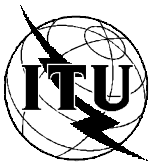

INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.850

(03/93)

DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1

GENERAL

USAGE OF CAUSE AND LOCATION IN THE DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1 AND THE SIGNALLING SYSTEM No. 7 ISDN USER PART

ITU-T Recommendation Q.850

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. 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, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation Q.850 was prepared by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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

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USAGE OF CAUSE AND LOCATION IN THE DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1 AND THE SIGNALLING SYSTEM No. 7 ISDN USER PART

(Helsinki, 1993)

1 General

1.1 Scope

This Recommendation defines the format, encoding and semantics of cause information elements/parameters and the usage of the location field, in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part. Many cause values are applicable to both DSS 1 and SS No. 7 ISUP and this Recommendation specifies the use of each cause value in other Recommendations.

2 Cause

2.1 Format

Format of Q.931 Cause information element or Q.763/Q.730 Cause indicators parameters contents is shown in Figure.

8	7	6	5	4	3	2	1	Octet (Note 3) Q.931	Octet (Note 3) Q.763
0/1 ext.	Coding standard		0 Spare	Location				3	1
1 ext.	Recommendation (Note 2)							3a*	
1 ext.	Cause value							4	2
Diagnostic(s) (if any)								5*	3*

NOTES

1 If the default applies for the Recommendation field, octet including this field shall be omitted.

2 The Recommendation field is not supported by the ISUP. The default interpretation for ISUP is Q.763.

3 Optional octets are marked with asterisks (*).

FIGURE 1/Q.850

Format of "Cause"

2.2 Codes used in the sub-field of the "Cause"

2.2.1 Extension indicator (ext.)

Bit

8

0 octet continues through the next octet (e.g. octet 1 to 1a)

1 last octet

2.2.2 Coding standard

Bits

7 6

0 0 CCITT standardized coding, as described below

0 1 ISO/IEC standard (see Note)

1 0 national standard (see Note)

1 1 standard specific to identified location (see Note)

NOTE – These other coding standards should be used only when the desired cause value cannot be represented with the CCITT-standardized coding.

2.2.3 Location

Bits

4 3 2 1

0 0 0 0 user (U)

0 0 0 1 private network serving the local user (LPN)

0 0 1 0 public network serving the local user (LN)

0 0 1 1 transit network (TN)

0 1 0 0 public network serving the remote user (RLN)

0 1 0 1 private network serving the remote user (RPN)

0 1 1 1 international network (INTL)

1 0 1 0 network beyond interworking point (BI)

All other values are reserved.

2.2.4 Recommendation

Bits

7 6 5 4 3 2 1

0 0 0 0 0 0 0 Q.931

0 0 0 0 0 1 1 X.21

0 0 0 0 1 0 0 X.25

0 0 0 0 1 0 1 public land mobile networks, Q.1031/Q.1051

All other values are reserved.

NOTE – If octet including this field is omitted, Recommendation Q.931 is assumed.

2.2.5 **Cause value** (only applicable in the context of Recommendations Q.763 and Q.931)

The cause value is divided into two fields, a class (bits 5 through 7) and a value within the class (bits 1 through 4).

1) The class indicates the general nature of the event.

   Class (000): normal event

   Class (001): normal event

   Class (010): resource unavailable

   Class (011): service or option not available

Class (100): service or option not implemented

Class (101): invalid message (e.g. parameter out of range)

Class (110): protocol error (e.g. unknown message)

Class (111): interworking

2) The cause values are listed in Table 1.

2.2.6 Diagnostics (only applicable in the context of Recommendations Q.763 and Q.931)

The diagnostics applicable to each cause value are given in Table 1. Diagnostic information is not available for every cause. In those cases in which the diagnostic is a Q.931 information element, the coding of the diagnostic is the same as for the corresponding information element in 4/Q.931.

2.2.6.1 Coding of Condition

The condition diagnostic is coded as follows:

Bit 8: 1

Bits 7-5: 000

Bit 4: Condition as follows:

0 – Network service – Provider

1 – Network service – User

Bit 3: Condition as follows:

0 – Normal

1 – Abnormal

Bits 2-1: Condition as follows:

00 – Unknown

01 – Permanent

10 – Transient

2.2.6.2 Coding of Transit network identity

The diagnostic field contains the entire transit network selection or network specific facilities information element as applicable, including parameter name/information element identifier and length octet.

2.2.6.3 Coding of CCBS indicator

The CCBS indicator is coded as follows:

Bits 8-1: 00000000 – Spare

00000001 – CCBS possible

00000010 – CCBS not possible

00000011

to – Spare

01111111

10000000

to – Spare for national use

11111110

11111111 – Reserved for extension

NOTE – Not used in Recommendation Q.931.

TABLE 1/Q.850 (sheet 1 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
000	0001	1	Unallocated (unassigned) number	Condition	DSS 1, ISUP	Q.931	U, RPN, LN	
							RLN, TN, INTL	No route by digit analysis
000	0010	2	No route to specified transit network	Transit network identifiy	DSS 1, ISUP(NU)	Q.931	LN, TN	
000	0011	3	No route to destination	Condition	DSS 1, ISUP	Q.931	U, RPN, LN	
000	0100	4	Send special information tone		ISUP			Clause 7/Q.35
000	0101	5	Misdialled trunk prefix		ISUP(NU)			
000	0110	6	Channel unacceptable		DSS 1	Q.931	LN	
000	0111	7	Call awarded and being delivered in an established channel		DSS 1	Q.931	LN	
000	1000	8	Preemption		DSS 1, ISUP	Q.735.3		MLPP
000	1001	9	Preemption – circuit reserved for reuse		ISUP	Q.735.3		MLPP
001	0000	16	Normal call clearing	Condition	DSS 1, ISUP	Q.931, 2.3/Q.764	U, RPN	
001	0001	17	User busy	CCBS Indicator	DSS 1, ISUP	Q.931, Q.732	U, RPN, RLN	Basic call and call diversion services
001	0010	18	No user responding		DSS 1, ISUP	Q.931, Q.732	RLN	Call diversion services

TABLE 1/Q.850 (sheet 2 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
001	0011	19	No answer from user (user alerted)		DSS 1, ISUP	Q.931	RLN	
						2.1.4/Q.764 2.9.8.3/Q.764	RLN, TN, INTL	Expiry of waiting ANM timer (T9)
						Q.732	RLN	Call diversion services
001	0100	20	Subscriber absent		DSS 1, ISUP			Mobile application
001	0101	21	Call rejected	Call rejected condition	DSS 1, ISUP	Q.931	U, RPN	
						Q.732	RLN	Call diversion services
001	0110	22	Number changed	New destination (DSS 1)/ called party number (ISUP)	DSS 1, ISUP	Q.931	U, RPN, LN	
001	1010	26	Non-selected user clearing		DSS 1	Q.931	LN	
001	1011	27	Destination out of order		DSS 1, ISUP	Q.931	RLN	

TABLE 1/Q.850 (sheet 3 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
001	1100	28	Invalid number format (address incomplete)			Q.931	U, RPN, RLN, LN	
					DSS 1, ISUP	2.1.1/Q.764 2.1.2/Q.764 2.9.8.3/Q.764 2.2.5/Q.764	TN, INTL	The called party number is not in a valid format or is not complete
						Annex A/Q.763	TN, INTL, RLN, RPN	
001	1101	29	Facility rejected	Facility Identification (DSS 1)/ parameter name (SUP)		Q.931	RLN, U, RPN, LN	
					DSS 1, ISUP		TN, INTL	Inability to provide a request signalling capability
						Q.735.1	INTL, RLN	CUG
						Q.737.1	INTL, TN, RLN	UUS
001	1110	30	Response to STATUS ENQUIRY		DSS 1	Q.931	U, LN	

TABLE 1/Q.850 (sheet 4 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
001	1111	31	Normal, unspecified		DSS 1, ISUP	Q.931	RLN	
						2.1.1/Q.764 2.1.2/Q.764 2.8.1/Q.764 2.8.2/Q.764 2.9.3/Q.764 2.9.6/Q.764 2.9.8.2/Q.764 2.9.8.3/Q.764 2.1.8/Q.764 2.2.4/Q.764	TN, INTL, RLN	Call failure information indicating the failure of a call due to the lapse of a timeout or a fault not covered by specific causes (examples: expiry of timers Q.764 not covered by specific causes, release of interconnected circuit, etc.)
						2.1.6/Q.764 2.9.7/Q.764	RLN, TN	Expiry of waiting INF timer (T33)
						Annex A/Q.763		
010	0010	34	No circuit/channel available		DSS 1, ISUP	Q.931	U, RPN, RLN, LN, TN	
							TN, INTL	Circuit congestion encountered in an exchange
010	0110	38	Network out of order		DSS 1, ISUP	Q.931	U, RPN	
010	0111	39	Permanent frame mode connection out of service		DSS 1	Q.933		

TABLE 1/Q.850 (sheet 5 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
010	1000	40	Permanent frame mode connection operational		DSS 1	Q.933		
010	1001	41	Temporary failure		DSS 1, ISUP	Q.931	U, RPN, RLN, LN	
010	1010	42	Switching equipment congestion		DSS 1, ISUP		TN, RLN, INTL	
						2.9.9.1/Q.764	TN, RLN	Temporary trunk block (national use)
010	1011	43	Access information discarded	Discarded information element identifier(s) (Note 4)	DSS 1, ISUP	Q.931	U, RPN, LN	
010	1100	44	Requested circuit/channel not available		DSS 1, ISUP	Q.931	U, RPN, LN	
010	1110	46	Precedence call blocked		DSS 1, ISUP	Q.735.3		MLPP
010	1111	47	Resource unavailable, unspecified		DSS 1, ISUP	Q.931	U, RPN	
						Annex A/Q.763		
011	0001	49	Quality of service unavailable	Condition	DSS 1	Q.931		
011	0010	50	Requested facility not subscribed	Facility Identification (DSS 1)/-parameter name (ISUP)	DSS 1, ISUP	Q.931, Q.735	U, LN, RLN	
011	0101	53	Outgoing calls barred within CUG		DSS 1, ISUP	Q.735.1		CUG
011	0111	55	Incoming calls barred within CUG		DSS 1, ISUP	Q.735.1	RLN	CUG
011	1001	57	Bearer capability not authorized	Attribute identity	DSS 1, ISUP	Q.931	LN	
011	1010	58	Bearer capability not presently available	Attribute identity	DSS 1, ISUP	Q.931	LN	
011	1110	62	Inconsistency in designated outgoing access information and subscriber class		DSS 1, ISUP	Q.735		
011	1111	63	Service or option not available, unspecified		DSS 1, ISUP	Q.931	LN	
						Annex A/Q.763		

TABLE 1/Q.850 (sheet 6 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
100	0001	65	Bearer capability not implemented	Attribute identity	DSS 1, ISUP	Q.931	LN	
						Annex A/Q.763	TN, INTL	Inability to provide a requested TMR
100	0010	66	Channel type not implemented	Channel type	DSS 1	Q.931		
100	0101	69	Requested facility not implemented	Facility Identification (DSS 1)/ parameter name (ISUP)	DSS 1, ISUP	Q.931, Q.737.1	U, RPN, LN, RLN	UUS
100	0110	70	Only restricted digital information bearer capability is available		DSS 1, ISUP (NU)	Q.931		
100	1111	79	Service or option not implemented, unspecified		DSS 1, ISUP	Q.931		
						Annex A/Q.763		
101	0001	81	Invalid call reference value		DSS 1	Q.931	U, LN	
101	0010	82	Identified channel does not exist	Channel identity	DSS 1	Q.931		
101	0011	83	A suspended call exists, but this call identity does not		DSS 1	Q.931	LN	
101	0100	84	Call identity in use		DSS 1	Q.931	LN	
101	0101	85	No call suspended		DSS 1	Q.931	LN	
101	0110	86	Call having the requested call identity has been cleared	Clearing cause	DSS 1	Q.931	LN	
101	0111	87	User not member of CUG		ISUP, DSS 1	Q.735.1	RLN	CUG
101	1000	88	Incompatible destination	Incompatible parameter (DSS 1)	DSS 1, ISUP	Q.931	U, RPN	
101	1010	90	Non-existent CUG		ISUP, DSS 1	Q.735		CUG

TABLE 1/Q.850 (sheet 7 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
101	1011	91	Invalid transit network selection		DSS 1, ISUP(NU)	Q.931	LN, TN	
101	1111	95	Invalid message, unspecified		DSS 1, ISUP	Q.931	LN	
						Annex A/Q.763		
110	0000	96	Mandatory information element is missing	Information element identifier (Note 4)	DSS 1,	Q.931	U, LN	
110	0001	97	Message type non-existent or not implemented	Message type	DSS 1, ISUP	Q.931	U, LN	
						2.9.5.2/Q.764 2.9.5.3/Q.764	TN, INTL, RLN	
110	0010	98	Message not compatible with call state or message type non-existent or not implemented	Message type	DSS 1	Q.931	U, LN	
110	0011	99	Information element /parameter non-existent or not implemented	Information element identifier(s) (DSS 1) (Note 4 and Note 5)/ Parameter names	DSS 1, ISUP	Q.931	U, LN	
						2.9.5.2/Q.764 2.9.5.3/Q.764 Annex A/Q.763	TN, INTL, RLN	
110	0100	100	Invalid information element contents	Information element identifier(s) (Note 4)	DSS 1	Q.931	U, LN	
110	0101	101	Message not compatible with call state	Message type	DSS 1	Q.931	U, LN	

TABLE 1/Q.850 (sheet 8 of 8)

Cause information element/parameter

Cause			Definition	Diagnostics	Application (Note 1)	Reference (Note 2)	Location (Note 3)	Remarks
Class	Value	No.						
110	0110	102	Recovery on timer expiry	Timer number	DSS 1, ISUP	Q.931		
						Q.733.4	RLN	Terminal portability: expiry of waiting RES (user) timer
						2.4.1/Q.764 2.4.3/Q.764	INTL	Expiry of waiting RES (network) timer (not generated by international transit exchange)
110	0111	103	Parameter non-existent or not implemented, passed on	Parameter name(s)	ISUP(NU)			
110	1110	110	Message with unrecognized parameter, discarded	Parameter name(s), message name	ISUP			
110	1111	111	Protocol error, unspecified		DSS 1, ISUP	Q.931	RLN	
						Annex A/Q.763	RLN, TN, INTL	
						Q.735.1	RLN	CUG
111	1111	127	Interworking, unspecified		DSS 1, ISUP	Q.931		
						Annex A/Q.763		

NOTES

1 Application indicates that the cause value may be carried in DSS 1 and/or ISUP. Causes carried in ISUP which are not marked for national use (NU) are the minimum set of cause values that shall be supported over the international interface.

2 The references included are not exhaustive.

3 These are typical locations generated within the scope of the associated Recommendations. Other locations may be used depending upon the network configuration.

4 Locking and non-locking shift procedures described in 4.5/Q.931 are applied. In principle information element identifiers are ordered in the same order as the information element in the received message.

5 When only locking shift information element is included and no variable length information element identifier follows, it means that the codeset in the locking shift itself is not implemented.

2.2.6.4 Coding of Call rejected diagnostic

The format of the diagnostic field for cause number 21 is as shown in Figure 2 and Table 2.

8	7	6	5	4	3	2	1	
1 ext.	Rejection reason					Condition		Octets x*
User specific diagnostic								x+1* etc. (Note 1)
IE type	Information element identifier							x+2* etc. (Note 2)

NOTES

1 This octet may be present only if octet x indicates user specific diagnostic.

2 This octet may be present only if octet x indicates information element missing or information element contents are not sufficient.

FIGURE 2/Q.850

Coding of diagnostic field for cause number 21

TABLE 2/Q.850

Coding of diagnostic field for cause number 21

Rejection reason (octet x)

Bits

7 6 5 4 3
0 0 0 0 0 user specific
0 0 0 0 1 information element missing
0 0 0 1 0 information element contents are not sufficient

All other values are reserved

Condition (octet x)

Bits

2 1
0 0 unknown
0 1 permanent
1 1 transient

User specific diagnostic (octet x+1)

Coded according to the user specification, subject to the maximum length of the Cause information element.

Information element type (octet x+2)

Bit

8
0 variable length information element
1 fixed length information element

Information element identifier (octet x+2)

Bits 7-1 encoded with the information element identifier of the missing or insufficient information element.

2.2.6.5 Coding of New destination/Called party number (new)

New destination is formatted as the called party number information element, including information element identifier. Transit network selection may also be included.

2.2.6.6 Coding of Facility identification/Rejected parameter

The coding of facility identification is network dependent.

2.2.6.7 Coding of Attribute identity

The coding of the attribute identity diagnostic is shown in Figure 3, Table 3a and Table 3b.

NOTE – Not generated by ISUP.

8	7	6	5	4	3	2	1	
0/1 ext.	Attribute number							Octet x
0/1 ext.	Rejected attribute							x+1
1 ext.	Available attribute							x+2

NOTES

1 When diagnostics information is provided, octet x and x+1 shall be present. Octet x+2 is optional.

2 Octets x-x+2 may be repeated to report multiple rejected attributes.

3 The extension bit (ext.) when coded 0, indicates that this diagnostic continues to the next octet.

FIGURE 3/Q.850

Coding of the diagnostic field for causes number 57, 58 and 65 (Attribute identity)

TABLE 3a/Q.850

Coding of diagnostic field for causes number 57, 58 and 65 (Attribute identity)

Attribute number (octet x)

Bits 7 6 5 4 3 2 1	No.	
0 1 1 0 0 0 1	1	Information transfer capability
0 1 1 0 0 1 0	2	Information transfer mode
0 1 1 0 0 1 1	3	Information transfer rate
0 1 1 0 1 0 0	4	Structure
0 1 1 0 1 0 1	5	Configuration
0 1 1 0 1 1 0	6	Establishment
0 1 1 0 1 1 1	7	Symmetry
0 1 1 1 0 0 0	8	Information transfer rate (dest. ® orig.)
0 1 1 1 0 0 1	9	Layer identification

TABLE 3b/Q.850

Coding of the diagnostic field for causes number 57, 58 and 65 (Attribute identity)

Rejected attribute (octet x+1)

Attribute No.

1. Information transfer capability:
   Bits 7-6: 00
   Bits 5-1: according to Table 4-6/Q.931, octet 3

2. Information transfer mode
   Bits 7-6: according to Table 4-6/Q.931, octet 4
   Bits 5-1: 00000

3. Information transfer rate
   Bits 7-6: 00
   Bits 5-1 according to Table 4-6/Q.931, octet 4

4. Structure (Note 1)
   Bits 7-5: according to Table 4-6/Q.931, octet 4a
   Bits 4-1: 0000

5. Configuration (Note 1)
   Bits 7-4: 000
   Bits 4-3: according to Table 4-6/Q.931, octet 4a
   Bits 2-1: 00

6. Establishment (Note 1)
   Bits 7-3: 00000
   Bits 2-1: according to Table 4-6/Q.931, octet 4a

7. Symmetry (Note 1)
   Bits 7-6: according to Table 4-6/Q.931, octet 4b
   Bits 5-1: 00000

8. Information transfer rate (dest. → orig.): (Note 1)
   Bits 7-6: 00
   Bits 5-1: according to Table 4-6/Q.931, octet 4b

9. Layer identification:

   Bits
   7 6
   0 1 (layer 1) Bits 5-1 according to Table 4-6/Q.931, octet 5
   1 0 (layer 2) Bits 5-1 according to Table 4-6/Q.931, octet 6
   1 1 (layer 3) Bits 5-1 according to Table 4-6/Q.931, octet 7

10. Rate Multiplier:
    Bit 8: 1
    Bits 7-1 according to Table 4-6/Q.931, octet 4.1

Available attributes (octet x+2)

The same coding as octet x+1

NOTES

1 These values were defined in Recommendation Q.931 (1988).

2 A description of Table 4-6/Q.931 is found in 3.57/Q.763.

2.2.6.8 Coding of Channel type

The channel type is coded as follows:

Bit 8: Extension bit

Bit 7-5: spare

Bit 4-1: according to the Table 4-15/Q.931 octet 3.2, channel type.

NOTE – Not generated by ISUP.

2.2.6.9 Coding of Incompatible parameter

Incompatible parameter is composed of incompatible information element identifier.

2.2.6.10 Coding of Timer number

NOTE – Not generated by ISUP.

The timer number is coded in IA5 characters, e.g. T308 is coded as "3" "0" "8". The following coding is used in each octet:

Bit 8: Spare "0"

Bit 7-1: IA5 character.

2.2.6.11 Coding of Message type

Message type is coded as specified in Table 4/Q.763 and Table 4-2/Q.931, respectively.

2.2.6.12 Coding of parameter name

Parameter name is coded as specified in Table 5/Q.763.

2.2.7 Cause Definitions

2.2.7.1 Normal class

Cause No. 1 – Unallocated (unassigned) number

This cause indicates that the called party cannot be reached because, although the called party number is in a valid format, it is not currently allocated (assigned).

Cause No. 2 – No route to specified transit network (national use)

This cause indicates that the equipment sending this cause has received a request to route the call through a particular transit network which it does not recognize. The equipment sending this cause does not recognize the transit network either because the transit network does not exist or because that particular transit network, while it does exist, does not serve the equipment which is sending this cause.

This cause is supported on a network-dependent basis.

Cause No. 3 – No route to destination

This cause indicates that the called party cannot be reached because the network through which the call has been routed does not serve the destination desired.

This cause is supported on a network-dependent basis.

Cause No. 4 – Send special information tone

This cause indicates that the called party cannot be reached for reasons that are of a long term nature and that the special information tone should be returned to the calling party.

Cause No. 5 – Misdialled trunk prefix (national use)

This cause indicates the erroneous inclusion of a trunk prefix in the called party number.

Cause No. 6 – Channel unacceptable

This cause indicates that the channel most recently identified is not acceptable to the sending entity for use in this call.

Cause No. 7 – Call awarded and being delivered in an established channel

This cause indicates that the user has been awarded the incoming call, and that the incoming call is being connected to a channel already established to that user for similar calls (e.g. packet-mode X.25 virtual calls).

Cause No. 8 – Preemption

This cause indicates that the call is being preempted.

Cause No. 9 – Preemption - circuit reserved for reuse

This cause indicates that the call is being preempted and the circuit is reserved for reuse by the preempting exchange.

Cause No. 16 – Normal call clearing

This cause indicates that the call is being cleared because one of the users involved in the call has requested that the call be cleared.

Under normal situations, the source of this cause is not the network.

Cause No. 17 – User busy

This cause is used to indicate that the called party is unable to accept another call because the user busy condition has been encountered. This cause value may be generated by the called user or by the network. In the case of user determine user busy, it is noted that the user equipment is compatible with the call.

Cause No. 18 – No user responding

This cause is used when a called party does not respond to a call establishment message with either an alerting or connect indication within the prescribed period of time allocated.

Cause No. 19 – No answer from user (user alerted)

This cause is used when the called party has been alerted but does not respond with a connect indication within a prescribed period of time.

NOTE – This cause is not necessarily generated by Q.931 procedures but may be generated by internal network timers.

Cause No. 20 – Subscriber absent

This cause value is used when a mobile station has logged off, radio contact is not obtained with a mobile station or if a personal telecommunication user is temporarily not addressable at any user-network interface.

Cause No. 21 – Call rejected

This cause indicates that the equipment sending this cause does not wish to accept this call, although it could have accepted the call because the equipment sending this cause is neither busy nor incompatible.

This cause may also be generated by the network, indicating that the call was cleared due to a supplementary service constraint. The diagnostic field may contain additional information about the supplementary service and reason for rejection.

Cause No. 22 – Number changed

This cause is returned to a calling party when the called party number indicated by the calling party is no longer assigned. The new called party number may optionally be included in the diagnostic field. If a network does not support this cause value, cause No. 1, unallocated (unassigned) number shall be used.

Cause No. 26 – Non-selected user clearing

This cause indicates that the user has not been awarded the incoming call.

Cause No. 27 – Destination out of order

This cause indicates that the destination indicated by the user cannot be reached because the interface to the destination is not functioning correctly. The term "not functioning correctly" indicates that a signalling message was unable to be delivered to the remote party; e.g. a physical layer or data link layer failure at the remote party, or user equipment off-line.

Cause No. 28 – Invalid number format (address incomplete)

This cause indicates that the called party cannot be reached because the called party number is not in a valid format or is not complete.

NOTE – This condition may be determined:

– immediately after reception of an ST signal; or

– on time-out after the last received digit.

Cause No. 29 – Facility rejected

This cause is returned when a supplementary service requested by the user cannot be provided by the network.

Cause No. 30 – Response to STATUS ENQUIRY

This cause is included in the STATUS message when the reason for generating the STATUS message was the prior receipt of a STATUS ENQUIRY message.

Cause No. 31 – Normal, unspecified

This cause is used to report a normal event only when no other cause in the normal class applies.

2.2.7.2 Resource unavailable class

Cause No. 34 – No circuit/channel available

This cause indicates that there is no appropriate circuit/channel presently available to handle the call.

Cause No. 38 – Network out of order

This cause indicates that the network is not functioning correctly and that the condition is likely to last a relatively long period of time; e.g. immediately re-attempting the call is not likely to be successful.

Cause No. 39 – Permanent frame mode connection out-of-service

This cause is included in a STATUS message to indicate that a permanently established frame mode connection is out-of-service (e.g. due to equipment or section failure) (see Annex A/Q.933).

Cause No. 40 – Permanent frame mode connection operational

This cause is included in a STATUS message to indicate that a permanently established frame mode connection is operational and capable of carrying user information (see Annex A/Q.933).

Cause No. 41 – Temporary failure

This cause indicates that the network is not functioning correctly and that the condition is not likely to last a long period of time; e.g. the user may wish to try another call attempt almost immediately.

Cause No. 42 – Switching equipment congestion

This cause indicates that the switching equipment generating this cause is experiencing a period of high traffic.

Cause No. 43 – Access information discarded

This cause indicates that the network could not deliver access information to the remote user as requested, i.e. user-to-user information, low layer compatibility, high layer compatibility, or sub-address, as indicated in the diagnostic.

It is noted that the particular type of access information discarded is optionally included in the diagnostic.

Cause No. 44 – Requested circuit/channel not available

This cause is returned when the circuit or channel indicated by the requesting entity cannot be provided by the other side of the interface.

Cause No. 46 – Precedence call blocked

This cause indicates that there are no preemptable circuits or that the called user is busy with a call of equal or higher preemptable level.

Cause No. 47 – Resource unavailable, unspecified

This cause is used to report a resource unavailable event only when no other cause in the resource unavailable class applies.

2.2.7.3 Service or option unavailable class

Cause No. 49 – Quality of Service not available

This cause is used to report that the requested Quality of Service, as defined in Recommendation X.213, cannot be provided (e.g. throughput or transit delay cannot be supported).

Cause No. 50 – Requested facility not subscribed

This cause indicates that the user has requested a supplementary service which is implemented by the equipment which generated this cause, but the user is not authorized to use.

Cause No. 53 – Outgoing calls barred within CUG

This cause indicates that although the calling party is a member of the CUG for the outgoing CUG call, outgoing calls are not allowed for this member of the CUG.

Cause No. 55 – Incoming calls barred within CUG

This cause indicates that although the called party is a member of the CUG for the incoming CUG call, incoming calls are not allowed to this member of the CUG.

Cause No. 57 – Bearer capability not authorized

This cause indicates that the user has requested a bearer capability which is implemented by the equipment which generated this cause but the user is not authorized to use.

Cause No. 58 – Bearer capability not presently available

This cause indicates that the user has requested a bearer capability which is implemented by the equipment which generated this cause but which is not available at this time.

Cause No. 62 – Inconsistency in designated outgoing access information and subscriber class

This cause indicates that there is an inconsistency in the designated outgoing access information and subscriber class.

Cause No. 63 – Service or option not available, unspecified

This cause is used to report a service or option not available event only when no other cause in the service or option not available class applies.

2.2.7.4 Service or option not implemented class

Cause No. 65 – Bearer capability not implemented

This cause indicates that the equipment sending this cause does not support the bearer capability requested.

Cause No. 66 – Channel type not implemented

This cause indicates that the equipment sending this cause does not support the channel type requested.

Cause No. 69 – Requested facility not implemented

This cause indicates that the equipment sending this cause does not support the requested supplementary service.

Cause No. 70 – Only restricted digital information bearer capability is available (national use)

This cause indicates that the calling party has requested an unrestricted bearer service but that the equipment sending this cause only supports the restricted version of the requested bearer capability.

Cause No. 79 – Service or option not implemented, unspecified

This cause is used to report a service or option not implemented event only when no other cause in the service or option not implemented class applies.

2.2.7.5 Invalid message (e.g. parameter out of range) class

Cause No. 81 – Invalid call reference value

This cause indicates that the equipment sending this cause has received a message with a call reference which is not currently in use on the user-network interface.

Cause No. 82 – Identified channel does not exist

This cause indicates that the equipment sending this cause has received a request to use a channel not activated on the interface for a call. For example, if a user has subscribed to those channels on a primary rate interface numbered from 1 to 12 and the user equipment or the network attempts to use channels 13 through 23, this cause is generated.

Cause No. 83 – A suspended call exists, but this call identity does not

This cause indicates that a call resume has been attempted with a call identity which differs from that in use for any presently suspended call(s).

Cause No. 84 – Call identity in use

This cause indicates that the network has received a call suspended request containing a call identity (including the null call identity) which is already in use for a suspended call within the domain of interfaces over which the call might be resumed.

Cause No. 85 – No call suspended

This cause indicates that the network has received a call resume request containing a call identity information element which presently does not indicate any suspended call within the domain of interfaces over which calls may be resumed.

Cause No. 86 – Call having the requested call identity has been cleared

This cause indicates that the network has received a call resume request containing a call identity information element indicating a suspended call that has in the meantime been cleared while suspended (either by network timeout or by the remote user).

Cause No. 87 – User not member of CUG

This cause indicates that the called user for the incoming CUG call is not a member of the specified CUG or that the calling user is an ordinary subscriber calling a CUG subscriber.

Cause No. 88 – Incompatible destination

This cause indicates that the equipment sending this cause has received a request to establish a call which has low layer compatibility, high layer compatibility, or other compatibility attributes (e.g. data rate) which cannot be accommodated.

Cause No. 90 – Non-existent CUG

This cause indicates that the specified CUG does not exist.

Cause No. 91 – Invalid transit network selection (national use)

This cause indicates that a transit network identification was received which is of an incorrect format as defined in Annex C/Q.931.

Cause No. 95 – Invalid message, unspecified

This cause is used to report an invalid message event only when no other cause in the invalid message class applies.

2.2.7.6 Protocol error (e.g. unknown message) class

Cause No. 96 – Mandatory information element is missing

This cause indicates that the equipment sending this cause has received a message which is missing an information element which must be present in the message before that message can be processed.

Cause No. 97 – Message type non-existent or not implemented

This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined or defined but not implemented by the equipment sending this cause.

Cause No. 98 – Message not compatible with call state or message type non-existent or not implemented

This cause indicates that the equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the call state, or a STATUS message was received indicating an incompatible call state.

Cause No. 99 – Information element/parameter non-existent or not implemented

This cause indicates that the equipment sending this cause has received a message which includes information element(s)/parameter(s) not recognized because the information element identifier(s)/parameter name(s) are not defined or are defined but not implemented by the equipment sending the cause. This cause indicates that the information element(s)/parameter(s) were discarded. However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.

Cause No. 100 – Invalid information element contents

This cause indicates that the equipment sending this cause has received an information element which it has implemented; however, one or more fields in the information element are coded in such a way which has not been implemented by the equipment sending this cause.

Cause No. 101 – Message not compatible with call state

This cause indicates that a message has been received which is incompatible with the call state.

Cause No: 102 – Recovery on timer expiry

This cause indicates that a procedure has been initiated by the expiry of a timer in association with error handling procedures.

Cause No. 103 – Parameter non-existent or not implemented - passed on (national use)

This cause indicates that the equipment sending this cause has received a message which includes parameters not recognized because the parameters are not defined or are defined but not implemented by the equipment sending the cause. The cause indicates that the parameter(s) were ignored. In addition, if the equipment sending this cause is an intermediate point, then this cause indicates that the parameter(s) were passed on unchanged.

Cause No: 110 – Message with unrecognized parameter discarded

This cause indicates that the equipment sending this cause has discarded a received message which includes a parameter that is not recognized.

Cause No. 111 – Protocol error, unspecified

This cause is used to report a protocol error event only when no other cause in the protocol error class applies.

2.2.7.7 Interworking class

Cause No. 127 – interworking, unspecified

This cause indicates that there has been interworking with a network which does not provide causes for actions it takes. Thus, the precise cause for a message which is being sent cannot be ascertained.

3 General rules for the handling of the location field

This cause specifies the rules for handling of the location field in the Cause and the Progress indicator information elements/parameters.

Figure 4 shows the reference configuration which is used to identify various nodes where the location filed may be generated.

Table 4 shows the setting of the location field to be generated by a node in the reference configuration and the location field information expected by user A in each case.

The handling of the location field shall be according to the following rules:

i) If the event causing the generation of the location field takes place in an international exchange (i.e. incoming or outgoing or international transit exchange) the location shall be set to *International network*.

ii) If the event causing the generation of the location field takes place in a national transit network, the location shall be set to *Transit network*.

iii) If the event causing the generation of the location field takes place in the public network serving the user, the location shall be set to *Public network serving the local user* or *Public network serving the remote user* on the basis of network configuration.

NOTE – Locations *User* and *Private network serving the local user* shall not be generated in public networks.

iv) If the event causing the generation of the location field takes place in the private network, the location shall be set to *Private network serving the local user* or *Private network serving the remote user* on the basis of network configuration.

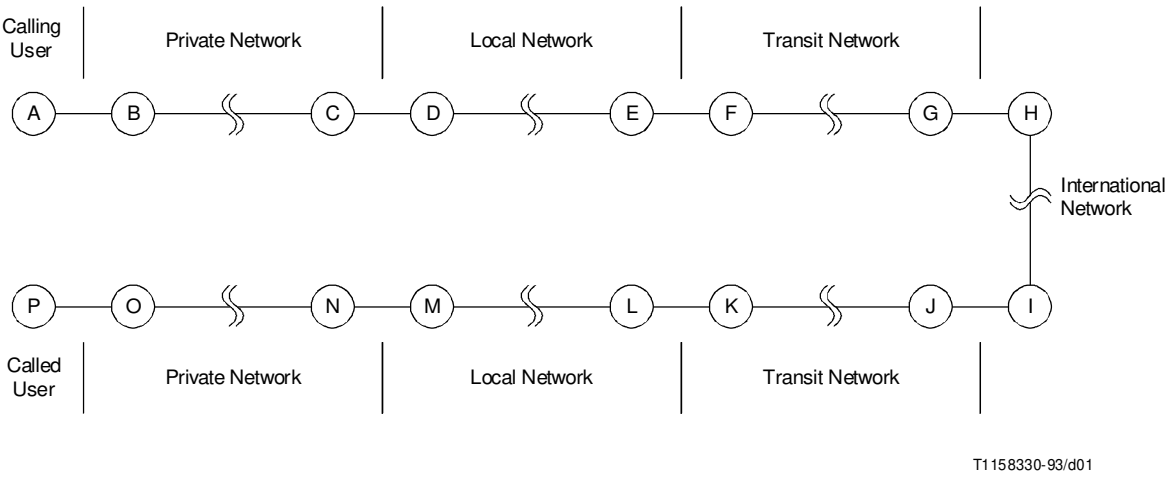
v) If interworking with a signalling system which cannot convey location information is encountered, and if a message containing a location field is sent because of the receipt of information from such a signalling system, the location shall be set to *Network beyond interworking point*.

As a consequence of these rules:

– The location Public network serving the local user can be sent over a transit network or can be converted to Public network serving the remote user according to the structure of the national network and/or agreements between the network operators involved in the call. In any case the location Public network serving the local user shall not be sent over the international network.

– The location Private network serving the local user shall not be sent over the public network. The conversion from Private network serving the local user to Private network serving the remote user, if required, shall take place in the private network initially generating the location information.

In addition, the network may optionally check, and if necessary, change the location when it crosses a network boundary. The definition of the boundaries between transit networks and public networks serving the local/remote users is dependent on network structure and is subject to agreement between network operators or to national regulations.



NOTE – The interfaces A-B, C-D, M-N and O-P are assumed to be Q.931.

FIGURE 4/Q.850

Reference configuration for location field generation

4 Handling of cause and location at the international interface

This clause contains clarification of the usage of cause values and the handling of location indicators on the international interface.

a) *Usage of causes:*

Setting Cause values 18 and 19, and using location "public or private network serving the remote user" or any other cause with location "user or private network serving the remote user" should imply that the call has reached the called party, i.e. end-to-end fields have been transmitted.

National networks should make sure, to avoid public network misuse, that the following locations are not generated on the access:

– Public

– International

– Transit network

– Beyond an interworking point

The cause value sent is the one of the latest occurred event (e.g. retransmitting of the release message).

b) *Handling of location indicators:*

If the event causing the sending of the cause indicators parameter takes place in the international exchange (i.e. incoming, outgoing or intermediate international exchange), the location will be set to "0111 International network".

If interworking is encountered in the international exchange and if a message containing the cause indicators parameter is sent because of the receipt of a message of the other signalling system, the location will be set to "1010 Beyond an interworking point" (BI).

The location "public network serving the local user" or " private network serving the local user" should not be sent on the international section. The conversion from "public network serving the local user" to "public network serving the remote user" or "private network serving the local user" to " private network serving the remote user" shall take place in the national network generating the cause.

In all other cases the international exchange will pass on the received location.

Using this solution, it is impossible to distinguish a national location "transit network" from a location "transit network beyond the international boundary".

The real location where the event was generated is lost when interworking: for example CGC and NNC in Telephone User Part are coded "34,BI". In spite of that, the limitations of this solution are accepted, because they are considered as acceptable for this ISDN User Part version.