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## ***Data Service Options for Spread Spectrum Systems: Service Options 33 and 66***

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## 1 1 INTRODUCTION

### 2 1.1 General Description

3 This chapter defines requirements for support of high speed packet data transmission  
4 capability on cdma2000®<sup>1</sup> spread spectrum systems. Packet data transmission is  
5 supported on cdma2000 Traffic Channels using primary or secondary traffic. For packet  
6 data transmission on traffic channels using Service Option 33 or Service Option 66, the  
7 Radio Link Protocol Type 3 specified in C.S0017-0-2.10 is used.

8 This standard specifies a packet data bearer service for communication between terminal  
9 equipment and a packet data serving node (PDSN) via a base station/packet control  
10 function (BS/PCF).

11 Packet data service options provide a means of establishing and maintaining Traffic  
12 Channels for packet data service. Service Option 33 and Service Option 66 are used to  
13 request packet data service through a PDSN supporting an Internet standard Point-to-Point  
14 Protocol (PPP) interface to network layer protocols (see 4.1). Additional packet data service  
15 options may be defined in future revisions to select other types of PDSN resources or  
16 services.

### 17 1.2 Terms

18 **Auxiliary Service Instance.** A packet data service instance that is not used to perform  
19 PPP negotiation (see [19]). An auxiliary service instance uses service option number 66.

20 **Base Station (BS).** A fixed station used for communicating with mobile stations.  
21 Depending upon the context, the term base station may refer to a cell, a sector within a  
22 cell, or other part of the wireless system.

23 **BS.** See base station.

24 **BS/PCF.** The base station and packet control function considered as a single functional  
25 entity.

26 **CCPD.** See Common Channel Packet Data.

27 **Common Channel Packet Data.** A mode of operation in which the MS and BS only use  
28 Short Data Bursts transmitted on common channels to exchange packet data. This mode  
29 can be used only while the mobile station's packet data service call control function is in  
30 the *Dormant State*. A mobile station will request a direct-to-dormant transition if it intends  
31 to use Common Channel Packet Data.

32 **Data Circuit Terminating Equipment (DCE).** A DCE connects a DTE to the network. A  
33 typical DCE would be a V-series modem.

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<sup>1</sup> cdma2000® is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.

- 1 **Direct-to-Dormant.** A mechanism to permit the packet data service call control function  
2 to transition from the *Initialization State* or *Reconnect State* to the *Dormant State* without  
3 passing through the *Connected State*. The mobile station requests direct-to-dormant  
4 during a connection attempt (see 2.2.3)
- 5 **DTE.** Data Terminal Equipment.
- 6 **ESCAM.** *Extended Supplemental Channel Assignment Message* (see [16]).
- 7 **Extended Packet Data Services Zone Identifier.** One of two formats used to identify a  
8 packet zone when SID/NID hysteresis is supported (see 2.2.5.1).
- 9 **Forward Dedicated Control Channel.** A portion of a Forward Traffic Channel.
- 10 **Forward Fundamental Channel.** A portion of a Forward Traffic Channel.
- 11 **Forward Packet Data Channel.** A portion of a Forward Traffic Channel that may operate  
12 in conjunction with a Forward Fundamental Channel or Forward Dedicated Control  
13 Channel in that Forward Traffic Channel to provide high data rate services.
- 14 **Forward Supplemental Channel.** A portion of a Forward Traffic Channel which operates  
15 in conjunction with a Forward Fundamental Channel or Forward Dedicated Control  
16 Channel in that Forward Traffic Channel to provide higher data rate services than using  
17 only a Forward Fundamental Channel or Forward Dedicated Control Channel.
- 18 **FSCAMM.** *Forward Supplemental Channel Assignment Mini Message* (see [16]).
- 19 **Forward Traffic Channel.** One or more Forward CDMA channels used to transport user  
20 and signaling traffic from the base station to the mobile station. See Forward Fundamental  
21 Channel, Forward Dedicated Control Channel, and Forward Supplemental Channel.
- 22 **IP.** Internet Protocol.
- 23 **IPCP.** Internet Protocol Control Protocol (see [5]).
- 24 **LCP.** PPP Link Control Protocol (see [7]).
- 25 **Main Service Instance.** The single packet data service instance used to perform PPP  
26 negotiation (see [19]). The main service instance is established before any auxiliary service  
27 instance can be established. The main service instance uses service option number 33.
- 28 **Mobile IP.** Mobile Internet Protocol (see [10]).
- 29 **Mobile Station.** A station in the Public Cellular Radio Telecommunications Service  
30 intended to be used while in motion or during halts at unspecified points. Mobile stations  
31 include portable units (e.g., hand-held personal units) and units installed in vehicles.
- 32 **MSC.** Mobile Switching Center.
- 33 **MT0.** Mobile Termination 0 (see 1.4.1).
- 34 **MT2.** Mobile Termination 2 (see 1.4.1).
- 35 **NID.** Network Identification (see [16]).
- 36 **Packet Data Services Zone Identifier.** The base station assigned number (see [16]) that,  
37 when non-zero, identifies the packet data mobility area associated with the base station.

- 1 **Packet Zone.** An identifier used by the mobile station for Packet Zone Reconnection  
2 Control (see 2.2.5). When the packet zone hysteresis is enabled and the mobile station  
3 supports SID/NID hysteresis, the packet zone is the extended packet data services zone  
4 identifier. Otherwise, the packet zone is the packet data services zone identifier.
- 5 **Packet Data Service Instance.** A packet data service call control function instance which  
6 is identified by the mobile station using an *sr\_id*.
- 7 **PCF.** Packet Control Function.
- 8 **PDSN.** Packet Data Serving Nodes.
- 9 **PPP.** Point-to-Point Protocol (see [7]).
- 10 **QoS.** See Quality of Service.
- 11 **Quality of Service.** The set of parameters and procedures associated with a service or  
12 user, indicating some of the capabilities and constraints related to the delivery of the  
13 service to the user.
- 14 **Radio Configuration.** A set of Forward Traffic Channel and Reverse Traffic Channel  
15 transmission formats that are characterized by physical layer parameters such as  
16 transmission rates, modulation characteristics, and spreading rate.
- 17 **Reactivation.** The connecting of a packet data service option that was previously active.
- 18 **Reverse Dedicated Control Channel.** A portion of a Reverse Traffic Channel.
- 19 **Reverse Fundamental Channel.** A portion of a Reverse Traffic Channel.
- 20 **Reverse Supplemental Channel.** A portion of a Reverse Traffic Channel which operates in  
21 conjunction with a Reverse Fundamental Channel or Reverse Dedicated Control Channel in  
22 that Reverse Traffic Channel to provide higher data rate services than using only a Forward  
23 Fundamental Channel or Forward Dedicated Control Channel.
- 24 **Reverse Traffic Channel.** One or more reverse CDMA channels on which data and  
25 signaling are transmitted from a mobile station to a base station. See Reverse Dedicated  
26 Control Channel, Reverse Fundamental Channel, and Reverse Supplemental Channel.
- 27 **RFC.** Request for Comments. The generic name of a specification developed by the  
28 Internet Engineering Task Force (IETF).
- 29 **RLP.** Radio Link Protocol.
- 30 **RSCAMM.** *Reverse Supplemental Channel Assignment Mini Message* (see [16]).
- 31 **SCRM.** *Supplemental Channel Request Message* (see [16]).
- 32 **SCRMM.** *Supplemental Channel Request Mini Message* (see [16]).
- 33 **Short Data Burst.** A Short Data Burst is a portion of a *Data Burst Message* that carries  
34 service option data in the CHARi fields.
- 35 **SID.** System Identification (see [16]).
- 36 **SLIP.** Serial Line IP.
- 37 **sr\_id.** Service Reference Identifier (see [14]).

- 1 **SYNC\_ID.** Synchronization Identifier (see [16]).
- 2 **TCP.** Transmission Control Protocol.
- 3 **TE2.** Terminal Equipment 2 (see 1.4.1).
- 4 **Traffic Channel.** One or more CDMA channels on which data and signaling are
- 5 transmitted between a mobile station and base station. See Forward Traffic Channel and
- 6 Reverse Traffic Channel.
- 7 **UHDM.** *Universal Handoff Direction Message* (see [16]).

### 8 **1.3 Normative References**

9 The following standards contain provisions which, through references in this text, become  
10 provisions of this Standard. At the time of publication, the editions indicated were valid.  
11 All standards are subject to revision, and parties to agreements based on this Standard are  
12 encouraged to investigate the possibility of applying the most recent editions of the  
13 standards indicated below. ANSI and TIA maintain registers of currently valid standards  
14 published by them.

- 15 **1. EIA/TIA-232-E** *Interface Between DTE and DCE Employing Serial Binary*  
16 *Data Interchange.*
- 17 **2. RFC 791** *Internet Protocol.*
- 18 **3. RFC 1055** *Nonstandard for transmission of IP datagrams over serial*  
19 *lines: SLIP.*
- 20 **4. RFC 1144** *Compressing TCP/IP Headers for Low-Speed Serial Links.*
- 21 **5. RFC 1332** *The PPP Internet Protocol Control Protocol (IPCP).*
- 22 **6. RFC 1570** *PPP LCP Extensions.*
- 23 **7. RFC 1661** *The Point-to-Point Protocol (PPP).*
- 24 **8. RFC 1662** *PPP in HDLC-like Framing.*
- 25 **9. RFC 1700** *Assigned Numbers.*
- 26 **10. RFC 2002** *IP Mobility Support.*
- 27 **11. cdma2000 Release C** A family of standards which comprise the cdma2000 Mobile  
28 Station-Base Station compatibility specification. The family  
29 includes [12], [13], [14], [15], [16], and [17].
- 30 **12. C.S0001-C** *Introduction to cdma2000 Standards for Spread Spectrum*  
31 *Systems*
- 32 **13. C.S0002-C** *Physical Layer Standard for cdma2000 Spread Spectrum*  
33 *Systems*
- 34 **14. C.S0003-C** *Medium Access Control (MAC) Standard for cdma2000*  
35 *Spread Spectrum Systems*

- 1 **15. C.S0004-C** *Link Access Control (LAC) Standard for cdma2000 Spread*  
2 *Spectrum Systems*
- 3 **16. C.S0005-C** *Upper Layer (Layer 3) Standard for cdma2000 Spread*  
4 *Spectrum Systems*
- 5 **17. C.S0006-C** *Analog Standard for cdma2000 Spread Spectrum Systems*
- 6 **18. TIA/EIA/IS-2001.3-C** *Inter-operability Specification (IOS) for cdma2000 Access*  
7 *Network Interfaces*
- 8 **19. TIA-835-C.** *cdma2000 Wireless IP Network Standard*

9 **1.4 Overview of Packet Data Service**

10 1.4.1 Protocol Options

11 This standard provides the requirements for communication protocols on the links between  
12 a mobile station and PDSN, including requirements for the  $R_m$ ,  $U_m$  and A8/A9/A<sub>quarter</sub>  
13 interfaces.

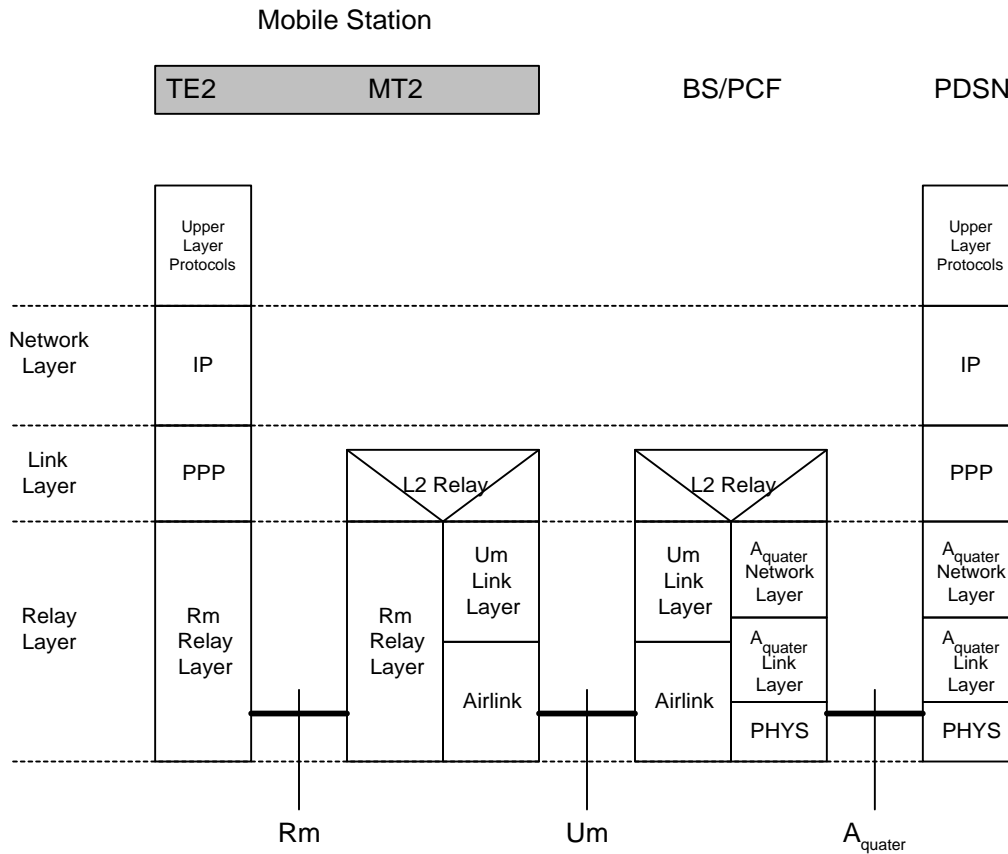
14 The Relay Layer provides lower layer communication and packet framing between the  
15 entities of the packet data service reference model. Over the  $R_m$  interface between the TE2  
16 and the MT2, the Relay Layer is not specified in this document. Over the  $U_m$  interface, the  
17 Relay Layer is a combination of RLP Type 3 and the protocols defined in [11]. On the  
18 A8/A9/A<sub>quarter</sub> interface, the Relay Layer uses the protocols defined in [18].

19 The two options for packet protocol stacks are presented in 1.4.1.1 and 1.4.1.2.

20 1.4.1.1 Relay Layer  $R_m$  Interface Protocol Option

21 The Relay Layer  $R_m$  interface protocol option supports TE2 applications in which the TE2 is  
22 responsible for some aspects of packet data service mobility management and network  
23 address management (e.g., IPCP). For the Relay Layer  $R_m$  interface protocol option, the  
24 packet data service protocol stack is as shown in Figure 1.

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**Figure 1 Relay Layer R<sub>m</sub> Interface Protocol Option**

3

In this protocol option, the Link Layer is implemented using PPP, as defined in [7]. When using the Relay Layer R<sub>m</sub> interface protocol option, there is one Link Layer connection between the TE2 and the PDSN. For the remainder of this chapter, this Link Layer connection is called the PDSN Link Layer.

7

The Network Layer includes IP and packet data network registration and authentication protocols. Recommendations for the use of certain specific protocols are given in Section 4.

9

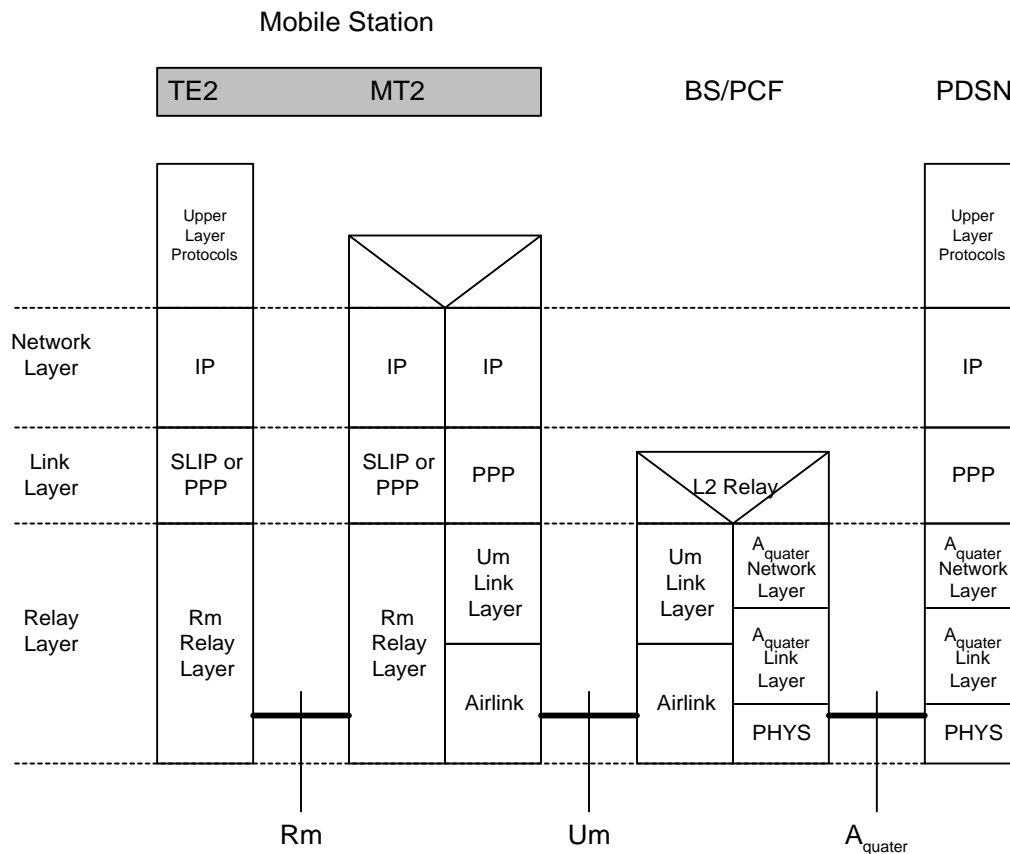
#### 1.4.1.2 Network Layer R<sub>m</sub> Interface Protocol Option

10

The Network Layer R<sub>m</sub> interface protocol option supports TE2 applications in which the PDSN Link Layer terminates at the MT2. For the Network Layer R<sub>m</sub> interface protocol option, the packet data service protocol stack is as shown in Figure 2.

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**Figure 2 Network Layer R<sub>m</sub> Interface Protocol Option**

3 In this protocol option, there are independent Link Layer connections between the TE2 and  
 4 the MT2, and between the MT2 and the PDSN. The Link Layer between the MT2 and the  
 5 PDSN is implemented using PPP, as defined in [7]. For the remainder of this chapter, this  
 6 Link Layer connection is called the PDSN Link Layer.

7 The Link Layer between the MT2 and the TE2 should be implemented using PPP, as defined  
 8 in [7]. Alternatively, the SLIP protocol as defined in [3] may be used. For the remainder of  
 9 this chapter, this Link Layer connection is called the R<sub>m</sub> Link Layer.

10 For this R<sub>m</sub> interface protocol option, the Network Layer also provides independent services  
 11 between the TE2 and the MT2, and between the MT2 and the PDSN. The TE2 includes  
 12 routing protocols and operates as if locally connected to a network routing server. The MT2  
 13 includes both routing and packet data network registration and authentication protocols.

#### 14 1.4.2 Packet Data Protocol States

##### 15 1.4.2.1 PDSN Link Layer Connection States

16 The PDSN and the mobile station use a Link Layer connection to transmit and receive  
 17 packet data. The PDSN Link Layer connection is opened when a packet data service option  
 18 is first connected, or the base station allows the mobile station packet data service call  
 19 control function to transition directly from the *Initialization State* to the *Dormant State*.

1 Once a PDSN Link Layer connection is opened, bandwidth (e.g., in the form of Traffic  
2 Channel assignment) is allocated to the connection on an as-needed basis.

3 The PDSN Link Layer connection can be in any of the following states:

- 4 • **Closed:** The PDSN Link Layer connection is closed when the PDSN has no Link Layer  
5 connection state information for the mobile station.
- 6 • **Opened:** The PDSN Link Layer connection is opened when the PDSN has Link Layer  
7 connection state information for the mobile station.

8 The mobile station and PDSN maintain the state of the PDSN Link Layer connection as  
9 defined above. The mobile station maintains the state of the PPP Link Control Protocol  
10 (LCP), and manages the PDSN Link Layer connection using the LCP opening and closing  
11 procedures defined in [7].

#### 12 1.4.2.2 Mobile Station Packet Data Service States

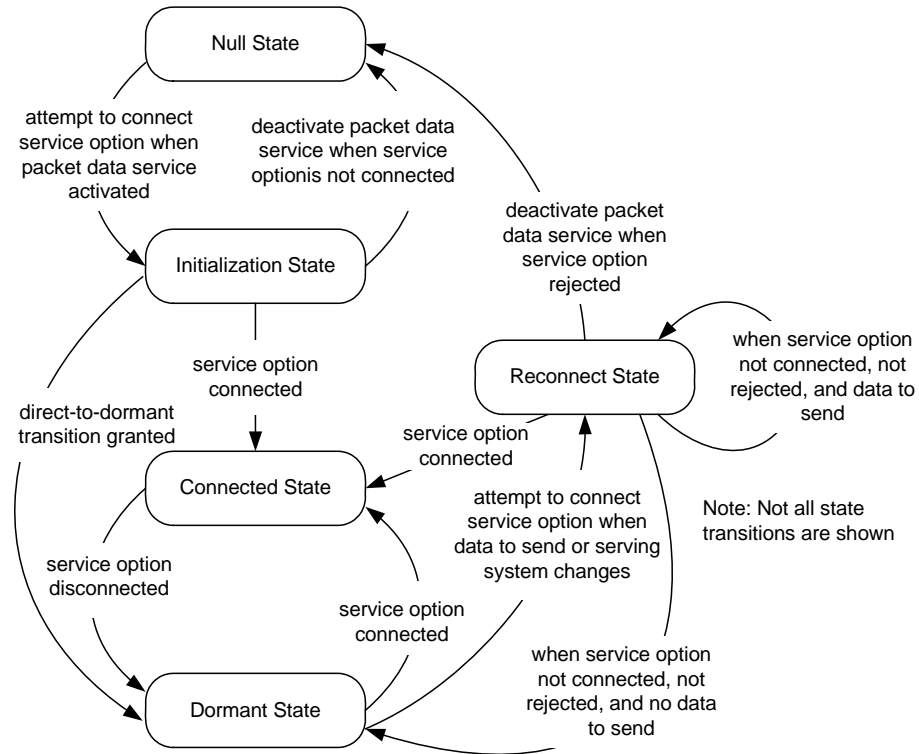
13 Packet data service processing in the mobile station consists of the following states.  
14 Requirements for the transitions between these states are given in 2.2.2.1.1.

- 15 • *Inactive State* - In this state, the mobile station does not provide packet data service.
- 16 • *Active State* - In this state, the mobile station provides packet data service.

17 The mobile station performs the packet data service call control function described in  
18 2.2.2.1.2. As illustrated in Figure 3, the packet data service call control function consists of  
19 the states listed below:

- 20 • *Null State* - The packet data service call control function is in this state when packet  
21 data service has not been activated.
- 22 • *Initialization State* - In this state, the mobile station attempts to connect a packet data  
23 service option.
- 24 • *Connected State* - In this state, a packet data service option is connected.
- 25 • *Dormant State* - In this state, the packet data service option is disconnected.
- 26 • *Reconnect State* - In this state, the mobile station attempts to connect a previously  
27 connected packet data service option.

28



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2 **Figure 3 Packet Data Service Call Control States in the Mobile Station**

3

## 4 1.4.2.3 BS Packet Data Service States

5 The base station performs the packet data service call control function described in  
 6 2.2.2.2.1. As illustrated in Figure 4, the packet data service call control function consists  
 7 of the following states:

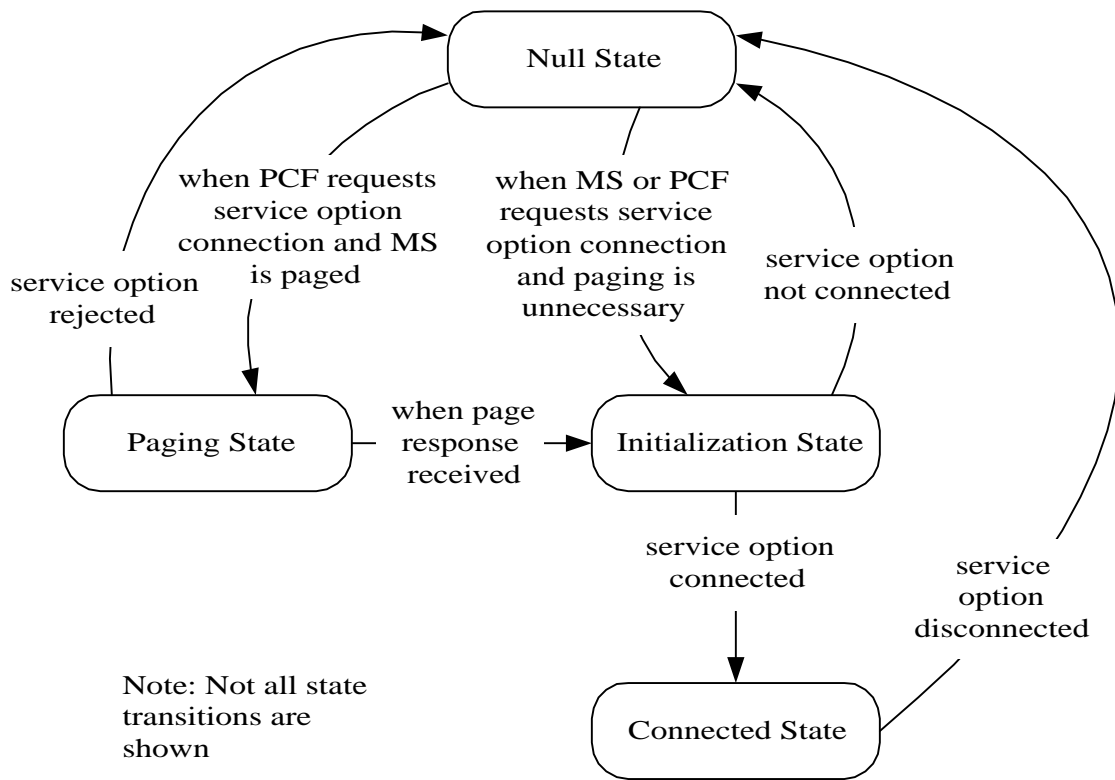
8 • *Null State* - In this state, the base station has no connection of a packet data service  
 9 option to the mobile station.

10 • *Paging State* - In this state, the PCF has requested that the base station connect a  
 11 packet data service option, and the base station has paged the mobile station.

12 • *Initialization State* - In this state, the base station awaits connection of a packet data  
 13 service option.

14 • *Connected State* - In this state, a packet data service option has been connected.

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**Figure 4 Packet Data Service Call Control States in the BS**

## 1   **2   RELAY LAYER**

### 2   **2.1   Introduction**

3   The Relay Layer spans across the  $R_m$ ,  $U_m$ , and A8/A9/ $A_{\text{quater}}$  interfaces. See Section 2.1 of  
4   IS-707-A.3 for  $R_m$  interface requirements.  $U_m$  interface requirements for the Relay Layer  
5   are described in the following sections.

6   RLP can be carried either as primary traffic or as secondary traffic. The mobile station and  
7   the base station shall support the physical layer, multiplex options, radio link  
8   management, and call control protocols as defined in [11].

9   At the  $A_{\text{quater}}$  interface, the PCF and the PDSN use the protocols recommended in [18] for  
10   transport of end-user data and control information. Protocols used for the A8/A9 interface  
11   between the base station and the PCF are specified in [18].

### 12   **2.2    $U_m$ Interface Requirements**

#### 13   2.2.1   RLP Requirements

14   At the  $U_m$  interface, the mobile station and the base station shall use the Radio Link  
15   Protocol Type 3. In this specification, the Radio Link Protocol Type 3 will be called RLP.

16   For Service Option 33 and Service Option 66, the base station RLP may segment new data  
17   frames that it sends. For Service Option 33 and Service Option 66, the mobile station RLP  
18   shall not segment new data frames that it sends.

#### 19   2.2.2   Service and Call Control Procedures

##### 20   2.2.2.1 Mobile Station Procedures

21   The packet data service states for mobile stations are described in 1.4.2.2. Mobile station  
22   states are described in [16].

23   When power is applied to the mobile station, the packet data service shall enter the *Inactive*  
24   *State*.

##### 25   2.2.2.1.1 Packet Data Service Control Procedures

###### 26   2.2.2.1.1.1 Inactive State

27   When the packet data service is in the *Inactive State*, the mobile station does not provide  
28   packet data service. The means for determining when the packet data service enters the  
29   *Active State* are left to the mobile station manufacturer.

30   When the packet data service enters the *Inactive State* from the *Active State*, if the Network  
31   Layer  $R_m$  interface protocol option is selected, and the  $R_m$  Link Layer interface is  
32   implemented using PPP, the MT2 should close the  $R_m$  Link Layer connection.

###### 33   2.2.2.1.1.2 Active State

34   When the packet data service is in the *Active State*, the mobile station provides packet data  
35   service.

## 1 2.2.2.1.2 Packet Data Service Call Control Function

2 Each packet data service call control function is associated with either the main service  
3 instance or an auxiliary service instance. The mobile station shall support only one main  
4 service instance. The mobile station may support one or more auxiliary service instances.

## 5 2.2.2.1.2.1 Null State

6 For any packet data service instance, its packet data service call control function is in the  
7 *Null State* whenever the packet data service is in the *Inactive State*.

8 If the main service instance's packet data service call control function is in the *Null State*  
9 and the packet data service enters the *Active State*, the mobile station shall perform the  
10 following:

- 11 • If the Network Layer  $R_m$  interface protocol option is selected, and the  $R_m$  interface Link  
12 Layer is implemented using PPP, the MT2 shall initiate PPP configuration on the  $R_m$   
13 interface, using the procedures defined in [8].
- 14 • If the mobile station is in the *Mobile Station Idle State*, or when the mobile station enters  
15 the *Mobile Station Idle State*, the mobile station shall initiate connection of the main  
16 service instance's packet data service option, as described in 2.2.3. The main service  
17 instance's packet data service call control function shall enter the *Initialization State*.
- 18 • If the mobile station supports concurrent services signaling, and the mobile station is in  
19 the *Mobile Station Control on the Traffic Channel State*, the mobile station shall initiate  
20 connection of the main service instance's packet data service option, as described in  
21 2.2.3. The main service instance's packet data service call control function shall enter  
22 the *Initialization State*.

23 If the packet data service call control function is associated with the main service instance  
24 and the packet data service call control function enters the *Null State*, the mobile station  
25 shall perform the following:

- 26 – The mobile station shall indicate to the base station that the packet data service is  
27 inactive.
- 28 – The mobile station shall disconnect the packet data service option, if connected, and  
29 if the mobile station does not support concurrent services signaling, the mobile  
30 station shall disconnect the call.
- 31 – The packet data service shall enter the *Inactive State*.

32 If the base station initiates connection of an auxiliary service instance whose packet data  
33 service call control function is in the *Null State* and the packet data service option  
34 associated with this auxiliary service instance is connected, the auxiliary service instance's  
35 packet data service call control function shall enter the *Connected State* when the auxiliary  
36 service instance's call control instance enters the *Conversation Substate*.

## 37 2.2.2.1.2.2 Initialization State

38 While the packet data service call control function is in the *Initialization State*, the mobile  
39 station shall perform the following:

- 1 • If the packet data service option is connected, the packet data service call control  
2 function shall enter the *Connected State* when the call control instance enters the  
3 *Conversation Substate*.
- 4 • If the mobile station requested a direct-to-dormant transition, and if the base station  
5 does not reject the request and also does not connect the service option, the packet  
6 data service call control function shall enter the *Dormant State*.
- 7 • If the packet data service call control function is associated with the main service  
8 instance, the packet data service shall enter the *Inactive State* if any of the following  
9 occur while the packet data service call control function is in the *Initialization State*:
  - 10 – The base station rejects the mobile station's request for a direct-to-dormant  
11 transition; or
  - 12 – The packet data service option cannot be connected (e.g. service option rejected); or
  - 13 – The mobile station enters the Mobile Station Initialization State; or
  - 14 – The mobile station exits the System Access State and enters any state other than  
15 the Mobile Station Control on the Traffic Channel State.
- 16 • If the packet data service call control function is associated with an auxiliary service  
17 instance, the packet data service call control function shall enter the *Null State* if any of  
18 the following occur while the packet data service call control function is in the  
19 *Initialization State*:
  - 20 – The base station rejects the mobile station's request for a direct-to-dormant  
21 transition; or
  - 22 – The packet data service option cannot be connected (e.g service option rejected).
- 23 • If the packet data service enters the *Inactive State*, the packet data service call control  
24 function shall enter the *Null State*.

#### 25 2.2.2.1.2.3 Connected State

26 When the packet data service call control function enters the *Connected State*, the mobile  
27 station begins RLP initialization.

28 While in the *Connected State*, the mobile station shall perform the following:

- 29 • If the packet data service option is disconnected, the mobile station shall perform the  
30 following:
  - 31 – the mobile station shall set the packet data dormant timer to the value specified in  
32 2.2.4 and start the timer;
  - 33 – the packet data service call control function shall enter the *Dormant State*.
- 34 • The mobile station shall maintain a packet data inactivity timer. The value of this timer  
35 shall not be less than 20 seconds. The timer should be reset whenever a non-idle RLP  
36 data frame is sent or received. If the packet data inactivity timer expires, the mobile  
37 station should disconnect the packet data service option. If the mobile station has  
38 determined that no further data will be exchanged with the base station prior to

1 expiration of the packet data inactivity timer, the mobile station may disconnect the  
2 service option.

- 3 • If the packet data service call control function is associated with the main service  
4 instance and packet zone hysteresis is enabled (see 2.2.5) and if the mobile station  
5 sends or receives user data,<sup>2</sup> the mobile station shall set the packet zone hysteresis  
6 activation indicator to 1.
- 7 • If the packet data service enters the *Inactive State*, the packet data service call control  
8 function shall enter the *Null State*.
- 9 • When the amount of user data in the mobile station reaches an implementation defined  
10 threshold, the mobile station may request reverse high speed operation (see 2.2.7).

#### 11 2.2.2.1.2.4 Dormant State

12 While the packet data service call control function is in the *Dormant State*, the mobile  
13 station shall perform the following:

- 14 • If the packet data service call control function is associated with the main service  
15 instance, the mobile station shall store the current value of SID, NID, and  
16 PACKET\_ZONE\_IDS.
- 17 • If the packet data service option is connected, the packet data service call control  
18 function shall enter the *Connected State* when the call control instance enters the  
19 *Conversation Substate*.
- 20 • If the packet data service enters the *Inactive State*, the packet data service call control  
21 function shall enter the *Null State*.
- 22 • If the packet data service has data to send and the mobile station chooses to use a  
23 Short Data Burst to send the data and the mobile station is not prohibited (see [16])  
24 from sending a Short Data Burst, the mobile station shall send the Short Data Burst  
25 according to 2.2.9.
- 26 • If the packet data service call control function is associated with the main service  
27 instance, packet zone hysteresis is enabled (see 2.2.5), and if the mobile station sends  
28 or receives a Short Data Burst containing user data, the mobile station shall set the  
29 packet zone hysteresis activation indicator to 1.
- 30 • If the packet data service call control function is associated with the main service  
31 instance and if packet zone hysteresis is enabled (see 2.2.5), the mobile station shall  
32 maintain a packet zone hysteresis activation timer. If the packet zone hysteresis  
33 activation indicator is set to 1, the mobile station shall set the packet zone hysteresis  
34 activation timer as follows:

---

<sup>2</sup> User data is assumed to be present whenever the mobile station or base station sends or receives a Short Data Burst or a non-idle, non-fill RLP data frame.

- 1     – If the mobile station determines that it is unlikely that further data will be  
 2     exchanged with the base station within the time specified by the hysteresis  
 3     activation timer, it may set the timer to 0.<sup>3</sup>
- 4     – Otherwise, the mobile station shall set the hysteresis activation timer as follows:
- 5         + If the base station indicated a value for the packet zone hysteresis activation  
 6         timer, the mobile station shall set the timer to the value indicated by the base  
 7         station.
- 8         + If the base station did not indicate a value for the packet zone hysteresis  
 9         activation timer, the mobile station shall set the timer to an implementation-  
 10         specific value between 0 and 30 seconds.

11     After setting the packet data hysteresis activation timer, the mobile station shall start  
 12     the timer and set the packet zone hysteresis activation indicator to 0.

13     If the hysteresis activation timer is active and the mobile station determines that it is  
 14     unlikely that further data will be exchanged with the base station before the expiry of  
 15     the hysteresis activation timer, the mobile station may cancel the hysteresis activation  
 16     timer.

17     If the hysteresis activation timer is active and the packet zone list contains an entry  
 18     with an active hysteresis timer for the current packet zone, the mobile station shall  
 19     cancel the entry's packet zone hysteresis timer and shall remove the entry from the  
 20     packet zone list.

21     If the mobile station enters the *Registration Access Substate* (see [16]) due to timer-  
 22     based registration, distance-based registration, zone-based registration, parameter  
 23     change registration, or user zone registration, and if the packet zone list contains an  
 24     entry with an active hysteresis timer for the current packet zone, the mobile station  
 25     shall cancel the entry's packet zone hysteresis timer and shall remove the entry from  
 26     the packet zone list.<sup>4</sup>

- 27     • If any of the following occurs, the mobile station shall perform the remaining  
 28     procedures in this section:
- 29         – The packet data service has data to send, and the mobile station either chooses not  
 30         to use a Short Data Burst to send the data or is prohibited from sending a Short  
 31         Data Burst, and the mobile station is not prohibited (see [16]) from initiating  
 32         connection of the packet data service option.
- 33         – If the packet data service call control function is associated with the main service  
 34         instance and the mobile station detects a change in the serving system SID or NID

---

<sup>3</sup> When the packet zone hysteresis timer is set to 0, it is considered to expire immediately.

<sup>4</sup> Removing the entry from the packet zone list will trigger the mobile station to send an *Origination Message* (or equivalent) which serves as an implicit registration. When the *Origination Message* (or equivalent) is sent, it will cause the transmission of the *Registration Message* to be aborted prior to the initiation of the access attempt.

- 1           when packet zone hysteresis is disabled, or when packet zone hysteresis is enabled  
2           but the mobile station does not support SID/NID hysteresis (see 2.2.5.1).
- 3       – If the packet data service call control function is associated with the main service  
4       instance and the mobile station detects a non-zero PACKET\_ZONE\_ID<sub>s</sub> that is not  
5       currently stored in its packet zone list (see 2.2.5) when packet zone hysteresis is  
6       disabled, or when packet zone hysteresis is enabled but the mobile station does not  
7       support SID/NID hysteresis (see 2.2.5.1).
  - 8       – If the packet data service call control function is associated with the main service  
9       instance and the mobile station detects an extended packet data service zone  
10      identifier with a non-zero packet data service zone identifier and the extended  
11      packet data service zone identifier is not currently stored in its packet zone list (see  
12      2.2.5) when the packet zone hysteresis is enabled and the mobile station supports  
13      SID/NID hysteresis (see 2.2.5.1).
  - 14   • If the packet data dormant timer is enabled, the mobile station shall delay any attempt  
15   to request a packet data service option until the expiration of the packet data dormant  
16   timer.
  - 17   • If the mobile station is in the *Mobile Station Idle State* the mobile station shall initiate  
18   connection of the packet data service option, as described in 2.2.3. The packet data  
19   service call control function shall enter the *Reconnect State*.
  - 20   • If the mobile station does not support concurrent services signaling, and the mobile  
21   station is not in the *Mobile Station Idle State*, the mobile station shall wait until entering  
22   the *Mobile Station Idle State* to begin initiating connection of the packet data service  
23   option.
  - 24   • If the mobile station supports concurrent services signaling, and the mobile is in the  
25   *Mobile Station Control on the Traffic Channel State*, the mobile shall initiate connection  
26   of the packet data service option as described in 2.2.3. The packet data service call  
27   control function shall enter the *Reconnect State*.

#### 28 2.2.2.1.2.5 Reconnect State

29 While the packet data service call control function is in the *Reconnect State*, the mobile  
30 station shall perform the following:

- 31   • If the packet data service option is connected, the packet data service call control  
32   function shall enter the *Connected State* when the call control instance enters the  
33   *Conversation Substate*.
- 34   • If the mobile station requested a direct-to-dormant transition, and if the base station  
35   does not reject the request and also does not connect the service option, the packet  
36   data service call control function shall enter the *Dormant State*.
- 37   • If the packet data service call control function is associated with the main service  
38   instance and the mobile station receives an indication from the base station that the  
39   packet data service option is rejected, the packet data service shall enter the *Inactive*  
40   *State*.

- 1 • If the packet data service call control function is associated with an auxiliary service  
 2 instance and the mobile station receives an indication from the base station that the  
 3 packet data service option is rejected, the packet data service call control function shall  
 4 enter the *Null State*.
- 5 • If the packet data service option is not connected and the packet data service option  
 6 has not been rejected, and the mobile station did not request a direct-to-dormant  
 7 transition, the mobile station shall perform the following:
- 8 – If the mobile station has data to send, the mobile station may discard the data.<sup>5</sup>  
 9 – The packet data service call control function shall enter the *Dormant State*.
- 10 • If the packet data service enters the *Inactive State*, the packet data service call control  
 11 function shall enter the *Null State*.

## 12 2.2.2.2 BS/PCF Procedures

### 13 2.2.2.2.1 Packet Data Service Call Control Function

14 Each packet data service call control function is associated with either the main service  
 15 instance or an auxiliary service instance.

#### 16 2.2.2.2.1.1 Null State

17 When the base station packet data service call control function is in the *Null State*, the  
 18 packet data service option is not connected. The following events can occur while the  
 19 packet data service call control function is in this state:

- 20 • The mobile station can request connection of a packet data service option.  
 21 • The PCF can request the base station to send a Short Data Burst to the mobile station.  
 22 • The PCF can request the base station to connect the packet data service option.

#### 23 2.2.2.2.1.1.1 PCF Initiated Service Option Connection

24 If the PCF requests the base station to send a Short Data Burst, the base station should  
 25 perform the following:

- 26 • If the base station chooses not to use a Short Data Burst to send the data, the base  
 27 station should inform the PCF that it does not accept the data.  
 28 • If the base station chooses to use a Short Data Burst to send the data, the base station  
 29 should send the Short Data Burst according to 2.2.9.

30 If the PCF requests the base station to connect a packet data service option, the base  
 31 station should perform the following:

- 32 • If the mobile station is in *Mobile Station Idle State*, the base station should page the  
 33 mobile station, requesting the packet data service option supplied by the PCF. The  
 34 packet data service call control function should enter the *Paging State*.

---

<sup>5</sup> Mobile stations supporting applications that include higher-layer data retransmission protocols should always discard such data.

- 1 • If the mobile station is not in the *Mobile Station Idle State*, and the mobile station does  
2 not support concurrent services signaling, the base station should indicate to the PCF  
3 that the mobile station is busy.
- 4 • If the mobile station is in the *Mobile Station Control on the Traffic Channel State*, and the  
5 mobile supports concurrent services signaling, the packet data service call control  
6 function should enter *Initialization State*.

#### 7 2.2.2.2.1.1.2 Mobile Station Originated Service Option Connection

8 If the base station receives a request to connect a packet data service option from the  
9 mobile station, the base station should perform the following:

- 10 • If the service option requested by the mobile station is not supported, the base station  
11 should reject the requested service option.
- 12 • If the mobile station did not request a direct-to-dormant transition, the base station  
13 should inform the PCF that the mobile is attempting to connect the packet data service  
14 option. The base station then performs the following:
  - 15 – If the PCF accepts the packet data connection, the packet data service call control  
16 function should enter the *Initialization State*.
  - 17 – If the PCF rejects the packet data connection, the base station should not connect  
18 the requested service option, and should indicate to the mobile station that the  
19 requested service option has been rejected.
  - 20 – If the PCF defers the packet data connection, the base station should not connect  
21 the requested service option, but should not indicate to the mobile station that the  
22 packet data service option was rejected. For example, the base station may send a  
23 *Retry Order* or a *Reorder* to the mobile station to indicate deferral of the packet data  
24 connection.
- 25 • If the mobile station requested a direct-to-dormant transition and the base station  
26 chooses not to accept the request, the base station should reject the requested service  
27 option.<sup>6</sup>
- 28 • If the mobile station requested a direct-to-dormant transition and the base station  
29 chooses to accept the request, the base station should inform the PCF that the mobile is  
30 attempting to transition directly to the *Dormant State*. The base station then performs  
31 the following:
  - 32 – If the PCF rejects the packet data connection, the base station should not connect  
33 the requested service option, and should indicate to the mobile station that the  
34 requested service option has been rejected.
  - 35 – If the PCF accepts the packet data connection, the base station should not connect  
36 the service option and should indicate to the mobile station that the service option  
37 has not been rejected.<sup>7</sup>

---

<sup>6</sup> For example, by sending a *Release Order* with the ORDQ field set to indicate that the service option is rejected.

- 1       – If the PCF accepts the packet data connection and indicates to the base station that  
2       the service option should be connected, the packet data service call control function  
3       should enter the *Initialization State*.

#### 4   2.2.2.2.1.2 Paging State

5   When the base station packet data service call control function is in the *Paging State*, the  
6   base station should perform the following:

- 7   • If the base station receives a *Page Response Message* or a *Reconnect Message*  
8    containing the same packet data service option number that was used to page the  
9    mobile station, the packet data service call control function should enter the  
10   *Initialization State*.
- 11 • If the base station does not receive a *Page Response Message* or a *Reconnect Message* ,  
12   the base station should inform the PCF that the request for the packet data service  
13   option has been rejected. The packet data service call control function should enter the  
14   *Null State*.
- 15 • If the base station receives a *Page Response Message* or a *Reconnect Message* with a  
16   service option that is different than the service option sent in the page, the base station  
17   should send a *Release Order* rejecting the requested service option.<sup>8</sup> The base station  
18   should inform the PCF that the request for the packet data service option has been  
19   rejected. The packet data service call control function should enter the *Null State*.

#### 20 2.2.2.2.1.3 Initialization State

21   When the base station packet data service call control function enters the *Initialization*  
22   *State*, the base station should attempt to connect the packet data service option according  
23   to 2.2.3.2

24   If the packet data service option is connected, the packet data service call control function  
25   should enter the *Connected State*.

26   If the packet data service option cannot be connected, the base station should perform the  
27   following:

- 28   • If the mobile station does not support concurrent services signaling, the base station  
29    should disconnect the call.
- 30   • The base station should inform the PCF that the mobile station has rejected the  
31    connection attempt.
- 32   • The packet data service call control function should enter the *Null State*.

---

<sup>7</sup> For example, by sending a *Release Order* with the ORDQ field set to indicate a normal release.

<sup>8</sup> This includes receiving a *Page Response Message* or a *Reconnect Message* with the service option set to zero which indicates that the mobile station rejected the service option sent in the page.

1 2.2.2.2.1.4 Connected State

2 When the base station packet data service call control function enters the *Connected State*,  
3 the base station should perform the following:

- 4 • The base station should inform the PCF that the packet data service option has been  
5 connected.
- 6 • The base station should perform RLP initialization. Upon completing RLP initialization,  
7 the base station should transfer octets in sequence between the base station and the  
8 PCF.

9 If the PCF requests the base station to disconnect the packet data service option, the base  
10 station should perform the following:

- 11 • The base station should disconnect the packet data service option. If the mobile station  
12 does not support concurrent services signaling, the base station should disconnect the  
13 call.
- 14 • The packet data service call control function should enter *Null State*.

15 While the packet data service call control function is in the *Connected State*, the base  
16 station may maintain a packet data inactivity timer. The timer should be reset whenever  
17 non-idle RLP data frames are sent or received. If the packet data inactivity timer expires, or  
18 if the base station chooses to disconnect the packet data service option before the timer  
19 expires, the base station should perform the following:

- 20 • The base station should disconnect the packet data service option.
- 21 • The base station should inform the PCF that the packet data service option has been  
22 disconnected.
- 23 • The packet data service call control function should enter the *Null State*.

24 2.2.3 Initialization and Connection of Packet Data Service Options

25 The mobile station shall initiate connection of a packet data service option by requesting a  
26 packet data service option in a *Page Response Message*, a *Reconnect Message*, an *Enhanced*  
27 *Origination Message*, or an *Origination Message*. When the mobile station sends an  
28 *Origination Message* or an *Enhanced Origination Message* it shall perform the following:

- 29 • The mobile station shall indicate whether it has data to send (i.e., by setting the DRS bit  
30 in the message sent by the mobile station).
- 31 • The mobile station shall indicate if a direct-to-dormant transition is requested (e.g., by  
32 setting the SDB\_DESIRED\_ONLY bit in the message sent by the mobile station<sup>9</sup>).
- 33 • If this connection attempt is associated with the main service instance, the mobile  
34 station shall perform the following:

---

<sup>9</sup> A mobile station that intends to use Common Channel Packet Data (CCPD, see [18]) will request a direct-to-dormant transition by setting the SDB\_DESIRED\_ONLY bit in the *Origination Message*.

- 1       – The mobile station shall request service option number 33 in the message sent by  
2       the mobile station.
- 3       – If the mobile station has stored a value of SID and if the stored value of SID is  
4       different than the current value of SID, the mobile station shall include the stored  
5       value as the value of the previous SID. Otherwise, the mobile station shall not  
6       include the stored value.
- 7       – If the mobile station has stored a value of NID and if the stored value of NID is  
8       different than the current value of NID, the mobile station shall include the stored  
9       value as the value of the previous NID. Otherwise, the mobile station shall not  
10      include the stored value.
- 11      – If packet zone based reconnection is enabled and if the mobile station has stored a  
12      value of PACKET\_ZONE\_ID<sub>S</sub> and if the stored value of PACKET\_ZONE\_ID<sub>S</sub> is  
13      different than the current value of PACKET\_ZONE\_ID<sub>S</sub>, the mobile station shall  
14      include the stored value as the value of the previous packet zone identifier.  
15      Otherwise, the mobile station shall not include the stored value.
- 16      • If this connection attempt is associated with an auxiliary service instance, the mobile  
17      station shall request service option number 66 in the message sent by the mobile  
18      station. When the mobile station sends an *Origination Message*, a *Reconnect Message*,  
19      or a *Page Response Message* and the connection attempt was initiated while the packet  
20      data service call control function was in the *Dormant State*,, the mobile station shall  
21      perform the following:
- 22      • If the mobile station is allowed to use SYNC\_ID, and has stored a non-NULL SYNC\_ID  
23      value that corresponds to a service configuration that is the same as the mobile  
24      station's requested service configuration, the mobile station shall include the SYNC\_ID  
25      in the *Origination Message*, the *Reconnect Message* or the *Page Response Message*.

26      If the mobile station packet data service call control function is in the *Dormant State*, the  
27      mobile station shall set the SR\_ID field to the value assigned to the last packet data service  
28      option connection for this packet data service.

29      After initiating connection of a packet data service option, the mobile station connects the  
30      service option as specified in 2.2.3.1.

#### 31      2.2.3.1 Mobile Station Procedures

32      Packet data service options shall be negotiated and connected using the service  
33      configuration and negotiation procedures defined in [16]. For any packet data service  
34      option, the mobile station shall not propose a service configuration whose attributes are  
35      inconsistent with the valid service configuration attribute table for the service option. The  
36      mobile station shall not accept a service configuration whose attributes are inconsistent  
37      with the valid service configuration attribute table for the service option. The default  
38      service configuration for the packet data service option shall be as shown in the valid  
39      service configuration attribute table for the service option.

1 **Table 1 Valid Service Configuration Attributes for Service Option 33 and Service**  
 2 **Option 66<sup>10</sup>**

<b>Service Configuration Attribute</b>	<b>Valid Selections</b>
Forward Multiplex Option	0x1, 0x2, 0x704
Reverse Multiplex Option	0x1, 0x2, 0x704
Forward Transmission Rates	For the FCH, Rates 1, 1/2, 1/4, and 1/8 enabled. For the DCCH, Rate 1 enabled, Rates 1/2, 1/4, and 1/8 not enabled.
Reverse Transmission Rates	For the FCH, Rates 1, 1/2, 1/4, and 1/8 enabled. For the DCCH, Rate 1 enabled, Rates 1/2, 1/4, and 1/8 not enabled.
Forward Traffic Type	<b>Primary</b> or Secondary Traffic.
Reverse Traffic Type	Shall be identical to the Forward Traffic Type.
Forward FCH Radio Configuration	RC <b>3</b> , 4, 5, 6, 7, 8, 9
Reverse FCH Radio Configuration	RC <b>3</b> , 4, 5, 6
Forward DCCH Radio Configuration	RC <b>3</b> , 4, 5, 6, 7, 8, 9
Reverse DCCH Radio Configuration	RC <b>3</b> , 4, 5, 6
Forward Supplemental Channel Multiplex Option	0x3, 0x4, 0x809, 0x80A, 0x811, 0x812, 0x821, 0x822, 0x905, 0x906, 0x909, 0x90A, 0x911, 0x912, 0x921, 0x922, 0xf20
Reverse Supplemental Channel Multiplex Option	0x3, 0x4, 0x809, 0x80A, 0x811, 0x812, 0x821, 0x822, 0x905, 0x906, 0x909, 0x90A, 0x911, 0x912, 0x921, 0x922, 0xf20
Forward Packet Data Channel Multiplex Option	0xf00
Forward PDCH Radio Configuration	RC 10

3

4 If the packet data service option is connected when the call control instance enters the  
 5 *Waiting for Mobile Station Answer Substate*, or if the packet data service option becomes  
 6 connected while the call control instance is in the *Waiting for Mobile Station Answer*  
 7 *Substate*, the mobile station shall automatically send a *Connect Order* to the base station as  
 8 a message requiring acknowledgment without waiting for the user to explicitly command

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<sup>10</sup> See [16] for a description of selections.

1 the call to be answered. When the mobile station sends a *Connect Order*, the call control  
2 instance enters the *Conversation Substate*.

### 3 2.2.3.2 BS Procedures

4 Packet data service options shall be negotiated and connected using the service  
5 configuration and negotiation procedures defined in [16]. For any service option, the base  
6 station shall not propose a service configuration whose attributes are inconsistent with the  
7 valid service configuration attribute table for the service option (see 2.2.3.1). The base  
8 station shall not accept a service configuration whose attributes are inconsistent with the  
9 valid service configuration attribute table for the service option.

### 10 2.2.4 Packet Data Dormant Timer Control

11 The mobile station shall maintain a packet data dormant timer controllable by the base  
12 station. The default value for this timer shall be zero seconds.

13 The base station may require a mobile station to establish a value for the packet data  
14 dormant timer. If this feature is enabled, a mobile station will not originate a packet data  
15 service option until the timer has expired.

16 The base station shall enable and control this feature in the mobile station through the  
17 *Service Option Control Message*. The default state within the mobile station for base station  
18 control of the packet data dormant timer shall be disabled. When this feature is disabled,  
19 the mobile station shall set its packet data dormant timer to the default value of 0 seconds.  
20 The mobile station shall disable base station control of the dormant timer when one of the  
21 following events occurs:

- 22 • The mobile station receives a *Service Option Control Message* disabling base station  
23 control.
- 24 • The mobile station detects a change in the SID of the serving system.
- 25 • Packet data service enters the *Inactive State*.

26 The base station may send a *Service Option Control Message* (see [16]) to control this  
27 feature. The *Service Option Control Message* shall include the type-specific fields shown in  
28 Table 2.

29 **Table 2 Type-Specific Fields for Data Dormant Timer Control**

Field	Length (bits)
DORM_CNTL	3
RESERVED	2
FIELD_TYPE	3
DORM_TIME	0 or 8

30

31 DORM\_CNTL - Dormant timer control.



1 When this feature is enabled, the mobile station's packet data dormant timer shall not be  
 2 set to a value less than the minimum value specified in the most recently received *Service*  
 3 *Option Control Message*. If the mobile station provides a means for user configuration of  
 4 the dormant timer, and the user attempts to set the value of the timer to a value less than  
 5 minimum specified value, the mobile station should provide the user with an error  
 6 indication. The means for providing the error indication is left to the manufacturer.

7

**Table 3 Dormant Timer Control Field**

<b>DORM_CNTL (binary)</b>	<b>Mobile Station Action</b>
'000'	Disable base station control of minimum dormant timer
'001'	Set the minimum dormant timer value to the value specified in DORM_TIME field
'010'	Set the minimum dormant timer value and the current value of mobile station's packet dormant timer to the value specified in DORM_TIME field
All other DORM_CNTL values are reserved.	

8

9

**Table 4 Minimum Value of Mobile Station Dormant Timer**

<b>DORM_TIME (binary)</b>	<b>Description</b>
'00000000'	Dormant mode not supported by base station
'00000001' through '11111111'	Minimum mobile station packet data dormant timer value in tenths of seconds

10

### 11 2.2.5 Packet Zone Reconnection Control

12 The mobile station may be required by the base station to initiate connection of the packet  
 13 data service option (see 2.2.3) when all of the following conditions are met:

- 14 • the packet data service call control function is associated with the main service  
 15 instance
- 16 • the packet data service is in the *Active State*;
- 17 • the packet data service call control function is in the *Reconnect State* or *Dormant State*;  
 18 and

- 1 • the mobile station detects a change in the packet zone and the new packet data  
2 services zone identifier is non-zero.

3 Packet zone based reconnection causes a mobile station to initiate connection of the packet  
4 data service option whenever it moves into a new packet zone not on its internally stored  
5 list of visited packet zones. A packet zone is added to the list whenever the mobile station  
6 initiates connection of the packet data service option while in the zone, and is deleted when  
7 the number of more recently visited zones is equal to the maximum number of zones  
8 retained by the mobile station, or, if packet zone hysteresis is enabled, when its packet  
9 zone hysteresis timer expires.

10 Packet zone hysteresis allows the mobile station to reduce the number of connections when  
11 the mobile station is moving between two or more packet zones and the base station has  
12 not required the mobile station to store more than one visited packet zone.

13 When packet zone hysteresis is enabled, a packet zone shall be identified either by a packet  
14 data services zone identifier or by an extended packet data services zone identifier, as  
15 follows:

- 16 • If the mobile station does not support SID/NID hysteresis (see 2.2.5.1), the mobile  
17 station shall identify a packet zone using the packet data services zone identifier. The  
18 packet data services zone identifier is the value in the field PACKET\_ZONE\_ID.
- 19 • If the mobile station supports SID/NID hysteresis (see 2.2.5.1), the mobile station shall  
20 identify a packet zone using its supported extended packet data services zone identifier.

21 The base station shall enable packet zone based reconnection in the mobile station by  
22 transmitting a non-zero packet data services zone identifier (PACKET\_ZONE\_ID). The base  
23 station may disable the packet zone based reconnection function in the mobile station by  
24 sending a *Service Option Control Message* disabling the enabled feature. The base station  
25 may re-enable the function in the mobile station by sending a *Service Option Control*  
26 *Message* enabling the feature. The base station may control the number of entries a mobile  
27 station is to retain in its list of visited packet zones and may clear the list by sending a  
28 *Service Option Control Message*.

29 The default state within the mobile station for the packet zone based reconnection feature  
30 shall be disabled. The mobile shall enable the feature upon initial detection of a non-zero  
31 packet data services zone identifier (PACKET\_ZONE\_ID<sub>s</sub>). The mobile station shall then  
32 add the packet zone to its stored list of visited packet zones. Upon enabling the packet  
33 zone reconnection feature, the mobile station shall set the length of the packet zone list to  
34 one entry until commanded otherwise by the base station. The mobile station shall provide  
35 memory for storing up to 15 packet zone.

36 If the base station has enabled packet zone based reconnection and if the length of the  
37 packet zone list is one entry, the mobile station shall perform the following:

- 38 • If the base station enables packet zone hysteresis, the mobile station shall enable  
39 packet zone hysteresis.
- 40 • If the base station disables packet zone hysteresis, the mobile station shall disable  
41 packet zone hysteresis.

- 1 • If the base station does not enable or disable packet zone hysteresis, the mobile station  
2 shall enable packet zone hysteresis.

3 If the mobile station receives a *Service Option Control Message* setting the length of the  
4 packet zone list to a number greater than one, the mobile station shall disable packet zone  
5 hysteresis and clear the packet zone hysteresis list.

6 When packet zone hysteresis is enabled, the mobile station shall perform the following:

- 7 • When the packet zone hysteresis activation timer expires, the mobile station shall set  
8 the length of the packet zone list to the number of packet zone hysteresis entries  
9 indicated by the base station. If the base station did not specify the number of packet  
10 zone hysteresis entries, the mobile station shall set the length of the packet zone list to  
11 4 entries.
- 12 • If the length of the packet zone list is set to more than one entry, then before the mobile  
13 station adds a new entry to the list, the mobile station shall perform the following:
- 14 – The mobile station shall set a packet zone hysteresis timer for the most recently  
15 added entry in the list to the value indicated by the base station for the packet zone  
16 hysteresis timer, or, if the base station did not indicate a value for the packet zone  
17 hysteresis timer, to 60 seconds, and shall start the timer.
  - 18 – The mobile station shall then add the new entry to the list.
- 19 • When the mobile station sends or receives user data, the packet zone hysteresis  
20 activation indicator is set to 1 (see 2.2.2.1.2.3 and 2.2.2.1.2.4). When the mobile  
21 station sets the packet zone hysteresis activation indicator to 1, the mobile station shall  
22 perform the following:
- 23 – If the data exchange was triggered by a *General Page Message* or a *Univeral Page*  
24 *Message, the mobile station shall* delete all but the most recent entry in the packet  
25 zone list and shall set the length of the packet zone list to one entry.
  - 26 – If the data exchange was not triggered by a *General Page Message* or a *Univeral Page*  
27 *Message, the mobile station may delete all but the most recent entry in the packet*  
28 *zone list and may set the length of the packet zone list to one entry.*<sup>11</sup>

29 The mobile station shall maintain the list of visited packet zones in most recently visited  
30 order sequence with the current zone contained in the first entry of the list. If  
31 P\_REV\_IN\_USE is greater than or equal to 9, the mobile station shall not add a zone  
32 identifier to its list unless the base station using Layer 2 or Layer 3 signaling acknowledged  
33 the mobile station's connection attempt for the zone. If packet zone hysteresis is not  
34 enabled or if the length of the packet zone list is one, entries shall be removed from the list  
35 in least recently visited order. If packet zone hysteresis is enabled and the length of the  
36 packet zone list is set to more than one entry, entries shall be removed from the list  
37 according to the following:

---

<sup>11</sup> By choosing not to delete all but the most recent entry in the list, the mobile station can avoid subsequent packet data reconnections.

- 1 • An entry shall be removed from the list upon expiration of its packet zone hysteresis  
 2 timer.<sup>12</sup>  
 3 • When adding a new entry to a list that is currently full, the entry with the smallest  
 4 remaining packet zone hysteresis timer value shall be removed from the list before  
 5 adding the new entry.

6 If the length of the packet zone list is set to a number that is less than the number of  
 7 entries currently stored in the packet zone list, the mobile station shall remove the entries  
 8 with the smallest remaining packet zone hysteresis timer value until the number of entries  
 9 stored in the packet zone list is equal to the length of the packet zone list.

10 The mobile station shall disable packet zone based reconnection and clear its list of visited  
 11 packet zones when one of the following occurs:

- 12 • The mobile station receives a *Service Option Control Message* disabling the feature.  
 13 • The mobile station detects a PACKET\_ZONE\_ID<sub>S</sub> field of value '00000000'.  
 14 • Packet data service enters the *Inactive State*.  
 15 • The mobile station detects a change in SID and the packet zone hysteresis is disabled.  
 16 • The mobile station detects a change in SID and the packet zone hysteresis is enabled  
 17 and the mobile station does not support SID/NID hysteresis (see 2.2.5.1).

18 Once disabled, the mobile station shall re-enable the feature upon detection of a non-zero  
 19 PACKET\_ZONE\_ID<sub>S</sub> or upon receipt of a *Service Option Control Message* enabling the  
 20 feature.

21 The base station may send a *Service Option Control Message* (see [16]) to control this  
 22 feature. The *Service Option Control Message* shall include the type-specific fields shown in  
 23 Table 5 .

24 **Table 5 Type-Specific Fields for Packet Connection Control**

Field	Length (bits)
PKT_CON_CNTL	3
RESERVED	2
FIELD_TYPE	3
RESERVED	0 or 4
PKT_ZONE_LIST_LEN	0 or 4

25

26 PKT\_CON\_CNTL - Packet Zone Connection Control.

---

<sup>12</sup> If the entry happens to be the current packet zone (PACKET\_ZONE\_ID<sub>S</sub>), removing the entry will trigger the mobile station to perform a packet data reconnect.

- 1                                   The base station shall set this field to the PKT\_CON\_CNTL  
2                                   value from Table 6 corresponding to the function that the  
3                                   mobile station is to perform.
- 4                   RESERVED     -   Reserved bits.  
5                                   The base station shall set this field to '00'.
- 6                   FIELD\_TYPE   -   Type-specific field designator.  
7                                   The base station shall set this field to '100'.
- 8                   RESERVED     -   Reserved bits.  
9                                   The base station shall set this field to '0000' if  
10                                  PKT\_CON\_CNTL is set to '001' or '010'. The base station shall  
11                                  omit this field if PKT\_CON\_CNTL is any other value.
- 12   PKT\_ZONE\_LIST\_LEN   -   Packet zone list length.  
13                                  The base station shall include this field if PKT\_CON\_CNTL is  
14                                  set to '001' or '010' to specify the number of packet zones the  
15                                  mobile station is to retain in its packet zone list. This field  
16                                  shall be within the range '0001' through '1111', inclusive.
- 17   The base station shall set the PKT\_CON\_CNTL appropriately as specified in Table 6.
- 18   •   The base station shall set the value of PKT\_CON\_CNTL to '000' to disable the packet  
19        zone based reconnection feature in the mobile station.
- 20   •   The base station shall set the value of PKT\_CON\_CNTL to '001' to enable packet zone  
21        based reconnection feature in the mobile station. The base station shall also include  
22        the PKT\_ZONE\_LIST\_LEN field in the type-specific fields of the *Service Option Control*  
23        *Message* to specify the number of packet zones the mobile station is to store in its  
24        internal list.
- 25   •   The base station shall set the value of PKT\_CON\_CNTL to '010' to clear the packet zone  
26        list within the mobile station. The base station shall also include the  
27        PKT\_ZONE\_LIST\_LEN field in the type-specific fields of the *Service Option Control*  
28        *Message* to specify the number of packet zones the mobile station is to store in its  
29        internal list.
- 30   •   The base station shall set the value of the PKT\_CON\_CNTL to '011' to request the mobile  
31        station to transfer its internally stored packet zone list to the base station.

1

**Table 6 Packet Zone Connection Control Field**

<b>PKT_CON_CNTL (binary)</b>	<b>Mobile Station Action</b>
'000'	Disable packet zone connection control
'001'	Enable packet zone connection control
'010'	Clear the packet zone list
'011'	Transfer the packet zone list to base station
All other PKT_CON_CNTL values are reserved.	

2

3 If the mobile station receives a *Service Option Control Message* for the service option with  
4 FIELD\_TYPE set to '100' and the PKT\_CON\_CNTL field is not equal to a value defined in  
5 Table 6, the mobile station shall reject the message by sending a Mobile Station Reject  
6 Order with the ORDQ field set equal to '00000100'.

7 If the mobile station receives a *Service Option Control Message* for the service option with  
8 FIELD\_TYPE set to '100' and the PKT\_CON\_CNTL field is equal to a value defined in Table  
9 6, the mobile station shall perform the following actions:

- 10 • If the value of PKT\_CON\_CNTL field is set to '000', the mobile station shall disable the  
11 packet zone based reconnection feature and clear its list of stored packet zones.
- 12 • If the value of the PKT\_CON\_CNTL field is set to '001', and the packet zone based  
13 reconnection feature is currently disabled, the mobile station shall enable the feature.  
14 The mobile station shall set the number of entries in its packet zone list to the value  
15 specified in the PKT\_ZONE\_LIST\_LEN field of the *Service Option Control Message*.
- 16 • If the value of the PKT\_CON\_CNTL field is set to '001', and the packet zone based  
17 reconnection feature is currently enabled, the mobile station shall set the number of  
18 entries in its packet zone list to the value specified in the PKT\_ZONE\_LIST\_LEN field of  
19 the *Service Option Control Message*. If the value of the PKT\_ZONE\_LIST\_LEN is greater  
20 than or equal to the number of existing entries in the list, the mobile station shall retain  
21 the current list entries. If the value of the PKT\_ZONE\_LIST\_LEN represents a decrease  
22 in the number of list entries, the mobile station shall delete the least recently visited  
23 zone list entries.
- 24 • If the value of the PKT\_CON\_CNTL field is set to '010', the mobile station shall clear its  
25 packet zone list. The mobile station shall set the number of entries in its packet zone  
26 list to the value specified in the PKT\_ZONE\_LIST\_LEN field of the *Service Option Control*  
27 *Message*.
- 28 • If the value of the PKT\_CON\_CNTL field is set to '011' and if packet zone hysteresis is  
29 not enabled, the mobile station shall transfer the contents of its stored packet zone list  
30 to the base station. If the value of the PKT\_CON\_CNTL field is set to '011' and if packet

1 zone hysteresis is enabled, then the mobile station shall transfer only the packet data  
 2 services zone identifier in the entry containing the current value of PACKET\_ZONE\_IDS.  
 3 The mobile station shall transfer the list using a *Service Option Control Message*  
 4 including the type-specific fields shown in Table 7.

5 **Table 7 Type-Specific Fields for Packet Zone Connection Response**

Field	Length (bits)
PKT_CON_RESP	3
RESERVED	2
FIELD_TYPE	3
RESERVED	4
PKT_ZONE_LIST_LEN	4

6 The mobile station shall include PKT\_ZONE\_LIST\_LEN  
 7 occurrences of the following record:

PACKET_ZONE_ID	8
----------------	---

8

- 9       PKT\_CON\_RESP   -   Packet Zone Connection Response.  
 10                            The mobile station shall set this field to '000'.
- 11           RESERVED   -   Reserved bits.  
 12                            The mobile shall set this field to '00'.
- 13           FIELD\_TYPE -   Type-specific field designator.  
 14                            The mobile shall set this field to '100'.
- 15           RESERVED   -   Reserved bits.  
 16                            The mobile station shall set this field to '0000'.
- 17   PKT\_ZONE\_LIST\_LEN -   Packet Zone List Length.  
 18                            The mobile station shall set this field to specify the number of  
 19                            reported packet data service zone identifiers within the *Service*  
 20                            *Option Control Message*. This field shall be within the range of  
 21                            '0001' through '1111', inclusive.
- 22           PACKET\_ZONE\_ID -   Packet data services zone identifier.  
 23                            The mobile station shall set this field to the packet data  
 24                            services zone identifier to be reported to the base station.

25 2.2.5.1 SID/NID Hysteresis

26 SID/NID hysteresis enhances packet zone hysteresis by allowing the hysteresis area to  
 27 include multiple NIDs and multiple SIDs. When SID/NID hysteresis is supported and  
 28 packet zone hysteresis is enabled, the mobile station includes the SID and, optionally, the  
 29 NID when identifying a packet zone. This tends to reduce the number of times the mobile

1 station detects a change in packet zone and correspondingly reduces the number of mobile  
2 station reconnection attempts due to a change in packet zone.

3 The mobile station may support SID/NID hysteresis.

4 If the mobile station supports SID/NID hysteresis, the mobile station shall support one of  
5 the following two extended packet data services zone identifier formats to identify a packet  
6 zone:

7 1. The extended packet data services zone identifier includes SID, NID, and the  
8 packet data services zone identifier. The packet data services zone identifier is the  
9 value in the field `PACKET_ZONE_ID`.

10 2. The extended packet data services zone identifier includes SID and the packet  
11 data services zone identifier. The packet data services zone identifier is the value  
12 in the field `PACKET_ZONE_ID`.

### 13 2.2.6 Strongest Pilot Monitoring and Reporting

14 The base station may require the mobile station, when the packet data service call control  
15 function is in the *Connected State*, to monitor the strongest pilot in the Active Set and send  
16 a *Periodic Pilot Strength Measurement Message* (PPSMM) when that pilot's rank in the Active  
17 Set changes.

18 This allows the base station to track the strongest pilot(s) in the Active Set to enhance  
19 forward Supplemental Channel assignment when operating with a reduced Active Set.

20 The base station shall enable strongest pilot monitoring and reporting in the mobile station  
21 by sending a Service Option Control Message enabling the feature. The base station may  
22 disable strongest pilot monitoring and reporting in the mobile station by sending a Service  
23 Option Control Message disabling strongest pilot monitoring and reporting.

24 The default state within the mobile station for strongest pilot monitoring and reporting  
25 shall be disabled. The mobile station shall begin strongest pilot monitoring and reporting  
26 upon receipt of a Service Option Control Message enabling strongest pilot monitoring and  
27 reporting.

28 The mobile station shall disable strongest pilot monitoring and reporting when one of the  
29 following occurs:

- 30 • The mobile station receives a *Service Option Control Message* disabling strongest pilot  
31 monitoring and reporting.
- 32 • The packet data service call control function exits the *Connected State*.

33 When strongest pilot monitoring and reporting is enabled, the mobile station shall send a  
34 *Periodic Pilot Strength Measurement Message* (PPSMM) after the strongest pilot becomes  
35 weaker than another pilot by a difference specified by `SP_MIN_DELTA` / 2 dB for an interval  
36 specified by `SP_INTERVAL` units of 80 ms. Once the mobile station has sent the PPSMM, it  
37 begins to monitor the pilot reported as the strongest in the PPSMM as the strongest pilot.

38 The Service Option Control Message that the base station sends to the mobile station shall  
39 include the type-specific fields shown in Table 8.

1 **Table 8 Type-Specific Fields for Strongest Pilot Monitoring and Reporting**

Field	Length (bits)
SP_MR_CNTL	1
RESERVED	4
FIELD_TYPE	3
SP_MIN_DELTA	3
SP_INTERVAL	4

2

3 SP\_MR\_CNTL - Strongest pilot monitoring and reporting control.

4 The base station shall set this field to '0' to disable strongest

5 pilot monitoring and reporting. The base station shall set this

6 field to '1' to enable strongest pilot monitoring and reporting.

7 RESERVED Reserved bits.

8 The base station shall set this field to '0000'.

9 FIELD\_TYPE Type-specific field designator.

10 The base station shall set this field to '101'.

11 SP\_MIN\_DELTA - If the SP\_MR\_CNTL field is set to '0', the base station shall set

12 this field to '000'. If the SP\_MR\_CNTL field is set to '1', the

13 base station shall set this field to the minimum pilot strength

14 measurement difference between the strongest pilot and any

15 other Active Set pilot (in units of 0.5 dB) that must be

16 measured in order for the mobile station to send a *Periodic*

17 *Pilot Strength Measurement Message*. A difference of at least

18  $SP\_MIN\_DELTA / 2$  dB must be measured for SP\_INTERVAL

19 successive intervals before a *Periodic Pilot Strength*

20 *Measurement Message* is sent.

21 SP\_INTERVAL - If the SP\_MR\_CNTL field is set to '0', the base station shall set

22 this field to '0000'. If the SP\_MR\_CNTL field is set to '1', the

23 base station shall set this field to the minimum interval (in 80

24 ms units) during which the indicated pilot strength

25 measurement difference (greater than or equal to

26 SP\_MIN\_DELTA) must be measured by the mobile station in

27 order for the mobile station to send a *Periodic Pilot Strength*

28 *Measurement Message*.

29 **2.2.7 High Speed Operation**

30 High speed operation uses non-Fundicated channel types to form a high-bandwidth traffic

31 channel. Non-Fundicated Channels include Supplemental Channels and the Forward

32 Packet Data Channel. Supplemental Channels are used in conjunction with Fundicated

33 Channels to provide the high speed Traffic Channel. The Forward Packet Data Channel is

34 used either in conjunction with a Fundicated Channel or as a substitute for the Fundicated

35 Channel to provide a high speed Traffic Channel.

1 Forward high speed operation uses a Forward Supplemental Channel or a Forward Packet  
2 Data Channel. Reverse high speed operation uses a Reverse Supplemental Channel.

3 When using a Supplemental Channel, the mobile station requests reverse high speed  
4 operation by sending a SCRM, or, if permitted by the base station, a SCRMM to the base  
5 station. The mobile station includes a SCRM\_REQ\_BLOB (see 2.2.7.2.1) in the REQ\_BLOB  
6 field of the SCRM or a SCRMM\_REQ\_BLOB (see 2.2.7.2.2) in the REQ\_BLOB field of the  
7 SCRMM.

8 The mobile station also uses a SCRM or SCRMM to report changes in the number of the  
9 Preferred Reverse Supplemental Channel Rate.

10 When using a Supplemental Channel, the base station controls both forward and reverse  
11 high speed operation by allocating Supplemental Channels for some time period. Allocation  
12 is specified in either the ESCAM, FSCAMM, RSCAMM, or UHDM. When using a Forward  
13 Packet Data Channel, the base station controls forward high speed operation by assigning a  
14 Forward Packet Data Channel. The Forward Packet Data Channel is assigned using an  
15 ECAM followed by an SCM or by a UHDM. The Forward Packet Data Channel is deassigned  
16 using a UHDM (see [16]).

#### 17 2.2.7.1 Mobile Station Procedures for Reverse High Speed Operation Using a 18 Supplemental Channel

19 When the amount of user data in the mobile station reaches an implementation defined  
20 threshold, the mobile station may request reverse high speed operation by sending a SCRM  
21 or SCRMM to the base station. If the mobile station sends a SCRM, the mobile station shall  
22 include a SCRM\_REQ\_BLOB (see 2.2.7.2.1) in the REQ\_BLOB field of the SCRM and shall  
23 set the SIZE\_OF\_REQ\_BLOB field to the number of octets in the SCRM\_REQ\_BLOB. If the  
24 mobile station sends a SCRMM, the mobile station shall include a SCRMM\_REQ\_BLOB (see  
25 2.2.7.2.2) in the REQ\_BLOB field of the SCRMM. Once the mobile station has sent the  
26 SCRM or SCRMM, it should allow the base station one second to respond with an allocation  
27 message (ESCAM, RSCAMM, or UHDM) before repeating the request. If the mobile station  
28 determines that it cannot use the PREFERRED\_RATE indicated in its request for high  
29 speed operation, the mobile station may send a SCRM or SCRMM to report the correct rate  
30 without waiting for an allocation message. The mobile station may cancel an outstanding  
31 request or request termination of a current assignment by sending a SCRM that does not  
32 include a REQ\_BLOB field, and whose SIZE\_OF\_REQ\_BLOB field is set to zero.  
33 Alternatively, the mobile station may cancel an outstanding request or request termination  
34 of a current assignment by sending a SCRMM with the DURATION field set to '0000'.

35 If, during reverse high speed operation, the mobile station determines that the user data in  
36 the reverse traffic buffer will exceed its implementation defined threshold when it exits  
37 reverse high speed operation, it may send a SCRM or SCRMM to the base station to request  
38 a continuation of reverse high speed operation. Once the mobile station has sent the SCRM  
39 or SCRMM, it should allow the base station one second to respond with an allocation  
40 message (ESCAM, RSCAMM, or UHDM) before repeating the request.

41 If either of the following two conditions is true:

- 1 • Layer 3 supports sending an indication to the service instance when the mobile station  
 2 has terminated transmission on the supplemental channel due to expiration of the  
 3 discontinued transmission period (see [16])
- 4 • Layer 3 does not support sending an indication to the service instance when the mobile  
 5 station has terminated transmission on the supplemental channel due to expiration of  
 6 the discontinued transmission period (see[16]), and either of the following two  
 7 conditions is true:
- 8 – the mobile station discontinues transmission and has not been granted permission  
 9 to use discontinuous transmission, or
- 10 – permission has been granted and the mobile station discontinues transmission for  
 11 more than the duration specified by REV\_SCH\_DTX\_DURATION<sub>S</sub>,

12 then the mobile station shall perform the following:

- 13 • If the base station has granted the mobile station reverse high speed operation for a  
 14 finite duration (i.e., not infinite), the mobile station should perform one of the following  
 15 two procedures:
- 16 – The mobile station shall send a SCRM to the base station that does not include a  
 17 REQ\_BLOB field and whose SIZE\_OF\_REQ\_BLOB field is set to zero, or
- 18 – The mobile station shall send a SCRMM to the base station with the DURATION  
 19 field set to '0000'.
- 20 • If the base station has granted the mobile station reverse high speed operation for an  
 21 infinite duration, the mobile station shall perform one of the following two procedures:
- 22 – The mobile station shall send a SCRM to the base station that does not include a  
 23 REQ\_BLOB field and whose SIZE\_OF\_REQ\_BLOB field is set to zero, or
- 24 – The mobile station shall send a SCRMM to the base station with the DURATION  
 25 field set to '0000'.

## 26 2.2.7.2 Reverse High Speed Operation Messages When Using a Supplemental Channel

### 27 2.2.7.2.1 SCRM\_REQ\_BLOB Format

Field	Length (bits)
DURATION_UNIT	3
NUM_REQ	3
RESERVED	2

Followed by NUM\_REQ occurrences of the following Service Request record

SR_ID	3
PREFERRED_RATE	4
DURATION	9



1 RESERVED - The mobile station shall set this field to '000'.

2 **Table 9 Encoding of the PREFERRED\_RATE**

<b>PREFERRED_RATE Field Value (binary)</b>	<b>Requested Reverse User Rate (kbps)</b>
'0000'	9.6
'0001'	19.2
'0010'	38.4
'0011'	76.8
'0100'	153.6
'0101'	307.2
'0110'	614.4
'0111' – '1111'	RESERVED

3 **Table 10 Encoding of the DURATION Field**

<b>DURATION Field Value (binary)</b>	<b>Number of 20 ms Intervals</b>
'0000'	0
'0001'	4
'0010'	5
'0011'	6
'0100'	7
'0101'	8
'0110'	9
'0111'	10
'1000'	16
'1001'	32
'1010'	64
'1011'	96
'1100'	128
'1101'	256
'1111'	infinite

4

1

**Table 11 Encoding of the RES\_DATA Field**

<b>RES_DATA Field Value (binary)</b>	<b>Residual Data (bits)</b>
'00'	No Data
'01'	$\frac{1}{4}$ of the total data transmitted at PREFERRED_RATE for DURATION time
'10'	$\frac{1}{2}$ of the total data transmitted at PREFERRED_RATE for DURATION time
'11'	$\frac{3}{4}$ of the total data transmitted at PREFERRED_RATE for DURATION time

2

## 3 2.2.8 Quality of Service (QoS)

## 4 2.2.8.1 QoS Parameters

5 For the mobile station, QoS BLOB Type 0 is a QoS BLOB in which the  
6 QOS\_BLOB\_TYPE\_INCL field is set to '10' and the QOS\_BLOB\_TYPE field is set to '0000'.

7 For the base station, QoS BLOB Type 0 is a QoS BLOB in which the  
8 MAX\_QOS\_BLOB\_TYPE\_SUPPORTED field is set to '0000' and the QOS\_BLOB\_TYPE field is  
9 set to '0000'.

10 The set of QoS parameters that apply to Service Option 33 and Service Option 66 for QoS  
11 BLOB Type 0 is defined in Table 12. If the mobile station supports QoS, it may support QoS  
12 BLOB Type 0. If the base station supports QoS, it may support QoS BLOB Type 0.

13 The set of QoS parameters that apply to Service Option 33 and Service Option 66 for a QoS  
14 BLOB other than QoS BLOB Type 0 is outside the scope of this specification. Mobile station  
15 and base station support requirements for a QoS BLOB other than QoS BLOB Type 0 are  
16 defined in the specification that describes the QoS parameters for that QoS BLOB.

17 For each QoS parameter in Table 12, the set of allowable values that can be selected by  
18 Service Option 33 and Service Option 66, is defined. If a parameter value is not specified in  
19 Table 12, it shall be considered reserved and shall not be used.

20 The set of default parameters and default parameter values that apply to Service Option 33  
21 and Service Option 66 for QoS BLOB Type 0 is identified in Table 12 using bold text and  
22 also by specification.

1 For assured mode packet data service, there are independently specified QoS parameters  
 2 for the forward and reverse links. A mobile station may also specify both a requested value  
 3 and an acceptable value for some QoS parameters, as indicated in Table 12.

4 **Table 12 QoS Parameters Applicable to Service Option 33 and Service Option 66 for**  
 5 **QoS BLOB Type 0**

QoS Parameter	Length (bits)	Allowable Value(s)
Assured Mode	1	'0' <b>Non-assured mode packet data service. This is the default value.</b>
		'1' Assured mode packet data service.
Non-assured Priority  Applies only to non-assured mode.  The priority referenced herein is the user's priority associated with this data service instance (a non-assured mode packet data service).	4	'0000' Adjust the user's priority to 0.
		'0001' Adjust the user's priority to 1/13 of the subscription priority value.
		'0010' Adjust the user's priority to 2/13 of the subscription priority value.
		'0011' Adjust the user's priority to 3/13 of the subscription priority value.
		'0100' Adjust the user's priority to 4/13 of the subscription priority value.
		'0101' Adjust the user's priority to 5/13 of the subscription priority value.
		'0110' Adjust the user's priority to 6/13 of the subscription priority value.
		'0111' Adjust the user's priority to 7/13 of the subscription priority value.
		'1000' Adjust the user's priority to 8/13 of the subscription priority value.
		'1001' Adjust the user's priority to 9/13 of the subscription priority value.

		<p>'1010' Adjust the user's priority to 10/13 of the subscription priority value.</p> <p>'1011' Adjust the user's priority to 11/13 of the subscription priority value.</p> <p>'1100' Adjust the user's priority to 12/13 of the subscription priority value.</p> <p><b>'1101' Adjust the user's priority to the subscription priority value.</b> <b>This is the default value.</b></p> <p>'1110' Reserved.</p> <p>'1111' Reserved.</p>
<p>Forward Link Priority</p> <p>Reverse Link Priority</p> <p>Applies only to assured mode.</p> <p>The priority referenced herein is the user's priority associated with this data service instance (an assured mode packet data service).</p>	4	<p>'0000' Adjust the user's priority to 0.</p> <p>'0001' Adjust the user's priority to 1/13 of the subscription priority value.</p> <p>'0010' Adjust the user's priority to 2/13 of the subscription priority value.</p> <p>'0011' Adjust the user's priority to 3/13 of the subscription priority value.</p> <p>'0100' Adjust the user's priority to 4/13 of the subscription priority value.</p> <p>'0101' Adjust the user's priority to 5/13 of the subscription priority value.</p> <p>'0110' Adjust the user's priority to 6/13 of the subscription priority value.</p> <p>'0111' Adjust the user's priority to 7/13 of the subscription priority value.</p> <p>'1000' Adjust the user's priority to 8/13 of the subscription priority value.</p>

		<p>'1001' Adjust the user's priority to 9/13 of the subscription priority value.</p> <p>'1010' Adjust the user's priority to 10/13 of the subscription priority value.</p> <p>'1011' Adjust the user's priority to 11/13 of the subscription priority value.</p> <p>'1100' Adjust the user's priority to 12/13 of the subscription priority value.</p> <p><b>'1101' Adjust the user's priority to the subscription priority value. This is the default value.</b></p> <p>'1110' Reserved.</p> <p>'1111' Reserved.</p>
<p>Forward Link Minimum Requested User Data Rate</p> <p>Forward Link Minimum Acceptable User Data Rate</p> <p>Reverse Link Minimum Requested User Data Rate</p> <p>Reverse Link Minimum Acceptable User Data Rate</p> <p>Applies only to assured mode.</p>	4	<p>'0001' 8 kbps</p> <p>'0010' 32 kbps</p> <p>'0011' 64 kbps</p> <p>'0100' 96 kbps</p> <p>'0101' 144 kbps</p> <p>'0110' 288 kbps</p> <p>'0111' 384 kbps</p>

		'1000'-'1111' Reserved.
Forward Link Requested Data Loss Rate		'0001' 1%
Forward Link Acceptable Data Loss Rate		'0010' 2%
Reverse Link Requested Data Loss Rate		'0011' 5%
Reverse Link Acceptable Data Loss Rate		'0100' 10%
Applies only to assured mode.	4	'0101' $10^{-3}$
If RLP does not use its ARQ mechanism, data loss rate is defined as being numerically equal to the Frame Error Rate. If RLP uses its ARQ mechanism, data loss rate is defined as the ratio of the number of lost data octets to the number of transmitted data octets, measured above RLP.		'0110' $10^{-4}$
		'0111' $10^{-6}$
		'1000' $10^{-8}$
		'1001'-'1111' Reserved.
Forward Link Requested		4

<sup>13</sup> The base station can use the maximum delay parameter to guide its selection of RLP parameters.

Maximum Delay		'0010' 80 ms
Forward Link Acceptable Maximum Delay		'0011' 160 ms
Reverse Link Requested Maximum Delay		'0100' 240 ms
		'0101' 320 ms
Reverse Link Acceptable Maximum Delay		'0110' 480 ms
Applies only to assured mode. <sup>13</sup>		'0111' 640 ms
Maximum delay is defined to be the maximum amount of time allowed from the time that an octet of user data is submitted to the transmitting RLP until the receiving RLP either delivers the octet or aborts its delivery.		'1000' 1 second
		'1001' 2 seconds
		'1010' 3 seconds
		'1011' 5 seconds
		'1100'-'1111' Reserved.

1

## 2 2.2.8.2 Mobile Station Procedures When Using QoS BLOB Type 0

3 To use the default set of QoS parameters for Service Option 33 or Service Option 66 for QoS  
4 BLOB Type 0, the mobile station should not include a QoS BLOB in the signaling message  
5 it uses to request connection of the service option.

6 To propose any non-default QoS parameter value, the mobile station shall include a QoS  
7 BLOB Type 0, as specified in Table 13, in the signaling message it uses to request  
8 connection of the service option. The mobile station shall set the parameters in the QoS  
9 BLOB using the values defined in Table 12. When requesting assured mode packet data  
10 service, the mobile station shall omit any QoS parameter for which it requests and can  
11 accept *best effort* service rather than a specific level of service.

12 If the mobile station does not receive a QoS BLOB Type 0 in the signaling message used by  
13 the base station to connect the service option, it shall use the default set of QoS parameters  
14 as defined in Table 12 for the service option.

15 If the mobile station receives a QoS BLOB Type 0 in the signaling message used by the base  
16 station to connect the service option, it shall perform the following:

- 1 • The mobile station may reject the signaling message containing the QoS BLOB.
- 2 • If the mobile station does not reject the message containing the QoS BLOB, it shall use
- 3 the specified set of QoS parameters contained in the QoS BLOB.

4

**Table 13 Mobile Station QoS BLOB**

<b>Field</b>	<b>Length (Bits)</b>
QOS_BLOB_TYPE_INCL	2
QOS_BLOB_TYPE	4
ASSURED_MODE	0 or 1
NON_ASSURED_PRI_ADJ_INCL	0 or 1
NON_ASSURED_PRI_ADJ	0 or 4
F_QOS_INCL	0 or 1
F_ASSURED_PRI_ADJ_INCL	0 or 1
F_ASSURED_PRI_ADJ	0 or 4
F_DATARATE_INCL	0 or 2
F_REQ_DATARATE	0 or 4
F_ACC_DATARATE	0 or 4
F_DATALOSS_INCL	0 or 2
F_REQ_DATALOSS	0 or 4
F_ACC_DATALOSS	0 or 4
F_DELAY_INCL	0 or 2
F_REQ_DELAY	0 or 4
F_ACC_DELAY	0 or 4
R_QOS_INCL	0 or 1
R_ASSURED_PRI_ADJ_INCL	0 or 1
R_ASSURED_PRI_ADJ	0 or 4
R_DATARATE_INCL	0 or 2
R_REQ_DATARATE	0 or 4
R_ACC_DATARATE	0 or 4
R_DATALOSS_INCL	0 or 2
R_REQ_DATALOSS	0 or 4
R_ACC_DATALOSS	0 or 4

R_DELAY_INCL	0 or 2
R_REQ_DELAY	0 or 4
R_ACC_DELAY	0 or 4

1

2

QOS\_BLOB\_TYPE\_

3

INCL - QoS BLOB type parameter(s) included indicator.

4

The mobile station shall include this field and set it to a non-reserved value in Table 14.

5

6

**Table 14 QoS BLOB Type Included Indicator Values**

Value	Description
'00'	Reserved. The definition of the remainder of the QoS BLOB associated with this value is outside the scope of this specification.
'01'	The QOS_BLOB_TYPE field is included.
'10'	Reserved
'11'	Reserved

7

8

QOS\_BLOB\_TYPE - QoS BLOB type.

9

The mobile station shall set this field to '0000'.

10

11

ASSURED\_MODE - Packet Data Service QoS mode.

12

If the QOS\_BLOB\_TYPE field is omitted, the mobile station shall omit this field.

13

14

If the QOS\_BLOB\_TYPE field is included, the mobile station shall include this field and shall set it as follows:

15

16

If non-assured mode packet data service is requested, the mobile station shall set this field to '0'. If assured mode packet data service is requested, the mobile station shall set this field to '1'.

17

18

19

20

NON\_ASSURED\_PRI\_

21

ADJ\_INCL - Non-assured mode priority adjustment included indicator.

22

If the ASSURED\_MODE field is omitted or is set to '1', the mobile station shall omit this field.

23

24

If the ASSURED\_MODE field is set to '0', and no change to the user's non assured mode priority is requested, the mobile station shall set this field to '0'.

25

26



1

**Table 15 User Priority Adjustment Values**

<b>Value</b>	<b>Description</b>
'0000'	Adjust the user's priority to 0
'0001'	Adjust the user's priority to 1/13 of the subscription priority value
'0010'	Adjust the user's priority to 2/13 of the subscription priority value
'0011'	Adjust the user's priority to 3/13 of the subscription priority value
'0100'	Adjust the user's priority to 4/13 of the subscription priority value
'0101'	Adjust the user's priority to 5/13 of the subscription priority value
'0110'	Adjust the user's priority to 6/13 of the subscription priority value
'0111'	Adjust the user's priority to 7/13 of the subscription priority value
'1000'	Adjust the user's priority to 8/13 of the subscription priority value
'1001'	Adjust the user's priority to 9/13 of the subscription priority value
'1010'	Adjust the user's priority to 10/13 of the subscription priority value
'1011'	Adjust the user's priority to 11/13 of the subscription priority value
'1100'	Adjust the user's priority to 12/13 of the subscription priority value
'1101'	Adjust the user's priority to the subscription priority value
'1110'- '1111'	Reserved

2

3

F\_QOS\_INCL - Forward QoS parameters included indicator.

4

If the ASSURED\_MODE field is omitted or is set to '0', the mobile station shall omit this field.

5

6

If the ASSURED\_MODE field is set to '1', the mobile station shall include this field and shall set it as follows:

7

1 If a forward QoS parameter is included, the mobile station  
 2 shall set this field to '1'. Otherwise, the mobile station shall  
 3 set this field to '0'.

4 F\_ASSURED\_PRI\_

5 ADJ\_INCL - Forward link assured mode priority adjustment included  
 6 indicator.

7 If the F\_QOS\_INCL field is omitted or is set to '0', the mobile  
 8 station shall omit this field.

9 If the F\_QOS\_INCL field is set to '1', and no change to the  
 10 user's forward link assured mode priority is requested, the  
 11 mobile station shall set this field to '0'.

12 If the F\_QOS\_INCL field is set to '1', and a change to the  
 13 user's forward link assured mode priority is requested, the  
 14 mobile station shall set this field to '1'.

15 F\_ASSURED\_PRI\_ADJ - Forward link assured mode priority adjustment.

16 If the F\_ASSURED\_PRI\_ADJ\_INCL field is omitted or is set to  
 17 '0', the mobile station shall omit this field.

18 If the F\_ASSURED\_PRI\_ADJ\_INCL field is set to '1', the mobile  
 19 station shall include this field and set it to a value specified in  
 20 Table 15 to indicate the negative adjustment to be applied to  
 21 the user's assured mode forward priority value.

22 F\_DATARATE\_INCL - Forward minimum user data rate parameter included  
 23 indicator.

24 If the F\_QOS\_INCL field is omitted or is set to '0', the mobile  
 25 station shall omit this field.

26 If the F\_QOS\_INCL field is set to '1', the mobile station shall  
 27 include this field and set it as specified in Table 16.

28

**Table 16 Minimum User Data Rate Indicator Values**

Value	Description
'00'	No minimum user data rate is specified
'01'	Only a minimum requested user data rate is specified
'10'	Only a minimum acceptable user data rate is specified
'11'	Both a minimum requested user data rate and a minimum acceptable user data rate are specified

29

30 F\_REQ\_DATARATE - If the F\_DATARATE\_INCL field is omitted or is set to '00' or  
 31 '10', the mobile station shall omit this field.

1 If the F\_DATARATE\_INCL field is set to '01' or '11', the mobile  
 2 station shall include this field and set it to a value specified in  
 3 Table 17 that corresponds to the minimum requested user  
 4 data rate for the forward link.

5 **Table 17 Minimum User Data Rate Values**

Value	Description
'0001'	8 kbps minimum user data rate
'0010'	32 kbps minimum user data rate
'0011'	64 kbps minimum user data rate
'0100'	96 kbps minimum user data rate
'0101'	144 kbps minimum user data rate
'0110'	288 kbps minimum user data rate
'0111'	384 kbps minimum user data rate
'1000'- '1111'	Reserved

6

7 F\_ACC\_DATARATE - If the F\_DATARATE\_INCL field is omitted or is set to '00' or  
 8 '01', the mobile station shall omit this field.

9 If the F\_DATARATE\_INCL field is set to '10' or '11', the mobile  
 10 station shall include this field and set it to a value specified in  
 11 Table 17 that corresponds to the minimum acceptable user  
 12 data rate for the forward link.

13 F\_DATALOSS\_INCL - Forward data loss rate parameter included indicator.

14 If the F\_QOS\_INCL field is omitted or is set to '0', the mobile  
 15 station shall omit this field.

16 If the F\_QOS\_INCL field is set to '1', the mobile station shall  
 17 include this field and set it as specified in Table 18.

18 **Table 18 Minimum Data Loss Indicator Values**

Value	Description
'00'	No data loss rate is specified
'01'	Only a requested data loss rate is specified
'10'	Only an acceptable data loss rate is specified
'11'	Both a requested data loss rate and an acceptable data loss rate are specified

19

1 F\_REQ\_DATALOSS - If the F\_DATALOSS\_INCL field is omitted or is set to '00' or  
 2 '10', the mobile station shall omit this field.  
 3 If the F\_DATALOSS\_INCL field is set to '01' or '11', the mobile  
 4 station shall include this field and set it to a value specified in  
 5 Table 19 that corresponds to the requested data loss rate for  
 6 the forward link.

7 **Table 19 Data Loss Rate Values**

Value	Description
'0001'	1% data loss rate
'0010'	2% data loss rate
'0011'	5% data loss rate
'0100'	10% data loss rate
'0101'	10 <sup>-3</sup> data loss rate
'0110'	10 <sup>-4</sup> data loss rate
'0111'	10 <sup>-6</sup> data loss rate
'1000'	10 <sup>-8</sup> data loss rate
'1001'- '1111'	Reserved

8  
 9 F\_ACC\_DATALOSS - If the F\_DATALOSS\_INCL field is omitted or is set to '00' or  
 10 '01', the mobile station shall omit this field.  
 11 If the F\_DATALOSS\_INCL field is set to '10' or '11', the mobile  
 12 station shall include this field and set it to a value specified in  
 13 Table 19 that corresponds to the acceptable data loss rate for  
 14 the forward link.

15 F\_DELAY\_INCL - Forward delay parameter included indicator.  
 16 If the F\_QOS\_INCL field is omitted or is set to '0', the mobile  
 17 station shall omit this field.  
 18 If the F\_QOS\_INCL field is set to '1', the mobile station shall  
 19 include this field and set it as specified in Table 20.

1

**Table 20 Maximum Delay Indicator Values**

<b>Value</b>	<b>Description</b>
'00'	No maximum delay is specified
'01'	Only a requested maximum delay is specified
'10'	Only an acceptable maximum delay is specified
'11'	Both a requested maximum delay and an acceptable maximum delay are specified

2

3

4

5

6

7

8

F\_REQ\_DELAY - If the F\_DELAY\_INCL field is omitted or is set to '00' or '10', the mobile station shall omit this field.

If the F\_DELAY\_INCL field is set to '01' or '11', the mobile station shall include this field and set it to a value specified in Table 21 that corresponds to the requested maximum delay for the forward link.

9

**Table 21 Maximum Delay Values**

<b>Value</b>	<b>Description</b>
'0001'	40 ms maximum delay
'0010'	80 ms maximum delay
'0011'	160 ms maximum delay
'0100'	240 ms maximum delay
'0101'	320 ms maximum delay
'0110'	480 ms maximum delay
'0111'	640 ms maximum delay
'1000'	1 second maximum delay
'1001'	2 seconds maximum delay
'1010'	3 seconds maximum delay
'1011'	5 seconds maximum delay
'1100'- '1111'	Reserved

10

11

12

F\_ACC\_DELAY - If the F\_DELAY\_INCL field is omitted or is set to '00' or '01', the mobile station shall omit this field.

1 If the F\_DELAY\_INCL field is set to '10' or '11', the mobile  
2 station shall include this field and set it to a value specified in  
3 Table 21 that corresponds to the acceptable maximum delay  
4 for the forward link.

5

6 R\_QOS\_INCL - Reverse QoS parameters included indicator.  
7 If the ASSURED\_MODE field is omitted or is set to '0', the  
8 mobile station shall omit this field.  
9 If the ASSURED\_MODE field is set to '1', the mobile station  
10 shall include this field and shall set it as follows:  
11 If a reverse QoS parameter is included, the mobile station  
12 shall set this field to '1'. Otherwise, the mobile station shall  
13 set this field to '0'.

14 R\_ASSURED\_PRI\_  
15 ADJ\_INCL - Reverse link assured mode priority adjustment included  
16 indicator.  
17 If the R\_QOS\_INCL field is omitted or is set to '0', the mobile  
18 station shall omit this field.  
19 If the R\_QOS\_INCL field is set to '1', and no change to the  
20 user's reverse link assured mode priority is requested, the  
21 mobile station shall set this field to '0'.  
22 If the R\_QOS\_INCL field is set to '1', and a change to the  
23 user's reverse link assured mode priority is requested, the  
24 mobile station shall set this field to '1'.

25 R\_ASSURED\_PRI\_ADJ - Reverse link assured mode priority adjustment.  
26 If the R\_ASSURED\_PRI\_ADJ\_INCL field is omitted or is set to  
27 '0', the mobile station shall omit this field.  
28 If the R\_ASSURED\_PRI\_ADJ\_INCL field is set to '1', the mobile  
29 station shall include this field and set it to a value specified in  
30 Table 15 to indicate the adjustment to be applied to the user's  
31 assured mode reverse priority value.

32 R\_DATARATE\_INCL - Reverse minimum user data rate parameter included  
33 indicator.  
34 If the R\_QOS\_INCL field is omitted or is set to '0', the mobile  
35 station shall omit this field.  
36 If the R\_QOS\_INCL field is set to '1', the mobile station shall  
37 include this field and set it as specified in Table 16.

38 R\_REQ\_DATARATE - If the R\_DATARATE\_INCL field is omitted or is set to '00' or  
39 '10', the mobile station shall omit this field.  
40 If the R\_DATARATE\_INCL field is set to '01' or '11', the mobile  
41 station shall include this field and set it to a value specified in  
42 Table 17 that corresponds to the minimum requested user  
43 data rate for the reverse link.

- 1 R\_ACC\_DATARATE - If the R\_DATARATE\_INCL field is omitted or is set to '00' or  
2 '01', the mobile station shall omit this field.
- 3 If the R\_DATARATE\_INCL field is set to '10' or '11', the mobile  
4 station shall include this field and set it to a value specified in  
5 Table 17 that corresponds to the minimum acceptable user  
6 data rate for the reverse link.
- 7 R\_DATALOSS\_INCL - Reverse data loss rate parameter included indicator.
- 8 If the R\_QOS\_INCL field is omitted or is set to '0', the mobile  
9 station shall omit this field.
- 10 If the R\_QOS\_INCL field is set to '1', the mobile station shall  
11 include this field and set it as specified in Table 18.
- 12 R\_REQ\_DATALOSS - If the R\_DATALOSS\_INCL field is omitted or is set to '00' or  
13 '10', the mobile station shall omit this field.
- 14 If the R\_DATALOSS\_INCL field is set to '01' or '11', the mobile  
15 station shall include this field and set it to a value specified in  
16 Table 19 that corresponds to the requested data loss rate for  
17 the reverse link.
- 18 R\_ACC\_DATALOSS - If the R\_DATALOSS\_INCL field is omitted or is set to '00' or  
19 '01', the mobile station shall omit this field.
- 20 If the R\_DATALOSS\_INCL field is set to '10' or '11', the mobile  
21 station shall include this field and set it to a value specified in  
22 Table 19 that corresponds to the acceptable data loss rate for  
23 the reverse link
- 24 R\_DELAY\_INCL - Reverse delay parameter included indicator.
- 25 If the R\_QOS\_INCL field is omitted or is set to '0', the mobile  
26 station shall omit this field.
- 27 If the R\_QOS\_INCL field is set to '1', the mobile station shall  
28 include this field and set it as specified in Table 20.
- 29 R\_REQ\_DELAY - If the R\_DELAY\_INCL field is omitted or is set to '00' or '10',  
30 the mobile station shall omit this field.
- 31 If the R\_DELAY\_INCL field is set to '01' or '11', the mobile  
32 station shall include this field and set it to a value specified in  
33 Table 21 that corresponds to the requested maximum delay  
34 for the reverse link.
- 35 R\_ACC\_DELAY - If the R\_DELAY\_INCL field is omitted or is set to '00' or '01',  
36 the mobile station shall omit this field.
- 37 If the R\_DELAY\_INCL field is set to '10' or '11', the mobile  
38 station shall include this field and set it to a value specified in  
39 Table 21 that corresponds to the acceptable maximum delay  
40 for the reverse link.

#### 41 2.2.8.3 Base Station Procedures When Using QoS BLOB Type 0

- 42 To use the default set of QoS parameters for Service Option 33 or Service Option 66 for QoS  
43 BLOB Type 0, the base station shall not include a QoS BLOB in the signaling message it  
44 uses to connect the service option.

- 1 To use any non-default QoS parameter value for QoS BLOB Type 0, the base station shall  
 2 include a QoS BLOB Type 0, as specified in Table 22, in the signaling message it uses to  
 3 connect the service option. The base station shall set the parameters in the QoS BLOB  
 4 using the values defined in Table 12. When using assured mode packet data service, the  
 5 base station should omit any parameter from the QoS BLOB for which it can only provide a  
 6 *best effort* service rather than a specific level of service.
- 7 If a mobile station proposes any non-default QoS parameter value, the base station should  
 8 attempt to accept the proposed value.

9 **Table 22 Base Station QoS BLOB When Using QoS BLOB Type 0**

Field	Length (Bits)
MAX_QOS_BLOB_TYPE_SUPPORTED	4
QOS_BLOB_TYPE	4
ASSURED_MODE	1
F_QOS_INCL	0 or 1
F_DATARATE_INCL	0 or 1
F_DATARATE	0 or 4
F_DATALOSS_INCL	0 or 1
F_DATALOSS	0 or 4
F_DELAY_INCL	0 or 1
F_DELAY	0 or 4
R_QOS_INCL	0 or 1
R_DATARATE_INCL	0 or 1
R_DATARATE	0 or 4
R_DATALOSS_INCL	0 or 1
R_DATALOSS	0 or 4
R_DELAY_INCL	0 or 1
R_DELAY	0 or 4

10

11 MAX\_QOS\_BLOB\_

12 TYPE\_SUPPORTED - Maximum QoS BLOB type supported by the base station.  
 13 The base station shall set this field to '0000'.

14 QOS\_BLOB\_TYPE - QoS BLOB type.

15 The base station shall set this field to '0000'.

16 ASSURED\_MODE - Packet Data Service QoS mode.

1			If the base station will deliver non-assured mode packet data
2			service, it shall set this field to '0'. If the base station will
3			deliver assured mode packet data service, it shall set this field
4			to '1'.
5	F_QOS_INCL	-	Forward QoS parameters included indicator.
6			If the ASSURED_MODE field is set to '0', the base station
7			shall omit this field.
8			If the ASSURED_MODE field is set to '1', the base station
9			shall include this field and shall set it as follows:
10			If a forward QoS parameter is included, the base station shall
11			set this field to '1'. Otherwise, the base station shall set this
12			field to '0'.
13	F_DATARATE_INCL	-	Forward minimum user data rate parameter included
14			indicator.
15			If the F_QOS_INCL field is omitted or is set to '0', the base
16			station shall omit this field.
17			If the F_QOS_INCL field is set to '1', the base station shall
18			include this field and shall set it as follows:
19			If the F_DATARATE field is included, the base station shall set
20			this field to '1'. Otherwise, the base station shall set this field
21			to '0'.
22	F_DATARATE	-	Forward minimum user data rate.
23			If the F_DATARATE_INCL field is omitted or is set to '0', the
24			base station shall omit this field.
25			If the F_DATARATE_INCL field is set to '1', the base station
26			shall include this field and set it to a value specified in Table
27			17 that corresponds to the minimum user data rate the base
28			station will provide on the forward link for the service option.
29	F_DATALOSS_INCL	-	Forward data loss rate parameter included indicator.
30			If the F_QOS_INCL field is omitted or is set to '0', the base
31			station shall omit this field.
32			If the F_QOS_INCL field is set to '1', the base station shall
33			include this field and shall set it as follows:
34			If the F_DATALOSS field is included, the base station shall set
35			this field to '1'. Otherwise, the base station shall set this field
36			to '0'.
37	F_DATALOSS	-	Forward data loss rate.
38			If the F_DATALOSS_INCL field is omitted or is set to '0', the
39			base station shall omit this field.
40			If the F_DATALOSS_INCL field is set to '1', the base station
41			shall include this field and set it to a value specified in Table
42			19 that corresponds to the data loss rate the base station will
43			provide on the forward link for the service option.
44	F_DELAY_INCL	-	Forward delay parameter included indicator.

1 If the F\_QOS\_INCL field is omitted or is set to '0', the base  
2 station shall omit this field.

3 If the F\_QOS\_INCL field is set to '1', the base station shall  
4 include this field and shall set it as follows:

5 If the F\_DELAY field is included, the base station shall set this  
6 field to '1'. Otherwise, the base station shall set this field to  
7 '0'.

8 F\_DELAY - Forward maximum delay.

9 If the F\_DELAY\_INCL field is omitted or is set to '0', the base  
10 station shall omit this field.

11 If the F\_DELAY\_INCL field is set to '1', the base station shall  
12 include this field and set it to a value specified in Table 21  
13 that corresponds to the maximum delay the base station will  
14 provide on the forward link for the service option.

15

16 R\_QOS\_INCL - Reverse QoS parameters included indicator.

17 If the ASSURED\_MODE field is set to '0', the base station  
18 shall omit this field.

19 If the ASSURED\_MODE field is set to '1', the base station  
20 shall include this field and shall set it as follows:

21 If a reverse QoS parameter is included, the base station shall  
22 set this field to '1'. Otherwise, the base station shall set this  
23 field to '0'.

24 R\_DATARATE\_INCL - Reverse minimum user data rate parameter included  
25 indicator.

26 If the R\_QOS\_INCL field is omitted or is set to '0', the base  
27 station shall omit this field.

28 If the R\_QOS\_INCL field is set to '1', the base station shall  
29 include this field and shall set it as follows:

30 If the R\_DATARATE field is included, the base station shall set  
31 this field to '1'. Otherwise, the base station shall set this field  
32 to '0'.

33 R\_DATARATE - Reverse minimum user data rate.

34 If the R\_DATARATE\_INCL field is omitted or is set to '0', the  
35 base station shall omit this field.

36 If the R\_DATARATE\_INCL field is set to '1', the base station  
37 shall include this field and set it to a value specified in Table  
38 17 that corresponds to the minimum user data rate the base  
39 station will provide on the reverse link for the service option.

40 R\_DATALOSS\_INCL - Reverse data loss rate parameter included indicator.

41 If the R\_QOS\_INCL field is omitted or is set to '0', the base  
42 station shall omit this field.

43 If the R\_QOS\_INCL field is set to '1', the base station shall  
44 include this field and shall set it as follows:

1			If the R_DATALOSS field is included, the base station shall set
2			this field to '1'. Otherwise, the base station shall set this field
3			to '0'.
4	R_DATALOSS	-	Reverse data loss rate.
5			If the R_DATALOSS_INCL field is omitted or is set to '0', the
6			base station shall omit this field.
7			If the R_DATALOSS_INCL field is set to '1', the base station
8			shall include this field and set it to a value specified in Table
9			19 that corresponds to the data loss rate the base station will
10			provide on the reverse link for the service option.
11	R_DELAY_INCL	-	Reverse delay parameter included indicator.
12			If the R_QOS_INCL field is omitted or is set to '0', the base
13			station shall omit this field.
14			If the R_QOS_INCL field is set to '1', the base station shall
15			include this field and shall set it as follows:
16			If the R_DELAY field is included, the base station shall set
17			this field to '1'. Otherwise, the base station shall set this field
18			to '0'.
19	R_DELAY	-	Reverse maximum delay.
20			If the R_DELAY_INCL field is omitted or is set to '0', the base
21			station shall omit this field.
22			If the R_DELAY_INCL field is set to '1', the base station shall
23			include this field and set it to a value specified in Table 21
24			that corresponds to the maximum delay the base station will
25			provide on the reverse link for the service option.

## 26 2.2.9 Short Data Burst

### 27 2.2.9.1 Short Data Burst Procedures

28 Service Option 33 and Service Option 66 do not permit more than one Short Data Burst  
 29 transmission to be outstanding for a given sr\_id at the same time. Reception and  
 30 transmission of a Short Data Burst may occur simultaneously.

31 Attributes of a Short Data Burst include the data block, the data length, the service option  
 32 number to which the data service was connected and the sr\_id.

33 A Short Data Burst is carried in a *Data Burst Message* (see 2.2.9.2). The data service  
 34 prepares the information for the Short Data Burst and forwards it to the Upper Layer  
 35 Signaling entity for assured mode delivery over the air. The BURST\_TYPE field of the *Data*  
 36 *Burst Message* shall be set to Short Data Burst (see TSB58) and the CHARi fields shall be  
 37 set as shown in 2.2.9.3.

38 The *Data Burst Message* shall be sent in assured mode, requiring confirmation of delivery.  
 39 If the AUTH\_DATA parameter is required for global challenge authentication, the first 24  
 40 bits in the CHARi fields (or all the bits of the CHARi fields, if less than 24 bits), in order,  
 41 shall be used to update the AUTH\_DATA parameter (see 2.1.1.1.2.2 of [15]).

1 After a *Data Burst Message* has been sent, the sender shall not send another *Data Burst*  
 2 *Message* until it is determined that the previous *Data Burst Message* has completed.  
 3 Completion shall be defined as successful delivery by receiving an acknowledgement of the  
 4 transmitted message, or a determination that the message was not delivered.

5 A mobile station or base station that supports Short Data Bursts shall process all *Data*  
 6 *Burst Messages* received in which the BURST\_TYPE field is set to the value corresponding  
 7 to Short Data Burst. (See TSB58). The mobile station or base station shall discard the  
 8 message without further processing if any of the following are true:

- 9 • The MSG\_NUMBER field is set to a value other than 1.
- 10 • The NUM\_MSGS field is set to a value other than 1.
- 11 • The NUM\_FIELDS field is set to zero.

12 Otherwise, the mobile station or base station shall interpret the CHAR<sub>i</sub> fields of the received  
 13 *Data Burst Message* according to 2.2.9.3.

14 2.2.9.2 Data Burst Message Format

MSG_NUMBER 8	BURST_TYPE 6	NUM_MSGS 8	NUM_FIELDS 8	CHAR <sub>i</sub> 8* NUM_FIELDS
-----------------	-----------------	---------------	-----------------	------------------------------------

**Data Burst Message Format**

15

Field	Length (bits)
MSG_NUMBER	8
BURST_TYPE	6
NUM_MSGS	8
NUM_FIELDS	8
CHAR <sub>i</sub>	8 * NUM_FIELDS

16

17 MSG\_NUMBER - Message Number.  
 18 This field shall be set to the number of this message within  
 19 the data burst stream.

20 The MSG\_NUMBER field shall be set to 1.

21 BURST\_TYPE - Data Burst Type.  
 22 This field shall be set to Short Data Burst as defined in  
 23 TSB58.

24 The BURST\_TYPE field shall be set to '000110'.

25 NUM\_MSGS - Number of messages in the data burst stream.

26 The NUM\_MSGS field shall be set to 1.

27 NUM\_FIELDS - Number of characters in this message.

1 This field shall be set to the number of occurrences of the  
2 CHARi field included in this message.

3 CHARi - Character.

4 NUM\_FIELDS occurrences of this field shall be set to the  
5 corresponding octet of the data burst stream.

### 6 2.2.9.3 Short Data Burst Format

SR_ID 3	SO_OMIT 1	RESERVED 4	SO 16	DATABLOCK var
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#### Short Data Burst Format

7

Field	Length (bits)
SR_ID	3
SO_OMIT	1
RESERVED	4
SO	16
DATABLOCK	Variable

8

9 SR\_ID - Service Reference Identifier.

10 This field shall be set to the sr\_id associated with the service  
11 instance.

12 SO\_OMIT - Service Option number omitted indicator.

13 The mobile station shall set this field to SDB\_SO\_OMIT<sub>s</sub>

14 If the P\_REV\_IN\_USE is less than 7, the base station shall set  
15 this field to '0'. Otherwise, the base station shall set this field  
16 to '1'.

17 RESERVED - Reserved bits.

18 This field shall be set to '0000'.

19 SO - Service Option number.

20 If SO\_OMIT is '0', this field shall be set to the service option  
21 number, 33, or 66, associated with the service.

22 If SO\_OMIT is '1', this field shall be omitted.

23 DATABLOCK - Data octets.

24 This field is set to the data octets included in this message.

1

2 No text.

3

### 1   **3   LINK LAYER**

#### 2   **3.1   R<sub>m</sub> Interface Link Layer**

3   The R<sub>m</sub> Interface Link Layer applies only to the Network Layer R<sub>m</sub> Interface Protocol  
4   Option. If PPP is used as the R<sub>m</sub> interface Link Layer, the R<sub>m</sub> interface Link Layer shall  
5   support negotiation of async control character mapping as defined in [8]. If software  
6   flow control is used on the R<sub>m</sub> interface, the TE2 shall negotiate mapping for the XON  
7   and XOFF control characters. To provide the maximum throughput, the TE2 should  
8   negotiate mapping only for the minimum number of control characters necessary for  
9   proper operation. The MT2 should not request control character mapping on the R<sub>m</sub>  
10   interface, but shall perform control character mapping on that interface if negotiated by  
11   the TE2.

12   The TE2 and MT2 shall frame PPP packets sent on the R<sub>m</sub> interface using the  
13   asynchronous framing protocol defined in [8].

##### 14   3.1.1   Link Layer Connection Open

15   If PPP is implemented as the Link Layer protocol on the R<sub>m</sub> interface, the MT2 shall  
16   initiate PPP configuration on the R<sub>m</sub> interface when packet data service is activated.

17   When the mobile station packet data service enters the *Active State*, the MT2 should  
18   also send a physical layer establishment indication to the TE2 (see Section 2.1.1 and  
19   Section 5 of C.S0017-0-2.3). If the PPP LCP in the TE2 is not in the Opened state, the  
20   TE2 initiates PPP configuration according to the protocol defined in [7]. When the PPP  
21   LCP enters the Opened state, PPP sends an establishment indication to higher protocol  
22   layers. After a PPP establishment indication, network layer protocols are configured  
23   using the appropriate network control protocols.

##### 24   3.1.2   Link Layer Connection Closure

25   If PPP is implemented as the Link Layer protocol on the R<sub>m</sub> interface, the MT2 should  
26   close the PPP LCP on the R<sub>m</sub> interface when the packet data service enters the *Inactive*  
27   *State*.

#### 28   **3.2   PDSN Link Layer**

29   For the PDSN Link Layer, requirements on the MT2 refer only to the Network Layer R<sub>m</sub>  
30   Interface Protocol Option.

31   The PDSN Link Layer protocol used for Service Option 33 is the Internet Point-to-Point  
32   Protocol (PPP), in accordance with [7]. The PDSN Link Layer supports the PPP Link  
33   Control Protocol (LCP) defined in [7] and the LCP extensions defined in [6].

34   The instances of PPP support control escaping in accordance with 4.2 of [8]. When the  
35   Relay Layer R<sub>m</sub> interface protocol option is selected, the MT2 does not activate an  
36   instance of PPP.

37   The PDSN Link Layer supports negotiation of async control character mapping as  
38   defined in [8]. The PDSN does not request control character mapping, but performs  
39   control character mapping if negotiated by the mobile station.

1 When the Relay Layer  $R_m$  interface protocol option is selected, the MT2 shall perform  
2 the necessary framing conversion,<sup>14</sup> except that the MT2 shall not perform  
3 asynchronous control character mapping, and the provisions of section 6 of [8] do not  
4 apply to the MT2.

5 Both the mobile station and PDSN frame PPP packets sent on the PDSN Link Layer  
6 using the octet-synchronous framing protocol defined in [8], except that there shall be  
7 no inter-frame time fill (see 4.4.1 of [8])<sup>15</sup>. That is, no flag octets are sent between a flag  
8 octet that ends one PPP frame and the flag octet that begins the subsequent PPP frame.

9 The base station shall pass octets between the mobile station and PCF without any  
10 framing conversion. The PCF passes octets between the base station and the PDSN  
11 without any framing conversion.

### 12 3.2.1 Link Layer Connection Open

13 If the Network Layer  $R_m$  Interface Protocol option is selected, and the mobile station  
14 packet data service call control function enters the *Connected State* while the  $U_m$   
15 interface PPP LCP is not in the Opened state, the MT2 initiates PPP configuration  
16 according to the protocol defined in [7]. When the PPP LCP enters the Opened state,  
17 PPP sends an establishment indication to higher protocol layers. After a PPP  
18 establishment indication, network layer protocols are configured using the appropriate  
19 network control protocols.

20 If the Relay Layer  $R_m$  Interface Protocol option is selected, when the mobile station  
21 packet data service enters the *Active State*, the MT2 should send a physical layer  
22 establishment indication to the TE2 (see Section 2.1.1 and Section 5 of C.S0017-0-2.3).  
23 If the PPP LCP in the TE2 is not in the Opened state, the TE2 initiates PPP configuration  
24 according to the protocol defined in [7]. When the PPP LCP enters the Opened state,  
25 PPP sends an establishment indication to higher protocol layers. After a PPP  
26 establishment indication, network layer protocols are configured using the appropriate  
27 network control protocols.

### 28 3.2.2 Link Layer Connection Closure

29 If the Network Layer  $R_m$  Interface Protocol Option is selected, then when the PPP  
30 connection to the TE2 is closed, the MT2 shall close the PPP connection to the PDSN.

---

<sup>14</sup>Framing conversion in the MT2 consists of the insertion and removal of start bits, stop bits, and mark characters (see 4.4.2 and 4.5.2 of RFC 1662).

<sup>15</sup> Due to the range of existing PPP implementations, a receiver should be able to process inter-frame time fill.

1   **4   NETWORK LAYER**

2   **4.1   Internet Protocol Support for the PDSN Link Layer**

3   Service Option 33 and Service Option 66 support the Internet Protocol (IP) Network  
4   Layer (as defined in [2]). For Service Option 33, the PDSN Link Layer supports the  
5   following PPP protocol numbers:

6	0x0021	Internet Protocol
7	0x002d	Van Jacobson Compressed TCP/IP
8	0x002f	Van Jacobson Uncompressed TCP/IP
9	0x8021	Internet Protocol Control Protocol

10   For Service Option 33, the mobile station supports the IP Control Protocol (IPCP)  
11   defined in [5]. The mobile station supports Van Jacobson TCP/IP header compression  
12   ([4]). Van Jacobson TCP/IP header compression is configured through IPCP  
13   negotiation.

1

2 No text.

3