

## Appendix I

(to Recommendation Q.931)

### Usage of cause values

Table I-2/Q.931 indicates the usage of cause values within Recommendation Q.931. Other usage may be provided within other Recommendations, e.g. Q.700-Series and Q.699. Other causes may also be used by Q.931 entities where this is not precluded by the procedures defined elsewhere in Q.931.

Table I-1/Q.931 defines the key for the location of generation in Table I-2/Q.931. For more precise usage of the location codes in the cause information element, see Annex J/Q.931.

TABLE I-1/Q.931

### Key for the location of the generation in Table I-2/Q.931

LU : Local user  
LN : Local network  
TN : Transit network  
RN : Remote network  
RU : Remote user  
LPE: Local peer entity (for symmetrical operation, see Annex D/Q.931)

The following abbreviations to message types are used in Table I-2/Q.931.

CON CON	CONGESTION CONTROL
DISC	DISCONNECT
REL	RELEASE
REL COM	RELEASE COMPLETE
RES REJ	RESUME REJECT
STAT	STATUS
SUSP REJ	SUSPEND REJECT

TABLE I-2/Q.931 (1 of 11)

Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Typical carrying Section		Typical identified by receiving side	message as
					location of generation	At remote interface		
1	000	0001	Unassigned (unallocated) number	Condition	5.1.4	LN	DISC	REL COM
					5.2.4	RU	DISC	REL COM
2	000	0010	No route to specified transit network	Transit	C.2	TN	DISC	
					E.3	LN		REL COM
3	000	0011	No route to destination	Condition	5.1.4	LN	REL COM	DISC
					5.2.4	RU	DISC	REL COM

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Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	generation	Typical carrying location of		Typical identified by receiving side	message as
						At remote interface	At local interface		
6	000	0110	Channel unacceptable	-	5.2.3.1c 5.3.2.d 6.2.2.3.1	LN		REL	
7	000	0111	Call awarded and being delivered in an established channel	-	6.2.2.3.1	LN		REL	
16	001	0000	Normal call clearing	Condition			RU	DISC	DISC
17	001	0001	User busy	-	5.2.5.1	RU	REL COM.		
					5.2.5.4b		DISC		
					No procedure	RN		DISC	
18	001	0010	No user responding	-	5.2.5.3	RN		DISC	
19	001	0011	User alerting, No answer	-	5.2.5.3	RN		DISC	
21	001	0101	Call rejected user supplied diagnostic	Condition:	5.2.5.1	RU	REL COM.	DISC	
					5.2.5.4b				

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Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Typical carrying location of generation	Section identified by receiving side		message as	
						At remote interface	At local interface		
22	001	0110	Number changed destination number	New	5.1.4	LN	REL COM	DISC	
					5.2.4	RU	REL COM	DISC	
26	001	1010	Non-selected user clearing	-	5.3.2b	LN		REL	
				6.2.2.3.1					
27	001	1011	Destination out of order	-	5.8.9	RN		DISC	
28	001	1100	Invalid number format (incomplete number)	-	network	Local		RELease +	
							DISC		
							COMPLete		
						5.2.4	RU	DISC	DISC
							REL COM		
		5.1.5.2	LN		DISC				
		5.2.4	RN		DISC				
		5.1.4	LN		DISC	REL COM			
29	011	1101	Facility rejected identification	Facility procedure in Q.931	No	LN		REL COM	
					RN		DISC		

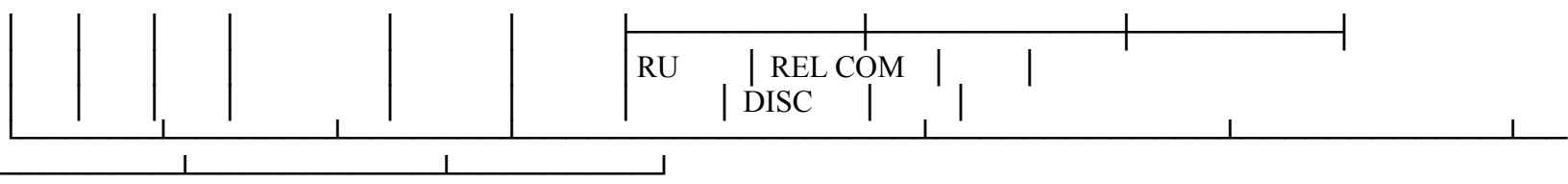


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Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Location of generation	Typical carrying Section identified by receiving side		message as
						At remote interface	At local interface	
30	001	1110	Response to STATUS ENQUIRY	-	5.8.10	LU, LN		STAT
31	001	1111	Normal, unspecified	-	5.8.4	RN	DISC	REL COM
34	010	0010	No circuit/channel available	-	5.1.1 5.1.2	LN		REL COM
				5.2.3.1b 5.2.3.1e 5.2.3.2 6.2.2.3.1		RU		REL COM. DISC
				C.2	LN		REL COM, DISC	REL COM, DISC
				C.2	TN			DISC
				D.1.1e D.3.b	LPE			REL COM
38	010	0110	Network out of order	-	No procedure			
41	010	1001	Temporary failure	-	5.8.8	LU, LN		DISC

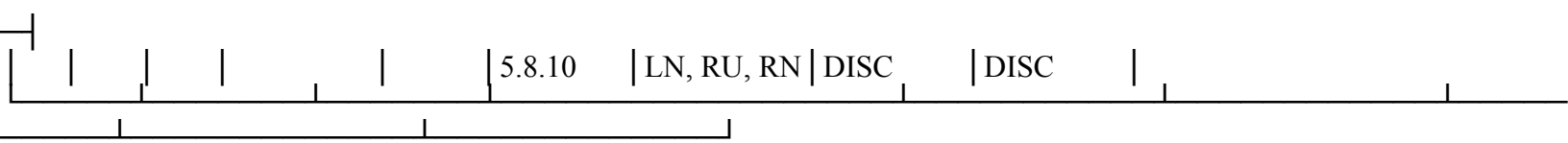


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Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	location of generation	Typical carrying Section identified by receiving side		message as
						At remote interface	At local interface	
42	010	1010	Switching equipment congestion	-	No procedure			REL REL COM
43	010	1011	Access information discarded	Discarded into element	7.1.5.7	RU, LN, RU		CON CON
			identifier(s)	7.1.6.1	LN		STAT	
				5.8.7.2	LN, LU		STAT	
44	010	1100	Requested circuit/channel	-	5.1.2	LN		REL COM
			not available	5.2.3.1e	RU		REL COM.	DISC
				5.2.3.2				
				6.2.2.3.1				
				D.1.1.e			REL COM	
47	010	1111	Resource unavailable, unspecified	-	No procedure			
49	011	0001	Quality of Service unavailable	Condition	6		REL COM	REL



TABLE I-2/Q.931 (6 of 11)

Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Typical carrying location of generation	Section identified by receiving side	Typical message as	
							At remote interface	At local interface
50	011	0010	Requested facility not subscribed	Facility identification	7.1.3.6	RU	DISC	DISC
					7.1.4.3	REL COM.		
				7.1.5.3	RN	DISC		
				7.1.7.4	LN	REL COM		
57	011	1001	Bearer capability not authorized	Attributes of bearer capability	5.1.5.2	LN	DISC	REL COM
				7.2.2	LN	REL COM		
58	011	1010	Bearer capability not presently available	Attributes of bearer capability	5.1.5.2	LN	DISC	REL COM
				7.2.2	LN	REL COM		
63	011	1111	Service or option not available, unspecified	-	5.1.5.2	LN	DISC	REL COM
65	100	0001	Bearer capability not implemented	Attributes of bearer capability	5.1.5.2	LN	DISC	REL COM
				6.1	LN	REL COM		
66	100	0010	Channel type not implemented	Channel type procedures	No			



TABLE I-2/Q.931 (7 of 11)

Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Location of generation	Typical carrying Section identified by receiving side		message as
						At remote interface	At local interface	
69	100	0101	Requested facility not implemented	Facility identification	7.1.3.6 7.1.4.3 7.1.5.3 7.1.7.4	RU REL COM RN LN	DISC REL DISC REL REL COM	DISC
70	100	0110	Only restricted digital information bearer capability is available	-	No procedure (network dependent option)			
79	100	1111	Service or option not implemented, unspecified					
81	101	0001	Invalid call reference value	-	5.8.3.2a	LU, LN	REL REL COM	
					5.8.3.2b	LU, LN	REL COM	
					5.8.3.2f	LU, LN	STAT	
82	101	0010	Identified channel does not exist	Channel identity	No procedure		REL COM	

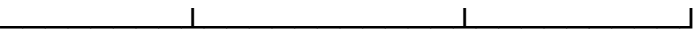


TABLE I-2/Q.931 (8 of 11)

Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Location of generation	Typical carrying Section identified by receiving side		message as
						At remote interface	At local interface	
83	101	0011	A suspended call exists, but this call identity does not	-	5.6.5	LN		RES REJ
84	101	0100	Call identity in use	-	5.6.3	LN		SUSP REJ
85	101	0101	No call suspended	-	5.6.5	LN		RES REJ
86	101	0110	Call having the requested call identity has been cleared		5.6.5	LN		RES REJ
88	101	0111	Incompatible destination	Incompatible parameter 5.2.5.1 5.2.5.3a B.3.2 B.3.3	5.2.2	RU	REL COM	DISC
91	101	1011	Invalid transit network selection	-	C.2	TN		DISC
					LN		DISC, REL	REL COM

95	101	1111	Invalid message, unspecified	Message type	5.8	LN STAT	REL COM
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TABLE I-2/Q.931 (9 of 11)

Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Diagnosis location of generation	Typical carrying section identified by receiving side		message as
						At remote interface	At local interface	
96	110	0000	Mandatory information element is missing	Information element identifier(s)	5.8.6.1	LN, LU	REL COM. STAT	REL
					5.8.11	LN, LU	STAT	
97	110	0001	Message type non-existent or not implemented	Message type 5.8.10	5.8.4	LU, LN	STAT	
				5.8.11				
98	110	0010	Message not compatible with call state or message type non-existent or not implemented	Message type	5.8.4	LU, LN	STAT	
99	110	0011	Information element non-existent or not implemented	Information element	5.8.7.1	LU, LN	STAT	
				5.8.11				
			identifier(s)	5.8.7.1	LN	REL COM	REL	

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Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Diagnosis location of generation	Typical carrying Section identified by receiving side		message as
						At remote interface	At local interface	
100	110	0100	Invalid information element contents	Information element identifier(s)	5.8.6.2	LU, LN	REL	STAT
					5.8.7.2 5.8.11	LU, LN	REL COM	STAT
101	110	0101	Message not compatible with call state	Message type	5.8.4	LN, LU	REL	STAT
					5.8.11	LN, LU	REL COM	DISC
102	110	0110	Recovery on time expiry	Timer number	5.2.4	LN	REL	DISC
					5.2.5.3			
					5.6.5 5.4.1			
					5.3.3 5.3.4	LN	REL	
				5.3.2f 5.3.3 5.6.5	LU	REL		



TABLE I-2/Q.931 (11 of 11)

Usage of cause values

Cause No.	Class	Value	Cause name	Diagnostics cross-reference	Typical carrying location of generation	Section identified by receiving side		Typical message as
						At remote interface	At local interface	
111	110	1111	Protocol error, unspecified		5.8.4	RN		DISC
127	111	1111	Interworking, unspecified		No explicit procedure			

## Appendix II

(to Recommendation Q.931)

### Example message flow diagrams and example conditions for cause mapping

#### II.1 Example message flow diagrams

Examples of the procedures for the use of the B and D channel network connection types and the selection of the appropriate channel types are summarized in Figures II-1/Q.931 to II-7/Q.931. These figures are intended to complement the description in the preceding text and do not illustrate all possible situations.

Note - Not all frames that may be sent across the TA interface may be represented in the following figures.

##### II.1.1 Key to the figures

RECOUP

cont. of recoup II.11 Key to figures

##### II.1.2 Example message flow diagrams

FIGURE II-1/Q.931

Example message sequence for the ISDN virtual service  
B-channel access first virtual call set-up in this channel recoup

FIGURE II-2/Q.931 recoup

FIGURE II-3/Q.931

recoup

FIGURE II-4/Q.931

recoup

FIGURE II-5/Q.931

recoup

FIGURE II-6/Q.931

recoup

FIGURE II-7/Q.931

II.2 Example conditions for cause mapping

Figures II-8/Q.931 through II-16/Q.931 show example conditions when cause mappings would be utilized between Q.931 and X.25 [5] messages and utilize the specific mappings of Table 6-5/Q.931 and Table 6-6/Q.931 as shown below:

recoup

FIGURE II-9/Q.931 and FIGURE II-10/Q.931

recoup

FIGURE II-11/Q.931 and FIGURE II-12/Q.931

recoup

FIGURE II-13/Q.931 and FIGURE II-14/Q.931

recoup

FIGURE II-15/Q.931 and FIGURE II-16/Q.931

Appendix III

(to Recommendation Q.931)

Summary of assigned information element identifier and  
message type code points for the Q.93X-Series of Recommendations

TABLE III-1

Information element code points

TABLE III-2

<u>8 7 6 5 4 3 2 1</u>	<u>Message type code points</u>	<u>Recommendation</u>
		<u>reference</u>
0 0 0 0 0 0 0 0	Escape to nationally specific message type	Q.931
0 0 0 - - - - -	<u>Call establishment messages:</u>	
0 0 0 0 1	ALERTING	Q.931
0 0 0 1 0	CALL PROCEEDING	Q.931
0 0 0 1 1	PROGRESS	Q.931
0 0 1 0 1	SETUP	Q.931
0 0 1 1 1	CONNECT	Q.931
0 1 1 0 1	SETUP ACKNOWLEDGE	Q.931
0 1 1 1 1	CONNECT ACKNOWLEDGE	Q.931
0 0 1 - - - - -	<u>Call information phase messages:</u>	
0 0 0 0 0	USER INFORMATION	Q.931
0 0 0 0 1	SUSPEND REJECT	Q.931
0 0 0 1 0	RESUME REJECT	Q.931
0 0 1 0 0	HOLD Q.932 [4]	
0 0 1 0 1	SUSPEND	Q.931
0 0 1 1 0	RESUME	Q.931
0 1 0 0 0	HOLD ACKNOWLEDGE	Q.932
0 1 1 0 1	SUSPEND ACKNOWLEDGE	Q.931
0 1 1 1 0	RESUME ACKNOWLEDGE	Q.931
1 0 0 0 0	HOLD REJECT	Q.932
1 0 0 0 1	RETRIEVE	Q.932
1 0 0 1 1	RETRIEVE ACKNOWLEDGE	Q.932
1 0 1 1 1	RETRIEVE REJECT	Q.932
0 1 0 - - - - -	<u>Call clearing messages:</u>	
0 0 1 0 1	DISCONNECT	Q.931
0 0 1 1 0	RESTART	Q.931
0 1 1 0 1	RELEASE	Q.931
0 1 1 1 0	RESTART ACKNOWLEDGE	Q.931
1 1 0 1 0	RELEASE COMPLETE	Q.931
0 1 1 - - - - -	<u>Miscellaneous messages:</u>	
0 0 0 0 0	SEGMENT	Q.931
0 0 0 1 0	FACILITY	Q.931
0 0 1 0 0	REGISTER	Q.932 [4]
0 1 1 1 0	NOTIFY	Q.931
1 0 1 0 1	STATUS ENQUIRY	Q.931
1 1 0 0 1	CONGESTION CONTROL	Q.931

1 1 0 1 1 INFORMATION  
1 1 1 0 1 STATUS

Q.931  
Q.931

TABLE III-3

Operation values assigned within the invoke component of the facility information element

8 7 6 5 4 3 2 1

0 0 0 0 0 0 0 1 User-user service

Acronyms used in Recommendation Q.931

<u>Acronym</u>			<u>Meaning</u>
<u>English</u>	<u>French</u>	<u>Spanish</u>	
ABM			Asynchronous Balanced Mode (of HDLC)
ACK			Acknowledgement
ADPCM			Adaptative Differential Pulse Code Modulation
AFI			Authority and Format Identifier
ARM			Asynchronous Response Mode (of HDLC)
AU			Access Unit
BC			Bearer Capability
BCD			Binary Coded Decimal
Bi			Indicated B Channel
B			An idle B Channel Bi
Bj			A B Channel in use
CEI			Connection Endpoint Identifier
CES			Connection Endpoint Suffix
CSPDN			Circuit Switched Public Data Network

D	The D Channel
DDI	Direct Dialling In
DLCI	Data Link Connection Identifier (See Recommendations Q.920/Q.921)
DTE	Data Terminal Equipment
HDLC	High Level Data Link Control (procedures)
HLC	High Layer Compatibility
I	Information (frame)
IA5	International Alphabet No. Five (defined by CCITT)
IE	Information Element
ISDN	Integrated Services Digital Network
ISO	International Standard Organization
IWF	Interworking Function
IWU	Interworking Unit

<u>Acronym</u>			Meaning
English	French	Spanish	
LAN			Local Area Network
LAPB			Link Access Protocol-Balanced
LAPD			Link Access Protocol on the D Channel
LLC			Low Layer Compatibility
LLI			Logical Link Identifier (See Recommendation Q.921)
NACK			Negative Acknowledgement
NIC			Network Independent Clock
NRM			Normal Response Mode (of HDLC)
NSAP			Network Service Access Point
NT2			Network Termination of type two
OSI			Open System Interconnection
PABX			Private Automatic Branch Exchange
PCM			Pulse Code Modulation
PH			Packet Handler
PSPDN			Packet Switched Public Data Network
PSTN			Public Switched Telephony Network
PVC			Permanent Virtual Circuit
RDTD			Restricted Differential Time Delay
SABME			Set Asynchronous Balanced Mode Extended (frame)
SAPI			Service Access Point Identifier (See Recommendation Q.921)
TA			Terminal Adaptor (See Recommendation I.411)
TE1			Terminal Equipment of type 1 (See Recommendation I.411)
TE2			Terminal Equipment of type 2 (See Recommendation I.411)
TEI			Terminal Endpoint Identifier (See Recommendations Q.920 and Q.921)
UI			Unnumbered Information (frame)
UDI			Unrestricted Digital Information
VC			(Switched) Virtual Circuit



## REFERENCES

- [1] CCITT Recommendation Q.930(I.450) ISDN user-network interface layer 3 - General aspects.
- [2] CCITT Recommendation I.412 ISDN user-network interfaces - Interface structures and access capabilities.
- [3] CCITT Recommendation Q.921(I.441) ISDN user-network interface data link layer specification.
- [4] CCITT Recommendation Q.932 - Generic procedures for the control of ISDN supplementary services.
- [5] CCITT Recommendation X.25 - 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.
- [6] CCITT Recommendation I.231 - Circuit mode bearer service categories.
- [7] CCITT Recommendation V.110 - Support of data terminal equipments (DTEs) with V-series type interfaces by an Integrated Services Digital Network (ISDN).
- [8] CCITT Recommendation X.30 - Support of X.21, X.21bis and X.20bis based data terminal equipments (DTEs) by an Integrated Services Digital Network (ISDN).
- [9] CCITT Recommendation V.120 - Support by an ISDN of data terminal equipment with V-series type interfaces with provision for statistical multiplexing.
- [10] CCITT Recommendation G.711 - Pulse code modulation (PCM) of voice frequencies.
- [11] CCITT Recommendation G.721 - 32 kbit/s adaptive differential pulse code modulation (ADPCM).
- [12] CCITT Recommendation G.722 - 7 kHz audio coding within 64 kbit/s.
- [13] CCITT Recommendation G.7xx<sup>1</sup> - 384 bits video.
- [14] CCITT Recommendation X.31 - Support of packet mode terminal equipment by an ISDN.
- [15] CCITT Recommendation I.460 - Multiplexing rate adaptation and support of existing interfaces.
- [16] CCITT Recommendation V.6 - Standardization of data signalling rates for synchronous data transmission on leased telephone-type circuits.
- [17] CCITT Recommendation X.1 - International user classes of service in public data networks and Integrated Services Digital Networks (ISDNs).
- [18] CCITT Recommendation I.330 - ISDN numbering and addressing principles.
- [19] CCITT Recommendation E.164 - Numbering plan for the ISDN era.

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1 These titles will appear in the Blue Book Text.

- [20] CCITT Recommendation E.163 - Numbering plan for the international telephone service.
- [21] CCITT Recommendation X.121 - International numbering plan for public data networks.
- [22] CCITT Recommendation F.69 - Plan for telex destination codes.
- [23] CCITT Recommendation X.213 - Network Service Definition for Open Systems Interconnection for CCITT Applications.
- [24] ISO 8348 Addendum 2 - Information processing systems - Data communications - Network service definition.
- [25] CCITT Recommendation I.334 - Principles relating ISDN number/subaddresses to the OSI reference model network layer addresses.
- [26] CCITT Recommendation X.21 - Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public data networks.
- [27] CCITT Recommendation I.431 - Primary rate user-network interface - Layer 1 specification.
- [28] CCITT Recommendation T.62 - Control procedures for Teletex and Group 4 facsimile services.
- [29] CCITT Recommendation T.503 - A document application profile for the interchange of Group 4 facsimile documents.
- [30] CCITT Recommendation T.501 - A document application profile MM for the interchange of formatted mixed mode documents.
- [31] CCITT Recommendation T.502 - Document application profile PM1 for the interchange of processable form documents.
- [32] CCITT Recommendation T.70 - Network independent basic transport service for the Telematic service.
- [33] CCITT Recommendation T.504 - Document application profile for Videotex interworking.
- [34] CCITT Recommendation I.212 - Teleservices supported by an ISDN.
- [35] CCITT Recommendation G.724 - Characteristics of 48-channel low bit rate encoding primary multiplex operating at 1544 kbit/s.
- [36] ISO 1745 Information processing - Basic mode control procedures for data communication systems.
- [37] CCITT Recommendation T.71 - Link Access Protocol Balanced extended for half-duplex physical level facility.
- [38] ISO 4335 Data communication - High-level data link control procedures - Consolidation of elements of procedures.
- [39] ISO 8802-2 Information processing systems - Local area networks -

Part 2: Logical link control.

- [40] CCITT Recommendation X.75 - Packet switched signalling system between public networks providing data transmission services.
- [41] ISO 8208 Information processing systems - Data communications - X.25 Packet Level Protocol for Data Terminal equipment.
- [42] ISO 8348 Information processing systems - Data communications - Network service definition.
- [43] ISO 8473 Information processing systems - Data communications protocol for providing the connectionless-mode network service.
- [44] CCITT Recommendation X.244 - Procedure for the exchange of protocol identification during virtual Call Establishment on packet Switched Public Data Networks.
- [45] CCITT Recommendation Q.920(I.440) ISDN user-network interface data link layer - General aspects.
- [46] CCITT Recommendation I.430 - Basic user-network interface - Layer 1 specification.
- [47] CCITT Recommendation I.230 - Definition of bearer service categories.
- [48] CCITT Recommendation I.240 - Definition of teleservices.
- [49] CCITT Recommendation T.50 - International Alphabet No. 5.
- [50] ISO 646 Information processing - ISO 7-bit coded character set for information interchange.
- [51] CCITT Recommendations - Integrated Services Digital Network (ISDN).
- [52] CCITT Recommendation I.463 - Support of Data Terminal Equipments (DTEs) with V-series type interfaces by an Integrated Services Digital Network (ISDN).
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