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Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS is part 1 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Closed User Group (CUG) supplementary service, as described below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5: "TSS&TP specification for the network";

Part 6: "ATS and partial PIXIT proforma specification for the network".

In accordance with CCITT Recommendation I.130, the following three level structure is used to describe the supplementary telecommunications services as provided by European public telecommunications operators under the pan-European Integrated Services Digital Network (ISDN):

- Stage 1: is an overall service description, from the user's stand-point;

- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and

- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This ETS details the stage 3 aspects (signalling system protocols and switching functions) needed to support the Closed User Group (CUG) supplementary service. The stage 1 and stage 2 aspects are detailed in ETS 300 136 (1992) and ETS 300 137 (1992), respectively.

This reprint includes all previous Corrigenda as shown in the History box at the last page.

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1 Scope

This first part of ETS 300 138 specifies the stage three of the Closed User Group (CUG) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators at the T reference point or coincident S and T reference point (as defined in CCITT Recommendation I.411 [1]) by means of the Digital Subscriber Signalling System No. one (DSS1). Stage three identifies the protocol procedures and switching functions needed to support a telecommunications service (see CCITT Recommendation I.130 [2]).

In addition this standard specifies the protocol requirements at the T reference point where the service is provided to the user via a private ISDN.

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

The CUG supplementary service enables users to form groups, to and from which access is restricted. A specific user may be a member of one or more closed user groups. Members of a specific closed user group can communicate among themselves but not, in general, with users outside the group.

The CUG supplementary service is applicable to all telecommunication services.

Further parts of this standard specify the method of testing required to identify conformance to this standard.

This standard is applicable to equipment, supporting the CUG supplementary service, to be attached at either side of a T reference point or coincident S and T reference points when used as an access to the public ISDN.

2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] CCITT Recommendation I.411 (1988): "ISDN user-network interfaces - Reference configurations".

[2] CCITT Recommendation I.130 (1988): "Method for the characterisation of telecommunications services supported by an ISDN and network capabilities of an ISDN".

[3] CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".

[4] CCITT Recommendation I.210 (1988): Principles of telecommunication services supported by an ISDN and the means used to describe them".

[5] CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".

[6] ETS 300 136 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service; Service description".

[7] ETS 300 195-1: "Integrated Services Digital Network (ISDN); Supplementary service interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[8] CCITT Recommendation X.208 (1988): "Open Systems Interconnection (OSI); Model and Notation: Service definition: Specification of Abstract Syntax Notation One (ASN.1)".

[9] CCITT Recommendation X.209 (1988): "Open Systems Interconnection (OSI); Model and Notation: Service definition: Specification of basic encoding rules for Abstract Syntax Notation One (ASN.1)".

[10] ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".

[11] ETS 300 102-2 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control; Specification Description Language (SDL) diagrams".

[12] ETS 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[13] CCITT Recommendation X.219 (1988): "Remote Operations: Notation and Service Definition".

[14] CCITT Recommendation Z.100 (1988): "Functional Specification and Description Language (SDL)".

3 Definitions

For the purpose of this standard, the following definitions apply:

Basic telecommunication service: a bearer service or teleservice. The terms "bearer service" and "teleservice" are defined in CCITT Recommendation I.112 [3], § 2.2, definitions 202 and 203.

CUG call: see ETS 300 136 [6], Clause 3.

CUG index: the closed user group index is a parameter used by the calling user to select a particular closed user group when originating a call. The index is also used by the network to indicate to the called user the closed user group from which an incoming call has originated. This index has only local significance, i.e. the index used by the calling user is, in general, different from the index used by the called user to identify the same closed user group.

CUG interlock code: this is a means of identifying closed user group membership within the network. At the calling side, if a closed user group match exists, the CUG index identifying a closed user group maps to the closed user group interlock code for that closed user group. If a closed user group match exists at the called side the closed user group interlock code identifying a closed user group maps to the CUG index representing that closed user group. Closed user group interlock code is not an access concept, but is used for clarity during the descriptions of signalling procedures and flows.

Default number: an ISDN number registered within the public ISDN following prior agreement between the third user and the public ISDN.

Incoming access: see ETS 300 136 [6], Clause 3.

Incoming calls barred within a closed user group: see ETS 300 136 [6], Clause 3.

Integrated Services Digital Network (ISDN): see CCITT Recommendation I.112 [3], § 2.3, definition 308.

ISDN number: a number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [5].

Network: the DSS1 protocol entity at the network side of the user-network interface.

Outgoing access: see ETS 300 136 [6], Clause 3.

Outgoing calls barred within a closed user group: see ETS 300 136 [6], Clause 3.

Preferential CUG: a closed user group user subscribing to preferential closed user group nominates a CUG index which the network uses as a default to identify the required closed user group in the absence of any closed user group information in the outgoing call request. A preferential closed user group applies to an ISDN number (or to an ISDN number/service - see subclause 6.1) and not to a specific closed user group.

Service; Telecommunications service: see CCITT Recommendation I.112 [3], § 2.2, definition 201.

Supplementary service: see CCITT Recommendation I.210 [4], § 2.4.

User: the DSS1 protocol entity at the user side of the user-network interface.

4 Symbols and abbreviations

CES	Connection Endpoint Suffix
CUG	Closed User Group
DSS1	Digital Subscriber Signalling System No. one
IA	Incoming Access
ICB	Incoming Calls Barred within a closed user group
ISDN	Integrated Services Digital Network
OA	Outgoing Access
OCB	Outgoing Calls Barred within a closed user group

5 Description

Essentially normal call establishment procedures shall apply but, additionally, to provide the CUG supplementary service, the network shall analyse the call request from the calling user in conjunction with the closed user group attributes associated with both the calling and called users (as identified by their ISDN numbers). As a result of this analysis the call can either fail for CUG supplementary service reasons or be allowed to proceed.

The network provider may define the maximum number of closed user groups of which a user can be a member.

Since the fundamental purpose of the CUG supplementary service is to prevent certain connections the network shall strictly control interactions with some other supplementary services to protect closed user group integrity.

6 Operational requirements

6.1 Provision and withdrawal

The provision of the CUG supplementary service to a new member and also the assignment of the various CUG supplementary service options to a new or existing member, shall require a prior arrangement between the member and the network provider.

The CUG supplementary service shall be provided on a subscription basis. As a network provider option, the CUG supplementary service may be offered with subscription options.

The options can be divided into two groups:

a) the options shown in table 1 shall apply per ISDN number. The option values may be assigned individually for each basic service, or set of basic services, available at the ISDN number with the CUG supplementary service.

b) the option shown in table 2 shall apply per closed user group provided at the ISDN number with the CUG supplementary service.

Table 1: Options available per ISDN number

Option (NOTE)	Values
1) Preferential CUG	Nominated CUG index, or none designated.
2) Outgoing access	Allowed, or not allowed.
3) Incoming access	Allowed, or not allowed.
NOTE: If, for a user with the CUG supplementary service, a basic service, or set of basic services, is not included in at least one closed user group, then: - preferential CUG shall have the "none designated" option value; - outgoing access shall have the "allowed" option value if normal outgoing calls using that basic service, or set of basic services, are required; - incoming access shall have the "allowed" option value if incoming calls using that basic service, or set of basic services, are required.	

Table 2: Options available per closed user group

Option	Values
1) Barring within the closed user group	None, incoming calls, or outgoing calls.

The options assigned to a closed user group member shall be stored in the network.

Withdrawal of the CUG supplementary service shall be as a result of network provider action either at the request of a particular member, or for administrative reasons.

6.2 Requirements on the originating network side

For correct interactions with certain other supplementary services, the originating network side shall store, for the duration of the call, details of whether a normal or a CUG call was requested in the information sent to the destination network side. The CUG interlock code (if any) of the call request to the destination network side shall also be retained. However, if the network knows that such interactions are not possible (e.g. the user has only the CUG supplementary service) then the information may be discarded.

6.3 Requirements on the destination network side

For correct interactions with certain other supplementary services, the destination network side shall store, for the duration of the call, details of whether a normal or a CUG call request was passed to the called user. The CUG interlock code (if any) of the call request shall also be retained. However, if the network knows that such interactions are not possible (e.g. the user has only the CUG supplementary service) then the information may be discarded.

7 Coding requirements

7.1 ASN.1 description of coding requirements

Table 3 provides an Abstract Syntax Notation one (ASN.1) description of the coding of the Facility information element components necessary to support this service in accordance with CCITT Recommendations X.208 [8] and X.209 [9] and uses the OPERATION and ERROR macro as defined in figure 4/X.219 of CCITT Recommendation X.219 [13].

Table 3

```
Closed-User-Group-Service-Operations
                              {ccitt identified-organisation etsi (0) 138 operations-and-errors (1)}

DEFINITION ::=
BEGIN

EXPORTS               CUGCall, InvalidOrUnregisteredCUGIndex.
                      RequestedBasicServiceViolatesCUGConstraints,
                      OutgoingCallsBarredWithinCUG, IncomingCallsBarredWithinCUG,
                      UserNotMemeberOfCUG,
                      InconsistencyInDesignatedFacilityAndSubscriberClass

IMPORTS               OPERATION,
                      ERROR
                      FROM Remote-Operation-Notation
                             {joint-iso-ccitt remote-operations(4) notation(0)},
                      notSubscribed, basicServiceNotProvided
                      FROM General-Errors
                             {ccitt identified-organisation etsi (0) 196 general-errors};

CUGcall ::=           OPERATION
                       -- in Facility information element. Invoked from calling user to
                       -- originating network side. Also from destination network side
                       -- to called user
                      ARGUMENT SEQUENCE {
                             OARequested DEFAULT FALSE,
                             CUGIndex OPTIONAL}
                       -- in SETUP message
                      ERRORS {
                             invalidOrUnregisteredCUGIndex,
                             requestedBasicServiceViolatesCUGConstraints,
                             outgoingCallsBarredWithinCUG,
                             incomingCallsBarredWithinCUG,
                             userNotMemberOfCUG,
                             basicServiceNotProvided,
                             incosistenceyInDesignatedFacilityAndSubscriberClass,
                             notSubscribed}
                       -- in clearing message to calling user. Also to destination
                       -- network side.
```

Table 3 (concluded)

```
InvalidOrUnregisteredCUGIndex ::= ERROR

RequestedBasicServiceViolatesCUGConstraints ::= ERROR

OutgoingCallsBarredWithinCUG ::= ERROR


IncomingCallsBarredWithinCUG ::= ERROR

UserNotMemberOfCUG ::= ERROR

InconsistenceyInDesignatedFacilityAndSubscriberClass ::= ERROR


OARequested ::=        [1] IMPLICIT BOOLEAN

CUGIndex    ::=        [2] IMPLICIT INTEGER (0..32767)


cUGCall CUGCall ::= 2

invalidOrUnregisteredCUGIndex  InvalidOrUnregisteredCUGIndex ::= 16

requestedBasicServiceViolatesCUGConstraints  RequestedBasicServiceViolatesCUGConstraints ::= 17

outgoingCallsBarredWithinCUG  OutgoingCallsBarredWithinCUG ::= 18

incomingCallsBarredWithinCUG  IncomingCallsBarredWithinCUG ::= 19

userNotMemberOfCUG  UserNotMemberOfCUG ::= 20

inconsistencyInDesignatedFacilityAndSubscriberClass InconsistencyInDesignatedFacilityAndSubscriberClass
::= 21


END -- of Closed-User-Group-Service-Operations
```

7.2 Coding of the Cause information element

The cause value for use in the Cause information element in certain CUG service related circumstances (as described in Clause 9 and Clause 11) is defined in table 4.

Table 4

Cause value		Cause number	Cause	Diagnostics
Class bits 7 6 5	Value bits 4 3 2 1			
1 0 1	0 1 1 1	87	User not a member of CUG	-

8 State definitions

No specifically defined ETS 300 102-1 [10] protocol control states shall be required for the CUG supplementary service.

To facilitate understanding of the service the following closed user group process states are used in the dynamic description (SDL):

- CUG idle;

- outgoing CUG;

- incoming CUG.

These states are specified for the purpose of the protocol definition; these states need not be provided in an implementation.

9 Signalling procedures at the coincident S and T reference point

9.1 Activation, deactivation and registration

Not applicable.

9.2 Invocation and operation

The CUG supplementary service shall be invoked by:

- a call originating from a CUG supplementary service user. The user may explicitly request the CUG supplementary service, but in the absence of an explicit request the CUG supplementary service default procedures shall be automatically applied;

- a call terminating at a CUG supplementary service user.

9.2.1 Call originating from a user with the CUG supplementary service (explicit request)

9.2.1.1 Normal operation

To request explicitly the CUG supplementary service the calling user shall include in the outgoing SETUP message a Facility information element containing a cUGCall invoke component. If no Calling party number information element is included by the calling user in the SETUP message, the default number stored in the originating network shall be used for the assignment of the closed user group.

The network shall perform internal checks appropriate to the originating network based on the contents of the cUGCall invoke component and the closed user group attributes of the calling user. The outcomes of these checks are defined in table 5 (including notes).

NOTE: the network may respond to the SETUP message with a SETUP ACKNOWLEDGE or CALL PROCEEDING message or the call may be cleared for some reason unrelated to the CUG supplementary service before the checks are completed.

If the result of the checks relevant to the originating network side allows the call to proceed then the destination network shall perform further internal checks based on the closed user group attributes (if any) of the called user. The outcomes of these checks are defined in table 6 (including notes).

If the call is successfully offered to the called user, then basic call control procedures shall apply at the calling user's interface.

9.2.1.2 Exceptional procedures

If, as a result of the checks relevant to either the originating or destination network, the network cannot allow the call to proceed for a CUG supplementary service related reason, then the network shall fail the call attempt and include in the first clearing message returned to the calling user (before the alerting phase) a Facility information element containing a cUGCall return error component with the appropriate indication as defined by tables 5 and 6 (including notes).

The cause in the clearing message conveying the cUGCall return error component should be #29 "facility rejected".

If the call attempt fails for a reason unrelated to the CUG supplementary service, then a Facility information element containing a cUGCall return error component indicating "basicServiceNotProvided" should be included in the first clearing message returned to the calling user (before the alerting phase). The cause cited shall be determined by the event causing the failure. If there is no cUGCall return error component present in the first clearing message, then the user shall abandon the CUG call operation and continue normal clearing.

The possibility of "simultaneous" failure for a CUG supplementary service related reason and a reason unrelated to the CUG supplementary service is not precluded. In this case, if the cUGCall return error component can be sent, it shall contain an indication as defined by tables 5 and 6 (including notes), but the cause shall be determined by the event not related to the CUG supplementary service which caused the call failure.

9.2.2 Call originating from a user with the CUG supplementary service (default request)

9.2.2.1 Normal operation

If the calling user does not include in the outgoing SETUP message a Facility information element containing a cUGCall invoke component, the network shall perform internal checks appropriate to the originating network based on the closed user group attributes of the calling user. The outcomes of these checks are defined in table 5 (including notes). If no Calling party number information element is included by the calling user in the SETUP message, the default number stored in the originating network shall be used for the assignment of the closed user group.

NOTE: the network may respond to the SETUP message with a SETUP ACKNOWLEDGE or CALL PROCEEDING message or the call may be cleared for some reason unrelated to the CUG supplementary service before the checks are completed.

If the result of the checks relevant to the originating network allows the call to proceed then the destination network shall perform further internal checks based on the closed user group attributes (if any) of the called user. The outcomes of these checks are defined in table 6 (including notes).

If the call is successfully offered to the called user then basic call control procedures shall apply at the calling user's interface.

9.2.2.2 Exceptional procedures

If, as a result of the checks relevant to either the originating or destination network, the network cannot allow the call to proceed for a CUG supplementary service related reason, then the network shall initiate call clearing using one of the following causes:

- #87 "user not a member of CUG" if the corresponding cUGCall return error component value would have been "userNotMemberOfCUG" using the explicit request procedures;

- #29 "facility rejected" in the case of all other CUG supplementary service related reasons.

When a call fails for a reason unrelated to the CUG supplementary service then no CUG supplementary service related procedures shall apply.

9.2.3 Call originating from a user without the CUG supplementary service

9.2.3.1 Normal operation

A user without the CUG supplementary service can make a call to a user with the CUG supplementary service. If such a calling user does not include in the outgoing SETUP message a Facility information element containing a cUGCall invoke component, then table 5 (including notes) shall apply.

The destination network shall then perform further internal checks based on the closed user group attributes (if any) of the called user. The outcomes of these checks are defined in table 6 (including notes).

9.2.3.2 Exceptional procedures

If the calling user includes in the outgoing SETUP message a Facility information element containing a cUGCall invoke component and if the network can recognise this cUGCall invoke component, then the network shall fail the call and initiate clearing with cause #50 "requested facility not subscribed". The network shall include in the first clearing message returned to the calling user a Facility information element containing a cUGCall return error component with the appropriate indication as defined by table 5 (including notes), i.e. "notSubscribed".

If the calling user includes in the outgoing SETUP message a Facility information element containing a cUGCall invoke component but the network cannot recognise this supplementary service request, then the procedures defined in subclause 8.4 of ETS 300 196-1 [12] shall apply.

If the calling user does not include in the outgoing SETUP message a Facility information element containing a cUGCall invoke component and the call fails as a result of the checks relevant to the destination network, then the network shall fail the call attempt and initiate clearing with cause #87 "user not a member of CUG". No other CUG supplementary service related indication shall be conveyed to the calling user.

If the call attempt fails for a reason unrelated to the CUG supplementary service, then no CUG supplementary service related procedures shall apply.

9.2.4 Call terminating at a user with the CUG supplementary service

9.2.4.1 Normal operation

If the internal checks defined in table 6 (including notes) result in a requirement for a CUG call to the called user, then the incoming SETUP message shall include a Facility information element containing a cUGCall invoke component to convey the necessary CUG call information (as defined by table 6).

The network shall then expect either:

a) an ALERTING or CONNECT message according to basic call control received from a connection endpoint identifier if the call is successfully offered in the user's domain represented by that connection endpoint identifier; or

b) a cUGCall return error component in a Facility information element in the first clearing message received from a connection endpoint identifier (before the alerting phase) if the call is failed by the terminal equipment represented by that connection endpoint identifier. The network shall continue clearing that connection endpoint identifier.

If the network knows that a point to point configuration exists then the error value shall be relayed by the network to the originating network and an appropriate indication (depending on the calling user's CUG supplementary service invocation being explicit or default) shall be delivered in the first clearing message to the calling user.

In case of a SETUP message sent via the broadcast datalink, the network may, as a network option, retain the return error component along with the ETS 300 102-1 cause retained according to subclause 5.2.5.3. of ETS 300 102-1 [10]. If there are multiple clearing messages containing return error components, the indication in the return error component contained in the first clearing message will be sent back to the calling user. If there are multiple clearing messages containing return error components, the indication in the return error component contained in the clearing message with the highest priority will be sent back to the calling user. In addition to the basic call procedures defined in ETS 300 102-1 [10], when a user receives a SETUP message with a Facility information element containing a cUGCall invoke component and the user can recognise CUG call invocation procedures, the user may:

1) initiate appropriate user domain closed user group procedures and, if the call fails for CUG supplementary service related reasons, may include in the first clearing message returned to the network (before the alerting phase) a Facility information element containing a cUGCall return error component; or

2) include in the first clearing message returned to the network (before the alerting phase) a Facility information element containing a cUGCall return error component with value "inconsistencyInDesignatedFacilityAndSubscriberClass" if the call fails for a reason unrelated to the CUG supplementary service.

9.2.4.2 Exceptional procedures

If the cUGCall return error component is absent in the first clearing message received from a connection endpoint identifier the destination network shall continue clearing that connection endpoint identifier for reasons unrelated to the CUG supplementary service. In addition, if the destination network knows that a point-to-point configuration exists it shall abandon the CUG call operation and initiate normal call clearing towards the calling user including, if appropriate, a cUGCall return error component indicating "inconsistencyInDesignatedFacilityAndSubscriberClass".

If no cUGCall return error component is received by the destination network during an unsuccessful call offering process, then the destination network shall abandon the CUG call operation and initiate call clearing towards the calling user with the appropriate cause derived from basic call control (e.g. cause #18 "no user responding", or the highest priority cause saved) including, if appropriate, a cUGCall return error component indicating "inconsistencyInDesignatedFacilityAndSubscriberClass".

When a user receives a SETUP message with a Facility information element containing a cUGCall invoke component and the user cannot recognise this supplementary service request, then the procedures defined in subclause 8.4 of ETS 300 196-1 [12] shall apply.

9.2.5 CUG checks at the originating and destination network

Table 5 shall be used to determine the type of call request sent to the destination network or rejection indication returned to the calling user.

Table 5: Closed user group checks at the originating network

CUG attributes of calling user for requested basic service		CUG information received from calling user in SETUP				
		CUG Call Invoke received				no CUG Call Invoke received
		OA not req. CUG index	OA req. CUG index	OA not req. no CUG ind.	OA req. no CUG ind.	
No Pref. CUG OA not allowed	not ocb	CUG call IC=spec CUG (*1)	CUG call IC=spec CUG (*1)	rejected RE value= e (*4)	rejected RE value= e (*4)	rejected no RE (*4)
	ocb	rejected RE value= d	rejected RE value= d			
No Pref. CUG OA allowed	not ocb	CUG call IC=spec CUG (*1)	CUG call IC=spec CUG (*1)	normal call (*4)	normal call (*4)	normal call (*4)
	ocb	rejected RE value= d	rejected RE value= d			
Pref. CUG nominated OA not allowed	not ocb	CUG call IC=spec CUG (*2)	CUG call IC=spec CUG (*2)	CUG call IC=pref CUG	rejected RE value= a	CUG call IC=pref CUG
	ocb	rej. (*3) RE value= d	rej. (*3) RE value= d	rej. (*5) RE value= d		rej. no RE (*5)
Pref. CUG nominated OA allowed	not ocb	CUG call IC=spec CUG (*2)	CUG call IC=spec CUG (*2)	CUG call IC=pref CUG	normal call	CUG call IC=pref CUG
	ocb	rej. (*3) RE value= d	rej. (*3) RE value= d	rej. (*5) RE value= d		rej. no RE (*5)
not a CUG user		rejected RE value= a	rejected RE value= a	rejected RE value= a	rejected RE value= a	normal call (*6)

NOTE: The type of call request derived from this table shall determine the linkage to table 6.

NOTES to table 5:

IC: CUG interlock code.
RE: cUGCall return error component.

RE value a: "notSubscribed".
RE value b: "invalidOrUnregisteredCUGIndex".
RE value c: "requestedBasicServiceViolatesCUGConstraints".
RE value d: "outgoingCallsBarredWithinCUG".
RE value e: "inconsistencyInDesignatedFacilityAndSubscriberClass".

*1: assumes match between CUG index and IC exists for the requested basic service. If no match exists then:

- if the CUG index exists but is not appropriate to the requested basic service the call shall be rejected with RE value=c. This includes the case when the requested basic service is not included in any closed user group;

- if the CUG index does not exist the call shall be rejected with RE value=b.

*2: assumes match between CUG index and IC exists for the requested basic service. If no match exists then:

- if the CUG index exists but is not appropriate to the requested basic service the call shall be rejected with RE value=c;

- if the CUG index does not exist the call shall be rejected with RE value=b.

*3: if the CUG index identifies the preferential CUG then this combination of CUG attribute values is not recommended.

*4: this includes the case when the requested basic service is not included in any CUG.

*5: this combination of CUG attribute values is not recommended.

*6: this represents the normal case of a user without the CUG supplementary service making a normal call.

Table 6 shall be used to determine the type of call request sent to the destination user or the type of rejection indication returned to the calling user.

Table 6: Closed user group checks at the destination network

Type of CUG indication from the network	M or NM	CUG attributes of called user for requested basic service				not a CUG user
		IA not allowed		IA allowed		
		not icb	icb	not icb	icb	
CUG call with no OA indication	M	CUG call	rejected RE value=e	CUG call	rejected RE value=e	rejected RE value =f
	NM	rejected RE value=f (*1)		rejected RE value=f (*1)		
normal call	-	rejected RE value=f (*2)		normal call (*2)		normal call(*3)

NOTES to table 6:

M: match between IC and CUG index exists for the requested basic service.

NM: no match between IC and CUG index exists for the requested basic service.

Key to cross points in table 6:

CUG call: cUGCall invoke component in SETUP message identifies CUG index but does not request outgoing access.

normal call: no cUGCall invoke component in SETUP message.

IC: CUG interlock code.

RE: cUGCall return error component returned to calling user. However if the call requested at the originating side did not include an explicit invocation of the CUG supplementary service then the calling user shall only receive indications as conveyed by the cause in the clearing procedure.

RE value c: "requestedBasicServiceViolatesCUGConstraints".

RE value e: "IncomingCallsBarredWithinCUG".

RE value f: "userNotMemberOfCUG".

*1: assumes that the match between the CUG index and IC fails because the IC does not exist for the called user. If the IC exists but is not appropriate to the requested basic service then the call shall be rejected with RE value=c. This includes the case when the requested basic service is not included in any closed user group.

*2: this includes the case when the requested basic service is not included in any closed user group.

*3: this represents the normal case of a user without the CUG supplementary service receiving a normal call.

10 Procedures for interworking with private ISDNs

Interworking with private ISDNs shall be according to the procedures of Clause 9.

11 Interactions with other networks

When a CUG call fails at a gateway to a network that does not support the CUG supplementary service then if the CUG supplementary service was explicitly invoked the cUGCall return error component returned to the calling user shall indicate "userNotMemberOfCUG" and the cause should be #29 "facility rejected". If the CUG supplementary service was invoked by default, normal clearing procedures shall apply using cause #87 "user not a member of CUG".

12 Interactions with other supplementary services

The interactions of the CUG supplementary service with other supplementary services shall be as specified in ETS 300 195-1 [7].

13 Parameter values (timers)

No additional timers are defined for the CUG supplementary service.

14 Dynamic description (SDL)

The SDL description in figures 1 and 2 is based on the model of ETS 300 102-1 [10] protocol control and call control as defined in ETS 300 102-2 [11]. Where there is an ambiguity in the text description then the SDL should be used to resolve the conflict. Where the text description and SDL are in disagreement then the text shall be used as the definitive source. The SDL is not intended to constrain implementations.

The dynamic description is specified according to CCITT Recommendation Z.100 [14].

14.1 The closed user group process

Figures 1 and 2 provide the SDL description of the closed user group process at the originating and destination network sides, respectively. No user side SDL diagrams are provided.

The closed user group process is modelled as an extension of the call control process. Information can pass between the call control and closed user group processes by means of primitives.

The call control process communicates certain call control events and parameters to the closed user group process and then waits for instructions to proceed from the closed user group process. The primitives from the closed user group process fall into two categories:

a) Continue - the continue primitive shall prompt the call control process to proceed but shall not change the course of call control in establishing or clearing the call attempt. It may provide additional instructions from the closed user group process to call control, e.g.:

- normal - no additional instructions to call control;

- apply checks - call control required to perform the appropriate closed user group checks and then proceed (note that the Stage 2 description functional entities; FE3 "outgoing closed user group control", and FE5 "incoming closed user group control", are not modelled as part of the Stage 3 description "closed user group process");

- RE value - call control required to include a cUGCall return error component with the indicated value in the first clearing message to the calling user.

b) Clear call - the clear call primitive shall cause call control to move from call establishment to appropriate call clearing procedures using the additional information provided by the closed user group process.

14.2 Relation to basic call control

The basic call control protocol as defined in ETS 300 102-2 [11] shall apply with the enhancement that whenever the "save cause" task is performed an additional task shall be performed which shall save any cUGCall return error component value according to the strategy described in subclause 9.2.4.1, item b.

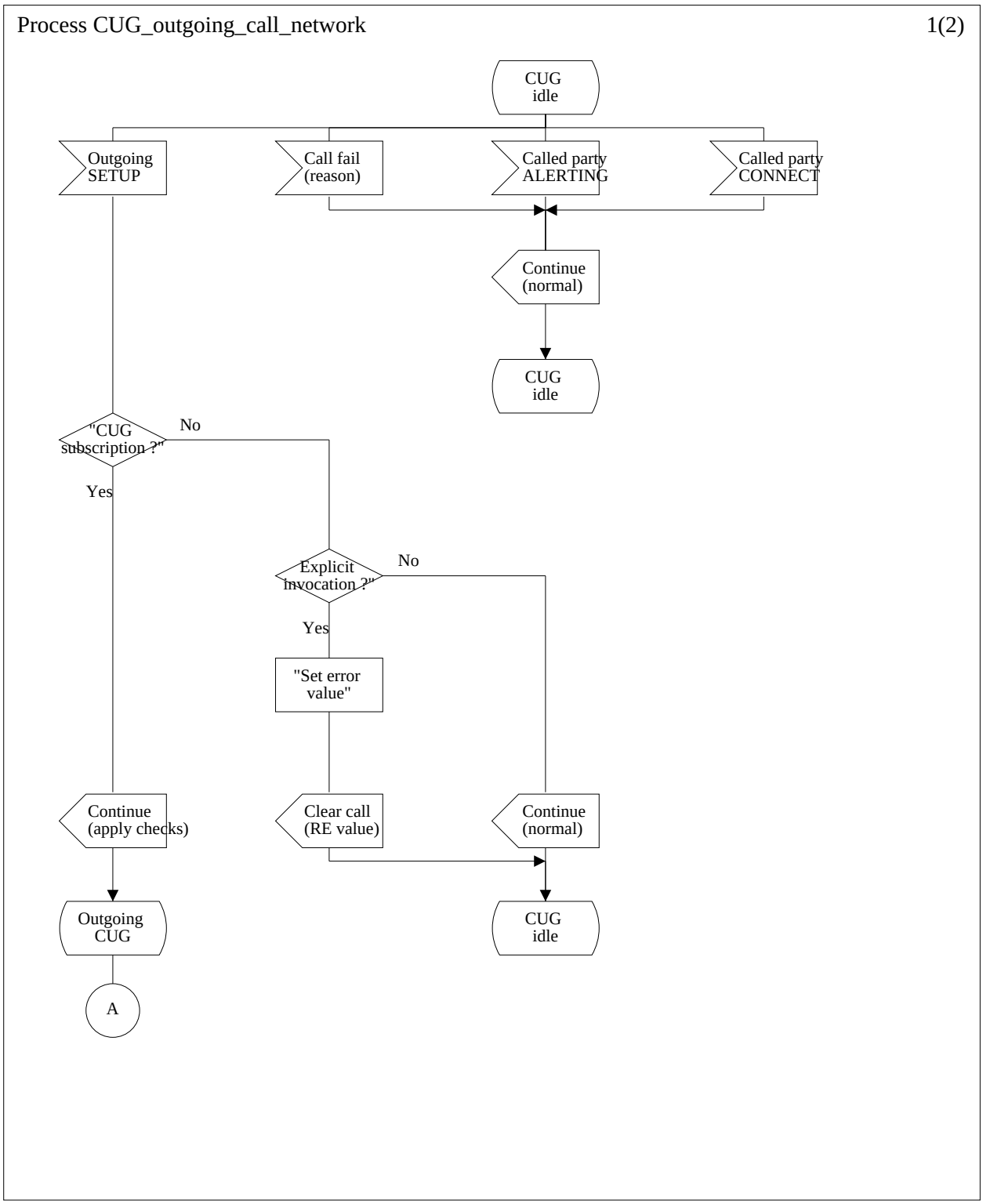


Figure 1 (sheet 1 of 2): Closed user group process - outgoing call (network side)

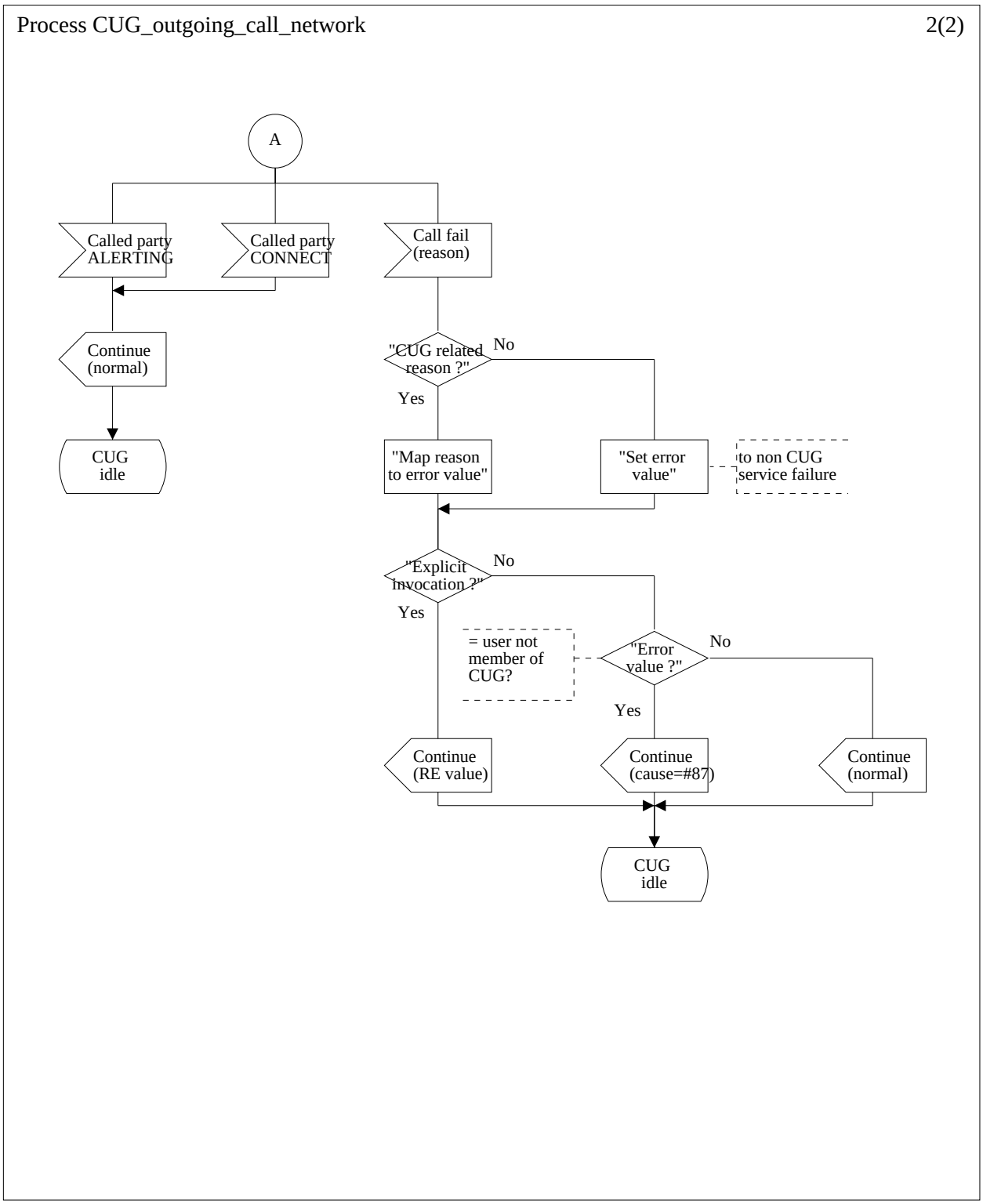


Figure 1 (sheet 2 of 2): Closed user group process - outgoing call (network side)

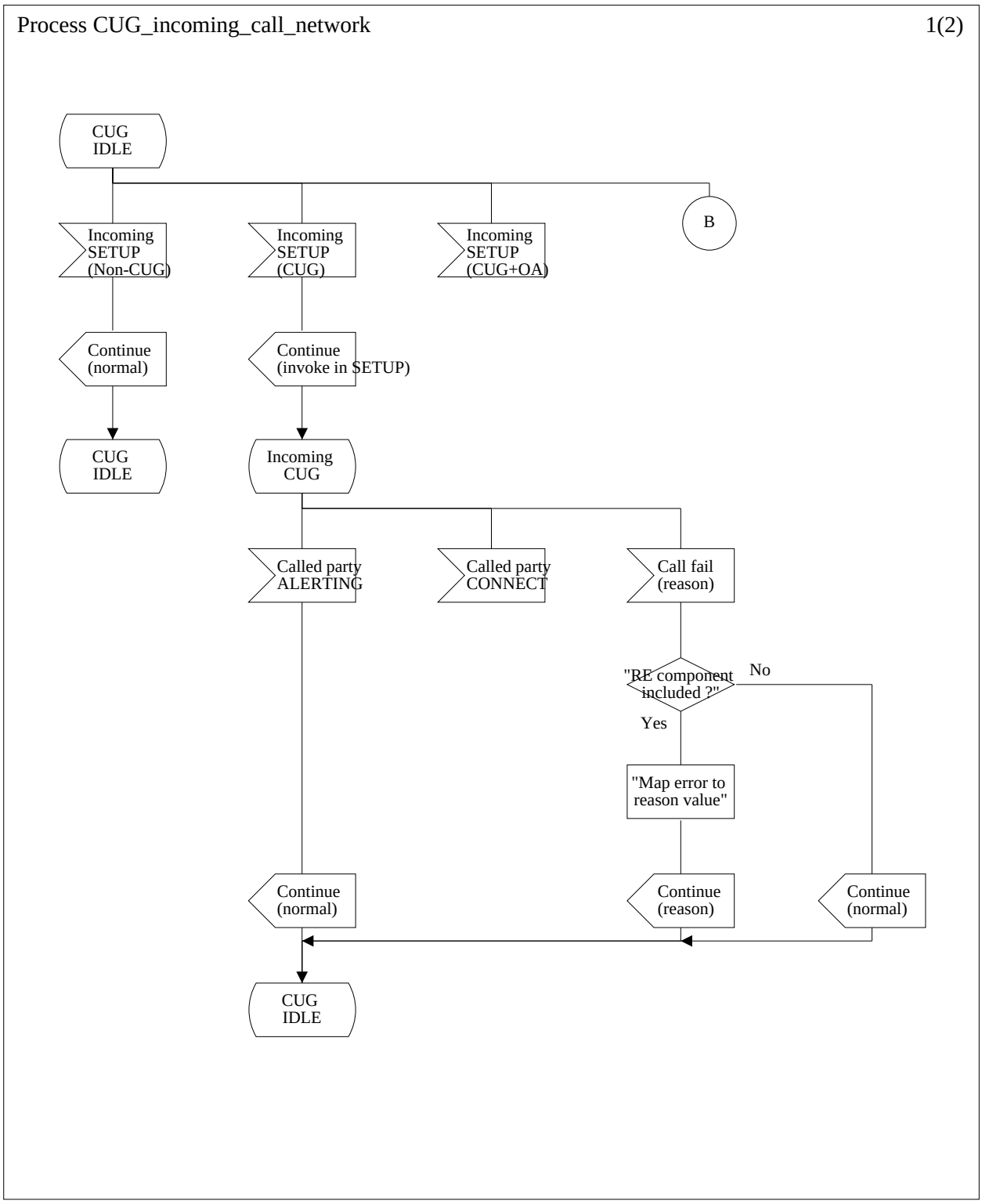


Figure 2 (sheet 1 of 2): Closed user group process - incoming call (network side)

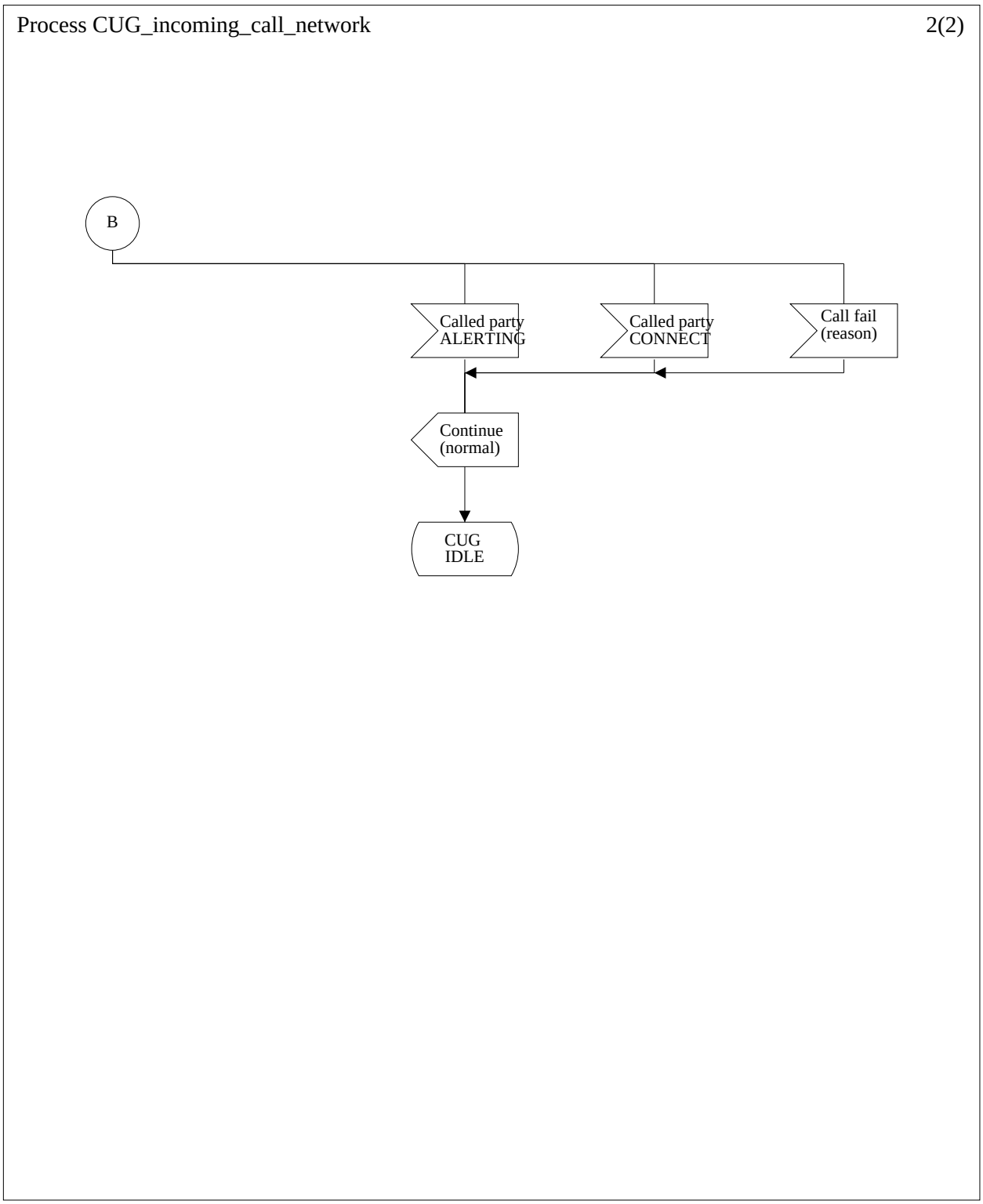
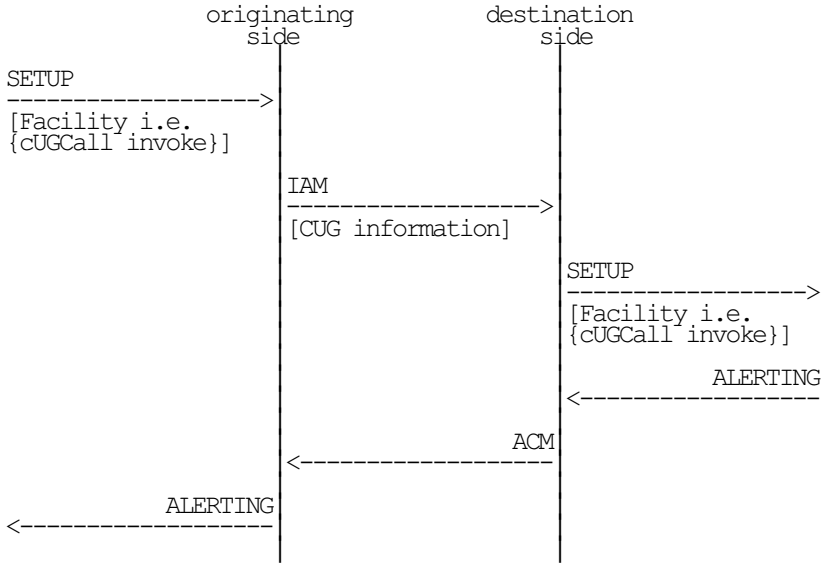


Figure 2 (sheet 2 of 2): Closed user group process - incoming call (network side)

Annex A (informative): Signalling flows

The examples in figures A.1 to A.5 show, in general, only the messages which convey closed user group information and their closed user group related contents. Otherwise, basic call control shall apply.



NOTE : Messages which do not convey closed user group information are included for added clarification.

Figure A.1: Call passes both originating and destination network side checks and is successful in the destination user's side

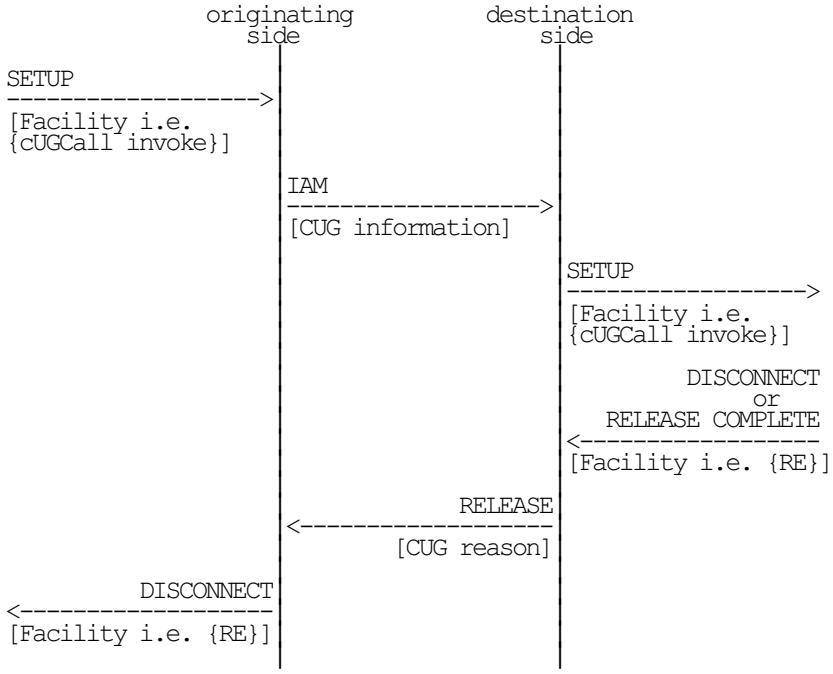
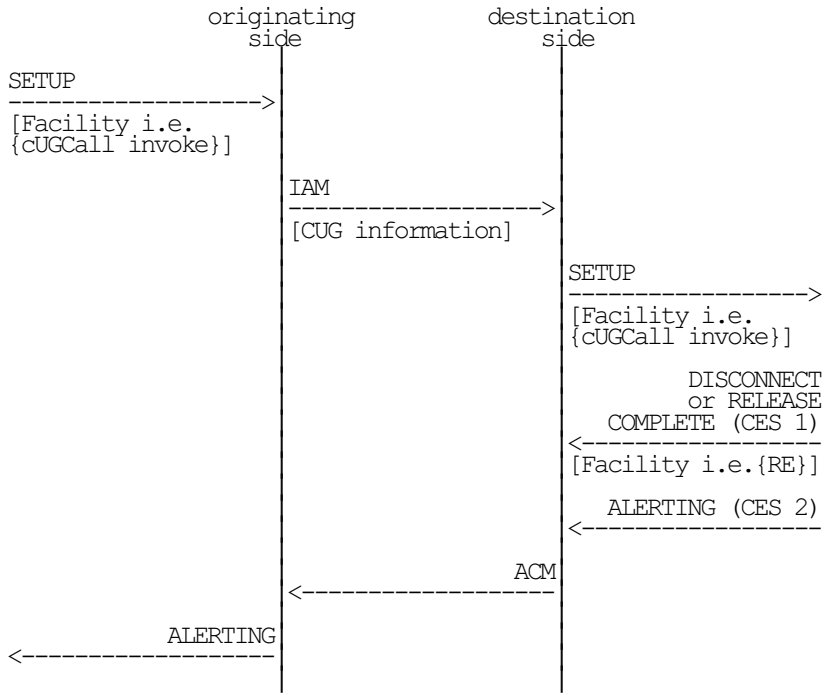


Figure A.2: Call passes both originating and destination network side checks but fails in the destination user's side



NOTE: Messages which do not convey closed user group information are included for added clarification.

Figure A.3: Call passes both originating and destination network side checks, with point-to-multipoint configuration at destination user's side

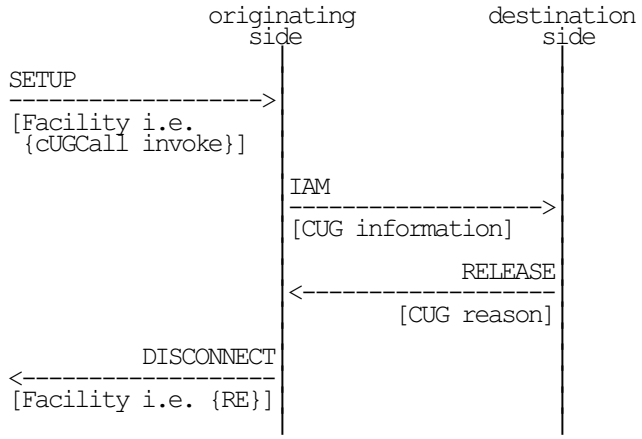


Figure A.4: Call fails destination network side checks

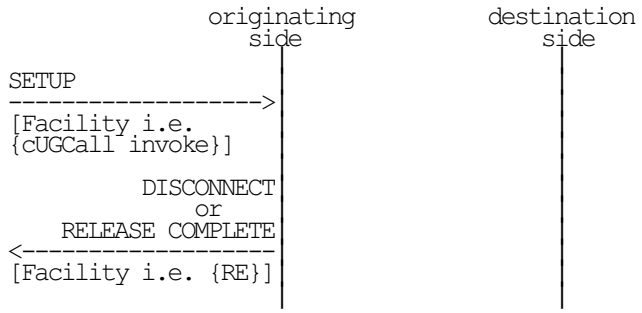


Figure A.5: Call fails originating network side checks

Annex B (informative): Diagrammatic description of coding requirements

B.1 CUG call invoke component (typical example)

Example component structures for the CUG supplementary service are shown in figures B.1 and B.2.

In cases of discrepancies between this annex and Clause 7, then Clause 7 is considered as the prime source.

Table B.1

Invoke Component type	10100001 context-spec,const,1
Invoke Component length	XXXXXXXX
Invoke Component contents:	
Invoke Identifier type	00000010 univ,prim,2(INTEGER)
Invoke Identifier length	00000001 (NOTE 1)
Invoke Identifier contents	XXXXXXXX transaction id value
OPERATION type	00000110 univ,prim,2(INTEGER)
OPERATION length	00000001
OPERATION contents	00000010 cUGCall operation
SEQUENCE type	00110000 univ,const,16(SEQ)
SEQUENCE length	00000111 (for example)
SEQUENCE contents:	
OA Request type	10000001 context-spec,prim,1
OA Request length	00000001
OA Request contents	ttttttttTRUE) (imp BOOLEAN) or 00000000 FALSE) (NOTE 2)
CUG Index type	10000010 context-spec,prim,2
CUG Index length	00000010 (for example)
CUG Index contents	XXXXXXXX) > (implied INTEGER)
CUG Index contents	XXXXXXXX)

NOTE 1: The length of the invoke identifier is either 1 or 2 octets.

NOTE 2: Any value of "tttttttt" other than "00000000" represents the value TRUE.

B.2 CUG call return error component

Table B.2

Return Error Component type	10100011 context-spec,const,3
Return Error Component length	00000110
Return Error Component cont:	
Invoke Identifier type	00000010 univ,prim,2(INTEGER)
Invoke Identifier length	00000001 (NOTE)
Invoke Identifier contents	XXXXXXXX invoke id value
ERROR type	00000010 univ,prim,2 (INTEGER)
ERROR length	00000001
ERROR contents	XXXXXXXX error value

NOTE: The length of the invoke identifier is either 1 or 2 octets.

History

Document history	
May 1992	First Edition
April 1994	Corrigendum to First Edition: change to part 1 of a multi-part standard
March 1996	Converted into Adobe Acrobat Portable Document Format (PDF) and incorporation of all prior Corrigenda