



International Civil Aviation Organization

**Fifth Meeting of Aeronautical Telecommunication Network (ATN)
Transition Task Force of APANPIRG**

Phuket, Thailand, 9-13 June 2003

Agenda Item 3: Review of the ATN Router Interface Control Document

Asia/Pacific Regional ATN G/G router ICD for ISO/IEC 8208 Sub-Network

(Presented by the Rapporteur of the ATNTTF Ad Hoc Working Group)

Summary

This working paper includes:

- A briefing to summarize the Asia/Pacific Regional ATN G/G router ICD;
- Comparison of the SARP Edition 2 and Edition 3 to support the revision of the ATN G/G router ICD;
- The latest revision of Asia/Pacific Interface Control Document for Aeronautical Telecommunication Network Ground-Ground Router for ISO/IEC 8208 Sub-Network.

1. Introduction

A draft Asia/Pacific Regional ICD for ATN G/G Router was reviewed at the fourth meeting of the ATN Transition Task Force. The ATNTTF Ad Hoc Working Group made a number of changes to the draft Asia/Pacific Regional ICD for ATN G/G Router at its sixth meeting in Canberra and at its seventh meeting in Fiji. A summary of the changes was included in the Appendix I. These changes have been included in a proposed draft version of the Router ICD in Appendix III

2. Action by the Meeting

The meeting is requested to:

- a) Review and comment on the contents of the attached ICD; and
- b) Accept the ICD that would be useful to the Asia/Pacific region ATN transition.



INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

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**ASIA/PACIFIC REGIONAL ROUTER INTERFACE
CONTROL DOCUMENT
FOR AERONAUTICAL TELECOMMUNICATION NETWORK
GROUND-GROUND ROUTER
FOR THE ISO/IEC 8208 SUB-NETWORK**

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EXECUTIVE SUMMARY

The Aeronautical Telecommunication Network (ATN) is a global inter-network that provides digital communications to satisfy the increasing telecommunications demand of air traffic service communication, aeronautical operational control, aeronautical administrative communication, and aeronautical passenger communication.

The ATN is composed of an ATN network infrastructure and ATN applications that provide the global communication for ground-ground (G/G) and air-ground (A/G) services. The ATN network infrastructure includes the ATN backbone communication link, ATN router, and end system. The ATN applications include among others, context management (CM), controller-pilot data link communication (CPDLC), air traffic service message handling service (ATSMHS).

The Asia/Pacific region is undertaking the implementation of an ATN network to support regional and global ATN services. This Interface Control Document (ICD) specifies the interface requirements for the ATN G/G Routers that form nodes of the Asia/Pacific ATN regional backbone network and/or have inter-State connectivity, to ensure interoperability between States. This ICD applies to an ISO/IEC 8208 connection over point-to-point circuit.

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1.0 Introduction

1.1 Purpose and Scope

This document provides G/G router ICD guidelines for the routers that form nodes of the Asia/Pacific regional network Backbone and/or have inter-State/organization connectivity within the Asia/Pacific region, to assure interoperability. The ICD guideline provisions include:

1. ISO layer 1 to layer 3 interface requirements between G/G routers;
2. G/G router functional requirements associated with ATN Protocol Requirements Lists (APRLs) relevant to support layer 1 to layer 3 interface requirements.

This ICD applies to the ISO/IEC 8208 connections over point-to-point circuit.

1.2 Organization

This ICD addresses the physical, data link, and network layers of the ATN G/G router using the International Organization for Standardization (ISO) Information Processing Systems Open Systems Interconnection (OSI) Basic Reference Model. This document is based on the standards and recommended practices (SARPs) specified in ICAO Doc. 9705 Edition 2. The SARPs paragraph numbers in the APRLs are referred to ICAO Doc. 9705, Edition 3.

This document is organized as follows:

- **Section 1, INTRODUCTION**, summarizes the contents of this document and reference documents.
- **Section 2, PHYSICAL LAYER**, provides the physical interface requirements for a point-to-point circuit.
- **Section 3, DATA LINK LAYER**, provides the data link layer interface requirements using link access procedure balanced (LAPB) to support the interface between G/G routers.
- **Section 4, NETWORK LAYER**, provides the interface requirements to support the network layer including the sub-networks, sub-network dependent convergence functions (SND CF), connectionless network protocol (CLNP) and inter-domain routing protocol (IDRP).

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1.3 ATN Documentation Tree and Reference Documents

1.3.1 ATN Documentation Tree

Figure 1-1 shows the ATN documentation tree for the Asia/Pacific ATN documents. This figure provides a hierarchical representation of the relationship between the various ICAO, ATN documents and Asia/Pac regional ATN ICD. From this documentation tree, the relationship between this ICD and other documents is clearly defined.

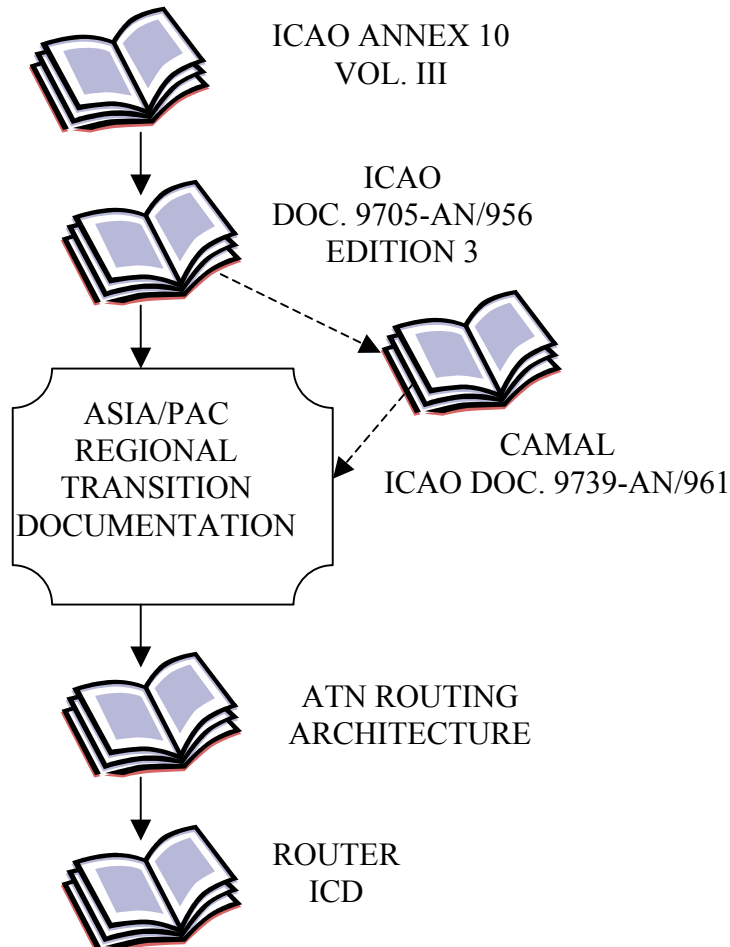


Figure 1-1: ATN Documentation Tree

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1.3.2 Documents

1.3.2.1 Applicable Documents

The following documents, with specific editions and/or versions, contain requirements which, through reference in this text, constitute requirements of this document. The requirements for the Asia/Pacific Regional Router ICD for ATN G/G Router are found in the following documents:

1. ITU-T Rec. X.25, (1984), Interface Between Data Terminal Equipment (DTE) and Data Circuit-terminating equipment (DCE) for Terminals Operating in the Packet Mode and Connected to Public Data Networks by Dedicated Circuit, Section 2, 3 and 4.
2. ISO/IEC 8208: 1995, Information Technology – Data Communications – X.25 Packet Level Protocol for Data Terminal Equipment (Revision of ISO/IEC 8208:1990).
3. ICAO Doc. 9705-AN/956. Manual of Technical Provisions for the Aeronautical Telecommunication Network, Edition 3 – 2001, Volume V.
4. ISO/IEC 10747:1994 Information Technology – Telecommunications and Information Exchange between Systems – Protocol for exchange of inter-domain routing information among intermediate systems to support forwarding of ISO 8473 PDUs.
5. ISO/IEC 8473-1:1994 Information Technology – Protocol for providing the connectionless-mode network service Part 1 – Protocol Specification.
6. ISO/IEC 8473-3:1995 Information Technology – Protocol for providing the connectionless-mode network service Part 3 – Provision of the underlying service by an X.25 sub-network.
7. Asia/Pacific ATN Addressing Plan.
8. Asia/Pacific ATN IDRP Routing Policy.
9. Table CNS-1B of the Asia/Pacific FASID.

1.3.2.2 Supporting Documents

The following documents are supporting documents applicable to the Asia/Pacific Regional Router ICD for ATN G/G Router. These documents do not form a part of this ICD and are not referenced within the document, however, these documents provide supporting background information for better understanding of this ICD.

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1. ICAO Annex 10 - Volumes I and II, Fifth Edition, Incorporating Amendment 70.
2. ISO/IEC TR 9575:1995 Information Technology – Telecommunications and Information Exchange between Systems -- OSI Routing Framework.
3. Asia/Pacific ATN Routing Architecture.

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2.0 Physical Layer (Layer 1)

The physical layer of the G/G router in this document supports the connection of a point-to-point circuit. The physical layer characteristics are based on mutual agreement between States and service providers.

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3.0 Data Link Layer (Layer 2)

The data link layer of ATN G/G router defined in this document uses Link Access Procedure Balanced (LAPB). The following sections provide the requirements for LAPB. LAPB shall comply with ITU X.25, 1984.

3.1 Procedures

3.1.1 Link-level control procedures between the routers shall comply with LAPB procedure.

3.1.2 Link-level control procedures between the routers shall be configured in an Asynchronous Balanced Mode (ABM) defined in ITU X.25, section 2.3 and 2.4.

3.1.3 The router shall be as a logical Data Terminal Equipment (DTE) or Data Communication Equipment (DCE), as specified in ITU X.25 for a point-to-point circuit or under mutual agreements between States/organizations.

3.2 Frame Structure

The unit of transmission is the frame that shall comply with the LAPB frame structure as defined in ITU X.25, section 2.2.

3.3 Link Control Parameter Setup

Table A-1 in Appendix A defines the recommended X.25 data link layer level parameter values, which are highlighted in the following paragraphs.

3.3.1 Time-out functions are necessary to ensure recovery action is taken by a combined station to respond to I-frames, S-frames, and U-frames that require acknowledgment. Timers shall be adjustable in one-second increments within a range of 2 to 120 seconds.

3.3.2 The retransmission attempts parameter shall indicate the maximum number of unsuccessful transmission attempts to complete successful transmission. The value in the range 3 to 7 is recommended for private interfaces for low to medium circuit speed.

3.3.3 The maximum number of sequentially numbered outstanding I frames shall be seven for private terrestrial interfaces.

3.3.4 The DTE and DCE shall use the same value for maximum number of sequentially numbered outstanding I frames in all cases.

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3.3.5 Interfaces operating over satellite circuits shall use modulo 128 numbering for the maximum number of sequentially numbered outstanding I frames, and select a value appropriate for the frame size and signalling speed.

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4.0 Network Layer (Layer 3)

The first sub-layer is the sub-network, which is X.25 PLP layer complying with ISO/IEC 8208. The second sub-layer is SNDCEF complying with ISO/IEC 8473-3. The third sub-layer includes CLNP and IDRP, which respectively comply with ISO/IEC 8473-1 and 10747 with specific requirements defined by ICAO Doc. 9705.

4.1 ISO/IEC 8208 Sub-Network

The router is capable of establishing one or more connections to other ATN routers via a point-to-point circuit. For a point-to-point circuit, the sub-network layer shall use ISO/IEC 8208 to access the services of the data link layer.

4.1.1 Procedures

Packet level procedures between the sub-networks are described herein and in accordance with ISO/IEC 8208, section 4 through section 11.

4.1.2 Packet Structure

The packet structure shall comply with the packet structure described in ISO/IEC 8208 section 12.

4.1.3 Functionality and Specific Setup

The sub-network layer shall support the functions defined in ISO/IEC 8208. The functions and specific setup are highlighted as follows.

4.1.3.1 Each router shall be capable of initiating an ISO/IEC 8208 sub-network connection.

4.1.3.2 The usage of diagnostic codes shall be established by mutual agreement between States/organizations.

4.1.3.3 Table A-2 in Appendix A provides ISO/IEC 8208 recommended interface parameters for point-to-point circuit.

The values of parameter in Appendix A are recommended values only for guidance. However, the actual values used for the circuit shall be defined by mutual agreement between States/organizations.

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4.1.3.4 When connectivity is provided by a point-to-point circuit, the DTE addresses shall be 10 decimal digits and be agreed between States/organizations during the implementation planning.

4.1.3.5 Each router shall be capable of terminating a sub-network connection.

4.1.3.6 The M-bit shall be supported to indicate a message transfer that consists of more than one packet.

4.1.3.7 Q-bit and D-bit shall be both set to 0.

4.1.4 Use of Switched Virtual Circuits

The use of Switched Virtual Circuits (SVCs) is preferred. The use of Permanent Virtual Circuits (PVCs) shall be taken into the consideration of the service availability.

4.1.4.1 CR Packet Transmission at Call

1. In the case that two-way virtual circuit is an SVC, although not essential it is desirable to tune the transmission of CR packets when call are made between two peers for the following reasons:
 - To avoid collisions between transmitted and received calls, avoiding excessive protocol exchanges;
 - To make for more easily comprehensible communications logs.
2. In the case of PVCs, calls are made directly without the transmission of CRV packets.

4.2 Sub-Network Dependent Convergence Functions (SND CF)

Sub-Network Dependent Convergence Functions (SND CF) must be implemented in the router for each type of underlying sub-network. The purpose of a SND CF is to provide the connectionless sub-network service assumed by the ATN Internet Protocol over real sub-network.

When a G/G router interfaces with another G/G router via a point-to-point circuit, the SND CF shall comply with the following requirements:

1. The SND CF shall provide byte- and code-independent service to the CLNP as specified in ICAO Doc. 9705, section 5.7.2;
2. The SND CF that is used with the ISO 8208 sub-network for the G/G router shall comply with the APRs given in Appendix B.

4.3 Connectionless Network Protocol (CLNP)

The G/G router interprets the CLNP protocol data unit (PDU) header and forwards the PDU to another G/G router without flow control or connection setup. The CLNP protocol functions shall be as specified in

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ISO/IEC 8473-1 and section 5.6.2 and 5.6.3 of ICAO Doc. 9705 in accordance with the APRLs in Appendix C.

4.4 Inter-Domain Routing Protocol (IDRP)

The IDRP protocol function shall be specified as in ISO/IEC 10747 in accordance with APRLs in Appendix D.

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APPENDIX A - X.25 RECOMMENDED INTERFACE PARAMETERS FOR POINT-TO-POINT CIRCUIT

A.0 X.25 Minimum Recommended Interface Parameters for a Point-to-Point Circuit

This appendix provides the X.25 minimum recommended interface parameters for point-to-point circuit. Other values may be established by mutual agreement

A.1 Data Link Layer Interface Parameters

Table A-1 provides the data link layer (LAPB) interface parameters.

Table A-1: Data link Layer (LAPB) Interface Parameters

Parameter	G/G Router A	G/G Router B	Comments
Max Outstanding Frames (k)	7	7	127(satellite and high circuit speed)
ACK Receipt Timer (T1)	6	6	Based on 9.6Kb and 256 byte packets.
ACK Send Timer (T2)	500 milliseconds	500 milliseconds	T2 < T1
Idle Channel State Timer (T3)	18-60 seconds	12-60 seconds	T3 > T4
Idle Probe Timer (T4)	3 seconds	3 seconds	
Maximum Number Bits in I-Frame (N1)	2104	2104	N1 > Maximum Packet Size X 8
Frame Retry Counter (N2)	3-7	3-7	
Frame Sequence	Modulo 8 or 128	Modulo 8 or 128	

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A.2 Layer Interface Parameters

Table A-2 provides the packet layer (ISO/IEC 8208) Packet interface parameters.

Table A-2: Packet Layer (ISO 8208) Interface Parameters

Parameter	G/G Router A	G/G Router B	Comments
Reference Standard (Packet/Network layer)	ISO 8208	ISO 8208	
Packet Sequence	Modulo 8	Modulo 8	128 for Satellite and high circuit speed
Packet Negotiation	No	No	
Packet Data Size	256	256	
Allowed Packet Data Size during Negotiation	None	None	
Allowed Packet Data Size (agreed in advance)	64, 128, 256	64, 128, 256	
Window Size Negotiation	No	No	
Window Size, W (Receive/Send)	7/7	7/7	1 to 7 1 to 127 (satellite and high circuit speed)
Total LCNs	5	5	
LCN Order			DCE-ascending DTE-descending Note 1
LCN Base	1	1	
Total PVCs	3	3	
Total two way Virtual Circuits			Note 1
Total Outgoing Virtual Circuits			Note 1
Total Incoming Virtual Circuits			Note 1

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Parameter	G/G Router A	G/G Router B	Comments
Total SVCs	2	2	
Delivery Confirmation Bit (D-bit)	Not supported	Not supported	
More Bit (M-bit)	Yes	Yes	
DTE Restart Request Timer (T20)	180 seconds	180 seconds	
DTE Call Request Timer (T21)	200 seconds	200 seconds	
DTE Reset Confirmation Timer (T22)	180 seconds	180 seconds	
DTE Clear Confirmation Timer (T23)	180 seconds	180 seconds	
DTE Window Transmission Timer (T24)	60 seconds	60 seconds	
DTE Packet Acknowledgement Timer (T25)	200 seconds	200 seconds	
DTE Interrupt Timer (T26)	180 seconds	180 seconds	
DTE Reject Timer (T27)	180 seconds	180 seconds	
Restart Request Retransmission Counter (R20)	2	2	
Restart Request Retransmission Count (R22)	2	2	
Clear Request Retransmission Count (R23)	2	2	
Data Packet Retransmission Count (R25)	2	2	
Reject Retransmission Count (R27)	2	2	
Restart Request Timer (T10)			DCE-60 seconds Note 1
Call Request Timer (T11)			DCE-180 seconds Note 1
Reset Confirmation Timer (T12)			DCE-60 seconds Note 1
Clear Confirmation Timer (T13)			DCE-60 seconds Note 1
Window Transmission Timer (T14)			DCE-60 seconds Note 1
Packet Acknowledgement Timer (T15)			DCE-60 seconds

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Parameter	G/G Router A	G/G Router B	Comments
			Note 1

Note 1: Selection of the values to be established by mutual agreements.

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APPENDIX B- SNDCF (ISO/IEC 8473-3) APRLs

B.0 SNDCF (ISO/IEC 8473-3) APRLs

An implementation of the SNDCF for ISO/IEC 8208 sub-networks shall be used in ATN G/G router and the SNDCF implementation shall be in compliance with the ATN Protocol Requirements Lists (APRLs) given in this appendix.

The APRLs 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

B.1 SNDCF for use with ISO 8208 Sub-networks - Function

Table B-1 provides the functions of SNDCF for use with ISO 8208 sub-network.

Table B-1: SNDCF for use with ISO 8208 Sub-networks - Function

Item	Function	ISO/IEC 8473-3 Reference	Status	ATN Support	G/G Router Support
XSNUD	Is Sub-network 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 Is a new call setup:	5.3.1			
XCalla	a. when no suitable call exists ?	5.3.1 a.	O.3	O.3	Y

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

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B.2 SNDCF for use with ISO 8208 Sub-networks - X.25 Call User Data

Table B-2 provides the X.25 call user data requirements of SNDCF for use with ISO 8208 sub-network.

Table B-2: SNDCF for use with ISO 8208 Sub-networks - X.25 call user data

Item	Parameter	ISO/IEC 8473-3 Reference	Status	ATN Support	G/G 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

B.3 SNDCF for use with ISO 8208 Sub-networks - ISO 8208 SNDCF Timers

Table B-3 provides the timers of SNDCF for use with ISO 8208 sub-network.

Table B-3: SNDCF for use with ISO 8208 Sub-networks - ISO 8208 SNDCF Timers

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

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B.4 SNDCF for use with ISO 8208 Sub-networks - Multi Layer Dependencies

Table B-4 provides multi layer dependency requirements of SNDCF for use with ISO 8208 sub-network.

Table B-4: SNDCF for use with ISO 8208 Sub-networks - Multi layer dependencies

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

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APPENDIX C- CLNP APRLs

C.0 CLNP APRLs

This appendix provides CLNP APRLs for ATN G/G router. The APRLs define the capabilities and options of the protocol that, at minimum, are required to be implemented for the ATN G/G router for ICAO Asia/Pacific regional ATN.

The APRLs in this appendix use the conventions and symbols defined in the beginning of appendix B.

C.1 Support of ATN-Specific Network Layer Features

Table C-1 provides the requirements for CLNP network layer features.

Table C-1: Support of ATN-specific network layer features

Index	Item	ATN SARPs Reference	ATN Support	G/G Router Support
ATN CLNP1	Encoding and use of the Security Parameter	5.6.2.2	M	Y
ATN CLNP2	Management of Network Priority	5.6.2.3, 5.2.8.4	M	Y
ATN CLNP4	Echo Request Function	5.6.3.3	O	Y
ATN CLNP5	Congestion Management	5.6.2.4	M	N, O
ATN CLNP6	Echo Response Function	5.6.3.4.1	M	Y
ATN CLNP7	Echo Response parameter setting	5.6.3.4.2, 5.6.3.4.3 5.6.3.4.4	M	Y

C.2 Major Capabilities

Table C-2 provides the CLNP major capabilities.

Table C-2: Major Capabilities

Item	Capability	ISO/IEC 8473 Reference	Status	ATN Support	G/G Router Support
ES	End System		O.1	O.1	N
IS	Intermediate System		O.1	O.1	Y
FL-r	<r> Full protocol	8473-1: 6	M	M	Y
FL-s	<s> Full protocol	8473-1: 6	M	M	Y
NSS-r	<r> Non-segmenting subset	8473-1: 5.2	M	M	Y

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Item	Capability	ISO/IEC 8473 Reference	Status	ATN Support	G/G Router Support
NSS-s	<s> Non segmenting subset	8473-1: 5.2	IS:M ^IS:O	IS:M ^IS:O	Y
IAS-r	<r> Inactive subset	8473-1: 5.2	ES:O	ES:O	N
IAS-s	<s> Inactive subset	8473-1: 5.2	IAS-r:M ^IAS-r:X	IAS-r:M ^IAS-r:X	N
S802	SNDCF for ISO 8802	8473-2: 5.4	O.2	O	Y
SCLL	SNDCF for CL Link Service	8473-4: 5.3.1	O.2	O	N
SCOL	SNDCF for CO Link Service	8473-4: 5.3.2	O.2	O	N
SX25	SNDCF for ISO 8208	8473-3: 5.4	O.2	O	Y
ATN SNDCF	SNDCF for Mobile Sub-networks	ATN SARPs Ref: Chapter 5.7	N/A	ISMOB:M ISGRD:O ^IS:O	N/A

ISMOB: If ISO/IEC 8473 is used over Mobile Sub-networks, then ISMOB is true, else ISMOB is false.

ISGRD: If ISO/IEC 8473 is used over Ground Sub-networks, then ISGRD is true, else ISGRD is false.

O.1: The supported functions, NPDUs, associated parameters and timers required for Intermediate Systems are provided in the APRLs. C.3 through C.10.

O.2: APRLs for the SNDCF for use with ISO/IEC 8208 sub-networks are provided in B.1 through B.4.

C.3 Ground-Ground Router - Supported Functions

Table C-3 specifies the ATN G/G router supported functions.

Table C-3: G/G Router - Supported Functions

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iPDUC	PDU Composition	6.1	M	M	Y
iPDUD	PDU Decomposition	6.2	M	M	Y

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Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iHFA	Header Format Analysis	6.3	M	M	Y
iPDUL	<s> PDU Lifetime Control	6.4	M	M	Y
iRout	Route PDU	6.5	M	M	Y
iForw	Forward PDU	6.6	M	M	Y
iSegm	Segment PDU	6.7	iDSNS:M	iDSNS:M	N
iReas	Reassemble PDU	6.8	O	O	N
iDisc	Discard PDU	6.9	M	M	Y
iErep	Error Reporting	6.10	M	M	Y
iEdec	<s> Header Error Detection	6.11	M	M	Y
iSecu	<s> Security	6.13 ATN SARPs Ref: 5.6.2.2	O	M	Y
iCRR	<s> Complete Route Recording	6.15	O	OX	N
iPRR	<s> Partial Route Recording	6.15	O	M	Y
iCSR	Complete Source Routing	6.14	O	OX	N
iPSR	Partial Source Routing	6.14	O	OX	N
iPri	<s> Priority	6.17, ATN SARPs Ref: 5.6.3.5	O	M	Y
iQOSM	<s> QOS Maintenance	6.16	O	M	Y
iCong	<s> Congestion Notification	6.18, ATN SARPs Ref: 5.6.2.4	O	M	Y
iPadd	<s> Padding	6.12	M	M	N, O
iEreq	Echo request	6.19, ATN SARPs Ref: 5.6.3.3	O	O	Y
iErsp	Echo response	6.20	O	M	Y

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Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iSegS	Create segments smaller than necessary	6.8	O	O	N
iDSNS	Simultaneous support of sub-networks with different SN-User data sizes	6.7	O	O	N

C.4 Supported Security Parameters

Table C-4 specifies the ATN G/G router supported security parameters.

Table C-4: G/G Router Supported Security Parameters

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iSADSSEC	Source Address Specific Security	7.5.3.1	iSecu:O.5	iSecu:O	N
iDADSSEC	Destination Address Specific Security	7.5.3.2	iSecu:O.5	iSecu:O	N
iGUNSEC	Globally Unique Security	ATN SARPs Ref. 5.6.2.2	iSecu:O.5	iSecu:M	Y

O.5: The Security parameter within a single NPDU specifies a security format code indicating Source Address Specific, Destination Address Specific or Globally Unique Security.

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C.5 Quality of Service Maintenance Function

Table C-5 specifies the ATN G/G router quality of service maintenance function.

Table C-5: Quality of Service Maintenance Function

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
IQOSNAVAIL	If requested QOS not available, deliver at different QOS	6.16	iQOSM:M	iQOSM:M	Y
IQOSNOT	Notification of failure to meet requested QOS	6.16	iQOSM:O	iQOSM:O	N
	Which of the following formats of QOS are implemented ?				
ISADDQoS	Source Address Specific QoS	7.5.6.1	iQoS:M:O.3	iQOSM:O	N
IDADDQoS	Destination Address Specific QoS	7.5.6.2	iQoS:M:O.3	iQOSM:O	N
IGUNQoS	Globally Unique QoS	7.5.6.3	iQoS:M:O.3	iQOSM:M	Y
iSvTD	Sequencing versus Transit Delay	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N
iCongE	Congestion Experienced	7.5.6.3	iGUNQoS:O.4	iGUNQoS:M	N, O
iTDvCst	Transit Delay versus Cost	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N
iREPVTD	Residual Error Probability versus Transit Delay	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N

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Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iREpVcst	Residual Error Probability versus Cost	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N

O.3: The Quality of Service Maintenance parameter within a single NPDU specifies a QoS format code indicating Source Address Specific, Destination Address Specific or Globally Unique QoS.

O.4: If the QoS format code indicates that the Globally Unique QoS maintenance function is employed, then each bit in the associated parameter value may be set to indicate the order of intra and inter domain routing decisions based on QoS. The parameter values which apply to inter-domain routing are provided in Table 4 of ISO/IEC 10747.

C.6 Boundary Intermediate Systems - Supported NPDUs

Table C-6 specifies the ATN G/G router supported NPDUs.

Table C-6: G/G Router - Supported NPDUs

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iDT-t	DT (full protocol) transmit	7.7	M	M	Y
iDT-r	DT (full protocol) receive	7.7	M	M	Y
iDTNS-t	DT (non-segment) transmit	7.7	M	M	Y
iDTNS-r	DT (non-segment) receive	7.7	M	M	Y
IER-t	ER transmit	7.9	M	M	Y
IER-r	ER receive	7.9	M	M	Y
iERQ-t	ERQ transmit	7.10	iEreq:M	iEreq:M	Y
iERQ-r	ERQ receive	7.10	M	M	Y
iERP-t	ERP transmit	7.11	iErsP:M	iErsP:M	Y
iERP-r	ERP receive	7.11	M	M	Y

C.7 Ground-Ground Router - Supported Data PDU (DT PDU) Parameters

Table C-7 describes the ATN G/G router supported DT PDU parameters.

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Table C-7: G/G Router - Supported DT PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
idFxFt-s	<s> Fixed Part	7.2	M	M	Y
idFxFt-r	<r> Fixed Part	7.2	M	M	Y
idAddr-s	<s> Addresses	7.3	M	M	Y
idAddr-r	<r> Addresses	7.3	M	M	Y
idSeg-s	<s> Segmentation Part	7.4	M	M	Y
idSeg-r	<r> Segmentation Part	7.4	M	M	Y
idPadd-s	<s> Padding	7.5.2	M	M	Y
idPadd-r	<r> Padding	7.5.2	M	M	Y
idSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	Y
idSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
idCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	-	N
idCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
idPRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
idPRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
idCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
idCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
idPSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
idPSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
idQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
idQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or iCong:M	Y
idPri-s	<s> Priority	7.5.7	M	M	Y
idPri-r	<r> Priority	7.5.7	iPri:M	iPri:M	Y

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Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
idData-s	<s> Data	7.6	M	M	Y
idData-r	<r> Data	7.6	M	M	Y
idUnSup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded and where appropriate an Error Report PDU generated ?	6.19	M	M	Y
idUnSup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.19	M	M	Y

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C.8 Ground-Ground Router - Supported Error Report PDU (ER PDU) Parameters

Table C-8 specifies the ATN G/G router supported ER PDU parameters.

Table C-8: G/G Router - Supported ER PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
ieFxFt-s	<s> Fixed Part	7.2	M	M	Y
ieFxFt-r	<r> Fixed Part	7.2	M	M	Y
ieAddr-s	<s> Address	7.3	M	M	Y
ieAddr-r	<r> Address	7.3	M	M	Y
iePadd-s	<s> Padding	7.5.2	M	M	Y
iePadd-r	<r> Padding	7.5.2	M	M	Y
ieSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	Y
ieSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
ieCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	iCRR:M	N
ieCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
iePRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
iePRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
ieCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
ieCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
iePSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
iePSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
ieQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
ieQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or iCong:M	Y

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Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iePri-s	<s> Priority	7.5.7	M	M	Y
iePri-r	<r> Priority	7.5.7	iPri:M	iPri:M	Y
ieDisc-s	<s> Reason for Discard	7.9.5	M	M	Y
ieDisc-r	<r> Reason for Discard	7.9.5	M	M	Y
ieData-s	<s> Data	7.6	M	M	Y
ieData-r	<r> Data	7.6	M	M	Y
ieUnsup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded ?	6.21	M	M	Y
ieUnsup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.21	M	M	Y

C.9 Ground-Ground Router - Supported Echo Request PDU (ERQ PDU) Parameters

Table C-9 specifies the ATN G/G router supported ERQ PDU parameters.

Table C-9: G/G Router - Supported ERQ PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iqFxFt-s	<s> Fixed Part	7.2	M	M	Y
iqFxFt-r	<r> Fixed Part	7.2	M	M	Y
iqAddr-s	<s> Addresses	7.3	M	M	Y
iqAddr-r	<r> Addresses	7.3	M	M	Y
iqSeg-s	<s> Segmentation Part	7.4	M	M	Y
iqSeg-r	<r> Segmentation Part	7.4	M	M	Y
iqPadd-s	<s> Padding	7.5.2	M	M	Y
iqPadd-r	<r> Padding	7.5.2	M	M	N, O
iqSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	N, O

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Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iqSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
iqCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	M	N
iqCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
iqPRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
iqPRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
iqCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
iqCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
iqPSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
iqPSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
iqQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
iqQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or ICong:M	Y
iqPri-s	<s> Priority	7.5.7	M	M	Y
iqPri-r	<r> Priority	7.5.7	iPri:M	iPri:M	Y
iqData-s	<s> Data	7.6	M	M	Y
iqData-r	<r> Data	7.6	M	M	Y
iqUnSup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded and where appropriate an Error Report PDU generated ?	6.19	M	M	Y
iqUnSup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.19	M	M	Y

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C.10 Ground-Ground Router - Supported Echo Reply PDU (ERP PDU) Parameters

Table C-10 specifies the ATN G/G router supported ERP PDU parameters.

Table C-10: G/G Router - Supported ERP PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
ipFxFt-s	<s> Fixed Part	7.2	M	M	Y
ipFxFt-r	<r> Fixed Part	7.2	M	M	Y
ipAddr-s	<s> Addresses	7.3	M	M	Y
ipAddr-r	<r> Addresses	7.3	M	M	Y
ipSeg-s	<s> Segmentation Part	7.4	M	M	Y
ipSeg-r	<r> Segmentation Part	7.4	M	M	Y
ipPadd-s	<s> Padding	7.5.2	M	M	N,O
ipPadd-r	<r> Padding	7.5.2	M	M	N,O
ipSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	Y
ipSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
ipCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	M	N
ipCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
ipPRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
ipPRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
ipCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
ipCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
ipPSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
ipPSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
ipQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
ipQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or iCong:M	Y
ipPri-s	<s> Priority	7.5.7	M	M	Y
ipPri-r	<r> Priority	7.5.7	iPri:M	iPri:M	Y
ipData-s	<s> Data	7.6	M	M	Y
ipData-r	<r> Data	7.6	M	M	Y

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Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
ipUnsup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded and where appropriate an Error Report PDU generated ?	6.19	M	M	Y
ipUnsup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.19	M	M	Y

C.11 Ground-Ground Router - Timer and Parameter Values

Table C-11 specifies the ATN G/G router Timer and parameter values.

Table C-11: G/G Router - Timer and Parameter Values

Item	Timer	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iReasTim	Reassembly Timer	6.8	iReas:M	M	Y

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APPENDIX D - IDRP APRLS

D.0 IDRP APRLs

This appendix provides IDRP APRLs for ATN G/G routers. The APRLs define the capabilities and options that, at a minimum, are required to be implemented for the ATN G/G router under an Asia/Pacific ATN environment.

The APRLs provided in this appendix use the conventions and symbols defined in the beginning of Appendix B.

D.1 ATN Specific Protocol Requirements

Table D-1 describes the ATN specific protocol requirements.

Table D-1: ATN specific protocol requirements

Index	Item	ATN SARPs Ref	G/G Router	G/GRouter Support
ATNIDRP1	Encoding and use of the Security Path Attribute	5.8.3.2.2, 5.8.3.2.3	M	Y
ATNIDRP2	Does this G/G ROUTER immediately re-advertise routes if the security information contained in the routes's path attribute change?	5.8.3.2.7	M	Y
ATNIDRP3	Support of 'policy based route aggregation'	5.8.3.2.6.2	O	N
ATNIDRP4	Support of 'policy based route information reduction'	5.8.3.2.6.5	O	N
ATNIDRP5	Support of aggregation of routes with identical NLRI using 'true route aggregation'	5.8.3.2.6.3	O.1	N
ATNIDRP6	Support of aggregation of routes with identical NLRI using 'route merging'	5.8.3.2.6.3	O.1	N
ATNIDRP7	Support of aggregation of security path attribute information field	5.8.3.2.6.4	M	N

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D.2 IDRP General

Table D-2 describes the IDRP general requirements.

Table D-2: IDRP General Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
BASIC	Are all basic G/G ROUTER functions implemented?	12.1	M	M	Y
MGT	Is this system capable of being managed by the specified management information?	11	M	O	N
VER	Does this G/G ROUTER support Version Negotiation?	7.8	M	M	Y
RTSEP	Does this G/G ROUTER support the ROUTE_SEPARATOR attribute?	7.12.1	M	M	Y
HOPS	Does this G/G ROUTER support the RD_HOP_COUNT attribute?	7.12.13	M	M	Y
PATH	Does this G/G ROUTER support the RD_PATH attribute?	7.12.3	M	M	Y
CAPY	Does this G/G ROUTER support the Capacity Attribute?	7.12.15	M	M	Y
FSM	Does this G/G ROUTER manage ROUTER-ROUTER connections according to the G/G ROUTER FSM description?	7.6.1	M	M	Y
FCTL	Does this G/G ROUTER provide flow control?	7.7.5	M	M	Y
SEQNO	Does this G/G ROUTER provide sequence number support?	7.7.4	M	M	Y
INTG1	Does this G/G ROUTER provide Data Integrity using authentication type 1?	7.7.1	O.1	M	Y

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Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
INTG2	Does this G/G ROUTER provide Data Integrity using authentication type 2?	7.7.2	O.1	O	N
INTG3	Does this G/G ROUTER provide Data Integrity using authentication type 3?	7.7.3	O.1	O	N
ERROR	Does this G/G ROUTER handle error handling for IDRP?	7.20	M	M	Y
RIBCHK	Does this G/G ROUTER operate in a "fail-stop" manner with respect to corrupted routing information?	7.10.2	M	M	Y

D.3 IDRP Update Send Process

Table D-3 describes the IDRP update send process requirements.

Table D-3: IDRP Update Send Process Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G ROUTER Support
INT	Does the G/G ROUTER provide the internal update procedures?	7.17.1	M	M	Y
RTSEL	Does this G/G ROUTER support the MinRouteAdvertisementInterval Timer?	7.17.3.1	M	M	Y
RTORG	Does this G/G ROUTER support the MinRDOriinationInterval Timer?	7.17.3.2	M	M	Y
JITTER	Does this G/G ROUTER provide jitter on its timers?	7.17.3.3	M	M	Y

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D.4 IDRP Update Receive Process

Table D-4 describes the IDRP update receive process requirements.

Table D-4: IDRP Update Receive Process Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
INPDU	Does the G/G ROUTER handle inbound PDUs correctly?	7.14	M	M	Y
INCONS	Does this G/G ROUTER detect inconsistent routing information?	7.15.1	M	M	Y

D.5 IDRP Decision Process

Table D-5 describes the IDRP decision process requirements.

Table D-5: IDRP Decision Process Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
TIES	Does this G/G ROUTER break ties between candidate routes correctly?	7.16.2.1	M	M	Y
RIBUPD	Does this G/G ROUTER update the Loc-RIBs correctly?	7.16.2	M	M	Y
AGGRT	Does this G/G ROUTER support route aggregations?	7.18.2.1, 7.18.2.2, 7.18.2.3	O	ATNIDRP3^ATNIDRP5: M	N
LOCK	Does this G/G ROUTER provide interlocks between its Decision Process and the updating of the information in its Adj-RIBs-In?	7.16.4	M	M	Y

D.6 IDRP Receive

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Table D-6 describes the IDRP receive requirements.

Table D-6: IDRP Receive Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
RCV	Does the G/G ROUTER process incoming PDUs and respond correctly to error conditions?	7.14, 7.20	M	M	Y
OSIZE	Does this G/G ROUTER accept incoming OPEN PDUs whose size in octets is between MinPDULength and 3000?	6.2, 7.20	M	M	Y
MXPDU	Does the G/G ROUTER accept incoming UPDATE, IDRP ERROR and RIB REFRESH PDUs whose size in octets is between minPDULength and maxPDULength?	6.2, 7.20	M	M	Y

D.7 IDRP CLNS Forwarding

Table D-7 describes the IDRP connectionless network service (CLNS) forwarding requirements.

Table D-7: IDRP CLNS Forwarding

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
PSRCRT	Does the G/G ROUTER correctly handle ISO/IEC 8473 NPDUs that contain a partial source route?	8	M	O	N
DATTS	Does the G/G ROUTER correctly extract the NPDU-derived Distinguishing Attributes from an ISO/IEC 8473 NPDU?	8.2	M	M	Y
MATCH	Does the G/G ROUTER correctly match the NPDU-derived Distinguishing Attributes with the corresponding FIB-Atts?	8.3	M	M	Y

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Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
EXTF	Does the G/G ROUTER correctly forward NPDUs with destinations outside its own routing domain?	8.4	M	M	Y
INTF	Does the G/G ROUTER correctly forward NPDUs with destinations inside its own routing domain?	8.1	M	M	Y

D.8 IDRP Optional Transitive Attributes

Table D-8 describes the requirements for IDRP optional transitive attributes.

Table D-8: IDRP Optional Transitive Attributes Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
MEXIT	Does this G/G ROUTER support use of the MULTI-EXIT DISC attribute?	7.12.7	O	O	N, O

D.9 Generating Well-Known Discretionary Attributes

Table D-9 describes the G/G router requirements for generating well-known discretionary attributes.

Table D-9: Generating Well-Known Discretionary Attributes Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
EXTG	Does the G/G ROUTER support generation of the EXT_INFO attribute?	7.12.2	O	O	N
NHRS	Does the G/G ROUTER support generation of the NEXT_HOP attribute in support of route servers?	7.12.4	O	O	N
NHSN	Does the G/G ROUTER support generation of the NEXT_HOP attribute to advertise SNPs?	7.12.4	O	O	N

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Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
DLI	Does the G/G ROUTER support generation of the DIST_LIST_INCL attribute?	7.12.5	O	O	N
DLE	Does the G/G ROUTER support generation of the DIST_LIST_EXCL attribute?	7.12.6	O	O	N
TDLY	Does the G/G ROUTER support generation of the TRANSIT DELAY attribute?	7.12.8	O	O	N
RERR	Does the G/G ROUTER support generation of the RESIDUAL ERROR attribute?	7.12.9	O	O	N
EXP	Does the G/G ROUTER support generation of the EXPENSE attribute?	7.12.10	O	O	N
LQOSG	Does the G/G ROUTER support generation of the LOCALLY DEFINED QOS attribute?	7.12.11	O	OX	N
HREC	Does the G/G ROUTER support generation of the HIERARCHICAL RECORDING attribute?	7.12.12	O	OX	N
SECG	Does the G/G ROUTER support generation of the SECURITY attribute?	7.12.14	O	M	Y
PRTY	Does the G/G ROUTER support generation of the PRIORITY attribute?	7.12.16	O	O	N

D.10 Peer Entity Authentication

Table D-10 describes peer entity authentication requirements.

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Table D-10: Peer Entity Authentication Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
AUTH	Does this G/G ROUTER correctly authenticate the source of a PDU?	7.7.2	O	M	Y

Note. Only support for an Authentication Code 1 is required

D.11 Propagating Well-Known Discretionary Attributes

Table D-11 describes requirements for propagating well-known discretionary attributes.

Table D-11: Propagating Well-Known Discretionary Attributes

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
EXTGP	Does the G/G ROUTER support propagation of the EXT_INFO attribute?	7.12.2	M	M	Y
NHRSP	Does the G/G ROUTER support propagation of the NEXT_HOP attribute in support of route servers?	7.12.4	O	O	N
NHSNP	Does the G/G ROUTER support propagation of the NEXT_HOP attribute to advertise SNPAs?	7.12.4	O	O	N
DLIP	Does the G/G ROUTER support propagation of the DIST_LIST_INCL attribute?	7.12.5	O	M	Y
DLEP	Does the G/G ROUTER support propagation of the DIST_LIST_EXCL attribute?	7.12.6	O	M	Y
TDLYP	Does the G/G ROUTER support propagation of the TRANSIT DELAY attribute?	7.12.8	O	O	N

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Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
RERRP	Does the G/G ROUTER support propagation of the RESIDUAL ERROR attribute?	7.12.9	O	O	N
EXPP	Does the G/G ROUTER support propagation of the EXPENSE attribute?	7.12.10	O	O	N
LQOSP	Does the G/G ROUTER support propagation of the LOCALLY DEFINED QOS attribute?	7.12.11	O	OX	N
HRECP	Does the G/G ROUTER support propagation of the HIERARCHICAL RECORDING attribute?	7.12.12	O	OX	N
SECP	Does the G/G ROUTER support propagation of the SECURITY attribute?	7.12.14	O	M	Y
PRTYP	Does the G/G ROUTER support propagation of the PRIORITY attribute?	7.12.16	O	O	N

D.12 Receiving Well-Known Discretionary Attributes

Table D-12 describes the requirements for receiving well-known discretionary attributes.

Table D-12: Receiving Well-Known Discretionary Attributes

Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
EXTR	Does the G/G ROUTER recognise upon receipt the EXT_INFO attribute?	7.12.2	M	M	Y
NHRSR	Does the G/G ROUTER recognise upon receipt the NEXT_HOP attribute ?	7.12.4	M	M	Y

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Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G Router	G/G Router Support
DLIR	Does the G/G ROUTER recognise upon receipt the DIST_LIST_INCL attribute?	7.12.5	M	M	N
DLER	Does the G/G ROUTER recognise upon receipt the DIST_LIST_EXCL attribute?	7.12.6	M	M	N
TDLYR	Does the G/G ROUTER recognise upon receipt the TRANSIT DELAY attribute?	7.12.8	M	M	Y
RERRR	Does the G/G ROUTER recognise upon receipt the RESIDUAL ERROR attribute?	7.12.9	M	M	Y
EXPR	Does the G/G ROUTER recognise upon receipt the EXPENSE attribute?	7.12.10	M	M	Y
LQOSR	Does the G/G ROUTER recognise upon receipt the LOCALLY DEFINED QOS attribute?	7.12.11	M	O	N
HRECR	Does the G/G ROUTER recognise upon receipt the HIERARCHICAL RECORDING attribute?	7.12.12	M	M	Y
SECR	Does the G/G ROUTER recognise upon receipt the SECURITY attribute?	7.12.14	M	M	Y
PRTYR	Does the G/G ROUTER recognise upon receipt the PRIORITY attribute?	7.12.16	M	M	Y

D.13 IDRP Timers

Table D-13 describes the IDRP timer requirements.

Table D-13: IDRP Timers Requirements
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Item	Description	ISO/IEC 10747 Ref.	ISO Status	G/G router	G/G Router Support
Ta	KeepAlive time	7.6.5	M	M	Y
Tr	Retransmission (tr) timer	7.6.5	M	M	Y
Tmr	maxRIBIntegrityCheck timer	7.10.2	M	M	Y
Tma	MinRouteAdvertisement timer	7.17.3.1	M	M	Y
Trd	MinRDOriationInterval timer	7.17.3.2	M	M	Y
Tcw	closeWaitDelay timer	7.6.4	M	M	Y

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APPENDIX E - ACRONYMS

E.0 Acronyms

This appendix defines the acronyms used in this document.

A/G	AIR-GROUND
AAC	Aeronautical Administrative Control
ABM	Asynchronous Balanced Mode
AIDC	ATS Interfacility Data Communications
AMHS	ATS Message Handling System
AOC	Aeronautical Operational Control
APC	Aeronautical Passenger Communication
APRLs	ATN Protocol Requirement Lists
ATN	Aeronautical Telecommunications Network
ATS	Air Traffic Service
ATSC	Air Traffic Service Control
CLNP	Connectionless Network Protocol
CLNS	Connection-Less Network Service
CPDLC	Controller Pilot Data Link Communications
DCE	Data Circuit-terminating Equipment
DM	Disconnected Mode
DTE	Data Terminal Equipment
E/R	Error Report
EIA	Electrical Industry Association
ERD	End Routing Domain
ES	End System
FIB	Forwarding Information Base
FSM	Finite State Machine
G-G(G/G)	Ground-Ground
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IDRP	Inter Domain Routing Protocol

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IEC	International Electrotechnical Commission
ISO	International Standardization Organization
ITU	International Telecommunications Union
ITU-T	ITU Telecommunications Sector
LAPB	Link Access Procedure Balanced
NET	Network Entity Title
NPDU	Network Protocol Data Unit
NSAP	Network Service Access Point
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
PIB	Policy Information Base
PICS	Protocol Implementation Compliance Statement
PSDN	Public Switched Data Network
PSN	Packet Switched Network
PVC	Permanent Virtual Circuit
QOS	Quality of Service
RD	Routing Domain
RDC	Routing Domain Confederation
RIB	Routing Information Base
SARPs	Standards and Recommended Practices
SNDCF	Sub Network Dependent Convergence Functions
SNPA	Sub Network Point of Attachment
SVC	Switched Virtual Circuit
TBD	to be Determined
TBR	to be Reviewed

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