

ETSI TS 124 654 V17.0.0 (2022-04)



**Digital cellular telecommunications system (Phase 2+) (GSM);
Universal Mobile Telecommunications System (UMTS);
LTE;
Closed User Group (CUG) using IP Multimedia (IM)
Core Network (CN) subsystem, Protocol Specification
(3GPP TS 24.654 version 17.0.0 Release 17)**



Reference

RTS/TSGC-0124654vh00

Keywords

GSM,LTE,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

If you find a security vulnerability in the present document, please report it through our
Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2022.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

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

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	5
1 Scope	6
2 References	6
3 Definitions and abbreviations.....	6
3.1 Definitions	6
3.2 Abbreviations	7
4 Closed User Group (CUG).....	8
4.1 Introduction	8
4.2 Description	8
4.3 Operational requirements	8
4.3.1 Provision/withdrawal	8
4.3.2 Requirements on the originating network side.....	9
4.3.3 Requirements in the terminating network	10
4.4 Coding requirements	10
4.4.1 XML definition.....	10
4.4.2 SIP-Messages used for CUG	11
4.5 Signalling requirements.....	11
4.5.0 General.....	11
4.5.1 Activation/deactivation.....	11
4.5.1a Registration/erasure	11
4.5.1b Interrogation	11
4.5.2 Invocation and operation	12
4.5.2.1 Actions at the originating UA	12
4.5.2.2 Void.....	12
4.5.2.3 Void.....	12
4.5.2.4 Actions at the AS of the originating User	12
4.5.2.5 Void.....	17
4.5.2.6 Void.....	17
4.5.2.7 Void.....	17
4.5.2.8 Void.....	17
4.5.2.9 Void.....	17
4.5.2.10 Actions at the AS of the terminating user	17
4.5.2.11 Void.....	18
4.5.2.12 Actions at the terminating UA	18
4.6 Interaction with other services.....	18
4.6.1 Communication Hold (HOLD).....	18
4.6.2 Terminating Identification Presentation (TIP).....	18
4.6.3 Terminating Identification Restriction (TIR).....	18
4.6.4 Originating Identification Presentation (OIP).....	18
4.6.5 Originating Identification Restriction (OIR).....	18
4.6.6 Conference calling (CONF).....	18
4.6.7 Communication Diversion Services (CDIV)	18
4.6.7.1 Communication Forwarding Unconditional (CFU)	18
4.6.7.2 Communication Forwarding Busy (CFB)	19
4.6.7.3 Call Forwarding No Reply (CFNR)	19
4.6.7.4 Communication Forwarding on Not Logged-in (CFNL)	19
4.6.7.5 Communication Forwarding on Subscriber Not Reachable (CFNRc)	19
4.6.7.6 Communication Deflection (CD).....	19
4.6.8 Malicious Communication Identification (MCID)	19
4.6.9 Anonymous Communication Rejection and Communication Barring (ACR/CB)	19
4.6.10 Explicit Communication Transfer (ECT)	19

4.6.11	Closed User Group (CUG)	19
4.6.12	Three-Party (3PTY)	20
4.6.13	Enhanced Calling Name (eCNAM)	20
4.6.14	Multi-Device (MuD)	20
4.6.15	Multi-Identity (MiD)	20
4.7	Interactions with other networks	20
4.7.1	Void	20
4.7.2	Void	20
4.7.3	Void	20
Annex A (informative):	Void	21
Annex B (informative):	Change history	22
History		23

Foreword

This Technical Specification (TS) was been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) and originally published as ETSI TS 183 054. It was transferred to the 3rd Generation Partnership Project (3GPP) in December 2007. 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 the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater 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 document.

1 Scope

The present document specifies the stage three Protocol Description of the Closed User Group (CUG) service, based on stage one and two of the ISDN Communication diversion supplementary services. It provides the protocol details in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP) and the Session Description Protocol (SDP).

The present document is applicable to User Equipment (UE) and Application Servers (AS) which are intended to support the CUG supplementary service.

2 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 TS 22.173: "IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services, stage 1".
- [2] 3GPP TS 24.229: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".
- [3] Void
- [4] Void
- [5] 3GPP TS 24.238: "Session Initiation Protocol (SIP) based user configuration; stage 3".
- [6] 3GPP TS 24.623: "Extensible Markup Language (XML) Configuration Access Protocol (XCAP) over the Ut interface for Manipulating Supplementary Services".
- [7] IETF RFC 5621: "Message Body Handling in the Session Initiation Protocol (SIP)".
- [8] 3GPP TS 24.174: "Support of Multi-Device and Multi-Identity in IMS; Stage 3".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 22.173 [1] and the following apply:

basic service: bearer or teleservice. Within the scope of SIP based networks the identification of a bearer or teleservice can be derived from the SDP used

Closed User Group (CUG) communication: closed user group communication is a communication which is restricted to a pre-defined group of users

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

CUG index: parameter used by the originating user to select a particular CUG when originating a communication

NOTE 1: The index is also used by the network to indicate to the terminating user the CUG from which an incoming communication has originated. This index has only local significance, i.e. the index used by the originating user is, in general, different from the index used by the terminating user to identify the same CUG.

CUG interlock code: means of identifying CUG membership within the network

NOTE 2: At the originating side, if a CUG match exists, the CUG index identifying a CUG maps to the CUG interlock code for that CUG. If a CUG match exists at the terminating side the CUG interlock code identifying a CUG maps to the CUG index representing that CUG. CUG interlock code has relevance on NN level between AS.

CUG manager: authority representing the interests of all the members of a CUG

NOTE 3: By planning and controlling the membership and members' options, the manager can provide the overall CUG service expected by the members as a whole. The CUG manager need not be a CUG member and the concept has no signalling implications.

incoming access: arrangement which allows a member of a closed user group to receive communications from outside the closed user group

incoming communications barred within a closed user group: access restriction that prevents a closed user group member from receiving communications from other members of that group

outgoing access: arrangement which allows a member of a closed user group to place communications outside the closed user group

outgoing communications barred within a closed user group: access restriction that prevents a closed user group member from placing communications to other members of that group

preferential CUG: user subscribing to preferential CUG nominates a CUG index which the network uses as a default to identify the required CUG in the absence of any CUG information in the outgoing communication request

NOTE 4: A preferential CUG applies to a Public ID.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACR	Anonymous Call Rejection
AS	Application Server
CDIV	Communication DIVersion
CONF	CONFerence calling
CUG	Closed User Group
ECT	Explicit Communication Transfer
HOLD	communication HOLD
IA	Incoming Access
ICB	Incoming Communication Barring
IMS	IP Multimedia Subsystem
IP	Internet Protocol
ISDN	Integrated Service Data Network
MCID	Malicious Communication IDentification
MiD	Multi-iDentity
MuD	Multi-Device
OA	Outgoing Access
OCB	Outgoing Communication Barring
OIP	Originating Identification Presentation
OIR	Originating Identification Restriction
PSTN	Public Switched Telephone Network
SDP	Session Description Protocol
SIP	Session Initiation Protocol

TIP	Terminating Identity Presentation
TIR	Terminating Identification Restriction
UA	User Agent
UE	User Equipment
URI	Universal Resource Identifier
XML	eXtensible Markup Language

4 Closed User Group (CUG)

4.1 Introduction

The Closed User Group (CUG) service enables users to form groups of members, whose communication profile is restricted for incoming and outgoing communications.

4.2 Description

Members of a specific CUG can communicate among themselves but not, in general, with users outside the group.

Specific CUG members can have additional capabilities that allow them to initiate outgoing communications to users outside the group, and/or to accept incoming communications from users outside the group. Specific CUG members can have additional restrictions that prevent outgoing communications to other members of the CUG, or prevent incoming communications from other members of the CUG.

A closed user group consists of a number of members from one or more public, and/or private networks. A specific user may be a member of one or more CUGs. Subscription to a closed user group shall be defined for all communication services, or in relation to one, or to a list of communication services.

4.3 Operational requirements

4.3.1 Provision/withdrawal

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

As a network option based on subscription basis. The CUG service can be offered with several subscription options.

The provisioning of a new CUG shall require a prior arrangement between the CUG Manager and the network provider.

The provision of the CUG service to a new member and also the assignment of the various CUG service options to a new or existing member shall require a prior arrangement between the CUG member and the network provider in coordination with the CUG Manager of the affected CUG.

The CUG Service is provisioned by the operator.

The subscription options can be divided into three groups:

- General Subscription options.
- Per CUG.
- Per Public ID.

General Subscription options:

A user can be a member of several closed user groups as shown in table 4.3.1.1. Each CUG is bind to the members with an individual CUG Index. Each network operator shall define the maximum number of closed user groups which can be allocated to an individual user.

Table 4.3.1.1: General subscription options

Subscription options	Value
Closed user groups	List of one or more closed user group indices

Subscription options per CUG:

- 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 4.3.1.2).

Table 4.3.1.2: Subscription options per CUG

Subscription options	Value
Intra closed user group restrictions (for each closed user group)	None designated
	Incoming communications barred within a closed user group
	Outgoing communications barred within a closed user group
Applicability to basic services (for each closed user group)	list of one or more basic services
	all basic services

Subscription options per Public ID:

- The network shall provide a subscription option in order to enable the user to specify a preferential closed user group (see table 4.3.1.3).
- 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 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 service shall be withdrawn at the customer's request, or for administrative reasons.

Table 4.3.1.3: Subscription options per Public ID

subscription options	Value
Preferential closed user group	None designated
	closed user group index
Outgoing access	allowed per communication
	allowed permanent (default)
	not allowed
Incoming access	allowed
	not allowed

4.3.2 Requirements on the originating network side

For correct interactions with other services, it is necessary for the originating network side to store, for the duration of the communication, details of whether a non-CUG, CUG (without outgoing access) or CUG (with outgoing access) communication was requested in the information sent to the destination network side. The CUG identity (if any) requested of the destination network side must also be retained.

4.3.3 Requirements in the terminating network

For correct interactions with other supplementary services, it is necessary for the destination network side to store, for the duration of the communication, details of whether a non-CUG or CUG (with or without outgoing access) communication request was passed to the user. The CUG identity (if any) requested must also be retained.

4.4 Coding requirements

4.4.1 XML definition

This subclause defines the XML Schema to be used for providing the CUG Interlock code and the CUGcommunicationindicator.

The application/vnd.etsi.cug+xml MIME type used to provide CUG Interlock code, cugIndex outgoingAccessRequest and the CUGcommunicationindicator the XML used shall be coded as following described:

```
<?xml version="1.0" encoding="UTF-8"?>

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:ss="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
  targetNamespace="http://uri.etsi.org/ngn/params/xml/simservs/xcap" elementFormDefault="qualified"
  attributeFormDefault="unqualified">

  <xs:annotation>
    <xs:documentation>XML Schema Definition for the closed user group
      parameter</xs:documentation>
  </xs:annotation>
  <xs:include schemaLocation="xcap.xsd"/>
  <!--Definition of simple types-->
  <xs:simpleType name="twobitType">
    <xs:restriction base="xs:string">
      <xs:pattern value="[0-1][0-1]"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="networkIdentityType">
    <xs:restriction base="xs:hexBinary">
      <xs:length value="2"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="sixteenbitType">
    <xs:restriction base="xs:hexBinary">
      <xs:length value="2"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="cugIndexType">
    <xs:restriction base="xs:integer">
      <xs:minInclusive value="0"/>
      <xs:maxInclusive value="32767"/>
    </xs:restriction>
  </xs:simpleType>
  <!--Definition of complex types-->
  <xs:complexType name="cugRequestType">
    <xs:sequence>
      <xs:element name="outgoingAccessRequest" type="xs:boolean"/>
      <xs:element name="cugIndex" type="cugIndexType" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
  <!--Definition of document structure-->
  <xs:element name="cug" substitutionGroup="ss:absService">
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="ss:simservType">
          <xs:sequence>
            <xs:element name="cugCallOperation" type="cugRequestType" minOccurs="0"/>
            <xs:element name="networkIndicator" type="networkIdentityType"
              minOccurs="0"/>
            <xs:element name="cugInterlockBinaryCode" type="sixteenbitType"
              minOccurs="0"/>
            <xs:element name="cugCommunicationIndicator" type="twobitType"
              minOccurs="0"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>

```

```

    </xs:complexContent>
  </xs:complexType>
</xs:element>
</xs:schema>

```

4.4.2 SIP-Messages used for CUG

The following SIP messages are used for the invocation and control of the CUG service.

Table 4.4.1.1: SIP Message used for CUG

SIP Message	SIP URI parameter	Used for
INVITE request	xml MIME CUG	
403 (Forbidden) response		rejection because the user does not belongs to the CUG or other failure.
603 (Decline) response		rejection because of barring or CUG with call barring.
500 (Server Internal Error) response		rejection of a CUG communication due to network caused reasons e.g. traversing the communication towards an IMS not supporting the CUG Service.

4.5 Signalling requirements

4.5.0 General

Configuration of supplementary services by the user should:

- take place over the Ut interface using XCAP as enabling protocol as described in 3GPP TS 24.623 [6]; or
- use SIP based user configuration as described in 3GPP TS 24.238 [5];

NOTE: Other possibilities for user configuration, such as web-based provisioning or pre-provisioning by the operator are outside the scope of the present document, but are not precluded.

The enhancements to the XML schema for use over the Ut interface are described in subclause 4.9.

4.5.1 Activation/deactivation

The CUG service is activated at provisioning or at the subscriber's request by using the mechanisms specified in subclause 4.5.0.

The CUG service is deactivated at withdrawal or at the subscriber's request by using the mechanisms specified in subclause 4.5.0.

4.5.1a Registration/erasure

For registration of CUG-related information, the mechanisms specified in subclause 4.5.0 should be used.

For erasure of CUG-related information, the mechanisms specified in subclause 4.5.0 should be used.

4.5.1b Interrogation

For interrogation of CUG-related information, the mechanisms specified in subclause 4.5.0 should be used.

4.5.2 Invocation and operation

4.5.2.1 Actions at the originating UA

Explicit request of CUG service:

- The originating user can explicitly request the CUG service by including in the initial INVITE request an xml CUGrequestType containing the preferred CUG and an outgoing access request.

NOTE: If the user is subscribed to the preferential CUG service and the preferred CUG is not included, the default CUG will be used.

- To indicate outgoing access the user shall set the value of the "outgoingAccessRequest" parameter to TRUE.

Implicit request of CUG service:

- The originating user with CUG service can request the CUG service without including an xml CUGrequestType in the initial INVITE request. In this case the procedures according to 3GPP TS 24.229 [2] shall apply

Call originating from a user without CUG service:

- It is possible for a user without CUG service to make a call to a user with CUG service. In this case the procedures according to 3GPP TS 24.229 [2] shall apply.

4.5.2.2 Void

4.5.2.3 Void

4.5.2.4 Actions at the AS of the originating User

Upon receipt of a request for CUG service the AS shall check its validity as shown in table 4.5.2.4.1 in conjunction with the access capabilities contained in the user profile. If a non-valid request is received or the checks cannot be performed, then the network shall reject the communication and return an appropriate indication to the originating user.

A received INVITE request may include an xml CUGrequestType containing the preferred CUG and an outgoing access request.

NOTE: In particular, a validation check is performed by verifying that both the originating and terminating parties belong to the CUG indicated by the interlock code.
The data for each CUG that a user belongs to, is stored at the AS of the originating User.

The actions at AS of the originating user at communication set-up from a user belonging to a CUG, depends on the result of the validation checks performed, based on whether the user belongs to one or more CUGs.

a) CUG without outgoing access.

If the result of the validation check indicates that the communication should be dealt with as a CUG communication, the interlock code of the selected CUG is obtained. The INVITE request forwarded towards the terminating network then includes the cugInterlockBinaryCode, networkIndicator and cugCommunicationIndicator.

b) CUG communication with outgoing access.

If the result of the validation check indicates that the communication should be dealt with as a CUG communication with outgoing access, the communication shall be treated as a Non-CUG communication.

c) Non-CUG.

If the result of the validation check indicates that the communication should be dealt with as a non-CUG communication, the INVITE request forwarded towards the terminating network then does not include a cugInterlockBinaryCode, networkIndicator and cugCommunicationIndicator

d) Communication rejected.

If the result of the validation check indicates that the communication is to be rejected, the communication set-up is not initiated. A 403 (Forbidden) response including a Reason header field and a cause code as specified in table 4.5.2.4.1 shall be sent back.

Table 4.5.2.4.1: Validation check of CUG communication concerning the originating user

Calling user class defined within the user profile	Indication from originating user sent within an INVITE request				
	INVITE request for CUG with CUGIndex	INVITE request for CUG with CUGIndex & outgoingAccessRequest	INVITE request for CUG communication without CUGIndex	INVITE request for CUG communication without CUGIndex & with outgoingAccessRequest	INVITE request for Non-CUG communication
CUG without preference	CUG communication (*1) (*3) IC: spec. CUG	CUG communication (*1) (*3) IC: spec. CUG	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "62"	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "62"	403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "62"
CUG+OAE without preference	CUG communication (*1) (*3) IC: spec. CUG	CUG+OA (*2) (*3) IC: spec. CUG	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "62"	Non-CUG communication	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "62"
CUG+OAI without preference	CUG+OA (*2) (*3) IC: spec. CUG	CUG+OA (*2) (*3) IC: spec. CUG	Non-CUG communication	Non-CUG communication	Non-CUG communication
CUG with preference	CUG communication (*1) (*3) IC: spec. CUG	CUG communication (*1) (*3) IC: spec. CUG	CUG (*4) communication IC: pref. CUG	403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "62"	CUG communication IC: pref. CUG (*4)
CUG+OAE with preference	CUG communication (*1) (*3) IC: spec. CUG	CUG+OA (*2) (*3) IC: spec. CUG	CUG (*4) IC: pref. CUG	Non-CUG communication	CUG communication (*4) pref. CUG
CUG+OAI with preference	CUG+OA (*1) (*2) (*3) IC: spec. CUG	CUG+OA (*2) (*3) (*1) IC: spec. CUG	(*4) (*5)	CUG+OA (*1) (*4) IC: pref. CUG	(*4) (*5)
No CUG	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "50"	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "50"	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "50"	Return 403 (Forbidden) response including Reason header field set to "Q.850" and cause code set to "50"	Non-CUG communication

OAE	Outgoing access, explicit request required.
OAI	Outgoing access, implicit outgoing access for all communications.
IC	Interlock code of the CUG selected.
spec. CUG	specific CUG indicated within the CUCIndex
pref. CUG	preferred CUG indicated by the user profile
NOTE:	As IA (incoming access) attribute of the calling user is of no concern for this validation check, CUG+OA/IA is equivalent to CUG+OA in this table.
(*1)	In case of OCB (outgoing communications barred) return 603 (Decline) response.
(*2)	In case of OCB within the CUG, the communication is interpreted as a non-CUG communication. An INVITE request without a <code>cugInterlockBinaryCode</code> , <code>networkIndicator</code> and <code>cugCommunicationIndicator</code> shall be sent towards the terminating user.
(*3)	In case the specified index does not match any of the registered indices, 403 (Forbidden) response
(*4)	In the case of OCB within the CUG, this combination is not allowed.
(*5)	Both 'Preferential CUG' and 'implicit' outgoing access options imply that no subscriber procedures are needed to invoke either option when placing a communication. When a user subscribes to both options, the network does not know which option the user is invoking, if no additional procedures are used when placing the communication. Then one of the following operations are recommended: a) if no information is given, the preferential CUG will be assumed, this shall be included in the INVITE request sent towards the terminating user. b) the network will route the communication with preferential CUG with outgoing access. The communication will therefore be connected if the terminating access is: - a member of preferential CUG; or - a member of another CUG with incoming access; or - a non-CUG user.

When a `vnd.etsi.cug+xml` MIME body is included in the outgoing INVITE request the AS shall set the handling parameter in the Content-Disposition for this MIME body to "required" as described in RFC 5621 [7] if outgoing access is not allowed.

- 4.5.2.5 Void
- 4.5.2.6 Void
- 4.5.2.7 Void
- 4.5.2.8 Void
- 4.5.2.9 Void
- 4.5.2.10 Actions at the AS of the terminating user

Table 4.5.2.10.1: Handling of a CUG communication at the AS of the terminating user

CUG Communication Indicator in INVITE request	CUG match check	Class of terminating user				
		CUG		CUG+IA		No CUG
		No ICB	ICB	No ICB	ICB	
CUG with OA not allowed	Match	CUG call	Sent 603 (Decline) response including Reason header field set to "Q.850" , and cause code set to "55"	CUG call	Sent 603 (Decline) response including Reason header field set to "Q.850" , and cause code set to "55"	Sent 403 (Forbidden) response including Reason header field set to "Q.850" , and cause code set to "87"
	No match	Send 403 (Forbidden) response including Reason header field set to "Q.850" , and cause code set to "87"		Send 403 (Forbidden) response including Reason header field set to "Q.850" , and cause code set to "87"		
CUG with OA allowed	Match	CUG call	Sent 603 (Decline) response including Reason header field set to "Q.850" , and cause code set to "55"	CUG+OA call	Non-CUG call	Non-CUG call
	No match	Sent 403 (Forbidden) response including Reason header field set to "Q.850" , and cause code set to "87"		Non-CUG call		
Non-CUG	–	Sent 403 (Forbidden) response including Reason header field set to "Q.850" , and cause code set to "87"		Non-CUG call		
IA Incoming access Non-CUG call OA Outgoing access ICB Incoming communications barred Match The interlock code in the received INVITE request matches one of the CUGs to which the user belongs. No match The interlock code does not match any of the CUGs to which the terminating user belongs. NOTE: As OA attribute of the terminating user is of no concern at the AS of the terminating User , CUG+OA class is equivalent to CUG, and CUG+IA class is equivalent to CUG+IA in this table. Subscription of preferential CUG by the terminating user is also of no concern in this table.						

In case of each successful CUG Check an INVITE request without a CUG xml MIME shall be sent towards the terminating user. Therefore the received CUG xml MIME shall be discarded.

4.5.2.11 Void

4.5.2.12 Actions at the terminating UA

Procedures according to 3GPP TS 24.229 [2] shall apply.

4.6 Interaction with other services

4.6.1 Communication Hold (HOLD)

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

4.6.2 Terminating Identification Presentation (TIP)

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

4.6.3 Terminating Identification Restriction (TIR)

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

4.6.4 Originating Identification Presentation (OIP)

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

4.6.5 Originating Identification Restriction (OIR)

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

4.6.6 Conference calling (CONF)

When the communication involving the first conferee is added to the conference, then the conference shall assume the CUG of that communication.

In order to add a subsequent communication to the conference, then the CUG of that communication shall be checked against the CUG of the conference.

4.6.7 Communication Diversion Services (CDIV)

4.6.7.1 Communication Forwarding Unconditional (CFU)

CUG restrictions shall be checked and met for the communication between the originating party and the forwarding party. The information of a CUG applied by the IMS on the original communication shall be used for the communication forwarding and by this means CUG restrictions shall be checked and met for the communication between the originating party and the forwarded-to party.

In the case of multiple forwarding, CUG restrictions between the originating party and the forwarding party have to be checked and met at each intermediate forwarding point. In addition, CUG restrictions between the originating party and forwarded-to party shall be met end-to-end.

The outgoing communication barring information of the forwarding party shall not be used to determine whether the communication can be forwarded.

The CUG information sent to the "forwarded-to" destination shall the same CUG information of the originating party that was sent from the originating network.

4.6.7.2 Communication Forwarding Busy (CFB)

See interactions with CFU in subclause 4.6.7.1.

4.6.7.3 Call Forwarding No Reply (CFNR)

See interactions with CFU in subclause 4.6.7.1.

NOTE: CUG restrictions were checked and met for the communication between the originating party and the forwarding party when the communication was offered to the forwarding party.

4.6.7.4 Communication Forwarding on Not Logged-in (CFNL)

See interactions with CFU in subclause 4.6.7.1.

4.6.7.5 Communication Forwarding on Subscriber Not Reachable (CFNRc).

See interactions with CFU in subclause 4.6.7.1.

4.6.7.6 Communication Deflection (CD)

The information of a CUG applied by the IMS on the original communication shall be used for the deflected part of the communication and by this means CUG restrictions shall be checked and met for the communication between the originating party and the deflected-to party.

In the case of multiple deflections, CUG restrictions between the originating party and the deflecting party have to be checked and met at each intermediate deflecting point. In addition, CUG restrictions between the originating party and deflected-to party shall be met end-to-end.

When a communication is deflected, a new check of the CUG restrictions between the originating party and the deflected-to party is made at the "deflected-to" destination. The CUG information sent to the 'deflected-to' destination is the same CUG information of the originating party that was sent from the originating network.

The outgoing communication barring information of the deflecting party shall not be used to determine whether the communication can be deflected.

NOTE: CUG restrictions were checked and met for the communication between the originating party and the deflecting party when the communication was offered to the deflecting party.

4.6.8 Malicious Communication Identification (MCID)

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

4.6.9 Anonymous Communication Rejection and Communication Barring (ACR/CB)

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

4.6.10 Explicit Communication Transfer (ECT)

The two communications shall use the same CUG for the transfer to be successful.

NOTE: CUG restrictions between users will have been checked when the first communication is established. Similarly, CUG restrictions between users will have been checked when establishing the second communication.

4.6.11 Closed User Group (CUG)

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

4.6.12 Three-Party (3PTY)

For the successful invocation of the three party service any CUG restrictions applied to one communication shall match with any CUG restrictions applied to the other communication.

4.6.13 Enhanced Calling Name (eCNAM)

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

4.6.14 Multi-Device (MuD)

No impact. Neither service shall affect the operation of the other service.

4.6.15 Multi-Identity (MiD)

In addition to the CUG restrictions for called and calling users, the CUG service restrictions apply to originating calls such that identity C as defined in 3GPP TS 24.174 [8] cannot be used if CUG restricts calling identity C. The CUG restrictions shall also apply at identity C both for the calls from identity A, defined in 3GPP TS 24.174 [8] and for the outgoing calls.

For incoming calls at identity D, defined in 3GPP TS 24.174 [8] that are forwarded according to procedures in 3GPP TS 24.174 [8], the same restrictions as for CDIV apply, see subclause 4.6.7.1.

4.7 Interactions with other networks

4.7.1 Void

4.7.2 Void

4.7.3 Void

Annex A (informative):
Void

Annex B (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2007-11					Publication as ETSI TS 183 054		2.1.0
2007-12					Conversion to 3GPP TS 24.454		2.1.1
2007-12					Technically identical copy as 3GPP TS 24.654 as basis for further development		2.1.2
2008-02					Implemented C1-080094		2.2.0
2008-04					Implemented C1-080812, C1-080896, C1-081100, C1-081101 And alignment with 3GPP Skeleton		2.3.0
2008-05					Implemented C1-81562, C1-81837, C1-81919 Editorial: Change of Keywords, Change of title Incorporation of comments from ETSI Edit help		2.4.0
2008-05	CT#40	CP-080336			Editorial changes done by MCC	2.4.0	2.4.1
2008-06	CT#40	CP-080336			CP-080336 was approved by CT#40 and version 8.0.0 is created by MCC for publishing	2.4.1	8.0.0
2008-06					Version 8.0.1 created to include attachments (.xml and .xsd files)	8.0.0	8.0.1
2008-09	CT#41	CP-080533	0001	1	Alignment of user configuration	8.0.1	8.1.0
2008-09	CT#41	CP-080539	0002	1	Allow SIP based user configuration mechanism for configuring supplementary services	8.0.1	8.1.0
2008-09	CT#41	CP-080533	0003		Applicability statement in scope	8.0.1	8.1.0
2008-12	CT#42	CP-080865	0004		Removal of unused reference in TS 24.654	8.1.0	8.2.0
2008-12	CT#42	CP-080864	0005	2	Interaction between SIP and Ut based service configuration	8.1.0	8.2.0
2008-12	CT#42				Editorial cleanup by MCC	8.1.0	8.2.0
2009-12	CT#46				Upgrade to Rel-9	8.2.0	9.0.0
2010-03	CT#47	CP-100114	0007		Clarification of the use of Content-Disposition in CUG.	9.0.0	9.1.0
2011-03	CT#51				Upgrade to Rel-10	9.1.0	10.0.0
2012-03	CT#55	CP-120097	0014	1	Incorrect XSD for CUG	10.0.0	10.1.0
2012-06	CT#56	CP-120291	0017	2	Wrong xml NetworkIndicator element	10.1.0	10.2.0
2012-06	CT#56	CP-120307	0020	1	CUG failure code specification	10.2.0	11.0.0
2013-03	CT#59	CP-130095	0028	2	Corection of CUG description due to mandatory CUG Index	11.0.0	11.1.0
2014-09	CT#65				Upgrade to Rel-12	11.1.0	12.0.0
2015-12	CT#70				Upgrade to Rel-13	12.0.0	13.0.0

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-03	SA#75					Upgrade to Rel-14	14.0.0
2017-12	CT-78	CP-173071	0029	2	B	Closed User Group (CUG) using IP Multimedia (IM) Core Network (CN) subsystem	15.0.0
2019-12	CT-86	CP-193111	0030	1	B	Adding interactions with "Multi-Device" and "Multi-Identity" services	16.0.0
2022-04	CT-95e	-	-	-	-	Update to Rel-17 version (MCC)	17.0.0

History

Document history		
V17.0.0	April 2022	Publication