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**Universal Mobile Telecommunications System (UMTS);**
**LTE;**
**Combined Circuit Switched (CS)**
**and IP Multimedia Subsystem (IMS) sessions;**
**Stage 1**
**(3GPP TS 22.279 version 13.0.0 Release 13)**


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# Contents

# Foreword

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

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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 service requirements for Combining CS and IMS services using a CS speech or CS multimedia call in association with an IMS session. The IMS session may consist of one or more IMS services.

Requirements for the following capabilities are included:

- Radio capability exchange.
- Terminal capability exchange.
- E.164 number exchange.
- Adding IMS session to an ongoing CS call.
- Adding a CS call to an ongoing IMS session.
- Supplementary services as they relate to CSICS.

It is intended that the capabilities defined herein for CSICS shall support interoperability between different operator networks, and roaming.

# 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 TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TR 22.979: "Feasibility study on Combined CS Calls and IMS Sessions".

[3] 3GPP TS 22.228: "Service requirements for the Internet Protocol (IP) multimedia core network subsystem".

[4] 3GPP TS 22.004: "General on Supplementary Services".

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**Combinational Service:** A combinational service is created by adding one or more IMS session(s) to a CS call (or vice versa). The CS call and IMS session are established between the same participants.

**Combinational call:** this is the name given to the service in which a circuit switched speech teleservice is enriched by adding an IMS session where both services (IMS session and CS call) are originated in one single UE and are terminated in another single UE.

**Combinational Session**: this is the name given to the service in which an ongoing IMS session between two users is enriched by adding a circuit switched based call. The individual service instances that form the combinational session are originated in a single UE and terminated in another single UE.

**CSICS capable UE:** UE that supports Combinational Service.

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply. Additional applicable abbreviations can be found in TR 21.905 [1].

CSICS Circuit Switched IMS Combinational Service

# 4 Introduction to Combinational Service

Combinational services are applicable to both UTRAN and GERAN and enables the unidirectional or bi-directional exchange of PS data within the context of an IMS session

A specific subscription for combinational services is not necessary. However, both users A and B shall as a minimum be provisioned with CS telephony (TS11) as well as for accessing the IMS.

The existing address context is reused when the combined service is established, which makes the combined service simple to invoke for the user.

# 5 General requirements

In addition to the existing IMS requirements [3], the following general requirements apply for CSICS:

It shall be possible to establish a combinational service between two users within the same PLMN or within different PLMNs.

It shall be possible to establish a combinational service between two users camped on identical or different RATs.

It shall be possible to establish a combinational service when roaming, assuming the visited operator supports GPRS roaming.

The user (A or B party) shall only need to know one address in order to establish the combinational service.

It shall be possible to add an IMS session to a CS speech call, thereby creating a combinational call.

It shall be possible to add a CS speech call to an IMS session, thereby creating a combinational session.

It shall be possible to add an IMS session to a CS Multimedia call, thereby creating a combinational call.

It shall be possible to add a CS Multimedia call to an IMS session, thereby creating a combinational session.

The following two service modes will exist in regards to IMS registration depending on different UE implementations:

1) IMS pre established state: the CSICS capable UE performs the IMS registration at switch on.

2) IMS on demand state: the CSICS capable UE performs the IMS registration:

   - to start the communication, or

   - to add a IMS session to an existing CS call.

Interoperability between UEs that implement such different approaches shall be enabled.

During a CS call it shall be possible to request establishment of the IMS session whether the invited UE is IMS registered or not. The invited user shall be able to accept or reject the IMS registration request.

A combinational service shall enable both unidirectional and bi-directional exchange of PS data within the context of the IMS session.

# 6 User experience of combinational services

When one of the participating users terminates the CS call of a combinational service, the IMS session may continue.

When one of the participating users terminates the IMS session of a combinational service, the CS call may continue.

When the user A sends media to a user B, the user B can accept or reject the media (confirmation from the receiving party is needed) and vice versa.

If media, or parts thereof, accepted by a user cannot be rendered by the UE simultaneously with the CS call, conflicts shall be resolved such that the user is presented with:

- CS speech with preference over IMS speech/audio;
- IMS video and images with preference over CS video.

It shall be possible to initiate a combinational service with user perceived simultaneous setup of IMS session and CS call. The CS call and IMS session can be established sequentially and on the failure of any of the setups the user may be prompted to decide whether to continue. The terminating user shall be able to accept or reject CS call or IMS session independently.

# 7 Service Capability Detection

## 7.1 General

The Service Capability Detection may indicate to the user that the UEs have interoperable CSICS capability and that the access network(s) have the necessary network functionality to carry the combinational service.

The detection of the capabilities of the recipient terminal and the operators" networks shall ensure that information is updated in case of change of terminal.

An operator should have the mechanism to inhibit the capability check, or at least indicate to UE that it should not be performed.

Note: An operator may want to inhibit the capability check for CSICS in order to optimise the usage of radio resources.

It shall be possible for the (CSICS capable) UEs to have the information, prior to initiating a combinational service, regarding the type of capabilities, which are jointly supported by both UEs, without user intervention.

Due to the handover of the participating users to an access network which does not support combinational services, service capability detection may be needed during a CS call to notify the user of the service availability.

## 7.2 User privacy

Participants in a CS call or IMS session may choose not to reveal their identity, even though this may prevent the establishment of a combinational session.

During the service capability detection and exchange of information process, the user's privacy settings shall be respected. The applicable privacy settings are as described in clauses 8 and 9. Additionally, the user shall be able to restrict the information exchanged by the service capability detection application and the user's consent should be requested prior to the exchange of information.

NOTE: The terminal is not normally aware of existing Calling Line Identity Restriction / Connected Line Restriction settings in the network, hence the need for the user to be able to configure the service capability detection application not to reveal such information.

# 8 IMS service behaviour during a Combinational Service

There is no standardised supplementary service defined for IMS session, however mechanisms exist (service capabilities) to emulate the behaviour of some of the most common supplementary services that exist in the circuit switched domain. The intention in this clause is NOT to define "supplementary services" for IMS, just to explain the service behaviour during a combinational session for some specific cases as indicated below:

- **IMS session hold**: In an ongoing combinational service, the user may decide to suspend the IMS session. When this service is invoked the user should be able to decide whether the CS call of the combinational service should also be put on hold.

- **IMS session waiting**: In an ongoing combinational service, the user should be able to receive an alert of an incoming IMS session towards his UE. Subject to the capability of the UE, the user should be provided with the option to switch between the ongoing session and the new incoming one, or accept the new one in parallel with the existing one. The CS call of the combinational service should continue during the alerting of the subscriber and the user may decide to put the CS call on hold when switching to the new IMS session.

- **IMS session redirect:** It should be possible to add CS call to a redirected IMS session, subject to the capability of the recipient UE.

- **Identity presentation:** Existing Session Originator Identity Presentation rules apply to IMS session.

- **Identity restriction:** Existing Session Originator Identity Presentation Suppression rules apply to IMS session, even if this results in the called party being unable to establish a combinational session.

# 9 Interaction with supplementary services

The current section lists the supplementary services as specified in 3GPP TS 22.004 [4].

## 9.1 Line Identification

### 9.1.1 Calling Line Identity Presentation (CLIP)

When CLIP is used in conjunction with a combinational service, it shall function as specified for CS voice and data calls.

If the called party does not subscribe to CLIP or the CLI is not available, then the called party"s UE may treat an incoming IMS session as an independent IMS session and the called party may establish an independent IMS session with the calling party.

### 9.1.2 Calling Line Identity Restriction (CLIR)

Existing CLIR rules apply, even if this results in the called party being unable to establish a combinational call.

If a calling party uses CLIR when establishing a CS call, either by subscription or per call basis, and the called party does not have CLIR override, then the called party"s UE may treat an incoming IMS session as an independent IMS session and the called party may establish an independent IMS session with the calling party.

If the CLI of the calling party is restricted as a result of CLIR, then the calling party"s UE or the network shall ensure that the Public User Identity of the calling party is also restricted when establishing an outgoing IMS session associated with this CS call and when responding to an incoming IMS session associated with this CS call.

### 9.1.3 Connected Line Identification Presentation (COLP)

When COLP is used in conjunction with a combinational service, it shall function as specified for CS voice and data calls.

If the calling party does not subscribe to COLP or the COL is not available, then the calling party"s UE may use the called party number of the CS call, as provided by the UE to the network, to correlate an incoming IMS session with the CS call and to establish an IMS session associated with the CS call.

### 9.1.4 Connected Line Identification Restriction (COLR)

Existing COLR rules apply, even if this results in the calling party being unable to establish a combinational call.

If the called party subscribes to COLR and the calling party does not have COLR override, then the calling party"s UE may use the called party number of the CS call, as provided by the UE to the network, to correlate an incoming IMS session with the CS call and to establish an IMS session associated with the CS call.

If the COL of the called party is restricted as a result of COLR, then the called party"s UE or the network shall ensure that the Public User Identity of the called party is also restricted when establishing an outgoing IMS session associated with this CS call and when responding to an incoming IMS session associated with this CS call.

## 9.2 Name Identification

### 9.2.1 Calling Name Presentation (CNAP)

When CNAP is used in conjunction with a combinational service, it shall function as specified for CS calls.

## 9.3 Call Forwarding

### 9.3.1 Call Forwarding Unconditional (CFU)

Call forwarding unconditional shall not prevent the calling party or the called party from adding an IMS session to the CS call. Refer to the clause on Line Identification for the usage of the CLI and COL for establishing an IMS session associated with the CS call and for correlating an incoming IMS session with the CS call.

### 9.3.2 Call Forwarding on Busy (CFB)

Refer to CFU.

### 9.3.3 Call Forwarding on No Reply (CFNRY)

Refer to CFU.

### 9.3.4 Call Forwarding on Not Reachable (CFNRC)

Refer to CFU.

### 9.3.5 Call Deflection (CD)

Refer to CFU.

## 9.4 Call Offering

### 9.4.1 Explicit Call Transfer (ECT)

At the moment that the subscriber invokes ECT, she may have an IMS session ongoing with either or both of the CS call parties. The user may keep or terminate these IMS sessions when ECT is invoked. The two CS call parties that are in speech connection after the invocation of ECT, have not exchanged Radio Network and Terminal capabilities with one another. Neither are these two call parties aware of one another"s Line Identification. These parties are therefore not capable of initiating IMS sessions, associated with the CS call.

## 9.5 Call Completion

### 9.5.1 Call Waiting (CW)

When a second CS call arrives during an ongoing combinational call, the IMS session of the ongoing combinational call shall not be affected. When the user decides to place the ongoing CS call on hold and accept the second CS call, then the rules as specified for Call Hold apply for the ongoing CS call that is placed on hold. When the incoming, waiting CS call is accepted, the calling party"s UE and called party"s UE may exchange terminal capability and radio network capability. An IMS session may be established associated with the second CS call, when that CS call is accepted. The IMS session(s) for the second CS call may run concurrently with the IMS session(s) for the CS call that is on hold.

### 9.5.2 Call Hold (CH)

When a user places a CS call on hold, the user may decide to suspend an IMS session associated with that CS call, or to terminate the IMS session. When a held CS call is resumed, an associated IMS session that was suspended when that CS call was placed on hold, may be resumed. The user may decide whether new IMS sessions may be created for a CS call when that CS call is currently in the held state.

For the second CS call that may be established or accepted when a first CS call is placed on hold, the calling party"s UE and called party"s UE may exchange terminal capability and radio network capability. An IMS session may be established associated with the second CS call, when that second call is active.

### 9.5.3 Call Completion to Busy Subscriber (CCBS)

Not part of the scope of the present specification.

### 9.5.4 Multi Call (MC)

Not part of the scope of the present specification.

## 9.6 Multi Party

### 9.6.1 Multi Party call (MPTY)

Not part of the scope of the present specification.

## 9.7 Community of Interest

### 9.7.1 Closed User Group (CUG)

No impact. When the establishment of an outgoing CS call or the acceptance of a CS incoming call is barred due to CUG, that shall not affect the calling or called party"s ability to establish IMS sessions with the other party. However, these IMS sessions will not be considered "combinational".

## 9.8 Charging

### 9.8.1 Advice of Charge - Information (AOCI)

When AOCI is used in conjunction with a combinational service, it shall function as specified for CS calls and packet data service.

### 9.8.2 Advice of charge – Charge (AOCC)

Refer to AOCI.

## 9.9 Additional Info Transfer

### 9.9.1 User-to-User Signalling service 1 (UUS1)

When UUS1 is used in conjunction with a combinational service, it shall function as specified for CS voice and data calls.

### 9.9.2 User-to-User Signalling service 2 (UUS2)

When UUS2 is used in conjunction with a combinational service, it shall function as specified for CS voice and data calls.

### 9.9.3 User-to-User Signalling service 3 (UUS3)

When UUS3 is used in conjunction with a combinational service, it shall function as specified for CS voice and data calls.

## 9.10 Call Barring

### 9.10.1 Barring of All Outgoing Calls (BAOC)

When the establishment of an outgoing CS call is barred due to BAOC, that shall not affect the calling party"s ability to establish IMS sessions with the other party. However, these IMS sessions will not be considered "combinational".

### 9.10.2 Barring of Outgoing International Calls (BOIC)

Refer to BAOC.

### 9.10.3 Barring of Outgoing International Calls except to HPLMN country (BOIC-exHc)

Refer to BAOC.

### 9.10.4 Barring of All Incoming Calls (BAIC)

When the acceptance of an incoming CS call is barred due to BAIC, that shall not affect the called party"s ability to establish IMS sessions with the other party. However, these IMS sessions will not be considered "combinational".

### 9.10.5 Barring of All Incoming Calls when roaming outside HPLMN country (BICROAM)

Refer to BAIC.

## 9.11 Call Priority

### 9.11.1 Enhanced Multi Level Precedence Pre-emption (EMLPP)

When a CS call cannot be established due to a lower precedence this shall not affect the user"s ability to establish IMS sessions to another party. However, these IMS sessions will not be considered 'combinational'.

It shall be possible to pre-empt a CS call which is part of a combinational service.

It shall be possible to add a precedence call to an IMS session.

# 10 Impacts on other services

## 10.1 Support of Teleservices during a combinational service

It should be possible to send and receive an SMS while engaged in a combinational service.

## 10.2 Support of Location Services during a combinational service

It shall be possible to locate a user engaged in a combinational service.

# 11 Charging aspects for Combinational Service

For combinational services, it must be possible to charge as follows:

It shall be possible to provide charging information on the CS call and IMS session for correlation purposes in order to allow off-line charging.

The charging information shall continue to be produced for any remaining multimedia components or the CS call when a multimedia component or the CS call drops during the communication between the two parties.

Note: The below requirement will presumably not be feasible within Rel-7 timeframe, but may be considered in Rel-8.

The home operator should be able to correlate charged media components and CS call in order to introduce dedicated charging schemes, e.g. discounts. This applies to on-line charging as well as off-line charging.

# 12 Provisioning

The combinational service should not place additional provisioning requirement on the operator.

# Annex A (informative): Change history

| Change history | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TSG SA#** | **SA Doc.** | **SA1 Doc** | **Spec** | **CR** | **Rev** | **Rel** | **Cat** | **Subject/Comment** | **Old** | **New** | **WI** |
| 2005-01 | | | | | | | | First Draft | | 0.0.0 | |
| 2005-04 | | | | | | | | Output from SA1 #28 Beijing | 0.0.0 | 1.0.0 | |
| 2005-07 | | | | | | | | Output from SA1 #29 SWG in Povoa de Varzim | 1.0.0 | 1.1.0 | |
| 2005-07 | | | | | | | | Output from SA #29 plenary | 1.1.0 | 2.0.0 | |
| SP-29 | SP-050517 | | | | | | | Approved at SA #29 | 2.0.0 | 7.0.0 | |
| SP-30 | SP-050745 | S1-051125 | 22.279 | 0001 | - | Rel-7 | F | UE behaviour for simultaneous rendering of CS call and IMS media _(Action A29-07 from SA#29) | 7.0.0 | 7.1.0 | CSICS |
| SP-30 | SP-050745 | S1-051148 | 22.279 | 0002 | - | Rel-7 | F | CR to TS22.279 for correction of the term | 7.0.0 | 7.1.0 | CSICS |
| SP-30 | SP-050745 | S1-051152 | 22.279 | 0003 | - | Rel-7 | F | Clarification of supplementary servces requirements for CSICS | 7.0.0 | 7.1.0 | CSICS |
| SP-42 | - | - | | | | Rel-8 | | Updated from Rel-7 to Rel-8 | 7.0.0 | 8.0.0 | |
| SP-46 | - | - | - | - | - | - | - | Updated to Rel-9 by MCC | 8.0.0 | 9.0.0 | |
| 2011-03 | - | - | - | - | - | - | - | Update to Rel-10 version (MCC) | 9.0.0 | 10.0.0 | |
| 2012-09 | - | - | - | - | - | - | - | Updated to Rel-11 by MCC | 10.0.0 | 11.0.0 | |
| 2014-10 | | | | | | | | Updated to Rel-12 by MCC | 11.0.0 | 12.0.0 | |
| 2015-12 | - | - | - | - | - | - | - | Updated to Rel-13 by MCC | 12.0.0 | 13.0.0 | |

# History

| Document history | | |
|---|---|---|
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