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3RD GENERATION
PARTNERSHIP
PROJECT 2
"3GPP2"

**Physical Layer Standard for cdma2000 Spread
Spectrum Systems**

Release A

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CONTENTS

1	FOREWORD	xxxvii
2	NOTES	xxxix
3	REFERENCES	xliii
4	1 GENERAL	1-1
5	1.1 Terms	1-1
6	1.2 Numeric Information	1-13
7	1.2.1 Mobile Station Stored Parameters	1-13
8	1.2.2 Base Station Parameters	1-17
9	1.2.3 MAC Interface	1-18
10	1.2.3.1 Service Interfaces	1-18
11	1.2.3.2 MAC Interface Parameters	1-19
12	1.2.3.3 Service Interface Primitives Received by the Physical Layer	1-19
13	1.2.3.4 Service Interface Primitives Sent from the Physical Layer	1-21
14	1.3 CDMA System Time	1-21
15	1.4 Tolerances	1-24
16	1.5 Reserved Bits	1-24
17	2 REQUIREMENTS FOR MOBILE STATION CDMA OPERATION	2-1
18	2.1 Transmitter	2-1
19	2.1.1 Frequency Parameters	2-1
20	2.1.1.1 Channel Spacing and Designation	2-1
21	2.1.1.1.1 Band Class 0 (800 MHz Band)	2-1
22	2.1.1.1.2 Band Class 1 (1900 MHz Band)	2-5
23	2.1.1.1.3 Band Class 2 (TACS Band)	2-9
24	2.1.1.1.4 Band Class 3 (JTACS Band)	2-14
25	2.1.1.1.5 Band Class 4 (Korean PCS Band)	2-16
26	2.1.1.1.6 Band Class 5 (450 MHz Band)	2-19
27	2.1.1.1.7 Band Class 6 (2 GHz Band)	2-23
28	2.1.1.1.8 Band Class 7 (700 MHz Band)	2-25
29	2.1.1.1.9 Band Class 8 (1800 MHz Band)	2-28
30	2.1.1.1.10 Band Class 9 (900 MHz Band)	2-30
31	2.1.1.1.11 Band Class 10 (Secondary 800 MHz Band)	2-31

CONTENTS

1 2.1.1.2 Frequency Tolerance 2-35

2 2.1.2 Power Output Characteristics..... 2-35

3 2.1.2.1 Maximum Output Power..... 2-35

4 2.1.2.2 Output Power Limits 2-35

5 2.1.2.2.1 Minimum Controlled Output Power 2-35

6 2.1.2.2.2 Gated Output Power 2-35

7 2.1.2.2.2.1 Gated Output Power Except During a Serving Frequency PUF

8 Probe..... 2-35

9 2.1.2.2.2.2 Gated Output Power During a Serving Frequency PUF Probe 2-36

10 2.1.2.2.3 Standby Output Power..... 2-37

11 2.1.2.3 Controlled Output Power 2-37

12 2.1.2.3.1 Estimated Open Loop Output Power..... 2-37

13 2.1.2.3.1.1 Open Loop Output Power When Transmitting on the Access

14 Channel 2-39

15 2.1.2.3.1.2 Open Loop Output Power When Transmitting on the Enhanced

16 Access Channel 2-40

17 2.1.2.3.1.3 Open Loop Output Power When Transmitting on the Reverse

18 Common Control Channel..... 2-42

19 2.1.2.3.1.4 Open Loop Output Power When Transmitting on the Reverse

20 Traffic Channel with Radio Configuration 1 or 2 2-44

21 2.1.2.3.1.5 Open Loop Output Power When Transmitting on the Reverse

22 Traffic Channel with Radio Configuration 3, 4, 5, or 6 2-46

23 2.1.2.3.2 Closed Loop Output Power..... 2-47

24 2.1.2.3.3 Code Channel Output Power for Other than the Reverse Pilot

25 Channel 2-49

26 2.1.2.3.3.1 Code Channel Output Power for the Enhanced Access Channel

27 Header, Enhanced Access Channel Data, and Reverse Common Control

28 Channel Data 2-49

29 2.1.2.3.3.2 Code Channel Output Power for Reverse Traffic Channel with

30 Radio Configuration 3, 4, 5, or 6 2-51

31 2.1.2.4 Power Transition Characteristics 2-57

32 2.1.2.4.1 Open Loop Estimation 2-57

33 2.1.2.4.2 Closed Loop Correction 2-58

34 2.1.2.4.3 Phase Continuity Requirements for Radio Configurations 3 through

35 6 2-58

CONTENTS

1	2.1.3 Modulation Characteristics.....	2-58
2	2.1.3.1 Reverse CDMA Channel Signals.....	2-58
3	2.1.3.1.1 Channel Structures.....	2-60
4	2.1.3.1.1.1 Spreading Rate 1.....	2-61
5	2.1.3.1.1.2 Spreading Rate 3.....	2-71
6	2.1.3.1.2 Modulation Parameters.....	2-78
7	2.1.3.1.2.1 Spreading Rate 1.....	2-78
8	2.1.3.1.2.2 Spreading Rate 3.....	2-91
9	2.1.3.1.3 Data Rates.....	2-101
10	2.1.3.1.4 Forward Error Correction.....	2-103
11	2.1.3.1.4.1 Convolutional Encoding.....	2-105
12	2.1.3.1.4.1.1 Rate 1/4 Convolutional Code.....	2-105
13	2.1.3.1.4.1.2 Rate 1/3 Convolutional Code.....	2-106
14	2.1.3.1.4.1.3 Rate 1/2 Convolutional Code.....	2-107
15	2.1.3.1.4.2 Turbo Encoding.....	2-107
16	2.1.3.1.4.2.1 Rate 1/2, 1/3, and 1/4 Turbo Encoders.....	2-108
17	2.1.3.1.4.2.2 Turbo Code Termination.....	2-108
18	2.1.3.1.4.2.3 Turbo Interleavers.....	2-111
19	2.1.3.1.5 Code Symbol Repetition.....	2-115
20	2.1.3.1.6 Puncturing.....	2-116
21	2.1.3.1.6.1 Convolutional Code Symbol Puncturing.....	2-116
22	2.1.3.1.6.2 Turbo Code Symbol Puncturing.....	2-117
23	2.1.3.1.6.3 Flexible and Variable Rate Puncturing.....	2-117
24	2.1.3.1.7 Block Interleaving.....	2-118
25	2.1.3.1.8 Orthogonal Modulation and Spreading.....	2-119
26	2.1.3.1.8.1 Orthogonal Modulation.....	2-120
27	2.1.3.1.8.2 Orthogonal Spreading.....	2-122
28	2.1.3.1.9 Gated Transmission.....	2-125
29	2.1.3.1.9.1 Rates and Gating for Radio Configurations 1 and 2.....	2-125
30	2.1.3.1.9.2 Data Burst Randomizing Algorithm for Radio Configurations 1	
31	and 2.....	2-128
32	2.1.3.1.9.3 Gating During a PUF Probe.....	2-129

CONTENTS

1	2.1.3.1.9.4 Reverse Pilot Channel Gating	2-129
2	2.1.3.1.9.5 Enhanced Access Channel Preamble Gating	2-130
3	2.1.3.1.9.6 Reverse Common Control Channel Preamble Gating	2-130
4	2.1.3.1.9.7 Reverse Fundamental Channel Gating.....	2-130
5	2.1.3.1.10 Reverse Power Control Subchannel	2-130
6	2.1.3.1.10.1 Reverse Power Control Subchannel Structure.....	2-130
7	2.1.3.1.10.2 Outer Power Control Loop	2-135
8	2.1.3.1.10.3 Inner Power Control Loop.....	2-137
9	2.1.3.1.11 Direct Sequence Spreading	2-137
10	2.1.3.1.12 Quadrature Spreading	2-140
11	2.1.3.1.12.1 Spreading Rate 1	2-144
12	2.1.3.1.12.2 Spreading Rate 3	2-144
13	2.1.3.1.13 Baseband Filtering.....	2-145
14	2.1.3.1.13.1 Spreading Rate 1	2-145
15	2.1.3.1.13.2 Spreading Rate 3	2-148
16	2.1.3.1.14 Carrier Phase Offset for Radio Configurations 1 and 2	2-150
17	2.1.3.2 Reverse Pilot Channel.....	2-150
18	2.1.3.2.1 Reverse Power Control Subchannel	2-150
19	2.1.3.2.2 Reverse Pilot Channel Spreading.....	2-150
20	2.1.3.2.3 Reverse Pilot Channel Gating.....	2-151
21	2.1.3.2.4 Reverse Pilot Channel Operation during Reverse Traffic Channel	
22	Preamble	2-154
23	2.1.3.2.5 Reverse Pilot Channel Quadrature Spreading	2-155
24	2.1.3.2.6 Reverse Pilot Channel Baseband Filtering.....	2-155
25	2.1.3.3 Access Channel.....	2-155
26	2.1.3.3.1 Access Channel Time Alignment and Modulation Rate	2-155
27	2.1.3.3.2 Access Channel Frame Structure	2-156
28	2.1.3.3.2.1 Access Channel Preamble	2-156
29	2.1.3.3.3 Access Channel Convolutional Encoding.....	2-156
30	2.1.3.3.4 Access Channel Code Symbol Repetition	2-157
31	2.1.3.3.5 Access Channel Interleaving	2-157
32	2.1.3.3.6 Access Channel Modulation	2-157

CONTENTS

1	2.1.3.3.7 Access Channel Gating.....	2-157
2	2.1.3.3.8 Access Channel Direct Sequence Spreading.....	2-157
3	2.1.3.3.9 Access Channel Quadrature Spreading.....	2-157
4	2.1.3.3.10 Access Channel Baseband Filtering	2-157
5	2.1.3.3.11 Access Channel Transmission Processing	2-157
6	2.1.3.4 Enhanced Access Channel	2-157
7	2.1.3.4.1 Enhanced Access Channel Time Alignment and Modulation Rate ...	2-158
8	2.1.3.4.2 Enhanced Access Channel Frame Structure	2-159
9	2.1.3.4.2.1 Enhanced Access Channel Frame Quality Indicator	2-160
10	2.1.3.4.2.2 Enhanced Access Channel Encoder Tail Bits.....	2-162
11	2.1.3.4.2.3 Enhanced Access Channel Preamble.....	2-162
12	2.1.3.4.3 Enhanced Access Channel Convolutional Encoding	2-163
13	2.1.3.4.4 Enhanced Access Channel Code Symbol Repetition	2-163
14	2.1.3.4.5 Enhanced Access Channel Interleaving.....	2-163
15	2.1.3.4.6 Enhanced Access Channel Modulation	2-164
16	2.1.3.4.7 Enhanced Access Channel Quadrature Spreading	2-164
17	2.1.3.4.8 Enhanced Access Channel Baseband Filtering.....	2-164
18	2.1.3.4.9 Enhanced Access Channel Transmission Processing.....	2-164
19	2.1.3.5 Reverse Common Control Channel	2-165
20	2.1.3.5.1 Reverse Common Control Channel Time Alignment and Modulation	
21	Rate.....	2-165
22	2.1.3.5.2 Reverse Common Control Channel Frame Structure	2-166
23	2.1.3.5.2.1 Reverse Common Control Channel Frame Quality Indicator	2-167
24	2.1.3.5.2.2 Reverse Common Control Channel Encoder Tail Bits.....	2-168
25	2.1.3.5.2.3 Reverse Common Control Channel Preamble.....	2-168
26	2.1.3.5.2.4 Reverse Common Control Channel Data	2-170
27	2.1.3.5.3 Reverse Common Control Channel Convolutional Encoding	2-170
28	2.1.3.5.4 Reverse Common Control Channel Code Symbol Repetition	2-170
29	2.1.3.5.5 Reverse Common Control Channel Interleaving.....	2-170
30	2.1.3.5.6 Reverse Common Control Channel Modulation	2-170
31	2.1.3.5.7 Reverse Common Control Channel Quadrature Spreading	2-170
32	2.1.3.5.8 Reverse Common Control Channel Baseband Filtering.....	2-170

CONTENTS

1	2.1.3.5.9 Reverse Common Control Channel Transmission Processing	2-170
2	2.1.3.6 Reverse Dedicated Control Channel	2-171
3	2.1.3.6.1 Reverse Dedicated Control Channel Time Alignment and	
4	Modulation Rates	2-171
5	2.1.3.6.2 Reverse Dedicated Control Channel Frame Structure	2-172
6	2.1.3.6.2.1 Reverse Dedicated Control Channel Frame Quality Indicator	2-173
7	2.1.3.6.2.2 Reverse Dedicated Control Channel Encoder Tail Bits.....	2-174
8	2.1.3.6.2.3 Reverse Traffic Channel Preamble	2-174
9	2.1.3.6.3 Reverse Dedicated Control Channel Convolutional Encoding	2-174
10	2.1.3.6.4 Reverse Dedicated Control Channel Code Symbol Repetition	2-175
11	2.1.3.6.5 Reverse Dedicated Control Channel Code Symbol Puncturing	2-175
12	2.1.3.6.6 Reverse Dedicated Control Channel Interleaving.....	2-175
13	2.1.3.6.7 Reverse Dedicated Control Channel Modulation	2-175
14	2.1.3.6.8 Reverse Dedicated Control Channel Quadrature Spreading.....	2-175
15	2.1.3.6.9 Reverse Dedicated Control Channel Baseband Filtering	2-175
16	2.1.3.6.10 Reverse Dedicated Control Channel Transmission Processing	2-175
17	2.1.3.7 Reverse Fundamental Channel	2-176
18	2.1.3.7.1 Reverse Fundamental Channel Time Alignment and Modulation	
19	Rates.....	2-176
20	2.1.3.7.2 Reverse Fundamental Channel Frame Structure	2-177
21	2.1.3.7.2.1 Reverse Fundamental Channel Frame Quality Indicator	2-179
22	2.1.3.7.2.2 Reverse Fundamental Channel Encoder Tail Bits.....	2-184
23	2.1.3.7.2.3 Reverse Traffic Channel Preambles.....	2-184
24	2.1.3.7.2.3.1 Radio Configurations 1 and 2	2-184
25	2.1.3.7.2.3.2 Radio Configurations 3 through 6.....	2-184
26	2.1.3.7.3 Reverse Fundamental Channel Convolutional Encoding	2-184
27	2.1.3.7.4 Reverse Fundamental Channel Code Symbol Repetition	2-184
28	2.1.3.7.5 Reverse Fundamental Channel Code Symbol Puncturing.....	2-184
29	2.1.3.7.6 Reverse Fundamental Channel Interleaving.....	2-184
30	2.1.3.7.7 Reverse Fundamental Channel Modulation	2-184
31	2.1.3.7.8 Reverse Fundamental Channel Gating	2-185
32	2.1.3.7.9 Reverse Fundamental Channel Direct Sequence Spreading.....	2-185

CONTENTS

1	2.1.3.7.10 Reverse Fundamental Channel Quadrature Spreading	2-186
2	2.1.3.7.11 Reverse Fundamental Channel Baseband Filtering	2-186
3	2.1.3.7.12 Reverse Fundamental Channel Transmission Processing	2-186
4	2.1.3.8 Reverse Supplemental Channel	2-186
5	2.1.3.8.1 Reverse Supplemental Channel Time Alignment and Modulation	
6	Rates	2-186
7	2.1.3.8.2 Reverse Supplemental Channel Frame Structure	2-189
8	2.1.3.8.2.1 Reverse Supplemental Channel Frame Quality Indicator	2-198
9	2.1.3.8.2.2 Reverse Supplemental Channel Encoder Tail Bits	2-200
10	2.1.3.8.3 Reverse Supplemental Channel Forward Error Correction Encoding	2-201
11	2.1.3.8.4 Reverse Supplemental Channel Code Symbol Repetition	2-201
12	2.1.3.8.5 Reverse Supplemental Channel Code Symbol Puncturing.....	2-201
13	2.1.3.8.6 Reverse Supplemental Channel Interleaving	2-201
14	2.1.3.8.7 Reverse Supplemental Channel Modulation	2-201
15	2.1.3.8.8 Reverse Supplemental Channel Quadrature Spreading	2-201
16	2.1.3.8.9 Reverse Supplemental Channel Baseband Filtering.....	2-201
17	2.1.3.8.10 Reverse Supplemental Channel Transmission Processing.....	2-201
18	2.1.3.9 Reverse Supplemental Code Channel	2-201
19	2.1.3.9.1 Reverse Supplemental Code Channel Time Alignment and	
20	Modulation Rates	2-202
21	2.1.3.9.2 Reverse Supplemental Code Channel Frame Structure.....	2-202
22	2.1.3.9.2.1 Reverse Supplemental Code Channel Frame Quality Indicator...	2-203
23	2.1.3.9.2.2 Reverse Supplemental Code Channel Encoder Tail Bits	2-204
24	2.1.3.9.2.3 Reverse Supplemental Code Channel Preambles	2-204
25	2.1.3.9.2.3.1 Reverse Supplemental Code Channel Preamble	2-204
26	2.1.3.9.2.3.2 Reverse Supplemental Code Channel Discontinuous	
27	Transmission Preamble	2-204
28	2.1.3.9.3 Reverse Supplemental Code Channel Convolutional Encoding.....	2-204
29	2.1.3.9.4 Reverse Supplemental Code Channel Code Symbol Repetition.....	2-204
30	2.1.3.9.5 Reverse Supplemental Code Channel Interleaving.....	2-205
31	2.1.3.9.6 Reverse Supplemental Code Channel Modulation.....	2-205
32	2.1.3.9.7 Reverse Supplemental Code Channel Direct Sequence Spreading	2-205

CONTENTS

1	2.1.3.9.8 Reverse Supplemental Code Channel Quadrature Spreading	2-205
2	2.1.3.9.9 Reverse Supplemental Code Channel Baseband Filtering.....	2-205
3	2.1.3.9.10 Reverse Supplemental Code Channel Transmission Processing	2-205
4	2.1.4 Limitations on Emissions	2-205
5	2.1.4.1 Conducted Spurious Emissions	2-205
6	2.1.4.2 Radiated Spurious Emissions	2-205
7	2.1.5 Synchronization and Timing.....	2-206
8	2.1.5.1 Pilot to Walsh Cover Time Tolerance	2-206
9	2.1.5.2 Pilot to Walsh Cover Phase Tolerance.....	2-207
10	2.1.6 Transmitter Performance Requirements.....	2-207
11	2.2 Receiver	2-207
12	2.2.1 Channel Spacing and Designation	2-207
13	2.2.2 Demodulation Characteristics	2-207
14	2.2.2.1 Processing.....	2-207
15	2.2.2.2 Erasure Indicator Bit and Quality Indicator Bit.....	2-208
16	2.2.2.3 Forward Traffic Channel Time Alignment	2-210
17	2.2.2.4 Interface to the MAC Layer	2-211
18	2.2.2.4.1 Sync Channel Reception Processing	2-211
19	2.2.2.4.2 Paging Channel Reception Processing	2-211
20	2.2.2.4.3 Broadcast Control Channel Reception Processing.....	2-211
21	2.2.2.4.4 Quick Paging Channel Reception Processing	2-211
22	2.2.2.4.5 Common Power Control Channel Reception Processing.....	2-211
23	2.2.2.4.6 Common Assignment Channel Reception Processing	2-212
24	2.2.2.4.7 Forward Common Control Channel Reception Processing	2-212
25	2.2.2.4.8 Forward Dedicated Control Channel Reception Processing.....	2-212
26	2.2.2.4.9 Forward Fundamental Channel Reception Processing.....	2-212
27	2.2.2.4.10 Forward Supplemental Channel Reception Processing	2-213
28	2.2.3 Limitations on Emissions	2-213
29	2.2.4 Receiver Performance Requirements	2-213
30	2.3 Malfunction Detection.....	2-214
31	2.3.1 Malfunction Timer	2-214
32	2.3.2 False Transmission	2-214

CONTENTS

1	3	REQUIREMENTS FOR BASE STATION CDMA OPERATION	3-1
2	3.1	Transmitter.....	3-1
3	3.1.1	Frequency Parameters	3-1
4	3.1.1.1	Channel Spacing and Designation.....	3-1
5	3.1.1.1.1	Band Class 0 (800 MHz Band)	3-1
6	3.1.1.1.2	Band Class 1 (1900 MHz Band)	3-1
7	3.1.1.1.3	Band Class 2 (TACS Band)	3-1
8	3.1.1.1.4	Band Class 3 (JTACS Band)	3-2
9	3.1.1.1.5	Band Class 4 (Korean PCS Band)	3-2
10	3.1.1.1.6	Band Class 5 (450 MHz Band)	3-2
11	3.1.1.1.7	Band Class 6 (2 GHz Band)	3-2
12	3.1.1.1.8	Band Class 7 (700 MHz Band)	3-2
13	3.1.1.1.9	Band Class 8 (1800 MHz Band)	3-3
14	3.1.1.1.10	Band Class 9 (900 MHz Band)	3-3
15	3.1.1.1.11	Band Class 10 (Secondary 800 MHz Band)	3-3
16	3.1.1.2	Frequency Tolerance	3-3
17	3.1.2	Power Output Characteristics	3-3
18	3.1.3	Modulation Characteristics	3-4
19	3.1.3.1	Forward CDMA Channel Signals	3-4
20	3.1.3.1.1	Channel Structures.....	3-6
21	3.1.3.1.1.1	Spreading Rate 1.....	3-6
22	3.1.3.1.1.2	Spreading Rate 3.....	3-25
23	3.1.3.1.2	Modulation Parameters	3-42
24	3.1.3.1.2.1	Spreading Rate 1.....	3-42
25	3.1.3.1.2.2	Spreading Rate 3.....	3-60
26	3.1.3.1.3	Data Rates	3-79
27	3.1.3.1.4	Forward Error Correction	3-83
28	3.1.3.1.4.1	Convolutional Encoding.....	3-85
29	3.1.3.1.4.1.1	Rate 1/6 Convolutional Code	3-85
30	3.1.3.1.4.1.2	Rate 1/4 Convolutional Code	3-86
31	3.1.3.1.4.1.3	Rate 1/3 Convolutional Code	3-87
32	3.1.3.1.4.1.4	Rate 1/2 Convolutional Code	3-88

CONTENTS

1	3.1.3.1.4.2 Turbo Encoding	3-89
2	3.1.3.1.4.2.1 Rate 1/2, 1/3, and 1/4 Turbo Encoders	3-89
3	3.1.3.1.4.2.2 Turbo Code Termination	3-89
4	3.1.3.1.4.2.3 Turbo Interleavers	3-92
5	3.1.3.1.5 Code Symbol Repetition	3-96
6	3.1.3.1.6 Puncturing	3-98
7	3.1.3.1.6.1 Convolutional Code Symbol Puncturing.....	3-98
8	3.1.3.1.6.2 Turbo Code Symbol Puncturing.....	3-98
9	3.1.3.1.6.3 Flexible and Variable Rate Puncturing.....	3-99
10	3.1.3.1.7 Block Interleaving.....	3-99
11	3.1.3.1.7.1 Spreading Rate 1 Interleaving	3-101
12	3.1.3.1.7.1.1 Bit-Reversal Order Interleaver.....	3-101
13	3.1.3.1.7.1.2 Forward-Backwards Bit-Reversal Order Interleaver	3-102
14	3.1.3.1.7.2 Spreading Rate 3 Interleaving	3-102
15	3.1.3.1.8 Sequence Repetition	3-103
16	3.1.3.1.9 Data Scrambling.....	3-103
17	3.1.3.1.10 Forward Power Control Subchannel	3-104
18	3.1.3.1.11 Symbol Demultiplexing and Repetition	3-108
19	3.1.3.1.11.1 Spreading Rate 1 Symbol Demultiplexing	3-108
20	3.1.3.1.11.2 Spreading Rate 1 Symbol Repetition for Transmit Diversity.....	3-108
21	3.1.3.1.11.3 Spreading Rate 3 Symbol Demultiplexing	3-109
22	3.1.3.1.12 Orthogonal and Quasi-Orthogonal Spreading	3-109
23	3.1.3.1.13 Quadrature Spreading	3-113
24	3.1.3.1.14 Filtering	3-114
25	3.1.3.1.14.1 Baseband Filtering.....	3-114
26	3.1.3.1.14.2 Phase Characteristics	3-117
27	3.1.3.2 Pilot Channels.....	3-117
28	3.1.3.2.1 Pilot PN Sequence Offset	3-118
29	3.1.3.2.2 Pilot Channel Orthogonal and Quasi-Orthogonal Spreading.....	3-119
30	3.1.3.2.2.1 Forward Pilot Channel	3-119
31	3.1.3.2.2.2 Forward Transmit Diversity Pilot Channel	3-119
32	3.1.3.2.2.3 Auxiliary Pilot Channel	3-120

CONTENTS

1	3.1.3.2.2.4 Auxiliary Transmit Diversity Pilot Channel.....	3-120
2	3.1.3.2.3 Pilot Channel Quadrature Spreading	3-121
3	3.1.3.2.4 Pilot Channel Filtering	3-121
4	3.1.3.2.5 Hopping Pilot Beacon Timing.....	3-121
5	3.1.3.3 Sync Channel	3-121
6	3.1.3.3.1 Sync Channel Time Alignment and Modulation Rates	3-122
7	3.1.3.3.2 Sync Channel Structure	3-122
8	3.1.3.3.3 Sync Channel Convolutional Encoding	3-122
9	3.1.3.3.4 Sync Channel Code Symbol Repetition	3-122
10	3.1.3.3.5 Sync Channel Interleaving.....	3-122
11	3.1.3.3.6 Sync Channel Orthogonal Spreading	3-122
12	3.1.3.3.7 Sync Channel Quadrature Spreading	3-122
13	3.1.3.3.8 Sync Channel Filtering.....	3-123
14	3.1.3.3.9 Sync Channel Transmission Processing.....	3-123
15	3.1.3.4 Paging Channel	3-123
16	3.1.3.4.1 Paging Channel Time Alignment and Modulation Rates.....	3-123
17	3.1.3.4.2 Paging Channel Structure	3-123
18	3.1.3.4.3 Paging Channel Convolutional Encoding.....	3-123
19	3.1.3.4.4 Paging Channel Code Symbol Repetition.....	3-123
20	3.1.3.4.5 Paging Channel Interleaving.....	3-124
21	3.1.3.4.6 Paging Channel Data Scrambling	3-124
22	3.1.3.4.7 Paging Channel Orthogonal Spreading.....	3-124
23	3.1.3.4.8 Paging Channel Quadrature Spreading.....	3-124
24	3.1.3.4.9 Paging Channel Filtering	3-124
25	3.1.3.4.10 Paging Channel Transmission Processing	3-124
26	3.1.3.5 Broadcast Control Channel	3-125
27	3.1.3.5.1 Broadcast Control Channel Time Alignment and Modulation Rates .	3-125
28	3.1.3.5.2 Broadcast Control Channel Structure.....	3-125
29	3.1.3.5.2.1 Broadcast Control Channel Frame Quality Indicator	3-126
30	3.1.3.5.2.2 Broadcast Control Channel Encoder Tail Bits	3-126
31	3.1.3.5.3 Broadcast Control Channel Convolutional Encoding	3-126
32	3.1.3.5.4 Broadcast Control Channel Interleaving	3-127

CONTENTS

1	3.1.3.5.5 Broadcast Control Channel Sequence Repetition	3-127
2	3.1.3.5.6 Broadcast Control Channel Data Scrambling	3-127
3	3.1.3.5.7 Broadcast Control Channel Orthogonal and Quasi-Orthogonal	
4	Spreading.....	3-127
5	3.1.3.5.8 Broadcast Control Channel Quadrature Spreading.....	3-127
6	3.1.3.5.9 Broadcast Control Channel Filtering	3-127
7	3.1.3.5.10 Broadcast Control Channel Transmission Processing	3-127
8	3.1.3.6 Quick Paging Channel	3-128
9	3.1.3.6.1 Quick Paging Channel Time Alignment and Modulation Rates	3-128
10	3.1.3.6.2 Quick Paging Channel Structure.....	3-128
11	3.1.3.6.3 Quick Paging Channel Paging Indicator Enabling	3-128
12	3.1.3.6.4 Quick Paging Channel Configuration Change Indicator Enabling	3-128
13	3.1.3.6.5 Quick Paging Channel Broadcast Indicator Enabling	3-129
14	3.1.3.6.6 Quick Paging Channel Paging Indicator, Configuration Change	
15	Indicator, and Broadcast Indicator Repetition.....	3-129
16	3.1.3.6.7 Quick Paging Channel Orthogonal and Quasi-Orthogonal	
17	Spreading.....	3-129
18	3.1.3.6.8 Quick Paging Channel Quadrature Spreading	3-129
19	3.1.3.6.9 Quick Paging Channel Filtering.....	3-129
20	3.1.3.6.10 Quick Paging Channel Transmit Power Level.....	3-130
21	3.1.3.6.11 Quick Paging Channel Transmission Processing.....	3-130
22	3.1.3.7 Common Power Control Channel	3-130
23	3.1.3.7.1 Common Power Control Channel Time Alignment and Modulation	
24	Rates.....	3-130
25	3.1.3.7.2 Common Power Control Channel Structure	3-131
26	3.1.3.7.3 Pseudo-Randomization of Power Control Bit Positions	3-131
27	3.1.3.7.4 Common Power Control Channel Orthogonal and Quasi-Orthogonal	
28	Spreading.....	3-133
29	3.1.3.7.5 Common Power Control Channel Quadrature Spreading.....	3-133
30	3.1.3.7.6 Common Power Control Channel Filtering.....	3-133
31	3.1.3.7.7 Common Power Control Channel Transmission Processing.....	3-133
32	3.1.3.8 Common Assignment Channel.....	3-133

CONTENTS

1	3.1.3.8.1 Common Assignment Channel Time Alignment and Modulation	
2	Rates	3-134
3	3.1.3.8.2 Common Assignment Channel Structure	3-134
4	3.1.3.8.2.1 Common Assignment Channel Frame Quality Indicator	3-134
5	3.1.3.8.2.2 Common Assignment Channel Encoder Tail Bits.....	3-135
6	3.1.3.8.3 Common Assignment Channel Convolutional Encoding	3-135
7	3.1.3.8.4 Common Assignment Channel Interleaving.....	3-135
8	3.1.3.8.5 Common Assignment Channel Data Scrambling	3-135
9	3.1.3.8.6 Common Assignment Channel Orthogonal and Quasi-Orthogonal	
10	Spreading	3-136
11	3.1.3.8.7 Common Assignment Channel Quadrature Spreading.....	3-136
12	3.1.3.8.8 Common Assignment Channel Filtering.....	3-136
13	3.1.3.8.9 Common Assignment Channel Transmission Processing	3-136
14	3.1.3.9 Forward Common Control Channel	3-136
15	3.1.3.9.1 Forward Common Control Channel Time Alignment and	
16	Modulation Rates.....	3-136
17	3.1.3.9.2 Forward Common Control Channel Structure.....	3-137
18	3.1.3.9.2.1 Forward Common Control Channel Frame Quality Indicator	3-138
19	3.1.3.9.2.2 Forward Common Control Channel Encoder Tail Bits.....	3-139
20	3.1.3.9.3 Forward Common Control Channel Encoding	3-139
21	3.1.3.9.4 Forward Common Control Channel Interleaving.....	3-139
22	3.1.3.9.5 Forward Common Control Channel Data Scrambling	3-139
23	3.1.3.9.6 Forward Common Control Channel Orthogonal and Quasi-	
24	Orthogonal Spreading.	3-139
25	3.1.3.9.7 Forward Common Control Channel Quadrature Spreading.....	3-140
26	3.1.3.9.8 Forward Common Control Channel Filtering.....	3-140
27	3.1.3.9.9 Forward Common Control Channel Transmission Processing	3-140
28	3.1.3.10 Forward Dedicated Control Channel.....	3-140
29	3.1.3.10.1 Forward Dedicated Control Channel Time Alignment and	
30	Modulation Rates.....	3-140
31	3.1.3.10.2 Forward Dedicated Control Channel Frame Structure	3-141
32	3.1.3.10.2.1 Forward Dedicated Control Channel Frame Quality Indicator ..	3-142
33	3.1.3.10.2.2 Forward Dedicated Control Channel Encoder Tail Bits	3-144

CONTENTS

1	3.1.3.10.2.3 Forward Dedicated Control Channel Reserved Bit	3-144
2	3.1.3.10.3 Forward Dedicated Control Channel Convolutional Encoding.....	3-144
3	3.1.3.10.4 Forward Dedicated Channel Code Symbol Repetition	3-144
4	3.1.3.10.5 Forward Dedicated Control Channel Puncturing.....	3-144
5	3.1.3.10.6 Forward Dedicated Control Channel Interleaving.....	3-144
6	3.1.3.10.7 Forward Dedicated Control Channel Data Scrambling	3-144
7	3.1.3.10.8 Forward Dedicated Control Channel Power Control Subchannel	3-144
8	3.1.3.10.9 Forward Dedicated Control Channel Orthogonal and Quasi-	
9	Orthogonal Spreading.....	3-145
10	3.1.3.10.10 Forward Dedicated Control Channel Quadrature Spreading.....	3-145
11	3.1.3.10.11 Forward Dedicated Control Channel Filtering	3-145
12	3.1.3.10.12 Forward Dedicated Control Channel Transmission Processing	3-145
13	3.1.3.11 Forward Fundamental Channel	3-145
14	3.1.3.11.1 Forward Fundamental Channel Time Alignment and Modulation	
15	Rates.....	3-145
16	3.1.3.11.2 Forward Fundamental Channel Frame Structure	3-147
17	3.1.3.11.2.1 Forward Fundamental Channel Frame Quality Indicator.....	3-151
18	3.1.3.11.2.2 Forward Fundamental Channel Encoder Tail Bits	3-154
19	3.1.3.11.2.3 Forward Fundamental Channel Reserved/Flag Bit.....	3-154
20	3.1.3.11.3 Forward Fundamental Channel Convolutional Encoding.....	3-155
21	3.1.3.11.4 Forward Fundamental Channel Code Symbol Repetition.....	3-155
22	3.1.3.11.5 Forward Fundamental Channel Puncturing.....	3-155
23	3.1.3.11.6 Forward Fundamental Channel Interleaving.....	3-155
24	3.1.3.11.7 Forward Fundamental Channel Data Scrambling	3-155
25	3.1.3.11.8 Forward Fundamental Channel Power Control Subchannel	3-155
26	3.1.3.11.9 Forward Fundamental Channel Orthogonal and Quasi-Orthogonal	
27	Spreading.....	3-155
28	3.1.3.11.10 Forward Fundamental Channel Quadrature Spreading.....	3-156
29	3.1.3.11.11 Forward Fundamental Channel Filtering	3-156
30	3.1.3.11.12 Forward Fundamental Channel Transmission Processing	3-156
31	3.1.3.12 Forward Supplemental Channel.....	3-156
32	3.1.3.12.1 Forward Supplemental Channel Time Alignment and Modulation	
33	Rates.....	3-156

CONTENTS

1	3.1.3.12.2 Forward Supplemental Channel Frame Structure	3-160
2	3.1.3.12.2.1 Forward Supplemental Channel Frame Quality Indicator	3-170
3	3.1.3.12.2.2 Forward Supplemental Channel Encoder Tail Bits.....	3-173
4	3.1.3.12.2.3 Forward Supplemental Channel Reserved Bit.....	3-173
5	3.1.3.12.3 Forward Supplemental Channel Forward Error Correction	
6	Encoding	3-173
7	3.1.3.12.4 Forward Supplemental Channel Code Symbol Repetition	3-173
8	3.1.3.12.5 Forward Supplemental Channel Puncturing	3-173
9	3.1.3.12.6 Forward Supplemental Channel Interleaving.....	3-173
10	3.1.3.12.7 Forward Supplemental Channel Data Scrambling.....	3-173
11	3.1.3.12.8 Forward Supplemental Channel Orthogonal and Quasi-	
12	Orthogonal Spreading	3-174
13	3.1.3.12.9 Forward Supplemental Channel Quadrature Spreading	3-174
14	3.1.3.12.10 Forward Supplemental Channel Filtering.....	3-174
15	3.1.3.12.11 Forward Supplemental Channel Transmission Processing	3-174
16	3.1.3.13 Forward Supplemental Code Channel.....	3-174
17	3.1.3.13.1 Forward Supplemental Code Channel Time Alignment and	
18	Modulation Rates	3-174
19	3.1.3.13.2 Forward Supplemental Code Channel Frame Structure.....	3-175
20	3.1.3.13.2.1 Forward Supplemental Code Channel Frame Quality Indicator	3-175
21	3.1.3.13.2.2 Forward Supplemental Code Channel Encoder Tail Bits	3-176
22	3.1.3.13.2.3 Forward Supplemental Code Channel Reserved Bit	3-176
23	3.1.3.13.3 Forward Supplemental Code Channel Convolutional Encoding.....	3-176
24	3.1.3.13.4 Forward Supplemental Code Channel Code Symbol Repetition	3-177
25	3.1.3.13.5 Forward Supplemental Code Channel Puncturing.....	3-177
26	3.1.3.13.6 Forward Supplemental Code Channel Interleaving	3-177
27	3.1.3.13.7 Forward Supplemental Code Channel Data Scrambling	3-177
28	3.1.3.13.8 Forward Supplemental Code Channel Orthogonal Spreading.....	3-177
29	3.1.3.13.9 Forward Supplemental Code Channel Quadrature Spreading	3-177
30	3.1.3.13.10 Forward Supplemental Code Channel Filtering	3-177
31	3.1.3.13.11 Forward Supplemental Code Channel Transmission Processing ..	3-177
32	3.1.4 Limitations on Emissions	3-178

CONTENTS

1 3.1.4.1 Conducted Spurious Emissions 3-178

2 3.1.4.2 Radiated Spurious Emissions 3-178

3 3.1.4.3 Intermodulation Products 3-178

4 3.1.5 Synchronization, Timing, and Phase 3-178

5 3.1.5.1 Timing Reference Source 3-178

6 3.1.5.2 Base Station Transmission Time 3-179

7 3.1.5.3 Pilot to Walsh Cover Time Tolerance 3-179

8 3.1.5.4 Pilot to Walsh Cover Phase Tolerance 3-179

9 3.1.6 Transmitter Performance Requirements 3-179

10 3.2 Receiver 3-179

11 3.2.1 Channel Spacing and Designation 3-179

12 3.2.2 Demodulation Characteristics 3-179

13 3.2.2.1 Interface to the MAC Layer 3-179

14 3.2.2.1.1 Access Channel Reception Processing 3-179

15 3.2.2.1.2 Enhanced Access Channel Reception Processing 3-180

16 3.2.2.1.3 Reverse Common Control Channel Reception Processing 3-180

17 3.2.2.1.4 Reverse Dedicated Control Channel Reception Processing 3-180

18 3.2.2.1.5 Reverse Fundamental Channel Reception Processing 3-181

19 3.2.2.1.6 Reverse Supplemental Channel Reception Processing 3-181

20 3.2.3 Limitations on Emissions 3-182

21 3.2.4 Receiver Performance Requirements 3-182

22

23

FIGURES

1	Figure 1.3-1. System Time Line.....	1-23
2	Figure 2.1.2.2.2.1-1. Transmission Envelope Mask (Average Gated-on Power	
3	Control Group).....	2-36
4	Figure 2.1.2.3.1.4-1. Power Up Function Transmission Envelope Mask.....	2-46
5	Figure 2.1.2.3.3.2-1. Increased Reverse Traffic Channel Power for Inter-frequency	
6	Hard Handoff.....	2-57
7	Figure 2.1.3.1.1-1. Reverse CDMA Channels Received at the Base Station	2-61
8	Figure 2.1.3.1.1.1-1. Channel Structure for the Access Channel for Spreading Rate	
9	1.....	2-63
10	Figure 2.1.3.1.1.1-2. Channel Structure for the Header on the Enhanced Access	
11	Channel for Spreading Rate 1.....	2-63
12	Figure 2.1.3.1.1.1-3. Channel Structure for the Data on the Enhanced Access	
13	Channel and the Reverse Common Control Channel for Spreading Rate 1	2-64
14	Figure 2.1.3.1.1.1-4. Reverse Dedicated Control Channel Structure for Radio	
15	Configuration 3.....	2-64
16	Figure 2.1.3.1.1.1-5. Reverse Dedicated Control Channel Structure for Radio	
17	Configuration 4.....	2-64
18	Figure 2.1.3.1.1.1-6. Channel Structure for the Reverse Fundamental Channel and	
19	Reverse Supplemental Code Channel with Radio Configuration 1	2-65
20	Figure 2.1.3.1.1.1-7. Channel Structure for the Reverse Fundamental Channel and	
21	Reverse Supplemental Code Channel with Radio Configuration 2	2-66
22	Figure 2.1.3.1.1.1-8. Reverse Fundamental Channel and Reverse Supplemental	
23	Channel Structure for Radio Configuration 3.....	2-68
24	Figure 2.1.3.1.1.1-9. Reverse Fundamental Channel and Reverse Supplemental	
25	Channel Structure for Radio Configuration 4.....	2-70
26	Figure 2.1.3.1.1.1-10. I and Q Mapping for Reverse Pilot Channel, Enhanced Access	
27	Channel, Reverse Common Control Channel, and Reverse Traffic Channel with	
28	Radio Configurations 3 and 4	2-71
29	Figure 2.1.3.1.1.2-1. Channel Structure for the Header on the Enhanced Access	
30	Channel for Spreading Rate 3.....	2-72
31	Figure 2.1.3.1.1.2-2. Channel Structure for the Data on the Enhanced Access	
32	Channel and the Reverse Common Control Channel for Spreading Rate 3	2-73
33	Figure 2.1.3.1.1.2-3. Reverse Dedicated Control Channel Structure for Radio	
34	Configuration 5.....	2-73
35	Figure 2.1.3.1.1.2-4. Reverse Dedicated Control Channel Structure for Radio	
36	Configuration 6.....	2-73

FIGURES

1	Figure 2.1.3.1.1.2-5. Reverse Fundamental Channel and Reverse Supplemental	
2	Channel Structure for Radio Configuration 5.....	2-75
3	Figure 2.1.3.1.1.2-6. Reverse Fundamental Channel and Reverse Supplemental	
4	Channel Structure for Radio Configuration 6.....	2-77
5	Figure 2.1.3.1.1.2-7. I and Q Mapping for Spreading Rate 3	2-78
6	Figure 2.1.3.1.4.1.1-1. K = 9, Rate 1/4 Convolutional Encoder.....	2-106
7	Figure 2.1.3.1.4.1.2-1. K = 9, Rate 1/3 Convolutional Encoder.....	2-107
8	Figure 2.1.3.1.4.1.3-1. K = 9, Rate 1/2 Convolutional Encoder.....	2-107
9	Figure 2.1.3.1.4.2.1-1. Turbo Encoder	2-110
10	Figure 2.1.3.1.4.2.3-1. Turbo Interleaver Output Address Calculation Procedure	2-112
11	Figure 2.1.3.1.9.1-1. Reverse CDMA Channel Variable Data Rate Transmission for	
12	Radio Configurations 1 and 2 Example.....	2-127
13	Figure 2.1.3.1.9.1-2. Access Channel Transmission Structure.....	2-128
14	Figure 2.1.3.1.10.1-1. Reverse Pilot Channel Showing the Power Control	
15	Subchannel Structure	2-131
16	Figure 2.1.3.1.10.1-2. Reverse Power Control Subchannel.....	2-132
17	Figure 2.1.3.1.10.1-3. Forward and Reverse Power Control Subchannel	
18	Transmission Timing	2-132
19	Figure 2.1.3.1.10.1-4. Primary Reverse Power Control Subchannel Transmission	
20	Timing for FPC_MODE _S = '011', '100', and '101'.....	2-135
21	Figure 2.1.3.1.10.1-5. Secondary Reverse Power Control Subchannel Transmission	
22	Timing for FPC_MODE _S = '101' and '110'.....	2-135
23	Figure 2.1.3.1.10.2-1. Increased Outer Power Control Loop Set Point for Inter-	
24	frequency Hard Handoff.....	2-136
25	Figure 2.1.3.1.11-1. Long Code Generator.....	2-139
26	Figure 2.1.3.1.11-2. Long Code Mask Format for Direct Sequence Spreading.....	2-140
27	Figure 2.1.3.1.11-3. Private Long Code Mask	2-140
28	Figure 2.1.3.1.12-1. Long Code Generator for Spreading Rate 3.....	2-141
29	Figure 2.1.3.1.12-2. Long Code Mask Format for Quadrature Spreading.....	2-143
30	Figure 2.1.3.1.13.1-1. Baseband Filters Frequency Response Limits.....	2-146
31	Figure 2.1.3.2.3-1. Reverse Pilot Channel Gating	2-151
32	Figure 2.1.3.2.3-2. Reverse Pilot Channel Gating during Reverse Dedicated Control	
33	Channel Transmission with 5 ms Frame Duration	2-153
34	Figure 2.1.3.2.3-3. Reverse Pilot Channel Gating during Reverse Dedicated Control	
35	Channel Transmission with 20 ms Frame Duration	2-154

FIGURES

1	Figure 2.1.3.2.4-1. Reverse Traffic Channel Preamble during Hard Handoff for the	
2	Reverse Dedicated Control Channel and the Reverse Fundamental Channel with	
3	Radio Configurations 3 through 6.....	2-155
4	Figure 2.1.3.3.2-1. Access Channel Frame Structure.....	2-156
5	Figure 2.1.3.4-1. Enhanced Access Channel Probe Structure.....	2-158
6	Figure 2.1.3.4.2-1. Enhanced Access Channel Frame Structure.....	2-160
7	Figure 2.1.3.4.2.1-1. Enhanced Access Channel Frame Quality Indicator Calculation	
8	for the 16-Bit Frame Quality Indicator.....	2-161
9	Figure 2.1.3.4.2.1-2. Enhanced Access Channel Frame Quality Indicator Calculation	
10	for the 12-Bit Frame Quality Indicator.....	2-161
11	Figure 2.1.3.4.2.1-3. Enhanced Access Channel Frame Quality Indicator Calculation	
12	for the 8-Bit Frame Quality Indicator.....	2-162
13	Figure 2.1.3.4.2.3-1 Preamble for the Enhanced Access Channel.....	2-163
14	Figure 2.1.3.5-1. Preamble and Data Transmission for the Reverse Common Control	
15	Channel.....	2-165
16	Figure 2.1.3.5.2-1. Reverse Common Control Channel Frame Structure.....	2-166
17	Figure 2.1.3.5.2.1-1. Reverse Common Control Channel Frame Quality Indicator	
18	Calculation for the 16-Bit Frame Quality Indicator.....	2-167
19	Figure 2.1.3.5.2.1-2. Reverse Common Control Channel Frame Quality Indicator	
20	Calculation for the 12-Bit Frame Quality Indicator.....	2-168
21	Figure 2.1.3.5.2.3-1. Preamble for the Reverse Common Control Channel.....	2-169
22	Figure 2.1.3.6.2-1. Reverse Dedicated Control Channel Frame Structure.....	2-173
23	Figure 2.1.3.6.2.1-1. Reverse Dedicated Control Channel Frame Quality Indicator	
24	Calculation for the 16-Bit Frame Quality Indicator.....	2-174
25	Figure 2.1.3.6.2.1-2. Reverse Dedicated Control Channel Frame Quality Indicator	
26	Calculation for the 12-Bit Frame Quality Indicator.....	2-174
27	Figure 2.1.3.7.2-1. Reverse Fundamental Channel Frame Structure.....	2-179
28	Figure 2.1.3.7.2.1-1. Reverse Fundamental Channel Frame Quality Indicator	
29	Calculation for the 16-Bit Frame Quality Indicator.....	2-181
30	Figure 2.1.3.7.2.1-2. Reverse Fundamental Channel Frame Quality Indicator	
31	Calculation for the 12-Bit Frame Quality Indicator.....	2-181
32	Figure 2.1.3.7.2.1-3. Reverse Fundamental Channel Frame Quality Indicator	
33	Calculation for the 10-Bit Frame Quality Indicator.....	2-181
34	Figure 2.1.3.7.2.1-4. Reverse Fundamental Channel Frame Quality Indicator	
35	Calculation for the 8-Bit Frame Quality Indicator.....	2-182

FIGURES

1	Figure 2.1.3.7.2.1-5. Reverse Fundamental Channel Frame Quality Indicator	
2	Calculation for the 6-Bit Frame Quality Indicator for Radio Configuration 2	2-183
3	Figure 2.1.3.7.2.1-6. Reverse Fundamental Channel Frame Quality Indicator	
4	Calculation for the 6-Bit Frame Quality Indicator for Radio Configurations 3	
5	through 6	2-183
6	Figure 2.1.3.7.8-1. Gating Operation When the Reverse Fundamental Channel Data	
7	Rate is 1500 bps for Radio Configuration 3 and 5 or 1800 bps for Radio	
8	Configuration 4 and 6	2-185
9	Figure 2.1.3.8.2-1. Reverse Supplemental Channel Frame Structure	2-198
10	Figure 2.1.3.8.2.1-1. Reverse Supplemental Channel Frame Quality Indicator	
11	Calculation for the 16-Bit Frame Quality Indicator	2-199
12	Figure 2.1.3.8.2.1-2. Reverse Supplemental Channel Frame Quality Indicator	
13	Calculation for the 12-Bit Frame Quality Indicator	2-199
14	Figure 2.1.3.8.2.1-3. Reverse Supplemental Channel Frame Quality Indicator	
15	Calculation for the 10-Bit Frame Quality Indicator	2-200
16	Figure 2.1.3.8.2.1-4. Reverse Supplemental Channel Frame Quality Indicator	
17	Calculation for the 8-Bit Frame Quality Indicator	2-200
18	Figure 2.1.3.8.2.1-5. Reverse Supplemental Channel Frame Quality Indicator	
19	Calculation for the 6-Bit Frame Quality Indicator	2-200
20	Figure 2.1.3.9.2-1. Reverse Supplemental Code Channel Frame Structure	2-203
21	Figure 2.1.3.9.2.1-1. Reverse Supplemental Code Channel Frame Quality Indicator	
22	Calculation	2-203
23	Figure 2.2.2.2-1. Erasure Indicator Bit/Quality Indicator Bit Timing	2-210
24	Figure 2.2.2.2-2. Erasure Indicator Bit Timing for the Forward Supplemental	
25	Channel	2-210
26	Figure 3.1.3.1.1-1. Forward CDMA Channel Transmitted by a Base Station.....	3-6
27	Figure 3.1.3.1.1.1-1. Pilot Channels, Sync Channel, and Paging Channels for	
28	Spreading Rate 1	3-8
29	Figure 3.1.3.1.1.1-2. Broadcast Control Channel Structure for Spreading Rate 1	
30	with R = 1/4 Mode.....	3-9
31	Figure 3.1.3.1.1.1-3. Broadcast Control Channel Structure for Spreading Rate 1	
32	with R = 1/2 Mode.....	3-9
33	Figure 3.1.3.1.1.1-4. Quick Paging Channel Structure for Spreading Rate 1	3-10
34	Figure 3.1.3.1.1.1-5. Common Power Control Channel Structure for Spreading Rate	
35	1	3-10
36	Figure 3.1.3.1.1.1-6. Common Assignment Channel Structure for Spreading Rate 1	
37	with R = 1/4 Mode.....	3-11

FIGURES

1	Figure 3.1.3.1.1.1-7. Common Assignment Channel Structure for Spreading Rate 1	
2	with R = 1/2 Mode	3-11
3	Figure 3.1.3.1.1.1-10. Forward Dedicated Control Channel Structure for Radio	
4	Configuration 3	3-13
5	Figure 3.1.3.1.1.1-11. Forward Dedicated Control Channel Structure for Radio	
6	Configuration 4	3-14
7	Figure 3.1.3.1.1.1-12. Forward Dedicated Control Channel Structure for Radio	
8	Configuration 5	3-14
9	Figure 3.1.3.1.1.1-13. Forward Traffic Channel Structure for Radio Configuration 1	3-15
10	Figure 3.1.3.1.1.1-14. Forward Traffic Channel Structure for Radio Configuration 2	3-15
11	Figure 3.1.3.1.1.1-15. Forward Fundamental Channel and Forward Supplemental	
12	Channel Structure for Radio Configuration 3	3-17
13	Figure 3.1.3.1.1.1-16. Forward Fundamental Channel and Forward Supplemental	
14	Channel Structure for Radio Configuration 4	3-19
15	Figure 3.1.3.1.1.1-17. Forward Fundamental Channel and Forward Supplemental	
16	Channel Structure for Radio Configuration 5	3-21
17	Figure 3.1.3.1.1.1-18. Long Code Scrambling, Power Control, and Signal Point	
18	Mapping for Forward Traffic Channels with Radio Configurations 3, 4, and 5	3-21
19	Figure 3.1.3.1.1.1-19. Demultiplexer Structure for Spreading Rate 1	3-22
20	Figure 3.1.3.1.1.1-20. I and Q Mapping (Non-TD Mode) for Spreading Rate 1	3-23
21	Figure 3.1.3.1.1.1-21. I and Q Mapping (OTD Mode) for Spreading Rate 1	3-24
22	Figure 3.1.3.1.1.1-22. I and Q Mapping (STS Mode) for Spreading Rate 1	3-25
23	Figure 3.1.3.1.1.2-1. Forward Pilot Channel, Auxiliary Pilot Channels, and Sync	
24	Channel for Spreading Rate 3	3-27
25	Figure 3.1.3.1.1.2-2. Broadcast Control Channel Structure for Spreading Rate 3	3-28
26	Figure 3.1.3.1.1.2-3. Quick Paging Channel Structure for Spreading Rate 3	3-28
27	Figure 3.1.3.1.1.2-4. Common Power Control Channel Structure for Spreading Rate	
28	3	3-29
29	Figure 3.1.3.1.1.2-5. Common Assignment Channel Structure for Spreading Rate 3	3-29
30	Figure 3.1.3.1.1.2-7. Forward Dedicated Control Channel Structure for Radio	
31	Configuration 6	3-30
32	Figure 3.1.3.1.1.2-8. Forward Dedicated Control Channel Structure for Radio	
33	Configuration 7	3-31
34	Figure 3.1.3.1.1.2-9. Forward Dedicated Control Channel Structure for Radio	
35	Configuration 8	3-31

FIGURES

1	Figure 3.1.3.1.1.2-10. Forward Dedicated Control Channel Structure for Radio	
2	Configuration 9	3-31
3	Figure 3.1.3.1.1.2-11. Forward Fundamental Channel and Forward Supplemental	
4	Channel Structure for Radio Configuration 6.....	3-33
5	Figure 3.1.3.1.1.2-12. Forward Fundamental Channel and Forward Supplemental	
6	Channel Structure for Radio Configuration 7.....	3-35
7	Figure 3.1.3.1.1.2-13. Forward Fundamental Channel and Forward Supplemental	
8	Channel Structure for Radio Configuration 8.....	3-37
9	Figure 3.1.3.1.1.2-14. Forward Fundamental Channel and Forward Supplemental	
10	Channel Structure for Radio Configuration 9.....	3-39
11	Figure 3.1.3.1.1.2-15. Long Code Scrambling, Power Control, and Signal Point	
12	Mapping for Forward Traffic Channels with Radio Configurations 6 through 9	3-40
13	Figure 3.1.3.1.1.2-16. Demultiplexer Structure for Spreading Rate 3.....	3-40
14	Figure 3.1.3.1.1.2-17. I and Q Mapping for Spreading Rate 3	3-41
15	Figure 3.1.3.1.4.1.1-1. K = 9, Rate 1/6 Convolutional Encoder.....	3-86
16	Figure 3.1.3.1.4.1.2-1. K = 9, Rate 1/4 Convolutional Encoder.....	3-87
17	Figure 3.1.3.1.4.1.3-1. K = 9, Rate 1/3 Convolutional Encoder.....	3-88
18	Figure 3.1.3.1.4.1.4-1. K = 9, Rate 1/2 Convolutional Encoder.....	3-88
19	Figure 3.1.3.1.4.2.1-1. Turbo Encoder	3-91
20	Figure 3.1.3.1.4.2.3-1. Turbo Interleaver Output Address Calculation Procedure	3-93
21	Figure 3.1.3.1.7-1. Structure for the N-Symbol Block Interleavers	3-101
22	Figure 3.1.3.1.10-1. Forward and Reverse Power Control Subchannel Transmission	
23	Timing.....	3-105
24	Figure 3.1.3.1.14.1-1. Baseband Filters Frequency Response Limits.....	3-115
25	Figure 3.1.3.2.1-1. Forward CDMA Channel Pilot PN Sequence Offset	3-119
26	Figure 3.1.3.2.5-1. Hopping Pilot Beacon Timing.....	3-121
27	Figure 3.1.3.4.6-1. Paging Channel Long Code Mask.....	3-124
28	Figure 3.1.3.5.2-1. Broadcast Control Channel Frame Structure	3-125
29	Figure 3.1.3.5.2.1-1. Broadcast Control Channel Frame Quality Indicator	
30	Calculation.....	3-126
31	Figure 3.1.3.5.6-1. Broadcast Control Channel Long Code Mask	3-127
32	Figure 3.1.3.7.3-1 Power Control Bit Randomization Long Code Mask	3-132
33	Figure 3.1.3.8.2-1. Common Assignment Channel Frame Structure	3-134

FIGURES

1	Figure 3.1.3.8.2.1-1. Common Assignment Channel Frame Quality Indicator	
2	Calculation for the 8-Bit Frame Quality Indicator.....	3-135
3	Figure 3.1.3.8.5-1 Common Assignment Channel Long Code Mask.....	3-136
4	Figure 3.1.3.9.2-1. Forward Common Control Channel Frame Structure.....	3-137
5	Figure 3.1.3.9.2.1-1. Forward Common Control Channel Frame Quality Indicator	
6	Calculation for the 16-Bit Frame Quality Indicator.....	3-138
7	Figure 3.1.3.9.2.1-2. Forward Common Control Channel Frame Quality Indicator	
8	Calculation for the 12-Bit Frame Quality Indicator.....	3-139
9	Figure 3.1.3.9.5-1. Forward Common Control Channel Long Code Mask.....	3-139
10	Figure 3.1.3.10.2-1. Forward Dedicated Control Channel Frame Structure	3-142
11	Figure 3.1.3.10.2.1-1. Forward Dedicated Control Channel Frame Quality Indicator	
12	Calculation for the 16-Bit Frame Quality Indicator.....	3-143
13	Figure 3.1.3.10.2.1-2. Forward Dedicated Control Channel Frame Quality Indicator	
14	Calculation for the 12-Bit Frame Quality Indicator.....	3-143
15	Figure 3.1.3.10.7-1. Forward Dedicated Control Channel Public Long Code Mask	3-144
16	Figure 3.1.3.11.2-1. Forward Fundamental Channel Frame Structure	3-150
17	Figure 3.1.3.11.2.1-1. Forward Fundamental Channel Frame Quality Indicator	
18	Calculation for the 16-Bit Frame Quality Indicator.....	3-152
19	Figure 3.1.3.11.2.1-2. Forward Fundamental Channel Frame Quality Indicator	
20	Calculation for the 12-Bit Frame Quality Indicator.....	3-153
21	Figure 3.1.3.11.2.1-3. Forward Fundamental Channel Frame Quality Indicator	
22	Calculation for the 10-Bit Frame Quality Indicator.....	3-153
23	Figure 3.1.3.11.2.1-4. Forward Fundamental Channel Frame Quality Indicator	
24	Calculation for the 8-Bit Frame Quality Indicator.....	3-153
25	Figure 3.1.3.11.2.1-5. Forward Fundamental Channel Frame Quality Indicator	
26	Calculation for the 6-Bit Frame Quality Indicator for Radio Configuration 2	3-154
27	Figure 3.1.3.11.2.1-6. Forward Fundamental Channel Frame Quality Indicator	
28	Calculation for the 6-Bit Frame Quality Indicator for Radio Configurations 3	
29	through 9	3-154
30	Figure 3.1.3.11.7-1. Forward Fundamental Channel Public Long Code Mask	3-155
31	Figure 3.1.3.12.2-1. Forward Supplemental Channel Frame Structure.....	3-170
32	Figure 3.1.3.12.2.1-1. Forward Supplemental Channel Frame Quality Indicator	
33	Calculation for the 16-Bit Frame Quality Indicator.....	3-171
34	Figure 3.1.3.12.2.1-2. Forward Supplemental Channel Frame Quality Indicator	
35	Calculation for the 12-Bit Frame Quality Indicator.....	3-172

FIGURES

1 Figure 3.1.3.12.2.1-3. Forward Supplemental Channel Frame Quality Indicator
2 Calculation for the 10-Bit Frame Quality Indicator 3-172
3 Figure 3.1.3.12.2.1-4. Forward Supplemental Channel Frame Quality Indicator
4 Calculation for the 8-Bit Frame Quality Indicator 3-172
5 Figure 3.1.3.12.2.1-5. Forward Supplemental Channel Frame Quality Indicator
6 Calculation for the 6-Bit Frame Quality Indicator 3-173
7 Figure 3.1.3.12.7-1. Forward Supplemental Channel Public Long Code Mask 3-174
8 Figure 3.1.3.13.2-1. Forward Supplemental Code Channel Frame Structure..... 3-175
9 Figure 3.1.3.13.2.1-1. Forward Supplemental Code Channel Frame Quality
10 Indicator Calculation 3-176
11 Figure 3.1.3.13.7-1. Forward Supplemental Code Channel Public Long Code Mask ... 3-177
12

TABLES

1	Table 1.2.3.1-1. Service Interface Primitive Types	1-18
2	Table 1.2.3.3-1. Service Interface Primitives Received by the Physical Layer	1-20
3	Table 1.2.3.4-1. Service interface Primitives Sent from the Physical Layer	1-21
4	Table 2.1.1.1.1-1. Band Class 0 System Frequency Correspondence	2-2
5	Table 2.1.1.1.1-2. CDMA Channel Number to CDMA Frequency Assignment	
6	Correspondence for Band Class 0	2-2
7	Table 2.1.1.1.1-3. CDMA Channel Numbers and Corresponding Frequencies for	
8	Band Class 0 and Spreading Rate 1	2-3
9	Table 2.1.1.1.1-4. CDMA Channel Numbers and Corresponding Frequencies for	
10	Band Class 0 and Spreading Rate 3	2-4
11	Table 2.1.1.1.1-5. CDMA Preferred Set of Frequency Assignments for Band Class 0	2-5
12	Table 2.1.1.1.1-6. Sync Channel Preferred Set of Frequency Assignments for	
13	Spreading Rate 3 for Band Class 0	2-5
14	Table 2.1.1.1.2-1. Band Class 1 Block Frequency Correspondence	2-6
15	Table 2.1.1.1.2-2. CDMA Channel Number to CDMA Frequency Assignment	
16	Correspondence for Band Class 1	2-7
17	Table 2.1.1.1.2-3. CDMA Channel Numbers and Corresponding Frequencies for	
18	Band Class 1 and Spreading Rate 1	2-7
19	Table 2.1.1.1.2-4. CDMA Channel Numbers and Corresponding Frequencies for	
20	Band Class 1 and Spreading Rate 3	2-8
21	Table 2.1.1.1.2-5. CDMA Preferred Set of Frequency Assignments for Band Class 1	2-9
22	Table 2.1.1.1.2-6. Sync Channel Preferred Set of Frequency Assignments for	
23	Spreading Rate 3 for Band Class 1	2-9
24	Table 2.1.1.1.3-1. Band Class 2 Block Frequency Correspondence	2-10
25	Table 2.1.1.1.3-2. Band Class 2 Band Subclasses	2-11
26	Table 2.1.1.1.3-3. CDMA Channel Number to CDMA Frequency Assignment	
27	Correspondence for Band Class 2	2-11
28	Table 2.1.1.1.3-4. CDMA Channel Numbers and Corresponding Frequencies for	
29	Band Class 2 and Spreading Rate 1	2-12
30	Table 2.1.1.1.3-5. CDMA Channel Numbers and Corresponding Frequencies for	
31	Band Class 2 and Spreading Rate 3	2-13
32	Table 2.1.1.1.3-6. CDMA Preferred Set of Frequency Assignments for Band Class 2	2-13
33	Table 2.1.1.1.4-1. Band Class 3 System Frequency Correspondence	2-14
34	Table 2.1.1.1.4-2. CDMA Channel Number to CDMA Frequency Assignment	
35	Correspondence for Band Class 3	2-15

TABLES

1	Table 2.1.1.1.4-3. CDMA Channel Numbers and Corresponding Frequencies for	
2	Band Class 3 and Spreading Rate 1	2-15
3	Table 2.1.1.1.4-4. CDMA Preferred Set of Frequency Assignments for Band Class 3.....	2-16
4	Table 2.1.1.1.5-1. Band Class 4 Block Frequency Correspondence	2-17
5	Table 2.1.1.1.5-2. CDMA Channel Number to CDMA Frequency Assignment	
6	Correspondence for Band Class 4	2-17
7	Table 2.1.1.1.5-3. CDMA Channel Numbers and Corresponding Frequencies for	
8	Band Class 4 and Spreading Rate 1	2-17
9	Table 2.1.1.1.5-4. CDMA Channel Numbers and Corresponding Frequencies for	
10	Band Class 4 and Spreading Rate 3	2-18
11	Table 2.1.1.1.5-5. CDMA Preferred Set of Frequency Assignments for Band Class 4.....	2-18
12	Table 2.1.1.1.5-6. Sync Channel Preferred Set of Frequency Assignments for	
13	Spreading Rate 3 for Band Class 4	2-18
14	Table 2.1.1.1.6-1. Band Class 5 Block Frequency Correspondence and Band	
15	Subclasses	2-20
16	Table 2.1.1.1.6-2. CDMA Channel Number to CDMA Frequency Assignment	
17	Correspondence for Band Class 5	2-20
18	Table 2.1.1.1.6-3. CDMA Channel Numbers and Corresponding Frequencies for	
19	Band Class 5 and Spreading Rate 1	2-21
20	Table 2.1.1.1.6-4. CDMA Channel Numbers and Corresponding Frequencies for	
21	Band Class 5 and Spreading Rate 3	2-22
22	Table 2.1.1.1.6-5. CDMA Preferred Set of Frequency Assignments for Band Class 5.....	2-23
23	Table 2.1.1.1.6-6. Sync Channel Preferred Set of Frequency Assignments for	
24	Spreading Rate 3 for Band Class 5	2-23
25	Table 2.1.1.1.7-1. CDMA Channel Number to CDMA Frequency Assignment	
26	Correspondence for Band Class 6	2-24
27	Table 2.1.1.1.7-2. CDMA Channel Numbers and Corresponding Frequencies for	
28	Band Class 6 and Spreading Rate 1	2-24
29	Table 2.1.1.1.7-3. CDMA Channel Numbers and Corresponding Frequencies for	
30	Band Class 6 and Spreading Rate 3	2-25
31	Table 2.1.1.1.7-4. CDMA Preferred Set of Frequency Assignments for Band Class 6.....	2-25
32	Table 2.1.1.1.8-1. Band Class 7 Block Frequency Correspondence	2-26
33	Table 2.1.1.1.8-2. CDMA Channel Number to CDMA Frequency Assignment	
34	Correspondence for Band Class 7	2-26
35	Table 2.1.1.1.8-3. CDMA Channel Numbers and Corresponding Frequencies for	
36	Band Class 7 and Spreading Rate 1	2-27

TABLES

1	Table 2.1.1.1.8-4. CDMA Channel Numbers and Corresponding Frequencies for	
2	Band Class 7 and Spreading Rate 3.....	2-27
3	Table 2.1.1.1.8-5. CDMA Preferred Set of Frequency Assignments for Band Class 7	2-28
4	Table 2.1.1.1.8-6. Sync Channel Preferred Set of Frequency Assignments for	
5	Spreading Rate 3 MC for Band Class 7	2-28
6	Table 2.1.1.1.9-1. CDMA Channel Number to CDMA Frequency Assignment	
7	Correspondence for Band Class 8	2-29
8	Table 2.1.1.1.9-2. CDMA Channel Numbers and Corresponding Frequencies for	
9	Band Class 8 and Spreading Rate 1.....	2-29
10	Table 2.1.1.1.9-3. CDMA Channel Numbers and Corresponding Frequencies for	
11	Band Class 8 and Spreading Rate 3.....	2-29
12	Table 2.1.1.1.9-4. CDMA Preferred Set of Frequency Assignments for Band Class 8	2-30
13	Table 2.1.1.1.10-1. CDMA Channel Number to CDMA Frequency Assignment	
14	Correspondence for Band Class 9	2-30
15	Table 2.1.1.1.10-2. CDMA Channel Numbers and Corresponding Frequencies for	
16	Band Class 9 and Spreading Rate 1.....	2-31
17	Table 2.1.1.1.10-3. CDMA Channel Numbers and Corresponding Frequencies for	
18	Band Class 9 and Spreading Rate 3.....	2-31
19	Table 2.1.1.1.10-4. CDMA Preferred Set of Frequency Assignments for Band Class 9 ...	2-31
20	Table 2.1.1.1.11-1. Band Class 10 System Frequency Correspondence	2-32
21	Table 2.1.1.1.11-2. CDMA Channel Number to CDMA Frequency Assignment	
22	Correspondence for Band Class 10	2-33
23	Table 2.1.1.1.11-3. CDMA Channel Numbers and Corresponding Frequencies for	
24	Band Class 10 and Spreading Rate 1.....	2-33
25	Table 2.1.1.1.11-4. CDMA Channel Numbers and Corresponding Frequencies for	
26	Band Class 10 and Spreading Rate 3.....	2-34
27	Table 2.1.1.1.11-5. CDMA Preferred Set of Frequency Assignments for Band Class	
28	10.....	2-34
29	Table 2.1.1.1.11-6. Sync Channel Preferred Set of Frequency Assignments for	
30	Spreading Rate 3 for Band Class 10	2-35
31	Table 2.1.2.3.1-1. Open Loop Power Offsets.....	2-38
32	Table 2.1.2.3.2-1. Closed Loop Power Control Step Size	2-49
33	Table 2.1.2.3.3.1-1. Nominal Reverse Common Channel Attribute Gain Table	2-50
34	Table 2.1.2.3.3.2-1. Reverse Link Nominal Attribute Gain Table (Part 1 of 2)	2-54
35	Table 2.1.2.3.3.2-1. Reverse Link Nominal Attribute Gain Table (Part 2 of 2)	2-55

TABLES

1	Table 2.1.2.3.3.2-2. Reverse Link Nominal Attribute Gain Values for the Reverse	
2	Fundamental Channel at the 1500 bps or 1800 bps Data Rate during Gated	
3	Transmission.....	2-56
4	Table 2.1.3.1-1. Radio Configuration Characteristics for the Reverse CDMA Channel...	2-60
5	Table 2.1.3.1.1.1-1. Channel Types per Mobile Station on the Reverse CDMA	
6	Channel for Spreading Rate 1	2-62
7	Table 2.1.3.1.1.2-1. Channel Types per Mobile Station on the Reverse CDMA	
8	Channel for Spreading Rate 3	2-72
9	Table 2.1.3.1.2.1-1. Access Channel Modulation Parameters for Spreading Rate 1	2-79
10	Table 2.1.3.1.2.1-2. Enhanced Access Channel Modulation Parameters for	
11	Spreading Rate 1	2-80
12	Table 2.1.3.1.2.1-3. Reverse Common Control Channel Modulation Parameters for	
13	Spreading Rate 1	2-81
14	Table 2.1.3.1.2.1-4. Reverse Dedicated Control Channel Modulation Parameters for	
15	Radio Configuration 3.....	2-81
16	Table 2.1.3.1.2.1-5. Reverse Dedicated Control Channel Modulation Parameters for	
17	Radio Configuration 4.....	2-82
18	Table 2.1.3.1.2.1-6. Reverse Fundamental Channel and Reverse Supplemental Code	
19	Channel Modulation Parameters for Radio Configuration 1	2-83
20	Table 2.1.3.1.2.1-7. Reverse Fundamental Channel and Reverse Supplemental Code	
21	Channel Modulation Parameters for Radio Configuration 2.....	2-84
22	Table 2.1.3.1.2.1-8. Reverse Fundamental Channel and Reverse Supplemental	
23	Channel Modulation Parameters for 20 ms Frames for Radio Configuration 3	2-85
24	Table 2.1.3.1.2.1-9. Reverse Supplemental Channel Modulation Parameters for 40	
25	ms Frames for Radio Configuration 3	2-86
26	Table 2.1.3.1.2.1-10. Reverse Supplemental Channel Modulation Parameters for 80	
27	ms Frames for Radio Configuration 3	2-87
28	Table 2.1.3.1.2.1-11. Reverse Fundamental Channel and Reverse Supplemental	
29	Channel Modulation Parameters for 20 ms Frames for Radio Configuration 4	2-88
30	Table 2.1.3.1.2.1-12. Reverse Supplemental Channel Modulation Parameters for 40	
31	ms Frames for Radio Configuration 4	2-89
32	Table 2.1.3.1.2.1-13. Reverse Supplemental Channel Modulation Parameters for 80	
33	ms Frames for Radio Configuration 4	2-90
34	Table 2.1.3.1.2.1-14. Reverse Fundamental Channel for 5 ms Frames.....	2-91
35	Table 2.1.3.1.2.2-1. Enhanced Access Channel Modulation Parameters for	
36	Spreading Rate 3	2-92

TABLES

1	Table 2.1.3.1.2.2-2. Reverse Common Control Channel Modulation Parameters for	
2	Spreading Rate 3.....	2-93
3	Table 2.1.3.1.2.2-3. Reverse Dedicated Control Channel Modulation Parameters for	
4	Radio Configuration 5	2-93
5	Table 2.1.3.1.2.2-4. Reverse Dedicated Control Channel Modulation Parameters for	
6	Radio Configuration 6	2-94
7	Table 2.1.3.1.2.2-5. Reverse Fundamental Channel and Reverse Supplemental	
8	Channel Modulation Parameters for 20 ms Frames for Radio Configuration 5.....	2-95
9	Table 2.1.3.1.2.2-6. Reverse Supplemental Channel Modulation Parameters for 40	
10	ms Frames for Radio Configuration 5	2-96
11	Table 2.1.3.1.2.2-7. Reverse Supplemental Channel Modulation Parameters for 80	
12	ms Frames for Radio Configuration 5	2-97
13	Table 2.1.3.1.2.2-8. Reverse Fundamental Channel and Reverse Supplemental	
14	Channel Modulation Parameters for 20 ms Frames for Radio Configuration 6.....	2-98
15	Table 2.1.3.1.2.2-9. Reverse Supplemental Channel Modulation Parameters for 40	
16	ms Frames for Radio Configuration 6	2-99
17	Table 2.1.3.1.2.2-10. Reverse Supplemental Channel Modulation Parameters for 80	
18	ms Frames for Radio Configuration 6	2-100
19	Table 2.1.3.1.2.2-11. Reverse Fundamental Channel for 5 ms Frames for Radio	
20	Configurations 5 and 6.....	2-101
21	Table 2.1.3.1.3-1. Data Rates for Spreading Rate 1.....	2-102
22	Table 2.1.3.1.3-2. Data Rates for Spreading Rate 3.....	2-103
23	Table 2.1.3.1.4-1. Forward Error Correction for Spreading Rate 1	2-104
24	Table 2.1.3.1.4-2. Forward Error Correction for Spreading Rate 3.....	2-105
25	Table 2.1.3.1.4.2.1-1. Puncturing Patterns for the Data Bit Periods	2-111
26	Table 2.1.3.1.4.2.2-1. Puncturing Patterns for the Tail Bit Periods	2-111
27	Table 2.1.3.1.4.2.3-1. Turbo Interleaver Parameter	2-113
28	Table 2.1.3.1.4.2.3-2. Turbo Interleaver Lookup Table Definition	2-114
29	Table 2.1.3.1.5-1. Code Symbol Repetition	2-116
30	Table 2.1.3.1.6.1-1. Punctured Codes Used with Convolutional Codes	2-117
31	Table 2.1.3.1.6.2-1. Punctured Codes Used with Turbo Codes	2-117
32	Table 2.1.3.1.7-1. Interleaver Parameters	2-119
33	Table 2.1.3.1.8.1-1. 64-ary Orthogonal Symbol Set.....	2-121
34	Table 2.1.3.1.8.2-1. Walsh Functions for Reverse CDMA Channels	2-122

TABLES

1	Table 2.1.3.1.8.2-2. Reverse Supplemental Channel Walsh Functions with	
2	Spreading Rate 1 when Only One Reverse Supplemental Channel Is Assigned.....	2-123
3	Table 2.1.3.1.8.2-3. Reverse Supplemental Channel Walsh Functions with	
4	Spreading Rate 1 when Two Reverse Supplemental Channels Are Assigned.....	2-123
5	Table 2.1.3.1.8.2-4. Reverse Supplemental Channel Walsh Functions with	
6	Spreading Rate 3 when Only One Reverse Supplemental Channel Is Assigned.....	2-124
7	Table 2.1.3.1.8.2-5. Reverse Supplemental Channel Walsh Functions with	
8	Spreading Rate 3 when Two Reverse Supplemental Channels Are Assigned.....	2-125
9	Table 2.1.3.1.10.1-1. Reverse Power Control Subchannel Configurations.....	2-134
10	Table 2.1.3.1.13.1-1. Coefficients of $h(k)$ for Spreading Rate 1	2-147
11	Table 2.1.3.1.13.2-1. Coefficients of $h(k)$ for Spreading Rate 3	2-149
12	Table 2.1.3.1.14-1. Reverse Supplemental Code Channel Carrier Phase Offsets for	
13	Radio Configurations 1 and 2.....	2-150
14	Table 2.1.3.4.2-1. Enhanced Access Channel Frame Structure Summary.....	2-160
15	Table 2.1.3.5.2-1. Reverse Common Control Channel Frame Structure Summary.....	2-166
16	Table 2.1.3.6.2-1. Reverse Dedicated Control Channel Frame Structure Summary	
17	for Non-flexible Data Rates	2-172
18	Table 2.1.3.6.2-2. Reverse Dedicated Control Channel Frame Structure Summary	
19	for Flexible Data Rates.....	2-173
20	Table 2.1.3.7.2-1. Reverse Fundamental Channel Frame Structure Summary for	
21	Non-flexible Data Rates.....	2-177
22	Table 2.1.3.7.2-2. Reverse Fundamental Channel Frame Structure Summary for	
23	Flexible Data Rates.....	2-178
24	Table 2.1.3.8.2-1. Reverse Supplemental Channel Frame Structure Summary for 20	
25	ms Frames for Non-flexible Data Rates.....	2-190
26	Table 2.1.3.8.2-2. Reverse Supplemental Channel Frame Structure Summary for 40	
27	ms Frames for Non-flexible Data Rates.....	2-191
28	Table 2.1.3.8.2-3. Reverse Supplemental Channel Frame Structure Summary for 80	
29	ms Frames for Non-flexible Data Rates.....	2-192
30	Table 2.1.3.8.2-4. Reverse Supplemental Channel Frame Structure Summary for 20	
31	ms Frames for Flexible Data Rates (Part 1 of 2)	2-193
32	Table 2.1.3.8.2-4. Reverse Supplemental Channel Frame Structure Summary for 20	
33	ms Frames for Flexible Data Rates (Part 2 of 2)	2-194
34	Table 2.1.3.8.2-5. Reverse Supplemental Channel Frame Structure Summary for 40	
35	ms Frames for Flexible Data Rates (Part 1 of 2)	2-195

TABLES

1	Table 2.1.3.8.2-5. Reverse Supplemental Channel Frame Structure Summary for 40	
2	ms Frames for Flexible Data Rates (Part 2 of 2)	2-196
3	Table 2.1.3.8.2-6. Reverse Supplemental Channel Frame Structure Summary for 80	
4	ms Frames for Flexible Data Rates	2-197
5	Table 2.1.3.9.2-1. Reverse Supplemental Code Channel Frame Structure Summary...	2-202
6	Table 3.1.3.1-1. Radio Configuration Characteristics for the Forward Traffic Channel ...	3-5
7	Table 3.1.3.1.1.1-1. Channel Types on the Forward CDMA Channel for Spreading	
8	Rate 1	3-7
9	Table 3.1.3.1.1.2-1. Channel Types for the Forward CDMA Channel for Spreading	
10	Rate 3	3-26
11	Table 3.1.3.1.2.1-1. Sync Channel Modulation Parameters for Spreading Rate 1	3-42
12	Table 3.1.3.1.2.1-2. Paging Channel Modulation Parameters for Spreading Rate 1	3-42
13	Table 3.1.3.1.2.1-3. Broadcast Control Channel Modulation Parameters for	
14	Spreading Rate 1 with $R = 1/4$	3-43
15	Table 3.1.3.1.2.1-4. Broadcast Control Channel Modulation Parameters for	
16	Spreading Rate 1 with $R = 1/2$	3-43
17	Table 3.1.3.1.2.1-5. Quick Paging Channel Modulation Parameters for Spreading	
18	Rate 1	3-44
19	Table 3.1.3.1.2.1-6. Common Power Control Channel Modulation Parameters for	
20	Spreading Rate 1	3-44
21	Table 3.1.3.1.2.1-7. Common Assignment Channel Modulation Parameters for	
22	Spreading Rate 1 with $R = 1/4$	3-45
23	Table 3.1.3.1.2.1-8. Common Assignment Channel Modulation Parameters for	
24	Spreading Rate 1 with $R = 1/2$	3-45
25	Table 3.1.3.1.2.1-9. Forward Common Control Channel Modulation Parameters for	
26	Spreading Rate 1 with $R = 1/4$	3-46
27	Table 3.1.3.1.2.1-10. Forward Common Control Channel Modulation Parameters for	
28	Spreading Rate 1 with $R = 1/2$	3-46
29	Table 3.1.3.1.2.1-11. Forward Dedicated Control Channel Modulation Parameters	
30	for Radio Configuration 3	3-47
31	Table 3.1.3.1.2.1-12. Forward Dedicated Control Channel Modulation Parameters	
32	for Radio Configuration 4	3-47
33	Table 3.1.3.1.2.1-13. Forward Dedicated Control Channel Modulation Parameters	
34	for Radio Configuration 5	3-48
35	Table 3.1.3.1.2.1-14. Forward Fundamental Channel and Forward Supplemental	
36	Code Channel Modulation Parameters for Radio Configuration 1	3-49

TABLES

1	Table 3.1.3.1.2.1-15. Forward Fundamental Channel and Forward Supplemental	
2	Code Channel Modulation Parameters for Radio Configuration 2	3-50
3	Table 3.1.3.1.2.1-16. Forward Fundamental Channel and Forward Supplemental	
4	Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration	
5	3	3-51
6	Table 3.1.3.1.2.1-17. Forward Supplemental Channel Modulation Parameters for 40	
7	ms Frames for Radio Configuration 3	3-52
8	Table 3.1.3.1.2.1-18. Forward Supplemental Channel Modulation Parameters for 80	
9	ms Frames for Radio Configuration 3	3-53
10	Table 3.1.3.1.2.1-19. Forward Fundamental Channel and Forward Supplemental	
11	Channel Modulation Parameters for 5 ms or 20 ms Frames for Radio	
12	Configuration 4	3-54
13	Table 3.1.3.1.2.1-20. Forward Supplemental Channel Modulation Parameters for 40	
14	ms Frames for Radio Configuration 4	3-55
15	Table 3.1.3.1.2.1-21. Forward Supplemental Channel Modulation Parameters for 80	
16	ms Frames for Radio Configuration 4	3-56
17	Table 3.1.3.1.2.1-22. Forward Fundamental Channel and Forward Supplemental	
18	Channel Modulation Parameters for 20 ms Frames for Radio Configuration 5	3-57
19	Table 3.1.3.1.2.1-23. Forward Supplemental Channel Modulation Parameters for 40	
20	ms Frames for Radio Configuration 5	3-58
21	Table 3.1.3.1.2.1-24. Forward Supplemental Channel Modulation Parameters for 80	
22	ms Frames for Radio Configuration 5	3-59
23	Table 3.1.3.1.2.1-25. Forward Fundamental Channel Modulation Parameters for 5	
24	ms Frames for Radio Configuration 5	3-60
25	Table 3.1.3.1.2.2-1. Sync Channel Modulation Parameters for Spreading Rate 3.....	3-61
26	Table 3.1.3.1.2.2-2. Broadcast Control Channel Modulation Parameters for	
27	Spreading Rate 3	3-61
28	Table 3.1.3.1.2.2-3. Quick Paging Channel Modulation Parameters for Spreading	
29	Rate 3	3-62
30	Table 3.1.3.1.2.2-4. Common Power Control Channel Modulation Parameters for	
31	Spreading Rate 3	3-62
32	Table 3.1.3.1.2.2-5. Common Assignment Channel Modulation Parameters for	
33	Spreading Rate 3	3-63
34	Table 3.1.3.1.2.2-6. Forward Common Control Channel Modulation Parameters for	
35	Spreading Rate 3	3-63
36	Table 3.1.3.1.2.2-7. Forward Dedicated Control Channel Modulation Parameters for	
37	Radio Configuration 6.....	3-64

TABLES

1	Table 3.1.3.1.2.2-8. Forward Dedicated Control Channel Modulation Parameters for	
2	Radio Configuration 7	3-64
3	Table 3.1.3.1.2.2-9. Forward Dedicated Control Channel Modulation Parameters for	
4	Radio Configuration 8	3-65
5	Table 3.1.3.1.2.2-10. Forward Dedicated Control Channel Modulation Parameters	
6	for Radio Configuration 9	3-66
7	Table 3.1.3.1.2.2-11. Forward Fundamental Channel and Forward Supplemental	
8	Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration	
9	6.....	3-67
10	Table 3.1.3.1.2.2-12. Forward Supplemental Channel Modulation Parameters for 40	
11	ms Frames for Radio Configuration 6	3-68
12	Table 3.1.3.1.2.2-13. Forward Supplemental Channel Modulation Parameters for 80	
13	ms Frames for Radio Configuration 6	3-69
14	Table 3.1.3.1.2.2-14. Forward Fundamental Channel and Forward Supplemental	
15	Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration	
16	7.....	3-70
17	Table 3.1.3.1.2.2-15. Forward Supplemental Channel Modulation Parameters for 40	
18	ms Frames for Radio Configuration 7	3-71
19	Table 3.1.3.1.2.2-16. Forward Supplemental Channel Modulation Parameters for 80	
20	ms Frames for Radio Configuration 7	3-72
21	Table 3.1.3.1.2.2-17. Forward Fundamental Channel and Forward Supplemental	
22	Channel Modulation Parameters for 20 ms Frames for Radio Configuration 8.....	3-73
23	Table 3.1.3.1.2.2-18. Forward Supplemental Channel Modulation Parameters for 40	
24	ms Frames for Radio Configuration 8	3-74
25	Table 3.1.3.1.2.2-19. Forward Supplemental Channel Modulation Parameters for 80	
26	ms Frames for Radio Configuration 8	3-75
27	Table 3.1.3.1.2.2-20. Forward Fundamental Channel and Forward Supplemental	
28	Channel Modulation Parameters for 20 ms Frames for Radio Configuration 9.....	3-76
29	Table 3.1.3.1.2.2-21. Forward Supplemental Channel Modulation Parameters for	
30	40 ms Frames for Radio Configuration 9.....	3-77
31	Table 3.1.3.1.2.2-22. Forward Supplemental Channel Modulation Parameters for 80	
32	ms Frames for Radio Configuration 9	3-78
33	Table 3.1.3.1.2.2-23. Forward Fundamental Channel Modulation Parameters for 5	
34	ms Frames for Radio Configurations 8 and 9	3-79
35	Table 3.1.3.1.3-1. Data Rates for Spreading Rate 1 (Part 1 of 2)	3-80
36	Table 3.1.3.1.3-1. Data Rates for Spreading Rate 1 (Part 2 of 2)	3-81
37	Table 3.1.3.1.3-2. Data Rates for Spreading Rate 3 (Part 1 of 2)	3-82

TABLES

1	Table 3.1.3.1.3-2. Data Rates for Spreading Rate 3 (Part 2 of 2).....	3-83
2	Table 3.1.3.1.4-1. Forward Error Correction for Spreading Rate 1.....	3-84
3	Table 3.1.3.1.4-2. Forward Error Correction for Spreading Rate 3.....	3-85
4	Table 3.1.3.1.4.2.1-1. Puncturing Patterns for the Data Bit Periods	3-92
5	Table 3.1.3.1.4.2.2-1. Puncturing Patterns for the Tail Bit Periods.....	3-92
6	Table 3.1.3.1.4.2.3-1. Turbo Interleaver Parameter	3-94
7	Table 3.1.3.1.4.2.3-2. Turbo Interleaver Lookup Table Definition.....	3-95
8	Table 3.1.3.1.5-1. Code Symbol Repetition.....	3-97
9	Table 3.1.3.1.6.1-1. Punctured Codes Used with Convolutional Codes.....	3-98
10	Table 3.1.3.1.6.2-1. Punctured Codes Used with Turbo Codes.....	3-99
11	Table 3.1.3.1.7-1. Interleaver Parameters.....	3-100
12	Table 3.1.3.1.10-1. Power Control Bit Duration and Power Level	3-107
13	Table 3.1.3.1.12-1. Maximum Walsh Function Length for Code Channels on the	
14	Forward CDMA Channel Except the Auxiliary Pilot Channel and Auxiliary	
15	Transmit Diversity Pilot Channel.....	3-110
16	Table 3.1.3.1.12-2. Masking Functions for Quasi-Orthogonal Functions with Length	
17	256	3-110
18	Table 3.1.3.1.14.1-1. Coefficients of $h(k)$	3-116
19	Table 3.1.3.7.2-1 Common Power Control Subchannels for Spreading Rate 1	3-131
20	Table 3.1.3.7.3-1 Parameters for Relative Offset Computation	3-133
21	Table 3.1.3.9.2-1. Forward Common Control Channel Frame Structure Summary	3-137
22	Table 3.1.3.10.2-1. Forward Dedicated Control Channel Frame Structure Summary	
23	for Non-flexible Data Rates	3-141
24	Table 3.1.3.10.2-2. Forward Dedicated Control Channel Frame Structure Summary	
25	for Flexible Data Rates.....	3-142
26	Table 3.1.3.11.2-1. Forward Fundamental Channel Frame Structure Summary for	
27	Non-flexible Data Rates.....	3-148
28	Table 3.1.3.11.2-2. Forward Fundamental Channel Frame Structure Summary for	
29	Flexible Data Rates (Part 1 of 2)	3-149
30	Table 3.1.3.11.2-2. Forward Fundamental Channel Frame Structure Summary for	
31	Flexible Data Rates (Part 2 of 2)	3-150
32	Table 3.1.3.12.2-1. Forward Supplemental Channel Frame Structure Summary for	
33	20 ms Frames for Non-flexible Data Rates	3-161
34	Table 3.1.3.12.2-2. Forward Supplemental Channel Frame Structure Summary for	
35	40 ms Frames for Non-flexible Data Rates	3-162

TABLES

1 Table 3.1.3.12.2-3. Forward Supplemental Channel Frame Structure Summary for
 2 80 ms Frames for Non-flexible Data Rates3-163

3 Table 3.1.3.12.2-4. Forward Supplemental Channel Frame Structure Summary for
 4 20 ms Frames for Flexible Data Rates (Part 1 and 2)3-164

5 Table 3.1.3.12.2-4. Forward Supplemental Channel Frame Structure Summary for
 6 20 ms Frames for Flexible Data Rates (Part 2 and 2)3-165

7 Table 3.1.3.12.2-5. Forward Supplemental Channel Frame Structure Summary for
 8 40 ms Frames for Flexible Data Rates (Part 1 of 2)3-166

9 Table 3.1.3.12.2-5. Forward Supplemental Channel Frame Structure Summary for
 10 40 ms Frames for Flexible Data Rates (Part 2 of 2)3-167

11 Table 3.1.3.12.2-6. Forward Supplemental Channel Frame Structure Summary for
 12 80 ms Frames for Flexible Data Rates (Part 1 of 2)3-168

13 Table 3.1.3.12.2-6. Forward Supplemental Channel Frame Structure Summary for
 14 80 ms Frames for Flexible Data Rates (Part 1 of 2)3-168

15 Table 3.1.3.12.2-6. Forward Supplemental Channel Frame Structure Summary for
 16 80 ms Frames for Flexible Data Rates (Part 2 of 2)3-169

17 Table 3.1.3.13.2-1. Forward Supplemental Code Channel Frame Structure
 18 Summary.....3-175

19

20

TABLES

- 1 No text.

FOREWORD**(This foreword is not part of this Standard)**

This Standard was prepared by Technical Specification Group C of the Third Generation Partnership Project 2 (3GPP2). This Standard contains the physical layer of the IMT-2000 CDMA Multi-Carrier Mode, IMT-2000 CDMA MC, for land mobile wireless systems based upon cellular principles. This Standard is a revision of the Telecommunications Industry Association Standard TIA/EIA/IS-2000.2, *Physical Layer Standard for cdma2000 Spread Spectrum Systems*. This Standard includes the capabilities of Telecommunications Industry Association Standard TIA/EIA-95-B. This Standard does not replace TIA/EIA-95-B.

This Standard provides the physical layer of the IMT-2000 CDMA MC air interface; however, other specifications are required to complete the air interface and the rest of the system. These specifications are listed in the References section.

Ten different operating bands have been specified. Equipment built to this Standard can be used in a band subject to allocation of the band and the rules and regulations of the country to which the allocated band has been assigned.

FOREWORD

- 1 No text

NOTES

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This volume defines the physical layer of the CDMA Spreading Rate 1 and Spreading Rate 3 multi-carrier air interface standard. This volume consists of the following sections:

1. General. This section defines the terms and numeric indications used in this document. This section also describes the time reference used in the CDMA system and the tolerances used throughout the document.

2. Requirements for Mobile Station CDMA Operation. This section describes the physical layer requirements for mobile stations operating in the CDMA mode. A mobile station complying with these requirements will be able to operate with CDMA base stations complying with this Standard.

3. Requirements for Base Station CDMA Operation. This section describes the physical layer requirements for CDMA base stations. A base station complying with these requirements will be able to operate with mobile stations complying with this Standard.

NOTES

- 1 1. Compatibility, as used in connection with this Standard, is understood to mean:
 2 Any mobile station is able to place and receive calls. Conversely all base stations are
 3 able to place and receive calls for any mobile station.
- 4 2. This compatibility Standard is based upon spectrum allocations that have been
 5 defined by various governmental administrations.
- 6 3. Standards [10] and [11] provide specifications and measurement methods for base
 7 stations and mobile stations.
- 10 4. Those wishing to deploy systems compliant with this standard should also take
 11 notice of the requirement to be compliant with the applicable rules and regulations
 12 of local administrations.
- 13 5. Those wishing to deploy systems compliant with this Standard should also take
 14 notice of the electromagnetic exposure criteria for the general public and for radio
 15 frequency carriers with low frequency amplitude modulation.
- 16 6. "Base station" refers to the functions performed on the land side, which are typically
 17 distributed among a cell, a sector of a cell, and a mobile switching center.
- 18 7. "Shall" and "shall not" identify requirements to be followed strictly to conform to the
 19 standard and from which no deviation is permitted. "Should" and "should not"
 20 indicate that one of several possibilities is recommended as particularly suitable,
 21 without mentioning or excluding others, that a certain course of action is preferred
 22 but not necessarily required, or that (in the negative form) a certain possibility or
 23 course of action is discouraged but not prohibited. "May" and "need not" indicate a
 24 course of action permissible within the limits of the standard. "Can" and "cannot"
 25 are used for statements of possibility and capability, whether material, physical, or
 26 causal.
- 27 8. Footnotes appear at various points in this Standard to elaborate and further clarify
 28 items discussed in the body of the Standard.
- 29 9. Unless indicated otherwise, this Standard presents numbers in decimal form.
 30 Binary numbers are distinguished in the text by the use of single quotation marks.
- 31 10. While communication between the Medium Access Control Layer and the Physical
 32 Layer is specified, there is no requirement to implement layering and the use of the
 33 word "shall" does not identify requirements to be followed strictly in order to
 34 conform to the standard.
- 35 11. The following operators define mathematical operations:
- 36 • \times indicates multiplication.
- 37 • $\lfloor x \rfloor$ indicates the largest integer less than or equal to x : $\lfloor 1.1 \rfloor = 1$, $\lfloor 1.0 \rfloor = 1$.
- 38 • $\lceil x \rceil$ indicates the smallest integer greater or equal to x : $\lceil 1.1 \rceil = 2$, $\lceil 2.0 \rceil = 2$.

NOTES

- 1 • $|x|$ indicates the absolute value of x : $|-17|=17$, $|17|=17$.
- 2 • \oplus indicates exclusive OR (modulo-2 addition).
- 3 • $\min(x, y)$ indicates the minimum of x and y .
- 4 • $\max(x, y)$ indicates the maximum of x and y .
- 5 • $x \bmod y$ indicates the remainder after dividing x by y : $x \bmod y = x - (y \times \lfloor x/y \rfloor)$.
- 6 12. Rounding to the nearest integer indicates the nearest integer: 1 for 1.4, -1 for -1.4, 2
- 7 for 1.5, and -2 for -1.5.
- 8

NOTES

- 1 No text

REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

—*Standards:*

1. Reserved.
2. Reserved
3. Reserved.
4. Reserved.
5. *C.S0005-A, Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems*, September 2001.
6. Reserved.
7. Reserved
8. Reserved
9. Reserved
10. *C.S0010-A, Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Spread Spectrum Mobile Stations*, April 2001.
11. *C.S0011-A, Recommended Minimum Performance Standards for Dual-Mode Spread Spectrum Mobile Stations*, April 2001.
12. ANSI C.95.1-1991, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

—*Other Documents:*

REFERENCES

13. *Enhanced Cryptographic Algorithms*. An EAR-controlled document subject to restricted distribution. Contact the Telecommunications Industry Association, Arlington, VA, September 2001.
14. NCRP Report 86, *Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields*, National Council on Radiation Protection and Measurements, 1986.
15. ICS-GPS-200, *Navstar GPS Space Segment / Navigation User Interfaces*.
16. C.R1001-B, *Administration of Parameter Value Assignments for TIA/EIA Spread Spectrum Standards*, January 2001.

1 No text.

1 GENERAL

1.1 Terms

Access Channel. A Reverse CDMA Channel used by mobile stations for communicating to the base station. The Access Channel is used for short signaling message exchanges, such as call originations, responses to pages, and registrations. The Access Channel is a slotted random access channel.

Access Channel Preamble. The preamble of an access probe consisting of a sequence of all-zero frames that is sent at the 4800 bps rate.

Access Probe. One Access Channel transmission consisting of a preamble and a message. The transmission is an integer number of frames in length and transmits one Access Channel message. See also Access Probe Sequence.

Access Probe Sequence. A sequence of one or more access probes on the Access Channel. See also Access Probe.

Additional Preamble. A preamble sent after the last fractional preamble on the Reverse Pilot Channel prior to transmitting on the Enhanced Access Channel or the Reverse Common Control Channel.

AWGN. Additive White Gaussian Noise.

Auxiliary Pilot Channel. An unmodulated, direct-sequence spread spectrum signal transmitted continuously by a CDMA base station. An auxiliary pilot channel is required for forward link spot beam and antenna beam forming applications, and provides a phase reference for coherent demodulation of those forward link CDMA channels associated with the auxiliary pilot.

Auxiliary Transmit Diversity Pilot Channel. A transmit diversity pilot channel associated with an auxiliary pilot channel. The auxiliary pilot channel and the auxiliary transmit diversity pilot channel provide phase references for coherent demodulation of those forward link CDMA channels associated with the auxiliary pilot and that employ transmit diversity.

Bad Frame. A frame classified with insufficient frame quality, or, for Radio Configuration 1, a 9600 bps primary traffic only frame with bit errors. See also Good Frame.

Band Class. A set of frequency channels and a numbering scheme for these channels.

Base Station. A fixed station used for communicating with mobile stations. Depending upon the context, the term base station may refer to a cell, a sector within a cell, an MSC, or other part of the wireless system. See also MSC.

Basic Access Mode. A mode used on the Enhanced Access Channel where a mobile station transmits an Enhanced Access Channel preamble and Enhanced Access data in a method similar to that used on the Access Channel.

bps. Bits per second.

BPSK. Biphase shift keying.

- 1 **Broadcast Control Channel.** A code channel in a Forward CDMA Channel used for
2 transmission of control information from a base station to a mobile station.
- 3 **Candidate Frequency.** The frequency for which the base station specifies a search set,
4 when searching on other frequencies while performing mobile-assisted handoffs.
- 5 **CDMA.** See Code Division Multiple Access.
- 6 **CDMA Cellular System.** The entire system supporting Domestic Public Cellular Service
7 operation as embraced by this Standard.
- 8 **CDMA Channel.** The set of channels transmitted between the base station and the mobile
9 stations within a given CDMA frequency assignment. See also Forward CDMA Channel and
10 Reverse CDMA Channel.
- 11 **CDMA Channel Number.** An 11-bit number corresponding to the center of the CDMA
12 frequency assignment.
- 13 **CDMA Frequency Assignment.** A 1.23 or 3.69 MHz segment of spectrum. The center of a
14 CDMA frequency assignment is given by a CDMA Channel Number.
- 15 **CDMA PCS System.** The entire system supporting Personal Communications Services as
16 embraced by this Standard.
- 17 **CDMA Preferred Set.** The set of CDMA channel numbers in a CDMA system corresponding
18 to frequency assignments that a mobile station will normally search to acquire a CDMA
19 Pilot Channel. For CDMA cellular systems, the primary and secondary channels comprise
20 the CDMA Preferred Set.
- 21 **Chip Rate.** Equivalent to the spreading rate of the channel. It is either 1.2288 Mcps or
22 3.6864 Mcps.
- 23 **Code Channel.** A subchannel of a Forward CDMA Channel or Reverse CDMA Channel.
24 Each subchannel uses an orthogonal Walsh function or quasi-orthogonal function.
- 25 **Code Division Multiple Access (CDMA).** A technique for spread-spectrum multiple-access
26 digital communications that creates channels through the use of unique code sequences.
- 27 **Code Symbol.** The output of an error-correcting encoder. Information bits are input to the
28 encoder and code symbols are output from the encoder. See Convolutional Code and Turbo
29 Code.
- 30 **Common Assignment Channel.** A forward common channel used by the base station to
31 acknowledge a mobile station accessing the Enhanced Access Channel, and in the case of
32 Reservation Access Mode, to transmit the address of a Reverse Common Control Channel
33 and associated Common Power Control Subchannel.
- 34 **Common Power Control Channel.** A forward common channel which transmits power
35 control bits (i.e., common power control subchannels) to multiple mobile stations. The
36 Common Power Control Channel is used by mobile stations operating in the Power
37 Controlled Access Mode, when operating in the Reservation Access Mode, or when
38 operating in the Designated Access Mode.

- 1 **Common Power Control Group.** A 1.25, 2.5, or 5 ms interval on the Common Power
2 Control Channel which carries power control information for multiple mobile stations.
- 3 **Common Power Control Subchannel.** A subchannel on the Common Power Control
4 Channel used by the base station to control the power of a mobile station when operating
5 in the Power Controlled Access Mode on the Enhanced Access Channel or when operating
6 in the Reservation Access Mode or the Designated Access Mode on the Reverse Common
7 Control Channel.
- 8 **Continuous Transmission.** A mode of operation in which Discontinuous Transmission is
9 not permitted.
- 10 **Convolutional Code.** A type of error-correcting code. A code symbol can be considered as
11 the convolution of the input data sequence with the impulse response of a generator
12 function.
- 13 **CRC.** See Cyclic Redundancy Code.
- 14 **Cyclic Redundancy Code (CRC).** A class of linear error detecting codes which generate
15 parity check bits by finding the remainder of a polynomial division. See also Frame Quality
16 Indicator.
- 17 **Data Burst Randomizer.** The function that determines which power control groups within
18 a frame are transmitted on the Reverse Fundamental Channel with Radio Configurations 1
19 and 2 when the data rate is lower than the maximum rate for the radio configuration. The
20 data burst randomizer determines, for each mobile station, the pseudorandom position of
21 the transmitted power control groups in the frame while guaranteeing that every
22 modulation symbol is transmitted exactly once.
- 23 **dBm.** A measure of power expressed in terms of its ratio (in dB) to one milliwatt.
- 24 **dBm/Hz.** A measure of power spectral density. The ratio, dBm/Hz, is the power in one
25 Hertz of bandwidth, where power is expressed in units of dBm.
- 26 **Deinterleaving.** The process of unpermuting the symbols that were permuted by the
27 interleaver. Deinterleaving is performed on received symbols prior to decoding.
- 28 **Designated Access Mode.** A mode of operation on the Reverse Common Control Channel
29 where the mobile station responds to requests received on the Forward Common Control
30 Channel.
- 31 **Direct Spread.** A CDMA mode in the International Telecommunications Union IMT-2000
32 family of standards.
- 33 **Discontinuous Transmission (DTX).** A mode of operation in which a base station or a
34 mobile station switches its transmitter or a particular code channel on and off
35 autonomously. For the case of DTX operation on the Forward Dedicated Control Channel,
36 the Forward Power Control Subchannel is still transmitted.
- 37 **DS.** See Direct Spread.
- 38 **E_b .** The energy of an information bit.

- 1 **E_b/N_t** . The ratio in dB of the combined received energy per bit to the effective noise power
2 spectral density.
- 3 **E_c/I_0** . The ratio in dB between the pilot energy accumulated over one PN chip period (E_c) to
4 the total power spectral density (I_0) in the received bandwidth.
- 5 **Effective Isotropically Radiated Power (EIRP)**. The product of the power supplied to the
6 antenna and the antenna gain in a direction relative to an isotropic antenna.
- 7 **Effective Radiated Power (ERP)**. The product of the power supplied to the antenna and its
8 gain relative to a half-wave dipole in a given direction.
- 9 **EIB**. See Erasure Indicator Bit.
- 10 **EIRP**. See Effective Isotropic Radiated Power.
- 11 **Electronic Serial Number (ESN)**. A 32-bit number assigned by the mobile station
12 manufacturer, uniquely identifying the mobile station equipment.
- 13 **Encoder Tail Bits**. A fixed sequence of bits added to the end of a block of data to reset the
14 convolutional encoder to a known state.
- 15 **Enhanced Access Channel**. A reverse channel used by the mobile for communicating to
16 the base station. The Enhanced Access Channel operates in the Basic Access Mode, Power
17 Controlled Access Mode, and Reservation Access Mode. It is used for transmission of short
18 messages, such as signaling, MAC messages, response to pages, and call originations. It
19 can also be used to transmit moderate-sized data packets.
- 20 **Enhanced Access Channel Preamble**. A non-data bearing portion of the Enhanced Access
21 probe sent by the mobile station to assist the base station in initial acquisition and channel
22 estimation.
- 23 **Enhanced Access Data**. The data transmitted while in the Basic Access Mode or Power
24 Controlled Access Mode on the Enhanced Access Channel or while in the Reservation
25 Access Mode on a Reverse Common Control Channel.
- 26 **Enhanced Access Header**. A frame containing access origination information transmitted
27 immediately after the Enhanced Access Channel preamble while in the Power Controlled
28 Access Mode or Reservation Access Mode.
- 29 **Enhanced Access Probe**. One Enhanced Access Channel transmission consisting of an
30 Enhanced Access Channel preamble, optionally an Enhanced Access header, and optionally
31 Enhanced Access data. See also Enhanced Access Probe Sequence.
- 32 **Enhanced Access Probe Sequence**. A sequence of one or more Enhanced Access probes
33 on the Enhanced Access Channel. See also Enhanced Access Probe.
- 34 **Erasure Indicator Bit (EIB)**. A bit used in the Radio Configuration 2 Reverse Traffic
35 Channel frame structure to indicate an erased Forward Fundamental Channel frame and in
36 the Radio Configurations 3, 4, 5, and 6 Reverse Power Control Subchannel to indicate
37 frame erasure(s) and/or non-transmission on the Forward Fundamental Channel or
38 Forward Dedicated Control Channel.
- 39 **ERP**. See Effective Radiated Power.

- 1 **ESN.** See Electronic Serial Number.
- 2 **Fixed Data Rate.** The operation of a Traffic Channel where the data rate does not change
3 from frame to frame. See variable data rates.
- 4 **Flexible Data Rate.** The operation of a Traffic Channel with Radio Configuration 3 or
5 above, where the frame format, including the number of information bits, the number of
6 reserved bits, and the number of frame quality indicator bits, is configurable.
- 7 **Forward CDMA Channel.** A CDMA Channel from a base station to mobile stations. The
8 Forward CDMA Channel contains one or more code channels that are transmitted on a
9 CDMA frequency assignment using a particular pilot PN offset.
- 10 **Forward Common Control Channel.** A control channel used for the transmission of digital
11 control information from a base station to one or more mobile stations.
- 12 **Forward Dedicated Control Channel.** A portion of a Radio Configuration 3 through 9
13 Forward Traffic Channel used for the transmission of higher-level data, control information,
14 and power control information from a base station to a mobile station.
- 15 **Forward Error Correction.** A process whereby data is encoded with convolutional or turbo
16 codes to assist in error correction of the link.
- 17 **Forward Fundamental Channel.** A portion of a Forward Traffic Channel which carries a
18 combination of higher-level data and power control information.
- 19 **Forward Pilot Channel.** An unmodulated, direct-sequence spread spectrum signal
20 transmitted continuously by each CDMA base station. The Pilot Channel allows a mobile
21 station to acquire the timing of the Forward CDMA Channel, provides a phase reference for
22 coherent demodulation, and provides means for signal strength comparisons between base
23 stations for determining when to handoff.
- 24 **Forward Power Control Subchannel.** A subchannel on the Forward Fundamental Channel
25 or Forward Dedicated Control Channel used by the base station to control the power of a
26 mobile station when operating on the Reverse Traffic Channel.
- 27 **Forward Supplemental Channel.** A portion of a Radio Configuration 3 through 9 Forward
28 Traffic Channel which operates in conjunction with a Forward Fundamental Channel or a
29 Forward Dedicated Control Channel in that Forward Traffic Channel to provide higher data
30 rate services, and on which higher-level data is transmitted.
- 31 **Forward Supplemental Code Channel.** A portion of a Radio Configuration 1 and 2
32 Forward Traffic Channel which operates in conjunction with a Forward Fundamental
33 Channel in that Forward Traffic Channel to provide higher data rate services, and on which
34 higher-level data is transmitted.
- 35 **Forward Traffic Channel.** One or more code channels used to transport user and signaling
36 traffic from the base station to the mobile station. See Forward Fundamental Channel,
37 Forward Dedicated Control Channel, Forward Supplemental Channel, and Forward
38 Supplemental Code Channel.
- 39 **Fractional Preamble.** A preamble in a sequence sent on the Reverse Pilot Channel prior to
40 transmitting on the Enhanced Access Channel or the Reverse Common Control Channel.

1 **Frame.** A basic timing interval in the system. For the Sync Channel, a frame is 26.666...
2 ms long. For the Access Channel, the Paging Channel, the Forward Supplemental Code
3 Channel, and the Reverse Supplemental Code Channel, a frame is 20 ms long. For the
4 Forward Supplemental Channel and the Reverse Supplemental Channel, a frame is 20, 40,
5 or 80 ms long. For the Enhanced Access Channel, the Forward Common Control Channel,
6 and the Reverse Common Control Channel, a frame is 5, 10, or 20 ms long. For the
7 Forward Fundamental Channel, Forward Dedicated Control Channel, Reverse Fundamental
8 Channel, and Reverse Dedicated Control Channel, a frame is 5 or 20 ms long. For the
9 Common Assignment Channel, a frame is 5 ms long. For the Broadcast Control Channel, a
10 frame is 40 ms long; the frame may be transmitted once, twice, or four times.

11 **Frame Offset.** A time skewing of Forward Traffic Channel or Reverse Traffic Channel
12 frames from System Time in integer multiples of 1.25 ms.

13 **Frame Quality Indicator.** The CRC check applied to 9.6 and 4.8 kbps Traffic Channel
14 frames of Radio Configuration 1, all Forward Traffic Channel frames for Radio
15 Configurations 2 through 9, all Reverse Traffic Channel frames for Radio Configurations 2
16 through 6, the Broadcast Control Channel, Common Assignment Channel, Enhanced
17 Access Channel, and the Reverse Common Control Channel.

18 **Gated Transmission.** A mode of operation in which the mobile station transmitter is gated
19 on and off during specific power control groups.

20 **GHz.** Gigahertz (10^9 Hertz).

21 **Global Positioning System (GPS).** A US government satellite system that provides location
22 and time information to users. See [15] for specifications.

23 **Good Frame.** A frame not classified as a bad frame. See also Bad Frame.

24 **GPS.** See Global Positioning System.

25 **Hard Handoff.** A handoff characterized by a temporary disconnection of the Traffic
26 Channel. Hard handoffs occur when the mobile station is transferred between disjoint
27 Active Sets, the CDMA frequency assignment changes, the frame offset changes, or the
28 mobile station is directed from a CDMA Traffic Channel to an analog voice channel. See
29 also Soft Handoff.

30 **Interleaving.** The process of permuting a sequence of symbols.

31 **kHz.** Kilohertz (10^3 Hertz).

32 **ksps.** Kilo-symbols per second (10^3 symbols per second).

33 **Long Code.** A PN sequence that is used for scrambling on the Forward CDMA Channel (the
34 Forward Traffic Channel, the Paging Channel, the Broadcast Control Channel, the Common
35 Assignment Channel, the Common Power Control Channel, and the Forward Common
36 Control Channel) and spreading on the Reverse CDMA Channel (the Reverse Traffic
37 Channel, Access Channel, the Enhanced Access Channel, and the Reverse Common
38 Control Channel). On the Forward Traffic Channel and the Reverse Traffic Channel, the
39 long code provides limited privacy. On the Reverse Traffic Channel, the long code uniquely
40 identifies a mobile station. See also Public Long Code and Private Long Code.

- 1 **Long Code Mask.** A 42-bit binary number that creates the unique identity of the long code.
2 See also Public Long Code, Private Long Code, Public Long Code Mask, and Private Long
3 Code Mask.
- 4 **LSB.** Least significant bit.
- 5 **MAC Layer.** Medium Access Control Layer.
- 6 **Maximal Length Sequence (m-Sequence).** A binary sequence of period $2^n - 1$, n being a
7 positive integer, with no internal periodicities. A maximal length sequence can be generated
8 by a tapped n -bit shift register with linear feedback.
- 9 **MC.** See Multi-Carrier.
- 10 **Mcps.** Megachips per second (10^6 chips per second).
- 11 **Mean Input Power.** The total received calorimetric power measured in a specified
12 bandwidth at the antenna connector, including all internal and external signal and noise
13 sources.
- 14 **Mean Output Power.** The total transmitted calorimetric power measured in a specified
15 bandwidth at the antenna connector when the transmitter is active.
- 16 **MHz.** Megahertz (10^6 Hertz).
- 17 **Mobile Station.** A station that communicates with the base station.
- 18 **Mobile Station Class.** Mobile station classes define mobile station characteristics such as
19 slotted operation and transmission power.
- 20 **Mobile Switching Center (MSC).** A configuration of equipment that provides cellular
21 radiotelephone service.
- 22 **Modulation Symbol.** The input to the signal point mapping block and the output of the
23 interleaver or the sequence repetition block, if present.
- 24 **Multi-Carrier.** A CDMA mode in the International Telecommunications Union IMT-2000
25 family of standards. The mode uses N ($N \geq 1$) adjacent 1.2288 Mcps direct-sequence spread
26 RF carriers on the Forward CDMA Channel and a single direct-sequence spread RF carrier
27 on the Reverse CDMA Channel.
- 28 **ms.** Millisecond (10^{-3} second).
- 29 **MSB.** Most significant bit.
- 30 **ns.** Nanosecond (10^{-9} second).
- 31 **Orthogonal Transmit Diversity (OTD).** A forward link transmission method which
32 distributes forward link channel symbols among multiple antennas and spreads the
33 symbols with a unique Walsh or quasi-orthogonal function associated with each antenna.
- 34 **OTD.** See orthogonal transmit diversity.
- 35 **Paging Channel.** A code channel in a Forward CDMA Channel used for transmission of
36 control information and pages from a base station to a mobile station.

- 1 **Paging Channel Slot.** An 80 ms interval on the Paging Channel. Mobile stations operating
2 in the slotted mode are assigned specific slots in which they monitor messages from the
3 base station.
- 4 **PCS.** See Personal Communications Services.
- 5 **PCS System.** See Personal Communications Services System.
- 6 **Personal Communications Services System.** A configuration of equipment that provides
7 PCS radiotelephone services.
- 8 **Personal Communications Services (PCS).** A family of mobile and portable radio
9 communications services for individuals and businesses that may be integrated with a
10 variety of competing networks. Broadcasting is prohibited and fixed operations are to be
11 ancillary to mobile operations.
- 12 **Physical Layer.** The part of the communication protocol between the mobile station and
13 the base station that is responsible for the transmission and reception of data. The physical
14 layer in the transmitting station is presented a frame and transforms it into an over-the-air
15 waveform. The physical layer in the receiving station transforms the waveform back into a
16 frame.
- 17 **Pilot Channel.** An unmodulated, direct-sequence spread spectrum signal transmitted by a
18 CDMA base station or mobile station. A pilot channel provides a phase reference for
19 coherent demodulation and may provide a means for signal strength comparisons between
20 base stations for determining when to handoff.
- 21 **Pilot PN Sequence.** A pair of modified maximal length PN sequences used to spread the
22 Forward CDMA Channel and the Reverse CDMA Channel. Different base stations are
23 identified by different pilot PN sequence offsets.
- 24 **Pilot PN Sequence Offset Index.** The PN offset in units of 64 PN chips of a pilot, relative to
25 the zero offset pilot PN sequence.
- 26 **PN.** Pseudonoise.
- 27 **PN Chip.** One bit in the PN sequence.
- 28 **PN Sequence.** Pseudonoise sequence. A periodic binary sequence.
- 29 **Power Control Bit.** A bit sent on the Forward Power Control Subchannel, Reverse Power
30 Control Subchannel, or Common Power Control Subchannel to signal the mobile station or
31 base station to increase or decrease its transmit power.
- 32 **Power Control Group.** A 1.25 ms interval on the Forward Traffic Channel, the Reverse
33 Traffic Channel, and the Reverse Pilot Channel. See also Power Control Bit.
- 34 **Power Controlled Access Mode.** A mode used on the Enhanced Access Channel where a
35 mobile station transmits an Enhanced Access preamble, an Enhanced Access header, and
36 Enhanced Access data in the Enhanced Access probe using closed loop power control.
- 37 **Power Up Function.** A method by which the mobile station increases its output power to
38 support location services.

- 1 **Preamble.** See Access Channel preamble, Enhanced Access Channel preamble, Reverse
2 Common Control Channel preamble, and Reverse Traffic Channel Preamble.
- 3 **Primary CDMA Channel.** A pre-assigned channel in a CDMA Cellular System for
4 Spreading Rate 1 used by the mobile station for initial acquisition. See also Secondary
5 CDMA Channel.
- 6 **Primary Paging Channel.** The default code channel (code channel 1) assigned for paging
7 on a CDMA Channel.
- 8 **Primary Reverse Power Control Subchannel.** A Reverse Power Control Subchannel used
9 to control the Forward Dedicated Control Channel or Forward Fundamental Channel.
- 10 **Private Long Code.** The long code characterized by the private long code mask. See also
11 Long Code.
- 12 **Private Long Code Mask.** The long code mask used to form the private long code. See also
13 Public Long Code Mask and Long Code.
- 14 **Public Long Code.** The long code characterized by the public long code mask. See also
15 Long Code.
- 16 **Public Long Code Mask.** The long code mask used to form the public long code. The mask
17 contains a permutation of the bits of the mobile station's ESN or the particular mask
18 specified by the base station. The mask also includes the channel number when used for a
19 Supplemental Code Channel. See also Private Long Code Mask and Long Code.
- 20 **PUF.** See Power Up Function.
- 21 **PUF Probe.** One or more consecutive frames on the Reverse Traffic Channel within which
22 the mobile station transmits the PUF pulse.
- 23 **PUF Pulse.** Portion of PUF probe which may be transmitted at elevated output power.
- 24 **PUF Target Frequency.** The CDMA frequency to which the base station directs a mobile
25 station for transmitting the PUF probe.
- 26 **Punctured Code.** An error-correcting code generated from another error-correcting code by
27 deleting (i.e., puncturing) code symbols from the encoder output.
- 28 **QIB.** See Quality Indicator Bit.
- 29 **QPSK.** Quadrature phase shift keying.
- 30 **Quality Indicator Bit (QIB).** A bit used in the Radio Configurations 3, 4, 5, and 6 Reverse
31 Power Control Subchannel to indicate signal quality on the Forward Dedicated Control
32 Channel. When the Forward Fundamental Channel is present, this bit is set the same as
33 the Erasure Indicator Bits.
- 34 **Quasi-Orthogonal Function.** A function created by applying a quasi-orthogonal masking
35 function to an orthogonal Walsh function.
- 36 **Quick Paging Channel.** An uncoded, spread, and On-Off-Keying (OOK) modulated spread
37 spectrum signal sent by a base station to inform mobile stations operating in the slotted
38 mode during the idle state whether to receive the Forward Common Control Channel or the

1 Paging Channel starting in the next Forward Common Control Channel or Paging Channel
2 frame.

3 **Radio Configuration.** A set of Forward Traffic Channel and Reverse Traffic Channel
4 transmission formats that are characterized by physical layer parameters such as data
5 rates, modulation characteristics, and spreading rate.

6 **RC.** See Radio Configuration.

7 **Reservation Access Mode.** A mode used on the Enhanced Access Channel and Reverse
8 Common Control Channel where a mobile station transmits an Enhanced Access preamble
9 and an Enhanced Access header in the Enhanced Access probe. The Enhanced Access data
10 is transmitted on a Reverse Common Control Channel using closed loop power control.

11 **Reverse CDMA Channel.** The CDMA Channel from the mobile station to the base station.
12 From the base station's perspective, the Reverse CDMA Channel is the sum of all mobile
13 station transmissions on a CDMA frequency assignment.

14 **Reverse Common Control Channel.** A portion of a Reverse CDMA Channel used for the
15 transmission of digital control information from one or more mobile stations to a base
16 station. The Reverse Common Control Channel can operate in a Reservation Access Mode
17 or Designated Access Mode. It can be power controlled in the Reservation Access Mode or
18 Designated Access Mode, and may support soft handoff in the Reservation Access Mode.

19 **Reverse Common Control Channel Preamble.** A non-data bearing portion of the Reverse
20 Common Control Channel sent by the mobile station to assist the base station in initial
21 acquisition and channel estimation.

22 **Reverse Dedicated Control Channel.** A portion of a Radio Configuration 3 through 6
23 Reverse Traffic Channel used for the transmission of higher-level data and control
24 information from a mobile station to a base station.

25 **Reverse Fundamental Channel.** A portion of a Reverse Traffic Channel which carries
26 higher-level data and control information from a mobile station to a base station.

27 **Reverse Pilot Channel.** An unmodulated, direct-sequence spread spectrum signal
28 transmitted continuously by a CDMA mobile station. A reverse pilot channel provides a
29 phase reference for coherent demodulation and may provide a means for signal strength
30 measurement.

31 **Reverse Power Control Subchannel.** A subchannel on the Reverse Pilot Channel used by
32 the mobile station to control the power of a base station when operating on the Forward
33 Traffic Channel with Radio Configurations 3 through 9.

34 **Reverse Supplemental Channel.** A portion of a Radio Configuration 3 through 6 Reverse
35 Traffic Channel which operates in conjunction with the Reverse Fundamental Channel or
36 the Reverse Dedicated Control Channel in that Reverse Traffic Channel to provide higher
37 data rate services, and on which higher-level data is transmitted.

38 **Reverse Supplemental Code Channel.** A portion of a Radio Configuration 1 and 2 Reverse
39 Traffic Channel which operates in conjunction with the Reverse Fundamental Channel in
40 that Reverse Traffic Channel, and (optionally) with other Reverse Supplemental Code

1 Channels to provide higher data rate services, and on which higher-level data is
2 transmitted.

3 **Reverse Supplemental Code Channel Preamble.** A sequence of all-zero frames that is
4 sent by the mobile station on the Reverse Supplemental Code Channel as an aid to Traffic
5 Channel acquisition.

6 **Reverse Traffic Channel.** A traffic channel on which data and signaling are transmitted
7 from a mobile station to a base station. For Radio Configurations 1 and 2, the Reverse
8 Traffic Channel is composed of a Reverse Fundamental Channel and up to seven Reverse
9 Supplemental Code Channels. For Radio Configurations 3 through 6, the Reverse Traffic
10 Channel is composed of a Reverse Fundamental Channel, a Reverse Dedicated Control
11 Channel, or both and up to two Reverse Supplemental Channels.

12 **Reverse Traffic Channel Preamble.** A non-data bearing portion of the Reverse Pilot
13 Channel sent by the mobile station to aid the base station in initial acquisition and channel
14 estimation for the Reverse Dedicated Control Channel and Reverse Fundamental Channel.

15 **RF Carrier.** A direct-sequence spread RF channel. For the Forward CDMA Channel, the
16 number of RF carriers is equal to the Spreading Rate; for the Reverse CDMA Channel, there
17 is one RF carrier.

18 **Secondary CDMA Channel.** A pre-assigned channel in a CDMA Cellular System for
19 Spreading Rate 1 used by the mobile station for initial acquisition. See also Primary CDMA
20 Channel.

21 **Secondary Reverse Power Control Subchannel.** A Reverse Power Control Subchannel
22 used to control a Forward Supplemental Channel.

23 **Serving Frequency.** The CDMA frequency on which a mobile station is currently
24 communicating with one or more base stations.

25 **Slotted Mode.** An operation mode of the mobile station in which the mobile station
26 monitors only selected slots on the Paging Channel.

27 **Space Time Spreading (STS).** A forward link transmission method which transmits all
28 forward link channel symbols on multiple antennas and spreads the symbols with
29 complementary Walsh or quasi-orthogonal functions.

30 **Spreading Rate.** The PN chip rate of the Forward CDMA Channel or the Reverse CDMA
31 Channel, defined as a multiple of 1.2288 Mcps.

32 **Spreading Rate 1.** Spreading Rate 1 is often referred to as "1X." A Spreading Rate 1
33 Forward CDMA Channel uses a single direct-sequence spread carrier with a chip rate of
34 1.2288 Mcps. A Spreading Rate 1 Reverse CDMA Channel uses a single direct-sequence
35 spread carrier with a chip rate of 1.2288 Mcps.

36 **Spreading Rate 3.** Spreading Rate 3 is often referred to as "3X." A Spreading Rate 3
37 Forward CDMA Channel uses three direct-sequence spread carriers (see Multiple-Carrier
38 Forward Channel) each with a chip rate of 1.2288 Mcps. A Spreading Rate 3 Reverse CDMA
39 Channel uses a single direct-sequence spread carrier with a chip rate of 3.6864 Mcps.

40 **sps.** Symbols per second.

- 1 **SR.** See Spreading Rate.
- 2 **STS.** See Space Time Spreading.
- 3 **Symbol.** See Code Symbol and Modulation Symbol.
- 4 **Sync Channel.** A code channel in the Forward CDMA Channel which transports the
5 synchronization message to the mobile station.
- 6 **Sync Channel Superframe.** An 80 ms interval consisting of three Sync Channel frames
7 (each 26.666... ms in length).
- 8 **System Time.** The time reference used by the system. System Time is synchronous to UTC
9 time (except for leap seconds) and uses the same time origin as GPS time. All base stations
10 use the same System Time (within a small error tolerance). Mobile stations use the same
11 System Time, offset by the propagation delay from the base station to the mobile station.
12 See also Universal Coordinated Time.
- 13 **TD.** Transmit Diversity schemes, including OTD and STS.
- 14 **Time Reference.** A reference established by the mobile station that is synchronous with
15 the earliest arriving multipath component used for demodulation.
- 16 **Transmit Diversity Pilot Channel.** An unmodulated, direct-sequence spread spectrum
17 signal transmitted continuously by a CDMA base station to support forward link transmit
18 diversity. The pilot channel and the transmit diversity pilot channel provide phase
19 references for coherent demodulation of forward link CDMA channels which employ
20 transmit diversity.
- 21 **Turbo Code.** A type of error-correcting code. A code symbol is based on the outputs of the
22 two recursive convolutional codes (constituent codes) of the Turbo code.
- 23 **Universal Coordinated Time (UTC).** An internationally agreed-upon time scale maintained
24 by the Bureau International de l'Heure (BIH) used as the time reference by nearly all
25 commonly available time and frequency distribution systems, i.e., WWV, WWVH, LORAN-C,
26 Transit, Omega, and GPS.
- 27 **UTC.** Universal Temps Coordoné. See Universal Coordinated Time.
- 28 **Variable Data Rates.** The operation of a Traffic Channel where the transmitter can change
29 the data rate among a set of possible choices on a frame-by-frame basis.
- 30 **Variable-rate Supplemental Channel.** The operation of the Forward Supplemental
31 Channel and the Reverse Supplemental Channel where the transmitter can change the
32 data rate among a set of possible choices on a frame-by-frame basis.
- 33 **Walsh Chip.** The shortest identifiable component of a Walsh or quasi-orthogonal function.
34 There are 2^N Walsh chips in one Walsh function where N is the order of the Walsh function.
- 35 **Walsh Function.** One of 2^N time orthogonal binary functions (note that the functions are
36 orthogonal after mapping '0' to 1 and '1' to -1).
- 37 **μs.** Microsecond (10^{-6} second).

1.2 Numeric Information

1.2.1 Mobile Station Stored Parameters

1XRRL_FREQ_OFFSET_s – A 2-bit parameter indicating the offset between the reverse link carrier frequency and the forward link carrier frequency when a Reverse Traffic Channel with Radio Configuration 3 or 4 is used with a Forward Traffic Channel with Radio Configuration 6, 7, 8 or 9.

ALT_RCCCH_PREAMBLE_ADD_DURATION_s – Length, in units of 1.25 ms, of the additional preamble sent prior to initializing the Reverse Common Control Channel in Designated Access Mode.

ALT_RCCCH_PREAMBLE_FRAC_DURATION_s – Length, less one, in units of 1.25 ms, of each fractional preamble sent prior to initializing the Reverse Common Control Channel in Designated Access Mode.

ALT_RCCCH_PREAMBLE_ENABLED_s – Indicates that a preamble will be sent on Reverse Common Control Channel in Designated Access Mode.

ALT_RCCCH_PREAMBLE_NUM_FRAC_s – Number of fractional preambles, less one, sent prior to initializing the Reverse Common Control Channel in Designated Access Mode.

ALT_RCCCH_PREAMBLE_OFF_DURATION_s – Length, in units of 1.25 ms, of the off duration after each fractional preamble sent prior to initializing the Reverse Common Control Channel in Designated Access Mode.

BASE_ID_s – Base station identification of the current base station.

CDMACH_s – CDMA Channel number. The CDMA Channel number currently used by the mobile station.

CURRENT_PUF_PROBE_s – Number of the next PUF probe to be transmitted within the PUF attempt.

DAM_CORRECTION_s – Power offset for Designated Access Mode. A correction factor to be used by mobile stations in the open loop power estimate, initially applied on the Reverse Common Control Channel.

EACH_INIT_PWR_s – Initial power offset for the Enhanced Access Channel.

EACH_PREAMBLE_ADD_DURATION_s – Length, in units of 1.25 ms, of the additional preamble sent prior to initializing the Enhanced Access Channel.

EACH_PREAMBLE_FRAC_DURATION_s – Length less one, in units of 1.25 ms, of each fractional preamble sent prior to initializing the Enhanced Access Channel.

EACH_PREAMBLE_ENABLED_s – Indicates that a preamble will be sent on the Enhanced Access Channel.

EACH_PREAMBLE_NUM_FRAC_s – Number of fractional preambles less one sent prior to initializing the Enhanced Access Channel.

EACH_PREAMBLE_OFF_DURATION_s – Length, in units of 1.25 ms, of the off duration after each fractional preamble sent prior to initializing the Enhanced Access Channel.

- 1 **EACH_PWR_STEP_s** – Power increment for successive Enhanced Access probes on the
2 Enhanced Access Channel, in units of 1.0 dB.
- 3 **EACH_SLOT_s** – Enhanced Access Channel slot duration, in units of 1.25 ms.
- 4 **EACH_SLOT_OFFSET1_s** – Enhanced Access Channel first slot offset, in units of 1.25 ms.
5 One of the slot offset values used to calculate the Enhanced Access Channel slot offset. The
6 Enhanced Access Channel slot offset is derived from EACH_SLOT_OFFSET1_s and
7 EACH_SLOT_OFFSET2_s.
- 8 **EACH_SLOT_OFFSET2_s** – Enhanced Access Channel second slot offset, in units of 1.25
9 ms. One of the slot offset values used to calculate the Enhanced Access Channel slot offset.
10 The Enhanced Access Channel slot offset is derived from EACH_SLOT_OFFSET1_s and
11 EACH_SLOT_OFFSET2_s.
- 12 **FPC_DCCH_CURR_SETPT_s** – Current power control subchannel outer loop setpoint for the
13 Forward Dedicated Control Channel.
- 14 **FPC_DCCH_MAX_SETPT_s** – Maximum value of the power control subchannel outer loop
15 setpoint for the Forward Dedicated Control Channel.
- 16 **FPC_DCCH_MIN_SETPT_s** – Minimum value of the power control subchannel outer loop
17 setpoint for the Forward Dedicated Control Channel.
- 18 **FPC_FCH_CURR_SETPT_s** – Current power control subchannel outer loop setpoint for the
19 Forward Fundamental Channel.
- 20 **FPC_FCH_MAX_SETPT_s** – Maximum value of the power control subchannel outer loop
21 setpoint for the Forward Fundamental Channel.
- 22 **FPC_FCH_MIN_SETPT_s** – Minimum value of the power control subchannel outer loop
23 setpoint for the Forward Fundamental Channel.
- 24 **FPC_MODE_s** – Forward power control operating mode.
- 25 **FPC_PRI_CHAN_s** – Indicates the channel that is associated with the Primary Reverse Power
26 Control Subchannel and the channel (Forward Dedicated Control Channel or Forward
27 Fundamental Channel) that includes a Forward Power Control Subchannel.
- 28 **FPC_SCH_CURR_SETPT[i]_s** – Current power control subchannel outer loop setpoint for
29 Forward Supplemental Channel i.
- 30 **FPC_SCH_MAX_SETPT[i]_s** – Maximum value of the power control subchannel outer loop
31 setpoint for Forward Supplemental Channel i.
- 32 **FPC_SCH_MIN_SETPT[i]_s** – Minimum value of the power control subchannel outer loop
33 setpoint for Forward Supplemental Channel i.
- 34 **FPC_SEC_CHAN_s** – Index of Forward Supplemental Channel that is associated with the
35 secondary power control subchannel.
- 36 **FRAME_OFFSET_s** – Current Forward Traffic Channel and Reverse Traffic Channel frame
37 offset, in units of 1.25 ms.
- 38 **IC_MAX_s** – The maximum interference correction that can be applied.

- 1 **IC_THRESH_s** – The threshold level at which the interference correction begins to be
2 applied.
- 3 **INIT_PWR_s** – Initial power offset for Access Channel probes.
- 4 **NOM_PWR_s** – Nominal transmit power offset. A correction factor to be used by mobile
5 stations in the open loop power estimate, initially applied on the Access Channel.
- 6 **NOM_PWR_EXT_s** – Extended nominal transmit power offset. A correction factor to be used
7 by mobile stations in the open loop power estimate.
- 8 **NUM_PREAMBLE_s** – Duration of Reverse Traffic Channel preamble during handoff in
9 multiples of 20 ms when operating in Radio Configuration 1 or 2 or the duration of the
10 Reverse Traffic Channel preamble during hard handoff in multiples of 1.25 ms when
11 operating in Radio Configurations 3, 4, 5, or 6.
- 12 **NUM_REV_CODES_s** – A storage variable in the mobile station which contains the number
13 of Reverse Supplemental Code Channels which will be utilized in the next Reverse
14 Supplemental Code Channel transmission beginning at time REV_START_TIME_s. A value of
15 0 indicates no Reverse Supplemental Code Channel transmission will be permitted (i.e.,
16 there is no pending Reverse Supplemental Code Channel transmission).
- 17 **PAGECH_s** – The Paging Channel number.
- 18 **PILOT_GATING_RATE_s** – The rate at which the Reverse Pilot Channel is gated on and off.
- 19 **PILOT_GATING_USE_RATE_s** – Indicates whether or not the Reverse Pilot Channel is gated.
- 20 **PILOT_PN_s** – Pilot Channel PN sequence offset, in units of 64 PN chips, for a base station.
- 21 **PUF_INIT_PWR_s** – Power increase (in dB) of the first PUF pulse in a PUF attempt.
- 22 **PUF_PWR_STEP_s** – Amount (in dB) by which the mobile station is to increment the power
23 of a PUF pulse above nominal power from one PUF pulse to the next.
- 24 **PWR_CNTL_STEP_s** – Power control step size assigned by the base station that the mobile
25 station is to use for closed loop power control.
- 26 **PWR_STEP_s** – Power increment for successive Access probes on the Access Channel, in
27 units of 1.0 dB.
- 28 **RCCCH_INIT_PWR_s** – Initial power offset for the Reverse Common Control Channel.
- 29 **RCCCH_NOM_PWR_s** – Nominal transmit power offset. A correction factor to be used by
30 mobile stations in the open loop power estimate, initially applied on the Reverse Common
31 Control Channel.
- 32 **RCCCH_PREAMBLE_ADD_DURATION_s** – Length, in units of 1.25 ms, of the additional
33 preamble sent prior to initializing the Reverse Common Control Channel in Reservation
34 Access Mode.
- 35 **RCCCH_PREAMBLE_FRAC_DURATION_s** – Length, less one, in units of 1.25 ms, of each
36 fractional preamble sent prior to initializing the Reverse Common Control Channel in
37 Reservation Access Mode.

- 1 **RCCCH_PREAMBLE_ENABLED_s** – Indicates that a preamble will be sent on Reverse
2 Common Control Channel in Reservation Access Mode.
- 3 **RCCCH_PREAMBLE_NUM_FRAC_s** – Number of fractional preambles, less one, sent prior to
4 initializing the Reverse Common Control Channel in Reservation Access Mode.
- 5 **RCCCH_PREAMBLE_OFF_DURATION_s** – Length, in units of 1.25 ms, of the off duration
6 after each fractional preamble sent prior to initializing the Reverse Common Control
7 Channel in Reservation Access Mode.
- 8 **RCCCH_SLOT_s** – Reverse Common Control Channel slot duration, in units of 1.25 ms.
- 9 **RCCCH_SLOT_OFFSET1_s** – Reverse Common Control Channel first slot offset, in units of
10 1.25 ms. One of the slot offset values used to calculate the Reverse Common Control
11 Channel slot offset. The Reverse Common Control Channel slot offset is derived from
12 **RCCCH_SLOT_OFFSET1_s** and **RCCCH_SLOT_OFFSET2_s**.
- 13 **RCCCH_SLOT_OFFSET2_s** – Reverse Common Control Channel second slot offset, in units
14 of 1.25 ms. One of the slot offset values used to calculate the Reverse Common Control
15 Channel slot offset. The Reverse Common Control Channel slot offset is derived from
16 **RCCCH_SLOT_OFFSET1_s** and **RCCCH_SLOT_OFFSET2_s**.
- 17 **RESUME_PREAMBLE_s** – A storage variable in the mobile station which contains the size of
18 the preamble which shall be transmitted on a Reverse Supplemental Code Channel at the
19 beginning of transmission on a Reverse Supplemental Code Channel when resuming
20 transmission following an interruption when discontinuous transmission is occurring.
- 21 **REV_FCH_GATING_MODE_s** – A parameter that enables gating of the Reverse Fundamental
22 Channel with Radio Configuration 3, 4, 5, or 6.
- 23 **REV_PWR_CNTL_DELAY_s** – Reverse link power control loop delay when the Reverse
24 Fundamental Channel with Radio Configuration 3, 4, 5, or 6 is gated or when the Reverse
25 Common Control Channel preamble is gated.
- 26 **REV_SCH_FRAME_OFFSET[i]_s** – Frame offset, in units of 20 ms, applied to Reverse
27 Supplemental Channel i.
- 28 **RLGAIN_ADJ_s** – Gain adjustment applied to the Traffic Channel output power relative to
29 the transmission power on the Access Channel, Enhanced Access Channel, or Reverse
30 Common Control Channel.
- 31 **RLGAIN_COMMON_PILOT_s** – Gain adjustment of the Enhanced Access Channel Header,
32 Enhanced Access Channel Data, or Reverse Common Control Channel Data relative to the
33 Reverse Pilot Channel.
- 34 **RLGAIN_TRAFFIC_PILOT_s** – Gain adjustment of the Reverse Traffic Channel with Radio
35 Configurations 3 through 6 relative to the Reverse Pilot Channel.
- 36 **RLGAIN_SCH_PILOT[i]_s** – Gain adjustment of Reverse Supplemental Channel i relative to
37 the Reverse Pilot Channel.

1 1.2.2 Base Station Parameters

2 Since many mobile stations are in communication with each base station, many of these
3 parameters will have multiple instantiations, with different values.

4 **BCN** – Index number of the Broadcast Control Channel.

5 **ESN** – Electronic serial number of the mobile station with which the base station is
6 communicating.

7 **FOR_SCH_FRAME_OFFSET[i]** – Frame offset, in units of 20 ms, applied to Forward
8 Supplemental Channel i.

9 **FPC_PRI_CHAN** – Indicates the channel that is associated with the Primary Reverse Power
10 Control Subchannel and the channel (Forward Dedicated Control Channel or Forward
11 Fundamental Channel) that includes a Forward Power Control Subchannel.

12 **FRAME_OFFSET** – Frame offset, in units of 1.25 ms, applied to the Forward Traffic
13 Channel and Reverse Traffic Channel.

14 **IFHHO_SRCH_CORR** – The optional inter-frequency hard handoff correction to the
15 Nominal Attribute Gain, usually set to 0.

16 **NGHBR_TX_DURATION** – Transmit duration, in units of 80 ms, of the transmit window for
17 the hopping pilot beacon base station.

18 **NGHBR_TX_OFFSET** – Time offset, in units of 80 ms, of the transmit window for the
19 hopping pilot beacon base station.

20 **NGHBR_TX_PERIOD** – Period between subsequent windows, in units of 80 ms, of the
21 transmit window for the hopping pilot beacon base station.

22 **PCN** – Index number of the Paging Channel.

23 **PILOT_PN** – Pilot PN sequence offset index for the Forward CDMA Channel.

24 **QPCH_POWER_LEVEL_PAGE** – Power level of the transmitted Quick Paging Channel
25 Paging Indicator modulation symbols, relative to the Forward Pilot Channel.

26 **QPCH_POWER_LEVEL_CONFIG** – Power level of the transmitted Quick Paging Channel
27 Configuration Change Indicator modulation symbols, relative to the Forward Pilot Channel.

28 **QPCH_POWER_LEVEL_BCAST** – Power level of the transmitted Quick Paging Channel
29 Broadcast Indicator modulation symbols, relative to the Forward Pilot Channel.

30 1.2.3 MAC Interface

31 1.2.3.1 Service Interfaces

32 This section describes the service interface primitives (or primitives in short) to and from
33 the MAC Layer. Service interface primitives are abstract, atomic, implementation-
34 independent representations of interactions between a service user and its service provider.
35 No requirement is placed on the mobile station or the base station to implement specific
36 service primitives. See ITU-T Recommendation X.210.

The following sections contain a summary of the service interface primitives definitions. The conventions that are used for service interface primitives are shown in Table 1.2.3.1-1, and conform to ITU-T Recommendation X.210.

Table 1.2.3.1-1. Service Interface Primitive Types

Primitive Type	Source	Destination	Purpose
<i>Request</i>	service user	service provider	Request a service, resource, etc.
<i>Indication</i>	service provider	service user	Indicates that data has arrived or an event for the service user has occurred.

The invocation of service interface primitives is notated as follows:

RX-Primitive.Primitive_Type(parameters)

where:

- RX* - An abbreviation for the service provider entity (e.g., PHY or the Physical Layer);
- Primitive* - The name of the specific primitive to or from the service provider (e.g., FCH)
- Primitive_Type* - The specific Primitive Type as defined in Table 1.2.3.1-1, (e.g., Request)
- parameters* - An (optional) list of parameters for the primitive (e.g., NUM_BITS)

For example, a request from the MAC Layer to the Physical Layer to transmit a Forward or Reverse Fundamental Channel frame with frame duration specified by FRAME_DURATION, information bits specified by SDU, and number of bits in a frame specified by NUM_BITS, is notated as follows:

PHY-FCH.Request (SDU, FRAME_DURATION, NUM_BITS)

1.2.3.2 MAC Interface Parameters

This section describes the parameters of the service interface primitives.

BASE_ID – Base station identification.

CACH_ID – Common Assignment Channel number.

CPCCH_ID – Common Power Control Channel number.

EACH_ID – Enhanced Access Channel number.

FCCCH_ID – Forward Common Control Channel number.

- 1 **FRAME_QUALITY** – An indication of the quality of the frame.
- 2 **FRAME_DURATION** – The duration of the frame.
- 3 **HEADER** – Enhanced Access Header, sent in the PHY-EACHHeader.Request primitive.
- 4 **NUM_BITS** – The number of bits in the frame.
- 5 **NUM_PREAMBLE_FRAMES** - The number of Access Channel preamble frames, sent in the
 6 PHY-ACHPreamble.Request primitive; the number of Enhanced Access Channel preamble
 7 frames sent in the PHY-EACHPreamble.Request primitive; or the number of Reverse
 8 Supplemental Code Channel preamble frames sent in the PHY-SCCHPreamble.Request
 9 primitive.
- 10 **PN** – Pilot PN sequence offset index for the Forward CDMA channel.
- 11 **PWR_LVL** – Power level adjustment of the Access probe, in units of PWR_STEP_S, sent in the
 12 PHY-ACHPreamble.Request primitive and PHY-ACH.Request primitive; or the power level
 13 adjustment of the Enhanced Access probe, in units of EACH_PWR_STEP_S, sent in the PHY-
 14 EACHPreamble.Request primitive, the PHY-EACHHeader.Request primitive, and the PHY-
 15 EACH.Request primitive.
- 16 **RA** – The Access Channel number.
- 17 **RES_SCH_ADDR** – The Common Power Control Subchannel Index.
- 18 **RCCCH_ID** – Reverse Common Control Channel number.
- 19 **RN** – The pseudo-random offset of the Access probe from a zero-offset Access Channel
 20 frame.
- 21 **SDU** – Service data unit.
- 22 **SLOT_OFFSET** – Slot offset associated with the Enhanced Access Channel.

23 1.2.3.3 Service Interface Primitives Received by the Physical Layer

24 The primitives sent from the MAC Layer to the Physical Layer are summarized in
 25 Table 1.2.3.3-1.

26

1

Table 1.2.3.3-1. Service Interface Primitives Received by the Physical Layer

Primitive Type	Primitive	Parameters
Request	PHY-ACHPreamble	RA, PWR_LVL, RN, NUM_PREAMBLE_FRAMES
	PHY-ACH	RA, PWR_LVL, RN, SDU
	PHY-EACHPreamble	PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET
	PHY-EACHHeader	PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET, SDU
	PHY-EACH	PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET, SDU, FRAME_DURATION, NUM_BITS
	PHY-RCCCHPreamble	FCCCH_ID, RCCCH_ID, BASE_ID
	PHY-RCCCH	FCCCH_ID, RCCCH_ID, BASE_ID, SDU, FRAME_DURATION, NUM_BITS
	PHY-DCCH	SDU, FRAME_DURATION, NUM_BITS
	PHY-FCH	SDU, FRAME_DURATION, NUM_BITS
	PHY-SCH	SDU, FRAME_DURATION, NUM_BITS
	PHY-SCCHPreamble	NUM_PREAMBLE_FRAMES
	PHY-SCCH	SDU, FRAME_DURATION, NUM_BITS
	PHY-SYNCH	SDU
	PHY-PCH	SDU
	PHY-BCCH	SDU, NUM_BITS
	PHY-CPCCH	PN, CPCCH_ID, RES_SCH_ADDR
	PHY-CACH	SDU, CACH_ID, NUM_BITS
PHY-FCCCH	SDU, FCCCH_ID, FRAME_DURATION, NUM_BITS	

2

1 1.2.3.4 Service Interface Primitives Sent from the Physical Layer

2 The primitives sent from the Physical Layer to the MAC Layer are summarized in
3 Table 1.2.3.4-1.

4
5 **Table 1.2.3.4-1. Service interface Primitives Sent from the Physical Layer**

Primitive-Type	Primitive	Parameters
Indication	PHY-SYNCH	SDU
	PHY-PCH	SDU
	PHY-BCCH	SDU, NUM_BITS, FRAME_QUALITY
	PHY-CACH	SDU, FRAME_QUALITY
	PHY-FCCCH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY
	PHY-DCCH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY
	PHY-FCH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY
	PHY-SCH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY
	PHY-SCCH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY
	PHY-ACH	SDU, FRAME_QUALITY
	PHY-EACHPreamble	
	PHY-EACHHeader	SDU, FRAME_QUALITY
	PHY-EACH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY
	PHY-RCCHPreamble	
	PHY-RCCCH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY

6
7 **1.3 CDMA System Time**

8 All base station digital transmissions are referenced to a common CDMA system-wide time
9 scale that uses the Global Positioning System (GPS) time scale, which is traceable to, and
10 synchronous with, Universal Coordinated Time (UTC). GPS and UTC differ by an integer
11 number of seconds, specifically the number of leap second corrections added to UTC since

1 January 6, 1980. The start of CDMA System Time is January 6, 1980 00:00:00 UTC, which
2 coincides with the start of GPS time.

3 System Time keeps track of leap second corrections to UTC but does not use these
4 corrections for physical adjustments to the System Time clocks.

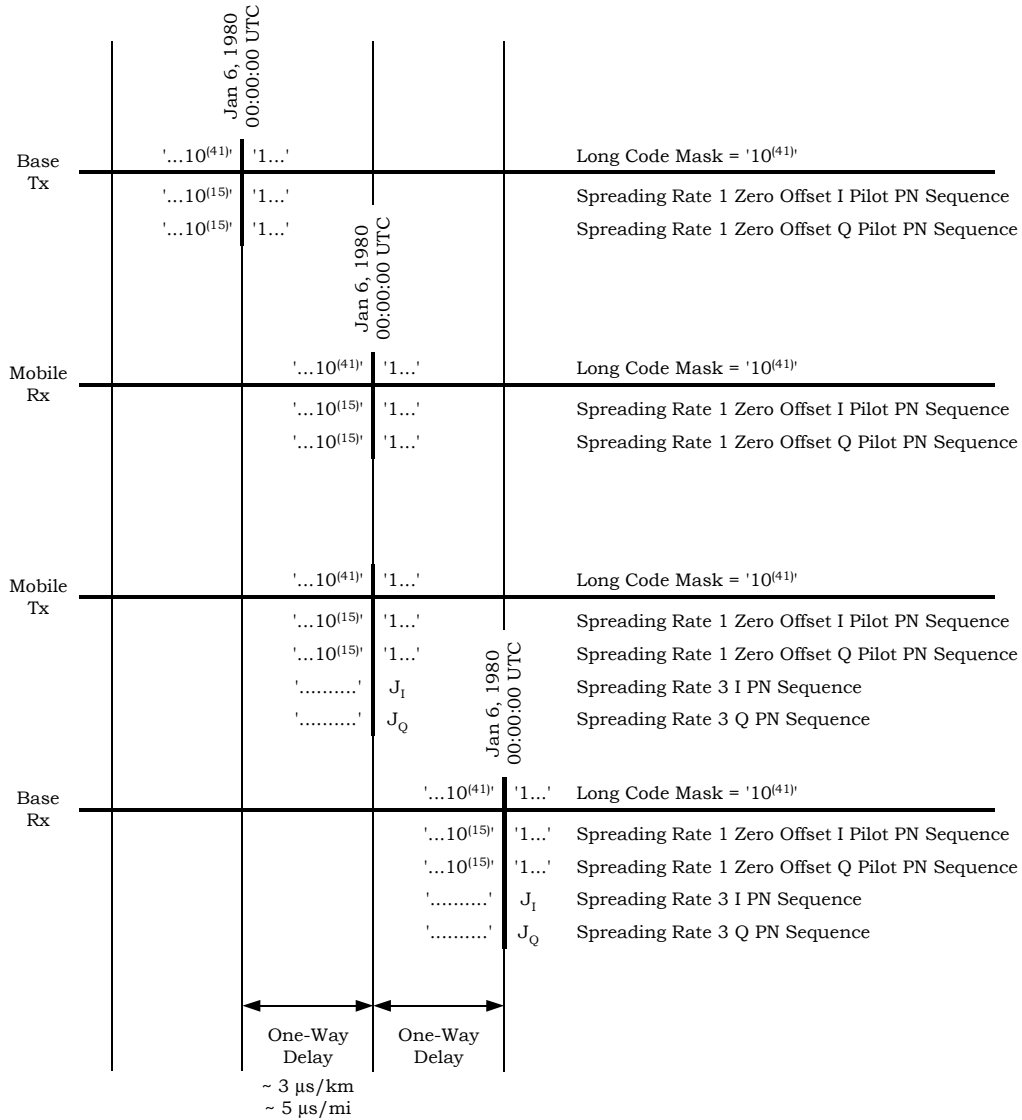
5 Figure 1.3-1 shows the relation of System Time at various points in the CDMA system. The
6 long code and the zero offset PN sequences for the I and Q channels (see 2.1.3.1.11,
7 2.1.3.1.12, and 3.1.3.1.13) are shown in their initial states at the start of System Time. The
8 initial state of the long code is that state in which the output of the long code generator is
9 the first '1' output following 41 consecutive '0' outputs, with the binary mask consisting of
10 '1' in the MSB followed by 41 '0's. Referring to the shift register in Figure 2.1.3.1.12-1, this
11 implies that the 42nd bit in the shift register equals '1' and that all other bits in the shift
12 register are equal to '0'.

13 A pair of 2^{15} length PN sequences are used for the Forward CDMA Channel and the
14 Spreading Rate 1 Reverse CDMA Channel. The initial state of the 2^{15} PN sequence, for both
15 I and Q channels, is the state in which the output of the PN sequence generator is the first
16 '1' output following 15 consecutive '0' outputs. A pair of 3×2^{15} length PN sequences are
17 used for the Spreading Rate 3 Reverse CDMA Channel. The initial state of the 3×2^{15} PN
18 sequence for the I channel is the state in which the first 20 outputs of the I PN sequence
19 generator are '1000 0000 0001 0001 0100'. The initial state of the 3×2^{15} PN sequence for
20 the Q channel is the state in which the first 20 outputs of the Q PN sequence generator are
21 '1001 0000 0010 0100 0101'.

22 From Figure 1.3-1, note that the System Time at various points in the transmission and
23 reception processes is the absolute time referenced at the base station antenna offset by
24 the one-way or round-trip delay of the transmission, as appropriate. Time measurements
25 are referenced to the transmit and receive antennas of the base station and the RF
26 connector of the mobile station. The precise zero instant of System Time is the midpoint
27 between the last '0' of the 41 consecutive '0' outputs and the succeeding '1' of the long code
28 using the binary mask consisting of '1' in the MSB followed by 41 '0's.

29 Wherever this document refers to CDMA System time in 20 ms frames, it is taken to mean
30 an integer value t such that: $t = \lfloor s/0.02 \rfloor$, where s represents System Time in seconds.

31



Note: Time measurements are made at the antennas of base stations and the RF connectors of the mobile stations.
 0⁽ⁿ⁾ denotes a sequence of n consecutive zeroes.
 J_I = '1000, 0000, 0001, 0001, 0100'.
 J_Q = '1001, 0000, 0010, 0100, 0101'.

1
2
3

Figure 1.3-1. System Time Line

1 **1.4 Tolerances**

2 Unless otherwise specified, all values indicated are exact unless an explicit tolerance is
3 stated. Also refer to [10] and [11].

4 **1.5 Reserved Bits**

5 Some bits are marked as reserved bits in the frame structure of some channels. Some or all
6 of these reserved bits may be used in the future. The mobile station and the base station
7 shall set all bits that are marked as reserved bits to '0' in all frames that they transmit. The
8 mobile station and the base station shall ignore the state of all bits that are marked as
9 reserved bits in all frames that they receive.

10

2 REQUIREMENTS FOR MOBILE STATION CDMA OPERATION

This section defines requirements that are specific to CDMA mobile station equipment and operation. A CDMA mobile station may support operation in one or more band classes and spreading rates.

2.1 Transmitter

2.1.1 Frequency Parameters

2.1.1.1 Channel Spacing and Designation

2.1.1.1.1 Band Class 0 (800 MHz Band)

The Band Class 0 system designators for the mobile station and base station shall be as specified in Table 2.1.1.1.1-1.

There are two band subclasses specified for Band Class 0. Mobile stations supporting Band Class 0 shall support at least one band subclass belonging to Band Class 0.

Mobile stations supporting Band Class 0 shall be capable of transmitting in Band Class 0.

The channel spacing, CDMA channel designations, and transmitter center frequencies of Band Class 0 shall be as specified in Table 2.1.1.1.1-2. Mobile stations supporting Band Class 0 and Spreading Rate 1 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.1-3.¹ Mobile stations supporting Band Class 0 and Spreading Rate 3 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.1-4.²

Channel numbers for the Primary CDMA Channels and the Secondary CDMA Channels are given in Table 2.1.1.1.1-5.

A preferred set of Sync Channel frequency assignments for the multi-carrier mode is given in Table 2.1.1.1.1-6.

If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s - 41$ if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 41$ if $1XRL_FREQ_OFFSET_s$ equals '10'.

^{1,2} Note that the Korean Cellular Band uses Band Subclass 1 and has additional valid channels that a Band Class 0 mobile station should support to permit roaming to Korea.

1 If the mobile station is transmitting and receiving using the same spreading rate, the
 2 nominal mobile station transmit carrier frequency shall be 45.0 MHz lower than the
 3 frequency of the base station transmit signal as measured at the mobile station receiver. If
 4 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3,
 5 the nominal mobile station transmit carrier frequency shall be $45.0 - 1.23 \times$
 6 $(1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the carrier frequency of the center CDMA
 7 channel transmitted by the base station as measured at the mobile station receiver.

8
 9 **Table 2.1.1.1.1-1. Band Class 0 System Frequency Correspondence**

System Designator	Band Subclass	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
A	0	824.025–835.005 844.995–846.495	869.025–880.005 889.995–891.495
	1	824.025–835.005 844.995–848.985	869.025–880.005 889.995–893.985
B	0	835.005–844.995 846.495–848.985	880.005–889.995 891.495–893.985
	1	835.005–844.995	880.005–889.995

10
 11 **Table 2.1.1.1.1-2. CDMA Channel Number to CDMA Frequency Assignment**
 12 **Correspondence for Band Class 0**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$1 \leq N \leq 799$	$0.030 N + 825.000$
	$991 \leq N \leq 1023$	$0.030 (N - 1023) + 825.000$
Base Station	$1 \leq N \leq 799$	$0.030 N + 870.000$
	$991 \leq N \leq 1023$	$0.030 (N - 1023) + 870.000$

1
2**Table 2.1.1.1-3. CDMA Channel Numbers and Corresponding Frequencies for Band Class 0 and Spreading Rate 1**

Band Subclass	System Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
				Mobile Station	Base Station
0	A" (1 MHz)	Not Valid	991–1012	824.040–824.670	869.040–869.670
		Valid	1013–1023	824.700–825.000	869.700–870.000
	A (10 MHz)	Valid	1–311	825.030–834.330	870.030–879.330
		Not Valid	312–333	834.360–834.990	879.360–879.990
		B (10 MHz)	Not Valid	334–355	835.020–835.650
	Valid		356–644	835.680–844.320	880.680–889.320
	Not Valid		645–666	844.350–844.980	889.350–889.980
	A' (1.5 MHz)	Not Valid	667–688	845.010–845.640	890.010–890.640
		Valid	689–694	845.670–845.820	890.670–890.820
		Not Valid	695–716	845.850–846.480	890.850–891.480
B' (2.5 MHz)	Not Valid	717–738	846.510–847.140	891.510–892.140	
	Valid	739–777	847.170–848.310	892.170–893.310	
	Not Valid	778–799	848.340–848.970	893.340–893.970	
1	A" (1 MHz)	Not Valid	991–1012	824.040–824.670	869.040–869.670
		Valid	1013–1023	824.700–825.000	869.700–870.000
	A (10 MHz)	Valid	1–311	825.030–834.330	870.030–879.330
		Not Valid	312–333	834.360–834.990	879.360–879.990
		B (10 MHz)	Not Valid	334–355	835.020–835.650
	Valid		356–644	835.680–844.320	880.680–889.320
Not Valid	645–666		844.350–844.980	889.350–889.980	
A' (1.5 MHz)	Not Valid	667–688	845.010–845.640	890.010–890.640	
	Valid	689–716	845.670–846.480	890.670–891.480	
A''' (2.5 MHz)	Valid	717–779	846.510–848.370	891.510–893.370	
	Not Valid	780–799	848.400–848.970	893.400–893.970	

3

1 **Table 2.1.1.1.1-4. CDMA Channel Numbers and Corresponding Frequencies for Band**
 2 **Class 0 and Spreading Rate 3**

Band Subclass	System Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
				Mobile Station	Base Station
0	A" (1 MHz)	Not Valid	991–1023	824.040–825.000	869.040–870.000
	A (10 MHz)	Not Valid	1–36	825.030–826.080	870.030–871.080
		Valid	37–262	826.110–832.860	871.110–877.860
		Not Valid	263–333	832.890–834.990	877.890–879.990
	B (10 MHz)	Not Valid	334–404	835.020–837.120	880.020–882.120
Valid		405–595	837.150–842.850	882.150–887.850	
Not Valid		596–666	842.880–844.980	887.880–889.980	
A' (1.5 MHz)	Not Valid	667–716	845.010–846.480	890.010–891.480	
B' (2.5 MHz)	Not Valid	717–799	846.510–848.970	891.510–893.970	
1	A" (1 MHz)	Not Valid	991–1023	824.040–825.000	869.040–870.000
	A (10 MHz)	Not Valid	1–36	825.030–826.080	870.030–871.080
		Valid	37–262	826.110–832.860	871.110–877.860
		Not Valid	263–333	832.890–834.990	877.890–879.990
	B (10 MHz)	Not Valid	334–403	835.020–837.090	880.020–882.090
Valid		404–595	837.120–842.850	882.120–887.850	
Not Valid		596–666	842.880–844.980	887.880–889.980	
A' (1.5 MHz)	Not Valid	667–716	845.010–846.480	890.010–891.480	
A''' (2.5 MHz)	Not Valid	717–737	846.510–847.110	891.510–892.110	
	Valid	738	847.140	892.140	
	Not Valid	739–799	847.170–848.970	892.170–893.970	

3

1 **Table 2.1.1.1.1-5. CDMA Preferred Set of Frequency Assignments for Band Class 0**

Band Subclass	System Designator	Spreading Rate	Preferred Set Channel Numbers
0	A	1	283 (Primary) and 691 (Secondary)
		3	37, 78, 119, 160, 201, 242 ³
	B	1	384 (Primary) and 777 (Secondary)
		3	425 ³ , 466, 507, 548, 589
1	A	1	779 (Primary) and 738 (Secondary)
		3	37, 78, 119, 160, 201, 242, 738 ⁴
	B	1	486 (Primary) and 568 (Secondary)
		3	404, 445, 486, 527, 568 ⁴

2
3 **Table 2.1.1.1.1-6. Sync Channel Preferred Set of Frequency Assignments for**
4 **Spreading Rate 3 for Band Class 0**

Band Subclass	System Designator	Preferred Set of Channel Numbers
0	A	37, 160, 283
	B	384, 507, 630
1	A	37, 160, 283, 779
	B	363, 486, 609

5
6 2.1.1.1.2 Band Class 1 (1900 MHz Band)

7 The Band Class 1 block designators for the mobile station and base station shall be as
8 specified in Table 2.1.1.1.2-1.

9 Mobile stations supporting Band Class 1 shall be capable of transmitting in Band Class 1.

10 The channel spacing, CDMA channel designations, and transmitter center frequencies of
11 Band Class 1 shall be as specified in Table 2.1.1.1.2-2. Mobile stations supporting Band
12 Class 1 and Spreading Rate 1 shall support transmission on the valid and conditionally

³ The use of preferred channel numbers 242 or 425 for Spreading Rate 3 ensures that overlaid multi-channel forward link systems with 1.23 MHz inter-channel spacing will contain a Spreading Rate 1 Forward CDMA Channel that aligns with one of the Spreading Rate 1 preferred channel numbers.

⁴ The use of preferred channel numbers 738, 445, 486, 527, or 568 for Spreading Rate 3 ensures that overlaid multi-channel forward link systems with 1.23 MHz inter-channel spacing will contain a Spreading Rate 1 Forward CDMA Channel that aligns with one of the Spreading Rate 1 preferred channel numbers.

1 valid channel numbers shown in Table 2.1.1.1.2-3. Mobile stations supporting Band Class
 2 1 and Spreading Rate 3 shall support transmission on the valid and conditionally valid
 3 channel numbers shown in Table 2.1.1.1.2-4. Note that certain channel assignments are
 4 not valid and others are conditionally valid. Transmission on conditionally valid channels is
 5 permissible if the adjacent block is allocated to the same licensee or if other valid
 6 authorization has been obtained.

7 A preferred set of CDMA frequency assignments is given in Table 2.1.1.1.2-5.

8 A preferred set of Sync Channel frequency assignments for the multi-carrier mode is given
 9 in Table 2.1.1.1.2-6.

10 If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and
 11 Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA
 12 Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the
 13 Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it
 14 shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$
 15 - 25 if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if
 16 $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 25$
 17 if $1XRL_FREQ_OFFSET_s$ equals '10'.

18 If the mobile station is transmitting and receiving using the same spreading rate, the
 19 nominal mobile station transmit carrier frequency shall be 80.0 MHz lower than the
 20 frequency of the base station transmit signal as measured at the mobile station receiver. If
 21 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3,
 22 the nominal mobile station transmit carrier frequency shall be $80.0 - 1.25 \times$
 23 $(1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the center frequency of the center CDMA
 24 channel transmitted by the base station as measured at the mobile station receiver.

25
 26 **Table 2.1.1.1.2-1. Band Class 1 Block Frequency Correspondence**

Block Designator	Transmit Frequency Band (MHz)	
	Mobile Station	Base Station
A	1850–1865	1930–1945
D	1865–1870	1945–1950
B	1870–1885	1950–1965
E	1885–1890	1965–1970
F	1890–1895	1970–1975
C	1895–1910	1975–1990

**Table 2.1.1.1.2-2. CDMA Channel Number to CDMA Frequency Assignment
Correspondence for Band Class 1**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 1199$	$1850.000 + 0.050 N$
Base Station	$0 \leq N \leq 1199$	$1930.000 + 0.050 N$

**Table 2.1.1.1.2-3. CDMA Channel Numbers and Corresponding Frequencies for
Band Class 1 and Spreading Rate 1**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (15 MHz)	Not Valid	0–24	1850.000–1851.200	1930.000–1931.200
	Valid	25–275	1851.250–1863.750	1931.250–1943.750
	Cond. Valid	276–299	1863.800–1864.950	1943.800–1944.950
D (5 MHz)	Cond. Valid	300–324	1865.000–1866.200	1945.000–1946.200
	Valid	325–375	1866.250–1868.750	1946.250–1948.750
	Cond. Valid	376–399	1868.800–1869.950	1948.800–1949.950
B (15 MHz)	Cond. Valid	400–424	1870.000–1871.200	1950.000–1951.200
	Valid	425–675	1871.250–1883.750	1951.250–1963.750
	Cond. Valid	676–699	1883.800–1884.950	1963.800–1964.950
E (5 MHz)	Cond. Valid	700–724	1885.000–1886.200	1965.000–1966.200
	Valid	725–775	1886.250–1888.750	1966.250–1968.750
	Cond. Valid	776–799	1888.800–1889.950	1968.800–1969.950
F (5 MHz)	Cond. Valid	800–824	1890.000–1891.200	1970.000–1971.200
	Valid	825–875	1891.250–1893.750	1971.250–1973.750
	Cond. Valid	876–899	1893.800–1894.950	1973.800–1974.950
C (15 MHz)	Cond. Valid	900–924	1895.000–1896.200	1975.000–1976.200
	Valid	925–1175	1896.250–1908.750	1976.250–1988.750
	Not Valid	1176–1199	1908.800–1909.950	1988.800–1989.950

1
2**Table 2.1.1.1.2-4. CDMA Channel Numbers and Corresponding Frequencies for Band Class 1 and Spreading Rate 3**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (15 MHz)	Not Valid	0–49	1850.000–1852.450	1930.000–1932.450
	Valid	50–250	1852.500–1862.500	1932.500–1942.500
	Cond. Valid	251–299	1862.550–1864.950	1942.550–1944.950
D (5 MHz)	Cond. Valid	300–349	1865.000–1867.450	1945.000–1947.450
	Valid	350	1867.500	1947.500
	Cond. Valid	351–399	1867.550–1869.950	1947.550–1949.950
B (15 MHz)	Cond. Valid	400–449	1870.000–1872.450	1950.000–1952.450
	Valid	450–650	1872.500–1882.500	1952.500–1962.500
	Cond. Valid	651–699	1882.550–1884.950	1962.550–1964.950
E (5 MHz)	Cond. Valid	700–749	1885.000–1887.450	1965.000–1967.450
	Valid	750	1887.500	1967.500
	Cond. Valid	751–799	1887.550–1889.950	1967.550–1969.950
F (5 MHz)	Cond. Valid	800–849	1890.000–1892.450	1970.000–1972.450
	Valid	850	1892.500	1972.500
	Cond. Valid	851–899	1892.550–1894.950	1972.550–1974.950
C (15 MHz)	Cond. Valid	900–949	1895.000–1897.450	1975.000–1977.450
	Valid	950–1150	1897.500–1907.500	1977.500–1987.500
	Not Valid	1151–1199	1907.550–1909.950	1987.550–1989.950

3
4

1 **Table 2.1.1.1.2-5. CDMA Preferred Set of Frequency Assignments for Band Class 1**

Block Designator	Spreading Rate	Preferred Set Channel Numbers
A	1	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275
	3	50, 75, 100, 125, 150, 175, 200, 225, 250
D	1	325, 350, 375
	3	350
B	1	425, 450, 475, 500, 525, 550, 575, 600, 625, 650, 675
	3	450, 475, 500, 525, 550, 575, 600, 625, 650
E	1	725, 750, 775
	3	750
F	1	825, 850, 875
	3	850
C	1	925, 950, 975, 1000, 1025, 1050, 1075, 1100, 1125, 1150, 1175
	3	950, 975, 1000, 1025, 1050, 1075, 1100, 1125, 1150

2

3 **Table 2.1.1.1.2-6. Sync Channel Preferred Set of Frequency Assignments for**
4 **Spreading Rate 3 for Band Class 1**

Block Designator	Preferred Set of Channel Numbers
A	75, 150, 225
D	350
B	475, 550, 625
E	750
F	850
C	975, 1050, 1125

5

6 2.1.1.1.3 Band Class 2 (TACS Band)

7 The Band Class 2 block designators for the mobile station and base station shall be as
8 specified in Table 2.1.1.1.3-1.9 Mobile stations supporting Band Class 2 shall be capable of transmitting in Band Class 2
10 using at least one band subclass. The band subclasses for Band Class 2 are specified in
11 Table 2.1.1.1.3-2.

1 The channel spacing, CDMA channel designations, and transmitter center frequencies of
 2 Band Class 2 shall be as specified in Table 2.1.1.1.3-3. Mobile stations supporting Band
 3 Class 2 and Spreading Rate 1 shall support transmission on the valid channel numbers
 4 shown in Table 2.1.1.1.3-4. Mobile stations supporting Band Class 2 and Spreading Rate 3
 5 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.3-5.

6 A preferred set of CDMA frequency assignments is given in Table 2.1.1.1.3-6.

7 If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and
 8 Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA
 9 Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the
 10 Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it
 11 shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$
 12 - 50 if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if
 13 $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 50$
 14 if $1XRL_FREQ_OFFSET_s$ equals '10'.

15 If the mobile station is transmitting and receiving using the same spreading rate, the
 16 nominal mobile station transmit carrier frequency shall be 45.0 MHz lower than the
 17 frequency of the base station transmit signal as measured at the mobile station receiver. If
 18 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3,
 19 the nominal mobile station transmit carrier frequency shall be $45.0 - 1.25 \times$
 20 $(1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the center frequency of the center CDMA
 21 channel transmitted by the base station as measured at the mobile station receiver.

22
 23 **Table 2.1.1.1.3-1. Band Class 2 Block Frequency Correspondence**

Block Designator	Transmit Frequency Band (MHz)	
	Mobile Station	Base Station
A	872.0125-879.9875	917.0125-924.9875
	890.0125-897.4875	935.0125-942.4875
	905.0125-908.9875	950.0125-953.9875
B	880.0125-887.9875	925.0125-932.9875
	897.5125-904.9875	942.5125-949.9875
	909.0125-914.9875	954.0125-959.9875

1

Table 2.1.1.1.3-2. Band Class 2 Band Subclasses

Channels Covered	Band Subclass
600	0
1000	1
1320	2

2

3

Table 2.1.1.1.3-3. CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 2

4

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 1000$	$0.025 N + 889.9875$
	$1329 \leq N \leq 2047$	$0.025 (N - 1328) + 871.9875$
Base Station	$0 \leq N \leq 1000$	$0.025 N + 934.9875$
	$1329 \leq N \leq 2047$	$0.025 (N - 1328) + 916.9875$

5

1 **Table 2.1.1.1.3-4. CDMA Channel Numbers and Corresponding Frequencies for**
 2 **Band Class 2 and Spreading Rate 1**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A ETACS (8 MHz)	Not Valid Valid-1320	1329-1355 1356-1648	872.0125-872.6625 872.6875-879.9875	917.0125-917.6625 917.6875-924.9875
B ETACS (8 MHz)	Valid-1320	1649-1941	880.0125-887.3125	925.0125-932.3125
Unassigned (2 MHz)	Cond. Valid-1320	1969-2047 0	888.0125-889.9625 889.9875	933.0125-934.9625 934.9875
A (7.5 MHz)	Cond. Valid-1320 Valid	1-28 29-300	890.0125-890.6875 890.7125-897.4875	935.0125-935.6875 935.7125-942.4875
B (7.5 MHz)	Valid Cond. Valid-1000	301-573 574-600	897.5125-904.3125 904.3375-904.9875	942.5125-949.3125 949.3375-949.9875
A' (4 MHz)	Valid-1000	601-760	905.0125-908.9875	950.0125-953.9875
B' (6 MHz)	Valid-1000 Not Valid	761-973 974-1000	909.0125-914.3125 914.3375-914.9875	954.0125-959.3125 959.3375-959.9875

Valid refers to 600, 1000, and 1320 channel mobile stations. Valid-1000 refers to 1000 channel mobile stations. Valid-1320 refers to 1320 channel mobile stations.

Table 2.1.1.1.3-5. CDMA Channel Numbers and Corresponding Frequencies for Band Class 2 and Spreading Rate 3

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A ETACS (8 MHz)	Not Valid Valid-1320	1329-Not specified Not specified-1648	872.0125-Not specified Not specified-879.9875	917.0125-Not specified Not specified-924.9875
B ETACS (8 MHz)	Valid-1320	1649-1941	880.0125-887.3125	925.0125-932.3125
Unassigned (2 MHz)	Cond. Valid-1320	1969-2047 0	888.0125-889.9625 889.9875	933.0125-934.9625 934.9875
A (7.5 MHz)	Cond. Valid-1320 Valid	1-Not specified Not specified-300	890.0125-Not specified Not specified-897.4875	935.0125-Not specified Not specified-942.4875
B (7.5 MHz)	Valid Cond. Valid-1000	301-573 Not specified-600	897.5125-904.3125 Not specified-904.9875	942.5125-949.3125 Not specified-949.9875
A' (4 MHz)	Valid-1000	601-760	905.0125-908.9875	950.0125-953.9875
B' (6 MHz)	Valid-1000 Not Valid	761-Not specified Not specified-1000	909.0125-Not specified Not specified-914.9875	954.0125-Not specified Not specified-959.9875

Valid refers to 600, 1000, and 1320 channel mobile stations. Valid-1000 refers to 1000 channel mobile stations. Valid-1320 refers to 1320 channel mobile stations.

Table 2.1.1.1.3-6. CDMA Preferred Set of Frequency Assignments for Band Class 2

Block Designator	Spreading Rate	Preferred Set Channel Numbers
A	1	79, 679, or 1365
	3	Not specified
B	1	379, 947, or 1932
	3	Not specified

1 2.1.1.1.4 Band Class 3 (JTACS Band)

2 The Band Class 3 system designators for the mobile station and base station shall be as
3 specified in Table 2.1.1.1.4-1.

4 Mobile stations supporting Band Class 3 shall be capable of transmitting in Band Class 3.

5 The channel spacing, CDMA channel designations, and transmitter center frequencies of
6 Band Class 3 shall be as specified in Table 2.1.1.1.4-2. Mobile stations supporting Band
7 Class 3 and Spreading Rate 1 shall support transmission on the valid and conditionally
8 valid channel numbers shown in Table 2.1.1.1.4-3. Note that certain channel assignments
9 are not valid and others are conditionally valid. Transmission on conditionally valid
10 channels is permissible if the adjacent block is allocated to the same licensee or if other
11 valid authorization has been obtained.

12 Channel numbers for the Primary CDMA Channels and the Secondary CDMA Channels are
13 given in Table 2.1.1.1.4-4.

14 If the mobile station uses Spreading Rate 1 for both Forward and Reverse Traffic Channel,
15 then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by
16 CDMACH_S.

17 If the mobile station is transmitting and receiving using the same spreading rate, the
18 nominal mobile station transmit carrier frequency shall be 55.0 MHz higher than the
19 frequency of the base station transmit signal as measured at the mobile station receiver.

20

21

Table 2.1.1.1.4-1. Band Class 3 System Frequency Correspondence

System Designator	Transmit Frequency Band (MHz)	
	Mobile Station	Base Station
A	887.0125-888.9875 893.0125-898.0000 898.0125-900.9875 915.0125-924.9875	832.0125-833.9875 838.0125-843.0000 843.0125-845.9875 860.0125-869.9875
B	Not specified	Not specified

22

**Table 2.1.1.1.4-2. CDMA Channel Number to CDMA Frequency Assignment
Correspondence for Band Class 3**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$1 \leq N \leq 799$	$0.0125 N + 915.000$
	$801 \leq N \leq 1039$	$0.0125 (N-800) + 898.000$
	$1041 \leq N \leq 1199$	$0.0125 (N-1040) + 887.000$
	$1201 \leq N \leq 1600$	$0.0125 (N - 1200) + 893.000$
Base Station	$1 \leq N \leq 799$	$0.0125 N + 860.000$
	$801 \leq N \leq 1039$	$0.0125 (N-800) + 843.000$
	$1041 \leq N \leq 1199$	$0.0125 (N-1040) + 832.000$
	$1201 \leq N \leq 1600$	$0.0125 (N - 1200) + 838.000$

In this Table, only even-valued N values are valid.

**Table 2.1.1.1.4-3. CDMA Channel Numbers and Corresponding Frequencies for
Band Class 3 and Spreading Rate 1**

System Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A1 (2 MHz)	Not Valid	1041-1099	887.0125-887.7375	832.0125-832.7375
	Valid	1100-1140	887.7500-888.2500	832.7500-833.2500
	Not Valid	1141-1199	888.2625-888.9875	833.2625-833.9875
A3 (5 MHz)	Not Valid	1201-1259	893.0125-893.7375	838.0125-838.7375
	Valid	1260-1540	893.7500-897.2500	838.7500-842.2500
	Cond. Valid	1541-1600	897.2625-898.0000	842.2625-843.0000
A2 (3 MHz)	Cond. Valid	801-859	898.0125-898.7375	843.0125-843.7375
	Valid	860-980	898.7500-900.2500	843.7500-845.2500
	Not Valid	981-1039	900.2625-900.9875	845.2625-845.9875
A (10 MHz)	Not Valid	1-59	915.0125-915.7375	860.0125-860.7375
	Valid	60-740	915.7500-924.2500	860.7500-869.2500
	Not Valid	741-799	924.2625-924.9875	869.2625-869.9875
B	Not specified	Not specified	Not specified	Not specified

Table 2.1.1.1.4-4. CDMA Preferred Set of Frequency Assignments for Band Class 3

System Designator	Spreading Rate	Preferred Set Channel Numbers
A	1	76 (Primary) and 872 (Secondary)
B	1	Not specified

2.1.1.1.5 Band Class 4 (Korean PCS Band)

The Band Class 4 block designators for the mobile station and base station shall be as specified in Table 2.1.1.1.5-1.

Mobile stations supporting Band Class 4 shall be capable of transmitting in Band Class 4.

The channel spacing, CDMA channel designations, and transmitter center frequencies of Band Class 4 shall be as specified in Table 2.1.1.1.5-2. Mobile stations supporting Band Class 4 and Spreading Rate 1 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.5-3. Mobile stations supporting Band Class 4 and Spreading Rate 3 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.5-4.

Channel numbers for the Primary CDMA Channels and the Secondary CDMA Channels are given in Table 2.1.1.1.5-5.

A preferred set of Sync Channel frequency assignments for the multi-carrier mode is given in Table 2.1.1.1.5-6.

If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s - 25$ if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 25$ if $1XRL_FREQ_OFFSET_s$ equals '10'.

If the mobile station is transmitting and receiving using the same spreading rate, the nominal mobile station transmit carrier frequency shall be 90.0 MHz lower than the frequency of the base station transmit signal as measured at the mobile station receiver. If the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3, the nominal mobile station transmit carrier frequency shall be $90.0 - 1.25 \times (1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the center frequency of the center CDMA channel transmitted by the base station as measured at the mobile station receiver.

1 **Table 2.1.1.1.5-1. Band Class 4 Block Frequency Correspondence**

Block Designator	Transmit Frequency Band (MHz)	
	Mobile Station	Base Station
A	1750-1760	1840-1850
B	1760-1770	1850-1860
C	1770-1780	1860-1870

2
3 **Table 2.1.1.1.5-2. CDMA Channel Number to CDMA Frequency Assignment**
4 **Correspondence for Band Class 4**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 599$	$0.050 N + 1750.000$
Base Station	$0 \leq N \leq 599$	$0.050 N + 1840.000$

5
6 **Table 2.1.1.1.5-3. CDMA Channel Numbers and Corresponding Frequencies for Band**
7 **Class 4 and Spreading Rate 1**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (10 MHz)	Not Valid	0–24	1750.000–1751.200	1840.000–1841.200
	Valid	25–175	1751.250–1758.750	1841.250–1848.750
	Cond. Valid	176–199	1758.800–1759.950	1848.800–1849.950
B (10 MHz)	Cond. Valid	200–224	1760.000–1761.200	1850.000–1851.200
	Valid	225–375	1761.250–1768.750	1851.250–1858.750
	Cond. Valid	376–399	1768.800–1769.950	1858.800–1859.950
C (10 MHz)	Cond. Valid	400–424	1770.000–1771.200	1860.000–1861.200
	Valid	425–575	1771.250–1778.750	1861.250–1868.750
	Not Valid	576–599	1778.800–1779.950	1868.800–1869.950

8

Table 2.1.1.1.5-4. CDMA Channel Numbers and Corresponding Frequencies for Band Class 4 and Spreading Rate 3

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (10 MHz)	Not Valid	0–49	1750.000–1752.450	1840.000–1842.450
	Valid	50–150	1752.500–1757.500	1842.500–1847.500
	Cond. Valid	151–199	1757.550–1759.950	1847.550–1849.950
B (10 MHz)	Cond. Valid	200–249	1760.000–1762.450	1850.000–1852.450
	Valid	250–350	1762.500–1767.500	1852.500–1857.500
	Cond. Valid	351–399	1767.550–1769.950	1857.550–1859.950
C (10 MHz)	Cond. Valid	400–449	1770.000–1772.450	1860.000–1862.450
	Valid	450–550	1772.500–1777.500	1862.500–1867.500
	Not Valid	551–599	1777.550–1779.950	1867.550–1869.950

Table 2.1.1.1.5-5. CDMA Preferred Set of Frequency Assignments for Band Class 4

Block Designator	Spreading Rate	Preferred Set Channel Numbers
A	1	25, 50, 75, 100, 125, 150, 175
	3	50, 75, 100, 125, 150
B	1	225, 250, 275, 300, 325, 350, 375
	3	250, 275, 300, 325, 350
C	1	425, 450, 475, 500, 525, 550, 575
	3	450, 475, 500, 525, 550

Table 2.1.1.1.5-6. Sync Channel Preferred Set of Frequency Assignments for Spreading Rate 3 for Band Class 4

Block Designator	Preferred Set of Channel Numbers
A	75, 150
B	275, 350
C	475, 550

1 2.1.1.1.6 Band Class 5 (450 MHz Band)

2 The Band Class 5 block designators for the mobile station and base station shall be as
3 specified in Table 2.1.1.1.6-1.

4 There are eight band subclasses specified for Band Class 5. Each band subclass
5 corresponds to a specific block designator (see Table 2.1.1.1.6-1). Each band subclass
6 includes all the channels designated for that block. Mobile stations supporting Band Class
7 5 shall be capable of transmitting in at least one band subclass belonging to Band Class 5.
8 For mobiles capable of transmitting in more than one band subclass belonging to Band
9 Class 5, one band subclass shall be designated as the Primary Band Subclass, which is the
10 band subclass used by the mobile's home system.

11 The channel spacing, CDMA channel designations, and transmitter center frequencies of
12 Band Class 5 shall be as specified in Table 2.1.1.1.6-2. Mobile stations supporting Band
13 Class 5 and Spreading Rate 1 shall support transmission on the valid channel numbers
14 shown in Table 2.1.1.1.6-3, depending on the Band Subclass of mobile station. Mobile
15 stations supporting Band Class 5 and Spreading Rate 3 shall support transmission on the
16 valid channel numbers shown in Table 2.1.1.1.6-4, depending on the Band Subclass of
17 mobile station.

18 Channel numbers for the Primary CDMA Channels and the Secondary CDMA Channels
19 and the band subclasses are given in 2.1.1.1.6-5.

20 A preferred set of Sync Channel frequency assignments for the multi-carrier mode is given
21 in Table 2.1.1.1.6-6.

22 If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and
23 Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA
24 Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the
25 Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel and is
26 operating in Band Subclass A, B, C, or E; then it shall transmit the Reverse Traffic Channel
27 on the CDMA Channel designated by $CDMACH_s - 50$ if $1XRL_FREQ_OFFSET_s$ equals '00',
28 on the CDMA Channel designated by $CDMACH_s$ if $1XRL_FREQ_OFFSET_s$ equals '01', or on
29 the CDMA Channel designated by $CDMACH_s + 50$ if $1XRL_FREQ_OFFSET_s$ equals '10'. If
30 the mobile station uses Spreading Rate 3 for the Forward Traffic Channel and uses
31 Spreading Rate 1 for the Reverse Traffic Channel and is operating in Band Subclass F, G,
32 or H; then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated
33 by $CDMACH_s - 62$ if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated
34 by $CDMACH_s$ if $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by
35 $CDMACH_s + 62$ if $1XRL_FREQ_OFFSET_s$ equals '10'.

36 If the mobile station is transmitting and receiving using the same spreading rate, the
37 nominal mobile station transmit carrier frequency shall be 10.0 MHz lower than the
38 frequency of the base station transmit signal as measured at the mobile station receiver. If
39 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3
40 and is operating in Band Subclass A, B, C, or E, the nominal mobile station transmit
41 carrier frequency shall be $10.0 - 1.25 \times (1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the
42 frequency of the base station transmit signal as measured at the mobile station receiver. If

1 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3
 2 and is operating in Band Subclass F, G, or H, the nominal mobile station transmit carrier
 3 frequency shall be $10.0 - 1.24 \times (1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the center
 4 frequency of the center CDMA channel transmitted by the base station as measured at the
 5 mobile station receiver.

6
 7 **Table 2.1.1.1.6-1. Band Class 5 Block Frequency Correspondence**
 8 **and Band Subclasses**

Block Designator	Band Subclass	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
A	0	452.500-457.475	462.500-467.475
B	1	452.000-456.475	462.000-466.475
C	2	450.000-454.800	460.000-464.800
D	3	411.675-415.850	421.675-425.850
E	4	415.500-419.975	425.500-429.975
F	5	479.000-483.480	489.000-493.480
G	6	455.230-459.990	465.230-469.990
H	7	451.310-455.730	461.310-465.730

9
 10 **Table 2.1.1.1.6-2. CDMA Channel Number to CDMA Frequency Assignment**
 11 **Correspondence for Band Class 5**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$1 \leq N \leq 300$	$0.025 (N-1) + 450.000$
	$539 \leq N \leq 871$	$0.025 (N-512) + 411.000$
	$1039 \leq N \leq 1473$	$0.020 (N-1024) + 451.010$
	$1792 \leq N \leq 2016$	$0.020 (N-1792) + 479.000$
Base Station	$1 \leq N \leq 300$	$0.025 (N-1) + 460.000$
	$539 \leq N \leq 871$	$0.025 (N-512) + 421.000$
	$1039 \leq N \leq 1473$	$0.020 (N-1024) + 461.010$
	$1792 \leq N \leq 2016$	$0.020 (N-1792) + 489.000$

1 **Table 2.1.1.1.6-3. CDMA Channel Numbers and Corresponding Frequencies for**
 2 **Band Class 5 and Spreading Rate 1**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (4.5 MHz)	Not Valid	121-125	453.000-453.100	463.000-463.100
	Cond. Valid	126-145	453.125-453.600	463.125-463.600
	Valid	146-275	453.625-456.850	463.625-466.850
	Not Valid	276-300	456.875-457.475	466.875-467.475
A' (0.5 MHz)	Not Valid	101-120	452.500-452.975	462.500-462.975
B (4.5 MHz)	Not Valid	81-105	452.000-452.600	462.000-462.600
	Valid	106-235	452.625-455.850	462.625-465.850
	Not Valid	236-260	455.875-456.475	465.875-466.475
C (4.8 MHz)	Not Valid	1-25	450.000-450.600	460.000-460.600
	Valid	26-168	450.625-454.175	460.625-464.175
	Not Valid	169-193	454.200-454.800	464.200-464.800
D (4.2 MHz)	Not Valid	539-563	411.675-412.275	421.675-422.275
	Valid	564-681	412.300-415.225	422.300-425.225
	Not Valid	682-706	415.250-415.850	425.250-425.850
E (4.5 MHz)	Not Valid	692-716	415.500-416.100	425.500-426.100
	Valid	717-846	416.125-419.350	426.125-429.350
	Not Valid	847-871	419.375-419.975	429.375-429.975
F (4.5 MHz)	Not Valid	1792-1822	479.000-479.600	489.000-489.600
	Valid	1823-1985	479.620-482.860	489.620-492.860
	Not Valid	1986-2016	482.880-483.480	492.880-493.480
G (4.76 MHz)	Not Valid	1235-1265	455.230-455.830	465.230-465.830
	Valid	1266-1442	455.850-459.370	465.850-469.370
	Not Valid	1443-1473	459.390-459.990	469.390-469.990
H (4.42 MHz)	Not Valid	1039-1069	451.310-451.910	461.310-461.910
	Valid	1070-1229	451.930-455.110	461.930-465.110
	Not Valid	1230-1260	455.130-455.730	465.130-465.730

3

1
2**Table 2.1.1.1.6-4. CDMA Channel Numbers and Corresponding Frequencies for Band Class 5 and Spreading Rate 3**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (4.5 MHz)	Not Valid	121-200	453.000-454.975	463.000-464.975
	Valid	201	455.000	465.000
	Not Valid	202-300	455.025-457.475	465.025-467.475
A' (0.5 MHz)	Not Valid	101-120	452.500-452.975	462.500-462.975
B (4.5 MHz)	Not Valid	81-170	452.000-454.225	462.000-464.225
	Valid	171	454.250	464.250
	Not Valid	172-260	454.275-456.475	464.275-466.475
C (4.8 MHz)	Not Valid	1-96	450.000-452.375	460.000-462.375
	Valid	97	452.400	462.400
	Not Valid	98-193	452.425-454.800	462.425-464.800
D (4.2 MHz)	Not Valid	539-706	411.675-415.850	421.675-425.850
E (4.5 MHz)	Not Valid	692-781	415.500-417.725	425.500-427.725
	Valid	782	417.750	427.750
	Not Valid	783-871	417.775-419.975	427.775-429.975
F (4.5 MHz)	Not Valid	1792-1903	479.000-481.220	489.000-491.220
	Valid	1904	481.240	491.240
	Not Valid	1905-2016	481.260-483.480	491.260-493.480
G (4.76 MHz)	Not Valid	1235-1353	455.230-457.590	465.230-467.590
	Valid	1354	457.610	467.610
	Not Valid	1355-1473	457.630-459.990	467.630-469.990
H (4.42 MHz)	Not Valid	1039-1149	451.310-453.510	461.310-463.510
	Valid	1150	453.530	463.530
	Not Valid	1151-1260	453.550-455.730	463.550-465.730

3

1 **Table 2.1.1.1.6-5. CDMA Preferred Set of Frequency Assignments for Band Class 5**

Block Designator	Preferred Set Channel Numbers
A	160, 210*, 260
B	120, 170, 220*
C	47, 97, 147*
D	573, 623, 673*
E	731*, 781, 831
F	1841*, 1903, 1965
G	1291*, 1353, 1415
H	1089, 1151, 1213*

* CDMA frequency assignments that support inter-block roaming

2
3 **Table 2.1.1.1.6-6. Sync Channel Preferred Set of Frequency Assignments for**
4 **Spreading Rate 3 for Band Class 5**

Block Designator	Preferred Set Channel Numbers
A	210
B	220
C	147
E	731
F	1841
G	1291
H	1213

5
6 2.1.1.1.7 Band Class 6 (2 GHz Band)

7 The Band Class 6 block designators for the mobile station and base station are not
8 specified, since licensee allocations vary by regulatory body.

9 Mobile stations supporting Band Class 6 shall be capable of transmitting in Band Class 6.

10 The channel spacing, CDMA channel designations, and transmitter center frequencies of
11 Band Class 6 shall be as specified in Table 2.1.1.1.7-1. Mobile stations supporting Band
12 Class 6 and Spreading Rate 1 shall support transmission on the valid channel numbers
13 shown in Table 2.1.1.1.7-2. Mobile stations supporting Band Class 6 and Spreading Rate 3
14 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.7-3.

15 A preferred set of CDMA frequency assignments is given in Table 2.1.1.1.7-4.

1 If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and
 2 Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA
 3 Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the
 4 Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it
 5 shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$
 6 - 25 if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if
 7 $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 25$
 8 if $1XRL_FREQ_OFFSET_s$ equals '10'.

9 If the mobile station is transmitting and receiving using the same spreading rate, the
 10 nominal mobile station transmit carrier frequency shall be 190.0 MHz lower than the
 11 frequency of the base station transmit signal as measured at the mobile station receiver. If
 12 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3,
 13 the nominal mobile station transmit carrier frequency shall be $190.0 - 1.25 \times$
 14 $(1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the center frequency of the center CDMA
 15 channel transmitted by the base station as measured at the mobile station receiver.

16
 17 **Table 2.1.1.1.7-1. CDMA Channel Number to CDMA Frequency Assignment**
 18 **Correspondence for Band Class 6**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 1199$	$1920.000 + 0.050 N$
Base Station	$0 \leq N \leq 1199$	$2110.000 + 0.050 N$

19
 20 **Table 2.1.1.1.7-2. CDMA Channel Numbers and Corresponding Frequencies for Band**
 21 **Class 6 and Spreading Rate 1**

CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
Not Valid	0-24	1920.000-1921.200	2110.000-2111.200
Valid	25-1175	1921.250-1978.750	2111.250-2168.750
Not Valid	1176-1199	1978.800-1979.950	2168.800-2169.950

Channel numbers less than 1.25 MHz from the licensee's band edge are not valid.

Table 2.1.1.1.7-3. CDMA Channel Numbers and Corresponding Frequencies for Band Class 6 and Spreading Rate 3

CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
Not Valid	0-49	1920.000-1922.450	2110.000-2112.450
Valid	50-1150	1922.500-1977.500	2112.500-2167.500
Not Valid	1151-1199	1977.550-1979.950	2167.550-2169.950

Channel numbers less than 2.5 MHz from the licensee's band edge are not valid.

Table 2.1.1.1.7-4. CDMA Preferred Set of Frequency Assignments for Band Class 6

Spreading Rate	Preferred Set Channel Numbers
1	25, 50, ..., 1150, 1175
3	50, 75, ..., 1125, 1150

2.1.1.1.8 Band Class 7 (700 MHz Band)

The Band Class 7 block designators for the mobile station and base station shall be as specified in Table 2.1.1.1.8-1.

Mobile stations supporting Band Class 7 shall be capable of transmitting in Band Class 7.

The channel spacing, CDMA channel designations, and transmitter center frequencies of Band Class 7 shall be as specified in Table 2.1.1.1.8-2. Mobile stations supporting Band Class 7 and Spreading Rate 1 shall support operations on the valid and conditionally valid channel numbers shown in Table 2.1.1.1.8-3. Mobile stations supporting Band Class 7 and Spreading Rate 3 shall support operations on the valid and conditionally valid channel numbers shown in Table 2.1.1.1.8-4. Note that certain channel assignments are not valid and others are conditionally valid. Transmission on conditionally valid channels is permissible if the adjacent block is allocated to the same licensee or if other valid authorization has been obtained.

A preferred set of CDMA frequency assignments is given in Table 2.1.1.1.8-5.

A preferred set of Sync Channel frequency assignments for the multi-carrier mode is given in Table 2.1.1.1.8-6.

1 If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and
 2 Reverse Traffic Channels, then it shall transmit the Reverse Traffic Channel on the CDMA
 3 Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the
 4 Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it
 5 shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$
 6 - 25 if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if
 7 $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 25$
 8 if $1XRL_FREQ_OFFSET_s$ equals '10'.

9 If the mobile station is transmitting and receiving using the same spreading rate, the
 10 nominal mobile station transmit carrier frequency shall be 30.0 MHz higher than the
 11 frequency of the base station transmit signal as measured at the mobile station receiver. If
 12 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3,
 13 the nominal mobile station transmit carrier frequency shall be $30.0 + 1.25 \times$
 14 $(1XRL_FREQ_OFFSET_s - 1)$ MHz higher than the center frequency of the center CDMA
 15 channel transmitted by the base station as measured at the mobile station receiver.

16

17 **Table 2.1.1.1.8-1. Band Class 7 Block Frequency Correspondence**

Block Designator	Transmit Frequency Band (MHz)	
	Mobile Station	Base Station
A	776-777	746-747
C	777-782	747-752
D	782-792	752-762
B	792-794	762-764

18

19 **Table 2.1.1.1.8-2. CDMA Channel Number to CDMA Frequency Assignment**
20 **Correspondence for Band Class 7**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 359$	$776.000 + 0.050 N$
Base Station	$0 \leq N \leq 359$	$746.000 + 0.050 N$

21

**Table 2.1.1.1.8-3. CDMA Channel Numbers and Corresponding Frequencies for
Band Class 7 and Spreading Rate 1**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (1 MHz)	Not Valid	0-19	776.000-776.950	746.000-746.950
C (5 MHz)	Not Valid	20-44	777.000-778.200	747.000-748.200
	Valid	45-95	778.250-780.750	748.250-750.750
	Cond. Valid	96-119	780.800-781.950	750.800-751.950
D (10 MHz)	Cond. Valid	120-144	782.000-783.200	752.000-753.200
	Valid	145-295	783.250-790.750	753.250-760.750
	Not Valid	296-319	790.800-791.950	760.800-761.950
B (2 MHz)	Not Valid	320-359	792.000-793.950	762.000-763.950

**Table 2.1.1.1.8-4. CDMA Channel Numbers and Corresponding Frequencies for
Band Class 7 and Spreading Rate 3**

Block Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
			Mobile Station	Base Station
A (1 MHz)	Not Valid	0-19	776.000-776.950	746.000-746.950
C (5 MHz)	Not Valid	20-69	777.000-779.450	747.000-749.450
	Valid	70	779.500	749.500
	Cond. Valid	71-119	779.550-781.950	749.550-751.950
D (10 MHz)	Cond. Valid	120-169	782.000-784.450	752.000-754.450
	Valid	170-270	784.500-789.500	754.500-759.500
	Not Valid	271-319	789.550-791.950	759.550-761.950
B (2 MHz)	Not Valid	320-359	792.000-793.950	762.000-763.950

Table 2.1.1.1.8-5. CDMA Preferred Set of Frequency Assignments for Band Class 7

Block Designator	Spreading Rate	Preferred Set Channel Numbers
A	N/A	None
C	1	45, 70, 95
	3	70
D	1	145, 170, 195, 220, 245, 270, 295
	3	170, 195, 220, 245, 270
B	N/A	None

Table 2.1.1.1.8-6. Sync Channel Preferred Set of Frequency Assignments for Spreading Rate 3 for Band Class 7

Block Designator	Preferred Set of Channel Numbers
A	None
C	70
D	170, 245
B	None

2.1.1.1.9 Band Class 8 (1800 MHz Band)

The Band Class 8 block designators for the mobile station and base station are not specified.

Mobile stations supporting Band Class 8 shall be capable of transmitting in Band Class 8.

The channel spacing, CDMA channel designations, and transmitter center frequencies of Band Class 8 shall be as specified in Table 2.1.1.1.9-1. Mobile stations supporting Band Class 8 and Spreading Rate 1 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.9-2. Mobile stations supporting Band Class 8 and Spreading Rate 3 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.9-3.

A preferred set of CDMA frequency assignments is given in Table 2.1.1.1.9-4.

If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the

Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$ - 25 if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 25$ if $1XRL_FREQ_OFFSET_s$ equals '10'.

1 If the mobile station is transmitting and receiving using the same spreading rate, the
 2 nominal mobile station transmit carrier frequency shall be 95.0 MHz lower than the
 3 frequency of the base station transmit signal as measured at the mobile station receiver. If
 4 the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3,
 5 the nominal mobile station transmit carrier frequency shall be $95.0 - 1.25 \times$
 6 $(1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the center frequency of the center CDMA
 7 channel transmitted by the base station as measured at the mobile station receiver.

8
 9 **Table 2.1.1.1.9-1. CDMA Channel Number to CDMA Frequency Assignment**
 10 **Correspondence for Band Class 8**

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 1499$	$1710.000 + 0.050 N$
Base Station	$0 \leq N \leq 1499$	$1805.000 + 0.050 N$

11
 12 **Table 2.1.1.1.9-2. CDMA Channel Numbers and Corresponding Frequencies for Band**
 13 **Class 8 and Spreading Rate 1**

CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
Not Valid	0-24	1710.000-1711.200	1805.000-1806.200
Valid	25-1475	1711.250-1783.750	1806.250-1878.750
Not Valid	1476-1499	1783.800-1784.950	1878.800-1879.950

Channel numbers less than 1.25 MHz from the licensee's band edge are not valid.

14
 15 **Table 2.1.1.1.9-3. CDMA Channel Numbers and Corresponding Frequencies for Band**
 16 **Class 8 and Spreading Rate 3**

CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
Not Valid	0-49	1710.000-1712.450	1805.000-1807.450
Valid	50-1450	1712.500-1782.500	1807.500-1877.500
Not Valid	1451-1499	1782.550-1784.950	1877.550-1879.950

Channel numbers less than 2.5 MHz from the licensee's band edge are not valid.

Table 2.1.1.1.9-4. CDMA Preferred Set of Frequency Assignments for Band Class 8

Spreading Rate	Preferred Set Channel Numbers
1	25, 50, ..., 1450, 1475
3	50, 75, ..., 1425, 1450

2.1.1.1.10 Band Class 9 (900 MHz Band)

The Band Class 9 block designators for the mobile station and base station are not specified.

Mobile stations supporting Band Class 9 shall be capable of transmitting in Band Class 9.

The channel spacing, CDMA channel designations, and transmitter center frequencies of Band Class 9 shall be as specified in Table 2.1.1.1.10-1. Mobile stations supporting Band Class 9 and Spreading Rate 1 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.10-2. Mobile stations supporting Band Class 9 and Spreading Rate 3 shall support transmission on the valid channel numbers shown in Table 2.1.1.1.10-3.

A preferred set of CDMA frequency assignments is given in Table 2.1.1.1.10-4.

If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$ - 25 if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 25$ if $1XRL_FREQ_OFFSET_s$ equals '10'.

If the mobile station is transmitting and receiving using the same spreading rate, the nominal mobile station transmit carrier frequency shall be 45.0 MHz lower than the frequency of the base station transmit signal as measured at the mobile station receiver. If the mobile station is transmitting on Spreading Rate 1 and receiving on Spreading Rate 3, the nominal mobile station transmit carrier frequency shall be $45.0 - 1.25 \times (1XRL_FREQ_OFFSET_s - 1)$ MHz lower than the center frequency of the center CDMA channel transmitted by the base station as measured at the mobile station receiver.

Table 2.1.1.1.10-1. CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 9

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 699$	$880.000 + 0.050 N$
Base Station	$0 \leq N \leq 699$	$925.000 + 0.050 N$

1

Table 2.1.1.1.10-2. CDMA Channel Numbers and Corresponding Frequencies for Band Class 9 and Spreading Rate 1

3

CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
Not Valid	0-24	880.000-881.200	925.000-926.200
Valid	25-675	881.250-913.750	926.250-958.750
Not Valid	676-699	913.800-914.950	958.800-959.950

Channel numbers less than 1.25 MHz from the licensee’s band edge are not valid.

4

Table 2.1.1.1.10-3. CDMA Channel Numbers and Corresponding Frequencies for Band Class 9 and Spreading Rate 3

6

CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
Not Valid	0-49	880.000-882.450	925.000-927.450
Valid	50-650	882.500-912.500	927.500-957.500
Not Valid	651-699	912.550-914.950	957.550-959.950

Channel numbers less than 2.5 MHz from the licensee’s band edge are not valid.

7

Table 2.1.1.1.10-4. CDMA Preferred Set of Frequency Assignments for Band Class 9

Spreading Rate	Preferred Set Channel Numbers
1	25, 50, ..., 650, 675
3	50, 75, ..., 625, 650

8

2.1.1.1.11 Band Class 10 (Secondary 800 MHz Band)

9

The Band Class 10 system designators for the mobile station and base station shall be as specified in Table 2.1.1.1.11-1.

10

There are five band subclasses specified for Band Class 10. Mobile stations supporting Band Class 10 shall support at least one band subclass belonging to Band Class 10.

11

12

13

1 Mobile stations supporting Band Class 10 shall be capable of transmitting in Band Class
2 10.

3 The channel spacing, CDMA channel designations, and transmitter center frequencies of
4 Band Class 10 shall be as specified in Table 2.1.1.1.11-2. Mobile stations supporting Band
5 Class 10 and Spreading Rate 1 shall support transmission on the valid channel numbers
6 shown in Table 2.1.1.1.11-3. Mobile stations supporting Band Class 10 and Spreading Rate
7 3 shall support operations on the valid channel numbers shown in Table 2.1.1.1.11-4.

8 A preferred set of CDMA frequency assignments is given in Table 2.1.1.1.11-5.

9 A preferred set of Sync Channel frequency assignments for the multi-carrier mode is given
10 in Table 2.1.1.1.11-6.

11 If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and
12 Reverse Traffic Channel, then it shall transmit the Reverse Traffic Channel on the CDMA
13 Channel designated by $CDMACH_s$. If the mobile station uses Spreading Rate 3 for the
14 Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel, then it
15 shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$
16 - 50 if $1XRL_FREQ_OFFSET_s$ equals '00', on the CDMA Channel designated by $CDMACH_s$ if
17 $1XRL_FREQ_OFFSET_s$ equals '01', or on the CDMA Channel designated by $CDMACH_s + 50$
18 if $1XRL_FREQ_OFFSET_s$ equals '10'.

19 If the mobile station is transmitting and receiving using the same spreading rate, the
20 nominal mobile station transmit carrier frequency shall be 45.0 MHz (Band Subclasses 0,
21 1, 2, and 3) or 39.0 MHz (Band Subclass 4) lower than the frequency of the base station
22 transmit signal as measured at the mobile station receiver. If the mobile station is
23 transmitting on Spreading Rate 1 and receiving on Spreading Rate 3, the nominal mobile
24 station transmit carrier frequency shall be $45.0 - 1.25 \times (1XRL_FREQ_OFFSET_s - 1)$ MHz
25 (Band Subclass 0, 1, and 2) or $39.0 - 1.25 \times (1XRL_FREQ_OFFSET_s - 1)$ MHz (Band
26 Subclass 3) lower than the carrier frequency of the center CDMA channel transmitted by
27 the base station as measured at the mobile station receiver.

28

29

Table 2.1.1.1.11-1. Band Class 10 System Frequency Correspondence

System Designator	Band Subclass	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
A	0	806.000-810.975	851.000-855.975
B	1	811.000-815.975	856.000-860.975
C	2	816.000-820.975	861.000-865.975
D	3	821.000-823.975	866.000-868.975
E	4	896.000-900.975	935.000-939.975

30

Table 2.1.1.1.11-2. CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 10

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 719$	$0.025 N + 806.000$
	$720 \leq N \leq 919$	$0.025 (N - 720) + 896.000$
Base Station	$0 \leq N \leq 719$	$0.025 N + 851.000$
	$720 \leq N \leq 919$	$0.025 (N - 720) + 935.000$

Table 2.1.1.1.11-3. CDMA Channel Numbers and Corresponding Frequencies for Band Class 10 and Spreading Rate 1

Band Subclass	System Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
				Mobile Station	Base Station
0	A	Not Valid	0-49	806.000-807.225	851.000-852.225
		Valid	50-150	807.250-809.750	852.250-854.750
		Cond. Valid	151-199	809.775-810.975	854.775-855.975
1	B	Cond. Valid	200-249	811.000-812.225	856.000-857.225
		Valid	250-350	812.250-814.750	857.250-859.750
		Cond. Valid	351-399	814.775-815.975	859.775-860.975
2	C	Cond. Valid	400-449	816.000-817.225	861.000-862.225
		Valid	450-550	817.250-819.750	862.250-864.750
		Cond. Valid	551-599	819.775-820.975	864.775-865.975
3	D	Cond. Valid	600-649	821.000-822.225	866.000-867.225
		Valid	650-670	822.250-822.750	867.250-867.750
		Not Valid	671-719	822.775-823.975	867.775-868.975
4	E	Not Valid	720-769	896.000-897.225	935.000-936.225
		Valid	770-870	897.250-899.750	936.250-938.750
		Not Valid	871-919	899.775-900.975	938.775-939.975

1 **Table 2.1.1.1.11-4. CDMA Channel Numbers and Corresponding Frequencies for Band**
 2 **Class 10 and Spreading Rate 3**

Band Subclass	System Designator	CDMA Channel Validity	CDMA Channel Number	Transmit Frequency Band (MHz)	
				Mobile Station	Base Station
0	A	Not Valid	0-99	806.000-808.475	851.000-853.475
		Valid	100	808.500	853.500
		Cond. Valid	101-199	808.525-810.975	853.525-855.975
1	B	Cond. Valid	200-299	811.000-813.475	856.000-858.475
		Valid	300	813.500	858.500
		Cond. Valid	301-399	813.525-815.975	858.525-860.975
2	C	Cond. Valid	400-499	816.000-818.475	861.000-863.475
		Valid	500	818.500	863.500
		Cond. Valid	501-599	818.525-820.975	863.525-865.975
3	D	Cond. Valid	600-620	821.000-821.500	866.000-866.500
		Not Valid	621-719	821.525-823.975	866.525-868.975
4	E	Not Valid	720-769	896.000-897.225	935.000-936.225
		Valid	770-870	897.250-899.750	936.250-938.750
		Not Valid	871-919	899.775-900.975	938.775-939.975

3
 4 **Table 2.1.1.1.11-5. CDMA Preferred Set of Frequency Assignments for Band Class 10**

Band Subclass	System Designator	Spreading Rate	Preferred Set Channel Numbers
0	A	1	50, 100, 150,
		3	100
1	B	1	250, 300, 350
		3	300
2	C	1	450, 500, 550
		3	500
3	D	1	650, 670
		3	Not applicable
4	E	1	770, 820, 870
		3	820

5

Table 2.1.1.1.11-6. Sync Channel Preferred Set of Frequency Assignments for Spreading Rate 3 for Band Class 10

Band Subclass	System Designator	Preferred Set of Channel Numbers
0	A	150
1	B	300
2	C	450, 500
3	D	Not applicable
4	E	820

2.1.1.2 Frequency Tolerance

The mobile station shall meet the requirements in Section 4.1.1 of the current version of [11].

2.1.2 Power Output Characteristics

All power levels are referenced to the mobile station antenna connector unless otherwise specified.

2.1.2.1 Maximum Output Power

The mobile station shall meet the requirements in Sections 4.4.5 and 5.1 of the current version of [11].

The mobile station shall be capable of transmitting at the minimum specified power level when transmitting only on the Access Channel, Enhanced Access Channel, Reverse Common Control Channel, or Reverse Fundamental Channel and when commanded to maximum output power. The output power may be lower when transmitting on more than one of the following: Reverse Dedicated Control Channel, Reverse Fundamental Channel, Reverse Supplemental Channel, or Reverse Supplemental Code Channel. The mobile station shall not exceed the maximum specified power levels under any circumstances.

2.1.2.2 Output Power Limits

2.1.2.2.1 Minimum Controlled Output Power

The mobile station shall meet the requirements in Section 4.4.6 of the current version of [11].

2.1.2.2.2 Gated Output Power

2.1.2.2.2.1 Gated Output Power Except During a Serving Frequency PUF Probe

The transmitter noise floor should be less than -60 dBm/1.23 MHz and shall be less than -54 dBm/1.23 MHz.

1 The mobile station transmits at nominal controlled power levels only during gated-on
 2 periods, which are defined as a power control group.

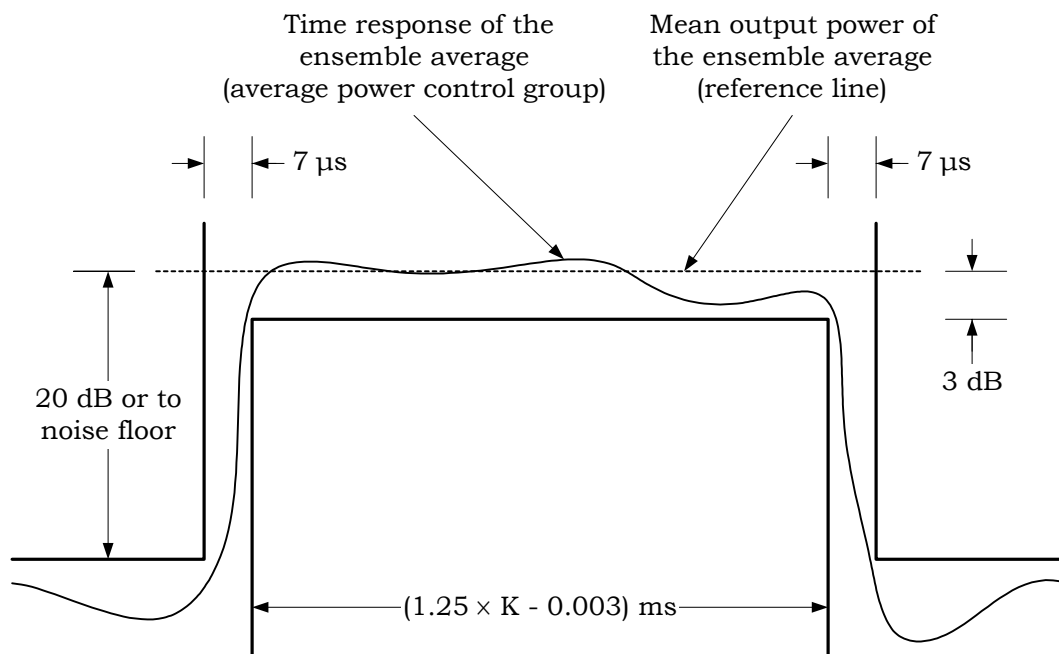
3 During gated-off periods, between the transmissions of power control groups, the mobile
 4 station shall reduce its mean output power, either by at least 20 dB with respect to the
 5 mean output power of the most recent gated-on power control group or to the transmitter
 6 noise floor, whichever is the greater power.

7 Given an ensemble of K gated-on power control groups, all with the same mean output
 8 power, the time response of the ensemble average shall be within the limits shown in Figure
 9 2.1.2.2.2.1-1.

10 This section applies to the following cases:

- 11 • When operating with Radio Configuration 1 or 2 in variable data rate transmission
 12 mode (see 2.1.3.1.9.1),
- 13 • When operating with Reverse Pilot Channel gating (see 2.1.3.2.3),
- 14 • When transmitting the Enhanced Access Channel preamble or the Reverse Common
 15 Control Channel preamble (see 2.1.3.4.2.3 and 2.1.3.5.2.3),
- 16 • Reverse Fundamental Channel gating with Reverse Radio Configurations 3, 4, 5,
 17 and 6.

18



19

20 **Figure 2.1.2.2.2.1-1. Transmission Envelope Mask (Average Gated-on Power**
 21 **Control Group)**

22 2.1.2.2.2.2 Gated Output Power During a Serving Frequency PUF Probe

23 If the mobile station transmits gated-off power control groups during the PUF recovery
 24 time, the mobile station shall reduce its mean output power, either by at least 20 dB with

1 respect to the mean output power of the power control group prior to the final power
2 control group of the PUF Setup time, or to the transmitter noise floor, whichever is the
3 greater power.

4 2.1.2.2.3 Standby Output Power

5 The mobile station shall disable its transmitter except when transmitting on the Reverse
6 CDMA Channel.

7 When the transmitter of a mobile station is disabled, the output noise power spectral
8 density of the mobile station shall be less than -61 dBm/1 MHz for all frequencies within
9 the transmit bands that the mobile station supports.

10 2.1.2.3 Controlled Output Power

11 The mobile station shall provide three independent means for output power adjustment: an
12 open loop estimation performed by the mobile station, a closed loop correction involving
13 both the mobile station and the base station, and, for Radio Configurations 3 through 6, a
14 code channel attribute adjustment performed by the mobile station and the base station.

15 Accuracy requirements on the controlled range of mean output power (see 2.1.2.4) need not
16 apply for the following three cases: mean output power levels exceeding the minimum EIRP
17 at the maximum output power for the corresponding mobile station class (see 2.1.2.1);
18 mean output power levels less than the minimum controlled output power (see 2.1.2.2.1);
19 or mean input power levels exceeding -25 dBm within the 1.23 MHz CDMA bandwidth for
20 Spreading Rate 1 or -20 dBm within the 3.69 MHz CDMA bandwidth for Spreading Rate 3.

21 2.1.2.3.1 Estimated Open Loop Output Power

22 In the following equations, mean power is referenced to the nominal CDMA Channel
23 bandwidth of 1.23 MHz for Spreading Rate 1 or 3.69 MHz for Spreading Rate 3. The offset
24 power is summarized in Table 2.1.2.3.1-1.

25

1

Table 2.1.2.3.1-1. Open Loop Power Offsets

Band Class	Forward Spreading Rate	Reverse Spreading Rate	Reverse Channels	Offset Power⁵
0, 2, 3, 5, 7, 9, and 10	1	1	Access Channel Reverse Traffic Channel (RC = 1 or 2)	-73
			Enhanced Access Channel Reverse Common Control Channel Reverse Traffic Channel (RC = 3 or 4)	-81.5
	3	1	Reverse Traffic Channel (RC = 3 or 4)	-76.5
		3	Enhanced Access Channel Reverse Common Control Channel Reverse Traffic Channel (RC = 5 or 6)	-76.5
1, 4, 6, and 8	1	1	Access Channel Reverse Traffic Channel (RC = 1 or 2)	-76
			Enhanced Access Channel Reverse Common Control Channel Reverse Traffic Channel (RC = 3 or 4)	-84.5
	3	1	Reverse Traffic Channel (RC = 3 or 4)	-79.5
		3	Enhanced Access Channel Reverse Common Control Channel Reverse Traffic Channel (RC = 5 or 6)	-79.5

2

3

⁵For simplicity, the Offset Power constants are expressed without units. For example, -73 is equal to $10 \times \log_{10} (10^{-7.3} \text{ mW}^2)$.

1 2.1.2.3.1.1 Open Loop Output Power When Transmitting on the Access Channel

2 The mobile station shall transmit each Access probe at a mean output power level defined
3 by⁶

$$\begin{aligned}
 & \text{mean output power (dBm) =} \\
 & \quad - \text{ mean input power (dBm)} \\
 & \quad + \text{ offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{ interference correction} \\
 & \quad + \text{ NOM_PWR}_S - 16 \times \text{NOM_PWR_EXT}_S \\
 & \quad + \text{ INIT_PWR}_S \\
 & \quad + \text{ PWR_LVL} \times \text{PWR_STEP}_S,
 \end{aligned}$$

11 where interference correction = $\min(\max(-7 - \text{ECIO}, 0), 7)$, ECIO is the E_c/I_0 (dB) per carrier
12 of the strongest active set pilot, measured within the previous 500 ms, and PWR_LVL is a
13 non-negative integer which is the power level adjustment step.

14 The mobile station shall determine E_c/I_0 (dB) by taking the ratio of the received pilot energy
15 per chip, E_c , to the total received power spectral density (noise and signals), of at most k
16 usable multipath components, where k is the number of demodulating elements supported
17 by the mobile station. The mobile station shall determine the total received power spectral
18 density, I_0 , over 1.23 MHz.

19 During an Access probe transmission, the mobile station shall update the mean output
20 power in response to changes in the mean input power. For subsequent Access probes in
21 an Access probe sequence, the mobile station shall update the mean output power in
22 response to changes in the mean input power, the interference correction, and PWR_LVL.

23 For Band Classes 0 and 3, NOM_PWR_EXT_S is set to 0 and the range of the $\text{NOM_PWR}_S -$
24 $16 \times \text{NOM_PWR_EXT}_S$ correction is from -8 to $+7$ dB. For Band Classes 1, 2, 4, 5, 6, 7, 8, 9,
25 and 10, the range of the $\text{NOM_PWR}_S - 16 \times \text{NOM_PWR_EXT}_S$ correction is from -24 to $+7$
26 dB. The range of the INIT_PWR_S parameter is -16 to $+15$ dB, with a nominal value of 0 dB.
27 The range of the PWR_STEP_S parameter is 0 to 7 dB. The accuracy of the adjustment to the
28 mean output power due to NOM_PWR_S , NOM_PWR_EXT_S , INIT_PWR_S , or a single Access
29 probe correction of PWR_STEP_S shall be ± 0.5 dB or $\pm 20\%$ of the value in dB, whichever is
30 greater.

⁶The purpose of having both an INIT_PWR_S and a NOM_PWR_EXT_S value is to distinguish between their use. If INIT_PWR_S were 0, then $\text{NOM_PWR}_S - 16 \times \text{NOM_PWR_EXT}_S$ would be the correction that should provide the correct received power at the base station. $\text{NOM_PWR}_S - 16 \times \text{NOM_PWR_EXT}_S$ allows the open loop estimation process to be adjusted for different operating environments. INIT_PWR_S is the adjustment that is made to the first Access Channel probe so that it should be received at somewhat less than the required signal power. This conservatism partially compensates for occasional, partially decorrelated path losses between the Forward CDMA Channel and the Reverse CDMA Channel.

1 The mobile station shall support a total combined range of interference correction,
 2 NOM_PWR_S , $NOM_PWR_EXT_S$, $INIT_PWR_S$, and $PWR_LVL \times PWR_STEP_S$ of at least ± 32 dB
 3 for mobile stations operating in Band Classes 0, 2, 3, 5, 7, 9, and 10 and ± 40 dB for mobile
 4 stations operating in Band Classes 1, 4, 6, and 8.

5 Prior to application of corrections from $PWR_LVL \times PWR_STEP_S$, closed loop power control
 6 corrections, and with $INIT_PWR_S$ set to zero, the mobile station's estimated open loop mean
 7 output power should be within ± 6 dB and shall be within ± 9 dB of the value determined by
 8 the following relationship:

$$\begin{aligned}
 & \text{mean output power (dBm)} = \\
 & \quad - \text{mean input power (dBm)} \\
 & \quad + \text{offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{interference correction} \\
 & \quad + NOM_PWR_S - 16 \times NOM_PWR_EXT_S.
 \end{aligned}$$

14 This requirement shall be met over the full range of $NOM_PWR_S - 16 \times NOM_PWR_EXT_S$
 15 (from -8 to $+7$ dB for Band Classes 0 and 3, and from -24 to $+7$ dB for Band Classes 1, 2,
 16 4, 5, 6, 7, 8, 9, and 10).

17 2.1.2.3.1.2 Open Loop Output Power When Transmitting on the Enhanced Access Channel

18 The mobile station shall transmit the Enhanced Access preamble (see 2.1.3.4.2.3) at a
 19 mean output power defined by

$$\begin{aligned}
 & \text{mean pilot channel output power (dBm)} = \\
 & \quad - \text{mean input power (dBm)} \\
 & \quad + \text{offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{interference correction} \\
 & \quad + EACH_NOM_PWR_S \\
 & \quad + EACH_INIT_PWR_S \\
 & \quad + 6 \\
 & \quad + PWR_LVL \times EACH_PWR_STEP_S,
 \end{aligned}$$

28 where interference correction = $\min(\max(IC_THRESH_S - ECIO, 0), IC_MAX_S)$, $ECIO$ is the
 29 E_C/I_0 (dB) per carrier of the strongest active set pilot, measured within the previous
 30 500 ms, and PWR_LVL is a non-negative integer which is the power level adjustment step.

31 The mobile station shall determine E_C/I_0 (dB) by taking the ratio of the received pilot energy
 32 per chip, E_C , to the total received power spectral density (noise and signals), of at most k
 33 usable multipath components, where k is the number of demodulating elements supported
 34 by the mobile station. While receiving Spreading Rate 1, the mobile station shall determine
 35 the total received power spectral density, I_0 , over 1.23 MHz; while receiving Spreading Rate
 36 3, the mobile station shall determine the total received power spectral density, I_0 , over 3.69
 37 MHz. While receiving Spreading Rate 3, the mobile station shall determine E_C/I_0 by
 38 summing the E_C from each multipath component for all three carriers and normalizing
 39 by I_0 .

40 During an initial Enhanced Access probe transmission, the mobile station shall update the
 41 mean output power in response to changes in the mean input power. For subsequent

1 Enhanced Access probes in an Enhanced Access probe sequence, the mobile station shall
 2 update the mean output power in response to changes in the mean input power, the
 3 interference correction, and PWR_LVL.

4 After transmitting the Enhanced Access Channel preamble, and before receiving the first
 5 valid power control bit, the mobile station shall transmit the Reverse Pilot Channel at a
 6 mean output power defined by

$$\begin{aligned}
 & \text{mean pilot channel output power (dBm) =} \\
 & \quad - \text{ mean input power (dBm)} \\
 & \quad + \text{ offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{ interference correction} \\
 & \quad + \text{ EACH_NOM_PWR}_s \\
 & \quad + \text{ EACH_INIT_PWR}_s \\
 & \quad + \text{ PWR_LVL} \times \text{ EACH_PWR_STEP}_s.
 \end{aligned}$$

14 If closed loop power control is enabled for the Enhanced Access Channel, then after the
 15 first valid power control bit is received, the mobile station shall transmit the Reverse Pilot
 16 Channel during the Enhanced Access header and Enhanced Access data transmission at a
 17 mean output power defined by

$$\begin{aligned}
 & \text{mean pilot channel output power (dBm) =} \\
 & \quad - \text{ mean input power (dBm)} \\
 & \quad + \text{ offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{ interference correction} \\
 & \quad + \text{ EACH_NOM_PWR}_s \\
 & \quad + \text{ EACH_INIT_PWR}_s \\
 & \quad + \text{ PWR_LVL} \times \text{ EACH_PWR_STEP}_s \\
 & \quad + \text{ the sum of all closed loop power control corrections (dB)}.
 \end{aligned}$$

26 The mobile station shall not update the interference correction after the first valid power
 27 control bit is received.

28 The range of the EACH_NOM_PWR_s correction is -16 to +15 dB. The range of the
 29 EACH_INIT_PWR_s parameter is -16 to +15 dB, with a nominal value of 0 dB. The range of
 30 the EACH_PWR_STEP_s parameter is 0 to 7 dB. The accuracy of the adjustment to the mean
 31 output power due to EACH_NOM_PWR_s, EACH_INIT_PWR_s, or a single Enhanced Access
 32 probe correction of EACH_PWR_STEP_s shall be ±0.5 dB or ±20% of the value in dB,
 33 whichever is greater.

34 The mobile station shall support a total combined range of interference correction,
 35 EACH_NOM_PWR_s, EACH_INIT_PWR_s, PWR_LVL × EACH_PWR_STEP_s, and closed loop
 36 power control corrections (if applicable) of at least ±32 dB for mobile stations operating in
 37 Band Classes 0, 2, 3, 5, 7, 9, and 10 and of at least ±40 dB for mobile stations operating in
 38 Band Classes 1, 4, 6, and 8.

39 Prior to application of corrections from PWR_LVL × EACH_PWR_STEP_s, closed loop power
 40 control corrections, with EACH_INIT_PWR_s set to zero, and with the mobile station only
 41 transmitting on the Reverse Pilot Channel, the mobile station's estimated open loop mean

1 output power should be within ± 6 dB and shall be within ± 9 dB of the value determined by
 2 the following relationship:

$$\begin{aligned}
 & \text{mean pilot channel output power (dBm) =} \\
 & \quad - \text{mean input power (dBm)} \\
 & \quad + \text{offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{interference correction} \\
 & \quad + \text{EACH_NOM_PWR}_s.
 \end{aligned}$$

8 This requirement shall be met over the full range of EACH_NOM_PWR_s (from -16 to
 9 $+15$ dB).

10 2.1.2.3.1.3 Open Loop Output Power When Transmitting on the Reverse Common Control 11 Channel

12 When operating in the Reservation Access Mode, the mobile station shall transmit the
 13 Reverse Common Channel preamble (see 2.1.3.5.2.3) at a mean output power defined by

$$\begin{aligned}
 & \text{mean pilot channel output power (dBm) =} \\
 & \quad - \text{mean input power (dBm)} \\
 & \quad + \text{offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{interference correction} \\
 & \quad + \text{RCCCH_NOM_PWR}_s \\
 & \quad + \text{RCCCH_INIT_PWR}_s \\
 & \quad + \text{PREV_CORRECTIONS} \\
 & \quad + 6,
 \end{aligned}$$

22 where interference correction = $\min(\max(\text{IC_THRESH}_s - \text{ECIO}, 0), \text{IC_MAX}_s)$, and ECIO is
 23 the E_c/I_0 (dB) per carrier of the strongest active set pilot, measured within the previous
 24 500 ms.

25 The mobile station shall determine E_c/I_0 (dB) by taking the ratio of the received pilot energy
 26 per chip, E_c , to the total received power spectral density (noise and signals), of at most k
 27 usable multipath components, where k is the number of demodulating elements supported
 28 by the mobile station. While receiving Spreading Rate 1, the mobile station shall determine
 29 the total received power spectral density, I_0 , over 1.23 MHz; while receiving Spreading Rate
 30 3, the mobile station shall determine the total received power spectral density, I_0 , over 3.69
 31 MHz. While receiving Spreading Rate 3, the mobile station shall determine E_c/I_0 by
 32 summing the E_c from each multipath component for all three carriers and normalizing
 33 by I_0 .

34 The mobile station shall set PREV_CORRECTIONS to $\text{PWR_LVL} \times \text{EACH_PWR_STEP}_s + \text{sum}$
 35 of all closed loop power control corrections, if applicable, from operation on the Enhanced
 36 Access Channel.

37 After transmitting the Reverse Common Control Channel preamble while in the Reservation
 38 Access Mode, and before receiving the first valid power control bit, the mobile station shall
 39 transmit the Reverse Pilot Channel at a mean output power defined by

1 mean pilot channel output power (dBm) =
 2 – mean input power (dBm)
 3 + offset power (from Table 2.1.2.3.1-1)
 4 + interference correction
 5 + $RCCCH_NOM_PWR_S$
 6 + $RCCCH_INIT_PWR_S$
 7 + $PREV_CORRECTIONS$,

8 After the first valid power control bit is received while in the Reservation Access Mode, the
 9 mobile station shall transmit the Reverse Pilot Channel at a mean output power defined by

10 mean pilot channel output power (dBm) =
 11 – mean input power (dBm)
 12 + offset power (from Table 2.1.2.3.1-1)
 13 + interference correction
 14 + $RCCCH_NOM_PWR_S$
 15 + $RCCCH_INIT_PWR_S$
 16 + $PREV_CORRECTIONS$
 17 + the sum of all closed loop power control corrections (dB).

18 When operating in the Designated Access Mode, the mobile station shall transmit the
 19 Reverse Common Control Channel preamble (see 2.1.3.5.2.3) and the Reverse Pilot Channel
 20 at a mean output power defined by

21 mean pilot channel output power (dBm) =
 22 – mean input power (dBm)
 23 + offset power (from Table 2.1.2.3.1-1)
 24 + interference correction
 25 + $RCCCH_NOM_PWR_S$
 26 + $RCCCH_INIT_PWR_S$
 27 + $PREV_CORRECTIONS$
 28 + 6
 29 + the sum of all closed loop power control corrections (dB).

30 The mobile station shall set $PREV_CORRECTIONS$ to $DAM_CORRECTION_S$.

31 The mobile station shall not update the interference correction after the first power control
 32 bit is received.

33 The range of the $RCCCH_NOM_PWR_S$ correction is –16 to +15 dB. The range of the
 34 $RCCCH_INIT_PWR_S$ parameter is –16 to +15 dB, with a nominal value of 0 dB. The
 35 accuracy of the adjustment to the mean output power due to $RCCCH_NOM_PWR_S$ or
 36 $RCCCH_INIT_PWR_S$ shall be ± 0.5 dB or $\pm 20\%$ of the value in dB, whichever is greater.

37 The range of the $DAM_CORRECTION_S$ parameter is 0 to +31 dB.

38 The mobile station shall support a total combined range of interference correction,
 39 $RCCCH_NOM_PWR_S$, $RCCCH_INIT_PWR_S$, $PREV_CORRECTIONS$, and closed loop power
 40 control corrections of at least ± 32 dB for mobile stations operating in Band Classes 0, 2, 3,
 41 5, 7, 9, and 10 and ± 40 dB for mobile stations operating in Band Classes 1, 4, 6, and 8.

1 Prior to application of closed loop power control corrections, with $RCCCH_INIT_PWR_S$ set to
 2 zero, and with the mobile station only transmitting on the Reverse Pilot Channel, the
 3 mobile station's estimated open loop mean output power should be within ± 6 dB and shall
 4 be within ± 9 dB of the value determined by the following relationship:

$$\begin{aligned}
 & \text{mean pilot channel output power (dBm)} = \\
 & \quad - \text{mean input power (dBm)} \\
 & \quad + \text{offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{interference correction} \\
 & \quad + RCCCH_NOM_PWR_S \\
 & \quad + PREV_CORRECTIONS.
 \end{aligned}$$

11 This requirement shall be met over the full range of $RCCCH_NOM_PWR_S$ (from -16 to
 12 $+15$ dB).

13 2.1.2.3.1.4 Open Loop Output Power When Transmitting on the Reverse Traffic Channel 14 with Radio Configuration 1 or 2

15 The initial transmission on the Reverse Fundamental Channel with Radio Configurations 1
 16 or 2 shall be at a mean output power defined by

$$\begin{aligned}
 & \text{mean output power (dBm)} = \\
 & \quad - \text{mean input power (dBm)} \\
 & \quad + \text{offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{interference correction} \\
 & \quad + ACC_CORRECTIONS \\
 & \quad + RLGAIN_ADJ_S,
 \end{aligned}$$

23 where interference correction = $\min(\max(-7 - ECIO, 0), 7)$, and $ECIO$ is the E_c/I_0 (dB) per
 24 carrier of the strongest active set pilot, measured within the previous 500 ms.

25 The mobile station shall determine E_c/I_0 (dB) by taking the ratio of the received pilot energy
 26 per chip, E_c , to the total received power spectral density (noise and signals), of at most k
 27 usable multipath components, where k is the number of demodulating elements supported
 28 by the mobile station. The mobile station shall determine the total received power spectral
 29 density, I_0 , over 1.23 MHz.

30 If the last channel used prior to operation on the Reverse Traffic Channel was the Access
 31 Channel, the mobile station shall set $ACC_CORRECTIONS$ to $NOM_PWR_S - 16 \times$
 32 $NOM_PWR_EXT_S + INIT_PWR_S + PWR_LVL \times PWR_STEP_S$.

33 If the last channel used prior to operation on the Reverse Traffic Channel was the
 34 Enhanced Access Channel, the mobile station shall set $ACC_CORRECTIONS$ to
 35 $EACH_NOM_PWR_S + EACH_INIT_PWR_S + PWR_LVL \times EACH_PWR_STEP_S +$ sum of all
 36 closed loop power control corrections (dB), if applicable.

37 If the last channel used prior to operation on the Reverse Traffic Channel was the Reverse
 38 Common Control Channel, the mobile station shall set $ACC_CORRECTIONS$ to
 39 $RCCCH_NOM_PWR_S + RCCCH_INIT_PWR_S + PREV_CORRECTIONS +$ sum of all closed loop
 40 power control corrections (dB), if applicable.

1 After the first power control bit is received, the mean output power shall be defined by

$$\begin{aligned}
 & \text{mean output power (dBm) =} \\
 & \quad - \text{ mean input power (dBm)} \\
 & \quad + \text{ offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{ interference correction} \\
 & \quad + \text{ ACC_CORRECTIONS} \\
 & \quad + \text{ RLGAIN_ADJ}_s \\
 & \quad + \text{ the sum of all closed loop power control corrections (dB)} \\
 & \quad + 10 \times \log_{10} (1 + \text{ NUM_RSCCH}) \text{ (dB)},
 \end{aligned}$$

10 where NUM_RSCCH is the number of Reverse Supplemental Code Channels on which the
11 mobile station is transmitting. The range of NUM_RSCCH is from 0 to 7.

12 The mobile station shall not update the interference correction after the first power control
13 bit is received.

14 The mobile station shall support a total combined range of interference correction,
15 ACC_CORRECTIONS, RLGAIN_ADJ_s, and closed loop power control corrections of at least
16 ±32 dB for mobile stations operating in Band Classes 0, 2, 3, 5, 7, 9, and 10 and ±40 dB for
17 mobile stations operating in Band Classes 1, 4, 6, and 8.

18 During a PUF pulse, the mean output power shall be defined by

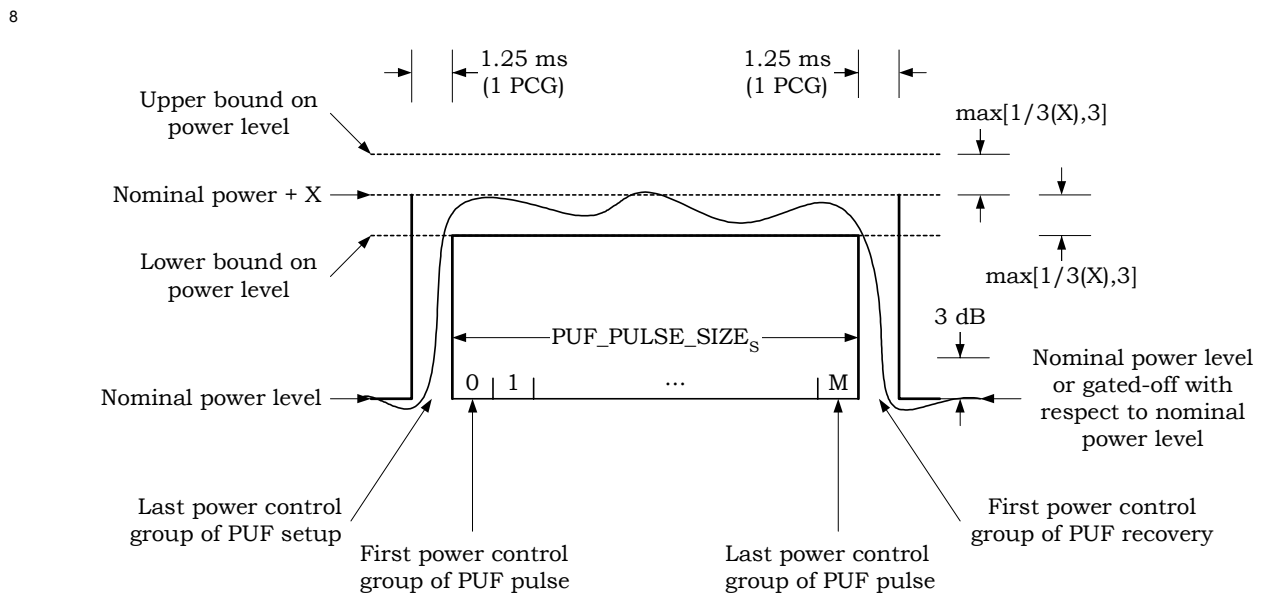
$$\begin{aligned}
 & \text{mean output power (dBm) =} \\
 & \quad - \text{ mean input power (dBm)} \\
 & \quad + \text{ offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{ interference correction} \\
 & \quad + \text{ ACC_CORRECTIONS} \\
 & \quad + \text{ RLGAIN_ADJ}_s \\
 & \quad + \text{ the sum of all closed loop power control corrections (dB)} \\
 & \quad + \text{ PUF_INIT_PWR}_s \\
 & \quad + \text{ CURRENT_PUF_PROBE}_s \times \text{ PUF_PWR_STEP}_s.
 \end{aligned}$$

28 The mobile station shall not begin to increase power for a PUF pulse earlier than one power
29 control group before the beginning of the PUF pulse. The mean output power should reach
30 the PUF pulse power by the beginning of the PUF pulse, and shall reach the PUF pulse
31 power by the end of the first power control group of the PUF pulse. After the end of a PUF
32 pulse transmitted on the serving frequency, the mean output power shall return to either
33 the gated-on or gated-off level by the end of the first power control group of the PUF
34 recovery time. After the end of a PUF pulse transmitted on a PUF target frequency, the
35 mobile station shall disable the transmitter by the end of the first power control group of
36 the PUF recovery time.

37 During a PUF pulse, the mobile station shall support power increases from the nominal up
38 to the maximum output power. Immediately following the PUF pulse, the mobile station
39 shall decrement its output power to the nominal power or to the gated-off power level with
40 respect to the nominal output power.

41

1 The range of PUF_INIT_PWR_s is 0 to 63 dB. The range of PUF_PWR_STEP_s is 0 to 31 dB.
 2 The range of CURRENT_PUF_PROBE_s is 1 to 16. The accuracy of the adjustment to the
 3 mean output power due to PUF_INIT_PWR_s + (CURRENT_PUF_PROBE_s × PUF_PWR_STEP_s)
 4 shall be ±1/3 of that value (in dB), or ±3 dB, whichever is greater, unless the resulting
 5 mean output power exceeds the mobile station's maximum output power. If the output
 6 power exceeds the mobile station's maximum output power, the mean output power shall
 7 be within 3 dB of the maximum output power. See Figure 2.1.2.3.1.4-1.



Note: $X = \text{PUF_INIT_PWR}_s + (\text{CURRENT_PUF_PROBE}_s \times \text{PUF_PWR_STEP}_s)$

Figure 2.1.2.3.1.4-1. Power Up Function Transmission Envelope Mask

12 2.1.2.3.1.5 Open Loop Output Power When Transmitting on the Reverse Traffic Channel
 13 with Radio Configuration 3, 4, 5, or 6

14 The initial transmission on the Reverse Pilot Channel when transmitting a Reverse Traffic
 15 Channel with Radio Configuration 3, 4, 5, or 6 shall be at a mean output power defined by

$$\begin{aligned}
 & \text{mean pilot channel output power (dBm)} = \\
 & \quad - \text{mean input power (dBm)} \\
 & \quad + \text{offset power (from Table 2.1.2.3.1-1)} \\
 & \quad + \text{interference correction} \\
 & \quad + \text{ACC_CORRECTIONS} \\
 & \quad + \text{RLGAIN_ADJ}_s,
 \end{aligned}$$

22 where interference correction = $\min(\max(\text{IC_THRESH}_s - \text{ECIO}, 0), 7)$, and ECIO is the E_c/I_0
 23 (dB) per carrier of the strongest active set pilot, measured within the previous 500 ms.

1 The mobile station shall determine E_c/I_0 (dB) by taking the ratio of the received pilot energy
 2 per chip, E_c , to the total received power spectral density (noise and signals), of at most k
 3 usable multipath components, where k is the number of demodulating elements supported
 4 by the mobile station. While receiving Spreading Rate 1, the mobile station shall determine
 5 the total received power spectral density, I_0 , over 1.23 MHz; while receiving Spreading Rate
 6 3, the mobile station shall determine the total received power spectral density, I_0 , over 3.69
 7 MHz. While receiving Spreading Rate 3 operation, the mobile station shall determine E_c/I_0
 8 by summing the E_c from each multipath component for all three carriers and normalizing
 9 by I_0 .

10 If the last channel used prior to operation on the Reverse Traffic Channel was the Access
 11 Channel, the mobile station shall set $ACC_CORRECTIONS$ to $NOM_PWR_s - 16 \times$
 12 $NOM_PWR_EXT_s + INIT_PWR_s + PWR_LVL \times PWR_STEP_s$.

13 If the last channel used prior to operation on the Reverse Traffic Channel was the
 14 Enhanced Access Channel, the mobile station shall set $ACC_CORRECTIONS$ to
 15 $EACH_NOM_PWR_s + EACH_INIT_PWR_s + PWR_LVL \times PWR_STEP_s +$ sum of all closed loop
 16 power control corrections (dB), if applicable.

17 If the last channel used prior to operation on the Reverse Traffic Channel was the Reverse
 18 Common Control Channel, the mobile station shall set $ACC_CORRECTIONS$ to
 19 $RCCCH_NOM_PWR_s + RCCCH_INIT_PWR_s + PREV_CORRECTIONS +$ sum of all closed loop
 20 power control corrections (dB), if applicable.

21 After the first valid power control bit is received, the mean output power shall be defined by

22 mean pilot channel output power (dBm) =
 23 - mean input power (dBm)
 24 + offset power (from Table 2.1.2.3.1-1)
 25 + interference correction
 26 + $ACC_CORRECTIONS$
 27 + $RLGAIN_ADJ_s$
 28 + the sum of all closed loop power control corrections.

29 The mobile station shall not update the interference correction after the first power control
 30 bit is received.

31 The mobile station shall support a total combined range of interference correction,
 32 $ACC_CORRECTIONS$, $RLGAIN_ADJ_s$, and closed loop power control corrections of at least
 33 ± 32 dB for mobile stations operating in Band Classes 0, 2, 3, 5, 7, 9, and 10 and ± 40 dB for
 34 mobile stations operating in Band Classes 1, 4, 6, and 8.

35 2.1.2.3.2 Closed Loop Output Power

36 For closed loop correction on the Enhanced Access Channel and the Reverse Common
 37 Control Channel (with respect to the open loop estimate), the mobile station shall adjust its
 38 mean output power level in response to each valid power control bit (see 3.1.3.7) received
 39 on the Forward Common Power Control Channel. The nominal change in mean output
 40 power per single power control bit shall be 1 dB.

1 For closed loop correction on the Reverse Traffic Channel (with respect to the open loop
2 estimate), the mobile station shall adjust its mean output power level in response to each
3 valid power control bit (see 3.1.3.1.10) received on the Forward Fundamental Channel or
4 the Forward Dedicated Control Channel.

5 For Radio Configuration 1 and 2, a power control bit shall be considered valid if it is
6 received in the second 1.25 ms time slot following a time slot in which the mobile station
7 transmitted (see 3.1.3.1.10), except during a PUF probe. During a PUF probe, the mobile
8 station shall consider a power control bit to be valid if it is received on the serving
9 frequency in the second 1.25 ms time slot following a time slot in which the mobile station
10 transmitted at the nominal power on the serving frequency. A power control bit received on
11 the Forward Power Control Subchannel is considered invalid if it is received in the second
12 1.25 ms time slot following a time slot in which the mobile station transmitter was gated
13 off, was changing power levels to increase power for the PUF pulse, was transmitting at the
14 PUF pulse power level, or was changing power levels to decrease power after the PUF pulse.

15 For Reverse Pilot Channel gating (see 2.1.3.2.3) with Radio Configurations 3 through 6, a
16 power control bit shall be considered valid if it is received during a power control group in
17 which the Forward Power Control Subchannel was transmitted (see 3.1.3.1.10). Otherwise,
18 it shall be considered invalid. For gated transmission other than the Reverse Pilot Channel
19 gating mode with Radio Configurations 3 through 6, a power control bit shall be considered
20 valid if it is received in the 1.25 ms time slot that starts $(REV_PWR_CNTL_DELAY_s + 1) \times$
21 1.25 ms following the end of a time slot in which the mobile station transmitted (see
22 3.1.3.1.10). For gated transmission other than the Reverse Pilot Channel gating mode with
23 Radio Configurations 3 through 6, a power control bit received on the Forward Power
24 Control Subchannel or on the assigned subchannel of the Common Power Control Channel
25 is considered invalid if it is received in the 1.25 ms time slot that starts
26 $(REV_PWR_CNTL_DELAY_s + 1) \times 1.25$ ms following the end of a time slot in which the
27 mobile station transmitter was gated off.

28 If the mobile station does not support operation on the Reverse Supplemental Channel or
29 the Reverse Supplemental Code Channel, then the mobile station shall support a 1 dB step
30 size. Otherwise, the mobile station shall support 0.5 dB and 1 dB step sizes. The mobile
31 station may also support any additional step sizes in Table 2.1.2.3.2-1. If a 0.25 dB step
32 size is supported, then the 0.5 dB and 1 dB step sizes shall be supported. The nominal
33 change in mean output power per single power control bit shall be as specified in Table
34 2.1.2.3.2-1 for the corresponding power control step size ($PWR_CNTL_STEP_s$). The total
35 change in the closed loop mean output power shall be the accumulation of the valid level
36 changes. The mobile station shall lock the accumulation of valid level changes and shall
37 ignore received power control bits when the transmitter is disabled. The total changed
38 closed loop mean output power shall be applied to the total transmit power of the mobile
39 station.

40

Table 2.1.2.3.2-1. Closed Loop Power Control Step Size

PWR_CNTL_STEP_s	Power Control Step Size (dB nominal)	Tolerance (dB)
0	1	±0.5
1	0.5	±0.3
2	0.25	±0.2

The change in mean output power per single power control bit shall be within the tolerance specified in Table 2.1.2.3.2-1 for the corresponding power control step size. For the 1.0 dB step size, the change in mean output power level per 10 valid power control bits of the same sign shall be within ±2.0 dB of 10 times the nominal change (10 dB). For the 0.5 dB step size, the change in mean output power level per 20 valid power control bits of the same sign shall be within ±2.5 dB of 20 times the nominal change (10 dB). For the 0.25 dB step size, the change in mean output power level per 40 valid power control bits of the same sign shall be within ±3.0 dB of 40 times the nominal change (10 dB). A '0' power control bit implies an increase in transmit power; and a '1' power control bit implies a decrease in transmit power.

The mobile station shall provide a closed loop adjustment range greater than ±24 dB around its open loop estimate.

For the Reverse Traffic Channel with Radio Configuration 1 or 2, if the mobile station is unable to transmit at the requested output power level, it shall terminate transmission on at least one active Reverse Supplemental Code Channel, not later than the transmission of the next 20 ms frame to maintain the requested output power on the Reverse Fundamental Channel.

For the Reverse Traffic Channel with Radio Configuration 3 through 6, if the mobile station is unable to transmit at the requested output power level, it shall reduce the data rate on the Reverse Fundamental Channel, or reduce the transmission power or terminate transmission on at least one of the following code channels that are active: the Reverse Fundamental Channel, the Reverse Supplemental Channels, or the Reverse Dedicated Control Channel. The mobile station shall perform this action not later than the 20 ms frame boundary occurring no later than 40 ms after determining that the mobile station is unable to transmit at the requested output power level. The mobile station should attempt to reduce the transmission power, the data rate, or terminate transmission first on the code channel with the lowest priority. The mobile station shall transmit at the commanded output power level on the Reverse Pilot Channel.

2.1.2.3.3 Code Channel Output Power for Other than the Reverse Pilot Channel

2.1.2.3.3.1 Code Channel Output Power for the Enhanced Access Channel Header, Enhanced Access Channel Data, and Reverse Common Control Channel Data

The mobile station shall set the output power of the Enhanced Access Channel Header, the Enhanced Access Channel Data, and the Reverse Common Control Channel Data relative to the output power of the Reverse Pilot Channel. The mobile station shall transmit the Enhanced Access Channel Header, Enhanced Access Channel Data, and Reverse Common Control Channel Data at an output power given by

$$\begin{aligned} \text{mean code channel output power (dBm)} = & \\ & \text{mean pilot channel output power (dBm)} \\ & + 0.125 \times \text{Nominal_Reverse_Common_Channel_Attribute_Gain} \\ & \quad [\text{Rate, Frame Duration}] \\ & + 0.125 \times \text{RLGAIN_COMMON_PILOT}_s. \end{aligned}$$

The mobile station shall maintain a Nominal Reverse Common Channel Attribute Gain Table containing the relative header gain for the Enhanced Access Channel Header, and the relative data gain for the Enhanced Access Channel Data and Reverse Common Channel Data for each data rate and frame duration supported by the mobile station. The mobile station shall use the values given in Table 2.1.2.3.3.1-1.

Table 2.1.2.3.3.1-1. Nominal Reverse Common Channel Attribute Gain Table

Data Rate (bps)	Frame Length (ms)	Nominal Reverse Common Channel Attribute Gain
9600	5 (Header)	54
9600	20	30
19200	10	64
19200	20	50
38400	5	88
38400	10	80
38400	20	72

The mobile station shall maintain the ratio

$$\frac{\text{mean code channel output power}}{\text{mean pilot channel output power}}$$

within ± 0.25 dB of the number specified by

$$\begin{aligned} & 0.125 \times (\text{Nominal_Reverse_Common_Channel_Attribute_Gain} \\ & \quad [\text{Rate, Frame Duration}]) \\ & + 0.125 \times \text{RLGAIN_COMMON_PILOT}_s. \end{aligned}$$

1 2.1.2.3.3.2 Code Channel Output Power for Reverse Traffic Channel with Radio
2 Configuration 3, 4, 5, or 6

3 The mobile station shall set the output power of the Reverse Fundamental Channel, the
4 Reverse Supplemental Channel, and the Reverse Dedicated Control Channel relative to the
5 output power of the Reverse Pilot Channel. The mobile station shall transmit each of the
6 Reverse Fundamental Channel, Reverse Supplemental Channel, and Reverse Dedicated
7 Control Channel at an output power given by⁷

$$\begin{aligned}
 & \text{mean code channel output power (dBm) =} \\
 & \quad \text{mean pilot channel output power (dBm)} \\
 & \quad + 0.125 \times (\text{Nominal_Attribute_Gain[Rate, Frame Duration, Coding]} \\
 & \quad + \text{Attribute_Adjustment_Gain[Rate, Frame Duration, Coding]} \\
 & \quad + \text{Reverse_Channel_Adjustment_Gain[Channel]} \\
 & \quad - \text{Multiple_Channel_Adjustment_Gain[Channel]} \\
 & \quad - \text{Variable_Supplemental_Adjustment_Gain[Channel]} \\
 & \quad + \text{RLGAIN_TRAFFIC_PILOT}_s \\
 & \quad + \text{RLGAIN_SCH_PILOT[Channel]}_s) \\
 & \quad + \text{IFHHO_SRCH_CORR.}
 \end{aligned}$$

18 where Channel identifies the Fundamental Channel, the Dedicated Control Channel, and
19 each Supplemental Channel.

20 The mobile station shall maintain a Reverse Link Nominal Attribute Gain Table containing
21 the nominal Reverse Fundamental Channel, Reverse Supplemental Channel, or Reverse
22 Dedicated Control Channel power relative to the Reverse Pilot Channel power for each data
23 rate listed in Table 2.1.2.3.3.2-1, frame duration, and coding rate supported by the mobile
24 station. The mobile station shall use the values given in Table 2.1.2.3.3.2-1.

25 If flexible data rates are supported, and if the specified data rate, coding, and frame length
26 are not specified in the Reverse Link Attribute Gain Table, the gain shall be determined by
27 linearly interpolating the values of Nominal_Attribute_Gain and the Pilot_Reference_Level to
28 the nearest integer from the nearest data rates above and below the specified data rate with
29 the same frame length and coding. If the specified data rate is below the lowest listed data
30 rate with the same frame length and coding, the gain shall be determined by linearly
31 extrapolating the values of Nominal_Attribute_Gain and the Pilot_Reference_Level to the
32 nearest integer from the two lowest data rates with the same frame length and coding in the
33 Reverse Link Attribute Gain Table. If variable-rate Reverse Supplemental Channel is
34 supported and the mobile station is transmitting using these rates, Pilot_Reference_Level of

⁷ The values of

Nominal_Attribute_Gain[Rate, Frame Duration, Coding]
Attribute_Adjustment_Gain[Rate, Frame Duration, Coding],
Reverse_Channel_Adjustment_Gain[Channel],
Multiple_Channel_Adjustment_Gain[Channel],
RLGAIN_TRAFFIC_PILOT_s, and RLGAIN_SCH_PILOT[Channel]_s

are integers, specified in units of 0.125 dB.

1 the highest assigned data rate shall be used for all the data rates on the Reverse
2 Supplemental Channel.

3 When the transmission on the Reverse Fundamental Channel is gated at the 1500 bps data
4 rate in Radio Configuration 3 or 5, or at the 1800 bps data rate in Radio Configuration 4 or
5 6, the mobile station shall use the Reverse Link Nominal Attribute Gain values given in
6 Table 2.1.2.3.3.2-2.

7 The mobile station shall maintain a Reverse Link Attribute Adjustment Gain Table
8 containing an offset relative to the Reverse Pilot Channel power for each data rate, frame
9 duration, and coding rate supported by the mobile station. The mobile station shall
10 initialize each entry in this table to 0.⁸

11 The mobile station shall maintain a Reverse Channel Adjustment Gain Table containing an
12 offset relative to Reverse Pilot Channel power for each reverse link code channel supported
13 by the mobile station. The mobile station shall initialize each entry in this table to 0.

14 The adjustment $RLGAIN_SCH_PILOT[Channel]_s$ is valid for the Reverse Supplemental
15 Channel.

16 The mobile station shall adjust the mean code channel output power for each of the
17 Reverse Fundamental Channel, Reverse Supplemental Channel, and Reverse Dedicated
18 Control Channel by $0.125 \times RLGAIN_TRAFFIC_PILOT_s$ (dB).

19 If the mobile station is transmitting on only one code channel in addition to the Reverse
20 Pilot Channel, then the mobile station shall set $Multiple_Channel_Adjustment_Gain$
21 $[Channel]$ to 0 for all code channels. If the mobile station is transmitting on two or more
22 code channels in addition to the Reverse Pilot Channel, then the mobile shall set $Multiple_$
23 $Channel_Adjustment_Gain[Channel]$ for each channel as follows:

- 24 • Let $Max_Channel$ identify the code channel with the highest $Pilot_Reference_Level$
25 among the code channels on which the mobile station is transmitting.
- 26 • Set $Multiple_Channel_Adjustment_Gain[Max_Channel]$ to 0.
- 27 • For all other code channels, set $Multiple_Channel_Adjustment_Gain [Channel]$ to
28 $Pilot_Reference_Level[Max_Channel] - Pilot_Reference_Level[Channel]$.

29 If variable-rate Reverse Supplemental Channel operation is supported and the mobile
30 station is transmitting using these rates on a Reverse Supplemental Channel, then the
31 mobile station shall set $Variable_Supplemental_Adjustment_Gain[Rate, Channel]$ for each
32 channel as follows:

- 33 • Let $Max_Channel$ identify the code channel with the highest $Pilot_Reference_Level$
34 among the code channels on which the mobile station is transmitting.
- 35 • If $Max_Channel$ is not a Reverse Supplemental Channel with variable data rates, set
36 all $Variable_Supplemental_Adjustment_Gain[Rate, Channel]$ to 0.

⁸ The format of this table is similar to that of the Reverse Link Nominal Attribute Gain Table.

- 1 • Otherwise, set $\text{Variable_Supplemental_Adjustment_Gain}[\text{Rate}, \text{Channel}]$ to
2 $\text{Pilot_Reference_Level}[\text{Max_Channel}] - \text{Pilot_Reference_Level}[\text{Rate}, \text{Channel}]$ for all
3 rates on the Max_Channel except the maximum assigned rate on that channel. Set
4 $\text{Variable_Supplemental_Adjustment_Gain}[\text{Rate}, \text{Channel}]$ to 0 for all other channels.
5

1 **Table 2.1.2.3.3.2-1. Reverse Link Nominal Attribute Gain Table (Part 1 of 2)**

Data Rate (bps)	Frame Length (ms)	Coding	Nominal_ Attribute _Gain	Pilot_ Reference _Level	Target Error Rate⁹
1,200	80	Convolutional	-56	0	0.05
1,350	40	Convolutional	-54	0	0.05
1,500	20	Convolutional	-47	0	0.01
1,800	20	Convolutional	-42	3	0.01
1,800	40 or 80	Convolutional	-45	3	0.05
2,400	40 or 80	Convolutional	-30	0	0.05
2,700	20	Convolutional	-22	0	0.01
3,600	20	Convolutional	-13	3	0.01
3,600	40 or 80	Convolutional	-17	3	0.05
4,800	20	Convolutional	-2	0	0.01
4,800	40 or 80	Convolutional	-3	0	0.05
7,200	20	Convolutional	15	3	0.01
7,200	40 or 80	Convolutional	10	3	0.05
9,600	20	Convolutional	30	0	0.01
9,600	40 or 80	Convolutional	24	0	0.05
9,600 (RC 3 and 5)	5	Convolutional	58	0	0.01
9,600 (RC 4 and 6)	5	Convolutional	54	3	0.01
14,400	20	Convolutional	44	3	0.01
14,400	40 or 80	Convolutional	40	3	0.05
19,200	20, 40 or 80	Convolutional	50	1	0.05
28,800	20, 40 or 80	Convolutional	56	11	0.05
38,400	20, 40 or 80	Convolutional	60	11	0.05
57,600	20, 40 or 80	Convolutional	72	18	0.05
76,800	20, 40 or 80	Convolutional	72	21	0.05
115,200	20, 40 or 80	Convolutional	80	32	0.05

⁹ The error rate is the frame error rate when a single transmission unit is used; otherwise, the Logical Transmission Unit (LTU) error rate is used. This applies to the cases in which the Target Error Rate is 0.05.

1

2

Table 2.1.2.3.3.2-1. Reverse Link Nominal Attribute Gain Table (Part 2 of 2)

Data Rate (bps)	Frame Length (ms)	Coding	Nominal Attribute Gain	Pilot Reference Level	Target Error Rate
153,600	20, 40 or 80	Convolutional	84	36	0.05
230,400	20 or 40	Convolutional	88	46	0.05
259,200	80	Convolutional	96	50	0.05
307,200	20 or 40	Convolutional	96	54	0.05
460,800	20	Convolutional	104	61	0.05
518,400	40	Convolutional	104	64	0.05
614,400	20	Convolutional	112	68	0.05
1,036,800	20	Convolutional	128	83	0.05
4,800	80	Turbo	2	0	0.05
7,200	80	Turbo	24	0	0.05
9,600	40 or 80	Turbo	34	0	0.05
14,400	40 or 80	Turbo	42	0	0.05
19,200	20, 40 or 80	Turbo	44	2	0.05
28,800	20, 40 or 80	Turbo	52	9	0.05
38,400	20, 40 or 80	Turbo	56	10	0.05
57,600	20, 40 or 80	Turbo	64	19	0.05
76,800	20, 40 or 80	Turbo	68	19	0.05
115,200	20, 40 or 80	Turbo	76	29	0.05
153,600	20, 40 or 80	Turbo	76	33	0.05
230,400	20 or 40	Turbo	88	39	0.05
259,200	80	Turbo	88	48	0.05
307,200	20 or 40	Turbo	88	50	0.05
460,800	20	Turbo	104	54	0.05
518,400	40	Turbo	108	56	0.05
614,400	20	Turbo	112	58	0.05
1,036,800	20	Turbo	125	78	0.05

3

Table 2.1.2.3.3.2-2. Reverse Link Nominal Attribute Gain Values for the Reverse Fundamental Channel at the 1500 bps or 1800 bps Data Rate during Gated Transmission

Data Rate (bps)	Frame Length (ms)	Coding	Nominal Attribute Gain	Pilot Reference Level	Target Error Rate
1,500	20	Convolutional	-10	0	0.01
1,800	20	Convolutional	-2	3	0.01

The mobile station shall maintain the ratio

$$\frac{\text{mean code channel output power}}{\text{mean pilot channel output power}}$$

within ± 0.25 dB of the number specified by:

$$\begin{aligned} & 0.125 \times (\text{Nominal_Attribute_Gain}[\text{Rate, Frame Duration, Coding}] \\ & + \text{Attribute_Adjustment_Gain}[\text{Rate, Frame Duration, Coding}] \\ & + \text{Reverse_Channel_Adjustment_Gain}[\text{Channel}] \\ & - \text{Multiple_Channel_Adjustment_Gain}[\text{Channel}] \\ & + \text{RLGAIN_TRAFFIC_PILOT}_s \\ & + \text{RLGAIN_SCH_PILOT}[\text{Channel}]_s) \\ & + \text{IFHHO_SRCH_CORR} \end{aligned}$$

for every code channel (i.e., the Reverse Fundamental Channel, Reverse Supplemental Channel, or Reverse Dedicated Control Channel) having an output power greater than 1/30 of the total output power of the mobile station. The mobile station shall maintain the above ratio to within ± 0.35 dB for every code channel having an output power greater than 1/60 and less than 1/30 of the total output power of the mobile station. The mobile station shall maintain the above ratio to within ± 0.6 dB for code channel having an output power less than 1/60 of the total output power of the mobile station.

If the mobile station reduces the data rate or terminates transmission on a code channel for any other reason than being commanded by the base station or reaching the end of an allowed transmission period, the mobile station shall not change Multiple_Channel_Adjustment_Gain for any code channel.

The mobile station shall support a total range of at least $-(0.125 \times \text{Maximum_Pilot_Reference_Level} + 4)$ dB to +6 dB for adjustment to the nominal mean code channel output power given by:

$$\begin{aligned} \text{mean code channel output power (dBm)} = \\ \text{mean pilot channel output power (dBm)} \\ + 0.125 \times \text{Nominal_Attribute_Gain}[\text{Rate, Frame Duration, Coding}]. \end{aligned}$$

The adjustment to the mean code channel output power (dB) is given by:

$$\begin{aligned}
& 0.125 \times (\text{Attribute_Adjustment_Gain}[\text{Rate, Frame Duration, Coding}] \\
& + \text{Reverse_Channel_Adjustment_Gain}[\text{Channel}] \\
& - \text{Multiple_Channel_Adjustment_Gain}[\text{Channel}] \\
& + \text{RLGAIN_TRAFFIC_PILOT}_s \\
& + \text{RLGAIN_SCH_PILOT}[\text{Channel}]_s) \\
& + \text{IFHHO_SRCH_CORR}.
\end{aligned}$$

Maximum_Pilot_Reference_Level is the Pilot_Reference_Level given in Table 2.1.2.3.3.2-1 for the highest data rate transmitted by the mobile station.

The mobile station may suspend its current Reverse Traffic Channel processing in order to tune to a Candidate Frequency for possible hard handoff, and re-tune to the Serving Frequency. If the mobile station transmission is suspended for d ms in a frame of length T ms, and if d is less than $T/2$, the mobile station may set IFHHO_SRCH_CORR to an amount no greater than $(1 + 10 \log (T/(T - d)))$ dB (rounded to the nearest 0.125 dB) for the remainder of the frame that is transmitted. Otherwise, the mobile station shall set IFHHO_SRCH_CORR to zero. See Figure 2.1.2.3.3.2-1.

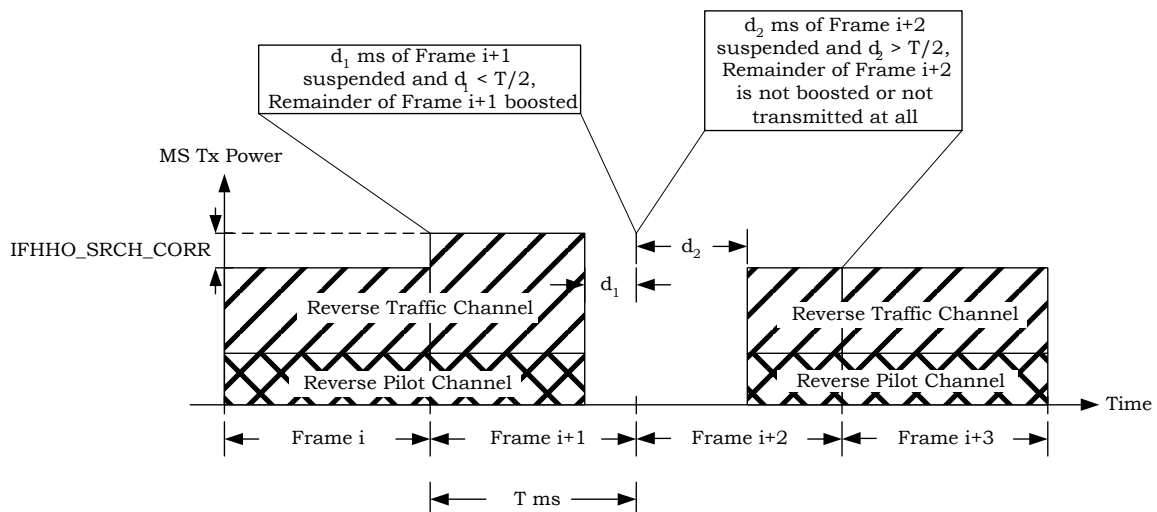


Figure 2.1.2.3.3.2-1. Increased Reverse Traffic Channel Power for Inter-frequency Hard Handoff

2.1.2.4 Power Transition Characteristics

2.1.2.4.1 Open Loop Estimation

Following a step change in mean input power, ΔP_{in} , the mean output power of the mobile station shall transition to its final value in a direction opposite in sign to ΔP_{in} , with magnitude contained between mask limits defined by:

- (a) upper limit:

1 for $0 < t < 24$ ms: $\max [1.2 \times |\Delta P_{in}| \times (t/24), |\Delta P_{in}| \times (t/24) + 2.0 \text{ dB}] + 1.5 \text{ dB}$,¹⁰

2 for $t \geq 24$ ms: $\max [1.2 \times |\Delta P_{in}|, |\Delta P_{in}| + 0.5 \text{ dB}] + 1.5 \text{ dB}$;

3 (b) lower limit:

4 for $t > 0$: $\max [0.8 \times |\Delta P_{in}| \times [1 - e^{(1.25 - t)/36}] - 2.0 \text{ dB}, 0] - 1 \text{ dB}$;

5 where t is expressed in units of milliseconds and ΔP_{in} is expressed in units of dB.

6 These limits shall apply for a step change ΔP_{in} of ± 20 dB or less. The absolute value of the
7 change in mean output power due to open loop power control shall be a monotonically
8 increasing function of time. If the change in mean output power consists of discrete
9 increments, no single increment shall exceed 1.2 dB. See 2.1.2.3 for the valid range of the
10 mobile station's mean output power.

11 2.1.2.4.2 Closed Loop Correction

12 Following the reception of a valid closed loop power control bit on the Forward Power
13 Control Subchannel or the Forward Common Power Control Channel, the mean output
14 power of the mobile station shall be within 0.3 dB of the final value in less than 500 μ s. For
15 power control step sizes of 0.5 dB and 0.25 dB, the mean output power of the mobile
16 station should be within 0.15 dB of the final value in less than 500 μ s.

17 2.1.2.4.3 Phase Continuity Requirements for Radio Configurations 3 through 6

18 When operating with Radio Configurations 3 through 6, the mobile station may have
19 transmitted phase discontinuities. The mobile station shall meet the requirements set forth
20 in the current version of [11].

21 2.1.3 Modulation Characteristics

22 2.1.3.1 Reverse CDMA Channel Signals

23 Signals transmitted on the Reverse Traffic Channel (i.e. Reverse Dedicated Control Channel,
24 Reverse Fundamental Channel, Reverse Supplemental Channel, or Reverse Supplemental
25 Code Channel) are specified by radio configurations. There are six radio configurations for
26 the Reverse Traffic Channel (see Table 2.1.3.1-1).

27 A mobile station shall support operation in Radio Configuration 1, 3, or 5. A mobile station
28 may support operation on Radio Configuration 2, 4, or 6. A mobile station supporting
29 operation in Radio Configuration 2 shall support Radio Configuration 1. A mobile station
30 supporting operation in Radio Configuration 4 shall support Radio Configuration 3. A
31 mobile station supporting operation in Radio Configuration 6 shall support Radio
32 Configuration 5.

33 A mobile station shall not use Radio Configuration 1 or 2 simultaneously with Radio
34 Configuration 3 or 4 on the Reverse Traffic Channel.

¹⁰The mask limits allow for the effect of alternating closed loop power control bits.

1 If the mobile station supports the Forward Fundamental Channel with Radio Configuration
2 1, then it shall support the Reverse Fundamental Channel with Radio Configuration 1. If
3 the mobile station supports the Forward Fundamental Channel with Radio Configuration 2,
4 then it shall support the Reverse Fundamental Channel with Radio Configuration 2. If the
5 mobile station supports the Forward Fundamental Channel with Radio Configuration 3 or
6 4, then it shall support the Reverse Fundamental Channel with Radio Configuration 3. If
7 the mobile station supports the Forward Fundamental Channel with Radio Configuration 5,
8 then it shall support the Reverse Fundamental Channel with Radio Configuration 4.

9 If the mobile station supports the Forward Fundamental Channel with Radio Configuration
10 6 or 7, then it shall support the Reverse Fundamental Channel with Radio Configuration 3
11 or 5. If the mobile station supports the Forward Fundamental Channel with Radio
12 Configuration 8 or 9, then it shall support the Reverse Fundamental Channel with Radio
13 Configuration 4 or 6.

14 If the mobile station supports the Forward Dedicated Control Channel with Radio
15 Configuration 3 or 4, then it shall support the Reverse Dedicated Control Channel with
16 Radio Configuration 3. If the mobile station supports the Forward Dedicated Control
17 Channel with Radio Configuration 5, then it shall support the Reverse Dedicated Control
18 Channel with Radio Configuration 4. If the mobile station supports the Forward Dedicated
19 Control Channel with Radio Configuration 6 or 7, then it shall support the Reverse
20 Dedicated Control Channel with Radio Configuration 3 or 5. If the mobile station supports
21 the Forward Dedicated Control Channel with Radio Configuration 8 or 9, then it shall
22 support the Reverse Dedicated Control Channel with Radio Configuration 4 or 6.

23

1 **Table 2.1.3.1-1. Radio Configuration Characteristics for the Reverse CDMA Channel**

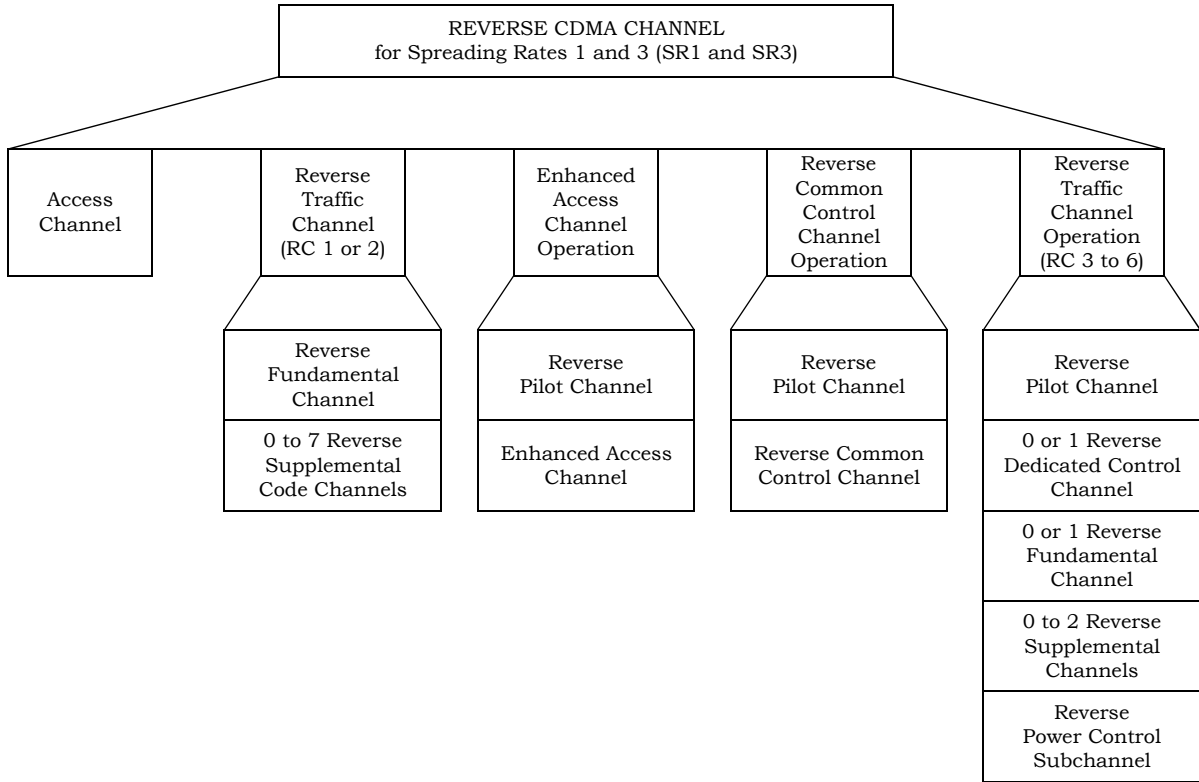
Radio Config.	Associated Spreading Rate	Data Rates, Forward Error Correction, and General Characteristics
1	1	1200, 2400, 4800, and 9600 bps data rates with $R = 1/3$, 64-ary orthogonal modulation
2	1	1800, 3600, 7200, and 14400 bps data rates with $R = 1/2$, 64-ary orthogonal modulation
3	1	1200, 1350, 1500, 2400, 2700, 4800, 9600, 19200, 38400, 76800, and 153600 bps data rates with $R = 1/4$, 307200 bps data rate with $R = 1/2$, BPSK modulation with a pilot
4	1	1800, 3600, 7200, 14400, 28800, 57600, 115200, and 230400 bps data rates with $R = 1/4$, BPSK modulation with a pilot
5	3	1200, 1350, 1500, 2400, 2700, 4800, 9600, 19200, 38400, 76800, and 153600 bps data rates with $R = 1/4$, 307200 and 614400 bps data rate with $R = 1/3$, BPSK modulation with a pilot
6	3	1800, 3600, 7200, 14400, 28800, 57600, 115200, 230400, and 460800 bps data rates with $R = 1/4$, 1036800 bps data rate with $R = 1/2$, BPSK modulation with a pilot
Note: For Radio Configurations 3 through 6, the Reverse Dedicated Control Channel and Reverse Fundamental Channel also allow a 9600 bps, 5 ms format.		

2

3 2.1.3.1.1 Channel Structures

4 The structure of the code channels transmitted by a mobile station is shown in Figure
5 2.1.3.1.1-1.

6



1
2
3
4
5
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7
8

Figure 2.1.3.1.1-1. Reverse CDMA Channels Received at the Base Station

2.1.3.1.1.1 Spreading Rate 1

The Reverse CDMA Channel consists of the channels specified in Table 2.1.3.1.1.1-1. Table 2.1.3.1.1.1-1 states the maximum number of channels that can be transmitted by each mobile station for each channel type.

Table 2.1.3.1.1.1-1. Channel Types per Mobile Station on the Reverse CDMA Channel for Spreading Rate 1

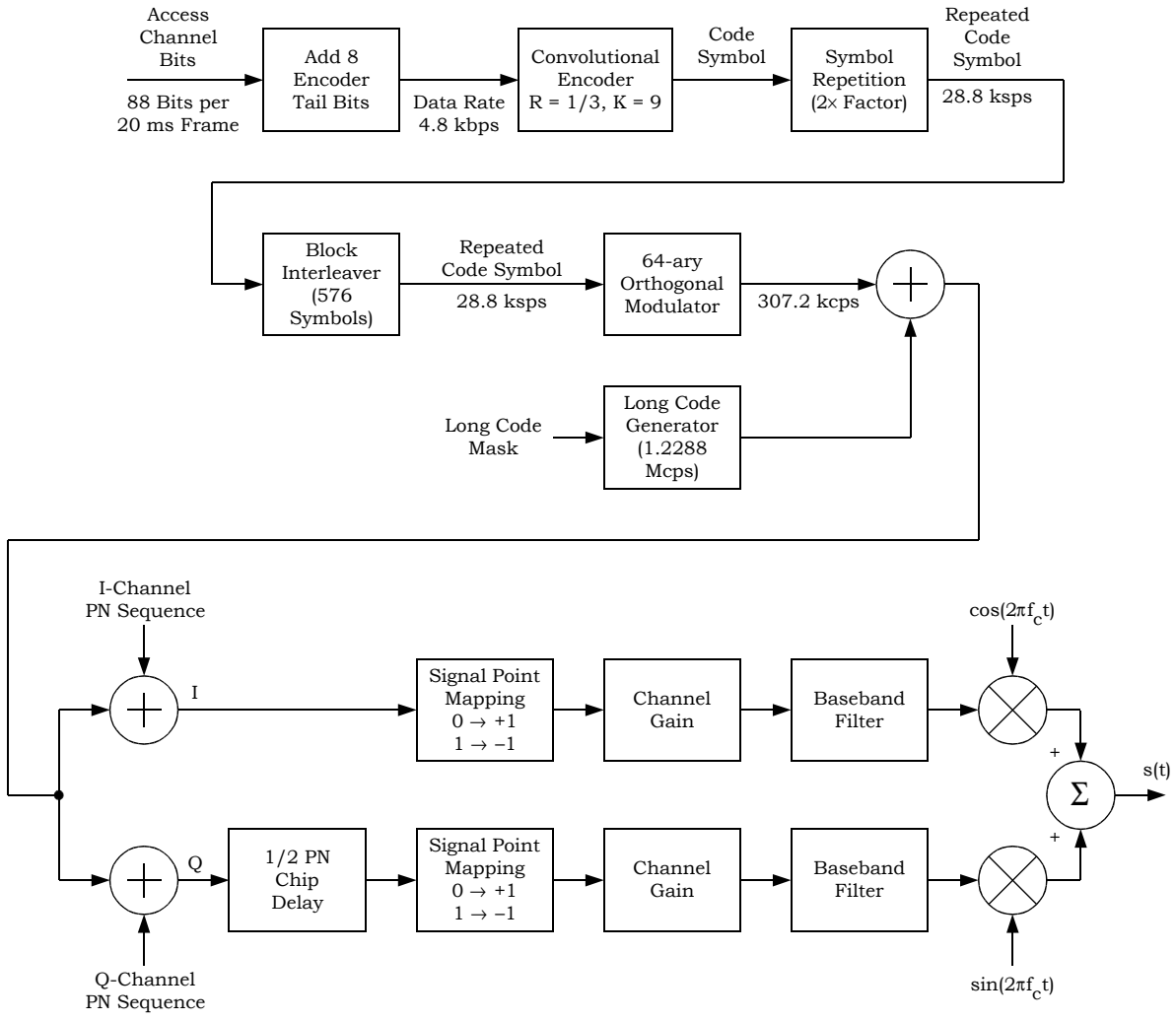
Channel Type	Maximum Number
Reverse Pilot Channel	1
Access Channel	1
Enhanced Access Channel	1
Reverse Common Control Channel	1
Reverse Dedicated Control Channel	1
Reverse Fundamental Channel	1
Reverse Supplemental Code Channel (RC 1 and 2 only)	7
Reverse Supplemental Channel (RC 3 and 4 only)	2

The structure of the Access Channel for Spreading Rate 1 is shown in Figure 2.1.3.1.1.1-1. The structure of the Enhanced Access Channel for Spreading Rate 1 is shown in Figures 2.1.3.1.1.1-2 and 2.1.3.1.1.1-3. The structure of the Reverse Common Control Channel for Spreading Rate 1 is shown in Figure 2.1.3.1.1.1-3. The structure of the Reverse Dedicated Control Channel for Spreading Rate 1 is shown in Figures 2.1.3.1.1.1-4 and 2.1.3.1.1.1-5.

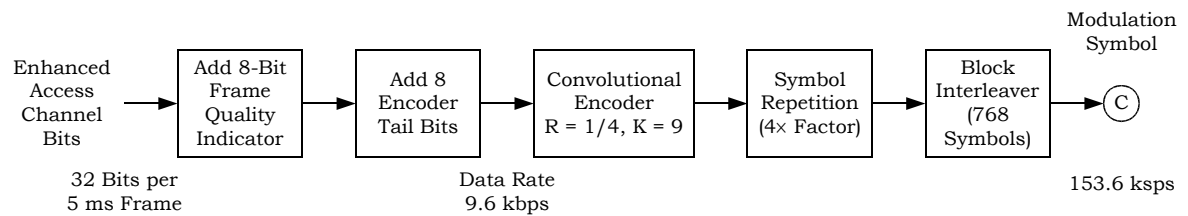
The Reverse Fundamental Channel and Reverse Supplemental Code Channel for Radio Configuration 1 have the overall structure shown in Figure 2.1.3.1.1.1-6. The Reverse Fundamental Channel and Reverse Supplemental Code Channel for Radio Configuration 2 have the overall structure shown in Figure 2.1.3.1.1.1-7. The Reverse Fundamental Channel and Reverse Supplemental Channel for Radio Configuration 3 have the overall structure shown in Figure 2.1.3.1.1.1-8. The Reverse Fundamental Channel and Reverse Supplemental Channel for Radio Configuration 4 have the overall structure shown in Figure 2.1.3.1.1.1-9.

The Reverse Pilot Channel and the Reverse Power Control Subchannel are shown in Figure 2.1.3.1.10.1-1.

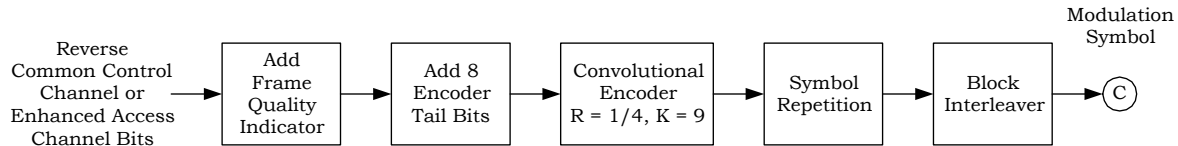
The I and Q mapping for the Reverse Pilot Channel, Enhanced Access Channel, Reverse Common Control Channel, and Reverse Traffic Channel with Radio Configurations 3 and 4 is shown in Figure 2.1.3.1.1.1-10.



1
2 **Figure 2.1.3.1.1.1-1. Channel Structure for the Access Channel for Spreading Rate 1**

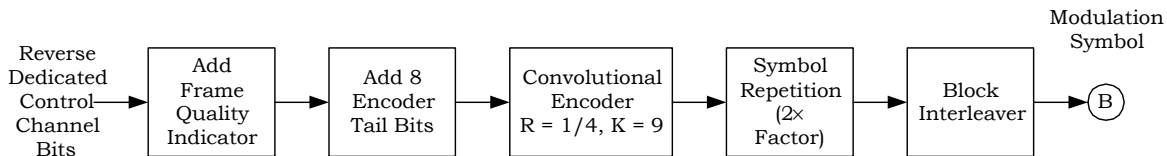


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5 **Figure 2.1.3.1.1.1-2. Channel Structure for the Header**
6 **on the Enhanced Access Channel for Spreading Rate 1**
7



<u>Bits/Frame</u>	<u>Bits</u>	<u>Data Rate (kbps)</u>	<u>Factor</u>	<u>Symbols</u>	<u>Rate (ksps)</u>
172 Bits/5 ms	12	38.4	1x	768	153.6
360 Bits/10 ms	16	38.4	1x	1,536	153.6
172 Bits/10 ms	12	19.2	2x	1,536	153.6
744 Bits/20 ms	16	38.4	1x	3,072	153.6
360 Bits/20 ms	16	19.2	2x	3,072	153.6
172 Bits/20 ms	12	9.6	4x	3,072	153.6

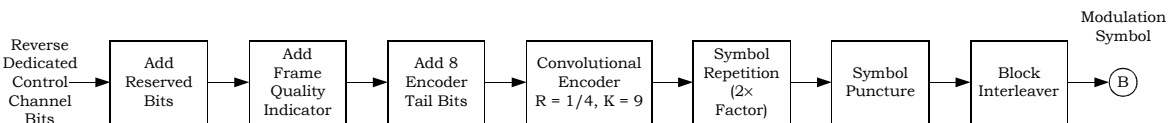
Figure 2.1.3.1.1-3. Channel Structure for the Data on the Enhanced Access Channel and the Reverse Common Control Channel for Spreading Rate 1



<u>Bits/Frame</u>	<u>Bits</u>	<u>Data Rate (kbps)</u>	<u>Symbols</u>	<u>Rate (ksps)</u>
24 Bits/5 ms	16	9.6	384	76.8
172 Bits/20 ms	12	9.6	1,536	76.8
1 to 171 Bits/20 ms	12 or 16	1.05 to 9.55	1,536	76.8

Note: If flexible data rates are supported, there can be 1 to 171 channel bits in a 20 ms frame and the encoded symbols will be repeated and then punctured to provide a 76.8 ksps modulation symbol rate.

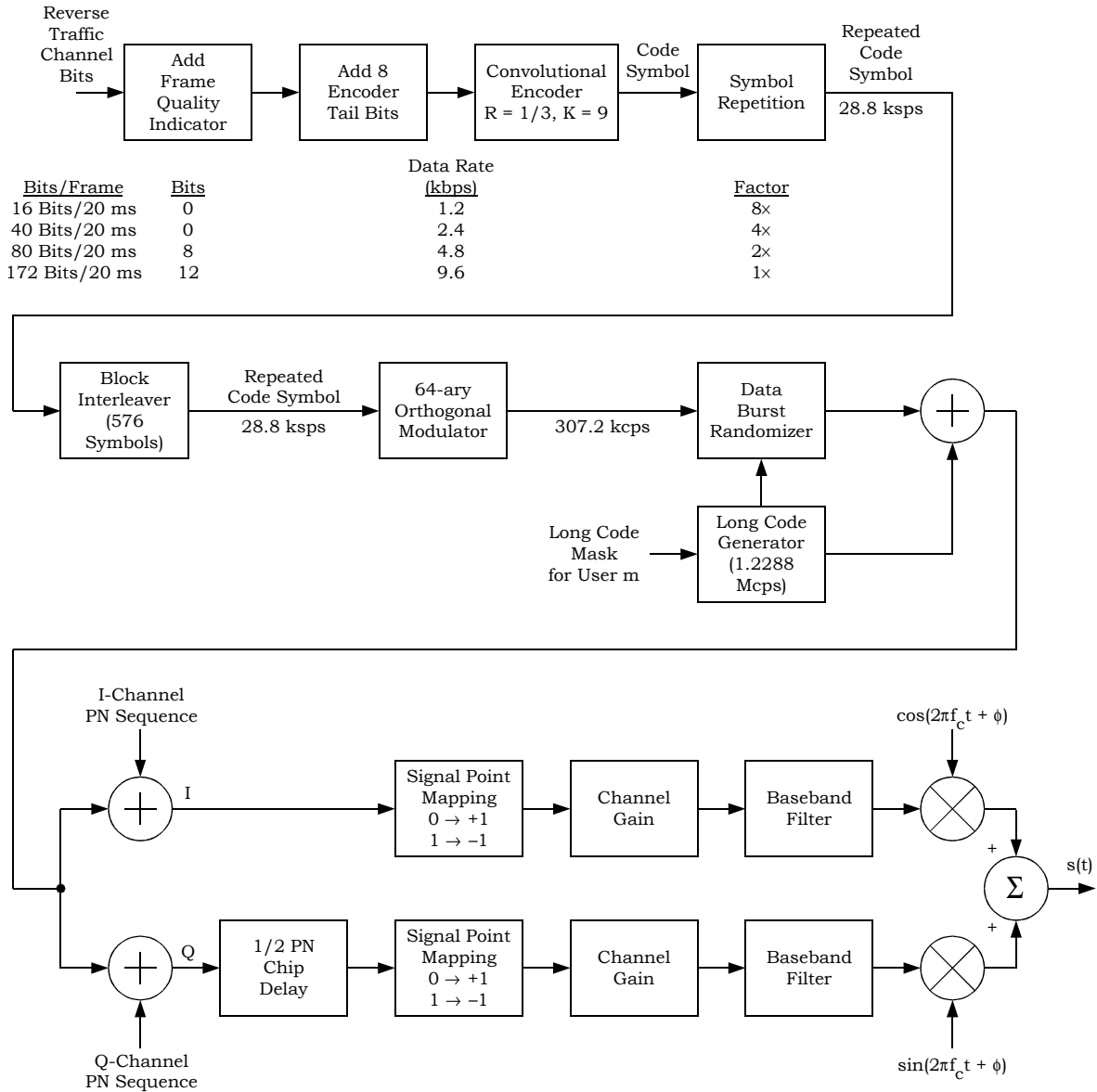
Figure 2.1.3.1.1-4. Reverse Dedicated Control Channel Structure for Radio Configuration 3



<u>Bits/Frame</u>	<u>Bits</u>	<u>Bits</u>	<u>Data Rate (kbps)</u>	<u>Deletion</u>	<u>Symbols</u>	<u>Rate (ksps)</u>
24 Bits/5 ms	0	16	9.6	None	384	76.8
267 Bits/20 ms	1	12	14.4	8 of 24	1,536	76.8
1 to 268 Bits/20 ms	0	12 or 16	1.05 to 14.4		1,536	76.8

Notes: If flexible data rates are supported, there can be 1 to 268 channel bits in a 20 ms frame and the encoded symbols will be repeated and then punctured to provide a 76.8 ksps modulation symbol rate.

Figure 2.1.3.1.1-5. Reverse Dedicated Control Channel Structure for Radio Configuration 4



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Figure 2.1.3.1.1-6. Channel Structure for the Reverse Fundamental Channel and Reverse Supplemental Code Channel with Radio Configuration 1

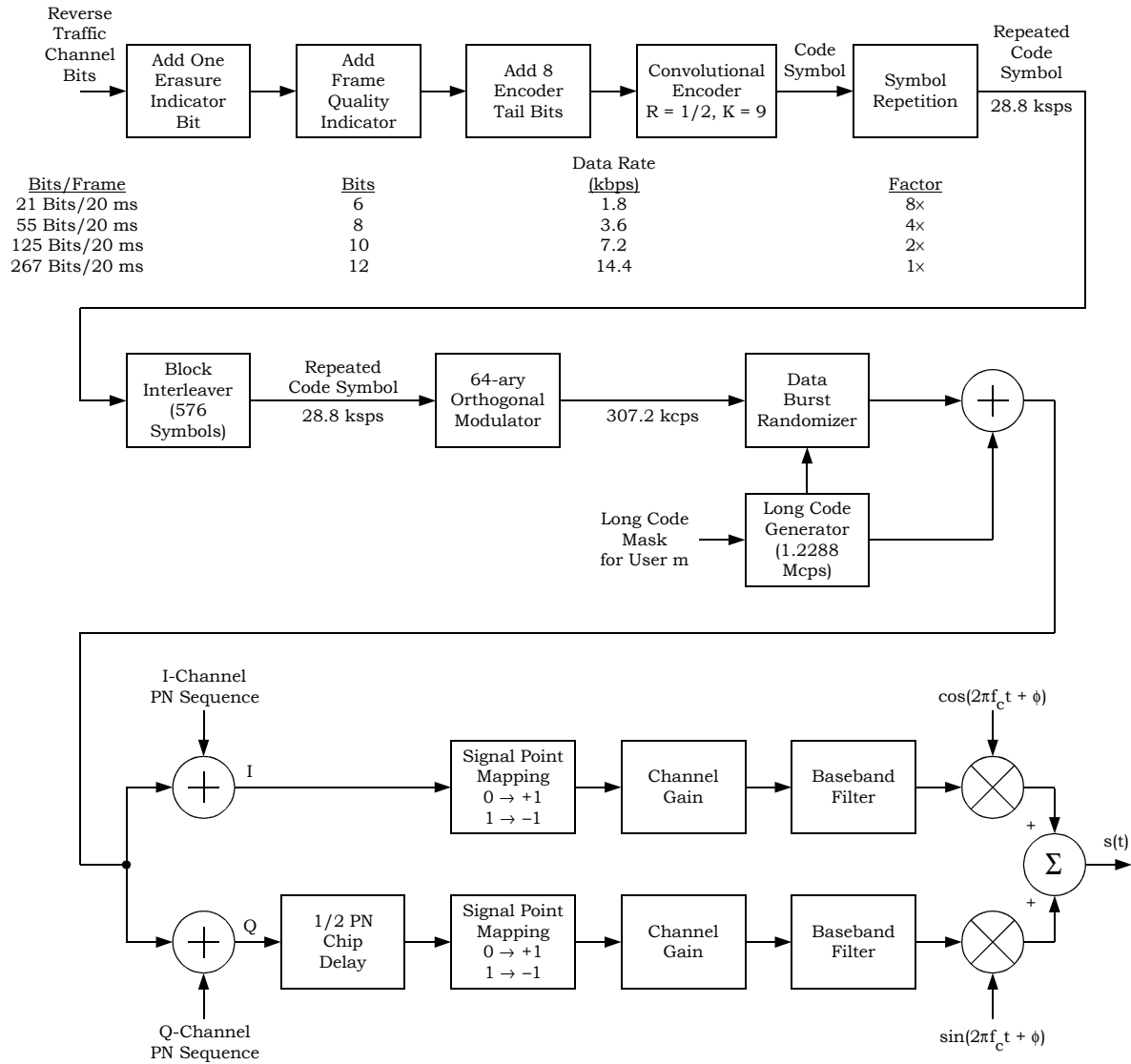
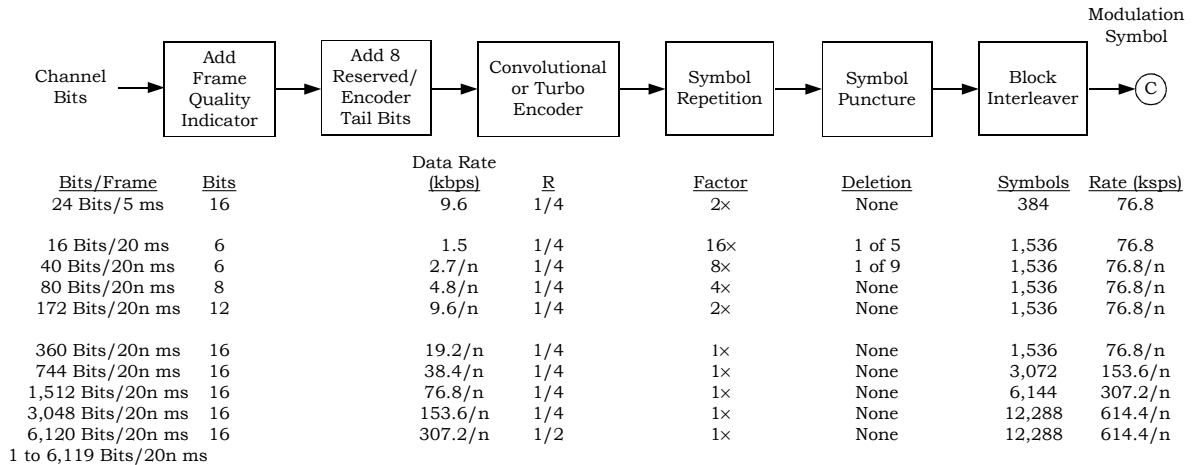


Figure 2.1.3.1.1-7. Channel Structure for the Reverse Fundamental Channel and Reverse Supplemental Code Channel with Radio Configuration 2

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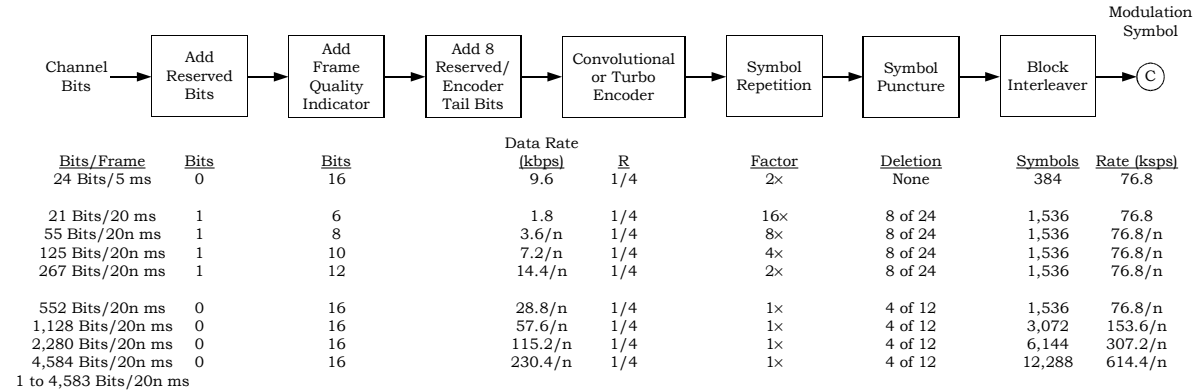


Notes:

1. n is the length of the frame in multiples of 20 ms. For 31 to 54 encoder input bits per frame, n = 1 or 2. For more than 54 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Reverse Fundamental Channel, and the Reverse Fundamental Channel only uses 15 to 192 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Reverse Supplemental Channels with 384 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
 - The frame quality indicator length is 16 for more than 192 encoder input bits per frame; 12 or 16 for 97 to 192 encoder input bits per frame; 8, 12, or 16 for 55 to 96 encoder input bits per frame; and 6, 8, 12, or 16 otherwise.
 - The code rate is 1/2 for more than 3,072 encoder input bits per frame; otherwise, it is 1/4. If the number of encoder input bits per frame is less than 384, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

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Figure 2.1.3.1.1-8. Reverse Fundamental Channel and Reverse Supplemental Channel Structure for Radio Configuration 3



Notes:

1. n is the length of the frame in multiples of 20 ms. For 37 to 72 encoder input bits per frame, n = 1 or 2. For more than 72 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Reverse Fundamental Channel, and the Reverse Fundamental Channel only uses 15 to 288 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Reverse Supplemental Channels with 576 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
 - When the number of channel bits per frame is 21, 55, 125, or 267 and the corresponding number of frame quality indicator bits is 6, 8, 10, and 12, an initial reserved bit is used; otherwise, no initial reserved bits are used.
 - The frame quality indicator length is 16 for more than 288 encoder input bits per frame; 12 or 16 for 145 to 288 encoder input bits per frame; 10, 12, or 16 for 73 to 144 encoder input bits per frame; 8, 10, 12, or 16 for 37 to 72 encoder input bits per frame; and 6, 8, 10, 12, or 16 otherwise.
 - The code rate is 1/4. If the number of encoder input bits per frame is less than 576, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

Figure 2.1.3.1.1-9. Reverse Fundamental Channel and Reverse Supplemental Channel Structure for Radio Configuration 4

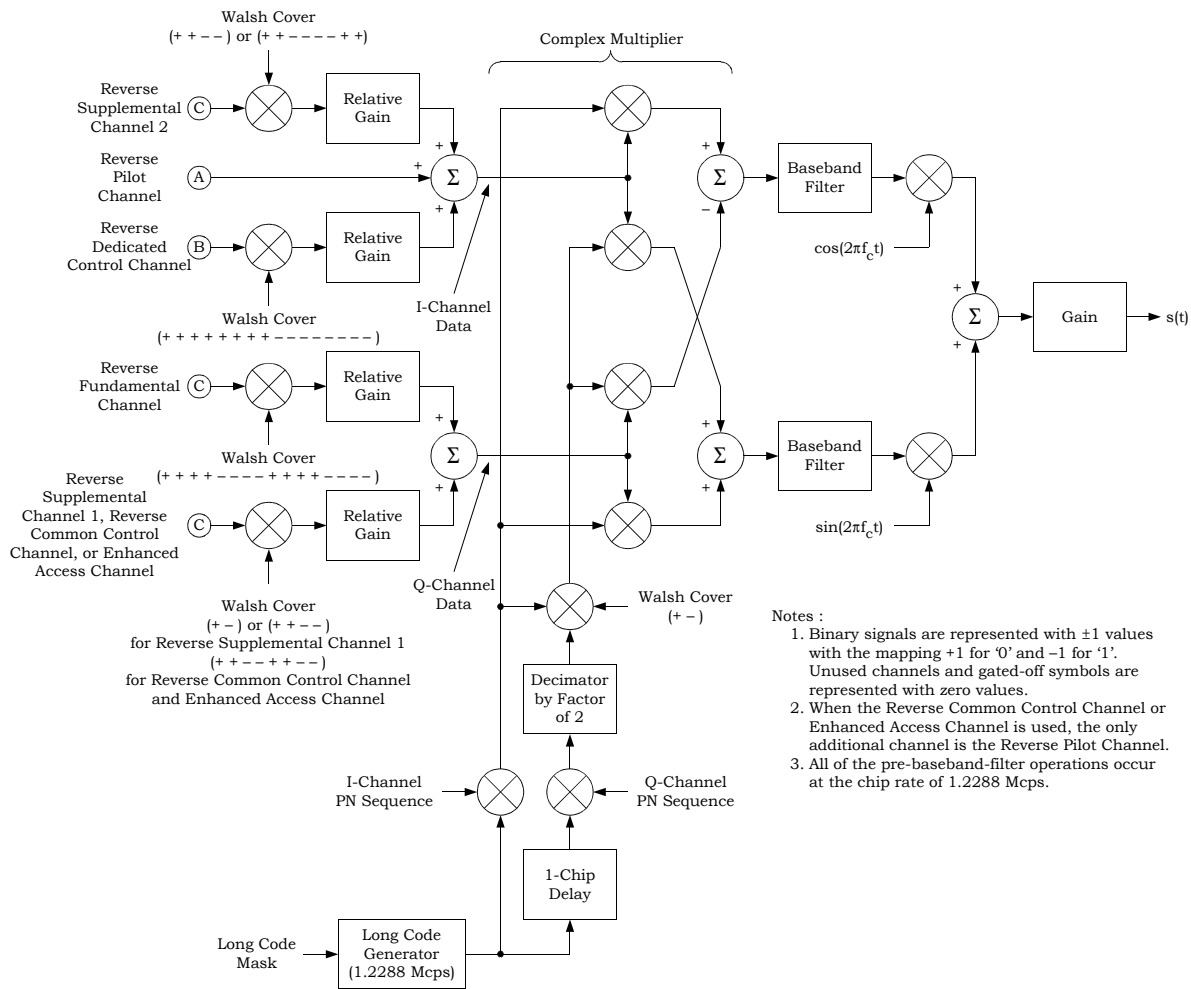


Figure 2.1.3.1.1.1-10. I and Q Mapping for Reverse Pilot Channel, Enhanced Access Channel, Reverse Common Control Channel, and Reverse Traffic Channel with Radio Configurations 3 and 4

2.1.3.1.1.2 Spreading Rate 3

The Reverse CDMA Channel consists of the channels specified in Table 2.1.3.1.1.2-1. Table 2.1.3.1.1.2-1 states the maximum number of channels that can be transmitted by each mobile station for each channel type.

Table 2.1.3.1.1.2-1. Channel Types per Mobile Station on the Reverse CDMA Channel for Spreading Rate 3

Channel Type	Maximum Number
Reverse Pilot Channel	1
Enhanced Access Channel	1
Reverse Common Control Channel	1
Reverse Dedicated Control Channel	1
Reverse Fundamental Channel	1
Reverse Supplemental Channel	2

The structure of the Enhanced Access Channel for Spreading Rate 3 is shown in Figures 2.1.3.1.1.2-1 and 2.1.3.1.1.2-2. The structure of the Reverse Common Control Channel for Spreading Rate 3 is shown in Figure 2.1.3.1.1.2-2. The structure of the Reverse Dedicated Control Channel for Spreading Rate 3 is shown in Figures 2.1.3.1.1.2-3 and 2.1.3.1.1.2-4.

The Reverse Fundamental Channel and Reverse Supplemental Channel for Radio Configuration 5 have the overall structure shown in Figure 2.1.3.1.1.2-5. The Reverse Fundamental Channel and Reverse Supplemental Channel for Radio Configuration 6 has the overall structure shown in Figure 2.1.3.1.1.2-6.

The Reverse Pilot Channel and the Reverse Power Control Subchannel are shown in Figure 2.1.3.1.10.1-1.

The I and Q mapping for Spreading Rate 3 is shown in Figure 2.1.3.1.1.2-7.

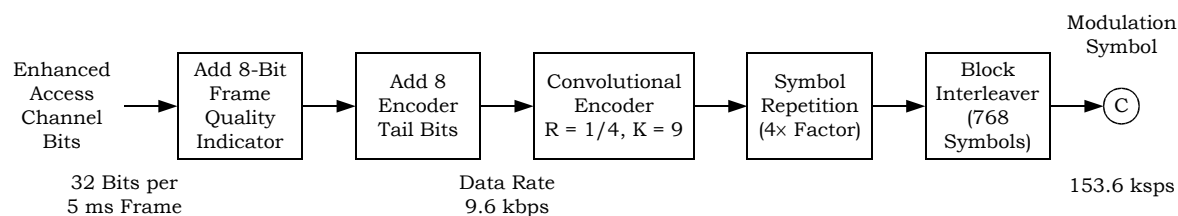
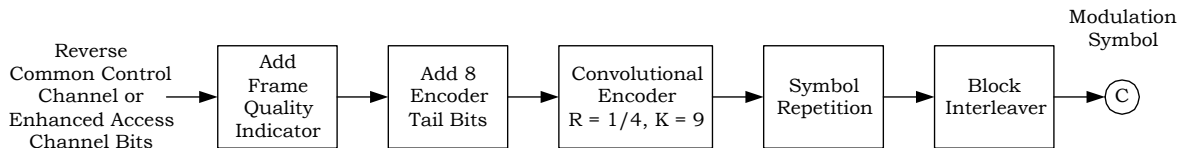
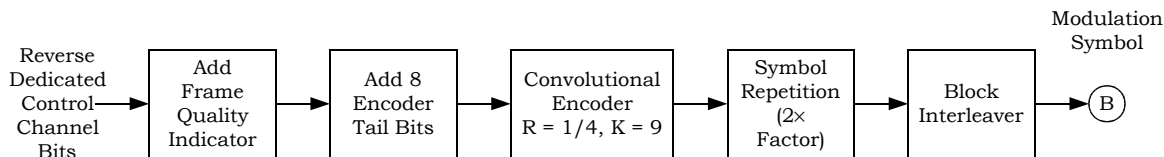


Figure 2.1.3.1.1.2-1. Channel Structure for the Header on the Enhanced Access Channel for Spreading Rate 3



<u>Bits/Frame</u>	<u>Bits</u>	<u>Data Rate (kbps)</u>	<u>Factor</u>	<u>Symbols</u>	<u>Rate (ksps)</u>
172 Bits/5 ms	12	38.4	1x	768	153.6
360 Bits/10 ms	16	38.4	1x	1,536	153.6
172 Bits/10 ms	12	19.2	2x	1,536	153.6
744 Bits/20 ms	16	38.4	1x	3,072	153.6
360 Bits/20 ms	16	19.2	2x	3,072	153.6
172 Bits/20 ms	12	9.6	4x	3,072	153.6

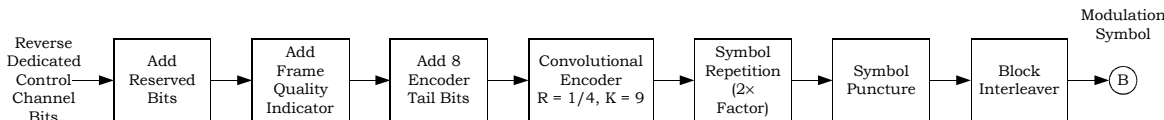
Figure 2.1.3.1.1.2-2. Channel Structure for the Data on the Enhanced Access Channel and the Reverse Common Control Channel for Spreading Rate 3



<u>Bits/Frame</u>	<u>Bits</u>	<u>Data Rate (kbps)</u>	<u>Symbols</u>	<u>Rate (ksps)</u>
24 Bits/5 ms	16	9.6	384	76.8
172 Bits/20 ms	12	9.6	1,536	76.8
1 to 171 Bits/20 ms	12 or 16	1.05 to 9.55	1,536	76.8

Note: If flexible data rates are supported, there can be 1 to 171 channel bits in a 20 ms frame and the encoded symbols will be repeated then punctured to provide a 76.8 ksps modulation symbol rate.

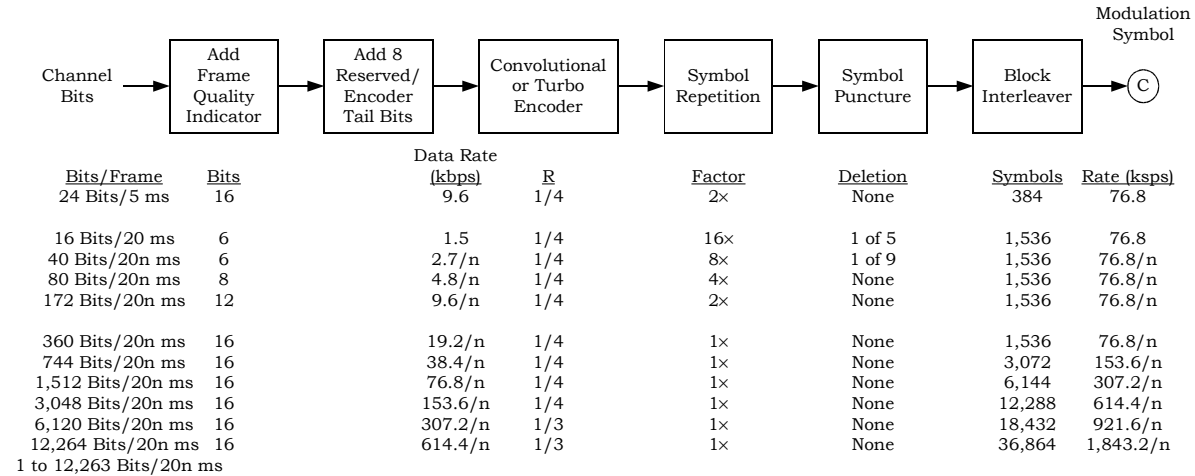
Figure 2.1.3.1.1.2-3. Reverse Dedicated Control Channel Structure for Radio Configuration 5



<u>Bits/Frame</u>	<u>Bits</u>	<u>Bits</u>	<u>Data Rate Rate (kbps)</u>	<u>Deletion</u>	<u>Symbols</u>	<u>Rate (ksps)</u>
24 Bits/5 ms	0	16	9.6	None	384	76.8
267 Bits/20 ms	1	12	14.4	8 of 24	1,536	76.8
1 to 268 Bits/20 ms	0	12 or 16	1.05 to 14.4		1,536	76.8

Note: If flexible data rates are supported, there can be 1 to 268 channel bits in a 20 ms frame and the encoded symbols will be additionally repeated and then punctured to provide a 76.8 ksps modulation symbol rate.

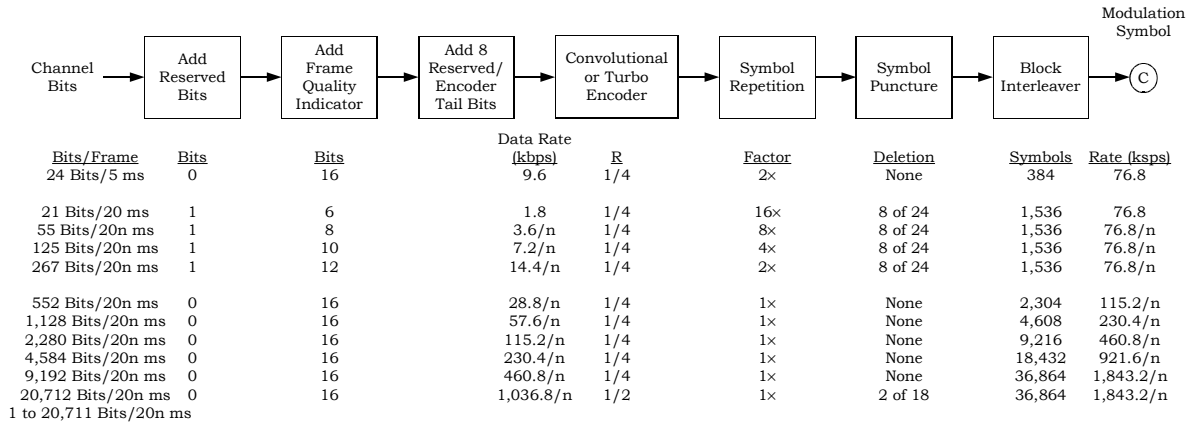
Figure 2.1.3.1.1.2-4. Reverse Dedicated Control Channel Structure for Radio Configuration 6



Notes:

1. n is the length of the frame in multiples of 20 ms. For 31 to 54 encoder input bits per frame, n = 1 or 2. For more than 54 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Reverse Fundamental Channel, and the Reverse Fundamental Channel only uses from 15 to 192 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Reverse Supplemental Channels with 384 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
 - The frame quality indicator length is 16 for more than 192 encoder input bits per frame; 12 or 16 for 97 to 192 encoder input bits per frame; 8, 12, or 16 for 55 to 96 encoder input bits per frame; and 6, 8, 12, or 16 otherwise.
 - The code rate is 1/3 for more than 3,072 encoder input bits per frame; otherwise, it is 1/4. If the number of encoder input bits per frame is less than 384, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

Figure 2.1.3.1.1.2-5. Reverse Fundamental Channel and Reverse Supplemental Channel Structure for Radio Configuration 5



Notes:

1. n is the length of the frame in multiples of 20 ms. For 37 to 72 encoder input bits per frame, n = 1 or 2. For more than 72 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Reverse Fundamental Channel, and the Reverse Fundamental Channel only uses from 15 to 288 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Reverse Supplemental Channels with 576 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
 - When the number of channel bits per frame is 21, 55, 125, or 267 and the corresponding frame quality indicator length is 6, 8, 10, and 12, an initial reserved bit is used; otherwise, no initial reserved bits are used.
 - The frame quality indicator length is 16 for more than 288 encoder input bits per frame; 12 or 16 for 145 to 288 encoder input bits per frame; 10, 12, or 16 for 73 to 144 encoder input bits per frame; 8, 10, 12, or 16 for 37 to 72 encoder input bits per frame; and 6, 8, 10, 12, or 16 otherwise.
 - The code rate is 1/2 for more than 9216 encoder input bits; otherwise, it is 1/4. If the number of encoder input bits per frame is less than 576, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

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Figure 2.1.3.1.1.2-6. Reverse Fundamental Channel and Reverse Supplemental Channel Structure for Radio Configuration 6

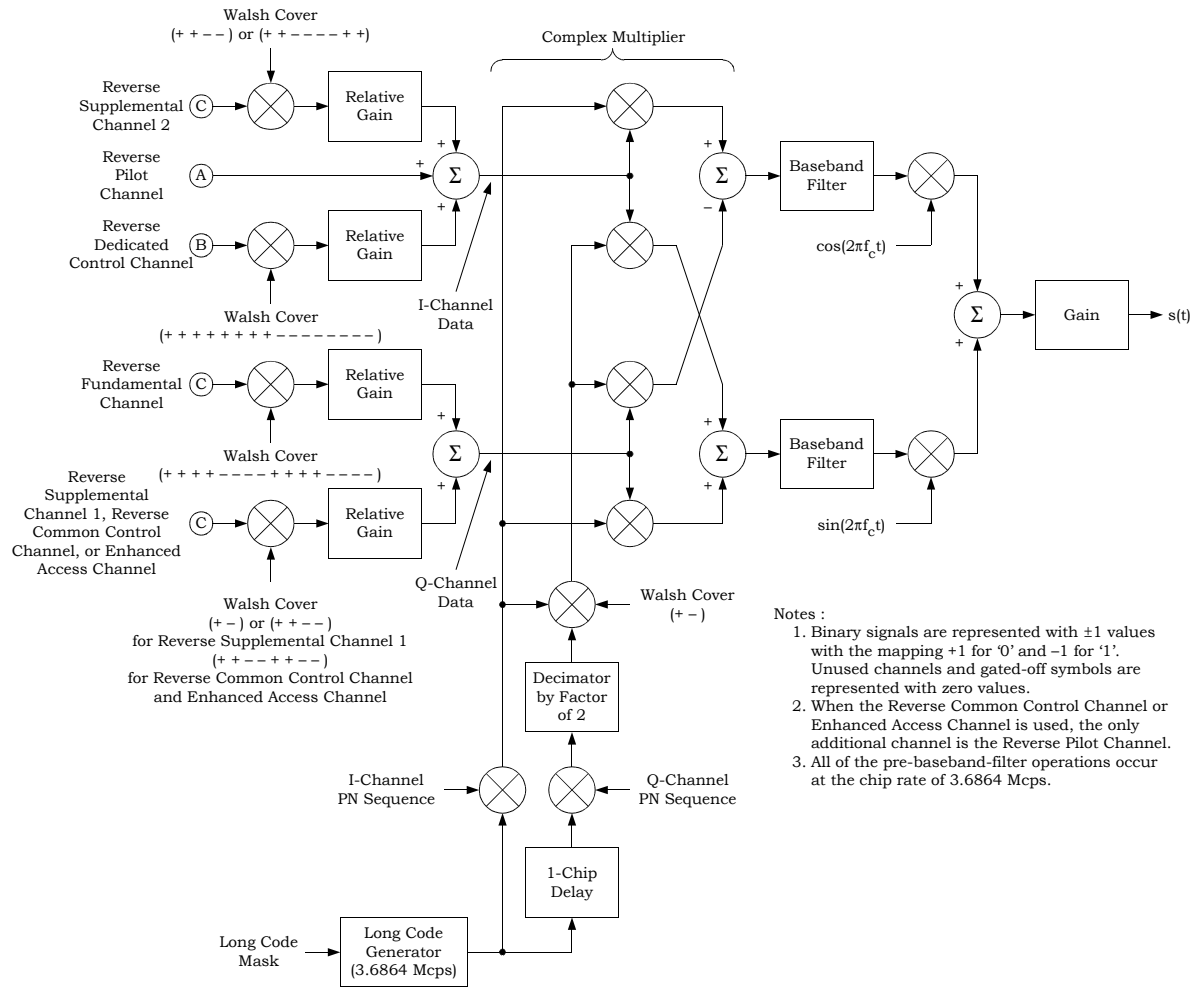


Figure 2.1.3.1.1.2-7. I and Q Mapping for Spreading Rate 3

2.1.3.1.2 Modulation Parameters

2.1.3.1.2.1 Spreading Rate 1

The modulation parameters for the Reverse CDMA Channel operating in Spreading Rate 1 are shown in Tables 2.1.3.1.2.1-1 through 2.1.3.1.2.1-14.

1

Table 2.1.3.1.2.1-1. Access Channel Modulation Parameters for Spreading Rate 1

Parameter	Data Rate (bps)	Units
	4,800	
PN Chip Rate	1.2288	Mcps
Code Rate	1/3	bits/code symbol
Code Symbol Repetition	2	repeated code symbols/code symbol
Repeated Code Symbol Rate	28,800	sps
Modulation	6	repeated code symbols/modulation symbol
Modulation Symbol Rate	4800	sps
Walsh Chip Rate	307.20	kcps
Modulation Symbol Duration	208.33	μs
PN Chips/Repeated Code Symbol	42.67	PN chips/repeated code symbol
PN Chips/Modulation Symbol	256	PN chips/modulation symbol
Transmit Duty Cycle	100.0	%
PN Chips/Walsh Chip	4	PN chips/Walsh chip

2

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**Table 2.1.3.1.2.1-2. Enhanced Access Channel Modulation Parameters
for Spreading Rate 1**

Parameter	Data Rate (bps)			Units
	9,600	19,200	38,400	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	4	2	1	repeated code symbols/code symbol
Modulation Symbol Rate	153,600	153,600	153,600	sps
Walsh Length	8	8	8	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1	1	1	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	%
Processing Gain	128	64	32	PN chips/bit

Note: The Enhanced Access header uses the 9600 bps data rate only, while the Enhanced Access data uses 9600, 19200, and 38400 bps data rates.

3

Table 2.1.3.1.2.1-3. Reverse Common Control Channel Modulation Parameters for Spreading Rate 1

Parameter	Data Rate (bps)			Units
	9,600	19,200	38,400	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	4	2	1	repeated code symbols/code symbol
Modulation Symbol Rate	153,600	153,600	153,600	sps
Walsh Length	8	8	8	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1	1	1	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	%
Processing Gain	128	64	32	PN chips/bit

Table 2.1.3.1.2.1-4. Reverse Dedicated Control Channel Modulation Parameters for Radio Configuration 3

Parameter	Data Rate (bps)		Units
	9,600		
PN Chip Rate	1.2288		Mcps
Code Rate	1/4		bits/code symbol
Code Symbol Repetition	2		repeated code symbols/code symbol
Modulation Symbol Rate	76,800		sps
Walsh Length	16		PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1		Walsh functions/modulation symbol
Transmit Duty Cycle	100.0		%
Processing Gain	128		PN chips/bit

Note: If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

1
2**Table 2.1.3.1.2.1-5. Reverse Dedicated Control Channel Modulation Parameters for Radio Configuration 4**

Parameter	Data Rate (bps)		Units
	9,600	14,400	
PN Chip Rate	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	bits/code symbol
Code Symbol Repetition	2	2	repeated code symbols/code symbol
Puncturing Rate	1	16/24	modulation symbols/repeated code symbol
Modulation Symbol Rate	76,800	76,800	sps
Walsh Length	16	16	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1	1	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	%
Processing Gain	128	85.33	PN chips/bit

Notes:

1. The 9600 bps data rate is used for 5 ms frames and the 14400 bps data rate is used for 20 ms frames.
2. If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

3

1 **Table 2.1.3.1.2.1-6. Reverse Fundamental Channel and Reverse Supplemental Code**
 2 **Channel Modulation Parameters for Radio Configuration 1**

Parameter	Data Rate (bps)				Units
	9,600	4,800	2,400	1,200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/3	1/3	1/3	1/3	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Repeated Code Symbol Rate	28,800	28,800	28,800	28,800	sps
Modulation	6	6	6	6	repeated code symbols/modulation symbol
Modulation Symbol Rate	4,800	4,800	4,800	4,800	sps
Walsh Chip Rate	307.20	307.20	307.20	307.20	kcps
Modulation Symbol Duration	208.33	208.33	208.33	208.33	μs
PN Chips/Repeated Code Symbol	42.67	42.67	42.67	42.67	PN chips/repeated code symbol
PN Chips/Modulation Symbol	256	256	256	256	PN chips/modulation symbol
PN Chips/Walsh Chip	4	4	4	4	PN chips/Walsh chip
Transmit Duty Cycle	100.0	50.0	25.0	12.5	%
Processing Gain	128	128	128	128	PN chips/bit

Note: The 1200, 2400, and 4800 bps data rates are applicable to the Reverse Fundamental Channel only.

3

1 **Table 2.1.3.1.2.1-7. Reverse Fundamental Channel and Reverse Supplemental Code**
 2 **Channel Modulation Parameters for Radio Configuration 2**

Parameter	Data Rate (bps)				Units
	14,400	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Repeated Code Symbol Rate	28,800	28,800	28,800	28,800	sps
Modulation	6	6	6	6	repeated code symbols/modulation symbol
Modulation Symbol Rate	4,800	4,800	4,800	4,800	sps
Walsh Chip Rate	307.20	307.20	307.20	307.20	kcps
Modulation Symbol Duration	208.33	208.33	208.33	208.33	μs
PN Chips/Repeated Code Symbol	42.67	42.67	42.67	42.67	PN chips/repeated code symbol
PN Chips/Modulation Symbol	256	256	256	256	PN chips/modulation symbol
PN Chips/Walsh Chip	4	4	4	4	PN chips/Walsh chip
Transmit Duty Cycle	100.0	50.0	25.0	12.5	%
Processing Gain	85.33	85.33	85.33	85.33	PN chips/bit

Note: The 1800, 3600, and 7200 bps data rates are applicable to the Reverse Fundamental Channel only.

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2**Table 2.1.3.1.2.1-8. Reverse Fundamental Channel and Reverse Supplemental Channel Modulation Parameters for 20 ms Frames for Radio Configuration 3**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,700	1,500	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4 (N < 32) 1/2 (N = 32)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	2 (N = 1) 1 (N > 1)	4	8	16	repeated code symbols/code symbol
Puncturing Rate	1	1	8/9	4/5	interleaver symbols/repeated code symbol
Modulation Symbol Rate	76,800 (N ≤ 2) 38,400 × N (N = 4 or 8) 614,400 (N ≥ 16)	76,800	76,800	76,800	sps
Walsh Length	For Reverse Fundamental Channel: 16 For Reverse Supplemental Channel: 8, 4, or 2 (N ≤ 4) 4 or 2 (N = 8) 2 (N ≥ 16)	16 (Reverse Fundamental Channel) 8, 4, or 2 (Reverse Supplemental Channel)			PN chips
Number of Walsh Function Repetitions per Modulation Symbol	For Reverse Fundamental Channel: 1 For Reverse Supplemental Channel: 2, 4, or 8 (N ≤ 2) 1, 2, or 4 (N = 4) 1 or 2 (N = 8) 1 (N ≥ 16)	1 (Reverse Fundamental Channel) 2, 4, or 8 (Reverse Supplemental Channel)			Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0 or 50.0	%
Processing Gain	128/N	256	455.1	819.2	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 32, which yields data rates of 9600, 19200, 38400, 76800, 153600, or 307200 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
3. The 50% transmit duty cycle at 1500 bps data rate corresponds to the Reverse Fundamental Channel gating.

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Table 2.1.3.1.2.1-9. Reverse Supplemental Channel Modulation Parameters for 40 ms Frames for Radio Configuration 3

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,350	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4 (N < 16) 1/2 (N = 16)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	1	1	1	8/9	interleaver symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N (N < 8) 307,200 (N ≥ 8)	38,400	38,400	38,400	sps
Walsh Length	8, 4, or 2 (N < 8) 4 or 2 (N ≥ 8)	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	4, 8, or 16 (N = 1) 2, 4, or 8 (N = 2) 1, 2, or 4 (N = 4) 1 or 2 (N ≥ 8)	4, 8, or 16	4, 8, or 16	4, 8, or 16	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	128/N	256	512	910.22	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 9600, 19200, 38400, 76800, or 153600 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

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Table 2.1.3.1.2.1-10. Reverse Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 3

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4 (N < 8) 1/2 (N = 8)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Modulation Symbol Rate	38,400 × N (N < 4) 153,600 (N ≥ 4)	19,200	19,200	19,200	sps
Walsh Length	8, 4, or 2	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	4, 8, or 16 (N = 1) 2, 4, or 8 (N = 2) 1, 2, or 4 (N ≥ 4)	8, 16, or 32	8, 16, or 32	8, 16, or 32	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	128/N	256	512	1024	PN chips/bit

Notes:

1. N = 1, 2, 4, or 8, which yields data rates of 9600, 19200, 38400, or 76800 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

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Table 2.1.3.1.2.1-11. Reverse Fundamental Channel and Reverse Supplemental Channel Modulation Parameters for 20 ms Frames for Radio Configuration 4

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	2 (N = 1) 1 (N > 1)	4	8	16	repeated code symbols/code symbol
Puncturing Rate	16/24 (N = 1) 8/12 (N > 1)	16/24	16/24	16/24	interleaver symbols/ repeated code symbol
Modulation Symbol Rate	76,800 (N = 1) 38,400 × N (N ≥ 2)	76,800	76,800	76,800	sps
Walsh Length	For Reverse Fundamental Channel: 16 For Reverse Supplemental Channel: 8, 4, or 2 (N ≤ 4) 4 or 2 (N = 8) 2 (N = 16)	16 (Reverse Fundamental Channel) 8, 4, or 2 (Reverse Supplemental Channel)			PN chips
Number of Walsh Function Repetitions per Modulation Symbol	For Reverse Fundamental Channel: 1 For Reverse Supplemental Channel: 2, 4, or 8 (N ≤ 2) 1, 2, or 4 (N = 4) 1 or 2 (N = 8) 1 (N = 16)	1 (Reverse Fundamental Channel) 2, 4, or 8 (Reverse Supplemental Channel)			Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0 or 50.0	%
Processing Gain	85.33/N	170.67	341.33	682.67	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 14400, 28800, 57600, 115200, or 230400 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
3. The 50% transmit duty cycle at 1800 bps data rate corresponds to the Reverse Fundamental Channel gating.

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1 **Table 2.1.3.1.2.1-12. Reverse Supplemental Channel Modulation Parameters for**
 2 **40 ms Frames for Radio Configuration 4**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	8/12	16/24	16/24	16/24	interleaver symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N	38,400	38,400	38,400	sps
Walsh Length	8, 4, or 2 (N ≤ 4) 4 or 2 (N = 8)	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	4, 8, or 16 (N = 1) 2, 4, or 8 (N = 2) 1, 2, or 4 (N = 4) 1 or 2 (N = 8)	4, 8, or 16	4, 8, or 16	4, 8, or 16	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	85.33/N	170.67	341.33	682.67	PN chips/bit

Notes:

1. N = 1, 2, 4, or 8, which yields data rates of 14400, 28800, 57600, or 115200 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

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2**Table 2.1.3.1.2.1-13. Reverse Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 4**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Puncturing Rate	8/12	8/12	16/24	16/24	interleaver symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N	19,200	19,200	19,200	sps
Walsh Length	8, 4, or 2	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	4, 8, or 16 (N = 1) 2, 4, or 8 (N = 2) 1, 2, or 4 (N = 4)	8, 16, or 32	8, 16, or 32	8, 16, or 32	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	85.33/N	170.67	341.33	682.67	PN chips/bit

Notes:

1. N = 1, 2, or 4, which yields data rates of 14400, 28800, or 57600 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

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Table 2.1.3.1.2.1-14. Reverse Fundamental Channel for 5 ms Frames

Parameter	Data Rate (bps)	
	9,600	Units
PN Chip Rate	1.2288	Mcps
Code Rate	1/4	bits/code symbol
Code Symbol Repetition	2	repeated code symbols/code symbol
Puncturing Rate	1	interleaver symbols/repeated code symbol
Modulation Symbol Rate	76,800	sps
Walsh Length	16	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	%
Processing Gain	128	PN chips/bit

2

3 2.1.3.1.2.2 Spreading Rate 3

4 The modulation parameters for the Reverse CDMA Channel operating in Spreading Rate 3
5 are shown in Tables 2.1.3.1.2.2-1 through 2.1.3.1.2.2-11.

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2**Table 2.1.3.1.2.2-1. Enhanced Access Channel Modulation Parameters
for Spreading Rate 3**

Parameter	Data Rate (bps)			Units
	9,600	19,200	38,400	
PN Chip Rate	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	4	2	1	repeated code symbols/code symbol
Modulation Symbol Rate	153,600	153,600	153,600	sps
Walsh Length	8	8	8	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	3	3	3	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	%
Processing Gain	384	192	96	PN chips/bit

Note: The Enhanced Access header uses the 9600 bps data rate only, while the Enhanced Access data uses 9600, 19200, and 38400 bps data rates.

3

**Table 2.1.3.1.2.2-2. Reverse Common Control Channel Modulation Parameters
for Spreading Rate 3**

Parameter	Data Rate (bps)			Units
	9,600	19,200	38,400	
PN Chip Rate	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	4	2	1	repeated code symbols/code symbol
Modulation Symbol Rate	153,600	153,600	153,600	sps
Walsh Length	8	8	8	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	3	3	3	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	%
Processing Gain	384	192	96	PN chips/bit

**Table 2.1.3.1.2.2-3. Reverse Dedicated Control Channel Modulation Parameters
for Radio Configuration 5**

Parameter	Data Rate (bps)		Units
	9,600		
PN Chip Rate	3.6864		Mcps
Code Rate	1/4		bits/code symbol
Code Symbol Repetition	2		repeated code symbols/code symbol
Modulation Symbol Rate	76,800		sps
Walsh Length	16		PN chips
Number of Walsh Function Repetitions per Modulation Symbol	3		Walsh functions/modulation symbol
Transmit Duty Cycle	100.0		%
Processing Gain	384		PN chips/bit

Note: If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

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2**Table 2.1.3.1.2.2-4. Reverse Dedicated Control Channel Modulation Parameters for Radio Configuration 6**

Parameter	Data Rate (bps)		Units
	9,600	14,400	
PN Chip Rate	3.6864	3.6864	Mcps
Code Rate	1/4	1/4	bits/code symbol
Code Symbol Repetition	2	2	repeated code symbols/code symbol
Puncturing Rate	1	16/24	modulation symbols/repeated code symbol
Modulation Symbol Rate	76,800	76,800	sps
Walsh Length	16	16	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	3	3	Walsh functions/ modulation symbol
Transmit Duty Cycle	100.0	100.0	%
Processing Gain	384	256	PN chips/bit

Note: The 9600 bps data rate is used for 5 ms frames and the 14400 bps data rate is used for 20 ms frames. If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

3

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2**Table 2.1.3.1.2.2-5. Reverse Fundamental Channel and Reverse Supplemental Channel Modulation Parameters for 20 ms Frames for Radio Configuration 5**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,700	1,500	
PN Chip Rate	3.6864	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4 (N ≤ 16) 1/3 (N ≥ 32)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	2 (N = 1) 1 (N > 1)	4	8	16	repeated code symbols/code symbol
Puncturing Rate	1	1	8/9	4/5	interleaver symbols/repeated code symbol
Modulation Symbol Rate	76,800 (N ≤ 2) 38,400 × N (4 ≤ N ≤ 16) 28,800 × N (N ≥ 32)	76,800	76,800	76,800	sps
Walsh Length	For Reverse Fundamental Channel: 16 For Reverse Supplemental Channel: 8, 4, or 2 (N ≤ 4) 4 or 2 (N = 8 or 32) 2 (N = 16 or 64)	16 (Reverse Fundamental Channel) 8, 4, or 2 (Reverse Supplemental Channel)			PN chips
Number of Walsh Function Repetitions per Modulation Symbol	For Reverse Fundamental Channel: 3 For Reverse Supplemental Channel: 6, 12, or 24 (N ≤ 2) 3, 6, or 12 (N = 4) 3 or 6 (N = 8) 3 (N = 16) 1 or 2 (N = 32) 1 (N = 64)	3 (Reverse Fundamental Channel) 6, 12, or 24 (Reverse Supplemental Channel)			Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0 or 50.0	%
Processing Gain	384/N	768	1,365.33	2,457.60	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, 32, or 64, which yields data rates of 9600, 19200, 38400, 76800, 153600, 307200, or 614400 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
3. The 50% transmit duty cycle at 1500 bps data rate corresponds to the Reverse Fundamental Channel gating.

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Table 2.1.3.1.2.2-6. Reverse Supplemental Channel Modulation Parameters for 40 ms Frames for Radio Configuration 5

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,350	
PN Chip Rate	3.6864	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4 (N ≤ 8) 1/3 (N ≥ 16)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	1	1	1	8/9	interleaver symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N (N ≤ 8) 28,800 × N (N ≥ 16)	38,400	38,400	38,400	sps
Walsh Length	8, 4, or 2 (N = 1, 2, 4, or 16) 4 or 2 (N = 8 or 32)	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	12, 24, or 48 (N = 1) 6, 12, or 24 (N = 2) 3, 6, or 12 (N = 4) 3 or 6 (N = 8) 1, 2, or 4 (N = 16) 1 or 2 (N = 32)	12, 24, or 48	12, 24, or 48	12, 24, or 48	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	384/N	768	1,536	2,730.67	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 32, which yields data rates of 9600, 19200, 38400, 76800, 153600, or 307200, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

1 **Table 2.1.3.1.2.2-7. Reverse Supplemental Channel Modulation Parameters for**
 2 **80 ms Frames for Radio Configuration 5**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,200	
PN Chip Rate	3.6864	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4 (N ≤ 4) 1/3 (N ≥ 8)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Modulation Symbol Rate	38,400 × N (N ≤ 4) 28,800 × N (N ≥ 8)	19,200	19,200	19,200	sps
Walsh Length	8, 4, or 2	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	12, 24, or 48 (N = 1) 6, 12, or 24 (N = 2) 3, 6, or 12 (N = 4) 2, 4, or 8 (N = 8) 1, 2, or 4 (N = 16)	24, 48, or 96	24, 48, or 96	24, 48, or 96	Walsh functions/ modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	384/N	768	1,536	3,072	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 9600, 19200, 38400, 76800, or 153600, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

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Table 2.1.3.1.2.2-8. Reverse Fundamental Channel and Reverse Supplemental Channel Modulation Parameters for 20 ms Frames for Radio Configuration 6

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	3.6864	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4 (N ≤ 32) 1/2 (N = 72)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	2 (N = 1) 1 (N > 1)	4	8	16	repeated code symbols/code symbol
Puncturing Rate	16/24 (N = 1) 1 (2 ≤ N ≤ 32) 16/18 (N = 72)	16/24	16/24	16/24	interleaver symbols/repeated code symbol
Modulation Symbol Rate	76,800 (N = 1) 57,600 × N (2 ≤ N ≤ 16) 1,843,200 (N ≥ 32)	76,800	76,800	76,800	sps
Walsh Length	For Reverse Fundamental Channel: 16 For Reverse Supplemental Channel: 8, 4, or 2 (N ≤ 8) 4 or 2 (N = 16) 2 (N ≥ 32)	16 (Reverse Fundamental Channel) 8, 4, or 2 (Reverse Supplemental Channel)			PN chips
Number of Walsh Function Repetitions per Modulation Symbol	For Reverse Fundamental Channel: 3 For Reverse Supplemental Channel: 6, 12, or 24 (N = 1) 4, 8, or 16 (N = 2) 2, 4, or 8 (N = 4) 1, 2, or 4 (N = 8) 1 or 2 (N = 16) 1 (N ≥ 32)	3 (Reverse Fundamental Channel) 6, 12, or 24 (Reverse Supplemental Channel)			Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0 or 50.0	%
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, 32, or 72, which yields data rates of 14400, 28800, 57600, 115200, 230400, 460800, or 1036800 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Fundamental Channel or the Reverse Supplemental Channel, and the specified frame quality indicator length.
3. The 50% transmit duty cycle at 1800 bps data rate corresponds to the Reverse Fundamental Channel gating.

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**Table 2.1.3.1.2.2-9. Reverse Supplemental Channel Modulation Parameters
for 40 ms Frames for Radio Configuration 6**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	3.6864	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4 (N ≤ 16) 1/2 (N = 36)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	1 (N ≤ 16) 16/18 (N = 36)	16/24	16/24	16/24	interleaver symbols/ repeated code symbol
Modulation Symbol Rate	57,600 × N (N ≤ 8) 921,600 (N ≥ 16)	38,400	38,400	38,400	sps
Walsh Length	8, 4, or 2 (N ≤ 8) 4 or 2 (N ≥ 16)	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	8, 16, or 32 (N = 1) 4, 8, or 16 (N = 2) 2, 4, or 8 (N = 4) 1, 2, or 4 (N = 8) 1 or 2 (N ≥ 16)	12, 24, or 48	12, 24, or 48	12, 24, or 48	Walsh functions/ modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 36, which yields data rates of 14400, 28800, 57600, 115200, 230400, or 518400 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

3

Table 2.1.3.1.2.2-10. Reverse Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 6

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	3.6864	3.6864	3.6864	3.6864	Mcps
Code Rate	1/4 (N ≤ 8) 1/2 (N = 18)	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Puncturing Rate	1 (N ≤ 8) 16/18 (N = 18)	1	16/24	16/24	interleaver symbols/repeated code symbol
Modulation Symbol Rate	57,600 × N (N < 8) 460,800 (N ≥ 8)	28,800	19,200	19,200	sps
Walsh Length	8, 4, or 2	8, 4, or 2	8, 4, or 2	8, 4, or 2	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	8, 16, or 32 (N = 1) 4, 8, or 16 (N = 2) 2, 4, or 8 (N = 4) 1, 2, or 4 (N ≥ 8)	16, 32, or 64	24, 48, or 96	24, 48, or 96	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	100.0	100.0	100.0	%
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 18, which yields data rates of 14400, 28800, 57600, 115200, or 259200 bps, respectively.
2. If variable-rate Reverse Supplemental Channel operation, flexible reverse link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Reverse Supplemental Channel, and the specified frame quality indicator length.

Table 2.1.3.1.2.2-11. Reverse Fundamental Channel for 5 ms Frames for Radio Configurations 5 and 6

Parameter	Data Rate (bps)	
	9,600	Units
PN Chip Rate	3.6864	Mcps
Code Rate	1/4	bits/code symbol
Code Symbol Repetition	2	repeated code symbols/code symbol
Puncturing Rate	1	modulation symbols/repeated symbol
Modulation Symbol Rate	76,800	sps
Walsh Length	16	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	3	Walsh functions/modulation symbol
Transmit Duty Cycle	100.0	%
Processing Gain	384	PN chips/bit

2.1.3.1.3 Data Rates

The data rates for channels operating with Spreading Rate 1 shall be as specified in Table 2.1.3.1.3-1. The data rates for channels operating with Spreading Rate 3 shall be as specified in Table 2.1.3.1.3-2.

Flexible data rates may be supported with Radio Configurations 3, 4, 5, and 6. If flexible data rates are supported, frame formats that do not match those listed in Table 2.1.3.6.2-1 for the Reverse Dedicated Control Channel, Table 2.1.3.7.2-1 for the Reverse Fundamental Channel, or Tables 2.1.3.8.2-1, 2.1.3.8.2-2, and 2.1.3.8.2-3 for the Reverse Supplemental Channel may be supported in Radio Configurations 3, 4, 5, and 6. These frame formats correspond to a range of data rates up to the highest dedicated channel data rate listed in Tables 2.1.3.1.3-1 and 2.1.3.1.3-2. These non-listed data rates are called flexible data rates.

1

Table 2.1.3.1.3-1. Data Rates for Spreading Rate 1

Channel Type		Data Rates (bps)
Access Channel		4800
Enhanced Access Channel	Header	9600
	Data	38400 (5, 10, or 20 ms frames), 19200 (10 or 20 ms frames), or 9600 (20 ms frames)
Reverse Common Control Channel		38400 (5, 10, or 20 ms frames), 19200 (10 or 20 ms frames), or 9600 (20 ms frames)
Reverse Dedicated Control Channel	RC 3	9600
	RC 4	14400 (20 ms frames) or 9600 (5 ms frames)
Reverse Fundamental Channel	RC 1	9600, 4800, 2400, or 1200
	RC 2	14400, 7200, 3600, or 1800
	RC 3	9600, 4800, 2700, or 1500 (20 ms frames) or 9600 (5 ms frames)
	RC 4	14400, 7200, 3600, or 1800 (20 ms frames) or 9600 (5 ms frames)
Reverse Supplemental Code Channel	RC 1	9600
	RC 2	14400
Reverse Supplemental Channel	RC 3	307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, or 1500 (20 ms frames) 153600, 76800, 38400, 19200, 9600, 4800, 2400, or 1350 (40 ms frames) 76800, 38400, 19200, 9600, 4800, 2400, or 1200 (80 ms frames)
	RC 4	230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (20 ms frames) 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (40 ms frames) 57600, 28800, 14400, 7200, 3600, or 1800 (80 ms frames)

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Table 2.1.3.1.3-2. Data Rates for Spreading Rate 3

Channel Type		Data Rates (bps)
Enhanced Access Channel	Header	9600
	Data	38400 (5, 10, or 20 ms frames), 19200 (10 or 20 ms frames), or 9600 (20 ms frames)
Reverse Common Control Channel		38400 (5, 10, or 20 ms frames), 19200 (10 or 20 ms frames), or 9600 (20 ms frames)
Reverse Dedicated Control Channel	RC 5	9600
	RC 6	14400 (20 ms frames) or 9600 (5 ms frames)
Reverse Fundamental Channel	RC 5	9600, 4800, 2700, or 1500 (20 ms frames) or 9600 (5 ms frames)
	RC 6	14400, 7200, 3600, or 1800 (20 ms frames) or 9600 (5 ms frames)
Reverse Supplemental Channel	RC 5	614400, 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, or 1500 (20 ms frames) 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2400, or 1350 (40 ms frames) 153600, 76800, 38400, 19200, 9600, 4800, 2400, or 1200 (80 ms frames)
	RC 6	1036800, 460800, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (20 ms frames) 518400, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (40 ms frames) 259200, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (80 ms frames)

2

3 2.1.3.1.4 Forward Error Correction

4 The forward error correction types for channels with Spreading Rate 1 shall be as specified
5 in Table 2.1.3.1.4-1. The forward error correction types for channels with Spreading Rate 3
6 shall be as specified in Table 2.1.3.1.4-2.

7 If the mobile station supports variable-rate Reverse Supplemental Channel operation,
8 flexible data rates, or both, and the specified number of reserved bits, information bits and
9 frame quality indicator bits per frame do not match one of those listed in Tables 2.1.3.8.2-
10 1, 2.1.3.8.2-2, or 2.1.3.8.2-3 for the Reverse Supplemental Channel, the forward error
11 correction type of the Reverse Supplemental Channel shall be the same as that of the

1 maximum assigned data rate for that channel, unless turbo coding is not available for the
 2 specified data rate, in which case convolutional coding shall be used. The forward error
 3 correction code rate of a specified frame format, not listed in Tables 2.1.3.8.2-1, 2.1.3.8.2-
 4 2, or 2.1.3.8.2-3 for the Reverse Supplemental Channel, shall be the same as that of the
 5 lowest listed data rate in the same radio configuration that is higher than the specified data
 6 rate.

7
 8 **Table 2.1.3.1.4-1. Forward Error Correction for Spreading Rate 1**

Channel Type	Forward Error Correction	R
Access Channel	Convolutional	1/3
Enhanced Access Channel	Convolutional	1/4
Reverse Common Control Channel	Convolutional	1/4
Reverse Dedicated Control Channel	Convolutional	1/4
Reverse Fundamental Channel	Convolutional	1/3 (RC 1) 1/2 (RC 2) 1/4 (RC 3 and 4)
Reverse Supplemental Code Channel	Convolutional	1/3 (RC 1) 1/2 (RC 2)
Reverse Supplemental Channel	Convolutional or Turbo ($N \geq 360$)	1/4 (RC 3, $N \leq 3048$) 1/2 (RC 3, $N > 3048$) 1/4 (RC 4)

Note: N is the number of channel bits per frame.

1 **Table 2.1.3.1.4-2. Forward Error Correction for Spreading Rate 3**

Channel Type	Forward Error Correction	R
Enhanced Access Channel	Convolutional	1/4
Reverse Common Control Channel	Convolutional	1/4
Reverse Dedicated Control Channel	Convolutional	1/4
Reverse Fundamental Channel	Convolutional	1/4
Reverse Supplemental Channel	Convolutional or Turbo ($N \geq 360$)	1/4 (RC 5, $N \leq 3048$) 1/3 (RC 5, $N > 3048$) 1/4 (RC 6, $N \leq 9192$) 1/2 (RC 6, $N > 9192$)

Note: N is the number of channel bits per frame.

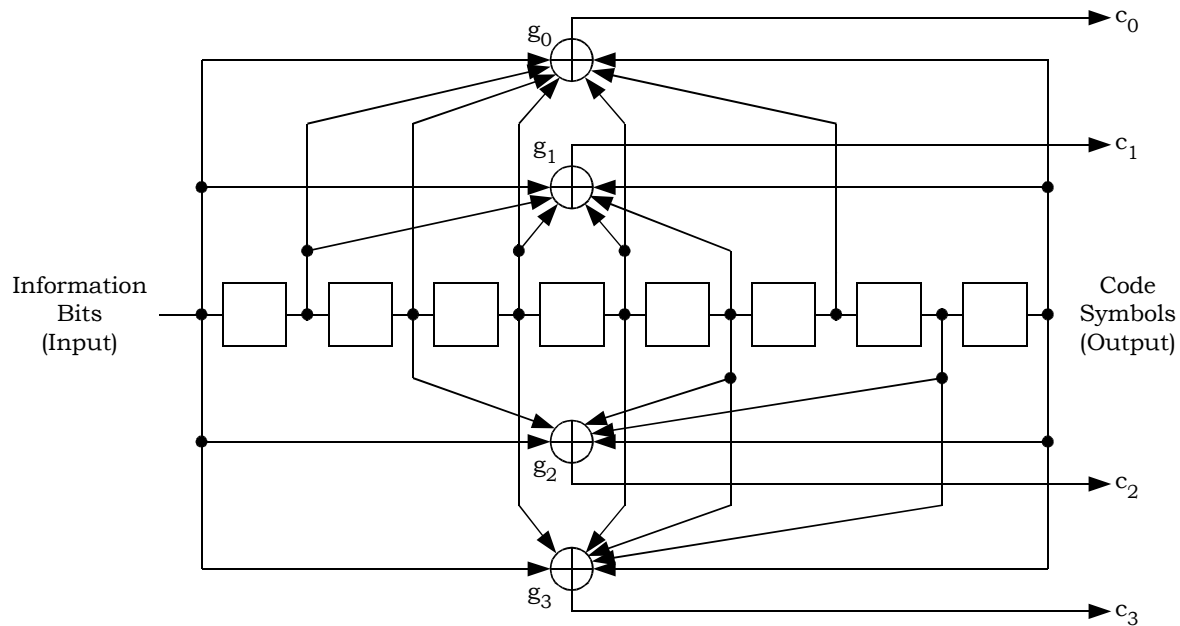
2
3 2.1.3.1.4.1 Convolutional Encoding

4 All convolutional codes shall have a constraint length of 9.

5 Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-
6 delayed data sequence. The length of the data sequence delay is equal to $K-1$, where K is
7 the constraint length of the code.

8 2.1.3.1.4.1.1 Rate 1/4 Convolutional Code

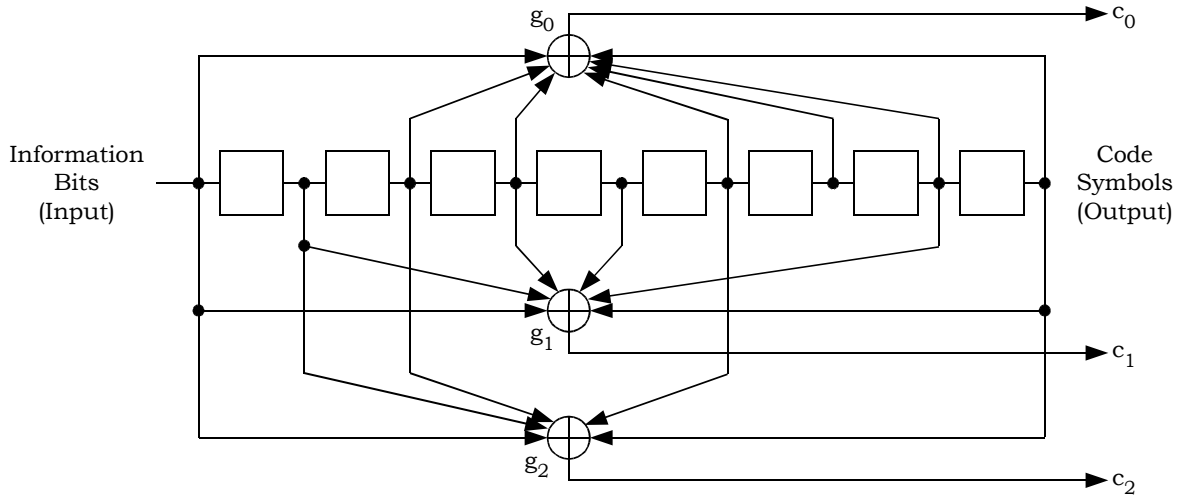
9 The generator functions for the rate 1/4 code shall be g_0 equals 765 (octal), g_1 equals 671
10 (octal), g_2 equals 513 (octal), and g_3 equals 473 (octal). This code generates four code
11 symbols for each data bit input to the encoder. These code symbols shall be output so that
12 the code symbol (c_0) encoded with generator function g_0 is output first, the code symbol
13 (c_1) encoded with generator function g_1 is output second, the code symbol (c_2) encoded
14 with generator function g_2 is output third, and the code symbol (c_3) encoded with generator
15 function g_3 is output last. The state of the convolutional encoder, upon initialization, shall
16 be the all-zero state. The first code symbol that is output after initialization shall be a code
17 symbol encoded with generator function g_0 . The encoder for this code is illustrated in
18 Figure 2.1.3.1.4.1.1-1.



1
2 **Figure 2.1.3.1.4.1.1-1. $K = 9$, Rate 1/4 Convolutional Encoder**

3
4 **2.1.3.1.4.1.2 Rate 1/3 Convolutional Code**

5 The generator functions for this code shall be g_0 equals 557 (octal), g_1 equals 663 (octal),
6 and g_2 equals 711 (octal). This code generates three code symbols for each data bit input to
7 the encoder. These code symbols shall be output so that the code symbol (c_0) encoded with
8 generator function g_0 shall be output first, the code symbol (c_1) encoded with generator
9 function g_1 shall be output second, and the code symbol (c_2) encoded with generator
10 function g_2 shall be output last. The state of the convolutional encoder, upon initialization,
11 shall be the all-zero state. The first code symbol output after initialization shall be a code
12 symbol encoded with generator function g_0 . The encoder for this code is illustrated in
13 Figure 2.1.3.1.4.1.2-1.



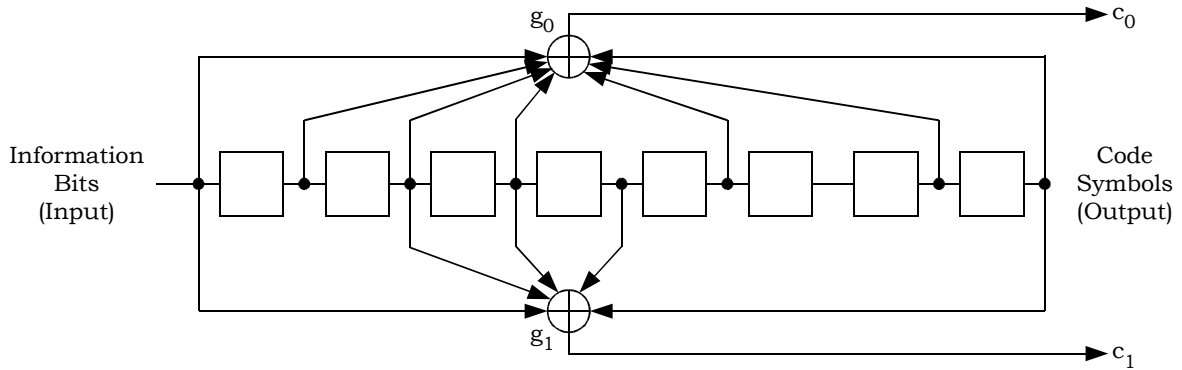
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Figure 2.1.3.1.4.1.2-1. K = 9, Rate 1/3 Convolutional Encoder

2.1.3.1.4.1.3 Rate 1/2 Convolutional Code

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The generator functions for this code shall be g_0 equals 753 (octal) and g_1 equals 561 (octal). This code generates two code symbols for each data bit input to the encoder. These code symbols shall be output so that the code symbol (c_0) encoded with generator function g_0 shall be output first and the code symbol (c_1) encoded with generator function g_1 shall be output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol output after initialization shall be a code symbol encoded with generator function g_0 . The encoder for this code is illustrated in Figure 2.1.3.1.4.1.3-1.



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Figure 2.1.3.1.4.1.3-1. K = 9, Rate 1/2 Convolutional Encoder

2.1.3.1.4.2 Turbo Encoding

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The turbo encoder encodes the data, frame quality indicator (CRC), and two reserved bits. During encoding, an encoder output tail sequence is added. If the total number of data,

1 frame quality, and reserved input bits is N_{turbo} , the turbo encoder generates N_{turbo}/R
 2 encoded data output symbols followed by $6/R$ tail output symbols, where R is the code rate
 3 of $1/2$, $1/3$, or $1/4$. The turbo encoder employs two systematic, recursive, convolutional
 4 encoders connected in parallel, with an interleaver, the turbo interleaver, preceding the
 5 second recursive convolutional encoder.

6 The two recursive convolutional codes are called the constituent codes of the turbo code.
 7 The outputs of the constituent encoders are punctured and repeated to achieve the $(N_{\text{turbo}}$
 8 $+ 6)/R$ output symbols.

9 2.1.3.1.4.2.1 Rate $1/2$, $1/3$, and $1/4$ Turbo Encoders

10 A common constituent code shall be used for the turbo codes of rate $1/2$, $1/3$, and $1/4$.
 11 The transfer function for the constituent code shall be

$$12 \quad G(D) = \begin{bmatrix} 1 & \frac{n_0(D)}{d(D)} & \frac{n_1(D)}{d(D)} \end{bmatrix}$$

13 where $d(D) = 1 + D^2 + D^3$, $n_0(D) = 1 + D + D^3$, and $n_1(D) = 1 + D + D^2 + D^3$.

14 The turbo encoder shall generate an output symbol sequence that is identical to the one
 15 generated by the encoder shown in Figure 2.1.3.1.4.2.1-1. Initially, the states of the
 16 constituent encoder registers in this figure are set to zero. Then, the constituent encoders
 17 are clocked with the switches in the positions noted.

18 The encoded data output symbols are generated by clocking the constituent encoders
 19 N_{turbo} times with the switches in the up positions and puncturing the outputs as specified
 20 in Table 2.1.3.1.4.2.1-1. Within a puncturing pattern, a '0' means that the symbol shall be
 21 deleted and a '1' means that a symbol shall be passed. The constituent encoder outputs for
 22 each bit period shall be output in the sequence $X, Y_0, Y_1, X', Y'_0, Y'_1$ with the X output
 23 first. Symbol repetition is not used in generating the encoded data output symbols.

24 2.1.3.1.4.2.2 Turbo Code Termination

25 The turbo encoder shall generate $6/R$ tail output symbols following the encoded data
 26 output symbols. This tail output symbol sequence shall be identical to the one generated by
 27 the encoder shown in Figure 2.1.3.1.4.2.1-1. The tail output symbols are generated after
 28 the constituent encoders have been clocked N_{turbo} times with the switches in the up
 29 position. The first $3/R$ tail output symbols are generated by clocking Constituent Encoder 1
 30 three times with its switch in the down position while Constituent Encoder 2 is not clocked
 31 and puncturing and repeating the resulting constituent encoder output symbols. The last
 32 $3/R$ tail output symbols are generated by clocking Constituent Encoder 2 three times with
 33 its switch in the down position while Constituent Encoder 1 is not clocked and puncturing
 34 and repeating the resulting constituent encoder output symbols. The constituent encoder
 35 outputs for each bit period shall be output in the sequence $X, Y_0, Y_1, X', Y'_0, Y'_1$ with the X
 36 output first.

37 The constituent encoder output symbol puncturing and symbol repetition shall be as
 38 specified in Table 2.1.3.1.4.2.2-1. Within a puncturing pattern, a '0' means that the symbol

1 shall be deleted and a '1' means that a symbol shall be passed. For rate 1/2 turbo codes,
2 the tail output symbols for each of the first three tail bit periods shall be XY_0 , and the tail
3 output symbols for each of the last three tail bit periods shall be XY'_0 . For rate 1/3 turbo
4 codes, the tail output symbols for each of the first three tail bit periods shall be XXY_0 , and
5 the tail output symbols for each of the last three tail bit periods shall be XXY'_0 .

6 For rate 1/4 turbo codes, the tail output symbols for each of the first three tail bit periods
7 shall be XXY_0Y_1 , and the tail output symbols for each of the last three tail bit periods shall
8 be $XXY'_0Y'_1$.

9

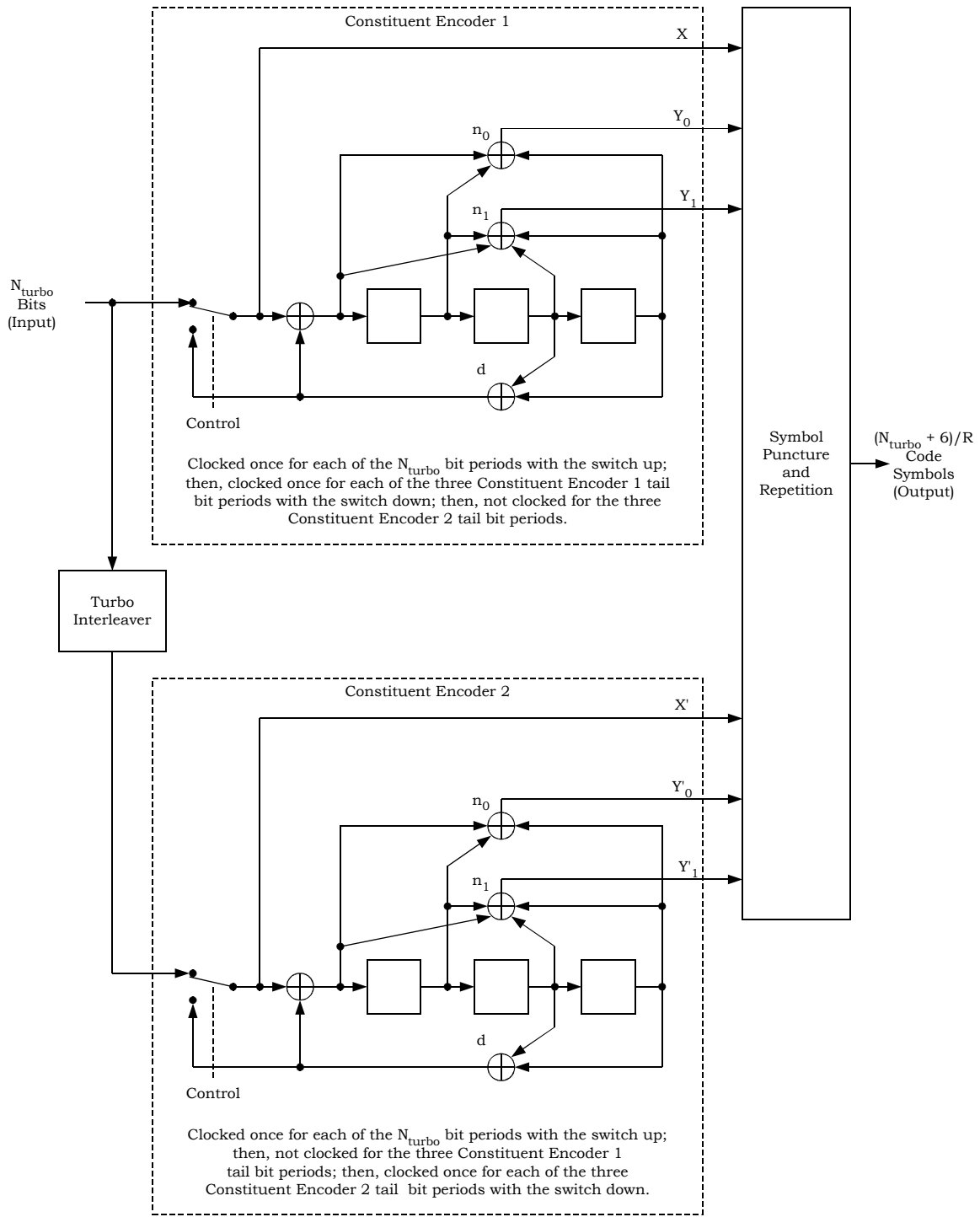


Figure 2.1.3.1.4.2.1-1. Turbo Encoder

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Table 2.1.3.1.4.2.1-1. Puncturing Patterns for the Data Bit Periods

Output	Code Rate		
	1/2	1/3	1/4
X	11	11	11
Y ₀	10	11	11
Y ₁	00	00	10
X'	00	00	00
Y' ₀	01	11	01
Y' ₁	00	00	11

Note: For each rate, the puncturing table shall be read first from top to bottom and then from left to right.

2

3

Table 2.1.3.1.4.2.2-1. Puncturing Patterns for the Tail Bit Periods

Output	Code Rate		
	1/2	1/3	1/4
X	111 000	111 000	111 000
Y ₀	111 000	111 000	111 000
Y ₁	000 000	000 000	111 000
X'	000 111	000 111	000 111
Y' ₀	000 111	000 111	000 111
Y' ₁	000 000	000 000	000 111

Note: For rate 1/2 turbo codes, the puncturing table shall be read first from top to bottom and then from left to right. For rate 1/3 and 1/4 turbo codes, the puncturing table shall be read first from top to bottom repeating X and X', and then from left to right.

4

5 2.1.3.1.4.2.3 Turbo Interleavers

6 The turbo interleaver, which is part of the turbo encoder, shall block interleave the data,
7 frame quality indicator (CRC), and reserved bits input to the turbo encoder.

8 The turbo interleaver shall be functionally equivalent to an approach where the entire
9 sequence of turbo interleaver input bits are written sequentially into an array at a sequence
10 of addresses, and then the entire sequence is read out from a sequence of addresses that
11 are defined by the procedure described below.

12

Let the sequence of input addresses be from 0 to $N_{\text{turbo}} - 1$, where N_{turbo} is the total number of information bits, frame quality indicator bits, and reserved bits in the turbo interleaver. Then, the sequence of interleaver output addresses shall be equivalent to those generated by the procedure illustrated in Figure 2.1.3.1.4.2.3-1 and described below.¹¹

1. Determine the turbo interleaver parameter, n , where n is the smallest integer such that $N_{\text{turbo}} \leq 2^{n+5}$. Table 2.1.3.1.4.2.3-1 gives this parameter for the numbers of bits per frame that are available without flexible data rates.
2. Initialize an $(n + 5)$ -bit counter to 0.
3. Extract the n most significant bits (MSBs) from the counter and add one to form a new value. Then, discard all except the n least significant bits (LSBs) of this value.
4. Obtain the n -bit output of the table lookup defined in Table 2.1.3.1.4.2.3-2 with a read address equal to the five LSBs of the counter. Note that this table depends on the value of n .
5. Multiply the values obtained in Steps 3 and 4, and discard all except the n LSBs.
6. Bit-reverse the five LSBs of the counter.
7. Form a tentative output address that has its MSBs equal to the value obtained in Step 6 and its LSBs equal to the value obtained in Step 5.
8. Accept the tentative output address as an output address if it is less than N_{turbo} ; otherwise, discard it.
9. Increment the counter and repeat Steps 3 through 8 until all N_{turbo} interleaver output addresses are obtained.

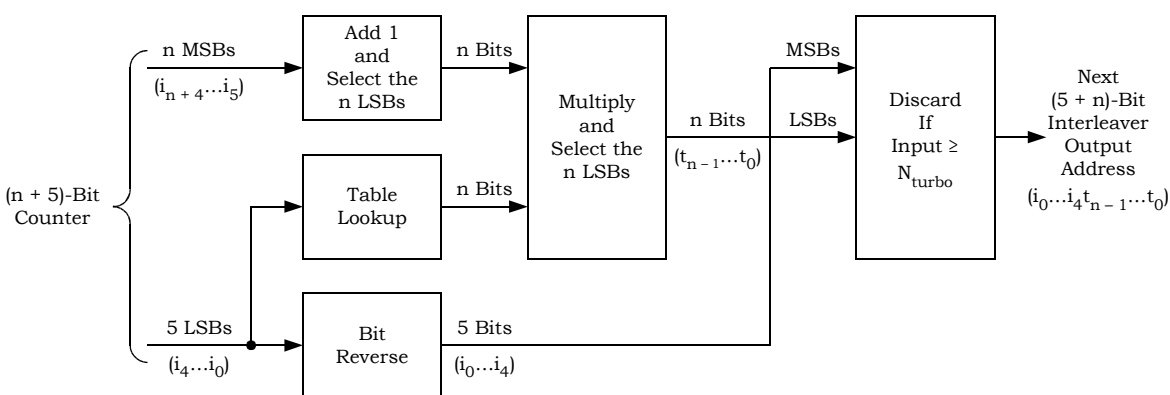


Figure 2.1.3.1.4.2.3-1. Turbo Interleaver Output Address Calculation Procedure

¹¹ This procedure is equivalent to one where the counter values are written into a 2^5 -row by 2^n -column array by rows, the rows are shuffled according to a bit-reversal rule, the elements within each row are permuted according to a row-specific linear congruential sequence, and tentative output addresses are read out by column. The linear congruential sequence rule is $x(i + 1) = (x(i) + c) \bmod 2^n$, where $x(0) = c$ and c is a row-specific value from a table lookup.

1

2

Table 2.1.3.1.4.2.3-1. Turbo Interleaver Parameter

Turbo Interleaver Block Size N_{turbo}	Turbo Interleaver Parameter n
378	4
570	5
762	5
1,146	6
1,530	6
2,298	7
3,066	7
4,602	8
6,138	8
9,210	9
12,282	9
20,730	10

3

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Table 2.1.3.1.4.2.3-2. Turbo Interleaver Lookup Table Definition

Table Index	n = 4 Entries	n = 5 Entries	n = 6 Entries	n = 7 Entries	n = 8 Entries	n = 9 Entries	n = 10 Entries
0	5	27	3	15	3	13	1
1	15	3	27	127	1	335	349
2	5	1	15	89	5	87	303
3	15	15	13	1	83	15	721
4	1	13	29	31	19	15	973
5	9	17	5	15	179	1	703
6	9	23	1	61	19	333	761
7	15	13	31	47	99	11	327
8	13	9	3	127	23	13	453
9	15	3	9	17	1	1	95
10	7	15	15	119	3	121	241
11	11	3	31	15	13	155	187
12	15	13	17	57	13	1	497
13	3	1	5	123	3	175	909
14	15	13	39	95	17	421	769
15	5	29	1	5	1	5	349
16	13	21	19	85	63	509	71
17	15	19	27	17	131	215	557
18	9	1	15	55	17	47	197
19	3	3	13	57	131	425	499
20	1	29	45	15	211	295	409
21	3	17	5	41	173	229	259
22	15	25	33	93	231	427	335
23	1	29	15	87	171	83	253
24	13	9	13	63	23	409	677
25	1	13	9	15	147	387	717
26	9	23	15	13	243	193	313
27	15	13	31	15	213	57	757
28	11	13	17	81	189	501	189
29	3	1	5	57	51	313	15
30	15	13	15	31	15	489	75
31	5	13	33	69	67	391	163

2

3

1 2.1.3.1.5 Code Symbol Repetition

2 Code symbols output from the forward error correction encoder shall be repeated as
3 specified in Table 2.1.3.1.5-1, except for the cases listed below.

4 If variable-rate Reverse Supplemental Channel operation is supported and the specified
5 data rate on the Reverse Supplemental Channel is not the maximum assigned data rate,
6 the symbol repetition factor for the specified data rate is the ratio of the interleaver block
7 size of the maximum assigned data rate and the specified number of encoded symbols per
8 frame. See $N_{\text{FSCH_BITS_SET}}[\text{FOR_SCH_ID}][\text{SCCL_INDEX}]$ in [5].

9 If flexible data rates are used, the repetition factor is calculated as follows:

- 10 • If the specified data rate is the maximum assigned, the repetition factor is the ratio
11 of the interleaver block size of the next higher listed rate and the specified number
12 of encoded symbols per frame on the Reverse Dedicated Control Channel, the
13 Reverse Fundamental Channel, and the Reverse Supplemental Channel.
- 14 • Otherwise, the repetition factor is the ratio of the interleaver block size of the
15 maximum assigned data rate and the specified number of encoded symbols per
16 frame.

17 If the repetition factor is less than 1, then code symbol repetition shall be disabled.
18 Otherwise, the symbol repetition¹² shall be performed as follows:

19 The k -th output symbol from the repetition block shall be the $\lfloor kL/N \rfloor$ -th input symbol
20 where $k = 0$ to $N-1$,

21 $L =$ Number of specified encoded symbols per frame at encoder output, and

22 $N =$ Desired channel interleaver block size ($N \geq L$).

¹² The symbol repetition factor is N/L .

1

Table 2.1.3.1.5-1. Code Symbol Repetition

Channel Type		Number of Repeated Code Symbols/Code Symbol
Access Channel (Spreading Rate 1 only)		2
Enhanced Access Channel		4 (9600 bps) 2 (19200 bps) 1 (38400 bps)
Reverse Common Control Channel		4 (9600 bps) 2 (19200 bps) 1 (38400 bps)
Reverse Dedicated Control Channel		2
Reverse Fundamental Channel	RC 1 or 2	8 (1200 or 1800 bps) 4 (2400 or 3600 bps) 2 (4800 or 7200 bps) 1 (9600 or 14400 bps)
	RC 3, 4, 5, or 6	16 (1500 or 1800 bps) 8 (2700 or 3600 bps) 4 (4800 or 7200 bps) 2 (9600 or 14400 bps)
Reverse Supplemental Code Channel (RC 1 or 2)		1
Reverse Supplemental Channel	20 ms frames	16 (1500 or 1800 bps) 8 (2700 or 3600 bps) 4 (4800 or 7200 bps) 2 (9600 or 14400 bps) 1 (> 14400 bps)
	40 ms frames	8 (1350 or 1800 bps) 4 (2400 or 3600 bps) 2 (4800 or 7200 bps) 1 (> 7200 bps)
	80 ms frames	4 (1200 or 1800 bps) 2 (2400 or 3600 bps) 1 (> 3600 bps)

2 2.1.3.1.6 Puncturing

3 2.1.3.1.6.1 Convolutional Code Symbol Puncturing

4 Table 2.1.3.1.6.1-1 includes the base code rate, puncturing ratio, and puncturing patterns
5 that shall be used for different radio configurations. Within a puncturing pattern, a '0'
6 means that the symbol shall be deleted and '1' means that a symbol shall be passed. The
7 most significant bit in the pattern corresponds to the first symbol in the symbol group

1 corresponding to the length of the puncturing pattern. The puncture pattern shall be
 2 repeated for all remaining symbols in the frame.

3
 4 **Table 2.1.3.1.6.1-1. Punctured Codes Used with Convolutional Codes**

Base Code Rate	Puncturing Ratio	Puncturing Pattern	Associated Radio Configurations
1/4	8 of 24	'111010111011 101011101010'	4 and 6
1/4	4 of 12	'110110011011'	4
1/4	1 of 5	'11110'	3 and 5
1/4	1 of 9	'111111110'	3 and 5
1/2	2 of 18	'111011111 111111110'	6

5
 6 For example, the 5-symbol puncturing pattern for Radio Configuration 3 is '11110',
 7 meaning that the first, second, third, and fourth symbols are passed, while the fifth symbol
 8 of each consecutive group of five symbols is removed.

9 2.1.3.1.6.2 Turbo Code Symbol Puncturing

10 Table 2.1.3.1.6.2-1 includes the base code rate, puncturing ratio, and puncturing patterns
 11 that shall be used for different radio configurations. Within a puncturing pattern, a '0'
 12 means that the symbol shall be deleted and a '1' means that a symbol shall be passed. The
 13 most significant bit in the pattern corresponds to the first symbol in the symbol group
 14 corresponding to the length of the puncturing pattern. The puncture pattern shall be
 15 repeated for all remaining symbols in the frame.

16
 17 **Table 2.1.3.1.6.2-1. Punctured Codes Used with Turbo Codes**

Base Code Rate	Puncturing Ratio	Puncturing Pattern	Associated Radio Configurations
1/2	2 of 18	'111110101 111111111'	6
1/4	4 of 12	'110111011010'	4

18 19 2.1.3.1.6.3 Flexible and Variable Rate Puncturing

20 If variable-rate Reverse Supplemental Channel operation, flexible data rates, or both are
 21 supported, puncturing after symbol repetition is calculated as described here. However,
 22 note that the puncturing in 2.1.3.1.6.1 and 2.1.3.1.6.2 is used for the frame formats listed

1 in Table 2.1.3.6.2-1 for the Reverse Dedicated Control Channel, Table 2.1.3.7.2-1 for the
 2 Reverse Fundamental Channel, or Tables 2.1.3.8.2-1, 2.1.3.8.2-2, or 2.1.3.8.2-3 for the
 3 Reverse Supplemental Channel.

4 If the number of specified encoded symbols per frame at the encoder output is larger than
 5 the desired channel interleaver block size, the following puncturing shall be applied.

6 The k -th output symbol from the puncturing block shall be the $\lfloor kL/N \rfloor$ -th input symbol,
 7 where $k = 0$ to $N-1$,

8 $L =$ Number of specified encoded symbols per frame at encoder output

9 $N =$ Desired channel interleaver block size ($N < L$).

10 Otherwise, puncturing after symbol repetition shall be disabled.

11 2.1.3.1.7 Block Interleaving

12 The mobile station shall interleave all repeated code symbols and subsequent puncturing, if
 13 used, on the Access Channel, the Enhanced Access Channel, the Reverse Common Control
 14 Channel, and the Reverse Traffic Channel prior to modulation and transmission.

15 For the Reverse Traffic Channel with Radio Configurations 1 and 2, the interleaver shall be
 16 an array with 32 rows and 18 columns (i.e., 576 cells). Repeated code symbols shall be
 17 written into the interleaver by columns from the first column to the eighteenth column
 18 filling the complete 32×18 matrix. Reverse Traffic Channel repeated code symbols shall be
 19 output from the interleaver by rows. For Radio Configuration 1 and 2, the interleaver rows
 20 shall be output in the following order:

21

22 At 9600 or 14400 bps:

23 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

24 At 4800 or 7200 bps:

25 1 3 2 4 5 7 6 8 9 11 10 12 13 15 14 16 17 19 18 20 21 23 22 24 25 27 26 28 29 31 30 32

26 At 2400 or 3600 bps:

27 1 5 2 6 3 7 4 8 9 13 10 14 11 15 12 16 17 21 18 22 19 23 20 24 25 29 26 30 27 31 28 32

28 At 1200 or 1800 bps:

29 1 9 2 10 3 11 4 12 5 13 6 14 7 15 8 16 17 25 18 26 19 27 20 28 21 29 22 30 23 31 24 32

30 For the Access Channel, the Enhanced Access Channel, the Reverse Common Control
 31 Channel, and the Reverse Traffic Channel with Radio Configurations 3, 4, 5, and 6, the
 32 symbols input to the interleaver are written sequentially at addresses 0 to the block size (N)
 33 minus one. The interleaved symbols are read out in a permuted order with the i -th symbol
 34 being read from address A_i , as follows:

$$35 \quad A_i = 2^m(i \bmod J) + \text{BRO}_m(\lfloor i/J \rfloor)$$

36 where

1 $i = 0$ to $N - 1$,
 2 $\lfloor x \rfloor$ indicates the largest integer less than or equal to x , and
 3 $BRO_m(y)$ indicates the bit-reversed m -bit value of y (i.e., $BRO_3(6) = 3$).
 4 The interleaver parameters m and J are specified in Table 2.1.3.1.7-1.

5
 6

Table 2.1.3.1.7-1. Interleaver Parameters

Interleaver Block Size	m	J
384	6	6
768	6	12
1,536	6	24
3,072	6	48
6,144	7	48
12,288	7	96
576	5	18
2,304	6	36
4,608	7	36
9,216	7	72
18,432	8	72
36,864	8	144

7

8 2.1.3.1.8 Orthogonal Modulation and Spreading

9 When transmitting on the Access Channel or the Reverse Traffic Channel with Radio
 10 Configurations 1 and 2, the mobile station uses orthogonal modulation. When transmitting
 11 on the Enhanced Access Channel, the Reverse Common Control Channel, or the Reverse
 12 Traffic Channel in Radio Configuration 3 through 6, the mobile station uses orthogonal
 13 spreading.

2.1.3.1.8.1 Orthogonal Modulation

When transmitting on the Access Channel or the Reverse Traffic Channel in Radio Configuration 1 or 2, modulation for the Reverse CDMA Channel shall be 64-ary orthogonal modulation. One of 64 possible modulation symbols is transmitted for each six repeated code symbols. The modulation symbol shall be one of 64 mutually orthogonal waveforms generated using Walsh functions. These modulation symbols are given in Table 2.1.3.1.8.1-1 and are numbered 0 through 63. The modulation symbols shall be selected according to the following formula:

$$\text{Modulation symbol index} = c_0 + 2c_1 + 4c_2 + 8c_3 + 16c_4 + 32c_5,$$

where c_5 shall represent the last (or most recent) and c_0 the first (or oldest) binary valued ('0' and '1') repeated code symbol of each group of six repeated code symbols that form a modulation symbol index.

The 64 by 64 matrix shown in Table 2.1.3.1.8.1-1 can be generated by means of the following recursive procedure:

$$\mathbf{H}_1 = 0, \quad \mathbf{H}_2 = \begin{matrix} 0 & 0 \\ 0 & 1 \end{matrix}, \quad \mathbf{H}_4 = \begin{matrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{matrix}, \quad \mathbf{H}_{2N} = \begin{matrix} \mathbf{H}_N & \mathbf{H}_N \\ \mathbf{H}_N & \overline{\mathbf{H}_N} \end{matrix};$$

where N is a power of 2 and $\overline{\mathbf{H}_N}$ denotes the binary complement of \mathbf{H}_N .

Walsh function time alignment shall be such that the first Walsh chip begins at the first chip of a frame.

The period of time required to transmit a single modulation symbol shall be equal to 1/4800 second (208.333... μ s). The period of time associated with one sixty-fourth of the modulation symbol is referred to as a Walsh chip and shall be equal to 1/307200 second (3.255... μ s).

Within a modulation symbol, Walsh chips shall be transmitted in the order of 0, 1, 2, ..., 63.

2.1.3.1.8.2 Orthogonal Spreading

When transmitting on the Reverse Pilot Channel, the Enhanced Access Channel, the Reverse Common Control Channel, or the Reverse Traffic Channel with Radio Configuration 3 through 6, the mobile station shall use orthogonal spreading. Table 2.1.3.1.8.2-1 specifies the Walsh functions that are applied to the Reverse CDMA Channels.

Table 2.1.3.1.8.2-1. Walsh Functions for Reverse CDMA Channels

Channel Type	Walsh Function
Reverse Pilot Channel	W_0^{32}
Enhanced Access Channel	W_2^8
Reverse Common Control Channel	W_2^8
Reverse Dedicated Control Channel	W_8^{16}
Reverse Fundamental Channel	W_4^{16}
Reverse Supplemental Channel 1	W_1^2 or W_2^4
Reverse Supplemental Channel 2	W_2^4 or W_6^8

Walsh function W_n^N represents a Walsh function of length N that is serially constructed from the n-th row of an $N \times N$ Hadamard matrix with the zeroth row being Walsh function 0, the first row being Walsh function 1, etc. Within Walsh function n, Walsh chips shall be transmitted serially from the n-th row from left to right. Hadamard matrices can be generated by means of the following recursive procedure:

$$\mathbf{H}_1 = 0, \quad \mathbf{H}_2 = \begin{matrix} 0 & 0 \\ 0 & 1 \end{matrix}, \quad \mathbf{H}_4 = \begin{matrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{matrix}, \quad \mathbf{H}_{2N} = \begin{matrix} \mathbf{H}_N & \mathbf{H}_N \\ \mathbf{H}_N & \overline{\mathbf{H}_N} \end{matrix};$$

where N is a power of 2 and $\overline{\mathbf{H}_N}$ denotes the binary complement of \mathbf{H}_N .

A code channel that is spread using Walsh function n from the N-ary orthogonal set ($0 \leq n \leq N-1$) shall be assigned to Walsh function W_n^N . Walsh function time alignment shall be such that the first Walsh chip begins at the first chip of a frame. The Walsh function spreading sequence shall repeat with a period of $N/1.2288 \mu\text{s}$ for Spreading Rate 1 and with a period of $N/3.6864 \mu\text{s}$ for Spreading Rate 3.

Tables 2.1.3.1.8.2-2 through 2.1.3.1.8.2-5 specify the Walsh functions that are applied to the Reverse Supplemental Channels. This Walsh function repetition factor is the number of Walsh function sequence repetitions per interleaver output symbol.

1 When a mobile station only supports one Reverse Supplemental Channel, it should support
 2 Reverse Supplemental Channel 1. Reverse Supplemental Channel 1 should use Walsh
 3 Function W_2^4 when possible.

4
 5 **Table 2.1.3.1.8.2-2. Reverse Supplemental Channel Walsh Functions**
 6 **with Spreading Rate 1 when Only One Reverse Supplemental Channel Is Assigned**

Reverse Supplemental Channel 1			Reverse Supplemental Channel 2		
Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor	Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor
$W_1^2 = (+ -)$	614.4/M	M = 1, 2, 4, 8, 16, and 32	Not Supported		
$W_2^4 = (+ + - -)$	307.2/M	M = 1, 2, 4, 8, and 16	Not Supported		
Not Supported			$W_2^4 = (+ + - -)$	307.2/M	M = 1, 2, 4, 8, and 16
Not Supported			$W_6^8 = (+ + - - - - + +)$	153.6/M	M = 1, 2, 4, and 8

7
 8 **Table 2.1.3.1.8.2-3. Reverse Supplemental Channel Walsh Functions**
 9 **with Spreading Rate 1 when Two Reverse Supplemental Channels Are Assigned**

Reverse Supplemental Channel 1			Reverse Supplemental Channel 2		
Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor	Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor
$W_1^2 = (+ -)$	614.4/M	M = 1, 2, 4, 8, 16, and 32	$W_2^4 = (+ + - -)$	307.2/M	M = 1, 2, 4, 8, and 16
$W_1^2 = (+ -)$	614.4/M	M = 1, 2, 4, 8, 16, and 32	$W_6^8 = (+ + - - - - + +)$	153.6/M	M = 1, 2, 4, and 8
$W_2^4 = (+ + - -)$	307.2/M	M = 2, 4, 8, and 16	$W_6^8 = (+ + - - - - + +)$	153.6/M	M = 1, 2, 4, and 8

10

1 **Table 2.1.3.1.8.2-4. Reverse Supplemental Channel Walsh Functions**
 2 **with Spreading Rate 3 when Only One Reverse Supplemental Channel Is Assigned**

Reverse Supplemental Channel 1			Reverse Supplemental Channel 2		
Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor	Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor
$W_1^2 = (+ -)$	1,843.2/M	M = 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 64, and 96	Not Supported		
$W_2^4 = (+ + - -)$	921.6/M	M = 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, and 48	Not Supported		
Not Supported			$W_2^4 = (+ + - -)$	921.6/M	M = 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, and 48
Not Supported			$W_6^8 = (+ + - - - - + +)$	460.8/M	M = 1, 2, 3, 4, 6, 8, 12, 16, and 24

3

Table 2.1.3.1.8.2-5. Reverse Supplemental Channel Walsh Functions with Spreading Rate 3 when Two Reverse Supplemental Channels Are Assigned

Reverse Supplemental Channel 1			Reverse Supplemental Channel 2		
Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor	Walsh Function	Interleaver Output Symbol Rate (ksps)	Walsh Function Repetition Factor
$W_1^2 = (+ -)$	1,843.2/M	M = 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 64, and 96	$W_2^4 = (+ + - -)$	921.6/M	M = 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, and 48
$W_1^2 = (+ -)$	1,843.2/M	M = 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 64, and 96	$W_6^8 = (+ + - - - - + +)$	460.8/M	M = 1, 2, 3, 4, 6, 8, 12, 16, and 24
$W_2^4 = (+ + - -)$	921.6/M	M = 2, 4, 6, 8, 12, 16, 24, 32, and 48	$W_6^8 = (+ + - - - - + +)$	460.8/M	M = 1, 2, 3, 4, 6, 8, 12, 16, and 24

2.1.3.1.9 Gated Transmission

Several types of gated transmission are used, depending on the mode of operation. These include:

- Variable data rate transmission on the Reverse Fundamental Channel with Radio Configurations 1 and 2.
- PUF operation on the Reverse Traffic Channel with Radio Configurations 1 and 2.
- Gated operation on the Reverse Pilot Channel.
- Gated operation of the Enhanced Access Channel preamble.
- Gated operation of the Reverse Common Control Channel preamble.
- Gated operation of the Reverse Fundamental Channel and the Reverse Pilot Channel with Radio Configuration 3, 4, 5, and 6.

2.1.3.1.9.1 Rates and Gating for Radio Configurations 1 and 2

When operating with Radio Configuration 1 or 2, the Reverse Fundamental Channel interleaver output stream is time-gated to allow transmission of certain interleaver output symbols and deletion of others. This process is illustrated in Figure 2.1.3.1.9.1-1. As shown in the figure, the duty cycle of the transmission gate varies with the transmit data rate. When the transmit data rate is 9600 or 14400 bps, the transmission gate allows all interleaver output symbols to be transmitted. When the transmit data rate is 4800 or 7200 bps, the transmission gate allows one-half of the interleaver output symbols to be

1 transmitted, and so forth. The gating process operates by dividing the 20 ms frame into 16
2 equal length (i.e., 1.25 ms) periods, called power control groups (PCG). Certain power
3 control groups are gated-on (i.e., transmitted), while other groups are gated-off (i.e., not
4 transmitted).

5 The assignment of gated-on and gated-off groups, referred to as the data burst randomizing
6 function, is specified in 2.1.3.1.9.2. The gated-on power control groups are pseudo
7 randomized in their positions within the frame. The data burst randomizer ensures that
8 every code symbol input to the repetition process is transmitted exactly once. During the
9 gated-off periods, the mobile station shall comply with the requirement in 2.1.2.2.2, thus
10 reducing the interference to other mobile stations operating on the same Reverse CDMA
11 Channel.

12 The data burst randomizer is not used during a PUF probe (see 2.1.3.1.9.3).

13 When transmitting on the Access Channel, the code symbols are repeated once (each
14 symbol occurs twice) prior to transmission. The data burst randomizer is not used when
15 the mobile station transmits on the Access Channel. Therefore, both copies of the repeated
16 code symbols are transmitted as shown in Figure 2.1.3.1.9.1-2.
17

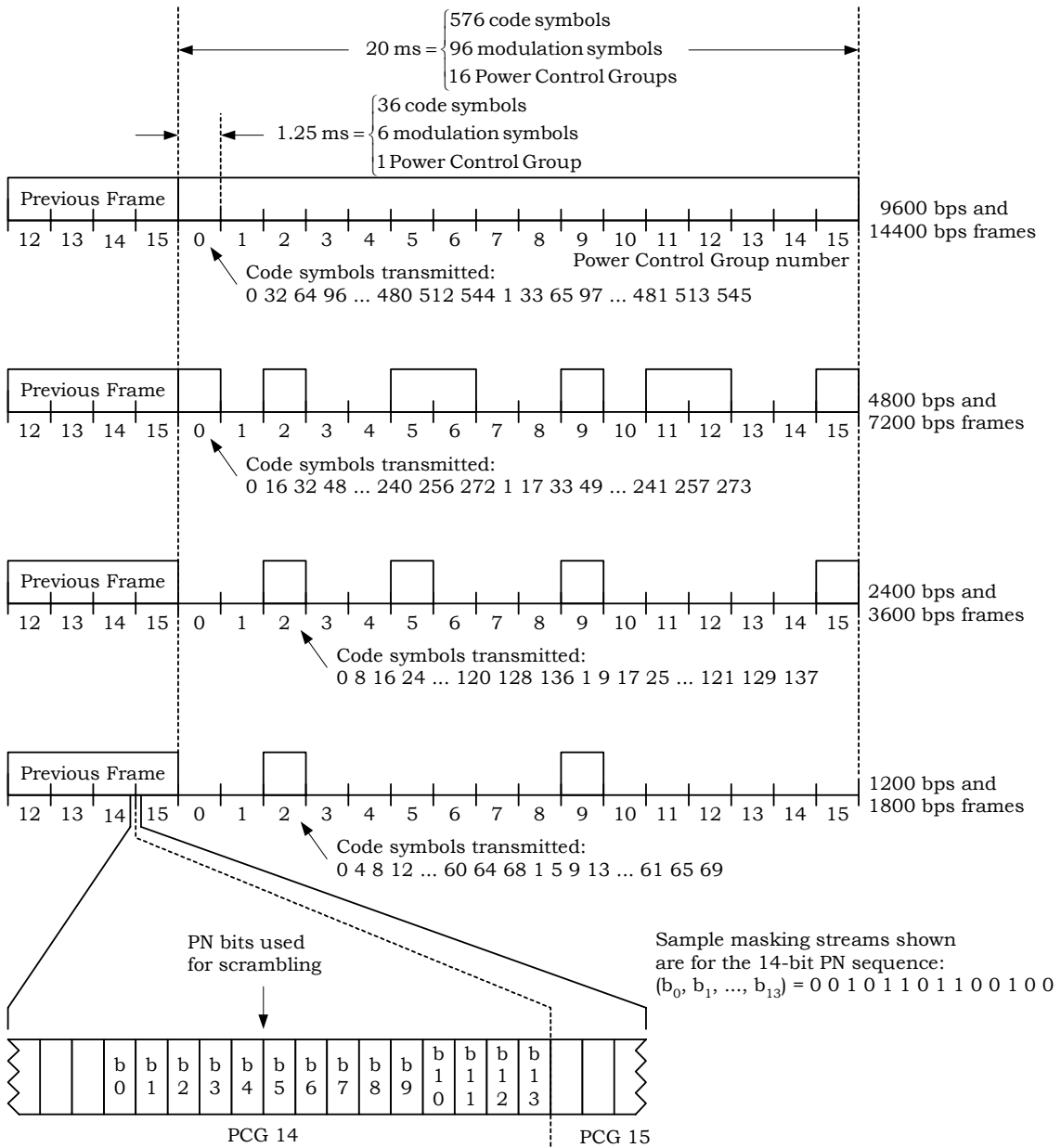


Figure 2.1.3.1.9.1-1. Reverse CDMA Channel Variable Data Rate Transmission for Radio Configurations 1 and 2 Example

1
2
3
4
5

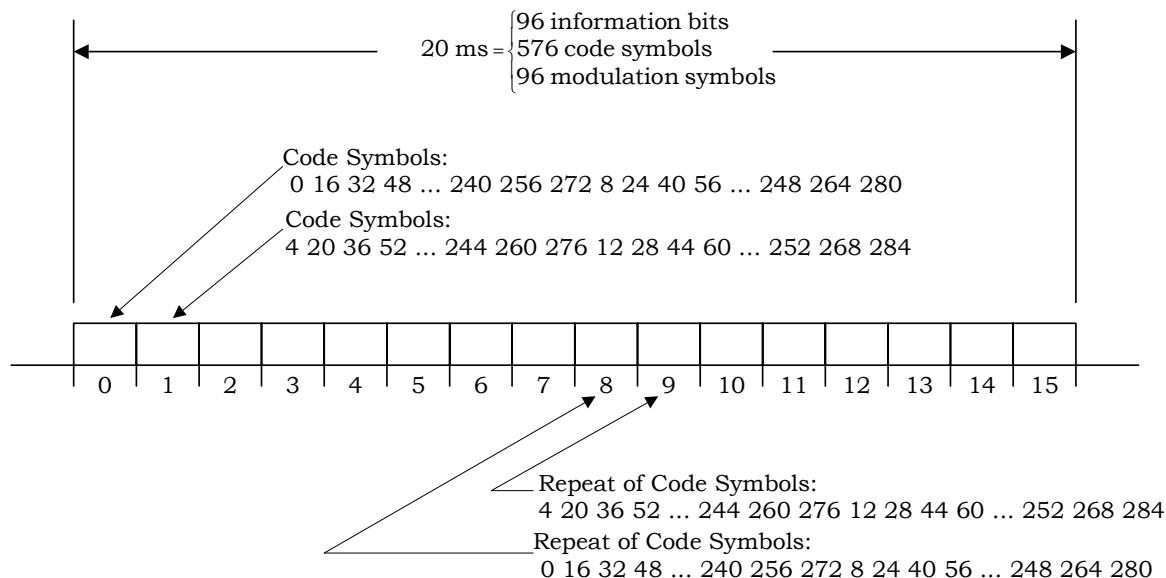


Figure 2.1.3.1.9.1-2. Access Channel Transmission Structure

2.1.3.1.9.2 Data Burst Randomizing Algorithm for Radio Configurations 1 and 2

The data burst randomizer generates a masking pattern of '0's and '1's that randomly masks out the redundant data generated by the code repetition. The masking pattern is determined by the data rate of the frame and by a block of 14 bits taken from the long code. These 14 bits shall be the last 14 bits of the long code used for spreading in the next to last power control group of the previous frame (see Figure 2.1.3.1.9.1-1). In other words, these are the 14 bits which occur exactly one power control group (1.25 ms) before each Reverse Fundamental Channel frame boundary. These 14 bits are denoted as

$$b_0 \ b_1 \ b_2 \ b_3 \ b_4 \ b_5 \ b_6 \ b_7 \ b_8 \ b_9 \ b_{10} \ b_{11} \ b_{12} \ b_{13},$$

where b_0 represents the oldest bit, and b_{13} represents the latest bit.¹³

Each 20 ms Reverse Fundamental Channel frame shall be divided into 16 equal length (i.e., 1.25 ms) power control groups numbered from 0 to 15 as shown in Figure 2.1.3.1.9.1-1. The data burst randomizer algorithm shall be as follows:

Data Rate Selected: 9600 or 14400 bps

Transmission shall occur on power control groups numbered

$$0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.$$

¹³In order to randomize the position of the data bursts, only 8 bits are strictly necessary. The algorithm described here uses 14 bits to ensure that the slots used for data transmission at the quarter rate are a subset of the slots used at the half rate and that the slots used at the one-eighth rate are a subset of the slots used at the quarter rate.

1 Data Rate Selected: 4800 or 7200 bps
 2 Transmission shall occur on power control groups numbered
 3 $b_0, 2 + b_1, 4 + b_2, 6 + b_3, 8 + b_4, 10 + b_5, 12 + b_6, 14 + b_7$.

4 Data Rate Selected: 2400 or 3600 bps
 5 Transmission shall occur on power control groups numbered
 6 b_0 if $b_8 = '0'$, or $2 + b_1$ if $b_8 = '1'$;
 7 $4 + b_2$ if $b_9 = '0'$, or $6 + b_3$ if $b_9 = '1'$;
 8 $8 + b_4$ if $b_{10} = '0'$, or $10 + b_5$ if $b_{10} = '1'$;
 9 $12 + b_6$ if $b_{11} = '0'$, or $14 + b_7$ if $b_{11} = '1'$.

10 Data Rate Selected: 1200 or 1800 bps
 11 Transmission shall occur on power control groups numbered
 12 b_0 if $(b_8, b_{12}) = ('0', '0')$, or
 13 $2 + b_1$ if $(b_8, b_{12}) = ('1', '0')$, or
 14 $4 + b_2$ if $(b_9, b_{12}) = ('0', '1')$, or
 15 $6 + b_3$ if $(b_9, b_{12}) = ('1', '1')$;
 16 $8 + b_4$ if $(b_{10}, b_{13}) = ('0', '0')$, or
 17 $10 + b_5$ if $(b_{10}, b_{13}) = ('1', '0')$, or
 18 $12 + b_6$ if $(b_{11}, b_{13}) = ('0', '1')$, or
 19 $14 + b_7$ if $(b_{11}, b_{13}) = ('1', '1')$.

20 2.1.3.1.9.3 Gating During a PUF Probe

21 While operating in Radio Configuration 1 or 2, the mobile station shall transmit all power
 22 control groups as gated-on during the PUF setup and PUF pulse portions of a PUF probe,
 23 except when the transmitter is disabled.

24 If the transmitter is enabled during the PUF recovery portion of a PUF probe, the mobile
 25 station shall transmit all power control groups as gated-on; otherwise, the mobile station
 26 shall not transmit any power control groups.

27 2.1.3.1.9.4 Reverse Pilot Channel Gating

28 The mobile station may support Reverse Pilot Channel gating when operating in Reverse
 29 Radio Configuration 3, 4, 5, or 6 and when none of the following channels is assigned: the
 30 Reverse Fundamental Channel, the Reverse Supplemental Channel, the Forward
 31 Fundamental Channel, and the Forward Supplemental Channel. If the mobile station
 32 supports Reverse Pilot Channel gating, it shall perform the gating as specified in 2.1.3.2.3.

2.1.3.1.9.5 Enhanced Access Channel Preamble Gating

The mobile station shall perform Enhanced Access Channel preamble gating as specified in 2.1.3.4.2.3.

2.1.3.1.9.6 Reverse Common Control Channel Preamble Gating

The mobile station shall perform Reverse Common Control Channel preamble gating as specified in 2.1.3.5.2.3.

2.1.3.1.9.7 Reverse Fundamental Channel Gating

The mobile station may support Reverse Fundamental Channel gating when operating in Reverse Radio Configuration 3, 4, 5, or 6. If the mobile station supports Reverse Fundamental Channel gating, the mobile station shall perform gating as specified in 2.1.3.7.8.

2.1.3.1.10 Reverse Power Control Subchannel

The Reverse Power Control Subchannel applies to Radio Configurations 3 through 6 only. The mobile station shall support both the inner power control loop and the outer power control loop for Forward Traffic Channel power control.

The outer power control loop estimates the setpoint value based on E_b/N_t to achieve the target frame error rate (FER) on each assigned Forward Traffic Channel. These setpoints are communicated to the base station, either implicitly through the inner loop, or explicitly through signaling messages. The differences between setpoints help the base station derive the appropriate transmit levels for the Forward Traffic Channels that do not have inner loops.

The inner power control loop compares the E_b/N_t of the received Forward Traffic Channel with the corresponding outer power control loop setpoint to determine the value of the power control bit to be sent to the base station on the Reverse Power Control Subchannel. The mobile station shall transmit the Erasure Indicator Bits (EIB) or the Quality Indicator Bits (QIB) on the Reverse Power Control Subchannel upon the command of the base station.

2.1.3.1.10.1 Reverse Power Control Subchannel Structure

Each 1.25 ms power control group on the Reverse Pilot Channel contains $1536 \times N$ PN chips, where N is the spreading rate number (N = 1 for Spreading Rate 1 and N = 3 for Spreading Rate 3).

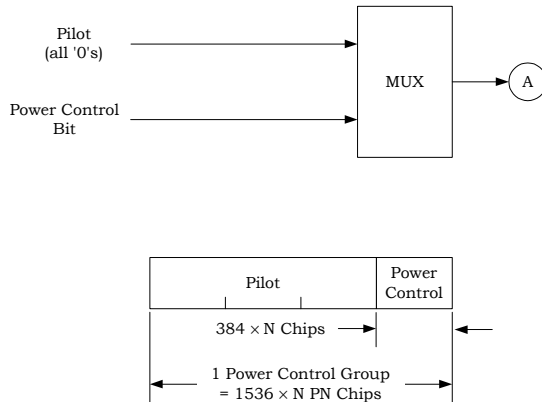
The mobile station shall transmit the pilot signal in the first $1152 \times N$ PN chips, and transmit the Reverse Power Control Subchannel in the following $384 \times N$ PN chips in each power control group on the Reverse Pilot Channel (see Figure 2.1.3.1.10.1-1).

For $FPC_MODE_s = '000', '001',$ and $'010'$, each of the $384 \times N$ PN chips on the Reverse Power Control Subchannel is a repetition of the forward power control bit generated by the mobile station. For $FPC_MODE_s = '011', '100',$ or $'101'$, each of the $384 \times N$ PN chips on the Reverse Power Control Subchannel is a repetition of the Erasure Indicator Bit (EIB) or the

1 Quality Indicator Bit (QIB) generated by the mobile station (see 2.2.2.2). For $FPC_MODE_s =$
 2 '110', each of the $384 \times N$ PN chips on the Primary Reverse Power Control Subchannel is a
 3 repetition of the forward power control bit generated by the mobile station and each of the
 4 $384 \times N$ PN chips on the Secondary Reverse Power Control Subchannel is a repetition of the
 5 Erasure Indicator Bit (EIB) generated by the mobile station (see 2.2.2.2).

6 All PN chips sent on the Reverse Pilot Channel within a power control group shall be
 7 transmitted at the same power level. The structure of the Reverse Power Control
 8 Subchannel is illustrated in Figure 2.1.3.1.10.1-1.

9



N is the Spreading Rate number

10

11 **Figure 2.1.3.1.10.1-1. Reverse Pilot Channel Showing the Power Control Subchannel**
 12 **Structure**

13

14 The Reverse Pilot Channel can be transmitted with the gated transmission mode enabled or
 15 disabled as described in 2.1.3.2.3. When the gated transmission mode is disabled
 16 ($PILOT_GATING_USE_RATE_s = '0'$), the mobile station shall transmit the Reverse Power
 17 Control Subchannel in every power control group as shown in Figure 2.1.3.1.10.1-2. When
 18 the gated transmission mode is enabled ($PILOT_GATING_USE_RATE_s = '1'$), the mobile
 19 station shall transmit the Reverse Power Control Subchannel only in the power control
 20 groups that are gated on as specified in 2.1.3.2.3. The relative timings of the forward and
 21 reverse power control subchannel transmissions when the gated transmission mode is
 22 enabled and disabled are depicted in Figure 2.1.3.1.10.1-3.

23

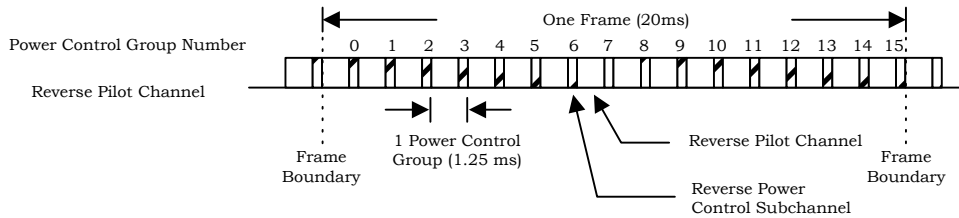


Figure 2.1.3.1.10.1-2. Reverse Power Control Subchannel

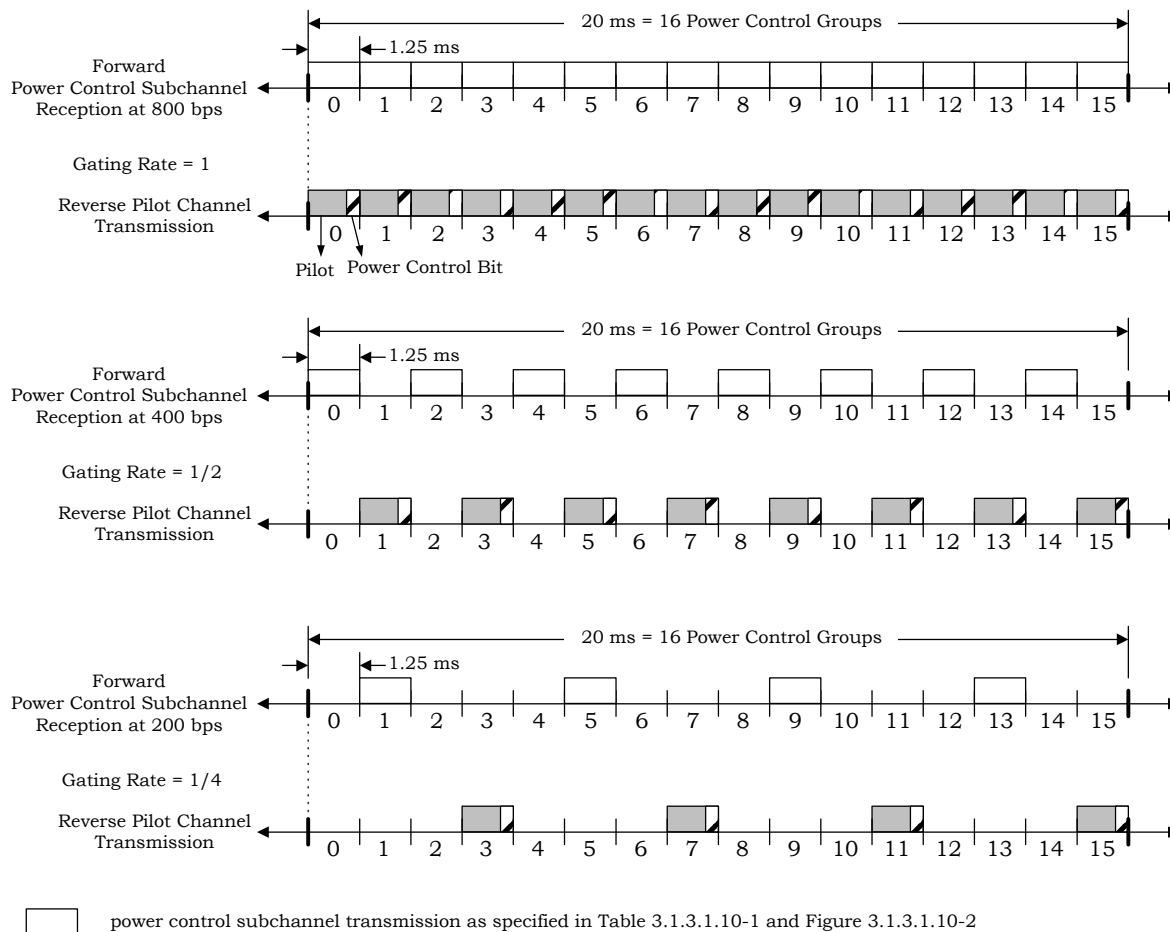


Figure 2.1.3.1.10.1-3. Forward and Reverse Power Control Subchannel Transmission Timing

If the Reverse Pilot Channel is not gated (PILOT_GATING_USE_RATE_s = '0'), the mobile station shall transmit one Reverse Power Control Subchannel when FPC_MODE_s = '000', '011', or '100'. If the mobile station supports the Forward Supplemental Channel, the mobile station shall transmit two Reverse Power Control Subchannels when FPC_MODE_s = '001', '010', '101', or '110'. If the Reverse Pilot Channel is in gated mode

1 (PILOT_GATING_USE_RATE_s = '1'), the mobile station shall transmit one Reverse Power
 2 Control Subchannel. Therefore, when the Reverse Pilot Channel is in the gated mode,
 3 FPC_MODE_s shall be '000', '011', or '100'.

4 The configurations of the Reverse Power Control Subchannel when the Reverse Pilot
 5 Channel is not in gated mode are shown in Table 2.1.3.1.10.1-1 and described as follow:

- 6 • When FPC_MODE_s = '000', the mobile station shall transmit the Primary Reverse Power
 7 Control Subchannel (see 2.1.3.1.10.3) at an 800 bps data rate.
- 8 • When FPC_MODE_s = '001', the mobile station shall transmit the Primary Reverse Power
 9 Control Subchannel at a 400 bps data rate, and the Secondary Reverse Power Control
 10 Subchannel (see 2.1.3.1.10.3) at a 400 bps data rate.
- 11 • When FPC_MODE_s = '010', the mobile station shall transmit the Primary Reverse Power
 12 Control Subchannel at a 200 bps data rate, and the Secondary Reverse Power Control
 13 Subchannel (see 2.1.3.1.10.3) at a 600 bps data rate.
- 14 • When FPC_MODE_s = '011', the mobile station shall transmit the Erasure Indicator Bit
 15 (EIB) on the Reverse Power Control Subchannel. The transmission of the Erasure
 16 Indicator Bit shall occur at the second frame (20 ms frame) of the Reverse Traffic
 17 Channel following the corresponding Forward Traffic Channel frame in which the
 18 Erasure Indicator Bit is determined (see 2.2.2.2 and Figure 2.1.3.1.10.1-4).
- 19 • When FPC_MODE_s = '100', the mobile station shall transmit the Quality Indicator Bit
 20 (QIB) on the Reverse Power Control Subchannel. The transmission of the Quality
 21 Indicator Bit shall occur at the second frame (20 ms frame) of the Reverse Traffic
 22 Channel following the corresponding Forward Traffic Channel frame in which the
 23 Quality Indicator Bit is determined (see 2.2.2.2 and Figure 2.1.3.1.10.1-4).
- 24 • When FPC_MODE_s = '101', the mobile station shall transmit the Quality Indicator Bit
 25 (QIB) derived from the Forward Fundamental Channel (FPC_PRI_CHAN_s = '0'), or the
 26 Forward Dedicated Control Channel (FPC_PRI_CHAN_s = '1'), on the Primary Reverse
 27 Power Control Subchannel and shall transmit the Erasure Indicator Bit (EIB) derived
 28 from Forward Supplemental Channel 0 (FPC_SEC_CHAN_s = '0') or Forward
 29 Supplemental Channel 1 (FPC_SEC_CHAN_s = '1'), on the Secondary Reverse Power
 30 Control Subchannel. The transmission of the Erasure Indicator Bit and the Quality
 31 Indicator Bit shall start at the second frame (20 ms frame) of the Reverse Traffic
 32 Channel following the corresponding Forward Traffic Channel frame in which the
 33 Quality Indicator Bit or Erasure Indicator Bit is determined (see 2.2.2.2 and Figure
 34 2.1.3.1.10.1-5).
- 35 • When FPC_MODE_s = '110', the mobile station shall transmit the Primary Reverse Power
 36 Control Subchannel at a 400 bps data rate, and shall transmit the Erasure Indicator
 37 Bit derived from Forward Supplemental Channel 0 (FPC_SEC_CHAN_s = '0') or Forward
 38 Supplemental Channel 1 (FPC_SEC_CHAN_s = '1') on the Secondary Reverse Power
 39 Control Subchannel (see 2.1.3.1.10.3 and Figure 2.1.3.1.10.1-5). The transmission of
 40 the Erasure Indicator Bit shall start at the second frame (20 ms frame) of the Reverse
 41 Traffic Channel following the end of the corresponding Forward Supplemental Channel
 42 frame in which the Erasure Indicator Bit is determined.

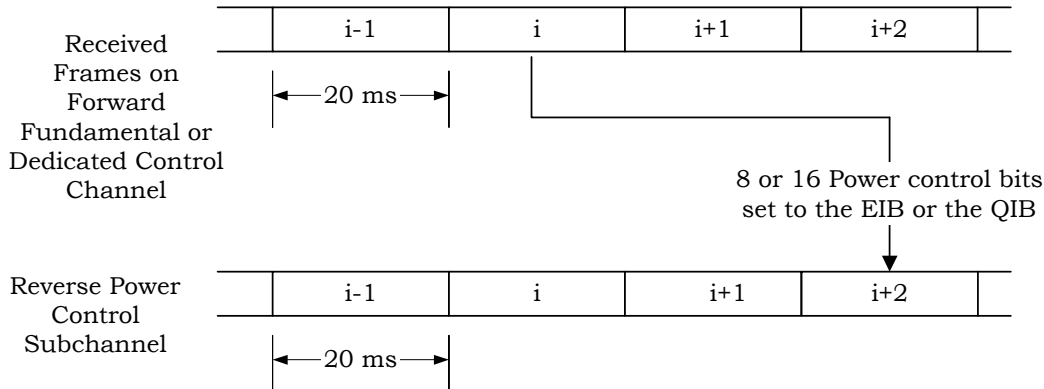
1
2**Table 2.1.3.1.10.1-1. Reverse Power Control Subchannel Configurations**

FPC_MODE_s	Reverse Power Control Subchannel Allocations (Power Control Group Numbers 0-15)	
	Primary Reverse Power Control Subchannel	Secondary Reverse Power Control Subchannel
'000'	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	Not supported
'001'	0, 2, 4, 6, 8, 10, 12, 14	1, 3, 5, 7, 9, 11, 13, 15
'010'	1, 5, 9, 13	0, 2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15
'011'	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	Not supported
'100'	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	Not supported
'101'	0, 2, 4, 6, 8, 10, 12, 14	1, 3, 5, 7, 9, 11, 13, 15
'110'	0, 2, 4, 6, 8, 10, 12, 14	1, 3, 5, 7, 9, 11, 13, 15
All other values	Reserved	Reserved

Notes:

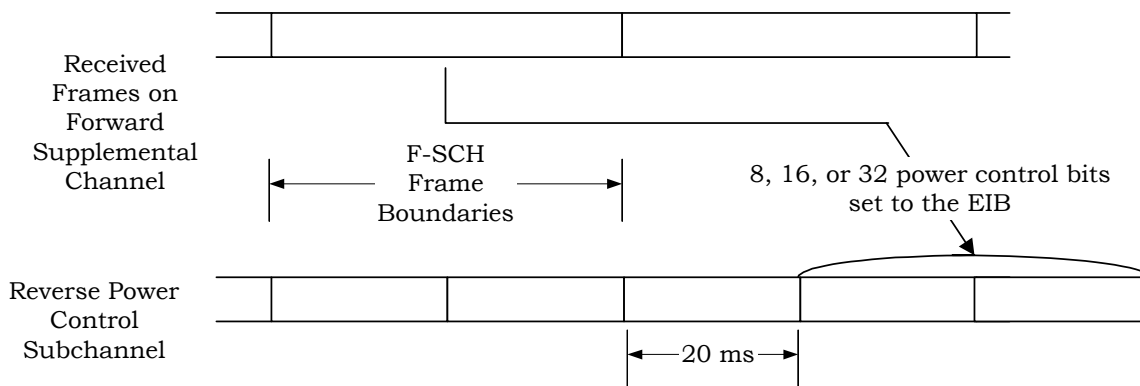
1. When FPC_MODE_s is equal to '011' or '100', the 16 power control bits on the Primary Reverse Power Control Subchannel are all set to the Erasure Indicator Bit or the Quality Indicator Bit, respectively, so the effective feedback rate is 50 bps.
2. When FPC_MODE_s is equal to '101', the eight power control bits on the Primary Reverse Power Control Subchannel are all set to the Quality Indicator Bit, so the effective feedback rate is 50 bps.
3. When FPC_MODE_s is equal to '101' or '110', the power control bits on the Secondary Reverse Power Control Subchannel corresponding to a Forward Supplemental Channel frame duration are all set to the Erasure Indicator Bit, so the effective feedback rate is 50 bps for 20 ms frames, 25 bps for 40 ms frames, or 12.5 bps for 80 ms frames.

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Figure 2.1.3.1.10.1-4. Primary Reverse Power Control Subchannel Transmission Timing for FPC_MODE_S = '011', '100', and '101'



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Figure 2.1.3.1.10.1-5. Secondary Reverse Power Control Subchannel Transmission Timing for FPC_MODE_S = '101' and '110'

2.1.3.1.10.2 Outer Power Control Loop

For FPC_MODE_S = '000', '001', and '010', the mobile station shall support an outer power control loop on all Forward Traffic Channels assigned to the mobile station, including the Forward Dedicated Control Channel, the Forward Fundamental Channel, and the Forward Supplemental Channels.

For FPC_MODE_S = '110', the mobile station shall support an outer power control loop on each of the following channels assigned to the mobile station: the Forward Dedicated Control Channel and the Forward Fundamental Channel.

If the mobile station is monitoring the Forward Fundamental Channel, the mobile station shall adjust FPC_FCH_CURR_SETPT_S (E_b/N_t) to achieve the target FER for the 9600 bps or the 14400 bps data rate on the Forward Fundamental Channel for 20 ms frames. When the value of FPC_FCH_CURR_SETPT_S is greater than FPC_FCH_MAX_SETPT_S, the mobile station shall set FPC_FCH_CURR_SETPT_S to FPC_FCH_MAX_SETPT_S. When the value of FPC_FCH_CURR_SETPT_S is less than FPC_FCH_MIN_SETPT_S, the mobile station shall set FPC_FCH_CURR_SETPT_S to FPC_FCH_MIN_SETPT_S.

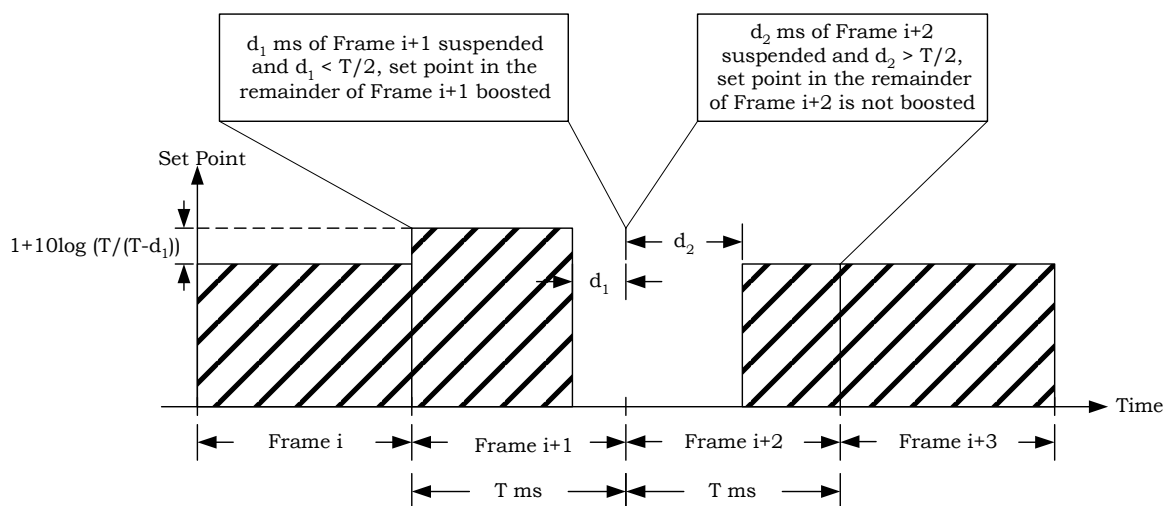
22

1 If the mobile station is monitoring the Forward Dedicated Control Channel, the mobile
 2 station shall adjust $FPC_DCCH_CURR_SETPT_s$ (E_b/N_t) to achieve the target FER for the
 3 9600 bps or the 14400 bps data rate on the Forward Dedicated Control Channel for 20 ms
 4 frames. When the value of $FPC_DCCH_CURR_SETPT_s$ is greater than
 5 $FPC_DCCH_MAX_SETPT_s$, the mobile station shall set $FPC_DCCH_CURR_SETPT_s$ to
 6 $FPC_DCCH_MAX_SETPT_s$. When the value of $FPC_DCCH_CURR_SETPT_s$ is less than
 7 $FPC_DCCH_MIN_SETPT_s$, the mobile station shall set $FPC_DCCH_CURR_SETPT_s$ to
 8 $FPC_DCCH_MIN_SETPT_s$.

9 If the mobile station is monitoring Forward Supplemental Channel i , the mobile station
 10 shall adjust $FPC_SCH_CURR_SETPT[i]_s$ (E_b/N_t) to achieve the target FER for the maximum
 11 assigned data rate on the Forward Supplemental Channel i . When the value of
 12 $FPC_SCH_CURR_SETPT[i]_s$ is greater than $FPC_SCH_MAX_SETPT[i]_s$, the mobile station
 13 shall set $FPC_SCH_CURR_SETPT[i]_s$ to $FPC_SCH_MAX_SETPT[i]_s$. When the value of
 14 $FPC_SCH_CURR_SETPT[i]_s$ is less than $FPC_SCH_MIN_SETPT[i]_s$, the mobile station shall
 15 set $FPC_SCH_CURR_SETPT[i]_s$ to $FPC_SCH_MIN_SETPT[i]_s$.

16 The mobile station may suspend its current Forward Traffic Channel processing in order to
 17 tune to a Candidate Frequency for possible hard handoff, and re-tune to the Serving
 18 Frequency. If the mobile station reception is suspended for d ms in a frame of length T ms,
 19 and if d is less than $T/2$, the mobile station may increase its setpoint value by an amount
 20 no greater than $(1 + 10\log(T/(T - d)))$ dB (rounded to the nearest 0.125 dB) for the
 21 remainder of the frame that is received. The mobile station shall resume its original
 22 setpoint value at the beginning of the next frame. See Figure 2.1.3.1.10.2-1.

23



24

25 **Figure 2.1.3.1.10.2-1. Increased Outer Power Control Loop Set Point for Inter-**
 26 **frequency Hard Handoff**

27

2.1.3.1.10.3 Inner Power Control Loop

When FPC_MODE_S is set to '000', '001', '010', or '110' the mobile station shall support a primary inner power control loop for the received Forward Fundamental Channel ($FPC_PRI_CHAN_S = '0'$), or for the received Forward Dedicated Control Channel ($FPC_PRI_CHAN_S = '1'$).

If FPC_MODE_S is equal to '001' or '010', the mobile station shall also support the secondary inner power control loop for the Supplemental Channel specified by $FPC_SEC_CHAN_S$.

The mobile station receiver shall compare the E_b/N_t (dB) value provided by the inner power control loop with the corresponding outer power control loop setpoint to determine the power control bits ('0' or '1') to be sent on the Reverse Power Control Subchannel.

If $FPC_PRI_CHAN_S = '0'$ and if FPC_MODE_S is equal to '000', '001', '010', or '110', the mobile station shall compare the E_b/N_t (dB) value provided by the primary inner power control loop with $FPC_FCH_CURR_SETPT_S$ to determine the power control bit sent on the Primary Reverse Power Control Subchannel. If FPC_MODE_S is equal to '001' or '010', the mobile station shall also compare the E_b/N_t (dB) value provided by the secondary inner power control loop with $FPC_SCH_CURR_SETPT[FPC_SEC_CHAN_S]_S$ to determine the power control bit sent on the Secondary Reverse Power Control Subchannel.

If $FPC_PRI_CHAN_S = '1'$ and if FPC_MODE_S is equal to '000', '001', '010', or '110', the mobile station shall compare the E_b/N_t (dB) value provided by the primary inner power control loop with $FPC_DCCH_CURR_SETPT_S$ to determine the power control bit sent on the Primary Reverse Power Control Subchannel. If FPC_MODE_S is equal to '001' or '010', the mobile station shall also compare the E_b/N_t (dB) value provided by the secondary inner power control loop with $FPC_SCH_CURR_SETPT[FPC_SEC_CHAN_S]_S$ to determine the power control bit sent on the Secondary Reverse Power Control Subchannel.

A power control bit shall be set to '0' when the E_b/N_t (dB) value provided by the inner power control loop is less than the corresponding setpoint value. A power control bit shall be set to '1' when the E_b/N_t (dB) value provided by the inner power control loop is greater than or equal to the corresponding setpoint value.

2.1.3.1.11 Direct Sequence Spreading

Direct sequence spreading using the long code shall be applied to the Access Channel and the Reverse Traffic Channel with Radio Configurations 1 and 2.

For the Access Channel, this spreading operation involves modulo-2 addition of the 64-ary orthogonal modulator output stream and the long code. For the Reverse Traffic Channel with Radio Configurations 1 and 2, this spreading operation involves modulo-2 addition of the data burst randomizer output stream and the long code.

The long code shall be periodic with period $2^{42}-1$ chips and shall satisfy the linear recursion specified by the following characteristic polynomial:

$$p(x) = x^{42} + x^{35} + x^{33} + x^{31} + x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{10} + x^7 + x^6 + x^5 + x^3 + x^2 + x^1 + 1.$$

Each PN chip of the long code shall be generated by the modulo-2 inner product of a 42-bit mask and the 42-bit state vector of the sequence generator as shown in Figure

1 2.1.3.1.11-1. The time alignment of the long code generator shall be as shown in Figure
2 1.3-1.

3 The mask used for the long code varies depending upon the channel type on which the
4 mobile station is transmitting. See Figure 2.1.3.1.11-2.

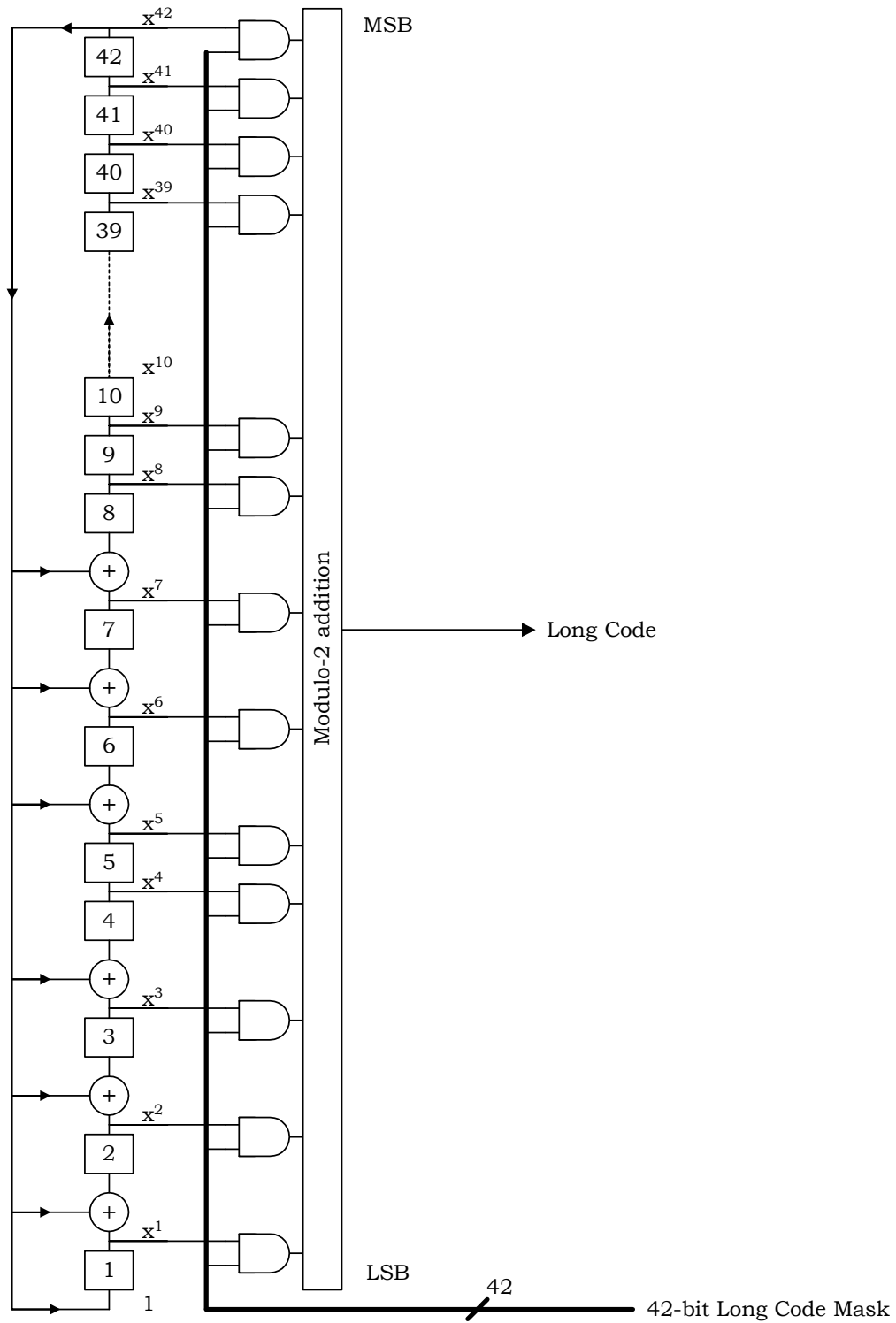
5 When transmitting on the Access Channel, the mask shall be as follows: M_{41} through M_{33}
6 shall be set to '110001111'; M_{32} through M_{28} shall be set to chosen to the Access Channel
7 number (RA); M_{27} through M_{25} shall be set to the code channel number for the associated
8 Paging Channel (PAGECH_s); M_{24} through M_9 shall be set to BASE_ID_s for the current base
9 station; and M_8 through M_0 shall be set to PILOT_PN_s for the current CDMA Channel (see
10 Figure 2.1.3.1.11-2).

11 For the public long code mask, bits M_{36} through M_0 shall be specified by PLCM₃₇ (see
12 2.3.6 in [5]). Bits M_{41} through M_{37} shall be set to '11000'. The resulting public long code
13 mask is shown in Figure 2.1.3.1.11-2.

14 The private long code mask (See Figure 2.1.3.1.11-3) shall be as follows: M_{41} through M_{40}
15 shall be set to '01'. M_{39} through M_0 shall be the 40 least significant bits of the Voice
16 Privacy Mask (VPM) generated by the Key_VPM_Generation procedure. M_0 of the private
17 long code mask shall be the least significant bit of the VPM. The private long code mask is
18 not to be changed during a call. See [13] for details of the Key_VPM_Generation procedure.

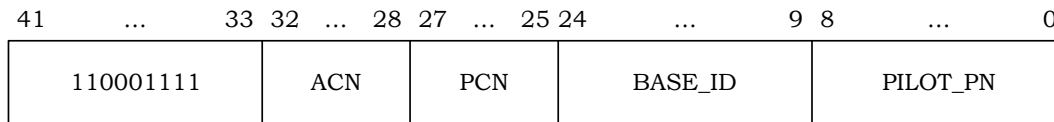
19 When a mobile station is transmitting on the Reverse Fundamental Channel or the Reverse
20 Supplemental Code Channel, the mobile station shall use one of the following two long code
21 masks unique to each channel: a public long code mask or a private long code mask. The
22 Reverse Fundamental Channel shall be assigned the channel number 0. Each of the $n - 1$
23 Reverse Supplemental Code Channels shall be assigned the numbers 1 through $n - 1$. Bits
24 M_{39} through M_{37} of the public or private long code mask for assigned code channel i , $0 \leq$
25 $i \leq n - 1 \leq \text{NUM_REV_CODES}_s$, shall be bit-by-bit XORed with the binary representation of
26 i .

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Figure 2.1.3.1.11-1. Long Code Generator



ACN - Access Channel Number
 PCN - Paging Channel Number
 BASE_ID - Base station identification
 PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

a) Access Channel Long Code Mask



Code Channel Index (i):
 '000': Reverse Fundamental Channel,
 '001' - '111': Reverse Supplemental Code Channel i, (i = 1,...,7)

b) Public Long Code Mask for the Reverse Fundamental Channel and the Reverse Supplemental Code Channels with Radio Configurations 1 and 2

Figure 2.1.3.1.11-2. Long Code Mask Format for Direct Sequence Spreading

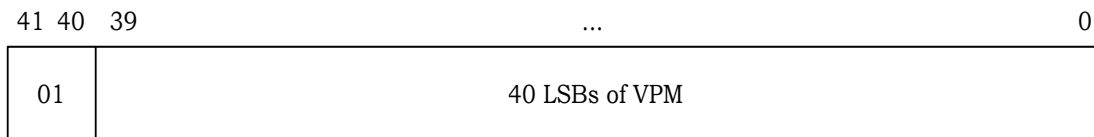


Figure 2.1.3.1.11-3. Private Long Code Mask

2.1.3.1.12 Quadrature Spreading

The Access Channel and the Reverse Traffic Channel with Radio Configurations 1 and 2 are spread in quadrature as shown in Figures 2.1.3.1.1.1-1, 2.1.3.1.1.1-6, and 2.1.3.1.1.1-7. The direct sequence spreading output is modulo-2 added to an in-phase and quadrature-phase sequence. The in-phase and quadrature-phase components of this spreading sequence are specified in 2.1.3.1.12.1. These sequences are periodic with a period of 2^{15} chips. After quadrature spreading, the Q-channel data shall be delayed by half a PN chip time (406.901 ns) with respect to the I-channel data.

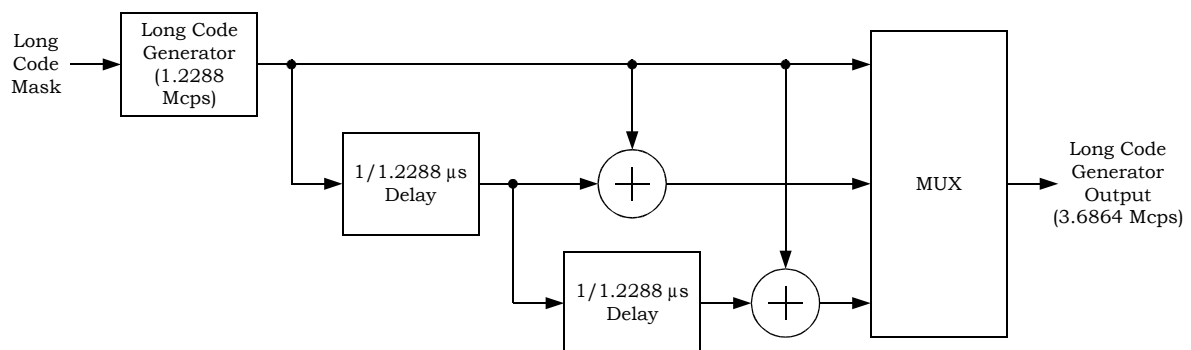
For the Enhanced Access Channel, the Reverse Common Control Channel, and the Reverse Traffic Channel with Radio Configurations 3 through 6, the I-channel data and Q-channel data shall be multiplied by a complex spreading sequence before baseband filtering as shown in Figures 2.1.3.1.1.1-10 and 2.1.3.1.1.2-7.

1 The in-phase spreading sequence shall be formed by a modulo-2 addition of the I-channel
 2 PN sequence and the I long code sequence. The quadrature-phase spreading sequence shall
 3 be formed by the modulo-2 addition of the following three terms: the W_1^2 Walsh function,
 4 the modulo-2 addition of the I-channel PN sequence and the I long code sequence, and the
 5 decimated-by-2 output of the modulo-2 addition of the Q-channel PN sequence and the Q
 6 long code sequence. The decimator shall provide an output that is constant for the two
 7 chips corresponding to the two symbols of the W_1^2 Walsh function, and the value of the
 8 decimator output for the W_1^2 Walsh function period shall be equal to the first of the two
 9 symbols into the decimator in that period. The W_1^2 Walsh function time alignment shall be
 10 such that the first Walsh chip begins at the first chip of a frame.

11 The I long code for Spreading Rate 1 shall be the long code sequence specified in 2.1.3.1.11.
 12 The I long code for Spreading Rate 1 shall have a chip rate of 1.2288 MHz. The Q long code
 13 for Spreading Rate 1 shall be the I long code delayed by one chip.

14 The I long code for Spreading Rate 3 shall consist of three multiplexed component
 15 sequences, each having a chip rate of 1.2288 Mcps, as shown in Figure 2.1.3.1.12-1. The
 16 first component sequence shall be the I long code for Spreading Rate 1. The second
 17 component sequence shall be the modulo-2 addition of the I long code for Spreading Rate 1
 18 and the I long code for Spreading Rate 1 delayed by $1/1.2288 \mu\text{s}$. The third component
 19 sequence shall be the modulo-2 addition of the I long code for Spreading Rate 1 and the I
 20 long code for Spreading Rate 1 delayed by $2/1.2288 \mu\text{s}$. The three component sequences
 21 shall be multiplexed such that the I long code value at the beginning of every $1/1.2288 \mu\text{s}$
 22 interval, starting from the beginning of the System Time, corresponds to the first
 23 component sequence. The I long code for Spreading Rate 3 shall have a chip rate of 3.6864
 24 Mcps. The Q long code for Spreading Rate 3 shall be the I long code delayed by one chip.

25



26

27 **Figure 2.1.3.1.12-1. Long Code Generator for Spreading Rate 3**

28

29 The mask used for generating the I long code for Spreading Rate 1 (or equivalently, the first
 30 component sequence of the I long code for Spreading Rate 3) varies depending on the
 31 channel type on which the mobile station is transmitting. See Figure 2.1.3.1.12-2.
 32

32

1 When transmitting on the Enhanced Access Channel using the common long code, the
2 mask shall be as follows: bits M_{41} through M_{33} shall be set to '110001110'; bits M_{32}
3 through M_{28} shall be set to the Enhanced Access Channel number; bits M_{27} through M_{25}
4 shall be set to the Forward Common Control Channel number; bits M_{24} through M_9 shall
5 be set to $BASE_ID_s$ for the current base station; and bits M_8 through M_0 shall be set to the
6 time dependent field, $SLOT_OFFSET$ (see Figure 2.1.3.1.12-2).

7 When transmitting on the Reverse Common Control Channel while in Reservation Access
8 Mode, the mask shall be as follows: bits M_{41} through M_{33} shall be set to '110001101'; bits
9 M_{32} through M_{28} shall be set to the Reverse Common Control Channel number chosen;
10 bits M_{27} through M_{25} shall be set to the code channel number for the associated Forward
11 Common Control Channel (the range is 1 through 7); bits M_{24} through M_9 shall be set to
12 $BASE_ID_s$ for the current base station; and bits M_8 through M_0 shall be set to $PILOT_PN_s$
13 for the current CDMA Channel (see Figure 2.1.3.1.12-2).

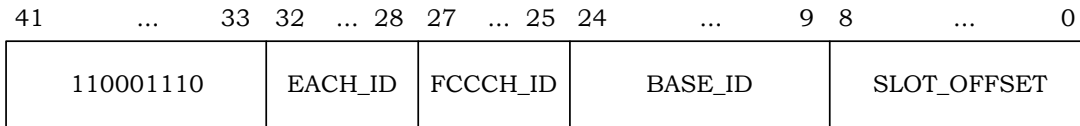
14 When transmitting on the Reverse Common Control Channel while in Designated Access
15 Mode, the mobile station shall use one of the following three long code masks designated by
16 the base station: a public long code mask, a private long code mask, or a scheduled
17 common long code mask (see Figure 2.1.3.1.12-2).

18 When transmitting on the Reverse Traffic Channel, the mobile station shall use one of the
19 following two long code masks: a public long code mask or a private long code mask (see
20 Figure 2.1.3.1.12-2).

21 For the public long code mask, bits M_{36} through M_0 shall be specified by $PLCM_{37}$ (see
22 2.3.6 in [5]). Bits M_{41} through M_{37} shall be set to '11000'. The resulting public long code
23 mask is shown in Figure 2.1.3.1.12-2.

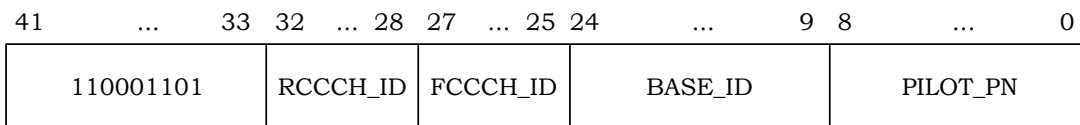
24 The private long code mask (see Figure 2.1.3.1.12-2) shall be as follows: M_{41} through M_{40}
25 shall be set to '01'. M_{39} through M_0 shall be the 40 least significant bits of the Voice
26 Privacy Mask (VPM) generated by the $Key_VPM_Generation$ procedure. M_0 of the private
27 long code mask shall be the least significant bit of the VPM. The private long code mask is
28 not to be changed during a call. See [13] for details of the $Key_VPM_Generation$ procedure.

29 The scheduled common long code mask shall be as follows: bits M_{41} through M_{33} shall be
30 set to '110001101'; bits M_{32} through M_{28} shall be set to the Reverse Common Control
31 Channel number chosen; bits M_{27} through M_{25} shall be set to the code channel number
32 for the associated Forward Common Control Channel (the range is 1 through 7); bits M_{24}
33 through M_9 shall be set to $BASE_ID_s$ for the current base station; and bits M_8 through M_0
34 shall be set to $PILOT_PN_s$ for the current CDMA Channel (see Figure 2.1.3.1.12-2).



EACH_ID - Enhanced Access Channel Number
 FCCCH_ID - Forward Common Control Channel Number
 BASE_ID - Base station identification
 SLOT_OFFSET - Slot offset associated with the Enhanced Access Channel

a) Enhanced Access Channel Long Code Mask

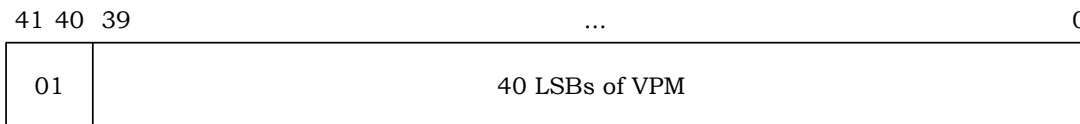


RCCCH_ID - Reverse Common Control Channel Number
 FCCCH_ID - Forward Common Control Channel Number
 BASE_ID - Base station identification
 PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

b) Reverse Common Control Channel Long Code Mask in the Reservation Access Mode or in the Designated Access Mode



c) Public Long Code Mask for the Reverse Fundamental Channel with Radio Configurations 3, 4, 5, and 6, the Reverse Supplemental Channels, the Reverse Dedicated Control Channel, and the Reverse Common Control Channel in the Designated Access Mode



d) Private Long Code Mask for the Reverse Fundamental Channel with Radio Configurations 3, 4, 5, and 6, the Reverse Supplemental Channels, the Reverse Dedicated Control Channel, and the Reverse Common Control Channel in the Designated Access Mode

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Figure 2.1.3.1.12-2. Long Code Mask Format for Quadrature Spreading

1 The I and Q PN sequences used for quadrature spreading shall be as specified in
 2 2.1.3.1.12.1 and 2.1.3.1.12.2. These sequences are periodic with a period of 2^{15} chips for
 3 Spreading Rate 1 and with a period of 3×2^{15} chips for Spreading Rate 3.

4 2.1.3.1.12.1 Spreading Rate 1

5 The PN sequences shall be based upon the following characteristic polynomials:

$$6 \quad P_I(x) = x^{15} + x^{13} + x^9 + x^8 + x^7 + x^5 + 1$$

7 (for the in-phase (I) sequence)

8 and

$$9 \quad P_Q(x) = x^{15} + x^{12} + x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

10 (for the quadrature-phase (Q) sequence).

11 The maximal length linear feedback shift register sequences $i(n)$ and $q(n)$ based upon the
 12 above polynomials are of length $2^{15} - 1$ and can be generated by the following linear
 13 recursions:

$$14 \quad i(n) = i(n - 15) \oplus i(n - 10) \oplus i(n - 8) \oplus i(n - 7) \oplus i(n - 6) \oplus i(n - 2)$$

15 (based upon $P_I(x)$ as the characteristic polynomial)

16 and

$$17 \quad q(n) = q(n - 15) \oplus q(n - 12) \oplus q(n - 11) \oplus q(n - 10) \oplus q(n - 9) \\ 18 \quad \oplus q(n - 5) \oplus q(n - 4) \oplus q(n - 3)$$

19 (based upon $P_Q(x)$ as the characteristic polynomial),

20 where $i(n)$ and $q(n)$ are binary-valued ('0' and '1') and the additions are modulo-2. In order
 21 to obtain the I and Q PN sequences (of period 2^{15}), a '0' is inserted in $i(n)$ and $q(n)$ after 14
 22 consecutive '0' outputs (this occurs only once in each period); therefore, the PN sequences
 23 have one run of 15 consecutive '0' outputs instead of 14.

24 The mobile station shall align the I and Q PN sequences such that the first chip on every
 25 even second mark as referenced to the transmit time reference (see 2.1.5) is the '1' after the
 26 15 consecutive '0's (see Figure 1.3-1).

27 The chip rate shall be 1.2288 Mcps. The PN sequence period is $32768/1228800 = 26.666\dots$
 28 ms, and exactly 75 PN sequence repetitions occur every 2 seconds.

29 For the Access Channel and the Reverse Traffic Channel with Radio Configurations 1 and
 30 2, the data spread by the Q PN sequence shall be delayed by half a PN chip time
 31 (406.901 ns) with respect to the data spread by the I PN sequence.

32 2.1.3.1.12.2 Spreading Rate 3

33 The PN sequences shall be truncated sequences of a maximal length linear feedback shift
 34 register sequence based upon the following characteristic polynomial:

$$35 \quad P(x) = x^{20} + x^9 + x^5 + x^3 + 1$$

1 The maximal length linear feedback shift register sequence based upon the above
 2 polynomial is of length $2^{20} - 1$ and can be generated by the following recursion:

$$3 \quad b(n) = b(n - 20) \oplus b(n - 17) \oplus b(n - 15) \oplus b(n - 11)$$

4 where $b(n)$ is binary-valued ('0' and '1') and the additions are modulo-2. The I and Q PN
 5 sequences are both formed from this maximal length sequence of length $2^{20} - 1$ using
 6 different starting positions and truncating the sequences after 3×2^{15} chips. The starting
 7 position of the I PN sequence is such that the first 20 chips are '1000 0000 0001 0001
 8 0100'. The starting position of the Q PN sequence is the starting position of the I PN
 9 sequence delayed by 2^{19} chips in the untruncated maximal length sequence of length
 10 $2^{20} - 1$. The mobile station shall align the I and Q PN sequences such that the first 20
 11 chips of the I and Q PN sequences on every even second mark as referenced to the transmit
 12 time reference (see 2.1.5) are '1000 0000 0001 0001 0100' and '1001 0000 0010 0100
 13 0101' (see Figure 1.3-1).

14 The chip rate shall be 3.6864 Mcps. The PN sequence period is $3 \times 32768/3686400 =$
 15 26.666... ms, and exactly 75 pilot PN sequence repetitions occur every 2 seconds.

16 2.1.3.1.13 Baseband Filtering

17 2.1.3.1.13.1 Spreading Rate 1

18 Following the spreading operation when operating in Spreading Rate 1, the I and Q
 19 impulses are applied to the inputs of the I and Q baseband filters as described in
 20 2.1.3.1.1.1. The baseband filters shall have a frequency response $S(f)$ that satisfies the
 21 limits given in Figure 2.1.3.1.13.1-1. Specifically, the normalized frequency response of the
 22 filter shall be contained within $\pm\delta_1$ in the passband $0 \leq f \leq f_p$, and shall be less than or
 23 equal to $-\delta_2$ in the stopband $f \geq f_s$. The numerical values for the parameters are
 24 $\delta_1 = 1.5$ dB, $\delta_2 = 40$ dB, $f_p = 590$ kHz, and $f_s = 740$ kHz.

25

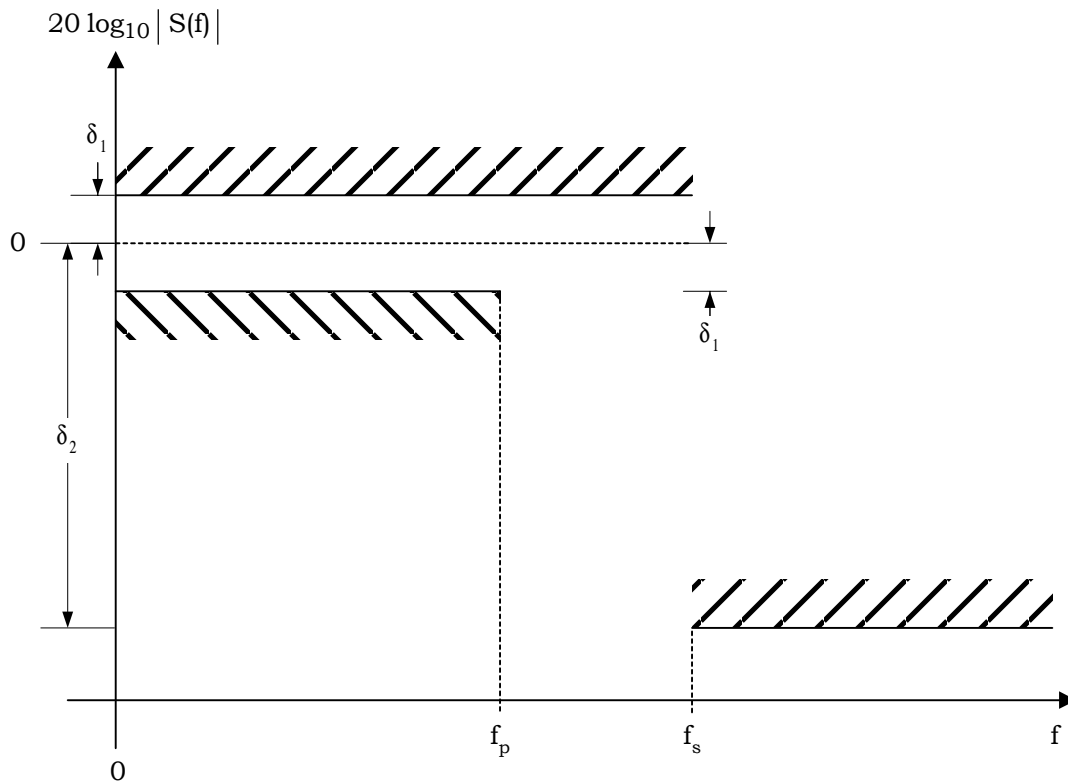


Figure 2.1.3.1.13.1-1. Baseband Filters Frequency Response Limits

Let $s(t)$ be the impulse response of the baseband filter. Then $s(t)$ should satisfy the following equation:

$$\text{Mean Squared Error} = \sum_{k=0}^{\infty} [\alpha s(kT_s - \tau) - h(k)]^2 \leq 0.03,$$

where the constants α and τ are used to minimize the mean squared error. The constant T_s is equal to 203.451... ns. T_s equals one quarter of the duration of a PN chip. The values of the coefficients $h(k)$, for $k < 48$, are given in Table 2.1.3.1.13.1-1; $h(k) = 0$ for $k \geq 48$. Note that $h(k)$ equals $h(47 - k)$.

1

Table 2.1.3.1.13.1-1. Coefficients of $h(k)$ for Spreading Rate 1

k	$h(k)$
0, 47	-0.025288315
1, 46	-0.034167931
2, 45	-0.035752323
3, 44	-0.016733702
4, 43	0.021602514
5, 42	0.064938487
6, 41	0.091002137
7, 40	0.081894974
8, 39	0.037071157
9, 38	-0.021998074
10, 37	-0.060716277
11, 36	-0.051178658
12, 35	0.007874526
13, 34	0.084368728
14, 33	0.126869306
15, 32	0.094528345
16, 31	-0.012839661
17, 30	-0.143477028
18, 29	-0.211829088
19, 28	-0.140513128
20, 27	0.094601918
21, 26	0.441387140
22, 25	0.785875640
23, 24	1.0

2

3

1 2.1.3.1.13.2 Spreading Rate 3

2 Following the spreading operation when operating in Spreading Rate 3, the I and Q
 3 impulses are applied to the inputs of the I and Q baseband filters as described in
 4 2.1.3.1.1.2. The baseband filters shall have a frequency response $S(f)$ that satisfies the
 5 limits given in Figure 2.1.3.1.13.1-1. Specifically, the normalized frequency response of the
 6 filter shall be contained within $\pm\delta_1$ in the passband $0 \leq f \leq f_p$, and shall be less than or
 7 equal to $-\delta_2$ in the stopband $f \geq f_s$. The numerical values for the parameters are $\delta_1 = 1.5$
 8 dB, $\delta_2 = 40$ dB, $f_p = 1.7164$ MHz, and $f_s = 1.97$ MHz.

9 Let $s(t)$ be the impulse response of the baseband filter. Then $s(t)$ should satisfy the following
 10 equation:

$$11 \quad \text{Mean Squared Error} = \sum_{k=0}^{\infty} [\alpha s(kT_s - \tau) - h(k)]^2 \leq 0.03,$$

12 where the constants α and τ are used to minimize the mean squared error. The constant T_s
 13 is equal to 67.81684027... ns. T_s equals one quarter of a PN chip. The values of the
 14 coefficients $h(k)$, for $k < 108$, are given in Table 2.1.3.1.13.2-1; $h(k) = 0$ for $k \geq 108$. Note
 15 that $h(k)$ equals $h(107 - k)$.

16

1

Table 2.1.3.1.13.2-1. Coefficients of $h(k)$ for Spreading Rate 3

k	$h(k)$	k	$h(k)$
0, 107	0.005907324	27, 80	0.036864993
1, 106	0.021114345	28, 79	0.032225981
2, 105	0.017930022	29, 78	0.007370446
3, 104	0.019703955	30, 77	-0.025081919
4, 103	0.011747086	31, 76	-0.046339352
5, 102	0.001239201	32, 75	-0.042011421
6, 101	-0.008925787	33, 74	-0.011379513
7, 100	-0.013339137	34, 73	0.030401507
8, 99	-0.009868192	35, 72	0.059332552
9, 98	-0.000190463	36, 71	0.055879297
10, 97	0.010347710	37, 70	0.017393708
11, 96	0.015531711	38, 69	-0.037885556
12, 95	0.011756251	39, 68	-0.078639005
13, 94	0.000409244	40, 67	-0.077310571
14, 93	-0.012439542	41, 66	-0.027229017
15, 92	-0.019169850	42, 65	0.049780118
16, 91	-0.015006530	43, 64	0.111330557
17, 90	-0.001245650	44, 63	0.115580285
18, 89	0.014862732	45, 62	0.046037444
19, 88	0.023810108	46, 61	-0.073329573
20, 87	0.019342903	47, 60	-0.182125302
21, 86	0.002612151	48, 59	-0.207349170
22, 85	-0.017662720	49, 58	-0.097600349
23, 84	-0.029588008	50, 57	0.148424686
24, 83	-0.024933958	51, 56	0.473501031
25, 82	-0.004575322	52, 55	0.779445702
26, 81	0.020992966	53, 54	0.964512513

2

3

2.1.3.1.14 Carrier Phase Offset for Radio Configurations 1 and 2

When operating in Radio Configuration 1 or 2, the phase offset ϕ_i represents the angular offset between the i^{th} Supplemental Code Channel and the Reverse Fundamental Channel as shown in Figures 2.1.3.1.1.1-6 and 2.1.3.1.1.1-7. The phase offset ϕ_i of Reverse Supplemental Code Channel i shall take on the values given in Table 2.1.3.1.14-1.

Table 2.1.3.1.14-1. Reverse Supplemental Code Channel Carrier Phase Offsets for Radio Configurations 1 and 2

Reverse Supplemental Code Channel (i)	Carrier Phase Offset ϕ_i (radians)
1	$\pi/2$
2	$\pi/4$
3	$3\pi/4$
4	0
5	$\pi/2$
6	$\pi/4$
7	$3\pi/4$

2.1.3.2 Reverse Pilot Channel

The Reverse Pilot Channel is an unmodulated spread spectrum signal used to assist the base station in detecting a mobile station transmission.

The Reverse Pilot Channel shall be transmitted when the Enhanced Access Channel, Reverse Common Control Channel, or the Reverse Traffic Channel with Radio Configurations 3 through 6 is enabled. The Reverse Pilot Channel shall also be transmitted during the Enhanced Access Channel preamble, the Reverse Common Control Channel preamble, and the Reverse Traffic Channel preamble.

2.1.3.2.1 Reverse Power Control Subchannel

The mobile station shall insert a Reverse Power Control Subchannel on the Reverse Pilot Channel as specified in 2.1.3.1.10 when operating on the Reverse Traffic Channel with Radio Configurations 3 through 6.

2.1.3.2.2 Reverse Pilot Channel Spreading

The Reverse Pilot Channel data shall be spread with W_0^{32} as specified in 2.1.3.1.8.

1 2.1.3.2.3 Reverse Pilot Channel Gating

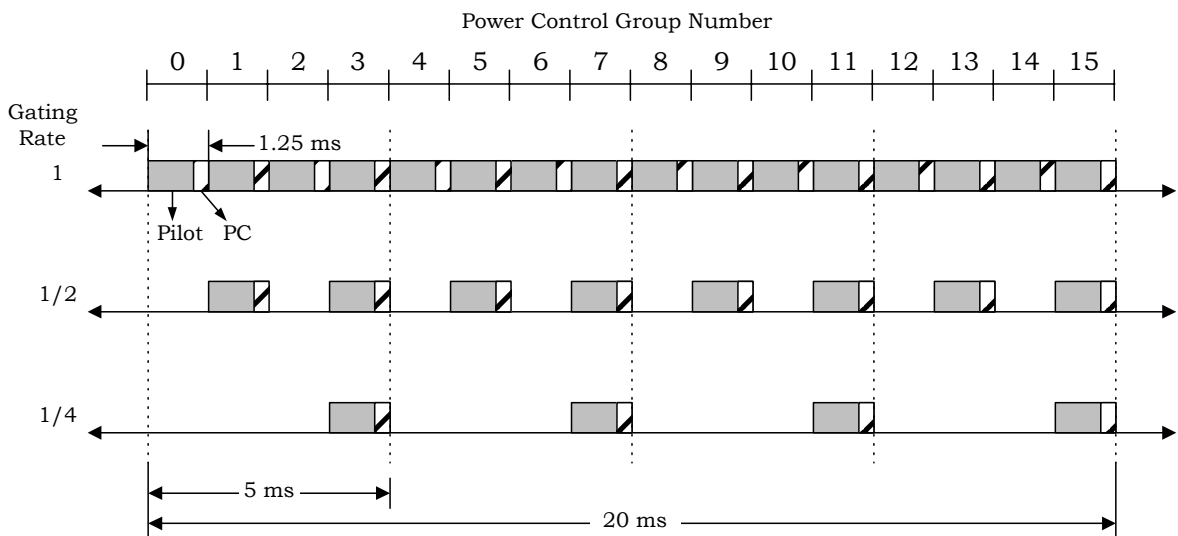
2 When transmitting only on the Reverse Pilot Channel in gated mode
 3 (PILOT_GATING_USE_RATE_s = '1'), the mobile station shall periodically gate off certain
 4 power control groups of the Reverse Pilot Channel at a rate specified by
 5 PILOT_GATING_RATE_s, which may be continuous (PILOT_GATING_RATE_s = '00'), 1/2 rate
 6 (PILOT_GATING_RATE_s = '01'), or 1/4 rate (PILOT_GATING_RATE_s = '10'). Reverse Pilot
 7 Channel gating may be used when none of the following channels is assigned: the Forward
 8 Fundamental Channel, the Forward Supplemental Channel, the Reverse Fundamental
 9 Channel, and the Reverse Supplemental Channel.

10 The power control groups within a 20 ms frame are numbered from 0 to 15. When 1/2 rate
 11 gating is used, only the odd numbered power control groups shall be transmitted. When
 12 1/4 rate gating is used, only power control groups 3, 7, 11, and 15 shall be transmitted.
 13 The gated-on and gated-off periods are arranged so that the gated-on period always comes
 14 immediately before the 5 ms frame boundary.

16 Gating patterns for the Reverse Pilot Channel with gating rates of 1, 1/2, and 1/4 are
 17 shown in Figure 2.1.3.2.3-1. When there is transmission on the Reverse Dedicated Control
 18 Channel, the Reverse Pilot Channel shall be gated on for the duration of the active frame as
 19 shown in Figures 2.1.3.2.3-2 and 2.1.3.2.3-3.

20 When the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or 6 is operated
 21 in the gated mode (see 2.1.3.7.8) at a data rate of 1500 bps for Radio Configurations 3 and
 22 5, or 1800 bps for Radio Configurations 4 and 6, the Reverse Pilot Channel shall have a
 23 transmission duty cycle of 50%. The Reverse Pilot Channel shall be transmitted in power
 24 control groups 2, 3, 6, 7, 10, 11, 14, and 15, and shall not be transmitted in power
 25 control groups 0, 1, 4, 5, 8, 9, 12, and 13, as shown in Figure 2.1.3.7.8-1.

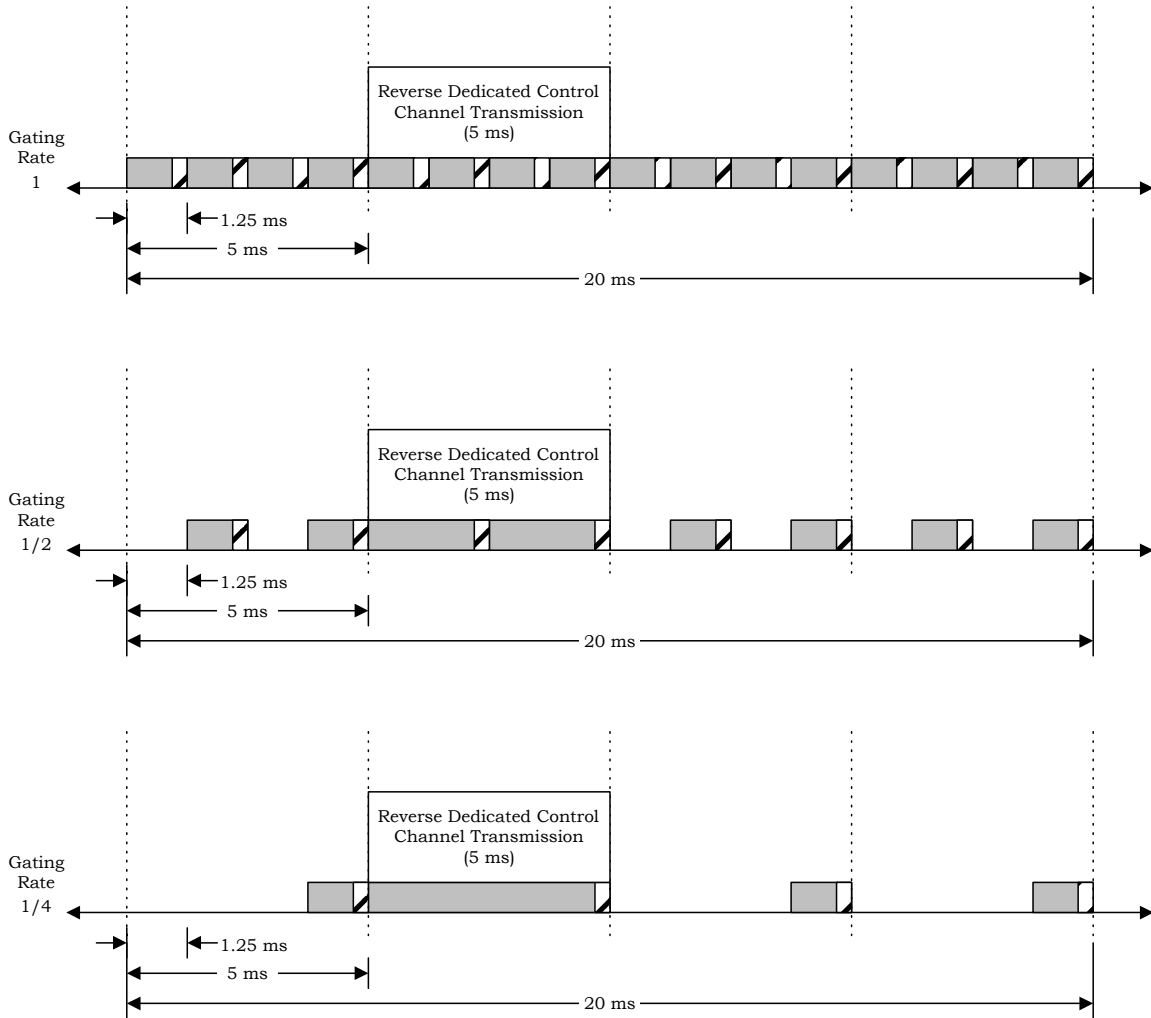
26



27

28 **Figure 2.1.3.2.3-1. Reverse Pilot Channel Gating**

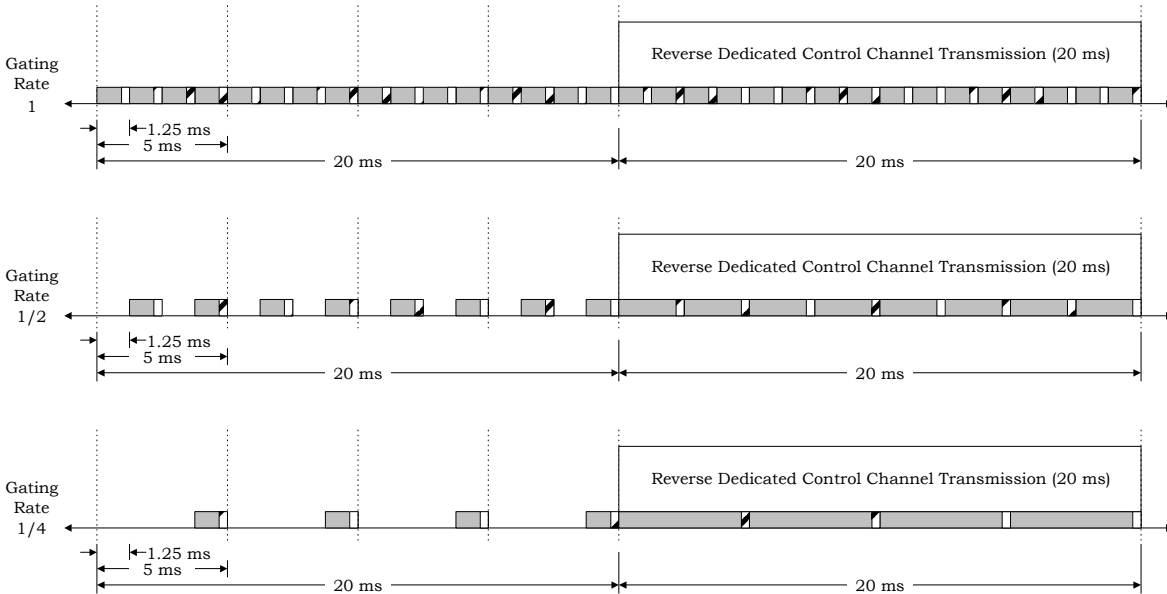
- 1
- 2



1
2
3
4
5

Figure 2.1.3.2.3-2. Reverse Pilot Channel Gating during Reverse Dedicated Control Channel Transmission with 5 ms Frame Duration

1



2

Figure 2.1.3.2.3-3. Reverse Pilot Channel Gating during Reverse Dedicated Control Channel Transmission with 20 ms Frame Duration

5

2.1.3.2.4 Reverse Pilot Channel Operation during Reverse Traffic Channel Preamble

The Reverse Traffic Channel preamble consists of transmissions only on the Reverse Pilot Channel before transmitting on the Reverse Dedicated Control Channel or the Reverse Fundamental Channel with Radio Configurations 3 through 6. The Reverse Pilot Channel shall not be gated during transmission of the preamble.

When performing a hard handoff, the mobile station shall begin the transmission of the Reverse Traffic Channel preamble NUM_PREAMBLE_s power control groups before the start of a 20 ms frame as is shown in Figure 2.1.3.2.4-1. The mobile station shall enable transmission on the appropriate code channels at the beginning of the 20 ms frame as is shown in Figure 2.1.3.2.4-1.

16

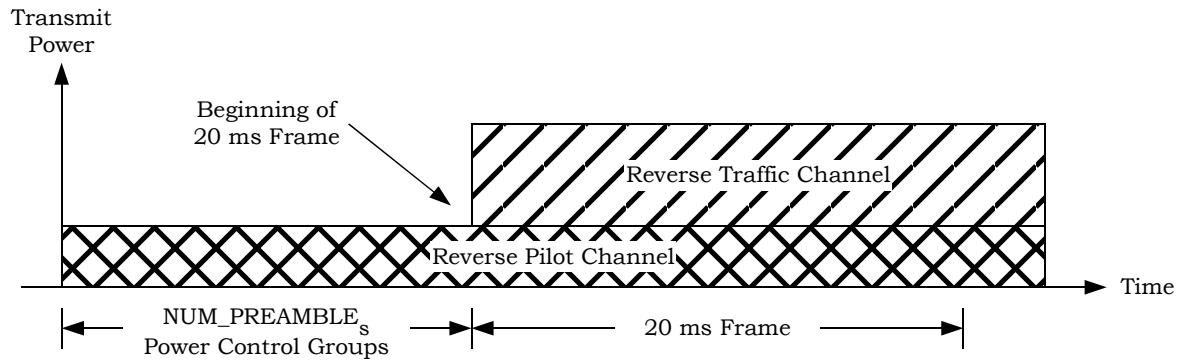


Figure 2.1.3.2.4-1. Reverse Traffic Channel Preamble during Hard Handoff for the Reverse Dedicated Control Channel and the Reverse Fundamental Channel with Radio Configurations 3 through 6

2.1.3.2.5 Reverse Pilot Channel Quadrature Spreading

The Reverse Pilot Channel shall be quadrature spread as specified in 2.1.3.1.12.

2.1.3.2.6 Reverse Pilot Channel Baseband Filtering

The Reverse Pilot Channel shall be filtered as specified in 2.1.3.1.13.

2.1.3.3 Access Channel

The Access Channel is used by the mobile station to initiate communication with the base station and to respond to Paging Channel messages. An Access Channel transmission is a coded, interleaved, and modulated spread-spectrum signal. The Access Channel uses a random-access protocol. Access Channels are uniquely identified by their long codes (see 2.1.3.1.11).

An Access probe shall consist of an Access preamble, followed by a series of Access Channel frames, with each carrying an SDU.

2.1.3.3.1 Access Channel Time Alignment and Modulation Rate

The mobile station shall transmit information on the Access Channel at a fixed data rate of 4800 bps. An Access Channel frame shall be 20 ms in duration. An Access Channel frame shall begin only when System Time is an integral multiple of 20 ms (see Figure 1.3-1).

The mobile station shall delay the transmit timing of the probe by RN PN chips, where the value of RN is supplied by the Common Channel multiplex sublayer. This transmit timing adjustment includes delay of the direct sequence spreading long code and of the

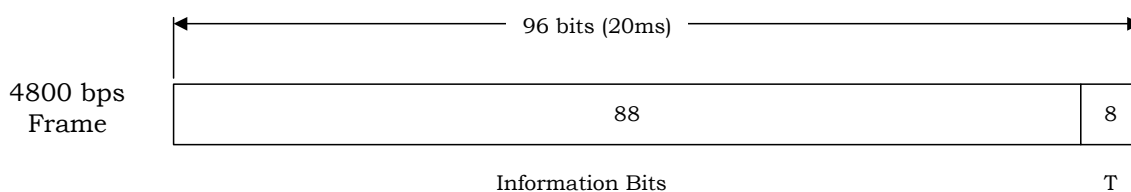
1 quadrature spreading I and Q pilot PN sequences, so it effectively increases the apparent
2 range from the mobile station to the base station.¹⁴

3 The Reverse CDMA Channel may contain up to 32 Access Channels numbered 0 through
4 31 per supported Paging Channel. At least one Access Channel exists on the Reverse CDMA
5 Channel for each Paging Channel on the corresponding Forward CDMA Channel. Each
6 Access Channel is associated with a single Paging Channel.

7 2.1.3.3.2 Access Channel Frame Structure

8 Each Access Channel frame contains 96 bits (20 ms frame at 4800 bps). Each Access
9 Channel frame shall consist of 88 information bits and eight Encoder Tail Bits (see Figure
10 2.1.3.3.2-1).

11



Notation

T - Encoder Tail Bits

12

13

Figure 2.1.3.3.2-1. Access Channel Frame Structure

14

15 2.1.3.3.2.1 Access Channel Preamble

16 The Access Channel preamble shall consist of frames of 96 zeros that are transmitted at the
17 4800 bps rate. The Access Channel preamble is transmitted to aid the base station in
18 acquiring an Access Channel transmission.

19 2.1.3.3.3 Access Channel Convolutional Encoding

20 The Access Channel data shall be convolutionally encoded as specified in 2.1.3.1.4.

21 When generating Access Channel data, the encoder shall be initialized at the end of each
22 20 ms frame.

¹⁴ This increases the probability that the base station will be able to separately demodulate transmissions from multiple mobile stations in the same Access Channel slot, especially when many mobile stations are at a similar range from the base station. Use of a non-random algorithm for PN randomization permits the base station to separate the PN randomization from the actual propagation delay from the mobile station, so it can accurately estimate the timing of Reverse Traffic Channel transmissions from the mobile station.

1 2.1.3.3.4 Access Channel Code Symbol Repetition

2 Each code symbol output from the convolutional encoder on the Access Channel shall be
3 repeated once (each code symbol occurs two consecutive times) as specified in 2.1.3.1.5.

4 2.1.3.3.5 Access Channel Interleaving

5 The repeated code symbols on the Access Channel shall be interleaved as specified in
6 2.1.3.1.7.

7 2.1.3.3.6 Access Channel Modulation

8 The Access Channel data shall be modulated as specified in 2.1.3.1.8.

9 2.1.3.3.7 Access Channel Gating

10 The mobile station shall transmit all power control groups while transmitting on the Access
11 Channel as specified in 2.1.3.1.9.1.

12 2.1.3.3.8 Access Channel Direct Sequence Spreading

13 The Access Channel shall be spread by the long code as specified in 2.1.3.1.11.

14 2.1.3.3.9 Access Channel Quadrature Spreading

15 The Access Channel shall be quadrature spread by the pilot PN sequences as specified in
16 2.1.3.1.12.

17 2.1.3.3.10 Access Channel Baseband Filtering

18 The Access Channel shall be filtered as specified in 2.1.3.1.13.

19 2.1.3.3.11 Access Channel Transmission Processing

20 When the Physical Layer receives a PHY-ACHPreamble.Request(RA, PWR_LVL, RN,
21 NUM_PREAMBLE_FRAMES) from the MAC Layer, the mobile station shall perform the
22 following:

- 23 • Store the arguments RA, PWR_LVL, RN, and NUM_PREAMBLE_FRAMES.
- 24 • Transmit NUM_PREAMBLE_FRAMES Access Channel preamble frames.

25 When the Physical Layer receives a PHY-ACH.Request(RA, PWR_LVL, RN, SDU) from the
26 MAC Layer, the mobile station shall:

- 27 • Store the arguments RA, PWR_LVL, RN, and SDU.
- 28 • Set the information bits (see Figure 2.1.3.3.2-1) to SDU.
- 29 • Transmit an Access Channel frame.

30 2.1.3.4 Enhanced Access Channel

31 The Enhanced Access Channel is used by the mobile station to initiate communication with
32 the base station or to respond to a mobile station directed message. The Enhanced Access
33 Channel can be used in three possible modes: Basic Access Mode, Power Controlled Access

1 Mode, and Reservation Access Mode. Power Controlled Access Mode and Reservation
 2 Access Mode may operate on the same Enhanced Access Channel. Basic Access Mode
 3 operates on a separate Enhanced Access Channel.

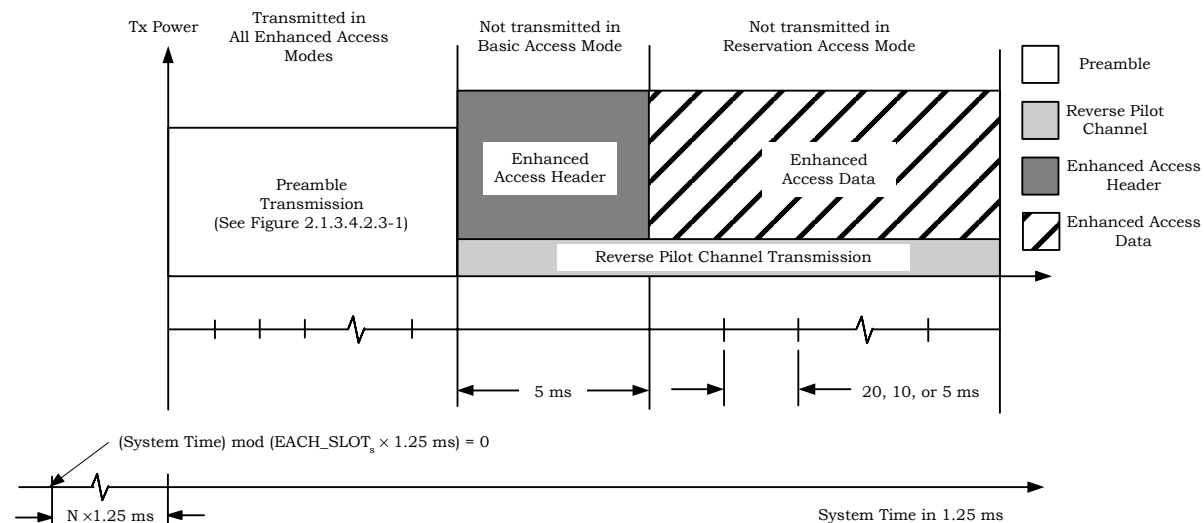
4 When operating in the Basic Access Mode, the mobile station shall not transmit the
 5 Enhanced Access header on the Enhanced Access Channel. In Basic Access Mode, the
 6 Enhanced Access probe shall consist of an Enhanced Access Channel preamble followed by
 7 Enhanced Access data.

8 When operating in the Power Controlled Access Mode, the Enhanced Access probe shall
 9 consist of an Enhanced Access Channel preamble, followed by an Enhanced Access header
 10 and Enhanced Access data.

11 When operating in the Reservation Access Mode, the Enhanced Access probe shall consist
 12 of an Enhanced Access Channel preamble followed by an Enhanced Access header.
 13 Enhanced Access data is sent on the Reverse Common Control Channel upon receiving
 14 permission from the base station.

15 The Enhanced Access Channel uses a random-access protocol. Enhanced Access Channels
 16 are uniquely identified by their long code masks (see 2.1.3.1.12). The Enhanced Access
 17 probe structure is shown in Figure 2.1.3.4-1.

18



19

Figure 2.1.3.4-1. Enhanced Access Channel Probe Structure

21

22 **2.1.3.4.1 Enhanced Access Channel Time Alignment and Modulation Rate**

23 The mobile station shall transmit the Enhanced Access header on the Enhanced Access
 24 Channel at a fixed data rate of 9600 bps. The mobile station shall transmit the Enhanced
 25 Access data on the Enhanced Access Channel at a fixed data rate of 9600, 19200, or
 26 38400 bps.

1 The frame duration for the Enhanced Access header on the Enhanced Access Channel shall
2 be 5 ms in duration. The frame duration for the Enhanced Access data on the Enhanced
3 Access Channel shall be 20, 10, or 5 ms in duration. The timing of Enhanced Access
4 Channel transmissions shall start on 1.25 ms increments of System Time (see
5 Figure 1.3-1).

6 The Reverse CDMA Channel may contain up to 32 Enhanced Access Channels per
7 supported Forward Common Control Channel, numbered 0 through 31. There is a Forward
8 Common Assignment Channel associated with every Enhanced Access Channel operating
9 in the Power Controlled Access Mode or the Reservation Access Mode.

10 The total number of slots associated with an Enhanced Access Channel shall be 512. The
11 Enhanced Access Channel slot duration shall be $EACH_SLOT_s \times 1.25$ ms. An Enhanced
12 Access Channel slot shall begin only when System Time is $N \times 1.25$ ms after an integer
13 multiple of $EACH_SLOT_s \times 1.25$ ms, where N equals $[(EACH_ID \times EACH_SLOT_OFFSET2_s)$
14 $+ EACH_SLOT_OFFSET1_s] \bmod EACH_SLOT_s$, and EACH_ID is the identity of the
15 Enhanced Access Channel to be used, which is passed by the primitives from the MAC
16 Layer (see 2.1.3.4.9 and Figure 2.1.3.4-1). The mobile station shall initiate transmission of
17 an Enhanced Access probe on an Enhanced Access Channel slot boundary.

18 For each Enhanced Access probe, the mobile station shall use a long code mask associated
19 with the first slot of the transmission and shall use this mask until transmission of the
20 Enhanced Access probe is complete. Depending on the slot in which the mobile station
21 starts transmission (SLOT_OFFSET), a maximum of 512 unique long code masks are
22 possible. The mobile procedure for generating the long code mask is specified in 2.1.3.1.12.

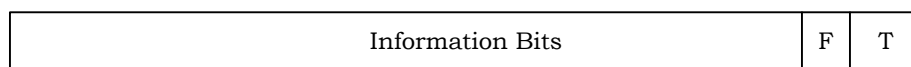
23 2.1.3.4.2 Enhanced Access Channel Frame Structure

24 Table 2.1.3.4.2-1 summarizes the Enhanced Access Channel bit allocations. The order of
25 the bits is shown in Figure 2.1.3.4.2-1.

26

1 **Table 2.1.3.4.2-1. Enhanced Access Channel Frame Structure Summary**

Frame Length (ms)	Frame Type	Transmission Rate (bps)	Number of Bits per Frame			
			Total	Information	Frame Quality Indicator	Encoder Tail
5	Header	9600	48	32	8	8
20	Data	9600	192	172	12	8
20	Data	19200	384	360	16	8
20	Data	38400	768	744	16	8
10	Data	19200	192	172	12	8
10	Data	38400	384	360	16	8
5	Data	38400	192	172	12	8



Notation

F - Frame Quality Indicator (CRC)

T - Encoder Tail Bits

3 **Figure 2.1.3.4.2-1. Enhanced Access Channel Frame Structure**

4 **2.1.3.4.2.1 Enhanced Access Channel Frame Quality Indicator**

5
6 The frame quality indicator (CRC) shall be calculated on all bits within the frame, except
7 the frame quality indicator itself and the Encoder Tail Bits.
8

9 When transmitting the Enhanced Access header, the Enhanced Access Channel shall use
10 an 8-bit frame quality indicator.

11 When transmitting Enhanced Access data, the 20 ms Enhanced Access Channel shall use a
12 12-bit frame quality indicator for the 9600 bps frame and a 16-bit frame quality indicator
13 for the 38400 bps and 19200 bps frames. When transmitting Enhanced Access data, the 10
14 ms Enhanced Access Channel shall use a 12-bit frame quality indicator for the 19200 bps
15 frame and a 16-bit frame quality indicator for the 38400 bps frame. When transmitting
16 Enhanced Access data, the 5 ms Enhanced Access Channel shall use a 12-bit frame quality
17 indicator.

18 The generator polynomials for the frame quality indicator shall be as follows:

19 $g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

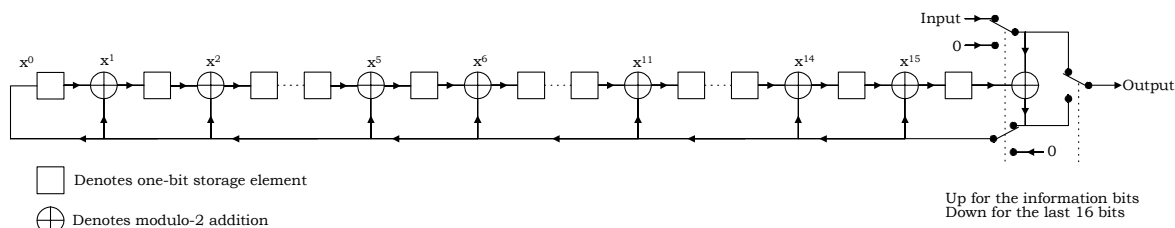
20 $g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator, and

1 $g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator.

2 The frame quality indicators shall be computed according to the following procedure as
 3 shown in Figures 2.1.3.4.2.1-1 through 2.1.3.4.2.1-3:

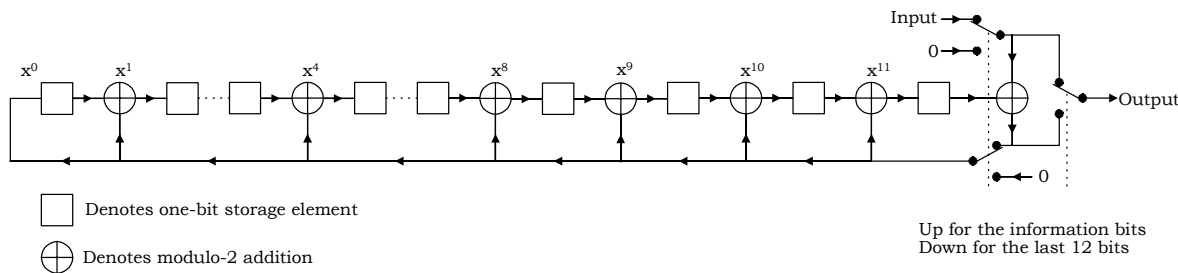
- 4 • Initially, all shift register elements shall be set to logical one and the switches shall
 5 be set in the up position.
- 6 • The register shall be clocked a number of times equal to the number of information
 7 bits in the frame with those bits as input.
- 8 • The switches shall be set in the down position so that the output is a modulo-2
 9 addition with a '0' and the successive shift register inputs are '0's.
- 10 • The register shall be clocked an additional number of times equal to the number of
 11 bits in the frame quality indicator (16, 12, or 8).
- 12 • These additional bits shall be the frame quality indicator bits.
- 13 • The bits shall be transmitted in the order calculated.

14



15 **Figure 2.1.3.4.2.1-1. Enhanced Access Channel Frame Quality Indicator Calculation**
 16 **for the 16-Bit Frame Quality Indicator**
 17

18



19 **Figure 2.1.3.4.2.1-2. Enhanced Access Channel Frame Quality Indicator Calculation**
 20 **for the 12-Bit Frame Quality Indicator**
 21

22

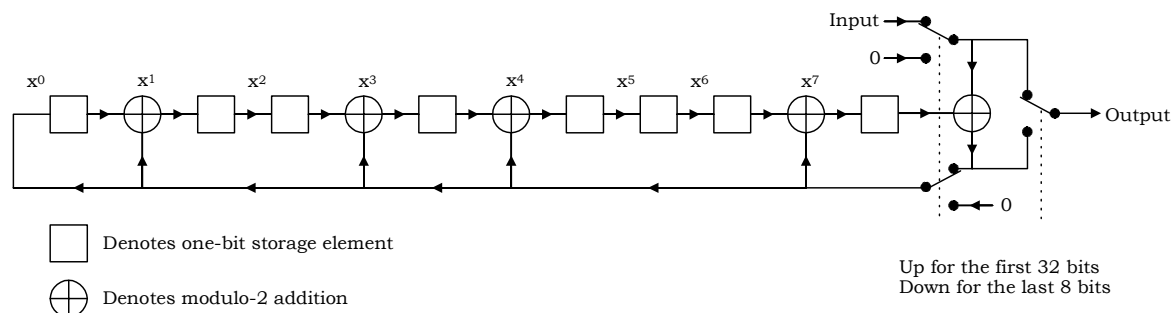


Figure 2.1.3.4.2.1-3. Enhanced Access Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

2.1.3.4.2.2 Enhanced Access Channel Encoder Tail Bits

The last eight bits of each Enhanced Access Channel frame are called the Encoder Tail Bits. These eight bits shall be set to '0'.

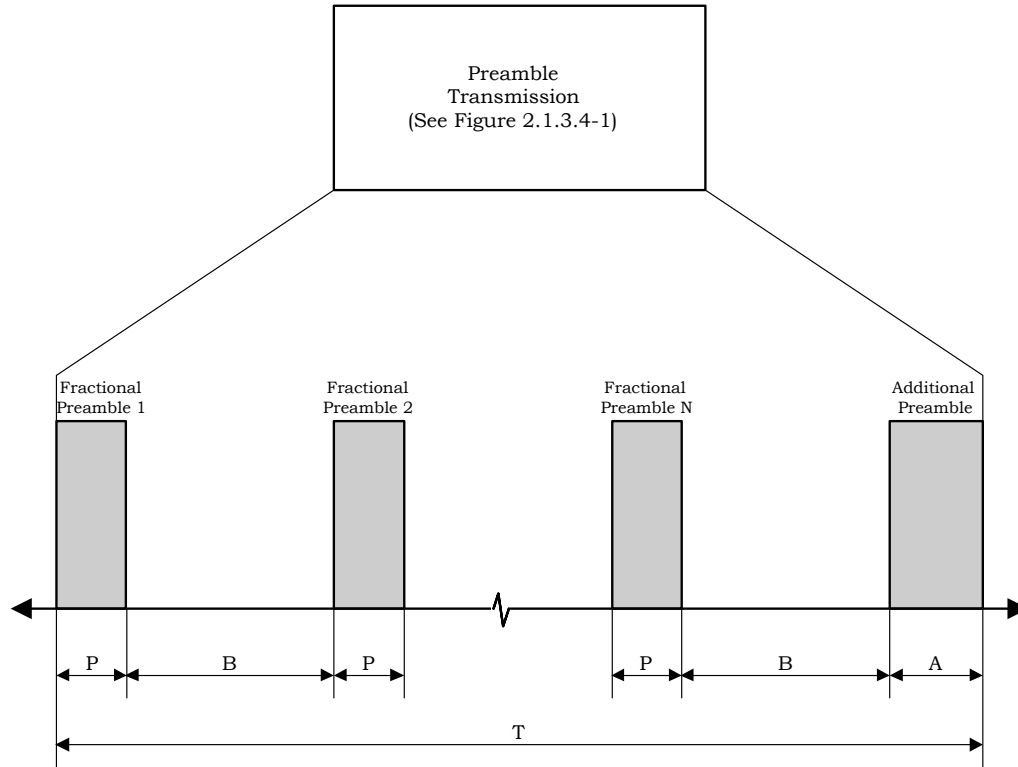
2.1.3.4.2.3 Enhanced Access Channel Preamble

The Enhanced Access Channel preamble is transmitted to aid the base station in acquiring an Enhanced Access Channel transmission.

The Enhanced Access Channel preamble is shown in Figure 2.1.3.4.2.3-1. The Enhanced Access Channel preamble is a transmission of only the non-data-bearing Reverse Pilot Channel at an increased power level. The Reverse Pilot Channel associated with the Enhanced Access Channel does not have a Reverse Power Control Subchannel. The total preamble length shall be an integer multiple of 1.25 ms. No preamble shall be transmitted when $EACH_PREAMBLE_ENABLED = '0'$. If the Enhanced Access Channel preamble is not of length zero, the Enhanced Access Channel preamble shall consist of a sequence of fractional preambles and one additional preamble.

The sequence of fractional preambles shall include $EACH_PREAMBLE_NUM_FRAC_S + 1$ fractional preambles, with a duration of $(EACH_PREAMBLE_FRAC_DURATION_S + 1) \times 1.25$ ms. The transmission of the Enhanced Access Channel preamble shall be gated-off for a period of $EACH_PREAMBLE_OFF_DURATION_S \times 1.25$ ms after the transmission of each fractional preamble.

When operating in Basic Access Mode, the additional preamble with a length of $EACH_PREAMBLE_ADD_DURATION_S \times 1.25$ ms shall be transmitted just prior to the Enhanced Access Channel data. When operating in Power Controlled Access Mode or Reservation Access Mode, the additional preamble with a length of $EACH_PREAMBLE_ADD_DURATION_S \times 1.25$ ms shall be transmitted just prior to the Enhanced Access Channel header. The additional preamble assists the base station in channel estimation.



$$N = \text{EACH_PREAMBLE_NUM_FRAC}_s + 1$$

$$P = (\text{EACH_PREAMBLE_FRAC_DURATION}_s + 1) \times 1.25 \text{ ms}$$

$$B = \text{EACH_PREAMBLE_OFF_DURATION}_s \times 1.25 \text{ ms}$$

$$A = \text{EACH_PREAMBLE_ADD_DURATION}_s \times 1.25 \text{ ms}$$

$$T = N(P + B) + A$$

1
2
3
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Figure 2.1.3.4.2.3-1 Preamble for the Enhanced Access Channel

2.1.3.4.3 Enhanced Access Channel Convolutional Encoding

The Enhanced Access Channel data shall be convolutionally encoded as specified in 2.1.3.1.4.

When generating Enhanced Access Channel data, the encoder shall be initialized at the end of each 20, 10, or 5 ms frame.

2.1.3.4.4 Enhanced Access Channel Code Symbol Repetition

Each code symbol output from the convolutional encoder on the Enhanced Access Channel shall be repeated as specified in 2.1.3.1.5.

2.1.3.4.5 Enhanced Access Channel Interleaving

The repeated code symbols on the Enhanced Access Channel shall be interleaved as specified in 2.1.3.1.7.

1 2.1.3.4.6 Enhanced Access Channel Modulation

2 The Access Channel data shall be modulated as specified in 2.1.3.1.8.

3 2.1.3.4.7 Enhanced Access Channel Quadrature Spreading

4 The Enhanced Access Channel shall be quadrature spread as specified in 2.1.3.1.12.

5 2.1.3.4.8 Enhanced Access Channel Baseband Filtering

6 The Enhanced Access Channel shall be filtered as specified in 2.1.3.1.13.

7 2.1.3.4.9 Enhanced Access Channel Transmission Processing

8 When the Physical Layer receives a PHY-EACHPreamble.Request(PWR_LVL, FCCCH_ID,
9 EACH_ID, BASE_ID, SLOT_OFFSET) from the MAC Layer, the mobile station shall perform
10 the following:

- 11 • Store the arguments PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, and
12 SLOT_OFFSET.
- 13 • Set the Enhanced Access Channel Long Code Mask using FCCCH_ID, EACH_ID,
14 BASE_ID and SLOT_OFFSET (see Figure 2.1.3.1.12-2).
- 15 • Transmit Enhanced Access Channel preamble frames.

16 When the Physical Layer receives a PHY-EACHHeader.Request(PWR_LVL, FCCCH_ID,
17 EACH_ID, BASE_ID, SLOT_OFFSET, SDU) from the MAC Layer, the mobile station shall:

- 18 • Store the arguments PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET,
19 and SDU.
- 20 • Set the Enhanced Access Channel Long Code Mask using FCCCH_ID, EACH_ID,
21 BASE_ID and SLOT_OFFSET (see Figure 2.1.3.1.12-2).
- 22 • Set the information bits (see Figure 2.1.3.4.2-1) to SDU.
- 23 • Transmit an Enhanced Access Channel Header.

24 When the Physical Layer receives a PHY-EACH.Request(PWR_LVL, FCCCH_ID, EACH_ID,
25 BASE_ID, SLOT_OFFSET, SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the
26 mobile station shall:

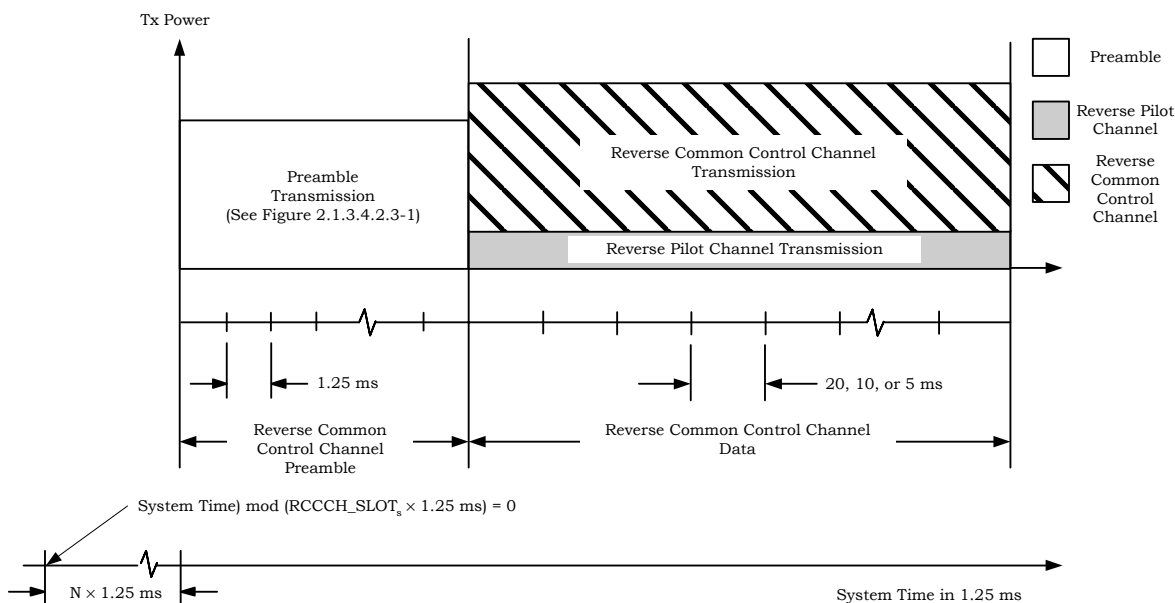
- 27 • Store the arguments PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET,
28 FRAME_DURATION, NUM_BITS, and SDU.
- 29 • Set the Enhanced Access Channel Long Code Mask using FCCCH_ID, EACH_ID,
30 BASE_ID and SLOT_OFFSET (see Figure 2.1.3.1.12-2).
- 31 • Set the information bits (see Figure 2.1.3.4.2-1) to SDU.
- 32 • Transmit an Enhanced Access Channel frame of duration FRAME_DURATION (5
33 ms, 10 ms or 20 ms) at a data rate that corresponds to NUM_BITS and
34 FRAME_DURATION as specified in Table 2.1.3.4.2-1.

1 2.1.3.5 Reverse Common Control Channel

2 The Reverse Common Control Channel is used for the transmission of user and signaling
 3 information to the base station when Reverse Traffic Channels are not in use. The Reverse
 4 Common Control Channel can be used in one of two possible modes: Reservation Access
 5 Mode and Designated Access Mode.

6 A Reverse Common Control Channel transmission is a coded, interleaved, and modulated
 7 spread-spectrum signal. The mobile station transmits during intervals specified by the base
 8 station. Reverse Common Control Channels are uniquely identified by their long codes (see
 9 2.1.3.1.12). The Reverse Common Control Channel preamble and data transmission
 10 structure is shown in Figure 2.1.3.5-1.

11



12

13 **Figure 2.1.3.5-1. Preamble and Data Transmission for the Reverse Common Control**
 14 **Channel**

15

16 2.1.3.5.1 Reverse Common Control Channel Time Alignment and Modulation Rate

17 The mobile station shall transmit information on the Reverse Common Control Channel at
 18 variable data rates of 9600, 19200, and 38400 bps. A Reverse Common Control Channel
 19 frame shall be 20, 10, or 5 ms in duration. The timing of Reverse Common Control Channel
 20 transmissions shall start on 1.25 ms increments of System Time (see Figure 1.3-1).

21 The Reverse CDMA Channel may contain up to 32 Reverse Common Control Channels
 22 numbered 0 through 31 per supported Forward Common Control Channel and up to 32
 23 Reverse Common Control Channels numbered 0 through 31 per supported Common
 24 Assignment Channel. At least one Reverse Common Control Channel exists on the Reverse
 25 CDMA Channel for each Forward Common Control Channel on the corresponding Forward

1 CDMA Channel. Each Reverse Common Control Channel is associated with a single
 2 Forward Common Control Channel.

3 The Reverse Common Control Channel slot shall begin only when System Time is $N \times 1.25$
 4 ms after an integer multiple of $RCCCH_SLOT_s \times 1.25$ ms, where N equals $[(RCCCH_ID \times$
 5 $RCCCH_SLOT_OFFSET2_s) + RCCCH_SLOT_OFFSET1_s] \bmod RCCCH_SLOT_s$, and
 6 $RCCCH_ID$ is the identity of the Reverse Common Control Channel to be used, which is
 7 passed by the primitives from the MAC Layer (see 2.1.3.5.9 and Figure 2.1.3.5-1). The
 8 mobile station shall initiate transmission of a Reverse Common Control Channel frame on a
 9 Reverse Common Control Channel slot boundary.

10 2.1.3.5.2 Reverse Common Control Channel Frame Structure

11 Table 2.1.3.5.2-1 summarizes the Reverse Common Control Channel bit allocations. The
 12 order of the bits is shown in Figure 2.1.3.5.2-1.

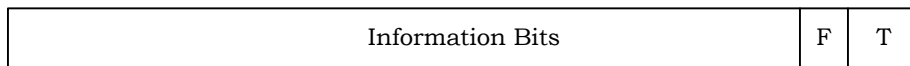
13 All frames shall consist of the information bits, followed by a frame quality indicator (CRC)
 14 and eight Encoder Tail Bits.

15

16 **Table 2.1.3.5.2-1. Reverse Common Control Channel Frame Structure Summary**

Frame Length (ms)	Transmission Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Encoder Tail
20	9600	192	172	12	8
20	19200	384	360	16	8
20	38400	768	744	16	8
10	19200	192	172	12	8
10	38400	384	360	16	8
5	38400	192	172	12	8

17



Notation

F - Frame Quality Indicator (CRC)
 T - Encoder Tail Bits

18

19 **Figure 2.1.3.5.2-1. Reverse Common Control Channel Frame Structure**

20

2.1.3.5.2.1 Reverse Common Control Channel Frame Quality Indicator

The frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Encoder Tail Bits. The 20 ms Reverse Common Control Channel shall use a 12-bit frame quality indicator for the 9600 bps frame and a 16-bit frame quality indicator for the 38400 bps and 19200 bps frames. The 10 ms Reverse Common Control Channel shall use a 12-bit frame quality indicator for the 19200 bps frame and a 16-bit frame quality indicator for the 38400 bps frame. The 5 ms Reverse Common Control Channel shall use a 12-bit frame quality indicator.

The generator polynomials for the frame quality indicator shall be as follows:

$$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1 \text{ for the 16-bit frame quality indicator}$$

and

$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1 \text{ for the 12-bit frame quality indicator.}$$

The frame quality indicators shall be computed according to the following procedure as shown in Figures 2.1.3.5.2.1-1 and 2.1.3.5.2.1-2:

- Initially, all shift register elements shall be set to logical one and the switches shall be set in the up position.
- The register shall be clocked a number of times equal to the number of information bits in the frame with those bits as input.
- The switches shall be set in the down position so that the output is a modulo-2 addition with a '0' and the successive shift register inputs are '0's.
- The register shall be clocked an additional number of times equal to the number of bits in the frame quality indicator (16 or 12).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

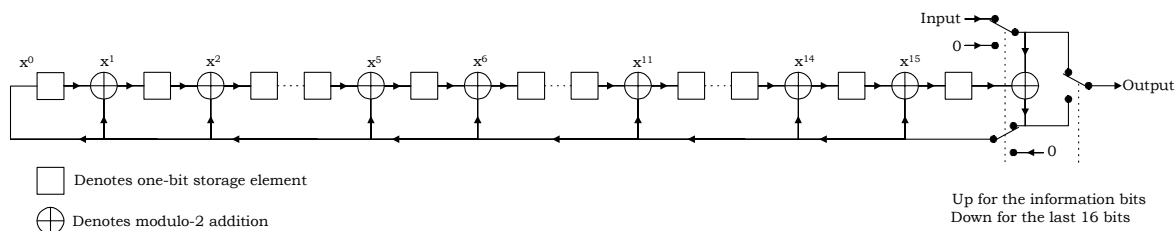


Figure 2.1.3.5.2.1-1. Reverse Common Control Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

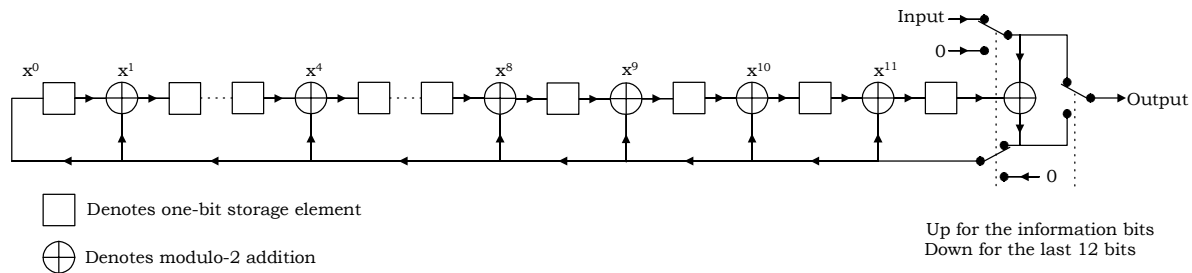


Figure 2.1.3.5.2.1-2. Reverse Common Control Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

2.1.3.5.2.2 Reverse Common Control Channel Encoder Tail Bits

The last eight bits of each Reverse Common Control Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to '0'.

2.1.3.5.2.3 Reverse Common Control Channel Preamble

The Reverse Common Control Channel preamble is transmitted to aid the base station in acquiring a Reverse Common Control Channel transmission.

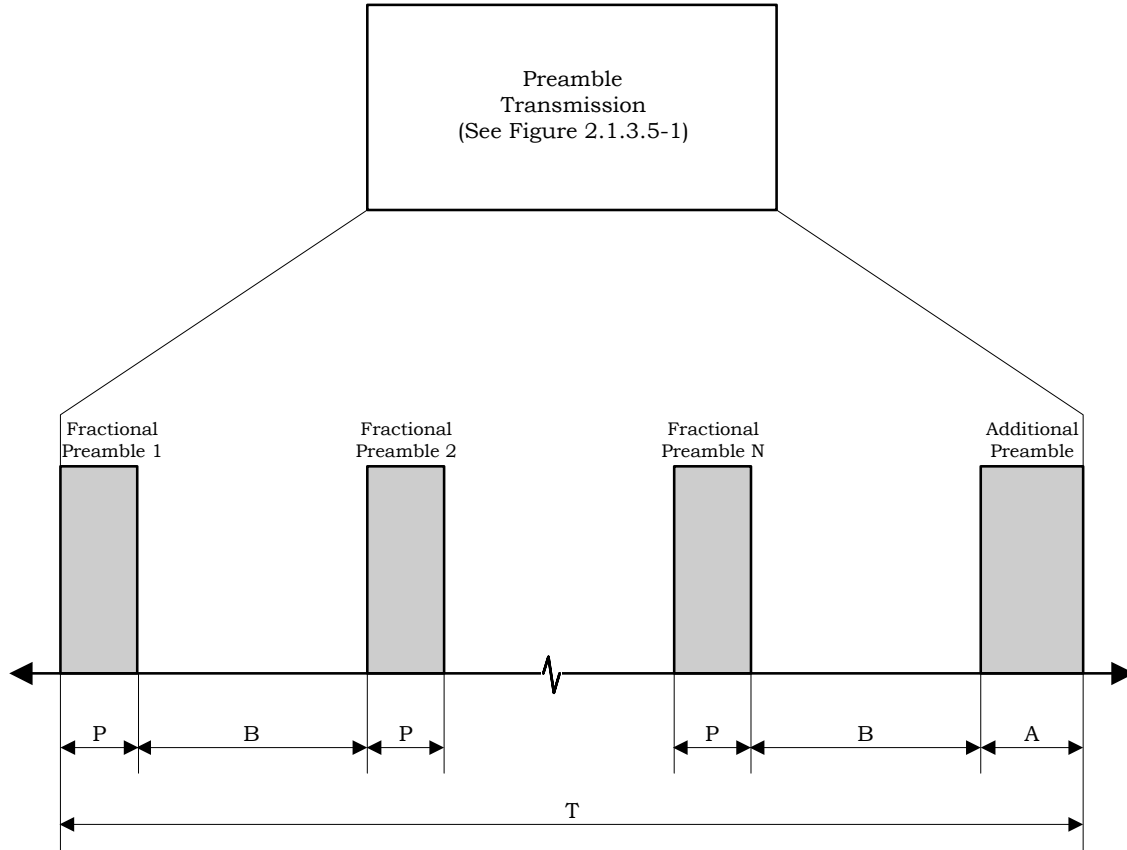
The Reverse Common Control Channel preamble is shown in Figure 2.1.3.5.2.3-1. The Reverse Common Control Channel preamble is a transmission of only the non-data-bearing Reverse Pilot Channel at an increased power level. The Reverse Pilot Channel associated with the Reverse Common Control Channel does not have a Reverse Power Control Subchannel. The total preamble duration shall be an integer multiple of 1.25 ms. No preamble shall be transmitted when operating in Reservation Access Mode and $RCCCH_PREAMBLE_ENABLED_S = '0'$, or when operating in Designated Access Mode and $ALT_RCCCH_PREAMBLE_ENABLED_S = '0'$. If the Reverse Common Control Channel preamble is not of zero length, the Reverse Common Control Channel preamble shall consist of a sequence of fractional preambles and one additional preamble.

When operating in the Reservation Access Mode, the sequence of fractional preambles shall include $RCCCH_PREAMBLE_NUM_FRAC_S + 1$ fractional preambles, each with a duration of $(RCCCH_PREAMBLE_FRAC_DURATION_S + 1) \times 1.25$ ms. The transmission of the Reverse Common Control Channel preamble shall be gated-off for a duration of $RCCCH_PREAMBLE_OFF_DURATION_S \times 1.25$ ms after the transmission of each fractional preamble. The additional preamble with a length of $RCCCH_PREAMBLE_ADD_DURATION_S \times 1.25$ ms shall be transmitted just prior to the Reverse Common Control Channel data.

When operating in the Designated Access Mode, the sequence of fractional preambles shall include $ALT_RCCCH_PREAMBLE_NUM_FRAC_S + 1$ fractional preambles, each with a duration of $(ALT_RCCCH_PREAMBLE_FRAC_DURATION_S + 1) \times 1.25$ ms. The transmission of the Reverse Common Control Channel preamble shall be gated-off for a duration of $ALT_RCCCH_PREAMBLE_OFF_DURATION_S \times 1.25$ ms after the transmission of each fractional preamble. The additional preamble with a length of

1 ALT_RCCCH_PREAMBLE_ADD_DURATION_s × 1.25 ms shall be transmitted just prior to the
 2 Reverse Common Control Channel data.

3 The additional preamble assists the base station in channel estimation.
 4



For Reservation Access Mode

$$N = \text{RCCCH_PREAMBLE_NUM_FRAC}_s + 1$$

$$P = (\text{RCCCH_PREAMBLE_FRAC_DURATION}_s + 1) \times 1.25 \text{ ms}$$

$$B = \text{RCCCH_PREAMBLE_OFF_DURATION}_s \times 1.25 \text{ ms}$$

$$A = \text{RCCCH_PREAMBLE_ADD_DURATION}_s \times 1.25 \text{ ms}$$

$$T = N (P + B) + A$$

For Designated Access Mode

$$N = \text{ALT_RCCCH_PREAMBLE_NUM_FRAC}_s + 1$$

$$P = (\text{ALT_RCCCH_PREAMBLE_FRAC_DURATION}_s + 1) \times 1.25 \text{ ms}$$

$$B = \text{ALT_RCCCH_PREAMBLE_OFF_DURATION}_s \times 1.25 \text{ ms}$$

$$A = \text{ALT_RCCCH_PREAMBLE_ADD_DURATION}_s \times 1.25 \text{ ms}$$

$$T = N (P + B) + A$$

5

6 **Figure 2.1.3.5.2.3-1. Preamble for the Reverse Common Control Channel**

1 2.1.3.5.2.4 Reverse Common Control Channel Data

2 When operating in the Reservation Access Mode, the Reverse Common Control Channel
3 data shall consist of Enhanced Access data. When operating in the Designated Access
4 Mode, the Reverse Common Control Channel data shall consist of Designated Access data.

5 2.1.3.5.3 Reverse Common Control Channel Convolutional Encoding

6 The Reverse Common Control Channel data shall be convolutionally encoded as specified in
7 2.1.3.1.4.

8 When generating Reverse Common Control Channel data, the encoder shall be initialized at
9 the end of each 20, 10, or 5 ms frame.

10 2.1.3.5.4 Reverse Common Control Channel Code Symbol Repetition

11 Each code symbol output from the convolutional encoder on the Reverse Common Control
12 Channel shall be repeated as specified in 2.1.3.1.5.

13 2.1.3.5.5 Reverse Common Control Channel Interleaving

14 The encoded code symbols on the Reverse Common Control Channel shall be interleaved as
15 specified in 2.1.3.1.7.

16 2.1.3.5.6 Reverse Common Control Channel Modulation

17 The Reverse Common Control Channel data shall be modulated as specified in 2.1.3.1.8.

18 2.1.3.5.7 Reverse Common Control Channel Quadrature Spreading

19 The Reverse Common Control Channel shall be quadrature spread as specified in
20 2.1.3.1.12.

21 2.1.3.5.8 Reverse Common Control Channel Baseband Filtering

22 The Reverse Common Control Channel shall be filtered as specified in 2.1.3.1.13.

23 2.1.3.5.9 Reverse Common Control Channel Transmission Processing

24 When the Physical Layer receives a PHY-RCCCHPreamble.Request(FCCCH_ID, RCCCH_ID,
25 BASE_ID) from the MAC Layer, the mobile station shall perform the following:

- 26 • Store the arguments FCCCH_ID, RCCCH_ID, and BASE_ID.
- 27 • Set the Reverse Common Control Channel Long Code Mask using FCCCH_ID,
28 RCCCH_ID, and BASE_ID (see Figure 2.1.3.1.12-2).
- 29 • Transmit a Reverse Common Control Channel preamble.

1 When the Physical Layer receives a PHY-RCCCH.Request(FCCCH_ID, RCCCH_ID, BASE_ID,
2 SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the mobile station shall
3 perform the following:

- 4 • Store the arguments FCCCH_ID, RCCCH_ID, BASE_ID, SDU, FRAME_DURATION,
5 and NUM_BITS.
- 6 • Set the Reverse Common Control Channel Long Code Mask using FCCCH_ID,
7 RCCCH_ID, and BASE_ID (see Figure 2.1.3.1.12-2).
- 8 • Set the information bits (see Figure 2.1.3.5.2-1) to SDU.
- 9 • Transmit a Reverse Common Control Channel frame of duration FRAME_DURATION
10 (5 ms, 10 ms, or 20 ms) at a data rate that corresponds to NUM_BITS and
11 FRAME_DURATION as specified in Table 2.1.3.5.2-1.

12 2.1.3.6 Reverse Dedicated Control Channel

13 The Reverse Dedicated Control Channel is used for the transmission of user and signaling
14 information to the base station during a call. The Reverse Traffic Channel may contain up
15 to one Reverse Dedicated Control Channel.

16 2.1.3.6.1 Reverse Dedicated Control Channel Time Alignment and Modulation Rates

17 The mobile station shall transmit information on the Reverse Dedicated Control Channel at
18 a fixed data rate of 9600 bps or 14400 bps using 20 ms frames, or 9600 bps using 5 ms
19 frames. The mobile station may support flexible data rates. If the mobile station supports
20 flexible data rates, other fixed data rates from 1050 bps to 9600 bps or 14400 bps using 20
21 ms frames can also be used.

22 The Reverse Dedicated Control Channel frame shall be 5 ms or 20 ms in duration.

23 The mobile station shall transmit information on the Reverse Dedicated Control Channel at
24 a data rate of 9600 bps for Radio Configurations 3 and 5. If the mobile station supports
25 flexible data rates, other fixed data rates from 1050 bps to 9600 bps using 20 ms frames
26 can also be used for the Reverse Dedicated Control Channel in Radio Configurations 3
27 and 5.

28 The mobile station shall transmit information on the Reverse Dedicated Control Channel at
29 a data rate of 14400 bps for 20 ms frames and 9600 bps for 5 ms frames for Radio
30 Configurations 4 and 6. If the mobile station supports flexible data rates, other fixed data
31 rates from 1050 bps to 14400 bps using 20 ms frames can also be used for the Reverse
32 Dedicated Control Channel in Radio Configurations 4 and 6.

33 The mobile station shall support discontinuous transmission on the Reverse Dedicated
34 Control Channel. The decision to enable or disable the Reverse Dedicated Control Channel
35 shall be made on a frame-by-frame (i.e., 5 or 20 ms) basis.

36 The mobile station shall support Reverse Dedicated Control Channel frames that are time
37 offset by multiples of 1.25 ms. The amount of the time offset is specified by
38 FRAME_OFFSET_s. A zero-offset 20 ms Reverse Dedicated Control Channel frame shall
39 begin only when System Time is an integral multiple of 20 ms (see Figure 1.3-1). A zero-

offset 5 ms Reverse Dedicated Control Channel frame shall begin only when System Time is an integral multiple of 5 ms. An offset 20 ms Reverse Dedicated Control Channel frame shall begin $1.25 \times \text{FRAME_OFFSET}_s$ ms later than the zero-offset 20 ms Reverse Dedicated Control Channel frame. An offset 5 ms Reverse Dedicated Control Channel frame shall begin $1.25 \times (\text{FRAME_OFFSET}_s \bmod 4)$ ms later than the zero-offset 5 ms Reverse Dedicated Control Channel frame. The interleaver block for the Reverse Dedicated Control Channel shall be aligned with the Reverse Dedicated Control Channel frame.

2.1.3.6.2 Reverse Dedicated Control Channel Frame Structure

Table 2.1.3.6.2-1 summarizes the Reverse Dedicated Control Channel bit allocations for non-flexible data rates. Table 2.1.3.6.2-2 summarizes the Reverse Dedicated Control Channel bit allocations for flexible data rates. The order of the bits is shown in Figure 2.1.3.6.2-1.

All 20 ms frames in Radio Configuration 3 and 5 and all 5 ms frames shall consist of the information bits, followed by a frame quality indicator (CRC) and eight Encoder Tail Bits.

All 20 ms frames in Radio Configuration 4 and 6 and all 5 ms frames shall consist of the information bits, followed by the frame quality indicator (CRC), and eight Encoder Tail Bits, except when 267 information bits are used together with 12 frame quality indicator bits, where one reserved bit will precede the information bits.

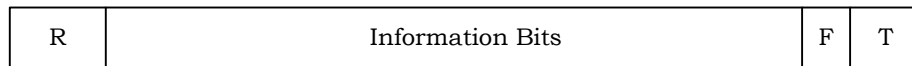
Table 2.1.3.6.2-1. Reverse Dedicated Control Channel Frame Structure Summary for Non-flexible Data Rates

Radio Config.	Frame Length (ms)	Data Rate (bps)	Number of Bits per Frame				
			Total	Reserved	Information	Frame Quality Indicator	Encoder Tail
3 and 5	20	9600	192	0	172	12	8
4 and 6	20	14400	288	1	267	12	8
3, 4, 5, and 6	5	9600	48	0	24	16	8

1 **Table 2.1.3.6.2-2. Reverse Dedicated Control Channel Frame Structure Summary for**
 2 **Flexible Data Rates**

Radio Config.	Frame Length (ms)	Data Rate (bps)	Number of Bits per Frame			
			Total	Information	Frame Quality Indicator	Encoder Tail
3 and 5	20	1250 to 9600	25 to 192	1 to 168	16	8
	20	1050 to 9550	21 to 191	1 to 171	12	8
4 and 6	20	1250 to 14400	25 to 288	1 to 264	16	8
	20	1050 to 14300, 14400	21 to 286, 288	1 to 266, 268	12	8

3



Notation

R - Reserved Bit

F - Frame Quality Indicator (CRC)

T - Encoder Tail Bits

4

5 **Figure 2.1.3.6.2-1. Reverse Dedicated Control Channel Frame Structure**

6

7 2.1.3.6.2.1 Reverse Dedicated Control Channel Frame Quality Indicator

8 The frame quality indicator (CRC) shall be calculated on all bits within the frame, except
 9 the frame quality indicator itself and the Encoder Tail Bits. The 20 ms Reverse Dedicated
 10 Control Channel shall use a 12-bit frame quality indicator for non-flexible data rates. If
 11 flexible data rates are supported, either a 12-bit or a 16-bit frame quality indicator shall be
 12 used. The 5 ms Reverse Dedicated Control Channel shall use a 16-bit frame quality
 13 indicator

14 The generator polynomials for the frame quality indicator shall be as follows:

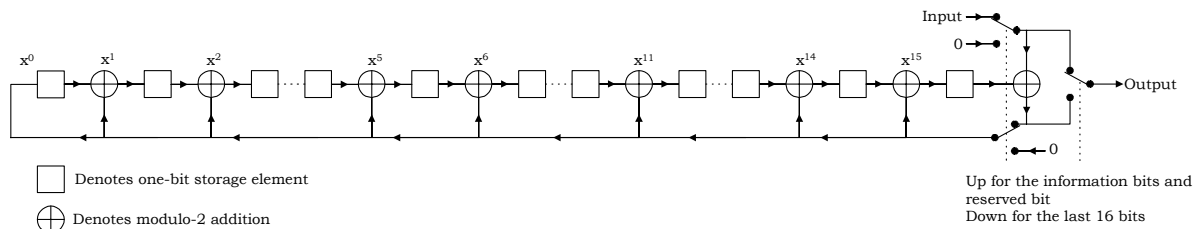
15 $g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator
 16 and

17 $g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator.

18 The frame quality indicators shall be computed according to the following procedure as
 19 shown in Figures 2.1.3.6.2.1-1 and 2.1.3.6.2.1-2:

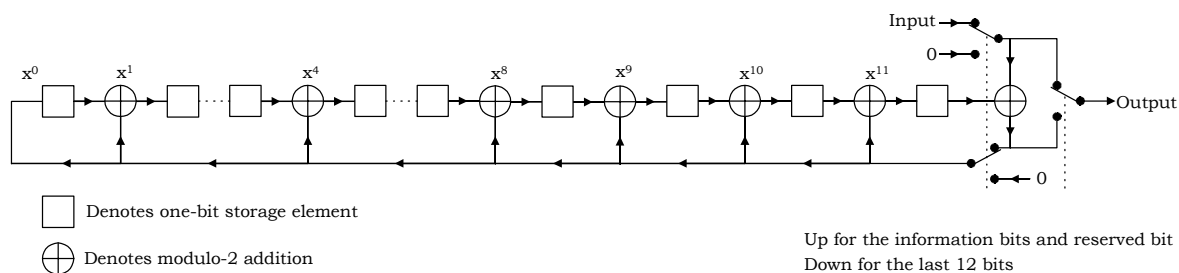
- 20 • Initially, all shift register elements shall be set to logical one and the switches shall
 21 be set in the up position.
- 22 • The register shall be clocked a number of times equal to the number of Reserved
 23 Bits and information bits in the frame with those bits as input.

- 1 • The switches shall be set in the down position so that the output is a modulo-2
- 2 addition with a '0' and the successive shift register inputs are '0's.
- 3 • The register shall be clocked an additional number of times equal to the number of
- 4 bits in the frame quality indicator (16 or 12).
- 5 • These additional bits shall be the frame quality indicator bits.
- 6 • The bits shall be transmitted in the order calculated.



8 **Figure 2.1.3.6.2.1-1. Reverse Dedicated Control Channel Frame Quality Indicator**

9 **Calculation for the 16-Bit Frame Quality Indicator**



12 **Figure 2.1.3.6.2.1-2. Reverse Dedicated Control Channel Frame Quality Indicator**

13 **Calculation for the 12-Bit Frame Quality Indicator**

16 2.1.3.6.2.2 Reverse Dedicated Control Channel Encoder Tail Bits

17 The last eight bits of each Reverse Dedicated Control Channel frame are called the Encoder

18 Tail Bits. These eight bits shall each be set to '0'.

19 2.1.3.6.2.3 Reverse Traffic Channel Preamble

20 The Reverse Traffic Channel preamble is transmitted on the Reverse Pilot Channel as

21 specified in 2.1.3.2.4.

22 2.1.3.6.3 Reverse Dedicated Control Channel Convolutional Encoding

23 The Reverse Dedicated Control Channel shall be convolutionally encoded as specified in

24 2.1.3.1.4.

1 When generating Reverse Dedicated Control Channel data, the encoder shall be initialized
2 to the all-zero state at the end of each 20 ms or 5 ms frame.

3 2.1.3.6.4 Reverse Dedicated Control Channel Code Symbol Repetition

4 Reverse Dedicated Control Channel code symbol repetition shall be as specified in
5 2.1.3.1.5.

6 2.1.3.6.5 Reverse Dedicated Control Channel Code Symbol Puncturing

7 Reverse Dedicated Control Channel code symbol puncturing shall be as specified in
8 2.1.3.1.6.

9 2.1.3.6.6 Reverse Dedicated Control Channel Interleaving

10 The modulation symbols shall be interleaved as specified in 2.1.3.1.7.

11 2.1.3.6.7 Reverse Dedicated Control Channel Modulation

12 The Reverse Dedicated Control Channel data shall be modulated as specified in 2.1.3.1.8.

13 2.1.3.6.8 Reverse Dedicated Control Channel Quadrature Spreading

14 The Reverse Dedicated Control Channel shall be quadrature spread as specified in
15 2.1.3.1.12.

16 2.1.3.6.9 Reverse Dedicated Control Channel Baseband Filtering

17 Filtering for the Reverse Dedicated Control Channel shall be as specified in 2.1.3.1.13.

18 2.1.3.6.10 Reverse Dedicated Control Channel Transmission Processing

19 When the Physical Layer receives a PHY-DCCH.Request(SDU, FRAME_DURATION,
20 NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- 21 • Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- 22 • If SDU is not equal to NULL, set the information bits to SDU.
- 23 • If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Reverse Dedicated
24 Control Channel frame of duration FRAME_DURATION (5 ms or 20 ms). If a PHY-
25 DCCH.Request primitive for a 5 ms frame is received coincident with a PHY-
26 DCCH.Request primitive for a 20 ms frame or during transmission of a 20 ms frame,
27 then the mobile station may preempt transmission of the 20 ms frame and transmit
28 a 5 ms frame. Transmission of the 20 ms frame may start or resume after
29 completion of the 5 ms frame. If transmission of the 20 ms frame is resumed after
30 an interruption in transmission, then the relative power level of the Reverse
31 Dedicated Control Channel modulation symbols shall be equal to that of the
32 modulation symbols sent prior to the preemption.

2.1.3.7 Reverse Fundamental Channel

The Reverse Fundamental Channel is used for the transmission of user and signaling information to the base station during a call. The Reverse Traffic Channel may contain up to one Reverse Fundamental Channel.

2.1.3.7.1 Reverse Fundamental Channel Time Alignment and Modulation Rates

When operating with Radio Configuration 1, the mobile station shall transmit information on the Reverse Fundamental Channel at variable data rates of 9600, 4800, 2400, and 1200 bps.

When operating with Radio Configuration 2, the mobile station shall transmit information on the Reverse Fundamental Channel at variable data rates of 14400, 7200, 3600, and 1800 bps.

When operating with Radio Configurations 3 and 5, the mobile station shall transmit information on the Reverse Fundamental Channel at variable data rates of 9600, 4800, 2700, and 1500 bps during 20 ms frames or at 9600 bps during 5 ms frames. The mobile station may support flexible data rates. If flexible data rates are supported, the mobile station should support variable data rates corresponding to 1 to 171 information bits per 20 ms frame on the Reverse Fundamental Channel. The minimum number of flexible data rates used in variable rate operation is not specified.

When operating with Radio Configurations 4 and 6, the mobile station shall transmit information on the Reverse Fundamental Channel at variable data rates of 14400, 7200, 3600, and 1800 bps during 20 ms frames or at 9600 bps during 5 ms frames. If flexible data rates are supported, the mobile station should support variable rates corresponding to 1 to 268 information bits per 20 ms frame on the Reverse Fundamental Channel. The minimum number of flexible data rates used in variable rate operation is not specified.

Reverse Fundamental Channel frames with Radio Configurations 1 and 2 shall be 20 ms in duration. Reverse Fundamental Channel frames with Radio Configurations 3 through 6 shall be 5 or 20 ms in duration. The data rate and frame duration on a Reverse Fundamental Channel within a radio configuration shall be selected on a frame-by-frame basis. Although the data rate may vary on a frame-by-frame basis, the modulation symbol rate is kept constant by code repetition. A mobile station operating with Radio Configurations 3 through 6 may discontinue transmission of the Reverse Fundamental Channel for up to three 5 ms frames in a 20 ms frame.

The mobile station shall support Reverse Fundamental Channel frames that are time offset by multiples of 1.25 ms. The amount of the time offset is specified by $FRAME_OFFSET_s$. A zero-offset 20 ms Reverse Fundamental Channel frame shall begin only when System Time is an integral multiple of 20 ms (see Figure 1.3-1). A zero-offset 5 ms Reverse Fundamental Channel frame shall begin only when System Time is an integral multiple of 5 ms. An offset 20 ms Reverse Fundamental Channel frame shall begin $1.25 \times FRAME_OFFSET_s$ ms later than the zero-offset 20 ms Reverse Fundamental Channel frame. An offset 5 ms Reverse Fundamental Channel frame shall begin $1.25 \times (FRAME_OFFSET_s \bmod 4)$ ms later than the zero-offset 5 ms Reverse Fundamental Channel frame. The interleaver block for the Reverse Fundamental Channel shall be aligned with the Reverse Fundamental Channel frame.

2.1.3.7.2 Reverse Fundamental Channel Frame Structure

Table 2.1.3.7.2-1 summarizes the Reverse Fundamental Channel bit allocations for non-flexible data rates. Table 2.1.3.7.2-2 summarizes the Reverse Fundamental Channel bit allocations for flexible data rates. The order of the bits is shown in Figure 2.1.3.7.2-1.

The 2400 and 1200 bps frames with Radio Configuration 1 shall consist of the information bits followed by eight Encoder Tail Bits. All 5 ms frames, all frames with Radio Configurations 3 and 5, and the 9600 and 4800 bps frames with Radio Configuration 1 shall consist of the information bits followed by a frame quality indicator (CRC) and eight Encoder Tail Bits. All 20 ms frames with Radio Configurations 2, 4, and 6 shall consist of zero or one Reserved/Erasure Indicator Bits, followed by the information bits, frame quality indicator (CRC), and eight Encoder Tail Bits.

Table 2.1.3.7.2-1. Reverse Fundamental Channel Frame Structure Summary for Non-flexible Data Rates

Radio Config.	Transmission Rate (bps)	Number of Bits per Frame				
		Total	Reserved/ Erasure Indicator	Information	Frame Quality Indicator	Encoder Tail
1	9600	192	0	172	12	8
	4800	96	0	80	8	8
	2400	48	0	40	0	8
	1200	24	0	16	0	8
2	14400	288	1	267	12	8
	7200	144	1	125	10	8
	3600	72	1	55	8	8
	1800	36	1	21	6	8
3 and 5	9600 (5 ms)	48	0	24	16	8
	9600 (20 ms)	192	0	172	12	8
	4800	96	0	80	8	8
	2700	54	0	40	6	8
	1500	30	0	16	6	8
4 and 6	9600 (5 ms)	48	0	24	16	8
	14400	288	1	267	12	8
	7200	144	1	125	10	8
	3600	72	1	55	8	8
	1800	36	1	21	6	8

1
2**Table 2.1.3.7.2-2. Reverse Fundamental Channel Frame Structure Summary for Flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Encoder Tail
3 and 5	4850 to 9600	97 to 192	73 to 168	16	8
	4850 to 9550	97 to 191	77 to 171	12	8
	2750 to 4800	55 to 96	31 to 72	16	8
	2750 to 4800	55 to 96	35 to 76	12	8
	2750 to 4750	55 to 95	39 to 79	8	8
	1550 to 2700	31 to 54	7 to 30	16	8
	1550 to 2700	31 to 54	11 to 34	12	8
	1550 to 2700	31 to 54	15 to 38	8	8
	1550 to 2650	31 to 53	17 to 39	6	8
	1250 to 1500	25 to 30	1 to 6	16	8
	1050 to 1500	21 to 30	1 to 10	12	8
	850 to 1500	17 to 30	1 to 14	8	8
	750 to 1450	15 to 29	1 to 15	6	8
4 and 6	7250 to 14400	145 to 288	121 to 264	16	8
	7250 to 14300, 14400	145 to 286, 288	125 to 266, 268	12	8
	3650 to 7200	73 to 144	49 to 120	16	8
	3650 to 7200	73 to 144	53 to 124	12	8
	3650 to 7100, 7200	73 to 142, 144	55 to 124, 126	10	8
	1850 to 3600	37 to 72	13 to 48	16	8
	1850 to 3600	37 to 72	17 to 52	12	8
	1850 to 3600	37 to 72	19 to 54	10	8
	1850 to 3500, 3600	37 to 70, 72	21 to 54, 56	8	8
	1250 to 1800	25 to 36	1 to 12	16	8
	1050 to 1800	21 to 36	1 to 16	12	8
	950 to 1800	19 to 36	1 to 18	10	8
	850 to 1800	17 to 36	1 to 20	8	8
750 to 1700, 1800	15 to 34, 36	1 to 20, 22	6	8	

3

R/E	Information Bits	F	T
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Notation

R/E - Reserved/Erasure Indicator Bit

F - Frame Quality Indicator (CRC)

T - Encoder Tail Bits

Figure 2.1.3.7.2-1. Reverse Fundamental Channel Frame Structure

2.1.3.7.2.1 Reverse Fundamental Channel Frame Quality Indicator

Each frame with Radio Configurations 2 through 6, and the 9600 and 4800 bps frames of Radio Configuration 1 shall include a frame quality indicator. This frame quality indicator is a CRC.¹⁵ No frame quality indicator is used for the 2400 and 1200 bps data rates of Radio Configuration 1.

The frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Encoder Tail Bits.

The 5 ms frames shall use a 16-bit frame quality indicator.

The 9600 bps transmissions with Radio Configuration 1 and the 14400 bps transmissions with Radio Configuration 2 shall use a 12-bit frame quality indicator.

The 7200 bps transmissions with Radio Configuration 2 shall use a 10-bit frame quality indicator.

The 4800 bps transmissions with Radio Configuration 1 and the 3600 bps transmissions with Radio Configuration 2 shall use an 8-bit frame quality indicator.

The 1800 bps transmissions with Radio Configuration 2 shall use a 6-bit frame quality indicator.

The 20 ms frames in Radio Configurations 3 and 5 with more than 96 total bits and in Radio Configurations 4 and 6 with more than 144 total bits shall use a 12-bit frame quality indicator. A 16-bit frame quality indicator may be used if flexible data rates are supported.

The 20 ms frames in Radio Configurations 4 and 6 with 73 to 144 total bits shall use a 10-bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible data rates are supported.

¹⁵The frame quality indicator supports two functions at the receiver: The first function is to determine whether the frame is in error. The second function is to assist in the determination of the data rate of the received frame. Other parameters may be needed for rate determination in addition to the frame quality indicator, such as symbol error rate evaluated at the four data rates of the Reverse Fundamental Channel.

1 The 20 ms frames in Radio Configurations 3 and 5 with 55 to 96 total bits shall use an 8-
 2 bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible
 3 data rates are supported.

4 The 20 ms frames in Radio Configurations 4 and 6 with 37 to 72 total bits shall use an 8-
 5 bit frame quality indicator. A 16-bit, 12-bit, or 10-bit frame quality indicator may be used if
 6 flexible data rates are supported.

7 The 20 ms frames in Radio Configurations 3 and 5 with 54 or fewer total bits shall use a 6-
 8 bit frame quality indicator. A 16-bit, 12-bit, or 8-bit frame quality indicator may be used if
 9 flexible data rates are supported.

10 The 20 ms frames in Radio Configurations 4 and 6 with 36 or fewer total bits shall use a 6-
 11 bit frame quality indicator. A 16-bit, 12-bit, 10-bit, or 8-bit frame quality indicator may be
 12 used if flexible data rates are supported.

13 The generator polynomials for the frame quality indicator shall be as follows:

14 $g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

15 $g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator,

16 $g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1$ for the 10-bit frame quality indicator,

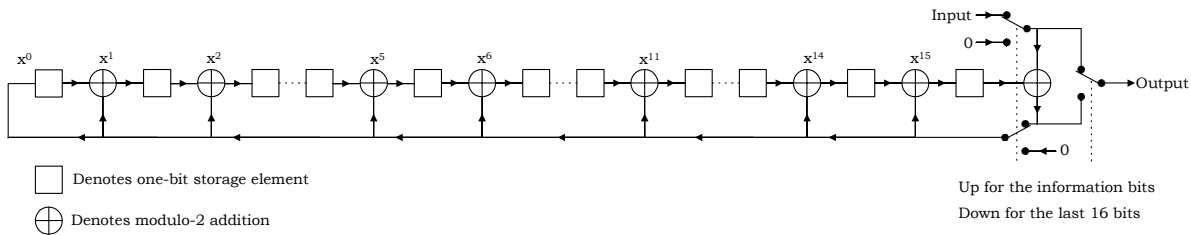
17 $g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator,

18 $g(x) = x^6 + x^2 + x + 1$ for the 6-bit frame quality indicator (RC = 2), and

19 $g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator ($3 \leq RC \leq 6$).

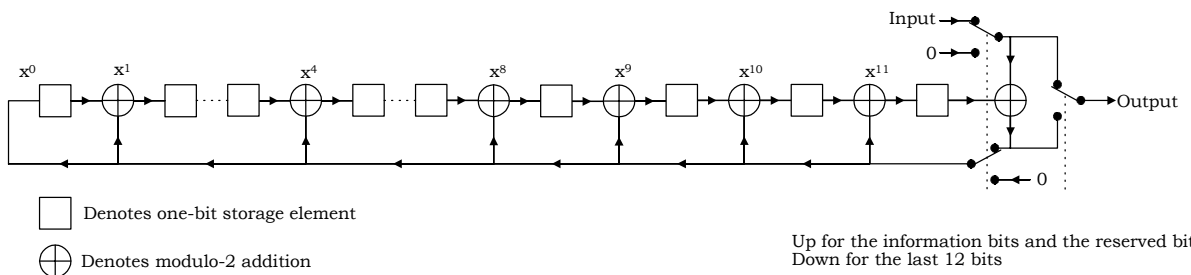
20 The frame quality indicators shall be computed according to the following procedure as
 21 shown in Figures 2.1.3.7.2.1-1 through 2.1.3.7.2.1-6:

- 22 • Initially, all shift register elements shall be set to logical one and the switches shall
 23 be set in the up position.
- 24 • The register shall be clocked a number of times equal to the number of
 25 Reserved/Erase Indicator Bits and information bits in the frame with those bits
 26 as input.
- 27 • The switches shall be set in the down position so that the output is a modulo-2
 28 addition with a '0' and the successive shift register inputs are '0's.
- 29 • The register shall be clocked an additional number of times equal to the number of
 30 bits in the frame quality indicator (16, 12, 10, 8, or 6).
- 31 • These additional bits shall be the frame quality indicator bits.
- 32 • The bits shall be transmitted in the order calculated.



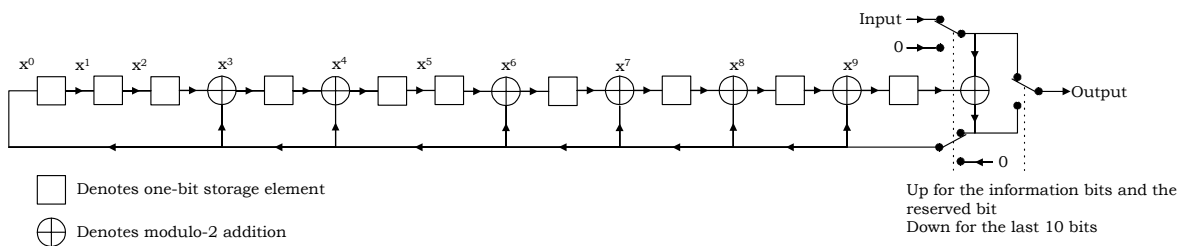
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Figure 2.1.3.7.2.1-1. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator



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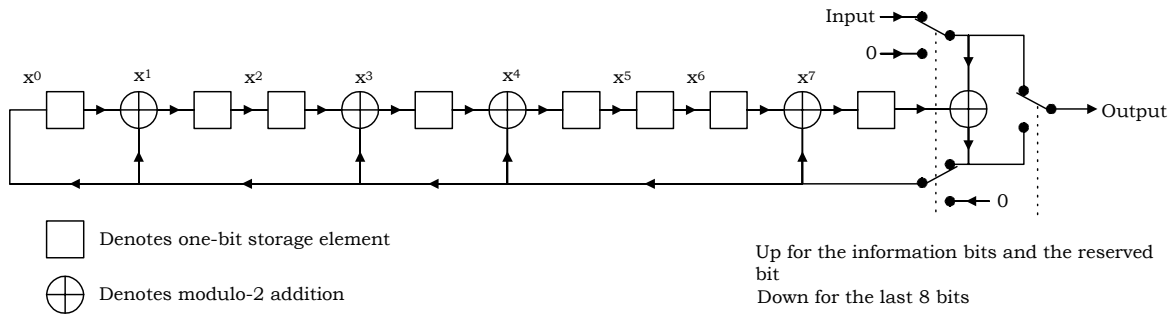
Figure 2.1.3.7.2.1-2. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator



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Figure 2.1.3.7.2.1-3. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator

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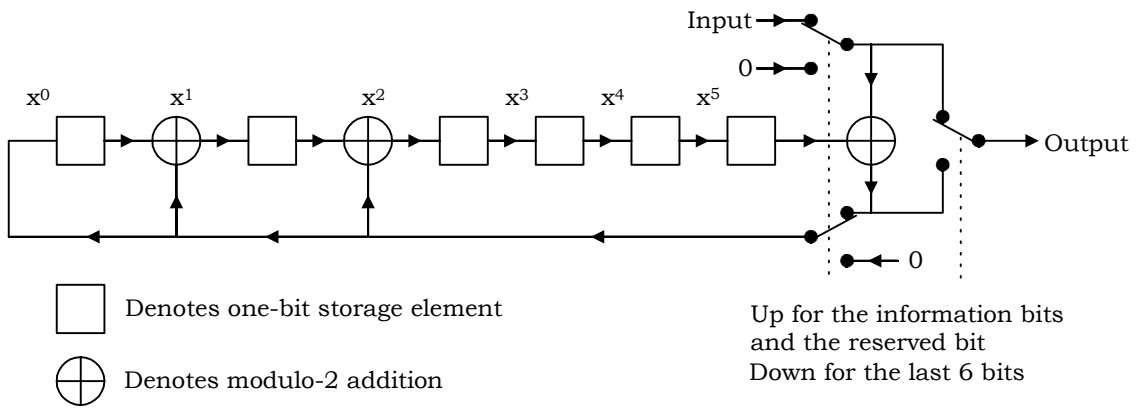
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figure 2.1.3.7.2.1-4. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

F

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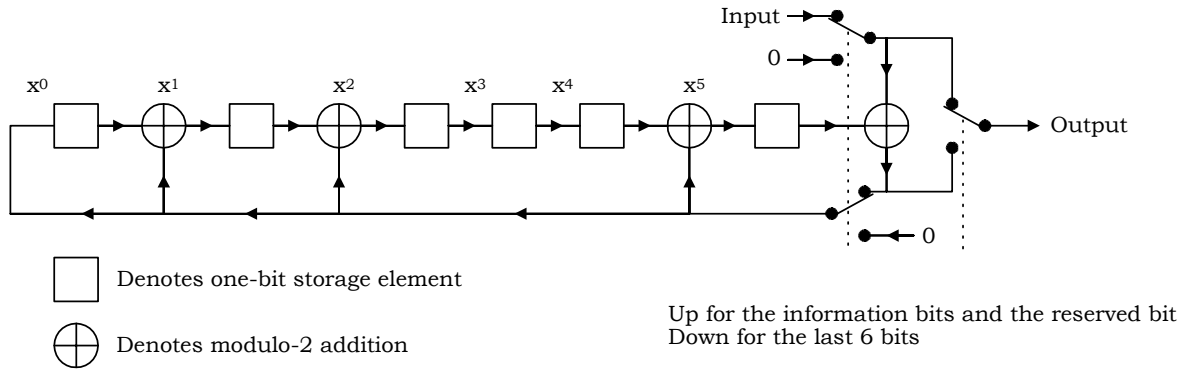
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Figure 2.1.3.7.2.1-5. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configuration 2

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Figure 2.1.3.7.2.1-6. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configurations 3 through 6

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1 2.1.3.7.2.2 Reverse Fundamental Channel Encoder Tail Bits

2 The last eight bits of each Reverse Fundamental Channel frame are called the Encoder Tail
3 Bits. These eight bits shall each be set to '0'.

4 2.1.3.7.2.3 Reverse Traffic Channel Preambles

5 The Reverse Traffic Channel preamble is transmitted on the Reverse Pilot Channel or
6 Reverse Fundamental Channel to aid the base station in acquiring the Reverse
7 Fundamental Channel transmissions.

8 2.1.3.7.2.3.1 Radio Configurations 1 and 2

9 The Reverse Traffic Channel preamble shall consist of a frame of all zeros that is
10 transmitted with a 100% transmission duty cycle. The Reverse Traffic Channel preamble
11 shall not include the frame quality indicator. For Radio Configuration 1, the Reverse Traffic
12 Channel preamble shall consist of 192 zeros that are transmitted at the 9600 bps rate. For
13 Radio Configuration 2, the Reverse Traffic Channel preamble shall consist of 288 zeros that
14 are transmitted at the 14400 bps rate.

15 When performing a hard handoff, the mobile station shall transmit the Reverse Traffic
16 Channel preamble for NUM_PREAMBLE_s frames.

17 2.1.3.7.2.3.2 Radio Configurations 3 through 6

18 The Reverse Traffic Channel preamble is transmitted on the Reverse Pilot Channel as
19 specified in 2.1.3.2.4.

20 2.1.3.7.3 Reverse Fundamental Channel Convolutional Encoding

21 The Reverse Fundamental Channel shall be convolutionally encoded as specified in
22 2.1.3.1.4.

23 When generating Reverse Fundamental Channel data, the encoder shall be initialized at the
24 end of each 5 or 20 ms frame.

25 2.1.3.7.4 Reverse Fundamental Channel Code Symbol Repetition

26 Reverse Fundamental Channel code symbol repetition shall be as specified in 2.1.3.1.5.

27 2.1.3.7.5 Reverse Fundamental Channel Code Symbol Puncturing

28 Reverse Fundamental Channel code symbol puncturing shall be as specified in 2.1.3.1.6.

29 2.1.3.7.6 Reverse Fundamental Channel Interleaving

30 The Reverse Fundamental Channel shall be interleaved as specified in 2.1.3.1.7.

31 2.1.3.7.7 Reverse Fundamental Channel Modulation

32 The Reverse Fundamental Channel data shall be modulated as specified in 2.1.3.1.8.

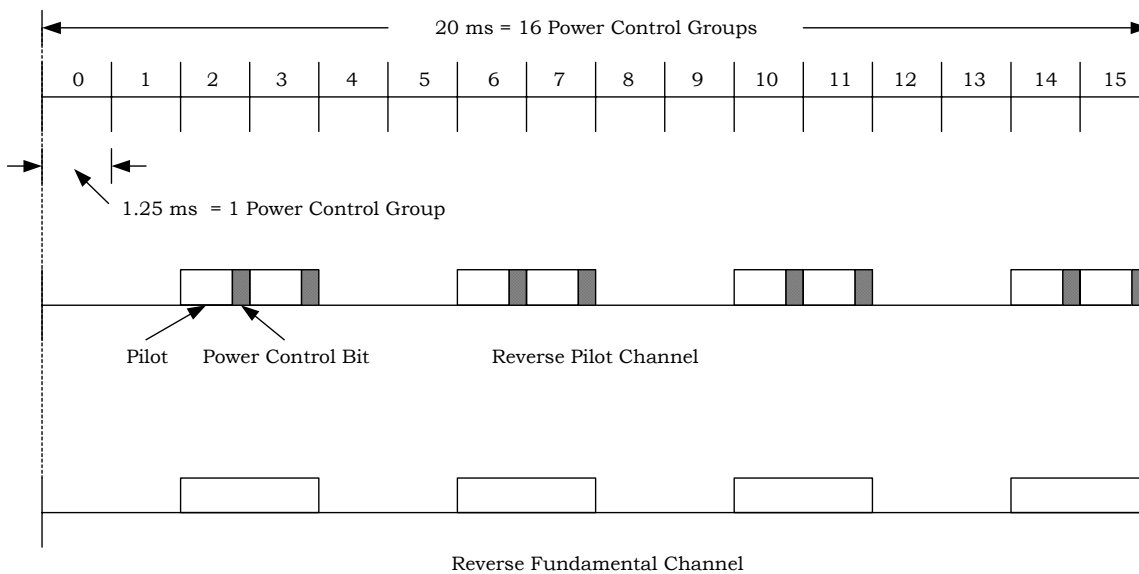
1 2.1.3.7.8 Reverse Fundamental Channel Gating

2 The mobile station shall perform the data burst randomizing function as specified in
 3 2.1.3.1.9 while transmitting on the Reverse Fundamental Channel with Radio
 4 Configuration 1 or 2.

5 The transmission of the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or
 6 6 may be gated when no other Reverse Traffic Channel is assigned, FPC_MODE_s is not
 7 '010', and the data rate is 1500 bps for Radio Configuration 3 and 5, or 1800 bps for Radio
 8 Configuration 4 and 6. The mobile station shall operate in the Reverse Fundamental
 9 Channel gating mode if and only if REV_FCH_GATING_MODE_s is equal to '1'.

10 When the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or 6 is operated
 11 in the gated mode at a data rate of 1500 bps for Radio Configurations 3 and 5, or 1800 bps
 12 for Radio Configurations 4 and 6 (i.e., when REV_FCH_GATING_MODE_s = 1), the Reverse
 13 Fundamental Channel shall have a transmission duty cycle of 50%. The Reverse
 14 Fundamental Channel shall be transmitted in power control groups 2, 3, 6, 7, 10, 11, 14,
 15 and 15, and shall not be transmitted in power control groups 0, 1, 4, 5, 8, 9, 12, and 13, as
 16 shown in Figure 2.1.3.7.8-1.

17



18

19 **Figure 2.1.3.7.8-1. Gating Operation When the Reverse Fundamental Channel Data**
 20 **Rate is 1500 bps for Radio Configuration 3 and 5 or 1800 bps for Radio Configuration**
 21 **4 and 6**

22

23 2.1.3.7.9 Reverse Fundamental Channel Direct Sequence Spreading

24 When operating in Radio Configuration 1 or 2, the Reverse Fundamental Channel shall be
 25 spread by the long code as specified in 2.1.3.1.11.

1 2.1.3.7.10 Reverse Fundamental Channel Quadrature Spreading

2 The Reverse Fundamental Channel shall be quadrature spread as specified in 2.1.3.1.12.

3 2.1.3.7.11 Reverse Fundamental Channel Baseband Filtering

4 The Reverse Fundamental Channel shall be filtered as specified in 2.1.3.1.13.

5 2.1.3.7.12 Reverse Fundamental Channel Transmission Processing

6 When the Physical Layer receives a PHY-FCH.Request(SDU, FRAME_DURATION,
7 NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- 8 • Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- 9 • Set the information bits to SDU.
- 10 • Transmit NUM_BITS bits of SDU on a Reverse Fundamental Channel frame of
11 duration FRAME_DURATION (5 ms or 20 ms). If a PHY-FCH.Request primitive for a
12 5 ms frame is received coincident with a PHY-FCH.Request primitive for a 20 ms
13 frame or during transmission of a 20 ms frame, then the mobile station may
14 preempt transmission of the 20 ms frame and transmit a 5 ms frame. Transmission
15 of the 20 ms frame may start or resume after completion of the 5 ms frame. If
16 transmission of the 20 ms frame is resumed after an interruption in transmission,
17 then the relative power level of the Reverse Fundamental Channel modulation
18 symbols shall be equal to that of the modulation symbols sent prior to the
19 preemption.

20 2.1.3.8 Reverse Supplemental Channel

21 The Reverse Supplemental Channel applies to Radio Configurations 3 through 6 only.

22 The Reverse Supplemental Channel is used for the transmission of user information to the
23 base station during a call. The Reverse Traffic Channel contains up to two Reverse
24 Supplemental Channels.

25 2.1.3.8.1 Reverse Supplemental Channel Time Alignment and Modulation Rates

26 When transmitting on the Reverse Supplemental Channel with a single assigned data rate
27 in Radio Configuration 3, the mobile station shall transmit information at fixed data rates
28 of 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200
29 bps.

30 The mobile station may support flexible data rates. If flexible data rates are supported,

- 31 • When transmitting on the Reverse Supplemental Channel with a single assigned
32 data rate and 20 ms frames in Radio Configuration 3, the mobile station should
33 transmit information at a fixed data rate corresponding to 15 to 6143 total bits per
34 frame in 1 bit increments. The mobile station need not support flexible rates with
35 less than 16 information bits per frame.

- 1 • When transmitting on the Reverse Supplemental Channel with a single assigned
2 data rate and 40 ms frames in Radio Configuration 3, the mobile station should
3 transmit information at a fixed data rate corresponding to 31 to 6143 total bits per
4 frame in 1 bit increments. The mobile station need not support flexible rates with
5 less than 40 information bits per frame.
- 6 • When transmitting on the Reverse Supplemental Channel with a single assigned
7 data rate and 80 ms frames in Radio Configuration 3, the mobile station should
8 transmit information at a fixed data rate corresponding to 55 to 6143 total bits per
9 frame in 1 bit increments. The mobile station need not support flexible rates with
10 less than 80 information bits per frame.

11 When transmitting on the Reverse Supplemental Channel with a single assigned data rate
12 in Radio Configuration 4, the mobile station shall transmit information at fixed data rates
13 of 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

14 If flexible data rates are supported,

- 15 • When transmitting on the Reverse Supplemental Channel with a single assigned
16 data rate and 20 ms frames in Radio Configuration 4, the mobile station should
17 transmit information at a fixed data rate corresponding to 15 to 4607 total bits per
18 frame in 1 bit increments. The mobile station need not support flexible rates with
19 less than 22 information bits per frame.
- 20 • When transmitting on the Reverse Supplemental Channel with a single assigned
21 data rate and 40 ms frames in Radio Configuration 4, the mobile station should
22 transmit information at a fixed data rate corresponding to 37 to 4607 total bits per
23 frame in 1 bit increments. The mobile station need not support flexible rates with
24 less than 56 information bits per frame.
- 25 • When transmitting on the Reverse Supplemental Channel with a single assigned
26 data rate and 80 ms frames in Radio Configuration 4, the mobile station should
27 transmit information at a fixed data rate corresponding to 73 to 4607 total bits per
28 frame in 1 bit increments. The mobile station need not support flexible rates with
29 less than 126 information bits per frame.

30 When transmitting on the Reverse Supplemental Channel with a single assigned data rate
31 in Radio Configuration 5, the mobile station shall transmit information at a fixed data rate
32 of 614400, 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350,
33 or 1200 bps.

34 If flexible data rates are supported,

- 35 • When transmitting on the Reverse Supplemental Channel with a single assigned
36 data rate and 20 ms frames in Radio Configuration 5, the mobile station should
37 transmit information at a fixed data rate corresponding to 15 to 12287 total bits per
38 frame in 1 bit increments. The mobile station need not support flexible rates with
39 less than 16 information bits per frame.

- 1 • When transmitting on the Reverse Supplemental Channel with a single assigned
2 data rate and 40 ms frames in Radio Configuration 5, the mobile station should
3 transmit information at a fixed data rate corresponding to 31 to 12287 total bits per
4 frame in 1 bit increments. The mobile station need not support flexible rates with
5 less than 40 information bits per frame.
- 6 • When transmitting on the Reverse Supplemental Channel with a single assigned
7 data rate and 80 ms frames in Radio Configuration 5, the mobile station should
8 transmit information at a fixed data rate corresponding to 55 to 12287 total bits per
9 frame in 1 bit increments. The mobile station need not support flexible rates with
10 less than 80 information bits per frame.

11 When transmitting on the Reverse Supplemental Channel with a single assigned data rate
12 in Radio Configuration 6, the mobile station shall transmit information at a fixed data rate
13 of 1036800, 518400, 460800, 259200, 230400, 115200, 57600, 28800, 14400, 7200,
14 3600, or 1800 bps.

15 If flexible data rates are supported,

- 16 • When transmitting on the Reverse Supplemental Channel with a single assigned
17 data rate and 20 ms frames in Radio Configuration 6, the mobile station should
18 transmit information at a fixed data rate corresponding to 15 to 20735 total bits per
19 frame in 1 bit increments. The mobile station need not support flexible rates with
20 less than 22 information bits per frame.
- 21 • When transmitting on the Reverse Supplemental Channel with a single assigned
22 data rate and 40 ms frames in Radio Configuration 6, the mobile station should
23 transmit information at a fixed data rate corresponding to 37 to 20735 total bits per
24 frame in 1 bit increments. The mobile station need not support flexible rates with
25 less than 56 information bits per frame.
- 26 • When transmitting on the Reverse Supplemental Channel with a single assigned
27 data rate and 80 ms frames in Radio Configuration 6, the mobile station should
28 transmit information at a fixed data rate corresponding to 73 to 20735 total bits per
29 frame in 1 bit increments. The mobile station need not support flexible rates with
30 less than 126 information bits per frame.

31 When using variable-rate transmission on the Reverse Supplemental Channel with multiple
32 assigned data rates in Radio Configurations 3, 4, 5, and 6, the mobile station shall

- 33 • Transmit information at the maximal assigned data rate, or
- 34 • Transmit information at the other assigned data rates with the same modulation
35 symbol rate as that of the maximal assigned data rate. To achieve a higher
36 modulation symbol rate, repetition and puncturing are applied to the specified data
37 rate.

38 If the mobile station supports the Reverse Supplemental Channel, the mobile station shall
39 support Reverse Supplemental Channel frames that are 20 ms in duration. The mobile
40 station may support Reverse Supplemental Channel frames that are 40 or 80 ms in
41 duration. The mobile station may support discontinuous transmission of Reverse
42 Supplemental Channel frames.

1 The mobile station shall support Reverse Supplemental Channel frames that are time offset
2 by multiples of 1.25 ms as specified by $FRAME_OFFSET_S$. The mobile station may support
3 40 or 80 ms Reverse Supplemental Channel frames that are time offset by multiples of 20
4 ms as specified by $REV_SCH_FRAME_OFFSET[i]_S$, where $i = 1$ and 2 for Reverse
5 Supplemental Channel 1 and Reverse Supplemental Channel 2, respectively.

6 The amount of the time offset is specified by $FRAME_OFFSET_S$ and
7 $REV_SCH_FRAME_OFFSET[i]_S$, where $i = 1$ or 2. A zero-offset 20 ms Reverse Supplemental
8 Channel frame shall begin only when System Time is an integral multiple of 20 ms (see
9 Figure 1.3-1). A zero-offset 40 ms Reverse Supplemental Channel frame shall begin only
10 when System Time is an integral multiple of 40 ms. A zero-offset 80 ms Reverse
11 Supplemental Channel frame shall begin only when System Time is an integral multiple of
12 80 ms. An offset 20 ms Reverse Supplemental Channel frame shall begin 1.25
13 $\times FRAME_OFFSET_S$ ms later than the zero-offset 20 ms Reverse Supplemental Channel
14 frame. An offset 40 ms Reverse Supplemental Channel frame shall begin $(1.25$
15 $\times FRAME_OFFSET_S + 20 \times REV_SCH_FRAME_OFFSET[i]_S)$ ms later than the zero-offset 40
16 ms Reverse Supplemental Channel frame. An offset 80 ms Reverse Supplemental Channel
17 frame shall begin $(1.25 \times FRAME_OFFSET_S + 20 \times REV_SCH_FRAME_OFFSET[i]_S)$ ms later
18 than the zero-offset 80 ms Reverse Supplemental Channel frame. The interleaver block for
19 the Reverse Supplemental Channels shall be aligned with the Reverse Supplemental
20 Channel frame.

21 2.1.3.8.2 Reverse Supplemental Channel Frame Structure

22 Tables 2.1.3.8.2-1 through 2.1.3.8.2-3 summarize the Reverse Supplemental Channel bit
23 allocations for non-flexible data rates. Tables 2.1.3.8.2-4 through 2.1.3.8.2-6 summarize
24 the Reverse Supplemental Channel bit allocations for flexible data rates. All frames shall
25 consist of zero or one Reserved Bits followed by the information bits, a frame quality
26 indicator (CRC), and eight Encoder Tail Bits, as shown in Figure 2.1.3.8.2-1.

27 All frames with Radio Configurations 3 and 5 and the frames with Radio Configurations 4
28 and 6 with data rates above 14400 bps shall consist of the information bits, followed by the
29 frame quality indicator (CRC) and eight Encoder Tail Bits. All frames with Radio
30 Configurations 4 and 6 with data rates equal to or less than 14400 bps shall consist of zero
31 or one Reserved Bits, followed by the information bits, frame quality indicator (CRC), and
32 eight Encoder Tail Bits.

33

**Table 2.1.3.8.2-1. Reverse Supplemental Channel Frame Structure Summary
for 20 ms Frames for Non-flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Reserved/Encoder Tail
3 and 5	614400	12288	0	12264	16	8
	307200	6144	0	6120	16	8
	153600	3072	0	3048	16	8
	76800	1536	0	1512	16	8
	38400	768	0	744	16	8
	19200	384	0	360	16	8
	9600	192	0	172	12	8
	4800	96	0	80	8	8
	2700	54	0	40	6	8
	1500	30	0	16	6	8
4 and 6	1036800	20736	0	20712	16	8
	460800	9216	0	9192	16	8
	230400	4608	0	4584	16	8
	115200	2304	0	2280	16	8
	57600	1152	0	1128	16	8
	28800	576	0	552	16	8
	14400	288	1	267	12	8
	7200	144	1	125	10	8
	3600	72	1	55	8	8
	1800	36	1	21	6	8

Note: The 614400 bps data rate applies to Radio Configuration 5. The 1036800 bps and 460800 bps data rates apply to Radio Configuration 6 only.

**Table 2.1.3.8.2-2. Reverse Supplemental Channel Frame Structure Summary
for 40 ms Frames for Non-flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Reserved/Encoder Tail
3 and 5	307200	12288	0	12264	16	8
	153600	6144	0	6120	16	8
	76800	3072	0	3048	16	8
	38400	1536	0	1512	16	8
	19200	768	0	744	16	8
	9600	384	0	360	16	8
	4800	192	0	172	12	8
	2400	96	0	80	8	8
	1350	54	0	40	6	8
4 and 6	518400	20736	0	20712	16	8
	230400	9216	0	9192	16	8
	115200	4608	0	4584	16	8
	57600	2304	0	2280	16	8
	28800	1152	0	1128	16	8
	14400	576	0	552	16	8
	7200	288	1	267	12	8
	3600	144	1	125	10	8
	1800	72	1	55	8	8

Note: The 307200 bps data rate applies to Radio Configuration 5. The 518400 bps and 230400 bps data rates apply to Radio Configuration 6 only.

1
2

**Table 2.1.3.8.2-3. Reverse Supplemental Channel Frame Structure Summary
for 80 ms Frames for Non-flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Reserved/Encoder Tail
3 and 5	153600	12288	0	12264	16	8
	76800	6144	0	6120	16	8
	38400	3072	0	3048	16	8
	19200	1536	0	1512	16	8
	9600	768	0	744	16	8
	4800	384	0	360	16	8
	2400	192	0	172	12	8
	1200	96	0	80	8	8
4 and 6	259200	20736	0	20712	16	8
	115200	9216	0	9192	16	8
	57600	4608	0	4584	16	8
	28800	2304	0	2280	16	8
	14400	1152	0	1128	16	8
	7200	576	0	552	16	8
	3600	288	1	267	12	8
	1800	144	1	125	10	8

Note: The 153600 bps data rate applies to Radio Configuration 5. The 259200 bps and 115200 bps data rates apply to Radio Configuration 6 only.

3

**Table 2.1.3.8.2-4. Reverse Supplemental Channel Frame Structure Summary
for 20 ms Frames for Flexible Data Rates (Part 1 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved/ Encoder Tail
5	307250 to 614350	6145 to 12287	6121 to 12263	16	8
3 and 5	153650 to 307150	3073 to 6143	3049 to 6119	16	8
	76850 to 153550	1537 to 3071	1513 to 3047	16	8
	38450 to 76750	769 to 1535	745 to 1511	16	8
	19250 to 38350	385 to 767	361 to 743	16	8
	9650 to 19150	193 to 383	169 to 359	16	8
	4850 to 9600	97 to 192	73 to 168	16	8
	4850 to 9550	97 to 191	77 to 171	12	8
	2750 to 4800	55 to 96	31 to 72	16	8
	2750 to 4800	55 to 96	35 to 76	12	8
	2750 to 4750	55 to 95	39 to 79	8	8
	1550 to 2700	31 to 54	7 to 30	16	8
	1550 to 2700	31 to 54	11 to 34	12	8
	1550 to 2700	31 to 54	15 to 38	8	8
	1550 to 2650	31 to 53	17 to 39	6	8
	1250 to 1500	25 to 30	1 to 6	16	8
	1050 to 1500	21 to 30	1 to 10	12	8
	850 to 1500	17 to 30	1 to 14	8	8
	750 to 1450	15 to 29	1 to 15	6	8

3

4

**Table 2.1.3.8.2-4. Reverse Supplemental Channel Frame Structure Summary
for 20 ms Frames for Flexible Data Rates (Part 2 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved /Encoder Tail
6	460850 to 1036750	9217 to 20735	9193 to 20711	16	8
	230450 to 460750	4609 to 9215	4585 to 9191	16	8
4 and 6	115250 to 230350	2305 to 4607	2281 to 4583	16	8
	57650 to 115150	1153 to 2303	1129 to 2279	16	8
	28850 to 57550	577 to 1151	553 to 1127	16	8
	14450 to 28750	289 to 575	265 to 551	16	8
	7250 to 14400	145 to 288	121 to 264	16	8
	7250 to 14300, 14400	145 to 286, 288	125 to 266, 268	12	8
	3650 to 7200	73 to 144	49 to 120	16	8
	3650 to 7200	73 to 144	53 to 124	12	8
	3650 to 7100, 7200	73 to 142, 144	55 to 124, 126	10	8
	1850 to 3600	37 to 72	13 to 48	16	8
	1850 to 3600	37 to 72	17 to 52	12	8
	1850 to 3600	37 to 72	19 to 54	10	8
	1850 to 3500, 3600	37 to 70, 72	21 to 54, 56	8	8
	1250 to 1800	25 to 36	1 to 12	16	8
	1050 to 1800	21 to 36	1 to 16	12	8
	950 to 1800	19 to 36	1 to 18	10	8
	850 to 1800	17 to 36	1 to 20	8	8
	750 to 1700, 1800	15 to 34, 36	1 to 20, 22	6	8

**Table 2.1.3.8.2-5. Reverse Supplemental Channel Frame Structure Summary
for 40 ms Frames for Flexible Data Rates (Part 1 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved /Encoder Tail
5	153625 to 307175	6145 to 12287	6121 to 12263	16	8
3 and 5	76825 to 153575	3073 to 6143	3049 to 6119	16	8
	38425 to 76775	1537 to 3071	1513 to 3047	16	8
	19225 to 38375	769 to 1535	745 to 1511	16	8
	9625 to 19175	385 to 767	361 to 743	16	8
	4825 to 9575	193 to 383	169 to 359	16	8
	2425 to 4800	97 to 192	73 to 168	16	8
	2425 to 4775	97 to 191	77 to 171	12	8
	1375 to 2400	55 to 96	31 to 72	16	8
	1375 to 2400	55 to 96	35 to 76	12	8
	1375 to 2375	55 to 95	39 to 79	8	8
	775 to 1350	31 to 54	7 to 30	16	8
	775 to 1350	31 to 54	11 to 34	12	8
	775 to 1350	31 to 54	15 to 38	8	8
	775 to 1325	31 to 53	17 to 39	6	8

3

1
2

**Table 2.1.3.8.2-5. Reverse Supplemental Channel Frame Structure Summary
for 40 ms Frames for Flexible Data Rates (Part 2 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved /Encoder Tail
6	230425 to 518375	9217 to 20735	9193 to 20711	16	8
	115225 to 230375	4609 to 9215	4585 to 9191	16	8
4 and 6	57625 to 115175	2305 to 4607	2281 to 4583	16	8
	28825 to 57575	1153 to 2303	1129 to 2279	16	8
	14425 to 28775	577 to 1151	553 to 1127	16	8
	7225 to 14375	289 to 575	265 to 551	16	8
	3625 to 7200	145 to 288	121 to 264	16	8
	3625 to 7150, 7200	145 to 286, 288	125 to 266, 268	12	8
	1825 to 3600	73 to 144	49 to 120	16	8
	1825 to 3600	73 to 144	53 to 124	12	8
	1825 to 3550, 3600	73 to 142, 144	55 to 124, 126	10	8
	925 to 1800	37 to 72	13 to 48	16	8
	925 to 1800	37 to 72	17 to 52	12	8
	925 to 1800	37 to 72	19 to 54	10	8
	925 to 1750, 1800	37 to 70, 72	21 to 54, 56	8	8

3

1
2

**Table 2.1.3.8.2-6. Reverse Supplemental Channel Frame Structure Summary
for 80 ms Frames for Flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved /Encoder Tail
5	76812.5 to 153587.5	6145 to 12287	6121 to 12263	16	8
3 and 5	38412.5 to 76787.5	3073 to 6143	3049 to 6119	16	8
	19212.5 to 38387.5	1537 to 3071	1513 to 3047	16	8
	9612.5 to 19187.5	769 to 1535	745 to 1511	16	8
	4812.5 to 9587.5	385 to 767	361 to 743	16	8
	2412.5 to 4787.5	193 to 383	169 to 359	16	8
	1212.5 to 2400	97 to 192	73 to 168	16	8
	1212.5 to 2387.5	97 to 191	77 to 171	12	8
	687.5 to 1200	55 to 96	31 to 72	16	8
	687.5 to 1200	55 to 96	35 to 76	12	8
	687.5 to 1187.5	55 to 95	39 to 79	8	8
6	115212.5 to 259187.5	9217 to 20735	9193 to 20711	16	8
	57612.5 to 115187.5	4609 to 9215	4585 to 9191	16	8
4 and 6	28812.5 to 57587.5	2305 to 4607	2281 to 4583	16	8
	14412.5 to 28787.5	1153 to 2303	1129 to 2279	16	8
	7212.5 to 14387.5	577 to 1151	553 to 1127	16	8
	3612.5 to 7187.5	289 to 575	265 to 551	16	8
	1812.5 to 3600	145 to 288	121 to 264	16	8
	1812.5 to 3575, 3600	145 to 286, 288	125 to 266, 268	12	8
	912.5 to 1800	73 to 144	49 to 120	16	8
	912.5 to 1800	73 to 144	53 to 124	12	8
	912.5 to 1775, 1800	73 to 142, 144	55 to 124, 126	10	8

3

R	Information Bits	F	R/T
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Notation

R - Reserved Bit

F - Frame Quality Indicator (CRC)

R/T - Reserved/Encoder Tail Bits

Figure 2.1.3.8.2-1. Reverse Supplemental Channel Frame Structure

2.1.3.8.2.1 Reverse Supplemental Channel Frame Quality Indicator

Each frame shall include a frame quality indicator. This frame quality indicator is a CRC.

The frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Reserved/Encoder Tail Bits.

Frames in Radio Configurations 3 and 5 with more than 192 total bits and in Radio Configurations 4 and 6 with more than 288 total bits shall use a 16-bit frame quality indicator.

Frames in Radio Configurations 3 and 5 with 97 to 192 total bits and in Radio Configurations 4 and 6 with 145 to 288 total bits shall use a 12-bit frame quality indicator. A 16-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 4 and 6 with 73 to 144 total bits shall use a 10-bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 3 and 5 with 55 to 96 total bits shall use an 8-bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 4 and 6 with 37 to 72 total bits shall use an 8-bit frame quality indicator. A 16-bit, 12-bit, or 10-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 3 and 5 with 54 or fewer total bits shall use a 6-bit frame quality indicator. A 16-bit, 12-bit, or 8-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 4 and 6 with 36 or fewer total bits shall use a 6-bit frame quality indicator. A 16-bit, 12-bit, 10-bit, or 8-bit frame quality indicator may be used if flexible data rates are supported.

The generator polynomials for the frame quality indicator shall be as follows:

$$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1 \text{ for the 16-bit frame quality indicator,}$$

$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1 \text{ for the 12-bit frame quality indicator,}$$

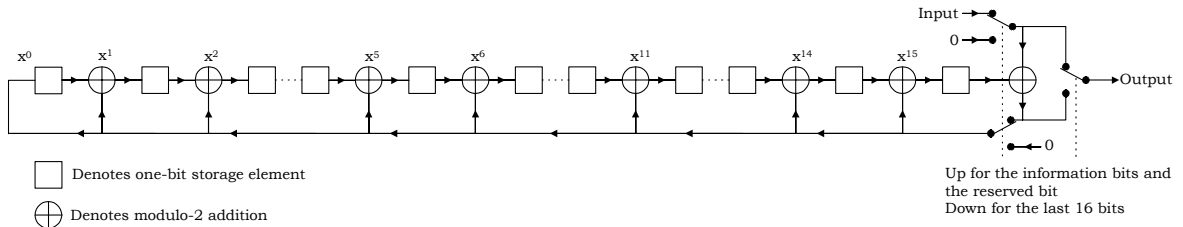
$$g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1 \text{ for the 10-bit frame quality indicator,}$$

1 $g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator, and
 2 $g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator.

3 The frame quality indicators shall be computed according to the following procedure as
 4 shown in Figures 2.1.3.8.2.1-1 through 2.1.3.8.2.1-5:

- 5 • Initially, all shift register elements shall be set to logical one and the switches shall
 6 be set in the up position.
- 7 • The register shall be clocked a number of times equal to the number of Reserved
 8 Bits and information bits in the frame with those bits as input.
- 9 • The switches shall be set in the down position so that the output is a modulo-2
 10 addition with a '0' and the successive shift register inputs are '0's.
- 11 • The register shall be clocked an additional number of times equal to the number of
 12 bits in the frame quality indicator (16, 12, 10, 8, or 6).
- 13 • These additional bits shall be the frame quality indicator bits.
- 14 • The bits shall be transmitted in the order calculated.

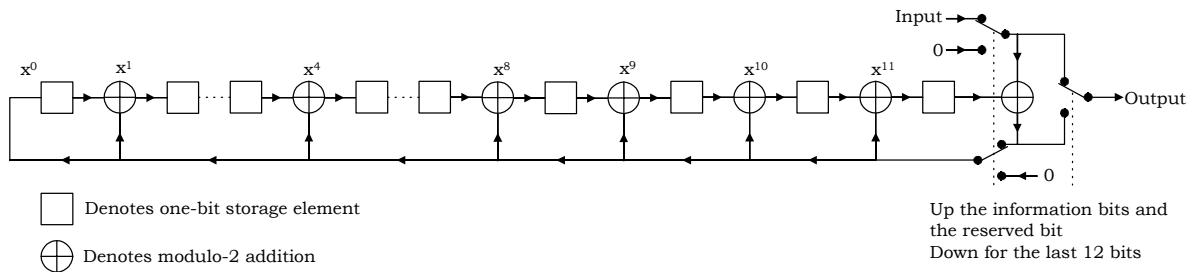
15



16

17 **Figure 2.1.3.8.2.1-1. Reverse Supplemental Channel Frame Quality Indicator**
 18 **Calculation for the 16-Bit Frame Quality Indicator**

19



20

21 **Figure 2.1.3.8.2.1-2. Reverse Supplemental Channel Frame Quality Indicator**
 22 **Calculation for the 12-Bit Frame Quality Indicator**

23

24

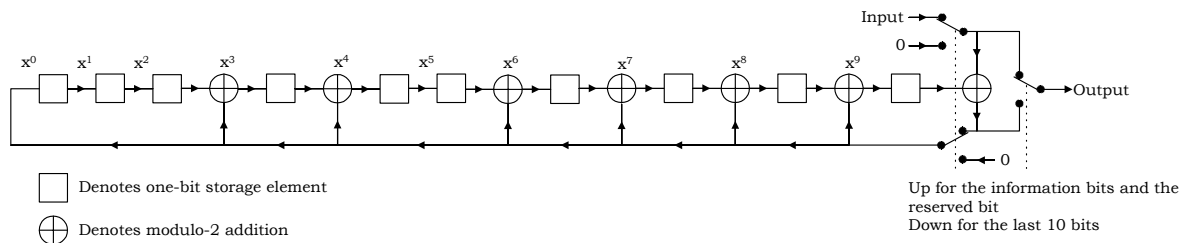


Figure 2.1.3.8.2.1-3. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator

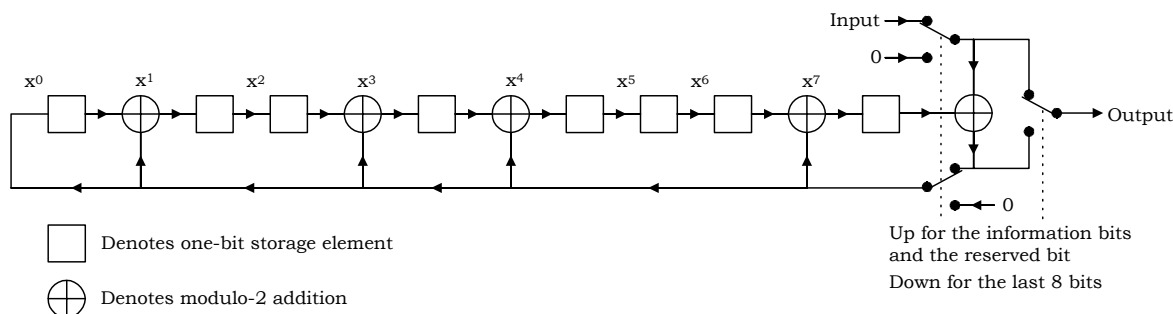


Figure 2.1.3.8.2.1-4. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

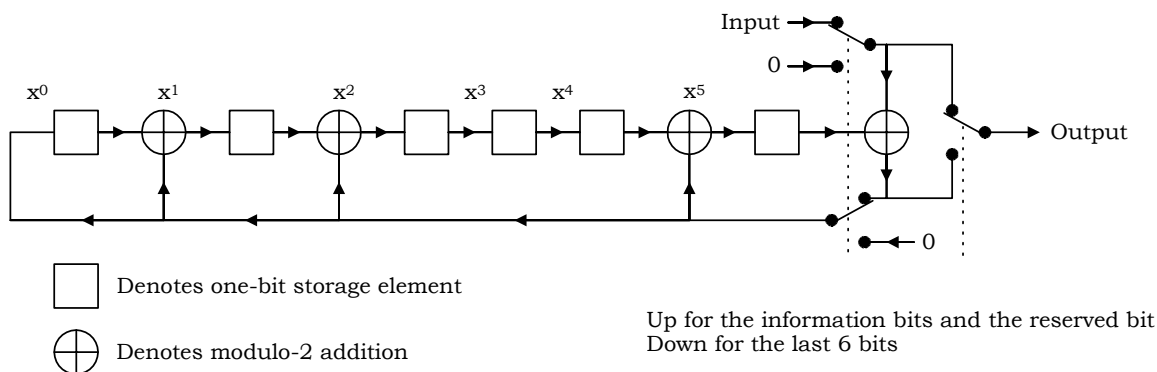


Figure 2.1.3.8.2.1-5. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator

2.1.3.8.2.2 Reverse Supplemental Channel Encoder Tail Bits

The last eight bits of each Reverse Supplemental Channel frame are called the Reserved/Encoder Tail Bits. For the convolutional encoder, these eight bits shall each be set to '0'. For the turbo encoder, the first two of the eight bits shall each be set to '0', and the turbo encoder will calculate and append the remaining six tail bits.

1 2.1.3.8.3 Reverse Supplemental Channel Forward Error Correction Encoding

2 The Reverse Supplemental Channel shall be convolutionally or turbo encoded as specified
3 in 2.1.3.1.4.

4 When generating Reverse Supplemental Channel data, the encoder shall be initialized at
5 the end of each frame.

6 2.1.3.8.4 Reverse Supplemental Channel Code Symbol Repetition

7 Reverse Supplemental Channel code symbol repetition shall be as specified in 2.1.3.1.5.

8 2.1.3.8.5 Reverse Supplemental Channel Code Symbol Puncturing

9 Reverse Supplemental Channel code symbol puncturing shall be as specified in 2.1.3.1.6.

10 2.1.3.8.6 Reverse Supplemental Channel Interleaving

11 The Reverse Supplemental Channel shall be interleaved as specified in 2.1.3.1.7.

12 2.1.3.8.7 Reverse Supplemental Channel Modulation

13 The Reverse Supplemental Channel data shall be modulated as specified in 2.1.3.1.8.

14 2.1.3.8.8 Reverse Supplemental Channel Quadrature Spreading

15 The Reverse Supplemental Channel shall be quadrature spread as specified in 2.1.3.1.12.

16 2.1.3.8.9 Reverse Supplemental Channel Baseband Filtering

17 The Reverse Supplemental Channel shall be filtered as specified in 2.1.3.1.13.

18 2.1.3.8.10 Reverse Supplemental Channel Transmission Processing

19 When the Physical Layer receives a PHY-SCH.Request(SDU, FRAME_DURATION,
20 NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- 21 • Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- 22 • If SDU is not equal to NULL, set the information bits to SDU.
- 23 • If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Reverse
24 Supplemental Channel frame of duration FRAME_DURATION (20, 40, or 80 ms).

25 2.1.3.9 Reverse Supplemental Code Channel

26 The Reverse Supplemental Code Channel applies to Radio Configurations 1 and 2 only.

27 The Reverse Supplemental Code Channel is used for the transmission of user information
28 to the base station during a call. The Reverse Traffic Channel contains up to seven Reverse
29 Supplemental Code Channels.

30 2.1.3.9.1 Reverse Supplemental Code Channel Time Alignment and Modulation Rates

31 When transmitting on Reverse Supplemental Code Channels with Radio Configuration 1,
32 the mobile station shall transmit information at 9600 bps. When transmitting on Reverse

1 Supplemental Code Channels with Radio Configuration 2, the mobile station shall transmit
2 information at 14400 bps.

3 The Reverse Supplemental Code Channel frame shall be 20 ms in duration.

4 The mobile station shall transmit Reverse Supplemental Code Channels within 3/8 of a PN
5 chip (305.1758 ns) of the Reverse Fundamental Channel.

6 The mobile station shall support Reverse Supplemental Code Channel frames that are time
7 offset by multiples of 1.25 ms. The amount of the time offset is specified by
8 $FRAME_OFFSET_s$. A zero-offset Reverse Supplemental Code Channel frame shall begin only
9 when System Time is an integral multiple of 20 ms (see Figure 1.3-1). An offset Reverse
10 Supplemental Code Channel frame shall begin $1.25 \times FRAME_OFFSET_s$ ms later than the
11 zero-offset Reverse Supplemental Code Channel frame. The mobile station shall transmit
12 frames on the Reverse Supplemental Code Channels in time alignment with the Reverse
13 Fundamental Channel. The interleaver block for the Reverse Supplemental Code Channels
14 shall be aligned with the Reverse Supplemental Code Channel frame.

15 2.1.3.9.2 Reverse Supplemental Code Channel Frame Structure

16 Table 2.1.3.9.2-1 summarizes the Reverse Supplemental Code Channel bit allocations. The
17 order of the bits is shown in Figure 2.1.3.9.2-1.

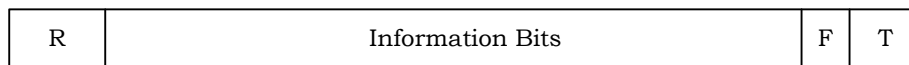
18 Radio Configuration 1 frames shall consist of the information bits followed by a frame
19 quality indicator (CRC) and eight Encoder Tail Bits. Radio Configuration 2 frames shall
20 consist of a Reserved Bit, followed by the information bits, a frame quality indicator (CRC),
21 and eight Encoder Tail Bits.

22

23 **Table 2.1.3.9.2-1. Reverse Supplemental Code Channel Frame Structure Summary**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Encoder Tail
1	9600	192	0	172	12	8
2	14400	288	1	267	12	8

24



Notation

R - Reserved Bit

F - Frame Quality Indicator (CRC)

T - Encoder Tail Bits

25

26

Figure 2.1.3.9.2-1. Reverse Supplemental Code Channel Frame Structure

27

2.1.3.9.2.1 Reverse Supplemental Code Channel Frame Quality Indicator

The frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Encoder Tail Bits. Each frame with Radio Configuration 1 and 2 shall include a 12-bit frame quality indicator. This frame quality indicator is a CRC.

The generator polynomial for the frame quality indicator shall be as follows:

$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1.$$

The frame quality indicator shall be computed according to the following procedure as shown in Figure 2.1.3.9.2.1-1:

- Initially, all shift register elements shall be set to logical one and the switches shall be set in the up position.
- The register shall be clocked a number of times equal to the number of Reserved Bits and information bits in the frame with those bits as input.
- The switches shall be set in the down position so that the output is a modulo-2 addition with a '0' and the successive shift register inputs are '0's.
- The register shall be clocked an additional number of times equal to the number of bits in the frame quality indicator (12).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

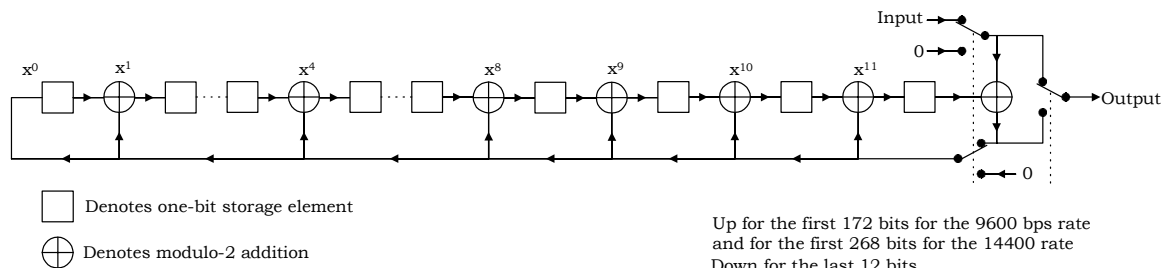


Figure 2.1.3.9.2.1-1. Reverse Supplemental Code Channel Frame Quality Indicator Calculation

2.1.3.9.2.2 Reverse Supplemental Code Channel Encoder Tail Bits

The last eight bits of each Reverse Supplemental Code Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to '0'.

2.1.3.9.2.3 Reverse Supplemental Code Channel Preambles

The Reverse Supplemental Code Channel preamble is transmitted on the Reverse Supplemental Code Channel to aid the base station in acquiring the Reverse Supplemental Code Channel transmissions.

1 2.1.3.9.2.3.1 Reverse Supplemental Code Channel Preamble

2 The Reverse Supplemental Code Channel preamble shall consist of
3 NUM_PREAMBLE_FRAMES_s frames of all zeros that are transmitted with a 100%
4 transmission duty cycle. The Reverse Supplemental Code Channel preamble shall not
5 include the frame quality indicator. For Radio Configuration 1, each frame of the Reverse
6 Supplemental Code Channel preamble shall consist of 192 zeros that are transmitted at the
7 9600 bps rate. For Radio Configuration 2, each frame of the Reverse Supplemental Code
8 Channel preamble shall consist of 288 zeros that are transmitted at the 14400 bps rate.

9 2.1.3.9.2.3.2 Reverse Supplemental Code Channel Discontinuous Transmission Preamble

10 When discontinuous transmission is permitted on the Reverse Supplemental Code
11 Channel, the mobile station may resume transmission following a break in the Reverse
12 Supplemental Code Channel transmission. When transmission on a Reverse Supplemental
13 Code Channel is resumed, the mobile station shall transmit a preamble, consisting of
14 RESUME_PREAMBLE_s frames of all zeros that are transmitted with a 100% transmission
15 duty cycle. The preamble frames shall not include the frame quality indicator.

16 For Radio Configuration 1, each frame of the Reverse Supplemental Code Channel
17 preamble shall consist of 192 zeros that are transmitted at the 9600 bps rate. For Radio
18 Configuration 2, each frame of the Reverse Supplemental Code Channel Discontinuous
19 Transmission preamble shall consist of 288 zeros that are transmitted at the 14400 bps
20 rate.

21 2.1.3.9.3 Reverse Supplemental Code Channel Convolutional Encoding

22 The Reverse Supplemental Channel shall be convolutionally encoded as specified in
23 2.1.3.1.4.

24 When generating Reverse Supplemental Code Channel data, the encoder shall be initialized
25 at the end of each 20 ms frame.

26 2.1.3.9.4 Reverse Supplemental Code Channel Code Symbol Repetition

27 Reverse Supplemental Code Channel code symbol repetition shall be as specified in
28 2.1.3.1.5.

29 2.1.3.9.5 Reverse Supplemental Code Channel Interleaving

30 The Reverse Supplemental Code Channel shall be interleaved as specified in 2.1.3.1.7.

31 2.1.3.9.6 Reverse Supplemental Code Channel Modulation

32 The Reverse Supplemental Code Channel data shall be modulated as specified in 2.1.3.1.8.

33 2.1.3.9.7 Reverse Supplemental Code Channel Direct Sequence Spreading

34 The Reverse Supplemental Code Channel shall be spread by the long code as specified in
35 2.1.3.1.11.

1 2.1.3.9.8 Reverse Supplemental Code Channel Quadrature Spreading

2 The Reverse Supplemental Code Channel shall be quadrature spread by the pilot PN
3 sequences as specified in 2.1.3.1.12.

4 2.1.3.9.9 Reverse Supplemental Code Channel Baseband Filtering

5 The Reverse Supplemental Code Channel shall be filtered as specified in 2.1.3.1.13.

6 2.1.3.9.10 Reverse Supplemental Code Channel Transmission Processing

7 When the Physical Layer receives a PHY-SCCHPreamble.Request(NUM_PREAMBLE_
8 FRAMES) from the MAC Layer, the mobile station shall perform the following:

- 9 • Store the arguments NUM_PREAMBLE_FRAMES.
- 10 • Transmit NUM_PREAMBLE_FRAMES Reverse Supplemental Code Channel
11 preamble frames.

12 When the Physical Layer receives a PHY-SCCH.Request(SDU, FRAME_DURATION,
13 NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- 14 • Store the arguments SDU and NUM_BITS.
- 15 • If SDU is not equal to NULL, set the information bits to SDU.
- 16 • If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Reverse
17 Supplemental Code Channel frame.

18 2.1.4 Limitations on Emissions

19 2.1.4.1 Conducted Spurious Emissions

20 The mobile station shall meet the requirements in Section 4.5.1 of the current version of
21 [11].

22 2.1.4.2 Radiated Spurious Emissions

23 The mobile station shall meet the requirements in Section 4.5.2 of the current version of
24 [11].

25 2.1.5 Synchronization and Timing

26 Figure 1.3-1 illustrates the nominal relationship between the mobile station and base
27 station transmit and receive time references. The mobile station shall establish a time
28 reference which is utilized to derive timing for the transmitted chips, symbols, frame slots,
29 and system timing. Under steady state conditions, the mobile station time reference shall
30 be within $\pm 1 \mu\text{s}$ of the time of occurrence of the earliest multipath component being used
31 for demodulation as measured at the mobile station antenna connector. If another
32 multipath component belonging to the same pilot channel or to a different pilot channel
33 becomes the earliest arriving multipath component to be used, the mobile station time
34 reference shall track to the new component. A valid pilot channel may be a Forward Pilot
35 Channel, Transmit Diversity Pilot Channel, Auxiliary Pilot Channel, or Auxiliary Transmit
36 Diversity Pilot Channel. If the difference between the mobile station time reference and the

1 time of occurrence of the earliest arriving multipath component being used for
2 demodulation, as measured at the mobile station antenna connector, is less than $\pm 1 \mu\text{s}$, the
3 mobile station may track its time reference to the earliest arriving multipath component
4 being used for demodulation.

5 When receiving the Forward Traffic Channel, the mobile station time reference shall be
6 used as the transmit time of the Reverse Traffic Channel. If a mobile station time reference
7 correction is needed, it shall be corrected no faster than 203 ns in any 200 ms period and
8 no slower than 305 ns per second when using Radio Configuration 1 or 2 and no slower
9 than 460 ns per second when using Radio Configuration 3 through 9.

10 When receiving the Paging Channel, the mobile station time reference shall be used as the
11 transmit time of the Access Channel. If a mobile station time reference correction is needed
12 before transmitting an Access probe, the mobile station shall correct the time reference
13 before it sends the Access probe; there is no limitation on the speed of the correction. If a
14 mobile station time reference correction is needed while transmitting an Access probe, it
15 shall be corrected no faster than 203 ns in any 200 ms period and no slower than 305 ns
16 per second.

17 When receiving the Forward Common Control Channel, the mobile station time reference
18 shall be used as the transmit time of the Enhanced Access Channel and the Reverse
19 Common Control Channel. If a mobile station time reference correction is needed before
20 transmitting on the Enhanced Access Channel or the Reverse Common Control Channel,
21 the mobile station shall correct the time reference before it transmits; there is no limitation
22 on the speed of the correction. If a mobile station time reference correction is needed while
23 transmitting, it shall be corrected no faster than 203 ns in any 200 ms period and no
24 slower than 460 ns per second.

25 2.1.5.1 Pilot to Walsh Cover Time Tolerance

26 When transmitting on the Enhanced Access Channel, the Reverse Common Control
27 Channel, or the Reverse Traffic Channel, the mobile station shall meet the requirements in
28 the current version of [11].

29 2.1.5.2 Pilot to Walsh Cover Phase Tolerance

30 When transmitting on the Enhanced Access Channel, the Reverse Common Control
31 Channel, or the Reverse Traffic Channel, the mobile station shall meet the requirements in
32 the current version of [11].

33 2.1.6 Transmitter Performance Requirements

34 System performance is predicated on transmitters meeting the requirements set forth in the
35 current version of [11].

36 **2.2 Receiver**

37 2.2.1 Channel Spacing and Designation

38 Channel spacing and designation for the mobile station reception shall be as specified in
39 2.1.1.1. Valid channels for CDMA operations shall be as specified in 2.1.1.1.

2.2.2 Demodulation Characteristics

2.2.2.1 Processing

The mobile station demodulation process shall perform complementary operations to the base station modulation process on the Forward CDMA Channel (see 3.1.3).

The mobile station shall support Walsh and quasi-orthogonal functions (see 3.1.3.1.12).

When the mobile station receives a Radio Configuration 2 frame with the Reserved/Flag Bit in the Forward Fundamental Channel set to '1' in frame i , the mobile station need not process the Forward Supplemental Code Channels in frame $i + 2$ (see 3.1.3.11.2.3). Otherwise, the mobile station shall process the assigned Forward Supplemental Code Channels.

The mobile station receiver shall provide a minimum of four processing elements that can be independently controlled. At least three elements shall be capable of tracking and demodulating multipath components of the Forward CDMA Channel. At least one element shall be a "searcher" element capable of scanning and estimating the signal strength at each pilot PN sequence offset.

When the mobile station begins monitoring its assigned slot of the Paging Channel, the mobile station should initialize the convolutional code decoder to minimize the message error rate of the first message which is received at the beginning of the mobile station's assigned Paging Channel slot.¹⁶

If the mobile station supports flexible data rates on the Forward Supplemental Channel with Radio Configuration 3, 4, 6, or 7; the mobile station need not support flexible rates with less than 16 information bits per 20 frame, less than 40 information bits per 40 ms, and less than 80 information bits per 80 ms frame. If the mobile station supports flexible data rates on the Forward Supplemental Channel with Radio Configuration 5, 8, or 9; the mobile station need not support flexible rates with less than 22 information bits per 20 frame, less than 56 information bits per 40 ms, and less than 126 information bits per 80 ms frame.

2.2.2.2 Erasure Indicator Bit and Quality Indicator Bit

If Radio Configuration 2 is used on the Reverse Traffic Channel, then during continuous operation on the Forward Fundamental Channel and Reverse Fundamental Channel the mobile station shall set the Reserved/Erasure Indicator Bit as follows:

- The mobile station shall set the Reserved/Erasure Indicator Bit (see Figure 2.1.3.7.2-1) to '1' in the second transmitted frame following the reception of a bad frame on the Forward Fundamental Channel as shown in Figure 2.2.2.2-1.

¹⁶ This allows the mobile station to take advantage of the four padding bits sent prior to the beginning of the slot. This can be achieved by assigning the greatest likelihood to 16 possible states and the least likelihood to the remaining states.

- 1 • The mobile station shall set the Reserved/Erasure Indicator Bit (see Figure
2 2.1.3.7.2-1) to '0' in the second transmitted frame following the reception of a good
3 frame on the Forward Fundamental Channel of the Forward Traffic Channel as
4 shown in Figure 2.2.2.2-1.

5 If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S
6 = '011', the mobile station shall set all the power control bits on the Reverse Power Control
7 Subchannel during a 20 ms period to the Erasure Indicator Bit (EIB) which is defined as
8 follows:

- 9 • The mobile station shall set the Erasure Indicator Bit to '0' in the second
10 transmitted frame following the detection¹⁷ of a good 20 ms frame on the Forward
11 Fundamental Channel or the Forward Dedicated Control Channel as shown in
12 Figure 2.2.2.2-1.
- 13 • The mobile station shall set the Erasure Indicator Bit to '0' in the second
14 transmitted frame following the detection of at least one good 5 ms frame without
15 detection of any bad 5 ms frames.
- 16 • Otherwise, the mobile station shall set the Erasure Indicator Bit to '1' in the second
17 transmitted frame.

18 If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S
19 = '100' and the channel configuration contains the Forward Fundamental Channel, the
20 mobile station shall set all the power control bits on the Reverse Power Control Subchannel
21 during a 20 ms period to the Quality Indicator Bit (QIB). The Quality Indicator Bit shall be
22 set the same as the Erasure Indicator Bit as when FPC_MODE_S = '011'.

23 If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S
24 = '100' and if the channel configuration does not contain the Forward Fundamental
25 Channel, the mobile station shall set all the power control bits on the Reverse Power
26 Control Subchannel during a 20 ms period to the Quality Indicator Bit (QIB) which is
27 defined as follows:

- 28 • The mobile station shall set the Quality Indicator Bit to '1' in the second transmitted
29 frame following the reception of a 20 ms period with insufficient signal quality (e.g.
30 bad frame) on the Forward Dedicated Control Channel as shown in Figure 2.2.2.2-1.
- 31 • The mobile station shall set the Quality Indicator Bit to '0' in the second transmitted
32 frame following the reception of a 20 ms period with sufficient signal quality (e.g.
33 good frame) on the Forward Dedicated Control Channel as shown in Figure
34 2.2.2.2-1.

35 If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S
36 = '101', the mobile station shall set all the power control bits on the Primary Reverse Power
37 Control Subchannel during a 20 ms period to the Quality Indicator Bit (QIB). The Quality
38 Indicator Bit shall be set the same as when FPC_MODE_S = '100'.

¹⁷ A frame is considered to be detected if the mobile station determines that the base station transmitted a frame containing data.

1 If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_s
2 = '101' or '110', the mobile station shall set all the power control bits on the Secondary
3 Reverse Power Control Subchannel during a period equal to the frame duration of Forward
4 Supplemental Channel 0 (FPC_SEC_CHAN_s = '0') or Forward Supplemental Channel 1
5 (FPC_SEC_CHAN_s = '1') to the Erasure Indicator Bit (EIB). This Erasure Indicator Bit is
6 derived from Forward Supplemental Channel 0 (FPC_SEC_CHAN_s = '0') or Forward
7 Supplemental Channel 1 (FPC_SEC_CHAN_s = '1'). The Erasure Indicator Bit is defined as
8 follows:

- 9 • The mobile station shall set the Erasure Indicator Bit to '0' for a period equal to the
10 frame duration of the corresponding Forward Supplemental Channel, starting at 20
11 ms after a detected good frame on that Forward Supplemental Channel as shown in
12 Figure 2.2.2.2-2.
- 13 • Otherwise, the mobile station shall set the Erasure Indicator Bit to '1'
14 for a period equal to the frame duration of the corresponding Forward Supplemental
15 Channel, starting at 20 ms after a frame on that Forward Supplemental Channel as
16 shown in Figure 2.2.2.2-2.

17 When the mobile station temporarily suspends reception of the Forward Traffic Channel in
18 order to tune to another frequency (such as during a PUF probe, a hard handoff with return
19 on failure, or a Candidate Frequency search), the mobile station shall set the
20 Reserved/Erasure Indicator/Quality Indicator Bit as follows:

- 21 • In the first two frames after the mobile station re-enables its transmitter, the mobile
22 station shall send Reserved/Erasure Indicator/Quality Indicator Bits corresponding
23 to the two most recently received frames. One or both of these Reserved/Erasure
24 Indicator/Quality Indicator Bits could be for frames that were received before the
25 mobile station tuned to the other frequency, and were stored by the mobile station
26 before the visit.
- 27 • After transmitting the first two frames, if the number of frames missed on the
28 Reverse Traffic Channel (due to the mobile station's visit away from the Serving
29 Frequency) is less than that on the Forward Traffic Channel, the mobile station
30 shall set the Reserved/Erasure Indicator/Quality Indicator Bit to '0', until it receives
31 two frames on the Forward Traffic Channel.
- 32 • The mobile station shall then set subsequent Reserved/Erasure Indicator/Quality
33 Indicator Bits as described above for continuous operation.

34

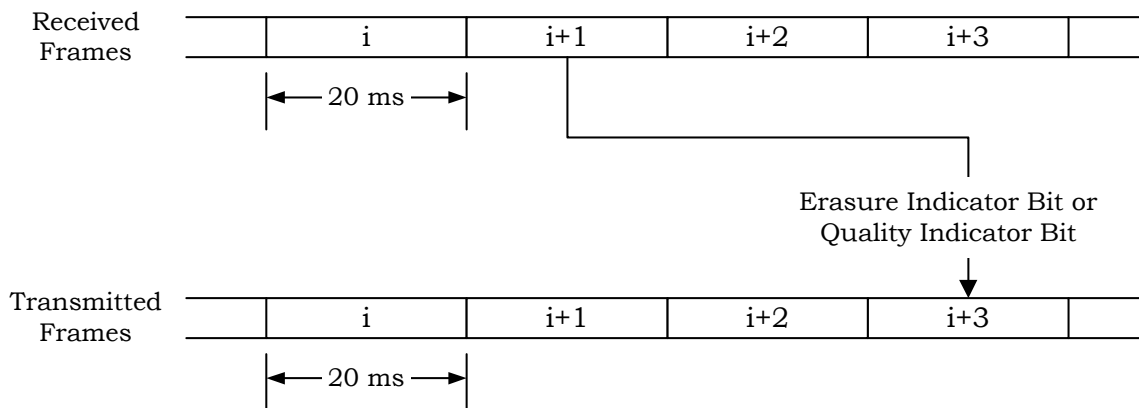


Figure 2.2.2.2-1. Erasure Indicator Bit/Quality Indicator Bit Timing

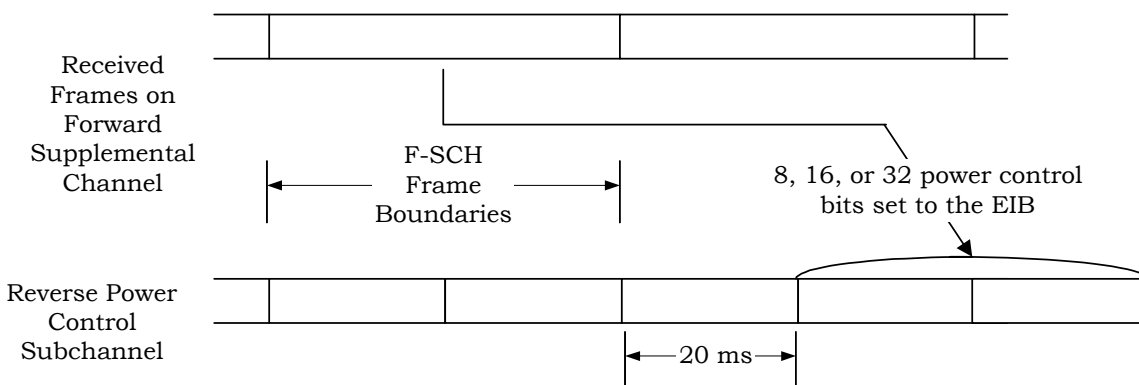


Figure 2.2.2.2-2. Erasure Indicator Bit Timing for the Forward Supplemental Channel

2.2.2.3 Forward Traffic Channel Time Alignment

The Forward Traffic Channel frame time alignment is specified in 3.1.3.10.1, 3.1.3.11.1, 3.1.3.12.1, and 3.1.3.13.1. The mobile station shall support offset Forward Traffic Channel frames.

2.2.2.4 Interface to the MAC Layer

This section specifies the passing of the received physical layer frames.

2.2.2.4.1 Sync Channel Reception Processing

When the mobile station receives a Sync Channel frame, the Physical Layer shall send a PHY-SYNCH.Indication (SDU) to the MAC Layer, after the mobile station performs the following action:

- Set the SDU to the received information bits.

1 2.2.2.4.2 Paging Channel Reception Processing

2 When the mobile station receives a Paging Channel frame, the Physical Layer shall send a
3 PHY-PCH.Indication (SDU) to the MAC Layer, after the mobile station performs the
4 following action:

- 5 • Set the SDU to the received information bits.

6 2.2.2.4.3 Broadcast Control Channel Reception Processing

7 When the mobile station receives a Broadcast Control Channel frame, the Physical Layer
8 shall send a PHY-BCCH.Indication (SDU, NUM_BITS, FRAME_QUALITY) to the MAC Layer,
9 after the mobile station performs the following actions:

- 10 • Set SDU to the received information bits.
- 11 • Set NUM_BITS to the number of bits of the received frame.
- 12 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
13 quality; otherwise, set FRAME_QUALITY to “insufficient.”

14 2.2.2.4.4 Quick Paging Channel Reception Processing

15 Not specified.

16 2.2.2.4.5 Common Power Control Channel Reception Processing

17 While operating in the Power Controlled Access Mode, the mobile station shall use the
18 common power control subchannel transmitted by the base station on the assigned
19 Common Power Control Channel to adjust the transmit power of the Enhanced Access
20 Channel. While operating in the Reservation Access Mode, the mobile station shall use the
21 common power control subchannel transmitted by the base station on the assigned
22 Common Power Control Channel to adjust the transmit power of the Reverse Common
23 Control Channel. While operating in the Designated Access Mode, the mobile station shall
24 use the common power control subchannel transmitted by the base station on the assigned
25 Common Power Control Channel to adjust the transmit power of the Reverse Common
26 Control Channel.

27 2.2.2.4.6 Common Assignment Channel Reception Processing

28 When the mobile station receives a Common Assignment Channel frame, the Physical Layer
29 shall send a PHY-CACH.Indication (SDU, FRAME_QUALITY) to the MAC Layer, after the
30 mobile station performs the following actions:

- 31 • Set the SDU to the received information bits.
- 32 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
33 quality; otherwise, set FRAME_QUALITY to “insufficient.”

34 2.2.2.4.7 Forward Common Control Channel Reception Processing

35 When the mobile station receives a Forward Common Control Channel frame, the Physical
36 Layer shall send a PHY-FCCCH.Indication (SDU, FRAME_DURATION, NUM_BITS,

1 FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following
2 actions:

- 3 • Set SDU to the received information bits.
- 4 • Set FRAME_DURATION to the duration of the received frame.
- 5 • Set NUM_BITS to the number of bits of the received frame.
- 6 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
7 quality; otherwise, set FRAME_QUALITY to “insufficient.”

8 2.2.2.4.8 Forward Dedicated Control Channel Reception Processing

9 When the mobile station receives a Forward Dedicated Control Channel frame, the Physical
10 Layer shall send a PHY-DCCH.Indication (SDU, FRAME_DURATION, NUM_BITS,
11 FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following
12 actions:

- 13 • Set the SDU to the received information bits.
- 14 • Set FRAME_DURATION to the duration of the received frame.
- 15 • Set NUM_BITS to the number of information bits in the SDU.
- 16 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
17 quality; otherwise, set FRAME_QUALITY to “insufficient.”

18 If the mobile station does not receive a Forward Dedicated Control Channel frame at the
19 end of a 20 ms frame boundary, the Physical Layer shall send a PHY-DCCH.Indication
20 (SDU) to the MAC Layer, after the mobile station performs the following action:

- 21 • Set the SDU to NULL.

22 2.2.2.4.9 Forward Fundamental Channel Reception Processing

23 When the mobile station receives a Forward Fundamental Channel frame, the Physical
24 Layer shall send a PHY-FCH.Indication (SDU, FRAME_DURATION, NUM_BITS,
25 FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following
26 actions:

- 27 • Set the SDU to the received information bits.
- 28 • Set FRAME_DURATION to the duration of the received frame.
- 29 • Set NUM_BITS to the number of information bits in the SDU.
- 30 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
31 quality; otherwise, set FRAME_QUALITY to “insufficient.”

32 2.2.2.4.10 Forward Supplemental Channel Reception Processing

33 When the mobile station receives a Forward Supplemental Channel frame, the Physical
34 Layer shall send a PHY-SCH.Indication (SDU, FRAME_DURATION, NUM_BITS,
35 FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following
36 actions:

- 1 • Set the SDU to the received information bits.
- 2 • Set FRAME_DURATION to the duration of the received frame.
- 3 • Set NUM_BITS to the number of information bits of the SDU.
- 4 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 5 quality; otherwise, set FRAME_QUALITY to “insufficient.”

6 2.2.2.4.11 Forward Supplemental Code Channel Reception Processing

7 When the mobile station receives a Forward Supplemental Code Channel frame, the
8 Physical Layer shall send a PHY-SCCH.Indication (SDU, FRAME_DURATION, NUM_BITS,
9 FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following
10 actions:

- 11 • Set the SDU to the received information bits.
- 12 • Set FRAME_DURATION to the duration of the received frame.
- 13 • Set NUM_BITS to the number of information bits of the SDU.
- 14 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 15 quality; otherwise, set FRAME_QUALITY to “insufficient.”

16 2.2.3 Limitations on Emissions

17 The mobile station shall meet the requirements in Section 3.5.1 of the current version
18 of [11].

19 2.2.4 Receiver Performance Requirements

20 System performance is predicated on receivers meeting the requirements set forth in
21 Section 3 of the current version of [11].

22 **2.3 Malfunction Detection**

23 2.3.1 Malfunction Timer

24 The mobile station shall have a malfunction timer that is separate from and independent of
25 all other functions and that runs continuously whenever power is applied to the transmitter
26 of the mobile station. Sufficient reset commands shall be interspersed throughout the
27 mobile station logic program to ensure that the timer never expires as long as the proper
28 sequence of operations is taking place. If the timer expires, a malfunction shall be assumed
29 and the mobile station shall be inhibited from transmitting. The maximum time allowed for
30 expiration of the timer is two seconds.

31 2.3.2 False Transmission

32 A protection circuit shall be provided to minimize the possibility of false transmitter
33 operation caused by component failure within the mobile station.

34

3 REQUIREMENTS FOR BASE STATION CDMA OPERATION

This section defines requirements specific to CDMA base station equipment and operation.

3.1 Transmitter

3.1.1 Frequency Parameters

3.1.1.1 Channel Spacing and Designation

3.1.1.1.1 Band Class 0 (800 MHz Band)

The Band Class 0 system designators for base station transmissions shall be as specified in Table 2.1.1.1.1-1. Base stations supporting Band Class 0 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.1-2 and as described in Tables 2.1.1.1.1-3 and 2.1.1.1.1-4.

The preferred set of CDMA frequency assignments for Band Class 0 is given in Table 2.1.1.1.1-5.

If a Band Class 0 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 41 CDMA Channels (1.23 MHz separation).

3.1.1.1.2 Band Class 1 (1900 MHz Band)

The Band Class 1 block designators for base station transmissions shall be as specified in Table 2.1.1.1.2-1. Base stations supporting Band Class 1 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.2-2 and as described in Tables 2.1.1.1.2-3 and 2.1.1.1.2-4.

The preferred set of CDMA frequency assignments for Band Class 1 is given in Table 2.1.1.1.2-5.

If a Band Class 1 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 25 CDMA Channels (1.25 MHz separation).

3.1.1.1.3 Band Class 2 (TACS Band)

The Band Class 2 block designators for base station transmissions shall be as specified in Table 2.1.1.1.3-1. Base stations supporting Band Class 2 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.3-3 and as described in Tables 2.1.1.1.3-4 and 2.1.1.1.3-5.

The preferred set of CDMA frequency assignments for Band Class 2 is given in Table 2.1.1.1.3-6.

If a Band Class 2 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 50 CDMA Channels (1.25 MHz separation).

1 3.1.1.1.4 Band Class 3 (JTACS Band)

2 The Band Class 3 system designators for base station transmissions shall be as specified in
3 Table 2.1.1.1.4-1. Base stations supporting Band Class 3 shall support CDMA operations
4 on CDMA Channels as calculated in Table 2.1.1.1.4-2 and as described in Table
5 2.1.1.1.4-3.

6 The preferred set of CDMA frequency assignments for Band Class 3 is given in Table
7 2.1.1.1.4-4.

8 3.1.1.1.5 Band Class 4 (Korean PCS Band)

9 The Band Class 4 block designators for base station transmissions shall be as specified in
10 Table 2.1.1.1.5-1. Base stations supporting Band Class 4 shall support CDMA operations
11 on CDMA Channels as calculated in Table 2.1.1.1.5-2 and as described in Tables 2.1.1.1.5-
12 3 and 2.1.1.1.5-4.

13 The preferred set of CDMA frequency assignments for Band Class 4 is given in Table
14 2.1.1.1.5-5.

15 If a Band Class 4 carrier operates with Spreading Rate 3, then all three carriers shall be
16 separated by 25 CDMA Channels (1.25 MHz separation).

17 3.1.1.1.6 Band Class 5 (450 MHz Band)

18 The Band Class 5 block designators for base station transmissions shall be as specified in
19 Table 2.1.1.1.6-1. Base stations supporting Band Class 5 shall support CDMA operations
20 on CDMA Channels as calculated in Table 2.1.1.1.6-2 and as described in Tables
21 2.1.1.1.6-3 and 2.1.1.1.6-4.

22 The preferred set of CDMA frequency assignments for Band Class 5 is given in Table
23 2.1.1.1.6-5.

24 If a Band Class 5 carrier operates with Spreading Rate 3 in Block A, B, C or E, then all
25 three carriers shall be separated by 50 CDMA Channels (1.25 MHz separation). If a Band
26 Class 5 carrier operates with Spreading Rate 3 in Block F, G, or H, then all three carriers
27 shall be separated by 62 CDMA Channels (1.24 MHz separation).

28 3.1.1.1.7 Band Class 6 (2 GHz Band)

29 Base stations supporting Band Class 6 shall support CDMA operations on CDMA Channels
30 as calculated in Table 2.1.1.1.7-1 and as described in Tables 2.1.1.1.7-2 and 2.1.1.1.7-3.

31 The preferred set of CDMA frequency assignments for Band Class 6 is given in Table
32 2.1.1.1.7-4.

33 If a Band Class 6 carrier operates with Spreading Rate 3, then all three carriers shall be
34 separated by 25 CDMA Channels (1.25 MHz separation).

35 3.1.1.1.8 Band Class 7 (700 MHz Band)

36 The Band Class 7 block designators for base station transmissions shall be as specified in
37 Table 2.1.1.1.8-1. Base stations supporting Band Class 7 shall support CDMA operations

1 on CDMA Channels as calculated in Table 2.1.1.1.8-2 and as described in Tables
2 2.1.1.1.8-3 and 2.1.1.1.8-4.

3 The preferred set of CDMA frequency assignments for Band Class 7 is given in Table
4 2.1.1.1.8-5.

5 If a Band Class 7 carrier operates with Spreading Rate 3, then all three carriers shall be
6 separated by 25 CDMA Channels (1.25 MHz separation).

7 3.1.1.1.9 Band Class 8 (1800 MHz Band)

8 The Band Class 8 block designators for base station transmissions are not specified. Base
9 stations supporting Band Class 8 shall support CDMA operations on CDMA Channels as
10 calculated in Table 2.1.1.1.9-1 and as described in Tables 2.1.1.1.9-2 and 2.1.1.1.9-3.

11 The preferred set of CDMA frequency assignments for Band Class 8 is given in Table
12 2.1.1.1.9-4.

13 If a Band Class 8 carrier operates with Spreading Rate 3, then all three carriers shall be
14 separated by 25 CDMA Channels (1.25 MHz separation).

15 3.1.1.1.10 Band Class 9 (900 MHz Band)

16 The Band Class 9 block designators for base station transmissions are not specified. Base
17 stations supporting Band Class 9 shall support CDMA operations on CDMA Channels as
18 calculated in Table 2.1.1.1.10-1 and as described in Tables 2.1.1.1.10-2 and 2.1.1.1.10-3.

19 The preferred set of CDMA frequency assignments for Band Class 9 is given in Table
20 2.1.1.1.10-4.

21 If a Band Class 9 carrier operates with Spreading Rate 3, then all three carriers shall be
22 separated by 25 CDMA Channels (1.25 MHz separation).

23 3.1.1.1.11 Band Class 10 (Secondary 800 MHz Band)

24 The Band Class 10 system designators for base station transmissions shall be as specified
25 in Table 2.1.1.1.11-1. Base stations supporting Band Class 10 shall support CDMA
26 operations on CDMA Channels as calculated in Table 2.1.1.1.11-2 and as described in
27 Tables 2.1.1.1.11-3 and 2.1.1.1.11-4.

28 The preferred set of CDMA frequency assignments for Band Class 10 is given in
29 Table 2.1.1.1.11-5.

30 If a Band Class 10 carrier operates with Spreading Rate 3, then all three carriers shall be
31 separated by 50 CDMA Channels (1.25 MHz separation).

32 3.1.1.2 Frequency Tolerance

33 The base station transmit carrier frequency shall be maintained within $\pm 5 \times 10^{-8}$ of the
34 CDMA frequency assignment.

35 3.1.2 Power Output Characteristics

36 The base station shall meet the requirements in the current version of [10].

3.1.3 Modulation Characteristics

3.1.3.1 Forward CDMA Channel Signals

Signals transmitted on the Forward Traffic Channel (i.e. Forward Dedicated Control Channel, Forward Fundamental Channel, Forward Supplemental Channel, or Forward Supplemental Code Channel sent to a specific mobile station) are specified by radio configurations. There are nine radio configurations for the Forward Traffic Channel (see Table 3.1.3.1-1).

A base station shall support operation in Radio Configuration 1, 3, or 7. A base station may support operation in Radio Configurations 2, 4, 5, 6, 8, or 9. A base station supporting operation in Radio Configuration 2 shall support Radio Configuration 1. A base station supporting operation in Radio Configuration 4 or 5 shall support Radio Configuration 3. A base station supporting operation in Radio Configuration 6, 8, or 9 shall support Radio Configuration 7.

A base station shall not use Radio Configuration 1 or 2 simultaneously with Radio Configuration 3, 4, or 5 on a Forward Traffic Channel.

If the base station supports the Reverse Fundamental Channel with Radio Configuration 1, then it shall support the Forward Fundamental Channel with Radio Configuration 1. If the base station supports the Reverse Fundamental Channel with Radio Configuration 2, then it shall support the Forward Fundamental Channel with Radio Configuration 2. If the base station supports the Reverse Fundamental Channel with Radio Configuration 3, then it shall support the Forward Fundamental Channel with Radio Configuration 3, 4, 6, or 7. If the base station supports the Reverse Fundamental Channel with Radio Configuration 4, then it shall support the Forward Fundamental Channel with Radio Configuration 5, 8, or 9. If the base station supports the Reverse Fundamental Channel with Radio Configuration 5, then it shall support the Forward Fundamental Channel with Radio Configuration 6 or 7. If the base station supports the Reverse Fundamental Channel with Radio Configuration 6, then it shall support the Forward Fundamental Channel with Radio Configuration 8 or 9.

If the base station supports the Reverse Dedicated Control Channel with Radio Configuration 3, then it shall support the Forward Dedicated Control Channel with Radio Configuration 3, 4, 6, or 7. If the base station supports the Reverse Dedicated Control Channel with Radio Configuration 4, then it shall support the Forward Dedicated Control Channel with Radio Configuration 5, 8, or 9. If the base station supports the Reverse Dedicated Control Channel with Radio Configuration 5, then it shall support the Forward Dedicated Control Channel with Radio Configuration 6 or 7. If the base station supports the Reverse Dedicated Control Channel with Radio Configuration 6, then it shall support the Forward Dedicated Control Channel with Radio Configuration 8 or 9.

Table 3.1.3.1-1 shows the general characteristics of the radio configurations.

1 **Table 3.1.3.1-1. Radio Configuration Characteristics for the Forward Traffic Channel**

Radio Configuration	Associated Spreading Rate	Data Rates, Forward Error Correction, and General Characteristics
1	1	1200, 2400, 4800, and 9600 bps data rates with $R = 1/2$, BPSK pre-spreading symbols
2	1	1800, 3600, 7200, and 14400 bps data rates with $R = 1/2$, BPSK pre-spreading symbols
3	1	1200, 1350, 1500, 2400, 2700, 4800, 9600, 19200, 38400, 76800, and 153600 bps data rates with $R = 1/4$, QPSK pre-spreading symbols, TD allowed
4	1	1200, 1350, 1500, 2400, 2700, 4800, 9600, 19200, 38400, 76800, 153600, and 307200 bps data rates with $R = 1/2$, QPSK pre-spreading symbols, TD allowed
5	1	1800, 3600, 7200, 14400, 28800, 57600, 115200, and 230400 bps data rates with $R = 1/4$, QPSK pre-spreading symbols, TD allowed
6	3	1200, 1350, 1500, 2400, 2700, 4800, 9600, 19200, 38400, 76800, 153600, and 307200 bps data rates with $R = 1/6$, QPSK pre-spreading symbols.
7	3	1200, 1350, 1500, 2400, 2700, 4800, 9600, 19200, 38400, 76800, 153600, 307200, and 614400 bps data rates with $R = 1/3$, QPSK pre-spreading symbols.
8	3	1800, 3600, 7200, 14400, 28800, 57600, 115200, 230400, and 460800 data rates with $R = 1/4$ (20 ms) or $1/3$ (5 ms), QPSK pre-spreading symbols.
9	3	1800, 3600, 7200, 14400, 28800, 57600, 115200, 230400, 259200, 460800, 518400, and 1036800 bps data rates with $R = 1/2$ (20 ms) or $1/3$ (5 ms), QPSK pre-spreading symbols.

Note: For Radio Configurations 3 through 9, the Forward Dedicated Control Channel and Forward Fundamental Channel also allow a 9600 bps, 5 ms format.

2

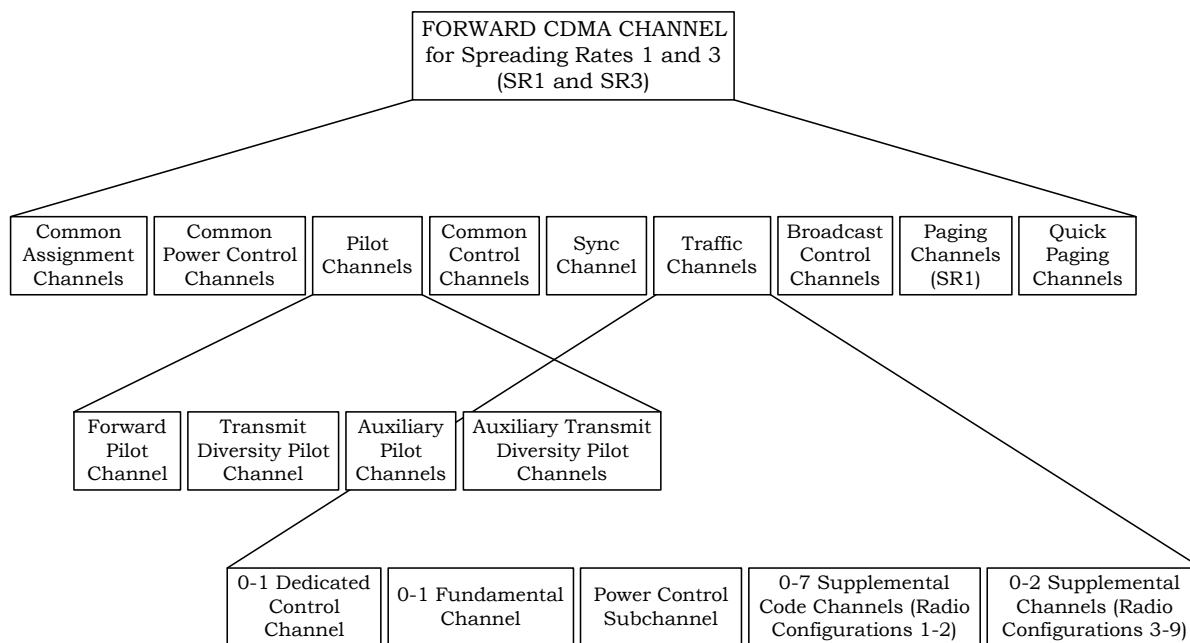
3 For Spreading Rate 1, the base station may support orthogonal transmit diversity (OTD) or
4 space time spreading (STS) on forward dedicated channels (i.e., Forward Dedicated Control
5 Channel, Forward Fundamental Channel, and Forward Supplemental Channel), and
6 forward common channels (i.e., Broadcast Control Channel, Quick Paging Channel,
7 Common Power Control Channel, Common Assignment Channel, and Forward Common
8 Control Channel). For Spreading Rate 3, the base station may support transmit diversity by
9 transmitting carriers on separate antennas. The base station shall transmit all forward
10 dedicated channels (i.e., Forward Dedicated Control Channel, Forward Fundamental

1 Channel, and Forward Supplemental Channel) to a mobile station using one of the
 2 following schemes: no transmit diversity, OTD, or STS. The base station shall transmit the
 3 Broadcast Control Channel, the Common Power Control Channel, the Common Assignment
 4 Channel, and the Forward Common Control Channel on a Forward CDMA Channel using
 5 one of the following schemes: no transmit diversity, OTD, or STS.

6 3.1.3.1.1 Channel Structures

7 The structure of the code channels transmitted by a base station is shown in Figure
 8 3.1.3.1.1-1.

9



10

11 **Figure 3.1.3.1.1-1. Forward CDMA Channel Transmitted by a Base Station**

12

13 3.1.3.1.1.1 Spreading Rate 1

14 The Forward CDMA Channel consists of the channels specified in Table 3.1.3.1.1.1-1. Table
 15 3.1.3.1.1.1-1 states the range of valid channels for each channel type.

16

Table 3.1.3.1.1.1-1. Channel Types on the Forward CDMA Channel for Spreading Rate 1

Channel Type	Maximum Number
Forward Pilot Channel	1
Transmit Diversity Pilot Channel	1
Auxiliary Pilot Channel	Not specified
Auxiliary Transmit Diversity Pilot Channel	Not specified
Sync Channel	1
Paging Channel	7
Broadcast Control Channel	8
Quick Paging Channel	3
Common Power Control Channel	4
Common Assignment Channel	7
Forward Common Control Channel	7
Forward Dedicated Control Channel	1*
Forward Fundamental Channel	1*
Forward Supplemental Code Channel (RC 1 and 2 only)	7*
Forward Supplemental Channel (RC 3 through 5 only)	2*

* per Forward Traffic Channel

Each of these code channels is spread by the appropriate Walsh or quasi-orthogonal function. Each code channel is then spread by a quadrature pair of PN sequences at a fixed chip rate of 1.2288 Mcps. Multiple Forward CDMA Channels may be used within a base station in a frequency division multiplexed manner.

If a base station transmits the Forward Common Control Channel on a Forward CDMA Channel, then the base station shall also transmit the Broadcast Control Channel on that Forward CDMA Channel.

The structures of the Forward Pilot Channel, Transmit Diversity Pilot Channel, Auxiliary Pilot Channels, Auxiliary Transmit Diversity Pilot Channels, Sync Channel, and Paging Channels for the Forward CDMA Channel for Spreading Rate 1 are shown in Figure 3.1.3.1.1.1-1. The structure of the Broadcast Control Channel for Spreading Rate 1 is shown in Figures 3.1.3.1.1.1-2 and 3.1.3.1.1.1-3. The structure of the Quick Paging Channel for Spreading Rate 1 is shown in Figure 3.1.3.1.1.1-4. The structure of the Common Power Control Channel for Spreading Rate 1 is shown in Figure 3.1.3.1.1.1-5. The structure of the Common Assignment Channel for Spreading Rate 1 is shown in Figures 3.1.3.1.1.1-6 and 3.1.3.1.1.1-7. The structure of the Forward Common Control Channel for

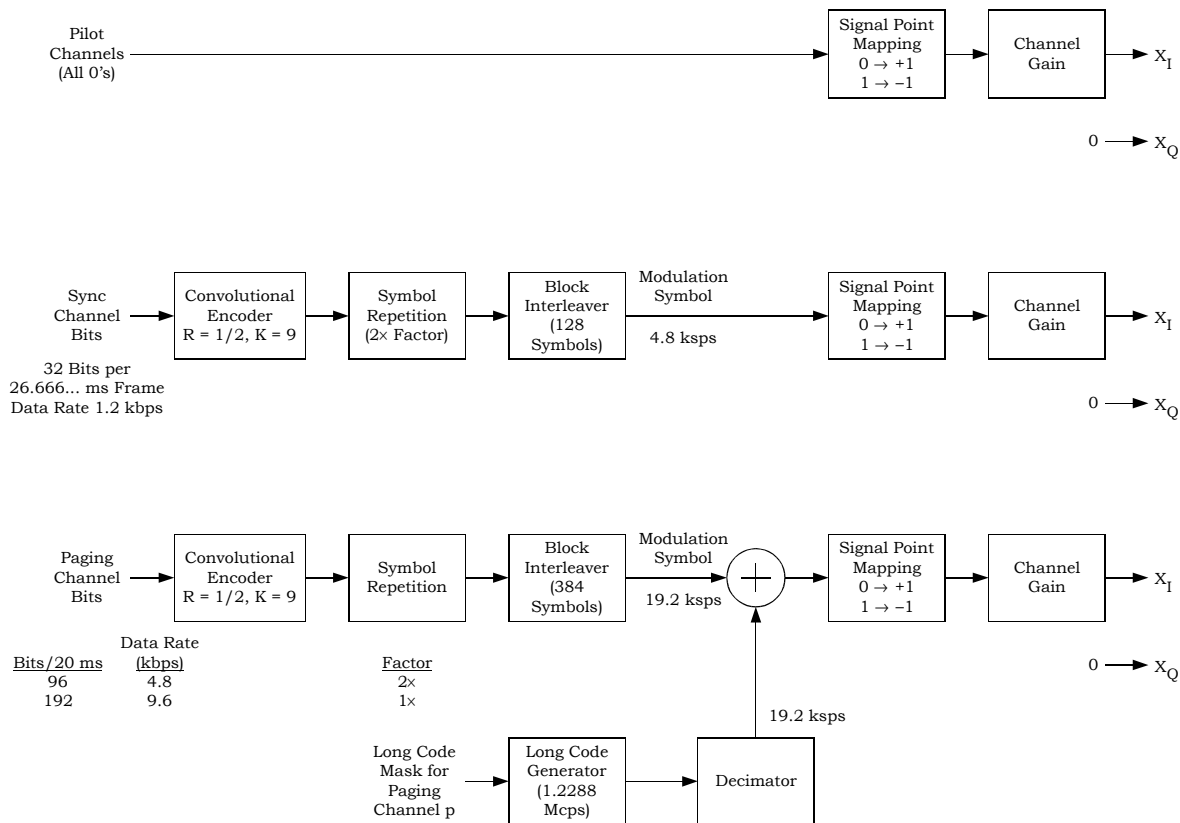
1 Spreading Rate 1 is shown in Figures 3.1.3.1.1.1-8 and 3.1.3.1.1.1-9. The structure of the
 2 Forward Dedicated Control Channel for Spreading Rate 1 is shown in Figures 3.1.3.1.1.1-
 3 10 through 3.1.3.1.1.1-12.

4 The Forward Fundamental Channel and Forward Supplemental Code Channel for Radio
 5 Configuration 1 have the overall structure shown in Figure 3.1.3.1.1.1-13. The Forward
 6 Fundamental Channel and Forward Supplemental Code Channel for Radio Configuration 2
 7 have the overall structure shown in Figure 3.1.3.1.1.1-14. The Forward Fundamental
 8 Channel and Forward Supplemental Channel for Radio Configuration 3 have the overall
 9 structure shown in Figure 3.1.3.1.1.1-15. The Forward Fundamental Channel and Forward
 10 Supplemental Channel for Radio Configuration 4 have the overall structure shown in
 11 Figure 3.1.3.1.1.1-16. The Forward Fundamental Channel and Forward Supplemental
 12 Channel for Radio Configuration 5 have the overall structure shown in Figure
 13 3.1.3.1.1.1-17.

14 For the Forward Traffic Channel with Radio Configurations 3 through 5, long code
 15 scrambling, power control puncturing, and symbol point mapping is shown in Figure
 16 3.1.3.1.1.1-18.

17 The symbol demultiplexing and I and Q mappings are shown in Figures 3.1.3.1.1.1-19,
 18 3.1.3.1.1.1-20, 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22.

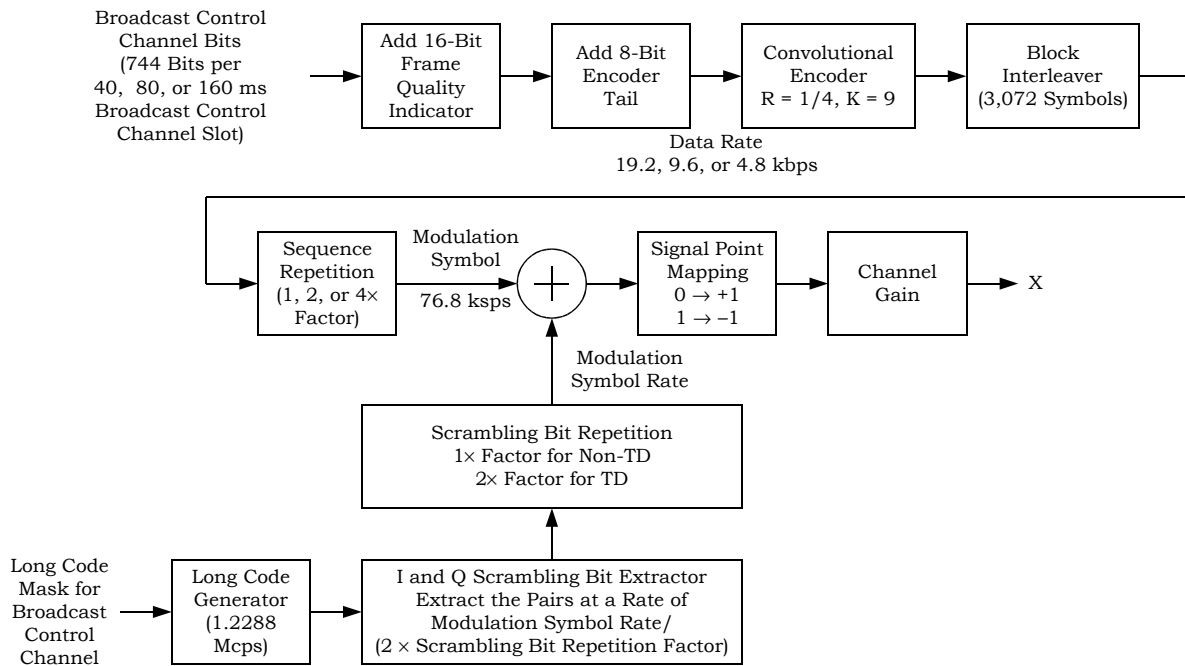
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21 **Figure 3.1.3.1.1.1-1. Pilot Channels, Sync Channel, and Paging Channels**
 22 **for Spreading Rate 1**

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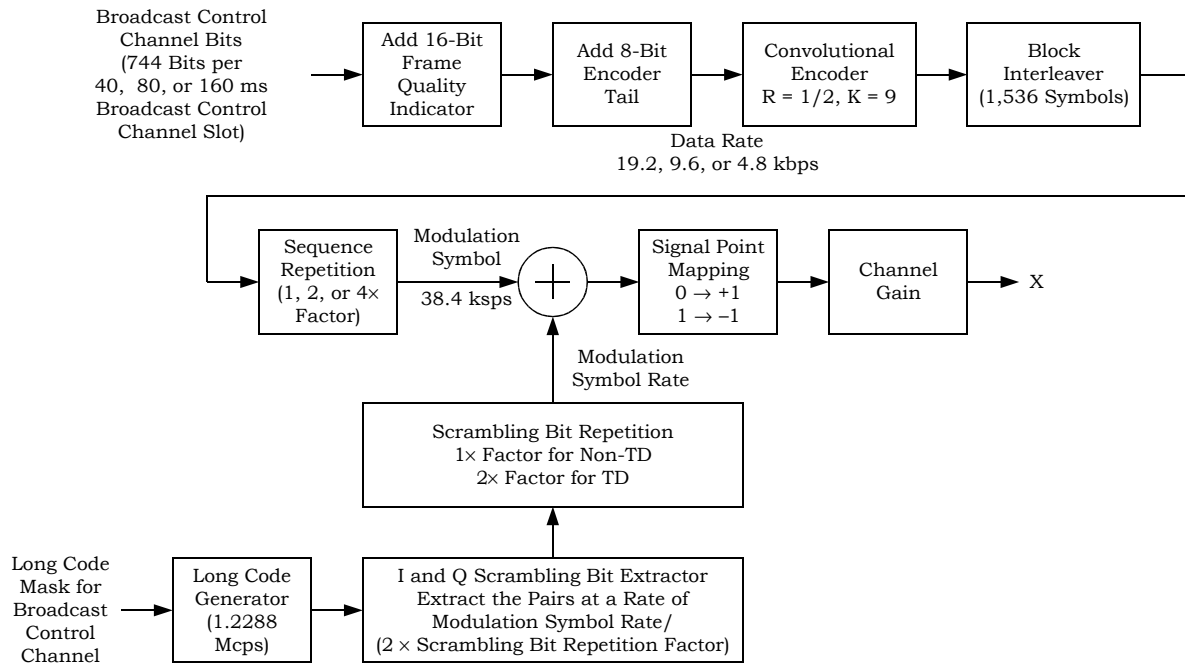
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Figure 3.1.3.1.1.1-2. Broadcast Control Channel Structure for Spreading Rate 1 with R = 1/4 Mode



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Figure 3.1.3.1.1.1-3. Broadcast Control Channel Structure for Spreading Rate 1 with R = 1/2 Mode

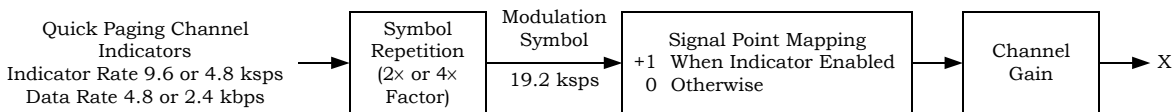


Figure 3.1.3.1.1.1-4. Quick Paging Channel Structure for Spreading Rate 1

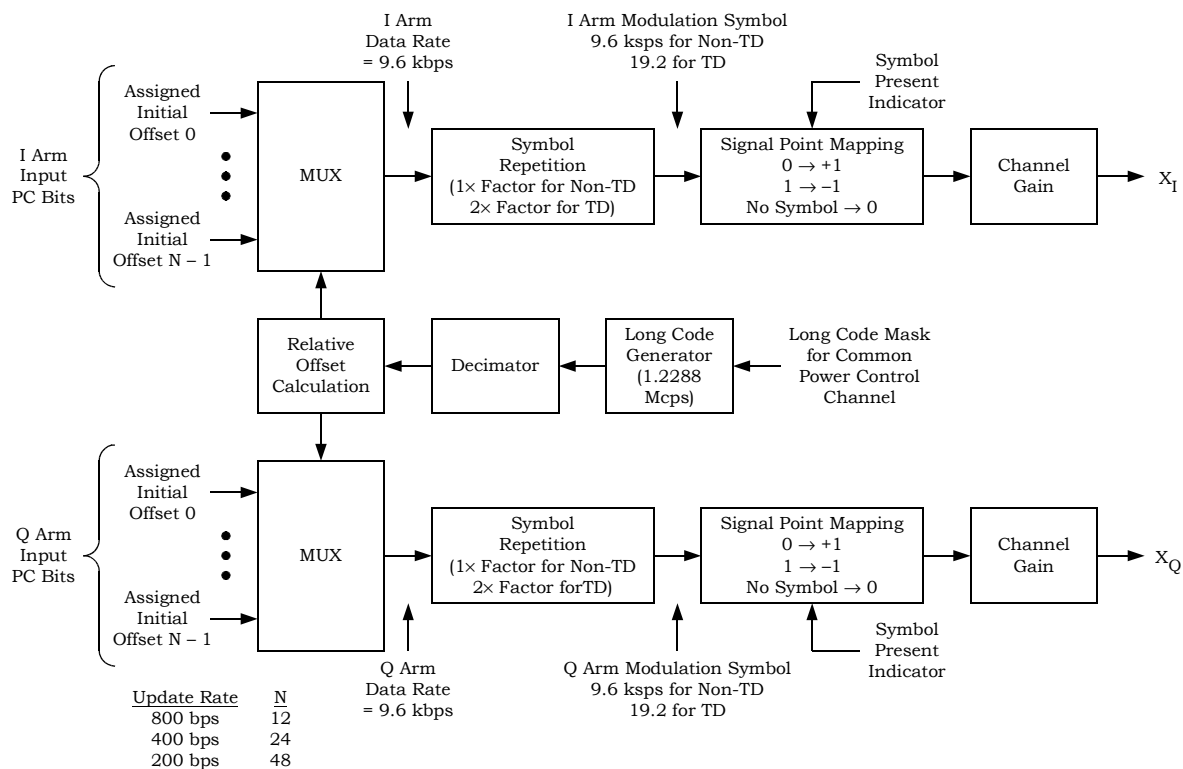
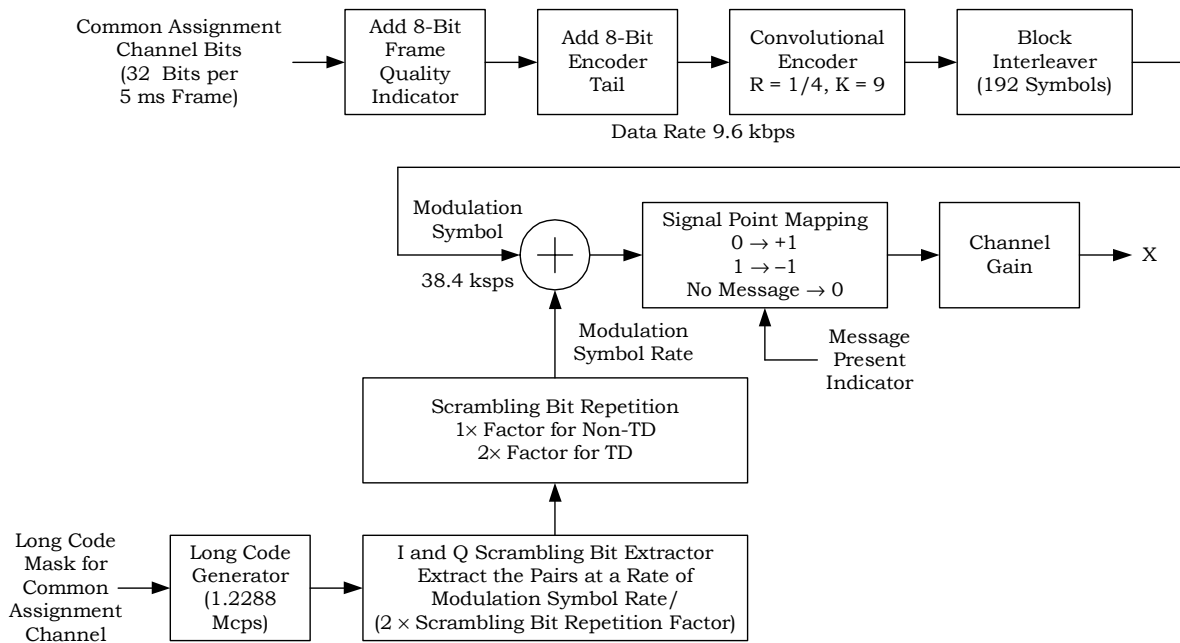
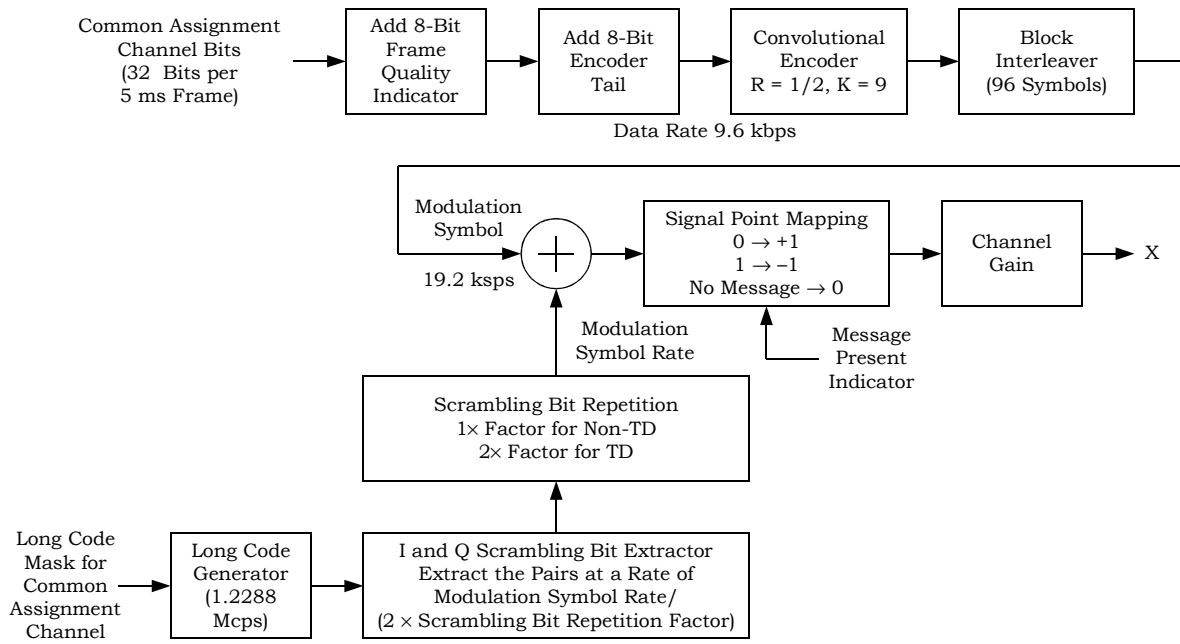


Figure 3.1.3.1.1.1-5. Common Power Control Channel Structure for Spreading Rate 1



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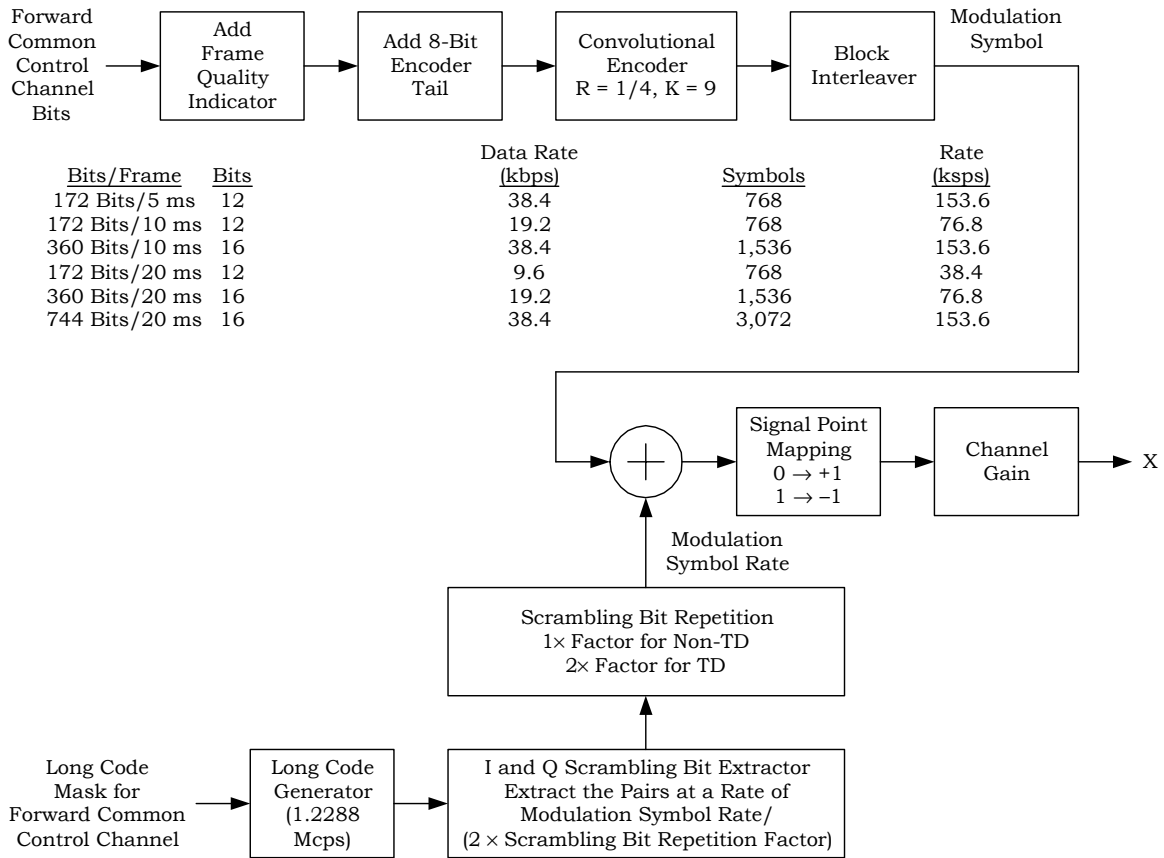
Figure 3.1.3.1.1.1-6. Common Assignment Channel Structure for Spreading Rate 1 with R = 1/4 Mode



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Figure 3.1.3.1.1.1-7. Common Assignment Channel Structure for Spreading Rate 1 with R = 1/2 Mode

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Figure 3.1.3.1.1.1-8. Forward Common Control Channel Structure for Spreading Rate 1 with R = 1/4 Mode

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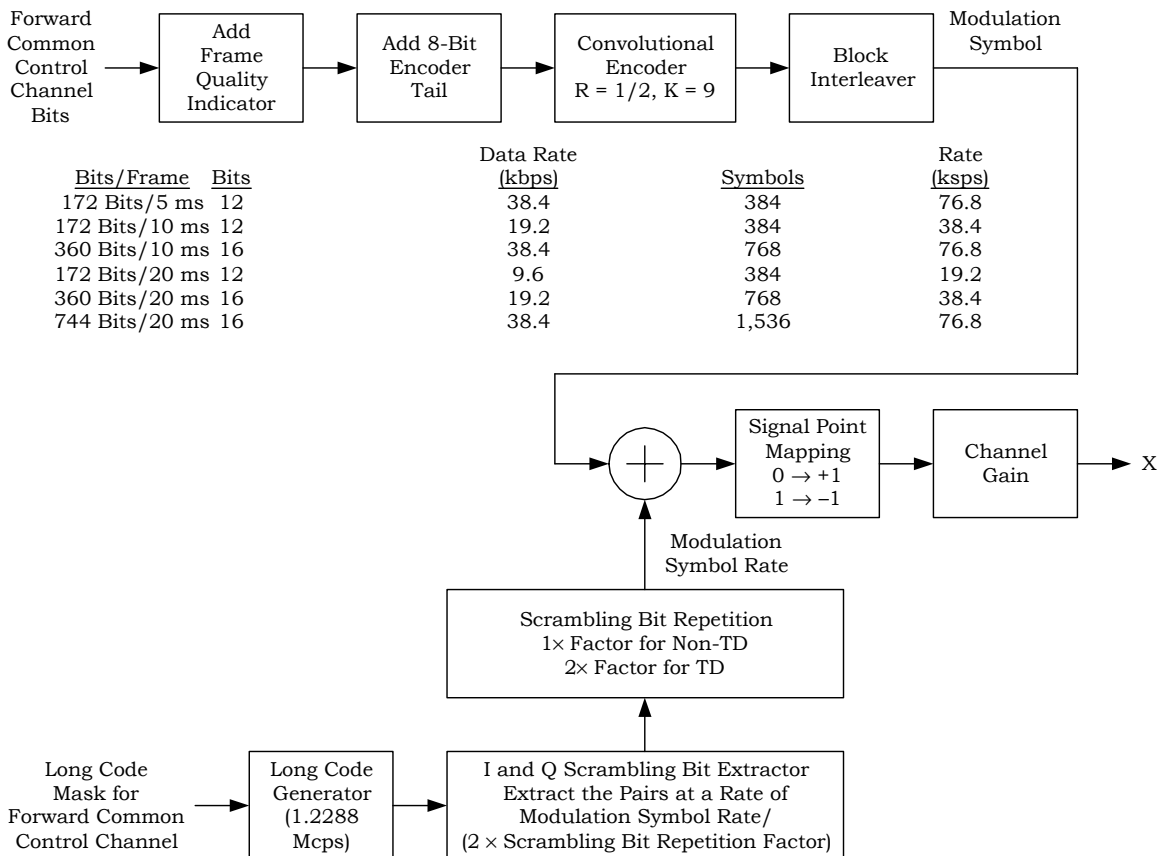
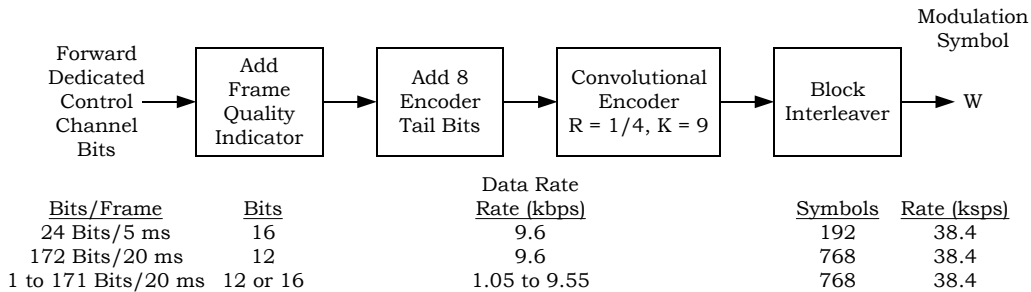


Figure 3.1.3.1.1.1-9. Forward Common Control Channel Structure for Spreading Rate 1 with R = 1/2 Mode

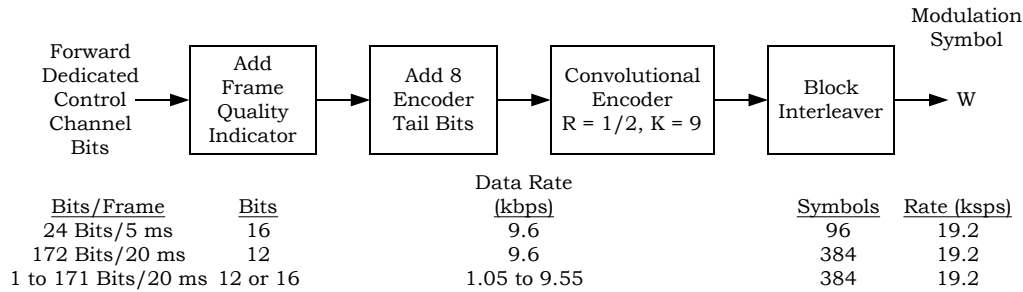
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Note: If flexible data rates are supported, there can be 1 to 171 channel bits in a 20 ms frame and the encoded symbols will be repeated then punctured to provide a 38.4 ksps modulation symbol rate.

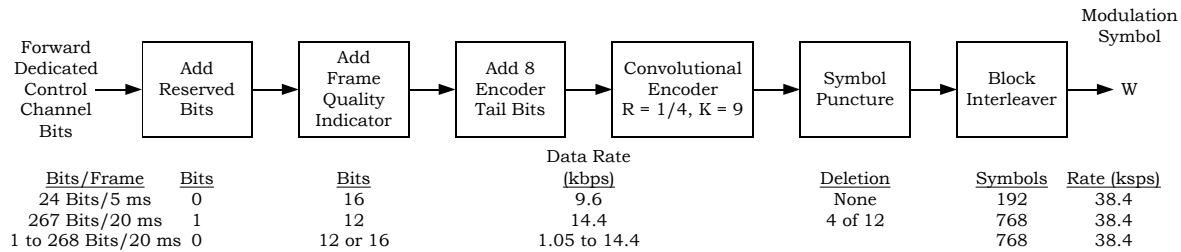
Figure 3.1.3.1.1.1-10. Forward Dedicated Control Channel Structure for Radio Configuration 3

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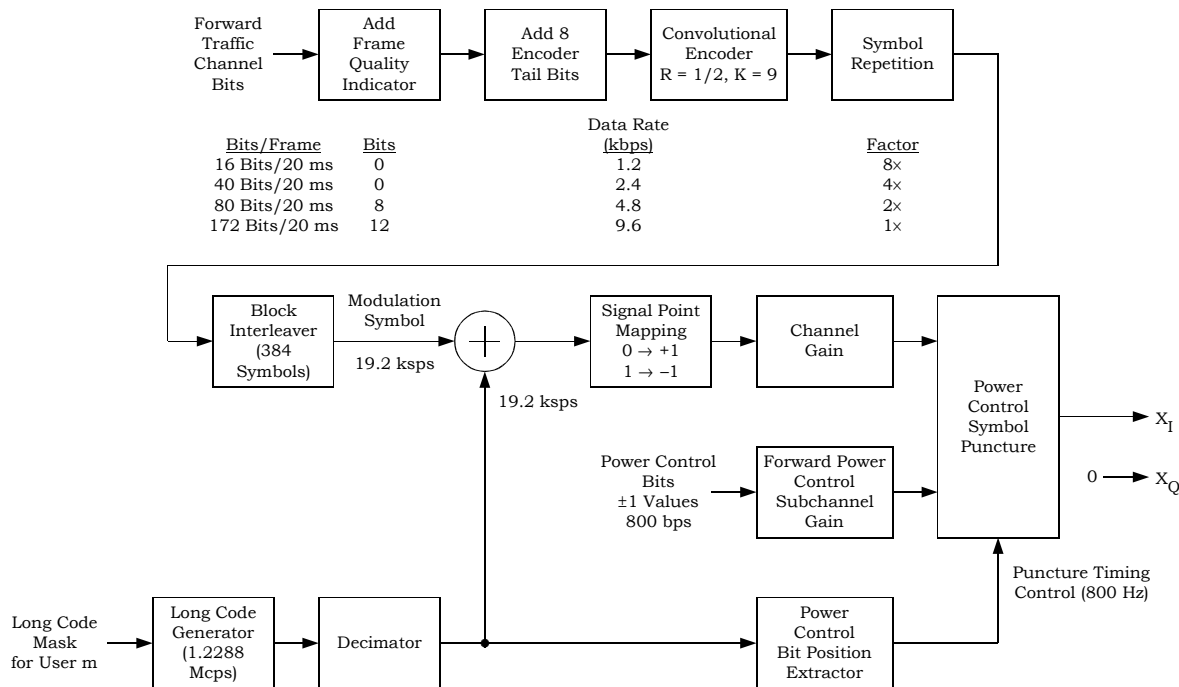
Note: If flexible data rates are supported, there can be 1 to 171 channel bits in a 20 ms frame and the encoded symbols will be repeated then punctured to provide a 19.2 ksps modulation symbol rate.

Figure 3.1.3.1.1.1-11. Forward Dedicated Control Channel Structure for Radio Configuration 4



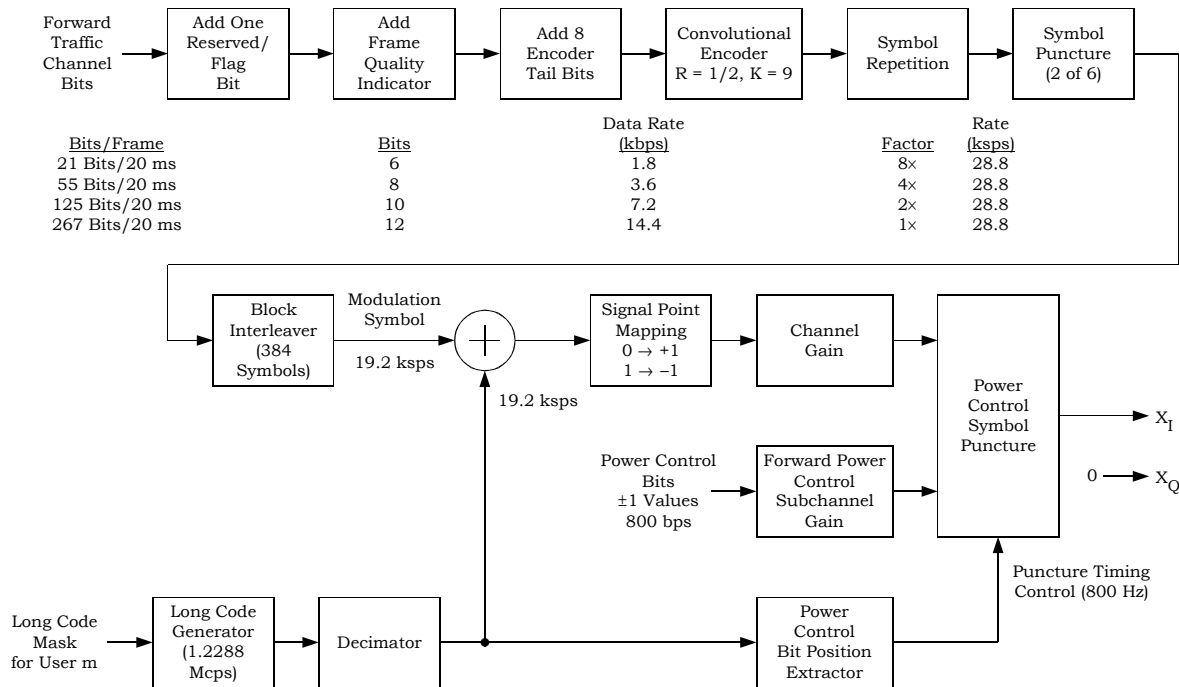
Note: If flexible data rates are supported, there can be 1 to 268 channel bits in a 20 ms frame. If there are 1 to 192 encoder input bits per frame, the encoder output symbols will be additionally repeated and then punctured to provide a 38.4 ksps modulation symbol rate. If there are 193 to 288 encoder input bits per frame, the encoder output symbols will be punctured to provide a 38.4 ksps modulation symbol rate.

Figure 3.1.3.1.1.1-12. Forward Dedicated Control Channel Structure for Radio Configuration 5



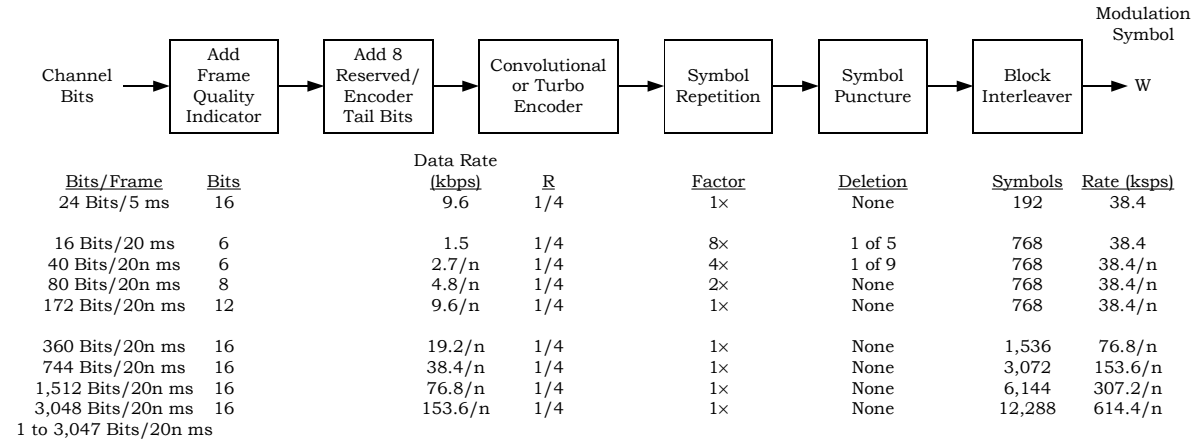
Power control bits are not punctured in for Forward Supplemental Code Channels of the Forward Traffic Channels.

Figure 3.1.3.1.1.1-13. Forward Traffic Channel Structure for Radio Configuration 1



Power control bits are not punctured in for Forward Supplemental Code Channels of the Forward Traffic Channels.

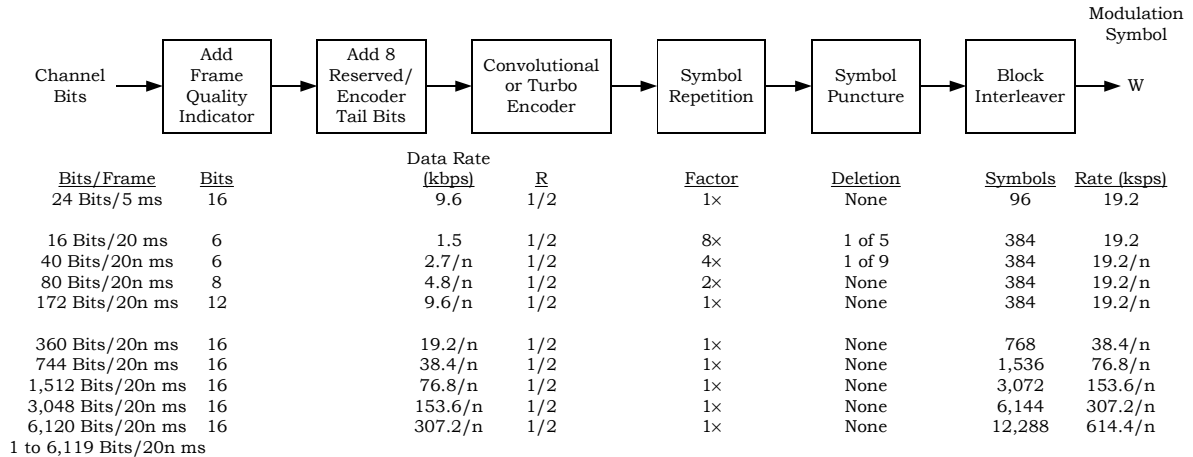
Figure 3.1.3.1.1.1-14. Forward Traffic Channel Structure for Radio Configuration 2



Notes:

1. n is the length of the frame in multiples of 20 ms. For 31 to 54 encoder input bits per frame, n = 1 or 2. For more than 54 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 192 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Forward Supplemental Channels with 384 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.
 - The frame quality indicator length is 16 for more than 192 encoder input bits per frame; 12 or 16 for 97 to 192 encoder input bits per frame; 8, 12, or 16 for 55 to 96 encoder input bits per frame; and 6, 8, 12, or 16 otherwise.
 - The code rate is 1/4. If the number of encoder input bits per frame is less than 384, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

Figure 3.1.3.1.1-15. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 3

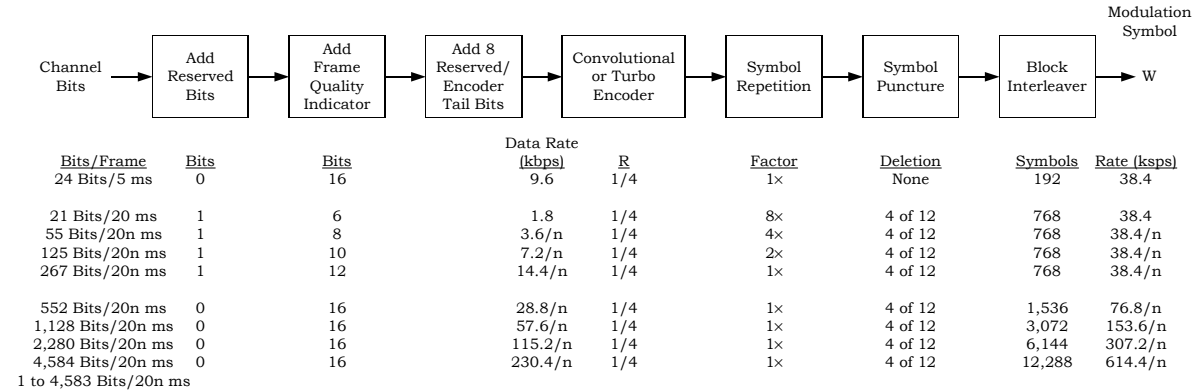


Notes:

1. n is the length of the frame in multiples of 20 ms. For 31 to 54 encoder input bits per frame, n = 1 or 2. For more than 54 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 192 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Forward Supplemental Channels with 384 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.
 - The frame quality indicator length is 16 for more than 192 encoder input bits per frame; 12 or 16 for 97 to 192 encoder input bits per frame; 8, 12, or 16 for 55 to 96 encoder input bits per frame; and 6, 8, 12, or 16 otherwise.
 - The code rate is 1/2. If the number of encoder input bits per frame is less than 384, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

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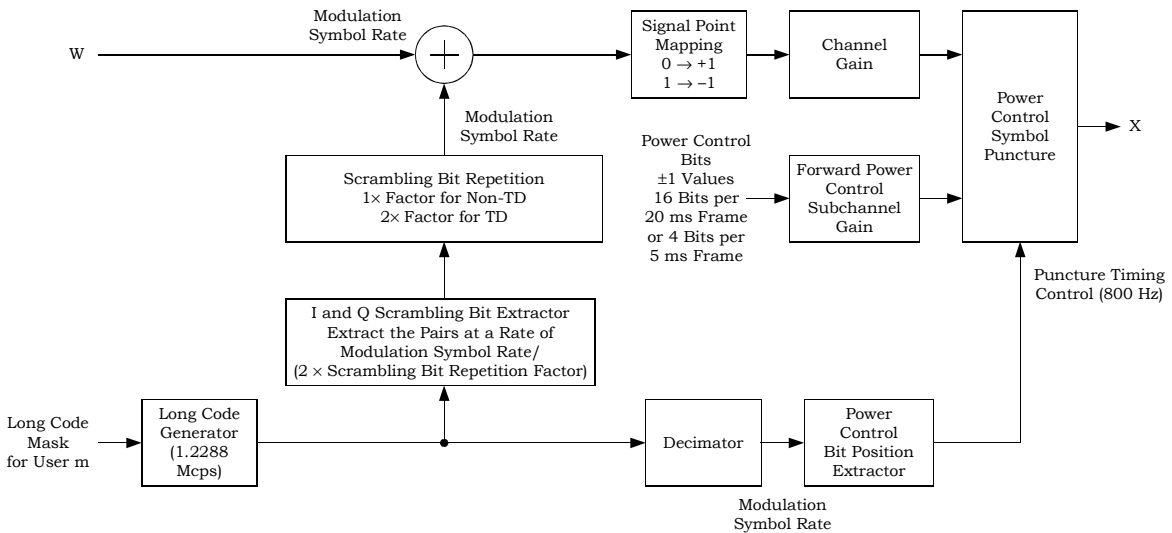
Figure 3.1.3.1.1-16. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 4



Notes:

- n is the length of the frame in multiples of 20 ms. For 37 to 72 encoder input bits per frame, n = 1, 2, or 4.
- The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 288 encoder input bits per frame with n = 1.
- Turbo coding may be used for the Forward Supplemental Channels with 576 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
- With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
- If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.
 - When the number of channel bits per frame is 21, 55, 125, or 267 and the corresponding frame quality indicator length is 6, 8, 10, and 12, an initial reserved bit is used; otherwise, no initial reserved bits are used.
 - The frame quality indicator length is 16 for more than 288 encoder input bits per frame; 12 or 16 for 145 to 288 encoder input bits per frame; 10, 12, or 16 for 73 to 144 encoder input bits per frame; 8, 10, 12, or 16 for 37 to 72 encoder input bits per frame; and 6, 8, 10, 12, or 16 otherwise.
 - The code rate is 1/4. If the number of encoder input bits per frame is less than 576, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

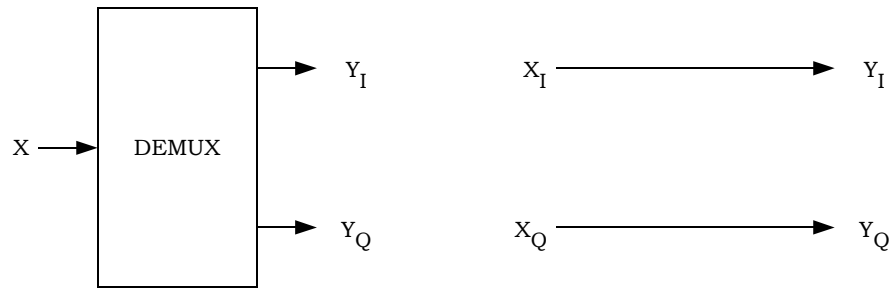
Figure 3.1.3.1.1.1-17. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 5



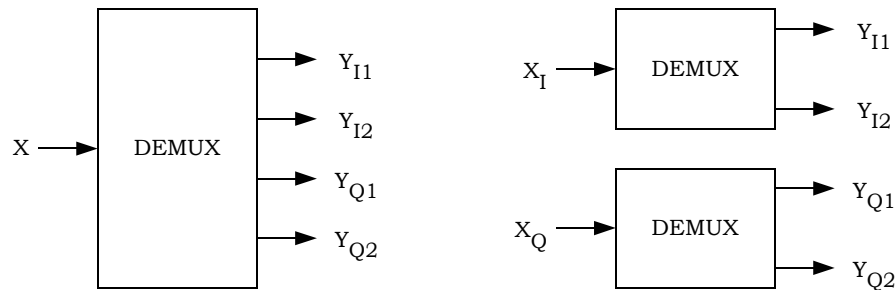
Power control symbol puncturing is on the Forward Fundamental Channels and Forward Dedicated Control Channels only.

Figure 3.1.3.1.1.1-18. Long Code Scrambling, Power Control, and Signal Point Mapping for Forward Traffic Channels with Radio Configurations 3, 4, and 5

1



a) Non-TD Mode



b) TD Mode

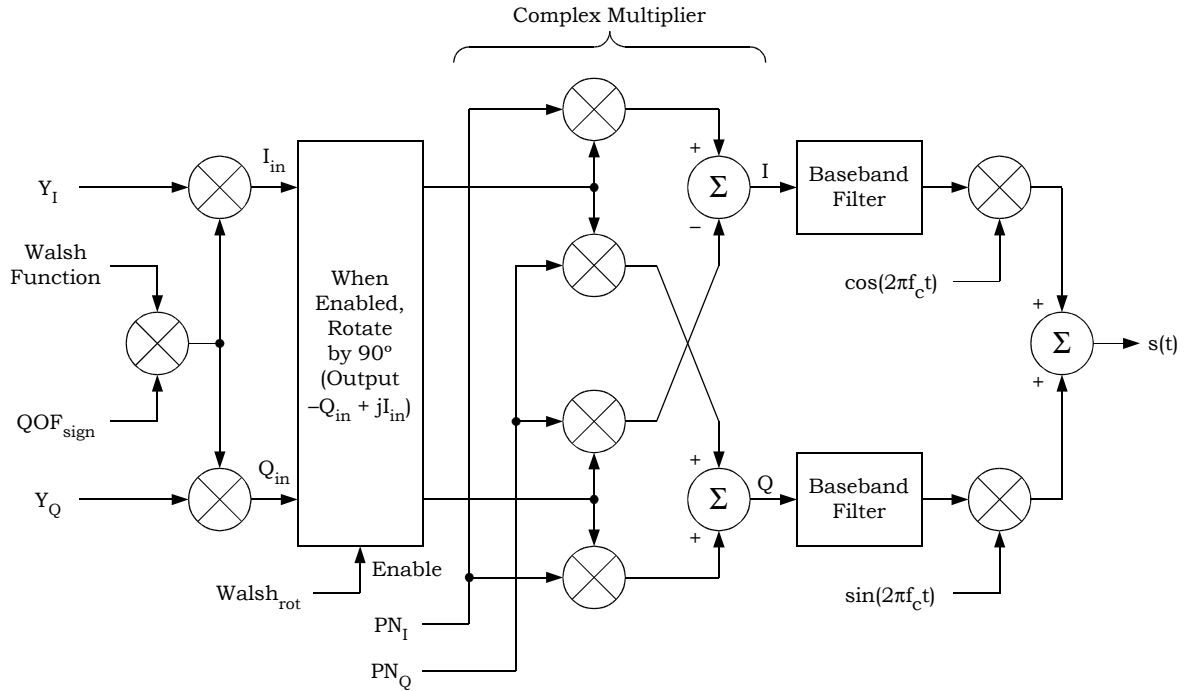
The DEMUX functions distribute input symbols sequentially from the top to the bottom output paths.

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Figure 3.1.3.1.1-19. Demultiplexer Structure for Spreading Rate 1

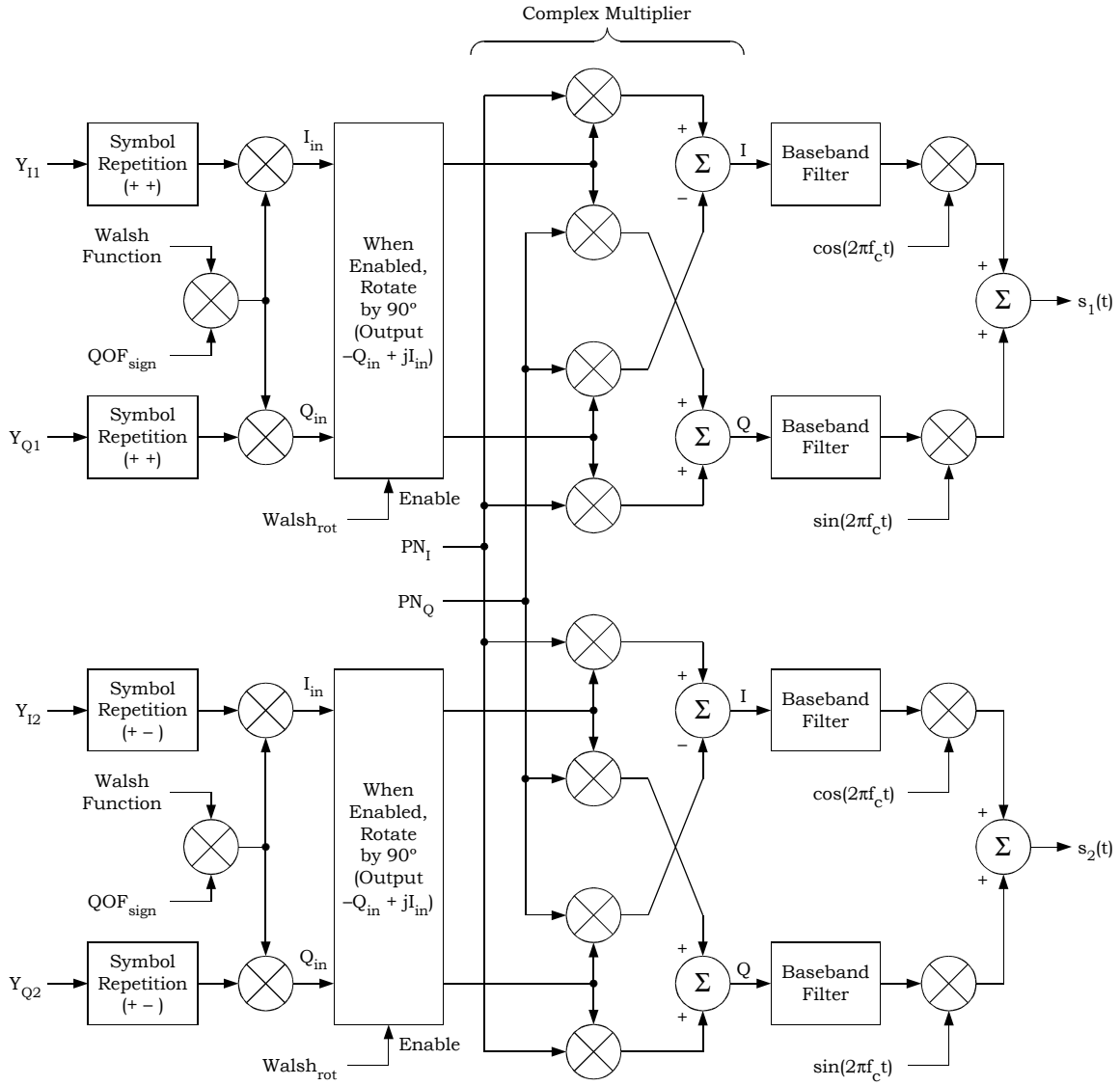
4



Walsh function = ± 1 (mapping: '0' \rightarrow +1, '1' \rightarrow -1)
 QOF_{sign} = ± 1 sign multiplier QOF mask (mapping: '0' \rightarrow +1, '1' \rightarrow -1)
 Walsh_{rot} = '0' or '1' 90°-rotation-enable Walsh function
 Walsh_{rot} = '0' means no rotation
 Walsh_{rot} = '1' means rotate by 90°
 The null QOF has QOF_{sign} = +1 and Walsh_{rot} = '0'.
 PN_I and PN_Q = ± 1 I-channel and Q-channel PN sequences
 The null QOF is used for Radio Configurations 1 and 2

Figure 3.1.3.1.1-20. I and Q Mapping (Non-TD Mode) for Spreading Rate 1

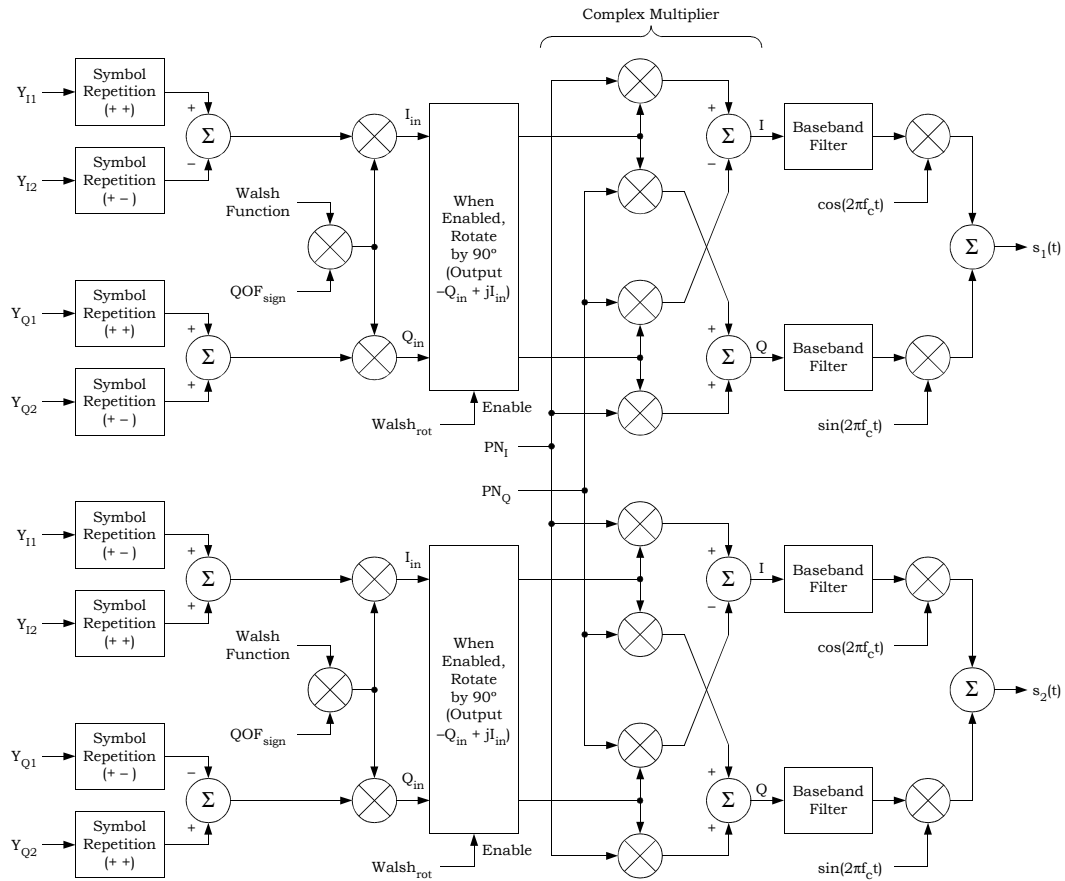
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Walsh function = ± 1 (mapping: '0' \rightarrow +1, '1' \rightarrow -1)
 QOF_{sign} = ± 1 sign multiplier QOF mask (mapping: '0' \rightarrow +1, '1' \rightarrow -1)
 Walsh_{rot} = '0' or '1' 90°-rotation-enable Walsh function
 Walsh_{rot} = '0' means no rotation
 Walsh_{rot} = '1' means rotate by 90°
 The null QOF has QOF_{sign} = +1 and Walsh_{rot} = '0'.
 PN_I and PN_Q = ± 1 I-channel and Q-channel PN sequences
 s₁(t) is associated with the Pilot Channel on W₀⁶⁴
 s₂(t) is associated with the Transmit Diversity Pilot Channel on W₁₆¹²⁸

1
2
3

Figure 3.1.3.1.1-21. I and Q Mapping (OTD Mode) for Spreading Rate 1



Walsh function = ± 1 (mapping: '0' $\rightarrow +1$, '1' $\rightarrow -1$)
 QOF_{sign} = ± 1 sign multiplier QOF mask (mapping: '0' $\rightarrow +1$, '1' $\rightarrow -1$)
 Walsh_{rot} = '0' or '1' 90°-rotation-enable Walsh function
 Walsh_{rot} = '0' means no rotation
 Walsh_{rot} = '1' means rotate by 90°
 The null QOF has QOF_{sign} = +1 and Walsh_{rot} = '0'.
 PN_I and PN_Q = ± 1 I-channel and Q-channel PN sequences
 s₁(t) is associated with the Pilot Channel on W₀⁶⁴
 s₂(t) is associated with the Transmit Diversity Pilot Channel on W₁₆¹²⁸

Figure 3.1.3.1.1.1-22. I and Q Mapping (STS Mode) for Spreading Rate 1

3.1.3.1.1.2 Spreading Rate 3

The Forward CDMA Channel consists of the channels specified in Table 3.1.3.1.1.2-1. Table 3.1.3.1.1.2-1 states the range of valid channels for each channel type.

**Table 3.1.3.1.1.2-1. Channel Types for the Forward CDMA Channel
for Spreading Rate 3**

Channel Type	Maximum Number
Forward Pilot Channel	1
Auxiliary Pilot Channel	Not specified
Sync Channel	1
Broadcast Control Channel	8
Quick Paging Channel	3
Common Power Control Channel	4
Common Assignment Channel	7
Forward Common Control Channel	7
Forward Dedicated Control Channel	1*
Forward Fundamental Channel	1*
Forward Supplemental Channel	2*

* per Forward Traffic Channel

Each of these code channels is spread by the appropriate Walsh function or quasi-orthogonal function. Each code channel is then spread by a quadrature pair of PN sequences at a fixed chip rate of 1.2288 Mcps. Multiple Forward CDMA Channels may be used within a base station in a frequency division multiplexed manner.

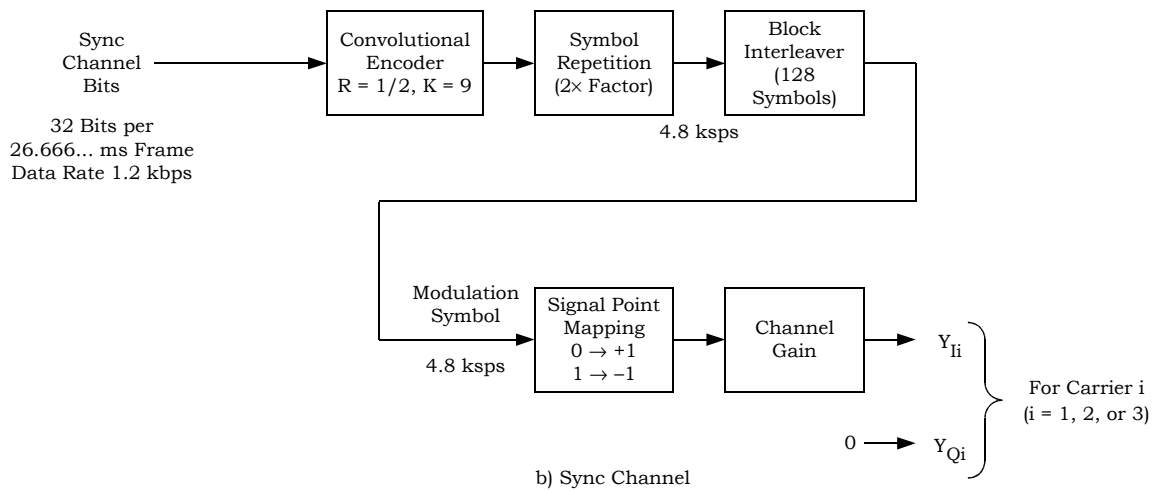
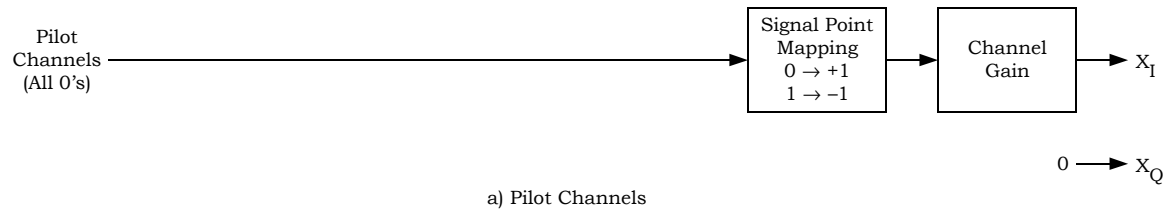
If a base station transmits the Forward Common Control Channel on a Forward CDMA Channel, then the base station shall also transmit the Broadcast Control Channel on that Forward CDMA Channel.

The structures of the Forward Pilot Channel, Auxiliary Pilot Channels, and Sync Channel for Spreading Rate 3 are shown in Figure 3.1.3.1.1.2-1. The structure of the Broadcast Control Channel for Spreading Rate 3 is shown in Figure 3.1.3.1.1.2-2. The structure of the Quick Paging Channel for Spreading Rate 3 is shown in Figure 3.1.3.1.1.2-3. The structure of the Common Power Control Channel for Spreading Rate 3 is shown in Figure 3.1.3.1.1.2-4. The structure of the Common Assignment Channel for Spreading Rate 3 is shown in Figure 3.1.3.1.1.2-5. The structure of the Forward Common Control Channel for Spreading Rate 3 is shown in Figure 3.1.3.1.1.2-6. The structure of the Forward Dedicated Control Channel for Spreading Rate 3 is shown in Figures 3.1.3.1.1.2-7 through 3.1.3.1.1.2-10.

The Forward Fundamental Channel and Forward Supplemental Channel for Radio Configuration 6 have the overall structure shown in Figure 3.1.3.1.1.2-11. The Forward Fundamental Channel and Forward Supplemental Channel for Radio Configuration 7 have the overall structure shown in Figure 3.1.3.1.1.2-12. The Forward Fundamental Channel and Forward Supplemental Channel for Radio Configuration 8 have the overall structure shown in Figure 3.1.3.1.1.2-13. The Forward Fundamental Channel and Forward

1 Supplemental Channel for Radio Configuration 9 have the overall structure shown in
 2 Figure 3.1.3.1.1.2-14.
 3 Long code scrambling, power control, and signal point mapping for Forward Traffic
 4 Channels with Radio Configurations 6 through 9 are shown in Figure 3.1.3.1.1.2-15.
 5 The symbol demultiplexing and I and Q mappings are shown in Figures 3.1.3.1.1.2-16 and
 6 3.1.3.1.1.2-17.

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9 **Figure 3.1.3.1.1.2-1. Forward Pilot Channel, Auxiliary Pilot Channels, and Sync**
 10 **Channel for Spreading Rate 3**

11

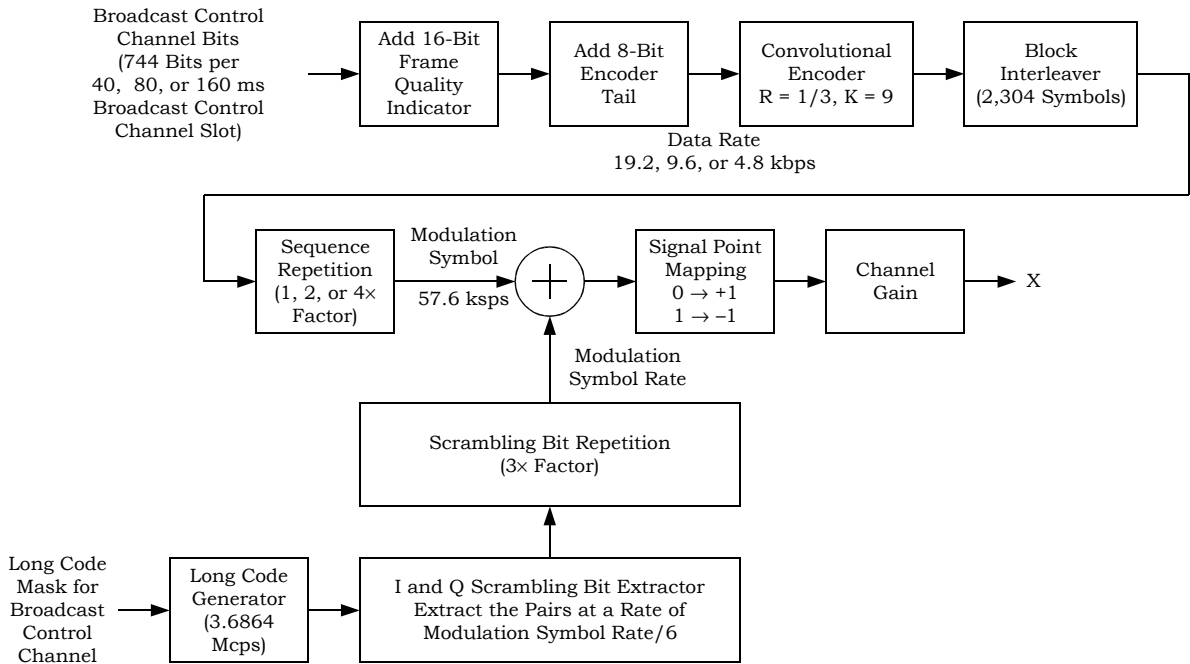


Figure 3.1.3.1.1.2-2. Broadcast Control Channel Structure for Spreading Rate 3

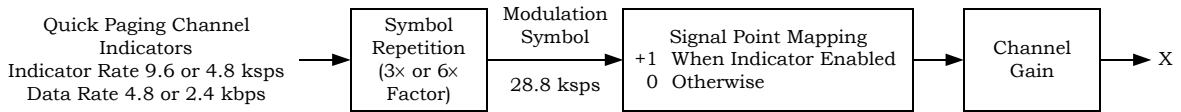


Figure 3.1.3.1.1.2-3. Quick Paging Channel Structure for Spreading Rate 3

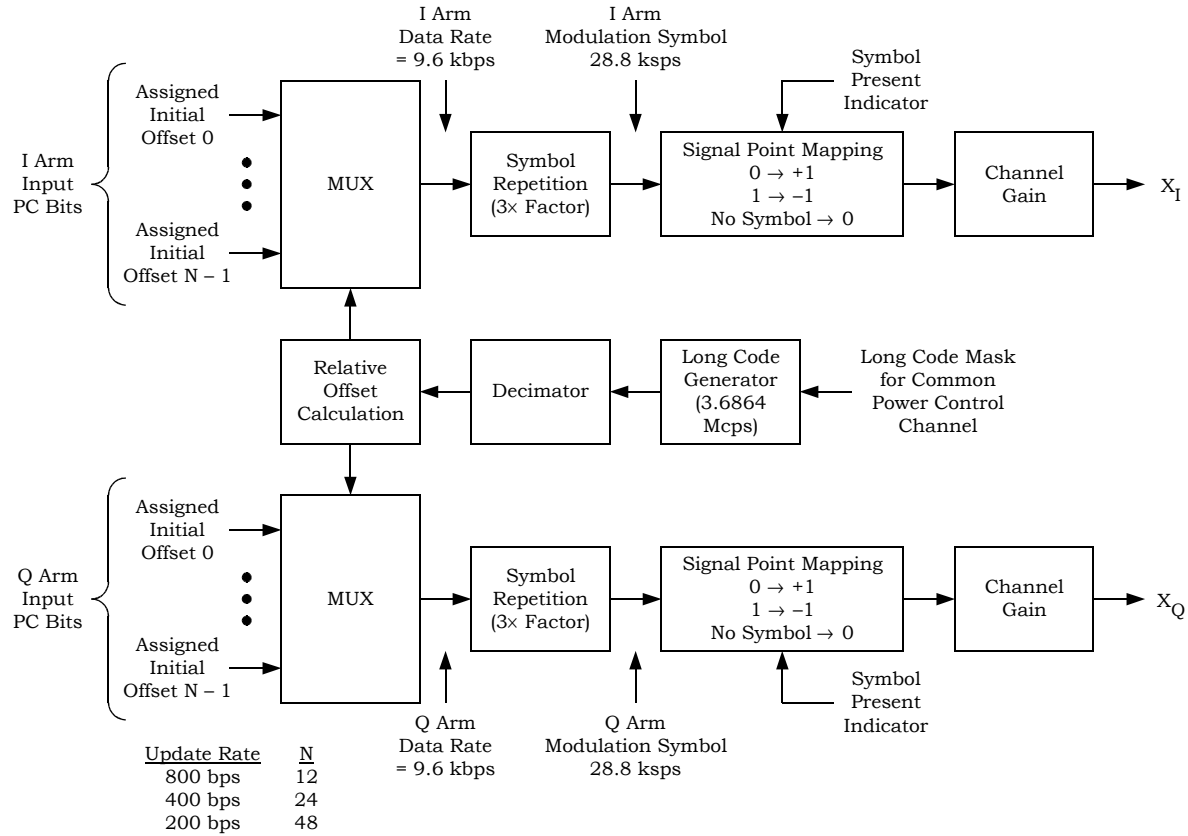


Figure 3.1.3.1.1.2-4. Common Power Control Channel Structure for Spreading Rate 3

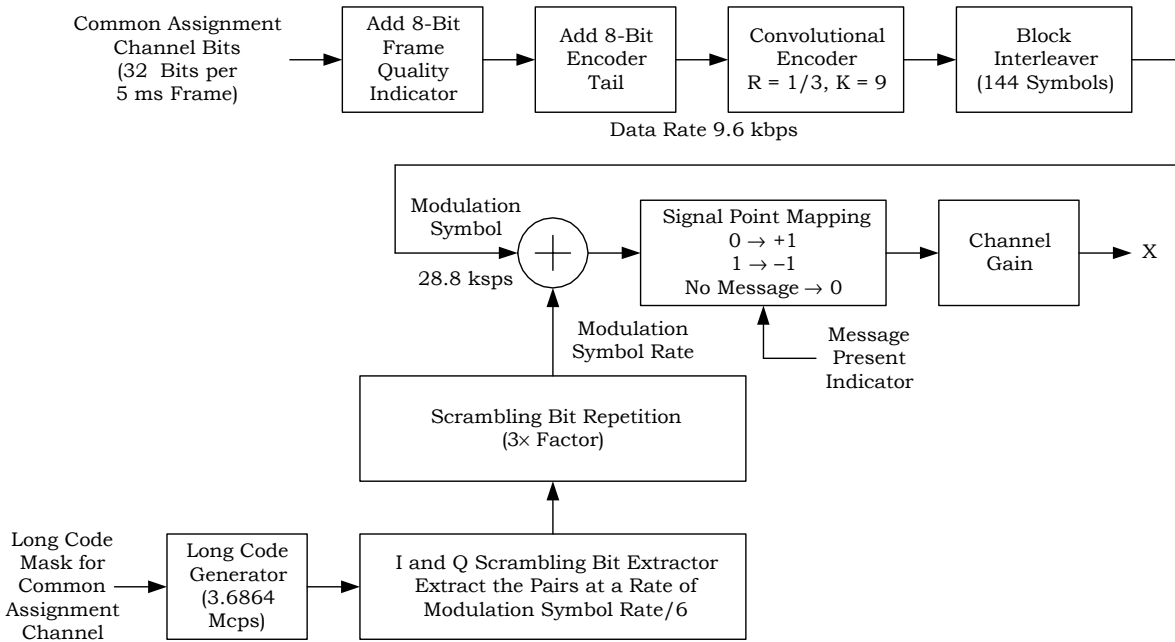


Figure 3.1.3.1.1.2-5. Common Assignment Channel Structure for Spreading Rate 3

1

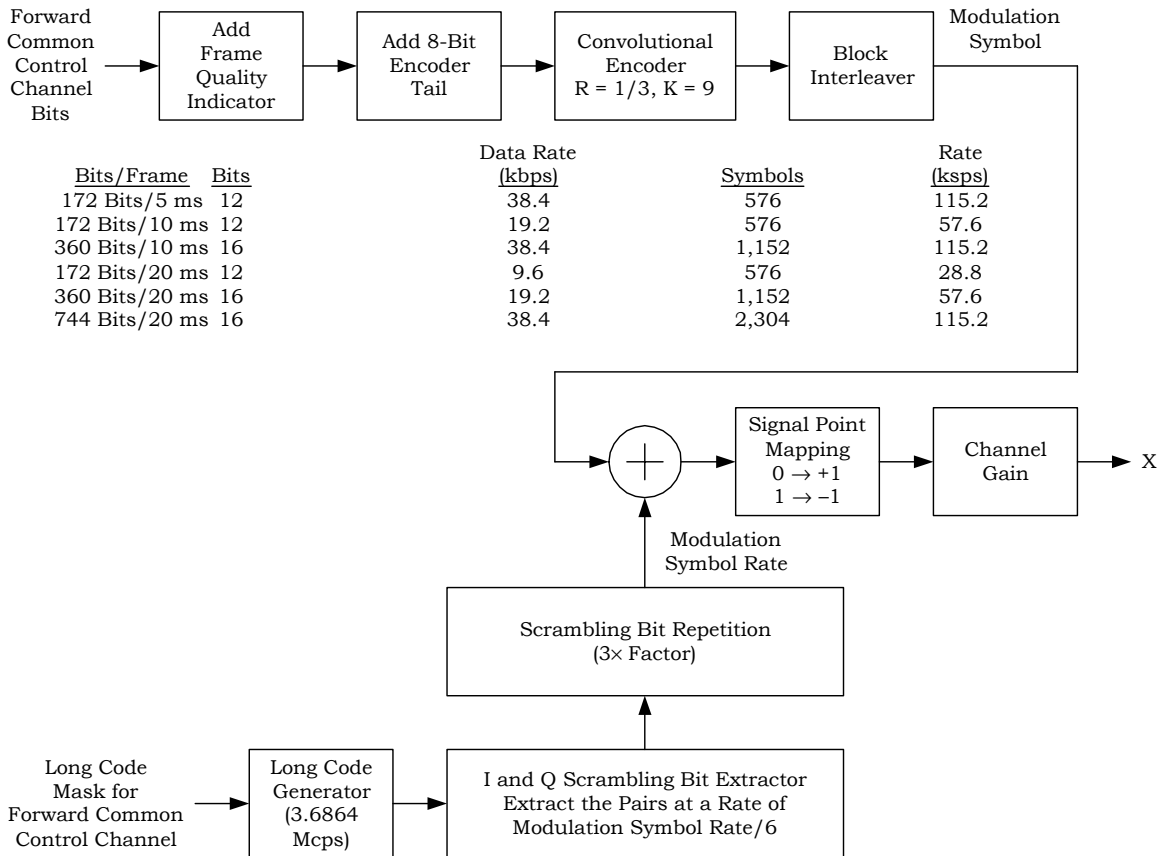
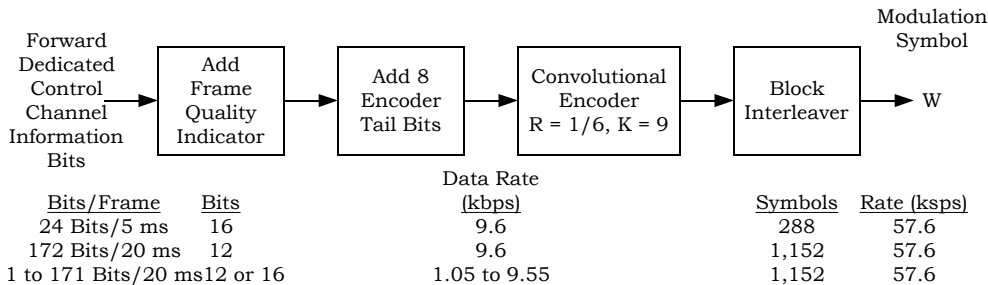


Figure 3.1.3.1.1.2-6. Forward Common Control Channel Structure for Spreading Rate 3

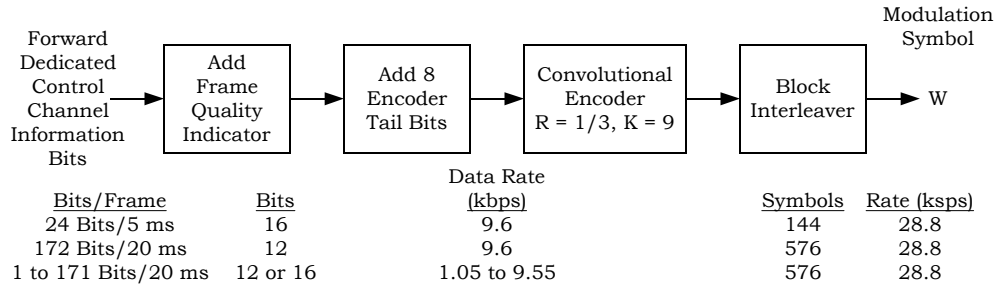
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Note: If flexible data rates are supported, there can be 1 to 171 information bits in a 20 ms frame and the encoded symbols will be repeated then punctured to provide a 57.6 kbps modulation symbol rate.

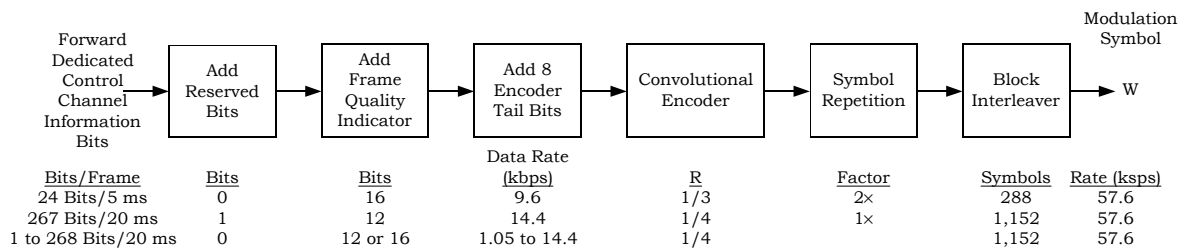
Figure 3.1.3.1.1.2-7. Forward Dedicated Control Channel Structure for Radio Configuration 6

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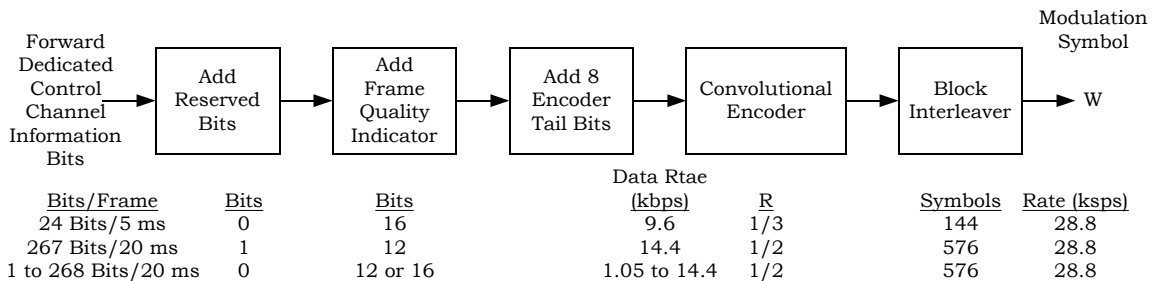
Note: If flexible data rates are supported, there can be 1 to 171 information bits in a 20 ms frame and the encoded symbols will be repeated then punctured to provide a 28.8 ksps modulation symbol rate.

Figure 3.1.3.1.1.2-8. Forward Dedicated Control Channel Structure for Radio Configuration 7



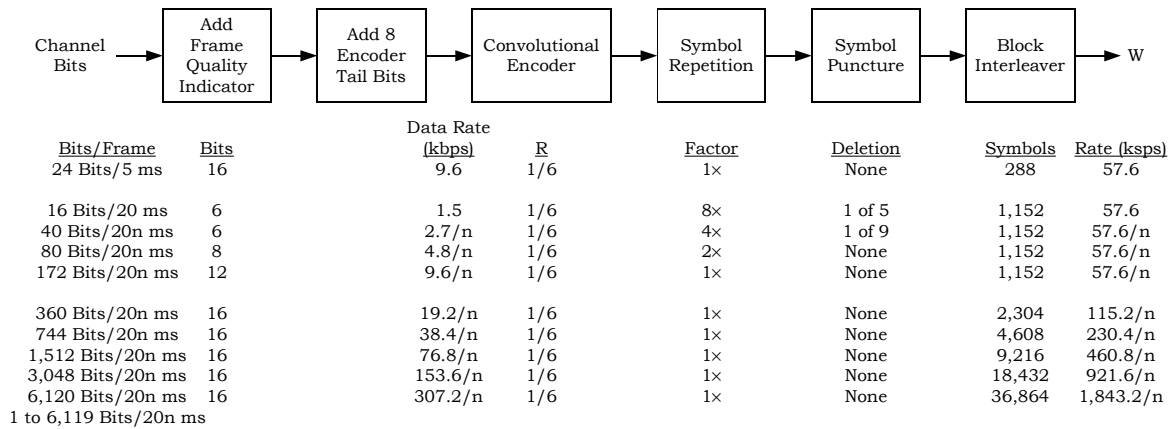
Note: If flexible data rates are supported, there can be 1 to 268 information bits in a 20 ms frame and the encoded symbols will be additionally repeated then punctured to provide a 57.6 ksps modulation symbol rate.

Figure 3.1.3.1.1.2-9. Forward Dedicated Control Channel Structure for Radio Configuration 8



Note: If flexible data rates are supported, there can be 1 to 268 information bits in a 20 ms frame and the encoded symbols will be repeated then punctured to provide a 28.8 ksps modulation symbol rate.

Figure 3.1.3.1.1.2-10. Forward Dedicated Control Channel Structure for Radio Configuration 9

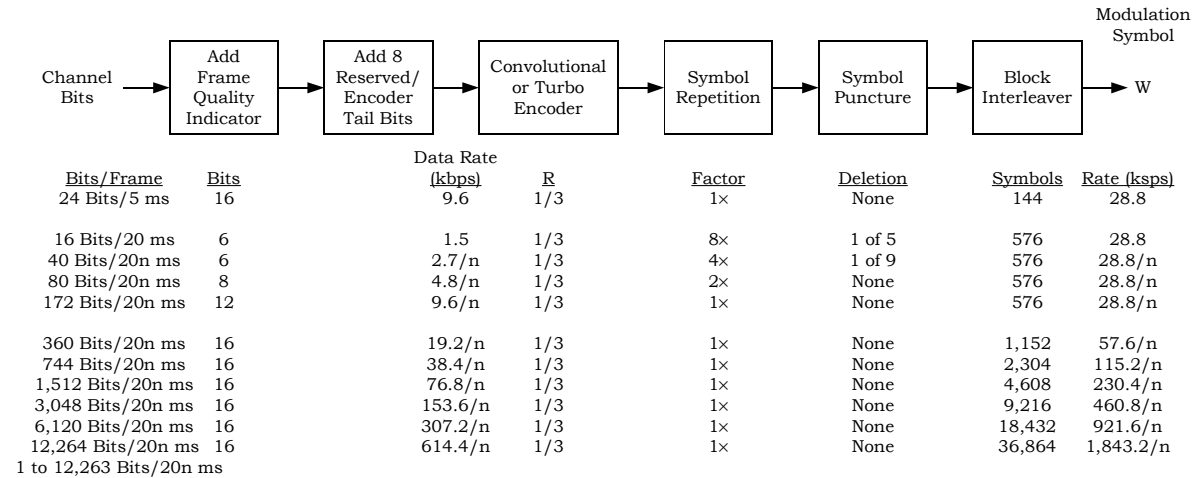


Notes:

1. n is the length of the frame in multiples of 20 ms. For 31 to 54 encoder input bits per frame, n = 1 or 2. For more than 54 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 192 encoder input bits per frame with n = 1.
3. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.
 - The frame quality indicator length is 16 for more than 192 encoder input bits per frame; 12 or 16 for 97 to 192 encoder input bits per frame; 8, 12, or 16 for 55 to 96 encoder input bits per frame; and 6, 8, 12, or 16 otherwise.
 - The code rate is 1/6.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

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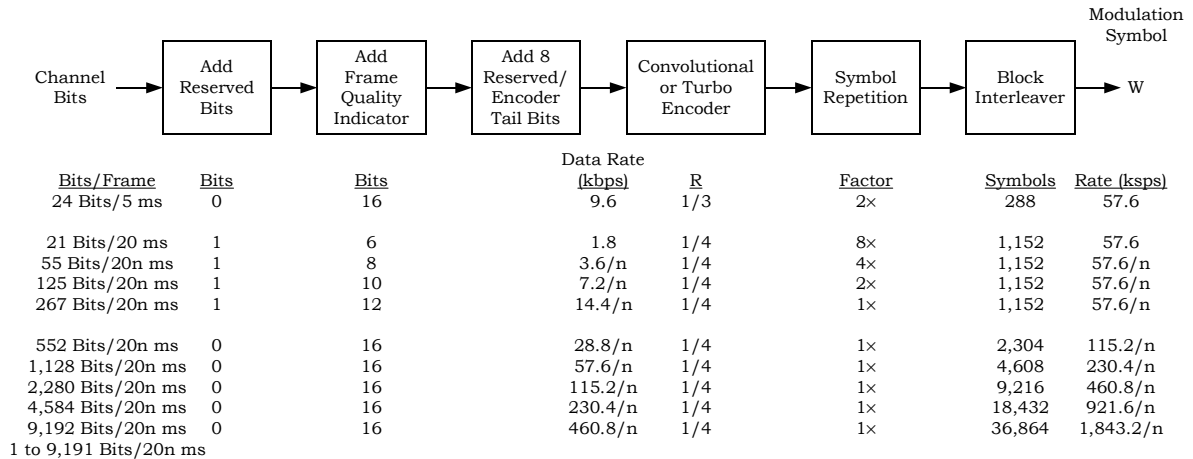
Figure 3.1.3.1.1.2-11. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 6



Notes:

1. n is the length of the frame in multiples of 20 ms. For 31 to 54 encoder input bits per frame, n = 1 or 2. For more than 54 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 192 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Forward Supplemental Channels with 384 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.
 - The frame quality indicator length is 16 for more than 192 encoder input bits per frame; 12 or 16 for 97 to 192 encoder input bits per frame; 8, 12, or 16 for 55 to 96 encoder input bits per frame; and 6, 8, 12, or 16 otherwise.
 - The code rate is 1/3. If the number of encoder input bits per frame is less than 384, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

Figure 3.1.3.1.1.2-12. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 7



Notes:

1. n is the length of the frame in multiples of 20 ms. For 37 to 72 encoder input bits per frame, n = 1 or 2. For more than 72 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 288 encoder input bits per frame with n = 1.
3. Turbo coding may be used for the Forward Supplemental Channels with 576 or more encoder input bits per frame; otherwise, K = 9 convolutional coding is used.
4. With convolutional coding, the Reserved/Encoder Tail bits provide an encoder tail. With turbo coding, the first two of these bits are reserved bits that are encoded and the last six bits are replaced by an internally generated tail.
5. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.
 - When the number of channel bits per frame is 21, 55, 125, or 267 and the corresponding frame quality indicator length is 6, 8, 10, and 12, an initial reserved bit is used; otherwise, no initial reserved bits are used.
 - The frame quality indicator length is 16 for more than 288 encoder input bits per frame; 12 or 16 for 145 to 288 encoder input bits per frame; 10, 12, or 16 for 73 to 144 encoder input bits per frame; 8, 10, 12, or 16 for 37 to 72 encoder input bits per frame; and 6, 8, 10, 12, or 16 otherwise.
 - The code rate is 1/4. If the number of encoder input bits per frame is less than 576, the type of encoding is convolutional; otherwise, it is the same as that of the maximum assigned data rate for the channel.
 - If the specified number of channel bits per frame is equal to the maximum assigned number of channel bits per frame and that number and the specified frame quality indicator length match one of the listed cases, the symbol repetition factor and symbol puncturing from that listed case are used. Otherwise, the symbol repetition factor and puncturing are calculated to achieve the same interleaver block size as for the maximum assigned data rate for the channel.
 - If the maximum assigned data rate matches one of the data rates listed in the figure, the interleaver block size for that listed data rate is used. Otherwise, the interleaver block size of the next higher listed data rate is used.

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Figure 3.1.3.1.1.2-13. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 8

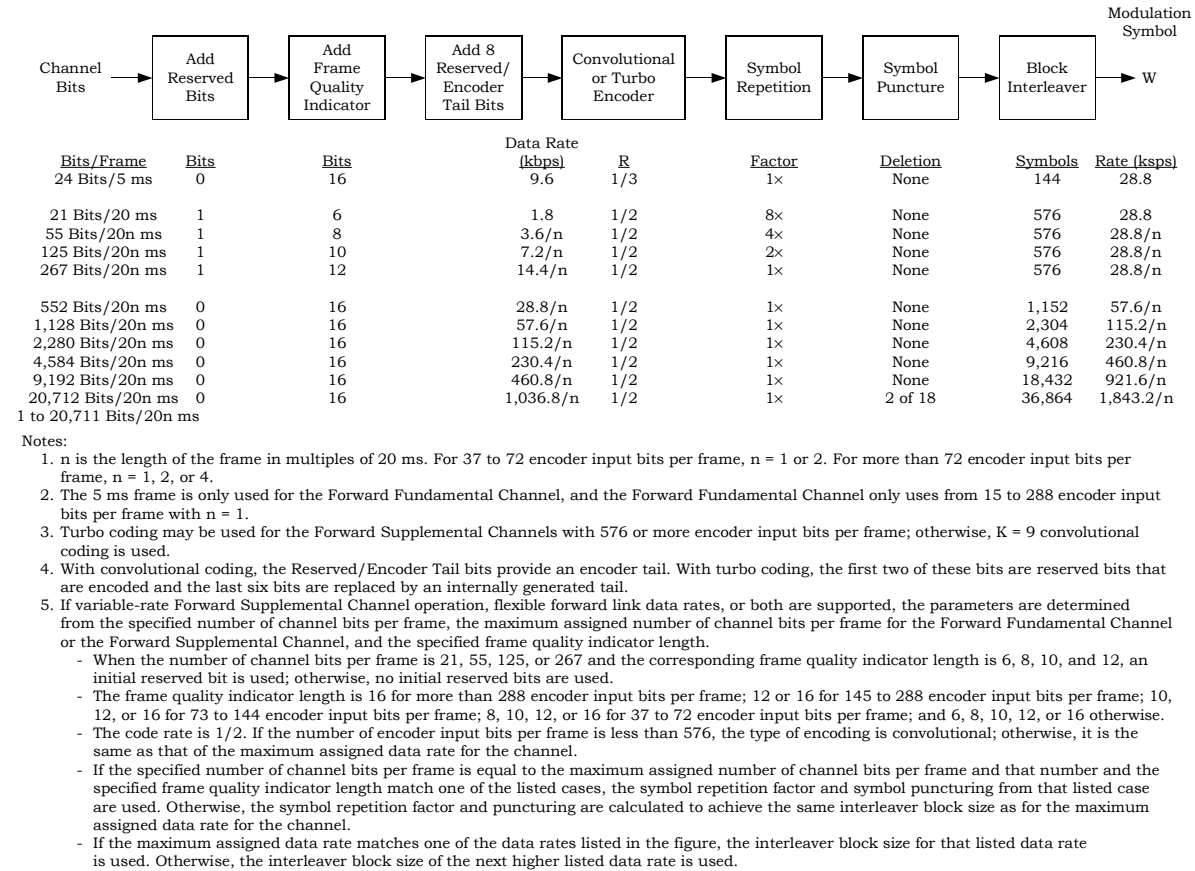
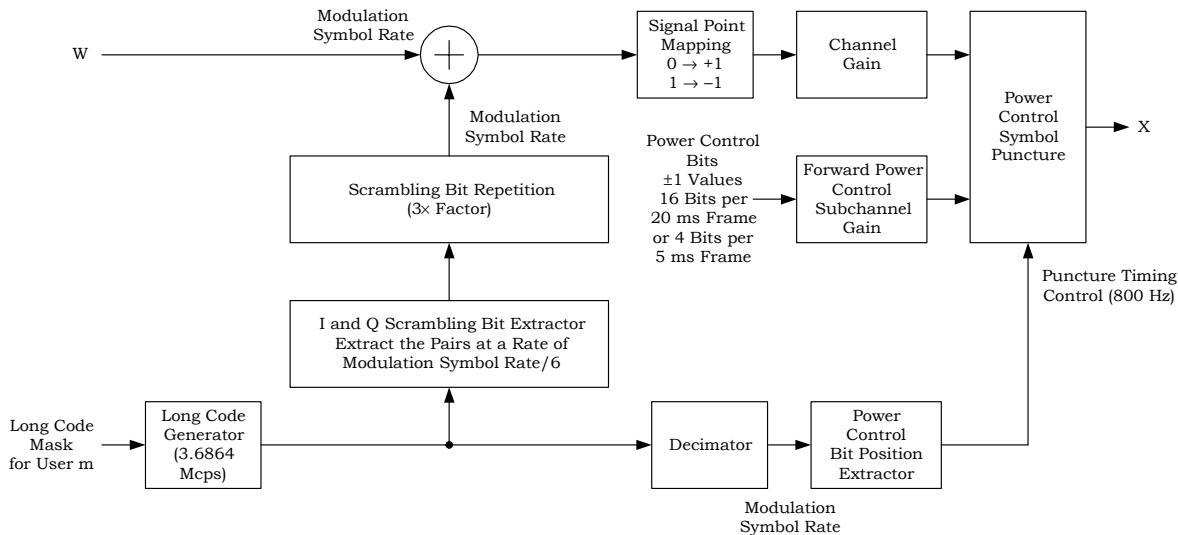


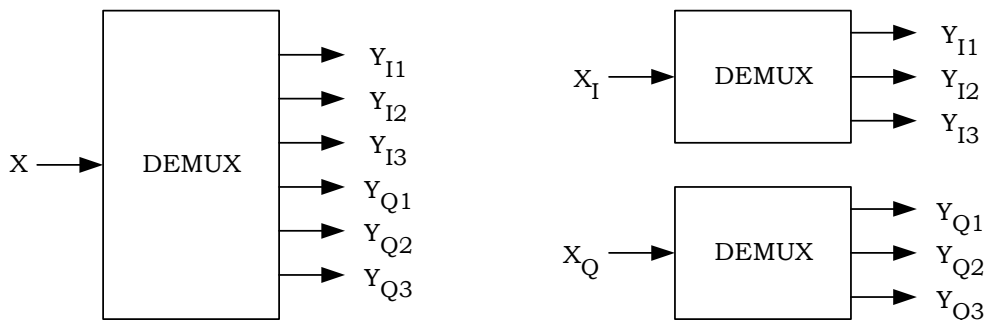
Figure 3.1.3.1.1.2-14. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 9



Power control symbol puncturing is on the Forward Fundamental Channels and Forward Dedicated Control Channels only.

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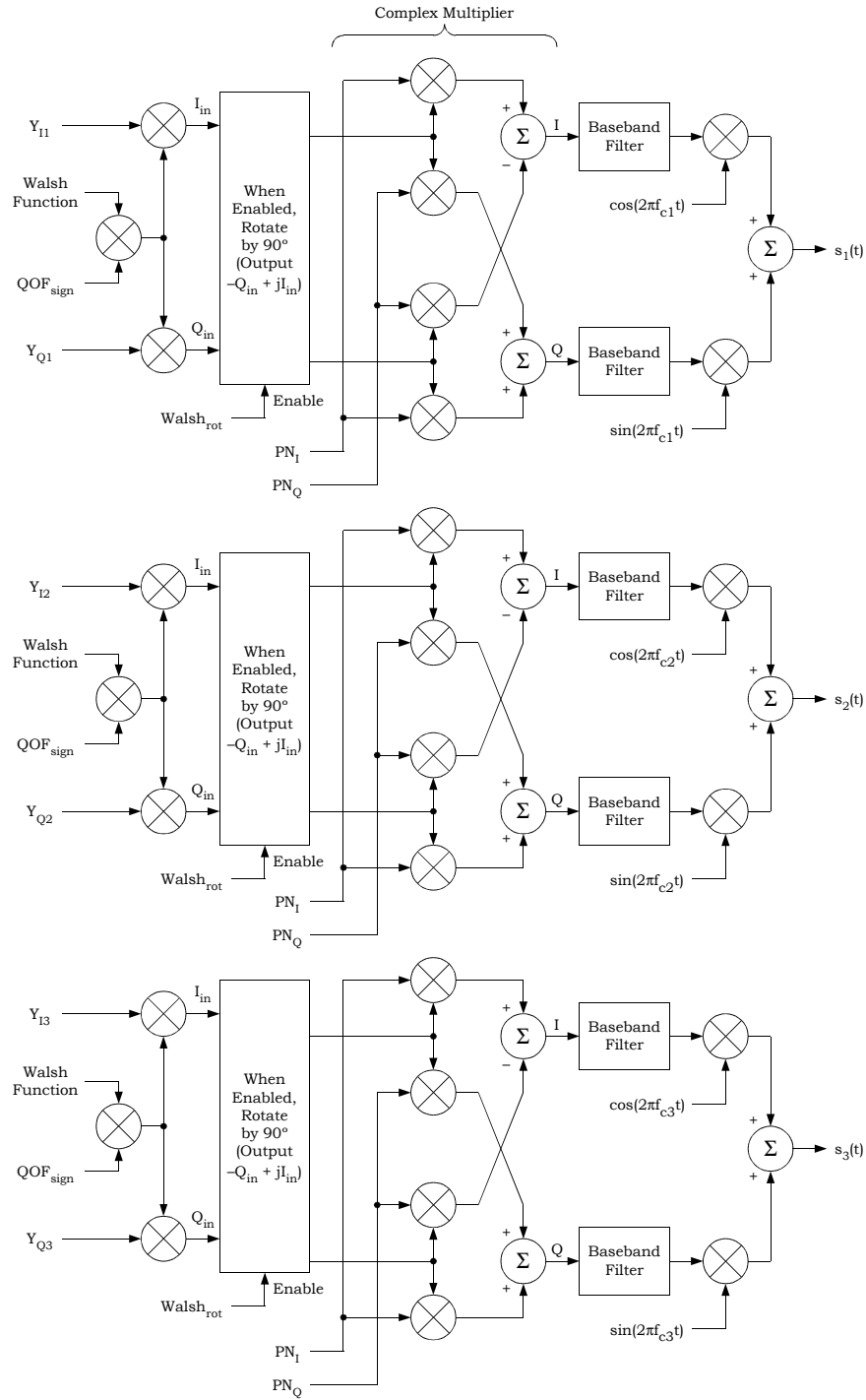
Figure 3.1.3.1.1.2-15. Long Code Scrambling, Power Control, and Signal Point Mapping for Forward Traffic Channels with Radio Configurations 6 through 9



The DEMUX functions distribute input symbols sequentially from the top to the bottom output paths.

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Figure 3.1.3.1.1.2-16. Demultiplexer Structure for Spreading Rate 3



Walsh function = ± 1 (mapping: '0' $\rightarrow +1$, '1' $\rightarrow -1$)
 $QOF_{sign} = \pm 1$ sign multiplier QOF mask (mapping: '0' $\rightarrow +1$, '1' $\rightarrow -1$)
 Walsh_rot = '0' or '1' 90°-rotation-enable Walsh function
 Walsh_rot = '0' means no rotation
 Walsh_rot = '1' means rotate by 90°
 The null QOF has $QOF_{sign} = +1$ and Walsh_rot = '0'.
 PN_I and PN_Q = ± 1 I-channel and Q-channel PN sequences
 $f_{c1} < f_{c2} < f_{c3}$

Figure 3.1.3.1.1.2-17. I and Q Mapping for Spreading Rate 3

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1 3.1.3.1.2 Modulation Parameters

2 3.1.3.1.2.1 Spreading Rate 1

3 The modulation parameters for the Forward CDMA Channel operating in Spreading Rate 1
 4 are shown in Tables 3.1.3.1.2.1-1 through 3.1.3.1.2.1-25.

5

6 **Table 3.1.3.1.2.1-1. Sync Channel Modulation Parameters for Spreading Rate 1**

Parameter	Data Rate (bps)		Units
	1,200		
PN Chip Rate	1.2288		Mcps
Code Rate	1/2		bits/code symbol
Code Symbol Repetition	2		modulation symbols/code symbol
Modulation Symbol Rate	4,800		sps
Walsh Length	64		PN chips
Number of Walsh Function Repetitions per Modulation Symbol	4		Walsh functions/modulation symbol
Processing Gain	1,024		PN chips/bit

7

8 **Table 3.1.3.1.2.1-2. Paging Channel Modulation Parameters for Spreading Rate 1**

Parameter	Data Rate (bps)		Units
	9,600	4,800	
PN Chip Rate	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	2	modulation symbols/code symbol
Modulation Symbol Rate	19,200	19,200	sps
Walsh Length	64	64	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1	1	Walsh functions/ modulation symbol
Processing Gain	128	256	PN chips/bit

9

Table 3.1.3.1.2.1-3. Broadcast Control Channel Modulation Parameters for Spreading Rate 1 with R = 1/4

Parameter	Data Rate (bps)			Units
	19,200	9,600	4,800	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	bits/code symbol
Code Sequence Repetition	1	2	4	modulation symbols/ code symbol
Modulation Symbol Rate	76,800	76,800	76,800	sps
QPSK Symbol Rate	38,400	38,400	38,400	sps
Walsh Length	32	32	32	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	Walsh functions/QPSK symbol
Processing Gain	64	128	256	PN chips/bit

Table 3.1.3.1.2.1-4. Broadcast Control Channel Modulation Parameters for Spreading Rate 1 with R = 1/2

Parameter	Data Rate (bps)			Units
	19,200	9,600	4,800	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	bits/code symbol
Code Sequence Repetition	1	2	4	modulation symbols/ code symbol
Modulation Symbol Rate	38,400	38,400	38,400	sps
QPSK Symbol Rate	19,200	19,200	19,200	sps
Walsh Length	64	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	Walsh functions/QPSK symbol
Processing Gain	64	128	256	PN chips/bit

**Table 3.1.3.1.2.1-5. Quick Paging Channel Modulation Parameters
for Spreading Rate 1**

Parameter	Data Rate (bps)		Units
	4,800	2,400	
PN Chip Rate	1.2288	1.2288	Mcps
Number of Indicators/80 ms Quick Paging Channel Slot	768	384	indicators/slot
Number of Indicators/Slot/ Mobile Station	2	2	indicators/mobile station
Indicator Rate	9,600	4,800	bps
Indicator Repetition Factor	2	4	modulation symbols/ indicator
Modulation Symbol Rate	19,200	19,200	sps
QPSK Symbol Rate	9,600	9,600	sps
Walsh Length	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	Walsh functions/QPSK symbol
Processing Gain	256	512	PN chips/mobile station

**Table 3.1.3.1.2.1-6. Common Power Control Channel Modulation Parameters
for Spreading Rate 1**

Parameter	Data Rate (bps)	Units
	19,200	
PN Chip Rate	1.2288	Mcps
PC Bit Repetition Factor	1 (non-TD) 2 (TD)	modulation symbols /bit
Modulation Symbol Rate	9,600 (non-TD) 19,200 (TD)	sps on I and Q
Walsh Length	128 (non-TD) 64 (TD)	PN chips
Number of Walsh Function Repetitions per I or Q Arm Modulation Symbol	1	Walsh functions/I or Q arm modulation symbol
Processing Gain	64	PN chips/bit

Note: I and Q arms are considered as separate BPSK channels.

**Table 3.1.3.1.2.1-7. Common Assignment Channel Modulation Parameters
for Spreading Rate 1 with R = 1/4**

Parameter	Data Rate (bps)	
	9,600	Units
PN Chip Rate	1.2288	Mcps
Code Rate	1/4	bits/code symbol
Code Symbol Repetition	1	modulation symbols/code symbol
Modulation Symbol Rate	38,400	sps
QPSK Symbol Rate	19,200	sps
Walsh Length	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	128	PN chips/bit

**Table 3.1.3.1.2.1-8. Common Assignment Channel Modulation Parameters
for Spreading Rate 1 with R = 1/2**

Parameter	Data Rate (bps)	
	9,600	Units
PN Chip Rate	1.2288	Mcps
Code Rate	1/2	bits/code symbol
Code Symbol Repetition	1	modulation symbols/code symbol
Modulation Symbol Rate	19,200	sps
QPSK Symbol Rate	9,600	sps
Walsh Length	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	128	PN chips/bit

**Table 3.1.3.1.2.1-9. Forward Common Control Channel Modulation Parameters
for Spreading Rate 1 with R = 1/4**

Parameter	Data Rate (bps)			Units
	38,400	19,200	9,600	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	1	modulation symbols/code symbol
Modulation Symbol Rate	153,600	76,800	38,400	sps
QPSK Symbol Rate	76,800	38,400	19,200	sps
Walsh Length	16	32	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	Walsh functions/QPSK symbol
Processing Gain	32	64	128	PN chips/bit

**Table 3.1.3.1.2.1-10. Forward Common Control Channel Modulation Parameters
for Spreading Rate 1 with R = 1/2**

Parameter	Data Rate (bps)			Units
	38,400	19,200	9,600	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	1	1	modulation symbols/code symbol
Modulation Symbol Rate	76,800	38,400	19,200	sps
QPSK Symbol Rate	38,400	19,200	9600	sps
Walsh Length	32	64	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	Walsh functions/QPSK symbol
Processing Gain	32	64	128	PN chips/bit

Table 3.1.3.1.2.1-11. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 3

Parameter	Data Rate (bps)	Units
	9,600	
PN Chip Rate	1.2288	Mcps
Code Rate	1/4	bits/code symbol
Code Symbol Repetition	1	modulation symbols/ code symbol
Modulation Symbol Rate	38,400	sps
QPSK Symbol Rate	19,200	sps
Walsh Length	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	128	PN chips/bit

Note: If flexible data rates are supported, symbol repetition and symbol puncturing can be used to support data rates not specified in this table.

Table 3.1.3.1.2.1-12. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 4

Parameter	Data Rate (bps)	Units
	9,600	
PN Chip Rate	1.2288	Mcps
Code Rate	1/2	bits/code symbol
Code Symbol Repetition	1	modulation symbols/ code symbol
Modulation Symbol Rate	19,200	sps
QPSK Symbol Rate	9,600	sps
Walsh Length	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	128	PN chips/bit

Note: If flexible data rates are supported, symbol repetition and symbol puncturing can be used to support data rates not specified in this table.

1 **Table 3.1.3.1.2.1-13. Forward Dedicated Control Channel Modulation Parameters**
 2 **for Radio Configuration 5**

Parameter	Data Rate (bps)		Units
	9,600	14,400	
PN Chip Rate	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	repeated code symbols/ code symbol
Puncturing Rate	1	8/12	modulation symbols/ repeated code symbol
Modulation Symbol Rate	38,400	38,400	sps
QPSK Symbol Rate	19,200	19,200	sps
Walsh Length	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	Walsh functions/QPSK symbol
Processing Gain	128	85.33	PN chips/bit

Notes:

1. The 9600 bps data rate is used for 5 ms frames and the 14400 bps data rate is used for 20 ms frames.
2. If flexible data rates are supported, symbol repetition and symbol puncturing can be used to support data rates not specified in this table.

3

1 **Table 3.1.3.1.2.1-14. Forward Fundamental Channel and Forward Supplemental Code**
 2 **Channel Modulation Parameters for Radio Configuration 1**

Parameter	Data Rate (bps)				Units
	9,600	4,800	2,400	1,200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	2	4	8	modulation symbols/code symbol
Modulation Symbol Rate	19,200	19,200	19,200	19,200	sps
Walsh Length	64	64	64	64	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1	1	1	1	Walsh functions/modulation symbol
Processing Gain	128	256	512	1024	PN chips/bit

3

1 **Table 3.1.3.1.2.1-15. Forward Fundamental Channel and Forward Supplemental Code**
 2 **Channel Modulation Parameters for Radio Configuration 2**

Parameter	Data Rate (bps)				Units
	14,400	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/ code symbol
Puncturing Rate	4/6	4/6	4/6	4/6	modulation symbols/repeat- ed code symbol
Modulation Symbol Rate	19,200	19,200	19,200	19,200	sps
Walsh Length	64	64	64	64	PN chips
Number of Walsh Function Repetitions per Modulation Symbol	1	1	1	1	Walsh functions/ modulation symbol
Processing Gain	85.33	170.7	341.33	682.7	PN chips/bit

3

1 **Table 3.1.3.1.2.1-16. Forward Fundamental Channel and Forward Supplemental**
 2 **Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 3**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,700	1,500	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	1	1	8/9	4/5	modulation symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N	38,400	38,400	38,400	sps
QPSK Symbol Rate	19,200 × N	19,200	19,200	19,200	sps
Walsh Length	64/N	64	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	1	Walsh functions/QPSK symbol
Processing Gain	128/N	256	455.1	819.2	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 9600, 19200, 38400, 76800, or 153600 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.

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**Table 3.1.3.1.2.1-17. Forward Supplemental Channel Modulation Parameters
for 40 ms Frames for Radio Configuration 3**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,350	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/ code symbol
Puncturing Rate	1	1	1	8/9	interleaver symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N	19,200	19,200	19,200	sps
QPSK Symbol Rate	19,200 × N	9,600	9,600	9,600	sps
Walsh Length	64/N	64	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	2	2	Walsh functions/QPSK symbol
Processing Gain	128/N	256	512	910.2	PN chips/bit

Notes:

1. N = 1, 2, 4, or 8, which yields data rates of 9600, 19200, 38400, or 76800 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

3

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Table 3.1.3.1.2.1-18. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 3

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	1	2	repeated code symbols/ code symbol
Modulation Symbol Rate	38,400 × N	19,200	9,600	9,600	sps
QPSK Symbol Rate	19,200 × N	9,600	4,800	4,800	sps
Walsh Length	64/N	64	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	4	4	Walsh functions/QPSK symbol
Processing Gain	128/N	256	512	1024	PN chips/bit

Notes:

1. N = 1, 2, or 4, which yields data rates of 9600, 19200, or 38400 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

3

1 **Table 3.1.3.1.2.1-19. Forward Fundamental Channel and Forward Supplemental**
 2 **Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 4**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,700	1,500	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/ code symbol
Puncturing Rate	1	1	8/9	4/5	modulation symbols/repeated code symbol
Modulation Symbol Rate	19,200 × N	19,200	19,200	19,200	sps
QPSK Symbol Rate	9,600 × N	9,600	9,600	9,600	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	1	Walsh functions/QPSK symbol
Processing Gain	128/N	256	455.1	819.2	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 32, which yields data rates of 9600, 19200, 38400, 76800, 153600, or 307200 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.

3

1 **Table 3.1.3.1.2.1-20. Forward Supplemental Channel Modulation Parameters**
 2 **for 40 ms Frames for Radio Configuration 4**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,350	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/ code symbol
Puncturing Rate	1	1	1	8/9	interleaver symbols/repeated code symbol
Modulation Symbol Rate	19,200 × N	9,600	9,600	9,600	sps
QPSK Symbol Rate	9,600 × N	4,800	4,800	4,800	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	2	2	Walsh functions/QPSK symbol
Processing Gain	128/N	256	512	910.2	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 9600, 19200, 38400, 76800, or 153600 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

1 **Table 3.1.3.1.2.1-21. Forward Supplemental Channel Modulation Parameters**
 2 **for 80 ms Frames for Radio Configuration 4**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	1	1	2	repeated code symbols/ code symbol
Modulation Symbol Rate	19,200 × N	9,600	4,800	4,800	sps
QPSK Symbol Rate	9,600 × N	4,800	2,400	2,400	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	4	4	Walsh functions/QPSK symbol
Processing Gain	128/N	256	512	1024	PN chips/bit

Notes:

1. N = 1, 2, 4, or 8, which yields data rates of 9600, 19200, 38400, or 76800 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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1 **Table 3.1.3.1.2.1-22. Forward Fundamental Channel and Forward Supplemental**
 2 **Channel Modulation Parameters for 20 ms Frames for Radio Configuration 5**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/ code symbol
Puncturing Rate	8/12	8/12	8/12	8/12	modulation symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N	38,400	38,400	38,400	sps
QPSK Symbol Rate	19,200 × N	19,200	19,200	19,200	sps
Walsh Length	64/N	64	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	1	Walsh functions/QPSK symbol
Processing Gain	85.33/N	170.7	341.33	682.7	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 14400, 28800, 57600, 115200, or 230400 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.

1 **Table 3.1.3.1.2.1-23. Forward Supplemental Channel Modulation Parameters**
 2 **for 40 ms Frames for Radio Configuration 5**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Puncturing Rate	8/12	8/12	8/12	8/12	interleaver symbols/repeated code symbol
Modulation Symbol Rate	38,400 × N	19,200	19,200	19,200	sps
QPSK Symbol Rate	19,200 × N	9,600	9,600	9,600	sps
Walsh Length	64/N	64	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	2	2	Walsh functions/QPSK symbol
Processing Gain	85.33/N	170.7	341.33	682.7	PN chips/bit

Notes:

1. N = 1, 2, 4, or 8, which yields data rates of 14400, 28800, 57600, or 115200 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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**Table 3.1.3.1.2.1-24. Forward Supplemental Channel Modulation Parameters
for 80 ms Frames for Radio Configuration 5**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	1	2	repeated code symbols/ code symbol
Puncturing Rate	8/12	8/12	8/12	8/12	interleaver symbols/ repeated code symbol
Modulation Symbol Rate	38,400 × N	19,200	9,600	9,600	sps
QPSK Symbol Rate	19,200 × N	9,600	4,800	4,800	sps
Walsh Length	64/N	64	64	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	4	4	Walsh functions/QPSK symbol
Processing Gain	85.33/N	170.7	341.33	682.7	PN chips/bit

Notes:

1. N = 1, 2, or 4, which yields data rates of 14400, 28800, or 57600 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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**Table 3.1.3.1.2.1-25. Forward Fundamental Channel Modulation Parameters
for 5 ms Frames for Radio Configuration 5**

Parameter	Data Rate (bps)	Units
	9,600	
PN Chip Rate	1.2288	Mcps
Code Rate	1/4	bits/code symbol
Code Symbol Repetition	1	modulation symbols/code symbol
Modulation Symbol Rate	38,400	sps
QPSK Symbol Rate	19,200	sps
Walsh Length	64	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	128	PN chips/bit

3.1.3.1.2.2 Spreading Rate 3

The modulation parameters for the Forward CDMA Channel operating in Spreading Rate 3 are shown in Tables 3.1.3.1.2.2-1 through 3.1.3.1.2.2-23.

1 **Table 3.1.3.1.2.2-1. Sync Channel Modulation Parameters for Spreading Rate 3**

Parameter	Data Rate (bps)		Units
	1,200		
PN Chip Rate	1.2288		Mcps
Code Rate	1/2		bits/code symbol
Code Symbol Repetition	2		modulation symbols/code symbol
Modulation Symbol Rate	4,800		sps
Walsh Length	64		PN chips
Number of Walsh Function Repetitions per Modulation Symbol	4		Walsh functions/modulation symbol
Processing Gain	1,024		PN chips/bit

Note: A Spreading Rate 3 Sync Channel can be transmitted on any of the three carriers.

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3 **Table 3.1.3.1.2.2-2. Broadcast Control Channel Modulation Parameters for Spreading Rate 3**
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Parameter	Data Rate (bps)			Units
	19,200	9,600	4,800	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/3	1/3	1/3	bits/code symbol
Code Sequence Repetition	1	2	4	modulation symbols/code symbol
Modulation Symbol Rate	57,600	57,600	57,600	sps
QPSK Symbol Rate	28,800	28,800	28,800	sps
Walsh Length	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	Walsh functions/QPSK symbol
Processing Gain	192	384	768	PN chips/bit

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Table 3.1.3.1.2.2-3. Quick Paging Channel Modulation Parameters for Spreading Rate 3

Parameter	Data Rate (bps)		Units
	4,800	2,400	
PN Chip Rate	1.2288	1.2288	Mcps/carrier
Number of Indicators/80 ms Quick Paging Channel Slot	768	384	indicators/slot
Number of Indicators/Slot/ Mobile Station	2	2	indicators/mobile station
Indicator Rate	9,600	4,800	bps
Indicator Repetition Factor	3	6	modulation symbols/indicator
Modulation Symbol Rate	28,800	28,800	sps
QPSK Symbol Rate	14,400	14,400	sps
Walsh Length	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	Walsh functions/QPSK symbol
Processing Gain	768	1,536	PN chips/mobile station

Table 3.1.3.1.2.2-4. Common Power Control Channel Modulation Parameters for Spreading Rate 3

Parameter	Data Rate (bps)		Units
	19,200		
PN Chip Rate	1.2288		Mcps/carrier
PC Bit Repetition Factor	3		modulation symbols/bit
Modulation Symbol Rate	28,800		sps on I and Q
Walsh Length	128		PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1		Walsh functions/QPSK symbol
Processing Gain	192		PN chips/bit

Note: I and Q arms are considered as separate BPSK channels.

Table 3.1.3.1.2.2-5. Common Assignment Channel Modulation Parameters for Spreading Rate 3

Parameter	Data Rate (bps)		Units
	9,600		
PN Chip Rate	1.2288		Mcps/carrier
Code Rate	1/3		bits/code symbol
Code Symbol Repetition	1		modulation symbols/code symbol
Modulation Symbol Rate	28,800		sps
QPSK Symbol Rate	14,400		sps
Walsh Length	256		PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1		Walsh functions/QPSK symbol
Processing Gain	384		PN chips/bit

Table 3.1.3.1.2.2-6. Forward Common Control Channel Modulation Parameters for Spreading Rate 3

Parameter	Data Rate (bps)			Units
	38,400	19,200	9,600	
PN Chip Rate	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/3	1/3	1/3	bits/code symbol
Code Symbol Repetition	1	1	1	Modulation symbols/code symbol
Modulation Symbol Rate	115,200	57,600	28,800	sps
QPSK Symbol Rate	57,600	28,800	14,400	sps
Walsh Length	64	128	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	Walsh functions/QPSK symbol
Processing Gain	96	192	384	PN chips/bit

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2**Table 3.1.3.1.2.2-7. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 6**

Parameter	Data Rate (bps)	
	9,600	Units
PN Chip Rate	1.2288	Mcps/carrier
Code Rate	1/6	bits/code symbol
Code Symbol Repetition	1	modulation symbols/code symbol
Modulation Symbol Rate	57,600	sps
QPSK Symbol Rate	28,800	sps
Walsh Length	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	384	PN chips/bit

Note: If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

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5**Table 3.1.3.1.2.2-8. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 7**

Parameter	Data Rate (bps)	
	9,600	Units
PN Chip Rate	1.2288	Mcps/carrier
Code Rate	1/3	bits/code symbol
Code Symbol Repetition	1	modulation symbols/code symbol
Modulation Symbol Rate	28,800	sps
QPSK Symbol Rate	14,400	sps
Walsh Length	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	384	PN chips/bit

Note: If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

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2**Table 3.1.3.1.2.2-9. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 8**

Parameter	Data Rate (bps)		Units
	9,600	14,400	
PN Chip Rate	1.2288	1.2288	Mcps/carrier
Code Rate	1/3	1/4	bits/code symbol
Code Symbol Repetition	2	1	modulation symbols/code symbol
Modulation Symbol Rate	57,600	57,600	sps
QPSK Symbol Rate	28,800	28,800	sps
Walsh Length	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	Walsh functions/QPSK symbol
Processing Gain	384	256	PN chips/bit

Notes:

1. The 9600 bps data rate is for 5 ms frames and the 14400 bps data rate is for 20 ms frames.
2. If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

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1 **Table 3.1.3.1.2.2-10. Forward Dedicated Control Channel Modulation Parameters**
 2 **for Radio Configuration 9**

Parameter	Data Rate (bps)		Units
	9,600	14,400	
PN Chip Rate	1.2288	1.2288	Mcps/carrier
Code Rate	1/3	1/2	bits/code symbol
Code Symbol Repetition	1	1	modulation symbols/code symbol
Modulation Symbol Rate	28,800	28,800	sps
QPSK Symbol Rate	14,400	14,400	sps
Walsh Length	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	Walsh functions/QPSK symbol
Processing Gain	384	256	PN chips/bit

Notes:

1. The 9600 bps data rate is for 5 ms frames and the 14400 bps data rate is for 20 ms frames.
2. If flexible data rates are supported, repetition and puncturing can be used to support data rates not specified in this table.

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1 **Table 3.1.3.1.2.2-11. Forward Fundamental Channel and Forward Supplemental**
 2 **Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 6**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,700	1,500	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/6	1/6	1/6	1/6	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	1	1	8/9	4/5	modulation symbols/repeated code symbol
Modulation Symbol Rate	57,600 × N	57,600	57,600	57,600	sps
QPSK Symbol Rate	28,800 × N	28,800	28,800	28,800	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	1	Walsh functions/QPSK symbol
Processing Gain	384/N	768	1,365.3	2,457.6	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 32, which yields data rates of 9600, 19200, 38400, 76800, 153600, or 307200 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.

**Table 3.1.3.1.2.2-12. Forward Supplemental Channel Modulation Parameters
for 40 ms Frames for Radio Configuration 6**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,350	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/6	1/6	1/6	1/6	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Puncturing Rate	1	1	1	8/9	interleaver symbols/repeated code symbol
Modulation Symbol Rate	57,600 × N	28,800	28,800	28,800	sps
QPSK Symbol Rate	28,800 × N	14,400	14,400	14,400	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	2	2	Walsh functions/QPSK symbol
Processing Gain	384/N	768	1,536	2,730.7	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 9600, 19200, 38400, 76800, or 153600 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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2**Table 3.1.3.1.2.2-13. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 6**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/6	1/6	1/6	1/6	bits/code symbol
Code Symbol Repetition	1	1	1	2	repeated code symbols/code symbol
Modulation Symbol Rate	57,600 × N	28,800	14,400	14,400	sps
QPSK Symbol Rate	28,800 × N	14,400	7,200	7,200	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	4	4	Walsh functions/QPSK symbol
Processing Gain	384/N	768	1,536	3,072	PN chips/bit

Notes:

1. N = 1, 2, 4, or 8, which yields data rates of 9600, 19200, 38400, or 76800 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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1 **Table 3.1.3.1.2.2-14. Forward Fundamental Channel and Forward Supplemental**
 2 **Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 7**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,700	1,500	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/3	1/3	1/3	1/3	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	1	1	8/9	4/5	modulation symbols/repeated code symbol
Modulation Symbol Rate	28,800 × N	28,800	28,800	28,800	sps
QPSK Symbol Rate	14,400 × N	14,400	14,400	14,400	sps
Walsh Length	256/N	256	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	1	Walsh functions/QPSK symbol
Processing Gain	384/N	768	1,365.3	2,457.6	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, 32, or 64, which yields data rates of 9600, 19200, 38400, 76800, 153600, 307200, or 614400 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.

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**Table 3.1.3.1.2.2-15. Forward Supplemental Channel Modulation Parameters
for 40 ms Frames for Radio Configuration 7**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,350	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/3	1/3	1/3	1/3	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Puncturing Rate	1	1	1	8/9	modulation symbols/repeated code symbol
Modulation Symbol Rate	28,800 × N	14,400	14,400	14,400	sps
QPSK Symbol Rate	14,400 × N	7,200	7,200	7,200	sps
Walsh Length	256/N	256	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	2	2	Walsh functions/QPSK symbol
Processing Gain	384/N	768	1,536	2,730.7	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 32, which yields data rates of 9600, 19200, 38400, 76800, 153600, or 307200 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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**Table 3.1.3.1.2.2-16. Forward Supplemental Channel Modulation Parameters
for 80 ms Frames for Radio Configuration 7**

Parameter	Data Rate (bps)				Units
	9,600 × N	4,800	2,400	1,200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/3	1/3	1/3	1/3	bits/code symbol
Code Symbol Repetition	1	1	1	2	repeated code symbols/code symbol
Modulation Symbol Rate	28,800 × N	14,400	7,200	7,200	sps
QPSK Symbol Rate	14,400 × N	7,200	3,600	3,600	sps
Walsh Length	256/N	256	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	4	4	Walsh functions/QPSK symbol
Processing Gain	384/N	768	1,536	3,072	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 9600, 19200, 38400, 76800, or 153600 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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1 **Table 3.1.3.1.2.2-17. Forward Fundamental Channel and Forward Supplemental**
 2 **Channel Modulation Parameters for 20 ms Frames for Radio Configuration 8**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Modulation Symbol Rate	57,600 × N	57,600	57,600	57,600	sps
QPSK Symbol Rate	28,800 × N	28,800	28,800	28,800	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	1	Walsh functions/QPSK symbol
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 32, which yields data rates of 14400, 28800, 57600, 115200, 230400, or 460800, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.

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**Table 3.1.3.1.2.2-18. Forward Supplemental Channel Modulation Parameters
for 40 ms Frames for Radio Configuration 8**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Modulation Symbol Rate	57,600 × N	28,800	28,800	28,800	sps
QPSK Symbol Rate	28,800 × N	14,400	14,400	14,400	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	2	2	Walsh functions/QPSK symbol
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 16, which yields data rates of 14400, 28800, 57600, 115200, or 230400, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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Table 3.1.3.1.2.2-19. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 8

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/4	1/4	1/4	1/4	bits/code symbol
Code Symbol Repetition	1	1	1	2	repeated code symbols/code symbol
Modulation Symbol Rate	57,600 × N	28,800	14,400	14,400	sps
QPSK Symbol Rate	28,800 × N	14,400	7,200	7,200	sps
Walsh Length	128/N	128	128	128	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	4	4	Walsh functions/QPSK symbol
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, or 8, which yields data rates of 14400, 28800, 57600, or 115200, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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1 **Table 3.1.3.1.2.2-20. Forward Fundamental Channel and Forward Supplemental**
 2 **Channel Modulation Parameters for 20 ms Frames for Radio Configuration 9**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	2	4	8	repeated code symbols/code symbol
Puncturing Rate	1 (N ≤ 32) 16/18 (N = 72)	1	1	1	modulation symbols/repeated code symbol
Modulation Symbol Rate	28,800 × N (N ≤ 32) 1,843,200 (N = 72)	28,800	28,800	28,800	sps
QPSK Symbol Rate	14,400 × N (N ≤ 32) 921,600 (N = 72)	14,400	14,400	14,400	sps
Walsh Length	256/N (N ≤ 32) 4 (N = 72)	256	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	1	1	1	Walsh functions/QPSK symbol
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, 32, or 72, which yields data rates of 14400, 28800, 57600, 115200, 230400, 460800, or 1036800 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Fundamental Channel or the Forward Supplemental Channel, and the specified frame quality indicator length.

3

1 **Table 3.1.3.1.2.2-21. Forward Supplemental Channel Modulation Parameters**
 2 **for 40 ms Frames for Radio Configuration 9**

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	1	2	4	repeated code symbols/code symbol
Puncturing Rate	1 (N ≤ 16) 16/18 (N = 36)	1	1	1	interleaver symbols/repeated code symbol
Modulation Symbol Rate	28,800 × N (N ≤ 16) 921,600 (N = 36)	14,400	14,400	14,400	sps
QPSK Symbol Rate	14,400 × N (N ≤ 16) 460,800 (N = 36)	7,200	7,200	7,200	sps
Walsh Length	256/N (N ≤ 16) 8 (N = 36)	256	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	2	2	Walsh functions/QPSK symbol
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, 16, or 36, which yields data rates of 14400, 28800, 57600, 115200, 230400, or 518400 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

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Table 3.1.3.1.2.2-22. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 9

Parameter	Data Rate (bps)				Units
	14,400 × N	7,200	3,600	1,800	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps/carrier
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Symbol Repetition	1	1	1	2	repeated code symbols/code symbol
Puncturing Rate	1 (N ≤ 8) 16/18 (N = 18)	1	1	1	interleaver symbols/repeated code symbol
Post-Interleaver Symbol Repetition	1	2	4	4	modulation symbols/interleaver symbol
Modulation Symbol Rate	28,800 × N (N ≤ 8) 460,800 (N = 18)	14,400	7,200	7,200	sps
QPSK Symbol Rate	14,400 × N (N ≤ 8) 230,400 (N = 18)	7,200	3,600	3,600	sps
Walsh Length	256/N (N ≤ 8) 16 (N = 18)	256	256	256	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	2	4	4	Walsh functions/QPSK symbol
Processing Gain	256/N	512	1,024	2,048	PN chips/bit

Notes:

1. N = 1, 2, 4, 8, or 18, which yields data rates of 14400, 28800, 57600, 115200, or 259200 bps, respectively.
2. If variable-rate Forward Supplemental Channel operation, flexible forward link data rates, or both are supported, the parameters are determined from the specified number of channel bits per frame, the maximum assigned number of channel bits per frame for the Forward Supplemental Channel, and the specified frame quality indicator length.

3

Table 3.1.3.1.2.2-23. Forward Fundamental Channel Modulation Parameters for 5 ms Frames for Radio Configurations 8 and 9

Parameter	Data Rate (bps)	Units
	9,600	
PN Chip Rate	1.2288	Mcps/carrier
Code Rate	1/3	bits/code symbol
Code Symbol Repetition	1 (RC 9) 2 (RC 8)	modulation symbols/ code symbol
Modulation Symbol Rate	28,800 (RC 9) 57,600 (RC 8)	sps
QPSK Symbol Rate	14,400 (RC 9) 28,800 (RC 8)	sps
Walsh Length	256 (RC 9) 128 (RC 8)	PN chips
Number of Walsh Function Repetitions per QPSK Symbol	1	Walsh functions/QPSK symbol
Processing Gain	384	PN chips/bit

Note: The number of data bits per frame is the same in all 5 ms frames operating in Spreading Rate 3.

3.1.3.1.3 Data Rates

The data rates for channels operating with Spreading Rate 1 shall be as specified in Table 3.1.3.1.3-1. The data rates for channels operating with Spreading Rate 3 shall be as specified in Table 3.1.3.1.3-2.

Flexible data rates may be supported with Radio Configurations 3, 4, 5, 6, 7, 8, and 9. If flexible data rates are supported, frame formats that do not match those listed in Table 3.1.3.10.2-1 for the Forward Dedicated Control Channel, Table 3.1.3.11.2-1 for the Forward Fundamental Channel, or Tables 3.1.3.12.2-1, 3.1.3.12.2-2, and 3.1.3.12.2-3 for the Forward Supplemental Channel may be supported in Radio Configurations 3, 4, 5, 6, 7, 8, and 9. These frame formats correspond to a range of data rates up to the highest dedicated channel data rate listed in Tables 3.1.3.1.3-1 and 3.1.3.1.3-2. These non-listed data rates are called flexible data rates.

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Table 3.1.3.1.3-1. Data Rates for Spreading Rate 1 (Part 1 of 2)

Channel Type		Data Rates (bps)
Sync Channel		1200
Paging Channel		9600 or 4800
Broadcast Control Channel		19200 (40 ms slots), 9600 (80 ms slots), or 4800 (160 ms slots)
Quick Paging Channel		4800 or 2400
Common Power Control Channel		19200 (9600 bps per I and Q arm)
Common Assignment Channel		9600
Forward Common Control Channel		38400 (5, 10 or 20 ms frames), 19200 (10 or 20 ms frames), or 9600 (20 ms frames)
Forward Dedicated Control Channel	RC 3 or 4	9600
	RC 5	14400 (20 ms frames) or 9600 (5 ms frames)
Forward Fundamental Channel	RC 1	9600, 4800, 2400, or 1200
	RC 2	14400, 7200, 3600, or 1800
	RC 3 or 4	9600, 4800, 2700, or 1500 (20 ms frames) or 9600 (5 ms frames)
	RC 5	14400, 7200, 3600, or 1800 (20 ms frames) or 9600 (5 ms frames)
Forward Supplemental Code Channel	RC 1	9600
	RC 2	14400

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Table 3.1.3.1.3-1. Data Rates for Spreading Rate 1 (Part 2 of 2)

Channel Type		Data Rates (bps)
Forward Supplemental Channel	RC 3	153600, 76800, 38400, 19200, 9600, 4800, 2700, or 1500 (20 ms frames) 76800, 38400, 19200, 9600, 4800, 2400, or 1350 (40 ms frames) 38400, 19200, 9600, 4800, 2400, or 1200 (80 ms frames)
	RC 4	307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, or 1500 (20 ms frames) 153600, 76800, 38400, 19200, 9600, 4800, 2400, or 1350 (40 ms frames) 76800, 38400, 19200, 9600, 4800, 2400, or 1200 (80 ms frames)
	RC 5	230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (20 ms frames) 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (40 ms frames) 57600, 28800, 14400, 7200, 3600, or 1800 (80 ms frames)

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Table 3.1.3.1.3-2. Data Rates for Spreading Rate 3 (Part 1 of 2)

Channel Type		Data Rates (bps)
Sync Channel		1200
Broadcast Control Channel		19200 (40 ms slots), 9600 (80 ms slots), or 4800 (160 ms slots)
Quick Paging Channel		4800 or 2400
Common Power Control Channel		19200 (9600 per I and Q arm)
Common Assignment Channel		9600
Forward Common Control Channel		38400 (5, 10 or 20 ms frames), 19200 (10 or 20 ms frames), or 9600 (20 ms frames)
Forward Dedicated Control Channel	RC 6 or 7	9600
	RC 8 or 9	14400 (20 ms frames) or 9600 (5 ms frames)
Forward Fundamental Channel	RC 6 or 7	9600, 4800, 2700, or 1500 (20 ms frames) or 9600 (5 ms frames)
	RC 8 or 9	14400, 7200, 3600, or 1800 (20 ms frames) or 9600 (5 ms frames)

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Table 3.1.3.1.3-2. Data Rates for Spreading Rate 3 (Part 2 of 2)

Channel Type		Data Rates (bps)
Forward Supplemental Channel	RC 6	307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, or 1500 (20 ms frames) 153600, 76800, 38400, 19200, 9600, 4800, 2400, or 1350 (40 ms frames) 76800, 38400, 19200, 9600, 4800, 2400, or 1200 (80 ms frames)
	RC 7	614400, 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, or 1500 (20 ms frames) 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2400, or 1350 (40 ms frames) 153600, 76800, 38400, 19200, 9600, 4800, 2400, or 1200 (80 ms frames)
	RC 8	460800, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (20 ms frames) 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (40 ms frames) 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (80 ms frames)
	RC 9	1036800, 460800, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (20 ms frames) 518400, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (40 ms frames) 259200, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 (80 ms frames)

3.1.3.1.4 Forward Error Correction

The forward error correction types for channels with Spreading Rate 1 shall be as specified in Table 3.1.3.1.4-1. The forward error correction types for channels with Spreading Rate 3 shall be as specified in Table 3.1.3.1.4-2.

If the base station supports variable-rate Forward Supplemental Channel operation, flexible data rates, or both, and the specified number of reserved bits, information bits and frame quality indicator bits do not match one of those listed in Tables 3.1.3.12.2-1, 3.1.3.12.2-2, or 3.1.3.12.2-3 for the Forward Supplemental Channel, the forward error correction type of the Forward Supplemental Channel shall be the same as that of the maximum assigned number of bits per frame for that channel, unless turbo code is not available for the specified number of bits per frame, in which case convolutional code shall be used. The forward error correction code rate of a specified frame format, not listed in Tables

1 3.1.3.12.2-1, 3.1.3.12.2-2, or 3.1.3.12.2-3 for the Forward Supplemental Channel, shall be
 2 the same as that of the lowest listed data rate in the same radio configuration that is higher
 3 than the specified data rate.

4

5 **Table 3.1.3.1.4-1. Forward Error Correction for Spreading Rate 1**

Channel Type	Forward Error Correction	R
Sync Channel	Convolutional	1/2
Paging Channel	Convolutional	1/2
Broadcast Control Channel	Convolutional	1/4 or 1/2
Quick Paging Channel	None	-
Common Power Control Channel	None	-
Common Assignment Channel	Convolutional	1/4 or 1/2
Forward Common Control Channel	Convolutional	1/4 or 1/2
Forward Dedicated Control Channel	Convolutional	1/4 (RC 3 or 5) 1/2 (RC 4)
Forward Fundamental Channel	Convolutional	1/2 (RC 1, 2, or 4) 1/4 (RC 3 or 5)
Forward Supplemental Code Channel	Convolutional	1/2 (RC 1 or 2)
Forward Supplemental Channel	Convolutional or Turbo ($N \geq 360$)	1/2 (RC 4) 1/4 (RC 3 or 5)

Notes:

1. The state of the convolutional encoder shall not be reset between Sync Channel and Paging Channel frames.
2. N is the number of channel bits per frame.

6

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Table 3.1.3.1.4-2. Forward Error Correction for Spreading Rate 3

Channel Type	Forward Error Correction	R
Sync Channel	Convolutional	1/2
Broadcast Control Channel	Convolutional	1/3
Quick Paging Channel	None	-
Common Power Control Channel	None	-
Common Assignment Channel	Convolutional	1/3
Forward Common Control Channel	Convolutional	1/3
Forward Dedicated Control Channel	Convolutional	1/6 (RC 6); 1/3 (RC 7); 1/4 (RC 8, 20 ms), 1/3 (RC 8, 5 ms); or 1/2 (RC 9, 20 ms), 1/3 (RC 9, 5 ms)
Forward Fundamental Channel	Convolutional	1/6 (RC 6); 1/3 (RC 7); 1/4 (RC 8, 20 ms), 1/3 (RC 8, 5 ms); or 1/2 (RC 9, 20 ms), 1/3 (RC 9, 5 ms)
Forward Supplemental Channel	Convolutional	1/6 (RC 6)
	Convolutional or Turbo ($N \geq 360$)	1/3 (RC 7)
		1/4 (RC 8) 1/2 (RC 9)

Notes:

1. The state of the convolutional encoder shall not be reset between Sync Channel frames.
2. N is the number of channel bits per frame.

2

3 3.1.3.1.4.1 Convolutional Encoding

4 All convolutional codes shall have a constraint length of 9.

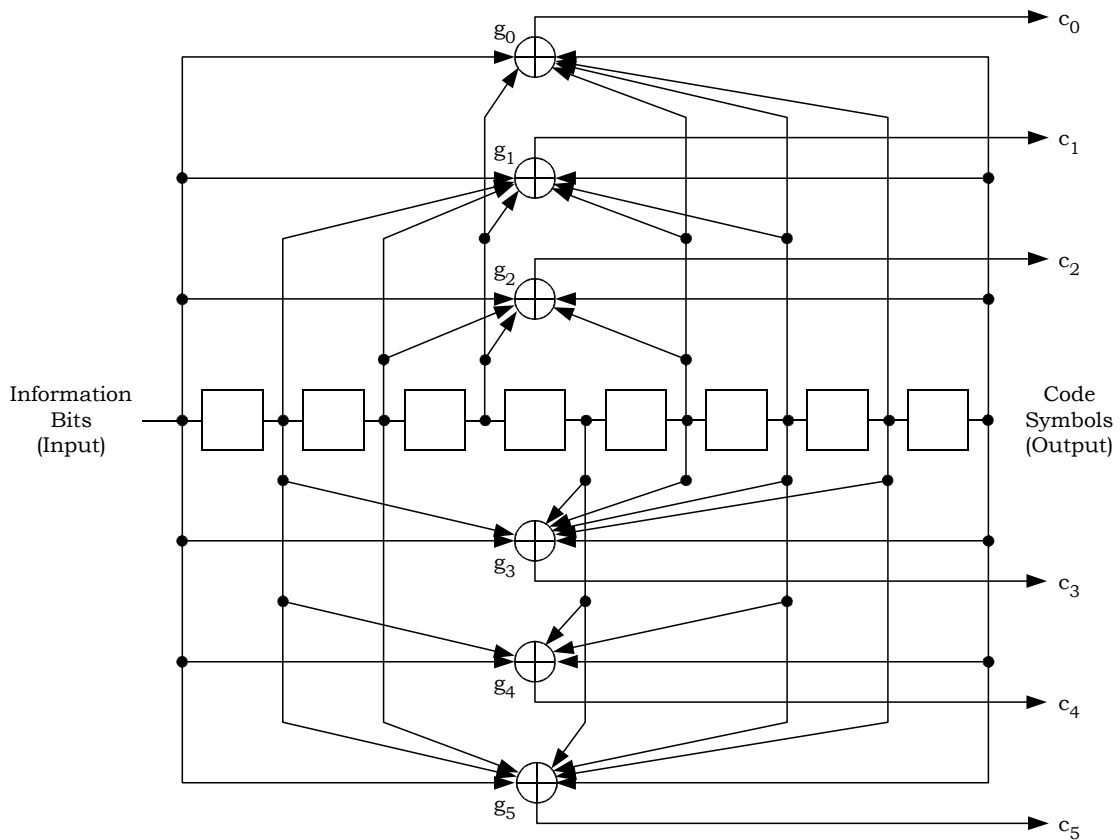
5 3.1.3.1.4.1.1 Rate 1/6 Convolutional Code

6 The generator functions for the rate 1/6 code shall be g_0 equals 457 (octal), g_1 equals 755
7 (octal), g_2 equals 551 (octal), g_3 equals 637 (octal), g_4 equals 625 (octal), and g_5 equals 727
8 (octal). This code generates six code symbols for each data bit input to the encoder. These
9 code symbols shall be output so that the code symbol (c_0) encoded with generator function
10 g_0 is output first, the code symbol (c_1) encoded with generator function g_1 is output

1 second, the code symbol (c_2) encoded with generator function g_2 is output third, the code
 2 symbol (c_3) encoded with generator function g_3 is output fourth, the code symbol (c_4)
 3 encoded with generator function g_4 is output fifth, and the code symbol (c_5) encoded with
 4 generator function g_5 is output last. The state of the convolutional encoder, upon
 5 initialization, shall be the all-zero state. The first code symbol that is output after
 6 initialization shall be a code symbol encoded with generator function g_0 .

7 Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-
 8 delayed data sequence. The length of the data sequence delay is equal to $K-1$, where K is
 9 the constraint length of the code. Figure 3.1.3.1.4.1.1-1 illustrates the specific K equals 9,
 10 rate 1/6 convolutional encoder that is used for these channels.

11



12

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Figure 3.1.3.1.4.1.1-1. $K = 9$, Rate 1/6 Convolutional Encoder

14

15 3.1.3.1.4.1.2 Rate 1/4 Convolutional Code

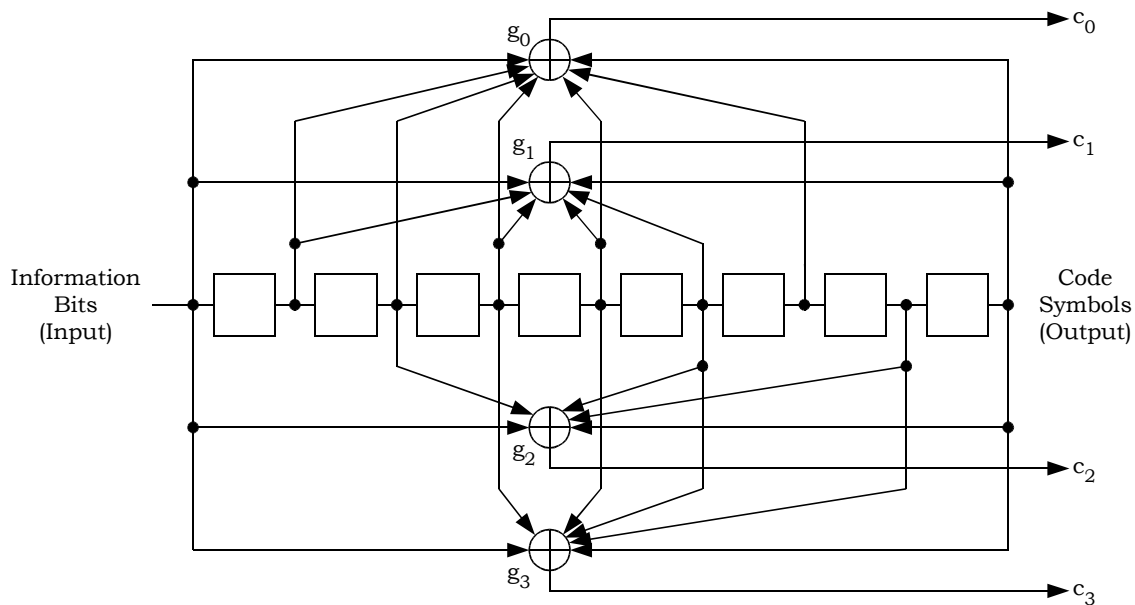
16 The generator functions for the rate 1/4 code shall be g_0 equals 765 (octal), g_1 equals 671
 17 (octal), g_2 equals 513 (octal), and g_3 equals 473 (octal). This code generates four code
 18 symbols for each data bit input to the encoder. These code symbols shall be output so that
 19 the code symbol (c_0) encoded with generator function g_0 is output first, the code symbol
 20 (c_1) encoded with generator function g_1 is output second, the code symbol (c_2) encoded

1 with generator function g_2 is output third, and the code symbol (c_3) encoded with generator
 2 function g_3 is output last.

3 The state of the convolutional encoder, upon initialization, shall be the all-zero state. The
 4 first code symbol that is output after initialization shall be a code symbol encoded with
 5 generator function g_0 .

6 Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-
 7 delayed data sequence. The length of the data sequence delay is equal to $K-1$, where K is
 8 the constraint length of the code. Figure 3.1.3.1.4.1.2-1 illustrates the specific K equals 9,
 9 rate 1/4 convolutional encoder that is used for these channels.

10



11

12 **Figure 3.1.3.1.4.1.2-1. $K = 9$, Rate 1/4 Convolutional Encoder**

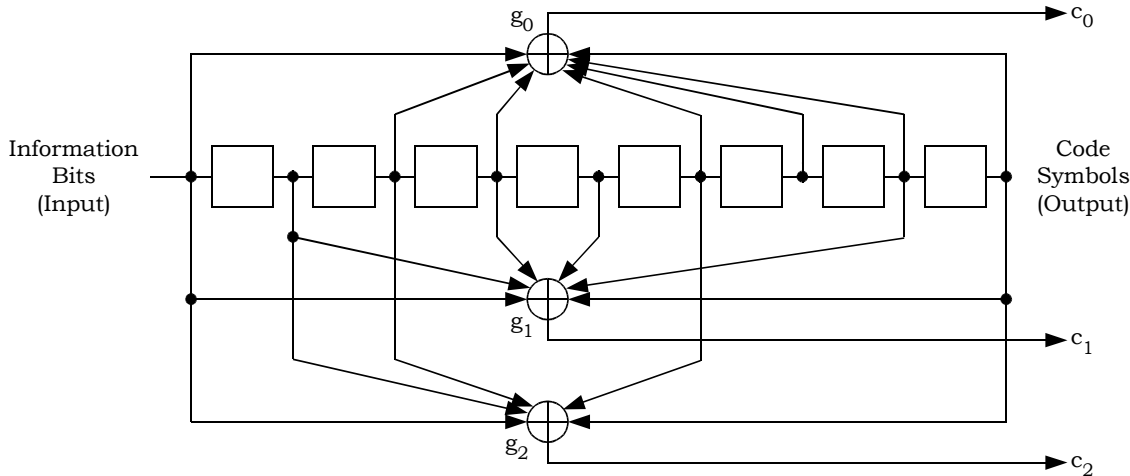
13

14 3.1.3.1.4.1.3 Rate 1/3 Convolutional Code

15 The generator functions for the rate 1/3 code shall be g_0 equals 557 (octal), g_1 equals 663
 16 (octal), and g_2 equals 711 (octal). This code generates three code symbols for each data bit
 17 that is input to the encoder. These code symbols shall be output so that the code symbol
 18 (c_0) encoded with generator function g_0 is output first, the code symbol (c_1) encoded with
 19 generator function g_1 is output second, and the code symbol (c_2) encoded with generator
 20 function g_2 is output last. The state of the convolutional encoder, upon initialization, shall
 21 be the all-zero state. The first code symbol that is output after initialization shall be a code
 22 symbol encoded with generator function g_0 .

23 Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-
 24 delayed data sequence. The length of the data sequence delay is equal to $K-1$, where K is
 25 the constraint length of the code. Figure 3.1.3.1.4.1.3-1 illustrates the specific K equals 9,
 26 rate 1/3 convolutional encoder that is used for these channels.

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Figure 3.1.3.1.4.1.3-1. K = 9, Rate 1/3 Convolutional Encoder

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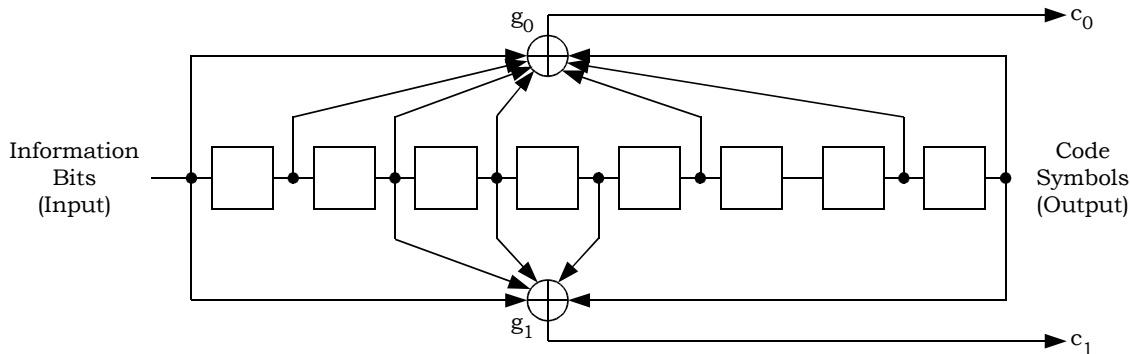
3.1.3.1.4.1.4 Rate 1/2 Convolutional Code

5

6 The generator functions for the rate 1/2 code shall be g_0 equals 753 (octal) and g_1 equals
 7 561 (octal). This code generates two code symbols for each data bit that is input to the
 8 encoder. These code symbols shall be output so that the code symbol (c_0) encoded with
 9 generator function g_0 is output first, and the code symbol (c_1) encoded with generator
 10 function g_1 is output last. The state of the convolutional encoder, upon initialization, shall
 11 be the all-zero state. The first code symbol that is output after initialization shall be a code
 12 symbol encoded with generator function g_0 .

13 Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-
 14 delayed data sequence. The length of the data sequence delay is equal to $K-1$, where K is
 15 the constraint length of the code. Figure 3.1.3.1.4.1.4-1 illustrates the specific K equals 9,
 16 rate 1/2 convolutional encoder that is used for these channels.

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Figure 3.1.3.1.4.1.4-1. K = 9, Rate 1/2 Convolutional Encoder

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3.1.3.1.4.2 Turbo Encoding

The turbo encoder encodes the data, frame quality indicator (CRC), and two reserved bits. During encoding, an encoder output tail sequence is added. If the total number of data, frame quality, and reserved input bits is N_{turbo} , the turbo encoder generates N_{turbo}/R encoded data output symbols followed by $6/R$ tail output symbols, where R is the code rate of $1/2$, $1/3$, or $1/4$. The turbo encoder employs two systematic, recursive, convolutional encoders connected in parallel, with an interleaver, the turbo interleaver, preceding the second recursive convolutional encoder. The two recursive convolutional codes are called the constituent codes of the turbo code. The outputs of the constituent encoders are punctured and repeated to achieve the $(N_{\text{turbo}} + 6)/R$ output symbols.

3.1.3.1.4.2.1 Rate $1/2$, $1/3$, and $1/4$ Turbo Encoders

A common constituent code shall be used for the turbo codes of rate $1/2$, $1/3$, and $1/4$. The transfer function for the constituent code shall be

$$G(D) = \begin{bmatrix} 1 & \frac{n_0(D)}{d(D)} & \frac{n_1(D)}{d(D)} \end{bmatrix}$$

where $d(D) = 1 + D^2 + D^3$, $n_0(D) = 1 + D + D^3$, and $n_1(D) = 1 + D + D^2 + D^3$.

The turbo encoder shall generate an output symbol sequence that is identical to the one generated by the encoder shown in Figure 3.1.3.1.4.2.1-1. Initially, the states of the constituent encoder registers in this figure are set to zero. Then, the constituent encoders are clocked with the switches in the positions noted.

The encoded data output symbols are generated by clocking the constituent encoders N_{turbo} times with the switches in the up positions and puncturing the outputs as specified in Table 3.1.3.1.4.2.1-1. Within a puncturing pattern, a '0' means that the symbol shall be deleted and a '1' means that a symbol shall be passed. The constituent encoder outputs for each bit period shall be output in the sequence $X, Y_0, Y_1, X', Y'_0, Y'_1$ with the X output first. Symbol repetition is not used in generating the encoded data output symbols.

3.1.3.1.4.2.2 Turbo Code Termination

The turbo encoder shall generate $6/R$ tail output symbols following the encoded data output symbols. This tail output symbol sequence shall be identical to the one generated by the encoder shown in Figure 3.1.3.1.4.2.1-1. The tail output symbols are generated after the constituent encoders have been clocked N_{turbo} times with the switches in the up position. The first $3/R$ tail output symbols are generated by clocking Constituent Encoder 1 three times with its switch in the down position while Constituent Encoder 2 is not clocked and puncturing and repeating the resulting constituent encoder output symbols. The last $3/R$ tail output symbols are generated by clocking Constituent Encoder 2 three times with its switch in the down position while Constituent Encoder 1 is not clocked and puncturing and repeating the resulting constituent encoder output symbols. The constituent encoder outputs for each bit period shall be output in the sequence $X, Y_0, Y_1, X', Y'_0, Y'_1$ with the X output first.

1 The constituent encoder output symbol puncturing and symbol repetition shall be as
2 specified in Table 3.1.3.1.4.2.2-1. Within a puncturing pattern, a '0' means that the symbol
3 shall be deleted and a '1' means that a symbol shall be passed. For rate 1/2 turbo codes,
4 the tail output symbols for each of the first three tail bit periods shall be XY_0 , and the tail
5 output symbols for each of the last three tail bit periods shall be $X'Y'_0$. For rate 1/3 turbo
6 codes, the tail output symbols for each of the first three tail bit periods shall be XXY_0 , and
7 the tail output symbols for each of the last three tail bit periods shall be $X'X'Y'_0$. For rate
8 1/4 turbo codes, the tail output symbols for each of the first three tail bit periods shall be
9 XXY_0Y_1 , and the tail output symbols for each of the last three tail bit periods shall be
10 $X'X'Y'_0Y'_1$.

11

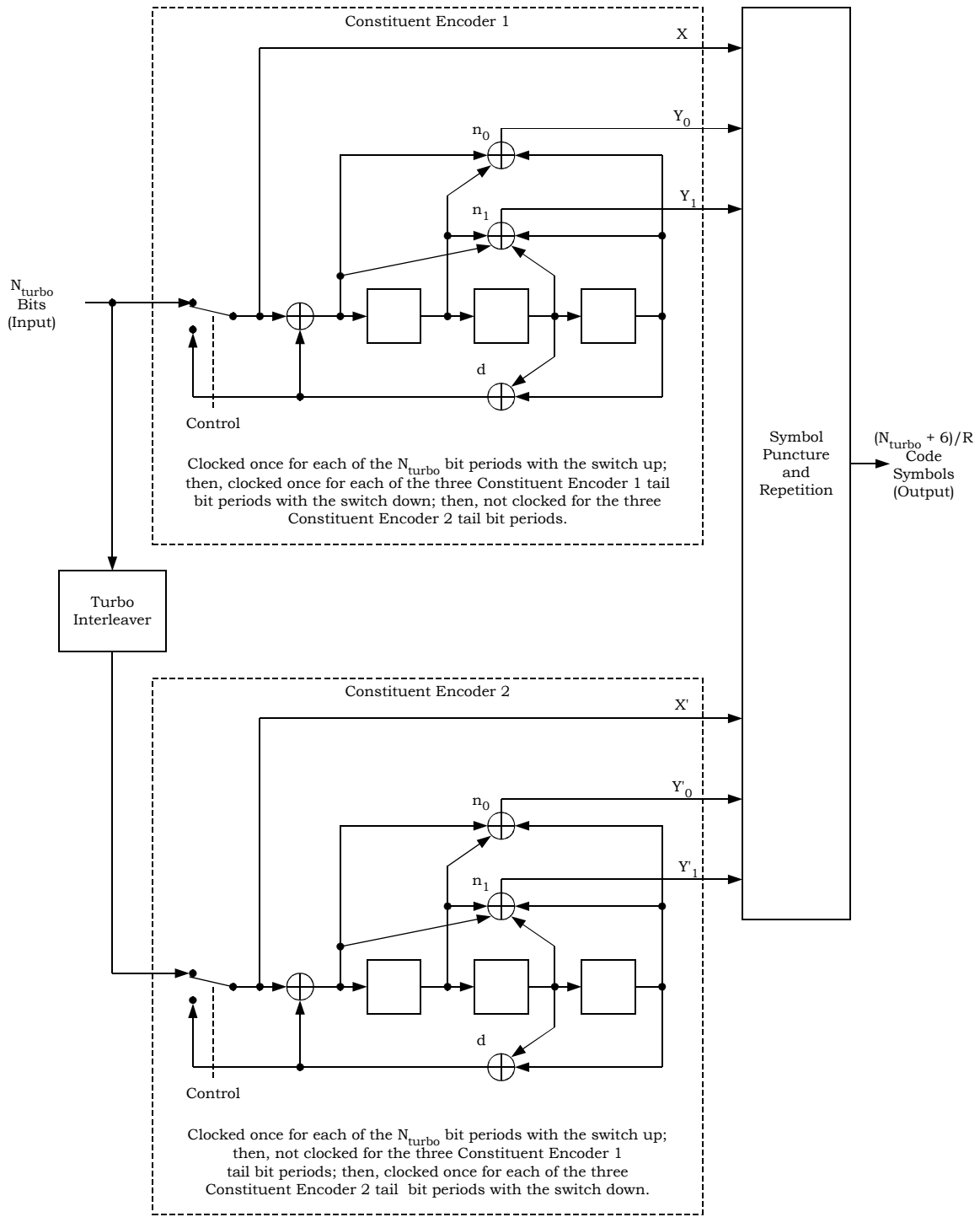


Figure 3.1.3.1.4.2.1-1. Turbo Encoder

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Table 3.1.3.1.4.2.1-1. Puncturing Patterns for the Data Bit Periods

Output	Code Rate		
	1/2	1/3	1/4
X	11	11	11
Y ₀	10	11	11
Y ₁	00	00	10
X'	00	00	00
Y' ₀	01	11	01
Y' ₁	00	00	11

Note: For each rate, the puncturing table shall be read first from top to bottom and then from left to right.

2

3

Table 3.1.3.1.4.2.2-1. Puncturing Patterns for the Tail Bit Periods

Output	Code Rate		
	1/2	1/3	1/4
X	111 000	111 000	111 000
Y ₀	111 000	111 000	111 000
Y ₁	000 000	000 000	111 000
X'	000 111	000 111	000 111
Y' ₀	000 111	000 111	000 111
Y' ₁	000 000	000 000	000 111

Note: For rate 1/2 turbo codes, the puncturing table shall be read first from top to bottom and then from left to right. For rate 1/3 and 1/4 turbo codes, the puncturing table shall be read first from top to bottom repeating X and X', and then from left to right.

4

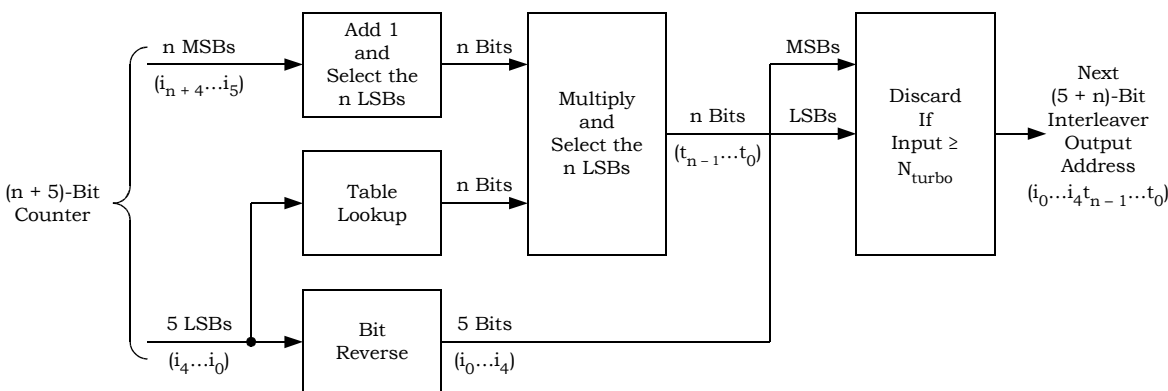
5 3.1.3.1.4.2.3 Turbo Interleavers

6 The turbo interleaver, which is part of the turbo encoder, shall block interleave the data,
7 the frame quality indicator (CRC), and the reserved bits input to the turbo encoder.

8 The turbo interleaver shall be functionally equivalent to an approach where the entire
9 sequence of turbo interleaver input bits are written sequentially into an array at a sequence
10 of addresses, and then the entire sequence is read out from a sequence of addresses that
11 are defined by the procedure described below.

1 Let the sequence of input addresses be from 0 to $N_{\text{turbo}} - 1$, where N_{turbo} is the total
 2 number of information bits, frame quality indicator bits, and reserved bits in the turbo
 3 interleaver. Then, the sequence of interleaver output addresses shall be equivalent to those
 4 generated by the procedure illustrated in Figure 3.1.3.1.4.2.3-1 and described below:¹⁸

- 5 1. Determine the turbo interleaver parameter, n , where n is the smallest integer such
 6 that $N_{\text{turbo}} \leq 2^{n+5}$. Table 3.1.3.1.4.2.3-1 gives this parameter.
- 7 2. Initialize an $(n+5)$ -bit counter to 0.
- 8 3. Extract the n most significant bits (MSBs) from the counter and add one to form a
 9 new value. Then, discard all except the n least significant bits (LSBs) of this value.
- 10 4. Obtain the n -bit output of the table lookup defined in Table 3.1.3.1.4.2.3-2 with a
 11 read address equal to the five LSBs of the counter. Note that this table depends
 12 upon the value of n .
- 13 5. Multiply the values obtained in Steps 3 and 4, and discard all except the n LSBs.
- 14 6. Bit-reverse the five LSBs of the counter.
- 15 7. Form a tentative output address that has its MSBs equal to the value obtained in
 16 Step 6 and its LSBs equal to the value obtained in Step 5.
- 17 8. Accept the tentative output address as an output address if it is less than N_{turbo} ;
 18 otherwise, discard it.
- 19 9. Increment the counter and repeat Steps 3 through 8 until all N_{turbo} interleaver
 20 output addresses are obtained.



23 **Figure 3.1.3.1.4.2.3-1. Turbo Interleaver Output Address Calculation Procedure**

24

¹⁸ This procedure is equivalent to one in which the counter values are written into a 2^5 -row by 2^n -column array by rows, the rows are shuffled according to a bit-reversal rule, the elements within each row are permuted according to a row-specific linear congruential sequence, and tentative output addresses are read out by column. The linear congruential sequence rule is $x(i+1) = (x(i) + c) \bmod 2^n$, where $x(0) = c$ and c is a row-specific value from a table lookup.

1

Table 3.1.3.1.4.2.3-1. Turbo Interleaver Parameter

Turbo Interleaver Block Size N_{turbo}	Turbo Interleaver Parameter n
378	4
570	5
762	5
1,146	6
1,530	6
2,298	7
3,066	7
4,602	8
6,138	8
9,210	9
12,282	9
20,730	10

2

1

Table 3.1.3.1.4.2.3-2. Turbo Interleaver Lookup Table Definition

Table Index	n = 4 Entries	n = 5 Entries	n = 6 Entries	n = 7 Entries	n = 8 Entries	n = 9 Entries	n = 10 Entries
0	5	27	3	15	3	13	1
1	15	3	27	127	1	335	349
2	5	1	15	89	5	87	303
3	15	15	13	1	83	15	721
4	1	13	29	31	19	15	973
5	9	17	5	15	179	1	703
6	9	23	1	61	19	333	761
7	15	13	31	47	99	11	327
8	13	9	3	127	23	13	453
9	15	3	9	17	1	1	95
10	7	15	15	119	3	121	241
11	11	3	31	15	13	155	187
12	15	13	17	57	13	1	497
13	3	1	5	123	3	175	909
14	15	13	39	95	17	421	769
15	5	29	1	5	1	5	349
16	13	21	19	85	63	509	71
17	15	19	27	17	131	215	557
18	9	1	15	55	17	47	197
19	3	3	13	57	131	425	499
20	1	29	45	15	211	295	409
21	3	17	5	41	173	229	259
22	15	25	33	93	231	427	335
23	1	29	15	87	171	83	253
24	13	9	13	63	23	409	677
25	1	13	9	15	147	387	717
26	9	23	15	13	243	193	313
27	15	13	31	15	213	57	757
28	11	13	17	81	189	501	189
29	3	1	5	57	51	313	15
30	15	13	15	31	15	489	75
31	5	13	33	69	67	391	163

2

3

3.1.3.1.5 Code Symbol Repetition

Code symbols output from the forward error correction encoder shall be repeated as specified in Table 3.1.3.1.5-1. Since the Quick Paging Channel and the Common Power Control Channel are not coded, the term code symbol repetition refers to symbol repetition for the Quick Paging Channel Indicators and the Common Power Control Channel bits.

If variable-rate Forward Supplemental Channel operation is supported and the specified number of bits per frame on the Forward Supplemental Channel is not the maximum assigned, repetition is calculated as follows: The symbol repetition factor is the ratio of the interleaver block size of the maximum assigned rate and the specified number of encoded symbols per frame.

If flexible data rates are used, the repetition factor is calculated as follows:

- If the specified data rate is the maximum assigned; the repetition factor is the ratio of the interleaver block size of the next higher listed rate and the specified number of encoded symbols per frame.
- Otherwise, the repetition factor is the ratio of the interleaver block size of the maximum assigned and the specified number of encoded symbol per frame.

If the repetition factor is less than 1, then code symbol repetition shall be disabled. Otherwise, the symbol repetition¹⁹ shall be performed as follows:

The k -th output symbol from the repetition block shall be the $\lfloor kL/N \rfloor$ -th input symbol

where $k = 0$ to $N-1$,

L = Number of specified encoded symbols per frame at encoder output, and

N = Desired channel interleaver block size ($N \geq L$).

¹⁹ The symbol repetition factor is N/L .

1

Table 3.1.3.1.5-1. Code Symbol Repetition

Channel Type		Number of Repeated Code Symbols/Code Symbol
Sync Channel		2 (SR 1) 2 (SR 3)
Paging Channel		2 (4800 bps) 1 (9600 bps)
Broadcast Control Channel		1
Quick Paging Channel		2 (SR 1 at 4800 bps) 4 (SR 1 at 2400 bps) 3 (SR 3 at 4800 bps) 6 (SR 3 at 2400 bps)
Common Power Control Channel		1 (SR 1, non-TD) 2 (SR 1, TD) 3 (SR 3)
Common Assignment Channel		1
Forward Common Control Channel		1 (SR 1, non-TD) 2 (SR 1, TD) 3 (SR 3)
Forward Dedicated Control Channel		1 (RC 3, 4, 5, 6, 7, and 9; and RC 8, 20 ms) 2 (RC 8, 5 ms)
Forward Fundamental Channel		8 (1200, 1500, or 1800 bps) 4 (2400, 2700, or 3600 bps) 2 (4800 or 7200 bps; and RC 8, 5 ms) 1 (9600 or 14400 bps, 20 ms; and RC 3, 4, 5, 6, 7, and 9, 5 ms)
Forward Supplemental Code Channel		1 (RC 1 or 2)
Forward Supplemental Channel	20 ms frames	8 (1500 or 1800 bps) 4 (2700 or 3600 bps) 2 (4800 or 7200 bps) 1 (> 7200 bps)
	40 ms frames	4 (1350 or 1800 bps) 2 (2400 or 3600 bps) 1 (> 3600 bps)
	80 ms frames	2 (1200 or 1800 bps) 1 (> 1800 bps)

2

3

3.1.3.1.6 Puncturing

3.1.3.1.6.1 Convolutional Code Symbol Puncturing

Table 3.1.3.1.6.1-1 includes the base code rate, puncturing ratio, and puncturing patterns that shall be used for different radio configurations. Within a puncturing pattern, a '0' means that the symbol shall be deleted, and '1' means that a symbol shall be passed. The most significant bit in the pattern corresponds to the first symbol in the symbol group corresponding to the length of the puncturing pattern. The puncture pattern shall be repeated for all remaining symbols in the frame.

Table 3.1.3.1.6.1-1. Punctured Codes Used with Convolutional Codes

Base Code Rate	Puncturing Ratio	Puncturing Pattern	Associated Radio Configurations
1/2	2 of 6	'110101'	2
1/2	1 of 5	'11110'	4
1/2	1 of 9	'111111110'	4
1/2	2 of 18	'111011111 111111110'	9
1/3	1 of 5	'11110'	7
1/3	1 of 9	'111111110'	7
1/4	4 of 12	'110110011011'	5
1/4	1 of 5	'11110'	3
1/4	1 of 9	'111111110'	3
1/6	1 of 5	'11110'	6
1/6	1 of 9	'111111110'	6

For example, the puncturing pattern for Radio Configuration 2 is '110101', meaning that the first, second, fourth, and sixth symbols are passed, while the third and the fifth symbols of each consecutive group of six symbols are removed.

3.1.3.1.6.2 Turbo Code Symbol Puncturing

Table 3.1.3.1.6.2-1 includes the base code rate, puncturing ratio, and puncturing patterns that shall be used for different radio configurations. Within a puncturing pattern, a '0' means that the symbol shall be deleted and a '1' means that a symbol shall be passed. The most significant bit in the pattern corresponds to the first symbol in the symbol group corresponding to the length of the puncturing pattern. The puncture pattern shall be repeated for all remaining symbols in the frame.

Table 3.1.3.1.6.2-1. Punctured Codes Used with Turbo Codes

Base Code Rate	Puncturing Ratio	Puncturing Pattern	Associated Radio Configurations
1/2	2 of 18	'111110101 111111111'	9
1/4	4 of 12	'110111011010'	5

3.1.3.1.6.3 Flexible and Variable Rate Puncturing

If variable-rate Forward Supplemental Channel operation, flexible data rates, or both are supported, puncturing after symbol repetition is calculated as described here. However, the puncturing in 3.1.3.1.6.1 and 3.1.3.1.6.2 is used for the frame formats listed in Table 3.1.3.10.2-1 for the Forward Dedicated Control Channel, Table 3.1.3.11.2-1 for the Forward Fundamental Channel, or Tables 3.1.3.12.2-1, 3.1.3.12.2-2, or 3.1.3.12.2-3 for the Forward Supplemental Channel.

If the number of specified encoded symbols per frame at the encoder output is larger than the desired channel interleaver block size, the following puncturing shall be applied. The k -th output symbol from the puncturing block shall be the $\lfloor kL/N \rfloor$ -th input symbol, where

$$k = 0 \text{ to } N-1,$$

$$L = \text{Number of specified encoded symbols per frame at encoder output, and}$$

$$N = \text{Desired channel interleaver block size } (N < L).$$

Otherwise, puncturing after symbol repetition shall be disabled.

3.1.3.1.7 Block Interleaving

For the Sync Channel, the Paging Channels, the Broadcast Control Channels, the Common Assignment Channel, the Forward Common Control Channel, and the Forward Traffic Channels, all the symbols after symbol repetition and subsequent puncturing, if used, shall be block interleaved.

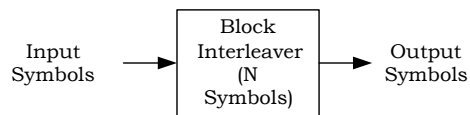
The interleaver parameters m and J are specified in Table 3.1.3.1.7-1. Figure 3.1.3.1.7-1 shows the configuration of the interleaver.

1

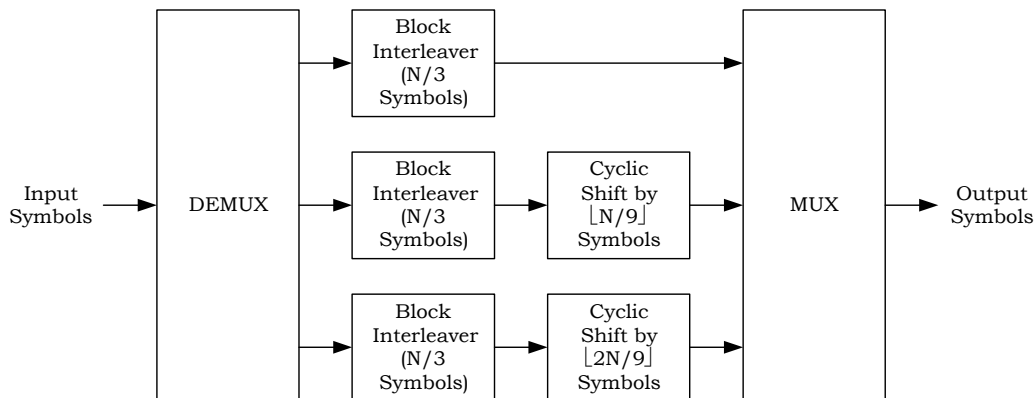
Table 3.1.3.1.7-1. Interleaver Parameters

Interleaver Block Size	m	J
48	4	3
96	5	3
192	6	3
384	6	6
768	6	12
1,536	6	24
3,072	6	48
6,144	7	48
12,288	7	96
144	4	9
288	5	9
576	5	18
1,152	6	18
2,304	6	36
4,608	7	36
9,216	7	72
18,432	8	72
36,864	8	144
128	7	1

2



a) Spreading Rate 1



b) Spreading Rate 3

The DEMUX functions distribute input symbols sequentially from the top to the bottom output paths. The MUX functions combine the input symbols sequentially from the top to the bottom input paths.

Figure 3.1.3.1.7-1. Structure for the N-Symbol Block Interleavers

3.1.3.1.7.1 Spreading Rate 1 Interleaving

The symbols input to the interleaver are written sequentially at addresses 0 to the block size (N) minus one.

3.1.3.1.7.1.1 Bit-Reversal Order Interleaver

When operating on the Sync Channel, the Paging Channel, or the Forward Traffic Channel with Radio Configuration 1 and 2, the symbols input to the interleaver are written sequentially at addresses 0 to the block size (N) minus one. The interleaved symbols are read out in permuted order from address A_i , as follows:

$$A_i = 2^m(i \bmod J) + \text{BRO}_m(\lfloor i/J \rfloor)$$

where

$$i = 0 \text{ to } N - 1,$$

m and J are given in Table 3.1.3.1.7-1 using interleaver block size N ,

$\lfloor x \rfloor$ indicates the largest integer less than or equal to x , and

$\text{BRO}_m(y)$ indicates the bit-reversed m -bit value of y (i.e., $\text{BRO}_3(6) = 3$).

1 3.1.3.1.7.1.2 Forward-Backwards Bit-Reversal Order Interleaver

2 When operating on the Broadcast Control Channel, the Common Assignment Channel, the
3 Forward Common Control Channel, or the Forward Traffic Channel with Radio
4 Configuration 3 through 5, the symbols input to the interleaver are written sequentially at
5 addresses 0 to the block size (N) minus one.

6 The even interleaved symbols (i is even) are read out in permuted order from address A_i , as
7 follows:

$$8 \quad A_i = 2^m \left[\frac{i}{2} \bmod J \right] + \text{BRO}_m \left(\left[\frac{i}{2} / J \right] \right)$$

9 where

$$10 \quad i = 0, 2, \dots, N - 2,$$

11 m and J are given in Table 3.1.3.1.7-1 using interleaver block size N,

12 $\lfloor x \rfloor$ indicates the largest integer less than or equal to x, and

13 $\text{BRO}_m(y)$ indicates the bit-reversed m-bit value of y (i.e., $\text{BRO}_3(6) = 3$).

14 The odd interleaved symbols (i is odd) are read out in permuted order from address A_i , as
15 follows:

$$16 \quad A_i = 2^m \left[\left(N - \frac{(i+1)}{2} \right) \bmod J \right] + \text{BRO}_m \left(\left[\left(N - \frac{(i+1)}{2} \right) / J \right] \right)$$

17 where

$$18 \quad i = 1, 3, \dots, N - 1, \text{ and}$$

19 m and J are given in Table 3.1.3.1.7-1 using interleaver block size N.

20 The Spreading Rate 1 block interleaving procedure is diagrammed in Figure 3.1.3.1.7-1.

21 3.1.3.1.7.2 Spreading Rate 3 Interleaving

22 The block interleaver shall demultiplex its input symbols into three blocks with N/3
23 symbols each.

24 The symbols input to block interleaver k (k = 0, 1, 2) are written sequentially into addresses
25 0 to N/3 - 1. The interleaved symbols are read out in a permuted order, with the i-th
26 address being read from address A_i , as follows:

$$27 \quad A_i = 2^m \left[\left(i + \left\lfloor \frac{kN}{9} \right\rfloor \right) \bmod J \right] + \text{BRO}_m \left\{ \left[\left[\left(i + \left\lfloor \frac{kN}{9} \right\rfloor \right) \bmod \left(\frac{N}{3} \right) \right] / J \right] \right\}$$

28 where

$$29 \quad i = 0 \text{ to } N/3 - 1,$$

30 m and J are given in Table 3.1.3.1.7-1 using interleaver block size N/3,

31 $\lfloor x \rfloor$ indicates the largest integer less than or equal to x, and

1 $BRO_m(y)$ indicates the bit-reversed m-bit value of y (i.e., $BRO_3(6) = 3$).

2 The three interleaved block outputs shall then be multiplexed together.

3 The Spreading Rate 3 block interleaving procedure is diagrammed in Figure 3.1.3.1.7-1.
4 Note that the equation describes the operation performed by both the interleaver block and
5 cyclic shift block in Figure 3.1.3.1.7-1.

6 3.1.3.1.8 Sequence Repetition

7 Sequence repetition applies to the Broadcast Control Channel.

8 When operating at 4800 bps, the encoded and interleaved sequence of symbols of the first
9 Broadcast Control Channel frame (40 ms) of a Broadcast Control Channel slot (160 ms)
10 shall be repeated in the next three Broadcast Control Channel frames. When operating at
11 9600 bps, the encoded and interleaved sequence of symbols of the first Broadcast Control
12 Channel frame (40 ms) of a Broadcast Control Channel slot (80 ms) shall be repeated in the
13 next Broadcast Control Channel frame. When operating at 19,200 bps, the encoded and
14 interleaved sequence of symbols of the first Broadcast Control Channel frame (40 ms) of a
15 Broadcast Control Channel slot (40 ms) shall not be repeated.

16 3.1.3.1.9 Data Scrambling

17 Data scrambling applies to the Paging Channels, the Broadcast Control Channels, the
18 Common Assignment Channels, the Forward Common Control Channels, and the Forward
19 Traffic Channels.

20 Data scrambling for the Paging Channels, Common Assignment Channel, Forward
21 Common Control Channels, and Forward Traffic Channels, is performed on the modulation
22 symbols output from the block interleaver at the modulation symbol rate. Data scrambling
23 for the Broadcast Control Channel is performed on the modulation symbols after sequence
24 repetition at the modulation symbol rate.

25 When operating on the Paging Channel or the Forward Traffic Channel with Radio
26 Configurations 1 and 2, the data scrambling shall be accomplished by performing the
27 modulo-2 addition of the modulation symbol with the binary value of the long code PN chip
28 that is valid at the start of the transmission period for that symbol as shown in Figures
29 3.1.3.1.1.1-1, 3.1.3.1.1.1-13, and 3.1.3.1.1.1-14. This PN sequence shall be the equivalent
30 of the long code operating at 1.2288 MHz clock rate. Only the first output of every 64 chips
31 is used for the data scrambling.

32 When operating on the Broadcast Control Channel, Common Assignment Channel,
33 Forward Common Control Channel, and the Forward Traffic Channel with Radio
34 Configurations 3 through 9, the data scrambling shall be accomplished by operating on
35 groups of 2M modulation symbols, where M is 1 for the Spreading Rate 1 non-TD mode, 2
36 for the Spreading Rate 1 TD mode, and 3 for the Spreading Rate 3 mode. For the first M
37 modulation symbols of each group, modulo-2 addition shall be performed on the
38 modulation symbols with the binary value of the long code PN chip that is valid at the start
39 of the transmission period for the 2M modulation symbols as shown in Figures 3.1.3.1.1.1-
40 2, 3.1.3.1.1.1-3, 3.1.3.1.1.1-6, 3.1.3.1.1.1-7, 3.1.3.1.1.1-8, 3.1.3.1.1.1-9, 3.1.3.1.1.1-18,
41 3.1.3.1.1.2-2, 3.1.3.1.1.2-5, 3.1.3.1.1.2-6, and 3.1.3.1.1.2-15. For the second M

1 modulation symbols of each group, modulo-2 addition shall be performed on the
2 modulation symbols with the binary value of the long code PN chip that is valid just prior to
3 the start of the transmission period for the 2M modulation symbols. This PN sequence shall
4 be the equivalent of the long code described in Figure 2.1.3.1.11-1 for Spreading Rate 1 and
5 the equivalent of the long code described in Figure 2.1.3.1.12-1 for Spreading Rate 3.

6 The long code shall be generated as described in 2.1.3.1.12. The long code masks to be
7 used for the Paging Channels, Broadcast Control Channel, Common Assignment Channels,
8 Forward Common Control Channels, and Forward Traffic Channels are specified in
9 3.1.3.4.6, 3.1.3.5.6, 3.1.3.8.5, 3.1.3.9.5, 3.1.3.10.7, 3.1.3.11.7, 3.1.3.12.7, and 3.1.3.13.7
10 respectively.

11 3.1.3.1.10 Forward Power Control Subchannel

12 A Forward Power Control Subchannel is transmitted only on the Forward Fundamental
13 Channel or on the Forward Dedicated Control Channel.

14 When the mobile station is not operating in the gated transmission mode, the subchannel
15 shall transmit at a rate of one bit ('0' or '1') every 1.25 ms (i.e., 800 bps).

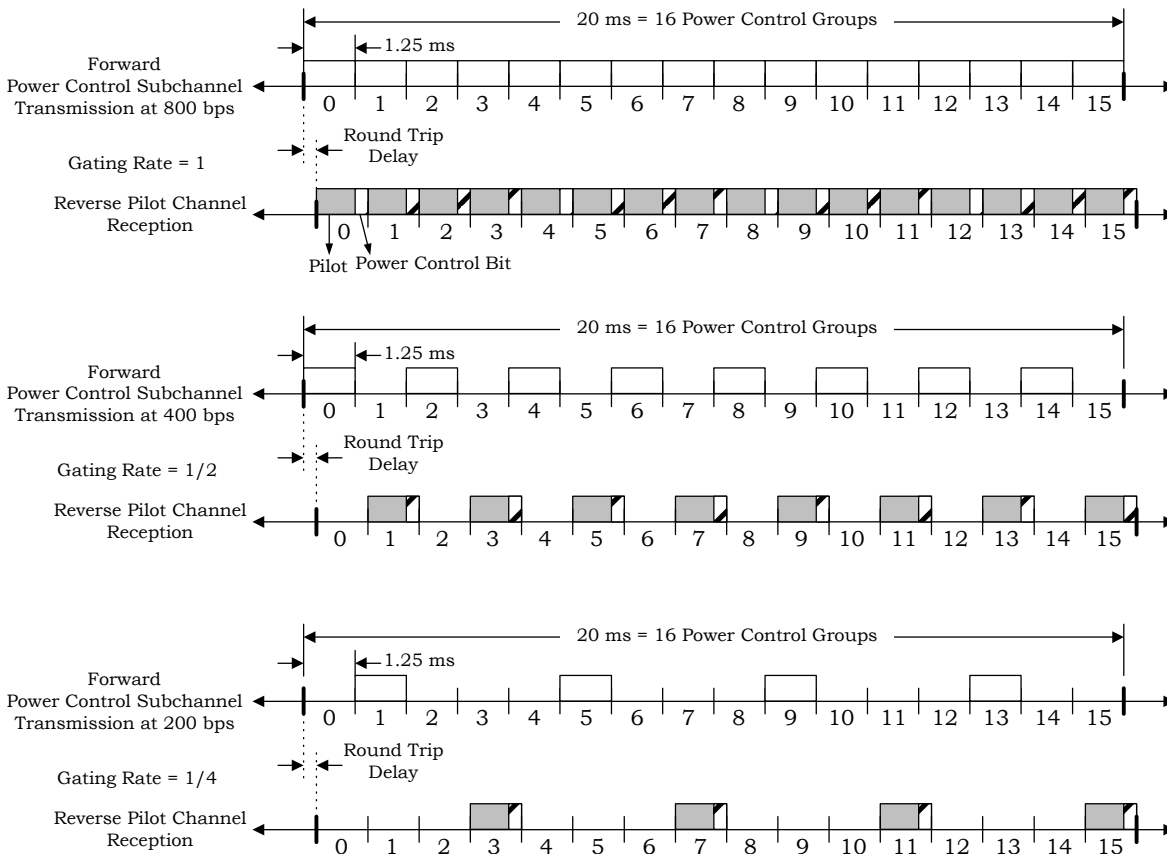
16 When the mobile station is operating in the gated transmission mode, the subchannel shall
17 transmit at a rate of 400 or 200 bps when the gating rate is 1/2 or 1/4 respectively as
18 shown in Figure 3.1.3.1.10-1.


19 The power control groups within a 20 ms frame are numbered from 0 to 15. When
20 operating with 1/2 rate Reverse Pilot Channel gating, the Forward Power Control
21 Subchannel shall be transmitted only in the even numbered power control groups. When
22 operating with 1/4 rate Reverse Pilot Channel gating, the Forward Power Control
23 Subchannel shall be transmitted only in power control groups 1, 5, 9, and 13.

24 When using gating other than Reverse Pilot Channel gating with Reverse Radio
25 Configurations 3 through 6, the base station shall transmit the power control bit in the
26 power control group that begins $(REV_PWR_CNTL_DELAY + 1) \times 1.25$ ms following the end
27 of a power control group in which the mobile station transmitted.

28 A '0' bit shall indicate to the mobile station that it is to increase the mean output power
29 level, and a '1' bit shall indicate to the mobile station that it is to decrease the mean output
30 power level. The amount that the mobile station increases or decreases its power for every
31 power control bit is specified in 2.1.2.3.2.

32



1  power control subchannel transmission as specified in Table 3.1.3.1.10-1 and Figure 3.1.3.1.10-2

2 **Figure 3.1.3.1.10-1. Forward and Reverse Power Control Subchannel Transmission**
 3 **Timing**

4
 5 The base station receiver shall estimate the received signal strength of the particular mobile
 6 station to which it is assigned over a 1.25 ms period. The base station receiver shall use the
 7 estimate to determine the value of the power control bit ('0' or '1'). The base station shall
 8 transmit the power control bit on the Forward Fundamental Channel or on the Forward
 9 Dedicated Control Channel using the puncturing technique described below.

10 For Radio Configurations 1 and 2, the transmission of the power control bit shall occur in
 11 the second power control group following the corresponding reverse channel power control
 12 group in which the signal strength was estimated²⁰.

13 In the case of non-gated transmission mode, the transmission of the power control bit shall
 14 occur on the Forward Fundamental Channel or on the Forward Dedicated Control Channel

²⁰ For example, the signal is received on the Reverse Traffic Channel in power control group number 7, and the corresponding power control bit is transmitted on the Forward Traffic Channel during power control group number 7 + 2 = 9.

1 (as specified by $FPC_PRI_CHAN_s$) in all of the power control groups. In the case of Reverse
2 Pilot Channel gated transmission mode (at 1/2 or 1/4 rate), the transmission of the power
3 control bit shall occur on the Forward Dedicated Control Channel in every second or fourth
4 power control group as shown in Figure 3.1.3.1.10-1.

5 The duration and power level of power control bits for each radio configuration are specified
6 in Table 3.1.3.1.10-1. Each power control bit shall replace the number of modulation
7 symbols specified in Table 3.1.3.1.10-1. Each power control bit shall be transmitted with
8 minimum energy as specified in Table 3.1.3.1.10-1. The power control bits shall be inserted
9 into the Forward Dedicated Control Channel or into the Forward Fundamental Channel
10 data stream, after the data scrambling.

11 An n-bit ($n = 3$ or 4) binary number with values 0 through $2^n - 1$ formed by the decimated
12 bits specified in Table 3.1.3.1.10-1 shall be used to determine the power control bit starting
13 position by indexing the list in Table 3.1.3.1.10-1. For example, if the values of decimated
14 bits for Radio Configuration 4 (non-TD) are '110' (6 decimal), the power control bit starting
15 position is 12 as shown in Figure 3.1.3.1.10-2. The value of the decimated bits shall be
16 equal to the first of the chips into the decimator (see Figure 3.1.3.1.1.1-18 and Figure
17 3.1.3.1.1.2-15) for each modulation symbol.

18 When operating with Radio Configurations 1 and 2, all unpunctured modulation symbols in
19 a frame are transmitted at the same power level. Modulation symbols in adjacent frames
20 may be sent at different power levels.

21

Table 3.1.3.1.10-1. Power Control Bit Duration and Power Level

Radio Configuration	Punctured Modulation Symbols	Minimum Power Control Bit Energy	Starting Symbol Positions	Decimated Bits (MSB → LSB)
1	2	E_b	0, 1, ..., 15	23, 22, 21, 20
2	1	$3E_b/4$	0, 1, ..., 15	23, 22, 21, 20
3 (non-TD)	4	E_b	0, 2, ..., 30	47, 46, 45, 44
3 (TD)	4	E_b	0, 4, ..., 28	47, 46, 45
4 (non-TD)	2	E_b	0, 2, ..., 14	23, 22, 21
4 (TD)	2	E_b	0, 2, ..., 14	23, 22, 21
5 (non-TD)	4	E_b	0, 2, ..., 30	47, 46, 45, 44
5 (TD)	4	E_b	0, 4, ..., 28	47, 46, 45
6	6	E_b	0, 6, ..., 42	71, 70, 69
7	3	E_b	0, 3, ..., 21	35, 34, 33
8	6	E_b	0, 6, ..., 42	71, 70, 69
9	3	E_b	0, 3, ..., 21	35, 34, 33

Notes:

E_b is the energy per bit of the Forward Fundamental Channel or Forward Dedicated Control Channel (RC 3, 4, 5, 6, 7, 8, and 9) being punctured.

The decimated bits are numbered so that the first bit from the decimator in every power control group is the zeroth, the next one is the first, etc.

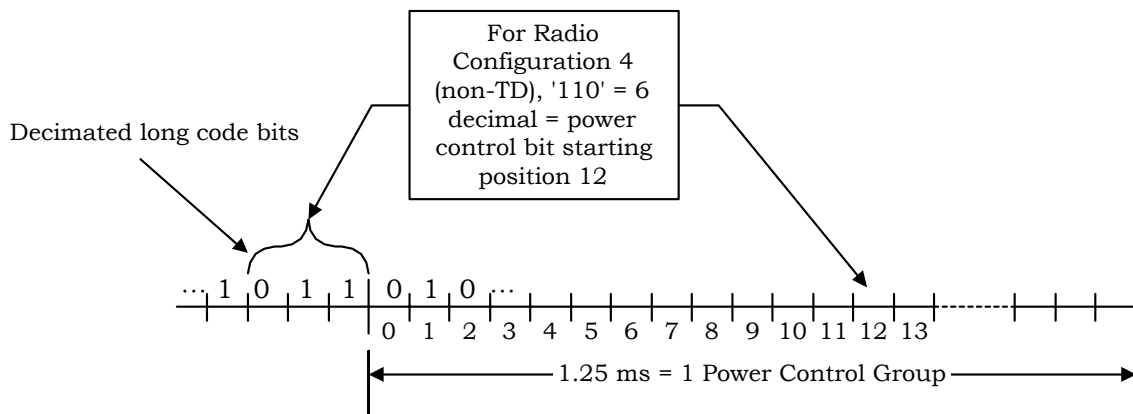


Figure 3.1.3.1.10-2. Randomization of Power Control Bit Starting Positions

1 3.1.3.1.11 Symbol Demultiplexing and Repetition

2 3.1.3.1.11.1 Spreading Rate 1 Symbol Demultiplexing

3 Symbol demultiplexing is performed on every code channel in the Forward CDMA Channel
4 as shown in Figure 3.1.3.1.1.1-19.

5 The demultiplexer with scalar input not supporting transmit diversity shall output the first
6 symbol in each frame to the Y_I output, and the subsequent symbols to the Y_Q , Y_I , ...
7 outputs.

8 The demultiplexer with scalar input supporting transmit diversity shall output the first
9 symbol in each frame to the Y_{I1} output, and the subsequent symbols to the Y_{I2} , Y_{Q1} , Y_{Q2} ,
10 Y_{I1} , ... outputs. The demultiplexer with complex input supporting transmit diversity shall
11 output the first complex symbol in each frame to the Y_{I1} and Y_{Q1} outputs, and the
12 subsequent complex symbols to the Y_{I2} and Y_{Q2} , Y_{I1} and Y_{Q1} , ... outputs.

13 The Forward Pilot Channel, the Transmit Diversity Pilot Channel, the Auxiliary Pilot
14 Channels, and the Auxiliary Transmit Diversity Pilot Channels shall be demultiplexed using
15 the non-TD demultiplexer (i.e., the TD demultiplexer is not allowed).

16 The Sync Channel, Paging Channels, and the Forward Traffic Channels with Radio
17 Configurations 1 and 2 shall be demultiplexed using the non-TD demultiplexer only (i.e.,
18 the TD demultiplexer is not allowed).

19 The Broadcast Control Channels, the Common Power Control Channels, the Common
20 Assignment Channels, the Forward Common Control Channels, and Forward Traffic
21 Channels with Radio Configurations 3 through 5 shall be demultiplexed using either the
22 non-TD or TD demultiplexer.

23 The Quick Paging Channel, when used in conjunction with the Paging Channel, shall be
24 demultiplexed using the non-TD demultiplexer (see Figure 3.1.3.1.1.1-19). Otherwise, the
25 Quick Paging Channel may be demultiplexed using the non-TD or TD demultiplexer.

26 3.1.3.1.11.2 Spreading Rate 1 Symbol Repetition for Transmit Diversity

27 If OTD mode is enabled, each symbol output on Y_{I1} , Y_{I2} , Y_{Q1} , and Y_{Q2} shall be repeated
28 once, to create two output symbols for each input symbol to the symbol repeater. The first
29 repeated symbol output from both the Y_{I2} and Y_{Q2} symbol repetition blocks during a frame
30 shall not be inverted. Subsequent outputs from both the Y_{I2} and Y_{Q2} symbol repetition
31 blocks shall be alternatively inverted.

32 If STS mode is enabled, each symbol output on Y_{I1} , Y_{I2} , Y_{Q1} , and Y_{Q2} shall be applied to
33 two repeaters, one for each transmit antenna, as shown in Figure 3.1.3.1.1.1-22 to create
34 two output symbols for each symbol input to the symbol repeater. On antenna 1 the first
35 repeated output symbol from the Y_{I2} repetition block shall be inverted and the second
36 repeated output symbol shall not be inverted. Subsequent output symbols from the Y_{I2}
37 repetition block on antenna 1 shall be alternatively inverted. The first repeated output
38 symbol from the Y_{Q2} symbol repetition block on antenna 1 shall not be inverted and the
39 second repeated output symbol shall be inverted. Subsequent output symbols from the Y_{Q2}
40 symbol repetition block shall be alternatively inverted. On antenna 2 the first repeated

1 output symbol from the Y_{Q1} repetition block shall be inverted and the second repeated
2 output symbol shall not be inverted. Subsequent output symbols from Y_{Q1} repetition block
3 on antenna 2 shall be alternatively inverted. The first repeated output symbol from the Y_{I1}
4 symbol repetition block on antenna 2 shall not be inverted and the second repeated output
5 symbol shall be inverted. Subsequent output symbols from the Y_{I1} symbol repetition block
6 shall be alternatively inverted.

7 3.1.3.1.11.3 Spreading Rate 3 Symbol Demultiplexing

8 Symbol demultiplexing is performed on every code channel in the Forward CDMA Channel
9 as shown in Figure 3.1.3.1.1.2-16.

10 The demultiplexer shall output the first symbol in each frame to the Y_{I1} output, and the
11 subsequent symbols to the Y_{I2} , Y_{I3} , Y_{Q1} , Y_{Q2} , Y_{Q3} , Y_{I1} , ... outputs. The demultiplexer shall
12 output the first complex symbol in each frame to the Y_{I1} and Y_{Q1} outputs, and the
13 subsequent complex symbols to the Y_{I2} and Y_{Q2} , Y_{I3} and Y_{Q3} , Y_{I1} and Y_{Q1} , ... outputs.

14 The Forward Pilot Channel and the Auxiliary Pilot Channels, shall be demultiplexed using
15 the demultiplexer shown in Figure 3.1.3.1.1.2-16.

16 The Broadcast Control Channels, the Common Power Control Channels, the Common
17 Assignment Channels, the Forward Common Control Channels, the Quick Paging
18 Channels, and Forward Traffic Channels with Radio Configurations 6 through 9 shall be
19 demultiplexed using the demultiplexer shown in Figure 3.1.3.1.1.2-16.

20 3.1.3.1.12 Orthogonal and Quasi-Orthogonal Spreading

21 Walsh functions are used with Radio Configurations 1 and 2. Walsh functions or quasi-
22 orthogonal functions are used with Radio Configurations 3 through 9.

23 Each code channel transmitted on the Forward CDMA Channel shall be spread with a
24 Walsh function or a quasi-orthogonal function at a fixed chip rate of 1.2288 Mcps to
25 provide channelization among all code channels on a given Forward CDMA Channel.

26 The maximum length of the assigned Walsh functions (N_{\max}) for code channels, except for
27 the Auxiliary Pilot Channels and the Auxiliary Transmit Diversity Pilot Channels,
28 transmitted on the Forward CDMA Channel is given in Table 3.1.3.1.12-1. One of N-ary (N
29 $\leq N_{\max}$) time-orthogonal Walsh functions, generated as described in 2.1.3.1.8.2, shall be
30 used. A code channel that is spread using Walsh function n from the N-ary orthogonal set
31 ($0 \leq n \leq N-1$) shall be assigned to code channel W_n^N . Walsh function time alignment shall
32 be such that the first Walsh chip begins at an even second time mark referenced to base
33 station transmission time (see 3.1.5). The Walsh function spreading sequence shall repeat
34 with a period of $(N/1.2288) \mu\text{s}$.

Table 3.1.3.1.12-1. Maximum Walsh Function Length for Code Channels on the Forward CDMA Channel Except the Auxiliary Pilot Channel and Auxiliary Transmit Diversity Pilot Channel

Spreading Rate	Maximum Walsh Length
1	128
3	256

Quasi-orthogonal functions (QOFs) shall be created using a non-zero sign multiplier QOF mask and a non-zero rotate enable Walsh function as specified in Table 3.1.3.1.12-2. The repeated sequence of an appropriate Walsh function shall be multiplied by the repeated sequence of masks with symbols +1 and -1 which correspond to the sign multiplier QOF mask values of 0 and 1, respectively. The sequence shall also be multiplied by the repeated sequence of masks with symbols 1 and j (j is the complex number representing a 90° phase shift) which correspond to the rotate enable Walsh function values of 0 and 1, respectively. The sign multiplier QOF masks (QOF_{sign}) and the rotate enable Walsh functions ($Walsh_{\text{rot}}$) given in Table 3.1.3.1.12-2 shall be used. The mask sequence order shall be output by rows from left to right for each row from top to bottom. Each hex symbol is output from the most-significant bit to the least-significant bit. The time alignment of QOF_{sign} and $Walsh_{\text{rot}}$ shall be such that the first Walsh chip of the quasi-orthogonal function begins at an even second time mark referenced to base station transmission time (see 3.1.5).

Table 3.1.3.1.12-2. Masking Functions for Quasi-Orthogonal Functions with Length 256

Function	Masking Function	
	Hexadecimal Representation of QOF_{sign}	$Walsh_{\text{rot}}$
0	00000000000000000000000000000000 00000000000000000000000000000000	W_0^{256}
1	7228d7724eebebb1eb4eb1ebd78d8d28 278282d81b41be1b411b1bbe7dd8277d	W_{130}^{256}
2	114b1e4444e14beeee4be144bbe1b4ee dd872d77882d78dd2287d277772d87dd	W_{173}^{256}
3	1724bd71b28118d48ebddb172b187eb2 e7d4b27ebd8ee82481b22be7dbe871bd	W_{47}^{256}

The assignment of code channels shall be such that each code channel is orthogonal or quasi-orthogonal to all other code channels in use.

- 1 Code channel W_0^{64} shall be assigned to the Forward Pilot Channel. Code channel W_0^{64}
 2 shall not be used with a non-zero quasi-orthogonal function. Code channels W_{64k}^N , with
 3 and without a non-zero quasi-orthogonal function, where $N > 64$ and k is an integer such
 4 that $0 \leq 64k < N$, shall not be used.
- 5 If the Transmit Diversity Pilot Channel is present, it shall be assigned code channel
 6 W_{16}^{128} .
- 7 If an Auxiliary Pilot Channel is present, it shall be assigned a code channel W_n^N , where $N \leq$
 8 512 , and $1 \leq n \leq N - 1$. The value of N and n are specified by the base station.
- 9 If an Auxiliary Pilot Channel is used with an Auxiliary Transmit Diversity Pilot Channel,
 10 then the Auxiliary Pilot Channel shall be assigned a code channel W_n^N , and the Auxiliary
 11 Transmit Diversity Pilot Channel shall be assigned a code channel $W_{n+N/2}^N$, where $N \leq 512$
 12 and $1 \leq n \leq N/2 - 1$. The value of N and n are specified by the base station.
- 13 If the Sync Channel is present, it shall be assigned code channel W_{32}^{64} .
- 14 If Paging Channels are present, they shall be assigned to code channels W_1^{64} to W_7^{64} ,
 15 consecutively.
- 16 If a Spreading Rate 1, rate 1/2 coded Broadcast Control Channel is present, it shall be
 17 assigned to a code channel W_n^{64} , where $1 \leq n \leq 63$. See Figures 3.1.3.1.1.1-20, 3.1.3.1.1.1-
 18 21, and 3.1.3.1.1.1-22. The value of n is specified by the base station.
- 19 If a Spreading Rate 1, rate 1/4 coded Broadcast Control Channel is present, it shall be
 20 assigned to a code channel W_n^{32} , where $1 \leq n \leq 31$. See Figures 3.1.3.1.1.1-20, 3.1.3.1.1.1-
 21 21, and 3.1.3.1.1.1-22. The value of n is specified by the base station.
- 22 If a Spreading Rate 3 Broadcast Control Channel is present, it shall be assigned to a code
 23 channel W_n^{128} , where $1 \leq n \leq 127$. See Figure 3.1.3.1.1.2-17. The value of n is specified by
 24 the base station.
- 25 If Spreading Rate 1 Quick Paging Channels are present, they shall be assigned to code
 26 channels W_{80}^{128} , W_{48}^{128} , and W_{112}^{128} , in that order. See Figures 3.1.3.1.1.1-20,
 27 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22.
- 28 If a Spreading Rate 3 Quick Paging channel is present, it shall be assigned to a code
 29 channel W_n^{256} , where $1 \leq n \leq 255$. See Figure 3.1.3.1.1.2-17. The value of n is specified by
 30 the base station.
- 31 If a Spreading Rate 1 Common Power Control Channel operating in the non-TD mode is
 32 present, it shall be assigned to a code channel W_n^{128} , where $1 \leq n \leq 127$. See Figure
 33 3.1.3.1.1.1-20. The value of n is specified by the base station.
- 34 If a Spreading Rate 1 Common Power Control Channel operating in the OTD or STS mode is
 35 present, it shall be assigned to a code channel W_n^{64} , where $1 \leq n \leq 63$. See Figures
 36 3.1.3.1.1.1-21 and 3.1.3.1.1.1-22. The value of n is specified by the base station.

- 1 If a Spreading Rate 3 Common Power Control Channel is present, it shall be assigned to a
 2 code channel W_n^{128} , where $1 \leq n \leq 127$. See Figure 3.1.3.1.1.2-17. The value of n is
 3 specified by the base station.
- 4 If a Spreading Rate 1, rate 1/2 coded Common Assignment Channel is present, it shall be
 5 assigned to a code channel W_n^{128} , where $1 \leq n \leq 127$. See Figures 3.1.3.1.1.1-20,
 6 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22. The value of n is specified by the base station.
- 7 If a Spreading Rate 1, rate 1/4 coded Common Assignment Channel is present, it shall be
 8 assigned to a code channel W_n^{64} , where $1 \leq n \leq 63$. See Figures 3.1.3.1.1.1-20, 3.1.3.1.1.1-
 9 21, and 3.1.3.1.1.1-22. The value of n is specified by the base station.
- 10 If a Spreading Rate 3 Common Assignment Channel is present, it shall be assigned to a
 11 code channel W_n^{256} , where $1 \leq n \leq 255$. See Figure 3.1.3.1.1.2-17. The value of n is
 12 specified by the base station.
- 13 If a Spreading Rate 1, rate 1/2 coded Forward Common Control Channel is present, it shall
 14 be assigned to a code channel W_n^N , where $N = 32, 64, \text{ and } 128$ for the data rate of 38400
 15 bps, 19200 bps, and 9600 bps, respectively, and $1 \leq n \leq N - 1$. See Figures 3.1.3.1.1.1-20,
 16 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22. The value of n is specified by the base station.
- 17 If a Spreading Rate 1, rate 1/4 coded Forward Common Control Channel is present, it shall
 18 be assigned to a code channel W_n^N , where $N = 16, 32, \text{ and } 64$ for the data rate of 38400
 19 bps, 19200 bps, and 9600 bps, respectively, and $1 \leq n \leq N - 1$. See Figures 3.1.3.1.1.1-20,
 20 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22. The value of n is specified by the base station.
- 21 If a Spreading Rate 3 Forward Common Control Channel is present, it shall be assigned to
 22 a code channel W_n^N , where $N = 64, 128, \text{ and } 256$ for the data rate of 38400 bps, 19200
 23 bps, and 9600 bps, respectively, and $1 \leq n \leq N - 1$. See Figure 3.1.3.1.1.2-17. The value of
 24 n is specified by the base station.
- 25 Each Forward Fundamental Channel and Forward Supplemental Code Channel with Radio
 26 Configuration 1 or 2 shall be assigned to a code channel W_n^{64} , where $1 \leq n \leq 63$. See
 27 Figure 3.1.3.1.1.1-20. The value of n is specified by the base station.
- 28 Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio
 29 Configuration 3 or 5 shall be assigned to a code channel W_n^{64} , where $1 \leq n \leq 63$. See
 30 Figures 3.1.3.1.1.1-20, 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22. The value of n is specified by the
 31 base station.
- 32 Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio
 33 Configuration 4 shall be assigned to a code channel W_n^{128} , where $1 \leq n \leq 127$. See Figures
 34 3.1.3.1.1.1-20, 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22. The value of n is specified by the base
 35 station.
- 36 Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio
 37 Configuration 6 or 8 shall be assigned to a code channel W_n^{128} , where $1 \leq n \leq 127$. See
 38 Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

1 Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio
 2 Configuration 7 or 9 shall be assigned to a code channel W_n^{256} , where $1 \leq n \leq 255$. See
 3 Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

4 Each Forward Supplemental Channel with Radio Configuration 3, 4, or 5 shall be assigned
 5 to a code channel W_n^N , where $N = 4, 8, 16, 32, 64, 128, 128, \text{ and } 128$ for the maximum
 6 assigned QPSK symbol rate of 307200 sps, 153600 sps, 76800 sps, 38400 sps, 19200 sps,
 7 9600 sps, 4800 sps, and 2400 sps, respectively, and $1 \leq n \leq N - 1$. See Figures 3.1.3.1.1.1-
 8 20, 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22. The value of n is specified by the base station. For
 9 QPSK symbol rates of 4800 sps and 2400 sps, the Walsh function is transmitted two times
 10 and four times per QPSK symbol, respectively. The effective length of the Walsh function is
 11 256 for the QPSK symbol rate of 4800 sps, and 512 for the QPSK symbol rate of 2400 sps.

12 Each Forward Supplemental Channel with Radio Configuration 6, 7, 8, or 9 shall be
 13 assigned to a code channel W_n^N , where $N = 4, 8, 16, 32, 64, 128, 256, 256, \text{ and } 256$ for the
 14 maximum assigned QPSK symbol rate of 921600 sps, 460800 sps, 230400 sps, 115200
 15 sps, 57600 sps, 28800 sps, 14400 sps, 7200 sps, and 3600 sps, respectively, and $1 \leq n \leq N$
 16 $- 1$. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station. For QPSK
 17 symbol rates of 7200 sps and 3600 sps, the Walsh function is transmitted two times and
 18 four times per QPSK symbol, respectively. The effective length of the Walsh function is 512
 19 for the QPSK symbol rate of 7200 sps, and 1024 for the QPSK symbol rate of 3600 sps.

20 3.1.3.1.13 Quadrature Spreading

21 Following the orthogonal spreading, each code channel is spread in quadrature as shown in
 22 Figures 3.1.3.1.1.1-20, 3.1.3.1.1.1-21, 3.1.3.1.1.1-22, and 3.1.3.1.1.2-17. The spreading
 23 sequence shall be a quadrature sequence of length 2^{15} (i.e., 32768 PN chips in length) for
 24 Spreading Rate 1 and each carrier of Spreading Rate 3. This sequence is called the pilot PN
 25 sequence.

26 For Spreading Rate 1 and each carrier of Spreading Rate 3, the pilot PN sequence shall be
 27 based on the following characteristic polynomials:

$$28 \quad P_I(x) = x^{15} + x^{13} + x^9 + x^8 + x^7 + x^5 + 1$$

29 (for the in-phase (I) sequence)

30 and

$$31 \quad P_Q(x) = x^{15} + x^{12} + x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

32 (for the quadrature-phase (Q) sequence).

33 The maximum length linear feedback shift register sequences $i(n)$ and $q(n)$ based on the
 34 above polynomials are of length $2^{15} - 1$ and can be generated by the following linear
 35 recursions:

$$36 \quad i(n) = i(n - 15) \oplus i(n - 10) \oplus i(n - 8) \oplus i(n - 7) \oplus i(n - 6) \oplus i(n - 2)$$

37 (based on $P_I(x)$ as the characteristic polynomial)

38 and

$$\begin{aligned}
 1 \quad & q(n) = q(n - 15) \oplus q(n - 12) \oplus q(n - 11) \oplus q(n - 10) \oplus q(n - 9) \\
 2 \quad & \oplus q(n - 5) \oplus q(n - 4) \oplus q(n - 3)
 \end{aligned}$$

3 (based on $P_Q(x)$ as the characteristic polynomial),

4 where $i(n)$ and $q(n)$ are binary-valued ('0' and '1') and the additions are modulo-2. In order
 5 to obtain the I and Q pilot PN sequences (of period 2^{15}), a '0' is inserted in $i(n)$ and $q(n)$
 6 after 14 consecutive '0' outputs (this occurs only once in each period); therefore, the pilot
 7 PN sequences have one run of 15 consecutive '0' outputs instead of 14.

8 The chip rate for Spreading Rate 1 and each carrier of Spreading Rate 3 shall be 1.2288
 9 Mcps. The pilot PN sequence period is $32768/1228800 = 26.666\dots$ ms, and exactly 75 pilot
 10 PN sequence repetitions occur every 2 seconds. The pilot PN sequence offset shall be as
 11 specified in 3.1.3.2.1.

12 3.1.3.1.14 Filtering

13 3.1.3.1.14.1 Baseband Filtering

14 Following the spreading operation, the I and Q impulses are applied to the inputs of the I
 15 and Q baseband filters as described in 3.1.3.1.1.1 and 3.1.3.1.1.2. The baseband filters
 16 shall have a frequency response $S(f)$ that satisfies the limits given in Figure 3.1.3.1.14.1-1.
 17 Specifically, the normalized frequency response of the filter shall be contained within $\pm\delta_1$ in
 18 the passband $0 \leq f \leq f_p$, and shall be less than or equal to $-\delta_2$ in the stopband $f \geq f_s$. The
 19 numerical values for the parameters are $\delta_1 = 1.5$ dB, $\delta_2 = 40$ dB, $f_p = 590$ kHz, and $f_s = 740$
 20 kHz.

21

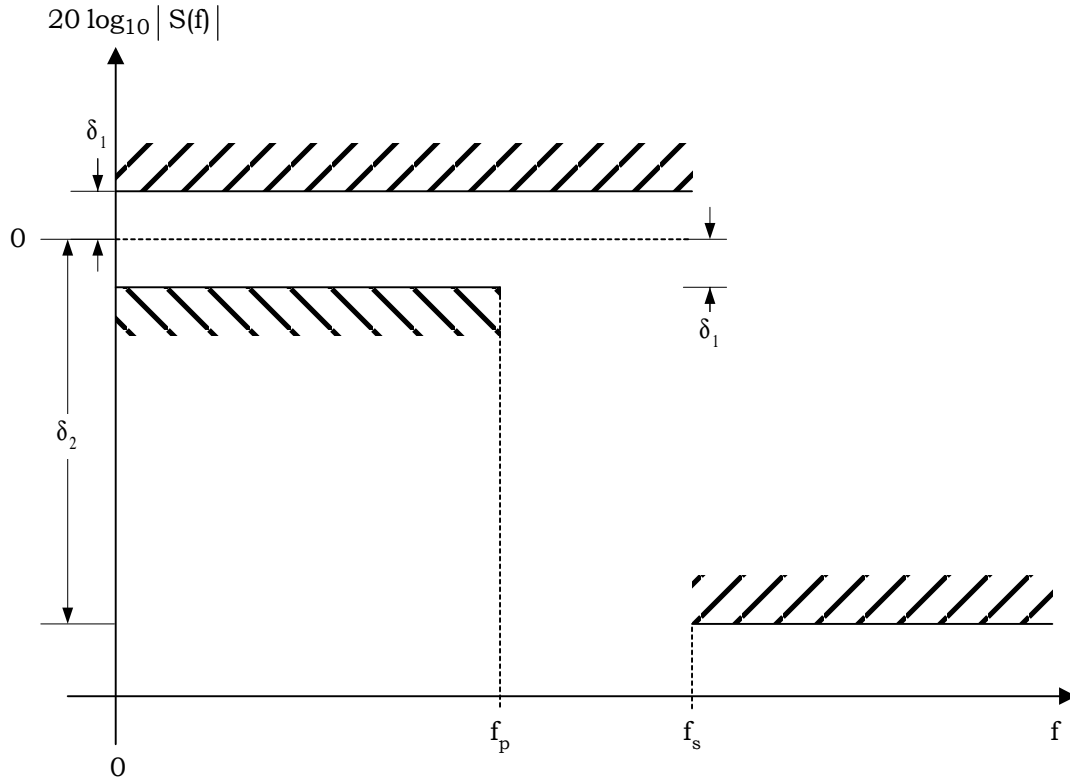


Figure 3.1.3.1.14.1-1. Baseband Filters Frequency Response Limits

If $s(t)$ is the impulse response of the baseband filter, then $s(t)$ should satisfy the following equation:

$$\text{Mean Squared Error} = \sum_{k=0}^{\infty} [\alpha s(kT_s - \tau) - h(k)]^2 \leq 0.03,$$

where the constants α and τ are used to minimize the mean squared error. The constant T_s is equal to 203.51... ns. T_s equals one quarter of a PN chip. The values of the coefficients $h(k)$, for $k < 48$, are given in Table 3.1.3.1.14.1-1; $h(k) = 0$ for $k \geq 48$. Note that $h(k)$ equals $h(47 - k)$.

1

Table 3.1.3.1.14.1-1. Coefficients of $h(k)$

k	$h(k)$
0, 47	-0.025288315
1, 46	-0.034167931
2, 45	-0.035752323
3, 44	-0.016733702
4, 43	0.021602514
5, 42	0.064938487
6, 41	0.091002137
7, 40	0.081894974
8, 39	0.037071157
9, 38	-0.021998074
10, 37	-0.060716277
11, 36	-0.051178658
12, 35	0.007874526
13, 34	0.084368728
14, 33	0.126869306
15, 32	0.094528345
16, 31	-0.012839661
17, 30	-0.143477028
18, 29	-0.211829088
19, 28	-0.140513128
20, 27	0.094601918
21, 26	0.441387140
22, 25	0.785875640
23, 24	1.0

2

3

3.1.3.1.14.2 Phase Characteristics

The base station shall provide phase equalization for the transmit signal path.²¹ The equalizing filter shall be designed to provide the equivalent baseband transfer function

$$H(\omega) = K \frac{\omega^2 + j\alpha\omega\omega_0 - \omega_0^2}{\omega^2 - j\alpha\omega\omega_0 - \omega_0^2},$$

where K is an arbitrary gain, j equals $\sqrt{-1}$, α equals 1.36, ω_0 equals $2\pi \times 3.15 \times 10^5$, and ω is the radian frequency. The equalizing filter implementation shall be equivalent to applying baseband filters with this transfer function, individually, to the baseband I and Q waveforms.

A phase error test filter is defined to be the overall base station transmitter filter (including the equalizing filter) cascaded with a filter having a transfer function that is the inverse of the equalizing filter specified above. The response of the test filter should have a mean squared phase error from the best fit linear phase response that is no greater than 0.01 squared radians when integrated over the frequency range $1 \text{ kHz} \leq |f - f_c| \leq 630 \text{ kHz}$. For purposes of this requirement, "overall" shall mean from the I and Q baseband filter inputs (see 3.1.3.1.14.1) to the RF output of the transmitter.

3.1.3.2 Pilot Channels

The Forward Pilot Channel, Transmit Diversity Pilot Channel, Auxiliary Pilot Channels, and Auxiliary Transmit Diversity Pilot Channels are unmodulated spread spectrum signals used for synchronization by a mobile station operating within the coverage area of the base station.

The Forward Pilot Channel is transmitted at all times by the base station on each active Forward CDMA Channel, unless the base station is classified as a hopping pilot beacon. If the Forward Pilot Channel is transmitted by a hopping pilot beacon, then the timing requirements in 3.1.3.2.5 shall apply. Hopping pilot beacons change frequency periodically to simulate multiple pilot beacons transmitting pilot information. This results in discontinuous transmissions on a given Forward CDMA Channel. If transmit diversity is used on a Forward CDMA Channel, then the base station shall transmit a Transmit Diversity Pilot.

When the Transmit Diversity Pilot Channel is transmitted, the base station should continue to use sufficient power on the Forward Pilot Channel to ensure that a mobile station is able to acquire and estimate the Forward CDMA Channel without using energy from the Transmit Diversity Pilot Channel.

Zero or more Auxiliary Pilot Channels can be transmitted by the base station on an active Forward CDMA Channel. If transmit diversity is used on the Forward CDMA Channel associated with an Auxiliary Pilot Channel, then the base station shall transmit an Auxiliary Transmit Diversity Pilot.

²¹This equalization simplifies the design of the mobile station receive filters.

1 3.1.3.2.1 Pilot PN Sequence Offset

2 Each base station shall use a time offset of the pilot PN sequence to identify a Forward
3 CDMA Channel. Time offsets may be reused within a CDMA cellular system.

4 Distinct pilot channels shall be identified by an offset index (0 through 511 inclusive). This
5 offset index specifies the offset time from the zero offset pilot PN sequence in multiples of 64
6 chips. The zero offset pilot PN sequence shall be such that the start of the sequence shall
7 be output at the beginning of every even second in time, referenced to the base station
8 transmission time (see 3.1.5). For Spreading Rate 1 and for each carrier of Spreading Rate
9 3, the start of the zero offset pilot PN sequence for either the I or Q sequence shall be
10 defined as the state of the sequence for which the previous 15 outputs were '0's (see Figure
11 1.3-1).

12 There are 512 unique values that are possible for the pilot PN sequence offset. The offset (in
13 chips) for a given pilot PN sequence from the zero offset pilot PN sequence is equal to the
14 index value multiplied by 64; for example, if the pilot PN sequence offset index is 15, the
15 pilot PN sequence offset will be $15 \times 64 = 960$ PN chips. The pilot PN sequence offset is
16 illustrated in Figure 3.1.3.2.1-1. The same pilot PN sequence offset shall be used on all
17 CDMA frequency assignments for a given base station.

18

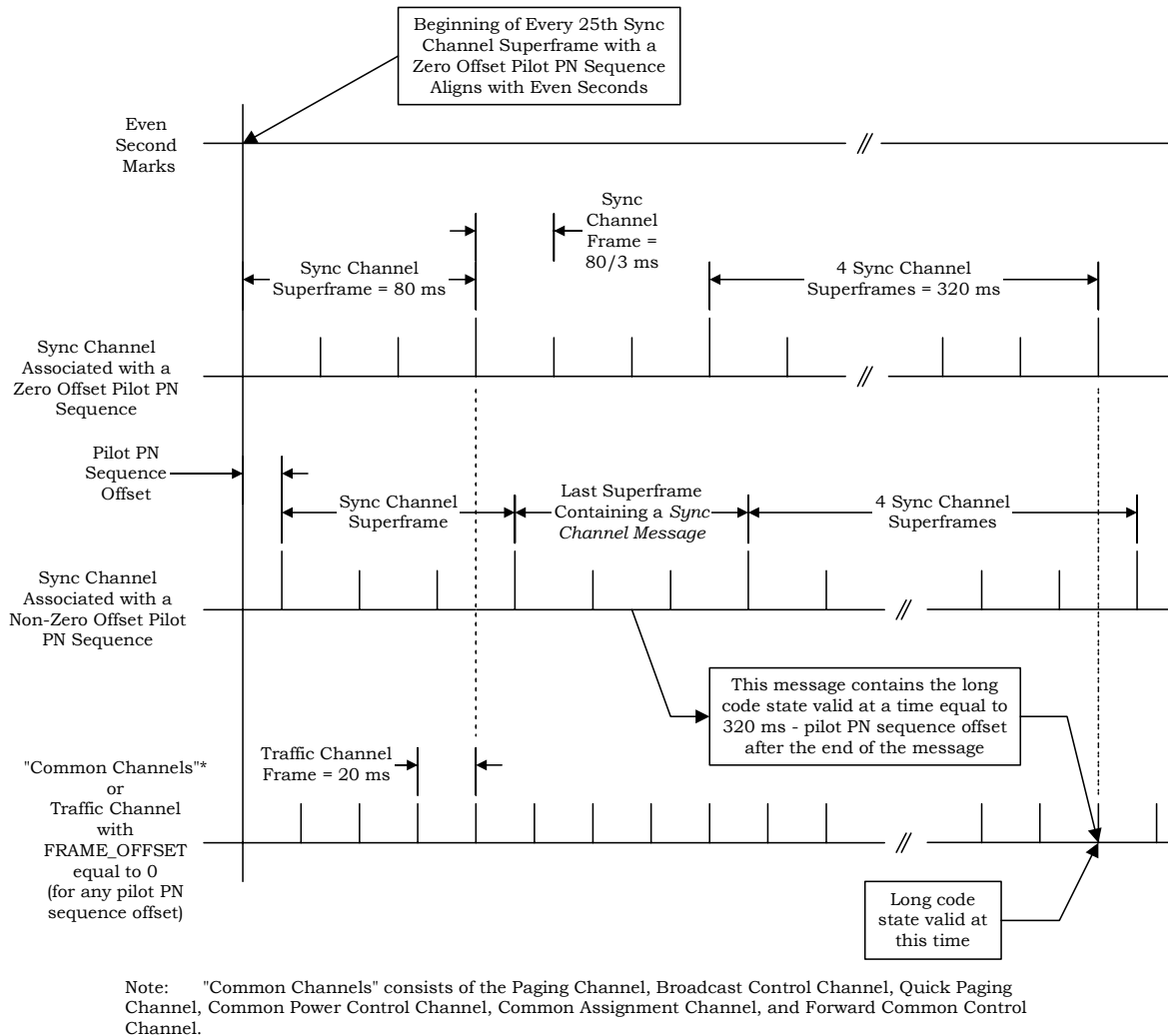


Figure 3.1.3.2.1-1. Forward CDMA Channel Pilot PN Sequence Offset

3.1.3.2.2 Pilot Channel Orthogonal and Quasi-Orthogonal Spreading

3.1.3.2.2.1 Forward Pilot Channel

The Forward Pilot Channel shall be spread by W_0 as specified in 3.1.3.1.12.

3.1.3.2.2.2 Forward Transmit Diversity Pilot Channel

If transmit diversity is supported on the Forward CDMA Channel, then the Transmit Diversity Pilot Channel shall be spread with W_{16}^{128} as specified in 3.1.3.1.12 and shall be transmitted at a power level of 0, -3, -6, or -9 dB relative to the power level of the Forward Pilot Channel.

3.1.3.2.2.3 Auxiliary Pilot Channel

Code multiplexed Auxiliary Pilots are generated by assigning a different Walsh function or a different quasi-orthogonal function to each Auxiliary Pilot. The Walsh function length may be extended to increase the number of available Walsh functions or quasi-orthogonal functions, thereby achieving a smaller impact to the number of orthogonal codes available for traffic channels.

Every Walsh function W_i^m (where i is the index of the Walsh function and m is 128 for Spreading Rate 1 and 256 for Spreading Rate 3) may be used to generate N Walsh functions of order $N \times m$, where N is a non-negative integer power of 2 ($N = 2^n$). A Walsh function of order $N \times m$ can be constructed by concatenating N times W_i^m , with certain permissible polarities for the concatenated W_i^m . Concatenation of W_0^m shall not be allowed, since it is incompatible with continuous or non-periodic integration of the Forward Pilot Channel. Additionally, concatenation of W_{64}^{128} shall not be allowed for Spreading Rate 1 and concatenation of W_{64}^{256} , W_{128}^{256} , and W_{192}^{256} shall not be allowed for Spreading Rate 3. Walsh function time alignment shall be such that the first Walsh chip begins at an even second time mark referenced to base station transmission time (see 3.1.5). The Walsh function spreading sequence shall repeat with a period of $(N \times m)/1.2288 \mu\text{s}$

The maximum length of the Walsh functions that may be used for Walsh function spreading or quasi-orthogonal function spreading of an Auxiliary Pilot shall be 512. For Spreading Rate 1, N equals 1, 2, or 4. For Spreading Rate 3, N equals 1 or 2.

For the case $N = 2$, the two possible Walsh functions of order $2 \times m$ are $W_i^m W_i^m$ (W_i^{2m}) and $W_i^m \overline{W_i^m}$ (W_{i+m}^{2m}), where the overbar denotes a polarity change and $i < m$. For the case $N = 4$, the four possible Walsh functions are $W_i^m W_i^m W_i^m W_i^m$ (W_i^{4m}), $W_i^m \overline{W_i^m} \overline{W_i^m} \overline{W_i^m}$ (W_{i+m}^{4m}), $W_i^m W_i^m \overline{W_i^m} \overline{W_i^m}$ (W_{i+2m}^{4m}), $W_i^m \overline{W_i^m} \overline{W_i^m} W_i^m$ (W_{i+3m}^{4m}).

When the Auxiliary Transmit Diversity Pilot Channel is transmitted, the base station should continue to use sufficient power on the Auxiliary Pilot Channel to ensure that a mobile station is able to acquire and estimate the Forward CDMA Channel without using energy from the Auxiliary Transmit Diversity Pilot Channel.

3.1.3.2.2.4 Auxiliary Transmit Diversity Pilot Channel

If transmit diversity is supported on the Forward CDMA Channel associated with an Auxiliary Pilot Channel, then the Auxiliary Transmit Diversity Pilot Channel shall be spread with a Walsh function or a quasi-orthogonal function. The length of the Walsh function, the sign multiplier QOF mask, and the rotate enable Walsh function used to spread the Auxiliary Transmit Diversity Pilot Channel shall be the same as the length of the Walsh function, the sign multiplier QOF mask, and the rotate enable Walsh function, respectively, that are used to spread the associated Auxiliary Pilot Channel.

3.1.3.2.3 Pilot Channel Quadrature Spreading

Each pilot channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

3.1.3.2.4 Pilot Channel Filtering

For each pilot channel, the filtering shall be as specified in 3.1.3.1.14.

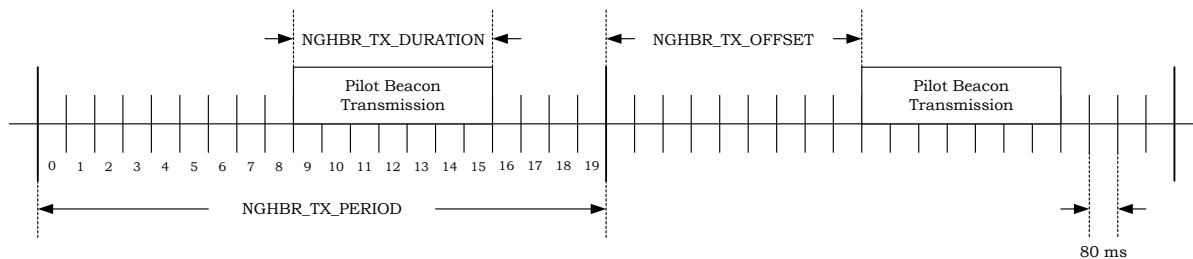
3.1.3.2.5 Hopping Pilot Beacon Timing

The hopping pilot beacon shall be transmitted periodically. The transmission time of a hopping pilot beacon is defined by three parameters: NGHBR_TX_PERIOD, NGHBR_TX_OFFSET, and NGHBR_TX_DURATION, as shown in Figure 3.1.3.2.5-1. NGHBR_TX_PERIOD, in units of 80 ms, is the period between pilot beacon transmissions. The start of the transmission period shall be aligned to the beginning of the System Time. NGHBR_TX_OFFSET, in units of 80 ms, is the time offset of the pilot beacon transmission from the beginning of the transmission period. NGHBR_TX_DURATION, in units of 80 ms, is the duration of each pilot beacon transmission.

Each pilot beacon transmission shall be NGHBR_TX_DURATION in duration. Pilot beacon shall be transmitted when

$$(\lfloor t/4 \rfloor - \text{NGHBR_TX_OFFSET}) \bmod \text{NGHBR_TX_PERIOD} = 0,$$

where t is the System Time in units of 20 ms.



NGHBR_TX_PERIOD = 20
 NGHBR_TX_OFFSET = 9
 NGHBR_TX_DURATION = 7

Figure 3.1.3.2.5-1. Hopping Pilot Beacon Timing

3.1.3.3 Sync Channel

The Sync Channel is an encoded, interleaved, spread, and modulated spread spectrum signal that is used by mobile stations operating within the coverage area of the base station to acquire initial time synchronization.

1 3.1.3.3.1 Sync Channel Time Alignment and Modulation Rates

2 The bit rate for the Sync Channel is 1200 bps. A Sync Channel frame is 26.666... ms in
3 duration. For a given base station, the I and Q channel pilot PN sequences for the Sync
4 Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

5 Once the mobile station achieves pilot PN sequence synchronization by acquiring the
6 Forward Pilot Channel, the synchronization for the Sync Channel is immediately known.
7 This is because the Sync Channel (and all other channels) is spread with the same pilot PN
8 sequence, and because the frame and interleaver timing on the Sync Channel are aligned
9 with the pilot PN sequence.

10 The start of the interleaver block and the frame of the Sync Channel shall align with the
11 start of the pilot PN sequence being used to spread the Forward CDMA Channel (see
12 Figures 3.1.3.1.1.1-1 and 3.1.3.1.1.2-1). See Tables 3.1.3.1.2.1-1 and 3.1.3.1.2.2-1 for a
13 summary of Sync Channel modulation parameters.

14 3.1.3.3.2 Sync Channel Structure

15 A Sync Channel superframe is formed by three Sync Channel frames (i.e., 80 ms) as shown
16 in Figure 3.1.3.2.1-1.

17 When using the zero-offset Pilot PN sequence, Sync Channel superframes shall begin at the
18 even second time mark referenced to base station transmission time (see 3.1.5) or at the
19 end of any third Sync Channel frame thereafter. When using a Pilot PN sequence other than
20 the zero-offset sequence, the Sync Channel superframe shall begin at the even second time
21 mark plus the pilot PN offset value in time or at the end of any third Sync Channel frame
22 thereafter.

23 3.1.3.3.3 Sync Channel Convolutional Encoding

24 The Sync Channel data shall be convolutionally encoded prior to transmission, as specified
25 in 3.1.3.1.4. The state of the Sync Channel convolutional encoder shall not be reset
26 between Sync Channel frames.

27 3.1.3.3.4 Sync Channel Code Symbol Repetition

28 The Sync Channel code symbols shall be repeated as specified in 3.1.3.1.5.

29 3.1.3.3.5 Sync Channel Interleaving

30 The modulation symbols on the Sync Channel shall be interleaved as specified in 3.1.3.1.7.

31 3.1.3.3.6 Sync Channel Orthogonal Spreading

32 The Sync Channel shall be spread by W_{32}^{64} as specified in 3.1.3.1.12. When operating in
33 Spreading Rate 3, a Sync Channel should be transmitted on a frequency from the Sync
34 Channel preferred set of frequency assignments for Spreading Rate 3.

35 3.1.3.3.7 Sync Channel Quadrature Spreading

36 The Sync Channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

1 3.1.3.3.8 Sync Channel Filtering

2 Filtering for the Sync Channel shall be as specified in 3.1.3.1.14.

3 3.1.3.3.9 Sync Channel Transmission Processing

4 When the Physical Layer receives a PHY-SYNCH.Request(SDU) from the MAC Layer, the
5 base station shall perform the following:

- 6 • Set the information bits to SDU.
- 7 • Transmit a Sync Channel frame.

8 3.1.3.4 Paging Channel

9 The Paging Channel applies to Spreading Rate 1 only.

10 The Paging Channel is an encoded, interleaved, spread, and modulated spread spectrum
11 signal that is used by mobile stations operating within the coverage area of the base
12 station. The base station uses the Paging Channel to transmit system overhead information
13 and mobile station-specific messages.

14 The Primary Paging Channel shall be Paging Channel number 1.

15 3.1.3.4.1 Paging Channel Time Alignment and Modulation Rates

16 The Paging Channel shall transmit information at a fixed data rate of 9600 or 4800 bps. All
17 Paging Channels in a given system (i.e., with the same SID) should transmit information at
18 the same data rate. A Paging Channel frame is 20 ms in duration.

19 For a given base station, the I and Q channel pilot PN sequences for the Paging Channel
20 use the same pilot PN sequence offset as for the Forward Pilot Channel.

21 The start of the interleaver block and the frame of the Paging Channel shall align with the
22 start of the zero-offset pilot PN sequence at every even-second time mark ($t \bmod 100 = 0$,
23 where t is the System Time in 20 ms frames) as shown in Figure 3.1.3.2.1-1. The first
24 Paging Channel frame shall begin at the start of base station transmission time (see 3.1.5).
25 See Table 3.1.3.1.2.1-2 for a summary of Paging Channel modulation parameters.

26 3.1.3.4.2 Paging Channel Structure

27 The Paging Channel shall be divided into Paging Channel slots that are each 80 ms in
28 duration.

29 3.1.3.4.3 Paging Channel Convolutional Encoding

30 The Paging Channel data shall be convolutionally encoded as specified in 3.1.3.1.4. The
31 state of the Paging Channel convolutional encoder shall not be reset between Paging
32 Channel frames.

33 3.1.3.4.4 Paging Channel Code Symbol Repetition

34 The Paging Channel code symbols shall be repeated as specified in 3.1.3.1.5.

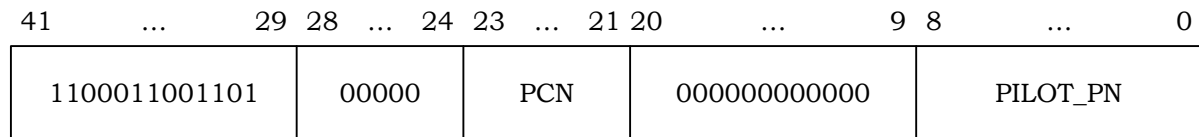
3.1.3.4.5 Paging Channel Interleaving

The modulation symbols on the Paging Channel shall be interleaved, as specified in 3.1.3.1.7. The interleaver block shall align with the Paging Channel frame. The alignment shall be such that the first bit of the frame influences the first 18 modulation symbols (for 9600 bps) or 36 modulation symbols (for 4800 bps) input into the interleaver.

Since the Paging Channel is not convolutionally encoded by blocks, the last 8 bits of a Paging Channel frame influence symbols in the successive interleaver block.

3.1.3.4.6 Paging Channel Data Scrambling

The Paging Channel data shall be scrambled as specified in 3.1.3.1.9, utilizing the Paging Channel long code mask as shown in Figure 3.1.3.4.6-1.



PCN - Paging Channel Number

PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

Figure 3.1.3.4.6-1. Paging Channel Long Code Mask

3.1.3.4.7 Paging Channel Orthogonal Spreading

The Paging Channel shall be spread by W_1^{64} , where i is equal to the Paging Channel number, as specified in 3.1.3.1.12.

3.1.3.4.8 Paging Channel Quadrature Spreading

The Paging Channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

3.1.3.4.9 Paging Channel Filtering

Filtering for the Paging Channel shall be as specified in 3.1.3.1.14.

3.1.3.4.10 Paging Channel Transmission Processing

When the Physical Layer receives a PHY-PCH.Request(SDU) from the MAC Layer, the base station shall perform the following:

- Set the information bits to SDU.
- Transmit a Paging Channel frame.

3.1.3.5 Broadcast Control Channel

The Broadcast Control Channel is an encoded, interleaved, spread, and modulated spread spectrum signal that is used by mobile stations operating within the coverage area of the base station.

3.1.3.5.1 Broadcast Control Channel Time Alignment and Modulation Rates

The Broadcast Control Channel shall transmit information at a data rate of 19200, 9600, or 4800 bps, which correspond to slot durations of 40, 80, and 160 ms respectively. The base station may support discontinuous transmission on the Broadcast Control Channel. The decision to enable or disable transmission shall be made on a Broadcast Control Channel slot basis.

For a given base station, the I and Q channel pilot PN sequences for the Broadcast Control Channel use the same pilot PN sequence offset as for the Pilot Channel.

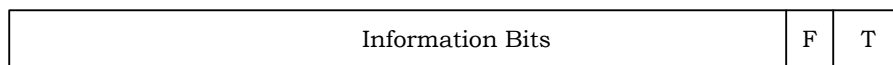
The start of the Broadcast Control Channel slot shall align with the start of the zero-offset pilot PN sequence at every four-second time mark ($t \bmod 200 = 0$, where t is the System Time in 20 ms frames) as shown in Figure 3.1.3.2.1-1. The first Broadcast Control Channel slot shall begin at the start of base station transmission time (see 3.1.5).

3.1.3.5.2 Broadcast Control Channel Structure

The Broadcast Control Channel shall be divided into Broadcast Control Channel slots that are 40, 80, or 160 ms in duration. For the 80 ms Broadcast Control Channel slot case, each Broadcast Control Channel slot shall consist of two 40 ms Broadcast Control Channel frames. For the 160 ms Broadcast Control Channel slot case, each Broadcast Control Channel slot shall consist of four 40 ms Broadcast Control Channel frames.

The first Broadcast Control Channel frame of a Broadcast Control Channel slot shall consist of a sequence of encoded and interleaved symbols. The following Broadcast Control Channel frames of a Broadcast Control Channel slot shall consist of the same sequence of encoded and interleaved symbols that were used on the first Broadcast Control Channel frame.

A Broadcast Control Channel frame shall consist of 768 bits. These shall be composed of 744 information bits followed by 16 Broadcast Control Channel frame quality indicator (CRC) bits and 8 Encoder Tail Bits, as shown in Figure 3.1.3.5.2-1.



Notation

F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 3.1.3.5.2-1. Broadcast Control Channel Frame Structure

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3.1.3.5.2.1 Broadcast Control Channel Frame Quality Indicator

The frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Encoder Tail Bits. The Broadcast Control Channel shall use a 16-bit frame quality indicator.

The generator polynomial for the frame quality indicator shall be as follows:

$$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$$

The frame quality indicator shall be computed according to the following procedure as shown in Figure 3.1.3.5.2.1-1:

- Initially, all shift register elements shall be set to logical one and the switches shall be set in the up position.
- The register shall be clocked a number of times equal to the number of information bits in the Broadcast Control Channel frame (i.e., 744) with those bits as input.
- The switches shall be set in the down position so that the output is a modulo-2 addition with a '0' and the successive shift register inputs are '0's.
- The register shall be clocked an additional number of times equal to the number of bits in the frame quality indicator (i.e., 16).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

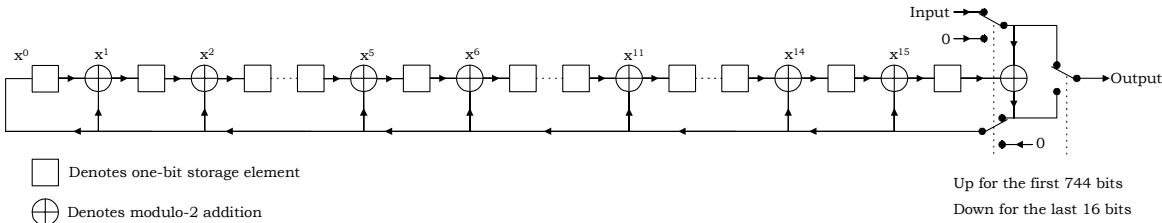


Figure 3.1.3.5.2.1-1. Broadcast Control Channel Frame Quality Indicator Calculation

3.1.3.5.2.2 Broadcast Control Channel Encoder Tail Bits

The last eight bits of each Broadcast Control Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to '0'.

3.1.3.5.3 Broadcast Control Channel Convolutional Encoding

The Broadcast Control Channel data shall be convolutionally encoded as specified in 3.1.3.1.4.

When generating Broadcast Control Channel data, the encoder shall be initialized to the all-zero state at the end of each Broadcast Control Channel frame.

1 3.1.3.5.4 Broadcast Control Channel Interleaving

2 The modulation symbols on the Broadcast Control Channel shall be interleaved, as
 3 specified in 3.1.3.1.7. The interleaver block shall align with the Broadcast Control Channel
 4 frame.

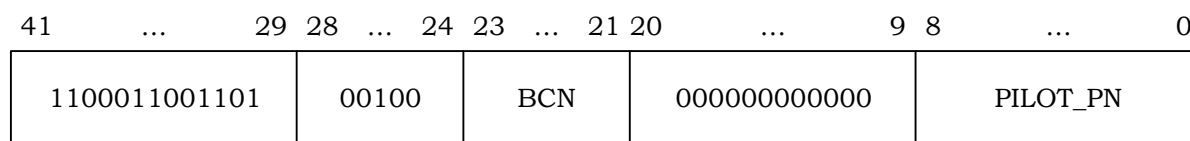
5 3.1.3.5.5 Broadcast Control Channel Sequence Repetition

6 When operating at 4800 and 9600 bps, the sequence shall be repeated as specified in
 7 3.1.3.1.8.

8 3.1.3.5.6 Broadcast Control Channel Data Scrambling

9 The Broadcast Control Channel data shall be scrambled as specified in 3.1.3.1.9 utilizing
 10 the Broadcast Control Channel long code mask as shown in Figure 3.1.3.5.6-1.

11



BCN - Broadcast Control Channel Number

PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

12

13 **Figure 3.1.3.5.6-1. Broadcast Control Channel Long Code Mask**

14

15 3.1.3.5.7 Broadcast Control Channel Orthogonal and Quasi-Orthogonal Spreading

16 The Broadcast Control Channel shall be spread by a Walsh function or quasi-orthogonal
 17 function as specified in 3.1.3.1.12.

18 3.1.3.5.8 Broadcast Control Channel Quadrature Spreading

19 The Broadcast Control Channel shall be PN spread, using the PN sequence specified in
 20 3.1.3.1.13.

21 3.1.3.5.9 Broadcast Control Channel Filtering

22 Filtering for the Broadcast Control Channel shall be as specified in 3.1.3.1.14.

23 3.1.3.5.10 Broadcast Control Channel Transmission Processing

24 When the Physical Layer receives a PHY-BCCH.Request(SDU, NUM_BITS) from the MAC
 25 Layer, the base station shall:

- 26 • Store the arguments SDU, and NUM_BITS.
- 27 • Set the information bits (see Figure 3.1.3.5.2-1) to SDU.
- 28 • Transmit a Broadcast Control Channel frame.

3.1.3.6 Quick Paging Channel

The Quick Paging Channel is an uncoded, spread, and On-Off-Keying (OOK) modulated spread spectrum signal that is used by mobile stations operating within the coverage area of the base station. The base station uses the Quick Paging Channel to inform mobile stations, operating in the slotted mode while in the idle state, whether or not they should receive the Forward Common Control Channel or the Paging Channel starting in the next Forward Common Control Channel or Paging Channel slot.

3.1.3.6.1 Quick Paging Channel Time Alignment and Modulation Rates

The Quick Paging Channel shall transmit information at a fixed data rate of 4800 or 2400 bps. For a given base station, the I and Q channel pilot PN sequences for the Quick Paging Channel use the same pilot PN sequence offset as for the Pilot Channel.

The Quick Paging Channel slots shall be aligned such that they begin 20 ms before the start of the zero-offset pilot PN sequence at every even-second time mark ($t \bmod 100 = 0$, where t is the System Time in 20 ms frames).

3.1.3.6.2 Quick Paging Channel Structure

The Quick Paging Channel shall be divided into Quick Paging Channel slots that are each 80 ms in duration. Quick Paging Channel slots shall be divided into Paging Indicators, Configuration Change Indicators, and Broadcast Indicators. The indicator data rate is 9600 or 4800 bps.

3.1.3.6.3 Quick Paging Channel Paging Indicator Enabling

The base station enables the Paging Indicators for the mobile stations operating in slotted mode in its coverage area that are to receive the Forward Common Control Channel or the Paging Channel starting 20 ms following the end of the current Quick Paging Channel slot.

The base station enables two Paging Indicators in the Quick Paging Channel slot for each mobile station that is to receive the next Forward Common Control Channel or Paging Channel slot. The first of the two Paging Indicators is enabled in the first 40 ms of the Quick Paging Channel slot. The second Paging Indicator is enabled in either the third 20 ms portion or the fourth 20 ms portion of the Quick Paging Channel slot. The third 20 ms portion of the Quick Paging Channel slot is used when the first Paging Indicator is enabled in the first 20 ms portion of the Quick Paging Channel slot; otherwise, the fourth 20 ms portion of the Quick Paging Channel slot is used. The signal shall be turned off for Paging Indicators that have not been enabled for any mobile station. The base station should refrain from setting Paging Indicators for mobile stations that do not monitor the Quick Paging Channel.

3.1.3.6.4 Quick Paging Channel Configuration Change Indicator Enabling

Configuration Change Indicators are only used on Quick Paging Channel 1.

If the Quick Paging Channel indicator data rate is 4800 bps, the last two indicators of the first 40 ms of a Quick Paging Channel slot and the last two indicators of the Quick Paging Channel slot are reserved as Configuration Change Indicators. If the Quick Paging Channel

1 indicator data rate is 9600 bps, the last four indicators of the first 40 ms of a Quick Paging
2 Channel slot and the last four indicators of the Quick Paging Channel slot are reserved as
3 Configuration Change Indicators. The base station enables the Configuration Change
4 Indicators in each Quick Paging Channel slot for a period of time following a change in
5 configuration parameters.

6 3.1.3.6.5 Quick Paging Channel Broadcast Indicator Enabling

7 Broadcast Indicators are only used on Quick Paging Channel 1.

8 If the Quick Paging Channel indicator data rate is 4800 bps, the two indicators prior to the
9 last two indicators of the first 40 ms of a Quick Paging Channel slot and the two indicators
10 prior to the last two indicators of the Quick Paging Channel slot are reserved as Broadcast
11 Indicators. If the Quick Paging Channel indicator data rate is 9600 bps, the four indicators
12 prior to the last four indicators of the first 40 ms of a Quick Paging Channel slot and the
13 four indicators prior to the last four indicators of the Quick Paging Channel slot are
14 reserved as Broadcast Indicators. The base station enables the Broadcast Indicators in the
15 Quick Paging Channel slot corresponding to a Broadcast Slot on the Forward Common
16 Control Channel which mobile stations configured to receive broadcast messages are to
17 monitor.

18 3.1.3.6.6 Quick Paging Channel Paging Indicator, Configuration Change Indicator, and 19 Broadcast Indicator Repetition

20 For Spreading Rate 1, each Paging Indicator, Configuration Change Indicator, and
21 Broadcast Indicator at the 9600 bps rate shall be repeated one time (each indicator occurs
22 two consecutive times) and each indicator at the 4800 bps rate shall be repeated three
23 times (each indicator occurs four consecutive times) as specified in Table 3.1.3.1.2.1-5.

24 For Spreading Rate 3, each Paging Indicator, Configuration Change Indicator, and
25 Broadcast Indicator at the 9600 bps rate shall be repeated two times (each indicator occurs
26 three consecutive times) and each indicator at the 4800 bps rate shall be repeated five
27 times (each indicator occurs six consecutive times) as specified in Table 3.1.3.1.2.2-3.

28 3.1.3.6.7 Quick Paging Channel Orthogonal and Quasi-Orthogonal Spreading

29 The Quick Paging Channel shall be spread by a Walsh function or quasi-orthogonal
30 function as specified in 3.1.3.1.12.

31 3.1.3.6.8 Quick Paging Channel Quadrature Spreading

32 The Quick Paging Channel shall be PN spread using the PN sequence specified in
33 3.1.3.1.13.

34 3.1.3.6.9 Quick Paging Channel Filtering

35 Filtering for the Quick Paging Channel shall be as specified in 3.1.3.1.14.

1 3.1.3.6.10 Quick Paging Channel Transmit Power Level

2 The enabled Paging Indicator modulation symbols shall be transmitted at the power level
3 relative to that of the Forward Pilot Channel that is specified by
4 QPCH_POWER_LEVEL_PAGE.

5 The enabled Configuration Change Indicator modulation symbols shall be transmitted at
6 the power level relative to that of the Forward Pilot Channel that is specified by
7 QPCH_POWER_LEVEL_CONFIG.

8 The enabled Broadcast Indicator modulation symbols shall be transmitted at the power
9 level relative to that of the Forward Pilot Channel that is specified by
10 QPCH_POWER_LEVEL_BCAST.

11 3.1.3.6.11 Quick Paging Channel Transmission Processing

12 Not specified.

13 3.1.3.7 Common Power Control Channel

14 The base station may support operation on one or more Common Power Control Channels.

15 The Common Power Control Channel is used by the base station for transmitting common
16 power control subchannels (one bit per subchannel) for the power control of multiple
17 Reverse Common Control Channels and Enhanced Access Channels. The common power
18 control subchannels are time multiplexed on the Common Power Control Channel. Each
19 common power control subchannel controls a Reverse Common Control Channel or an
20 Enhanced Access Channel.

21 The common power control subchannel may be used with the Enhanced Access Channel or
22 the Reverse Common Control Channel, depending upon the operating mode. While
23 operating in the Power Controlled Access Mode, the mobile station uses the common power
24 control subchannel transmitted by the base station on the assigned Common Power
25 Control Channel to adjust the transmit power of the Enhanced Access Channel. While
26 operating in the Reservation Access Mode, the mobile station uses the common power
27 control subchannel transmitted by the base station on the assigned Common Power
28 Control Channel to adjust the transmit power of the Reverse Common Control Channel.
29 While operating in the Designated Access Mode, the mobile station uses the common power
30 control subchannel transmitted by the base station on the assigned Common Power
31 Control Channel to adjust the transmit power of the Reverse Common Control Channel.

32 3.1.3.7.1 Common Power Control Channel Time Alignment and Modulation Rates

33 The common power control subchannels are multiplexed into separate data streams on the
34 I and Q arms of the Common Power Control Channels. The data rate on both the I arm and
35 Q arm is 9600 bps. In a 20 ms frame, there are 16 common power control groups for an
36 800 bps power control update rate, 8 common power control groups for a 400 bps power
37 control update rate, and 4 common power control groups for a 200 bps power control
38 update rate. The start of the first power control bit in the first common power control group
39 aligns with the beginning of the 20 ms frame. The start of the Common Power Control
40 Channel frame shall align with the start of the zero-offset pilot PN sequence at every even-

1 second time mark ($t \bmod 100 = 0$, where t is the System Time in 20 ms frames) as shown in
 2 Figure 3.1.3.2.1-1. The first Common Power Control Channel frame shall begin at the start
 3 of the base station transmission time (see 3.1.5).

4 For Spreading Rate 1, the power control bits on each of the I and Q arms are not repeated
 5 (1 symbol/bit) for the non-TD mode, and repeated once (2 symbols/bit) for the TD mode.
 6 For Spreading Rate 3, the power control bits on each of the I and Q arms are repeated twice
 7 (3 symbols/bit).

8 For a given base station, the I and Q channel pilot PN sequences for the Common Power
 9 Control Channel use the same pilot PN sequence offset as for the Pilot Channel.

10 3.1.3.7.2 Common Power Control Channel Structure

11 The channel structure for the Common Power Control Channel is shown in Figures
 12 3.1.3.1.1.1-5 and 3.1.3.1.1.2-4.

13 There are $2N$ common power control subchannels, numbered from 0 through $2N - 1$, in one
 14 common power control group of the Common Power Control Channel. These are divided
 15 equally between the I arm and the Q arm of the Common Power Control Channel. Table
 16 3.1.3.7.2-1 gives the number of common power control subchannels for power control
 17 update rates of 800, 400 and 200 bps per subchannel.

18
 19 **Table 3.1.3.7.2-1 Common Power Control Subchannels for Spreading Rate 1**

Rate (bps)	Duration (ms)	Power Control Subchannels (N) per I and Q Arms	Power Control Subchannels (2N)
800	1.25	12	24
400	2.5	24	48
200	5.0	48	96

20
 21 The common power control subchannels numbered 0 through $N - 1$ shall correspond to the
 22 I arm and those numbered N through $2N - 1$ shall correspond to the Q arm.

23 3.1.3.7.3 Pseudo-Randomization of Power Control Bit Positions

24 There are N bit positions or “offsets” numbered 0 through $N - 1$, on both the I arm and the
 25 Q arm in one common power control group. In each common power control group, the
 26 randomization process shall add a “relative offset” to an “initial offset”, modulo N , to
 27 determine the “effective offset” to be used by the multiplexer.

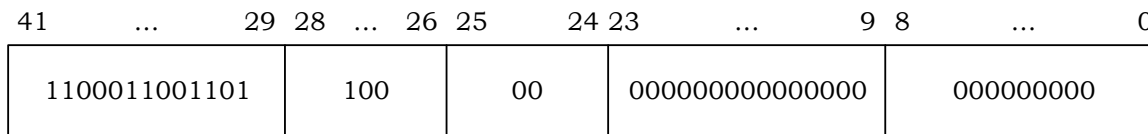
28 The common power control subchannels shall be assigned initial offsets according to the
 29 following rules:

- 1 • For the I arm, the initial offset value is the same as the common power control
2 subchannel index, i.e., the common power control subchannel index 0 shall
3 correspond to initial offset 0, and the common power control subchannel index
4 $N - 1$ shall correspond to initial offset $N - 1$.
- 5 • For the Q arm, the common power control subchannel index N shall correspond to
6 initial offset 0, and the index $2N - 1$ shall correspond to initial offset $N - 1$.

7 Offset 0 corresponds to the first bit position in the common power control group, and offset
8 $N - 1$ shall correspond to the last bit position. In-phase power control bits shall remain on
9 the I arm after each modulo operation and the same shall be true for the Q arm. When
10 there is no data to be sent on any common power control subchannel, the power at the
11 corresponding bit position shall be gated off.

12 The Common Power Control Channel shall use the decimated output of the long code
13 generator specified in 2.1.3.1.12 with the long code mask shown in Figure 3.1.3.7.3-1 to
14 randomize the power control bit position as shown in Figure 3.1.3.1.1.1-5 and 3.1.3.1.1.2-
15 4. For Spreading Rate 1, a decimation factor of 128 shall be realized by outputting the first
16 chip of each 128 chips output from the long code generator. For Spreading Rate 3, a
17 decimation factor of 384 shall be realized by outputting the first chip of each 384 chips
18 output from the long code generator. The decimated output of the long code generator shall
19 not be used to scramble the multiplexer output data stream.

20



21

22 **Figure 3.1.3.7.3-1 Power Control Bit Randomization Long Code Mask**

23

24 The following algorithm shall be used to compute the relative offset using the long code
25 decimator output. The decimator output bit rate shall be 9600 bps, giving exactly N
26 scrambling bits in one common power control group. During the common power control
27 group, the N bits from the long code decimator are numbered from 0 through $N - 1$, with
28 bit 0 occurring first, and bit $N - 1$ occurring last. The last L bits from the decimator
29 appearing in the previous common power control group shall be used to compute the
30 relative offset for the current common power control group, where L is listed in Table
31 3.1.3.7.3-1.

32

Table 3.1.3.7.3-1 Parameters for Relative Offset Computation

PCG (ms)	Number of Offset Position Bits (L)	First Offset Position Bits (L_1)	Second Offset Position Bits (L_2)	Computed Relative Offset (P)
1.25	5	2	3	0 to 10
2.5	7	3	4	0 to 22
5.0	9	4	5	0 to 46

The L bits are separated into L_1 -bit and L_2 -bit blocks, with the L_1 -bit block occurring first. The relative offset P is computed from the sum of P_1 and P_2 , the unsigned binary integers given by the L_1 -bit block and the L_2 -bit block, respectively, where the first bit in each block is considered as the LSB. The value of the relative offset (P) is from 0 through $N - 2$ as shown in Table 3.1.3.7.3-1.

3.1.3.7.4 Common Power Control Channel Orthogonal and Quasi-Orthogonal Spreading

The Common Power Control Channel shall be spread by a Walsh function or quasi-orthogonal function as specified in 3.1.3.1.12.

3.1.3.7.5 Common Power Control Channel Quadrature Spreading

The Common Power Control Channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

3.1.3.7.6 Common Power Control Channel Filtering

Filtering for the Common Power Control Channel shall be as specified in 3.1.3.1.14.

3.1.3.7.7 Common Power Control Channel Transmission Processing

When the Physical Layer receives a PHY-CPCCH.Request(PN, CPCCH_ID, RES_SCH_ADDR) from the MAC Layer, the base station shall perform the following:

- Store the arguments PN, CPCCH_ID, and RES_SCH_ADDR.
- For the base station with its pilot PN offset equal to the stored value of PN, set the common power control subchannel index to RES_SCH_ADDR and compute the effective offset for the common power control subchannel as specified in 3.1.3.7.3.
- Transmit the common power control subchannel with the effective offset (computed in the previous step) on the Common Power Control Channel specified by CPCCH_ID and the rate specified by CPCCH_RATE (see [5]).

3.1.3.8 Common Assignment Channel

The Common Assignment Channel is specifically designed to provide fast response reverse link channel assignments to support transmission of random access packets on the reverse link. This channel controls the Reverse Common Control Channel and the associated

1 common power control subchannel in the Reservation Access Mode and provides a fast
 2 acknowledgement in the Power Controlled Access Mode. It also implements congestion
 3 control. The base station may choose not to support Common Assignment Channels and
 4 inform the mobile stations on the Broadcast Control Channel of this choice.

5 3.1.3.8.1 Common Assignment Channel Time Alignment and Modulation Rates

6 The base station shall transmit information on the Common Assignment Channel at a fixed
 7 data rate of 9600 bps. The Common Assignment Channel frame length shall be 5 ms.

8 For a given base station, the I and Q channel pilot PN sequences for the Common
 9 Assignment Channel use the same pilot PN sequence offset as for the Pilot Channel.

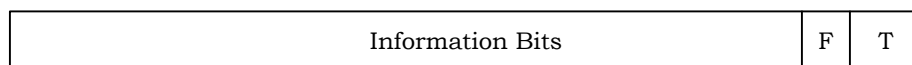
10 The Common Assignment Channel block interleaver shall always be aligned with the
 11 Common Assignment Channel frame.

12 The base station shall support discontinuous transmission on the Common Assignment
 13 Channel. The decision to enable or disable the Common Assignment Channel shall be made
 14 by the base station on a frame-by-frame basis (i.e. 5 ms basis).

15 The start of the Common Assignment Channel block interleaver shall align with the start of
 16 the zero-offset pilot PN sequence at every even-second time mark ($t \bmod 100 = 0$, where t is
 17 the System Time in 20 ms frames). The first Common Assignment Channel frame shall
 18 begin at the start of the base station transmission time.

19 3.1.3.8.2 Common Assignment Channel Structure

20 Common Assignment Channel frames shall consist of 48 bits. These 48 bits shall be
 21 composed of 32 information bits followed by 8 frame quality indicator (CRC) bits and 8
 22 Encoder Tail Bits, as shown in Figure 3.1.3.8.2-1.



Notation

F - Frame Quality Indicator (CRC)
 T - Encoder Tail Bits

24
 25 **Figure 3.1.3.8.2-1. Common Assignment Channel Frame Structure**
 26

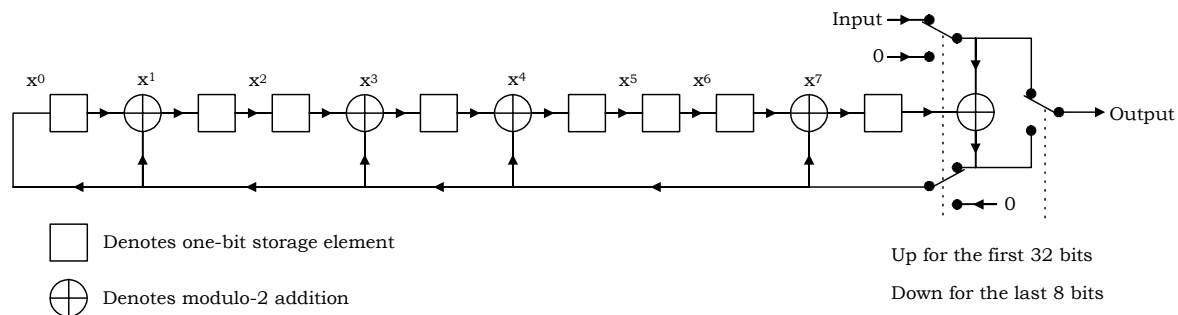
27 3.1.3.8.2.1 Common Assignment Channel Frame Quality Indicator

28 The frame quality indicator (CRC) shall be calculated on all bits within the frame, except
 29 the frame quality indicator itself and the Encoder Tail Bits. The generator polynomial for
 30 the frame quality indicator shall be as follows:

31
$$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1.$$

32 The frame quality indicators shall be computed according to the following procedure as
 33 shown in Figure 3.1.3.8.2.1-1:

- 1 • Initially, all shift register elements shall be set to logical one and the switches shall
2 be set in the up position.
- 3 • The register shall be clocked a number of times equal to the number of information
4 bits in the frame with those bits as input.
- 5 • The switches shall be set in the down position so that the output is a modulo-2
6 addition with a '0' and the successive shift register inputs are '0's.
- 7 • The register shall be clocked an additional number of times equal to the number of
8 bits in the frame quality indicator (8).
- 9 • These additional bits shall be the frame quality indicator bits.
- 10 • The bits shall be transmitted in the order calculated.



12

13 **Figure 3.1.3.8.2.1-1. Common Assignment Channel Frame Quality Indicator**
14 **Calculation for the 8-Bit Frame Quality Indicator**

15

16 3.1.3.8.2.2 Common Assignment Channel Encoder Tail Bits

17 The last eight bits of each Common Assignment Channel frame are called the Encoder Tail
18 Bits. These eight bits shall each be set to '0'.

19 3.1.3.8.3 Common Assignment Channel Convolutional Encoding

20 The Common Assignment Channel shall be convolutionally encoded as specified in
21 3.1.3.1.4. When generating Common Assignment Channel data, the encoder shall be
22 initialized to the all-zero state at the end of each frame.

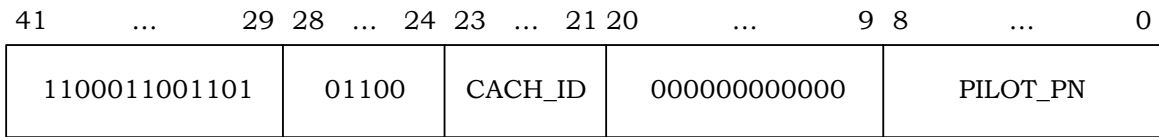
23 3.1.3.8.4 Common Assignment Channel Interleaving

24 The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

25 3.1.3.8.5 Common Assignment Channel Data Scrambling

26 The Common Assignment Channel shall be scrambled as specified in 3.1.3.1.9, using the
27 Common Assignment Channel long code mask which shall be as shown in Figure
28 3.1.3.8.5-1.

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CACH_ID - Common Assignment Channel ID
 PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

Figure 3.1.3.8.5-1 Common Assignment Channel Long Code Mask

3.1.3.8.6 Common Assignment Channel Orthogonal and Quasi-Orthogonal Spreading

The Common Assignment Channel shall be spread by a Walsh function or quasi-orthogonal function as specified in 3.1.3.1.12.

3.1.3.8.7 Common Assignment Channel Quadrature Spreading

The Common Assignment Channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

3.1.3.8.8 Common Assignment Channel Filtering

Filtering for the Common Assignment Channel shall be as specified in 3.1.3.1.14.

3.1.3.8.9 Common Assignment Channel Transmission Processing

When the Physical Layer receives a PHY-CACH.Request(SDU, CACH_ID, NUM_BITS) from the MAC Layer, the base station shall:

- Store the arguments SDU, CACH_ID and NUM_BITS;
- Set the information bits (see Figure 3.1.3.8.2-1) to SDU;
- Transmit a Common Assignment Channel frame.

3.1.3.9 Forward Common Control Channel

The Forward Common Control Channel is an encoded, interleaved, spread, and modulated spread spectrum signal that is used by mobile stations operating within the coverage area of the base station. The base station uses the Forward Common Control Channel to transmit mobile station-specific messages.

3.1.3.9.1 Forward Common Control Channel Time Alignment and Modulation Rates

The Forward Common Control Channel shall be transmitted at a variable data rate of 9600, 19200, or 38400 bps. A Forward Common Control Channel frame is 20, 10, or 5 ms in duration. Although the data rate of the Forward Common Control Channel is variable from frame to frame, the data rate transmitted to a mobile station in a given frame is predetermined and known to that mobile station.

1 For a given base station, the I and Q channel pilot PN sequences for the Forward Common
2 Control Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

3 The start of the interleaver block and the frame of the Forward Common Control Channel
4 shall align with the start of the zero-offset pilot PN sequence at every even-second time
5 mark ($t \bmod 100 = 0$, where t is the System Time in 20 ms frames) as shown in Figure
6 3.1.3.2.1-1. The first Forward Common Control Channel frame shall begin at the start of
7 base station transmission time (see 3.1.5).

8 3.1.3.9.2 Forward Common Control Channel Structure

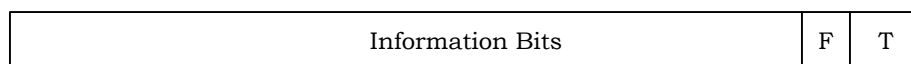
9 Table 3.1.3.9.2-1 specifies the Forward Common Control Channel bit allocations, and the
10 structure is shown in Figure 3.1.3.9.2-1.

11 All frames shall consist of the information bits, followed by a frame quality indicator (CRC)
12 and eight Encoder Tail Bits.

13 The Forward Common Control Channel shall be divided into Forward Common Control
14 Channel slots that are each 80 ms in duration.

15
16 **Table 3.1.3.9.2-1. Forward Common Control Channel Frame Structure Summary**

Frame length (ms)	Data Rate (bps)	Number of Bits per Frame			
		Total	Information Bits	Frame Quality Indicator	Encoder Tail
20	9600	192	172	12	8
20	19200	384	360	16	8
20	38400	768	744	16	8
10	19200	192	172	12	8
10	38400	384	360	16	8
5	38400	192	172	12	8



Notation

F - Frame Quality Indicator (CRC)

T - Encoder Tail Bits

18
19 **Figure 3.1.3.9.2-1. Forward Common Control Channel Frame Structure**

3.1.3.9.2.1 Forward Common Control Channel Frame Quality Indicator

The frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Encoder Tail Bits. The 20 ms Forward Common Control Channel shall use a 12-bit frame quality indicator for the 9600 bps frame and a 16-bit frame quality indicator for the 38400 bps and 19200 bps frames. The 10 ms Forward Common Control Channel shall use a 12-bit frame quality indicator for the 19200 bps frame and a 16-bit frame quality indicator for the 38400 bps frame. The 5 ms Forward Common Control Channel shall use a 12-bit frame quality indicator.

The generator polynomials for the frame quality indicator shall be as follows:

$$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1 \text{ for the 16-bit frame quality indicator}$$

and

$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1 \text{ for the 12-bit frame quality indicator.}$$

The frame quality indicators shall be computed according to the following procedure as shown in Figures 3.1.3.9.2.1-1 and 3.1.3.9.2.1-2:

- Initially, all shift register elements shall be set to logical one and the switches shall be set in the up position.
- The register shall be clocked a number of times equal to the number of information bits in the frame with those bits as input.
- The switches shall be set in the down position so that the output is a modulo-2 addition with a '0' and the successive shift register inputs are '0's.
- The register shall be clocked an additional number of times equal to the number of bits in the frame quality indicator (16 or 12).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

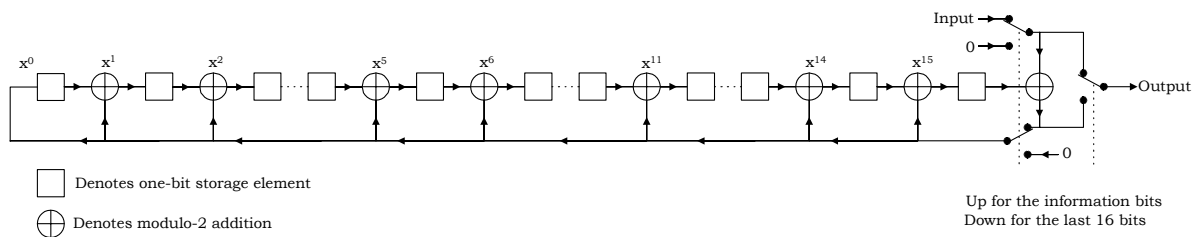


Figure 3.1.3.9.2.1-1. Forward Common Control Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

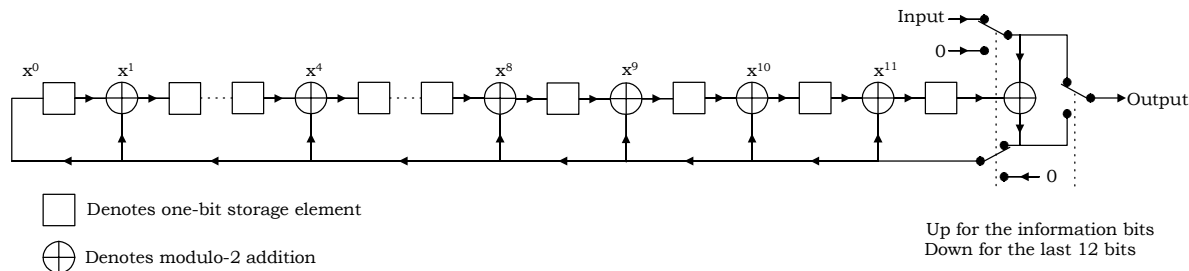


Figure 3.1.3.9.2.1-2. Forward Common Control Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

3.1.3.9.2.2 Forward Common Control Channel Encoder Tail Bits

The last eight bits of each Forward Common Control Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to '0'.

3.1.3.9.3 Forward Common Control Channel Encoding

The Forward Common Control Channel data shall be encoded as specified in 3.1.3.1.4.

When generating Forward Common Control Channel data, the encoder shall be initialized to the all-zero state at the end of each 5, 10, or 20 ms frame.

3.1.3.9.4 Forward Common Control Channel Interleaving

The modulation symbols on the Forward Common Control Channel shall be interleaved, as specified in 3.1.3.1.7. The interleaver block shall align with the Forward Common Control Channel frame.

3.1.3.9.5 Forward Common Control Channel Data Scrambling

The Forward Common Control Channel data shall be scrambled as specified in 3.1.3.1.9 utilizing the Forward Common Control Channel long code mask as shown in Figure 3.1.3.9.5-1.

41	...	29	28	...	24	23	...	21	20	...	9	8	...	0
1100011001101		01000		000		000000000000				00000000				

Figure 3.1.3.9.5-1. Forward Common Control Channel Long Code Mask

3.1.3.9.6 Forward Common Control Channel Orthogonal and Quasi-Orthogonal Spreading.

The Forward Common Control Channel shall be spread by a Walsh function or quasi-orthogonal function as specified in 3.1.3.1.12.

1 3.1.3.9.7 Forward Common Control Channel Quadrature Spreading

2 The Forward Common Control Channel shall be PN spread, using the PN sequence
3 specified in 3.1.3.1.13.

4 3.1.3.9.8 Forward Common Control Channel Filtering

5 Filtering for the Forward Common Control Channel shall be as specified in 3.1.3.1.14.

6 3.1.3.9.9 Forward Common Control Channel Transmission Processing

7 When the Physical Layer receives a PHY-FCCCH.Request(SDU, FCCCH_ID,
8 FRAME_DURATION, NUM_BITS) from the MAC Layer, the base station shall:

- 9 • Store the arguments SDU, FCCCH_ID, FRAME_DURATION, and NUM_BITS;
- 10 • Set the information bits (see Figure 3.1.3.9.2-1) to SDU;
- 11 • Transmit a Forward Common Control Channel frame of duration
12 FRAME_DURATION (5 ms, 10 ms, or 20 ms) at a data rate that corresponds to
13 NUM_BITS and FRAME_DURATION as specified in Table 3.1.3.9.2-1.

14 3.1.3.10 Forward Dedicated Control Channel

15 The Forward Dedicated Control Channel is used for the transmission of user and signaling
16 information to a specific mobile station during a call. Each Forward Traffic Channel may
17 contain one Forward Dedicated Control Channel.

18 3.1.3.10.1 Forward Dedicated Control Channel Time Alignment and Modulation Rates

19 The base station shall transmit information on the Forward Dedicated Control Channel at a
20 fixed data rate.

21 A Forward Dedicated Control Channel frame shall be 5 or 20 ms in duration.

22 The base station shall transmit information on the Forward Dedicated Control Channel at a
23 fixed data rate of 9600 bps for Radio Configurations 3, 4, 6, and 7. If flexible data rates are
24 supported for 20 ms frames, a fixed data rate between 1050 and 9600 bps can be used for
25 the Forward Dedicated Control Channel in Radio Configurations 3, 4, 6, and 7.

26 The base station shall transmit information on the Forward Dedicated Control Channel at a
27 fixed data rate of 14400 bps for 20 ms frames and 9600 bps for 5 ms frames for Radio
28 Configurations 5, 8, and 9. The base station may support flexible data rates. If flexible data
29 rates are supported for 20 ms frames, a fixed data rate between 1050 and 14400 bps can
30 be used for the Forward Dedicated Control Channel in Radio Configurations 5, 8, and 9.

31 For a given base station, the I and Q channel pilot PN sequences for the Forward Dedicated
32 Control Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

33 The base station shall support discontinuous transmission on the Forward Dedicated
34 Control Channel. The decision to enable or disable transmission shall be made on a frame-
35 by-frame (i.e., 5 or 20 ms) basis.

1 The base station may support Forward Dedicated Control Channel frames that are time
 2 offset by multiples of 1.25 ms. The amount of the time offset is specified by
 3 FRAME_OFFSET. A zero-offset 20 ms Forward Dedicated Control Channel frame shall begin
 4 only when System Time is an integral multiple of 20 ms (see Figure 1.3-1). A zero-offset 5
 5 ms Forward Dedicated Control Channel frame shall begin only when System Time is an
 6 integral multiple of 5 ms. An offset 20 ms Forward Dedicated Control Channel frame shall
 7 begin $1.25 \times \text{FRAME_OFFSET}$ ms later than the zero-offset 20 ms Forward Dedicated
 8 Control Channel frame. An offset 5 ms Forward Dedicated Control Channel frame shall
 9 begin $1.25 \times (\text{FRAME_OFFSET} \bmod 4)$ ms later than the zero-offset 5 ms Forward Dedicated
 10 Control Channel frame. The interleave block for the Forward Dedicated Control Channel
 11 shall be aligned with the Forward Dedicated Control Channel frame.

12 3.1.3.10.2 Forward Dedicated Control Channel Frame Structure

13 Table 3.1.3.10.2-1 specifies the Forward Dedicated Control Channel bit allocations. Table
 14 3.1.3.10.2-2 specifies the Forward Dedicated Control Channel bit allocations for flexible
 15 data rates. All frames that carry data shall consist of zero or one Reserved Bits and the
 16 information bits followed by a frame quality indicator (CRC) and eight Encoder Tail Bits, as
 17 shown in Figure 3.1.3.10.2-1.

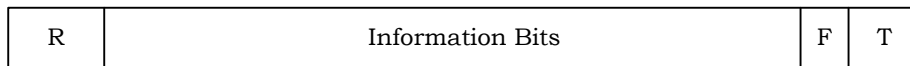
18
 19 **Table 3.1.3.10.2-1. Forward Dedicated Control Channel Frame Structure Summary for**
 20 **Non-flexible Data Rates**

Radio Config.	Frame Length (ms)	Data Rate (bps)	Number of Bits per Frame				
			Total	Reserved	Information	Frame Quality Indicator	Encoder Tail
3, 4, 6, and 7	20	9600	192	0	172	12	8
5, 8, and 9	20	14400	288	1	267	12	8
3, 4, 5, 6, 7, 8, and 9	5	9600	48	0	24	16	8

1 **Table 3.1.3.10.2-2. Forward Dedicated Control Channel Frame Structure Summary for**
 2 **Flexible Data Rates**

Radio Config.	Frame Length (ms)	Data Rate (bps)	Number of Bits per Frame			
			Total	Information	Frame Quality Indicator	Encoder Tail
3, 4, 6, and 7	20	1250 to 9600	25 to 192	1 to 168	16	8
	20	1050 to 9550	21 to 191	1 to 171	12	8
5, 8, and 9	20	1250 to 14400	25 to 288	1 to 264	16	8
	20	1050 to 14300, 14400	21 to 286, 288	1 to 266, 268	12	8

3



Notation

- R - Reserved Bit
- F - Frame Quality Indicator (CRC)
- T - Encoder Tail Bits

4

5

Figure 3.1.3.10.2-1. Forward Dedicated Control Channel Frame Structure

6

7 3.1.3.10.2.1 Forward Dedicated Control Channel Frame Quality Indicator

8 The frame quality indicator (CRC) shall be calculated on all bits within the frame, except
 9 the frame quality indicator itself and the Encoder Tail Bits. The 20 ms Forward Dedicated
 10 Control Channel shall use a 12-bit frame quality indicator. If flexible data rates are
 11 supported, a 16-bit frame quality indicator may be used. The 5 ms Forward Dedicated
 12 Control Channel shall use a 16-bit frame quality indicator.

13

The generator polynomials for the frame quality indicator shall be as follows:

$$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1 \text{ for the 16-bit frame quality indicator}$$

and

$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1 \text{ for the 12-bit frame quality indicator.}$$

The frame quality indicators shall be computed according to the following procedure as shown in Figures 3.1.3.10.2.1-1 and 3.1.3.10.2.1-2:

- Initially, all shift register elements shall be set to logical one and the switches shall be set in the up position.
- The register shall be clocked a number of times equal to the number of reserved and information bits in the frame with those bits as input.
- The switches shall be set in the down position so that the output is a modulo-2 addition with a '0' and the successive shift register inputs are '0's.
- The register shall be clocked an additional number of times equal to the number of bits in the frame quality indicator (16 or 12).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

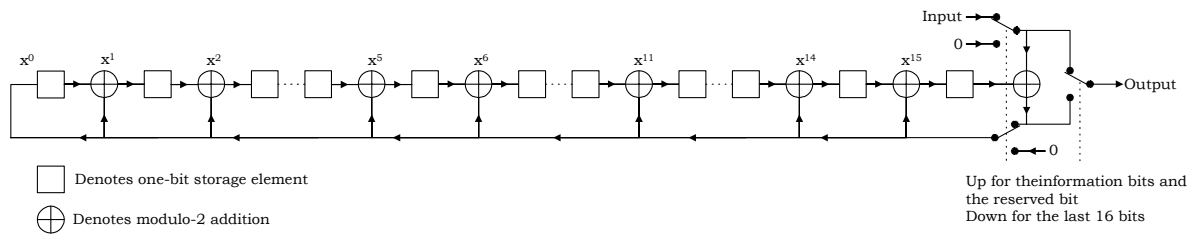


Figure 3.1.3.10.2.1-1. Forward Dedicated Control Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

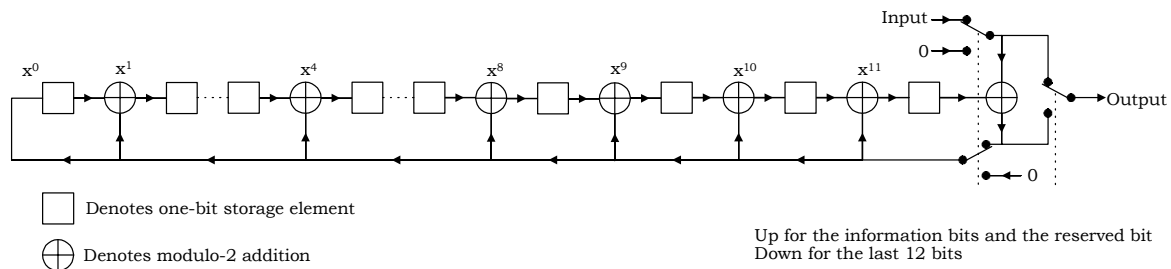


Figure 3.1.3.10.2.1-2. Forward Dedicated Control Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

1 3.1.3.10.2.2 Forward Dedicated Control Channel Encoder Tail Bits

2 The last eight bits of each Forward Dedicated Control Channel frame are called the Encoder
3 Tail Bits. These eight bits shall each be set to '0'.

4 3.1.3.10.2.3 Forward Dedicated Control Channel Reserved Bit

5 This bit is reserved and shall be set to '0'.

6 3.1.3.10.3 Forward Dedicated Control Channel Convolutional Encoding

7 The Forward Dedicated Control Channel shall be convolutionally encoded as specified in
8 3.1.3.1.4.

9 When generating Forward Dedicated Control Channel data, the encoder shall be initialized
10 to the all-zero state at the end of each 5 or 20 ms frame.

11 3.1.3.10.4 Forward Dedicated Channel Code Symbol Repetition

12 Forward Dedicated Control Channel code symbol repetition shall be as specified in
13 3.1.3.1.5.

14 3.1.3.10.5 Forward Dedicated Control Channel Puncturing

15 Code symbols resulting from the symbol repetition shall be punctured as specified in
16 3.1.3.1.6.

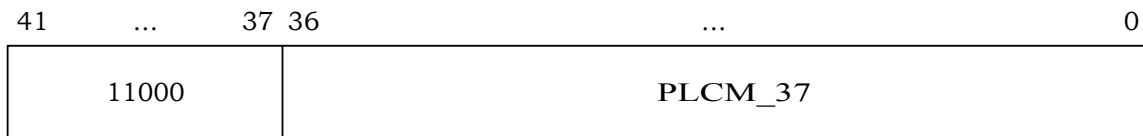
17 3.1.3.10.6 Forward Dedicated Control Channel Interleaving

18 The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

19 3.1.3.10.7 Forward Dedicated Control Channel Data Scrambling

20 The Forward Dedicated Control Channel shall be scrambled as specified in 3.1.3.1.9. The
21 public long code mask shall be as shown in Figure 3.1.3.10.7-1. The generation of the
22 private long code mask shall be as specified in 2.1.3.1.12.

23



24

25 **Figure 3.1.3.10.7-1. Forward Dedicated Control Channel Public Long Code Mask**

26

27 3.1.3.10.8 Forward Dedicated Control Channel Power Control Subchannel

28 If the Forward Power Control Subchannel is enabled on the Forward Dedicated Control
29 Channel (FPC_PRI_CHANNEL = '1'), the base station shall transmit continuously a Forward

1 Power Control Subchannel on the Forward Dedicated Control Channel as specified in
2 3.1.3.1.10.

3 3.1.3.10.9 Forward Dedicated Control Channel Orthogonal and Quasi-Orthogonal 4 Spreading

5 The Forward Dedicated Control Channel shall be spread by a Walsh function or quasi-
6 orthogonal function as specified in 3.1.3.1.12.

7 3.1.3.10.10 Forward Dedicated Control Channel Quadrature Spreading

8 The Forward Dedicated Control Channel shall be PN spread as specified in 3.1.3.1.13.

9 3.1.3.10.11 Forward Dedicated Control Channel Filtering

10 Filtering for the Forward Dedicated Control Channel shall be as specified in 3.1.3.1.14.

11 3.1.3.10.12 Forward Dedicated Control Channel Transmission Processing

12 When the Physical Layer receives a PHY-DCCH.Request(SDU, FRAME_DURATION,
13 NUM_BITS) from the MAC Layer, the base station shall perform the following:

- 14 • Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- 15 • If SDU is not equal to NULL, set the information bits to SDU.
- 16 • If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Forward
17 Dedicated Control Channel frame of duration FRAME_DURATION (5 ms or 20 ms). If
18 a PHY-DCCH.Request primitive for a 5 ms frame is received coincident with a PHY-
19 DCCH.Request primitive for a 20 ms frame or during transmission of a 20 ms
20 frame, then the base station may preempt transmission of the 20 ms frame and
21 transmit a 5 ms frame. Transmission of the 20 ms frame may start or resume after
22 completion of the 5 ms frame.

23 3.1.3.11 Forward Fundamental Channel

24 The Forward Fundamental Channel is used for the transmission of user and signaling
25 information to a specific mobile station during a call. Each Forward Traffic Channel may
26 contain one Forward Fundamental Channel.

27 3.1.3.11.1 Forward Fundamental Channel Time Alignment and Modulation Rates

28 When operating in Radio Configuration 1, the base station shall transmit information on
29 the Forward Fundamental Channel at variable data rates of 9600, 4800, 2400, and 1200
30 bps.

31 When operating in Radio Configuration 2, the base station shall transmit information on
32 the Forward Fundamental Channel at variable data rates of 14400, 7200, 3600, and 1800
33 bps.

34 When operating in Radio Configurations 3, 4, 6, or 7, the base station shall transmit
35 information on the Forward Fundamental Channel at variable data rates of 9600, 4800,
36 2700, and 1500 bps during 20 ms frames or at 9600 bps during 5 ms frames. The base

1 station may support flexible data rates. If flexible data rates are supported for 20 ms
 2 frames, the base station should support variable rates corresponding to 1 to 171
 3 information bits per 20 ms frame on the Forward Fundamental Channel. The minimum
 4 number of flexible data rates used in variable rate operation is not specified.

5 When operating in Radio Configurations 5, 8, or 9, the base station shall transmit
 6 information on the Forward Fundamental Channel at variable data rates of 14400, 7200,
 7 3600, and 1800 bps during 20 ms frames or at 9600 bps during 5 ms frames. If flexible
 8 data rates are supported, the base station should support variable rates corresponding to 1
 9 to 268 information bits per 20 ms frame on the Forward Fundamental Channel. The
 10 minimum number of flexible data rates used in variable rate operation is not specified.

11 Forward Fundamental Channel frames with Radio Configurations 1 and 2 shall be 20 ms in
 12 duration. Forward Fundamental Channel frames with Radio Configurations 3 through 9
 13 shall be 5 or 20 ms in duration. The data rate and frame duration on a Forward
 14 Fundamental Channel within a radio configuration shall be selected on a frame-by-frame
 15 basis. Although the data rate may vary on a frame-by-frame basis, the modulation symbol
 16 rate is kept constant by code repetition for data rates lower than the maximum. A base
 17 station operating with Radio Configurations 3 through 9 may discontinue transmission of
 18 the Forward Fundamental Channel for up to three 5 ms frames in a 20 ms frame.

19 For a given base station, the I and Q channel pilot PN sequences for the Forward
 20 Fundamental Channel use the same pilot PN sequence offset as for the Forward Pilot
 21 Channel.

22 The modulation symbols that are transmitted at lower data rates shall be transmitted using
 23 lower energy. Specifically, the energy per modulation symbol (E_s) for the supported data
 24 rates should be:

$$E_s = E_{\max} \times R / R_{\max}$$

25
 26 where E_{\max} is the energy per symbol at the maximum data rate for the Forward
 27 Fundamental Channel with the associated radio configuration, R is the data rate, and R_{\max}
 28 is the maximum data rate for the Forward Fundamental Channel for the associated radio
 29 configuration. For example, when transmitting a Radio Configuration 1 frame at 4800 bps,
 30 the energy per symbol should be one half the energy per symbol in a 9600 bps frame.

31 The base station may support Forward Fundamental Channel frames that are time offset by
 32 multiples of 1.25 ms. The amount of the time offset is specified by FRAME_OFFSET. A zero-
 33 offset 20 ms Forward Fundamental Channel frame shall begin only when System Time is
 34 an integral multiple of 20 ms (see Figure 1.3-1). A zero-offset 5 ms Forward Fundamental
 35 Channel frame shall begin only when System Time is an integral multiple of 5 ms. An offset
 36 20 ms Forward Fundamental Channel frame shall begin $1.25 \times \text{FRAME_OFFSET}$ ms later
 37 than the zero-offset 20 ms Forward Fundamental Channel frame. An offset 5 ms Forward
 38 Fundamental Channel frame shall begin $1.25 \times (\text{FRAME_OFFSET} \bmod 4)$ ms later than the
 39 zero-offset 5 ms Forward Fundamental Channel frame. The interleaver block for the
 40 Forward Fundamental Channel shall be aligned with the Forward Fundamental Channel
 41 frame.

1 3.1.3.11.2 Forward Fundamental Channel Frame Structure

2 Table 3.1.3.11.2-1 summarizes the Forward Fundamental Channel bit allocations. Table
3 3.1.3.11.2-2 summarizes the Forward Fundamental Channel bit allocations for flexible data
4 rates. The order of the bits is shown in Figure 3.1.3.11.2-1.

5 The 2400 and 1200 bps frames with Radio Configuration 1 shall consist of the information
6 bits followed by 8 Encoder Tail Bits. All frames with Radio Configurations 3, 4, 6, and 7,
7 and the 9600 and 4800 bps frames with Radio Configuration 1, shall consist of the
8 information bits followed by a frame quality indicator (CRC) and 8 Encoder Tail Bits. All
9 frames with Radio Configurations 2, 5, 8, and 9 shall consist of zero or one Reserved/Flag
10 Bits followed by the information bits, a frame quality indicator (CRC), and 8 Encoder Tail
11 Bits.

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2**Table 3.1.3.11.2-1. Forward Fundamental Channel Frame Structure Summary for Non-flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved/Flag	Information	Frame Quality Indicator	Encoder Tail
1	9600	192	0	172	12	8
	4800	96	0	80	8	8
	2400	48	0	40	0	8
	1200	24	0	16	0	8
2	14400	288	1	267	12	8
	7200	144	1	125	10	8
	3600	72	1	55	8	8
	1800	36	1	21	6	8
3, 4, 6, and 7	9600 (5 ms)	48	0	24	16	8
	9600 (20 ms)	192	0	172	12	8
	4800	96	0	80	8	8
	2700	54	0	40	6	8
	1500	30	0	16	6	8
5, 8, and 9	9600	48	0	24	16	8
	14400	288	1	267	12	8
	7200	144	1	125	10	8
	3600	72	1	55	8	8
	1800	36	1	21	6	8

3

1
2**Table 3.1.3.11.2-2. Forward Fundamental Channel Frame Structure Summary for Flexible Data Rates (Part 1 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Encoder Tail
3, 4, 6, and 7	4850 to 9600	97 to 192	73 to 168	16	8
	4850 to 9550	97 to 191	77 to 171	12	8
	2750 to 4800	55 to 96	31 to 72	16	8
	2750 to 4800	55 to 96	35 to 76	12	8
	2750 to 4750	55 to 95	39 to 79	8	8
	1550 to 2700	31 to 54	7 to 30	16	8
	1550 to 2700	31 to 54	11 to 34	12	8
	1550 to 2700	31 to 54	15 to 38	8	8
	1550 to 2650	31 to 53	17 to 39	6	8
	1250 to 1500	25 to 30	1 to 6	16	8
	1050 to 1500	21 to 30	1 to 10	12	8
	850 to 1500	17 to 30	1 to 14	8	8
	750 to 1450	15 to 29	1 to 15	6	8

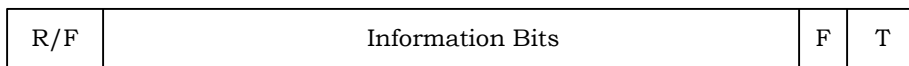
3

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Table 3.1.3.11.2-2. Forward Fundamental Channel Frame Structure Summary for Flexible Data Rates (Part 2 of 2)

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Encoder Tail
5, 8, and 9	7250 to 14400	145 to 288	121 to 264	16	8
	7250 to 14300, 14400	145 to 286, 288	125 to 266, 268	12	8
	3650 to 7200	73 to 144	49 to 120	16	8
	3650 to 7200	73 to 144	53 to 124	12	8
	3650 to 7100, 7200	73 to 142, 144	55 to 124, 126	10	8
	1850 to 3600	37 to 72	13 to 48	16	8
	1850 to 3600	37 to 72	17 to 52	12	8
	1850 to 3600	37 to 72	19 to 54	10	8
	1850 to 3500, 3600	37 to 70, 72	21 to 54, 56	8	8
	1250 to 1800	25 to 36	1 to 12	16	8
	1050 to 1800	21 to 36	1 to 16	12	8
	950 to 1800	19 to 36	1 to 18	10	8
	850 to 1800	17 to 36	1 to 20	8	8
	750 to 1700, 1800	15 to 34, 36	1 to 20, 22	6	8

3



Notation

R/F - Reserved/Flag Bit
 F - Frame Quality Indicator (CRC)
 T - Encoder Tail Bits

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Figure 3.1.3.11.2-1. Forward Fundamental Channel Frame Structure

1 3.1.3.11.2.1 Forward Fundamental Channel Frame Quality Indicator

2 Each frame with Radio Configurations 2 through 9, and the 9600 and 4800 bps frames of
3 Radio Configuration 1 shall include a frame quality indicator. This frame quality indicator
4 is a CRC.²² No frame quality indicator is used for the 2400 and 1200 bps data rates of
5 Radio Configuration 1.

6 The frame quality indicator (CRC) shall be calculated on all bits within the frame, except
7 the frame quality indicator itself and the Encoder Tail Bits.

8 The 5 ms frames use a 16-bit frame quality indicator.

9 The 9600 bps transmissions with Radio Configuration 1 and the 14400 bps transmissions
10 with Radio Configuration 2 shall use a 12-bit frame quality indicator.

11 The 7200 bps transmissions with Radio Configuration 2 shall use a 10-bit frame quality
12 indicator.

13 The 4800 bps transmissions with Radio Configuration 1 and the 3600 bps transmissions
14 with Radio Configuration 2 shall use an 8-bit frame quality indicator.

15 The 1800 bps transmissions with Radio Configuration 2 shall use a 6-bit frame quality
16 indicator.

17 20 ms frames in Radio Configurations 3, 4, 6, and 7 with more than 96 total bits and in
18 Radio Configurations 5, 8, and 9 with more than 144 total bits shall use a 12-bit frame
19 quality indicator. A 16-bit frame quality indicator may be used if flexible data rates are
20 supported.

21 20 ms frames in Radio Configurations 5, 8, and 9 with 73 to 144 total bits shall use a 10-
22 bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible
23 data rates are supported.

24 20 ms frames in Radio Configurations 3, 4, 6, and 7 with 55 to 96 total bits shall use an 8-
25 bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible
26 data rates are supported.

27 20 ms frames in Radio Configurations 5, 8, and 9 with 37 to 72 total bits shall use an 8-bit
28 frame quality indicator. A 16-bit, 12-bit, or 10-bit frame quality indicator may be used if
29 flexible data rates are supported.

30 20 ms frames in Radio Configurations 3, 4, 6, and 7 with 54 or fewer total bits shall use a
31 6-bit frame quality indicator. A 16-bit, 12-bit, or 8-bit frame quality indicator may be used
32 if flexible data rates are supported.

²²The frame quality indicator supports two functions at the receiver: The first function is to determine whether the frame is in error. The second function is to assist in the determination of the data rate of the received frame. Other parameters may be needed for rate determination in addition to the frame quality indicator, such as symbol error rate evaluated at the four data rates of the Forward Fundamental Channel.

1 20 ms frames in Radio Configurations 5, 8, and 9 with 36 or fewer total bits shall use a 6-
 2 bit frame quality indicator. A 16-bit, 12-bit, 10-bit, or 8-bit frame quality indicator may be
 3 used if flexible data rates are supported.

4 The generator polynomials for the frame quality indicator shall be as follows:

5 $g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

6 $g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator,

7 $g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1$ for the 10-bit frame quality indicator,

8 $g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator,

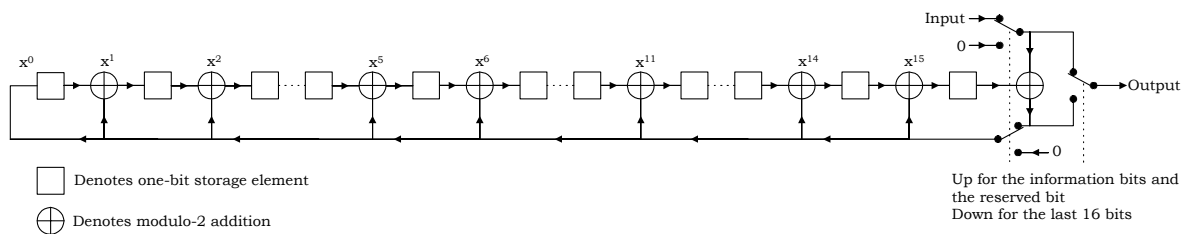
9 $g(x) = x^6 + x^2 + x + 1$ for the 6-bit frame quality indicator (for Radio Configuration 2),
 10 and

11 $g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator (for Radio Configurations
 12 3 through 9).

13 The frame quality indicators shall be computed according to the following procedure as
 14 shown in Figures 3.1.3.11.2.1-1 through 3.1.3.11.2.1-6:

- 15 • Initially, all shift register elements shall be set to logical one and the switches shall
 16 be set in the up position.
- 17 • The register shall be clocked a number of times equal to the number of
 18 Reserved/Flag Bits and information bits in the frame with those bits as input.
- 19 • The switches shall be set in the down position so that the output is a modulo-2
 20 addition with a '0' and the successive shift register inputs are '0's.
- 21 • The register shall be clocked an additional number of times equal to the number of
 22 bits in the frame quality indicator (16, 12, 10, 8, or 6).
- 23 • These additional bits shall be the frame quality indicator bits.
- 24 • The bits shall be transmitted in the order calculated.

25



26

27 **Figure 3.1.3.11.2.1-1. Forward Fundamental Channel Frame Quality Indicator**
 28 **Calculation for the 16-Bit Frame Quality Indicator**

29

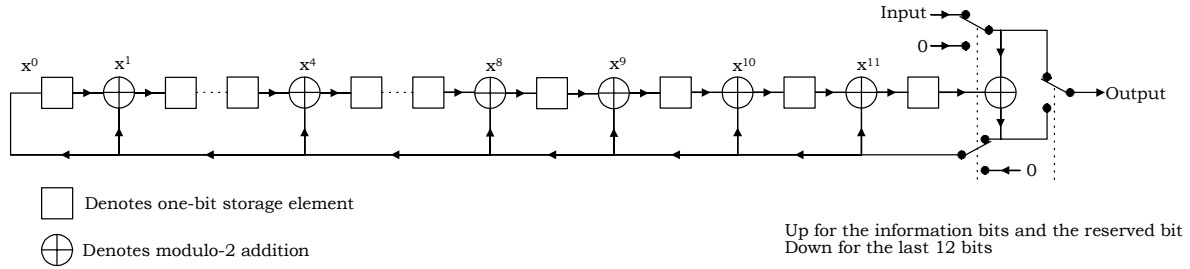


Figure 3.1.3.11.2.1-2. Forward Fundamental Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

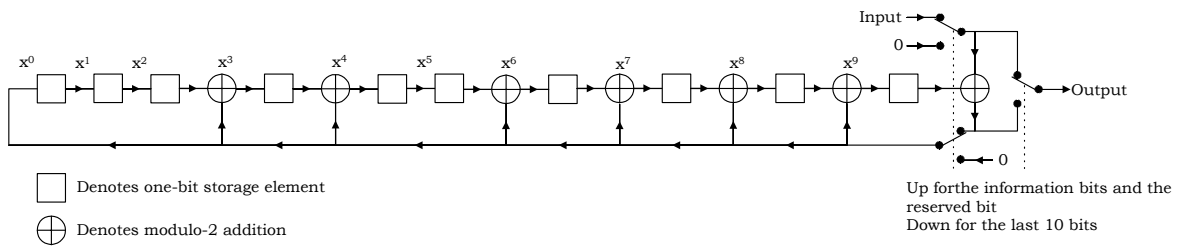


Figure 3.1.3.11.2.1-3. Forward Fundamental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator

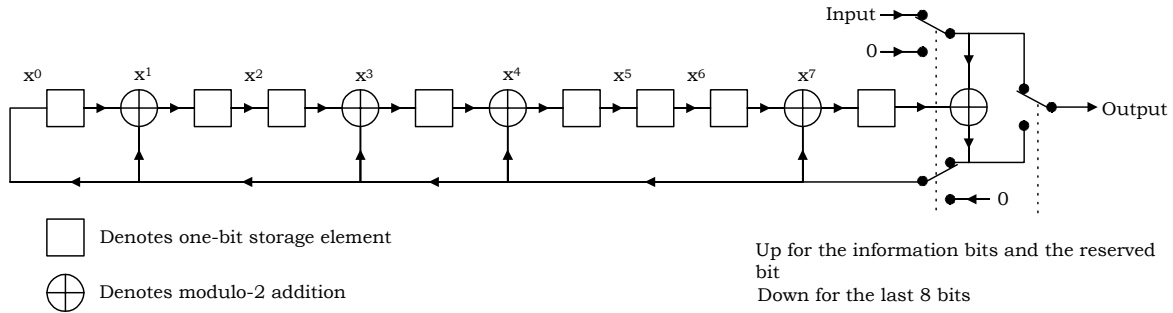
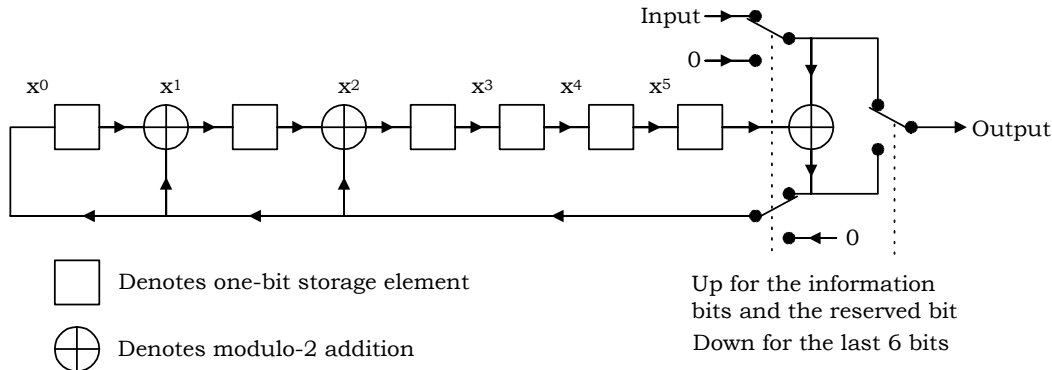


Figure 3.1.3.11.2.1-4. Forward Fundamental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator



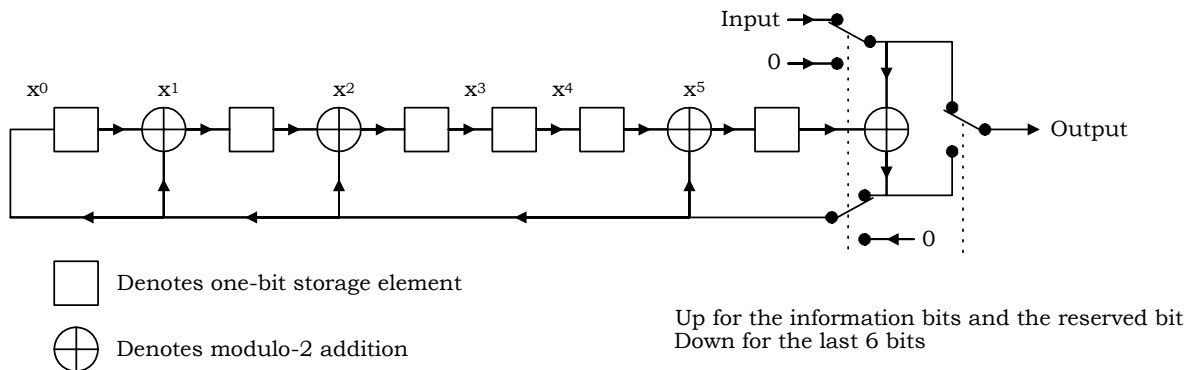
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Figure 3.1.3.11.2.1-5. Forward Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configuration 2

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Figure 3.1.3.11.2.1-6. Forward Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configurations 3 through 9

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3.1.3.11.2.2 Forward Fundamental Channel Encoder Tail Bits

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The last eight bits of each Forward Fundamental Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to '0'.

11

12

3.1.3.11.2.3 Forward Fundamental Channel Reserved/Flag Bit

13

The Reserved/Flag Bit is used with Radio Configurations 2, 5, 8, and 9.

14

The Reserved/Flag Bit may be used on the Forward Fundamental Channel when one or more Forward Supplemental Code Channels are in use; otherwise, this bit is reserved and shall be set to '0'.

15

16

17

If the Reserved/Flag bit is used, the base station shall set this bit to '0' if the mobile station is to process the Forward Supplemental Code Channels in the second transmitted frame after the current frame (see 2.2.2.1). The base station should set this bit to '1' if the base

18

19

20

1 station will not transmit to the mobile station on the Forward Supplemental Code Channels
 2 in the second frame after the current frame.

3 3.1.3.11.3 Forward Fundamental Channel Convolutional Encoding

4 The Forward Fundamental Channel data shall be convolutionally encoded as specified in
 5 3.1.3.1.4. When generating Forward Fundamental Channel data, the encoder shall be
 6 initialized to the all-zero state at the end of each 5 or 20 ms frame.

7 3.1.3.11.4 Forward Fundamental Channel Code Symbol Repetition

8 Forward Fundamental Channel code symbol repetition shall be as specified in 3.1.3.1.5.

9 3.1.3.11.5 Forward Fundamental Channel Puncturing

10 Code symbols resulting from the symbol repetition shall be punctured as specified in
 11 3.1.3.1.6.

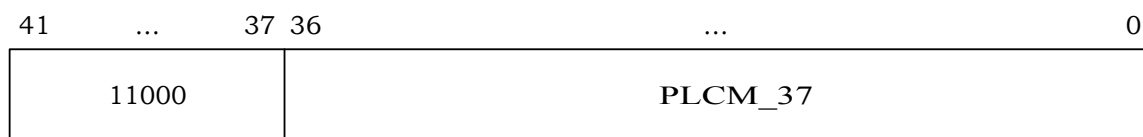
12 3.1.3.11.6 Forward Fundamental Channel Interleaving

13 The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

14 3.1.3.11.7 Forward Fundamental Channel Data Scrambling

15 The Forward Fundamental Channel data shall be scrambled as specified in 3.1.3.1.9. The
 16 public long code mask shall be as shown in Figure 3.1.3.11.7-1. The generation of the
 17 private long code mask shall be as specified in 2.1.3.1.11 and 2.1.3.1.12.

18



19

20 **Figure 3.1.3.11.7-1. Forward Fundamental Channel Public Long Code Mask**

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22 3.1.3.11.8 Forward Fundamental Channel Power Control Subchannel

23 If the Forward Power Control Subchannel is enabled on the Forward Fundamental Channel
 24 (FPC_PRI_CHANNEL = '0'), the base station shall transmit continuously a Forward Power
 25 Control Subchannel on the Forward Fundamental Channel as specified in 3.1.3.1.10.

26 3.1.3.11.9 Forward Fundamental Channel Orthogonal and Quasi-Orthogonal Spreading

27 The Forward Fundamental Channel shall be spread by a Walsh function (Radio
 28 Configurations 1 through 9) or quasi-orthogonal function (Radio Configurations 3 through
 29 9) as specified in 3.1.3.1.12.

1 3.1.3.11.10 Forward Fundamental Channel Quadrature Spreading

2 The Forward Fundamental Channel shall be PN spread as specified in 3.1.3.1.13.

3 3.1.3.11.11 Forward Fundamental Channel Filtering

4 Filtering for the Forward Fundamental Channel shall be as specified in 3.1.3.1.14.

5 3.1.3.11.12 Forward Fundamental Channel Transmission Processing

6 When the Physical Layer receives a PHY-FCH.Request(SDU, FRAME_DURATION,
7 NUM_BITS) from the MAC Layer, the base station shall perform the following:

- 8 • Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- 9 • Set the information bits to SDU.
- 10 • Transmit NUM_BITS bits of SDU on a Forward Fundamental Channel frame of
11 duration FRAME_DURATION (5 ms or 20 ms). If a PHY-FCH.Request primitive for a
12 5 ms frame is received coincident with a PHY-FCH.Request primitive for a 20 ms
13 frame or during transmission of a 20 ms, then the base station may preempt
14 transmission of the 20 ms frame and transmit a 5 ms frame. Transmission of the 20
15 ms frame may start or resume after completion of the 5 ms frame.

16 3.1.3.12 Forward Supplemental Channel

17 The Forward Supplemental Channel applies to Radio Configurations 3 through 9 only.

18 The Forward Supplemental Channel is used for the transmission of user information to a
19 specific mobile station during a call. Each Forward Traffic Channel contains up to two
20 Forward Supplemental Channels.

21 3.1.3.12.1 Forward Supplemental Channel Time Alignment and Modulation Rates

22 When transmitting on the Forward Supplemental Channel with a single assigned data rate
23 in Radio Configuration 3, the base station shall transmit information at a fixed rate of
24 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

25 The base station may support flexible data rates. If flexible data rates are supported,

- 26 • When transmitting on the Forward Supplemental Channel with a single assigned
27 data rate and 20 ms frames in Radio Configuration 3, the base station should
28 transmit information at a fixed rate corresponding to 15 to 3071 total bits per frame
29 in 1 bit increments.
- 30 • When transmitting on the Forward Supplemental Channel with a single assigned
31 data rate and 40 ms frames in Radio Configuration 3, the base station should
32 transmit information at a fixed rate corresponding to 31 to 3071 total bits per frame
33 in 1 bit increments.
- 34 • When transmitting on the Forward Supplemental Channel with a single assigned
35 data rate and 80 ms frames in Radio Configuration 3, the base station should
36 transmit information at a fixed rate corresponding to 55 to 3071 total bits per frame
37 in 1 bit increments.

1 When transmitting on the Forward Supplemental Channel with a single assigned data rate
2 in Radio Configuration 4, the base station shall transmit information at a fixed rate of
3 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

4 If flexible data rates are supported,

- 5 • When transmitting on the Forward Supplemental Channel with a single assigned
6 data rate and 20 ms frames in Radio Configuration 4, the base station should
7 transmit information at a fixed rate corresponding to 15 to 6143 total bits per frame
8 in 1 bit increments.
- 9 • When transmitting on the Forward Supplemental Channel with a single assigned
10 data rate and 40 ms frames in Radio Configurations 4, the base station should
11 transmit information at a fixed rate corresponding to 31 to 6143 total bits per frame
12 in 1 bit increments.
- 13 • When transmitting on the Forward Supplemental Channel with a single assigned
14 data rate and 80 ms frames in Radio Configuration 4, the base station should
15 transmit information at a fixed rate corresponding to 55 to 6143 total bits per frame
16 in 1 bit increments.

17 When transmitting on the Forward Supplemental Channel with a single assigned data rate
18 in Radio Configuration 5, the base station shall transmit information at a fixed rate of
19 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

20 If flexible data rates are supported,

- 21 • When transmitting on the Forward Supplemental Channel with a single assigned
22 data rate and 20 ms frames in Radio Configuration 5, the base station should
23 transmit information at a fixed rate corresponding to 15 to 4607 total bits per frame
24 in 1 bit increments.
- 25 • When transmitting on the Forward Supplemental Channel with a single assigned
26 data rate and 40 ms frames in Radio Configuration 5, the base station should
27 transmit information at a fixed rate corresponding to 37 to 4607 total bits per frame
28 in 1 bit increments.
- 29 • When transmitting on the Forward Supplemental Channel with a single assigned
30 data rate and 80 ms frames in Radio Configuration 5, the base station should
31 transmit information at a fixed rate corresponding to 73 to 4607 total bits per frame
32 in 1 bit increments.

33 When transmitting on the Forward Supplemental Channel with a single assigned data rate
34 in Radio Configuration 6, the base station shall transmit information at a fixed rate of
35 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

36 If flexible data rates are supported,

- 37 • When transmitting on the Forward Supplemental Channel with a single assigned
38 data rate and 20 ms frames in Radio Configuration 6, the base station should
39 transmit information at a fixed rate corresponding to 15 to 6143 total bits per frame
40 in 1 bit increments.

- 1 • When transmitting on the Forward Supplemental Channel with a single assigned
2 data rate and 40 ms frames in Radio Configurations 6, the base station should
3 transmit information at a fixed rate corresponding to 31 to 6143 total bits per frame
4 in 1 bit increments.
- 5 • When transmitting on the Forward Supplemental Channel with a single assigned
6 data rate and 80 ms frames in Radio Configuration 6, the base station should
7 transmit information at a fixed rate corresponding to 55 to 6143 total bits per frame
8 in 1 bit increments.

9 When transmitting on the Forward Supplemental Channel with a single assigned data rate
10 in Radio Configuration 7, the base station shall transmit information at a fixed rate of
11 614400, 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or
12 1200 bps.

13 If flexible data rates are supported,

- 14 • When transmitting on the Forward Supplemental Channel with a single assigned
15 data rate and 20 ms frames in Radio Configuration 7, the base station should
16 transmit information at a fixed rate corresponding to 15 to 12287 total bits per
17 frame in 1 bit increments.
- 18 • When transmitting on the Forward Supplemental Channel with a single assigned
19 data rate and 40 ms frames in Radio Configuration 7, the base station should
20 transmit information at a fixed rate corresponding to 31 to 12287 total bits per
21 frame in 1 bit increments.
- 22 • When transmitting on the Forward Supplemental Channel with a single assigned
23 data rate and 80 ms frames in Radio Configuration 7, the base station should
24 transmit information at a fixed rate corresponding to 55 to 12287 total bits per
25 frame in 1 bit increments.

26 When transmitting on the Forward Supplemental Channel with a single assigned data rate
27 in Radio Configuration 8, the base station shall transmit information at a fixed rate of
28 460800, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

29 If flexible data rates are supported,

- 30 • When transmitting on the Forward Supplemental Channel with a single assigned
31 data rate and 20 ms frames in Radio Configuration 8, the base station should
32 transmit information at a fixed rate corresponding to 15 to 9215 total bits per frame
33 in 1 bit increments.
- 34 • When transmitting on the Forward Supplemental Channel with a single assigned
35 data rate and 40 ms frames in Radio Configuration 8, the base station should
36 transmit information at a fixed rate corresponding to 37 to 9215 total bits per frame
37 in 1 bit increments.
- 38 • When transmitting on the Forward Supplemental Channel with a single assigned
39 data rate and 80 ms frames in Radio Configuration 8, the base station should
40 transmit information at a fixed rate corresponding to 73 to 9215 total bits per frame
41 in 1 bit increments.

1 When transmitting on the Forward Supplemental Channel with a single assigned data rate
2 in Radio Configuration 9, the base station shall transmit information at a fixed rate of
3 1036800, 518400, 460800, 259200, 230400, 115200, 57600, 28800, 14400, 7200, 3600,
4 or 1800 bps.

5 If flexible data rates are supported,

- 6 • When transmitting on the Forward Supplemental Channel with a single assigned
7 data rate and 20 ms frames in Radio Configuration 9, the base station should
8 transmit information at a fixed rate corresponding to 15 to 20735 total bits per
9 frame in 1 bit increments.
- 10 • When transmitting on the Forward Supplemental Channel with a single assigned
11 data rate and 40 ms frames in Radio Configuration 9, the base station should
12 transmit information at a fixed rate corresponding to 37 to 20735 total bits per
13 frame in 1 bit increments.
- 14 • When transmitting on the Forward Supplemental Channel with a single assigned
15 data rate and 80 ms frames in Radio Configuration 9, the base station should
16 transmit information at a fixed rate corresponding to 73 to 20735 total bits per
17 frame in 1 bit increments.

18 When using variable-rate transmission on the Forward Supplemental Channel with
19 multiple assigned data rates in Radio Configurations 3, 4, 5, 6, 7, 8, and 9, the base station
20 shall

- 21 • Transmit information at the maximal assigned data rate, or,
- 22 • Transmit information at the other assigned data rates with the same modulation
23 symbol rate as that of the maximal assigned data rate. To achieve a higher
24 modulation symbol rate, repetition and puncturing are used in the symbol repetition
25 stage of the specified data rate.

26 The base station shall not use forward power control mode FPC_MODE = '001' nor
27 FPC_MODE '010' when the Forward Supplemental Channel is operated in a variable rate
28 mode.

29 Forward Supplemental Channel frames shall be 20, 40, or 80 ms in duration. A base
30 station may support discontinuous transmission of Forward Supplemental Channel frames.

31 For a given base station, the I and Q channel pilot PN sequences for the Forward
32 Supplemental Channel use the same pilot PN sequence offset as for the Forward Pilot
33 Channel.

34 The base station may support Forward Supplemental Channel frames that are time offset
35 by multiples of 1.25 ms as specified by FRAME_OFFSET. The base station may support 40
36 or 80 ms Forward Supplemental Channel frames that are time offset by multiples of 20 ms
37 as specified by FOR_SCH_FRAME_OFFSET[i], where i = 1 and 2 for Forward Supplemental
38 Channel 1 and Forward Supplemental Channel 2, respectively.

39 The amount of the time offset is specified by FRAME_OFFSET and
40 FOR_SCH_FRAME_OFFSET[i], where i = 1 or 2. A zero-offset 20 ms Forward Supplemental
41 Channel frame shall begin only when System Time is an integral multiple of 20 ms (see

1 Figure 1.3-1). A zero-offset 40 ms Forward Supplemental Channel frame shall begin only
2 when System Time is an integral multiple of 40 ms. A zero-offset 80 ms Forward
3 Supplemental Channel frame shall begin only when System Time is an integral multiple of
4 80 ms. An offset 20 ms Forward Supplemental Channel frame shall begin $1.25 \times$
5 $FRAME_OFFSET$ ms later than the zero-offset 20 ms Forward Supplemental Channel
6 frame. An offset 40 ms Forward Supplemental Channel frame shall begin $(1.25 \times$
7 $FRAME_OFFSET + 20 \times FOR_SCH_FRAME_OFFSET[i])$ ms later than the zero-offset 40 ms
8 Forward Supplemental Channel frame. An offset 80 ms Forward Supplemental Channel
9 frame shall begin $(1.25 \times FRAME_OFFSET + 20 \times FOR_SCH_FRAME_OFFSET[i])$ ms later
10 than the zero-offset 80 ms Forward Supplemental Channel frame. The interleaver block for
11 the Forward Supplemental Channel shall be aligned with the Forward Supplemental
12 Channel frame.

13 3.1.3.12.2 Forward Supplemental Channel Frame Structure

14 Tables 3.1.3.12.2-1 through 3.1.3.12.2-3 specify the Forward Supplemental Channel bit
15 allocations. Tables 3.1.3.12.2-4 through 3.1.3.12.2-6 specify the Forward Supplemental
16 Channel bit allocations for flexible data rates.

17 All frames shall consist of zero or one Reserved Bits and the information bits followed by a
18 frame quality indicator (CRC) and eight Encoder Tail Bits, as shown in Figure 3.1.3.12.2-1.

19

1 **Table 3.1.3.12.2-1. Forward Supplemental Channel Frame Structure Summary**
 2 **for 20 ms Frames for Non-flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Reserved/Encoder Tail
3, 4, 6, and 7	614400	12288	0	12264	16	8
	307200	6144	0	6120	16	8
	153600	3072	0	3048	16	8
	76800	1536	0	1512	16	8
	38400	768	0	744	16	8
	19200	384	0	360	16	8
	9600	192	0	172	12	8
	4800	96	0	80	8	8
	2700	54	0	40	6	8
	1500	30	0	16	6	8
5, 8, and 9	1036800	20736	0	20712	16	8
	460800	9216	0	9192	16	8
	230400	4608	0	4584	16	8
	115200	2304	0	2280	16	8
	57600	1152	0	1128	16	8
	28800	576	0	552	16	8
	14400	288	1	267	12	8
	7200	144	1	125	10	8
	3600	72	1	55	8	8
	1800	36	1	21	6	8

Note: The 614400 bps rate applies to Radio Configuration 7. The 307200 bps rate applies to Radio Configurations 4, 6, and 7. The 1036800 bps rate applies to Radio Configuration 9. The 460800 bps rate applies to Radio Configurations 8 and 9.

1
2

**Table 3.1.3.12.2-2. Forward Supplemental Channel Frame Structure Summary
for 40 ms Frames for Non-flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Reserved/Encoder Tail
3, 4, 6, and 7	307200	12288	0	12264	16	8
	153600	6144	0	6120	16	8
	76800	3072	0	3048	16	8
	38400	1536	0	1512	16	8
	19200	768	0	744	16	8
	9600	384	0	360	16	8
	4800	192	0	172	12	8
	2400	96	0	80	8	8
	1350	54	0	40	6	8
5, 8, and 9	518400	20736	0	20712	16	8
	230400	9216	0	9192	16	8
	115200	4608	0	4584	16	8
	57600	2304	0	2280	16	8
	28800	1152	0	1128	16	8
	14400	576	0	552	16	8
	7200	288	1	267	12	8
	3600	144	1	125	10	8
	1800	72	1	55	8	8

Note: The 307200 bps rate applies to Radio Configuration 7. The 153600 bps rate applies to Radio Configurations 4, 6, and 7. The 518400 bps rate applies to Radio Configuration 9. The 230400 bps rate applies to Radio Configurations 8 and 9.

3

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**Table 3.1.3.12.2-3. Forward Supplemental Channel Frame Structure Summary
for 80 ms Frames for Non-flexible Data Rates**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Reserved/Encoder Tail
3, 4, 6, and 7	153600	12288	0	12264	16	8
	76800	6144	0	6120	16	8
	38400	3072	0	3048	16	8
	19200	1536	0	1512	16	8
	9600	768	0	744	16	8
	4800	384	0	360	16	8
	2400	192	0	172	12	8
	1200	96	0	80	8	8
5, 8, and 9	259200	20736	0	20712	16	8
	115200	9216	0	9192	16	8
	57600	4608	0	4584	16	8
	28800	2304	0	2280	16	8
	14400	1152	0	1128	16	8
	7200	576	0	552	16	8
	3600	288	1	267	12	8
	1800	144	1	125	10	8

Note: The 153600 bps rate applies to Radio Configuration 7. The 76800 bps rate applies to Radio Configurations 4, 6, and 7. The 259200 bps rate applies to Radio Configuration 9. The 115200 bps rate applies to Radio Configurations 8 and 9.

3

1
2**Table 3.1.3.12.2-4. Forward Supplemental Channel Frame Structure Summary for 20 ms Frames for Flexible Data Rates (Part 1 and 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved/ Encoder Tail
7	307250 to 614350	6145 to 12287	6121 to 12263	16	8
4, 6, and 7	153650 to 307150	3073 to 6143	3049 to 6119	16	8
3, 4, 6, and 7	76850 to 153550	1537 to 3071	1513 to 3047	16	8
	38450 to 76750	769 to 1535	745 to 1511	16	8
	19250 to 38350	385 to 767	361 to 743	16	8
	9650 to 19150	193 to 383	169 to 359	16	8
	4850 to 9600	97 to 192	73 to 168	16	8
	4850 to 9550	97 to 191	77 to 171	12	8
	2750 to 4800	55 to 96	31 to 72	16	8
	2750 to 4800	55 to 96	35 to 76	12	8
	2750 to 4750	55 to 95	39 to 79	8	8
	1550 to 2700	31 to 54	7 to 30	16	8
	1550 to 2700	31 to 54	11 to 34	12	8
	1550 to 2700	31 to 54	15 to 38	8	8
	1550 to 2650	31 to 53	17 to 39	6	8
	1250 to 1500	25 to 30	1 to 6	16	8
	1050 to 1500	21 to 30	1 to 10	12	8
	850 to 1500	17 to 30	1 to 14	8	8
750 to 1450	15 to 29	1 to 15	6	8	

3
4

**Table 3.1.3.12.2-4. Forward Supplemental Channel Frame Structure Summary
for 20 ms Frames for Flexible Data Rates (Part 2 and 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved/ Encoder Tail
9	460850 to 1036750	9217 to 20735	9193 to 20711	16	8
8 and 9	230450 to 460750	4609 to 9215	4585 to 9191	16	8
	115250 to 230350	2305 to 4607	2281 to 4583	16	8
5	115250 to 230350	2305 to 4607	2281 to 4583	16	8
5, 8, and 9	57650 to 115150	1153 to 2303	1129 to 2279	16	8
	28850 to 57550	577 to 1151	553 to 1127	16	8
	14450 to 28750	289 to 575	265 to 551	16	8
	7250 to 14400	145 to 288	121 to 264	16	8
	7250 to 14300, 14400	145 to 286, 288	125 to 266, 268	12	8
	3650 to 7200	73 to 144	49 to 120	16	8
	3650 to 7200	73 to 144	53 to 124	12	8
	3650 to 7100, 7200	73 to 142, 144	55 to 124, 126	10	8
	1850 to 3600	37 to 72	13 to 48	16	8
	1850 to 3600	37 to 72	17 to 52	12	8
	1850 to 3600	37 to 72	19 to 54	10	8
	1850 to 3500, 3600	37 to 70, 72	21 to 54, 56	8	8
	1250 to 1800	25 to 36	1 to 12	16	8
	1050 to 1800	21 to 36	1 to 16	12	8
	950 to 1800	19 to 36	1 to 18	10	8
	850 to 1800	17 to 36	1 to 20	8	8
750 to 1700, 1800	15 to 34, 36	1 to 20, 22	6	8	

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1
2**Table 3.1.3.12.2-5. Forward Supplemental Channel Frame Structure Summary
for 40 ms Frames for Flexible Data Rates (Part 1 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved /Encoder Tail
7	153625 to 307175	6145 to 12287	6121 to 12263	16	8
4, 6, and 7	76825 to 153575	3073 to 6143	3049 to 6119	16	8
3, 4, 6, and 7	38425 to 76775	1537 to 3071	1513 to 3047	16	8
	19225 to 38375	769 to 1535	745 to 1511	16	8
	9625 to 19175	385 to 767	361 to 743	16	8
	4825 to 9575	193 to 383	169 to 359	16	8
	2425 to 4800	97 to 192	73 to 168	16	8
	2425 to 4775	97 to 191	77 to 171	12	8
	1375 to 2400	55 to 96	31 to 72	16	8
	1375 to 2400	55 to 96	35 to 76	12	8
	1375 to 2375	55 to 95	39 to 79	8	8
	775 to 1350	31 to 54	7 to 30	16	8
	775 to 1350	31 to 54	11 to 34	12	8
	775 to 1350	31 to 54	15 to 38	8	8
	775 to 1325	31 to 53	17 to 39	6	8

3
4

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2**Table 3.1.3.12.2-5. Forward Supplemental Channel Frame Structure Summary for 40 ms Frames for Flexible Data Rates (Part 2 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved /Encoder Tail
9	230425 to 518375	9217 to 20735	9193 to 20711	16	8
8 and 9	115225 to 230375	4609 to 9215	4585 to 9191	16	8
	57625 to 115175	2305 to 4607	2281 to 4583	16	8
5	57625 to 115175	2305 to 4607	2281 to 4583	16	8
5, 8, and 9	28825 to 57575	1153 to 2303	1129 to 2279	16	8
	14425 to 28775	577 to 1151	553 to 1127	16	8
	7225 to 14375	289 to 575	265 to 551	16	8
	3625 to 7200	145 to 288	121 to 264	16	8
	3625 to 7150, 7200	145 to 286, 288	125 to 266, 268	12	8
	1825 to 3600	73 to 144	49 to 120	16	8
	1825 to 3600	73 to 144	53 to 124	12	8
	1825 to 3550, 3600	73 to 142, 144	55 to 124, 126	10	8
	925 to 1800	37 to 72	13 to 48	16	8
	925 to 1800	37 to 72	17 to 52	12	8
	925 to 1800	37 to 72	19 to 54	10	8
	925 to 1750, 1800	37 to 70, 72	21 to 54, 56	8	8

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**Table 3.1.3.12.2-6. Forward Supplemental Channel Frame Structure Summary
for 80 ms Frames for Flexible Data Rates (Part 1 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved /Encoder Tail
7	76812.5 to 153587.5	6145 to 12287	6121 to 12263	16	8
4, 6, and 7	38412.5 to 76787.5	3073 to 6143	3049 to 6119	16	8
3, 4, 6, and 7	19212.5 to 38387.5	1537 to 3071	1513 to 3047	16	8
	9612.5 to 19187.5	769 to 1535	745 to 1511	16	8
	4812.5 to 9587.5	385 to 767	361 to 743	16	8
	2412.5 to 4787.5	193 to 383	169 to 359	16	8
	1212.5 to 2400	97 to 192	73 to 168	16	8
	1212.5 to 2387.5	97 to 191	77 to 171	12	8
	687.5 to 1200	55 to 96	31 to 72	16	8
	687.5 to 1200	55 to 96	35 to 76	12	8
	687.5 to 1187.5	55 to 95	39 to 79	8	8

3
4

**Table 3.1.3.12.2-6. Forward Supplemental Channel Frame Structure Summary
for 80 ms Frames for Flexible Data Rates (Part 2 of 2)**

Radio Config.	Data Rate (bps)	Number of Bits per Frame			
		Total	Information	Frame Quality Indicator	Reserved/ Encoder Tail
9	115212.5 to 259187.5	9217 to 20735	9193 to 20711	16	8
8 and 9	57612.5 to 115187.5	4609 to 9215	4585 to 9191	16	8
	28812.5 to 57587.5	2305 to 4607	2281 to 4583	16	8
5	28812.5 to 57587.5	2305 to 4607	2281 to 4583	16	8
5, 8, and 9	14412.5 to 28787.5	1153 to 2303	1129 to 2279	16	8
	7212.5 to 14387.5	577 to 1151	553 to 1127	16	8
	3612.5 to 7187.5	289 to 575	265 to 551	16	8
	1812.5 to 3600	145 to 288	121 to 264	16	8
	1812.5 to 3575, 3600	145 to 286, 288	125 to 266, 268	12	8
	912.5 to 1800	73 to 144	49 to 120	16	8
	912.5 to 1800	73 to 144	53 to 124	12	8
	912.5 to 1775, 1800	73 to 142, 144	55 to 124, 126	10	8

3
4

R	Information Bits	F	R/T
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Notation

R - Reserved Bit

F - Frame Quality Indicator (CRC)

R/T - Reserved/Encoder Tail Bits

Figure 3.1.3.12.2-1. Forward Supplemental Channel Frame Structure

3.1.3.12.2.1 Forward Supplemental Channel Frame Quality Indicator

Each frame shall include a frame quality indicator. This frame quality indicator is a CRC.

The frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Reserved/Encoder Tail Bits.

Frames in Radio Configurations 3, 4, 6, and 7 with more than 192 total bits shall use a 16-bit frame quality indicator.

Frames in Radio Configurations 5, 8, and 9 with more than 288 total bits shall use a 16-bit frame quality indicator.

Frames in Radio Configurations 3, 4, 6 and 7 with 97 to 192 total bits shall use a 12-bit frame quality indicator. A 16-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 5, 8, and 9 with 145 to 288 total bits shall use a 12-bit frame quality indicator. A 16-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 5, 8, and 9 with 73 to 144 total bits shall use a 10-bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 3, 4, 6, and 7 with 55 to 96 total bits shall use an 8-bit frame quality indicator. A 16-bit or 12-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 5, 8, and 9 with 37 to 72 total bits shall use an 8-bit frame quality indicator. A 16-bit, 12-bit, or 10-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 3, 4, 6, and 7 with 54 or fewer total bits shall use a 6-bit frame quality indicator. A 16-bit, 12-bit, or 8-bit frame quality indicator may be used if flexible data rates are supported.

Frames in Radio Configurations 5, 8, and 9 with 36 or fewer total bits shall use a 6-bit frame quality indicator. A 16-bit, 12-bit, 10-bit, or 8-bit frame quality indicator may be used if flexible data rates are supported.

1 The generator polynomials for the frame quality indicator shall be as follows:

2 $g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

3 $g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator,

4 $g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1$ for the 10-bit frame quality indicator,

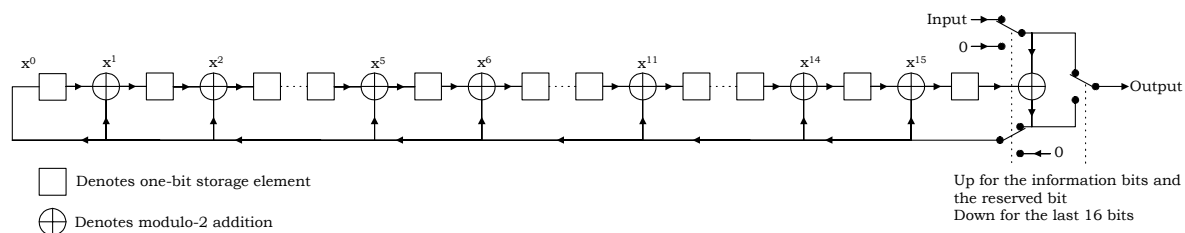
5 $g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator, and

6 $g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator.

7 The frame quality indicators shall be computed according to the following procedure as
8 shown in Figures 3.1.3.12.2.1-1 through 3.1.3.12.2.1-5:

- 9 • Initially, all shift register elements shall be set to logical one and the switches shall
10 be set in the up position.
- 11 • The register shall be clocked a number of times equal to the number of reserved and
12 information bits in the frame with those bits as input.
- 13 • The switches shall be set in the down position so that the output is a modulo-2
14 addition with a '0' and the successive shift register inputs are '0's.
- 15 • The register shall be clocked an additional number of times equal to the number of
16 bits in the frame quality indicator (16, 12, 10, 8, or 6).
- 17 • These additional bits shall be the frame quality indicator bits.
- 18 • The bits shall be transmitted in the order calculated.

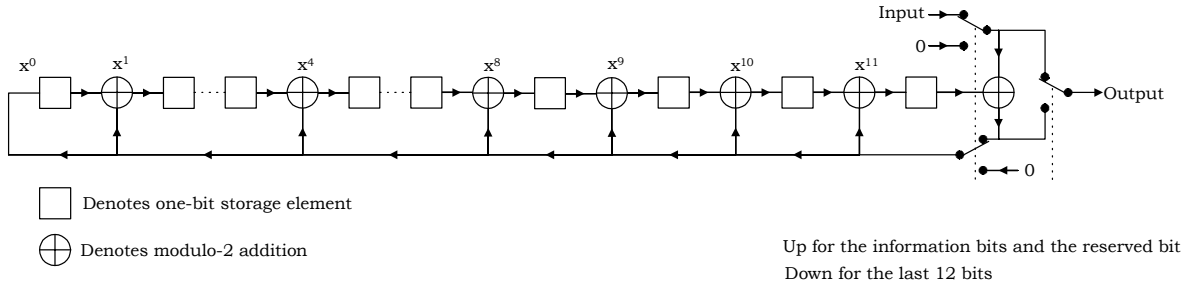
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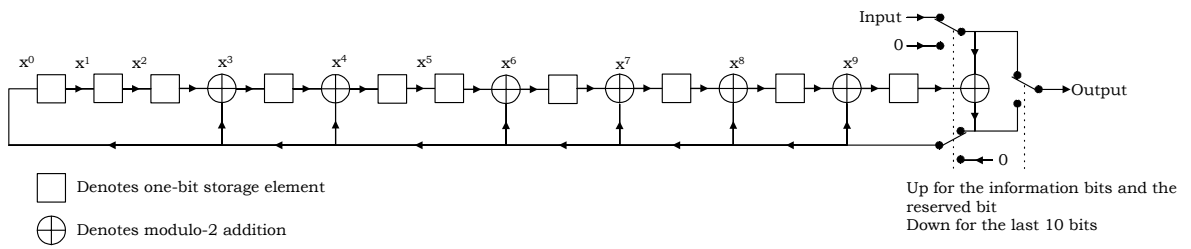
21 **Figure 3.1.3.12.2.1-1. Forward Supplemental Channel Frame Quality Indicator**
22 **Calculation for the 16-Bit Frame Quality Indicator**

23



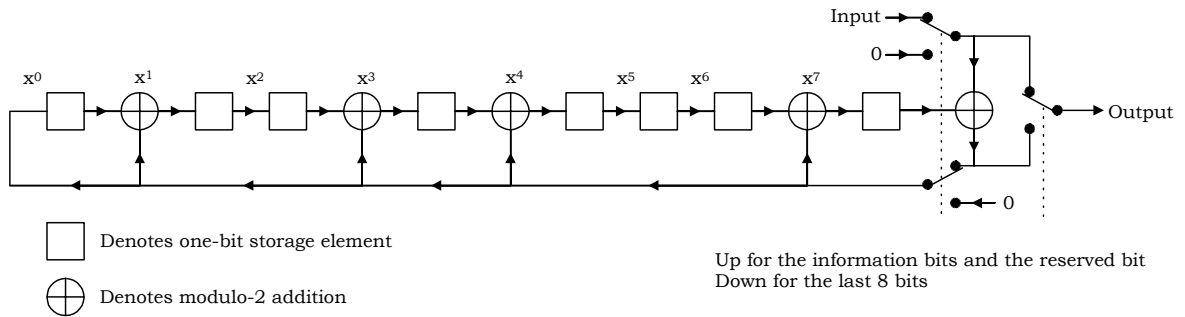
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Figure 3.1.3.12.2.1-2. Forward Supplemental Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator



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Figure 3.1.3.12.2.1-3. Forward Supplemental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator



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11
12

Figure 3.1.3.12.2.1-4. Forward Supplemental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

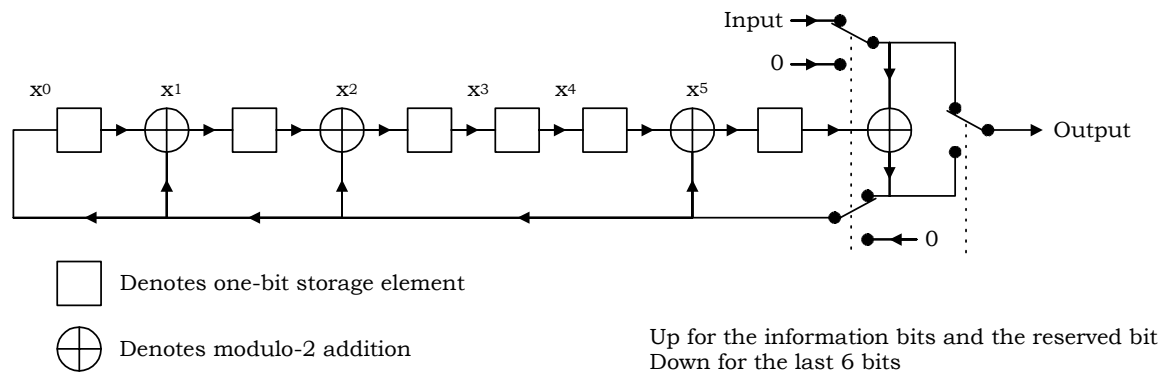


Figure 3.1.3.12.2.1-5. Forward Supplemental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator

3.1.3.12.2.2 Forward Supplemental Channel Encoder Tail Bits

The last eight bits of each Forward Supplemental Channel frame are called the Reserved/Encoder Tail Bits. For the convolutional encoder, these eight bits shall each be set to '0'. For the turbo encoder, the first two of the eight bits shall each be set to '0', and the turbo encoder will calculate and append the remaining six tail bits.

3.1.3.12.2.3 Forward Supplemental Channel Reserved Bit

This bit is reserved and shall be set to '0'.

3.1.3.12.3 Forward Supplemental Channel Forward Error Correction Encoding

The data for Forward Supplemental Channels shall be convolutionally or turbo encoded as specified in 3.1.3.1.4.

3.1.3.12.4 Forward Supplemental Channel Code Symbol Repetition

Forward Supplemental Channel code symbol repetition shall be as specified in 3.1.3.1.5.

3.1.3.12.5 Forward Supplemental Channel Puncturing

Code symbols resulting from the symbol repetition shall be punctured as specified in 3.1.3.1.6.

3.1.3.12.6 Forward Supplemental Channel Interleaving

The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

3.1.3.12.7 Forward Supplemental Channel Data Scrambling

The data for Forward Supplemental Channels shall be scrambled as specified in 3.1.3.1.9. The same long code mask is used for all code channels of the Forward Traffic Channel. The public long code mask shall be as shown in Figure 3.1.3.12.7-1. The generation of the private long code mask shall be as specified in 2.1.3.1.12.

1 For a given base station, the I and Q channel pilot PN sequences for the Forward
2 Supplemental Code Channels use the same pilot PN sequence offset as for the Forward
3 Pilot Channel.

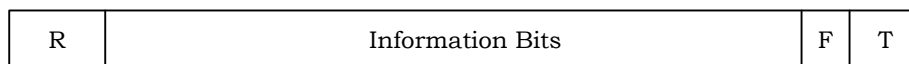
4 The base station may support Forward Supplemental Code Channel frames that are time
5 offset by multiples of 1.25 ms. The amount of the time offset is specified by
6 FRAME_OFFSET. A zero-offset Forward Supplemental Code Channel frame shall begin only
7 when System Time is an integral multiple of 20 ms (see Figure 1.3-1). An offset Forward
8 Supplemental Code Channel frame shall begin $1.25 \times \text{FRAME_OFFSET}$ ms later than the
9 zero-offset Forward Supplemental Code Channel frame. The base station shall transmit
10 frames on the Forward Supplemental Code Channels in time alignment with the Forward
11 Fundamental Channel. The interleave block for the Forward Supplemental Code Channel
12 shall be aligned with the Forward Supplemental Code Channel frame.

13 3.1.3.13.2 Forward Supplemental Code Channel Frame Structure

14 Table 3.1.3.13.2-1 specifies the Forward Supplemental Code Channel bit allocations. All
15 frames shall consist of zero or one Reserved Bits and information bits followed by a frame
16 quality indicator (CRC) and eight Encoder Tail Bits, as shown in Figure 3.1.3.13.2-1.

17
18 **Table 3.1.3.13.2-1. Forward Supplemental Code Channel Frame Structure Summary**

Radio Config.	Data Rate (bps)	Number of Bits per Frame				
		Total	Reserved	Information	Frame Quality Indicator	Encoder Tail
1	9600	192	0	172	12	8
2	14400	288	1	267	12	8



Notation

R - Reserved Bit
F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

20
21 **Figure 3.1.3.13.2-1. Forward Supplemental Code Channel Frame Structure**

22 3.1.3.13.2.1 Forward Supplemental Code Channel Frame Quality Indicator

23 The frame quality indicator (CRC) shall be calculated on all bits within the frame, except
24 the frame quality indicator itself and the Encoder Tail Bits. Each frame with Radio
25

1 Configuration 1 and 2 shall include a 12-bit frame quality indicator. This frame quality
 2 indicator is a CRC.

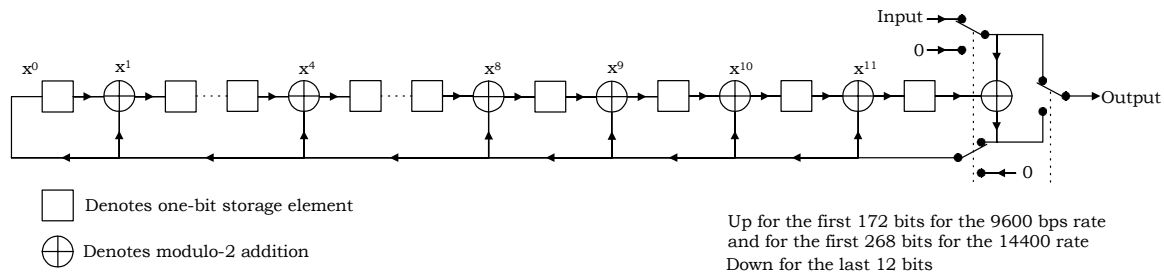
3 The generator polynomial for the frame quality indicator shall be as follows:

4
$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1.$$

5 The frame quality indicators shall be computed according to the following procedure as
 6 shown in Figure 3.1.3.13.2.1-1:

- 7 • Initially, all shift register elements shall be set to logical one and the switches shall
 8 be set in the up position.
- 9 • The register shall be clocked a number of times equal to the number of reserved and
 10 information bits in the frame with those bits as input.
- 11 • The switches shall be set in the down position so that the output is a modulo-2
 12 addition with a '0' and the successive shift register inputs are '0's.
- 13 • The register shall be clocked an additional number of times equal to the number of
 14 bits in the frame quality indicator (12).
- 15 • These additional bits shall be the frame quality indicator bits.
- 16 • The bits shall be transmitted in the order calculated.

17



18

19 **Figure 3.1.3.13.2.1-1. Forward Supplemental Code Channel Frame Quality Indicator**
 20 **Calculation**

21

22 3.1.3.13.2.2 Forward Supplemental Code Channel Encoder Tail Bits

23 The last eight bits of each Forward Supplemental Code Channel frame are called the
 24 Reserved/Encoder Tail Bits. These eight bits shall each be set to '0'.

25 3.1.3.13.2.3 Forward Supplemental Code Channel Reserved Bit

26 This bit is reserved and shall be set to '0'.

27 3.1.3.13.3 Forward Supplemental Code Channel Convolutional Encoding

28 The data for Forward Supplemental Code Channels shall be convolutionally encoded as
 29 specified in 3.1.3.1.4.

1 When generating Forward Supplemental Code Channel data, the encoder shall be initialized
 2 to the all-zero state at the end of each 20 ms frame.

3 3.1.3.13.4 Forward Supplemental Code Channel Code Symbol Repetition

4 Forward Supplemental Code Channel code symbol repetition shall be as specified in
 5 3.1.3.1.5.

6 3.1.3.13.5 Forward Supplemental Code Channel Puncturing

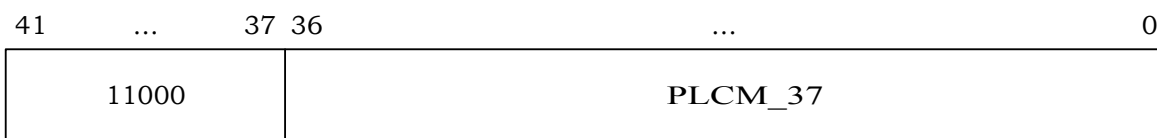
7 Code symbols resulting from the symbol repetition shall be punctured as specified in
 8 3.1.3.1.6.

9 3.1.3.13.6 Forward Supplemental Code Channel Interleaving

10 The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

11 3.1.3.13.7 Forward Supplemental Code Channel Data Scrambling

12 The data for Forward Supplemental Code Channels shall be scrambled as specified in
 13 3.1.3.1.9. The same long code mask is used for all code channels of the Forward Traffic
 14 Channel. The public long code mask shall be as shown in Figure 3.1.3.13.7-1. The
 15 generation of the private long code mask shall be as specified in 2.1.3.1.11.



17
 18 **Figure 3.1.3.13.7-1. Forward Supplemental Code Channel Public Long Code Mask**

19
 20 3.1.3.13.8 Forward Supplemental Code Channel Orthogonal Spreading

21 The Forward Supplemental Code Channels shall be spread by a Walsh function of length
 22 64 as specified in 3.1.3.1.12.

23 3.1.3.13.9 Forward Supplemental Code Channel Quadrature Spreading

24 The Forward Supplemental Code Channels shall be PN spread as specified in 3.1.3.1.13.

25 3.1.3.13.10 Forward Supplemental Code Channel Filtering

26 Filtering for the Forward Supplemental Code Channels shall be as specified in 3.1.3.1.14.

27 3.1.3.13.11 Forward Supplemental Code Channel Transmission Processing

28 When the Physical Layer receives a PHY-SCCH.Request(SDU, FRAME_DURATION,
 29 NUM_BITS) from the MAC Layer, the base station shall perform the following:

- 1 • Store the arguments SDU and NUM_BITS.
- 2 • If SDU is not equal to NULL, set the information bits to SDU.
- 3 • If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Forward
- 4 Supplemental Code Channel frame.

5 3.1.4 Limitations on Emissions

6 3.1.4.1 Conducted Spurious Emissions

7 The base station shall meet the requirements in Section 4.5.1 of the current version of [10].

8 3.1.4.2 Radiated Spurious Emissions

9 The base station shall meet the requirements in Section 4.5.2 of the current version of [10].

10 3.1.4.3 Intermodulation Products

11 The base station shall meet the requirements in Section 4.4.3 of the current version of [10].

15 3.1.5 Synchronization, Timing, and Phase

16 3.1.5.1 Timing Reference Source

17 Each base station shall use a time base reference from which all time-critical CDMA
 18 transmission components, including pilot PN sequences, frames, and Walsh functions,
 19 shall be derived. The time base reference shall be time-aligned to CDMA System Time, as
 20 described in 1.3. Reliable external means should be provided at each base station to
 21 synchronize each base station's time base reference to CDMA System Time. Each base
 22 station should use a frequency reference of sufficient accuracy to maintain time alignment
 23 to CDMA System Time.

24 In the event that the external source of System Time is lost,²³ the system shall maintain
 25 the base station transmit time within the tolerance specified in 3.1.5.2 for a period of time
 26 specified in the current version of [10].

²³These guidelines on time keeping requirements reflect the fact that the amount of time error between base stations that can be tolerated in a CDMA network is not a hard limit. Each mobile station can search an ever increasing time window as directed by the base stations. However, increasing this window gradually degrades performance, since wider windows require a longer time for the mobile stations to search out and to locate the various arrivals from all base stations that may be in view. An eventual limit on time errors occurs, since pilot addresses are derived as 64 chip time shifts of a length 32768 chip sequence. In a very extreme case where the maximum number of 512 sequences were assigned to base stations, these address sequences would be 64 chips apart. In this situation, it is possible that large time errors between base station transmissions would be confused with path-delayed arrivals from a given base station.

1 3.1.5.2 Base Station Transmission Time

2 The base station shall meet the requirements in Section 4.3.1.1 of the current version of
3 [10].

4 Time measurements are made at the base station antenna connector. If a base station has
5 multiple radiating antenna connectors for the same CDMA channel, time measurements
6 are made at the antenna connector having the earliest radiated signal.

7 The rate of change for timing corrections shall not exceed 101.725 ns per 200 ms.

8 3.1.5.3 Pilot to Walsh Cover Time Tolerance

9 The base station shall meet the requirements in Section 4.3.1.2 of the current version of
10 [10].

11 3.1.5.4 Pilot to Walsh Cover Phase Tolerance

12 The base station shall meet the requirements in Section 4.3.1.3 of the current version of
13 [10].

14 3.1.6 Transmitter Performance Requirements

15 System performance is predicated on transmitters meeting the requirements set forth in the
16 current version of [10].

17 **3.2 Receiver**

18 3.2.1 Channel Spacing and Designation

19 Channel spacing and designations for the base station reception shall be as specified in
20 2.1.1.1.

21 3.2.2 Demodulation Characteristics

22 The base station demodulation process shall perform complementary operations to the
23 mobile station modulation process on the Reverse CDMA Channel (see 2.1.3).

24 The base station receiver shall support the closed loop power control sub-channel as
25 specified in 3.1.3.1.10.

26 The Reverse Traffic Channel frame is described in 2.1.3.6.2, 2.1.3.7.2, 2.1.3.8.2, and
27 2.1.3.9.2. A base station may implement offset Reverse Traffic Channel frames as described
28 in 2.1.3.6.1, 2.1.3.7.1, 2.1.3.8.1, and 2.1.3.9.1.

29 3.2.2.1 Interface to the MAC Layer

30 This section specifies the passing of the received physical layer frames.

31 3.2.2.1.1 Access Channel Reception Processing

32 When the base station receives an Access Channel frame, the Physical Layer shall send a
33 PHY-ACH.Indication(SDU, FRAME_QUALITY) to the MAC Layer, after the base station
34 performs the following actions:

- 1 • Set the SDU to the received information bits.
- 2 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 3 quality; otherwise, set FRAME_QUALITY to “insufficient.”

4 3.2.2.1.2 Enhanced Access Channel Reception Processing

5 When the base station receives an Enhanced Access Channel Preamble, the Physical Layer
6 shall send a PHY-EACHPreamble.Indication to the MAC Layer.

7 When the base station receives an Enhanced Access header, the Physical Layer shall send a
8 PHY-EACHHeader.Indication(SDU, FRAME_QUALITY) to the MAC Layer, after the base
9 station performs the following actions:

- 10 • Set SDU to the received information bits.
- 11 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 12 quality; otherwise, set FRAME_QUALITY to “insufficient.”

13 When the base station receives an Enhanced Access data frame, the Physical Layer shall
14 send a PHY-EACH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to
15 the MAC Layer, after the base station performs the following actions:

- 16 • Set SDU to the received information bits.
- 17 • Set FRAME_DURATION to the duration of the received frame.
- 18 • Set NUM_BITS to the number of data bits of the received frame.
- 19 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 20 quality; otherwise, set FRAME_QUALITY to “insufficient.”

21 3.2.2.1.3 Reverse Common Control Channel Reception Processing

22 When the base station receives a Reverse Common Control Channel preamble, the Physical
23 Layer shall send a PHY-RCCCHPreamble.Indication to the MAC Layer.

24 When the base station receives a Reverse Common Control Channel frame, the Physical
25 Layer shall send a PHY-RCCCH.Indication(SDU, FRAME_DURATION, NUM_BITS,
26 FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- 27 • Set SDU to the received information bits.
- 28 • Set FRAME_DURATION to the duration of the received frame.
- 29 • Set NUM_BITS to the number of data bits of the received frame.
- 30 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 31 quality; otherwise, set FRAME_QUALITY to “insufficient.”

32 3.2.2.1.4 Reverse Dedicated Control Channel Reception Processing

33 When the base station receives a Reverse Dedicated Control Channel frame, the Physical
34 Layer shall send a PHY-DCCH.Indication(SDU, FRAME_DURATION, NUM_BITS,
35 FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- 36 • Set the SDU to the received information bits.

- 1 • Set FRAME_DURATION to the duration of the received frame.
- 2 • Set NUM_BITS to the number of information bits in the SDU.
- 3 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 4 quality; otherwise, set FRAME_QUALITY to “insufficient.”

5 If the base station does not receive a Forward Dedicated Control Channel frame at the end
6 of a 20 ms frame boundary, the Physical Layer shall send a PHY-DCCH.Indication(SDU) to
7 the MAC Layer, after the base station performs the following actions:

- 8 • Set the SDU to NULL.
- 9 • Pass the SDU as an argument.

10 3.2.2.1.5 Reverse Fundamental Channel Reception Processing

11 When the base station receives a Reverse Fundamental Channel frame, the Physical Layer
12 shall send a PHY-FCH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY)
13 to the MAC Layer, after the base station performs the following actions:

- 14 • Set the SDU to the received information bits.
- 15 • Set FRAME_DURATION to the duration of the received frame.
- 16 • Set NUM_BITS to the number of bits of the SDU.
- 17 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 18 quality; otherwise, set FRAME_QUALITY to “insufficient.”

19 3.2.2.1.6 Reverse Supplemental Channel Reception Processing

20 When the base station receives a Reverse Supplemental Channel frame, the Physical Layer
21 shall send a PHY-SCH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY)
22 to the MAC Layer, after the base station performs the following actions:

- 23 • Set the SDU to the received information bits.
- 24 • Set FRAME_DURATION to the duration of the received frame.
- 25 • Set NUM_BITS to the number of bits of the SDU.
- 26 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
- 27 quality; otherwise, set FRAME_QUALITY to “insufficient.”

28 3.2.2.1.7 Reverse Supplemental Code Channel Reception Processing

29 When the base station receives a Reverse Supplemental Code Channel frame, the Physical
30 Layer shall send a PHY-SCCH.Indication(SDU, FRAME_DURATION, NUM_BITS,
31 FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- 32 • Set the SDU to the received information bits.
- 33 • Set FRAME_DURATION to the duration of the received frame.
- 34 • Set NUM_BITS to the number of bits of the SDU.

- 1 • Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame
2 quality; otherwise, set FRAME_QUALITY to “insufficient.”

3 3.2.3 Limitations on Emissions

4 The base station shall meet the requirements in Section 3.5.1 of the current version of [10].

5 3.2.4 Receiver Performance Requirements

6 System performance is predicated on receivers meeting the requirements set forth in the
7 current version of [10].