ATIS-1000621.2014(R2019)

Integrated Services Digital Network (ISDN) – User-to-User Signaling Supplementary Service

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ATIS-1000621.2014(R2019), *Integrated Services Digital Network (ISDN) – User-to-User Signaling Supplementary Service*

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American National Standard for Telecommunications

Integrated Services Digital Network (ISDN) – User-to-User Signaling Supplementary Service

Alliance for Telecommunications Industry Solutions

Approved June 2014

American National Standards Institute, Inc.

Abstract

This standard is one of a series which defines and describes service capabilities within the context of an Integrated Service Digital Network (ISDN). It describes a single service capability which is a telecommunication transport capability. Such capability 5 be made available on a demand or a subscription arrangement.

Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between providers, customers, and manufacturers. The Packet Technologies and Systems Committee (PTSC) develops and recommends standards and technical reports related to services, architectures, and signaling, in addition to related subjects under consideration in other North American and international standards bodies. PTSC coordinates and develops standards and technical reports relevant to telecommunications networks in the U.S., reviews and prepares contributions on such matters for submission to U.S. ITU-T and U.S. ITU-R Study Groups or other standards organizations, and reviews for acceptability or per contra the positions of other countries in related standards development and takes or recommends appropriate actions.

This standard defines and describes the user-to-user signaling supplementary service in the context of an Integrated Services Digital Network (ISDN). The user-to-user signaling service permits subscribers to exchange limited amounts of user information during the establishment of a circuit-switched call. This service applies to both an ISDN basic rate access and an ISDN primary rate access. It is intended to supplement the basic circuit mode bearer services contained in American National Standard for Telecommunications – Integrated Services Digital Network (ISDN) – Circuit mode bearer service category descriptionATIS-1000620.

Manufacturers of ISDN user terminals and manufacturers of ISDN switching equipment can apply this standard to the design and development of their products.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, PTSC, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, PTSC, which was responsible for its development, had the following leadership:

M. Dolly, PTSC Chair (AT&T)
V. Shaikh, PTSC Vice-Chair (ACS)
M. Dolly, PTSC SAC Chair (AT&T)

The **SAC** Subcommittee was responsible for the development of this document.

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Integrated Services Digital Network (ISDN) – User-to-User Signaling Supplementary Service

1 Scope, Purpose, & Application

1.1 Scope & Purpose

The user-to-user signaling supplementary service provides a means of communication used to exchange user information between two users. The exchange of user information is generally not a network acknowledged service. Acknowledgement of receipt of user information is not the responsibility of the net- work. Network notification of user information discard, due to the network's inability to trans- port the user information, shall be limited to notification sent to the user originating the discarded user information.

This standard is one of a series which defines and describes service capabilities within the context of an Integrated Service Digital Network (ISDN). It describes a single service capability which is a telecommunication trans- port capability. Such capability may be made available on a demand or a subscription arrangement. The interaction of this service capability with other ANSI defined service capabilities is also included. The purpose of the standard is to allow maximum compatibility among network and user owned telecommunications equipments in order to increase the attractiveness and usefulness of ISDN- based capabilities.

This standard specifies only the operation of UUS service (requested implicitly). The specifications for Service 1 requested explicitly, and Services 2 and 3 are for further study. Services 1, 2, and 3 are defined in ITU-T Recommendation I.257.1.

1.2 Application

This service applies to an ISDN as described in the ITU-T recommendations of the I-series and is intended to supplement the Basic Circuit Mode call procedures specified in ANSI ATIS-1000607 and ANSI ATIS-1000113. It should be used in conjunction with the other ANSI standards for ISDN supplementary services for a complete understanding of the interactions between this and other services.

This service may be applied to the following circuit mode bearer services identified in ATIS-1000603, and ATIS-1000604 for the ISDN basic and primary rate interfaces:

- speech;
- 3.1 kHz audio (voiceband data);
- 64 kbit/s unrestricted data.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American

National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicatedbelow.

ATIS-1000113.2005(R2010), Telecommunications – Signaling System Number 7 (SS7) – Integrated Services Digital Network (ISDN) user part.[1]

ATIS-1000603.1993(R2009), Telecommunications – Integrated Services digital network (ISDN) – Minimal set of bearer services for the primary rate interface[2]

ATIS-1000604.1990(R2009), Telecommunications – Integrated Services digital network (ISDN) – Minimal set of bearer services for the basic rate interface[3]

ATIS-1000607.2000(R2009), Telecommunications – Integrated Services Digital Network (ISDN) – Layer 3 signaling specification for circuit- switched bearer service for Digital Subscriber Signaling System Number 1 (DSS1)[4]

ATIS-1000609.1999(R2009), Telecommunications – Interworking between the ISDN user-network interface protocol and the signalling system number 7 ISDN user part[5]

ATIS-1000610.1998(R2013), Telecommunications – Digital Subscriber Signalling System Number 1 (DSS1) – Generic procedures for the control of ISDN supplementary services[6]

3 Definitions

In this standard the following terminologyapplies:

3.1 UUS: User-user signaling.

3.2 UUS service: User-user signaling service 1, as defined in ITU-T Recommendation I.257.1 (implicit).

3.3 user information (UUI): User generated information contents of the DSS1 User-user information elements or the ISUP user-to-user information parameter.

3.4 UUIE: DSS1 User-user information element.

3.5 served user: The user who requests UUS service.

3.6 network: All telecommunications equipment which has any part in processing a call or a supplementary service for the referred to user. It may include Local Exchanges, and NT2s,

[1] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS), 1200 G Street N.W., Suite 500, Washington, DC 20005 < https://www.atis.org/docstore/product.aspx?id=24941>

[2] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS), 1200 G Street N.W., Suite 500, Washington, DC 20005 < https://www.atis.org/docstore/product.aspx?id=24727>

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but does not include the ISDN terminal and is not limited to the "Public" network or any other particular set of equipment.

3.7 service provider: This is a company, organization, administration, business, etc.,that sells, administers, maintains, charges for, etc. the service. The service provider may or may not be the provider of the network.

3.8 contention: Contention exists on the called interface if more than one terminal is expected to respond to a setup request sent by the network, based on the contents of the setup request.

a) If contention applies to an incoming (to user) call, the network will allow more than one terminal to respond to a call setup request sent by the network. In this case, the network shall not award the call to a particular user equipment until a terminal has indicated called party answer, by sending a connect message.
b) If contention is not allowed, the network shall award the call only to the first called user equipment that responds to the setup message and does not indicate terminal incompatibility.

4 Description

4.1 General Description

UUS service allows the user to send and receive limited amounts of user generated information to and from another user-network interface. This information is passed transparently (i.e., without modification of contents) through the network. Although the delivery of the user information is not guaranteed, it is expected to be delivered with a high probability. The network will not interpret or act on this information.

Where multiple network providers comprise the network, delivery of UUS service information may require multilateral agreementsamong involved network providers.

The user can transfer user information during the setup and clearing phases of a call, with user information embedded within certain call control messages.

4.2 Procedures

4.2.1 Provision/withdrawal

The UUS service may be provided on a subscription basis or, as a service provideroption, may be provided to some or all users without subscription. UUS service may be withdrawn for administrative reasons or at the request of the subscriber.

As a service provider option, UUS service can be offered to the calling user with the subscription options given in table 1. The options apply separately to each ISDN number and bearer service combination or each interface.

4.2.2 Normal Procedures

4.2.2.1 Activation/deactivation

The calling party activates the UUS service (implicit 1) by including a User-user information element (UUIE), which may contain user information in the SETUP message. If the calling party has subscribed to the UUS service, the network will accept and transferUUIE from both the calling party and the called party during call establishment and call clearing phases for that particular call.

4.2.2.2 Invocation & Operation

A user wishing to send user information will be informed by the network, as part of normal call establishment, if there is not sufficient signaling connectivity to allow the transfer of user information. The network does not expect any confirmation of user information acceptance from the called user, and will not provide confirmation of delivery.

The UUS Delivery subscription parametershall be set to Preferred or Required. When it is set to Preferred, the network will discard the user information, if it cannot be delivered to the called user. The network will theninform the calling party about this action and continue processing the call. If the UUSDelivery subscription parameter is set torequired and the service request cannot be satisfied by the network, then the user information will be discarded, the network will clear the call and at the same time inform the calling user that the service request has been rejected.

The UUS Delivery subscription parametershall only apply during the call request phase. The delivery of user information in the call clearing phase is not guaranteed due to collision between user-generated and network- generated clearing.

If an indication of interworking or of information discard is received by the network access node of the calling user, then this shall be interpreted as a remote indication that the user information was discarded. Also if a remote node discards the user information, then this action shall be indicated to the originating node. In this case, if the UUS Delivery subscription parameter is set to required, then the call shall be cleared and at the same time the calling user shall be informed that the user information has been discarded.

When user information is delivered in a call setup request, the following user information transfers are allowed from the called party's access:

- If contention applies to the incoming call, then the network shall only accept (and send to the calling party) user information from the called party that includes the user information in a message that requests acceptance of the incoming call (and for the party towhom the call is to be connected). User information included in any other call establishment messages from any other called parties shall be discarded by the called party's network.
- If contention is not allowed for an incoming call, then the user information included in appropriate call establishment messages from the called party shall be sent to the calling party by the called party's network.

Table 1 - Subscription parameters for UUS per ISDN number/bearer service or interface

Subscription option	Values
UUS transfer	– No, not subscribed
	– Yes, accept and transfer UUI
Delivery	– Required, clear call if UUI discarded
	– Preferred, continue call if UUI discarded

When user information is delivered in a call setup request, and the incoming call is not to be accepted, the following user-information transfers are allowed from the called party's access:

- If contention applies to the incoming call, then it is possible that the network receives clearing messages containing user information from more than one called party. As an option, the called party's network may retain the user information included in these clearing messages (while the network waits for an acceptance of the call). If the call is subsequently not accepted, then as an option the network may select a particular called party's user information to be returned in the clearing message sent to the calling party.
- If contention is not allowed for an incoming call, then the user information included in the first expected clearing message from the called party shall be sent to the calling party by the called party's network.

After the UUS service is activated but before the call is connected (i.e., before a called party has accepted the call), the calling party may send a clearing message to clear the call and may include user information in that clearing message. In this case, the user information may be delivered by the called party's network in a clearing message to all called terminals that had already acknowledged the call setup indication. Transport delivery of user information in a clearing message when a connection has not been established may not be supported by all networks.

Once the UUS service has been activated and a connection established, user information may be included in the first expected clearing message sent by either the calling or called party. This clearing message and its user information may be transferred by the network and delivered to the other party.

A dynamic description of activation, invocation, and operation of the UUS service isshown in figures 1 and 2, in the form of SDLs.

4.2.3 Exceptional Procedures

4.2.3.1 Activation/deactivation

If the network cannot accept an activation request for user-information transfer, notification with cause will be returned to the served user.

Possible reasons for notification are:

a) Service not subscribed to;
b) Called user is not an ISDN User (see 4.3);
c) Protocol error;
d) Necessary interoffice signaling connectivity does not exist between sending and destination users.

4.2.3.2 Invocation & Operation

The user receiving user information may not be able to interpret the incoming user information. In such a situation, this user should dis- card the user information without disrupting normal call handling. No specific signaling is provided by the network to accommodate this situation.

User information sent near or at the end of a call may not reach its destination, e.g., if the called party initiates disconnection procedures prior to the arrival of the user information. At all other times, however, the network offers high probability that user information will be delivered correctly.

4.2.4 Alternate Procedures

4.2.4.1 Activation/deactivation

None identified.

4.2.4.2 Invocation & Operation

None identified.

4.3 Interworking Considerations

User information can be exchanged when both users are ISDN subscribers, and the net-work(s) connecting these users support(s) ISDN signaling. However, user information can also be exchanged when both users are ISDN subscribers, and an intervening non-ISDN net- work connecting these users provides a means of conveying the user information.

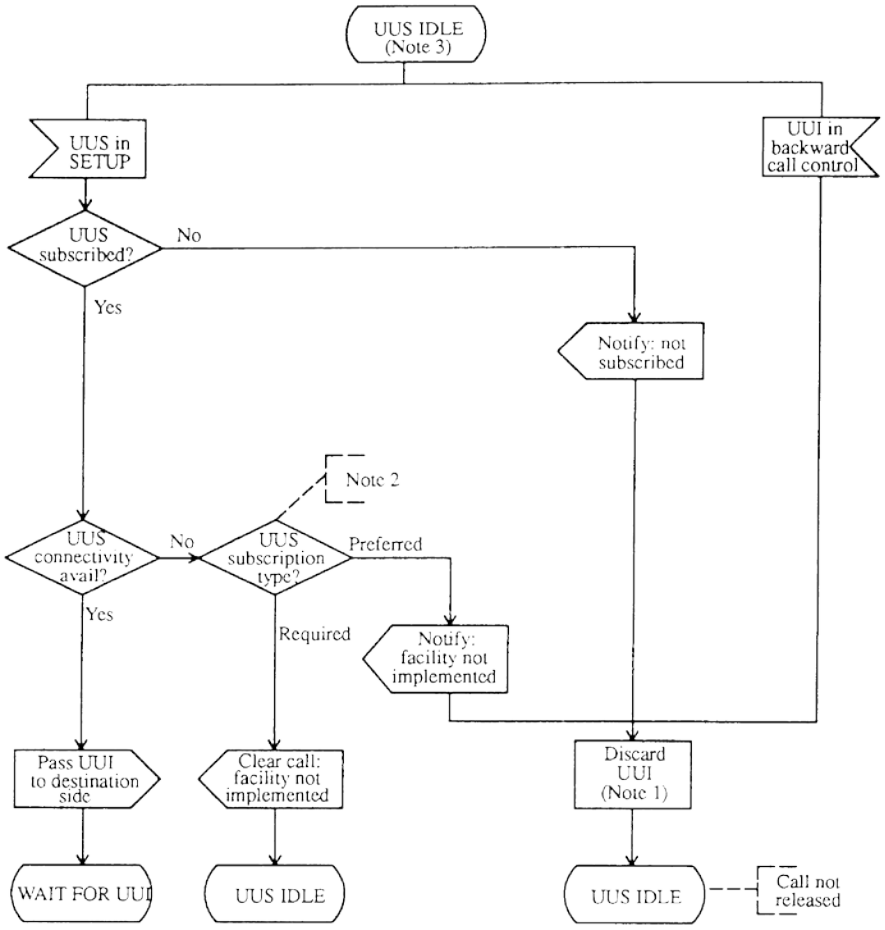

Figure 1 - SDL for originating side of UUS (continued)

NOTES

1) The reasons and procedures for service rejection and network notifications are given in 4.2.3.1 and 6.3.

2) Call handling with respect to the UUS subscription parameter is defined in 4.2.2.2 and 6.3.
3) UUS IDLE should be interpreted as UUS service is idle.

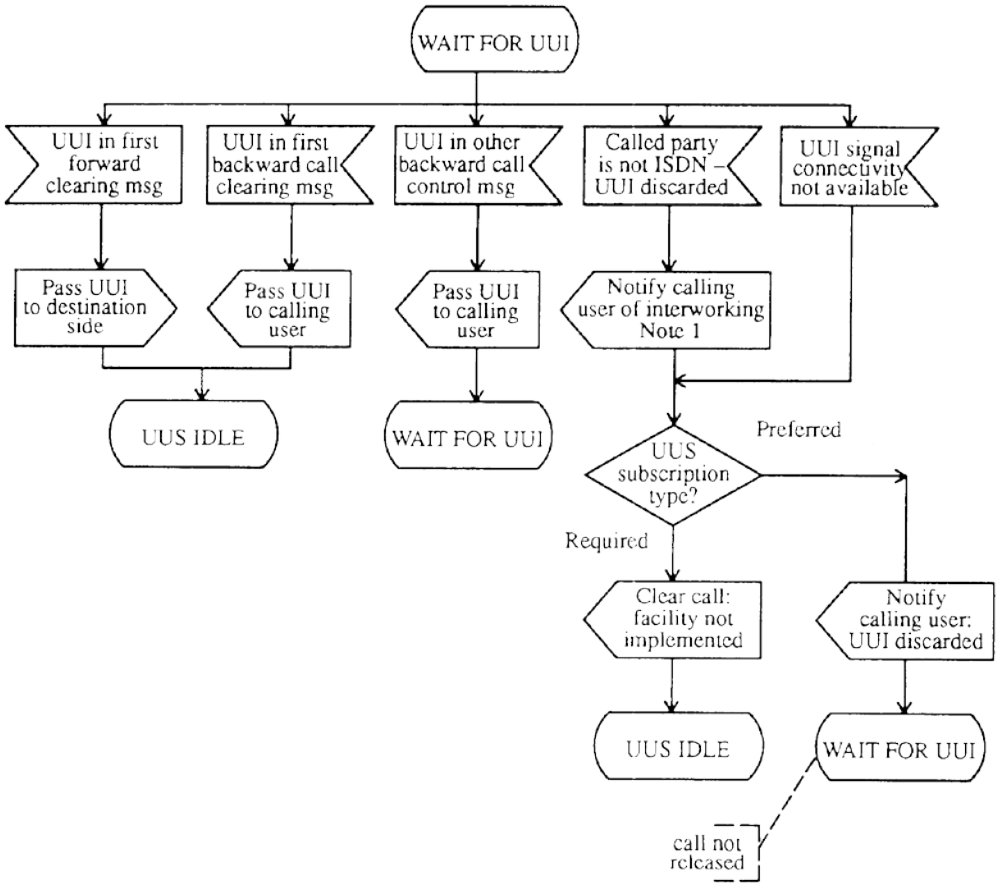

Figure 1 – SDL for originating side of UUS (concluded)

NOTE – This functionality is covered in ATIS-1000607, implicitly notifying calling user of interworking.

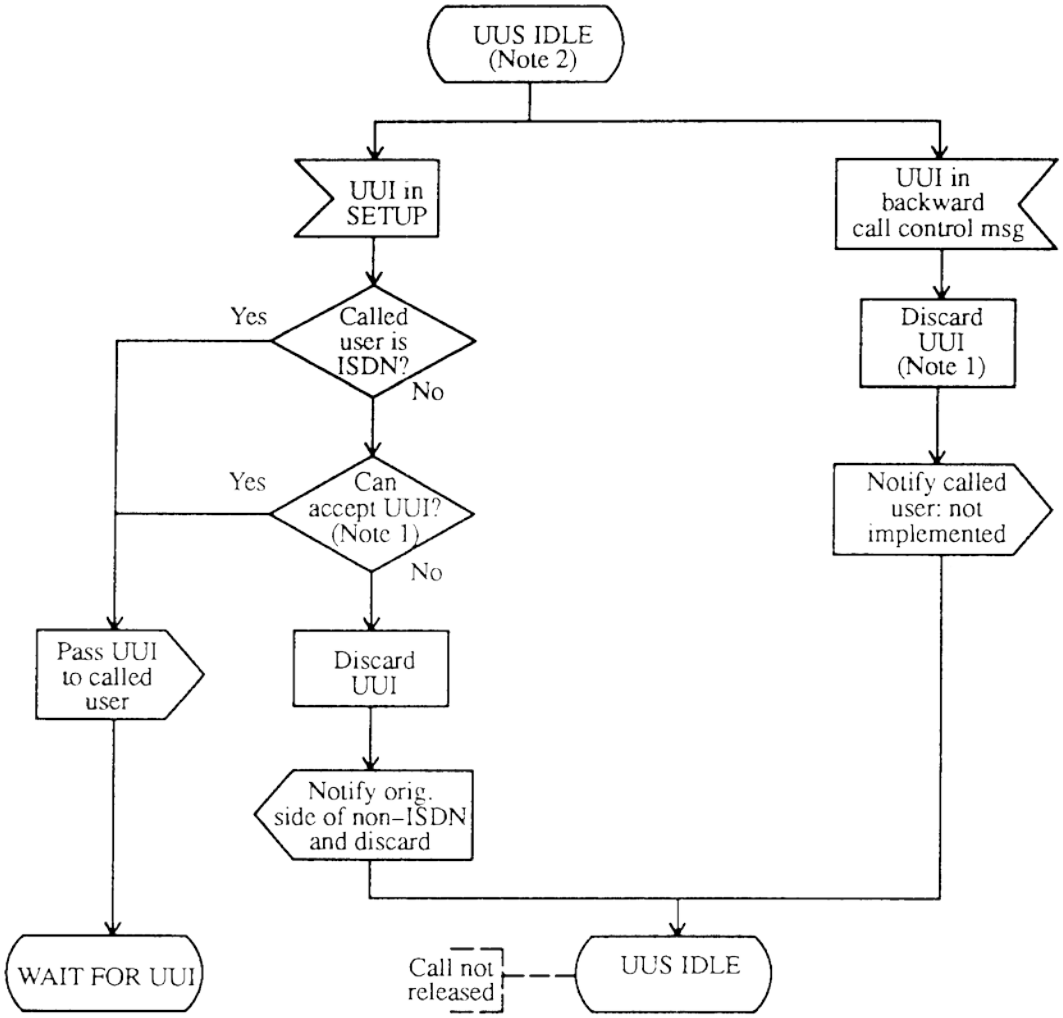

Figure 2 - SDL for terminating side of UUS (continued)

NOTES:

1) Handling of non-ISDN interworking is defined in 4.3 and 6.3.
2) UUS IDLE should be interpreted as UUS service is idle.

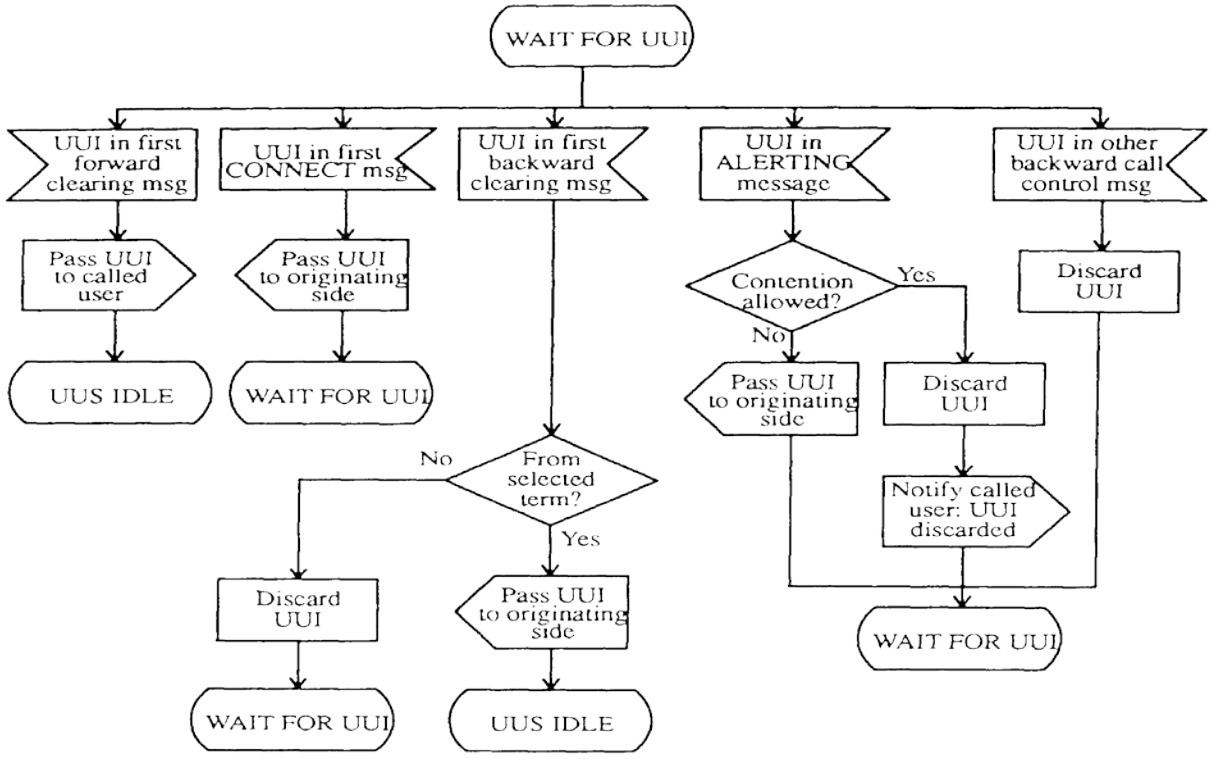

Figure 2 – SDL for terminating side of UUS (concluded)

4.4 Interactions with Other Supplementary Services

4.4.1 Call Waiting

Calling user: Any user information included in the call setup request will be delivered with the call waiting indication. User information can be sent by a called party during the call alerting period. Whether or not a called party's user information is sent to the calling party is dependent upon whether or not contention for the waiting call applies at the called party's interface. The proceduresdescribed in 4.2.2.2 are followed in this situation.

Called user: A party receiving a call waiting indication can include user information with the rejection of the call. Whether or not a called party's user information is sent to the calling party is dependent upon whether or not contention for the waiting call applies at the called party's interface. The procedures described in 4.2.2.2 are followed in this situation.

4.4.2 Calling Line Identification Presentation

The calling line identification presentation and the UUS service do not affect each other's operation.

4.4.3 Calling Line Identification Restriction

The calling line identification restriction and the UUS service do not affect each other's operation.

4.4.4 Call Hold

A held party that is disconnecting may send user information in an appropriate call clear- ing message during the clearing phase of the call.

4.4.5 Multi-level Precedence & Preemption

User information can be provided in an MLPP call setup request that also indicates it is a precedence call. If premption does not take place (either within the network or at the called user's access), then the call setup indication containing the user information would be delivered to the called user. In this case, all other normal UUS service procedures (as defined in 4.2.2.2) would be available to the calling and called users.

An MLPP call that has the UUS service active may be cleared by preemption within the net- work. Since the network is clearing this call, no user information transfer is possible. Also, if a call having UUS service active (either involving or not involving the called party) is preempted at the called user's access, then the call would be cleared by the network and again no user information transfer would be possible.

Once a preempted call at the called party's access is cleared, then if user information is included in the precedence call setup request from the calling party, then the user information shall be delivered to the called party in the call setup indication.

If a precedence call is diverted to an alternate party (e.g., upon the expiration of Timer Tk), then the user information accompanying the setup of the precedence call shall be sent along with the diverted call to the alternate party if both the calling and called parties have subscribed to the UUS service. If the called party has not subscribed to the UUS service, the user information shall not be delivered to the alternate party, and the calling party shall receive an indication that they can no longer use the UUS service on this call.

4.5 Capabilities for Charging

It shall be possible for the service provider to charge accurately for this service.

5 Functional Capabilities & Information Flows Needed for the User-to-User Signaling Service

This clause identifies a way of dividing theoverall functionality for the user-to-user signaling (UUS) service into functional units, each of which could be placed in one location. The overall functionality results from communication between the functional units (called "entities") using information flows, which are also identified in this clause. An information flow is an abstraction which is subsequently realized in clauses 6 through 8 by means of additions to existing signaling system messages or by new messages. Finally, this clause identifies several ways in which the functional entities of the UUS service can be located in specific network or user equipment.

5.1 Functional Entity Model for the User-to- User Signaling Service

This subclause identifies a way of partitioning the UUS service functionality into functional entities and identifies actions that occur in each functional entity. Each functional entity is an abstract representation that could be implemented in more than one kind of telecommunications equipment (e.g., in terminal equipment, in a local switching machine, or in a data base). Functional entities have been defined to cover the most complex scenario (see 5.3) for which information flows have been defined. Functional entities may be combined in a single piece of telecommunications equipment and, for some scenarios, may not exist at all. Figure 3 shows the UUS service functional model. See table 2 for an identification of different plans, called “scenarios”, for allocating the functional subdivision of the UUS service to specific network or userequipment.

5.1.1 Description of Functional Entity 1

Functional Entity 1 (FE1) provides functionality in support of the calling party and FE3. When the calling party initiates a call, FE1 may:

a) Provide user information (in a user-user information element) in the call setuprequest sent to FE3;
b) Receive and process functional indications relating to the UUS service request from FE3, and relay them to the calling user; for example, FE1 may receive:
    a. Notification that the user information has been discarded when it cannot be delivered to the called user, or when there is not sufficient interoffice signaling connectivity to allow the transfer of user information, if the UUS Delivery subscription parameter is set to “Preferred”;
    b. An indication of the clearing of the call and notification that the UUS service request has been rejected; for example, when the UUS service request cannot be satisfied by the network, when the user information has been discarded due to interworking, or when the user information has been discarded due to an inter-action with another supplementary service (such as call forwarding), if the UUS Delivery subscription parameter is set to “required”.

After initiating a call that activates the UUS service, FEI may:

- send additional user information in the first clearing message sent to FE3;
- process user information received from FE3 in either a call control message (during call establishment) or in the first clearing message for the call, and relay this information to the calling user.

5.1.2 Description of Functional Entity 2

Functional Entity 2 (FE2) provides the functional support of a possible NT2 connection for FE1; this may provide a gateway function to a private network. FE2 may or may not exist, depending upon the allocation of equipment scenario for which the UUS service is applied (see 5.3). When FE2 does exist, the UUS service is still subscribed to at FE3. The FE2 should provide the following functionality in support of FE3:

a) If user information is included in a call setup request received at FE2, then FE2 should be capable of sending this user information to FE3;
b) If user information is not included in the call setup request received at FE2, FE2 may provide user information (based on the called destination’s address) on behalf of the calling party in the call setup request sent to FE3;
c) If an error condition exists in its invocation (e.g., the UUS service had not been subscribed at FE3), FE2 may reject a UUS service activation. In this case, FE2 should

discard the user information, send a notification in the backward direction indicating that the UUS service request had been rejected, and send the call setup request without the user information to FE3;

d) Receive and process functional indications relating to the UUS service request from FE3 and relay them in the backward direction;

e) Receive additional user information in the first clearing message for the call and send this user information to FE3;

f) Process user information received from FE3 in either a call control message (during call establishment) or in the first clearing message for the call, and send this information to FE1.

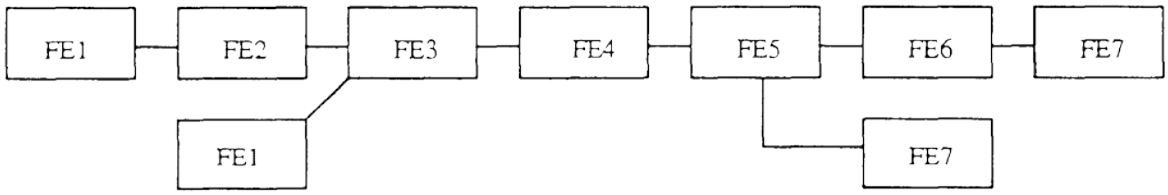

Figure 3 - Functional entity model for the user-to-user signaling service

Table 2 -User-to-user signaling service scenarios

	FE1	FE2	FE3	FE4	FE5	FE6	FE7
Scenario 1	*	NT2	LE	TR	LE	NT2	*
Variation 1	*	NT2	LE	TR	LE	–	TE
Variation 2	*	NT2	LE	–	LE	NT2	*
Variation 3	*	NT2	LE	–	LE	–	TE
Variation 4	*	NT2	LE	–	(LE)	NT2	*
Variation 5	*	NT2	LE	–	(LE)	–	TE
Scenario 2	TE	–	LE	TR	LE	NT2	*
Variation 6	TE	–	LE	TR	LE	–	TE
Variation 7	TE	–	LE	–	LE	NT2	*
Variation 8	TE	–	LE	–	LE	–	TE
Variation 9	TE	–	LE	–	(LE)	NT2	*
Variation 10	TE	–	LE	–	(LE)	–	TE

TE – Terminal Equipment
NT2 – Network Termination – Type 2
LE – Local Exchange
TR – Transit Exchange
(LE) – Destination Exchange (FE5) is the same as the Orig. Exchange (FE3)

(–) Means this FE does not exist for this scenario.

* Expected to be a TE or NT2; however, relationships between FE1 and FE2, and between FE6 and FE7 are not within the scope of this standard.

5.1.3 Description of Functional Entity 3.

Functional Entity 3 (FE3) provides the functional support of a Local Exchange connection for FE1 (or FE2 if it exists). FE3 is the "origination network" for the calling user, and it may or may not be the same Local Exchange connection as for the called user (FE5). As the originating network, FE3 accepts call setup requests and processes UUS service requests from FE1 or FE2. FE3 treats calls originated from either FE1 or FE2 in the same manner. FE3 provides the following functionality in support of FE1 (or FE2 if it exists) and when a call setup request containing user information is received from FE1 or FE2:

a) Determine if the user has subscribed to UUS service. If the UUS service has not been subscribed to, then:
   a. the user information shall be discarded, but the call setup request shall be processed;
   b. a notification shall be sent toward FE1 or FE2 indicating that the user information has been discarded;
b) Determine if the user information included in a call setup request can be processed. If so, then the user information shall be sent to FE4;

c) If there is not sufficient interoffice signaling connectivity available to process the user information in the call setup request, or if there is a protocol error in the user information, then the action taken by FE3 is dependent upon the UUS Delivery subscription parameter for the calling user:
    a. if the UUS Delivery subscription parameter is set to “preferred”, then the call setup request shall be sent to FE4 without the user information, and a notification shall be sent to FE1 indicating that the user information has been discarded;
    b. if the UUS Delivery subscription parameter is set to “required”, then a rejection of the call setup request shall be sent to FE1 with an indication that the UUS service request has also been rejected;
d) If FE3 determines that the user information has been discarded in the network (e.g., due to interworking or discarded due to an interaction with another supplementary service, such as call forwarding), then the action taken by FE3 is dependent upon the UUS Delivery subscription parameter for the calling user:
    a. if the UUS Delivery subscription parameter is set to “preferred”, then a notification shall be sent to FE1 indicating that the user information has been discarded;
    b. if the UUS Delivery subscription parameter is set to “required”, then FE3 shall initiate a clearing of the call and rejection of the call setup request shall be sent to FE1 with an indication that the UUS service request has also been rejected.

After establishing a call that activates the UUS service, FE3:

a) May receive from FE1 (or FE2 if it exists) additional user information in the first clear- ing message for the call; this information is sent toward FE7;
b) Processes user information received from FE4 in either a call control message (during call establishment) or in the first clearing message for the call, and sends this information toward the FE1 or FE2, if it exists.

5.1.4 Description of Functional Entity 4

Functional Entity 4 (FE4) provides the functional support of a possible transit network between FE3 and FE5. FE4 may or may not exist. FE4 provides the following functionality in support of FE3 and FE5:

a) Receives call setup requests from FE3 containing user information and relays this call setup request with the user information to FE5;
b) Receives from FE3 additional user information in the first clearing message for the call and sends this information to FE5;
c) Processes user information received from FE5 in either a call control message (during call establishment) or in the first clearing message for the call, and sends this information to FE3;
d) Sends notification of the discard to FE3, if FE4 discards the user-to-user information.

5.1.5 Description of Functional Entity 5

Functional Entity 5 (FE5) provides the functional support of a Local Exchange connection for FE7 (or FE6 if it exists). FE5 is the “destination network” for the called user, and it may or may not be the same Local Exchange connection as for the calling user (FE1), or FE2. FE5 provides the following functionality in support of FE3 or FE4 if it exists:

a) Receives a call setup request from FE3 containing user information and sends this call setup request with the user information toward FE6 or FE7;
b) Processes user information received from FE6 or FE7 during call establishment and sends it to FE3;

c) Receives user information during anactive call, sent from FE6 or FE7 in the first clearing message, and sends this information to FE3;
d) Receives from FE3 additional user information in the first clearing message for the call and sends this information to FE7;
e) Sends notification of the discard to FE4 or FE3, if FE5 discards the user-to-user information.

5.1.6 Description of Functional Entity 6

Functional Entity 6 provides the functional support of a possible NT2 connection for FE7. FE6 may or may not exist. Functional Entity 6 should provide the following functionality in support of FE5:

a) Receives call setup requests from FE5 containing user information;
b) Receives from FE5 additional user information in the first clearing message for the call;
c) Sends user information in a call control or the first clearing message that is sent to FE3.

5.1.7 Description of Functional Entity 7

Functional Entity 7 provides the following functionality in support of the called user and FE5:

a) Receives a call setup request containing user information from FE5;
b) Receives additional user information in the first clearing message from FE5;
c) Provides for the sending of user information in either a call control message (during call establishment) or in the first clearing message sent to FE5.

5.2 Information Flow Diagrams for the User- to-User Signaling Service

The figures in this subclause provide a high level view of the sequence of, and types of, information passed between functional entities, and the actions performed within the functional entities to support the UUS service. Figures 4 and 5 identify the information flows and functional entity actions for the functional entities. Figure 6 shows the SS7 ISUP and DSS1 messages that would flow between user equipment and the exchanges. Figures 4 and 6 show successful activation and use of the UUS service in a point-to-point configuration at the called interface. Figure 5 shows a successful activation and use of the UUS service in a point-to-multipoint configuration at the called interface.

The following abbreviations are used in the flow diagrams:

Conf Confirmation

Ind Indication

Req Request

5.3 Allocation of Functions to Equipment

This subclause identifies a number of different plans, call “scenarios,” for allocating the functional subdivision of the UUS service to specific network or user equipment (see table 2). Each scenario implicitly identifies what proto- col is impacted by the UUS service information flows. Functional Entities 2, 4 and 6 may or may not exist for the identified scenarios.

The five variations shown under each of the two scenarios indicate the various permutations of existence or lack of existence of FE4 and FE6.

FE1 and FE7 are the functional entities that support the users of the UUS service. FE1 provides the functional support of a calling user, and FE7 provides the functional support of a called user.

FE3 and FE5 are the functional entities that provide the network aspects of the UUS service (origination network and destination net- work, respectively). Note that FE5 may be the same Local Exchange as FE3. In these cases (i.e., shown in variations 4, 5, 9 and 10), the functions performed by the originating exchange (FE3) and the destination exchange (FE5) are handled in one Local Exchange.

FE2, FE4 and FE6 are functional entities that need not exist in all variations of each scenario. For each of the scenarios, the variations show possible representations where one or more than one of these functional entities are not present.

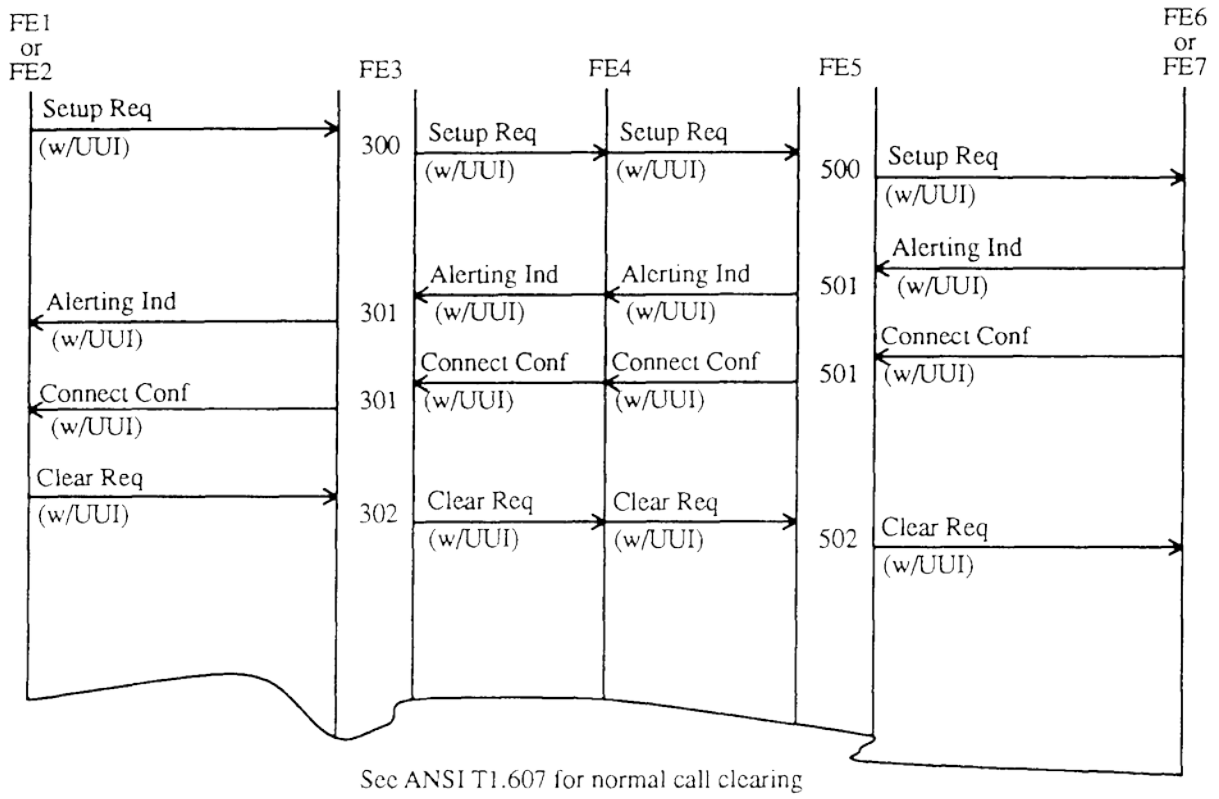

Figure 4 - Information flow UUS service, single point configuration at the called user side

Functional Entity actions:

300 Receives from FE1 a call setup request containing a UUS service request. Checks to ensure that the user has subscribed to the UUS service, and that the user information can be sent before sending the setup request and the user information toward FE7.

301 Processes user information received from FE7 during the call establishment or clearing phases, and sends this information toward FE1.

302 Receives from FE1 user information during the clearing phase of the call and sends this information toward FE7.

500 Receives from FE3 a call setup request containing a UUS service request, and sends the setup request and the user information toward FE7.

501 Processes user information received from FE7 during the call establishment or clearing phases, and sends this information toward FE1 (contention by users for the incoming call is not possible).

502 Receives from FE3 user information during the clearing phase of the call and sends this information toward FE7.

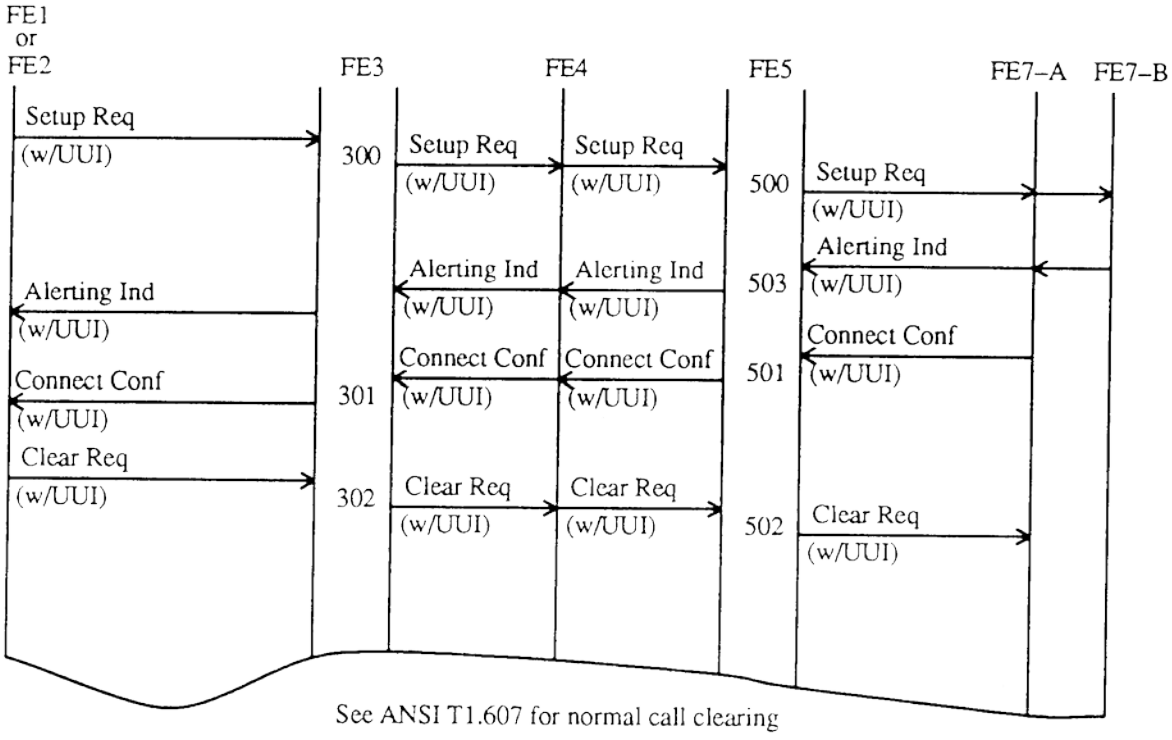

Figure 5 - Information flows for UUS service, multipoint configuration at the called user side

Functional Entity actions:

300 Receives from FE1 a call setup request containing a UUS service request. Checks to ensure that the user has subscribed to the UUS service, and that the user information can be sent before sending the setup request and the user information toward FE7.

301 Processes user information received from FE7 during the call establishment or clearing phases, and sends this information toward FE1.

302 Receives from FE1 user information during the clearing phase of the call and sends this information toward FE7.

500 Receives from FE3 a call setup request containing a UUS service request, and sends the setup request and the user information toward FE7.

501 Processes user information received from FE7 during the call establishment or clearing phases, and sends this information toward FE1.

502 Receives from FE3 user information during the clearing phase of the call and sends this information toward FE7.

503 If contention for a call is possible and user information is received from a party before the call is awarded to a specific party, that user information is discarded.

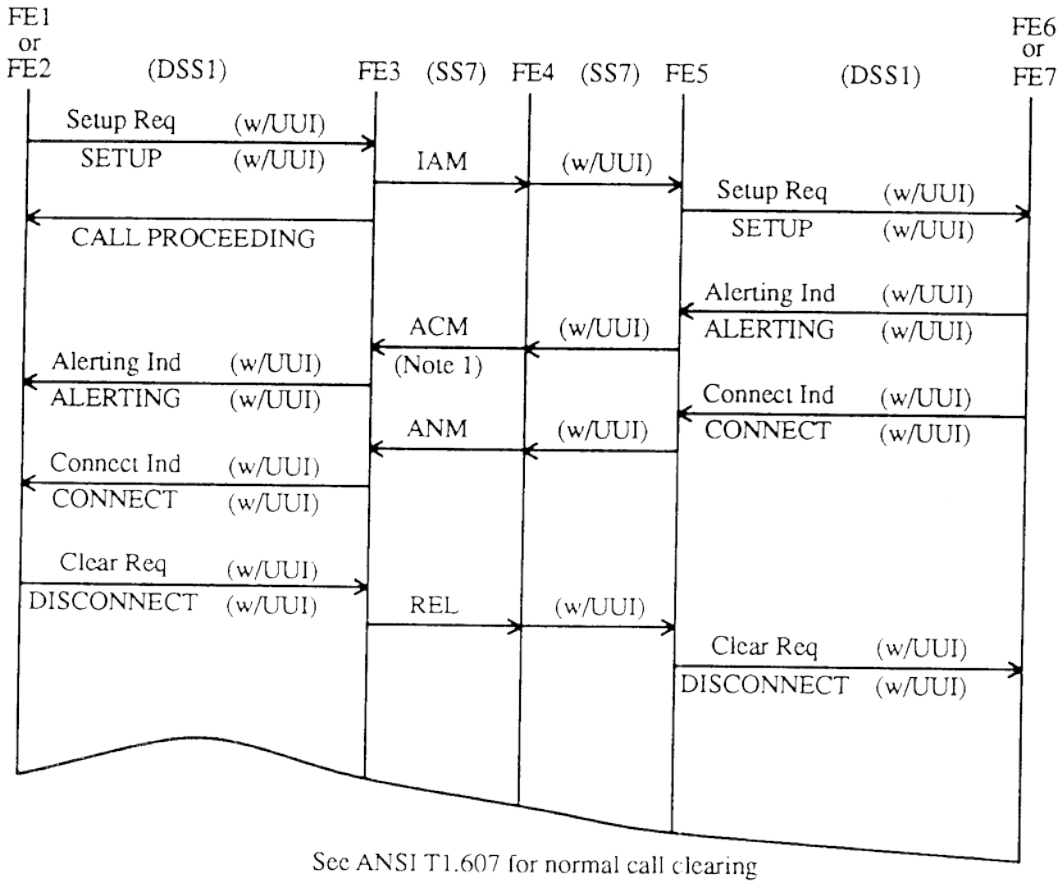

Figure 6 - Protocol messages for UUS service, single point configuration at the called user side

NOTE – In the case that an alerting indication is carried by a Call Progress Message, the user-to-user information parameter may also be transported in the Call Progress Message.

5.3.1 Scenario 1:

One representation of this scenario would be an ISDN terminal (supported at FE1) connected via either a point-to-point or a multi-point data link on a Basic Rate Interface to an ISDN PBX (supported at FE2). The ISDN terminal is the calling user, and the ISDN PBX initiates a call for the ISDN terminal through a public ISDN. The Local Exchange (supported at FE3) provides the originating network service functions for the UUS service. When initiating a call, the ISDN terminal, or the ISDN PBX on behalf of the terminal, may provide user information.

One representation of this scenario would be an ISDN PBX (an NT2 supported at FE2) connected via a point-to-point data link on either a basic or primary rate interface to a Local Exchange (supported at FE3). The ISDN PBX is the initiator of the UUS service request (e.g. establishing call on non-ISDN terminal, or a private network). The Local Exchange provides the originating network service functions for the UUS service. When initiating a call, the ISDN PBX provides the user information in the call setup request.

5.3.2 Scenario 2:

One representation of this scenario would be an ISDN terminal (supported at FE1) connected via either a point-to-point or a multi-point data link on a basic rate interface to a Local Exchange (supported at FE3). The ISDN terminal is a calling user, and the Local Exchange is the network that provides the UUS service originating network service functions. When initiating a call, the ISDN terminal provides the user information in the call setup request.

6 UUS Switching & Signaling Specifications – At User-Network Interface

This clause contains the detailed specifications of switching and signaling capabilities for the UUS service. This clause identifies the Digital Subscriber Signaling System No. 1 (DSS1) messages and procedures needed to support the functional entity actions for the scenarios described in clause 5.

6.1 Support Assumptions (Terminal)

Terminal equipment using UUS service is expected to be able to generate and accept the UUIE as described in 6.2.2.1.

6.2 Messages Formats & Codings

The following messages are applicable to the operation of UUS service: SETUP, ALERT- ING, CONNECT, PROGRESS, DISCON- NECT, RELEASE, RELEASE COMPLETE

(see tables 3 through 9).

6.2.1 Codesets

All information elements are in codeset 0.

6.2.2 Information Elements

The following information element is applicable to the operation of UUS service: User-user information element.

6.2.2.1 User-User Information Element

The purpose of the UUIE is to convey information between ISDN users. This information is not interpreted by the network, but is carried transparently and delivered to the remote user(s). There are no restrictions on the con- tent of the user information field (i.e., user information).

The UUIE has a network dependent maximum size of 131 octets for the UUS service (see tables 3 through 9).

Table 3 - Message type: ALERTING

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/ANSI T1.607	both	M	2
Call reference	4.3/ANSI T1.607	both	M	2
Message type	4.4/ANSI T1.607	both	M	1
User-user	6.2.2.1/UUS	both	O (see note)	3-131
Other mandatory and optional information elements as described in ANSI T1.607. NOTE – May be included for UUS service when contention is not allowed. Not included otherwise.				

Table 4 - Message type: CONNECT

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/ANSI T1.607	both	M	2
Call reference	4.3/ANSI T1.607	both	M	2
Message type	4.4/ANSI T1.607	both	M	1
User-user	6.2.2.1/UUS	both	O (see note)	3–131
Other mandatory and optional information elements as described in ANSI T1.607. NOTE – May be included for UUS service. Not included otherwise.				

Table 5 - Message type: DISCONNECT

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/ANSI T1.607	both	M	2
Call reference	4.3/ANSI T1.607	both	M	2
Message type	4.4/ANSI T1.607	both	M	1
User-user	6.2.2.1/UUS	both	O (see note)	3–131
Other mandatory and optional information elements as described in ANSI T1.607. NOTE – May be included for UUS service where DISCONNECT is the first clearing message. Not included otherwise.				

Table 6 - Message type: PROGESS

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/ANSI T1.607	both	M	2
Call reference	4.3/ANSI T1.607	both	M	2
Message type	4.4/ANSI T1.607	both	M	1
User-user	6.2.2.1/UUS	N->U	O (see note)	3-131

Other mandatory and optional information elements as described in ANSI T1.607.

NOTE – Included only in conjunction with in-band tones or announcements. User information transported to the calling party will be supplied by the called party.

Table 7 - Message type: RELEASE

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/ANSI T1.607	both	M	2
Call reference	4.3/ANSI T1.607	both	M	2
Message type	4.4/ANSI T1.607	both	M	1
User-user	6.2.2.1/UUS	both	O (see note)	3-131

Other mandatory and optional information elements as described in ANSI T1.607.

NOTE – May be included for UUS service in the N->U direction where RELEASE is used by the network to clear each responding called user in the case of premature clearing by the calling user. May be included for UUS service in the U->N direction when the RELEASE message is the first clearing message used by the holding user to clear a held call (see 6.3.5.2.4). Not included otherwise.

Table 8 - Message type: RELEASE COMPLETE

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/ANSI T1.607	both	M	2
Call reference	4.3/ANSI T1.607	both	M	2
Message type	4.4/ANSI T1.607	both	M	1
User-user	6.2.2.1/UUS	U->N	O (see note)	3-131

Other mandatory and optional information elements as described in ANSI T1.607.

NOTE – May be included for UUS service where RELEASE COMPLETE is sent by the user to reject an incoming SETUP message. Not included otherwise.

Table 9 - Message type: SETUP

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/ANSI T1.607	both	M	2
Call reference	4.3/ANSI T1.607	both	M	2
Message type	4.4/ANSI T1.607	both	M	1
User-user	6.2.2.1/UUS	both	O (see note)	3-131(see note)
Other mandatory and optional information elements as described in ANSI T1.607. NOTE – Included if the calling user wishes to activate UUS service for the call.				

6.2.3 Codepoints

All codepoints used in these protocols are described in specific detail in ATIS-1000607 and ATIS-1000610. For the specific messages and information elements supported by UUS service, see 6.2 of this standard. Note that the UUIE codepoint and information element con- tent is not described in the referenced documents, and is instead defined in table 10 of this American National Standard.

6.3 Procedures

6.3.1 Service states and timers

No specific service states or timers are identified for UUS service.

6.3.2 Activation/deactivation

6.3.2.1 General

The UUS service is activated (implicitly) as described in 6.3.3.1. Activation and invocation of the service are identical.

Deactivation occurs upon receipt of the first clearing message. Deactivation may also occur in conjunction with interactions with other supplementary services.

Procedures at the destination network during activation of this service are restricted in the case in which contention for calls is possible. For the purposes of these procedures, the destination network upon sending a SETUP message, should assume that contention for the call may occur unless at least one of the following applies:

- the SETUP message is delivered using a point-to-point data link;
- terminal identification procedures have been successfully completed (see annex A of ATIS-1000610), and the SETUP message contains an endpoint identifier information element which uniquely selects the user equipment (i.e., the USID and TID values match the corresponding stored values, and the interpreter bit value is 0);
- the called user (ISDN number/bearerservice) has by prior arrangement with the network agreed that contention is notallowed for this ISDN number/bearer service.

6.3.2.2 UUS Service

6.3.2.2.1 Invocation

Invocation occurs by the submission of the UUIE in a SETUP message.

6.3.2.2.2 Notification

No notification procedures using the NOTIFY message are identified.

6.3.3 Normal operation

6.3.3.1 UUS in the Call Establishment Phase

The UUS service is implicitly requested by including a UUIE of variable length in the SETUP message (as specified in 6.2, table 9, and 6.2.2.1). This SETUP message is transferred across the user-network interface at the calling side as described in 5.1.1 of ATIS-1000607. This information element is trans- ported by the network and delivered un- changed in the UUIE included in the SETUP message transferred across the user-network interface at the called user side as described in 5.2.1 of ATIS-1000607. The called user may not be able to interpret the incoming UUIE. In such situations, the user should discard the user information without disrupting normal call handling. No specific signaling is provided by the network to accommodate this situation.

For activation purposes, this information element as specified in 6.2.2.1, must be at least three octets long as defined in table 9. In the case where contention by users for the incoming call is not possible, a UUIE may be included in either the ALERTING message, the CONNECT message, or both messages transferred across the user-network interface at the called side as described in 5.2 of ATIS-1000607. The content of the UUIE is trans- ported by the network and delivered in the UUIE included in the corresponding message(s) transferred across the user-network interface at the calling side as described in and 5.1.8 of ATIS-1000607. The called user may also be included in the UUIE in the RELEASE COMPLETE message. The processing performed by the network uponreceiving the UUIE in a RELEASE COM-PLETE message, and the determination of whether the UUIE is sent to the calling user, is described in 6.3.3.2.

In the case where it is possible for users to contend for an incoming call during call establishment, the UUIE should be included only in the CONNECT message (i.e., not in an ALERTING message) transferred at the called side, as described in 5.2.7 and 5.2.8 of ATIS-1000607. If the ALERTING message contains a UUIE, the network will discard the UUIE and proceed as specified in 6.3.4.2. The content of the UUIE delivered to the calling user shall be the user information received from the selected called terminal. The network shall include the UUIE in the CONNECT message sent to the calling user as described in 5.1.8 of ATIS-1000607.

Table 10 - User-user information element

8	7	6	5	4	3	2	1	
User-user								
0	1	1	1	1	1	1	0	Octet
Information element identifier								1
Length of user-user contents								2
Protocol discriminator								3
User information								4
								etc.

Protocol discriminator (Octet 3)

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	User-specific protocol (Note 1)
0 0 0 0 0 0 0 1	OSI high layer protocols
0 0 0 0 0 0 1 0	X.244 (Note 2)
0 0 0 0 0 0 1 1	Reserved for system management convergence function
0 0 0 0 0 1 0 0	ASCII characters (Note 3)
0 0 0 0 0 1 0 1	CCITT Recommendation X.208/X.209 coded user information (Note 4)
0 0 0 0 0 1 1 1	CCITT Recommendation V.120 rate adaptation
0 0 0 0 1 0 0 0	ANSI T1.607 user-network call control message
0 0 0 1 0 0 0 0	Reserved for other network layer or layer 3 protocols,
Through	including Recommendation X.25
0 0 1 1 1 1 1 1	(Note 5)
0 1 0 0 0 0 0 0	
Through	National use
0 1 0 0 1 1 1 1	
0 1 0 1 0 0 0 0	Reserved for other network layer or layer 3 protocols,
Through	including Recommendation X.25
1 1 1 1 1 1 1 0	(Note 5)
All other values are reserved.	

NOTES

1 The user information is structured according to user needs.

2 The user information is structured according to Recommendation X.244 which specifies the structure of X.25 call user data.

3 The user information consists of ASCII characters.

4 The number of X.208/X.209 components in a user-user information element as well as their semantics and use are user-application dependent and may be subject to other CCITT Recommendations.

5 These values are reserved to discriminate these protocol discriminators from the first octet of an X.25 packet including general format identifier.

If the network discards the UUIE from the SETUP message or if a remote indication is received that the UUIE cannot be delivered to the called party, the network shall identify the value of the UUS Delivery subscription para- meter. For example, the network shall discard the UUIE in the following situations:

- the call interworks with a non-ISDN trunk or line;
- the length of the UUIE is greater than 131 octets.

If the UUS Delivery subscription parameter is set to “Required”, the network shall take the following action. If the call is in call state N1, “Call initiated”, or call state N2, “Overlap sending”, the call shall be cleared to the calling party. If the call is in call state N3,“Outgoing call proceeding” or call state N4, “Call delivered”, then the call shall be cleared to both the calling

and called parties. If the UUIE is discarded, then the network shall use cause value number 69, “Requested facility not implemented”, (Location: public network serving the local user), (no diagnostic pro- vided), when clearing the calling user. If the call is in call state N3 or N4, then the network shall use cause value number 16, “Normal call clearing”, (Location: public network serving the remote user), when clearing the called user.

If the UUS Delivery subscription parameter is set to “Preferred”, the network shall apply the following treatment: If interworking with a non-ISDN trunk or line, the network shallreturn a notification of interworking at the originating interface as defined in 5.1.6 of ATIS-1000607. If the UUIE is discarded for reasons other than interworking, the network shall send a STATUS message to the calling party. The STATUS message shall contain cause value 43, “Access information discarded”, (Diagnostic: User-user Information Element (I.E.) identifier).

Also, the “Location” field in the cause information element should identify where in the net- work the user information was discarded, for example, “public network serving the local user”, “transit network”, or “public network serving the remote user”.

> NOTE – The called user may perform compatibility checking using the UUIE contents (see annex B of ATIS-1000607).

6.3.3.2 UUS in the call clearing phase

A UUIE (as defined in 6.2.2.1) may be included in the first message used to initiate nor- mal call clearing (see 5.3.3 and 5.3.4 of ATIS-1000607).

The user information contained in the UUIE signaled by the clearing party is transferred to the remote user in the first clearing message sent by the network (see 5.3.3 and 5.3.4 of ATIS-1000607). Therefore, in order for theremote user to receive this user information, the network shall initiate call clearing to the remote user. It should be noted that the delivery of user information during call clearing is not guaranteed. The network shall discard the UUIE without sending any notification in the case of a collision between clearing initiated by the remote user and clearing initiated by the network.

In addition, when a SETUP message has been delivered and contention applies to the terminating call, only the following UUIEtransfer is allowed:

- in the network to called user direction, in the case of premature clearing (clearing prior to completion of the call) by the calling user, the UUIE is sent in the RELEASE message to each called user that has already responded to the incoming SETUP message;
- in the called user-network direction, a UUIE will only be accepted from a terminal that is selected.

As a network option, if contention applies to the terminating call and multiple clearing messages are received, the network may retain the UUIE along with the cause value retained according to 5.2.5.3 of ATIS-1000607. In the event that this cause is returned to the calling user, the associated UUIE shall also bereturned. If there are multiple clearing messages containing both causes of equal priority and UUIEs, the UUIE contained in the first clearing message will be sent to the calling user. If any of the clearing messages with the highest priority causes do not contain UUIEs and other clearing messages with causes of lower priority do contain UUIEs, no UUIEs shall be sent back to the calling user. If the network does not retain the UUIE sent by the called user, it shall include the cause information element with cause value 43, “Access Information Discarded”, (Location: public net- work serving the local user; diagnostic: User- user Information Element (I.E.) identifier), in the next sequential clearing message sent to the called user, as specified in 6.3.4.2.

In the case where contention by users for the incoming call is not possible, a UUIE may be included in the first normal clearing message sent by the called user during call establishment at the destination interface. If the called user rejects the call with a RELEASE COM- PLETE message containing UUIE, the net- work shall deliver the UUIE in the DISCON- NECT message sent to the calling user. However, if network-provided in-band information applies and the network chooses not to initiate call clearing procedures to the calling user, the network shall deliver the UUIE in a PROGRESS message sent to the calling user.

6.3.3.3 Interworking

The network shall discard the UUIE if the call interworks with a non-ISDN trunk or line. In the case of interworking and the UUS Delivery subscription parameter is set to “Preferred”, the return of a PROGRESS, ALERTING, or CONNECT message to the calling user with either of the following progress-indicator information-element values shall serve as indication that, in particular, the delivery of the UUIE in call control messages cannot beguaranteed:

- value 1, “call is not end-to-end ISDN; fur- ther call progress information may be avail- able in-band”;
- value 2, “destination address is non-ISDN”.

If the UUS Delivery subscription parameter is set to “Required”, the network shall initiate call clearing as stated in 6.3.3.1.

6.3.4 Error Handling

6.3.4.1 Rejection of UUS Requests

If the network receives a UUIE, from the calling user in the SETUP message, but deter- mines that the calling party has not sub - scribed to the UUS service, then the UUIE shall be discarded from the SETUP message and a STATUS message with cause value 50, “requested facility not subscribed”, (No diagnostic value provided), shall be sent to the calling user. The STATUS message shall also contain the appropriate call state information. The network shall continue to process the call as per the basic call procedures in ATIS-1000607.

6.3.4.2 Unexpected UUIE in Call Control Messages

The network shall apply the following error procedures in support of UUS service:

- the network shall discard the UUIE if it is received from the called user in an ALERT- ING or CONNECT message, but a request for UUS service was not indicated (i.e.,implicitly) in the SETUP message delivered to the called user. If discard occurs, the net- work shall take action on the remaining con- tents of the message received from thecalled user and shall send a STATUS message to the called user containing cause value 69, “requested facility not implemented”, (No diagnostic value provided);
- the network shall discard the UUIE if it is received from either user in a DISCONNECT or RELEASE COMPLETE message, but a request for UUS service was not indicated (i.e., 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 had sent a DIS- CONNECT message, the network shall send to the clearing party a RELEASE message containing cause value 69, “requested facility not implemented”, (No diagnostic value provided). If the clearing party had sent a RELEASE COMPLETE message, the net- work shall consider the call as cleared to that party and no additional action shall be taken by the network;

- the network shall discard the UUIE if it is received from the calling user in a SETUP
- message which requests an access connection to an X.25 packet handling function pro- vided within the ISDN. 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 calling user containing cause value 43, “access information discarded”.
- if the SETUP message delivered to the called user contains the UUIE, the network shall discard the UUIE if it is received in an ALERTING message and contention is allowed. If discard occurs, the network shall take action on the remaining contents of the message received from the called user and shall send a STATUS message to the called user containing cause value 43, “accessinformation discarded”;
- the network shall discard the UUIE in the following cases not explicitly discussed else- where in this subclause:
    - The overall length of the UUIE is greater than 131 octets, and the SETUP message delivered to the called user contains the UUIE;
    - The network receives a message containing the UUIE, but that message is not allowed to contain the UUIE as defined by this document.

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 value 43, “access information discarded”. However, if the network dis- cards a UUIE from a received clearing message, the network shall include cause value 43, “access information discarded”, in the next sequential clearing message sent to the user, as specified in 5.3 of ATIS-1000607. If the net- work discards a UUIE from a RELEASE COMPLETE message, the network shall consider the call as cleared to that party, and no additional action shall be taken by the network.

6.3.5 Interactions

6.3.5.1 Basic Call

Procedures for UUS are based on the basic call procedures of ATIS-1000607. Modifications to those procedures are described in 6.3, above.

6.3.5.2 Other Services

6.3.5.2.1 Call Waiting

UUS may be used in conjunction with call waiting. The UUS service operates in its normal manner with call waiting, and the procedures of 6.3.3 are applicable.

6.3.5.2.2 Calling Line Identification Presentation

No interactions are identified.

6.3.5.2.3 Calling Line Identification Restriction

No interactions are identified.

6.3.5.2.4 Call Hold

Normal operation of UUS service may continue regardless of the auxiliary hold state of the call. When the UUS service is active and a call has been held, the holding user may clear the held

call by sending a RELEASE message that contains the UUIE to the net- work. The UUIE would then be transferred by the network to the remote user and delivered in the first clearing message.

6.3.5.2.5 Multilevel Precedence & Preemption

MLPP calls may contain the UUIE in appropriate call establishment and clearing messages, and the operation of the UUS service is not affected by the MLPP service as long as no preemption takes place. The MLPP service takes precedence over the UUS service when calls are preempted. When a call that has the UUS service active is preempted, the call is cleared by the network. UUS service is then deactivated for that cleared call. In this case, there is no opportunity for a calling or called user to include the UUIE in a clearing message.

6.4 SDL Diagrams

Refer to ATIS-1000607for SDL diagrams on message flow.

7 Switching & Signaling Specification at Interexchange Interfaces

7.1 Formats & Codes

7.1.1 Messages

The format and coding of ISDN user part messages are given in chapter 3 of ATIS-1000113.No new ISDN User Part messages are required for UUS. User information may be carried in the Initial Address (IAM), Information (INF), Address Complete (ACM), Call Progress (CPG), Answer (ANS), andRelease Messages (REL).

7.1.2 Parameters

The format and coding of ISDN user part parameters are given in chapter 3 of ATIS-1000113. The Identifier for the user-to-user indicators parameter is 00101010. The User- user indicators parameter containing a new network discard indicator is required in order to provide network notification for UUS when user information is discarded by the network. The format and contents of this User-user indicator parameter are shown in table 11. The network discard field of the User-user indicators parameter will only define when user information discard by the networkoccurs. It will not be used for network verification that user information was accepted. This optional parameter may only be included in the backward call control messages identified in 7.1.1. User information is carried in the user-to-user information parameter which is an optional parameter of variable length andwhich may be included in the messages identified in 7.1.1.

A new network IAM segmentation indicator is required in the forward call indicatorsparameter to provide network notification with- in the ISUP signaling network that IAM segmentation has occurred, and that additional information will be forwarded in the ISUP information message rather than in the ISUP initial address message (see chapter 4 of ATIS-1000113).

A new network IAM segmentation indicator is also required in the backward call indicators parameter in the ISUP address complete and answer messages to provide network notification within the ISUP network that the ISUP information message (i.e., “Additional information received”) has been received at the terminating exchange (see chapter 4 of ATIS-1000113).

7.2 Procedures

7.2.1 UUS Service

UUS service may be provided by the network to users in association with circuit-switched calls. UUS service allows users to communicate by transferring user information within ISDN user part call control messages during the call set-up and clearing phases. UUS service is not a guaranteed service. If for any reason the combination of the basic plus supplementary service information causes the overall maximum length of the ISDN user part message to be exceeded and user information is included, then the UUS service shall be rejected, unless the IAM segmentation procedures described below are supported by the service provider.

Table 11 - User-to-user indicators parameter

8	7	6	5	4	3	2	1
H	G	F	E	D	C	B	A

The following codepoints are used in the user-to-user indicators parameter field:

bit A: Type
0 [No procedures for U.S. networks]
1 Response

bits CB: Service 1 [No procedures for U.S. networks]

bits ED: Service 2 [No procedures for U.S. networks]

bits GF: Service 3 [No procedures for U.S. networks]

bit H: Network Discard Indicator
0 [No procedures for U.S. networks]
1 UUI discarded by the network

NOTE – All field values, for bits A & H, shall be coded as one for user-user signaling implicit service 1 (UUS service). Any other value is acceptable for bits CB, ED, and GF.

During call setup, ISUP IAM segmentation procedures within the ISUP signaling network provide a mechanism for the transfer of ISUP IAM messages whose contents exceed 272 octets, but are shorter than 544 octets (see chapter 4 of ATIS-1000113for general procedures concerning IAM segmentation, and 7.2.1.1.1 of this standard for IAM segmentation procedures specific to UUS service).

Up to 128 octets of user information may be transferred in a message. The 128 octets do not include the user-to-user informationparameter name, length, or protocol discriminator octets.

7.2.1.1 UUS in the Call Set-up Phase

Procedures for basic call setup are described in clause 2, chapter 4 of ATIS-1000113.

UUS service is requested implicitly via the originating call control by including the user- to-user information parameter in either an ISUP IAM message, if the length of the IAM message does not exceed 272 octets, or in the ISUP information message, if IAM segmentation was invoked. This parameter is transported across the network and delivered unchanged to the terminating exchange.

If the intermediate or the terminating exchange receives the User-user information parameter in an initial address message or in an ISUP information message (if IAM segmentation was invoked), the called party is ISDN (this applies to the terminating switch only), and the network cannot support the implicit UUS service request either on a long- term or short-term

basis, then the exchange shall include the User-user indicators parameter in the first appropriate backward message, with the network discard indicator, bit H,coded as “1”.

The user may not be able to interpret incoming user information. In such situations, the user should discard the user information with- out disrupting normal call handling. No specific signaling is provided by the network to accommodate this situation.

7.2.1.2 Rejection of UUS Service Requests

If a network receives the User-user information parameter in an initial address message or in an ISUP information message (if IAM Segmentation was invoked), the called party is ISDN (this applies to the terminating switch only), but the network cannot support UUS service, then the network shall include the User-user indicators parameter in the first appropriate backward message, with the net- work discard indicator, bit H, coded as “1”.

7.2.1.3 UUS in the Call Clearing Phase

A user-to-user information parameter may be included in the release message. The user-to- user information parameter received at the distant exchange in the release message is passed to the call control for the remote user. In the case of simultaneous clearing of the call the release message may not reach the distant exchange and the user information will be lost. If the user information cannot be delivered during the call clearing phase, it will be discarded and no notification will be pro- vided to the sending user.

7.2.2 Message Flow Diagrams

Figure 6 shows a successful use of UUS service when (implicitly) requested in a point-to- point configuration.

7.2.3 Interactions with Other Supplementary Services

7.2.3.1 Call Waiting

See 6.3.5.2.1

7.2.3.2 Calling Line Identification Presentation

See 6.3.5.2.2

7.2.3.3 Calling Line Identification Restriction

See 6.3.5.2.2

7.2.3.4 Call Hold

See 6.3.5.2.4

7.2.3.5 Multi-level Precedence & Preemption

See 6.3.5.2.5

8 Specifications for Protocol Interworking

8.1 Interworking Between SS7 & DSS1

8.1.1 General

The interworking between SS7 and DSS1 for basic call control is described in ATIS-1000609. No new message interworking is required for UUS. In order to support UUS, the DSS1UUIE (i.e., as defined in 6.2.2.1) must be interworked to the SS7 ISDN user part user- to-user information parameter when theDSS1-to-SS7 message interworking results in the sending of one of the ISDN user part mes- sages identified in 7.1.1. The reverse interworking must be performed when one of these ISDN user part messages is received and is interworked to a DSS1 message. This interworking is shown in table 12. See 8.1.2 and8.2 for additional details.

8.1.2 Interworking Between SS7 & DSS1

If discard of a DSS1 UUIE occurs due to the network (including the case where the extended length supported by IAM Segmentation is exceeded, as a result for example, from a DSS1 SETUP message being too long due to interactions with other supplementary service), the originating exchange will receive a User-user indicators parameter in an appropriate backward message with the network discard indicator bit “H”, coded as “1”. See 6.3.3.1 for call handling procedures based on the UUS subscription delivery parameter.

In addition, if IAM segmentation occurs during the call setup phase of the call, the following procedures apply. If discard of the ISUP UUI parameter (i.e., DSS1 UUIE) occurs due to lack of receipt of the ISUP information mes- sage at the exchange doing reassembly (i.e., Timer T36 times out), the sending exchange will, instead, receive a backward call indicators parameter in an appropriate backward message with an IAM segmentation indicator bit “J” coded as zero from the exchange doing reassembly. If the sending exchange (i.e. the exchange that performed IAM segmentation) is the originating exchange, the originating exchange shall treat this response the same as the network discard indicator coded as “1”. If the sending exchange is not the originating exchange, the sending exchange shall then transport this backward message and thebackward call indicators parameter with bit “J” of the IAM segmentation indicator field coded as zero to the originating exchange. The originating exchange shall treat this response the same as network discard indicator coded as “1” (interpret this as a DSS1 STATUS message with cause value 43, “Access information discarded”).

The DSS1 UUIE is conveyed in the ISUPUser-user information parameter. When pre- sent in the SETUP message, it will be conveyed in the initial address message (IAM) or if IAM segmentation procedures were invoked, it will be conveyed in the information message (INF); when present in the CONNECT message, it will be conveyed in the answer message (ANM); when present in the first clearing message (i.e., DISCONNECT, RELEASE, OR RELEASE COMPLETE), it will be conveyed in the ISUP release message (REL); and when present in the ALERTING message, it will be conveyed either in the address complete (ACM) or call progress (CPG) message.

In the case of clearing with in-band tones and announcements, the DSS1 UUIE sent by the called user in the first clearing message will be conveyed in either an ISUP release or call progress message and will be sent to the calling user in the DSS1 PROGRESS message.

Table 12 - Interworking user information between SS7 and DSS1

DSS1 User-user information element		SS7 User-to-user information parameter
Octet 1: Identifier	(no mapping)	Octet 1: Parameter name
Octet 2: Length	(no mapping)	Octet 2: Length
Octet 3: Protocol discriminator	<——->	Octet 3: Protocol discriminator
Octet 4 : Octet n (n≤131)	User information <——->	Octet 4 : Octet n (n≤131)

8.1.3 Public/private

Not applicable.

8.2 Interworking Between SS7 & Non-SS7 Signaling

In the case of interworking with a non-SS7 signaling system, the “interworking” protocol control information shall be returned to the originating exchange in the first appropriate message (e.g. an address complete message). If the non-SS7 signaling system is unable to support the transport of the DSS1 UUIE then the DSS1 UUIE shall be discarded. See 6.3.3.3 for call handling based on the UUS subscription delivery parameter.

8.3 Interworking Between SS7 & a Non- ISDN called party

This topic is covered in ATIS-1000609.

Annex A: Bibliography

(informative)

The publication listed here is for information only and is not essential for compliance with this standard:

ITU-T Recommendation I.257.1-1988, User-to-user signalling