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Technical Specification

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Foreword

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The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

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Foreword

This Technical Specification has been produced by the 3GPP.

This TS specifies the procedures used at the radio interface (reference point Um as defined in 3GPP TS 24.002) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of Closed User Group (CUG) supplementary services within the 3GPP system.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version 3.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 Indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the specification;

0 Scope

This Technical Specification (TS) for Mobile communications specifies the procedures used at the radio interface (reference point Um as defined in 3GPP TS 24.002) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of community of interest supplementary services. The provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and causes no signalling on the radio interface.

In 3GPP TS 24.010, the general aspects of the specification of supplementary services at the layer 3 radio interface are given.

3GPP TS 24.080 specifies the formats coding for the supplementary services.

Definitions and descriptions of supplementary services are given in 3GPP TS 22.004 and 3GPP TS 22.08x and 3GPP TS 22.09x-series. 3GPP TS 22.085 is related to the community of interest supplementary services.

Technical realization of supplementary services is described in technical specifications 3GPP TS 23.011 and 3GPP TS TS 23.08x and 3GPP TS 23.09x-series. 3GPP TS 23.085 is related to the community of interest supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3 radio interface are defined in 3GPP TS 24.007 and 3GPP TS 24.008.

Signalling interworking for supplementary services between 3GPP TS 29.002 and 3GPP TS 24.008 and between 3GPP TS 29.002 and 3GPP TS 24.080 is defined in 3GPP TS 29.011.

The following supplementary services belong to the community of interest supplementary services and are described in this TS:

- Closed User Group (CUG) clause 1.

0.1 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.004: "General on supplementary services".

[3] 3GPP TS 22.081: "Line identification Supplementary Services - Stage 1".

[4] 3GPP TS 22.082: "Call Forwarding (CF) Supplementary Services - Stage 1".

[5] 3GPP TS 22.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 1".

[6] 3GPP TS 22.084: "Multi Party (MPTY) Supplementary Services - Stage 1".

[7] 3GPP TS 22.085: "Closed User Group (CUG) Supplementary Services - Stage 1".

[8] 3GPP TS 22.086: "Advice of Charge (AoC) Supplementary Services - Stage 1".

[9] 3GPP TS 22.087: "User-to-User Signalling (UUS) Service description - Stage 1".

[10] 3GPP TS 22.088: "Call Barring (CB) Supplementary Services - Stage 1".

[11] 3GPP TS 22.090: "Unstructured Supplementary Service Data (USSD) - Stage 1".

[12] 3GPP TS 23.002: "Network architecture".

[13] 3GPP TS 23.011: "Technical realization of supplementary services".

[14] 3GPP TS 23.081: "Line identification supplementary services - Stage 2".

[15] 3GPP TS 23.082: "Call Forwarding (CF) supplementary services - Stage 2".

[16] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".

[17] 3GPP TS 23.084: "Multi Party (MPTY) supplementary services - Stage 2".

[18] 3GPP TS 23.085: "Closed User Group (CUG) supplementary services - Stage 2".

[19] 3GPP TS 23.086: "Advice of Charge (AoC) supplementary services - Stage 2".

[20] 3GPP TS 23.088: "Call Barring (CB) supplementary services - Stage 2".

[21] 3GPP TS 23.090: "Unstructured supplementary services operation - Stage 2".

[22] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) Access Reference Configuration".

[23] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[24] 3GPP TS 24.008: "Mobile radio interface layer 3 specification".

[25] 3GPP TS 24.010: "Mobile radio interface layer 3; Supplementary services specification; General aspects".

[26] 3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification; Formats and coding".

[27] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[28] 3GPP TS 29.011: "Signalling interworking for supplementary services".

0.2 Abbreviations

Abbreviations used in this TS are listed in 3GPP TR 21.905.

1 Closed User Group (CUG)

1.1 Normal operation

1.1.1 Mobile originated CUG calls

1.1.1.1 Successful operation

CUG calls may be invoked Implicitly or Explicitly by the calling user.

In the case of Implicit invocation, no CUG information is provided by the user in the call set-up request and a default attribute of CUG is invoked. Normal call establishment procedures are followed over the radio interface and no CUG signalling is required.

In the case of Explicit CUG invocation, CUG information is provided by the user and is included in the SETUP message using the ForwardCUG-Info operation (see figure 1.1). User provided CUG information may consist of any combination of the following parameters:

- CUG Index;
- Suppress Preferential CUG indicator;
- Suppress OA indicator.

NOTE: No more than one of each parameter may be included per call attempt.

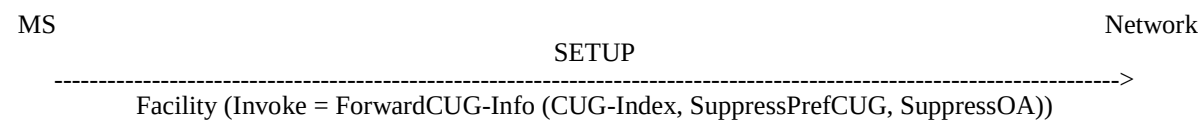

Figure 1.1: Transfer of CUG information during CUG call set-up

If the network received a non-zero SS Screening indicator from the calling user's mobile station, the network may optionally indicate to the MS that a CUG has been invoked for a call (see figure 1.2). When a CUG Index is received from the VLR the MSC shall send it immediately to the MS in a FACILITY or CALL PROCEEDING message. If the network did not receive a non-zero SS Screening indicator from the calling user's mobile station, it shall not send this notification.

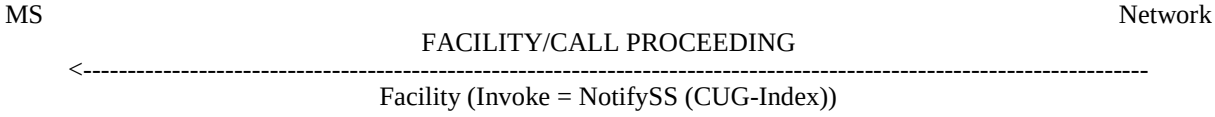

Figure 1.2: Indication of CUG invocation to the calling subscriber by the network

1.1.1.2 Unsuccessful operation

When an attempted CUG call is rejected for CUG related reasons, the mobile station is provided with an indication of the reason for failure.

The indication is passed to the calling MS in the first clearing message. The indication may be given in one of two ways:

- Diagnostics information in cause value #29 "Facility Rejected";
- A standard call control cause value.

Diagnostics are used when the rejection is generated locally (the serving VLR has rejected the call), or if they are provided in a cause value from a remote network node (see figure 1.3). Table 1.1 gives the diagnostics information for each potential local rejection case.

A CUG rejection from a remote network node is generally indicated using a standard (CUG related) call control cause value contained in an ISUP clearing message. These cause values are passed to the mobile station in the appropriate radio interface clearing message (see figure 1.4). Table 1.2 gives the cause values in each potential remote rejection case.

All CUG related call rejection cases are defined in 3GPP TS 23.085. Cause values are defined in 3GPP TS 24.008 and diagnostics in 3GPP TS 24.080.

NOTE: Annex A specifies the mapping of cause values between MAP, ISUP and 3GPP TS 24.008 for remotely generated CUG rejections.

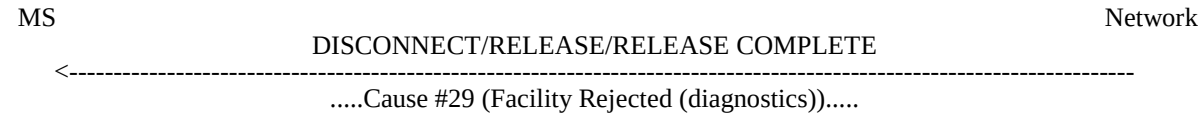

Figure 1.3: Indication of local CUG call rejection

MS Network

DISCONNECT/RELEASE/RELEASE COMPLETE

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Cause Information Element (Cause Value)

Figure 1.4: Indication of remote CUG call rejection

Table 1.1: Use of diagnostic values for local CUG call failure indications

Reason for rejection See 3GPP TS 23.085	**Facility Rejected #29 Diagnostic Field (Diagnostics)**
Outgoing calls barred within the CUG	Outgoing calls barred within the CUG
Inconsistent access info - No CUG Selected	No CUG Selected
Unknown CUG Index	Unknown CUG Index
Inconsistent access info - Index incompatible with requested basic service	Index incompatible with requested basic service

Table 1.2: Use of cause values for remote CUG call failure indications

Reason for rejection See 3GPP TS 23.085	**Cause Information Element (cause value)**
Called party supplementary service interaction violation	Facility Rejected #29 Diagnostic = CUG call failure, unspecified
Incompatible Destination (see note)	Facility Rejected #29 Diagnostic = CUG call failure, unspecified
Incoming calls barred within the CUG	Incoming calls barred within the CUG #55
Interlock mismatch	User not a member of CUG #87
Requested basic service violates CUG constraints	Facility Rejected #29
NOTE: In cases of interworking failures ETSI ISUP V2 clears the call with cause value #29 "Facility Rejected", Diagnostic = "Interlock Code". This is mapped to Facility Rejected with general diagnostic value "CUG call failure, unspecified" since the interlock code has no meaning for a mobile user.	

1.1.2 Mobile terminated calls

If the network received a non-zero SS Screening indicator from the called user's mobile station, when a CUG call is terminated by a CUG subscriber the Index associated with the invoked CUG may be passed to the mobile station (see figure 1.5). If the network did not receive a non-zero SS Screening indicator from the called user's mobile station, it shall not send this notification.

MS Network

SETUP

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Facility (Invoke = NotifySS (CUG-Index))

Figure 1.5: Presentation of the CUG Index to a CUG subscriber during reception of a CUG call

1.2 Activation, deactivation, interrogation, registration and erasure

Activation, deactivation, interrogation, registration and erasure of the supplementary service closed user group are not applicable.

Annex A (normative): CUG rejection cause value mapping

Table A.1 indicates how MAP, ISUP and 3GPP TS 24.008 cause values are mapped to enable a rejection indication to be passed from the remote rejecting node to the calling user.

Table A.1: Protocol mapping for CUG call rejection cause values

GSM MAP CUG reject cause value	CCITT ISUP cause value	3GPP TS 24.008 cause value
calledPartySupplementary-ServiceInteractionViolation	#29 Facility Rejected Diagnostic = IC (see note 1)	#29 Facility Rejected Diagnostic = CUG call failure, unspecified
incomingCallsBarredWithinCUG	#55 I/C calls barred within CUG	#55 I/C calls barred within CUG
subscriberNotMemberOfCUG	#87 User not member of CUG	#87 User not member of CUG
requestedBasicService-ViolatesCUGConstraints	#29 Facility Rejected (see note 2)	#29Facility Rejected (no diagnostic)

NOTE 1: There is no specific cause value in ISUP for this rejection case. Therefore it is proposed that Cause Value #29 "Facility Rejected" is used with the diagnostic equal to the interlock of the call. This approach has been used in ISUP for interworking problems.

NOTE 2: There is no specific cause value in ISUP for this rejection case. It is therefore proposed to use cause value #29 "Facility Rejected" to indicate a general supplementary service failure.

Annex B (informative): Change history

Change history						
TSG CN#	**Spec**	**Version**	**CR**	**<Phase>**	**New Version**	**Subject/Comment**
Apr 1999	GSM 04.85	6.0.0				Transferred to 3GPP CN1
CN#03	24.085			R99	3.0.0	Approved at CN#03
CN#11	24.085	3.0.0		Rel-4	4.0.0	Release 4 after CN#11
CN#16	24.085	4.0.0		Rel-4	4.0.1	References updated
CN#16	24.085	4.0.1		Rel-5	5.0.0	Rel-5 created after CN#16
CN#26	24.085	5.0.0		Rel-6	6.0.0	Rel-6 created after CN#26
CT#36	24.085	6.0.0		Rel-7	7.0.0	Upgraded unchanged from Rel-6
CT#42	24.085	7.0.0		Rel-8	8.0.0	Upgraded unchanged from Rel-7

History

Document history		
V8.0.0	January 2009	Publication