AERONAUTICAL TELECOMMUNICATION NETWORK PANEL

Working Group 2

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Proposed Revisions to Chapter 7

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SUMMARY

A number of technical problems were identified by the ATN SARPs editorial committee in chapter 7. This working paper is the result of an action accepted at the editorial meeting to propose detailed revisions to correct the identified problems..

DOCUMENT CONTROL LOG

SECTION	DATE	REV. NO.	REASON FOR CHANGE OR REFERENCE TO CHANGE
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1. Introduction

The following problems and issues were identified during the editorial committee meeting:

1. There are serious technical problems in 5.7.5.2 (On subnetwork QoS). The specified way in which subnetwork QoS is used is wrong and needs to be re-specified.

2. Non-use of Fast Select procedures need to be clarified and the Call Request procedures for the Mobile SNDCF generally tidied up. We found it almost impossible to understand when reading through.

3. The procedures that are common to all ISO 8208 SNDCFs and those which are specific to the fixed and mobile SNDCFs need to be clearly identified.

4. The CIDIN SNDCF has been inserted in the wrong place and separates the ACA from the rest of the Mobile SNDCF.

5. A proposal to move the SNDCF APRLs from chapter 6 to chapter 7 appears to be in order, as the SNDCFs are specified in chapter 7, not chapter 6.

2. Proposed Resolution

The attachment to this working paper provides the proposed revised text for chapter 7. The following changes have been applied:

1. The SN-Service interface is now presented as notes in line with the other chapters.

2. ISO 8802 and CIDIN SNDCFs are presented before the Mobile SNDCF. This avoids the separation of the ACA from the other parts of the Mobile SNDCF and makes these other SNDCFs more visible.

3. The text of ISO 8208 QoS is deleted. It was not relevant and contained technical errors.

4. Call Setup procedures for the Mobile SNDCF have been fully revised in order to make them clearer and to bring in non-use of Fast Select.

5. APRLs for 8802-2 and 8208 have been moved from chapter 6 into this chapter. If this change is accepted then they must be deleted from chapter 6.

3. Recommendation

It is recommended that WG2 conducts a line by line review of the attachment prior to considering it as replacement text for Chapter 7 of the draft ATN Internet SARPs.

5.7. SPECIFICATION OF SUBNETWORK DEPENDANT CONVERGENCE FUNCTIONS

5.7.1 IntroductionScope and Applicability

Note 1.— The purpose of a Subnetwork Dependent Convergence Function (SNDCF) is to provide the connectionless SN-Service assumed by the ATN Internet Protocols over real subnetworks.

Note 21.— The Subnetwork Service (SN-Service) provided by an SNDCF and as specified in this Chapter is provided to the ISO/IEC 8473 Internetwork Protocol and the ISO/IEC 9542 End System to Intermediate System Protocol entities.

Note 2.— The purpose of a Subnetwork Dependent Convergence Function (SNDCF) is to provide the connectionless SN-Service assumed by the ATN Internet Protocols over real subnetworks.

Note 3.— The ATN Internetwork Layer, including CLNP and the routing protocols that support it, assume this common connectionless service to be provided by all subnetworks providing communications between ATN systems.

Note 4.— For the purposes of describing the notional interfaces between different OSI protocol layers, each protocol layer is assumed to provide a service to the next higher layer. The assumed service provided by the subnetworks is described in ISO/IEC 8473 clause 5.5 and 8.

Note 4.— Figure 5.5.7-1 illustrates the relationships between the SNDCFs defined in this chapter, the SN-Service that they provide to CLNP and ES-IS, and the underlying subnetworks.

Note 5.— There is no requirement to implement this service as a software interface.

5.7.2 Service Provided by the SNDCF

Note 1. — This section specifies the assumed service provided internally by the SNDCF for the purpose of conveying Network Data PDUs between Network Entities.

Note 2. — The service to support SN-Service-Users is defined by the primitives in Table 5.5.7-1.

5.7.2.1 Subnetwork Service Primitive Parameters

Note. — The following section specifies the Subnetwork Service primitive parameters.

Table 5.5.7-1 SN-Service Primitives and Associated Parameters

Parameter	SN-UNITDATA Request	SN-UNITDATA Indication
SN-Source-Address	Mandatory	Mandatory
SN-Destination-Address	Mandatory	Mandatory
SN-Priority	Optional	Optional
SN-Quality-of-Service	Optional	Optional
SNS-Userdata	Mandatory	Mandatory

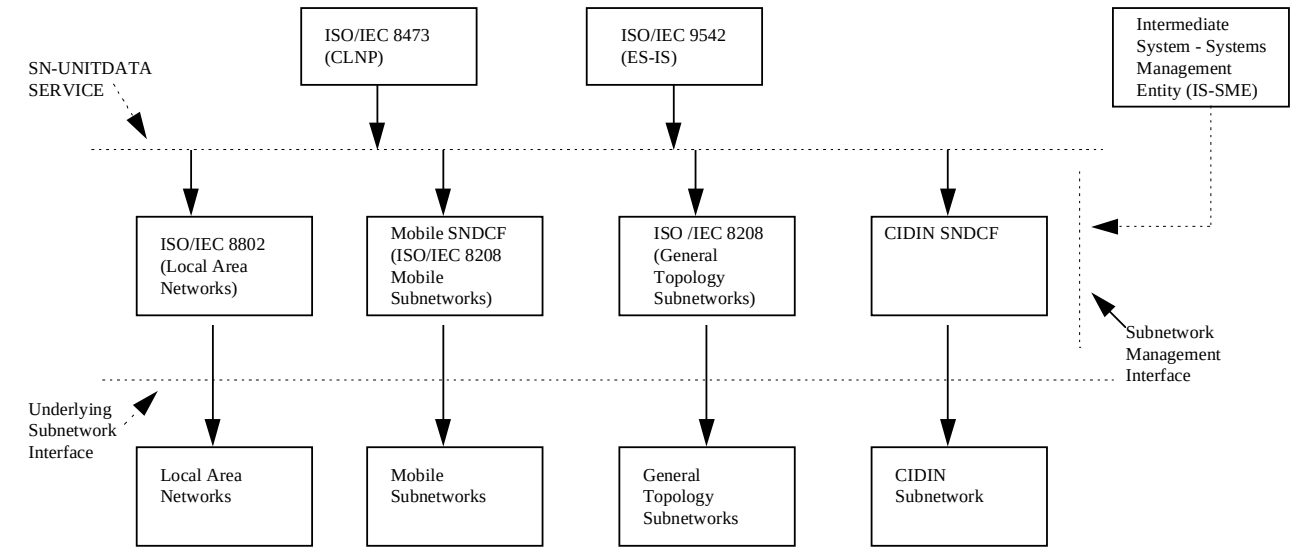

Figure 5.5.7-1. Relationship of SNDCFs to SN-Service and underlying Subnetworks

5.7.2.1.1 Subnetwork Point of Attachment (SNPA) Addresses

Note. — The SN-Source-Address and SN-Destination-Address parameters specify the points of attachment to a public or private subnetwork(s). The SN-Source-Address and SN-Destination-Address addresses include information denoting a particular underlying subnetwork, as well as addressing information for systems attached directly to that subnetwork. SNPA values for a particular subnetwork are those specified and administered by the authority responsible for administration of that subnetwork. Subnetwork Priority.

5.7.2.1.2 SN-Priority

Note 1.— ~~If supported by the subnetwork,~~ The SN-Priority parameter indicates~~, as specified in~~ Table 5.7-1~~, shall specify~~ the relative importance of the associated SNS-Userdata parameter, and may influence the order in which the SNS-Userdata are transferred via the real underlying subnetwork service.

Note 2.— SN-Priority values may~~shall~~ be in the range ~~[0000 0000] through [0000 1110]~~zero to fourteen, with higher values indicating higher priorities.

5.7.2.1.2.1 If no SN-Priority is indicated, the value ~~**[0000 0000]**~~ zero shall be assumed to be the default.

Note . — Further requirements related to subnetwork priority are specified in 5.2.8.5.

5.7.2.1.3 Subnetwork Quality of Service (SNQoS)

Note 1. — The use of the SN-Quality-of-Service parameter is optional, and depends on the needs of the SN-Service-User.

Note 2. — Associated with each connectionless-mode transmission, certain measures of quality of service are requested when the SN-UNITDATA primitive action is initiated. These requested measures (or parameter values and options) are based on a priori knowledge of the service available from the subnetwork. Knowledge of the nature and type of service available is ty~~i~~pically obtained prior to an invocation of the underlying connectionless-mode service and the information passed is a local matter.

5.7.2.1.4 Subnetwork Service Userdata

Note 1.— The SNS-Userdata ~~shall~~ contains the ISO/IEC 8473 or ISO/IEC 9542 NPDU that has~~ve~~ to be conveyed between adjacent network entities.

Note 2. — The SNS-Userdata is~~shall be~~ an ordered multiple of octets, and is~~shall be~~ transferred transparently between the subnetwork points of attachment specified in the SNS primitive.

5.7.3 SNDCF for ISO/IEC 8802-2 Broadcast Subnetworks

5.7.3.1 The SNDCF for use with ISO/IEC 8802-2 Broadcast Subnetworks shall be implemented according to ISO/IEC 8473-2.

5.7.4 SNDCF for the Common ICAO Data Interchange Network (CIDIN)

5.7.4.1 General Considerations

Note.— CIDIN provides a Connectionless Mode Service so that the functionality provided by CIDIN at level 4 is already very close to what is required by the ATN network protocol.

5.7.4.1.1 The SNDCF for CIDIN shall be as specified in the following sections.

5.7.4.2 SN-UNITDATA Request and Indication Primitives

5.7.4.2.1 These primitives shall correspond to the request to send a CIDIN message at a CIDIN entry centre and the reception of a CIDIN message at a CIDIN exit centre respectively.

5.7.4.2.2 CIDIN messages shall be sent with the "no acknowledgement" option.

Note.— CIDIN messages requested to be transported to exit addresses which are not reachable are discarded in the entry centre.

5.7.4.3 SN Source Address

5.7.4.3.1 This address shall correspond to a CIDIN entry address in the Entry Address item.

5.7.4.4 SN Destination Address

5.7.4.4.1 This address shall correspond to a CIDIN exit address in an Exit Address item.

5.7.4.5 SN Quality of Service

5.7.4.5.1 *A priori* values for transit delay, protection against unauthorized access, cost determinants and residual error probability shall be entered as management data in the ATN system.

5.7.4.6 SN Priority

5.7.4.6.1 The mapping between SN Priority and the CIDIN Subnetwork Priority shall be entered as management data in the ATN system.

5.7.4.7 SNS-Userdata

5.7.4.7.1 SNS-Userdata shall be conveyed as the contents of the CIDIN message which is transported transparently by CIDIN.

Note.— The coding of the CIDIN message is code and byte independent.

~~Convergence Provisions for ISO/IEC 8208 Subnetworks~~

~~General~~

~~The facility provided for convergence of ISO/IEC 8473 and ISO/IEC 9542 over the ISO/IEC 8208 SNAcP shall establish, maintain and release ISO/IEC 8208 virtual circuits as needed, and shall provide for the priority and QoS requirements of ISO/IEC 8473 and ISO/IEC 9542.~~

~~Service Coordination between the SNDCF and SN-Service-Users~~

~~On receipt of a SN-UNITDATA request, the SNDCF shall either establish a new virtual circuit or make available an existing virtual circuit which meets the priority and QoS requirements of the SN-Service-User as specified by the SN-Priority and SN-Quality-of-Service parameters, if present.~~

~~If the SN-Priority and SN-Quality-of-Service parameters are not present in a received SN-UNITDATA request, the SNDCF shall use local default parameter values; in this case, it shall be assumed that the SN-Service-User has accepted the default QoS available from the underlying subnetwork.~~

~~Service Coordination between the SNDCF and ISO/IEC 8208 Subnetwork Providers~~

~~General~~

If any combination of the Transit Delay Selection and Indication, Throughput Class Negotiation or Priority ISO/IEC 8208 optional user facilities are available from the Subnetwork Provider via the Subnetwork Access Protocol, then the SNDCF shall use them for service coordination at the time of establishment of virtual circuits, as described in 5.7.4.7.2, 5.7.4.7.2 and 5.7.4.7.2.

If one or more of these three ISO/IEC 8208 optional user facilities are not available from the Subnetwork Provider via the ISO/IEC 8208 Subnetwork Access Protocol, default values for transit delay, throughput class and priority shall be assumed by the SNDCF.

Transit Delay

General

The SNDCF shall invoke the Transit Delay Selection and Indication Facility, if provided, when:

1. A new virtual circuit must be established;

2. Transit Delay is indicated in the SN-UNITDATA request primitive causing establishment of the new virtual circuit; and,

3. Expected Transit Delay for the selected subnetwork is unknown.

If the requested maximum transit delay is less than the transit delay available from the Subnetwork Provider, the SNDCF shall attempt to transfer the SN-UNITDATA request at a greater transit delay than requested.

If the indicated value is equal to or greater than the transit delay available from the Subnetwork Provider, the SNDCF shall transfer the SN-UNITDATA request.

The requested maximum transfer delay shall apply to both directions of transfer.

Transit Delay Selection and Indication Facility

The SNDCF shall indicate the requested transit delay by means of the Transit Delay Selection and Indication Facility in the CALL REQUEST packet.

Recommendation. — *The Subnetwork Provider, when able to do so, should allocate resources and route the Virtual Circuit in a manner such that the transit delay applicable to that circuit does not exceed the desired transit delay.*

When the Transit Delay Selection and Indication Facility is invoked, the INCOMING CALL packet transmitted to the called SNDCF and the CALL CONNECTED packet transmitted to the calling SNDCF shall contain the indication of the transit delay applicable to the Virtual Circuit.

Residual Error Probability

The SNDCF shall discard an SN-UNITDATA request primitive and its associated SN-Userdata parameter if the requested maximum residual error probability is less than the residual error probability known to be available from the Subnetwork Provider.

If the requested value is equal to or greater than the residual error probability known to be available from the Subnetwork Provider, the SNDCF shall transfer the SN-UNITDATA request.

The requested maximum residual error probability shall apply to both directions of transfer.

Economic cost

The SNDCF shall discard an SN-UNITDATA request primitive and its associated SN-Userdata parameter if the requested maximum economic cost is less than the economic cost known to be available from the Subnetwork Provider.

If the requested value is equal to or greater than the economic cost known to be available from the Subnetwork Provider, the SNDCF shall transfer the SN-UNITDATA request.

The requested maximum cost determinant shall apply to both directions of transfer.

Protection against Unauthorized Access

The Subnetwork Provider shall inform the SN-Service-User of the level of protection provided for data in transit.

The level of protection shall be specified as one of the following four qualitative options:

a) No protection.

b) Protection against passive monitoring of SNSDU traffic flow.

c) Protection against active modification of SNSDU traffic flow.

d) Protection against both passive monitoring and active modification of SNSDU traffic flow.

If the SN-Service-User includes information in the SN-Quality-of-Service parameter indicating the required level of protection in the SN-UNITDATA request primitive and the Subnetwork Provider cannot satisfy this requirement, then the SNDCF shall discard the SN-UNITDATA request primitive and its associated SN-Userdata parameter.

Throughput

General

Subnetwork throughput shall be determined or negotiated in one of two ways:

1. Throughput information may be available as a priori information from the Subnetwork Provider; or,

2. Throughput information may be dynamically indicated and/or negotiated by the SNDCF, using the ISO/IEC 8208 Throughput Class Negotiation Facility.

Recommendation.— *If the throughput required by the SN-Service-User is greater than the throughput which can be provided, the SNDCF should opt for another Subnetwork Provider, if available.*

Throughput Class Negotiation Facility

Recommendation.— *The SNDCF should make use of the ISO/IEC 8208 Throughput Class Negotiation Facility for indication and/or negotiation of Throughput Class, if offered by the subnetwork service provider.*

If Throughput Class Negotiation is used by the SNDCF, the calling SNDCF shall request throughput classes for both directions of data transmission via the ISO/IEC 8208 Call Request packet.

The throughput class indicated to the called SNDCF shall not be greater than the default throughput classes, for each direction of transmission, at the calling and called SNDCF Subnetwork Provider interfaces respectively.

Note.— The supplied throughput may be less than indicated throughput.

Priority

General

The SNDCF shall have a priori information regarding the use of priority by the Subnetwork Provider.

If the Subnetwork Provider supports priority and specifies the mapping of Network Service to Subnetwork Service priorities:

1. The SNDCF shall convey the priority to the Subnetwork Provider by means of the ISO/IEC 8208 priority facility, as described in 5.7.4.7.1.1. If the subnetwork supports priority values ranging from **[0000 0000]** to **[0000 1110]**, the subnetwork priority value shall be the same as the priority value in the ISO/IEC 8473 or ISO/IEC 9542 header, respectively to provide a one-to-one mapping between the Network and Subnetwork Layer priorities. If fewer (or more) than fourteen levels of subnetwork priority are supported, the priority value in the ISO/IEC 8473 or ISO/IEC 9542 header shall be mapped onto the subnetwork priority value according to the requirements of the subnetwork provider.

2. The SNDCF shall establish a SN-connection for each requested priority. A SN-connection shall only be used for SNSDUs for which the indicated priority corresponds with the priority associated with the connection.

If the Subnetwork Provider does not require connections to be prioritized, then the SNDCF shall not convey priority information to the Subnetwork Provider and the provisions of 5.7.4.7.1.1 shall not apply.

Use of the Priority Facility

If no SN-connection with the requested priority is available, the SNDCF shall establish a connection by sending a CALL REQUEST containing the appropriate priority facility to the Subnetwork Provider.

Upon receipt of an INCOMING CALL packet from the Subnetwork Provider the called SNDCF shall map the contents of the priority parameter field into the priority parameter of the CALL ACCEPTED packet.

Note 1.— The Priority Option is mandatory within an ISO/IEC 8473 NPDU as specified in Chapter 5.6.

Note 2.— Neither the priority to gain a connection nor to keep a connection are specified.

5.7.5 SNDCF~~Convergence Provisions~~ for ISO/IEC 8208 General Topology Subnetworks

5.7.5.1 Over ISO/IEC 8208 General Topology Subnetworks, the subnetwork service described in 5.7.2 shall be provided using the SNDCF for ISO/IEC 8208 General Topology Subnetworks as specified in ISO/IEC 8473-3.

~~**Recommendation**.— *All ATN End Systems and Intermediate Systems using ISO/IEC 8208 General Topology Subnetworks for communication with other ATN End Systems and Intermediate Systems shall comply with the requirements specified in 5.6.4.20.*~~

5.7.6 SNDCF~~Convergence Provisions~~ for ISO/IEC 8208 Mobile Subnetworks

5.7.6.1 General

5.7.6.1.1 Over ISO/IEC 8208 Mobile Subnetworks, the subnetwork service described in 5.7.2 shall be provided using the SNDCF for ISO/IEC 8208 Mobile Subnetworks as specified below~~in this clause and its subordinate paragraphs, and as qualified by 5~~.7.4.8.

Note 1.— The SNDCF specified below is only applicable when providing the SN-UNITDATA service to ISO/IEC 8473, ISO/IEC 9542, ISO/IEC 11577 and ISO/IEC 10589 Network Layer protocols. Unpredictable behavior may result if used to support other Network Layer Entities.

Note 2.— This SNDCF supports the following Data Compression Procedures:

- *Local Reference (LREF) Compression;*
- *The ICAO Address Compression Algorithm;*
- *Compression of the data stream according to ITU-T Recommendation V.42bis.*

Note ~~2~~3.— An optional feature of LREF Compression~~the SNDCF~~ provides for "local reference cancellation".

Note 4.— The supported Data Compression Mechanisms and their options are negotiated when each Virtual Circuit used by the SNDCF is established, and are applied on a per Virtual Circuit basis.

5.7.6.1.2 All ATN Intermediate Systems using Mobile ISO/IEC 8208 subnetworks for communication with other Intermediate Systems shall implement the LREF compression procedure.

5.7.6.1.3 **Recommendation**.— *Implementations using this SNDCF for Air/Ground communications should only implement the LREF optional facility for local reference cancellation when the lifetime of the virtual circuits is of the same order as the flight time.*

5.7.6.1.4 **Recommendation**.— *Implementations using this SNDCF and the LREF Compression Procedure for Ground/Ground communications should use the LREF optional local reference cancellation mechanism.*

~~Conformance~~

~~All ATN Intermediate Systems using Mobile ISO/IEC 8208 subnetworks for communication with other Intermediate Systems shall implement the SNDCF procedures and local reference header compression of the DT and Error PDU headers, as specified below.~~

5.7.6.2 Call Setup

5.7.6.2.1 Calling DTE Procedures

5.7.6.2.1.1 General

~~On receipt of a SN-UNITDATA request or based on local System Management action, and lacking a suitable existing virtual circuit, the SNDCF shall establish a new virtual circuit meeting, where supported by the subnetwork, the priority and QoS requirements expressed in the SN-UNITDATA request service primitive.~~

~~***Call Setup Mechanism and Timing***~~

5.7.6.2.1.1.1 A Virtual Circuit shall be established either~~The mechanism and timing for opening a virtual circuit to a known SNDCF prior to the transmission of SNSDUs shall be determined~~:

a) dynamically, on receipt of a SN-UNITDATA request and when the SNDCF lacks a suitable virtual circuit to the NPDU's destination supporting the required priority and QoS, or

b) by the explicit intervention of Systems Management, identifying the destination SNDCF's SNPA address, priority and QoS.

~~Call Setup Functions~~

5.7.6.2.1.1.2 When it has been determined that a virtual circuit is to be made available, the calling SNDCF shall ~~perform all functions associated with~~ establish~~ing~~ a~~the~~ virtual circuit using the procedures specified in ISO/IEC 8208.

5.7.6.2.1.1.3 ~~The SNDCF shall send~~ An ISO/IEC 8208 CALL REQUEST packet shall be sent to the DTE Address specified as the SN-Destination-Address, with the following optional user facilities and CCITT-specified DTE facilities.~~:~~

Note.— Other optional user facilities and CCITT-specified DTE facilities may be required by subnetworks. The use of these facilities is a local matter.

5.7.6.2.1.1.4 The Call Request user data shall be formatted as specified in 5.5.7.6.2.1.5.

5.7.6.2.1.2 The Priority Facility

5.7.6.2.1.2.1 The Priority Facility shall be ~~set~~used if the subnetwork provider supports priority~~y~~isation of Virtual Circuits and specifies the mapping of Network Service to Subnetwork Service priorities.

5.7.6.2.1.2.2 The priority value passed in the SN-UNITDATA request or indicated by the System Manager shall be mapped~~apply~~ to priority of data on a connection, as specified by the Subnetwork Provider.

5.7.6.2.1.2.3 If the priority to gain a connection and/or priority to keep a connection is conveyed within the ISO/IEC 8208 Facility Parameter Field, these priorities shall be consistent with the priority of data on a connection, and set according to the Subnetwork Provider's Guidelines.

Note 1.— The SNDCF is assumed to know, a priori, if a given subnetwork supports prioritisation of virtual circuits, the number of discrete priority levels supported and the relationship between the subnetwork priority and SNSDU priority.

Note 2.— The mapping between SNSDU priority and subnetwork priority is specified separately for each subnetwork type.

5.7.6.2.1.3 The Non-Standard default packet size Facility

5.7.6.2.1.3.1 Non-standard default packet size Facility shall be used and the value requested set to the maximum supported by the subnetwork.

5.7.6.2.1.4 The Fast Select Facility

5.7.6.2.1.4.1 The Fast Select Facility shall be used if supported by the Subnetwork Provider~~available~~.

5.7.6.2.1.4.2 No restriction on response shall be indicated.

Note 1.— This permits the responding DTE to return up to 128 octets of user data.

~~Note 1.— Other optional user facilities and CCITT-specified DTE facilities may be required by subnetworks. The use of these facilities is a local matter.~~

~~Note 2.— The SNDCF is assumed to know, a priori, if a given subnetwork supports prioritisation of virtual circuits, the number of discrete priority levels supported and the relationship between the subnetwork priority and SNSDU priority.~~

~~Note 3.— The mapping between SNSDU priority and subnetwork priority is specified separately for each subnetwork type.~~

Note ~~2~~4.— If Fast Select is not supported, the Compression Procedures ~~algorithms~~ cannot be negotiated except by successive attempts to establish the virtual circuit requesting different combinations of Compression Procedures.

5.7.6.2.1.5 Call Request User Data ~~Format of Call Request and Call Accept User Data~~

Note .— Call Request User Data is used to indicate which Compression Procedures are offered by the calling DTE. When the Fast Select Facility is used, Call Accept User Data is then used to indicate which Compression Procedures are accepted by the Called DTE.~~The following sections specify the format of Call Request and Call Accept User Data.~~

~~Call Request User Data~~

5.7.6.2.1.5.1 The call user data format~~field layout~~ shall be as illustrated in Figure 5.5.7-2.

~~The field is variable in length, and shall be constructed as follows:~~

5.7.6.2.1.5.2 The first octet of the call user data ~~field of the Call Request packet~~ (the Subsequent Protocol Identifier (SPI)) shall be set to Binary **[1100 0001]** to indicate that the virtual circuit is to

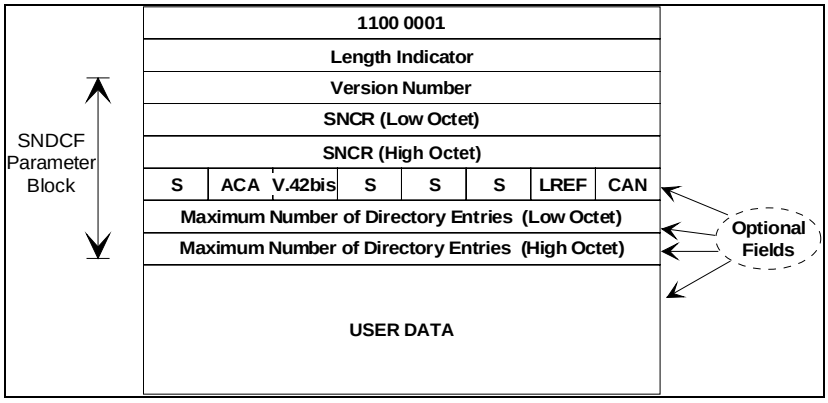

Figure 5.5.7-2 Format for Call Request User Data

be used to provide the underlying service by this SNDCF.

*Note ~~1~~.— ISO TR 9577 provides the international register for SPI values. The value binary **[1100 0001]** has not been assigned by the ISO Technical Report and it is unlikely that it will be. However, it is not guaranteed to be unambiguous outside of the scope of the ATN.*

5.7.6.2.1.5.3 The value of the second octet ~~is a~~ (length indicator) shall be an unsigned binary number giving the number of octets in the SNDCF parameter block (including this length indicator up to and including (if present) the maximum number of directory entries field).

5.7.6.2.1.5.4 The third octet is the SNDCF version indicator and shall be set to **[0000 0001]** to indicate this version of the SNDCF protocol.

5.7.6.2.1.5.5 The fourth and fifth octets shall provide~~form~~ the Subnetwork Connection Reference (SNCR).

5.7.6.2.1.5.6 The value encoded in this field shall be the number of virtual circuits currently established between the calling and called DTEs (i.e. the originating and the responding SNDCFs) at this call priority.

Note.— The use of the SNCR is specified in ISO/IEC 8473 for use in call collision resolution over ISO/IEC 8208 subnetworks.

5.7.6.2.1.5.7 The sixth octet shall indicate~~identifies~~ the compression techniques offered~~supported~~ by the calling DTE, according to Table 5.5.7-2.~~this ATN SNDCF. The bit fields in this octet are defined in the Tables below~~.

5.7.6.2.1.5.8 LREF Compression shall always be offered.

Note 1.— The decision as regards which options to offer out of those supported is otherwise a local matter.

Note 2.— Multiple compression procedures~~techniques~~ may be offered~~supported~~.

~~Note 3. — If bit 2 is set in the ISO/IEC 8208 Call Request, the LREF CLNP Header Compression is offered.~~

Table 5.5.7-2 ~~Stream~~ Compression Options Offered Parameter

bit number	option
bit 8	Spare (S)
bit 7	*ICAO Address Compression Algorithm (ACA)*
bit 6	V.42 BIS
bit 5	Spare (S)
bit 4	Spare (S)
bit 3	Spare
bit 2	*Local Reference* (LREF) option
bit 1	*Local Reference Cancellation Option* (CAN) supported

5.7.6.2.1.5.9 Bit 1 of octet 6 shall~~may~~ only be set if bit 2 is also set.

~~Note 5. — When bit 2 is set the local reference cancellation procedures are also offered.~~

Note ~~6~~. — At most, one of the the ACA or V.42bis~~stream~~ compression algorithms can be used.~~,~~ ~~so~~However, ~~bits 6 and 7 can~~ both can be offered in the Call Request Packet when Fast Select is in use, but only one can be accepted~~both cannot be set~~ in the CallAccept ~~response~~ Packet.

5.7.6.2.1.5.10 Both ACA and V.42bis shall not be offered if the Fast Facility is not in use.

5.7.6.2.1.5.11 When the LREF compression algorithm is offered~~used~~, i.e if bit 2 in octet six is set, then the seventh and eight octets (Maximum Directory Entries) shall indicate~~identifiy~~ the maximum number of directory entries supported for the local reference (minimum size 128), as an unsigned even number.

5.7.6.2.1.5.12 When the LREF compression algorithm is not used, the seventh octet shall be the first octet of the User Data field.

5.7.6.2.1.5.13 When the LREF compression algorithm is used , the ninth octet shall be the first octet of the User Data field.

Note ~~7~~.— When the fast select facility is available, the User Data field may be used to convey the ISO/IEC 9542 ISH PDU as part of the routing initiation sequence.

5.7.6.2.1.6 Receipt of "Call Accepted Packet"

5.7.6.2.1.6.1 Fast Select Facility In Use

5.7.6.2.1.6.1.1 When an ISO/IEC 8208 Call Accept Packet is received from the Called DTE and the Fast Select Facility is in use, then the Calling DTE shall inspect the Call Accept User Data in order to determine which of the offered Compression Procedures have been accepted.

5.7.6.2.1.6.1.2 If the called SNDCF has accepted the call indicating that an offered compression procedure is not supported, then the Calling SNDCF shall maintain the virtual circuit and shall not apply this compression procedure.

5.7.6.2.1.6.2 Fast Select Facility not in Use

5.7.6.2.1.6.2.1 When an ISO/IEC 8208 Call Accept Packet is received from the Called DTE and the Fast Select Facility is not in use, then the Calling DTE shall assume that all of the offered Compression Procedures have been accepted.

5.7.6.2.1.7 Call Rejection by the DCE or Called DTE

5.7.6.2.1.7.1 General

5.7.6.2.1.7.1.1 **Recommendation.** *When a DTE originated ISO/IEC 8208 Call Clearing Packet is received with a diagnostic indicating that the proposed LREF directory is too big (see Table 5.5.7-4), then the call shall be re-attempted with the default directory size.*

Note.— This is to ensure that the call is not rejected again due to the requested directory size being too big.

5.7.6.2.1.7.1.2 If the diagnostic indicates Call Collision resolution then no further attempt shall be made to re-establish the call.

5.7.6.2.1.7.1.3 In all other cases, the problem shall be reported to a System Manager.

Note.— Any further attempts to establish the virtual circuit are a local matter.

5.7.6.2.1.7.2 Fast Select Facility Requested

5.7.6.2.1.7.2.1 When a DCE or DTE originated ISO/IEC 8208 Call Clearing Packet is received with a diagnostic indicating *Fast Select not Subscribed* or *Fast Select Acceptance Not Subscribed*, then the call shall be re-attempted but without requesting the Fast Select Facility.

5.7.6.2.1.7.3 Fast Select Facility not in Use

Note.— In this case, when rejection by the called DTE indicates that the reject reason is due to an offered compression procedure not being supported, then the call is re-attempted without offering the offending procedure. This is the only negotiation procedure possible when Fast Select is not available.

5.7.6.2.1.7.3.1 When a DTE originated ISO/IEC 8208 Call Clearing Packet is received with a diagnostic indicating *Local Reference Cancellation not Supported* (see Table 5.5.7-4), the call shall be re-attempted without offering Local Reference Cancellation.

5.7.6.2.1.7.3.2 When a DTE originated ISO/IEC 8208 Call Clearing Packet is received with a diagnostic indicating *ACA not Supported* (see Table 5.5.7-4), the call shall be re-attempted without offering the ACA.

5.7.6.2.1.7.3.3 When a DTE originated ISO/IEC 8208 Call Clearing Packet is received with a diagnostic indicating *V.42bis compression not*

Supported (see Table 5.5.7-4), the call shall be re-attempted without offering V.42bis compression.

5.7.6.2.2 Called DTE Procedures~~Call acceptance and compression negotiation~~

5.7.6.2.2.1 Incoming Call Processing

5.7.6.2.2.1.1 When a~~-~~n ISO/IEC 8208 IncomingCall Packet~~Indication~~ is received, the called SNDCF first shall check for a call collision.

5.7.6.2.2.1.2 If the SNDCF has an outstanding Call Request to the same DTE Address, specified as the calling DTE in this Incoming Call Packet~~Indication~~, and the call priority and SNCR are identical, then a call collision has occurred, and the call collision resolution procedures specified in ISO/IEC 8473-3 shall be invoked to resolve the call collision.

5.7.6.2.2.1.3 The called SNDCF shall then determine whether to accept the call.

5.7.6.2.2.1.4 The call shall be rejected if any of the following conditions is true:

a) The proposed ISO/IEC 8208 facility, is not available;

b) The proposed priority is not supported;

c) The Fast Select Facility was not selected in the Incoming Call Packet and an offered compression algorithm is not supported;

d) The format of the call user data is invalid;

e) The version number is not supported;

f) The Local Reference compression is offered and the called SNDCF does not support the proposed directory size;

g) Local Policy does not permit communication with the calling DTE.

5.7.6.2.2.1.5 The call shall be rejected using a Call Clearing Packet, with the appropriate diagnostic code, as listed in Table 5.5.7-4.

5.7.6.2.2.1.6 If the call is to be accepted then the Called SNDCF shall perform the ISO/IEC 8208 procedures~~those operations~~ associated with accepting a call, ~~provided that none of the reasons for rejection listed in 5.~~7.6.2.3 ~~occurs,~~ but shall not generate any SN-UNITDATA indication.

5.7.6.2.2.2 Call Acceptance with the Fast Select Facility in Use

5.7.6.2.2.2.1 The priority on call acceptance shall be that proposed by the calling SNDCF.

5.7.6.2.2.2.2 ~~If the call is acceptable, then the Called SNDCF shall accept the call and indicate~~ The combination of compression techniques acceptable to the SNDCF, out of those offered~~proposed~~ by the Calling SNDCF, shall be indicated by including the one-octet field shown in Figure 5.5.7-4, in the ISO/IEC 8208 Call Accept User Data.

5.7.6.2.2.2.3 The Called SNDCF shall not indicate support for both the ACA and V.42bis~~no more than one stream compression option~~.

5.7.6.2.2.3 Call Acceptance without the Fast Select Facility in Use

5.7.6.2.2.3.1 If Fast Select is not in use then a call shall only be accepted if all offered compression procedures and facilties are acceptable, and the proposed LREF directory size can be supported.

Note. Call rejection is specified above in 5.5.7.6.2.2.1.4

~~If the called SNDCF accepts the call indicating that a proposed compression procedure is not supported, then the Calling SNDCF shall maintain the virtual circuit and shall not apply this compression procedure.~~

~~If the Called SNDCF accepts the call and if the Call User Data contains the User Data fields then the Called SNDCF shall process the PDU in the User Data field according to 5.~~7.6.3.4~~.~~

~~On receipt of User Data in the Call Accept User Data field, then the Calling SNDCF shall process the PDU in the User Data field according to 5.~~7.6.3.4~~.~~

~~Call rejection~~

~~If the call is not accepted by the called SNDCF due to the local policy, then the call shall be rejected with a diagnostic code of **[1000 0101]** (see Table 5.7-8). A call shall also be rejected for the following reasons:~~

The ~~proposed ISO/IEC 8208 facility, priority or Fast Select is not available;~~

~~Fast Select was not selected in the received Call Request and a proposed compression algorithm is not supported;~~

~~The format of the call user data is invalid;~~

~~The version number is not supported;~~

a) ~~The Local Reference compression is supported and the called SNDCF does not support the proposed directory size.~~

~~**Recommendation**. — *If a call is rejected due to the proposed directory size being too large, the caller should re-attempt the call using the default directory size, thus ensuring that the call will not be rejected again due to the requested directory size.*~~

~~If the calling SNDCF receives a Clear Indication indicating call rejection, other than as part of a call collision resolution or directory size negotiation, then a Systems Management notification shall be generated, and any SN-UNITDATA queued for this call shall be discarded.~~

~~The diagnostic code listed in Table 5.7-8 shall be used when an SNDCF rejects an incoming Call Request.~~

5.7.6.2.2.4 Call Accept User Data

Note.— User Data can only be present in the Call Accept packet if the fast select facility is available and has been selected in the Call Request.

5.7.6.2.2.4.1 When fast select is available and has been selected in the Call Request, then a Call Accept User Data shall be present~~inserted~~ in the Call Accept packet.

5.7.6.2.2.4.2 The Call Accept User Data field layout shall be as illustrated in Figure 5.5.7-4. ~~The field shall be variable in length, and shall be constructed as follows:~~

5.7.6.2.2.4.3 The first octet of the Call Accept User Data shall identify~~ies~~ the compression procedure(s) accepted by the called DTE~~techniques supported by this ATN SNDCF~~.

Note. — The bit fields have the same semamtics~~meaning~~ as the ones used for the sixth octet of the Call Request User Data .

5.7.6.2.2.4.4 The Second octet of the Call Accept User Data shall shall be~~is~~ the first octet of the User Data field.

Note.— The User Data field may be used to convey the ISO/IEC 9542 ISH PDU as part of the routing initiation sequence.

5.7.6.2.3 Data Transfer Phase~~Application of Compression Procedures~~

5.7.6.2.3.1 During the data transfer phase of a virtual circuit established by this SNDCF, the compression procedures accepted by the called DTE shall be applied to each NPDU transferred over the virtual circuit.

Note.— NPDUs are queued for transfer as a result of an SN-UNITDATA.request. Received NPDUs are passed to the SN-Service user by an SN-UNITDATA.indication.

5.7.6.2.3.2 The order in which concurrently applied compression procedures~~algorithms~~ and ISO/IEC 8208 segmentation are applied shall be as follows:

a) If the LREF compression algorithm is used, it shall be applied to the ISO/IEC 8473 PDU first;

b) If either of the ACA or V.42bis~~the stream~~ compression algorithms is used, it shall be applied after LREF compression and before M-bit segmentation~~next~~;

c) Finally, if the PDU is still large enough to need ISO/IEC 8208 M-bit sequencing procedures, these shall then be applied.

5.7.6.2.3.3 This sequence shall be inverted on the receiving end as follows:

a) If M-bit ~~Re~~-segmentation has been applied~~is required~~, then reassembly of the NPDU from the received ISO/IEC 8208 Data Packets~~Re-segmentation based on the M-bit~~ shall be done first;

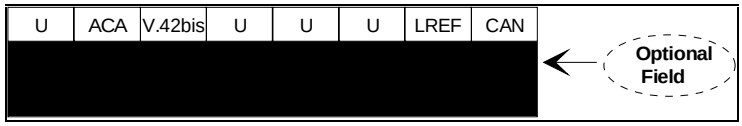

Figure 5.5.7-4 Format for Call Accept User Data

b) If either of the ACA or V.42bis~~a stream de~~compression algorithms is used the corresponding decompression algorithm~~it~~ shall be applied after M-bit segmentation and before LREF compression~~next~~;

c) Finally if the LREF compression is used, the LREF decompression algorithm shall then be applied.

5.7.6.2.4 Call Clearing ~~Provisions~~

5.7.6.2.4.1 The ~~Mobile~~ SNDCF shall clear a virtual circuit when:

a) System Management requests call clearing, or

b) On the expiration of a timeout period following the transmission or receipt of SN-UNITDATA, or

c) If the resources are required by another virtual circuit with a higher priority.

5.7.6.2.4.2 Events b) or c) above shall only apply to those virtual circuits that have been dynamically established i.e. in response to an SN-UNITDATA.request (see 5.5.7.6.2.1.1).

5.7.6.2.4.3 When it has been determined that a virtual circuit is to be cleared, the SNDCF shall invoke the ISO/IEC 8208~~perform all~~ functions associated with call clearing.

5.7.6.2.4.4 All subsequently packets received other than a Clear Confirm or a Clear Indication shall be ignored.

5.7.6.2.4.5 The same actions shall apply to the receipt of a Clear Indication.

5.7.6.2.4.6 The Clearing Cause octet in the ISO/IEC-8208 Cause/Diagnostic field shall be set to **[1000 0000]**.

5.7.6.2.4.7 The reason for clearing the call shall be placed in the Diagnostic field.

Note 1.— The diagnostic values listed in Table 5.5.7-4 shall be used when an SNDCF rejects a Call Request or clears a virtual circuit.

Note 2.— If a virtual connection is cleared due to a network problem, the SNDCF may attempt to re-establish the connection before the associated forwarding information is removed from Network Layer routing tables. The selective re-establishment of X.25 connections may be based on the originating Clearing Cause and Diagnostic Codes.

5.7.6.3 Local Reference Compression Procedures

5.7.6.3.1 Local Directory Initialization

5.7.6.3.1.1 Both calling and called SNDCFs shall create a local directory to be associated with each newly established virtual circuit.

5.7.6.3.1.2 This directory shall consist of entries numbered from zero to a maximum of 32767, each entry consisting of:

a) A pair of NSAP Addresses, known as the inward and outward NSAP Addresses respectively;

b) The ISO/IEC 8473 protocol version number;

c) The value of the security options parameter which may be empty.

5.7.6.3.1.3 The directory shall be initially empty. The Mobile SNDCF shall support a minimum directory size of 128 entries.

Table 5.5.7-4 Diagnostics values for ATN call clearing

	Hexadecimal value	Decimal value	Clearing Cause
1	1111 1001	249	Connection Rejection - unrecognized protocol identifier in user data
2	1000 0000	128	Version number not supported
3	1000 0001	129	Length field invalid
4	1000 0010	130	Call Collision Resolution
5	1000 0011	131	Proposed Directory Size too large
6	1000 0100	132	Local Reference Cancellation Not Supported
7	1000 0101	133	Received DTE refused, received NET refused or invalid NET selector
8	1000 0110	134	Invalid SNCR field
9	1000 0111	135	ACA compression not supported
10	1000 1111	143	V42bis compression not supported
11	1111 0000	240	System lack of resources
12	0000 0000	0	Cleared by System Management
13	1001 0000	144	Idle Timer expiration
14	1001 0001	145	Need to re-use the circuit
15	1001 0010	146	By local means (to be used for system local error)
16	1001 0011	147	Invalid SEL field value in received NET

5.7.6.3.2 Action following an SN-UNITDATA Request

5.7.6.3.2.1 General

5.7.6.3.2.1.1 On receipt of a SN-UNITDATA request the SNDCF shall identify an appropriate virtual circuit to the subnetwork user associated with the SN-Destination-Address, and which satisfies the PDU Priority and Security requirements, and queue the accompanying PDU (i.e. the user data associated with the SN-UNITDATA request) for transfer over that virtual circuit.

5.7.6.3.2.1.2 If there is no virtual circuit which satisfies the PDU Priority and Security requirement, then the SNDCF shall try to establish a virtual circuit with the requested PDU Security and priority.

5.7.6.3.2.1.3 If a suitable virtual circuit can be established, then the PDU shall be queued for transfer over the newly established virtual circuit.

If no such virtual circuit can be established, then if an existing virtual circuit associated with the SN-Destination-Address provides an adequate level of security and priority, the PDU shall be queued for transfer over the existing virtual circuit.

5.7.6.3.2.1.4 Otherwise, the PDU shall be discarded.

Note 1.— The opening of an additional virtual circuit for this purpose may be inappropriate in certain cases. For example, opening an additional virtual circuit via a single frequency VDL subnetwork or via the Mode S subnetwork will not necessarily result in increased capacity.

Note 2.— The maintenance of the minimum QoS level includes ensuring that the number of local references that are required to support the number of data streams multiplexed over a given virtual circuit does not exceed the number available.

5.7.6.3.2.1.5 If no virtual circuit exists to the SN-Destination-Address, and the circuit is not

classified as dynamically assigned by the ISO/IEC 10589 (IS-IS) routing protocol or under a static routing regime, then the SN-UNITDATA shall be discarded, with an error report sent to a System Manager.

Note ~~3~~.— Virtual Circuits between Intermediate Systems and between Intermediate Systems and End Systems are initially established by procedures associated with the specific routing procedures employed. If no such virtual circuit has been established, or may be established under the routing procedures, then no route exists and hence it is an error if an attempt is made to send a PDU over such a route.

5.7.6.3.2.2 Identification of Network Layer Protocol

5.7.6.3.2.2.1 Prior to transmission of an SN-UNITDATA SN-Userdata parameter over a virtual circuit, the SNDCF shall inspect the initial octet of the SN-Userdata parameter (Initial Protocol Identifier (IPI)) to identify the Network Layer protocol contained within the SN-UNITDATA request.

5.7.6.3.2.2.2 If the IPI contains binary **[1000 0001]** indicating ISO/IEC 8473, then the procedures in 5.5.7.6.3.2.3 shall be performed.

5.7.6.3.2.2.3 If the IPI contains binary **[1000 0010]** indicating ISO/IEC 9542 (ES-IS), binary **[1000 0011]** indicating ISO/IEC 10589 (IS-IS), or binary **[0100 0101]** indicating ISO/IEC 11577 (NLSP), then the packet shall be sent unchanged over the virtual circuit, using the M-bit segmentation mechanism, if the packet is larger than the maximum length of user data permitted for the virtual circuit.

5.7.6.3.2.2.4 If the IPI contains any other value, the SN-UNITDATA request shall be discarded, and an error sent to a System Manager.

Note.— The IPI designating the ISO/IEC 11577 has been included in the set of allowed IPIs in order to preserve the possiblity for use of this protocol in the future. However, at the time of publication of this specification, no ATN Security Protocol Architecture has been defined. Thus, this inclusion of the NLSP IPI in the allowed IPI set does not indicate that NLSP will be incorporated into the future ATN security architecture.

5.7.6.3.2.3 Identification of Option Parameter and Local Directory Look-up

5.7.6.3.2.3.1 The options part of the ISO/IEC 8473 NPDU header contained in the SN-Userdata shall then be inspected. If one of the following is true:

a) Source Routing option is present,

b) Recording of Route option is present,

c) QoS Maintenance option is anything other than the globally unique format,

d) padding option is present,

e) priority option is present with a value greater than 14,

f) an unknown parameter is present,

then the SN-Userdata shall be sent unchanged over the virtual circuit using M-bit segmentation procedures as appropriate.

5.7.6.3.2.3.2 Otherwise, the local directory associated with the virtual circuit shall then be interrogated to determine if an entry exists such that:

a) the inward NSAP Address is equal to the PDU's source NSAP Address;

b) the outward NSAP Address is equal to the PDU's destination NSAP Address;

c) a security parameter is present with the same value as that contained in the PDU header, if present, and otherwise absent;

d) the same ISO/IEC 8473 version number as is present in the PDU header.

5.7.6.3.2.3.3 If an entry is found, then the NPDUshall be sent in the compressed form constructed according to 5.5.7.6.3.3, using the local directory entry number as the local reference.

5.7.6.3.2.3.4 If no entry is found, then a new directory entry shall be created and the SN-Userdata shall be modified as specified in 5.7.6.3.2~~.3.5.5~~.4.

5.7.6.3.2.4 Establishing a New Local Reference

5.7.6.3.2.4.1 A new directory entry shall be created containing the NPDU source NSAP Address as the inward NSAP Address, and the NPDU destination NSAP Address as the outward NSAP Address.

5.7.6.3.2.4.2 The value of the protocol version number, and the security parameter, if present, shall also be placed in this entry.

5.7.6.3.2.4.3 The entry number shall have the lowest possible entry number that has not previously been used for the local directory associated with this virtual circuit, and shall be in the range **[0..63]** or **[128..16447]** if the SNDCF is the initiator of the virtual circuit, or **[64..127]** or **[16448..32767]**, if the SNDCF is the responder.

5.7.6.3.2.4.4 When a directory size greater than 128 but less than 32767 has been negotiated, then the highest local reference that the initiator may allocate shall be:

127 + (n -128) / 2

and the highest local reference that the responder may allocate shall be

16447 + (n -128) / 2

where 'n' is the agreed maximum directory size.

5.7.6.3.2.4.5 If a directory full condition occurs then, as a local matter, either the PDU shall be sent unmodified over the virtual circuit or the virtual circuit shall be reset.

Note.— A user generated Network Reset results in the total clearing of the directory which then permits the assignment of an unused local reference.

5.7.6.3.2.4.6 **Recommendation**.— *When this SNDCF is used for Air/Ground communication or when the local reference cancellation option is available for use, then the PDU should be sent unmodified over the virtual circuit.*

5.7.6.3.2.4.7 The PDU, which may be either a DT PDU or an ER PDU, shall have an additional options field added to the PDU header.

5.7.6.3.2.4.8 This option parameter shall have local significance only (i.e. is only of interest to the sending and receiving SNDCFs), and is called the Local Reference.

5.7.6.3.2.4.9 This Local Reference option parameter shall be included as the first parameter in the Option Part of the DT or ER PDU header.

5.7.6.3.2.4.10 This option shall be specified as follows:

Parameter Code:	**[0000 0101]**
Parameter Length:	variable
Parameter Value:	the entry number of the ocal directory entry created above and expressed as an unsigned integer.

Note . — The entry number is therefore assigned as a so called Local Reference.

5.7.6.3.2.4.11 The Checksum, Length Indicator, and Segment Length fields of the PDU header shall be modified to reflect the insertion of the new options field, and any changes to the length of the source and destination address.

5.7.6.3.2.4.12 The Total Length, if present, shall be left unmodified.

5.7.6.3.2.5 Reference Cancellation Option

5.7.6.3.2.5.1 When the optional lLocal Reference Cancellation facility is implemented, and both SNDCFs using a virtual circuit have indicated that they support this facility, then the SNDCF shall monitor the number of local references on each virtual circuit which it has both assigned and are in use.

5.7.6.3.2.5.2 When the number of such local references on a given virtual circuit exceeds a System Manager specified threshold, then the local reference cancellation procedures specified in 5.5.7.6.3.6 shall be invoked, in order to ensure that the number of unused local references in the range in which the SNDCF is permitted to assign local references, is at least equal to a System Manager specified target.

5.7.6.3.2.6 Transfer of the Modified ISO/IEC 8473 PDU

5.7.6.3.2.6.1 The modified ISO/IEC 8473 NPDU (i.e. the NPDU with the added Local Reference Option) shall be inserted in the User Data field of an ISO/IEC 8208 Data packet and shall be sent over the virtual circuit, using the ISO/IEC 8208 M-bit segmentation procedure if appropriate.

5.7.6.3.3 Compression of SN-Userdata

5.7.6.3.3.1 General

5.7.6.3.3.1.1 An Initial DT NPDU shall be compressed according to the procedures specified in 5.5.7.6.3.3.2.

5.7.6.3.3.1.2 A Derived DT NPDU shall be compressed according to the procedures specified in 5.5.7.6.3.3.3.

5.7.6.3.3.1.3 An ER NPDU shall be compressed according to the procedures specified in 5.5.7.6.3.3.4.

5.7.6.3.3.2 Initial DT PDU Compression

5.7.6.3.3.2.1 General

Note.— *An Initial DT PDU is an ISO/IEC 8473 DT PDU that either contains no Segmentation Part in its PDU header or contains a Segmentation Part with a Segment Offset value that equals zero and the Segment Length is equal to the Total Length*.

5.7.6.3.3.2.1.1 The original Initial DT PDU shall be compressed into the Compressed Initial Data PDU as shown in Figure 5.7-4.

5.7.6.3.3.2.1.2 The fields of the Compressed Initial Data PDU shall be set as follows.

5.7.6.3.3.2.2 Type Field

5.7.6.3.3.2.2.1 The PDU Type field value shall be set according to the values of the original Initial DT PDU ER, SP and More Segments (MS) flags as defined in **Error! Reference source not found.**4.

Table 5.5.7-6 Initial DT PDU PDU Type codes

PDU Type Values	CLNP NPDU ER Value	CLNP NPDU SP Value	CLNP NPDU MS Value
0 0 0 0	0	0	0
0 0 0 1	0	1	0
0 0 1 0	1	0	0
0 0 1 1	1	1	0

5.7.6.3.3.2.3 PDU Priority Field

5.7.6.3.3.2.3.1 The PDU Priority field value shall be set to the lowest four bits of the original PDU Priority parameter value field, if the Priority option is present, and set to zero otherwise.

5.7.6.3.3.2.4 PDU Lifetime Field

5.7.6.3.3.2.4.1 The PDU Lifetime field value shall be set to the eight bits of the original NPDU lifetime field.

5.7.6.3.3.2.5 P bit Field

5.7.6.3.3.2.5.1 The P field value shall be set to one if the original uncompressed PDU contained the priority option. This field shall be set to zero otherwise.

5.7.6.3.3.2.6 Q bit Field

5.7.6.3.3.2.6.1 The Q field value shall be set to one if the original uncompressed PDU contained the QoS Maintenance option.

5.7.6.3.3.2.6.2 This field shall be set to zero otherwise.

5.7.6.3.3.2.7 R bit Field

5.7.6.3.3.2.7.1 The R field value shall be set to one if the original uncompressed PDU contains a non-zero checksum.

5.7.6.3.3.2.7.2 This field shall be set to zero otherwise.

5.7.6.3.3.2.8 S/T, CE , T/C, E/T, and E/C Fields

5.7.6.3.3.2.8.1 The values of these fields shall be set to bits 5 through 1 of the QoS parameter value option field of the original PDU, if the Quality of Service maintenance option is present.

5.7.6.3.3.2.8.2 The S/T field shall be set to the value of bit 5 of the Quality of Service Maintenance parameter value field, if present (i.e. sequencing vs. transit delay) and set to zero otherwise.

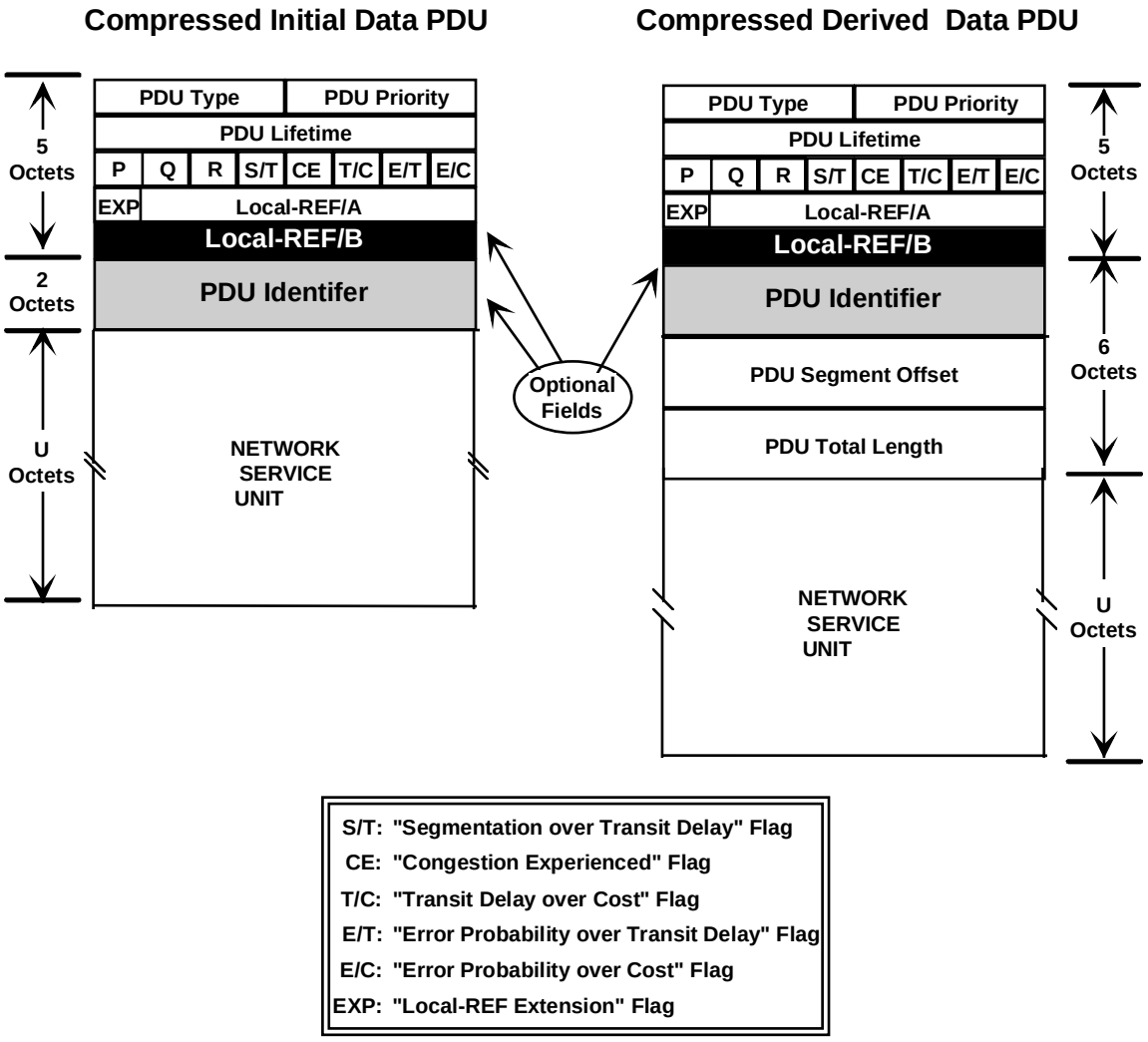

Figure 5.5.7-6 Compressed Initial and Derived PDU Formats

5.7.6.3.3.2.8.3 The CE field shall be set to the value of bit 4 in the Quality of Service Maintenance parameter value field.

5.7.6.3.3.2.8.4 The T/C field shall be set to the value of bit 3 in the Quality of Service Maintenance parameter value field.

5.7.6.3.3.2.8.5 The E/T field shall be set to the value of bit 2 in the Quality of Service Maintenance parameter value field.

5.7.6.3.3.2.8.6 The E/C field shall be set to the value of bit 1 in the Quality of Service Maintenance parameter value field.

5.7.6.3.3.2.9 EXP, Local-REF/A and Local-REF/B Fields

5.7.6.3.3.2.9.1 If the value of the Local Reference determined according to the procedure specified in 5.5.7.6.3.2.4 is less than 128, then the EXP field shall be set to zero.

5.7.6.3.3.2.9.2 In this case, only the Local-REF/A field shall be present in the PDU.

5.7.6.3.3.2.9.3 The Local-REF/A field value shall be set to the value of the Local Reference encoded as an unsigned integer.

5.7.6.3.3.2.9.4 If the value of the Local Reference is greater than or equal to 128, the EXP field shall be set to one, and both Local-REF/A and Local-REF/B fields shall be present in the PDU.

5.7.6.3.3.2.9.5 The Local Reference shall be encoded as a 15 bit unsigned integer, with the least significant eight bits placed in the Local-REF/B

field, and the most significant seven bits placed in the Local-REF/A field.

5.7.6.3.3.2.13.1 This field shall contain the Data Part of the original Initial DT PDU.

Table 5.5.7-7 Derived PDU Type Codes

PDU Type Values	CLNP NPDU ER Value	CLNP NPDU SP Value	CLNP NPDU MS Value
0 1 1 0	0	1	0
0 1 1 1	0	1	1
1 0 0 1	1	1	0
1 0 1 0	1	1	1

5.7.6.3.3.2.10 PDU Identifier

5.7.6.3.3.2.10.1 If the Initial DT PDU allows segmentation (SP Flag is set to one), then the PDU Identifier field shall be included in the Compressed Initial Data PDU.

5.7.6.3.3.2.10.2 The PDU Identifier field shall contain the Data Unit Identifier as provided in the segmentation part of the Initial DT PDU.

5.7.6.3.3.2.10.3 If the Initial DT PDU does not allow segmentation (SP Flag is set to zero), then this field shall not be included in the Compressed Initial Data PDU.

5.7.6.3.3.2.11 PDU Segment Offset

5.7.6.3.3.2.11.1 This field shall not be present in the Compressed Data PDU for an Initial DT PDU.

Note. — The segment offset of an Initial DT PDU is always zero and is a priori known by the receiving SNDCF.

5.7.6.3.3.2.12 PDU Total Length

5.7.6.3.3.2.12.1 This field shall not be present in the Compressed Data PDU for an Initial DT PDU.

Note. — The Total Length field value of an Initial DT PDU is the length of the entire PDU in octets. This value is identical to the value of the Segment Length field for an Initial DT PDU and both values may be recalculated by the receiving SNDCF.

5.7.6.3.3.2.13 Network Service Data Unit Field

5.7.6.3.3.3 Derived DT PDU Compression

5.7.6.3.3.3.1 General

5.7.6.3.3.3.1.1 The original Derived DT PDU shall be compressed into the Compressed Derived Data PDU as shown in Figure 5.5.7-6.

5.7.6.3.3.3.1.2 The fields of the Compressed Derived Data PDU shall be set as defined in the following sections.

5.7.6.3.3.3.2 Type Field

5.7.6.3.3.3.2.1 The PDU Type field value shall be set according to the values of the original NPDU ER, SP and MS flags as defined in Table 5.5.7-7.

5.7.6.3.3.3.3 PDU Priority Field

5.7.6.3.3.3.3.1 This field shall be set as defined in 5.5.7.6.3.3.2.3.

5.7.6.3.3.3.4 PDU Lifetime Field

5.7.6.3.3.3.4.1 This field shall be set as defined in 5.5.7.6.3.3.2.4.

5.7.6.3.3.3.5 P bit Field

5.7.6.3.3.3.5.1 This field shall be set as defined in 5.5.7.6.3.3.2.5.

5.7.6.3.3.3.6 Q bit Field

5.7.6.3.3.3.6.1 This field shall be set as defined in 5.5.7.6.3.3.2.6.

5.7.6.3.3.3.7 S/T, CE , T/C, E/T, and E/C Fields

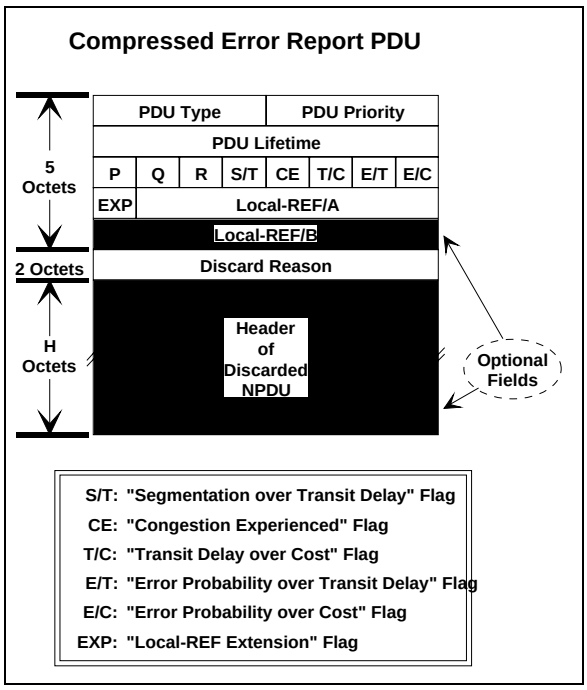

Figure 5.5.7-7 Compressed Error Report PDU

5.7.6.3.3.3.7.1 These fields shall be set as defined in 5.5.7.6.3.3.2.8.

5.7.6.3.3.3.8 EXP, Local-REF/A and Local-REF/B Fields

5.7.6.3.3.3.8.1 These fields shall be set as defined in 5.5.7.6.3.3.2.9.

5.7.6.3.3.3.9 PDU Identifier Field

5.7.6.3.3.3.9.1 The PDU Identifier field value shall be set to the Data Unit Identifier contained in the segmentation part of the original Derived DT PDU header.

5.7.6.3.3.3.10 PDU Segment Offset Field

5.7.6.3.3.3.10.1 The PDU Segment Offset field value shall be set to the Segment Offset value contained in the segmentation part of the original Derived DT PDU header.

5.7.6.3.3.3.11 PDU Total Length Field

5.7.6.3.3.3.11.1 The PDU Total Length field value shall be set to the value of the Total Length field contained in the Segmentation Part of the original Derived DT PDU.

5.7.6.3.3.4 Error Report PDU Compression

5.7.6.3.3.4.1 General

5.7.6.3.3.4.1.1 The original ER PDU shall be compressed into the Compressed Error Report PDU as shown in Figure 5.5.7-7.

5.7.6.3.3.4.1.2 The fields of the Compressed Error Report PDU shall be set as defined in the following sections.

5.7.6.3.3.4.2 PDU Type Field

5.7.6.3.3.4.2.1 The PDU Type field value shall be set to **[1101]**.

5.7.6.3.3.4.3 PDU Priority Field

5.7.6.3.3.4.3.1 This field shall be set as defined in 5.5.7.6.3.3.2.3.

5.7.6.3.3.4.4 PDU Lifetime Field

5.7.6.3.3.4.4.1 This field shall be set as defined in 5.5.7.6.3.3.2.4.

5.7.6.3.3.4.5 P bit Field

5.7.6.3.3.4.5.1 This field shall be as defined in 5.5.7.6.3.3.2.5.

5.7.6.3.3.4.6 Q bit Field

5.7.6.3.3.4.6.1 This field shall be set as defined in 5.5.7.6.3.3.2.6.

5.7.6.3.3.4.7 S/T, CE , T/C, E/T and E/C Fields

5.7.6.3.3.4.7.1 These fields shall be set as defined in 5.5.7.6.3.3.2.8.

5.7.6.3.3.4.8 EXP, Local-REF/A, Local-REF/B Fields

5.7.6.3.3.4.8.1 These fields shall be set as defined in 5.5.7.6.3.3.2.9.

5.7.6.3.3.4.9 Discard Reason Field

5.7.6.3.3.4.9.1 This field shall be set to the value of the Reason for Discard Parameter Value field contained in the original NPDU header.

5.7.6.3.3.4.10 Header of Discarded NPDU Field

5.7.6.3.3.4.10.1 This field shall contain the value of the Error Report Data Part if provided in the original Error Report PDU.

5.7.6.3.3.4.11 Transfer of Compressed ISO/IEC 8473 PDUs

5.7.6.3.3.4.11.1 The compressed ISO/IEC 8473 NPDU (i.e. Compressed Initial Data PDU, Compressed Derived Data PDU, or Compressed Error Report PDU) shall be inserted in the User Data field of an ISO/IEC 8208 Data packet and shall be sent over the virtual circuit, using the ISO/IEC 8208 M-bit segmentation procedure if appropriate.

5.7.6.3.4 Processing of Packets Received from the Subnetwork Service Provider

Table 5.5.7-9 Mapping between Compressed PDU Type Fields and Uncompressed PDU Types

Compressed PDU Type Field	PDU Type
[0000] - [0011]	Compressed Initial DT PDU
[0110] - [0111] [1001] - [1010]	Compressed Derived DT PDU
[1101]	Compressed Error Report PDU
[1110]	SNDCF Error Report
[0100]	Cancellation Request PDU
[0101]	Cancellation Accept PDU

Note . — The following sections specify the processing of packets received from the Subnetwork Service provider.

5.7.6.3.4.1 Initial Processing of NPDU

5.7.6.3.4.1.1 On receipt of an incoming packet received from a virtual circuit, the SNDCF shall inspect the first octet to determine the Network Layer Protocol ID or the compressed PDU type (see Table 5.5.7-9).

a) If this value is set to **[1000 0001]** indicating that the NPDU is an ISO/IEC 8473 NPDU with an uncompressed header, then the NPDU shall be processed according to 5.5.7.6.3.4.2.2.

b) If the first octet indicates either ISO/IEC 9542 (ES-IS), ISO/IEC 11577 (NLSP) or ISO/IEC 10589 (IS-IS), the SNDCF shall generate an SN-UNITDATA.indication with the NPDU as its SN-Userdata parameter, and the SN-Source-Address and SN-Destination-Address parameters set to the remote and local DTE addresses for the virtual circuit over which the NPDU was received.

c) If the value of the first four bits of the first octet is in the range binary **[0000]** to binary **[0011]** then the PDU is a compressed ISO/IEC 8473 Initial DT PDU which shall be decompressed using the procedures specified in 5.5.7.6.3.4.3.

d) If the value of the first four bits of the first octet is in the range binary **[0110]** to binary **[1010]** (excluding 1000) then the PDU is a compressed ISO/IEC 8473 Derived PDU, which shall be decompressed using the procedures specified in 5.5.7.6.3.4.3.

e) If the value of the first four bits of the first octet is binary **[1101]** then the PDU is a compressed ISO/IEC 8473 Error PDU, which shall be decompressed using the procedures specified in 5.5.7.6.3.4.4.

f) If the value of the first four bits of the first octet is binary **[1110]** then the PDU is an SNDCF Error Report, which shall be processed according to the procedures of 5.5.7.6.3.4.5, and no SN-UNITDATA.indication generated.

g) If the value of the first four bits of the first octet is binary **[0100]** or binary **[0101],** then the PDU is respectively, a local reference cancellation request or response, which shall be processed according to the procedures of 5.5.7.6.3.6 and no SN-UNITDATA.indication generated.

In all other cases, the PDU shall be discarded and an SNDCF Error Report Generated (see 5.5.7.6.3.5).

5.7.6.3.4.2 Incoming ISO/IEC 8473 PDU with Uncompressed Header

5.7.6.3.4.2.1 General

5.7.6.3.4.2.1.1 If the received NPDU is an ISO/IEC 8473 NPDU then the options part shall be inspected for the options field containing the local reference.

5.7.6.3.4.2.2 Processing of Unmodified ISO/IEC 8473 PDUs

5.7.6.3.4.2.2.1 If the local reference option is not present, then the SNDCF shall generate a SN-UNITDATA indication with the NPDU as its SN-Userdata, and the SN-Source-Address and SN-Destination-Address parameters set to the remote and local DTE addresses for the virtual circuit over which the NPDU was received.

5.7.6.3.4.2.3 Processing of Modified ISO/IEC 8473 PDUs

5.7.6.3.4.2.3.1 If the Local Reference option is present, it shall be removed, and the checksum and PDU header length indication and segment length shall be modified to reflect this removal.

5.7.6.3.4.2.3.2 If a Local Reference options field is present, then the local directory associated with the virtual circuit over which the PDU was received shall be inspected for the presence of the corresponding entry.

5.7.6.3.4.2.3.3 If no such entry is present, and the value of the Local Reference is in the range within which the remote SNDCF is permitted to create local directory entries, then the entry shall be created, and:

a) The value of the inward NSAP Address set to the PDU's destination NSAP Address,

b) The value of the outward NSAP Address set to the NSAP's source NSAP Address, and

c) The values of the Version Number and Security Parameter, set to the corresponding values in the PDU header.

5.7.6.3.4.2.3.4 An SNDCF Error Report (see 5.5.7.6.3.5) shall be generated if the value of the Local Reference is not within the range within which the remote SNDCF is permitted to create local directory entries, or is greater than the maximum negotiated when the call was established.

5.7.6.3.4.2.3.5 Otherwise, the local directory entry shall be compared with the received PDU. If:

a) The inward NSAP Address does not match the destination NSAP Address, or

b) The outward NSAP Address does not match the source NSAP Address, or

c) The Version Number does not match the Version Number present in the directory entry, or

d) The value of the Security options parameter does not match the value in the directory, or is not correspondingly absent, then

an SNDCF Error Report shall be generated and returned over the same virtual circuit as the PDU was received.

5.7.6.3.4.2.3.6 The SNDCF shall then generate a SN-UNITDATA.indication with the NPDU as its SN-Userdata, and the SN-Source-Address and SN-Destination-Address parameters set to the remote and local DTE addresses for the virtual circuit over which the NPDU was received.

5.7.6.3.4.3 Incoming Compressed Data PDU

5.7.6.3.4.3.1 General

5.7.6.3.4.3.1.1 If the most significant four bits of the first octet of a received PDU (i.e. the PDU Type field) are in the range **[0000]** to **[0011]** binary, excluding **[1000]**, then the packet is a compressed ISO/IEC 8473 Initial DT NPDU.

5.7.6.3.4.3.1.2 If the PDU Type field of a received compressed PDU is in the range **[0110]** to **[1010]** binary, then the PDU is a compressed ISO/IEC 8473 Derived DT NPDU.

5.7.6.3.4.3.1.3 Upon receipt, the SNDCF shall examine and validate the Local-REF in the compressed PDU.

5.7.6.3.4.3.1.4 The value of the Local Reference shall be extracted from the compressed header and the corresponding entry in the local directory located.

5.7.6.3.4.3.1.5 If no entry exists corresponding to the Local-REF present in the PDU, then an SNDCF Error Report shall be generated and returned over the same virtual circuit as the PDU was received, and the PDU shall be discarded .

5.7.6.3.4.3.1.6 If the Local-REF is valid, the original uncompressed NPDU shall be recreated by the procedures defined in 5.5.7.6.3.4.3.2 through 5.5.7.6.3.4.3.6.

5.7.6.3.4.3.1.7 The SNDCF then shall generate a SN-UNITDATA.indication with the SN-Source Address and SN-Destination Address parameters set to the remote and local DTE addresses for the virtual circuit over which the NPDU was received, and the SN-Userdata shall be set to the uncompressed DT NPDU.

5.7.6.3.4.3.2 Fixed Part

Note 1. — The Fixed Part of the NPDU header consists of the Network Layer Protocol Identifier, Length Indicator, Version/Protocol Identifier Extension, PDU Lifetime, SP flag, MS flag, E/R Flag, Type, Segment Length and Checksum fields as defined in ISO/IEC 8473.

Note 2.— If the EXP field is set to zero, the Local Reference is the seven bit integer value of the Local-REF/A field. If the EXP field is set to one, the Local Reference value consists of the fifteen bit unsigned integer as stored with the least significant eight bits placed in the Local-REF/B field, and the most significant seven bits placed in the Local-REF/A field.

5.7.6.3.4.3.2.1 Network Layer Protocol Identifier

5.7.6.3.4.3.2.1.1 This field shall be set to binary **[1000 0001]** to identify this Network Layer Protocol as ISO/IEC 8473.

5.7.6.3.4.3.2.2 Length Indicator

5.7.6.3.4.3.2.2.1 This field shall be set to the length of the uncompressed NPDU header in octets.

5.7.6.3.4.3.2.3 Version/Protocol Identifier Extension

The Version/Protocol Identifier Extension field shall be set to the values provided in the corresponding entry of the local directory.

5.7.6.3.4.3.2.4 PDU Lifetime

5.7.6.3.4.3.2.4.1 The eight bits of the PDU Lifetime field shall be set to the eight bits of the PDU Lifetime field of the Compressed Data PDU.

5.7.6.3.4.3.2.5 Segmentation Permitted, More Segments, Error Report Flags

5.7.6.3.4.3.2.5.1 The values of these flags shall be derived fromthe value of the Protocol ID field and Type field of the Compressed Data PDU.

5.7.6.3.4.3.2.5.2 These flag values shall be determined according to Table 5.5.7-6 for an Initial Data PDU and Table 5.5.7-7 for a Derived Data PDU.

5.7.6.3.4.3.2.6 Type Code

5.7.6.3.4.3.2.6.1 This field shall be set to binary **[11100]** to indicate a DT PDU.

5.7.6.3.4.3.2.7 Segment Length

5.7.6.3.4.3.2.7.1 This field shall indicate the entire length in octets of the PDU, including both header and data.

5.7.6.3.4.3.2.7.2 The value of this field shall be computed by the SNDCF.

5.7.6.3.4.3.2.7.3 For an Initial DT NPDU, the value of this field shall be identical to the value of the Total Length field located in the Segmentation Part of the header.

5.7.6.3.4.3.2.8 PDU Checksum

5.7.6.3.4.3.2.8.1 The value of this field shall be set to zero if the R bit in the compressed header is zero.

5.7.6.3.4.3.2.8.2 Otherwise, a Checksum field shall be recomputed.

Note.— For the DT PDU, this includes the segmentation and options part (if present). For the Error Report PDU, this includes the reason for discard field as well.

5.7.6.3.4.3.3 Address Part

Note.— The Address Part consists of the Destination Address Length Indicator, Destination Address, Source Address Length Indicator and Source Address as defined in ISO/IEC 8473.

5.7.6.3.4.3.3.1 Destination and Source Address Length Indicators and Addresses

5.7.6.3.4.3.3.1.1 The Source and Destination NSAP addresses shall be set to the values provided in the corresponding entry of the local directory for the Local Reference number calculated.

5.7.6.3.4.3.3.1.2 The source NSAP Address shall be set to the value of the outward NSAP Address, and the destination NSAP Address set to the value of the inward NSAP Address.

5.7.6.3.4.3.3.1.3 The Length fields shall contain the length of each address in octets.

5.7.6.3.4.3.4 Segmentation Part

5.7.6.3.4.3.4.1 General

5.7.6.3.4.3.4.1.1 If the ISO/IEC 8473 SP field is set to one, then the Segmentation Part shall be generated.

5.7.6.3.4.3.4.1.2 The Segmentation Part shall consist of the Data Unit Identifier, Segment Offset, and Total Length field as defined in ISO/IEC 8473.

5.7.6.3.4.3.4.2 Data Unit Identifier

5.7.6.3.4.3.4.2.1 This field shall contain the value of the PDU Identifier field as provided in the compressed DT PDU.

5.7.6.3.4.3.4.3 Segment Offset

5.7.6.3.4.3.4.3.1 For an Initial DT PDU, this field shall be set to zero.

5.7.6.3.4.3.4.3.2 For a Derived DT PDU, this field shall be set to the PDU Segment Offset field as provided in the compressed DT PDU.

5.7.6.3.4.3.4.4 PDU Total Length

5.7.6.3.4.3.4.4.1 For a Derived DT PDU, this field shall contain the value of the PDU Total Length field as provided in the Compressed DT PDU.

5.7.6.3.4.3.4.4.2 For an Initial PDU, the entire length of the PDU in octets shall be calculated by the SNDCF and stored in this field.

5.7.6.3.4.3.5 Options Part

5.7.6.3.4.3.5.1 General

5.7.6.3.4.3.5.1.1 If the Q bit field is set to one, the Globally Unique QoS option shall be recreated according to 5.5.7.6.3.4.3.5.3.

5.7.6.3.4.3.5.1.2 If the Security option is present in the local reference directory entry, the Security option shall be recreated according to 5.5.7.6.3.4.3.5.4.

5.7.6.3.4.3.5.1.3 If the P bit field is set to one, the Priority option shall be recreated according to 5.5.7.6.3.4.3.5.2.

5.7.6.3.4.3.5.2 Priority

5.7.6.3.4.3.5.2.1 For the Priority option, the Parameter Code shall be set to binary **[1100 1101]** and the Parameter Length set to one octet.

5.7.6.3.4.3.5.2.2 The four most significant bits of the Parameter Value shall be set to zero, and the four least significant bits set to the PDU Priority field as provided in the compressed DT PDU.

5.7.6.3.4.3.5.3 Quality of Service Maintenance

5.7.6.3.4.3.5.3.1 For the Quality of Service Maintenance option, the Parameter Code shall be set to binary **[1100 0011]**, the Parameter Length set to one octet.

5.7.6.3.4.3.5.3.2 The high order two bits of the Parameter Value shall be set to binary **[11]** to indicate Globally Unique, bit 6 shall be set to zero, and bits 5 through one set to the S/T, CE , T/C, E/T and E/C fields respectively as provided in the compressed Data PDU.

5.7.6.3.4.3.5.4 Security

5.7.6.3.4.3.5.4.1 This field shall be set to the value of the Security parameter contained in the corresponding Local Reference directory entry.

5.7.6.3.4.3.6 Data Part

5.7.6.3.4.3.6.1 The Data Part shall be copied from the Compressed Data PDU data part.

5.7.6.3.4.4 Incoming Compressed Error Report PDU

5.7.6.3.4.4.1 General

5.7.6.3.4.4.1.1 The original uncompressed header shall be recreated as defined in the following sections.

*Note.— If the four most significant bits of the first octet (the PDU Type Field) of a received packet are **[1101]** then the packet is a compressed ISO/IEC 8473 ER NPDU.*

5.7.6.3.4.4.2 Fixed Part

5.7.6.3.4.4.2.1 The Fixed Part of the ER PDU shall be composed in the same manner as defined in 5.5.7.6.3.4.3.2 except for the Type Code which shall be set to binary **[00001]** to indicate an ER PDU, and for the SP and MS flags which shall be set to zeros.

5.7.6.3.4.4.3 Address Part

5.7.6.3.4.4.3.1 The Address Part of the ER PDU shall be composed in the same manner as defined in 5.5.7.6.3.4.3.3.

5.7.6.3.4.4.4 Options Part

5.7.6.3.4.4.4.1 The Options Part of the ER PDU shall be composed in the same manner as defined in 5.5.7.6.3.4.3.5 for an Initial DT PDU.

5.7.6.3.4.4.5 Reason for Discard

5.7.6.3.4.4.5.1 To compose this field, the Parameter Code shall be set to binary **[1100 0001]**, the Parameter Length set to two octets, and the Parameter Value set to the Discard Reason field as provided in the Compressed Error Report PDU.

5.7.6.3.4.4.6 Error Report Data Part

5.7.6.3.4.4.6.1 If the Compressed Error Report PDU contains the Header of Discarded NPDU field, then the Error Report Data Part shall be set to the value of the Header of Discarded NPDU field.

5.7.6.3.4.5 Incoming SNDCF Error Report

5.7.6.3.4.5.1 On receipt of an SNDCF Error Report, the virtual circuit shall be reset (see 5.0), unless the reason is "compressed PDU with unrecognized local reference".

5.7.6.3.4.5.2 In this case, the directory entry corresponding to the local reference returned in the SNDCF Error Report shall be reset to the unused state.

5.7.6.3.4.5.3 **Recommendation** .*— The error should be notified to Systems Management.*

*Note.— If the four most significant bits of the first octet (the PDU Type field) of an incoming packet are set to **[1110]**, then a SNDCF Error Report has been received (see 5.5.7.6.3.5).*

5.7.6.3.5 SNDCF Error Report

5.7.6.3.5.1 The SNDCF Error Report is a packet format unique to the Mobile SNDCF, and shall be used to report errors in the use of local references as specified below.

5.7.6.3.5.2 The SNDCF Error Report PDU shall be constructed as follows:

a) The most significant four bits (PDU Type) of the first octet are set to binary 1110, while the least significant four bits are set to 0000.

b) The second octet is a discard reason encoded as an unsigned integer, with the following reason codes defined in the Table below:

Table 5.5.7-11 SNDCF Error Report Diagnostic Codes

Code	Reason
[0000 0000]	Compressed NPDU with unrecognized Local Reference
[0000 0001]	Creation of directory entry outside of sender's permitted range
[0000 0010]	Directory entry exists
[0000 0011]	Local Reference greater than maximum value accepted.
[0000 0100]	Data Unit Identifier missing when SP=1.
[0000 0101]	Reserved.
[0000 0111]	Compressed ISO/IEC 8473 PDU with unrecognized Type.
[0000 1000]	Local Reference Cancellation Error

c) The Local Reference contained in the PDU for which the error is being reported is placed in the remaining octet(s) of the SNDCF Error Report PDU Header, unless the reason is Local Reference Cancellation Error, when the SNDCF Error Report shall consist of three octets only, and the third octet shall contain the Cancellation Reference of the invalid Cancellation Request PDU.

5.7.6.3.5.3 The data portion of the SNDCF Error Report shall be used to return a copy of the PDU in error, similar to the ISO/IEC 8473 Error Report PDU.

5.7.6.3.5.4 The Error Report PDU shall be sent as an ISO/IEC 8208 DATA packet(s) and, if needed, segmented using the M-bit procedures.

5.7.6.3.6 Local Reference Cancellation Option

5.7.6.3.6.1 General

Note.— When the implementation of this option has been agreed by both SNDCFs using a virtual circuit during the call setup procedures, then the

following procedures may be used to selectively cancel one or more Local References, i.e. make them available for re-use. An SNDCF may only request the cancellation of Local References which are within the range in which it is permitted to assign Local References.

5.7.6.3.6.1.1 When an SNDCF invokes the procedures for Local Reference cancellation it shall format a Cancellation Request PDU, as specified below, and send the PDU to the other SNDCF over the virtual circuit to which it applies.

5.7.6.3.6.1.2 A Cancellation Request PDU shall be retransmitted periodically until it is acknowledged by a cancellation accept PDU, or an SNDCF Error Report PDU is received indicating an error in the request.

5.7.6.3.6.1.3 When a Cancellation Accept PDU is received, the corresponding directory entries shall be cleared, and the Local References therefore become available for re-use.

5.7.6.3.6.1.4 When an SNDCF receives a Cancellation Request PDU, it shall first check to ensure that the local references identified in the PDU are within the range in which the sending SNDCF is permitted to assign local references.

5.7.6.3.6.1.5 If any one of them is not, then an SNDCF error report shall be returned, and the request ignored.

5.7.6.3.6.1.6 Otherwise, the directory entries corresponding to the indicated local references shall be cleared, and a cancellation accept PDU be formatted and returned, in order to accept cancellation of these local references.

5.7.6.3.6.2 The Cancellation Request PDU

5.7.6.3.6.2.1 The PDU format shall be as illustrated in Figure 5.5.7-6. The first octet shall be set to **[0100 0000]**. The remainder of the PDU shall consist of:

a) A Cancellation Reference expressed as a one octet unsigned integer, and which uniquely identifies this Cancellation Request within the context of the virtual circuit.

Note 1.— In most cases uniqueness will be assured if the reference is implemented as a sequence number starting at zero and incremented by one (modulo 256), each time a Cancellation Request is sent.

b) A length octet (L1) given as an unsigned integer (0 to 255), which indicates the length in octets of the set of individual Local References to cancel.

c) One or more Local References expressed as one or two octets each, as appropriate, and encoded in successive octets, with the total number of octets containing such local references given by L1.

d) A length octet (L2) given as an unsigned integer (0 to 255), which indicates the length in octets of the set of inclusive Local Reference ranges to cancel.

e) One or more pairs of Local Reference ranges expressed as one or two octets each, as appropriate, and encoded in successive octets, with the total number of octets containing such Local References given by L2.

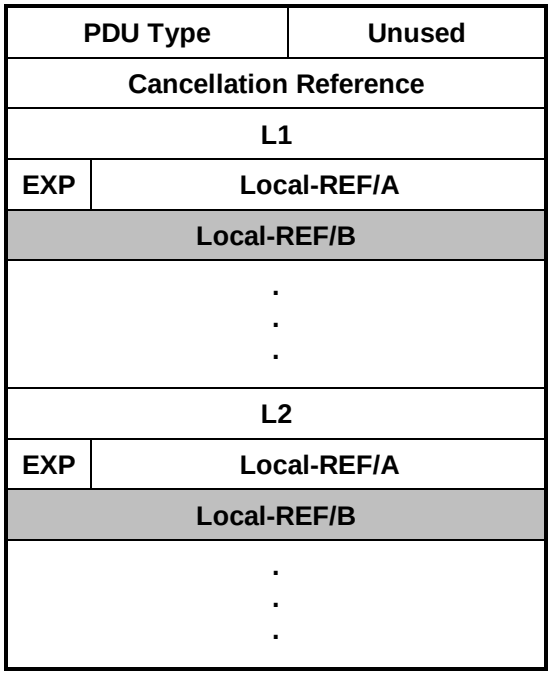

Figure 5.5.7-6 Cancellation Request PDU

5.7.6.3.6.2.2 In each of the above cases, if the value of a local reference is less than 128, then bit eight of the first octet in which it is encoded shall be set to zero, and the remaining seven bits set to the value of the Local Reference encoded as an unsigned integer.

5.7.6.3.6.2.3 The extended Local Reference octet shall not be present.

5.7.6.3.6.2.4 Otherwise, bit eight shall be set to one, and the remaining seven bits and the next octet set to the value of the Local Reference encoded as a 15 bit unsigned integer, with the least

significant eight bits placed in the extended Local Reference octet, and the most significant seven bits placed in the first octet.

Note 2.— This format allows for the Local References to be cancelled, to be expressed as either a set of individual references, or a set of inclusive ranges of individual references, or both.

5.7.6.3.6.3 The Cancellation Accept PDU

5.7.6.3.6.3.1 The PDU format shall be as illustrated in Figure 5.5.7-10.

5.7.6.3.6.3.2 The first octet shall be set to binary **[0101 0000]**, and the second octet set to the Cancellation Reference of the Cancellation Request which is being accepted.

PDU Type	Unused
Cancellation Reference	

Figure 5.5.7-10 Cancellation Accept PDU

5.7.6.3.7 Call Reset Provisions

5.7.6.3.7.1 If at any time, a Reset Indication is received indicating a DCE originated reset, then this shall be confirmed and all other procedures associated with the Call Reset performed.

Note. —There is Otherwise no impact on this SNDCF.

5.7.6.3.7.2 If the Reset Indication indicates a DTE user originated reset then, additionally, the directory associated with the virtual circuit shall be cleared to its initial state.

5.7.6.3.8 Call Clearing and LREF Procedures

5.7.6.3.8.1 When a virtual circuit has been terminated, then the local directory associated with the virtual circuit shall be discarded.

~~Convergence Provisions for ISO/IEC 8802-2 Broadcast Subnetworks~~

~~The SNDCF for use with ISO/IEC 8802-2 Broadcast Subnetworks shall be implemented according to ISO/IEC 8473-2.~~

~~Convergence Provisions for Common ICAO Data Interchange Network (CIDIN)~~

~~*General ConsiderationsNote.— CIDIN provides a Connectionless Mode Service so that the functionality provided by CIDIN at level 4 is already very close to what is required by the ATN network protocol.*~~

~~The SNDCF for CIDIN shall be as specified in the following sections.~~

~~SN-UNITDATA Request and Indication Primitives~~

~~These primitives shall correspond to the request to send a CIDIN message at a CIDIN entry centre and the reception of a CIDIN message at a CIDIN exit centre respectively.~~

~~CIDIN messages shall be sent with the "no acknowledgement" option.~~

~~*Note.— CIDIN messages requested to be transported to exit addresses which are not reachable are discarded in the entry centre.*~~

~~SN Source Address~~

~~This address shall correspond to a CIDIN entry address in the Entry Address item.~~

~~SN Destination Address~~

~~This address shall correspond to a CIDIN exit address in an Exit Address item.~~

~~SN Quality of Service~~

~~*A priori* values for transit delay, protection against unauthorized access, cost determinants and residual error probability shall be entered as management data in the ATN system.~~

~~SN Priority~~

~~The mapping between SN Priority and the CIDIN Subnetwork Priority shall be entered as management data in the ATN system.~~

~~SNS-Userdata~~

~~SNS-Userdata shall be conveyed as the contents of the CIDIN message which is transported transparently by CIDIN.~~

~~*Note.— The coding of the CIDIN message is code and byte independent.*~~

5.7.6.4 ATN NSAP Compression Algorithm (ACA)

5.7.6.4.1 General Overview

5.7.6.4.1.1 When negotiated in the Mobile SNDCF Call establishment phase, the optional ACA algorithms shall be applied as follows:

a) the compression processing (5.5.7.6.4.5) to data octets being output to the subnetwork, and

b) the decompression processing (5.5.7.6.4.6) to data octets input from the subnetwork.

5.7.6.4.2 Address Length Determination

5.7.6.4.2.1 The address length for the address or address prefix to be compressed shall be extracted from the octet preceding the AFI octet in the uncompressed data stream.

5.7.6.4.2.2 If the extracted length lies in the range 7 through 20, the extracted length shall be used as the address "octet length" and the address length type shall be indicated as "normal".

5.7.6.4.2.3 If the extracted length lies in the range 56 through 160 and is an integral multiple of 8, the extracted length shall be divided by 8 to compute the length in octets of the address prefix and the address length type shall be indicated as "IDRP".

5.7.6.4.2.4 If the extracted length does not lie in either of these ranges, the input data does not form a compressible ATN NSAP address and the ACA shall not further process the current data as a compressible ATN NSAP address.

5.7.6.4.2.5 The octet length for ACA compressed address prefixes shall be encoded in the first header octet LEN/SEL subfield and the FP subfield shall be set to one.

5.7.6.4.2.6 If the octet length for the ACA compressed address is 20 (indicating a full address instead of a prefix) the FP subfield shall be set to zero.

5.7.6.4.2.7 The explicit address length octet shall be removed as part of the ACA compression processing.

Note 1.— No length octet is required for compressed ACA addresses. All information concerning address length and the presence or length of variable-length fields is contained in the header octets.

Note 2.— The shortest ATN NSAP address prefix that can be compressed is 7 octets and the length of a full ATN address is 20 octets.

Note 3.— Address lengths for normal addresses and prefixes are expressed in octet units. The address lengths for IDRP addresses and prefixes are expressed in bit units (even though the address lengths are always in full octets).

Note 4.—The IDRP subfield in the first header octet indicates whether the expanded address used octet or bit length units. Internal (compressed) addresses assume octet lengths for encoding.

5.7.6.4.3 Compressed Address Structure

5.7.6.4.3.1 General

5.7.6.4.3.1.1 An ACA compressed address or address prefix shall consist of the following components in the order shown below:

Table 5.5.7-9 Compressed NSAP Address Format

Name	Length (octets)	Reference
Address Marker	2	7.9.4
Header Octet 1	1	7.9.3.1.1
Header Octet 2	1	7.9.3.1.2
Compressed ADM	2 or 3	7.9.3.2
Variable Fields	0 to 14	7.9.3.3

The coding and use of each component shall be as defined below.

Note.— Multi-octet uncompressed ATN address fields (ADM, ARS, LOC, and SYS) are processed from left to right, i.e. from most-significant to least-significant octet.

5.7.6.4.3.2 Address Header Octets

5.7.6.4.3.2.1 General

5.7.6.4.3.2.1.1 Two header octets shall begin each compressed address or address prefix.

5.7.6.4.3.2.1.2 All bits of these header octets shall be set to zero unless otherwise specified in the following subparagraphs.

5.7.6.4.3.2.1.3 Bits in each header octet shall be assigned from the high-order (most-significant or left-most).

Note.— The value of the first header octet is never zero for any compressed address. This prevents confusing a compressed address with an embedded address marker (5.5.7.6.4.4.3).

5.7.6.4.3.2.2 First Header Octet

5.7.6.4.3.2.2.1 General

5.7.6.4.3.2.2.1.1 The first header octet of a compressed address shall be subdivided into four subfields as follows:

Table 5.7-10.

Name	Length (bits)	Comments
IDRP	1	Units of address length
FP	1	Full address of prefix
LEN/SEL	3	Address length or SEL code
CVER	3	Compressed VER value

The coding and use of each subfield shall be as defined below

5.7.6.4.3.2.2.2 IDRP Subfield

5.7.6.4.3.2.2.2.1 If the address length determination process (5.5.7.6.4.1, 5.5.7.6.4.2) indicates that the address to be compressed expresses length in octet units, the IDRP subfield shall be set to zero.

5.7.6.4.3.2.2.2.2 If the address expresses length in bit units (i.e. IDRP address), the IDRP subfield shall be set to one.

5.7.6.4.3.2.2.3 FP Subfield

5.7.6.4.3.2.2.3.1 The FP subfield shall be set to one if the address to be compressed is an address prefix.

5.7.6.4.3.2.2.3.2 The FP subfield shall be set to zero if the address to be compressed is a full address (i.e. its octet length is 20).

5.7.6.4.3.2.2.4 LEN/SEL Subfield

5.7.6.4.3.2.2.4.1 If the address to be compressed is an address prefix (the FP subfield is set to one), the LEN/SEL subfield shall be set to the the prefix length encoded using the encodings in the following table:

Table 5.7-11.

Length	Encoding	Comments
--	0	reserved
7	1	end with ADM
8	2	end with RDF
11	3	end with ARS
13	4	end with LOC
19	5	end with SYS
--	6, 7	unassigned

5.7.6.4.3.2.2.4.2 If the length is not found in this encoding table then the input data does not form an ATN NSAP address prefix that can be compressed and the address prefix shall not be further processed.

5.7.6.4.3.2.2.4.3 If the address to be compressed is a full address (the FP subfield is set to zero), the LEN/SEL subfield shall be set to the encoded value of the address SEL field (5.4.2.4.3) using encodings in the following table:

Table 5.7-12.

SEL	Encoding	Comments
--	0	reserved
00 hex	1	NET
fe hex	2	NET of an airborne router not supporting IDRP
--	3, 4, 5, 6	unassigned
--	7	other SEL codes

If the SEL field value in the address to be compressed is not one of the table entries above, the LEN/SEL encoding value shall be set to 7.

*Note .— A LEN/SEL subfield value of zero is not allowed in either encoding to insure that the first header octet can never have the value **[00]** hexadecimal. Hence, no compressed address can be confused with an embedded address marker (5.5.7.6.4.4.3).*

5.7.6.4.3.2.2.5 CVER Subfield

*5.7.6.4.3.2.2.5.1 If the value of the VER field in the address is in the range **[01- 07]**, **[41- 47]**, **[81- 87]**, or **[c1- c7]**, then the CVER subfield shall be set to the low-order 3 bits of the VER value.*

5.7.6.4.3.2.2.5.2 If the value of the VER field in the address is not in one of the above ranges, then the CVER subfield shall be set to zero.

Note.— The encoding of the version numbers in ATN addresses is defined in 5.4.2.4.3.4.

5.7.6.4.3.2.3 Second Header Octet

5.7.6.4.3.2.3.1 General

5.7.6.4.3.2.3.1.1 The second header octet of a compressed address shall be subdivided into 8 subfields as follows:

Table 5.7-13.

Name	Length (bits)	Comments
ADMF	1	Flag compressed ADM value
T/I	1	ATSC/AINSC
F/M	1	Fixed/Mobile
ARSD	1	Flag defaulted ARS value
LOCD	1	Flag defaulted LOC value
SYS6	1	Flag octet 6 of SYS = 0
SYS5	1	Flag octet 5 of SYS = 0
SYS4	1	Flag octet 4 of SYS = 0

5.7.6.4.3.2.3.1.2 The encodings and use of each subfield shall be as defined below.

5.7.6.4.3.2.3.2 ADMF Subfield

5.7.6.4.3.2.3.2.1 The ADMF subfield shall be set to one if the ADM value in the address to be compressed may be encoded into two octets using the identifier metacharacter syntax (5.4.2.3.7).

5.7.6.4.3.2.3.2.2 The ADMF subfield shall be set to zero if the ADM value in the address to be compressed cannot be expressed using the identifier metacharacter syntax.

Note.— The ADM value can be compressed if each of its three octets contain a character from one of the following character classes:

a) An upper-case letter "A-Z"

b) A decimal digit "0-9"

c) The "@" character.

5.7.6.4.3.2.3.3 T/I Subfield

*5.7.6.4.3.2.3.3.1 The T/I subfield shall be set to zero if the VER value in the address to be compressed lies in the ranges **[01]-[3f]** or **[41]-[7f]**, indicating that the address is in the AINSC domain.*

*5.7.6.4.3.2.3.3.2 The T/I subfield shall be set to one if the VER value in the address to be compressed lies in the ranges **[81]-[bf]** or **[c1]-[ff]**, indicating that the address is in the ATSC domain.*

*5.7.6.4.3.2.3.3.3 If the VER value in the address to be compressed is either **[00]**, **[40]**, **[80]**, or **[c0]**, then the T/I subfield shall be set to zero.*

Note. .— The encoding of the VER field in an ATN address is defined in 5.4.2.4.3.4.

5.7.6.4.3.2.3.4 F/M Subfield

*5.7.6.4.3.2.3.4.1 The F/M subfield shall be set to zero if the VER value in the address to be compressed lies in the ranges **[01]-[3f]** or **[81]-[bf]**, indicating that the address is a fixed system.*

*5.7.6.4.3.2.3.4.2 The F/M subfield shall be set to one if the VER value in the address to be compressed lies in the ranges **[41]-[7f]** or **[c1]-[ff]**, indicating that the address is a Mobile system.*

*Note.— The values **[00], [40], [80]** and **[c0]** are not used in the VER field of an ATN address (see 5.4.2.4.3.3)*

5.7.6.4.3.2.3.5 ARSD Subfield

*5.7.6.4.3.2.3.5.1 The ARSD subfield shall be set to zero if the ARS value in the address to be compressed is not the default value (**[000001]** hexadecimal) or if the address prefix to be compressed does not include an ARS field.*

5.7.6.4.3.2.3.5.2 The ARSD subfield shall be set to one if the ARS value in the address to be compressed has the default value (5.4.2.4.6.5).

5.7.6.4.3.2.3.6 LOCD Subfield

*5.7.6.4.3.2.3.6.1 The LOCD subfield shall be set to zero if the LOC value in the address to be compressed is not the default value (**[0001]** hexadecimal) or if the address prefix to be compressed does not include a LOC field. The LOCD subfield shall be set to one if the LOC value in the address to be compressed has the default value (5.4.2.4.7.5).*

5.7.6.4.3.2.3.7 SYS6 Subfield

5.7.6.4.3.2.3.7.1 The SYS6 subfield shall be set to zero if the value of the high-order (6th) octet of the SYS field in the address to be compressed is zero or if the address prefix to be compressed does not include a SYS field.

5.7.6.4.3.2.3.7.2 The SYS6 subfield shall be set to one if the value of the high-order (6th) octet of the SYS field in the address to be compressed is nonzero.

5.7.6.4.3.2.3.8 SYS5 Subfield

5.7.6.4.3.2.3.8.1 The SYS5 subfield shall be set to zero if the value of the second to high-order (5th) octet of the SYS field in the address to be compressed is zero or if the address prefix to be compressed does not include a SYS field.

5.7.6.4.3.2.3.8.2 The SYS5 subfield shall be set to one if the value of the second to high-order (5th) octet of the SYS field in the address to be compressed is nonzero.

5.7.6.4.3.2.3.9 SYS4 Subfield

5.7.6.4.3.2.3.9.1 The SYS4 subfield shall be set to zero if the value of the third to high-order (4th) octet of the SYS field in the address to be compressed is zero or if the address prefix to be compressed does not include a SYS field.

5.7.6.4.3.2.3.9.2 The SYS4 subfield shall be set to one if the value of the third to high-order (4th) octet of the SYS field in the address to be compressed is nonzero.

5.7.6.4.3.3 Compressed ADM Field

5.7.6.4.3.3.1 If the ADM field value of the address to be compressed follows the syntax of an identifier (5.4.2.3.7) then the compressed ADM field shall consist of two octets and shall contain the encoded value of the identifier obtained by applying the definitions in 5.4.2.3.7 to the ADM field value.

5.7.6.4.3.3.2 If the ADM field value of the address to be compressed does not follow the identifier syntax then the compressed ADM field shall consist of three octets and shall contain the 3-octet ADM value unchanged.

Note.— The value of the ADMF subfield in the second header octet indicates whether the compressed ADM field has the 2-octet (compressed) or 3-octet (uncompressed) format.

5.7.6.4.3.4 Variable Fields

5.7.6.4.3.4.1 The variable fields shall have a minimum length of 0 octets and a maximum length of 13 octets. Variable field data octets shall be concatenated when required in the order that their fields occur in the ATN address (Figure 5.7-3) as follows:

a) VER value (if > 7), 1 octet

b) ARS value (if not default), 3 octets

c) LOC value (if not default), 2 octets

d) SYS octet 6 value (if nonzero), 1 octet

e) SYS octet 5 value (if nonzero), 1 octet

f) SYS octet 4 value (if nonzero), 1 octet

g) SYS octets 3-1, 3 octets

h) SEL value (if not defined in 5.4.2.4.9.3), 1 octet

5.7.6.4.3.4.2 The ACA compression of address prefixes shall omit those variable fields b) through h) which are not present in the uncompressed address prefix.

5.7.6.4.4 Compressed Address Marker

5.7.6.4.4.1 General

5.7.6.4.4.1.1 The ACA shall prefix each compressed address or address prefix with an address marker.

5.7.6.4.4.1.2 The address marker shall consist of two octets with the value **[55aa]** hexadecimal.

5.7.6.4.4.1.3 The ACA shall process the case of the address marker value occuring in the input octet stream as defined in 5.5.7.6.4.4.3 below.

5.7.6.4.4.2 Normal Address Case

5.7.6.4.4.2.1 In the case of a normal compressed address or address prefix, the header octets of the compressed address format (5.5.7.6.4.3) shall follow the address marker.

*Note.— The first header octet of a compressed address can never have the value **[00]**. This distinguishes the normal address case from the embedded address case.*

5.7.6.4.4.3 Embedded Address Marker Case

5.7.6.4.4.3.1 If two octets with the value of an address marker occur in data, a padding octet with value **[00]** hexadecimal shall be inserted into the data stream following the embedded address marker octets.

Note 1.—The likelihood of embedded address markers in the input data stream is very low. When they occur, however, the ACA algorithm must add the extra padding octet. Hence, it is possible (although highly unlikely) for the ACA to expand data.

*Note 2.— The design of the ACA requires that the first header octet of a compressed address can never have the value **[00]** hexadecimal. Hence, the first header octet of a compressed address cannot be confused with the padding octet of an embedded address marker.*

5.7.6.4.5 Compression Algorithm

5.7.6.4.5.1 General

5.7.6.4.5.1.1 The ACA shall perform compression by replacing ATN addresses or address prefixes identified in the input octet stream with compressed, encoded equivalents as defined below.

5.7.6.4.5.1.2 The format of a compressed address shall be as defined in 5.5.7.6.4.3.

5.7.6.4.5.1.3 Each compressed address shall be prefixed with a compressed address marker (5.5.7.6.4.4).

5.7.6.4.5.1.4 Any embedded address markers found in the input octet stream shall be padded with a null-value octet (5.5.7.6.4.4.3).

5.7.6.4.5.1.5 The overall logic flow of the ACA compression processing shall be as defined in 5.5.7.6.4.5.3.

5.7.6.4.5.2 Address Encoding Process

5.7.6.4.5.2.1 General

5.7.6.4.5.2.1.1 The process of encoding an ATN address or address prefix into the ACA compressed format (5.5.7.6.4.3) shall be performed using the sequence of steps defined in this paragraph.

5.7.6.4.5.2.1.2 The steps shall be performed in the order they are listed.

5.7.6.4.5.2.1.3 If any step of the encoding process fails, the ACA compression processing shall not consider the current input octets as an address and shall continue with the compression logic.

5.7.6.4.5.2.2 Encoding Address Length

5.7.6.4.5.2.2.1 Determination of the length in octets of an address to be compressed shall be performed as defined in 5.7.6.2.

5.7.6.4.5.2.2.2 If the address length is of type "normal", the IDRP subfield in the first header octet shall be set to zero.

5.7.6.4.5.2.2.3 Otherwise, the IDRP subfield shall be set to one.

5.7.6.4.5.2.2.4 If the octet length of the address is 20 (indicating a full ATN address), the FP subfield in the first header octet shall be set to zero.

5.7.6.4.5.2.2.5 If the octet length of the address is less than 20 (indicating an address prefix), the FP subfield shall be set to one and the address length shall be encoded in the LEN/SEL subfield of the first header octet according to the table in 5.5.7.6.4.3.2.2.4.

5.7.6.4.5.2.2.6 If the address length is not found in the length table, the encoding process shall halt and the current input octet string shall not be treated as an ATN address.

5.7.6.4.5.2.3 Encoding the AFI and IDI Fields

5.7.6.4.5.2.3.1 No encoding shall be performed on the constant values of the address AFI and IDI fields.

5.7.6.4.5.2.3.2 These fields shall be omitted from the compressed address encoding.

5.7.6.4.5.2.4 Encoding the VER Field

*5.7.6.4.5.2.4.1 If the VER value in the address to be compressed lies within the range **[01]-[3f]**, the T/I subfield in the second header octet shall be set to zero and the F/M subfield in the second header octet shall be set to zero.*

*5.7.6.4.5.2.4.2 If the VER value lies within the range **[01]-[07]**, then the low-order 3 bits of the VER value shall be stored in the CVER subfield of the first header octet.*

*5.7.6.4.5.2.4.3 If the VER value lies in the range **[08]-[3f]**, then the CVER subfield shall be set to zero and the VER value octet shall be*

concatenated to the variable field of the encoded address.

*5.7.6.4.5.2.4.4 If the VER value in the address to be compressed lies within the range **[41]-[7f]**, the T/I subfield in the second header octet shall be set to zero and the F/M subfield in the second header octet shall be set to one.*

*5.7.6.4.5.2.4.5 If the VER value lies within the range **[41]-[47]**, then the low-order 3 bits of the VER value shall be stored in the CVER subfield of the first header octet.*

*5.7.6.4.5.2.4.6 If the VER value lies in the range **[48]-[7f]**, then the CVER subfield shall be set to zero and the VER value octet shall be concatenated to the variable field of the encoded adress.*

*5.7.6.4.5.2.4.7 If the VER value in the address to be compressed lies within the range **[81]-[bf]**, the T/I subfield in the second header octet shall be set to one and the F/M subfield in the second header octet shall be set to zero.*

*5.7.6.4.5.2.4.8 If the VER value lies within the range **[81]-[87]**, then the low-order 3 bits of the VER value shall be stored in the CVER subfield of the first header octet.*

*5.7.6.4.5.2.4.9 If the VER value lies in the range **[88]-[bf]**, then the CVER subfield shall be set to zero and the VER value octet shall be concatenated to the variable field of the encoded adress.*

*5.7.6.4.5.2.4.10 If the VER value in the address to be compressed lies within the range **[c1]-[ff]**, the T/I subfield in the second header octet shall be set to one and the F/M subfield in the second header octet shall be set to one.*

*5.7.6.4.5.2.4.11 If the VER value lies within the range **[c1]-[c7]**, then the low-order 3 bits of the VER value shall be stored in the CVER subfield of the first header octet.*

*5.7.6.4.5.2.4.12 If the VER value lies in the range **[c8]-[ff]**, then the CVER subfield shall be set to zero and the VER value octet shall be concatenated to the variable field of the encoded adress.*

*5.7.6.4.5.2.4.13 If the VER value is either **[00]**, **[40]**, **[80]**, or **[c0]**, the encoding process shall halt and the current input octet string shall not be treated as an ATN address.*

5.7.6.4.5.2.5 Encoding the ADM Field

5.7.6.4.5.2.5.1 If the three octets of the ADM field in the address to be compressed do not follow the rules for Identifier Syntax (5.4.2.3.7), the ADMF subfield in the second header octet shall be set to zero and the three octets of the ADM field value shall be concatenated to the compressed ADM of the encoded address.

5.7.6.4.5.2.5.2 If the ADM field value does follow the Identifier Syntax rules, the ADMF subfield shall be set to one and the two-octet compressed ADM value (5.5.7.6.4.3.3) shall be concatenated to the compressed ADM of the encoded address.

5.7.6.4.5.2.6 Encoding the RDF Field

5.7.6.4.5.2.6.1 If the address length indicates an address prefix whose length is less than or equal to 7, no RDF field value shall be encoded and the encoding process shall halt.

*5.7.6.4.5.2.6.2 If the RDF value in the address to be compressed is not **[00]**, the encoding process shall halt and the current input octet string shall not be treated as an ATN address.*

5.7.6.4.5.2.7 Encoding the ARS Field

5.7.6.4.5.2.7.1 If the address length indicates an address prefix whose length is less than or equal to 8, no ARS field value shall be encoded and the encoding process shall halt.

*5.7.6.4.5.2.7.2 If the ARS value of the address to be compressed has the default value (**[000001]** hexadecimal), the ARSD subfield in the second header octet shall be set to one.*

5.7.6.4.5.2.7.3 If the ARS value of the address to be compressed is not default, the ARSD subfield shall be set to zero and the three octets of the ARS value shall be concatenated to the variable field data of the encoded address.

5.7.6.4.5.2.8 Encoding the LOC Field

5.7.6.4.5.2.8.1 If the address length indicates an address prefix whose length is less than or equal to 11, no LOC field value shall be encoded and the encoding process shall halt.

*5.7.6.4.5.2.8.2 If the LOC value of the address to be compressed has the default value (**[0001]** hexadecimal), the LOCD subfield in the second header octet shall be set to one.*

5.7.6.4.5.2.8.3 If the LOC value of the address to be compressed is not default, the LOCD subfield shall be set to zero and the two octets of the LOC value shall be concatenated to the variable field data of the encoded address.

5.7.6.4.5.2.9 Encoding the SYS Field

5.7.6.4.5.2.9.1 If the address length indicates an address prefix whose length is less than or equal to 13, no SYS field value shall be encoded and the encoding process shall halt.

5.7.6.4.5.2.9.2 If the high-order (6th) octet of the SYS field of the address to be compressed has a nonzero value, the SYS6 subfield in the second header octet shall be set to zero and the value of the SYS field octet shall be concatenated to the variable field data of the encoded address. Otherwise, the SYS6 subfield shall be set to one.

5.7.6.4.5.2.9.3 If the second to high-order (5th) octet of the SYS field of the address to be compressed has a nonzero value, the SYS5 subfield in the second header octet shall be set to zero and the value of the SYS field octet shall be concatenated to the variable field data of the encoded address.

5.7.6.4.5.2.9.4 Otherwise, the SYS5 subfield shall be set to one.

5.7.6.4.5.2.9.5 If the third to high-order (4th) octet of the SYS field of the address to be compressed has a nonzero value, the SYS4 subfield in the second header octet shall be set to zero and the value of the SYS field octet shall be concatenated to the variable field data of the encoded address.

5.7.6.4.5.2.9.6 Otherwise, the SYS4 subfield shall be set to one.

5.7.6.4.5.2.9.7 The three remaining octets of the SYS field shall be concatenated to the variable field data of the encoded address.

5.7.6.4.5.2.10 Encoding the SEL Field

5.7.6.4.5.2.10.1 If the address length indicates an address prefix whose length is less than or equal to 19, no SEL field value shall be encoded and the encoding process shall halt.

5.7.6.4.5.2.10.2 Since the address length indicates a full ATN address, the FP subfield in the first header octet shall be set to zero.

5.7.6.4.5.2.10.3 The SEL value shall be encoded into the LEN/SEL subfield in the first header octet according to the table in 5.5.7.6.4.3.2.2.4.

5.7.6.4.5.2.10.4 If the SEL value is not one of the table entries, the LEN/SEL subfield shall be set to 7 and the SEL value octet shall be concatenated to the variable field data of the encoded address.

5.7.6.4.5.3 Compression Logic Flow

5.7.6.4.5.3.1 The ACA compression logic shall process octets sequentially from the uncompressed data input stream.

5.7.6.4.5.3.2 For each input octet, a test shall be performed to determine if the current octet and the subsequent octets form an ATN address or address prefix.

5.7.6.4.5.3.3 If they do form an ATN address, the ACA shall attempt to encode the address into the compressed address format (5.5.7.6.4.3) as defined in the steps of 5.5.7.6.4.5.2.

5.7.6.4.5.3.4 If the encoding process is successful, a compressed address marker (5.5.7.6.4.4) shall be output to the compressed octet stream followed by the compressed address octets.

5.7.6.4.5.3.5 The compression processing shall then continue with the next uncompressed data octet not a part of the address just processed.

5.7.6.4.5.3.6 If the encoding process fails, or if the current octet does not begin an ATN address, the ACA processing shall check at the current uncompressed octet position in the input data stream for an embedded address marker (5.5.7.6.4.4.3).

5.7.6.4.5.3.7 If an embedded address marker is found, the ACA shall copy the address marker octets to the compressed output octet stream. A padding zero-valued octet shall be output as well as the address marker.

5.7.6.4.5.3.8 The compression processing shall then continue with the next uncompressed data octet not a part of the embedded address marker.

5.7.6.4.5.3.9 If neither an ATN address or embedded address mark is found, the ACA shall copy the current uncompressed input octet to the compressed output octet stream and shall continue processing with the next sequential input octet.

Note.— Since the ACA compression logic may not recognize the appearance of an ATN address or

prefix in the data stream until after the uncompressed length octet has been processed (the length octet precedes the fixed-value ATN AFI and IDI fields that distinguish an ATN address), the ACA compression process will need to be able to recall the value of the previous input octet during compression processing. Hence, a one-octet "backup" may be necessary in the implementation of the ACA compression logic.

5.7.6.4.6 Decompression Algorithm

5.7.6.4.6.1 General

5.7.6.4.6.1.1 The ACA shall perform decompression by replacing compressed ATN addresses or address prefixes in the ACA compressed format (5.5.7.6.4.3) with their expanded equivalent as defined below. Address markers and padding octets shall be removed from the data stream during ACA decompression processing.

5.7.6.4.6.1.2 The overall logic flow of the ACA decompression processing shall be as defined in 5.5.7.6.4.5.3.

5.7.6.4.6.2 Address Decoding Process

5.7.6.4.6.2.1 General

5.7.6.4.6.2.1.1 The process of decoding a compressed ATN address or address prefix from the ACA compressed format (5.5.7.6.4.3) shall be performed using the sequence of steps defined in the following paragraphs.

5.7.6.4.6.2.1.2 The steps shall be performed in the order listed below. The expanded address or prefix shall include the decoded address length octet and the decoded 7-20 address octets.

5.7.6.4.6.2.2 Decoding Address Length

5.7.6.4.6.2.2.1 If the FP subfield in the first header octet is zero, the octet length of the compressed address shall be set to 20 (a full ATN address).

5.7.6.4.6.2.2.2 Otherwise, the octet length of the compressed address prefix shall be decoded from the LEN/SEL subfield in the first header octet according to the table in 5.5.7.6.4.3.2.2.4.

5.7.6.4.6.2.2.3 The address octet length shall be used in the further decoding process steps.

5.7.6.4.6.2.2.4 If the IDRP subfield in the first header octet is zero, the output address length shall be the address octet length.

5.7.6.4.6.2.2.5 Otherwise, the output address length shall be 8 times the address octet length.

Note.— The address octet length is an internal variable used in the decoding process. The output length prefixed to the expanded address after the decoding process is completed is either the same as the octet length (normal case) or 8 times the octet length (IDRP case, length in bits).

5.7.6.4.6.2.3 Decoding the AFI and IDI Fields

*5.7.6.4.6.2.3.1 The AFI field of the decoded address shall be set to its constant value of **[47]** hexadecimal.*

*5.7.6.4.6.2.3.2 The IDI field of the decoded address shall be set to its constant value of **[0027]** hexadecimal.*

5.7.6.4.6.2.4 Decoding the VER Fields

5.7.6.4.6.2.4.1 If the CVER subfield in the first header octet is zero, the VER octet shall be extracted from the next octet in the variable field of the compressed address.

5.7.6.4.6.2.4.2 If the CVER subfield is non-zero, then the VER field value in the expanded address shall be computed as follows:

a) If the T/I subfield in the second header octet is zero and the F/M subfield in the second header octet is zero, then the VER field value shall be set to the CVER value.

b) If the T/I subfield in the second header octet is zero and the F/M subfield in the second header octet is one, then the VER field value shall be set to the CVER value plus 64.

c) If the T/I subfield in the second header octet is one and the F/M subfield in the second header octet is zero, then the VER field value shall be set to the CVER value plus 128.

d) If the T/I subfield in the second header octet is one and the F/M subfield in the second header octet is one, then the VER field value shall be set to the CVER value plus 192.

5.7.6.4.6.2.5 Decoding the ADM Fields

5.7.6.4.6.2.5.1 If the ADMF subfield in the second header octet is set to zero, the three octets

of the ADM field shall be extracted from the next three octets in the variable field data.

5.7.6.4.6.2.5.2 Otherwise, the ADM field value shall be decoded from the compressed ADM which is extracted from the next two octets in the variable field data of the compressed address.

5.7.6.4.6.2.5.3 The decoding of the compressed ADM value shall be performed as defined in 5.4.2.3.7.

5.7.6.4.6.2.6 Decoding the RDF Fields

5.7.6.4.6.2.6.1 The RDF field in the expanded address shall be set to zero.

5.7.6.4.6.2.7 Decoding the ARS Fields

5.7.6.4.6.2.7.1 If the address length indicates an address prefix whose length is less than or equal to 8, no ARS field value shall be decoded and the decoding process shall halt.

*5.7.6.4.6.2.7.2 If the ARSD subfield in the second header octet of the compressed address is set to one, the expanded ARS field shall be set to the default value (**[000001]** hexadecimal).*

5.7.6.4.6.2.7.3 Otherwise, the expanded ARS field value shall be extracted from the next three octets in the variable field data of the compressed address.

5.7.6.4.6.2.8 Decoding the LOC Fields

5.7.6.4.6.2.8.1 If the address length indicates an address prefix whose length is less than or equal to 11, no LOC field value shall be decoded and the decoding process shall halt.

*5.7.6.4.6.2.8.2 If the LOCD subfield in the second header octet of the compressed address is set to one, the expanded LOC field shall be set to the default value (**[0001]** hexadecimal).*

5.7.6.4.6.2.8.3 Otherwise, the expanded LOC field value shall be extracted from the next two octets in the variable field data of the compressed address.

5.7.6.4.6.2.9 Decoding the SYS Fields

5.7.6.4.6.2.9.1 If the address length indicates an address prefix whose length is less than or equal to 13, no SYS field value shall be decoded and the decoding process shall halt.

5.7.6.4.6.2.9.2 If the SYS6 subfield in the second header octet has the value one, the high-order (6th) octet of the expanded SYS field shall be extracted from the next octet in the variable data field of the compressed address.

5.7.6.4.6.2.9.3 Otherwise, the high-order (6th) octet of the expanded SYS field shall be set to zero.

5.7.6.4.6.2.9.4 If the SYS5 subfield in the second header octet has the value one, the second to high-order (5th) octet of the expanded SYS field shall be extracted from the next octet in the variable data field of the compressed address. Otherwise, the second to high-order (5th) octet of the expanded SYS field shall be set to zero.

5.7.6.4.6.2.9.5 If the SYS4 subfield in the second header octet has the value one, the third to high-order (4th) octet of the expanded SYS field shall be extracted from the next octet in the variable data field of the compressed address.

5.7.6.4.6.2.9.6 Otherwise, the third to high-order (4th) octet of the expanded SYS field shall be set to zero.

5.7.6.4.6.2.9.7 The remaining three octets of the expanded SYS field shall be extracted from the next three octets in the variable data field of the compressed address.

5.7.6.4.6.2.10 Decoding the SEL Fields

5.7.6.4.6.2.10.1 If the address length indicates an address prefix whose length is less than or equal to 19, no SEL field value shall be decoded and the decoding process shall halt.

5.7.6.4.6.2.10.2 If the FP subfield in the first header octet has the value zero (indicating a full ATN address), then the value of the SEL field shall be decoded from the LEN/SEL subfield in the first header octet.

5.7.6.4.6.2.10.3 If the value of the LEN/SEL subfield lies in the range 1-2 the SEL value shall be decoded using the SEL encoding table in 5.5.7.6.4.3.2.2.4.

5.7.6.4.6.2.10.4 If the LEN/SEL subfield encoding has the value 7, the SEL field value shall be extracted from the next octet in the variable data field of the compressed address.

Note.— Only a full ATN address (not a prefix) includes a SEL field.

5.7.6.4.6.3 Decompression Logic Flow

5.7.6.4.6.3.1 The ACA decompression logic shall process octets sequentially from the compressed data input stream.

5.7.6.4.6.3.2 If the octet at the current input position and the next octet do not form a compressed address marker (5.5.7.6.4.4), the current input octet shall be copied to the decompressed output octet stream and decompression processing shall continue with the next input octet.

5.7.6.4.6.3.3 When a compressed address marker is found in the input octet stream, the decompression processing shall examine the value of the next octet beyond the address marker.

5.7.6.4.6.3.4 If the value of this octet is zero (indicating an embedded address mark (5.5.7.6.4.4.3), the compressed address marker octets shall be copied to the decompressed output octet stream and the zero-value octet shall be dropped from the output stream.

5.7.6.4.6.3.5 If the value is nonzero (indicating a compressed ATN address), the compressed address shall be decoded according to 5.5.7.6.4.6.2.

5.7.6.4.6.3.6 The decoded address octets shall be copied to the decompressed octet output stream and decompression processing shall continue with the next input octet beyond those that formed the compressed ATN address.

5.7.6.4.6.3.7 The compressed address marker octets shall not be copied to the output.

5.7.7 ATN SNDCF Protocol Requirements List

5.7.7.1 Conformance

5.7.7.1.1 An implementation of the ATN Mobile SNDCF shall be used in ATN Airborne and Air/Ground Routers if and only if its PICS is in compliance with the APRLs given in 5.7.7.8~~the following sections~~.

5.7.7.1.2 An implementation of the ISO/IEC 8802 SNDCF shall be used in ATN End Systems and Routers if and only if its PICS is in compliance with the APRLs given in 5.7.7.2.

5.7.7.1.3 An implementation of the SNDCF for General Topology ISO/IEC 8208 Subnetworks shall be used in ATN End Systems and Routers if and only if its PICS is in compliance with the APRLs given in 5.7.7.4.

5.7.7.2 Subnetwork Dependent Convergence Functions SNDCF for use with ISO/IEC 8802-2 Subnetworks - Functions

Item	Function	ISO/IEC 8473-2 Reference	Status	ATN Support
S802SNUD	Is subnetwork user data of at least 512 octets transferred transparently by the SNDCF ?	5.2	M	M
S802SNTD	Is Transit Delay determined by the SNDCF prior to the processing of User Data ?	5.2	M	M

5.7.7.3 Subnetwork Dependent Convergence Functions SNDCF for use with ISO/IEC 8802-2 Subnetworks - Multi Layer Dependencies

Item	Dependency	ISO/IEC 8473-2 Reference	ATN Support
S802SSg-r	<r> Maximum SN data unit size (RX)	5.2	>=512
S802SSg-s	<s> Maximum SN data unit size (TX)	5.2	>=512

5.7.7.4 Subnetwork Dependent Convergence Functions SNDCF for use with ISO/IEC 8208 Subnetworks - Functions

Item	Function	ISO/IEC 8473-3 Reference	Status	ATN Support
XSNUD	Is Subnetwork User Data of at least 512 octets transferred transparently by the SNDCF ?	5.2	M	M
XSNTD	Is Transit Delay determined by the SNDCF prior to the processing of user data ?	5.2	M	M
	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
XCallb	b. when queue threshold reached ?	5.3.1 b.	O.3	O.3
XCallc	c. by systems management ?	5.3.1 c.	O.3	O.3
XCalld	d. when queue threshold reached and timer expires ?	5.3.4	O.3	O.3
XCalle	e. by other local means ?	5.3.1	O.3	O.3
	Call clearing considerations Are calls cleared:	5.3.2		
XClra	a. when idle timer expires	5.3.2 a., 5.3.4	O	O
XClrb	b. when need to re-use circuit	5.3.2 b.	O	O
XClrc	c. by systems management	5.3.2 c.	O	O
XClrd	d. by provider ?	5.3.2 d.	M	M
XClrer	e. by other local means ?	5.3.2	O	O
XPD	X.25 Protocol Discrimination	5.3.3	M	M
XVCC	Resolution of VC collisions	5.3.5	M	M
XMCR	Multiple VCs responding	5.3.6	M	M
XMCI	Multiple VCs initiating	5.3.6	O	O
Xpri	X.25 Priority procedure	5.3.7	O	M

5.7.7.5 Subnetwork Dependent Convergence Functions SNDCF for use with ISO/IEC 8208 Subnetworks - X.25 Call User Data

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

5.7.7.6 Subnetwork Dependent Convergence Functions SNDCF for use with ISO/IEC 8208 Subnetworks - ISO/IEC 8208 SNDCF Timers

Item	Timer	ISO/IEC 8473-3 Reference	Status	Values	ATN Support
XIDL	X25 VC Idle	5.3.4	XClra:O	Any	XClra:O
XNVC	additional VC	5.3.4	O	Any	M

5.7.7.7 Subnetwork Dependent Convergence Functions SNDCF for use with ISO/IEC 8208 Subnetworks - SNDCF Multi Layer Dependencies

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

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

5.7.7.8 ATN Requirements for Mobile SNDCFs

Note . This section specifies the requirements for the Mobile SNDCF in Airborne and Air/Ground Routers.

5.7.7.8.1 Major Capabilities

Item	Capability	ATN SARPs Ref.	ATN Support
*mcNego	Negotiation of Compression Algorithm	5.7.6.23.5.3.3	M
*mcLocRef	Local Reference Header Compression	5.7.6.33.5	M
*mcCan	Local Reference Cancellation	5.7.6.3.63.5.5.5	O
*mcACA	ICAO Address Compression Algorithm (ACA)	5.7.6.43.5	O
mcV42	V.42bis Compression	5.7.6.23.5	O

5.7.7.8.2 Call Setup and Clearing Procedures

Item	Function	ATN SARPs Ref.	ATN Support
csDynam	Dynamic Call Setup	5.7.6.2.1.1.13.5.3.3	M
csSys	Call Setup by Systems Management	5.7.6.2.1.13.5.3.3	O
csDef	Use of non-standard Default packet size	5.7.6.2.1.3 3.5.3.3	M
csFast	Use of Fast Select[1]	5.7.6.2.1.4 3.5.3.3	M
csOther	Use of other optional User Facilities and CCITT-specified DTE facilities	5.7.6.2.1.1.3 3.5.3.3	O
csCol	Call Collision Resolution	5.7.6.2.2.1.2 3.5.3.3	M

continued..

[1] Only required if supported by subnetwork

Call Setup and Clearing Procedures continued..

Item	Function	ATN SARPs Ref.	ATN Support
csAcp	Call Acceptance Procedures	5.7.6.2.1.63.5.3.6	M
csRej	Call rejection Procedures	5.7.6.2.1.73.5.3.7	M
csOrd	Order of compression Procedures	5.7.6.2.3.23.5.3.5	M
csDiag	Use of call rejection diagnostic codes	5.7.6.2.1.7.33.5.3.7	M
csReset	Call ClearingReset Procedures	5.7.6.2.43.5.1 1	M

5.7.7.8.3 Negotiation of Compression Algorithm

Item	Function	ATN SARPs Ref.	ATN Support
caMaxd	Indication of the maximum of directories entries in the call user Data	5.7.6.2.1.5.113.5.3.4.1	mcNego:O

5.7.7.8.4 Local Reference Header Compression

Item	Function	ATN SARPs Ref.	ATN Support
lrVC	Opening additional virtual circuits	5.7.6.3.2.1.2 3.5.5	M
*lrDirSize	Local Directory with more than 128 entries	5.7.6.3.13.5.4	O
lrProt	Identification of Network Layer Protocol	5.7.6.3.23.5.5.2	M
lrMod	Processing of SN-UnitData Requests	5.7.6.3.23.5.5.3	M
lrEst	Establishment of new local reference	5.7.6.3.2.3.5.5.4	M
lrTransfer	Transfer of modified ISO 8473 PDU	5.7.6.3.2.3.5.5.6	M

lrInitial	Initial DT PDU Compression	5.7.6.3.3.~~3.5.6~~.2	M
lrDerived	Derived DT PDU Compression	5.7.6.3.3.~~3.5.6~~.3	M
*lrError-s	Generation of Error PDU Compression	5.7.6.3.3.~~3.5.6~~.3	M
lrDiscard	Compression of discarded PDU encapsulated within Error PDU	5.7.6.3.3.~~3.5.6~~.4	lrError-s:M
lrCompTr	Transfer of compressed PDUs	5.7.6.3.3.~~3.5.6~~.4.11	M
lrReceived	Processing of received PDUs	5.7.6.3.4.~~3.5.7~~	M
lrUncomp-r	Processing of received uncompressed PDUs	5.7.6.3.4.~~3.5.7~~.2	M
LrReset	Purging directories entries on Reset	5.7.3.5.11	mcMocRef:M

continued..

Local Reference Header Compression continued..

Item	Function	ATN SARPs Ref.	ATN Support
lrUnMod-r	Processing of received unmodified PDUs	5.7.6.3.4.3.5.7.2.2	M
lrComp-r	Processing of received compressed data PDUs	5.7.6.3.4.3.5.7.3	M
lrError-r	Processing of received compressed Error PDUs	5.7.6.3.4.3.5.7.4	M
lrSNDCFerr-s	Generation of SNDCF Error Report	5.7.6.3.5.3.5.8	M
lrSNDCFerr-r	Processing of received SNDCF Error Report	5.7.6.3.4.3.5.7.5	M

5.7.7.8.5 Local Reference Cancellation

Item	Function	ATN SARPs Ref.	ATN Support
lrcMgmt	Management of local references	5.7.6.3.2.3.5.5.5	mcCan:M
lrcRequest-s	Generation of Cancellation Request PDU	5.7.6.3.6.3.5.9	mcCan:M
lrcRequest-r	Processing of incoming Cancellation Request PDU	5.7.6.3.6.3.5.9	mcCan:M
lrcReliable	Reliable transfer of Cancellation Request	5.7.6.3.6.3.5.9	mcCan:M
lrcAccept-s	Generation of Cancellation Accept PDU	5.7.6.3.6.3.5.9	mcCan:M
lrcAccept-r	Processing of incoming Cancellation Accept PDU	5.7.6.3.6.3.5.9	mcCan:M

5.7.7.8.6 ICAO Address Compression Algorithm

Item	Function	ATN SARPs Ref.	ATN Support
acOut	Compression of outgoing PDUs	5.7.6.4.1	mcACA:M
acIn	Decompression of incoming PDUs	5.7.6.4.1	mcACA:M
acAddr	Address Length Determination	5.7.6.4.2	mcACA:M
acComp	Compression of NSAP Addresses and address prefixes	5.7.6.4.5	mcACA:M

acDecomp	Decompression of NSAP Addresses and address prefixes	5.7.6.4.6	mcACA:M

5.7.7.8.7 PDU Formats

5.7.7.8.7.1 Call Request User Data

Item	Description	ATN SARPs Ref.	ATN Support
crLen	Length Indicator	5.7.6.2.1.5.33 .5.3.4	M
crVersion	Version Indicator	5.7.6.2.1.5.43 .5.3.4	M
crSNCR	Subnetwork Connection Reference (SNCR)	5.7.6.2.1.5.53 .5.3.4	M
crComp	Offerred Compression Techniques	5.7.6.2.1.5.73 .5.3.4	M
crDir	Maximum Directory Size	5.7.6.2.1.5.11 3.5.3.4	M[2]
crAdd-s	Additional User Data on send	5.7.6.2.1.5.12 3.5.3.4	O
crAdd-r	Additional User Data on receive	5.7.6.2.1.5.12 3.5.3.4	O
MaxDir	Maximum number of directory entries supported	5.7.6.2.1.5.73 .5.3.4	≥128

5.7.7.8.7.2 Call Accept User Data

Item	Description	ATN SARPs Ref.	ATN Support
caComp	Offerred Compression Techniques	5.7.6.2.2.4.33. 5.3.4	mcNego:M
caAdd-s	Additional User Data on send	5.7.6.2.2.4.43. 5.3.4	mcNego:O
caAdd-r	Additional User Data on receive	5.7.6.2.2.4.43. 5.3.4	mcNego:O

5.7.7.8.7.3 Modified ISO/IEC 8473 NPDU

[2] Dynamically, this field is only generated if Local Reference Compression is offered.

Item	**Description**	**ATN SARPs Ref.**	**ATN Support**
npLocRef-s	Local Reference Option field	5.7.6.3.2.~~3.5.5~~ .3	M

5.7.7.8.7.4 Compressed Initial PDU

Item	Description	ATN SARPs Ref.	ATN Support
inType	PDU Type	5.7.6.3.3.3.5.6.2.2	M
inPri	Priority	5.7.6.3.3.3.5.6.2.3	M
inLifetime	Lifetime	5.7.6.3.3.3.5.6.2.4	M
inFlags	Flag Bits	5.7.6.3.3.3.5.6.2.5 to 5.7.6.3.3.3.5.6.2.9	M
inLocRef	Local Reference (1 octet)	5.7.6.3.3.3.5.6.2.9	M
inLocRef2	Local Reference (2 octet)	5.7.6.3.3.3.5.6.2.9	lrDirSize:M ^lrDirsize:X
inPDUId	PDU Identifier	5.7.6.3.3.3.5.6.2.10	M
inNSDU	User Data	Figure 5.7-4	M

5.7.7.8.7.5 Compressed Derived PDU

Item	Description	ATN SARPs Ref.	ATN Support
drType	PDU Type	5.7.6.3.3.3.5.6.3.2	M
drPri	Priority	5.7.6.3.3.3.5.6.3.3	M
drLifetime	Lifetime	5.7.6.3.3.3.5.6.3.4	M
drFlags	Flag Bits	5.7.6.3.3.3.5.6.3.5 to 5.7.6.3.3.3.5.6.3.8	M
drLocRef	Local Reference (1 octet)	5.7.6.3.3.3.5.6.2.8	M
drLocRef2	Local Reference (2 octet)	5.7.6.3.3.3.5.6.2.8	lrDirSize:M ^lrDirsize:X

drPDUId	PDU Identifier	5.7.6.3.3.~~3.5.6~~.3.9	M
drSegOff	Segment Offset	5.7.6.3.3.~~3.5.6~~.3.10	M
drTotalLen	Total Length	5.7.6.3.3.~~3.5.6~~.3.11	M
drNSDU	User Data	Figure 5.7-4	M

5.7.7.8.7.6 Compressed Error PDU

Item	Description	ATN SARPs Ref.	ATN Support
erType	PDU Type	5.7.6.3.3.~~3.5.6~~.4.2	M
erPri	Priority	5.7.6.3.3.~~3.5.6~~.4.3	M
erLifetime	Lifetime	5.7.6.3.3.~~3.5.6~~.4.4	M
erFlags	Flag Bits	5.7.6.3.3.~~3.5.6~~.4.5 to 5.7.6.3.3.~~3.5.6~~.4.8	M
erLocRef	Local Reference (1 octet)	5.7.6.3.3.~~3.5.6~~.2.8	M
erLocRef2	Local Reference (2 octet)	5.7.6.3.3.~~3.5.6~~.2.8	lrDirSize:M ^lrDirsize:X
erReason	Discard Reason	5.7.6.3.3.~~3.5.6~~.4.9	M
erNSDU	Compressed Header of discarded PDU	5.7.6.3.3.~~3.5.6~~.4	M

5.7.7.8.7.7 SNDCF Error Report PDU

Item	Description	ATN SARPs Ref.	ATN Support
sfType	PDU Type	5.7.6.3.5.~~3.5.8~~	M
sfReason	Discard Reason	5.7.6.3.5.~~3.5.8~~	M
sfLocRef	Local Reference	5.7.6.3.5.~~3.5.8~~	M
sfLocRef2	Local Reference (2 octet)	5.7.6.3.3.~~3.5.6~~.2.9	lrDirSize:M ^lrDirsize:X

5.7.7.8.7.8 Cancellation Request

Item	Description	ATN SARPs Ref.	ATN Support
cqType	PDU Type	5.7.6.3.6.~~3.5.9~~	mcCan:M

cqRef	Cancellation Reference	5.7.6.3.6.~~3.5.9~~	mcCan:M
cqLocRef	Local Reference	5.7.6.3.6.~~3.5.9~~	M
cqLocRef2	Local Reference (2 octet)	5.7.6.3.3.~~3.5.6~~ .2.9	lrDirSize:M ^lrDirsize:X

5.7.7.8.7.9 Cancellation Accept

Item	**Description**	**ATN SARPs Ref.**	**ATN Support**
ccType	PDU Type	5.7.6.3.6.~~3.5.9~~	mcCan:M
ccRef	Cancellation Reference	5.7.6.3.6.~~3.5.9~~	mcCan:M