



Contents of Recommendation Q.85  
COMMUNITY OF INTEREST SUPPLEMENTARY SERVICES

1. Closed user group
2. ISDN networking (under study)
3. Private numbering plan (under study)

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Recommendation Q.85

COMMUNITY OF INTEREST SUPPLEMENTARY SERVICES

1. Closed user group

1.1 Introduction

The supplementary service closed user group (CUG) makes provision for a group of users to meet security requirements of certain applications by providing restrictions, which prevent non-members from reaching these applications.

The basic facility provides, via the ISDN, the CUG members with controlled intercommunication exclusively amongst themselves and denies access into or outside the group. This facility can be extended to include outgoing and/or incoming access for specified CUG members.

1.2 Definition of functional model

1.2.1 Functional model description

The high level functional model for the CUG service contains the following network addressable functional entities:

FIGURE 1-1/Q.85

CUG service functional model

FE 1: originating CUG agent  
FE 2: outgoing CUG determination  
FE 3: outgoing CUG control  
FE 4: incoming CUG determination  
FE 5: incoming CUG control  
FE 6: destination CUG agent

1.2.2.1 Outgoing CUG determination entity (FE 2)

It has the ability:

- to identify a CUG call;
- to check the CUG subscription of the calling user;
- to access the outgoing CUG control entity

1.2.2.2 Outgoing CUG control entity (FE 3)

It performs:

- the validation checks of CUG information of a calling user;
- the conversion of the CUG index to an interlock code.

1.2.2.3 Incoming CUG determination entity (FE 4)

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It has the ability:

- to identify a CUG call;
- to check the CUG subscription of the called user;
- to access the incoming CUG control entity.

#### 1.2.2.4 Incoming CUG control entity (FE 5)

It performs:

- the conversion of the interlock code to CUG index;
- the validation checks of CUG information of a called user (including the compatibility with the called user class - CUG IA - in case of an ordinary incoming call).

Note - FE 3 and FE 5 are coupled in the sense that they handle a common set of data (interlock codes).

#### 1.2.3 Relationship to basic service

Refer to § 1.6 for the physical location of each entity residing in the following figure.

FIGURE 1-2/Q.85

Relationship to basic service model

First case: type A of scenario

1.3. Information flow description

1.3.1 Information flow diagrams

Note 1 - This information flow may be omitted.

FIGURE 1-3/Q.85

Successful CUG calls

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FIGURE 1-4/Q.85  
Unsuccessful CUG calls - Case 1

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FIGURE 1-5/Q.85

Unsuccessful CUG calls - Case 2



### 1.3.2 Definition of individual information flows

The parameters that are carried on the information flows in the successful case are as follows:

#### 1.3.2.1 SETUP (FE 1 - FE 2) - in addition to called party number and CLI

- nothing, or
- index, or
- index + OA indication.

#### 1.3.2.2 ENQUIRY (FE 2 - FE 3) - carries the same information as SETUP (FE 1 - FE 2) except called party number.

#### 1.3.2.3 ENQUIRY (FE 3 - FE 2):

- nothing, or
- interlock code, or
- interlock code + OA indication.

#### 1.3.2.4 SETUP (FE 2 - FE 4) - in addition to called party number

- nothing, or
- interlock code, or
- interlock code + OA indication.

#### 1.3.2.5 ENQUIRY (FE 4 - FE 5) - carries exactly the same information as SETUP (FE 2 - FE 4).

#### 1.3.2.6 ENQUIRY (FE 5 - FE 6):

- nothing, or
- index, or
- index + OA indication.

### 1.4. Functional entity actions

FE 1 - A user initiates call SETUP request with the CUG index code (when a preferential CUG is used, no index code is designated).

FE 2 - identify a CUG call and receive CUG information,

- CUG subscription check of the calling user.

FE 3 - Outgoing validation check:

- 1) CUG index code check of a calling user (when no index code is designated, preferential CUG is used);
- 2) outgoing barring check within CUG;

When any logical contradiction is detected in the above procedure, a call is rejected (see Table 1-1/Q.85).

- conversion of the index code to an interlock code.

FE 4 - identify an incoming CUG call and receive CUG information;

- CUG subscription check of the called user.

FE 5 - incoming validation check:

- 1) incoming barring check within CUG;
- 2) if interlock codes do not match between a calling user and a called user, a call is rejected;
- 3) ordinary incoming call check (CUG IA);

When any logical contradiction is detected in the above procedure, a call is rejected (see Table 1-2/Q.85).

- an index code corresponding to the designated interlock code is extracted from CUG data of a called user.

FE 6 - a user checks whether or not the designated index code exists in the index code list of his own. A user shall give proper responses.

## 1.5. SDL diagrams for functional entities

### 1.5.1 FE 1 originating CUG agent

FE 1 has the same SDL diagram as the CCA FE (basic call) except that the SETUP information flow to the FE 2 must carry additional information (index or index + OA or nothing).

1.5.2 FE 2 outgoing CUG determination

Refer to the following figure

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SDL diagram for FE 2

1.5.3 FE 3 outgoing CUG control

Refer to the following figure

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FE 3

TABLE 1-1/Q.85

CUG interpretation table (outgoing side)

Calling user class	SETUP presen- tation	CUG with index OA=OFF	CUG with index OA=ON	CUG with index OA=ON	CUG without Ordinary OA=ON	No. CUG INFO. subscriber
	CUG+ OA (E)   CUG+ OA (I)   pCUG					
Y		Specified CUG *1	Specified CUG *1	Rejected	Rejected	
	Y	Specified CUG *1	Specified CUG with OA *2	Ordinary call	Rejected	
	Y	Specified CUG with OA *1	Specified CUG with OA *2	Ordinary call	Ordinary call	
Y		Y   Specified CUG *1	Specified CUG *1	pCUG *1	pCUG *1	FE 3
	Y	Y   Specified CUG *1	Specified CUG with OA *2	pCUG with OA *2	pCUG *2	
	Y	Y   Specified CUG with OA *1	Specified CUG with OA *1	pCUG with OA *1	pCUG with OA *2	

.....  
.....  
.....

Calling user is NOT CUG	REJECT	Ordinary call	FE 2
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\*1 : In case of OCB (CUG), a call is rejected  
 \*2 : In case of OCB (CUG), a call is interpreted as an ordinary call  
 OA(E) : Outgoing access explicit  
 OA(I) : Outgoing access implicit  
 OA : Outgoing access allowed  
 OCB : Outgoing access barred within the CUG

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pCUG : Preferential call

Y : Yes

Note 1 - When an illegal index code is received, the outgoing call is rejected.

Note 2 - All the user classes are not necessarily supported by all the networks. User classes to be supported are network dependent.



1.5.4 FE 4 incoming CUG determination

Refer to the following figure

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FE 4

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FIGURE 1-8/Q.85 (2 of 2)

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FE 4

1.5.5 FE 5 incoming CUG control

Refer to the following figure

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FE 3

TABLE 1-2/Q.85

CUG checking in incoming side

user's	Called user is CUG		Called user is not CUG	
	CUG with or without pCUG	CUG IA with or without pCUG	CUG with or without pCUG	CUG IA with or without pCUG
SETUP presentation	No ICB	ICB	No ICB	ICB
CUG	M (1) REJ NM REJ	REJ	M (1) REJ NM REJ	REJ
CUG and OA	M (1) REJ NM REJ	REJ	M (2) REJ NM (3)	(3) REJ (3)
Ordinary	REJ	REJ	(3)	(3) *

ICB: Incoming access barred within the CUG

Note - Since CUG OA user class is not concerned in the incoming case, it is not shown in the above list. It shall be regarded that CUG OA user class is the same as user class CUG, and CUG OA/IA is the same as user class CUG IA in this table.

- Most of the table is performed in FE 5.

Notes to the TABLE 1-2/Q.85

Note 1 - (1)-(3) shows CUG parameter to be used in the SETUP to the called user.

- (1) - CUG (index)
- (2) - CUG + OA (index + OA mark)
- (3) - No CUG (ordinary call)

Note 2 - ICB means incoming calls barred within the CUG. The interpretation logic is changed in this case as shown in each column in the table. For example:

No ICB	ICB
M (1)	REJ

This means that when the interlock codes are matched and no ICB is applied for the CUG, then (1) is used. However, when ICB is applied for the CUG, the incoming call is rejected even if interlock codes are matched.

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Note 3 - M means that the interlock code is matched with the CUG of the called user.

Note 4 - NM means "not matched".

Note 5 - REJ means that an incoming call is rejected.

Note 6 - Interpretation logic, e.g.:

{  
M  
(3)  
}

means that when matched with CUG, no CUG selection facility field is set in the SETUP to the called user.

### 1.5.6 FE 6 destination in CUG agent

FE 6 has the same SDL diagram as the CCA FE (basic call) except that the SETUP information flow to the FE 6 must carry additional information (index or index + OA mark or nothing).

### 1.5.7 Basic call hooks

See the following two diagrams.



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FIGURE 1-10/Q.85 (1 of 5)

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C C Functional Entity (r1-ri) i = 1,2 (based on Recommendation Q.71)

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FIGURE 1-10/Q.85 (2 of 5)

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C C Functional Entity (r1-ri) i = 1,2  
(based on Recommendation Q.71)

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FIGURE 1-10/Q.85 (3 of 5)

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C C Functional Entity (r1-ri) i = 1,2)

(based on Recommendation Q.71)

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FIGURE 1-10/Q.85 (4 of 5)

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C C Functional Entity (r2-ri) i = 1,2  
(based on Recommendation Q.71)



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FIGURE 1-10/Q.85 (5 of 5)

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C C Functional Entity (r2-ri) i = 1,2 (based on Recommendation Q.71)

1.6 Network physical allocation scenarios

TABLE 1-3/Q.85

Network physical allocation scenario A

	FE 1	FE 2	FE 3	FE 4	FE 5	FE 6
A.1	TE/NT2	LE1	LE1	LE2	LE2	TE/NT2
A.2	TE/NT2	LE1	DB1	LE2	DB1	TE/NT2
A.3	TE/NT2	LE1	DB1	LE2	DB2	TE/NT2
A.4	TE	NT2A	NT2A	NT2A	NT2B	TE

The network scenario A.1 represents the decentralized approach of the CUG service implementation.

The network scenario A.2 describes the fully centralized approach with a unique data base (DB1).

The network scenario A.3 describes a centralized approach with two data bases (DB1 and DB2).

In the network scenario A.4, the Cug service is handled in the NT2s and then the network is transparent for this service.