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**3RD GENERATION  
PARTNERSHIP  
PROJECT 2  
"3GPP2"**

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## ***cdma2000 High Rate Packet Data Supplemental Services***

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**FOREWARD**

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

2 This standard was prepared by Technical Specification Group C of the Third Generation  
3 Partnership Project 2 (3GPP2). This standard is evolved from and is a companion to the  
4 cdma2000<sup>®1</sup> standards. This air interface standard provides high rate packet data  
5 supplemental services.

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<sup>1</sup> “cdma2000<sup>®</sup> 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<sup>®</sup> is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.”

**FOREWORD**

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**REFERENCES**

1 The following documents contain provisions, which, through reference in this text,  
2 constitute provisions of this document. References are either specific (identified by date of  
3 publication, edition number, version number, etc.) or non-specific. For a specific reference,  
4 subsequent revisions do not apply. For a non-specific reference, the latest version applies.  
5 In the case of a reference to a 3GPP2 document, a non-specific reference implicitly refers to  
6 the latest version of that document in the same Release as the present document.

- 7
- 8 [1] X.S0011-001, cdma2000 Wireless IP Network Standard: Introduction.
- 9 [2] C.S0005-D, Upper Layer (Layer 3) Signaling Specification for cdma2000 Spread  
10 Spectrum Systems.
- 11 [3] C.R1001, Administration of Parameter Value Assignments for cdma2000 Spread  
12 Spectrum Standards. (Informative Reference)
- 13 [4] IETF RFC 1662, PPP in HDLC-like Framing.
- 14 [5] IETF RFC 791, Internet Protocol.
- 15 [6] IETF RFC 3095, Robust Header Compression (ROHC): Framework and four  
16 profiles: RTP, UDP, ESP, and uncompressed.
- 17 [7] Reserved.
- 18 [8] C.S0024, cdma2000 High Rate Packet Data Air Interface Specification.
- 19 [9] C.S0002-D, Physical Layer standard for cdma2000 Spread Spectrum Systems.
- 20 [10] IETF RFC 2460, Internet Protocol, Version 6 (IPv6) Specification.
- 21 [11] A.S0008, Inter-Operability Specification (IOS) for High Rate Packet Data (HRPD)  
22 Access Network Interfaces with Session Control in the Access Network.
- 23 [12] RObust Header Compression (ROHC) Profile Identifiers  
24 [<http://www.iana.org/assignments/rohc-pro-ids>]
- 25 [13] A.S0009, Inter-Operability Specification (IOS) for High Rate Packet Data (HRPD)  
26 Access Network Interfaces with Session Control in the Packet Control Function.
- 27

**REFERENCES**

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## 1 OVERVIEW

### 1.1 Scope of This Document

These technical requirements form a compatibility standard for supplemental services on cdma2000 high rate packet data systems. These requirements ensure that a compliant access terminal can obtain service through any access network conforming to this standard. These requirements do not address the quality or reliability of that service, nor do they cover equipment performance or measurement procedures.

This specification is primarily oriented toward requirements necessary for the design and implementation of access terminals. As a result, detailed procedures are specified for access terminals to ensure a uniform response to all access networks. Access network procedures, however, are specified only to the extent necessary for compatibility with those specified for the access terminal.

This specification includes provisions for future service additions and expansion of system capabilities. The architecture defined by this specification permits such expansion without the loss of backward compatibility to older access terminals.

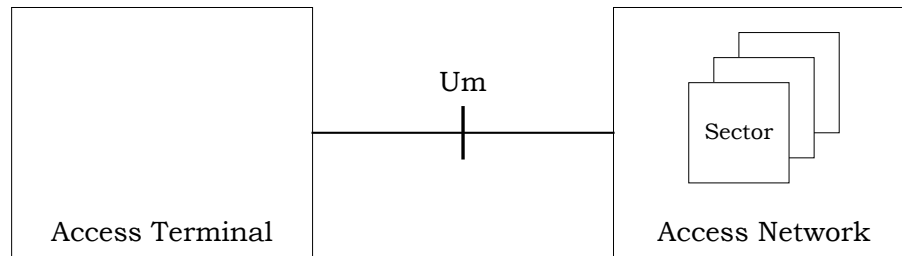
### 1.2 Requirements Language

Compatibility, as used in connection with this standard, is understood to mean: Any access terminal can obtain service through any access network conforming to this standard. Conversely, all access networks conforming to this standard can service access terminals.

“Shall” and “shall not” identify requirements to be followed strictly to conform to the standard and from which no deviation is permitted. “Should” and “should not” indicate that one of several possibilities is recommended as particularly suitable, without mentioning or excluding others, that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is discouraged but not prohibited. “May” and “need not” indicate a course of action permissible within the limits of the standard. “Can” and “cannot” are used for statements of possibility and capability, whether material, physical, or causal.

### 1.3 Architecture Reference Model

The architecture reference model is presented in Figure 1.3-1. The reference model consists of the following functional units:



**Figure 1.3-1. Architecture Reference Model**

The access terminal, the access network, and the sector are formally defined in Section 1.5. The reference model includes the air interface between the access terminal and the access network. The protocols used over the air interface are defined in this document.

## 1.4 Protocols

### 1.4.1 Interfaces

This standard defines a set of interfaces for communications between protocols in the same entity and between a protocol executing in one entity and the same protocol executing in the other entity.

In the following the generic term “entity” is used to refer to the access terminal and the access network.

Protocols in this specification have four types of interfaces:

- Headers and messages are used for communications between a protocol executing in one entity and the same protocol executing in the other entity.
- Commands are used by a protocol to obtain a service from another protocol within the same access network or access terminal.
- Indications are used by a protocol to convey information regarding the occurrence of an event to another protocol within the same access network or access terminal. Any protocol can register to receive these indications.
- Public Data is used to share information in a controlled way between protocols/applications. Public data is shared between protocols/applications in the same layer, as well as between protocols/applications in different layers. The public data of the InUse protocol/application is created when an InUse instance of a protocol/application is created. All configurable attributes of the InConfiguration instance of a protocol or application are also public data of that protocol or application.

Commands and indications are written in the form of *Protocol.Command* and *Protocol.Indication*. When the context is clear, the *Protocol* part is dropped.

Commands are always written in the imperative form, since they direct an action. Indications are always written in the past tense since they notify of events that happened.

1 Headers and messages are binding on all implementations. Commands, indications, and  
2 public data are used as a device for a clear and precise specification. Access terminals and  
3 access networks can be compliant with this specification while choosing a different  
4 implementation that exhibits identical behavior.

#### 5 1.4.2 States

6 When protocols exhibit different behavior as a function of the environment, this behavior is  
7 captured in a set of states and the events leading to a transition between states.

8 Unless otherwise specifically mentioned, the state of the access network refers to the state  
9 of a protocol engine in the access network as it applies to a particular access terminal.  
10 Since the access network communicates with multiple access terminals, multiple  
11 independent instantiations of a protocol will exist in the access network, each with its own  
12 independent state machine.

13 Unless otherwise specifically shown, the state transitions due to failure are not shown in  
14 the figures.

15 Typical events leading to a transition from one state to another are the receipt of a message,  
16 a command from a higher layer protocol, an indication from a lower layer protocol, or the  
17 expiration of a timer.

18 When a protocol is not functional at a particular time the protocol is placed in a state called  
19 the Inactive state. This state is common for most protocols.

20 Other common states are Open, indicating that the session or connection (as applicable to  
21 the protocol) is open and Close, indicating that the session or connection is closed.

22 If a protocol has a single state other than the Inactive state, that state is always called the  
23 Active state. If a protocol has more than one state other than the Inactive state, all of these  
24 states are considered active, and are given individual names.

#### 25 1.5 Terms

26 **Access Network (AN).** The network equipment providing data connectivity between a  
27 packet switched data network (typically the Internet) and the access terminals. An access  
28 network is equivalent to a base station in [9].

29 **Access Terminal (AT).** A device providing data connectivity to a user. An access terminal  
30 may be connected to a computing device such as a laptop personal computer or it may be a  
31 self-contained data device such as a personal digital assistant. An access terminal is  
32 equivalent to a mobile station in [9].

33 **Channel.** The set of channels transmitted between the access network and the access  
34 terminals within a given frequency assignment. A Channel consists of a Forward Link and a  
35 Reverse Link.

36 **Forward Channel.** The portion of the Channel consisting of those Physical Layer Channels  
37 transmitted from the access network to the access terminal.

38 **Forward Control Channel.** The channel that carries data to be received by all access  
39 terminals monitoring the Forward Channel.

1 **Forward Traffic Channel.** The portion of the Forward Channel that carries information for  
 2 a specific access terminal. The Forward Traffic Channel can be used as either a Dedicated  
 3 Resource or a non-Dedicated Resource. Prior to successful access terminal authentication,  
 4 the Forward Traffic Channel serves as a non-Dedicated Resource. Only after successful  
 5 access terminal authentication can the Forward Traffic Channel be used as a Dedicated  
 6 Resource for the specific access terminal.

7 **FCS.** Frame Check Sequence.

8 **NULL.** A value which is not in the specified range of the field.

9 **Reservation.** Air interface resources set up by the access network to carry a higher layer  
 10 flow. A Reservation is identified by its ReservationLabel. ReservationLabels are bound to  
 11 Link Flows that carry higher layer flows. A Reservation can be either in the Open or Close  
 12 state.

13 **Reverse Access Channel.** The portion of the Reverse Channel that is used by access  
 14 terminals to communicate with the access network when they do not have a traffic channel  
 15 assigned. There is a separate Reverse Access Channel for each sector of the access network.

16 **Reverse Channel.** The portion of the Channel consisting of those Physical Layer Channels  
 17 transmitted from the access terminal to the access network.

18 **Reverse Traffic Channel.** The portion of the Reverse Channel that carries information from  
 19 a specific access terminal to the access network. The Reverse Traffic Channel can be used  
 20 as either a Dedicated Resource or a non-Dedicated Resource. Prior to successful access  
 21 terminal authentication, the Reverse Traffic Channel serves as a non-Dedicated Resource.  
 22 Only after successful access terminal authentication can the Reverse Traffic Channel be  
 23 used as a Dedicated Resource for the specific access terminal.

24 **RLP.** Radio Link Protocol provides reliable delivery if needed, in-order delivery if needed,  
 25 and duplicate detection for a higher layer data stream.

26 **Rx.** Receive.

27 **Sector.** The part of the access network that provides one CDMA channel.

28 **SNP.** Signaling Network Protocol provides message transmission services for signaling  
 29 messages. The protocols that control each layer use SNP to deliver their messages to their  
 30 peer protocols. SNP is defined in [8].

31 **Stream Layer.** The Stream Layer provides multiplexing of distinct streams. Stream 0 is  
 32 dedicated to signaling and defaults to the default signaling stream (SNP / SLP). Stream 1,  
 33 Stream 2 and Stream 3 are not used by default. The Stream Layer is defined in [8].

34 **Tx.** Transmit.

## 35 1.6 Notation

36 **A[i]** The  $i^{\text{th}}$  element of array A. The zeroeth element of the array is A[0].

37 **<e<sub>1</sub>, e<sub>2</sub>, ..., e<sub>n</sub>>** A *structure* with elements 'e<sub>1</sub>', 'e<sub>2</sub>', ..., 'e<sub>n</sub>'.  
 38 Two structures E = <e<sub>1</sub>, e<sub>2</sub>, ..., e<sub>n</sub>> and F = <f<sub>1</sub>, f<sub>2</sub>, ..., f<sub>m</sub>> are equal if

1		and only if 'm' is equal to 'n' and $e_i$ is equal to $f_i$ for $i=1, \dots, n$ .
2		Given $E = \langle e_1, e_2, \dots, e_n \rangle$ and $F = \langle f_1, f_2, \dots, f_m \rangle$ , the assignment "E =
3		F" denotes the following set of assignments: $e_i = f_i$ , for $i=1, \dots, n$ .
4	<b>S.e</b>	The member of the structure 'S' that is identified by 'e'.
5	<b>M[i:j]</b>	Bits $i^{\text{th}}$ through $j^{\text{th}}$ inclusive ( $i \geq j$ ) of the binary representation of
6		variable M. M[0:0] denotes the least significant bit of M.
7		Concatenation operator. (A   B) denotes variable A concatenated with
8		variable B.
9	×	Indicates multiplication.
10	$\lfloor x \rfloor$	Indicates the largest integer less than or equal to x: $\lfloor 1.1 \rfloor = 1, \lfloor 1.0 \rfloor =$
11		1.
12	$\lceil x \rceil$	Indicates the smallest integer greater or equal to x: $\lceil 1.1 \rceil = 2, \lceil 2.0 \rceil =$
13		2.
14	$ x $	Indicates the absolute value of x: $ -17  = 17,  17  = 17$ .
15	$\oplus$	Indicates exclusive OR (modulo-2 addition).
16	min (x, y)	Indicates the minimum of x and y.
17	max (x, y)	Indicates the maximum of x and y.
18	x mod y	Indicates the remainder after dividing x by y: $x \text{ mod } y = x - (y \times \lfloor x/y \rfloor)$ .
19	Unless otherwise specified, the format of field values is unsigned binary.	
20	Unless indicated otherwise, this standard presents numbers in decimal form. Binary	
21	numbers are distinguished in the text by the use of single quotation marks. Hexadecimal	
22	numbers are distinguished by the prefix '0x'.	
23	Unless specified otherwise, each field of a packet shall be transmitted in sequence such	
24	that the most significant bit (MSB) is transmitted first and the least significant bit (LSB) is	
25	transmitted last. The MSB is the left-most bit in the figures in this document. If there are	
26	multiple rows in a table, the top-most row is transmitted first. If a table is used to show the	
27	sub-fields of a particular field or variable, the top-most row consists of the MSBs of the	
28	field. Within a row in a table, the left-most bit is transmitted first. Notations of the form	
29	"repetition factor of N" or "repeated N times" mean that a total of N versions of the item are	
30	used.	
31	When a procedure, consisting of a set of steps, is normatively defined as a sequence of	
32	bullet list items, it is assumed that the steps are performed in the indicated order unless	
33	specified otherwise.	
34		

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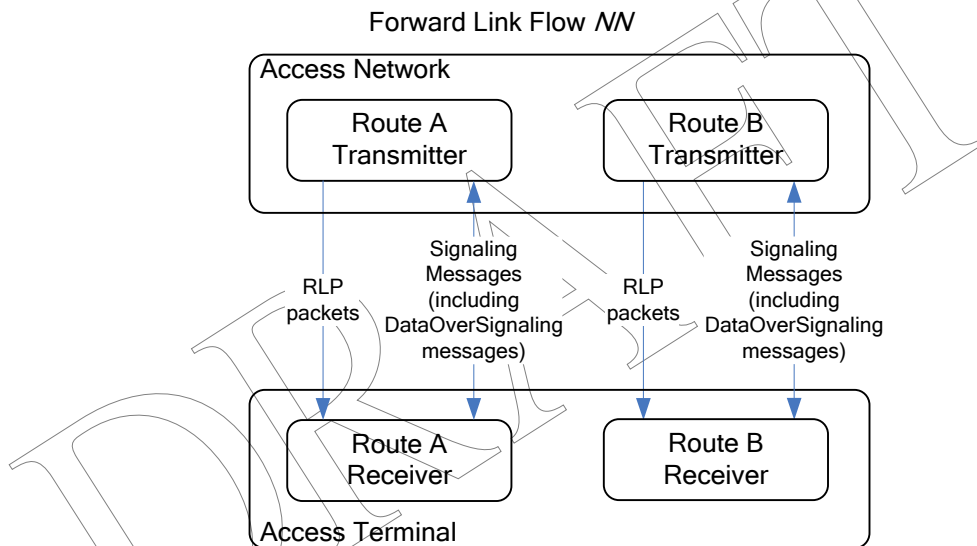


## 2 ENHANCED MULTI-FLOW PACKET APPLICATION

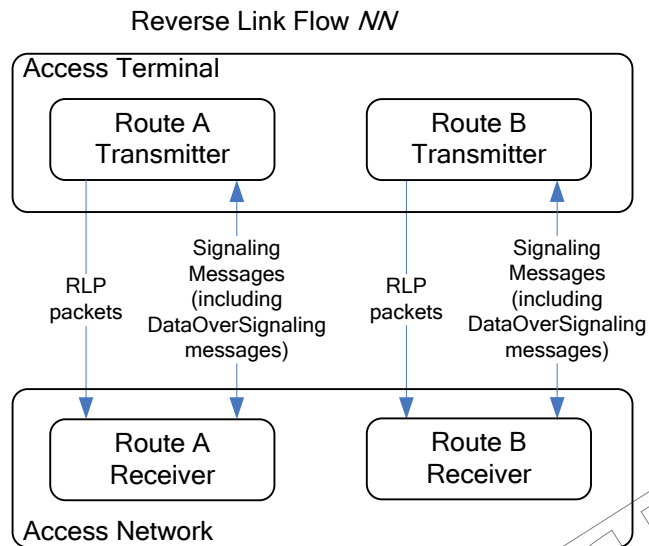
### 2.1 Introduction

#### 2.1.1 General Overview

The Enhanced Multi-Flow Packet Application provides multiple octet or packet streams that can be used to carry octets or packets between the access terminal and the access network. Each octet or packet stream is called a Link Flow. Each Link Flow provides two routes for transmission and reception of payloads from the higher layer. These routes are named Route A and Route B and can be carried using a single receiver-transmitter pair. Each route is associated with a transmitter-receiver pair. Figure 2.1.1-1 shows the association between a forward Link Flow and the transmitters and receivers for its two routes. Figure 2.1.1-2 shows the reference architecture for a reverse Link Flow.

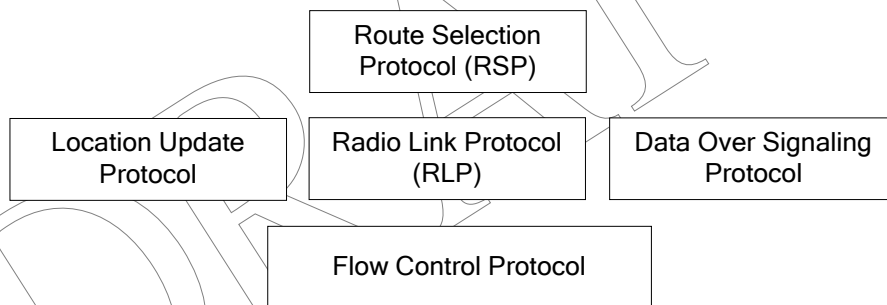


**Figure 2.1.1-1. Reference Architecture for a Forward Link Flow**



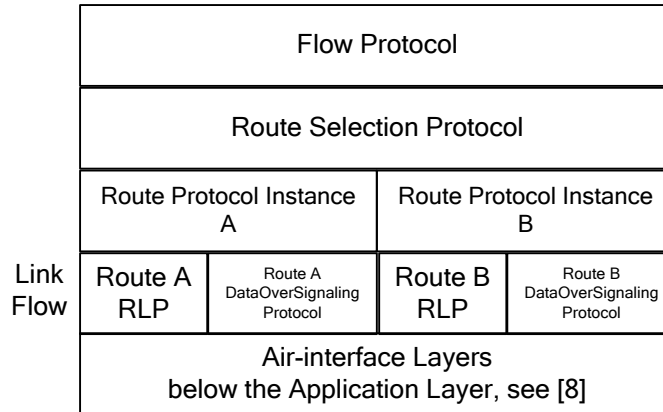
**Figure 2.1.1-2. Reference Architecture for a Reverse Link Flow**

The relationship between the Enhanced Multi-Flow Packet Application protocols is illustrated in Figure 2.1.1-3.



**Figure 2.1.1-3. Enhanced Multi-Flow Packet Application Protocols**

Figure 2.1.1-4 illustrates the relationship for each Link Flow between the Enhanced Multi-flow Packet Application and the higher layer protocols supported by the Enhanced Multi-flow Packet Application. The Flow Protocol and the Route Protocol are referred to as higher layer protocols. The protocols defined in the Enhanced Multi-flow Packet Application are shown shaded. The Route Selection Protocol routes Flow Protocol PDUs to either instance A or instance B of the Route Protocol. Instance A of the Route Protocol is bound to Route A of the Link Flow. Instance B of the Route Protocol is bound to Route B of the Link Flow.



**Figure 2.1.1-4. Relationship for each Link Flow between Enhanced Multi-Flow Packet Application and Higher Layer Protocols**

The Enhanced Multi-Flow Packet Application provides:

- the functionality defined in [1],
- the Route Selection Protocol, which routes Flow Protocol PDUs over either Route A or Route B of a Link Flow.
- the Radio Link Protocol (RLP), which provides retransmission (if needed) and duplicate detection of higher layer octets or packets transmitted on each route,
- the Data Over Signaling Protocol, which provides transmission and duplicate detection of higher layer data packets transmitted on each route using signaling messages,
- the Location Update Protocol, which defines location update procedures and messages in support of mobility management for the Packet Application,
- the Flow Control Protocol, which provides flow control for the Enhanced Multi-Flow Packet Application, and
- ability to negotiate Route Protocol and Flow Protocol parameters.

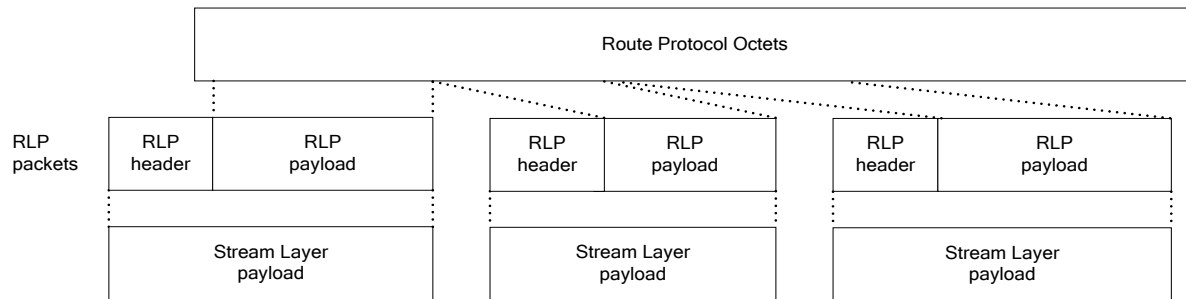
This application uses the Signaling Application to transmit and receive messages.

### 2.1.2 Public Data

- Subtype for this application

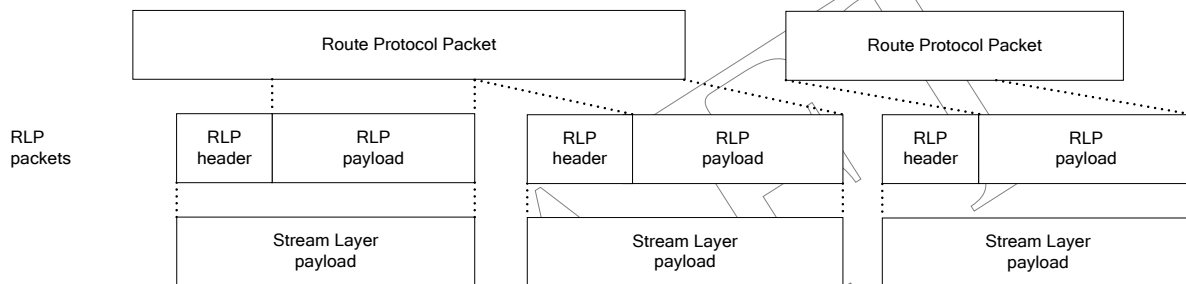
### 2.1.3 Data Encapsulation for the InUse Instance of the Application

Figure 2.1.3-1 illustrates the relationship between octets from the Route Protocol, RLP packets, and Stream Layer payload for the case when the Link Flow carries an octet stream.



**Figure 2.1.3-1. Enhanced Multi-Flow Packet Application Encapsulation when the Link Flow carries an Octet Stream**

Figure 2.1.3-2 illustrates the relationship between packets from the Route Protocol, RLP packets, and Stream Layer payload for the case when the Link Flow carries a packet stream.



**Figure 2.1.3-2. Enhanced Multi-Flow Packet Application Encapsulation when the Link Flow carries a Packet Stream**

## 2.2 Protocol Initialization

### 2.2.1 Protocol Initialization for the InConfiguration Application Instance

Upon creation, the InConfiguration instance of this application in the access terminal and the access network shall perform the following in the order specified:

- The fall-back values of the attributes for this application instance shall be set to the default values specified for each attribute.
- If the InUse instance of this application (i.e., corresponding to the stream to which this application is bound) has the same application subtype as this InConfiguration application instance, then the fall-back values of the attributes defined by the InConfiguration application instance shall be set to the corresponding attribute values for the InUse application instance.
- The value for each attribute for this application instance shall be set to the fall-back value for that attribute.
- The value of the InConfiguration application instance public data shall be set to the value of the corresponding InUse application instance public data.

- 1 • The value of the application subtype associated with the InConfiguration application  
2 instance shall be set to the application subtype that identifies this application.

### 3 **2.3 Procedures and Messages for the InConfiguration Instance of the Packet** 4 **Application**

#### 5 2.3.1 Procedures

6 This protocol uses the Generic Configuration Protocol (see [8]) to define the processing of  
7 the configuration messages.

8 The Enhanced Multi-Flow Packet Application shall not be bound to a virtual stream.

9 The access terminal shall not send a ConfigurationRequest message containing the  
10 ReservationKKQoSResponseFwd attribute. The access network shall not send a  
11 ConfigurationRequest message containing the ReservationKKQoSRequestFwd attribute. The  
12 access terminal shall not send a ConfigurationRequest message containing the  
13 ReservationKKQoSResponseRev attribute. The access network shall not send a  
14 ConfigurationRequest message containing the ReservationKKQoSRequestRev attribute.

15 The access terminal shall not initiate negotiation of the ANSupportedQoSProfiles attribute.  
16 The access network shall not initiate negotiation of the ATSupportedQoSProfiles attribute.  
17 The access terminal should include supported values of ProfileValue with ProfileType equal  
18 to 0x04 in the ATSupportedQoSProfiles attribute during the AT Initiated state of the Session  
19 Configuration Protocol. The access network shall include all supported values of  
20 ProfileValue with ProfileType equal to 0x04 in the ANSupportedQoSProfiles attribute during  
21 the AN Initiated state of the Session Configuration Protocol. The access terminal shall use  
22 the ProfileType 0x00, 0x01, or 0x02 in the ReservationKKQoSRequestFwd or the  
23 ReservationKKQoSRequestRev attributes. The access network shall use ProfileType 0x00 or  
24 0x03 in the ReservationKKQoSResponseFwd or the ReservationKKQoSResponseRev  
25 attributes.

26 The access network shall not initiate negotiation of the  
27 ATSupportedFlowProtocolParametersPP attribute. The access network shall not initiate  
28 negotiation of the ATSupportedRouteProtocolParametersPP attribute.

29 The access network shall not initiate negotiation of the MaxLinkFlows attribute.

30 The access network and access terminal shall not propose value of MaxAbortTimer that is  
31 less than any of the AbortTimer values in FlowNMTimersFwd and FlowNMTimersRev  
32 Attributes.

#### 33 2.3.2 Commit Procedures

34 The access terminal and the access network shall perform the procedures specified in this  
35 section, in the order specified, when directed by the InUse instance of the Session  
36 Configuration Protocol to execute the Commit procedures:

- 37 • All the public data that are defined by this application, but are not defined by the InUse  
38 application instance shall be added to the public data of the InUse application.

- 1 • If the InUse instance of this application (corresponding to the stream to which this  
2 application is bound) has the same subtype as this application instance, then
- 3 – The access terminal and the access network shall set the attribute values  
4 associated with the InUse instance of this application to the attribute values  
5 associated with the InConfiguration instance of this application, and
- 6 – The access terminal and the access network shall purge the InConfiguration  
7 instance of the application.
- 8 • If the InUse instance of this application (corresponding to the stream to which this  
9 application is bound) does not have the same subtype as this application instance, then:
- 10 – The access terminal and the access network shall initialize a receive pointer for  
11 DataOverSignaling message validation on Route A,  $V(R_A)$ , to 63.
- 12 – The access terminal and the access network shall initialize a receive pointer for  
13 DataOverSignaling message validation on Route B,  $V(R_B)$ , to 63.
- 14 – The access terminal and the access network shall initialize a transmit pointer  
15 for DataOverSignaling message validation on Route A,  $V(S_A)$ , to zero.
- 16 – The access terminal and the access network shall initialize a transmit pointer  
17 for DataOverSignaling message validation on Route B,  $V(S_B)$ , to zero.
- 18 – The access terminal and the access network shall set the StorageBLOB  
19 parameter of the Location Update Protocol to NULL.
- 20 – The initial state of the Flow Control Protocol associated with the  
21 InConfiguration instance of the Packet Application at the access terminal and  
22 access network shall be set to the Close State.
- 23 – The access network shall set the Forward Reservations with ReservationLabel  
24 0xff and 0xfe to the Open state.<sup>2</sup>
- 25 – The access terminal shall set the Reverse Reservations with ReservationLabel  
26 0xff and 0xfe to the Open state.
- 27 – The access network shall set the Forward Reservations with ReservationLabel  
28 not equal to 0xff or 0xfe to the Close state.
- 29 – The access terminal shall set the Reverse Reservations with ReservationLabel  
30 not equal to 0xff or 0xfe to the Close state.
- 31 – The Route Selection Protocol at the access terminal shall enter the A Open B  
32 Setting state (See Figure 2.4.4.1.2-1).
- 33 – The InConfiguration instance of the Packet Application at the access terminal  
34 and access network shall become the InUse instance for the Packet Application  
35 (corresponding to the stream to which this application is bound).

---

<sup>2</sup> Forward and reverse link Reservations 0xff initialized in the Open state so that data can be sent without having to perform a state transition.

- All the public data not defined by this application shall be removed from the public data of the InUse application.

### 2.3.3 Message Formats

#### 2.3.3.1 ConfigurationRequest

The ConfigurationRequest message format is as follows:

Field	Length (bits)
MessageID	8
TransactionID	8

Zero or more instances of the following record

AttributeRecord	Attribute dependent
-----------------	---------------------

**MessageID** The sender shall set this field to 0x50.

**TransactionID** The sender shall increment this value for each new ConfigurationRequest message sent.

**AttributeRecord** The format of this record is specified in [8].

<b>Channels</b>	FTC	RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.3.3.2 ConfigurationResponse

The ConfigurationResponse message format is as follows:

Field	Length (bits)
MessageID	8
TransactionID	8

Zero or more instances of the following record

AttributeRecord	Attribute dependent
-----------------	---------------------

**MessageID** The sender shall set this field to 0x51.

**TransactionID** The sender shall set this value to the TransactionID field of the corresponding ConfigurationRequest message.

**AttributeRecord** An attribute record containing a single attribute value. If this message selects a complex attribute, only the ValueID field of the complex attribute shall be included in the message. The format of the

1  
2  
3  
4

AttributeRecord is given in [8]. The sender shall not include more than one attribute record with the same attribute identifier.

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

DRAFT



## 2.4 Route Selection Protocol

### 2.4.1 Overview

The Route Selection Protocol provides means to select either instance A or instance B of the Route Protocol. The Route Selection Protocol routes Flow Protocol PDUs to the selected instance of the Route Protocol. Instance A of the Route Protocol is bound to Route A of the Link Flow. Instance B of the Route Protocol is bound to Route B of the Link Flow. The Route Selection Protocol is a protocol associated with the Enhanced Multi-Flow Packet Application. The application subtype for this application is defined in [3].

### 2.4.2 Primitives and Public Data

#### 2.4.2.1 Commands

This protocol does not define any commands.

#### 2.4.2.2 Return Indications

This protocol does not return any indications.

### 2.4.3 Protocol Data Unit

The Route Selection Protocol routes Flow Protocol PDUs to the Route Protocol without modifying them. Hence, the transmission unit of this protocol is the same as a Flow Protocol PDU. The Flow Protocol for a forward Link Flow *NN* is identified by the ProtocolID field of the Flow*NN*FlowProtocolParametersFwd attribute. The Flow Protocol for a reverse Link Flow *NN* is identified by the ProtocolID field of the Flow*NN*FlowProtocolParametersRev attribute.

### 2.4.4 Procedures and Messages for the InUse Instance of the Protocol

#### 2.4.4.1 Procedures

##### 2.4.4.1.1 General Requirements

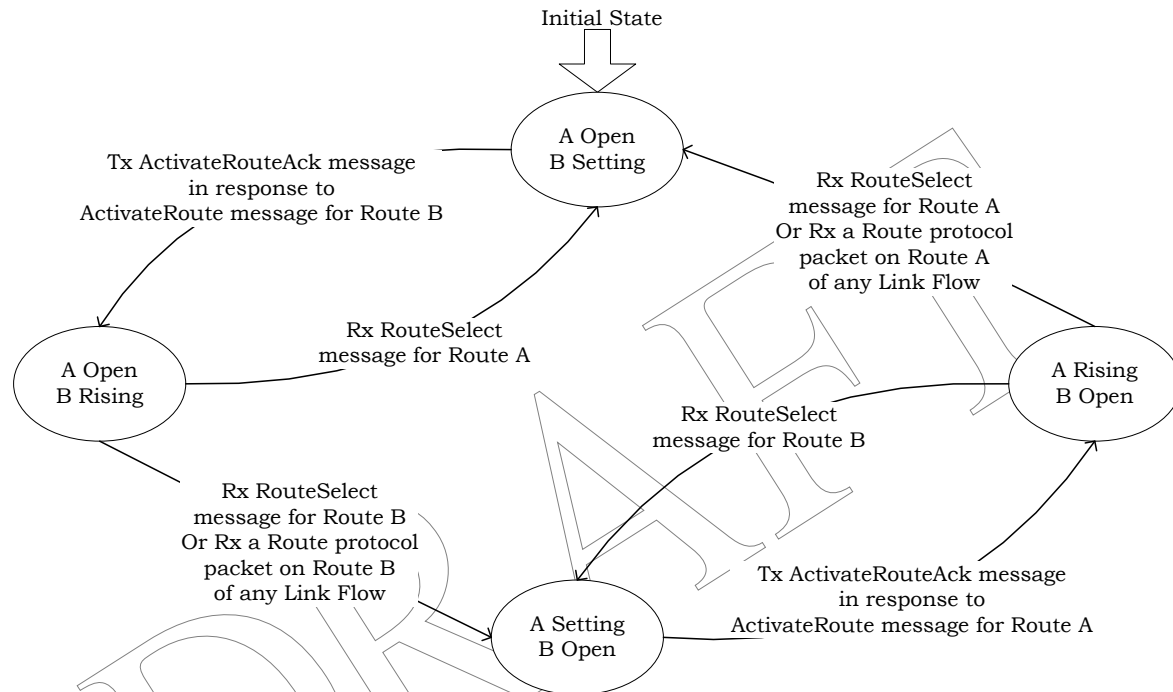
If the Flow*NN*FlowProtocolPDUFwd attribute of forward Link Flow *NN* is 0x00, then forward Link Flow *NN* provides an octet stream to the Flow Protocol. If the Flow*NN*FlowProtocolPDUFwd attribute of forward Link Flow *NN* is 0x01, then forward Link Flow *NN* provides a packet stream to the Flow Protocol.

If the Flow*NN*FlowProtocolPDUREv attribute of reverse Link Flow *NN* is 0x00, then reverse Link Flow *NN* provides an octet stream to the Flow Protocol. If the Flow*NN*FlowProtocolPDUREv attribute of reverse Link Flow *NN* is 0x01, then reverse Link Flow *NN* provides a packet stream to the Flow Protocol.

##### 2.4.4.1.2 Access Terminal Requirements

The Route Selection Protocol associated with an activated Link Flow can be in one of four states: A Open B Setting, A Open B Rising, A Setting B Open, or A Rising B Open. The

1 Route Selection Protocol instance associated with all activated Link Flows shall be in the  
 2 same state at any time. When a Link Flow is activated, the Route Selection Protocol shall  
 3 enter the state that the Route Selection Protocols of other activated Link Flows are in. If no  
 4 other Link Flows are activated when a Link Flow is activated, then the Route Selection  
 5 Protocol shall enter the A Open B Setting state. If the Route Selection Protocol receives a  
 6 *ConnectedState.ConnectionClosed* indication or *RouteUpdate.ConnectionLost* indication, it  
 7 shall enter the A Open B Setting state. Figure 2.4.4.1.2-1 shows the state diagram for the  
 8 Route Selection Protocol at the access terminal.



9  
 10 **Figure 2.4.4.1.2-1. Route Selection Protocol State Diagram (Access Terminal)**

#### 11 2.4.4.1.2.1 A Open B Setting State

##### 12 2.4.4.1.2.1.1 State Transitions

13 Upon receiving an *ActivateRoute* message requesting to activate Route B, the access  
 14 terminal shall perform the following:

- 15 • If *TwoRoutesSupported* is 0x01, the access terminal shall perform the following:
  - 16 • The Route Selection Protocol shall issue a *RadioLinkProtocol.InitializeRoute* command
  - 17 with Route B as the argument.
  - 18 • The access terminal shall initialize the Route Protocol bound to Route B.
  - 19 • After the Radio Link Protocol and the Route Protocol are initialized, the access
  - 20 terminal shall send an *ActivateRouteAck* message, and shall transition to the A
  - 21 Open B Rising state.
- 22 • Otherwise, the access terminal shall ignore the *ActivateRoute* message.

1 Upon receiving a RouteSelect message for Route A, the access terminal shall respond with a  
2 RouteSelectAck message.

#### 3 2.4.4.1.2.1.2 Transmitter Requirements

4 The access terminal shall route Flow Protocol PDUs to Route A. The access terminal shall  
5 not route Flow Protocol PDUs to Route B.

#### 6 2.4.4.1.2.1.3 Receiver Requirements if TwoRoutesSupported is 0x00

7 The access terminal shall pass Flow Protocol PDUs received on Route A to the Flow  
8 Protocol. The access terminal shall discard Flow Protocol PDUs received on Route B.

#### 9 2.4.4.1.2.1.4 Receiver Requirements if TwoRoutesSupported is 0x01

10 The access terminal shall pass Flow Protocol PDUs received on Route A to the Flow  
11 Protocol.

12 If the FlowNNSimultaneousDeliveryOnBothRoutesFwd attribute for Link Flow *NN* is 0x01,  
13 the access terminal shall perform the following: the access terminal shall pass Flow Protocol  
14 PDUs received on Route B of the Link Flow to the Flow Protocol if the access terminal has  
15 not received an ActivateRoute message requesting to activate Route B since the last time it  
16 entered this state; otherwise, the access terminal shall discard Flow Protocol PDUs received  
17 on Route B.

18 If the FlowNNSimultaneousDeliveryOnBothRoutesFwd attribute for Link Flow *NN* is 0x00,  
19 the access terminal shall perform the following: the access terminal shall pass Flow Protocol  
20 PDUs received on Route B of the Link Flow to the Flow Protocol if the access terminal has  
21 not passed Flow Protocol PDUs received on Route A of the Link Flow to the Flow Protocol  
22 since the last time the access terminal entered this state and if the access terminal has not  
23 received an ActivateRoute message requesting to activate Route B since the last time it  
24 entered this state; otherwise, the access terminal shall discard Flow Protocol PDUs received  
25 on Route B of the Link Flow.

#### 26 2.4.4.1.2.2 A Open B Rising State

##### 27 2.4.4.1.2.2.1 State Transitions

28 Upon receiving a RouteSelect message requesting to select Route B<sup>3</sup>, the access terminal  
29 shall respond with a RouteSelectAck message, and shall transition to the A Setting B Open  
30 state. Upon receiving Flow Protocol PDU on Route B of any Link Flow<sup>4</sup>, the access terminal  
31 shall store the Flow Protocol PDU received from Route B for processing in the A Setting B  
32 Open state and shall transition to the A Setting B Open state.

---

<sup>3</sup> The access terminal could wait to send RouteSelectAck message and transition state until the next Flow protocol packet boundary.

<sup>4</sup> The access terminal could wait to transition state until the next Flow protocol packet boundary.

1 Upon receiving a RouteSelect message requesting to select Route A, the access terminal  
2 shall respond with a RouteSelectAck message, and shall transition to the A Open B Setting  
3 state.

4 If the access terminal receives an ActivateRoute message, the message shall be ignored.

#### 5 2.4.4.1.2.2.2 Transmitter Requirements

6 The access terminal shall route Flow Protocol PDUs to Route A. The access terminal shall  
7 not route Flow Protocol PDUs to Route B.

#### 8 2.4.4.1.2.2.3 Receiver Requirements

9 The access terminal shall pass Flow Protocol PDUs received on Route A to the Flow  
10 Protocol.

#### 11 2.4.4.1.2.3 A Setting B Open State

##### 12 2.4.4.1.2.3.1 State Transitions

13 Upon receiving an ActivateRoute message requesting to activate Route A, the access  
14 terminal shall perform the following:

- 15 • The Route Selection Protocol shall issue a *RadioLinkProtocol.InitializeRoute* command  
16 with Route A as the argument.
- 17 • The access terminal shall initialize the Route Protocol bound to Route A.
- 18 • After the Radio Link Protocol and the Route Protocol are initialized, the access terminal  
19 shall send an ActivateRouteAck message, and shall transition to the A Rising B Open  
20 state.

21 Upon receiving a RouteSelect message for Route B, the access terminal shall respond with a  
22 RouteSelectAck message.

##### 23 2.4.4.1.2.3.2 Transmitter Requirements

24 The access terminal shall route Flow Protocol PDUs to Route B. The access terminal shall  
25 not route Flow Protocol PDUs to Route A.

##### 26 2.4.4.1.2.3.3 Receiver Requirements

27 The access terminal shall pass Flow Protocol PDUs received on Route B to the Flow  
28 Protocol.

29 If the *FlowNNSimultaneousDeliveryOnBothRoutesFwd* attribute for Link Flow *NW* is 0x01,  
30 the access terminal shall perform the following: the access terminal shall pass Flow Protocol  
31 PDUs received on Route A of the Link Flow to the Flow Protocol if the access terminal has  
32 not received an ActivateRoute message requesting to activate Route A since the last time it  
33 entered this state; otherwise, the access terminal shall discard Flow Protocol PDUs received  
34 on Route A.

1 If the *FlowNNSimultaneousDeliveryOnBothRoutesFwd* attribute for Link Flow *NV* is 0x00,  
2 the access terminal shall perform the following: the access terminal shall pass Flow Protocol  
3 PDUs received on Route A of the Link Flow to the Flow Protocol if the access terminal has  
4 not passed Flow Protocol PDUs received on Route B of the Link Flow to the Flow Protocol  
5 since the last time the access terminal entered this state and if the access terminal has not  
6 received an *ActivateRoute* message requesting to activate Route A since the last time it  
7 entered this state; otherwise, the access terminal shall discard Flow Protocol PDUs received  
8 on Route A of the Link Flow.

#### 9 2.4.4.1.2.4 A Rising B Open State

##### 10 2.4.4.1.2.4.1 State Transitions

11 Upon receiving a *RouteSelect* message requesting to select Route A<sup>5</sup>, the access terminal  
12 shall respond with a *RouteSelectAck* message, and shall transition to the A Open B Setting  
13 state. Upon receiving Flow Protocol PDU on Route A of any Link Flow<sup>6</sup>, the access terminal  
14 shall store the Flow Protocol PDU received on Route A for processing in the A Open B  
15 Setting state and shall transition to the A Open B Setting state.

16 Upon receiving a *RouteSelect* message requesting to select Route B, the access terminal  
17 shall respond with a *RouteSelectAck* message, and shall transition to the A Setting B Open  
18 state.

19 If the access terminal receives an *ActivateRoute* message, the message shall be ignored.

##### 20 2.4.4.1.2.4.2 Transmitter Requirements

21 The access terminal shall route Flow Protocol PDUs to Route B. The access terminal shall  
22 not route Flow Protocol PDUs to Route A.

##### 23 2.4.4.1.2.4.3 Receiver Requirements

24 The access terminal shall pass Flow Protocol PDUs received on Route B to the Flow  
25 Protocol.

##### 26 2.4.4.1.3 Access Network Requirements

27 If *TwoRoutesSupported* attribute is 0x00, then the access network shall not send  
28 *ActivateRoute* or *RouteSelect* messages.

29 Upon sending an *ActivateRoute* message requesting to activate Route A, the access network  
30 shall issue a *RadioLinkProtocol.InitializeRoute* command with Route A as the argument and  
31 initialize the Route Protocol bound to Route A.

---

<sup>5</sup> The access terminal could wait to send *RouteSelectAck* message and transition state until the next Flow protocol packet boundary.

<sup>6</sup> The access terminal could wait to transition state until the next Flow protocol packet boundary.

1 Upon sending an ActivateRoute message requesting to activate Route B, the access network  
 2 shall issue a *RadioLinkProtocol.InitializeRoute* command with Route B as the argument and  
 3 initialize the Route Protocol bound to Route B.

#### 4 2.4.4.2 Message Formats

##### 5 2.4.4.2.1 RouteSelect

6 The access network sends this message to transition the access terminal to the A Open B  
 7 Setting or the A Setting B Open state.

8

Field	Length (bits)
MessageID	8
TransactionID	8
Route	1
Reserved	7

9 MessageID The access network shall set this field to 0x1e.

10 TransactionID The access network shall set this field to one more (modulo 256) than  
 11 the TransactionID field of the last RouteSelect message sent by the  
 12 access network.

13 Route The access network shall set this field to '0' to transition the access  
 14 terminal to the A Open B Setting state. The access network shall set  
 15 this field to '1' to transition the access terminal to the A Setting B  
 16 Open state.

17 Reserved The access network shall set this field to '0000000'. The access  
 18 terminal shall ignore this field.

19

<b>Channels</b>	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	40

##### 20 2.4.4.2.2 RouteSelectAck

21 The access terminal sends this message to acknowledge the receipt of a RouteSelect  
 22 message.

23

Field	Length (bits)
MessageID	8
TransactionID	8

24 MessageID The access terminal shall set this field to 0x1f.

1 TransactionID The access terminal shall set this field to the TransactionID field of  
 2 the RouteSelect message whose receipt is being acknowledged by this  
 3 message.  
 4

<b>Channels</b>	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	40

5 2.4.4.2.3 ActivateRoute

6 The access network sends this message to transition the access terminal to the A Rising B  
 7 Open state or the A Open B Rising state.  
 8

Field	Length (bits)
MessageID	8
TransactionID	8
Route	1
Reserved	7

9 MessageID The access network shall set this field to 0x20.

10 TransactionID The access network shall set this field to one more (modulo 256) than  
 11 the TransactionID field of the last ActivateRoute message sent by the  
 12 access network.

13 Route The access network shall set this field to '0' to transition the access  
 14 terminal to the A Rising B Open state. The access network shall set  
 15 this field to '1' to transition the access terminal to the A Open B  
 16 Rising state.

17 Reserved The access network shall set this field to '0000000'. The access  
 18 terminal shall ignore this field.  
 19

<b>Channels</b>	FTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

20 2.4.4.2.4 ActivateRouteAck

21 The access terminal sends this message to acknowledge the receipt of an ActivateRoute  
 22 message.  
 23

Field	Length (bits)
MessageID	8
TransactionID	8

1 MessageID The access terminal shall set this field to 0x21.

2 TransactionID The access terminal shall set this field to the TransactionID field of  
3 the ActivateRoute message whose receipt is being acknowledged by  
4 this message.  
5

<b>Channels</b>	RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

#### 6 2.4.4.3 Interface to Other Protocols

##### 7 2.4.4.3.1 Commands

8 This protocol issue the following commands:

- 9 • *RadioLinkProtocol.InitializeRoute* with argument indicating which Route is to be  
10 initialized.

##### 11 2.4.4.3.2 Indications

12 This protocol registers to receive the following indications:

- 13 • *ConnectedState.ConnectionClosed*
- 14 • *RouteUpdate.ConnectionLost*

#### 15 2.4.5 Protocol Numeric Constants

16 This protocol does not define any protocol numeric constants.  
17



## 2.5 Radio Link Protocol

### 2.5.1 Overview

The Radio Link Protocol (RLP) provides one or more octet or packet streams with an acceptably low erasure rate for efficient operation of higher layer protocols (e.g., TCP). When used as part of the Enhanced Multi-Flow Packet Application, the protocol carries one or more octet or packet streams from the higher layer. RLP is a protocol associated with the Enhanced Multi-Flow Packet Application. The application subtype for this application is defined in [3].

### 2.5.2 Primitives and Public Data

#### 2.5.2.1 Commands

This protocol defines the following commands:

- *InitializeRoute* with argument indicating which Route is to be initialized.

#### 2.5.2.2 Return Indications

This protocol does not return any indications.

### 2.5.3 Protocol Data Unit

The transmission unit of this protocol is an RLP packet.

### 2.5.4 Procedures and Messages for the InUse Instance of the Protocol

A forward Link Flow *NN* is defined to be activated if the *FlowNNActivatedFwd* attribute is set to 0x01, where *NN* is the hexadecimal Link Flow number in the range 0x00 to *MaxNumLinkFlowsFwd*-1 inclusive. The number of activated Link Flows on the forward link shall not exceed the value of the *MaxActivatedLinkFlowsFwd* attribute.

A reverse Link Flow *NN* is defined to be activated if the *FlowNNActivatedRev* attribute is set to 0x01, where *NN* is the hexadecimal Link Flow number in the range 0x00 to *MaxNumLinkFlowsRev*-1 inclusive. The number of activated Link Flows on the reverse link shall not exceed the value of the *MaxActivatedLinkFlowsRev* attribute.

A Link Flow is defined to be deactivated if it is not activated.

This section defines the procedures and messages for the in-use instance of each forward or reverse Link Flow.

#### 2.5.4.1 Procedures

Each Route of the Link Flow receives octets or packets for transmission from the corresponding instance of the Route Protocol and forms an RLP packet by prepending the RLP packet header defined in 2.5.4.3 with a number of received contiguous octets.

1 The Route Protocol for a forward Link Flow *NN* is identified by the ProtocolID field of  
2 Flow*NN*RouteProtocolParametersFwd attribute. The Route Protocol for a reverse Link Flow  
3 *NN* is identified by the ProtocolID field of Flow*NN*RouteProtocolParametersRev attribute.

4 If the Route Protocol is NULL<sup>7</sup>, then the transmitter shall set Route Protocols octets or  
5 packets to Flow Protocol octets or packets routed along the Route. If the Route Protocol is  
6 NULL, then the receiver shall set Flow Protocols octets or packets to Route Protocol packets  
7 or octets received on the Route.

8 If the Flow*NN*RouteProtocolPDUFwd attribute of forward Link Flow *NN* is 0x00, then each  
9 Route of forward Link Flow *NN* provides an octet stream to the corresponding instance of  
10 the Route Protocol. If the Flow*NN*RouteProtocolPDUFwd attribute of forward Link Flow *NN*  
11 is 0x01, then each Route of forward Link Flow *NN* provides a packet stream to the  
12 corresponding instance of the Route Protocol.

13 If the Flow*NN*OutOfOrderDeliveryToRouteProtocolFwd attribute of forward Link Flow *NN* is  
14 0x00, then each Route of forward Link Flow *NN* delivers payload to the corresponding  
15 instance of the Route Protocol in order. If the  
16 Flow*NN*OutOfOrderDeliveryToRouteProtocolFwd attribute of forward Link Flow *NN* is 0x01,  
17 then each Route of forward Link Flow *NN* may deliver payload to the corresponding instance  
18 of the Route Protocol out of order.

19 If the Flow*NN*RouteProtocolPDUREv attribute of reverse Link Flow *NN* is 0x00, then each  
20 Route of reverse Link Flow *NN* provides an octet stream to the corresponding instance of the  
21 Route Protocol. If the Flow*NN*RouteProtocolPDUREv attribute of reverse Link Flow *NN* is  
22 0x01, then each Route of reverse Link Flow *NN* provides a packet stream to the  
23 corresponding instance of the Route Protocol.

24 The policy RLP follows in determining the number of octets to send in an RLP packet is  
25 beyond the scope of this specification. It is subject to the following requirements:

- 26 • The size of an RLP packet shall not exceed the maximum payload length that can be  
27 carried by a Stream Layer packet given the target channel and current transmission  
28 rate on that channel.
- 29 • If the Link Flow is carrying a packet stream, then an RLP packet shall contain octets  
30 from no more than one Route Protocol packet.
- 31 • The RLP packet should contain all octets of the Route Protocol packet if all of the  
32 following conditions are true:
  - 33 – The size of the RLP packet carrying all octets of the Route Protocol packet does  
34 not exceed the maximum payload length that can be carried by a Stream Layer  
35 packet given the target channel and the current transmission rate on that  
36 channel.
  - 37 – The Link flow is carrying a packet stream.
  - 38 – The data unit for the Link Flow is RLP packet payloads.

---

<sup>7 7</sup> Route Protocol being NULL means that a Route Protocol has not been negotiated.

- 1 • If all of the following conditions are true, the size of the RLP packet shall be such that it  
2 could be re-transmitted in a lower layer packet with same or higher payload:
- 3 – The data unit for the Link Flow is RLP packet payloads.
  - 4 – If the RLP transmitter is the access terminal, FlowNNakEnableRev attribute is  
5 set to 0x01 for this Link Flow or FlowNNPhysicalLayerNakEnableRev is set to  
6 0x01 for this Link Flow.
  - 7 – If the RLP transmitter is the access network, FlowNNakEnableFwd attribute is  
8 set to 0x01 for this Link Flow.

9 For the purpose of binding Link Flows to lower layer flows (such as MAC flows in the  
10 Subtype 3 Reverse Traffic Channel MAC Protocol specified in [8]), each Link Flow shall be  
11 treated as a substream with the substream number set to the Link Flow number.

12 RLP makes use of the ResetTxIndication, ResetRxIndication, ResetTxIndicationAck,  
13 ResetTxComplete, ResetRxComplete, and Nak messages to perform control related  
14 operations.

15 When sending an AttributeUpdateRequest message containing requests to set one or more  
16 ReservationKKQoSRequestFwd or the ReservationKKQoSRequestRev attribute to their  
17 default value, the access terminal shall not include other types of requests in the same  
18 AttributeUpdateRequest message.

19 The access network shall not initiate modification of the ReservationKKQoSRequestFwd or  
20 the ReservationKKQoSRequestRev attributes. If the access network receives an  
21 AttributeUpdateRequest message requesting to set the ReservationKKQoSRequestFwd or  
22 the ReservationKKQoSRequestRev attribute to its default value, then the access network  
23 shall respond with an AttributeUpdateAccept message. The access terminal shall not  
24 initiate modification of the ReservationKKQoSResponseFwd or the  
25 ReservationKKQoSResponseRev attributes. The access terminal shall use the ProfileType  
26 0x00, 0x01, or 0x02 in the ReservationKKQoSRequestFwd or the  
27 ReservationKKQoSRequestRev attributes. The access network shall use ProfileType 0x00 or  
28 0x03 in the ReservationKKQoSResponseFwd or the ReservationKKQoSResponseRev  
29 attributes.

30 When forward Link Flow NN is activated, the access network and the access terminal shall  
31 not update the following attributes:

- 32 • FlowNNFlowProtocolParametersFwd,
- 33 • FlowNNRouteProtocolParametersFwd,
- 34 • FlowNNSequenceLengthFwd,
- 35 • FlowNNFlowProtocolPDUFwd,
- 36 • FlowNNRouteProtocolPDUFwd,
- 37 • FlowNNDataUnitFwd,
- 38 • FlowNNSimultaneousDeliveryOnBothRoutesFwd, and
- 39 • FlowNNOOutOfOrderDeliveryToRouteProtocolFwd.

1 The access terminal shall not initiate re-activation of a deactivated forward Link Flow *NN*  
2 unless the access terminal initiated deactivation of forward Link Flow *NN* since the last time  
3 the Link Flow was activated, and the deactivation was successful. The access network shall  
4 not initiate re-activation of a deactivated forward Link Flow *NN* unless the access network  
5 initiated deactivation of forward Link Flow *NN* since the last time the Link Flow was  
6 activated, and the deactivation was successful.

7 When reverse Link Flow *NN* is activated, the access network and the access terminal shall  
8 not update the following attributes:

- 9 • Flow*NN*FlowProtocolParametersRev,
- 10 • Flow*NN*RouteProtocolParametersRev,
- 11 • Flow*NN*SequenceLengthRev,
- 12 • Flow*NN*FlowProtocolPDURev,
- 13 • Flow*NN*RouteProtocolPDURev, and,
- 14 • Flow*NN*DataUnitRev

15 The access terminal shall not initiate re-activation of a deactivated reverse Link Flow *NN*  
16 unless the access terminal initiated deactivation of reverse Link Flow *NN* since the last time  
17 the Link Flow was activated, and the deactivation was successful. The access network shall  
18 not initiate re-activation of a deactivated reverse Link Flow *NN* unless the access network  
19 initiated deactivation of reverse Link Flow *NN* since the last time the Link Flow was  
20 activated, and the deactivation was successful.

21 The ProtocolID field of the Flow*NN*FlowProtocolParametersFwd attribute shall be set to a  
22 value that is supported by the access terminal as indicated in the  
23 ATSupportedFlowProtocolParameters*PP* attribute. The ProtocolID field of the  
24 Flow*NN*FlowProtocolParametersRev attribute shall be set to a value that is supported by the  
25 access terminal as indicated in the ATSupportedFlowProtocolParameters*PP* attribute. The  
26 ProtocolID field of the Flow*NN*RouteProtocolParametersFwd attribute shall be set to a value  
27 that is supported by the access terminal as indicated in the  
28 ATSupportedRouteProtocolParameters*PP* attribute. The ProtocolID field of the  
29 Flow*NN*RouteProtocolParametersRev attribute shall be set to a value that is supported by  
30 the access terminal as indicated in the ATSupportedRouteProtocolParameters*PP* attribute.

31 The fields of the ProtocolParameters record of the Flow*NN*FlowProtocolParametersFwd  
32 attribute shall be set to values that are in accordance with those supported by the AT as  
33 indicated in the SupportedProtocolParametersValues record of the  
34 ATSupportedFlowProtocolParameters*PP* attribute. The fields of the ProtocolParameters  
35 record of the Flow*NN*FlowProtocolParametersRev attribute shall be set to values that are in  
36 accordance with those supported by the AT as indicated in the  
37 SupportedProtocolParametersValues record of the ATSupportedFlowProtocolParameters*PP*  
38 attribute. The fields of the ProtocolParameters record of the  
39 Flow*NN*RouteProtocolParametersFwd attribute shall be set to values that are in accordance  
40 with those supported by the AT as indicated in the SupportedProtocolParametersValues  
41 record of the ATSupportedRouteProtocolParameters*PP* attribute. The fields of the

1 ProtocolParameters record of the FlowNMRouteProtocolParametersRev attribute shall be set  
2 to values that are in accordance with those supported by the AT as indicated in the  
3 SupportedProtocolParametersValues record of the ATSupportedRouteProtocolParametersPP  
4 attribute.

5 If the FlowNMDataUnitFwd attribute of forward Link Flow *NN* is 0x00, then the data unit for  
6 the Link Flow shall be octets. Otherwise the data unit for the Link Flow shall be RLP packet  
7 payloads. If the FlowNMDataUnitRev attribute reverse Link Flow *NN* is 0x00, then the data  
8 unit for the Link Flow shall be octets. Otherwise the data unit for the Link Flow shall be  
9 RLP packet payloads.

10 If the access terminal wishes to associate one or more BCMCS flow IDs to a reservation *KK*,  
11 and if the BCMCSOverRLPAllowed is set to '1', then the access terminal may send  
12 AttributeUpdateRequest message containing ReservationKKBCMCSFlowIDAssociation  
13 attribute. If the access network receives an AttributeUpdateRequest message containing  
14 ReservationKKBCMCSFlowIDAssociation attribute, and if the access network accepts the  
15 BCMCS Flow ID(s) association to the reservation, then the access network shall respond  
16 with an AttributeUpdateAccept message. The access network shall not send  
17 AttributeUpdateRequest message containing ReservationKKBCMCSFlowIDAssociation  
18 attribute.

19 If the access terminal wishes to associate one or more BCMCS Programs to a reservation  
20 *KK*, and if the BCMCSOverRLPAllowed is set to '1', then the access terminal may send  
21 AttributeUpdateRequest message containing ReservationKKBCMCSProgramIDAssociation  
22 attribute. If the access network receives an AttributeUpdateRequest message containing  
23 ReservationKKBCMCSProgramIDAssociation attribute, and if the access network accepts  
24 the BCMCS Program(s) association to the reservation, then the access network shall  
25 respond with an AttributeUpdateAccept message. The access network shall not send  
26 AttributeUpdateRequest message containing ReservationKKBCMCSProgramIDAssociation  
27 attribute.

#### 28 2.5.4.1.1 Initialization and Reset

29 The RLP initialization procedure initializes the RLP variables and data structures in one end  
30 of the link. The RLP reset procedure guarantees that RLP state variables on both sides are  
31 synchronized. The reset procedure includes initialization.

32 The access terminal and the access network shall perform the initialization procedures  
33 defined in 2.5.4.1.1.1.1 and 2.5.4.1.1.1.2 for both routes of all activated Link Flows if the  
34 protocol receives an *IdleState.ConnectionOpened* indication. The access network shall  
35 perform the initialization procedure defined in 2.5.4.1.1.1.1 for both routes of forward Link  
36 Flow *NN* when forward Link Flow *NN* is activated. The access terminal shall perform the  
37 initialization procedure defined in 2.5.4.1.1.1.2 for both routes of forward Link Flow *NN*  
38 when forward Link Flow *NN* is activated. The access terminal shall perform the initialization  
39 procedure defined in 2.5.4.1.1.1.1 for both routes of reverse Link Flow *NN* when reverse  
40 Link Flow *NN* is activated. The access network shall perform the initialization procedure  
41 defined in 2.5.4.1.1.1.2 for both routes of reverse Link Flow *NN* when reverse Link Flow *NN*  
42 is activated. Upon receiving an *InitializeRoute* command, the access terminal shall perform  
43 the initialization procedures defined in 2.5.4.1.1.1 for the specified Route of all activated

1 Link Flows. Upon receiving an *InitializeRoute* command, the access network shall perform  
 2 the initialization procedures defined in 2.5.4.1.1.1 for the specified Route of all activated  
 3 Link Flows.

#### 4 2.5.4.1.1.1 Initialization Procedure

##### 5 2.5.4.1.1.1.1 Initialization Procedure for the RLP Transmitter

6 When RLP transmitter performs the initialization procedure it shall:

- 7 • Reset the send state variable  $V(S)_{NN,P}$  to zero, where  $NN$  indicates the Link Flow, and  $P$   
 8 indicates the Route which is being initialized, and
- 9 • clear the retransmission queues.

##### 10 2.5.4.1.1.1.2 Initialization Procedure for the RLP Receiver

11 When RLP receiver performs the initialization procedure it shall:

- 12 • Reset the receive state variables  $V(R)_{NN,P}$  and  $V(N)_{NN,P}$  to zero, and
- 13 • clear the resequencing buffer.

#### 14 2.5.4.1.1.2 Reset Procedure

##### 15 2.5.4.1.1.2.1 Reset Procedure for the Initiating Side when it is an RLP Transmitter

16 If the side initiating a reset procedure is an RLP transmitter for the Route of the Link Flow  
 17 (or of all Link Flows) being reset, then it shall send a *ResetTxIndication* message and enter  
 18 the RLP Reset State.

19 Upon entering the RLP Reset state RLP transmitter shall:

- 20 • Perform the RLP transmitter initialization procedure defined in 2.5.4.1.1.1.1 for the  
 21 Route being reset.
- 22 • If a Nak message is received for the Route of the Link Flow being reset while in the RLP  
 23 Reset state, the message shall be ignored.
- 24 • If the RLP transmitter that initiated the reset procedure is an access terminal, and if a  
 25 *PhysicalLayer.ReverseTrafficPacketsMissed* indication is received for the Route of the  
 26 Link Flow being reset while RLP is in the Reset state, then the indication shall be  
 27 ignored.
- 28 • The RLP transmitter should not transmit RLP packets while in the RLP Reset state.
- 29 • If RLP receives a *ResetTxIndicationAck* message for the Route of the Link Flow being  
 30 reset while in the RLP Reset state, it shall send a *ResetTxComplete* message back and  
 31 leave the RLP Reset state.
- 32 • If RLP receives an *IdleState.ConnectionOpened* indication while in the RLP Reset state, it  
 33 shall leave the RLP Reset state.

34 If a *ResetTxIndicationAck* message is received for a Route while that Route is not in the RLP  
 35 Reset state, the message shall be ignored.

1 2.5.4.1.1.2.2 Reset Procedure for Initiating Side when it is an RLP Receiver

2 If the side initiating a reset procedure is an RLP receiver for the Route of the Link Flow  
3 being reset, then it shall send a ResetRxIndication message and enter the RLP Reset State.  
4 Upon entering the RLP Reset state, the RLP receiver shall:

- 5 • Perform the RLP receiver initialization procedure defined in 2.5.4.1.1.1.2 for the Route  
6 being reset.
- 7 • Ignore all RLP data units received for the Route of the Link Flow being reset while in the  
8 RLP Reset state.
- 9 • When RLP receives a ResetRxComplete message for the Route of the Link Flow being  
10 reset, it shall leave the RLP Reset state.
- 11 • If RLP receives an *IdleState.ConnectionOpened* indication while in the RLP Reset state, it  
12 shall leave the RLP Reset state.

13 If a ResetRxComplete is received for a Route while the Route is not in the RLP Reset state,  
14 the message shall be ignored.

15 2.5.4.1.1.2.3 Reset Procedure for the Responding Side when it is an RLP Receiver

16 If the side responding to a reset procedure is an RLP receiver for the Route of the Link Flow  
17 being reset, then it shall respond with a ResetTxIndicationAck message upon receiving a  
18 ResetTxIndication message. After sending the message it shall enter the RLP Reset state for  
19 the Route being reset, if it was not already in the RLP Reset state. Upon entering the RLP  
20 Reset state RLP shall:

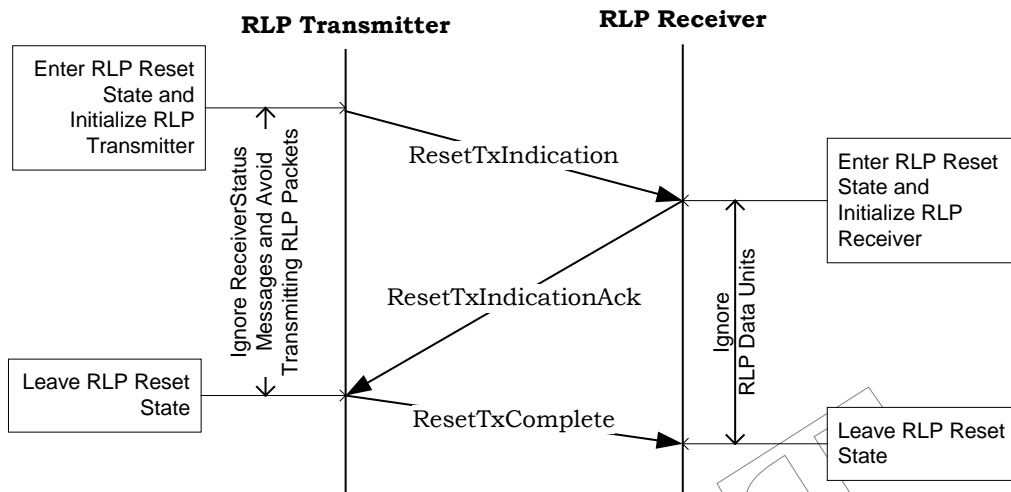
- 21 • Perform the RLP receiver initialization procedure defined in 2.5.4.1.1.1.2 for the Route  
22 being reset.
- 23 • Ignore all RLP data units received for the Route of the Link Flow being reset while in the  
24 RLP Reset state.
- 25 • When RLP receives a ResetTxComplete message for the Route of the Link Flow being  
26 reset, it shall leave the RLP Reset state.
- 27 • If RLP receives an *IdleState.ConnectionOpened* indication while in the RLP Reset state, it  
28 shall leave the RLP Reset state.

29 If a ResetTxComplete message is received for a Route while the Route is not in the RLP  
30 Reset state, the message shall be ignored.

31 2.5.4.1.1.2.4 Reset Procedure for the Responding Side when it is an RLP transmitter

32 If the side responding to a reset procedure is an RLP transmitter for the Route being reset,  
33 then it shall respond with a ResetRxComplete message upon receiving a ResetRxIndication  
34 message. After sending the message, it shall perform the RLP transmitter initialization  
35 procedure defined in 2.5.4.1.1.1.1 for the Route being reset.

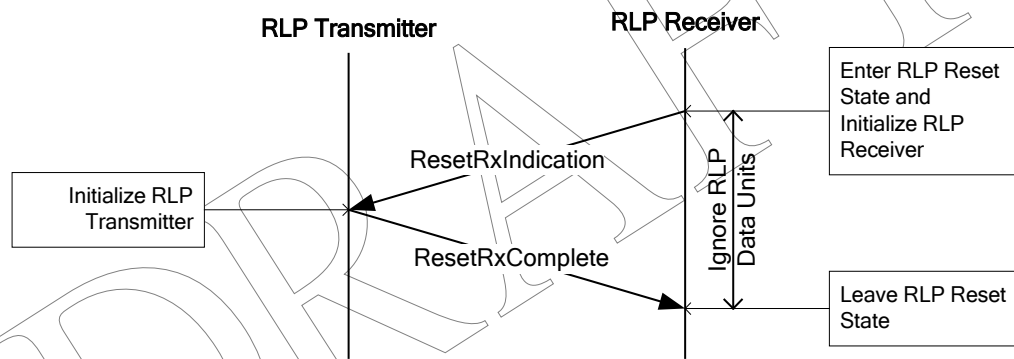
1 2.5.4.1.1.2.5 RLP Reset Message Flows



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**Figure 2.5.4.1.1.2.5-1. RLP Reset Procedure Initiated by RLP Transmitter**



4

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**Figure 2.5.4.1.1.2.5-2. RLP Reset Procedure Initiated by RLP Receiver**

6 2.5.4.2 Data Transfer

7 RLP is a Nak-based protocol with a sequence space of SequenceLength bits, where  
 8 SequenceLength is indicated by the FlowNNSequenceLengthFwd and  
 9 FlowNNSequenceLengthRev attribute for forward and reverse Link Flow NN, respectively.

10 All operations and comparisons performed on RLP packet sequence numbers shall be  
 11 carried out in unsigned modulo  $2^S$  arithmetic, where S represents the value of  
 12 SequenceLength. For any RLP sequence number N, the sequence numbers in the range  
 13  $[N+1, N+2^{S-1}-1]$  shall be considered greater than N and the sequence numbers in the range  
 14  $[N-2^{S-1}, N-1]$  shall be considered smaller than N.

15 2.5.4.2.1 RLP Transmit Procedures

16 The RLP transmitter shall maintain a SequenceLength-bit variable  $V(S)_{NN,P}$  for all  
 17 transmitted RLP data units (see Figure 2.5.4.2.1-1), where NN is the two-digit hexadecimal  
 18 Link Flow number in the range 0x00 to M-1 inclusive, P is the Route indicator that takes



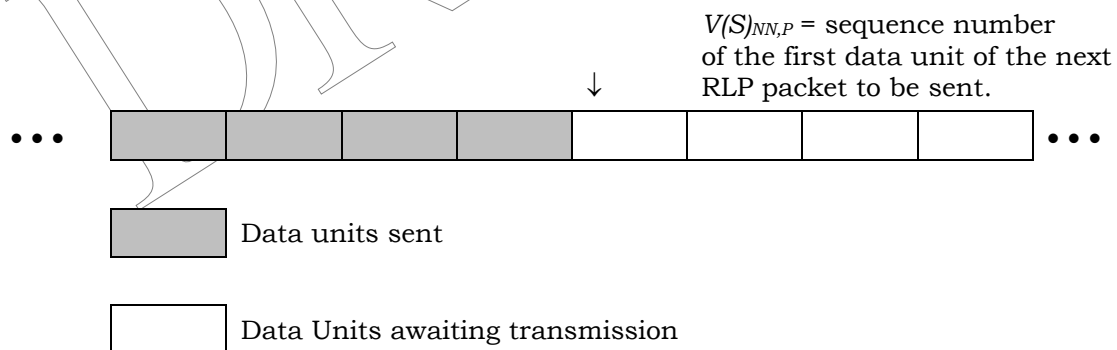
values of either A or B, and  $M$  is  $\text{MaxNumLinkFlowsFwd}$  or  $\text{MaxNumLinkFlowsRev}$  for a forward Link Flow or reverse Link Flow, respectively.  $V(S)_{NN,P}$  is the sequence number of the next RLP data unit to be sent on Route  $P$  of Link Flow  $NN$ . The sequence number field (SEQ) in each new RLP packet transmitted shall be set to  $V(S)_{NN,P}$ , corresponding to the sequence number of the first data unit in the packet. If the data unit is octets, then the sequence number of the  $i^{\text{th}}$  octet in the packet (with the first octet being octet 0) is implicitly given by  $\text{SEQ}+i$ .  $V(S)_{NN,P}$  shall be incremented for each data unit contained in the packet.

The RLP transmitter should allow sufficient time before deleting an RLP packet payload transmitted for the first time.

Upon receiving a Nak message, RLP shall transmit the missing data unit(s) (if any) conveyed by the Nak message if all of the following conditions are satisfied:

- the requested data units are available,
- the requested data units have not been retransmitted before in response to a Nak message, and
- if the data unit for the Link Flow is RLP packet payloads, the payload carrying capacity of the lower layer packet is not smaller than the size of the packet to be re-transmitted.

If the RLP transmitter is the access network, and the Nak message includes any sequence number greater than or equal to  $V(S)_{NN,P}$ , RLP shall perform the reset procedures specified in 2.5.4.1.1.2.1 for Route  $P$  of forward Link Flow  $NN$ . If the RLP transmitter is the access terminal, and the Nak message includes any sequence number greater than or equal to  $V(S)_{NN,P}$ , RLP shall perform the reset procedures specified in 2.5.4.1.1.2.1 for Route  $P$  of reverse Link Flow  $NN$ . If the Nak message does not include any sequence number greater than or equal to  $V(S)_{NN,P}$  but the requested data units are not available for retransmissions, RLP shall ignore the Nak message for data units that are not available.



**Figure 2.5.4.2.1-1. RLP Transmit Sequence Number Variable**

Upon receiving a *PhysicalLayer.ReverseTrafficPacketsMissed* indication for reverse Link Flow  $NN$ , the RLP transmitter in the access terminal shall retransmit the requested data unit(s) if and only if all of the following conditions are satisfied:

- $\text{FlowNNPhysicalLayerNakEnableRev}$  attribute is set to 0x01,
- if the data unit for the Link Flow is RLP packet payloads, the payload carrying capacity of the lower layer packet is not smaller than the size of the packet to be re-transmitted,

- 1 • the requested data units have not been retransmitted before, and
- 2 • the requested data units are available.

3 If  $FlowNNNakEnableFwd$  is 0x01, then the transmitter at the access network for each Route  
4 of Link Flow  $NN$  shall meet the following requirements:

- 5 • After transmitting a packet, the RLP transmitter shall start an RLP flush timer for time  
6  $FlushTimer$ , where  $FlushTimer$  is a parameter of the  $FlowNNTimersFwd$  attribute.
- 7 • If the RLP transmitter sends another packet before the RLP flush timer expires, the RLP  
8 transmitter shall reset and restart the timer.
- 9 • If the timer expires, the RLP transmitter shall disable the flush timer and the RLP  
10 transmitter should send an RLP packet that contains at least the data unit with  
11 sequence number  $V(S)_{NN,P}-1$ .

12 If  $FlowNNNakEnableRev$  is 0x01, then the transmitter at the access terminal for each Route  
13 of Link Flow  $NN$  shall meet the following requirements:

- 14 • After transmitting a packet, the RLP transmitter shall start an RLP flush timer for time  
15  $FlushTimer$ , where  $FlushTimer$  is a parameter of the  $FlowNNTimersRev$  attribute.
- 16 • If the RLP transmitter sends another packet before the RLP flush timer expires, the RLP  
17 transmitter shall reset and restart the timer.
- 18 • If the timer expires, the RLP transmitter shall disable the flush timer and the RLP  
19 transmitter should send an RLP packet that contains at least the data unit with  
20 sequence number  $V(S)_{NN,P}-1$ .

21 The RLP transmitter should not transmit more than  $2^{SequenceLength-1}$  first-time data units in  
22 any  $AbortTimer$  interval, where  $SequenceLength$  is the length of the SEQ field in the RLP  
23 header for the corresponding Link Flow.

#### 24 2.5.4.2.1.1 Reservation State Maintenance

25 The  $ReservationLabel$  parameter of the  $FlowNNReservationFwd$  or  $FlowNNReservationRev$   
26 attribute indicates the higher layer flows associated with Link Flow  $NN$ . Each  
27  $ReservationLabel$  shall be associated with no more than one forward Link Flow. Each  
28  $ReservationLabel$  shall be associated with no more than one reverse Link Flow.

29 Each Reservation can be in one of the following two states:

- 30 • Close State
- 31 • Open State

32 The transmitter should transmit higher layer octets<sup>8</sup> or packets using the Link Flow  
33 associated with the higher layer flow if the associated Link Flow is activated and if the  
34 Reservation is in the Open state. The transmitter should transmit higher layer octets

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<sup>8</sup> Higher layer is represented by  $ProtocolID$  field of the  $FlowNNFlowProtocolParametersFwd/FlowNNFlowProtocolParametersRev$  attribute of the respective link flow  $NN$ .

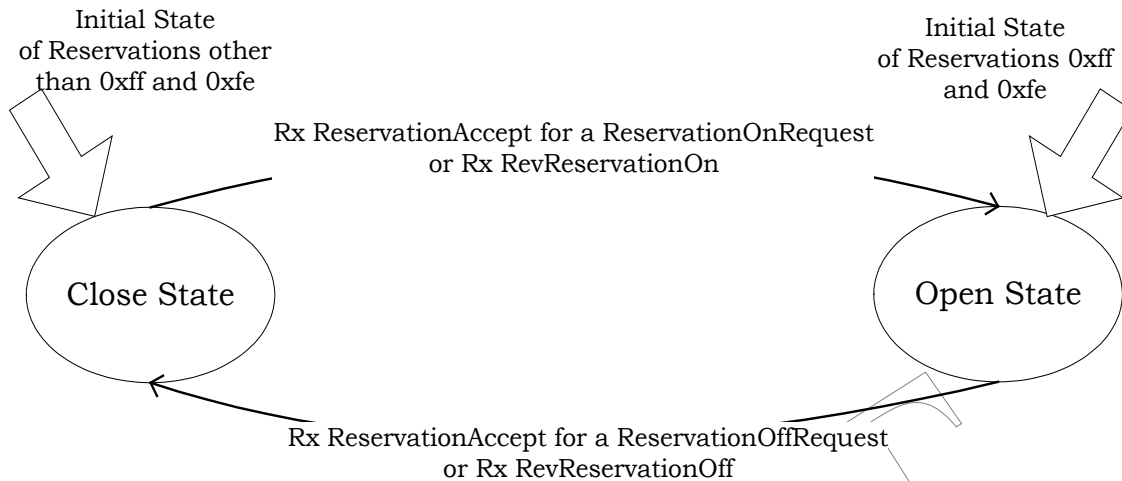
1 belonging to a higher layer flow that is not associated with any Link Flow using the Link  
2 Flow with ReservationLabel 0xff if the higher layer flow provides an octet stream with octet-  
3 based HDLC-like framing to the Enhanced Multi-flow Packet Application. The transmitter  
4 may transmit higher layer octets belonging to a higher layer flow identified by a Reservation  
5 that is in the Close state using the Link Flow with ReservationLabel 0xff if the higher layer  
6 flow provides an octet stream with octet-based HDLC-like framing to the Enhanced Multi-  
7 flow Packet Application. The transmitter may transmit higher layer octets belonging to a  
8 higher layer flow identified by a Reservation that is bound to a de-activated Link Flow using  
9 the Link Flow with ReservationLabel 0xff if the higher layer flow provides an octet stream  
10 with octet-based HDLC-like framing to the Enhanced Multi-flow Packet Application. The  
11 transmitter should transmit higher layer packets belonging to a higher layer flow that is not  
12 associated with any Link Flow using the Link Flow with ReservationLabel 0xfe if the higher  
13 layer flow provides an IP packet stream to the Enhanced Multi-flow Packet Application. The  
14 transmitter may transmit higher layer packets belonging to a higher layer flow identified by  
15 a Reservation that is in the Close state using the Link Flow with ReservationLabel 0xfe if  
16 the higher layer flow provides an IP packet stream to the Enhanced Multi-flow Packet  
17 Application. The transmitter may transmit higher layer packets belonging to a higher layer  
18 flow identified by a Reservation that is bound to a de-activated Link Flow using the Link  
19 Flow with ReservationLabel 0xfe if the higher layer flow provides an IP packet stream to the  
20 Enhanced Multi-flow Packet Application.

21 If the ReservationLabel is associated with BCMCS flow(s), and if the Reservation is in the  
22 Open state, then the transmitter shall transmit the octets or packets of the BCMCS flow  
23 using the Link Flow associated with the BCMCS FlowID or BCMCS ProgramID. Otherwise  
24 the transmitter shall not transmit the octets or packets of the BCMCS flow.

25 The access terminal and the access network shall not perform any actions that will result in  
26 the number of Reverse Link Reservations in the Open state to exceed the value specified by  
27 MaxNumOpenReservationsRev. The access terminal and the access network shall not  
28 perform any actions that will result in the number of Forward Link Reservations in the  
29 Open state to exceed the value specified by MaxNumOpenReservationsFwd.

30 Figure 2.5.4.2.1-2 and Figure 2.5.4.2.1-3 show the state transition diagram at the access  
31 terminal and the access network. State transitions that may be caused by  
32 *ConnectedState.ConnectionClosed* and *RouteUpdate.ConnectionLost* indications are not  
33 shown.

1

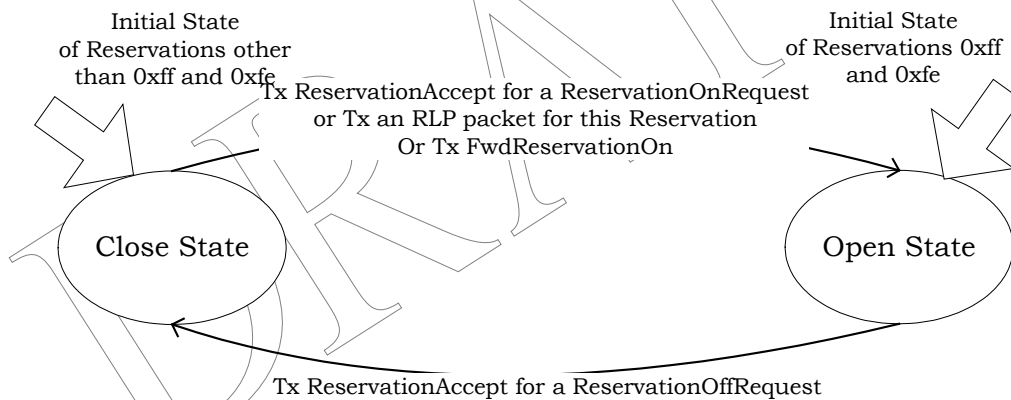


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**Figure 2.5.4.2.1-2. Reverse Link Reservation State Diagram (Access Terminal)**

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**Figure 2.5.4.2.1-3. Forward Link Reservation State Diagram (Access Network)**

6

7 2.5.4.2.1.1.1 State-independent Requirements

8 2.5.4.2.1.1.1.1 Access Terminal Requirements

9 Upon receiving a RevReservationOn message, the access terminal shall

- 10 • Respond with a ReservationAccept message within the time period specified by
- 11  $T_{RLPResponse}$  of receiving the RevReservationOn message.
- 12 • Set the TransactionID field of the ReservationAccept message to that of the
- 13 RevReservationOn message.

14 Upon receiving a RevReservationOff message, the access terminal shall

1 • Respond with a ReservationAccept message within the time period specified by  
2 T<sub>RLPResponse</sub> of receiving the RevReservationOff message.

3 • Set the TransactionID field of the ReservationAccept message to that of the  
4 RevReservationOff message.

5 Upon receiving a FwdReservationOn message, the access terminal shall

6 • Respond with a FwdReservationAck message within the time period specified by  
7 T<sub>RLPResponse</sub> of reception of the FwdReservationOn message.

8 • Set the TransactionID field of the FwdReservationAck message to that of the  
9 FwdReservationOn message.

10 Upon receiving a FwdReservationOff message, the access terminal shall

11 • Respond with a FwdReservationAck message within the time period specified by  
12 T<sub>RLPResponse</sub> of receiving the FwdReservationOff message.

13 • Set the TransactionID field of the FwdReservationAck message to that of the  
14 FwdReservationOff message.

15 If the access terminal receives a ReservationReject message from the access network with  
16 the RejectCode set to ReservationPending, the access terminal shall not send  
17 ReservationOnRequest for a PendingDuration period of time to the same access network.  
18 The access terminal shall stay in the monitor state until it receives the FwdReservationOn/  
19 RevReservationOn message or the PendingDuration period is over.

#### 20 2.5.4.2.1.1.1.2 Access Network Requirements

21 The access network may re-send a FwdReservationOn message if it does not receive a  
22 FwdReservationAck message containing the same TransactionID within the time period  
23 specified by T<sub>RLPResponse</sub> of sending the FwdReservationOn message.

24 The access network may re-send a FwdReservationOff message if it does not receive a  
25 FwdReservationAck message containing the same TransactionID within the time period  
26 specified by T<sub>RLPResponse</sub> of sending the FwdReservationOff message.

27 The access network may send a RevReservationOn message to transition the state of the  
28 reverse link Reservation of the access terminal to the Open state. The access network may  
29 re-send a RevReservationOn message if it does not receive a ReservationAccept message  
30 containing the same TransactionID within the time period specified by T<sub>RLPResponse</sub> of sending  
31 the RevReservationOn message.

32 The access network may send a RevReservationOff message to transition the state of the  
33 reverse link Reservation of the access terminal to the Close state. The access network may  
34 re-send a RevReservationOff message if it does not receive a ReservationAccept message  
35 containing the same TransactionID within the time period specified by T<sub>RLPResponse</sub> of sending  
36 the RevReservationOff message.

37 If the access network receives a ReservationOnRequest message, it shall

1 • Send either a ReservationAccept message or a ReservationReject message within the  
 2 time period specified by  $T_{RLPResponse}$  of reception of the ReservationOnRequest message. If  
 3 the resources required for the Reservation *KK* are not available, the access network  
 4 determines that queuing is required for the Reservation *KK*, and if one or both of the  
 5 following conditions are satisfied:

- 6 – Reservation*KK*ReservationQueuingSupported attribute is set to '0x01', or
- 7 – Access network has received ReservationOnRequest message from the access  
 8 terminal with the ReservationQueuingReq field for the Reservation *KK* set to '1'

9 then the access network should send ReservationReject message with the RejectCode  
 10 for the Reservation *KK* set to ReservationPending (0x01). Otherwise, the access network  
 11 shall not send ReservationReject message with the RejectCode for the Reservation *KK*  
 12 set to ReservationPending (0x01).

- 13 • If the access network sent a ReservationReject message with the RejectCode set to  
 14 ReservationPending (0x01), then the access network shall queue the  
 15 ReservationOnRequest up to PendingDuration period of time. During this time, the  
 16 access network should send FwdReservationOn/ RevReservationOn message to  
 17 transition the state of the forward link/reverse link Reservation of the access terminal  
 18 to the Open state.
- 19 • Set the TransactionID field of the ReservationAccept or ReservationReject message to  
 20 that of the ReservationOnRequest message.

21 If the access network receives a ReservationOffRequest message, it shall

- 22 • Send a ReservationAccept or a ReservationReject message within the time period  
 23 specified by  $T_{RLPResponse}$  of reception of the ReservationOffRequest message.
- 24 • Set the TransactionID field of the ReservationAccept or ReservationReject message to  
 25 that of the ReservationOffRequest message.

#### 26 2.5.4.2.1.1.2 Close State

##### 27 2.5.4.2.1.1.2.1 Access Terminal Requirements

28 The access terminal shall not transmit PDUs from higher layer flows belonging to this  
 29 Reservation using any Link Flow other than the Link Flow associated with ReservationLabel  
 30 0xff if the higher layer flow provides an octet stream with octet-based HDLC-like framing to  
 31 the Enhanced Multi-flow Packet Application. The access terminal shall not transmit PDUs  
 32 from higher layer flows belonging to this Reservation using any Link Flow other than the  
 33 Link Flow associated with ReservationLabel 0xfe if the higher layer flow provides an IP  
 34 packet stream to the Enhanced Multi-flow Packet Application. The access terminal may  
 35 send a ReservationOnRequest message to request transition of the Reservation to the Open  
 36 state<sup>9</sup>. The access terminal may re-send a ReservationOnRequest message if it does not

---

<sup>9</sup> Note that the ReservationOnRequest message supports requests for multiple Reservations on both the forward and reverse links. This arrangement allows requests for groups of Reservations (e.g., for

1 receive a corresponding ReservationAccept or ReservationReject message within the time  
2 period specified by *T<sub>RLPResponse</sub>* of sending the ReservationOnRequest message. If the  
3 ReservationOnRequest message contains a reverse Reservation, then the Reservation shall  
4 transition to the Open state when the access terminal receives the corresponding  
5 ReservationAccept message.

6 Upon receiving a RevReservationOn message, the access terminal shall transition the  
7 Reservation to the Open state. Upon receiving an *IdleState.ConnectionOpened* indication,  
8 the access terminal shall transition the Reservations to the Open State whose  
9 corresponding ReservationKKIdleStateRev attribute is 0x02, where *KK* is the two-digit  
10 hexadecimal ReservationLabel in the range 0x00 to 0xff inclusive.

#### 11 2.5.4.2.1.1.2.2 Access Network Requirements

12 If the Reservation entered this state as a result of any condition other than the following  
13 conditions, then the access network shall send a FwdReservationOff message upon entering  
14 this state:

- 15 • the access network transmitted a ReservationAccept message in response to a  
16 ReservationOffRequest message requesting to transition the Reservation to the Close  
17 state, or
- 18 • ReservationKKIdleStateFwd attribute of the Reservation is 0x01 or 0x02, and the  
19 Reservation transitioned to the Close state because the Connection was closed or lost.

20 Upon sending a ReservationAccept message for a forward Reservation in response to a  
21 ReservationOnRequest message, the access network shall transition the Reservation to the  
22 Open state.

23 Upon sending a FwdReservationOn message, the access network shall transition the  
24 Reservation to the Open state. Upon receiving an *IdleState.ConnectionOpened* indication,  
25 the access network shall transition the Reservations to the Open state whose corresponding  
26 ReservationKKIdleStateFwd attribute is 0x02, where *KK* is the two-digit hexadecimal  
27 ReservationLabel in the range 0x00 to 0xff inclusive.

28 The access network may transmit SDUs from higher layer flows belonging to this  
29 Reservation using the Link Flow to which the Reservation is bound. Upon doing so, the  
30 access network shall transition the Reservation to the Open State.

#### 31 2.5.4.2.1.1.3 Open State

##### 32 2.5.4.2.1.1.3.1 Access Terminal Requirements

33 The access terminal may transmit PDUs from higher layer flows belonging to this  
34 Reservation using the Link Flow to which the Reservation is bound.

35 The access terminal may send a ReservationOffRequest message to request the transition of  
36 a Reservation to the Close state. The access terminal may re-send a ReservationOffRequest

---

bidirectional higher layer application flows) to be combined in the same ReservationOnRequest message.

1 message if it does not receive a ReservationAccept or ReservationReject message within the  
2 time period specified by  $T_{RLPResponse}$  of sending the ReservationOffRequest message. If the  
3 ReservationOffRequest message contains a reverse Reservation, then the access terminal  
4 shall transition the Reservation to the Close state when the access terminal receives a  
5 ReservationAccept message.

6 Upon receiving a RevReservationOff message, the access terminal shall transition the  
7 Reservation to the Close state. Upon receiving a *ConnectedState.ConnectionClosed*  
8 indication, the access terminal shall transition to the Close state Reservations whose  
9 corresponding ReservationKKIdleStateRev attribute is 0x01 or 0x02 unless an access  
10 network initiated Connection is being opened at the same time<sup>10</sup>, where *KK* is the two-digit  
11 hexadecimal ReservationLabel. Upon receiving an *IdleState.ConnectionFailed* indication, the  
12 access terminal shall transition to the Close state Reservations whose corresponding  
13 ReservationKKIdleStateRev attribute is 0x01 or 0x02, where *KK* is the two-digit hexadecimal  
14 ReservationLabel.

#### 15 2.5.4.2.1.1.3.2 Access Network Requirements

16 The access network may transmit PDUs from higher layer flows belonging to this  
17 Reservation using the Link Flow to which the Reservation is bound.

- 18 • Upon sending a ReservationAccept message for a forward Reservation in response to a  
19 ReservationOffRequest message, the access network shall transition the Reservation to  
20 the Close state.

21 Upon receiving a *ConnectedState.ConnectionClosed* indication, the access network shall  
22 transition to the Close state Reservations whose corresponding ReservationKKIdleStateFwd  
23 attribute is 0x01 or 0x02 unless an access network initiated Connection is being opened at  
24 the same time<sup>10</sup>, where *KK* is the two-digit hexadecimal ReservationLabel. Upon receiving a  
25 *RouteUpdate.ConnectionLost* or *IdleState.ConnectionFailed* indication, the access network  
26 shall transition to the Close state Reservations whose corresponding  
27 ReservationKKIdleStateFwd attribute is 0x01 or 0x02, where *KK* is the two-digit  
28 hexadecimal ReservationLabel.

29 If, for any *KK*, all of the following conditions are true, the access network shall take action  
30 within  $T_{Turnaround}$ , where  $T_{Turnaround}$  is equal to 2 seconds, such that at least one of the  
31 following conditions would no longer be true (e.g., by modifying the value of  
32 ReservationKKQoSResponseFwd or by transitioning forward Reservation *KK* to the Close  
33 state):

- 34 • ReservationKKQoSRequestFwd is set to a non-default value.
- 35 • Forward Reservation *KK* is in the Open state.

---

<sup>10</sup> An access network can send ConnectionClose message of Connected State Protocol and TrafficChannelAssignment message of Route Update Protocol in the same security layer packet.



- ReservationKKQoSResponseFwd is set to the default value or the QoS\_ATTRIBUTE\_SET\_ID field in ReservationKKQoSResponseFwd is not equal to the value of any QoS\_ATTRIBUTE\_SET\_ID field in the corresponding ReservationKKQoSRequestFwd attribute (see [1]).

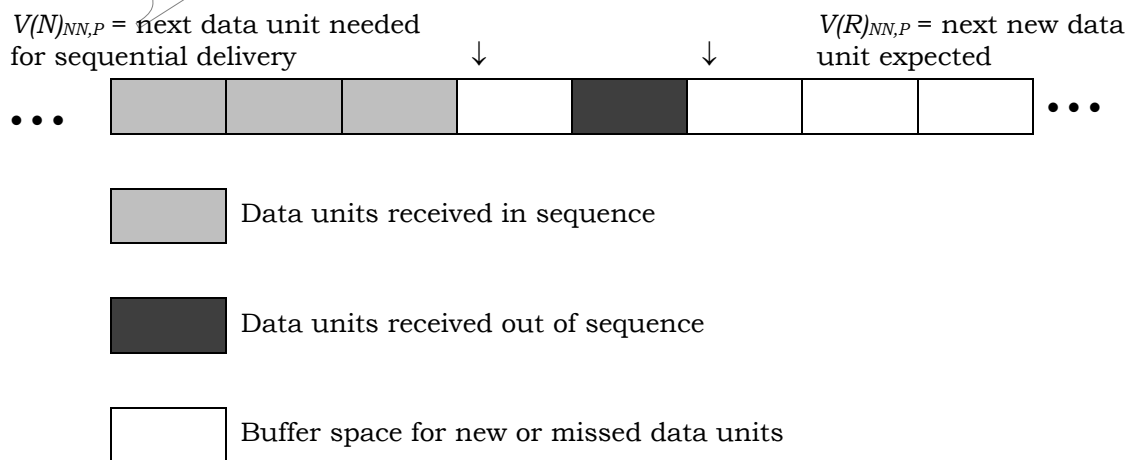
If, for any *KK*, all of the following conditions are true, the access network shall take action within  $T_{Turnaround}$ , where  $T_{Turnaround}$  is equal to 2 seconds, such that at least one of the following conditions would no longer be true (e.g., by modifying the value of ReservationKKQoSResponseRev or by transitioning reverse Reservation *KK* to the Close state):

- ReservationKKQoSRequestRev is set to a non-default value.
- Reverse Reservation *KK* is in the Open state.
- ReservationKKQoSResponseRev is set to the default value or the QoS\_ATTRIBUTE\_SET\_ID field in ReservationKKQoSResponseRev is not equal to the value of any QoS\_ATTRIBUTE\_SET\_ID field in the corresponding ReservationKKQoSRequestRev attribute (see [1]).

2.5.4.2.2 RLP Receive Procedures

The RLP receiver shall maintain two SequenceLength-bit variables for receiving,  $V(R)_{NN,P}$  and  $V(N)_{NN,P}$  (see Figure 2.5.4.2.2-1), where *NN* is the two-digit hexadecimal Link Flow number in the range 0x00 to *M*-1 inclusive, and *P* is the Route indicator that takes values of either A or B. *M* is the MaxNumLinkFlowsFwd or MaxNumLinkFlowsRev for a forward Link Flow or reverse Link Flow, respectively.  $V(R)_{NN,P}$  contains the sequence number of the next data unit expected to arrive.  $V(N)_{NN,P}$  contains the sequence number of the first missing data unit, as described below.

In addition, the RLP receiver shall keep track of the status of each data unit in its resequencing buffer indicating whether the data unit was received or not. Use of this status is implied in the following procedures. The RLP receiver informs the RLP transmitter of the status of data units in its receive buffer by sending a Nak message. The Nak message shall not convey status of data units with sequence number less than  $V(N)_{NN,P}$ .



**Figure 2.5.4.2.2-1. RLP Receive Sequence Number Variables**

1 In the following,  $X$  denotes the sequence number of a received data unit. For each received  
2 data unit, RLP shall perform the following procedures:

- 3 • If  $X < V(N)_{NN,P}$ , the data unit shall be discarded as a duplicate.
- 4 • If  $V(N)_{NN,P} \leq X < V(R)_{NN,P}$ , and the data unit is not already stored in the resequencing  
5 buffer nor has been passed up to the Route Protocol, then:
  - 6 – RLP shall store the received data unit in the resequencing buffer.
  - 7 – If  $X = V(N)_{NN,P}$ , and if the Link Flow is carrying an octet stream, then RLP shall  
8 pass all contiguous octets in the resequencing buffer, from  $V(N)_{NN,P}$  upward, to  
9 the Route Protocol. RLP shall then set  $V(N)_{NN,P}$  to (LAST+1) where LAST is the  
10 sequence number of the last contiguous octet (i.e., the octet with the highest  
11 sequence number) received by the resequencing buffer.
  - 12 – If  $X = V(N)_{NN,P}$ , and if the Link Flow is carrying a packet stream, and if in-order  
13 delivery of Route Protocol packets is required, then RLP shall pass all  
14 contiguous complete Route Protocol packets in the resequencing buffer, that  
15 have not been passed to the Route Protocol, from the beginning of the  
16 resequencing buffer upward, to the Route Protocol. RLP shall then set  $V(N)_{NN,P}$   
17 to (LAST+1) where LAST is the sequence number of the last contiguous data  
18 unit received by the resequencing buffer.
  - 19 – If the Link Flow is carrying a packet stream, and if in-order delivery of Route  
20 Protocol packets is not required, then RLP shall pass all complete Route  
21 Protocol packets in the resequencing buffer, that have not been passed to the  
22 Route Protocol, from the beginning of the resequencing buffer upward, to the  
23 Route Protocol. RLP shall then set  $V(N)_{NN,P}$  to (LAST+1) where LAST is the  
24 sequence number of the last contiguous data unit received by the resequencing  
25 buffer.
- 26 • If  $V(N)_{NN,P} < X < V(R)_{NN,P}$ , and the data unit is already stored in the resequencing buffer or  
27 has already been passed up to the Route Protocol, then the data unit shall be discarded  
28 as a duplicate.
- 29 • If  $X = V(R)_{NN,P}$ , then:
  - 30 – If  $V(R)_{NN,P} = V(N)_{NN,P}$  and if the Link Flow is carrying an octet stream, then RLP  
31 shall increment  $V(N)_{NN,P}$  and  $V(R)_{NN,P}$  and shall pass the data unit to the Route  
32 Protocol.
  - 33 – If  $V(R)_{NN,P} > V(N)_{NN,P}$ , and if the Link Flow is carrying a packet stream, then RLP  
34 shall increment  $V(N)_{NN,P}$  and  $V(R)_{NN,P}$ , shall store the data unit in the  
35 resequencing buffer, and shall pass all complete Route Protocol packets in the  
36 resequencing buffer, that have not been passed to the Route Protocol, from the  
37 beginning of the resequencing buffer upward, to the Route Protocol.

- 1           – If  $V(R)_{NN,P} \neq V(N)_{NN,P}$ , RLP shall increment  $V(R)_{NN,P}$  and shall store the data unit  
2           in the resequencing buffer. If the Link Flow is carrying a packet stream, and if  
3           in-order delivery of Route Protocol packets is not required, then RLP shall pass  
4           all complete Route Protocol packets in the resequencing buffer, that have not  
5           been passed to the Route Protocol, from the beginning of the resequencing  
6           buffer upward, to the Route Protocol.
- 7           • If  $X > V(R)_{NN,P}$ , then:
- 8           – RLP shall store the data unit in the resequencing buffer.
- 9           – If the Link Flow is carrying a packet stream, and if in-order delivery of Route  
10           Protocol packets is not required, then RLP shall pass all complete Route  
11           Protocol packets in the resequencing buffer, that have not been passed to the  
12           Route Protocol, from the beginning of the resequencing buffer upward, to the  
13           Route Protocol.
- 14           – If the RLP receiver is an access network, then RLP shall set an RLP abort timer  
15           to AbortTimer, where AbortTimer is a parameter of the FlowNMTimersRev  
16           attribute, for each missing RLP data unit from  $V(R)_{NN,P}$  to  $X-1$ , inclusive. If the  
17           RLP receiver is an access terminal, then RLP shall set an RLP abort timer to  
18           AbortTimer, where AbortTimer is a parameter of the FlowNMTimersFwd  
19           attribute, for each missing RLP data unit from  $V(R)_{NN,P}$  to  $X-1$ , inclusive.
- 20           – If the RLP receiver is an access terminal, and if the FlowNMNakEnableFwd  
21           attribute is set to 0x01, then RLP shall set a Nak delay timer to  
22           FlowNMNakDelayTimeFwd for each missing RLP data unit from  $V(R)_{NN,P}$  to  $X-1$ ,  
23           inclusive.
- 24           – If the RLP receiver is an access network, and if the FlowNMNakEnableRev  
25           attribute is set to 0x01, then RLP shall send a Nak message.
- 26           – RLP shall set  $V(R)_{NN,P}$  to  $X+1$ .
- 27           – If a missing data unit has not been received when its Nak delay timer expires,  
28           then the access terminal shall send a Nak message reporting this missing data  
29           unit.

30           For each missing data unit from  $V(N)_{NN,P}$  upward up to  $V(R)_{NN,P}-1$ , inclusive, RLP shall  
31           perform the following in the order specified, if the RLP abort timer of the missing data unit  
32           has expired:

- 33           • If the Link Flow is carrying an octet stream, RLP shall pass all octets in the  
34           resequencing buffer up to the next missing octet, in order of sequence number, to the  
35           Route Protocol. RLP shall skip any missing octets.
- 36           • If the Link Flow is carrying a packet stream, and if in-order delivery of Route Protocol  
37           packets is required, then RLP shall pass all complete Route Protocol packets, that have  
38           not been passed to the Route Protocol, from the beginning of the resequencing buffer  
39           upward up to the next missing data unit, to the Route Protocol. RLP may pass to the  
40           Route Protocol partially received packets with an indication of partial packet delivery.

- RLP shall set  $V(N)_{NN,P}$  to the sequence number of the next missing data unit, or to  $V(R)_{NN,P}$  if there are no remaining missing data units.

Further recovery is the responsibility of higher layer protocols.

#### 2.5.4.3 RLP Packet Header

The RLP packet header, which precedes the RLP payload, has the following format:

Field	Length (bits)
LinkFlowNumber	5
Route	1
SEQ	6, 14, or 22
FirstDataUnit	1
LastDataUnit	1

**LinkFlowNumber** The identifier for this Link Flow.

**Route** If this RLP packet is sent on Route A, then the sender shall set this field to '0'. Otherwise, the sender shall set this field to '1'.

**SEQ** The RLP sequence number of the first data unit in the RLP payload<sup>11</sup>. If this RLP packet is being sent on the forward link, the length of this field is indicated by the  $Flow_{NN}SequenceLengthFwd$  attribute corresponding to this flow. If this RLP packet is being sent on the reverse link, the length of this field is indicated by the  $Flow_{NN}SequenceLengthRev$  attribute corresponding to this flow.

**FirstDataUnit** If the Link Flow is carrying an octet stream, then the sender shall set this field to '0'. Otherwise, the sender shall set this field as follows:

If the payload of this RLP packet is the first segment of a Route Protocol packet, then the sender shall set this field to '1'. Otherwise, the sender shall set this field to '0'.

**LastDataUnit** If the Link Flow is carrying an octet stream, then the sender shall set this field to '0'. Otherwise, the sender shall set this field as follows:

If the payload of this RLP packet is the last segment of a Route Protocol packet, then the sender shall set this field to '1'. Otherwise, the sender shall set this field to '0'.

<sup>11</sup> When data unit is set to RLP payload, the RLP packet contains one data unit.

## 1 2.5.4.4 Message Formats

2 The messages described in this section control the function of the RLP. These messages are  
3 exchanged between the access terminal and the access network using the SNP.

## 4 2.5.4.4.1 ResetTxIndication

5 The RLP transmitter in the access terminal or the access network sends the  
6 ResetTxIndication message to reset its peer RLP receiver.

7

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

8 MessageID The sender shall set this field to 0x00.

9 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. The  
10 sender shall set this field to '11111' to reset all Link Flows.

11 Route If Route A is reset, then the sender shall set this field to '0'. If Route B  
12 is reset, then the sender shall set this field to '1'.

13 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
14 field.

15

<b>Channels</b>	FTC	RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast		<b>Priority</b>	50

## 16 2.5.4.4.2 ResetRxIndication

17 The RLP receiver in the access terminal or the access network sends the ResetRxIndication  
18 message to reset its peer RLP transmitter.

19

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

20 MessageID The sender shall set this field to 0x01.

- 1 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. The  
2 sender shall set this field to '11111' to reset all Link Flows.
- 3 Route If Route A is reset, then the sender shall set this field to '0'. If Route B  
4 is reset, then the sender shall set this field to '1'.
- 5 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
6 field.

<b>Channels</b>	FTC RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

#### 8 2.5.4.4.3 ResetTxIndicationAck

9 The RLP receiver in the access terminal or the access network sends the  
10 ResetTxIndicationAck message in response to a ResetTxIndication message.

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

- 13 MessageID The sender shall set this field to 0x0d.
- 14 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. If this  
15 message is being sent in response to a ResetTxIndication message  
16 that required reset of all Link Flows, then the sender shall set this  
17 field to '11111'.
- 18 Route If Route A is reset, then the sender shall set this field to '0'. If Route B  
19 is reset, then the sender shall set this field to '1'.
- 20 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
21 field.

<b>Channels</b>	FTC RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

#### 23 2.5.4.4.4 ResetTxComplete

24 The RLP transmitter in the access terminal or the access network sends the  
25 ResetTxComplete message to complete the RLP reset procedure.

1

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

2

3 MessageID The sender shall set this field to 0x0e.

4 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. If all Link  
5 Flows were reset, then the sender shall set this field to '11111'.

6 Route If Route A is reset, then the sender shall set this field to '0'. If Route B  
7 is reset, then the sender shall set this field to '1'.

8 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
9 field.

10

<b>Channels</b>	FTC RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

11 2.5.4.4.5 ResetRxComplete

12 The RLP transmitter in the access terminal or the access network sends the  
13 ResetRxComplete message to complete the RLP reset procedure.

14

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

15

16 MessageID The sender shall set this field to 0x0f.

17 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. If all Link  
18 Flows were reset, then the sender shall set this field to '11111'.

19 Route If Route A is reset, then the sender shall set this field to '0'. If Route B  
20 is reset, then the sender shall set this field to '1'.

21 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
22 field.

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

## 2.5.4.4.6 Nak

The access terminal and the access network send the Nak message to request the retransmission of one or more RLP data units.

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved1	2
SequenceLength	8
ReportCount	8

ReportCount occurrences of the following two fields:

FirstErasedDataUnit	SequenceLength
WindowLen	SequenceLength

VR	SequenceLength
----	----------------

Reserved2	0 – 7 (as needed)
-----------	-------------------

- 6 MessageID            The sender shall set this field to 0x02.
- 7 LinkFlowNumber    The sender shall set this field to the Link Flow for which this Nak is  
8 being sent.
- 9 Route                If this Nak is being sent for Route A, then the sender shall set this  
10 field to '0'. Otherwise, the sender shall set this field to '1'.
- 11 Reserved1            The sender shall set this field to '00'. The receiver shall ignore this  
12 field.
- 13 SequenceLength     The sender shall set this field to the length of the sequence number  
14 as indicated by the FlowNNSequenceLengthFwd or  
15 FlowNNSequenceLengthRev attribute for forward or reverse Link Flow  
16 NN, respectively.



1 ReportCount The sender shall set this field to the number of Report records  
 2 included in this message. The sender shall include ReportCount  
 3 occurrences of the following two fields with the message.

4 Sequences of erased data units shall be listed in the ascending order of RLP sequence  
 5 number associated with FirstErasedDataUnit.

6 FirstErasedDataUnit The sender shall set this field to the sequence number of the first RLP  
 7 data unit erased in a sequence of erased data units.

8 WindowLen The sender shall set this field to the length of the erased window in  
 9 units of data units.

10 VR The sender shall set this field to  $V(R)_{NN,P}$ .

11 Reserved2 The sender shall add reserved bits to make the length of the entire  
 12 message an integer number of octets. The sender shall set these bits  
 13 to '0'. The receiver shall ignore this field.  
 14

<b>Channels</b>	FTC RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	50

15 2.5.4.4.7 ReservationOnRequest

16 The access terminal sends this message to request transition of one or more Reservations to  
 17 the Open State.  
 18

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following two fields:

Link	1
ReservationLabel	8

EmergencyIndication	0 or 1
ReservationQueuingReq	0 or 1

Reserved	0 – 7 (as needed)
----------	-------------------

19 MessageID The access terminal shall set this field to 0x16.

1	TransactionID	The access terminal shall set this field to one more (modulo 256) than
2		the TransactionID field of the last ReservationOnRequest or
3		ReservationOffRequest message sent by the access terminal. If this is
4		the first ReservationOnRequest or ReservationOffRequest message
5		sent by the access terminal, then the access terminal shall set this
6		field to zero.
7	ReservationCount	The access terminal shall set this field to the number of the following
8		two fields in this message.
9	Link	If this request is for a forward Reservation, then the access terminal
10		shall set this field to '1'. If this request is for a reverse Reservation,
11		then the access terminal shall set this field to '0'.
12	ReservationLabel	The access terminal shall set this field to the ReservationLabel for
13		which this request is generated.
14	EmergencyIndication	
15		The access terminal shall include this field if any of the non-reserved fields that follow this
16		field are included in the message.
17		If included, the access terminal shall set this field as follows:
18		If this is an emergency ReservationOnRequest, then the access
19		terminal shall set this field to '1'. Otherwise, the access terminal shall
20		set this field to '0'.
21	ReservationQueuingReq	
22		The access terminal shall include this field if any of the non-reserved
23		fields that follow this field are included in the message or if the access
24		terminal wants to request queuing. If this field is included, the access
25		terminal shall set this field as follows: If the access terminal requests
26		that the queuing treatment be enabled in the access network for this
27		ReservationOnRequest message, then the access terminal shall set
28		this field to '1'. Otherwise, the access terminal shall set this field to
29		'0'.
30	Reserved	The access terminal shall add reserved bits to make the length of the
31		entire message an integer number of octets. The access terminal shall
32		set these bits to zero. The access network shall ignore this field.
33		

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

1 2.5.4.4.8 ReservationOffRequest

2 The access terminal sends this message to request transition of one or more Reservations to  
3 the Close State.

4

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8
ReservationCount occurrences of the following two fields:	
Link	1
ReservationLabel	8
Reserved	0 – 7 (as needed)

5 **MessageID** The access terminal shall set this field to 0x17.

6 **TransactionID** The access terminal shall set this field to one more (modulo 256) than  
7 the TransactionID field of the last ReservationOnRequest or  
8 ReservationOffRequest message sent by the access terminal. If this is  
9 the first ReservationOnRequest or ReservationOffRequest message  
10 sent by the access terminal, then the access terminal shall set this  
11 field to zero.

12 **ReservationCount** The access terminal shall set this field to the number of the following  
13 two fields in this message.

14 **Link** If this request is for a forward Reservation, then the access terminal  
15 shall set this field to '1'. If this request is for a reverse Reservation,  
16 then the access terminal shall set this field to '0'.

17 **ReservationLabel** The access terminal shall set this field to the Reservation for which  
18 this request is generated.

19 **Reserved** The access terminal shall add reserved bits to make the length of the  
20 entire message an integer number of octets. The access terminal shall  
21 set these bits to zero. The access network shall ignore this field.  
22

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

## 1 2.5.4.4.9 ReservationAccept

2 The access network sends this message to acknowledge reception of and allow the state  
3 transition requested by a ReservationOnRequest or ReservationOffRequest message. The  
4 access terminal sends this message to acknowledge reception of and accept the state  
5 transition requested by a RevReservationOn or RevReservationOff message.  
6

Field	Length (bits)
MessageID	8
TransactionID	8

7 MessageID The sender shall set this field to 0x18.

8 TransactionID The access network shall set this field to the TransactionID field of  
9 the ReservationOnRequest or ReservationOffRequest message to  
10 which the access network is responding. The access terminal shall set  
11 this field to the TransactionID field of the RevReservationOn or  
12 RevReservationOff message to which the access terminal is  
13 responding.  
14

<b>Channels</b>	CC	FTC	RTC	AC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast				<b>Priority</b>	40

## 15 2.5.4.4.10 ReservationReject

16 The access network sends this message to acknowledge reception of and deny the state  
17 transition requested by a ReservationOnRequest or ReservationOffRequest message.  
18

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following two fields:

AllowableLink	1
AllowableReservationLabel	8

ReservationCount occurrences of the following two fields:

RejectCode	0 or 4
PendingDuration	0 or 5

Reserved	0 – 7 (as needed)
----------	-------------------

- 1 MessageID The access network shall set this field to 0x19.
- 2 TransactionID The access network shall set this field to the TransactionID field of  
3 the ReservationOnRequest or ReservationOffRequest message to  
4 which the access network is responding.
- 5 ReservationCount The access network shall set this field to the number of the following  
6 two fields in this message.
- 7 AllowableLink If the Reservation for which the access network would have allowed  
8 the state transition requested in the ReservationOnRequest or  
9 ReservationOffRequest message is a forward Reservation, then the  
10 access network shall set this field to '1'. If the Reservation for which  
11 the access network would have allowed the state transition requested  
12 in the ReservationOnRequest or ReservationOffRequest message is a  
13 reverse Reservation, then the access network shall set this field to '0'.
- 14 AllowableReservationLabel  
15 The access network shall set this field to the ReservationLabel for  
16 which the access network would have allowed the state transition  
17 requested in the ReservationOnRequest or ReservationOffRequest  
18 message.
- 19 RejectCode If included, the access network shall set this field as follows:  
20 The access network shall set the RejectCode to indicate the Reject  
21 Code.

22

Field value	Description
0x0	General
0x1	ReservationPending
All other values are reserved	

1 PendingDuration The access network shall include this field if RejectCode is included  
 2 and is set to ReservationPending. If this field is included, the access  
 3 network shall set this field to the pending duration in units of  
 4 seconds for this reservation.

5 Reserved The access network shall add reserved bits to make the length of the  
 6 entire message an integer number of octets. The access network shall  
 7 set these bits to zero. The access terminal shall ignore this field.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

9 2.5.4.4.11 RevReservationOn

10 The access network sends this message to transition a reverse Reservation to the Open  
 11 state.

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8
ReservationCount occurrences of the following field:	
ReservationLabel	8

13 MessageID The access network shall set this field to 0x1a.

14 TransactionID The access network shall set this field to one more (modulo 256) than  
 15 the TransactionID field of the last RevReservationOn or  
 16 RevReservationOff message sent by the access network. If this is the  
 17 first RevReservationOn or RevReservationOff message sent by the  
 18 access network, then the access network shall set this field to zero.

19 ReservationCount The access network shall set this field to the number of  
 20 ReservationLabel fields in this message.

21 ReservationLabel The access network shall set this field to the Reservation which is to  
 22 be transitioned to the Open state.

23

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

1 2.5.4.4.12 RevReservationOff

2 The access network sends this message to transition a reverse Reservation to the Close  
3 state.

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8
ReservationCount occurrences of the following field:	
ReservationLabel	8

5 MessageID The access network shall set this field to 0x1b.

6 TransactionID The access network shall set this field to one more (modulo 256) than  
7 the TransactionID field of the last RevReservationOn or  
8 RevReservationOff message sent by the access network. If this is the  
9 first RevReservationOn or RevReservationOff message sent by the  
10 access network, then the access network shall set this field to zero.

11 ReservationCount The access network shall set this field to the number of  
12 ReservationLabel fields in this message.

13 ReservationLabel The access network shall set this field to the Reservation that is to be  
14 transitioned to the Close state.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

16 2.5.4.4.13 FwdReservationOff

17 The access network sends this message to inform the access terminal when a forward  
18 Reservation transitions to the Close state.

19

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following field:

ReservationLabel	8
------------------	---

- 1 MessageID The access network shall set this field to 0x22.
- 2 TransactionID The access network shall set this field to one more (modulo 256) than  
3 the TransactionID field of the last FwdReservationOn or  
4 FwdReservationOff message sent by the access network. If this is the  
5 first FwdReservationOn or FwdReservationOff message sent by the  
6 access network, then the access network shall set this field to zero.
- 7 ReservationCount The access network shall set this field to the number of  
8 ReservationLabel fields in this message.
- 9 ReservationLabel The access network shall set this field to the Reservation transitioned  
10 to the Close state.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>		unicast	<b>Priority</b>	40

2.5.4.4.14 FwdReservationOn

The access network sends this message to inform the access terminal when a forward Reservation transitions to the Open state.

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following field:

ReservationLabel	8
------------------	---

- 16 MessageID The access network shall set this field to 0x23.
- 17 TransactionID The access network shall set this field to one more (modulo 256) than  
18 the TransactionID field of the last FwdReservationOn or  
19 FwdReservationOff message sent by the access network. If this is the  
20 first FwdReservationOn or FwdReservationOff message sent by the  
21 access network, then the access network shall set this field to zero.



1 ReservationCount The access network shall set this field to the number of  
 2 ReservationLabel fields in this message.

3 ReservationLabel The access network shall set this field to the Reservation that  
 4 transitioned to the Open state.  
 5

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

6 2.5.4.4.15 FwdReservationAck

7 The access terminal sends this message to acknowledge reception of the FwdReservationOn  
 8 or the FwdReservationOff message and to accept the related state transition.  
 9

Field	Length (bits)
MessageID	8
TransactionID	8

10 MessageID The access terminal shall set this field to 0x24.

11 TransactionID The access terminal shall set this field to the TransactionID field of  
 12 the FwdReservationOn or FwdReservationOff message to which the  
 13 access terminal is responding.  
 14

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

15 2.5.4.4.16 AttributeUpdateRequest

16 The sender sends an AttributeUpdateRequest message to offer an attribute value for a given  
 17 attribute.  
 18

Field	Length (bits)
MessageID	8
TransactionID	8

One or more instances of the following record

AttributeRecord	Attribute dependent
-----------------	---------------------

19 MessageID The sender shall set this field to 0x52.

20 TransactionID The sender shall increment this value for each new  
 21 AttributeUpdateRequest message sent.

22 AttributeRecord The format of this record is specified in [8].

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

#### 2.5.4.4.17 AttributeUpdateAccept

The sender sends an AttributeUpdateAccept message in response to an AttributeUpdateRequest message to accept the offered attribute values.

Field	Length (bits)
MessageID	8
TransactionID	8

MessageID            The sender shall set this field to 0x53.

TransactionID        The sender shall set this value to the TransactionID field of the corresponding AttributeUpdateRequest message.

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

#### 2.5.4.4.18 AttributeUpdateReject

The access network sends an AttributeUpdateReject message in response to an AttributeUpdateRequest message to reject the offered attribute values.

Field	Length (bits)
MessageID	8
TransactionID	8

MessageID            The access network shall set this field to 0x54.

TransactionID        The sender shall set this value to the TransactionID field of the corresponding AttributeUpdateRequest message.

<b>Channels</b>	FTC
-----------------	-----

<b>SLP</b>	Reliable
------------	----------

<b>Addressing</b>	unicast
-------------------	---------

<b>Priority</b>	40
-----------------	----

1 2.5.4.5 Interface to Other Protocols

2 2.5.4.5.1 Commands

3 This protocol does not issue any commands.

4 2.5.4.5.2 Indications

5 This protocol registers to receive the following indications:

- 6 • *IdleState.ConnectionOpened*
- 7 • *IdleState.ConnectionFailed*
- 8 • *PhysicalLayer.ReverseTrafficPacketsMissed* along with parameters indicating the Link  
9 Flow number and missing data units.
- 10 • *ConnectedState.ConnectionClosed*
- 11 • *RouteUpdate.ConnectionLost*

12 2.5.4.6 RLP Packet Priorities

13 The sender shall assign priority between 60 and 70 inclusive to RLP packets. For a given  
14 Link Flow, the sender shall assign higher priority (lower number) to packets containing  
15 retransmitted application traffic than packets containing only first time transmissions. If  
16 *FlowNMTransmitAbortTimerRev* is not set to 0x00, then the access terminal should transmit  
17 a higher layer data unit within *FlowNMTransmitAbortTimerRev* time of the higher layer data  
18 unit being received by the Enhanced Multi-flow Packet Application. The access terminal  
19 may use the *FlowNMTransmitAbortTimerRev* attribute to determine the priority of reverse  
20 RLP packets.

21

<b>Type of RLP Packet</b>	<b>Channel</b>	<b>Addressing</b>	<b>Priority</b>
Packet containing only First Time Transmissions	FTC, RTC	unicast	Between 60 and 70 inclusive
Packet containing re-transmitted application traffic	FTC, RTC	unicast	Between 60 and 70 inclusive

22 2.5.5 Protocol Numeric Constants

23

<b>Constant</b>	<b>Meaning</b>	<b>Value</b>
$T_{RLPResponse}$	Time period within which the access network is to respond to ReservationOnRequest and ReservationOffRequest messages.	1 second

1

DRAFT

## 2.6 Data Over Signaling Protocol

### 2.6.1 Overview

The Data Over Signaling Protocol provides transmission and duplicate detection of higher layer packets using signaling messages. Each Link flow provides two instances of the Data Over Signaling Protocol, one associated with Route A of the Link flow, and the other associated with Route B<sup>12</sup>. A higher layer packet is carried in a DataOverSignaling message. The Data Over Signaling Protocol uses message sequence numbers in the DataOverSignaling message to provide duplicate detection. Data Over Signaling Protocol is associated with the Enhanced Multi-Flow Packet Application. The application subtype for this application is defined in [3].

### 2.6.2 Primitives and Public Data

#### 2.6.2.1 Commands

This protocol does not define any commands.

#### 2.6.2.2 Return Indications

This protocol does not return any indications.

### 2.6.3 Protocol Data Unit

The transmission unit of this protocol is a DataOverSignaling message. The DataOverSignaling message carries payload on behalf of the higher layer. This protocol uses the Signaling Application to transmit and receive messages.

### 2.6.4 Procedures and Messages for the InUse Instance of the Protocol

#### 2.6.4.1 Procedures

If FlowNMDataOverSignalingAllowedRev is set to 0x00, the access terminal shall not send a DataOverSignaling message for Link Flow *NN*. The sender shall set the MessageSequence field of a DataOverSignaling message to  $V(S_P)$  value maintained by the sender for the Route *P* on which the DataOverSignaling message was sent. Each time the sender sends a new DataOverSignaling message, it shall increment the value of  $V(S_P)$ . If the sender does not receive a DataOverSignalingAck message within an implementation specific time interval in response to a DataOverSignaling message requiring an acknowledgment, then the sender may retransmit the DataOverSignaling message containing the same higher layer packet and the same MessageSequence an implementation specific number of times.

---

<sup>12</sup> Note that the all instances of the Data Over Signaling Protocol associated with a Route share the same MessageSequence space.

1 The access terminal or the access network shall not send a DataOverSignaling message if  
2 the associated Link Flow for which the DataOverSignaling message is carrying payload is  
3 deactivated, or if the associated Reservation is in the Close state.

4 Upon receiving a DataOverSignaling message, the receiver shall perform the following:

- 5 • If Reset is set to '1' and the receiver is the access terminal, the receiver shall perform  
6 the following:
  - 7 – If Route is set to '0', the receiver shall set  $V(R_A)$  to  $(\text{MessageSequence} - 1) \bmod$   
8 64.
  - 9 – If Route is set to '1', the receiver shall set  $V(R_B)$  to  $(\text{MessageSequence} - 1) \bmod$   
10 64.
- 11 • The receiver shall validate the message using the procedure defined in the Sequence  
12 Number Validation Procedure of [8] by setting the variable  $V(R)$  defined in [8] to the  $V(R_P)$   
13 value maintained by the receiver for the Route  $P$  on which the DataOverSignaling  
14 message was received, and by setting  $S = 6$ .
- 15 • The receiver shall discard the DataOverSignaling message if it is invalid. If the  
16 DataOverSignaling message is valid, then the receiver shall pass the HigherLayerPacket  
17 field of the DataOverSignaling message to the higher layer. If the receiver is an access  
18 terminal, then the higher layer is indicated by the ProtocolID field of the  
19 FlowNNRouteProtocolParametersFwd attribute, where  $NN$  is the Link Flow with which  
20 the DataOverSignaling message is associated. If the receiver is an access network, then  
21 the higher layer is indicated by the ProtocolID field of the  
22 FlowNNRouteProtocolParametersRev attribute, where  $NN$  is the Link Flow with which  
23 the DataOverSignaling message is associated.
- 24 • If the AckRequired field of the DataOverSignaling message is '1', then the receiver shall  
25 respond with a DataOverSignalingAck message with AckSequence field set to the  
26 MessageSequence field of the DataOverSignaling message.

#### 27 2.6.4.2 Message Formats

28 The messages described in this section are exchanged between the access terminal and the  
29 access network using the Signaling Application.

##### 30 2.6.4.2.1 DataOverSignaling

31 The access network or the access terminal sends the DataOverSignaling message to  
32 transmit a higher layer packet.  
33

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
AckRequired	1
Reset	1
Reserved	2
MessageSequence	6
HigherLayerPacket	Variable Length

- 1 MessageID            The sender shall set this field to 0x14.
- 2 LinkFlowNumber    The sender shall set this field to the Link Flow with which this  
3 DataOverSignaling message is associated.
- 4 Route                If this DataOverSignaling message is associated with Route A, then  
5 the sender shall set this field to '0'. If this DataOverSignaling message  
6 is associated with Route B, then the sender shall set this field to '1'.
- 7 AckRequired        The sender shall set this field to '1' if the receiver is required to  
8 acknowledge the receipt of this message. Otherwise, the sender shall  
9 set this field to '0'.
- 10 Reset                The access terminal shall set this field to '0'. The access network may  
11 set this field to '1' to indicate that the access terminal is to reset its  
12 V(R) for the indicated route. The access network may set this field to  
13 '0' to indicate that the access terminal is not required to reset its  
14 V(R).
- 15 Reserved            The sender shall set this field to '00'. The receiver shall ignore this  
16 field.
- 17 MessageSequence    The sender shall set this field to the V(S<sub>P</sub>) value maintained by the  
18 sender for the Route P on which the DataOverSignaling message was  
19 sent.
- 20 HigherLayerPacket    The sender shall set this field to an entire higher layer packet<sup>13</sup>. The  
21 length of the higher layer packet shall be an integer number of octets.  
22

<b>Channels</b>	CC	AC	FTC
-----------------	----	----	-----

<b>SLP</b>	Best Effort
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<sup>13</sup> For example, if the higher layer packet is an HDLC frame, then the entire HDLC frame is included.

<b>Addressing</b>	unicast	<b>Priority</b>	20 to 50 (inclusive)
-------------------	---------	-----------------	----------------------

1 The sender shall assign message priority in the range 20 to 50, inclusive, depending on the  
2 priority of the higher layer packet carried as payload in this message.

### 3 2.6.4.2.2 DataOverSignalingAck

4 The access network or the access terminal sends a DataOverSignalingAck message to  
5 acknowledge receipt of a DataOverSignaling message.  
6

Field	Length (bits)
MessageID	8
Route	1
AckSequence	6
Reserved	1

7 **MessageID** The sender shall set this field to 0x15.

8 **Route** If this message is acknowledging a DataOverSignaling received on  
9 Route A, then the sender shall set this field to '0'. Otherwise the  
10 sender shall set this field to '1'.

11 **AckSequence** The sender shall set this field to the MessageSequence field of the  
12 DataOverSignaling message whose receipt is being acknowledged.

13 **Reserved** The sender shall set this field to '0'. The receiver shall ignore this  
14 field.  
15

<b>Channels</b>	CC	AC	FTC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast				<b>Priority</b>	40

### 16 2.6.4.3 Interface to Other Protocols

#### 17 2.6.4.3.1 Commands

18 This protocol does not issue any commands.

#### 19 2.6.4.3.2 Indications

20 This protocol does not register to receive any indications.  
21



## 2.7 Location Update Protocol

### 2.7.1 Overview

The Location Update Protocol defines location update procedures and messages for mobility management for the Enhanced Multi-Flow Packet Application.

The Location Update Protocol is a protocol associated with the Enhanced Multi-Flow Packet Application. The application subtype for this application is defined in [3].

### 2.7.2 Primitives and Public Data

#### 2.7.2.1 Commands

This protocol does not define any commands.

#### 2.7.2.2 Return Indications

This protocol does not return any indications.

### 2.7.3 Protocol Data Unit

The transmission unit of this protocol is a message. This is a control protocol; and, therefore, it does not carry payload on behalf of other layers or protocols.

### 2.7.4 Procedures and Messages for the InUse Instance of the Protocol

#### 2.7.4.1 Procedures

##### 2.7.4.1.1 Access Network Requirements

If the protocol receives an *AddressManagement.SubnetChanged* indication, the access network:

- May send a *LocationRequest* message to query the Location information.
- May send a *LocationAssignment* message to update the Location information.
- May send a *StorageBLOBRequest* message to query the stored BLOB.
- May send a *StorageBLOBAssignment* message to update the stored BLOB.

##### 2.7.4.1.2 Access Terminal Requirements

If the access terminal receives a *LocationRequest* message, it shall send a *LocationNotification* message. If the access terminal has a stored value for the *LocationValue* parameter, the access terminal shall set the *LocationType*, *LocationLength*, and *LocationValue* fields in this message to its stored values of these fields. If the access terminal does not have a stored value for the *LocationValue* parameter, the access terminal shall omit the *LocationLength* and *LocationValue* fields in this message.

If the access terminal receives a *LocationAssignment* message, it shall send a *LocationComplete* message and the access terminal shall store the value of the

1 LocationType, LocationLength, and LocationValue fields of the LocationAssignment message  
2 in LocationType, LocationLength, and LocationValue variables, respectively.

3 If the access terminal receives a StorageBLOBRequest message, it shall send a  
4 StorageBLOBNotification message. If the access terminal has a stored value for the  
5 StorageBLOB parameter, the access terminal shall set the StorageBLOBLength and  
6 StorageBLOB fields in this message to its stored values of these fields. If the access  
7 terminal does not have a stored value for the StorageBLOB parameter, the access terminal  
8 shall set the StorageBLOBLength field to zero and shall omit the StorageBLOB fields in this  
9 message.

10 If the access terminal receives a StorageBLOBAssignment message, it shall send a  
11 StorageBLOBComplete message and the access terminal shall store the value of the  
12 StorageBLOBLength and StorageBLOB fields of the StorageBLOBAssignment message in  
13 StorageBLOBLength and StorageBLOB variables, respectively.

#### 14 2.7.4.2 Message Formats

##### 15 2.7.4.2.1 LocationRequest

16 The access network uses this message to query the access terminal of its Location  
17 information.  
18

Field	Length (bits)
MessageID	8

19 MessageID The access network shall set this field to 0x03.  
20

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>		unicast	<b>Priority</b>	40

##### 21 2.7.4.2.2 LocationNotification

22 The access terminal sends the LocationNotification message either in response to the  
23 LocationRequest message or in an unsolicited manner as specified in [11] or [13] if the  
24 configured value of the RANHandoff attribute is 0x01.  
25

Field	Length (bits)
MessageID	8
LocationType	8
LocationLength	0 or 8
LocationValue	0 or 8 × LocationLength

26 MessageID The access terminal shall set this field to 0x04.

- 1 LocationType            The access terminal shall set this field to zero if the value of its stored  
2 LocationValue is NULL; otherwise, the access terminal shall set this  
3 field to the stored value of LocationType.
  
- 4 LocationLength        The access terminal shall not include this field if the value of its  
5 stored LocationValue is NULL; otherwise, the access terminal shall  
6 set this field to the stored value of LocationLength.
  
- 7 LocationValue        The access terminal shall not include this field if the value of its  
8 stored LocationValue is NULL; otherwise, the access terminal shall  
9 set this field to the stored value of LocationValue.

10

<b>Channels</b>	AC            RTC	<b>SLP</b>	Reliable <sup>14</sup> Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	40

11 2.7.4.2.3 LocationAssignment

12 The access network uses this message to update the Location information of the access  
13 terminal.

Field	Length (bits)
MessageID	8
TransactionID	8
LocationType	8
LocationLength	8
LocationValue	8 × LocationLength

- 14 MessageID            The access network shall set this field to 0x05.
  
- 15 TransactionID        The access network shall increment this value for each new  
16 LocationAssignment message sent.
  
- 17 LocationType        The access network shall set this field to the type of the location as  
18 specified in Table 2.7.4.2-1.

---

<sup>14</sup> This message is sent reliably when it is sent over the Reverse Traffic Channel.

**Table 2.7.4.2-1. LocationType Encoding**

<b>LocationType</b>	<b>LocationLength</b>	<b>Meaning</b>
0x00	N/A	No location is stored
0x01	0x05	Location compatible with [2] (see Table 2.7.4.2-2)
All other values	N/A	Reserved

**LocationLength** The access network shall set this field to the length of the LocationValue field in octets as specified in Table 2.7.4.2-1.

**LocationValue** The access network shall set this field to the Location of type specified by LocationType. If LocationType is set to 0x01, the access network shall set this field as shown in Table 2.7.4.2-2, where SID, NID, and PACKET\_ZONE\_ID correspond to the current access network.

**Table 2.7.4.2-2. Subfields of LocationValue when LocationType = 0x01**

<b>Sub-fields of LocationValue</b>	<b># of bits</b>
SID	15
Reserved	1
NID	16
PACKET_ZONE_ID	8

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>		unicast	<b>Priority</b>	40

**2.7.4.2.4 LocationComplete**

The access terminal sends this message in response to the LocationAssignment message.

<b>Field</b>	<b>Length (bits)</b>
MessageID	8
TransactionID	8

**MessageID** The access terminal shall set this field to 0x06.

**TransactionID** The access terminal shall set this field the TransactionID field of the corresponding LocationAssignment message.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.7.4.2.5 StorageBLOBRequest

The access network uses this message to query the access terminal of its StorageBLOB information.

Field	Length (bits)
MessageID	8

MessageID The access network shall set this field to 0x10.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.7.4.2.6 StorageBLOBNotification

The access terminal sends the StorageBLOBNotification message in response to the StorageBLOBRequest message.

Field	Length (bits)
MessageID	8
StorageBLOBType	16
StorageBLOBLength	8
StorageBLOB	0 or 8 × StorageBLOBLength

MessageID The access terminal shall set this field to 0x11.

StorageBLOBType The access terminal shall set this field to zero if the value of its stored StorageBLOB is NULL; otherwise, the access terminal shall set this field to the stored value of StorageBLOBType.

StorageBLOBLength

The access terminal shall set this field to zero if the value of its stored StorageBLOB is NULL; otherwise, the access terminal shall set this field to the stored value of StorageBLOBLength.

StorageBLOB The access terminal shall not include this field if the value of its stored StorageBLOB is NULL; otherwise, the access terminal shall set this field to the stored value of StorageBLOB.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.7.4.2.7 StorageBLOBAssignment

The access network uses this message to update the StorageBLOB information of the access terminal.

Field	Length (bits)
MessageID	8
TransactionID	8
StorageBLOBType	16
StorageBLOBLength	8
StorageBLOB	8 × StorageBLOBLength

- MessageID** The access network shall set this field to 0x12.
- TransactionID** The access network shall increment this value for each new StorageBLOBAssignment message sent.
- StorageBLOBType** The access network shall set this field to the StorageBLOBType. The access network shall set this field to zero if StorageBLOB is NULL. Otherwise, the access network shall set this field as defined in [3].
- StorageBLOBLength** The access network shall set this field to the length of the StorageBLOB field in octets. The access network shall set this field to zero if the value of its stored StorageBLOB is NULL.
- StorageBLOB** The access network shall not include this field if the value of its stored StorageBLOB is NULL. Otherwise, the access network shall set this field to the StorageBLOB.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.7.4.2.8 StorageBLOBComplete

The access terminal sends this message in response to the StorageBLOBAssignment message.

Field	Length (bits)
MessageID	8
TransactionID	8

- 1 MessageID            The access terminal shall set this field to 0x13.
- 2 TransactionID        The access terminal shall set this field the TransactionID field of the
- 3                            corresponding StorageBLOBAssignment message.
- 4

<b>Channels</b>	AC                      RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	40

5 2.7.4.3 Interface to Other Protocols

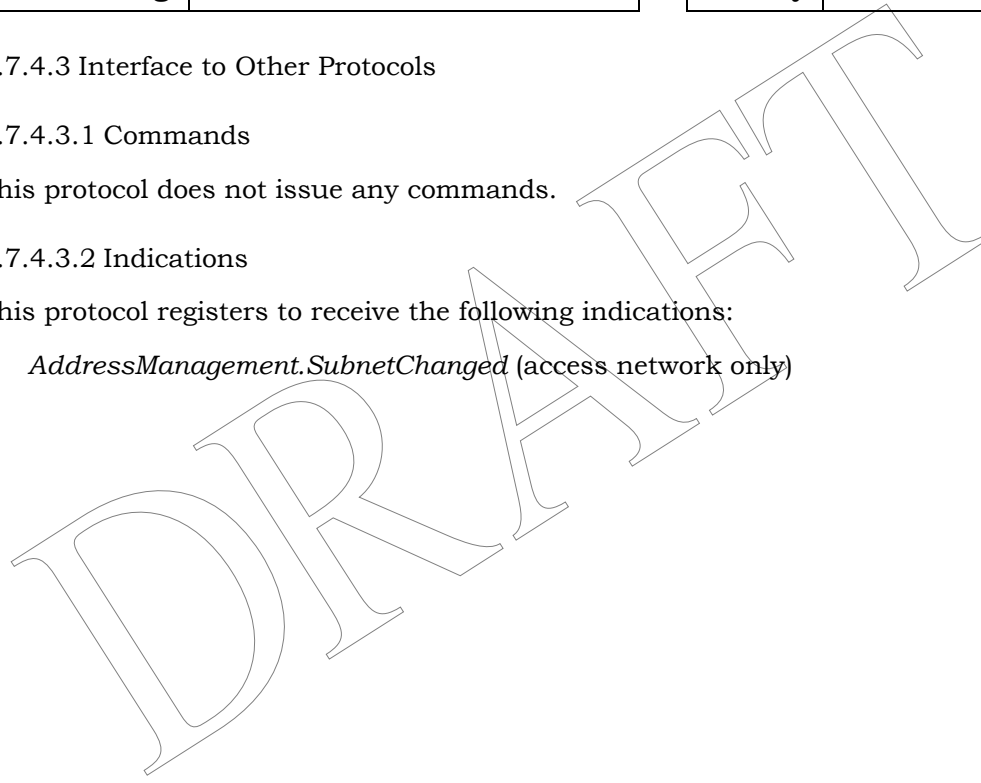
6 2.7.4.3.1 Commands

7 This protocol does not issue any commands.

8 2.7.4.3.2 Indications

9 This protocol registers to receive the following indications:

- 10 • *AddressManagement.SubnetChanged* (access network only)
- 11



## 2.8 Flow Control Protocol

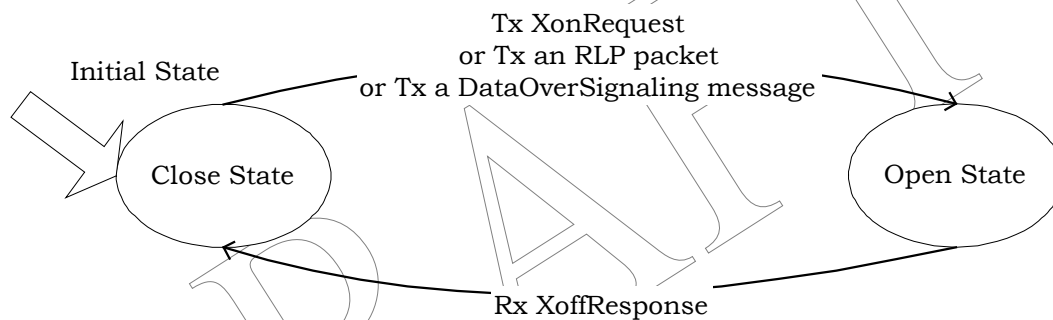
### 2.8.1 Overview

The Flow Control Protocol provides procedures and messages used by the access terminal and the access network to perform flow control for the Enhanced Multi-Flow Packet Application.

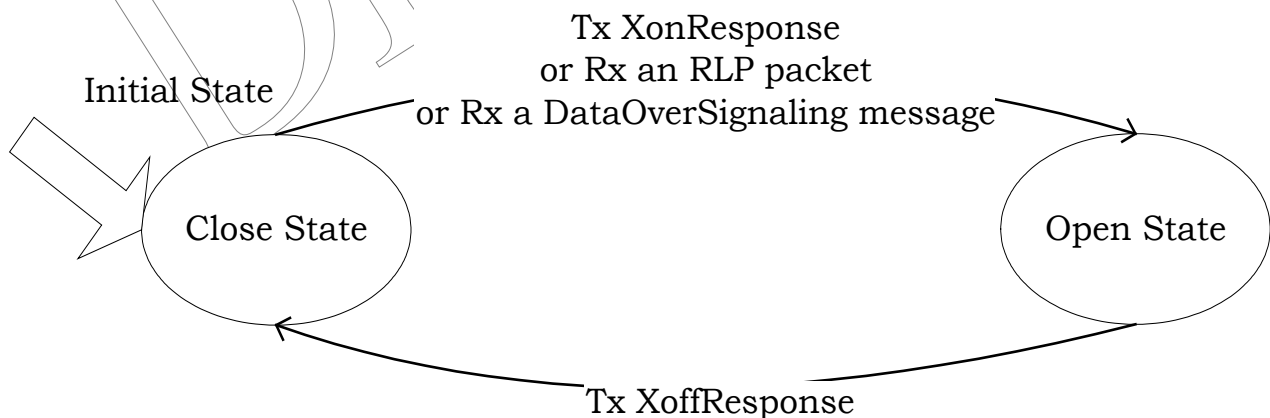
This protocol can be in one of the following states:

- Close State: in this state the Enhanced Multi-Flow Packet Application does not send or receive any RLP packets or DataOverSignaling messages.
- Open State: in this state the Enhanced Multi-Flow Packet Application can send and receive RLP packets and DataOverSignaling messages.

Figure 2.8.1-1 and Figure 2.8.1-2 show the state transition diagram at the access terminal and the access network.



**Figure 2.8.1-1. Flow Control Protocol State Diagram (Access Terminal)**



**Figure 2.8.1-2. Flow Control Protocol State Diagram (Access Network)**

The flow control protocol is a protocol associated with the Enhanced Multi-Flow Packet Application. The application subtype for this application is defined in [3].



1 2.8.2 Primitives and Public Data

2 2.8.2.1 Commands

3 This protocol does not define any commands.

4 2.8.2.2 Return Indications

5 This protocol does not return any indications.

6 2.8.3 Protocol Data Unit

7 The transmission unit of this protocol is a message. This is a control protocol and,  
8 therefore, it does not carry payload on behalf of other layers or protocols.

9 2.8.4 Procedures and Messages for the InUse Instance of the Protocol

10 2.8.4.1 Procedures

11 2.8.4.1.1 Transmission and Processing of DataReady Message

12 The access network may send a DataReady message to indicate that there is data  
13 corresponding to this packet application waiting to be transmitted.

14 The access terminal shall send a DataReadyAck within the time period specified by  
15  $T_{FCResponse}$  after reception of the DataReady message to acknowledge reception of the  
16 message.

17 2.8.4.1.2 Transmission and Processing of RestartNetworkInterface Message

18 The access network may send a RestartNetworkInterface message to direct the access  
19 terminal to restart the interface between the packet application and the higher layer.

20 Upon receiving a RestartNetworkInterface message, the access terminal shall send a  
21 RestartNetworkInterfaceAck message and shall restart the interface between the packet  
22 application and the higher layer. The access terminal may also restart higher layer  
23 protocols.

24 2.8.4.1.3 Close State

25 2.8.4.1.3.1 Access Terminal Requirements

26 The access terminal shall send an XonRequest message or an RLP packet (corresponding to  
27 this instance of the Enhanced Multi-Flow Packet Application) or a DataOverSignaling  
28 message (corresponding to this instance of the Enhanced Multi-Flow Packet Application)  
29 when it is ready to exchange RLP packets or DataOverSignaling messages with the access  
30 network. The access terminal should send an XonRequest message or an RLP packet  
31 (corresponding to this instance of the Enhanced Multi-Flow Packet Application) or a  
32 DataOverSignaling message (corresponding to this instance of the Enhanced Multi-Flow  
33 Packet Application) when it receives a DataReady from the access network.

1 The access terminal shall transition to the Open State when it sends an XonRequest  
2 message or when it sends an RLP packet (corresponding to this instance of the Enhanced  
3 Multi-Flow Packet Application) or when it sends a DataOverSignaling message  
4 (corresponding to this instance of the Enhanced Multi-Flow Packet Application).

#### 5 2.8.4.1.3.2 Access Network Requirements

6 The access network shall not send any RLP packets or DataOverSignaling messages in this  
7 state.

8 If the access network receives an XonRequest message, it shall

- 9 • Send an XonResponse message within the time period specified by  $T_{FCResponse}$  after  
10 reception of the XonRequest message to acknowledge reception of the message.
- 11 • Transition to the Open State.

12 The access network shall also transition to the Open State if it receives an RLP packet  
13 (corresponding to this instance of the Enhanced Multi-Flow Packet Application) or a  
14 DataOverSignaling message (corresponding to this instance of the Enhanced Multi-Flow  
15 Packet Application).

16 If the access network receives an XoffRequest message, it shall send an XoffResponse  
17 message within the time period specified by  $T_{FCResponse}$  after reception of the XoffRequest  
18 message to acknowledge reception of the message.

#### 19 2.8.4.1.4 Open State

20 In this state, the access terminal and the access network may send or receive any RLP  
21 packets or DataOverSignaling messages.

##### 22 2.8.4.1.4.1 Access Terminal Requirements

23 The access terminal may re-send an XonRequest message if it does not receive an  
24 XonResponse message or an RLP packet (corresponding to this instance of the Enhanced  
25 Multi-Flow Packet Application) or a DataOverSignaling message (corresponding to this  
26 instance of the Enhanced Multi-Flow Packet Application) within the time period specified by  
27  $T_{FCResponse}$  after sending the XonRequest message.

28 The access terminal should send an XonRequest message if it receives a DataReady  
29 message.

30 The access terminal may send an XoffRequest message to request the access network to  
31 stop sending RLP packets and DataOverSignaling messages. The access terminal shall  
32 transition to the Close state when it receives an XoffResponse message.

33 The access terminal may re-send an XoffRequest message if it does not receive an  
34 XoffResponse message within the time period specified by  $T_{FCResponse}$  after sending the  
35 XoffRequest message.

##### 36 2.8.4.1.4.2 Access Network Requirements

37 If the access network receives an XoffRequest message, it shall

- 1 • Send an XoffResponse message within the time period specified by  $T_{FCResponse}$  after
- 2 reception of the XoffRequest message to acknowledge reception of the message.
- 3 • Transition to the Close State.

4 If the access network receives an XonRequest message, it shall send an XonResponse

5 message within the time period specified by  $T_{FCResponse}$  after reception of the XonRequest

6 message to acknowledge reception of the message.

7 2.8.4.2 Message Formats

8 2.8.4.2.1 XonRequest

9 The access terminal sends this message to request transition to the Open State.

10

Field	Length (bits)
MessageID	8

11 MessageID

The access terminal shall set this field to 0x07.

12

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

13 2.8.4.2.2 XonResponse

14 The access network sends this message to acknowledge reception of the XonRequest

15 message.

16

Field	Length (bits)
MessageID	8

17 MessageID

The access network shall set this field to 0x08.

18

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

19 2.8.4.2.3 XoffRequest

20 The access terminal sends this message to request transition to the Close State.

21

Field	Length (bits)
MessageID	8

22 MessageID

The access terminal shall set this field to 0x09.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.8.4.2.4 XoffResponse

The access network sends this message to acknowledge reception of the XoffRequest message.

Field	Length (bits)
MessageID	8

MessageID The access network shall set this field to 0x0a.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.8.4.2.5 DataReady

The access network sends this message to indicate that there is data corresponding to this packet application awaiting to be transmitted.

Field	Length (bits)
MessageID	8
TransactionID	8

MessageID The access network shall set this field to 0x0b.

TransactionID The access network shall increment this value for each new DataReady message sent.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 2.8.4.2.6 DataReadyAck

The access terminal sends this message to acknowledge reception of a DataReady message.

Field	Length (bits)
MessageID	8
TransactionID	8

1 MessageID The access terminal shall set this field to 0x0c.

2 TransactionID The access terminal shall set this value to the value of the  
3 TransactionID field of the corresponding DataReady message.  
4

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

5 2.8.4.2.7 RestartNetworkInterface

6 The access network sends this message to request the access terminal to restart the  
7 network interface.  
8

Field	Length (bits)
MessageID	8
TransactionID	8

9 MessageID The access network shall set this field to 0x1c.

10 TransactionID The access network shall increment this value for each new  
11 RestartNetworkInterface message sent.  
12

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

13 2.8.4.2.8 RestartNetworkInterfaceAck

14 The access terminal sends this message to acknowledge reception of a  
15 RestartNetworkInterface message.  
16

Field	Length (bits)
MessageID	8
TransactionID	8

17 MessageID The access terminal shall set this field to 0x1d.

1 TransactionID The access terminal shall set this value to the value of the  
 2 TransactionID field of the corresponding RestartNetworkInterface  
 3 message.  
 4

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

5 2.8.5 Interface to Other Protocols

6 2.8.5.1 Commands

7 This protocol does not issue any commands.

8 2.8.5.2 Indications

9 This protocol does not register to receive any indications.

10 2.8.6 Protocol Numeric Constants

11

<b>Constant</b>	<b>Meaning</b>	<b>Value</b>
$T_{FCResponse}$	Time period within which the access terminal and access network are to respond to flow control messages.	1 second

12

## 2.9 Configuration Attributes for the Enhanced Multi-Flow Packet Application

The access terminal shall support default values of all attributes.

Unless specified otherwise, the access terminal and the access network shall not use the Generic Attribute Update Protocol to update configurable attributes belonging to the Enhanced Multi-Flow Packet Application. The access terminal and the access network shall support the use of the Generic Attribute Update Protocol to update values of the following configurable attributes belonging to the Enhanced Multi-Flow Packet Application:

- FlowNNTimersFwd,
- FlowNNTimersRev,
- FlowNNNakEnableFwd,
- FlowNNNakEnableRev,
- FlowNNPhysicalLayerNakEnableRev,
- FlowNNFlowProtocolParametersFwd,
- FlowNNFlowProtocolParametersRev,
- FlowNNRouteProtocolParametersFwd,
- FlowNNRouteProtocolParametersRev,
- FlowNNActivatedFwd,
- FlowNNActivatedRev,
- FlowNNSequenceLengthFwd,
- FlowNNSequenceLengthRev,
- FlowNNFlowProtocolPDUFwd,
- FlowNNFlowProtocolPDURev,
- FlowNNRouteProtocolPDUFwd,
- FlowNNRouteProtocolPDURev,
- FlowNNSimultaneousDeliveryOnBothRoutesFwd,
- FlowNNOutOfOrderDeliveryToRouteProtocolFwd,
- FlowNNDataUnitFwd,
- FlowNNDataUnitRev,
- FlowNNReservationFwd,
- FlowNNReservationRev,
- FlowNNTransmitAbortTimerRev,
- FlowNNDataOverSignalingAllowedRev,
- ReservationKKIdleStateFwd,

- 1 • ReservationKKIdleStateRev,
- 2 • ReservationKKQoSRequestFwd,
- 3 • ReservationKKQoSRequestRev,
- 4 • ReservationKKQoSResponseFwd,
- 5 • ReservationKKQoSResponseRev,
- 6 • ANSupportedQoSProfiles,
- 7 • ReservationKKBCMCSFlowIDAssociation,
- 8 • ReservationKKBCMCSProgramIDAssociation, and
- 9 • ReservationKKReservationQueuingSupported

10 If the value of the ATNAKDelaySupported attribute is 0x01, then the access terminal and  
 11 the access network shall support the use of the Generic Attribute Update Protocol to update  
 12 values of the following attribute:

- 13 – FlowNNakDelayTimeFwd

14 where *NN* is the hexadecimal Link Flow number in the range 0x00 to *M* -1 inclusive, where  
 15 *M* is MaxNumLinkFlowsFwd or MaxNumLinkFlowsRev for a Link Flow on the forward link  
 16 or reverse link respectively and *KK* is the two-digit hexadecimal ReservationLabel.

17 The updated values of the attributes shall be consistent with the value of the  
 18 MaxActivatedLinkFlowsFwd and MaxActivatedLinkFlowsRev attributes.

19 The number of Forward Link Reservations that satisfy at least one of the following  
 20 conditions shall not exceed one plus the value of the MaxNumReservationsFwd field of  
 21 MaxReservations attribute:

- 22 • The Reservation is in Open state.
- 23 • The Reservation is bound to a link flow.
- 24 • The ReservationKKQoSRequestFwd corresponding to the Reservation is set to a non-  
 25 default value.

26 The number of Reverse Link Reservations that satisfy at least one of the following  
 27 conditions shall not exceed one plus the value of the MaxNumReservationsRev field of  
 28 MaxReservations attribute:

- 29 • The Reservation is in Open state.
- 30 • The Reservation is bound to a link flow.
- 31 • The ReservationKKQoSRequestRev corresponding to the Reservation is set to a non-  
 32 default value.

33 The access terminal shall not send an AttributeUpdateRequest message proposing to  
 34 update the value of the ANSupportedQoSProfiles attribute.

35 The access network shall not send an AttributeUpdateRequest message proposing to update  
 36 the value of the ReservationKKReservationQueuingSupported attribute.



1 The value of the Nak delay timer shall be less than or equal to that of the corresponding  
2 abort timer.

### 3 2.9.1 Simple Attributes

4 The negotiable simple attribute for this protocol is listed in Table 2.9-1. The access terminal  
5 and the access network shall use as defaults the values in Table 2.9-1 typed in **bold**  
6 **italics**.  
7

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1

**Table 2.9-1. Configurable Values**

Attribute ID	Attribute	Values	Meaning
0xffff	RANHandoff	0x00	The access terminal shall not send an unsolicited LocationNotification message. The access network does not switch between the radio access technologies (E.g. specified in [2]) in a manner that preserves the state of all protocol layers at or above the data link layer (PPP).
		0x01	The access terminal shall send an unsolicited LocationNotification message. The access network switches between the radio access technologies (E.g. specified in [2]) in a manner that preserves the state of all protocol layers at or above the data link layer (PPP).
		All other values	Reserved
0xfffc	MaxAbortTimer	0x05	Maximum abort timer is 500 ms.
		0x06 to 0x64	Maximum abort timer in units of 100 ms.
		All other values	Reserved
0xffffb	PPPFreeAuthenticationSupport	0x00	PPP free authentication as specified in [1] is not supported.
		0x01	PPP free authentication as specified in [1] is supported
		All other values	Reserved
0xffffa	TwoRoutesSupported	0x00	Two Routes are not supported
		0x01	Two Routes are supported
		All other values	Reserved
0xffff9	ATNAKDelaySupported	0x00	The access terminal does not support a non-zero value for FlowNNakDelayTimeFwd.
		0x01	The access terminal does support non-zero values for FlowNNakDelayTimeFwd.
		All other values	Reserved
0xfeNN NN is the two-	FlowNNakEnableFwd NN is the two-digit	0x00	RLP receivers associated with forward Link Flow NN do not transmit Nak messages when missing data units are detected.

Attribute ID	Attribute	Values	Meaning
digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd -1 inclusive.	hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd -1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x01	RLP receivers associated with forward Link Flow <i>NN</i> transmit a Nak message when missing data units are detected.
		All other values	Reserved.
0xfd <i>NN</i> <i>NN</i> is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev -1 inclusive.	Flow <i>NN</i> NakEnableRev <i>NN</i> is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev -1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	RLP receivers associated with reverse Link Flow <i>NN</i> do not transmit Nak messages when missing data units are detected.
		0x01	RLP receivers associated with reverse Link Flow <i>NN</i> transmit a Nak message when missing data units are detected.
		All other values	Reserved.
0xfa <i>NN</i> <i>NN</i> is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev -1 inclusive.	Flow <i>NN</i> PhysicalLayerNakEnableRev <i>NN</i> is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev -1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x01	RLP is to retransmit data units when a <i>PhysicalLayer.ReverseTrafficPacketsMissed</i> indication is received.
		0x00	RLP is to ignore <i>PhysicalLayer.ReverseTrafficPacketsMissed</i> indication.
		All other values	Reserved
0xf9 <i>KK</i> <i>KK</i> is the two-digit hexadecimal ReservationLabel.	Reservation <i>KK</i> IdleStateFwd <i>KK</i> is the two-digit hexadecimal forward link ReservationLabel, where hexadecimal digits A through F are specified in upper case letters.	0x00	Reservation does not change states when a Connection is closed.
		0x01	Reservation transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.
		0x02	Reservation transitions to the Open state when a Connection is opened and transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.
		All other values	Reserved

Attribute ID	Attribute	Values	Meaning
0xf8KK KK is the two-digit hexadecimal ReservationLabel.	ReservationKKIdleStateRev KK is the two-digit hexadecimal reverse link ReservationLabel, where hexadecimal digits A through F are specified in upper case letters.	0x00	Reservation does not change states when a Connection is closed.
		0x01	Reservation transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.
		0x02	Reservation transitions to the Open state when a Connection is opened and transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.
		All other values	Reserved
0xf7NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive.	FlowNNTransmitAbortTimeRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x0000	Maximum delay for transmission of a higher layer data unit for Link Flow NN is not specified.
		0x0001 - 0x03e8	Maximum delay for transmission of a higher layer data unit for Link Flow NN in units of 5 ms.
		All other values	Reserved
0xf6NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive.	FlowNNDataOverSignalingAllowedRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Access terminal is not allowed to send DataOverSignaling messages for this Link Flow.
		0x01	Access terminal is allowed to send DataOverSignaling messages for this Link Flow.
		All other values	Reserved
0xf300	Flow00ActivatedFwd	0x01	Forward Link Flow 0x00 is activated.
		0x00	Forward Link Flow 0x00 is not activated.
		All other values	Reserved
0xf301	Flow01ActivatedFwd	0x01	Forward Link Flow 0x01 is activated.
		0x00	Forward Link Flow 0x01 is not activated.

Attribute ID	Attribute	Values	Meaning
		All other values	Reserved
0xf3NN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x02 to MaxNumLinkFlowsFwd - 1 inclusive.	FlowNNActivatedFwd NN is the two-digit hexadecimal Link Flow number in the range 0x02 to MaxNumLinkFlowsFwd - 1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Forward Link Flow NN is not activated.
		0x01	Forward Link Flow NN is activated.
		All other values	Reserved
0xf200	Flow00ActivatedRev	0x01	Reverse Link Flow 0x00 is activated.
		0x00	Reverse Link Flow 0x00 is not activated.
		All other values	Reserved
0xf201	Flow01ActivatedRev	0x01	Reverse Link Flow 0x01 is activated.
		0x00	Reverse Link Flow 0x01 is not activated.
		All other values	Reserved
0xf2NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x02 to MaxNumLinkFlowsRev - 1 inclusive.	FlowNNActivatedRev NN is the two-digit hexadecimal Link Flow number in the range 0x02 to MaxNumLinkFlowsRev - 1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x0000	Reverse Link Flow NN is not activated.
		0x0001	Reverse Link Flow NN is activated.
		All other values	Reserved
0xf1NN NN is the two-digit hexadecimal Link Flow number of the	FlowNNSequenceLengthFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd -	0x00	RLP of Forward Link Flow NN has a 6-bit sequence number.
		0x01	RLP of Forward Link Flow NN has a 14-bit sequence number.
		0x02	RLP of Forward Link Flow NN has a 22-bit sequence number.

Attribute ID	Attribute	Values	Meaning
forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd -1 inclusive.	1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	All other values	Reserved
0xf0NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev -1 inclusive.	FlowNNSequenceLengthRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev -1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	RLP of Reverse Link Flow NN has a 6-bit sequence number.
		0x01	RLP of Reverse Link Flow NN has a 14-bit sequence number.
		0x02	RLP of Reverse Link Flow NN has a 22-bit sequence number.
		All other values	Reserved
0xef01	Flow01FlowProtocolPDUFwd	0x00	Forward Link Flow 0x01 provides an octet stream to the Flow Protocol.
		0x01	Forward Link Flow 0x01 provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xefNN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsFwd-1 inclusive.	FlowNNFlowProtocolPDUFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00, and 0x02 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Forward Link Flow NN provides an octet stream to the Flow Protocol.
		0x01	Forward Link Flow NN provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xee01	Flow01FlowProtocolPDURev	0x00	Reverse Link Flow 0x01 provides an octet stream to the Flow Protocol.
		0x01	Reverse Link Flow 0x01 provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xeeNN NN is the two-digit	FlowNNFlowProtocolPDURev	0x00	Reverse Link Flow NN provides an octet stream to the Flow Protocol.

Attribute ID	Attribute	Values	Meaning
hexadecimal Link Flow number of the reverse Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsRev-1 inclusive.	NN is the two-digit hexadecimal Link Flow number in the range 0x00, and 0x02 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x01	Reverse Link Flow NN provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xedNN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.	FlowNNDataUnitFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	<b>0x00</b>	Data unit for forward Link Flow NN is octets.
		0x01	Data unit for forward Link Flow NN is RLP packet payload.
		All other values	Reserved.
0xecNN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNDataUnitRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	<b>0x00</b>	Data unit for reverse Link Flow NN is octets.
		0x01	Data unit for reverse Link Flow NN is RLP packet payload.
		All other values	Reserved.
0xeb01	Flow01RouteProtocolPDUFwd	0x00	Each Route of Forward Link Flow 0x01 provides an octet stream to the Route Protocol.
		<b>0x01</b>	Each Route of Forward Link Flow 0x01 provides a packet stream to the Route Protocol.
		All other values	Reserved.
0xebNN NN is the two-digit hexadecimal Link Flow number of the	FlowNNRouteProtocolPDUFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00, and 0x02 to	<b>0x00</b>	Each Route of Forward Link Flow NN provides an octet stream to the Route Protocol.
		0x01	Each Route of Forward Link Flow NN provides a packet stream to the Route Protocol.

Attribute ID	Attribute	Values	Meaning
forward Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsFwd-1 inclusive.	MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	All other values	Reserved.
0xea01	Flow01RouteProtocolPDUR ev	0x00	Each Route of Reverse Link Flow 0x01 provides an octet stream to the Route Protocol.
		0x01	Each Route of Reverse Link Flow 0x01 provides a packet stream to the Route Protocol.
		All other values	Reserved.
0xeaNN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNRouteProtocolPDUR ev NN is the two-digit hexadecimal Link Flow number in the range 0x00, and 0x02 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Each Route of Reverse Link Flow NN provides an octet stream to the Route Protocol.
		0x01	Each Route of Reverse Link Flow NN provides a packet stream to the Route Protocol.
		All other values	Reserved.
0xe9NN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.	FlowNNSimultaneousDeliveryOnBothRoutesFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Simultaneous delivery of Flow Protocol payload on both routes of Forward Link Flow NN is not allowed.
		0x01	Simultaneous delivery of Flow Protocol payload on both routes of Forward Link Flow NN is allowed.
		All other values	Reserved.
0xe8NN NN is the two-digit hexadecimal Link Flow	FlowNNOutOfOrderDeliveryToRouteProtocolFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00	0x00	Each Route of Forward Link Flow NN delivers Route Protocol payload in-order.
		0x01	Each Route of Forward Link Flow NN may deliver Route Protocol payload out-of-order.



Attribute ID	Attribute	Values	Meaning
number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.	to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	All other values	Reserved.
0xe7NN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.	FlowNNakDelayTimeFwd	0x00	The values of the NAK Delay Time for flow NN is zero.
		0x01 – 0xff	The values of the NAK Delay Time for flow NN is specified by the value of this attribute in units of 10 ms.
0xffff8	BCMCSOverRLPAllowed	0x00	Transmission of BCMCS packets over RLP is not allowed
		0x01	Transmission of BCMCS packets over RLP is allowed
		All other values	Reserved.
0xe6KK KK is the two-digit hexadecimal ReservationLabel. 1.	ReservationKKReservationQueuingSupported KK is the two-digit hexadecimal reverse link ReservationLabel, where hexadecimal digits A through F are specified in upper case letters.	0x00	Access terminal does not support Priority Queuing for the Reservation KK.
		0x01	Access terminal supports Priority Queuing for the Reservation KK.
		All other values	Reserved.

1 2.9.2 Complex Attributes

2 The following complex attributes and default values are defined (see [8] for attribute record  
3 definition).

4 2.9.2.1 FlowNNTimersFwd Attribute

5 NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range  
6 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are  
7 specified in upper case letters.

8

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
AbortTimer	16	0x01f4
FlushTimer	16	0x012c

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x03*NN*, where *NN* is the two-digit  
4 hexadecimal Link Flow number in the range 0x00 to  
5 MaxNumLinkFlowsFwd-1 inclusive.
- 6 ValueID The sender shall set this field to an identifier assigned to this complex  
7 value.
- 8 AbortTimer The sender shall set this field to the value of the RLP abort timer for  
9 this forward Link Flow in units of ms. The sender shall not set this  
10 field to a value greater than MaxAbortTimer.
- 11 FlushTimer The sender shall set this field to the value of the RLP flush timer for  
12 this forward Link Flow in units of ms. The value of the RLP flush  
13 timer shall be less than or equal to that of the corresponding abort  
14 timer.

#### 15 2.9.2.2 Flow*NN*TimersRev Attribute

16 *NN* is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range  
17 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are  
18 specified in upper case letters.

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
AbortTimer	16	0x01f4
FlushTimer	16	0x012c

- 20 Length Length of the complex attribute in octets. The sender shall set this  
21 field to the length of the complex attribute excluding the Length field.

1	AttributeID	The sender shall set this field to 0x04 <i>NN</i> , where <i>NN</i> is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive.
2		
3		
4	ValueID	The sender shall set this field to an identifier assigned to this complex value.
5		
6	AbortTimer	The sender shall set this field to the value of the RLP abort timer for this reverse Link Flow in units of ms. The sender shall not set this field to a value greater than MaxAbortTimer.
7		
8		
9	FlushTimer	The sender shall set this field to the value of the RLP flush timer for this reverse Link Flow in units of ms. The value of the RLP flush timer shall be less than or equal to that of the corresponding abort timer.
10		
11		
12		

### 13 2.9.2.3 Flow*NN*ReservationFwd Attribute

14 *NN* is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range  
 15 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are  
 16 specified in upper case letters.

Field	Length (bits)	Default for <i>NN</i> = 0x00	Default for <i>NN</i> = 0x01	Default for <i>NN</i> > 0x01
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

One or more occurrences of the following record:

ValueID	8	N/A	N/A	N/A
ReservationCount	8	0x01	0x01	0x00

ReservationCount occurrences of the following field:

ReservationLabel	8	0xff	0xfe	N/A
------------------	---	------	------	-----

17

18 **Length** Length of the complex attribute in octets. The sender shall set this  
 19 field to the length of the complex attribute excluding the Length field.

20 **AttributeID** The sender shall set this field to 0x05*NN*, where *NN* is the two-digit  
 21 hexadecimal Link Flow number in the range 0x00 to  
 22 MaxNumLinkFlowsFwd-1 inclusive.

23 **ValueID** The sender shall set this field to an identifier assigned to this complex  
 24 value.

25 **ReservationCount** The sender shall set this field to the number of reservations  
 26 associated with this Link Flow.

1 ReservationLabel The sender shall set this field to the ReservationLabel of the  
2 reservation associated with this Link Flow.

### 3 2.9.2.4 FlowNNReservationRev Attribute

4 *NN* is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range  
5 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are  
6 specified in upper case letters.

Field	Length (bits)	Default for <i>NN</i> = 0x00	Default for <i>NN</i> = 0x01	Default for <i>NN</i> > 0x01
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

One or more occurrences of the following record:

ValueID	8	N/A	N/A	N/A
ReservationCount	8	0x01	0x01	0x00

ReservationCount occurrences of the following field:

ReservationLabel	8	0xff	0xfe	N/A
------------------	---	------	------	-----

7

8 Length Length of the complex attribute in octets. The sender shall set this  
9 field to the length of the complex attribute excluding the Length field.

10 AttributeID The sender shall set this field to 0x06*NN*, where *NN* is the two-digit  
11 hexadecimal Link Flow number in the range 0x00 to  
12 MaxNumLinkFlowsRev-1 inclusive.

13 ValueID The sender shall set this field to an identifier assigned to this complex  
14 value.

15 ReservationCount The sender shall set this field to the number of reservations  
16 associated with this Link Flow.

17 ReservationLabel The sender shall set this field to the ReservationLabel of the  
18 reservation associated with this Link Flow.

### 19 2.9.2.5 ATSupportedFlowProtocolParameters*PP* Attribute

20 *PP* is the two-digit hexadecimal ProtocolID number for the Flow Protocol as specified in [3],  
21 where hexadecimal digits A through F are specified in upper case letters.

22

Field	Length (bits)	Default for <i>PP</i> = 0x00, 0x01, 0x05	Default for <i>PP</i> other than 0x00, 0x01, 0x05
Length	8	N/A	N/A
AttributeID	16	N/A	N/A

One occurrence of the following record:

ValueID	8	N/A	N/A
ProtocolSupported	8	0x01	0x00
SupportedProtocolParametersValuesLength	8	0x00	0x00
SupportedProtocolParametersValues	SupportedProtocolParametersValuesLength × 8	N/A	N/A

1

2 Length Length of the complex attribute in octets. The sender shall set this  
3 field to the length of the complex attribute excluding the Length field.

4 AttributeID The sender shall set this field to 0x0*PP*.

5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.

7 ProtocolSupported The sender shall set this field to 0x00 if the Flow Protocol *PP* is not  
8 supported. Otherwise, the sender shall set this field to 0x01 if the  
9 Flow Protocol *PP* is supported. All other values are reserved.

10 SupportedProtocolParametersValuesLength  
11 If the SupportedProtocolParametersValues record is not included, the  
12 sender shall set this field to 0x00. Otherwise, the sender shall set  
13 this field to the length of the SupportedProtocolParametersValues  
14 record in units of octets.

15 SupportedProtocolParametersValues  
16 Unless specified otherwise by [3], the sender shall omit this record. If  
17 *PP* is 0x04 and ProtocolSupported is 0x01, then the sender shall set  
18 this record as defined in 2.9.2.5.1. If *PP* is less than 0x04 or equal to  
19 0x05, the sender shall omit this record.

20 2.9.2.5.1 Definition of SupportedProtocolParametersValues record when the Flow Protocol  
21 or Route Protocol is ROHC  
22

Field	Length (bits)
MaxSupportedMaxCID	16
LargeCIDSupported	1
MaxSupportedMRRU	16
TimerBasedCompressionSupported	1
SupportedProfileCount	8

SupportedProfileCount occurrences of the following field:

SupportedProfile	16
------------------	----

Reserved	0 - 7 (as needed)
----------	-------------------

1

2 MaxSupportedMaxCID

3 The sender shall set this field to the maximum MAX\_CID parameter  
4 supported.

5 LargeCIDSupported The sender shall set this field to '0' if large CID representation is not  
6 supported according to [6]. Otherwise, the sender shall set this field  
7 to '1' if large CID representation is supported.

8 MaxSupportedMRRU  
9 The sender shall set this field to the MRRU supported by the  
10 decompressor according to [6]. Default value is 0x0000 (no  
11 segmentation).

12 TimerBasedCompressionSupported  
13 The sender shall set this field to '1' if the compressor at the access  
14 terminal supports timer based compression mode. Otherwise, the  
15 sender shall set this field to '0'.

16 SupportedProfileCount  
17 The sender shall set this field to the number of ROHC profiles  
18 supported.

19 SupportedProfile The sender shall set this field to the ROHC profile supported by the  
20 compressor and decompressor. IANA ROHC profile identifier  
21 definitions can be found at [12].

22 Reserved The sender shall add reserved bits to make the length of the entire  
23 record an integer number of octets. The sender shall set these bits to  
24 '0'. The receiver shall ignore this field.

## 2.9.2.6 ATSupportedRouteProtocolParametersPP Attribute

PP is the two-digit hexadecimal ProtocolID number for the Route Protocol as specified in [3], where hexadecimal digits A through F are specified in upper case letters.

Field	Length (bits)	Default for PP = 0x00	Default for PP > 0x00
Length	8	N/A	N/A
AttributeID	16	N/A	N/A

One occurrence of the following record:

ValueID	8	N/A	N/A
ProtocolSupported	8	0x01	0x00
SupportedProtocolParametersValuesLength	8	0x00	0x00
SupportedProtocolParametersValues	SupportedProtocolParametersValuesLength × 8	N/A	N/A

**Length** Length of the complex attribute in octets. The sender shall set this field to the length of the complex attribute excluding the Length field.

**AttributeID** The sender shall set this field to 0x10PP.

**ValueID** The sender shall set this field to an identifier assigned to this complex value.

**ProtocolSupported** The sender shall set this field to 0x00 if the Route Protocol PP is not supported. Otherwise, the sender shall set this field to 0x01 if the Route Protocol PP is supported. All other values are reserved.

**SupportedProtocolParametersValuesLength** If the SupportedProtocolParametersValues record is not included, the sender shall set this field to 0x00. Otherwise, the sender shall set this field to the length of the SupportedProtocolParametersValues record in units of octets.

**SupportedProtocolParametersValues** Unless specified otherwise by [3], the sender shall omit this record. If PP is 0x04 and ProtocolSupported is 0x01, then the sender shall set this record as defined in 2.9.2.5.1. If PP is less than 0x04, the sender shall omit this record.

## 2.9.2.7 ATSupportedQoSProfiles Attribute

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One occurrence of the following record:

ValueID	8	N/A
QoSProfileCount	8	0

QoSProfileCount of the following record:

ProfileType	8	N/A
ProfileLength	8	N/A
ProfileValue	ProfileLength × 8	N/A

**Length** Length of the complex attribute in octets. The sender shall set this field to the length of the complex attribute excluding the Length field.

**AttributeID** The sender shall set this field to 0x0002.

**ValueID** The sender shall set this field to an identifier assigned to this complex value.

**QoSProfileCount** The sender shall set this field to the number of QoS Profiles that are included in this message.

**ProfileType** The sender shall set this field to indicate the profile type. The sender shall set this field according to [3].

**ProfileLength** The sender shall set this field to length of the ProfileValue field in units of octets.

**ProfileValue** The sender shall set this field to the profile according to [3].



## 2.9.2.8 ANSupportedQoSProfiles Attribute

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One occurrence of the following record:

ValueID	8	N/A
QoSProfileCount	8	0

QoSProfileCount of the following record:

ProfileType	8	N/A
ProfileLength	8	N/A
ProfileValue	ProfileLength × 8	N/A

**Length** Length of the complex attribute in octets. The sender shall set this field to the length of the complex attribute excluding the Length field.

**AttributeID** The sender shall set this field to 0x0003.

**ValueID** The sender shall set this field to an identifier assigned to this complex value.

**QoSProfileCount** The sender shall set this field to the number of QoS Profiles that are included in this message.

**ProfileType** The sender shall set this field to indicate the profile type. The sender shall set this field according to [3].

**ProfileLength** The sender shall set this field to length of the ProfileValue field in units of octets.

**ProfileValue** The sender shall set this field to the profile according to [3].

## 2.9.2.9 MaxLinkFlows Attribute

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more occurrences of the following record:

ValueID	8	N/A
MaxNumLinkFlowsFwd	8	<b>0x06</b>
MaxNumLinkFlowsRev	8	<b>0x06</b>
MaxActivatedLinkFlowsFwd	8	<b>0x03</b>
MaxActivatedLinkFlowsRev	8	<b>0x03</b>

1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.

3 AttributeID The sender shall set this field to 0x0004.

4 ValueID The sender shall set this field to an identifier assigned to this complex  
5 value.

6 MaxNumLinkFlowsFwd

7 The sender shall set this field to indicate the maximum total number  
8 of activated and deactivated forward Link Flows supported. The value  
9 shall be in the range of 0x06 to 0x1f, inclusive

10 MaxNumLinkFlowsRev

11 The sender shall set this field to indicate the maximum total number  
12 of activated and deactivated reverse Link Flows supported. The value  
13 shall be in the range of 0x06 to 0x1f, inclusive.

14 MaxActivatedLinkFlowsFwd

15 The sender shall set this field to indicate the maximum number of  
16 simultaneous activated forward Link Flows supported. The value  
17 shall be in the range of 0x03 to MaxNumLinkFlowsFwd, inclusive.

18 MaxActivatedLinkFlowsRev

19 The sender shall set this field to indicate the maximum number of  
20 simultaneous activated reverse Link Flows supported. The value shall  
21 be in the range of 0x03 to MaxNumLinkFlowsRev, inclusive.

#### 22 2.9.2.10 ReservationKKQoSRequestFwd Attribute

23 *KK* is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
24 are specified in upper case letters.

25

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

1	Length	Length of the complex attribute in octets. The sender shall set this
2		field to the length of the complex attribute excluding the Length field.
3	AttributeID	The sender shall set this field to 0x07KK, where KK is the two-digit
4		hexadecimal ReservationLabel.
5	ValueID	The sender shall set this field to an identifier assigned to this complex
6		value.
7	ProfileType	The sender shall set this field to indicate the profile type. The sender
8		shall set this field as defined in [3].
9	ProfileLength	The sender shall set this field to length of the ProfileValue field in
10		units of octets. If ProfileType is equal to 0x00, then the sender shall
11		set this field to 0x0000.
12	ProfileValue	The sender shall set this field to the Profile Value corresponding to
13		the Profile Type according to [3]. If ProfileType is equal to 0x00, then
14		the sender shall omit this field. If ProfileType is equal to 0x01, if the
15		ANSupportedQoSProfiles attribute does not have a default value, and
16		if this attribute is included in an AttributeUpdateRequest then the
17		requested Flow Profile IDs shall be a subset of the Flow Profile IDs in
18		the ProfileValue fields of the ANSupportedQoSProfiles attribute.

#### 19 2.9.2.11 ReservationKKQoSRequestRev Attribute

20 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
21 are specified in upper case letters.

22

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x08KK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 ProfileType The sender shall set this field to indicate the profile type. The sender  
8 shall set this field as defined in [3].
- 9 ProfileLength The sender shall set this field to length of the ProfileValue field in  
10 units of octets. If ProfileType is equal to 0x00, then the sender shall  
11 set this field to 0x0000.
- 12 ProfileValue The sender shall set this field to the Profile Value corresponding to  
13 the Profile Type according to [3]. If ProfileType is equal to 0x00, then  
14 the sender shall omit this field. If ProfileType is equal to 0x01, if the  
15 ANSupportedQoSProfiles attribute does not have a default value, and  
16 if this attribute is included in an AttributeUpdateRequest, then the  
17 requested Flow Profile IDs shall be a subset of the Flow Profile IDs in  
18 the ProfileValue fields of the ANSupportedQoSProfiles attribute.

#### 19 2.9.2.12 ReservationKKQoSResponseFwd Attribute

20 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
21 are specified in upper case letters.

22

<b>Field</b>	<b>Length (bits)</b>	<b>Default</b>
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

1	Length	Length of the complex attribute in octets. The sender shall set this
2		field to the length of the complex attribute excluding the Length field.
3	AttributeID	The sender shall set this field to 0x09KK, where KK is the two-digit
4		hexadecimal ReservationLabel.
5	ValueID	The sender shall set this field to an identifier assigned to this complex
6		value.
7	ProfileType	The sender shall set this field to indicate the profile type. The sender
8		shall set this field as defined in [3].
9	ProfileLength	The sender shall set this field to length of the ProfileValue field in
10		units of octets. If ProfileType is equal to 0x00, then the sender shall
11		set this field to 0x0000.
12	ProfileValue	The sender shall set this field to the Profile Value corresponding to
13		the Profile Type according to [3]. If ProfileType is equal to 0x00, then
14		the sender shall omit this field.

#### 15 2.9.2.13 ReservationKKQoSResponseRev Attribute

16 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
17 are specified in upper case letters.

18

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x0aKK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 ProfileType The sender shall set this field to indicate the profile type. The sender  
8 shall set this field as defined in [3].
- 9 ProfileLength The sender shall set this field to length of the ProfileValue field in  
10 units of octets. If ProfileType is equal to 0x00, then the sender shall  
11 set this field to 0x0000.
- 12 ProfileValue The sender shall set this field to the Profile Value corresponding to  
13 the Profile Type according to [3]. If ProfileType is equal to 0x00, then  
14 the sender shall omit this field.

#### 15 2.9.2.14 MaxReservations Attribute

16

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more occurrences of the following record:

ValueID	8	N/A
MaxNumReservationsFwd	8	0xff
MaxNumReservationsRev	8	0xff
MaxNumOpenReservationsFwd	8	0x0f
MaxNumOpenReservationsRev	8	0x0f

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x0005.
- 4 ValueID The sender shall set this field to an identifier assigned to this complex  
5 value.
- 6 MaxNumReservationsFwd  
7 The sender shall set this field to indicate one less than the maximum  
8 total number of Forward Link Reservations supported that satisfy at  
9 least one of the following conditions:  
10 • The Reservation is in Open state.  
11 • The Reservation is bound to a link flow.  
12 • The Reservation *KKQoSRequestFwd* corresponding to the  
13 Reservation is set to a non-default value.
- 14 The value shall be in the range of 0x00 to 0xff, inclusive
- 15 MaxNumReservationsRev  
16 The sender shall set this field to indicate one less than the maximum  
17 total number of Reverse Link Reservations supported that satisfy at  
18 least one of the following conditions:  
19 • The Reservation is in Open state.  
20 • The Reservation is bound to a link flow.  
21 • The Reservation *KKQoSRequestRev* corresponding to the  
22 Reservation is set to a non-default value.
- 23 The value shall be in the range of 0x00 to 0xff, inclusive.

## 1 MaxNumOpenReservationsFwd

2 The sender shall set this field to indicate one less than the maximum  
3 number of simultaneous activated Forward Link Reservations  
4 supported. The value shall be in the range of 0x00 to  
5 MaxNumReservationsFwd, inclusive.

## 6 MaxNumOpenReservationsRev

7 The sender shall set this field to indicate one less than the maximum  
8 number of simultaneous activated Reverse Link Reservations  
9 supported. The value shall be in the range of 0x00 to  
10 MaxNumReservationsRev, inclusive.

## 11 2.9.2.15 FlowNNFlowProtocolParametersFwd Attribute

12 *NN* is the two-digit hexadecimal forward Link flow identifier, where hexadecimal digits A  
13 through F are specified in upper case letters.

Field	Length (bits)	Default for <i>NN</i> = 0x00	Default for <i>NN</i> = 0x01	Default for <i>NN</i> > 0x01
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

14 One or more occurrences of the following record:

ValueID	8	N/A	N/A	N/A
ProtocolID	8	0x01	0x05	0x00
ProtocolParametersLength	8	0x00	0x00	0x00
ProtocolParameters	ProtocolParametersLength × 8	N/A	N/A	N/A

15 Length Length of the complex attribute in octets. The sender shall set this  
16 field to the length of the complex attribute excluding the Length field.

17 AttributeID The sender shall set this field to 0x0b*NN*, where *NN* is the two-digit  
18 hexadecimal forward Link flow number.

19 ValueID The sender shall set this field to an identifier assigned to this complex  
20 value.

21 ProtocolID The sender shall set this field to an identifier for the Flow Protocol as  
22 specified in [3] ProtocolParametersLength  
23 If the ProtocolParameters record is not included, then the sender  
24 shall set this field to 0x00. Otherwise, the sender shall set this field  
25 to the length of the ProtocolParameters record in units of octets.

26 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
27 ProtocolID is 0x04, then the sender shall set this record as defined in



1 2.9.2.15.1. If ProtocolID is less than 0x04 or equal to 0x05, the  
2 sender shall omit this record.

3 2.9.2.15.1 Definition of ProtocolParameters record when the Flow Protocol or Route Protocol  
4 is ROHC  
5

Field	Length (bits)
MaxCID	16
LargeCIDs	1
FeedbackForIncluded	1
FeedbackFor	0 or 5
MRRU	16
ProfileCount	8

ProfileCount occurrences of the following field:

Profile	16
Reserved	0 – 7 (as needed)

6

7 MaxCID The sender shall set this field to the MAX\_CID parameter for this  
8 ROHC Channel. The sender shall not set this field to a value greater  
9 than MaxSupportedMaxCID.

10 LargeCIDs If the LARGE\_CIDS parameter for this ROHC Channel is false, then  
11 the sender shall set this field to '0'. Otherwise, the sender shall set  
12 this field to '1'. The sender shall not set this field to '1' if  
13 LargeCIDsSupported is not set to '1'.

14 FeedbackForIncluded If ROHC feedback associated with another Link flow (ROHC channel)  
15 is sent on this Link flow (ROHC channel), then this field shall be set  
16 to '1'. Otherwise, this field shall be set to '0'.

17 FeedbackFor If FeedbackForIncluded is set to '0', then the sender shall omit this  
18 field. Otherwise, the sender shall set this field to the Link flow  
19 number (ROHC channel) to which ROHC feedback sent on this Link  
20 flow (ROHC channel) refers.

21 MRRU The sender shall set this field to the MRRU parameter for this ROHC  
22 channel. The sender shall not set this field to a value larger than  
23 MaxSupportedMRRU.

24 ProfileCount The sender shall set this field to the number of ROHC profiles  
25 supported by the decompressor.

- 1 Profile The sender shall set this field to the ROHC profile supported by the  
2 decompressor according to [6]. The sender shall not set this field to a  
3 value that is not included in the list of supported Profiles.
- 4 Reserved The sender shall add reserved bits to make the length of the entire  
5 record an integer number of octets. The sender shall set these bits to  
6 '0'. The receiver shall ignore this field.

#### 7 2.9.2.16 FlowNNFlowProtocolParametersRev Attribute

- 8 *NN* is the two-digit hexadecimal reverse Link flow number, where hexadecimal digits A  
9 through F are specified in upper case letters.

Field	Length (bits)	Default for <i>NN</i> = 0x00	Default for <i>NN</i> = 0x01	Default for <i>NN</i> > 0x01
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

10 One or more of the following record:

ValueID	8	N/A	N/A	N/A
ProtocolID	8	0x01	0x05	0x00
ProtocolParametersLength	8	0x00	0x00	0x00
ProtocolParameters	ProtocolParametersLength × 8	N/A	N/A	N/A

- 11
- 12 Length Length of the complex attribute in octets. The sender shall set this  
13 field to the length of the complex attribute excluding the Length field.
- 14 AttributeID The sender shall set this field to 0x0c*NN*, where *NN* is a two-digit  
15 hexadecimal reverse Link flow number.
- 16 ValueID The sender shall set this field to an identifier assigned to this complex  
17 value.
- 18 ProtocolID The sender shall set this field to an identifier for the Flow Protocol as  
19 specified in [3].
- 20 ProtocolParametersLength  
21 If the ProtocolParameters record is not included, then the sender  
22 shall set this field to 0x00. Otherwise, the sender shall set this field  
23 to the length of the ProtocolParameters record in units of octets.
- 24 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
25 ProtocolID is 0x04, then the sender shall set this record as defined in  
26 2.9.2.16.1. If ProtocolID is less than 0x04 or equal to 0x05, the  
27 sender shall omit this record.

2.9.2.16.1 Definition of ProtocolParameters record attribute when the Flow Protocol or Route Protocol is ROHC

Field	Length (bits)
MaxCID	16
LargeCIDs	1
FeedbackForIncluded	1
FeedbackFor	0 or 5
MRRU	16
TimerBasedCompression	1
ProfileCount	8

ProfileCount occurrences of the following field:

Profile	16
Reserved	0 – 7 (as needed)

MaxCID

The sender shall set this field to the MAX\_CID parameter for this ROHC Channel. The sender shall not set this field to a value greater than MaxSupportedMaxCID.

LargeCIDs

If the LARGE\_CIDS parameter for this ROHC Channel is false, then the sender shall set this field to '0'. Otherwise, the sender shall set this field to '1'. If LargeCIDsSupported is '0', then the sender shall not set this field to '1'.

FeedbackForIncluded If ROHC feedback associated with another Link flow (ROHC channel) is sent on this Link flow (ROHC channel), then this field shall be set to '1'. Otherwise, this field shall be set to '0'.

FeedbackFor

If FeedbackForIncluded is set to '0', then the sender shall omit this field. Otherwise, the sender shall set this field to the Link flow number (ROHC channel) to which ROHC feedback sent on this Link flow (ROHC channel) refers.

MRRU

The sender shall set this field to the MRRU parameter for this ROHC channel. The sender shall not set this field to a value greater than MaxSupportedMRRU.

TimerBasedCompression

The sender shall set this field to '0' if timer based compression according to [6] is not enabled for this ROHC channel. The sender shall set this field to '1' if timer based compression according to [6] is

- 1 enabled for this ROHC channel. If `TimerBasedCompressionSupported`  
 2 is set to '0', then the sender shall not set this field to '1'.
- 3 **ProfileCount** The sender shall set this field to the number of ROHC profiles  
 4 supported by the decompressor.
- 5 **Profile** The sender shall set this field to the ROHC profile supported by the  
 6 decompressor according to [6]. The sender shall not set this field to a  
 7 value that is not included in the list of supported profiles.
- 8 **Reserved** The sender shall add reserved bits to make the length of the entire  
 9 record an integer number of octets. The sender shall set these bits to  
 10 '0'. The receiver shall ignore this field.

#### 11 2.9.2.17 FlowNNRouteProtocolParametersFwd Attribute

12 *NN* is the two-digit hexadecimal forward Link flow number, where hexadecimal digits A  
 13 through F are specified in upper case letters.

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProtocolID	8	0x00
ProtocolParametersLength	8	0x00
ProtocolParameters	ProtocolParametersLength × 8	N/A

- 15 **Length** Length of the complex attribute in octets. The sender shall set this  
 16 field to the length of the complex attribute excluding the Length field.
- 17 **AttributeID** The sender shall set this field to 0x0d*NN*, where *NN* is a two-digit  
 18 hexadecimal forward Link flow number.
- 19 **ValueID** The sender shall set this field to an identifier assigned to this complex  
 20 value.
- 21 **ProtocolID** The sender shall set this field to an identifier for the Route Protocol as  
 22 specified in [3].
- 23 **ProtocolParametersLength**  
 24 If the ProtocolParameters record is omitted, then the sender shall set  
 25 this field to 0x00. Otherwise, the sender shall set this field to the  
 26 length of the ProtocolParameters record in units of octets.

1 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
 2 ProtocolID is 0x04, then the sender shall set this field as defined in  
 3 2.9.2.15.1. If ProtocolID is less than 0x04, the sender shall omit this  
 4 record.

#### 5 2.9.2.18 FlowNNRouteProtocolParametersRev Attribute

6 NN is the two-digit hexadecimal reverse Link flow number, where hexadecimal digits A  
 7 through F are specified in upper case letters.

8

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProtocolID	8	0x00
ProtocolParametersLength	8	0x00
ProtocolParameters	ProtocolParametersLength × 8	N/A

9 Length Length of the complex attribute in octets. The sender shall set this  
 10 field to the length of the complex attribute excluding the Length field.

11 AttributeID The sender shall set this field to 0x0eNN, where NN is a two-digit  
 12 hexadecimal reverse Link flow number.

13 ValueID The sender shall set this field to an identifier assigned to this complex  
 14 value.

15 ProtocolID The sender shall set this field to an identifier for the Route Protocol as  
 16 specified in [3].

#### 17 ProtocolParametersLength

18 If the ProtocolParameters field is omitted, then the sender shall set  
 19 this field to 0x00. Otherwise, the sender shall set this field to the  
 20 length of the ProtocolParameters record in units of octets.

21 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
 22 ProtocolID is 0x04, then the sender shall set this field as defined in  
 23 2.9.2.16.1.

#### 24 2.9.2.19 ReservationKKBCMCSFlowIDAssociation Attribute

25 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
 26 are specified in upper case letters.

27

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One occurrence of the following record:

ValueID	8	N/A
BCMCSFlowCount	8	<b>0x00</b>

BCMCSFlowCount occurrences of the following record:

BCMCSFlowID	32	N/A
-------------	----	-----

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x11KK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 BCMCSFlowCount The sender shall set this field to the number of BCMCS Flow  
8 identifiers associated with this reservation.
- 9 BCMCSFlowID The sender shall set this field to the BCMCS Flow identifier(s) of the  
10 BCMCS Flow(s) that are associated with this reservation.
- 11 2.9.2.20 ReservationKKBCMCSProgramIDAssociation Attribute
- 12 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
13 are specified in upper case letters.  
14

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One occurrence of the following record:

ValueID	8	N/A
ProgramCount	8	<b>0x00</b>

ProgramCount occurrences of the following record:

ProgramIDLSBLength	8	N/A
ProgramIDLSBs	32	N/A
FlowDiscriminatorCount	8	N/A

FlowDiscriminatorCount occurrences of the following record:

FlowDiscriminator	8	N/A
-------------------	---	-----

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x12KK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 ProgramCount The sender shall set this field to the number of BCMCS Programs  
8 that is associated with this reservation.
- 9 ProgramIDLSBLength The sender shall set this field to the valid number of the least  
10 significant bits of the ProgramID of the BCMCS Program that is  
11 associated with this reservation.
- 12 ProgramIDLSBs The sender shall set this field to the ProgramIDLSBLength least  
13 significant bits of Program ID of the BCMCS Program that is  
14 associated with this reservation.
- 15 FlowDiscriminatorCount The sender shall set this field to the number of Flow  
16 Discriminators for the Program that is associated with this  
17 reservation. If all the Flow Discriminators for this ProgramID is  
18 associated with this reservation, then the sender shall set this field to  
19 0.
- 20 FlowDiscriminator The sender shall set this field to the Flow Discriminator that is  
21 associated with this reservation.

## 2.10 Session State Information

The Session State Information record (see [8]) consists of parameter records.

This application defines the following parameter records in addition to the configuration attributes for this application.

### 2.10.1 Location Parameter

**Table 2.10.1-1. The Format of the Parameter Record for the Location Parameter**

Field	Length (bits)
ParameterType	8
Length	8
LocationType	8
LocationValue	$8 \times (\text{Length} - 2)$

**ParameterType** This field shall be set to 0x01 for this parameter record.

**Length** This field shall be set to the length of this parameter record in units of octets excluding the Length field.

**LocationType** This field shall be set to the value of LocationType associated with the access terminal's session.

**LocationValue** This field shall be set to the stored value of LocationValue associated with the access terminal's session.

### 2.10.2 FlowControlState Parameter

**Table 2.10.2-1. The Format of the Parameter Record for the FlowControlState Parameter**

Field	Length (bits)
ParameterType	8
Length	8
FlowControlState	8

**ParameterType** This field shall be set to 0x02 for this parameter record.

**Length** This field shall be set to the length of this parameter record in units of octets excluding the Length field.

**FlowControlState** This field shall be set to 0x00 if the state of the Flow Control Protocol associated with the access terminal's session is Close. Otherwise, this field shall be set to 0x01. All the other values for this field are reserved.



## 2.10.3 DataOverSignalingMessageSequence Parameter

**Table 2.10.3-1. The Format of the Parameter Record for the DataOverSignalingMessageSequence Parameter**

Field	Length (bits)
ParameterType	8
Length	8
Reserved1	2
ReceivePointerA	6
Reserved2	2
TransmitPointerA	6
Reserved3	2
ReceivePointerB	6
Reserved4	2
TransmitPointerB	6

4	ParameterType	This field shall be set to 0x03 for this parameter record.
5	Length	This field shall be set to the length of this parameter record in units of octets excluding the Length field.
6		
7	Reserved1	The sender shall set this field to '00'. The receiver shall ignore this field.
8		
9	ReceivePointerA	This field shall be set to the value of the receive pointer for DataOverSignaling message validation on Route A, $V(R_A)$ .
10		
11	Reserved2	The sender shall set this field to '00'. The receiver shall ignore this field.
12		
13	TransmitPointerA	This field shall be set to the value of the transmit pointer for DataOverSignaling message validation on Route A, $V(S_A)$ .
14		
15	Reserved3	The sender shall set this field to '00'. The receiver shall ignore this field.
16		
17	ReceivePointerB	This field shall be set to the value of the receive pointer for DataOverSignaling message validation on Route B, $V(R_B)$ .
18		
19	Reserved4	The sender shall set this field to '00'. The receiver shall ignore this field.
20		

1 TransmitPointerB This field shall be set to the value of the transmit pointer for  
 2 DataOverSignaling message validation on Route B,  $V(S_B)$ .

3 2.10.4 StorageBLOB Parameter

4 **Table 2.10.4-1. The Format of the Parameter Record for the StorageBLOB Parameter**

Field	Length (bits)
ParameterType	8
Length	8
StorageBLOBType	16
StorageBLOBLength	8
StorageBLOB	0 or $8 \times \text{StorageBLOBLength}$

5 ParameterType This field shall be set to 0x04 for this parameter record.

6 Length This field shall be set to the length of this parameter record in units  
 7 of octets excluding the Length field.

8 StorageBLOBType This field shall be set to zero if the value of its stored StorageBLOB is  
 9 NULL; otherwise, this field shall be set to the stored value of  
 10 StorageBLOBType.

11 StorageBLOB Length  
 12 This field shall be set to zero if the value of its stored StorageBLOB is  
 13 NULL; otherwise, this field shall be set to the stored value of  
 14 StorageBLOB Length.

15 StorageBLOB This field shall be omitted if the value of the stored StorageBLOB is  
 16 NULL; otherwise, this field shall be set to the stored value of  
 17 StorageBLOB.

## 1 2.10.5 ReservationState Parameter

2 **Table 2.10.5-1. The Format of the Parameter Record for the ReservationState**  
3 **Parameter**

Field	Length (bits)
ParameterType	8
Length	8
OpenReservationCount	8
OpenReservationCount occurrences of the following record:	
Link	1
ReservationLabel	8
Reserved	0 – 7 (as needed)

- 4 ParameterType This field shall be set to 0x05 for this parameter record.
- 5 Length This field shall be set to the length of this parameter record in units  
6 of octets excluding the Length field.
- 7 OpenReservationCount  
8 This field shall be set to the number of Reservations that are in the  
9 Open state.
- 10 Link This field shall be set to '1' for a forward link Reservation, and to '0'  
11 for a reverse link Reservation.
- 12 ReservationLabel This field shall be set to the ReservationLabel.
- 13 Reserved The sender shall add reserved bits to make the length of the entire  
14 parameter an integer number of octets. The sender shall set these  
15 bits to zero. The receiver shall ignore this field

## 2.10.6 RouteState Parameter

**Table 2.10.6-1. The Format of the Parameter Record for the RouteState Parameter**

Field	Length (bits)
ParameterType	8
Length	8
RouteSelectionProtocolState	2
NextRouteSelectTransactionID	8
NextActivateRouteTransactionID	8
Reserved	6

ParameterType This field shall be set to 0x06 for this parameter record.

Length This field shall be set to the length of this parameter record in units of octets excluding the Length field.

RouteSelectionProtocolState

This field shall be set to indicate the state of Route Selection Protocol according to Table 2.10.6-2.

**Table 2.10.6-2. RouteSelectionProtocolState Encoding**

State	Value
A Open B Setting	'00'
A Open B Rising	'01'
A Setting B Open	'10'
A Rising B Open	'11'

NextRouteSelectTransactionID

This field shall be set to the TransactionID field of the next RouteSelect message that will be sent.

NextActivateRouteTransactionID

This field shall be set to the TransactionID field of the next ActivateRoute message that will be sent.

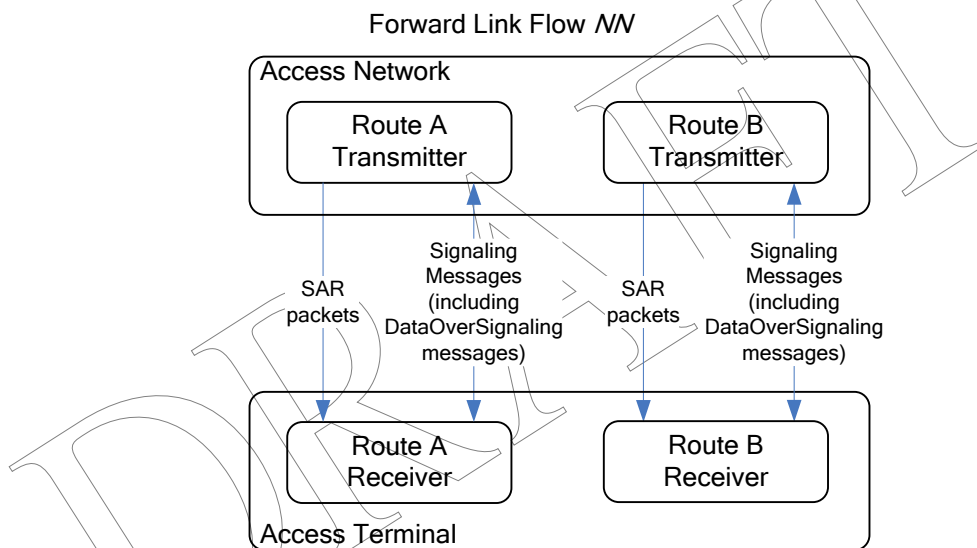
Reserved This field shall be set to '000000'. The receiver shall ignore this field.

### 3 MULTI-LINK MULTI-FLOW PACKET APPLICATION

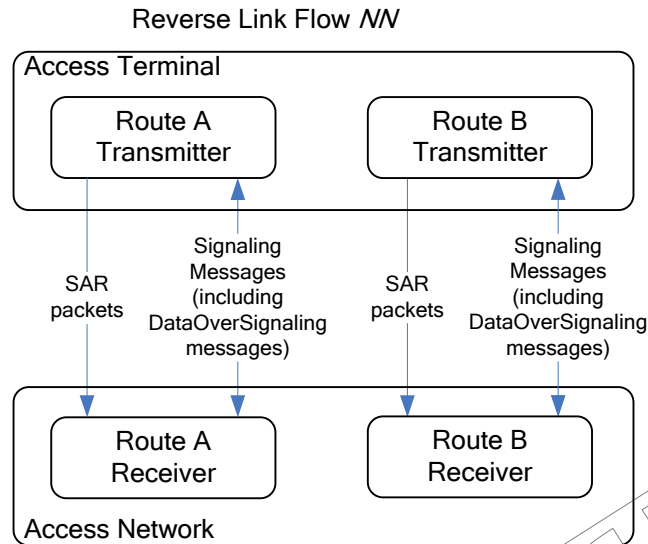
#### 3.1 Introduction

##### 3.1.1 General Overview

The Multi-link Multi-flow Packet Application provides multiple octet or packet streams that can be used to carry octets or packets between the access terminal and the access network. Each octet or packet stream is called a Link Flow. Each Link Flow provides two routes for transmission and reception of payloads from the higher layer. These routes are named Route A and Route B and can be carried using a single receiver-transmitter pair. Each route is associated with a transmitter-receiver pair. Figure 3.1.1-1 shows the association between a forward Link Flow and the transmitters and receivers for its two routes. Figure 3.1.1-2 shows the reference architecture for a reverse Link Flow.

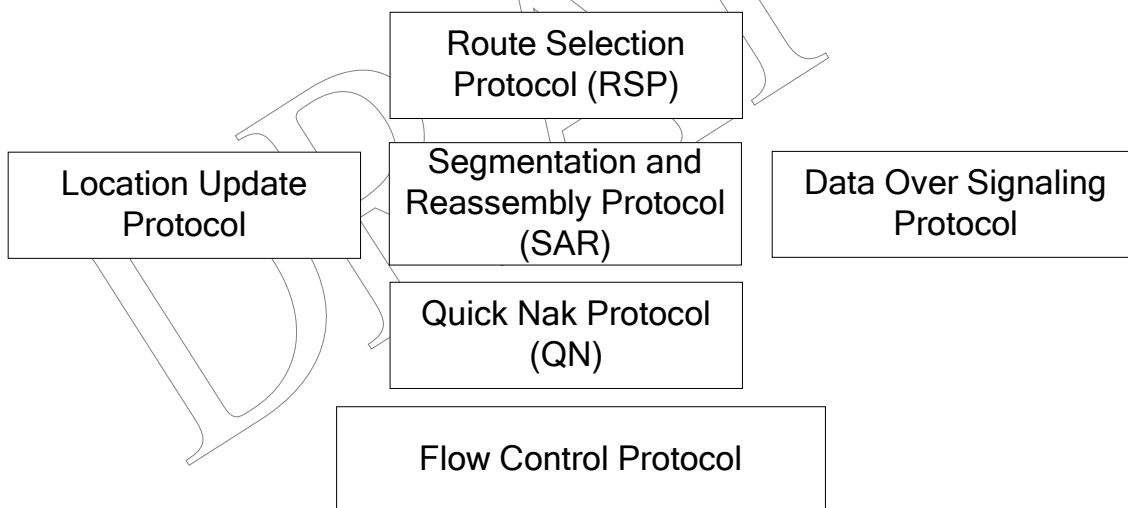


**Figure 3.1.1-1. Reference Architecture for a Forward Link Flow**



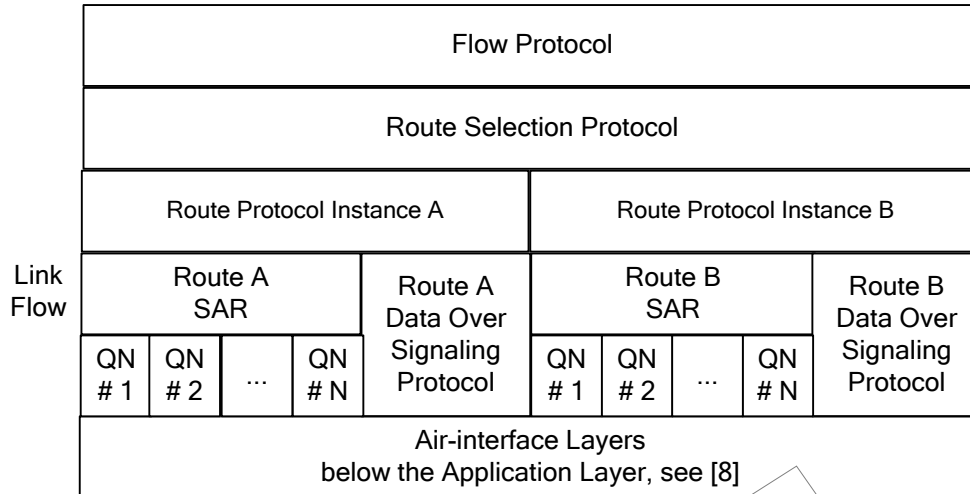
**Figure 3.1.1-2. Reference Architecture for a Reverse Link Flow**

The relationship between the Multi-link Multi-flow Packet Application protocols is illustrated in Figure 3.1.1-3.



**Figure 3.1.1-3. Multi-link Multi-flow Packet Application Protocols**

Figure 3.1.1-4 illustrates the relationship for each Link Flow between the Multi-link Multi-flow Packet Application and the higher layer protocols supported by the Multi-link Multi-flow Packet Application. The Flow Protocol and the Route Protocol are referred to as higher layer protocols. The protocols defined in the Multi-link Multi-flow Packet Application are shown shaded. The Route Selection Protocol routes Flow Protocol PDUs to either instance A or instance B of the Route Protocol. Instance A of the Route Protocol is bound to Route A of the Link Flow. Instance B of the Route Protocol is bound to Route B of the Link Flow.



**Figure 3.1.1-4. Relationship for each Link Flow between Multi-link Multi-flow Packet Application and Higher Layer Protocols**

The Multi-link Multi-flow Packet Application provides:

- the functionality defined in [1],
- the Route Selection Protocol, which routes Flow Protocol PDUs over either Route A or Route B of a Link Flow.
- the Segmentation and Reassembly (SAR) Protocol, which provides retransmission (if needed) and duplicate detection of higher layer octets or packets transmitted on each route,
- the Quick Nak Protocol, which provides indication of erased higher layer octets or packets,
- the Data Over Signaling Protocol, which provides transmission and duplicate detection of higher layer data packets transmitted on each route using signaling messages,
- the Location Update Protocol, which defines location update procedures and messages in support of mobility management for the Packet Application,
- the Flow Control Protocol, which provides flow control for the Multi-link Multi-flow Packet Application, and
- ability to negotiate Route Protocol and Flow Protocol parameters.

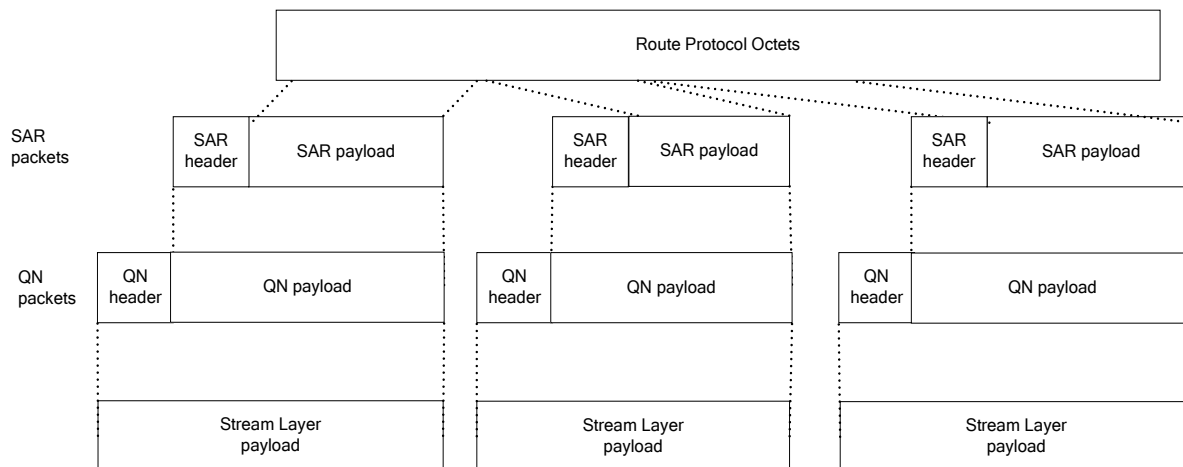
This application uses the Signaling Application to transmit and receive messages.

### 3.1.2 Public Data

- Subtype for this application

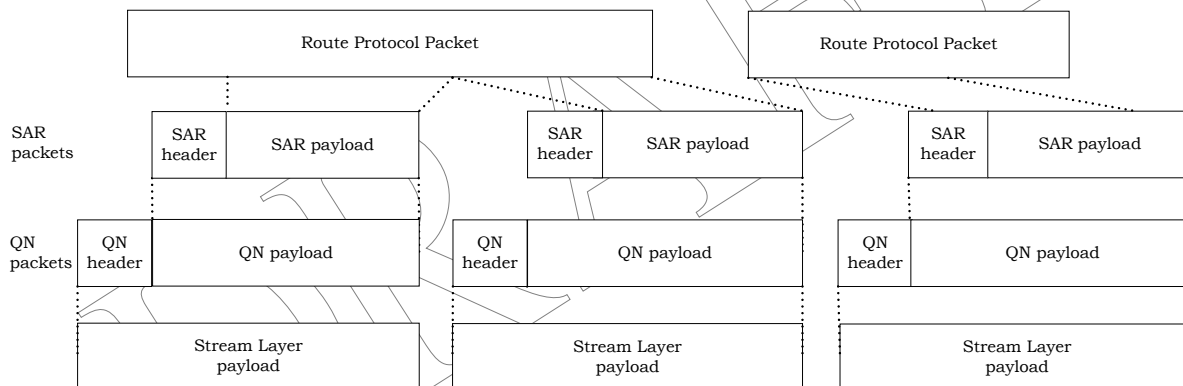
### 3.1.3 Data Encapsulation for the InUse Instance of the Application

Figure 3.1.3-1 illustrates the relationship between octets from the Route Protocol, SAR packets, QN packets, and Stream Layer payload for the case when the Link Flow carries an octet stream.



**Figure 3.1.3-1. Multi-link Multi-flow Packet Application Encapsulation when the Link Flow carries an Octet Stream**

Figure 3.1.3-2 illustrates the relationship between packets from the Route Protocol, SAR packets, QN packets, and Stream Layer payload for the case when the Link Flow carries a packet stream.



**Figure 3.1.3-2. Multi-link Multi-flow Packet Application Encapsulation when the Link Flow carries a Packet Stream**

### 3.2 Protocol Initialization

#### 3.2.1 Protocol Initialization for the InConfiguration Application Instance

Upon creation, the InConfiguration instance of this application in the access terminal and the access network shall perform the following in the order specified:

- The fall-back values of the attributes for this application instance shall be set to the default values specified for each attribute.



- 1 • If the InUse instance of this application (i.e., corresponding to the stream to which this  
2 application is bound) has the same application subtype as this InConfiguration  
3 application instance, then the fall-back values of the attributes defined by the  
4 InConfiguration application instance shall be set to the corresponding attribute values  
5 for the InUse application instance.
- 6 • The value for each attribute for this application instance shall be set to the fall-back  
7 value for that attribute.
- 8 • The value of the InConfiguration application instance public data shall be set to the  
9 value of the corresponding InUse application instance public data.
- 10 • The value of the application subtype associated with the InConfiguration application  
11 instance shall be set to the application subtype that identifies this application.

### 12 **3.3 Procedures and Messages for the InConfiguration Instance of the Packet** 13 **Application**

#### 14 3.3.1 Procedures

15 This protocol uses the Generic Configuration Protocol (see [8]) to define the processing of  
16 the configuration messages.

17 The Multi-link Multi-Flow Packet Application shall not be bound to a virtual stream.

18 The access terminal shall not send a ConfigurationRequest message containing the  
19 ReservationKKQoSResponseFwd attribute. The access network shall not send a  
20 ConfigurationRequest message containing the ReservationKKQoSRequestFwd attribute. The  
21 access terminal shall not send a ConfigurationRequest message containing the  
22 ReservationKKQoSResponseRev attribute. The access network shall not send a  
23 ConfigurationRequest message containing the ReservationKKQoSRequestRev attribute.

24 The access terminal shall not initiate negotiation of the ANSupportedQoSProfiles attribute.  
25 The access network shall not initiate negotiation of the ATSupportedQoSProfiles attribute.  
26 The access terminal should include supported values of ProfileValue with ProfileType equal  
27 to 0x04 in the ATSupportedQoSProfiles attribute during the AT Initiated state of the Session  
28 Configuration Protocol. The access network shall include all supported values of  
29 ProfileValue with ProfileType equal to 0x04 in the ANSupportedQoSProfiles attribute during  
30 the AN Initiated state of the Session Configuration Protocol. The access terminal shall use  
31 the ProfileType 0x00, 0x01, or 0x02 in the ReservationKKQoSRequestFwd or the  
32 ReservationKKQoSRequestRev attributes. The access network shall use ProfileType 0x00 or  
33 0x03 in the ReservationKKQoSResponseFwd or the ReservationKKQoSResponseRev  
34 attributes.

35 The access network shall not initiate negotiation of the  
36 ATSupportedFlowProtocolParametersPP attribute. The access network shall not initiate  
37 negotiation of the ATSupportedRouteProtocolParametersPP attribute.

38 The access network shall not initiate negotiation of the MaxLinkFlows attribute.

1 The access network and access terminal shall not propose value of MaxAbortTimer that is  
 2 less than any of the AbortTimer values in FlowNMTimersFwd and FlowNMTimersRev  
 3 Attributes.

### 4 3.3.2 Commit Procedures

5 The access terminal and the access network shall perform the procedures specified in this  
 6 section, in the order specified, when directed by the InUse instance of the Session  
 7 Configuration Protocol to execute the Commit procedures:

- 8 • All the public data that are defined by this application, but are not defined by the InUse  
 9 application instance shall be added to the public data of the InUse application.
- 10 • If the InUse instance of this application (corresponding to the stream to which this  
 11 application is bound) has the same subtype as this application instance, then
  - 12 – The access terminal and the access network shall set the attribute values  
 13 associated with the InUse instance of this application to the attribute values  
 14 associated with the InConfiguration instance of this application, and
  - 15 – The access terminal and the access network shall purge the InConfiguration  
 16 instance of the application.
- 17 • If the InUse instance of this application (corresponding to the stream to which this  
 18 application is bound) does not have the same subtype as this application instance, then:
  - 19 – The access terminal and the access network shall initialize a receive pointer for  
 20 DataOverSignaling message validation on Route A,  $V(R_A)$ , to 63.
  - 21 – The access terminal and the access network shall initialize a receive pointer for  
 22 DataOverSignaling message validation on Route B,  $V(R_B)$ , to 63.
  - 23 – The access terminal and the access network shall initialize a transmit pointer  
 24 for DataOverSignaling message validation on Route A,  $V(S_A)$ , to zero.
  - 25 – The access terminal and the access network shall initialize a transmit pointer  
 26 for DataOverSignaling message validation on Route B,  $V(S_B)$ , to zero.
  - 27 – The access terminal and the access network shall set the StorageBLOB  
 28 parameter of the Location Update Protocol to NULL.
  - 29 – The initial state of the Flow Control Protocol associated with the  
 30 InConfiguration instance of the Packet Application at the access terminal and  
 31 access network shall be set to the Close State.
  - 32 – The access network shall set the Forward Reservations with ReservationLabel  
 33 0xff and 0xfe to the Open state.<sup>15</sup>
  - 34 – The access terminal shall set the Reverse Reservations with ReservationLabel  
 35 0xff and 0xfe to the Open state.

---

<sup>15</sup> Forward and reverse link Reservations 0xff initialized in the Open state so that data can be sent without having to perform a state transition.

- 1           – The access network shall set the Forward Reservations with ReservationLabel  
2 not equal to 0xff or 0xfe to the Close state.
- 3           – The access terminal shall set the Reverse Reservations with ReservationLabel  
4 not equal to 0xff or 0xfe to the Close state.
- 5           – The Route Selection Protocol at the access terminal shall enter the A Open B  
6 Setting state (See Figure 3.4.4.1.2-1).
- 7           – The InConfiguration instance of the Packet Application at the access terminal  
8 and access network shall become the InUse instance for the Packet Application  
9 (corresponding to the stream to which this application is bound).
- 10       • All the public data not defined by this application shall be removed from the public data  
11 of the InUse application.

### 12 3.3.3 Message Formats

#### 13 3.3.3.1 ConfigurationRequest

14 The ConfigurationRequest message format is as follows:

15

Field	Length (bits)
MessageID	8
TransactionID	8

Zero or more instances of the following record

AttributeRecord	Attribute dependent
-----------------	---------------------

16 MessageID           The sender shall set this field to 0x50.

17 TransactionID       The sender shall increment this value for each new  
18 ConfigurationRequest message sent.

19 AttributeRecord     The format of this record is specified in [8].

20

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

#### 21 3.3.3.2 ConfigurationResponse

22 The ConfigurationResponse message format is as follows:

23

Field	Length (bits)
MessageID	8
TransactionID	8

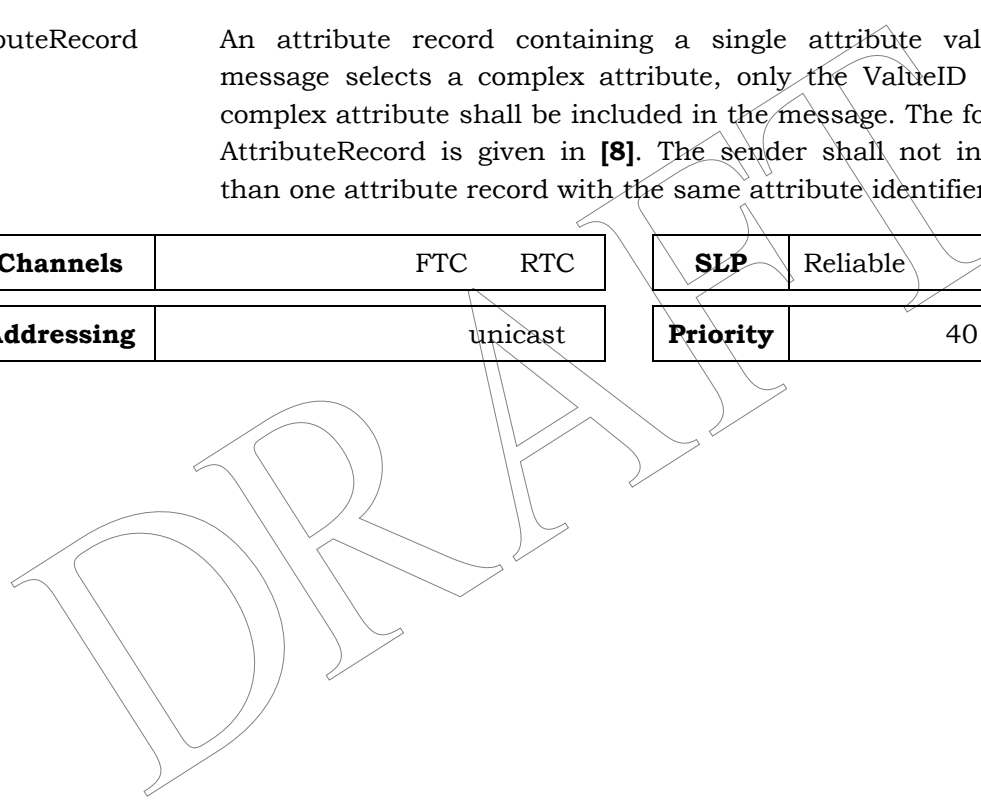
Zero or more instances of the following record

AttributeRecord	Attribute dependent
-----------------	---------------------

- 1 MessageID                    The sender shall set this field to 0x51.
- 2 TransactionID                The sender shall set this value to the TransactionID field of the
- 3                                    corresponding ConfigurationRequest message.
- 4 AttributeRecord              An attribute record containing a single attribute value. If this
- 5                                    message selects a complex attribute, only the ValueID field of the
- 6                                    complex attribute shall be included in the message. The format of the
- 7                                    AttributeRecord is given in [8]. The sender shall not include more
- 8                                    than one attribute record with the same attribute identifier.
- 9

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

10



## 3.4 Route Selection Protocol

### 3.4.1 Overview

The Route Selection Protocol provides means to select either instance A or instance B of the Route Protocol. The Route Selection Protocol routes Flow Protocol PDUs to the selected instance of the Route Protocol. Instance A of the Route Protocol is bound to Route A of the Link Flow. Instance B of the Route Protocol is bound to Route B of the Link Flow. The Route Selection Protocol is a protocol associated with the Multi-link Multi-flow Packet Application. The application subtype for this application is defined in [3].

### 3.4.2 Primitives and Public Data

#### 3.4.2.1 Commands

This protocol does not define any commands.

#### 3.4.2.2 Return Indications

This protocol does not return any indications.

#### 3.4.3 Protocol Data Unit

The Route Selection Protocol routes Flow Protocol PDUs to the Route Protocol without modifying them. Hence, the transmission unit of this protocol is the same as a Flow Protocol PDU. The Flow Protocol for a forward Link Flow *NN* is identified by the ProtocolID field of the Flow*NN*FlowProtocolParametersFwd attribute. The Flow Protocol for a reverse Link Flow *NN* is identified by the ProtocolID field of the Flow*NN*FlowProtocolParametersRev attribute.

### 3.4.4 Procedures and Messages for the InUse Instance of the Protocol

#### 3.4.4.1 Procedures

##### 3.4.4.1.1 General Requirements

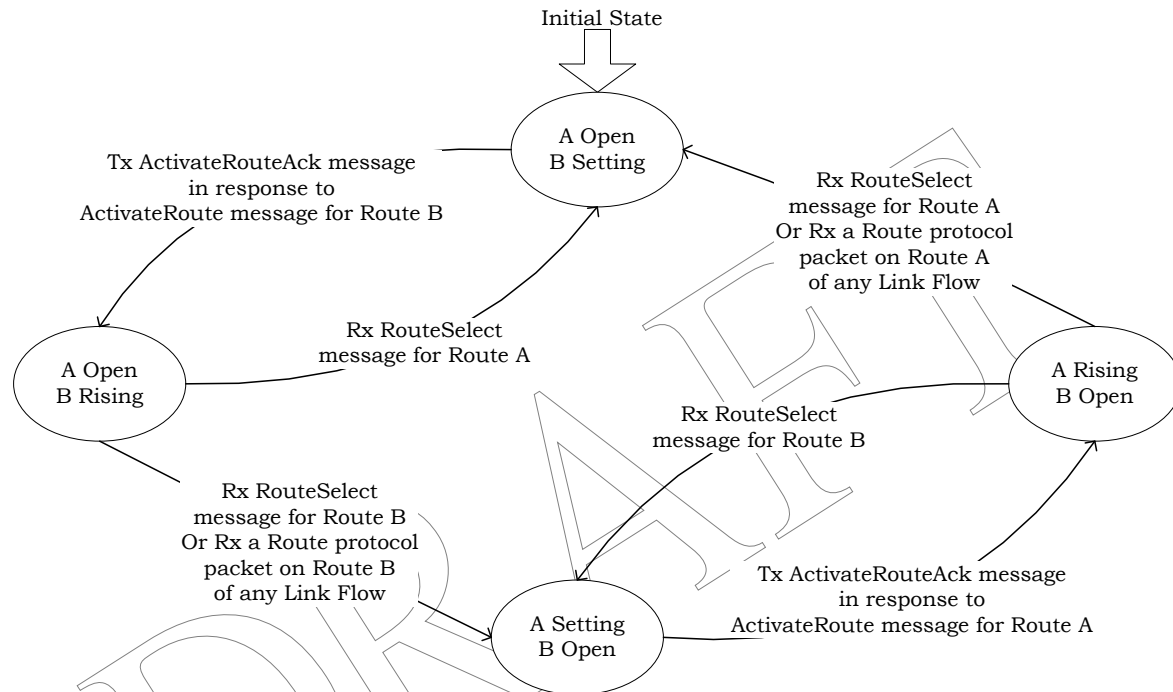
If the Flow*NN*FlowProtocolPDUFwd attribute of forward Link Flow *NN* is 0x00, then forward Link Flow *NN* provides an octet stream to the Flow Protocol. If the Flow*NN*FlowProtocolPDUFwd attribute of forward Link Flow *NN* is 0x01, then forward Link Flow *NN* provides a packet stream to the Flow Protocol.

If the Flow*NN*FlowProtocolPDUREv attribute of reverse Link Flow *NN* is 0x00, then reverse Link Flow *NN* provides an octet stream to the Flow Protocol. If the Flow*NN*FlowProtocolPDUREv attribute of reverse Link Flow *NN* is 0x01, then reverse Link Flow *NN* provides a packet stream to the Flow Protocol.

##### 3.4.4.1.2 Access Terminal Requirements

The Route Selection Protocol associated with an activated Link Flow can be in one of four states: A Open B Setting, A Open B Rising, A Setting B Open, or A Rising B Open. The

1 Route Selection Protocol instance associated with all activated Link Flows shall be in the  
 2 same state at any time. When a Link Flow is activated, the Route Selection Protocol shall  
 3 enter the state that the Route Selection Protocols of other activated Link Flows are in. If no  
 4 other Link Flows are activated when a Link Flow is activated, then the Route Selection  
 5 Protocol shall enter the A Open B Setting state. If the Route Selection Protocol receives a  
 6 *ConnectedState.ConnectionClosed* indication or *RouteUpdate.ConnectionLost* indication, it  
 7 shall enter the A Open B Setting state. Figure 3.4.4.1.2-1 shows the state diagram for the  
 8 Route Selection Protocol at the access terminal.



9  
 10 **Figure 3.4.4.1.2-1. Route Selection Protocol State Diagram (Access Terminal)**

### 11 3.4.4.1.2.1 A Open B Setting State

#### 12 3.4.4.1.2.1.1 State Transitions

13 Upon receiving an *ActivateRoute* message requesting to activate Route B, the access  
 14 terminal shall perform the following:

- 15 • If *TwoRoutesSupported* is 0x01, the access terminal shall perform the following:
  - 16 • The Route Selection Protocol shall issue a *SAR.InitializeRoute* command with Route B
  - 17 as the argument.
  - 18 • The access terminal shall initialize the Route Protocol bound to Route B.
  - 19 • After the Segmentation and Reassembly Protocol and the Route Protocol are
  - 20 initialized, the access terminal shall send an *ActivateRouteAck* message, and shall
  - 21 transition to the A Open B Rising state.
- 22 • Otherwise, the access terminal shall ignore the *ActivateRoute* message.

1 Upon receiving a RouteSelect message for Route A, the access terminal shall respond with a  
2 RouteSelectAck message.

#### 3 3.4.4.1.2.1.2 Transmitter Requirements

4 The access terminal shall route Flow Protocol PDUs to Route A. The access terminal shall  
5 not route Flow Protocol PDUs to Route B.

#### 6 3.4.4.1.2.1.3 Receiver Requirements if TwoRoutesSupported is 0x00

7 The access terminal shall pass Flow Protocol PDUs received on Route A to the Flow  
8 Protocol. The access terminal shall discard Flow Protocol PDUs received on Route B.

#### 9 3.4.4.1.2.1.4 Receiver Requirements if TwoRoutesSupported is 0x01

10 The access terminal shall pass Flow Protocol PDUs received on Route A to the Flow  
11 Protocol.

12 If the FlowNNSimultaneousDeliveryOnBothRoutesFwd attribute for Link Flow *NN* is 0x01,  
13 the access terminal shall perform the following: the access terminal shall pass Flow Protocol  
14 PDUs received on Route B of the Link Flow to the Flow Protocol if the access terminal has  
15 not received an ActivateRoute message requesting to activate Route B since the last time it  
16 entered this state; otherwise, the access terminal shall discard Flow Protocol PDUs received  
17 on Route B.

18 If the FlowNNSimultaneousDeliveryOnBothRoutesFwd attribute for Link Flow *NN* is 0x00,  
19 the access terminal shall perform the following: the access terminal shall pass Flow  
20 Protocol PDUs received on Route B of the Link Flow to the Flow Protocol if the access  
21 terminal has not passed Flow Protocol PDUs received on Route A of the Link Flow to the  
22 Flow Protocol since the last time the access terminal entered this state and if the access  
23 terminal has not received an ActivateRoute message requesting to activate Route B since  
24 the last time it entered this state; otherwise, the access terminal shall discard Flow Protocol  
25 PDUs received on Route B of the Link Flow.

#### 26 3.4.4.1.2.2 A Open B Rising State

##### 27 3.4.4.1.2.2.1 State Transitions

28 Upon receiving a RouteSelect message requesting to select Route B<sup>16</sup>, the access terminal  
29 shall respond with a RouteSelectAck message, and shall transition to the A Setting B Open  
30 state. Upon receiving Flow Protocol PDU on Route B of any Link Flow<sup>17</sup>, the access terminal  
31 shall store the Flow Protocol PDU received from Route B for processing in the A Setting B  
32 Open state and shall transition to the A Setting B Open state.

---

<sup>16</sup> The access terminal could wait to send RouteSelectAck message and transition state until the next Flow protocol packet boundary

<sup>17</sup> The access terminal could wait to transition state until the next Flow protocol packet boundary.

1 Upon receiving a RouteSelect message requesting to select Route A, the access terminal  
2 shall respond with a RouteSelectAck message, and shall transition to the A Open B Setting  
3 state.

4 If the access terminal receives an ActivateRoute message, the message shall be ignored.

#### 5 3.4.4.1.2.2.2 Transmitter Requirements

6 The access terminal shall route Flow Protocol PDUs to Route A. The access terminal shall  
7 not route Flow Protocol PDUs to Route B.

#### 8 3.4.4.1.2.2.3 Receiver Requirements

9 The access terminal shall pass Flow Protocol PDUs received on Route A to the Flow  
10 Protocol.

#### 11 3.4.4.1.2.3 A Setting B Open State

##### 12 3.4.4.1.2.3.1 State Transitions

13 Upon receiving an ActivateRoute message requesting to activate Route A, the access  
14 terminal shall perform the following:

- 15 • The Route Selection Protocol shall issue a *SAR.InitializeRoute* command with Route A as  
16 the argument.
- 17 • The access terminal shall initialize the Route Protocol bound to Route A.
- 18 • After the Segmentation and Reassembly Protocol and the Route Protocol are initialized,  
19 the access terminal shall send an ActivateRouteAck message, and shall transition to the  
20 A Rising B Open state.

21 Upon receiving a RouteSelect message for Route B, the access terminal shall respond with a  
22 RouteSelectAck message.

##### 23 3.4.4.1.2.3.2 Transmitter Requirements

24 The access terminal shall route Flow Protocol PDUs to Route B. The access terminal shall  
25 not route Flow Protocol PDUs to Route A.

##### 26 3.4.4.1.2.3.3 Receiver Requirements

27 The access terminal shall pass Flow Protocol PDUs received on Route B to the Flow  
28 Protocol.

29 If the *FlowNNSimultaneousDeliveryOnBothRoutesFwd* attribute for Link Flow *NW* is 0x01,  
30 the access terminal shall perform the following: the access terminal shall pass Flow Protocol  
31 PDUs received on Route A of the Link Flow to the Flow Protocol if the access terminal has  
32 not received an ActivateRoute message requesting to activate Route A since the last time it  
33 entered this state; otherwise, the access terminal shall discard Flow Protocol PDUs received  
34 on Route A.



1 If the *FlowNNSimultaneousDeliveryOnBothRoutesFwd* attribute for Link Flow *NV* is 0x00,  
2 the access terminal shall perform the following: the access terminal shall pass Flow Protocol  
3 PDUs received on Route A of the Link Flow to the Flow Protocol if the access terminal has  
4 not passed Flow Protocol PDUs received on Route B of the Link Flow to the Flow Protocol  
5 since the last time the access terminal entered this state and if the access terminal has not  
6 received an *ActivateRoute* message requesting to activate Route A since the last time it  
7 entered this state; otherwise, the access terminal shall discard Flow Protocol PDUs received  
8 on Route A of the Link Flow.

#### 9 3.4.4.1.2.4 A Rising B Open State

##### 10 3.4.4.1.2.4.1 State Transitions

11 Upon receiving a *RouteSelect* message requesting to select Route A<sup>18</sup>, the access terminal  
12 shall respond with a *RouteSelectAck* message, and shall transition to the A Open B Setting  
13 state. Upon receiving Flow Protocol PDU on Route A of any Link Flow<sup>19</sup>, the access terminal  
14 shall store the Flow Protocol PDU received on Route A for processing in the A Open B  
15 Setting state and shall transition to the A Open B Setting state.

16 Upon receiving a *RouteSelect* message requesting to select Route B, the access terminal  
17 shall respond with a *RouteSelectAck* message, and shall transition to the A Setting B Open  
18 state.

19 If the access terminal receives an *ActivateRoute* message, the message shall be ignored.

##### 20 3.4.4.1.2.4.2 Transmitter Requirements

21 The access terminal shall route Flow Protocol PDUs to Route B. The access terminal shall  
22 not route Flow Protocol PDUs to Route A.

##### 23 3.4.4.1.2.4.3 Receiver Requirements

24 The access terminal shall pass Flow Protocol PDUs received on Route B to the Flow  
25 Protocol.

##### 26 3.4.4.1.3 Access Network Requirements

27 If *TwoRoutesSupported* attribute is 0x00, then the access network shall not send  
28 *ActivateRoute* or *RouteSelect* messages.

29 Upon sending an *ActivateRoute* message requesting to activate Route A, the access network  
30 shall issue a *SAR.InitializeRoute* command with Route A as the argument and initialize the  
31 Route Protocol bound to Route A.

---

<sup>18</sup> The access terminal could wait to send *RouteSelectAck* message and transition state until the next Flow protocol packet boundary.

<sup>19</sup> The access terminal could wait to transition state until the next Flow protocol packet boundary.

1 Upon sending an ActivateRoute message requesting to activate Route B, the access network  
 2 shall issue a *SAR.InitializeRoute* command with Route B as the argument and initialize the  
 3 Route Protocol bound to Route B.

#### 4 3.4.4.2 Message Formats

##### 5 3.4.4.2.1 RouteSelect

6 The access network sends this message to transition the access terminal to the A Open B  
 7 Setting or the A Setting B Open state.

8

Field	Length (bits)
MessageID	8
TransactionID	8
Route	1
Reserved	7

9 MessageID The access network shall set this field to 0x1e.

10 TransactionID The access network shall set this field to one more (modulo 256) than  
 11 the TransactionID field of the last RouteSelect message sent by the  
 12 access network.

13 Route The access network shall set this field to '0' to transition the access  
 14 terminal to the A Open B Setting state. The access network shall set  
 15 this field to '1' to transition the access terminal to the A Setting B  
 16 Open state.

17 Reserved The access network shall set this field to '0000000'. The access  
 18 terminal shall ignore this field.

19

<b>Channels</b>	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	40

##### 20 3.4.4.2.2 RouteSelectAck

21 The access terminal sends this message to acknowledge the receipt of a RouteSelect  
 22 message.

23

Field	Length (bits)
MessageID	8
TransactionID	8

24 MessageID The access terminal shall set this field to 0x1f.

1 TransactionID The access terminal shall set this field to the TransactionID field of  
 2 the RouteSelect message whose receipt is being acknowledged by this  
 3 message.  
 4

<b>Channels</b>	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	40

#### 5 3.4.4.2.3 ActivateRoute

6 The access network sends this message to transition the access terminal to the A Rising B  
 7 Open state or the A Open B Rising state.  
 8

Field	Length (bits)
MessageID	8
TransactionID	8
Route	1
Reserved	7

9 MessageID The access network shall set this field to 0x20.

10 TransactionID The access network shall set this field to one more (modulo 256) than  
 11 the TransactionID field of the last ActivateRoute message sent by the  
 12 access network.

13 Route The access network shall set this field to '0' to transition the access  
 14 terminal to the A Rising B Open state. The access network shall set  
 15 this field to '1' to transition the access terminal to the A Open B  
 16 Rising state.

17 Reserved The access network shall set this field to '0000000'. The access  
 18 terminal shall ignore this field.  
 19

<b>Channels</b>	FTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

#### 20 3.4.4.2.4 ActivateRouteAck

21 The access terminal sends this message to acknowledge the receipt of an ActivateRoute  
 22 message.  
 23

Field	Length (bits)
MessageID	8
TransactionID	8

1 MessageID The access terminal shall set this field to 0x21.

2 TransactionID The access terminal shall set this field to the TransactionID field of  
3 the ActivateRoute message whose receipt is being acknowledged by  
4 this message.

<b>Channels</b>	RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

### 6 3.4.4.3 Interface to Other Protocols

#### 7 3.4.4.3.1 Commands

8 This protocol issue the following commands:

- 9 • *SAR.InitializeRoute* with argument indicating which Route is to be initialized.

#### 10 3.4.4.3.2 Indications

11 This protocol registers to receive the following indications:

- 12 • *ConnectedState.ConnectionClosed*
- 13 • *RouteUpdate.ConnectionLost*

#### 14 3.4.5 Protocol Numeric Constants

15 This protocol does not define any protocol numeric constants.

16

## 3.5 Segmentation and Reassembly Protocol

### 3.5.1 Overview

The Segmentation and Reassembly Protocol (SAR) provides one or more octet or packet streams with an acceptably low erasure rate for efficient operation of higher layer protocols (e.g., TCP). When used as part of the Multi-link Multi-flow Packet Application, the protocol carries one or more octet or packet streams from the higher layer. SAR is a protocol associated with the Multi-link Multi-flow Packet Application. The application subtype for this application is defined in [3].

### 3.5.2 Primitives and Public Data

#### 3.5.2.1 Commands

This protocol defines the following commands:

- *InitializeRoute* with argument indicating which Route is to be initialized.

#### 3.5.2.2 Return Indications

This protocol does not return any indications.

### 3.5.3 Protocol Data Unit

The transmission unit of this protocol is a SAR packet.

### 3.5.4 Procedures and Messages for the InUse Instance of the Protocol

A forward Link Flow *NN* is defined to be activated if the *FlowNNActivatedFwd* attribute is set to 0x01, where *NN* is the hexadecimal Link Flow number in the range 0x00 to *MaxNumLinkFlowsFwd* -1 inclusive. The number of activated Link Flows on the forward link shall not exceed the value of the *MaxActivatedLinkFlowsFwd* attribute.

A reverse Link Flow *NN* is defined to be activated if the *FlowNNActivatedRev* attribute is set to 0x01, where *NN* is the hexadecimal Link Flow number in the range 0x00 to *MaxNumLinkFlowsRev*-1 inclusive. The number of activated Link Flows on the reverse link shall not exceed the value of the *MaxActivatedLinkFlowsRev* attribute.

A Link Flow is defined to be deactivated if it is not activated.

This section defines the procedures and messages for the in-use instance of each forward or reverse Link Flow.

#### 3.5.4.1 Procedures

Each Route of the Link Flow receives octets or packets for transmission from the corresponding instance of the Route Protocol and forms a SAR packet by prepending the SAR packet header defined in 3.5.4.3 with a number of received contiguous octets.

1 The Route Protocol for a forward Link Flow *NN* is identified by the ProtocolID field of  
2 FlowNNRouteProtocolParametersFwd attribute. The Route Protocol for a reverse Link Flow  
3 *NN* is identified by the ProtocolID field of FlowNNRouteProtocolParametersRev attribute.

4 If the Route Protocol is NULL<sup>20</sup>, then the transmitter shall set Route Protocols octets or  
5 packets to Flow Protocol octets or packets routed along the Route. If the Route Protocol is  
6 NULL, then the receiver shall set Flow Protocols octets or packets to Route Protocol packets  
7 or octets received on the Route.

8 If the FlowNNRouteProtocolPDUFwd attribute of forward Link Flow *NN* is 0x00, then each  
9 Route of forward Link Flow *NN* provides an octet stream to the corresponding instance of  
10 the Route Protocol. If the FlowNNRouteProtocolPDUFwd attribute of forward Link Flow *NN*  
11 is 0x01, then each Route of forward Link Flow *NN* provides a packet stream to the  
12 corresponding instance of the Route Protocol.

13 If the FlowNNOutOfOrderDeliveryToRouteProtocolFwd attribute of forward Link Flow *NN* is  
14 0x00, then each Route of forward Link Flow *NN* delivers payload to the corresponding  
15 instance of the Route Protocol in order. If the  
16 FlowNNOutOfOrderDeliveryToRouteProtocolFwd attribute of forward Link Flow *NN* is 0x01,  
17 then each Route of forward Link Flow *NN* may deliver payload to the corresponding instance  
18 of the Route Protocol out of order.

19 If the FlowNNRouteProtocolPDURev attribute of reverse Link Flow *NN* is 0x00, then each  
20 Route of reverse Link Flow *NN* provides an octet stream to the corresponding instance of the  
21 Route Protocol. If the FlowNNRouteProtocolPDURev attribute of reverse Link Flow *NN* is  
22 0x01, then each Route of reverse Link Flow *NN* provides a packet stream to the  
23 corresponding instance of the Route Protocol.

24 The policy SAR follows in determining the number of octets to send in a SAR packet is  
25 beyond the scope of this specification. It is subject to the following requirements:

- 26 • The size of a SAR packet shall not exceed the maximum payload length that can be  
27 carried by a Stream Layer packet given the target channel and current transmission  
28 rate on that channel.
- 29 • If the Link Flow is carrying a packet stream, then a SAR packet shall contain octets  
30 from no more than one Route Protocol packet.
- 31 • The SAR packet should contain all octets of the Route Protocol packet if all of the  
32 following conditions are true:
  - 33 – The size of the SAR packet carrying all octets of the Route Protocol packet does  
34 not exceed the maximum payload length that can be carried by a Stream Layer  
35 packet given the target channel and the current transmission rate on that  
36 channel.
  - 37 – The Link flow is carrying a packet stream.
  - 38 – The data unit for the Link Flow is SAR packet payloads.

---

<sup>20</sup> <sup>20</sup> Route Protocol being NULL means that a Route Protocol has not been negotiated.

- 1 • If all of the following conditions are true, the size of the SAR packet shall be such that it  
2 could be re-transmitted in a lower layer packet with same or higher payload:
- 3 – The data unit for the Link Flow is SAR packet payloads.
  - 4 – If the SAR transmitter is the access terminal, FlowNNakEnableRev attribute  
5 is set to 0x01 for this Link Flow or FlowNNPhysicalLayerNakEnableRev is set to  
6 0x01 for this Link Flow.
  - 7 – If the SAR transmitter is the access network, FlowNNakEnableFwd attribute  
8 is set to 0x01 for this Link Flow.

9 For the purpose of binding Link Flows to lower layer flows (such as MAC flows in the  
10 Subtype 3 Reverse Traffic Channel MAC Protocol specified in **[8]**), each Link Flow shall be  
11 treated as a substream with the substream number set to the Link Flow number.

12 SAR makes use of the ResetTxIndication, ResetRxIndication, ResetTxIndicationAck,  
13 ResetTxComplete, ResetRxComplete, Flush, MultiLinkNak, and Nak messages to perform  
14 control related operations.

15 When sending an AttributeUpdateRequest message containing requests to set one or more  
16 ReservationKKQoSRequestFwd or the ReservationKKQoSRequestRev attribute to their  
17 default value, the access terminal shall not include other types of requests in the same  
18 AttributeUpdateRequest message.

19 The access network shall not initiate modification of the ReservationKKQoSRequestFwd or  
20 the ReservationKKQoSRequestRev attributes. If the access network receives an  
21 AttributeUpdateRequest message requesting to set the ReservationKKQoSRequestFwd or  
22 the ReservationKKQoSRequestRev attribute to its default value, then the access network  
23 shall respond with an AttributeUpdateAccept message. The access terminal shall not  
24 initiate modification of the ReservationKKQoSResponseFwd or the  
25 ReservationKKQoSResponseRev attributes. The access terminal shall use the ProfileType  
26 0x00, 0x01, or 0x02 in the ReservationKKQoSRequestFwd or the  
27 ReservationKKQoSRequestRev attributes. The access network shall use ProfileType 0x00 or  
28 0x03 in the ReservationKKQoSResponseFwd or the ReservationKKQoSResponseRev  
29 attributes.

30 When forward Link Flow NN is activated, the access network and the access terminal shall  
31 not update the following attributes:

- 32 • FlowNNFlowProtocolParametersFwd,
- 33 • FlowNNRouteProtocolParametersFwd,
- 34 • FlowNNSequenceLengthFwd,
- 35 • FlowNNFlowProtocolPDUFwd,
- 36 • FlowNNRouteProtocolPDUFwd,
- 37 • FlowNNDataUnitFwd,
- 38 • FlowNNSimultaneousDeliveryOnBothRoutesFwd, and
- 39 • FlowNNOOutOfOrderDeliveryToRouteProtocolFwd.

1 The access terminal shall not initiate re-activation of a deactivated forward Link Flow *NN*  
2 unless the access terminal initiated deactivation of forward Link Flow *NN* since the last time  
3 the Link Flow was activated, and the deactivation was successful. The access network shall  
4 not initiate re-activation of a deactivated forward Link Flow *NN* unless the access network  
5 initiated deactivation of forward Link Flow *NN* since the last time the Link Flow was  
6 activated, and the deactivation was successful.

7 When reverse Link Flow *NN* is activated, the access network and the access terminal shall  
8 not update the following attributes:

- 9 • Flow*NN*FlowProtocolParametersRev,
- 10 • Flow*NN*RouteProtocolParametersRev,
- 11 • Flow*NN*SequenceLengthRev,
- 12 • Flow*NN*FlowProtocolPDURev,
- 13 • Flow*NN*RouteProtocolPDURev, and
- 14 • Flow*NN*DataUnitRev

15 The access terminal shall not initiate re-activation of a deactivated reverse Link Flow *NN*  
16 unless the access terminal initiated deactivation of reverse Link Flow *NN* since the last time  
17 the Link Flow was activated, and the deactivation was successful. The access network shall  
18 not initiate re-activation of a deactivated reverse Link Flow *NN* unless the access network  
19 initiated deactivation of reverse Link Flow *NN* since the last time the Link Flow was  
20 activated, and the deactivation was successful.

21 The ProtocolID field of the Flow*NN*FlowProtocolParametersFwd attribute shall be set to a  
22 value that is supported by the access terminal as indicated in the  
23 ATSupportedFlowProtocolParameters*PP* attribute. The ProtocolID field of the  
24 Flow*NN*FlowProtocolParametersRev attribute shall be set to a value that is supported by the  
25 access terminal as indicated in the ATSupportedFlowProtocolParameters*PP* attribute. The  
26 ProtocolID field of the Flow*NN*RouteProtocolParametersFwd attribute shall be set to a value  
27 that is supported by the access terminal as indicated in the  
28 ATSupportedRouteProtocolParameters*PP* attribute. The ProtocolID field of the  
29 Flow*NN*RouteProtocolParametersRev attribute shall be set to a value that is supported by  
30 the access terminal as indicated in the ATSupportedRouteProtocolParameters*PP* attribute.

31 The fields of the ProtocolParameters record of the Flow*NN*FlowProtocolParametersFwd  
32 attribute shall be set to values that are in accordance with those supported by the AT as  
33 indicated in the SupportedProtocolParametersValues record of the  
34 ATSupportedFlowProtocolParameters*PP* attribute. The fields of the ProtocolParameters  
35 record of the Flow*NN*FlowProtocolParametersRev attribute shall be set to values that are in  
36 accordance with those supported by the AT as indicated in the  
37 SupportedProtocolParametersValues record of the ATSupportedFlowProtocolParameters*PP*  
38 attribute. The fields of the ProtocolParameters record of the  
39 Flow*NN*RouteProtocolParametersFwd attribute shall be set to values that are in accordance  
40 with those supported by the AT as indicated in the SupportedProtocolParametersValues  
41 record of the ATSupportedRouteProtocolParameters*PP* attribute. The fields of the



1 ProtocolParameters record of the FlowNMRouteProtocolParametersRev attribute shall be set  
2 to values that are in accordance with those supported by the AT as indicated in the  
3 SupportedProtocolParametersValues record of the ATSupportedRouteProtocolParametersPP  
4 attribute.

5 If the FlowNMDataUnitFwd attribute of forward Link Flow *NN* is 0x00, then the data unit for  
6 the Link Flow shall be octets. Otherwise the data unit for the Link Flow shall be SAR packet  
7 payloads. If the FlowNMDataUnitRev attribute of reverse Link Flow *NN* is 0x00, then the  
8 data unit for the Link Flow shall be octets. Otherwise the data unit for the Link Flow shall  
9 be SAR packet payloads.

10 If the access terminal wishes to associate one or more BCMCS flow IDs to a reservation *KK*,  
11 and if the BCMCSOverRLPAllowed is set to '1', then the access terminal may send  
12 AttributeUpdateRequest message containing ReservationKKBCMCSFlowIDAssociation  
13 attribute. If the access network receives an AttributeUpdateRequest message containing  
14 ReservationKKBCMCSFlowIDAssociation attribute, and if the access network accepts the  
15 BCMCS Flow ID(s) association to the reservation, then the access network shall respond  
16 with an AttributeUpdateAccept message. The access network shall not send  
17 AttributeUpdateRequest message containing ReservationKKBCMCSFlowIDAssociation  
18 attribute.

19 If the access terminal wishes to associate one or more BCMCS Programs to a reservation  
20 *KK*, and if the BCMCSOverRLPAllowed is set to '1', then the access terminal may send  
21 AttributeUpdateRequest message containing ReservationKKBCMCSProgramIDAssociation  
22 attribute. If the access network receives an AttributeUpdateRequest message containing  
23 ReservationKKBCMCSProgramIDAssociation attribute, and if the access network accepts  
24 the BCMCS Program(s) association to the reservation, then the access network shall  
25 respond with an AttributeUpdateAccept message. The access network shall not send  
26 AttributeUpdateRequest message containing ReservationKKBCMCSProgramIDAssociation  
27 attribute.

#### 28 3.5.4.1.1 Initialization and Reset

29 The SAR initialization procedure initializes the SAR variables and data structures in one  
30 end of the link. The SAR reset procedure guarantees that SAR state variables on both sides  
31 are synchronized. The reset procedure includes initialization.

32 The access terminal and the access network shall perform the initialization procedures  
33 defined in 3.5.4.1.1.1 and 0 for both routes of all activated Link Flows if the protocol  
34 receives an *IdleState.ConnectionOpened* indication. The access network shall perform the  
35 initialization procedure defined in 3.5.4.1.1.1 for both routes of forward Link Flow *NN*  
36 when forward Link Flow *NN* is activated. The access terminal shall perform the initialization  
37 procedure defined in 3.5.4.1.1.2 for both routes of forward Link Flow *NN* when forward  
38 Link Flow *NN* is activated. The access terminal shall perform the initialization procedure  
39 defined in 3.5.4.1.1.1 for both routes of reverse Link Flow *NN* when reverse Link Flow *NN*  
40 is activated. The access network shall perform the initialization procedure defined in  
41 3.5.4.1.1.2 for both routes of reverse Link Flow *NN* when reverse Link Flow *NN* is  
42 activated. Upon receiving an *InitializeRoute* command, the access terminal shall perform the  
43 initialization procedures defined in 3.5.4.1.1 for the specified Route of all activated Link

1 Flows. Upon receiving an *InitializeRoute* command, the access network shall perform the  
 2 initialization procedures defined in 3.5.4.1.1.1 for the specified Route of all activated Link  
 3 Flows.

#### 4 3.5.4.1.1.1 Initialization Procedure

##### 5 3.5.4.1.1.1.1 Initialization Procedure for the SAR Transmitter

6 When SAR transmitter performs the initialization procedure it shall:

- 7 • Reset the send state variable  $V(S)_{NN,P}$  to zero, where  $NN$  indicates the Link Flow, and  $P$   
 8 indicates the Route which is being initialized,
- 9 • send a *QN.Initialize* command to all instances of the QN transmitter of Route  $P$  of Link  
 10 Flow  $NN$ , and
- 11 • clear the retransmission queues.

##### 12 3.5.4.1.1.1.2 Initialization Procedure for the SAR Receiver

13 When SAR receiver performs the initialization procedure it shall:

- 14 • Reset the receive state variables  $V(R)_{NN,P}$  and  $V(N)_{NN,P}$  to zero,
- 15 • Send a *QN.Initialize* command to all instances of the QN receiver of Route  $P$  of Link Flow  
 16  $NN$ , and
- 17 • clear the resequencing buffer.

#### 18 3.5.4.1.1.2 Reset Procedure

##### 19 3.5.4.1.1.2.1 Reset Procedure for the Initiating Side when it is a SAR Transmitter

20 If the side initiating a reset procedure is a SAR transmitter for the Route of the Link Flow  
 21 (or of all Link Flows) being reset, then it shall send a *ResetTxIndication* message and enter  
 22 the SAR Reset State.

23 Upon entering the SAR Reset state SAR transmitter shall:

- 24 • Perform the SAR transmitter initialization procedure defined in 3.5.4.1.1.1.1 for the  
 25 Route being reset.
- 26 • If a *MultiLinkNak* or *Nak* message is received for the Route of the Link Flow being reset  
 27 while in the SAR Reset state, the message shall be ignored.
- 28 • If the SAR transmitter that initiated the reset procedure is an access terminal, and if a  
 29 *PhysicalLayer.ReverseTrafficPacketsMissed* indication is received for the Route of the  
 30 Link Flow being reset while SAR is in the Reset state, then the indication shall be  
 31 ignored.
- 32 • The SAR transmitter should not transmit SAR packets while in the SAR Reset state.
- 33 • If SAR receives a *ResetTxIndicationAck* message for the Route of the Link Flow being  
 34 reset while in the SAR Reset state, it shall send a *ResetTxComplete* message back and  
 35 leave the SAR Reset state.

- 1 • If SAR receives an *IdleState.ConnectionOpened* indication while in the SAR Reset state, it  
2 shall leave the SAR Reset state.

3 If a *ResetTxIndicationAck* message is received for a Route while that Route is not in the SAR  
4 Reset state, the message shall be ignored.

#### 5 3.5.4.1.1.2.2 Reset Procedure for Initiating Side when it is a SAR Receiver

6 If the side initiating a reset procedure is a SAR receiver for the Route of the Link Flow being  
7 reset, then it shall send a *ResetRxIndication* message and enter the SAR Reset State. Upon  
8 entering the SAR Reset state, the SAR receiver shall:

- 9 • Perform the SAR receiver initialization procedure defined in 3.5.4.1.1.1.2 for the Route  
10 being reset.
- 11 • Ignore all SAR data units received for the Route of the Link Flow being reset while in the  
12 SAR Reset state.
- 13 • When SAR receives a *ResetRxComplete* message for the Route of the Link Flow being  
14 reset, it shall leave the SAR Reset state.
- 15 • If SAR receives an *IdleState.ConnectionOpened* indication while in the SAR Reset state, it  
16 shall leave the SAR Reset state.

17 If a *ResetRxComplete* is received for a Route while the Route is not in the SAR Reset state,  
18 the message shall be ignored.

#### 19 3.5.4.1.1.2.3 Reset Procedure for the Responding Side when it is a SAR Receiver

20 If the side responding to a reset procedure is a SAR receiver for the Route of the Link Flow  
21 being reset, then it shall respond with a *ResetTxIndicationAck* message upon receiving a  
22 *ResetTxIndication* message. After sending the message it shall enter the SAR Reset state for  
23 the Route being reset, if it was not already in the SAR Reset state. Upon entering the SAR  
24 Reset state SAR shall:

- 25 • Perform the SAR receiver initialization procedure defined in 3.5.4.1.1.1.2 for the Route  
26 being reset.
- 27 • Ignore all SAR data units received for the Route of the Link Flow being reset while in the  
28 SAR Reset state.
- 29 • When SAR receives a *ResetTxComplete* message for the Route of the Link Flow being  
30 reset, it shall leave the SAR Reset state.
- 31 • If SAR receives an *IdleState.ConnectionOpened* indication while in the SAR Reset state, it  
32 shall leave the SAR Reset state.

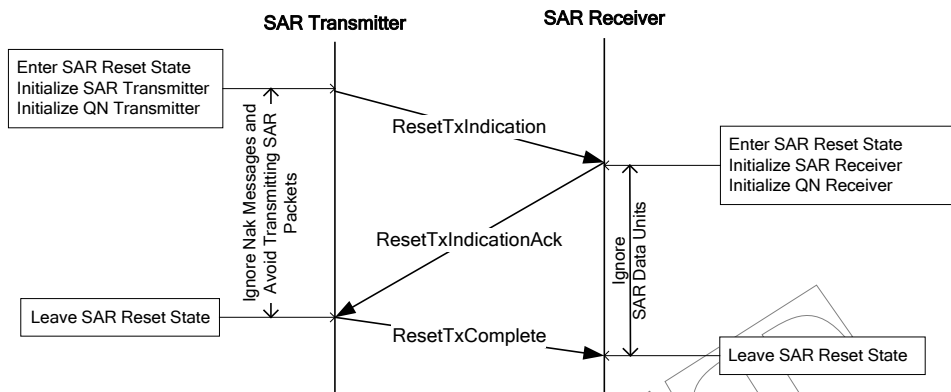
33 If a *ResetTxComplete* message is received for a Route while the Route is not in the SAR  
34 Reset state, the message shall be ignored.

#### 35 3.5.4.1.1.2.4 Reset Procedure for the Responding Side when it is a SAR transmitter

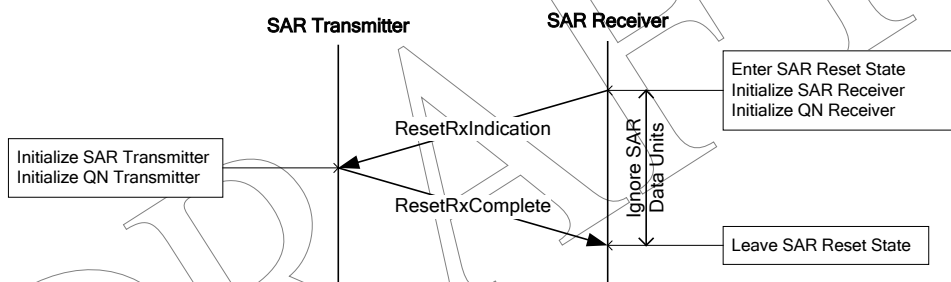
36 If the side responding to a reset procedure is a SAR transmitter for the Route being reset,  
37 then it shall respond with a *ResetRxComplete* message upon receiving a *ResetRxIndication*

1 message. After sending the message, it shall perform the SAR transmitter initialization  
 2 procedure defined in 3.5.4.1.1.1.1 for the Route being reset.

3 3.5.4.1.1.2.5 SAR Reset Message Flows



4 **Figure 3.5.4.1.1.2.5-1. SAR Reset Procedure Initiated by SAR Transmitter**



6 **Figure 3.5.4.1.1.2.5-2. SAR Reset Procedure Initiated by SAR Receiver**

7 3.5.4.2 Data Transfer

8 SAR is a Nak-based protocol with a sequence space of SARSequenceLength bits, where  
 9 SARSequenceLength is indicated by the SARSequenceLength field of the FlowNNSequenceLengthFwd for forward Link Flow NN and the FlowNNSequenceLengthRev  
 10 attribute for reverse Link Flow NN.  
 11  
 12

13 All operations and comparisons performed on SAR packet sequence numbers shall be  
 14 carried out in unsigned modulo  $2^S$  arithmetic, where S represents the value of  
 15 SARSequenceLength. For any SAR sequence number N, the sequence numbers in the range  
 16  $[N+1, N+2^{S-1}-1]$  shall be considered greater than N and the sequence numbers in the range  
 17  $[N-2^{S-1}, N-1]$  shall be considered smaller than N.

18 3.5.4.2.1 SAR Transmit Procedures

19 The SAR transmitter shall maintain a SARSequenceLength-bit variable  $V(S)_{NN,P}$  for all  
 20 transmitted SAR data units (see Figure 3.5.4.2.1-1), where NN is the two-digit hexadecimal  
 21 Link Flow number in the range 0x00 to M-1 inclusive, P is the Route indicator that takes  
 22 values of either A or B, and M is MaxNumLinkFlowsFwd or MaxNumLinkFlowsRev for a

1 forward Link Flow or reverse Link Flow, respectively.  $V(S)_{NN,P}$  is the sequence number of the  
2 next SAR data unit to be sent on Route  $P$  of Link Flow  $NN$ . The sequence number field (SEQ)  
3 in each new SAR packet transmitted shall be set to  $V(S)_{NN,P}$ , corresponding to the sequence  
4 number of the first data unit in the packet. If the data unit is octets, then the sequence  
5 number of the  $i^{\text{th}}$  octet in the packet (with the first octet being octet 0) is implicitly given by  
6  $\text{SEQ}+i$ .  $V(S)_{NN,P}$  shall be incremented for each data unit contained in the packet.

7 The SAR transmitter should allow sufficient time before deleting a SAR packet payload  
8 transmitted for the first time.

9 Upon receiving a Nak message, SAR transmitter at the access terminal shall transmit the  
10 missing data unit(s) (if any) conveyed by the Nak message if all of the following conditions  
11 are satisfied:

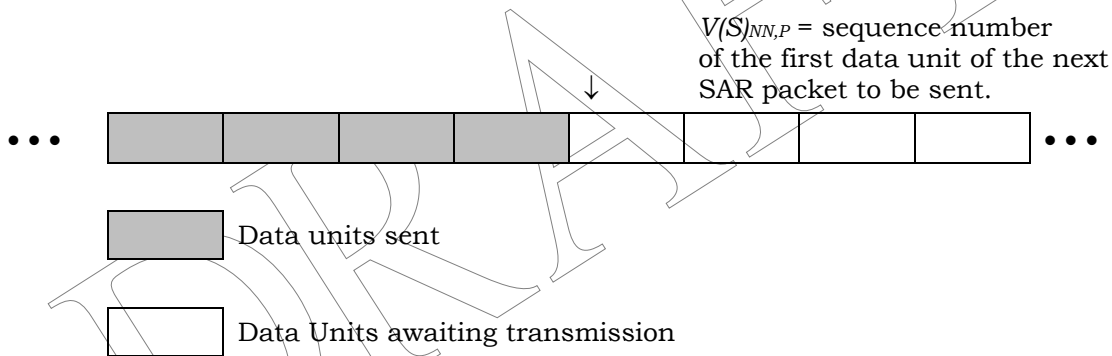
- 12 • the requested data units are available,
- 13 • the requested data units have not been retransmitted before in response to a Nak  
14 message, and
- 15 • if the data unit for the Link Flow is SAR packet payloads, the payload carrying capacity  
16 of the lower layer packet is not smaller than the size of the packet to be re-transmitted.

17 Upon receiving a MultiLinkNak message, SAR transmitter at the access network shall  
18 transmit the missing data unit(s) (if any) conveyed by the MultiLinkNak message if all of the  
19 following conditions are satisfied:

- 20 • the requested data unit is available,
- 21 • the requested data unit has not been retransmitted before in response to a  
22 MultiLinkNak message,
- 23 • if the data unit for the Link Flow is SAR packet payloads, the payload carrying capacity  
24 of the lower layer packet is not smaller than the size of the packet to be re-transmitted,  
25 and
- 26 • one of the following conditions is true:
  - 27 – the DelayedNak field corresponding to the missing data units in the  
28 MultiLinkNak message is set to '1', or
  - 29 – the DelayedNak field corresponding to the missing data units in the  
30 MultiLinkNak message is not set to '1', the LeadingEdgeIncluded field  
31 corresponding to the missing data units in the MultiLinkNak message is set to  
32 '1', and the missing data unit was transmitted on the QN instance on which  
33 data units whose SAR sequence numbers are equal to the LeadingEdge and  
34 TrailingEdge fields of the MultiLinkNak message were transmitted, or

- 1           – the DelayedNak field corresponding to the missing data units in the  
2           MultiLinkNak message is not set to '1', the LeadingEdgeIncluded field  
3           corresponding to the missing data units in the MultiLinkNak message is set to  
4           '0', the missing data unit was transmitted on the QN instance on which data  
5           unit whose SAR sequence number is equal to the TrailingEdge field of the  
6           MultiLinkNak message was transmitted, and the missing data unit was  
7           transmitted since the last time (before transmission of data unit with sequence  
8           number TrailingEdge on the QN instance) that the QN instance became the  
9           serving QN instance.

10 If the SAR transmitter is the access network, and the MultiLinkNak message includes any  
11 sequence number greater than or equal to  $V(S)_{NN,P}$ , SAR shall perform the reset procedures  
12 specified in 3.5.4.1.1.2.1 for Route  $P$  of forward Link Flow  $NN$ . If the SAR transmitter is the  
13 access terminal, and the Nak message includes any sequence number greater than or equal  
14 to  $V(S)_{NN,P}$ , SAR shall perform the reset procedures specified in 3.5.4.1.1.2.1 for Route  $P$  of  
15 reverse Link Flow  $NN$ . If the MultiLinkNak or Nak message does not include any sequence  
16 number greater than or equal to  $V(S)_{NN,P}$  but the requested data units are not available for  
17 retransmissions, SAR shall ignore the MultiLinkNak or Nak message for data units that are  
18 not available.  
19



20 **Figure 3.5.4.2.1-1. SAR Transmit Sequence Number Variable**

21 Upon receiving a *PhysicalLayer.ReverseTrafficPacketsMissed* indication for reverse Link  
22 Flow  $NN$ , the SAR transmitter in the access terminal shall retransmit the requested data  
23 units(s) if and only if all of the following conditions are satisfied:

- 24 • Flow $NN$ PhysicalLayerNakEnableRev attribute is set to 0x01,  
25 • if the data unit for the Link Flow is SAR packet payloads, the payload carrying capacity  
26 of the lower layer packet is not smaller than the size of the packet to be re-transmitted  
27 • the requested data units have not been retransmitted before, and  
28 • the requested data units are available.

29 If Flow $NN$ NakEnableFwd is 0x01, then the transmitter at the access network for each Route  
30 of Link Flow  $NN$  shall meet the following requirements:

- 1 • After transmitting a packet that contains first-time data unit(s), the SAR transmitter  
2 shall start a SAR flush timer for time FlushTimer, where FlushTimer is a parameter of  
3 the FlowNNTimersFwd attribute.
- 4 • If the SAR transmitter sends another packet that contains first-time data unit(s) before  
5 the SAR flush timer expires, the SAR transmitter shall reset and restart the timer.
- 6 • If the timer expires, the SAR transmitter shall disable the flush timer and the SAR  
7 transmitter should send a Flush message containing  $V(S)_{NN,P-1}$ .

8 If FlowNNTimersFwd is 0x01, then the transmitter at the access terminal for each Route  
9 of Link Flow  $NN$  shall meet the following requirements:

- 10 • After transmitting a packet that contains first-time data unit(s), the SAR transmitter  
11 shall start a SAR flush timer for time FlushTimer, where FlushTimer is a parameter of  
12 the FlowNNTimersRev attribute.
- 13 • If the SAR transmitter sends another packet that contains first-time data unit(s) before  
14 the SAR flush timer expires, the SAR transmitter shall reset and restart the timer.
- 15 • If the timer expires, the SAR transmitter shall disable the flush timer and the SAR  
16 transmitter should perform the following:
  - 17 - If the data unit for this Link Flow is octets, then the SAR transmitter should send a  
18 SAR packet that contains at least the data unit with sequence number  $V(S)_{NN,P-1}$ .
  - 19 - Otherwise, the SAR transmitter should either send a SAR packet that contains at  
20 least the data unit with sequence number  $V(S)_{NN,P-1}$  or send a Flush message  
21 containing  $V(S)_{NN,P-1}$ .

22 The SAR transmitter should not transmit more than  $2^{\text{SARSequenceLength}-1}$  first-time data units  
23 in any AbortTimer interval.

#### 24 3.5.4.2.1.1 Reservation State Maintenance

25 The ReservationLabel parameter of the FlowNNReservationFwd or FlowNNReservationRev  
26 attribute indicates the higher layer flows associated with Link Flow  $NN$ . Each  
27 ReservationLabel shall be associated with no more than one forward Link Flow. Each  
28 ReservationLabel shall be associated with no more than one reverse Link Flow.

29 Each Reservation can be in one of the following two states:

- 30 • Close State
- 31 • Open State

32 The transmitter should transmit higher layer octets<sup>21</sup> or packets using the Link Flow  
33 associated with the higher layer flow if the associated Link Flow is activated and if the  
34 Reservation is in the Open state. The transmitter should transmit higher layer octets

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21 Higher layer is represented by ProtocolID field of the FlowNNFlowProtocolParametersFwd/FlowNNFlowProtocolParametersRev attribute of the respective link flow  $NN$ .

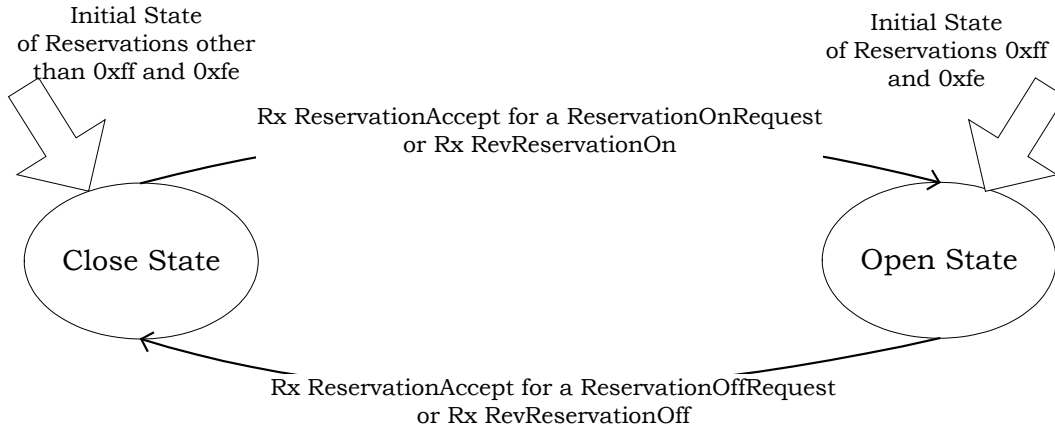
1 belonging to a higher layer flow that is not associated with any Link Flow using the Link  
2 Flow with ReservationLabel 0xff if the higher layer flow provides an octet stream with octet-  
3 based HDLC-like framing to the Multi-link Multi-flow Packet Application. The transmitter  
4 may transmit higher layer octets belonging to a higher layer flow identified by a Reservation  
5 that is in the Close state using the Link Flow with ReservationLabel 0xff if the higher layer  
6 flow provides an octet stream with octet-based HDLC-like framing to the Multi-link Multi-  
7 flow Packet Application. The transmitter may transmit higher layer octets belonging to a  
8 higher layer flow identified by a Reservation that is bound to a de-activated Link Flow using  
9 the Link Flow with ReservationLabel 0xff if the higher layer flow provides an octet stream  
10 with octet-based HDLC-like framing to the Multi-link Multi-flow Packet Application. The  
11 transmitter should transmit higher layer packets belonging to a higher layer flow that is not  
12 associated with any Link Flow using the Link Flow with ReservationLabel 0xfe if the higher  
13 layer flow provides an IP packet stream to the Multi-link Multi-flow Packet Application. The  
14 transmitter may transmit higher layer packets belonging to a higher layer flow identified by  
15 a Reservation that is in the Close state using the Link Flow with ReservationLabel 0xfe if  
16 the higher layer flow provides an IP packet stream to the Multi-link Multi-flow Packet  
17 Application. The transmitter may transmit higher layer packets belonging to a higher layer  
18 flow identified by a Reservation that is bound to a de-activated Link Flow using the Link  
19 Flow with ReservationLabel 0xfe if the higher layer flow provides an IP packet stream to the  
20 Multi-link Multi-flow Packet Application.

21 If the ReservationLabel is associated with BCMCS flow(s), and if the Reservation is in the  
22 Open state, then the transmitter shall transmit the octets or packets of the BCMCS flow  
23 using the Link Flow associated with the BCMCS FlowID or BCMCS ProgramID. Otherwise  
24 the transmitter shall not transmit the octets or packets of the BCMCS flow.

25 The access terminal and the access network shall not perform any actions that will result in  
26 the number of Reverse Link Reservations in the Open state to exceed the value specified by  
27 MaxNumOpenReservationsRev. The access terminal and the access network shall not  
28 perform any actions that will result in the number of Forward Link Reservations in the  
29 Open state to exceed the value specified by MaxNumOpenReservationsFwd.

30 Figure 3.5.4.2.1-2 and Figure 3.5.4.2.1-3 show the state transition diagram at the access  
31 terminal and the access network. State transitions that may be caused by  
32 *ConnectedState.ConnectionClosed* and *RouteUpdate.ConnectionLost* indications are not  
33 shown.

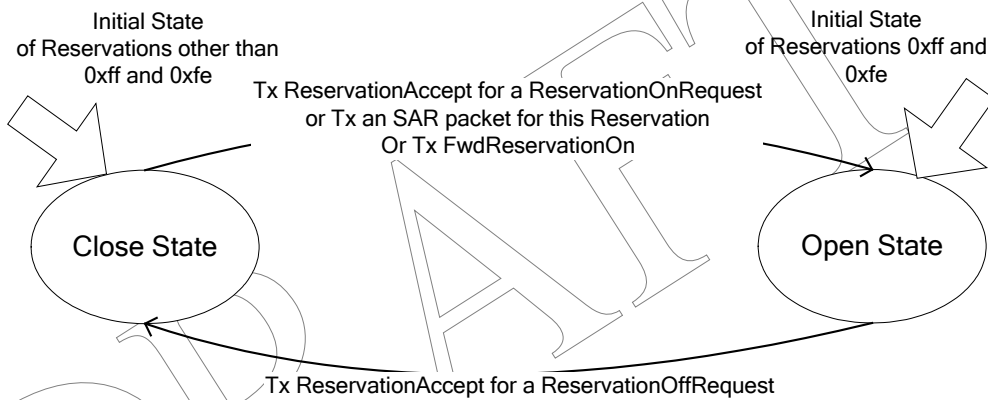




1

2

**Figure 3.5.4.2.1-2. Reverse Link Reservation State Diagram (Access Terminal)**



3

4

**Figure 3.5.4.2.1-3. Forward Link Reservation State Diagram (Access Network)**

#### 3.5.4.2.1.1.1 State-independent Requirements

##### 3.5.4.2.1.1.1.1 Access Terminal Requirements

Upon receiving a RevReservationOn message, the access terminal shall

- Respond with a ReservationAccept message within the time period specified by  $T_{SARResponse}$  of receiving the RevReservationOn message.
- Set the TransactionID field of the ReservationAccept message to that of the RevReservationOn message.

Upon receiving a RevReservationOff message, the access terminal shall

- Respond with a ReservationAccept message within the time period specified by  $T_{SARResponse}$  of receiving the RevReservationOff message.
- Set the TransactionID field of the ReservationAccept message to that of the RevReservationOff message.

Upon receiving a FwdReservationOn message, the access terminal shall

1 • Respond with a FwdReservationAck message within the time period specified by  
2 T<sub>SARResponse</sub> of reception of the FwdReservationOn message.

3 • Set the TransactionID field of the FwdReservationAck message to that of the  
4 FwdReservationOn message.

5 Upon receiving a FwdReservationOff message, the access terminal shall

6 • Respond with a FwdReservationAck message within the time period specified by  
7 T<sub>SARResponse</sub> of receiving the FwdReservationOff message.

8 • Set the TransactionID field of the FwdReservationAck message to that of the  
9 FwdReservationOff message.

10 Upon receiving a ReservationReject message with the RejectCode set to ReservationPending,  
11 the access terminal shall not send ReservationOnRequest for a PendingDuration period of  
12 time to the same access network. The access terminal shall stay in the monitor state until it  
13 receives the FwdReservationOn/ RevReservationOn message or the PendingDuration period  
14 is over.

#### 15 3.5.4.2.1.1.1.2 Access Network Requirements

16 The access network may re-send a FwdReservationOn message if it does not receive a  
17 FwdReservationAck message containing the same TransactionID within the time period  
18 specified by T<sub>SARResponse</sub> of sending the FwdReservationOn message.

19 The access network may re-send a FwdReservationOff message if it does not receive a  
20 FwdReservationAck message containing the same TransactionID within the time period  
21 specified by T<sub>SARResponse</sub> of sending the FwdReservationOff message.

22 The access network may send a RevReservationOn message to transition the state of the  
23 reverse link Reservation of the access terminal to the Open state. The access network may  
24 re-send a RevReservationOn message if it does not receive a ReservationAccept message  
25 containing the same TransactionID within the time period specified by T<sub>SARResponse</sub> of sending  
26 the RevReservationOn message.

27 The access network may send a RevReservationOff message to transition the state of the  
28 reverse link Reservation of the access terminal to the Close state. The access network may  
29 re-send a RevReservationOff message if it does not receive a ReservationAccept message  
30 containing the same TransactionID within the time period specified by T<sub>SARResponse</sub> of sending  
31 the RevReservationOff message.

32 If the access network receives a ReservationOnRequest message, it shall

33 • Send either a ReservationAccept message or a ReservationReject message within the  
34 time period specified by T<sub>SARResponse</sub> of reception of the ReservationOnRequest message. If  
35 the resources required for the Reservation *KK* are not available, the access network  
36 determines that queuing is required for the Reservation *KK*, and if one or both of the  
37 following conditions are satisfied:

- 38 – Reservation*KK*ReservationQueuingSupported attribute is set to '0x01', or

- 1           – Access network has received ReservationOnRequest message from the access  
2           terminal with the ReservationQueuingReq field for the Reservation *KK* set to ‘1’
- 3           then the access network should send ReservationReject message with the RejectCode  
4           for the Reservation *KK* set to ReservationPending (0x01). Otherwise, the access network  
5           shall not send ReservationReject message with the RejectCode for the Reservation *KK*  
6           set to ReservationPending (0x01).
- 7           • If the access network sent a ReservationReject message with the RejectCode set to  
8           ReservationPending (0x01), then the access network shall queue the  
9           ReservationOnRequest up to PendingDuration period of time. During this time, the  
10          access network should send FwdReservationOn/ RevReservationOn message to  
11          transition the state of the forward link/reverse link Reservation of the access terminal  
12          to the Open state.
  - 13          • Set the TransactionID field of the ReservationAccept or ReservationReject message to  
14          that of the ReservationOnRequest message.

15       If the access network receives a ReservationOffRequest message, it shall

- 16          • Send a ReservationAccept or a ReservationReject message within the time period  
17          specified by  $T_{SARResponse}$  of reception of the ReservationOffRequest message.
- 18          • Set the TransactionID field of the ReservationAccept or ReservationReject message to  
19          that of the ReservationOffRequest message.

#### 20       3.5.4.2.1.2 Close State

##### 21       3.5.4.2.1.2.1 Access Terminal Requirements

22       The access terminal shall not transmit PDUs from higher layer flows belonging to this  
23       Reservation using any Link Flow other than the Link Flow associated with ReservationLabel  
24       0xff if the higher layer flow provides an octet stream with octet-based HDLC-like framing to  
25       the Multi-link Multi-flow Packet Application. The access terminal shall not transmit PDUs  
26       from higher layer flows belonging to this Reservation using any Link Flow other than the  
27       Link Flow associated with ReservationLabel 0xfe if the higher layer flow provides an IP  
28       packet stream to the Multi-link Multi-flow Packet Application. The access terminal may  
29       send a ReservationOnRequest message to request transition of the Reservation to the Open  
30       state<sup>22</sup>. The access terminal may re-send a ReservationOnRequest message if it does not  
31       receive a corresponding ReservationAccept or ReservationReject message within the time  
32       period specified by  $T_{SARResponse}$  of sending the ReservationOnRequest message. If the  
33       ReservationOnRequest message contains a reverse Reservation, then the Reservation shall  
34       transition to the Open state when the access terminal receives the corresponding  
35       ReservationAccept message.

---

<sup>22</sup> Note that the ReservationOnRequest message supports requests for multiple Reservations on both the forward and reverse links. This arrangement allows requests for groups of Reservations (e.g., for bidirectional higher layer application flows) to be combined in the same ReservationOnRequest message.

1 Upon receiving a *RevReservationOn* message, the access terminal shall transition the  
2 Reservation to the Open state. Upon receiving an *IdleState.ConnectionOpened* indication,  
3 the access terminal shall transition the Reservations to the Open State whose  
4 corresponding *ReservationKKIdleStateRev* attribute is 0x02, where *KK* is the two-digit  
5 hexadecimal *ReservationLabel* in the range 0x00 to 0xff inclusive.

#### 6 3.5.4.2.1.2.2 Access Network Requirements

7 If the Reservation entered this state as a result of any condition other than the following  
8 conditions, then the access network shall send a *FwdReservationOff* message upon entering  
9 this state:

- 10 • the access network transmitted a *ReservationAccept* message in response to a  
11 *ReservationOffRequest* message requesting to transition the Reservation to the Close  
12 state, or
- 13 • *ReservationKKIdleStateFwd* attribute of the Reservation is 0x01 or 0x02, and the  
14 Reservation transitioned to the Close state because the Connection was closed or lost.

15 Upon sending a *ReservationAccept* message for a forward Reservation in response to a  
16 *ReservationOnRequest* message, the access network shall transition the Reservation to the  
17 Open state.

18 Upon sending a *FwdReservationOn* message, the access network shall transition the  
19 Reservation to the Open state. Upon receiving an *IdleState.ConnectionOpened* indication,  
20 the access network shall transition the Reservations to the Open state whose corresponding  
21 *ReservationKKIdleStateFwd* attribute is 0x02, where *KK* is the two-digit hexadecimal  
22 *ReservationLabel* in the range 0x00 to 0xff inclusive. The access network may transmit  
23 SDUs from higher layer flows belonging to this Reservation using the Link Flow to which  
24 the Reservation is bound. Upon doing so, the access network shall transition the  
25 Reservation to the Open State.

#### 26 3.5.4.2.1.3 Open State

##### 27 3.5.4.2.1.3.1 Access Terminal Requirements

28 The access terminal may transmit PDUs from higher layer flows belonging to this  
29 Reservation using the Link Flow to which the Reservation is bound.

30 The access terminal may send a *ReservationOffRequest* message to request the transition of  
31 a Reservation to the Close state. The access terminal may re-send a *ReservationOffRequest*  
32 message if it does not receive a *ReservationAccept* or *ReservationReject* message within the  
33 time period specified by  $T_{SARResponse}$  of sending the *ReservationOffRequest* message. If the  
34 *ReservationOffRequest* message contains a reverse Reservation, then the access terminal  
35 shall transition the Reservation to the Close state when the access terminal receives a  
36 *ReservationAccept* message.

37 Upon receiving a *RevReservationOff* message, the access terminal shall transition the  
38 Reservation to the Close state. Upon receiving a *ConnectedState.ConnectionClosed*  
39 indication, the access terminal shall transition to the Close state Reservations whose  
40 corresponding *ReservationKKIdleStateRev* attribute is 0x01 or 0x02 unless an access

1 network initiated Connection is being opened at the same time<sup>23</sup>, where *KK* is the two-digit  
2 hexadecimal ReservationLabel. Upon receiving an *IdleState.ConnectionFailed* indication, the  
3 access terminal shall transition to the Close state Reservations whose corresponding  
4 Reservation*KK*IdleStateRev attribute is 0x01 or 0x02, where *KK* is the two-digit hexadecimal  
5 ReservationLabel.

#### 6 3.5.4.2.1.3.2 Access Network Requirements

7 The access network may transmit PDUs from higher layer flows belonging to this  
8 Reservation using the Link Flow to which the Reservation is bound.

9 Upon sending a ReservationAccept message for a forward Reservation in response to a  
10 ReservationOffRequest message, the access network shall transition the Reservation to the  
11 Close state.

12 Upon receiving a *ConnectedState.ConnectionClosed* indication, the access network shall  
13 transition to the Close state Reservations whose corresponding Reservation*KK*IdleStateFwd  
14 attribute is 0x01 or 0x02 unless an access network initiated Connection is being opened at  
15 the same time<sup>23</sup>, where *KK* is the two-digit hexadecimal ReservationLabel. Upon receiving a  
16 *RouteUpdate.ConnectionLost* or *IdleState.ConnectionFailed* indication, the access network  
17 shall transition to the Close state Reservations whose corresponding  
18 Reservation*KK*IdleStateFwd attribute is 0x01 or 0x02, where *KK* is the two-digit  
19 hexadecimal ReservationLabel.

20 If, for any *KK*, all of the following conditions are true, the access network shall take action  
21 within  $T_{\text{Turnaround}}$ , where  $T_{\text{Turnaround}}$  is equal to 2 seconds, such that at least one of the  
22 following conditions would no longer be true (e.g., by modifying the value of  
23 Reservation*KK*QoSResponseFwd or by transitioning forward Reservation *KK* to the Close  
24 state):

- 25 • Reservation*KK*QoSRequestFwd is set to a non-default value.
- 26 • Forward Reservation *KK* is in the Open state.
- 27 • Reservation*KK*QoSResponseFwd is set to the default value or the  
28 QoS\_ATTRIBUTE\_SET\_ID field in Reservation*KK*QoSResponseFwd is not equal to the  
29 value of any QoS\_ATTRIBUTE\_SET\_ID field in the corresponding  
30 Reservation*KK*QoSRequestFwd attribute (see [1]).

31 If, for any *KK*, all of the following conditions are true, the access network shall take action  
32 within  $T_{\text{Turnaround}}$ , where  $T_{\text{Turnaround}}$  is equal to 2 seconds, such that at least one of the  
33 following conditions would no longer be true (e.g., by modifying the value of  
34 Reservation*KK*QoSResponseRev or by transitioning reverse Reservation *KK* to the Close  
35 state):

- 36 • Reservation*KK*QoSRequestRev is set to a non-default value.
- 37 • Reverse Reservation *KK* is in the Open state.

---

<sup>23</sup> An access network can send ConnectionClose message of Connected State Protocol and TrafficChannelAssignment message of Route Update Protocol in the same security layer packet.

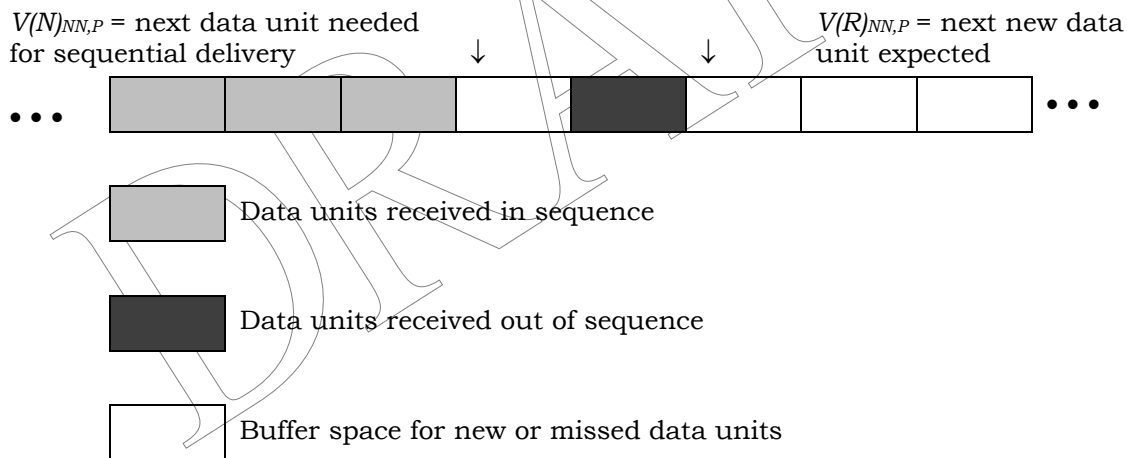
- ReservationKKQoSResponseRev is set to the default value or the QoS\_ATTRIBUTE\_SET\_ID field in ReservationKKQoSResponseRev is not equal to the value of any QoS\_ATTRIBUTE\_SET\_ID field in the corresponding ReservationKKQoSRequestRev attribute (see [1]).

#### 3.5.4.2.2 SAR Receive Procedures

The SAR receiver shall maintain two SARSequenceLength-bit variables for receiving,  $V(R)_{NN,P}$  and  $V(N)_{NN,P}$  (see Figure 3.5.4.2.2-1), where  $NN$  is the two-digit hexadecimal Link Flow number in the range 0x00 to M-1 inclusive, and  $P$  is the Route indicator that takes values of either A or B.  $M$  is the MaxNumLinkFlowsFwd or MaxNumLinkFlowsRev for a forward Link Flow or reverse Link Flow, respectively.  $V(R)_{NN,P}$  contains the sequence number of the next data unit expected to arrive.  $V(N)_{NN,P}$  contains the sequence number of the first missing data unit, as described below.

In addition, the SAR receiver shall keep track of the status of each data unit in its resequencing buffer indicating whether the data unit was received or not. Use of this status is implied in the following procedures.

The SAR receiver informs the SAR transmitter of the status of data units in its receive buffer by sending a MultiLinkNak or Nak message. The Nak message shall not convey status of data units with sequence number less than  $V(N)_{NN,P}$ .



**Figure 3.5.4.2.2-1. SAR Receive Sequence Number Variables**

The access terminal shall send a MultiLinkNak message upon receiving a QuickNak.QuickNak indication if  $V(N)_{NN,P}$  is not equal to  $V(R)_{NN,P}$  and if the NAKDelayTimer is not set to zero.

Upon receiving a Flush message, the SAR receiver shall perform the following if LastSARSequence is greater than or equal to  $V(R)_{NN,P}$ .

- If the SAR receiver is an access network, SAR receiver shall send a Nak message; if the SAR receiver is an access terminal, SAR receiver shall send a MultiLinkNak message.

- 1 • If the SAR receiver is an access network, then SAR shall set a SAR abort timer to  
 2 AbortTimer, where AbortTimer is a parameter of the FlowNMTimersRev attribute, for  
 3 each missing SAR data unit from  $V(R)_{NN,P}$  to LastSARSequence, inclusive. If the SAR  
 4 receiver is an access terminal, then SAR shall set a SAR abort timer to AbortTimer,  
 5 where AbortTimer is a parameter of the FlowNMTimersFwd attribute, for each missing  
 6 SAR data unit from  $V(R)_{NN,P}$  to LastSARSequence, inclusive.

- 7 • SAR receiver shall set  $V(R)_{NN,P}$  to LastSARSequence+1

8 For each received data unit, SAR shall perform the following procedures:

- 9 • If the SAR receiver is an access network, then SAR shall set  $X$  to the SAR sequence  
 10 number of the received data unit.

- 11 • If the SAR receiver is an access terminal, then SAR shall set  $X$  as follows:

- 12 – If the QNSEQIncluded field of the QN packet in which this data unit was  
 13 received is set to '0', then the access terminal shall set  $X$  to the SAR sequence  
 14 number of the received data unit.

- 15 – Otherwise, the access terminal shall perform the following to determine the  
 16 value of  $X$ :

- 17 – Define the interpretation interval of size  $2^{\text{SARSequenceLengthShort}}$  around  $V(R)_{NN,P}$   
 18 as follows:

19 
$$[V(R)_{NN,P} - 2^{\text{SARSequenceLengthShort}-1} + 1, \dots, V(R)_{NN,P} + 2^{\text{SARSequenceLengthShort}-1}]$$

- 20 – Set  $X$  to the SARSequenceLength-bit value in the interpretation interval  
 21 around  $V(R)_{NN,P}$  whose SARSequenceLengthShort least significant bits match  
 22 the value of the SEQ field of the received SAR Packet Header.

- 23 • If  $X < V(N)_{NN,P}$ , the data unit shall be discarded as a duplicate.

- 24 • If  $V(N)_{NN,P} \leq X < V(R)_{NN,P}$ , and the data unit is not already stored in the resequencing  
 25 buffer nor has been passed up to the Route Protocol, then:

- 26 – SAR shall store the received data unit in the resequencing buffer.

- 27 – If  $X = V(N)_{NN,P}$ , and if the Link Flow is carrying an octet stream, then SAR shall  
 28 pass all contiguous octets in the resequencing buffer, from  $V(N)_{NN,P}$  upward, to  
 29 the Route Protocol. SAR shall then set  $V(N)_{NN,P}$  to (LAST+1) where LAST is the  
 30 sequence number of the last contiguous octet (i.e., the octet with the highest  
 31 sequence number) received by the resequencing buffer.

- 32 – If  $X = V(N)_{NN,P}$ , and if the Link Flow is carrying a packet stream, and if in-order  
 33 delivery of Route Protocol packets is required, then SAR shall pass all  
 34 contiguous complete Route Protocol packets in the resequencing buffer, that  
 35 have not been passed to the Route Protocol, from the beginning of the  
 36 resequencing buffer upward, to the Route Protocol. SAR shall then set  $V(N)_{NN,P}$   
 37 to (LAST+1) where LAST is the sequence number of the last contiguous data  
 38 unit received by the resequencing buffer.

- 1           – If the Link Flow is carrying a packet stream, and if in-order delivery of Route  
2           Protocol packets is not required, then SAR shall pass all complete Route  
3           Protocol packets in the resequencing buffer, that have not been passed to the  
4           Route Protocol, from the beginning of the resequencing buffer upward, to the  
5           Route Protocol. SAR shall then set  $V(N)_{NN,P}$  to (LAST+1) where LAST is the  
6           sequence number of the last contiguous data unit received by the resequencing  
7           buffer.
- 8           • If  $V(N)_{NN,P} < X < V(R)_{NN,P}$ , and the data unit is already stored in the resequencing buffer or  
9           has already been passed up to the Route Protocol, then the data unit shall be discarded  
10           as a duplicate.
- 11           • If  $X = V(R)_{NN,P}$ , then:
- 12           – If  $V(R)_{NN,P} = V(N)_{NN,P}$  and if the Link Flow is carrying an octet stream, then SAR  
13           shall increment  $V(N)_{NN,P}$  and  $V(R)_{NN,P}$  and shall pass the data unit to the Route  
14           Protocol.
- 15           – If  $V(R)_{NN,P} = V(N)_{NN,P}$ , and if the Link Flow is carrying a packet stream, then SAR  
16           shall increment  $V(N)_{NN,P}$  and  $V(R)_{NN,P}$ , shall store the data unit in the  
17           resequencing buffer, and shall pass all complete Route Protocol packets in the  
18           resequencing buffer, that have not been passed to the Route Protocol, from the  
19           beginning of the resequencing buffer upward, to the Route Protocol.
- 20           – If  $V(R)_{NN,P} \neq V(N)_{NN,P}$ , SAR shall increment  $V(R)_{NN,P}$  and shall store the data unit  
21           in the resequencing buffer. If the Link Flow is carrying a packet stream, and if  
22           in-order delivery of Route Protocol packets is not required, then SAR shall pass  
23           all complete Route Protocol packets in the resequencing buffer, that have not  
24           been passed to the Route Protocol, from the beginning of the resequencing  
25           buffer upward, to the Route Protocol.
- 26           • If  $X > V(R)_{NN,P}$ , then:
- 27           – SAR shall store the data unit in the resequencing buffer.
- 28           – If the Link Flow is carrying a packet stream, and if in-order delivery of Route  
29           Protocol packets is not required, then SAR shall pass all complete Route  
30           Protocol packets in the resequencing buffer, that have not been passed to the  
31           Route Protocol, from the beginning of the resequencing buffer upward, to the  
32           Route Protocol.
- 33           – If the SAR receiver is an access network, then SAR shall set a SAR abort timer  
34           to AbortTimer, where AbortTimer is a parameter of the FlowNNTimersRev  
35           attribute, for each missing SAR data unit from  $V(R)_{NN,P}$  to  $X-1$ , inclusive. If the  
36           SAR receiver is an access terminal, then SAR shall set a SAR abort timer to  
37           AbortTimer, where AbortTimer is a parameter of the FlowNNTimersFwd  
38           attribute, for each missing SAR data unit from  $V(R)_{NN,P}$  to  $X-1$ , inclusive.



- 1           – If the SAR receiver is an access terminal, and if the FlowNNakEnableFwd  
2           attribute is set to 0x01, then SAR shall set a Nak delay timer to  
3           NakDelayTimer, where NakDelayTimer is a parameter of the FlowNNTimersFwd  
4           attribute, for each missing SAR data unit from  $V(R)_{NN,P}$  to  $X-1$ , inclusive.
- 5           – If the SAR receiver is an access network, and if the FlowNNakEnableRev  
6           attribute is set to 0x01, then SAR shall send a Nak message.
- 7           – SAR shall set  $V(R)_{NN,P}$  to  $X+1$ .
- 8           – If a missing data unit has not been received when its Nak delay timer expires,  
9           then the access terminal shall send a MultiLinkNak message reporting this  
10          missing data unit

11 For each missing data unit from  $V(N)_{NN,P}$  upward up to  $V(R)_{NN,P}-1$ , inclusive, SAR shall  
12 perform the following in the order specified, if the SAR abort timer of the missing data unit  
13 has expired:

- 14 • If the Link Flow is carrying an octet stream, SAR shall pass all octets in the  
15 resequencing buffer up to the next missing octet, in order of sequence number, to the  
16 Route Protocol. SAR shall skip any missing octets. If the Link Flow is carrying a packet  
17 stream, and if in-order delivery of Route Protocol packets is required, then SAR shall  
18 pass all complete Route Protocol packets, that have not been passed to the Route  
19 Protocol, from the beginning of the resequencing buffer upward up to the next missing  
20 data unit, to the Route Protocol. SAR may pass to the Route Protocol partially received  
21 packets with an indication of partial packet delivery. SAR shall set  $V(N)_{NN,P}$  to the  
22 sequence number of the next missing data unit, or to  $V(R)_{NN,P}$  if there are no remaining  
23 missing data units.

24 Further recovery is the responsibility of higher layer protocols.

#### 25 3.5.4.3 SAR Packet Header

26 The SAR packet header, which precedes the SAR payload, has the following format:  
27

Field	Length (bits)
SEQ	SARSequenceLength, SARSequenceLengthShort, or FlowNNSequenceLengthRev
FirstDataUnit	1
LastDataUnit	1

28 SEQ           The SAR sequence number of the first data unit in the SAR payload.  
29           If this SAR packet is being sent on the forward link, and if the  
30           payload of this SAR packet is being transmitted for the first time,  
31           then the access network should set the length of this field according  
32           to the SARSequenceLengthShort field in the  
33           FlowNNSequenceLengthFwd attribute corresponding to this flow, but  
34           may set the length of this field according to the SARSequenceLength

field in the FlowNNSequenceLengthFwd attribute corresponding to this flow. If this SAR packet is being sent on the forward link, and if the payload of this SAR packet is being re-transmitted, then the access network shall set the length of this field according to the SARSequenceLength field in the FlowNNSequenceLengthFwd attribute corresponding to this flow. If this SAR packet is being sent on the reverse link, the access terminal shall set the length of this field according to the FlowNNSequenceLengthRev attribute corresponding to this flow.

**FirstDataUnit** If the Link Flow is carrying an octet stream, then the sender shall set this field to '0'. Otherwise, the sender shall set this field as follows:

If the payload of this SAR packet is the first segment of a Route Protocol packet, then the sender shall set this field to '1'. Otherwise, the sender shall set this field to '0'.

**LastDataUnit** If the Link Flow is carrying an octet stream, then the sender shall set this field to '0'. Otherwise, the sender shall set this field as follows:

If the payload of this SAR packet is the last segment of a Route Protocol packet, then the sender shall set this field to '1'. Otherwise, the sender shall set this field to '0'.

#### 3.5.4.4 Message Formats

The messages described in this section control the function of the SAR. These messages are exchanged between the access terminal and the access network using the SNP.

##### 3.5.4.4.1 ResetTxIndication

The SAR transmitter in the access terminal or the access network sends the ResetTxIndication message to reset its peer SAR receiver.

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

**MessageID** The sender shall set this field to 0x00.

**LinkFlowNumber** The sender shall set this field to the Link Flow that is reset. The sender shall set this field to '11111' to reset all Link Flows.

**Route** If Route A is reset, then the sender shall set this field to '0'. If Route B is reset, then the sender shall set this field to '1'.

1 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
2 field.  
3

<b>Channels</b>	FTC RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

#### 4 3.5.4.4.2 ResetRxIndication

5 The SAR receiver in the access terminal or the access network sends the ResetRxIndication  
6 message to reset its peer SAR transmitter.  
7

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

8 MessageID The sender shall set this field to 0x01.

9 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. The  
10 sender shall set this field to '11111' to reset all Link Flows.

11 Route If Route A is reset, then the sender shall set this field to '0'. If Route B  
12 is reset, then the sender shall set this field to '1'.

13 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
14 field.  
15

<b>Channels</b>	FTC RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

#### 16 3.5.4.4.3 ResetTxIndicationAck

17 The SAR receiver in the access terminal or the access network sends the  
18 ResetTxIndicationAck message in response to a ResetTxIndication message.  
19

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

20

- 1 MessageID The sender shall set this field to 0x0d.
- 2 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. If this
- 3 message is being sent in response to a ResetTxIndication message
- 4 that required reset of all Link Flows, then the sender shall set this
- 5 field to '11111'.
- 6 Route If Route A is reset, then the sender shall set this field to '0'. If Route B
- 7 is reset, then the sender shall set this field to '1'.
- 8 Reserved The sender shall set this field to '00'. The receiver shall ignore this
- 9 field.

<b>Channels</b>	FTC RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

11 3.5.4.4.4 ResetTxComplete

12 The SAR transmitter in the access terminal or the access network sends the

13 ResetTxComplete message to complete the SAR reset procedure.

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

- 16 MessageID The sender shall set this field to 0x0e.
- 17 LinkFlowNumber The sender shall set this field to the Link Flow that is reset. If all Link
- 18 Flows were reset, then the sender shall set this field to "11111".
- 19 Route If Route A is reset, then the sender shall set this field to '0'. If Route B
- 20 is reset, then the sender shall set this field to '1'.
- 21 Reserved The sender shall set this field to '00'. The receiver shall ignore this
- 22 field.

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

## 1    3.5.4.4.5 ResetRxComplete

2    The SAR transmitter in the access terminal or the access network sends the  
3    ResetRxComplete message to complete the SAR reset procedure.

4

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved	2

5

6    MessageID            The sender shall set this field to 0x0f.

7    LinkFlowNumber      The sender shall set this field to the Link Flow that is reset. If all Link  
8    Flows were reset, then the sender shall set this field to '11111'.

9    Route                If Route A is reset, then the sender shall set this field to '0'. If Route B  
10    is reset, then the sender shall set this field to '1'.

11    Reserved             The sender shall set this field to '00'. The receiver shall ignore this  
12    field.

13

<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	50

## 14    3.5.4.4.6 MultiLinkNak

15    The access terminal sends the MultiLinkNak message to request the retransmission of one  
16    or more SAR data units.

17

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved1	2
SARSequenceLength	8
ReportCount	8

ReportCount occurrences of the following four fields:

DelayedNak	1
LeadingEdgeIncluded	1
LeadingEdge	0 or SARSequenceLength
TrailingEdge	SARSequenceLength

OtherQNCount	0 or 8
--------------	--------

OtherQNCount occurrences of the following field:

LargestSAR	0 or SARSequenceLength
------------	------------------------

VR	0 or SARSequenceLength
----	------------------------

Reserved2	0 – 7 (as needed)
-----------	-------------------

- 1 MessageID The access terminal shall set this field to 0x25.
- 2 LinkFlowNumber The access terminal shall set this field to the Link Flow for which this  
3 MultiLinkNak is being sent.
- 4 Route If this MultiLinkNak is being sent for Route A, then the access  
5 terminal shall set this field to '0'. Otherwise, the access terminal shall  
6 set this field to '1'.
- 7 Reserved1 The access terminal shall set this field to '00'. The access network  
8 shall ignore this field.
- 9 SARSequenceLength The access terminal shall set this field to the length of the SAR  
10 sequence number as indicated by the SARSequenceLength field of the  
11 FlowMNSequenceLengthFwd attribute for forward Link Flow NN.
- 12 ReportCount The access terminal shall set this field to the number of Report  
13 records included in this message. The access terminal shall include

1 ReportCount occurrences of the following four fields with the  
2 message.

3 DelayedNak The access terminal shall set this field to '0' if this report is triggered  
4 by a *QuickNak.QuickNak* indication. Otherwise, the access terminal  
5 shall set this field to '1'.

6 LeadingEdgeIncluded If DelayedNak is set '1', the access terminal shall set this field to '1'.

7 If DelayedNak is set '0':

- 8 - If the access terminal has received more than one QN packet on  
9 the corresponding QN instance in the last abort time interval, the  
10 access terminal shall set this field to '1'
- 11 - Otherwise, the access terminal shall set this field to '0'.

12 LeadingEdge The access terminal shall omit this field if LeadingEdgeIncluded is set  
13 to '0'; otherwise, the access terminal shall include this field and set it  
14 as follows:

15 If this report is triggered by a *QuickNak.QuickNak* indication, then the  
16 access terminal sender shall set this field to the largest SAR sequence  
17 number received on the QN instance that triggered this message  
18 before the *QuickNak.QuickNak* indication was received. If this report  
19 is triggered by a Flush message, then the access terminal shall set  
20 this field to the value of  $V(R)_{NN,P} - 1$ . Otherwise, the access terminal  
21 shall set this field to one less than the SAR sequence number of the  
22 first SAR data unit erased in a sequence of erased data units.

23 TrailingEdge If this report is triggered by a *QuickNak.QuickNak* indication, then the  
24 access terminal shall set this field to the SAR sequence number of the  
25 first data unit in the payload received on the QN instance that  
26 triggered this report at the time that the *QuickNak.QuickNak*  
27 indication was received. If this report is triggered by a Flush message,  
28 then the access terminal shall set this field to  $\text{LastSARSequence} + 1$ ,  
29 where  $\text{LastSARSequence}$  is the value of the field included in the Flush  
30 message. Otherwise, the access terminal shall set this field to one  
31 more than the SAR sequence number of the last SAR data unit erased  
32 in a sequence of erased data units.

33 OtherQNCount The access terminal shall set this field as follows:  
34 If this MultiLinkNak message reports any erased data units for which  
35 the corresponding DelayedNak field is set to '0', then the access  
36 terminal shall include this field and set it to the number of QN  
37 instances such that SAR packets have been received on the QN  
38 instance and LeadingEdge and TrailingEdge with corresponding

1 DelayedNak field set to '0' have not been reported in this message  
 2 corresponding to SAR packets received on that QN instance.  
 3 Otherwise, the access terminal shall omit this field.

4 LargestSAR If the OtherQNCount field is omitted, then the access terminal shall  
 5 omit this field. Otherwise, the access terminal shall set this field to  
 6 the largest SAR sequence number received on this QN instance.

7 VR If OtherQNCount is included and is not zero, then the access terminal  
 8 shall omit this field. Otherwise, the access terminal shall set this field  
 9 to  $V(R)_{NN,P}$ .

10 Reserved2 The access terminal shall add reserved bits to make the length of the  
 11 entire message an integer number of octets. The access terminal shall  
 12 set these bits to '0'. The access network shall ignore this field.  
 13

<b>Channels</b>	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	50

#### 14 3.5.4.4.7 ReservationOnRequest

15 The access terminal sends this message to request transition of one or more Reservations to  
 16 the Open State.

17

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following two fields:

Link	1
ReservationLabel	8

EmergencyIndication	0 or 1
ReservationQueuingReq	0 or 1

Reserved	0 – 7 (as needed)
----------	-------------------

18 MessageID The access terminal shall set this field to 0x16.

19 TransactionID The access terminal shall set this field to one more (modulo 256) than  
 20 the TransactionID field of the last ReservationOnRequest or  
 21 ReservationOffRequest message sent by the access terminal. If this is



- 1 the first ReservationOnRequest or ReservationOffRequest message  
 2 sent by the access terminal, then the access terminal shall set this  
 3 field to zero.
- 4 **ReservationCount** The access terminal shall set this field to the number of the following  
 5 two fields in this message.
- 6 **Link** If this request is for a forward Reservation, then the access terminal  
 7 shall set this field to '1'. If this request is for a reverse Reservation,  
 8 then the access terminal shall set this field to '0'.
- 9 **ReservationLabel** The access terminal shall set this field to the ReservationLabel for  
 10 which this request is generated.
- 11 **EmergencyIndication**
- 12 The access terminal shall include this field if any of the non-reserved fields that follow this  
 13 field are included in the message.  
 14 If included, the access terminal shall set this field as follows:  
 15 If this is an emergency ReservationOnRequest, then the access  
 16 terminal shall set this field to '1'. Otherwise, the access terminal shall  
 17 set this field to '0'.
- 18 **ReservationQueuingReq**
- 19 The access terminal shall include this field if any of the non-reserved  
 20 fields that follow this field are included in the message or if the access  
 21 terminal wants to request queuing. If this field is included, the access  
 22 terminal shall set this field as follows: If the access terminal requests  
 23 that the queuing treatment be enabled in the access network for this  
 24 ReservationOnRequest message, then the access terminal shall set  
 25 this field to '1'. Otherwise, the access terminal shall set this field to  
 26 '0'.
- 27 **Reserved** The access terminal shall add reserved bits to make the length of the  
 28 entire message an integer number of octets. The access terminal shall  
 29 set these bits to zero. The access network shall ignore this field.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 31 3.5.4.4.8 ReservationOffRequest

32 The access terminal sends this message to request transition of one or more Reservations to  
 33 the Close State.

34

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following two fields:

Link	1
ReservationLabel	8

Reserved	0 – 7 (as needed)
----------	-------------------

- 1    MessageID            The access terminal shall set this field to 0x17.
- 2    TransactionID        The access terminal shall set this field to one more (modulo 256) than  
3                            the TransactionID field of the last ReservationOnRequest or  
4                            ReservationOffRequest message sent by the access terminal. If this is  
5                            the first ReservationOnRequest or ReservationOffRequest message  
6                            sent by the access terminal, then the access terminal shall set this  
7                            field to zero.
- 8    ReservationCount     The access terminal shall set this field to the number of the following  
9                            two fields in this message.
- 10   Link                    If this request is for a forward Reservation, then the access terminal  
11                            shall set this field to '1'. If this request is for a reverse Reservation,  
12                            then the access terminal shall set this field to '0'.
- 13   ReservationLabel     The access terminal shall set this field to the Reservation for which  
14                            this request is generated.
- 15   Reserved              The access terminal shall add reserved bits to make the length of the  
16                            entire message an integer number of octets. The access terminal shall  
17                            set these bits to zero. The access network shall ignore this field.

<b>Channels</b>	AC                    RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	40

19    3.5.4.4.9 ReservationAccept

20    The access network sends this message to acknowledge reception of and allow the state  
21    transition requested by a ReservationOnRequest or ReservationOffRequest message. The  
22    access terminal sends this message to acknowledge reception of and accept the state  
23    transition requested by a RevReservationOn or RevReservationOff message.

24

Field	Length (bits)
MessageID	8
TransactionID	8

1 MessageID The sender shall set this field to 0x18.

2 TransactionID The access network shall set this field to the TransactionID field of  
3 the ReservationOnRequest or ReservationOffRequest message to  
4 which the access network is responding. The access terminal shall set  
5 this field to the TransactionID field of the RevReservationOn or  
6 RevReservationOff message to which the access terminal is  
7 responding.  
8

<b>Channels</b>	CC	FTC	RTC	AC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast			<b>Priority</b>	40	

#### 9 3.5.4.4.10 ReservationReject

10 The access network sends this message to acknowledge reception of and deny the state  
11 transition requested by a ReservationOnRequest or ReservationOffRequest message.  
12

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following two fields:

AllowableLink	1
AllowableReservationLabel	8

ReservationCount occurrences of the following two fields:

RejectCode	0 or 4
PendingDuration	0 or 5

Reserved	0 – 7 (as needed)
----------	-------------------

13 MessageID The access network shall set this field to 0x19.

14 TransactionID The access network shall set this field to the TransactionID field of  
15 the ReservationOnRequest or ReservationOffRequest message to  
16 which the access network is responding.

1 ReservationCount The access network shall set this field to the number of the following  
 2 two fields in this message.

3 AllowableLink If the Reservation for which the access network would have allowed  
 4 the state transition requested in the ReservationOnRequest or  
 5 ReservationOffRequest message is a forward Reservation, then the  
 6 access network shall set this field to '1'. If the Reservation for which  
 7 the access network would have allowed the state transition requested  
 8 in the ReservationOnRequest or ReservationOffRequest message is a  
 9 reverse Reservation, then the access network shall set this field to '0'.

10 AllowableReservationLabel  
 11 The access network shall set this field to the ReservationLabel for  
 12 which the access network would have allowed the state transition  
 13 requested in the ReservationOnRequest or ReservationOffRequest  
 14 message.

15 RejectCode If included, the access network shall set this field as follows:  
 16 The access network shall set the RejectCode to indicate the Reject  
 17 Code.

Field value	Description
0x0	General
0x1	ReservationPending
All other values are reserved	

19 PendingDuration The access network shall include this field if RejectCode field is  
 20 included and is set to ReservationPending. If this field is included, the  
 21 access network shall set this field to the pending duration in units of  
 22 seconds

23 Reserved The access network shall add reserved bits to make the length of the  
 24 entire message an integer number of octets. The access network shall  
 25 set these bits to zero. The access terminal shall ignore this field.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

27 3.5.4.4.11 RevReservationOn

28 The access network sends this message to transition a reverse Reservation to the Open  
 29 state.  
 30

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following field:

ReservationLabel	8
------------------	---

- 1 MessageID            The access network shall set this field to 0x1a.
- 2 TransactionID        The access network shall set this field to one more (modulo 256) than
- 3                            the TransactionID field of the last RevReservationOn or
- 4                            RevReservationOff message sent by the access network. If this is the
- 5                            first RevReservationOn or RevReservationOff message sent by the
- 6                            access network, then the access network shall set this field to zero.
- 7 ReservationCount    The access network shall set this field to the number of
- 8                            ReservationLabel fields in this message.
- 9 ReservationLabel    The access network shall set this field to the Reservation which is to
- 10                           be transitioned to the Open state.
- 11

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

- 12 3.5.4.4.12 RevReservationOff
- 13 The access network sends this message to transition a reverse Reservation to the Close
- 14 state.
- 15

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8

ReservationCount occurrences of the following field:

ReservationLabel	8
------------------	---

- 16 MessageID            The access network shall set this field to 0x1b.
- 17 TransactionID        The access network shall set this field to one more (modulo 256) than
- 18                            the TransactionID field of the last RevReservationOn or
- 19                            RevReservationOff message sent by the access network. If this is the
- 20                            first RevReservationOn or RevReservationOff message sent by the
- 21                            access network, then the access network shall set this field to zero.

1 ReservationCount The access network shall set this field to the number of  
 2 ReservationLabel fields in this message.

3 ReservationLabel The access network shall set this field to the Reservation that is to be  
 4 transitioned to the Close state.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

6 3.5.4.4.13 FwdReservationOff

7 The access network sends this message to inform the access terminal when a forward  
 8 Reservation transitions to the Close state.

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8
ReservationCount occurrences of the following field:	
ReservationLabel	8

10 MessageID The access network shall set this field to 0x22.

11 TransactionID The access network shall set this field to one more (modulo 256) than  
 12 the TransactionID field of the last FwdReservationOn or  
 13 FwdReservationOff message sent by the access network. If this is the  
 14 first FwdReservationOn or FwdReservationOff message sent by the  
 15 access network, then the access network shall set this field to zero.

16 ReservationCount The access network shall set this field to the number of  
 17 ReservationLabel fields in this message.

18 ReservationLabel The access network shall set this field to the Reservation transitioned  
 19 to the Close state.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

21 3.5.4.4.14 FwdReservationOn

22 The access network sends this message to inform the access terminal when a forward  
 23 Reservation transitions to the Open state.

24

Field	Length (bits)
MessageID	8
TransactionID	8
ReservationCount	8
ReservationCount occurrences of the following field:	
ReservationLabel	8

- 1 MessageID The access network shall set this field to 0x23.
- 2 TransactionID The access network shall set this field to one more (modulo 256) than  
3 the TransactionID field of the last FwdReservationOn or  
4 FwdReservationOff message sent by the access network. If this is the  
5 first FwdReservationOn or FwdReservationOff message sent by the  
6 access network, then the access network shall set this field to zero.
- 7 ReservationCount The access network shall set this field to the number of  
8 ReservationLabel fields in this message.
- 9 ReservationLabel The access network shall set this field to the Reservation that  
10 transitioned to the Open state.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 12 3.5.4.4.15 FwdReservationAck

13 The access terminal sends this message to acknowledge reception of the FwdReservationOn  
14 or the FwdReservationOff message and to accept the related state transition.

Field	Length (bits)
MessageID	8
TransactionID	8

- 16 MessageID The access terminal shall set this field to 0x24.
- 17 TransactionID The access terminal shall set this field to the TransactionID field of  
18 the FwdReservationOn or FwdReservationOff message to which the  
19 access terminal is responding.

20

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.5.4.4.16 AttributeUpdateRequest

The sender sends an AttributeUpdateRequest message to offer an attribute value for a given attribute.

Field	Length (bits)
MessageID	8
TransactionID	8

One or more instances of the following record

AttributeRecord	Attribute dependent
-----------------	---------------------

**MessageID** The sender shall set this field to 0x52.

**TransactionID** The sender shall increment this value for each new AttributeUpdateRequest message sent.

**AttributeRecord** The format of this record is specified in [8].

<b>Channels</b>	FTC	RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.5.4.4.17 AttributeUpdateAccept

The sender sends an AttributeUpdateAccept message in response to an AttributeUpdateRequest message to accept the offered attribute values.

Field	Length (bits)
MessageID	8
TransactionID	8

**MessageID** The sender shall set this field to 0x53.

**TransactionID** The sender shall set this value to the TransactionID field of the corresponding AttributeUpdateRequest message.



<b>Channels</b>	FTC    RTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

## 1    3.5.4.4.18 AttributeUpdateReject

2    The access network sends an AttributeUpdateReject message in response to an  
3    AttributeUpdateRequest message to reject the offered attribute values.

4

Field	Length (bits)
MessageID	8
TransactionID	8

5    MessageID            The access network shall set this field to 0x54.

6    TransactionID        The sender shall set this value to the TransactionID field of the  
7    corresponding AttributeUpdateRequest message.

8

<b>Channels</b>	FTC	<b>SLP</b>	Reliable
<b>Addressing</b>	unicast	<b>Priority</b>	40

## 9    3.5.4.4.19 Flush

10   The access terminal and the access network send the Flush message to indicate the end of  
11   a data burst.

12

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
SARSequenceLength	8
LastSARSequence	SARSequenceLength
Reserved	0-7 (as needed)

13   MessageID            The sender shall set this field to 0x26.

14   LinkFlowNumber        The sender shall set this field to the Link Flow for which this Flush is  
15   being sent.

16   Route                 If this Flush is being sent for Route A, then the sender shall set this  
17   field to '0'. Otherwise, the sender shall set this field to '1'.

- 1 SARSequenceLength The sender shall set this field to the size of the SAR sequence number  
2 for this Link Flow in units of bits.
- 3 LastSARSequence The sender shall set this field to  $V(S)_{NN,P}-1$ .
- 4 Reserved The sender shall add reserved bits to make the length of the entire  
5 message an integer number of octets. The sender shall set these bits  
6 to zero. The receiver shall ignore this field.

<b>Channels</b>	RTC    FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	50

#### 8 3.5.4.4.20 Nak

- 9 The access network sends the Nak message to request the retransmission of one or more  
10 SAR data units.

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
Reserved1	2
SARSequenceLength	8
ReportCount	8

ReportCount occurrences of the following two fields:

FirstErasedDataUnit	SARSequenceLength
WindowLen	SARSequenceLength

VR	SARSequenceLength
----	-------------------

Reserved2	0 – 7 (as needed)
-----------	-------------------

- 12 MessageID The access network shall set this field to 0x02.
- 13 LinkFlowNumber The access network shall set this field to the Link Flow for which this  
14 Nak is being sent.
- 15 Route If this Nak is being sent for Route A, then the access network shall  
16 set this field to '0'. Otherwise, the access network shall set this field  
17 to '1'.

- 1 Reserved1 The access network shall set this field to '00'. The access terminal  
2 shall ignore this field.
- 3 SARSequenceLength The access network shall set this field to the length of the sequence  
4 number as indicated by the FlowNNSequenceLengthRev attribute for  
5 this reverse Link Flow NN.
- 6 ReportCount The access network shall set this field to the number of Report  
7 records included in this message. The access network shall include  
8 ReportCount occurrences of the following two fields with the message.
- 9 Sequences of erased data units shall be listed in the ascending order of SAR sequence  
10 number associated with FirstErasedDataUnit.
- 11 FirstErasedDataUnit The access network shall set this field to the sequence number of the  
12 first SAR data unit erased in a sequence of erased data units.
- 13 WindowLen The access network shall set this field to the length of the erased  
14 window in units of data units.
- 15 VR The access network shall set this field to  $V(R)_{NN,P}$ .
- 16 Reserved2 The access network shall add reserved bits to make the length of the  
17 entire message an integer number of octets. The access network shall  
18 set these bits to '0'. The access terminal shall ignore this field.

<b>Channels</b>	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast	<b>Priority</b>	50

20

## 21 3.5.4.5 Interface to Other Protocols

## 22 3.5.4.5.1 Commands

23 This protocol does not issue any commands.

## 24 3.5.4.5.2 Indications

25 This protocol registers to receive the following indications:

- 26 • *IdleState.ConnectionOpened*
- 27 • *IdleState.ConnectionFailed*
- 28 • *PhysicalLayer.ReverseTrafficPacketsMissed* along with parameters indicating the Link  
29 Flow number and missing data units.
- 30 • *ConnectedState.ConnectionClosed*

- 1 • *RouteUpdate.ConnectionLost*
- 2 • *QuickNak.QuickNak* (access terminal only)

3 3.5.5 Protocol Numeric Constants

4

<b>Constant</b>	<b>Meaning</b>	<b>Value</b>
$T_{\text{SARResponse}}$	Time period within which the access network is to respond to ReservationOnRequest and ReservationOffRequest messages.	1 second

5

DRAFT

## 3.6 Quick Nak Protocol

### 3.6.1 Overview

The Quick Nak Protocol (QN) is used to detect erased forward link SAR packets. There may be one or more instances of the QN for each Route of a Link Flow. SAR may deliver SAR packets for transmission to any instance of the QN protocol associated with that Link Flow and Route. Each instance of the QN protocol detects loss of packets delivered by the SAR transmitter to that QN instance. QN is a protocol associated with the Multi-link Multi-flow Packet Application. The application subtype for this application is defined in [3].

### 3.6.2 Primitives and Public Data

#### 3.6.2.1 Commands

This protocol defines the following commands:

- *Initialize*

#### 3.6.2.2 Return Indications

This protocol returns the following indications:

- *QuickNak* (access terminal only)

### 3.6.3 Protocol Data Unit

The transmission unit of this protocol is a QN packet.

### 3.6.4 Procedures and Messages for the InUse Instance of the Protocol

This section defines the procedures and messages for each instance of QN.

#### 3.6.4.1 Procedures

The access network and the access terminal shall have one instance of the QN protocol for each (Link Flow, Route, QNGroup) tuple. The QNGroup indicates Active Set pilots that share the same QN instance for a given Route of a given Link Flow. Information about which Active Set pilot belong to a QNGroup is provided by Scheduler Group public data of the Route Update Protocol.

The procedures in this section apply to each instance of the QN protocol. If the public data of the Route Update Protocol does not provide QNGroup information, then all pilots in the Active Set shall be considered to be part of one QNGroup.

The access network and the access terminal shall set QNSequenceLength for a forward Link flow to SARSequenceLength - SARSequenceLengthShort corresponding to that forward Link flow.

Upon receiving a *RouteUpdate.ActiveSetUpdated* indication, the access network and the access terminal shall perform the following:

- 1 • The access network and the access terminal shall delete QN instances corresponding to
- 2 QNGroups that have been deleted from the Active Set.
- 3 • The access network and access terminal shall create a new QN instance for each new
- 4 QNGroup in the Active Set.

#### 5 3.6.4.1.1 Initialization

6 Upon creation of a QN instance, the QN receiver at the access terminal shall set  $V(R)_{QN}$  to  
 7 zero. Upon creation of a QN instance, the QN transmitter at the access network shall set  
 8  $V(S)_{QN}$  to zero. The QN transmitter at the access terminal shall ignore an *Initialize* command.  
 9 The QN receiver at the access network shall ignore an *Initialize* command.

10 Upon receiving an *Initialize* command, the access terminal shall set  $V(R)_{QN}$  to zero. Upon  
 11 receiving an *Initialize* command, the access network shall set  $V(S)_{QN}$  to zero.

#### 12 3.6.4.1.2 Data Transfer

13 QN is an erasure detection protocol with a sequence space of QNSequenceLength bits,  
 14 where QNSequenceLength is equal to (SARSequenceLength – SARSequenceLengthShort) as  
 15 indicated by the corresponding fields of the FlowMNSequenceLengthFwd attribute for  
 16 forward Link Flow MN. All operations and comparisons performed on QN packet sequence  
 17 numbers shall be carried out in unsigned modulo  $2^S$  arithmetic, where S represents the  
 18 value of QNSequenceLength.

##### 19 3.6.4.1.2.1 QN Transmit Procedures

20 The SAR protocol associated with each Route of a Link Flow provides SAR packets for  
 21 transmission to the instance of QN associated with that (Route, Link Flow, QNGroup),  
 22 where QNGroup is the QNGroup associated with the pilot on which the SAR packet is to be  
 23 transmitted.

24 The sender forms a QN packet by prepending the QN packet header defined in 3.6.4.1.3 to a  
 25 SAR packet.

26 The access network shall maintain a QNSequenceLength-bit variable  $V(S)_{QN}$  that indicates  
 27 the sequence number of the next QN packet to be sent using this QN instance.  $V(S)_{QN}$  shall  
 28 be incremented each time a QN packet containing first-time payload is transmitted.

##### 29 3.6.4.1.2.2 QN Receive Procedures

30 The access network shall pass the payload of the QN packet along with the contents of the  
 31 QN header to SAR.

32 The access terminal shall maintain a QNSequenceLength-bit variable  $V(R)_{QN}$  for each QN  
 33 instance.  $V(R)_{QN}$  contains the sequence number of the next QN packet expected to arrive.

34 If the QN packet does not contain a sequence number, then the access terminal shall pass  
 35 the payload of the QN packet to SAR.

36 In the following, X denotes the sequence number of a received QN packet. For each received  
 37 QN packet, the access terminal shall perform the following procedures in the order  
 38 specified:

- 1 • QN shall pass the payload of the QN packet along with the contents of the QN header to  
2 SAR.
- 3 • If  $X \neq V(R)QN$ , then QN shall generate a QuickNak indication.
- 4 • QN shall set  $V(R)QN$  to  $X + 1$ .

### 5 3.6.4.1.3 QN Packet Header

6 The QN packet header, which precedes a SAR payload, has the following format:

Field	Length (bits)
LinkFlowNumber	5
Route	1
QNSEQIncluded	0 or 1
QNSEQ	0 or QNSequenceLength

- 8 LinkFlowNumber The sender shall set this field to the identifier for the Link Flow that  
9 this QN instance is associated with.
- 10 Route If this QN instance is associated with Route A of the Link Flow, then  
11 the sender shall set this field to '0'. Otherwise, the sender shall set  
12 this field to '1'.
- 13 QNSEQIncluded The access terminal shall omit this field. If this QN packet contains a  
14 SAR packet with a SEQ field of length SARSequenceLength, then the  
15 access network shall set this field to '0'. Otherwise, the access  
16 network shall set this field to '1'.
- 17 QNSEQ The access terminal shall omit this field. If QNSEQIncluded is set to  
18 '0', then the access network shall omit this field. Otherwise, the  
19 access network shall set this field to  $V(S)QN$ .

### 20 3.6.4.2 Message Formats

21 No messages are defined in this protocol.

### 22 3.6.5 Interface to Other Protocols

#### 23 3.6.5.1 Commands

24 This protocol does not issue any commands.

#### 25 3.6.5.2 Indications

26 This protocol registers to receive the following indications:

- 27 • *RouteUpdate.ActiveSetUpdated*

### 3.6.6 QN Packet Priorities

The sender shall assign priority between 60 and 70 inclusive to QN packets. For a given Link Flow, the sender shall assign higher priority (lower number) to packets containing retransmitted application traffic than packets containing only first time transmissions. If FlowNMTransmitAbortTimerRev is not set to 0x00, then the access terminal should transmit a higher layer data unit within FlowNMTransmitAbortTimerRev time of the higher layer data unit being received by the Multi-link Multi-flow Packet Application. The access terminal may use the FlowNMTransmitAbortTimerRev attribute to determine the priority of reverse QN packets.

Type of QN Packet	Channel	Addressing	Priority
Packet containing only first-time transmissions	FTC, RTC	unicast	Between 60 and 70 inclusive
Packet containing re-transmitted application traffic	FTC, RTC	unicast	Between 60 and 70 inclusive

### 3.6.7 Protocol Numeric Constants

No numeric constants are defined in this protocol.



## 3.7 Data Over Signaling Protocol

### 3.7.1 Overview

The Data Over Signaling Protocol provides transmission and duplicate detection of higher layer packets using signaling messages. Each Link flow provides two instances of the Data Over Signaling Protocol, one associated with Route A of the Link flow, and the other associated with Route B<sup>24</sup>. A higher layer packet is carried in a DataOverSignaling message. The Data Over Signaling Protocol uses message sequence numbers in the DataOverSignaling message to provide duplicate detection. Data Over Signaling Protocol is associated with the Multi-link Multi-flow Packet Application. The application subtype for this application is defined in [3].

### 3.7.2 Primitives and Public Data

#### 3.7.2.1 Commands

This protocol does not define any commands.

#### 3.7.2.2 Return Indications

This protocol does not return any indications.

### 3.7.3 Protocol Data Unit

The transmission unit of this protocol is a DataOverSignaling message. The DataOverSignaling message carries payload on behalf of the higher layer. This protocol uses the Signaling Application to transmit and receive messages.

### 3.7.4 Procedures and Messages for the InUse Instance of the Protocol

#### 3.7.4.1 Procedures

If FlowNMDataOverSignalingAllowedRev is set to 0x00, the access terminal shall not send a DataOverSignaling message for Link Flow *NN*. The sender shall set the MessageSequence field of a DataOverSignaling message to  $V(S_P)$  value maintained by the sender for the Route *P* on which the DataOverSignaling message was sent. Each time the sender sends a new DataOverSignaling message, it shall increment the value of  $V(S_P)$ . If the sender does not receive a DataOverSignalingAck message within an implementation specific time interval in response to a DataOverSignaling message requiring an acknowledgment, then the sender may retransmit the DataOverSignaling message containing the same higher layer packet and the same MessageSequence an implementation specific number of times.

---

<sup>24</sup> Note that the all instances of the Data Over Signaling Protocol associated with a Route share the same MessageSequence space.

1 The access terminal or the access network shall not send a DataOverSignaling message if  
2 the associated Link Flow for which the DataOverSignaling message is carrying payload is  
3 deactivated, or if the associated Reservation is in the Close state.

4 Upon receiving a DataOverSignaling message, the receiver shall perform the following:

- 5 • If Reset is set to '1' and the receiver is the access terminal, the receiver shall perform  
6 the following:
  - 7 – If Route is set to '0', the receiver shall set  $V(R_A)$  to  $(\text{MessageSequence} - 1) \bmod$   
8 64.
  - 9 – If Route is set to '1', the receiver shall set  $V(R_B)$  to  $(\text{MessageSequence} - 1) \bmod$   
10 64.
- 11 • The receiver shall validate the message using the procedure defined in the Sequence  
12 Number Validation Procedure of [8] by setting the variable  $V(R)$  defined in [8] to the  
13  $V(R_P)$  value maintained by the receiver for the Route  $P$  on which the DataOverSignaling  
14 message was received, and by setting  $S = 6$ .
- 15 • The receiver shall discard the DataOverSignaling message if it is invalid. If the  
16 DataOverSignaling message is valid, then the receiver shall pass the HigherLayerPacket  
17 field of the DataOverSignaling message to the higher layer. If the receiver is an access  
18 terminal, then the higher layer is indicated by the ProtocolID field of the  
19 FlowNNRouteProtocolParametersFwd attribute, where  $NN$  is the Link Flow with which  
20 the DataOverSignaling message is associated. If the receiver is an access network, then  
21 the higher layer is indicated by the ProtocolID field of the  
22 FlowNNRouteProtocolParametersRev attribute, where  $NN$  is the Link Flow with which  
23 the DataOverSignaling message is associated.
- 24 • If the AckRequired field of the DataOverSignaling message is '1', then the receiver shall  
25 respond with a DataOverSignalingAck message with AckSequence field set to the  
26 MessageSequence field of the DataOverSignaling message.

#### 27 3.7.4.2 Message Formats

28 The messages described in this section are exchanged between the access terminal and the  
29 access network using the Signaling Application.

##### 30 3.7.4.2.1 DataOverSignaling

31 The access network or the access terminal sends the DataOverSignaling message to  
32 transmit a higher layer packet.  
33

Field	Length (bits)
MessageID	8
LinkFlowNumber	5
Route	1
AckRequired	1
Reset	1
Reserved	2
MessageSequence	6
HigherLayerPacket	Variable Length

- 1 MessageID The sender shall set this field to 0x14.
- 2 LinkFlowNumber The sender shall set this field to the Link Flow with which this  
3 DataOverSignaling message is associated.
- 4 Route If this DataOverSignaling message is associated with Route A, then  
5 the sender shall set this field to '0'. If this DataOverSignaling message  
6 is associated with Route B, then the sender shall set this field to '1'.
- 7 AckRequired The sender shall set this field to '1' if the receiver is required to  
8 acknowledge the receipt of this message. Otherwise, the sender shall  
9 set this field to '0'.
- 10 Reset The access terminal shall set this field to '0'. The access network may  
11 set this field to '1' to indicate that the access terminal is to reset its  
12 V(R) for the indicated route. The access network may set this field to  
13 '0' to indicate that the access terminal is not required to reset its  
14 V(R).
- 15 Reserved The sender shall set this field to '00'. The receiver shall ignore this  
16 field.
- 17 MessageSequence The sender shall set this field to the V(S<sub>P</sub>) value maintained by the  
18 sender for the Route P on which the DataOverSignaling message was  
19 sent.
- 20 HigherLayerPacket The sender shall set this field to an entire higher layer packet<sup>25</sup>. The  
21 length of the higher layer packet shall be an integer number of octets.  
22

Channels	CC	AC	FTC

SLP	Best Effort

<sup>25</sup> For example, if the higher layer packet is an HDLC frame, then the entire HDLC frame is included.

<b>Addressing</b>	unicast	<b>Priority</b>	20 to 50 (inclusive)
-------------------	---------	-----------------	----------------------

1 The sender shall assign message priority in the range 20 to 50, inclusive, depending on the  
2 priority of the higher layer packet carried as payload in this message.

### 3 3.7.4.2.2 DataOverSignalingAck

4 The access network or the access terminal sends a DataOverSignalingAck message to  
5 acknowledge receipt of a DataOverSignaling message.  
6

Field	Length (bits)
MessageID	8
Route	1
AckSequence	6
Reserved	1

7 **MessageID** The sender shall set this field to 0x15.

8 **Route** If this message is acknowledging a DataOverSignaling received on  
9 Route A, then the sender shall set this field to '0'. Otherwise the  
10 sender shall set this field to '1'.

11 **AckSequence** The sender shall set this field to the MessageSequence field of the  
12 DataOverSignaling message whose receipt is being acknowledged.

13 **Reserved** The sender shall set this field to '0'. The receiver shall ignore this  
14 field.  
15

<b>Channels</b>	CC	AC	FTC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast				<b>Priority</b>	40

### 16 3.7.4.3 Interface to Other Protocols

#### 17 3.7.4.3.1 Commands

18 This protocol does not issue any commands.

#### 19 3.7.4.3.2 Indications

20 This protocol does not register to receive any indications.  
21

## 3.8 Location Update Protocol

### 3.8.1 Overview

The Location Update Protocol defines location update procedures and messages for mobility management for the Multi-link Multi-flow Packet Application.

The Location Update Protocol is a protocol associated with the Multi-link Multi-flow Packet Application. The application subtype for this application is defined in [3].

### 3.8.2 Primitives and Public Data

#### 3.8.2.1 Commands

This protocol does not define any commands.

#### 3.8.2.2 Return Indications

This protocol does not return any indications.

### 3.8.3 Protocol Data Unit

The transmission unit of this protocol is a message. This is a control protocol; and, therefore, it does not carry payload on behalf of other layers or protocols.

### 3.8.4 Procedures and Messages for the InUse Instance of the Protocol

#### 3.8.4.1 Procedures

##### 3.8.4.1.1 Access Network Requirements

If the protocol receives an *AddressManagement.SubnetChanged* indication, the access network:

- May send a *LocationRequest* message to query the Location information.
- May send a *LocationAssignment* message to update the Location information.
- May send a *StorageBLOBRequest* message to query the stored BLOB.
- May send a *StorageBLOBAssignment* message to update stored BLOB.

##### 3.8.4.1.2 Access Terminal Requirements

If the access terminal receives a *LocationRequest* message, it shall send a *LocationNotification* message. If the access terminal has a stored value for the *LocationValue* parameter, the access terminal shall set the *LocationType*, *LocationLength*, and *LocationValue* fields in this message to its stored values of these fields. If the access terminal does not have a stored value for the *LocationValue* parameter, the access terminal shall omit the *LocationLength* and *LocationValue* fields in this message.

If the access terminal receives a *LocationAssignment* message, it shall send a *LocationComplete* message and the access terminal shall store the value of the

1 LocationType, LocationLength, and LocationValue fields of the LocationAssignment message  
2 in LocationType, LocationLength, and LocationValue variables, respectively.

3 If the access terminal receives a StorageBLOBRequest message, it shall send a  
4 StorageBLOBNotification message. If the access terminal has a stored value for the  
5 StorageBLOB parameter, the access terminal shall set the StorageBLOBType,  
6 StorageBLOBLength and StorageBLOB fields in this message to its stored values of these  
7 fields. If the access terminal does not have a stored value for the StorageBLOB parameter,  
8 the access terminal shall set the StorageBLOBType, StorageBLOBLength fields to zero and  
9 shall omit the StorageBLOB fields in this message.

10 If the access terminal receives a StorageBLOBAssignment message, it shall send a  
11 StorageBLOBComplete message and the access terminal shall store the value of the  
12 StorageBLOBType, StorageBLOBLength and StorageBLOB fields of the  
13 StorageBLOBAssignment message in StorageBLOBType, StorageBLOBLength and  
14 StorageBLOB variables, respectively.

### 15 3.8.4.2 Message Formats

#### 16 3.8.4.2.1 LocationRequest

17 The access network uses this message to query the access terminal of its Location  
18 information.

Field	Length (bits)
MessageID	8

20 MessageID The access network shall set this field to 0x03.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 22 3.8.4.2.2 LocationNotification

23 The access terminal sends the LocationNotification message either in response to the  
24 LocationRequest message or in an unsolicited manner as specified in [11] or [13] if the  
25 configured value of the RANHandoff attribute is 0x01.

Field	Length (bits)
MessageID	8
LocationType	8
LocationLength	0 or 8
LocationValue	0 or 8 × LocationLength

27 MessageID The access terminal shall set this field to 0x04.

- 1 LocationType The access terminal shall set this field to zero if the value of its stored  
2 LocationValue is NULL; otherwise, the access terminal shall set this  
3 field to the stored value of LocationType.
- 4 LocationLength The access terminal shall not include this field if the value of its  
5 stored LocationValue is NULL; otherwise, the access terminal shall  
6 set this field to the stored value of LocationLength.
- 7 LocationValue The access terminal shall not include this field if the value of its  
8 stored LocationValue is NULL; otherwise, the access terminal shall  
9 set this field to the stored value of LocationValue.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Reliable <sup>26</sup>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40	

#### 11 3.8.4.2.3 LocationAssignment

- 12 The access network uses this message to update the Location information of the access  
13 terminal.

Field	Length (bits)
MessageID	8
TransactionID	8
LocationType	8
LocationLength	8
LocationValue	8 × LocationLength

- 14 MessageID The access network shall set this field to 0x05.
- 15 TransactionID The access network shall increment this value for each new  
16 LocationAssignment message sent.
- 17 LocationType The access network shall set this field to the type of the location as  
18 specified in Table 3.8.4.2-1.

<sup>26</sup> This message is sent reliably when it is sent over the Reverse Traffic Channel.

**Table 3.8.4.2-1. LocationType Encoding**

LocationType	LocationLength	Meaning
0x00	N/A	No location is stored
0x01	0x05	Location compatible with [2] (see Table 3.8.4.2-2)
All other values	N/A	Reserved

LocationLength The access network shall set this field to the length of the LocationValue field in octets as specified in Table 3.8.4.2-1.

LocationValue The access network shall set this field to the Location of type specified by LocationType. If LocationType is set to 0x01, the access network shall set this field as shown in Table 3.8.4.2-2, where SID, NID, and PACKET\_ZONE\_ID correspond to the current access network.

**Table 3.8.4.2-2. Subfields of LocationValue when LocationType = 0x01**

Sub-fields of LocationValue	# of bits
SID	15
Reserved	1
NID	16
PACKET_ZONE_ID	8

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>		unicast	<b>Priority</b>	40

3.8.4.2.4 LocationComplete

The access terminal sends this message in response to the LocationAssignment message.

Field	Length (bits)
MessageID	8
TransactionID	8

MessageID The access terminal shall set this field to 0x06.

TransactionID The access terminal shall set this field the TransactionID field of the corresponding LocationAssignment message.



<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.8.4.2.5 StorageBLOBRequest

The access network uses this message to query the access terminal of its StorageBLOB information.

Field	Length (bits)
MessageID	8

MessageID The access network shall set this field to 0x10.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.8.4.2.6 StorageBLOBNotification

The access terminal sends the StorageBLOBNotification message in response to the StorageBLOBRequest message.

Field	Length (bits)
MessageID	8
StorageBLOBType	16
StorageBLOBLength	8
StorageBLOB	0 or 8 × StorageBLOBLength

MessageID The access terminal shall set this field to 0x11.

StorageBLOBType The access terminal shall set this field to zero if the value of its stored StorageBLOB is NULL; otherwise, the access terminal shall set this field to the stored value of StorageBLOBType.

StorageBLOBLength

The access terminal shall set this field to zero if the value of its stored StorageBLOB is NULL; otherwise, the access terminal shall set this field to the stored value of StorageBLOBLength.

StorageBLOB The access terminal shall not include this field if the value of its stored StorageBLOB is NULL; otherwise, the access terminal shall set this field to the stored value of StorageBLOB.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.8.4.2.7 StorageBLOBAssignment

The access network uses this message to update the StorageBLOB information of the access terminal.

Field	Length (bits)
MessageID	8
TransactionID	8
StorageBLOBType	16
StorageBLOBLength	8
StorageBLOB	8 × StorageBLOBLength

**MessageID** The access network shall set this field to 0x12.

**TransactionID** The access network shall increment this value for each new StorageBLOBAssignment message sent.

**StorageBLOBType** The access network shall set this field to the StorageBLOBType. The access network shall set this field to zero if StorageBLOB is NULL. Otherwise, the access network shall set this field as defined in [3].

**StorageBLOBLength** The access network shall set this field to the length of the StorageBLOB field in octets. The access network shall set this field to zero if StorageBLOB is NULL.

**StorageBLOB** The access network shall not include this field if the StorageBLOB is NULL. Otherwise, the access network shall set this field to the StorageBLOB.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.8.4.2.8 StorageBLOBComplete

The access terminal sends this message in response to the StorageBLOBAssignment message.

Field	Length (bits)
MessageID	8
TransactionID	8

1 MessageID The access terminal shall set this field to 0x13.

2 TransactionID The access terminal shall set this field the TransactionID field of the  
3 corresponding StorageBLOBAssignment message.  
4

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

5 3.8.4.3 Interface to Other Protocols

6 3.8.4.3.1 Commands

7 This protocol does not issue any commands.

8 3.8.4.3.2 Indications

9 This protocol registers to receive the following indications:

- 10 • *AddressManagement.SubnetChanged* (access network only)  
11

**3.9 Flow Control Protocol**

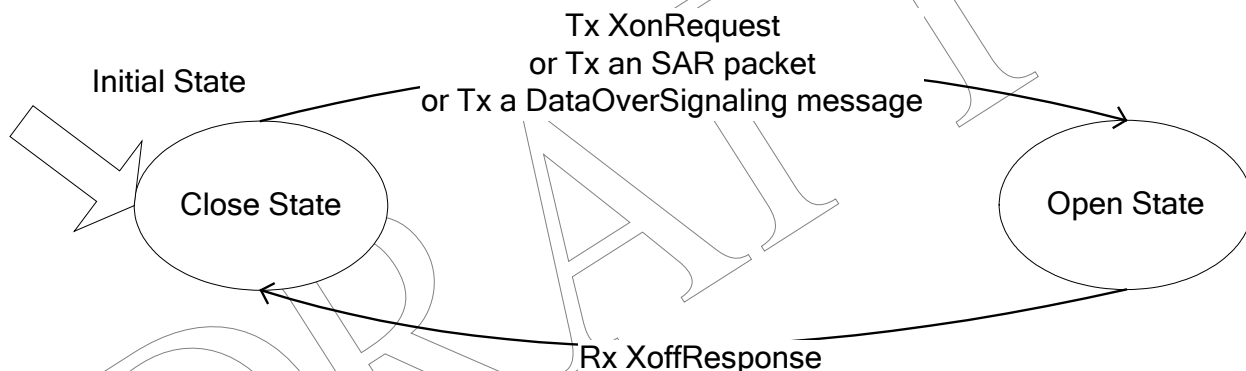
**3.9.1 Overview**

The Flow Control Protocol provides procedures and messages used by the access terminal and the access network to perform flow control for the Multi-link Multi-flow Packet Application.

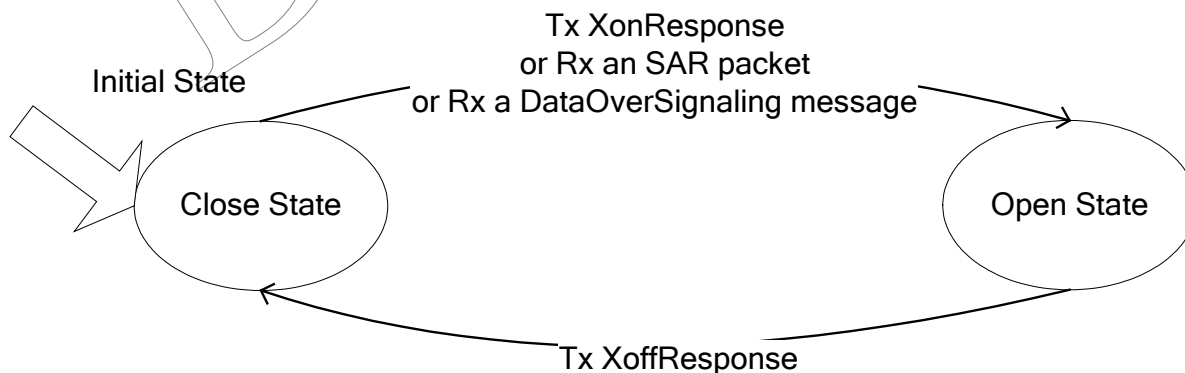
This protocol can be in one of the following states:

- Close State: in this state the Multi-link Multi-flow Packet Application does not send or receive any SAR packets or DataOverSignaling messages.
- Open State: in this state the Multi-link Multi-flow Packet Application can send and receive SAR packets and DataOverSignaling messages.

Figure 3.9.1-1 and Figure 3.9.1-2 show the state transition diagram at the access terminal and the access network.



**Figure 3.9.1-1. Flow Control Protocol State Diagram (Access Terminal)**



**Figure 3.9.1-2. Flow Control Protocol State Diagram (Access Network)**

1 The flow control protocol is a protocol associated with the Multi-link Multi-flow Packet  
2 Application. The application subtype for this application is defined in [3].

### 3 3.9.2 Primitives and Public Data

#### 4 3.9.2.1 Commands

5 This protocol does not define any commands.

#### 6 3.9.2.2 Return Indications

7 This protocol does not return any indications.

### 8 3.9.3 Protocol Data Unit

9 The transmission unit of this protocol is a message. This is a control protocol and,  
10 therefore, it does not carry payload on behalf of other layers or protocols.

### 11 3.9.4 Procedures and Messages for the InUse Instance of the Protocol

#### 12 3.9.4.1 Procedures

##### 13 3.9.4.1.1 Transmission and Processing of DataReady Message

14 The access network may send a DataReady message to indicate that there is data  
15 corresponding to this packet application waiting to be transmitted.

16 The access terminal shall send a DataReadyAck within the time period specified by  
17  $T_{FCResponse}$  after reception of the DataReady message to acknowledge reception of the  
18 message.

##### 19 3.9.4.1.2 Transmission and Processing of RestartNetworkInterface Message

20 The access network may send a RestartNetworkInterface message to direct the access  
21 terminal to restart the interface between the packet application and the higher layer.

22 Upon receiving a RestartNetworkInterface message, the access terminal shall send a  
23 RestartNetworkInterfaceAck message and shall restart the interface between the packet  
24 application and the higher layer. The access terminal may also restart higher layer  
25 protocols.

#### 26 3.9.4.1.3 Close State

##### 27 3.9.4.1.3.1 Access Terminal Requirements

28 The access terminal shall send an XonRequest message or a SAR packet (corresponding to  
29 this instance of the Multi-link Multi-flow Packet Application) or a DataOverSignaling  
30 message (corresponding to this instance of the Multi-link Multi-flow Packet Application)  
31 when it is ready to exchange SAR packets or DataOverSignaling messages with the access  
32 network. The access terminal should send an XonRequest message or a SAR packet  
33 (corresponding to this instance of the Multi-link Multi-flow Packet Application) or a

1 DataOverSignaling message (corresponding to this instance of the Multi-link Multi-flow  
2 Packet Application) when it receives a DataReady from the access network.

3 The access terminal shall transition to the Open State when it sends an XonRequest  
4 message or when it sends a SAR packet (corresponding to this instance of the Multi-link  
5 Multi-flow Packet Application) or when it sends a DataOverSignaling message  
6 (corresponding to this instance of the Multi-link Multi-flow Packet Application).

#### 7 3.9.4.1.3.2 Access Network Requirements

8 The access network shall not send any SAR packets or DataOverSignaling messages in this  
9 state.

10 If the access network receives an XonRequest message, it shall

- 11 • Send an XonResponse message within the time period specified by  $T_{FCResponse}$  after  
12 reception of the XonRequest message to acknowledge reception of the message.
- 13 • Transition to the Open State.

14 The access network shall also transition to the Open State if it receives a SAR packet  
15 (corresponding to this instance of the Multi-link Multi-flow Packet Application) or a  
16 DataOverSignaling message (corresponding to this instance of the Multi-link Multi-flow  
17 Packet Application).

18 If the access network receives an XoffRequest message, it shall send an XoffResponse  
19 message within the time period specified by  $T_{FCResponse}$  after reception of the XoffRequest  
20 message to acknowledge reception of the message.

#### 21 3.9.4.1.4 Open State

22 In this state, the access terminal and the access network may send or receive any SAR  
23 packets or DataOverSignaling messages.

##### 24 3.9.4.1.4.1 Access Terminal Requirements

25 The access terminal may re-send an XonRequest message if it does not receive an  
26 XonResponse message or a SAR packet (corresponding to this instance of the Multi-link  
27 Multi-flow Packet Application) or a DataOverSignaling message (corresponding to this  
28 instance of the Multi-link Multi-flow Packet Application) within the time period specified by  
29  $T_{FCResponse}$  after sending the XonRequest message.

30 The access terminal should send an XonRequest message if it receives a DataReady  
31 message.

32 The access terminal may send an XoffRequest message to request the access network to  
33 stop sending SAR packets and DataOverSignaling messages. The access terminal shall  
34 transition to the Close state when it receives an XoffResponse message.

35 The access terminal may re-send an XoffRequest message if it does not receive an  
36 XoffResponse message within the time period specified by  $T_{FCResponse}$  after sending the  
37 XoffRequest message.

### 3.9.4.1.4.2 Access Network Requirements

If the access network receives an XoffRequest message, it shall

- Send an XoffResponse message within the time period specified by  $T_{FCResponse}$  after reception of the XoffRequest message to acknowledge reception of the message.
- Transition to the Close State.

If the access network receives an XonRequest message, it shall send an XonResponse message within the time period specified by  $T_{FCResponse}$  after reception of the XonRequest message to acknowledge reception of the message.

### 3.9.4.2 Message Formats

#### 3.9.4.2.1 XonRequest

The access terminal sends this message to request transition to the Open State.

Field	Length (bits)
MessageID	8

MessageID

The access terminal shall set this field to 0x07.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.9.4.2.2 XonResponse

The access network sends this message to acknowledge reception of the XonRequest message.

Field	Length (bits)
MessageID	8

MessageID

The access network shall set this field to 0x08.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 3.9.4.2.3 XoffRequest

The access terminal sends this message to request transition to the Close State.

Field	Length (bits)
MessageID	8

1 MessageID The access terminal shall set this field to 0x09.

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

### 3 3.9.4.2.4 XoffResponse

4 The access network sends this message to acknowledge reception of the XoffRequest  
5 message.

Field	Length (bits)
MessageID	8

7 MessageID The access network shall set this field to 0x0a.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

### 9 3.9.4.2.5 DataReady

10 The access network sends this message to indicate that there is data corresponding to this  
11 packet application awaiting to be transmitted.

Field	Length (bits)
MessageID	8
TransactionID	8

13 MessageID The access network shall set this field to 0x0b.

14 TransactionID The access network shall increment this value for each new  
15 DataReady message sent.

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

### 17 3.9.4.2.6 DataReadyAck

18 The access terminal sends this message to acknowledge reception of a DataReady message.

19



Field	Length (bits)
MessageID	8
TransactionID	8

1 MessageID The access terminal shall set this field to 0x0c.

2 TransactionID The access terminal shall set this value to the value of the  
3 TransactionID field of the corresponding DataReady message.  
4

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 5 3.9.4.2.7 RestartNetworkInterface

6 The access network sends this message to request the access terminal to restart the  
7 network interface.  
8

Field	Length (bits)
MessageID	8
TransactionID	8

9 MessageID The access network shall set this field to 0x1c.

10 TransactionID The access network shall increment this value for each new  
11 RestartNetworkInterface message sent.  
12

<b>Channels</b>	CC	FTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

#### 13 3.9.4.2.8 RestartNetworkInterfaceAck

14 The access terminal sends this message to acknowledge reception of a  
15 RestartNetworkInterface message.  
16

Field	Length (bits)
MessageID	8
TransactionID	8

17 MessageID The access terminal shall set this field to 0x1d.

1 TransactionID The access terminal shall set this value to the value of the  
 2 TransactionID field of the corresponding RestartNetworkInterface  
 3 message.  
 4

<b>Channels</b>	AC	RTC	<b>SLP</b>	Best Effort
<b>Addressing</b>	unicast		<b>Priority</b>	40

### 5 3.9.5 Interface to Other Protocols

#### 6 3.9.5.1 Commands

7 This protocol does not issue any commands.

#### 8 3.9.5.2 Indications

9 This protocol does not register to receive any indications.

### 10 3.9.6 Protocol Numeric Constants

11 <b>Constant</b>	<b>Meaning</b>	<b>Value</b>
$T_{FCResponse}$	Time period within which the access terminal and access network are to respond to flow control messages.	1 second

12

### 3.10 Configuration Attributes for the Multi-link Multi-flow Packet Application

The access terminal shall support default values of all attributes.

Unless specified otherwise, the access terminal and the access network shall not use the Generic Attribute Update Protocol to update configurable attributes belonging to the Multi-link Multi-flow Packet Application. The access terminal and the access network shall support the use of the Generic Attribute Update Protocol to update values of the following configurable attributes belonging to the Multi-link Multi-flow Packet Application:

- FlowNNTimersFwd,
- FlowNNTimersRev,
- FlowNNNakEnableFwd,
- FlowNNNakEnableRev,
- FlowNNPhysicalLayerNakEnableRev,
- FlowNNFlowProtocolParametersFwd,
- FlowNNFlowProtocolParametersRev,
- FlowNNRouteProtocolParametersFwd,
- FlowNNRouteProtocolParametersRev,
- FlowNNActivatedFwd,
- FlowNNActivatedRev,
- FlowNNSequenceLengthFwd,
- FlowNNSequenceLengthRev,
- FlowNNFlowProtocolPDUFwd,
- FlowNNFlowProtocolPDURev,
- FlowNNRouteProtocolPDUFwd,
- FlowNNRouteProtocolPDURev,
- FlowNNSimultaneousDeliveryOnBothRoutesFwd,
- FlowNNOutOfOrderDeliveryToRouteProtocolFwd,
- FlowNNDataUnitFwd,
- FlowNNDataUnitRev,
- FlowNNReservationFwd,
- FlowNNReservationRev,
- FlowNNTransmitAbortTimerRev,
- FlowNNDataOverSignalingAllowedRev,
- ReservationKKIdleStateFwd,

- 1 • ReservationKKIdleStateRev,
- 2 • ReservationKKQoSRequestFwd,
- 3 • ReservationKKQoSRequestRev,
- 4 • ReservationKKQoSResponseFwd,
- 5 • ReservationKKQoSResponseRev,
- 6 • ANSupportedQoSProfiles,
- 7 • ReservationKKBCMCSFlowIDAssociation,
- 8 • ReservationKKBCMCSProgramIDAssociation, and
- 9 • ReservationKKReservationQueuingSupported

10 where  $NN$  is the hexadecimal Link Flow number in the range  $0x00$  to  $M-1$  inclusive, where  
 11  $M$  is MaxNumLinkFlowsFwd or MaxNumLinkFlowsRev for a Link Flow on the forward link or  
 12 reverse link respectively and  $KK$  is the two-digit hexadecimal ReservationLabel.

13 The updated values of the attributes shall be consistent with the value of the  
 14 MaxActivatedLinkFlowsFwd and MaxActivatedLinkFlowsRev attributes.

15 The number of Forward Link Reservations that satisfy at least one of the following  
 16 conditions shall not exceed one plus the value of the MaxNumReservationsFwd field of  
 17 MaxReservations attribute:

- 18 • The Reservation is in Open state.
- 19 • The Reservation is bound to a link flow.
- 20 • The ReservationKKQoSRequestFwd corresponding to the Reservation is set to a non-  
 21 default value.

22 The number of Reverse Link Reservations that satisfy at least one of the following  
 23 conditions shall not exceed one plus the value of the MaxNumReservationsRev field of  
 24 MaxReservations attribute:

- 25 • The Reservation is in Open state.
- 26 • The Reservation is bound to a link flow.
- 27 • The ReservationKKQoSRequestRev corresponding to the Reservation is set to a non-  
 28 default value.

29 The access terminal shall not send an AttributeUpdateRequest message proposing to  
 30 update the value of the ANSupportedQoSProfiles attribute.

31 The access network shall not send an AttributeUpdateRequest message proposing to update  
 32 the value of the ReservationKKReservationQueuingSupported attribute.

### 33 3.10.1 Simple Attributes

34 The negotiable simple attribute for this protocol is listed in Table 3.10-1. The access  
 35 terminal and the access network shall use as defaults the values in Table 3.10-1 typed in  
 36 ***bold italics***.

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**Table 3.10-1. Configurable Values**

Attribute ID	Attribute	Values	Meaning
0xffff	RANHandoff	0x00	The access terminal shall not send an unsolicited LocationNotification message. The access network does not switch between the radio access technologies (E.g. specified in [2]) in a manner that preserves the state of all protocol layers at or above the data link layer (PPP).
		0x01	The access terminal shall send an unsolicited LocationNotification message. The access network switches between the radio access technologies (E.g. specified in [2]) in a manner that preserves the state of all protocol layers at or above the data link layer (PPP).
		All other values	Reserved
0xfffc	MaxAbortTimer	0x05	Maximum abort timer is 500 ms.
		0x06 to 0x64	Maximum abort timer in units of 100 ms.
		All other values	Reserved
0xffffb	PPPFreeAuthenticationSupport	0x00	PPP free authentication as specified in [1] is not supported.
		0x01	PPP free authentication as specified in [1] is supported
		All other values	Reserved
0xffffa	TwoRoutesSupported	0x00	Two Routes are not supported
		0x01	Two Routes are supported
		All other values	Reserved
0xfeNN	FlowNNNakEnableFwd  NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	SAR receivers associated with forward Link Flow NN do not transmit MultiLinkNak messages when missing data units are detected.
		0x01	SAR receivers associated with forward Link Flow NN transmit a MultiLinkNak message when missing data units are detected.
		All other values	Reserved.

Attribute ID	Attribute	Values	Meaning
0xfdNN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNakEnableRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	SAR receivers associated with reverse Link Flow NN do not transmit Nak messages when missing data units are detected.
		0x01	SAR receivers associated with reverse Link Flow NN transmit a Nak message when missing data units are detected.
		All other values	Reserved.
0xfaNN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNPhysicalLayerNakEnableRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x01	SAR is to retransmit data units when a <i>PhysicalLayer.ReverseTrafficPacketsMissed</i> indication is received.
		0x00	SAR is to ignore <i>PhysicalLayer.ReverseTrafficPacketsMissed</i> indication.
		All other values	Reserved
0xf9KK KK is the two-digit hexadecimal ReservationLabel.	ReservationKKIdleStateFwd KK is the two-digit hexadecimal forward link ReservationLabel, where hexadecimal digits A through F are specified in upper case letters.	0x00	Reservation does not change states when a Connection is closed.
		0x01	Reservation transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.
		0x02	Reservation transitions to the Open state when a Connection is opened and transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.
		All other values	Reserved
0xf8KK KK is the two-digit hexadecimal ReservationLabel.	ReservationKKIdleStateRev KK is the two-digit hexadecimal reverse link ReservationLabel, where hexadecimal digits A through F are specified in	0x00	Reservation does not change states when a Connection is closed.
		0x01	Reservation transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.

Attribute ID	Attribute	Values	Meaning
el.	upper case letters.	0x02	Reservation transitions to the Open state when a Connection is opened and transitions to the Close state when a Connection is closed unless an access network initiated Connection is being opened at the same time.
		All other values	Reserved
0xf7NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive.	FlowNMTransmitAbortTimeRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x0000	Maximum delay for transmission of a higher layer data unit for Link Flow NN is not specified.
		0x0001 – 0x03e8	Maximum delay for transmission of a higher layer data unit for Link Flow NN in units of 5 ms.
		All other values	Reserved
0xf6NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive.	FlowNNDataOverSignalingAllowedRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev - 1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Access terminal is not allowed to send DataOverSignaling messages for this Link Flow.
		0x01	Access terminal is allowed to send DataOverSignaling messages for this Link Flow.
		All other values	Reserved
0xf300	Flow00ActivatedFwd	0x01	Forward Link Flow 0x00 is activated.
		0x00	Forward Link Flow 0x00 is not activated.
		All other values	Reserved
0xf301	Flow01ActivatedFwd	0x01	Forward Link Flow 0x01 is activated.
		0x00	Forward Link Flow 0x01 is not activated.
		All other values	Reserved
0xf3NN NN is the two-digit	FlowNNActivatedFwd NN is the two-digit hexadecimal Link Flow	0x00	Forward Link Flow NN is not activated.
		0x01	Forward Link Flow NN is activated.



Attribute ID	Attribute	Values	Meaning
hexadecimal Link Flow number of the forward Link Flow in the range 0x02 to MaxNumLinkFlowsFwd-1 inclusive.	number in the range 0x02 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	All other values	Reserved
0xf200	Flow00ActivatedRev	0x01	Reverse Link Flow 0x00 is activated.
		0x00	Reverse Link Flow 0x00 is not activated.
		All other values	Reserved
0xf201	Flow01ActivatedRev	0x01	Reverse Link Flow 0x01 is activated.
		0x00	Reverse Link Flow 0x01 is not activated.
		All other values	Reserved
0xf2NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x02 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNActivatedRev NN is the two-digit hexadecimal Link Flow number in the range 0x02 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Reverse Link Flow NN is not activated.
		0x01	Reverse Link Flow NN is activated.
		All other values	Reserved
0xf0NN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNSequenceLengthRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	SAR of Reverse Link Flow NN has a 6-bit sequence number.
		0x01	SAR of Reverse Link Flow NN has a 14-bit sequence number.
		0x02	SAR of Reverse Link Flow NN has a 22-bit sequence number.
		0x03	SAR of Reverse Link Flow NN has a 30-bit sequence number. This value shall not be used unless $\lceil \log_2 [R \times (AbortTimer)] \rceil + 1 > 22$ , where $R$ is the maximum data rate in units of higher layer octets per second that can be achieved by the lower layers, and abort timer is in units of seconds.

Attribute ID	Attribute	Values	Meaning
		All other values	Reserved
0xef01	Flow01FlowProtocolPDUFwd	0x00	Forward Link Flow 0x01 provides an octet stream to the Flow Protocol.
		0x01	Forward Link Flow 0x01 provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xefNN	FlowNNFlowProtocolPDUFwd  NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsFwd-1 inclusive.	0x00	Forward Link Flow NN provides an octet stream to the Flow Protocol.
		0x01	Forward Link Flow NN provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xee01	Flow01FlowProtocolPDURev	0x00	Reverse Link Flow 0x01 provides an octet stream to the Flow Protocol.
		0x01	Reverse Link Flow 0x01 provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xeeNN	FlowNNFlowProtocolPDURev  NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsRev-1 inclusive.	0x00	Reverse Link Flow NN provides an octet stream to the Flow Protocol.
		0x01	Reverse Link Flow NN provides a packet stream to the Flow Protocol.
		All other values	Reserved.
0xedNN	FlowNNDataUnitFwd  NN is the two-digit hexadecimal Link Flow number in the range 0x00	0x00	Data unit for forward Link Flow NN is octets.
		0x01	Data unit for forward Link Flow NN is SAR packet payload.

Attribute ID	Attribute	Values	Meaning
Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.	to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	All other values	Reserved.
0xecNN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNDataUnitRev NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Data unit for reverse Link Flow NN is octets.
		0x01	Data unit for reverse Link Flow NN is SAR packet payload.
		All other values	Reserved.
0xeb01	Flow01RouteProtocolPDUFwd	0x00	Each Route of Forward Link Flow 0x01 provides an octet stream to the Route Protocol.
		0x01	Each Route of Forward Link Flow 0x01 provides a packet stream to the Route Protocol.
		All other values	Reserved.
0xebNN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsFwd-1 inclusive.	FlowNNRouteProtocolPDUFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00, and 0x02 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Each Route of Forward Link Flow NN provides an octet stream to the Route Protocol.
		0x01	Each Route of Forward Link Flow NN provides a packet stream to the Route Protocol.
		All other values	Reserved.
0xea01	Flow01RouteProtocolPDURev	0x00	Each Route of Reverse Link Flow 0x01 provides an octet stream to the Route Protocol.
		0x01	Each Route of Reverse Link Flow 0x01 provides a packet stream to the Route Protocol.
		All other values	Reserved.

Attribute ID	Attribute	Values	Meaning
0xeaNN NN is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range 0x00, and 0x02 to MaxNumLinkFlowsRev-1 inclusive.	FlowNNRouteProtocolPDUR ev NN is the two-digit hexadecimal Link Flow number in the range 0x00, and 0x02 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Each Route of Reverse Link Flow NN provides an octet stream to the Route Protocol.
		0x01	Each Route of Reverse Link Flow NN provides a packet stream to the Route Protocol.
		All other values	Reserved.
0xe9NN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.	FlowNNSimultaneousDeliveryOnBothRoutesFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Simultaneous delivery of Flow Protocol payload on both routes of Forward Link Flow NN is not allowed.
		0x01	Simultaneous delivery of Flow Protocol payload on both routes of Forward Link Flow NN is allowed.
		All other values	Reserved.
0xe8NN NN is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.	FlowNNOutOfOrderDeliveryToRouteProtocolFwd NN is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.	0x00	Each Route of Forward Link Flow NN delivers Route Protocol payload in-order.
		0x01	Each Route of Forward Link Flow NN may deliver Route Protocol payload out-of-order.
		All other values	Reserved.
0xffff8	BCMCSOverRLPAllowed	0x00	Transmission of BCMCS packets over RLP is not allowed
		0x01	Transmission of BCMCS packets over RLP is allowed
		All other values	Reserved.
0xe6KK KK is the two-digit hexadecimal	ReservationKKReservationQueuingSupported KK is the two-digit hexadecimal reverse link	0x00	Access terminal does not support Priority Queuing for the Reservation KK.
		0x01	Access terminal supports Priority Queuing for the Reservation KK.

Attribute ID	Attribute	Values	Meaning
ReservationLabel.	ReservationLabel, where hexadecimal digits A through F are specified in upper case letters.	All other values	Reserved.

### 3.10.2 Complex Attributes

The following complex attributes and default values are defined (see [8] for attribute record definition).

#### 3.10.2.1 FlowNNTimersFwd Attribute

*NV* is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are specified in upper case letters.

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
AbortTimer	16	0x01f4
FlushTimer	16	0x012c
NakDelayTimer	16	0x0000

**Length** Length of the complex attribute in octets. The sender shall set this field to the length of the complex attribute excluding the Length field.

**AttributeID** The sender shall set this field to 0x03*NV*, where *NV* is the two-digit hexadecimal Link Flow number in the range 0x00 to MaxNumLinkFlowsFwd-1 inclusive.

**ValueID** The sender shall set this field to an identifier assigned to this complex value.

**AbortTimer** The sender shall set this field to the value of the SAR abort timer for this forward Link Flow in units of ms. The sender shall not set this field to a value greater than MaxAbortTimer.

**FlushTimer** The sender shall set this field to the value of the SAR flush timer for this forward Link Flow in units of ms. The value of the SAR flush timer shall be less than or equal to that of the corresponding abort timer.

1 NakDelayTimer The sender shall set this field to the value of the Nak delay timer for  
 2 this forward Link Flow in units of ms. The value of the Nak delay  
 3 timer shall be less than or equal to that of the corresponding abort  
 4 timer.

5

### 6 3.10.2.2 Flow*NN*TimersRev Attribute

7 *NN* is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range  
 8 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are  
 9 specified in upper case letters.

10

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
AbortTimer	16	0x01f4
FlushTimer	16	0x012c

11 Length Length of the complex attribute in octets. The sender shall set this  
 12 field to the length of the complex attribute excluding the Length field.

13 AttributeID The sender shall set this field to 0x04*NN*, where *NN* is the two-digit  
 14 hexadecimal Link Flow number in the range 0x00 to  
 15 MaxNumLinkFlowsRev-1 inclusive.

16 ValueID The sender shall set this field to an identifier assigned to this complex  
 17 value.

18 AbortTimer The sender shall set this field to the value of the SAR abort timer for  
 19 this reverse Link Flow in units of ms. The sender shall not set this  
 20 field to a value greater than MaxAbortTimer.

21 FlushTimer The sender shall set this field to the value of the SAR flush timer for  
 22 this reverse Link Flow in units of ms. The value of the SAR flush  
 23 timer shall be less than or equal to that of the corresponding abort  
 24 timer.

### 25 3.10.2.3 Flow*NN*ReservationFwd Attribute

26 *NN* is the two-digit hexadecimal Link Flow number of the forward Link Flow in the range  
 27 0x00 to MaxNumLinkFlowsFwd-1 inclusive, where hexadecimal digits A through F are  
 28 specified in upper case letters.

Field	Length (bits)	Default for <i>NN = 0x00</i>	Default for <i>NN = 0x01</i>	Default for <i>NN &gt; 0x01</i>
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

One or more occurrences of the following record:

ValueID	8	N/A	N/A	N/A
ReservationCount	8	0x01	0x01	0x00

ReservationCount occurrences of the following field:

ReservationLabel	8	0xff	0xfe	N/A
------------------	---	------	------	-----

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x05*NN*, where *NN* is the two-digit  
4 hexadecimal Link Flow number in the range 0x00 to  
5 MaxNumLinkFlowsFwd-1 inclusive.
- 6 ValueID The sender shall set this field to an identifier assigned to this complex  
7 value.
- 8 ReservationCount The sender shall set this field to the number of reservations  
9 associated with this Link Flow.
- 10 ReservationLabel The sender shall set this field to the ReservationLabel of the  
11 reservation associated with this Link Flow.

#### 3.10.2.4 Flow*NN*ReservationRev Attribute

13 *NN* is the two-digit hexadecimal Link Flow number of the reverse Link Flow in the range  
14 0x00 to MaxNumLinkFlowsRev-1 inclusive, where hexadecimal digits A through F are  
15 specified in upper case letters.

Field	Length (bits)	Default for <i>NN = 0x00</i>	Default for <i>NN = 0x01</i>	Default for <i>NN &gt; 0x01</i>
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

One or more occurrences of the following record:

ValueID	8	N/A	N/A	N/A
ReservationCount	8	0x01	0x01	0x00

ReservationCount occurrences of the following field:

ReservationLabel	8	0xff	0xfe	N/A
------------------	---	------	------	-----

- 16 Length Length of the complex attribute in octets. The sender shall set this  
17 field to the length of the complex attribute excluding the Length field.

- 1 AttributeID The sender shall set this field to 0x06*NN*, where *NN* is the two-digit  
2 hexadecimal Link Flow number in the range 0x00 to  
3 MaxNumLinkFlowsRev-1 inclusive.
- 4 ValueID The sender shall set this field to an identifier assigned to this complex  
5 value.
- 6 ReservationCount The sender shall set this field to the number of reservations  
7 associated with this Link Flow.
- 8 ReservationLabel The sender shall set this field to the ReservationLabel of the  
9 reservation associated with this Link Flow.

### 10 3.10.2.5 ATSupportedFlowProtocolParameters*PP* Attribute

11  
12 *PP* is the two-digit hexadecimal ProtocolID number for the Flow Protocol as specified in [3],  
13 where hexadecimal digits A through F are specified in upper case letters.

Field	Length (bits)	Default for <i>PP</i> = 0x00, 0x01, 0x05	Default for <i>PP</i> other than 0x00, 0x01, 0x05
Length	8	N/A	N/A
AttributeID	16	N/A	N/A

14 One occurrence of the following record:

ValueID	8	N/A	N/A
ProtocolSupported	8	0x01	0x00
SupportedProtocolParametersValue sLength	8	0x00	0x00
SupportedProtocolParametersValue s	SupportedProtoco lParametersValue sLength × 8	N/A	N/A

- 15
- 16 Length Length of the complex attribute in octets. The sender shall set this  
17 field to the length of the complex attribute excluding the Length field.
- 18 AttributeID The sender shall set this field to 0x0f*PP*.
- 19 ValueID The sender shall set this field to an identifier assigned to this complex  
20 value.



1 ProtocolSupported The sender shall set this field to 0x00 if the Flow Protocol *PP* is not  
 2 supported. Otherwise, the sender shall set this field to 0x01 if the  
 3 Flow Protocol *PP* is supported. All other values are reserved.

4 SupportedProtocolParametersValuesLength  
 5 If the SupportedProtocolParametersValues record is not included, the  
 6 sender shall set this field to 0x00. Otherwise, the sender shall set  
 7 this field to the length of the SupportedProtocolParametersValues  
 8 record in units of octets.

9 SupportedProtocolParametersValues  
 10 Unless specified otherwise by [3], the sender shall omit this record. If  
 11 *PP* is 0x04 and ProtocolSupported is 0x01, then the sender shall set  
 12 this record as defined in 3.10.2.5.1. If *PP* is less than 0x04 or equal  
 13 to 0x05, the sender shall omit this record.

14 3.10.2.5.1 Definition of SupportedProtocolParametersValues record when the Flow Protocol  
 15 or Route Protocol is ROHC

Field	Length (bits)
MaxSupportedMaxCID	16
LargeCIDSupported	1
MaxSupportedMRRU	16
TimerBasedCompressionSupported	1
SupportedProfileCount	8

SupportedProfileCount occurrences of the following field:

SupportedProfile	16
Reserved	0 - 7 (as needed)

16  
 17 MaxSupportedMaxCID  
 18 The sender shall set this field to the maximum MAX\_CID parameter  
 19 supported.

20 LargeCIDSupported The sender shall set this field to '0' if large CID representation is not  
 21 supported according to [6]. Otherwise, the sender shall set this field  
 22 to '1' if large CID representation is supported.

23 MaxSupportedMRRU  
 24 The sender shall set this field to the MRRU supported by the  
 25 decompressor according to [6]. Default value is 0x0000 (no  
 26 segmentation).

- 1 TimerBasedCompressionSupported  
 2 The sender shall set this field to '1' if the compressor at the access  
 3 terminal supports timer based compression mode. Otherwise, the  
 4 sender shall set this field to '0'.
- 5 SupportedProfileCount  
 6 The sender shall set this field to the number of ROHC profiles  
 7 supported.
- 8 SupportedProfile The sender shall set this field to the ROHC profile supported by the  
 9 compressor and decompressor. IANA ROHC profile identifier  
 10 definitions can be found at [12].
- 11 Reserved The sender shall add reserved bits to make the length of the entire  
 12 record an integer number of octets. The sender shall set these bits to  
 13 '0'. The receiver shall ignore this field.

#### 14 3.10.2.6 ATSupportedRouteProtocolParametersPP Attribute

15 PP is the two-digit hexadecimal ProtocolID number for the Route Protocol as specified in [3],  
 16 where hexadecimal digits A through F are specified in upper case letters.

Field	Length (bits)	Default for PP = 0x00	Default for PP > 0x00
Length	8	N/A	N/A
AttributeID	16	N/A	N/A

One occurrence of the following record:

ValueID	8	N/A	N/A
ProtocolSupported	8	0x01	0x00
SupportedProtocolParametersValue sLength	8	0x00	0x00
SupportedProtocolParametersValue s	SupportedProtocolParametersValue sLength × 8	N/A	N/A

- 18 Length Length of the complex attribute in octets. The sender shall set this  
 19 field to the length of the complex attribute excluding the Length field.
- 20 AttributeID The sender shall set this field to 0x10PP.
- 21 ValueID The sender shall set this field to an identifier assigned to this complex  
 22 value.

1 ProtocolSupported The sender shall set this field to 0x00 if the Route Protocol *PP* is not  
 2 supported. Otherwise, the sender shall set this field to 0x01 if the  
 3 Route Protocol *PP* is supported. All other values are reserved.

4 SupportedProtocolParametersValuesLength  
 5 If the SupportedProtocolParametersValues record is not included, the  
 6 sender shall set this field to 0x00. Otherwise, the sender shall set  
 7 this field to the length of the SupportedProtocolParametersValues  
 8 record in units of octets.

9 SupportedProtocolParametersValues  
 10 Unless specified otherwise by [3], the sender shall omit this record. If  
 11 *PP* is 0x04 and ProtocolSupported is 0x01, then the sender shall set  
 12 this record as defined in 3.10.2.5.1. If *PP* is less than 0x04, the  
 13 sender shall omit this record.

#### 14 3.10.2.7 ATSupportedQoSProfiles Attribute

15

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A
One occurrence of the following record:		
ValueID	8	N/A
QoSProfileCount	8	0
QoSProfileCount of the following record:		
ProfileType	8	N/A
ProfileLength	8	N/A
ProfileValue	ProfileLength × 8	N/A

16 Length Length of the complex attribute in octets. The sender shall set this  
 17 field to the length of the complex attribute excluding the Length field.

18 AttributeID The sender shall set this field to 0x0002.

19 ValueID The sender shall set this field to an identifier assigned to this complex  
 20 value.

21 QoSProfileCount The sender shall set this field to the number of QoS Profiles that are  
 22 included in this message.

23 ProfileType The sender shall set this field to indicate the profile type. The sender  
 24 shall set this field according to [3].

1 ProfileLength The sender shall set this field to length of the ProfileValue field in  
2 units of octets.

3 ProfileValue The sender shall set this field to the profile according to [3].

4 3.10.2.8 ANSupportedQoSProfiles Attribute

5

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One occurrence of the following record:

ValueID	8	N/A
QoSProfileCount	8	0

QoSProfileCount of the following record:

ProfileType	8	N/A
ProfileLength	8	N/A
ProfileValue	ProfileLength × 8	N/A

6 Length Length of the complex attribute in octets. The sender shall set this  
7 field to the length of the complex attribute excluding the Length field.

8 AttributeID The sender shall set this field to 0x0003.

9 ValueID The sender shall set this field to an identifier assigned to this complex  
10 value.

11 QoSProfileCount The sender shall set this field to the number of QoS Profiles that are  
12 included in this message.

13 ProfileType The sender shall set this field to indicate the profile type. The sender  
14 shall set this field according to [3].

15 ProfileLength The sender shall set this field to length of the ProfileValue field in  
16 units of octets.

17 ProfileValue The sender shall set this field to the profile according to [3].

## 3.10.2.9 MaxLinkFlows Attribute

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more occurrences of the following record:

ValueID	8	N/A
MaxNumLinkFlowsFwd	8	<b>0x06</b>
MaxNumLinkFlowsRev	8	<b>0x06</b>
MaxActivatedLinkFlowsFwd	8	<b>0x03</b>
MaxActivatedLinkFlowsRev	8	<b>0x03</b>

**Length** Length of the complex attribute in octets. The sender shall set this field to the length of the complex attribute excluding the Length field.

**AttributeID** The sender shall set this field to 0x0004.

**ValueID** The sender shall set this field to an identifier assigned to this complex value.

**MaxNumLinkFlowsFwd** The sender shall set this field to indicate the maximum total number of activated and deactivated forward Link Flows supported. The value shall be in the range of 0x06 to 0x1f, inclusive

**MaxNumLinkFlowsRev** The sender shall set this field to indicate the maximum total number of activated and deactivated reverse Link Flows supported. The value shall be in the range of 0x06 to 0x1f, inclusive.

**MaxActivatedLinkFlowsFwd** The sender shall set this field to indicate the maximum number of simultaneous activated forward Link Flows supported. The value shall be in the range of 0x03 to MaxNumLinkFlowsFwd, inclusive.

**MaxActivatedLinkFlowsRev** The sender shall set this field to indicate the maximum number of simultaneous activated reverse Link Flows supported. The value shall be in the range of 0x03 to MaxNumLinkFlowsRev, inclusive.

## 3.10.2.10 ReservationKKQoSRequestFwd Attribute

*KK* is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F are specified in upper case letters.

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x07KK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 ProfileType The sender shall set this field to indicate the profile type. The sender  
8 shall set this field as defined in [3].
- 9 ProfileLength The sender shall set this field to length of the ProfileValue field in  
10 units of octets. If ProfileType is equal to 0x00, then the sender shall  
11 set this field to 0x0000.
- 12 ProfileValue The sender shall set this field to the Profile Value corresponding to  
13 the Profile Type according to [3]. If ProfileType is equal to 0x00, then  
14 the sender shall omit this field. If ProfileType is equal to 0x01, if the  
15 ANSupportedQoSProfiles attribute does not have a default value, and  
16 if this attribute is included in an AttributeUpdateRequest then the  
17 requested Flow Profile IDs shall be a subset of the Flow Profile IDs in  
18 the ProfileValue fields of the ANSupportedQoSProfiles attribute.

### 19 3.10.2.11 ReservationKKQoSRequestRev Attribute

20 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
21 are specified in upper case letters.

22

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

1	Length	Length of the complex attribute in octets. The sender shall set this
2		field to the length of the complex attribute excluding the Length field.
3	AttributeID	The sender shall set this field to 0x08KK, where KK is the two-digit
4		hexadecimal ReservationLabel.
5	ValueID	The sender shall set this field to an identifier assigned to this complex
6		value.
7	ProfileType	The sender shall set this field to indicate the profile type. The sender
8		shall set this field as defined in [3].
9	ProfileLength	The sender shall set this field to length of the ProfileValue field in
10		units of octets. If ProfileType is equal to 0x00, then the sender shall
11		set this field to 0x0000.
12	ProfileValue	The sender shall set this field to the Profile Value corresponding to
13		the Profile Type according to [3]. If ProfileType is equal to 0x00, then
14		the sender shall omit this field. If ProfileType is equal to 0x01, if the
15		ANSupportedQoSProfiles attribute does not have a default value, and
16		if this attribute is included in an AttributeUpdateRequest, then the
17		requested Flow Profile IDs shall be a subset of the Flow Profile IDs in
18		the ProfileValue fields of the ANSupportedQoSProfiles attribute.

### 19 3.10.2.12 ReservationKKQoSResponseFwd Attribute

20 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
21 are specified in upper case letters.

22

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x09KK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 ProfileType The sender shall set this field to indicate the profile type. The sender  
8 shall set this field as defined in [3].
- 9 ProfileLength The sender shall set this field to length of the ProfileValue field in  
10 units of octets. If ProfileType is equal to 0x00, then the sender shall  
11 set this field to 0x0000.
- 12 ProfileValue The sender shall set this field to the Profile Value corresponding to  
13 the Profile Type according to [3]. If ProfileType is equal to 0x00, then  
14 the sender shall omit this field.

### 15 3.10.2.13 ReservationKKQoSResponseRev Attribute

16 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
17 are specified in upper case letters.

18



Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProfileType	8	<b>0x00</b>
ProfileLength	16	<b>0x0000</b>
ProfileValue	ProfileLength × 8	N/A

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x0aKK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 ProfileType The sender shall set this field to indicate the profile type. The sender  
8 shall set this field as defined in [3].
- 9 ProfileLength The sender shall set this field to length of the ProfileValue field in  
10 units of octets. If ProfileType is equal to 0x00, then the sender shall  
11 set this field to 0x0000.
- 12 ProfileValue The sender shall set this field to the Profile Value corresponding to  
13 the Profile Type according to [3]. If ProfileType is equal to 0x00, then  
14 the sender shall omit this field.

## 3.10.2.14 MaxReservations Attribute

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more occurrences of the following record:

ValueID	8	N/A
MaxNumReservationsFwd	8	0xff
MaxNumReservationsRev	8	0xff
MaxNumOpenReservationsFwd	8	0x0f
MaxNumOpenReservationsRev	8	0x0f

**Length** Length of the complex attribute in octets. The sender shall set this field to the length of the complex attribute excluding the Length field.

**AttributeID** The sender shall set this field to 0x0005.

**ValueID** The sender shall set this field to an identifier assigned to this complex value.

**MaxNumReservationsFwd**

The sender shall set this field to indicate one less than the maximum total number of Forward Link Reservations supported that satisfy at least one of the following conditions:

- The Reservation is in Open state.
- The Reservation is bound to a link flow.
- The Reservation *KKQoSRequestFwd* corresponding to the Reservation is set to a non-default value.

The value shall be in the range of 0x00 to 0xff, inclusive

**MaxNumReservationsRev**

The sender shall set this field to indicate one less than the maximum total number of Reverse Link Reservations supported that satisfy at least one of the following conditions:

- The Reservation is in Open state.
- The Reservation is bound to a link flow.
- The Reservation *KKQoSRequestRev* corresponding to the Reservation is set to a non-default value.

The value shall be in the range of 0x00 to 0xff, inclusive.

1 MaxNumOpenReservationsFwd  
 2 The sender shall set this field to indicate one less than the maximum  
 3 number of simultaneous activated Forward Link Reservations  
 4 supported. The value shall be in the range of 0x00 to  
 5 MaxNumReservationsFwd, inclusive.

6 MaxNumOpenReservationsRev  
 7 The sender shall set this field to indicate one less than the maximum  
 8 number of simultaneous activated Reverse Link Reservations  
 9 supported. The value shall be in the range of 0x00 to  
 10 MaxNumReservationsRev, inclusive.

### 11 3.10.2.15 FlowNNFlowProtocolParametersFwd Attribute

12 NN is the two-digit hexadecimal forward Link flow identifier, where hexadecimal digits A  
 13 through F are specified in upper case letters.

Field	Length (bits)	Default for NN = 0x00	Default for NN = 0x01	Default for NN > 0x01
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

14 One or more occurrences of the following record:

ValueID	8	N/A	N/A	N/A
ProtocolID	8	0x01	0x05	0x00
ProtocolParametersLength	8	0x00	0x00	0x00
ProtocolParameters	ProtocolParamete rsLength × 8	N/A	N/A	N/A

15 Length Length of the complex attribute in octets. The sender shall set this  
 16 field to the length of the complex attribute excluding the Length field.

17 AttributeID The sender shall set this field to 0x0bNN, where NN is the two-digit  
 18 hexadecimal forward Link flow number.

19 ValueID The sender shall set this field to an identifier assigned to this complex  
 20 value.

21 ProtocolID The sender shall set this field to n identifier for the Flow Protocol as  
 22 specified in [3].

23 ProtocolParametersLength  
 24 If the ProtocolParameters record is not included, then the sender  
 25 shall set this field to 0x00. Otherwise, the sender shall set this field  
 26 to the length of the ProtocolParameters record in units of octets.

1 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
 2 ProtocolID is 0x04, then the sender shall set this record as defined in  
 3 3.10.2.15.1. If ProtocolID is less than 0x04 or equal to 0x05, the  
 4 sender shall omit this record.

5

6 3.10.2.15.1 Definition of ProtocolParameters record when the Flow Protocol or Route  
 7 Protocol is ROHC  
 8

Field	Length (bits)
MaxCID	16
LargeCIDs	1
FeedbackForIncluded	1
FeedbackFor	0 or 5
MRRU	16
ProfileCount	8
ProfileCount occurrences of the following field:	
Profile	16
Reserved	0 – 7 (as needed)

9

10 MaxCID The sender shall set this field to the MAX\_CID parameter for this  
 11 ROHC Channel. The sender shall not set this field to a value greater  
 12 than MaxSupportedMaxCID.

13 LargeCIDs If the LARGE\_CIDS parameter for this ROHC Channel is false, then  
 14 the sender shall set this field to '0'. Otherwise, the sender shall set  
 15 this field to '1'. The sender shall not set this field to '1' if  
 16 LargeCIDSupported is not set to '1'.

17 FeedbackForIncluded If ROHC feedback associated with another Link flow (ROHC channel)  
 18 is sent on this Link flow (ROHC channel), then this field shall be set  
 19 to '1'. Otherwise, this field shall be set to '0'.

20 FeedbackFor If FeedbackForIncluded is set to '0', then the sender shall omit this  
 21 field. Otherwise, the sender shall set this field to the Link flow  
 22 number (ROHC channel) to which ROHC feedback sent on this Link  
 23 flow (ROHC channel) refers.

24 MRRU The sender shall set this field to the MRRU parameter for this ROHC  
 25 channel. The sender shall not set this field to a value larger than  
 26 MaxSupportedMRRU.

- 1 ProfileCount The sender shall set this field to the number of ROHC profiles  
2 supported by the decompressor.
- 3 Profile The sender shall set this field to the ROHC profile supported by the  
4 decompressor according to [6]. The sender shall not set this field to a  
5 value that is not included in the list of supported Profiles.
- 6 Reserved The sender shall add reserved bits to make the length of the entire  
7 record an integer number of octets. The sender shall set these bits to  
8 '0'. The receiver shall ignore this field.

### 9 3.10.2.16 FlowNNFlowProtocolParametersRev Attribute

- 10 NN is the two-digit hexadecimal reverse Link flow number, where hexadecimal digits A  
11 through F are specified in upper case letters.

Field	Length (bits)	Default for NN = 0x00	Default for NN = 0x01	Default for NN > 0x01
Length	8	N/A	N/A	N/A
AttributeID	16	N/A	N/A	N/A

12 One or more of the following record:

ValueID	8	N/A	N/A	N/A
ProtocolID	8	0x01	0x05	0x00
ProtocolParametersLength	8	0x00	0x00	0x00
ProtocolParameters	ProtocolParametersLength × 8	N/A	N/A	N/A

- 13 Length Length of the complex attribute in octets. The sender shall set this  
14 field to the length of the complex attribute excluding the Length field.
- 15 AttributeID The sender shall set this field to 0x0cNN, where NN is a two-digit  
16 hexadecimal reverse Link flow number.
- 17 ValueID The sender shall set this field to an identifier assigned to this complex  
18 value.
- 19 ProtocolID The sender shall set this field to an identifier for the Flow Protocol as  
20 specified in [3].
- 21 ProtocolParametersLength  
22 If the ProtocolParameters record is not included, then the sender  
23 shall set this field to 0x00. Otherwise, the sender shall set this field  
24 to the length of the ProtocolParameters record in units of octets.
- 25 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
26 ProtocolID is 0x04, then the sender shall set this record as defined in

3.10.2.16.1. If ProtocolID is less than 0x04 or equal to 0x05, the sender shall omit this record.

3.10.2.16.1 Definition of ProtocolParameters record attribute when the Flow Protocol or Route Protocol is ROHC

Field	Length (bits)
MaxCID	16
LargeCIDs	1
FeedbackForIncluded	1
FeedbackFor	0 or 5
MRRU	16
TimerBasedCompression	1
ProfileCount	8
ProfileCount occurrences of the following field:	
Profile	16
Reserved	0 – 7 (as needed)

**MaxCID** The sender shall set this field to the MAX\_CID parameter for this ROHC Channel. The sender shall not set this field to a value greater than MaxSupportedMaxCID.

**LargeCIDs** If the LARGE\_CIDS parameter for this ROHC Channel is false, then the sender shall set this field to '0'. Otherwise, the sender shall set this field to '1'. If LargeCIDsSupported is '0', then the sender shall not set this field to '1'.

**FeedbackForIncluded** If ROHC feedback associated with another Link flow (ROHC channel) is sent on this Link flow (ROHC channel), then this field shall be set to '1'. Otherwise, this field shall be set to '0'.

**FeedbackFor** If FeedbackForIncluded is set to '0', then the sender shall omit this field. Otherwise, the sender shall set this field to the Link flow number (ROHC channel) to which ROHC feedback sent on this Link flow (ROHC channel) refers.

**MRRU** The sender shall set this field to the MRRU parameter for this ROHC channel. The sender shall not set this field to a value greater than MaxSupportedMRRU.

1	TimerBasedCompression	
2		The sender shall set this field to '0' if timer based compression
3		according to [6] is not enabled for this ROHC channel. The sender
4		shall set this field to '1' if timer based compression according to [6] is
5		enabled for this ROHC channel. If TimerBasedCompressionSupported
6		is set to '0', then the sender shall not set this field to '1'.
7	ProfileCount	The sender shall set this field to the number of ROHC profiles
8		supported by the decompressor.
9	Profile	The sender shall set this field to the ROHC profile supported by the
10		decompressor according to [6]. The sender shall not set this field to a
11		value that is not included in the list of supported profiles.
12	Reserved	The sender shall add reserved bits to make the length of the entire
13		record an integer number of octets. The sender shall set these bits to
14		'0'. The receiver shall ignore this field.

### 15 3.10.2.17 FlowNNRouteProtocolParametersFwd Attribute

16 *NN* is the two-digit hexadecimal forward Link flow number, where hexadecimal digits A  
17 through F are specified in upper case letters.

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

18 One or more of the following record:

ValueID	8	N/A
ProtocolID	8	0x00
ProtocolParametersLength	8	0x00
ProtocolParameters	ProtocolParametersLength × 8	N/A

19	Length	Length of the complex attribute in octets. The sender shall set this
20		field to the length of the complex attribute excluding the Length field.
21	AttributeID	The sender shall set this field to 0x0d <i>NN</i> , where <i>NN</i> is a two-digit
22		hexadecimal forward Link flow number.
23	ValueID	The sender shall set this field to an identifier assigned to this complex
24		value.
25	ProtocolID	The sender shall set this field to an identifier for the Route Protocol as
26		specified in [3].

## 1 ProtocolParametersLength

2 If the ProtocolParameters record is omitted, then the sender shall set  
3 this field to 0x00. Otherwise, the sender shall set this field to the  
4 length of the ProtocolParameters record in units of octets.

5 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
6 ProtocolID is 0x04, then the sender shall set this field as defined in  
7 3.10.2.15.1. If ProtocolID is less than 0x04, the sender shall omit this  
8 record.

## 9 3.10.2.18 FlowNNRouteProtocolParametersRev Attribute

10 NN is the two-digit hexadecimal reverse Link flow number, where hexadecimal digits A  
11 through F are specified in upper case letters.

12

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
ProtocolID	8	0x00
ProtocolParametersLength	8	0x00
ProtocolParameters	ProtocolParametersLength × 8	N/A

13 Length Length of the complex attribute in octets. The sender shall set this  
14 field to the length of the complex attribute excluding the Length field.

15 AttributeID The sender shall set this field to 0x0eNN, where NN is a two-digit  
16 hexadecimal reverse Link flow number.

17 ValueID The sender shall set this field to an identifier assigned to this complex  
18 value.

19 ProtocolID The sender shall set this field to an identifier for the Route Protocol as  
20 specified in [3].

## 21 ProtocolParametersLength

22 If the ProtocolParameters field is omitted, then the sender shall set  
23 this field to 0x00. Otherwise, the sender shall set this field to the  
24 length of the ProtocolParameters record in units of octets.

25 ProtocolParameters Unless specified otherwise by [3], the sender shall omit this record. If  
26 ProtocolID is 0x04, then the sender shall set this field as defined in  
27 3.10.2.16.1.



3.10.2.19 Flow*NN*SequenceLengthFwd Attribute

*NN* is the two-digit hexadecimal forward Link flow number, where hexadecimal digits A through F are specified in upper case letters.

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One or more of the following record:

ValueID	8	N/A
SARSequenceLength	8	21
SARSequenceLengthShort	8	21

**Length** Length of the complex attribute in octets. The sender shall set this field to the length of the complex attribute excluding the Length field.

**AttributeID** The sender shall set this field to 0x02*NN*, where *NN* is a two-digit hexadecimal forward Link flow number.

**ValueID** The sender shall set this field to an identifier assigned to this complex value.

**SARSequenceLength** The sender shall set this field to the length of the SAR sequence number in units of bits. The sender shall not set this field to any value other than 5, 13, 21, or 29. The sender shall set this field to 29 only if  $\lceil \log_2[R \times \text{AbortTimer}] \rceil + 1 > 21$ , where *R* is the maximum data rate in units of higher layer octets per second that can be achieved by the lower layers, and abort timer is in units of seconds.

**SARSequenceLengthShort** The sender shall set this field to the length of the sequence number included in the header of a SAR packet that does not carry re-transmitted data units. SARSequenceLengthShort shall be less than or equal to SARSequenceLength.

3.10.2.20 Reservation*KK*BCMCSFlowIDAssociation Attribute

*KK* is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F are specified in upper case letters.

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One occurrence of the following record:

ValueID	8	N/A
BCMCSFlowCount	8	<b>0x00</b>

BCMCSFlowCount occurrences of the following record:

BCMCSFlowID	32	N/A
-------------	----	-----

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x11KK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 BCMCSFlowCount The sender shall set this field to the number of BCMCS Flow  
8 identifiers associated with this reservation.
- 9 BCMCSFlowID The sender shall set this field to the BCMCS Flow identifier(s) of the  
10 BCMCS Flow(s) that are associated with this reservation.
- 11 3.10.2.21 ReservationKKBCMCSProgramIDAssociation Attribute
- 12 KK is the two-digit hexadecimal ReservationLabel, where hexadecimal digits A through F  
13 are specified in upper case letters.  
14

Field	Length (bits)	Default
Length	8	N/A
AttributeID	16	N/A

One occurrence of the following record:

ValueID	8	N/A
ProgramCount	8	<b>0x00</b>

ProgramCount occurrences of the following record:

ProgramIDLSBLength	8	N/A
ProgramIDLSBs	32	N/A
FlowDiscriminatorCount	8	N/A

FlowDiscriminatorCount occurrences of the following record:

FlowDiscriminator	8	N/A
-------------------	---	-----

- 1 Length Length of the complex attribute in octets. The sender shall set this  
2 field to the length of the complex attribute excluding the Length field.
- 3 AttributeID The sender shall set this field to 0x12KK, where KK is the two-digit  
4 hexadecimal ReservationLabel.
- 5 ValueID The sender shall set this field to an identifier assigned to this complex  
6 value.
- 7 ProgramCount The sender shall set this field to the number of BCMCS Programs  
8 that is associated with this reservation.
- 9 ProgramIDLSBLength The sender shall set this field to the valid number of the least  
10 significant bits of the ProgramID of the BCMCS Program that is  
11 associated with this reservation.
- 12 ProgramIDLSBs The sender shall set this field to the ProgramIDLSBLength least  
13 significant bits of Program ID of the BCMCS Program that is  
14 associated with this reservation.
- 15 FlowDiscriminatorCount The sender shall set this field to the number of Flow  
16 Discriminators for the Program that is associated with this  
17 reservation. If all the Flow Discriminators for this ProgramID is  
18 associated with this reservation, then the sender shall set this field to  
19 0.
- 20 FlowDiscriminator The sender shall set this field to the Flow Discriminator that is  
21 associated with this reservation.

### 3.11 Session State Information

The Session State Information record (see [8]) consists of parameter records.

This application defines the following parameter records in addition to the configuration attributes for this application.

#### 3.11.1 Location Parameter

**Table 3.11.1-1. The Format of the Parameter Record for the Location Parameter**

Field	Length (bits)
ParameterType	8
Length	8
LocationType	8
LocationValue	$8 \times (\text{Length} - 2)$

ParameterType This field shall be set to 0x01 for this parameter record.

Length This field shall be set to the length of this parameter record in units of octets excluding the Length field.

LocationType This field shall be set to the value of LocationType associated with the access terminal's session.

LocationValue This field shall be set to the stored value of LocationValue associated with the access terminal's session.

#### 3.11.2 FlowControlState Parameter

**Table 3.11.2-1. The Format of the Parameter Record for the FlowControlState Parameter**

Field	Length (bits)
ParameterType	8
Length	8
FlowControlState	8

ParameterType This field shall be set to 0x02 for this parameter record.

Length This field shall be set to the length of this parameter record in units of octets excluding the Length field.

FlowControlState This field shall be set to 0x00 if the state of the Flow Control Protocol associated with the access terminal's session is Close. Otherwise, this field shall be set to 0x01. All the other values for this field are reserved.

## 1 3.11.3 DataOverSignalingMessageSequence Parameter

2 **Table 3.11.3-1. The Format of the Parameter Record for the**  
 3 **DataOverSignalingMessageSequence Parameter**

Field	Length (bits)
ParameterType	8
Length	8
Reserved1	2
ReceivePointerA	6
Reserved2	2
TransmitPointerA	6
Reserved3	2
ReceivePointerB	6
Reserved4	2
TransmitPointerB	6

- 4 ParameterType This field shall be set to 0x03 for this parameter record.
- 5 Length This field shall be set to the length of this parameter record in units  
 6 of octets excluding the Length field.
- 7 Reserved1 The sender shall set this field to '00'. The receiver shall ignore this  
 8 field.
- 9 ReceivePointerA This field shall be set to the value of the receive pointer for  
 10 DataOverSignaling message validation on Route A,  $V(R_A)$ .
- 11 Reserved2 The sender shall set this field to '00'. The receiver shall ignore this  
 12 field.
- 13 TransmitPointerA This field shall be set to the value of the transmit pointer for  
 14 DataOverSignaling message validation on Route A,  $V(S_A)$ .
- 15 Reserved3 The sender shall set this field to '00'. The receiver shall ignore this  
 16 field.
- 17 ReceivePointerB This field shall be set to the value of the receive pointer for  
 18 DataOverSignaling message validation on Route B,  $V(R_B)$ .
- 19 Reserved4 The sender shall set this field to '00'. The receiver shall ignore this  
 20 field.

1 TransmitPointerB This field shall be set to the value of the transmit pointer for  
 2 DataOverSignaling message validation on Route B,  $V(S_B)$ .

### 3 3.11.4 StorageBLOB Parameter

4 **Table 3.11.4-1. The Format of the Parameter Record for the StorageBLOB Parameter**

Field	Length (bits)
ParameterType	8
Length	8
StorageBLOBType	16
StorageBLOBLength	8
StorageBLOB	0 or $8 \times \text{StorageBLOBLength}$

5 ParameterType This field shall be set to 0x04 for this parameter record.

6 Length This field shall be set to the length of this parameter record in units  
 7 of octets excluding the Length field.

8 StorageBLOBType This field shall be set to zero if the value of its stored StorageBLOB is  
 9 NULL; otherwise, this field shall be set to the stored value of  
 10 StorageBLOBType.

11 StorageBLOBLength This field shall be set to zero if the value of its stored StorageBLOB is  
 12 NULL; otherwise, this field shall be set to the stored value of  
 13 StorageBLOBLength.  
 14

15 StorageBLOB This field shall be omitted if the value of the stored StorageBLOB is  
 16 NULL; otherwise, this field shall be set to the stored value of  
 17 StorageBLOB.

## 1 3.11.5 ReservationState Parameter

2 **Table 3.11.5-1. The Format of the Parameter Record for the ReservationState**  
3 **Parameter**

Field	Length (bits)
ParameterType	8
Length	8
OpenReservationCount	8
OpenReservationCount occurrences of the following record:	
Link	1
ReservationLabel	8
Reserved	0 – 7 (as needed)

- 4 ParameterType This field shall be set to 0x05 for this parameter record.
- 5 Length This field shall be set to the length of this parameter record in units  
6 of octets excluding the Length field.
- 7 OpenReservationCount  
8 This field shall be set to the number of Reservations that are in the  
9 Open state.
- 10 Link This field shall be set to '1' for a forward link Reservation, and to '0'  
11 for a reverse link Reservation.
- 12 ReservationLabel This field shall be set to the ReservationLabel.
- 13 Reserved The sender shall add reserved bits to make the length of the entire  
14 parameter an integer number of octets. The sender shall set these  
15 bits to zero. The receiver shall ignore this field

## 3.11.6 RouteState Parameter

**Table 3.11.6-1. The Format of the Parameter Record for the RouteState Parameter**

Field	Length (bits)
ParameterType	8
Length	8
RouteSelectionProtocolState	2
NextRouteSelectTransactionID	8
NextActivateRouteTransactionID	8
Reserved	6

ParameterType This field shall be set to 0x06 for this parameter record.

Length This field shall be set to the length of this parameter record in units of octets excluding the Length field.

RouteSelectionProtocolState

This field shall be set to indicate the state of Route Selection Protocol according to Table 3.11.6-2.

**Table 3.11.6-2. RouteSelectionProtocolState Encoding**

State	Value
A Open B Setting	'00'
A Open B Rising	'01'
A Setting B Open	'10'
A Rising B Open	'11'

NextRouteSelectTransactionID

This field shall be set to the TransactionID field of the next RouteSelect message that will be sent.

NextActivateRouteTransactionID

This field shall be set to the TransactionID field of the next ActivateRoute message that will be sent.

Reserved This field shall be set to '000000'. The receiver shall ignore this field.