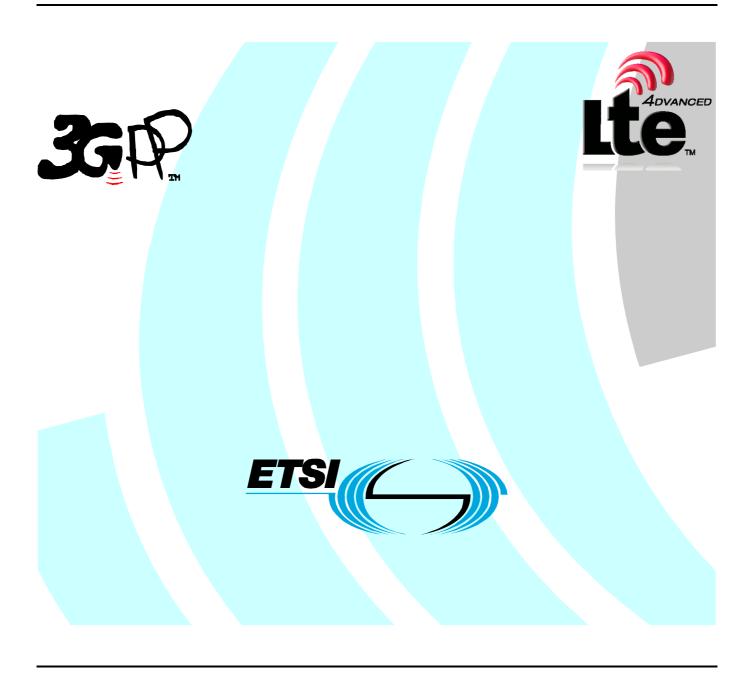# ETSI TR 122 973 V10.0.0 (2011-05)

Technical Report

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
IMS Multimedia Telephony service;
and supplementary services
(3GPP TR 22.973 version 10.0.0 Release 10)**

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Contents

Foreword

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Introduction

In addition to reusing the IMS system as defined by 3GPP, TISPAN is defining an IMS based Multimedia Telephony service, which is an evolution of the CS based Telephony service provided by traditional ISDNs and PSTNs [2].

A similar service, defined by 3GPP, is needed for wireless access to IMS, in order to be able to define services to the end-users, and to support interoperability in multi-vendor and multi-operator environment and to provide the user with the same experience across the different IP based accesses and domains

1   Scope

This Technical Report defines the IMS Multimedia Telephony service and associated supplementary services for IMS. It aims to take account and build on the IMS capabilities already provided in 3GPP Release 5 and Release 6.

The objective is to define the minimum set of capabilities required in the IP Multimedia Subsystem to secure multi-vendor and multi-operator inter-operability for the IMS Multimedia Telephony service and related Supplementary Services.

Close cooperation shall be sought with TISPAN. TISPAN requirements, as captured in [2], will be taken into account, and referred to where appropriate.

While the user experience for the IMS Multimedia Telephony service is expected to have some similarity to existing telephony services, the richer capabilities of IMS will be exploited.

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]   ETSI TS 181 002: " Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services", version 1.1.1.

[3]   ETSI TS 181 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Videotelephony over NGN; Stage 1 service description".

[4]   3GPP TS 22.228: "Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS); Stage 1".

[5]   3GPP TR 23.816: "Identification of communication services in IMS".

Note: Reference [5] is an internal report to 3GPP, available via
http://www.3gpp.org/ftp/Specs/html-info/23816.htm

3   Definitions, symbols and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

(none)

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

(none)

4 Service description

4.1 General service characteristics

The IMS Multimedia Telephony service should allow multimedia conversational communications between two or more users. It provides real time bidirectional conversational transfer of speech, video or optionally other types of data.

The IMS Multimedia Telephony service is point to point between terminals communicating , or a terminal and a network entity. This communication is usually symmetrical, but in special cases the media components present in each direction may be different, or they may be the same but with different bit rates and Quality of Service.

An IMS Multimedia Telephony service can start with only one type of media and additional types of media may or may not be added by the users as the communication progress. Therefore a particular IMS Multimedia Telephony service may consist of only one type of media, e.g. speech.

The IMS Multimedia Telephony service is different from other IMS based services, such as Push to Talk over Cellular (PoC).
Its characteristics includes the following:

- IMS Multimedia Telephony is a service where speech, and speech combined with other media components, is the typical usage but the service is not limited to always include speech, it also caters for other media or combinations of media (e.g. text and video).

- The IMS Multimedia Telephony service includes supplementary services. The behaviour of supplementary services is almost identical to supplementary services for CS voice (TS 11)

Note: Most supplementary services are active in the set-up phase. Mid session supplementary services such as session transfer and session hold exist.

- The anticipated usage model is that of traditional telephony: one user connecting to any other user, regardless of operator and access technology..

4.2 Default media handling capabilities of the IMS Multimedia Telephony service

The IMS Multimedia Telephony service can support many different types of media and the default set of capabilities include the following:

- Full duplex speech

- Real time video (simplex, full duplex), synchronized with speech if present.

- Text communication

- File transfer,

- Video clip sharing, picture sharing, audio clip sharing. Transferred files may be displayed/replayed on receiving terminal for specified file formats.

At least one common standardized format (e.g. JPEG, AMR) shall be supported per media type.

The IMS Multimedia Telephony service should at least support the following handling of media

- Adding and removing individual media to/from a IMS Multimedia Telephony communication

5 Service requirements

General service requirements as specified for IMS services in [4] apply.

6 Quality of Service (QoS)

General QoS requirements as specified for IMS services in [4] apply.

7 Interworking considerations

7.1 Interworking with CS domain

Standardisation of interworking between the IMS domain and the CS domain for multimedia telephony communications is provided as specified in [4].

7.2 Interworking with external networks

General interworking requirements with external networks as specified for IMS services in [4] apply.

8 Supplementary services

8.1 Background

8.1.1 General considerations on supplementary services in IMS

With the specification of the IP Multimedia Subsystem (IMS see [4]) 3GPP has created a basis for flexible deployment of a multitude of IP based services. In contrast to GSM, which defined a set of bearer- and teleservices that were complemented by a number of supplementary services, 3GPP did not pursue that but rather specified "IP multimedia sessions" within the concept of IMS.

8.1.2 IMS services

An "IP multimedia session" could carry any combination of media (voice, video, text …) and the services, that make use of these IMS sessions, need not be standardised. However, in the last years non-3GPP standardisation bodies like the Open Mobile Alliance (OMA) have created standards for several IMS based services (e.g. PoC, "Presence Simple" and others)
The user primarily distinguishes, understands and experiences these services, not the sessions therein. For example, PoC may set up a session, that transports voice in just the same way as a IMS Multimedia Telephony service would, but for the user these are two different services.

8.1.3 Supplementary services

The user may handle supplementary services to the examples given above differently (e.g. he may choose to hide his identity in the PoC chat group while still providing it in a IP Multimedia telephone call).
In IMS supplementary services apply to individual services. An IMS service – at least in this respect – can roughly be considered as the analogue to the bearer- or teleservices of GSM.

Note: To be able to apply a supplementary service to individual IMS services these services need to be identifiable. Currently SA2 is working on this task (see [5]).

A single supplementary service, when applied to two different IMS services, may not only have different user-settings, as in the example above, but even may have different service behaviour. For example when forwarding is applied to an IMS service, that mimics a voice call, then activating the forwarding would simply forward the call to the intended destination. But when forwarding is applied to a different, more complex multimedia service, the user may be able to e.g. only forward the video part to a different destination (e.g. his PDA, that has a bigger screen or to a recording device) and keep the speech part on his telephone.

For the reasons described above we can not hope to be able to define supplementary services, that can 'generically' be applied to IMS services.

8.1.4 'Building blocks' of supplementary services

The approach taken in 3GPP is that IMS provides 'building blocks' such that supplementary services for a particular IMS service can be constructed from these building blocks.
Staying with the last example we could e.g. define a building block that forwards the speech (or video) component of a IMS service to a different terminal. Ideally, such a building block would be (re-)usable for any IMS service.

In the following sections it is analyzed, whether these 'building blocks' are sufficient for the purpose of providing the Supplementary Services, listed in [2] and [3] to the IMS Multimedia Telephony service.

8.1.5 Service consistency with CS supplementary services

The IMS Multimedia Telephony service provides a telephony service and a videotelephony service for the IMS, which can be considered the equivalent in the IMS of the respective CS based services (Teleservice 11 and Bearerservice 30). In addition the IMS Multimedia Telephony service specifies a number of supplementary services that provide an almost identical service experience to the user as the respective CS based supplementary services.

Therefore with the introduction of IMS Multimedia Telephony – unlike 22.228 – the *same* user may make/receive a voice (or video) service via two different systems (CS and PS/IMS). Moreover, during an ongoing voice call, Voice Call Continuity (VCC) may be invoked to enable a smooth transition of the voice call between the two systems. In the case that VCC has turned a CS voice call into an IMS voice call, this IMS voice call is considered an instance of the IMS Multimedia Telephony service with a voice component.

Note, that currently, a function like VCC for video calls does not exist.

As CS voice (and video) services have been established for a long time the user will expect the same service behaviour, whether he places a voice (or video) call via the CS domain or via IMS. Often a user may even not know how his call is set up. In this case a different service behaviour of the call – one time set-up via the CS domain and at another time via IMS – would be very annoying.

The following figure depicts this service-interworking.

8.2   Comparisons between CS supplementary services and existing IMS capabilities

8.2.1   Line Identification services

8.2.1.1   CLIP

The CLIP service provides presentation of the calling line identity to the called party. In IMS this is technically provided already using the P-Asserted Identity header.

Comparison of CS-CLIP and IMS capabilities

	CS-Domain	**IMS**
Provisioning	Users only receive line identity if CLIP is provisioned	All IMS users are capable of receiving line identity
Identity format	E.164 number	SIP or TEL URL (Tel URL includes E.164 number)
Override	Override capability may be provisioned per subscriber.	Network behaviour may provide an override function to meet local needs, but there is no standard per-subscriber provisioning of override.
Interrogation	Users may interrogate using a standard procedure to determine the state of their CLIP service	No standard interrogation feature is provided.

The IMS provides the core CLIP functionality.

8.2.1.2 CLIR

The CLIR service allows the calling party to restrict the presentation of their identity to the called party. In IMS this is technically provided using the Privacy header.

Comparison of CS-CLIR and IMS capabilities

	CS-Domain	**IMS**
Provisioning	Only users provisioned with CLIR may restrict their identity	All IMS users are capable of restricting their identity on a per session basis.
Temporary mode	CLIR can be provisioned in temporary mode (users select per call whether to invoke CLIR) or permanent mode (CLIR is always invoked). In temporary mode there are two options: default is to present identity, default is to restrict identity.	All IMS users are capable of restricting their identity on a per session basis. Unless requested by the user the identity is normally made available for presentation.
Interrogation	Users may interrogate using a standard procedure to determine the state of their CLIR service	No standard interrogation feature is provided.

As can be seen the current IMS behaviour corresponds to the CS-Domain use of CLIR in a temporary mode.

IMS sessions are not intended to be anonymous to the originating or terminating network operators (see [4]). Therefore, even if a user has requested to withhold his identity both, the originating and terminating network operators are able to identify the user (e.g. for Lawful intercept purposes, for destination users with override category or Malicious Communication Identification MCID).

8.2.1.3 COLP

The COLP service provides the calling party with the possibility to receive the line identity of the connected party. In IMS this is technically provided by the P-Asserted-Identity header in response messages from the connected party.

Comparison of CS-COLP and IMS capabilities

	CS-Domain	**IMS**
Provisioning	Only users provisioned with COLP may receive the identity of the connected party	All IMS users are capable of receiving the line identity of the connected party via response messages to requests
Identity format	E.164 number	SIP or TEL URL (Tel URL includes E.164 number)
Override	Override capability may be provisioned per subscriber.	Network behaviour may provide an override function to meet local needs, but there is no standard per-subscriber provisioning of override.
Interrogation	Users may interrogate using a standard procedure to determine the state of their COLP service	No standard interrogation feature is provided.

The COLP service can be implemented using SIP mechanisms in IMS.

8.2.1.4 COLR

The COLR service enables the connected party to prevent presentation of its line identity to the calling party. In IMS this is technically provided using the Privacy header.

Comparison of CS-COLR and IMS capabilities

	CS-Domain	**IMS**
Provisioning	Only users provisioned with COLR may restrict their identity	All IMS users are capable of restricting their identity in response messages on a per session basis
Interrogation	Users may interrogate using a standard procedure to determine the state of their COLR service	No standard interrogation feature is provided.

The IMS provides the core COLR functionality.

8.2.2   Call Forwarding

Four standard flavours of call forwarding are standardised for the CS-domain. These are:

-    Call Forwarding Unconditional (CFU)

-    Call forwarding on mobile subscriber busy (CFB)

-    Call forwarding on no reply (CFNRy)

-    Call forwarding on mobile subscriber not reachable (CFNRc)

IMS does not provide any standard call forwarding service. However IMS provides the ability to build applications that can redirect sessions on the users behalf based on many different types of criteria. Many IMS users will be provided with a "personal agent" service that is able to route incoming calls based on sophisticated and personalised criteria including the subscriber's call state.

CS-domain call forwarding provides a standard mechanism to allow the user to set forwarding parameters ("registration/activation") using dedicated procedures on the mobile. In contrast IMS servers may allow users to change their personal agent's criteria using non-service specific technology such as a Web or WAP interface. These Web/WAP pages may be integrated in to the operator's portal.

Comparison of CS-Call Forwarding and non-standard IMS "personal agent" capabilities.

	CS-Domain	**IMS personal agent**
Criteria	Four standard criteria only (CFU, CFB, CFNRy, CFNRc)	Four criteria supported by CS-domain are possible along with other criteria adapted to individual requirements (time of day, identity of caller, day of week etc.). Also see Call Waiting below for differences related to the definition of "busy" in IMS.
Provisioning	Provisioned in HLR based on standard data structure.	Provisioned in IMS application server and HSS based on data structure defined by server provider.
User data manipulation	Activation, deactivation, registration, erasure and interrogation are possible from the mobile via dedicated service-specific procedures.	Users may manipulate data via non-service specific technology such as a Web or WAP interface.
Notifications	Notifications to other parties controlled by subscription.	Control of notifications may be built in to the design of the IMS personal agent.

8.2.3 Call Waiting and Call Hold

8.2.3.1 Call Waiting

The purpose of the CS-domain call waiting service is to allow a second incoming call to alert a user who is "busy" on a first call. Providing the call waiting service changes the definition of Network Determined User Busy (NDUB) in the CS-domain.

The concept of call waiting originates in the circuit-switched PSTN where there is a single analogue line and signalling path between the network and the user. These ideas were copied in to GSM which had similar restrictions on its radio interface. In the context of IMS the hardcoded limits on ongoing sessions do not exist. It is always possible to signal the request for a new incoming session to the user regardless of how many ongoing sessions the user already has. The user's terminal is then able to decide whether or not to accept the call based on its physical capabilities or user preference. The only case in which network busy conditions may exist in IMS are in case of resource exhaustion or in response to a non-standardised behaviour introduced by a users personal agent.

Comparison of CS call waiting and IMS capabilities.

	CS-Domain	IMS capabilities
Provisioning	A user must be provisioned with call waiting in order to be able to receive a new incoming call while there is already a call ongoing.	All users are capable of receiving new incoming sessions even if they have a session ongoing.
User data manipulation	The user may activate, deactivate or interrogate call waiting via dedicated service-specific procedures	By default incoming sessions will always be presented to the called user. The terminal handling of these sessions may depend on non-standard data input by the user. In addition the network may provide a non-standard personal agent service (see above) which may use the existence of other IMS sessions as criteria in their call handling. Users may manipulate personal agent data via non-service specific technology such as a Web or WAP interface
Notifications	Notification is provided to the calling party that the call is waiting.	No special notification is given to the calling party unless a personal agent service provides one.

8.2.3.2 Call Hold

Call hold allows the user to suspend an ongoing session and stop sending media. IMS provides a very similar function by the use of the SIP update procedure.

The main difference between CS-domain call hold and IMS capabilities is that in the CS-domain there are certain restrictions on the allowed combinations of held and active calls which do not apply to IMS sessions (IMS permits more than one active session).

None the less the treatment of call hold in the CS domain and IMS is very similar.

8.2.4 Call Barring

The CS-domain outgoing call barring services limits the permitted calls to or from specific groups of destinations. The user may activate and deactivate call barring services under the control of a password.

IMS does not intrinsically provide call barring services. However it is possible to bar certain types of call using a non-standard IMS call barring application.

Comparison of CS-Outgoing Call Barring and non-standard IMS "barring application" capabilities.

	CS-Domain	IMS barring application
Criteria	Standard criteria only	Flexible choice of criteria is possible.
Provisioning	Provisioned in HLR based on standard data structure.	Provisioned in IMS application server and HSS based on data structure defined by server provider.
User data manipulation	Activation, deactivation and interrogation are possible from the mobile via dedicated service-specific procedures.	Users may manipulate data via non-service specific technology such as a Web or WAP interface.

8.3 Analysis of TISPAN Multimedia Telephony supplementary services

TISPAN has defined an IMS based Multimedia telephony service to be used for fixed access. This service consists of both a basic communication service and associated supplementary services (called simulation services in TISPAN specifications). The basic communication and its supplementary services in general are described in [2] while its requirements related to the video component are described in [3]. This chapter analyzes if the TISPAN supplementary services are applicable for mobile access and if they can be reused by 3GPP.

The table consists of all TISPAN supplementary services as found in [2] with its relevant subchapter in the left column below.

Each of these services has been analysed and are marked as:

- **Access Dependency**: User experience of the service depends on if the end user is using a mobile or fixed access.

- **No Access Dependency**: User experience of the service does not depend on whether the user is using a mobile or fixed access.

- **Referable**: The TISPAN definition can be directly referred to by 3GPP.

- **Not referable:** The TISPAN definition is not referable by 3GPP.

- **Endorsed**: The supplementary service shall be standardized by 3GPP according to the TISPAN definition.

Chapter in [2]	Supplementary service name	Comments	Capability exists in IMS stage 1	Result	Recommendation
8.2.1	Originating Identification Presentation (OIP)	No access dependency.	Yes OIP is based on "7.6.1 Presentation of session originator identity" in 22.228.	Referable	Endorsed

8.2.2	Originating Identification Restriction (OIR)	No access dependency.	Yes OIR is based on "7.6.1 Presentation of session originator identity" in 22.228.	Referable	Endorsed
8.2.3	Terminating Identification Presentation (TIP)	No access dependency.	Yes TIP is based on "7.7.3 Presentation of identity of connected-to party of a session" in 22.228.	Referable	Endorsed
8.2.4	Terminating Identification Restriction (TIR)	No access dependency.	Yes TIR is based on "7.7.3 Presentation of identity of connected-to party of a session" in 22.228.	Referable	Endorsed
8.2.5	Malicious Communication Identification (MCID)	No access dependency. Note: MCID is not part of the CS supplementary services in GSM.	No	Referable (see note 2)	FFS
8.2.6	Anonymous Communication Rejection (ACR)	No access dependency. Note: ACR is not part of the CS supplementary services in GSM. (ACR could be implemented in the terminal)	No	Referable	FFS
8.3.1	Communication Diversion (CDIV)	Communication Forwarding Unconditional has No Access Dependency Communication Forwarding on Busy user has No Access Dependency Communication Forwarding on no Reply has No Access Dependency Communication Forwarding on Not Logged-in has No Access	Yes The CDIV services are based on "7.4 Redirecting of IP Multimedia sessions" in 22.228.	Referable	Endorsed

		Dependency Communication Deflection has No Access Dependency Also, one more Communication Diversions service is mentioned in 8.6 for unreachable subscriber It is recommended that the "busy" condition is derived by the terminal.			
8.3.2	Communication Waiting (CW)	8.2.2 is only applicable to a network centric Communication Waiting service. The Communication Waiting service when applied as a result of the user or UE indicates busy is best supported by functions in the terminal only. Therefore a full terminal centric service is recommended. The TISPAN extensions rest on access specific features.	No	Not referable (see note 1) Not included in TISPAN R1 stage 3. Candidate for TISPAN R2. The service in TISPAN stage 1 is not the same as the CW service for CS Terminal centric solution can still be supported but do not require further standardisation. This should only be done in the terminal.	Not considered for current 3GPP release.
8.3.3	Communication Hold (HOLD)	No Access Dependency. This TISPAN service is based on the capabilities specified in 22.228 with regard to suspend and resume an ongoing session.	Yes HOLD is based on "7.7.2 Suspending and resuming of an ongoing session" in 22.228.	Referable	Endorsed
8.3.4	Communication Barring (CB)	No Access Dependency Both outgoing and incoming calls can be barred. The service shouldn't prevent that the terminal can also do some	No	Referable The Incoming Communication Barring (ICB) service needs to be extended with a roaming condition. The roaming	Endorsement with modification

		local barring but the network version may have more capabilities in terms of the conditions it can use to determine if barring is to be applied.		condition evaluates to true when the served user is roaming. This is not currently supported by TISPAN R1	
8.3.5	Completion of Communications to Busy Subscriber (CCBS)	8.2.5 is only applicable to a network centric CCBS service. The complexity is high for a network centric solution and the traditional concept of a busy subscriber is not valid any more for IP Multimedia. Therefore it's recommended that this should not be standardized by 3GPP. Not included in TISPAN R1 stage 3. Candidate for TISPAN R2.	No	Not referable (see note 1)	Not considered for current 3GPP release.
8.3.6	Message Waiting Indication (MWI)	No Access Dependency	No	Referable	Endorsed
8.4.1	Conference (CONF)	No Access Dependency	Yes CONF is based on "7.10 Handling of conferences" in 22.228.	Referable	Endorsed
8.4.2	Advice of Charge (AOC)	No Access Dependency. Note: AOC is not included in TISPAN R1 since TISPAN stage 3 will not be ready in time with regard to this feature. Candidate for TISPAN R2.	Yes	Not referable	Not considered for current 3GPP release.
8.4.3	Explicit Communication Transfer (ECT)	No Access Dependency.	Yes ECT is based on "7.4 Redirecting of IP Multimedia sessions" in 22.228.	Referable	Endorsed
8.4.4	Reverse Charging	Stage 1 is not finalised and is not currently included in TISPAN R1.	No	Not referable	Not considered for current 3GPP release.

		TISPAN stage 3 is not started.			

Note 1: As can be seen above, the services for **Communication Waiting** (CW) and **Completion of Communications to Busy Subscriber** (CCBS) are treated differently compared to the others. This is due to the fact that the handling of busy is not the same in IMS as in CS.

Note 2: The regulatory framework for VoIP is still under discussion, but it may be safe to assume that an operator, which has its own network and is providing communications service with E.164 numbers over that network, will be subject to the same requirement that exists today, which are for fixed networks.

8.3.1 Analysis result

This analysis has come to the conclusion that the following TISPAN supplementary services are suggested to be included into the 3GPP system.

8.3.1.1 Originating Identification Presentation (OIP)

All elements of clause 8.2.1 of reference [2] apply, except for the following clause, which does not apply:

- 8.2.1.2.3 Communication Waiting (CW).

8.3.1.2 Originating Identification Restriction (OIR)

All elements of clause 8.2.2 of reference [2] apply.

8.3.1.3 Terminating Identification Presentation (TIP)

All elements of clause 8.2.3 of reference [2] apply.

8.3.1.4 Terminating Identification Restriction (TIR)

All elements of clause 8.2.4 of reference [2] apply.

8.3.1.5 Communication Diversion (CDIV)

All elements of clause 8.3.1 of reference [2] apply, except for the following clauses, which do not apply:

- 8.3.1.2.2 Malicious Communication Identification (MCID)

- 8.3.1.2.3 Anonymous Communication Rejection (ACR)

- 8.3.1.2.5 Communication Waiting (CW)

- 8.3.1.2.7 Completion of Communications to Busy Subscriber (CCBS)

- 8.3.1.2.8 Advice of Charge (AOC).

8.3.1.6 Communication Hold (HOLD)

All elements of clause 8.3.3 of reference [2] apply.

8.3.1.7 Communication Barring (CB)

All elements of clause 8.3.4 of reference [2] apply with the following addition:

The ICB service is extended with a roaming condition. The roaming condition is set to true when the served user is roaming.

8.3.1.8 Message Waiting Indication (MWI)

All elements of clause 8.3.6 of reference [2] apply.

8.3.1.9 Conference (CONF)

All elements of clause 8.4.1 of reference [2] apply, except for the following clause, which does not apply:

- Advice of charge services (AOC).

8.3.1.10 Explicit Communication Transfer (ECT)

All elements of clause 8.4.3 of reference [2] apply, except for the following clause, which does not apply:

- 8.4.3.2.4 Advice of charge services (AOC).

8.4 Potential supplementary service not described by TISPAN

TISPAN has not defined a Communication Diversion simulation service that is applicable to the condition subscriber being temporary unreachable, e.g. due to lack of radio coverage. The following text is therefore suggested:

"Communication Diversion: Communication Forwarding on Mobile Subscriber Not Reachable

This service permits a served user to have the network redirect all incoming communications, or just those associated with a specific service, addressed to the called mobile subscriber's address, but which is not reachable, to another address. The ability of the served mobile subscriber to originate communication is principally unaffected, but practically it is affected if the mobile subscriber is de-registered, if there is radio congestion or if the mobile subscriber for example is being out of radio coverage. If this service is activated, a communication is forwarded only if the mobile subscriber is not reachable.

The maximum number of diversions permitted for each communication is a service provider option. The service provider shall define the upper limit of diversions. When counting the number of diversions, all types of diversion are included."

8.4.1 Service interactions with other supplementary services

Communication Diversion: Communication Forwarding on Mobile Subscriber Not Reachable (CFNRc) shall interact with the following supplementary services in exactly the same way as described in [2] for Communication Forwarding No Reply (CFNR):

Originating Identification Presentation (OIP)
Originating Identification Restriction (OIR)
Terminating Identification Presentation (TIP)
Terminating Identification Restriction (TIR)
Communication Diversion (CDIV); Communication Forward Unconditional
Communication Diversion (CDIV); Communication Deflection
Communication Diversion (CDIV); Communication Forward On not Logged-in
Communication Hold (HOLD)
Communication Barring (CB)
Message Waiting Indication (MWI)
Conference (CONF)

CFNRc shall interact with the following services according to the following:

Communication Diversion (CDIV); Communication Forward Busy

If the terminating party is network determined busy, then CFB shall take precedence over CFNRc. Otherwise, if the terminating party is not network determined then there is no impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

Communication Diversion (CDIV); Communication Forward No Reply

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

Explicit Communication Transfer (ECT)

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

9 Conclusion

The conclusion from this report is to recommend 3GPP to standardise a service with the name IMS Multimedia Telephony service.

It is also recommended that the specification work shall endorse the service definition by TISPAN for the supplementary services that are applicable to 3GPP Systems. The analysis shows that the applicable supplementary services are:

Originating Identification Presentation (OIP) as described in clause 8.2.1 of reference [2].
Originating Identification Restriction (OIR) as described in clause 8.2.2 of reference [2].
Terminating Identification Presentation (TIP) as described in clause 8.2.3 of reference [2].
Terminating Identification Restriction (TIR) as described in clause 8.2.4 of reference [2].
Communication Diversion (CDIV) as described in clause 8.3.1 of reference [2].
Communication Hold (HOLD) as described in clause 8.3.3 of reference [2].
Communication Barring (CB) as described in clause 8.3.4 of reference [2] with the following addition:
The ICB service needs is to be extended with a roaming condition. The roaming condition is set to true when the served user is roaming..
Message Waiting Indication (MWI) as described in clause 8.3.6 of reference [2].
Conference (CONF) as described in clause 8.4.1 of reference [2].
Explicit Communication Transfer (ECT) as described in clause 8.4.3 of reference [2].

The study has found one supplementary service not covered by TISPAN but applicable to a 3GPP specified IMS Multimedia Telephony service and that is:

Communication Diversion: Communication Forwarding on Mobile Subscriber Not Reachable.

Annex A:
Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2005-05					ToC created by Ericsson		0.0.0
2005-07					First draft at TSG SA1 # 29 (Povoa)	0.0.0	0.1.0
2005-10					Enhancements at TSG SA1 # 30 (Los Angeles), including S1-051161, S1-051162, S1-051164, S1-051165, S1-051166	0.1.0	0.2.0
2005-10	SP-30				Raised to version 1.0.0 for presentation to SA #30	0.2.0	1.0.0
2006-02					Enhancements at TSG SA1 # 31, including documents S1-060028, S1-060032, S1-060100, S1-060104, S1-060234, S1-060236, S1-060237, S1-060238	1.0.0	1.1.0
2006-02	SP-31	SP-060041			Agreed to be sent to the plenary for approval	1.1.0	2.0.0
2006-03	SP-31	SP-060223			Updated at SA #31 to change references and apply correct TR template	2.0.0	2.1.0
2006-03	SP-31	SP-060223			Approved at SA #31	2.1.0	7.0.0
SP-42	-	-			Updated from Rel-7 to Rel-8	7.0.0	8.0.0
	-	-			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

History

Document history		
V10.0.0	May 2011	Publication