# Stable Implementation Agreements for Open Systems Interconnection Protocols: Part 2 - Subnetworks

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## Foreword

This part of the Stable Implementation Agreements was prepared by the Lower Layers Special Interest Group (LLSIG) of the National Institute of Standards and Technology (NIST) Workshop for Implementors of Open Systems Interconnection (OSI). See Procedures Manual for Workshop charter.

Text in this part has been approved by the Plenary of the above-mentioned Workshop. This part replaces the previously existing chapter on this subject.

Annexes A and B are for information only.

Future changes and additions to this version of these Implementor Agreements will be published as change pages. Deleted and replaced text will be shown as strikeout. New and replacement text will be shown as shaded.

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# Part 2 - Subnetworks

## 0 Introduction

This part provides agreements about subnetwork services used in support of the OSI Network Layer.

## 1 Scope

These agreements cover subnetwork types including local area networks, packet switched networks, circuit switched networks, ISDN, and others.

## 2 Normative References

### 2.1 CCITT

[**1**] Recommendation I.231 (Blue Book, 1988), *Circuit-Mode Bearer Service Categories*.

[**2**] Recommendation I.232 (Blue Book, 1988), *Packet-Mode Bearer Service Categories*.

[**3**] Recommendation I.431 (Blue Book, 1988), *Primary Rate User-Network Interface - Layer 1 Specification*.

[**4**] Recommendation Q.921 (I.441) (Blue Book, 1988), *ISDN User-Network Interface, Data Link Layer Specification*.

[**5**] Recommendation Q.931 (I.451) (Blue Book, 1988), *ISDN User-Network Interface Layer 3 Specification for Basic Call Control*.

[**6**] Recommendation X.25 (Yellow Book 1980), *Interface Between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for Terminals Operating in the Packet Mode on Public Data Networks*.

[**7**] Recommendation X.25 (Blue Book, 1988), *Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode and Connected to Public Data Networks by Dedicated Circuit*.

[**8**] Recommendation X.31 (Blue Book, 1988), *Support of Packet Mode Terminal Equipment by an ISDN*.

## 2.2 ISO

[**9**] ISO 7776, *Information processing systems - Data communication - High-level Data Link Control Procedures - Description of the X.25 LAPB-compatible DTE data link procedures*.

[**10**] ISO/IEC 8208 Edition 2, *Information technology - Data communications - X.25 Packet layer protocol for data terminal equipment*.

[**11**] ISO 8802-2, *Information processing systems - Local area networks - Part 2: Logical link control*.

[**12**] ISO DIS 8802-3, *Information processing systems - Local area networks - Part 3: Carrier sense multiple access method with collision detection (CSMA/CD) and physical layer specifications*.

[**13**] ISO DIS 8802-4, *Information processing systems - Local area networks - Part 4: Token-passing bus access method and physical layer specifications*.

[**14**] ISO 8802-5, *Information processing systems - Local area networks - Part 5: Token ring access method and physical layer specifications*.

[**15**] ISO 9314-1, *Information processing systems - Fibre distributed data interface (FDDI) - Part 1: Token ring physical layer protocol (PHY)*.

[**16**] ISO 9314-2, *Information processing systems - Fibre distributed data interface (FDDI) - Part 2: Token ring media access control (MAC)*.

[**17**] ISO DIS 9314-3, *Information processing systems - Fibre distributed data interface (FDDI) - Part 3: Physical layer medium dependent (PMD)*.

[**18**] ISO 10039, *Information Technology - Local Area Networks - MAC Service Definition*

## 2.3 ANSI

[**19**] ANSI/IEEE 802.2, *Logical Link Control*, 1987.

[**20**] ANSI/IEEE 802.3, *Carrier Sense Multiple Access with Collision Detection (CSMA/CD) and Physical Layer Specifications*, 1985.

[**21**] ANSI/IEEE 802.3 Supplement a, *MAU and Baseband Medium Specification, Type 10BASE2 (Section 10)*, 1988.

[**22**] ANSI/IEEE 802.3 Supplement b, *Broadband MAU and Broadband Medium Specifications, Type 10BROAD36 (Section 11)*, 1988.

[**23**] ANSI/IEEE 802.3 Supplement c, *Repeater Unit for 10 Mb/s Baseband Networks (Section 9)*, 1988.

[**24**] ANSI/IEEE 802.3 Supplement e, *Physical Signaling, Medium Attachment, and Baseband Medium Specifications, Type 1BASE5 (Section 12)*, 1988.

[**25**] ANSI/IEEE 802.4, *Token-Passing Bus Access Method and Physical Layer Specifications*, Draft 1987.

[**26**] ANSI/IEEE 802.5, *Token-Ring Access Method and Physical Layer Specifications*, 1986.

[**27**] ANS T1.403, *Carrier-to-Customer Installation - DS1 Metallic Interface*.

[**28**] ANS T1.601, *Integrated Services Digital Network (ISDN) - Basic Access Interface for Use on Metallic Loops for Application on the Network Side of the NT (Layer 1 Specification)*.

[**29**] ANS T1.602, *Integrated Services Digital Network (ISDN) - Data-Link Layer Signalling Specification for Application at the User-Network Interface*.

[**30**] ANS T1.605, *Integrated Services Digital Network (ISDN) - Basic Access Interface for S and T Reference Points - Layer 1 Specification*.

[**31**] ANS T1.607, *Telecommunications - Digital Subscriber Signaling System #1 - Layer 3 Signaling Specification for Circuit Switched Bearer Service*.

[**32**] ANS T1.608, *Telecommunications - Digital Subscriber Signaling System #1 - Layer 3 Signaling Specification for Packet Switched Bearer Service*.

[**33**] ANS X3.139, *Fiber distributed data interface (FDDI) - Token ring media access control (MAC)*, 1987.

[**34**] ANS X3.148, *Fiber distributed data interface (FDDI) - Token ring physical layer protocol (PHY)*, 1988.

[**35**] ANS X3.166, *Fiber distributed data interface (FDDI) - Physical layer medium dependent (PMD)*, 1989.

# 3 Status

This version was completed in December 1990.

# 4 Errata

**NOTE -** This clause may contain "defect report" and resolutions material, and the versions of Implementor's Agreements to which this material applies.

# 5 Local Area Networks

## 5.1 IEEE 802.2 Logical Link Control

The following decisions have been reached with respect to this protocol:

a) Link Service Access Point (LSAP):

1) The code below shall be used to address systems using Network Layer protocols identified by ISO TR 9577 (e.g., ISO 8473, ISO 8208). Note that bit zero is transmitted first;

2) The most significant bit is bit 7, thus this bit pattern represents hexadecimal FE (see figure 1 below);

b) Type and Class:

1) Only the connectionless type 1, class I IEEE 802 link service will be used.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

**Figure 1 - LSAP bit pattern**

## 5.2 IEEE 802.3 CSMA/CD Access Method

The following implementation agreements have been reached with respect to the IEEE 802.3 CSMA/CD Access Method and Physical Layer Specifications:

a) The address length shall be 48 bits;

b) For a data packet of LLC data length of n octets, the length of the pad field is as follows:

1) max(0, minFrameSize-(8n+2(addressSize)+48)) bits.

The following implementation agreements have been reached with respect to 10 BROAD 36 Networks:

a) Single Cable Networks:

1) The translator frequency shall be 192.25 Mhz;

2) The channel allocations are as follows:

a) Reverse Channels:

1) T12, T13, T14

2) T13, T14, 2’

3) T14, 2’, 3’

4) 2’, 3’, 4’

5) 3’, 4’, 4A’

6) 4’, 4A’, 5’

b) Forward Channels:

1) L, M, N

2) M, N, O

3) N, O, P

4) O, P, Q

5) P, Q, R

6) Q, R, S

b) Dual Cable Networks:

For nontranslated dual cable networks forward and reverse frequencies are the same. Permissible channel allocations are listed below:

1) T12, T13, T14

2) T13, T14, 2’

3) T14, 2’, 3’

4) 2’, 3’, 4’

5) 3’, 4’, 4A’

6) 4’, 4A’, 5’

7) L, M, N

8) M, N, O

9) N, O, P

10) O, P, Q

11) Q, R, S

c) When both IEEE 802.4 and IEEE 802.3 10 BROAD 36 networks coexist on the broadband cable system the preferred channel allocations are as follows:

1) Reverse:

a) T12, T13, T14 - IEEE 802.3;

b) 6', FM1' - IEEE 802.4;

c) 3', 4'- Channels reserved for future use;

d) 4A', 5' - Channels reserved for future use;

2) Forward:

a) L, M, N - IEEE 802.3;

b) T, U - IEEE 802.4;

c) P, Q - Channels reserved for future use;

d) R, S - Channels reserved for future use.

The following implementation agreements have been reached with respect to 10 BASE-T networks:

a) Auto-partition: A repeater port which connects 10 BASE-T links either through an external or internal MAU shall implement the auto-partition and reconnections algorithm as defined in IEEE 802.3, Chapter 9.

## 5.3 IEEE 802.4 Token Bus Access Method

The following options are agreed to with respect to Draft J of token bus:

a) Data Rate:

1) 10 Mb (Broadband);

2) 5 Mb (Carrierband);

b) Addressing: 48 bit;

c) The ImeOption, Priority Mechanism, shall be implemented;

d) Broadband Channel Assignments are as follows:

1) Forward:

a) P

b) Q

c) R

d) S

e) T

f) U

2) Reverse:

a) 3'

b) 4'

c) 4A'

d) 5'

e) 6'

f) FM1'.

## 5.4 IEEE 802.5 Token Ring Access Method

The following implementation agreements have been reached with respect to the IEEE Standard 802.5, Token Passing Ring Access Method and Physical Layer specification:

a) The data signalling rate shall be 4 Mbit/s;

b) The address length shall be 48 bits;

c) The message priority (PM) of the AMP data unit shall be 7;

d) The ALL_STATIONS_THIS_RING_ADDRESS shall be X'C000FFFFFFFF';

e) The TRR value shall be 4 milliseconds;

f) The THT value shall be 8.9 milliseconds;

g) The TQP value shall be 20 milliseconds;

h) The TVX value shall be 10 milliseconds;

i) The TNT value shall be 2.6 milliseconds;

j) The TAM value shall be 7 seconds;

k) The TSM value shall be 15 seconds;

l) The MAC Information field (I-field) shall be defined as follows in figure 2 below. Sequences are as follows:

1) Starting Sequence includes: SD, AC, FC, DA, SA;

2) Ending Sequence includes: FCS, ED, FS;

m) With the above timer and MAC I-field definitions, the following limits are defined:

1) Protocol limits the I-field to a maximum of 4425 bytes;

2) All stations shall support I-fields that have a minimum of one byte and a maximum of at least 2000 bytes.

| | | |
|---|---|---|
| Starting Sequence | I-Field | End Sequence |

**Figure 2 - I-Field Format**

## 5.5 Fiber Distributed Data Interface (FDDI)

### 5.5.1 Token Ring Media Access Control (MAC, X3.139-1987)

The following are implementation agreements with respect to FDDI MAC:

a) The address length shall be 48 bits;

b) There shall be some manual or programmatic means of resetting stations and concentrators to the values specified as defaults herein or in X3.139-1987;

c) The default value of T_Max shall be at least 165 milliseconds and not more than 200 milliseconds;

d) The default value of T_Req shall be equal to either T_MAX or T_Req_Max[1] whichever is less;

e) All FDDI stations shall process Info_Fields of 0 to 4478 bytes. The frame is defined as follows in Figure 3:

f) Stations shall not use restricted token service.

| P | SD | FC | DA | SA | Info | FCS | ED | FS |
|---|---|---|---|---|---|---|---|---|

**Figure 3 - FDDI FRAME FORMAT**

P: Preamble
- 16 Idle Symbols for Transmitting
- >=6 Idle Symbols for Copying
- >=2 Idle Symbols for Repeating

SD: Starting Delimiter (2 Symbols, JK)
FC: Frame Control (2 Symbols)
DA: Destination Address (12 Symbols)
SA: Source Address (12 Symbols)
INFO: Information Field (=<8956 Symbols)
FCS: Frame Check Sequence (8 Symbols)
ED: Ending Delimiter (1 Symbol)
FS: Frame Status (3 Symbols)

### 5.5.2 Token Ring Physical Layer (PHY, X3.148-1988)

The following implementation agreement is with respect to the FDDI PHY specifications:

[1] T_Req_Max is defined in the Ring Management (RMT) section of Station Management. It is used in the resolution of duplicate address problems which prevent ring initialization. Stations which have detected that they are duplicates during ring initialization take action to make sure that they lose the Claim process to other stations having a T_Req value less than T_Req_Max. T_Req_Max is specified in SMT to have a value $\leq 167.8$ milliseconds.

1 The average delay, that is the time between when a station receives a Starting Delimiter (JK symbol pair) beginning a valid frame until it repeats that Starting Delimiter, when that Starting Delimiter is preceded by a sequence of a valid frame followed by 50 Idle Symbols shall not exceed:

- 1 microsecond in a station, and
- 1 microsecond times the number of ports in a concentrator, in addition to the delays contributed by the active slaves of the concentrator.

The measurement method described above allows a consistent repeatable measurement, however it does not measure maximum possible delay. When the delay is one microsecond as measured above, the maximum effective delay contribution component which can result is 1.164 microseconds. This number, not one microsecond, should be used per PHY to compute maximum possible network delay.

### 5.5.3 Physical Layer Media Dependent (PMD, X3.166-1989)

The following implementation agreements are with respect to the FDDI PMD specification:

1 Stations shall repeat all valid packets under all signal conditions specified in section 5.2 of X3.166-1989, "Active Input Interface", with a bit error rate (BER) of not more than $2.5 \times 10^{-10}$;

2 Stations shall repeat all valid packets under all signal conditions specified in section 5.2, "Active Input Interface", except that the Minimum Average Power shall be -29 dBm (2 dB above the specified minimum), with a BER of not more than $10^{-12}$.

# 6 Wide Area Networks

## 6.1 CCITT Recommendation X.25

The procedures required to describe the DTE side of a DTE/DCE interface for systems attached to sub-networks providing an X.25 interface shall be as defined in ISO 7776 and ISO 8208 and as supplemented below. (These procedures shall also apply to a DTE operating on a DTE/DTE interface.)

## 6.2 ISO 7776

ISO 7776 is used as the Layer 2 Protocol with the agreements defined below:

a) Address assignment information is as follows:

1) DTE = A (=11000000 binary);

2) DCE = B (=10000000 binary);

3) On a DTE/DTE interface, one of the DTEs, by a prior agreement, shall use the DCE address;

b) The modulus shall be 8;

c) A window size (k) of 7 shall be supported. In addition, other window sizes may also be supported;

d) The Multilink Procedures are excluded.

## 6.3 ISO 8208

The elements of ISO 8208 applicable for use depend on the OSI role of ISO 8208 (i.e., provision of CONS, support of CLNP). Independent of the role, ISO 8208 is used as the Layer 3 protocol, with the following agreements:

a) Virtual Call Service;

b) any mutually agreed window and packet size, however, all DTEs must be capable of supporting a window size of 2, a packet size of 128 octets, and a sequence number modulus of 8;

c) a DTE must be capable of receiving the Flow Control Parameter Negotiation Facility and responding appropriately (per ISO 8208);

d) The Basic RPOA Selection Facility shall be implemented and its use or non-use selectable on a per virtual call basis.

When ISO 8208 is used to support CONS, the optional user facilities in Clause 5.1 of ISO 8878 shall also be supported.

When ISO 8208 is used to support CLNP (when providing the CLNS), Permanent Virtual Circuit Service may also be used.

# 7 Integrated Services Digital Networks (ISDN)

## 7.1 Introduction

This clause defines Implementation Agreements for packet-data transfer in an ISDN context. The agreements provide a set of procedures for accessing an ISDN so that end systems implemented according to these agreements can obtain ISDN services and can successfully interoperate.

The agreements are not meant to preclude vendors from implementing additional procedures as long as they do not create system interoperability problems. Capabilities will vary from ISDN to ISDN and procedures beyond those included here may be necessary to request and utilize network services more effectively and fully.

The agreements cover two fundamental ISDN services for X.25 packet mode ISDN terminals, namely,

CASE I: The ISDN provides a circuit-mode (Layer 1) connection either on demand ("switched") or permanently ("dedicated circuit"). A general description of the corresponding ISDN 64 Kbps circuit-mode bearer service is described in CCITT Recommendation I.231. The circuit-mode connection is between an X.25 ISDN terminal and (i) a PSPDN, or (ii) another X.25 ISDN terminal. The circuit-mode connection to a PSPDN corresponds to CASE A of CCITT Recommendation X.31.

CASE II: The ISDN provides the X.25 virtual circuit service. A general description of this service is given in CCITT Recommendation I.232. This case corresponds to CASE B of CCITT Recommendation X.31.

Figures 4 and 5 give the agreed stacks for X.25 packet transfer over D and B channels, respectively. Some particular aspects are given below:

a) The packet data transfer is on a B channel of a Basic Access or a Primary Rate Interface. In CASE II, it can be on a D channel of a Basic Access Interface;

b) The layer 2 procedures are LAPB (ISO 7776) on a B channel and LAPD (CCITT Recommendation Q.921) on a D channel;

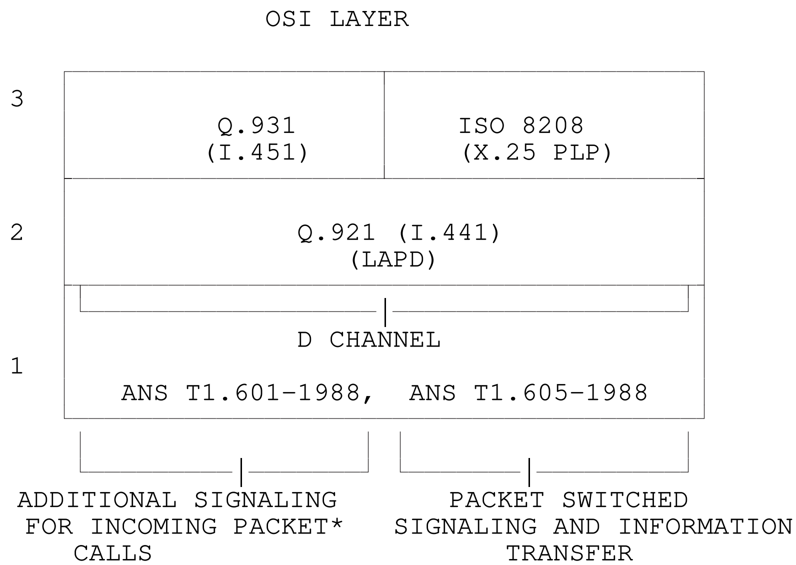
c) X.25 PLP (ISO 8208) procedures are used, including the setting up and clearing of virtual calls;

d) Q.921 and Q.931 procedures on a D channel are used for access signaling, when appropriate, to select the B or D channel for packet data transfer and for establishing and releasing a physical path in the ISDN;

e) Refer to part 3 for the specification of methods for providing OSI Network Services.

## 7.2 Implementation Agreements

This clause gives Implementation Agreements for individual ISDN-related protocols. The relevant protocol stacks are given in figures 4 and 5.




* MAY BE NULL

**Figure 4 - Protocol Layers at S, T and U reference points when D Channel is used in ISDN**

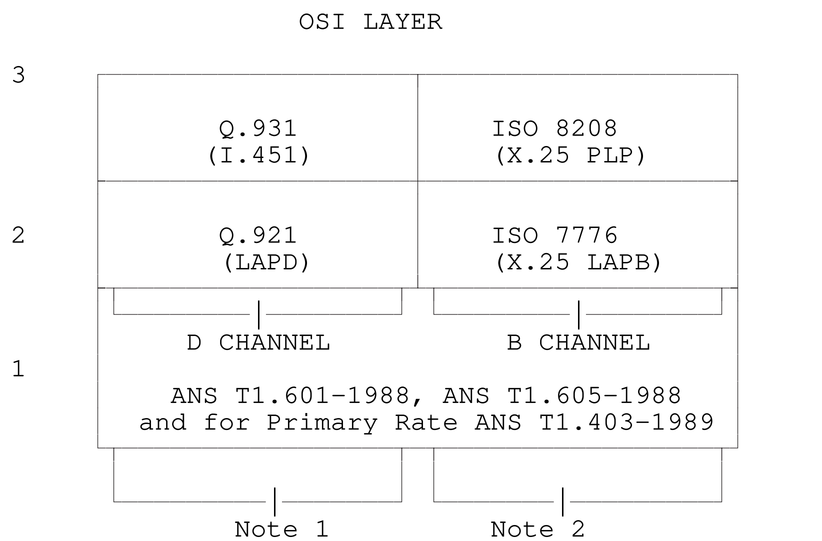



**Figure 5 - Protocol Layers at S, T and U reference points when B Channel is used in ISDN**

**NOTES**

1 This refers to signaling for circuit switched access (may be null), as well as additional signaling for incoming packet calls (may be null).

2 This refers to packet switched signaling and information transfer.

### 7.2.1 Physical Layer, Basic Access at "U"

ANS T1.601-1988, "Integrated Services Digital Network-Basic Access Interface for Use on Metallic Loops for Application on the Network Side of the NT (Layer 1 Specification)" applies.

### 7.2.2 Physical Layer, Basic Access at S and T

ANS T1.605-1988, "Integrated Services Digital Network-Basic Access Interface for S and T Reference Points-Layer 1 Specification" applies.

### 7.2.3 Physical Layer, Primary Rate at "U"

The physical layer is governed[2] by ANS T1.403-1989, "Carrier-to-Customer Installation - Metallic Interface", and CCITT Recommendation I.431-1988, "Primary Rate User-Network Interface - Layer 1 Specification" subject to the exceptions given below:

The following portions of ANS T1.403-1989 shall be deleted:

a) Section 5.3.1: The bit rate tolerance option of +/- 200 bps;

b) Section 5.6: The minimum pulse density of this section;

c) Section 6.1: The superframe format;

d) Section 6.3: The complete section;

e) Section 8.0: The reference to the SF format;

f) Section 8.3: The text in paragraph 8.3.1.1 and footnote 7 (8.3.1.2);

g) Section 8.4.1: Footnote 9;

h) Section 9/figure 9: Provisions for the use of the RJ48M connector;

i) Table 2: This table;

j) Table 3: The illustration in table 3 of "Robbed-Bit Signaling".

The following portions of ANS T1.403-1989 shall be modified:

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2 ANSI accredited subcommittee T1E1 is developing a standard for the ISDN primary rate interface at reference points "S" and "T" as well as "U". One of the accepted guidelines for the standard is consistency with ANS T1.403–1989. It is intended that, when this new ISDN–unique standard is adopted, this agreement will be modified to reference it and will be extended to cover interfaces at reference points "S" and "T" as well as "U". The current standard mentioned is at the default letter ballot level of the draft document: T1E1–2/89–046R4, "ISDN Primary Rate Customer Installation Interfaces Layer 1 Specification".

a) Section 5.3.2: The text of this section is replaced by:

1) "The line code is B8ZS except as noted in section 7";

b) Section 7.0: The reference to the pulse density requirements of section 5.6 is inappropriate. The text is replaced by:

1) "The provisions of Clear Channel Capability (CCC) depends upon the use of the B8ZS line code, though the use of ZBTSI is one interim method that may be employed by agreement of the network and the user".

The provisions of ANS T1.403-1989 shall be supplemented by the provisions of CCITT Recommendation I.431 - section 4.4.

### 7.2.4 Data Link Layer, D-Channel

CCITT Recommendation Q.921 (I.441), "ISDN User-Network Interface, Data Link Layer Specification" applies.

### 7.2.5 Signaling

CCITT Recommendation Q.931 (I.451), "ISDN User-Network Interface Layer 3 Specification for Basic Call Control" applies.

The following agreements have been reached concerning the use of Q.931:

a) On a Basic Rate Interface supporting the ISDN virtual circuit service, all of Q.931 section 6 except for 6.1.1 and 6.2.1 (the sections covering the circuit-switched access case) shall apply. The following sections also apply: 2.2, packet mode access connection states; 3.2, messages for packet mode access connection control; 4-4.5, section specifying general information element handling and encoding; 4.7, information elements for packet communications;

b) On a Primary Rate Interface supporting the ISDN virtual circuit service all of Q.931 section 6 shall apply except for 6.1.1 and 6.2.1 (the sections specifying the circuit switched access case), 6.1.2.2, 6.2.2.2 and 6.4.2 (the sections specifying D-Channel ISDN Virtual Circuit service case). The following sections also apply: 2.2, packet mode access connection states; 3.2, messages for packet mode access connection control; 4-4.5, sections specifying general information element handling and encoding; 4.7, information elements for packet communications;

c) On a Basic or Primary Rate Interface supporting the unrestricted 64-Kbps circuit-mode service, Q.931 sections 6.1.1, 6.2.1, 6.4.1 and 6.4.3 shall apply. The following sections also apply: 2.1, circuit mode connection states; 3.1, messages for circuit mode connection control; 4-4.5, sections specifying general information element handling and encoding.

### 7.2.6 Data Link Layer B-Channel

The agreements on ISO 7776 specified in 6.2 shall apply here.

If the ISDN provides a circuit-mode service between two ISDN packet-mode devices, then the layer 2 address shall be assigned as follows:

a) For permanent ("non-switched") circuit-mode service, one terminal uses address A and the other terminal uses address B, as arranged by prior agreement;

b) For demand ("switched") circuit-mode service, the terminal originating the circuit-mode call uses address A and the other terminal uses address B.

### 7.2.7 Packet Layer

The agreements on ISO 8208 specified in 6.3 shall apply here. When ISO 8208 is used on the D-Channel, the maximum DATA packet size (i.e., actually the maximum size of the User Data Field in a DATA packet) shall be limited to 256 octets.

# Annex A (informative)

# Cross Reference Between CCITT and ANSI Text Relating to ISDN Agreements

This annex provides a cross-reference listing between those sections of the CCITT ISDN Recommendations given in clause 7 of this document and the sections of the corresponding ANSI ISDN Standards. This appendix does not supersede clause 7 but merely provides a pointer to those who wish to implement the ISDN procedures based on ANSI Standards.

## A.1 Data Link Layer, D-Channel

CCITT Recommendation Q.921, which is referenced in 7.2.4 of this document, is identical to ANSI Standard T1.602.

## A.2 Signaling

The following table provides the cross-references between those sections of CCITT Recommendation Q.931 referenced in 7.2.5 of this document and the corresponding ANSI ISDN Standards.

**Table 1 - ANSI-CCITT Cross-References**

| CCITT RECOMMENDATION Q.931 | ANSI T1.608 |
|---|---|
| Section 2.1 | Section 4.1 (refers to sec. 2.1.1 of ANSI T1.607) |
| Section 2.2 | Section 4.2 |
| Section 3.1 | Section 5.1 (refers to sec. 3 of ANSI T1.607) |
| Section 3.2 | Section 5.2 |
| Section 4.1 | Section 6.1 |
| Section 4.2 | Section 6.2 |
| Section 4.3 | Section 6.3 |
| Section 4.4 | Section 6.4 |
| Section 4.5 | Section 6.5 |
| Section 4.7 | Section 6.5 |
| Section 6 | Section 7 |
| Section 6.1.1 | Section 7.1.1 |
| Section 6.1.2.2 | Section 7.1.2.2 |
| Section 6.2.1 | Section 7.2.1 |
| Section 6.2.2.2 | Section 7.2.2.3 |
| Section 6.4.1 | Section 7.4.1 |
| Section 6.4.2 | Section 7.4.2 |
| Section 6.4.3 | Section 7.4.3 |

## **Annex B** (informative)

## Bibliography

ANS T1.607-1989, Telecommunications - Digital Subscriber Signaling System #1 - Layer 3 Signaling Specification for Circuit Switched Bearer Service.

ANS T1.608-1989, Telecommunications - Digital Subscriber Signaling System #1 - Layer 3 Signaling Specification for Packet Switched Bearer Service.

CCITT Recommendation I.430 (Blue Book), Basic User-Network Interface - Layer 1 Specification.

FIPS 107, Local Area Networks: Baseband Carrier Sense Multiple Access with Collision Detection Access Method and Physical Layer Profiles and Link Layer Protocol, NTIS, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161.
^C