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SERIES Q: SWITCHING AND SIGNALLING, AND ASSOCIATED MEASUREMENTS AND TESTS

Signalling requirements and protocols for the NGN – VoLTE/ViLTE network signalling

IMS references to Release 11 for communication between IMS and NGN networks to support end-to-end service interoperability

Recommendation ITU-T Q.3641

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Recommendation ITU-T Q.3641

IMS references to Release 11 for communication between IMS and NGN networks to support end-to-end service interoperability

Summary

Recommendation ITU-T Q.3641 identifies IP multimedia subsystem (IMS) specifications for the "ETSI Release 11" as the base for communication between IMS and next-generation network (NGN) to support end-to-end service interoperability.

History

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IMS references to Release 11 for communication between IMS and NGN networks to support end-to-end service interoperability

1 Scope

This Recommendation identifies the IP multimedia subsystem (IMS) specifications for the "ETSI Release 11" as the base for communication between IMS and next-generation network (NGN) in order to support end-to-end service interoperability.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T H.248.1] Recommendation ITU-T H.248.1 (2013), *Gateway control protocol: Version 3*.

[ITU-T I.130] Recommendation ITU-T I.130 (1998), *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN*.

[ITU-T Q.65] Recommendation ITU-T Q.65 (2000), *The unified functional methodology for the characterization of services and network capabilities including alternative object oriented techniques*.

[ITU-T Q.761] Recommendation ITU-T Q.761 (1999), *Signalling System No. 7 – ISDN User Part functional description*.

[ITU-T Q.762] Recommendation ITU-T Q.762 (1999), *Signalling System No. 7 – ISDN User Part general functions of messages and signals*.

[ITU-T Q.763] Recommendation ITU-T Q.763 (1999), *Signalling System No. 7 – ISDN User Part formats and codes*.

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[ITU-T Q.1902.1] Recommendation ITU-T Q.1902.1 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Functional description*.

[ITU-T Q.1902.2] Recommendation ITU-T Q.1902.2 (2001), *Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: General functions of messages and paramaters*.

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[ITU-R M.2012] Recommendation ITU-R M.2012 (2018), *Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced)*.

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[ETSI TS 122 173] ETSI TS 122 173 V11.7.0 (2016), *Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System S); LTE; IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1 (3GPP TS 22.173 version 11.7.0 Release 11)*.

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[ETSI TS 123 167] ETSI TS 123 167 V11.11.0 (2014), *Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS) emergency sessions (3GPP TS 23.167 version 11.11.0 Release 11)*.

[ETSI TS 123 203] ETSI TS 123 203 V11.15.0 (2015), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Policy and charging control architecture (3GPP TS 23.203 version 11.15.0 Release 11)*.

[ETSI TS 123 228] ETSI TS 123 228 V11.11.0 (2015*), Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS); Stage 2 (3GPP TS 23.228 version 11.11.0 Release 11)*.

[ETSI TS 123 231] ETSI TS 123 231 V11.1.1 (2012), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); SIP-I based circuit-switched core network; Stage 2 (3GPP TS 23.231 version 11.1.1 Release 11)*.

[ETSI TS 124 147] ETSI TS 124 147 V11.4.0 (2015), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3 (3GPP TS 24.147 version 11.4.0 Release 11).*

[ETSI TS 124 173] ETSI TS 124 173 V11.5.0 (2013), *Universal Mobile Telecommunications System (UMTS); LTE; IMS Multimedia telephony communication service and supplementary services; Stage 3 (3GPP TS 24.173 version 11.5.0 Release 11).*

[ETSI TS 124 229] ETSI TS 124 229 V11.26.0 (2018), *Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 version 11.26.0 Release 11).*

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[ETSI TS 124 606] ETSI TS 124 606 V11.1.0 (2012), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Message Waiting Indication (MWI) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification (3GPP TS 24.606 version 11.1.0 Release 11).*

[ETSI TS 124 607] ETSI TS 124 607 V11.3.0 (2014), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Originating Identification Presentation (OIP) and Originating Identification Restriction (OIR) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification (3GPP TS 24.607 version 11.3.0 Release 11).*

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[ETSI TS 124 629] ETSI TS 124 629 V11.3.0 (2014): *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Explicit Communication Transfer (ECT) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification (3GPP TS 24.629 version 11.3.0 Release 11).*

[ETSI TS 124 642] ETSI TS 124 642 V11.4.0 (2013), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Completion of Communications to Busy Subscriber (CCBS) and Completion of Communications by No Reply (CCNR) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification (3GPP TS 24.642 version 11.4.0 Release 11).*

[ETSI TS 124 654] ETSI TS 124 654 V11.1.0 (2013), *Digital cellular telecommunications system (Phase 2+); 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 11.1.0 Release 11).*

[ETSI TS 126 114] ETSI TS 126 114 V11.12.0 (2016), *Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction (3GPP TS 26.114 version 11.12.0 Release 11).*

[ETSI TS 129 079] ETSI TS 129 079 V11.7.0 (2015), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Optimal media routeing within the IP Multimedia Subsystem (IMS); Stage 3 (3GPP TS 29.079 version 11.7.0 Release 11).*

[ETSI TS 129 162] ETSI TS 129 162 V11.2.0 (2014), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Interworking between the IM CN subsystem and IP networks (3GPP TS 29.162 version 11.2.0 Release 11).*

[ETSI TS 129 163] ETSI TS 129 163 V11.17.0 (2016), *Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks (3GPP TS 29.163 version 11.17.0 Release 11).*

[ETSI TS 129 165] ETSI TS 129 165 V11.22.0 (2018), *Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Inter-IMS Network to Network Interface (NNI) (3GPP TS 29.165 version 11.22.0 Release 11).*

[ETSI TS 129 202] ETSI TS 129 202 V11.0.0 (2012), *Universal Mobile Telecommunications System (UMTS); Signalling System No. 7 (SS7) signalling transport in core network; Stage 3 (3GPP TS 29.202 version 11.0.0 Release 11).*

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[ETSI TS 129 212] ETSI TS 129 212 V11.18.0 (2016), *Universal Mobile Telecommunications System (UMTS); LTE; Policy and Charging Control (PCC); Reference points (3GPP TS 29.212 version 11.18.0 Release 11).*

[ETSI TS 129 213] ETSI TS 129 213 V11.15.0 (2016), *Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping (3GPP TS 29.213 version 11.15.0 Release 11).*

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[ETSI TS 129 235] ETSI TS 129 235 V11.3.0 (2013), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Interworking between SIP-I based circuit-switched core network and other networks (3GPP TS 29.235 version 11.3.0 Release 11).*

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[ETSI TS 129 292] ETSI TS 129 292 V11.9.0 (2015), *Universal Mobile Telecommunications System (UMTS); LTE; Interworking between the IP Multimedia (IM) Core Network (CN) subsystem (IMS) and MSC Server for IMS Centralized Services (ICS) (3GPP TS 29.292 version 11.9.0 Release 11).*

[ETSI TS 129 658] ETSI TS 129 658 V11.0.0 (2012), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; SIP Transfer of IP Multimedia Service Tariff Information; Protocol specification (3GPP TS 29.658 version 11.0.0 Release 11).*

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[IETF RFC 4566] IETF RFC 4566 (2006) *SDP: Session Description Protocol*.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

3GPP 3rd Generation Partnership Project

3PTY Three-Party

ACR Anonymous Communication Rejection

AOC Advice of Charge

AS Application Server

ATCF Access Transfer Control Function

B2BUA Back-to-Back User Agent

BICC Bearer Independent Call Control

BFCP	Binary Floor Control Protocol
BGCF	Breakout Gateway Control Function
CAT	Customized Alerting Tone
CB	Communication Barring
CCBS	Completion of Communications to Busy Subscriber
CCNL	Completion of Communications on Not Logged-in
CCNR	Communication Completion on No Reply
CDIV	Communication Diversion
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CONF	Conference
CRS	Customized Ringing Signal
CS	Circuit Switched
CSCF	Call Session Control Function
CUG	Closed User Group
CW	Communication Waiting
DRVCC	Dual Radio Voice Call Continuity
ECT	Explicit Communication Transfer
FA	Flexible Alerting
GPRS	General Packet Radio Services
GRUU	Globally Routable User agent URIs
HOLD	Communication HOLD
IBCF	Interconnection Border Control Function
ICB	Incoming Communication Barring
ICID	IMS Charging Identifier
ICS	IMS Centralized Services
ISUP	ISDN User Part
I-CSCF	Interrogating CSCF
II-NNI	Inter-IMS Network to Network Interface
IM	Instant Messaging
IM CN	IP multimedia (IM) core network (CN)
IMS	IP Multimedia Subsystem
IMS-ALG	IMS Application Level Gateway
IOI	Inter Operator Identifier
IP-CAN	IP-Connectivity Access Network
IUT	Inter UE Transfer
MBMS	Multimedia Broadcast Multicast Service

MCID Malicious Communication Identification
MCPTT Mission Critical Push-To-Talk
MGC Media Gateway Controller
MGCF Media Gateway Control Function
MGW Media Gateway
MMTEL Multimedia Telephony
MPS Multimedia Priority Service
MRB Media Resource Broker
MRFC Media Resource Function Controller
MRFP Multimedia Resource Function Processor
MSRP Message Session Relay Protocol
MWI Message Waiting Indication
NA(P)T-PT Network Address (Port-Multiplexing) Translation-Protocol Translation
NGN Next-Generation Network
NNI Network to Network Interface
OCB Outgoing Communication Barring
OIP Originating Identification Presentation
OIR Originating Identification Restriction
OMA Open Mobile Alliance
OMR Optimal Media Routeing
P-CSCF Proxy CSCF
PCRF Policy and Charging Rules Function
PLMN Public Land Mobile Network
PNM Personal Network Management
PRES Presence
QoS Quality of Service
RTT Round-trip Time
SDP Session Description Protocol
SIP Session Initiation Protocol
SRVCC Single Radio Voice Call Continuity
SS7 Signalling System no. 7
TIP Terminating Identification Presentation
TIR Terminating Identification Restriction
TrGW Transition Gateway
UE User Equipment
UMTS Universal Mobile Telecommunications Service

5 Conventions

None.

6 Introduction

This Recommendation identifies the IMS specifications for the "ETSI Release 11" as base for the communication between IMS and NGN in order to support end-to-end service interoperability.

7 Overview of the interconnection between two different IM CN subsystems

Interconnection between two different IP multimedia (IM) core network (CN) (IM CN) subsystems shall be guaranteed in order to support end-to-end service interoperability. For this purpose, inter-IMS network to network interface (II-NNI) between two IM CN subsystem networks is adopted, according to the assumptions in [ETSI TS 123 002] and [ETSI TS 123 228].

To support the delivery of IMS services between two separated IM CN subsystems, protocol interconnection has to occur:

– at a control plane level, in order that IMS procedures can be supported. In this case the adopted reference point is the Ici; and

– at a user plane level, where media streams are exchanged over the Izi reference point.

IP multimedia sessions are managed by session initiation protocol (SIP). The transport mechanism for both SIP session signalling and media transport is IPv4 [IETF RFC 791] or IPv6 [IETF RFC 2460]. The ETSI profile of SIP defining the usage of SIP within the IM CN subsystem is specified in [ETSI TS 124 229].

The IMS/LTE basic configuration is shown in Figure 7.1, the inter network interfaces between 3GGP and NGN networks are shown in Figure 7.2, and the general interconnection model is shown in Figure 7.3.

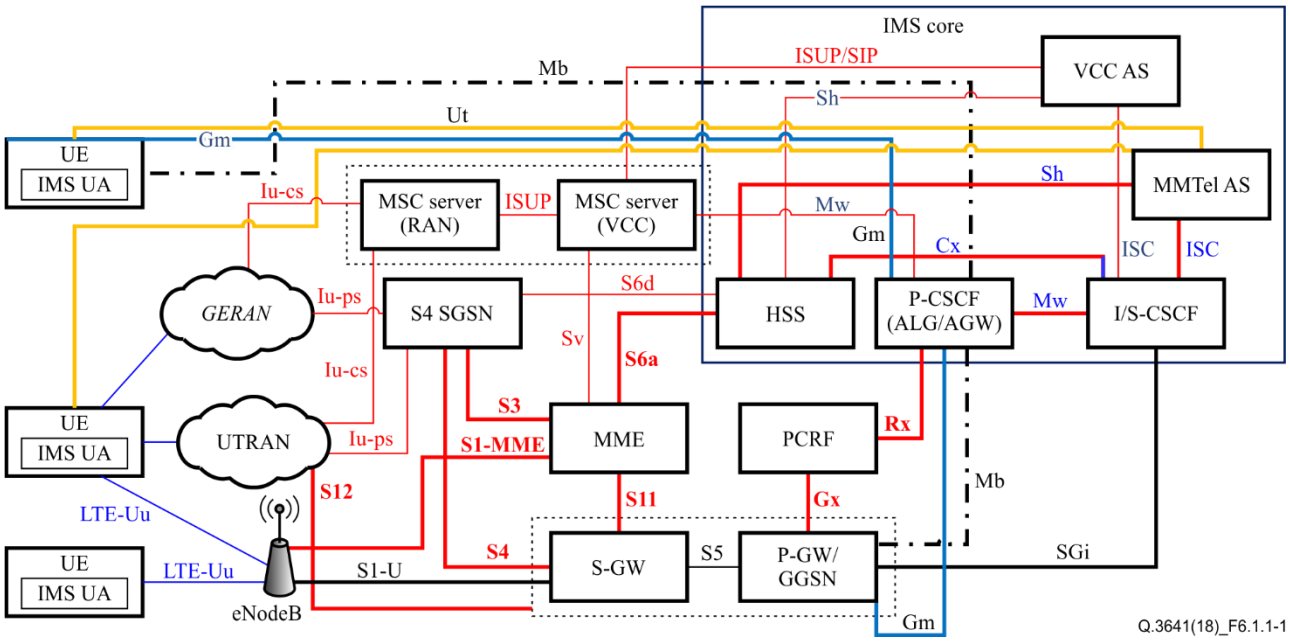


Figure 7-1 – IMS/LTE basic configuration

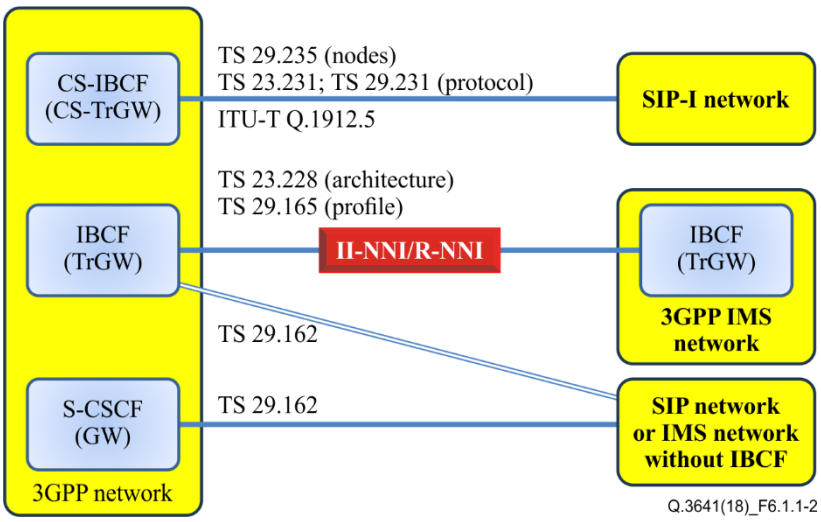
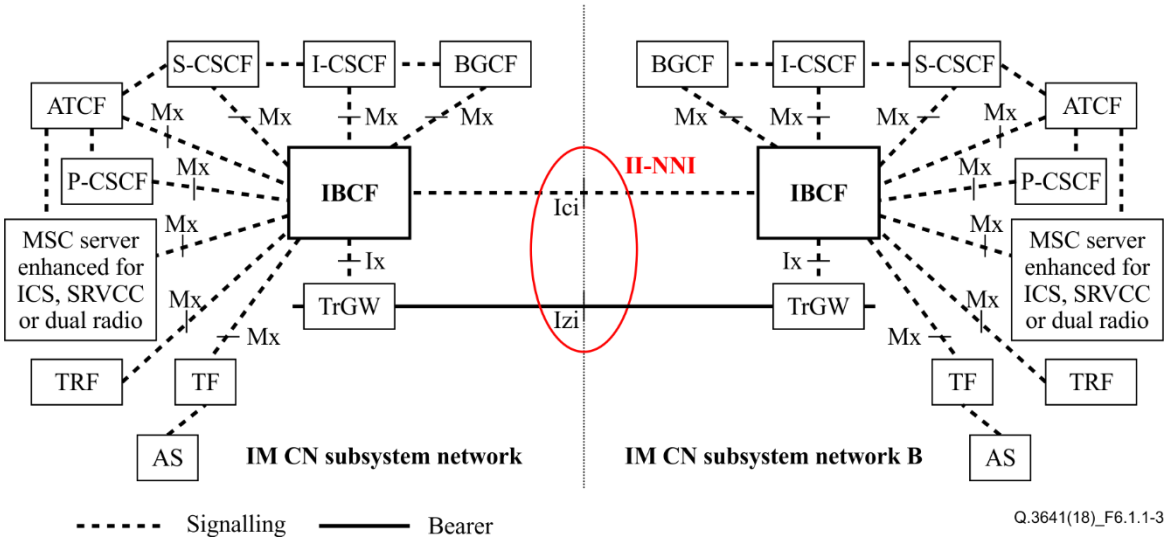


Figure 7-2 – Inter-network interfaces between 3GGP and NGN networks



NOTE 1 – The TRF can reside in a stand-alone entity or can be combined with another functional entity.
NOTE 2 – This figure is from [ETSI TS 129 165].

Figure 7-3 – Inter-IMS network to network interface between two IM CN subsystem networks

8 Technical specifications structure

This clause provides an overview of the IMS specifications for networks. Details for these specifications are found in clause 9.

The following text describes the numbering scheme for the specifications and reports for the fourth- generation mobile system (4G).

The following ETSI standards and descriptions are used for guidance only and may be further revised in the future.

The ETSI standards are:

122-series Service aspects ("Stage 1");

123-series Technical realization ("Stage 2");

124-series Signalling protocols ("Stage 3") - user equipment to network;

126-series CODECs;

127-series Data;

129-series Signalling protocols ("Stage 3") - intra-fixed-network;

131-series Subscriber identity module (SIM/USIM), IC cards. Test specifications;

132-series Operations, administration, maintenance, and provisioning (OAM&P) and charging;

133-series Security aspects;

135-series Security algorithms.

NOTE 1 – Technical specifications in this series are not included in the scope of this Recommendation. They are described in [ITU-R M.2012].

NOTE 2 – Technical specifications in these series are not included in the scope of this Recommendation.

9 Technical specifications

9.1 122-series, Service aspects

9.1.1 ETSI TS 122 115: Service aspects; charging and billing

This document describes the service aspects of charging and billing of 4G.

This document is not intended to duplicate existing standards or standards being developed by other groups on these topics, and will reference these where appropriate. The document will elaborate on the charging requirements described in the charging principles in [ETSI TS 122 001] service principles. It will allow the generation of accurate charging information to be used in commercial and contractual relationships between the parties concerned.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 122 115	11.6.0	Published	2012	http://www.etsi.org/deliver/etsi_ts/122100_122199/122115/11.06.00_60/ts_122115v110600p.pdf

9.2 123-Series, Technical realization

9.2.1 ETSI TS 123 002: Network architecture

This document offers an overview of the public land mobile network (PLMN) and its architectures and configuration. The configuration and the functional entities of the PLMN and the interfaces between them are described on a general level in order to cope with possible implementations. These descriptions include interfaces between and within the core networks, the access networks, the user equipment (UE), different service platforms, different domains and subsystems, and functional entities within domains and subsystems.

This document covers different architectural aspects with varying level of detail. In general, other specifications shall be referred to for further details; these specifications enable the reader to acquire the full understanding of a system or service feature.

This document does not cover, or even list, all features of PLMNs.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 002	11.6.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/123000_123099/123002/11.06.00_60/ts_123002v110600p.pdf

9.2.2 ETSI TS 123 167: IP multimedia subsystem emergency sessions

This document defines the stage-2 service description for emergency services in the IP multimedia core network subsystem including the elements necessary to support IP multimedia emergency services.

[ITU-T I.130] describes a three-stage method for characterisation of telecommunication services, and [ITU-T Q.65] defines stage 2 of the method.

This document also covers the access network aspects that are crucial for the provisioning of IMS emergency services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 167	11.11.0	Published	2014	http://www.etsi.org/deliver/etsi_ts/123100_123199/123167/11.11.00_60/ts_123167v111100p.pdf

9.2.3 ETSI TS 123 203: Policy and charging control architecture

This document specifies the overall stage-2 level functionality for policy and charging control that encompasses the following high-level functions for IP-connectivity access networks (IP-CANs) (e.g., general packet radio services (GPRS), industrial wireless local area network (IWLAN), fixed broadband):

– flow based charging, including charging control and online credit control;

– policy control (e.g., gating control, quality of service (QoS) control).

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 203	11.15.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/123200_123299/123203/11.15.00_60/ts_123203v111500p.pdf

9.2.4 ETSI TS 123 228: Interconnection border control function

An interconnection border control function (IBCF) provides application specific functions at the SIP/session description protocol (SDP) protocol layer in order to perform interconnection between IM CN subsystem networks by using Ici reference point. According to [ETSI TS 123 228], IBCF can act both as an entry point and as an exit point for the IM CN subsystem network.

The functionalities of IBCF are indicated in [ETSI TS 123 228] and specified in [ETSI TS 124 229]. They include:

– network topology hiding;

– application level gateway (for instance enabling communication between IPv6 and IPv4 SIP applications, or between a SIP application in a private IP address space and a SIP application outside this address space);

– controlling transport plane functions;

– controlling media plane adaptations;

– screening of SIP signalling information;

– selecting the appropriate signalling interconnect;

– generation of charging data records;

– privacy protection; and

– inclusion of a transit inter operator identifier (IOI) in requests when acting as an entry point for a transit network and in responses when acting as an exit point for a transit network.

Based on local configuration, the IBCF performs transit routing functions as specified in [ETSI TS 124 229] clause I.2.

The IBCF acts as a back-to-back user agent (B2BUA) when it performs IMS application level gateway (IMS-ALG) functionality.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 228	V11.11.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/123200_123299/123228/11.11.00_60/ts_123228v111100p.pdf

9.2.5 ETSI TS 123 002: Transition gateway

According to [ETSI TS 123 002], the transition gateway (TrGW) is located at the network borders within the media path and is controlled by an IBCF. Forwarding of media streams between IM CN subsystem networks is applied over Izi reference point.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 002	V11.6.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/123000_123099/123002/11.06.00_60/ts_123002v110600p.pdf

9.3 124-series, Signalling protocols - user equipment to network

9.3.1 TS 124 229: IP multimedia call control protocol based on SIP and SDP; Stage 3

This document defines a call control protocol for use in the IM CN subsystem based on the SIP, and the associated SDP.

This document is applicable to:

– the interface between the UE and the call session control function (CSCF);
– the interface between the CSCF and any other CSCF;
– the interface between the CSCF and an application server (AS);
– the interface between the CSCF and the media gateway control function (MGCF);
– the interface between the S-CSCF and the media resource function controller (MRFC);
– the interface between the CSCF and the breakout gateway control function (BGCF);
– the interface between the BGCF and the MGCF;
– the interface between the BGCF and any other BGCF; and
– the interface between the CSCF and an external multimedia IP network.

Where possible, this document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of SIP and SDP. Where this is not possible, extensions to SIP and SDP are defined within this document. The document has therefore been structured in order to allow both forms of specification.

As the IM CN subsystem is designed to interwork with different IP-CANs, the IP-CAN independent aspects of the IM CN subsystem are described in the main body and Annex A of this specification. Aspects for connecting a UE to the IM CN subsystem through specific types of IP-CANs are documented separately in the annexes or in separate documents.

NOTE – This document covers only the usage of SIP and SDP to communicate with the entities of the IM CN subsystem. It is possible, and not precluded, to use the capabilities of GPRS to allow a terminal containing a SIP UA to communicate with SIP servers or SIP UAs outside the IM CN subsystem, and therefore utilize the services provided by those SIP servers. The usage of SIP and SDP for communicating with SIP servers or SIP UAs outside the IM CN subsystem is outside the scope of this document.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 229	11.26.0	Published	2018	http://www.etsi.org/deliver/etsi_ts/124200_124299/124229/11.26.00_60/ts_124229v112600p.pdf

9.3.2 ETSI TS 124 608: Terminating identification presentation and terminating identification restriction using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the terminating identification presentation (TIP) and terminating identification restriction (TIR) services, based on stage one and two of the ISDN connected line identification presentation (COLP) and connected line identification restriction (COLR) supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

Service specific requirements in accordance with [ETSI TS 124 608] shall be supported over the II-NNI.

The P-Asserted-Identity header field and the Privacy header field with values "id", "user", "none", "header" and "critical" shall be supported at the II-NNI.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 608	11.3.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124600_124699/124608/11.03.00_60/ts_124608v110300p.pdf

9.3.3 ETSI TS 124 607: Originating identification presentation and originating identification restriction using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the TIP and TIR services, based on stage one and two of the ISDN COLP and COLR supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 607	11.3.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/124600_124699/124607/11.03.00_60/ts_124607v110300p.pdf

9.3.4 ETSI TS 124 610: Communication HOLD using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the communication hold (HOLD) services, based on stages one and two of the ISDN Hold (HOLD) supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to UE and AS which are intended to support the HOLD supplementary service.

Service specific requirements in accordance with [ETSI TS 124 610] shall be supported over the II-NNI.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 610	11.3.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124600_124699/124610/11.03.00_60/ts_124610v110300p.pdf

9.3.5 ETSI TS 124 604: Communication diversion using IP multimedia core network subsystem; Protocol specification

The document specifies the stage-3 protocol description of the communication diversion (CDIV)

Supplementary services, based on stage one and two of the ISDN CDIV supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP. This document is applicable to UE and ASs which are intended to support the CDIV supplementary service.

Service specific requirements in accordance with [ETSI TS 124 604] shall be supported over the II-NNI.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 604	11.11.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/124600_124699/124604/11.11.00_60/ts_124604v111100p.pdf

9.3.6 ETSI TS 124 605: Conference using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the conference (CONF) service based on stage one and two of the ISDN CONF supplementary service. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document specifies centralized conferencing, using a conference focus, distributed conferencing is out of scope.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 605	11.1.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124600_124699/124605/11.01.00_60/ts_124605v110100p.pdf

9.3.7 ETSI TS 124 629: Explicit communication transfer using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the explicit communication transfer (ECT) supplementary service, based on stage one and two of the ISDN ECT supplementary service. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to UE and ASs which are intended to support the ECT supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 629	11.3.0	Published	2014	http://www.etsi.org/deliver/etsi_ts/124600_124699/124629/11.03.00_60/ts_124629v110300p.pdf

9.3.8 ETS TS 124 616: Malicious communication identification using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the malicious communication identification (MCID) service based on stage one and two of ISDN malicious call identification supplementary service. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP. The MCID service will store session related information independent of the service requested.

This document is applicable to UE and AS which are intended to support the MCID supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 616	11.1.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124600_124699/124616/11.01.00_60/ts_124616v110100p.pdf

9.3.9 ETSI TS 124 642: Completion of communications to busy subscriber and completion of communications by no reply using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the completion of communications to busy subscriber (CCBS) service, the completion of communications on no reply (CCNR) service, and completion of communications on not logged-in (CCNL) service, based on stage one and two of the ISDN supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

The CCBS service enables user A, encountering a busy destination B, to have the communication completed without having to make a new communication attempt when the destination B becomes not busy.

The CCNR supplementary service enables user A, encountering a destination B which does not answer the communication (No Reply), to have the communication completed without having to make a new communication attempt when the destination becomes not busy after having initiated an activity.

The CCNL supplementary service enables user A, encountering a destination B which is not registered with the IMS network, to have the communication completed without having to make a new communication attempt when the destination becomes registered.

This document is applicable to UE and AS which are intended to support the CCBS and CCNR supplementary services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 642	11.4.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124600_124699/124642/11.04.00_60/ts_124642v110400p.pdf

9.3.10 ETSI TS 124 606: Message waiting indication using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the message waiting indication (MWI) service, based on stage one and two of the ISDN MWI supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to UE and AS which are intended to support the MWI supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 606	11.1.0	Published	2012	http://www.etsi.org/deliver/etsi_ts/124600_124699/124606/11.01.00_60/ts_124606v110100p.pdf

9.3.11 ETSI 124 654: Closed user group using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 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 IM CN subsystem based on the SIP and the SDP.

This document is applicable to UE and AS which are intended to support the CUG supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 654	11.1.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124600_124699/124654/11.01.00_60/ts_124654v110100p.pdf

9.3.12 ETSI TS 124 611: Anonymous communication rejection and communication barring using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the anonymous communication rejection (ACR) and communication barring (CB) supplementary service, based on stage one and two of the ISDN supplementary service anonymous call rejection, incoming communication barring (ICB) and outgoing communication barring (OCB). It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to UE and AS which are intended to support the ACR and CB supplementary services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 611	11.3.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/124600_124699/124611/11.03.00_60/ts_124611v110300p.pdf

9.3.13 ETSI TS 124 147: Conferencing using the IP multimedia core network subsystem; Stage 3

This document provides the protocol details for conferencing within the IP multimedia core network subsystem based on the SIP, SIP events, the SDP and the binary floor control protocol (BFCP).

The functionalities for conference policy control (with respective standardised protocols) are felt to be essential for a complete IMS conferencing service, but are not specified in this version of IMS conferencing and are for further study.

This document does not cover the signaling between a MRFC and a multimedia resource function processor (MRFP).

Where possible, this document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of SIP, SIP events, SDP and BFCP, either directly, or as modified by [ETSI TS 124 229]. Where this is not possible, extensions to SIP are defined. This document has therefore been structured to allow both forms of specification.

The document is applicable to ASs, MRFCs, MRFPs, MGCFs and to UE providing conferencing capabilities.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 147	11.4.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/124100_124199/124147/11.04.00_60/ts_124147v110400p.pdf

9.3.14 ETSI TS 124 628: Common basic communication procedures using IP multimedia core network (CN) subsystem

This document describes the stage-3 protocol for basic communication procedures common to several services in the IM CN subsystem when at least one AS is included in the communication. The common procedures are based on stage-3 specifications for supplementary services.

This document contains examples of signaling flows for the common basic communication procedures.

This document is applicable to UE and ASs which are intended to support the common basic communication procedures.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 628	11.2.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124600_124699/124628/11.02.00_60/ts_124628v110200p.pdf

9.3.15 ETSI TS 124 615: Communication waiting using IP multimedia core network (CN) subsystem

This document specifies the stage-3 protocol description of the communication waiting (CW) service, based on stage one and stage two of the ISDN call waiting supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

The CW service enables a user to be informed, that very limited resources are available for an incoming communication. The user then has the choice of accepting, rejecting or ignoring the waiting call (as per basic call procedures).

This document is applicable to UE and AS which are intended to support the CW supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 615	11.4.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/124600_124699/124615/11.04.00_60/ts_124615v110400p.pdf

9.3.16 ETSI TS 124 173: IMS multimedia telephony communication service and supplementary services; Stage 3

This document provides the protocol details for multimedia telephony communication service and associated supplementary services in the IM CN subsystem based on the requirements defined in [ETSI TS 122 173].

Multimedia telephony and supplementary services allow users to establish communications between them and enrich that by enabling supplementary services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 173	11.5.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/124100_124199/124173/11.05.00_60/ts_124173v110500p.pdf

9.4 126-series, CODECs

9.4.1 ETSI TS 126 114: IP multimedia subsystem; Multimedia telephony; Media handling and interaction

	Document No.	Version	Status	Issued date	Location
ETSI	TS 126 114	11.12.0	Published	2016	http://www.etsi.org/deliver/etsi_ts/126100_126199/126114/11.12.00_60/ts_126114v111200p.pdf

9.5 129-series, Signalling protocols - intra-fixed-network

9.5.1 ETSI TS 129 162: Interworking between the IM CN subsystem and IP networks

The IM CN subsystem interworks with the external IP networks through the Mb reference point.

This document details the interworking between the IM CN subsystem and external IP networks for IM service support. It addresses the issues of control plane interworking, user plane interworking and IP version interworking.

The IP version interworking, between IPv4 [IETF RFC 791] "*Internet Protocol*", and IPv6 [IETF RFC 2460] "*Internet Protocol, Version 6 (IPv6) Specification*" is detailed in terms of the processes and protocol mappings required to support both mobile originated and terminated calls.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 162	11.2.0	Published	2014	http://www.etsi.org/deliver/etsi_ts/129100_129199/129162/11.02.00_60/ts_129162v110200p.pdf

9.5.2 ETSI TS 129 163: Interworking between the IP multimedia core network subsystem and circuit switched networks

This document specifies the principles of interworking between the ETSI IM CN subsystem and bearer independent call control (BICC)/ISDN user part (ISUP) based legacy circuit switched (CS) networks, in order to support IM basic voice calls.

This document addresses the areas of control and user plane interworking between the IM CN subsystem and CS networks through the network functions, which include the MGCF and IM-MGW. For the specification of control plane interworking, areas such as the interworking between SIP and

BICC or ISUP are detailed in terms of the processes and protocol mappings required for the support of both IM originated and terminated voice calls.

Other areas addressed encompass the transport protocol and signalling issues for negotiation and mapping of bearer capabilities and QoS information.

This document specifies the interworking between the 3GPP profile of SIP (as detailed according to [ETSI TS 124 229]) and BICC or ISUP, as specified in [ITU-T Q.1902.1] to [ITUT Q.1902.6]: "*Bearer Independent Call Control*" and [ITU-T Q.761] to [ITU-T Q.764]: "*Signalling System No. 7 – ISDN User Part*", respectively.

This document addresses two interworking scenarios with respect to the properties of the CS network:

1) the CS network does not use any ETSI specific additions;

2) the CS network uses ETSI-specific additions.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 163	11.17.0	Published	2016	http://www.etsi.org/deliver/etsi_ts/129100_129199/129163/11.17.00_60/ts_129163v111700p.pdf

9.5.3 ETSI TS 129 165: Inter-IMS network to network interface

This document addresses the II-NNI consisting of Ici and Izi reference points between IMS networks in order to support end-to-end service interoperability.

This document addresses the issues related to control plane signalling (ETSI usage of SIP and SDP protocols, required SIP headers) as well as other interconnecting aspects like security, numbering/naming/addressing and user plane issues as transport protocol, media and codecs actually covered in a widespread set of ETSI specifications. A profiling of the II-NNI is also provided.

Charging aspects will be addressed as far as SIP signalling is concerned.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 165	11.22.0	Published	2018	http://www.etsi.org/deliver/etsi_ts/129100_129199/129165/11.22.00_60/ts_129165v112200p.pdf

9.5.4 ETSI TS 129 202: Signalling system No. 7 signalling transport in core network; Stage 3

This document defines the possible protocol architectures for transport of signalling system no. 7 (SS7) signalling protocols in core network.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 202	11.0.0	Published	2012	http://www.etsi.org/deliver/etsi_ts/129200_129299/129202/11.00.00_60/ts_129202v110000p.pdf

9.5.5 ETSI TS 129 204: Signalling system No. 7 security gateway; Architecture, functional description and protocol details

This document provides functional description of the SS7 security gateway. This document also covers network architecture, routeing considerations, and protocol details.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 204	11.0.0	Published	2012	http://www.etsi.org/deliver/etsi_ts/129200_129299/129204/11.00.00_60/ts_129204v110000p.pdf

9.5.6 ETSI TS 129 212: Policy and charging control; Reference points

This document provides the stage-3 specification of the Gx, Gxx and Sd reference points for the present release. The functional requirements and the stage-2 specifications of the Gx, Gxx and Sd reference points are contained in [ETSI TS 123 203]. The Gx reference point lies between the policy and charging rule function and the policy and charging enforcement function. The Gxx reference point lies between the policy and charging rule function and the bearer binding and event reporting function. The Sd reference point lies between the policy and charging rule function and the traffic detection function.

Whenever it is possible, this document specifies the requirements for the protocol by reference to specifications produced by the IETF within the scope of Diameter. Where this is not possible, extensions to Diameter are defined.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 212	11.18.0	Published	2016	http://www.etsi.org/deliver/etsi_ts/129200_129299/129212/11.18.00_60/ts_129212v111800p.pdf

9.5.7 ETSI TS 129 213: Policy and charging control signalling flows and QoS parameter mapping

This specification adds detailed flows of policy and charging control (PCC) over the Rx and Gx reference points and their relationship with the bearer level signalling flows over the Gn interface.

The calls flows depicted in this specification represent usual cases, i.e., not all situations are covered. Detailed information provided in [ETSI TS 129 212] and [ETSI TS 129 214] shall be taken into consideration.

This specification also describes the binding and the mapping of QoS parameters among SDP, universal mobile telecommunications service (UMTS) QoS parameters, and QoS authorization parameters.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 213	11.15.0	Published	2016	http://www.etsi.org/deliver/etsi_ts/129200_129299/129213/11.15.00_60/ts_129213v111500p.pdf

9.5.8 ETSI TS 129 214: Policy and charging control over Rx reference point

This document provides the stage-3 specification of the Rx reference point for the present release. The functional requirements and the stage-2 specifications of the Rx reference point are contained in [ETSI TS 23 203]. The Rx reference point lies between the application function and the policy and charging rule function.

Whenever it is possible, this document specifies the requirements for the protocol by reference to specifications produced by the IETF within the scope of Diameter. Where this is not possible, extensions to Diameter are defined.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 214	11.16.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/129200_129299/129214/11.16.00_60/ts_129214v111600p.pdf

9.5.9 ETSI TS 129 231: Application of SIP-I protocols to circuit switched core network architecture; Stage 3

This document describes the protocols to be used when SIP-I is optionally used as call control protocol in a ETSI CS core network on Nc interface, see [ETSI TS 123 231]. The SIP-I protocol operates between (G)MSC servers. The SIP-I architecture consists of a number of protocols. The following types of protocols are described: call control protocol, resource control protocols and user plane protocol for this architecture. The architecture complies with the requirements imposed by [ETSI TS 123 231] and [b-ETSI TS 123 153].

Interworking of SIP-I on Nc to external networks is described by [ETSI TS 129 235].

This document is valid for a third-generation PLMN (UMTS) complying with Release 9 and later.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 231	11.0.0	Published	2012	http://www.etsi.org/deliver/etsi_ts/129200_129299/129231/11.00.00_60/ts_129231v110000p.pdf

9.5.10 ETSI TS 129 232: Media gateway controller – Media gateway interface; Stage 3

This document describes the protocol to be used on the media gateway controller (MGC) – media gateway (MGW) interface. The media gateway controllers covered in this specification are the MSC server and the GMSC server. The basis for this protocol is the ITU-T H.248.1 MEGACO protocol as specified in ITU-T and IETF. The BICC architecture, as described in [b-ETSI TS 123 205] and [b-ETSI TS 129 205], defines the usage of this protocol.

This specification describes the changes to ITU-T H.248.1/MEGACO which are needed to handle 3G specific traffic cases. This is done by using the ITU-T H.248.1/MEGACO standard extension mechanism.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 232	11.2.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/129200_129299/129232/11.02.00_60/ts_129232v110200p.pdf

9.5.11 ETSI TS 129 235: Interworking between SIP-I based circuit-switched core network and other networks

This document specifies the interworking between SIP-I based CS core network, as specified in [ETSI TS 123 231] and [ETSI TS 129 231], with out-of-band transcoder control related procedures in [b-ETSI TS 123 153], and:

– an external SIP-I based signalling network compliant to [ITU-T Q.1912.5];

– an ISUP ([ITU-T Q.761] to [ITU-T Q.764]) based network such as an ISUP based ETSI CS domain or an PSTN;

– a BICC ([ITU-T Q.1902.1] to [ITU-T Q.1902.6]) based network such as an BICC-based ETSI CS domain as specified in [b-ETSI TS 123 205] and [b-ETSI TS 129 205];

– an Internet multimedia subsystem, as specified in [ETSI TS 123 228] and [ETSI TS 124 229].

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 235	11.3.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/129200_129299/129235/11.03.00_60/ts_129235v110300p.pdf

9.5.12 ETSI TS 129 238: Interconnection border control functions – Transition gateway interface, Ix interface; Stage 3

This document describes the protocol to be used on the IBCF – transition gateway (TrGW) interface and the CS-IBCF – CS-TrGW interface. The basis for this protocol is the ITU-T H.248 protocol as specified in ITU-T.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 238	11.2.0	Published	2013	http://www.etsi.org/deliver/etsi_ts/129200_129299/129238/11.02.00_60/ts_129238v110200p.pdf

9.5.13 ETSI TS 129 272: Evolved packet system; Mobility management entity and serving GPRS support node related interfaces based on Diameter protocol

This document describes the mobility management entity (MME) and serving GPRS support node (SGSN) related diameter-based interfaces towards the home subscriber server (HSS), and the MME and the SGSN related diameter-based interface towards the equipment identity register (EIR).

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 272	11.14.0	Published	2018	http://www.etsi.org/deliver/etsi_ts/129200_129299/129272/11.14.00_60/ts_129272v111400p.pdf

9.5.14 ETSI TS 129 292: Interworking between the IP multimedia core network subsystem and MSC server for IMS centralized services

The document specifies the principles of interworking between the IM CN subsystem and CS domain in order to enable ICS for UEs using CS domain access.

This document addresses the area of registration procedures interworking between the CS domain and IM CN subsystem.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 292	11.9.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/129200_129299/129292/11.09.00_60/ts_129292v110900p.pdf

9.5.15 ETSI TS 129 079: Optimal media routeing within the IP multimedia subsystem; Stage 3

This document defines optional optimal media routeing (OMR) procedures that can be applied by entities in the IMS that control media resources and are capable of manipulating the SDP as defined by [IETF RFC 4566].

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 079	11.7.0	Published	2015	http://www.etsi.org/deliver/etsi_ts/129000_129099/129079/11.07.00_60/ts_129079v110700p.pdf

9.5.16 ETSI TS 129 658: SIP transfer of IP multimedia service tariff information; Protocol specification

This document specifies stage three of the real-time transfer of tariff information between a charge determination point (CDP) and a charge generation point (CGP) by means of the SIP.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 658	11.0.0	Published	2012	http://www.etsi.org/deliver/etsi_ts/129600_129699/129658/11.00.00_60/ts_129658v110000p.pdf

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[b-ETSI TS 123 153] ETSI TS 123 153 V12.0.0 (2014), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Out of band control; Stage 2*.

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[b-ETSI TS 129 205] ETSI TS 129 205 V15.0.0 (2018), *Universal Mobile Telecommunications System (UMTS); Application of Q.1900 series to bearer independent Circuit Switched (CS) core network architecture; Stage 3*.

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