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PROJECT 2
"3GPP2"

Loopback Service Options (LSO) for cdma2000 Spread Spectrum Systems

Release A

(Ballot Resolution Version)

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NOTES

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1. “Base station” refers to the functions performed on the landline side, which are typically distributed among a cell, a sector of a cell, and a mobile switching center.
2. This Standard uses the following verbal forms: “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.
3. Unless indicated otherwise, this document presents numbers in decimal form. Binary numbers are distinguished in the text by the use of single quotation marks.

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.

1. *3GPP2 C.S0010-A, Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Spread Spectrum Mobile Stations.*
2. *3GPP2 C.S0011-A, Recommended Minimum Performance Standards for Dual-Mode Spread Spectrum Mobile Stations.*
3. *3GPP2 C.S0003-A, Medium Access Control Standard for cdma2000 Spread Spectrum Systems.*
4. *3GPP2 C.S0005-A, Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems.*
5. *3GPP2 C.P9003-A, Multi-Carrier Specification for Spread Spectrum on GSM MAP (MC-MAP).*

1. GENERAL

1.1 Terms and Numeric Information

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, or another part of the wireless system.

Blank-and-burst. The preemption of the traffic in an entire traffic channel frame by another form of traffic, typically signaling.

Data Block. The unit of data exchanged between the multiplex sublayer and the MSO.

Dim-and-burst. A frame in which primary traffic is multiplexed with secondary, signaling, or secondary and signaling traffic.

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

Forward Supplemental Code Channel. A portion of a Forward Traffic Channel which operates in conjunction with a Forward Fundamental Code Channel in that Forward Traffic Channel, and (optionally) with other Forward Supplemental Code Channels to provide higher data rate services, and on which higher-level data is transmitted.

Forward Traffic Channel. A code channel used to transport user and signaling traffic from a base station to a mobile station.

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

Fundamental Code Channel. A portion of a Forward or Reverse Traffic Channel which carries a combination of higher-level data and power control information (specific to IS-95B systems).

Mobile Station. A station intended to be used while in motion or during halts at unspecified points. Mobile stations include portable units (e.g., hand-held personal units) and units installed in vehicles.

Multiplex Option. The ability of the multiplex sublayer and lower layers to be tailored to provide special capabilities. A multiplex option defines such characteristics as the frame format and rate decision rules (see also Multiplex Sublayer).

Multiplex Sublayer. One of the conceptual layers of the system that multiplexes and demultiplexes primary traffic, secondary traffic, and signaling traffic (see [3]).

P_REV. Protocol revision level supported by a base station.

Primary Traffic. Data bits from a service that has the traffic type in the Service Configuration Record set to Primary.

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

- 1 **RC.** See Radio configuration.
- 2 **Reverse Fundamental Code Channel.** A portion of a Reverse Traffic Channel that carries a
3 combination of higher-level data and power control information.
- 4 **Reverse Traffic Channel.** A Reverse CDMA Channel used to transport user and signaling
5 traffic from a single mobile station to one or more base stations.
- 6 **Secondary Traffic.** Data bits from a service that has the traffic type in the Service
7 Configuration Record set to Secondary.
- 8 **Service Option.** A service capability of the system. Service options may be applications
9 such as voice, data, or facsimile etc.
- 10 **Signaling Traffic.** Control messages that are carried between mobile station and the base
11 station on the Traffic Channel.

2. SERVICE OPTION 2, 9, 30, 31, AND 55

2.1 General Description

Service Options 2, 9, 30, 31, and 55 are defined in this document.

Service Option 2 and 9 allow testing of the Fundamental Code Channel for systems with RC 1 and RC 2, respectively. Service Option 30 and 31 allow testing of the Forward Supplemental Code Channel for systems with RC 1 and RC 2, respectively.

Service Option 55 allows testing of the Fundamental Channel for systems with all radio configurations, and with P_REV equal to 6 or higher. Based on the service option number 55 and the preferred RC indicated during call set-up, the correct multiplex option can be derived without ambiguity. When Service Option 55 is used with Multiplex Option 0x01, most of the mobile station procedures for Service Option 2 apply. When Service Option 55 is used with Multiplex Option 0x02, most of the mobile station procedures for Service Option 9 apply.

These service options 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. In addition, 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 [1] and [2].

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 0x01 primary traffic) or 266, 124, 54, 20, or 0 bits (for Multiplex Option 0x02 primary traffic). The base station can generate a data block size of 171 bits (for Multiplex Option 0x03 primary traffic) or 266 bits (for Multiplex Option 0x04 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 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 upon the multiplex option. The mobile station replaces the first two bits of

1 the data block with frame categorization information obtained from the Forward Traffic
 2 Channel, so that the base station can obtain information about the quality of the Forward
 3 Traffic Channel.

4 2.2 Service Option Numbers

5 For systems with P_REV equal to 5 or lower, the service option described by this standard
 6 shall use service option number 2 and is called Service Option 2 when using the Forward
 7 Fundamental Code Channel with Multiplex Option 1. It shall use service option number 9
 8 and is called Service Option 9 when using the Forward Fundamental Code Channel with
 9 Multiplex Option 0x02. It shall use service option number 30 and is called Service Option
 10 30 when using the Forward Supplemental Code Channel with Multiplex Option 0x03. It
 11 shall use service option number 31 and is called Service Option 31 when using the Forward
 12 Supplemental Code Channel with Multiplex Option 0x04.

13 For systems with P_REV equal to 6 or higher, the service option described by this standard
 14 shall use service option number 55 and is called Service Option 55. The multiplex option in
 15 use can be either 0x01 or 0x02 depending upon the RC configured based on Table 2.2-1.

16 **Table 2.2-1. Multiplex Option in use for Service Option 55**

Multiplex Option in use	Forward Fundamental Channel RC	Reverse Fundamental Channel RC
0x01	1, 3, 4, 6, or 7	1, 3, or 5
0x02	2, 5, 8, or 9	2, 4, or 6

17 2.3 Multiplex Option

18 2.3.1 Required Multiplex Option Support

19 2.3.1.1 Service Option 2

20 Service Option 2 shall support an interface with Multiplex Option 0x01. Service Option 2
 21 data blocks shall only be transported as primary traffic on the Forward and Reverse
 22 Fundamental Code Channels. Data block transport between Service Option 2 and Multiplex
 23 Option 0x01 shall ensure that the leftmost bit of a Service Option 2 data block (as defined
 24 in 2.4.1) shall correspond to the leftmost bit of the primary fundamental data block.

25 2.3.1.2 Service Option 9

26 Service Option 9 shall support an interface with Multiplex Option 0x02. Service Option 9
 27 data blocks shall only be transported as primary traffic on the Forward and Reverse
 28 Fundamental Code Channels. Data block transport between Service Option 9 and Multiplex
 29 Option 0x02 shall ensure that the leftmost bit of a Service Option 9 data block (as defined
 30 in 2.4.2) shall correspond to the leftmost bit of the primary fundamental data block .

31 2.3.1.3 Service Option 30

32 Service Option 30 shall support an interface with Multiplex Option 0x03. Service Option 30
 33 data blocks shall only be transported as primary traffic on the Forward Supplemental Code

1 Channel and Reverse Fundamental Code Channel. Data block transport between Service
2 Option 30 and Multiplex Option 0x03 shall ensure that the leftmost bit of a Service Option
3 30 data block (as defined in 2.4.3) shall correspond to the leftmost bit of the primary
4 supplemental data block.

5 2.3.1.4 Service Option 31

6 Service Option 31 shall support an interface with Multiplex Option 0x04. Service Option 31
7 data blocks shall only be transported as primary traffic on the Forward Supplemental Code
8 Channel and Reverse Fundamental Code Channel. Data block transport between Service
9 Option 31 and Multiplex Option 0x04 shall ensure that the leftmost bit of a Service Option
10 31 data block (as defined in 2.4.4) shall correspond to the leftmost bit of the primary
11 supplemental data block.

12 2.3.1.5 Service Option 55

13 When Service Option 55 is used with Multiplex Option 0x01, the mobile station shall follow
14 the requirement in 2.3.1.1 for Service Option 2 as if Service Option 2 were used.

15 When Service Option 55 is used with Multiplex Option 0x02, the mobile station shall follow
16 the requirement in 2.3.1.1 for Service Option 9 as if Service Option 9 were used.

17 When Service Option 55 is used, any mentioning of Fundamental Code Channel shall be
18 regarded as Fundamental Channel.

19 2.3.2 Interface to Multiplex Options

20 2.3.2.1 Service Option 2

21 2.3.2.1.1 Transmitted Fundamental Data Blocks

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

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

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

3 A Rate 1 fundamental data block corresponds to a 9600 bps Fundamental Code Channel
 4 frame with 171 primary fundamental data block bits. A Rate 1/2 fundamental data block
 5 corresponds to a 4800 bps Fundamental Code Channel frame or to a dim-and-burst
 6 Fundamental Code Channel frame with 80 primary fundamental data block bits. A Rate
 7 1/4 fundamental data block corresponds to a 2400 bps Fundamental Code Channel frame
 8 or to a dim-and-burst Fundamental Code Channel frame with 40 primary fundamental data
 9 block bits. A Rate 1/8 fundamental data block corresponds to a 1200 bps Fundamental
 10 Code Channel frame or to a dim-and-burst Fundamental Code Channel frame with 16
 11 primary fundamental data block bits. A Blank fundamental data block corresponds to a
 12 blank-and-burst Fundamental Code Channel frame.

13 2.3.2.1.2 Received Fundamental Data Blocks

14 The multiplex sublayer in the mobile station categorizes every received Forward
 15 Fundamental Code Channel frame (see [3]), and supplies the fundamental data block type
 16 and accompanying bits, if any, to Service Option 2 as shown in Table 2.3.2.1.2-1. Service
 17 Option 2 processes the bits of the fundamental data block as described in 2.5. The first five
 18 received fundamental data block types shown in Table 2.3.2.1.2-1 correspond to the
 19 transmitted fundamental data block types shown in Table 2.3.2.1.1-1. (The Blank
 20 fundamental data block type occurs when the receiving station determines that a blank-
 21 and-burst Fundamental Code Channel frame for signaling traffic or secondary traffic was
 22 transmitted.) The Rate 1 with Bit Errors fundamental data block type occurs when the
 23 receiving station determines that the Fundamental Code Channel frame was transmitted at
 24 9600 bps and the Fundamental Code Channel frame has one or more bit errors. The
 25 Insufficient Frame Quality fundamental data block type occurs when the mobile station is
 26 unable to decide upon the data rate of the received Fundamental Code Channel frame or
 27 when the mobile station detects a Fundamental Code Channel frame in error which does
 28 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.

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

Table 2.3.2.2.1-1. Fundamental Data block Types Supplied by Service Option 9 to the 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

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 7200 bps Fundamental Code Channel frame or to a dim-and-burst Fundamental Code Channel frame with 124 primary fundamental data block bits. A Rate 1/4 fundamental data block corresponds to a 3600 bps Fundamental Code Channel frame

1 or to a dim-and-burst Fundamental Code Channel frame with 54 primary fundamental data
 2 block bits. A Rate 1/8 fundamental data block corresponds to an 1800 bps Fundamental
 3 Code Channel frame or to a dim-and-burst Fundamental Code Channel frame with 20
 4 primary fundamental data block bits. A Blank fundamental data block corresponds to a
 5 blank-and-burst Fundamental Code Channel frame.

6 2.3.2.2.2 Received Fundamental Data Blocks

7 The multiplex sublayer in the mobile station categorizes every received Forward
 8 Fundamental Code Channel frame (see [3]), and supplies the fundamental data block type
 9 and accompanying bits, if any, to Service Option 9 as shown in Table 2.3.2.2.2-1. Service
 10 Option 9 processes the bits of the fundamental data block as described in 2.5. The first five
 11 received fundamental data block types shown in Table 2.3.2.2.2-1 correspond to the
 12 transmitted fundamental data block types shown in Table 2.3.2.2.1-1. (The Blank
 13 fundamental data block type occurs when the receiving station determines that a blank-
 14 and-burst Fundamental Code Channel frame for signaling traffic or secondary traffic was
 15 transmitted.) The Insufficient Frame Quality fundamental data block type occurs when the
 16 mobile station is unable to decide upon the data rate of the received Fundamental Code
 17 Channel frame or when the mobile station detects a frame in error.

18 **Table 2.3.2.2.2-1. Fundamental Data Block Types Supplied by the Multiplex Sublayer**
 19 **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

20 2.3.2.3 Service Option 30

21 2.3.2.3.1 Transmitted Fundamental Data Blocks

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

29 Unless otherwise commanded, Service Option 30 shall supply a Rate 1 fundamental data
 30 block. Upon command, Service Option 30 shall generate a Blank fundamental data block.
 31 Also upon command, Service Option 30 shall generate a non-blank fundamental data block
 32 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 an 1200 bps Fundamental Code Channel frame or 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 [3]), 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 fundamental 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 Forward Supplemental Code Channel frame in error or when the mobile station detects that a blank-and-burst Forward Supplemental Code Channel frame for secondary traffic was transmitted.

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 four 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

1 the generated fundamental data block shall be based upon the contents of the received
2 supplemental data block and shall be constructed per the requirements of 2.5.1.4.

3 Unless otherwise commanded, Service Option 31 shall supply a Rate 1 fundamental data
4 block. Upon command, Service Option 31 shall generate a Blank fundamental data block.
5 Also upon command, Service Option 31 shall generate a non-blank fundamental data block
6 with a maximum rate of Rate 1/2.

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

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

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 dim-and-burst Fundamental Code Channel frame with 124 primary
12 fundamental data block bits. A Rate 1/8 fundamental data block corresponds to an 1800
13 bps Fundamental Code Channel frame or a dim-and-burst Fundamental Code Channel
14 frame with 20 primary fundamental data block bits. A Blank fundamental data block
15 corresponds to a blank-and-burst Fundamental Code Channel frame.

16 2.3.2.4.2 Received Supplemental Data Blocks

17 The multiplex sublayer in the mobile station categorizes every received Forward
18 Supplemental Code Channel frame (see [3]), and supplies the supplemental data block type
19 and accompanying bits, if any, to Service Option 31 as shown in Table 2.3.2.4.2-1. Service
20 Option 31 processes the bits of the supplemental data block as described in 2.5. The first
21 received supplemental data block type shown in Table 2.3.2.4.2-1 corresponds to the
22 transmitted fundamental data block type shown in Table 2.3.2.4.1-1. The Insufficient
23 Frame Quality supplemental data block type occurs when the mobile station detects a
24 Forward Supplemental Code Channel frame in error or when the mobile station detects that
25 a blank-and-burst Forward Supplemental Code Channel frame for secondary traffic was
26 transmitted.

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

2.3.2.5 Service Option 55

2.3.2.5.1 Transmitted Fundamental Data Blocks

If Multiplex Option 0x01 is used, the mobile station shall follow the descriptions of 2.3.2.1.1 for Service Option 2 as if Service Option 2 were used.

If Multiplex Option 0x02 is used, the mobile station shall follow the descriptions of 2.3.2.2.1 for Service Option 9 as if Service Option 9 were used.

2.3.2.5.2 Received Fundamental Data Blocks

If Multiplex Option 0x01 is used, the mobile station shall follow the descriptions of 2.3.2.1.2 for Service Option 2 as if Service Option 2 were used.

If Multiplex Option 0x02 is used, the mobile station shall follow the descriptions of 2.3.2.2.2 for Service Option 9 as if Service Option 9 were used.

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).

The mobile station and base station can negotiate for Service Option 55 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 [4]. The base station shall perform service option negotiation for Service Option 2 as described in [4].

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 [4]) according to the following requirements:

- If service option negotiation is completed as a result of the base station sending a *Service Option Response Order*, then the mobile station shall declare the service option to be active at the explicit or implicit action time associated with the *Service Option Response Order*.

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

8 2.3.3.1.1 Initialization and Connection in the Mobile Station

9 No initialization is required for Service Option 2.

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

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

20 When Service Option 2 is connected, Service Option 2 shall begin processing data blocks it
21 obtains from the receiving side of the multiplex sublayer as specified in 2.5. Refer to [4] for
22 procedures to be followed when Service Option 2 is not connected.

23 2.3.3.1.2 Initialization and Connection in the Base Station

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

27 When Service Option 2 is connected, Service Option 2 shall generate and provide test data
28 blocks to the transmitting side of the multiplex sublayer as specified in 2.4.1. Refer to [4]
29 for procedures to be followed when Service Option 2 is not connected.

¹ 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*.

2.3.3.1.3 Service Option Control Orders

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

2.3.3.2 Procedures Using Service Negotiation

2.3.3.2.1 Mobile Station Requirements

The mobile station shall perform service negotiation for Service Option 2, 9, 30, 31, or 55 as described in [4]. The mobile station shall only propose service configurations for Service Option 2, 9, 30, 31, or 55 with attributes as specified in Tables 2.3.3.2.1-1, 2.3.3.2.1-2, 2.3.3.2.1-3, 2.3.3.2.1-4, and 2.3.3.2.1-5, respectively. The mobile 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, 2.3.3.2.1-4, and 2.3.3.2.1-5, respectively.

When using Service Option 55, for a mobile station operating in MC-41 mode, the mobile station shall indicate the preferred Forward RC and Reverse RC in the FOR_RC_PREF field and the REV_RC_PREF field, respectively, in the *Page Response Message* and *Origination Message*. For a mobile station operating in MC-MAP mode (see [5]), the mobile station shall indicate the preferred Forward RC and Reverse RC in the FOR_RC_PREF field and the REV_RC_PREF field, respectively, in the *MC-MAP RRC Connection Request Message*.

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 0x01
Reverse Multiplex Option	Multiplex Option 0x01
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 Forward Fundamental Code Channel
Reverse Traffic Type	Primary Traffic on Reverse Fundamental Code Channel

2 **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 0x02
Reverse Multiplex Option	Multiplex Option 0x02
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 Forward Fundamental Code Channel
Reverse Traffic Type	Primary Traffic on Reverse Fundamental Code Channel

3

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 0x03
Reverse Multiplex Option	Multiplex Option 0x01
Forward Transmission Rates	Rate Set 1
Reverse Transmission Rates	Rate Set 1
Forward Traffic Type	Primary Traffic on Forward Supplemental Code Channel
Reverse Traffic Type	Primary Traffic on Reverse Fundamental Code Channel

2 **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 0x04
Reverse Multiplex Option	Multiplex Option 0x02
Forward Transmission Rates	Rate Set 2
Reverse Transmission Rates	Rate Set 2
Forward Traffic Type	Primary Traffic on Forward Supplemental Code Channel
Reverse Traffic Type	Primary Traffic on Reverse Fundamental Code Channel

3 **Table 2.3.3.2.1-5. Valid Service Configuration Attributes for Service Option 55**

Service Configuration Attribute	Valid Selections
Forward Multiplex Option	Multiplex Option 0x01 or 0x02
Reverse Multiplex Option	Same as Forward Multiplex Option
Forward Fundamental Channel RC	1, 3, 4, 6, or 7 with Multiplex Option 0x01 2, 5, 8, or 9 with Multiplex Option 0x02
Reverse Fundamental Channel RC	1, 3, or 5 with Multiplex Option 0x01 2, 4, or 6 with Multiplex Option 0x02
Forward Traffic Type	Primary Traffic on Forward Fundamental Channel
Reverse Traffic Type	Primary Traffic on Reverse Fundamental Channel

1 If the mobile station accepts a service configuration, as specified in a *Service Connect*
2 *Message*, that includes a service option connection using Service Option 2, 9, 30, 31, or 55
3 then, commencing at the action time associated with the *Service Connect Message* and
4 continuing for as long as the service configuration includes the service option connection,
5 Service Option 2, 9, 30, 31, or 55 shall process received test data blocks and generate and
6 shall supply test data blocks for transmission in accordance with this standard.

7 If a service option connection associated with Service Option 2, 9, 30, 31, or 55 is part of
8 the current service configuration when the mobile station enters the *Waiting for Mobile*
9 *Station Answer Substate*, or if a service option connection associated with Service Option 2,
10 9, 30, 31, or 55 becomes part of the current service configuration while the mobile station
11 is in the *Waiting for Mobile Station Answer Substate*, the mobile station shall initiate an
12 auto-answer as described in 2.3.3.1.1.

13 The mobile station shall not send a *Service Option Control Message* for Service Option 2, 9,
14 30, 31, or 55.

15 2.3.3.2.2 Base Station Requirements

16 The base station shall perform service negotiation for Service Option 2, 9, 30, 31, or 55 as
17 described in [4]. The base station shall only propose service configurations for Service
18 Option 2, 9, 30, 31, or 55 with attributes as specified in Tables 2.3.3.2.1-1, 2.3.3.2.1-2,
19 2.3.3.2.1-3, 2.3.3.2.1-4, and 2.3.3.2.1-5, respectively. The base station shall reject any
20 service configuration for Service Option 2, 9, 30, or 31 with attributes different from those
21 specified in Tables 2.3.3.2.1-1, 2.3.3.2.1-2, 2.3.3.2.1-3, 2.3.3.2.1-4, and 2.3.3.2.1-5,
22 respectively.

23 If the base station establishes a service configuration, as specified in a *Service Connect*
24 *Message*, that includes a service option connection using Service Option 2, 9, 30, 31, or 55
25 then, commencing at the action time associated with the *Service Connect Message* and
26 continuing for as long as the service configuration includes the service option connection,
27 Service Option 2, 9, 30, 31, or 55 shall generate and shall supply test data blocks for
28 transmission in accordance with this standard.

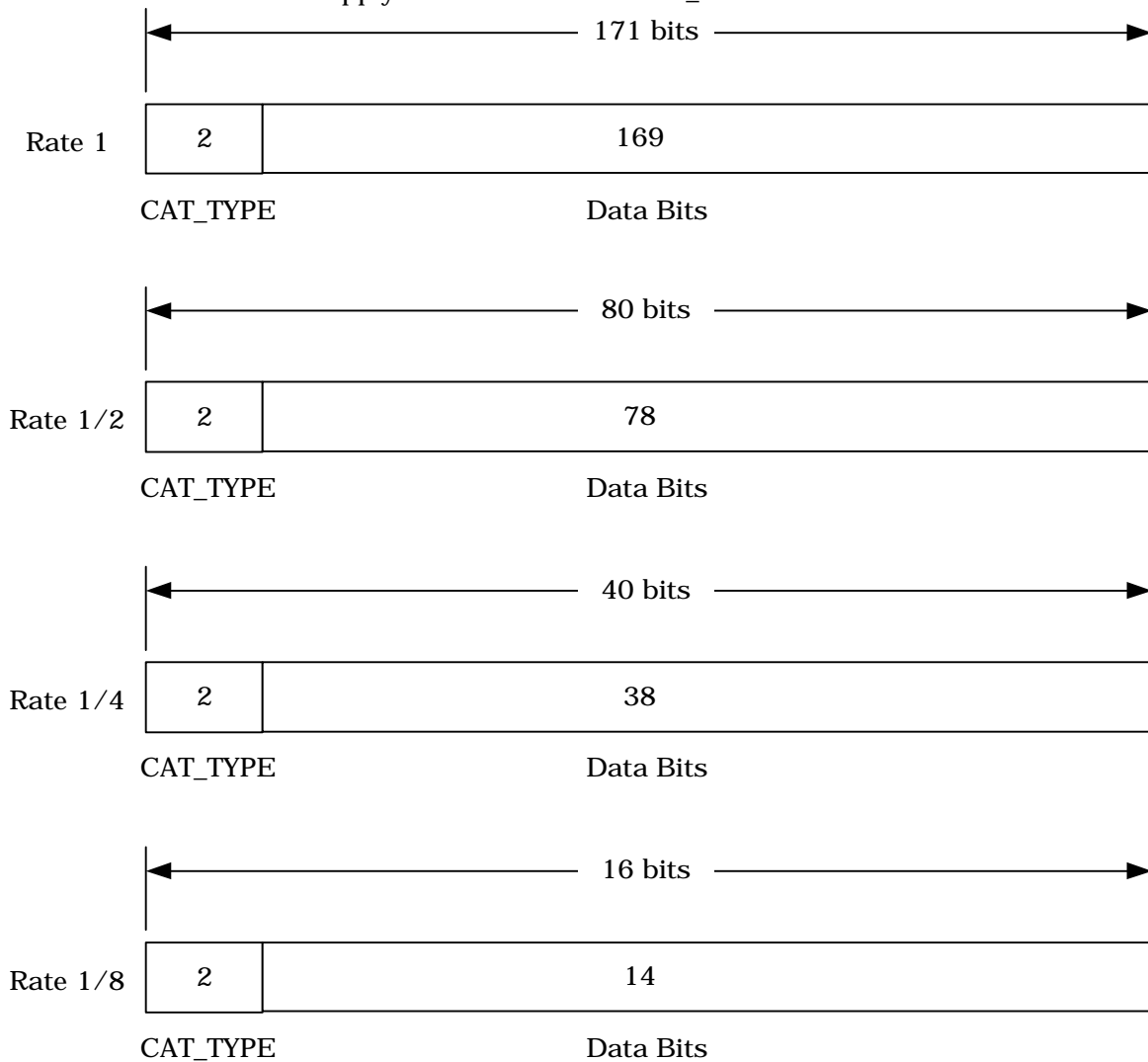
29 The base station shall not send a *Service Option Control Message* for Service Option 2, 9, 30,
30 31, or 55.

31 2.4 Data Block Information Bits

32 2.4.1 Service Option 2

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

- 1 The base station shall supply the number of information bits shown in Table 2.3.2.1.1-1.²
- 2 The base station may use any bit pattern for both the data bits and the CAT_TYPE field.
- 3 The mobile station shall supply the number of information bits shown in Table 2.3.2.1.1-1.
- 4 The mobile station shall supply the data bits and CAT_TYPE field as described in 2.5.



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

6 2.4.2 Service Option 9

- 7 Figure 2.4.2-1 shows four of the five data block formats that are used by Service Option 9.
- 8 The Blank data block is not shown.

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.

- 1 The base station shall supply the number of information bits shown in Table 2.3.2.2.1-1.
- 2 The base station may use any bit pattern for both the data bits and the CAT_TYPE field.
- 3 The mobile station shall supply the number of information bits shown in Table 2.3.2.2.1-1.
- 4 The mobile station shall supply the data bits and CAT_TYPE field as described in 2.5.

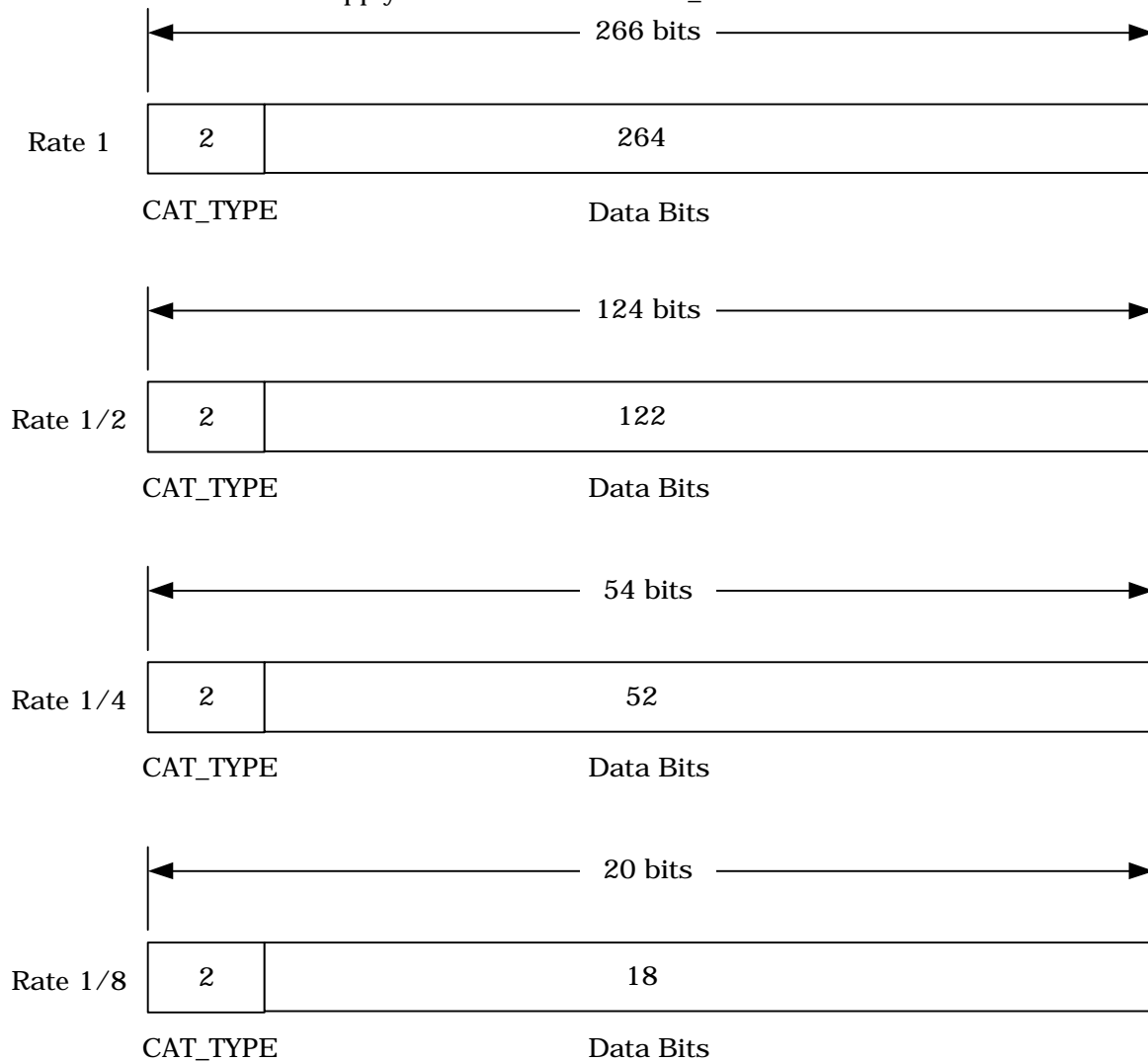


Figure 2.4.2-1. Data Block Formats for Service Option 9

2.4.3 Service Option 30

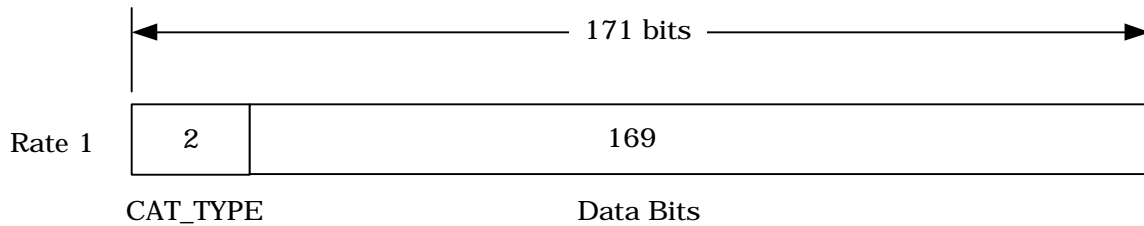
Figure 2.4.3-1 shows one of the data block formats that is used by Service Option 30. The Blank data block is not shown.

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.



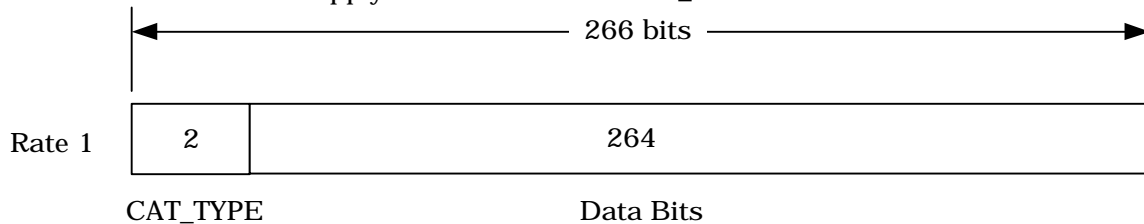
3 **Figure 2.4.3-1. Data Block Format for Service Option 30**

4 2.4.4 Service Option 31

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

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

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



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

12 2.4.5 Service Option 55

13 If Multiplex Option 0x01 is used, the mobile station shall follow the procedures described in
14 2.4.1 for Service Option 2 as if Service Option 2 were used.

15 If Multiplex Option 0x02 is used, the mobile station shall follow the procedures described in
16 2.4.2 for Service Option 9 as if Service Option 9 were used.

17 2.5 Mobile Station Processing

18 2.5.1 Basic Data Block Processing

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

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

1

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

2

3

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 **2.5.1.1 Service Option 2**

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

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

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

1 any desired value. The resulting 171 information bits shall be supplied to the
 2 multiplex sublayer as a Rate 1 data block.

3 2.5.1.2 Service Option 9

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 9 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 as specified in Table
 9 2.5.1-1:

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

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

23 2.5.1.3 Service Option 30

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

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

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

10 2.5.1.4 Service Option 31

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

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

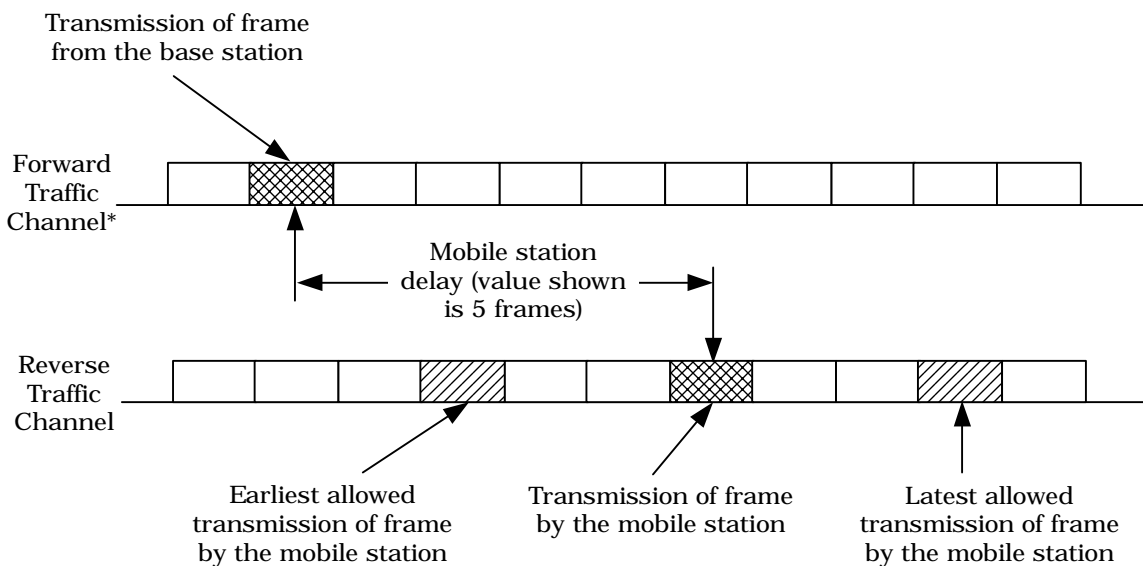
2.5.1.5 Service Option 55

If Multiplex Option 0x01 is use, then the mobile station shall follow the processing described in 2.5.1.1 for Service Option 2 as if Service Option 2 were used.

If Multiplex Option 0x02 is use, then the mobile station shall follow the processing described in 2.5.1.2 for Service Option 9 as if Service Option 9 were used.

2.5.2 Processing Delays

While Service Option 2, 9, 30, 31, or 55 is connected, the mobile station shall maintain a fixed delay (as measured at the antenna connector) between Forward Traffic Channel frames it receives and their corresponding Reverse Traffic Channel frames produced from the data blocks generated by Service Option 2, 9, 30, 31, or 55 as specified in 2.5.1. The value of the delay shall not vary during a call. The value of the delay shall not be less than two frames and shall not exceed eight frames.



* either Fundamental Code Channel frame or Forward Supplemental Code Channel frame, depending upon the Loopback service.

Figure 2.5.2-1. Allowable Mobile Station Processing Delays

2.6 Computing Error Rate Statistics at the Base Station

The receiving side of Service Option 2, 9, 30, 31, or 55 within the base station should compute both Forward Traffic Channel and Reverse Traffic Channel frame error rates as described in the following sections.

2.6.1 Forward Traffic Channel Frame Error Rates

2.6.1.1 Forward Fundamental Code Channel Frame Error Rate

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

1 Define the following indicator variables for Rate x:

- 2 • I_x is equal to 1 if the base station generated a Rate x fundamental data block for the
3 frame; otherwise, I_x is equal to 0;

- 4 • I_{xx} is equal to 1 if all the following conditions are met:

- 5 - The base station generates a Rate x fundamental data block for the frame,
- 6 - The base station receives a Rate x fundamental data block with no errors, and
- 7 - The received CAT_TYPE is equal to '00'.

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

- 9 • I_{xb} is equal to 1 if all the following conditions are met:

- 10 - The base station generates a Rate x fundamental data block for the frame, and
- 11 - The base station receives a Blank fundamental data block.

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

- 13 • I_{1d} is equal to 1 if all the following conditions are met:

- 14 - The base station generates a Rate 1 fundamental data block for the frame, and
- 15 - The base station receives a Rate 1/2 fundamental data block with CAT_TYPE
16 equal to '11'.

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

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

$$19 \quad FDBER_1 = 1 - \frac{\sum I_{11}}{\sum (I_1 - I_{1b} - I_{1d})},$$

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

$$22 \quad FDBER_x = 1 - \frac{\sum I_{xx}}{\sum (I_x - I_{xb})},$$

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

26 2.6.1.2 Forward Supplemental Code Channel Frame Error Rate

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

30 Define the following indicator variables for Rate 1:

- 31 • I_1 is equal to 1 if the base station generated a Rate 1 supplemental data block for the
32 frame; otherwise, I_1 is equal to 0;

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

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

16
$$SDBER_1 = 1 - \frac{\sum I_{11}}{\sum (I_1 - I_{1b} - I_{1d})},$$

17 where the summation is taken over the measurement interval. When secondary traffic is

18 not being used, the Forward Supplemental Code Channel frame error rate is approximately

19 the supplemental data block error rate.

20 2.6.2 Reverse Traffic Channel Frame Error Rates

21 2.6.2.1 Reverse Fundamental Code Channel Frame Error Rate

22 For Service Option 2 and 9, if the Forward Fundamental Code Channel is error free, the

23 error rate for fundamental data blocks transmitted on the Reverse Fundamental Code

24 Channel can be computed as described in 2.6.1.1.

25 For Service Option 30 and 31, if the Forward Supplemental Code Channel is error free, the

26 error rate for fundamental data blocks transmitted on the Reverse Fundamental Code

27 Channel can be computed as described in 2.6.1.2.

28 2.6.2.2 Reverse Supplemental Code Channel Frame Error Rate

29 The Loopback service option does not support computing of the Reverse Supplemental Code

30 Channel frame error rate.

31

1

2 No text.