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3rd Generation Partnership Project 2 "3GPP2"

Physical Layer Standard for cdma2000 Spread Spectrum Systems

Release A

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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

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NOTES

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

NOTES

- $|x|$ indicates the absolute value of x: $|-17|=17$, $|17|=17$.
- $\oplus$ indicates exclusive OR (modulo-2 addition).
- min (x, y) indicates the minimum of x and y.
- max (x, y) indicates the maximum of x and y.
- x mod y indicates the remainder after dividing x by y: $x \bmod y = x - (y \times \lfloor x/y \rfloor)$.

12. Rounding to the nearest integer indicates the nearest integer: 1 for 1.4, -1 for -1.4, 2 for 1.5, and -2 for -1.5.

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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.

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.

Broadcast Control Channel. A code channel in a Forward CDMA Channel used for transmission of control information from a base station to a mobile station.

Candidate Frequency. The frequency for which the base station specifies a search set, when searching on other frequencies while performing mobile-assisted handoffs.

CDMA. See Code Division Multiple Access.

CDMA Cellular System. The entire system supporting Domestic Public Cellular Service operation as embraced by this Standard.

CDMA Channel. The set of channels transmitted between the base station and the mobile stations within a given CDMA frequency assignment. See also Forward CDMA Channel and Reverse CDMA Channel.

CDMA Channel Number. An 11-bit number corresponding to the center of the CDMA frequency assignment.

CDMA Frequency Assignment. A 1.23 or 3.69 MHz segment of spectrum. The center of a CDMA frequency assignment is given by a CDMA Channel Number.

CDMA PCS System. The entire system supporting Personal Communications Services as embraced by this Standard.

CDMA Preferred Set. The set of CDMA channel numbers in a CDMA system corresponding to frequency assignments that a mobile station will normally search to acquire a CDMA Pilot Channel. For CDMA cellular systems, the primary and secondary channels comprise the CDMA Preferred Set.

Chip Rate. Equivalent to the spreading rate of the channel. It is either 1.2288 Mcps or 3.6864 Mcps.

Code Channel. A subchannel of a Forward CDMA Channel or Reverse CDMA Channel. Each subchannel uses an orthogonal Walsh function or quasi-orthogonal function.

Code Division Multiple Access (CDMA). A technique for spread-spectrum multiple-access digital communications that creates channels through the use of unique code sequences.

Code Symbol. The output of an error-correcting encoder. Information bits are input to the encoder and code symbols are output from the encoder. See Convolutional Code and Turbo Code.

Common Assignment Channel. A forward common channel used by the base station to acknowledge a mobile station accessing the Enhanced Access Channel, and in the case of Reservation Access Mode, to transmit the address of a Reverse Common Control Channel and associated Common Power Control Subchannel.

Common Power Control Channel. A forward common channel which transmits power control bits (i.e., common power control subchannels) to multiple mobile stations. The Common Power Control Channel is used by mobile stations operating in the Power Controlled Access Mode, when operating in the Reservation Access Mode, or when operating in the Designated Access Mode.

Common Power Control Group. A 1.25, 2.5, or 5 ms interval on the Common Power Control Channel which carries power control information for multiple mobile stations.

Common Power Control Subchannel. A subchannel on the Common Power Control Channel used by the base station to control the power of a mobile station when operating in the Power Controlled Access Mode on the Enhanced Access Channel or when operating in the Reservation Access Mode or the Designated Access Mode on the Reverse Common Control Channel.

Continuous Transmission. A mode of operation in which Discontinuous Transmission is not permitted.

Convolutional Code. A type of error-correcting code. A code symbol can be considered as the convolution of the input data sequence with the impulse response of a generator function.

CRC. See Cyclic Redundancy Code.

Cyclic Redundancy Code (CRC). A class of linear error detecting codes which generate parity check bits by finding the remainder of a polynomial division. See also Frame Quality Indicator.

Data Burst Randomizer. The function that determines which power control groups within a frame are transmitted on the Reverse Fundamental Channel with Radio Configurations 1 and 2 when the data rate is lower than the maximum rate for the radio configuration. The data burst randomizer determines, for each mobile station, the pseudorandom position of the transmitted power control groups in the frame while guaranteeing that every modulation symbol is transmitted exactly once.

dBm. A measure of power expressed in terms of its ratio (in dB) to one milliwatt.

dBm/Hz. A measure of power spectral density. The ratio, dBm/Hz, is the power in one Hertz of bandwidth, where power is expressed in units of dBm.

Deinterleaving. The process of unpermuting the symbols that were permuted by the interleaver. Deinterleaving is performed on received symbols prior to decoding.

Designated Access Mode. A mode of operation on the Reverse Common Control Channel where the mobile station responds to requests received on the Forward Common Control Channel.

Direct Spread. A CDMA mode in the International Telecommunications Union IMT-2000 family of standards.

Discontinuous Transmission (DTX). A mode of operation in which a base station or a mobile station switches its transmitter or a particular code channel on and off autonomously. For the case of DTX operation on the Forward Dedicated Control Channel, the Forward Power Control Subchannel is still transmitted.

DS. See Direct Spread.

E_b. The energy of an information bit.

E_b/N_t. The ratio in dB of the combined received energy per bit to the effective noise power spectral density.

E_c/I_0. The ratio in dB between the pilot energy accumulated over one PN chip period (E_c) to the total power spectral density (I_0) in the received bandwidth.

Effective Isotropically Radiated Power (EIRP). The product of the power supplied to the antenna and the antenna gain in a direction relative to an isotropic antenna.

Effective Radiated Power (ERP). The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

EIB. See Erasure Indicator Bit.

EIRP. See Effective Isotropic Radiated Power.

Electronic Serial Number (ESN). A 32-bit number assigned by the mobile station manufacturer, uniquely identifying the mobile station equipment.

Encoder Tail Bits. A fixed sequence of bits added to the end of a block of data to reset the convolutional encoder to a known state.

Enhanced Access Channel. A reverse channel used by the mobile for communicating to the base station. The Enhanced Access Channel operates in the Basic Access Mode, Power Controlled Access Mode, and Reservation Access Mode. It is used for transmission of short messages, such as signaling, MAC messages, response to pages, and call originations. It can also be used to transmit moderate-sized data packets.

Enhanced Access Channel Preamble. A non-data bearing portion of the Enhanced Access probe sent by the mobile station to assist the base station in initial acquisition and channel estimation.

Enhanced Access Data. The data transmitted while in the Basic Access Mode or Power Controlled Access Mode on the Enhanced Access Channel or while in the Reservation Access Mode on a Reverse Common Control Channel.

Enhanced Access Header. A frame containing access origination information transmitted immediately after the Enhanced Access Channel preamble while in the Power Controlled Access Mode or Reservation Access Mode.

Enhanced Access Probe. One Enhanced Access Channel transmission consisting of an Enhanced Access Channel preamble, optionally an Enhanced Access header, and optionally Enhanced Access data. See also Enhanced Access Probe Sequence.

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

Erasure Indicator Bit (EIB). A bit used in the Radio Configuration 2 Reverse Traffic Channel frame structure to indicate an erased Forward Fundamental Channel frame and in the Radio Configurations 3, 4, 5, and 6 Reverse Power Control Subchannel to indicate frame erasure(s) and/or non-transmission on the Forward Fundamental Channel or Forward Dedicated Control Channel.

ERP. See Effective Radiated Power.

ESN. See Electronic Serial Number.

Fixed Data Rate. The operation of a Traffic Channel where the data rate does not change from frame to frame. See variable data rates.

Flexible Data Rate. The operation of a Traffic Channel with Radio Configuration 3 or above, where the frame format, including the number of information bits, the number of reserved bits, and the number of frame quality indicator bits, is configurable.

Forward CDMA Channel. A CDMA Channel from a base station to mobile stations. The Forward CDMA Channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a particular pilot PN offset.

Forward Common Control Channel. A control channel used for the transmission of digital control information from a base station to one or more mobile stations.

Forward Dedicated Control Channel. A portion of a Radio Configuration 3 through 9 Forward Traffic Channel used for the transmission of higher-level data, control information, and power control information from a base station to a mobile station.

Forward Error Correction. A process whereby data is encoded with convolutional or turbo codes to assist in error correction of the link.

Forward Fundamental Channel. A portion of a Forward Traffic Channel which carries a combination of higher-level data and power control information.

Forward Pilot Channel. An unmodulated, direct-sequence spread spectrum signal transmitted continuously by each CDMA base station. The Pilot Channel allows a mobile station to acquire the timing of the Forward CDMA Channel, provides a phase reference for coherent demodulation, and provides means for signal strength comparisons between base stations for determining when to handoff.

Forward Power Control Subchannel. A subchannel on the Forward Fundamental Channel or Forward Dedicated Control Channel used by the base station to control the power of a mobile station when operating on the Reverse Traffic Channel.

Forward Supplemental Channel. A portion of a Radio Configuration 3 through 9 Forward Traffic Channel which operates in conjunction with a Forward Fundamental Channel or a Forward Dedicated Control Channel in that Forward Traffic Channel to provide higher data rate services, and on which higher-level data is transmitted.

Forward Supplemental Code Channel. A portion of a Radio Configuration 1 and 2 Forward Traffic Channel which operates in conjunction with a Forward Fundamental Channel in that Forward Traffic Channel to provide higher data rate services, and on which higher-level data is transmitted.

Forward Traffic Channel. One or more code channels used to transport user and signaling traffic from the base station to the mobile station. See Forward Fundamental Channel, Forward Dedicated Control Channel, Forward Supplemental Channel, and Forward Supplemental Code Channel.

Fractional Preamble. A preamble in a sequence sent on the Reverse Pilot Channel prior to transmitting on the Enhanced Access Channel or the Reverse Common Control Channel.

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

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

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

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

GHz. Gigahertz (10^9 Hertz).

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

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

GPS. See Global Positioning System.

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

Interleaving. The process of permuting a sequence of symbols.

kHz. Kilohertz (10^3 Hertz).

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

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

Long Code Mask. A 42-bit binary number that creates the unique identity of the long code. See also Public Long Code, Private Long Code, Public Long Code Mask, and Private Long Code Mask.

LSB. Least significant bit.

MAC Layer. Medium Access Control Layer.

Maximal Length Sequence (m-Sequence). A binary sequence of period $2^n - 1$, n being a positive integer, with no internal periodicities. A maximal length sequence can be generated by a tapped n-bit shift register with linear feedback.

MC. See Multi-Carrier.

Mcps. Megachips per second (10^6 chips per second).

Mean Input Power. The total received calorimetric power measured in a specified bandwidth at the antenna connector, including all internal and external signal and noise sources.

Mean Output Power. The total transmitted calorimetric power measured in a specified bandwidth at the antenna connector when the transmitter is active.

MHz. Megahertz (10^6 Hertz).

Mobile Station. A station that communicates with the base station.

Mobile Station Class. Mobile station classes define mobile station characteristics such as slotted operation and transmission power.

Mobile Switching Center (MSC). A configuration of equipment that provides cellular radiotelephone service.

Modulation Symbol. The input to the signal point mapping block and the output of the interleaver or the sequence repetition block, if present.

Multi-Carrier. A CDMA mode in the International Telecommunications Union IMT-2000 family of standards. The mode uses N ($N \geq 1$) adjacent 1.2288 Mcps direct-sequence spread RF carriers on the Forward CDMA Channel and a single direct-sequence spread RF carrier on the Reverse CDMA Channel.

ms. Millisecond (10^{-3} second).

MSB. Most significant bit.

ns. Nanosecond (10^{-9} second).

Orthogonal Transmit Diversity (OTD). A forward link transmission method which distributes forward link channel symbols among multiple antennas and spreads the symbols with a unique Walsh or quasi-orthogonal function associated with each antenna.

OTD. See orthogonal transmit diversity.

Paging Channel. A code channel in a Forward CDMA Channel used for transmission of control information and pages from a base station to a mobile station.

Paging Channel Slot. An 80 ms interval on the Paging Channel. Mobile stations operating in the slotted mode are assigned specific slots in which they monitor messages from the base station.

PCS. See Personal Communications Services.

PCS System. See Personal Communications Services System.

Personal Communications Services System. A configuration of equipment that provides PCS radiotelephone services.

Personal Communications Services (PCS). A family of mobile and portable radio communications services for individuals and businesses that may be integrated with a variety of competing networks. Broadcasting is prohibited and fixed operations are to be ancillary to mobile operations.

Physical Layer. The part of the communication protocol between the mobile station and the base station that is responsible for the transmission and reception of data. The physical layer in the transmitting station is presented a frame and transforms it into an over-the-air waveform. The physical layer in the receiving station transforms the waveform back into a frame.

Pilot Channel. An unmodulated, direct-sequence spread spectrum signal transmitted by a CDMA base station or mobile station. A pilot channel provides a phase reference for coherent demodulation and may provide a means for signal strength comparisons between base stations for determining when to handoff.

Pilot PN Sequence. A pair of modified maximal length PN sequences used to spread the Forward CDMA Channel and the Reverse CDMA Channel. Different base stations are identified by different pilot PN sequence offsets.

Pilot PN Sequence Offset Index. The PN offset in units of 64 PN chips of a pilot, relative to the zero offset pilot PN sequence.

PN. Pseudonoise.

PN Chip. One bit in the PN sequence.

PN Sequence. Pseudonoise sequence. A periodic binary sequence.

Power Control Bit. A bit sent on the Forward Power Control Subchannel, Reverse Power Control Subchannel, or Common Power Control Subchannel to signal the mobile station or base station to increase or decrease its transmit power.

Power Control Group. A 1.25 ms interval on the Forward Traffic Channel, the Reverse Traffic Channel, and the Reverse Pilot Channel. See also Power Control Bit.

Power Controlled Access Mode. A mode used on the Enhanced Access Channel where a mobile station transmits an Enhanced Access preamble, an Enhanced Access header, and Enhanced Access data in the Enhanced Access probe using closed loop power control.

Power Up Function. A method by which the mobile station increases its output power to support location services.

Preamble. See Access Channel preamble, Enhanced Access Channel preamble, Reverse Common Control Channel preamble, and Reverse Traffic Channel Preamble.

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

Primary Paging Channel. The default code channel (code channel 1) assigned for paging on a CDMA Channel.

Primary Reverse Power Control Subchannel. A Reverse Power Control Subchannel used to control the Forward Dedicated Control Channel or Forward Fundamental Channel.

Private Long Code. The long code characterized by the private long code mask. See also Long Code.

Private Long Code Mask. The long code mask used to form the private long code. See also Public Long Code Mask and Long Code.

Public Long Code. The long code characterized by the public long code mask. See also Long Code.

Public Long Code Mask. The long code mask used to form the public long code. The mask contains a permutation of the bits of the mobile station's ESN or the particular mask specified by the base station. The mask also includes the channel number when used for a Supplemental Code Channel. See also Private Long Code Mask and Long Code.

PUF. See Power Up Function.

PUF Probe. One or more consecutive frames on the Reverse Traffic Channel within which the mobile station transmits the PUF pulse.

PUF Pulse. Portion of PUF probe which may be transmitted at elevated output power.

PUF Target Frequency. The CDMA frequency to which the base station directs a mobile station for transmitting the PUF probe.

Punctured Code. An error-correcting code generated from another error-correcting code by deleting (i.e., puncturing) code symbols from the encoder output.

QIB. See Quality Indicator Bit.

QPSK. Quadrature phase shift keying.

Quality Indicator Bit (QIB). A bit used in the Radio Configurations 3, 4, 5, and 6 Reverse Power Control Subchannel to indicate signal quality on the Forward Dedicated Control Channel. When the Forward Fundamental Channel is present, this bit is set the same as the Erasure Indicator Bits.

Quasi-Orthogonal Function. A function created by applying a quasi-orthogonal masking function to an orthogonal Walsh function.

Quick Paging Channel. An uncoded, spread, and On-Off-Keying (OOK) modulated spread spectrum signal sent by a base station to inform mobile stations operating in the slotted mode during the idle state whether to receive the Forward Common Control Channel or the

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

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

RC. See Radio Configuration.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Spreading Rate 1. Spreading Rate 1 is often referred to as “1X.” A Spreading Rate 1 Forward CDMA Channel uses a single direct-sequence spread carrier with a chip rate of 1.2288 Mcps. A Spreading Rate 1 Reverse CDMA Channel uses a single direct-sequence spread carrier with a chip rate of 1.2288 Mcps.

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

sps. Symbols per second.

SR. See Spreading Rate.

STS. See Space Time Spreading.

Symbol. See Code Symbol and Modulation Symbol.

Sync Channel. A code channel in the Forward CDMA Channel which transports the synchronization message to the mobile station.

Sync Channel Superframe. An 80 ms interval consisting of three Sync Channel frames (each 26.666... ms in length).

System Time. The time reference used by the system. System Time is synchronous to UTC time (except for leap seconds) and uses the same time origin as GPS time. All base stations use the same System Time (within a small error tolerance). Mobile stations use the same System Time, offset by the propagation delay from the base station to the mobile station. See also Universal Coordinated Time.

TD. Transmit Diversity schemes, including OTD and STS.

Time Reference. A reference established by the mobile station that is synchronous with the earliest arriving multipath component used for demodulation.

Transmit Diversity Pilot Channel. An unmodulated, direct-sequence spread spectrum signal transmitted continuously by a CDMA base station to support forward link transmit diversity. The pilot channel and the transmit diversity pilot channel provide phase references for coherent demodulation of forward link CDMA channels which employ transmit diversity.

Turbo Code. A type of error-correcting code. A code symbol is based on the outputs of the two recursive convolutional codes (constituent codes) of the Turbo code.

Universal Coordinated Time (UTC). An internationally agreed-upon time scale maintained by the Bureau International de l'Heure (BIH) used as the time reference by nearly all commonly available time and frequency distribution systems, i.e., WWV, WWVH, LORAN-C, Transit, Omega, and GPS.

UTC. Universal Temps Coordiné. See Universal Coordinated Time.

Variable Data Rates. The operation of a Traffic Channel where the transmitter can change the data rate among a set of possible choices on a frame-by-frame basis.

Variable-rate Supplemental Channel. The operation of the Forward Supplemental Channel and the Reverse Supplemental Channel where the transmitter can change the data rate among a set of possible choices on a frame-by-frame basis.

Walsh Chip. The shortest identifiable component of a Walsh or quasi-orthogonal function. There are 2^N Walsh chips in one Walsh function where N is the order of the Walsh function.

Walsh Function. One of 2^N time orthogonal binary functions (note that the functions are orthogonal after mapping '0' to 1 and '1' to -1).

μs. Microsecond (10^{-6} second).

1.2 Numeric Information

1.2.1 Mobile Station Stored Parameters

1XRL_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.

EACH_PWR_STEP$_S$ – Power increment for successive Enhanced Access probes on the Enhanced Access Channel, in units of 1.0 dB.

EACH_SLOT$_S$ – Enhanced Access Channel slot duration, in units of 1.25 ms.

EACH_SLOT_OFFSET1$_S$ – Enhanced Access Channel first slot offset, in units of 1.25 ms. One of the slot offset values used to calculate the Enhanced Access Channel slot offset. The Enhanced Access Channel slot offset is derived from EACH_SLOT_OFFSET1$_S$ and EACH_SLOT OFFSET2$_S$.

EACH_SLOT_OFFSET2$_S$ – Enhanced Access Channel second slot offset, in units of 1.25 ms. One of the slot offset values used to calculate the Enhanced Access Channel slot offset. The Enhanced Access Channel slot offset is derived from EACH_SLOT_OFFSET1$_S$ and EACH_SLOT OFFSET2$_S$.

FPC_DCCH_CURR_SETPT$_S$ – Current power control subchannel outer loop setpoint for the Forward Dedicated Control Channel.

FPC_DCCH_MAX_SETPT$_S$ – Maximum value of the power control subchannel outer loop setpoint for the Forward Dedicated Control Channel.

FPC_DCCH_MIN_SETPT$_S$ – Minimum value of the power control subchannel outer loop setpoint for the Forward Dedicated Control Channel.

FPC_FCH_CURR_SETPT$_S$ – Current power control subchannel outer loop setpoint for the Forward Fundamental Channel.

FPC_FCH_MAX_SETPT$_S$ – Maximum value of the power control subchannel outer loop setpoint for the Forward Fundamental Channel.

FPC_FCH_MIN_SETPT$_S$ – Minimum value of the power control subchannel outer loop setpoint for the Forward Fundamental Channel.

FPC_MODE$_S$ – Forward power control operating mode.

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

FPC_SCH_CURR_SETPT[i]$_S$ – Current power control subchannel outer loop setpoint for Forward Supplemental Channel i.

FPC_SCH_MAX_SETPT[i]$_S$ – Maximum value of the power control subchannel outer loop setpoint for Forward Supplemental Channel i.

FPC_SCH_MIN_SETPT[i]$_S$ – Minimum value of the power control subchannel outer loop setpoint for Forward Supplemental Channel i.

FPC_SEC_CHAN$_S$ – Index of Forward Supplemental Channel that is associated with the secondary power control subchannel.

FRAME_OFFSET$_S$ – Current Forward Traffic Channel and Reverse Traffic Channel frame offset, in units of 1.25 ms.

IC_MAX$_S$ – The maximum interference correction that can be applied.

IC_THRESH$_S$ – The threshold level at which the interference correction begins to be applied.

INIT_PWR$_S$ – Initial power offset for Access Channel probes.

NOM_PWR$_S$ – Nominal transmit power offset. A correction factor to be used by mobile stations in the open loop power estimate, initially applied on the Access Channel.

NOM_PWR_EXT$_S$ – Extended nominal transmit power offset. A correction factor to be used by mobile stations in the open loop power estimate.

NUM_PREAMBLE$_S$ – Duration of Reverse Traffic Channel preamble during handoff in multiples of 20 ms when operating in Radio Configuration 1 or 2 or the duration of the Reverse Traffic Channel preamble during hard handoff in multiples of 1.25 ms when operating in Radio Configurations 3, 4, 5, or 6.

NUM_REV_CODES$_S$ – A storage variable in the mobile station which contains the number of Reverse Supplemental Code Channels which will be utilized in the next Reverse Supplemental Code Channel transmission beginning at time REV_START_TIME$_S$. A value of 0 indicates no Reverse Supplemental Code Channel transmission will be permitted (i.e., there is no pending Reverse Supplemental Code Channel transmission).

PAGECH$_S$ – The Paging Channel number.

PILOT_GATING_RATE$_S$ – The rate at which the Reverse Pilot Channel is gated on and off.

PILOT_GATING_USE_RATE$_S$ – Indicates whether or not the Reverse Pilot Channel is gated.

PILOT_PN$_S$ – Pilot Channel PN sequence offset, in units of 64 PN chips, for a base station.

PUF_INIT_PWR$_S$ – Power increase (in dB) of the first PUF pulse in a PUF attempt.

PUF_PWR_STEP$_S$ – Amount (in dB) by which the mobile station is to increment the power of a PUF pulse above nominal power from one PUF pulse to the next.

PWR_CNTL_STEP$_S$ – Power control step size assigned by the base station that the mobile station is to use for closed loop power control.

PWR_STEP$_S$ – Power increment for successive Access probes on the Access Channel, in units of 1.0 dB.

RCCCH_INIT_PWR$_S$ – Initial power offset for the Reverse Common Control Channel.

RCCCH_NOM_PWR$_S$ – Nominal transmit power offset. A correction factor to be used by mobile stations in the open loop power estimate, initially applied on the Reverse Common Control Channel.

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 Reservation Access Mode.

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 Reservation Access Mode.

RCCCH_PREAMBLE_ENABLED$_s$ – Indicates that a preamble will be sent on Reverse Common Control Channel in Reservation Access Mode.

RCCCH_PREAMBLE_NUM_FRAC$_s$ – Number of fractional preambles, less one, sent prior to initializing the Reverse Common Control Channel in Reservation Access Mode.

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 Reservation Access Mode.

RCCCH_SLOT$_s$ – Reverse Common Control Channel slot duration, in units of 1.25 ms.

RCCCH_SLOT_OFFSET1$_s$ – Reverse Common Control Channel first slot offset, in units of 1.25 ms. One of the slot offset values used to calculate the Reverse Common Control Channel slot offset. The Reverse Common Control Channel slot offset is derived from RCCCH_SLOT_OFFSET1$_s$ and RCCCH_SLOT OFFSET2$_s$.

RCCCH_SLOT_OFFSET2$_s$ – Reverse Common Control Channel second slot offset, in units of 1.25 ms. One of the slot offset values used to calculate the Reverse Common Control Channel slot offset. The Reverse Common Control Channel slot offset is derived from RCCCH_SLOT_OFFSET1$_s$ and RCCCH_SLOT OFFSET2$_s$.

RESUME_PREAMBLE$_s$ – A storage variable in the mobile station which contains the size of the preamble which shall be transmitted on a Reverse Supplemental Code Channel at the beginning of transmission on a Reverse Supplemental Code Channel when resuming transmission following an interruption when discontinuous transmission is occurring.

REV_FCH_GATING_MODE$_s$ – A parameter that enables gating of the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or 6.

REV_PWR_CNTL_DELAY$_s$ – Reverse link power control loop delay when the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or 6 is gated or when the Reverse Common Control Channel preamble is gated.

REV_SCH_FRAME_OFFSET[i]$_s$ – Frame offset, in units of 20 ms, applied to Reverse Supplemental Channel i.

RLGAIN_ADJ$_s$ – Gain adjustment applied to the Traffic Channel output power relative to the transmission power on the Access Channel, Enhanced Access Channel, or Reverse Common Control Channel.

RLGAIN_COMMON_PILOT$_s$ – Gain adjustment of the Enhanced Access Channel Header, Enhanced Access Channel Data, or Reverse Common Control Channel Data relative to the Reverse Pilot Channel.

RLGAIN_TRAFFIC_PILOT$_s$ – Gain adjustment of the Reverse Traffic Channel with Radio Configurations 3 through 6 relative to the Reverse Pilot Channel.

RLGAIN_SCH_PILOT[i]$_s$ – Gain adjustment of Reverse Supplemental Channel i relative to the Reverse Pilot Channel.

1.2.2 Base Station Parameters

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

BCN – Index number of the Broadcast Control Channel.

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

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

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

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

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

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

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

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

PCN – Index number of the Paging Channel.

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

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

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

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

1.2.3 MAC Interface

1.2.3.1 Service Interfaces

This section describes the service interface primitives (or primitives in short) to and from the MAC Layer. Service interface primitives are abstract, atomic, implementation-independent representations of interactions between a service user and its service provider. No requirement is placed on the mobile station or the base station to implement specific 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
Request	service user	service provider	Request a service, resource, etc.
Indication	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.

FRAME_QUALITY – An indication of the quality of the frame.

FRAME_DURATION – The duration of the frame.

HEADER – Enhanced Access Header, sent in the PHY-EACHHeader.Request primitive.

NUM_BITS – The number of bits in the frame.

NUM_PREAMBLE_FRAMES - The number of Access Channel preamble frames, sent in the PHY-ACHPreamble.Request primitive; the number of Enhanced Access Channel preamble frames sent in the PHY-EACHPreamble.Request primitive; or the number of Reverse Supplemental Code Channel preamble frames sent in the PHY-SCCHPreamble.Request primitive.

PN – Pilot PN sequence offset index for the Forward CDMA channel.

PWR_LVL – Power level adjustment of the Access probe, in units of PWR_STEP_S, sent in the PHY-ACHPreamble.Request primitive and PHY-ACH.Request primitive; or the power level adjustment of the Enhanced Access probe, in units of $EACH\_PWR\_STEP_S$, sent in the PHY-EACHPreamble.Request primitive, the PHY-EACHHeader.Request primitive, and the PHY-EACH.Request primitive.

RA – The Access Channel number.

RES_SCH_ADDR – The Common Power Control Subchannel Index.

RCCCH_ID – Reverse Common Control Channel number.

RN – The pseudo-random offset of the Access probe from a zero-offset Access Channel frame.

SDU – Service data unit.

SLOT_OFFSET – Slot offset associated with the Enhanced Access Channel.

1.2.3.3 Service Interface Primitives Received by the Physical Layer

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

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

1.2.3.4 Service Interface Primitives Sent from the Physical Layer

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

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-RCCCHPreamble	
	PHY-RCCCH	SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY

1.3 CDMA System Time

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

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

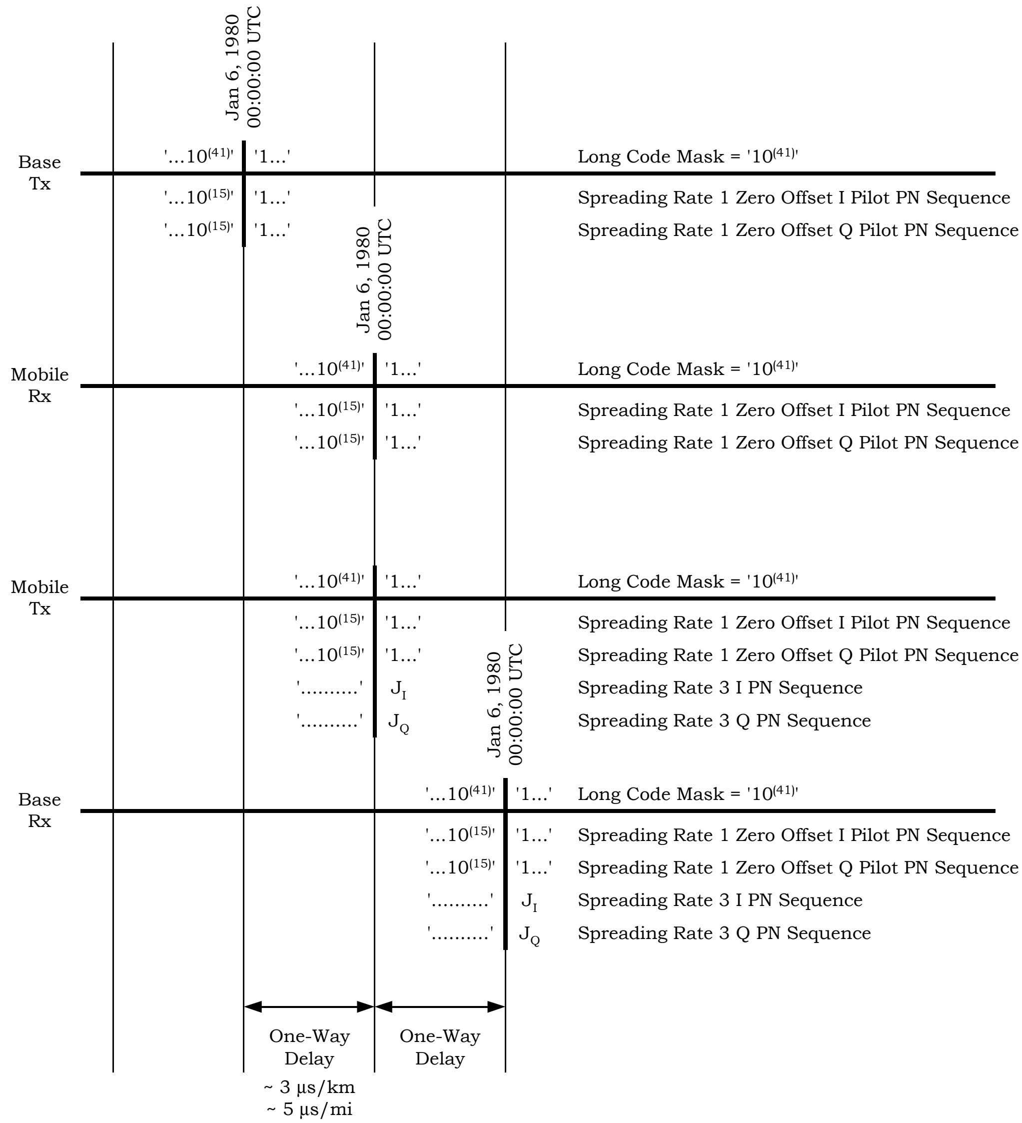
System Time keeps track of leap second corrections to UTC but does not use these corrections for physical adjustments to the System Time clocks.

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

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

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

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



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'.

Figure 1.3-1. System Time Line

1.4 Tolerances

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

1.5 Reserved Bits

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

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.

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 - 1.23 × ($1XRL\_FREQ\_OFFSET_s$ - 1) MHz lower than the carrier frequency of the center CDMA channel transmitted by the base station as measured at the mobile station receiver.

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

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

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	1 ≤ N ≤ 799	0.030 N + 825.000
	991 ≤ N ≤ 1023	0.030 (N – 1023) + 825.000
Base Station	1 ≤ N ≤ 799	0.030 N + 870.000
	991 ≤ N ≤ 1023	0.030 (N – 1023) + 870.000

Table 2.1.1.1.1-3. 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	880.020–880.650
		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	880.020–880.650
		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

Table 2.1.1.1.1-4. CDMA Channel Numbers and Corresponding Frequencies for Band 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 Valid Not Valid	1–36 37–262 263–333	825.030–826.080 826.110–832.860 832.890–834.990	870.030–871.080 871.110–877.860 877.890–879.990
	B (10 MHz)	Not Valid Valid Not Valid	334–404 405–595 596–666	835.020–837.120 837.150–842.850 842.880–844.980	880.020–882.120 882.150–887.850 887.880–889.980
	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 Valid Not Valid	1–36 37–262 263–333	825.030–826.080 826.110–832.860 832.890–834.990	870.030–871.080 871.110–877.860 877.890–879.990
	B (10 MHz)	Not Valid Valid Not Valid	334–403 404–595 596–666	835.020–837.090 837.120–842.850 842.880–844.980	880.020–882.090 882.120–887.850 887.880–889.980
	A' (1.5 MHz)	Not Valid	667–716	845.010–846.480	890.010–891.480
	A''' (2.5 MHz)	Not Valid Valid Not Valid	717–737 738 739–799	846.510–847.110 847.140 847.170–848.970	891.510–892.110 892.140 892.170–893.970

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]

Table 2.1.1.1.1-6. Sync Channel Preferred Set of Frequency Assignments for 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

2.1.1.1.2 Band Class 1 (1900 MHz Band)

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

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

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

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[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.

valid channel numbers shown in Table 2.1.1.1.2-3. Mobile stations supporting Band Class 1 and Spreading Rate 3 shall support transmission on the valid and conditionally valid channel numbers shown in Table 2.1.1.1.2-4. 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 2.1.1.1.2-5.

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

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 80.0 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 $80.0 - 1.25 \times (1XRL\_FREQ\_OFFSET_s - 1)$ MHz lower than the center frequency of the center CDMA channel transmitted by the base station as measured at the mobile station receiver.

Table 2.1.1.1.2-1. 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 ≤ N ≤ 1199	1850.000 + 0.050 N
Base Station	0 ≤ N ≤ 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 Valid Cond. Valid	0–24 25–275 276–299	1850.000–1851.200 1851.250–1863.750 1863.800–1864.950	1930.000–1931.200 1931.250–1943.750 1943.800–1944.950
D (5 MHz)	Cond. Valid Valid Cond. Valid	300–324 325–375 376–399	1865.000–1866.200 1866.250–1868.750 1868.800–1869.950	1945.000–1946.200 1946.250–1948.750 1948.800–1949.950
B (15 MHz)	Cond. Valid Valid Cond. Valid	400–424 425–675 676–699	1870.000–1871.200 1871.250–1883.750 1883.800–1884.950	1950.000–1951.200 1951.250–1963.750 1963.800–1964.950
E (5 MHz)	Cond. Valid Valid Cond. Valid	700–724 725–775 776–799	1885.000–1886.200 1886.250–1888.750 1888.800–1889.950	1965.000–1966.200 1966.250–1968.750 1968.800–1969.950
F (5 MHz)	Cond. Valid Valid Cond. Valid	800–824 825–875 876–899	1890.000–1891.200 1891.250–1893.750 1893.800–1894.950	1970.000–1971.200 1971.250–1973.750 1973.800–1974.950
C (15 MHz)	Cond. Valid Valid Not Valid	900–924 925–1175 1176–1199	1895.000–1896.200 1896.250–1908.750 1908.800–1909.950	1975.000–1976.200 1976.250–1988.750 1988.800–1989.950

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

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

Table 2.1.1.1.2-6. Sync Channel Preferred Set of Frequency Assignments for 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

2.1.1.1.3 Band Class 2 (TACS Band)

The Band Class 2 block designators for the mobile station and base station shall be as specified in Table 2.1.1.1.3-1.

Mobile stations supporting Band Class 2 shall be capable of transmitting in Band Class 2 using at least one band subclass. The band subclasses for Band Class 2 are specified in Table 2.1.1.1.3-2.

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

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

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 $CDMACH_S$ - 50 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 $CDMACH_S$ + 50 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 2.1.1.1.3-1. Band Class 2 Block Frequency Correspondence

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

Table 2.1.1.1.3-2. Band Class 2 Band Subclasses

Channels Covered	Band Subclass
600	0
1000	1
1320	2

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

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

Table 2.1.1.1.3-4. CDMA Channel Numbers and Corresponding Frequencies for 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

2.1.1.1.4 Band Class 3 (JTACS Band)

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

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

The channel spacing, CDMA channel designations, and transmitter center frequencies of Band Class 3 shall be as specified in Table 2.1.1.1.4-2. Mobile stations supporting Band Class 3 and Spreading Rate 1 shall support transmission on the valid and conditionally valid channel numbers shown in Table 2.1.1.1.4-3. 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.

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

If the mobile station uses Spreading Rate 1 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 is transmitting and receiving using the same spreading rate, the nominal mobile station transmit carrier frequency shall be 55.0 MHz higher than the frequency of the base station transmit signal as measured at the mobile station receiver.

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

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 ≤ N ≤ 799	0.0125 N + 915.000
	801 ≤ N ≤ 1039	0.0125 (N-800) + 898.000
	1041 ≤ N ≤ 1199	0.0125 (N-1040) + 887.000
	1201 ≤ N ≤ 1600	0.0125 (N – 1200) + 893.000
Base Station	1 ≤ N ≤ 799	0.0125 N + 860.000
	801 ≤ N ≤ 1039	0.0125 (N-800) + 843.000
	1041 ≤ N ≤ 1199	0.0125 (N-1040) + 832.000
	1201 ≤ N ≤ 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 Valid Not Valid	1041-1099 1100-1140 1141-1199	887.0125-887.7375 887.7500-888.2500 888.2625-888.9875	832.0125-832.7375 832.7500-833.2500 833.2625-833.9875
A3 (5 MHz)	Not Valid Valid Cond. Valid	1201-1259 1260-1540 1541-1600	893.0125-893.7375 893.7500-897.2500 897.2625-898.0000	838.0125-838.7375 838.7500-842.2500 842.2625-843.0000
A2 (3 MHz)	Cond. Valid Valid Not Valid	801-859 860-980 981-1039	898.0125-898.7375 898.7500-900.2500 900.2625-900.9875	843.0125-843.7375 843.7500-845.2500 845.2625-845.9875
A (10 MHz)	Not Valid Valid Not Valid	1-59 60-740 741-799	915.0125-915.7375 915.7500-924.2500 924.2625-924.9875	860.0125-860.7375 860.7500-869.2500 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.

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

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

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

Table 2.1.1.1.5-3. CDMA Channel Numbers and Corresponding Frequencies for Band 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 Valid Cond. Valid	0–24 25–175 176–199	1750.000–1751.200 1751.250–1758.750 1758.800–1759.950	1840.000–1841.200 1841.250–1848.750 1848.800–1849.950
B (10 MHz)	Cond. Valid Valid Cond. Valid	200–224 225–375 376–399	1760.000–1761.200 1761.250–1768.750 1768.800–1769.950	1850.000–1851.200 1851.250–1858.750 1858.800–1859.950
C (10 MHz)	Cond. Valid Valid Not Valid	400–424 425–575 576–599	1770.000–1771.200 1771.250–1778.750 1778.800–1779.950	1860.000–1861.200 1861.250–1868.750 1868.800–1869.950

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

2.1.1.1.6 Band Class 5 (450 MHz Band)

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

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

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

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

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

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 and is operating in Band Subclass A, B, C, or E; then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$ - 50 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 $CDMACH_s$ + 50 if $1XRL\_FREQ\_OFFSET_s$ equals '10'. If the mobile station uses Spreading Rate 3 for the Forward Traffic Channel and uses Spreading Rate 1 for the Reverse Traffic Channel and is operating in Band Subclass F, G, or H; then it shall transmit the Reverse Traffic Channel on the CDMA Channel designated by $CDMACH_s$ - 62 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 $CDMACH_s$ + 62 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 10.0 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 and is operating in Band Subclass A, B, C, or E, the nominal mobile station transmit carrier frequency shall be $10.0 - 1.25 \times (1XRL\_FREQ\_OFFSET_s - 1)$ 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 and is operating in Band Subclass F, G, or H, the nominal mobile station transmit carrier frequency shall be 10.0 - 1.24 × (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 2.1.1.1.6-1. Band Class 5 Block Frequency Correspondence 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

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

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

Table 2.1.1.1.6-3. CDMA Channel Numbers and Corresponding Frequencies for 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

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

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

Table 2.1.1.1.6-6. Sync Channel Preferred Set of Frequency Assignments for 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

2.1.1.1.7 Band Class 6 (2 GHz Band)

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

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

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

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

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 190.0 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 $190.0 - 1.25 \times (1XRL\_FREQ\_OFFSET_S - 1)$ MHz lower than the center frequency of the center CDMA channel transmitted by the base station as measured at the mobile station receiver.

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

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

Table 2.1.1.1.7-2. CDMA Channel Numbers and Corresponding Frequencies for Band 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.

If the mobile station uses Spreading Rate 1 or Spreading Rate 3 for both Forward and Reverse Traffic Channels, 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 30.0 MHz higher 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 $30.0 + 1.25 \times (1XRL\_FREQ\_OFFSET_s - 1)$ MHz higher than the center frequency of the center CDMA channel transmitted by the base station as measured at the mobile station receiver.

Table 2.1.1.1.8-1. 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

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

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

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 Valid Cond. Valid	20-44 45-95 96-119	777.000-778.200 778.250-780.750 780.800-781.950	747.000-748.200 748.250-750.750 750.800-751.950
D (10 MHz)	Cond. Valid Valid Not Valid	120-144 145-295 296-319	782.000-783.200 783.250-790.750 790.800-791.950	752.000-753.200 753.250-760.750 760.800-761.950
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 Valid Cond. Valid	20-69 70 71-119	777.000-779.450 779.500 779.550-781.950	747.000-749.450 749.500 749.550-751.950
D (10 MHz)	Cond. Valid Valid Not Valid	120-169 170-270 271-319	782.000–784.450 784.500–789.500 789.550–791.950	752.000–754.450 754.500–759.500 759.550–761.950
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’.

If the mobile station is transmitting and receiving using the same spreading rate, the nominal mobile station transmit carrier frequency shall be 95.0 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 95.0 - 1.25 × ($1XRL\_FREQ\_OFFSET_s$ - 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 2.1.1.1.9-1. CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 8

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

Table 2.1.1.1.9-2. CDMA Channel Numbers and Corresponding Frequencies for Band 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.

Table 2.1.1.1.9-3. CDMA Channel Numbers and Corresponding Frequencies for Band 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	$0 \le N \le 699$	880.000 + 0.050 N
Base Station	$0 \le N \le 699$	925.000 + 0.050 N

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

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.

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

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.

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

2.1.1.1.11 Band Class 10 (Secondary 800 MHz Band)

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.

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.

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

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

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

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

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 $CDMACH_s$ - 50 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 $CDMACH_s$ + 50 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 (Band Subclasses 0, 1, 2, and 3) or 39.0 MHz (Band Subclass 4) 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 (Band Subclass 0, 1, and 2) or $39.0 - 1.25 \times (1XRL\_FREQ\_OFFSET_s - 1)$ MHz (Band Subclass 3) lower than the carrier frequency of the center CDMA channel transmitted by the base station as measured at the mobile station receiver.

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

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 ≤ N ≤ 719	0.025 N + 806.000
	720 ≤ N ≤ 919	0.025 (N – 720) + 896.000
Base Station	0 ≤ N ≤ 719	0.025 N + 851.000
	720 ≤ N ≤ 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 Valid Cond. Valid	0-49 50-150 151-199	806.000-807.225 807.250-809.750 809.775-810.975	851.000-852.225 852.250-854.750 854.775-855.975
1	B	Cond. Valid Valid Cond. Valid	200-249 250-350 351-399	811.000-812.225 812.250-814.750 814.775-815.975	856.000-857.225 857.250-859.750 859.775-860.975
2	C	Cond. Valid Valid Cond. Valid	400-449 450-550 551-599	816.000-817.225 817.250-819.750 819.775-820.975	861.000-862.225 862.250-864.750 864.775-865.975
3	D	Cond. Valid Valid Not Valid	600-649 650-670 671-719	821.000-822.225 822.250-822.750 822.775-823.975	866.000-867.225 867.250-867.750 867.775-868.975
4	E	Not Valid Valid Not Valid	720-769 770-870 871-919	896.000-897.225 897.250-899.750 899.775-900.975	935.000-936.225 936.250-938.750 938.775-939.975

Table 2.1.1.1.11-4. CDMA Channel Numbers and Corresponding Frequencies for Band 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 Valid Cond. Valid	0-99 100 101-199	806.000-808.475 808.500 808.525-810.975	851.000-853.475 853.500 853.525-855.975
1	B	Cond. Valid Valid Cond. Valid	200-299 300 301-399	811.000-813.475 813.500 813.525-815.975	856.000-858.475 858.500 858.525-860.975
2	C	Cond. Valid Valid Cond. Valid	400-499 500 501-599	816.000-818.475 818.500 818.525-820.975	861.000-863.475 863.500 863.525-865.975
3	D	Cond. Valid Not Valid	600-620 621-719	821.000-821.500 821.525-823.975	866.000-866.500 866.525-868.975
4	E	Not Valid Valid Not Valid	720-769 770-870 871-919	896.000-897.225 897.250-899.750 899.775-900.975	935.000-936.225 936.250-938.750 938.775-939.975

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

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.

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

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

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

This section applies to the following cases:

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

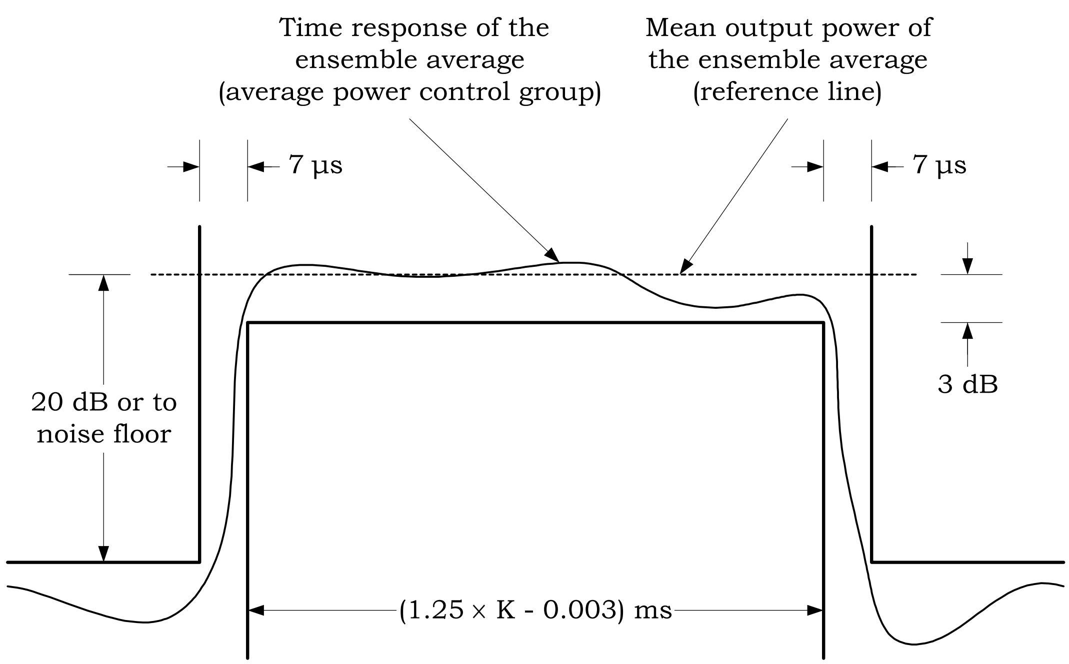

Figure 2.1.2.2.2.1-1. Transmission Envelope Mask (Average Gated-on Power Control Group)

2.1.2.2.2.2 Gated Output Power During a Serving Frequency PUF Probe

If the mobile station transmits gated-off power control groups during the PUF recovery time, the mobile station shall reduce its mean output power, either by at least 20 dB with respect to the mean output power of the power control group prior to the final power control group of the PUF Setup time, or to the transmitter noise floor, whichever is the greater power.

2.1.2.2.3 Standby Output Power

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

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

2.1.2.3 Controlled Output Power

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

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

2.1.2.3.1 Estimated Open Loop Output Power

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

Table 2.1.2.3.1-1. Open Loop Power Offsets

Band Class	Forward Spreading Rate	Reverse Spreading Rate	Reverse Channels	Offset Power[5]
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

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

2.1.2.3.1.1 Open Loop Output Power When Transmitting on the Access Channel

The mobile station shall transmit each Access probe at a mean output power level defined by[6]

mean output power (dBm) =

– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ NOM_PWR_s - 16 × $NOM\_PWR\_EXT_s$
+ $INIT\_PWR_s$
+ PWR_LVL × PWR_STEP_s,

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

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

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

For Band Classes 0 and 3, $NOM\_PWR\_EXT_s$ is set to 0 and the range of the NOM_PWR_s – 16 × $NOM\_PWR\_EXT_s$ correction is from –8 to +7 dB. For Band Classes 1, 2, 4, 5, 6, 7, 8, 9, and 10, the range of the NOM_PWR_s – 16 × $NOM\_PWR\_EXT_s$ correction is from –24 to +7 dB. The range of the $INIT\_PWR_s$ parameter is –16 to +15 dB, with a nominal value of 0 dB. The range of the PWR_STEP_s parameter is 0 to 7 dB. The accuracy of the adjustment to the mean output power due to NOM_PWR_s, $NOM\_PWR\_EXT_s$, $INIT\_PWR_s$, or a single Access probe correction of PWR_STEP_s shall be ±0.5 dB or ±20% of the value in dB, whichever is greater.

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[6]The 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 NOM_PWR_s - 16 × $NOM\_PWR\_EXT_s$ would be the correction that should provide the correct received power at the base station. NOM_PWR_s - 16 × $NOM\_PWR\_EXT_s$ 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.

The mobile station shall support a total combined range of interference correction, NOM_PWR_s, $NOM\_PWR\_EXT_s$, $INIT\_PWR_s$, and $PWR\_LVL \times PWR\_STEP_s$ of at least ±32 dB for mobile stations operating in Band Classes 0, 2, 3, 5, 7, 9, and 10 and ±40 dB for mobile stations operating in Band Classes 1, 4, 6, and 8.

Prior to application of corrections from $PWR\_LVL \times PWR\_STEP_s$, closed loop power control corrections, and with $INIT\_PWR_s$ set to zero, the mobile station's estimated open loop mean output power should be within ±6 dB and shall be within ±9 dB of the value determined by the following relationship:

mean output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ NOM_PWR_s - 16 × $NOM\_PWR\_EXT_s$.

This requirement shall be met over the full range of NOM_PWR_s – 16 × $NOM\_PWR\_EXT_s$ (from –8 to +7 dB for Band Classes 0 and 3, and from –24 to +7 dB for Band Classes 1, 2, 4, 5, 6, 7, 8, 9, and 10).

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

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $EACH\_NOM\_PWR_s$
+ $EACH\_INIT\_PWR_s$
+ 6
+ $PWR\_LVL \times EACH\_PWR\_STEP_s$,

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

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

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

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

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $EACH\_NOM\_PWR_S$
+ $EACH\_INIT\_PWR_S$
+ PWR_LVL × $EACH\_PWR\_STEP_S$.

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $EACH\_NOM\_PWR_S$
+ $EACH\_INIT\_PWR_S$
+ PWR_LVL × $EACH\_PWR\_STEP_S$
+ the sum of all closed loop power control corrections (dB).

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

The range of the $EACH\_NOM\_PWR_S$ correction is –16 to +15 dB. The range of the $EACH\_INIT\_PWR_S$ parameter is –16 to +15 dB, with a nominal value of 0 dB. The range of the $EACH\_PWR\_STEP_S$ parameter is 0 to 7 dB. The accuracy of the adjustment to the mean output power due to $EACH\_NOM\_PWR_S$, $EACH\_INIT\_PWR_S$, or a single Enhanced Access probe correction of $EACH\_PWR\_STEP_S$ shall be ±0.5 dB or ±20% of the value in dB, whichever is greater.

The mobile station shall support a total combined range of interference correction, $EACH\_NOM\_PWR_S$, $EACH\_INIT\_PWR_S$, PWR_LVL × $EACH\_PWR\_STEP_S$, and closed loop power control corrections (if applicable) of at least ±32 dB for mobile stations operating in Band Classes 0, 2, 3, 5, 7, 9, and 10 and of at least ±40 dB for mobile stations operating in Band Classes 1, 4, 6, and 8.

Prior to application of corrections from PWR_LVL × $EACH\_PWR\_STEP_S$, closed loop power control corrections, with $EACH\_INIT\_PWR_S$ set to zero, and with the mobile station only transmitting on the Reverse Pilot Channel, the mobile station's estimated open loop mean output power should be within ±6 dB and shall be within ±9 dB of the value determined by the following relationship:

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $EACH\_NOM\_PWR_s$.

This requirement shall be met over the full range of $EACH\_NOM\_PWR_s$ (from –16 to +15 dB).

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

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $RCCCH\_NOM\_PWR_s$
+ $RCCCH\_INIT\_PWR_s$
+ PREV_CORRECTIONS
+ 6,

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

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

The mobile station shall set PREV_CORRECTIONS to PWR_LVL × $EACH\_PWR\_STEP_s$ + sum of all closed loop power control corrections, if applicable, from operation on the Enhanced Access Channel.

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $RCCCH\_NOM\_PWR_S$
+ $RCCCH\_INIT\_PWR_S$
+ PREV_CORRECTIONS,

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $RCCCH\_NOM\_PWR_S$
+ $RCCCH\_INIT\_PWR_S$
+ PREV_CORRECTIONS
+ the sum of all closed loop power control corrections (dB).

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $RCCCH\_NOM\_PWR_S$
+ $RCCCH\_INIT\_PWR_S$
+ PREV_CORRECTIONS
+ 6
+ the sum of all closed loop power control corrections (dB).

The mobile station shall set PREV_CORRECTIONS to $DAM\_CORRECTION_S$.

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

The range of the $RCCCH\_NOM\_PWR_S$ correction is –16 to +15 dB. The range of the $RCCCH\_INIT\_PWR_S$ parameter is –16 to +15 dB, with a nominal value of 0 dB. The accuracy of the adjustment to the mean output power due to $RCCCH\_NOM\_PWR_S$ or $RCCCH\_INIT\_PWR_S$ shall be ±0.5 dB or ±20% of the value in dB, whichever is greater.

The range of the $DAM\_CORRECTION_S$ parameter is 0 to +31 dB.

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

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ $RCCCH\_NOM\_PWR_s$
+ PREV_CORRECTIONS.

This requirement shall be met over the full range of $RCCCH\_NOM\_PWR_s$ (from –16 to +15 dB).

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

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

mean output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ ACC_CORRECTIONS
+ $RLGAIN\_ADJ_s$,

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

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

If the last channel used prior to operation on the Reverse Traffic Channel was the Access Channel, the mobile station shall set ACC_CORRECTIONS to $NOM\_PWR_s - 16 \times NOM\_PWR\_EXT_s + INIT\_PWR_s + PWR\_LVL \times PWR\_STEP_s$.

If the last channel used prior to operation on the Reverse Traffic Channel was the Enhanced Access Channel, the mobile station shall set ACC_CORRECTIONS to $EACH\_NOM\_PWR_s + EACH\_INIT\_PWR_s + PWR\_LVL \times EACH\_PWR\_STEP_s$ + sum of all closed loop power control corrections (dB), if applicable.

If the last channel used prior to operation on the Reverse Traffic Channel was the Reverse Common Control Channel, the mobile station shall set ACC_CORRECTIONS to $RCCCH\_NOM\_PWR_s + RCCCH\_INIT\_PWR_s$ + PREV_CORRECTIONS + sum of all closed loop power control corrections (dB), if applicable.

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

mean output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ ACC_CORRECTIONS
+ $RLGAIN\_ADJ_s$
+ the sum of all closed loop power control corrections (dB)
+ $10 \times \log_{10}(1 + NUM\_RSCCH)$ (dB),

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

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

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

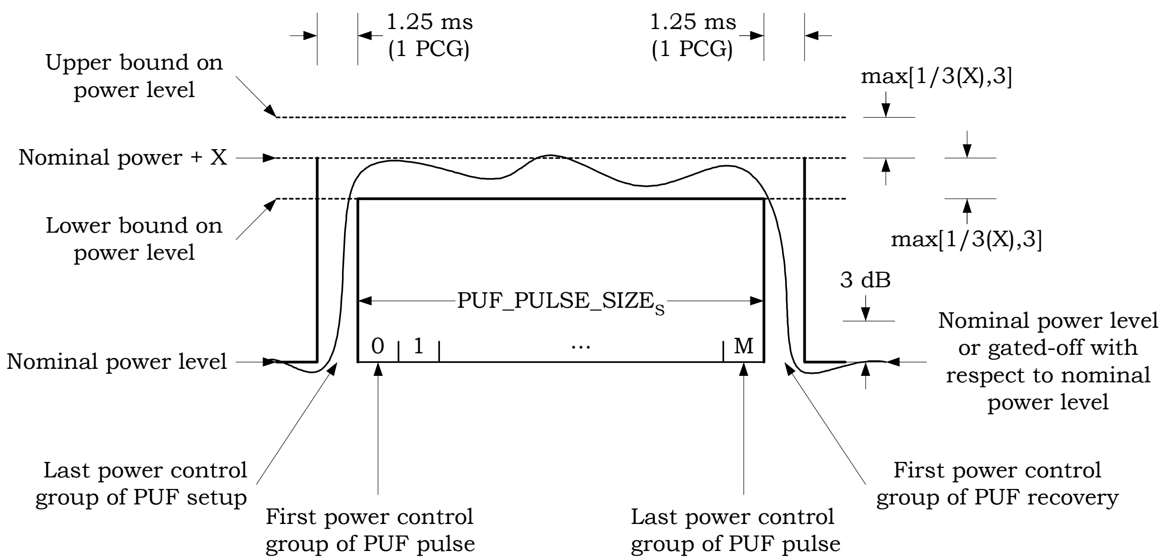
During a PUF pulse, the mean output power shall be defined by

mean output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ ACC_CORRECTIONS
+ $RLGAIN\_ADJ_s$
+ the sum of all closed loop power control corrections (dB)
+ $PUF\_INIT\_PWR_s$
+ $CURRENT\_PUF\_PROBE_s \times PUF\_PWR\_STEP_s$.

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

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

The range of $PUF\_INIT\_PWR_S$ is 0 to 63 dB. The range of $PUF\_PWR\_STEP_S$ is 0 to 31 dB. The range of $CURRENT\_PUF\_PROBE_S$ is 1 to 16. The accuracy of the adjustment to the mean output power due to $PUF\_INIT\_PWR_S + (CURRENT\_PUF\_PROBE_S \times PUF\_PWR\_STEP_S)$ shall be ±1/3 of that value (in dB), or ±3 dB, whichever is greater, unless the resulting mean output power exceeds the mobile station's maximum output power. If the output power exceeds the mobile station's maximum output power, the mean output power shall be within 3 dB of the maximum output power. See Figure 2.1.2.3.1.4-1.



Note: $X = PUF\_INIT\_PWR_S + (CURRENT\_PUF\_PROBE_S \text{ x } PUF\_PWR\_STEP_S)$

Figure 2.1.2.3.1.4-1. Power Up Function Transmission Envelope Mask

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

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ ACC_CORRECTIONS
+ $RLGAIN\_ADJ_S$,

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

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

If the last channel used prior to operation on the Reverse Traffic Channel was the Access Channel, the mobile station shall set ACC_CORRECTIONS to $NOM\_PWR_s - 16 \times NOM\_PWR\_EXT_s + INIT\_PWR_s + PWR\_LVL \times PWR\_STEP_s$.

If the last channel used prior to operation on the Reverse Traffic Channel was the Enhanced Access Channel, the mobile station shall set ACC_CORRECTIONS to $EACH\_NOM\_PWR_s + EACH\_INIT\_PWR_s + PWR\_LVL \times PWR\_STEP_s$ + sum of all closed loop power control corrections (dB), if applicable.

If the last channel used prior to operation on the Reverse Traffic Channel was the Reverse Common Control Channel, the mobile station shall set ACC_CORRECTIONS to $RCCCH\_NOM\_PWR_s + RCCCH\_INIT\_PWR_s$ + PREV_CORRECTIONS + sum of all closed loop power control corrections (dB), if applicable.

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

mean pilot channel output power (dBm) =
– mean input power (dBm)
+ offset power (from Table 2.1.2.3.1-1)
+ interference correction
+ ACC_CORRECTIONS
+ $RLGAIN\_ADJ_s$
+ the sum of all closed loop power control corrections.

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

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

2.1.2.3.2 Closed Loop Output Power

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

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

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

For Reverse Pilot Channel gating (see 2.1.3.2.3) with Radio Configurations 3 through 6, a power control bit shall be considered valid if it is received during a power control group in which the Forward Power Control Subchannel was transmitted (see 3.1.3.1.10). Otherwise, it shall be considered invalid. For gated transmission other than the Reverse Pilot Channel gating mode with Radio Configurations 3 through 6, a power control bit shall be considered valid if it is received in the 1.25 ms time slot that starts ($REV\_PWR\_CNTL\_DELAY_S$ +1) × 1.25 ms following the end of a time slot in which the mobile station transmitted (see 3.1.3.1.10). For gated transmission other than the Reverse Pilot Channel gating mode with Radio Configurations 3 through 6, a power control bit received on the Forward Power Control Subchannel or on the assigned subchannel of the Common Power Control Channel is considered invalid if it is received in the 1.25 ms time slot that starts ($REV\_PWR\_CNTL\_DELAY_S$ +1) × 1.25 ms following the end of a time slot in which the mobile station transmitter was gated off.

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

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

mean code channel output power (dBm) =
mean pilot channel output power (dBm)
+ 0.125 × Nominal_Reverse_Common_Channel_Attribute_Gain [Rate, Frame Duration]
+ 0.125 × $RLGAIN\_COMMON\_PILOT_s$.

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

0.125 × (Nominal_Reverse_Common_Channel_Attribute_Gain [Rate, Frame Duration])
+ 0.125 × $RLGAIN\_COMMON\_PILOT_s$.

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

The mobile station shall set the output power of the Reverse Fundamental Channel, the Reverse Supplemental Channel, and the Reverse Dedicated Control Channel relative to the output power of the Reverse Pilot Channel. The mobile station shall transmit each of the Reverse Fundamental Channel, Reverse Supplemental Channel, and Reverse Dedicated Control Channel at an output power given by[7]

mean code channel output power (dBm) =
mean pilot channel output power (dBm)
+ 0.125 × (Nominal_Attribute_Gain[Rate, Frame Duration, Coding]
+ Attribute_Adjustment_Gain[Rate, Frame Duration, Coding]
+ Reverse_Channel_Adjustment_Gain[Channel]
– Multiple_Channel_Adjustment_Gain[Channel]
– Variable_Supplemental_Adjustment_Gain[Channel]
+ RLGAIN_TRAFFIC_PILOT$_S$
+ RLGAIN_SCH_PILOT[Channel]$_S$)
+ IFHHO_SRCH_CORR.

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

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

If flexible data rates are supported, and if the specified data rate, coding, and frame length are not specified in the Reverse Link Attribute Gain Table, the gain shall be determined by linearly interpolating the values of Nominal_Attribute_Gain and the Pilot_Reference_Level to the nearest integer from the nearest data rates above and below the specified data rate with the same frame length and coding. If the specified data rate is below the lowest listed data rate with the same frame length and coding, the gain shall be determined by linearly extrapolating the values of Nominal_Attribute_Gain and the Pilot_Reference_Level to the nearest integer from the two lowest data rates with the same frame length and coding in the Reverse Link Attribute Gain Table. If variable-rate Reverse Supplemental Channel is 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.

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

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

The mobile station shall maintain a Reverse Link Attribute Adjustment Gain Table containing an offset relative to the Reverse Pilot Channel power for each data rate, frame duration, and coding rate supported by the mobile station. The mobile station shall initialize each entry in this table to 0.[8]

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

The adjustment $RLGAIN\_SCH\_PILOT[Channel]_s$ is valid for the Reverse Supplemental Channel.

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

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

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

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

- Let Max_Channel identify the code channel with the highest Pilot_Reference_Level among the code channels on which the mobile station is transmitting.
- If Max_Channel is not a Reverse Supplemental Channel with variable data rates, set 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.

- Otherwise, set Variable_Supplemental_Adjustment_Gain[Rate, Channel] to Pilot_Reference_Level[Max_Channel] - Pilot_Reference_Level[Rate, Channel] for all rates on the Max_Channel except the maximum assigned rate on that channel. Set Variable_Supplemental_Adjustment_Gain[Rate, Channel] to 0 for all other channels.

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 Rate[9]
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.

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

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:

0.125 × (Nominal_Attribute_Gain[Rate, Frame Duration, Coding]
+ Attribute_Adjustment_Gain[Rate, Frame Duration, Coding]
+ Reverse_Channel_Adjustment_Gain[Channel]
– Multiple_Channel_Adjustment_Gain[Channel]
+ $RLGAIN\_TRAFFIC\_PILOT_s$
+ $RLGAIN\_SCH\_PILOT[Channel]_s$)
+ IFHHO_SRCH_CORR

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 × Maximum_Pilot_Reference_Level + 4) dB to +6 dB for adjustment to the nominal mean code channel output power given by:

mean code channel output power (dBm) =
mean pilot channel output power (dBm)
+ 0.125 × Nominal_Attribute_Gain[Rate, Frame Duration, Coding].

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

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

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 + 10log (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.

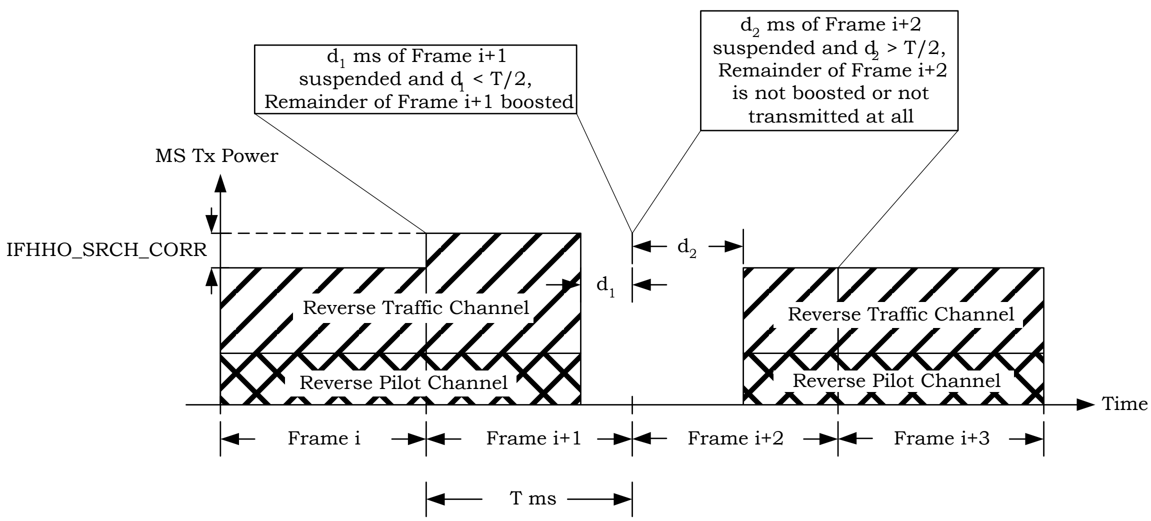


Figure 2.1.2.3.3.2-1. Increased Reverse Traffic Channel Power for Inter-frequency Hard Handoff

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:

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

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

(b) lower limit:

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

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

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

2.1.2.4.2 Closed Loop Correction

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

2.1.2.4.3 Phase Continuity Requirements for Radio Configurations 3 through 6

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

2.1.3 Modulation Characteristics

2.1.3.1 Reverse CDMA Channel Signals

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

A mobile station shall support operation in Radio Configuration 1, 3, or 5. A mobile station may support operation on Radio Configuration 2, 4, or 6. A mobile station supporting operation in Radio Configuration 2 shall support Radio Configuration 1. A mobile station supporting operation in Radio Configuration 4 shall support Radio Configuration 3. A mobile station supporting operation in Radio Configuration 6 shall support Radio Configuration 5.

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

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

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

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

If the mobile station supports the Forward Dedicated Control Channel with Radio Configuration 3 or 4, then it shall support the Reverse Dedicated Control Channel with Radio Configuration 3. If the mobile station supports the Forward Dedicated Control Channel with Radio Configuration 5, then it shall support the Reverse Dedicated Control Channel with Radio Configuration 4. If the mobile station supports the Forward Dedicated Control Channel with Radio Configuration 6 or 7, then it shall support the Reverse Dedicated Control Channel with Radio Configuration 3 or 5. If the mobile station supports the Forward Dedicated Control Channel with Radio Configuration 8 or 9, then it shall support the Reverse Dedicated Control Channel with Radio Configuration 4 or 6.

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.		

2.1.3.1.1 Channel Structures

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

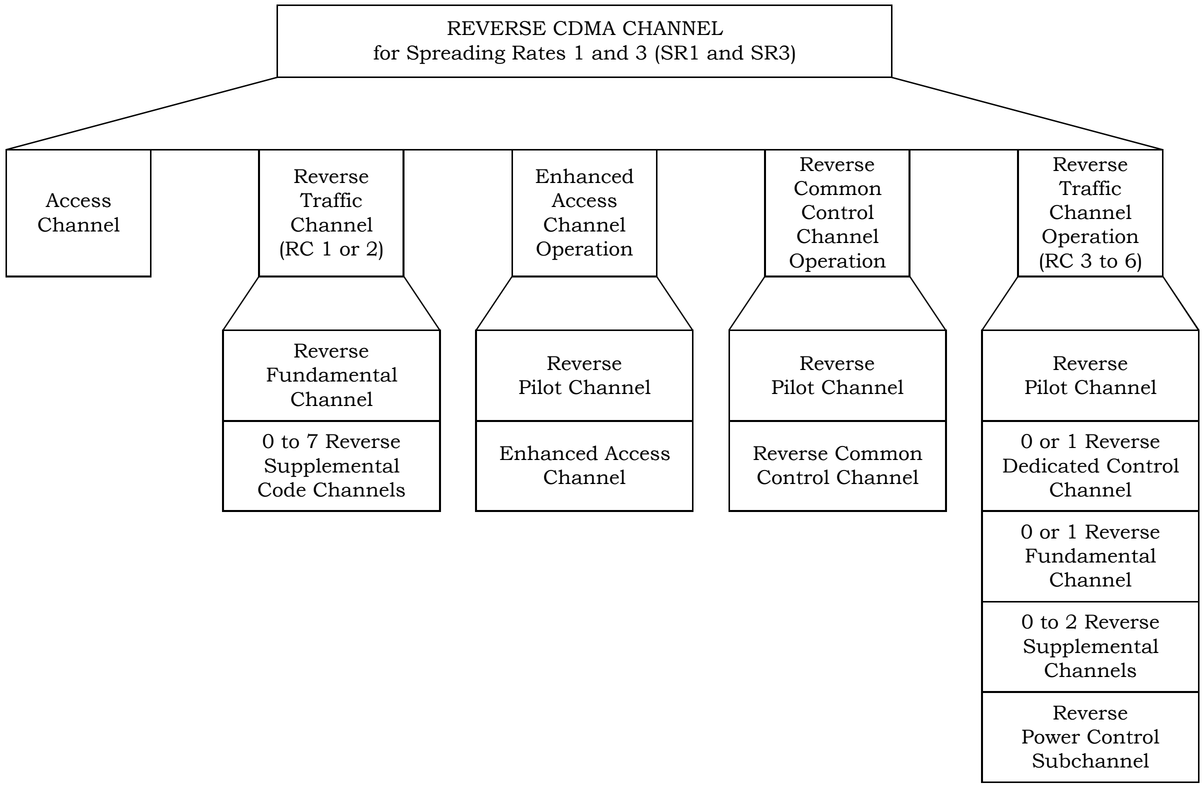


Figure 2.1.3.1.1-1. Reverse CDMA Channels Received at the Base Station

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.

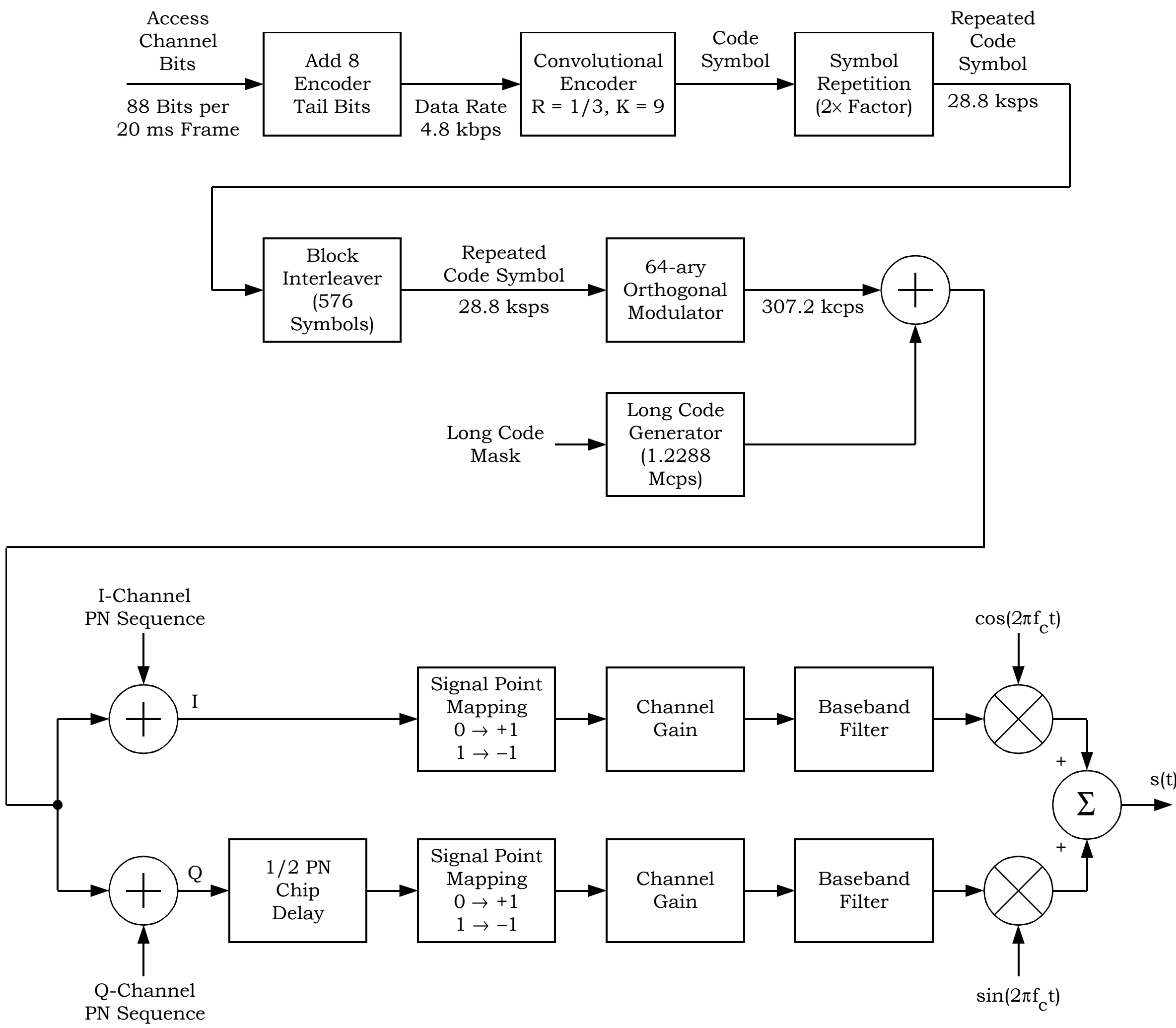


Figure 2.1.3.1.1.1-1. Channel Structure for the Access Channel for Spreading Rate 1

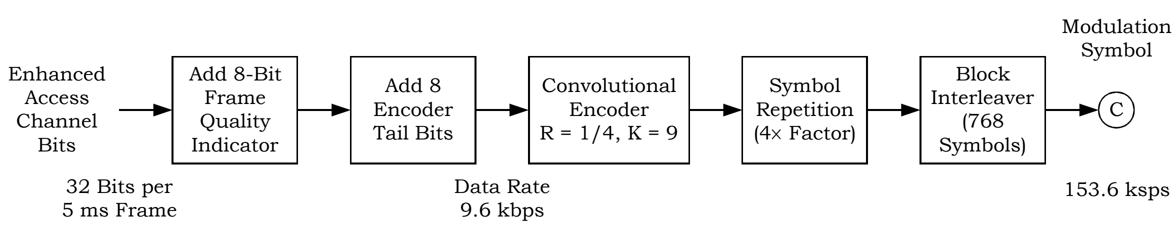
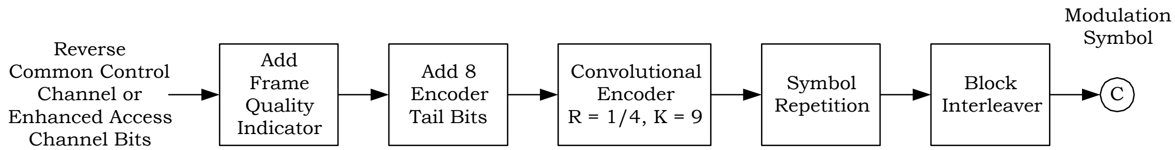
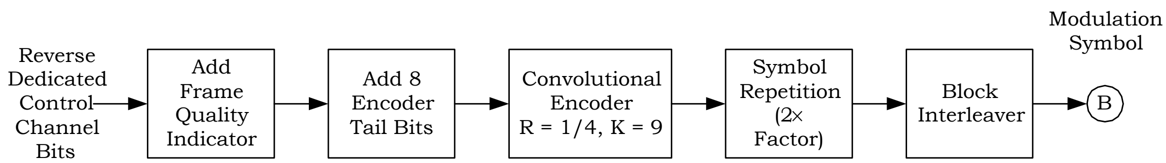


Figure 2.1.3.1.1.1-2. Channel Structure for the Header on the Enhanced Access Channel for Spreading Rate 1



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

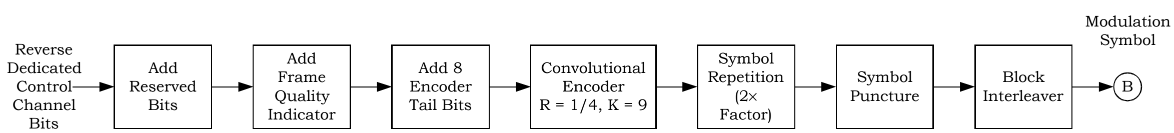
Figure 2.1.3.1.1.1-3. Channel Structure for the Data on the Enhanced Access Channel and the Reverse Common Control Channel for Spreading Rate 1



Bits/Frame	Bits	Data Rate (kbps)	Symbols	Rate (ksps)
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 2.1.3.1.1.1-4. Reverse Dedicated Control Channel Structure for Radio Configuration 3



Bits/Frame	Bits	Bits	Data Rate (kbps)	Deletion	Symbols	Rate (ksps)
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 2.1.3.1.1.1-5. Reverse Dedicated Control Channel Structure for Radio Configuration 4

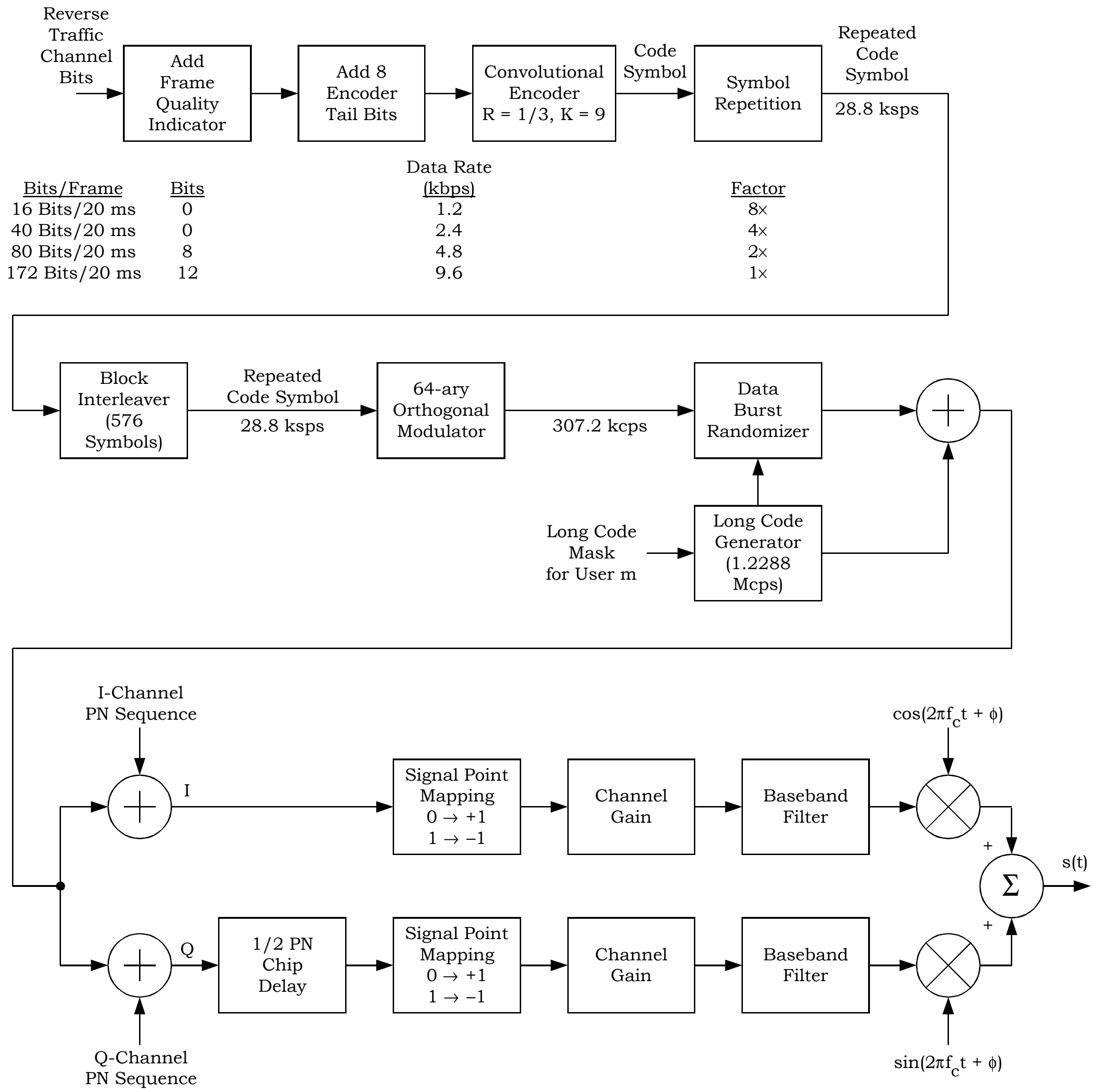


Figure 2.1.3.1.1.1-6. Channel Structure for the Reverse Fundamental Channel and Reverse Supplemental Code Channel with Radio Configuration 1

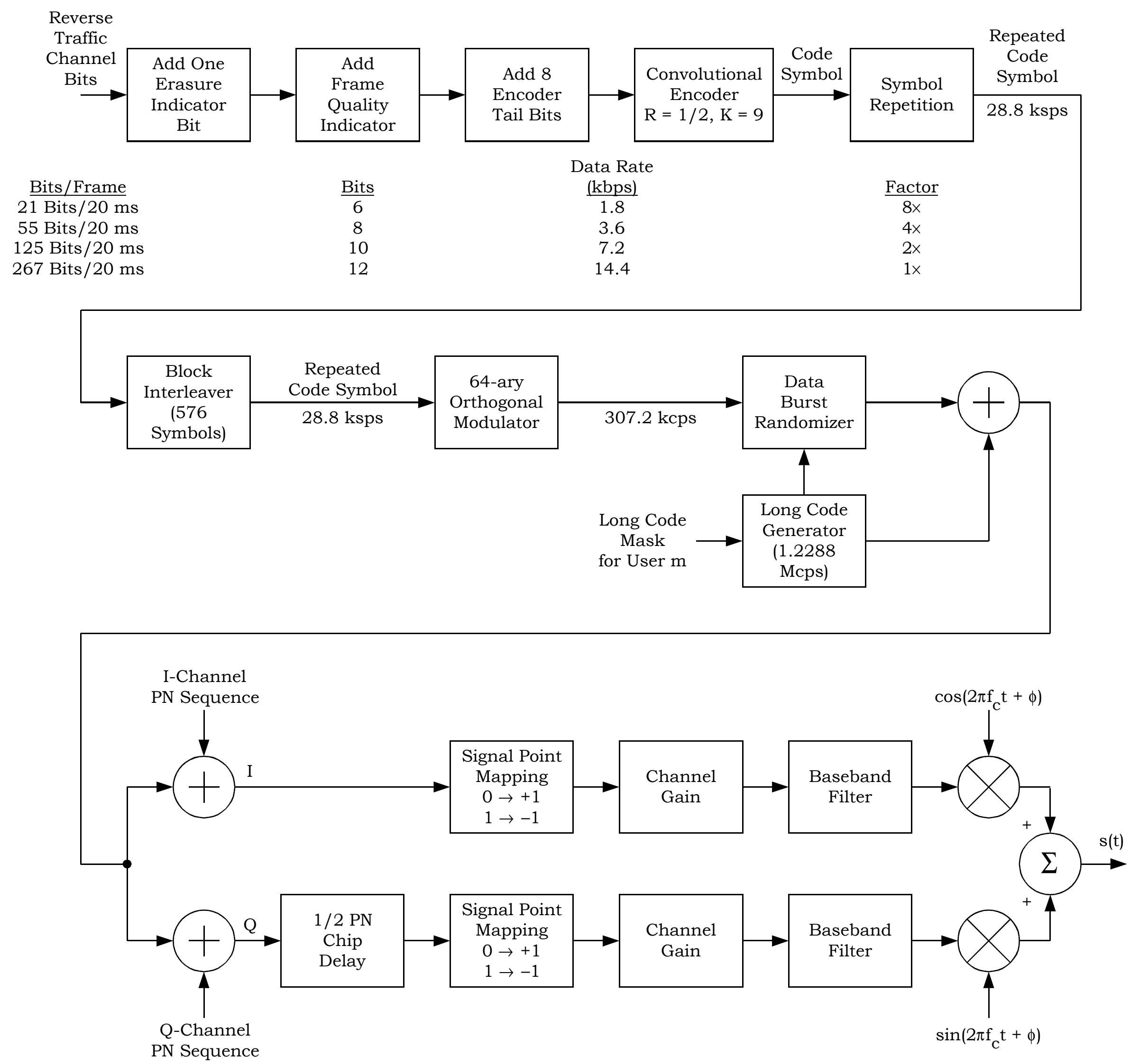
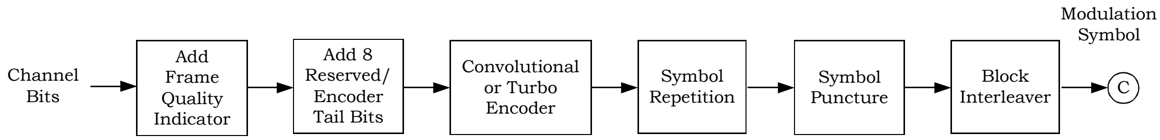


Figure 2.1.3.1.1.1-7. Channel Structure for the Reverse Fundamental Channel and Reverse Supplemental Code Channel with Radio Configuration 2

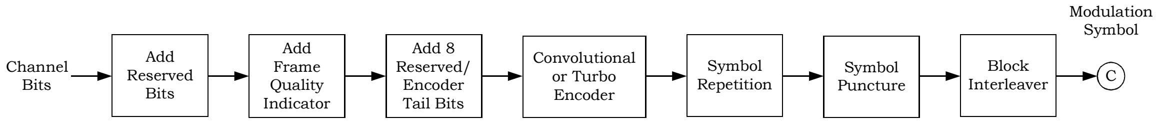


Bits/Frame	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	1/4	2×	None	384	76.8
16 Bits/20 ms	6	1.5	1/4	16×	1 of 5	1,536	76.8
40 Bits/20n ms	6	2.7/n	1/4	8×	1 of 9	1,536	76.8/n
80 Bits/20n ms	8	4.8/n	1/4	4×	None	1,536	76.8/n
172 Bits/20n ms	12	9.6/n	1/4	2×	None	1,536	76.8/n
360 Bits/20n ms	16	19.2/n	1/4	1×	None	1,536	76.8/n
744 Bits/20n ms	16	38.4/n	1/4	1×	None	3,072	153.6/n
1,512 Bits/20n ms	16	76.8/n	1/4	1×	None	6,144	307.2/n
3,048 Bits/20n ms	16	153.6/n	1/4	1×	None	12,288	614.4/n
6,120 Bits/20n ms	16	307.2/n	1/2	1×	None	12,288	614.4/n
1 to 6,119 Bits/20n ms							

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.

Figure 2.1.3.1.1.1-8. Reverse Fundamental Channel and Reverse Supplemental Channel Structure for Radio Configuration 3



Bits/Frame	Bits	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	1/4	2×	None	384	76.8
21 Bits/20 ms	1	6	1.8	1/4	16×	8 of 24	1,536	76.8
55 Bits/20n ms	1	8	3.6/n	1/4	8×	8 of 24	1,536	76.8/n
125 Bits/20n ms	1	10	7.2/n	1/4	4×	8 of 24	1,536	76.8/n
267 Bits/20n ms	1	12	14.4/n	1/4	2×	8 of 24	1,536	76.8/n
552 Bits/20n ms	0	16	28.8/n	1/4	1×	4 of 12	1,536	76.8/n
1,128 Bits/20n ms	0	16	57.6/n	1/4	1×	4 of 12	3,072	153.6/n
2,280 Bits/20n ms	0	16	115.2/n	1/4	1×	4 of 12	6,144	307.2/n
4,584 Bits/20n ms	0	16	230.4/n	1/4	1×	4 of 12	12,288	614.4/n
1 to 4,583 Bits/20n ms								

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 2.1.3.1.1.1-9. Reverse Fundamental Channel and Reverse Supplemental Channel Structure for Radio Configuration 4

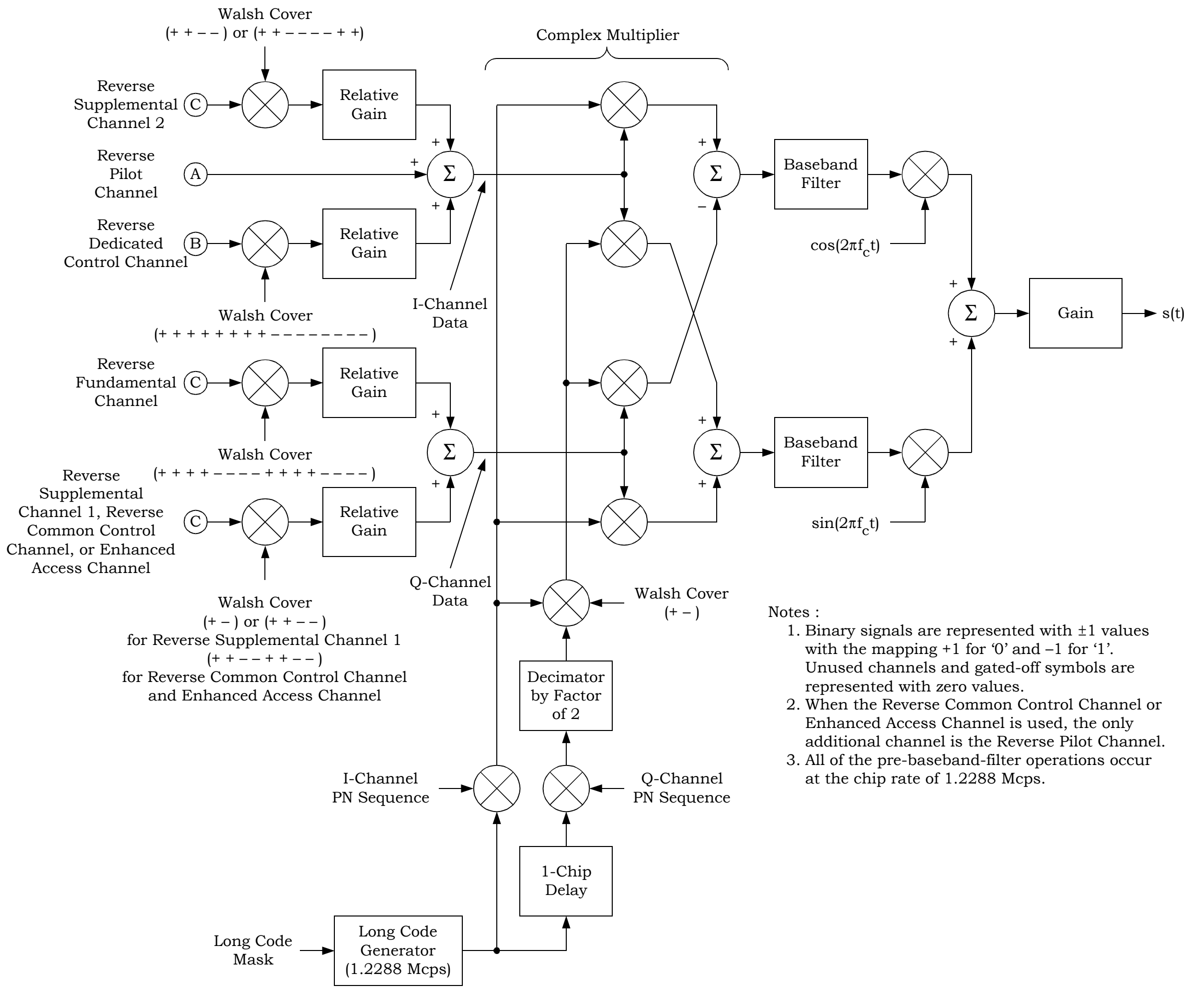


Figure 2.1.3.1.1.1-10. I and Q Mapping for Reverse Pilot Channel, Enhanced Access Channel, Reverse Common Control Channel, and Reverse Traffic Channel with Radio Configurations 3 and 4

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.

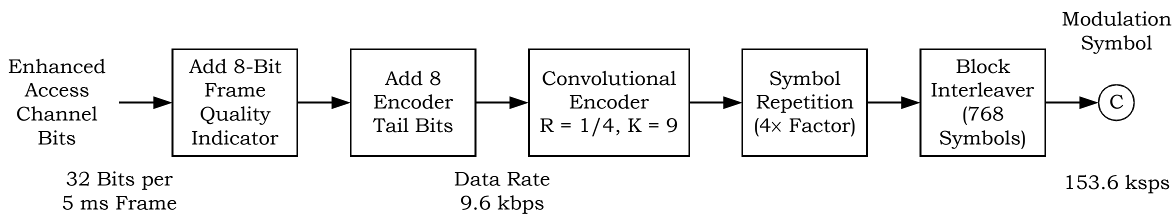
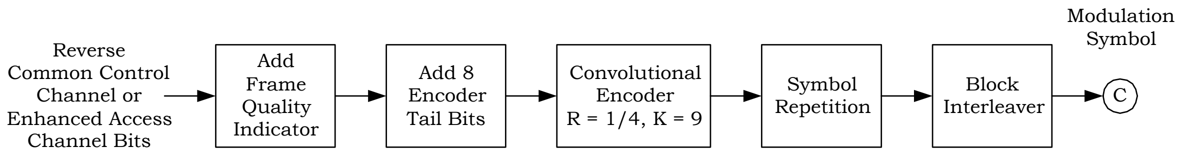
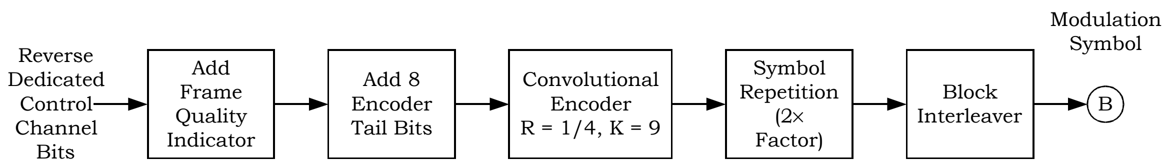


Figure 2.1.3.1.1.2-1. Channel Structure for the Header on the Enhanced Access Channel for Spreading Rate 3



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

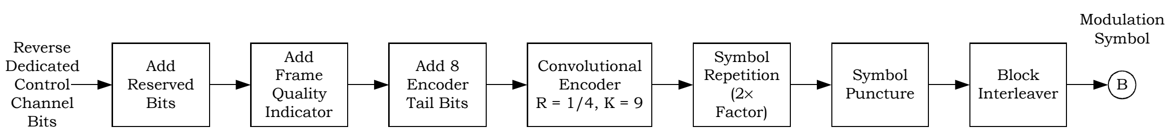
Figure 2.1.3.1.1.2-2. Channel Structure for the Data on the Enhanced Access Channel and the Reverse Common Control Channel for Spreading Rate 3



Bits/Frame	Bits	Data Rate (kbps)	Symbols	Rate (ksps)
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.

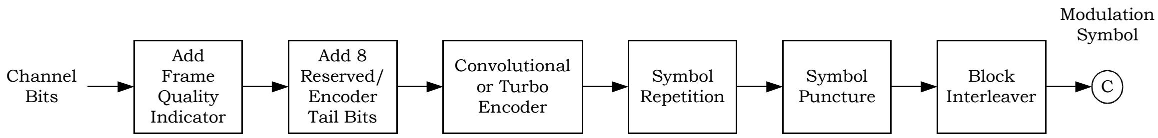
Figure 2.1.3.1.1.2-3. Reverse Dedicated Control Channel Structure for Radio Configuration 5



Bits/Frame	Bits	Bits	Data Rate Rate (kbps)	Deletion	Symbols	Rate (ksps)
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

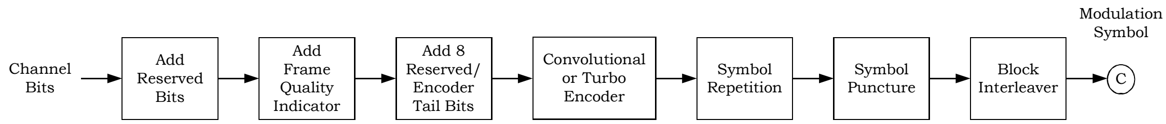


Bits/Frame	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	1/4	2×	None	384	76.8
16 Bits/20 ms	6	1.5	1/4	16×	1 of 5	1,536	76.8
40 Bits/20n ms	6	2.7/n	1/4	8×	1 of 9	1,536	76.8/n
80 Bits/20n ms	8	4.8/n	1/4	4×	None	1,536	76.8/n
172 Bits/20n ms	12	9.6/n	1/4	2×	None	1,536	76.8/n
360 Bits/20n ms	16	19.2/n	1/4	1×	None	1,536	76.8/n
744 Bits/20n ms	16	38.4/n	1/4	1×	None	3,072	153.6/n
1,512 Bits/20n ms	16	76.8/n	1/4	1×	None	6,144	307.2/n
3,048 Bits/20n ms	16	153.6/n	1/4	1×	None	12,288	614.4/n
6,120 Bits/20n ms	16	307.2/n	1/3	1×	None	18,432	921.6/n
12,264 Bits/20n ms	16	614.4/n	1/3	1×	None	36,864	1,843.2/n
1 to 12,263 Bits/20n ms							

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



Bits/Frame	Bits	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	1/4	2×	None	384	76.8
21 Bits/20 ms	1	6	1.8	1/4	16×	8 of 24	1,536	76.8
55 Bits/20n ms	1	8	3.6/n	1/4	8×	8 of 24	1,536	76.8/n
125 Bits/20n ms	1	10	7.2/n	1/4	4×	8 of 24	1,536	76.8/n
267 Bits/20n ms	1	12	14.4/n	1/4	2×	8 of 24	1,536	76.8/n
552 Bits/20n ms	0	16	28.8/n	1/4	1×	None	2,304	115.2/n
1,128 Bits/20n ms	0	16	57.6/n	1/4	1×	None	4,608	230.4/n
2,280 Bits/20n ms	0	16	115.2/n	1/4	1×	None	9,216	460.8/n
4,584 Bits/20n ms	0	16	230.4/n	1/4	1×	None	18,432	921.6/n
9,192 Bits/20n ms	0	16	460.8/n	1/4	1×	None	36,864	1,843.2/n
20,712 Bits/20n ms	0	16	1,036.8/n	1/2	1×	2 of 18	36,864	1,843.2/n
1 to 20,711 Bits/20n ms								

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.

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

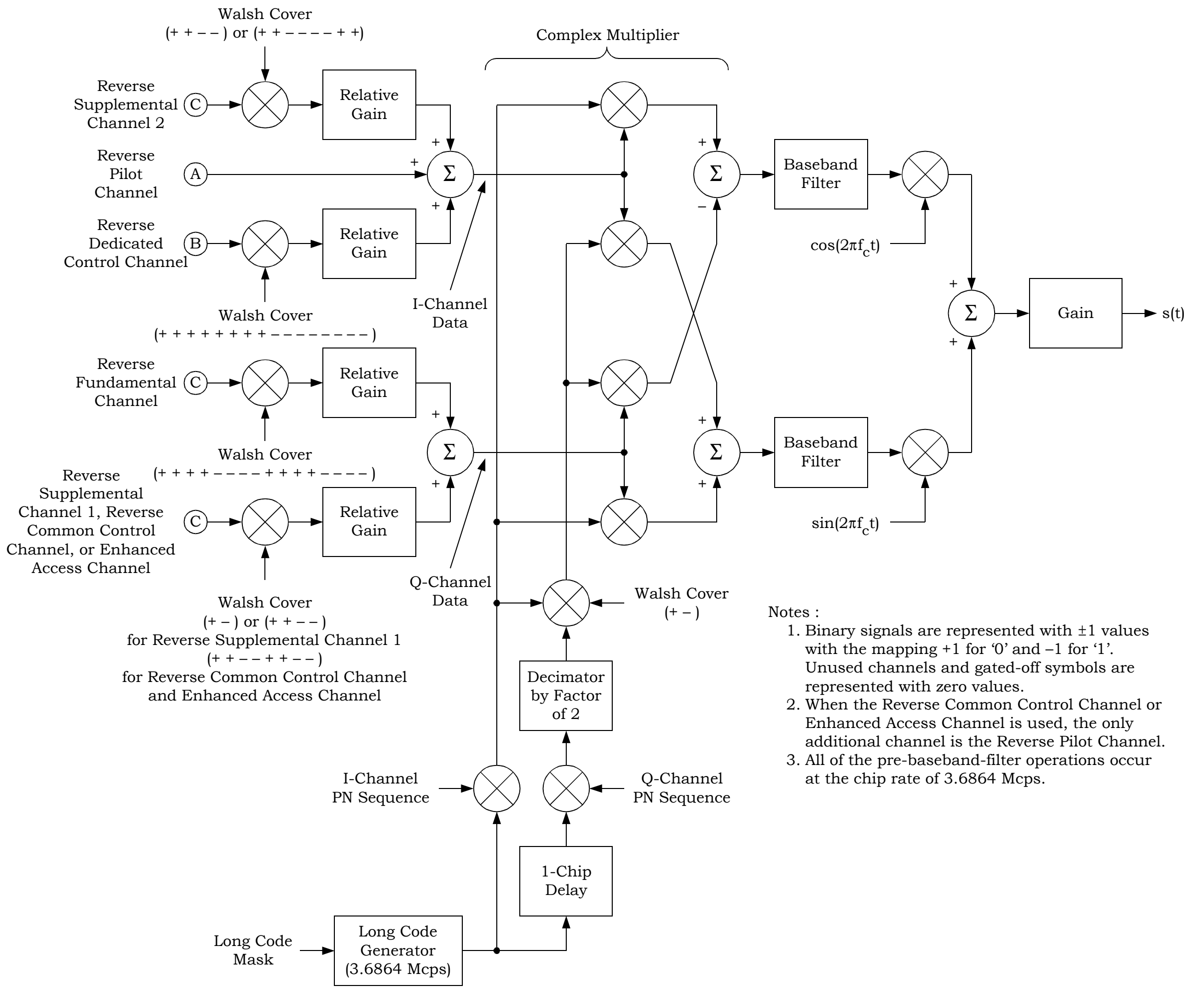


Figure 2.1.3.1.1.2-7. I and Q Mapping for Spreading Rate 3

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.

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

	Data Rate (bps)	
Parameter	**4,800**	**Units**
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

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

	Data Rate (bps)			
Parameter	**9,600**	**19,200**	**38,400**	**Units**
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.

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

	Data Rate (bps)			
Parameter	**9,600**	**19,200**	**38,400**	**Units**
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

	Data Rate (bps)	
Parameter	**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
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.

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

Parameter	Data Rate (bps) 9,600	Data Rate (bps) 14,400	Units
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.

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

	Data Rate (bps)				
Parameter	**9,600**	**4,800**	**2,400**	**1,200**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**14,400**	**7,200**	**3,600**	**1,800**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,700**	**1,500**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,350**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,200**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

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

	Data Rate (bps)	
Parameter	**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

2.1.3.1.2.2 Spreading Rate 3

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

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

	Data Rate (bps)			
Parameter	**9,600**	**19,200**	**38,400**	**Units**
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.

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

	Data Rate (bps)			
Parameter	**9,600**	**19,200**	**38,400**	**Units**
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

	Data Rate (bps)	
Parameter	**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
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.

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

	Data Rate (bps)		
Parameter	**9,600**	**14,400**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,700**	**1,500**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,350**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,200**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

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

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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

	Data Rate (bps)	
Parameter	**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.

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)

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)

2.1.3.1.4 Forward Error Correction

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

If the mobile station supports variable-rate Reverse Supplemental Channel operation, flexible data rates, or both, and the specified number of reserved bits, information bits and frame quality indicator bits per frame do not match one of those listed in Tables 2.1.3.8.2-1, 2.1.3.8.2-2, or 2.1.3.8.2-3 for the Reverse Supplemental Channel, the forward error correction type of the Reverse Supplemental Channel shall be the same as that of the maximum assigned data rate for that channel, unless turbo coding is not available for the specified data rate, in which case convolutional coding shall be used. The forward error correction code rate of a specified frame format, not listed in Tables 2.1.3.8.2-1, 2.1.3.8.2-2, or 2.1.3.8.2-3 for the Reverse Supplemental Channel, shall be the same as that of the lowest listed data rate in the same radio configuration that is higher than the specified data rate.

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.

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 ≥ 360)	1/4 (RC 5, N ≤ 3048) 1/3 (RC 5, N > 3048) 1/4 (RC 6, N ≤ 9192) 1/2 (RC 6, N > 9192)

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

2.1.3.1.4.1 Convolutional Encoding

All convolutional codes shall have a constraint length of 9.

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

2.1.3.1.4.1.1 Rate 1/4 Convolutional Code

The generator functions for the rate 1/4 code shall be g_0 equals 765 (octal), g_1 equals 671 (octal), g_2 equals 513 (octal), and g_3 equals 473 (octal). This code generates four 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 is output first, the code symbol (c_1) encoded with generator function g_1 is output second, the code symbol (c_2) encoded with generator function g_2 is output third, and the code symbol (c_3) encoded with generator function g_3 is output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol that is output after initialization shall be a code symbol encoded with generator function g_0. The encoder for this code is illustrated in Figure 2.1.3.1.4.1.1-1.

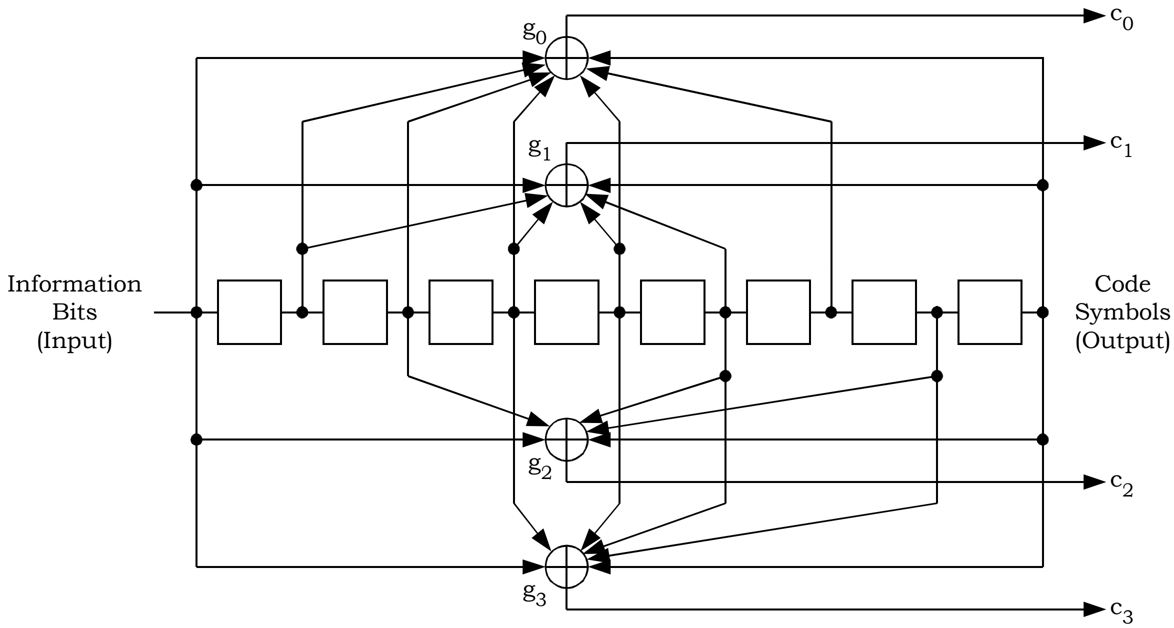


Figure 2.1.3.1.4.1.1-1. K = 9, Rate 1/4 Convolutional Encoder

2.1.3.1.4.1.2 Rate 1/3 Convolutional Code

The generator functions for this code shall be g_0 equals 557 (octal), g_1 equals 663 (octal), and g_2 equals 711 (octal). This code generates three 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, the code symbol (c_1) encoded with generator function g_1 shall be output second, and the code symbol (c_2) encoded with generator function g_2 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 2.1.3.1.4.1.2-1.

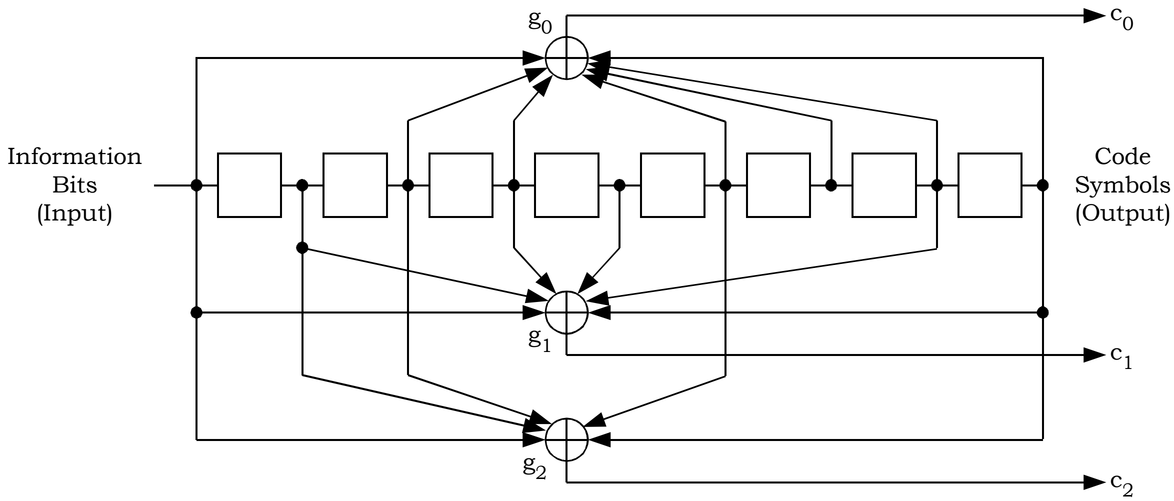


Figure 2.1.3.1.4.1.2-1. K = 9, Rate 1/3 Convolutional Encoder

2.1.3.1.4.1.3 Rate 1/2 Convolutional Code

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.

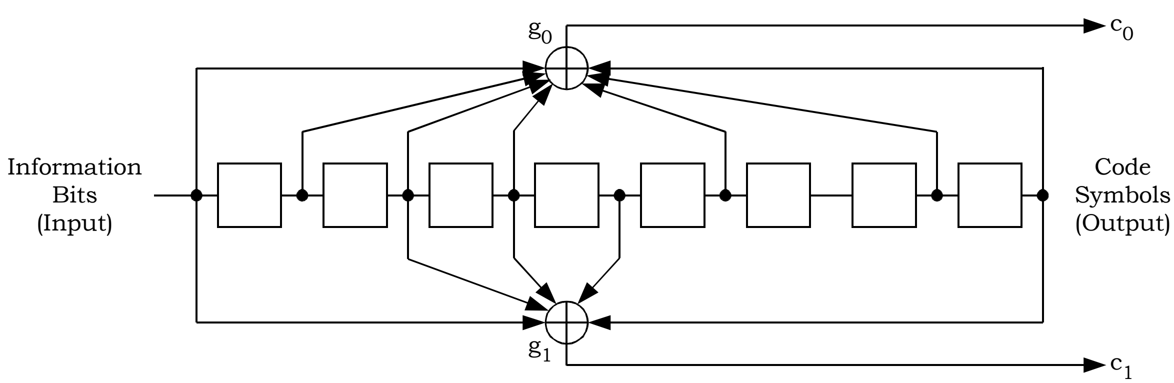


Figure 2.1.3.1.4.1.3-1. K = 9, Rate 1/2 Convolutional Encoder

2.1.3.1.4.2 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 $(N_{turbo} + 6)/R$ output symbols.

2.1.3.1.4.2.1 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 2.1.3.1.4.2.1-1. 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 2.1.3.1.4.2.1-1. 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.

2.1.3.1.4.2.2 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 2.1.3.1.4.2.1-1. 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.

The constituent encoder output symbol puncturing and symbol repetition shall be as specified in Table 2.1.3.1.4.2.2-1. Within a puncturing pattern, a ‘0’ means that the symbol shall be deleted and a ‘1’ means that a symbol shall be passed. For rate 1/2 turbo codes, the tail output symbols for each of the first three tail bit periods shall be XY_0, and the tail output symbols for each of the last three tail bit periods shall be $X'Y'_0$. For rate 1/3 turbo codes, the tail output symbols for each of the first three tail bit periods shall be XXY_0, and the tail output symbols for each of the last three tail bit periods shall be $X'X'Y'_0$.

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

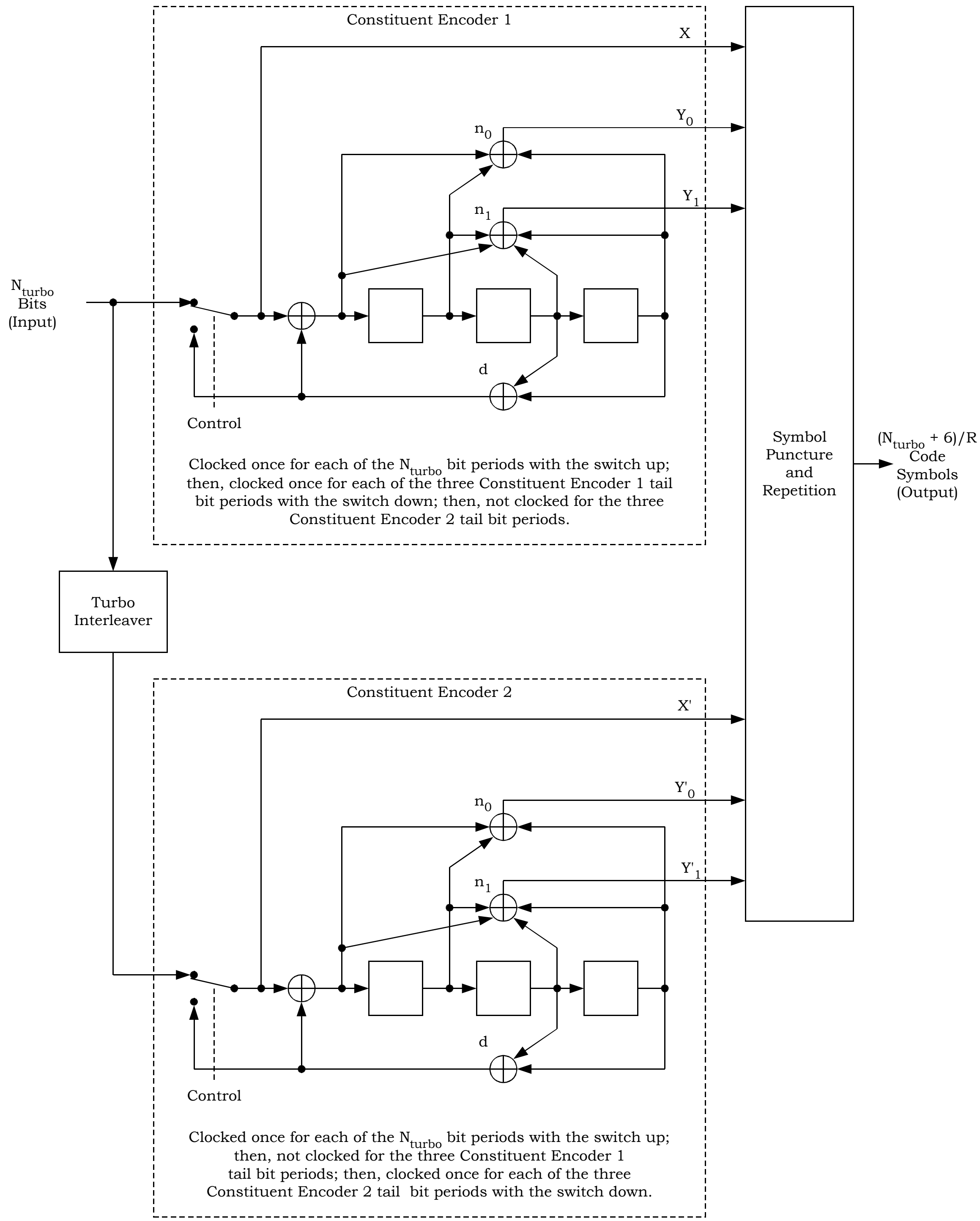


Figure 2.1.3.1.4.2.1-1. Turbo Encoder

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

	Code Rate		
Output	**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.

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

	Code Rate		
Output	**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.

2.1.3.1.4.2.3 Turbo Interleavers

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

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

Let the sequence of input addresses be from 0 to $N_{turbo} - 1$, 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 $N_{turbo} \le 2^{n+5}$. 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.

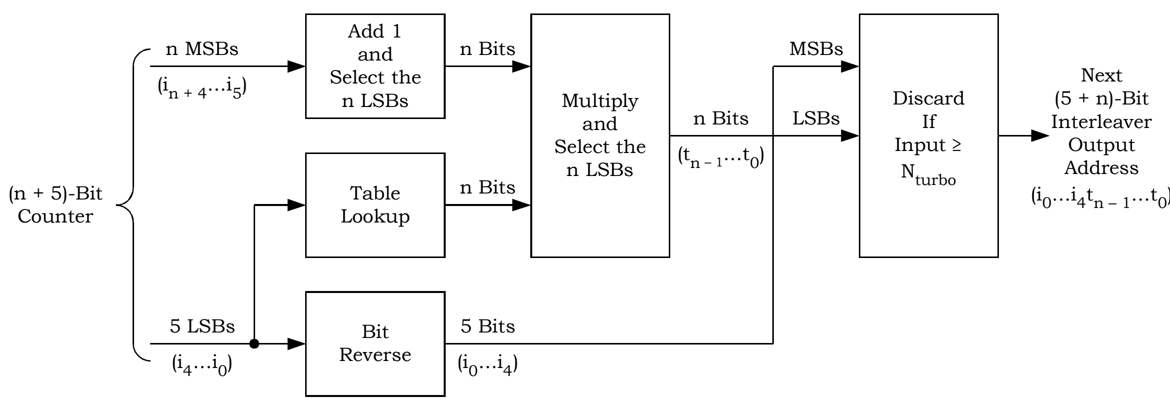


Figure 2.1.3.1.4.2.3-1. Turbo Interleaver Output Address Calculation Procedure

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[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.

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

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

2.1.3.1.5 Code Symbol Repetition

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

If variable-rate Reverse Supplemental Channel operation is supported and the specified data rate on the Reverse Supplemental Channel is not the maximum assigned data rate, the symbol repetition factor for the specified data rate is the ratio of the interleaver block size of the maximum assigned data rate and the specified number of encoded symbols per frame. See N_FSCH_BITS_SET[FOR_SCH_ID][SCCL_INDEX] in [5].

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 on the Reverse Dedicated Control Channel, the Reverse Fundamental Channel, and the Reverse Supplemental Channel.
- Otherwise, the repetition factor is the ratio of the interleaver block size of the maximum assigned data rate and the specified number of encoded symbols per frame.

If the repetition factor is less than 1, then code symbol repitition shall be disabled. Otherwise, the symbol repetition[12] 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 ($N \geq L$).

[12] The symbol repetition factor is N/L.

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)

2.1.3.1.6 Puncturing

2.1.3.1.6.1 Convolutional Code Symbol Puncturing

Table 2.1.3.1.6.1-1 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 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

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

2.1.3.1.6.2 Turbo Code Symbol Puncturing

Table 2.1.3.1.6.2-1 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 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

2.1.3.1.6.3 Flexible and Variable Rate Puncturing

If variable-rate Reverse Supplemental Channel operation, flexible data rates, or both are supported, puncturing after symbol repetition is calculated as described here. However, 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 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, or 2.1.3.8.2-3 for the Reverse 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 to N-1,

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

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

Otherwise, puncturing after symbol repetition shall be disabled.

2.1.3.1.7 Block Interleaving

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

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

At 9600 or 14400 bps:

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

At 4800 or 7200 bps:

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

At 2400 or 3600 bps:

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

At 1200 or 1800 bps:

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

For the Access Channel, the Enhanced Access Channel, the Reverse Common Control Channel, and the Reverse Traffic Channel with Radio Configurations 3, 4, 5, and 6, 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 a permuted order with the i-th symbol being read from address A_i, as follows:

$$A_i = 2^m (i \bmod J) + BRO_m(\lfloor i / J \rfloor)$$

where

i = 0 to N – 1,

$\lfloor x \rfloor$ indicates the largest integer less than or equal to x, and

$BRO_m(y)$ indicates the bit-reversed m-bit value of y (i.e., $BRO_3(6) = 3$).

The interleaver parameters m and J are specified in Table 2.1.3.1.7-1.

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

2.1.3.1.8 Orthogonal Modulation and Spreading

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

$$\mathbf{H_1} = 0, \qquad \mathbf{H_2} = \begin{matrix} 0 & 0 \\ 0 & 1 \end{matrix}, \qquad \mathbf{H}_4 = \begin{matrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{matrix}, \qquad \mathbf{H}_{2N} = \begin{matrix} \mathbf{H}_N & \mathbf{H}_N \\ \mathbf{H}_N & \overline{\mathbf{H}_N} \end{matrix};$$

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... μs). 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... μs).

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

Table 2.1.3.1.8.1-1. 64-ary Orthogonal Symbol Set

Walsh Chip within Symbol

MODULATION SYMBOL INDEX	0 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 33 34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53 54 55	56 57 58 59	60 61 62 63
0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1
2	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1
3	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0
4	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1
5	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0
6	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0
7	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1
8	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1
9	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0
10	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0
11	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1
12	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0
13	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1
14	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1
15	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0
16	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
17	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0
18	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0
19	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1
20	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0
21	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1
22	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1
23	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0
24	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0
25	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1
26	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1
27	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0
28	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1
29	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0
30	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0
31	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1
32	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
33	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0
34	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0
35	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1
36	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0
37	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1
38	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1
39	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0
40	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0
41	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1
42	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1
43	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0
44	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1
45	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0
46	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0
47	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1
48	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
49	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1
50	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1
51	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0
52	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1
53	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0
54	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0
55	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1
56	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1
57	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0
58	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0
59	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1
60	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0
61	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1
62	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1
63	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0

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 × 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:

$$\mathbf{H_1} = 0, \qquad \mathbf{H_2} = \begin{matrix} 0 & 0 \\ 0 & 1 \end{matrix}, \qquad \mathbf{H}_4 = \begin{matrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{matrix}, \qquad \mathbf{H}_{2N} = \begin{matrix} \mathbf{H}_N & \mathbf{H}_N \\ \mathbf{H}_N & \overline{\mathbf{H}_N} \end{matrix};$$

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 ≤ n ≤ 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 μs for Spreading Rate 1 and with a period of N/3.6864 μs 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.

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

Table 2.1.3.1.8.2-2. Reverse Supplemental Channel Walsh Functions 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

Table 2.1.3.1.8.2-3. Reverse Supplemental Channel Walsh Functions 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

Table 2.1.3.1.8.2-4. Reverse Supplemental Channel Walsh Functions 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

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

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

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

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

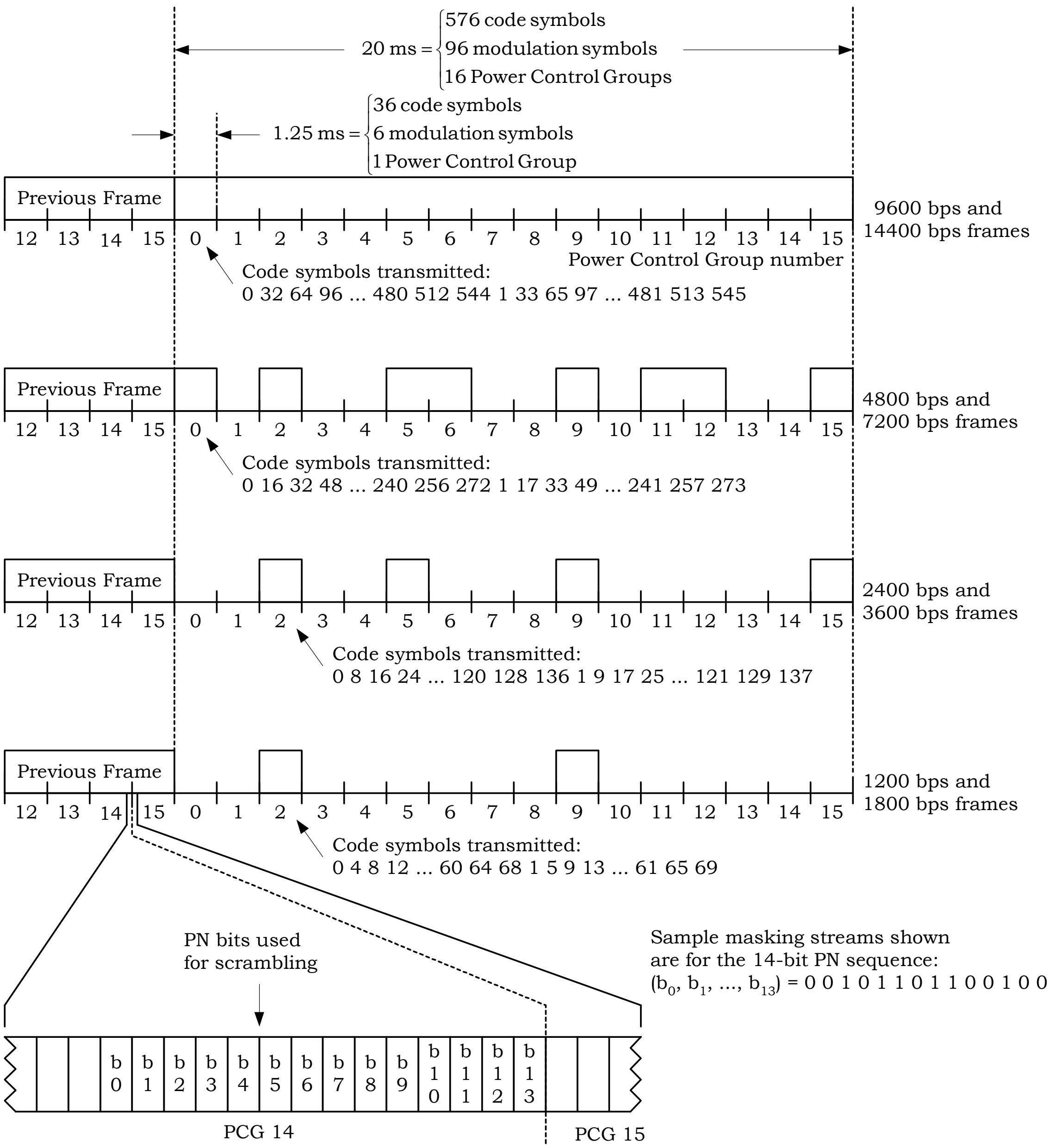

Figure 2.1.3.1.9.1-1. Reverse CDMA Channel Variable Data Rate Transmission for Radio Configurations 1 and 2 Example

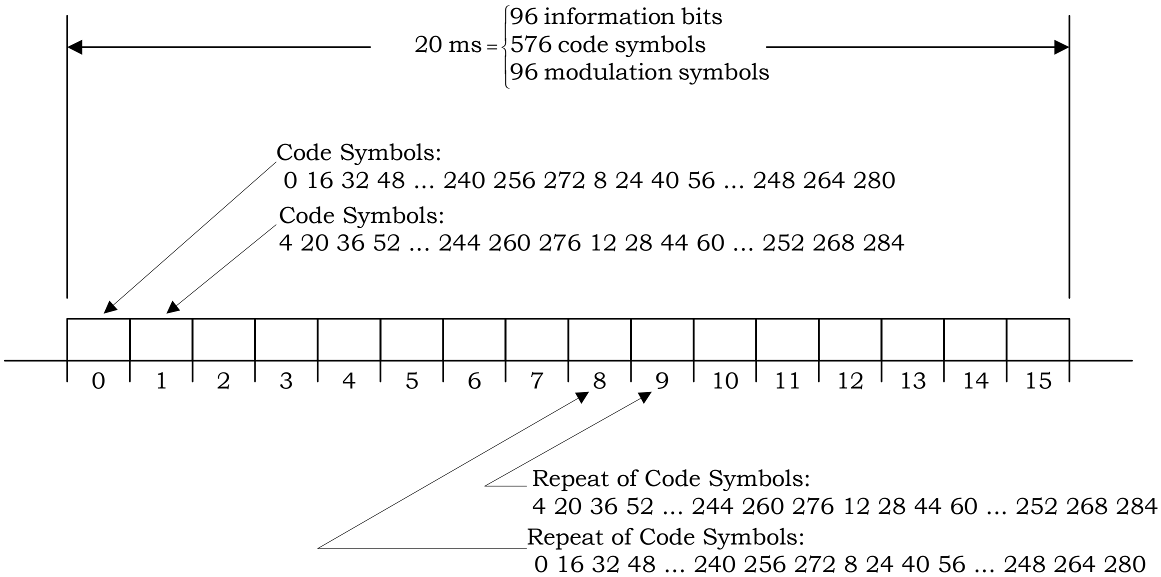

Figure 2.1.3.1.9.1-2. Access Channel Transmission Structure

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.

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[13]In 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.

Data Rate Selected: 4800 or 7200 bps

Transmission shall occur on power control groups numbered

b_0, 2 + b_1, 4 + b_2, 6 + b_3, 8 + b_4, 10 + b_5, 12 + b_6, 14 + b_7.

Data Rate Selected: 2400 or 3600 bps

Transmission shall occur on power control groups numbered

b_0 if b_8 = '0', or 2 + b_1 if b_8 = '1';

4 + b_2 if b_9 = '0', or 6 + b_3 if b_9 = '1';

8 + b_4 if b_{10} = '0', or 10 + b_5 if b_{10} = '1';

12 + b_6 if b_{11} = '0', or 14 + b_7 if b_{11} = '1'.

Data Rate Selected: 1200 or 1800 bps

Transmission shall occur on power control groups numbered

b_0	if (b_8, b_{12})	=	('0', '0'), or
2 + b_1	if (b_8, b_{12})	=	('1', '0'), or
4 + b_2	if (b_9, b_{12})	=	('0', '1'), or
6 + b_3	if (b_9, b_{12})	=	('1', '1');
8 + b_4	if (b_{10}, b_{13})	=	('0', '0'), or
10 + b_5	if (b_{10}, b_{13})	=	('1', '0'), or
12 + b_6	if (b_{11}, b_{13})	=	('0', '1'), or
14 + b_7	if (b_{11}, b_{13})	=	('1', '1').

2.1.3.1.9.3 Gating During a PUF Probe

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

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

2.1.3.1.9.4 Reverse Pilot Channel Gating

The mobile station may support Reverse Pilot Channel gating when operating in Reverse Radio Configuration 3, 4, 5, or 6 and when none of the following channels is assigned: the Reverse Fundamental Channel, the Reverse Supplemental Channel, the Forward Fundamental Channel, and the Forward Supplemental Channel. If the mobile station 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 × 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 × N PN chips, and transmit the Reverse Power Control Subchannel in the following 384 × 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 × 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 × N PN chips on the Reverse Power Control Subchannel is a repetition of the Erasure Indicator Bit (EIB) or the

Quality Indicator Bit (QIB) generated by the mobile station (see 2.2.2.2). For FPC_MODE_S = '110', each of the 384 × N PN chips on the Primary Reverse Power Control Subchannel is a repetition of the forward power control bit generated by the mobile station and each of the 384 × N PN chips on the Secondary Reverse Power Control Subchannel is a repetition of the Erasure Indicator Bit (EIB) generated by the mobile station (see 2.2.2.2).

All PN chips sent on the Reverse Pilot Channel within a power control group shall be transmitted at the same power level. The structure of the Reverse Power Control Subchannel is illustrated in Figure 2.1.3.1.10.1-1.

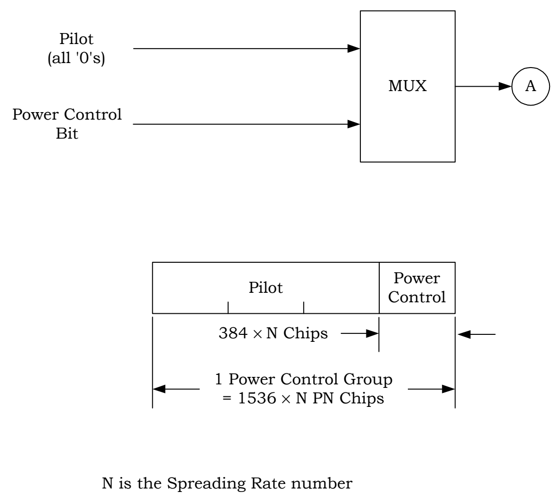


Figure 2.1.3.1.10.1-1. Reverse Pilot Channel Showing the Power Control Subchannel Structure

The Reverse Pilot Channel can be transmitted with the gated transmission mode enabled or disabled as described in 2.1.3.2.3. When the gated transmission mode is disabled ($PILOT\_GATING\_USE\_RATE_S$ = '0'), the mobile station shall transmit the Reverse Power Control Subchannel in every power control group as shown in Figure 2.1.3.1.10.1-2. When the gated transmission mode is enabled ($PILOT\_GATING\_USE\_RATE_S$ = '1'), the mobile station shall transmit the Reverse Power Control Subchannel only in the power control groups that are gated on as specified in 2.1.3.2.3. The relative timings of the forward and reverse power control subchannel transmissions when the gated transmission mode is enabled and disabled are depicted in Figure 2.1.3.1.10.1-3.

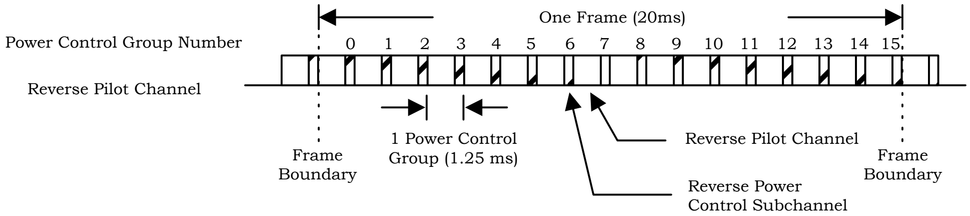
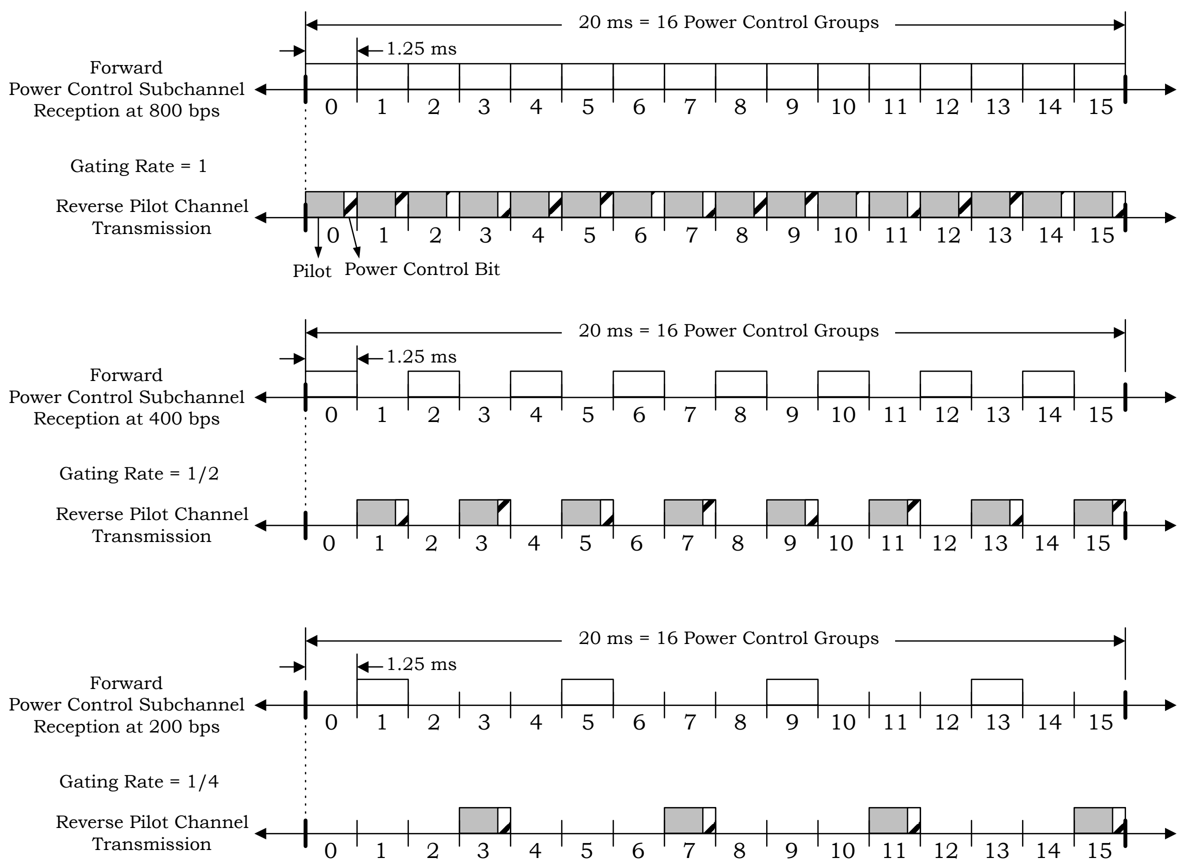


Figure 2.1.3.1.10.1-2. Reverse Power Control Subchannel



power control subchannel transmission as specified in Table 3.1.3.1.10-1 and Figure 3.1.3.1.10-2

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

(PILOT_GATING_USE_RATE$_S$ = ‘1’), the mobile station shall transmit one Reverse Power Control Subchannel. Therefore, when the Reverse Pilot Channel is in the gated mode, FPC_MODE$_S$ shall be ‘000’, ‘011’, or ‘100’.

The configurations of the Reverse Power Control Subchannel when the Reverse Pilot Channel is not in gated mode are shown in Table 2.1.3.1.10.1-1 and described as follow:

- When FPC_MODE$_S$ = ‘000’, the mobile station shall transmit the Primary Reverse Power Control Subchannel (see 2.1.3.1.10.3) at an 800 bps data rate.
- When FPC_MODE$_S$ = ‘001’, the mobile station shall transmit the Primary Reverse Power Control Subchannel at a 400 bps data rate, and the Secondary Reverse Power Control Subchannel (see 2.1.3.1.10.3) at a 400 bps data rate.
- When FPC_MODE$_S$ = ‘010’, the mobile station shall transmit the Primary Reverse Power Control Subchannel at a 200 bps data rate, and the Secondary Reverse Power Control Subchannel (see 2.1.3.1.10.3) at a 600 bps data rate.
- When FPC_MODE$_S$ = ‘011’, the mobile station shall transmit the Erasure Indicator Bit (EIB) on the Reverse Power Control Subchannel. The transmission of the Erasure Indicator Bit shall occur at the second frame (20 ms frame) of the Reverse Traffic Channel following the corresponding Forward Traffic Channel frame in which the Erasure Indicator Bit is determined (see 2.2.2.2 and Figure 2.1.3.1.10.1-4).
- When FPC_MODE$_S$ = ‘100’, the mobile station shall transmit the Quality Indicator Bit (QIB) on the Reverse Power Control Subchannel. The transmission of the Quality Indicator Bit shall occur at the second frame (20 ms frame) of the Reverse Traffic Channel following the corresponding Forward Traffic Channel frame in which the Quality Indicator Bit is determined (see 2.2.2.2 and Figure 2.1.3.1.10.1-4).
- When FPC_MODE$_S$ = ‘101’, the mobile station shall transmit the Quality Indicator Bit (QIB) derived from the Forward Fundamental Channel (FPC_PRI_CHAN$_S$ = ‘0’), or the Forward Dedicated Control Channel (FPC_PRI_CHAN$_S$ = ‘1’), on the Primary Reverse Power Control Subchannel and shall transmit the Erasure Indicator Bit (EIB) derived from Forward Supplemental Channel 0 (FPC_SEC_CHAN$_S$ = ‘0’) or Forward Supplemental Channel 1 (FPC_SEC_CHAN$_S$ = ‘1’), on the Secondary Reverse Power Control Subchannel. The transmission of the Erasure Indicator Bit and the Quality Indicator Bit shall start at the second frame (20 ms frame) of the Reverse Traffic Channel following the corresponding Forward Traffic Channel frame in which the Quality Indicator Bit or Erasure Indicator Bit is determined (see 2.2.2.2 and Figure 2.1.3.1.10.1-5).
- When FPC_MODE$_S$ = ‘110’, the mobile station shall transmit the Primary Reverse Power Control Subchannel at a 400 bps data rate, and shall transmit the Erasure Indicator Bit derived from Forward Supplemental Channel 0 (FPC_SEC_CHAN$_S$ = ‘0’) or Forward Supplemental Channel 1 (FPC_SEC_CHAN$_S$ = ‘1’) on the Secondary Reverse Power Control Subchannel (see 2.1.3.1.10.3 and Figure 2.1.3.1.10.1-5). The transmission of the Erasure Indicator Bit shall start at the second frame (20 ms frame) of the Reverse Traffic Channel following the end of the corresponding Forward Supplemental Channel frame in which the Erasure Indicator Bit is determined.

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.

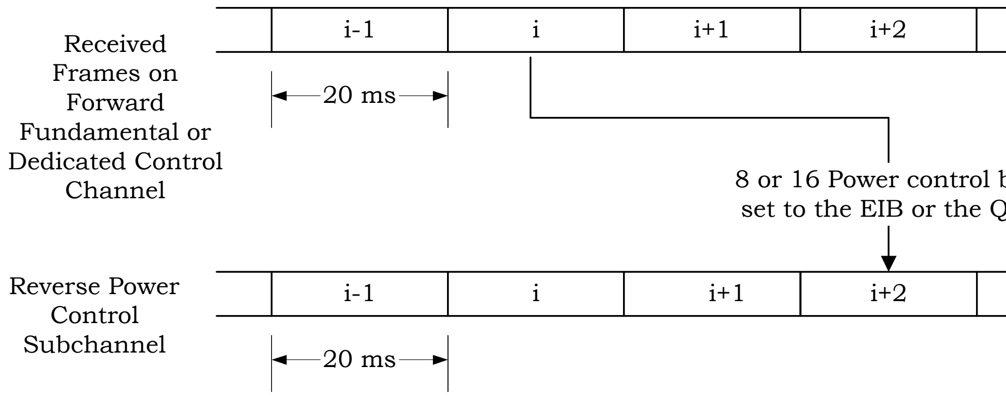


Figure 2.1.3.1.10.1-4. Primary Reverse Power Control Subchannel Transmission Timing for FPC_MODE$_S$ = '011', '100', and '101'

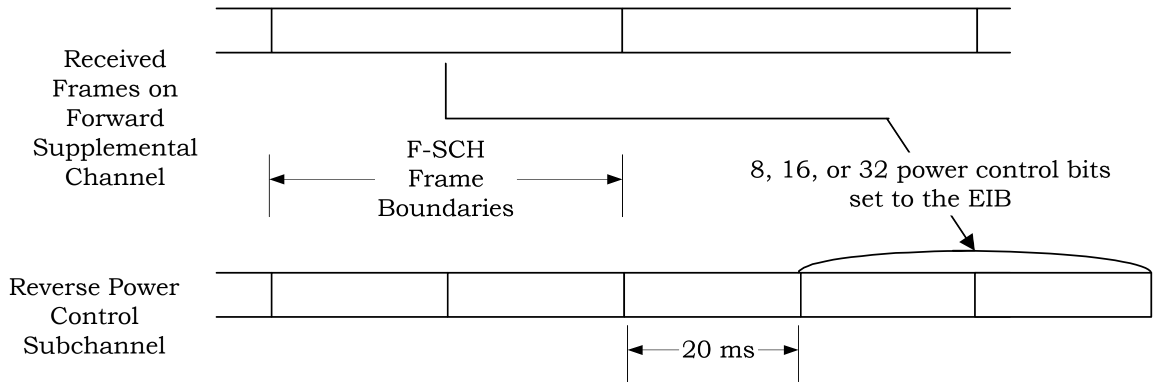


Figure 2.1.3.1.10.1-5. Secondary Reverse Power Control Subchannel Transmission Timing for FPC_MODE$_S$ = '101' and '110'

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$_S$.

If the mobile station is monitoring the Forward Dedicated Control Channel, the mobile station shall adjust FPC_DCCH_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 Dedicated Control Channel for 20 ms frames. When the value of FPC_DCCH_CURR_SETPT$_s$ is greater than FPC_DCCH_MAX_SETPT$_s$, the mobile station shall set FPC_DCCH_CURR_SETPT$_s$ to FPC_DCCH_MAX_SETPT$_s$. When the value of FPC_DCCH_CURR_SETPT$_s$ is less than FPC_DCCH_MIN_SETPT$_s$, the mobile station shall set FPC_DCCH_CURR_SETPT$_s$ to FPC_DCCH_MIN_SETPT$_s$.

If the mobile station is monitoring Forward Supplemental Channel i, the mobile station shall adjust FPC_SCH_CURR_SETPT[i]$_s$ (E_b/N_t) to achieve the target FER for the maximum assigned data rate on the Forward Supplemental Channel i. When the value of FPC_SCH_CURR_SETPT[i]$_s$ is greater than FPC_SCH_MAX_SETPT[i]$_s$, the mobile station shall set FPC_SCH_CURR_SETPT[i]$_s$ to FPC_SCH_MAX_SETPT[i]$_s$. When the value of FPC_SCH_CURR_SETPT[i]$_s$ is less than FPC_SCH_MIN_SETPT[i]$_s$, the mobile station shall set FPC_SCH_CURR_SETPT[i]$_s$ to FPC_SCH_MIN_SETPT[i]$_s$.

The mobile station may suspend its current Forward 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 reception is suspended for d ms in a frame of length T ms, and if d is less than T/2, the mobile station may increase its setpoint value by an amount no greater than (1 + 10log(T/(T - d))) dB (rounded to the nearest 0.125 dB) for the remainder of the frame that is received. The mobile station shall resume its original setpoint value at the beginning of the next frame. See Figure 2.1.3.1.10.2-1.

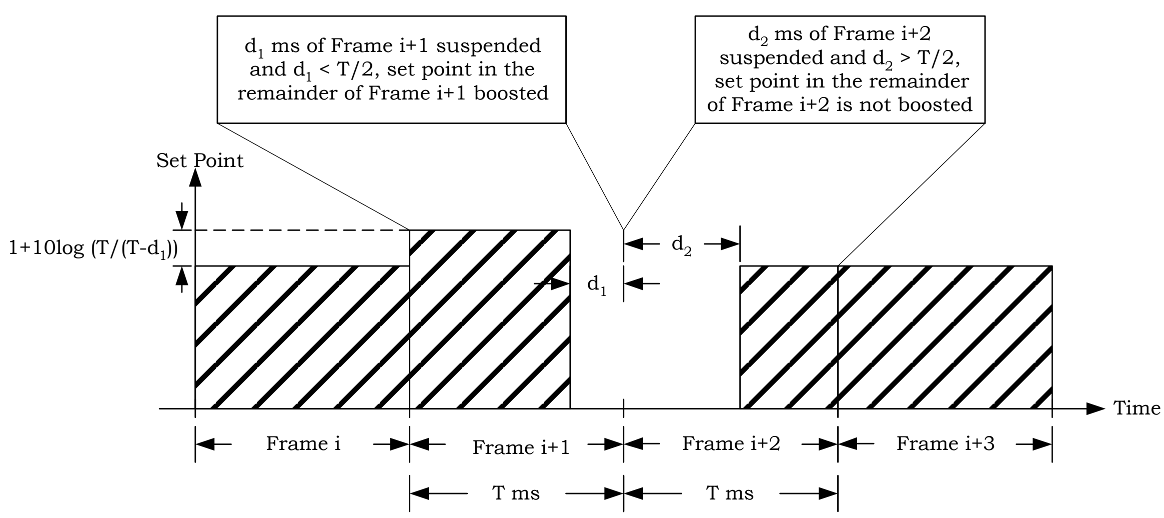


Figure 2.1.3.1.10.2-1. Increased Outer Power Control Loop Set Point for Inter-frequency Hard Handoff

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

2.1.3.1.11-1. The time alignment of the long code generator shall be as shown in Figure 1.3-1.

The mask used for the long code varies depending upon the channel type on which the mobile station is transmitting. See Figure 2.1.3.1.11-2.

When transmitting on the Access Channel, the mask shall be as follows: M_{41} through M_{33} shall be set to '110001111'; M_{32} through M_{28} shall be set to chosen to the Access Channel number (RA); M_{27} through M_{25} shall be set to the code channel number for the associated Paging Channel ($PAGECH_s$); M_{24} through M_9 shall be set to $BASE\_ID_s$ for the current base station; and M_8 through M_0 shall be set to $PILOT\_PN_s$ for the current CDMA Channel (see Figure 2.1.3.1.11-2).

For the public long code mask, bits M_{36} through M_0 shall be specified by PLCM_37 (see 2.3.6 in [5]). Bits M_{41} through M_{37} shall be set to '11000'. The resulting public long code mask is shown in Figure 2.1.3.1.11-2.

The private long code mask (See Figure 2.1.3.1.11-3) shall be as follows: M_{41} through M_{40} shall be set to '01'. M_{39} through M_0 shall be the 40 least significant bits of the Voice Privacy Mask (VPM) generated by the Key_VPM_Generation procedure. M_0 of the private long code mask shall be the least significant bit of the VPM. The private long code mask is not to be changed during a call. See [13] for details of the Key_VPM_Generation procedure.

When a mobile station is transmitting on the Reverse Fundamental Channel or the Reverse Supplemental Code Channel, the mobile station shall use one of the following two long code masks unique to each channel: a public long code mask or a private long code mask. The Reverse Fundamental Channel shall be assigned the channel number 0. Each of the n – 1 Reverse Supplemental Code Channels shall be assigned the numbers 1 through n – 1. Bits M_{39} through M_{37} of the public or private long code mask for assigned code channel i, $0 \le i \le n - 1 \le NUM\_REV\_CODES_s$, shall be bit-by-bit XORed with the binary representation of i.

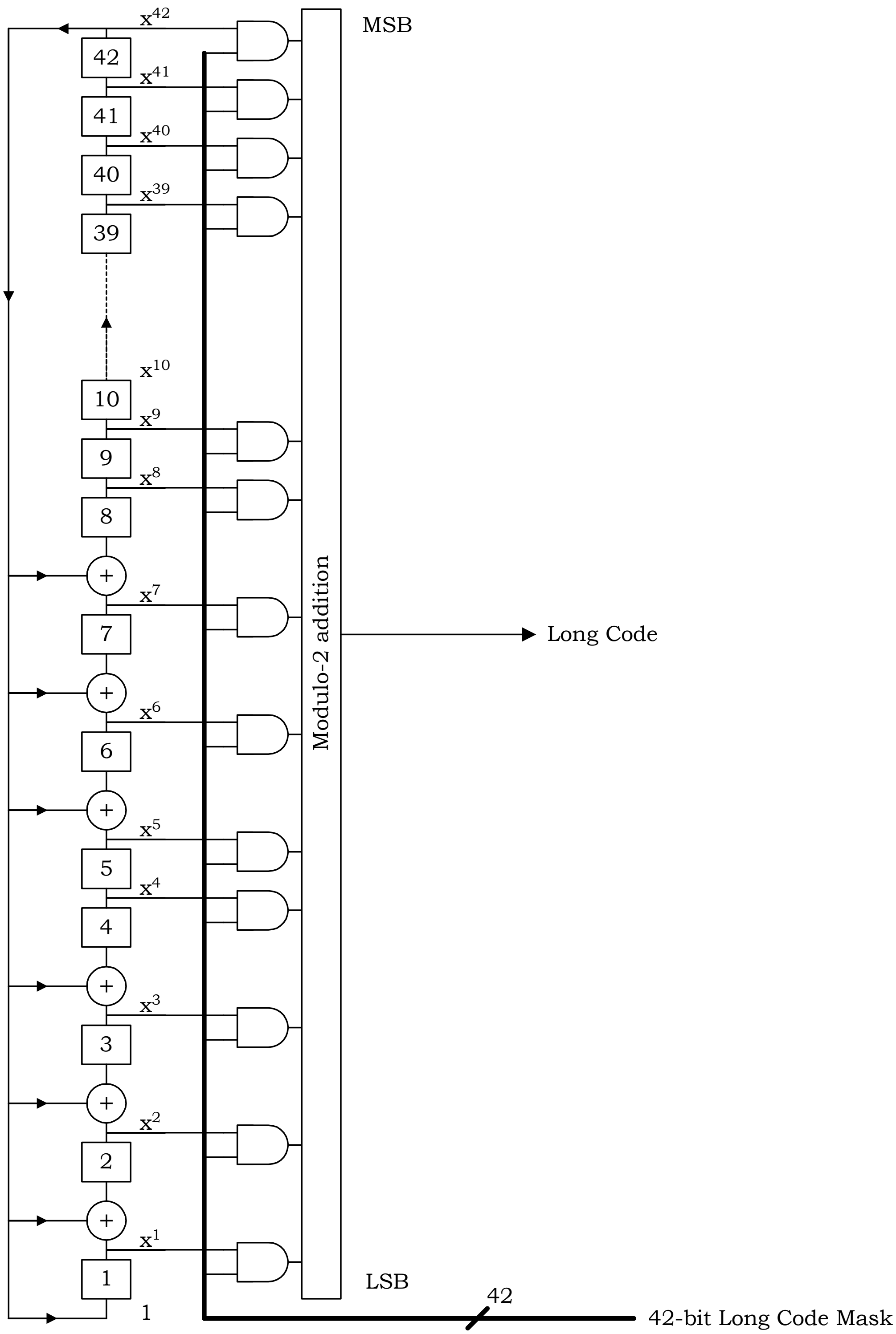


Figure 2.1.3.1.11-1. Long Code Generator

41 … 33	32 … 28	27 … 25	24 … 9	8 … 0
110001111	ACN	PCN	BASE_ID	PILOT_PN

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

41 40	39 … 37	36 … 0
11	Code Channel Index (i)	PLCM_37

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

41 40	39 … 0
01	40 LSBs of VPM

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.

The in-phase spreading sequence shall be formed by a modulo-2 addition of the I-channel PN sequence and the I long code sequence. The quadrature-phase spreading sequence shall be formed by the modulo-2 addition of the following three terms: the W_1^2 Walsh function, the modulo-2 addition of the I-channel PN sequence and the I long code sequence, and the decimated-by-2 output of the modulo-2 addition of the Q-channel PN sequence and the Q long code sequence. The decimator shall provide an output that is constant for the two chips corresponding to the two symbols of the W_1^2 Walsh function, and the value of the decimator output for the W_1^2 Walsh function period shall be equal to the first of the two symbols into the decimator in that period. The W_1^2 Walsh function time alignment shall be such that the first Walsh chip begins at the first chip of a frame.

The I long code for Spreading Rate 1 shall be the long code sequence specified in 2.1.3.1.11. The I long code for Spreading Rate 1 shall have a chip rate of 1.2288 MHz. The Q long code for Spreading Rate 1 shall be the I long code delayed by one chip.

The I long code for Spreading Rate 3 shall consist of three multiplexed component sequences, each having a chip rate of 1.2288 Mcps, as shown in Figure 2.1.3.1.12-1. The first component sequence shall be the I long code for Spreading Rate 1. The second component sequence shall be the modulo-2 addition of the I long code for Spreading Rate 1 and the I long code for Spreading Rate 1 delayed by 1/1.2288 μs. The third component sequence shall be the modulo-2 addition of the I long code for Spreading Rate 1 and the I long code for Spreading Rate 1 delayed by 2/1.2288 μs. The three component sequences shall be multiplexed such that the I long code value at the beginning of every 1/1.2288 μs interval, starting from the beginning of the System Time, corresponds to the first component sequence. The I long code for Spreading Rate 3 shall have a chip rate of 3.6864 Mcps. The Q long code for Spreading Rate 3 shall be the I long code delayed by one chip.

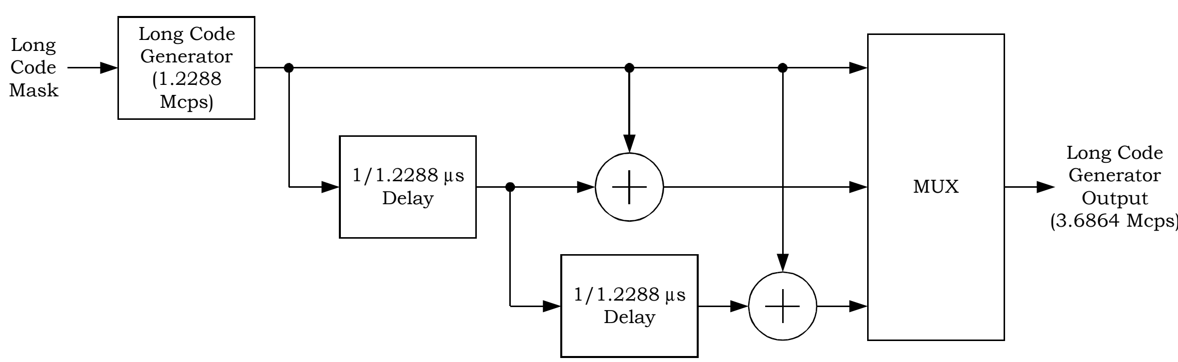


Figure 2.1.3.1.12-1. Long Code Generator for Spreading Rate 3

The mask used for generating the I long code for Spreading Rate 1 (or equivalently, the first component sequence of the I long code for Spreading Rate 3) varies depending on the channel type on which the mobile station is transmitting. See Figure 2.1.3.1.12-2.

When transmitting on the Enhanced Access Channel using the common long code, the mask shall be as follows: bits M_{41} through M_{33} shall be set to '110001110'; bits M_{32} through M_{28} shall be set to the Enhanced Access Channel number; bits M_{27} through M_{25} shall be set to the Forward Common Control Channel number; bits M_{24} through M_9 shall be set to $BASE\_ID_s$ for the current base station; and bits M_8 through M_0 shall be set to the time dependent field, SLOT_OFFSET (see Figure 2.1.3.1.12-2).

When transmitting on the Reverse Common Control Channel while in Reservation Access Mode, the mask shall be as follows: bits M_{41} through M_{33} shall be set to '110001101'; bits M_{32} through M_{28} shall be set to the Reverse Common Control Channel number chosen; bits M_{27} through M_{25} shall be set to the code channel number for the associated Forward Common Control Channel (the range is 1 through 7); bits M_{24} through M_9 shall be set to $BASE\_ID_s$ for the current base station; and bits M_8 through M_0 shall be set to $PILOT\_PN_s$ for the current CDMA Channel (see Figure 2.1.3.1.12-2).

When transmitting on the Reverse Common Control Channel while in Designated Access Mode, the mobile station shall use one of the following three long code masks designated by the base station: a public long code mask, a private long code mask, or a scheduled common long code mask (see Figure 2.1.3.1.12-2).

When transmitting on the Reverse Traffic Channel, the mobile station shall use one of the following two long code masks: a public long code mask or a private long code mask (see Figure 2.1.3.1.12-2).

For the public long code mask, bits M_{36} through M_0 shall be specified by PLCM_37 (see 2.3.6 in [5]). Bits M_{41} through M_{37} shall be set to '11000'. The resulting public long code mask is shown in Figure 2.1.3.1.12-2.

The private long code mask (see Figure 2.1.3.1.12-2) shall be as follows: M_{41} through M_{40} shall be set to '01'. M_{39} through M_0 shall be the 40 least significant bits of the Voice Privacy Mask (VPM) generated by the Key_VPM_Generation procedure. M_0 of the private long code mask shall be the least significant bit of the VPM. The private long code mask is not to be changed during a call. See [13] for details of the Key_VPM_Generation procedure.

The scheduled common long code mask shall be as follows: bits M_{41} through M_{33} shall be set to '110001101'; bits M_{32} through M_{28} shall be set to the Reverse Common Control Channel number chosen; bits M_{27} through M_{25} shall be set to the code channel number for the associated Forward Common Control Channel (the range is 1 through 7); bits M_{24} through M_9 shall be set to $BASE\_ID_s$ for the current base station; and bits M_8 through M_0 shall be set to $PILOT\_PN_s$ for the current CDMA Channel (see Figure 2.1.3.1.12-2).

41 … 33	32 … 28	27 … 25	24 … 9	8 … 0
110001110	EACH_ID	FCCCH_ID	BASE_ID	SLOT_OFFSET

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

41 … 33	32 … 28	27 … 25	24 … 9	8 … 0
110001101	RCCCH_ID	FCCCH_ID	BASE_ID	PILOT_PN

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

41 40	39 … 37	36 … 0
11	000	PLCM_37

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

41 40	39 … 0
01	40 LSBs of VPM

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

Figure 2.1.3.1.12-2. Long Code Mask Format for Quadrature Spreading

The I and Q PN sequences used for quadrature spreading shall be as specified in 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 Spreading Rate 1 and with a period of 3×2^{15} chips for Spreading Rate 3.

2.1.3.1.12.1 Spreading Rate 1

The PN sequences shall be based upon the following characteristic polynomials:

$$P_I(x) = x^{15} + x^{13} + x^9 + x^8 + x^7 + x^5 + 1$$

(for the in-phase (I) sequence)

and

$$P_Q(x) = x^{15} + x^{12} + x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

(for the quadrature-phase (Q) sequence).

The maximal length linear feedback shift register sequences i(n) and q(n) based upon the above polynomials are of length $2^{15} - 1$ and can be generated by the following linear recursions:

$$i(n) = i(n-15) \oplus i(n-10) \oplus i(n-8) \oplus i(n-7) \oplus i(n-6) \oplus i(n-2)$$

(based upon $P_I(x)$ as the characteristic polynomial)

and

$$q(n) = q(n-15) \oplus q(n-12) \oplus q(n-11) \oplus q(n-10) \oplus q(n-9)$$

$$\oplus\, q(n-5) \oplus q(n-4) \oplus q(n-3)$$

(based upon $P_Q(x)$ as the characteristic polynomial),

where i(n) and q(n) are binary-valued (‘0’ and ‘1’) and the additions are modulo-2. In order to obtain the I and Q PN sequences (of period 2^{15}), a ‘0’ is inserted in i(n) and q(n) after 14 consecutive ‘0’ outputs (this occurs only once in each period); therefore, the PN sequences have one run of 15 consecutive ‘0’ outputs instead of 14.

The mobile station shall align the I and Q PN sequences such that the first chip on every even second mark as referenced to the transmit time reference (see 2.1.5) is the ‘1’ after the 15 consecutive ‘0’s (see Figure 1.3-1).

The chip rate shall be 1.2288 Mcps. The PN sequence period is 32768/1228800 = 26.666… ms, and exactly 75 PN sequence repetitions occur every 2 seconds.

For the Access Channel and the Reverse Traffic Channel with Radio Configurations 1 and 2, the data spread by the Q PN sequence shall be delayed by half a PN chip time (406.901 ns) with respect to the data spread by the I PN sequence.

2.1.3.1.12.2 Spreading Rate 3

The PN sequences shall be truncated sequences of a maximal length linear feedback shift register sequence based upon the following characteristic polynomial:

$$P(x) = x^{20} + x^9 + x^5 + x^3 + 1$$

The maximal length linear feedback shift register sequence based upon the above polynomial is of length $2^{20} - 1$ and can be generated by the following recursion:

$$b(n) = b(n - 20) \oplus b(n - 17) \oplus b(n - 15) \oplus b(n - 11)$$

where b(n) is binary-valued ('0' and '1') and the additions are modulo-2. The I and Q PN sequences are both formed from this maximal length sequence of length $2^{20} - 1$ using different starting positions and truncating the sequences after 3×2^{15} chips. The starting position of the I PN sequence is such that the first 20 chips are '1000 0000 0001 0001 0100'. The starting position of the Q PN sequence is the starting position of the I PN sequence delayed by 2^{19} chips in the untruncated maximal length sequence of length 2^{20} - 1. The mobile station shall align the I and Q PN sequences such that the first 20 chips of the I and Q PN sequences on every even second mark as referenced to the transmit time reference (see 2.1.5) are '1000 0000 0001 0001 0100' and '1001 0000 0010 0100 0101' (see Figure 1.3-1).

The chip rate shall be 3.6864 Mcps. The PN sequence period is $3 \times 32768/3686400$ = 26.666… ms, and exactly 75 pilot PN sequence repetitions occur every 2 seconds.

2.1.3.1.13 Baseband Filtering

2.1.3.1.13.1 Spreading Rate 1

Following the spreading operation when operating in Spreading Rate 1, the I and Q impulses are applied to the inputs of the I and Q baseband filters as described in 2.1.3.1.1.1. The baseband filters shall have a frequency response S(f) that satisfies the limits given in Figure 2.1.3.1.13.1-1. Specifically, the normalized frequency response of the filter shall be contained within $\pm\delta_1$ in the passband $0 \le f \le f_p$, and shall be less than or equal to $-\delta_2$ in the stopband $f \ge f_s$. The numerical values for the parameters are δ_1 = 1.5 dB, δ_2 = 40 dB, f_p = 590 kHz, and f_s = 740 kHz.

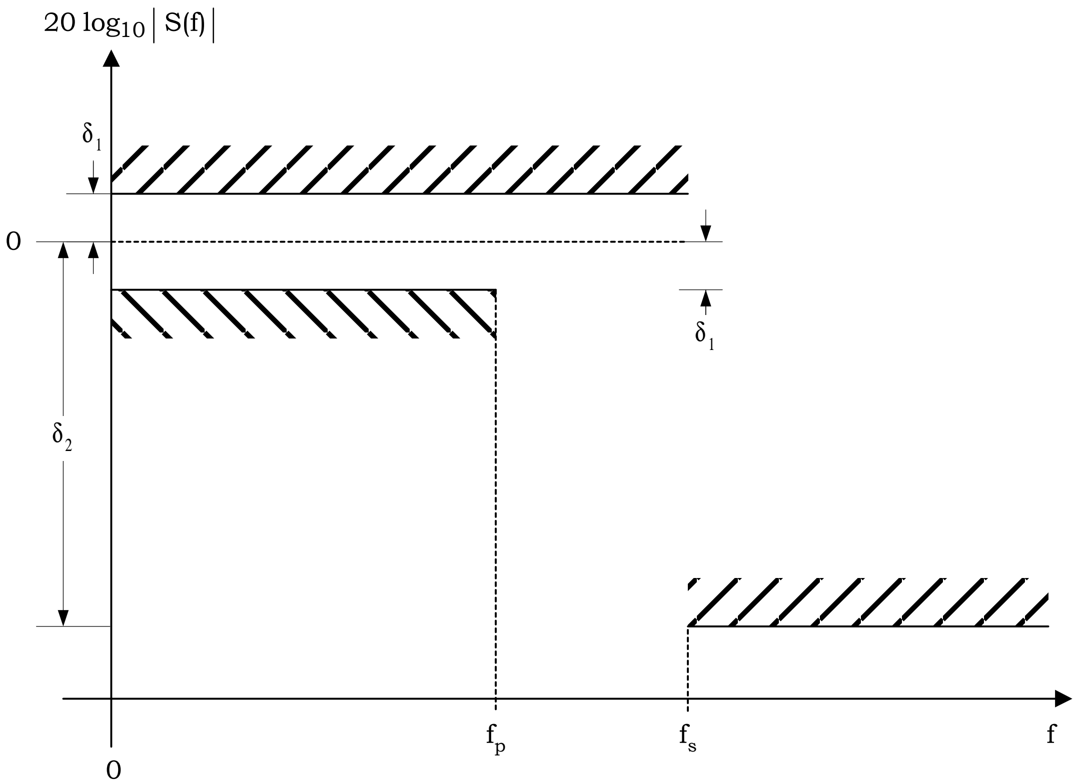


Figure 2.1.3.1.13.1-1. Baseband Filters Frequency Response Limits

Let s(t) be the impulse response of the baseband filter. Then s(t) should satisfy the following equation:

$$\text{Mean Squared Error} = \sum_{k=0}^{\infty}\left[\alpha s(kT_s - \tau) - h(k)\right]^2 \le 0.03,$$

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 ≥ 48. Note that h(k) equals h(47 - k).

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

2.1.3.1.13.2 Spreading Rate 3

Following the spreading operation when operating in Spreading Rate 3, the I and Q impulses are applied to the inputs of the I and Q baseband filters as described in 2.1.3.1.1.2. The baseband filters shall have a frequency response S(f) that satisfies the limits given in Figure 2.1.3.1.13.1-1. Specifically, the normalized frequency response of the filter shall be contained within $\pm\delta_1$ in the passband $0 \le f \le f_p$, and shall be less than or equal to $-\delta_2$ in the stopband $f \ge f_s$. The numerical values for the parameters are δ_1 = 1.5 dB, δ_2 = 40 dB, f_p = 1.7164 MHz, and f_s = 1.97 MHz.

Let s(t) be the impulse response of the baseband filter. Then s(t) should satisfy the following equation:

$$\text{Mean Squared Error} = \sum_{k=0}^{\infty}\left[\alpha s(kT_s - \tau) - h(k)\right]^2 \le 0.03,$$

where the constants α and τ are used to minimize the mean squared error. The constant T_s is equal to 67.81684027... ns. T_s equals one quarter of a PN chip. The values of the coefficients h(k), for k < 108, are given in Table 2.1.3.1.13.2-1; h(k) = 0 for k ≥ 108. Note that h(k) equals h(107 - k).

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

2.1.3.1.14 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.

2.1.3.2.3 Reverse Pilot Channel Gating

When transmitting only on the Reverse Pilot Channel in gated mode ($PILOT\_GATING\_USE\_RATE_S$ = '1'), the mobile station shall periodically gate off certain power control groups of the Reverse Pilot Channel at a rate specified by $PILOT\_GATING\_RATE_S$, which may be continuous ($PILOT\_GATING\_RATE_S$ = '00'), 1/2 rate ($PILOT\_GATING\_RATE_S$ = '01'), or 1/4 rate ($PILOT\_GATING\_RATE_S$ = '10'). Reverse Pilot Channel gating may be used when none of the following channels is assigned: the Forward Fundamental Channel, the Forward Supplemental Channel, the Reverse Fundamental Channel, and the Reverse Supplemental Channel.

The power control groups within a 20 ms frame are numbered from 0 to 15. When 1/2 rate gating is used, only the odd numbered power control groups shall be transmitted. When 1/4 rate gating is used, only power control groups 3, 7, 11, and 15 shall be transmitted. The gated-on and gated-off periods are arranged so that the gated-on period always comes immediately before the 5 ms frame boundary.

Gating patterns for the Reverse Pilot Channel with gating rates of 1, 1/2, and 1/4 are shown in Figure 2.1.3.2.3-1. When there is transmission on the Reverse Dedicated Control Channel, the Reverse Pilot Channel shall be gated on for the duration of the active frame as shown in Figures 2.1.3.2.3-2 and 2.1.3.2.3-3.

When the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or 6 is operated in the gated mode (see 2.1.3.7.8) at a data rate of 1500 bps for Radio Configurations 3 and 5, or 1800 bps for Radio Configurations 4 and 6, the Reverse Pilot Channel shall have a transmission duty cycle of 50%. The Reverse Pilot Channel shall be transmitted in power control groups 2, 3, 6, 7, 10, 11, 14, and 15, and shall not be transmitted in power control groups 0, 1, 4, 5, 8, 9, 12, and 13, as shown in Figure 2.1.3.7.8-1.

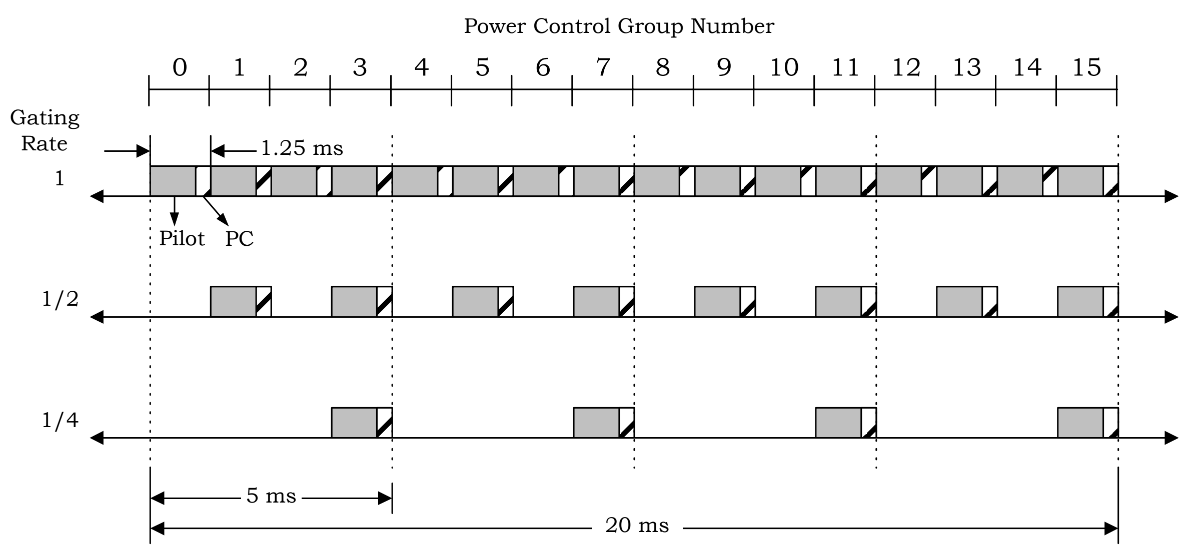


Figure 2.1.3.2.3-1. Reverse Pilot Channel Gating

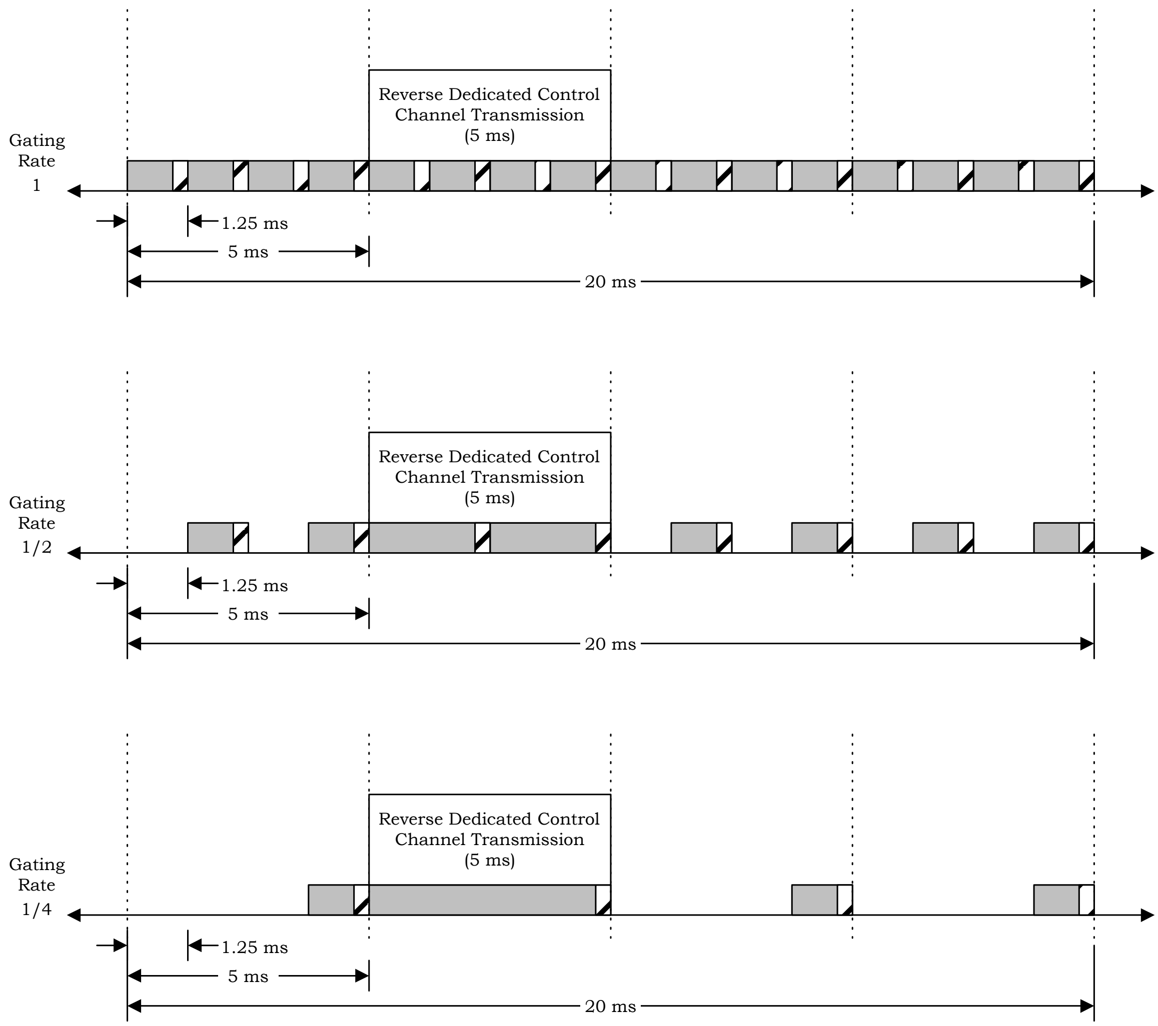


Figure 2.1.3.2.3-2. Reverse Pilot Channel Gating during Reverse Dedicated Control Channel Transmission with 5 ms Frame Duration

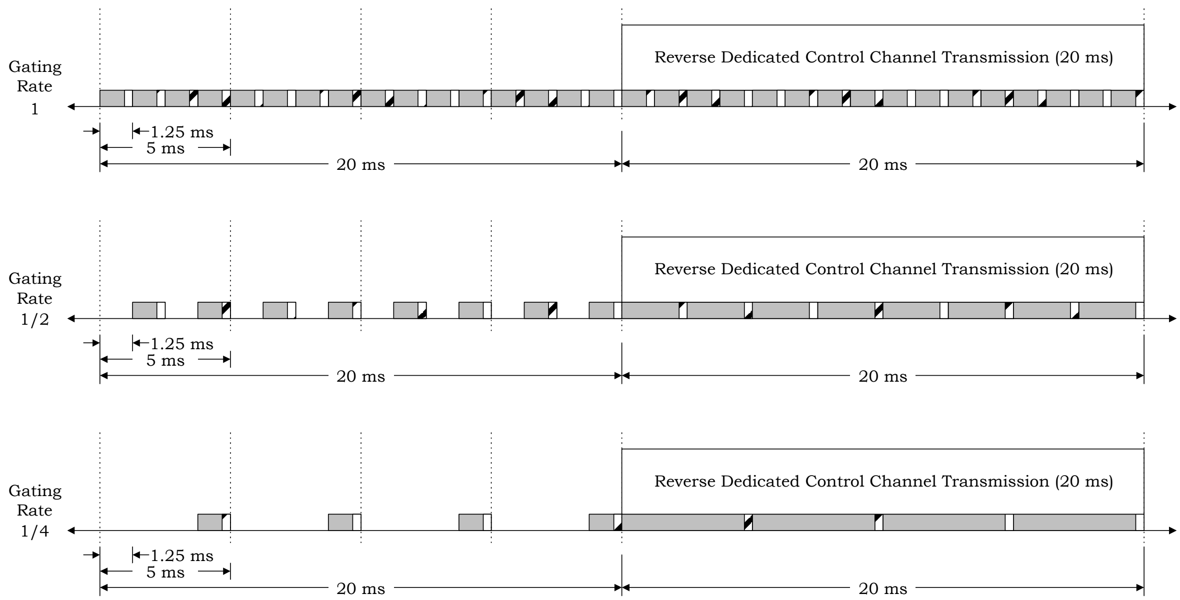


Figure 2.1.3.2.3-3. Reverse Pilot Channel Gating during Reverse Dedicated Control Channel Transmission with 20 ms Frame Duration

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.

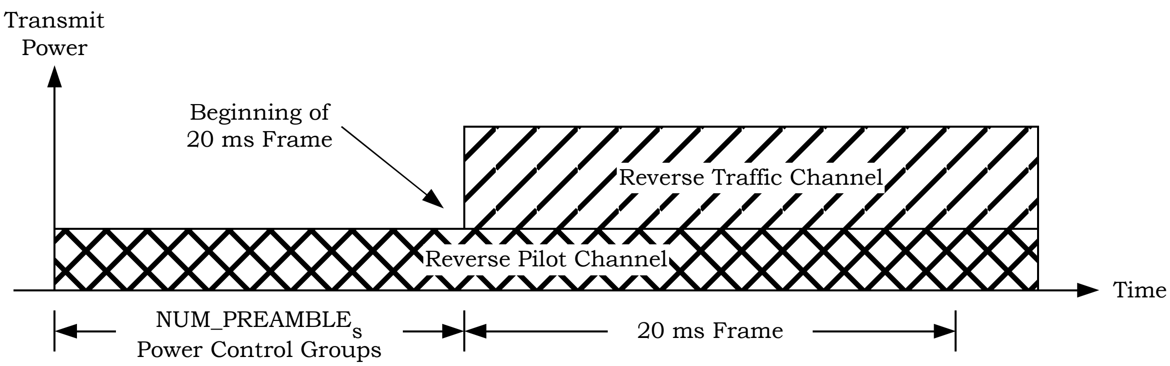


Figure 2.1.3.2.4-1. Reverse Traffic Channel Preamble during Hard Handoff for the Reverse Dedicated Control Channel and the Reverse Fundamental Channel with Radio Configurations 3 through 6

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 quadrature spreading I and Q pilot PN sequences, so it effectively increases the apparent range from the mobile station to the base station.[14]

The Reverse CDMA Channel may contain up to 32 Access Channels numbered 0 through 31 per supported Paging Channel. At least one Access Channel exists on the Reverse CDMA Channel for each Paging Channel on the corresponding Forward CDMA Channel. Each Access Channel is associated with a single Paging Channel.

2.1.3.3.2 Access Channel Frame Structure

Each Access Channel frame contains 96 bits (20 ms frame at 4800 bps). Each Access Channel frame shall consist of 88 information bits and eight Encoder Tail Bits (see Figure 2.1.3.3.2-1).

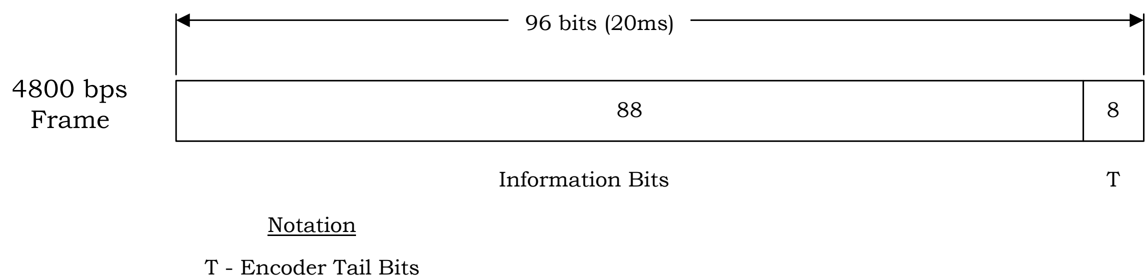


Figure 2.1.3.3.2-1. Access Channel Frame Structure

2.1.3.3.2.1 Access Channel Preamble

The Access Channel preamble shall consist of frames of 96 zeros that are transmitted at the 4800 bps rate. The Access Channel preamble is transmitted to aid the base station in acquiring an Access Channel transmission.

2.1.3.3.3 Access Channel Convolutional Encoding

The Access Channel data shall be convolutionally encoded as specified in 2.1.3.1.4.

When generating Access Channel data, the encoder shall be initialized at the end of each 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.

2.1.3.3.4 Access Channel Code Symbol Repetition

Each code symbol output from the convolutional encoder on the Access Channel shall be repeated once (each code symbol occurs two consecutive times) as specified in 2.1.3.1.5.

2.1.3.3.5 Access Channel Interleaving

The repeated code symbols on the Access Channel shall be interleaved as specified in 2.1.3.1.7.

2.1.3.3.6 Access Channel Modulation

The Access Channel data shall be modulated as specified in 2.1.3.1.8.

2.1.3.3.7 Access Channel Gating

The mobile station shall transmit all power control groups while transmitting on the Access Channel as specified in 2.1.3.1.9.1.

2.1.3.3.8 Access Channel Direct Sequence Spreading

The Access Channel shall be spread by the long code as specified in 2.1.3.1.11.

2.1.3.3.9 Access Channel Quadrature Spreading

The Access Channel shall be quadrature spread by the pilot PN sequences as specified in 2.1.3.1.12.

2.1.3.3.10 Access Channel Baseband Filtering

The Access Channel shall be filtered as specified in 2.1.3.1.13.

2.1.3.3.11 Access Channel Transmission Processing

When the Physical Layer receives a PHY-ACHPreamble.Request(RA, PWR_LVL, RN, NUM_PREAMBLE_FRAMES) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments RA, PWR_LVL, RN, and NUM_PREAMBLE_FRAMES.
- Transmit NUM_PREAMBLE_FRAMES Access Channel preamble frames.

When the Physical Layer receives a PHY-ACH.Request(RA, PWR_LVL, RN, SDU) from the MAC Layer, the mobile station shall:

- Store the arguments RA, PWR_LVL, RN, and SDU.
- Set the information bits (see Figure 2.1.3.3.2-1) to SDU.
- Transmit an Access Channel frame.

2.1.3.4 Enhanced Access Channel

The Enhanced Access Channel is used by the mobile station to initiate communication with the base station or to respond to a mobile station directed message. The Enhanced Access Channel can be used in three possible modes: Basic Access Mode, Power Controlled Access

Mode, and Reservation Access Mode. Power Controlled Access Mode and Reservation Access Mode may operate on the same Enhanced Access Channel. Basic Access Mode operates on a separate Enhanced Access Channel.

When operating in the Basic Access Mode, the mobile station shall not transmit the Enhanced Access header on the Enhanced Access Channel. In Basic Access Mode, the Enhanced Access probe shall consist of an Enhanced Access Channel preamble followed by Enhanced Access data.

When operating in the Power Controlled Access Mode, the Enhanced Access probe shall consist of an Enhanced Access Channel preamble, followed by an Enhanced Access header and Enhanced Access data.

When operating in the Reservation Access Mode, the Enhanced Access probe shall consist of an Enhanced Access Channel preamble followed by an Enhanced Access header. Enhanced Access data is sent on the Reverse Common Control Channel upon receiving permission from the base station.

The Enhanced Access Channel uses a random-access protocol. Enhanced Access Channels are uniquely identified by their long code masks (see 2.1.3.1.12). The Enhanced Access probe structure is shown in Figure 2.1.3.4-1.

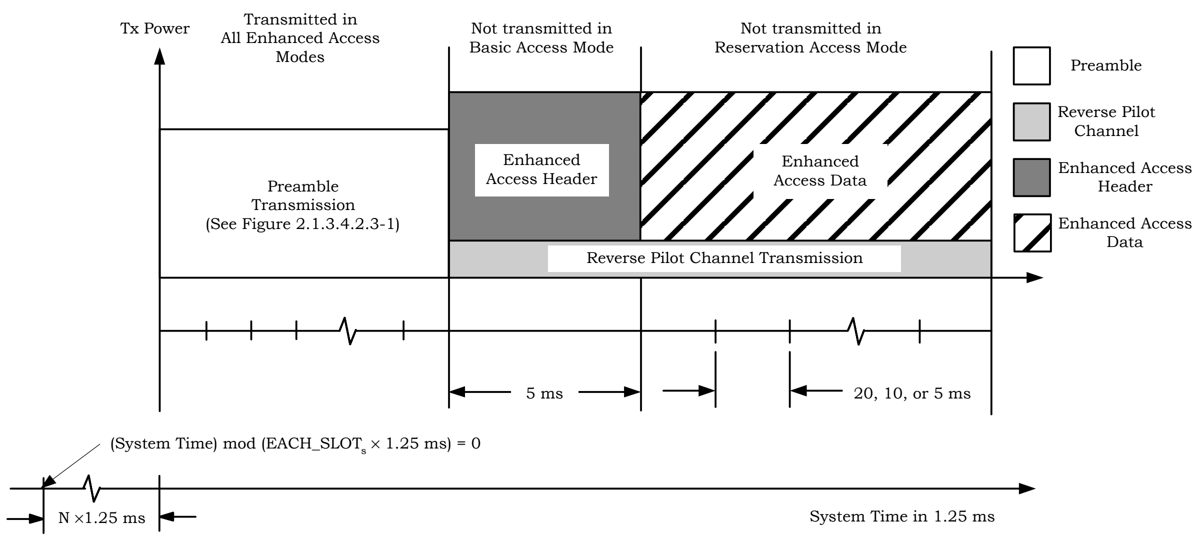


Figure 2.1.3.4-1. Enhanced Access Channel Probe Structure

2.1.3.4.1 Enhanced Access Channel Time Alignment and Modulation Rate

The mobile station shall transmit the Enhanced Access header on the Enhanced Access Channel at a fixed data rate of 9600 bps. The mobile station shall transmit the Enhanced Access data on the Enhanced Access Channel at a fixed data rate of 9600, 19200, or 38400 bps.

The frame duration for the Enhanced Access header on the Enhanced Access Channel shall be 5 ms in duration. The frame duration for the Enhanced Access data on the Enhanced Access Channel shall be 20, 10, or 5 ms in duration. The timing of Enhanced Access Channel transmissions shall start on 1.25 ms increments of System Time (see Figure 1.3-1).

The Reverse CDMA Channel may contain up to 32 Enhanced Access Channels per supported Forward Common Control Channel, numbered 0 through 31. There is a Forward Common Assignment Channel associated with every Enhanced Access Channel operating in the Power Controlled Access Mode or the Reservation Access Mode.

The total number of slots associated with an Enhanced Access Channel shall be 512. The Enhanced Access Channel slot duration shall be $EACH\_SLOT_s \times 1.25$ ms. An Enhanced Access Channel slot shall begin only when System Time is $N \times 1.25$ ms after an integer multiple of $EACH\_SLOT_s \times 1.25$ ms, where N equals $[(EACH\_ID \times EACH\_SLOT\_OFFSET2_s) + EACH\_SLOT\_OFFSET1_s] \bmod EACH\_SLOT_s$, and EACH_ID is the identity of the Enhanced Access Channel to be used, which is passed by the primitives from the MAC Layer (see 2.1.3.4.9 and Figure 2.1.3.4-1). The mobile station shall initiate transmission of an Enhanced Access probe on an Enhanced Access Channel slot boundary.

For each Enhanced Access probe, the mobile station shall use a long code mask associated with the first slot of the transmission and shall use this mask until transmission of the Enhanced Access probe is complete. Depending on the slot in which the mobile station starts transmission (SLOT_OFFSET), a maximum of 512 unique long code masks are possible. The mobile procedure for generating the long code mask is specified in 2.1.3.1.12.

2.1.3.4.2 Enhanced Access Channel Frame Structure

Table 2.1.3.4.2-1 summarizes the Enhanced Access Channel bit allocations. The order of the bits is shown in Figure 2.1.3.4.2-1.

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

Information Bits	F	T

Notation

F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 2.1.3.4.2-1. Enhanced Access Channel Frame Structure

2.1.3.4.2.1 Enhanced Access 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.

When transmitting the Enhanced Access header, the Enhanced Access Channel shall use an 8-bit frame quality indicator.

When transmitting Enhanced Access data, the 20 ms Enhanced Access 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. When transmitting Enhanced Access data, the 10 ms Enhanced Access 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. When transmitting Enhanced Access data, the 5 ms Enhanced Access Channel shall use a 12-bit frame quality indicator.

The generator polynomials for the frame quality indicator shall be as follows:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^{6} + x^{5} + x^{2} + x + 1$ for the 16-bit frame quality indicator,

$g(x) = x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{4} + x + 1$ for the 12-bit frame quality indicator, and

$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator.

The frame quality indicators shall be computed according to the following procedure as shown in Figures 2.1.3.4.2.1-1 through 2.1.3.4.2.1-3:

- 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, 12, or 8).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

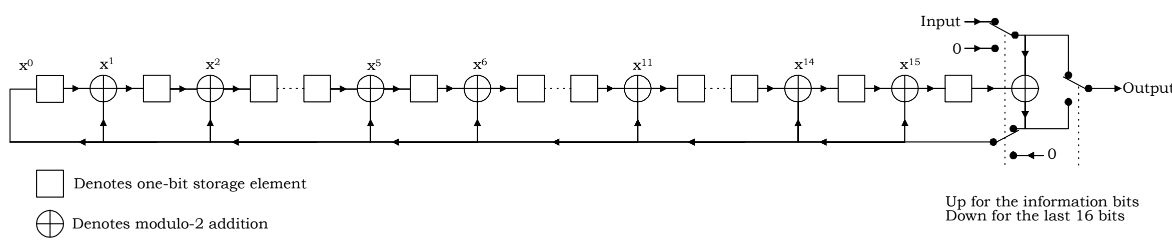


Figure 2.1.3.4.2.1-1. Enhanced Access Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

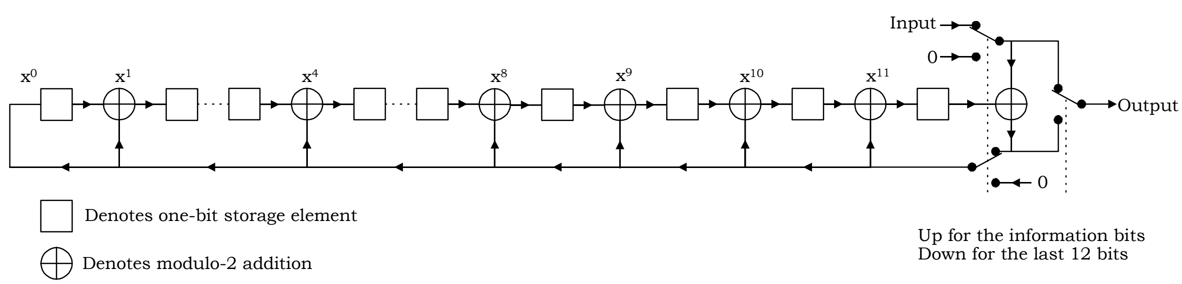


Figure 2.1.3.4.2.1-2. Enhanced Access Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

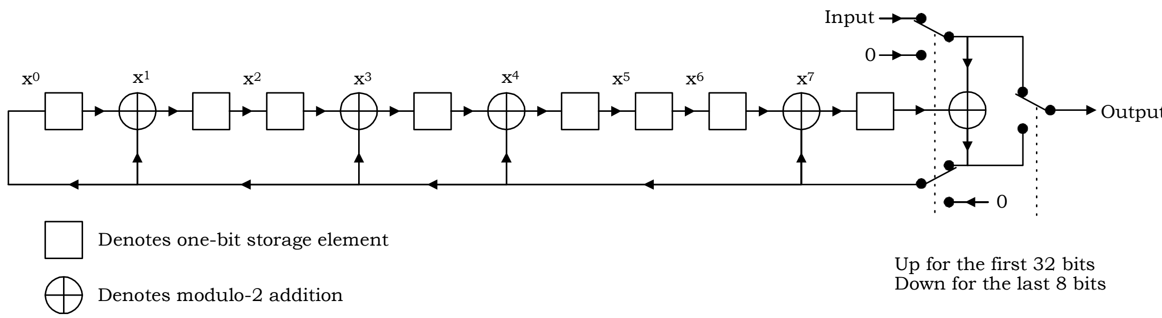


Figure 2.1.3.4.2.1-3. Enhanced Access Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

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'.

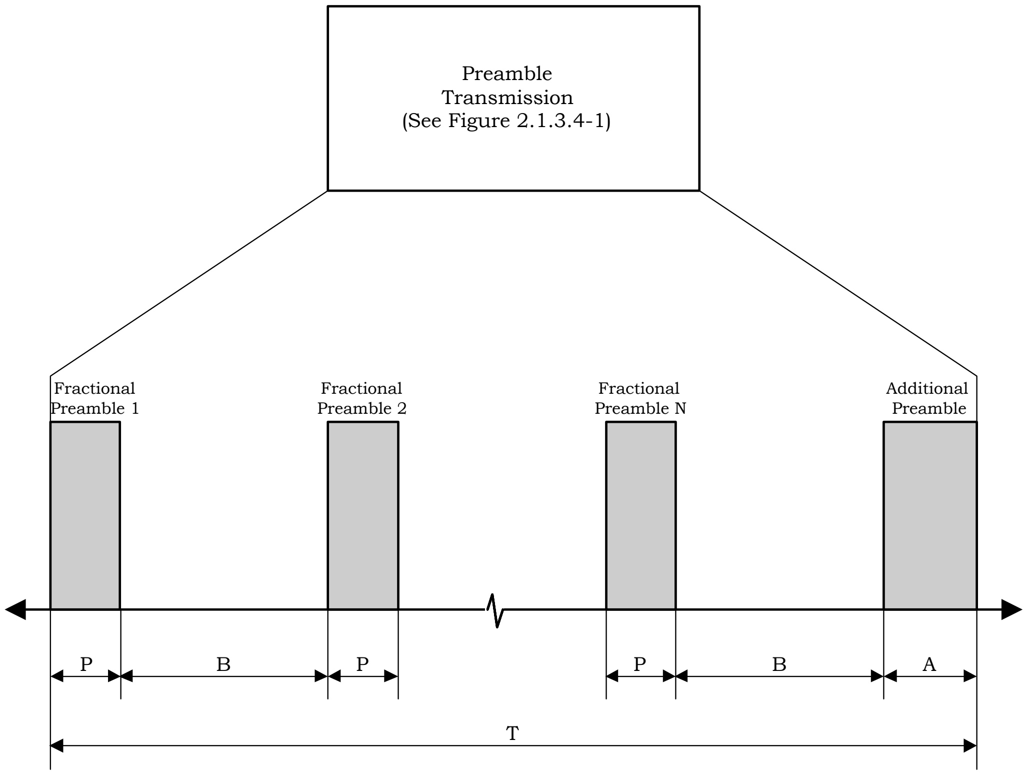
2.1.3.4.2.3 Enhanced Access Channel Preamble

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 $\text{EACH\_PREAMBLE\_NUM\_FRAC}_S + 1$ fractional preambles, with a duration of $(\text{EACH\_PREAMBLE\_FRAC\_DURATION}_S + 1) \times 1.25$ ms. The transmission of the Enhanced Access Channel preamble shall be gated-off for a period of $\text{EACH\_PREAMBLE\_OFF\_DURATION}_S \times 1.25$ ms after the transmission of each fractional preamble.

When operating in Basic Access Mode, the additional preamble with a length of $\text{EACH\_PREAMBLE\_ADD\_DURATION}_S \times 1.25$ 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 $\text{EACH\_PREAMBLE\_ADD\_DURATION}_S \times 1.25$ ms shall be transmitted just prior to the Enhanced Access Channel header. The additional preamble assists the base station in channel estimation.



N = EACH_PREAMBLE_NUM_FRAC$_s$ + 1

P = (EACH_PREAMBLE_FRAC_DURATION$_s$ + 1) × 1.25 ms

B = EACH_PREAMBLE_OFF_DURATION$_s$ × 1.25 ms

A = EACH_PREAMBLE_ADD_DURATION$_s$ × 1.25 ms

T = N (P + B) + A

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.

2.1.3.4.6 Enhanced Access Channel Modulation

The Access Channel data shall be modulated as specified in 2.1.3.1.8.

2.1.3.4.7 Enhanced Access Channel Quadrature Spreading

The Enhanced Access Channel shall be quadrature spread as specified in 2.1.3.1.12.

2.1.3.4.8 Enhanced Access Channel Baseband Filtering

The Enhanced Access Channel shall be filtered as specified in 2.1.3.1.13.

2.1.3.4.9 Enhanced Access Channel Transmission Processing

When the Physical Layer receives a PHY-EACHPreamble.Request(PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, and SLOT_OFFSET.
- Set the Enhanced Access Channel Long Code Mask using FCCCH_ID, EACH_ID, BASE_ID and SLOT_OFFSET (see Figure 2.1.3.1.12-2).
- Transmit Enhanced Access Channel preamble frames.

When the Physical Layer receives a PHY-EACHHeader.Request(PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET, SDU) from the MAC Layer, the mobile station shall:

- Store the arguments PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET, and SDU.
- Set the Enhanced Access Channel Long Code Mask using FCCCH_ID, EACH_ID, BASE_ID and SLOT_OFFSET (see Figure 2.1.3.1.12-2).
- Set the information bits (see Figure 2.1.3.4.2-1) to SDU.
- Transmit an Enhanced Access Channel Header.

When the Physical Layer receives a PHY-EACH.Request(PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET, SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the mobile station shall:

- Store the arguments PWR_LVL, FCCCH_ID, EACH_ID, BASE_ID, SLOT_OFFSET, FRAME_DURATION, NUM_BITS, and SDU.
- Set the Enhanced Access Channel Long Code Mask using FCCCH_ID, EACH_ID, BASE_ID and SLOT_OFFSET (see Figure 2.1.3.1.12-2).
- Set the information bits (see Figure 2.1.3.4.2-1) to SDU.
- Transmit an Enhanced Access Channel frame of duration FRAME_DURATION (5 ms, 10 ms or 20 ms) at a data rate that corresponds to NUM_BITS and FRAME_DURATION as specified in Table 2.1.3.4.2-1.

2.1.3.5 Reverse Common Control Channel

The Reverse Common Control Channel is used for the transmission of user and signaling information to the base station when Reverse Traffic Channels are not in use. The Reverse Common Control Channel can be used in one of two possible modes: Reservation Access Mode and Designated Access Mode.

A Reverse Common Control Channel transmission is a coded, interleaved, and modulated spread-spectrum signal. The mobile station transmits during intervals specified by the base station. Reverse Common Control Channels are uniquely identified by their long codes (see 2.1.3.1.12). The Reverse Common Control Channel preamble and data transmission structure is shown in Figure 2.1.3.5-1.

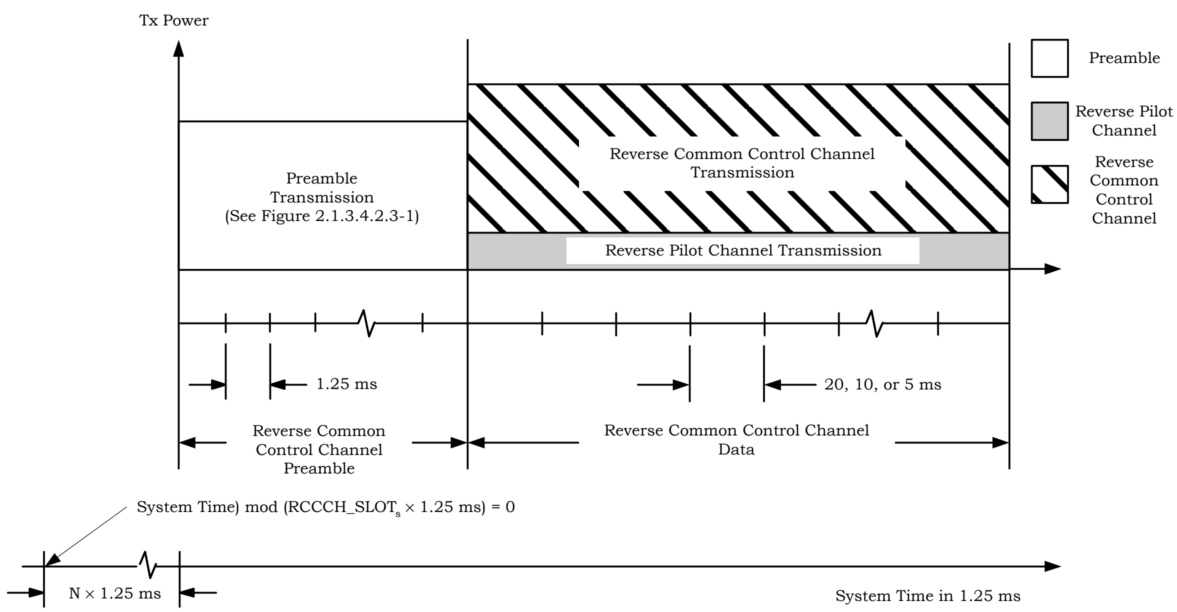


Figure 2.1.3.5-1. Preamble and Data Transmission for the Reverse Common Control Channel

2.1.3.5.1 Reverse Common Control Channel Time Alignment and Modulation Rate

The mobile station shall transmit information on the Reverse Common Control Channel at variable data rates of 9600, 19200, and 38400 bps. A Reverse Common Control Channel frame shall be 20, 10, or 5 ms in duration. The timing of Reverse Common Control Channel transmissions shall start on 1.25 ms increments of System Time (see Figure 1.3-1).

The Reverse CDMA Channel may contain up to 32 Reverse Common Control Channels numbered 0 through 31 per supported Forward Common Control Channel and up to 32 Reverse Common Control Channels numbered 0 through 31 per supported Common Assignment Channel. At least one Reverse Common Control Channel exists on the Reverse CDMA Channel for each Forward Common Control Channel on the corresponding Forward

CDMA Channel. Each Reverse Common Control Channel is associated with a single Forward Common Control Channel.

The Reverse Common Control Channel slot shall begin only when System Time is N × 1.25 ms after an integer multiple of $RCCCH\_SLOT_S \times 1.25$ ms, where N equals $[(RCCCH\_ID \times RCCCH\_SLOT\_OFFSET2_S) + RCCCH\_SLOT\_OFFSET1_S] \bmod RCCCH\_SLOT_S$, and RCCCH_ID is the identity of the Reverse Common Control Channel to be used, which is passed by the primitives from the MAC Layer (see 2.1.3.5.9 and Figure 2.1.3.5-1). The mobile station shall initiate transmission of a Reverse Common Control Channel frame on a Reverse Common Control Channel slot boundary.

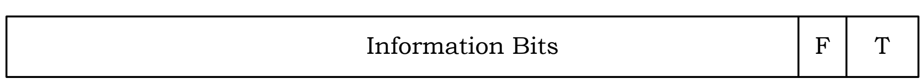
2.1.3.5.2 Reverse Common Control Channel Frame Structure

Table 2.1.3.5.2-1 summarizes the Reverse Common Control Channel bit allocations. The order of the bits is shown in Figure 2.1.3.5.2-1.

All frames shall consist of the information bits, followed by a frame quality indicator (CRC) and eight Encoder Tail Bits.

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



Notation

F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 2.1.3.5.2-1. Reverse Common Control Channel Frame Structure

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:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator and

$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ 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.

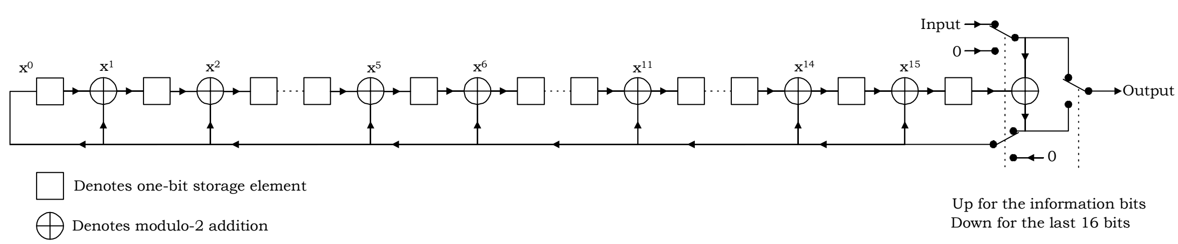


Figure 2.1.3.5.2.1-1. Reverse Common Control Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

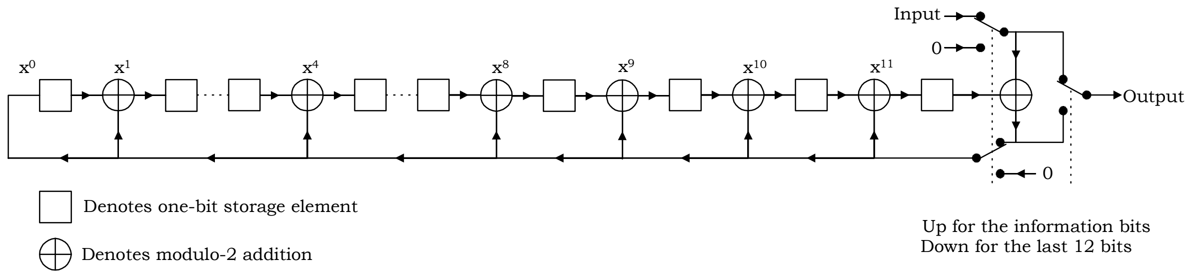


Figure 2.1.3.5.2.1-2. Reverse Common Control Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

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.

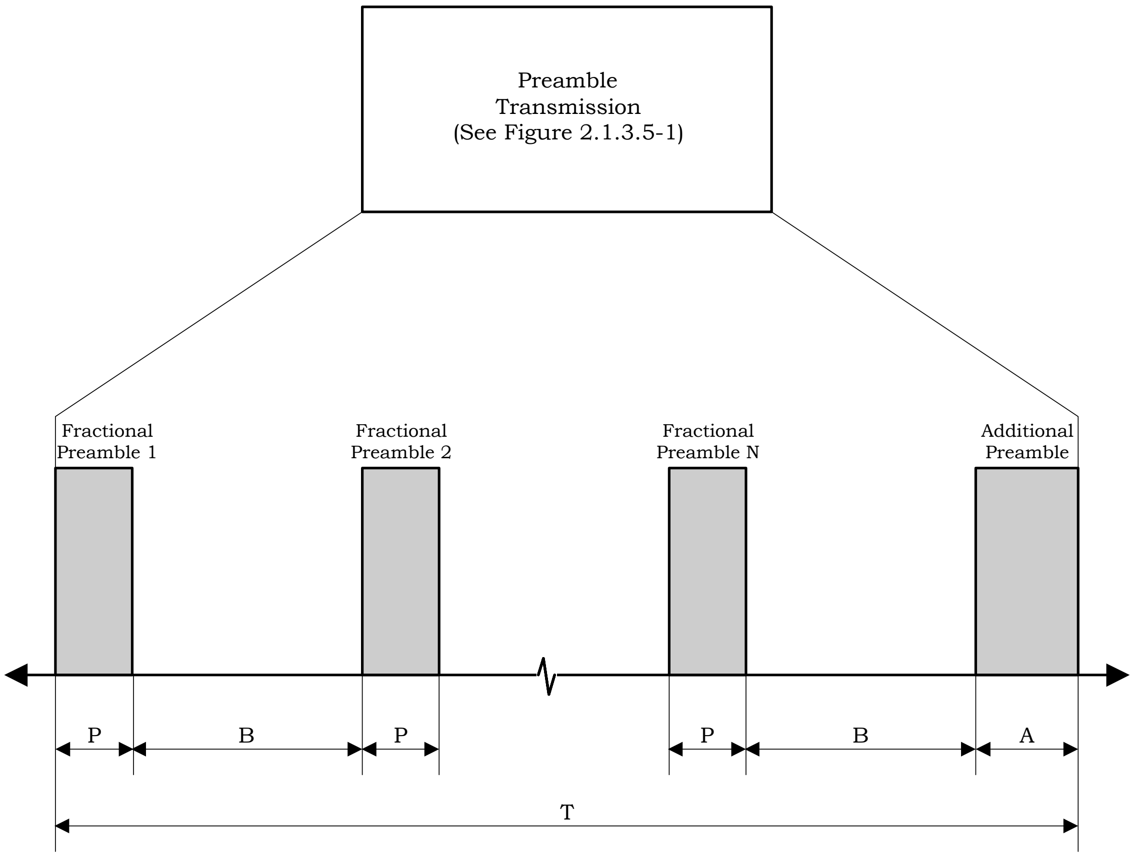
The Reverse Common Control Channel preamble is shown in Figure 2.1.3.5.2.3-1. The Reverse Common Control Channel preamble is a transmission of only the non-data-bearing Reverse Pilot Channel at an increased power level. The Reverse Pilot Channel associated with the Reverse Common Control Channel does 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

$ALT\_RCCCH\_PREAMBLE\_ADD\_DURATION_s \times 1.25$ ms shall be transmitted just prior to the Reverse Common Control Channel data.

The additional preamble assists the base station in channel estimation.



For Reservation Access Mode

$N = RCCCH\_PREAMBLE\_NUM\_FRAC_s + 1$

$P = (RCCCH\_PREAMBLE\_FRAC\_DURATION_s + 1) \times 1.25$ ms

$B = RCCCH\_PREAMBLE\_OFF\_DURATION_s \times 1.25$ ms

$A = RCCCH\_PREAMBLE\_ADD\_DURATION_s \times 1.25$ ms

$T = N (P + B) + A$

For Designated Access Mode

$N = ALT\_RCCCH\_PREAMBLE\_NUM\_FRAC_s + 1$

$P = (ALT\_RCCCH\_PREAMBLE\_FRAC\_DURATION_s + 1) \times 1.25$ ms

$B = ALT\_RCCCH\_PREAMBLE\_OFF\_DURATION_s \times 1.25$ ms

$A = ALT\_RCCCH\_PREAMBLE\_ADD\_DURATION_s \times 1.25$ ms

$T = N (P + B) + A$

Figure 2.1.3.5.2.3-1. Preamble for the Reverse Common Control Channel

2.1.3.5.2.4 Reverse Common Control Channel Data

When operating in the Reservation Access Mode, the Reverse Common Control Channel data shall consist of Enhanced Access data. When operating in the Designated Access Mode, the Reverse Common Control Channel data shall consist of Designated Access data.

2.1.3.5.3 Reverse Common Control Channel Convolutional Encoding

The Reverse Common Control Channel data shall be convolutionally encoded as specified in 2.1.3.1.4.

When generating Reverse Common Control Channel data, the encoder shall be initialized at the end of each 20, 10, or 5 ms frame.

2.1.3.5.4 Reverse Common Control Channel Code Symbol Repetition

Each code symbol output from the convolutional encoder on the Reverse Common Control Channel shall be repeated as specified in 2.1.3.1.5.

2.1.3.5.5 Reverse Common Control Channel Interleaving

The encoded code symbols on the Reverse Common Control Channel shall be interleaved as specified in 2.1.3.1.7.

2.1.3.5.6 Reverse Common Control Channel Modulation

The Reverse Common Control Channel data shall be modulated as specified in 2.1.3.1.8.

2.1.3.5.7 Reverse Common Control Channel Quadrature Spreading

The Reverse Common Control Channel shall be quadrature spread as specified in 2.1.3.1.12.

2.1.3.5.8 Reverse Common Control Channel Baseband Filtering

The Reverse Common Control Channel shall be filtered as specified in 2.1.3.1.13.

2.1.3.5.9 Reverse Common Control Channel Transmission Processing

When the Physical Layer receives a PHY-RCCCHPreamble.Request(FCCCH_ID, RCCCH_ID, BASE_ID) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments FCCCH_ID, RCCCH_ID, and BASE_ID.
- Set the Reverse Common Control Channel Long Code Mask using FCCCH_ID, RCCCH_ID, and BASE_ID (see Figure 2.1.3.1.12-2).
- Transmit a Reverse Common Control Channel preamble.

When the Physical Layer receives a PHY-RCCCH.Request(FCCCH_ID, RCCCH_ID, BASE_ID, SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments FCCCH_ID, RCCCH_ID, BASE_ID, SDU, FRAME_DURATION, and NUM_BITS.
- Set the Reverse Common Control Channel Long Code Mask using FCCCH_ID, RCCCH_ID, and BASE_ID (see Figure 2.1.3.1.12-2).
- Set the information bits (see Figure 2.1.3.5.2-1) to SDU.
- Transmit a Reverse Common Control Channel frame of duration FRAME_DURATION (5 ms, 10 ms, or 20 ms) at a data rate that corresponds to NUM_BITS and FRAME_DURATION as specified in Table 2.1.3.5.2-1.

2.1.3.6 Reverse Dedicated Control Channel

The Reverse Dedicated Control 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 Dedicated Control Channel.

2.1.3.6.1 Reverse Dedicated Control Channel Time Alignment and Modulation Rates

The mobile station shall transmit information on the Reverse Dedicated Control Channel at a fixed data rate of 9600 bps or 14400 bps using 20 ms frames, or 9600 bps using 5 ms frames. The mobile station may support flexible data rates. If the mobile station supports flexible data rates, other fixed data rates from 1050 bps to 9600 bps or 14400 bps using 20 ms frames can also be used.

The Reverse Dedicated Control Channel frame shall be 5 ms or 20 ms in duration.

The mobile station shall transmit information on the Reverse Dedicated Control Channel at a data rate of 9600 bps for Radio Configurations 3 and 5. If the mobile station supports flexible data rates, other fixed data rates from 1050 bps to 9600 bps using 20 ms frames can also be used for the Reverse Dedicated Control Channel in Radio Configurations 3 and 5.

The mobile station shall transmit information on the Reverse Dedicated Control Channel at a data rate of 14400 bps for 20 ms frames and 9600 bps for 5 ms frames for Radio Configurations 4 and 6. If the mobile station supports flexible data rates, other fixed data rates from 1050 bps to 14400 bps using 20 ms frames can also be used for the Reverse Dedicated Control Channel in Radio Configurations 4 and 6.

The mobile station shall support discontinuous transmission on the Reverse Dedicated Control Channel. The decision to enable or disable the Reverse Dedicated Control Channel shall be made on a frame-by-frame (i.e., 5 or 20 ms) basis.

The mobile station shall support Reverse Dedicated Control 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 Dedicated Control 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 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

Table 2.1.3.6.2-2. Reverse Dedicated Control Channel Frame Structure Summary for 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

R	Information Bits	F	T

Notation

R - Reserved Bit
F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 2.1.3.6.2-1. Reverse Dedicated Control Channel Frame Structure

2.1.3.6.2.1 Reverse Dedicated 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 Dedicated Control Channel shall use a 12-bit frame quality indicator for non-flexible data rates. If flexible data rates are supported, either a 12-bit or a 16-bit frame quality indicator shall be used. The 5 ms Reverse Dedicated Control Channel shall use a 16-bit frame quality indicator

The generator polynomials for the frame quality indicator shall be as follows:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator and

$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator.

The frame quality indicators shall be computed according to the following procedure as shown in Figures 2.1.3.6.2.1-1 and 2.1.3.6.2.1-2:

- 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 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 (16 or 12).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

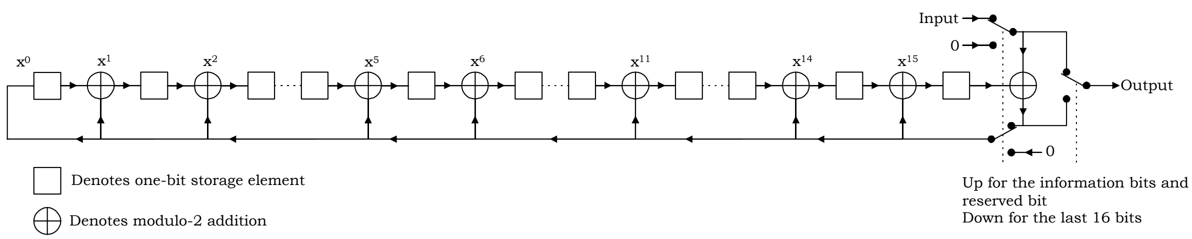


Figure 2.1.3.6.2.1-1. Reverse Dedicated Control Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

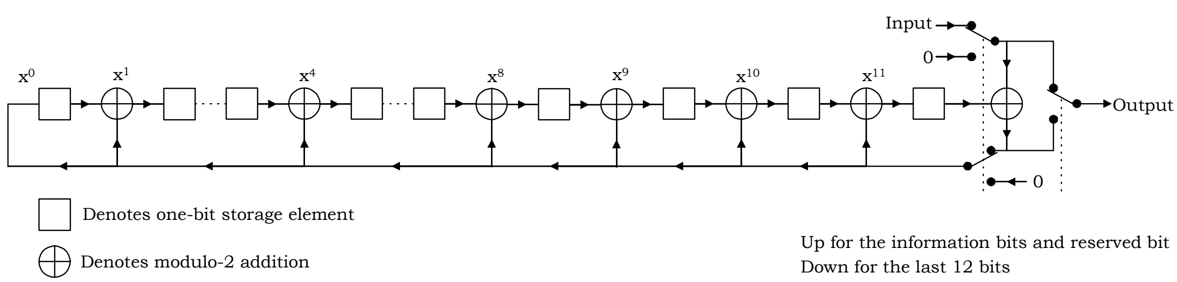


Figure 2.1.3.6.2.1-2. Reverse Dedicated Control Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

2.1.3.6.2.2 Reverse Dedicated Control Channel Encoder Tail Bits

The last eight bits of each Reverse Dedicated Control Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to ‘0’.

2.1.3.6.2.3 Reverse Traffic Channel Preamble

The Reverse Traffic Channel preamble is transmitted on the Reverse Pilot Channel as specified in 2.1.3.2.4.

2.1.3.6.3 Reverse Dedicated Control Channel Convolutional Encoding

The Reverse Dedicated Control Channel shall be convolutionally encoded as specified in 2.1.3.1.4.

When generating Reverse Dedicated Control Channel data, the encoder shall be initialized to the all-zero state at the end of each 20 ms or 5 ms frame.

2.1.3.6.4 Reverse Dedicated Control Channel Code Symbol Repetition

Reverse Dedicated Control Channel code symbol repetition shall be as specified in 2.1.3.1.5.

2.1.3.6.5 Reverse Dedicated Control Channel Code Symbol Puncturing

Reverse Dedicated Control Channel code symbol puncturing shall be as specified in 2.1.3.1.6.

2.1.3.6.6 Reverse Dedicated Control Channel Interleaving

The modulation symbols shall be interleaved as specified in 2.1.3.1.7.

2.1.3.6.7 Reverse Dedicated Control Channel Modulation

The Reverse Dedicated Control Channel data shall be modulated as specified in 2.1.3.1.8.

2.1.3.6.8 Reverse Dedicated Control Channel Quadrature Spreading

The Reverse Dedicated Control Channel shall be quadrature spread as specified in 2.1.3.1.12.

2.1.3.6.9 Reverse Dedicated Control Channel Baseband Filtering

Filtering for the Reverse Dedicated Control Channel shall be as specified in 2.1.3.1.13.

2.1.3.6.10 Reverse Dedicated Control Channel Transmission Processing

When the Physical Layer receives a PHY-DCCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- If SDU is not equal to NULL, set the information bits to SDU.
- If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Reverse Dedicated Control Channel frame of duration FRAME_DURATION (5 ms or 20 ms). If a PHY-DCCH.Request primitive for a 5 ms frame is received coincident with a PHY-DCCH.Request primitive for a 20 ms frame or during transmission of a 20 ms frame, then the mobile station may preempt transmission of the 20 ms frame and transmit a 5 ms frame. Transmission of the 20 ms frame may start or resume after completion of the 5 ms frame. If transmission of the 20 ms frame is resumed after an interruption in transmission, then the relative power level of the Reverse Dedicated Control Channel modulation symbols shall be equal to that of the 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 $1.25 \times \text{FRAME\_OFFSET}_S$ ms later than the zero-offset 20 ms Reverse Fundamental Channel frame. An offset 5 ms Reverse Fundamental Channel frame shall begin $1.25 \times (\text{FRAME\_OFFSET}_S \bmod 4)$ 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

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

R/E	Information Bits	F	T

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.

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[15] The 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.

The 20 ms 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.

The 20 ms 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.

The 20 ms 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.

The 20 ms 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:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator,

$g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1$ for the 10-bit frame quality indicator,

$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator,

$g(x) = x^6 + x^2 + x + 1$ for the 6-bit frame quality indicator (RC = 2), and

$g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator ($3 \le RC \le 6$).

The frame quality indicators shall be computed according to the following procedure as shown in Figures 2.1.3.7.2.1-1 through 2.1.3.7.2.1-6:

- 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/Erasure Indicator 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 (16, 12, 10, 8, or 6).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

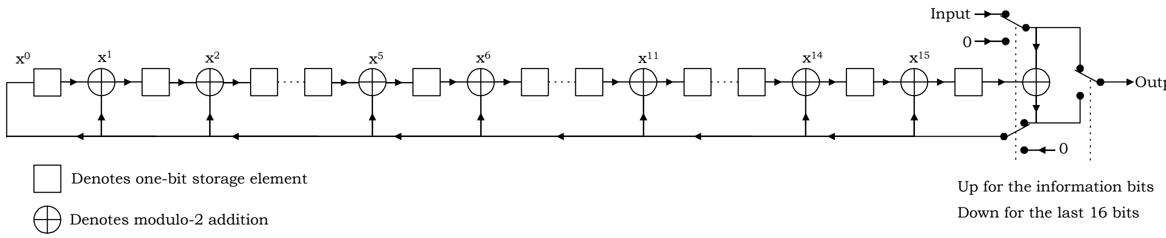

Figure 2.1.3.7.2.1-1. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

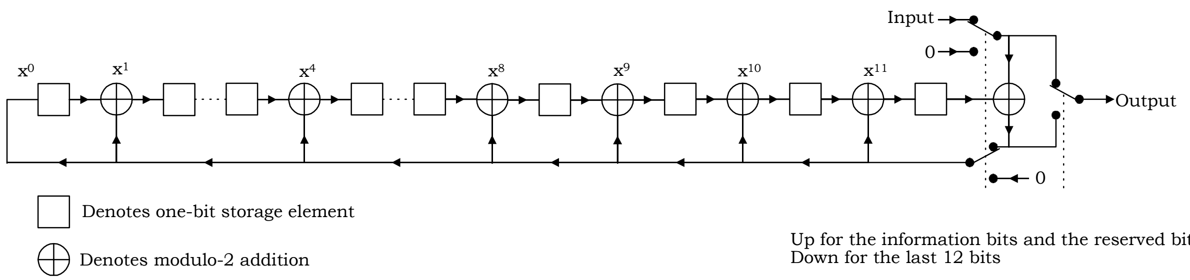

Figure 2.1.3.7.2.1-2. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

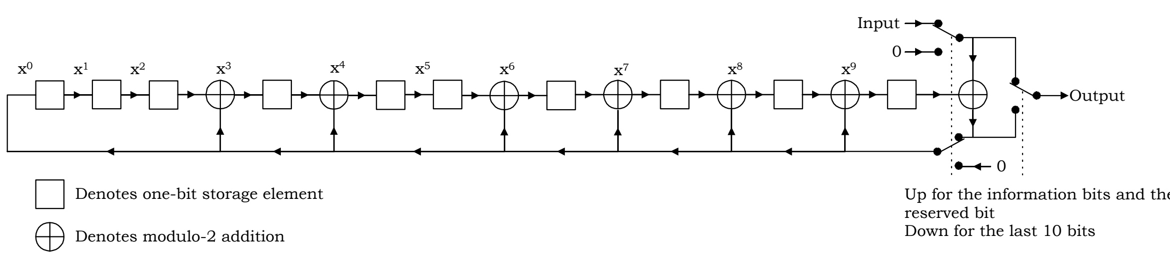

Figure 2.1.3.7.2.1-3. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator

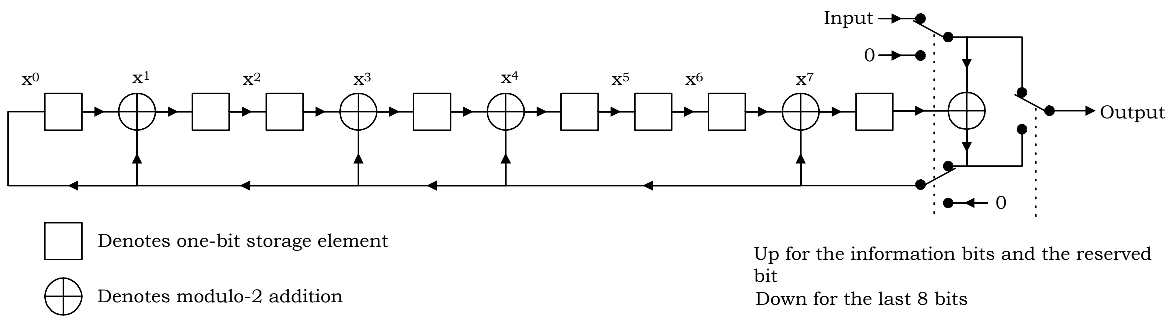

Figure 2.1.3.7.2.1-4. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

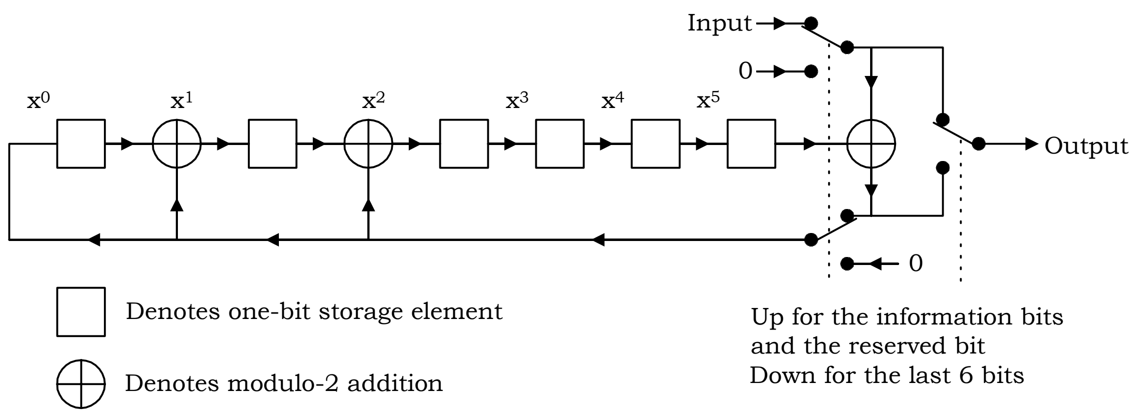

Figure 2.1.3.7.2.1-5. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configuration 2

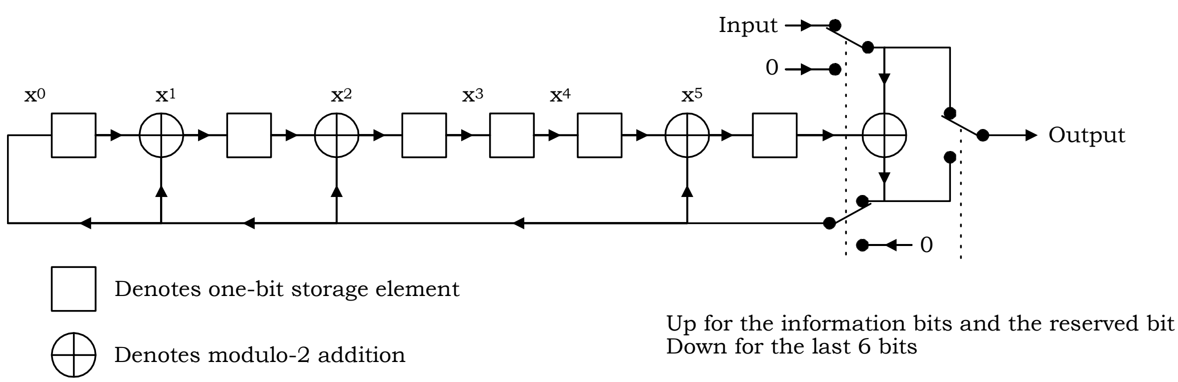

Figure 2.1.3.7.2.1-6. Reverse Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configurations 3 through 6

2.1.3.7.2.2 Reverse Fundamental Channel Encoder Tail Bits

The last eight bits of each Reverse Fundamental Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to '0'.

2.1.3.7.2.3 Reverse Traffic Channel Preambles

The Reverse Traffic Channel preamble is transmitted on the Reverse Pilot Channel or Reverse Fundamental Channel to aid the base station in acquiring the Reverse Fundamental Channel transmissions.

2.1.3.7.2.3.1 Radio Configurations 1 and 2

The Reverse Traffic Channel preamble shall consist of a frame of all zeros that is transmitted with a 100% transmission duty cycle. The Reverse Traffic Channel preamble shall not include the frame quality indicator. For Radio Configuration 1, the Reverse Traffic Channel preamble shall consist of 192 zeros that are transmitted at the 9600 bps rate. For Radio Configuration 2, the Reverse Traffic Channel preamble shall consist of 288 zeros that are transmitted at the 14400 bps rate.

When performing a hard handoff, the mobile station shall transmit the Reverse Traffic Channel preamble for $NUM\_PREAMBLE_S$ frames.

2.1.3.7.2.3.2 Radio Configurations 3 through 6

The Reverse Traffic Channel preamble is transmitted on the Reverse Pilot Channel as specified in 2.1.3.2.4.

2.1.3.7.3 Reverse Fundamental Channel Convolutional Encoding

The Reverse Fundamental Channel shall be convolutionally encoded as specified in 2.1.3.1.4.

When generating Reverse Fundamental Channel data, the encoder shall be initialized at the end of each 5 or 20 ms frame.

2.1.3.7.4 Reverse Fundamental Channel Code Symbol Repetition

Reverse Fundamental Channel code symbol repetition shall be as specified in 2.1.3.1.5.

2.1.3.7.5 Reverse Fundamental Channel Code Symbol Puncturing

Reverse Fundamental Channel code symbol puncturing shall be as specified in 2.1.3.1.6.

2.1.3.7.6 Reverse Fundamental Channel Interleaving

The Reverse Fundamental Channel shall be interleaved as specified in 2.1.3.1.7.

2.1.3.7.7 Reverse Fundamental Channel Modulation

The Reverse Fundamental Channel data shall be modulated as specified in 2.1.3.1.8.

2.1.3.7.8 Reverse Fundamental Channel Gating

The mobile station shall perform the data burst randomizing function as specified in 2.1.3.1.9 while transmitting on the Reverse Fundamental Channel with Radio Configuration 1 or 2.

The transmission of the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or 6 may be gated when no other Reverse Traffic Channel is assigned, FPC_MODE_S is not '010', and the data rate is 1500 bps for Radio Configuration 3 and 5, or 1800 bps for Radio Configuration 4 and 6. The mobile station shall operate in the Reverse Fundamental Channel gating mode if and only if $REV\_FCH\_GATING\_MODE_S$ is equal to '1'.

When the Reverse Fundamental Channel with Radio Configuration 3, 4, 5, or 6 is operated in the gated mode at a data rate of 1500 bps for Radio Configurations 3 and 5, or 1800 bps for Radio Configurations 4 and 6 (i.e., when $REV\_FCH\_GATING\_MODE_S$ = 1), the Reverse Fundamental Channel shall have a transmission duty cycle of 50%. The Reverse Fundamental Channel shall be transmitted in power control groups 2, 3, 6, 7, 10, 11, 14, and 15, and shall not be transmitted in power control groups 0, 1, 4, 5, 8, 9, 12, and 13, as shown in Figure 2.1.3.7.8-1.

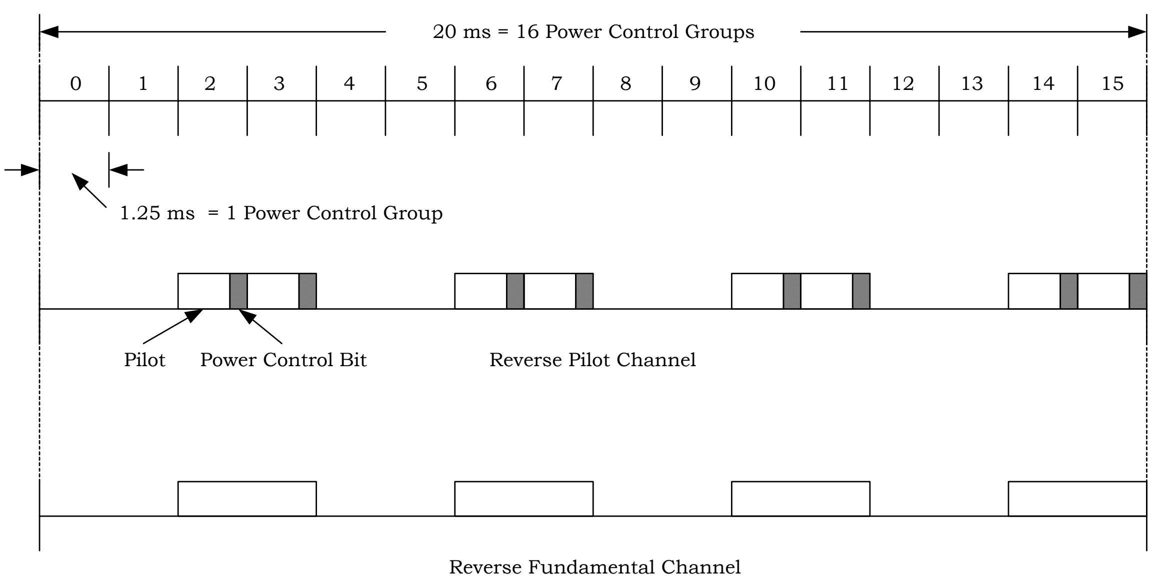

Figure 2.1.3.7.8-1. Gating Operation When the Reverse Fundamental Channel Data Rate is 1500 bps for Radio Configuration 3 and 5 or 1800 bps for Radio Configuration 4 and 6

2.1.3.7.9 Reverse Fundamental Channel Direct Sequence Spreading

When operating in Radio Configuration 1 or 2, the Reverse Fundamental Channel shall be spread by the long code as specified in 2.1.3.1.11.

2.1.3.7.10 Reverse Fundamental Channel Quadrature Spreading

The Reverse Fundamental Channel shall be quadrature spread as specified in 2.1.3.1.12.

2.1.3.7.11 Reverse Fundamental Channel Baseband Filtering

The Reverse Fundamental Channel shall be filtered as specified in 2.1.3.1.13.

2.1.3.7.12 Reverse Fundamental Channel Transmission Processing

When the Physical Layer receives a PHY-FCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- Set the information bits to SDU.
- Transmit NUM_BITS bits of SDU on a Reverse Fundamental Channel frame of duration FRAME_DURATION (5 ms or 20 ms). If a PHY-FCH.Request primitive for a 5 ms frame is received coincident with a PHY-FCH.Request primitive for a 20 ms frame or during transmission of a 20 ms frame, then the mobile station may preempt transmission of the 20 ms frame and transmit a 5 ms frame. Transmission of the 20 ms frame may start or resume after completion of the 5 ms frame. If transmission of the 20 ms frame is resumed after an interruption in transmission, then the relative power level of the Reverse Fundamental Channel modulation symbols shall be equal to that of the modulation symbols sent prior to the preemption.

2.1.3.8 Reverse Supplemental Channel

The Reverse Supplemental Channel applies to Radio Configurations 3 through 6 only.

The Reverse Supplemental Channel is used for the transmission of user information to the base station during a call. The Reverse Traffic Channel contains up to two Reverse Supplemental Channels.

2.1.3.8.1 Reverse Supplemental Channel Time Alignment and Modulation Rates

When transmitting on the Reverse Supplemental Channel with a single assigned data rate in Radio Configuration 3, the mobile station shall transmit information at fixed data rates of 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

The mobile station may support flexible data rates. If flexible data rates are supported,

- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 3, the mobile station should transmit information at a fixed data rate corresponding to 15 to 6143 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 16 information bits per frame.

- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 3, the mobile station should transmit information at a fixed data rate corresponding to 31 to 6143 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 40 information bits per frame.
- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 3, the mobile station should transmit information at a fixed data rate corresponding to 55 to 6143 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 80 information bits per frame.

When transmitting on the Reverse Supplemental Channel with a single assigned data rate in Radio Configuration 4, the mobile station shall transmit information at fixed data rates of 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

If flexible data rates are supported,

- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 4, the mobile station should transmit information at a fixed data rate corresponding to 15 to 4607 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 22 information bits per frame.
- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 4, the mobile station should transmit information at a fixed data rate corresponding to 37 to 4607 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 56 information bits per frame.
- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 4, the mobile station should transmit information at a fixed data rate corresponding to 73 to 4607 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 126 information bits per frame.

When transmitting on the Reverse Supplemental Channel with a single assigned data rate in Radio Configuration 5, the mobile station shall transmit information at a fixed data rate of 614400, 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

If flexible data rates are supported,

- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 5, the mobile station should transmit information at a fixed data rate corresponding to 15 to 12287 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 16 information bits per frame.

- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 5, the mobile station should transmit information at a fixed data rate corresponding to 31 to 12287 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 40 information bits per frame.
- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 5, the mobile station should transmit information at a fixed data rate corresponding to 55 to 12287 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 80 information bits per frame.

When transmitting on the Reverse Supplemental Channel with a single assigned data rate in Radio Configuration 6, the mobile station shall transmit information at a fixed data rate of 1036800, 518400, 460800, 259200, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

If flexible data rates are supported,

- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 6, the mobile station should transmit information at a fixed data rate corresponding to 15 to 20735 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 22 information bits per frame.
- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 6, the mobile station should transmit information at a fixed data rate corresponding to 37 to 20735 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 56 information bits per frame.
- When transmitting on the Reverse Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 6, the mobile station should transmit information at a fixed data rate corresponding to 73 to 20735 total bits per frame in 1 bit increments. The mobile station need not support flexible rates with less than 126 information bits per frame.

When using variable-rate transmission on the Reverse Supplemental Channel with multiple assigned data rates in Radio Configurations 3, 4, 5, and 6, the mobile station shall

- Transmit information at the maximal assigned data rate, or
- Transmit information at the other assigned data rates with the same modulation symbol rate as that of the maximal assigned data rate. To achieve a higher modulation symbol rate, repetition and puncturing are applied to the specified data rate.

If the mobile station supports the Reverse Supplemental Channel, the mobile station shall support Reverse Supplemental Channel frames that are 20 ms in duration. The mobile station may support Reverse Supplemental Channel frames that are 40 or 80 ms in duration. The mobile station may support discontinuous transmission of Reverse Supplemental Channel frames.

The mobile station shall support Reverse Supplemental Channel frames that are time offset by multiples of 1.25 ms as specified by $FRAME\_OFFSET_S$. The mobile station may support 40 or 80 ms Reverse Supplemental Channel frames that are time offset by multiples of 20 ms as specified by $REV\_SCH\_FRAME\_OFFSET[i]_S$, where i = 1 and 2 for Reverse Supplemental Channel 1 and Reverse Supplemental Channel 2, respectively.

The amount of the time offset is specified by $FRAME\_OFFSET_S$ and $REV\_SCH\_FRAME\_OFFSET[i]_S$, where i = 1 or 2. A zero-offset 20 ms Reverse Supplemental Channel frame shall begin only when System Time is an integral multiple of 20 ms (see Figure 1.3-1). A zero-offset 40 ms Reverse Supplemental Channel frame shall begin only when System Time is an integral multiple of 40 ms. A zero-offset 80 ms Reverse Supplemental Channel frame shall begin only when System Time is an integral multiple of 80 ms. An offset 20 ms Reverse Supplemental Channel frame shall begin $1.25 \times FRAME\_OFFSET_S$ ms later than the zero-offset 20 ms Reverse Supplemental Channel frame. An offset 40 ms Reverse Supplemental Channel frame shall begin $(1.25 \times FRAME\_OFFSET_S + 20 \times REV\_SCH\_FRAME\_OFFSET[i]_S)$ ms later than the zero-offset 40 ms Reverse Supplemental Channel frame. An offset 80 ms Reverse Supplemental Channel frame shall begin $(1.25 \times FRAME\_OFFSET_S + 20 \times REV\_SCH\_FRAME\_OFFSET[i]_S)$ ms later than the zero-offset 80 ms Reverse Supplemental Channel frame. The interleaver block for the Reverse Supplemental Channels shall be aligned with the Reverse Supplemental Channel frame.

2.1.3.8.2 Reverse Supplemental Channel Frame Structure

Tables 2.1.3.8.2-1 through 2.1.3.8.2-3 summarize the Reverse Supplemental Channel bit allocations for non-flexible data rates. Tables 2.1.3.8.2-4 through 2.1.3.8.2-6 summarize the Reverse Supplemental Channel bit allocations for flexible data rates. All frames shall consist of zero or one Reserved Bits followed by the information bits, a frame quality indicator (CRC), and eight Encoder Tail Bits, as shown in Figure 2.1.3.8.2-1.

All frames with Radio Configurations 3 and 5 and the frames with Radio Configurations 4 and 6 with data rates above 14400 bps shall consist of the information bits, followed by the frame quality indicator (CRC) and eight Encoder Tail Bits. All frames with Radio Configurations 4 and 6 with data rates equal to or less than 14400 bps shall consist of zero or one Reserved Bits, followed by the information bits, frame quality indicator (CRC), and eight Encoder Tail Bits.

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	Informa-tion	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	Informa-tion	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.

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	Informa-tion	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.

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

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

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

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

R	Information Bits	F	R/T

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:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator,

$g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1$ for the 10-bit frame quality indicator,

$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator, and

$g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator.

The frame quality indicators shall be computed according to the following procedure as shown in Figures 2.1.3.8.2.1-1 through 2.1.3.8.2.1-5:

- 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 (16, 12, 10, 8, or 6).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

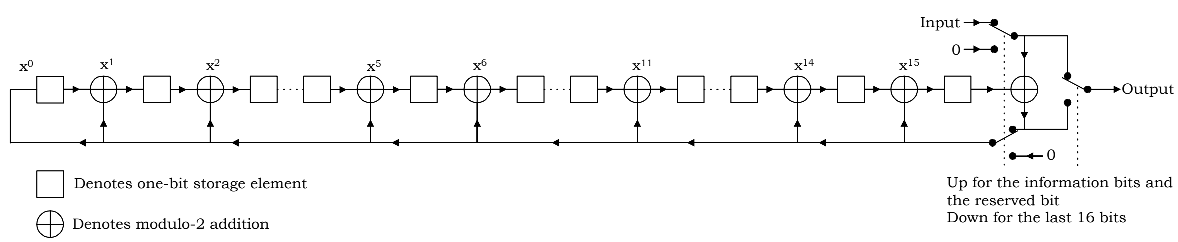

Figure 2.1.3.8.2.1-1. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

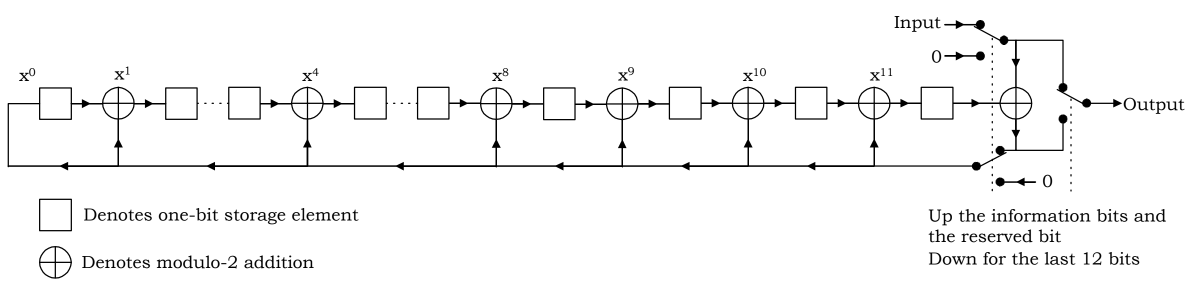

Figure 2.1.3.8.2.1-2. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

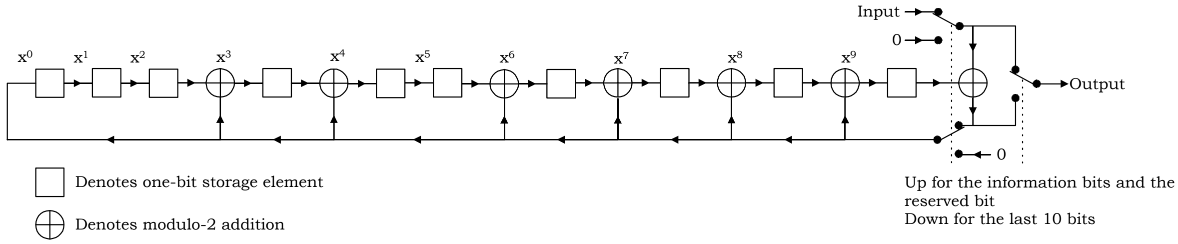

Figure 2.1.3.8.2.1-3. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator

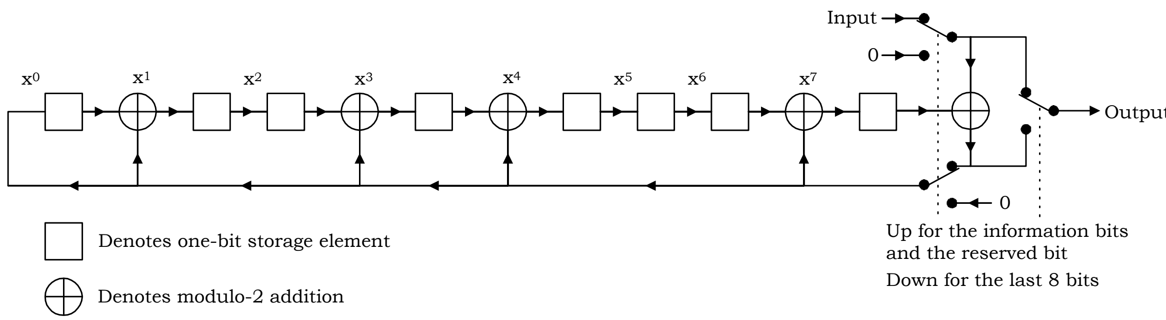

Figure 2.1.3.8.2.1-4. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

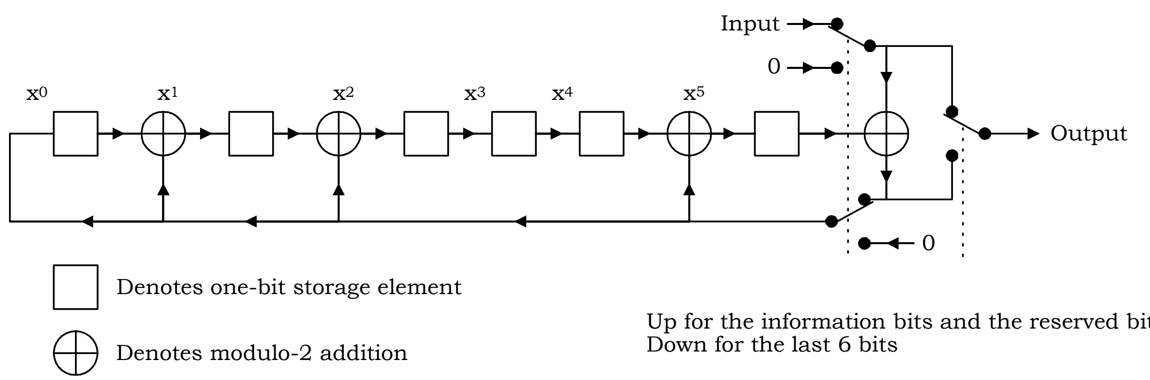

Figure 2.1.3.8.2.1-5. Reverse Supplemental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator

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.

2.1.3.8.3 Reverse Supplemental Channel Forward Error Correction Encoding

The Reverse Supplemental Channel shall be convolutionally or turbo encoded as specified in 2.1.3.1.4.

When generating Reverse Supplemental Channel data, the encoder shall be initialized at the end of each frame.

2.1.3.8.4 Reverse Supplemental Channel Code Symbol Repetition

Reverse Supplemental Channel code symbol repetition shall be as specified in 2.1.3.1.5.

2.1.3.8.5 Reverse Supplemental Channel Code Symbol Puncturing

Reverse Supplemental Channel code symbol puncturing shall be as specified in 2.1.3.1.6.

2.1.3.8.6 Reverse Supplemental Channel Interleaving

The Reverse Supplemental Channel shall be interleaved as specified in 2.1.3.1.7.

2.1.3.8.7 Reverse Supplemental Channel Modulation

The Reverse Supplemental Channel data shall be modulated as specified in 2.1.3.1.8.

2.1.3.8.8 Reverse Supplemental Channel Quadrature Spreading

The Reverse Supplemental Channel shall be quadrature spread as specified in 2.1.3.1.12.

2.1.3.8.9 Reverse Supplemental Channel Baseband Filtering

The Reverse Supplemental Channel shall be filtered as specified in 2.1.3.1.13.

2.1.3.8.10 Reverse Supplemental Channel Transmission Processing

When the Physical Layer receives a PHY-SCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- If SDU is not equal to NULL, set the information bits to SDU.
- If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Reverse Supplemental Channel frame of duration FRAME_DURATION (20, 40, or 80 ms).

2.1.3.9 Reverse Supplemental Code Channel

The Reverse Supplemental Code Channel applies to Radio Configurations 1 and 2 only.

The Reverse Supplemental Code Channel is used for the transmission of user information to the base station during a call. The Reverse Traffic Channel contains up to seven Reverse Supplemental Code Channels.

2.1.3.9.1 Reverse Supplemental Code Channel Time Alignment and Modulation Rates

When transmitting on Reverse Supplemental Code Channels with Radio Configuration 1, the mobile station shall transmit information at 9600 bps. When transmitting on Reverse

Supplemental Code Channels with Radio Configuration 2, the mobile station shall transmit information at 14400 bps.

The Reverse Supplemental Code Channel frame shall be 20 ms in duration.

The mobile station shall transmit Reverse Supplemental Code Channels within 3/8 of a PN chip (305.1758 ns) of the Reverse Fundamental Channel.

The mobile station shall support Reverse Supplemental Code 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 Reverse Supplemental Code Channel frame shall begin only when System Time is an integral multiple of 20 ms (see Figure 1.3-1). An offset Reverse Supplemental Code Channel frame shall begin $1.25 \times \text{FRAME\_OFFSET}_S$ ms later than the zero-offset Reverse Supplemental Code Channel frame. The mobile station shall transmit frames on the Reverse Supplemental Code Channels in time alignment with the Reverse Fundamental Channel. The interleaver block for the Reverse Supplemental Code Channels shall be aligned with the Reverse Supplemental Code Channel frame.

2.1.3.9.2 Reverse Supplemental Code Channel Frame Structure

Table 2.1.3.9.2-1 summarizes the Reverse Supplemental Code Channel bit allocations. The order of the bits is shown in Figure 2.1.3.9.2-1.

Radio Configuration 1 frames shall consist of the information bits followed by a frame quality indicator (CRC) and eight Encoder Tail Bits. Radio Configuration 2 frames shall consist of a Reserved Bit, followed by the information bits, a frame quality indicator (CRC), and eight Encoder Tail Bits.

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**	**Informa-tion**	**Frame Quality Indicator**	**Encoder Tail**
1	9600	192	0	172	12	8
2	14400	288	1	267	12	8

R	Information Bits	F	T

Notation

R - Reserved Bit
F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 2.1.3.9.2-1. Reverse Supplemental Code Channel Frame Structure

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.

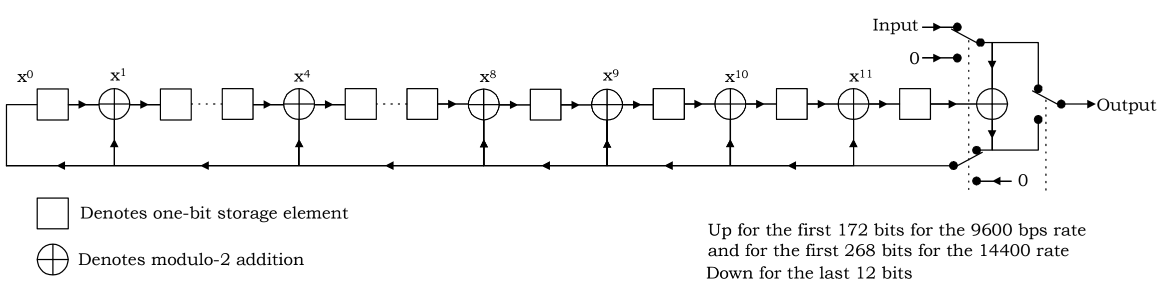

Figure 2.1.3.9.2.1-1. Reverse Supplemental Code Channel Frame Quality Indicator Calculation

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.

2.1.3.9.2.3.1 Reverse Supplemental Code Channel Preamble

The Reverse Supplemental Code Channel preamble shall consist of $NUM\_PREAMBLE\_FRAMES_S$ frames of all zeros that are transmitted with a 100% transmission duty cycle. The Reverse Supplemental Code Channel preamble shall not include the frame quality indicator. For Radio Configuration 1, each frame of the Reverse Supplemental Code Channel preamble shall consist of 192 zeros that are transmitted at the 9600 bps rate. For Radio Configuration 2, each frame of the Reverse Supplemental Code Channel preamble shall consist of 288 zeros that are transmitted at the 14400 bps rate.

2.1.3.9.2.3.2 Reverse Supplemental Code Channel Discontinuous Transmission Preamble

When discontinuous transmission is permitted on the Reverse Supplemental Code Channel, the mobile station may resume transmission following a break in the Reverse Supplemental Code Channel transmission. When transmission on a Reverse Supplemental Code Channel is resumed, the mobile station shall transmit a preamble, consisting of $RESUME\_PREAMBLE_S$ frames of all zeros that are transmitted with a 100% transmission duty cycle. The preamble frames shall not include the frame quality indicator.

For Radio Configuration 1, each frame of the Reverse Supplemental Code Channel preamble shall consist of 192 zeros that are transmitted at the 9600 bps rate. For Radio Configuration 2, each frame of the Reverse Supplemental Code Channel Discontinuous Transmission preamble shall consist of 288 zeros that are transmitted at the 14400 bps rate.

2.1.3.9.3 Reverse Supplemental Code Channel Convolutional Encoding

The Reverse Supplemental Channel shall be convolutionally encoded as specified in 2.1.3.1.4.

When generating Reverse Supplemental Code Channel data, the encoder shall be initialized at the end of each 20 ms frame.

2.1.3.9.4 Reverse Supplemental Code Channel Code Symbol Repetition

Reverse Supplemental Code Channel code symbol repetition shall be as specified in 2.1.3.1.5.

2.1.3.9.5 Reverse Supplemental Code Channel Interleaving

The Reverse Supplemental Code Channel shall be interleaved as specified in 2.1.3.1.7.

2.1.3.9.6 Reverse Supplemental Code Channel Modulation

The Reverse Supplemental Code Channel data shall be modulated as specified in 2.1.3.1.8.

2.1.3.9.7 Reverse Supplemental Code Channel Direct Sequence Spreading

The Reverse Supplemental Code Channel shall be spread by the long code as specified in 2.1.3.1.11.

2.1.3.9.8 Reverse Supplemental Code Channel Quadrature Spreading

The Reverse Supplemental Code Channel shall be quadrature spread by the pilot PN sequences as specified in 2.1.3.1.12.

2.1.3.9.9 Reverse Supplemental Code Channel Baseband Filtering

The Reverse Supplemental Code Channel shall be filtered as specified in 2.1.3.1.13.

2.1.3.9.10 Reverse Supplemental Code Channel Transmission Processing

When the Physical Layer receives a PHY-SCCHPreamble.Request(NUM_PREAMBLE_FRAMES) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments NUM_PREAMBLE_FRAMES.
- Transmit NUM_PREAMBLE_FRAMES Reverse Supplemental Code Channel preamble frames.

When the Physical Layer receives a PHY-SCCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the mobile station shall perform the following:

- Store the arguments SDU and NUM_BITS.
- If SDU is not equal to NULL, set the information bits to SDU.
- If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Reverse Supplemental Code Channel frame.

2.1.4 Limitations on Emissions

2.1.4.1 Conducted Spurious Emissions

The mobile station shall meet the requirements in Section 4.5.1 of the current version of [11].

2.1.4.2 Radiated Spurious Emissions

The mobile station shall meet the requirements in Section 4.5.2 of the current version of [11].

2.1.5 Synchronization and Timing

Figure 1.3-1 illustrates the nominal relationship between the mobile station and base station transmit and receive time references. The mobile station shall establish a time reference which is utilized to derive timing for the transmitted chips, symbols, frame slots, and system timing. Under steady state conditions, the mobile station time reference shall be within ±1 μs of the time of occurrence of the earliest multipath component being used for demodulation as measured at the mobile station antenna connector. If another multipath component belonging to the same pilot channel or to a different pilot channel becomes the earliest arriving multipath component to be used, the mobile station time reference shall track to the new component. A valid pilot channel may be a Forward Pilot Channel, Transmit Diversity Pilot Channel, Auxiliary Pilot Channel, or Auxiliary Transmit Diversity Pilot Channel. If the difference between the mobile station time reference and the time of occurrence of the earliest arriving multipath component being used for demodulation, as measured at the mobile station antenna connector, is less than ±1 μs, the mobile station may track its time reference to the earliest arriving multipath component being used for demodulation.

When receiving the Forward Traffic Channel, the mobile station time reference shall be used as the transmit time of the Reverse Traffic Channel. If a mobile station time reference correction is needed, it shall be corrected no faster than 203 ns in any 200 ms period and no slower than 305 ns per second when using Radio Configuration 1 or 2 and no slower than 460 ns per second when using Radio Configuration 3 through 9.

When receiving the Paging Channel, the mobile station time reference shall be used as the transmit time of the Access Channel. If a mobile station time reference correction is needed before transmitting an Access probe, the mobile station shall correct the time reference before it sends the Access probe; there is no limitation on the speed of the correction. If a mobile station time reference correction is needed while transmitting an Access probe, it shall be corrected no faster than 203 ns in any 200 ms period and no slower than 305 ns per second.

When receiving the Forward Common Control Channel, the mobile station time reference shall be used as the transmit time of the Enhanced Access Channel and the Reverse Common Control Channel. If a mobile station time reference correction is needed before transmitting on the Enhanced Access Channel or the Reverse Common Control Channel, the mobile station shall correct the time reference before it transmits; there is no limitation on the speed of the correction. If a mobile station time reference correction is needed while transmitting, it shall be corrected no faster than 203 ns in any 200 ms period and no slower than 460 ns per second.

2.1.5.1 Pilot to Walsh Cover Time Tolerance

When transmitting on the Enhanced Access Channel, the Reverse Common Control Channel, or the Reverse Traffic Channel, the mobile station shall meet the requirements in the current version of [11].

2.1.5.2 Pilot to Walsh Cover Phase Tolerance

When transmitting on the Enhanced Access Channel, the Reverse Common Control Channel, or the Reverse Traffic Channel, the mobile station shall meet the requirements in the current version of [11].

2.1.6 Transmitter Performance Requirements

System performance is predicated on transmitters meeting the requirements set forth in the current version of [11].

2.2 Receiver

2.2.1 Channel Spacing and Designation

Channel spacing and designation for the mobile station reception shall be as specified in 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.

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[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.

- The mobile station shall set the Reserved/Erasure Indicator Bit (see Figure 2.1.3.7.2-1) to '0' in the second transmitted frame following the reception of a good frame on the Forward Fundamental Channel of the Forward Traffic Channel as shown in Figure 2.2.2.2-1.

If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S = '011', the mobile station shall set all the power control bits on the Reverse Power Control Subchannel during a 20 ms period to the Erasure Indicator Bit (EIB) which is defined as follows:

- The mobile station shall set the Erasure Indicator Bit to '0' in the second transmitted frame following the detection[17] of a good 20 ms frame on the Forward Fundamental Channel or the Forward Dedicated Control Channel as shown in Figure 2.2.2.2-1.
- The mobile station shall set the Erasure Indicator Bit to '0' in the second transmitted frame following the detection of at least one good 5 ms frame without detection of any bad 5 ms frames.
- Otherwise, the mobile station shall set the Erasure Indicator Bit to '1' in the second transmitted frame.

If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S = '100' and the channel configuration contains the Forward Fundamental Channel, the mobile station shall set all the power control bits on the Reverse Power Control Subchannel during a 20 ms period to the Quality Indicator Bit (QIB). The Quality Indicator Bit shall be set the same as the Erasure Indicator Bit as when FPC_MODE_S = '011'.

If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S = '100' and if the channel configuration does not contain the Forward Fundamental Channel, the mobile station shall set all the power control bits on the Reverse Power Control Subchannel during a 20 ms period to the Quality Indicator Bit (QIB) which is defined as follows:

- The mobile station shall set the Quality Indicator Bit to '1' in the second transmitted frame following the reception of a 20 ms period with insufficient signal quality (e.g. bad frame) on the Forward Dedicated Control Channel as shown in Figure 2.2.2.2-1.
- The mobile station shall set the Quality Indicator Bit to '0' in the second transmitted frame following the reception of a 20 ms period with sufficient signal quality (e.g. good frame) on the Forward Dedicated Control Channel as shown in Figure 2.2.2.2-1.

If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S = '101', the mobile station shall set all the power control bits on the Primary Reverse Power Control Subchannel during a 20 ms period to the Quality Indicator Bit (QIB). The Quality Indicator Bit shall be set the same as when FPC_MODE_S = '100'.

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[17] A frame is considered to be detected if the mobile station determines that the base station transmitted a frame containing data.

If Radio Configuration 3, 4, 5, or 6 is used on the Reverse Traffic Channel with FPC_MODE_S = '101' or '110', the mobile station shall set all the power control bits on the Secondary Reverse Power Control Subchannel during a period equal to the frame duration of Forward Supplemental Channel 0 ($FPC\_SEC\_CHAN_S$ = '0') or Forward Supplemental Channel 1 ($FPC\_SEC\_CHAN_S$ = '1') to the Erasure Indicator Bit (EIB). This Erasure Indicator Bit is derived from Forward Supplemental Channel 0 ($FPC\_SEC\_CHAN_S$ = '0') or Forward Supplemental Channel 1 ($FPC\_SEC\_CHAN_S$ = '1'). The Erasure Indicator Bit is defined as follows:

- The mobile station shall set the Erasure Indicator Bit to '0' for a period equal to the frame duration of the corresponding Forward Supplemental Channel, starting at 20 ms after a detected good frame on that Forward Supplemental Channel as shown in Figure 2.2.2.2-2.
- Otherwise, the mobile station mobile station shall set the Erasure Indicator Bit to '1' for a periodequal to the frame duration of the corresponding Forward Supplemental Channel, starting at 20 ms after a frame on that Forward Supplemental Channel as shown in Figure 2.2.2.2-2.

When the mobile station temporarily suspends reception of the Forward Traffic Channel in order to tune to another frequency (such as during a PUF probe, a hard handoff with return on failure, or a Candidate Frequency search), the mobile station shall set the Reserved/Erasure Indicator/Quality Indicator Bit as follows:

- In the first two frames after the mobile station re-enables its transmitter, the mobile station shall send Reserved/Erasure Indicator/Quality Indicator Bits corresponding to the two most recently received frames. One or both of these Reserved/Erasure Indicator/Quality Indicator Bits could be for frames that were received before the mobile station tuned to the other frequency, and were stored by the mobile station before the visit.
- After transmitting the first two frames, if the number of frames missed on the Reverse Traffic Channel (due to the mobile station's visit away from the Serving Frequency) is less than that on the Forward Traffic Channel, the mobile station shall set the Reserved/Erasure Indicator/Quality Indicator Bit to '0', until it receives two frames on the Forward Traffic Channel.
- The mobile station shall then set subsequent Reserved/Erasure Indicator/Quality Indicator Bits as described above for continuous operation.

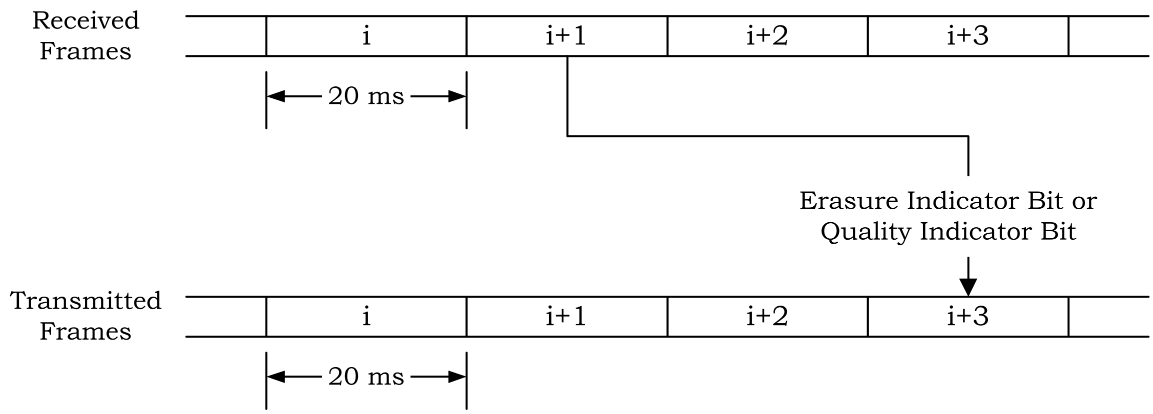


Figure 2.2.2.2-1. Erasure Indicator Bit/Quality Indicator Bit Timing

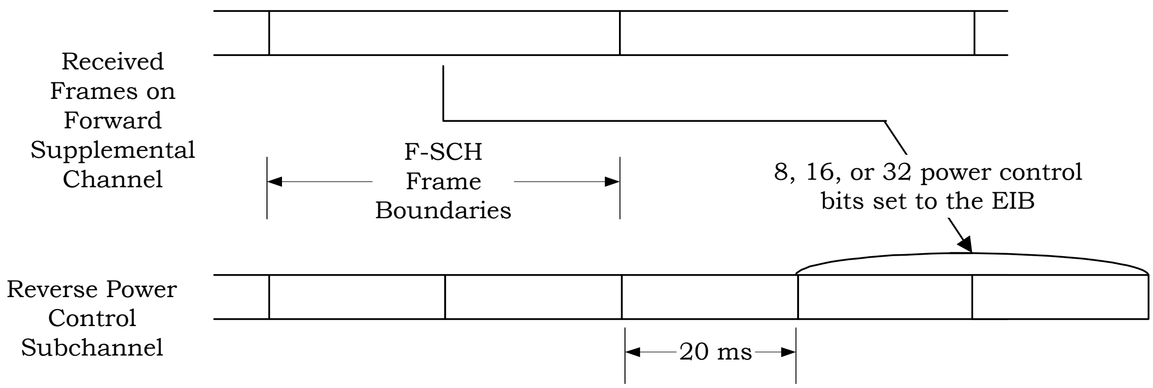


Figure 2.2.2.2-2. Erasure Indicator Bit Timing for the Forward Supplemental Channel

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.

2.2.2.4.2 Paging Channel Reception Processing

When the mobile station receives a Paging Channel frame, the Physical Layer shall send a PHY-PCH.Indication (SDU) to the MAC Layer, after the mobile station performs the following action:

- Set the SDU to the received information bits.

2.2.2.4.3 Broadcast Control Channel Reception Processing

When the mobile station receives a Broadcast Control Channel frame, the Physical Layer shall send a PHY-BCCH.Indication (SDU, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following actions:

- Set SDU to the received information bits.
- Set NUM_BITS to the number of bits of the received frame.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

2.2.2.4.4 Quick Paging Channel Reception Processing

Not specified.

2.2.2.4.5 Common Power Control Channel Reception Processing

While operating in the Power Controlled Access Mode, the mobile station shall use the common power control subchannel transmitted by the base station on the assigned Common Power Control Channel to adjust the transmit power of the Enhanced Access Channel. While operating in the Reservation Access Mode, the mobile station shall use the common power control subchannel transmitted by the base station on the assigned Common Power Control Channel to adjust the transmit power of the Reverse Common Control Channel. While operating in the Designated Access Mode, the mobile station shall use the common power control subchannel transmitted by the base station on the assigned Common Power Control Channel to adjust the transmit power of the Reverse Common Control Channel.

2.2.2.4.6 Common Assignment Channel Reception Processing

When the mobile station receives a Common Assignment Channel frame, the Physical Layer shall send a PHY-CACH.Indication (SDU, FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

2.2.2.4.7 Forward Common Control Channel Reception Processing

When the mobile station receives a Forward Common Control Channel frame, the Physical Layer shall send a PHY-FCCCH.Indication (SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following actions:

- Set SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of bits of the received frame.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

2.2.2.4.8 Forward Dedicated Control Channel Reception Processing

When the mobile station receives a Forward Dedicated Control Channel frame, the Physical Layer shall send a PHY-DCCH.Indication (SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of information bits in the SDU.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

If the mobile station does not receive a Forward Dedicated Control Channel frame at the end of a 20 ms frame boundary, the Physical Layer shall send a PHY-DCCH.Indication (SDU) to the MAC Layer, after the mobile station performs the following action:

- Set the SDU to NULL.

2.2.2.4.9 Forward Fundamental Channel Reception Processing

When the mobile station receives a Forward Fundamental Channel frame, the Physical Layer shall send a PHY-FCH.Indication (SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of information bits in the SDU.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

2.2.2.4.10 Forward Supplemental Channel Reception Processing

When the mobile station receives a Forward Supplemental Channel frame, the Physical Layer shall send a PHY-SCH.Indication (SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of information bits of the SDU.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

2.2.2.4.11 Forward Supplemental Code Channel Reception Processing

When the mobile station receives a Forward Supplemental Code Channel frame, the Physical Layer shall send a PHY-SCCH.Indication (SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the mobile station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of information bits of the SDU.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

2.2.3 Limitations on Emissions

The mobile station shall meet the requirements in Section 3.5.1 of the current version of [11].

2.2.4 Receiver Performance Requirements

System performance is predicated on receivers meeting the requirements set forth in Section 3 of the current version of [11].

2.3 Malfunction Detection

2.3.1 Malfunction Timer

The mobile station shall have a malfunction timer that is separate from and independent of all other functions and that runs continuously whenever power is applied to the transmitter of the mobile station. Sufficient reset commands shall be interspersed throughout the mobile station logic program to ensure that the timer never expires as long as the proper sequence of operations is taking place. If the timer expires, a malfunction shall be assumed and the mobile station shall be inhibited from transmitting. The maximum time allowed for expiration of the timer is two seconds.

2.3.2 False Transmission

A protection circuit shall be provided to minimize the possibility of false transmitter operation caused by component failure within the mobile station.

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).

3.1.1.1.4 Band Class 3 (JTACS Band)

The Band Class 3 system designators for base station transmissions shall be as specified in Table 2.1.1.1.4-1. Base stations supporting Band Class 3 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.4-2 and as described in Table 2.1.1.1.4-3.

The preferred set of CDMA frequency assignments for Band Class 3 is given in Table 2.1.1.1.4-4.

3.1.1.1.5 Band Class 4 (Korean PCS Band)

The Band Class 4 block designators for base station transmissions shall be as specified in Table 2.1.1.1.5-1. Base stations supporting Band Class 4 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.5-2 and as described in Tables 2.1.1.1.5-3 and 2.1.1.1.5-4.

The preferred set of CDMA frequency assignments for Band Class 4 is given in Table 2.1.1.1.5-5.

If a Band Class 4 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 25 CDMA Channels (1.25 MHz separation).

3.1.1.1.6 Band Class 5 (450 MHz Band)

The Band Class 5 block designators for base station transmissions shall be as specified in Table 2.1.1.1.6-1. Base stations supporting Band Class 5 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.6-2 and as described in Tables 2.1.1.1.6-3 and 2.1.1.1.6-4.

The preferred set of CDMA frequency assignments for Band Class 5 is given in Table 2.1.1.1.6-5.

If a Band Class 5 carrier operates with Spreading Rate 3 in Block A, B, C or E, then all three carriers shall be separated by 50 CDMA Channels (1.25 MHz separation). If a Band Class 5 carrier operates with Spreading Rate 3 in Block F, G, or H, then all three carriers shall be separated by 62 CDMA Channels (1.24 MHz separation).

3.1.1.1.7 Band Class 6 (2 GHz Band)

Base stations supporting Band Class 6 shall support CDMA operations on CDMA Channels 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.

The preferred set of CDMA frequency assignments for Band Class 6 is given in Table 2.1.1.1.7-4.

If a Band Class 6 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 25 CDMA Channels (1.25 MHz separation).

3.1.1.1.8 Band Class 7 (700 MHz Band)

The Band Class 7 block designators for base station transmissions shall be as specified in Table 2.1.1.1.8-1. Base stations supporting Band Class 7 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.8-2 and as described in Tables 2.1.1.1.8-3 and 2.1.1.1.8-4.

The preferred set of CDMA frequency assignments for Band Class 7 is given in Table 2.1.1.1.8-5.

If a Band Class 7 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 25 CDMA Channels (1.25 MHz separation).

3.1.1.1.9 Band Class 8 (1800 MHz Band)

The Band Class 8 block designators for base station transmissions are not specified. Base stations supporting Band Class 8 shall support CDMA operations on CDMA Channels as 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.

The preferred set of CDMA frequency assignments for Band Class 8 is given in Table 2.1.1.1.9-4.

If a Band Class 8 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 25 CDMA Channels (1.25 MHz separation).

3.1.1.1.10 Band Class 9 (900 MHz Band)

The Band Class 9 block designators for base station transmissions are not specified. Base stations supporting Band Class 9 shall support CDMA operations on CDMA Channels as 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.

The preferred set of CDMA frequency assignments for Band Class 9 is given in Table 2.1.1.1.10-4.

If a Band Class 9 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 25 CDMA Channels (1.25 MHz separation).

3.1.1.1.11 Band Class 10 (Secondary 800 MHz Band)

The Band Class 10 system designators for base station transmissions shall be as specified in Table 2.1.1.1.11-1. Base stations supporting Band Class 10 shall support CDMA operations on CDMA Channels as calculated in Table 2.1.1.1.11-2 and as described in Tables 2.1.1.1.11-3 and 2.1.1.1.11-4.

The preferred set of CDMA frequency assignments for Band Class 10 is given in Table 2.1.1.1.11-5.

If a Band Class 10 carrier operates with Spreading Rate 3, then all three carriers shall be separated by 50 CDMA Channels (1.25 MHz separation).

3.1.1.2 Frequency Tolerance

The base station transmit carrier frequency shall be maintained within $\pm 5 \times 10^{-8}$ of the CDMA frequency assignment.

3.1.2 Power Output Characteristics

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.

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.

For Spreading Rate 1, the base station may support orthogonal transmit diversity (OTD) or space time spreading (STS) on forward dedicated channels (i.e., Forward Dedicated Control Channel, Forward Fundamental Channel, and Forward Supplemental Channel), and forward common channels (i.e., Broadcast Control Channel, Quick Paging Channel, Common Power Control Channel, Common Assignment Channel, and Forward Common Control Channel). For Spreading Rate 3, the base station may support transmit diversity by transmitting carriers on separate antennas. The base station shall transmit all forward dedicated channels (i.e., Forward Dedicated Control Channel, Forward Fundamental

Channel, and Forward Supplemental Channel) to a mobile station using one of the following schemes: no transmit diversity, OTD, or STS. The base station shall transmit the Broadcast Control Channel, the Common Power Control Channel, the Common Assignment Channel, and the Forward Common Control Channel on a Forward CDMA Channel using one of the following schemes: no transmit diversity, OTD, or STS.

3.1.3.1.1 Channel Structures

The structure of the code channels transmitted by a base station is shown in Figure 3.1.3.1.1-1.

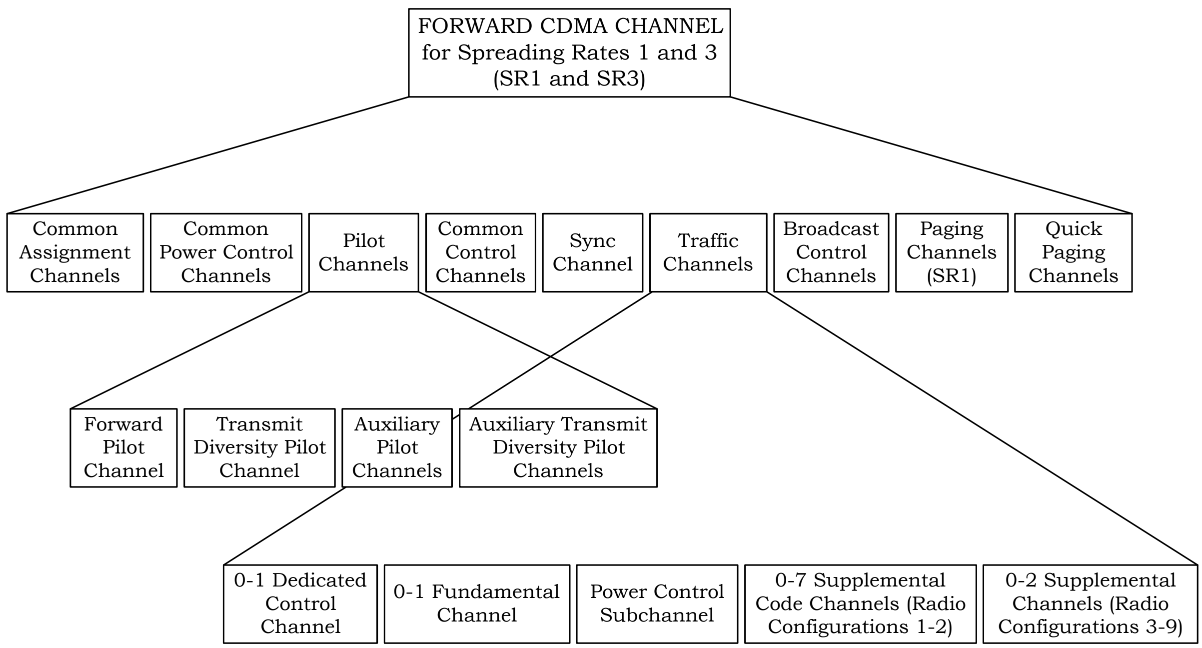


Figure 3.1.3.1.1-1. Forward CDMA Channel Transmitted by a Base Station

3.1.3.1.1.1 Spreading Rate 1

The Forward CDMA Channel consists of the channels specified in Table 3.1.3.1.1.1-1. Table 3.1.3.1.1.1-1 states the range of valid channels for each channel type.

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

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 Forward Dedicated Control Channel for Spreading Rate 1 is shown in Figures 3.1.3.1.1.1-10 through 3.1.3.1.1.1-12.

The Forward Fundamental Channel and Forward Supplemental Code Channel for Radio Configuration 1 have the overall structure shown in Figure 3.1.3.1.1.1-13. The Forward Fundamental Channel and Forward Supplemental Code Channel for Radio Configuration 2 have the overall structure shown in Figure 3.1.3.1.1.1-14. The Forward Fundamental Channel and Forward Supplemental Channel for Radio Configuration 3 have the overall structure shown in Figure 3.1.3.1.1.1-15. The Forward Fundamental Channel and Forward Supplemental Channel for Radio Configuration 4 have the overall structure shown in Figure 3.1.3.1.1.1-16. The Forward Fundamental Channel and Forward Supplemental Channel for Radio Configuration 5 have the overall structure shown in Figure 3.1.3.1.1.1-17.

For the Forward Traffic Channel with Radio Configurations 3 through 5, long code scrambling, power control puncturing, and symbol point mapping is shown in Figure 3.1.3.1.1.1-18.

The symbol demultiplexing and I and Q mappings are shown in Figures 3.1.3.1.1.1-19, 3.1.3.1.1.1-20, 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22.

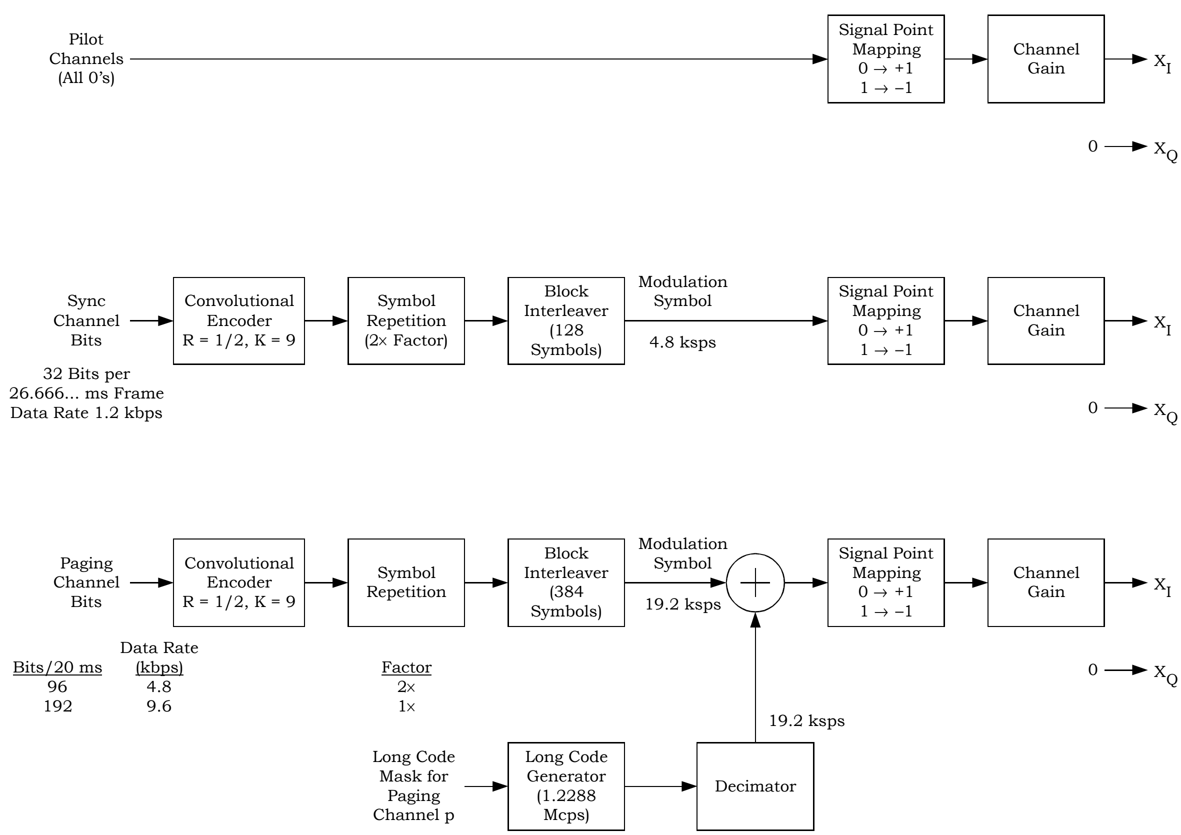


Figure 3.1.3.1.1.1-1. Pilot Channels, Sync Channel, and Paging Channels for Spreading Rate 1

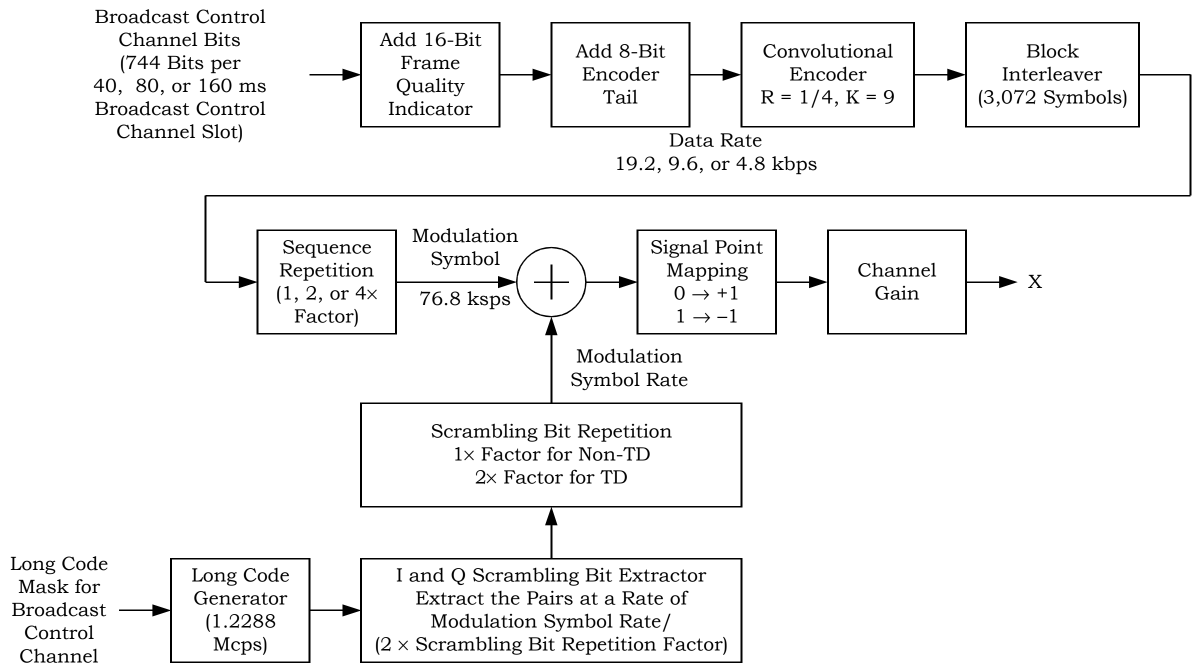


Figure 3.1.3.1.1.1-2. Broadcast Control Channel Structure for Spreading Rate 1 with R = 1/4 Mode

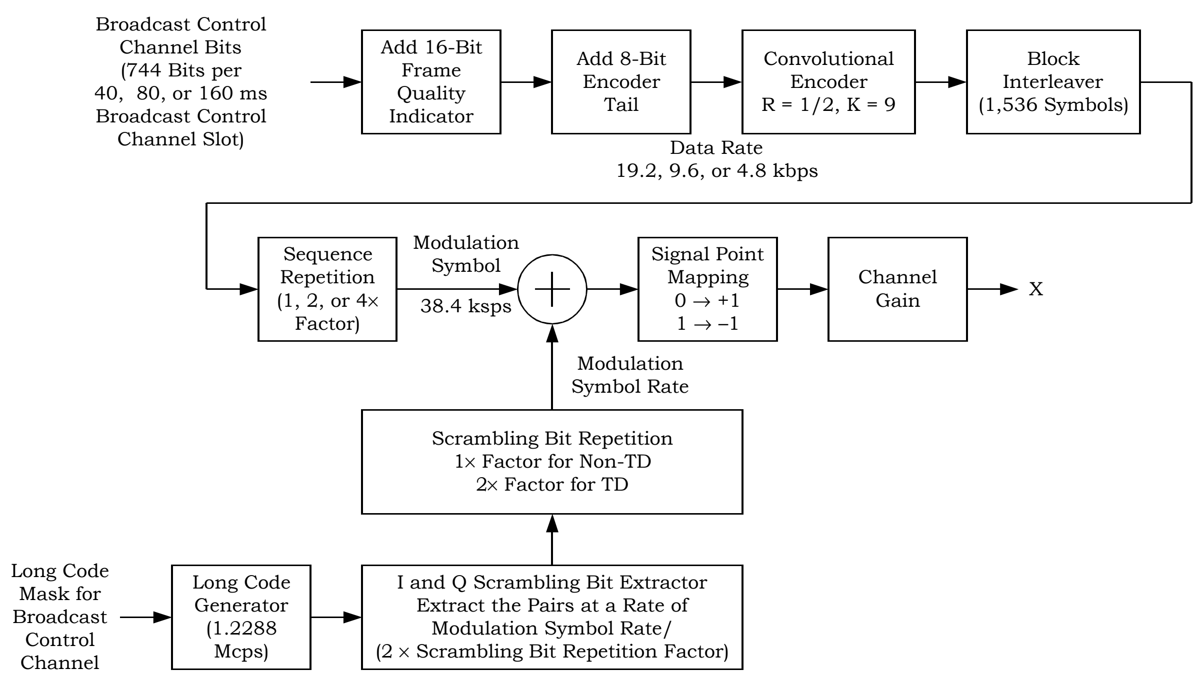


Figure 3.1.3.1.1.1-3. Broadcast Control Channel Structure for Spreading Rate 1 with R = 1/2 Mode

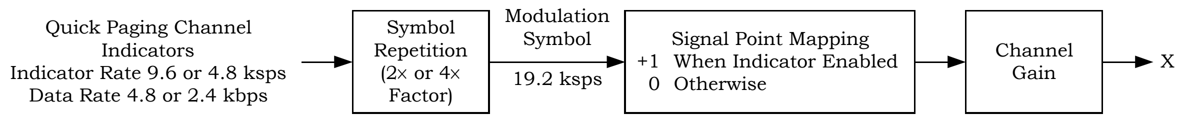


Figure 3.1.3.1.1.1-4. Quick Paging Channel Structure for Spreading Rate 1

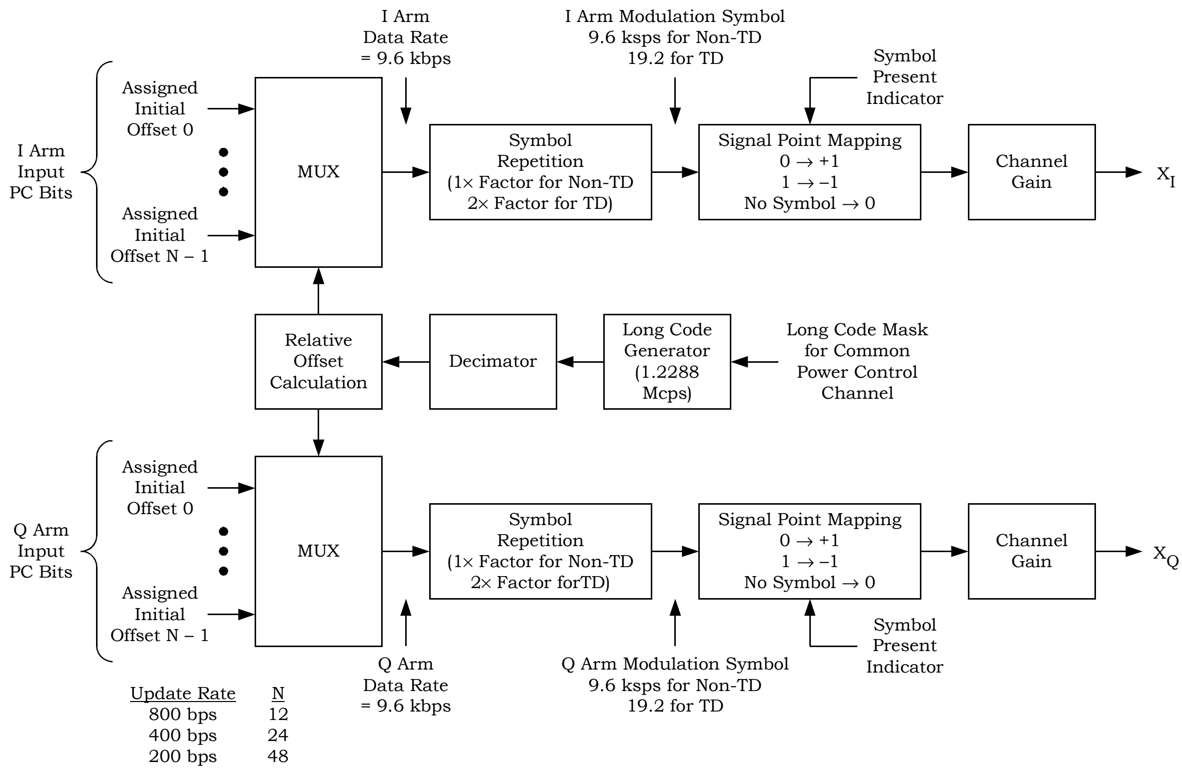


Figure 3.1.3.1.1.1-5. Common Power Control Channel Structure for Spreading Rate 1

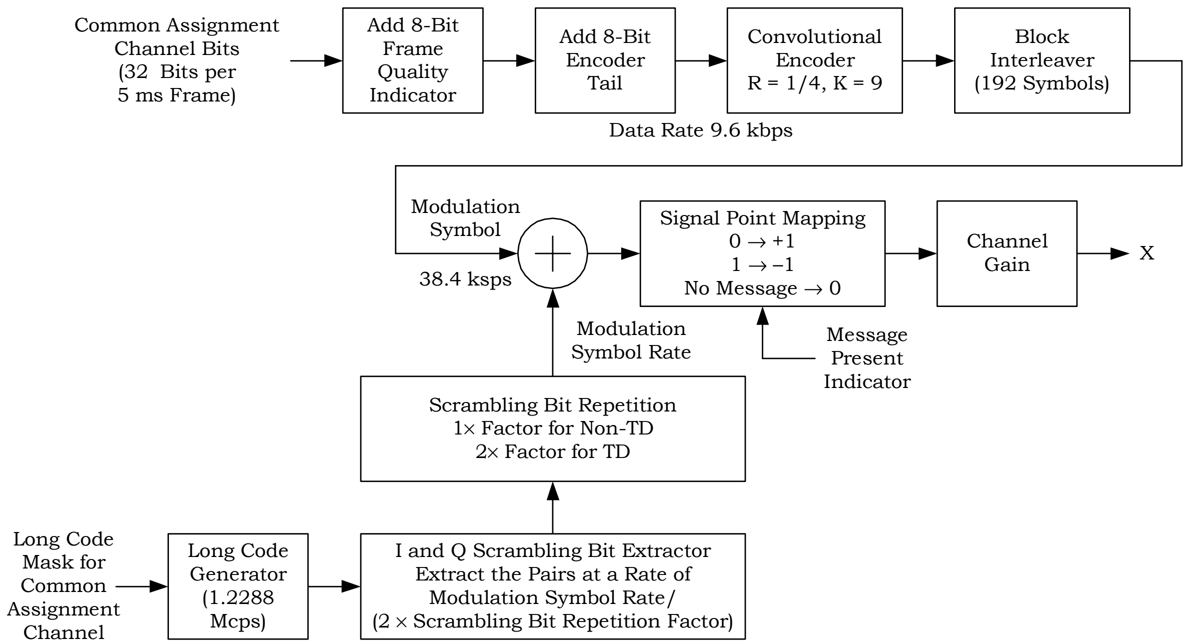


Figure 3.1.3.1.1.1-6. Common Assignment Channel Structure for Spreading Rate 1 with R = 1/4 Mode

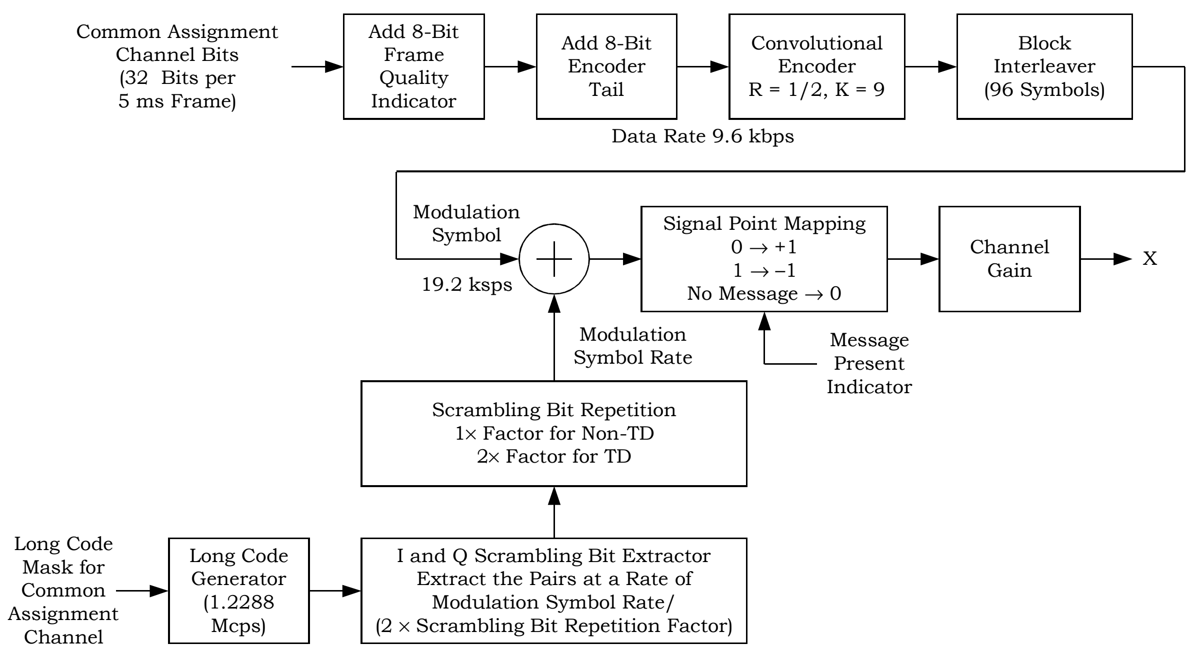


Figure 3.1.3.1.1.1-7. Common Assignment Channel Structure for Spreading Rate 1 with R = 1/2 Mode

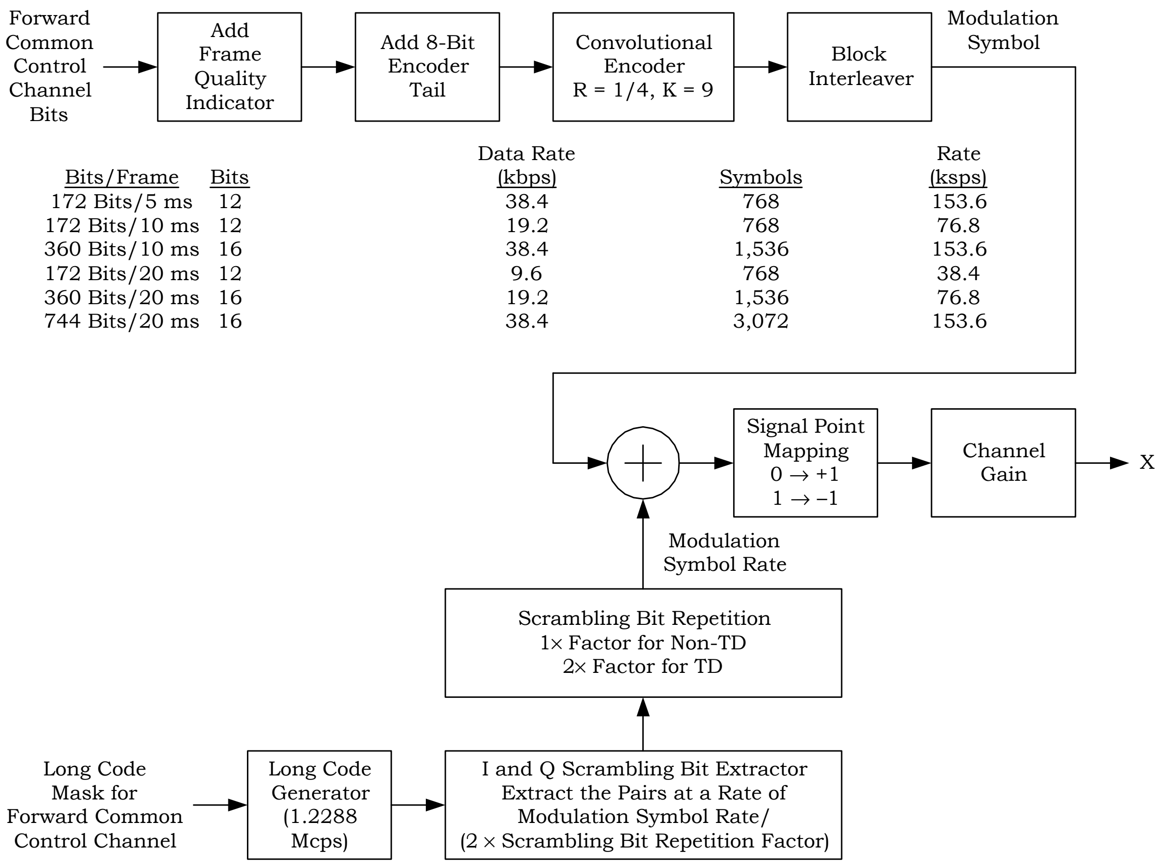
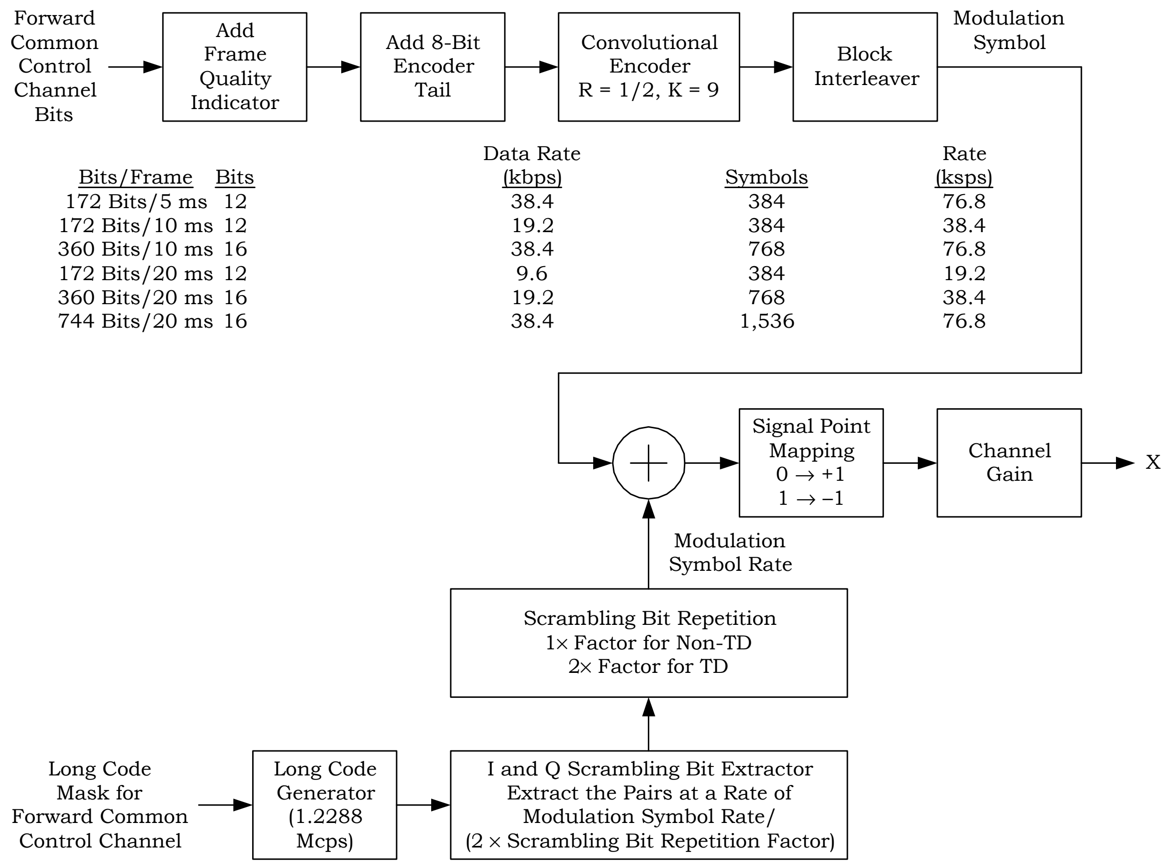
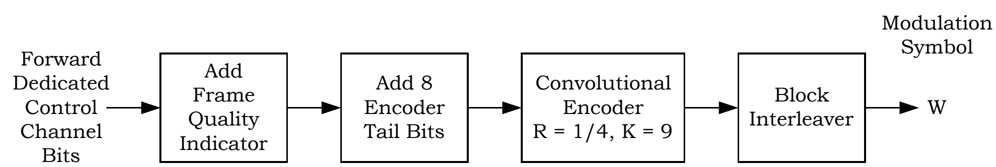


Figure 3.1.3.1.1.1-8. Forward Common Control Channel Structure for Spreading Rate 1 with R = 1/4 Mode



Bits/Frame	Bits	Data Rate (kbps)	Symbols	Rate (ksps)
172 Bits/5 ms	12	38.4	384	76.8
172 Bits/10 ms	12	19.2	384	38.4
360 Bits/10 ms	16	38.4	768	76.8
172 Bits/20 ms	12	9.6	384	19.2
360 Bits/20 ms	16	19.2	768	38.4
744 Bits/20 ms	16	38.4	1,536	76.8

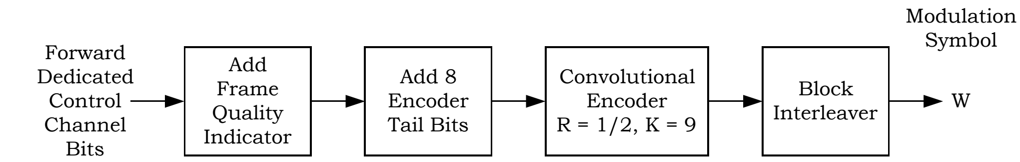
Figure 3.1.3.1.1.1-9. Forward Common Control Channel Structure for Spreading Rate 1 with R = 1/2 Mode



Bits/Frame	Bits	Data Rate Rate (kbps)	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	192	38.4
172 Bits/20 ms	12	9.6	768	38.4
1 to 171 Bits/20 ms	12 or 16	1.05 to 9.55	768	38.4

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.

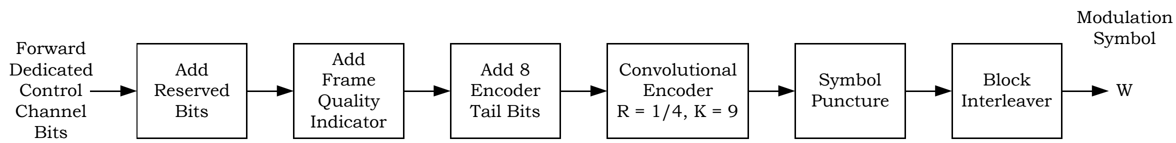
Figure 3.1.3.1.1.1-10. Forward Dedicated Control Channel Structure for Radio Configuration 3



Bits/Frame	Bits	Data Rate (kbps)	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	96	19.2
172 Bits/20 ms	12	9.6	384	19.2
1 to 171 Bits/20 ms	12 or 16	1.05 to 9.55	384	19.2

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.

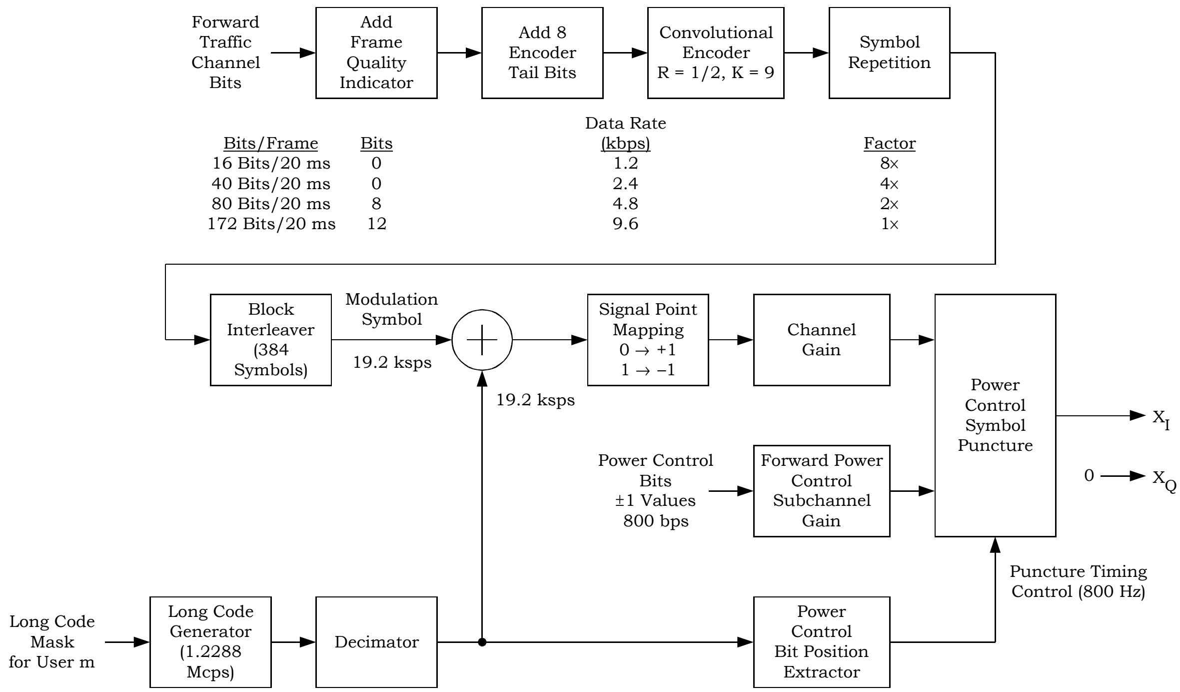
Figure 3.1.3.1.1.1-11. Forward Dedicated Control Channel Structure for Radio Configuration 4



Bits/Frame	Bits	Bits	Data Rate (kbps)	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	None	192	38.4
267 Bits/20 ms	1	12	14.4	4 of 12	768	38.4
1 to 268 Bits/20 ms	0	12 or 16	1.05 to 14.4		768	38.4

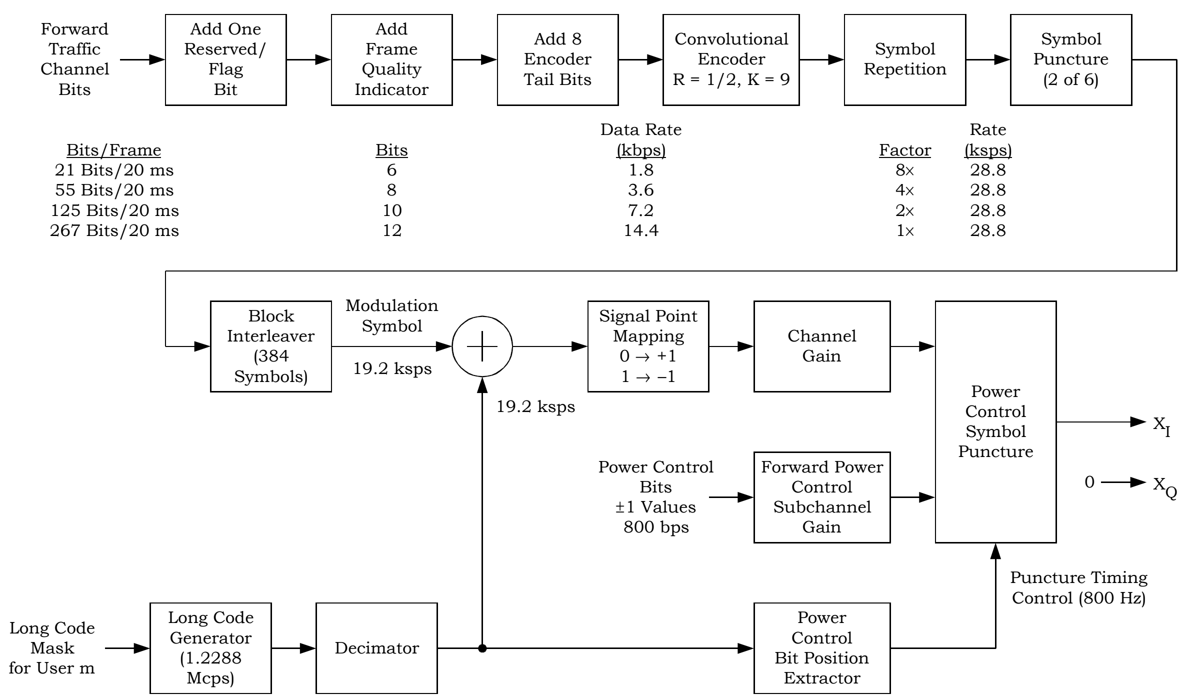
Note: If flexible data rates are supported, there can be 1 to 268 channel bits in a 20 ms frame. If there are 1 to 192 encoder input bits per frame, the encoder output symbols will be additionally repeated and then punctured to provide a 38.4 ksps modulation symbol rate. If there are 193 to 288 encoder 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



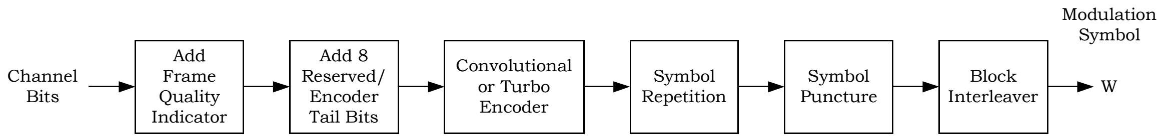
Power control bits are not punctured in for Forward Supplemental Code Channels of the Forward Traffic Channels.

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

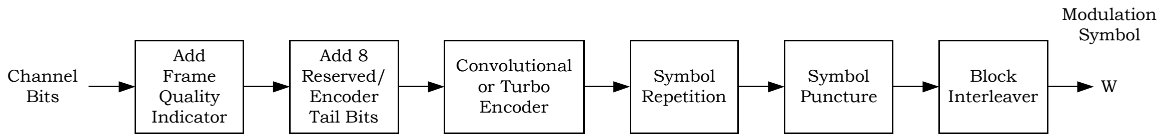


Bits/Frame	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	1/4	1×	None	192	38.4
16 Bits/20 ms	6	1.5	1/4	8×	1 of 5	768	38.4
40 Bits/20n ms	6	2.7/n	1/4	4×	1 of 9	768	38.4/n
80 Bits/20n ms	8	4.8/n	1/4	2×	None	768	38.4/n
172 Bits/20n ms	12	9.6/n	1/4	1×	None	768	38.4/n
360 Bits/20n ms	16	19.2/n	1/4	1×	None	1,536	76.8/n
744 Bits/20n ms	16	38.4/n	1/4	1×	None	3,072	153.6/n
1,512 Bits/20n ms	16	76.8/n	1/4	1×	None	6,144	307.2/n
3,048 Bits/20n ms	16	153.6/n	1/4	1×	None	12,288	614.4/n
1 to 3,047 Bits/20n ms							

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 3.1.3.1.1.1-15. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 3

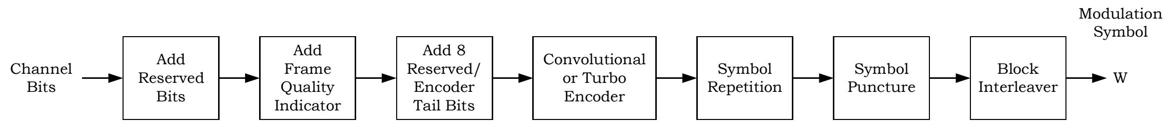


Bits/Frame	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	1/2	1×	None	96	19.2
16 Bits/20 ms	6	1.5	1/2	8×	1 of 5	384	19.2
40 Bits/20n ms	6	2.7/n	1/2	4×	1 of 9	384	19.2/n
80 Bits/20n ms	8	4.8/n	1/2	2×	None	384	19.2/n
172 Bits/20n ms	12	9.6/n	1/2	1×	None	384	19.2/n
360 Bits/20n ms	16	19.2/n	1/2	1×	None	768	38.4/n
744 Bits/20n ms	16	38.4/n	1/2	1×	None	1,536	76.8/n
1,512 Bits/20n ms	16	76.8/n	1/2	1×	None	3,072	153.6/n
3,048 Bits/20n ms	16	153.6/n	1/2	1×	None	6,144	307.2/n
6,120 Bits/20n ms	16	307.2/n	1/2	1×	None	12,288	614.4/n
1 to 6,119 Bits/20n ms							

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.

Figure 3.1.3.1.1.1-16. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 4

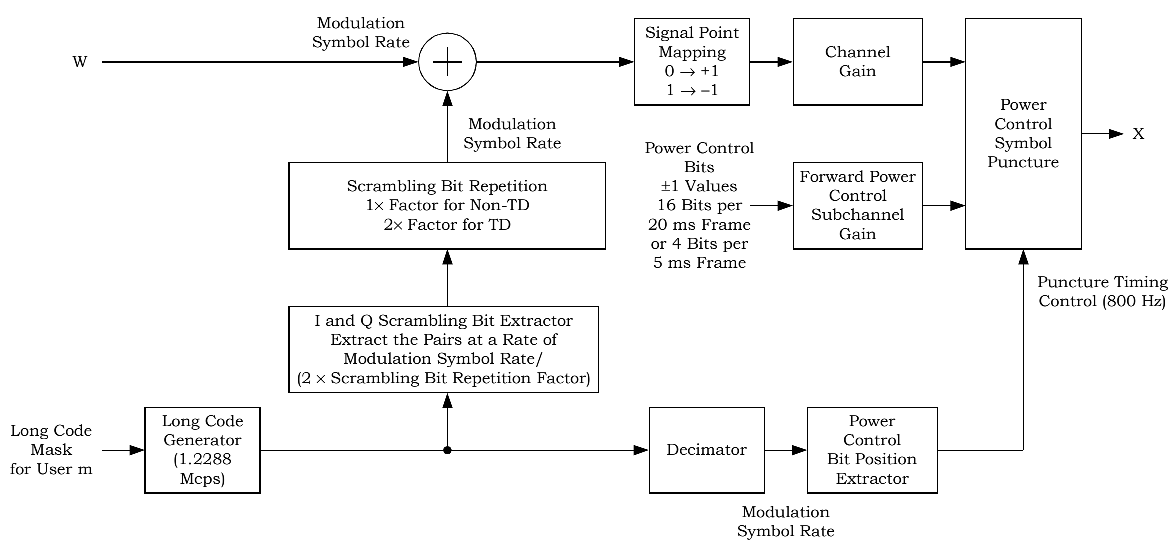


Bits/Frame	Bits	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	1/4	1×	None	192	38.4
21 Bits/20 ms	1	6	1.8	1/4	8×	4 of 12	768	38.4
55 Bits/20n ms	1	8	3.6/n	1/4	4×	4 of 12	768	38.4/n
125 Bits/20n ms	1	10	7.2/n	1/4	2×	4 of 12	768	38.4/n
267 Bits/20n ms	1	12	14.4/n	1/4	1×	4 of 12	768	38.4/n
552 Bits/20n ms	0	16	28.8/n	1/4	1×	4 of 12	1,536	76.8/n
1,128 Bits/20n ms	0	16	57.6/n	1/4	1×	4 of 12	3,072	153.6/n
2,280 Bits/20n ms	0	16	115.2/n	1/4	1×	4 of 12	6,144	307.2/n
4,584 Bits/20n ms	0	16	230.4/n	1/4	1×	4 of 12	12,288	614.4/n
1 to 4,583 Bits/20n ms								

Notes:

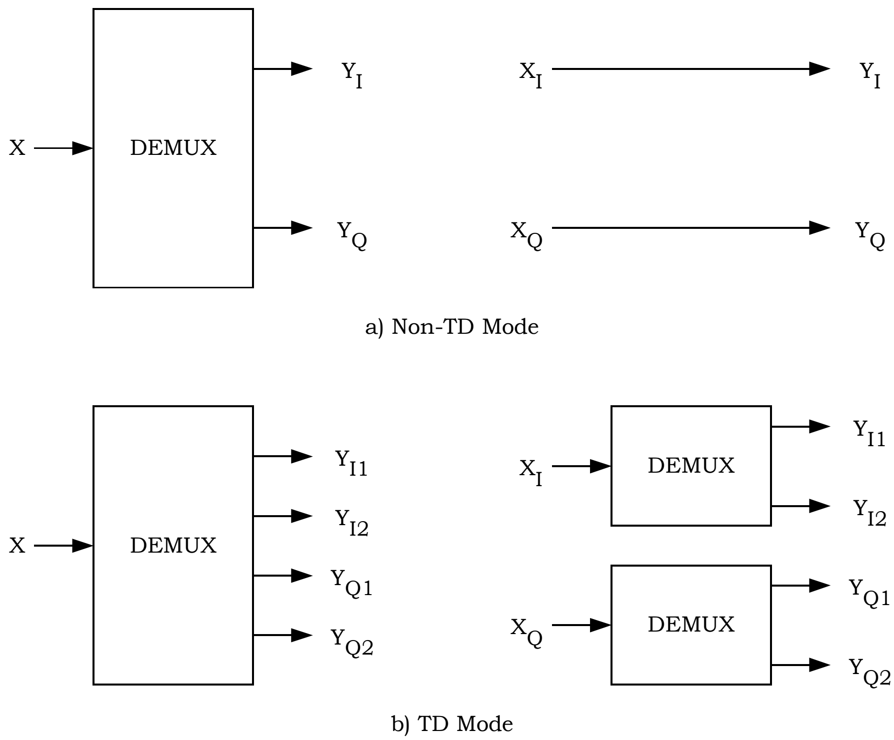
1. n is the length of the frame in multiples of 20 ms. For 37 to 72 encoder input bits per frame, n = 1 or 2. For more than 72 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 288 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.

Figure 3.1.3.1.1.1-17. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 5



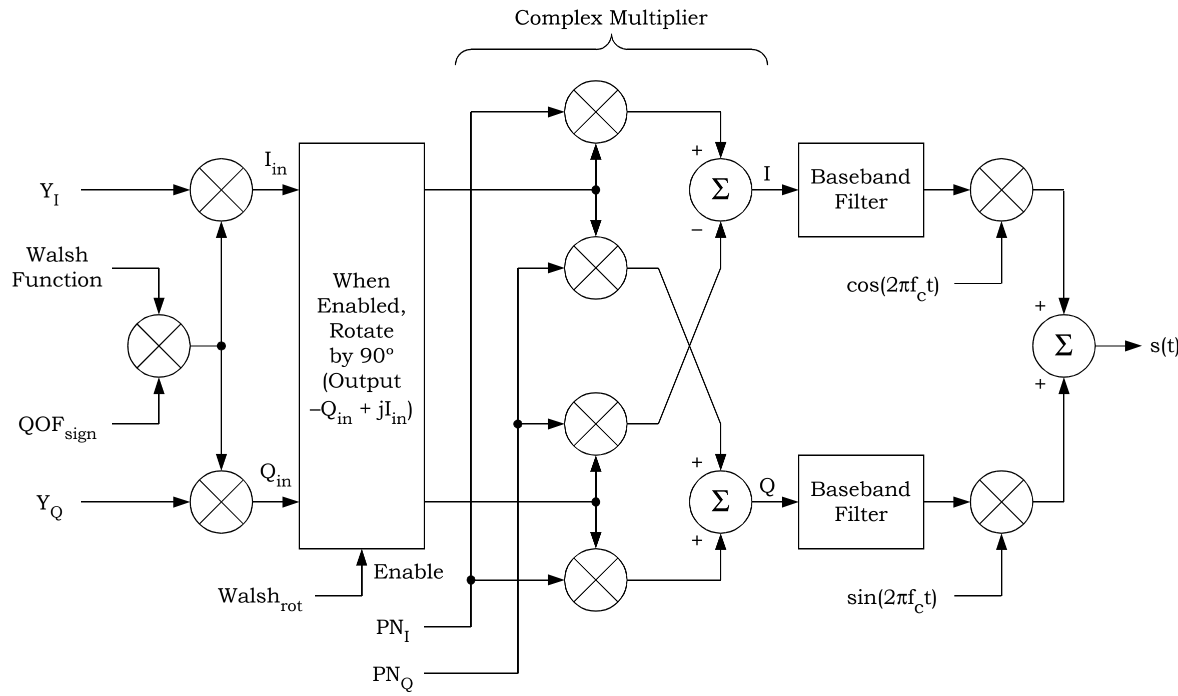
Power control symbol puncturing is on the Forward Fundamental Channels and Forward Dedicated Control Channels only.

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



The DEMUX functions distribute input symbols sequentially from the top to the bottom output paths.

Figure 3.1.3.1.1.1-19. Demultiplexer Structure for Spreading Rate 1



Walsh function = ±1 (mapping: '0' → +1, '1' → –1)

QOF_{sign} = ±1 sign multiplier QOF mask (mapping: '0' → +1, '1' → –1)

$Walsh_{rot}$ = '0' or '1' 90º-rotation-enable Walsh function

$Walsh_{rot}$ = '0' means no rotation

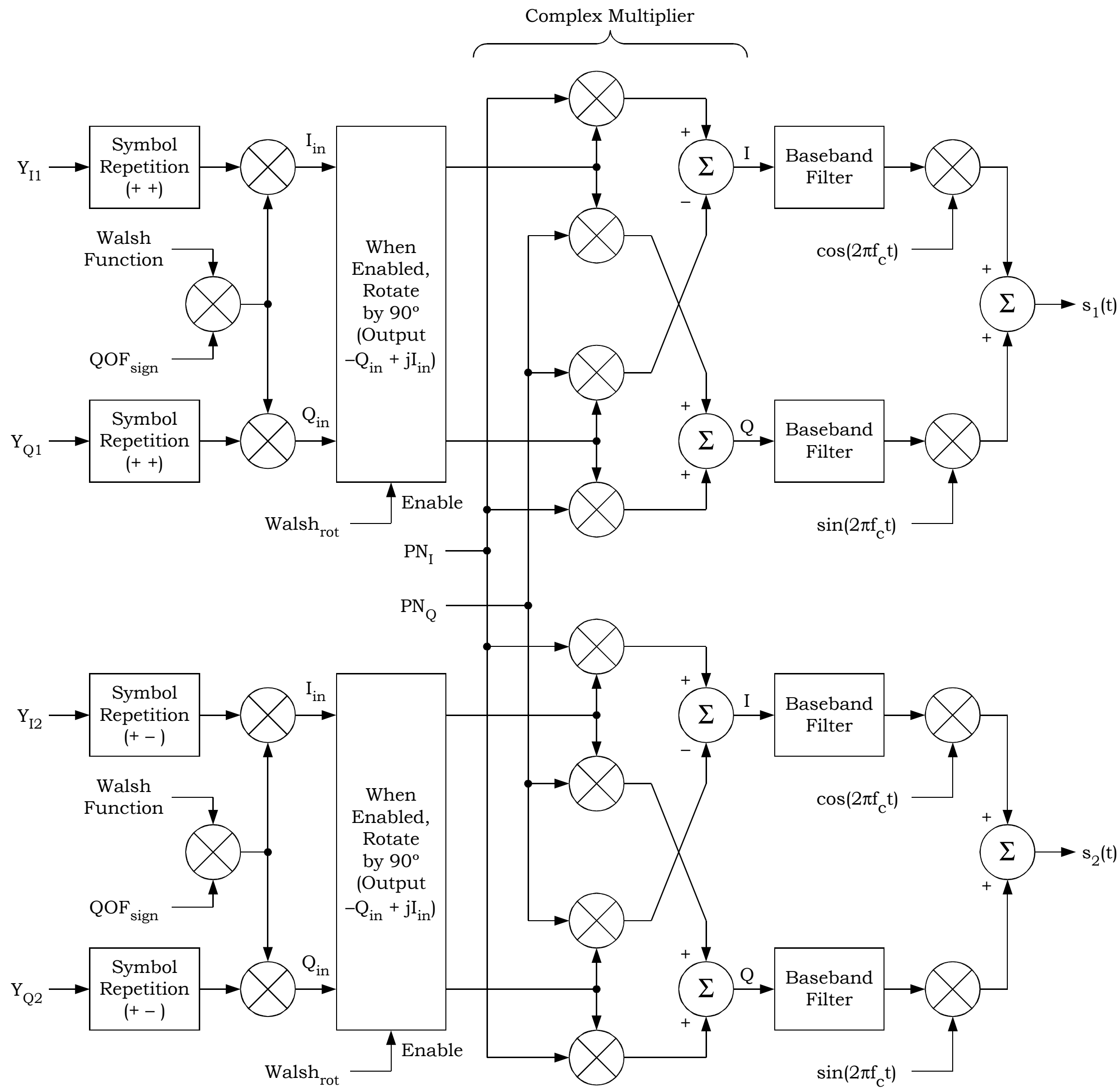
$Walsh_{rot}$ = '1' means rotate by 90º

The null QOF has QOF_{sign} = +1 and $Walsh_{rot}$ = '0'.

PN_I and PN_Q = ±1 I-channel and Q-channel PN sequences

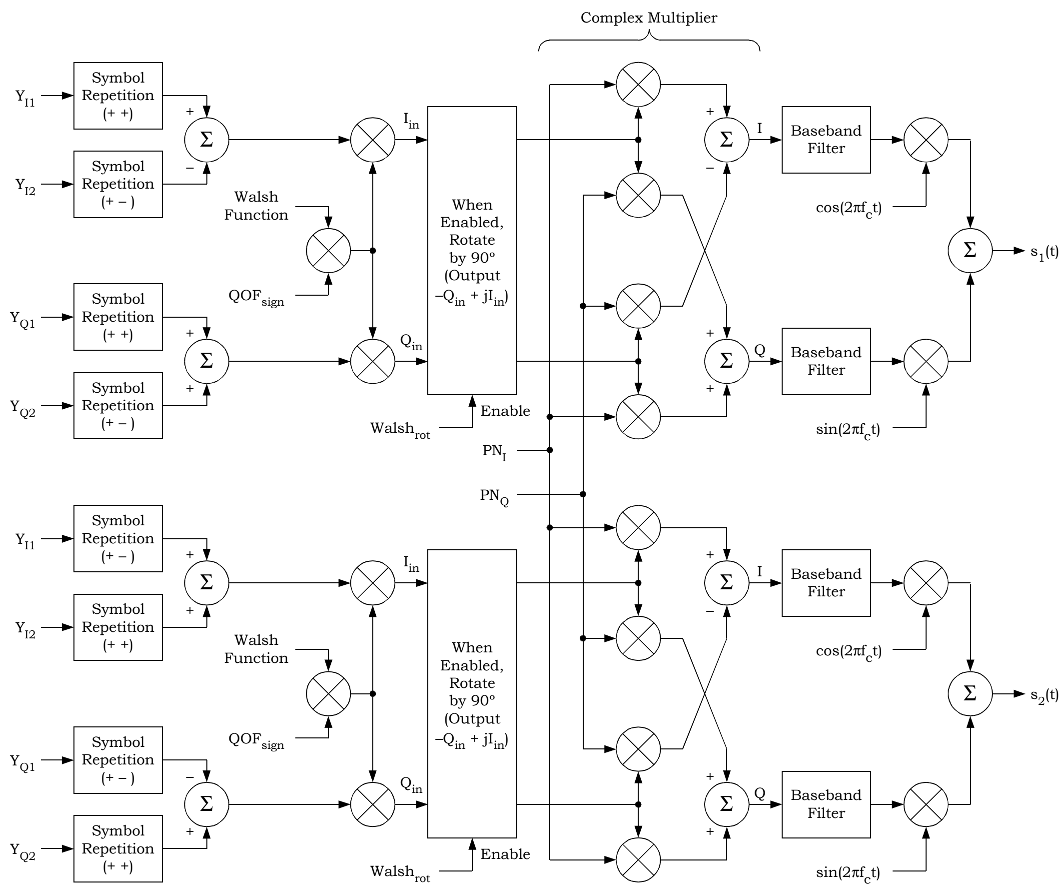
The null QOF is used for Radio Configurations 1 and 2

Figure 3.1.3.1.1.1-20. I and Q Mapping (Non-TD Mode) for Spreading Rate 1



Walsh function = ±1 (mapping: '0' → +1, '1' → −1)
QOF_{sign} = ±1 sign multiplier QOF mask (mapping: '0' → +1, '1' → −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
$s_1(t)$ is associated with the Pilot Channel on W_0^{64}
$s_2(t)$ is associated with the Transmit Diversity Pilot Channel on W_{16}^{128}

Figure 3.1.3.1.1.1-21. I and Q Mapping (OTD Mode) for Spreading Rate 1



Walsh function = ±1 (mapping: '0' → +1, '1' → −1)
QOF_{sign} = ±1 sign multiplier QOF mask (mapping: '0' → +1, '1' → −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
$s_1(t)$ is associated with the Pilot Channel on W_0^{64}
$s_2(t)$ is associated with the Transmit Diversity Pilot Channel on W_{16}^{128}

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

Supplemental Channel for Radio Configuration 9 have the overall structure shown in Figure 3.1.3.1.1.2-14.

Long code scrambling, power control, and signal point mapping for Forward Traffic Channels with Radio Configurations 6 though 9 are shown in Figure 3.1.3.1.1.2-15.

The symbol demultiplexing and I and Q mappings are shown in Figures 3.1.3.1.1.2-16 and 3.1.3.1.1.2-17.

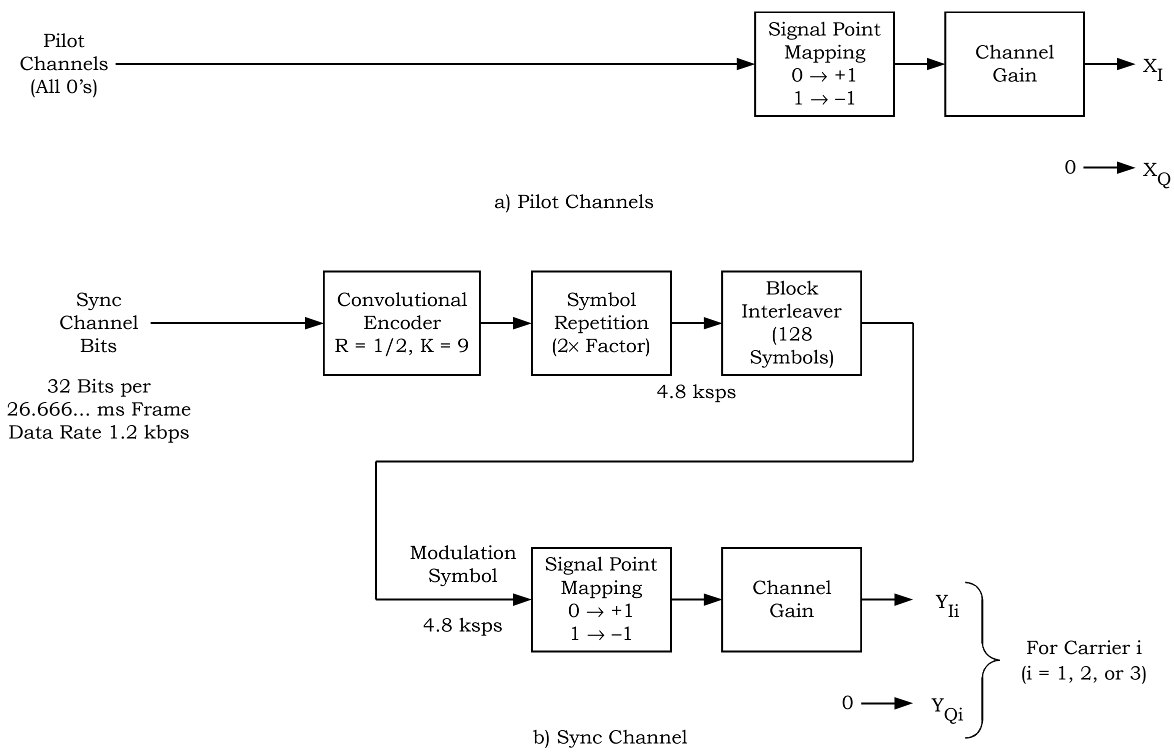


Figure 3.1.3.1.1.2-1. Forward Pilot Channel, Auxiliary Pilot Channels, and Sync Channel for Spreading Rate 3

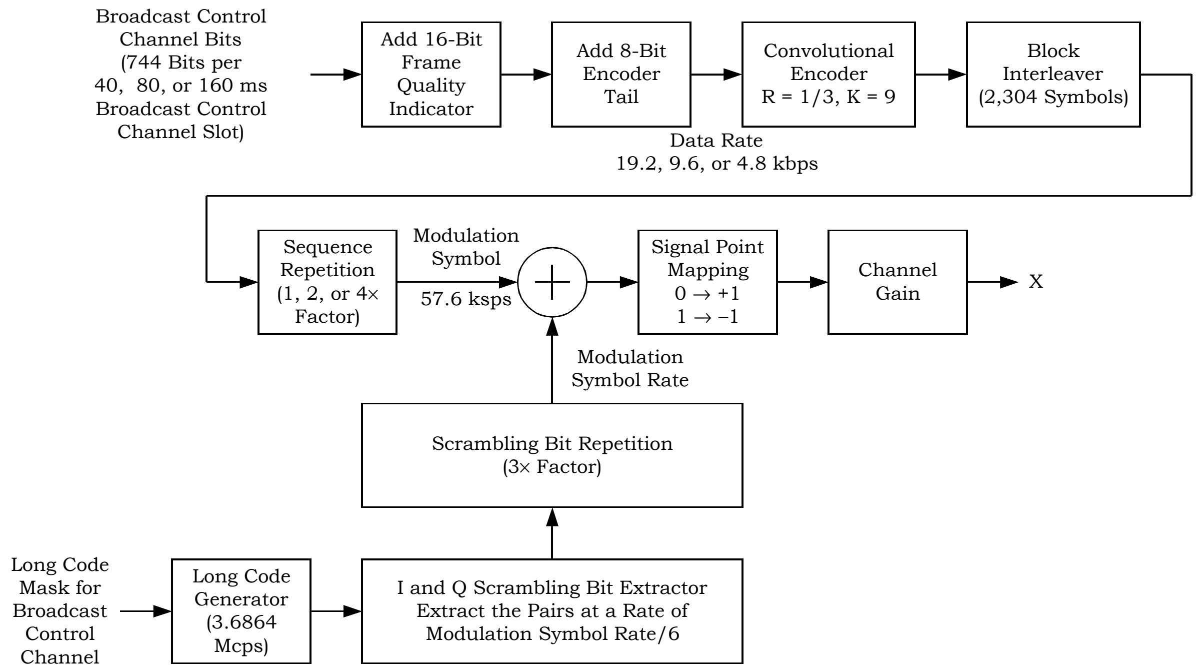


Figure 3.1.3.1.1.2-2. Broadcast Control Channel Structure for Spreading Rate 3

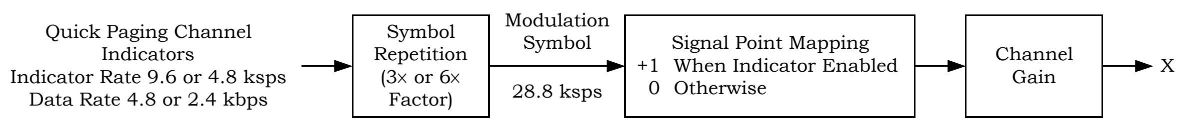


Figure 3.1.3.1.1.2-3. Quick Paging Channel Structure for Spreading Rate 3

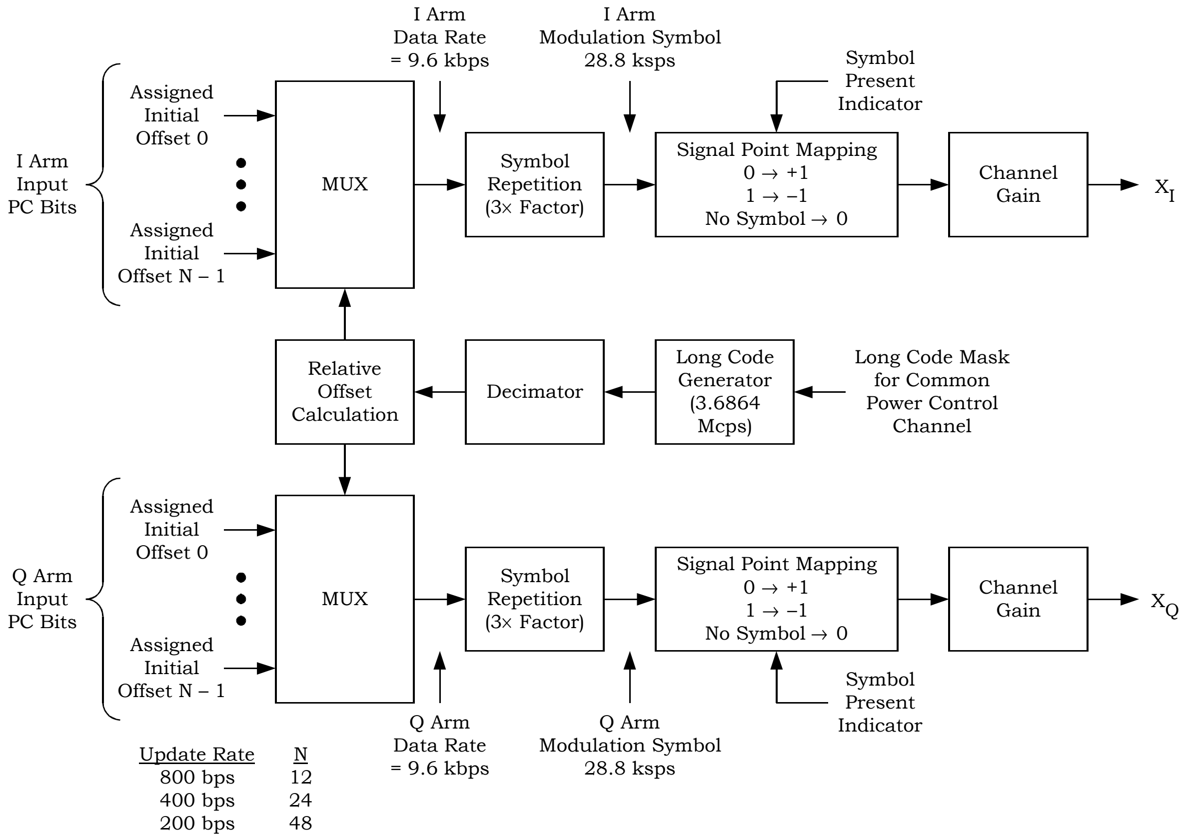


Figure 3.1.3.1.1.2-4. Common Power Control Channel Structure for Spreading Rate 3

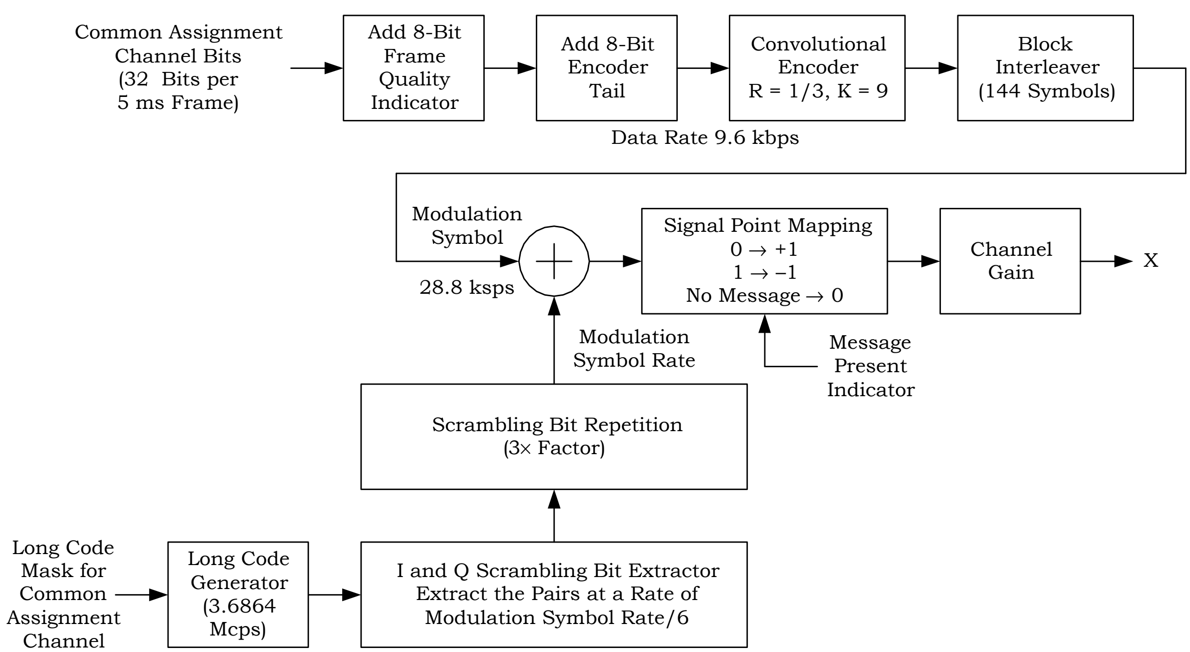
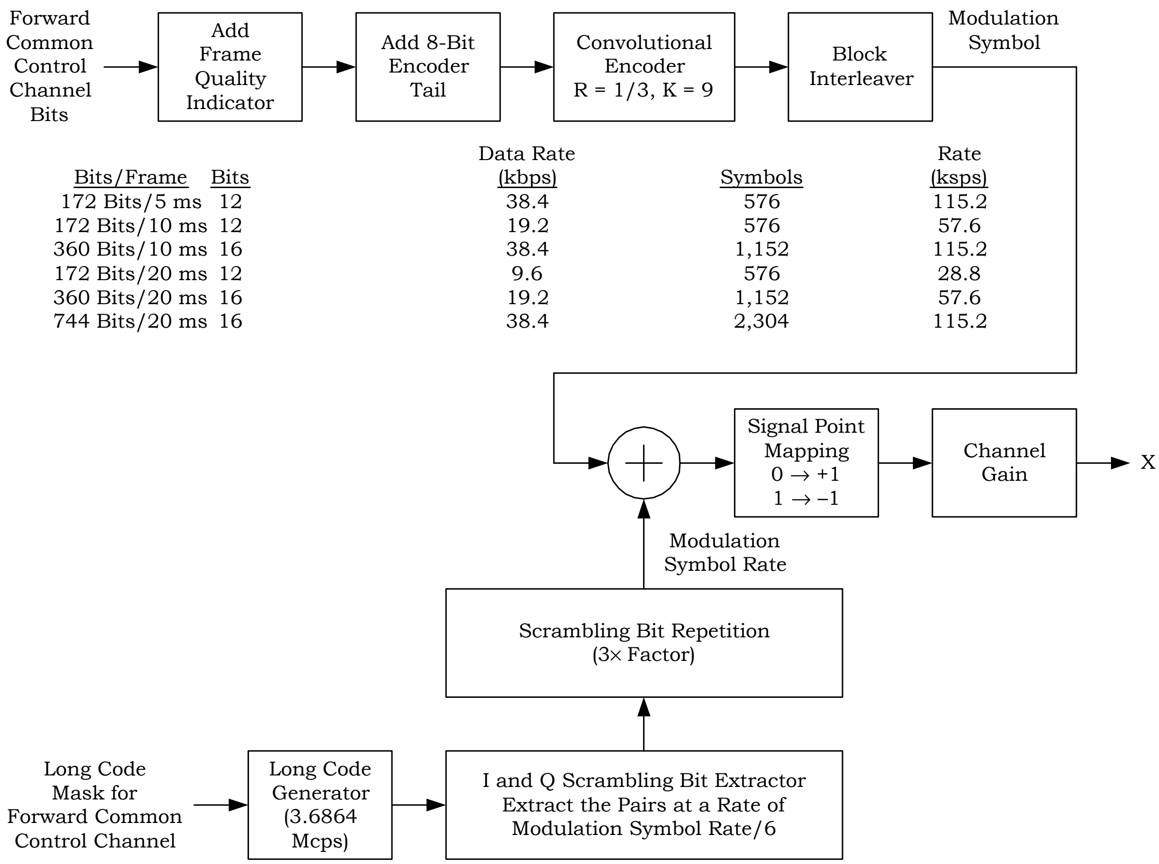
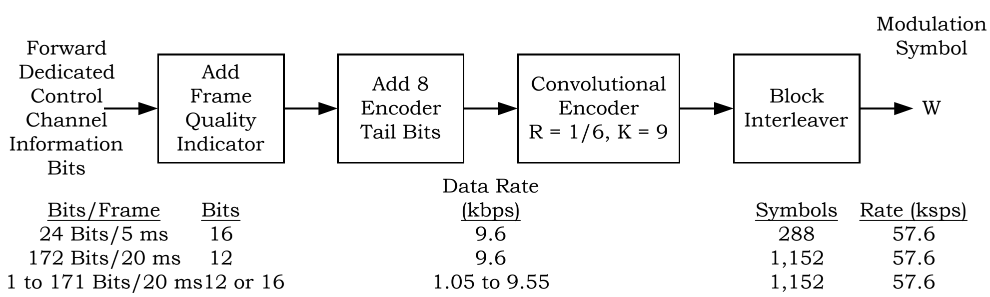


Figure 3.1.3.1.1.2-5. Common Assignment Channel Structure for Spreading Rate 3



Bits/Frame	Bits	Data Rate (kbps)	Symbols	Rate (ksps)
172 Bits/5 ms	12	38.4	576	115.2
172 Bits/10 ms	12	19.2	576	57.6
360 Bits/10 ms	16	38.4	1,152	115.2
172 Bits/20 ms	12	9.6	576	28.8
360 Bits/20 ms	16	19.2	1,152	57.6
744 Bits/20 ms	16	38.4	2,304	115.2

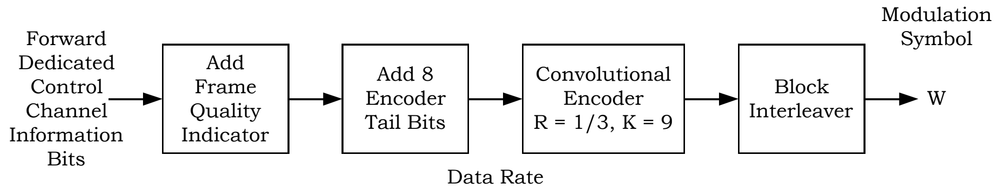
Figure 3.1.3.1.1.2-6. Forward Common Control Channel Structure for Spreading Rate 3



Bits/Frame	Bits	Data Rate (kbps)	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	288	57.6
172 Bits/20 ms	12	9.6	1,152	57.6
1 to 171 Bits/20 ms	12 or 16	1.05 to 9.55	1,152	57.6

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 ksps modulation symbol rate.

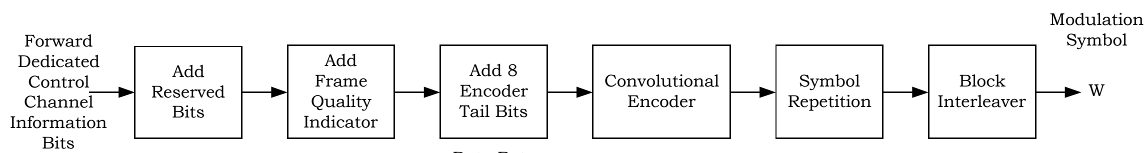
Figure 3.1.3.1.1.2-7. Forward Dedicated Control Channel Structure for Radio Configuration 6



Bits/Frame	Bits	Data Rate (kbps)	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	144	28.8
172 Bits/20 ms	12	9.6	576	28.8
1 to 171 Bits/20 ms	12 or 16	1.05 to 9.55	576	28.8

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.

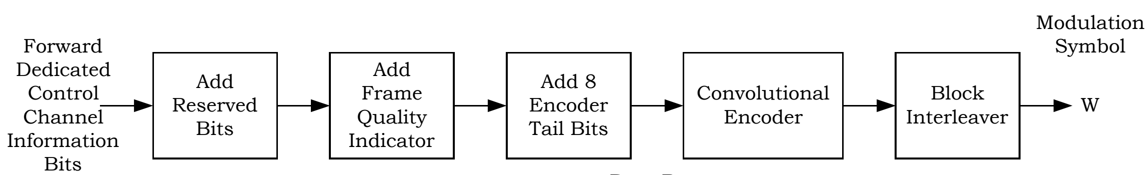
Figure 3.1.3.1.1.2-8. Forward Dedicated Control Channel Structure for Radio Configuration 7



Bits/Frame	Bits	Bits	Data Rate (kbps)	R	Factor	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	1/3	2×	288	57.6
267 Bits/20 ms	1	12	14.4	1/4	1×	1,152	57.6
1 to 268 Bits/20 ms	0	12 or 16	1.05 to 14.4	1/4		1,152	57.6

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.

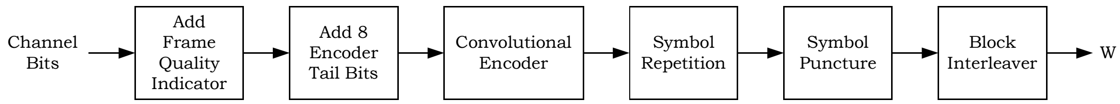
Figure 3.1.3.1.1.2-9. Forward Dedicated Control Channel Structure for Radio Configuration 8



Bits/Frame	Bits	Bits	Data Rtae (kbps)	R	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	1/3	144	28.8
267 Bits/20 ms	1	12	14.4	1/2	576	28.8
1 to 268 Bits/20 ms	0	12 or 16	1.05 to 14.4	1/2	576	28.8

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

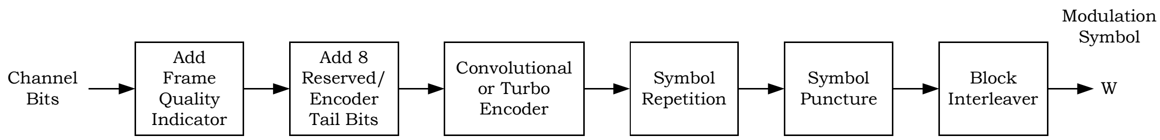


Bits/Frame	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	1/6	1×	None	288	57.6
16 Bits/20 ms	6	1.5	1/6	8×	1 of 5	1,152	57.6
40 Bits/20n ms	6	2.7/n	1/6	4×	1 of 9	1,152	57.6/n
80 Bits/20n ms	8	4.8/n	1/6	2×	None	1,152	57.6/n
172 Bits/20n ms	12	9.6/n	1/6	1×	None	1,152	57.6/n
360 Bits/20n ms	16	19.2/n	1/6	1×	None	2,304	115.2/n
744 Bits/20n ms	16	38.4/n	1/6	1×	None	4,608	230.4/n
1,512 Bits/20n ms	16	76.8/n	1/6	1×	None	9,216	460.8/n
3,048 Bits/20n ms	16	153.6/n	1/6	1×	None	18,432	921.6/n
6,120 Bits/20n ms	16	307.2/n	1/6	1×	None	36,864	1,843.2/n
1 to 6,119 Bits/20n ms							

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.

Figure 3.1.3.1.1.2-11. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 6

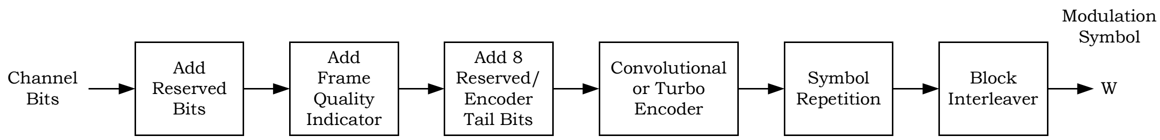


Bits/Frame	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	16	9.6	1/3	1×	None	144	28.8
16 Bits/20 ms	6	1.5	1/3	8×	1 of 5	576	28.8
40 Bits/20n ms	6	2.7/n	1/3	4×	1 of 9	576	28.8/n
80 Bits/20n ms	8	4.8/n	1/3	2×	None	576	28.8/n
172 Bits/20n ms	12	9.6/n	1/3	1×	None	576	28.8/n
360 Bits/20n ms	16	19.2/n	1/3	1×	None	1,152	57.6/n
744 Bits/20n ms	16	38.4/n	1/3	1×	None	2,304	115.2/n
1,512 Bits/20n ms	16	76.8/n	1/3	1×	None	4,608	230.4/n
3,048 Bits/20n ms	16	153.6/n	1/3	1×	None	9,216	460.8/n
6,120 Bits/20n ms	16	307.2/n	1/3	1×	None	18,432	921.6/n
12,264 Bits/20n ms	16	614.4/n	1/3	1×	None	36,864	1,843.2/n
1 to 12,263 Bits/20n ms							

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

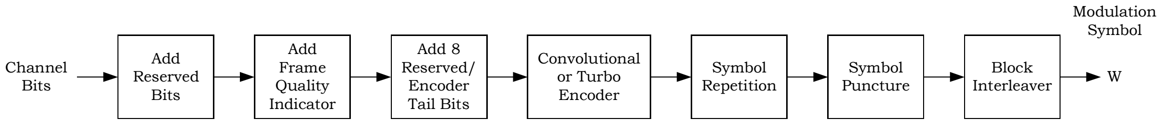


Bits/Frame	Bits	Bits	Data Rate (kbps)	R	Factor	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	1/3	2×	288	57.6
21 Bits/20 ms	1	6	1.8	1/4	8×	1,152	57.6
55 Bits/20n ms	1	8	3.6/n	1/4	4×	1,152	57.6/n
125 Bits/20n ms	1	10	7.2/n	1/4	2×	1,152	57.6/n
267 Bits/20n ms	1	12	14.4/n	1/4	1×	1,152	57.6/n
552 Bits/20n ms	0	16	28.8/n	1/4	1×	2,304	115.2/n
1,128 Bits/20n ms	0	16	57.6/n	1/4	1×	4,608	230.4/n
2,280 Bits/20n ms	0	16	115.2/n	1/4	1×	9,216	460.8/n
4,584 Bits/20n ms	0	16	230.4/n	1/4	1×	18,432	921.6/n
9,192 Bits/20n ms	0	16	460.8/n	1/4	1×	36,864	1,843.2/n
1 to 9,191 Bits/20n ms							

Notes:

1. n is the length of the frame in multiples of 20 ms. For 37 to 72 encoder iput 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.

Figure 3.1.3.1.1.2-13. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 8

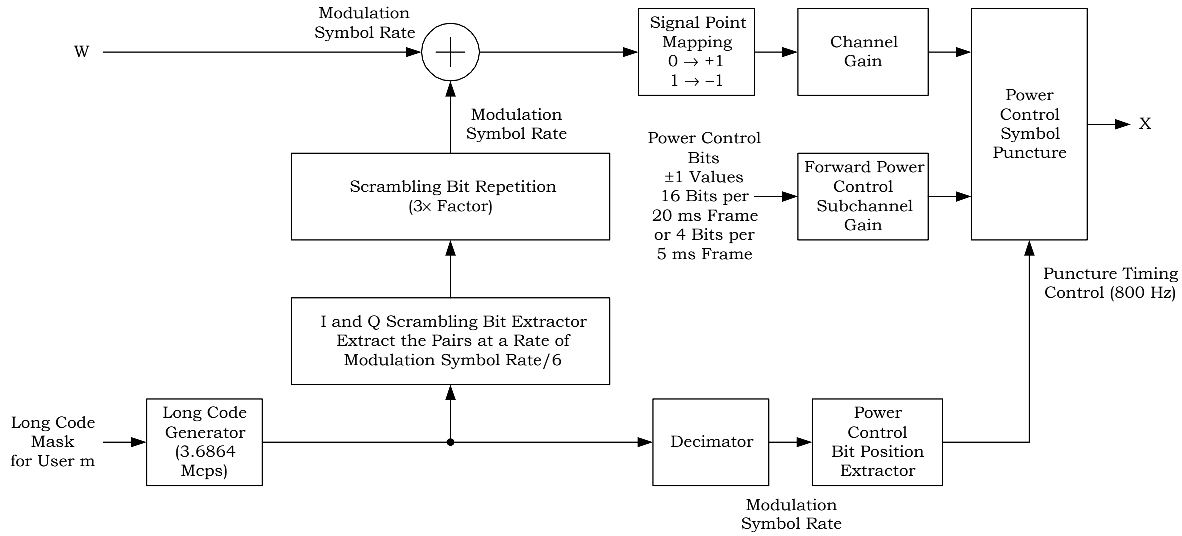


Bits/Frame	Bits	Bits	Data Rate (kbps)	R	Factor	Deletion	Symbols	Rate (ksps)
24 Bits/5 ms	0	16	9.6	1/3	1×	None	144	28.8
21 Bits/20 ms	1	6	1.8	1/2	8×	None	576	28.8
55 Bits/20n ms	1	8	3.6/n	1/2	4×	None	576	28.8/n
125 Bits/20n ms	1	10	7.2/n	1/2	2×	None	576	28.8/n
267 Bits/20n ms	1	12	14.4/n	1/2	1×	None	576	28.8/n
552 Bits/20n ms	0	16	28.8/n	1/2	1×	None	1,152	57.6/n
1,128 Bits/20n ms	0	16	57.6/n	1/2	1×	None	2,304	115.2/n
2,280 Bits/20n ms	0	16	115.2/n	1/2	1×	None	4,608	230.4/n
4,584 Bits/20n ms	0	16	230.4/n	1/2	1×	None	9,216	460.8/n
9,192 Bits/20n ms	0	16	460.8/n	1/2	1×	None	18,432	921.6/n
20,712 Bits/20n ms	0	16	1,036.8/n	1/2	1×	2 of 18	36,864	1,843.2/n
1 to 20,711 Bits/20n ms								

Notes:

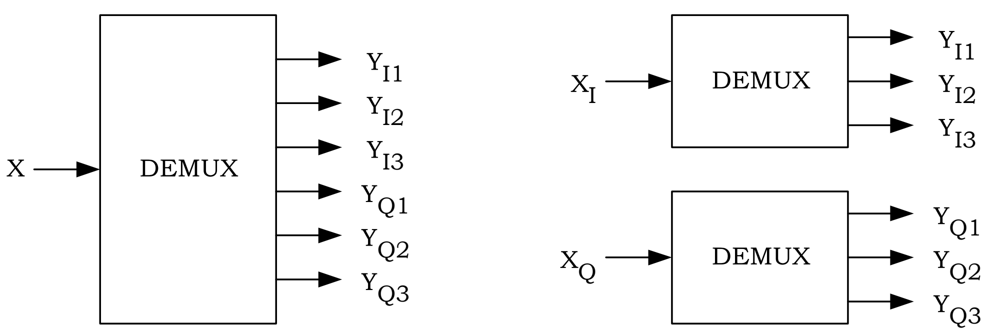
1. n is the length of the frame in multiples of 20 ms. For 37 to 72 encoder input bits per frame, n = 1 or 2. For more than 72 encoder input bits per frame, n = 1, 2, or 4.
2. The 5 ms frame is only used for the Forward Fundamental Channel, and the Forward Fundamental Channel only uses from 15 to 288 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 1/2. 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 3.1.3.1.1.2-14. Forward Fundamental Channel and Forward Supplemental Channel Structure for Radio Configuration 9



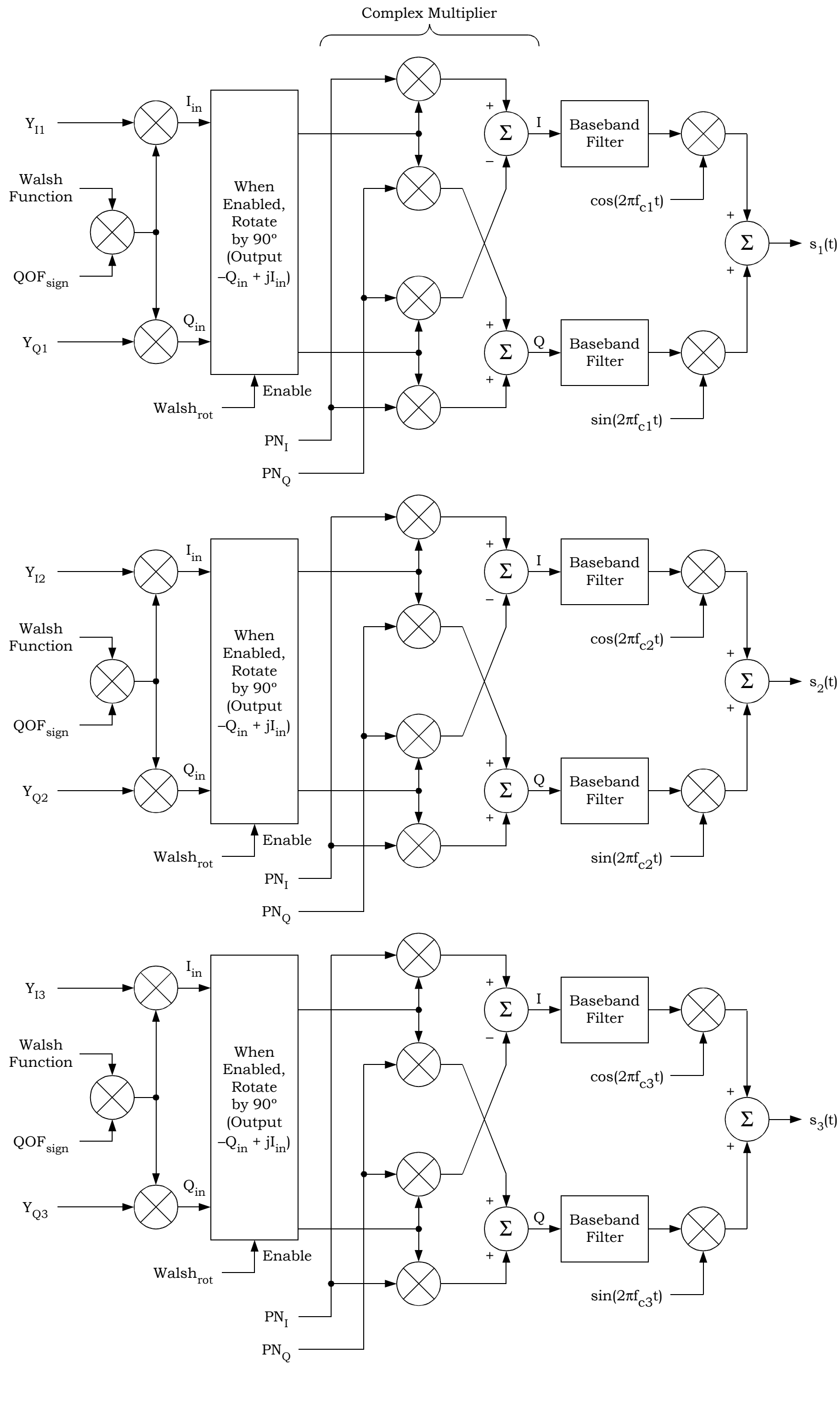
Power control symbol puncturing is on the Forward Fundamental Channels and Forward Dedicated Control Channels only.

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.

Figure 3.1.3.1.1.2-16. Demultiplexer Structure for Spreading Rate 3



Walsh function = ±1 (mapping: '0' → +1, '1' → –1)
QOF_{sign} = ±1 sign multiplier QOF mask (mapping: '0' → +1, '1' → –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

3.1.3.1.2 Modulation Parameters

3.1.3.1.2.1 Spreading Rate 1

The modulation parameters for the Forward CDMA Channel operating in Spreading Rate 1 are shown in Tables 3.1.3.1.2.1-1 through 3.1.3.1.2.1-25.

Table 3.1.3.1.2.1-1. Sync Channel Modulation Parameters for Spreading Rate 1

	Data Rate (bps)	
Parameter	**1,200**	**Units**
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

Table 3.1.3.1.2.1-2. Paging Channel Modulation Parameters for Spreading Rate 1

	Data Rate (bps)		
Parameter	**9,600**	**4,800**	**Units**
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

Table 3.1.3.1.2.1-3. Broadcast Control Channel Modulation Parameters for Spreading Rate 1 with R = 1/4

	Data Rate (bps)			
Parameter	**19,200**	**9,600**	**4,800**	**Units**
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

	Data Rate (bps)			
Parameter	**19,200**	**9,600**	**4,800**	**Units**
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) 4,800	2,400	Units
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) 19,200	Units
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

	Data Rate (bps)	
Parameter	**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

	Data Rate (bps)	
Parameter	**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

	Data Rate (bps)			
Parameter	**38,400**	**19,200**	**9,600**	**Units**
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

	Data Rate (bps)			
Parameter	**38,400**	**19,200**	**9,600**	**Units**
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

	Data Rate (bps)	
Parameter	**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

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

	Data Rate (bps)	
Parameter	**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

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 3.1.3.1.2.1-13. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 5

	Data Rate (bps)		
Parameter	**9,600**	**14,400**	**Units**
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.

Table 3.1.3.1.2.1-14. Forward Fundamental Channel and Forward Supplemental Code Channel Modulation Parameters for Radio Configuration 1

	Data Rate (bps)				
Parameter	**9,600**	**4,800**	**2,400**	**1,200**	**Units**
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

Table 3.1.3.1.2.1-15. Forward Fundamental Channel and Forward Supplemental Code Channel Modulation Parameters for Radio Configuration 2

	Data Rate (bps)				
Parameter	**14,400**	**7,200**	**3,600**	**1,800**	**Units**
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

Table 3.1.3.1.2.1-16. Forward Fundamental Channel and Forward Supplemental Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 3

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,700**	**1,500**	**Units**
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.

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) 9,600 × N	4,800	2,400	1,350	Units
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.

Table 3.1.3.1.2.1-18. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 3

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,200**	**Units**
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.

Table 3.1.3.1.2.1-19. Forward Fundamental Channel and Forward Supplemental Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 4

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,700**	**1,500**	**Units**
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.

Table 3.1.3.1.2.1-20. Forward Supplemental Channel Modulation Parameters for 40 ms Frames for Radio Configuration 4

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,350**	**Units**
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.

Table 3.1.3.1.2.1-21. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 4

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,200**	**Units**
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.

Table 3.1.3.1.2.1-22. Forward Fundamental Channel and Forward Supplemental Channel Modulation Parameters for 20 ms Frames for Radio Configuration 5

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.1-23. Forward Supplemental Channel Modulation Parameters for 40 ms Frames for Radio Configuration 5

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.1-24. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 5

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.1-25. Forward Fundamental Channel Modulation Parameters for 5 ms Frames for Radio Configuration 5

	Data Rate (bps)	
Parameter	**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

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.

Table 3.1.3.1.2.2-1. Sync Channel Modulation Parameters for Spreading Rate 3

	Data Rate (bps)	
Parameter	**1,200**	**Units**
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.

Table 3.1.3.1.2.2-2. Broadcast Control Channel Modulation Parameters for Spreading Rate 3

	Data Rate (bps)			
Parameter	**19,200**	**9,600**	**4,800**	**Units**
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

Table 3.1.3.1.2.2-3. Quick Paging Channel Modulation Parameters for Spreading Rate 3

Parameter	Data Rate (bps) 4,800	Data Rate (bps) 2,400	Units
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) 19,200	Units
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) 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

Table 3.1.3.1.2.2-6. Forward Common Control Channel Modulation Parameters for Spreading Rate 3

	Data Rate (bps)			
Parameter	38,400	19,200	9,600	Units
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

Table 3.1.3.1.2.2-7. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 6

	Data Rate (bps)	
Parameter	**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.

Table 3.1.3.1.2.2-8. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 7

	Data Rate (bps)	
Parameter	**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.

Table 3.1.3.1.2.2-9. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 8

	Data Rate (bps)		
Parameter	**9,600**	**14,400**	**Units**
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.

Table 3.1.3.1.2.2-10. Forward Dedicated Control Channel Modulation Parameters for Radio Configuration 9

	Data Rate (bps)		
Parameter	**9,600**	**14,400**	**Units**
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.

Table 3.1.3.1.2.2-11. Forward Fundamental Channel and Forward Supplemental Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 6

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,700**	**1,500**	**Units**
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

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,350**	**Units**
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.

Table 3.1.3.1.2.2-13. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 6

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,200**	**Units**
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.

Table 3.1.3.1.2.2-14. Forward Fundamental Channel and Forward Supplemental Channel Modulation Parameters for 5 or 20 ms Frames for Radio Configuration 7

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,700**	**1,500**	**Units**
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.

Table 3.1.3.1.2.2-15. Forward Supplemental Channel Modulation Parameters for 40 ms Frames for Radio Configuration 7

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,350**	**Units**
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.

Table 3.1.3.1.2.2-16. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 7

	Data Rate (bps)				
Parameter	**9,600 × N**	**4,800**	**2,400**	**1,200**	**Units**
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.

Table 3.1.3.1.2.2-17. Forward Fundamental Channel and Forward Supplemental Channel Modulation Parameters for 20 ms Frames for Radio Configuration 8

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.2-18. Forward Supplemental Channel Modulation Parameters for 40 ms Frames for Radio Configuration 8

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.2-19. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 8

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.2-20. Forward Fundamental Channel and Forward Supplemental Channel Modulation Parameters for 20 ms Frames for Radio Configuration 9

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.2-21. Forward Supplemental Channel Modulation Parameters for 40 ms Frames for Radio Configuration 9

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.2-22. Forward Supplemental Channel Modulation Parameters for 80 ms Frames for Radio Configuration 9

	Data Rate (bps)				
Parameter	**14,400 × N**	**7,200**	**3,600**	**1,800**	**Units**
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.

Table 3.1.3.1.2.2-23. Forward Fundamental Channel Modulation Parameters for 5 ms Frames for Radio Configurations 8 and 9

	Data Rate (bps)	
Parameter	**9,600**	**Units**
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.

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

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)

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)

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

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 the same as that of the lowest listed data rate in the same radio configuration that is higher than the specified data rate.

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.

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 ≥ 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.

3.1.3.1.4.1 Convolutional Encoding

All convolutional codes shall have a constraint length of 9.

3.1.3.1.4.1.1 Rate 1/6 Convolutional Code

The generator functions for the rate 1/6 code shall be g_0 equals 457 (octal), g_1 equals 755 (octal), g_2 equals 551 (octal), g_3 equals 637 (octal), g_4 equals 625 (octal), and g_5 equals 727 (octal). This code generates six 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 is output first, the code symbol (c_1) encoded with generator function g_1 is output second, the code symbol (c_2) encoded with generator function g_2 is output third, the code symbol (c_3) encoded with generator function g_3 is output fourth, the code symbol (c_4) encoded with generator function g_4 is output fifth, and the code symbol (c_5) encoded with generator function g_5 is output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol that is output after initialization shall be a code symbol encoded with generator function g_0.

Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-delayed data sequence. The length of the data sequence delay is equal to K-1, where K is the constraint length of the code. Figure 3.1.3.1.4.1.1-1 illustrates the specific K equals 9, rate 1/6 convolutional encoder that is used for these channels.

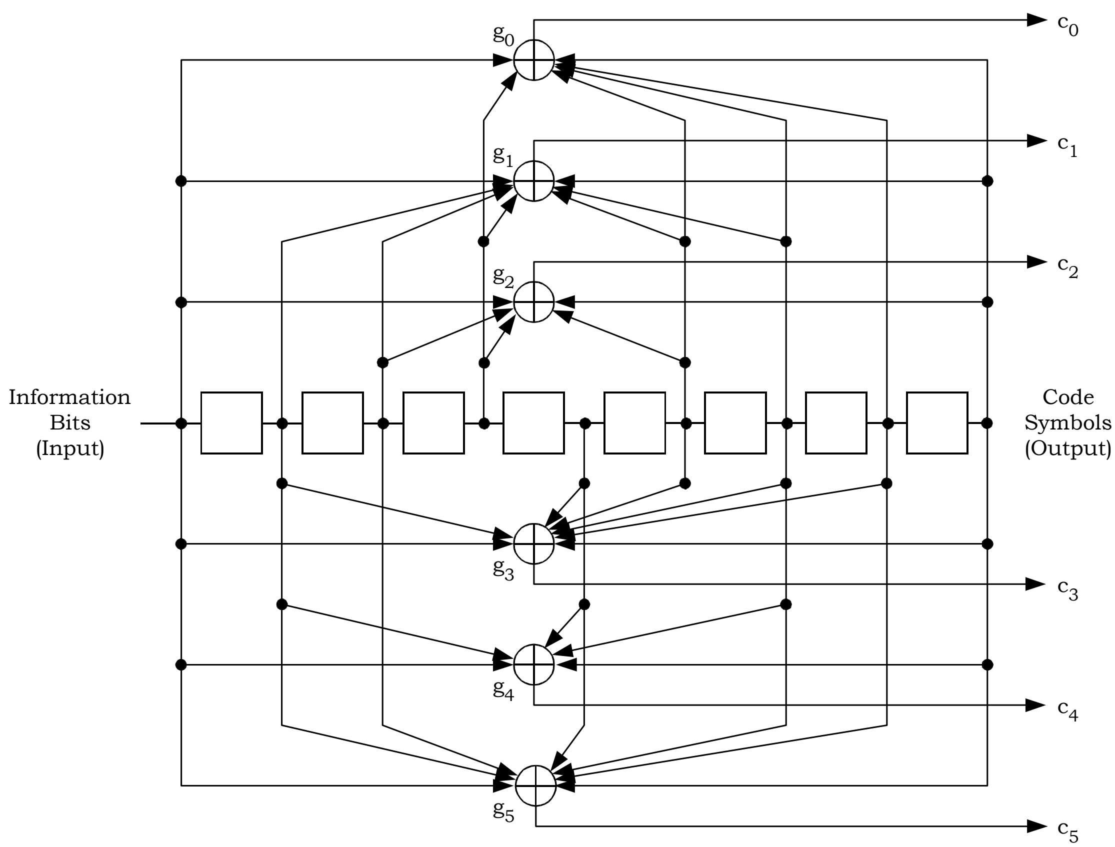


Figure 3.1.3.1.4.1.1-1. K = 9, Rate 1/6 Convolutional Encoder

3.1.3.1.4.1.2 Rate 1/4 Convolutional Code

The generator functions for the rate 1/4 code shall be g_0 equals 765 (octal), g_1 equals 671 (octal), g_2 equals 513 (octal), and g_3 equals 473 (octal). This code generates four 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 is output first, the code symbol (c_1) encoded with generator function g_1 is output second, the code symbol (c_2) encoded with generator function g_2 is output third, and the code symbol (c_3) encoded with generator function g_3 is output last.

The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol that is output after initialization shall be a code symbol encoded with generator function g_0.

Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-delayed data sequence. The length of the data sequence delay is equal to K-1, where K is the constraint length of the code. Figure 3.1.3.1.4.1.2-1 illustrates the specific K equals 9, rate 1/4 convolutional encoder that is used for these channels.

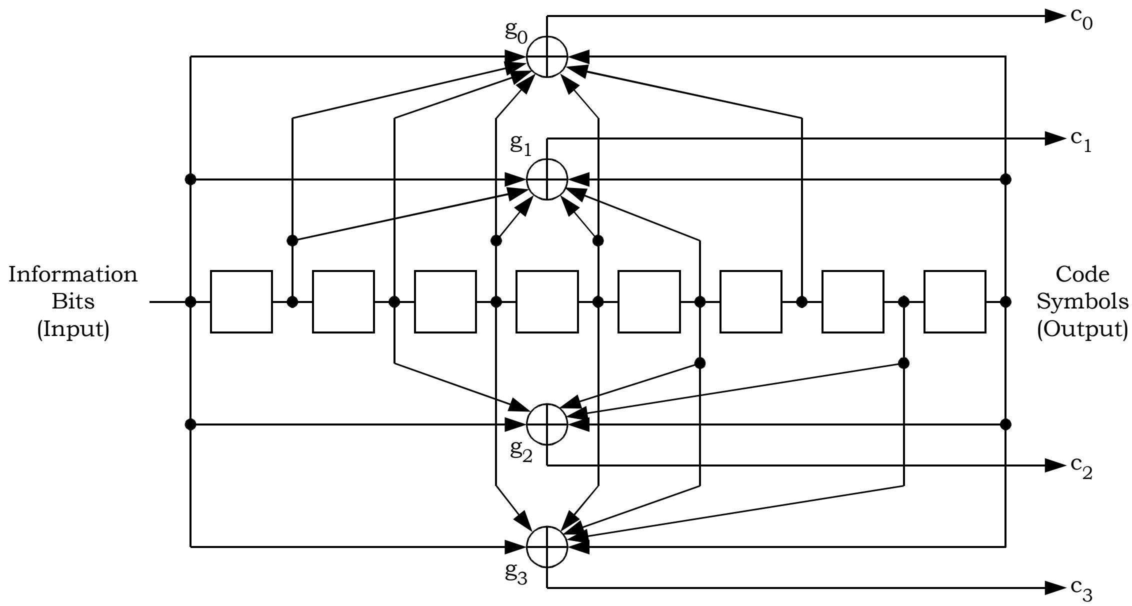


Figure 3.1.3.1.4.1.2-1. K = 9, Rate 1/4 Convolutional Encoder

3.1.3.1.4.1.3 Rate 1/3 Convolutional Code

The generator functions for the rate 1/3 code shall be g_0 equals 557 (octal), g_1 equals 663 (octal), and g_2 equals 711 (octal). This code generates three code symbols for each data bit that is input to the encoder. These code symbols shall be output so that the code symbol (c_0) encoded with generator function g_0 is output first, the code symbol (c_1) encoded with generator function g_1 is output second, and the code symbol (c_2) encoded with generator function g_2 is output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol that is output after initialization shall be a code symbol encoded with generator function g_0.

Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-delayed data sequence. The length of the data sequence delay is equal to K-1, where K is the constraint length of the code. Figure 3.1.3.1.4.1.3-1 illustrates the specific K equals 9, rate 1/3 convolutional encoder that is used for these channels.

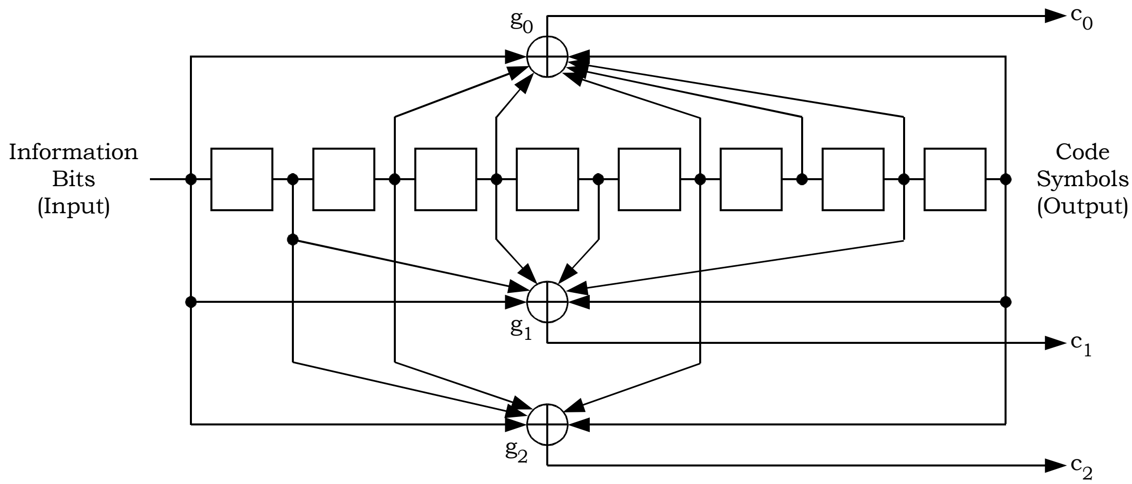


Figure 3.1.3.1.4.1.3-1. K = 9, Rate 1/3 Convolutional Encoder

3.1.3.1.4.1.4 Rate 1/2 Convolutional Code

The generator functions for the rate 1/2 code shall be g_0 equals 753 (octal) and g_1 equals 561 (octal). This code generates two code symbols for each data bit that is input to the encoder. These code symbols shall be output so that the code symbol (c_0) encoded with generator function g_0 is output first, and the code symbol (c_1) encoded with generator function g_1 is output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol that is output after initialization shall be a code symbol encoded with generator function g_0.

Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-delayed data sequence. The length of the data sequence delay is equal to K-1, where K is the constraint length of the code. Figure 3.1.3.1.4.1.4-1 illustrates the specific K equals 9, rate 1/2 convolutional encoder that is used for these channels.

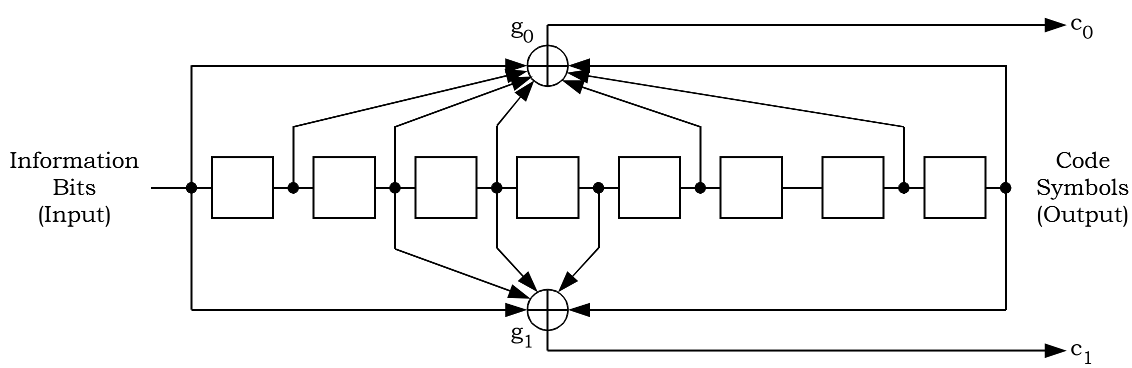


Figure 3.1.3.1.4.1.4-1. K = 9, Rate 1/2 Convolutional Encoder

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 $(N_{turbo} + 6)/R$ 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.

The constituent encoder output symbol puncturing and symbol repetition shall be as specified in Table 3.1.3.1.4.2.2-1. Within a puncturing pattern, a ‘0’ means that the symbol shall be deleted and a ‘1’ means that a symbol shall be passed. For rate 1/2 turbo codes, the tail output symbols for each of the first three tail bit periods shall be XY_0, and the tail output symbols for each of the last three tail bit periods shall be $X'Y'_0$. For rate 1/3 turbo codes, the tail output symbols for each of the first three tail bit periods shall be XXY_0, and the tail output symbols for each of the last three tail bit periods shall be $X'X'Y'_0$. For rate 1/4 turbo codes, the tail output symbols for each of the first three tail bit periods shall be XXY_0Y_1, and the tail output symbols for each of the last three tail bit periods shall be $X'X'Y'_0Y'_1$.

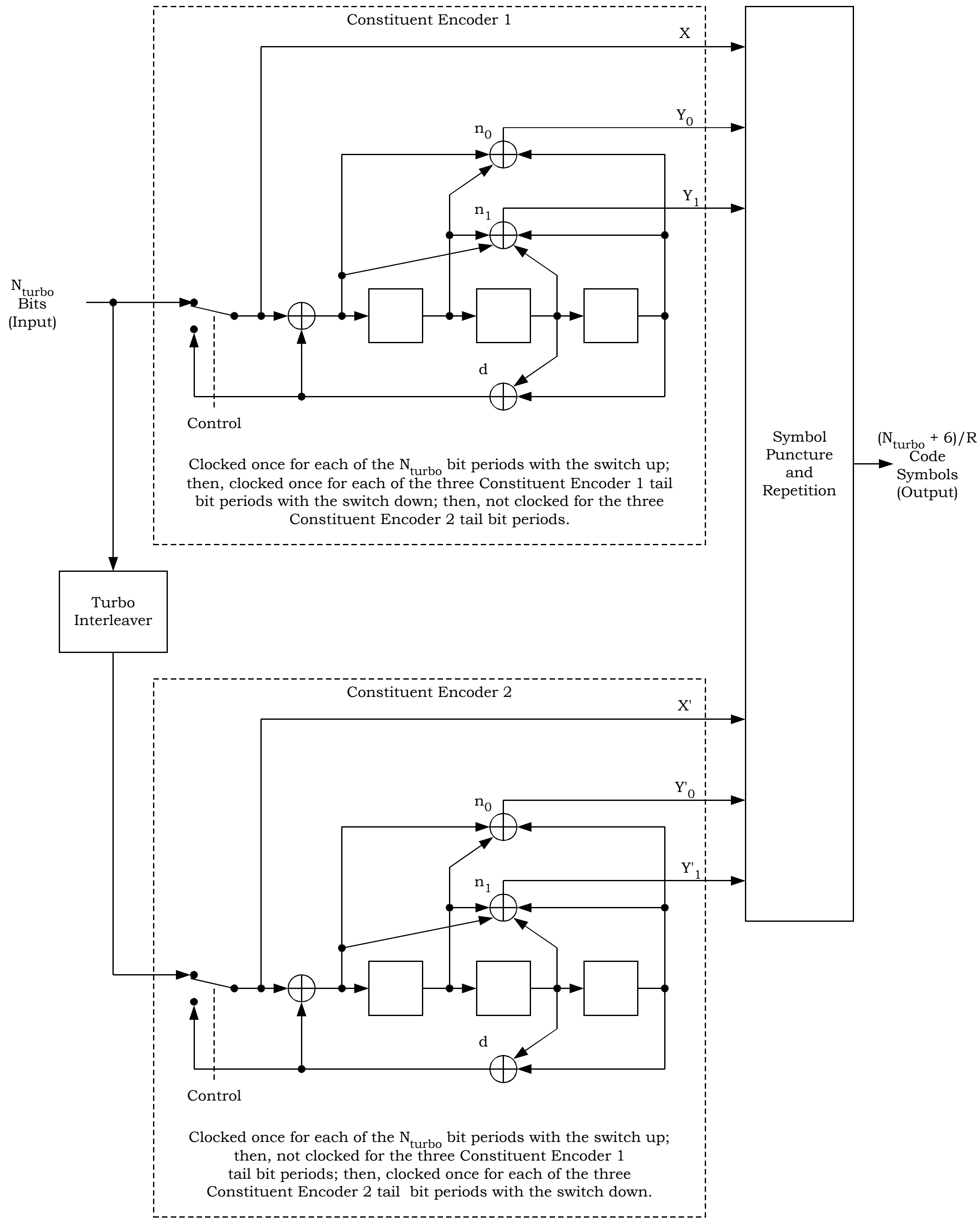


Figure 3.1.3.1.4.2.1-1. Turbo Encoder

Table 3.1.3.1.4.2.1-1. Puncturing Patterns for the Data Bit Periods

	Code Rate		
Output	**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.

Table 3.1.3.1.4.2.2-1. Puncturing Patterns for the Tail Bit Periods

	Code Rate		
Output	**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.

3.1.3.1.4.2.3 Turbo Interleavers

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

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

Let the sequence of input addresses be from 0 to $N_{turbo} - 1$, 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 3.1.3.1.4.2.3-1 and described below:[18]

1. Determine the turbo interleaver parameter, n, where n is the smallest integer such that $N_{turbo} \le 2^{n+5}$. Table 3.1.3.1.4.2.3-1 gives this parameter.
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 3.1.3.1.4.2.3-2 with a read address equal to the five LSBs of the counter. Note that this table depends upon 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.

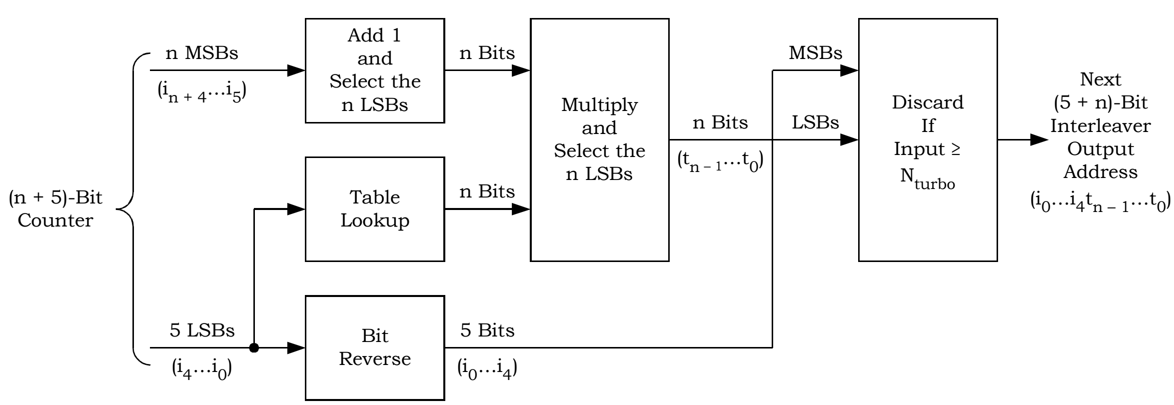


Figure 3.1.3.1.4.2.3-1. Turbo Interleaver Output Address Calculation Procedure

[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.

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

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

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 repetition[19] 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.

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)

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 to N-1,

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

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

Otherwise, puncturing after symbol repetition shall be disabled.

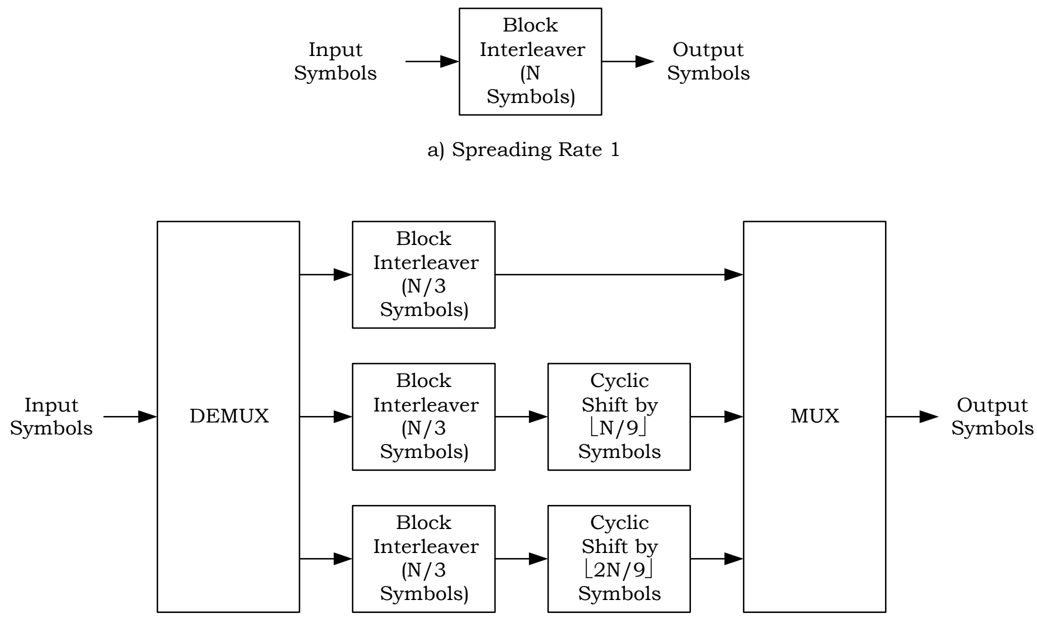
3.1.3.1.7 Block Interleaving

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.

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



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:

$$A_i = 2^m (i \bmod J) + BRO_m(\lfloor i / J \rfloor)$$

where

$i = 0$ 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

$BRO_m(y)$ indicates the bit-reversed m-bit value of y (i.e., $BRO_3(6) = 3$).

3.1.3.1.7.1.2 Forward-Backwards Bit-Reversal Order Interleaver

When operating on the Broadcast Control Channel, the Common Assignment Channel, the Forward Common Control Channel, or the Forward Traffic Channel with Radio Configuration 3 through 5, the symbols input to the interleaver are written sequentially at addresses 0 to the block size (N) minus one.

The even interleaved symbols (i is even) are read out in permuted order from address A_i, as follows:

$$A_i = 2^m\left[\frac{i}{2} \bmod J\right] + BRO_m\left(\left\lfloor \frac{i}{2} / J \right\rfloor\right)$$

where

$i = 0, 2, \ldots, N - 2,$

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

$BRO_m(y)$ indicates the bit-reversed m-bit value of y (i.e., $BRO_3(6) = 3$).

The odd interleaved symbols (i is odd) are read out in permuted order from address A_i, as follows:

$$A_i = 2^m\left[\left(N - \frac{(i+1)}{2}\right) \bmod J\right] + BRO_m\left(\left\lfloor \left(N - \frac{(i+1)}{2}\right) / J \right\rfloor\right)$$

where

$i = 1, 3, \ldots, N - 1$, and

m and J are given in Table 3.1.3.1.7-1 using interleaver block size N.

The Spreading Rate 1 block interleaving procedure is diagrammed in Figure 3.1.3.1.7-1.

3.1.3.1.7.2 Spreading Rate 3 Interleaving

The block interleaver shall demultiplex its input symbols into three blocks with N/3 symbols each.

The symbols input to block interleaver k (k = 0, 1, 2) are written sequentially into addresses 0 to N/3 – 1. The interleaved symbols are read out in a permuted order, with the i-th address being read from address A_i, as follows:

$$A_i = 2^m\left[\left(i + \left\lfloor \frac{kN}{9} \right\rfloor\right) \bmod J\right] + BRO_m\left\{\left\lfloor \left[\left(i + \left\lfloor \frac{kN}{9} \right\rfloor\right) \bmod \left(\frac{N}{3}\right)\right] / J \right\rfloor\right\}$$

where

$i = 0$ to $N/3 - 1,$

m and J are given in Table 3.1.3.1.7-1 using interleaver block size N/3,

$\lfloor x \rfloor$ indicates the largest integer less than or equal to x, and

$BRO_m(y)$ indicates the bit-reversed m-bit value of y (i.e., $BRO_3(6) = 3$).

The three interleaved block outputs shall then be multiplexed together.

The Spreading Rate 3 block interleaving procedure is diagrammed in Figure 3.1.3.1.7-1. Note that the equation describes the operation performed by both the interleaver block and cyclic shift block in Figure 3.1.3.1.7-1.

3.1.3.1.8 Sequence Repetition

Sequence repetition applies to the Broadcast Control Channel.

When operating at 4800 bps, the encoded and interleaved sequence of symbols of the first Broadcast Control Channel frame (40 ms) of a Broadcast Control Channel slot (160 ms) shall be repeated in the next three Broadcast Control Channel frames. When operating at 9600 bps, the encoded and interleaved sequence of symbols of the first Broadcast Control Channel frame (40 ms) of a Broadcast Control Channel slot (80 ms) shall be repeated in the next Broadcast Control Channel frame. When operating at 19,200 bps, the encoded and interleaved sequence of symbols of the first Broadcast Control Channel frame (40 ms) of a Broadcast Control Channel slot (40 ms) shall not be repeated.

3.1.3.1.9 Data Scrambling

Data scrambling applies to the Paging Channels, the Broadcast Control Channels, the Common Assignment Channels, the Forward Common Control Channels, and the Forward Traffic Channels.

Data scrambling for the Paging Channels, Common Assignment Channel, Forward Common Control Channels, and Forward Traffic Channels, is performed on the modulation symbols output from the block interleaver at the modulation symbol rate. Data scrambling for the Broadcast Control Channel is performed on the modulation symbols after sequence repetition at the modulation symbol rate.

When operating on the Paging Channel or the Forward Traffic Channel with Radio Configurations 1 and 2, the data scrambling shall be accomplished by performing the modulo-2 addition of the modulation symbol with the binary value of the long code PN chip that is valid at the start of the transmission period for that symbol as shown in Figures 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 of the long code operating at 1.2288 MHz clock rate. Only the first output of every 64 chips is used for the data scrambling.

When operating on the Broadcast Control Channel, Common Assignment Channel, Forward Common Control Channel, and the Forward Traffic Channel with Radio Configurations 3 through 9, the data scrambling shall be accomplished by operating on groups of 2M modulation symbols, where M is 1 for the Spreading Rate 1 non-TD mode, 2 for the Spreading Rate 1 TD mode, and 3 for the Spreading Rate 3 mode. For the first M modulation symbols of each group, modulo-2 addition shall be performed on the modulation symbols with the binary value of the long code PN chip that is valid at the start of the transmission period for the 2M modulation symbols as shown in Figures 3.1.3.1.1.1-2, 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, 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 modulation symbols of each group, modulo-2 addition shall be performed on the modulation symbols with the binary value of the long code PN chip that is valid just prior to the start of the transmission period for the 2M modulation symbols. This PN sequence shall be the equivalent of the long code described in Figure 2.1.3.1.11-1 for Spreading Rate 1 and the equivalent of the long code described in Figure 2.1.3.1.12-1 for Spreading Rate 3.

The long code shall be generated as described in 2.1.3.1.12. The long code masks to be used for the Paging Channels, Broadcast Control Channel, Common Assignment Channels, Forward Common Control Channels, and Forward Traffic Channels are specified in 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 respectively.

3.1.3.1.10 Forward Power Control Subchannel

A Forward Power Control Subchannel is transmitted only on the Forward Fundamental Channel or on the Forward Dedicated Control Channel.

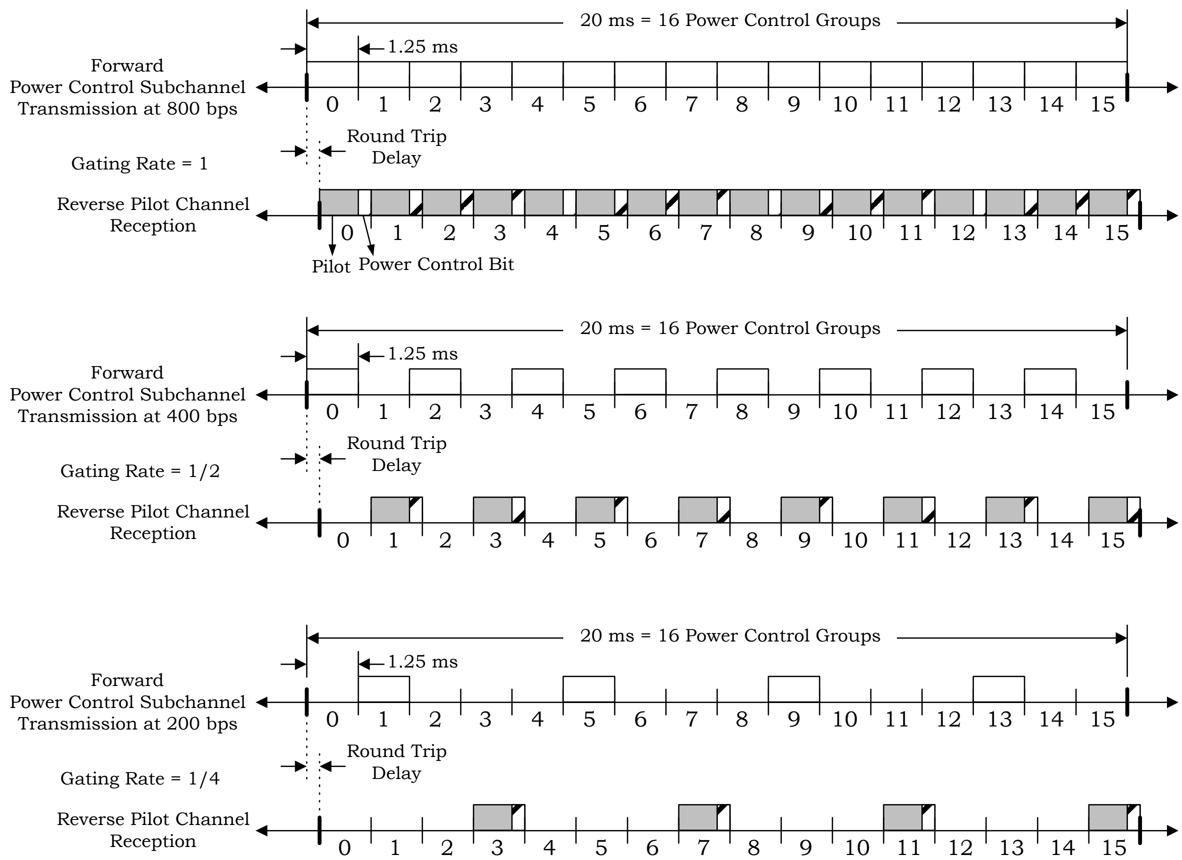
When the mobile station is not operating in the gated transmission mode, the subchannel shall transmit at a rate of one bit ('0' or '1') every 1.25 ms (i.e., 800 bps).

When the mobile station is operating in the gated transmission mode, the subchannel shall transmit at a rate of 400 or 200 bps when the gating rate is 1/2 or 1/4 respectively as shown in Figure 3.1.3.1.10-1.

The power control groups within a 20 ms frame are numbered from 0 to 15. When operating with 1/2 rate Reverse Pilot Channel gating, the Forward Power Control Subchannel shall be transmitted only in the even numbered power control groups. When operating with 1/4 rate Reverse Pilot Channel gating, the Forward Power Control Subchannel shall be transmitted only in power control groups 1, 5, 9, and 13.

When using gating other than Reverse Pilot Channel gating with Reverse Radio Configurations 3 through 6, the base station shall transmit the power control bit in the power control group that begins (REV_PWR_CNTL_DELAY+ 1) × 1.25 ms following the end of a power control group in which the mobile station transmitted.

A '0' bit shall indicate to the mobile station that it is to increase the mean output power level, and a '1' bit shall indicate to the mobile station that it is to decrease the mean output power level. The amount that the mobile station increases or decreases its power for every power control bit is specified in 2.1.2.3.2.



power control subchannel transmission as specified in Table 3.1.3.1.10-1 and Figure 3.1.3.1.10-2

Figure 3.1.3.1.10-1. Forward and Reverse Power Control Subchannel Transmission Timing

The base station receiver shall estimate the received signal strength of the particular mobile station to which it is assigned over a 1.25 ms period. The base station receiver shall use the estimate to determine the value of the power control bit ('0' or '1'). The base station shall transmit the power control bit on the Forward Fundamental Channel or on the Forward Dedicated Control Channel using the puncturing technique described below.

For Radio Configurations 1 and 2, the transmission of the power control bit shall occur in the second power control group following the corresponding reverse channel power control group in which the signal strength was estimated[20].

In the case of non-gated transmission mode, the transmission of the power control bit shall 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.

(as specified by $FPC\_PRI\_CHAN_s$) in all of the power control groups. In the case of Reverse Pilot Channel gated transmission mode (at 1/2 or 1/4 rate), the transmission of the power control bit shall occur on the Forward Dedicated Control Channel in every second or fourth power control group as shown in Figure 3.1.3.1.10-1.

The duration and power level of power control bits for each radio configuration are specified in Table 3.1.3.1.10-1. Each power control bit shall replace the number of modulation symbols specified in Table 3.1.3.1.10-1. Each power control bit shall be transmitted with minimum energy as specified in Table 3.1.3.1.10-1. The power control bits shall be inserted into the Forward Dedicated Control Channel or into the Forward Fundamental Channel data stream, after the data scrambling.

An n-bit (n = 3 or 4) binary number with values 0 through 2^n - 1 formed by the decimated bits specified in Table 3.1.3.1.10-1 shall be used to determine the power control bit starting position by indexing the list in Table 3.1.3.1.10-1. For example, if the values of decimated bits for Radio Configuration 4 (non-TD) are '110' (6 decimal), the power control bit starting position is 12 as shown in Figure 3.1.3.1.10-2. The value of the decimated bits shall be equal to the first of the chips into the decimator (see Figure 3.1.3.1.1.1-18 and Figure 3.1.3.1.1.2-15) for each modulation symbol.

When operating with Radio Configurations 1 and 2, all unpunctured modulation symbols in a frame are transmitted at the same power level. Modulation symbols in adjacent frames may be sent at different power levels.

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.

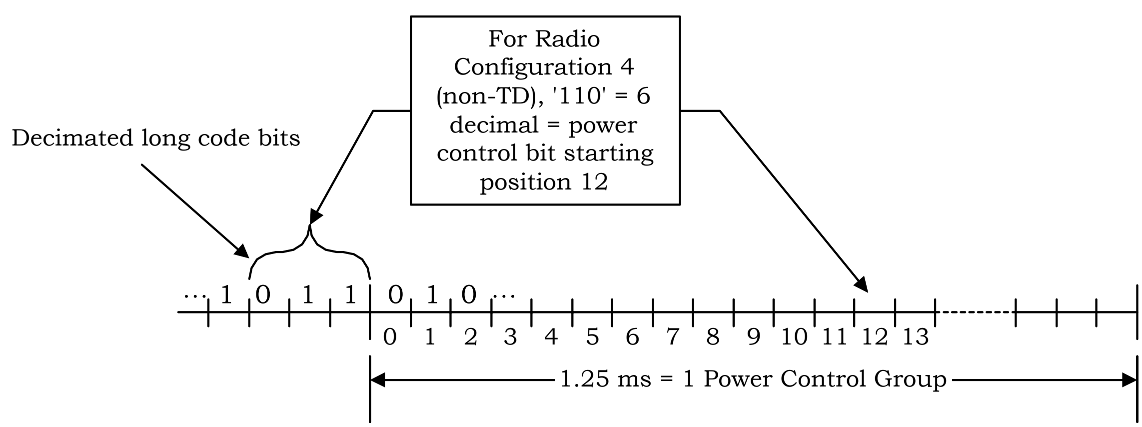


Figure 3.1.3.1.10-2. Randomization of Power Control Bit Starting Positions

3.1.3.1.11 Symbol Demultiplexing and Repetition

3.1.3.1.11.1 Spreading Rate 1 Symbol Demultiplexing

Symbol demultiplexing is performed on every code channel in the Forward CDMA Channel as shown in Figure 3.1.3.1.1.1-19.

The demultiplexer with scalar input not supporting transmit diversity shall output the first symbol in each frame to the Y_I output, and the subsequent symbols to the Y_Q, Y_I, … outputs.

The demultiplexer with scalar input supporting transmit diversity shall output the first symbol in each frame to the Y_{I1} output, and the subsequent symbols to the Y_{I2}, Y_{Q1}, Y_{Q2}, Y_{I1}, … outputs. The demultiplexer with complex input supporting transmit diversity shall output the first complex symbol in each frame to the Y_{I1} and Y_{Q1} outputs, and the subsequent complex symbols to the Y_{I2} and Y_{Q2}, Y_{I1} and Y_{Q1}, … outputs.

The Forward Pilot Channel, the Transmit Diversity Pilot Channel, the Auxiliary Pilot Channels, and the Auxiliary Transmit Diversity Pilot Channels shall be demultiplexed using the non-TD demultiplexer (i.e., the TD demultiplexer is not allowed).

The Sync Channel, Paging Channels, and the Forward Traffic Channels with Radio Configurations 1 and 2 shall be demultiplexed using the non-TD demultiplexer only (i.e., the TD demultiplexer is not allowed).

The Broadcast Control Channels, the Common Power Control Channels, the Common Assignment Channels, the Forward Common Control Channels, and Forward Traffic Channels with Radio Configurations 3 through 5 shall be demultiplexed using either the non-TD or TD demultiplexer.

The Quick Paging Channel, when used in conjunction with the Paging Channel, shall be demultiplexed using the non-TD demultiplexer (see Figure 3.1.3.1.1.1-19). Otherwise, the Quick Paging Channel may be demultiplexed using the non-TD or TD demultiplexer.

3.1.3.1.11.2 Spreading Rate 1 Symbol Repetition for Transmit Diversity

If OTD mode is enabled, each symbol output on Y_{I1}, Y_{I2}, Y_{Q1}, and Y_{Q2} shall be repeated once, to create two output symbols for each input symbol to the symbol repeater. The first repeated symbol output from both the Y_{I2} and Y_{Q2} symbol repetition blocks during a frame shall not be inverted. Subsequent outputs from both the Y_{I2} and Y_{Q2} symbol repetition blocks shall be alternatively inverted.

If STS mode is enabled, each symbol output on Y_{I1}, Y_{I2}, Y_{Q1}, and Y_{Q2} shall be applied to two repeaters, one for each transmit antenna, as shown in Figure 3.1.3.1.1.1-22 to create two output symbols for each symbol input to the symbol repeater. On antenna 1 the first repeated output symbol from the Y_{I2} repetition block shall be inverted and the second repeated output symbol shall not be inverted. Subsequent output symbols from the Y_{I2} repetition block on antenna 1 shall be alternatively inverted. The first repeated output symbol from the Y_{Q2} symbol repetition block on antenna 1 shall not be inverted and the second repeated output symbol shall be inverted. Subsequent output symbols from the Y_{Q2} symbol repetition block shall be alternatively inverted. On antenna 2 the first repeated output symbol from the Y_{Q1} repetition block shall be inverted and the second repeated output symbol shall not be inverted. Subsequent output symbols from Y_{Q1} repetition block on antenna 2 shall be alternatively inverted. The first repeated output symbol from the Y_{I1} symbol repetition block on antenna 2 shall not be inverted and the second repeated output symbol shall be inverted. Subsequent output symbols from the Y_{I1} symbol repetition block shall be alternatively inverted.

3.1.3.1.11.3 Spreading Rate 3 Symbol Demultiplexing

Symbol demultiplexing is performed on every code channel in the Forward CDMA Channel as shown in Figure 3.1.3.1.1.2-16.

The demultiplexer shall output the first symbol in each frame to the Y_{I1} output, and the subsequent symbols to the Y_{I2}, Y_{I3}, Y_{Q1}, Y_{Q2}, Y_{Q3}, Y_{I1}, … outputs. The demultiplexer shall output the first complex symbol in each frame to the Y_{I1} and Y_{Q1} outputs, and the subsequent complex symbols to the Y_{I2} and Y_{Q2}, Y_{I3} and Y_{Q3}, Y_{I1} and Y_{Q1}, … outputs.

The Forward Pilot Channel and the Auxiliary Pilot Channels, shall be demultiplexed using the demultiplexer shown in Figure 3.1.3.1.1.2-16.

The Broadcast Control Channels, the Common Power Control Channels, the Common Assignment Channels, the Forward Common Control Channels, the Quick Paging Channels, and Forward Traffic Channels with Radio Configurations 6 through 9 shall be demultiplexed using the demultiplexer shown in Figure 3.1.3.1.1.2-16.

3.1.3.1.12 Orthogonal and Quasi-Orthogonal Spreading

Walsh functions are used with Radio Configurations 1 and 2. Walsh functions or quasi-orthogonal functions are used with Radio Configurations 3 through 9.

Each code channel transmitted on the Forward CDMA Channel shall be spread with a Walsh function or a quasi-orthogonal function at a fixed chip rate of 1.2288 Mcps to provide channelization among all code channels on a given Forward CDMA Channel.

The maximum length of the assigned Walsh functions (N_{max}) for code channels, except for the Auxiliary Pilot Channels and the Auxiliary Transmit Diversity Pilot Channels, transmitted on the Forward CDMA Channel is given in Table 3.1.3.1.12-1. One of N-ary ($N \le N_{max}$) time-orthogonal Walsh functions, generated as described in 2.1.3.1.8.2, shall be used. A code channel that is spread using Walsh function n from the N-ary orthogonal set ($0 \le n \le N-1$) shall be assigned to code channel W_n^N. 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/1.2288) μs.

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 ($Walsh_{rot}$) 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 $Walsh_{rot}$ 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}	$Walsh_{rot}$
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.

Code channel W_0^{64} shall be assigned to the Forward Pilot Channel. Code channel W_0^{64} shall not be used with a non-zero quasi-orthogonal function. Code channels W_{64k}^{N}, with and without a non-zero quasi-orthogonal function, where N > 64 and k is an integer such that 0 ≤ 64k < N, shall not be used.

If the Transmit Diversity Pilot Channel is present, it shall be assigned code channel W_{16}^{128}.

If an Auxiliary Pilot Channel is present, it shall be assigned a code channel W_n^N, where N ≤ 512, and 1 ≤ n ≤ N – 1. The value of N and n are specified by the base station.

If an Auxiliary Pilot Channel is used with an Auxiliary Transmit Diversity Pilot Channel, then the Auxiliary Pilot Channel shall be assigned a code channel W_n^N, and the Auxiliary Transmit Diversity Pilot Channel shall be assigned a code channel $W_{n+N/2}^{N}$, where N ≤ 512 and 1 ≤ n ≤ N/2 – 1. The value of N and n are specified by the base station.

If the Sync Channel is present, it shall be assigned code channel W_{32}^{64}.

If Paging Channels are present, they shall be assigned to code channels W_1^{64} to W_7^{64}, consecutively.

If a Spreading Rate 1, rate 1/2 coded Broadcast Control Channel is present, it shall be assigned to a code channel W_n^{64}, where 1 ≤ n ≤ 63. See 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 base station.

If a Spreading Rate 1, rate 1/4 coded Broadcast Control Channel is present, it shall be assigned to a code channel W_n^{32}, where 1 ≤ n ≤ 31. See 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 base station.

If a Spreading Rate 3 Broadcast Control Channel is present, it shall be assigned to a code channel W_n^{128}, where 1 ≤ n ≤ 127. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

If Spreading Rate 1 Quick Paging Channels are present, they shall be assigned to code channels W_{80}^{128}, W_{48}^{128}, and W_{112}^{128}, in that order. See Figures 3.1.3.1.1.1-20, 3.1.3.1.1.1-21, and 3.1.3.1.1.1-22.

If a Spreading Rate 3 Quick Paging channel is present, it shall be assigned to a code channel W_n^{256}, where 1 ≤ n ≤ 255. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

If a Spreading Rate 1 Common Power Control Channel operating in the non-TD mode is present, it shall be assigned to a code channel W_n^{128}, where 1 ≤ n ≤ 127. See Figure 3.1.3.1.1.1-20. The value of n is specified by the base station.

If a Spreading Rate 1 Common Power Control Channel operating in the OTD or STS mode is present, it shall be assigned to a code channel W_n^{64}, where 1 ≤ n ≤ 63. See Figures 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.

If a Spreading Rate 3 Common Power Control Channel is present, it shall be assigned to a code channel W_n^{128}, where $1 \le n \le 127$. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

If a Spreading Rate 1, rate 1/2 coded Common Assignment Channel is present, it shall be assigned to a code channel W_n^{128}, where $1 \le n \le 127$. See 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 base station.

If a Spreading Rate 1, rate 1/4 coded Common Assignment Channel is present, it shall be assigned to a code channel W_n^{64}, where $1 \le n \le 63$. See 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 base station.

If a Spreading Rate 3 Common Assignment Channel is present, it shall be assigned to a code channel W_n^{256}, where $1 \le n \le 255$. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

If a Spreading Rate 1, rate 1/2 coded Forward Common Control Channel is present, it shall be assigned to a code channel W_n^N, where N = 32, 64, and 128 for the data rate of 38400 bps, 19200 bps, and 9600 bps, respectively, and $1 \le n \le N - 1$. See 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 base station.

If a Spreading Rate 1, rate 1/4 coded Forward Common Control Channel is present, it shall be assigned to a code channel W_n^N, where N = 16, 32, and 64 for the data rate of 38400 bps, 19200 bps, and 9600 bps, respectively, and $1 \le n \le N - 1$. See 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 base station.

If a Spreading Rate 3 Forward Common Control Channel is present, it shall be assigned to a code channel W_n^N, where N = 64, 128, and 256 for the data rate of 38400 bps, 19200 bps, and 9600 bps, respectively, and $1 \le n \le N - 1$. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

Each Forward Fundamental Channel and Forward Supplemental Code Channel with Radio Configuration 1 or 2 shall be assigned to a code channel W_n^{64}, where $1 \le n \le 63$. See Figure 3.1.3.1.1.1-20. The value of n is specified by the base station.

Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio Configuration 3 or 5 shall be assigned to a code channel W_n^{64}, where $1 \le n \le 63$. See 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 base station.

Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio Configuration 4 shall be assigned to a code channel W_n^{128}, where $1 \le n \le 127$. See 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 base station.

Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio Configuration 6 or 8 shall be assigned to a code channel W_n^{128}, where $1 \le n \le 127$. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

Each Forward Fundamental Channel and Forward Dedicated Control Channel with Radio Configuration 7 or 9 shall be assigned to a code channel W_n^{256}, where $1 \le n \le 255$. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station.

Each Forward Supplemental Channel with Radio Configuration 3, 4, or 5 shall be assigned to a code channel W_n^N, where N = 4, 8, 16, 32, 64, 128, 128, and 128 for the maximum assigned QPSK symbol rate of 307200 sps, 153600 sps, 76800 sps, 38400 sps, 19200 sps, 9600 sps, 4800 sps, and 2400 sps, respectively, and $1 \le n \le N - 1$. See 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 base station. For QPSK symbol rates of 4800 sps and 2400 sps, the Walsh function is transmitted two times and four times per QPSK symbol, respectively. The effective length of the Walsh function is 256 for the QPSK symbol rate of 4800 sps, and 512 for the QPSK symbol rate of 2400 sps.

Each Forward Supplemental Channel with Radio Configuration 6, 7, 8, or 9 shall be assigned to a code channel W_n^N, where N = 4, 8, 16, 32, 64, 128, 256, 256, and 256 for the maximum assigned QPSK symbol rate of 921600 sps, 460800 sps, 230400 sps, 115200 sps, 57600 sps, 28800 sps, 14400 sps, 7200 sps, and 3600 sps, respectively, and $1 \le n \le N - 1$. See Figure 3.1.3.1.1.2-17. The value of n is specified by the base station. For QPSK symbol rates of 7200 sps and 3600 sps, the Walsh function is transmitted two times and four times per QPSK symbol, respectively. The effective length of the Walsh function is 512 for the QPSK symbol rate of 7200 sps, and 1024 for the QPSK symbol rate of 3600 sps.

3.1.3.1.13 Quadrature Spreading

Following the orthogonal spreading, each code channel is spread in quadrature as shown in 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 sequence shall be a quadrature sequence of length 2^{15} (i.e., 32768 PN chips in length) for Spreading Rate 1 and each carrier of Spreading Rate 3. This sequence is called the pilot PN sequence.

For Spreading Rate 1 and each carrier of Spreading Rate 3, the pilot PN sequence shall be based on the following characteristic polynomials:

$$P_I(x) = x^{15} + x^{13} + x^9 + x^8 + x^7 + x^5 + 1$$

(for the in-phase (I) sequence)

and

$$P_Q(x) = x^{15} + x^{12} + x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

(for the quadrature-phase (Q) sequence).

The maximum length linear feedback shift register sequences i(n) and q(n) based on the above polynomials are of length $2^{15} - 1$ and can be generated by the following linear recursions:

$$i(n) = i(n - 15) \oplus i(n - 10) \oplus i(n - 8) \oplus i(n - 7) \oplus i(n - 6) \oplus i(n - 2)$$

(based on $P_I(x)$ as the characteristic polynomial)

and

$$q(n) = q(n-15) \oplus q(n-12) \oplus q(n-11) \oplus q(n-10) \oplus q(n-9)$$
$$\oplus\, q(n-5) \oplus q(n-4) \oplus q(n-3)$$

(based on $P_Q(x)$ as the characteristic polynomial),

where i(n) and q(n) are binary-valued ('0' and '1') and the additions are modulo-2. In order to obtain the I and Q pilot PN sequences (of period 2^{15}), a '0' is inserted in i(n) and q(n) after 14 consecutive '0' outputs (this occurs only once in each period); therefore, the pilot PN sequences have one run of 15 consecutive '0' outputs instead of 14.

The chip rate for Spreading Rate 1 and each carrier of Spreading Rate 3 shall be 1.2288 Mcps. The pilot PN sequence period is 32768/1228800 = 26.666… ms, and exactly 75 pilot PN sequence repetitions occur every 2 seconds. The pilot PN sequence offset shall be as specified in 3.1.3.2.1.

3.1.3.1.14 Filtering

3.1.3.1.14.1 Baseband Filtering

Following the spreading operation, the I and Q impulses are applied to the inputs of the I and Q baseband filters as described in 3.1.3.1.1.1 and 3.1.3.1.1.2. The baseband filters shall have a frequency response S(f) that satisfies the limits given in Figure 3.1.3.1.14.1-1. Specifically, the normalized frequency response of the filter shall be contained within $\pm\delta_1$ in the passband $0 \le f \le f_p$, and shall be less than or equal to $-\delta_2$ in the stopband $f \ge f_s$. The numerical values for the parameters are δ_1 = 1.5 dB, δ_2 = 40 dB, f_p = 590 kHz, and f_s = 740 kHz.

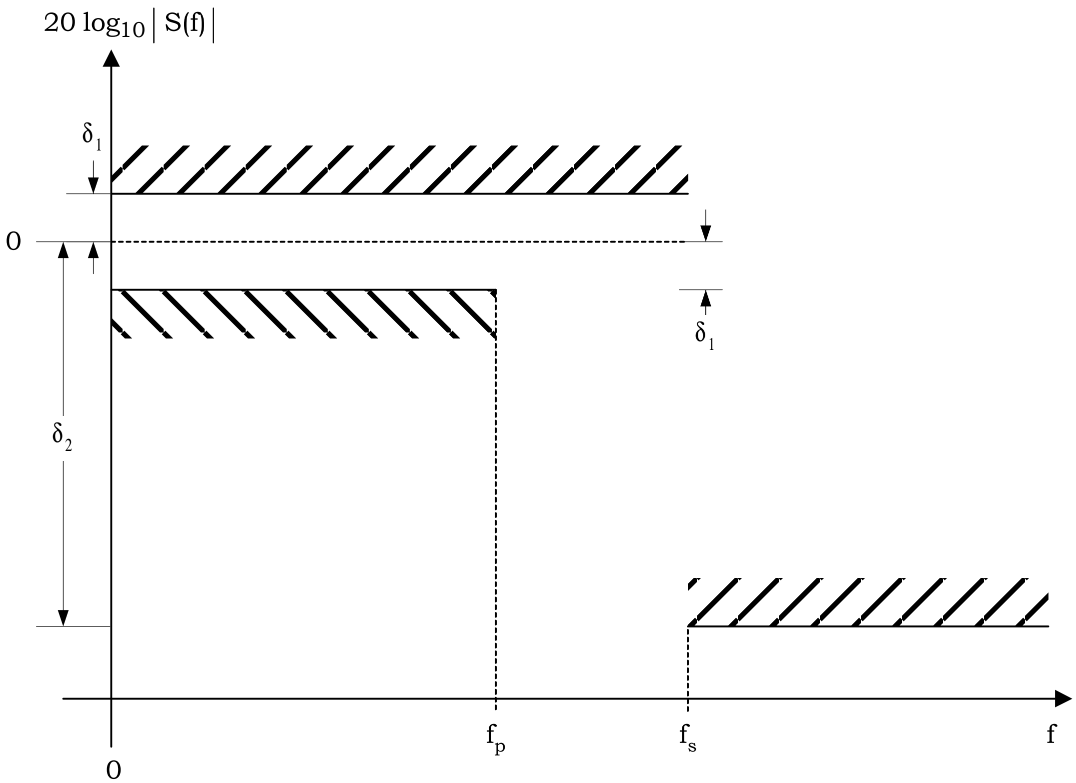


Figure 3.1.3.1.14.1-1. Baseband Filters Frequency Response Limits

If s(t) is the impulse response of the baseband filter, then s(t) should satisfy the following equation:

$$\text{Mean Squared Error} = \sum_{k=0}^{\infty}\left[\alpha s\left(kT_S - \tau\right) - h(k)\right]^2 \le 0.03,$$

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 ≥ 48. Note that h(k) equals h(47 - k).

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

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 kHz ≤ $|f - f_c|$ ≤ 630 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.

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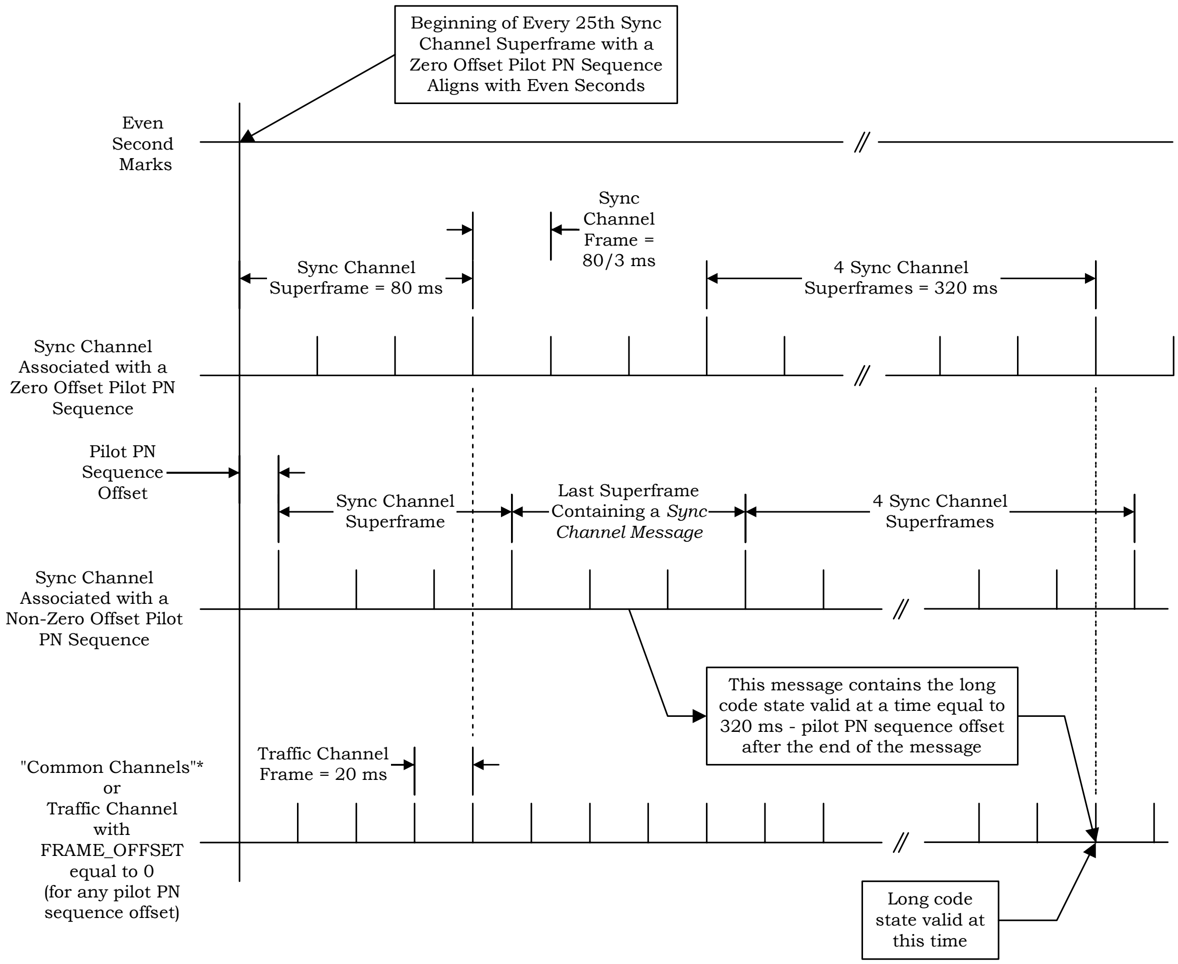
[21]This equalization simplifies the design of the mobile station receive filters.

3.1.3.2.1 Pilot PN Sequence Offset

Each base station shall use a time offset of the pilot PN sequence to identify a Forward CDMA Channel. Time offsets may be reused within a CDMA cellular system.

Distinct pilot channels shall be identified by an offset index (0 through 511 inclusive). This offset index specifies the offset time from the zero offset pilot PN sequence in multiples of 64 chips. The zero offset pilot PN sequence shall be such that the start of the sequence shall be output at the beginning of every even second in time, referenced to the base station transmission time (see 3.1.5). For Spreading Rate 1 and for each carrier of Spreading Rate 3, the start of the zero offset pilot PN sequence for either the I or Q sequence shall be defined as the state of the sequence for which the previous 15 outputs were '0's (see Figure 1.3-1).

There are 512 unique values that are possible for the pilot PN sequence offset. The offset (in chips) for a given pilot PN sequence from the zero offset pilot PN sequence is equal to the index value multiplied by 64; for example, if the pilot PN sequence offset index is 15, the pilot PN sequence offset will be $15 \times 64 = 960$ PN chips. The pilot PN sequence offset is illustrated in Figure 3.1.3.2.1-1. The same pilot PN sequence offset shall be used on all CDMA frequency assignments for a given base station.



Note: "Common Channels" consists of the Paging Channel, Broadcast Control Channel, Quick Paging Channel, Common Power Control Channel, Common Assignment Channel, and Forward Common Control Channel.

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 × m, where N is a non-negative integer power of 2 ($N = 2^n$). A Walsh function of order N × 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 × m)/1.2288 µs

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 × 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 $W_i^m\ W_i^m\ W_i^m\ W_i^m\ (W_i^{4m})$, $W_i^m\ \overline{W_i^m}\ W_i^m\ \overline{W_i^m}\ (W_{i+m}^{4m})$, $W_i^m\ W_i^m\ \overline{W_i^m}\ \overline{W_i^m}\ (W_{i+2m}^{4m})$, $W_i^m\ \overline{W_i^m}\ \overline{W_i^m}\ W_i^m\ (W_{i+3m}^{4m})$.

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

$$(\lfloor t/4 \rfloor - \mathrm{NGHBR\_TX\_OFFSET}) \bmod \mathrm{NGHBR\_TX\_PERIOD} = 0,$$

where t is the System Time in units of 20 ms.

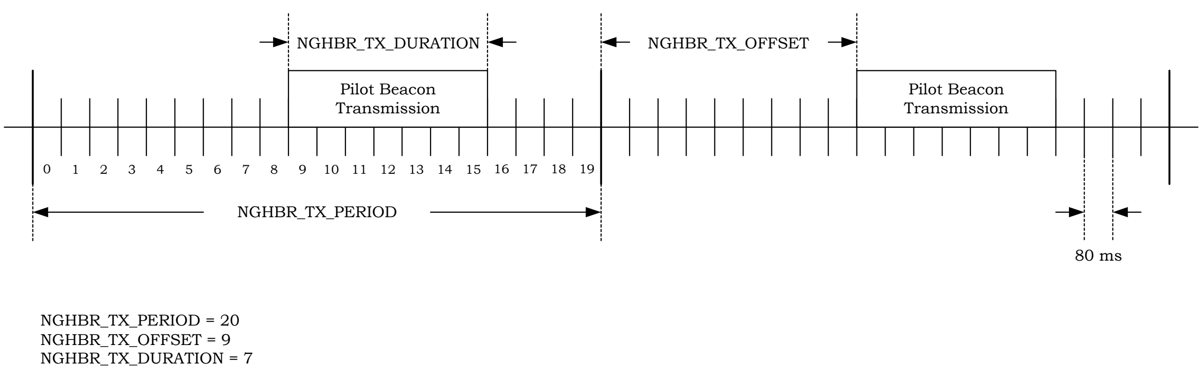


Figure 3.1.3.2.5-1. Hopping Pilot Beacon Timing

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.

3.1.3.3.1 Sync Channel Time Alignment and Modulation Rates

The bit rate for the Sync Channel is 1200 bps. A Sync Channel frame is 26.666... ms in duration. For a given base station, the I and Q channel pilot PN sequences for the Sync Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

Once the mobile station achieves pilot PN sequence synchronization by acquiring the Forward Pilot Channel, the synchronization for the Sync Channel is immediately known. This is because the Sync Channel (and all other channels) is spread with the same pilot PN sequence, and because the frame and interleaver timing on the Sync Channel are aligned with the pilot PN sequence.

The start of the interleaver block and the frame of the Sync Channel shall align with the start of the pilot PN sequence being used to spread the Forward CDMA Channel (see 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 summary of Sync Channel modulation parameters.

3.1.3.3.2 Sync Channel Structure

A Sync Channel superframe is formed by three Sync Channel frames (i.e., 80 ms) as shown in Figure 3.1.3.2.1-1.

When using the zero-offset Pilot PN sequence, Sync Channel superframes shall begin at the even second time mark referenced to base station transmission time (see 3.1.5) or at the end of any third Sync Channel frame thereafter. When using a Pilot PN sequence other than the zero-offset sequence, the Sync Channel superframe shall begin at the even second time mark plus the pilot PN offset value in time or at the end of any third Sync Channel frame thereafter.

3.1.3.3.3 Sync Channel Convolutional Encoding

The Sync Channel data shall be convolutionally encoded prior to transmission, as specified in 3.1.3.1.4. The state of the Sync Channel convolutional encoder shall not be reset between Sync Channel frames.

3.1.3.3.4 Sync Channel Code Symbol Repetition

The Sync Channel code symbols shall be repeated as specified in 3.1.3.1.5.

3.1.3.3.5 Sync Channel Interleaving

The modulation symbols on the Sync Channel shall be interleaved as specified in 3.1.3.1.7.

3.1.3.3.6 Sync Channel Orthogonal Spreading

The Sync Channel shall be spread by W_{32}^{64} as specified in 3.1.3.1.12. When operating in Spreading Rate 3, a Sync Channel should be transmitted on a frequency from the Sync Channel preferred set of frequency assignments for Spreading Rate 3.

3.1.3.3.7 Sync Channel Quadrature Spreading

The Sync Channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

3.1.3.3.8 Sync Channel Filtering

Filtering for the Sync Channel shall be as specified in 3.1.3.1.14.

3.1.3.3.9 Sync Channel Transmission Processing

When the Physical Layer receives a PHY-SYNCH.Request(SDU) from the MAC Layer, the base station shall perform the following:

- Set the information bits to SDU.
- Transmit a Sync Channel frame.

3.1.3.4 Paging Channel

The Paging Channel applies to Spreading Rate 1 only.

The Paging 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 Paging Channel to transmit system overhead information and mobile station-specific messages.

The Primary Paging Channel shall be Paging Channel number 1.

3.1.3.4.1 Paging Channel Time Alignment and Modulation Rates

The Paging Channel shall transmit information at a fixed data rate of 9600 or 4800 bps. All Paging Channels in a given system (i.e., with the same SID) should transmit information at the same data rate. A Paging Channel frame is 20 ms in duration.

For a given base station, the I and Q channel pilot PN sequences for the Paging Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

The start of the interleaver block and the frame of the Paging Channel shall align with the start of the zero-offset pilot PN sequence at every even-second time mark (t mod 100 = 0, where t is the System Time in 20 ms frames) as shown in Figure 3.1.3.2.1-1. The first Paging Channel frame shall begin at the start of base station transmission time (see 3.1.5). See Table 3.1.3.1.2.1-2 for a summary of Paging Channel modulation parameters.

3.1.3.4.2 Paging Channel Structure

The Paging Channel shall be divided into Paging Channel slots that are each 80 ms in duration.

3.1.3.4.3 Paging Channel Convolutional Encoding

The Paging Channel data shall be convolutionally encoded as specified in 3.1.3.1.4. The state of the Paging Channel convolutional encoder shall not be reset between Paging Channel frames.

3.1.3.4.4 Paging Channel Code Symbol Repetition

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.

41 … 29	28 … 24	23 … 21	20 … 9	8 … 0
1100011001101	00000	PCN	000000000000	PILOT_PN

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_i^{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 mod 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.

Information Bits	F	T

Notation

F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 3.1.3.5.2-1. Broadcast Control Channel Frame Structure

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.

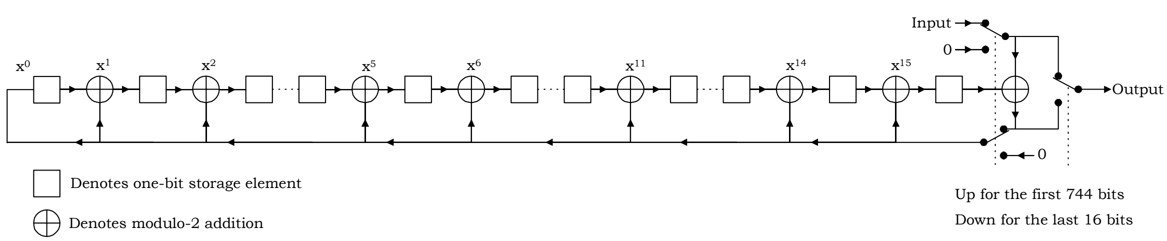


Figure 3.1.3.5.2.1-1. Broadcast Control Channel Frame Quality Indicator Calculation

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.

3.1.3.5.4 Broadcast Control Channel Interleaving

The modulation symbols on the Broadcast Control Channel shall be interleaved, as specified in 3.1.3.1.7. The interleaver block shall align with the Broadcast Control Channel frame.

3.1.3.5.5 Broadcast Control Channel Sequence Repetition

When operating at 4800 and 9600 bps, the sequence shall be repeated as specified in 3.1.3.1.8.

3.1.3.5.6 Broadcast Control Channel Data Scrambling

The Broadcast Control Channel data shall be scrambled as specified in 3.1.3.1.9 utilizing the Broadcast Control Channel long code mask as shown in Figure 3.1.3.5.6-1.

41 … 29	28 … 24	23 … 21	20 … 9	8 … 0
1100011001101	00100	BCN	000000000000	PILOT_PN

BCN - Broadcast Control Channel Number
PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

Figure 3.1.3.5.6-1. Broadcast Control Channel Long Code Mask

3.1.3.5.7 Broadcast Control Channel Orthogonal and Quasi-Orthogonal Spreading

The Broadcast Control Channel shall be spread by a Walsh function or quasi-orthogonal function as specified in 3.1.3.1.12.

3.1.3.5.8 Broadcast Control Channel Quadrature Spreading

The Broadcast Control Channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

3.1.3.5.9 Broadcast Control Channel Filtering

Filtering for the Broadcast Control Channel shall be as specified in 3.1.3.1.14.

3.1.3.5.10 Broadcast Control Channel Transmission Processing

When the Physical Layer receives a PHY-BCCH.Request(SDU, NUM_BITS) from the MAC Layer, the base station shall:

- Store the arguments SDU, and NUM_BITS.
- Set the information bits (see Figure 3.1.3.5.2-1) to SDU.
- 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 mod 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 indicator data rate is 9600 bps, the last four indicators of the first 40 ms of a Quick Paging Channel slot and the last four indicators of the Quick Paging Channel slot are reserved as Configuration Change Indicators. The base station enables the Configuration Change Indicators in each Quick Paging Channel slot for a period of time following a change in configuration parameters.

3.1.3.6.5 Quick Paging Channel Broadcast Indicator Enabling

Broadcast Indicators are only used on Quick Paging Channel 1.

If the Quick Paging Channel indicator data rate is 4800 bps, the two indicators prior to the last two indicators of the first 40 ms of a Quick Paging Channel slot and the two indicators prior to the last two indicators of the Quick Paging Channel slot are reserved as Broadcast Indicators. If the Quick Paging Channel indicator data rate is 9600 bps, the four indicators prior to the last four indicators of the first 40 ms of a Quick Paging Channel slot and the four indicators prior to the last four indicators of the Quick Paging Channel slot are reserved as Broadcast Indicators. The base station enables the Broadcast Indicators in the Quick Paging Channel slot corresponding to a Broadcast Slot on the Forward Common Control Channel which mobile stations configured to receive broadcast messages are to monitor.

3.1.3.6.6 Quick Paging Channel Paging Indicator, Configuration Change Indicator, and Broadcast Indicator Repetition

For Spreading Rate 1, each Paging Indicator, Configuration Change Indicator, and Broadcast Indicator at the 9600 bps rate shall be repeated one time (each indicator occurs two consecutive times) and each indicator at the 4800 bps rate shall be repeated three times (each indicator occurs four consecutive times) as specified in Table 3.1.3.1.2.1-5.

For Spreading Rate 3, each Paging Indicator, Configuration Change Indicator, and Broadcast Indicator at the 9600 bps rate shall be repeated two times (each indicator occurs three consecutive times) and each indicator at the 4800 bps rate shall be repeated five times (each indicator occurs six consecutive times) as specified in Table 3.1.3.1.2.2-3.

3.1.3.6.7 Quick Paging Channel Orthogonal and Quasi-Orthogonal Spreading

The Quick Paging Channel shall be spread by a Walsh function or quasi-orthogonal function as specified in 3.1.3.1.12.

3.1.3.6.8 Quick Paging Channel Quadrature Spreading

The Quick Paging Channel shall be PN spread using the PN sequence specified in 3.1.3.1.13.

3.1.3.6.9 Quick Paging Channel Filtering

Filtering for the Quick Paging Channel shall be as specified in 3.1.3.1.14.

3.1.3.6.10 Quick Paging Channel Transmit Power Level

The enabled Paging Indicator modulation symbols shall be transmitted at the power level relative to that of the Forward Pilot Channel that is specified by QPCH_POWER_LEVEL_PAGE.

The enabled Configuration Change Indicator modulation symbols shall be transmitted at the power level relative to that of the Forward Pilot Channel that is specified by QPCH_POWER_LEVEL_CONFIG.

The enabled Broadcast Indicator modulation symbols shall be transmitted at the power level relative to that of the Forward Pilot Channel that is specified by QPCH_POWER_LEVEL_BCAST.

3.1.3.6.11 Quick Paging Channel Transmission Processing

Not specified.

3.1.3.7 Common Power Control Channel

The base station may support operation on one or more Common Power Control Channels.

The Common Power Control Channel is used by the base station for transmitting common power control subchannels (one bit per subchannel) for the power control of multiple Reverse Common Control Channels and Enhanced Access Channels. The common power control subchannels are time multiplexed on the Common Power Control Channel. Each common power control subchannel controls a Reverse Common Control Channel or an Enhanced Access Channel.

The common power control subchannel may be used with the Enhanced Access Channel or the Reverse Common Control Channel, depending upon the operating mode. While operating in the Power Controlled Access Mode, the mobile station uses the common power control subchannel transmitted by the base station on the assigned Common Power Control Channel to adjust the transmit power of the Enhanced Access Channel. While operating in the Reservation Access Mode, the mobile station uses the common power control subchannel transmitted by the base station on the assigned Common Power Control Channel to adjust the transmit power of the Reverse Common Control Channel. While operating in the Designated Access Mode, the mobile station uses the common power control subchannel transmitted by the base station on the assigned Common Power Control Channel to adjust the transmit power of the Reverse Common Control Channel.

3.1.3.7.1 Common Power Control Channel Time Alignment and Modulation Rates

The common power control subchannels are multiplexed into separate data streams on the I and Q arms of the Common Power Control Channels. The data rate on both the I arm and Q arm is 9600 bps. In a 20 ms frame, there are 16 common power control groups for an 800 bps power control update rate, 8 common power control groups for a 400 bps power control update rate, and 4 common power control groups for a 200 bps power control update rate. The start of the first power control bit in the first common power control group aligns with the beginning of the 20 ms frame. The start of the Common Power Control Channel frame shall align with the start of the zero-offset pilot PN sequence at every even-second time mark (t mod 100 = 0, where t is the System Time in 20 ms frames) as shown in Figure 3.1.3.2.1-1. The first Common Power Control Channel frame shall begin at the start of the base station transmission time (see 3.1.5).

For Spreading Rate 1, the power control bits on each of the I and Q arms are not repeated (1 symbol/bit) for the non-TD mode, and repeated once (2 symbols/bit) for the TD mode. For Spreading Rate 3, the power control bits on each of the I and Q arms are repeated twice (3 symbols/bit).

For a given base station, the I and Q channel pilot PN sequences for the Common Power Control Channel use the same pilot PN sequence offset as for the Pilot Channel.

3.1.3.7.2 Common Power Control Channel Structure

The channel structure for the Common Power Control Channel is shown in Figures 3.1.3.1.1.1-5 and 3.1.3.1.1.2-4.

There are 2N common power control subchannels, numbered from 0 through 2N - 1, in one common power control group of the Common Power Control Channel. These are divided equally between the I arm and the Q arm of the Common Power Control Channel. Table 3.1.3.7.2-1 gives the number of common power control subchannels for power control update rates of 800, 400 and 200 bps per subchannel.

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

The common power control subchannels numbered 0 through N – 1 shall correspond to the I arm and those numbered N through 2N – 1 shall correspond to the Q arm.

3.1.3.7.3 Pseudo-Randomization of Power Control Bit Positions

There are N bit positions or “offsets” numbered 0 through N – 1, on both the I arm and the Q arm in one common power control group. In each common power control group, the randomization process shall add a “relative offset” to an “initial offset”, modulo N, to determine the “effective offset” to be used by the multiplexer.

The common power control subchannels shall be assigned initial offsets according to the following rules:

- For the I arm, the initial offset value is the same as the common power control subchannel index, i.e., the common power control subchannel index 0 shall correspond to initial offset 0, and the common power control subchannel index N – 1 shall correspond to initial offset N – 1.
- For the Q arm, the common power control subchannel index N shall correspond to initial offset 0, and the index 2N – 1 shall correspond to initial offset N – 1.

Offset 0 corresponds to the first bit position in the common power control group, and offset N – 1 shall correspond to the last bit position. In-phase power control bits shall remain on the I arm after each modulo operation and the same shall be true for the Q arm. When there is no data to be sent on any common power control subchannel, the power at the corresponding bit position shall be gated off.

The Common Power Control Channel shall use the decimated output of the long code generator specified in 2.1.3.1.12 with the long code mask shown in Figure 3.1.3.7.3-1 to randomize the power control bit position as shown in Figure 3.1.3.1.1.1-5 and 3.1.3.1.1.2-4. For Spreading Rate 1, a decimation factor of 128 shall be realized by outputting the first chip of each 128 chips output from the long code generator. For Spreading Rate 3, a decimation factor of 384 shall be realized by outputting the first chip of each 384 chips output from the long code generator. The decimated output of the long code generator shall not be used to scramble the multiplexer output data stream.

41 … 29	28 … 26	25 24	23 … 9	8 … 0
1100011001101	100	00	000000000000000	000000000

Figure 3.1.3.7.3-1 Power Control Bit Randomization Long Code Mask

The following algorithm shall be used to compute the relative offset using the long code decimator output. The decimator output bit rate shall be 9600 bps, giving exactly N scrambling bits in one common power control group. During the common power control group, the N bits from the long code decimator are numbered from 0 through N – 1, with bit 0 occurring first, and bit N – 1 occurring last. The last L bits from the decimator appearing in the previous common power control group shall be used to compute the relative offset for the current common power control group, where L is listed in Table 3.1.3.7.3-1.

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 common power control subchannel in the Reservation Access Mode and provides a fast acknowledgement in the Power Controlled Access Mode. It also implements congestion control. The base station may choose not to support Common Assignment Channels and inform the mobile stations on the Broadcast Control Channel of this choice.

3.1.3.8.1 Common Assignment Channel Time Alignment and Modulation Rates

The base station shall transmit information on the Common Assignment Channel at a fixed data rate of 9600 bps. The Common Assignment Channel frame length shall be 5 ms.

For a given base station, the I and Q channel pilot PN sequences for the Common Assignment Channel use the same pilot PN sequence offset as for the Pilot Channel.

The Common Assignment Channel block interleaver shall always be aligned with the Common Assignment Channel frame.

The base station shall support discontinuous transmission on the Common Assignment Channel. The decision to enable or disable the Common Assignment Channel shall be made by the base station on a frame-by-frame basis (i.e. 5 ms basis).

The start of the Common Assignment Channel block interleaver shall align with the start of the zero-offset pilot PN sequence at every even-second time mark (t mod 100 = 0, where t is the System Time in 20 ms frames). The first Common Assignment Channel frame shall begin at the start of the base station transmission time.

3.1.3.8.2 Common Assignment Channel Structure

Common Assignment Channel frames shall consist of 48 bits. These 48 bits shall be composed of 32 information bits followed by 8 frame quality indicator (CRC) bits and 8 Encoder Tail Bits, as shown in Figure 3.1.3.8.2-1.

Information Bits	F	T

Notation

F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 3.1.3.8.2-1. Common Assignment Channel Frame Structure

3.1.3.8.2.1 Common Assignment 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 generator polynomial for the frame quality indicator shall be as follows:

$$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1.$$

The frame quality indicators shall be computed according to the following procedure as shown in Figure 3.1.3.8.2.1-1:

- 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 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 (8).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

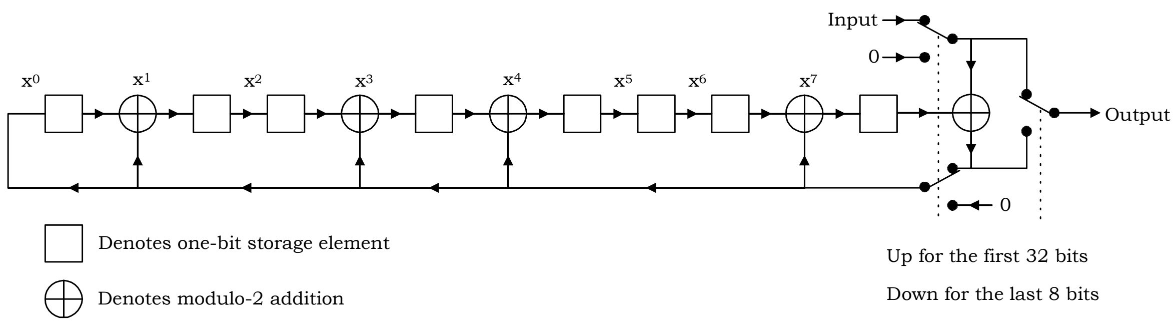


Figure 3.1.3.8.2.1-1. Common Assignment Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

3.1.3.8.2.2 Common Assignment Channel Encoder Tail Bits

The last eight bits of each Common Assignment Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to '0'.

3.1.3.8.3 Common Assignment Channel Convolutional Encoding

The Common Assignment Channel shall be convolutionally encoded as specified in 3.1.3.1.4. When generating Common Assignment Channel data, the encoder shall be initialized to the all-zero state at the end of each frame.

3.1.3.8.4 Common Assignment Channel Interleaving

The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

3.1.3.8.5 Common Assignment Channel Data Scrambling

The Common Assignment Channel shall be scrambled as specified in 3.1.3.1.9, using the Common Assignment Channel long code mask which shall be as shown in Figure 3.1.3.8.5-1.

41 … 29	28 … 24	23 … 21	20 … 9	8 … 0
1100011001101	01100	CACH_ID	000000000000	PILOT_PN

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.

For a given base station, the I and Q channel pilot PN sequences for the Forward Common Control Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

The start of the interleaver block and the frame of the Forward Common Control Channel shall align with the start of the zero-offset pilot PN sequence at every even-second time mark (t mod 100 = 0, where t is the System Time in 20 ms frames) as shown in Figure 3.1.3.2.1-1. The first Forward Common Control Channel frame shall begin at the start of base station transmission time (see 3.1.5).

3.1.3.9.2 Forward Common Control Channel Structure

Table 3.1.3.9.2-1 specifies the Forward Common Control Channel bit allocations, and the structure is shown in Figure 3.1.3.9.2-1.

All frames shall consist of the information bits, followed by a frame quality indicator (CRC) and eight Encoder Tail Bits.

The Forward Common Control Channel shall be divided into Forward Common Control Channel slots that are each 80 ms in duration.

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

Information Bits	F	T

Notation

F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

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:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator and

$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ 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.

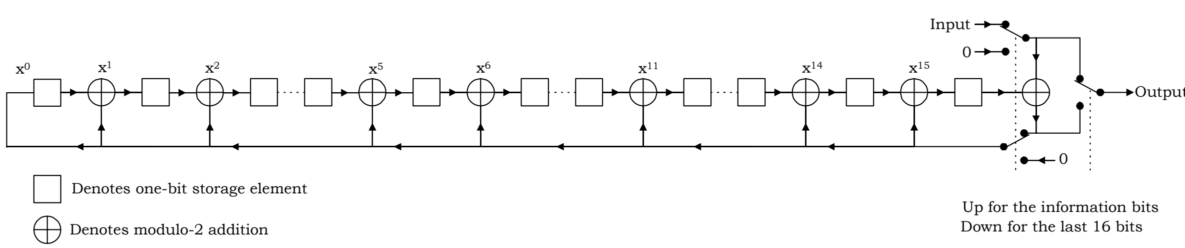


Figure 3.1.3.9.2.1-1. Forward Common Control Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

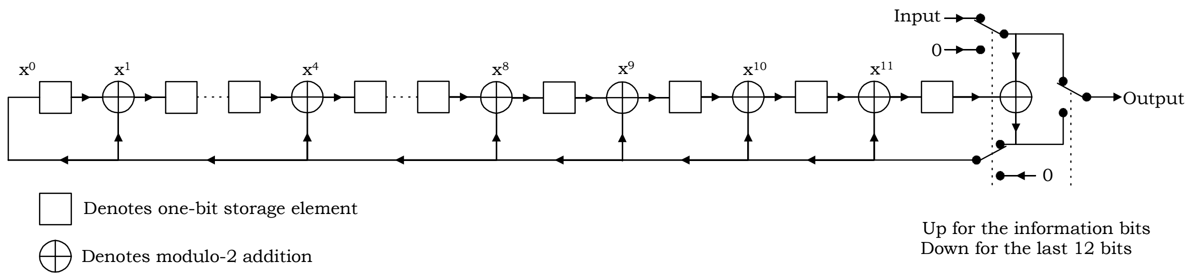


Figure 3.1.3.9.2.1-2. Forward Common Control Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

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	000000000

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.

3.1.3.9.7 Forward Common Control Channel Quadrature Spreading

The Forward Common Control Channel shall be PN spread, using the PN sequence specified in 3.1.3.1.13.

3.1.3.9.8 Forward Common Control Channel Filtering

Filtering for the Forward Common Control Channel shall be as specified in 3.1.3.1.14.

3.1.3.9.9 Forward Common Control Channel Transmission Processing

When the Physical Layer receives a PHY-FCCCH.Request(SDU, FCCCH_ID, FRAME_DURATION, NUM_BITS) from the MAC Layer, the base station shall:

- Store the arguments SDU, FCCCH_ID, FRAME_DURATION, and NUM_BITS;
- Set the information bits (see Figure 3.1.3.9.2-1) to SDU;
- Transmit a Forward Common Control Channel frame of duration FRAME_DURATION (5 ms, 10 ms, or 20 ms) at a data rate that corresponds to NUM_BITS and FRAME_DURATION as specified in Table 3.1.3.9.2-1.

3.1.3.10 Forward Dedicated Control Channel

The Forward Dedicated Control Channel is used for the transmission of user and signaling information to a specific mobile station during a call. Each Forward Traffic Channel may contain one Forward Dedicated Control Channel.

3.1.3.10.1 Forward Dedicated Control Channel Time Alignment and Modulation Rates

The base station shall transmit information on the Forward Dedicated Control Channel at a fixed data rate.

A Forward Dedicated Control Channel frame shall be 5 or 20 ms in duration.

The base station shall transmit information on the Forward Dedicated Control Channel at a fixed data rate of 9600 bps for Radio Configurations 3, 4, 6, and 7. If flexible data rates are supported for 20 ms frames, a fixed data rate between 1050 and 9600 bps can be used for the Forward Dedicated Control Channel in Radio Configurations 3, 4, 6, and 7.

The base station shall transmit information on the Forward Dedicated Control Channel at a fixed data rate of 14400 bps for 20 ms frames and 9600 bps for 5 ms frames for Radio Configurations 5, 8, and 9. The base station may support flexible data rates. If flexible data rates are supported for 20 ms frames, a fixed data rate between 1050 and 14400 bps can be used for the Forward Dedicated Control Channel in Radio Configurations 5, 8, and 9.

For a given base station, the I and Q channel pilot PN sequences for the Forward Dedicated Control Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

The base station shall support discontinuous transmission on the Forward Dedicated Control Channel. The decision to enable or disable transmission shall be made on a frame-by-frame (i.e., 5 or 20 ms) basis.

The base station may support Forward Dedicated Control Channel frames that are time offset by multiples of 1.25 ms. The amount of the time offset is specified by FRAME_OFFSET. A zero-offset 20 ms Forward Dedicated Control 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 Forward Dedicated Control Channel frame shall begin only when System Time is an integral multiple of 5 ms. An offset 20 ms Forward Dedicated Control Channel frame shall begin 1.25 × FRAME_OFFSET ms later than the zero-offset 20 ms Forward Dedicated Control Channel frame. An offset 5 ms Forward Dedicated Control Channel frame shall begin 1.25 × (FRAME_OFFSET mod 4) ms later than the zero-offset 5 ms Forward Dedicated Control Channel frame. The interleave block for the Forward Dedicated Control Channel shall be aligned with the Forward Dedicated Control Channel frame.

3.1.3.10.2 Forward Dedicated Control Channel Frame Structure

Table 3.1.3.10.2-1 specifies the Forward Dedicated Control Channel bit allocations. Table 3.1.3.10.2-2 specifies the Forward Dedicated Control Channel bit allocations for flexible data rates. All frames that carry data shall consist of zero or one Reserved Bits and the information bits followed by a frame quality indicator (CRC) and eight Encoder Tail Bits, as shown in Figure 3.1.3.10.2-1.

Table 3.1.3.10.2-1. Forward 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 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

Table 3.1.3.10.2-2. Forward Dedicated Control Channel Frame Structure Summary for 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

R	Information Bits	F	T

Notation

R - Reserved Bit
F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 3.1.3.10.2-1. Forward Dedicated Control Channel Frame Structure

3.1.3.10.2.1 Forward Dedicated 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 Dedicated Control Channel shall use a 12-bit frame quality indicator. If flexible data rates are supported, a 16-bit frame quality indicator may be used. The 5 ms Forward Dedicated Control Channel shall use a 16-bit frame quality indicator.

The generator polynomials for the frame quality indicator shall be as follows:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^{6} + x^{5} + x^{2} + x + 1$ for the 16-bit frame quality indicator and

$g(x) = x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{4} + x + 1$ 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.

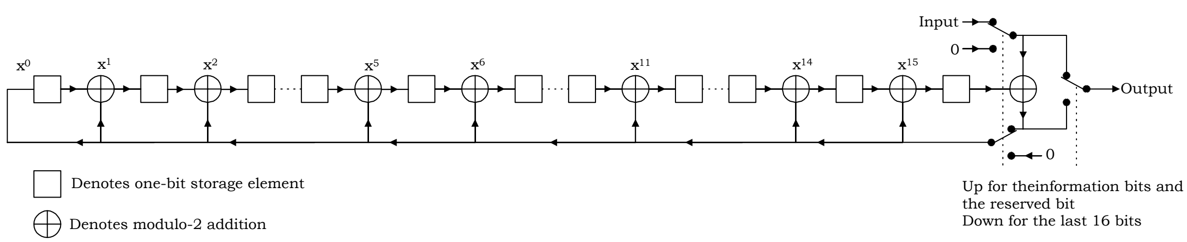


Figure 3.1.3.10.2.1-1. Forward Dedicated Control Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

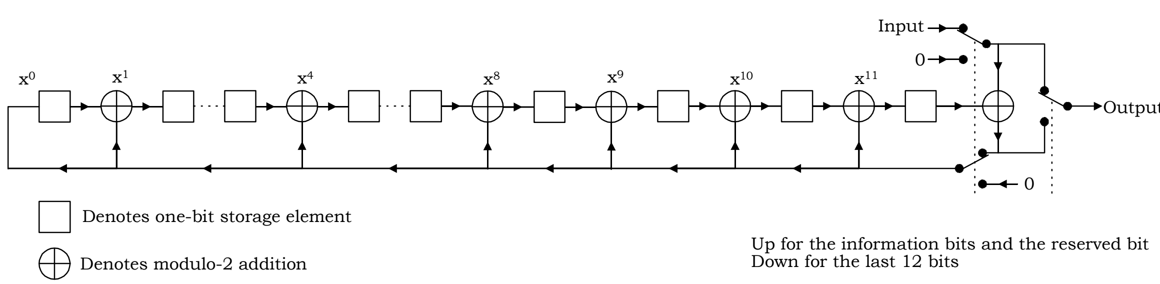


Figure 3.1.3.10.2.1-2. Forward Dedicated Control Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

3.1.3.10.2.2 Forward Dedicated Control Channel Encoder Tail Bits

The last eight bits of each Forward Dedicated Control Channel frame are called the Encoder Tail Bits. These eight bits shall each be set to ‘0’.

3.1.3.10.2.3 Forward Dedicated Control Channel Reserved Bit

This bit is reserved and shall be set to ‘0’.

3.1.3.10.3 Forward Dedicated Control Channel Convolutional Encoding

The Forward Dedicated Control Channel shall be convolutionally encoded as specified in 3.1.3.1.4.

When generating Forward Dedicated Control Channel data, the encoder shall be initialized to the all-zero state at the end of each 5 or 20 ms frame.

3.1.3.10.4 Forward Dedicated Channel Code Symbol Repetition

Forward Dedicated Control Channel code symbol repetition shall be as specified in 3.1.3.1.5.

3.1.3.10.5 Forward Dedicated Control Channel Puncturing

Code symbols resulting from the symbol repetition shall be punctured as specified in 3.1.3.1.6.

3.1.3.10.6 Forward Dedicated Control Channel Interleaving

The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

3.1.3.10.7 Forward Dedicated Control Channel Data Scrambling

The Forward Dedicated Control Channel shall be scrambled as specified in 3.1.3.1.9. The public long code mask shall be as shown in Figure 3.1.3.10.7-1. The generation of the private long code mask shall be as specified in 2.1.3.1.12.

41 … 37	36 … 0
11000	PLCM_37

Figure 3.1.3.10.7-1. Forward Dedicated Control Channel Public Long Code Mask

3.1.3.10.8 Forward Dedicated Control Channel Power Control Subchannel

If the Forward Power Control Subchannel is enabled on the Forward Dedicated Control Channel (FPC_PRI_CHANNEL = ‘1’), the base station shall transmit continuously a Forward

Power Control Subchannel on the Forward Dedicated Control Channel as specified in 3.1.3.1.10.

3.1.3.10.9 Forward Dedicated Control Channel Orthogonal and Quasi-Orthogonal Spreading

The Forward Dedicated Control Channel shall be spread by a Walsh function or quasi-orthogonal function as specified in 3.1.3.1.12.

3.1.3.10.10 Forward Dedicated Control Channel Quadrature Spreading

The Forward Dedicated Control Channel shall be PN spread as specified in 3.1.3.1.13.

3.1.3.10.11 Forward Dedicated Control Channel Filtering

Filtering for the Forward Dedicated Control Channel shall be as specified in 3.1.3.1.14.

3.1.3.10.12 Forward Dedicated Control Channel Transmission Processing

When the Physical Layer receives a PHY-DCCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the base station shall perform the following:

- Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- If SDU is not equal to NULL, set the information bits to SDU.
- If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Forward Dedicated Control Channel frame of duration FRAME_DURATION (5 ms or 20 ms). If a PHY-DCCH.Request primitive for a 5 ms frame is received coincident with a PHY-DCCH.Request primitive for a 20 ms frame or during transmission of a 20 ms frame, then the base station may preempt transmission of the 20 ms frame and transmit a 5 ms frame. Transmission of the 20 ms frame may start or resume after completion of the 5 ms frame.

3.1.3.11 Forward Fundamental Channel

The Forward Fundamental Channel is used for the transmission of user and signaling information to a specific mobile station during a call. Each Forward Traffic Channel may contain one Forward Fundamental Channel.

3.1.3.11.1 Forward Fundamental Channel Time Alignment and Modulation Rates

When operating in Radio Configuration 1, the base station shall transmit information on the Forward Fundamental Channel at variable data rates of 9600, 4800, 2400, and 1200 bps.

When operating in Radio Configuration 2, the base station shall transmit information on the Forward Fundamental Channel at variable data rates of 14400, 7200, 3600, and 1800 bps.

When operating in Radio Configurations 3, 4, 6, or 7, the base station shall transmit information on the Forward 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 base station may support flexible data rates. If flexible data rates are supported for 20 ms frames, the base station should support variable rates corresponding to 1 to 171 information bits per 20 ms frame on the Forward Fundamental Channel. The minimum number of flexible data rates used in variable rate operation is not specified.

When operating in Radio Configurations 5, 8, or 9, the base station shall transmit information on the Forward 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 base station should support variable rates corresponding to 1 to 268 information bits per 20 ms frame on the Forward Fundamental Channel. The minimum number of flexible data rates used in variable rate operation is not specified.

Forward Fundamental Channel frames with Radio Configurations 1 and 2 shall be 20 ms in duration. Forward Fundamental Channel frames with Radio Configurations 3 through 9 shall be 5 or 20 ms in duration. The data rate and frame duration on a Forward 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 for data rates lower than the maximum. A base station operating with Radio Configurations 3 through 9 may discontinue transmission of the Forward Fundamental Channel for up to three 5 ms frames in a 20 ms frame.

For a given base station, the I and Q channel pilot PN sequences for the Forward Fundamental Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

The modulation symbols that are transmitted at lower data rates shall be transmitted using lower energy. Specifically, the energy per modulation symbol (E_s) for the supported data rates should be:

$$E_s = E_{max} \times R / R_{max}$$

where E_{max} is the energy per symbol at the maximum data rate for the Forward Fundamental Channel with the associated radio configuration, R is the data rate, and R_{max} is the maximum data rate for the Forward Fundamental Channel for the associated radio configuration. For example, when transmitting a Radio Configuration 1 frame at 4800 bps, the energy per symbol should be one half the energy per symbol in a 9600 bps frame.

The base station may support Forward Fundamental Channel frames that are time offset by multiples of 1.25 ms. The amount of the time offset is specified by FRAME_OFFSET. A zero-offset 20 ms Forward 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 Forward Fundamental Channel frame shall begin only when System Time is an integral multiple of 5 ms. An offset 20 ms Forward Fundamental Channel frame shall begin 1.25 × FRAME_OFFSET ms later than the zero-offset 20 ms Forward Fundamental Channel frame. An offset 5 ms Forward Fundamental Channel frame shall begin 1.25 × (FRAME_OFFSET mod 4) ms later than the zero-offset 5 ms Forward Fundamental Channel frame. The interleaver block for the Forward Fundamental Channel shall be aligned with the Forward Fundamental Channel frame.

3.1.3.11.2 Forward Fundamental Channel Frame Structure

Table 3.1.3.11.2-1 summarizes the Forward Fundamental Channel bit allocations. Table 3.1.3.11.2-2 summarizes the Forward Fundamental Channel bit allocations for flexible data rates. The order of the bits is shown in Figure 3.1.3.11.2-1.

The 2400 and 1200 bps frames with Radio Configuration 1 shall consist of the information bits followed by 8 Encoder Tail Bits. All frames with Radio Configurations 3, 4, 6, and 7, 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 8 Encoder Tail Bits. All frames with Radio Configurations 2, 5, 8, and 9 shall consist of zero or one Reserved/Flag Bits followed by the information bits, a frame quality indicator (CRC), and 8 Encoder Tail Bits.

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	Informa-tion	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

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

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

R/F	Information Bits	F	T

Notation

R/F - Reserved/Flag Bit
F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 3.1.3.11.2-1. Forward Fundamental Channel Frame Structure

3.1.3.11.2.1 Forward Fundamental Channel Frame Quality Indicator

Each frame with Radio Configurations 2 through 9, and the 9600 and 4800 bps frames of Radio Configuration 1 shall include a frame quality indicator. This frame quality indicator is a CRC.[22] 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 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.

20 ms frames in Radio Configurations 3, 4, 6, and 7 with more than 96 total bits and in Radio Configurations 5, 8, and 9 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.

20 ms 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.

20 ms 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.

20 ms 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.

20 ms 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.

[22] The 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.

20 ms 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.

The generator polynomials for the frame quality indicator shall be as follows:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator,

$g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1$ for the 10-bit frame quality indicator,

$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator,

$g(x) = x^6 + x^2 + x + 1$ for the 6-bit frame quality indicator (for Radio Configuration 2), and

$g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator (for Radio Configurations 3 through 9).

The frame quality indicators shall be computed according to the following procedure as shown in Figures 3.1.3.11.2.1-1 through 3.1.3.11.2.1-6:

- 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/Flag 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 (16, 12, 10, 8, or 6).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

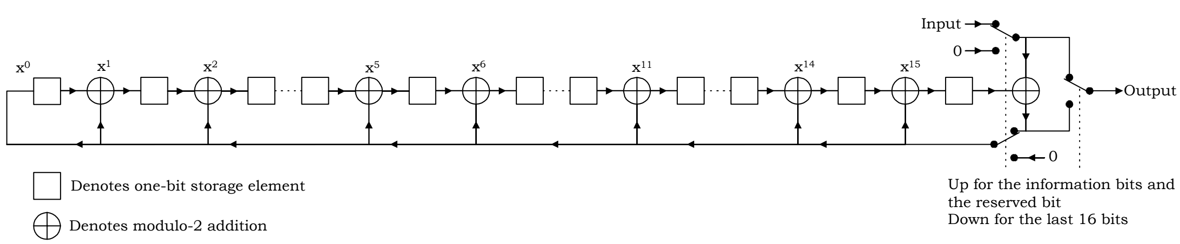


Figure 3.1.3.11.2.1-1. Forward Fundamental Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

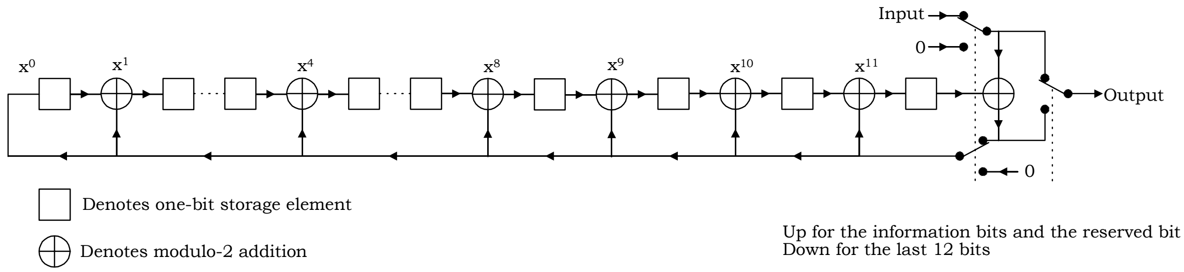


Figure 3.1.3.11.2.1-2. Forward Fundamental Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

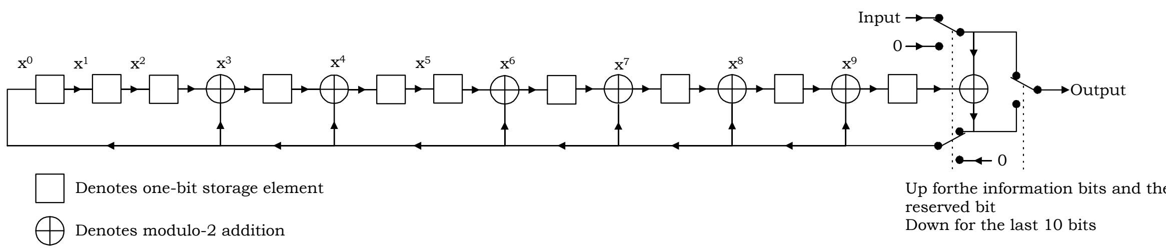


Figure 3.1.3.11.2.1-3. Forward Fundamental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator

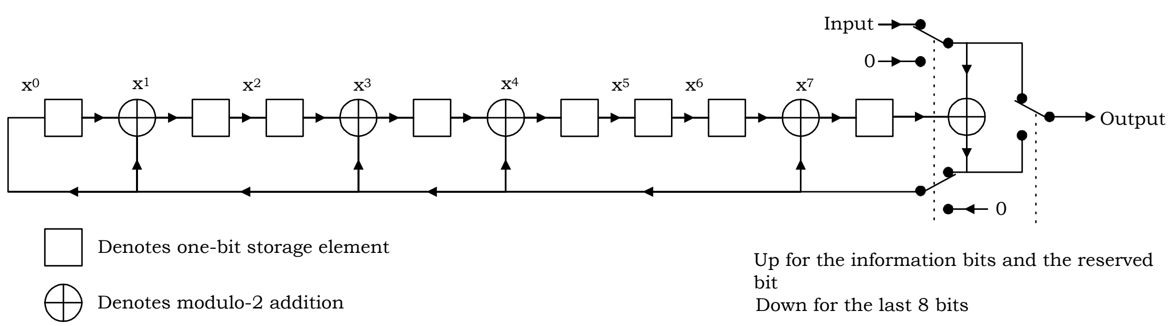


Figure 3.1.3.11.2.1-4. Forward Fundamental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

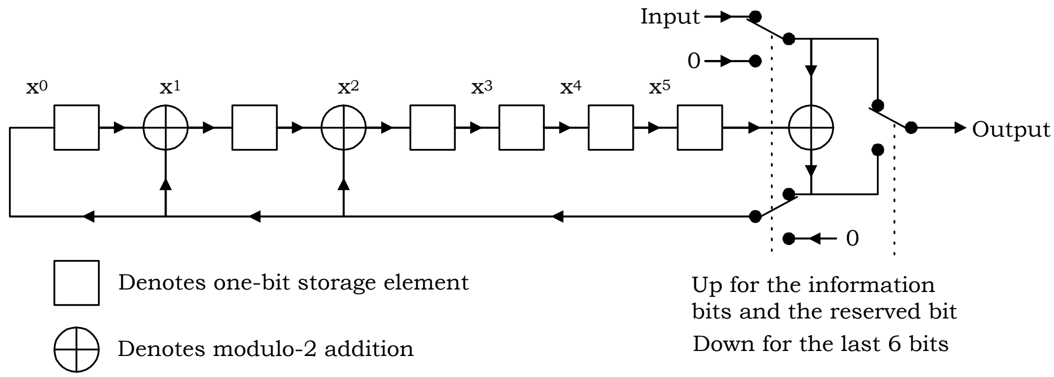


Figure 3.1.3.11.2.1-5. Forward Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configuration 2

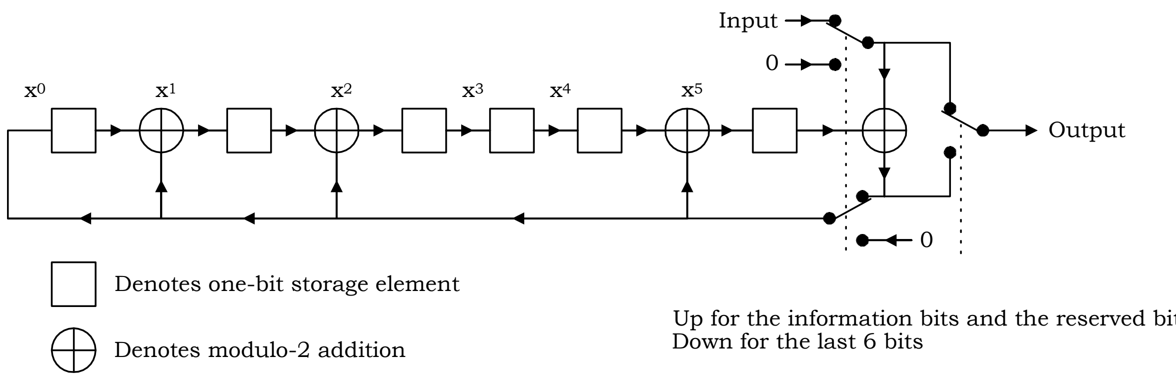


Figure 3.1.3.11.2.1-6. Forward Fundamental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator for Radio Configurations 3 through 9

3.1.3.11.2.2 Forward Fundamental Channel Encoder Tail Bits

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'.

3.1.3.11.2.3 Forward Fundamental Channel Reserved/Flag Bit

The Reserved/Flag Bit is used with Radio Configurations 2, 5, 8, and 9.

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'.

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 station will not transmit to the mobile station on the Forward Supplemental Code Channels in the second frame after the current frame.

3.1.3.11.3 Forward Fundamental Channel Convolutional Encoding

The Forward Fundamental Channel data shall be convolutionally encoded as specified in 3.1.3.1.4. When generating Forward Fundamental Channel data, the encoder shall be initialized to the all-zero state at the end of each 5 or 20 ms frame.

3.1.3.11.4 Forward Fundamental Channel Code Symbol Repetition

Forward Fundamental Channel code symbol repetition shall be as specified in 3.1.3.1.5.

3.1.3.11.5 Forward Fundamental Channel Puncturing

Code symbols resulting from the symbol repetition shall be punctured as specified in 3.1.3.1.6.

3.1.3.11.6 Forward Fundamental Channel Interleaving

The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

3.1.3.11.7 Forward Fundamental Channel Data Scrambling

The Forward Fundamental Channel data shall be scrambled as specified in 3.1.3.1.9. The public long code mask shall be as shown in Figure 3.1.3.11.7-1. The generation of the private long code mask shall be as specified in 2.1.3.1.11 and 2.1.3.1.12.

41 … 37	36 … 0
11000	PLCM_37

Figure 3.1.3.11.7-1. Forward Fundamental Channel Public Long Code Mask

3.1.3.11.8 Forward Fundamental Channel Power Control Subchannel

If the Forward Power Control Subchannel is enabled on the Forward Fundamental Channel (FPC_PRI_CHANNEL = ‘0’), the base station shall transmit continuously a Forward Power Control Subchannel on the Forward Fundamental Channel as specified in 3.1.3.1.10.

3.1.3.11.9 Forward Fundamental Channel Orthogonal and Quasi-Orthogonal Spreading

The Forward Fundamental Channel shall be spread by a Walsh function (Radio Configurations 1 through 9) or quasi-orthogonal function (Radio Configurations 3 through 9) as specified in 3.1.3.1.12.

3.1.3.11.10 Forward Fundamental Channel Quadrature Spreading

The Forward Fundamental Channel shall be PN spread as specified in 3.1.3.1.13.

3.1.3.11.11 Forward Fundamental Channel Filtering

Filtering for the Forward Fundamental Channel shall be as specified in 3.1.3.1.14.

3.1.3.11.12 Forward Fundamental Channel Transmission Processing

When the Physical Layer receives a PHY-FCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the base station shall perform the following:

- Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- Set the information bits to SDU.
- Transmit NUM_BITS bits of SDU on a Forward Fundamental Channel frame of duration FRAME_DURATION (5 ms or 20 ms). If a PHY-FCH.Request primitive for a 5 ms frame is received coincident with a PHY-FCH.Request primitive for a 20 ms frame or during transmission of a 20 ms, then the base station may preempt transmission of the 20 ms frame and transmit a 5 ms frame. Transmission of the 20 ms frame may start or resume after completion of the 5 ms frame.

3.1.3.12 Forward Supplemental Channel

The Forward Supplemental Channel applies to Radio Configurations 3 through 9 only.

The Forward Supplemental Channel is used for the transmission of user information to a specific mobile station during a call. Each Forward Traffic Channel contains up to two Forward Supplemental Channels.

3.1.3.12.1 Forward Supplemental Channel Time Alignment and Modulation Rates

When transmitting on the Forward Supplemental Channel with a single assigned data rate in Radio Configuration 3, the base station shall transmit information at a fixed rate of 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

The base station may support flexible data rates. If flexible data rates are supported,

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 3, the base station should transmit information at a fixed rate corresponding to 15 to 3071 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 3, the base station should transmit information at a fixed rate corresponding to 31 to 3071 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 3, the base station should transmit information at a fixed rate corresponding to 55 to 3071 total bits per frame in 1 bit increments.

When transmitting on the Forward Supplemental Channel with a single assigned data rate in Radio Configuration 4, the base station shall transmit information at a fixed rate of 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

If flexible data rates are supported,

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 4, the base station should transmit information at a fixed rate corresponding to 15 to 6143 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configurations 4, the base station should transmit information at a fixed rate corresponding to 31 to 6143 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 4, the base station should transmit information at a fixed rate corresponding to 55 to 6143 total bits per frame in 1 bit increments.

When transmitting on the Forward Supplemental Channel with a single assigned data rate in Radio Configuration 5, the base station shall transmit information at a fixed rate of 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

If flexible data rates are supported,

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 5, the base station should transmit information at a fixed rate corresponding to 15 to 4607 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 5, the base station should transmit information at a fixed rate corresponding to 37 to 4607 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 5, the base station should transmit information at a fixed rate corresponding to 73 to 4607 total bits per frame in 1 bit increments.

When transmitting on the Forward Supplemental Channel with a single assigned data rate in Radio Configuration 6, the base station shall transmit information at a fixed rate of 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

If flexible data rates are supported,

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 6, the base station should transmit information at a fixed rate corresponding to 15 to 6143 total bits per frame in 1 bit increments.

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configurations 6, the base station should transmit information at a fixed rate corresponding to 31 to 6143 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 6, the base station should transmit information at a fixed rate corresponding to 55 to 6143 total bits per frame in 1 bit increments.

When transmitting on the Forward Supplemental Channel with a single assigned data rate in Radio Configuration 7, the base station shall transmit information at a fixed rate of 614400, 307200, 153600, 76800, 38400, 19200, 9600, 4800, 2700, 2400, 1500, 1350, or 1200 bps.

If flexible data rates are supported,

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 7, the base station should transmit information at a fixed rate corresponding to 15 to 12287 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 7, the base station should transmit information at a fixed rate corresponding to 31 to 12287 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 7, the base station should transmit information at a fixed rate corresponding to 55 to 12287 total bits per frame in 1 bit increments.

When transmitting on the Forward Supplemental Channel with a single assigned data rate in Radio Configuration 8, the base station shall transmit information at a fixed rate of 460800, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

If flexible data rates are supported,

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 8, the base station should transmit information at a fixed rate corresponding to 15 to 9215 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 8, the base station should transmit information at a fixed rate corresponding to 37 to 9215 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 8, the base station should transmit information at a fixed rate corresponding to 73 to 9215 total bits per frame in 1 bit increments.

When transmitting on the Forward Supplemental Channel with a single assigned data rate in Radio Configuration 9, the base station shall transmit information at a fixed rate of 1036800, 518400, 460800, 259200, 230400, 115200, 57600, 28800, 14400, 7200, 3600, or 1800 bps.

If flexible data rates are supported,

- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 20 ms frames in Radio Configuration 9, the base station should transmit information at a fixed rate corresponding to 15 to 20735 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 40 ms frames in Radio Configuration 9, the base station should transmit information at a fixed rate corresponding to 37 to 20735 total bits per frame in 1 bit increments.
- When transmitting on the Forward Supplemental Channel with a single assigned data rate and 80 ms frames in Radio Configuration 9, the base station should transmit information at a fixed rate corresponding to 73 to 20735 total bits per frame in 1 bit increments.

When using variable-rate transmission on the Forward Supplemental Channel with multiple assigned data rates in Radio Configurations 3, 4, 5, 6, 7, 8, and 9, the base station shall

- Transmit information at the maximal assigned data rate, or,
- Transmit information at the other assigned data rates with the same modulation symbol rate as that of the maximal assigned data rate. To achieve a higher modulation symbol rate, repetition and puncturing are used in the symbol repetition stage of the specified data rate.

The base station shall not use forward power control mode FPC_MODE = '001' nor FPC_MODE '010' when the Forward Supplemental Channel is operated in a variable rate mode.

Forward Supplemental Channel frames shall be 20, 40, or 80 ms in duration. A base station may support discontinuous transmission of Forward Supplemental Channel frames.

For a given base station, the I and Q channel pilot PN sequences for the Forward Supplemental Channel use the same pilot PN sequence offset as for the Forward Pilot Channel.

The base station may support Forward Supplemental Channel frames that are time offset by multiples of 1.25 ms as specified by FRAME_OFFSET. The base station may support 40 or 80 ms Forward Supplemental Channel frames that are time offset by multiples of 20 ms as specified by FOR_SCH_FRAME_OFFSET[i], where i =1 and 2 for Forward Supplemental Channel 1 and Forward Supplemental Channel 2, respectively.

The amount of the time offset is specified by FRAME_OFFSET and FOR_SCH_FRAME_OFFSET[i], where i = 1 or 2. A zero-offset 20 ms Forward Supplemental Channel frame shall begin only when System Time is an integral multiple of 20 ms (see

Figure 1.3-1). A zero-offset 40 ms Forward Supplemental Channel frame shall begin only when System Time is an integral multiple of 40 ms. A zero-offset 80 ms Forward Supplemental Channel frame shall begin only when System Time is an integral multiple of 80 ms. An offset 20 ms Forward Supplemental Channel frame shall begin 1.25 × FRAME_OFFSET ms later than the zero-offset 20 ms Forward Supplemental Channel frame. An offset 40 ms Forward Supplemental Channel frame shall begin (1.25 × FRAME_OFFSET + 20 × FOR_SCH_FRAME_OFFSET[i]) ms later than the zero-offset 40 ms Forward Supplemental Channel frame. An offset 80 ms Forward Supplemental Channel frame shall begin (1.25 × FRAME_OFFSET + 20 × FOR_SCH_FRAME_OFFSET[i]) ms later than the zero-offset 80 ms Forward Supplemental Channel frame. The interleaver block for the Forward Supplemental Channel shall be aligned with the Forward Supplemental Channel frame.

3.1.3.12.2 Forward Supplemental Channel Frame Structure

Tables 3.1.3.12.2-1 through 3.1.3.12.2-3 specify the Forward Supplemental Channel bit allocations. Tables 3.1.3.12.2-4 through 3.1.3.12.2-6 specify the Forward Supplemental Channel bit allocations for flexible data rates.

All frames shall consist of zero or one Reserved Bits and the information bits followed by a frame quality indicator (CRC) and eight Encoder Tail Bits, as shown in Figure 3.1.3.12.2-1.

Table 3.1.3.12.2-1. Forward 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	Informa-tion	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.

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.

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.

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

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

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

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

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

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

R	Information Bits	F	R/T

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.

The generator polynomials for the frame quality indicator shall be as follows:

$g(x) = x^{16} + x^{15} + x^{14} + x^{11} + x^6 + x^5 + x^2 + x + 1$ for the 16-bit frame quality indicator,

$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$ for the 12-bit frame quality indicator,

$g(x) = x^{10} + x^9 + x^8 + x^7 + x^6 + x^4 + x^3 + 1$ for the 10-bit frame quality indicator,

$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1$ for the 8-bit frame quality indicator, and

$g(x) = x^6 + x^5 + x^2 + x + 1$ for the 6-bit frame quality indicator.

The frame quality indicators shall be computed according to the following procedure as shown in Figures 3.1.3.12.2.1-1 through 3.1.3.12.2.1-5:

- 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, 12, 10, 8, or 6).
- These additional bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

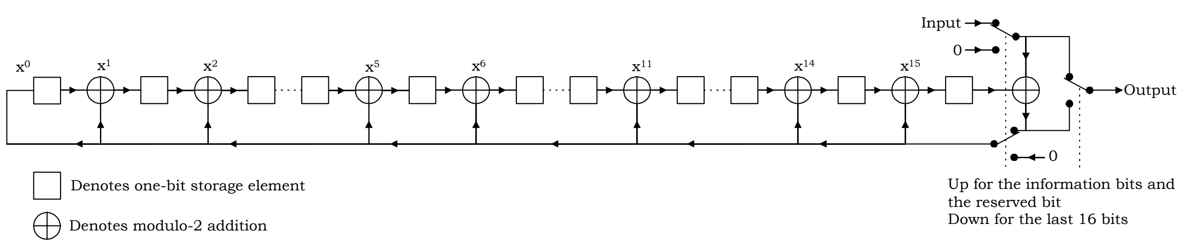


Figure 3.1.3.12.2.1-1. Forward Supplemental Channel Frame Quality Indicator Calculation for the 16-Bit Frame Quality Indicator

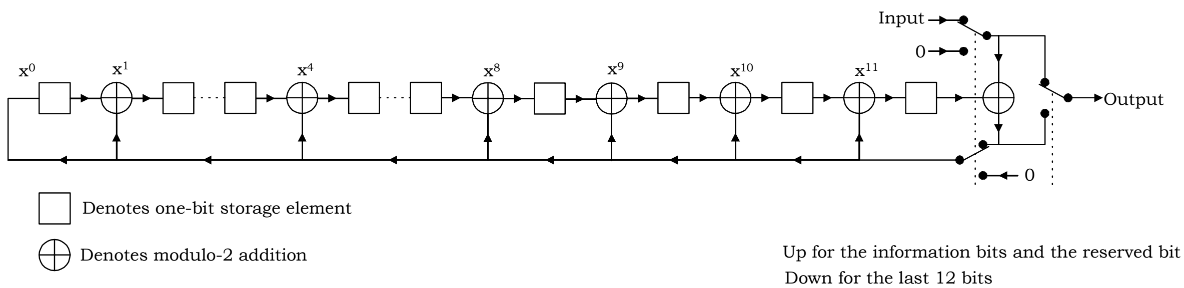


Figure 3.1.3.12.2.1-2. Forward Supplemental Channel Frame Quality Indicator Calculation for the 12-Bit Frame Quality Indicator

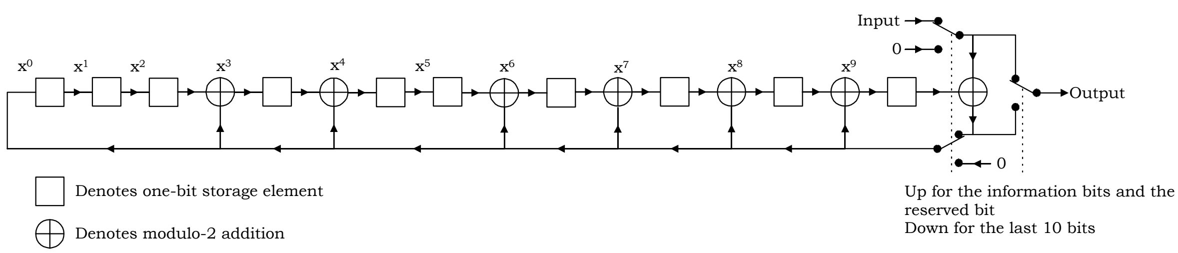


Figure 3.1.3.12.2.1-3. Forward Supplemental Channel Frame Quality Indicator Calculation for the 10-Bit Frame Quality Indicator

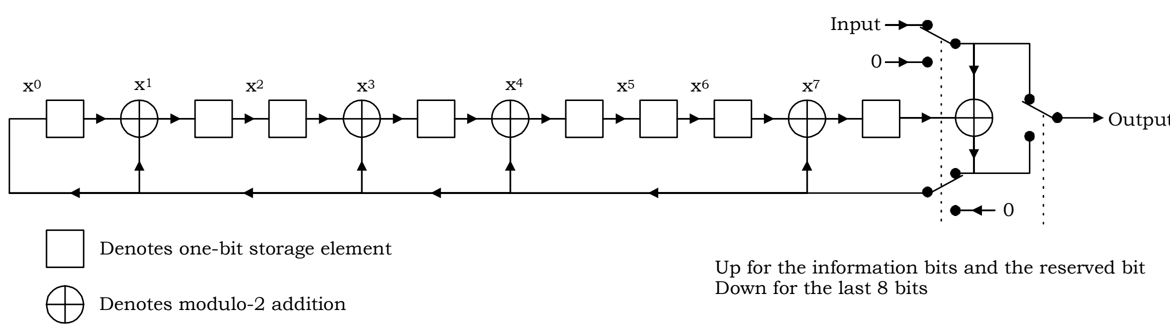


Figure 3.1.3.12.2.1-4. Forward Supplemental Channel Frame Quality Indicator Calculation for the 8-Bit Frame Quality Indicator

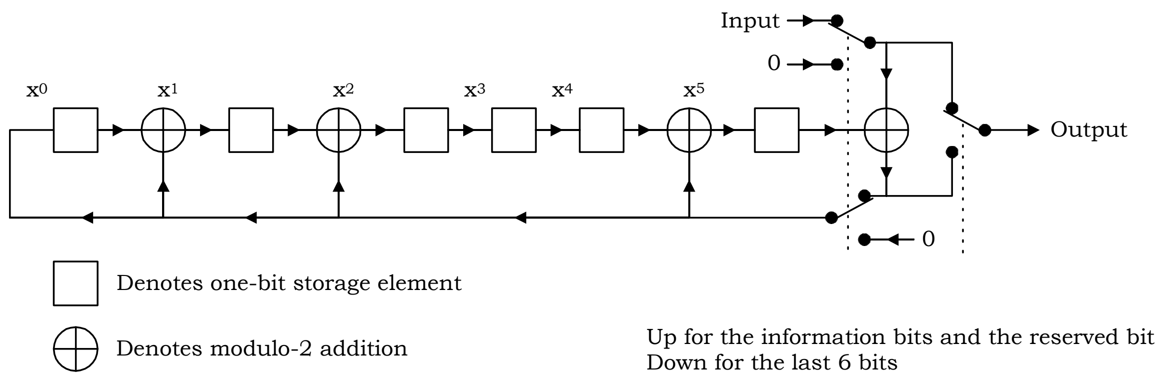


Figure 3.1.3.12.2.1-5. Forward Supplemental Channel Frame Quality Indicator Calculation for the 6-Bit Frame Quality Indicator

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.

41 … 37	36 … 0
11000	PLCM_37

Figure 3.1.3.12.7-1. Forward Supplemental Channel Public Long Code Mask

3.1.3.12.8 Forward Supplemental Channel Orthogonal and Quasi-Orthogonal Spreading

The Forward Supplemental Channels shall be spread by a Walsh function or quasi-orthogonal function as specified in 3.1.3.1.12.

3.1.3.12.9 Forward Supplemental Channel Quadrature Spreading

The Forward Supplemental Channels shall be PN spread as specified in 3.1.3.1.13.

3.1.3.12.10 Forward Supplemental Channel Filtering

Filtering for the Forward Supplemental Channels shall be as specified in 3.1.3.1.14.

3.1.3.12.11 Forward Supplemental Channel Transmission Processing

When the Physical Layer receives a PHY-SCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the base station shall perform the following:

- Store the arguments SDU, FRAME_DURATION, and NUM_BITS.
- If SDU is not equal to NULL, set the information bits to SDU.
- If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Forward Supplemental Channel frame of duration FRAME_DURATION.

3.1.3.13 Forward Supplemental Code Channel

The Forward Supplemental Code Channel applies to Radio Configurations 1 and 2 only.

The Forward Supplemental Code Channel is used for the transmission of user information to a specific mobile station during a call. Each Forward Traffic Channel contains up to seven Forward Supplemental Code Channels.

3.1.3.13.1 Forward Supplemental Code Channel Time Alignment and Modulation Rates

When transmitting on Forward Supplemental Code Channels with Radio Configuration 1, the base station shall transmit information at 9600 bps. When transmitting on Forward Supplemental Code Channels with Radio Configuration 2, the base station shall transmit information at 14400 bps.

All Forward Supplemental Code Channel frames shall be 20 ms in duration.

For a given base station, the I and Q channel pilot PN sequences for the Forward Supplemental Code Channels use the same pilot PN sequence offset as for the Forward Pilot Channel.

The base station may support Forward Supplemental Code Channel frames that are time offset by multiples of 1.25 ms. The amount of the time offset is specified by FRAME_OFFSET. A zero-offset Forward Supplemental Code Channel frame shall begin only when System Time is an integral multiple of 20 ms (see Figure 1.3-1). An offset Forward Supplemental Code Channel frame shall begin 1.25 × FRAME_OFFSET ms later than the zero-offset Forward Supplemental Code Channel frame. The base station shall transmit frames on the Forward Supplemental Code Channels in time alignment with the Forward Fundamental Channel. The interleave block for the Forward Supplemental Code Channel shall be aligned with the Forward Supplemental Code Channel frame.

3.1.3.13.2 Forward Supplemental Code Channel Frame Structure

Table 3.1.3.13.2-1 specifies the Forward Supplemental Code Channel bit allocations. All frames shall consist of zero or one Reserved Bits and information bits followed by a frame quality indicator (CRC) and eight Encoder Tail Bits, as shown in Figure 3.1.3.13.2-1.

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	Informa-tion	Frame Quality Indicator	Encoder Tail
1	9600	192	0	172	12	8
2	14400	288	1	267	12	8

R	Information Bits	F	T

Notation

R - Reserved Bit
F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 3.1.3.13.2-1. Forward Supplemental Code Channel Frame Structure

3.1.3.13.2.1 Forward 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 indicators shall be computed according to the following procedure as shown in Figure 3.1.3.13.2.1-1:

- 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 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.

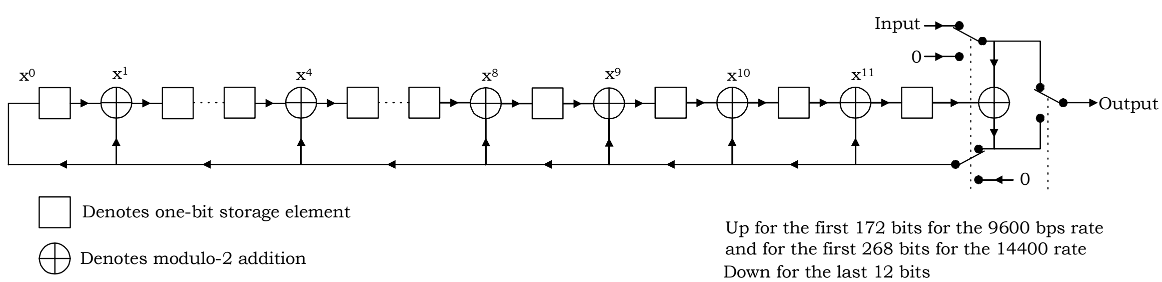


Figure 3.1.3.13.2.1-1. Forward Supplemental Code Channel Frame Quality Indicator Calculation

3.1.3.13.2.2 Forward Supplemental Code Channel Encoder Tail Bits

The last eight bits of each Forward Supplemental Code Channel frame are called the Reserved/Encoder Tail Bits. These eight bits shall each be set to '0'.

3.1.3.13.2.3 Forward Supplemental Code Channel Reserved Bit

This bit is reserved and shall be set to '0'.

3.1.3.13.3 Forward Supplemental Code Channel Convolutional Encoding

The data for Forward Supplemental Code Channels shall be convolutionally encoded as specified in 3.1.3.1.4.

When generating Forward Supplemental Code Channel data, the encoder shall be initialized to the all-zero state at the end of each 20 ms frame.

3.1.3.13.4 Forward Supplemental Code Channel Code Symbol Repetition

Forward Supplemental Code Channel code symbol repetition shall be as specified in 3.1.3.1.5.

3.1.3.13.5 Forward Supplemental Code Channel Puncturing

Code symbols resulting from the symbol repetition shall be punctured as specified in 3.1.3.1.6.

3.1.3.13.6 Forward Supplemental Code Channel Interleaving

The modulation symbols shall be interleaved as specified in 3.1.3.1.7.

3.1.3.13.7 Forward Supplemental Code Channel Data Scrambling

The data for Forward Supplemental Code 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 3.1.3.13.7-1. The generation of the private long code mask shall be as specified in 2.1.3.1.11.

41 … 37	36 … 0
11000	PLCM_37

Figure 3.1.3.13.7-1. Forward Supplemental Code Channel Public Long Code Mask

3.1.3.13.8 Forward Supplemental Code Channel Orthogonal Spreading

The Forward Supplemental Code Channels shall be spread by a Walsh function of length 64 as specified in 3.1.3.1.12.

3.1.3.13.9 Forward Supplemental Code Channel Quadrature Spreading

The Forward Supplemental Code Channels shall be PN spread as specified in 3.1.3.1.13.

3.1.3.13.10 Forward Supplemental Code Channel Filtering

Filtering for the Forward Supplemental Code Channels shall be as specified in 3.1.3.1.14.

3.1.3.13.11 Forward Supplemental Code Channel Transmission Processing

When the Physical Layer receives a PHY-SCCH.Request(SDU, FRAME_DURATION, NUM_BITS) from the MAC Layer, the base station shall perform the following:

- Store the arguments SDU and NUM_BITS.
- If SDU is not equal to NULL, set the information bits to SDU.
- If SDU is not equal to NULL, transmit NUM_BITS bits of SDU in a Forward Supplemental Code Channel frame.

3.1.4 Limitations on Emissions

3.1.4.1 Conducted Spurious Emissions

The base station shall meet the requirements in Section 4.5.1 of the current version of [10].

3.1.4.2 Radiated Spurious Emissions

The base station shall meet the requirements in Section 4.5.2 of the current version of [10].

3.1.4.3 Intermodulation Products

The base station shall meet the requirements in Section 4.4.3 of the current version of [10].

3.1.5 Synchronization, Timing, and Phase

3.1.5.1 Timing Reference Source

Each base station shall use a time base reference from which all time-critical CDMA transmission components, including pilot PN sequences, frames, and Walsh functions, shall be derived. The time base reference shall be time-aligned to CDMA System Time, as described in 1.3. Reliable external means should be provided at each base station to synchronize each base station's time base reference to CDMA System Time. Each base station should use a frequency reference of sufficient accuracy to maintain time alignment to CDMA System Time.

In the event that the external source of System Time is lost,[23] the system shall maintain the base station transmit time within the tolerance specified in 3.1.5.2 for a period of time specified in the current version of [10].

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[23]These 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.

3.1.5.2 Base Station Transmission Time

The base station shall meet the requirements in Section 4.3.1.1 of the current version of [10].

Time measurements are made at the base station antenna connector. If a base station has multiple radiating antenna connectors for the same CDMA channel, time measurements are made at the antenna connector having the earliest radiated signal.

The rate of change for timing corrections shall not exceed 101.725 ns per 200 ms.

3.1.5.3 Pilot to Walsh Cover Time Tolerance

The base station shall meet the requirements in Section 4.3.1.2 of the current version of [10].

3.1.5.4 Pilot to Walsh Cover Phase Tolerance

The base station shall meet the requirements in Section 4.3.1.3 of the current version of [10].

3.1.6 Transmitter Performance Requirements

System performance is predicated on transmitters meeting the requirements set forth in the current version of [10].

3.2 Receiver

3.2.1 Channel Spacing and Designation

Channel spacing and designations for the base station reception shall be as specified in 2.1.1.1.

3.2.2 Demodulation Characteristics

The base station demodulation process shall perform complementary operations to the mobile station modulation process on the Reverse CDMA Channel (see 2.1.3).

The base station receiver shall support the closed loop power control sub-channel as specified in 3.1.3.1.10.

The Reverse Traffic Channel frame is described in 2.1.3.6.2, 2.1.3.7.2, 2.1.3.8.2, and 2.1.3.9.2. A base station may implement offset Reverse Traffic Channel frames as described in 2.1.3.6.1, 2.1.3.7.1, 2.1.3.8.1, and 2.1.3.9.1.

3.2.2.1 Interface to the MAC Layer

This section specifies the passing of the received physical layer frames.

3.2.2.1.1 Access Channel Reception Processing

When the base station receives an Access Channel frame, the Physical Layer shall send a PHY-ACH.Indication(SDU, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_QUALITY to "sufficient" if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to "insufficient."

3.2.2.1.2 Enhanced Access Channel Reception Processing

When the base station receives an Enhanced Access Channel Preamble, the Physical Layer shall send a PHY-EACHPreamble.Indication to the MAC Layer.

When the base station receives an Enhanced Access header, the Physical Layer shall send a PHY-EACHHeader.Indication(SDU, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set SDU to the received information bits.
- Set FRAME_QUALITY to "sufficient" if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to "insufficient."

When the base station receives an Enhanced Access data frame, the Physical Layer shall send a PHY-EACH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of data bits of the received frame.
- Set FRAME_QUALITY to "sufficient" if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to "insufficient."

3.2.2.1.3 Reverse Common Control Channel Reception Processing

When the base station receives a Reverse Common Control Channel preamble, the Physical Layer shall send a PHY-RCCCHPreamble.Indication to the MAC Layer.

When the base station receives a Reverse Common Control Channel frame, the Physical Layer shall send a PHY-RCCCH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of data bits of the received frame.
- Set FRAME_QUALITY to "sufficient" if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to "insufficient."

3.2.2.1.4 Reverse Dedicated Control Channel Reception Processing

When the base station receives a Reverse Dedicated Control Channel frame, the Physical Layer shall send a PHY-DCCH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set the SDU to the received information bits.

- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of information bits in the SDU.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

If the base station does not receive a Forward Dedicated Control Channel frame at the end of a 20 ms frame boundary, the Physical Layer shall send a PHY-DCCH.Indication(SDU) to the MAC Layer, after the base station performs the following actions:

- Set the SDU to NULL.
- Pass the SDU as an argument.

3.2.2.1.5 Reverse Fundamental Channel Reception Processing

When the base station receives a Reverse Fundamental Channel frame, the Physical Layer shall send a PHY-FCH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of bits of the SDU.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

3.2.2.1.6 Reverse Supplemental Channel Reception Processing

When the base station receives a Reverse Supplemental Channel frame, the Physical Layer shall send a PHY-SCH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of bits of the SDU.
- Set FRAME_QUALITY to “sufficient” if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to “insufficient.”

3.2.2.1.7 Reverse Supplemental Code Channel Reception Processing

When the base station receives a Reverse Supplemental Code Channel frame, the Physical Layer shall send a PHY-SCCH.Indication(SDU, FRAME_DURATION, NUM_BITS, FRAME_QUALITY) to the MAC Layer, after the base station performs the following actions:

- Set the SDU to the received information bits.
- Set FRAME_DURATION to the duration of the received frame.
- Set NUM_BITS to the number of bits of the SDU.

- Set FRAME_QUALITY to "sufficient" if the received frame has sufficient frame quality; otherwise, set FRAME_QUALITY to "insufficient."

3.2.3 Limitations on Emissions

The base station shall meet the requirements in Section 3.5.1 of the current version of [10].

3.2.4 Receiver Performance Requirements

System performance is predicated on receivers meeting the requirements set forth in the current version of [10].