INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.2957

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(02/95)

B-ISDN APPLICATION PROTOCOLS FOR ACCESS SIGNALLING

STAGE 3 DESCRIPTION FOR ADDITIONAL INFORMATION TRANSFER SUPPLEMENTARY SERVICES USING B-ISDN DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 2 (DSS 2) – BASIC CALL
Clause 1 – User-to-user signalling (UUS)

ITU-T Recommendation Q.2957

(Previously "CCITT Recommendation")

FOREWORD

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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 (Helsinki, March 1-12, 1993).

ITU-T Recommendation Q.2957, clause 1, was prepared by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 7th of February 1995.

NOTE

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

CONTENTS

SUMMARY

This Recommendation defines the operation of the Digital subscriber Signalling System No. 2 (DSS 2) for the support of the User-to-User Signalling (UUS) supplementary service at the T_B or the coincident S_B and T_B reference point of the user to network interface of the Broadband-Integrated Services Digital Network (B-ISDN).

The User-to-User Signalling (UUS) supplementary service allows a B-ISDN user to send and receive a limited amount of information to/from another B-ISDN user over the signalling virtual channel in association with a call/connection to the other B-ISDN user.

Recommendation Q.2957

STAGE 3 DESCRIPTION FOR ADDITIONAL INFORMATION TRANSFER SUPPLEMENTARY SERVICES USING B-ISDN DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 2 (DSS 2) – BASIC CALL

(Geneva, 1995)

1 User-to-User Signalling (UUS)

1.1 Scope

This Recommendation specifies the stage three of the User-to-User Signalling (UUS) supplementary service for the Broadband Integrated Services Digital Network (B-ISDN) at the T_B reference point or coincident S_B and T_B reference point (as defined in Recommendation I.413 [1]) by means of the Digital Subscriber Signalling System No. 2 (DSS 2) protocol. Stage three identifies the protocol procedures and switching functions needed to support a telecommunications service (see Recommendation I.130 [2]).

In addition, this Recommendation specifies the protocol requirements at the T_B reference point where the service is provided to the user via an intermediate private B-ISDN.

This Recommendation does not specify the additional protocol requirements where the service is provided to the user via a telecommunications network that is not a B-ISDN.

The User-to-User Signalling (UUS) supplementary service allows a B-ISDN user to send/receive a limited amount of information to/from another B-ISDN user over the signalling virtual channel in association with a call/connection to the other B-ISDN user.

For N-ISDN services supported in B-ISDN, see Recommendation I.257.1 [5]. For B-ISDN services, the applicability has yet to be defined.

This Recommendation is applicable to equipment, supporting the UUS supplementary service, to be attached at either side of a T_B reference point or coincident S_B and T_B reference point when used as an access to the public B-ISDN.

1.2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] ITU-T Recommendation I.413 (1993), *B-ISDN user-network interfaces*.

[2] CCITT Recommendation I.130 (1988), *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN*.

[3] ITU-T Recommendation Q.2931 (1995), *Broadband-Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling No. 2 (DSS2) – User-network interface layer 3 specification for basic call/connection control*.

[4] CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era*.

[5] CCITT Recommendation I.257.1 (1992), *User-to-user signalling*.

[6] CCITT Recommendation X.213 (1992), *Information technology – Network service definition for Open Systems interconnection (OSI)*.

[7] ITU-T Recommendation I.580 (1993), *General arrangements for interworking between B-ISDN and 64 kbit/s based ISDN*.

1.3 Definitions

For the purposes of this Recommendation, the following definitions apply:

1.3.1 **user**: The DSS 2 protocol entity at the user side of the user-network interface.

1.3.2 **network**: The DSS 2 protocol entity at the network side of the user-network interface.

1.3.3 **called user**: The user who is offered an incoming call/connection at the terminating interface.

1.3.4 **calling user**: The user who initiates an outgoing call/connection at the originating interface.

1.3.5 **served user**: The user requesting the User-to-User (UUS) supplementary service.

1.4 Abbreviations

For the purposes of this Recommendation, the following abbreviations are used:

B-ISDN	Broadband Integrated Services Digital Network
DSS 2	Digital Subscriber Signalling System No. 2
ISDN	Integrated Services Digital Network
N-ISDN	Narrow-band Integrated Services Digital Network
UUS	User-to-User Signalling
UUI	User-to-User Information

1.5 Description

The UUS supplementary services provide a means of communication between two users by using as a basis the layer 3 protocol defined in clause 5/Q.2931 [3]. User-to-user signalling is used to exchange information between two users to provide the services described in the Stage 1 Service Description. The exchange of user-to-user signalling is limited by flow control procedures provided by the network or the user. The exchange of user-to-user information is not a network acknowledged service. Any acknowledgement procedure shall be controlled at a higher layer between users.

Three UUS services associated with B-ISDN calls that may be provided by the network to users are:

a) *Service 1* – User-to-user information exchanged during the set-up and clearing phases of a call/connection, by transporting the User-user information element within Recommendation Q.2931 [3] call/connection control messages;

b) *Service 2* – User-to-user information exchanged from the sender's point of view during call/connection establishment, between the ALERTING and CONNECT messages, within USER INFORMATION messages; and

c) *Service 3* – User-to-user information exchanged while a call/connection is in the Active state, within USER INFORMATION messages.

All three services may be used separately or in any combination in association with a single call. As an option, at call/connection set-up, users may be able to specify that the requested user-to-user signalling service(s) is (are) required for the call, i.e. the call should not be completed if user-to-user information cannot be passed.

For B-ISDN Release 1, only UUS service 1 (implicitly requested) is specified and supported. UUS service 1 (explicitly requested), UUS service 2 and UUS service 3 are outside the scope of this Recommendation.

1.6 Operational requirements

1.6.1 Provision/withdrawal

UUS service 1 must be subscribed to by the calling user.

1.6.2 Requirements on the originating network side

The basic call/connection control procedures according to 5.1/Q.2931 and 5.4/Q.2931 [3] are applicable.

1.6.3 Requirements on the destination network side

The basic call/connection control procedures according to 5.2/Q.2931 and 5.4/Q.2931 [3] are applicable.

1.6.4 Assumptions made about the terminal

Terminal equipment using UUS service 1 is expected to be able to generate and accept the User-user information element (see 1.8.3) as described in 1.9 below.

1.7 State definitions

The states associated with basic call/connection control according to Recommendation Q.2931 [3] are applicable.

1.8 Coding Requirements

1.8.1 Messages

The following messages are applicable to the operation of service 1: SETUP, ALERTING, CONNECT, RELEASE, RELEASE COMPLETE, PROGRESS.

Tables 1-1 to 1-6 show the message contents for UUS service 1 implicit.

1.8.2 Codesets

The UUS supplementary service information elements are in codeset 0.

1.8.3 Information elements

The User-user information element is applicable to the operation of service 1.

The purpose of the User-user information element is to convey information between B-ISDN users. This information is not interpreted by the network, but rather is carried transparently and delivered to the remote user(s).

The User-user information element shall be considered as an access information element (see Annex J/Q.2931 [3]).

TABLE 1-1/Q.2957

Contents of ALERTING message

Message type: ALERTING

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	4.4.1/Q.2931	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (see Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2931 [3]				
NOTE – May be included for UUS service 1 (implicit activation).				

TABLE 1-2/Q.2957

Contents of CONNECT message

Message type: CONNECT

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	4.4.1/Q.2931	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (see Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2931 [3]				
NOTE – May be included for UUS service 1 (implicit activation). Not included otherwise.				

TABLE 1-3/Q.2957

Contents of RELEASE message

Message type: RELEASE

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	4.4.1/Q.2931	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (see Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2931 [3]				
NOTE – May be included for UUS service 1 (implicit activation). Not included otherwise.				

TABLE 1-4/Q.2957

Contents of RELEASE COMPLETE message

Message type: RELEASE COMPLETE

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	4.4.1/Q.2931	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	U → N	O (see Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2931 [3]				
NOTE – May be included for UUS service 1 where a RELEASE COMPLETE message is sent by the user to reject an incoming SETUP message. Not included otherwise.				

TABLE 1-5/Q.2957

Contents of SETUP message

Message type: SETUP

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	4.4.1/Q.2931	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (see Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2931 [3]				
NOTE – Always included for UUS service 1 (implicit activation); the length must be at least four octets.				

TABLE 1-6/Q.2957

Contents of PROGRESS message

Message type: PROGRESS

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	4.4.1/Q.2931	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	N → U	O (see Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2931 [3]				
NOTE – May be included for UUS service 1 (implicit activation). Not included otherwise.				

The coding for the User-user information element is shown in Figure 1-1.

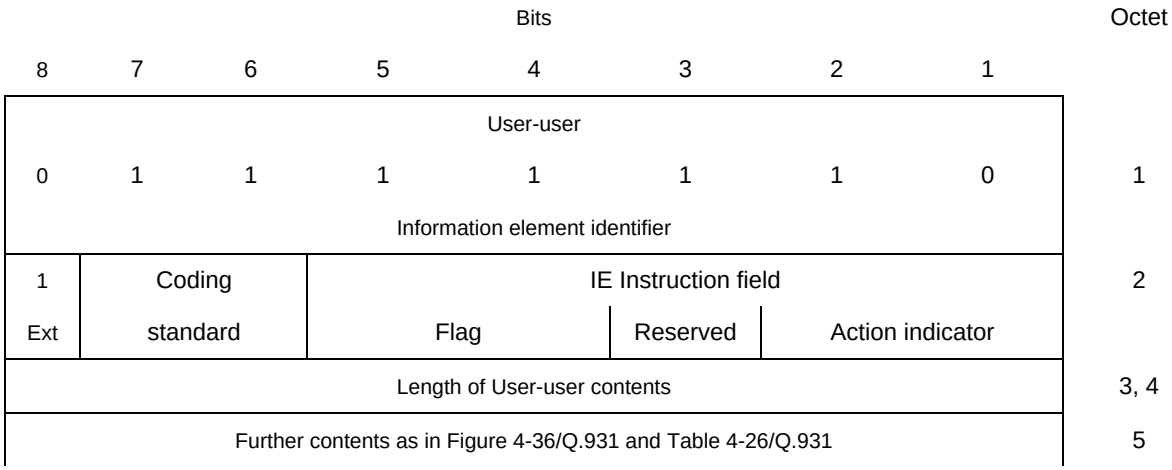

FIGURE 1-1/Q.2957

User-user information element

1.9 Signalling procedures at the coincident S_B and T_B reference point

1.9.1 Activation/deactivation/registration

Service 1 shall be activated implicitly as described in 1.9.2 below. In this case, activation and operation of the service are indistinguishable.

The procedures for call establishment are described in Recommendation Q.2931 [3] with the following modifications. On call request, the SETUP message sent by the calling user shall contain the service 1 request, i.e. the User-user information element.

The SETUP message sent by the network towards the called user shall also contain the same service requests, i.e. the User-user information element.

Deactivation procedures are not required to support service 1 implicit.

1.9.2 Call establishment phase – Implicit operation

1.9.2.1 Normal operation

Service 1 may be implicitly requested by including a User-user information element of variable length as specified in 1.8.2 in the SETUP message, transferred across the user-network interface at the calling side as described in 5.1.1/Q.2931 [3]. This information element is transported by the network and delivered unchanged in the User-user information element included in the SETUP message transferred across the user-network interface at the called side as described in 5.2.1/Q.2931 [3]. For activation purposes, this information element must be at least five octets long, as defined in 1.8.3.

A User-user information element may be included in the ALERTING and/or CONNECT messages transferred across the user-network interface at the called side as described in 5.2.5/Q.2931 [3]. It may also be included in the RELEASE or RELEASE COMPLETE message (see 1.9.3). The content of this information element is transported by the network and delivered in the User-user information element included in the corresponding message(s) transferred across the user-network interface at the calling side as described in 5.1.6/Q.2931 and 5.1.7/Q.2931 [3].

NOTE – In accordance with the Network Service Definition for Open Systems Interconnection, ISO 8348 | Recommendation X.213 [6], the called user may perform compatibility checking using the User-user information element contents (see Annex B/Q.2931 [3]). In the context of the OSI Network Service, service 1 may be used to support the conveyance of the NS-User-Data parameter of the N-CONNECT and N-DISCONNECT primitives.

1.9.2.2 Exceptional procedures

The network shall discard the User-user information element if it is received from the calling user in a SETUP message, but the calling user has not subscribed to UUS service 1. If the discard occurs, the network shall continue to process the call request. The network shall also inform the calling user that the UUS request is not accepted by sending a STATUS message containing cause No. 50 *requested facility non-subscribed*, or cause No. 43 *access information discarded*.

The network shall discard the User-user information element if it is received from the called user in the ALERTING or CONNECT message, but a request for UUS was not indicated implicitly in the SETUP message delivered to the called user. If discard occurs, the network shall take action on the remaining contents of the message received from the calling user and shall send a STATUS message to the called user containing cause No. 43 *access information discarded*.

The called user may not be able to interpret incoming User-user information elements. In such situations, the user should discard this information without disrupting normal call handling. No specific signalling is provided by the network to accommodate this situation.

1.9.3 Call clearing phase

1.9.3.1 Normal operation

A User-user information element may be included in the first message used to initiate the normal call clearing phase (see 5.4.3/Q.2931 and 5.4.4/Q.2931 [3]).

The information contained in such an information element is transferred to the remote user in the first clearing message (see 5.3.3/Q.2931 and 5.3.4/Q.2931 [3]). Such a transfer is only performed if the information is received at the local exchange of the remote user before sending a clearing message to that user; otherwise, the information is discarded without sending any notification.

A User-user information element may be included in the first normal clearing message sent by the called user during call establishment.

If the called user rejects the call with a clearing message containing a User-user information element, the network shall deliver the User-user information element in the RELEASE message sent to the calling user. However, if the network is providing in-band information to the calling user, and chooses not to initiate clearing procedures at that time, the network may deliver the User-user information element in a PROGRESS message sent to the calling user.

NOTE – It is intended that this capability may be used to provide the clearing data transfer (i.e. conveyance of the NS User-Data parameter to the N-DISCONNECT primitives) described in ISO 8348 | Recommendation X.213 [6].

1.9.3.2 Exceptional procedures

The network shall discard the User-user information element if it is received from either user in a RELEASE or RELEASE COMPLETE message, but a request for UUS was not indicated implicitly in the SETUP message delivered to the called user. If discard occurs, the network shall take action on the remaining contents of the message received from the user. If the clearing party has sent a RELEASE message, the network shall send to the clearing party a RELEASE COMPLETE message containing cause No. 43 *access information discarded*. If the clearing party had sent a RELEASE COMPLETE message, the network shall consider the call as cleared to that party; no additional action shall be taken.

The network shall discard the User-user information element in the following cases not explicitly discussed elsewhere in clause 9:

- the overall length of the User-user information element is greater than 133 octets and UUS service 1 was activated implicitly;
- the network receives a message containing the User-user information element, but that message is not allowed to contain UUS as defined by this Recommendation.

If discard occurs, the network shall take action on the remaining contents of the message received from the sending user and shall send a STATUS message to that user containing cause No. 43, *access information discarded*. However, if the network discards a User-user information element from a received clearing message, the network shall include cause No. 43 *access information discarded*, in the next sequential clearing message sent to the user as specified in 5.4/Q.2931 [3]. If the network discards a User-user information element from a RELEASE COMPLETE message, the network shall consider the call as cleared to that party; no additional action shall be taken.

1.10 Procedures for interworking with private networks

The procedures described in 1.9 shall apply.

NOTE – Generally, interworking between a public ISDN and a private ISDN is based on bilateral agreements.

1.11 Interworking with other networks

1.11.1 Interworking with N-ISDNs

This subclause specifies the particular features to support access signalling interworking between B-ISDN and N-ISDN. The description of interworking assumes the communication scenario B as defined in Annex A/I.580 [7].

Interworking N-ISDN → B-ISDN

The DSS 1 User-user information element is mapped to the DSS 2 User-user information element by the terminal adapter or the interworking function by inserting octet 2 and changing the length indication from one to two octets.

NOTE – It is recommended that the flag bit and the action indicator field in octet 2 is set as shown in Appendix I.

Interworking B-ISDN → N-ISDN

The DSS 2 User-user information element is mapped to the DSS 1 User-user information element by the terminal adapter or interworking function by removing its second octet and adjusting the length indication without causing other changes to the contents, and by respecting the order of this information element in the DSS 1 message.

1.11.2 Interworking with non-ISDNs

In the case of interworking with a non-ISDN, the return of a PROGRESS or an ALERTING message with the Progress indicator information element indicating No. 1 *call is not end-to-end ISDN; further call progress information may be available in-band* to the calling user shall serve as indication that, in particular, the delivery of User-user information elements in call control messages cannot be guaranteed.

In the case of interworking with a non-ISDN called user, the return of a PROGRESS or an ALERTING message with the Progress indicator information element indicating No. 2 *destination address is non-ISDN* to the calling user shall serve as indication that, in particular, the delivery of User-user information elements in call control messages cannot be guaranteed.

1.12 Interaction with other supplementary services

1.12.1 Connected Line Identification Presentation

No impact.

1.12.2 Connected Line Identification Restriction

No impact.

1.12.3 Calling Line Identification Presentation

No impact.

1.12.4 Calling Line Identification Restriction

No impact.

1.12.5 Direct Dialling-In

No impact.

1.12.6 User-to-User Signalling

1.12.6.1 Service 1

Not relevant.

1.12.7 Multiple Subscriber Number

No impact.

1.12.8 Sub-addressing

No impact.

1.13 Parameter values (timers)

No timers in addition to those used for basic call (Recommendation Q.2931 [3]) are required.

1.14 Dynamic description (SDLs)

See Annex A/Q.931 [3].

Appendix I

Signalling flows

(This appendix does not form an integral part of this Recommendation)

The signalling flows are not included as they form an integral part of the basic call control procedures.

Appendix II

Instruction indicators

(This appendix does not form an integral part of this Recommendation)

This appendix specifies the values for the instruction indicator field of the messages and information elements defined and used in this Recommendation.

TABLE II-1/Q.2957

Information element instruction indicators

Information element type	Flag	Action indicator
User-user	Follow explicit instructions	Discard information element, proceed, and report status