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## Foreword

This European Telecommunication Standard (ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

In accordance with CCITT Recommendation I.130 [1], 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 standpoint;
- 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 standard details the stage 1 aspects (overall service description) for the Closed User Group (CUG) supplementary service. The stage 2 and stage 3 aspects are detailed in ETS 300 137 (1992) and ETS 300 138 (1992), respectively.

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## 1 Scope

This standard defines the stage one of the Closed User Group (CUG) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators. Stage one is an overall service description from the user's point of view (see CCITT Recommendation I.130 [1]), but does not deal with the details of the human interface itself.

This standard defines the interworking requirements of private ISDNs with the public ISDN.

In addition this standard specifies the base functionality where the service is provided to the user via a private ISDN.

This standard does not specify the additional requirements where the service is provided to the user via a telecommunications network that is not an ISDN, but it does include interworking requirements of other networks with the public ISDN.

Interactions with supplementary services not listed in Clause 8 are outside the scope of this standard.

Charging principles are outside the scope of this standard.

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 each other but not, in general, with users outside the group.

Some networks may permit closed user group members to make special calls which are outside that user's closed user group requirements (e.g., calls to emergency services). This functionality and associated procedures are outside the scope of this standard.

The CUG supplementary service is applicable to all telecommunications services.

This standard is applicable to the stage two and stage three standards for the ISDN CUG supplementary service. The terms "stage two" and "stage three" are also defined in CCITT Recommendation I.130 [1]. Where the text indicates the status of a requirement (i.e. as strict command or prohibition, as authorisation leaving freedom, or as a capability or possibility), this shall be reflected in the text of the relevant stage two and stage three standards.

Furthermore, conformance to this standard is met by conforming to the stage three standards with the field of application appropriate to the equipment being implemented. Therefore no method of testing is provided for this standard.

## 2 Normative references

This ETS incorporates, by dated or 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.130 (1988): "Method for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [2] CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".
- [3] CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means used to describe them".

- [4] CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".
- [5] CCITT Recommendation X.180 (1988): "Administrative arrangements for international closed user groups".
- [6] CCITT Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".
- [7] ETS 300 089 (1992): "Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Service description".

### 3 Definitions

For the purposes of this standard the following definitions apply:

**Integrated Services Digital Network (ISDN):** see CCITT Recommendation I.112 [2], § 2.3, definition 308.

**(Basic) service; telecommunications service:** see CCITT Recommendation I.112 [2], § 2.2, definition 201.

**Supplementary service:** see CCITT Recommendation I.210 [3], § 2.4.

**ISDN number:** a number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [4].

**Closed user group (CUG) member:** a user who has subscribed to the CUG supplementary service and is one of the users in the group formed by a particular closed user group.

**Closed user group (CUG) index:** a value assigned by the network to identify a closed user group. This value is used in closed user group calls at the user's access.

**Preferential CUG:** a preferential closed user group is the nominated default group to be used when no closed user group or explicit outgoing access request is received by the network.

**Incoming access:** an arrangement which allows a member of a closed user group to receive calls from outside the closed user group.

**Outgoing access:** an arrangement which allows a member of a closed user group to place calls outside the closed user group.

**Incoming calls barred within a closed user group:** an access restriction that prevents a closed user group member from receiving calls from other members of that group.

**Outgoing calls barred within a closed user group:** an access restriction that prevents a closed user group member from placing calls to other members of that group.

**Closed user group call:** a closed user group call is a call which is restricted to a pre-defined group of users.

**Basic access:** see CCITT Recommendation Q.9 [6], § 1, definition 1551.

**Primary rate access:** see CCITT Recommendation Q.9 [6], § 1, definition 1552.



## 4 Symbols and abbreviations

CUG	Closed User Group
ISDN	Integrated Services Digital Network
PSTN	Public Switched Telephone Network

## 5 Description

The CUG supplementary service shall apply to the basic access and to the primary rate access.

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 each other but not, in general, with users outside the group.

A closed user group consists of a number of users. A closed user group can have members from one or more public networks. In the ISDN, each member of a closed user group is identified by their ISDN number (see also subclauses 8.9 and 8.13).

Subscription to a closed user group shall be defined for all basic services, or in relation to one, or to a list of basic services.

Closed user group members can have additional capabilities that allow them to originate calls outside the group, and/or to receive calls from outside the group. Closed user group members can have additional restrictions that prevent them from originating calls to other members of the closed user group, or from receiving calls from other members of the closed user group.

## 6 Procedures

### 6.1 Provision and withdrawal

The CUG supplementary service shall be provided after prior arrangement with the service provider.

As a network option, the CUG supplementary service can be offered with several subscription options. For a particular closed user group, the associated set of general subscription options can apply to one basic service, to a particular set of basic services, or to all basic services (see table 1A).

A user may subscribe to one of two additional restrictions applying to each particular closed user group:

- incoming calls barred within a closed user group;
- outgoing calls barred within a closed user group.

A user can be a member of several closed user groups. Each network operator shall define the maximum number of closed user groups which can be allocated to an individual user.

When a user subscribes to the CUG supplementary service, a network operator shall also register one of the following service arrangements as requested by the user (see table 1B):

- closed user group calls only;
- closed user group with incoming access, i.e. can also receive calls which are not subject to closed user group restrictions; or
- closed user group with outgoing access, i.e. can also make calls which are not subject to closed user group restrictions; or

- closed user group with incoming and outgoing access, i.e. can also make and receive calls which are not subject to closed user group restrictions.

The network shall provide a subscription option in order to enable the user to specify a preferential closed user group (see table 1B). The user can request that no preferential closed user group exists, or can request that a particular one of the user's closed user groups (or the only one if a single closed user group applies) is used as a preferential closed user group.

The subscription options are shown in table 1A and table 1B.

The closed user group indices shall be allocated by prior arrangement with the service provider.

The choice of preferential closed user group shall be alterable only by service provider action upon request by the served user.

The CUG supplementary service shall be withdrawn at the customer's request, or for administrative reasons.

**Table 1A - General subscription options**

Subscription option	Value
Closed user groups	List of one or more closed user group indices
Intra closed user group restrictions (for each closed user group)	<ul style="list-style-type: none"> <li>- None designated</li> <li>- Incoming calls barred within a closed user group</li> <li>- Outgoing calls barred within a closed user group</li> </ul>
Applicability to basic services (for each closed user group)	<ul style="list-style-type: none"> <li>- list of one or more basic services</li> <li>- all basic services</li> </ul>

**Table 1B - Per service subscription options**

Subscription option	Value
Preferential closed user group	<ul style="list-style-type: none"> <li>- None designated (see NOTE)</li> <li>- closed user group index</li> </ul>
Type of inter closed user group accessibility	<ul style="list-style-type: none"> <li>- None designated</li> <li>- Outgoing access</li> <li>- Incoming access</li> <li>- Outgoing and incoming access</li> </ul>
NOTE: The user is advised to specify a preferential closed user group when the type of inter closed user group accessibility option is set to "none designated" or "incoming access"	

## 6.2 Normal procedures

### 6.2.1 Activation, deactivation and registration

The CUG supplementary service shall be activated on provision and deactivated on withdrawal by the service provider. The CUG supplementary service requires no registration procedures.

## **6.2.2 Erasure**

Not applicable.

## **6.2.3 Invocation and operation**

A user having neither the restriction of incoming calls barred within a closed user group, nor the restriction of outgoing calls barred within a closed user group can make calls to, and receive calls from, members of those closed user groups of which the user is a member.

Normal call establishment procedures shall apply to all calls on which the CUG supplementary service has been invoked. In addition, the network shall carry out internal checks to determine whether or not the particular call shall be allowed between the two users concerned.

Table 2 illustrates some of the situations described below.

### **6.2.3.1 Originating calls**

When originating a call, the calling user can include a request for the CUG supplementary service and a closed user group index in the information for originating the call.

If a user requests the CUG supplementary service with a closed user group index and the outgoing access capability, then the network shall use the closed user group provided and the outgoing access information shall be discarded.

If the user does not provide their number, or provides an invalid number, or the user provides an unscreened number (see ETS 300 089 [7]), the network shall use the default number (see ETS 300 089 [7]) for the purposes of the CUG supplementary service.

#### **6.2.3.1.1 Preferential closed user group without outgoing access capability**

If a user who has a preferential closed user group, but does not have the outgoing access capability, originates a call but does not request the CUG supplementary service, the network shall assume that the preferential closed user group is requested and automatically invoke the CUG supplementary service using the preferential closed user group (i.e. preferential closed user group is the default).

#### **6.2.3.1.2 Outgoing access capability without preferential closed user group**

If a user has subscribed to the CUG supplementary service and has the outgoing access capability, but has no preferential closed user group, then if this user specifies outgoing access without indicating a closed user group or makes an ordinary call, this user can call any user who has not subscribed to the CUG supplementary service, and those other users who are members of closed user groups and have the incoming access capability.

#### **6.2.3.1.3 Both preferential closed user group and outgoing access capability**

If a user who has subscribed to the CUG supplementary service and has both a preferential closed user group and the outgoing access capability, originates a call but does not request the CUG supplementary service, then the network shall automatically invoke the CUG supplementary service using the preferential closed user group information only, i.e. without the outgoing access allowed information. In this case, if the user wishes to place a normal call, that user shall explicitly indicate that outgoing access is required. The network shall handle this explicit request as a normal call.

### **6.2.3.2 Terminating calls**

If a calling user has invoked the CUG supplementary service and the called user is a member of the same closed user group (with or without the incoming access capability), then the called user shall receive an indication that the CUG supplementary service has been invoked and shall also be given the CUG index.

If a user has subscribed to the CUG supplementary service and has the incoming access capability, this user can receive calls from any user who has not subscribed to the CUG supplementary service and also from other users who are members of CUGs by means of the outgoing access capability. In this case, no CUG related information shall be included when the call is offered to the user, i.e. as a normal incoming call.

**Table 2 - Network actions on call requests at the calling user side**

	Information from the calling user			
Calling user subscription	Closed user group index	Closed user group index+ OA indicator	OA indicator	No closed user group information
User without preferential closed user group and without OA	Establish call using closed user group index provided	Establish call using closed user group index provided (OA discarded)	Reject call	Reject call
User with preferential closed user group but without OA	Establish call using closed user group index provided	Establish call using closed user group index provided (OA discarded)	Reject call	Establish call using preferential closed user group index
User without preferential closed user group but with OA	Establish call using closed user group index provided	Establish call using closed user group index provided (OA discarded)	Establish call without any closed user group information	Establish call without any closed user group information
User with preferential closed user group and with OA	Establish call using closed user group index provided	Establish call using closed user group index provided (OA discarded)	Establish call without any closed user group information	Establish call using preferential closed user group index
User without the closed user group supplementary service	Reject call	Reject call	Reject call	Establish call without any closed user group information

In table 2 above, "OA" means "outgoing access"

#### 6.2.4 Interrogation

Not applicable.

#### 6.3 Exceptional procedures

##### 6.3.1 Activation, deactivation and registration

Not applicable.

##### 6.3.2 Erasure

Not applicable.

### 6.3.3 Invocation and operation

Upon receipt of a request for the CUG supplementary service, the network shall check its validity in conjunction with the access capabilities subscribed to by the user. If an invalid request is received or the checks cannot be performed, then the network shall reject the call and return an appropriate indication to the calling user.

The network shall reject calls to a user who has subscribed to the restriction of incoming calls barred within a closed user group for the closed user group requested on that call. The network shall offer this access restriction per CUG supplementary service user and closed user group.

The network shall reject calls from a user who has subscribed to the restriction of outgoing calls barred within a closed user group for the closed user group requested on that call. The network shall offer this access restriction per CUG supplementary service user and closed user group.

### 6.3.4 Interrogation

Not applicable.

## 7 Intercommunication considerations

If, due to an interworking situation, signalling in the network is not able to carry the information required to provide the service, the network shall terminate the attempt and return an appropriate indication to the calling user.

In the case of interworking between public ISDNs, if a call is received which contains a closed user group index and indicates that the outgoing access capability is also required, the indication that the outgoing access capability is required shall be discarded.

### 7.1 Interworking with non-ISDNs

A closed user group may span over several networks. In this case the responsibility for the management of this is in one of these networks.

NOTE: One mechanism presently exists for the management of closed user groups spanning over data networks only, having a numbering plan according to CCITT Recommendation X.121 (see CCITT Recommendation X.180 [5]).

### 7.2 Interworking with private ISDNs

The public ISDN shall treat all accesses in the same way.

NOTE: For example, this means that a whole private ISDN belongs to one or more closed user groups and that the public ISDN has no knowledge of whether a restriction applies for a certain private ISDN user.

Interworking occurs if a closed user group application covers both the public ISDN and private ISDN users. To cover this case both the public ISDN and the private ISDN shall establish individually a corresponding closed user group related to that application. Each network shall treat the other network's closed user group as a single member of its own closed user group, by correlating the relevant closed user group assigned to the access at the network boundary.

Each ISDN shall only be responsible for managing the members of its own closed user group and has no knowledge of the restrictions and membership in the corresponding closed user group in the other ISDN.

## **8 Interaction with other supplementary services**

NOTE: The purpose of the CUG supplementary service is to allow some connections and prohibit others. No supplementary service interaction which could compromise this purpose should be allowed.

Calls which are made using incoming or outgoing access arrangements shall be treated as ordinary calls, i.e calls on which the CUG supplementary service was not invoked, and shall be originated using the basic call procedures. Therefore normal procedures for supplementary services shall apply in these cases.

### **8.1 Advice of charge services**

#### **8.1.1 Charging information at call setup time**

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

#### **8.1.2 Charging information during the call**

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

#### **8.1.3 Charging information at the end of the call**

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

### **8.2 Call waiting**

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

### **8.3 Call hold**

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

### **8.4 Call transfer services**

#### **8.4.1 Explicit call transfer**

The two calls shall use the same closed user group for the transfer to be successful.

NOTE: Closed user group restrictions between users will have been checked when the first call is established. Similarly, closed user group restrictions between users will have been checked when establishing the second call.

#### **8.4.2 Single step call transfer**

The closed user group for the first call shall be used for the second call.

NOTE: Closed user group restrictions between users will have been checked when the first call is set up.

**8.5 Number identification services**

**8.5.1 Calling line identification presentation**

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

**8.5.2 Calling line identification restriction**

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

**8.5.3 Connected line identification presentation**

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

**8.5.4 Connected line identification restriction**

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

**8.6 Closed user group**

Not applicable.

**8.7 Completion of calls to busy subscriber**

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

**8.8 Conference services**

**8.8.1 Conference call, add-on**

When the call involving the first conferee is added to the conference, then the conference shall assume the closed user group of that call.

In order to add a subsequent call to the conference, then the closed user group of that call shall be checked against the closed user group of the conference.

**8.8.2 Meet-me conference**

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

**8.9 Direct dialling in**

Closed user group membership shall not be available on a per ISDN number basis, but instead shall be on the basis on the entire range of ISDN numbers applicable at an access or a group of accesses.

## **8.10 Diversion services**

### **8.10.1 Call forwarding unconditional**

Closed user group restrictions shall be checked and met for the call between the calling user and the forwarding user. The parameters of a closed user group applied by the network on the original call shall be used for the forwarded part of the call and by this means closed user group restrictions shall be checked and met for the call between the calling user and the forwarded-to user.

The outgoing call barring attribute of the forwarding user shall not be used to determine if the call can be forwarded.

### **8.10.2 Call forwarding busy**

Closed user group restrictions shall be checked and met for the call between the calling user and the forwarding user. The parameters of a closed user group applied by the network on the original call shall be used for the forwarded part of the call, and by this means closed user group restrictions shall be checked and met for the call between the calling user and the forwarded-to user.

The outgoing call barring attribute of the forwarding user shall not be used to determine if the call can be forwarded.

### **8.10.3 Call forwarding no reply**

NOTE: Closed user group restrictions were checked and met for the call between the calling user and the forwarding user when call was offered to the forwarding user.

The parameters of the closed user group applied by the network on the original call shall be used for the forwarded part of the call and by this means closed user group restrictions shall be checked and met for the call between the calling user and the forwarded-to user.

The outgoing call barring attribute of the forwarding user shall not be used to determine if the call can be forwarded.

### **8.10.4 Call deflection**

NOTE: Closed user group restrictions were checked and met for the call between the calling user and the deflecting user when call was offered to the deflecting user.

The parameters of the closed user group applied by the network on the original call shall be used for the deflected part of the call and by this means closed user group restrictions shall be checked and met for the call between the calling user and the deflected-to user.

The outgoing call barring attribute of the deflecting user shall not be used to determine if the call can be deflected.

## **8.11 Freephone**

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

## **8.12 Malicious call identification**

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



**8.13 Multiple subscriber number**

Different closed user groups can be assigned to each multiple subscriber number. The network cannot guarantee that a given closed user group matches beyond the access towards the user. As the closed user group assignment to the multiple subscriber numbers is the full responsibility of the user, this may lead to restricted applicability of a combination of the CUG and multiple subscriber number supplementary services.

**8.14 Subaddressing**

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

**8.15 Terminal portability**

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

**8.16 Three party**

For the successful invocation of the three party supplementary service any closed user group restrictions applied to one call shall match with any closed user group restrictions applied to the other call.

**8.17 User-to-user signalling**

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

## History

Document history	
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