IMS Profile for Converged IP Communications

Version 1.0

19 May 2015

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1 Introduction

1.1 Overview

This Permanent Reference Document (PRD) defines a profile that identifies a minimum mandatory set of common IMS functionalities that are defined in 3GPP specifications and other GSMA PRDs that a wireless device (the User Equipment (UE)) and network are required to support in order to guarantee interoperable, high quality IMS-based and Mobile Operator provided Converged IP Communications Services (as defined in section 1.4).

The service and access specific functionality for Converged IP Communications is defined within the following related PRDs:

- GSMA PRD IR.92 [1] - IMS Profile for Voice and SMS (over LTE).
- GSMA PRD IR.94 [2] – IMS Profile for Conversational Video Service
- GSMA PRD IR.64 [17] - IMS Service Centralization and Continuity Guidelines
- GSMA PRD RCC.07 [3] - RCS 5.3 Advanced Communications Services and Client Specification
- GSMA PRD IR.51 [5] – IMS Profile for Voice, Video and SMS over Wi-Fi.

This document defines normative requirements for the UE and the network to support Converged IP Communication Services.

The following network deployments are supported:

- a converged IMS core network (i.e. supporting Multimedia Telephony, SMS and RCS services), or
- two separate IMS core networks (i.e. one IMS core network supporting Multimedia Telephony and SMS and another IMS core network supporting RCS only services).

Note 1: In the two separate IMS core networks scenario each core network contains its own HSS.

The network deployments described above require that the UE supports:

- a single IMS registration to a single IMS core network; and
- two separate IMS registrations, either to a single IMS core network or to two separate IMS core networks.

Table 1 provides an overview of all allowed and prohibited combinations for single registration and dual registrations.

	Single IMS Core Network (supporting Multimedia Telephony, SMS and RCS)	**Two separate IMS Core Networks (one for Multimedia Telephony and SMS, one for RCS only services)**
UE performs single IMS Registration	Allowed	Prohibited (see Note)
UE performs two IMS Registrations	Allowed	Allowed

Table 1IMS Registration / IMS Core Combinations

Note 2: In the prohibited case in Table 1, the UE must perform two separate IMS registrations, otherwise only either Multimedia Telephony and SMS will be registered by the UE and available to the user, or, only RCS services will be registered by the UE and available to the user.

All of the different combinations for UE implementation and network deployment are able to provide a solution for Converged IP Communication Services. The UE implementations must support both single and two separate registrations, whereas networks can choose which approach to use. A single IMS registration on the UE to a single IMS core network provides the most efficient and optimised solution and has a number of benefits:

- single IMS Registration to be maintained,
- Security Association based on USIM or ISIM credentials for all access types,
- single APN to better manage radio and network resources,
- optimised traffic load management, more efficient memory usage, increased battery lifetime on the UE,
- common Network-to-Network Interface (NNI) without the need for discrimination when selecting the NNI,
- reduced OPEX/CAPEX associated with managing two core networks,
- more efficient subscriber data management,
- easier capability to combine IP Communication Services (Multimedia Telephony and SMS +RCS) together and with future IMS-based services.

1.2 Relationship to Existing Standards

1.2.1 3GPP Specifications

This profile is based on the open and published 3GPP specifications as listed in section 1.5. If the referenced GSMA PRDs have a basis, e.g. 3GPP Release 8, or reference a particular 3GPP release, then this is taken as a basis for the referenced parts. It should be noted, however that not all the features mandatory in the respective base 3GPP Release are required for compliance with this profile.

When reference is made to a particular 3GPP specification in the following sections, then either the 3GPP release is explicitly mentioned or 3GPP Rel-8 is assumed.

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 the common IMS functionality to enable Converged IP Communications Services; it profiles UE and IMS core network capabilities that are considered essential to launch interoperable, high quality IMS-based and Mobile Operator provided Converged IP Communications Services. The defined profile is compliant with 3GPP specifications (see section 1.2 for more information). The scope of this profile is the interface between UE and network (also known as the User-Network Interface (UNI)).

In the context of this PRD, the UE is a wireless device containing a USIM (and optionally also an ISIM) on a UICC. The Mobile Operator providing the Converged IP Communication Services is the HPMN as identified via the Mobile Country Code (MCC) and Mobile Network Code (MNC) portions of the IMSI on the USIM.

UEs accessing IMS via GERAN, UTRAN, E-UTRAN and EPC integrated Wi-Fi are considered within the scope of this document. UE access to IMS via other accesses (including non EPC integrated Wi-Fi) is considered out of scope.

This document 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 Terms

Term	Description
3GPP	3rd Generation Partnership Project
APN	Access Point Name
CAPEX	CAPital EXpense
Converged IP Communications Services	Multimedia Telephony, SMS and RCS.
CS	Circuit Switched
EDGE	Enhanced Data rates for Global Evolution
EPC	Evolved Packet Core
EPC-integrated Wi-Fi	A Wi-Fi access as defined in GSMA PRD IR.51 [5].
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
GBR	Guaranteed Bit Rate
GERAN	GSM EDGE Terrestrial Radio Access Network
GIBA	GPRS IMS Bundled Authentication
GPRS	General Packet Relay Service
GRUU	Globally Routable User Agent URI
GSM	Global System for Mobile communication
HOS	Home Operator Services
HPMN	Home Public Mobile Network
HSS	Home Subscriber Server
HTTP	Hyper Text Transfer Protocol
IARI	IMS Application Reference Identifier
IARP	Inter APN Routing Policy
ICSI	IMS Communication Service Identifier
IM	IP Multimedia
IMAP	Internet Mail Access Protocol
IMEI	International Mobile Equipment Identity

Term	Description
IMPI	IP Multimedia Private User Identity
IMPU	IP Multimedia Public User Identity
IMS	IP Multimedia Subsystem
IMS-AKA	IMS Authentication and Key Agreement
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISIM	IM Services Identity Module
Legacy 3GPP Access	GERAN or UTRAN
LTE	Long Term Evolution
MCC	Mobile Country Code
MNC	Mobile Network Code
MO	Management Object
MSISDN	Mobile Station International Subscriber Directory Number
MSRP	Message Sending Relay Protocol
MTU	Maximum Transmission Unit
Multimedia Telephony	Voice/Conversational Video
NAT	Network Address Translation
NNI	Network-Network Interface
OPEX	OPerating EXpense
P-CSCF	Proxy - Call Session Control Function
PDN	Packet Data Network
PDP	Packet Data Protocol
PRD	Permanent Reference Document
PS	Packet Switched
QCI	Quality of Service (QoS) Class Identifier
RAT	Radio Access Technology
RCS	Rich Communication Services
RCS only services	Services in RCS other than Multimedia Telephony services and SMS
RFC	Request For Comments
SDP	Session Description Protocol
SIGCOMP	SIGnalling COMPression
SIM	Subscriber Identity Module
SIMPLE	Session Initiation Protocol for Instant Messaging and Presence Leveraging Extensions

Term	Description
SIP	Session Initiation Protocol
SMS	Short Messaging Service
SMSoIP	SMS over IP
SRVCC	Single Radio Voice Call Continuity
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UE	User Equipment
UICC	Universal Integrated Circuit Card
UMTS	Universal Telecommunications Mobile System
UNI	User-Network Interface
URI	Uniform Resource Identifier
URN	Uniform Resource Name
USIM	Universal Subscriber Identity Module
UTRAN	UMTS Terrestrial Radio Access Network
UUID	Universal Unique Identifier
VoIP	Voice Over IP
VoLTE	Voice over LTE
VPMN	Visited Public Mobile Network
Wi-Fi	Wireless Fidelity
WLAN	Wireless Local Area Network
XCAP	XML Configuration Access Protocol
XML	eXtensible Markup Language

1.5   Document Cross-References

Ref	Doc Number	Title
[1]	GSMA PRD IR.92	IMS Profile for Voice and SMS
[2]	GSMA PRD IR.94	IMS Profile for Conversational Video Service
[3]	GSMA PRD RCC.07	RCS 5.3 Advanced Communications Services and Client Specification
[4]	GSMA PRD RCC.15	IMS Device Configuration and Supporting Services
[5]	GSMA PRD IR.51	IMS Profile for Voice, Video and SMS over Wi-Fi
[6]	IETF RFC 2119	Key words for use in RFCs to Indicate Requirement Levels
[7]	3GPP TS 23.003	Numbering, addressing and identification
[8]	3GPP TS 24.229	IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3
[9]	3GPP TS 24.623	Extensible Markup Language (XML) Configuration Access Protocol (XCAP) over the Ut interface for Manipulating Supplementary Services
[10]	3GPP TS 31.103	Characteristics of the IP Multimedia Services Identity Module (ISIM)

Ref	Doc Number	Title
		application
[11]	IETF RFC 3261	SIP: Session Initiation Protocol
[12]	GSMA PRD IR.65	IMS Roaming and Interworking Guidelines
[13]	GSMA PRD IR.88	LTE Roaming Guidelines
[14]	GSMA PRD IR.61	Wi-Fi Roaming Guidelines
[15]	3GPP TS 23.402	Architecture Enhancements for non-3GPP accesses
[16]	3GPP TS 23.401	General Packet Radio Service (GPRS) enhancement for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access
[17]	GSMA PRD IR.64	IMS Service Centralization and Continuity Guidelines

1.6   Conventions

The key words "must", "must not", "required", "shall", "shall not", "should", "should not", "recommended", "may", and "optional" in this document are to be interpreted as described in IETF RFC 2119 [6].

2   Converged IMS UNI Requirements

2.1   Remote Client Configuration

The UE and the network must support remote client configuration as per GSMA PRD RCC.07 [3].

2.2   APN Configuration and Usage

2.2.1   General

The number of required APNs for SIP signalling and related media is dependent on whether:

- Multimedia Telephony, SMS and RCS only services are all on the IMS well-known APN.
- Multimedia Telephony, SMS and RCS only services are on different APNs (IMS well-known APN and HOS APN).

This is summarised in Table 2 below. For details regarding the IMS well-known APN and the HOS APN, see GSMA PRD IR.92 [1] and GSMA PRD IR.88 [13].

The configuration of the APNs to be used for the RCS services described in the above cases depend on the RCS VOLTE SINGLE REGISTRATION parameter and NO MSRP SUPPORT parameter as defined in annexes A.1.7 and A.1.12 of GSMA PRD RCC.07 [3]. Table 2 illustrates the usage of these parameters for a UE.

RCS VOLTE SINGLE REGISTRATION (see GSMA PRD RCC.07 [3])	UE roaming outside of HPMN?	NO MSRP SUPPORT (see GSMA PRD RCC.07 [3])	UE behaviour
0	Not applicable	Not applicable	As described in section 2.2.3.
1	Not applicable	No value or roamed to network not listed	As described in section 2.2.2.
		UE is roaming in a network that is listed	As described in section 2.2.3.
2	No	Not applicable	As described in section 2.2.2.
	Yes	Not applicable	As described in section 2.2.3.

Table 2Summary of parameters controlling APN Usage for SIP signalling and related media for IP Communication Services

2.2.2 Single APN; IMS well-known APN

The UE determines that one APN is used as described in section 2.2.1.

The UE must use the IMS well-known APN for SIP signalling and media as described in section 2.2.1.

The UE must prevent non-IMS applications from using this APN. The IMS well-known APN is defined in GSMA PRD IR.88 [13].

For details regarding PDN connection establishment to the IMS well-known APN, see section 4.3.1 of GSMA PRD IR.92 [1] and section 4.5 of GSMA PRD IR.51 [5].

2.2.3 Two APNs; IMS well-known APN and HOS APN

The UE determines that two APNs are used (as specified in section 2.2.1).

For Multimedia Telephony and SMS services, the IMS well-known APN must always be used (see section 2.2.4).

For RCS only services, the HOS APN is used as shown in Table 2.

2.2.4 APNs and Converged IP Communication Services

The UE provides Converged IP Communication Services via:

- a single registration for Multimedia Telephony and SMS and RCS services if, according to Table 2, only the IMS well-known APN is used for registration, or

- two separate registrations: a registration for Multimedia Telephony and SMS on the IMS well-known APN and in addition a registration for RCS only services on the HOS APN if according to Table 2 both the IMS APN and the HOS APN are used for registration.

The UE must register the Multimedia Telephony and SMS services and RCS services on the IMS well-known and HOS APN as described in **Error! Reference source not found.**.

Functionality supported by UE	APN to be used for registration for a given functionality	
	Single Registration as per Table 2	Two Separate Registrations as per Table 2
IR.92 / IR.51 voice	IMS well-known APN	IMS well-known APN
IR.92 / IR.51 SMSoIP (*)	IMS well-known APN	IMS well-known APN
IR.94/IR.51 conversational video (**)	IMS well-known APN	IMS well-known APN
RCS Chat (**)	IMS well-known APN	HOS APN
RCS IP voice call	Not registered.	Not registered.
RCS IP video call	Not registered	Not registered.
IR.74 video share (**)	IMS well-known APN	HOS APN
Other RCS Services (**)	IMS well-known APN	HOS APN

Table 3Service Registrations on IMS well-known APN and HOS APN

For items marked with "*" in Table 3, the UE shall register this service only if the service is activated in the UE by configuration, as described in Annex A.7 of GSMA PRD IR.92 [1].

For items marked with "**" in Table 3, the UE shall register this service only if the service is activated in the UE by configuration, as described in section 2.1.

2.3   P-CSCF Discovery Mechanism and Utilisation

A UE must support the capability to connect to a single P-CSCF for the single registration case and the capability to connect to two P-CSCFs for the two registrations case. The UE must discover the P-CSCF as follows:

- for Multimedia Telephony and SMS services over E-UTRAN, a UE must support the P-CSCF discovery mechanisms as described in section 4.4 of GSMA PRD IR.92 [1]. For the single registration case, RCS services must utilise the same P-CSCF address.
- for Multimedia Telephony and SMS services over EPC integrated Wi-Fi, a UE must support the P-CSCF discovery mechanisms as described in section 6.9 of GSMA PRD IR.51 [5]. For the single registration case, RCS services must utilise the same P-CSCF address.

- for RCS services on the HOS APN for the two registration case, a UE must perform the P-CSCF discovery mechanism via the RCS client configuration mechanism (IMS-MO for RCS as described in section 2.4.6 of GSMA PRD RCC.07 [3]).

The provisioning of P-CSCF address(es) is defined by the Home and/or Visited Mobile Operator(s) dependent on configuration of the IMS core network(s).

2.4   IMS Identities

2.4.1   IMS Public User Identity (IMPU)

The UE and IMS core network must support IMS Public User Identities (IMPUs) as specified in section 2.2.3 of GSMA PRD IR.92 [1].

2.4.2   IMS Private User Identity (IMPI)

2.4.2.1 General

The UE and IMS core network must support IMPIs in the format defined in section 13.3 of 3GPP TS 23.003 [7]. The UE and IMS core network must support the IMPIs defined in the following two sub-sections.

2.4.2.2 UICC obtained/derived IMPI

If an ISIM application is present on the UICC, the IMPI in the first (or only) record in the EF_{IMPI} Elementary File in the ISIM (see section 4.2.2 of 3GPP TS 31.103 [10]) must be used.

If the UICC does not contain an ISIM application, then an IMPI derived from the USIM's IMSI as per section 13.3 of 3GPP TS 23.003 [7] must be used.

2.4.2.3 IMS Management Object (MO) obtained IMPI

The IMPI obtained from the IMS Management Object as defined in section 2.2 of GSMA PRD RCC.15 [4] must be used.

2.4.3   Addressing

The support in the UE and network of E.164 numbers, home-local numbers and geo-local numbers for Multimedia Telephony must be as defined in section 2.2.3 of GSMA PRD IR.92 [1].

The support in the UE and network of E.164 numbers and home-local numbers for RCS only services must be as defined in section 2.5 of RCC.07 [3].

Note: RCC.07 [3] does not specify that geo-local numbers can be used for RCS Capability Exchange, RCS Chat, RCS File Transfer, RCS Standalone Messaging, IR.74 Video Share or IR.79 Image Share.

The support in the UE and network of the P-Called-Party-ID header field must be as defined in section 2.2.3 of GSMA PRD IR.92 [1].

2.5   IMS Registration

2.5.1   General

The UE and IMS core network must support the SIP registration procedures as follows (see Table 3).

For registration via the IMS well-known APN:

- for voice and SMS over LTE a UE must support the SIP registration procedures as defined in section 2.2.1 of GSMA PRD IR.92 [1].
- for conversational video services, a UE must support the SIP registration procedures as defined in section 2.2.1 of GSMA PRD IR.94 [2].
- for Multimedia Telephony and SMS over EPC integrated Wi-Fi, a UE must support the SIP registration procedures as defined in section 4.2.1 of GSMA PRD IR.51 [5].
- the procedures for registration of the relevant services feature tags for RCS only services in section 2.4.4 of GSMA PRD RCC.07 [3].

For registration via HOS APN:

- the UE must support the SIP registration procedures as defined in section 2.4 of GSMA PRD RCC.07 [3].

Further requirements and clarifications are specified below.

The UE must be able to support all of the following registration options:

- a single IMS registration to a single converged IMS core,
- two separate IMS registrations to a single converged IMS core, and
- two separate registrations to two separate IMS cores.

In the two separate registrations case, the UE must use the same IMPU in both registration procedures.

The configuration of whether to support a single registration or two separate registrations is dependent on the RCS VOLTE SINGLE REGISTRATION parameter in the IMS MO (see section Table 2).

The UE must subscribe to the registration event package as defined in section 5.1.1.3 of 3GPP TS 24.229 [8] for each registration.

UE and IMS core network must support network-initiated de-registration as defined in section 5.1.1.7 of 3GPP TS 24.229 [8].

On being de-registered by the network, the UE must behave as specified in section 5.1.1.7 of 3GPP TS 24.229 [8].

Note: For two registration case, the subscription to registration event package as well as network initiated de-registration is not described in the current version of this document.

2.5.2 Single IMS Registration

For a single registration to a converged IMS core network, the UE must include:

- the IMS Public User Identity (as specified in section 2.4.1),
- the IMS Private User Identity (as specified in section 2.4.2.2),
- the "+sip.instance" header field parameter (Instance ID) of the Contact address. The parameter must be encoded as the IMEI URN in specified in section 2.2.1 of GSMA PRD IR.92 [1].
- the ICSIs and/or IARIs and/or feature tags referenced in GSMA PRDs IR.92 [1], IR.94 [2] and RCC.07 [3] for the services supported by the UE on that registration (see Table 3).

2.5.3 Two Separate IMS Registrations

For each individual registration, the UE must include:

- the IMS Public User Identity (as specified in section 2.4.1),
- the IMS Private User Identity, as follows:

  - for registration for Multimedia Telephony and SMS, the IMS Private User Identity specified in section 2.4.2.2 shall be used.
  - for registration for RCS only services, the IMS Private User Identity specified in section 2.4.2.3 shall be used.

  Note 1:   In order to prevent a subsequent registration by a UE over-writing a previous registration in the IMS core network, the HPMN needs to ensure that the IMS Private Identities used in the two registrations are different.

- the "+sip.instance" header field parameter (Instance ID) of the Contact address, as follows:

  - for registration for Multimedia Telephony and SMS, the parameter must be encoded as the IMEI URN as specified in section 2.2.1 of GSMA PRD IR.92 [1].
  - for registration for RCS only services, the parameter may be encoded as the IMEI URN as specified in section 2.2.1 of GSMA PRD IR.92 [1] or may be encoded as the UUID (Universal Unique Identifier) that is provided as part of the UE/client configuration as specified in section 2.4.2 of GSMA PRD RCC.07 [3].

  Note 2:   As the same IMS Public User Identity is registered for Multimedia Telephony and SMS, and for RCS only services (see section 2.5.1), the network can fork an incoming SIP request to the same UE.

- the defined ICSIs and/or IARIs and/or feature tags for the services supported by the UE as defined in GSMA PRDs IR.92 [1], IR.94 [2] and RCC.07 [3].

2.6 IMS Security

2.6.1 Single IMS Registration

When a single IMS registration is used for IP Communication Services, the UE and the network must follow the procedures for IMS Authentication and Key Agreement (IMS-AKA),

Sec-Agree and IPSec as described in section 2.2.2 of GSMA PRD IR.92 [1] and section 4.3 of GSMA PRD IR.51 [5].

2.6.2 Two Separate IMS Registrations

When two separate IMS registrations are used for IP Communication Services, each individual IMS registration registers the same IMS Public User Identity and includes authorisation and authentication procedures to establish the security relationship between the IMS User Agent and the core network. Only a single security association can be setup to the IMS using the procedures for IMS IMS-AKA, Sec-Agree and IPSec. Therefore, the additional registration is based on SIP Digest or GPRS-IMS-Bundled Authentication (GIBA). The digest credentials are retrieved by the UE during the initial configuration interaction with the core network as described in section 2.13.1 of GSMA PRD RCC.07 [3].

The UE and network must follow the security procedures as follows:

- as described in section 2.2.2 of GSMA PRD IR.92 [1] for registration for Multimedia Telephony and SMS over E-UTRAN; or
- as described in section 4.3 of GSMA PRD IR.51 [5] for registration for Multimedia Telephony and SMS services over EPC integrated Wi-Fi.

The UE and network must follow procedures for SIP Digest and GIBA as specified in section 2.13.1 of GSMA PRD RCC.07 [3] for the registration used for RCS services.

2.7   Non IMS Protocols APN Utilization and Security Mechanism

2.7.1 XCAP

For Multimedia Telephony services, the XCAP based Ut interface (see 3GPP TS 24.623 [9]) is used for configuration of Supplementary Services as described in section 2.3.2 of GSMA PRD IR.92 [1] and section 6.5 of GSMA PRD IR.51 [5]. This interface uses in cellular access the HOS APN as defined in section 6.3 of GSMA PRD IR.88 [13] and in Wi-Fi either the HOS APN or a different APN as defined in section 6.5 of GSMA PRD IR.51 [5] and enables XCAP messages to be exchanged with the home IMS network for service configuration.

XCAP is also used for the management of the resource lists for presence subscriptions and authorisation rules for SIMPLE Presence as described in GSMA PRD RCC.07 [3] sections 2.14 and 3.7.4.5 and for the management of personal network blacklists as described in GSMA PRD RCC.07 [3] section 2.15. The XCAP requests must be sent over the HOS APN or the different APN as defined in section 6.5 of GSMA PRD IR.51 [5] depending on configuration and the currently used access network.

> **Note:**   This version of the PRD does not describe whether the XCAP traffic for Multimedia Telephony and the XCAP traffic for SIMPLE Presence and personal network blacklists use the same infrastructure (e.g. aggregation proxy).

2.7.2 IMAP

IMAP is used in RCS for accessing the message store server (see section 2.8 of GSMA PRD RCC.07 [3]). The UE must use the HOS APN (as defined in section 6.3 of GSMA PRD IR.88 [13]) for IMAP as utilised for RCS services.

2.7.3 HTTP

HTTP is used in RCS for accessing the autoconfiguration and content servers for file transfer via HTTP (see section 2.8 of GSMA PRD RCC.07 [3]). The UE must use the HOS APN (as defined in section 6.3 of GSMA PRD IR.88 [13]) for HTTP as utilised for RCS only services.

2.8 SIP Preconditions

The UE must support and use SIP Preconditions as described in section 2.4.1 of GSMA PRD IR.92 [1] and section 4.7.1.1 of GSMA PRD IR.51 [5] for voice and conversational video sessions.

Additionally, for the single registration case, the UE must support SIP Preconditions for IR.74 video share sessions.

For RCS services using MSRP, the UE must not use SIP Preconditions.

2.9 Capability Exchange

The UE must support at least one of the Capability Exchange mechanisms described in section 2.6 of GSMA PRD RCC.07 [3] to advertise/negotiate support of conversational video and RCS services.

The configuration of the default mechanism is defined by the configuration parameter CAPABILITY DISCOVERY MECHANISM as defined in annex A.1.11 of GSMA PRD RCC.07 [3].

For two registrations, the capability exchange shall take place over the IMS registration for RCS only services.

2.10 IP Transport

As stated in IETF RFC 3261 [11], clients must support SIP over both UDP and TCP. The UE must support the configuration parameters PSSignalling, PSSignallingRoaming or WiFiSignalling as defined in section 2.2.2.2 of GSMA PRD RCC.15 [4] to determine the transport.

In order to avoid SIP message fragmentation due to MTU issues, the UE and the network must comply with 3GPP TS 24.229 [8] subclause 4.2A. As stated in IETF RFC 3261 [11], the transport must be selected on a per SIP message basis and not on a per SIP session basis.

2.11 SIP Timers

The UE and the network must support the SIP timers as defined in sections 7.7 and 7.8 of 3GPP TS 24.229 [8]. The UE must also support modification of the SIP timers via the IMS MO as defined in GSMA PRD RCC.15 [4].

It is recommended for Mobile Operators to use the values standardised in sections 7.7 and 7.8 of 3GPP TS 24.229 [8].

2.12 Multimedia Telephony Supplementary Services

The UE must support the supplementary services as described in section 2.3 of GSMA PRD IR.92 [1]. If the UE supports conversational video services as defined in GSMA PRD IR.94

[2], then the UE must support the supplementary services as described in section 2.3 of GSMA PRD IR.94 [2].

> **Note:** The means by which the supplementary services are synchronized between the separate IMS core networks is out of scope.

2.13 Multi-device Support

A user's subscription may include multi-device support (i.e. a Converged IP Communications Services UE and one or more secondary devices supporting RCS only services as defined in GSMA PRD RCC.07 [3]). Secondary device(s) may also perform an IMS registration (as described in section 2.4.2 of GSMA PRD RCC.07 [3]) over any allowed access technology (as described in section 2.9 of GSMA PRD RCC.07 [3]). By definition, the secondary device(s) must not be a Converged IP Communications Services UE.

> **Note:** Multi SIM devices/services are out of scope of this document.

2.14 Forking

2.14.1 Outgoing Requests

The UE must be able to receive responses due to a forked request as described in section 2.2.5 of GSMA PRD IR.92 [1].

2.14.2 Incoming Requests

In the case of multi-device support (see section 2.13), an incoming request to a registered public user identity must be forked to the multiple registered devices and handled as described in section 2.11 of GSMA PRD RCC.07 [3].

2.15 The use of Signalling Compression (SIGCOMP)

The UE must not use SIGCOMP.

2.16 SIP Session Establishment and Termination

UE and IMS core network must follow 3GPP TS 24.229 [8] for establishment and termination of a session.

UE and IMS core network must support reliable provisional responses.

For the purpose of indicating a Converged IP Communications Service to the network, the UE must use an ICSI value and/or IARI value and/or feature tag in accordance with section 5.7.1.9 of 3GPP TS 24.229 [8]. The related ICSIs, IARIs and feature tags are specified in the related service level PRDs (see section 1.1).

When generating an outgoing non-REGISTER request, the UE may populate the P-Preferred-Identity header field in accordance with section 2.5.3.2 of GSMA PRD RCC.07 [3].

2.17 Hosted NAT Traversal

The UE and network must support hosted NAT traversal as described in section 4.6.2 of GSMA PRD IR.51 [5] and section 2.8 of GSMA PRD RCC.07 [3].

2.18 Handover (LTE <-> EPC Integrated Wi-Fi)

The UE must support seamless handover between LTE and EPC integrated Wi-Fi as described in section 6.8 of GSMA PRD IR.51 [5]. The network may fulfil the requirements for mobility management as specified in section 6.2 of GSMA PRD IR.51 [5].

2.19 Data Off and Services Availability

The UE must support Data Off and service availability as defined in section 5.5 of GSMA PRD IR.92 [1] and in sections 2.9.1.5 and 2.9.1.6 of GSMA PRD RCC.07 [3].

> **Note:**   Data Off is defined only for PDN connections via a 3GPP access.

3   Common functionalities

3.1   Roaming Considerations

This profile has been designed to support IMS roaming as per GSMA PRDs IR.65 [12], IR.88 [13] and IR.61 [14]. Other roaming models are out of the scope of this profile.

3.2   IP Version

The UE and the network must support both IPv4 and IPv6 as described in section 5.1 of GSMA PRD IR.92 [1] and section 7.1 of GSMA PRD IR.51 [5] for all protocols that are used for the Converged IP Services.

3.3   Emergency Service

The UE and the network must support Emergency Service as specified in section 5.2 of GSMA PRD IR.92 [1] and section 7.3 of GSMA PRD IR.51 [5].

Annex A   Legacy 3GPP Access Considerations (Normative)

A.1   General

In most markets, there will not be ubiquitous LTE coverage for some time and thus consideration also needs to be given to any implications arising from Legacy 3GPP Access (GERAN or UTRAN) in terms of APN usage and mapping of bearers between legacy 3GPP accesses and LTE/EPC integrated Wi-Fi.

Voice service and SMS from a UE must use the CS network when under legacy 3GPP access coverage as specified in annex A of GSMA PRD IR.92 [1]. RCS only services must be enabled via legacy 3GPP accesses.

A.2   Attachment and IMS Registration on Legacy 3GPP Access

For RCS only services, the UE must perform a network attachment using its configured APN for RCS only services, which may be the IMS well-known APN or the HOS APN – as indicated in section 2.2. The UE must register for RCS only services (using P-CSCF address obtained as in section 2.3) but must only include RCS IARIs/ICSIs/feature tags in the IMS registration.

> **Note:**   If the PDN connection for the IMS well-known APN is established via Legacy 3GPP Access, then the SGSN in the VPMN may select a PGW in the HPMN even if the HPMN allows selecting a PGW in the VPMN. The PGW in the HPMN would be used also after performing handover to E-UTRAN, see section A.3.2.

For voice services, it is assumed that the UE must perform a CS-attach. See also section 2 of GSMA PRD IR.64 [17].

A.3   Handover to/from Legacy 3GPP Access

A.3.1 Handover between Legacy 3GPP Access and EPC Integrated Wi-Fi

A UE when handing over between Legacy 3GPP Access and EPC integrated Wi-Fi, must support the following:

- when moving into integrated Wi-Fi coverage:

  - leave voice call on CS network and the PDN Connection to the IMS well-known APN in GERAN/UTRAN until the voice call is terminated.
  - if performing handover packet bearers from GERAN/UTRAN to integrated Wi-Fi, proceed as described in sections 8.6.2 and 16.10.2 of 3GPP TS 23.402 [15] in conjunction with section 5.5.2.2, section 5.5.2.4 and annex D.3.4 of 3GPP TS 23.401 [16].

- when moving out of EPC-integrated Wi-Fi coverage:

  - for RCS only services, handover the packet bearers between EPC integrated Wi-Fi and GERAN/UTRAN as described in sections 8.2.1.3 (S2a) and 8.6.1.2 (S2b) of 3GPP TS 23.402 [15].

A.3.2 Handover between Legacy 3GPP Access and E-UTRAN

A UE when handing over between Legacy 3GPP Access and E-UTRAN, must support the following:

- when moving into E-UTRAN:

    - handover packet bearers between 2G/3G and E-UTRAN (as described in section 5.5.2.2, section 5.5.2.4 and annex D.3.4 of 3GPP TS 23.401 [16]).

- when moving out of E-UTRAN:

    - for voice services, perform SRVCC as described in section A.3 of GSMA PRD IR.92 [1]
    - for RCS only services, handover the packet bearers between E-UTRAN and 2G/3G as described in section 5.5.2.1, section 5.5.2.3 and annex D.3.3 of 3GPP TS 23.401 [16]

> **Note 1:**   Only the default bearer of each PDN connection can be maintained on GERAN/UTRAN in deployments not supporting secondary PDP contexts. GBR bearers will be released during SRVCC procedure and all non GBR bearers other than the default bearer will be released during handover of the packet bearers between E-UTRAN and GERAN/UTRAN and hence all sessions associated with these released non GBR bearers will break. When moving from GERAN/UTRAN to E-UTRAN, traffic carried on the signalling bearer on GERAN/UTRAN would then be on the QCI=5 bearer on E-UTRAN.

> **Note 2:**   There is limited support for parallel PS radio access bearers in legacy 3GPP deployments. Typical limits are 3 PS bearers plus 1 CS bearer although there are some networks that support only 1 PS bearer plus 1 CS bearer. All PS bearers exceeding these limits will be released during handover of the packet bearers between E-UTRAN and GERAN/UTRAN and all sessions associated with these released non GBR bearers will break.

Annex B   Document Management

B.1   Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	TBA	New PRD approved by PSMC.	PSMC	David Hutton, GSMA Wayne Cutler, GSMA, Tom Van Pelt GSMA

Other Information

Type	Description
Document Owner	IP Communications UNI Task Force
Editor / Company	David Hutton, Wayne Cutler, Tom Van Pelt - GSMA

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