INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

X.1
(03/00)

SERIES X: DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

Public data networks – Services and facilities

International user classes of service in, and categories of access to, public data networks and integrated services digital networks (ISDNs)

ITU-T Recommendation X.1

(Previously CCITT Recommendation)

ITU-T X-SERIES RECOMMENDATIONS

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

PUBLIC DATA NETWORKS	
Services and facilities	**X.1–X.19**
Interfaces	X.20–X.49
Transmission, signalling and switching	X.50–X.89
Network aspects	X.90–X.149
Maintenance	X.150–X.179
Administrative arrangements	X.180–X.199
OPEN SYSTEMS INTERCONNECTION	
Model and notation	X.200–X.209
Service definitions	X.210–X.219
Connection-mode protocol specifications	X.220–X.229
Connectionless-mode protocol specifications	X.230–X.239
PICS proformas	X.240–X.259
Protocol Identification	X.260–X.269
Security Protocols	X.270–X.279
Layer Managed Objects	X.280–X.289
Conformance testing	X.290–X.299
INTERWORKING BETWEEN NETWORKS	
General	X.300–X.349
Satellite data transmission systems	X.350–X.399
MESSAGE HANDLING SYSTEMS	X.400–X.499
DIRECTORY	X.500–X.599
OSI NETWORKING AND SYSTEM ASPECTS	
Networking	X.600–X.629
Efficiency	X.630–X.639
Quality of service	X.640–X.649
Naming, Addressing and Registration	X.650–X.679
Abstract Syntax Notation One (ASN.1)	X.680–X.699
OSI MANAGEMENT	
Systems Management framework and architecture	X.700–X.709
Management Communication Service and Protocol	X.710–X.719
Structure of Management Information	X.720–X.729
Management functions and ODMA functions	X.730–X.799
SECURITY	X.800–X.849
OSI APPLICATIONS	
Commitment, Concurrency and Recovery	X.850–X.859
Transaction processing	X.860–X.879
Remote operations	X.880–X.899
OPEN DISTRIBUTED PROCESSING	X.900–X.999

For further details, please refer to ITU-T List of Recommendations.

ITU-T RECOMMENDATION X.1

INTERNATIONAL USER CLASSES OF SERVICE IN, AND CATEGORIES OF ACCESS TO, PUBLIC DATA NETWORKS AND INTEGRATED SERVICES DIGITAL NETWORKS (ISDNs)

Summary

This Recommendation describes international user classes of service in, categories of access to, public data networks and Integrated Services Digital Networks (ISDN). Details for leased circuit, circuit-switched, packet-switched, and frame relay data transmission services are provided. This revision includes the access to FRDTS via B-ISDN.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

INTERNATIONAL USER CLASSES OF SERVICE IN, AND CATEGORIES OF ACCESS TO, PUBLIC DATA NETWORKS AND INTEGRATED SERVICES DIGITAL NETWORKS (ISDNs)

*(Geneva, 1972; amended at Geneva, 1976 and 1980; Malaga-Torremolinos, 1984;
Melbourne, 1988; Helsinki, 1993; revised in Geneva, 1996 and 2000)*

1   Introduction

The establishment in various countries of public networks for data transmission and ISDNs for integrated services creates a need to standardize user classes of service and categories of access. This Recommendation is required to meet the following goals:

a)   providing sufficient data signalling rates to meet users' needs;

b)   allowing optimization of Data Terminal Equipment (DTE) and transmission and switching costs to provide an overall economic service to the user;

c)   recognizing particular operating modes of users' DTE;

d)   allowing users to transfer information consisting of any bit sequence and of any number of bits up to a certain amount;

e)   recognizing the interaction between users' requirements, technical limitations and tariff structure that may influence how DTE gains access to public data transmission services.

User class of service is a category of data transmission service in which the DTE operation mode, data signalling rate, call control signalling rates and code structure (in start-stop mode) are standardized.

Category of access identifies the method by which DTE gains access to a specific data transmission service.

There are four public data transmission services, namely:

1)   leased circuit data transmission service;

2)   circuit-switched data transmission service (CSDTS);

3)   packet-switched data transmission service (PSDTS);

4)   frame relay data transmission service (FRDTS).

This Recommendation defines only the basic user facility(ies) of these data transmission services. Optional user facilities of these data transmission services are defined in Recommendation X.2.

Access for Data Terminal Equipment (DTE) to data transmission services may be any of the following:

a)   *direct access* when DTE is connected to the network providing the service without intermediate switched network; or

b)   *port access* when DTE is connected to the network providing the service via intermediate switched network (see Figure 1).

Port access may be achieved by any of the following:

1)   by *switched connection* when signalling/control procedures are required to establish/release connection of the DTE to the network providing the service; or

2)   by *permanent connection* when no signalling/control procedures are required to establish/release the connection of the DTE to the network providing the service (see Figure 2).

The categories of access described in this Recommendation take into account direct access (see Note) to public data networks and ISDNs and the port access cases where interworking with other public networks is involved. Access to the packet-switched data transmission service via the Packet Assembly/Disassembly (PAD), Facsimile Packet Assembly/Disassembly (FPAD) or Multi-Aspect Packet Assembly/Disassembly (MAP) function, as defined in Recommendations X.3, X.5 or X.8, respectively, is also covered in this Recommendation.

NOTE – Direct access may be provided by means of leased circuits or by dedicated access circuits.

a) Direct access

T0726140-96/d01
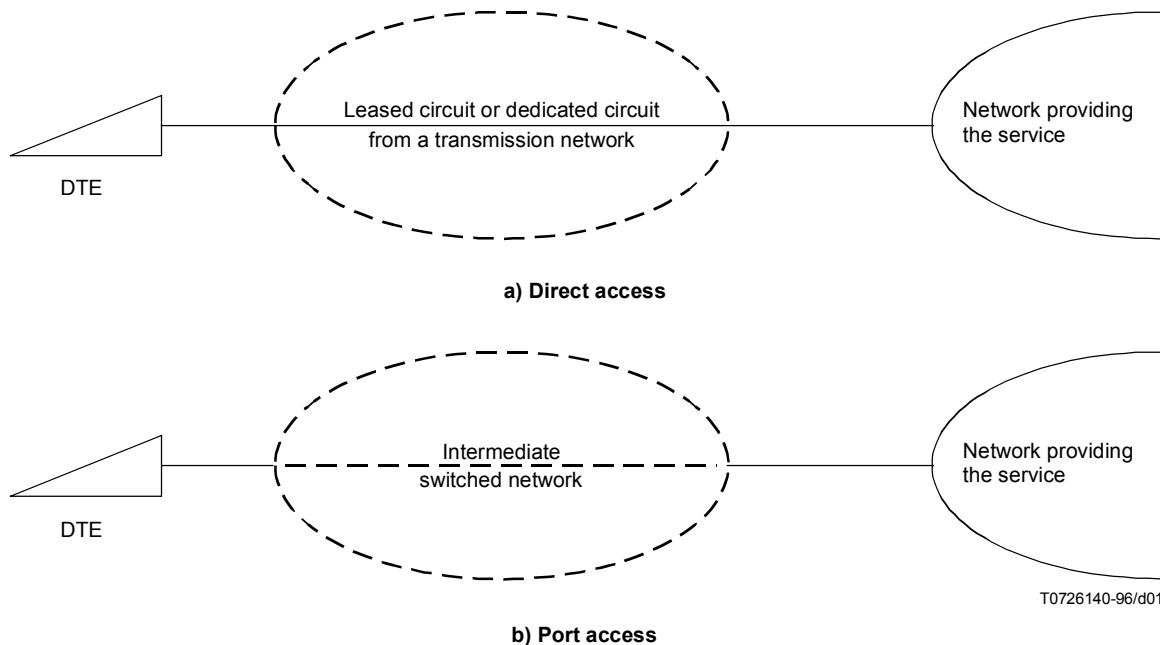
b) Port access

Figure 1/X.1 – Examples of direct access and port access

a) Access with switched connection

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b) Access with permanent connection
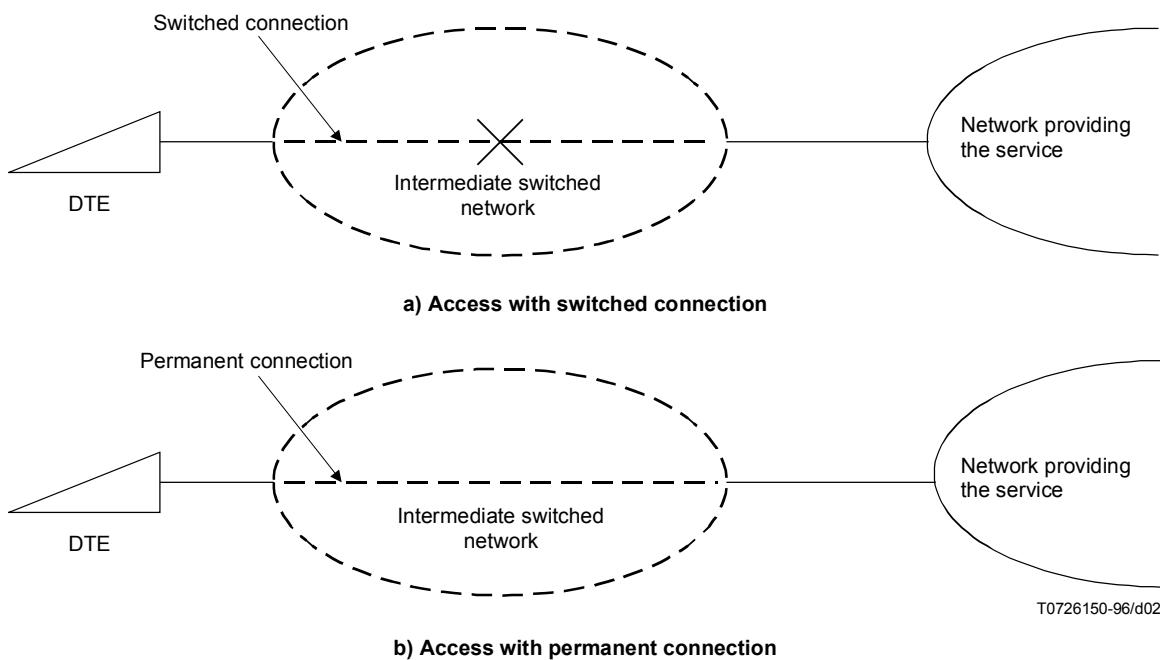
Figure 2/X.1 – Two types of port access

For example, packet mode terminals may have access to the public packet-switched data transmission service, in user classes of service 8 to 11, either via a direct access (see above Note) or via a port access. The port access can be established using a Circuit-Switched Public Data Network (CSPDN), a Public Switched Telephone Network (PSTN), an ISDN or a PDN providing frame relay data transmission service. In all of these cases, an interworking function will be required to access the packet-switched data transmission service and both permanent and switched connections may be used for the access.

It is not mandatory for Administrations to provide all of the data transmission services, user classes of service, or categories of access contained in this Recommendation. In addition, categories of access have not been recognized for every user class of service; absence is indicated by an " – " in the tables below.

2　Access to a leased circuit data transmission service

See Tables 2-1 and 2-2.

Table 2-1/X.1 – Access by data terminal equipment operating in synchronous mode
using X.21 or X.21 *bis* interfaces

User class of service	Data signalling rate in the data transfer phase (Note)	Categories of access
		Direct access
3	600　bit/s	F1
4	2400　bit/s	F2
5	4800　bit/s	F3
6	9600　bit/s	F4
7	48 kbit/s	F5
19	64 kbit/s	F6
31	128 kbit/s	F7
32	192 kbit/s	F8
33	256 kbit/s	F9
35	384 kbit/s	F10
37	512 kbit/s	F11
45	1024 kbit/s	F12
53	1536 kbit/s	F13
59	1920 kbit/s	F14

NOTE – The support of these user classes of service in the ISDN may be provided by means of a terminal adaptor (in accordance with Recommendation X.30). The concept of terminal adaptor functional grouping is defined in Recommendation I.411.

Table 2-2/X.1 – Access by data terminal equipment operating in start-stop mode
using X.20 or X.20 *bis* interfaces

User class of service	Data signalling rate and code structure in the data transfer phase (Note)	Categories of access
		Direct access
1	300 bit/s, 11[a)] units/character start-stop	E2
2	50 to 200 bit/s, 7.5 to 11[a)] units/character start-stop	E1
14	600 bit/s, 10 units/character start-stop	E3
15	1200 bit/s, 10 units/character start-stop	E4
16	2400 bit/s, 10 units/character start-stop	E5
17	4800 bit/s, 10 units/character start-stop	E6
18	9600 bit/s, 10 units/character start-stop	E7

[a)]　Usage in accordance with Recommendation X.4.

NOTE – Some Administrations are offering leased circuits asynchronous services for terminals operating at the data signalling rate of 600 bit/s, 1200 bit/s, 2400 bit/s, 4800 bit/s and 9600 bit/s supporting them by the synchronous network bearer channels with asynchronous to synchronous coding. The asynchronous to synchronous coding is described in Recommendation V.14 for the data signalling rates of 600 bit/s, 4800 bit/s, 9600 bit/s and Recommendation X.52 for 1200 bit/s.

3 Access to a circuit-switched data transmission service

See Tables 3-1 and 3-2.

**Table 3-1/X.1 – Access by data terminal equipment operating in start-stop mode using
X.20 or X.20 *bis* interfaces** (Note 1)

User class of service	Data signalling rate and code structure in data transfer phase (Note 2)	Call control signals in the call control phase	Categories of access
			Direct access
1	300 bit/s, 11[a] units/character start-stop	300 bit/s, International Alphabet No. 5 (11 units/character) start-stop	A2
2	50 to 200 bit/s, 7.5 to 11[a] units/character start-stop (Notes 3 and 4)	200 bit/s, International Alphabet No. 5 (11 units/character) start-stop (Note 5)	A1
14	600 bit/s, 10 units/character start-stop	600 bit/s, International Alphabet No. 5 (10 units/character) start-stop	A3
15	1200 bit/s, 10 units/character start-stop	1200 bit/s, International Alphabet No. 5 (10 units/character) start-stop	A4
16	2400 bit/s, 10 units/character start-stop	2400 bit/s, International Alphabet No. 5 (10 units/character) start-stop	A5
17	4800 bit/s, 10 units/character start-stop	4800 bit/s, International Alphabet No. 5 (10 units/character) start-stop	A6
18	9600 bit/s, 10 units/character start-stop	9600 bit/s, International Alphabet No. 5 (10 units/character) start-stop	A7

[a] Usage in accordance with Recommendation X.4.

NOTE 1 – There is no user class of service for data signalling rate of 50 bit/s, the transmission mode of 7.5 units/character start-stop and address selection and call progress signals at 50 bit/s, International Telegraph Alphabet No. 2. However, several Administrations have indicated that their telex service (50-baud, International Telegraph Alphabet No. 2) will be provided as one of the many services carried by their public data network.

NOTE 2 – User classes of service 1, 2 and 15 are supported by the synchronous network bearer channels with asynchronous to synchronous coding according to Recommendation X.52. For user classes of service 14, 16, 17 and 18, the asynchronous to synchronous coding of Recommendation V.14 is used.

NOTE 3 – User class of service 2 will provide, in the data transfer phase, for operation at the following data signalling rates and code structures:

50 bit/s (7.5 units/character)

100 bit/s (7.5 units/character)

110 bit/s (11 units/character)

134.5 bit/s (9 units/character)

200 bit/s (11 units/character)

Call control signals would be at 200 bit/s, International Alphabet No. 5 (11 units/character).

NOTE 4 – For international user class of service 2, it should be noted that some public data networks may not be able to prevent two terminals working at different data signalling rates and code structures from being connected together by means of a circuit-switched connection.

NOTE 5 – Some Administrations have indicated that, for certain data signalling rates listed in Note 3 above, they will permit users in class of service 2 to operate the same signalling rate and code structure for both data transfer and address selection and to receive call progress signals at these signalling rates and code structures. Where International Alphabet No. 5 is used for the call control signals, the appropriate parts of Recommendation X.20 shall apply.

**Table 3-2/X.1 – Access by data terminal equipment operating in synchronous mode
using X.21 or X.21 *bis* interfaces**

User class of service	Data signalling rate in the data transfer phase (Note 1)	Call control signals in the call control phase (Notes 2 and 3)	Categories of access		
			Direct access	Port access via ISDN (Notes 4 and 5) with:	
				Permanent connection	Switched connection
3	600 bit/s	600 bit/s, International Alphabet No. 5	B1	S1	R1
4	2400 bit/s	2400 bit/s, International Alphabet No. 5	B2	S2	R2
5	4800 bit/s	4800 bit/s, International Alphabet No. 5	B3	S3	R3
6	9600 bit/s	9600 bit/s, International Alphabet No. 5	B4	S4	R4
7	48 kbit/s	48 kbit/s, International Alphabet No. 5	B5	S5	R5
30	64 kbit/s	64 kbit/s, International Alphabet No. 5	B6	S6	R6
35	384 kbit/s	384 kbit/s, International Alphabet No. 5	B7	S7	R7
53	1536 kbit/s	1536 kbit/s, International Alphabet No. 5	B8	S8	R8
59	1920 kbit/s	1920 kbit/s, International Alphabet No. 5	B9	S9	R9

NOTE 1 – Some Administrations are offering circuit-switched asynchronous services for terminals operating at the data signalling rate of 600 bit/s, 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s with 10 units/character, start-stop in the data transfer phase and, respectively, 600 bit/s, 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, International Alphabet No. 5, 10 units/character, start-stop in the call control phase. These services are supported by the synchronous network bearer channels with asynchronous to synchronous coding according to Recommendation X.52 for user classes of service 1 and 2 and for 1200 bit/s. For the data signalling rates of 600 bit/s, 2400 bit/s, 4800 bit/s, and 9600 bit/s, the asynchronous to synchronous coding of Recommendation V.14 is used.

NOTE 2 – Only applicable when using the X.21 interface.

NOTE 3 – The characteristics at the reference point R for user classes of service 30 and higher are for further study.

NOTE 4 – The support of these user classes of service in the ISDN may be provided by means of a terminal adaptor (in accordance with Recommendation X.30). The concept of terminal adaptor functional grouping is defined in Recommendation I.411.

NOTE 5 – The call control signals used for categories of access S6 through S9 and R6 through R9 will be in accordance with those defined for ISDN at reference point S/T. For interface at reference point R, see the corresponding user class of service for the same data signalling rate in this table. Reference points R, S, and T are defined in Recommendation I.411.

4 Access to a packet-switched data transmission service

See Tables 4-1 to 4-5.

**Table 4-1/X.1 – Access by data terminal equipment operating in synchronous mode
using X.25, X.32, X.34 or X.36: interfaces to service provided by PSPDN;
Direct access and port access with permanent connection** (Note 1)

User class of service	Data signalling rate		Categories of access							
			Service provided by a PSPDN with:							
			Direct access (Note 3)	Port access with:						
				Permanent connection						
				via CSPDN	via PSTN	via ISDN (B-/H-channel) (Notes 2, 3, 4 and 5)	via FRPDN (Note 6)	via ISDN (FRDTS) B-/H-channel	via ISDN (FRDTS) D-channel	via B-ISDN (Note 7)
8	2 400 bit/s		D1	M1	N2	V1	–	IFA1	IFB1	–
9	4 800 bit/s		D2	M2	N3	V2	–	IFA2	IFB2	–
10	9 600 bit/s		D3	M3	N4	V3	–	IFA3	IFB3	–
26	14 400 bit/s		D14	–	N5	–	–	–	–	–
11	48 kbit/s		D4	M4	–	V4	–	IFA4	IFB4	–
12	1 200 bit/s		–	–	N1	–	–	–	–	–
30	64 kbit/s		D5	M5	–	V5	W1	IFA5	IFB5	BIA1
31	128 kbit/s		D6	–	–	–	W2	IFA6	–	BIA2
32	192 kbit/s		D7	–	–	–	W3	IFA7	–	BIA3
33	256 kbit/s		D8	–	–	–	W4	IFA8	–	BIA4
34	320 kbit/s		D15	–	–	–	W5	IFA9	–	BIA5
35	384 kbit/s		D9	–	–	V6	W6	IFA10	–	BIA6
36	448 kbit/s		D16	–	–	–	W7	IFA11	–	BIA7
37	512 kbit/s		D10	–	–	–	W8	IFA12	–	BIA8
38	576 kbit/s		D17	–	–	–	W9	IFA13	–	BIA9
39	640 kbit/s		D18	–	–	–	W10	IFA14	–	BIA10
40	704 kbit/s		D19	–	–	–	W11	IFA15	–	BIA11
41	768 kbit/s		D20	–	–	–	W12	IFA16	–	BIA12
42	832 kbit/s		D21	–	–	–	W13	IFA17	–	BIA13
43	896 kbit/s		D22	–	–	–	W14	IFA18	–	BIA14
44	960 kbit/s		D23	–	–	–	W15	IFA19	–	BIA15
45	1 024 kbit/s		D11	–	–	–	W16	IFA20	–	BIA16
46	1 088 kbit/s		D24	–	–	–	W17	IFA21	–	BIA17
47	1 152 kbit/s		D25	–	–	–	W18	IFA22	–	BIA18
48	1 216 kbit/s		D26	–	–	–	W19	IFA23	–	BIA19
49	1 280 kbit/s		D27	–	–	–	W20	IFA24	–	BIA20
50	1 344 kbit/s		D28	–	–	–	W21	IFA25	–	BIA21
51	1 408 kbit/s		D29	–	–	–	W22	IFA26	–	BIA22
52	1 472 kbit/s		D30	–	–	–	W23	IFA27	–	BIA23
53	1 536 kbit/s		D12	–	–	V7	W24	IFA28	–	BIA24
54	1 600 kbit/s		D31	–	–	–	W25	IFA29	–	BIA25
55	1 664 kbit/s		D32	–	–	–	W26	IFA30	–	BIA26
56	1 728 kbit/s		D33	–	–	–	W27	IFA31	–	BIA27
57	1 792 kbit/s		D34	–	–	–	W28	IFA32	–	BIA28
58	1 856 kbit/s		D35	–	–	–	W29	IFA33	–	BIA29
59	1 920 kbit/s		D13	–	–	V8	W30	IFA34	–	BIA30
60	1 984 kbit/s		D36	–	–	–	W31	IFA35	–	BIA31
61	2 048 kbit/s		D37	–	–	–	W32	IFA36	–	BIA32

See common Notes after Table 4-3.

Table 4-2/X.1 – Access by data terminal equipment operating in synchronous mode using X.25, X.32, X.34 or X.36: interfaces to service provided by PSPDN; Port access with switched connection (Note 1)

User class of service	Data signalling rate	Categories of access						
		Service provided by a PSPDN with:						
		Port access with:						
		Switched connection						
		via CSPDN	via PSTN (Note 4)	via ISDN (B-/H-channel) (Notes 2, 3, 4 and 5)	via FRPDN (Note 6)	via ISDN (FRDTS) B-/H-channel	via ISDN (FRDTS) D-channel	via B-ISDN (Note 7)
8	2 400 bit/s	O1	P2	Q1	–	IFC1	IFD1	–
9	4 800 bit/s	O2	P3	Q2	–	IFC2	IFD2	–
10	9 600 bit/s	O3	P4	Q3	–	IFC3	IFD3	–
26	14 400 bit/s	–	P5	–	–	–	–	–
11	48 kbit/s	O4	–	Q4	–	IFC4	IFD4	–
12	1 200 bit/s	–	P1	–	–	–	–	–
30	64 kbit/s	O5	–	Q5	X1	IFC5	IFD5	BIB1
31	128 kbit/s	–	–	–	X2	IFC6	–	BIB2
32	192 kbit/s	–	–	–	X3	IFC7	–	BIB3
33	256 kbit/s	–	–	–	X4	IFC8	–	BIB4
34	320 kbit/s	–	–	–	X5	IFC9	–	BIB5
35	384 kbit/s	–	–	Q6	X6	IFC10	–	BIB6
36	448 kbit/s	–	–	–	X7	IFC11	–	BIB7
37	512 kbit/s	–	–	–	X8	IFC12	–	BIB8
38	576 kbit/s	–	–	–	X9	IFC13	–	BIB9
39	640 kbit/s	–	–	–	X10	IFC14	–	BIB10
40	704 kbit/s	–	–	–	X11	IFC15	–	BIB11
41	768 kbit/s	–	–	–	X12	IFC16	–	BIB12
42	832 kbit/s	–	–	–	X13	IFC17	–	BIB13
43	896 kbit/s	–	–	–	X14	IFC18	–	BIB14
44	960 kbit/s	–	–	–	X15	IFC19	–	BIB15
45	1 024 kbit/s	–	–	–	X16	IFC20	–	BIB16
46	1 088 kbit/s	–	–	–	X17	IFC21	–	BIB17
47	1 152 kbit/s	–	–	–	X18	IFC22	–	BIB18
48	1 216 kbit/s	–	–	–	X19	IFC23	–	BIB19
49	1 280 kbit/s	–	–	–	X20	IFC24	–	BIB20
50	1 344 kbit/s	–	–	–	X21	IFC25	–	BIB21
51	1 408 kbit/s	–	–	–	X22	IFC26	–	BIB22
52	1 472 kbit/s	–	–	–	X23	IFC27	–	BIB23
53	1 536 kbit/s	–	–	Q7	X24	IFC28	–	BIB24
54	1 600 kbit/s	–	–	–	X25	IFC29	–	BIB25
55	1 664 kbit/s	–	–	–	X26	IFC30	–	BIB26
56	1 728 kbit/s	–	–	–	X27	IFC31	–	BIB27
57	1 792 kbit/s	–	–	–	X28	IFC32	–	BIB28
58	1 856 kbit/s	–	–	–	X29	IFC33	–	BIB29
59	1 920 kbit/s	–	–	Q8	X30	IFC34	–	BIB30
60	1 984 kbit/s	–	–	–	X31	IFC35	–	BIB31
61	2 048 kbit/s	–	–	–	X32	IFC36	–	BIB32

See common Notes after Table 4-3.

Table 4-3/X.1 – Access by data terminal equipment operating in synchronous mode using X.25, X.34 or X.36: interfaces to service provided by ISDN (Note 1)

| User class of service | Data signalling rate | Direct access | | Port access with: Permanent connection | | | | Port access with: Switched connection | | | |
		via a B-/H-channel (Notes 2 and 4)	via a D-channel	via FRPDN (Note 6)	via ISDN (FRDTS) B-/H-channel	via ISDN (FRDTS) D-channel	via B-ISDN (Note 7)	via FRPDN (Note 6)	via ISDN (FRDTS) B-/H-channel	via ISDN (FRDTS) D-channel	via B-ISDN (Note 7)
8	2 400 bit/s	T1	U1	–	IFE1	IFF1	–	–	IFG1	IFH1	–
9	4 800 bit/s	T2	U2	–	IFE2	IFF2	–	–	IFG2	IFH2	–
10	9 600 bit/s	T3	U3	–	IFE3	IFF3	–	–	IFG3	IFH3	–
26	14 400 bit/s	T9	U7	–	–	–	–	–	–	–	–
27	16 000 bit/s	–	U6	–	–	–	–	–	–	–	–
11	48 kbit/s	T4	U4	–	IFE4	IFF4	–	–	IFG4	IFH4	–
30	64 kbit/s	T5	U5	Y1	IFE5	IFF5	BIC1	Z1	IFG5	IFH5	BID1
31	128 kbit/s	–	–	Y2	IFE6	–	BIC2	Z2	IFG6	–	BID2
32	192 kbit/s	–	–	Y3	IFE7	–	BIC3	Z3	IFG7	–	BID3
33	256 kbit/s	–	–	Y4	IFE8	–	BIC4	Z4	IFG8	–	BID4
34	320 kbit/s	–	–	Y5	IFE9	–	BIC5	Z5	IFG9	–	BID5
35	384 kbit/s	T6	–	Y6	IFE10	–	BIC6	Z6	IFG10	–	BID6
36	448 kbit/s	–	–	Y7	IFE11	–	BIC7	Z7	IFG11	–	BID7
37	512 kbit/s	–	–	Y8	IFE12	–	BIC8	Z8	IFG12	–	BID8
38	576 kbit/s	–	–	Y9	IFE13	–	BIC9	Z9	IFG13	–	BID9
39	640 kbit/s	–	–	Y10	IFE14	–	BIC10	Z10	IFG14	–	BID10
40	704 kbit/s	–	–	Y11	IFE15	–	BIC11	Z11	IFG15	–	BID11
41	768 kbit/s	–	–	Y12	IFE16	–	BIC12	Z12	IFG16	–	BID12
42	832 kbit/s	–	–	Y13	IFE17	–	BIC13	Z13	IFG17	–	BID13
43	896 kbit/s	–	–	Y14	IFE18	–	BIC14	Z14	IFG18	–	BID14
44	960 kbit/s	–	–	Y15	IFE19	–	BIC15	Z15	IFG19	–	BID15
45	1 024 kbit/s	–	–	Y16	IFE20	–	BIC16	Z16	IFG20	–	BID16
46	1 088 kbit/s	–	–	Y17	IFE21	–	BIC17	Z17	IFG21	–	BID17
47	1 152 kbit/s	–	–	Y18	IFE22	–	BIC18	Z18	IFG22	–	BID18
48	1 216 kbit/s	–	–	Y19	IFE23	–	BIC19	Z19	IFG23	–	BID19
49	1 280 kbit/s	–	–	Y20	IFE24	–	BIC20	Z20	IFG24	–	BID20
50	1 344 kbit/s	–	–	Y21	IFE25	–	BIC21	Z21	IFG25	–	BID21
51	1 408 kbit/s	–	–	Y22	IFE26	–	BIC22	Z22	IFG26	–	BID22
52	1 472 kbit/s	–	–	Y23	IFE27	–	BIC23	Z23	IFG27	–	BID23
53	1 536 kbit/s	T7	–	Y24	IFE28	–	BIC24	Z24	IFG28	–	BID24
54	1 600 kbit/s	–	–	Y25	IFE29	–	BIC25	Z25	IFG29	–	BID25
55	1 664 kbit/s	–	–	Y26	IFE30	–	BIC26	Z26	IFG30	–	BID26
56	1 728 kbit/s	–	–	Y27	IFE31	–	BIC27	Z27	IFG31	–	BID27
57	1 792 kbit/s	–	–	Y28	IFE32	–	BIC28	Z28	IFG32	–	BID28
58	1 856 kbit/s	–	–	Y29	IFE33	–	BIC29	Z29	IFG33	–	BID29
59	1 920 kbit/s	T8	–	Y30	IFE34	–	BIC30	Z30	IFG34	–	BID30
60	1 984 kbit/s	–	–	Y31	IFE35	–	BIC31	Z31	IFG35	–	BID31
61	2 048 kbit/s	–	–	Y32	IFE36	–	BIC32	Z32	IFG36	–	BID32

Notes to Tables 4-1, 4-2 and 4-3

NOTE 1 – The packet switched data transmission service allows for communication between data terminal equipments operating at different data signalling rates.

NOTE 2 – The support of these user classes of service in the ISDN may be provided by means of a terminal adaptor (in accordance with Recommendation X.31). The concept of terminal adaptor functional grouping is defined in Recommendation I.411.

NOTE 3 – Recommendation X.31 (case A) is appropriate:

– at the S/T reference point when categories of access D5 and Q5 are provided via an ISDN B-channel;

– at the S/T reference point when categories of access D9, D12, D13, Q6, Q7 and Q8 are provided via an ISDN H-channel; or

– at the R reference point when categories of access D1, D2, D3, D4, D5, Q1, Q2, Q3, Q4 and Q5 are provided via an ISDN B-channel with terminal adaptors.

NOTE 4 – Recommendations X.31 (case A) and X.32 are appropriate at the S/T reference point. Recommendation X.32 is appropriate at the R reference point.

NOTE 5 – The characteristics at the reference point R for user classes of service 30 and higher are for further study.

NOTE 6 – Recommendation X.36 is used.

NOTE 7 – Recommendation X.34 is used.

Table 4-4/X.1 – Access by data terminal equipment operating in start-stop mode using X.28 interface
(Notes 1 and 2)

User class of service	Data signalling rate and code structure (Note 3)	Direct access (Note 4)	Service provided by a PSPDN with: Port access with: Switched connection via CSPDN	via PSTN	Permanent connection via CSPDN	via PSTN
20 (Note 5)	50-300 bit/s, 10 or 11 units/character	C1, C2, C3	K1	L1, L2, L3	I1	J1, J2, J3
21	75/1200 bit/s, 10 units/character (Note 6)	C5	–	L5	–	J5
22	1200 bit/s, 10 units/character	C4	K4	L4	I4	J4
23	2400 bit/s, 10 units/character	C6	K6	L6	I6	J6
24	4800 bit/s, 10 units/character	C7	K7	L7	I7	J7
25	9600 bit/s, 10 units/character	C8	K8	L8	I8	J8
26	14 400 bit/s, 10 units/character	C9	–	L9	–	J9

NOTE 1 – The packet-switched data transmission service allows for communication between X.25 and/or X.28 data terminal equipments operating at different data signalling rates.

NOTE 2 – The support of X.28 DTE in the ISDN is for further study.

NOTE 3 – Some Administrations are offering circuit-switched asynchronous services for terminals operating at the data signalling rate of 600 bit/s, 10 units/character, start-stop in the data transfer phase and 600 bit/s, International Alphabet No. 5, 10 units/character, start-stop in the call control phase. For the data signalling rate 600 bit/s, the asynchronous to synchronous coding of Recommendation V.14 is used.

NOTE 4 – Some Administrations may offer the categories of access of 600 bit/s.

NOTE 5 – User class of service 20 allows for categories of access according to the following speeds:

– by direct access: C1 at 110 bit/s, C2 at 200 bit/s and C3 at 300 bit/s;

– by port access via a CSPDN: K1 and I1 at 300 bit/s;

– by port access via PSTN: L1 and J1 at 110 bit/s, L2 and J2 at 200 bit/s and L3 and J3 at 300 bit/s.

NOTE 6 – 75 bit/s from DTE to DCE, 1200 bit/s from DCE to DTE.

Table 4-5/X.1 – Access by Group 3 facsimile terminals using X.38 interface (Note 1)

User class of service	Data signalling rate	Direct access	Service provided by a PSPDN with: Port access with: Switched connection via PSTN	Permanent connection via PSTN
29	300/2400/2400-14 400 bit/s (Note 2)	FAXC	FAXA	FAXB

NOTE 1 – The packet-switched data transmission service allows for communication between X.25 and/or X.38 data terminal equipments operating at different data signalling rates. The support of X.38 terminals in the ISDN is for further study.

NOTE 2 – Operation of the facsimile terminal equipment is in accordance with Recommendation T.4 for image data encoding at speeds of 2400-14 400 bit/s and in accordance with Recommendation T.30 for control signalling at speeds of 300 bit/s or, optionally, 2400 bit/s.

5 Access to a frame relay data transmission service

See Table 5-1.

Table 5-1/X.1 – Access by terminal equipment operating in synchronous mode (Notes 1, 2 and 3)

User class of service	Data signalling rate (Note 5)		Categories of access					
			Service provided by an FRPDN with:					
			Port access with:					
		Direct access	Permanent connection			Switched connection		
			via CSPDN	via ISDN (B-/H-channel)	via B-ISDN (Note 4)	via CSPDN	via ISDN (B-/H-channel)	via B-ISDN (Note 4)
30	64 kbit/s	G1	FRA1	FRB1	FRE1	FRC1	FRD1	FRF1
31	128 kbit/s	G2	FRA2	FRB2	FRE2	FRC2	FRD2	FRF2
32	192 kbit/s	G3	FRA3	FRB3	FRE3	FRC3	FRD3	FRF3
33	256 kbit/s	G4	FRA4	FRB4	FRE4	FRC4	FRD4	FRF4
34	320 kbit/s	G5	–	FRB5	FRE5	–	FRD5	FRF5
35	384 kbit/s	G6	FRA6	FRB6	FRE6	FRC6	FRD6	FRF6
36	448 kbit/s	G7	–	FRB7	FRE7	–	FRD7	FRF7
37	512 kbit/s	G8	FRA8	FRB8	FRE8	FRC8	FRD8	FRF8
38	576 kbit/s	G9	–	FRB9	FRE9	–	FRD9	FRF9
39	640 kbit/s	G10	–	FRB10	FRE10	–	FRD10	FRF10
40	704 kbit/s	G11	–	FRB11	FRE11	–	FRD11	FRF11
41	768 kbit/s	G12	–	FRB12	FRE12	–	FRD12	FRF12
42	832 kbit/s	G13	–	FRB13	FRE13	–	FRD13	FRF13
43	896 kbit/s	G14	–	FRB14	FRE14	–	FRD14	FRF14
44	960 kbit/s	G15	–	FRB15	FRE15	–	FRD15	FRF15
45	1 024 kbit/s	G16	FRA16	FRB16	FRE16	FRC16	FRD16	FRF16
46	1 088 kbit/s	G17	–	FRB17	FRE17	–	FRD17	FRF17
47	1 152 kbit/s	G18	–	FRB18	FRE18	–	FRD18	FRF18
48	1 216 kbit/s	G19	–	FRB19	FRE19	–	FRD19	FRF19
49	1 280 kbit/s	G20	–	FRB20	FRE20	–	FRD20	FRF20
50	1 344 kbit/s	G21	–	FRB21	FRE21	–	FRD21	FRF21
51	1 408 kbit/s	G22	–	FRB22	FRE22	–	FRD22	FRF22
52	1 472 kbit/s	G23	–	FRB23	FRE23	–	FRD23	FRF23
53	1 536 kbit/s	G24	FRA24	FRB24	FRE24	FRC24	FRD24	FRF24
54	1 600 kbit/s	G25	–	FRB25	FRE25	–	FRD25	FRF25
55	1 664 kbit/s	G26	–	FRB26	FRE26	–	FRD26	FRF26
56	1 728 kbit/s	G27	–	FRB27	FRE27	–	FRD27	FRF27
57	1 792 kbit/s	G28	–	FRB28	FRE28	–	FRD28	FRF28
58	1 856 kbit/s	G29	–	FRB29	FRE29	–	FRD29	FRF29
59	1 920 kbit/s	G30	FRA30	FRB30	FRE30	FRC30	FRD30	FRF30
60	1 984 kbit/s	G31	–	FRB31	FRE31	–	FRD31	FRF31
61	2 048 kbit/s	G32	–	FRB32	FRE32	–	FRD32	FRF32
62	6 312 kbit/s	G33	–	–	FRE33	–	–	FRF33
63	8 448 kbit/s	G34	–	–	FRE34	–	–	FRF34
64	34 368 kbit/s	G35	–	–	FRE35	–	–	FRF35
65	44 736 kbit/s	G36	–	–	FRE36	–	–	FRF36
66	155 520 kbit/s	G37	–	–	FRE37	–	–	FRF37
67	622 080 kbit/s	G38	–	–	FRE38	–	–	FRF38

NOTE 1 – The interface for ISDN is defined in Recommendations 1.430, 1.431, Q.921, Q.922 and Q.933. The interface for B-ISDN is defined in Recommendations I.413, I.432 and Q.2931. The interface for FRPDN is defined in Recommendation X.36.

NOTE 2 – DTE using X.25 interface may operate by means of a terminal adaptor.

NOTE 3 – Services provided by an ISDN Frame Relaying Bearer Service (FRBS) are the responsibility of Study Group 13.

NOTE 4 – Recommendation X.46 is used (configuration with B-TA).

NOTE 5 – Data signalling rates for classes 62-67 are bit rates as in Recommendations G.703, G.707.

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