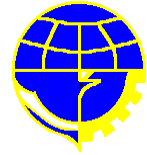




International Civil Aviation Organization and the Directorate General of Air Communication, Indonesia

SIXTH MEETING OF AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) TRANSITION TASK FORCE OF APANPIRG



Bali, Indonesia, 26-30 April 2004

Agenda Item 2: Discussions and Review ATN Router Activities – X. 25 Study

**ISO 8208 (X.25)
PROTOCOL REQUIREMENTS LIST (PRL)**

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SUMMARY

In the proposed changes to the ATNTTF documentation tree, it is recommend that the X.25 requirements in the ATN G/G Router ICD be moved to a separate ICD and properly specified as Protocol Requirements List (PRL), i.e., in Protocol Implementation Conformance statement PICs, format. This would leave the Router ICD independent of subnetworks and allow for the introduction of new subnetworks. The attached document is a draft 8208 ICD.



International Civil Aviation Organization

Interface Control Document

For

8208

Sub-networks

Draft Version 1.0

April 2004

Revision History	
Version Identification	Description
Version 1.0	Initial Draft Release – April, 2004

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1. Introduction

1.1 Purpose and Scope

This specification defines the capabilities and features that should be provided to operate ATN systems over an 8208 (“x-25 type) subnetwork.

1.2 Document Organization

This document is organized as follows:

Section 1 Introduction –Identifies the objective of this functional specification.

Section 2 Capabilities and Features – Specifies the capabilities and features that must be provided (by reference to PRLs) to operate over an 8208 subnetwork..

Section 3 Acronyms – Provides a description of the acronyms used throughout this document.

Section 4 References – Provides a list of references used to develop the information contained in this document.

Appendix A – Provides the Profile Requirements List for the protocols operating in the 8208 subnetwork environment.

2. Capabilities and Features

The following sections identify the capabilities and features that must be provided to operate over an 8208 subnetwork.

2.1 Subnetwork Functions

2.1.1 Subnetwork Dependent Convergence Function

- a. The Router provides the ISO 8473-3 Subnetwork Dependent Convergence Function for use with ISO 8208 Subnetworks conforming to the APRL defined in Section A.3 of Appendix A.

2.1.2 Subnetwork Access Function

- a. The Router provides the ISO 8208 Packet Level Protocol (PLP) conforming to the APRL defined in Section A.4 of Appendix A.

2.2 Interface Function

2.2.1 X.25 Interface

- a. The Router provides communication ports capable of being configured to communicate using the X.25 protocols.

Note. –The number of X.25 communication ports depends on the hardware platform.

- b. The Router provides the ITU-T X.25 (1984) Link Access Procedure for Balanced (LAPB) operation as the Data Link Layer protocol.
- c. The Router provides a physical layer interface conforming to the EIA-530 standard.
- d. Each physical communications port is capable of supporting line speeds up to 1 Megabit per second (Mbps).

3. Acronyms

A/G	– Air/Ground
AMHS	– ATS Message Handling System
APRL	– ATN Protocol Requirements List
ATN	– Aeronautical Telecommunication Network
BIS	– Boundary Intermediate System
CLNP	– Connectionless Network Protocol
ES	– End System
ICAO	– International Civil Aviation Authority
IS	– Intermediate System
ISO	– International Organization for Standardization
LAN	– Local Area Network
LAPB	– Link Access Procedure for Balanced operation
LLC	– Logical Link Control
Mbps	– Megabits per second
MIB	– Management Information Base
NPDU	– Network Protocol Data Unit
NSAP	– Network Service Access Point
SARPS	– Standards and Recommended Practices
SNACF	– Subnetwork Access Function
SNDCF	– Subnetwork Dependent Convergence Function

5 References

1. ICAO Doc 9705-AN/956 – Manual of Technical Provisions for the Aeronautical Telecommunications Network (ATN)

APPENDIX A – Profile Requirements List

A.1 Scope

This appendix contains the PRLs for the SNDCEF and subnetwork protocols operating across the interface described by this functional specification. PRLs not listed in this appendix are not within the scope of this document.

A.2 Conventions

The PRLs provided in this appendix use the following conventions and symbols:

M	[M]andatory - the capability must be supported
MO	Mandatory to implement but optional for use
O	[O]ptional - The capability may optionally be supported
O.<n>	[O]ptional, but support of at least one of the group of options labeled by the numeral <n> is required
X or P	prohibited/precluded i.e. the capability must not be supported.
OX or OP	Optional to implement but precluded for use
<pred>	Condition item symbol, including predicate identification
^	Logical negation, applied to a condition item's predicate
<r>	Receive aspects of an item
<s>	Send aspects of an item
Y	[Y]es, indicates that an implementation must support the item
N	[N]o, indicates that there is no requirement for the an implementation to support the item.
N/A	Not Applicable

A.3 SNDCF (ISO/IEC 8473-3)

A.3.1 SNDCF for use with ISO 8208 Subnetworks - Functions

Item	Function	ISO/IEC 8473-3 Reference	Status	ATN Support	Router Support
XSNUD	Is Subnetwork User Data of at least 512 octets transferred transparently by the SNDCF ?	5.2	M	M	Y
XSNTD	Is Transit Delay determined by the SNDCF prior to the processing of user data ?	5.2	M	M	Y
	Call Setup Considerations	5.31			
	Is a new call setup:				
XCalla	a. when no suitable call exists ?	5.3.1 a.	O.3	O.3	Y
XCallb	b. when queue threshold reached ?	5.3.1 b.	O.3	O.3	N
XCalld	c. by systems management ?	5.3.1 c.	O.3	O.3	Y
XCalld	d. when queue threshold reached and timer expires ?	5.3.4	O.3	O.3	N
XCalld	e. by other local means?	5.3.1	O.3	O.3	N
	Call clearing considerations Are calls cleared:	5.3.2			
XClra	a. when idle timer expires	5.3.2 a., 5.3.4	O	O	Y
XClrb	b. when need to re-use circuit	5.3.2 b.	O	O	N
XClrc	c. by systems management	5.3.2 c.	O	O	Y
XClrd	d. by provider ?	5.3.2 d.	M	M	Y
XClrer	e. by other local means?	5.3.2	O	O	N
XPD	X.25 Protocol Discrimination	5.3.3	M	M	Y
XVCC	Resolution of VC collisions	5.3.5	M	M	Y
XMCR	Multiple VCs responding	5.3.6	M	M	Y
XMCI	Multiple VCs initiating	5.3.6	O	O	N

Item	Function	ISO/IEC 8473-3 Reference	Status	ATN Support	Router Support
Xpri	X.25 Priority procedure	5.3.7	O	M	N

A.3.2 SNDCF for use with ISO 8208 Subnetworks - X.25 Call User Data

Item	Parameter	ISO/IEC 8473-3 Reference	Status	ATN Support	Router Support
PD-s	<s> Protocol Discriminator	5.3.3	M	M	Y
PD-r	<r> Protocol Discriminator	5.3.3	M	M	Y
LI-s	<s> Length Indication	5.3.6	XMCI:M	XMCI:M	N
LI-r	<r> Length Indication	5.3.6	M	M	Y
Ver-s	<s> SNCR Version	5.3.6	XMCI:M	XMCI:M	N
Ver-r	<r> SNCR Version	5.3.6	M	M	Y
SNCR-s	<s> SNCR Value	5.3.6	XMCI:M	XMCI:M	N
SNCR-r	<r> SNCR Value	5.3.6	M	M	Y

A.3.3 SNDCF for use with ISO 8208 Subnetworks - ISO 8208 SNDCF Timers

Item	Timer	ISO/IEC 8473-3 Reference	Status	Values	ATN Support	Router Support
XIDL	X25 VC Idle	5.3.4	XC Ira:O	Any	XC Ira:O	Y, 0 to 72000 sec.
XNVC	additional VC	5.3.4	O	Any	M	Y, 0 to 72000 sec.

A.3.4 SNDCF for use with ISO 8208 Subnetworks - Multi Layer Dependencies

Item	Dependency	ISO/IEC 8473-3 Reference	ATN Support	Router Support
XSSg-r	<r> Maximum SN data unit size (Rx)	5.2	>=512 bytes	>=512 bytes
XSSg-s	<s> Maximum SN data unit size (Tx)	5.2	>=512 bytes	>=512 bytes

Item	Dependency	ISO/IEC 8473-3 Reference	Status	ATN Support	Router Support
Xvc	X.25 Virtual call service	5.3.8	M	M	Y
Xdt	X.25 Data transfer	5.3.8	M	M	Y
Xfc	X.25 flow control procedures	5.3.8	M	M	Y
Xfrp	X.25 flow control + reset packets	5.3.8	M	M	Y
Xccp	X.25 call setup and clear packets	5.3.8	M	M	Y
Xdp	X.25 DTE and DCE data packets	5.3.8	M	M	Y
Xrs	X.25 restart procedures	5.3.8	M	M	Y
XDct	X.25 DCE timeouts	5.3.8	M	M	Y
XDtT	X.25 time limits	5.3.8	M	M	Y
Xpco	X.25 network packet coding	5.3.8	M	M	Y
Xfcn	X.25 flow control parameter negotiation	5.3.8	O	O	Y
Xtd	X.25 transit delay selection and negotiation	5.3.8	O	O	Y
Xtc	X.25 throughput class negotiation	5.3.8	O	O	Y
Xoth	Other X.25 elements	5.3.8	O	O	Y

A.4 ISO/IEC 8208 Packet Level Protocol PICS

A.4.1 General DTE Characteristics

Item	Function	ISO/IEC 8208 Reference	Router Support
Vs	Virtual Call	3.4, 3.7	Y
Vp	Permanent Virtual Circuit	3.4, 3.7	Y
Ec/8	DTE/DCE (1988) environment	3.1.1	N
Ec/4	DTE/DCE (1984) environment	3.1.2	Y
Ec/0	DTE/DCE (1980) environment	3.1.3	N
Et/t	DTE/DTE in fixed role as DTE	3.3	Y
Et/d	DTE/DTE with dynamic role selection	4.5	Y
M8	Packet sequence numbering modulo 8	13.2, 12.1.1	Y
M128	Packet sequence numbering modulo 128 (extended)	13.2, 12.1.1	Y
Rna	Is the Reference Number optional user facility supported (DTE/DTE only)?	13.29	N

A.4.2 Link Layer Interactions

Item	Function	ISO/IEC 8208 Reference	Router Support
L1a	Restarting of the packet layer initiated (in the DTE) on completion of link layer initialization (Note 1)	3.10	Y
L1b	Restarting of the packet layer initiated (in the DTE) on recovery from failure of the link layer (Note 1)	10	Y
L2	Can packets consisting of a non-integral number of octets be received from the link layer	12	N

A.4.3 General Packet Formatting

Item	Function	ISO/IEC 8208 Reference	Router Support
P2	Do all (DTE) transmitted packets consist of an integral number of octets?	12.1	Y
P3a	Do all (DTE) transmitted packets contain General Format Identifier?	12.1.1	Y
P3b	Do all (DTE) transmitted packets contain Logical Channel Identifier	12.1.2	Y
P3c	Do all (DTE) transmitted packets contain Packet Type Identifier?	12.1.3	Y
P4	Are all (DTE) received packets that do not contain valid GFI, LCI and PTI fields treated as erroneous?	12.1.1 table 3, 12.1.3, 12.1.2, table 6, table 31-36	Y

A.4.4 Packet Layer Functions Independent of Logical Channels

Item	Function	ISO/IEC 8208 Reference	Router Support
Z1i	DTE restarts the packet layer as initiator	12.6.1	Y
Z1r	DTE restarts the packet layer as responder	12.6.1	Y
Z2r	DTE receives DIAGNOSTIC packet	11.1, 12.7	Y
Z2s	DTE sends DIAGNOSTIC packet	12.7, table 24	Y
Z3	DISCARD, or ERROR restart, on erroneous received packets not assignable to a logical channel and not covered by item Z2s	11.1, tables 31-32	Y
Z4i	DTE initiating On-line Facility Registration	13.1, 12.9.1	N

A.4.5 Call Setup

Item	Function	ISO/IEC 8208 Reference	Router Support
S1a	Outgoing Virtual Calls support Fast Select, no restriction on response	5.2.4, 13.16	Y
S1b	Outgoing Virtual Calls support Fast Select with restricted response	13.16	Y
S1c	Outgoing Virtual Calls support non-Fast-Select	5.2.4	Y
SP1b	DTE sends CALL REQUEST, basic format	12.2.3.1	Y
SP1e	DTE sends CALL REQUEST, extended format	12.2.3.1, 12.2.3.2	Y
SP2b	DTE receives CALL CONNECTED, basic format	12.2.4.1	Y
SP2e	DTE receives CALL CONNECTED, extended format	12.2.4.1, 12.2.4.2	Y
S2a	Incoming Virtual Calls support Fast Select with acceptance possible	5.2.3, 13.17	Y
S2b	Incoming Virtual Calls support Fast Select, always cleared	13.17	N
S2c	Incoming Virtual Calls support non-Fast-Select with acceptance possible	5.2.3	Y
S2d	Incoming Virtual Calls support non-Fast-Select, always cleared	5.2.3	N
SP3b	DTE receives INCOMING CALL, basic format	12.2.3.1	Y
SP3e	DTE receives INCOMING CALL, extended format	12.2.3.1, 12.2.3.2	Y
SP4b	DTE sends CALL ACCEPTED, basic format	12.2.4.1	Y
SP4e	DTE sends CALL ACCEPTED, extended format	12.2.4.1, 12.2.4.2	Y
DN1	D-bit negotiation is supported for outgoing Virtual Calls	6.3	Y
DN2	D-bit negotiation is supported for incoming Virtual Calls	6.3	Y

A.4.6 Call Clearing

Item	Function	ISO/IEC 8208 Reference	Router Support
C1	Call clearing is supported to respond to an indication of Clearing	5.5.2	Y
C2a	Call clearing is supported to abort an outgoing Virtual Call attempt	5.4, 5.5.1, 5.5.3	Y
C2b	Call clearing is supported to reject an incoming Virtual Call	5.3, 5.5.1, 5.5.3	Y
C2c	Call clearing is supported to clear an established Virtual Call	5.5.1, 5.5.3	Y
CP1b	DTE receives CLEAR INDICATION, basic format	12.2.5.1	Y
CP1e	DTE receives CLEAR INDICATION, extended format	12.2.5.1, 12.2.5.2	Y
CP2b	DTE sends CLEAR CONFIRMATION, basic format	12.2.6.1	Y
CP2e	DTE sends CLEAR CONFIRMATION, extended format	12.2.6.1, 12.2.6.2	N
CP3b	DTE sends CLEAR REQUEST, basic format	12.2.5.1	Y
CP3e	DTE sends CLEAR REQUEST, extended format	12.2.5.1, 12.2.5.2	Y
CP4b	DTE receives CLEAR CONFIRMATION, basic format	12.2.6.1	Y
CP4e	DTE receives CLEAR CONFIRMATION, extended format	12.2.6.1, 12.2.6.2	N

A.4.7 Resetting of Logical Channels

Item	Function	ISO/IEC 8208 Reference	Router Support
Rsi	Resetting is supported when DTE is an initiator	12.5.1, 12.5.2	Y
RSr	Resetting is supported when DTE is a responder	12.5.1, 12.5.2	Y

A.4.8 Interrupt Transfer

Item	Function	ISO/IEC 8208 Reference	Router Support
Ls	Sending Interrupts	6.8, 12.3	Y
Lr	Receiving Interrupts	6.8, 12.3	Y

A.4.9 Sending Data

Item	Function	ISO/IEC 8208 Reference	Router Support
DS1	Sending of DATA packets is supported	6, 6.1, 6.2, 7.1, 12.3	Y

Item	Function	ISO/IEC 8208 Reference	Router Support
DS2	Send-window rotation on receiving updated P(R) values	7.1, 7.1.2, 7.1.3	Y
DS3	Response to flow control by received RNR and RR packets	7.1.5, 7.1.6, 12.4.1, 12.4.2	Y
DS4a	Sending M=0 in DATA packets	6.4, 6.5, 6.7	Y
DS4b	Sending M=1 in DATA packets	6.4, 6.5, 6.7	Y
DS5a	Sending Q=0 in DATA packets	6.6	Y
DS5b	Sending Q=1 in DATA packets	6.6	Y

A.4.10Receiving Data

Item	Function	ISO/IEC 8208 Reference	Router Support
DR1	Receiving DATA packets	6, 6.1, 6.2, 7.1.1, 7.1.2, 7.1.3, 12.3.1	Y
DR2	Receive-window rotation by sending updated P(R) values	7.1.2, 7.1.3	Y
DR3	Flow control by sending RNR and RR packets	7.1.5, 7.1.6, 12.4.1, 12.4.2	Y
DR4a	Receiving M=0 in DATA packets	6.4, 6.5, 6.7	Y
DR4b	Receiving M=1 in DATA packets	6.4, 6.5, 6.7	Y
DR5a	Receiving Q=0 in DATA packets	6.6	Y
DR5b	Receiving Q=1 in DATA packets	6.6	Y
DR6	Requesting packet retransmission by sending REJECT packets	13.4.1, 12.8	Y
DR7a	Recovery from receipt of DATA packets containing invalid P(S), by ERROR-R Action.	11.3(a)	Y (note 1)
DR7b	Recovery from receipt of DATA packets containing invalid P(S), by: requesting packet retransmission	11.3(b)	Y(note 1)
DR7c	Recovery from receipt of DATA packets containing invalid P(S), by: ignoring the packet and waiting for a correct retransmitted packet.	11.3(c)	N
DR8a	Recovery from receipt of DATA packets with invalid User Data field, by: ERROR-R Action	11.3(a)	Y(note 2)
DR8b	Recovery from receipt of DATA packets with invalid User Data field, by: requesting packet retransmission	11.3(b)	Y(note 2)
DR8c	Recovery from receipt of DATA packets with invalid User Data field, by: ignoring the packet and waiting for a correct retransmitted packet.	11.3(c)	N
DR9	Window Status Transmission Timer Procedure	11.2.2	Y

Note 1: Since DR7a and DR7b are mutually exclusive in a DTE receiving DATA packets, DTEs will be provisioned to support one or the other depending on their location in the network.

Note 2: Since DR8a and DR8b are mutually exclusive in a DTE receiving DATA packets, DTEs will be provisioned to support one or the other depending on their location in the network.

A.4.11 Delivery Confirmation

Item	Function	ISO/IEC 8208 Reference	Router Support
DC	Support of Delivery Confirmation	6.3, 6.5, 6.7, 7.1.4	Y

A.4.12 Values of Cause Codes and Diagnostic Fields

Item	Function	ISO/IEC 8208 Reference	Router Support
Y1a	In RESTART REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal specific codes	12.6.1.1, 12.6.1.2, tables 24 -25	Y
Y1b	In RESTART REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal generic codes (including 0)	12.6.1.1, 12.6.1.2, tables 24 -25	Y
Y1c	In RESTART REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal 0, always	12.6.1.1, 12.6.1.2, tables 24 -25	N
Y1d	In RESTART REQUEST packets sent (by DTE), when Cause equals 128, private Diagnostic Codes are specified	12.6.1.1, 12.6.1.2, tables 24 -25	N
Y1e	In RESTART REQUEST packets sent (by DTE) Causes and Diagnostic Codes other than in items Y1a and Y1b	12.6.1.1, 12.6.1.2, tables 24 -25	N
Y2a	In RESTART INDICATION packets received (by DTE), Cause = 0 or 128, any diagnostic code value	12.6.1.1, table 9, 12.6.1.2	Y
Y2b	In RESTART INDICATION packets received (by DTE), Cause is not equal to 0 or 128, any diagnostic code value	12.6.1.1, table 9, 12.6.1.2	Y
Y3a	In CLEAR REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal specific codes	12.2.3.1.1, 1.2.2.3.2, tables 24 -25	Y
Y3b	In CLEAR REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal generic codes (including 0)	12.2.3.1.1, 12.2.3.1.2, tables 24 -25	Y
Y3c	In CLEAR REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal 0, always	12.2.3.1.1, 12.2.3.1.2, tables 24 -25	N
Y3d	In CLEAR REQUEST packets sent (by DTE), when Cause equals 128, Diagnostic Codes equal private diagnostic codes (Note 1)	12.2.3.1.1, 12.2.3.1.2, tables 24 -25	Y
Y3e	In CLEAR REQUEST packets sent (by DTE) Causes and Diagnostic Codes other than in items Y3a and Y3b	12.2.3.1.1, 12.2.3.1.2, tables 24 -25	N
Y4a	In CLEAR INDICATION packets received (by DTE), Cause equals 0 or 128, any diagnostic code values	12.2.3.1.1, table 7, 12.2.3.1.2	Y
Y4b	In CLEAR INDICATION packets received (by DTE), Cause is not equal to 0 or 128, any diagnostic code value	12.2.3.1.1, table 7, 12.2.3.1.2	Y
Y5a	In RESET REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal specific Diagnostic codes	12.5.1.1, 12.5.1.2, tables 24 -25	Y

Item	Function	ISO/IEC 8208 Reference	Router Support
Y5b	In RESET REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal generic diagnostic codes (including 0)	12.5.1.1, 12.5.1.2, tables 24 –25	Y
Y5c	In RESET REQUEST packets sent (by DTE), when Cause equals 0, Diagnostic Codes equal 0, always	12.5.1.1, 12.5.1.2, tables 24 –25	N
Y5d	In RESET REQUEST packets sent (by DTE), when Cause equals 128, Diagnostic Codes equal private Diagnostic codes	12.5.1.1, 12.5.1.2, tables 24 –25	N
Y5e	In RESET REQUEST packets sent (by DTE) Causes and Diagnostic Codes other than in items Y5a and Y5b	12.5.1.1, 12.5.1.2, tables 24 –25	N
Y6a	In RESET INDICATION packets received (by DTE), Cause equals 0 or 128, any diagnostic code value	12.5.1.1, table 8, 12.5.1.2	Y
Y6b	In RESET INDICATION packets received (by DTE), Cause is not equal to 0 or 128, any diagnostic code value	12.5.1.1, table 8, 12.5.1.2	Y

Note 1: Various ATN diagnostic codes are defined in the ICAO SARPs (section 5.7.6.2.4, table 5.7-3) for mobile SMDCF Clear Request packets (Cause equals 128).

A.4.13 Facilities Sent in Outgoing Call Request Packets (DTE to DCE)

Item	Function	ISO/IEC 8208 Reference	Router Support
FS1pi	Flow Control Parameter Negotiation, packet size (note 1)	13.12, 15.2.2.1.1	Y
FS1wi	Flow Control Parameter Negotiation, window size (note 1)	13.12, 15.2.2.1.2	Y
FS2ib	Throughput Class Negotiation (basic) (note 1)	13.13, 15.2.2.2.1	Y
FS2ie	Throughput Class Negotiation (extended)	13.13, 15.2.2.2.2	N
FS3b	Closed User Group Selection, basic format	13.14.6, 15.2.2.3.1	N
FS3e	Closed User Group Selection, extended format	13.14.6, 15.2.2.3.2	N
FS4b	Closed User Group With Outgoing Access Selection, basic format	13.4.7, 15.2.2.4.1	N
FS4e	Closed User Group With Outgoing Access Selection, extended format	13.4.7, 15.2.2.4.2	N
FS5	Bilateral Closed User Group Selection	13.15, 15.2.2.5	N
FS6a	Fast Select (note 1)	13.16, 15.2.2.6	Y
FS6b	Reverse Charging	13.18, 15.2.2.6	N
FS7i	Network User Identification	13.21, 13.21.3, 15.2.2.	N
FS8i	Charging Information, requesting service	13.22, 15.2.2.8.1	N
FS9b	ROA Selection, basic format	13.23, 13.23.2, 15.2.2.9.1	N
FS9e	ROA Selection, extended format	13.23, 13.23.2,	N

Item	Function	ISO/IEC 8208 Reference	Router Support
		15.2.2.9.2	
FS12	Transit Delay Selection and Indication	13.27, 15.2.2.13	Y
FS99i	Local non-X.25 facilities, following Facility Marker	15.1, table 18	N
FS98i	Remote non-X.25 facilities, following Facility Marker	15.1, table 18	N
FS20i	Facility Marker, ITU-T-specified DTE facilities	15.1	Y
FS21i	Calling Address Extension	14.1, 15.3.2.1	Y
FS22i	Called Address Extension	14.2, 15.3.2.2	Y
FS23i	Minimum Throughput Class Negotiation (basic)	14.3, 15.3.2.3.1, table 20a	Y
FS23i	Minimum Throughput Class Negotiation (extended)	14.3, 15.3.2.2, Table 20b	N
FS24i	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	Y
FS25i	Expedited Data Negotiation	14.7, 15.3.2.7	N
FS26i	Priority	14.5, 15.3.2.5	Y
FS27i	Protection	14.6, 15.3.2.6	N

A.4.14 Facilities Sent in Outgoing Call Accept Packets (DTE to DCE)

Item	Function	ISO/IEC 8208 Reference	Router Support
FS1pr	Flow Control Parameter Negotiation, packet size	13.12, 15.2.2.1.1, table 13	Y
FS1wr	Flow Control Parameter Negotiation, window size	13.12, 15.2.2.1.2, table 13	Y
FS2rb	Throughput Class Negotiation (basic) (Note 1)	13.13, 15.2.2.2.1, table 20a	Y
FS2re	Throughput Class Negotiation (extended)	13.13, 15.2.2.2.2, table 20b	N
FS7r	Network User Identification	13.21, 13.21.3, 15.2.2.7	N
FS8r	Charging Information, requesting service	13.22, 15.2.2.8.1	N
FS10r	Called Line Address Modified Notification	13.26, 15.2.2.12	Y
FS20r	Facility Marker, ITU-T-specified DTE facilities	15.1	Y
FS22r	Called Address Extension	14.2, 15.3.2.2	Y
FS24r	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	Y
FS25r	Expedited Data Negotiation	14.7, 15.3.2.7	N
FS26r	Priority	14.5, 15.3.2.5	Y
FS27r	Protection	14.6, 15.3.2.6	N
FS98r	Remote non-X.25 facilities, following Facility Marker	15.1, table 18	N
FS99r	Local non-X.25 facilities, following Facility Marker	15.1, table 18	N

Note 1: This facility may be used per prior agreement between the DTE and the DXE without the use of the Online Registration Facility.

A.4.15 Facilities Sent in Clear Request Packets

Item	Function	ISO/IEC 8208 Reference	Router Support
FS10d	Called Line Address Modified Notification	13.26, 15.2.2.12	Y
FS13	Call Deflection Selection	13.25.2.2, 15.2.2.10	N
FS20d	Facility Marker, ITU-T-specified DTE facilities	15.1	N
FS22d	Called Address Extension	14.2, 15.3.2.2	Y
FS98d	Remote non-X.25 facilities, following Facility Marker	15.1, table 18	N
FS99d	Local non-X.25 facilities, following Facility Marker	15.1, table 18	N

A.4.16 Facilities received in Incoming call Packets (DCE to DTE)

Item	Function	ISO/IEC 8208 Reference	Router Support
FR1pi	Flow Control Parameter Negotiation, packet size (Note 1)	13.12, 15.2.2.1.1	Y
FR1wi	Flow Control Parameter Negotiation, window size (Note 1)	13.12, 15.2.2.1.2	Y
FR2ib	Throughput Class Negotiation (basic) (Note 1)	13.13, 15.2.2.2.1, table 20a	Y
FR2ie	Throughput Class Negotiation (extended)	13.13, 15.2.2.2.2, table 20b	N
FR3b	Closed User Group Selection, basic format	13.14.6, 15.2.2.3.1	N
FR3e	Closed User Group Selection, extended format	13.14.6, 15.2.2.3.2	N
FR4b	Closed User Group With Outgoing Access Selection, basic format	13.4.7, 15.2.2.4.1	N
FR4e	Closed User Group With Outgoing Access Selection, extended format	13.4.7, 15.2.2.4.2	N
FR5	Bilateral Closed User Group Selection	13.15, 15.2.2.5	N
FR6a	Fast Select (Note 1)	13.16, 13.17, 15.2.2.	Y
FR6b	Reverse Charging (Note 1)	13.18, 13.19, 15.2.2.	Y
FR11	Call Redirection or Call Deflection Notification	13.25.3, 15.2.2.11	Y
FR12i	Transit Delay Selection and Indication	13.27, 15.2.2.13	Y
FR20i	Facility Marker, ITU-T-specified DTE facilities	15.1	Y
FR21	Calling Address Extension	14.1, 15.3.2.1	Y
FR22i	Called Address Extension	14.2, 15.3.2.2	Y
FR23b	Minimum Throughput Class Negotiation (basic)	14.3, 15.3.2.3.1, table 20a	Y
FR23e	Minimum Throughput Class Negotiation (extended)	14.3, 15.3.2.3.1, table 20b	N

Item	Function	ISO/IEC 8208 Reference	Router Support
FR24i	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	Y
FR25i	Expedited Data Negotiation	14.7, 15.3.2.7	Y
FR26i	Priority	14.5, 15.3.2.5	Y
FR27i	Protection	14.6, 15.3.2.6	Y
FR99i	Local non-X.25 facilities, following Facility Marker	15.1, table 18	Y

Note 1: This facility may be used per prior agreement between the DTE and the DXE without the use of the Online Registration Facility.

A.4.17 Facilities Received in Incoming call Connect Packets (DCE to DTE)

Item	Function	ISO/IEC 8208 Reference	Router Support
FR1pr	Flow Control Parameter Negotiation, packet size (Note 1)	13.12, 15.2.2.1.1, table 14	Y
FR1wr	Flow Control Parameter Negotiation, window size (Note 1)	13.12, 15.2.2.1.2, table 14	Y
FR2rb	Throughput Class Negotiation (basic) (Note 1)	13.13, 15.2.2.2.1, table 20a	Y
FR2re	Throughput Class Negotiation (extended) (Note 1)	13.13, 15.2.2.2.2, table 20b	N
FR10r	Called Line Address Modified Notification	13.26, 15.2.2.12	Y
FR12r	Transit Delay Selection And Indication	13.27, 15.2.2.13	Y
FR20r	Facility Marker, ITU-T-specified DTE facilities	15.1	Y
FR22r	Called Address Extension	14.2, 15.3.2.2	Y
FR24r	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	Y
FR25r	Expedited Data Negotiation	14.7, 15.3.2.7	Y
FR26r	Priority	14.5, 15.3.2.5	Y
FR27r	Protection	14.6, 15.3.2.6	Y
FR99r	Local non-X.25 facilities, following Facility Marker	15.1, table 18	Y

Note 1: This facility may be used per prior agreement between the DTE and the DXE without the use of the Online Registration Facility.

A.4.18 Facilities Received in Clear Indication Packets

Item	Function	ISO/IEC 8208 Reference	Router Support
FR8ad	Charging Information, monetary unit	13.22, 15.2.2.8.2	Y
FR8bd	Charging Information, segment count	13.22, 15.2.2.8.3	Y
FR8cd	Charging Information, call duration	13.22, 15.2.2.8.4	Y
FR10d	Called Line Address Modified Notification	13.26,	Y

Item	Function	ISO/IEC 8208 Reference	Router Support
		15.2.2.12	
FR99d	Local non-X.25 facilities, following Facility Marker	15.1, table 18	Y
FR20d	Facility Marker, ITUT-specified DTE facilities	15.	Y
FS22d	Called Address Extension	14.2, 15.3.2.2	N

A.4.19 Facilities Received in Clear Confirmation Packets

Item	Function	ISO/IEC 8208 Reference	Router Support
FR8af	Charging Information, monetary unit	13.22, 15.2.2.8.2	Y
FR8bf	Charging Information, segment count	13.22, 15.2.2.8.3	Y
FR8cf	Charging Information, call duration	13.22, 15.2.2.8.4	Y

A.4.20 Values for Flow Control Parameters and Throughput Class, Virtual Call Service

Item	Function	ISO/IEC 8208 Reference	Router Support
V1s	What values are supported for default packet sizes, sending (octets)? (Notes 1 and 5)	16.2.2.5	Shall support a default of one or more of these values: 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
V1r	What values are supported for default packet sizes, receiving (octets)? (Notes 1 and 5)	16.2.2.5	Shall support a default of one or more of these values: 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
V2s	What values are supported for default window sizes, sending? (Note 6)	16.2.2.6	1 -127
V2r	What values are supported for default window sizes, receiving? (Note 6)	16.2.2.6	1 -127
V3s	What values are supported for default throughput classes, sending (bps)? (Notes 2 and 7)	16.2.2.7, tables 20a and 20b	Shall support a default of one or more of these values: 75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 48000, 64000
V3r	What values are supported for default throughput	16.2.2.7, tables	Shall support a

Item	Function	ISO/IEC 8208 Reference	Router Support
	classes, receiving (bps)? (Notes 2 and 7)	20a and 20b	default of one or more of these values: 75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 48000, 64000
V5	Can different default packet sizes be set for sending and receiving? (Notes 1 and 5)	13.9	Y
V7	Can different window sizes be set for sending and receiving? (Note 6)	13.10	Y
V8	Can different default throughput classes be set for sending and receiving? (Notes 2 and 7)	13.11	Y
V9s	What values are supported in flow control parameter negotiation for packet sizes, sending (octets)? (Note 1)	15.2.2.1.1	16, 32, 64, 128, 256, 512, 1024, 2048, 4096
V9r	What values are supported in flow control parameter negotiation for packet sizes, receiving (octets) (Note 1)	15.2.2.1.1	16, 32, 64, 128, 256, 512, 1024, 2048, 4096
V10s	What values are supported in flow control parameter negotiation for window sizes, sending (octets)?	15.2.2.1.2	1-127
V10r	What values are supported in flow control parameter Negotiation for window sizes, receiving (octets)?	15.2.2.1.2	1-127
V11s	What values are supported in flow control parameter negotiation for throughput class, sending (bps)? (Note 2)	15.2.2.2, tables 20a and 20b	75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 48000, 64000
V11r	What values are supported in flow control parameter negotiation for throughput class, receiving (bps)? (Note 2)	15.2.2.2, tables 20a and 20b	75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 48000, 64000
V12	Is the packet size of 128 octets supported for sending and receiving?	15.2.2.1.1	Y
V13	Is the window size of 2 supported for sending and receiving?	15.2.2.1.2	Y

Note 1: V1s, V1r, V9s, V9r. The term "packet size" refers to the maximum length of the User Data Field in a DATA packet.

Note 2: V3s, V3r, V8, V11s, V11r. The default throughput class represents the maximum value from which the throughput may be negotiated down from; the effective throughput may be significantly lower.

Note 5: The Non-standard Default Packet Size will be manually provisionable. A value of 128 is the standard default per ISO/IEC 8208. Support for the Online Facility Registration is not required.

Note 6: The Non-standard Default Window Size will be manually provisionable. A value of 2 is the standard default per ISO/IEC 8208. Support for the Online Facility Registration is not required.

Note 7: the non-standard default throughput will be manually provisionable. The non-support for the Online Registration Facility is not required.

A.4.21 Timers, Retransmission Counts and Logical Channel Ranges

Item	Function	ISO/IEC 8208 Reference	Router Support
	(Note 1)		
T20	Restart Request Response Timer Y Y	18, table 26	Y
T21	Call Request Response Timer Y Y	18, table 26	Y
T22	Reset Request Response Timer	18, table 26	Y
T23	Clear Request Response Timer	18, table 26	Y
T24	Window Status Transmission Timer	18, table 26	Y
T25	Window Rotation Timer	18, table 26	Y
T26	Interrupt Response Timer	18, table 26	Y
T27	Reject Response Timer	18, table 26	Y
T28	Registration Request Response Timer	18, table 26	N
LC8	Maximum number of active SVCs (Switched Virtual Circuits)	3.7	Local choice for DTE /DCE

Note 1: All timers use ISO/IEC 8208 default values.

