IMS Profile for Voice and SMS for UE category M1
Version 3.0
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1   Introduction

1.1   Overview

The IP Multimedia Subsystem (IMS) Profile for Voice and SMS, documented in this Permanent Reference Document (PRD), defines a profile that identifies a minimum mandatory set of features which are defined in 3GPP specifications that a category M1 wireless device (the User Equipment (UE)) and network are required to implement in order to guarantee an interoperable, high quality IMS-based telephony service and IMS-based and Non-Access-Stratum (NAS) based Short Message Service (SMS) over LTE radio access.

The *minimum* mandatory set of features is defined by listing the features for the voice service over LTE that are required on top of the features defined in GSMA PRD IR.92 [1] for voice and SMS.

1.2   Relationship to existing standards

1.2.1   3GPP specifications

This profile is solely based on the open and published 3GPP specifications as listed in Section 1.5. 3GPP Release 8, the first release supporting LTE, that is taken as a basis. It should be noted, however that not all the features mandatory in 3GPP Release 8 are required for compliance with this profile.

Conversely, some features required for compliance with this profile are based on functionality defined in 3GPP Release 13 or higher releases.

All such exceptions are explicitly mentioned in the following sections along with the relevant Release 8 or higher 3GPP release specifications, respectively.

Unless otherwise stated, the latest version of the referenced specifications for the relevant 3GPP release applies.

1.3   Scope

This document defines a profile for voice over IMS over LTE, and for SMS over IMS and SMS over SGs, by listing a number of Evolved Universal Terrestrial Radio Access Network (E-UTRAN), Evolved Packet Core, IMS core, and UE features that are considered essential for category M1 UE and the network. The defined profile is compliant with 3GPP specifications. The scope of this profile is the interface between UE and the network.

The profile does not limit anybody, by any means, to deploy other standardized features or optional features, in addition to the defined profile.

1.4   Definition of Acronyms and Terms

1.4.1   Acronyms

Acronym	Description
3GPP	3rd Generation Partnership Project
AMR	Adaptive Multi-Rate

Acronym	Description
AMR-WB	Adaptive Multi-Rate wideband
CS	Circuit Switched
DRX	Discontinuous Reception
eNB	eNodeB
EPS	Evolved Packet System
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
EVS	Enhanced Voice Services
FDD	Frequency-Division Duplexing
GBR	Guaranteed Bit Rate
GSM	Global System for Mobile communications
HTTP	Hypetext Transfer Protocol
IMS	IP Multimedia Subsystem
IP	Internet Protocol
LTE	Long Term Evolution
MMTel	Multimedia Telephony
MS-ISDN	Mobile Subscriber ISDN Number
NAS	Non-Access-Stratum
NGBR	Non Guaranteed Bit Rate
P-CSCF	Proxy - Call Session Control Function
PDN	Packet Data Network
PS	Packet Switched
QCI	Quality of Service Class Indicator
RAT	Radio Access Technology
RLC	Radio Link Control
SIP	Session Initiation Protocol
SMSoIP	SMS over IP
SR-VCC	Single Radio Voice Call Continuity
TAS	Telephony Application Server
TDD	Time-Division Duplexing
UE	User Equipment
USSD	Unstructured Supplementary Service Data
VoIP	Voice Over IP
XCAP	XML Configuration Access Protocol

1.5   Definition of Terms

Term	Description
UE Category M1	A UE that supports the uplink and downlink category M1 as defined in 3GPP Release 13 TS 36.306 [3].

Term	Description
Data Off	See GSMA PRD IR.92 [1].
Region	See GSMA PRD IR.92 [1].

1.6   Document Cross-References

Ref	Doc Number	Title
[1]	GSMA PRD IR.92	IMS Profile for Voice and SMS
[2]	3GPP TS 36.331	Evolved Universal Terrestrial Radio Access (E-UTRA);Radio Resource Control (RRC); Protocol specification
[3]	3GPP TS 36.306	Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities
[4]	GSMA PRD IR.65	IMS Roaming, Interconnection and Interworking Guidelines
[5]	GSMA PRD IR.88	LTE and EPC Roaming Guidelines
[6]	3GPP TS 23.682	Architecture enhancements to facilitate communications
[7]	3GPP TS 24.301	Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS)

2   IMS Feature Set

2.1   General

The IMS profile part lists the mandatory capabilities, that are required over the Gm and Ut reference points.

2.2   Support of generic IMS functions

2.2.1   SIP Registration Procedures

The UE and the IMS core network must conform to section 2.2.1 of GSMA PRD IR.92 [1].

Note :   A UE equipped with a call-button registers in the IMS when it is ready to initiate a call, and stays registered within an implementation specific time period after call is released to allow for operator call back.

2.2.2   Authentication

The UE and the IMS core network must conform to section 2.2.2 of GSMA PRD IR.92 [1] with the following modified requirement: the UE can support the Ut reference point.

2.2.3   Addressing

The UE and the IMS core network must conform to section 2.2.3 of GSMA PRD IR.92 [1].

2.2.4   Call Establishment and Termination

The UE and the IMS core network must conform to section 2.2.4 of GSMA PRD IR.92 [1].

2.2.5   Forking

The UE must conform to section 2.2.5 of GSMA PRD IR.92 [1].

2.2.6   The use of Signalling Compression

The UE must conform to section 2.2.6 of GSMA PRD IR.92 [1].

2.2.7   Early media and announcements

The UE must conform to section 2.2.7 of GSMA PRD IR.92 [1].

2.2.8   SIP Session Timer

The UE must conform to section 2.2.8 of GSMA PRD IR.92 [1].

2.3   Supplementary Services

2.3.1   Supplementary Services Overview

The UE and the Telephony Application Server (TAS) must conform to section 2.3.1 of GSMA PRD IR.92 [1].

2.3.2   Supplementary Service Configuration

The UE and the IMS core network can conform to section 2.3.2 of GSMA PRD IR.92 [1].

2.3.3   Ad-Hoc Multi Party Conference

The UE and the IMS core network can conform to section 2.3.3 of GSMA PRD IR.92 [1].

2.3.4   Communication Waiting

The UE and the IMS core network must conform to section 2.3.4 of GSMA PRD IR.92 [1].

2.3.5   Message Waiting Indication

The UE and the IMS core network must conform to section 2.3.5 of GSMA PRD IR.92 [1].

2.3.6   Originating Identification Restriction

The UE and the IMS core network must conform to section 2.3.6 of GSMA PRD IR.92 [1].

2.3.7   Terminating Identification Restriction

The UE and the IMS core network must conform to section 2.3.7 of GSMA PRD IR.92 [1].

2.3.8   Communication Diversion

The UE and the IMS core network must conform to section 2.3.8 of GSMA PRD IR.92 [1] with the following modified requirement: the UE can support the Ut reference point.

2.3.9   Communication Barring

The UE and the IMS core network must conform to section 2.3.9 of GSMA PRD IR.92 [1] with the following modified requirement: the UE can support the Ut reference point.

2.3.10   Communication Hold

The UE can conform to section 2.3.10 of GSMA PRD IR.92 [1].

2.3.11   Explicit Communication Transfer - Consultative

The UE and the IMS core network can conform to section 2.3.11 of GSMA PRD IR.92 [1].

2.3.12   Originating Identification Presentation

The UE and the IMS core network must conform to section 2.3.12 of GSMA PRD IR.92 [1].

2.4   Call Set-up Considerations

2.4.1   SIP Precondition Considerations

The UE and the IMS core network must conform to section 2.4.1 of GSMA PRD IR.92 [1].

2.4.2   Integration of resource management and SIP

The UE and the network must conform to section 2.4.2 of GSMA PRD IR.92 [1].

2.4.3   Voice Media Considerations

The UE must conform to section 2.4.3 of GSMA PRD IR.92 [1].

2.4.4   Multimedia Considerations

The UE must conform to section 2.4.4 of GSMA PRD IR.92 [1].

2.5   SMS over IP

The UE and the IMS core network must conform to section 2.5 of GSMA PRD IR.92 [1].

3   IMS Media

The UE and the IMS core network must conform to section 3 of GSMA PRD IR.92 [1] with the following modified requirement: the UE can support the Adaptive Multi-Rate wideband (AMR-WB) speech codec. The AMR-WB speech codec must be supported if wideband speech communication is offered. The Enhanced Voice Services (EVS) speech codec must be supported if super-wideband or fullband speech communication is offered. The details of AMR-WB and EVS, when supported, are as specified in IR.92 [1].

> Note: In GSMA PRD IR.92 [1], both AMR and AMR-WB speech codecs are mandatory to support.

4   Radio and Packet Core Feature Set

4.0   General

The LTE radio capabilities included in this specification are applicable to category M1 UEs configured with CE Mode A and networks supporting FDD LTE only, TDD LTE only, or both FDD LTE and TDD LTE as specified in 3GPP Release 13 TS 36.331 [2].

4.1   Robust Header Compression

The UE and network must conform to section 4.1 of GSMA PRD IR.92 [1].

4.2   LTE Radio Capabilities

4.2.1   Radio Bearers

The UE and network must conform to section 4.2.1 of GSMA PRD IR.92 [1].

4.2.2   DRX Mode of Operation

The UE and network must conform to section 4.2.2 of GSMA PRD IR.92 [1].

4.2.3   RLC configurations

The UE and network must conform to section 4.2.3 of GSMA PRD IR.92 [1].

4.2.4   GBR and NGBR Services, GBR Monitoring Function

The UE and the network must conform to section 4.2.4 of GSMA PRD IR.92 [1].

4.3   Bearer Management

4.3.1   EPS Bearer Considerations for SIP Signalling and XCAP

The UE and the network must conform to section 4.3.1 of GSMA PRD IR.92 [1] with the following modified requirement: the UE can support the Ut reference point..

4.3.2   EPS Bearer Considerations for Voice

The UE and the network must conform to section 4.3.2 of GSMA PRD IR.92 [1].

4.3.3   EPS Bearer Considerations for voice media on emergency PDN Connection

The UE and the network must conform to section 4.3.3 of GSMA PRD IR.92 [1].

4.4   P-CSCF Discovery

The UE and the packet core network must conform to section 4.4 of GSMA PRD IR.92 [1].

4.5   Extended Idle Mode Discontinuous Reception

If the UE supports Extended Idle Mode Discontinuous Reception (eDRX), and the UE supports and uses terminating voice calls, then the UE must not include the extended idle mode DRX parameters information element during Attach and TAU procedure as specified in 3GPP Release 13 TS 23.682 [6].

4.6   Control Plane CIoT EPS Optimisation for transport of user data over NAS

Even if the UE supports control plane CIoT EPS optimisation for transport of user data over NAS, the UE must not indicate support of control Plane CIoT EPS optimizations during Attach and TAU procedure as specified in 3GPP Release 13 TS 24.301 [7].

5   Common Functionalities

5.1   IP Version

The UE and the network must conform to section 5.1 of GSMA PRD IR.92 [1] with the following modified requirement: the UE can support XCAP/HTTP.

5.2   Emergency Service

5.2.1   General

The UE and the network must conform to section 5.2.1 of GSMA PRD IR.92 [1].

5.2.2   Interactions between supplementary services and PSAP callback

The network must conform to section 5.2.2 of GSMA PRD IR.92 [1].

5.3   Roaming Considerations

This profile has been designed to support IMS voice roaming. For more information on the IMS voice roaming models see GSMA PRD IR.65 [4] and GSMA PRD IR.88 [5].

5.4   Accesses in addition to E-UTRAN

The UE must conform to section 5.4 of GSMA PRD IR.92 [1].

5.5   Data Off and Services Availability

The UE and the network must conform to section 5.5 of GSMA PRD IR.92 [1].

5.6   Voice Calls and Smart Congestion Mitigation

The UE and the network must conform to section 5.6 of GSMA PRD IR.92 [1].

5.7   Extended Idle Mode Discontinuous Reception

If the UE supports Extended Idle Mode Discontinuous Reception (eDRX), and the UE supports and uses terminating voice calls, then the UE must not include the extended idle mode DRX parameters information element during Attach and TAU procedure as specified in 3GPP Release 13 TS 23.682 [6].

5.8   Power Saving Mode

If the UE supports Power Saving Mode (PSM), and the UE supports and uses terminating voice calls, then the UE must neither request an Active Time value nor request a Periodic TAU/RAU Timer value during Attach and TAU procedures as described in 3GPP Release 13 TS 23.682 [6].

Annex A   Complementing IMS with CS

A.1   General

In order to offer its customers a seamless service, the operator may wish to complement the IMS VoIP and SMSoIP capable radio coverage by utilising the CS (Circuit Switched) radio access for voice and/or and/or SMS over NAS signalling on cellular access. The IMS VoIP and SMSoIP coverage may be less or more extensive than the concurrent CS coverage. This Annex describes the additional features that need to be implemented for the UEs and networks that wish to support such a deployment scenario.

The voice related requirements in this annex are applicable if the UE has the setting of "IMS PS Voice preferred, CS Voice as secondary".

A.2   Domain Selection

The UE and the network can conform to section A.2 of GSMA PRD IR.92 [1].

A.3   SR-VCC

The UE and the network can conform to section A.3 of GSMA PRD IR.92 [1].

A.4   IMS Voice service settings management when using CS access

The UE and the network can conform to section A.4 of GSMA PRD IR.92 [1].

A.5   Emergency Service

The UE and the network must conform to section A.5 of GSMA PRD IR.92 [1].

A.6   Roaming Considerations

The UE can conform to section A.6 of GSMA PRD IR.92 [1].

A.7   SMS Support

The UE and the network must conform to section A.7 of GSMA PRD IR.92 [1].

A.8   Call Waiting in the CS domain

The UE and the network can conform to section A.8 of GSMA PRD IR.92 [1].

A.9   USSD

The UE and the network can conform to section A.9 of GSMA PRD IR.92 [1].

Annex B   Features needed in certain regions

B.1   General

This Annex describes features that operators need to support in certain regions due to local regulatory requirements.

B.2   Global Text Telephony

The UE and the network must conform to section B.2 of GSMA PRD IR.92 [1].

B.3   Service Specific Access Control

The UE and the network must conform to section B.3 of GSMA PRD IR.92 [1].

Annex C   Document Management

C.1   Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	June 2017	New PRD	NG/PSMC	Ralf Keller (Ericsson)
2.0	April 2018	Implemented CRs • CR1002 eDRX and PSM in case of terminating voice calls • CR1003: DONAS and PDN Connections to IMS APN and HOS APN	NG/PSMC	Ralf Keller (Ericsson)
3.0	May 2020	Implemented CR1004 SIP Registration upon call	NG	George Foti (Ericsson())

Other Information

Type	Description
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