
Loopback Service Options (LSO) for cdma2000 Spread Spectrum Systems

Release A

COPYRIGHT

3GPP2 and its Organizational Partners claim copyright in this document and individual Organizational Partners may copyright and issue documents or standards publications in individual Organizational Partner's name based on this document. Requests for reproduction of this document should be directed to the 3GPP2 Secretariat at secretariat@3gpp2.org. Requests to reproduce individual Organizational Partner's documents should be directed to that Organizational Partner. See www.3gpp2.org for more information.

1

2

3

CONTENTS

1	1 GENERAL	1-1
2	1.1 Terms and Numeric Information	1-1
3	2 SERVICE OPTIONS 2, 9, 30 and 31: MOBILE STATION LOOPBACK	2-1
4	2.1 General Description	2-1
5	2.2 Service Option Numbers	2-1
6	2.3 Multiplex Option	2-2
7	2.3.1 Required Multiplex Option Support	2-2
8	2.3.1.1 Service Option 2	2-2
9	2.3.1.2 Service Option 9	2-2
10	2.3.1.3 Service Option 30	2-2
11	2.3.1.4 Service Option 31	2-2
12	2.3.2 Interface to Multiplex Options	2-3
13	2.3.2.1 Service Option 2	2-3
14	2.3.2.1.1 Transmitted Fundamental Data Blocks	2-3
15	2.3.2.1.2 Received Fundamental Data Blocks	2-4
16	2.3.2.2 Service Option 9	2-4
17	2.3.2.2.1 Transmitted Fundamental Data Blocks	2-4
18	2.3.2.2.2 Received Fundamental Data Blocks	2-5
19	2.3.2.3 Service Option 30	2-6
20	2.3.2.3.1 Transmitted Fundamental Data Blocks	2-6
21	2.3.2.3.2 Received Supplemental Data Blocks	2-7
22	2.3.2.4 Service Option 31	2-7
23	2.3.2.4.1 Transmitted Fundamental Data Blocks	2-7
24	2.3.2.4.2 Received Supplemental Data Blocks	2-8
25	2.3.3 Service Option Negotiation, Service Negotiation, and Activation	2-8
26	2.3.3.1 Procedures Using Service Option Negotiation	2-8
27	2.3.3.1.1 Initialization and Connection in the Mobile Station	2-9
28	2.3.3.1.2 Initialization and Connection in the Base Station	2-10
29	2.3.3.1.3 Service Option Control Orders	2-10
30	2.3.3.2 Procedures Using Service Negotiation	2-10
31	2.3.3.2.1 Mobile Station Requirements	2-10

CONTENTS

1 2.3.3.2.2 Base Station Requirements 2-13

2 2.4 Data Block Information Bits 2-13

3 2.4.1 Service Option 2 2-13

4 2.4.2 Service Option 9 2-14

5 2.4.3 Service Option 30 2-15

6 2.4.4 Service Option 31 2-16

7 2.5 Mobile Station Processing 2-16

8 2.5.1 Basic Data Block Processing 2-16

9 2.5.1.1 Service Option 2 2-18

10 2.5.1.2 Service Option 9 2-20

11 2.5.1.3 Service Option 30..... 2-21

12 2.5.1.4 Service Option 31..... 2-22

13 2.5.2 Processing Delays 2-23

14 2.6 Computing Error Rate Statistics at the Base Station..... 2-23

15 2.6.1 Forward Traffic Channel Frame Error Rates 2-23

16 2.6.1.1 Forward Fundamental Code Channel Frame Error Rate 2-23

17 2.6.1.2 Forward Supplemental Code Channel Frame Error Rate 2-24

18 2.6.2 Reverse Traffic Channel Frame Error Rates 2-25

19 2.6.2.1 Reverse Fundamental Code Channel Frame Error Rate 2-25

20 2.6.2.2 Reverse Supplemental Code Channel Frame Error Rate 2-25

FIGURES

1 Figure 2.4.1-1. Data Block Formats for Service Option 2..... 2-14

2 Figure 2.4.2-1. Data Block Formats for Service Option 9..... 2-15

3 Figure 2.4.3-1. Data Block Formats for Service Option 30..... 2-16

4 Figure 2.4.4-1. Data Block Formats for Service Option 31 2-16

5 Figure 2.5.2-1. Allowable Mobile Station Processing Delays..... 2-23

6

TABLES

1 Table 2.3.2.1.1-1. Fundamental Data Block Types Supplied by Service Option 2
2 to the Multiplex Sublayer 2-3

3 Table 2.3.2.1.2-1. Fundamental Data Block Types Supplied by the Multiplex Sublayer
4 to Service Option 2..... 2-4

5 Table 2.3.2.2.1-1. Fundamental Data Block Types Supplied by Service Option 9
6 to the Multiplex Sublayer 2-5

7 Table 2.3.2.2.2-1. Fundamental Data Block Types Supplied by the Multiplex
8 Sublayer to Service Option 9 2-6

9 Table 2.3.2.3.1-1. Fundamental Data Block Types Supplied by Service Option 30
10 to the Multiplex Sublayer 2-6

11 Table 2.3.2.3.2-1. Fundamental Data Block Types Supplied by the Multiplex Sublayer
12 to Service Option 30..... 2-7

13 Table 2.3.2.4.1-1. Fundamental Data Block Supplied by Service Option 31
14 to the Multiplex Sublayer 2-8

15 Table 2.3.2.4.2-1. Fundamental Data Block Types Supplied by the Multiplex Sublayer
16 to Service Option 31 2-8

17 Table 2.3.3.2.1-1. Valid Service Configuration Attributes for Service Option 2..... 2-11

18 Table 2.3.3.2.1-2. Valid Service Configuration Attributes for Service Option 9..... 2-11

19 Table 2.3.3.2.1-3. Valid Service Configuration Attributes for Service Option 30..... 2-12

20 Table 2.3.3.2.1-4. Valid Service Configuration Attributes for Service Option 31 2-12

21 Table 2.5.1-1. Service Option 2 or 9 Data Block Processing 2-17

22 Table 2.5.1-2. Service Option 30 or 31 Data Block Processing..... 2-18

NOTES

- 1 1. “Base station” refers to the functions performed on the land side, which are
2 typically distributed among a cell, a sector of a cell, and a mobile switching center.
- 3 2. This Standard uses the following verbal forms: “Shall” and “shall not” identify
4 requirements to be followed strictly to conform to the standard and from which no
5 deviation is permitted. “Should” and “should not” indicate that one of several
6 possibilities is recommended as particularly suitable, without mentioning or
7 excluding others; that a certain course of action is preferred but not necessarily
8 required; or that (in the negative form) a certain possibility or course of action is
9 discouraged but not prohibited. “May” and “need not” indicate a course of action
10 permissible within the limits of the standard. “Can” and “cannot” are used for
11 statements of possibility and capability, whether material, physical, or causal.
- 12 3. Unless indicated otherwise, this document presents numbers in decimal form.
13 Binary numbers are distinguished in the text by the use of single quotation marks.

14

REFERENCES

1 The following standards contain provisions which, through reference in this text, constitute
2 provisions of this Standard. At the time of publication, the editions indicated were valid.
3 All standards are subject to revision, and parties to agreements based on this Standard are
4 encouraged to investigate the possibility of applying the most recent editions of the
5 standards indicated below. ANSI and TIA maintain registers of currently valid national
6 standards published by them.

- 7
- 8 1. TIA/EIA-95-B, *Mobile Station-Base Station Compatibility Standard for Dual-Mode*
9 *Spread Spectrum Systems, March, 1999.*
- 10 2. TIA/EIA-97-C, *Recommended Minimum Performance Standards for Base Stations*
11 *Supporting Dual-Mode Spread Spectrum Mobile Stations, May, 1999.*
- 12 3. TIA/EIA-98-C, *Recommended Minimum Performance Standards for Dual-Mode*
13 *Spread Spectrum Mobile Stations, June, 1999.*

1 **1 GENERAL**

2 **1.1 Terms and Numeric Information**

3 Reserved.

C.S0013-0

1

2 No text.

2 SERVICE OPTIONS 2, 9, 30 AND 31: MOBILE STATION LOOPBACK

2.1 General Description

Service Options 2, 9, 30, and 31 are defined in this document. They provide a loopback of primary traffic information bits through the mobile station. These service options provide the means for a base station to supply a known data stream on both the Forward and Reverse Traffic Channels so that a mobile station's receiving and transmitting performance can be measured. Also, these service options provide a convenient means of setting up calls and generating traffic for system testing. Specifically, these service options are used in some of the tests specified in TIA/EIA-97-C and TIA/EIA-98-C.

For each Forward Traffic Channel frame, the base station generates and sends one or more primary data blocks to the mobile station, consisting of one forward fundamental data block and up to one forward supplemental data block. After a delay to allow for processing, the mobile station sends one reverse fundamental data block back to the base station. The base station can then check the forward fundamental data block, forward supplemental data block or reverse fundamental data block for correctness.

The base station can generate data block sizes of 171, 80, 40, 16, or 0 bits (for Multiplex Option 1 primary traffic) or 266, 124, 54, 20, or 0 bits (for Multiplex Option 2 primary traffic). The base station can generate a data block size of 171 bits (for Multiplex Option 3 primary traffic) or 266 bits (for Multiplex Option 4 primary traffic). The base station uses a data block size of 0 bits for blank-and-burst transmissions. The base station can generate any of the data block sizes associated with the current multiplex option in each frame without regard to the data block size that was generated in the previous frame. The base station can set the bits within a data block to any desired value. However, to obtain satisfactory measurements of performance, the base station should set these bits randomly and vary the bits from data block to data block.

The Mobile Station Loopback service options allow for simultaneous normal operation of signaling messages and secondary traffic.

The mobile station generates the primary fundamental data block for the Reverse Traffic Channel from the received forward fundamental data block or forward supplemental data block, depending on the Mobile Station Loopback service option. The mobile station replaces the first two bits of the data block with frame categorization information obtained from the Forward Traffic Channel, so that the base station can obtain information about the quality of the Forward Traffic Channel.

The C revision of TIA/EIA-126 adds Service Options 30 and 31 to allow testing of the supplemental channels. Service Options 2 and 9 are unchanged from the prior version.

2.2 Service Option Numbers

The Mobile Station Loopback service option described by this standard shall use service option number 2 and is called Service Option 2 when using the Forward Fundamental Code Channel with Multiplex Option 1. It shall use service option number 9 and is called Service Option 9 when using the Forward Fundamental Code Channel with Multiplex Option 2. It

1 shall use service option number 30 and is called Service Option 30 when using the Forward
2 Supplemental Code Channel with Multiplex Option 3. It shall use service option number 31
3 and is called Service Option 31 when using the Forward Supplemental Code Channel with
4 Multiplex Option 4.

5 **2.3 Multiplex Option**

6 2.3.1 Required Multiplex Option Support

7 2.3.1.1 Service Option 2

8 Service Option 2 shall support an interface with Multiplex Option 1. Service Option 2 data
9 blocks shall only be transported as primary traffic on the Forward and Reverse
10 Fundamental Code Channels. Data block transport between Service Option 2 and
11 Multiplex Option 1 shall ensure that the leftmost bit of a Service Option 2 data block (as
12 defined in 2.4.1) shall correspond to the leftmost bit of the primary fundamental data block
13 within the information bit structure defined in 6.1.3.3.11 and 7.1.3.5.12 of TIA/EIA-95-B.

14 2.3.1.2 Service Option 9

15 Service Option 9 shall support an interface with Multiplex Option 2. Service Option 9 data
16 blocks shall only be transported as primary traffic on the Forward and Reverse
17 Fundamental Code Channels. Data block transport between Service Option 9 and
18 Multiplex Option 2 shall ensure that the leftmost bit of a Service Option 9 data block (as
19 defined in 2.4.2) shall correspond to the leftmost bit of the primary fundamental data block
20 within the information bit structure defined in 6.1.3.3.12 and 7.1.3.5.13 of TIA/EIA-95-B.

21 2.3.1.3 Service Option 30

22 Service Option 30 shall support an interface with Multiplex Option 3. Service Option 30
23 data blocks shall only be transported as primary traffic on the Forward Supplemental Code
24 Channel and Reverse Fundamental Code Channel. Data block transport between Service
25 Option 30 and Multiplex Option 3 shall ensure that the leftmost bit of a Service Option 30
26 data block (as defined in 2.4.3) shall correspond to the leftmost bit of the primary
27 supplemental data block within the information bit structure defined in 6.1.3.3.13 and
28 7.1.3.5.14 of TIA/EIA-95-B.

29 The mobile station shall receive the Forward Fundamental Code Channel but shall not
30 process the traffic data. The mobile station shall process the signaling and power control
31 information.

32 2.3.1.4 Service Option 31

33 Service Option 31 shall support an interface with Multiplex Option 4. Service Option 31
34 data blocks shall only be transported as primary traffic on the Forward Supplemental Code
35 Channel and Reverse Fundamental Code Channel. Data block transport between Service
36 Option 31 and Multiplex Option 4 shall ensure that the leftmost bit of a Service Option 31
37 data block (as defined in 2.4.4) shall correspond to the leftmost bit of the primary
38 supplemental data block within the information bit structure defined in 6.1.3.3.14 and
39 7.1.3.5.15 of TIA/EIA-95-B.

1 The mobile station shall receive the Forward Fundamental Code Channel but shall not
 2 process the traffic data. The mobile station shall process the signaling and power control
 3 information.

4 2.3.2 Interface to Multiplex Options

5 2.3.2.1 Service Option 2

6 2.3.2.1.1 Transmitted Fundamental Data Blocks

7 In the mobile station, Service Option 2 shall generate and shall supply exactly one
 8 fundamental data block to the multiplex sublayer every 20 ms. The fundamental data
 9 block shall be one of five types as shown in Table 2.3.2.1.1-1 and shall have an internal
 10 format as specified in 2.4.1. The number of bits supplied to the multiplex sublayer for each
 11 type of fundamental data block shall be as shown in Table 2.3.2.1.1-1. The data contained
 12 within the generated fundamental data block shall be based upon the contents of the
 13 received fundamental data block and shall be constructed per the requirements of 2.5.1.1.

14 Unless otherwise commanded, Service Option 2 shall supply a Rate 1, Rate 1/2, Rate 1/4
 15 or Rate 1/8 fundamental data block. Upon command, Service Option 2 shall generate a
 16 Blank fundamental data block. Also, upon command, Service Option 2 shall generate a
 17 non-blank fundamental data block with a maximum rate of Rate 1/2.

18
 19 **Table 2.3.2.1.1-1. Fundamental Data Block Types Supplied by Service Option 2 to the**
 20 **Multiplex Sublayer**

Data Block Type	Bits per Data Block
Rate 1	171
Rate 1/2	80
Rate 1/4	40
Rate 1/8	16
Blank	0

21
 22 A Rate 1 fundamental data block corresponds to a 9600 bps Fundamental Code Channel
 23 frame with 171 primary fundamental data block bits. A Rate 1/2 fundamental data block
 24 corresponds to a 4800 bps Fundamental Code Channel frame or to a dim-and-burst
 25 Fundamental Code Channel frame with 80 primary fundamental data block bits. A Rate
 26 1/4 fundamental data block corresponds to a 2400 bps Fundamental Code Channel frame
 27 or to a dim-and-burst Fundamental Code Channel frame with 40 fundamental data block
 28 bits. A Rate 1/8 fundamental data block corresponds to a 1200 bps Fundamental Code
 29 Channel frame or to a dim-and-burst Fundamental Code Channel frame with 16 primary
 30 fundamental data block bits. A Blank fundamental data block corresponds to a blank-and-
 31 burst Fundamental Code Channel frame.

2.3.2.1.2 Received Fundamental Data Blocks

The multiplex sublayer in the mobile station categorizes every received Forward Fundamental Code Channel frame (see 6.2.2.2.1 of TIA/EIA-95-B), and supplies the fundamental data block type and accompanying bits, if any, to Service Option 2 as shown in Table 2.3.2.1.2-1. Service Option 2 processes the bits of the fundamental data block as described in 2.5. The first five received fundamental data block types shown in Table 2.3.2.1.2-1 correspond to the transmitted fundamental data block types shown in Table 2.3.2.1.1-1. (The Blank fundamental data block type occurs when the receiving station determines that a blank-and-burst Fundamental Code Channel frame for signaling traffic or secondary traffic was transmitted.) The Rate 1 with Bit Errors fundamental data block type occurs when the receiving station determines that the Fundamental Code Channel frame was transmitted at 9600 bps and the Fundamental Code Channel frame has one or more bit errors. The Insufficient Frame Quality fundamental data block type occurs when the mobile station is unable to decide upon the data rate of the received Fundamental Code Channel frame or when the mobile station detects a Fundamental Code Channel frame in error which does not belong to the Rate 1 with Bit Errors fundamental data block type.

Table 2.3.2.1.2-1. Fundamental Data Block Types Supplied by the Multiplex Sublayer to Service Option 2

Data Block Type	Bits per Data Block
Rate 1	171
Rate 1/2	80
Rate 1/4	40
Rate 1/8	16
Blank	0
Rate 1 with Bit Errors	171
Insufficient Frame Quality (Erasure)	0

2.3.2.2 Service Option 9

2.3.2.2.1 Transmitted Fundamental Data Blocks

In the mobile station, Service Option 9 shall generate and shall supply exactly one fundamental data block to the multiplex sublayer every 20 ms. The fundamental data block shall be one of five types as shown in Table 2.3.2.2.1-1 and shall have an internal format as specified in 2.4.2. The number of bits supplied to the multiplex sublayer for each type of fundamental data block shall be as shown in Table 2.3.2.2.1-1. The data contained within the generated fundamental data block shall be based upon the contents of the received fundamental data block and shall be constructed per the requirements of 2.5.1.2.

1 Unless otherwise commanded, Service Option 9 shall supply a Rate 1, Rate 1/2, Rate 1/4
 2 or Rate 1/8 fundamental data block. Upon command, Service Option 9 shall generate a
 3 Blank fundamental data block. Also upon command, Service Option 9 shall generate a
 4 non-blank fundamental data block with a maximum rate of Rate 1/2.

5
 6 **Table 2.3.2.2.1-1. Fundamental Data block Types Supplied by Service Option 9 to the**
 7 **Multiplex Sublayer**

Data Block Type	Bits per Data Block
Rate 1	266
Rate 1/2	124
Rate 1/4	54
Rate 1/8	20
Blank	0

8
 9 A Rate 1 fundamental data block corresponds to a 14400 bps Fundamental Code Channel
 10 frame with 266 primary fundamental data block bits. A Rate 1/2 fundamental data block
 11 corresponds to a 7200 bps Fundamental Code Channel frame or to a dim-and-burst
 12 Fundamental Code Channel frame with 124 primary fundamental data block bits. A Rate
 13 1/4 fundamental data block corresponds to a 3600 bps Fundamental Code Channel frame
 14 or to a dim-and-burst Fundamental Code Channel frame with 54 primary fundamental data
 15 block bits. A Rate 1/8 fundamental data block corresponds to an 1800 bps Fundamental
 16 Code Channel frame or to a dim-and-burst Fundamental Code Channel frame with 20
 17 primary fundamental data block bits. A Blank fundamental data block corresponds to a
 18 blank-and-burst Fundamental Code Channel frame.

19 2.3.2.2.2 Received Fundamental Data Blocks

20 The multiplex sublayer in the mobile station categorizes every received Forward
 21 Fundamental Code Channel frame (see 6.2.2.2.2 of TIA/EIA-95-B), and supplies the
 22 fundamental data block type and accompanying bits, if any, to Service Option 9 as shown
 23 in Table 2.3.2.2.2-1. Service Option 9 processes the bits of the fundamental data block as
 24 described in 2.5. The first five received fundamental data block types shown in Table
 25 2.3.2.2.2-1 correspond to the transmitted fundamental data block types shown in Table
 26 2.3.2.2.1-1. (The Blank fundamental data block type occurs when the receiving station
 27 determines that a blank-and-burst Fundamental Code Channel frame for signaling traffic or
 28 secondary traffic was transmitted.) The Insufficient Frame Quality fundamental data block
 29 type occurs when the mobile station is unable to decide upon the data rate of the received
 30 Fundamental Code Channel frame or when the mobile station detects a frame in error.

Table 2.3.2.2-1. Fundamental Data Block Types Supplied by the Multiplex Sublayer to Service Option 9

Data Block Type	Bits per Data Block
Rate 1	266
Rate 1/2	124
Rate 1/4	54
Rate 1/8	20
Blank	0
Insufficient Frame Quality (Erasure)	0

2.3.2.3 Service Option 30

2.3.2.3.1 Transmitted Fundamental Data Blocks

In the mobile station, Service Option 30 shall generate and shall supply exactly one fundamental data block to the multiplex sublayer every 20 ms. The fundamental data block shall be one of four types as shown in Table 2.3.2.3.1-1 and shall have an internal format as specified in 2.4.3. The number of bits supplied to the multiplex sublayer for each type of fundamental data block shall be as shown in Table 2.3.2.3.1-1. The data contained within the generated fundamental data block shall be based upon the contents of the received fundamental data block and shall be constructed per the requirements of 2.5.1.3.

Unless otherwise commanded, Service Option 30 shall supply a Rate 1 fundamental data block. Upon command, Service Option 30 shall generate a Blank fundamental data block. Also upon command, Service Option 30 shall generate a non-blank fundamental data block with a maximum rate of Rate 1/2.

Table 2.3.2.3.1-1. Fundamental Data Block Types Supplied by Service Option 30 to the Multiplex Sublayer

Data Block Type	Bits per Data Block
Rate 1	171
Rate 1/2	80
Rate 1/8	16
Blank	0

A Rate 1 fundamental data block corresponds to a 9600 bps Fundamental Code Channel frame with 171 primary fundamental data block bits. A Rate 1/2 fundamental data block corresponds to a dim-and-burst Fundamental Code Channel frame with 80 primary fundamental data block bits. A Rate 1/8 fundamental data block corresponds to a dim-and-burst Fundamental Code Channel frame with 16 primary fundamental data block bits. A

Blank fundamental data block corresponds to a blank-and-burst Fundamental Code Channel frame.

2.3.2.3.2 Received Supplemental Data Blocks

The multiplex sublayer in the mobile station categorizes every received Forward Supplemental Code Channel frame (see 6.2.2.2.1 of TIA/EIA-95-B), and supplies the supplemental data block type and accompanying bits, if any, to Service Option 30 as shown in Table 2.3.2.3.2-1. Service Option 30 processes the bits of the supplemental data block as described in 2.5. The first received supplemental data block type shown in Table 2.3.2.3.2-1 corresponds to the transmitted supplemental data block type shown in Table 2.3.2.3.1-1. The Insufficient Frame Quality supplemental data block type occurs when the mobile station detects a frame in error.

Table 2.3.2.3.2-1. Supplemental Data Block Types Supplied by the Multiplex Sublayer to Service Option 30

Data Block Type	Bits per Data Block
Rate 1	171
Insufficient Frame Quality (Erasure)	0

2.3.2.4 Service Option 31

2.3.2.4.1 Transmitted Fundamental Data Blocks

In the mobile station, Service Option 31 shall generate and shall supply exactly one fundamental data block to the multiplex sublayer every 20 ms. The fundamental data block shall be one of three types as shown in Table 2.3.2.4.1-1 and shall have an internal format as specified in 2.4.4. The number of bits supplied to the multiplex sublayer for each type of fundamental data block shall be as shown in Table 2.3.2.4.1-1. The data contained within the generated fundamental data block shall be based upon the contents of the received fundamental data block and shall be constructed per the requirements of 2.5.1.4.

Unless otherwise commanded, Service Option 31 shall supply a Rate 1 fundamental data block. A Rate 1 fundamental data block corresponds to a 14400 bps Fundamental Code Channel frame with 266 primary fundamental data block bits. A Rate 1/2 fundamental data block corresponds to a dim-and-burst Fundamental Code Channel frame with 124 primary fundamental data block bits. A Blank fundamental data block corresponds to a blank-and-burst Fundamental Code Channel frame. Also upon command, Service Option 31 shall generate a non-blank fundamental data block with a maximum rate of Rate 1/2.

Upon command, Service Option 31 shall generate a Blank fundamental data block.

Table 2.3.2.4.1-1. Fundamental Data Block Types Supplied by Service Option 31 to the Multiplex Sublayer

Data Block Type	Bits per Data Block
Rate 1	266
Rate 1/2	124
Blank	0

2.3.2.4.2 Received Supplemental Data Blocks

The multiplex sublayer in the mobile station categorizes every received Forward Supplemental Code Channel frame (see 6.2.2.2.2 of TIA/EIA-95-B), and supplies the supplemental data block type and accompanying bits, if any, to Service Option 31 as shown in Table 2.3.2.4.2-1. Service Option 31 processes the bits of the supplemental data block as described in 2.5. The first received supplemental data block type shown in Table 2.3.2.4.2-1 corresponds to the transmitted supplemental data block type shown in Table 2.3.2.4.1-1. The Insufficient Frame Quality supplemental data block type occurs when the mobile station detects a frame in error.

Table 2.3.2.4.2-1. Supplemental Data Block Types Supplied by the Multiplex Sublayer to Service Option 31

Data Block Type	Bits per Data Block
Rate 1	266
Insufficient Frame Quality (Erasure)	0

2.3.3 Service Option Negotiation, Service Negotiation, and Activation

The mobile station and base station can negotiate for Service Option 2 using either service option negotiation (see 2.3.3.1) or service negotiation (see 2.3.3.2).

The mobile station and base station can negotiate for Service Options 9, 30 and 31 using service negotiation (see 2.3.3.2).

2.3.3.1 Procedures Using Service Option Negotiation

The mobile station shall perform service option negotiation for Service Option 2 as described in 6.6.4.1.2 of TIA/EIA-95-B. The base station shall perform service option negotiation for Service Option 2 as described in 7.6.4.1.2 of TIA/EIA-95-B.

Upon successfully completing negotiation for Service Option 2, the mobile station shall declare the service option to be active (set SO_CUR equal to 2; see section 6.6.4.1.2 of TIA/EIA-95-B) according to the following requirements:

- 1 • If service option negotiation is completed as a result of the base station sending a
2 *Service Option Response Order*, then the mobile station shall declare the service
3 option to be active at the explicit or implicit action time associated with the *Service*
4 *Option Response Order*.
- 5 • If service option negotiation is completed as a result of the mobile station sending a
6 *Service Option Response Order*, then the mobile station shall declare the service
7 option to be active when the later of the following two times occurs:
 - 8 - The implicit or explicit action time associated with the most recently received
9 *Service Option Request Order* from the base station, or
 - 10 - The time at which the mobile station sends the *Service Option Response Order*
11 that accepts Service Option 2.

12 2.3.3.1.1 Initialization and Connection in the Mobile Station

13 No initialization is required for Service Option 2.

14 The mobile station shall connect Service Option 2 as follows:

- 15 • If Service Option 2 is active when the mobile station enters the *Waiting for Mobile*
16 *Station Answer Substate* or Service Option 2 becomes active when the mobile station
17 is already in the *Waiting for Mobile Station Answer Substate*, then the mobile station
18 shall initiate an auto-answer.¹
- 19 • If Service Option 2 becomes active when the mobile station is not in the *Conversation*
20 *Substate*, then the mobile station shall connect Service Option 2 immediately upon
21 entering the *Conversation Substate*. Otherwise, the mobile station shall connect
22 Service Option 2 at the time it becomes active. The mobile station shall complete
23 connection of Service Option 2 within 200 ms of starting the connection.

24 When Service Option 2 is connected, Service Option 2 shall begin processing data blocks it
25 obtains from the receiving side of the multiplex sublayer as specified in 2.5. Refer to
26 6.1.3.3.11.3 of TIA/EIA-95-B for procedures to be followed when Service Option 2 is not
27 connected.

¹The term “auto-answer” is not explicitly defined in TIA/EIA-95-B. For purposes of this standard, the term “auto-answer” shall have the following supplementary meaning: while in the *Waiting for Mobile Station Answer Substate* of the *Mobile Station Control on the Traffic Channel State*, the mobile station shall automatically send a *Connect Order* to the base station as a message requiring acknowledgment without waiting for the user to explicitly command the call to be answered. The mobile station shall enter the *Conversation Substate*.

1 2.3.3.1.2 Initialization and Connection in the Base Station

2 The base station should wait until the action time associated with the most recently
3 transmitted *Service Option Response Order* or *Service Option Request Order* before
4 initializing and connecting Service Option 2.

5 When Service Option 2 is connected, Service Option 2 shall generate and provide test data
6 blocks to the transmitting side of the multiplex sublayer as specified in 2.4.1. Refer to
7 7.1.3.5.12.3 of TIA/EIA-95-B for procedures to be followed when Service Option 2 is not
8 connected.

9 2.3.3.1.3 Service Option Control Orders

10 The base station shall not send any *Service Option Control Orders* relating to Service Option
11 2 to the mobile station. The mobile station shall not send any *Service Option Control Orders*
12 relating to Service Option 2 to the base station.

13 2.3.3.2 Procedures Using Service Negotiation

14 2.3.3.2.1 Mobile Station Requirements

15 The mobile station shall perform service negotiation for Service Option 2, 9, 30, or 31 as
16 described in 6.6.4.1.2 of TIA/EIA-95-B. The mobile station shall only propose service
17 configurations for Service Option 2, 9, 30, or 31 with attributes as specified in Tables
18 2.3.3.2.1-1, 2.3.3.2.1-2, 2.3.3.2.1-3, and 2.3.3.2.1-4, respectively. The mobile station shall
19 reject any service configuration for Service Option 2, 9, 30, or 31 with attributes different
20 from those specified in Tables 2.3.3.2.1-1, 2.3.3.2.1-2, 2.3.3.2.1-3, and 2.3.3.2.1-4,
21 respectively.

22

1

Table 2.3.3.2.1-1. Valid Service Configuration Attributes for Service Option 2

Service Configuration Attribute	Valid Selections
Forward Multiplex Option	Multiplex Option 1
Reverse Multiplex Option	Multiplex Option 1
Forward Transmission Rates	Rate Set 1 with all 4 rates enabled
Reverse Transmission Rates	Rate Set 1 with all 4 rates enabled
Forward Traffic Type	Primary Traffic on Fundamental Code Channel
Reverse Traffic Type	Primary Traffic on Fundamental Code Channel

2

3

Table 2.3.3.2.1-2. Valid Service Configuration Attributes for Service Option 9

Service Configuration Attribute	Valid Selections
Forward Multiplex Option	Multiplex Option 2
Reverse Multiplex Option	Multiplex Option 2
Forward Transmission Rates	Rate Set 2 with all 4 rates enabled
Reverse Transmission Rates	Rate Set 2 with all 4 rates enabled
Forward Traffic Type	Primary Traffic on Fundamental Code Channel
Reverse Traffic Type	Primary Traffic on Fundamental Code Channel

4

1 **Table 2.3.3.2.1-3. Valid Service Configuration Attributes for Service Option 30**

Service Configuration Attribute	Valid Selections
Forward Multiplex Option	Multiplex Option 3
Reverse Multiplex Option	Multiplex Option 1
Forward Transmission Rates	Rate Set 1
Reverse Transmission Rates	Rate Set 1
Forward Traffic Type	Primary Traffic on Supplemental Code Channel
Reverse Traffic Type	Primary Traffic on Fundamental Code Channel

2
3 **Table 2.3.3.2.1-4. Valid Service Configuration Attributes for Service Option 31**

Service Configuration Attribute	Valid Selections
Forward Multiplex Option	Multiplex Option 4
Reverse Multiplex Option	Multiplex Option 2
Forward Transmission Rates	Rate Set 2
Reverse Transmission Rates	Rate Set 2
Forward Traffic Type	Primary Traffic on Supplemental Code Channel
Reverse Traffic Type	Primary Traffic on Fundamental Code Channel

4
5 If the mobile station accepts a service configuration, as specified in a *Service Connect*
6 *Message*, that includes a service option connection using Service Option 2, 9, 30, or 31,
7 then, commencing at the action time associated with the *Service Connect Message* and
8 continuing for as long as the service configuration includes the service option connection,
9 Service Option 2, 9, 30, or 31 shall process received test data blocks and generate and shall
10 supply test data blocks for transmission in accordance with this standard.

11 If a service option connection associated with Service Option 2, 9, 30, or 31 is part of the
12 current service configuration when the mobile station enters the *Waiting for Mobile Station*
13 *Answer Substate*, or if a service option connection associated with Service Option 2, 9, 30,
14 or 31 becomes part of the current service configuration while the mobile station is in the
15 *Waiting for Mobile Station Answer Substate*, the mobile station shall initiate an auto-answer
16 as described in 2.3.3.1.1.

17 The mobile station shall not send a *Service Option Control Message* for Service Option 2, 9,
18 30, or 31.

2.3.3.2.2 Base Station Requirements

The base station shall perform service negotiation for Service Option 2, 9, 30, or 31 as described in 7.6.4.1.2 of TIA/EIA-95-B. The base station shall only propose service configurations for Service Option 2, 9, 30, or 31 with attributes as specified in Tables 2.3.3.2.1-1, 2.3.3.2.1-2, 2.3.3.2.1-3, and 2.3.3.2.1-4, respectively. The base station shall reject any service configuration for Service Option 2, 9, 30, or 31 with attributes different from those specified in Tables 2.3.3.2.1-1, 2.3.3.2.1-2, 2.3.3.2.1-3, and 2.3.3.2.1-4 respectively.

If the base station establishes a service configuration, as specified in a *Service Connect Message*, that includes a service option connection using Service Option 2, 9, 30, or 31, then, commencing at the action time associated with the *Service Connect Message* and continuing for as long as the service configuration includes the service option connection, Service Option 2, 9, 30, or 31 shall generate and shall supply test data blocks for transmission in accordance with this standard.

The base station shall not send a *Service Option Control Message* for Service Option 2, 9, 30, or 31.

2.4 Data Block Information Bits

2.4.1 Service Option 2

Figure 2.4.1-1 shows four of the five data block formats that are used by Service Option 2. The Blank data block is not shown.

The base station shall supply the number of information bits shown in Table 2.3.2.1.1-1.² The base station may use any bit pattern for both the data bits and the CAT_TYPE field.

The mobile station shall supply the number of information bits shown in Table 2.3.2.1.1-1. The mobile station shall supply the data bits and CAT_TYPE field as described in 2.5.

²The term information bits is used when referring to all the bits in the data block; the term data bits is used when referring to the subset looped back by the mobile station. The CAT_TYPE field concatenated with the data bits are the information bits.

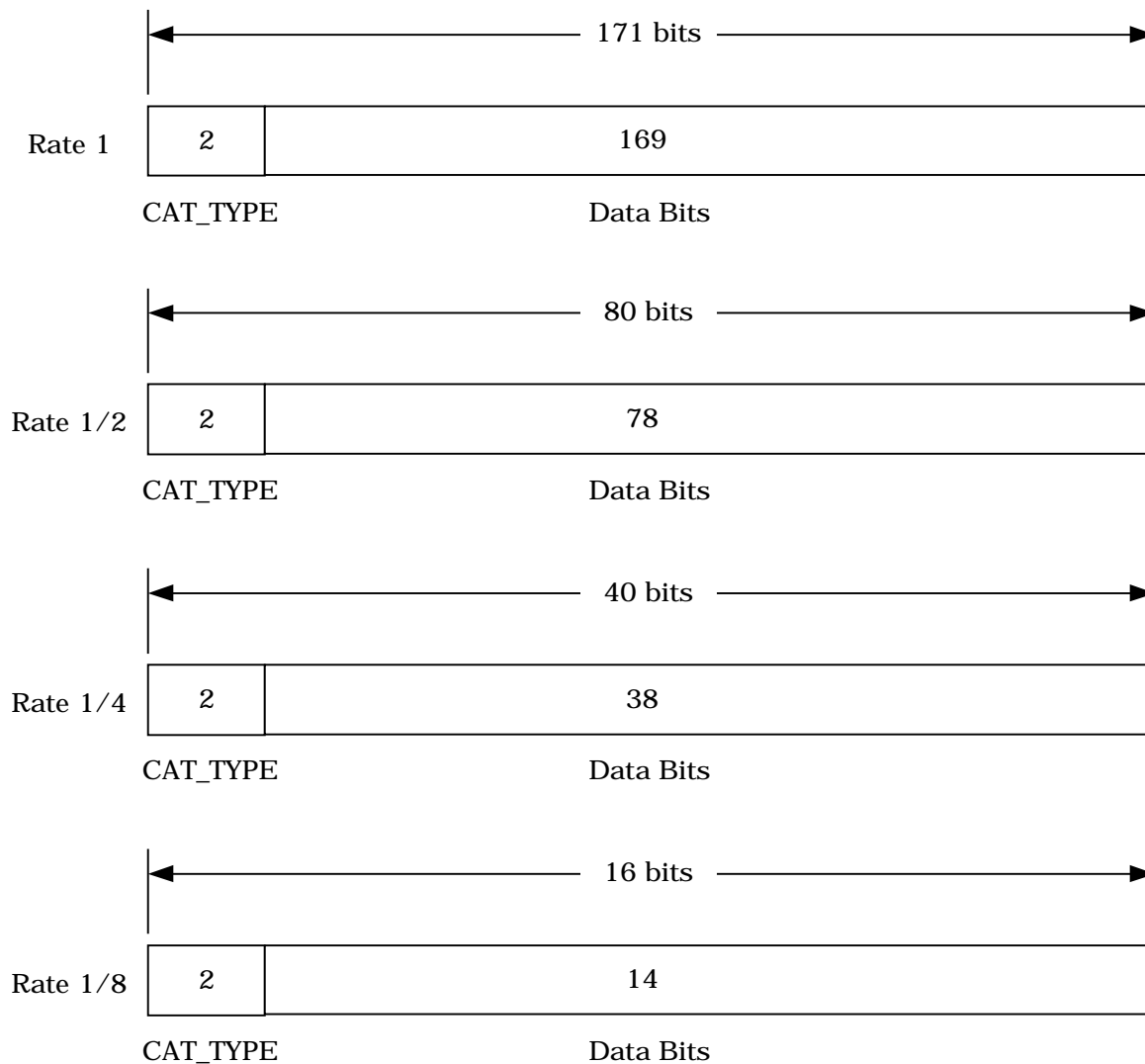


Figure 2.4.1-1. Data Block Formats for Service Option 2

- 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
- 2.4.2 Service Option 9
- Figure 2.4.2-1 shows four of the five data block formats that are used by Service Option 9. The Blank data block is not shown.
- The base station shall supply the number of information bits shown in Table 2.3.2.2.1-1. The base station may use any bit pattern for both the data bits and the CAT_TYPE field.
- The mobile station shall supply the number of information bits shown in Table 2.3.2.2.1-1. The mobile station shall supply the data bits and CAT_TYPE field as described in 2.5.

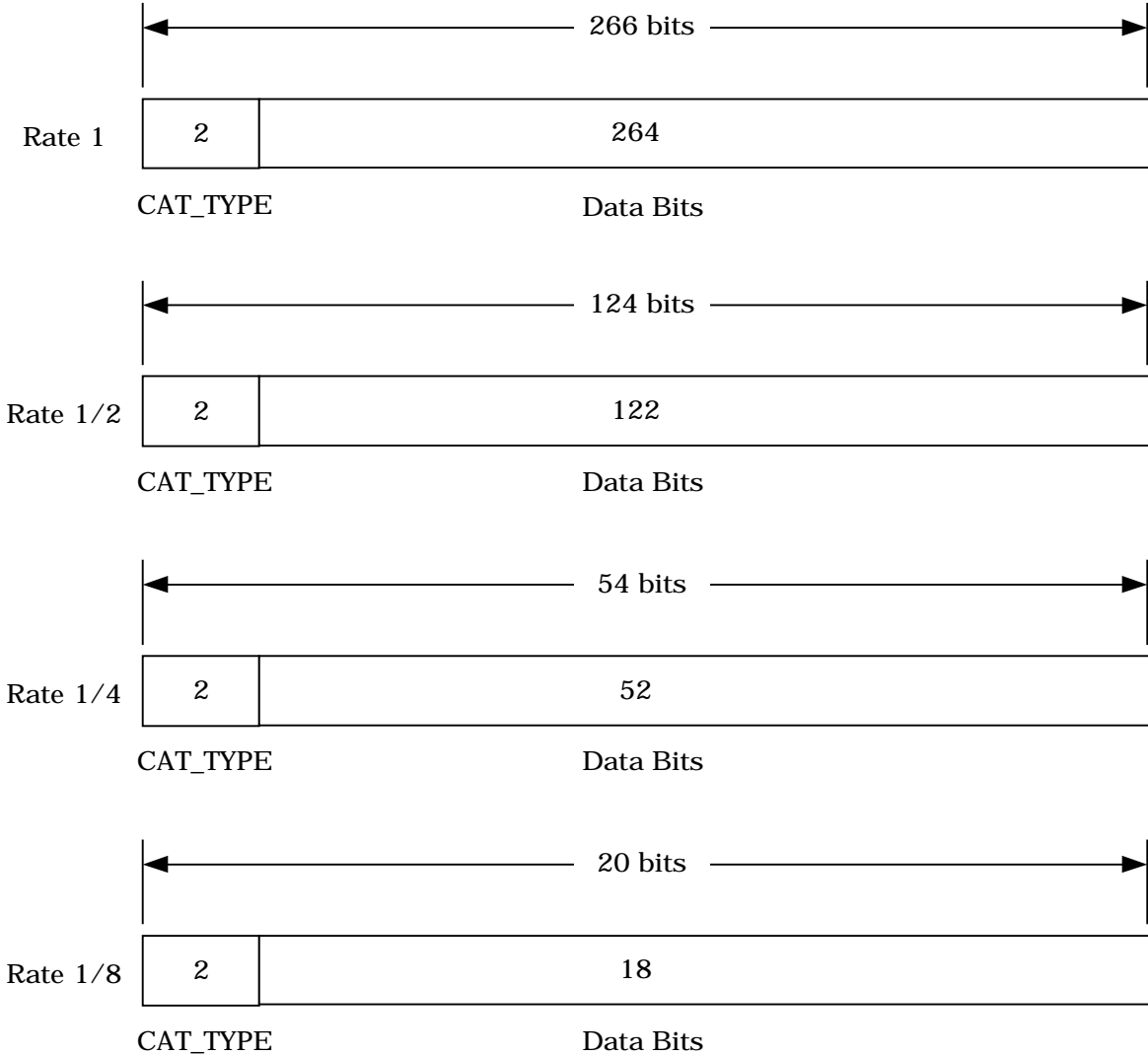


Figure 2.4.2-1. Data Block Formats for Service Option 9

1
2
3
4
5
6
7
8
9
10
11

2.4.3 Service Option 30

Figure 2.4.3-1 shows one of the data block formats that is used by Service Option 30. The Blank data block is not shown.

The base station shall supply the number of information bits shown in Table 2.3.2.3.1-1. The base station may use any bit pattern for both the data bits and the CAT_TYPE field.

The mobile station shall supply the number of information bits shown in Table 2.3.2.3.1-1. The mobile station shall supply the data bits and CAT_TYPE field as described in 2.5.

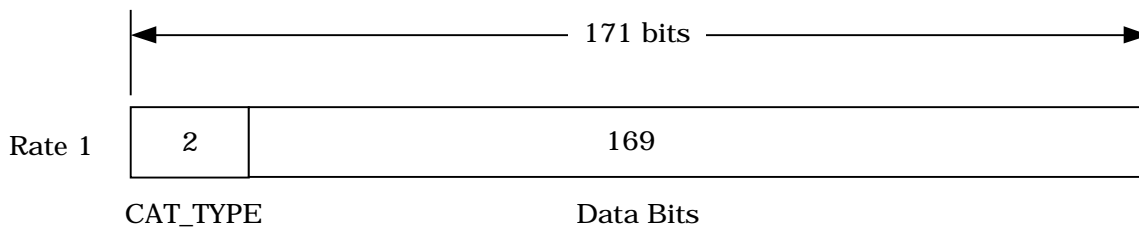


Figure 2.4.3-1. Data Block Format for Service Option 30

2.4.4 Service Option 31

Figure 2.4.4-1 shows one of the data block formats that is used by Service Option 31. The Blank data block is not shown.

The base station shall supply the number of information bits shown in Table 2.3.2.4.1-1. The base station may use any bit pattern for both the data bits and the CAT_TYPE field.

The mobile station shall supply the number of information bits shown in Table 2.3.2.4.1-1. The mobile station shall supply the data bits and CAT_TYPE field as described in 2.5.

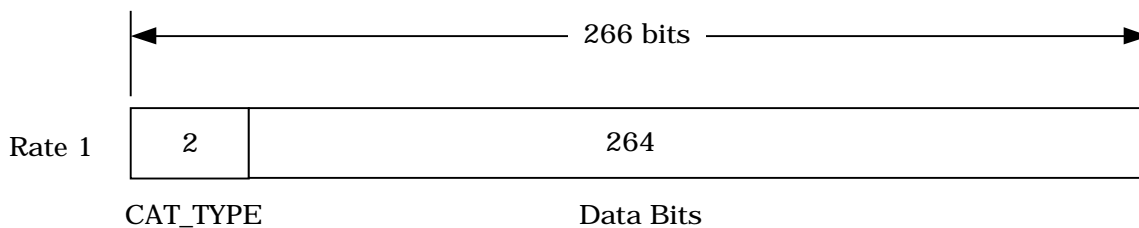


Figure 2.4.4-1. Data block Format for Service Option 31

2.5 Mobile Station Processing

2.5.1 Basic Data Block Processing

Table 2.5.1-1 specifies the data block processing for Service Options 2 and 9. If the mobile station supports Service Option 2, then the mobile station shall provide the processing described in 2.5.1.1. If the mobile station supports Service Option 9, then the mobile station shall provide the processing described in 2.5.1.2.

Table 2.5.1-2 specifies the data block processing for Service Options 30 and 31. If the mobile station supports Service Option 30, then the mobile station shall provide the processing described in 2.5.1.3. If the mobile station supports Service Option 31, then the mobile station shall provide the processing described in 2.5.1.4.

Table 2.5.1-1. Service Option 2 or 9 Data Block Processing

Data Block Type Received from the Multiplex Sublayer	Rate Restriction	Data Block Type Supplied to the Multiplex Sublayer	CAT_TYPE Field (binary)
Rate 1	None	Rate 1	00
Rate 1	Not Rate 1	Rate 1/2	11
Rate 1	Blank	Blank	Field not Present
Rate 1/2	None	Rate 1/2	00
Rate 1/2	Not Rate 1	Rate 1/2	00
Rate 1/2	Blank	Blank	Field not Present
Rate 1/4	None	Rate 1/4	00
Rate 1/4	Not Rate 1	Rate 1/4	00
Rate 1/4	Blank	Blank	Field not Present
Rate 1/8	None	Rate 1/8	00
Rate 1/8	Not Rate 1	Rate 1/8	00
Rate 1/8	Blank	Blank	Field not Present
Blank	None	Rate 1	01
Blank	Not Rate 1	Rate 1/2	01
Blank	Blank	Blank	Field not Present
Rate 1 with Bit Errors (Service Option 2 only)	None	Rate 1	10
Rate 1 with Bit Errors (Service Option 2 only)	Not Rate 1	Rate 1/2	10
Rate 1 with Bit Errors (Service Option 2 only)	Blank	Blank	Field not Present
Insufficient Frame Quality (Erasure)	None	Rate 1	11
Insufficient Frame Quality (Erasure)	Not Rate 1	Rate 1/8	11
Insufficient Frame Quality (Erasure)	Blank	Blank	Field not Present

1 **Table 2.5.1-2. Service Option 30 or 31 Data Block Processing**

Data Block Type Received from the Multiplex Sublayer	Rate Restriction	Data Block Type Supplied to the Multiplex Sublayer	CAT_TYPE Field (binary)
Rate 1	None	Rate 1	00
Rate 1	Not Rate 1	Rate 1/2	11
Rate 1	Blank	Blank	Field not Present
Insufficient Frame Quality (Erasure)	None	Rate 1	11
Insufficient Frame Quality (Erasure)	Not Rate 1	Rate 1/8	11
Insufficient Frame Quality (Erasure)	Blank	Blank	Field not Present

2
3 **2.5.1.1 Service Option 2**

4 If the processing delay (see 2.5.2) in looping back the Forward Fundamental Code Channel
5 frame is x frames, then for the first x frames immediately following the connection of the
6 service option, Service Option 2 should supply to the multiplex sublayer data blocks of Rate
7 1/8 in which all primary reverse fundamental data block traffic data bits are set to '1'.
8 Afterwards, the mobile station shall perform the following processing (see 6.1.3.3.11.4 of
9 TIA/EIA-95-B) as specified in Table 2.5.1-1:

- 10 • If Service Option 2 has been commanded to generate a non-blank data block with a
11 maximum rate of Rate 1/2, then:
- 12 - If the received data block is Rate 1, then Service Option 2 shall set the
13 CAT_TYPE field equal to '11' and shall set 78 data bits to the least significant 78
14 of the 169 received data bits. The resulting 80 information bits shall be supplied
15 to the multiplex sublayer as a Rate 1/2 data block.
 - 16 - If the received data block is Rate 1/2, then Service Option 2 shall set the
17 CAT_TYPE field equal to '00' and the 78 data bits to the 78 received data bits.
18 The resulting 80 information bits shall be supplied to the multiplex sublayer as a
19 Rate 1/2 data block.
 - 20 - If the received data block is Rate 1/4, then Service Option 2 shall set the
21 CAT_TYPE field equal to '00' and the 38 data bits to the 38 received data bits.
22 The resulting 40 information bits shall be supplied to the multiplex sublayer as a
23 Rate 1/4 data block.
 - 24 - If the received data block is Rate 1/8, then Service Option 2 shall set the
25 CAT_TYPE field equal to '00' and the 14 data bits to the 14 received data bits.

- 1 The resulting 16 information bits shall be supplied to the multiplex sublayer as a
2 Rate 1/8 data block.
- 3 - If the received data block is Blank, then Service Option 2 shall set the CAT_TYPE
4 field equal to '01' and shall set 78 data bits to any desired value. The resulting
5 80 information bits shall be supplied to the multiplex sublayer as a Rate 1/2
6 data block.
 - 7 - If the received data block is Rate 1 with Bit Errors, then Service Option 2 shall
8 set the CAT_TYPE field equal to '10' and shall set 78 data bits to the least
9 significant 78 of the 169 received data bits. The resulting 80 information bits
10 shall be supplied to the multiplex sublayer as a Rate 1/2 data block.
 - 11 - If the received data block is Insufficient Frame Quality (Erasure), then Service
12 Option 2 shall set the CAT_TYPE field equal to '11' and shall set 14 data bits to
13 any desired value. The resulting 16 information bits shall be supplied to the
14 multiplex sublayer as a Rate 1/8 data block.
- 15 • If Service Option 2 has been commanded to generate a Blank data block, Service
16 Option 2 shall do so, thus providing zero information bits to the multiplex sublayer.
 - 17 • If Service Option 2 has not been commanded to adapt its rates, then:
 - 18 - If the received data block is Rate 1, then Service Option 2 shall set the
19 CAT_TYPE field equal to '00' and the 169 data bits to the 169 received data bits.
20 The resulting 171 information bits shall be supplied to the multiplex sublayer as
21 a Rate 1 data block.
 - 22 - If the received data block is Rate 1/2, then Service Option 2 shall set the
23 CAT_TYPE field equal to '00' and the 78 data bits to the 78 received data bits.
24 The resulting 80 information bits shall be supplied to the multiplex sublayer as a
25 Rate 1/2 data block.
 - 26 - If the received data block is Rate 1/4, then Service Option 2 shall set the
27 CAT_TYPE field equal to '00' and the 38 data bits to the 38 received data bits.
28 The resulting 40 information bits shall be supplied to the multiplex sublayer as a
29 Rate 1/4 data block.
 - 30 - If the received data block is Rate 1/8, then Service Option 2 shall set the
31 CAT_TYPE field equal to '00' and the 14 data bits to the 14 received data bits.
32 The resulting 16 information bits shall be supplied to the multiplex sublayer as a
33 Rate 1/8 data block.
 - 34 - If the received data block is Blank, then Service Option 2 shall set the CAT_TYPE
35 field equal to '01' and shall set 169 data bits to any desired value. The resulting
36 171 information bits shall be supplied to the multiplex sublayer as a Rate 1 data
37 block.
 - 38 - If the received data block is Rate 1 with Bit Errors, then Service Option 2 shall
39 set the CAT_TYPE field equal to '10' and the 169 data bits to the 169 received
40 data bits. The resulting 171 information bits shall be supplied to the multiplex
41 sublayer as a Rate 1 data block.

- 1 - If the received data block is Insufficient Frame Quality (Erasure), then Service
2 Option 2 shall set the CAT_TYPE field equal to '11' and shall set 169 data bits to
3 any desired value. The resulting 171 information bits shall be supplied to the
4 multiplex sublayer as a Rate 1 data block.

5 2.5.1.2 Service Option 9

6 If the processing delay (see 2.5.2) in looping back the Forward Fundamental Code Channel
7 frame is x frames, then for the first x frames immediately following the connection of the
8 service option, Service Option 9 should supply to the multiplex sublayer data blocks of Rate
9 1/8 in which all primary reverse fundamental data block traffic data bits are set to '1'.
10 Afterwards, the mobile station shall perform the following processing (see 6.1.3.3.12.4 of
11 TIA/EIA-95-B) as specified in Table 2.5.1-1:

- 12 • If Service Option 9 has been commanded to generate a non-blank data block with a
13 maximum rate of Rate 1/2, then:
 - 14 - If the received data block is Rate 1, then Service Option 9 shall set the
15 CAT_TYPE field equal to '11' and shall set 122 data bits to the least significant
16 122 of the 264 received data bits. The resulting 124 information bits shall be
17 supplied to the multiplex sublayer as a Rate 1/2 data block.
 - 18 - If the received data block is Rate 1/2, then Service Option 9 shall set the
19 CAT_TYPE field equal to '00' and the 122 data bits to the 122 received data bits.
20 The resulting 124 information bits shall be supplied to the multiplex sublayer as
21 a Rate 1/2 data block.
 - 22 - If the received data block is Rate 1/4, then Service Option 9 shall set the
23 CAT_TYPE field equal to '00' and the 52 data bits to the 52 received data bits.
24 The resulting 54 information bits shall be supplied to the multiplex sublayer as a
25 Rate 1/4 data block.
 - 26 - If the received data block is Rate 1/8, then Service Option 9 shall set the
27 CAT_TYPE field equal to '00' and the 18 data bits to the 18 received data bits.
28 The resulting 20 information bits shall be supplied to the multiplex sublayer as a
29 Rate 1/8 data block.
 - 30 - If the received data block is Blank, then Service Option 9 shall set the CAT_TYPE
31 field equal to '01' and shall set 122 data bits to any desired value. The resulting
32 124 information bits shall be supplied to the multiplex sublayer as a Rate 1/2
33 data block.
 - 34 - If the received data block is Insufficient Frame Quality (Erasure), then Service
35 Option 9 shall set the CAT_TYPE field equal to '11' and shall set 18 data bits to
36 any desired value. The resulting 20 information bits shall be supplied to the
37 multiplex sublayer as a Rate 1/8 data block.
- 38 • If Service Option 9 has been commanded to generate a Blank data block, Service
39 Option 9 shall do so, thus providing zero information bits to the multiplex sublayer.
- 40 • If Service Option 9 has not been commanded to adapt its rates, then:

- 1 - If the received data block is Rate 1, then Service Option 9 shall set the
2 CAT_TYPE field equal to '00' and the 264 data bits to the 264 received data bits.
3 The resulting 266 information bits shall be supplied to the multiplex sublayer as
4 a Rate 1 data block.
- 5 - If the received data block is Rate 1/2, then Service Option 9 shall set the
6 CAT_TYPE field equal to '00' and the 122 data bits to the 122 received data bits.
7 The resulting 124 information bits shall be supplied to the multiplex sublayer as
8 a Rate 1/2 data block.
- 9 - If the received data block is Rate 1/4, then Service Option 9 shall set the
10 CAT_TYPE field equal to '00' and the 52 data bits to the 52 received data bits.
11 The resulting 54 information bits shall be supplied to the multiplex sublayer as a
12 Rate 1/4 data block.
- 13 - If the received data block is Rate 1/8, then Service Option 9 shall set the
14 CAT_TYPE field equal to '00' and the 18 data bits to the 18 received data bits.
15 The resulting 20 information bits shall be supplied to the multiplex sublayer as a
16 Rate 1/8 data block.
- 17 - If the received data block is Blank, then Service Option 9 shall set the CAT_TYPE
18 field equal to '01' and shall set 264 data bits to any desired value. The resulting
19 266 information bits shall be supplied to the multiplex sublayer as a Rate 1 data
20 block.
- 21 - If the received data block is Insufficient Frame Quality (Erasure), then Service
22 Option 9 shall set the CAT_TYPE field equal to '11' and shall set 264 data bits to
23 any desired value. The resulting 266 information bits shall be supplied to the
24 multiplex sublayer as a Rate 1 data block.

25 2.5.1.3 Service Option 30

26 If the processing delay (see 2.5.2) in looping back the Forward Supplemental Code Channel
27 frame is x frames, then for the first x frames immediately following the connection of the
28 service option, Service Option 30 should supply to the multiplex sublayer data blocks of
29 Rate 1/8 in which all primary reverse fundamental data block traffic data bits are set to '1'.
30 Afterwards, the mobile station shall perform the following processing (see 6.1.3.3.13.4 of
31 TIA/EIA-95-B) as specified in Table 2.5.1-2:

- 32 • If Service Option 30 has been commanded to generate a non-blank data block with a
33 maximum rate of Rate 1/2, then:
 - 34 - If the received data block is Rate 1, then Service Option 30 shall set the
35 CAT_TYPE field equal to '11' and shall set 78 data bits to the least significant 78
36 of the 169 received data bits. The resulting 80 information bits shall be supplied
37 to the multiplex sublayer as a Rate 1/2 data block.
 - 38 - If the received data block is Insufficient Frame Quality (Erasure), then Service
39 Option 30 shall set the CAT_TYPE field equal to '11' and shall set 14 data bits to
40 any desired value. The resulting 16 information bits shall be supplied to the
41 multiplex sublayer as a Rate 1/8 data block.

- 1 • If Service Option 30 has been commanded to generate a Blank data block, Service
2 Option 30 shall do so, thus providing zero information bits to the multiplex sublayer.
- 3 • If Service Option 30 has not been commanded to adapt its rates, then:
 - 4 - If the received data block is Rate 1, then Service Option 30 shall set the
5 CAT_TYPE field equal to '00' and the 169 data bits to the 169 received data bits.
6 The resulting 171 information bits shall be supplied to the multiplex sublayer as
7 a Rate 1 data block.
 - 8 - If the received data block is Insufficient Frame Quality (Erasure), then Service
9 Option 30 shall set the CAT_TYPE field equal to '11' and shall set 169 data bits
10 to any desired value. The resulting 171 information bits shall be supplied to the
11 multiplex sublayer as a Rate 1 data block.

12 2.5.1.4 Service Option 31

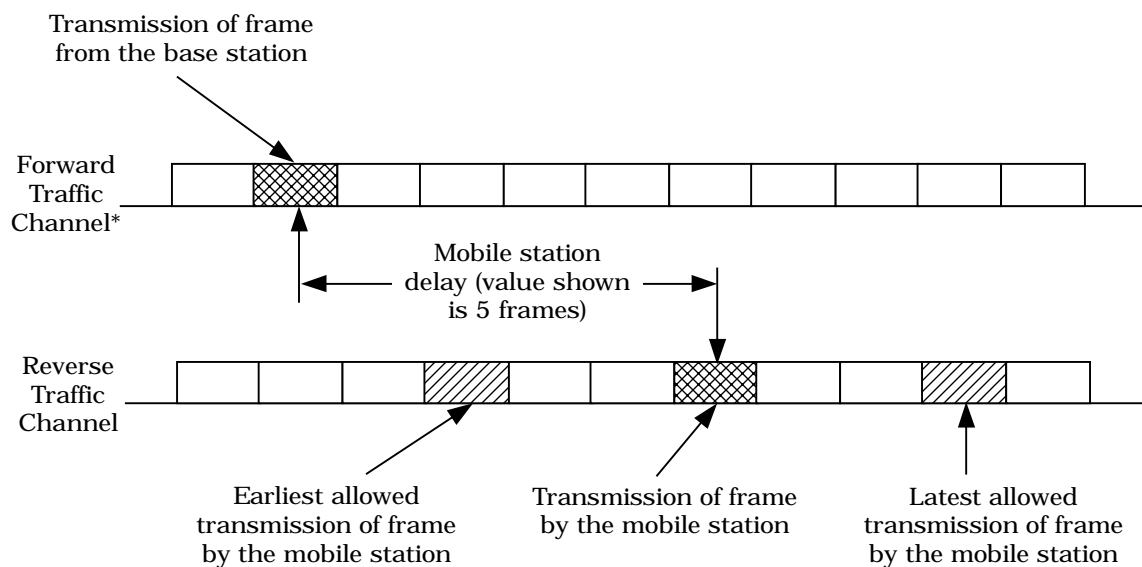
13 If the processing delay (see 2.5.2) in looping back the Forward Supplemental Channel frame
14 is x frames, then for the first x frames immediately following the connection of the service
15 option, Service Option 31 should supply to the multiplex sublayer data blocks of Rate 1/8
16 in which all primary reverse fundamental data block traffic data bits are set to '1'.
17 Afterwards, the mobile station shall perform the following processing (see 6.1.3.3.14.4 of
18 TIA/EIA-95-B) as specified in Table 2.5.1-2:

- 19 • If Service Option 31 has been commanded to generate a non-blank data block with a
20 maximum rate of Rate 1/2, then:
 - 21 - If the received data block is Rate 1, then Service Option 31 shall set the
22 CAT_TYPE field equal to '11' and shall set 122 data bits to the least significant
23 122 of the 264 received data bits. The resulting 124 information bits shall be
24 supplied to the multiplex sublayer as a Rate 1/2 data block.
 - 25 - If the received data block is Insufficient Frame Quality (Erasure), then Service
26 Option 31 shall set the CAT_TYPE field equal to '11' and shall set 18 data bits to
27 any desired value. The resulting 20 information bits shall be supplied to the
28 multiplex sublayer as a Rate 1/8 data block.
- 29 • If Service Option 31 has been commanded to generate a Blank data block, Service
30 Option 31 shall do so, thus providing zero information bits to the multiplex sublayer.
- 31 • If Service Option 31 has not been commanded to adapt its rates, then:
 - 32 - If the received data block is Rate 1, then Service Option 31 shall set the
33 CAT_TYPE field equal to '00' and the 264 data bits to the 264 received data bits.
34 The resulting 266 information bits shall be supplied to the multiplex sublayer as
35 a Rate 1 data block.

- 1 - If the received data block is Insufficient Frame Quality (Erasure), then Service
 2 Option 31 shall set the CAT_TYPE field equal to '11' and shall set 264 data bits
 3 to any desired value. The resulting 266 information bits shall be supplied to the
 4 multiplex sublayer as a Rate 1 data block.

5 2.5.2 Processing Delays

6 While Service Option 2, 9, 30, or 31 is connected, the mobile station shall maintain a fixed
 7 delay (as measured at the antenna connector) between Forward Traffic Channel frames it
 8 receives and their corresponding Reverse Traffic Channel frames produced from the data
 9 blocks generated by Service Option 2, 9, 30, or 31 as specified in 2.5.1. The value of the
 10 delay shall not vary during a call. The value of the delay shall not be less than two frames
 11 and shall not exceed eight frames.



14 * either Fundamental Code Channel frame or Supplemental Code Channel frame, depending upon
 15 the Mobile Station Loopback service.

16 **Figure 2.5.2-1. Allowable Mobile Station Processing Delays**

18 2.6 Computing Error Rate Statistics at the Base Station

19 The receiving side of Service Option 2, 9, 30, or 31 within the base station should compute
 20 both Forward Traffic Channel and Reverse Traffic Channel frame error rates as described in
 21 the following sections.

22 2.6.1 Forward Traffic Channel Frame Error Rates

23 2.6.1.1 Forward Fundamental Code Channel Frame Error Rate

1 If the Reverse Fundamental Code Channel is error free, the error rate for fundamental data
2 blocks transmitted on the Forward Fundamental Code Channel can be computed as follows:

3 Define the following indicator variables for Rate x:

- 4 • I_x is equal to 1 if the base station generated a Rate x fundamental data block for the
5 frame; otherwise, I_x is equal to 0;
- 6 • I_{xx} is equal to 1 if all the following conditions are met:
 - 7 - the base station generates a Rate x fundamental data block for the frame,
 - 8 - the base station receives a Rate x fundamental data block with no errors, and
 - 9 - the received CAT_TYPE is equal to '00'.

10 Otherwise, I_{xx} is equal to 0;

- 11 • I_{xb} is equal to 1 if the the following conditions are met:
 - 12 - the base station generates a Rate x fundamental data block for the frame, and
 - 13 - the base station receives a Blank fundamental data block.

14 Otherwise, I_{xb} is equal to 0;

- 15 • I_{1d} is equal to 1 if the following conditions are met:
 - 16 - the base station generates a Rate 1 fundamental data block for the frame, and
 - 17 - the base station receives a Rate 1/2 fundamental data block with CAT_TYPE
18 equal to '11'.

19 Otherwise, I_{1d} is equal to 0.

20 The error rate for Rate 1 fundamental data blocks ($FDBER_1$) is:

$$21 \quad FDBER_1 = 1 - \frac{I_{11}}{(I_1 - I_{1b} - I_{1d})},$$

22 and the error rate for Rate 1/2, Rate 1/4, and Rate 1/8 fundamental data blocks
23 ($FDBER_{1/2}$, $FDBER_{1/4}$, and $FDBER_{1/8}$) is:

$$24 \quad FDBER_x = 1 - \frac{I_{xx}}{(I_x - I_{xb})},$$

25 where the summation is taken over the measurement interval. When secondary traffic is
26 not being used, the Forward Fundamental Code Channel frame error rate is approximately
27 the fundamental data block error rate.

28 2.6.1.2 Forward Supplemental Code Channel Frame Error Rate

29 If the Reverse Fundamental Code Channel is error free, the error rate for supplemental data
30 blocks transmitted on the Forward Supplemental Code Channel can be computed as
31 follows:

32 Define the following indicator variables for Rate 1:

- 1 • I_1 is equal to 1 if the base station generated a Rate 1 supplemental data block for the
2 frame; otherwise, I_1 is equal to 0;
- 3 • I_{11} is equal to 1 if all the following conditions are met:
- 4 - the base station generates a Rate 1 supplemental data block for the frame,
5 - the base station receives a Rate 1 fundamental data block with no errors, and
6 - the received CAT_TYPE is equal to '00'.
7 Otherwise, I_{11} is equal to 0;
- 8 • I_{1b} is equal to 1 if the following conditions are met:
- 9 - the base station generates a Rate 1 supplemental data block for the frame, and
10 - the base station receives a Blank fundamental data block.
11 Otherwise, I_{1b} is equal to 0;
- 12 • I_{1d} is equal to 1 if the following conditions are met:
- 13 - the base station generates a Rate 1 supplemental data block for the frame, and
14 - the base station receives a Rate 1/2 fundamental data block with CAT_TYPE
15 equal to '11'.
16 Otherwise, I_{1d} is equal to 0.

17 The error rate for Rate 1 supplemental data blocks ($SDBER_1$) is:

$$18 \quad SDBER_1 = 1 - \frac{I_{11}}{(I_1 - I_{1b} - I_{1d})},$$

19 where the summation is taken over the measurement interval. When secondary traffic is
20 not being used, the Forward Supplemental Code Channel frame error rate is approximately
21 the supplemental data block error rate.

22 2.6.2 Reverse Traffic Channel Frame Error Rates

23 2.6.2.1 Reverse Fundamental Code Channel Frame Error Rate

24 For Service Option 2 and 9, if the Forward Fundamental Code Channel is error free, the
25 error rate for fundamental data blocks transmitted on the Reverse Fundamental Code
26 Channel can be computed as described in 2.6.1.1.

27 For Service Option 30 and 31, if the Forward Supplemental Code Channel is error free, the
28 error rate for fundamental data blocks transmitted on the Reverse Fundamental Code
29 Channel can be computed as described in 2.6.1.2.

30 2.6.2.2 Reverse Supplemental Code Channel Frame Error Rate

31 The Mobile Station Loopback service option does not support computing of the Reverse
32 Supplemental Code Channel frame error rate.

C.S0013-0

1

2 No text.