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CCITT

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THE INTERNATIONAL
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CONSULTATIVE COMMITTEE

INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

GENERAL STRUCTURE AND SERVICE CAPABILITIES

USER-TO-USER SIGNALLING

Recommendation I.257.1

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation I.257.1 was revised by Study Group I and was approved under the Resolution No. 2 procedure on the 4th of August 1992.

CCITT NOTES

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

2) A list of abbreviations used in this Recommendation can be found in Annex C.

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Recommendation I.257.1

USER-TO-USER SIGNALLING

(revised 1992)

1 Definition

The **User-to-User Signalling supplementary service** allows an ISDN user to send/receive a limited amount of information to/from another ISDN user over the signalling channel in association with a call to the other ISDN user.

Note – These procedures are applicable to user-to-user information transfer in association with a circuit-switched telecommunication service only. Procedures to permit user-to-user information transfer in association with other types of calls (e.g. packet bearer services) need to be investigated.

2 Description

2.1 *General description*

User-to-User Signalling (UUS) allows the user to send/receive a limited amount of user-generated information to/from another user-network interface. This information is passed transparently (i.e. without modification of contents) through the network. Normally, the network will not interpret or act upon this information.

Services 1, 2 and 3 allow the transmission of 128 octets per message as a maximum.

Note – During an interim period of time, some networks may support a maximum of 32 octets on one or more of the services. 32 octets will always be supported. Restrictions may apply to calls requesting user-to-user information (UUI) of more than 32 octets.

Limitations are also placed on the number of messages per time unit for service 3. The flow control of each direction shall be operated independently.

Network flow control mechanisms shall exist after answer to restrict user-to-user message flow in each direction (see Annex A).

The user can transfer UUI in different phases of the call depending on the service(s) to which the user subscribes. These are:

– *Service 1:* The transfer of UUI during the set-up and clearing phases of a call, with UUI embedded with call control messages.

– *Service 2:* The transfer of UUI during the set-up phase of call, transferred independently of call control messages. From the sender's point of view, UUI is sent prior to the active phase of the call (i.e. prior to the acceptance of the call at the distant exchange). This same UUI may, as a service provider option, be received by the terminating exchange and delivered to the user during the active phase of the call.

  Note – This service is applicable to intelligent network terminations 2 (NT2s) [e.g. private integrated services digital networks (ISDNs)], where the network regards the intelligent NT2 as a user. This means that the network has fulfilled its task when it has delivered the UUI to the intelligent NT2. All indications and the charging will be handled accordingly.

– *Service 3:* The transfer of UUI during the active phase of a call, transferred independently of call control messages.

In a point-to-multipoint arrangement at the called party the following service 1 UUI transfer is allowed:

– in the forward direction, UUI will only be accepted if it is contained in either the initial set-up or the first clearing message. In the case of premature clearing, UUI will be delivered to terminals which have at this point in time already acknowledged the call;

– in the backward direction, UUI can be sent from the called user to the calling user with the alerting indication;

– if the network has knowledge that contention may occur (i.e. multiple alerting messages) on the called user's interface, the network should not allow UUI to be sent in the alerting indication to the calling user. If the network does not know the user's configuration, the network should send the UUI in the alerting indication to the calling user;

– if the call never reaches the active phase (e.g. in the case of call rejection), several call rejection causes may be received from the called user. In this case, the network shall choose the UUI (if any) associated with the call rejection cause which is selected to be sent to the calling user. If multiple responses with the same rejection cause are received, the first one shall be sent to the calling user.

UUS service 2 shall be applicable only to point-to-point arrangements.

2.2 *Specific terminology*

UUI – User-to-User Information: The information transferred by the service UUS.

Point-to-point arrangement: A situation where multiple responses to an incoming call cannot occur.

Point-to-multipoint arrangement: A situation where multiple responses to an incoming call can occur.

Served user: The user who requests the UUS supplementary service.

Remote user: The user who receives a request for the UUS supplementary service.

Explicit request: The service is explicitly requested when a request is sent. An explicit request requires an explicit response (acceptance or rejection). For service 1, both a request and an acceptance can include UUI.

Implicit request: The service is implicitly requested when UUI is sent without an explicit request in the set-up request to activate the service.

Invocation: The service is invoked when UUI is submitted.

2.3 *Qualification of the applicability to telecommunication services*

Restrictions can only be identified for telecommunication services which are based on the X.31 packet mode bearer services and their future enhancement.

3 Procedures

3.1 *Provision/withdrawal*

The UUS supplementary service may be provided to the user after prior arrangement with the network provider or as a network provider option may be generally available. The UUS supplementary service may be withdrawn at the customer's request or for network provider reasons. Whether these component services are offered to the user as separate supplementary services or in any particular combination is a service provider option.

3.2 *Normal procedures*

3.2.1 *Activation/deactivation/registration*

UUS services 1 and 2, must be requested by the calling user at the set-up of the call if UUI transfer is desired in either direction. Service 3 may be requested by the calling user at call set-up or during the active phase of the call or, as a service provider option, by the called user during the active phase of the call.

Note 1 – Depending on the network connection selected at call set-up, the request for service 3 during the set-up or active phase of the call may fail.

Once a UUS service is activated (see Note 2), the network will accept UUI in both directions according to the subscription of the served user.

Note 2 – Activation means implicit request, or explicit request with acceptance for UUS. Invocation means submission of UUI.

Services 2 and 3 must be explicitly requested. Service 1 may be explicitly or implicitly requested. The service is implicitly requested when UUI is included without an explicit request in the call request.

A network providing Service 1 shall support the implicit request from users.

On a per-call basis, the calling user should be able to specify the desired UUS service(s) according to the service options offered by the service provider.

At call set-up, users should be able to specify whether the requested UUS service(s) is (are) required for the call. If the UUI-required indication is given by the user, the call will not be completed if UUI cannot be passed to the remote user. If the UUI-required indication is not given by the user, the call will be completed even if UUI cannot be passed. If UUS service 1 is implicitly requested or if UUS service 3 is requested during the call, it cannot be requested as "UUI required".

For services 2 and 3 the network will confirm the UUS service request. This confirmation is preceded by an end-to-end check by the network for service availability.

For services 2 and 3, the network should interrogate the remote user concerning service availability. No response from the remote user is taken as a rejection of the UUS request by the network. The network should explicitly indicate to the served user whether the requested service(s) has been (are) successfully activated or not. In the case of unsuccessful activation, the network should indicate whether or not the condition is due to unavailability of the remote user (see § 3.3).

When service 1 is explicitly requested, the network will inform the remote user of the request. The remote user should accept or reject the activation as described for services 2 and 3.

When service 1 is explicitly requested, the remote user can include UUI when accepting the supplementary service request.

When service 1 is implicitly requested, the service is active for the call, i.e. the remote user is not required to send an implicit response. However, the remote user can include UUI in the call response (e.g. for user-to-user negotiation).

3.2.2 *Invocation and operation*

A user wishing to send UUI will be informed by the network as part of normal call establishment if there is not sufficient signalling connectivity to allow the transfer of UUI. Confirmation of delivery is not provided by the network. The network does not expect any confirmation of UUI acceptance from the destination.

3.2.2.1 *Service 1*

An ISDN user can transfer UUI when initiating a call. When the service has been activated, either user can include UUI when accepting, rejecting and clearing a call.

It is possible for a calling user to request UUI transfer with a call set-up and to terminate the call before a connection is established.

3.2.2.2 *Service 2*

Any time between activation of UUS service 2 and connection of the call, an ISDN user can transfer UUI (i.e. up to two messages in each direction) to the other user involved in the call.

3.2.2.3 *Service 3*

After UUS service 3 has been activated, an ISDN user may transfer UUI (during the active phase of the call) to the other user.

3.3 *Exceptional procedures*

3.3.1 *Activation/deactivation/registration*

If the network cannot accept a request for UUI transfer, notification with cause will be returned to the served user. Possible reasons for rejection are:

1) service not subscribed to;
2) calling or called user is not an ISDN user;
3) necessary inter-network signalling connectivity does not exist between sending and receiving users;
4) user constraints prohibit activation/invocation of service between calling and called user [e.g. Closed User Group (CUG)];
5) network congestion.

Note – If UUI contained in a set-up message cannot be transferred for reasons 2) or 4), notification will not be provided until after the network has received a response to the set-up message, since the network does not know *a priori* whether UUI can be transferred or not.

It may not be possible to give a notification when UUS service 1 is implicitly requested.

3.3.2 *Invocation and operation*

The user may not be able to interpret incoming UUI. In such a situation, the user should discard this information without disrupting normal call handling. The network will not provide any indication to the sending user to indicate this occurrence.

UUI 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 UUI. At all other times, however, the network offers high probability that messages will be delivered correctly.

Under circumstances of network congestion, failure or if the authorized amount of user-generated information has been reached, the network may discard services 2 and 3 UUI. Users desiring to have confirmed UUI delivery must employ their own end-to-end protocols (i.e. acknowledgement of receipt by another UUI).

In case of excessive UUI length, no truncation is performed by the provider and UUI information shall be discarded. Where UUI is discarded by a network (i.e. if unable to support 128 octets or if more than 128 octets are sent), then the sending user may be informed.

For service 1, if there is no UUI in the call request (implicit request) or if there is no explicit request for service 1, neither the calling user nor the called user can send/receive UUI in call control messages.

When a UUS service is not activated or a request for a UUS service has been rejected by the network, any UUI for this service sent from a user, should be discarded without notification to the user.

3.4 *Alternative procedures*

3.4.1 *Activation/deactivation/registration*

None identified.

3.4.2 *Invocation and operation*

None identified.

4 Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

It shall be possible to charge the subscriber accurately for the service.

5 Interworking requirements

UUI can be delivered only when both users are ISDN subscribers or when a non-ISDN network provides a means of conveying the UUI.

If an explicit request for service 1 with UUI, indicated as "UUI not required", is sent to an ISDN network only supporting implicit request, the UUI shall be transferred to the remote user as an implicit request. If the remote user replies with UUI, the served user's network can generate an explicit acceptance. The explicit acceptance with UUI shall be sent to the served user. If the remote user does not reply with UUI, the served user's network shall send an explicit rejection to the served user.

Note – It is a network option for the served user's network to provide this interworking.

6 Interaction with other supplementary services

6.1 *Call Waiting*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.2 *Call Transfer*

6.2.1 *Normal Call Transfer*

When normal call transfer is completed, any UUS service that has previously been activated on either leg, shall be cancelled by the network.

Note – No specific notification will be sent to the users of the resulting call when an activated UUS service is no longer available.

It shall be the responsibility of the users on the resulting call to renegotiate service 3, if required.

6.2.2 *Explicit Call Transfer*

When explicit call transfer is invoked, any UUS service that has previously been activated on either leg, shall be cancelled by the network.

Note – No specific notification will be sent to the users of the resulting call when an activated UUS service is no longer available.

It shall be the responsibility of the users on the resulting call to renegotiate service 3, if required.

6.2.3 *Single step Call Transfer*

When single step call transfer is invoked, any UUS service that was requested or activated on the first call, shall be cancelled by the network.

When the second call is set up by the served user, any explicit request for UUS shall be rejected by the network. However, if a set-up request from the transferring user contains UUI (implicit request for service 1), this UUI shall be delivered to the transferred-to-user before this UUS service is cancelled.

Note – No specific notification will be sent to the users of the resulting call when an activated UUS service is no longer available.

It shall be the responsibility of the users on the resulting call to renegotiate service 3, if required.

6.3 *Connected Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.4 *Connected Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.5 *Calling Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.6 *Calling Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.7 *Closed User Group*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.8 *Conference Calling*

Conference controller: UUI (service 3) can be sent by the conference controller to any of the conferees individually, and as broadcast to all conferees. UUI (service 3) can be received by the conference controller from any of the conferees with identification of the sending conferee.

The same limitations on the amount of UUI (service 3) which can be transferred between two users shall apply to communications between the conference controller and any particular conferee.

Conferees: UUI can be sent to and received from the conference controller. UUI (service 3) shall not be transferred between the conferees in association with the conference call.

UUS services 1 and 2 shall not be available in conjunction with a conference. However, on calls which are set up to potential conferees outside the conference, these services shall be available.

6.9 *Direct-Dialling-In*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.10 *Call diversion services*

See also Annex B.

6.10.1 *Call Forwarding Busy*

See interaction with Call Forwarding Unconditional. However, if a user determined user busy (UDUB) condition exists, any UUI and/or request for UUS shall also be delivered to the forwarding user when the call is offered.

6.10.2 *Call Forwarding No Reply*

Calls originated by a user with Call Forwarding No Reply (CFNR) activated:

Since call forwarding no reply does not affect the forwarding user's ability to make outgoing calls, a user with call forwarding no reply activated can send UUI in association with an on-going call or at the set-up of a new call.

Calls incoming to a user with call forwarding no reply activated:

UUS service 1: If the UUS service is explicitly requested and the forwarding user explicitly rejects the request, the UUS request and the UUI (if any) shall not be forwarded with the call. However, if the request was indicated as "UUI required" and either the forwarding or forwarded-to user explicitly rejects the request, the call shall be rejected. In all other cases the UUS request and/or UUI shall be forwarded or delivered with the call.

UUS service 2: If the UUS service is requested as "UUI not required", the call will be forwarded without the UUS request. If the UUS service is requested as "UUI required", call forwarding no reply shall be overridden (i.e. the call is treated as if call forwarding no reply was not activated).

UUS service 3: Any request for UUS service 3 that accompanies the set-up request shall be forwarded with the call.

Note – As a network provider option, the forwarding of UUI and/or UUS requests can be restricted to forwarding users who subscribe to the relevant UUS supplementary service.

After forwarding:

UUS service 3 may be requested during the active phase of the call.

6.10.3 *Call Forwarding Unconditional*

Calls originated by a user with Call Forwarding Unconditional (CFU) activated:

Since call forwarding unconditional does not affect the forwarding user's ability to make outgoing calls, a user with call forwarding unconditional activated can send and receive UUI in association with an ongoing call or at the set-up of a new call.

Calls incoming to a user with call forwarding unconditional activated:

Any UUI or request for UUS that accompanies the set-up request, shall be forwarded with the call.

Note – As a network provider option, the forwarding of UUI and/or UUS requests can be restricted to forwarding users who subscribe to the relevant UUS supplementary service.

After forwarding:

UUS service 3 may be requested during the active phase of the call.

6.10.4 *Call Deflection*

Call deflection before alerting: See Call Forwarding Busy (the call shall be treated as if the user determined user busy condition exists).

Call deflection after alerting: See Call Forwarding No Reply.

6.11 *Line Hunting*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.12 *Three-Party Service*

UUS service 1: No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

UUS service 2: UUS service 2 does not apply to calls that have been answered.

UUS service 3

Served user: No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

Other parties: UUI can be sent to and received from the served user. UUI shall not be transferred between users B and C.

6.13 *User-to-User Signalling*

Not applicable.

6.14 *Multiple Subscriber Number*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.15 *Call Hold*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.16 *Advice of Charge*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.17 *Multi-level Precedence and Preemption*

When a connection is preempted, the service provider should make certain that user-to-user information (UUI) of the preempted connection is not delivered to the users of the new connection.

6.18 *Priority*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.19 *Malicious Call Identification*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.20 *Outgoing Call Barring*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.21 *Reverse Charging (Rev)*

REV case A: UUI is charged to the called user, if reverse charging is accepted. If the request for reverse charging is rejected, charging should be according to the UUS supplementary service.

REV case B: Before the reverse charging acceptance, UUI is charged based on normal charging principles. After the acceptance, UUI is charged to the called user.

REV case C: UUI is charged to the called user.

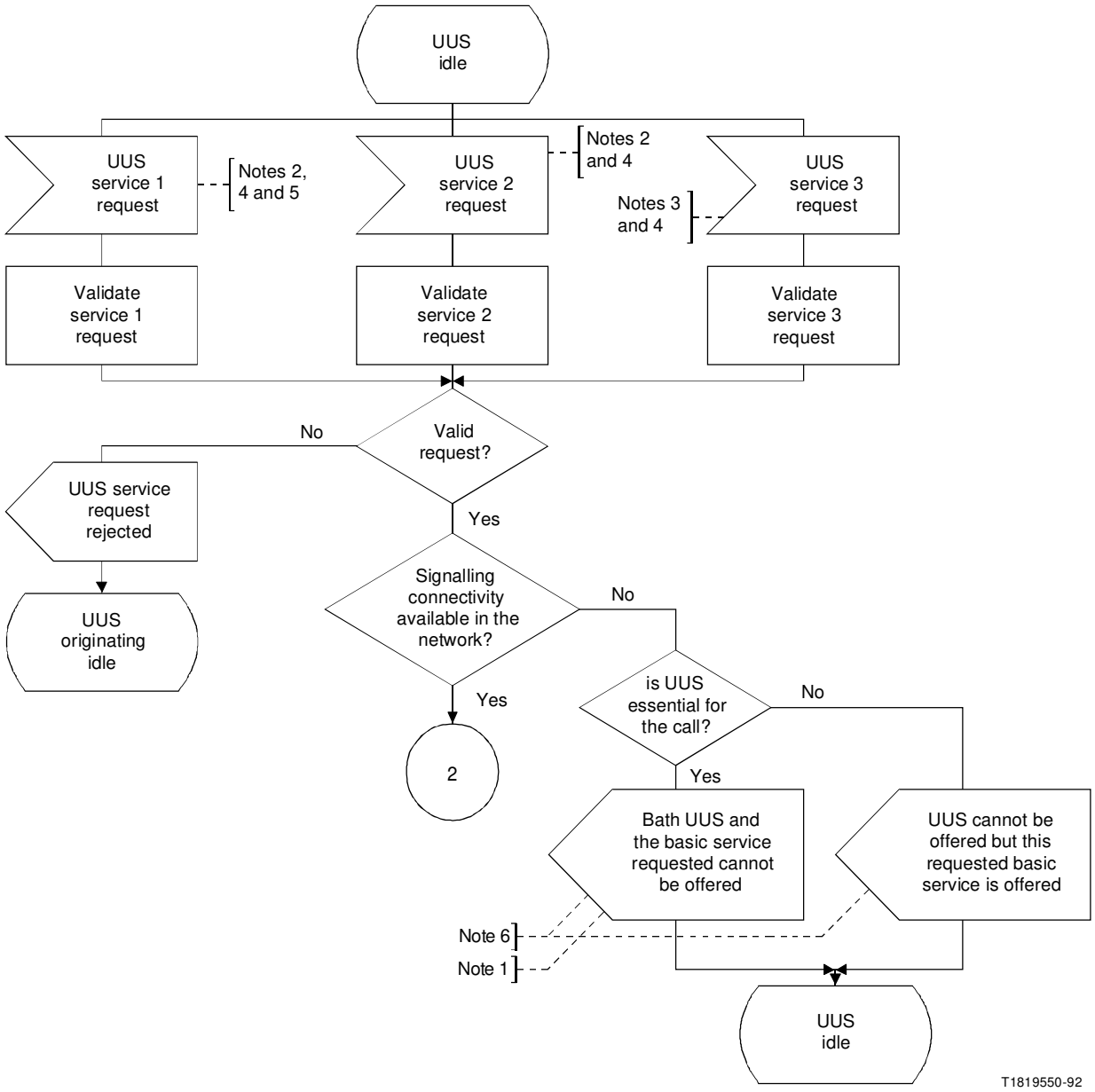
REV case D: UUI is charged to the called user.

6.22 *Sub-addressing*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

7 Dynamic description

The dynamic description of this service is shown in Figure 1/I.257.1.



Note 1 – The call is cleared.
Note 2 – This service must be requested as call set-up by the calling user.
Note 3 – This service 3 may be requested at call set-up or during the active phase of the call by the calling user and during the active phase of the exil by the called user.
Note 4 – As an option, at call set-up, users should be able to specify whether the requested UUS service essential or non-essential for the call.
Note 5 – Service 1 may be explicitly or implicitly requested.
Note 6 – The reasons for rejections are given in § 3.3.

FIGURE 1/I.257.1 (sheet 1 of 3)
User-to-User Signalling

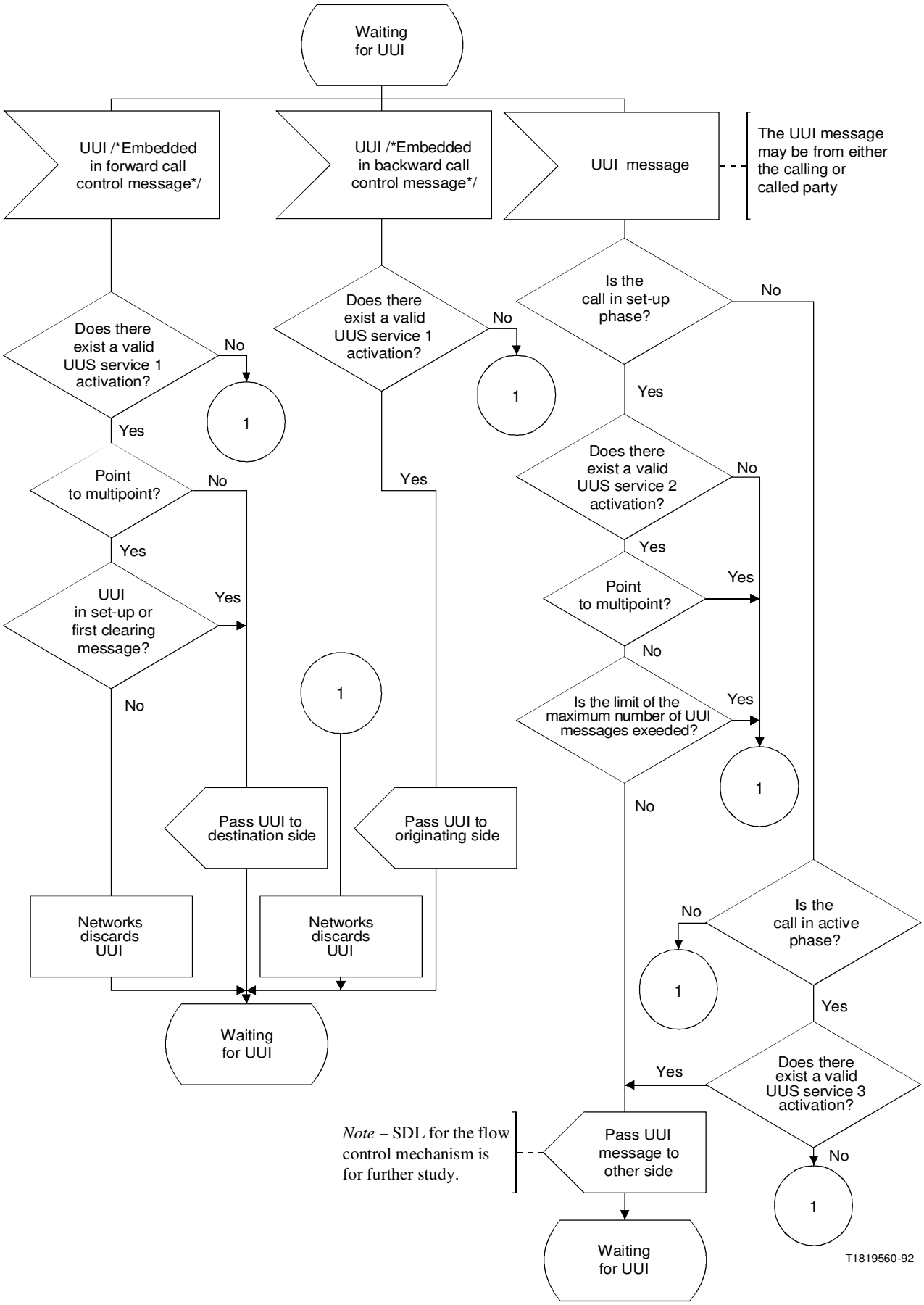
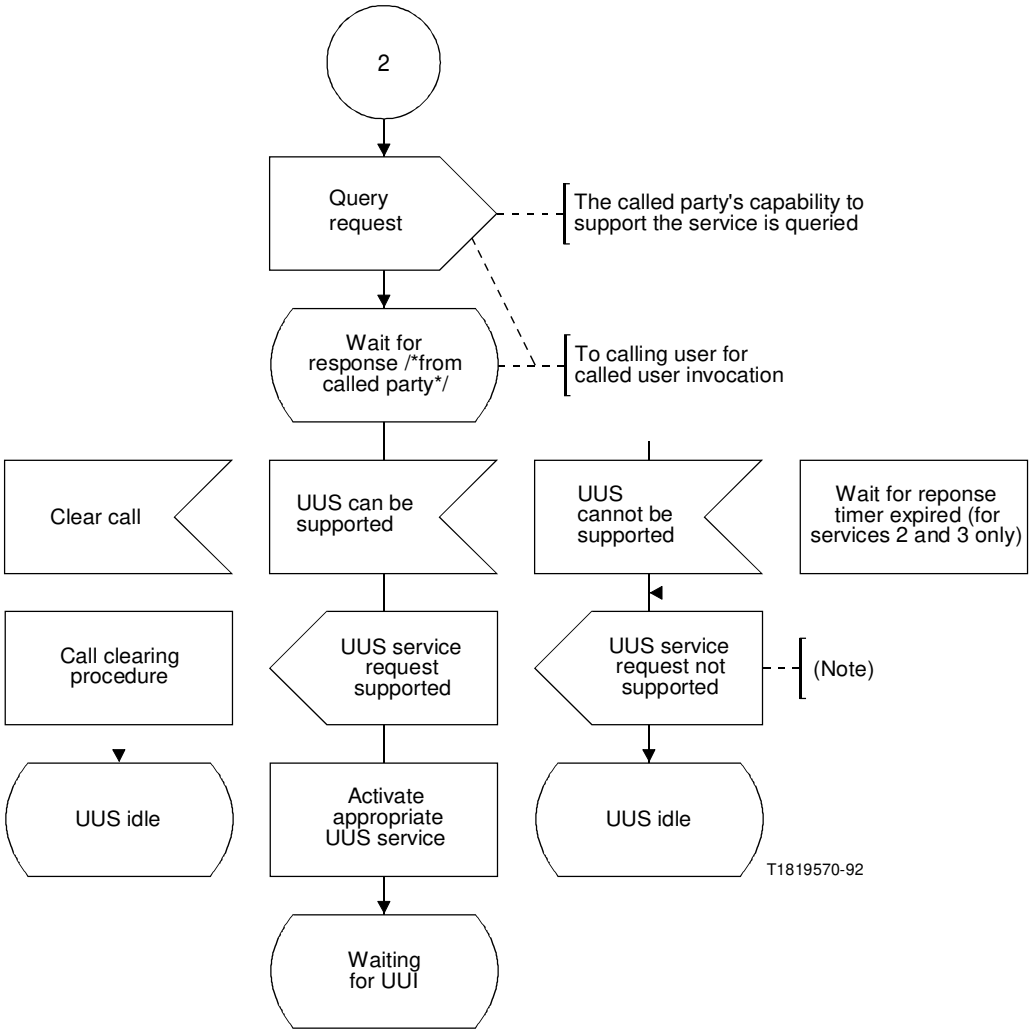


FIGURE 1/I.257.1 (sheet 2 of 3)

User-to-User Signalling



Note – The reasons for rejections are given in § 3.3.

FIGURE 1/I.257.1 (sheet 3 of 3)
User-to-User Signalling

ANNEX A

(to Recommendation I.257.1)

Flow control mechanism for User-to-User Signalling service 3

After answer in each direction, a burst capability of sending N messages is immediately available where N initially equals the value of the burst parameter X. The value of N shall be decremented by one for every message sent by the user and incremented by Y at regular intervals of T (T = 10 sec) subject to the limitation that N may not exceed X, i.e. $N + Y \leq X$.

The burst parameter X is a variable which shall be set to a value of $X = 16$.

The replenishment parameter Y shall be capable of taking a value $Y = 8$.

Note – While some networks may support higher values of X and Y, the value of X and Y across international interfaces shall be set as above. It is up to the network using higher values to take the appropriate actions, unless bilateral agreements exist.

If user-to-user messages are received at a rate which exceeds the flow control limit set by the network, the network shall discard the messages that cannot be handled and respond to the first discarded message with a control indication.

When the flow control restrictions are removed, then, if a UUS message has been discarded due to that restriction, an indication shall be given to the user that further UUS messages can be accepted. Otherwise no indication shall be given.

No network flow control mechanism shall exist for control of receiving UUS messages.

ANNEX B

(to Recommendation I.257.1)

Interaction between User-to-User Signalling and call diversion services

TABLE B-1/I.257-1

Interaction between UUS and:

- Call Forwarding Unconditional
- Call Forwarding Busy
- Call Deflection (before alerting)

Calling user		Forwarding user	
UUS service	Type of request	Call is forwarded	UUS request and/or UUI forwarded
1-A	Implicit	Yes	Yes
1-B	Explicit, not required	Yes	Yes
1-C	Explicit, required	Yes	Yes
2-A	Explicit, not required	Yes	Yes
2-B	Explicit, required	Yes	Yes
3-A	Explicit, not required requested in call set-up	Yes	Yes
3-B	Explicit, required requested in call set-up	Yes	Yes
3-C	Explicit, requested during the call	Not applicable	Yes

Note 1 – In case of call forwarding unconditional or call forwarding busy (network determined user busy), the UUS request and/or UUI will not be given to the forwarding user. In case of call forwarding busy (user determined user busy), the UUS request and/or UUI will be given to the forwarding user.

Note 2 – As a network option, the forwarding of UUI and/or UUS requests can be restricted to forwarding users who subscribe to the relevant UUS supplementary service.

TABLE B-2/I.257.1

Interaction between UUS and:

— Call Forwarding No Reply

— Call Deflection (after alerting)

Calling user		Forwarding user		
UUS service	Type of request	UUS request and/or UUI given to diverting user	Call is forwarded	UUS request and/or UUI forwarded
1-A	Implicit	Yes	Yes	Yes
1-B	Explicit, not required	Yes (Acceptance) Yes (No response) Yes (Rejection)	Yes Yes Yes	Yes Yes No
1-C	Explicit, required	Yes (Acceptance) Yes (No response) Yes (Rejection)	Yes Yes Not applicable (Rejection)	Yes Yes Not applicable
2-A	Explicit, not required	Yes	Yes	No
2-B	Explicit, required	Yes (Acceptance) Yes (Rejection)	No (Maintain) Not applicable (Rejection)	No Not applicable
3-A	Explicit, not required requested in call set-up	Yes	Yes	Yes
3-B	Explicit, required requested in call set-up	Yes	Yes	Yes
3-C	Explicit, requested during the call	Not applicable	Not applicable	Yes

Note — As a network option, the forwarding of UUI and/or UUS requests can be restricted to forwarding users who subscribe to the relevant UUS supplementary service.

ANNEX C

(to Recommendation I.257.1)

Alphabetical list of abbreviations used in this Recommendation

CFNR	Call forwarding no reply
CFU	Call forwarding unconditional
CUG	Closed user group
ISDN	Integrated services digital network
NT2	Network termination 2
REV	Reverse charging
UDUB	User determined user busy
UUI	User-to-user information
UUS	User-to-user signalling