RCS Common Core 1.1 Service Description Document

Version 2.0

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1 Introduction

1.1 Purpose of the document

The RCS Common Core Service Description Document provides guidance to Original Equipment Manufacturers (OEMs) for open market device implementations and guidance to Application Developers for downloadable client implementations.

The document provides user stories, feature requirements and technical information based on the RCS specification and a prioritised set of features which Mobile Network Operators (MNOs) can launch.

1.1.1 Structure of the document

The document details how the features are to be implemented in regards to the Functional Requirements and includes technical specification references and details that may influence how certain functions behave, creating an overall guide for OEMs and application developers.

- Chapter 2 covers discovery and activation.
- Chapter 3 covers capability discovery and service availability.
- Chapters 4 to 13 detail the 10 major Common Core services.
- Chapters 14 to 16 address Security, Data Off and RCS Settings.

Each feature is structured into three parts: a user story that shall explain the user's view of the feature, the context and the benefit or the rationale why the feature makes sense. The second part lists the requirement(s), which describe how the user story shall be delivered to match the expectations. The final part is the technical implementation which maps to or explains how to use the supporting technical specification.

1.1.2 Common Core client scope

The Common Core can be delivered in two ways for users:

1. Implemented natively within the device by the OEM, tightly integrating the capabilities and services within the address book and many other native touch points across the device.
2. Implemented as a downloadable application that can be downloaded from Application stores and accessible as a separate application on the user's device, usually within the device's application folder or it's desktop.

In most cases implementation of features is identical for both native and downloadable clients and this document for the most part will not differentiate between the two. In those cases where implementation of a feature in a downloadable client differs from the native experience, this may be described separately within the relevant section.

1.2   Table of references

Ref	Doc Number	Title
[1]	[3GPP TS 22.140]	3GPP TS 22.140, release 10, Multimedia Messaging Service (MMS); Stage 1 http://www.3gpp.org/DynaReport/22140.htm
[2]	[3GPP TS 23.040]	3GPP TS 23.040, release 10, Technical realization of the Short Message Service (SMS) http://www.3gpp.org/DynaReport/23040.htm
[3]	[3GPP TS 24.167]	3GPP TS 24.167, release 10, 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; 3GPP IMS Management Object (MO) http://www.3gpp.org/DynaReport/24167.htm
[4]	[CAB_TS]	OMA Converged Address Book (CAB) Specification, Approved Version 1.0, 13 November 2012http://www.openmobilealliance.org
[5]	[PRD-IR.92]	GSMA PRD IR.92 - "IMS Profile for Voice and SMS" Version 7.1 18 September 2013 http://www.gsma.com/
[6]	[PRD-IR.94]	GSMA PRD IR.94 - "IMS Profile for Conversational Video Service" Version 6.1 23 September 2013 http://www.gsma.com/
[7]	[RCC.07]	GSMA PRD RCC.07 version 6.0- "Rich Communication Suite 5.3 Advanced Communications Services and Client Specification" 28 February 2015 http://www.gsma.com/
[8]	[RCC.09]	GSMA PRD RCC.09 RCS 5.3 Endorsement of OMA CPM 2.0 Message Storage, Version 5.0 28 February 2015 http://www.gsma.com/
[9]	[RCC.10]	GSMA PRD RCC.10 Rich Communication Suite 5.3 Endorsement of OMA CPM 2.0 Interworking Version 4.0 http://www.gsma.com/
[10]	[RCC.11]	GSMA PRD RCC.11 Rich Communication Suite 5.3 Endorsement of OMA CPM 2.0 Conversation Functions Version 4.0 28 February 2015 http://www.gsma.com/
[11]	[RCC.14]	GSMA PRD RCC.14 Service Provider Device Configuration Version 1.0 16 February 2015 http://www.gsma.com/
[12]	[RCC.15]	GSMA PRD RCC.15 IMS Device Configuration and Supporting Services Version 1.0 16 February 2015 http://www.gsma.com/
[13]	[RCC.53]	GSMA PRD RCC.53 joyn Device API Specification Version 2.0 16 October 2014 http://www.gsma.com/
[14]	[RCC.55]	GSMA PRD RCC.55 [TAPI-Security]: RCS Extensibility: Terminal API Security Version 1.0 15 October 2014 http://www.gsma.com/
[15]	[RCC.60]	Blackbird Product Definition Document, version 4.0, www.gsma.com
[16]	[RFC2425]	A MIME Content-Type for Directory Information IETF RFC http://tools.ietf.org/html/rfc2425

Ref	Doc Number	Title
[17]	[RFC2426]	vCard MIME Directory Profile IETF RFC http://tools.ietf.org/html/rfc2426
[18]	[RFC5547]	A Session Description Protocol (SDP) Offer/Answer Mechanism to Enable File Transfer IETF RFC http://tools.ietf.org/html/rfc5547
[19]	[vCard21]	vCard, The Electronic Business Card, A versit Consortium Specification, 18 Sep 1996 http://www.imc.org/pdi/vcard-21.doc

1.3   Conventions

It is a shared understanding by the standardizing RCS operators that any service described in the RCS standard may or may not be offered by any given mobile network operator; however, it is agreed that if a feature is supported by an operator, the Feature Requirements which are marked 'OM' (operator mandatory) shall be supported.

> NOTE: For device manufacturers and client developers requirements are classified based on the conventions defined in section 1.4 of this document.

For the purpose of this document, user stories are identified using the following numbering convention: "US-N.N", where US= User Story and N= the associated user story e.g. US2.2.

The associated requirements are identified using the following numbering convention: "R-N-N-N, where "R" = requirement e.g. R2-2-1. Sub requirements will appear as a third level e.g. R-2-2-1-1.

1.4   Requirement and Technical Realization Classification

Term	Description
Shall	These terms dictate that a functionality and/or process is **Mandatory**
Shall/Shall Not	These terms dictate that a functionality and/or process is **Mandatory**
Required	These terms dictate that a functionality and/or process is **Mandatory**
Should/*Should* Not	This term dictates that the functionality and or/process is **Highly *Recommended***
Recommended	This term dictates that the functionality and or/process is **Highly *Recommended***
May	This term dictates that the functionality and or/process is **Nice to Have**
Optional	This term dictates that the functionality and or/process is **Nice to Have**

Table 1: Requirements Classification

1.5   Terms and Abbreviations

Term	Description (contains technical and functional terms)
Active device or interface	A device or interface will be active for a conversation's "session" if the user has either started a conversation, or sent events outside of a session from that device or responded to an incoming event with an event listed in R9-3-4 on that device/interface. A session is established and associated with that conversation. Further events sent within the conversation will be sent only to that device in real-time and will be synchronised with other (inactive) devices as required. Any given user can only have one active device / interface at any given point in time for an active session.

Term	Description (contains technical and functional terms)
Aggregation of device capabilities	All of a user's capabilities for their RCS services on all of their RCS-enabled devices will be combined into a single set of capabilities which is shared with other users. Other users will not be able to determine on exactly which device another user has a specific capability, nor will other users know whether the user has multiple RCS devices available to him at all (using this capability information shared).
A-Party	The party that initiates a communication event e.g. creates and sends a chat message or File Transfer or initiates a call.
App	Smartphone application.
App ID	Unique identifier for an application.
Auto-Accept	A function on the device that shortcuts the user manual acceptance of the incoming communication event (such as chat, files etc.).
B-Party	The party that receives or is intended to receive a communication event e.g. Chat Message or File Transfer from A-Party.
Capability / Availability	A contact has a device registered for RCS service that can initiate or respond to a requested RCS service.
Chat Message	A single text message that was conveyed from one user to another using the RCS Chat service.
Common Message Store (CMS)	A network storage that enables Multi-Device and Backup and Restore use cases.
Contact	A contact is a communication partner either selected from the device contact list or typed into the dialler as a phone number.
Contact Card	The details of a single contact which are displayed whenever a contact is selected from the contact list.
Conversation History	A list of all the content exchanged between parties of a conversation.
Delivery Notification	Indication that a message was successfully received by the B-Party device.
DELIVERY TIMEOUT	A duration parameter set by the operator which triggers the RCS application to perform an action if the delivery notification of the receiving device has not been confirmed within the set time.
Developer	Application owner.
Developer ID	ID assigned to application owner. It is not the same as the App ID.
Device Wiping	Removing user specific data from the device.
Display Notification	Indication to the A-Party that the B-Party's device has displayed the message.
Emoji	Emoji are "picture characters", that is, characters presented as pictographs, images of things such as faces, weather, vehicles and buildings, food and drink, animals and plants or icons that represent emotions, feelings, or activities.
Emoticon	A graphical 'mood' element that technically is corresponding with a text string. The text string is conveyed by the standard, and interpreted on UI level and replaced with the corresponding graphical element.

Term	Description (contains technical and functional terms)
External Loudspeaker	Speaker on the device which amplifies the audio of the call when activated.
Feature Tag	A IARI Tag assigned to a RCS functionality allowing to identify and route the RCS traffic invoked by those apps through APIs.
Front Camera	Camera placed on the display side of a communication device.
Inactive device or Interface	A device or interface not currently active in a multi-device scenario.
Interconnected RCS Service	An RCS Service that can be accessed between users of network operators supporting the same RCS Service capabilities.
Interface	Any entity that provides RCS Service capabilities to a user, e.g. browser-based, app-based, natively implemented.
IMSI	International Mobile Subscriber Identification.
Integrated Messaging	A operator messaging service whereby the different message types are proposed to the end user, threaded together in a conversation and can be changed by the user. In this experience the message type used to deliver a message is indicated to the user
Messaging event	Associated with any of the services listed in R9-3-4 and includes all types of messages, files, content, new message notifications, previews, icons and message status notifications (sent and received).
MNO	Mobile network operator.
Multi-Device Support	RCS Service that enables a user to register more than one device under a single identity.
MSISDN	Mobile Subscriber Integrated Services Digital Number, i.e. mobile phone number.
OEM	Original Equipment Manufacturer.
"offline" user	A user who is known to be RCS enabled and not currently registered to the RCS service.
On-Net	Communication or signalling that does not go across the interworking interface (NNI) between networks or networks operators.
"online" user	A user who is known to be RCS enabled and is currently registered to the RCS service.
Operator Messaging	Integration of all Operator Messaging Services into one single application. There are two options for Operator Messaging: "Integrated Messaging" and "Seamless Messaging".
Operator Messaging Services	One or more services from traditional messaging services (SMS, MMS) or RCS services (Chat, File Transfer, Audio Messaging, vCard Push, Geolocation Push).
Primary device or Primary Interface	Device which contains the SIM that matches the identity which the client uses to register in IMS.

Term	Description (contains technical and functional terms)
RCS Alias name	A name that is defined by the user that represents the user as a Chat participant on B-Party devices, if no Contact exists in the contact list.
RCS-enabled	Capable of the RCS service, activated and ready to operate when the network conditions allow.
Rear Camera	Opposite to the front camera positioned on the back of the device.
Seamless Messaging	A operator messaging service whereby the user is not aware of the messaging technology used but the device / network determines which messaging technology is used.
Secondary device or Secondary Interface	Terms used to describe any access to a user's RCS account and service features from a device or interface not containing the SIM associated with the primary identity. A user may have several secondary devices and/or interfaces available to access their RCS service, including devices containing SIMs not associated with the user's primary identity.
Service availability	Service availability is a state of a specific user that is determined using Capability Discovery processes.
SDD	Service Definition Document – a document that describes the User Stories, Requirements and Technical Implementation Details of specific RCS services.
TE	Technical Enabler
Thread (or messaging thread)	A thread (or "messaging thread") is the history of all messages or files exchanged in past between two users, including message exchanged in past which are not part of the current conversation. This notion can be extended to Group, and then represents exchanges between all participants of the group.
UI	User Interface
xMS	The traditional operator messaging services known as Short Message Service (SMS) and Multimedia Messaging Service (MMS).

1.6   Differences to previous versions

RCS Common Core 1.1 is a maintenance update that provides further clarification to existing requirements. The technical information has also been updated to align with RCS 5.3 (see section 1.5 of [RCC.07])

1.6.1   Summary of Changes

- Device Provisioning
  - Alignment with [RCC.14] and [RCC.15]
- Capability Discovery and Service Availability
  - Clarification on the behaviour of the CAPABILITY VALIDITY timer (see requirement R3-3-7-5-6)
- Operator Messaging
  - Clarification to the Integrated Messaging requirements for proposed message selection (see section 4.2.1.1)
  - Clarification on the DELIVERY TIMEOUT behaviour and technology selection logic for Integrated Messaging variant 1 (see section 4.2.3)
- One-to-One Chat

- o Additional requirements for handling unseen messages and files (see requirements for user story US5-13).
  - Group Chat
    - o Additional requirement introduced to allow the user to see who set up the Group Chat (see requirement R6-6-2).
  - IP Voice Call
    - o Additional user story included to allow the user to see what the call bearer is in use for the call (see requirements for user story US10-12).
- Introduction of LED notifications for received one to one, group chat and file transfer messages
- Editorial clarifications to Audio Messaging and Messaging for Multi-device sections.

NOTE: Further improvements to the Messaging for Multi-device section (such as introduction of synchronisation triggers) are expected once the work of the Multi-device Messaging Operator Interest Group has been concluded

2   Device Provisioning

2.1   Description

An operator may provision different services for different users and/or devices based on internal policies (e.g. having an active subscription to one service). In the device provisioning phase, the services that are allowed for that user are configured on the device.
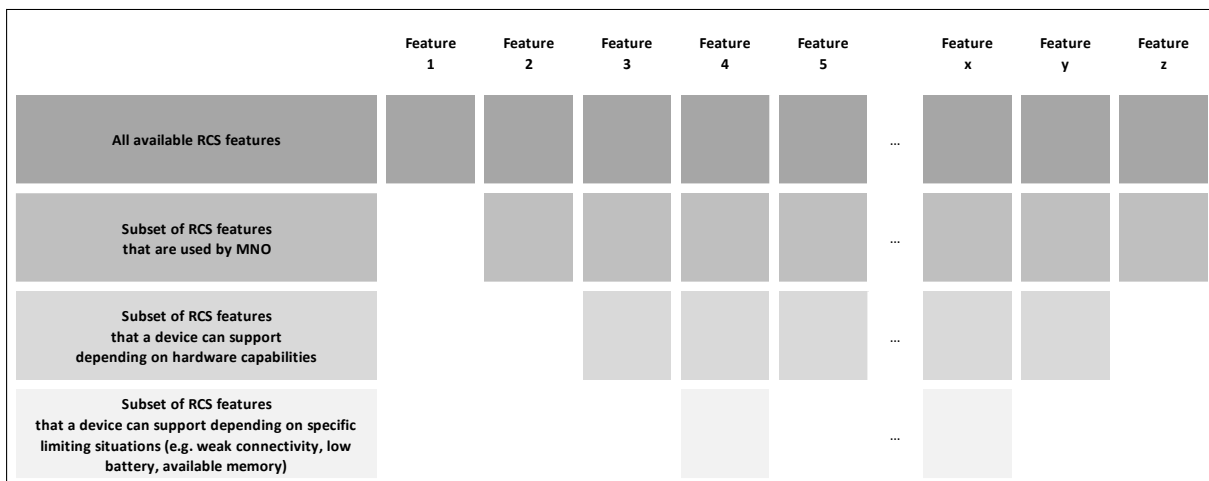
Figure 1: RCS features and their availability depending on operator choice, device capability, and specific limiting situations.

An RCS service will most likely be activated in one of the following scenarios:

- As part of the initial phone setup, when RCS is natively implemented in a device.
- Just after downloading the RCS application from any online market to any kind of device.
- Just after the install of a firmware update including the RCS service.

Activation may happen over cellular or non-cellular networks.

2.2 User Stories and Feature Requirements

2.2.1 Configuration of the user´s primary device by requesting user identity

US2-1 **As an operator, I want my RCS users to verify their identity before they use the RCS service.**

> *R2-1-1* When automatic identification of the user is not possible, the user shall be prompted to provide (manually type in) the MSISDN. To do so, a pop-up shall be displayed.

> *R2-1-2* To ensure validity of the provided MSISDN, a verification process shall take place:

> > *R2-1-2-1* A silent SMS with a password is sent to the device.

> > *R2-1-2-2* This SMS shall be intercepted by the RCS provisioning process and verified.

> *R2-1-3* In case the verification process has been completed successfully, the provisioning process shall be completed without any further user interaction.

> *R2-1-4* If the SMS takes too long or is never received (e.g. because the network does not deliver the SMS properly or the user provided a wrong MSISDN), the user shall be presented with a screen informing them that the process is taking longer than expected and cannot be completed at this stage.

> *R2-1-5* For this case, the user shall be informed about the previously given MSISDN (so that the user can amend it if necessary) and shall be provided with means to retry.

> NOTE: This procedure can be attempted a maximum of ten times after which RCS is deactivated and the user shall be informed of how to attempt to reactivate RCS later).

US2-2 **As a user, I want to seamlessly use RCS services after I bought a new RCS enabled smartphone.**

> **As a user, I want to start using my RCS services independently of the connectivity status (Wi-Fi or cellular coverage) of my device while setting up the (new) device or download an RCS client.**

> NOTE: It is an accepted restriction that device provisioning does not happen in case there is no data connectivity at all)

> *R2-2-1* When the user activates RCS over a network that allows automatic authentication, then provisioning of the service and configuration of the device shall be done without any user interaction. However, there are three exceptions, covered in R2-4-1,R2-5-1 and R2-5-1.

> *R2-2-2* In any case, where the network hasn't been able to identify the user automatically, the device will enter into the process which describes the configuration of the user´s device by requesting the identity of the user via manual submission of the MSISDN.

2.2.2   Downloadable RCS application/ Multiple RCS instances

US2-3   **As a user, I want to download RCS applications and use them without any additional manual configuration**

R2-3-1   There shall be only one active RCS client at any given point time to run on a device.

R2-3-2   In case there is more than one RCS client on a device (i.e. native RCS and one or more downloadable RCS clients) the toggle RCS client switch shall provide the option to choose the RCS client that will be active.

R2-3-3   The toggle RCS client switch shall not be visible as long as the RCS client is active.

R2-3-4   If the user would like to activate another RCS client (e.g. after downloading a new RCS client or by clicking on the toggle RCS switch of another currently inactive RCS client), a popup (or other relevant user notification) providing a link to the toggle RCS client switch of the currently active RCS client shall be displayed.

R2-3-5   If the user turns the toggle RCS client switch of the currently active RCS client off, the respective RCS client shall be deactivated, keeping all its entry points visible (but e.g. greyed-out/disabled), and all of its RCS user related content available (e.g. Chat history, files, etc.).

R2-3-6   In this state, the current deactivated RCS client is disconnected (consequently, no messages can be sent nor capability requests be answered). Therefore, the new client is automatically activated and connected to the RCS service.

R2-3-7   The user shall be able to switch on the deactivated RCS client at any point in time (e.g. by enabling its toggle RCS client switch triggering the deactivation process of the currently active client).

R2-3-8   After reactivation of a RCS client (e.g. via its toggle RCS client switch, triggering deactivation of the currently active RCS client), all its entry points are activated again and its toggle RCS client switch is removed from the settings menu (once the user has left the settings menu).

A RCS native implementation may enter into the following states depending on certain conditions:

R2-3-9   RCS permanently disabled: This state is the starting point for a device that is started-up for the very first time or has been put by the network into this state. It leads to the automatic service activation process when a user switches on the device for the first time - if the operator is RCS enabled and the user has data connectivity.

R2-3-10   RCS on set-up process: RCS is in the middle of the service activation process. It is not yet visible on the device but HTTP requests are active.

R2-3-11   **OM** In the event of a SIM swap, if a configuration associated to the SIM (either because the device is able to resolve the MSISDN or via the IMSI) is available in the device then it shall be used; otherwise the use case is equivalent to a first time configuration. Independent of the outcome, user data (e.g.

configuration, messages, contacts etc.) shall not be deleted from the device in the event of a SIM swap.

R2-3-11-1 After a SIM swap the device will enter the state "RCS on set-up process" (see also item 3 in next figure).

R2-3-12 RCS in launcher mode: This state applies only for those networks that require the user to accept Terms & Conditions. It is considered highly likely that a user that rejected those Terms & Conditions on the first device start-up, learns later about RCS and wants to activate it. The RCS set up icon shall be visible in this state, and if clicked, will trigger service activation.

R2-3-13 RCS active: RCS is configured and up and running in the device. Capabilities are exchanged, all entry points enabled and all available RCS services active.

R2-3-14 RCS instance disabled: This state is entered by a RCS client if the user has multiple RCS clients on a device and has activated another or if the operator disables the client from the network. In this state this RCS client is off, all its entry points with the exception of the toggle RCS client switch are disabled and all its user related content is available (Chat history, files, etc.). Since this RCS client is disconnected in this state, no messages can be sent nor capability requests be answered. By clicking on the toggle RCS client switch and switching it to ON the RCS client can be re-activated. At the same time, this will trigger the option (pop-up with link to settings of the active RCS client) to deactivate the currently active RCS client.
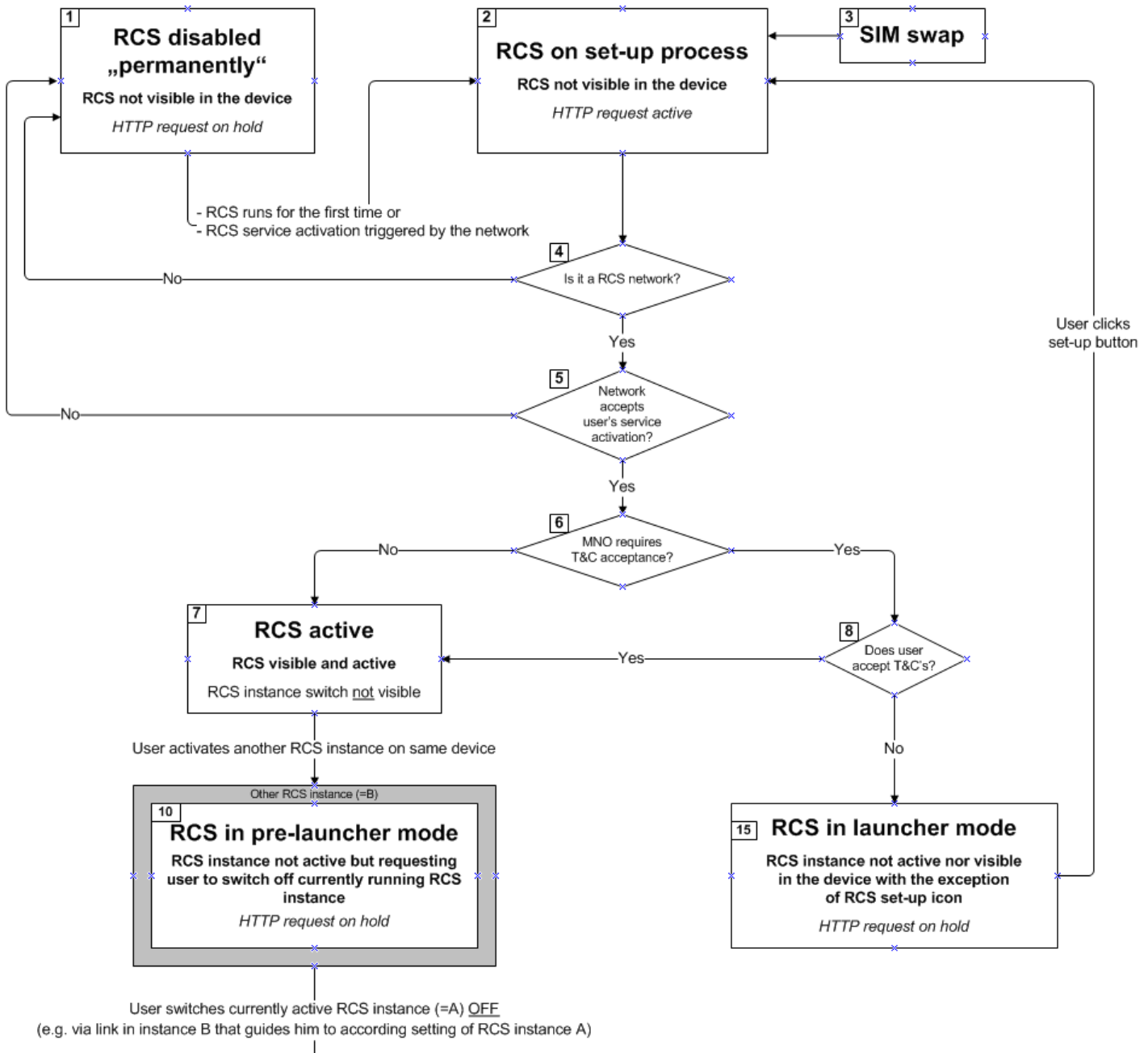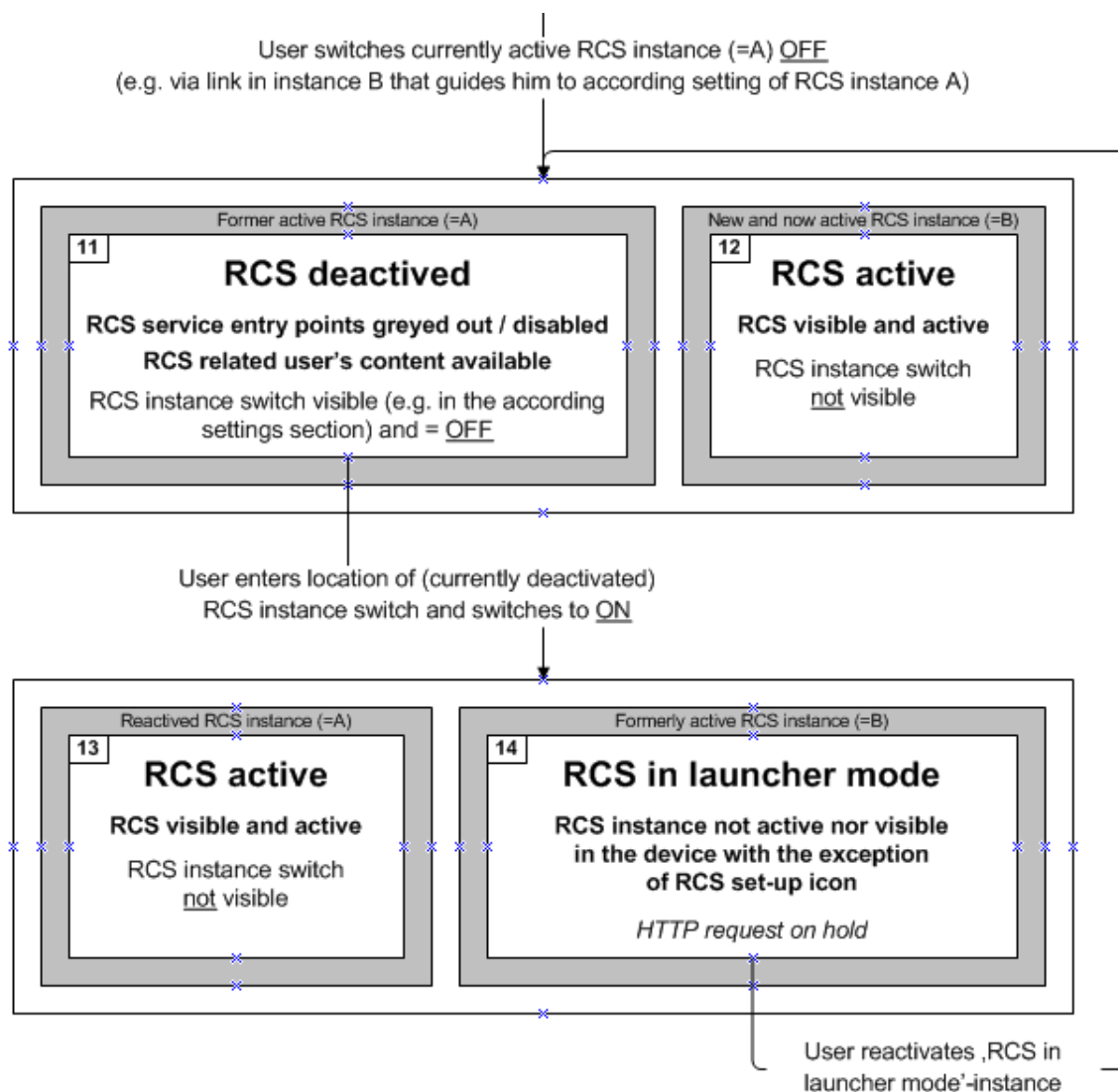
Figure 2: Status logic flow

2.2.3   User consent

Markets may or may not require users to accept Terms & Conditions (T&C) before using RCS. To reflect those different cases two scenarios can be applied, display of "User Message" or display of "End User Confirmation Request".

User Message

US2-4   **As an operator, I want to be able to provide information and require consent BEFORE my users use the RCS service.**

    R2-4-1   Upon operator discretion a popup showing EITHER Terms & Conditions OR a Welcome Message (OR no popup is shown) shall be displayed to the user during first-time configuration.

    NOTE: Display of Terms & Conditions requires two buttons (e.g. "accept" & "decline") for user action while display of Welcome Message requires only one button (e.g. "Ok").

R2-4-2   The presentation of the messages must be clear to the user and not hidden within the notification tray for action, but be presented 'on top' of the screen (see figure below).
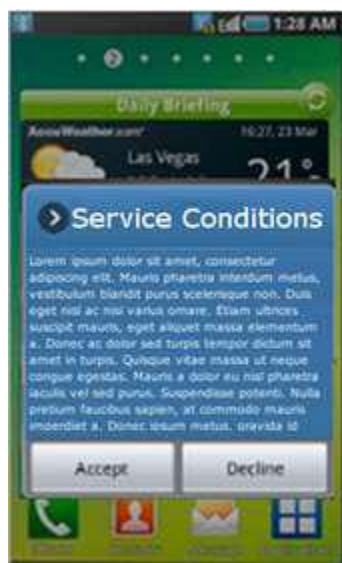
Figure 3: Example Terms & Conditions pop-up

R2-4-3   As soon as the user is presented with the popup, the RCS service shall be active on the device.

NOTE: This means that if the user leaves the screen without any action it is equivalent to an acceptance of the User Message.

R2-4-4   If the user declines the User Message, RCS services shall not be available on the device, the RCS client shall become inactive and not visible on the device (for details see R2-3-12 and Figure 2, page 16).

R2-4-5   In case of decline, a retry algorithm shall be able to retrigger the service activation and T&C acceptance process (on RCS capable networks). The retry algorithm shall be a retry after one day, then after one week, then after one month, then END.

End User Confirmation Request

US2-5   **As an operator, I want to be able to provide information and require consent from my users AFTER the RCS service has been activated**

R2-5-1   Upon operator discretion a popup showing a message (e.g. Terms & Conditions OR a Welcome message) shall be displayed to the user at any time after successful first-time registration.

R2-5-2   The display of that message shall be able to come with EITHER one OR two buttons to respond by the user.

R2-5-3   The operator shall be able to determine the button texts (e.g. 'accept') of that popup.

R2-5-4   The responses to the message shall be relayed back to the network.

R2-5-5   The presentation of the message shall be clear to the user and not hidden within the notification tray for action, but be presented 'on top' of the screen.

R2-5-6   Depending on the response by the user, the network can send a trigger to deactivate the RCS services on the device, i.e. RCS services shall not be available on the device, the RCS client will become inactive and not visible on the device.

R2-5-7   In case the RCS services are deactivated, an RCS set-up entry point shall become visible in the device (e.g. settings).

R2-5-8   Upon operator policies, additional messages may be displayed to the user

US2-6   **As an operator I want to request additional information from my users during first-time registration in order to fulfil specific security purposes.**

R2-6-1   Upon operator discretion users can be requested to enter additional information during first-time registration in order to fulfil specific security requirements set by the operator.

NOTE: Details are covered in 'Security against Malware', page 161.

US2-7   **As a user, I want to have access to the text displayed as User Message and / or End User Confirmation Request at any time after being provisioned to the service.**

R2-7-1   The text displayed as User Message and / or End User Confirmation Request shall be accessible for the user after the user has started using the service (e.g. in Messaging Settings).

2.2.4   Secondary Devices

US2-8   **As a user, I want to use RCS services on other RCS enabled devices other than my primary device.**

R2-8-1   Any device for which there is a compatible RCS application shall become a secondary device.

R2-8-2   When a user wants to use their primary identity in a second or subsequent device, they shall follow a specific authentication process.

R2-8-3   If the application is to be shared by several operators, it shall request the user, during the secondary device's authentication process, to choose among the available options. As an alternative, the application could be operator and country specific, therefore not needing to request this information.

R2-8-4   During the secondary device's authentication process the user shall be prompted to type in a valid MSISDN.

R2-8-5   After successful completion of R2-8-4 a password shall be sent over SMS to the user's primary device.

R2-8-6   In case the user enters and sends an invalid MSISDN in R2-8-5, the UI shall respond according to R2-9-1.

R2-8-7   After successful completion of R2-8-5 the user shall *be* requested to enter the password to complete the provisioning process.

NOTE: Since the SMS with the password is sent in this case to the primary device but the device to be configured may be a different one, the application on the secondary cannot intercept the SMS. Therefore this SMS is readable and the user will be requested to go to their inbox, get the password and type it in to complete the provisioning.

R2-8-8   In case the user enters and sends a wrong password in R2-8-7, the UI shall respond according to the UI guidelines defined by the individual operator (e.g. display again the text box requesting the password).

R2-8-9   When the secondary device authentication has successfully completed, a completion or welcome message should be displayed.

2.2.5   Error Management

US2-9   **As an operator, I want technical errors to be handled with minimal user interaction**

The user may get any of the following errors:

R2-9-1   Reception of SMS (see R2-1-2-1, R2-8-5) takes too long or is never received.

NOTE: There are two possible causes:

1. The network does not deliver the SMS.
2. The user made a mistake when typing the MSISDN and the SMS is sent to a different device (also see R2-8-8). In either case, the user shall be presented a screen informing them that the process is taking longer than expected. This screen shall contain a text box with the previously given MSISDN (so that the user can amend it if necessary) and a 'retry' button (final UI and text label up to operator's discretion).

R2-9-2   The procedure in R2-9-1 can be attempted a maximum number of times according to the operator's definition. It is *Recommended* to set the maximum number to 10 to be consistent with R2-1-5

R2-9-3   Temporary unavailable: Applies to internal errors during configuration/provisioning or configuration server unreachable, as specified in section 2.3.3.2.4 of [RCC.07] specs. The device shall reattempt provisioning at a later stage (i.e. at the next device start-up)

R2-9-4   Permanently unavailable: In case the operator does not want to provide RCS services to a particular subscription an operator defined error message shall be displayed and the provisioning process is stopped.

R2-9-5   The user closes the MSISDN input field (e.g. by mistake) without providing any input: The user shall be presented the MSISDN input field a maximum number of 3 times while being not provisioned under non cellular connection. Further configuration attempts shall automatically start once the user connects to a cellular network.

2.2.6   Provisioning push

US2-10 **As an operator, I want to be able to push configuration settings in special cases.**

Network initiated configuration request: Provisioning push will allow an operator to force the reconfiguration of each user´s device if needed:

R2-10-1 The operator shall be able to push configuration settings to new or existing RCS users (e.g. in the case of changing parameters)

R2-10-2 The operator shall be able to push configuration settings in case the network is upgraded to a new RCS release

R2-10-3 The operator shall be able to push configuration settings when the device is permanently disabled but the user would like to start using RCS.

2.3   Technical Information

2.3.1   Technical Implementation of User Stories and Service requirements

R2-11-1 Provisioning on networks with automatic identification (see requirement R2-2-1) shall be done as described in [RCC.07] section 2.3.3.1 and 2.3.3.2 with only the Hyper Text Transfer Protocol (HTTP) solution being in scope as it is also needed when configuring over networks where identification is not possible (see R2-11-2). For the HTTP based mechanism, section 2.3.3.2 of [RCC.07] and its subsections shall apply in their entirety. If the network cannot authorize the user (as described in requirement R2-2-2) an HTTP 511 Response shall be returned as indicated in section 2.2.4 of , which shall (as indicated in) result in the use of the procedures in section 2.3 of . In that case if the IMSI is available, a device shall not ask the user for the MSISDN, and shall instead attempt the configuration providing only the IMSI in the HTTP request.

R2-11-2 Configuration over networks where automatic authentication is not possible (e.g. non-cellular networks) shall be realised using the HTTP mechanism as described in section 2.3. of and its subsections providing the procedure required in requirements R2-1-1, R2-1-2, R2-1-2-1, R2-1-2-2, R2-1-3 and R2-9-1, with the error handling described in section 2.3.3.4 covering the behaviour required in R2-1-4 and R2-1-5. The device shall assume that RCS is available on the user's network if DNS resolution of the HTTP configuration URL is possible using the MCC and MNC obtained from the SIM card. As described in US2-11, if the IMSI is available, a device shall not ask the user for the MSISDN, and shall instead attempt the configuration providing only the IMSI. The operator limitation required in R2-9-2 is covered by the Note in section 2.3.2 of .

R2-11-3 Configuration of additional devices shall be done as described in section 2.5 of realising the requirements in section US2-8.

R2-11-4 The rcs_profile parameter shall be included in the HTTP GET requests and set to "CommonCore_1.0".

R2-11-5 To ensure that there is only one client active on a particular device (as required in R2-3-1 to R2-3-8) a device-local solution is required which will therefore be

OS specific. For the Android™ OS this shall be implemented locally on the device as follows:

- Identifying Android™ applications as RCS clients using a Manifest.xml meta-data property
- Identifying if a RCS client is enabled by accessing its Shared Preferences and reading a property from it.
- Accessing a RCS client settings screen by sending an intent using the action defined as a Manifest.xml meta-data property.

NOTE: This recommendation applies to all clients (embedded or downloaded) and that any value-add service propositions which involve complementing the RCS proposition with additional services or RCS services using alternative platforms are not required to follow the procedures described in this section.

- In order to prevent having two RCS clients on the same device and, therefore, negative consequences in the user experience, the following mechanism shall be implemented by both RCS embedded and OTT client implementations. This mechanism is based on the following principles:

R2-11-6 Client requirements

R2-11-6-1 Android™ RCS clients shall define the following meta-data properties in their Manifest.xml file[1].

• Name	Value	• Description
gsma.joyn.client	true	Used to identify the application as an RCS client
gsma.joyn.settings.activity	<String>	Equals to the intent action that be used to start the RCS client settings screen

Table 2: Android RCS client Manifest meta-data properties

R2-11-6-2 Android RCS clients shall define a settings screen activity that can be open by third party applications by using a simple intent which action string is equal to the value of the "*gsma.joyn.settings.activity*" meta-data property. Sending that intent to open the settings screen shall require no permission. Thus, the user decides or not to deactivate the third party application.

R2-11-6-3 The following example illustrates the meta-data that shall be added to the Manifest.xml file, as well as a sample settings screen activity.

---

[1] The naming of the parameters includes "joyn" for historic reasons to ensure compatibility with legacy joyn clients implementing the same mechanism for similar purposes. It is required to be provided regardless of whether the client implements a joyn profile.

```
<application
android:icon="@drawable/icon"
android:label="@string/app_name">

        <!-- the following meta-data is used to identify the application as an RCS client -->
        <meta-data android:name="gsma.joyn.client" android:value="true" />

        <!-- the following meta-data is used to provide the value of the intent action that can be
        used by other applications to start the RCS client settings screen -->
        <meta-data
                android:name="gsma.joyn.settings.activity"
                android:value="com.vendor.product.MyRCSSettingsActivity" />

        <!-- RCS client shall define a settings property such that it can be open by third party
        applications using an intent which action string corresponds to the meta-data value
        defined above -->
        <activity android:name=".MyRCSSettingsActivity">
            <intent-filter>
                <action android:name="com.vendor.product.MyRCSSettingsActivity" />
                <category android:name="android.intent.category.DEFAULT" />
            </intent-filter>
        </activity>
```

Table 3: Android meta-data usage

R2-11-6-4 Every RCS client shall define a publicly readable Shared Preferences using the name "*pckgname.gsma.joyn.preferences*", where '*pckgname*' parameter shall be replaced with client's unique package name of the application (no two applications can have the same package name on the Android market). Client shall add this to the manifest as a meta data:

```
<meta-data android:name="gsma.joyn.preferences"
android:value="pckgname.gsma.joyn.preferences" />.
```

R2-11-6-5 The shared preferences shall be created using the RCS client application context, using the mode MODE_WORLD_READABLE.

R2-11-6-6 The shared preferences shall contain a Boolean property named "*gsma.joyn.enabled*".

R2-11-6-7 This property can have two values:

- True: It will mean that the RCS client is enabled (user switch in settings set to ON) and the application has been provisioned successfully.
- False (default value): It will mean that the RCS client is disabled (user switch in settings set to OFF) or the RCS client has never been provisioned yet.

R2-11-6-8 The RCS client will modify the value of these properties according to the rules defined in the following section.

R2-11-7 Client start-up behaviour

R2-11-7-1 An RCS client which is started for the first time on a device shall:

- Retrieve the list of installed applications from the Package Manager, and identify existing RCS clients by looking for the Boolean meta-data property named "*gsma.joyn.client*", as defined in the previous section.

- For every RCS client that is found, the client shall open their shared preferences named "*pckgname.gsma.joyn.preferences*" and retrieve the Boolean property "*gsma.joyn.enabled*", as defined in the previous section.
- If an existing RCS client is found with the Boolean property "*gsma.joyn.enabled*" set to "*True*", it means that client is already active on the device. The new client shall inform to the user that there is another RCS client already configured in the device and that as a pre-requisite to use this one, it is necessary to disable it. In the same pop-up the possibility to access the RCS settings of the active RCS application (via intent mechanism) shall be offered. The intent action used to open the active RCS client settings screen shall be retrieved by reading its Manifest meta-data property named "gsma.joyn.settings.activity".
- After disabling the active client, its settings screen shall be closed and the new client shall be given control again. The new client shall then perform these first time start checks again which would lead to the conclusion that there is no active client and that therefore the new client shall become the active client (see NOTE).
- If there is no existing RCS client, or that none of them are enabled, the new RCS client may proceed with provisioning and registration. Once the client is successfully provisioned and registered to the network it shall open its own "*pckgname.gsma.joyn.preferences*" shared preferences and set its own "*gsma.joyn.enabled*" property to "True".

NOTE: As required in requirement R2-3-5 this will be done automatically for a client that directed the user to the settings screen of the currently active client when that active client is disabled as a result.

R2-11-7-2 If the RCS client is disabled (e.g. user switch in settings set to OFF) it shall open its own "*pckgname.gsma.joyn.preferences*" shared preferences and set its own "*gsma.joyn.enabled*" property to "False".

R2-11-7-3 This start-up behaviour shall also apply when there is an attempt to re-activate the disabled client; and when the disabled client is re-started.

R2-11-8   When an active RCS client is disabled, a HTTP configuration request with the vers parameter set to -1 (as described in [RCC.07]) shall be sent to the network at the first possible occasion

R2-11-9   When the user re-enables an RCS client, a HTTP configuration request will be done to verify whether the available version of the RCS configuration parameters is still valid.

R2-11-10 Requirements R2-3-9 to R2-3-14 shall be implemented locally on the device with the operator having the possibility to disable the RCS client as indicated in requirement R2-3-14 by setting the RCS DISABLED STATE configuration parameter in a provided configuration document to -1 as described in section 2.3.3.2. of [RCC.07]. For R2-3-11, SIM swap shall be handled as described in section 2.2 and 4.2.1. of .

R2-11-11 The user consent before use of the service described in user story US2-4 shall be realised through the mechanism for providing User Messages in the HTTP configuration described in section 2.2.3 of . This mechanism shall be supported by the RCS clients and may be used upon the service provider's discretion.

R2-11-12 As described in section 2.2.3 of the User Message mechanism supports requirements R2-4-1and R2-4-4.

R2-11-13 Requirements R2-4-2 and R2-4-5 shall be implemented locally on the device.

NOTE: The retry algorithm described is to be realised in the device. An operator can opt for more retries through the Provisioning Push mechanism described in US2-10.

R2-11-14 For requirement R2-4-3 as defined the configuration shall be applied and the service shall be activated when the user presses the "Accept" button, moving to another screen shall be considered equivalent with this "accept" button action.

R2-11-15 The user consent after activation of the service described in user story US2-6 shall be realised through the mechanism End User Confirmation Request mechanism described in section 3.1 of [RCC.15]. This mechanism shall be supported by the RCS clients and may be used upon service provider discretion. No specific handling apart from the normal processing of End User Confirmation Requests is thus assumed to be provided on the device.

R2-11-16 As described in section 3.1 of [RCC.15] the End User Confirmation Request mechanism supports requirements R2-5-1, R2-5-2, R2-5-3 and R2-5-4. For requirement R2-5-2, in the case when one button is required, the End User Notification Request described in section 3.1.3 of [RCC.15] shall be used. For a message requiring two buttons, the End User Confirmation Request and Response described in section 3.1.1 and 3.1.2 of [RCC.15] respectively shall be used.

R2-11-17 Requirement R2-5-5 shall be implemented locally on the device

R2-11-18 For requirements R2-5-6 and R2-5-7 the network shall disable the RCS client by triggering a client reconfiguration using the procedure defined in R2-11-24 and R2-11-25 returning a HTTP configuration response with the RCS DISABLED STATE configuration parameter set to '–2' ensuring that the RCS touch points remain available as described in section 2.3.3.2 of [RCC.07].

R2-11-19 For requirement R2-5-8, [RCC.07] does not impose restrictions on the use of the End User Confirmation request mechanism. Further messages can thus be sent at any point in time, including immediately after a previous one.

R2-11-20 As described in section 2.2.5 of an operator can choose to fall back to the SMS-based authentication mechanism used on networks where automatic identification is not possible. This allows in combination with the mechanism described in section 2.3.2 and 2.3.5 of to handle that SMS in a manner that is not transparent to the user thereby supporting the requirement R2-6-1. This same non-transparent handling of the SMS can be used to realise this requirement on networks where automatic identification is not possible.

R2-11-21 Requirement R2-7-1 shall be implemented locally on the device by making the contents of any received User Message and non-volatile End User Confirmation Request available for consultation by the user at a later time. This consultation shall not require the user to provide a response to the request.

R2-11-22 If the subscriber cannot be provisioned due to operator policy (i.e. a permanent unavailability as described in requirement R2-9-4), the service provider can include a message as described in section 2.2.3 of in a response disabling the RCS client (i.e RCS DISABLED STATE set to -1).

R2-11-23 As described in section 2.2.4 of , a number of consecutive internal errors (each resulting in a temporary unavailability as described in requirement R2-9-1) shall lead to a permanent unavailability. As described in section 2.3.4 , for non-cellular networks, this situation shall be applicable only to that particular network however.

R2-11-24 A SMS shall be sent to the device with a specific format defined in section 3.1 and 3.2 of respectively for the push request for initial configuration of a device on which RCS was permanently disabled (i.e. as a consequence of R2-11-23 and R2-11-24 required in R2-10-1and R2-10-3), and a reconfiguration of an active RCS device (required in R2-10-1 and R2-10-2), shall be enough to trigger a new configuration of a primary device.

R2-11-25 For the reconfiguration of primary and additional devices on which RCS is active already (required in R2-10-1and R2-10-2), it shall be possible to trigger a reconfiguration by sending an End User Confirmation Request to the device as specified in section 2.1.3.1 of [RCC.15][RCC.07].

3   Capability Discovery and Service Availability

3.1   Description

The capability discovery is a process which enables RCS users to understand the set or subset of RCS services their contacts use, at certain points in time. Capability discovery can also be used by RCS entities to detect service awareness of other RCS users on behalf of an RCS service or user.

The availability of a RCS service is influenced by three categories of conditions:

3. Provisioning status
4. Device capability and status
5. Network conditions

3.2   User Stories and Feature Requirements

US3-1   **As a user, I want to be aware of the ways I can communicate with contacts stored in my contact list, regardless of their service provider or country where they reside.**

R3-1-1   The device shall make visible to the user whether a contact is RCS-enabled and if so, for which RCS services or categories they are capable and available for at a given point in time.

R3-1-2   The device shall make visible to the user about the detected RCS capabilities for contacts following a contact list scan or an individual contact capability check.

R3-1-3   The device shall only make visible services that are known to be compatible with defined RCS services for a Non RCS contact.

R3-1-4   For integrated messaging (as defined in 'Operator Messaging', page 36), there shall not be any RCS service entry points when the recipient is known to be a non RCS user.

R3-1-5   When more than one RCS feature can deliver the similar service, the RCS capability and service availability information should be made visible to the user under a general RCS service category via an icon/label/button. This is done to avoid user confusion when similar RCS capabilities use different underlying services for service delivery.

US3-2   **As a user, I do not want to be disappointed by selecting a communication option that appears to be available but is not.**

R3-2-1   RCS service entry points which represent an available service at a given point in time shall be selectable.

R3-2-2   Selecting an available RCS service shall initiate the device dialogue for that service.

R3-2-3   In the case when the recipient (B-Party) has multiple devices, RCS service entry points which represent an available service at a given point in time on the A-Party device shall be selectable if at least one of the recipient's devices is capable for this service.

US3-3   **As a user, I want to be sure that the information I have about my contacts RCS service capabilities is up to date and if they are available to communicate using those capabilities.**

R3-3-1   Based on a capability discovery or service availability poll performed by the device, the user shall be able to see which contacts are equipped and provisioned for certain RCS services.

R3-3-2   Any capability discovery or service availability check of contact(s) shall happen in the background without the user being aware of this activity.

R3-3-3   Operators can configure how service entry points shall be presented at key touch points on the device where RCS communications can occur, specifically:

R3-3-3-1   Service entry points for voice call shall always be visible and selectable at any given point in time. The service entry point for RCS IP Voice Call and CS/VoLTE may appear differently; however, only one service entry point style shall be shown at a time.

R3-3-3-2   Service entry points for messaging shall always be visible and selectable at any given point in time. This requirement shall be applicable for Group Chat as well.

R3-3-3-3   Service entry points for File Transfer shall always be visible and selectable at any given point in time. This requirement shall be applicable for all services that use File Transfer as an enabler: Audio Messaging, vCard sharing and Geolocation Push.

R3-3-3-4 For IP Video Call, the operator shall have the option to configure the device behavior (on a per-device basis) in one of the following ways:

R3-3-3-4-1 **Variant A**: The IP Video Call service entry point shall be visible and selectable by the user if there is a high likelihood that the IP Video Call attempt will be successful at that time. If an IP Video Call is unlikely to be successful, the IP Video Call service entry point shall be greyed out and not selectable. This variant applies for any phone number including RCS and non RCS contacts.

R3-3-3-4-2 **Variant B**: The IP Video Call service entry point shall be visible and selectable by the user if there is a high likelihood that the IP Video Call attempt will be successful at that time. If this attempt is unlikely to be successful, the appearance of the IP Video Call service entry point shall change and remain visible and selectable for any phone number including RCS and non RCS contacts.

R3-3-3-5 For In-Call Services, the operator shall have the option to configure the device behavior (on a per-device basis) in one of the following ways:

R3-3-3-5-1 **Variant A**: The In-Call-Service service entry point(s) shall be visible and selectable by the user if there is a high likelihood the respective In-Call-Service attempt will be successful at that time. If this attempt is unlikely to be successful, the service entry point for In-Call-Services shall be greyed out and not selectable.

R3-3-3-5-2 **Variant B**: The In-Call-Service service entry point(s) shall be visible and selectable by the user if there is a high likelihood the respective In-Call-Service attempt will be successful at that time. If this attempt is unlikely to besuccessful, the appearance for the service entry point(s) for theIn-Call-Service shall change and remain visible and selectable.

NOTE 1: Where service entry points are shown on key touch points shall be up to each individual operator, operator interest groups or OEMs / client developers.

NOTE 2: In the case user B is a non RCS user with ViLTE, during call setup ViLTE capability is to be considered there is a high likelihood for a successful video call upgrade.

NOTE 3: "Likely to succeed" means capability or service availability exchange is indicating end-to-end support. "Likely to fail" means capability or service availability exchange is indicating "not available at this time".

R3-3-4 RCS service information may be presented at other key touch points on the device to indicate RCS communications are enabled.

R3-3-5   A contact is deemed to be a RCS user when at least one RCS service capability is discovered and/or available for that contact.

R3-3-6   **OM** On first RCS device boot up, after installation and/or set up of the RCS application, and after each re-configuration of the RCS service, the device shall perform an initial setup scan of the contact list and find out which of the contacts are enabled for RCS services.

R3-3-7   **OM** Under certain circumstances after the initial setup scan, the device shall poll for RCS service capabilities of all contacts or defined subset(s) of contacts in the contact list in order to promote real time awareness and use of services. Any subsequent capability discovery and/or service availability checks shall only be made by the device based on the following:

   R3-3-7-1   The operator shall be able to define a minimum time span between two full contact list scans (this includes the option to select 'no subsequent full contact list scans').

   R3-3-7-2   Polling of RCS enabled contact(s) shall only occur when the RCS capability information for the contact is older than the operator configured value.

   R3-3-7-3   The device shall only perform capability scans of the entire contact list when connected to a charger. The device may split very long contact lists into chunks and perform the regular contact list updates on subsequent charging cycles.

   R3-3-7-4   A new "scan" of the contact list or set of contacts shall not commence until the previous one was completed.

   R3-3-7-5   The device shall request a RCS capability discovery and/or service availability check/update of an individual contact when the capability information is invalid or expired AND one of the following applies:

      R3-3-7-5-1   When a new contact is added to the address book.

NOTE: If this contact is RCS enabled, their current RCS capabilities shall be displayed.

      R3-3-7-5-2   When opening that contact from the contact list.

      R3-3-7-5-3   When starting a conversation with that contact (e.g. when adding a contact to the "To:" field of a new message.)

      R3-3-7-5-4   When opening a conversation or thread with that contact.

      R3-3-7-5-5   When the capability information expires or when an operator-configurable timer expires for a sent message (DELIVERY TIMEOUT) during an active conversation when the B Party is an Operator Messaging user (Integrated Messaging option 1 or File Transfer option 1)

R3-3-7-5-6   When the A-Party has just come online during an ongoing conversation and the current messaging services is xMS (Integrated Messaging option 1 or File Transfer option 1).

R3-3-7-5-7   When initiating a voice or video call with contact.

R3-3-7-5-8   During a voice or a video call with a known RCS contact.

R3-3-7-6 The CAPABILITY VALIDITY timer shall be reset every time a chat message or File Transfer event is received and when a delivery notification for a sent message is received.

R3-3-7-7 **OM** The operator shall have the ability to limit the impact of capability and availability checks based on the following:

R3-3-7-7-1   An operator defined minimum interval duration shall exist between two queries sent to the same RCS contact (CAPABILITY VALIDITY).

R3-3-7-7-2   An operator defined minimum interval duration shall exist between two queries sent to the same non-RCS contact.

R3-3-7-7-3   An operator defined telephone number prefix setting.

R3-3-7-7-4   RCS applications shall use known and valid contact capability or service availability information which is stored locally on the device (i.e. cached) when attempting to establish a connection with a contact.

R3-3-7-7-5   For In-Call services, a capability check shall always be made when the call has been set up and irrespective of whether the interval of capability checks has expired or not.

R3-3-7-8 Each response to a capability/service availability request/update shall include the current or most recently available capability/availability information.

R3-3-7-9 A sender of a capability / service availability request shall include the sender's own latest capability and availability information in that request.

R3-3-8   **OM** The operator shall be able to limit the impact of capability and availability checks (network load, device battery drain) by implementation of a capability and availability server which buffers online and / or offline capabilities and availability of RCS users and answers capability and availability checks.

R3-3-8-1 The operator may respond to capability requests with current user capabilities or service availabilities which are stored on the capability or service availability server.

R3-3-9   The RCS capability of a contact shall be removed when in the process of capability discovery and service availability exchange the network returns an error that indicates the user is not a provisioned RCS user.

R3-3-10   When a client is permanently removed from a device or otherwise permanently deactivated, it shall attempt to inform the service provider.

R3-3-11   A "triggered removal" shall be applied, when all of the following conditions apply:

*R3-3-11-1*A RCS contact is manipulated by the user in such a way to trigger a capability and availability check (e.g. in a group chat picker) and its RCS capabilities are older than an operator set parameter and the operator does not request a periodic polling of the capabilities of contacts with obsolete capability information

*R3-3-11-2*The response to the capability exchange is inconclusive.

R3-3-12   When the RCS application on the device is disabled by the operator, the contact's RCS capability and availability indications associated with the RCS application shall be removed from all associated device UI(s) on the user's device.

R3-3-13   When the RCS application on the device is uninstalled by the user, the contact's RCS capability and availability indications associated with the RCS application will be removed from all associated User Interface(s) on the user's device.

3.3   Technical Information

3.3.1   Overview

Capability Discovery and Service Availability shall be realised based on two main Technical Enablers:

TE1: SIP Options Exchange as specified in [RCC.07] Sections 2.6, 2.6.1.1, 2.7, 2.7.1.1

TE2: Presence Based Exchange as specified in [RCC.07] Sections 2.6, 2.6.1.2, 2.7, 2.7.1.1, 3.7.4, A.1, A1.1, A.2.8

The two implementations are compatible through the co-existence solutions [RCC.07] Section 2.6.1.3.

R3-4-1   Requirements R3-1-1 and R3-1-2 shall follow TE1 or TE2. The rest of the requirements under R3-1-3, R3-1-4, and R3-1-5 shall be implemented locally on the device. The available services for requirement R3-1-3 are voice calling, operator messaging with RCS messaging being available if configured through corresponding configuration parameters.

R3-4-2   User Story US3-2 requirements are implemented locally on the device. In order to realise R3-2-3 requires the service provider to deploy a OPTIONS AS as specified in 2.6.1.1.5 [RCC.07] or Presence server as specified in 2.6.1.2.2 [RCC.07]

R3-4-3   Requirement R3-3-1 shall follow TE1 or TE2. Requirement R3-3-2
            requirement is implemented locally on the device.

R3-4-4   Service providers need to configure how RCS service entry points are
            displayed and made selectable as described in requirement R3-3-3.

Configuration parameter	Description	Parameter usage
VIDEO UX	This parameter controls the visibility and selectability of the UX service entry point for video (0, default value): (0); The Video service entry point will be conditionally visible and conditionally selectable. In the case when the capability exchange is successful, the service entry point is visible and selectable. In the case when the capability exchange fails, the service entry point colour will change and the service entry point will become unselectable. (1); The Video service entry point will be conditionally visible and always selectable. In the case when the capability exchange is successful, the service entry point is visible and selectable. In the case when the capability exchange fails, the service entry point will change and remain selectable. NOTE: The VIDEO UX behaviour is valid for any phone number. NOTE: Successful Capability exchange includes video	Optional Parameter

Table 4: Video Service Entry Point UX Configuration Parameter

A new configuration parameter to control the display and selectability of the In-Call Service Entry UX is defined as follows.

Configuration parameter	Description	Parameter usage
INCALL UX	This parameter controls the visibility and selectability of the UX service entry point(s) for In-call services (0, default value): (0); The In-Call service entry point will be conditionally visible and conditionally selectable. In the case when the In-call service capability exchange is successful, the service entry point is visible and selectable. In the case when the In-call service capability exchange fails, the In-call service entry point colour will change and the In-call service entry point will become unselectable. (1); The In-call service entry point will be conditionally visible and always selectable. In the case when In-call service capability exchange is successful, the service entry point is visible and selectable. In the case when In-call service capability exchange fails, the service entry point will change and remain selectable. NOTE: The INCALL UX is only valid for RCS users and non-RCS users that have discoverable video capability. NOTE: Successful capability exchange includes the incall service capability.	Optional Parameter

Table 5: In-Call Service Entry Point Ux Configuration Parameter
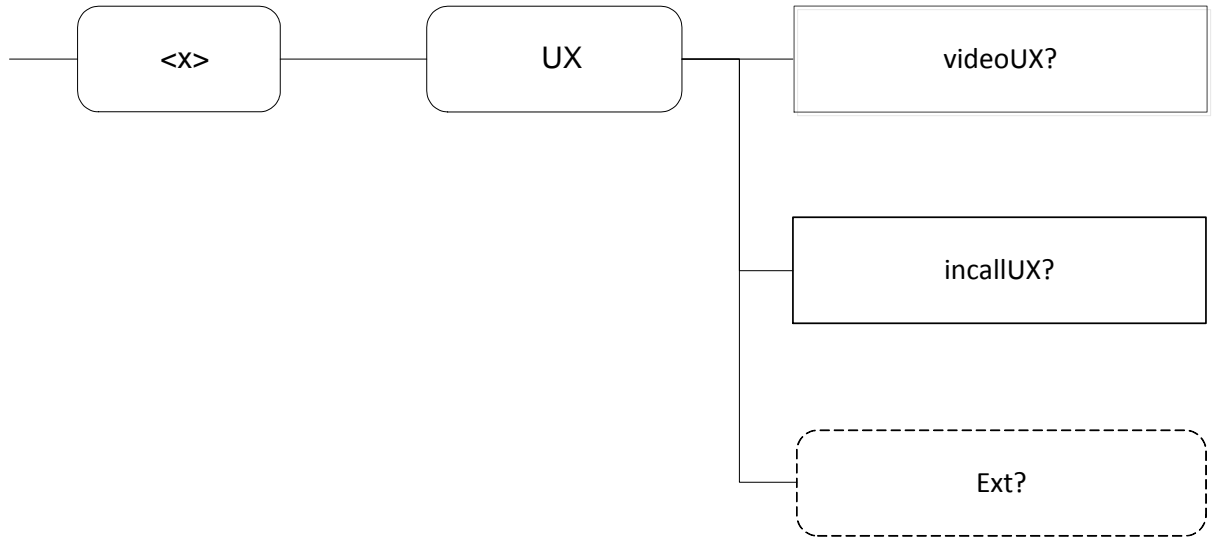
Figure 4: UX MO sub tree

The associated HTTP configuration XML structure is presented in the table below:

```
<characteristic type="UX">
    <parm name="videoUX" value="X"/>
    <parm name="incallUX" value="X"/>
    <characteristic type="Ext"/>
</characteristic>
```

Table 6: UX sub tree associated HTTP configuration XML structure

Node: /<x>/UX

Under this interior node Common Core related parameters are placed being used to control the UX of the client.

Status	Occurrence	Format	Min. Access Types
Required	One	node	Get

Table 7: UX MO sub tree addition node

- Values: N/A
- Type property of the node is: *urn:gsma:mo:gcc-ux:1.0*
- Associated HTTP XML characteristic type: "UX"

Node: /<x>/UX/videoUX

Leaf node that describes the visibility and selectability of the video UX service entry point.

If not instantiated, the same UX service entry point shall be used.

Status	Occurrence	Format	Min. Access Types
Required	ZeroOrOne	Bool	Get, Replace

Table 8: UX MO sub tree addition parameters (videoUX)

- Values:
  0, the Video service entry point will be conditionally visible and conditionally selectable
  1, the Video service entry point will be conditionally visible and always selectable
  Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.
- Type property of the node is: *urn:gsma:mo:gcc-ux:1.0:videoUX*
- Associated HTTP XML characteristic type: "videoUX"

Node: /<x>/UX/incallUX

Leaf node that describes the visibility and selectability of the UX service entry point(s) for In-call services.

If not instantiated, the same UX service entry point shall be used.

Status	Occurrence	Format	Min. Access Types
Required	ZeroOrOne	Bool	Get, Replace

Table 9: UX MO sub tree addition parameters (incallUX)

- Values:
  0, the In-call service entry point will be conditionally visible and conditionally selectable
  1, the In-call service entry point will be conditionally visible and always selectable
  Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.
- Type property of the node is: urn:gsma:mo:gcc-ux:1.0:incallUX
- Associated HTTP XML characteristic type: "incallUX"

Node: /<x>/Ext

An extension node for service provider specific parameters. Clients that are not aware of any extensions in this subtree (e.g. because they are not service provider specific) should not instantiate this tree.

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	Node	Get

Table 10: UX MO sub tree addition Service Provider Extension Node

- Values: N/A
- Type property of the node is: *urn:gsma:mo:gcc-ux:1.0:Ext*
- Post-reconfiguration actions: The client should be reset and should perform the complete first-time registration procedure following a reconfiguration (e.g. OMA-DM/HTTP).
- Associated HTTP XML characteristic type: "Ext"

R3-4-5   Requirement R3-3-4 requirement is implemented locally on the device.

R3-4-6   Requirements under R3-3-5 are implemented locally on the device and shall follow limits described in is supported when any RCS service tag is exposed/discovered.

R3-4-7   Requirements under R3-3-6 shall follow 2.6.2 [RCC.07]. The client configuration parameter DISABLE INITIAL ADDRESS BOOK SCAN shall either not be provisioned or be set to 0.

R3-4-8   R3-3-7-1 requirement shall use POLLING PERIOD in A.1.11 [RCC.07]. R3-3-7-2 requirement shall use CAPABILITY INFO EXPIRY in A.1.11 [RCC.07]. Requirements R3-3-7-3, and R3-3-7-4 requirements are implemented locally on the device.

R3-4-9   R3-3-7-5 requirements shall follow 2.6.2.1, 2.6.3.1, 3.3.6.3, and 3.3.4.1.3 [RCC.07]

R3-4-10 R3-3-7-5-5 requirement parameter is defined in 'Operator Messaging', page 36. Requirement R3-3-7-5-6 is implemented locally on the device. Requirement R3-3-7-5-7 and R3-3-7-5-8 are implemented locally on the device. Requirement R3-3-7-5-7 and R3-3-7-5-8 follows 2.6.3.1 [RCC.07] after a voice call is established.

R3-4-11 Requirements under R3-3-7-6 shall follow TE1 or TE2 capability discovery optimizations defined in 2.6.3, 2.6.4, and A.1.11 [RCC.07] Requirement R3-3-7-7-3 shall follow 2.6.4.1 [RCC.07]. Requirement R3-3-7-7-5 applies only to TE1.

R3-4-12 Requirement 3.3.7.8 can be realised only for TE1 following section 2.6.1.1.2 of [RCC.07].

R3-4-13 Requirement R3-3-8-1 which shall follow TE2.

R3-4-14 Requirement R3-3-9 is implemented locally on the device following error codes handling defined in 2.6.1.1. and 2.6.2.1 [RCC.07] for TE1 and TE2 implementations.

R3-4-15 Requirement R3-3-10 shall set the RCS state set to -1 in the configuration request and follow client codes 2.3.3.2.1 and procedures defined in [RCC.07].

R3-4-16 Requirement R3-3-11 is implemented locally on the device following 2.6.3 [RCC.07] and POLLING PERIOD set to 0 as per A.1.11 [RCC.07] or following 2.6.2.1 [RCC.07] for inconclusive results.

R3-4-17 Requirements R3-3-12, and R3-3-13 shall be implemented locally on the device.

4 Operator Messaging

4.1 Description

Operator Messaging integrates various Messaging Services (SMS, MMS, 1-to-1 Chat, Group Chat, File Transfer, Geolocation Push, and Audio Messaging) to one single conversational view for the end consumer. This chapter is structured into two main parts: the representation of Operator Messaging on the device, and the client logic that proposes / decides the Messaging Service, based on availability of services and bearers on both sides of the conversation to convey the message or file. In some configurations, the proposed Messaging Service can be overridden at any time by the end consumer.

- Representation of Operator Messaging to the user

  o Common Requirements for Operator Messaging
  o Variant 1 "Integrated Messaging"
  o Variant 2 "Seamless Messaging"

- Client logic to propose the desired Messaging service:
  o Offline experience for messaging (IM_CAP_ALWAYS_ON=0,
  o Offline experience for sending files (FT_HTTP_CAP_ALWAYS_ON=0),
  o Online experience for messaging (IM_CAP_ALWAYS_ON=1),
  o Online experience for sending files (FT_HTTP_CAP_ALWAYS_ON=1),
  o Seamless Messaging (based on sender's device connectivity and RCS registration).

In general, we distinguish between two different integration options: Seamless Messaging and Integrated Messaging:

- In Seamless Messaging, the user sends a message or sends a file, not being aware of which Messaging Service is being used, and having no influence on how the message or file is transferred.

- In Integrated Messaging, the user has one Inbox for various Operator Messaging Services, and the various service messages are all threaded into one conversation, but the Messaging Service that is proposed to convey the message or file is indicated to the user. By user action, the proposed Messaging Service can be changed whenever alternatives are available.

During the Device Provisioning Process, the operator sets parameters to configure the service in the way he wants to offer the service.

4.2 User Stories and Feature Requirements

US4-1   **As a user, I want to see all messages and files exchanged with a contact in a single threaded view.**

As a user, I want a single environment for creating and viewing my messages, covering a multitude of different services. By having this convenience, I don't have to change apps to carry out similar messaging tasks.

R4-1-1   In Operator Messaging, the user shall see any Messages and File Transfer events exchanged with a single Contact grouped into one Conversation thread.

R4-1-2   All Messages and File Transfer events shall appear in order of the time that they have been sent and received on the device. Details for message order are defined in '1-to-1 Chat', page 61 and 'File Transfer incl. Geolocation Push', page 84.

R4-1-3   The Operator Messaging application shall combine the composing of RCS Messaging and File Transfer with xMS messaging.

R4-1-4   All Operator Messaging Services shall be offered consistently over primary and secondary devices.

NOTE: Full details are described in 'Messaging for Multi-Device', page 102.

R4-1-5   Operator Messaging shall have no impact on the RCS Group Chat experience of the user.

NOTE: RCS Group Chat is the only Operator service today that delivers a full group chat experience, hence, there is no integration necessary.)

R4-1-6   All messaging entry points on a device shall ensure access to the full Operator Messaging experience.

NOTE: For native implementations.

US4-2   **As a user, I want to know the status of any messages or files I have sent**

R4-2-1   States for sent RCS messages and files as described in '1-to-1 Chat', page 61, 'Group Chat', page 71, and 'File Transfer incl. Geolocation Push', page 84, shall be supported in Operator Messaging.

R4-2-2   For legacy xMS messages sent from a device, Delivery Notifications may be supported upon user choice or network default configuration.

R4-2-3   For legacy xMS messages sent from a device, Display Notifications will not be available.

R4-2-4   For legacy xMS messages sent from a device, the message status "pending" *Shall* be provided (e.g. for messages queuing on the device).

R4-2-5   For legacy xMS messages sent from a device, the status "Message failed" shall be supported in case the message could (for whatever reason) not be sent (re-sending the message may be triggered manually by the user).

US4-3   **As a user, I want to ensure that my messages are received in a user-friendly way.**

R4-3-1   The A-Party Operator shall be able to request to revoke a message that has been sent to the B-Party. (e.g., but not limited to, the case that a Delivery notification has not been received and the operator intends to try a second delivery using a different Messaging Service).

NOTE: The Operator of the B-Party may not be able to revoke a message.

R4-3-2   The A-Party Operator shall ensure that duplication of messages within the Operator Messaging application is avoided within their network control.

US4-4   **As a user, I want to ensure that my messages reach their destination as reliably and quickly as possible.**

R4-4-1   To avoid a cluttered experience between Operator Messaging users and non-Integrated / non-Seamless Messaging RCS users, the user equipment shall be aware of the Integrated / Seamless Messaging capability of any of the RCS enabled contacts in order to adjust behaviour accordingly.

R4-4-2   The network operator shall ensure all messages and related messaging services originating from a device shall be conveyed in a manner that will ensure the quickest delivery to the recipient.

NOTE: This may involve the network conveying the message or file on a different Messaging Service or File Transfer service.

R4-4-3   **OM** Store and Forward shall be available and provided by every RCS service provider to host messages and file notifications for its RCS users on the terminating leg when these users are offline.

R4-4-4   For xMS messages sent from the device, Store and Forward function shall be available and provided by the operator network.

NOTE: Details outside of this RCS specification.

R4-4-5   For MMS files sent from the device, the user shall not be given the option of selecting files that are not compatible with the MMS technology.

R4-4-6   For files sent from the device using MMS, the restrictions of the MMS service on file type and size will apply.

R4-4-7   For MMS files sent from the device, the user shall be notified of file format changes based on the MMS service parameters.

R4-4-8   For 1-to-1 Chat messages, the full RCS chat experience applies, e.g. but not limited to, emoticons and Emoji (guaranteed correct display), and Delivery and Display Notifications shall be available).

NOTE: Details of "the full RCS chat experience" are described in '1-to-1 Chat', page 61.

R4-4-9   SMS messages shall support emoticons according to the RCS standard.

NOTE: It is accepted compromise that some emoticons may not be correctly converted to graphics by legacy receiving devices.

R4-4-10   SMS messages shall support Emoji according to the RCS standard, if UNICODE messaging encoding is available (either via automatic or manual selection). Whenever UNICODE encoding is not available, it shall not be possible to send Emoji.

NOTE: It is an accepted compromise that some Emoji may not be correctly converted to graphics by legacy receiving devices.

US4-5   **As an operator, I want to make sure that any application taking on default management of xMS messaging on a device of an RCS-enabled user shall also display and take on management of RCS messages and ensure that the operator promise of Operator Messaging is guaranteed.**

R4-5-1   Any application allowed to manage (read, write, view) xMS on a device shall also be allowed to manage (read, write, view) RCS chat messages.

R4-5-2   Any application selected by the user as the default messaging application shall manage xMS and RCS messages (incl. File Transfer) as defined by the Operator Messaging rules.

R4-5-3   Notifications for new incoming (RCS or xMS) messages shall be handled according to the specifications in '1-to-1 Chat', page 61, 'Group Chat', page 71, and 'File Transfer incl. Geolocation Push', page 84, and shall not be replicated across multiple apps on a device.

NOTE: This shall be to avoid a situation where a read message is still seen as 'unread' in another application.

R4-5-4   Notifications for new incoming (RCS or xMS) messages in case the user has multiple RCS devices shall be handled in line with the requirements of 'Messaging for Multi-Device', page 102.

NOTE: This shall be to avoid a situation where a read message is still seen as 'unread' from another device when connected.

R4-5-5   Any application managing xMS and RCS chat messages on a device shall follow the rules prescribed in this 'Operator Messaging' section.

R4-5-6   The Operator Messaging conversations shall be visible from the native messaging icon and/or the icon of the application which has taken on message management.

R4-5-7   The Operator Messaging application must conform to the Messaging Service requirements when sending xMS messages from the device.
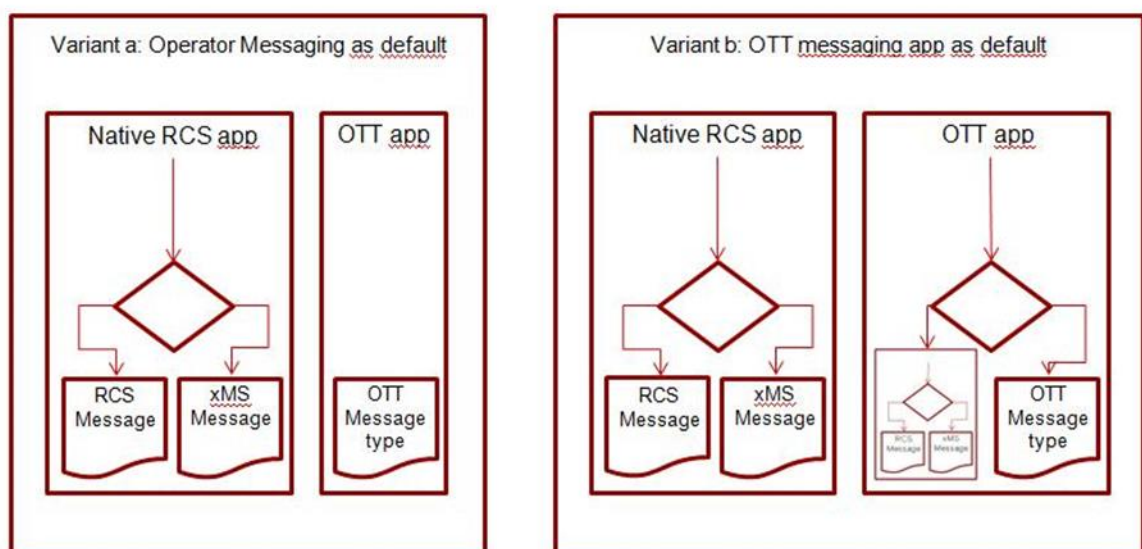
Figure 5: Integration of Operator Messaging into native and OTT applications

4.2.1 Operator customization variants for representation of Operator Messaging variants on the device.

4.2.1.1 Variant 1 "Integrated Messaging" User Stories / Requirements

US4-6 **As a user, I want a service logic to propose the Messaging Service to be used.**

US4-7 **As a user, I want to be able to override the proposed Messaging Service during the message composing and file selection processes.**

US4-8 **As a user, I always want to know what type of message I am sending, before submitting it and I want this information to be clearly represented on my screen.**

US4-9 **As a user, I always want to know the type of message or file I have sent, and I want this information to be clearly represented on my screen.**

   R4-9-1 When opening the conversation or entering the message composer on the device, the client logic shall propose the Messaging Service (either xMS based or RCS based) to be used for that message.

   R4-9-2 The device UI shall indicate to the user before a message / file is sent what the currently selected Messaging / File Transfer Service is.

   R4-9-3 The user shall have, before the Message Composing or File Selection process, the opportunity to change the Messaging or File Transfer Service and select from supported services and overwrite the proposed setting.

NOTE: This shall be a "one click experience" on UI level.

   R4-9-4 The user should have, at any time during the Message Composing or File Selection process, the opportunity to change the Messaging or File Transfer Service and overwrite the proposed setting.

NOTE: This shall be a "one click experience" on UI level.

   R4-9-5 A warning may be shown to the user when the composer changes the sending Messaging Service whilst the user is typing a message, informing them that xMS or chat services are charged as per their tariff. The user shall have the possibility to dismiss such a notice permanently.

   R4-9-6 A manual user selection of a Messaging or File Transfer Service during an active conversation shall be persistent until either manually changed again by the user or until the user navigates out of the conversation thread.

   R4-9-7 A new conversation will trigger automatic selection of the proposed service when it's being created. The creation of new conversation shall trigger the automatic selection of the proposed Messaging Service.

   R4-9-8 At any time during the process, selecting and sending a message or file, the client logic shall propose a Messaging or File Transfer Service (either xMS based or RCS based) to be used for that message or file.

   R4-9-9 If the available technology changes while the user is in the process of composing a message or selecting a file, any impact of the technology change

on the available message content must be made clear to the user, and they shall be able to reject the automatic technology change.

R4-9-10 After sending a message or file, the device UI shall differentiate the Messaging or File Transfer Service that was used.

NOTE: Differentiation shall allow the user to know which messaging (i.e. chat / SMS) or File Transfer (i.e. RCS File Transfer, MMS) service was used to convey the message.

R4-9-11 The RCS File Transfer service should be clearly differentiated from MMS.

R4-9-12 Where appropriate, the user should be made aware of any additional or enhanced File Transfer functionality available via RCS (vs. MMS), for example, but not limited to, the transfer of HD video.

R4-9-13 When receiving a message or file, the device UI should differentiate the Messaging or File Transfer Service that was used.

NOTE: Differentiation shall allow the user to know which messaging (i.e. chat / SMS) or File Transfer (i.e. chat, MMS) service was used to convey the message.

R4-9-14 In case the operator has changed the Messaging or File Transfer Service on the terminating leg to ensure delivery, the A-Party UI shall not change the Messaging or File Transfer Service indication (e.g. A-Party creates an RCS Chat Message, the operator terminates this message as xMS if the B-Party has cellular connectivity but is not registered to RCS).

NOTE: In this case, a message is indicated as RCS Chat on the sending device and may be shown as SMS on the receiving device.

R4-9-15 The device shall provide the user with an option to resend pending or failed RCS messages or files by another Messaging or File Transfer Service, e.g., but not limited to, cases where the A-Party loses connectivity due to changing radio conditions. If, in this case, the initial message was pending and has not yet been sent, the device shall not make further attempts to send the message using the attempted Messaging Service but shall propose the alternative Messaging Service to be used instead. If there are also further, more recent, undelivered RCS messages sent by the A-Party in that active conversation then the user is asked whether they would like to resend just the single message (for which the timer has expired) or all of the undelivered messages.

US4-10 **As a user, I want to be in control of the default messaging service in Operator Messaging.**

R4-10-1 A setting shall allow the user to select the default sending method to be used when the user sends a message. The user is able to select:

- 'Proposed Messaging Service' (follow Integrated Messaging behaviour as defined in Integrated Messaging requirements), or
- 'SMS', or
- 'RCS chat'

R4-10-2 The default setting shall be "Proposed Messaging Service".

R4-10-3 It shall always be visible to the user which Messaging Service is used and the user shall have the option to change the chosed Messaging Service irrespective of the setting in R4-10-1 upon user interaction (as a case by case decision taken in the messaging composer).

4.2.1.2   Variant 2 "Seamless Messaging" User Stories / Requirements

US4-11 **As a user, I want to send a message without knowing about the underlying technology / service that is being used to convey my messages / file shares. I want the operator to deliver the message the best possible way to the intended recipient(s).**

As a user, I don't want my Messaging Application to show the Messaging Service being used when messages are displayed in my inbox.

R4-11-1 The RCS client can be configured to automatically send RCS messages when connected and registered for the RCS service.

NOTE: If the client is not registered for RCS service, it will follow the seamless messaging service logic defined in section 4.

R4-11-2 The RCS client will not show or visually indicate to the user the technology / service used to convey the message from the device.

R4-11-3 The operator can interwork any message sent from the RCS device (regardless of technology / service) to ensure the best possible message delivery to an intended recipient.

4.2.2   Client Logic to propose the desired Messaging and File Transfer Service – Seamless Messaging

US4-12 **As a user, I want to fully rely on my operator to convey the Messaging Service to ensure quickest and most reliable message delivery**

R4-12-1 The Seamless Messaging composer shall select RCS as the Messaging and File Transfer Service when no network connection is available and not registered for RCS services. These messages shall be queued for delivery when the device is reconnected. The user shall be notified that these messages are queued for delivery.

R4-12-2 When the device is connected to cellular coverage without data (not registered to the RCS platform), the delivery mechanism from the Seamless Messaging App shall be SMS.

NOTE: All other RCS services will not be available.

R4-12-2-1 If the user selects other RCS services *(non text messaging)* when in this mode these messages will be queued for delivery when the device is reconnected. The user shall be notified that these messages are queued for delivery.

R4-12-3 When the device is connected to cellular coverage with data but not registered to the RCS platform, the sending mechanism from the Seamless Messaging App shall be xMS.

NOTE: Restrictions in file size and -type for MMS apply.

R4-12-4 When the device is registered for RCS service, the delivery mechanism from the Seamless Messaging App shall be RCS.

NOTE: This shall also be valid for RCS messages/service to non-RCS enabled contacts.

R4-12-5 When the device is registered for RCS service and the sent RCS message times out due to a loss of IP connectivity, the RCS client/application may attempt to resend the RCS message in SMS mode without notifying the user or the RCS client/application may visually display a message sent error to the user.

R4-12-6 When the device is registered for RCS service and the DELIVERY TIMEOUT parameter is enabled, the RCS client/application shall attempt to resend a RCS message in xMS mode when the DELIVERY TIMEOUT timer expires before confirmation of a message delivered state

Seamless Messaging - Selected Messaging Service						
User A - Sender	Connect to Cellular network	Yes	Yes	No	No
	Connect to RCS	Yes	No	Yes	No
User B - Receiver	Connect to Cellular network	n/a			
	Connect to RCS				
Selected Service		**RCS**	**xMS***	**RCS**	**RCS***
* On-device caching of unsent files required and user shall be informed					

Table 11: Table to explain and summarize static conditions for Seamless Messaging

4.2.3 Client Logic to propose the desired Messaging Service – Integrated Messaging 1 (IM_CAP_ALWAYS_ON = 0 / SMS as default)

US4-13 **As a user, I want the best Messaging Service to be proposed to me to convey my messages.**

R4-13-1 The preferred messaging service for composing and sending messages shall be determined by a number of factors, including bot not limited to, the RCS Online/Offline status of the sender (A-Party) and the receiver (B-Party).

NOTE: See requirement R3-3-7-5 for Capability Validity and checking requirements. Neither A-Party nor B-Party's cellular connectivity is relevant for determining the preferred messaging service.

4.2.3.1 Entering a new or existing conversation

The preferred messaging service is automatically determined according to rules described below:

R4-13-1-1 Preferred Messaging Service when entering a new or existing conversation (including, but not limited to, opening a conversation, returning to a conversation and unlocking the screen on an open conversation):

R4-13-1-1-1   If a valid Capability check is available when opening the conversation, then the preferred service is set accordingly.

R4-13-1-1-2   If a new Capability check is required, then xMS is the preferred service until the result of this new capability check is available. If the result of this new Capability check is that the B-Party is RCS Online, then the preferred service changes to Chat.
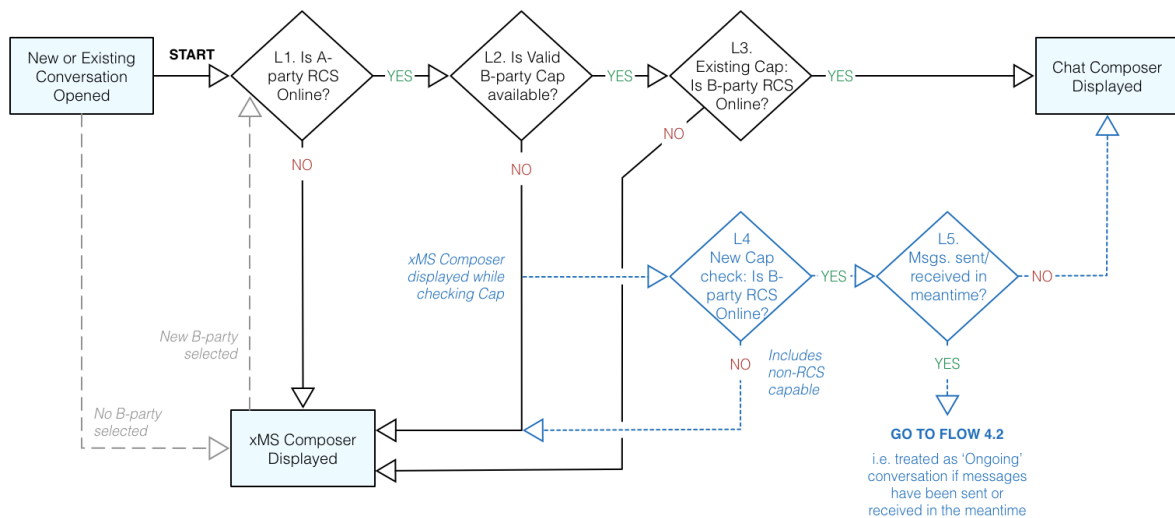
Figure 6: Initial Technology Selection Logic When Entering a Conversation [IM_CAP_ALWAYS_ON=0]

4.2.3.2   During an ongoing xMS conversation

R4-13-1-2 During an 'on-going' xMS conversation the proposed Messaging Service shall change according to Figure 8, including (but not limited to) the following cases:

R4-13-1-3 When a chat message or RCS File is received from the B-Party.

R4-13-1-4 When the B-party, with Integrated (or Seamless) messaging, is discovered as RCS online.
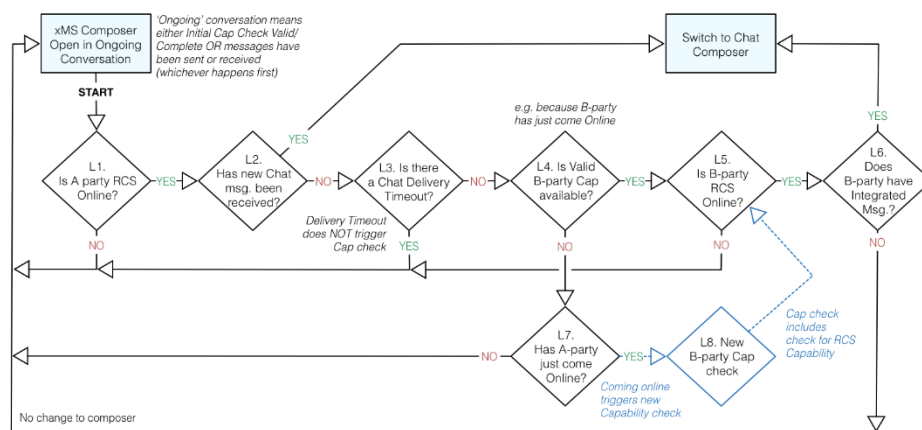
Figure 7: Technology Selection Logic During an ongoing Conversation (when current composer is xMS) [IM_CAP_ALWAYS_ON=0]

4.2.3.3   During an on-going RCS conversation:

*R4-13-1-5*During an 'on-going' RCS conversation the proposed Messaging Service shall change according to Figure 9, including, but not limited to, the following cases:

*R4-13-1-6*When an xMS message is received from the B-party. This will cause the DELIVERY TIMEOUT timer to expire.

*R4-13-1-7*When the B-Party is an Integrated (or Seamless) Messaging user and expiry of the Delivery Timeout timer occurs.

NOTE: There is no immediate change to the Messaging Service if the A-Party loses data connectivity: the device waits for the expiry of Delivery Timeout before changing to xMS.
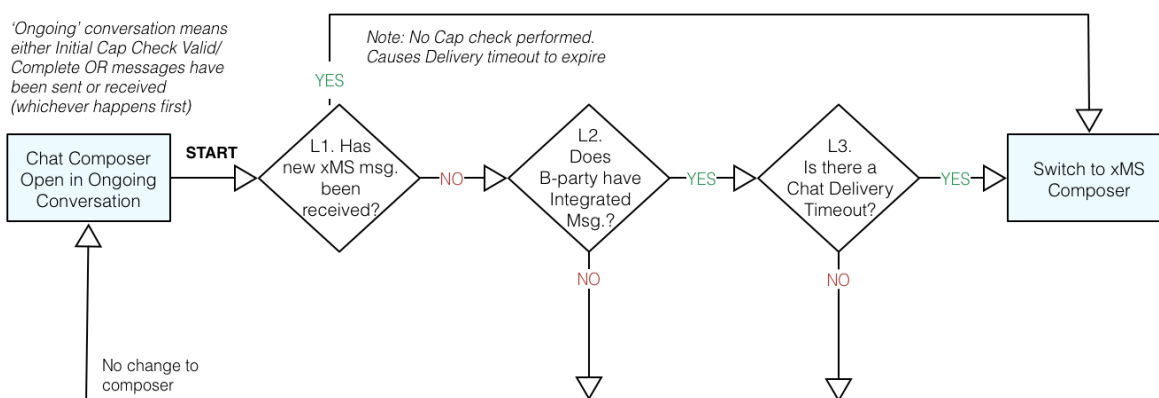
Figure 8: Technology Selection Logic During an Ongoing Conversation (when current composer is Chat) [IM_CAP_ALWAYS_ON=0]

For details of the technology selection logic if the end user manually changes the flow Manual service change:

4.2.3.4   "DELIVERY TIMEOUT":

The DELIVERY TIMEOUT timer defines the timeout for reception of delivery reports for RCS messages and files sent to the B Party. There is one DELIVERY TIMEOUT timer used per conversation.

*R4-13-1-8*This timer is armed/started during an RCS conversation, in any of the following situations:

- When sending an RCS chat message or file while there is no other message or file undelivered or unsent.
- When the A-Party loses IP connectivity, and there are undelivered or pending chat messages or files.

*R4-13-1-9*The DELIVERY TIMEOUT will be stopped when receiving a message or file delivery notification, but immediately restarted ("rearmed") if there are still undelivered or pending RCS message(s).

*R4-13-1-10*When the DELIVERY TIMEOUT expires any undelivered messages shall have their status changed to "undelivered" and any pending messages shall have their status changed to "failed".

R4-13-1-11 DELIVERY TIMEOUT is only calculated for the first undelivered chat message or file transfer after a delivered one. Example:
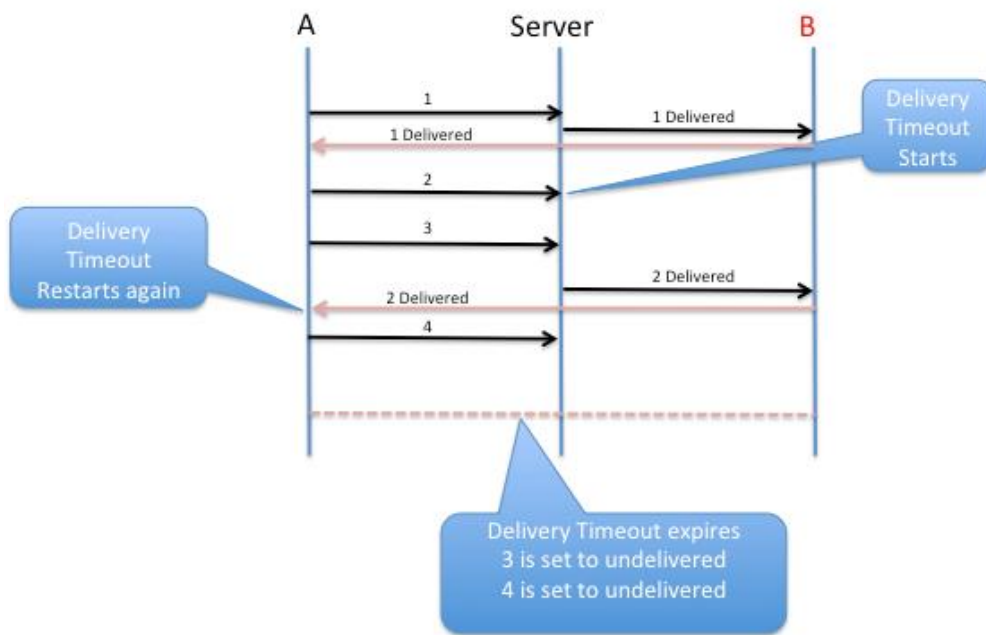
Figure 9: "DELIVERY TIMEOUT" flow diagram

Integrated Messaging 1 (IM_CAP_ALWAYS_ON=0) Selected Messaging Service								
User A (Sender)	Connected to cellular network	Yes	Yes	Yes	Yes	Yes	No	No
	Connected to RCS	Yes	Yes	Yes	Yes	No	Yes	No
User B (Receiver)	Connected to cellular network	Yes	Yes	No	No	N/A	Yes	N/A
	Connected to RCS	Yes	No	Yes	No		Yes	
Selected Service	Default	SMS	SMS	SMS	SMS	SMS	SMS*	SMS*
	Change after capability confirmation	RCS	SMS	RCS	SMS	SMS	RCS	SMS*
	Possible User Choice	SMS	RCS	SMS	RCS	RCS*	SMS*	RCS*
*on device caching of unsent messages is required and user shall be informed								

Table 12: Table to explain and summarise static conditions and proposed Messaging Service by the device logic

R4-13-2   Undelivered chat messages (sent but not delivered)

R4-13-2-1 When A-Party is RCS online and a DELIVERY TIMEOUT expires, sent but not yet delivered chat messages shall be considered as "undelivered". The user shall be able to send manually by SMS any "undelivered" chat messages by xMS.

R4-13-2-2 The user shall be notified about undelivered chat messages:

- Inside the message thread: through an indication in the thread (message status indication). The first time this indication is shown, a contextual indication (e.g. tool tip) shall explain to the user what it means and what options the iser has (e.g. resending via SMS).
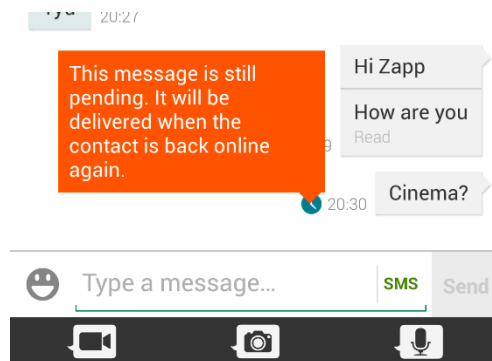
Figure 10: Example of a tool tip indication to notify the user of undelivered chat messages

    R4-13-3   In the messaging inbox:

       *R4-13-3-1*The user shall be informed through a system notification that:

          R4-13-3-1-1 Some messages have not yet been delivered.

          R4-13-3-1-2 Those messages will be delivered when the receiver is back online.

          *R4-13-3-1-3*The user shall be able to resend one or all of the undelivered messages by SMS.

       *R4-13-3-2*Opening the notification shall forward the user to the associated message thread.

       *R4-13-3-3*The same indication should be displayed in both the inbox view and the associated message thread view.
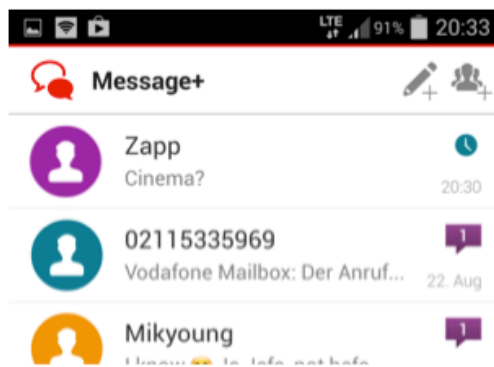
Figure 11: Example of indication in Inbox of a thread containing undelivered messages

    R4-13-4   When outside the message thread or inbox the user shall be informed through a system notification that:

       R4-13-4-1 Some messages have not yet been delivered:

          R4-13-4-1-1 These messages will be delivered when the receiver is back online again.

          R4-13-4-1-2 The user is able to resend these messages by xMS.

R4-13-4-2 Opening the notification shall forward the user to the associated message thread.

4.2.3.5   Unsent Chat Messages (pending)

R4-13-4-3 When the A Party goes offline during an ongoing chat conversation, pending chat messages (i.e. those the user has attempted to send but have not yet become "sent") shall be queued and marked as "pending". The user shall be able to retry manually the sending of one or all of these messages by xMS.

R4-13-4-4 When a DELIVERY TIMEOUT expires for these pending chat messages, they shall be considered as "failed". The user shall be able to retry manually the sending of one or all of these messages by xMS, or via chat if it becomes available again.

R4-13-4-5 The user shall be notified about "pending" chat messages:

- Inside the message thread: through an indication in the thread (message status indication).
- In the messaging inbox: the visual indication should be used in both the message inbox view and the message thread view.
- Outside the message thread or inbox: notification shall not be displayed to the user.

R4-13-4-6 The user shall be notified about "failed" chat messages:

- Inside the message thread: through indication in the thread (message status indication).
- In the messaging inbox: the same visual indication should be used in both the message inbox view and the message thread view.
- Outside the message thread or inbox: through a system notification. The notification shall inform the user that some messages are faled and will not be sent.
- Opening the notification shall forward the user to the associated message thread.

4.2.4   Integrated Messaging 2 – (IM_CAP_ALWAYS_ON = 1 / RCS Chat as default between RCS users)

US4-14 **As a user, I want the best Messaging Service to be proposed to me to convey my messages.**

R4-14-1 The messaging service to be proposed for sending messages to RCS capable users shall be determined by the connectivity status to the RCS platform of the sender (A-Party).

R4-14-1-1 RCS Chat shall be the default Messaging Service for outbound messages proposed by the device for recipients (B-Party) being known as RCS capable contacts, irrespective of their connectivity status.

R4-14-2 If the A-Party has lost IP connectivity to the RCS service, messages to B-Party being an RCS user shall be 1-to-1 Chat locally queued and sent once the IP

connectivity is restored. In this case, the A-Party shall be informed about the loss of the connectivity status by the device appropriately.

R4-14-2-1 If the A-Party is not registered to the RCS service (e.g. the user has chosen to switch their mobile data setting to "OFF"), the proposed Messaging Service shall be SMS.

R4-14-3 SMS shall be the default messaging service for outbound messages proposed by the device logic for recipients (B-Party) being known or detected as not RCS capable. In case the device has no cellular connectivity, SMS messages shall be queued locally on the device and will be sent once the connection to cellular is restored.

NOTE: In case cellular is not available, the SMS shall be locally queued on the device.

Integrated Messaging 2 (IM CAP ALWAYS ON=1)- Selected Messaging Service					
User A (Sender)	Connected to Cellular Network	Yes	Yes	N/A	Yes
	Connected to RCS	No[2]	No[3]	Yes	Yes
User B (Receiver)	Connected to Cellular Network	N/A			
	Connected to RCS				
Selected Service	Default	RCS*	SMS	RCS	SMS**
	User Choice	SMS	RCS*	SMS***	N/A
*On-device caching of messages is required and user shall be informed ** If B-Party is known to be a non RCS user ***If cellular network connection is not available, on-device caching of messages is required and user shall be informed					

Table 13: Table to explain and summarize static conditions and proposed Messaging Service by the device logic

---

[2] Cellular data is switched on

[3] Cellular data is switched off

4.2.5 Integrated Messaging – File Transfer 1 (FT_HTTP_CAP_ALWAYS_ON=0 / online Experience only)

US4-15 **As a user, I want the best File Transfer service to be proposed to me to convey my files.**

R4-15-1 The File Transfer Service to be proposed for sending files shall be determined by the registration status to RCS platform of the sender (A-Party) and receiver (B-Party).

R4-15-2 If A-Party is not registered to RCS ("offline"), MMS shall be considered the default File Transfer Service proposed by the device logic.

NOTE: In this case, RCS File Transfer shall not be sent.

R4-15-2-1 If MMS messages cannot be sent immediately, MMS shall be composed and locally queued until data connection is restored.

R4-15-3 If A-party is registered to RCS ("online") and in cellular coverage, the current capabilities of B-party determine the proposed messaging service.

R4-15-3-1 A capability check for B-Party shall be performed in the background whenever A-Party enters the messaging composer and selects a recipient, or selects File Transfer from any of the service entry points on the device.

NOTE: The operator Capability Server may deliver capabilities instead of B-Party's device.

R4-15-3-2 If B-Party is registered to RCS ("online"), then RCS File Transfer shall be the proposed File Transfer service.

NOTE: Taking into consideration the exception detailed in R4-15-3-3

R4-15-3-3 Exception: if B party is a non- Integrated / non- Seamless Messaging user, and a conversation is already in progress between A and B and the last message in that active conversation was sent or received using xMS, or after operator-configurable timer ("DELIVERY TIMEOUT") expires for a sent RCS message in that active conversation then MMS shall be the proposed File Transfer service.

R4-15-3-4 If B-Party is not available for RCS ("offline") or A-Party has not yet determined B-Party's availability, or B-Party is not an RCS user, then MMS shall be the proposed File Transfer service.

NOTE: This shall be the case even if B-Party is a known RCS user.

R4-15-3-5 If, after the A-Party user has entered the file selection process, B-Party's capabilities for RCS File Transfer are received, the proposed File Transfer Service shall be adjusted to RCS File Transfer if the change is visible to the user, can be manually changed back and if the user has not manually selected the Messaging Service in this Session before.

NOTE: Taking into consideration the exception detailed in R4-15-3-3

R4-15-4 If A- Party is registered to RCS ("online") but outside of cellular coverage, the current capabilities of B-party shall determine the proposed File Transfer Service.

NOTE: A capability check for B-Party shall be performed in the background whenever A-Party enters the messaging composer and selects a recipient (B-Party), or if A enters into a conversation with B or when A-Party enters any of the relevant File Share service entry points and selects a recipient (B-Party).

R4-15-4-1 If B-Party is registered to RCS ("online"), then RCS File Transfer service shall be proposed.

R4-15-4-2 If B-Party is not registered to RCS ("offline") or A-Party has not yet determined B-Party's capabilities, the proposed File Transfer Service shall be MMS and messages are queued locally and delivered as soon as cellular connectivity is restored.

NOTE: This shall be the case even if B-Party is a known RCS user.

R4-15-4-3 If, after the A-Party user has entered the file selection process, B-Party's capabilities for RCS File Transfer are received, the proposed File Transfer Service shall be adjusted to RCS File Transfer if the change is visible to the user, it can be manually changed back and if the user has not manually selected the Messaging Service in this Session previously.

NOTE: Taking into consideration the exception detailed in R4-15-3-3

File Transfer 1 (FT_HTTP_CAP_ALWAS_ON=0) - Selected File Transfer Service					
User A - Sender	Connect to Cellular network	n/a	n/a	n/a
	Connect to RCS	No	yes	yes
User B - Receiver (RCS user)	Connect to Cellular network	n/a	n/a	n/a
	Connect to RCS	n/a	yes	No
Proposed Service	Default FT service	MMS*	RCS FT	MMS*
	User Choice	RCS FT*	MMS	RCS FT*
* On-device caching of unsent files required and user shall be informed				

Table 14: Table to explain and summarize static conditions and proposed Messaging Service by the device logic

4.2.6 Integrated Messaging – File Transfer 2 (FT_HTTP_CAP_ALWAYS_ON=1 / File Transfer with Store and Forward)

US4-16 **As a user, I want the best File Transfer Service to be proposed to me to convey my files.**

R4-16-1 The proposed File Transfer Service to be used for sending files shall be determined by the registration status to RCS platform of the sender (A-Party) and if the B-Party is a known RCS user.

> *R4-16-2* If the A-Party is registered to RCS ("online"),
>
> > *R4-16-2-1* RCS File Transfer shall be the default service for outbound files proposed by the device logic for recipients being known as RCS capable contacts, irrespective of their connectivity status.
> >
> > *R4-16-2-2* MMS shall be the default File Transfer Service for outbound messages proposed by the device logic for recipients being known or detected as not RCS capable.
>
> *R4-16-3* If the A-Party is not registered to RCS ("offline"),
>
> > *R4-16-3-1* Any files sent to a B-Party who is known as an RCS user shall be RCS File Transfer locally queued and sent once the RCS connectivity is restored. In this case, the A-Party shall be informed about the "offline" status by the device appropriately.
> >
> > *R4-16-3-2* Any Files sent to a B-Party who is not known as an RCS user shall be sent as MMS. In case no data connection is available, MMS shall be locally queued, the A-Party shall be informed about the "offline" status by the device appropriately and the file will be sent once mobile data is available again.

File Transfer 2 (FT_HTTP_CAP_ALWAS_ON=1) - Selected File Transfer Service				
User A	Connect to Cellular network	n/a	n/a	n/a
Sender	Connect to RCS	Yes	No	n/a
User B	Connect to Cellular network	n/a	n/a	n/a
Receiver (RCS user)	Connect to RCS	n/a	n/a	n/a
	Default FT service	**RCS FT**	**RCS FT***	**MMS****
Proposed Service	**User Choice**	**MMS**	**MMS***	n/a
	*On-device caching of unsent files required and user shall be informed ** If B-Party is known to be a non RCS user (Exception: see **Error! Reference source not found.**)			

Table 15: Table to explain and summarize static conditions and proposed Messaging Service by the device logic

4.2.7 Multimedia Message Service Selection

The sections above (sections 4.2.3 to 4.2.6) describe the logic for selecting the preferred messaging service for individual messages and File Transfers in a conversation. As described, the preferred messaging service is influenced by the IM_CAP_ALWAYS_ON and FT_HTTP_CAP_ALWAYS_ON configuration parameters.

A client configuration where these two parameters are set to different values (e.g. where IM_CAP is set to "0", and FT_HTTP_CAP is set to "1") can result in two different messaging services being selected for different messages in the same conversation. For example, SMS being selected for text messages and RCS File transfer for files. (This would be the case with a client configuration of IM_CAP_ALWAYS_ON=0

and FT_HTTP_CAP_ALWAYS_ON=1, in a conversation where the A-party is Online and the B-party is Offline).

Some devices, however, allow users to enter both text and files while composing a single message.

> *R4-16-4* When a single message includes both text and file components, the entire 'multimedia' message must be conveyed using the same messaging service to preserve the consistency of the message:
>
>> *R4-16-4-1* The MMS service must be used if xMS has been selected by the client logic for either the text and/or the file components of the multimedia message.
>>
>> *R4-16-4-2* RCS chat and RCS File Transfer must be used only when RCS has been selected by the client logic for both the text and the file components of the multimedia message.

4.3 Technical Information

4.3.1 Overview

Operator Messaging is a client functionality to provide the user with a common messaging service behaviour using multiple services and technologies. The sections US4-6 through US4-16 provide the functional requirements for the client to select and apply the specified service behaviour for a number of messaging services. Whilst the Operator Messaging Service User Stories and Feature Requirements deal with the co-existence of the services in the client, there are service definition documents that define the service behaviour of the single services. For some services the desired service requirements may be provided by multiple technologies. The following service implementations are involved.

- The RCS 1-to-1 Chat service refers to the service defined in '1-to-1 Chat', page 61.

- The RCS File Transfer Service refers to the service defined in 'File Transfer incl. Geolocation Push', page 84.

- The Short Messaging Service (SMS) is provided by the client as follows:
  - o If the Short Messaging Service is selected by the client and the standalone messaging service is enabled by the service provider via the configuration parameter STANDALONE MSG AUTH as defined in sections A.1.4.3 and A.2.1 of [RCC.07] and the client is registered in IMS, then Standalone Messaging as defined in section 3.2 of [RCC.07] shall be used.
  - o Otherwise, if supported by the device, the client shall use the Short Messaging Service as defined in [3GPP TS 23.040] or the Short Messaging Service over IP as defined in IR.92.

- The Multimedia Messaging Service (MMS) is provided by the client as follows:
  - o If the Multimedia Messaging Service is selected by the client and the standalone messaging service is enabled by the service provider via the configuration parameter STANDALONE MSG AUTH as defined in sections A.1.4.3 and A.2.1 of [RCC.07] and the client is registered in IMS, then Standalone Messaging as defined in section 3.2 of [RCC.07] shall be used.

   o   Otherwise, if supported by the device, the client shall use the Multimedia Messaging Service as defined in 3GPP TS 22.140 and 3GPP TS 23.140.

4.3.2   Configuration Parameters

The User Stories and Feature Requirements in the previous sections refer to a number of configuration parameters influencing the client behaviour for integrated and seamless messaging. Apart from the parameters defined in this section these are defined in sections A.1.4.3.3 and A.1.5 of [RCC.07].

Service providers need to be able to configure devices for the two operator messaging integration modes defined in this Operator Messaging section. A new configuration parameter to control the Common Core messaging UX is defined as follows.

Configuration parameter	Description	Parameter usage
MESSAGING UX	This parameter controls whether the UX for messaging shall be the seamless messaging (0, default value) or the integrated messaging experience (1) NOTE: When receiving a provisioning document from a legacy network, this parameter is not provided resulting in the default behaviour.	Optional Parameter

Table 16: Common Core UX Configuration Parameters

The MESSAGING UX parameter will be placed in a new UX MO sub tree defined in this specification.

Figure 12: UX MO sub tree

The associated HTTP configuration XML structure is presented in the table below:

```
<characteristic type="UX">
    <parm name="ipVideoCallNonRCS" value="X"/>
    <parm name="messagingUX" value="X"/>
    <characteristic type="Ext"/>
</characteristic>
```

Table 17: UX sub tree associated HTTP configuration XML structure

Node: /<x>/UX

Common Core related parameters used to control the UX of the client are placed under this interior node.

Status	Occurrence	Format	Min. Access Types
Required	One	node	Get

Table 18: UX MO sub tree addition node

- Values: N/A
- Type property of the node is: *urn:gsma:mo:gcc-ux:1.0*
- Associated HTTP XML characteristic type: "UX"

Node: /<x>/UX/messagingUX

Leaf node that describes whether the seamless messaging experience or the integrated messaging experience shall be used.

If not instantiated, the seamless messaging experiences shall be used.

Status	Occurrence	Format	Min. Access Types
Required	ZeroOrOne	Bool	Get, Replace

Table 19: UX MO sub tree addition parameters (messagingUX)

- Values:
  0, the client shall use the seamless messaging experience
  1, the client shall use the integrated messaging experience
- Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.
- Type property of the node is: urn:gsma:mo:gcc-ux:1.0:messagingUX
- Associated HTTP XML characteristic type: "messagingUX"

Node: /<x>/Ext

An extension node for service provider specific parameters. Clients that are not aware of any extensions in this sub tree (e.g. because they are not service provider specific) should not instantiate this tree.

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

Table 20: UX MO sub tree addition Service Provider Extension Node

- Values: N/A
- Type property of the node is: *urn:gsma:mo:gcc-ux:1.0:Ext*
- Post-reconfiguration actions: The client should be reset and should perform the complete first-time registration procedure following a reconfiguration (e.g. OMA-DM/HTTP).
- Associated HTTP XML characteristic type: "Ext"

In addition the service provider needs to be able to control the switch-over behaviour between messaging technologies as defined in the functional part by means of new configuration parameters.

The Common Core configuration parameters are defined as follows:

Configuration parameter	Description	Parameter usage
DELIVERY TIMEOUT	This parameter controls the timeout for the reception of delivery reports for RCS messages and files after which the client shall initiate a capability discovery or inform the user as defined in the Operator Messaging User stories. If the value is set to 0 these actions shall not be invoked by the client. The default value should be set to 0 seconds if the parameter is not provided. NOTE: A recommended default value of 300 seconds is used in case the parameter is not provided	Optional Parameter
FT HTTP CAP ALWAYS ON	This parameter controls whether 1-to-1 File Transfer is available to all contacts supporting File Transfer via HTTP regardless of their online status (1) or only to those contacts that are online (0)	Optional Parameter It becomes mandatory when MESSAGING UX is set to 1.

Table 21: Common Core Client Control Configuration Parameters

These client control parameters will be placed in a new Client Control sub tree defined in this specification.
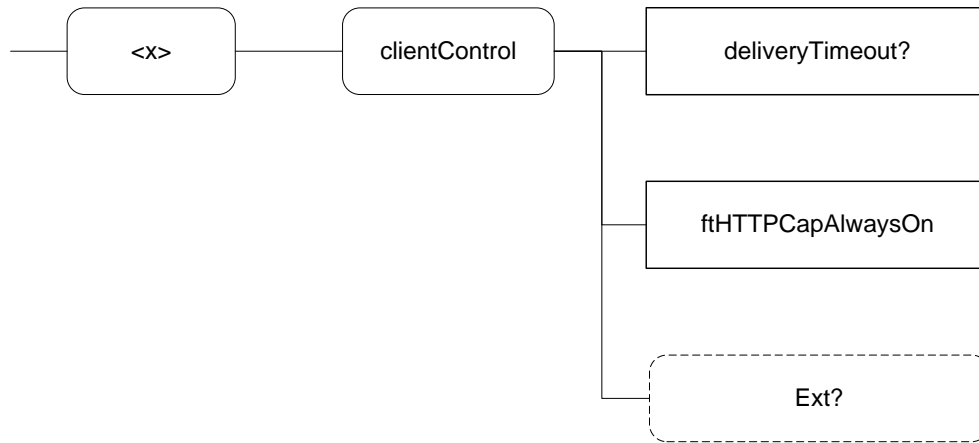
Figure 13: Client Control MO sub tree

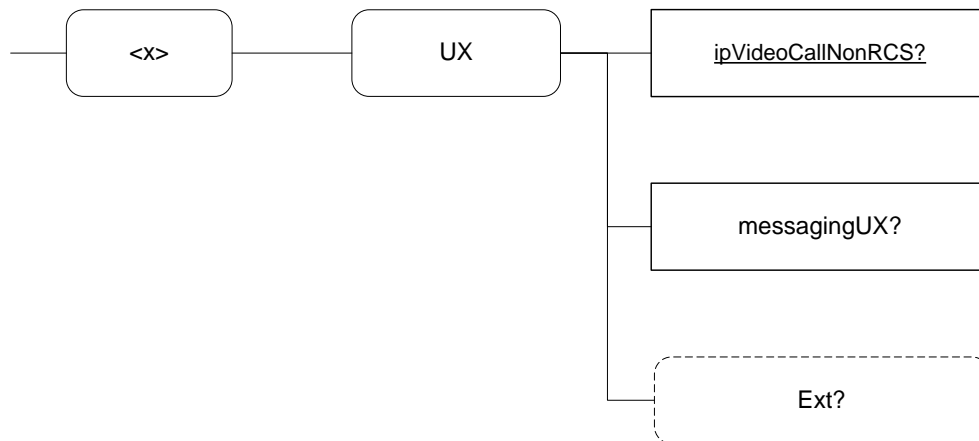The associated HTTP configuration XML structure is presented in the table below:

```
<characteristic type="clientControl">
    <parm name="deliveryTimeout" value="X"/>
    <parm name="ftHTTPCapAlwaysOn" value="X"/>
    <characteristic type="Ext"/>
</characteristic>
```

Table 22: ClientControl sub tree associated HTTP configuration XML structure

Node: /<x>/ClientControl

Common Core related parameters used to control the client behaviour are placed under this interior node.

Status	Occurrence	Format	Min. Access Types
Required	One	node	Get

Table 23: ClientControl MO sub tree addition node

- Values: N/A
- Type property of the node is: urn:gsma:mo:gcc-clientcontrol:1.0
- Associated HTTP XML characteristic type: "clientControl"

Node: /<x>/ClientControl/deliveryTimeout

Leaf node that configures on a device the timeout for the reception of delivery reports after which a context specific actions are invoked.

The node is optional and if not provided the default value of 300 seconds will be used

Status	Occurrence	Format	Min. Access Types
Required	ZeroOrOne	int	Get, Replace

Table 24: Client Control MO sub tree addition parameters (deliveryTimeout)

Values: integer value defining the timeout to be used in seconds, when set to 0 the timeout shall not be used as trigger for a capability check

Type property of the node is: urn:gsma:mo:gcc-clientControl:1.0:deliveryTimeoutPost-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.

Associated HTTP XML characteristic type: "deliveryTimeout"

Node: /<x>/ClientControl/ftHTTPCapAlwaysOn

Leaf node that describes whether the File Transfer via HTTP capability needs to be on independently of whether or not the other end is registered. For example this can be used by service providers preferring the user experience of 1-to-1 File Transfer to offline users over the use of xMS based messaging.

It is required to be instantiated if a service provider enables the Integrated Messaging experience.

Status	Occurrence	Format	Min. Access Types
Required	ZeroOrOne	bool	Get, Replace

Table 25: Client Control MO sub tree addition parameters (ftHTTPCapAlwaysOn)

Values:
0, File Transfer via HTTP can be used only to File Transfer via HTTP capable contacts that are online
1, File Transfer via HTTP can be used with all File Transfer via HTTP capable contacts regardless of their current status.

Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.

Associated HTTP XML characteristic type: "ftHTTPCapAlwaysOn"

Node:/ <x>/ClientControl/Ext

An extension node for service provider specific parameters. Clients that are not aware of any extensions in this sub tree (e.g. because they are not service provider specific) should not instantiate this tree.

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

Table 26: ClientControl MO sub tree addition Service Provider Extension Node

Values: N/A

Type property of the node is: urn:gsma:mo:gcc-clientControl:1.0:Ext

Post-reconfiguration actions: The client should be reset and should perform the complete first-time registration procedure following a reconfiguration

Associated HTTP XML characteristic type: "Ext"

4.3.3   Capability Discovery

To realise the behaviour specified in this Operator Messaging chapter section, a client must be able to indicate whether a combined messaging UX is provided to the user (integrated / seamless messaging user). Thus a new SIP OPTIONS tag and Presence service-id is defined for clients to be able to convey the Combined Messaging UX capability.

Clients shall indicate their Combined Messaging UX capability in accordance with their ability to manage xMS messaging.

A client configured for Integrated Messaging or Seamless Messaging shall advertise the Combined Messaging UX capability as long as it is able to manage both xMS and RCS messaging. If the client does not own the capability to manage the xMS service (due to other device configurations), then it shall not advertise the Combined Messaging UX Capability.

> NOTE: For the definition of the SIP OPTIONS tag a value of RCS joyn Blackbird is used to ensure interoperability with devices of this RCS profile.

RCS service	Tag
Combined Messaging UX	+g.3gpp.iari-ref="urn%3Aurn-7%3A3gpp-application.ims.iari.joyn.intmsg"

Table 27: SIP OPTIONS tags for Messaging Modes

The following *<service-description>* elements will be used for Capability Discovery via Presence as extension to the definitions in section 2.6.1.2 of [RCC.07]

Combined Messaging UX

Service-id: org.3gpp.urn:urn-7:3gpp-application.ims.iari.joyn.intmsg
Version: 1.0
Contact address type: tel/ SIP URI

4.4   Technical Implementation of User Stories & Feature requirements

> *R4-17-1* The requirements listed under user story US4-1 shall be implemented locally on the client.

> *R4-17-2* The requirements listed under user story US4-2. shall be implemented locally on the client based on the submission, delivery and display status technology of the various messaging technologies. Note, the service provider is able to provide a display notification for MMS via Read Reports.

R4-17-3   The requirements listed under user story US4-3 the operator shall implement message revocation for 1-to-1 Chat as defined 3.3.4.1.10 of [RCC.07]

R4-17-4   The requirements listed under user story US4-4 shall be implemented locally on the device based on the capability discovery result. Requirement R4-4-1 shall be implemented as defined in section 4.3.3.

R4-17-5   The requirements listed under user story US4-5 shall be implemented locally on the client.

R4-17-6   The requirements listed under user stories US4-6 through US4-16 shall be implemented locally on the client. The following general procedural requirements shall be considered.

For the requirements, where a client needs to determine the RCS registered status of the other party via capability discovery, the client implementation shall take the definitions of the automata tag in section 2.7.1.1 of [RCC.07] into account.

For the requirements, where a client needs to determine the messaging technology based on the network connection status and the device is in a situation where it attaches to the network anew (e.g. due to power-on or resume from airplane mode) it is recommended that the client awaits the completion of all network attach procedures first.

The determination of the integrated / seamless messaging capability of other RCS users is provided by the capability discovery of the Combined Messaging UX as defined in section 4.3.3, page 60.

If the DELIVERY TIMEOUT timer expires for a chat message or a File Transfer the client shall either initiate a capability discovery to determine whether messaging technology is to be switched or inform the user as defined in the operator messaging requirements.

5   1-to-1 Chat

5.1   Description

1-to-1 Chat enables users to exchange chat messages with another party. This section describes the User Stories and Service Requirements for the core chat service and all features around the core.

5.2   User Stories and Feature Requirements

US5-1   **As a user, I want to send Chat Messages to my contacts.**

NOTE: This document describes the Chat Service functionality for contacts on-net or on an Interconnected RCS service. Other contacts may have less functionality available. Please refer to 'Operator Messaging', page 36.

R5-1-1   **OM** Any RCS user shall be able to send a Chat Message to Contacts in the contact list.

R5-1-2   The user shall have the option to send a message at any time by entering an existing chat and continuing.

NOTE: The 1-to-1 chat has no visible end. Despite the way it is technically realised, to the user it will always appear as a thread of messages to which they can reply at any time. The user may switch to other screens any time during or after a chat without affecting the chat history or the option to resume the chat at a later time.

US5-2   **As a user, I want to see the status of my sent Chat Messages.**

R5-2-1   **OM** For A-Party, the following message states shall be supported:

R5-2-1-1 Message Pending: Transfer of the Chat Message in progress *(e.g. queuing on device)*.

R5-2-1-2 Message Sent: confirmation that the message has been correctly accepted by the A-Party's network.

R5-2-1-3 Message Delivered: Confirmation that the message has been delivered to the B-Party device.

R5-2-1-4 Message Displayed: Confirmation the message was displayed on the receiving device (technical confirmation that message was read by the recipient)

R5-2-1-5 Message send failed: The expected outcome of the operation could not be confirmed by the network (in this case: Message Sent or Message Delivered status notification has not been received) and the device does not attempt to send the message anymore). (Sending the message may be re-triggered manually by the user)

R5-2-2   **OM** If the sending device is offline at the time a notification is received, notifications shall be stored on the network and forwarded once the sending device is online.

US5-3   **As a user, I want to include smilies into my Chat Messages.**

NOTE: Smilies are small graphical elements that can express mood, fun or icons to explain a thing or a status in a graphical, easy to use and understand manner. Example for smilies are☺,☎ ☀ and☮.

R5-3-1   It shall be possible to add Emoji when creating a chat message by adding from a selection of graphical elements in the chat application.

NOTE: Standards for conversion of text strings to Emoji are described in Annex "Emoticon conversion table", page 164.

R5-3-2   It shall be possible to add the basic Emoticons when creating a chat message by typing in the respective text string, separated by blank spaces (e.g. ";-) "converts to☺) or typing in the respective text string without blank spaces if the string is the only characters of the message content.

NOTE: The basic set of Emoticons is listed in the Annex "Emoticon conversion table", page 164.

R5-3-3   **OM** Emoji shall be interpreted as detailed in the conversion table in the Annex of this document. The graphical elements that are used may vary from vendor to vendor, but the conveyed meaning must not be changed.

R5-3-4   **OM** Emoticons from the basic set of Emoticons, which are received in Chat Messages, shall be converted to graphics, if they were separated by blank spaces in messages (e.g. " ;-) "converts to☺) or without the blank spaces if the emoticon string is the only characters of the message content.

US5-4   **As a user, I want to use the text editing tools of the device that are available on my device (e.g., but not limited to, copy paste, edit) for chat messages.**

NOTE: In case of the user trying to paste an image into the text editor the device may ignore the user action.

R5-4-1   The user shall have the option to select text (e.g. from a message, a website or any other text source) and use text editing tools such as copy & paste to create messages.

US5-5   **As a user, I want to see when the other party is currently writing a Chat Message.**

R5-5-1   **OM** The other party shall be able to see an "is typing" notification whenever a new Chat Message is created.

US5-6   **As a user, I want to receive text Chat Messages from my contacts.**

R5-6-1   **OM** Any RCS user shall be able to receive Chat Message(s) that are sent to them.

US5-7   **As a user, I can send a Chat Message like a text and it is just delivered. B-party does not need to accept the message.**

R5-7-1   **OM** Chat Messages shall be received straight in the inbox; no hand-shake acceptance shall be required.

US5-8   **As a user, I want to send text Chat Messages to my contacts even when they're temporarily offline (e.g. device switched off). I expect them to receive these Chat Messages when they come online again.**

R5-8-1   **OM** In case the B-Party is currently not connected to the RCS service *(remark: "offline"),* the message(s) shall be delivered once the user is back registered on RCS.

NOTE: If the B party receives the message using another service before re-registering to RCS, then the B-party shall not be notified of the message – this avoids message duplication.

NOTE: Details of alternative delivery methods from 'Operator Messaging', page 36, may apply.

R5-8-2   **OM** The operator shall be able to set the storage duration for store & forward cases (deferred messaging) based on its own individual operator parameters.

NOTE: The parameters may be aligned at a local level as the terminating network storage time has an impact on the sending network user's experience.

US5-9   **As a user, I want to be notified at any time my device receives a new Chat Message.**

    R5-9-1   **OM** On receiving a message, the user shall be notified with graphical and sound elements (similar as the device notifies of incoming SMS messages if not stated differently in this requirements document).

US5-10   **As a user, I want notifications of rapidly sequenced incoming Chat Messages intelligibly aggregated and counted.**

    R5-10-1   For audio notifications, device audio related settings shall prevail.

    R5-10-2   Rapid sequence of incoming Chat Messages in one Conversation shall be consolidated into one audible notification per Conversation. Consolidation of visual notifications is not affected.

    R5-10-3   On selection of the visual notification for one or more new message(s) in a single Chat or Group Chat conversation, the user shall be forwarded to the respective Chat Message and the visual notification shall be permanently removed from the notification centre or bar.

    R5-10-4   On selection of the visual notification for two or more new messages from different Chat or Group Chat Notifications, the user shall be forwarded to the list of Chat or Group Chat conversations. In this case, the unread message visual identifier shall be removed once the last new message was read. Alternatively, the OEM may handle it differently on the device (e.g. the visual notification disappears already after selecting the notification and seeing the list of Chat or Group Chat conversations).

    R5-10-5   Any audible or visual notification shall be suppressed in case the reception is visible on the currently active screen of the device. (E.g. if the user is currently on the Chat screen with a person and a Chat Message is received).

US5-11   **As a user, I want to view my sent and received Chat Messages in a time-based order.**

    R5-11-1   **OM** All messages exchanged 1-to-1 with the same contact shall be threaded in the same chat thread.

  NOTE: Where a contact has multiple phone numbers, then a thread should be created for each phone number. The thread name should clearly show which identity is in use (e.g. work, home and so on).

    R5-11-2   **OM** The order of messages shall be in line with the order messages have been sent and received on the device.

    R5-11-3   **OM** The originating network shall have the ability to recall RCS messages from the terminating store.

  NOTE: This requirement does not affect any messages which have already been delivered to the terminating device.

    R5-11-4   Incoming and outgoing messages shall be displayed interlaced.

    R5-11-5   Sent messages shall be inserted into the Conversation thread as they have been created.

US5-12 **As a user, I want to see the timestamp associated with each of my sent and received messages.**

> *R5-12-1* **OM** The date and time associated with each chat message shall be displayed adjusted to the current device date and time.
>
>> *R5-12-1-1* This timestamp shall be generated for sent messages by the device in a consistent way as timestamps are generated for other device functions, e.g. SMS.
>>
>> *R5-12-1-2* Timestamps for received messages shall be based on the UTC timestamp that comes with each message, aligned with the selected device time zone.

US5-13 **As a user, I want conversations which contain unread messages to be differentiated from conversations that contain messages I have seen.**

> NOTE 1:   This requirement shall be valid for Messaging for Multi-Device as well.
>
> NOTE 2:   Unseen files or file download notifications cover events that use File Transfer as an enabler e.g. but not limited to, Geolocation Push, Audio Messaging or vCard share.
>
> *R5-13-1* Conversations with unread messages or unseen files or file download notifications shall be marked accordingly, e.g. by display of subject line in bold font and / or an unread message counter.
>
> *R5-13-2* Conversations shall, on reception of a new message, elevate to the top of the Chat or Group Chat Conversation list.
>
> *R5-13-3* If the device supports a notification LED (for screen-off notification) then this LED shall flash as long as there are unread RCS messages. The colour should differentiate from notifications of other applications, but may be identical for all Operator Messaging services.

US5-14 **As a user, I want the contact names of Chat Conversations to be aligned with the according contact card (i.e. if a Contact I am in a Chat Conversation with is in my contact list, the identifying MSISDN shall be replaced with the name from the contact card).**

> *R5-14-1* **OM** If the sender of a Chat Message is in my contact list, the MSISDN shall be replaced with the sender's name on the contact list in any representations where the message sender is represented.
>
> *R5-14-2* **OM** If the sender of a Chat Message is not in my contact list, the MSISDN shall be replaced with the sender's RCS Alias name if available.
>
> *R5-14-3* **OM** In case the Alias is being used to represent the sender's identity, the device UI shall use appropriate means to make transparent that the Alias name is unverified information.
>
> NOTE: The Alias as specified in RCS 5.2 standard is being created by the message sender and could be set to any possible name, the real name of the person, or a nickname or in extreme cases – in an attempt of identity spoofing – the sender could try to pretend a false identity.

US5-15 **As a user, I don't want to feel restricted by Chat Message size limits.**

> *R5-15-1* **OM** Chat Messages (incoming and outgoing) shall allow to enter at least 999 characters.

NOTE: Operator defined parameter.

US5-16 **As a user, I want to exchange multi-media content in my Chat Conversations (e.g., but not limited to: take an instant picture from camera and send from within the chat).**

NOTE: Details on multi-media content are covered in 'File Transfer incl. Geolocation Push', page 84.

> *R5-16-1* The user shall be able to select and send Multi Media in Chat Conversations.

NOTE: Details on multi-media content share are covered in 'File Transfer incl. Geolocation Push', page 84.

> *R5-16-2* **OM** The user shall be able to receive Multi Media in Chat Conversations.

NOTE: Details on 'multi-media content share' are covered in 'File Transfer incl. Geolocation Push', page 84.

US5-17 **As a user, I want to maintain multiple Conversations in parallel.**

NOTE: These Conversations may be one-to-one or Group Chat Conversations.

> *R5-17-1* The device shall offer the option of multiple parallel Chat and Group Chat Conversations at any given point in time.

US5-18 **As a user, I want to easily and quickly switch between multiple parallel Conversations.**

NOTE: These Conversations may be One-to-One or Group Chat Conversations.

> *R5-18-1* The device shall offer the option to switch between Conversations easily and quickly.

US5-19 **As a user, I want my messages backed up on Common Message Store which is trusted and safe.**

> *R5-19-1* **OM** All Conversations shall be stored on the network.

NOTE: Details of that storage are at the individual operator discretion.

> *R5-19-2* The operator shall be able to determine the storage duration for messages on the Common Message Store based on individual operator parameters.

> *R5-19-3* In case the operator deletes messages from the Common Message Store (e.g. for capacity limitation) these messages shall not be deleted from local consumer equipment.

US5-20 **As a user, I want my device always be in sync with the Chat Messages stored in the Common Message Store even in case of multiple devices.**
As a user, I want to send Chat Messages from secondary devices.

> *R5-20-1* 1-to-1 Chat shall support Multi-Device Usage.

NOTE: Details on secondary device use will be described in 'Messaging for Multi-Device', page 102.

US5-21 **As a user, I want to restore my Conversations from the Common Message Store (e.g., but not limited to, after wiping device or purchasing a new device).**

R5-21-1 The user shall have the option to restore Conversations from the Common Message Store (e.g., but not limited to, in case of handset replacement or automated local memory removal of messages on device to free up memory space).

US5-22 **As a user, I want to delete complete Conversations.**
As a user, I want to select and delete single and multiple nonadjacent chat messages in a chat thread.

R5-22-1 The user shall have the option to delete a single Chat Message from a Conversation.

R5-22-2 The user shall have the option to delete single and multiple non-adjacent Chat Messages in a chat thread.

R5-22-3 The user shall have the option to delete an entire Conversation.

R5-22-4 Any Chat Messages or entire Conversations that have been deleted by the user shall no longer be available on the Common Message Store.

NOTE: Deletion on other devices of the same identity is described in 'Messaging for Multi-Device', page 102.

US5-23 **As a user, I want to be able to forward a single sent or received chat message to one or more Contacts.**

NOTE: This may be performed by the user by copying existing message text and pasting into a new Chat message.

R5-23-1 The user shall have the option to forward a single sent or received Chat Message to one or more contacts.

NOTE: This function may be executed using the copy and paste text editor function of the device.

US5-24 **As a user, I want to switch to a voice or video call with the B-Party during a Conversation - and return to chat when the call is finished.**

R5-24-1 The user shall have the option to easily access voice calls from the Chat UI with the contact in the Conversation. After the call has ended, the user can return to the Conversation.

R5-24-2 The user shall be able to receive a voice call when actively engaged in a Conversation and return to the chat when the voice call was ended.

R5-24-3 The user shall have the option to easily access video calls from the Chat UI with the contact in the Conversation. After the call has ended, the user can return to the Conversation.

R5-24-4 The user shall be able to receive a video call when actively engaged in a Chat or Group Chat Conversation and return to the chat when the video call ends.

US5-25 **As a user, I want to block specific users so that I do not receive any kind of Chat Message from them anymore.**

R5-25-1 If the sender of a Chat Message is on my local device blacklist, the incoming message shall be ignored.

R5-25-2 Messages from blocked contacts shall neither trigger visual nor audio notification.

R5-25-3 For messages from blocked contacts, Conversations shall not be created.

R5-25-4 Incoming Messages from blocked contacts shall not be displayed.

R5-25-5 The recipient has no option to see or respond to messages from a blocked contact.

5.3   Technical Information

5.3.1   Overview

The 1-to-1 Chat service is provided as defined in sections 2.7.1.1 and 3.3 of [RCC.07]

For the purpose of the following technical implementation of the user stories and service requirements the 1-to-1 Chat service is considered as a stand-alone end-to-end service. The technical implementation of the 1-to-1 Chat service in relation to the integrated messaging experience is provided in 'Operator Messaging', page 36.

[RCC.07] allows service providers to implement the one-to-one user experience based on SIMPLE IM or CPM. The service provider is able to select the technology via the CHAT MESSAGING TECHNOLOGY configuration parameter defined in section A.1.4.3. of [RCC.07]..

5.3.2   Technical Implementation of User Stories and Service requirements

R5-26-1 For user story US5-1 the following definitions apply.

- The 1-to-1 Chat service shall be offered to the user if the device configuration authorizes the chat service via the CHAT AUTH parameter defined in section A.1.4.3 of [RCC.07].
- The ability of the user to send chat messages to a contact depends on the result of the capability discovery and the service provider's capability to support store-and-forward as defined in section 2.7 of [RCC.07].
- As defined by requirement R5-1-2 the chat transfer technology requires the client to create and manage a chat session without making it visible to the user. The chat session shall be managed by the client with regard to the session acceptance and time-out as defined by the configuration parameters IM SESSION START, IM SESSION AUTO ACCEPT and IM SESSION TIMER of [RCC.07].

R5-26-2 For the message transfer states of requirement R5-2-1 the following technical implementation applies:

- **Pending**: When the user presses ENTER to send the message until the first success response is received from the network. The message may be in this state for some time when the user is NOT registered with the IMS core (e.g. offline or airplane mode).
- **Sent**: A first SIP provisional response is received from the network if the message is sent as part of the INVITE or a MSRP 200 OK is received in case the message was sent over MSRP.
- **Delivered**: When receiving the Delivery Notification with status set to "delivered".
- **Displayed**: When receiving the Displayed Notification with the status set to "displayed".
- **Error**: When an error different from 486/487 is received.

NOTE: Receipt of a 486/487 doesn't change the status of the message

R5-26-3 Notifications on delivery status information as defined in R5-2-2 shall be stored and forwarded in the store & forward server as specified in section 3.3.4.1.5 [RCC.07].

R5-26-4 For the requirements in user story US5-3 the device shall support the encoding and display of the graphical elements as defined in the referred Annexes.

R5-26-5 The requirements in user story US5-4 shall be implemented locally on the device.

R5-26-6 The indication that the other party is typing in requirement R5-5-1 is derived from the reception of the "isComposing" indication as defined in section 3.3.4.1 of [RCC.07]. It should be noted that the "isComposing" indication can only be transferred if an active chat session exist. Clients should send the "isComposing" indication only if a chat session exists for the conversation the user is typing in.

R5-26-7 The requirements of user story US5-6 shall be implemented as defined in section 3.3.4 of [RCC.07].

R5-26-8 As a clarification of the user story US5-7 it shall be noted that the client shall *Not* apply any procedures for the acceptance of the delivery of single messages. If the first message is carried in a SIP INVITE then the client should enforce the chat session auto accept policy of the service provider as defined via the configuration parameters IM SESSION START and SESSION AUTO ACCEPT defined in section A.1.4.3. of [RCC.07]. In all other cases the device shall rely on the value of the SESSION AUTO ACCEPT parameter which needs to be set by the service provider to 1 to enforce the client to accept the session immediately.

R5-26-9 The store-and-forward functionality defined in user story US5-8 shall be implemented as defined in sections 3.3.4.1.4 and 3.3.4.1.5 of [RCC.07]

R5-26-10 The requirements of user stories US5-9 and US5-10 shall be implemented locally on the device.

R5-26-11 For the requirements in user story US5-11 the client shall support the following procedure.

- It is the responsibility of the Messaging Server to deliver messages in the correct order, so the Client can rely on it when sorting messages. The client shall interleave the sent and received messages in the chronological order.
- After the client has synchronized with the Common Message Store successfully, then messages shall be sorted in accordance with the time indicated in the CPIM DateTime header value received with message from the Common Message Store.

R5-26-12 The requirement R5-11-3 shall be implemented as defined in section 3.3.4.1.10 of [RCC.07]

R5-26-13 The requirements of user story US5-12 shall be implemented locally on the device.

R5-26-14 The requirements of user story US5-13 shall be implemented locally on the device.

R5-26-15 The user alias defined in user story US5-14 for addresses which do not match a contact shall be implemented as defined in section 2.5.3.3 of [RCC.07]

R5-26-16 For the realization of requirements of user story US5-15 the client shall enforce the max message size for sending messages as defined by the configuration parameter MAX SIZE 1-to-1 IM defined in section A.1.4.3. of [RCC.07]. It is required for service providers to set the value to "999" or more.

R5-26-17 For the requirements of user story File Transfer will be used as defined in 'File Transfer incl. Geolocation Push', page 84. For the interactions with the 1-to-1 Chat message service the requirements of section 3.5.2 of [RCC.07] apply.

R5-26-18 The requirements of user stories US5-17 and US5-18 shall be implemented locally on the device.

R5-26-19 The requirements of user stories US5-19, US5-20 and US5-21 are implemented as defined in 'Messaging for Multi-Device', page 102.

R5-26-20 The requirements of user stories US5-22 through US5-24 shall be implemented locally on the device.

R5-26-21 The requirements of user story US5-25 will be implemented as defined in section 3.3.4.1.1 or 3.3.4.1.2 of [RCC.07].

6 Group Chat

6.1 Description

Group Chat allows users to exchange chat messages with a number of contacts. This Service Description Document describes the User Stories, Service Requirements Technical RCS Definition for the core chat service and all features around the core.

6.2 User Stories and Feature Requirements

US6-1 **As a user, I want to create either an Open Group Chat Conversation with a selection of my contacts, or a Closed Group Chat Conversation with a selection of my contacts.**

R6-1-1 Any RCS user shall be able to create an Open Group Chat Conversation by selecting capable (for this service) contacts from the contact list and invite them to an Open Group Chat.

R6-1-2 It shall be possible to create an Open Group Chat Conversation by adding a (for this service capable) participant to a 1-to-1 Chat Conversation. The existing 1-to-1 Chat Conversation remains in the Chat Conversation list, and a new Group Chat is being created.

R6-1-3 Any RCS user shall be able to create a Closed Group Conversation by selecting capable (for this service) contacts from the contact list and invite them to the Closed Group Chat.

R6-1-4 **OM** Any (for this service capable) RCS user shall be able to participate in an Open Group Chat Conversation when invited.

R6-1-5 **OM** Any (for this service capable) RCS user shall be able to participate in a Closed Group Chat Conversation when invited.

R6-1-6 The network operator shall be able to set a maximum number of participants in a Group Chat Conversation.

NOTE: It is beneficial for proper RCS Interworking that RCS operators align on the maximum number of participants, at least at a local level.

R6-1-7 It shall only be possible to set up a new Group Chat Conversation if the initiating user is connected to the RCS platform.

US6-2 **As a user, I want to add a subject title to any Open or Closed Group Chat Conversation.**

R6-2-1 When Creating a Group Chat Conversation it shall be possible for the initiator to define a subject title.

R6-2-2 **OM** If no subject title has been defined, the application shall automatically generate a subject title (e.g. list of users on the Group Chat "Liz, Thomas plus 3 others")

R6-2-3 **OM** It shall be possible to maintain more than one Group Chat with identical Group Chat subject titles.

US6-3 **As a user, I want to add a contact from my contact list to an existing Open Group Chat Conversation.**

R6-3-1 **OM** Participants in an Open Group Chat Conversation shall be able to add new participants from their contact list.

R6-3-2 **OM** It shall not be possible to add new Group Chat participants in an Open Group Chat Conversation once the maximum number of participants has been reached as configured by the network operator.

R6-3-3 **OM** It shall possible to add participants to a Group Chat if they are not registered to the RCS platform ("offline") at the time where the addition takes place.

R6-3-4 **OM** Other Group Chat participants shall see the new participant- irrespective of whether the new participant is registered to the RCS platform ("online") or not (offline")- from the time the new participant was invited.

US6-4 **As a user, I don't want anybody to be able to add a participant to a Closed Group Chat Conversation after it has been created.**

R6-4-1 **OM** Participants in a Closed Group Chat Conversation – including the creator – shall not be able to add any further participants to the Group Chat Conversation once the Group Chat Conversation invites have been sent.

US6-5 **As a user, I want to know who is participating in a Group Chat Conversation at any point in time.**
As a user, I want the contact names of Group Chat Participants to be aligned with the according contact card (i.e. if a Contact I am in a Group Chat Conversation with is in my contact list, the identifying MSISDN shall be replaced with the name from the contact card).

R6-5-1 **OM** Any participant in a Group Chat Conversation shall be able to see a list of participants at any point in time.

R6-5-2 **OM** If the sender of a Group Chat Message is in my contact list, the MSISDN shall be replaced with the sender's name on the contact list in any representations where the message sender is represented.

R6-5-3 **OM** If the sender of a Chat Message is not in my contact list, the MSISDN shall be replaced with the sender's RCS Alias name if available.

R6-5-4 **OM** In case the Alias is being used to represent the sender's identity, the device UI shall use appropriate means to indicate that the Alias name is unverified information.

NOTE: The Alias as specified in RCS 5.2 standard is being created by the message sender and could be set to any possible name, the real name of the person, or a nickname or in extreme cases – in an attempt of identity spoofing – the sender could try to pretend a false identity.

R6-5-5 **OM** If neither Contact name nor RCS Alias is available, a participating contact shall be represented with the MSISDN in the list of Group Chat participants.

R6-5-6   **OM** In the case where new Group Chat participants join the Group Chat, all other Group Chat participants shall be notified with graphical elements inside the Group Chat Conversation only.

R6-5-7   **OM** In the case where Group Chat participants leave the conversation, all other Group Chat participants shall be notified with graphical elements inside the Group Chat Conversation only.

US6-6   **As a user, I don't want to deal with Group Chat invites and acceptances, I want to join a Group Chat Conversation whenever I am invited to participate.**

R6-6-1   **OM** Any user who was invited to a (Closed or Open) Group Chat Conversation shall automatically become a participant of that Group Chat Conversation – no invite / acceptance 'handshake process' required.

R6-6-2   The user shall be able to see who originally set up the Group Chat.

US6-7   **As a user, I want to send text Group Chat Messages to an existing Group Chat Conversation.**

R6-7-1   Any participant in a Group Chat Conversation shall be able to send messages to all Group Chat participants.

R6-7-2   If the originating user tries to send messages to other Group Chat participants while not connected to the RCS platform ("offline"), the messages shall be queued locally on the device and sent out once the device reconnects to RCS platform. ("Online") again.

US6-8   **As a user, I can send a Group Chat Message to an existing Group Chat Conversation like a text and it is just delivered. Recipients do not need to explicitly accept any single message.**

R6-8-1   Any message exchanged in the Group Chat Conversation shall be received on other participants' devices without any form of acceptance of the message.

US6-9   **As a user, I want to send text Chat Messages to my Group Chat participants even when they're temporarily offline (e.g. device switched off). I expect them to receive these Chat Messages when they come online again.**

R6-9-1   **OM** In case any participant in a Group Chat Conversation is currently not registered on the RCS service *(remark: "offline"),* any message(s) or updates to the list of Group Chat participants shall be delivered once the user is back registered on RCS *(remark: "online")*.

R6-9-2   The operator shall be able to set the storage duration for store & forward cases (deferred messaging) based on individual operator parameters.

NOTE: The parameters may be aligned on local level as the terminating network storage time has an impact on the sending network user's experience.

US6-10   **As a user, I want to include smileys into my Chat Messages.**

NOTE: Smileys are small graphical elements that can express mood, fun or icons to explain a thing or a status in a graphical, easy to use and understand manner. Example for smileys are☺,☏ ☙ and☻.

R6-10-1   It shall be possible to add Emoji when creating a chat message by adding from a selection of graphical elements in the chat application.

NOTE: Standards for conversion of text strings to Emoji are described in the Annex "Emoticon conversion table", page 164.

R6-10-2   It shall be possible to add the basic Emoticons when creating a chat message by typing in the respective text string, separated by blank spaces (e.g. ";-) "converts to "☺") or typing in the respective text string without blank spaces if the string is the only characters of the message content.

NOTE: The basic set of Emoticons is listed in the Annex "Emoticon conversion table", page 164.

R6-10-3   **OM** Emoji shall be interpreted as detailed in the conversion table in the Annex of this document. The graphical elements that are used may vary from vendor to vendor, but the conveyed meaning must not be changed.

R6-10-4   **OM** Emoticons from the basic set of Emoticons, which are received in Chat Messages, shall be converted to graphics, if they were separated by blank spaces in messages (e.g. " ;-) "converts to "☺") or without the blank spaces if the emoticon string is the only characters of the message content.

US6-11   **As a user, I don't want to feel restricted by Group Chat Message size limits.**

R6-11-1   **OM** Group Chat Messages (incoming and outgoing) shall allow to send and receive at least 999 characters.

NOTE: Operator defined parameter.

US6-12   **As a user, I want to see the status of my sent Group Chat Messages.**

R6-12-1   **OM** For A-Party, the following message states shall be indicated to the user:

R6-12-1-1 Message Pending: Transfer of the Chat Message in progress *(e.g. queuing on device)*.

R6-12-1-2 Message Sent: confirmation that the message has been correctly accepted by the A-Party's network.

R6-12-1-3 Message Delivered: Receiving devices have noticed that a message has been received by the device.

NOTE: The Delivery Notification is intended to inform the sender of the message about the delivery status of the message or file transfer. Other participants of the Group Chat are not expected to receive the message delivery status.

R6-12-1-4 Message send failed: The expected outcome of the operation could not be confirmed by the network (in this case: Message Sent or Message Delivered status notification has not been received) and the device does not attempt to send the message anymore). (Sending the message may be re-triggered manually by the user).

R6-12-2   **OM** If the sending device is offline at the time a notification is received, notifications shall be stored on the network and forwarded once the sending device is online.

US6-13 **As a user, I want to see when the other party is currently writing a Group Chat Message.**

R6-13-1 **OM** The other party shall be able to see an "[name from contact list or MSISDN] is typing" notification whenever a new Chat Message is being created.

US6-14 **As a user, I want to be notified at any time my device receives a new Group Chat Message.**

R6-14-1 **OM** On receiving a Group Chat message, the user shall be notified with graphical and sound elements (similar as the device notifies incoming SMS messages if not stated differently in this requirements document).

R6-14-2 For audio notifications, device audio related settings shall prevail.

R6-14-3 Any audible or visual notification shall be suppressed in case the reception is visible on the currently active screen of the device. (e.g. if the user is currently on the chat screen with a person and a File Transfer is received).

R6-14-4 If the device supports a notification LED (for screen-off notification) then this LED shall flash as long as there are unread RCS messages. The colour should differentiate from notifications of other applications, but may be identical for all Operator Messaging services.

US6-15 **As a user, I want notifications of rapidly sequenced incoming Group Chat Messages intelligibly aggregated and counted.**

R6-15-1 Rapid sequence of incoming Group Chat Messages in one Group Chat Conversation shall be consolidated into one audible notification per Group Chat Conversation. Consolidation of visual notifications is not affected.

R6-15-2 On selection of the visual notification for a single new message or multiple messages from one Group Chat Conversation, the user shall be directed to the respective Group Chat Message.

R6-15-3 On selection of the visual notification for two or more new messages from different Group Chat Notifications, the user shall be forwarded to the list of Group Chat Conversations. In this case, the unread message visual identifier shall be removed once the last new message was read. Alternatively, the OEM may handle it differently on the device (e.g. the visual notification disappears already after selecting the notification and seeing the list of Group Chat Conversations).

R6-15-4 The visual notification shall be permanently removed after the user has opened the message.

US6-16 **As a user, I want to be able to mute individual Group Chat Conversations which results in silencing any audible notification or vibration on incoming new Group Chat Messages or notifications on joining / leaving participants from that specific Group Chat Conversation.**

R6-16-1 The user shall be able to mute selected Group Chat Conversations, i.e. no audio or vibrate notification shall be performed on incoming new messages within the selected Group Chat Conversation.

NOTE: This selection does not have any effect on notifications in any other than the selected Group Chat Conversation.

US6-17   **As a user, I want to see the subject title and Group Picture as the identifier of a Group Chat Conversation in the list of Chat and Group Chat Conversations.**

R6-17-1   Any Group Chat shall be represented with Subject title and Group Picture (and possibly unread message identifier) in the list of Chat Conversations.

US6-18   **As a user, I want conversations which contain unread messages to be differentiated from conversations that contain messages I have seen.**

NOTE: This requirement shall be valid for Messaging for Multi-Device as well.

R6-18-1   Group Chat Conversations shall, on reception of a new message, elevate to the top of the Conversation list.

R6-18-2   Group Chat Conversations with unread messages shall be marked accordingly, e.g. by display of subject line in bold font and / or an unread message counter.

US6-19   **As a user, I want to receive text Group Chat Messages from any of the contacts participating in a Group Chat Conversation.**

R6-19-1   **OM** Any RCS user shall be able to receive Chat Message(s) that are sent to Group Chat Conversations the user participates in at any point in time.

NOTE: Group Chat Participants who are blacklisted on the user's device are treated separately.

R6-19-2   **OM** Group Chat Messages shall be received straight in the inbox; no hand-shake acceptance shall be required.

R6-19-3   **OM** Any participant of a Group Chat shall only be able to see messages that have been exchanged between the time of joining the Group Chat and leaving the Group Chat.

NOTE: Group Chat Participants who are blacklisted on the user's device are treated separately.

R6-19-4   **OM** It shall not be possible for any participant of a Group Chat Conversation to see any messages that possibly have been exchanged before the participant has joined the Group Chat.

US6-20   **As a user, I want to exchange multi-media content (e.g., but not limited to: take an instant picture from camera and send from within the chat) in my Group Chat Conversations.**

NOTE: Details on multi-media content are covered by 'File Transfer incl. Geolocation Push', page 84.

R6-20-1   The user shall be able to select and send Multi Media elements in Group Chat Conversations.

NOTE: Details on multi-media content share are covered by 'File Transfer incl. Geolocation Push', page 84.

R6-20-2 **OM** The user shall be able to receive Multi Media elements in Group Chat Conversations.

NOTE: Details on 'multi-media content share' are covered by 'File Transfer incl. Geolocation Push', page 84.

US6-21 **As a user, I want to view my sent and received Group Chat Messages in a time-based order.**

R6-21-1 **OM** All messages exchanged within the same Group Chat Conversation shall be threaded in the same group chat thread in timely order.

R6-21-2 **OM** The order of messages shall be in line with the order messages have been sent and received on the device.

R6-21-3 Incoming and outgoing messages shall be displayed interlaced.

R6-21-4 Outgoing messages shall be inserted into the Group Chat Conversation thread as they have been sent.

US6-22 **As a user, I want to see the timestamp associated with each of my sent and received messages.**

R6-22-1 **OM** The date and time associated with each chat message shall be displayed adjusted to the current device date and time.

R6-22-1-1 This timestamp shall be generated for sent messages by the device in a consistent way as timestamps are generated for other device functions, e.g. SMS.

R6-22-1-2 Timestamps for received messages shall be based on the UTC timestamp that comes with each message, aligned with the selected device time zone.

US6-23 **As a user, I want any Group Chat Conversations to permanently reside on my phone, and I can resume that group whenever I decide to do so.**

R6-23-1 **OM** Any participant in a Group Chat Conversation shall be able to send a Chat Message to other participants in the Group Chat at any given point in time.

R6-23-2 If the chat application is closed either by manual user interaction (e.g. by selection of another RCS function, pressing the 'home' key or switch to another application) or phone interaction (e.g. receiving call), the connection to the ongoing Group Chat shall be kept. In this case, the user shall stay in the group, continue to receive incoming new messages and resume at any point in time. The other participants shall not receive any notification about this procedure.

R6-23-3 A Group Chat expires in the network when there is no activity in it for a few minutes. However, when this happens, the device shall hide this network behaviour from the user and simulate the experience of a permanent Group Chat, showing the conversation in the Chat history and allowing any subsequent continuation. The following solution shall be implemented:

R6-23-3-1 Session related information is not shown to the user, i.e. 'Chat closed' shall not be displayed at the UI level.

R6-23-3-2 Simply writing a new message and hitting 'Send' shall be enough to continue a Group Chat that has timed out at network level.

R6-23-3-3 When the user hits 'Send' the Group Chat session is set up and the user message is also sent.

R6-23-3-4 When a Group Chat is restarted, no notifications of users joining shall be displayed for participants that were already part of the local participant list. The Group Chat header shall show if any participant is unavailable and shall give access to details of active participants.

R6-23-3-5 Group Chat follows up in the same Chat window, keeping the full history of the session.

R6-23-3-6 While the Chat is closed at network level, the 'Participants list' should still be expandable in order for the user to be able to see the recipients of their new message. However, all participants may be marked as inactive where there is no information on their availability.

US6-24 **As a user, I want to maintain multiple Chat and Group Chat Conversations in parallel.**

R6-24-1 The device shall offer the option of multiple parallel Chat and Group conversations at any given point in time.

US6-25 **As a user, I want to easily and quickly switch between parallel Chat Conversations.**

NOTE: These Chat Conversations may be One-to-One or Group Chat Conversations.

R6-25-1 The device shall offer the option to switch between parallel Chat and Group Chat conversations easily and quickly.

US6-26 **As a user, I want to be able to leave a Group Chat Conversation at any point in time. After I left a Group Chat Conversation, the conversation thread is still visible in the list of my conversations, but I am neither able to send any messages to that Group nor do I receive any kind of updates from that Group.**

NOTE: Re-joining Group Chat Conversation once left is only possible if the user is re-invited to that (Open) Group Chat. Re-joining a closed Group Chat Conversation is not possible.)

R6-26-1 **OM** Any participant in a Group Chat Conversation shall be able to leave that Group Chat at any point in time.

R6-26-2 **OM** Any participant who has left a Group Chat Conversation shall no longer receive any new messages or updates to the participants list.

R6-26-3 After a Group Chat participant has left, the Group Chat Conversation shall still be visible in the list of Conversations (if not manually deleted), containing any messages or participant list updates for the period of participation of the user.

R6-26-4 Re-joining a previously left Group Chat Conversation shall be possible by the user being re-invited by another (still active) Group Chat participant.

NOTE: This requirement shall only apply to Open Group Chats.

US6-27 **As a user, I want to use the text editing tools of the device that are available on my device (e.g., but not limited to, copy paste, edit) for chat messages.**

NOTE: In case of the user trying to paste an image into the text editor the device may ignore the user action.

R6-27-1 The user shall have the option to select text (e.g. from a message, a website or any other text source) and use text editing tools such as copy & paste to create messages.

US6-28 **As a user, I want to select and delete single and multiple nonadjacent chat messages in a Group Chat thread.**

R6-28-1 The user shall have the option to delete a single Chat Message from a Group Chat Conversation.

R6-28-2 The user should have the option to delete single and multiple nonadjacent Chat Messages from a Group Chat Conversation.

US6-29 **As a user, I want to delete complete Group Chat Conversations.**

R6-29-1 The user shall have the option to delete an entire Group Chat Conversation. Deleting an entire Group Chat Conversation shall automatically trigger leaving the Group Chat.

US6-30 **As a user, I want to be able to forward a single sent or received chat message or multimedia content to one or more Contacts.**

NOTE: This may be performed by the user by copying existing message text and pasting into a new Chat Message.

R6-30-1 The user shall have the option to forward a single sent or received Group Chat Message or multimedia content to one or more contacts.

NOTE: This function may be executed using the copy and paste text editor function of the device.

US6-31 **As a user, I want to switch to a voice or video call with one of the Group Chat participants by selecting one person from the participants list and initiating the call.**

NOTE: During the Voice or Video Call, the user may make use of the Group Chat application.

R6-31-1 The user shall have the option to easily access and make a voice call to one of the Group Chat participants. After the call has ended, the user interface should return to the Group Chat Conversation.

R6-31-2 The user shall have the option to easily access and make a video call to one of the Group Chat participants. After the call has ended, the user interface should return to the Group Chat Conversation.

US6-32 **As a user, I want to be able to answer any incoming voice or video call during a Group Chat Conversation - and resume the Group Chat when the call is finished.**

NOTE: During the Voice or Video Call, the user may make use of the Group Chat application.

R6-32-1 The user shall be able to receive a voice call when actively engaged in a Group Chat Conversation and when the voice call ends, the user interface should return to the Group Chat Conversation.

R6-32-2 The user shall be able to receive a video call when actively engaged in a Group Chat Conversation and when the video call ends, the user interface should return to the Group Chat Conversation.

US6-33 **As a user, I want to send Group Chat Messages from secondary devices with identical capabilities compared to primary device capabilities.**
As a user, I want my device to always be in sync with the Group Chat Messages on the network even in case of multiple devices.

R6-33-1 Group Chat shall support Multi-Device Usage.

US6-34 **As a user, I want my Group Chat messages backed up on the Common Message Store which is trusted and safe.**

R6-34-1 All Group Chat Conversations shall be stored on the Common Message Store.

NOTE: If the user has not been part of a Group Chat Conversation from the very beginning, or left the Group Chat Conversation while other Group Chat participants continued, only the part of the Group Chat Conversation between joining and leaving the Group Chat shall be stored.

US6-35 **As a user, I want to restore my Group Chat Conversations from the Common Message Store (e.g. but not limited to, after wiping device or purchasing a new device).**

R6-35-1 The user shall have the option to restore Group Chat Conversations from the Common Message Store *(e.g. in case of handset replacement).*

US6-36 **As a user, I want to block specific users so that I do not receive any kind of Group Chat Message from them anymore. However, I want to be aware that there was a message of a blocked contact to understand the context of the Group Chat. I want to see that even blocked contacts are participating in a Group Chat Conversation.**

R6-36-1 **OM** If one or more participants in a Group Chat Conversation are on my local device blacklist, these contacts shall appear on the list of Group Chat participants.

R6-36-2 If the sender of a Group Chat Message is on my local device blacklist, the incoming message shall be shown as an anonymous empty placeholder message in the message thread. No visual or audio notification shall be performed for that message.

6.3 Technical Information

6.3.1 Overview

The group chat service is provided as defined in section 3.4 of [RCC.07].

For the purpose of the following technical implementation of the user stories and service requirements the group chat service is considered as a stand-alone end-to-end service.

[RCC.07]allows service providers to implement the group chat user experience based on SIMPLE IM or CPM. The service provider is able to select the technology via the CHAT MESSAGING TECHNOLOGY configuration parameter defined in section A.1.4.3. of [RCC.07].

RCC.07 RCS 5.2 allows service providers to implement the file transfer user experience based on File Transfer over MSRP or File Transfer over HTTP. The technology used for the transfer of a file to a Group depends on the support of File Transfer technologies of the conference focus. The client shall select the technology as defined in sections 3.5.4.2 and 3.5.4.8.1 of [RCC.07]. If the conference focus does not support File Transfer the client may apply the alternative procedure defined in section 3.4.2.3 of [RCC.07].

A more detailed overview of applicable sections of the baseline specification will be provided once the detailed use case analyses identifies the required feature set.

6.3.2 Technical Implementation of User Stories and Service requirements

R6-37-1 For use case US6-1 the following definitions apply.

- The Group Chat service shall be offered to the user if the device configuration authorizes the service via the CHAT AUTH, GROUP CHAT AUTH and CONF-FCTY-URI parameters defined in section A.1.4 of [RCC.07]
- The procedures for initiation of a group chat and the conditions for the client to select capable contacts are defined in section 3.4.4. of [RCC.07]. The service provider is able to determine for the client which contacts are capable for a group chat, i.e. chat contacts only, or any contact including non RCS contacts.
- The technical implementation of the Closed Group Chat is defined in section 3.4.4.2 of [RCC.07]

R6-37-2 The subject of a Group Chat Conversation as defined in user story US6-2 is implemented in accordance with sections 3.4.4.1.1. and 3.4.4.1.2 of [RCC.07].

R6-37-3 The client shall allow members of an Open Group Chat Conversation to add new participants as defined in section 3.4.4.1.2 of [RCC.07] to fulfil the requirements of user story US6-3.

NOTE: To avoid sending notifications to participants twice in short succession, the conference focus shall briefly delay notifying the existing participants of the "pending" state of the newly added participant to allow for automatic acceptance of the Chat (e.g. because of Store and Forward). In that case the participant's state will change to "active" almost immediately.

R6-37-4   The technical implementation of the clients and the messaging server to provide the Closed Group Chat as defined for user story US6-4 shall be based on section 3.4.4.2 of [RCC.07]

R6-37-5   In order to be able to display the list and status of users in a group conversation as required in user story US6-5 each client shall subscribe to the conference event package as defined in section 3.4.4.1.1 of [RCC.07]. The client will be informed by the Messaging Server about the list of participants and their status based on this subscription.

The user alias for Group Chat users described in user story R6-5-3 and R6-5-4 is implemented as defined in section 2.5.3.3 of [RCC.07].

R6-37-6   The client implementation shall ensure that the invitation to a Group Chat does not require explicit user input to accept it as required in user story US6-6. However the service provider is able to define the technical procedure of the client to accept an invitation to a Group Chat by use of the configuration parameters IM SESSION AUTO ACCEPT GROUP CHAT as defined in section A.1.4.3. of [RCC.07].

R6-37-7   For the requirements of user story US6-7, in order to send text to a conversation while a Group Chat exists the client shall send the message using this session. If no session exists the client shall restart the Group Chat as defined in section 3.4.4.1.7. and send the message to it.

R6-37-8   The client shall not implement client UI procedures to accept reception of messages or group chat invitations to fulfil the requirements of user story US6-8.

R6-37-9   The requirements of user story US6-8 is fulfilled by means of the Group Chat Store and Forward functionality (section 3.4.4.3 of [RCC.07].

R6-37-10 The requirements related to the list of participants defined in user story US6-9 are implemented on the client via the subscription to the conference event package as defined in section 3.4.4 of [RCC.07]. As a result the client is continuously notified about the conference state.

R6-37-11 The implementation of the smilies and emoji in the requirements of US6-10 shall be supported as defined in the documents in the Annex.

R6-37-12 For the realization of the requirements in user story US6-11 the client shall enforce the max message size for sending messages as defined by the configuration parameter MAX SIZE GROUP IM defined in section A.1.4.3. of [RCC.07]. It is required for service providers to set the value to "999" or more.

R6-37-13 The Status indication for chat messages and File Transfer sent in the group chat are the same as defined for 1-to-1 Chat in '1-to-1 Chat', page 61 and File Transfer in 'File Transfer incl. Geolocation Push', page 84.

R6-37-14 Notifications on delivery status information as defined in R6-12-2 shall be stored and forwarded in the store & forward server as specified in section 3.4.4.3 of [RCC.07]

R6-37-15 The requirements for US6-13 to display typing notifications is implemented same as for 1-to-1 Chat as defined in section 3.4.4. of [RCC.07]

R6-37-16 The requirements for user stories US6-14 through to US6-16 are implemented locally on the device.

R6-37-17 The subject of a Group Chat Conversation as required in requirement R6-17-1 is implemented as defined in user story US6-2. There is no technical implementation of a group chat icon.

R6-37-18 The requirement of user story US6-18 for display notifications is implemented as defined in section 3.4.4.1.5 of [RCC.07]

R6-37-19 The requirements for user story US6-19, shall be implemented locally on the device. For acceptance of Group Chat sessions the client shall apply the behaviour as defined by the configuration parameters IM SESSION AUTO ACCEPT GROUP CHAT and IM SESSION START. The client shall not apply any UI procedures for the acceptance of the delivery of single messages

R6-37-20 Sending of Multimedia in a Group Chat, as defined in the requirements of user story US6-20, is done.

R6-37-21 For the requirements in user story US6-21 the client shall support the following procedure.

- It is the responsibility of the Messaging Server to deliver messages in the correct order, so the Client can rely on it when sorting messages. The client shall interleave the sent and received messages in the chronological order.
- After the client has synchronized with the Common Message Store successfully, then messages shall be sorted in accordance with the time indicated in the CPIM DateTime header value received with message from the Common Message Store.

R6-37-22 The requirements of user story US6-22 shall be implemented locally on the device.

R6-37-23 The requirements of user story US6-23 shall be implemented locally on the device based on the Group Chat life cycle definitions in section 3.4.4 of [RCC.07].

R6-37-24 The requirements of user stories US6-24 and US6-25 shall be implemented locally on the device.

R6-37-25 The requirements of user story US6-26 shall be implemented as defined in section 3.4.4.1.3.1 of [RCC.07]. If the user wants to leave a group chat while it is inactive, the client shall restart the Group Chat first, as defined in section 3.4.4.1.7 of [RCC.07].

Subsequent invitations to a Group Chat the user has voluntarily left shall be accepted by the client.

R6-37-26 The requirements of user stories US6-27 through to US6-32 shall be implemented locally on the device.

R6-37-27 The requirements of user stories US6-33 through to US6-35 are implemented as defined in section 3.4.4.1.8 of [RCC.07] and 'Messaging for Multi-Device', page 102, and 'Operator Messaging', page 36.

R6-37-28 The specific requirement for handling of locally blocked contacts in user story US6-36 appears to be only a UX function to be implemented locally on the device. However with regards to the interactions with Group Chat in the network, the client should treat the blocked contacts as regular contacts.

NOTE: Messages sent to the group will also be delivered to the blocked contact.

7   File Transfer incl. Geolocation Push

7.1   Description

File Transfer enables transferring files from one RCS device to one or more RCS devices. The main service entry points will be the Chat and Group Chat applications on the device, but there shall be other service entry points as well. This chapter describes the User Stories, Service Requirements and Technical Implementation details for the core File Transfer service and all features around the core.

Geolocation Push allows a user to share their current position or selected location with one or more RCS contacts.

7.2   User Stories and Feature Requirements

US7-1   **As a user, I want to transfer files to Contacts and receive files from other RCS users.**
As a user, I want to transfer and receive a file of any file format.

NOTE: Any file format can be selected and transferred, irrespective of the receiving device capabilities of representing the content in an appropriate way.

R7-1-1   **OM** File Transfer shall allow transfer of any files from a sending device to one or more recipients.

NOTE: This document describes the File Transfer functionality between RCS users. Other Contacts without RCS may have less functionality available. Please refer to 'Operator Messaging', page 36.

R7-1-2   **OM** File Transfer shall be capable of transferring exactly one file at a time.

NOTE: The user interface of a device may want to allow multiple selection of files for File Transfer and then process these files as separate File Transfer jobs.

US7-2   **As a user, I want to transfer a file from multiple service entry points on my device.**

R7-2-1   There shall be a number of service entry points to File Transfer, including, but not limited to, 1-to-1 Chat, Group Chat, Contact Card, and Gallery.

US7-3   **As a user, I want to see the status of any file I sent (including those which have not been delivered (yet)).**

R7-3-1   File Transfer shall support delivery status notifications per individual file (sender device):

R7-3-1-1 File Transfer Pending – waiting to transfer the file to the network *(e.g. queuing on device)*.

R7-3-1-2 File Transfer in progress – progress bar that indicates the transfer progress of the file transmission (from sending device to the network).

R7-3-1-3 Cancelled – the sender shall have the option to cancel the File Transfer during the File Transfer process.

R7-3-1-4 File delivered – transmission of the File Transfer request has been successfully completed to the receiving network.

R7-3-1-5 File downloaded: Automatic or user initiated download of file is complete.

R7-3-1-6 File Transfer failed: The expected outcome of the operation could not be confirmed by the network

NOTE: In this case, File Sent or File Delivered status notification has not been received and the device does not attempt to transfer the file anymore. The failed File Transfer event may be re-triggered manually by the sender.

R7-3-2 **OM** If the sending device is offline at the time a notification is received, notifications shall be stored on the network and forwarded once the sending device is online

US7-4 **As a user, I want the option to resize pictures before transferring the file, in order to limit transfer volume, memory need and transfer time.**

NOTE: "resize" means changing the picture size to either a high, medium and low size of the picture.

R7-4-1 **OM** Selecting a picture file format that can be rendered by the sending device shall offer the option to resize the picture to smaller file size in order to save memory, network load and transfer time. "Resize" means changing the picture resolution.

NOTE: In most cases, users are aware of the use of the picture on receiver side, for instance whether it shall be displayed on small screens only, or whether it may be printed on large scale. This feature provides the user with an option to adopt to these cases.

US7-5 **As a user, I want the option to resize videos before transferring the file, in order to limit the transfer volume, the size of storage needed and the time to transfer the file. *(Note "resize" means changing the resolution to either a high, medium and low format).***

R7-5-1 **OM** The default resizing option proposed shall be 480p at 1200kbps.

R7-5-2 **OM** Selecting a video file which is of a resolution higher than the default resizing option shall offer the option to resize the video file (Video Resolution) to a smaller file size in order to save memory, network load and transfer time. For each resizing option, the user shall see what the file size would be after that resizing option is applied.

R7-5-3 **OM** When a video is recorded with the specific purpose of sending using File Transfer, the video shall be recorded in 480p at 1200 kbps resolution.

US7-6 **As a user, I don't want to perceive a restriction in file sizes that I want to transfer.**

R7-6-1   **OM** The service provider shall be able to configure the File Transfer service to set a maximum file size to be accepted by the File Transfer service.

NOTE: It is recommended that RCS operators agree on a common file size limit to ensure interoperability at least on a local level.

R7-6-2   The service provider shall be able to configure a warning threshold value. When a user attempts to transfer a file larger than this value, auto-acceptance is not possible.

US7-7   **As a user, I want to transfer a file to multiple users at a time within a Group Chat.**

R7-7-1   **OM** File Transfer within a Group Chat shall transfer the file to all participants of the Group Chat.

NOTE: The sender side shall only send the file once over the network in this case.

R7-7-2   The ability to send files shall be available independently of whether the operator supports legacy Group Chat or not.

NOTE: Any adaption from the standard Group Chat File Transfer for legacy (non-RCS) contacts is done on the network level.

US7-8   **As a user, I want to be able to cancel files while the sending process has not been completed yet.**

R7-8-1   The device shall provide the user with the option to cancel a File Transfer while the file is still in the process of being sent on the originating leg.

NOTE: Once the File Transfer on the originating leg is completed, it is not possible for the sender to stop the process of File Transfer.

US7-9   **As a user, I want to transfer a file with my Contact(s) even when they're temporarily offline (e.g. device switched off). I expect them to receive the file when they come online again.**

R7-9-1   **OM** In case the B-Party is currently not registered on the RCS service *(remark: "offline"),* the request to deliver the file shall be delivered to the B-party device once the user is registered again on RCS ("online").

NOTE: This requirement refers to the store & forward feature.

R7-9-2   **OM** If a user attempts to download a file that has expired from the network storage, they shall be informed that the file is no longer available.

NOTE: This requirement relates to the store & forward feature.

US7-10   **As a service provider, I want to limit how long a file is available on the network for offline users.**

R7-10-1 The operator shall be able to define the network storage time for File Transfers that have not been downloaded yet.

NOTE: This requirements relates to the store & forward feature.

US7-11 **As a user, I want the device to notify me about new incoming files in a similar way to new incoming messages.**
As a user, I want to be notified in case of incoming positions / locations.

R7-11-1 **OM** On receiving a file or preview thumbnail, the user shall be notified with graphical and sound elements (in a similar way to how the device notifies about incoming messages).

NOTE: The standard customization options of the device for incoming notifications shall be available.

R7-11-2 For audio notifications of a new File Transfer request, device settings shall prevail.

R7-11-3 Rapid sequence of incoming File Transfer requests and Chat Messages in one Chat Conversation shall be consolidated into one audible notification per Chat Conversation. Visual notifications are not affected.

R7-11-4 On selection of the visual notification for a File Transfer, the user shall be directed to the respective thumbnail preview (in case of auto-accept is off) or file (in case File Transfer auto-accept is on) within the Chat or Group Chat Conversation.

R7-11-5 The visual notification for an incoming File Transfer shall be permanently removed from the notification centre bar, once the thread with the file or thumbnail preview has been opened

NOTE: Independently of whether the user has clicked the notification or has accessed the thread from the messaging application.

R7-11-6 Any audible or visual notification shall be suppressed in case the reception is visible on the currently active screen of the device (e.g. if the user is currently on the chat screen with a person and a File Transfer is received).

R7-11-7 For notification of a new incoming location or position, the above mentioned requirements shall be valid accordingly.

NOTE: Geolocation Push feature is technically using File Transfer mechanisms.

R7-11-1 If the device supports a notification LED (for screen-off notification) then this LED shall flash as long as there are un-opened RCS File Transfers. The colour should differentiate from notifications from other applications, but may be identical for all Operator Messaging services.

US7-12 **As a user, I want to receive incoming files within a new or existing Chat or Group Chat Conversation.**
As a user, I want sent and received files to be part of the Chat or Group Chat Conversation thread in similar order and appearance of chat messages, but representing the transferred content.

R7-12-1 Incoming files shall be displayed within a new or existing Chat Conversation.

R7-12-2 Files shall be threaded in the conversation as an event similar to chat messages. The same ruling for order of messages as specified in '1-to-1 Chat', page 61, and 'Group Chat', page 71, shall be applied to Files.

R7-12-3 **OM** Chat of Group Chat Conversations shall be sorted descending according to the time stamp of the last action (e.g., but not limited to, a received File Transfer, Audio Message or Geolocation Push) within the conversation (i.e. the Conversation with the latest event timestamp shall be on top of the list).

R7-12-4 **OM** Chat or Group Chat Conversations with unread events (any event that is received within the Chat Conversation, including, but not limited to, Chat Messages, received files, received Geolocation Push, received Audio Messages) shall be marked accordingly, e.g. by display of a subject line in bold font and / or a unread message counter.

US7-13 **As a user, I want to see incoming files as a thumbnail preview (or generic icon if content cannot be rendered on a receiving device) including fil size indication.**
As a user, I want to trigger file download to my device by selecting the thumbnail preview.
As a user, I want to be in control of the acceptance of the File Transfer (individually or for all File Transfer events).

R7-13-1 In case "File Transfer Auto-Accept" is set to off:

R7-13-1-1 The incoming File Transfer presents a thumbnail preview of the file, including file size, on the receiving device first.

R7-13-1-2 The thumbnail preview shall be a preview of the actual picture (if the file type is a picture in a format that can be rendered by the receiving device), a file type specific icon

NOTE: There shall be file type specific icons at minimum for standard RCS content types for Contact Card, Audio Messaging and Geolocation Push or a generic icon.

R7-13-1-3 Selection of the preview icon on the receiving device shall trigger the download of the full file to the user's device.

R7-13-1-4 The user shall have the option to delete the thumbnail preview without downloading the content.

R7-13-2 In case Auto-accept for File Transfer is set to on:

R7-13-2-1 The user does not have to accept the download for each received File Transfer.

R7-13-2-2 The file is automatically downloaded and can be accessed in the Chat Conversation.

R7-13-3 The Operator shall have the option to set the default value for "File Transfer Auto Accept" via the device provisioning process.

R7-13-4 The user shall have the option to select or deselect "File Transfer Auto-Accept".

R7-13-5 As a user, I want to have a visible notification about the status of received files.

R7-13-6 **OM** File Transfer shall support status notifications per individual file (receiver device):

R7-13-6-1 In case of auto accept off: Thumbnail preview received – indication that a file is waiting for download trigger on a receiving network.

R7-13-6-2 File Transfer in progress on receiving device – a progress bar that indicates the transfer of the file (from network store to receiving device) after download was triggered.

R7-13-6-3 Cancelled – the receiver shall have the option to cancel the File Transfer during the File Transfer process.

R7-13-6-4 File downloaded.

R7-13-6-5 File Transfer failed – File Transfer could not be confirmed successfully completed by the network and client does not attempt to retrieve the file any further. (In case of File Transfer store & forward function is available, the user may be able to manually re-trigger File Transfer and resume from where the File Transfer failed. In case of no File Transfer store & forward, the user has the option to ask the sender to re-send the file.)

US7-14 As a user, I want to transfer a Contact's information from the contact list to other RCS users.

R7-14-1 Selecting "Send Contact" from a Contact Card shall send the Contact details in vcf-format to a recipient that shall be selected.

NOTE: vCard as the default format, details in the Annex A1 '**Personal Card format**', page 162.

R7-14-2 **OM** Devices shall be capable to render vCard files in .vcf format according to RCS standard (see Annex A1 '**Personal Card format**', page 162) and offer to store received Contacts in the device contact list.

US7-15 As a user, I want to be able to resume interrupted File Transfers

NOTE: On sending and receiving side.

R7-15-1 If a File Transfer has been interrupted on the sending or receiving side (e.g. in case of, but not limited to, if device lost radio coverage), the File Transfer shall resume automatically from the point of interruption once the required conditions have been restored (e.g. device is back in radio coverage).

R7-15-2 If the receiver's device does not have enough storage space to download the full file,

R7-15-2-1 A notification shall be provided to the receiver before downloading the full file.

R7-15-2-2 Storage space shall be freed up manually by the receiver before download attempt shall be possible.

R7-15-2-3 The user shall have the option to re-start the file download as long as the operator storage time (as in R7-10-1) has not expired.

US7-16 As a service provider, I want to be able to limit the size of the files that are transferred.

R7-16-1 If the sending device attempts to send a file larger than the limit for File Transfer, the A party shall be notified that the file exceeds the size limit supported by the service.

NOTE: In order to avoid user disappointment caused by different maximum allowed file sizes on different networks, it is recommended to align a maximum file size at least on a national level across operators.

US7-17 As a user, I want to block specific users so that I do not receive any kind of files from them anymore.

R7-17-1 Incoming File Transfers from Contacts on the local device blacklist

R7-17-1-1 shall be ignored by the device.

R7-17-1-2 The user shall not be made aware of any File Transfer attempts from blacklisted Contacts.

R7-17-1-3 No notifications or thumbnail previews shall be displayed.

R7-17-1-4 In case the user has selected "File Transfer Auto-Accept" as a setting on his device, any incoming File Transfer attempts from blacklisted Contacts shall not be auto-accepted.

US7-18 As a user, I want to administrate File Transfers in Chat and Group Chat Conversations intuitively.

R7-18-1 The user shall have the option to delete File Transfer events (outgoing or incoming) from a Chat or Group Chat Conversation:

R7-18-1-1 Deleting a single File Transfer directly from the chat conversation.

R7-18-1-2 Delete multiple File Transfer events (with or without other associated events in the conversation such as Chat messages).

R7-18-1-3 Deleting a File Transfer from the Chat or Group Chat Conversation shall delete the entry in the conversation thread and the Operator Store (e.g. CMS).

R7-18-2 If received or sent files are automatically stored on a device or online repository (e.g. an RCS gallery on the device picture gallery), then deleting the File Transfer events from the conversation thread does not automatically delete any files from this repository. In case the user permanently wants to delete this content, separate user action is required (as per individual device operation).

US7-19 As a user, I want my operator to store my sent and received files safely and securely.

R7-19-1 Any successfully sent and received files shall be stored on the network.

NOTE: This is Common Message Store feature.

R7-19-2 Details of the network storage shall be controlled by the individual operator, including, but not limited to:

R7-19-2-1 Total Volume of storage capacity per user

> *R7-19-2-2* Maximum storage time of conversations, messages, files etc.

US7-20 As a user, I want to restore my sent and received files from the network operator storage

> NOTE: Central File Storage, e.g. in case of handset replacement.

> *R7-20-1* The user shall have the option to restore transferred files from the network storage *(e.g. in case of handset replacement)*.

US7-21 As a user, I want my device to always be in sync with the stored files on the network even in case of multiple devices.

> NOTE: Details on synchronization and secondary device use will be described in 'Messaging for Multi-Device', page 102.

> *R7-21-1* All user devices shall always maintain full synchronisation of sent and received files.

> NOTE: Details on synchronization and secondary device use will be described in 'Messaging for Multi-Device', page 102.

> *R7-21-2* In the multi-device case,

> > *R7-21-2-1* All Geolocation Push capable devices of the user shall offer full function,

> > *R7-21-2-2* Legacy devices (non RCS or on a RCS version that does not support Geolocation Push) should offer legacy mode function.

> NOTE: Any details of Multi-Device Support shall be as described in 'Messaging for Multi-Device', page 102.

US7-22 As a user, I want the ability to share my current position or a selected location with any of my contacts (RCS contacts or legacy non-RCS contacts).

> NOTE: Pre-requisite: The Geolocation Push Service relies on a map function on the sending device that supports the RCS functionalities.

> NOTE: Pre-requisite: There is no intention to build positioning or map functions within the RCS standard.

> *R7-22-1* Chat, Group Chat and In-Call Sharing shall be service entry points to initiate a Geolocation Push.

> *R7-22-2* There may be other service entry points available on the device to initiate a Geolocation Push (e.g. Contact Card, call log).

> *R7-22-3* The Geolocation Push Service should offer a 'legacy mode' to send positions or locations to non-RCS recipients or recipients with RCS versions that do not support Geolocation Push.

> NOTE: Legacy mode may be provided by a link to an online map display or a 'screenshot' with map picture.

US7-23 As a user, I want to pre-view an automatically detected position on map and have the ability to change this manually before sending.

R7-23-1   If the current position shall be sent, the location shall be automatically detected and suggested to the end user.

R7-23-2   The user shall have the option to preview and correct the automatically detected position on a map view before sending.

R7-23-3   The Geolocation Push Service shall support sending of a location that was picked from the map.

US7-24   **As a user, I want to tag positions or locations with a text field.**

R7-24-1   The user shall have the option to tag a position or location with a free text field before sending.

US7-25   **As a user, I want to receive positions / locations in a map view.**
As a user, I want to use standard map functions e.g. "guide me to…" feature.

NOTE: These functions are not provided by the RCS implementation.

R7-25-1   **OM** When receiving a position or location, the RCS Geolocation Push user shall have the ability to see the position / location on a map.

R7-25-2   **OM** When receiving a position or location, the RCS Geolocation Push user shall be able to see any tags that were added by the sender.

R7-25-3   When receiving a position or location, the RCS Geolocation Push user shall be able to use map and navigation tool functions such as 'guide me to…' feature.

NOTE: The compliance with this feature may depend on the capabilities of the receiving handset.

R7-25-4   When receiving a position or location, the legacy (non-RCS or RCS without Geolocation Push Service) user should receive either a link that opens a map application on the web, or a map image.

7.3   Technical Information

7.3.1   Overview

The File Transfer service is provided as defined in section 3.5 of [RCC.07]. There are a number of technologies to provide the File Transfer user experience. It is a service provider option which File Transfer technology is deployed.

The selection of the transfer technology for files is derived by the client as result of the capability discovery as defined in sections 2.6.1.1.2, 2.6.1.2.3 and 3.5.4.8.1 of [RCC.07].

7.3.2   Technical Implementation of User Stories and Service requirements

R7-26-1   For the requirements of user story US7-1 the following definitions apply:

- The File Transfer service shall be offered to the user if the device configuration authorizes the service via the PROVIDE FT parameter defined in section A.1.5 of [RCC.07].
- The ability of the user to send files to a contact depends on the result of the capability discovery as defined in section 2.7 of [RCC.07].

R7-26-2 The requirements of user story US7-2 shall be implemented locally on the device.

R7-26-3 The requirements of user story US7-3 shall be implemented as follows. The implementation depends on the file transport technology used.

- **Pending**:
  For File Transfer over MSRP; when the user presses ENTER to send the message until the first SIP success response is received from the network.

  For File Transfer over HTTP; when the user presses ENTER to send the message until the first HTTP POST success response is received from the network.

  The File Transfer may be in this state for some time when the user is NOT registered with the IMS core (e.g. offline or airplane mode).

- **Progress:**
  For File Transfer over MSRP; from the reception of the first SIP Response is received from the network until the final MSRP 200 OK is received.

  For File Transfer over HTTP; from the reception of the first success HTTP response from the network until a provisional response is received from the network for the SIP INVITE or a MSRP 200 OK is received from the network for the chat message carrying the File Transfer via HTTP message body content.

- **Cancelled**: If the user has cancelled the File Transfer and the client did invoke the user story US7-8.

- **Sent**:
  For File Transfer over MSRP; when receiving the final MSRP 200 OK.

  For File Transfer over HTTP; when receiving the provisional response for the SIP INVITE or a MSRP 200 OK for the chat message transferring the File Transfer via HTTP message body.

- **Delivered**:
  For File Transfer over MSRP without store and forward; same as sent.

  For File Transfer over MSRP with store and forward, when receiving the delivery notification

  For File Transfer over HTTP, when receiving the display notification

- **Failed:**

  When a notification that the file has been sent is not received and the device does not attempt to transfer the file anymore.

NOTE: The A-Party Operator shall ensure that duplication of messages within the Operator Messaging application is avoided within their network control.

R7-26-4   Notifications on delivery status information as defined in 7.3.2 shall be stored and forwarded in the store & forward server as specified in [RCC.07].

R7-26-5   The requirement R7-4-1 shall be implemented locally on the device. When transferring a large image using File Transfer (regardless of whether it is HTTP or MSRP based), as described in R7-5-1 a client shall check whether it is possible to reduce the size of the image. It may use following mechanism for this:

- The default scale factor F for the image shall be, $F = \min (1280/w, 1280/h, 1.0)$.

NOTE: The w (width) and the h (height) shall be used in pixels for the calculation.

- If the factor (F) is 1, the original image shall be transferred.

- Otherwise, the size of the image shall be reduced using following algorithm:
  - Scale both dimensions by the same factor F (same for width and height so the aspect ratio is maintained).
  - Compress as JPG with q=75%
  - Compare the new image size with the original, and only offer the possibility to send a resized image if the resulting file is smaller than the original one

R7-26-6   The requirement of user story US7-5 shall be implemented locally on the device.

R7-26-7   The file size limits required in the user story US7-6 are configured via the FT MAX SIZE,FT WARN SIZE and optionally FT MAX SIZE INCOMING parameters defined in section A.1.5 of [RCC.07].

R7-26-8   The technical implementation of the requirements of user story US7-7 is defined in section 3.5.4.2 and 3.5.4.8.3 of [RCC.07].

R7-26-9   The technical implementation of the cancellation of the File Transfer via MSRP as required in user story US7-8 is defined in section 3.5.4.3 of [RCC.07]. A File Transfer via HTTP shall be cancelled by interruption of the ongoing HTTP transfer flow at the time of user input.

R7-26-10 The technical implementation of File Transfer store and forward of user story US7-9 is defined in sections 3.5.4.7 and 3.5.4.8 of [RCC.07]. The file will remain stored for a period determined based on service provider policy fulfilling the requirement in R7-10-1

R7-26-11 The requirement of user story US7-10 is provided by a service provider policy on the messaging server or the HTTP content server.

R7-26-12 The requirements of user stories US7-11 and US7-12 shall be implemented locally on the device.

R7-26-13 The client's File Transfer auto accept behaviour defined in requirements of user story US7-13. is defined is controlled via the FT AUT ACCEPT parameter defined in section A.1.5 of [RCC.07].

The requirements of the user story US7-12 related to thumbnail preview are implemented for File Transfer over MSRP as defined in section 3.5.4 of [RCC.07] and for File Transfer over HTTP as defined in section 3.5.4.8 [RCC.07]. For File Transfer over MSRP to offline users (store and forward) thumbnails are not supported as defined in section 3.5.4.7.2 of [RCC.07].

R7-26-14 The requirements of user story R7-13-5 shall be implemented locally on the device.

R7-26-15 The transfer format for personal cards of user story US7-14 is defined in section 3.5.4.9.1 of [RCC.07].

R7-26-16 The requirement to resume interrupted File Transfers of user story US7-15 shall only be supported if File Transfer over HTTP is used as defined in section 3.5.4.8 of [RCC.07].

R7-26-17 The file size limits defined in the user story US7-16 are configured via the FT MAX SIZE parameter defined in section A.1.5 of [RCC.07].

R7-26-18 The user story US7-17 will be implemented as defined in section 3.5.4.1 of [RCC.07].

R7-26-19 The administration of File Transfers defined in user story US7-18, US7-19 and US7-20 in conjunction with the Common Message store is defined in section 3.5.4.8.6 of [RCC.07] for File Transfer over HTTP and [RCC.09] for File Transfer over MSRP.

R7-26-20 The requirements of the user stories from US7-22 to US7-25 are implemented via the Geolocation PUSH feature defined in section 3.10 of [RCC.07].

8 Audio Messaging

8.1 Description

The Audio Messaging feature allows RCS users to send Audio Messages to one or more RCS users at a time. Audio Messaging provides a new dimension of communication using the spoken voice to convey a message, allowing the recipient to listen to the message within their RCS interface. The handling of Audio Messaging files follows the rules of File Transfer as described in 'File Transfer incl. Geolocation Push', page 84, with the following refinements detailed below.

8.2 User Stories and Feature Requirements

US8-1 **As a user, I want to record and send an Audio Message to one or more of my RCS contacts at a time.**

R8-1-1 **OM** An RCS user with the Audio Messaging feature will be able to see which of their contacts can receive Audio Message files

NOTE: This is not based on a specific Audio Messaging capability, but the ability of the user to support RCS File Transfer as per 'Capability Discovery and Service Availability', page 25.

R8-1-2   It shall be possible to create and send an Audio Message in Chat and Group Chat conversations.

R8-1-3   Audio Messaging shall use File Transfer Store & Forward as defined in the File Transfer section, page 84.

R8-1-4   **OM** Audio Messaging service shall be capable of sharing exactly one Audio Message at a time.

R8-1-5   The Audio Message shall stay within limits of the File Transfer maximum size limits as defined in the File Transfer section, page 84.

R8-1-6   Interruptions in transfer of Audio Messages shall be handled as defined in the File Transfer section, page 84.

8.2.1   Sending Audio Messages

R8-1-7   Audio Messaging shall be available from the following service entry points:

R8-1-7-1 It shall be possible to create and send an Audio Message to an RCS contact from an existing 1-to-1 Chat or Group Chat session.

R8-1-7-2 A UI entry point of the contact card of an RCS contact shall allow the possibility of creating and sending of an Audio Message.

R8-1-7-3 A UI entry point of the messaging application shall allow the possibility of creating and sending of an Audio Message.

R8-1-7-4 A UI entry point from the call log or call history for RCS contacts shall allow the possibility of creating and sending of an Audio Message.

R8-1-8   **OM** Audio Messaging within a Group Chat shall transfer the Audio Message to all participants in the Group Chat.

NOTE: The sender side shall only send the file once over the network in this case.

R8-1-9   Audio Messages are created by a simple user interaction e.g. pressing or holding down a soft key or button to record the message. Once the soft key or button is pressed again or released, the message recording is terminated and the Audio Message may be presented to the sender for playback and/or sending.

R8-1-10   Audio Messaging shall support status notification per individual Audio Message (sender side).

R8-1-10-1 Audio Message transfer Pending – waiting to transfer the Audio Message to the network *(e.g. queuing on device)*.

R8-1-10-2 Audio Message transfer in progress – progress indicator that displays the transfer progress of the Audio Message transmission (from sending device to the network).

R8-1-10-3 Cancelled – presented when the sender has chosen to cancel the Audio Message sending during the transfer process.

R8-1-10-4 **OM** Audio Message delivered – transmission of the underlying File Transfer request has been successfully completed to the receiving network

NOTE: On receiving side, the Audio Message is either ready for download or has been downloaded.

R8-1-10-5 Audio Message downloaded: either an automatic or user-initiated download of the Audio Message is complete.

R8-1-10-6 Audio Message transfer failed - the sending device does not attempt to send the file to the network anymore (however sending may be re-triggered manually by the user).

R8-1-10-7 **OM** If the sending device is offline at the time a notification is delivered, notifications shall be stored on the network and forwarded once the sending device is online again.

R8-1-11 The sender shall be able to cancel the sending of an Audio Message before transfer is complete in accordance with requirements in the File Transfer section, page 84.

R8-1-12 If a sender is interrupted when they are recording an Audio Message, e.g. by an incoming call, then the recording shall stop, and the recording that was made shall be held in the device for later use.

R8-1-13 **OM** Sent Audio Messages shall be displayed and available for playback from a Chat Conversation which is associated with the participant(s) concerned.

R8-1-13-1 Audio Message recording shall be limited to a maximum length of ten minutes.

NOTE: Operators should consider this maximum length when setting the maximum file size supported by a File Transfer.

US8-2   **As a user, I want to be able to receive and listen to Audio Messages that are shared with me as part of a 1-to-1 Chat or Group Chat session.**

8.2.2   Notification on Receiving Audio Messages

R8-2-1   Notifications on reception of an Audio Message or preview icon shall be in line with the according requirement/s in the File Transfer section, page 84.

R8-2-2   A new Audio Message notification may look different from a new Chat Message or File Transfer notification in order to indicate it as being an Audio Message.

R8-2-3   Sorting of Chat and Group Chat Conversations on new incoming Audio Messages shall be in line with the according requirement/s in the File Transfer section, page 84.

R8-2-4   Selecting a visual notification shall trigger the appropriate action according to requirements in the File Transfer section, page 84.

8.2.3   Receiving Audio Messages

R8-2-5   **OM** For Audio Messaging, the rules of File Transfer Auto-Accept shall be in line with the according requirement/s in the File Transfer section, page 84.

R8-2-6   A user will be notified of Audio Messages sent to them whilst they were offline as soon as they become online again.

R8-2-7   Incoming Audio Messages from Contacts on the local device blacklist shall follow requirement R7-17-1.

R8-2-8   If the receiving device does not have enough space to store the incoming Audio Message, the regulations in requirement R7-15-2 shall apply.

R8-2-9   When a user plays back an Audio Message, it shall be played through the devices internal earpiece (telephone speaker) or through any other currently active audio output.

R8-2-10   There shall be an option for the user to switch the Audio Message playback to the handset's loudspeaker during   playback of the message.

US8-3   **As a user, I want to find my Audio Messages as part of the Chat Conversation with a specific contact or Group Chat.**

R8-3-1   It shall be possible to delete Audio Messages from a Conversation Thread according to requirements defined in the File Transfer section, page 84.

R8-3-2   Audio Messages shall be stored on a central operator storage in accordance with requirements defined the File Transfer section, page 84.

R8-3-3   Any Audio Messages shall be available on secondary devices and interfaces in accordance with requirements in the File Transfer section, page 84, and requirements specified in the Messaging for Multi-Device section, page 102.

R8-3-4   Audio Messages shall display an Audio Messaging specific icon in the Chat or Group Chat Conversation. The Audio Message icon shall provide a clear visual association with the Audio Message file type, so that a user shall easily identify it as a sound file and shall understand that clicking on it will lead to download and/or playback of an Audio Message.

   R8-3-4-1 This icon shall be visually distinguishable from a music file icon.

R8-3-5   Audio Messages shall be available for playback from the Chat or Group Chat conversation by sending and receiving parties.

R8-3-6   **OM** Audio Messages shall be saved in the conversation history along with Chat messages and files in a chronological order (as per ordering requirements specified in Chat and Group Chat sections).

R8-3-7   **OM** Audio Messages shall be displayed with information on the message's time and date and duration.

R8-3-8   **OM** In the case of Multi-Device, all requirements in the File Transfer section, page 84, and in the Multi-Device Messaging section, page 102 shall apply.

R8-3-9   **OM** Incoming Audio Messages shall be represented in Chat Conversations in accordance with requirements in the File Transfer section, page 84.

R8-3-10   Status notifications for incoming Audio Messages shall be supported in accordance with requirements in the File Transfer section, page 84.

8.3   Technical Information

8.3.1   Overview

An Audio Message is a specifically formatted file as per section 3.11.4.1 of [RCC.07] that is recorded on the sender's device using the Adaptive Multi-Rate (AMR) codec and exchanged with contacts via the File Transfer feature.

Audio Message is a File Transfer specific content type as specified in sections 3.5.1.1.2 & 3.5.4.9.2 of [RCC.07].

As such, Audio Messaging uses the procedure defined for File Transfer, as per [RCC.07] section 3.5, to exchange Audio Messages such as:

- Procedures for handling File Transfer interruptions and failures,
- Use of delivery notifications
- Rules for Auto-Accept
- Use of a local device blacklist
- Rules for managing shortage of space for local storage

Any contact having the File Transfer capability is seen as being compatible with Audio Messaging.

An Audio Message is identified via its format (section 3.11.4.1 of [RCC.07]) and shall be displayed accordingly by the UI. A specific icon, pre-embedded in the device, shall be associated to the Audio Message.

The content of the Audio Message can be played directly from the Chat application upon user action as indicated by the File Disposition being set to '*render*' (see section 3.11.4.2.2. of [RCC.07]).

The maximum length of an Audio Message is controlled by the service provider via the MAX RRAM DURATION parameter defined in section A.1.16 of [RCC.07]. The default value of this parameter is 600 seconds (10 minutes).

8.3.2   Requirements matching

R8-4-1   Audio Messaging (see requirement R2-2-1) shall be done as described in section 3.11 of [RCC.07].

R8-4-2   Requirement R8-1-1 relies on the RCS Capability Discovery feature as per 'Capability Discovery and Service Availability', page 25. No specific "Audio Messaging" capability (tag or service) is added for this feature. As Audio Messaging relies on the File Transfer mechanism, support of Audio Messaging is derived from the support of the File Transfer capability (refer to Table 33 of [RCC.07]).

R8-4-3   As a file can be sent to one or more contacts, requirement R8-1-2 is covered.

R8-4-4   As Audio Messaging is based on the File Transfer mechanism as per [RCC.07] section 3.5, it inherits from the File Transfer features.

- Store and forward is one of these features, hence, requirement R8-1-3 is covered.
- Interruptions in transfer of Audio Messages, hence, requirement R8-1-6 is covered.

R8-4-5   Requirement R8-1-4 shall be implemented locally on the device.

R8-4-6   To stay within limits of the File Transfer maximum size, as required in R8-1-5, the service provider shall configure the MAX RRAM DURATION parameter defined in section A.1.16 of [RCC.07] to an adequate value (i.e. a file encoded with the highest encoding quality for the maximum duration gives a lower resulting file size in Kilobyte than the FT MAX SIZE parameter value).

8.3.2.1   Sending Audio Messages

R8-4-7   Requirement R8-1-7 and its sub requirements are UI related and shall be implemented locally on the device.

R8-4-8   To fulfil requirement R8-1-8, Audio Messaging uses the procedure defined for File Transfer, as per 'File Transfer incl. Geolocation Push', page 84 section 2.7, to exchange Audio Messages to a group of contacts.

R8-4-9   Requirement R8-1-9 shall be implemented locally on the device.

R8-4-10   Requirement R8-1-10 and its sub requirements are covered via the File Transfer corresponding requirements (see 'File Transfer incl. Geolocation Push', page 84).

R8-4-11   Notifications on delivery status information as defined in R8-1-10-7 shall be stored and forwarded in the store & forward server as specified in section 3.3.4.1.5 [RCC.07]

R8-4-12   Requirement R8-1-11 is covered by the ability to cancel a File Transfer (see 'File Transfer incl. Geolocation Push', page 84).

R8-4-13   Requirement R8-1-12 shall be implemented locally on the device.

R8-4-14   As an Audio Message is a file, it shall be part of a Chat conversation as required by requirement R8-1-13. The content of the Audio Message can be played directly from the Chat application upon user action. This is indicated by the File Disposition being set to '*render*' (see section 3.11.4.2.2. of [RCC.07]):

- For FToHTTP, the File Disposition is located in the *file-disposition* attribute of the file-info element of the main file.
- For FToMSRP, the File Disposition is the File-Disposition SDP attribute as described in [RFC5547].

R8-4-15   Requirement R8-1-13-1 sets a limit of ten minutes for a recorded Audio Message. This is achieved by setting the MAX RRAM DURATION parameter defined in section A.1.16 of [RCC.07] to 600 (seconds).

8.3.2.2   Notification on Receiving Audio Messages

R8-4-16   As an Audio Message is a file (see 'File Transfer incl. Geolocation Push',
             page 84),

- Notifications shall be triggered, hence, requirement R8-2-1 is covered.
- Sorting as per requirement R8-2-3 is covered.
- Action resulting to the selection of a visual notification as per
  requirement R8-2-4 is covered.

R8-4-17   Requirement R8-2-2 shall be implemented locally on the device.

8.3.2.3   Receiving Audio Messages

R8-4-18   As an Audio Message is a file,

- It shall comply to the rules of File Transfer Auto-Accept as described in
  'File Transfer incl. Geolocation Push', page 84, fulfilling R8-2-5.
- The Store and forward mechanism as defined in 'File Transfer incl.
  Geolocation Push', page 84, will take care of requirement R8-2-6.
- The local blacklist mechanism as defined in 'File Transfer incl.
  Geolocation Push', page 84, will take care of requirement R8-2-7.
- Management of local storage space as required in 'File Transfer incl.
  Geolocation Push', page 84, will take care of requirement R8-2-8.

R8-4-19   Requirement R8-2-9 shall be implemented locally on the device.

R8-4-20   Requirement R8-2-10 shall be implemented locally on the device.

8.3.2.4   Audio Messages are part of the Chat Conversation with a specific contact or Group Chat

R8-4-21   As an Audio Message is a file,

- Deletion as required in 'File Transfer incl. Geolocation Push', page 84,
  is supported, fulfilling requirement R8-3-1.
- Storage in the Common Message store as defined in 'File Transfer incl.
  Geolocation Push', page 84, is supported, fulfilling requirement R8-3-2,
  R8-3-6 and R8-3-8.
- Availability of messaging content on other devices is supported as
  defined in 'Messaging for Multi-Device', page 102, fulfilling requirement
  R8-3-3 and R8-3-8.
- Availability of Audio Messages from the Chat and Group Chat
  conversation follows the one defined for File Transfer as required in 'File
  Transfer incl. Geolocation Push', page 84 fulfilling requirement R8-3-5.
- Audio Messages are represented in Chat Conversations, fulfilling
  requirement R8-3-9.
- Status notifications for incoming Audio Messages shall follow the status
  notification for incoming File Transfer request as required in 'File
  Transfer incl. Geolocation Push', page 84, and fulfilling requirement R8-
  3-10.

R8-4-22   Requirement R8-3-4 shall be implemented locally on the device. The Audio Messaging icon has to be embedded in the device.

R8-4-23   Regarding requirement R8-3-7, the message's time and date information are retrieved from the corresponding elements conveying the File Transfer request as per '1-to-1 Chat', 'Group Chat' and 'File Transfer incl. Geolocation Push'. When using the FToHTTP technology, the duration is retrieved from the <playing-length> element of the File Transfer via HTTP message body as defined in Table 76 of [RCC.07]. When using the FToMSRP technology, the duration may be derived by the Client via an extrapolation from the size of the AMR file.

R8-4-24   A file being identified as an Audio Message, according to its format defined in section 8.3 'Overview', page 99, shall be associated with a specific icon embedded in the Client.

9   Messaging for Multi-Device

9.1   Description

Multi-device Messaging allows users to view, receive, send and manage their Chat and xMS messages and RCS-based content from devices and interfaces other than the mobile device containing the primary SIM. Examples of devices include but are not limited to non-native interfaces on smartphones containing a SIM other than the primary SIM, tablets, laptops and connected watches. The devices may connect using any kind of data connection (e.g. mobile data, Wi-Fi).

9.2   User Stories and Feature Requirements

US9-1   **As an RCS user, I shall be able to connect to and access my RCS messaging services from all of my RCS-enabled devices and interfaces.**

R9-1-1   **OM** There shall be one single primary mobile device for the set of multiple devices belonging to a user. The user shall be addressed through the MSISDN associated with that single primary mobile device.

NOTE: The A-Party user is not necessarily aware that they are communicating with the B-Party's primary or secondary device or interface, nor does the functionality offered by the client necessarily have to vary between primary and secondary devices or interfaces.

US9-2   **As an RCS user with multiple RCS-enabled devices and interfaces I shall have available all the RCS messaging features that my service provider offers me on any of my devices or interfaces.**

As an RCS user with multiple devices, I shall always be able to receive communications on my primary device whenever under either cellular but no data coverage or cellular on data coverage regardless of the connectivity state of the secondary device(s) and interface(s

R9-2-1   **OM** an RCS user with multiple RCS-enabled devices and interfaces shall be able to perform all of the following actions on all of these devices and interfaces.

R9-2-2   Receive any of the services and any pertaining notifications listed in R9-3-4.

NOTE: Notifications for events belonging to a session which is already active will not be displayed on inactive devices / interfaces for that session nor on the active device / interface for that session if the user has the conversation window open and visible as per requirements **Error! Reference source not found.** and **Error! Reference source not found.**.

R9-2-3   Create and send any of the services listed in R9-3-4.

R9-2-4   Forward, delete and resend any of the services listed in R9-3-4.

R9-2-5   Reply to any of the services listed in R9-3-4.

R9-2-6   The primary mobile device shall also be able to perform the above actions R9-2-2 and R9-2-5 when connected to mobile cellular network only (i.e. when not connected to mobile data or Wi-Fi). In this case, it is acceptable that functional limitations of the services apply (e.g. SMS limitations apply to text messages).

NOTE: Requirement R9-2-6 is **OM** for operators using the Integrated Messaging configuration of IM CAP ALWAYS ON = 0 and / or FT HTTP CAP ALWAYS ON = 0.

US9-3   **As an RCS user with multiple RCS-enabled devices I shall have access to all my SMS/ MMS (or the equivalent Standalone Messages), RCS 1-to-1 Chat, RCS Group Chat messages, message states and RCS-related content (including files and events related to services listed in R9-3-4 for full list of services) from any of my devices and interfaces. I shall be able to manage all of the above messages and content in the same way on every device and interface (i.e. in the same way as on the primary device).**

R9-3-1   **OM** A user's complete set of conversation histories with their contacts shall be stored on a network repository

NOTE: This is the Common Message Store or CMS.

R9-3-2   This store shall be used for RCS-enabled devices and interfaces to be able to receive up-to-date message and conversation histories.

R9-3-3   **OM** All contents on the Common Message Store shall be kept for an MNO-configurable period of time and/or up to a configurable quota size per user.

R9-3-4   A conversation history shall include all events that a user has sent and received during that conversation on any of their devices and/or interfaces. An event can be a message, a piece of content, or a message or content notification associated with any of the following services the user has access to:

   R9-3-4-1 SMS,

   R9-3-4-2 MMS,

   R9-3-4-3 Chat messages,

   R9-3-4-4 Group Chat messages,

R9-3-4-5 Geolocations,

R9-3-4-6 vCards,

R9-3-4-7 Audio Messages,

R9-3-4-8 Files,

R9-3-5 All events belonging to services listed in R9-3-4 shall be made available to the user's other RCS-enabled devices even when these services and events are being managed by another application on the device.

R9-3-6 **OM** an RCS user with multiple RCS-enabled devices shall have the messaging features and contents that are available to them on the primary device also available on their secondary devices and interfaces.

R9-3-7 An RCS user with multiple RCS-enabled devices shall have their conversation history for all events belonging to the services listed in R9-3-4 available on all of their RCS-enabled devices and interfaces no matter which one was used to accept, send or manage the content. The message and content history shall be synchronised across all devices and interfaces as soon as possible.

R9-3-8 Events (messages, content, and notifications) shall be synchronised with devices and interfaces so that, for each conversation, the most recent events are synchronised first.

R9-3-9 Client implementations may choose to display (and therefore synchronise) only the most recent set of events (messages, contents associated with services listed in R9-3-4) on the devices and interfaces that were inactive for the conversation ("session") when that event occurred. In this case, it shall be clear to the user that they are able to download and access older events on that device or interface if desired and an option shall be made available to the user to do so.

R9-3-10 When File Transfer content is synchronised with devices and interfaces which were inactive for its associated session, the files themselves shall only be downloaded automatically in full when the Auto-Accept parameter value is set to "on". When the Auto-Accept parameter is set to "off", File Transfer events shall be represented by their thumbnails or preview icons, which the user can select in order to trigger the download of that particular file on that device ot interface. A "download all" option may be available to trigger the download of all the content of the displayed conversation history on that device if desired.

R9-3-11 **OM** an RCS user with multiple RCS-enabled devices and/or interfaces shall have all their events (messages, content, notifications associated with R9-3-4) available on all their registered and connected devices and interfaces as soon as possible.

R9-3-12 **OM** an RCS user with multiple RCS-enabled devices and/or interfaces shall receive notifications of new incoming events belonging to services listed in R9-3-4 on all their RCS-enabled devices and interfaces (if the incoming event is not part of an existing conversation or "session").

R9-3-13 **OM** An RCS user with multiple RCS-enabled devices and/or interfaces opening and responding to a new incoming event belonging to services listed in R9-3-

4 on one of their devices/interfaces shall trigger the clearing of the notifications for that same message on their other RCS-enabled devices and interfaces (i.e. if the message is read on one device/interface, it is marked as "read" on other devices and interfaces).

NOTE: Taking into account the potential concession of R9-3-6.

R9-3-14 **OM** The device or interface from which a Chat response to a Chat incoming event is sent, becomes the "active" device/interface for that session. The Chat response and any further Chat messages in that session will be made available in real-time on this active device/interface only as long as the session is active.

NOTE: Any other device/interface not active for that conversation ("session") becomes an "inactive" device/interface for that session).

R9-3-15 **OM** an RCS user with multiple RCS-enabled devices and/or interfaces shall perceive the reception of events belonging to services listed in R9-3-4 to be real time on any device or interface with the RCS app open.

R9-3-16 **OM** Events (e.g. messages, content, notifications) for that conversation (session) shall be available on inactive devices / interfaces for that conversation (session) as soon as the user tries to access the service associated with those events on that device or interface (i.e. all previously unsynchronised events for all conversations shall be downloaded as soon as a user opens the messaging app on an inactive device.

R9-3-17 **OM** If a period of inactivity controlled by the device is reached for a conversation session, then that session will be terminated. Any further messages, events and/or content sent to the user within that conversation shall be delivered again to all the user's registered devices/interfaces until a new session is established when the conversation is accepted on one of these devices or interfaces.

NOTE: Inactivity means no messages or notifications sent and received from that device / interface in the active session.

R9-3-18 **OM** When an RCS user (A-Party) transfers a file (or File Transfer-based event) to another RCS user (B-Party) who has multiple RCS-enabled devices and the File Transfer is sent outside of an existing Chat conversation (session), the notification will arrive on all of the B-Party's RCS-enabled devices and/or interfaces which are online.

R9-3-19 **OM** When an RCS user (A-Party) transfers a file (or File Transfer based event) to another RCS user (B-Party) who has multiple RCS-enabled devices and interfaces inside an existing conversation (session), then the preview icon or file shall arrive on the B-Party's active device or interface depending on the Auto-Accept setting (i.e. ON/OFF).

R9-3-20 **OM** If an RCS user (A-Party) is in an active session with another RCS user (B-Party) with multiple RCS-enabled devices and the B-Party is using a mobile (i.e. primary) device to chat, it is possible that the B-Party loses their data connectivity. In this case, the conversation shall persist between user A and user B on the B-Party's mobile device following the rules of Integrated Messaging (e.g. relying on Store and Forward or falling back to SMS) until the session ends.

R9-3-21   An RCS user who has chosen to leave a Group Chat on one of their connected devices or interfaces shall stop receiving any further updates from that Group Chat on their other devices and interfaces.

R9-3-22   **OM** Any events (messages, content and notifications) associated with services listed in R9-3-4 that are deleted by a user on any of his RCS-enabled devices or interfaces shall also be deleted from the Common Message Store and their other RCS-enabled devices and interfaces.

   R9-3-22-1 When deleting an event, the user may be warned that it will also be deleted from thier other devices and interfaces. A "don't ask again" prompt may be offered.

R9-3-23   **OM** Any content that has been deleted from the Common Message Store by the system (e.g. content expiry) shall not be deleted from any of the user's devices or interfaces.

R9-3-24   **OM** Any content deleted or removed from a device or interface that was not explicitly deleted by a user action or consent shall not be deleted from the Common Message Store (nor any other device or interface)

NOTE: SIM swap shall not delete locally stored content on the device. Factory reset shall not cause deletion on the Common Message Store.

R9-3-25   An RCS user with multiple RCS-enabled devices and interfaces shall be able to log out of an identity on a secondary device or interface and another user will be able to log into that device or interface with a different identity.

R9-3-26   **OM** An RCS user with multiple RCS-enabled devices or interfaces shall be able to start a messaging conversation (Chat and/or xMS) from one of their devices / interfaces and continue it from any of their other devices. / interfaces.

R9-3-27   **OM** The user shall continue the conversation on another device or interface by opening the messaging thread associated with the conversation they would like to pursue on that device / interface. As soon as they respond to a message or piece of content on this newly used device/interface, it becomes the active device / interface for that messaging session and messages / content are no longer delivered automatically to the previously active device / interface.

US9-4   **As an RCS user, I can have multiple conversations active at the same time using different devices and / or interfaces (e.g. I am chatting to Alice using my mobile, whilst at the same time chatting to Bob using my tablet).**

R9-4-1   **OM** It shall be possible for an RCS user A with multiple connected RCS-enabled devices and / or interfaces to have multiple conversations with different Contacts at the same time from the same or from different devices / interfaces

NOTE: A device or interface is active for a specific session, not for a generic RCS service.

9.3 Technical Information

9.3.1 Overview

R9-5-1   Provisioning

- The Primary device shall be provisioned as per 'Differences to previous versions

RCS Common Core 1.1 is a maintenance update that provides further clarification to existing requirements. The technical information has also been updated to align with RCS 5.3 (see section 1.5 of [RCC.07])

9.3.2 Summary of Changes

- Device Provisioning
  - Alignment with [RCC.14] and [RCC.15]
- Capability Discovery and Service Availability
  - Clarification on the behaviour of the CAPABILITY VALIDITY timer (see requirement R3-3-7-5-6)
- Operator Messaging
  - Clarification to the Integrated Messaging requirements for proposed message selection (see section 4.2.1.1)
  - Clarification on the DELIVERY TIMEOUT behaviour and technology selection logic for Integrated Messaging variant 1 (see section 4.2.3)
- One-to-One Chat
  - Additional requirements for handling unseen messages and files (see requirements for user story US5-13).
- Group Chat
  - Additional requirement introduced to allow the user to see who set up the Group Chat (see requirement R6-6-2).
- IP Voice Call
  - Additional user story included to allow the user to see what the call bearer is in use for the call (see requirements for user story US10-12).
- Introduction of LED notifications for received one to one, group chat and file transfer messages
- Editorial clarifications to Audio Messaging and Messaging for Multi-device sections.

NOTE: Further improvements to the Messaging for Multi-device section (such as introduction of synchronisation triggers) are expected once the work of the Multi-device Messaging Operator Interest Group has been concluded

- Device Provisioning', page 10.
- Secondary devices or interfaces shall be provisioned as R2-11-3 (page 20).
- Configuration of secondary devices shall be done as described in section 2.3.3.4 of [RCC.07].

R9-5-2   Addressing and Routing

- Each device or interface that is registered to the IMS is distinctly identified either via a GRUU or via a sip.instance (refer to sections 2.4.2 and 2.11.3 of [RCC.07]).

R9-5-3   Capabilities handling

- The capability discovery shall be performed as specified in section 2.6 of [RCC.07].
- A service provider allowing SIP OPTIONS for the Capability exchange (TE1 defined in section R3-3-1) shall use an Options Application Server as presented in section 2.6.1.1.5 of [RCC.07] to allow presenting an aggregated view of the contact's available services to the requester.

R9-5-4   Message management

- Unless clearly stated otherwise, all new messaging requests are forked to all registered RCS clients (devices or interfaces) of the intended callee (see requirement R9-3-12) as per IMS rules.
- Standalone messages shall be processed as described in section 3.2.4.5 of [RCC.07].
- A 1-to-1 Chat invitation shall be processed as described in section 3.3.4.1.7 of [RCC.07].
- A Group Chat invitation shall be processed as described in section 3.4.4.1.8 of [RCC.07].

R9-5-5   Device or interface switching

- A user can change from one client to another during a session (see section 3.3.4.1.7 of [RCC.07]).

R9-5-6   Central storage and synchronization

- Fulfilling the requirements of this section requires a service provider to deploy a Common Message Store and a synchronization client on each device or interface (see [RCC.09] and [RCC.11]).
- Standalone Messages interactions with the Common Message Store shall be processed according to sections 3.2.1.5, 3.2.4.5 and 3.2.4.7 of [RCC.07].
- 1-to-1 chat messages interactions with the Common Message Store shall be processed according to sections 3.3.4.4 and 3.3.6.6 of [RCC.07].
- Group Chat messages interactions with the Common Message Store shall be processed according to section 3.4.4.1.8 of [RCC.07].
- Specific content generated by Extension (see 'API Extensions', page 136) shall not be stored in the Storage Server as per section 3.12.4.2.1.1 of [RCC.07].
- The Message Store client shall follow the clarifications given in section 3.2.6.2 of [RCC.07].
- The Message Store client shall follow the synchronization guidelines defined in section 3.2.6.2.8 of [RCC.07].

- The Message Store client shall apply the mechanism to correlate legacy SMS/MMS messages with the same messages already stored in the Common Message Store as per sections 3.2.4.7.1 to 3.2.4.7.4 of [RCC.07].

9.3.3   Requirements matching

R9-5-7   Multi-device Messaging (see user story US9-1) shall be done as described in sections 3.2, 3.3, 3.4 and 3.5 of [RCC.07].

R9-5-8   Requirement R9-1-1 is mainly ensured via the devices or interfaces implementation that knows whether this is a primary or secondary device (see definitions). As specified in section 2.5.1 of the first-time configuration of the RCS capable device or interface is linked to the primary SIM card of the user. Table 12 of also indicates that the MSISDN of the primary SIM is used to derive the user's main identity.

R9-5-9   Requirement US9-2 is controlled through provisioning (see 'Differences to previous versions

RCS Common Core 1.1 is a maintenance update that provides further clarification to existing requirements. The technical information has also been updated to align with RCS 5.3 (see section 1.5 of [RCC.07])

9.3.4   Summary of Changes

- Device Provisioning
  - o Alignment with [RCC.14] and [RCC.15]
- Capability Discovery and Service Availability
  - o Clarification on the behaviour of the CAPABILITY VALIDITY timer (see requirement R3-3-7-5-6)
- Operator Messaging
  - o Clarification to the Integrated Messaging requirements for proposed message selection (see section 4.2.1.1)
  - o Clarification on the DELIVERY TIMEOUT behaviour and technology selection logic for Integrated Messaging variant 1 (see section 4.2.3)
- One-to-One Chat
  - o Additional requirements for handling unseen messages and files (see requirements for user story US5-13).
- Group Chat
  - o Additional requirement introduced to allow the user to see who set up the Group Chat (see requirement R6-6-2).
- IP Voice Call
  - o Additional user story included to allow the user to see what the call bearer is in use for the call (see requirements for user story US10-12).
- Introduction of LED notifications for received one to one, group chat and file transfer messages
- Editorial clarifications to Audio Messaging and Messaging for Multi-device sections.

NOTE: Further improvements to the Messaging for Multi-device section (such as introduction of synchronisation triggers) are expected once the work of the Multi-device Messaging Operator Interest Group has been concluded

R9-5-10 Device Provisioning', page 10, for example the CHAT AUTH parameter). More specifically, Secondary clients and interfaces are handled as per sections 2.11.2 and A.1.10 of [RCC.07]. In addition, when it is required that secondary devices send an SMS or MMS, or can receive SMS and MMS as messages (as opposed to receiving them only due to synchronisation with the message store) procedures defined in [RCC.10] shall apply. To interwork with SMS/MMS, the technology shall follow the IM CAP NON RCS parameter. If the IM CAP NON RCS parameter is not set, by default the device shall use standalone messages.

NOTE: When the Chat technology relies on OMA SIMPLE IM and the IM CAP NON RCS is set to 1, it is up to the service provider to realise the SMS and MMS gateway.

R9-5-11 With the adequate configuration, devices based on implementations following 'File Transfer incl. Geolocation Push' (page 84), '1-to-1 Chat' (page 61), 'Group Chat' (page 71) and 'Audio Messaging' (page 95), will be able to perform requirements R9-2-1, R9-2-3, R9-2-4 and R9-2-5. The network as described in section 9.3 > Overview will allow forking, adding the ability for requirement R9-2-2.

R9-5-12 User story US9-3 is covered via the endorsement of OMA CPM as defined in [RCC.09], [RCC.11] and section 3.2.4.7 of [RCC.07].

R9-5-13 Requirements R9-3-1, R9-3-2, R9-3-3 and R9-3-4 are provided by the use of the Common Message Store and the synchronization of clients as described in section R9-5-6 to complement the information received in live communications.

R9-5-14 SMS (R9-3-4-1), MMS (R9-3-4-2), Chat messages (R9-3-4-3), Group Chat messages (R9-3-4-4) and files (R9-3-4-8) are processed according to [RCC.09], [RCC.10] and [RCC.11]. As vCard (R9-3-4-6) and Audio Messages (R9-3-4-7) are seen as File Transfer specific Content (see section 3.5.1.1. of [RCC.07]), they are also covered. Geolocation push (R9-3-4-5) based on File Transfer and Chat is also covered.

R9-5-15 Requirement R9-3-5 shall be implemented locally on the device. SMS and MMS are stored in the network and are processed according to the MNO's policy.

R9-5-16 The requirement R9-3-6 shall be implemented locally on the device.

R9-5-17 Triggers for synchronization as defined in section 3.2.6.2.8 of [RCC.07] are defined to cover requirement R9-3-6. See also section R9-5-6.

R9-5-18 Requirement R9-3-8 can be covered with the current RCS specifications (see [RCC.07]). It is up to the device implementation to fetch messages starting with the most recent one.

R9-5-19 Requirement R9-3-9 shall be implemented locally on the device.

R9-5-20   Requirement R9-3-10 shall be implemented locally on the device. File Transfer and thumbnails procedures are covered in 'File Transfer incl. Geolocation Push', page 84.

R9-5-21   Requirement R9-3-11 is covered for registered and connected devices. As described in section R9-5-4, as long as there is no explicitly chosen active device, all devices will receive the incoming requests.

R9-5-22   Requirement R9-3-12 fully covered in RCS when the messaging realization is based on OMA CPM (see [RCC.11]). With a strict messaging realization based on OMA SIMPLE IM a network internal proprietary solution is required, since OMA SIMPLE IM's multi-device approach does not support the requirement for Group Chat.

R9-5-23   Requirement R9-3-13 is mainly covered due to the synchronization with the Common Message Store as described in section R9-5-6. In addition, a device can know if a request has been accepted on another device due to the reason header provided in the SIP CANCEL as described in section 2.11.1 of [RCC.07] or SIP BYE as described in sections 3.4.1.7.1, and 3.4.4.1.8.1 of [RCC.07].

R9-5-24   Requirement R9-3-14 is covered as described in section 3.3.4.1.7 of [RCC.07].

R9-5-25   For requirement R9-3-16, the link between the app and the RCS stack is up to implementation. Note that not all kinds of events can be delivered in real time due to the limitations explained in section 9.3, 'Overview'. For instance only the 'active' device will receive the messages of the ongoing session. There is no real time synchronization with the Common Message Store. However it is up to the client to give the user the illusion that they are updated in a timely manner due to the guidelines defined in section 3.2.6.2.8 of [RCC.07].

R9-5-26   Requirement R9-3-17 is covered by the synchronization guidelines defined in section 3.2.6.2.3 of [RCC.07].

R9-5-27   Requirement R9-3-18 is covered as per section R9-5-4.

R9-5-28   Requirement R9-3-19 is covered as described in section R9-5-4 (forking to all registered devices). Disabling Auto-accept is achieved by provisioning the FT AUT ACCEPT parameter to 0 (see Table 86 in Section A.1.5 of [RCC.07]).

NOTE: A user may override the auto-accept with a local setting. This local setting will be valid regardless of the session state.

R9-5-28-1 When using the FToHTTP technology, the requirement R9-3-20 is covered by the procedures of section 3.5.4.8.3.1 of [RCC.07], since there is already an established chat session, it is required to reuse it to convey the File Transfer via HTTP message body content. When receiving the File Transfer request the receiving device shall follow the rules of 'File Transfer incl. Geolocation Push', page 84, related to auto-acceptance (see FT AUT ACCEPT parameter in Table 86 of [RCC.07]).

R9-5-28-2 When using the FToMSRP technology, the requirement R9-3-20 is currently not covered in the RCS specifications as, according to section R9-5-4, the File Transfer request will be forked to all devices. The devices that are not in an active chat session have no way to know that

another device is still in a session thus allowing to have a special processing regarding auto-acceptance. A service provider may implement a proprietary solution to cover this requirement.

R9-5-29   Requirement R9-3-20 shall be fulfilled based on service provider policy.

R9-5-30   Requirement R9-3-21 is partially covered (not feasible in all situations) by the procedures of section 3.4.4.1.3.1 of [RCC.07]. The requirement can only be covered in case the client where the explicit departure is triggered is connected to the focus (see 'Group Chat', page 71).

R9-5-31   Deletion as required by R9-3-22 is one of the actions covered by the synchronization with the Common Message Store (see section 6.3.5 of [RCC.09]).When a user wants to delete information related to a conversation from one of their devices, the device on which the action is triggered shall store\Deleted flag on the related objects in the Common Message Store as per Annex B.4.5 of [RCC.07].

R9-5-32   Requirement R9-3-22-1 shall be implemented locally on the device.

R9-5-33   Requirements on deletion

    *R9-5-33-1*Requirement R9-3-24 shall be implemented by the system by simply deleting the pertaining objects from the Common Message Store and by the device not deleting messages on the device that it no longer receives after synch with the Common Message Store.

    *R9-5-33-2*Requirement R9-3-24 shall be implemented locally on the device by the device not deleting on the device or in the Common Message Store any content that the user did not specifically select for deletion.

R9-5-34   Requirement R9-3-25 shall be implemented locally on the device.

R9-5-35   Requirement R9-3-26 is covered by the procedures described in section 3.3.4.1.7 of [RCC.07].

NOTE: To be sure to receive all messages of the conversation, the switching device would have to keep synching with the CMS until the new session is established.

R9-5-36   Requirement R9-3-27 is covered by the procedures described in section 3.3.4.1.7 of [RCC.07].

R9-5-37   Requirement US9-4 and R9-4-1 are covered by the RCS infrastructure. The IMS and Application Server infrastructure used for RCS, does not put technical restrictions on the number of parallel sessions nor does it restrict such parallel sessions to a particular device. Limitations on parallel sessions may be imposed by an operator policy applied in the network or due to resource constraints in device or network

10 IP Voice Call

10.1 Description

IP Voice Call describes the behaviour of voice calls over an IP bearer which can be delivered via Voice over LTE call (VoLTE, as defined in GSMA permanent reference document IR.92) or via RCS IP Voice Call (as per sections 2.2.1 and 3.8 of [RCC.07]).

Both calling technologies are exclusive to each other and cannot be operated in parallel on one device.

RCS IP Voice Call in particular replaces one or both legs of a CS Call or VoLTE Call in order to extend voice calling to situations where neither of these two voice bearers is available. An RCS IP Voice Call leg shall break in/out to a CS or VoLTE network as required.

Therefore RCS IP Voice Call allows voice calling capabilities for RCS users either on secondary devices (e.g. tablet, PC, IP TV etc.) or on primary devices (i.e. mobile phones) when cellular bearer is not available but data connectivity is available over Wi-Fi.

RCS IP Voice Call has to be activated and configured by the individual operator during the RCS provisioning process of the device.

This section describes the User Stories and Service Requirements for the core IP Voice Call service and all features around that core.

10.2 User Stories and Feature Requirements

US10-1 **As a user, I (i.e. user A) want to make and receive voice calls with my 4G supporting primary device while my device is still registered on a 4G network bearer.**

    R10-1-1 'Voice over LTE' calls shall be supported on primary devices supporting 4G data.

US10-2 **As a user, I (i.e. user A) want to make and receive voice calls with my primary device in areas without sufficient cellular reception.**

    R10-2-1 'RCS IP Voice Call' services should be available from primary devices.

    R10-2-2 RCS IP Voice Call on primary devices may be delivered on a best-effort basis, i.e. no commitment on quality of service (QoS) or mobility may be offered by the MNO.

    NOTE: RCS IP Voice Call aims at providing a high-quality voice call to users.

US10-3 **As a user, I (i.e. user A) want to make and receive voice calls with my secondary devices (i.e. which do not have cellular voice call capabilities).**

    R10-3-1 'RCS IP Voice Call' service should be available from secondary interfaces.

    R10-3-2 RCS IP Voice Call on secondary devices may be delivered on a best-effort basis, i.e. no commitment on quality of service (QoS) or mobility may be offered by the MNO.

    NOTE: RCS IP Voice Call aims at providing a high-quality voice call to users.

US10-4 **As a service provider, I want RCS IP Voice calls and Voice over LTE calls exclusive to each other so that VoLTE is used whenever supported even if RCS IP Voice call is technically possible.**

R10-4-1 For the cases that a primary device is under a network that supports both VoLTE and RCS IP Voice call, VoLTE calls prevail.

NOTE: Such cases shall not exist since RCS IP Voice call is per definition only available on primary devices in case NO cellular coverage is given.

US10-5 **As a service provider, I want the RCS IP Voice Call service not as an end-to-end service but only as coverage / interface extension service breaking in/out to standard CS/VoLTE call connected legs.**

R10-5-1 **OM** NNI for calls using RCS IP Voice Call on either leg (even if both originating and terminating legs are RCS IP Voice Call) shall be based on either the existing or to be built interface for CS and / or VoLTE.

US10-6 **As a service provider, I want to configure one of the following options for RCS IP Voice Call on a <u>primary device</u>:**

a) No RCS IP Voice Call availability.

b) RCS IP Voice Call is available when connected to Wi-Fi without cellular reception.

R10-6-1 The MNO shall be able to activate or not activate the RCS IP Voice Call service using the provisioning process of a primary device.

R10-6-2 If activated during the provisioning process, primary cellular devices shall only support RCS IP Voice Call over a Wi-Fi data bearer.

NOTE: A RCS IP Voice call that is connected on a Wi-Fi bearer shall remain connected as long as the Wi-Fi bearer is available and the users decide to maintain the call.

US10-7 **As a service provider, I want to configure one from the following options for RCS IP Voice Call on any secondary device:**

a) No RCS IP Voice Call support.

b) RCS IP Voice Call is available on any access e.g. Wi-Fi and cellular data.

R10-7-1 The MNO shall be able to activate or not activate the RCS IP Voice Call service using the provisioning process of a secondary device.

R10-7-2 If activated during the provisioning process, secondary devices which are data only devices shall support RCS IP Voice Call *either* over non-cellular access only *or* non-cellular access and cellular data bearer based on individual configuration of the service provider.

US10-8 **As a service provider, I may want to allow multi-party voice calling utilising CS / VoLTE / RCS IP Voice Call.**

R10-8-1 Multi-party voice calls may be offered by a service provider utilising any available call bearer (CS / VoLTE / RCS IP Voice).

US10-9 **As a user, I want to use emergency call services over RCS IP Voice Call as far as country specific regulatory requirements require.**

R10-9-1 Emergency call services shall be supported as regulatory requirements exist today or are expected to come into place in the relevant territories.

US10-10 **As a service provider, I may want to allow supplementary services for RCS IP Voice Calls such as Calling Line Identification Presentation (CLIP), Call Waiting (CW), Call Hold, Call Forward Busy (CFB), Call Forward Unreachable, Call Forward No Reply and Conference Call.**

R10-10-1 Supplementary Services such as Calling Line Identification Presentation (CLIP), Call Waiting (CW), Call Hold, Call Forward Busy (CFB), Call Forward Unreachable, Call Forward No Reply and Conference Call may be offered by a service provider during a RCS IP Voice Call.

US10-11 **As a user, I want to use DTMF tones during my RCS IP Voice calls.**

R10-11-1 DTMF may be supported within the RCS IP Voice call in both the sender's and receiver's experience.

US10-12 **As a user, I want to definitely know which call bearer (Cellular/ Wi-Fi) is used for voice service.**

R10-12-1 The device shall inform the user in a non-intrusive way about the Wi-Fi voice bearer before making or receiving a voice call.

10.3 Technical Information

10.3.1 Overview

Voice over LTE (VoLTE) is a major Technical Enabler for delivering voice call service when in LTE coverage as defined in [PRD-IR.92].

Note that consistently with section 2.2.1 of [RCC.07], a device providing both VoLTE/ViLTE and RCS can:

- Follow a single registration (target solution) for both RCS and VoLTE/ViLTE services. Note in this configuration, the RCS stack works in RCS-VoLTE mode.

- Follow a dual registration approach (transition solution) where RCS services use a separate registration from the VoLTE/ViLTE one in separate instantiations of the stack. In this case, the RCS stack shall work in RCS-CS mode.

- Follow a single registration for both RCS and VoLTE/ViLTE services when in the home network and follow a dual registration approach when roaming.

For RCS IP Voice call, main feature requirements can be realised by considering the sections 2.2.1 and 3.8 of [RCC.07].

Note that as per [RCC.07], it is not possible for a device to simultaneously allow VoLTE and RCS IP voice call. In case both VoLTE/CS and RCS IP Voice Call capabilities are available simultaneously (dual registration case), VoLTE/CS shall prevail.

NOTE: The RCS IP Voice Call term is equivalent to the Wi-Fi-Voice term. In this section, the term RCS IP Voice call is used.

10.3.2   Technical Implementation of User Stories and Service requirements

R10-13-1 The requirements for user story US10-1 shall be implemented as per [PRD-IR.92]. For the use cases and requirements where the companion video service to VoLTE is mentioned, [PRD-IR.94] shall be followed.

R10-13-2 The requirements for user stories US10-2 and US10-3 shall be realised as described in sections 2.2.1 and 3.8 of [RCC.07].

It is left up to the service provider policy and implementation to decide how an incoming call terminates using CS, VoLTE or RCS IP Voice Call. The RCS telephony tag as defined in section 2.4.3 of [RCC.07] may be used for this.

- Note the parameter Voice_Domain_Preference_E_UTRAN described in section 2.9.1 of [RCC.07] shall be taken into account.

- The possibility to provide QoS of any kind is down to service provider's policy and implementation.

R10-13-3 A device capable of making VoLTE calls which is also RCS capable shall operate in RCS-VoLTE mode as described in section 2.2.1 of [RCC.07] bearing in mind the implications in terms of registration and APN behaviour (user story US10-4). For the case of a transition period that a device provides both RCS and VoLTE clients as completely separate implementation, the note of the same section becomes relevant.

R10-13-4 For the requirements of user story US10-5, since RCS IP Voice Call service is not an end-to-end service, service identification is not performed as for end to end services. When connecting through a radio technology where RCS IP Voice Calls may be supported (see section A.1.14 of [RCC.07]), NOT include the +g.gsma.rcs.ipcall feature tag in the SIP OPTIONS requests and responses for capability exchange as it does not support end-to-end RCS IP Voice calls. A client shall also ignore those capabilities when received.

- Given that on the interconnect, end to end RCS IP Voice Calls are not allowed (as the operator only offers the option VoIP Breakout), the +g.gsma.rcs.ipcall feature tags should be filtered out from the OPTIONS request and responses. If based on the removed capabilities end to end RCS IP Video Calls were possible and such calls are allowed on the interconnect the +g.gsma.rcs.ipvideocallonly feature tag is added to the OPTIONS requests and responses.

- In order to identify that a Voice Call should not be routed end to end over IP and do break-out, a client shall not include the +g.gsma.rcs.ipcall feature tag in the Contact and Accept-Contact header fields of the SIP INVITE requests that it sends. For an outgoing RCS IP Voice Call, a common core 1.0 client shall only include the MMTEL ICSI in the Accept-Contact and Contact header fields (that is +g.gsma.rcs.ipcall and +g.gsma.rcs.ipvideocallonly are not included). The network shall use this as an indication that the call has to be broken out according to its local policies.

- RCS IP Voice Call shall not be available at NNI level (except in the case of a downgrade of a RCS IP Video Call as described in section 3.9.4 of [RCC.07]). NNI rules are based on CS/VoLTE NNI rules. Therefore there shall only be a

single NNI for Voice over IMS without differentiation between VoLTE and RCS IP Voice.

R10-13-5 For requirements of user stories US10-6 and US10-7, following configuration parameters (defined in Annex A of [RCC.07] and being specific to RCS IP Voice Call) shall be considered:

Configuration parameter	Description
PROVIDE RCS IP VOICE CALL	Service Provider Configurable to either 0 (i.e. completely disabled) or 1 (i.e. Wi-Fi only for primary devices and any access for secondary devices)
RCS IP VOICE CALL BREAK OUT	Service Provider Configurable

Table 28: RCS IP Voice Call configuration parameters

Based on the definition of these parameters in [RCC.07] this leads to the following valid combinations:

PROVIDE RCS IP VOICE CALL	RCS IP VOICE CALL BREAK OUT	Behaviour
0	N/A	Only cellular voice call service available no voice service when only in Wi-Fi coverage for primary devices and no voice service for secondary devices
1	1	Whenever in cellular coverage only the applicable cellular voice call service is available (i.e. no user choice), Wi-Fi voice service with breakout when in Wi-Fi coverage without cellular coverage on primary device

Table 29: RCS IP Voice Call configuration parameters combinations

R10-13-6 The enabling/disabling of the RCS IP Voice Call functionality on a secondary device (requirement R10-7-1) shall be realised through the related configuration parameter (i.e. PROVIDE RCS IP VOICE CALL) as described in [RCC.07].

R10-13-7 Multi-party call establishment rules are up to the policy of the service provider (user story US10-8) and shall be developed as described in section 2.3.3 of [PRD-IR.92].

R10-13-8 For the requirements of US10-9 RCS IP Voice emergency call services are subject to local regulation and service provider policies (as per section 2.2.1 of [RCC.07].

    R10-13-9 Regarding Supplementary Services (user story US10-10):

- Availability is down to service provider policy.

- Services that can be implemented on the device/client without network interaction shall be always implemented (i.e. Calling Line Identification Presentation (CLIP), Call Waiting (CW), and Call Hold).

NOTE: Configuration of supplementary services e.g. Call Forward Busy (CFB), Call Forward Unreachable, Call Forward No Reply and Conference Call shall only be possible from the primary device and only when it is in cellular coverage. Based on operator policy the supplementary services configuration may however be applied to all types of calls targeted to all types of devices (i.e. primary or secondary).

    R10-13-10 The requirements of US10-11 shall be implemented locally in the device.

    R10-13-11 Requirement R10-12-1 shall be implemented locally on the device.

11 IP Video Call

11.1 Description

Video calling is an important feature to evolve the operators' calling experience. Video calling will offer a sustainable and reliable video calling experience across multiple devices and different bearers triggered by a single video calling 'button'. Widespread reach across user locations and use cases will be ensured. This section describes the User Stories and Service Requirements for the core IP Video Call service and all features around that core.

11.2 User Stories and Feature Requirements

US11-1 **As a user, I (i.e. user A) want to initiate from various call related entry points (e.g. contact card, call logs) a lip sync IP video call to a contact (i.e. user B).**

    R11-1-1 **OM** From any call related entry point on a device a user should be able to initiate an IP video call to a contact whenever it is possible.

    R11-1-2 A network operator may connect an IP video call to a secondary interface.

US11-2 **As a user, I (i.e. user A) want to be assured that in case I press the button to initiate an IP video call to a contact (i.e. user B) the "IP video call" can actually happen end-to-end with a high likelihood so that I do not get disappointed or a perception of an unreliable service.**

    R11-2-1 **OM** The "IP video call" capability shall be refreshed once a user accesses the screen view containing the IP video call entry point.

    R11-2-2 Capability polling will follow the procedure as described in 'Capability Discovery and Service Availability', page 25.

R11-2-3   In case the A-Party device does not provide a camera (hardware limitation), the IP Video Call capability is not given. There shall not be a service entry point for upgrading to video.

R11-2-4   In case the B-Party device does not have a camera built in (neither front facing nor rear facing) but is able to display video in 352x288 pixel resolution @ 15 fps (or better), the A-Party shall be able to trigger a 1-way IP Video Call to B-Party device. B-Party obviously shall have no option to activate the video channel back to A-Party.

R11-2-5   In case the B-Party device does not have a camera built in (neither front facing nor rear facing) and is not able to display video in 352x288 pixel resolution @ 15 fps (or better), the A-Party shall not be able to trigger an IP Video Call to B-Party.

US11-3   **As a user, I (i.e. user A) want to be able to initiate an IP video call using a single "start video call" button, irrespective of network bearer used.**

R11-3-1   There shall be only one button displayed to the user to initiate an IP video call irrespective of the actual network bearer

NOTE: CS Video Call shall not be offered as part of this one-button experience.

R11-3-2   The network operator may configure on which network bearers an IP video call shall be made available.

US11-4   **As a user receiving an incoming IP video call, I (i.e. user B) want to decide whether to:**
   a) Decline the call which leads to an "unanswered video call" indication to the calling party (i.e. user A),
   b) Accept the call without transmitting my camera view, or
   c) Accept the call with transmitting my camera view.

R11-4-1   **OM** The receiver shall be able to accept or decline an incoming IP video call.

R11-4-2   Upon decline by the receiver, the incoming call shall be handled as configured in the specific call forwarding settings for (video) calls. This depends on B-Party operator specific enablers on whether this is offered and how it is handled (e.g. with support of video mail box or voice mail box).

R11-4-3   **OM** For acceptance the receiver shall have the option to answer the incoming IP video call with or without transmitting their own camera view back to the sender.

US11-5   **As a user answering an incoming IP video call, I (i.e. user B) want the incoming voice automatically on a connected headset. If there is no headset connected, then play the voice on my external loudspeaker.**

R11-5-1   When an upgrade to an IP video call is accepted, the audio part shall be played either via a connected headset (if connected) or via the external loudspeaker (if no headset connected).

US11-6   **As users in an IP video call, we want to experience in ideal end-to-end coverage situation a high quality and lip sync video experience.**

R11-6-1 **OM** The IP video call should be connected with guaranteed video quality when available (operator preferred connectivity method).

R11-6-2 **OM** If guaranteed video quality is not available, the IP video call should be connected with at a minimum best effort video quality (operator less preferred connectivity method).

US11-7 **As users in an IP video call, we want to continue the transmission of the video as long as possible under changing connectivity situations delivering a high quality and lip sync experience.**

R11-7-1 **OM** In case during an ongoing IP video call one user moves out of LTE coverage, the transmission of the video media part of the IP Video Call should be maintained if network conditions allow.

US11-8 **As users in an IP video call with insufficient bandwidth, I want to be made aware of when the video stream is interrupted until bandwidth is improved and the video transmission is continued.**

R11-8-1 **OM** When connectivity during an IP Video Call is insufficient to deliver a decent video stream, the video stream displayed to the user shall be interrupted and a visual indication shall be provided that connectivity is insufficient and the video continues when connectivity conditions are improved.

NOTE: Preferably a visual icon is used instead of an "error message".

US11-9 **As users in an IP video call, we want to continue the call as voice call only in case video cannot be maintained for any reason anymore, so that the call does not drop entirely.**

R11-9-1 **OM** In case during an ongoing IP video call one user loses the ability to transmit video completely (i.e. loss of data), the call should continue as voice call without video.

*R11-9-1-1***OM** If it is not possible to continue the call as (a) best effort quality video call or as (b) voice call, a call may eventually drop.

US11-10 **As users in an IP video call, we want to stop (and restart) transmitting the *camera view* at any point during the call without interrupting the call, i.e. *audio* is maintained during the call.**

*R11-10-1*Each user in an IP video call shall be able to stop (and restart) transmitting their own live video at any point during the call.

*R11-10-2*If both users stop sharing their camera views, either an in-call screen may be displayed clearly indicating how the user can share his camera again or the video call may drop.

US11-11 **As users in an IP video call, we want to mute (and unmute) the *voice* (i.e. mute microphone) at any point during the call without interrupting the call, i.e. *video* is maintained during the call.**

*R11-11-1*Each user in an IP video call shall be able to mute (and unmute) its own live audio at any point during the call.

US11-12 **As users in an IP video call, when we rotate (i.e. user A / B) our devices the correct video orientation is displayed based on the orientation of each device.**

R11-12-1 **OM** The device shall handle the different orientation permutations depending on how the device is rotated during an IP video call.

US11-13 **As users in an IP video call, we (i.e. user A / B) want to toggle between front and rear camera without interruption when the device supports two cameras.**

R11-13-1 The user shall be able to toggle the camera (i.e. front / back) which is recording the transmitted IP video signal given the phone supports two cameras.

R11-13-2 Given the phone support two cameras, the front facing camera shall be activated by default when the video transmission is started.

US11-14 **As users in an IP video call, we (i.e. user A / B) want to see an indication of the connection quality on the in-call screen so that we know that compromises on the video quality might be due to limitations in the local data connectivity leg.**

R11-14-1 During an ongoing IP Video Call a "connection quality indicator" should be displayed on the in-call screen to indicate risk of video call switching to audio-only or dropping completely due to unsatisfactory coverage.

US11-15 **As users in an IP video call, we (i.e. user A / B) want to upgrade a two way IP video call to a multiparty video call.**

As users in an IP video call, when a party leaves a multiparty video call the IP video call continues between the remaining IP video call parties.

R11-15-1 An IP video call shall be delivered minimum as a 1-to-1 video call but may be distributed on the network to support a multiparty video call.

US11-16 **As a service provider, I may want to allow supplementary services during IP video calls when another (voice/video) call comes in such as Calling Line Identification Presentation (CLIP), Call Waiting (CW), Call Hold, Call Forward Busy (CFB), Call Forward Unreachable, and Call Forward No Reply.**

R11-16-1 Supplementary Services such as Calling Line Identification Presentation (CLIP), Call Waiting (CW), Call Hold, Call Forward Busy (CFB), Call Forward Unreachable, and Call Forward No Reply may be offered by a service provider during an IP video call.

NOTE: Supplementary services shall be aligned across voice and video call types.

US11-17 **As a user, I want to see my (initiated and received) IP video calls in my call logs similar to any other voice call.**

R11-17-1 The IP video call must be displayed in the single (voice AND video) call log interface (per contact or global call log).

R11-17-2 In that single log of the user's device, an IP video call shall be differentiated with a specific visual reference from a standard voice call and/or from an enriched voice call (i.e. with content sharing that has taken place during the call).

R11-17-3 Similar to voice call events, initial video call events (i.e. not added in-call) shall be differentiated between answered and unanswered video calls.

R11-17-4 The B-party shall be informed of any video calls they have missed. The notification shall clearly show that the missed call is an IP video call.

11.3 Technical Information

11.3.1 Overview

The IP Video Call service shall be realised based on two main Technical Enablers:

- o TE1: ViLTE Technical Enabler as defined in [PRD IR.94], and,
- o TE2: RCS IP video call service as described in sections 2.2.1, 2.7.1.2.2 and 3.9 of [RCC.07]

Note the two implementations are fully compatible:

- Capability discovery: If the result of the exchange is that ViLTE is supported in one end and RCS IP Video Call is supported in the other, the IP video call shall be available to both ends
- Service initiation and acceptance: A ViLTE-only device shall accept an incoming SIP INVITE for RCS IP Video Call as a SIP INVITE for ViLTE and vice-versa as the services are compatible.
  - o An overview of the availability of the two Technical Enablers based on various factors (e.g. coverage, APN used etc.) for originating and terminating side can be found in section 3.9.4 of [RCC.07]:

For the cases where both Technical Enablers are available on the originating side the Technical Enabler that applies is based on configuration parameter IP Video DEFAULT MECH defined in [RCC.07]:

11.3.2 Technical Implementation of User Stories and Service Requirements

R11-18-1 The realisation for requirement US11-1 including is covered in section 11.3.1.

R11-18-2 Requirement R11-1-1 shall be implemented locally in the device.

R11-18-3 Regarding requirement R11-1-2, the implementation is restricted to the RCS IP video call enabler (TE2, see section 11.3.1).

R11-18-4 The requirements for user story US11-2 (including R11-2-1 and R11-2-2) are fulfilled via the required capability exchange as highlighted in section 11.3.1).

NOTE: to allow service providers to guarantee that access to the ViLTE service is available with non-RCS users with ViLTE capable devices an additional UX configuration parameter VIDEO UX as described in Table 4

R11-18-5 Requirements R11-2-3, R11-2-4 and R11-2-5 shall be implemented locally in the device, and, consequently, make the relevant capabilities available or not during capability discovery.

NOTE: For the cases the video shall not be initiated, the implementation shall follow the procedures described in section 2.2.2 of [PRD IR.94], which is applicable both to TE1 and, by endorsements, to TE2.

R11-18-6 Requirement US11-3 (including R11-3-1) shall be implemented locally in the device. The Technical Enabler depends on network conditions/supported services and client/device configuration.

R11-18-7 The realisation for requirement R11-3-2 including is covered in section 11.3.1.

NOTE: requirement R11-3-2 is not implementable if TE1 is used.

R11-18-8 For requirement US11-4, the following shall be considered:

- TE1: Section 2.2.2 of [PRD IR.94]

- TE2: Section 3.9.4.2.2 of [RCC.07]

R11-18-9 Requirements R11-4-3 and US11-5 shall be implemented locally in the device.

R11-18-10 For requirement R11-6-1 section 2.2.2 of [PRD IR.94] shall be considered and for requirement R11-6-2 sections 2.2.1, 2.7.1.2.2 and 3.9 of [RCC.07] shall be taken into account.

NOTE: In all cases, the decision to provide guaranteed or best effort QoS to the video stream is up to Service Provider's policies and implementation.

R11-18-11 Requirement US11-7 (including R11-7-1) is subject to Technical Enabler employed (TE1 or TE2 as described in section 11.3.1) and on network conditions (e.g., device IP Address and port maintenance after moving out of LTE, availability of secondary PDP context).

NOTE: Requirement R11-7-1 is not implementable if TE1 is used.

R11-18-12 Requirement US11-8 (including R11-8-1) shall be implemented locally in the device.

R11-18-13 For requirement US11-9 (R11-9-1 and R11-9-1-1), the following shall be considered:

- TE1: Section 2.4.4 of [PRD-IR.92] and section 2.4 of [PRD-IR.94] shall be taken into consideration. Note that in the particular case, the underlying VoLTE call cannot be maintained, Annex A of [PRD-IR.92] shall be considered.

- TE2: Sections 3.8 and 3.9.4.1.1 of [RCC.07]. Note that the continuity is subject network conditions (e.g. device IP Address and port continuity).

R11-18-14 Requirements US11-10 (R11-10-1 and R11-10-2), US11-11 (R11-11-1), US11-13 (R11-13-1 and R11-13-2), US11-14 (R11-14-1) and US11-17 (R11-17-1, R11-17-2, R11-17-3 and R11-17-4) shall be implemented locally in the device.

NOTE: Requirements R11-4-3 and R11-10-1 the stop video transmission is implemented as described in section 2.2.2 [PRD IR.94], which is applicable

both to TE1 and, by endorsements, to TE2.Regarding Video orientation requirement (US11-12 and R11-12-1), image orientation extension as defined in 2.7.1.2.2 of [RCC.07] shall be considered.

*R11-18-15*Requirement US11-15 (including R11-15-1) shall be implemented as per section 2.3.3 of [PRD IR.92] and section 2.3.3 of [PRD IR.94] applicable to both Technical Enablers (TE1 and with endorsement of TE2).

*R11-18-16*Regarding Supplementary Services (requirement US11-16):

- TE1: shall be implemented as per section 2.3 of [PRD-IR.92] and section 2.3 of [PRD-IR.94].

- TE2: Availability is up to Service Provider policy and shall be implemented again as per section 2.3 of [PRD-IR.92] and section 2.3 of [PRD-IR.94] via endorsements.

R11-18-17   When receiving a SIP CANCEL request carrying a Reason header field with the protocol set to SIP and the protocol_cause set to 200, a client shall use this information to indicate that RCS the IP Video Call was continued on another device (requirement R11-17-3).

12 In Call Services

12.1 Description

In-Call services are available for use during an ongoing voice and/or video call between RCS enabled users depending on the capabilities available but in general independent of the actual voice or video call technology. With In-call Services users achieve a more engaged conversation experience leading to the perception of being closer to each other as talking and sharing becomes more natural and closer to a face-to-face conversation. Since communication from a user point of view shall always work across the entire contact list it is essential to ensure the listed in-call services are supported end-to-end also across operators. However, the network support of the individual in-call services is at the discretion of each operator by enabling/disabling each service upon provisioning.

12.2 User Stories and Feature Requirements

12.2.1 General

US12-1 **As a user during a voice / video call, I want to use enhanced functionality that allows me to have a more meaningful and engaging (i.e. "richer") conversation with the person I am on the call with.**

R12-1-1 All in-call services shall be made accessible from the in-call screen which is by definition only shown during an ongoing call.

R12-1-2 **OM** All services shall be delivered in a 1-to-1 call only as there is no multiparty sharing provided.

R12-1-3 **OM** The user shall be able to recognise whether the individual in-call services are available to use with the conversation partner. These capabilities need to be updated for both ends real-time.

R12-1-4 An operator may require a charging indication to be displayed whenever an In-Call Service is used by a user (can be displayed only one time).

12.2.2 "Live" Video

In addition to the "Video Share" feature of previous RCS versions, this SDD introduces two video services: Video over LTE (ViLTE, IR.94) and RCS IP Video Call (ViIP) both captured under the term "IP Video Call". From a user's perspective, all three services shall be available as "Live Video ". Selection of the technical enabler is dependent on available network conditions in the end-to-end usage scenario. Each technology has its benefits and limitations and the individual use is based on each operator's configuration.

US12-2 **As a network operator, I want to configure which video call technology shall be used when pressing the single "share live video" button in case both capabilities of "Video Share" and "IP Video Call" are available.**

R12-2-1 There shall be only one button displayed to the user to enable "share live video" during an ongoing voice call irrespective of the actual voice call   bearer.

R12-2-2 The network operator shall be able to configure which Live Video technology shall be used in case both capabilities for "Video Share" and "IP Video Call" are available.

R12-2-3 In general, in case both capabilities for "Video Share" and "ViLTE" are available, "ViLTE" shall prevail.

R12-2-4 Whenever neither ViLTE nor ViIP (depending on selected profile) is supported, the Live Video functionality shall be delivered as Video Share (if available end-to-end).

Based on the available technology options to deliver the Live Video functionality, various combinations are possible in the end-to-end user scenario. Due to the desire of operator specific configurability of those technologies, combinations can be clustered into two profiles:

A / B	VoLTE	CS	RCS IP Voice
VoLTE	ViLTE-ViLTE	VS-VS	ViLTE-ViIP
CS	VS-VS	VS-VS	VS-VS
RCS IP Voice	ViIP-ViLTE	VS-VS	ViIP-ViIP

Table 30: VIDEOSHARE PROFILE (RCS IP VIDEO CALL UPGRADE FROM CS=0)

A / B	VoLTE	CS	RCS IP Voice (Wi-Fi Voice)
VoLTE	ViLTE-ViLTE	ViLTE-ViIP	ViLTE-ViIP
CS	ViIP-ViLTE	ViIP-ViIP	ViIP-ViIP
RCS IP Voice (Wi-Fi Voice)	ViIP-ViLTE	ViIP-ViIP	ViIP-ViIP

Table 31: ViIP PROFILE (RCS IP VIDEO CALL UPGRADE FROM CS=1)

12.2.2.1   Video Share

Video Share is offering a way to share "live" video during an ongoing call without affecting the underlying voice call. A main characteristic is a non-lip sync experience between voice and video.

US12-3 **As a user in a voice call, I (i.e. user A) want to have the ability share a "live" (i.e. the camera view) or recorded video from my in-call screen with the other participant of the call (i.e. user B) whenever it is possible. While sharing, the video is delivered as a real-time stream to the receiver's screen, the sound is still delivered via the ongoing Voice Call.**

R12-3-1 **OM** A user shall be able to stream a Video Share to the other conversation party during an ongoing voice call (CS/VoLTE/RCS IP Voice Call) while the voice call shall continue seamlessly on the same voice bearer.

NOTE: The transmitted Video Share cannot be recorded by any user.

R12-3-2 **OM** In case the underlying voice call is terminated, Video Share shall be terminated as well.

US12-4 **As a user, when receiving a video share request, I (i.e. user B) want to decide whether to:**
  d) Decline the incoming video share request and continue with a plain voice call,
  e) Accept the incoming video share request without sending my camera view, or
  f) Accept the incoming video share request and sending also my camera view.

R12-4-1 **OM** The receiver (user B) shall be able to reject an incoming video share and the voice call continues.

R12-4-2 **OM** The receiver (user B) shall be able to accept an incoming video share (i.e. no auto-accept) without initiating a video share from their side.

R12-4-3 **OM** The receiver (user B) shall be able to accept an incoming video share (i.e. no auto-accept) with initiating a video share from their side as well.

R12-4-4 **OM** The sender shall (user A) be notified accordingly about the selection of the receiver (user B) i.e. accepting or rejecting the video share service. If the receiver (user B) decides to initiate a video share service back to the originator

(user A), the originator is not prompted to accept or reject the video share and the stream is shown on the originator's device.

R12-4-5 **OM** Upon acceptance of user A's video stream, the camera view is streamed to the receiver (user B) and displayed on the receiver's screen.

US12-5 **As a user accepting an incoming video share, I (i.e. user B) want the incoming voice automatically on a connected headset. If there is no headset connected, then play the voice on my external loudspeaker.**

R12-5-1 When an incoming video share is accepted, the audio part shall be played either via a connected headset (if connected) or via the external loudspeaker (if no headset connected).

US12-6 **As a user sharing video, when I rotate (i.e. user A / B) my device the correct video orientation is displayed on both ends.**

R12-6-1 **OM** The device shall handle the different orientation permutations depending on how the device is rotated during a Video Share to always show the incoming video in the right orientation (e.g. not upside down).

US12-7 **As a user sharing "live" video from my camera, I (i.e. user A / B) want to toggle between front and rear camera and upon selection video is changed without interruption (if the device supports two cameras).**

R12-7-1 The user shall be able to toggle the camera (i.e. front / back) which is recording the transmitted live stream given the phone supports two cameras.

R12-7-2 If the phone supports two cameras, the front camera shall be active by default for transmission of the "live" video share.

US12-8 **As a user sharing video, I (i.e. user A / B) want to stop sharing video at any point during the call without interrupting the underlying voice call.**

R12-8-1 **OM** A user shall be able to terminate either its own and/or a received video share at any point during the call

NOTE: This is an explicit stop of the transmission not a "hiding" of video while the actual stream is continuing.

US12-9 **As users sharing video, we want to continue our call as voice call only if video support is lost during the call on either video sharing leg.**

R12-9-1 **OM** In case of loss of a video share due to any reason the underlying voice call shall continue.

US12-10 **As users sharing video (both one and two-way), we want the best possible quality of video available to us for the bearer we use.**

R12-10-1 A Video Share taking place on top of a VoLTE call shall benefit from a higher quality of video than is currently on top of a CS call or RCS IP Voice Call.

NOTE: Following requirement R12-2-3, ViLTE (IR.94) is used whenever possible. Otherwise use Video Share.

12.2.2.2   Upgrade to IP Video Call

"IP Video Call" mainly considers the fact that transmission of both voice and video signal happen always over IP, so can basically deliver a lip sync experience between voice and video. "Upgrade to IP Video Call" can be technically delivered via Video over LTE (ViLTE, IR.94) or RCS IP Video Call (ViIP). The IP Video Call specific behaviour is defined in 'IP Video Call', page 118.

US12-11 **As a user during a voice call (all bearers), I (i.e. user A) want to upgrade the ongoing call to an IP video call.**

> *R12-11-1* **OM** During an ongoing voice call (CS/VoLTE/RCS IP Voice Call) a user should be able to initiate an IP Video call that replaces or adds on the ongoing voice call with minimum disruption to the other party.

> *R12-11-2* A notification shall be displayed to the user in cases where the In-Call service is linked with an ongoing CS call that cannot be continued due to a potential switch of voice bearer.

US12-12 **As a user, I (i.e. user A) want to be assured that in case I press the button to upgrade my call to an IP video call the "IP video call" can actually happen end-to-end with a high likelihood so that I do not get disappointed or a perception of an unreliable service.**

> *R12-12-1* **OM** During an ongoing voice call there shall be an indication of end-to-end IP video call capability (or indication of end-to-end Video Share capability depending on operator configuration, see below).

> *R12-12-2* In-call capability polling will follow the procedure as described in 'Capability Discovery and Service Availability', page 25.

> *R12-12-3* In case the B-Party device does not have a camera built in (neither front facing nor rear facing) but is able to display video in 352x288 pixel resolution @ 15 fps (or better), the A-Party shall be able to trigger a 1-way IP Video Call to B-Party device. B-Party obviously shall have no option to activate the video channel back to A-Party.

> *R12-12-4* In case the B-Party device does not have a camera built in (neither front facing nor rear facing) and is not able to display video in 352x288 pixel resolution @ 15 fps (or better), the A-Party shall not be able to trigger an IP Video Call to B-Party.

US12-13 **As a user during a voice call (all bearers) receiving an incoming IP video call from the other participant of the ongoing call, I (i.e. user B) want to decide whether to:**

> g) Decline the video call and continue with a plain voice call,
> h) Accept the video call without transmitting my camera view, or
> i)   Accept the video call with transmitting my camera view.

> *R12-13-1* **OM** The receiver shall be able to accept or decline an incoming IP video call.

> *R12-13-2* **OM** Upon decline by the receiver the voice call shall continue seamlessly.

R12-13-3 **OM** For acceptance the receiver shall have the option to answer the incoming IP video call with or without transmitting the own camera view back to the sender.

NOTE: It is acceptable though that during signalling / set-up of the IP Video Call the CS call is "muted" but it is not dropped. If the incoming IP Video request is declined the CS call continues. The CS call is dropped only once the IP Video call is accepted. Implication on call logs and charging are "noted" but for each operator to deal with individually whether to accept this experience or not allowing to upgrade to an IP Video Call while on CS call.

US12-14 **As a user during a voice call (all bearers) accepting an incoming IP video call, I (i.e. user B) want the incoming voice automatically on a connected headset. If there is no headset connected, then play the voice on my external loudspeaker.**

R12-14-1 When an upgrade to an IP video call is accepted, the audio part shall be played either via a connected headset (if connected) or via the external loudspeaker (if no headset connected).

US12-15 **As users in an IP video call, we want to continue the transmission of the video as long as possible under changing connectivity situations delivering a high quality and lip sync experience.**

R12-15-1 **OM** In case during an ongoing IP video call one user moves out of LTE coverage, the transmission of the video media part of the IP Video Call should be maintained if network conditions allow.

R12-15-2 In case the transmission of the video cannot be maintained when one user moves out of LTE coverage, an automatic establish of a Video Share session shall be initiated by the party moving out of the LTE coverage if capabilities allow.

NOTE: Existing flows for initiating and accepting Video Share shall be followed as specified in the Video Share section.

12.2.3   Image Share

Image Share is a service that allows sending a picture (either stored in a user's device or taken for the purpose) while in a voice call with a contact. The service differs from File Transfer only in terms of user experience and interface. Sharing during a call, given the real time context, is an immediate task with minimal user interaction displaying the shared content within (or on top) of the calling screen.

US12-16 **As a user in a voice call, I (i.e. user A) want to send a picture from my in-call screen (either stored in a user's device or taken for the purpose) to the other participant of the call (i.e. user B) whenever it is possible.**

R12-16-1 **OM** A user shall be able to transfer a picture to the other conversation party during an ongoing voice call (CS/VoLTE/RCS IP Voice Call) while the voice call shall continue seamlessly on the same bearer.

R12-16-2 **OM** In case the underlying voice call is terminated, Image Share shall be terminated as well.

US12-17 **As a user, I want the option to resize pictures before sharing, in order to limit transfer volume, memory need and transfer time.**

NOTE: "resize" means changing the picture size to a high, medium and low size of the picture.

R12-17-1 **OM** Selecting image share shall offer the option to resize the image to smaller file size in order to save memory, network load and transfer time. "Resize" means changing the picture resolution.

NOTE: In most cases, users are aware of the use of the picture on the receiver side, for instance whether it shall be displayed on small screens only, or whether it may be printed on large scale. This feature provides the user with an option to adapt to these cases.

US12-18 **As a user, when receiving an image share request, I (i.e. user B) want to decide whether to:**

j)   Decline the incoming image share request and continue with a plain voice call,
k)   Accept the incoming image share request.

R12-18-1 **OM** The receiver shall be able to accept or reject an incoming image share (no auto-accept). The sender shall be notified accordingly about the selection of the receiver.

R12-18-2 **OM** Upon acceptance the picture is transferred to the receiver.

R12-18-3 Once the transfer of the image is completed the received picture shall be displayed with minimal user interaction on the receiver's screen.

R12-18-4 When the underlying call is terminated for any reason, the image share shall stop and the receiver shall no longer have access to the image.

US12-19 **As a user accepting an incoming image share, I (i.e. user B) want the incoming voice automatically on a connected headset. If there is no headset connected, then play the voice on my external loudspeaker.**

R12-19-1 When an incoming image share is accepted, the audio part shall be played either via a connected headset (if connected) or via the external loudspeaker (if no headset connected).

12.2.4   Share any file during call

The functionality to share any file during a call is basically based on File Transfer that happens usually within the context of messaging. Sharing during a call therefore happens within the context and user flows of the ongoing voice or video call.

US12-20 **As a user while in a voice or video call, I (i.e. user A) want to share any file from my in-call screen with the other participant of the call (i.e. user B) whenever it is possible.**

R12-20-1 **OM** File Transfer shall be possible during an ongoing voice (CS/VoLTE/RCS IP Voice Call) or video (ViLTE/RCS IP Video Call) call while the call shall continue seamlessly on the same bearer.

NOTE: This includes the case where other in-call services are also in progress.

R12-20-2 During a voice or video call, user A should be able to send a file to user B to directly from the in-call screen.

NOTE: This includes the case where other in call services are also in progress.

R12-20-3 The support of file types and file sizes shall follow as specified in 'File Transfer incl. Geolocation Push', page 84.

R12-20-4 Images and videos shall be able to be resized as specified in 'File Transfer incl. Geolocation Push', page 84.

R12-20-5 **OM** An ongoing File Transfer shall be completed even if the call was terminated. After completion a notification *Shall* be displayed that the file is now accessible via the messaging experience.

R12-20-6 Any file shared during a call shall be available to the user after the call.

US12-21 **As a user while in a voice or video call when receiving a file share request, I (i.e. user B) want to decide whether to accept or reject the incoming invitation based on my operator's configuration for File Transfer.**

R12-21-1 Upon receiving an incoming file on side of user B, the File Transfer shall follow the rules described in 'File Transfer incl. Geolocation Push', page 84, regarding automatic or manual download of the file.

R12-21-2 Upon accepting the File Transfer (either automatically of manually) the file shall be automatically displayed on the user B's screen if the receiving device supports the display of that file type. If display of the file type is not supported the user shall be accordingly notified to ensure the simplest user experience how to access the file.

12.2.5   Both Exchange messages

Exchanging messages during a call is based on the available messaging functionality but is optimised to the ongoing voice or video call situation.

US12-22 **As a user while in a voice or video call, I want to send (chat) messages to another user (not necessarily the other call party) whenever it is possible.**

As a user while in a voice or video call, I want to receive (chat) messages from another user (not necessarily the other call party) whenever it is possible.

R12-22-1 **OM** Sending and receiving messages from/to any other RCS enabled user shall be possible during an ongoing voice (CS/VoLTE/RCS IP Voice Call) or video (ViLTE/RCS IP Video Call/) call while the call shall continue seamlessly on the same bearer.

NOTE: This includes the case where other in-call services are also in progress.

R12-22-2 When sending messages the RCS application shall follow the logic described in 'Operator Messaging', page 36.

R12-22-3 Message notifications shall be clearly displayed or announced to indicate the arrival of the new message and to facilitate access to the message.

R12-22-4 Sending messages to the *other participant of the call* shall be possible from the in-call screen.

R12-22-5 Messages received from the *other participant of the call* shall be clearly displayed and it shall be easy to continue the messaging conversation in parallel to the audio or video call.

R12-22-6 Any chat during a call shall be available to the user after the call similar to the experience of Chat outside a call as described in 1-to-1 Chat, page 61.

12.2.6   Location Push

Location Push as In-Call Service describes the functionality to allow sending a location or position to the other contact while in a call.

US12-23 **As a user while in a voice or video call, I (i.e. user A) want to send "my location" or a "position" from my in-call screen to the other participant of the call (i.e. user B) whenever it is possible.**

As a user while in a voice or video call, I (i.e. user B) want to receive "A's location" or a "position" in my in-call screen from the other participant of the call (i.e. user A) whenever it is possible.

R12-23-1 **OM** Location Push shall be possible during an ongoing voice (CS/VoLTE/RCS IP Voice Call) or video (ViLTE/RCS IP Video Call) call while the call shall continue seamlessly on the same bearer.

R12-23-2 **OM** During such call, user A can select directly from the in-call screen to send the current location or a position to user B which is automatically accepted (based on File Transfer configuration) and displayed on user B's screen.

R12-23-3 **OM** In case the underlying voice or video call is terminated, a Location Push may be terminated but could be received via the messaging experience of the receiver instead.

R12-23-4 Any Location Push during a call shall be available to the user after the call

12.3   Technical Information

12.3.1   Overview

Based on the requirements, the in-call services are constituted of the following main services:

- Video share (sharing video during a call): Implemented via the RCS Video Share service as described in section 2.7.1.2 and 3.6 of [RCC.07] .

NOTE: In line with the requirements in this document and 'IP Video Call', page 118, in case the call is an end-to-end VoLTE call (covered in [PRD-IR.92]) and the ViLTE service (covered in [PRD-IR.94]) is available (confirmed via capability exchange), video share shall not be available to the user.

- Upgrade to video call: Implemented by upgrading the existing call to an RCS IP video call service as described in section 3.9 of [RCC.07] and addressed in 'IP Video Call', page 118.

NOTE: In line with the requirements in this document and 'IP Video Call', page 118, in case ViLTE (covered in [PRD-IR.94]) is available (confirmed via capability exchange), the upgrade to video call shall be performed using ViLTE.

- Image share (share a picture during a call): Implemented via the RCS image share service as described in section 3.6 of [RCC.07].
- Sharing any file during a call: Implemented via the RCS File Transfer service as described in section 3.5 of [RCC.07].
- Exchange messages: Implemented via either RCS Standalone Messaging service or the RCS 1-to-1 Chat service as described in sections 3.2 and 3.3, respectively, of [RCC.07].
- Location push: Implemented via the RCS location push service as described in section 3.10 of [RCC.07].

NOTE 1:   Common to all the services and before initiating a session, it is a requirement to perform a capability exchange as described in sections 2.6 and 2.7 of [RCC.07] and covered in 'Capability Discovery and Service Availability', page 25. A service shall not be initiated if not supported by both parties.

NOTE 2:   There is one exception to be considered; if the device is in a VoLTE call, the availability of the upgrade to video call (implemented through ViLTE as in [PRD IR.94]) shall rely on the contact header negotiation during the VoLTE call establishment (SIP INVITE and response).

12.3.2   Detailed requirements realisation

R12-24-1 The realisation for requirements US12-1, R12-1-1, R12-1-2 and R12-1-3 is covered in section 12.3.

- Note that RCS sharing services outside a voice call covered in sections 3.6.1.3, 3.6.1.4.4, 3.6.2.2, 3.6.2.4, 3.6.4.1.2 and 3.6.6.2 of [RCC.07] are outside the scope and thus not applicable.

R12-24-2 In order to fulfil requirement R12-1-4, End User Notifications as described in section 2.10 of [RCC.07] shall be used.

12.3.2.1   Live Video

R12-24-3 In order to fulfil requirements US12-2, R12-2-1, R12-2-2, R12-2-3 and R12-2-4, and to resolve the conflict between the video share and RCS IP video call service (in case they are both available following capability exchange) the following considerations shall be taken into account

- If the parameter RCS IP VIDEO CALL UPGRADE FROM CS (as described in Annex A.1.13 of [RCC.07]) is set to 0, then video share shall prevail. If set to 1, RCS IP video call shall prevail.
- To resolve the potential race conditions:

  o   If inviting for or accepting a video share, subsequent RCS IP video call shall be rejected and vice versa.

> o If a video share (one direction) session is in place, then the only choice is video share.

- Note that consistently with section 12.3 (video share bullet), if the ViLTE service is available, then ViLTE shall be used independently of the value of RCS IP VIDEO CALL UPGRADE FROM CS.

12.3.2.1.1 Video Share

R12-24-4 The realisation for requirements US12-3, R12-3-1 and R12-3-2 is covered in section 12.3.

R12-24-5 The realisation for requirements of user stories US12-4 and US12-8 is covered in section 12.3 (video share bullet).

R12-24-6 Regarding requirement US12-6 (Video orientation), it shall be implemented following the image orientation extension as defined in 2.7.1.2.2 of [RCC.07].

R12-24-7 The requirements for user story US12-7 shall be implemented locally in the device.

R12-24-8 For requirements of user story US12-8, procedures as described in sections 3.6.4.3.4 and 3.6.4.3.5 shall be followed.

R12-24-9 For requirements of user story US12-9 and for the case of bidirectional video share, section 2.7.1.2.1 of [RCC.07] shall be taken into consideration

R12-24-10 For the requirements of user story US12-10, the codec/profile selection shall follow the procedures described in section 3.6.4.1.4 and 3.6.4.1.5 of [RCC.07].

12.3.2.1.2 Upgrade to IP Video Call

R12-24-11 The realisation for requirements of user stories US12-11, US12-12, US12-13 and US12-15 are covered in section 12.3 (upgrade to IP video call bullet).

NOTE: The parameter RCS IP VIDEO CALL UPGRADE FROM CS mentioned in R12-24-3 shall be taken into account regarding the availability to add video.

R12-24-12 Requirement R12-11-2 shall be implemented locally in the device.

R12-24-13 Requirements for user story US12-12 (R12-12-1 and R12-12-2) are fulfilled via the required capability exchange as highlighted in section 12.3.

R12-24-14 Requirements, R12-12-3 and R12-12-4 shall be implemented locally in the device, and, consequently, make the relevant capabilities available or not during discovery.

R12-24-15 Requirements R12-13-3 and US12-14 shall be implemented locally in the device.

12.3.2.2 Image Share

R12-24-16 The realisation for requirements of user story US12-16 (R12-16-1 and
R12-16-2) and US12-18 (R12-18-1, R12-18-2 and R12-18-4) is
covered in section 12.3 (image share bullet).

R12-24-17 For the requirements of user story US12-17, it is recommended to follow the
proposal for a compression mechanism summarised below:

- In order to provide the user a seamless experience when transferring images and be
aligned with other internet applications providing the service, there is a proposal for a
compression mechanism for images which are transmitted using the Image Share
service and is similar to the mechanism for File Transfer described in section 7.4.3.2
of [RCC.60].
- The recommended approach based on the principle of maximizing the range of
devices/resolutions where the image will be displayed with sufficient quality is the
following:

1. The default scale factor F for the image shall be, $F = \min (1280/w, 1280/h, 1.0)$. It shall
be noted the w (width) and the h (height) shall be used in pixels for the calculation.
2. Please note that if the factor (F) is 1, the next step can be skipped.
3. Scale both dimensions by the same factor F (same for width and height so the aspect
ratio is maintained).
4. Compress as JPG with q=75%
5. Compare the new image size with the original, and only offer the possibility to send a
resized image if the resulting file is smaller than the original one

- When a user sends an image to another user the size reduction algorithm will take
place. Then if:

  o the scale factor (F) of the algorithm is lower than 1, and,
  o the result of the compression is a smaller file

- The smaller file will be used for the Image Share service. Otherwise, the original file
will be used.
- Note that any process to evaluate and execute the size reduction shall occur prior to
the image share service initiation (SIP INVITE sent to recipient).

R12-24-18 Requirement R12-19-1 shall be implemented locally in the device.

12.3.2.3 Share any file during call

R12-24-19 The realisation for requirements of user stories US12-20 (R12-20-1
and R12-20-3) and US12-21 (R12-21-1 and R12-21-2) are covered in
section 12.3 (share any file during a call).

NOTE: It is required for a client/device implementation to be able to identify whether
a File Transfer is received from the other party in a call to, if so, present the
File Transfer within the call window instead the messaging application.

If the conversation continues after the call is terminated, it is expected that the exchange takes place within the messaging application, meaning the exchanges that took place during the call are part of the messaging history.

R12-24-20 Requirement R12-20-2 and R12-20-6 shall be implemented locally in the device.

R12-24-21 For the requirements of user story US12-21, technical information of 'File Transfer incl. Geolocation Push', page 84, shall be considered. In general, section 3.5 of [RCC.07] shall be considered.

R12-24-22 For requirement R12-21-2, file display options are the same as described in 'File Transfer incl. Geolocation Push', page 84, and are not different within an in-Call context.

12.3.2.4   Exchange messages

R12-24-23 The realisation for requirements for user story US12-22 (R12-22-1, R12-22-2 and R12-22-3) is covered in section 12.3 (exchange messages during a call).

NOTE: It is required for a client/device implementation to be able to identify whether a message is received from the other party in a call to, if so, present the File Transfer within the call window instead the messaging application.

If the conversation continues after the call is terminated, it is expected that the exchange takes place within the messaging application, meaning the exchanges that took place during the call are part of the messaging history.

R12-24-24 Requirements R12-22-4, R12-22-5 and R12-22-6 shall be implemented locally in the device.

12.3.2.5   Location Push

R12-24-25 The realisation for requirements of user story US12-23 are covered in section 12.3 (geolocation push).

- Note that it is required for a client/device implementation to be able to identify whether a location push is received from the other party in a call to, if so, present the File Transfer within the call window instead the messaging application.
- If the conversation continues after the call is terminated, it is expected that the exchange takes place within the messaging application, meaning the exchanges that took place during the call are part of the messaging history.

R12-24-26 Requirement R12-23-2 and R12-23-4 shall be implemented locally in the device.

13 API Extensions

13.1 Description

RCS APIs enable operator developers (MNOs Apps), OEM developers (OEM Apps) and developers from companies outside of the operators (Third party apps) to integrate RCS

features into their applications. APIs can be used by all these three different parties to enrich their applications with RCS functionalities, and build extra functionality on top of the native out of the box RCS experience.

MNOs leverage in-house operator developers, OEM developers and developers from companies outside of the operators to propose innovative user experiences, which increase RCS use and data traffic and introduce new service extensions independent of OEM involvement.

This document covers requirements for all APIs available across any device and network.

> NOTE: The scope of API access is at first limited to MNO and OEM apps only. However the enablers put in place for this OEM/MNO API access shall be extensible to support Third party access in the future. This means that access to Third party apps running on an MNO's network can be opened by that MNO at their own discretion.

> NOTE: In this document "developer" means either OEM application developer, MNO application developer or Third party developer

13.2 User Stories and Feature Requirements

US13-1 **As a user, I want to be able to install apps which use RCS APIs**

US13-2 **As a developer, I want to be able to add RCS communication features to my application using RCS functionality exposed through APIs. My app will be considered as an RCS enabled app.**

US13-3 **As a developer I can provide stand-alone applications which exploit RCS features accessed by APIs provided in the terminal or in the network**

US13-4 **As a developer, I want to be able to integrate new RCS communication features into the native user interface using special APIs (UI hooks), at the following points:**

- Messaging Application
- Call Application (s) (i.e. Dialler, Call Set-up Screen, In-call Screen, Incoming Screen)
- Contacts Application
- Call Logs
- "Sharing" Touch point

US13-5 **As an Operator, I can identify which applications and its owner generates traffic through RCS APIs"**

R13-5-1 App ID identifies the app which generates the traffic through the RCS APIs

R13-5-2 Developer ID identifies the owner of the app

R13-5-3 App ID and Developer ID are both unique

R13-5-3-1 RCS enabled app installed on a device offers one or more services that are identified by a specific ID, a Feature Tag, that is considered as a capacity of the user / device

US13-6 **As a developer, I have to insert my App ID, my Developer ID and the Feature Tags to be used in my source code allowing me to use RCS APIs.**

US13-7 **As a developer, I want to be able to use a specific API called "Multimedia session" allowing two apps, that have the same Feature Tag, to exchange specific data.**

R13-7-1 A multimedia session can be established only between two apps that support the same Feature Tag.

R13-7-2 An interface allows to check for a specific user the support of the same Feature Tag.

R13-7-3 An RCS enabled app using "Multimedia session" provides a capability that follows the regular capability discovery mechanism.
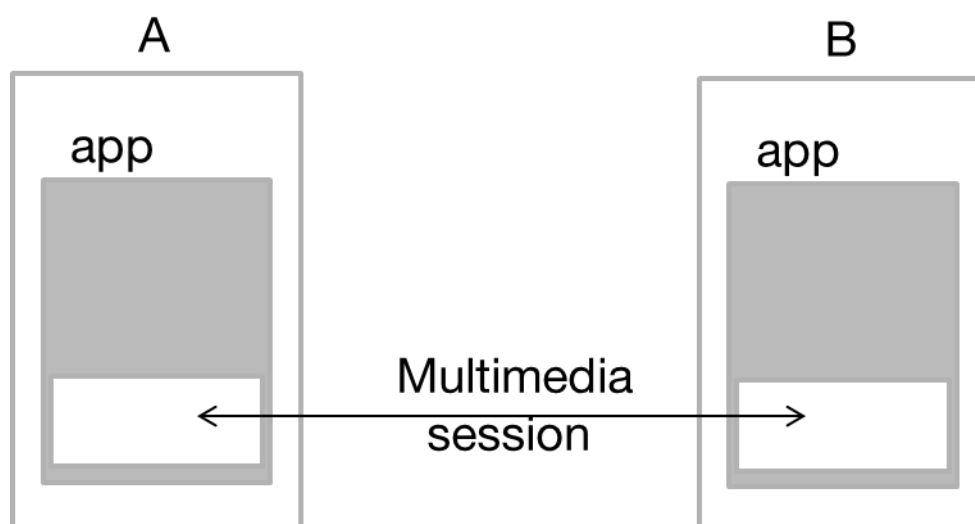
Figure 14: Multimedia session (1)

US13-8 **As a developer, I want to be able to integrate RCS communications features within my apps through APIs. This enables end users to establish a communication from their app. Here are different scenarios according to developers needs**

R13-8-1 App to app communication: The A party triggers an RCS communication from an app using the APIs. In this mode, A party and B party shall both have the same Feature Tag: B party receives the RCS communication within this app (identified by the Feature Tag)
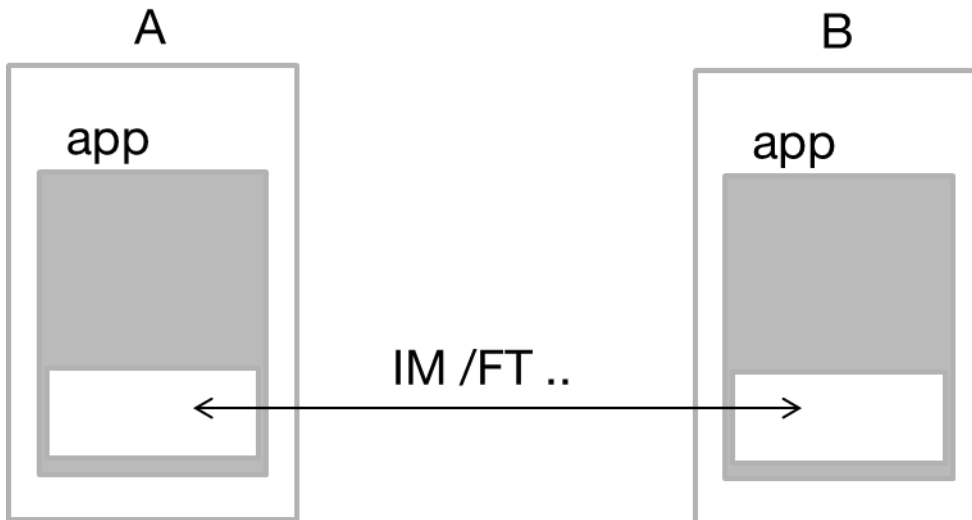
Figure 15: App communication

R13-8-2 App to RCS UX: The A party triggers an RCS communication from an app using the APIs. In this second mode, B party is not required to have a specific app or service (identified by its Feature Tag) from where the com has been generated: the B party receives the RCS communication in his native RCS app. The B Party can reply to A from his native UI and the A party receives it on app and continues the conversation thread.

Figure 16: App / RCS communication

R13-8-3 The RCS APIs available are:

- Instant Messaging,
- File Transfer including geo-location,
- Audio Messaging,
- IP Video Call,
- Video share during a call
- Request for services configuration information relevant for the application (e.g. max number of participants in a Group Chat, max file

size of a File Transfer, warning threshold for a File Transfer, IM CAP ALWAYS ON, FT HTTP CAP ALWAYS ON).
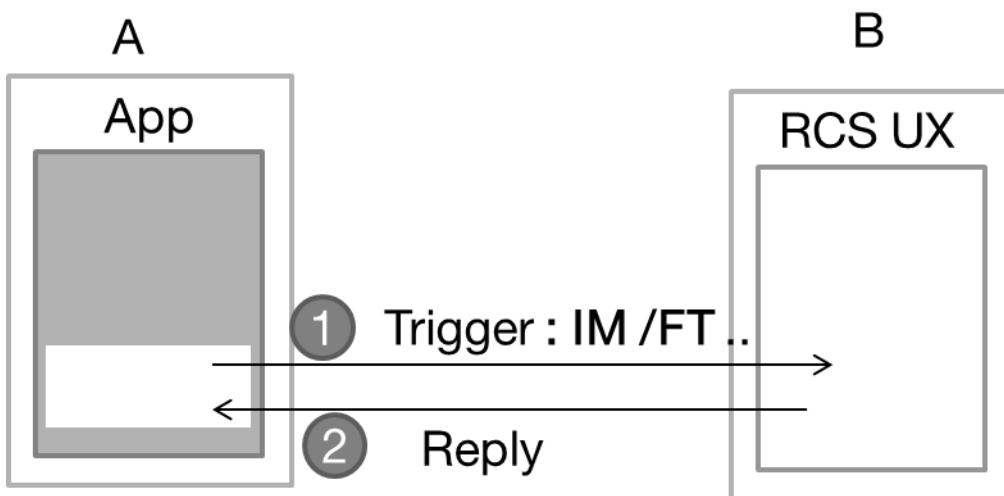
US13-9   **As a user I want to be able to see (via capability discovery) which of my contacts have installed the same RCS-enabled apps as I have installed. Apps installed on my contacts' secondary devices are also discovered.**

US13-10 **As a user, when I install an RCS-enabled app, I want to be able to decide whether or not I want to make it discoverable to other users via capability discovery. If I opt not to make the app discoverable, my contacts will not see that I have installed the app. I cannot tailor the capability discovery response by contact.**

US13-11 **As a user, I want to be able to change the discoverability setting for specific applications via RCS Settings. Apps may also provide this option within the application UI.**

US13-12 **As a user, I want to be able to trigger interaction with a contact having the same enabled RCS app from the address book/contact card or from within the app.**

US13-13 **As a user, when I uninstall an RCS-enabled app it is no longer notified to other RCS enabled app users in Capability exchange.**

US13-14 **As an operator, I want to be able to find out how many instances of each RCS-enabled app have registered their capability with my network, via the Feature tag.**

US13-15 **As a user, when I install an app enabled by RCS, I want to be informed that this app will use the RCS services through the API.**

US13-16 **As an operator, I want to be able to introduce a network element to measure the volume of data traffic triggered by each specific RCS-enabled app on my network, identified by the app's Feature Tag(s).**

US13-17 **As an operator, I can identify the developer / owner of an app from the app's Feature Tag(s)**

US13-18 **As an operator, I can block traffic and withdraw access for a specific service or application making use of the RCS APIs, identified by the specific Feature Tags. Blocking an app which sends traffic (chat or File Transfers, etc.) to the native RCS UI (App-to-Native messaging) will not affect the user's ability to send such traffic from other apps or from their native RCS UI.**

13.3 Technical Information

13.3.1 Overview

There are three different enablers that can expose different types of RCS API

6. Device or Terminal API
7. Network API.
8. UI Hook.

This current version only covers Device API. Technical requirement matching for Network API and UI Hooks will be completed in a maintenance or future release of the Common Core.

The technical answers to above requirements may have technical requirements on several elements of the end to end RCS infrastructure:

- The terminal and associated RCS stack exposing Terminal API
- The UNI / NNI interface
- The application using the Terminal API
- The service provider RCS infrastructure

13.3.2 Requirements matching

R13-18-1 For Terminal API, requirements of user stories US13-1, US13-2 and US13-3 are covered by [RCC.53].

R13-18-2 The requirements of user story US13-4 is left to device implementation.

R13-18-3 Requirement R13-5-1 for identification of the services offered by the application is done through the IARI which uniquely identifies the service. This is ensured:

- At the UNI level, through the definition of the IARI and its usages in sections 2.6.1.1.3 and 2.6.1.2.6 of [RCC.07].

NOTE: The term application is equal to the term Extension as used in [RCC.07].

- At the terminal level, through the procedures defined in sections 4.4.4.5 of [RCC.53] and in section 8 of [RCC.55].

R13-18-4 For requirement R13-5-1and R13-5-2, identification of the developer for Second Party apps is covered by the security model defined in [RCC.55]. For Third Party apps, this is up to MNO implementation.

R13-18-5 For requirement R13-5-3, the following applies:

- For the Feature Tag, uniqueness is ensured by the procedures described in section 5.3 for the second party app and in section 6.3 of [RCC.55]
- For Developer ID and App ID, this is dependent on MNO handling of those Identifiers.

R13-18-6 Requirements of user story US13-6 is covered by the overall procedures described in [RCC.55].

R13-18-7 Requirement R13-7-1 for multimedia sessions between the same application is covered:

- At UNI Level, using the multimedia session by the procedures defined in section 3.12.4.2.2 of [RCC.07].
- At the terminal level, through the procedures of section

R13-18-8 Requirement R13-7-2 is ensured by procedures of capability discovery of [RCC.53].

R13-18-9 Requirement R13-7-3 is ensured with the same procedures than requirement US13-9.

R13-18-10 For requirement R13-8-1 and R13-8-3 the following applies:

- At the UNI level

  o If the communication is messaged based, using the MSRP protocol, the app shall follow the procedures defined in section 3.12.4.2.1.1 of [RCC.07]
  o If the communication is real time based, using the RTP protocol, the app shall follow the procedures defined in section 3.12.4.2.1.2 of [RCC.07].

- At the Terminal level through the procedures defined in [RCC.53]

R13-18-11 For requirement R13-8-2 and R13-8-3 the following applies.

- At the UNI level, an app can set a communication with any other RCS entity which does not have specifically the same app using an RCS service by following the procedures defined in section 3.12.4.1 of [RCC.07].
- At the terminal level, through the procedures defined in [RCC.53] .

R13-18-12 For services configuration of requirement 13.6.1.2, this is ensured through procedures described in [RCC.53].

R13-18-13 Requirements of user story US13-9 is only applicable to applications that use features of requirements of user story US13-7 or requirement R13-8-1. The discovery is performed via the standard capability exchange mechanism (see 'Capability Discovery and Service Availability', page 25). Each app is uniquely identified by an IARI as defined in sections 2.6.1.1.3 and 2.6.1.2.6 of [RCC.07]. An app shall not be granted access to trigger a capability exchange itself. However the app may have access to the result of a prior capability exchange.

R13-18-14 Requirement for user stories US13-10 and US13-11 are ensured at the application and stack level. These requirements are only applicable to applications that use features associated to requirement US13-7 or R13-8-1. When the user decides that a specific application shall not be discoverable by others contacts, this means that the application will no longer apply the procedure described in sections 2.6.1.1.3 and 2.6.1.2.2.6 of [RCC.07] for that specific application. This requirement needs to be enforced on the client and is up to its implementation.

R13-18-15 Requirements for user story US13-12 are ensured at the terminal level for the triggering from the address book and at the application level for the triggering within the application. At the address book level, this is ensured through the procedures defined in [RCC.53]. At the application level, it's up to the application to display this information provided through the API as per [RCC.53].

R13-18-16 When an application is uninstalled, the requirements for user story US13-13 are covered at the stack level, by following the procedures defined in section 4.4.4.5 of [RCC.53]

R13-18-17 The requirements of user story US13-14 are only applicable to applications that use features associated to user story US13-7 or requirement R13-8-2. It

is ensured at the network level and is up to service provider policy. Identification of the app registering shall be done via the SIP REGISTER request that conveys the identity of the app through its IARI tag set in the Contact header as described in section 2.4.4.5 of [RCC.07].

R13-18-18 Requirements for user story US13-15 is covered through procedures of section 4.4.2 of [RCC.53].

R13-18-19 Requirements for user story US13-16 are applicable to all application using API (i.e. either derived from user story US13-7 or US13-8).They can be ensured at the network level and are up to service provider policy. Identification of the app generating a specific traffic may be done by linking the data plane with the SIP session that has allowed the data session establishment as the SIP INVITE request that was used to set the session shall convey the identity of the app through its IARI tag set in the Contact header as described in section 3.12.4.1 and 3.12.4.2 of [RCC.07]

NOTE: An application derived from requirement US13-8 cannot be identified when using standalone messaging using SIP Message.

R13-18-20 Requirements for user story US13-17 are covered for MNOs applications through the security model defined in [RCC.55]. For Third Parties applications, this requirement is not covered yet.

R13-18-21 The requirements of user story US13-18 are covered:

- At the UNI level, a Service Provider can control dynamically the authorization of any app to access the RCS infrastructure, for any user, via the EUCR mechanism described in section 3.12.4.3 of [RCC.07]. These network initiated requests indicate to the device to block an app or a list of apps for a certain duration (the duration can be unlimited).
- At the network level, triggering of the revocation procedures in the network is dependent on the MNO's policy on revocation procedures.

R13-18-22 Security model

- Devices exposing API shall restrict applications from accessing the RCS infrastructure based on the security model defined in [RCC.55] and on the Service Provider's policy provided through provisioning (see ''Differences to previous versions

RCS Common Core 1.1 is a maintenance update that provides further clarification to existing requirements. The technical information has also been updated to align with RCS 5.3 (see section 1.5 of [RCC.07])

13.3.3   Summary of Changes

- Device Provisioning
    - Alignment with [RCC.14] and [RCC.15]
- Capability Discovery and Service Availability
    - Clarification on the behaviour of the CAPABILITY VALIDITY timer (see requirement R3-3-7-5-6)
- Operator Messaging

- o Clarification to the Integrated Messaging requirements for proposed message selection (see section 4.2.1.1)
- o Clarification on the DELIVERY TIMEOUT behaviour and technology selection logic for Integrated Messaging variant 1 (see section 4.2.3)
- One-to-One Chat
  - o Additional requirements for handling unseen messages and files (see requirements for user story US5-13).
- Group Chat
  - o Additional requirement introduced to allow the user to see who set up the Group Chat (see requirement R6-6-2).
- IP Voice Call
  - o Additional user story included to allow the user to see what the call bearer is in use for the call (see requirements for user story US10-12).
- Introduction of LED notifications for received one to one, group chat and file transfer messages
- Editorial clarifications to Audio Messaging and Messaging for Multi-device sections.

NOTE: Further improvements to the Messaging for Multi-device section (such as introduction of synchronisation triggers) are expected once the work of the Multi-device Messaging Operator Interest Group has been concluded

- Device Provisioning', page 10). The 'ALLOW RCS EXTENSIONS' parameter defined in Table 94 of [RCC.07] indicates at a general level whether apps are allowed or not.

14 Security against Malware

14.1 Description

Authentication in RCS services on an individual device is currently done with a solution based on username / password combination. There is a risk that these credentials are hijacked by a malware application and used for spoofing identities. There is a need to offer an enhanced security function at least temporarily until a long term solution is available.

14.2 User Stories and Feature Requirements

US14-1 **As a user, I want to use my operator communication services safely and securely.**

 R14-1-1 **OM** RCS services shall use an authentication mechanism that is safe and secure, not allowing 3rd party applications to retrieve any user data including data that is relevant for authentication against networks.

 R14-1-2 **OM** Authentication mechanism(s) shall be defined for a user on devices with a SIM.

 R14-1-3 **OM** Authentication mechanism(s) shall be defined for a user on devices without a SIM.

R14-1-4   **OM** Devices containing a SIM which is associated with the user's RCS identity shall use any available SIM-based authentication mechanism in preference of a non-SIM based authentication mechanism.

R14-1-5   User interaction to ensure security solutions shall be minimized.

R14-1-6   If manual user interaction is required, this interaction shall be limited to a single one time experience and not be repeated, in case – but not limited to – device re-provisioning.

R14-1-7   If manual user interaction is required, for native implementations any user interaction shall be performed on one single screen (or an intuitive flow of screens).

US14-2   **As an operator, I want to customize the enhanced security function.**

R14-2-1   The security solution shall offer the option for the operator to enable or disable the function with appropriate security control.

R14-2-1-1   Enable or disable over the air.

R14-2-1-2   Enable or disable for selected devices.

R14-2-2   If user interaction is required, the user shall be guided to accomplish the interaction in a way that RCS use of the primary identity is enabled in a secure way after the set-up process.

US14-3   **As an operator, I want to ensure that traffic and content generated by an RCS identity is generated by that identity's true user.**

R14-3-1   Second Party and Third Party applications shall inherit the identity of the stack therefore whilst API access may be controlled (not addressed here) no additional RCS authentication shall be required from second and third party applications.

R14-3-2   All traffic generated by an identity shall be identifiable as such.

14.3 Technical Information

The technical implementation of RCS involves a number of technologies on the user network interface. Encryption, user authentication and access authorization is applied by the client and the network on a per protocol basis (e.g. SIP, HTTP, IMAP). The level of security for the individual technologies depend on the selection of the mean of authentication applied in the technical specification.

14.3.1 User Authentication

The following main user authentication and methods are used in RCS.

R14-4-1   User Authentication via the UICC based Authentication and Key Agreement protocol (AKA). This authentication protocol comes with a high level of security based on shared secrets exchanged between the UICC and the network authentication centre. As a result of the initial authentication session keys are agreed which are used to secure the UNI signalling flow.

R14-4-2 User Authentication via the basic or digest access authentication based on credentials (user name and password) exchanged between the application and the peer network application. Since the RCS user stories aim to prevent that the user is involved in the exchange of the access credentials an automatic provisioning of the credentials is applied via device provisioning. The digest procedure in itself is secure and robust against attacks. It is vulnerable to attacks to discover the credentials via access to the application's key store or spoofing attacks based on the credential management procedure (e.g. malware pretending to be an RCS application).

R14-4-3 Network based user identification via "header enrichment" or "GPRS IMS Bundled Authentication" (GIBA) which is in fact a single-sign-on (SSO) prolonging the authentication of the user at the time of bearer set-up for the usage of services within the bearer session. The bearer set-up in a 3GPP network is typically based on the UICC based Authentication and Key Agreement protocol. The IP address assigned at the time of bearer set-up is used as the "token" to identify the user within the existing bearer session. This identification mechanism is secure in itself, i.e. it is not possible for an attacker to claim another identity within the bearer session. However attackers will be able to gain unauthorized access to the network services using a bearer session on behalf of the user.

R14-4-4 User based Authentication via one time password (OTP), whereby the user is authenticated for a signalling transaction by using a token transfer over a channel with a secure identification or authentication context, e.g. the short message service or a sign on to a web portal. Based on the one time authentication a long term authentication context can be generated (SSO) to prevent the need for subsequent authentication transactions. Depending on the usage scenario the OTP based authentication can be executed without user impact (e.g. primary devices in non 3GPP access) or with user impact (additional non SIM devices).

The single token exchange via OTP is secure in itself. However it is vulnerable to spoofing attacks to gain access to the token used to authenticate the access, e.g. via initiation of the authentication by malware on behalf of the user and eavesdropping of the OTP transfer.

14.3.2 Encryption

The User Network Interface transactions should be always encrypted to prevent eavesdropping of the user's personal communication in the various access and transit networks. RCS makes use of the common encryption protocols, i.e. Transport Layer Security and Ipsec.

14.3.3 Storage of Authentication and Identification Data

The RCS client need to store for active RCS users authentication and identification data (user identification data, password, token) used for network access. The client shall store this data in a secure manner to prevent access from users and invaders.

For the requirements in user story US14-1 the following applies.

R14-4-5 RCS makes use of a number of authentication mechanisms with some of them being vulnerable to attacks as summarized on a high level in section 14.3.1. Thus the risk that 3rd party applications are able to retrieve user data or to make

use of communication services on behalf of the user persists. The main RCS vulnerability comes from the fact that user identification and authentication data is made available to consumers via a device management technology with weak security measures.

The following authentication mechanisms and encryption methods are used on a UNI technology basis.

R14-4-5-1 HTTP(s) based client configuration in 3GPP access makes use of either the Generic Bootstrapping Architecture (GBA) (1) or network based user identification via (3) as defined in section 2.4 and 2..2 of respectively. As defined in section 2..2.5 the service provider may decide to further secure the identification via invocation of the SMS based procedure which adds additional authentication via (4). The SMS based procedure may be further secured by the service provider by enforcing user input of the OTP as defined in section 2.3.5 of .

Client configuration transactions carrying user data are encrypted via TLS/SSL as defined in sections 2.2.5 of .

R14-4-5-2 HTTP(s) based client configuration on non 3GPP access for primary and for additional devices makes use of either based on the GBA (1, primary device only) or the authentication method (4) as defined in sections 2.3 – 2.5 and 2.6 of .

Client configuration transactions are encrypted via TLS/SSL as defined in 2.3.3.2.5 of [RCC.07].

R14-4-5-3 The authentication method for IMS access depends on the mode and capability of the RCS device, the type of access and the device configuration. The client shall apply the authentication in IMS as defined in section 2.13.1.2 of [RCC.07].

The encryption of SIP signalling is determined by client configuration as defined in section 2.8 of [RCC.07] and 2.2.2.2 of [RCC.15].The authentication method for HTTP transaction of File Transfer over HTTP shall be based on digest authentication (2) based on the credentials received by the client via device configuration as defined in sections 3.5.4.8.1 of [RCC.07].

HTTP File Transfer transactions carrying user data are encrypted via TLS/SSL as defined in 3.5.4.8.5 of [RCC.07].

R14-4-5-4 The authentication method for IMAP sessions for the Common Message Store either based on AKA based on the GBA (1) or is based on basic authentication (2) with the CMS credentials received by the client via device configuration as defined in section 2.13.1.5 of [RCC.07].

IMAP sessions are encrypted by use of TLS as defined in section 2.13.1.5 of [RCC.07].

R14-4-5-5 The authentication method for HTTP/XCAP transactions with the XDMS is either based either based on AKA based on the Generic Bootstrapping Architecture (GBA) (1) or digest authentication (2) with the IMS credentials received by the client via device configuration or network

based user identification (3) as defined in section 2.13.1.4 of [RCC.07].

The encryption of HTTP/XCAP is based on TLS as defined in section 2.8 of [RCC.07].

R14-4-5-6 For MSRP transaction no additional user identification is applied. The MRSP transactions rely on the user identity that has been authenticated in the related SIP registration of session.
The encryption of MSRP signalling is determined by client configuration as defined in section 2.8 of [RCC.07] and 2.2.2.2 of [RCC.15].

R14-4-5-7 For RTP media streams no additional user identification is applied. The RTP transactions rely on the user identity that has been authenticated in the related SIP registration of session.

The encryption of RTP streams is determined by client configuration as defined in section 2.8 of [RCC.07] and 2.2.2.2 of [RCC.15].

R14-4-6 For the requirements in user story US14-1 to minimize the user interaction for security solutions a case by case analyses of user interaction flows for device configuration and personalization is done below. User interactions can be characterized with regard to their user experience as "in-band" or "out-of-band". In-band refers to user interactions that can be smoothly integrated in the user interface based on well-defined RCS signalling flows. Out-of-band refers to user interaction flows that come not with RCS signalling flows but with another media channel, most likely a user readable short message.

R14-4-6-1 "HTTP(s) based client configuration mechanism over 3GPP access" as defined in section 2.2 of is transparent for the user if the service provider supports with the network to supports network based user identification. If the network operator does not support network based user authentication, then it may invoke the procedures for the client configuration over non 3GPP access. The corresponding user interactions apply as defined below.

R14-4-6-2 "HTTP(s) based client configuration mechanism over non 3GPP access" as defined in section 2.3of requires user prompt for MSISDN and OTP password which is "in-band". The OTP password in itself is received in between the two prompts is "out-of-band". The exact flow depends of the device capabilities to determine the user identity (IMSI) of the SIM or to receive short messages on UDH ports or the service provider policy to enforce user prompts for OTP as defined in section 2..3.2 of

R14-4-6-3 For the configuration of additional devices sharing an identity there are a number of user interactions involved.

The primary device holding the user's identity to be federated with the additional device may support a procedure to enable the user consent based on the external EUCR as defined in section 2..1.2 of [RCC.15]. The user dialogue associated with this action is "in-band".

The procedure to request the federation of the user identity of a primary device via the "HTTP(s) based client configuration mechanism for alternative devices sharing a user identify" as defined in section 2..3.5 of

[RCC.07] requires user prompt for MSISDN and service provider indication on the additional device. In addition the user may need to enter an OTP or a PIN as defined in section 2.5.1of   and 2.1.2. of [RCC.15]. This full user   interaction flow is "in-band".

The reception of the OTP on the primary device via SMS as defined in section 2.5.1 of [RCC.15] is "out-of-band".

The user interaction for the federation consent on a primary device via the external EUCR as defined in section 2.1.2 of [RCC.15] is "in-band".

The user interaction for the input of a PIN on the primary device as defined in section 2.3.3.4.2.3 of [RCC.15]is "in-band".

R14-4-7 For the requirements in user story US14-2 the following applies.

*R14-4-7-1*The enhanced security function can be enabled or disabled by the service provider as defined in section 2..2.5 and 2..3.5 of [RCC.07].

*R14-4-7-2*The enhanced security function makes use of general client procedures for the user identification and authorization. These procedures have only limited capabilities to convey operator specific explanatory text. Only the out-of-band transaction provides the service provider with the capability to covey specific information. However this is outside of the scope of this specification.

R14-4-8 For the requirements in user story US14-3 the following applies.

*R14-4-8-1*The RCS implementation assumes one common user identity managed across all involved technologies (e.g. SIM, Device Configuration, IMS, Messaging Server, Common Message store, Voice and Video services). It is the service provider responsibility to maintain this user identity and the related authentication, permission and preference data in sync across all technologies and network services. The RCS client shall use for RCS access only the user data retrieved from the SIM or via the user profile received from Device Configuration.

This allows the network to assign all traffic and service usage events to this single user identity.

15 Data Off

15.1 User Stories and Feature Requirements

US15-1 **As a user, I want to use operator voice and video calling irrespective of my chosen connectivity conditions.**

R15-1-1 Voice and video services shall be available whenever the device is registered to a cellular network or a Wi-Fi connection is available.

NOTE: The availability of voice and video services offer over Wi-Fi is at the discretion of the operator.

R15-1-2   The operator shall be able to zero rate data traffic which is induced by voice and video calling and meter minutes instead.

NOTE: Signalling that is used for production of operator voice and video services shall be in the background and hidden from the user, i.e. also not metered.

R15-1-3   Operator voice services shall be available over the cellular network irrespectively of the setting of the cellular data switch.

R15-1-4   Operator video services shall be based on operator configuration (see R15-4-2) be available over the cellular network when the cellular data switch is switched off.

R15-1-5   In domestic case and roaming, the operator tariff scheme for voice and video services applies.

R15-1-6   Operator voice and video services over cellular shall be disabled by the device in-flight mode. Voice and video calls over Wi-Fi may be possible (if offered by the operator and allowed by the airline, see note to 15.1.1).

R15-1-7   Wi-Fi based operator voice, as described in RCS 5.2 standard, shall only be available (if offered by the operator) if Wi-Fi capability is enabled on the device, the device is attached to a (public or private) Wi-Fi access point and the Wi-Fi access point has connection to the operator voice service

US15-2   **As a user, I want to use Operator Messaging Services irrespective of my chosen connectivity conditions.**

R15-2-1   The operator shall be able to zero rate data traffic which is induced by Operator Messaging and meter events instead.

NOTE: Signalling that is used for production of Operator Messaging shall be in the background and hidden from the user, i.e. also not metered.

R15-2-2   Operator Messaging over cellular shall be disabled by the device in-flight mode. Usage over Wi-Fi may be possible (if offered by the operator and allowed by the airline).

R15-2-3   RCS Messaging as part of Operator Messaging shall be, based on operator configuration (see R15-4-2), available over the cellular network when the cellular data switch is switched off.

R15-2-4   The SMS service shall be available whenever the device is registered to a cellular network.

R15-2-5   In domestic case and in roaming, the operator tariff scheme for Operator Messaging services applies.

R15-2-6   The operator MMS service shall be available whenever the device is registered to a cellular network.

R15-2-7   The various device settings for MMS (e.g., but not limited to, MMS auto-acceptance, MMS auto-acceptance in roaming, etc.) shall apply.

R15-2-8   The operator RCS Messaging Services shall be available whenever the device is connected to a cellular network or a Wi-Fi connection is available.

NOTE: Wi-Fi service offer is at the discretion of the operator.

R15-2-9   The operator may apply as part of the terms and conditions a "Fair Use Policy for Data Consumption of RCS Services on Home Network" which shall *Not* apply for usage on visited networks (e.g. in case of national or international roaming).

US15-3   **As a user, I want to use 3rd party services on my (smartphone) device or browse the Internet or an Intranet.**

R15-3-1   The operator Internet Access service shall be available whenever the device is registered to a cellular network and the user is enabled by the operator to use cellular data services.

R15-3-2   The device may offer Internet access services using a Wi-Fi connection as well. The user shall be free to select which access service shall be used for connection to Internet services at any point in time.

R15-3-3   Signalling that is required for the production of Internet-based 3rd party services is not separated from any user data and counted as such as user data.

R15-3-4   Internet-based 3rd party services are not available over cellular access when the cellular data switch is switched off.

R15-3-5   Internet-based 3rd party services can be accessed over Wi-Fi (if offered by the 3rd party) if Wi-Fi capability is enabled on the device, the device is attached to a (public or private) Wi-Fi access point and the Wi-Fi access point has connection to the Internet.

US15-4   **As an operator, I want to use various technologies for the production of operator communication services.**

R15-4-1   For production of operator voice, video and messaging services, the following technologies / bearers shall be considered in scope:

R15-4-1-1 CS call over 2G network

R15-4-1-2 CS call over 3G network

R15-4-1-3 VoLTE call over 4G network

R15-4-1-4 RCS IP call over Wi-Fi bearer

R15-4-1-5 SMS over 2G and 3G network

R15-4-1-6 IR.92 SMS over 4G network

R15-4-1-7 MMS over 2G and 3G network

R15-4-1-8 MMS over 4G network

R15-4-1-9 RCS Chat over 2G, 3G, 4G network or Wi-Fi bearer

R15-4-1-10 RCS File Transfer over 2G, 3G, 4G network or Wi-Fi bearer

R15-4-1-11 RCS In-Call services over 3G, 4G networks or Wi-Fi bearer

> *R15-4-1-12* RCS IP Video Call over 3G, 4G network or Wi-Fi bearer
>
> *R15-4-1-13* IR.94 ViLTE over 4G network
>
> *R15-4-1-14* Operator Provisioning over 2G, 3G, 4G networks or Wi-Fi bearer

R15-4-2   The availability of the services listed in requirement R15-4-1 shall be configurable on a per-operator basis as per the table below.

	Proposal to satisfy implementation scenarios	Example: Implementation Scenario 1	Example: Implementation Scenario 2	Example: Implementation Scenario 3
CS Voice (as in 15.4.1.1 to 15.4.1.2)	**Always on**	Always on	Always on	Always on
SMS (as in 15.4.1.5)	**Always on**	Always on	Always on	Always on
IP Voice (as in 15.4.1.3 to 15.4.1.4)	**Configurable**	Always on	Always off	Always on
PS xMS (as in 15.4.1.6 to 15.4.1.8)	**Configurable**	Always on	Always off	Always on
RCS Chat (as in 15.4.1.9)	**Configurable**	Always on	Always off	Configurable
RCS File Transfer (as in 15-4-1-10)	**Configurable**	Always on	Always off	Configurable
RCS In-Call Services (as in 15-4-1-11	**Configurable**	Always on	Always off	Configurable
RCS IP Video (as in 15-4-1-12)	**Configurable**	Always on	Always off	Configurable
ViLTE (IR.94) (as in 15.4.1.13)	**Configurable**	Always on	Always off	Configurable
Provisioning (as in 15.4.1.14)	**Configurable**	Always on	Always off	Always on

PS data/Internet Access	**Always off**	Always off	Always off	Always off
Note	**Any configuration affects device and network**			Any configuration affects device **and** network

Table 32: Summary of proposed implementation and desired behaviour of services when DATA is OFF

15.2 Technical Information

R15-5-1 The technical realization of data off behaviour is applicable to devices in the following way:

R15-5-1-1 TE1: For primary devices that use the IMS or HOSAPN for RCS (see ALWAYS USE IMS APN in section A.1.12 of [RCC.07] and RCS VOLTE SINGLE REGISTRATION in 'IP Voice Call', page 113) the complete behaviour is applicable.

R15-5-1-2 TE2: For primary devices that use the internet APN for RCS (see ALWAYS USE IMS APN in section A.1.12 of [RCC.07] and RCS VOLTE SINGLE REGISTRATION in 'IP Voice Call', page 113), the connectivity when data is switched off would be handled based on the provided value of the RCSE ONLY APN as described in section 2.9.1.4 of [RCC.07]. The data off behaviour is applicable only when an RCSE ONLY APN is configured.

R15-5-1-3 Secondary devices: Those are access agnostic and as a result the behaviour described is not applicable to such clients. When the cellular data switch is switched off, they would have no data connectivity on cellular networks and as a result in those circumstances they shall not be able to offer any operator services on such networks.

R15-5-2 For requirement R15-1-1, PS voice services shall be available if allowed by configuration (see 'IP Voice Call', page 113), supported by the current network coverage and allowed based on the current data off setting (see R15-5-21). If PS voice services are not allowed, a CS voice call shall be possible when the device is connected to a cellular 2G/3G network. When connected to an LTE network calls can in that case be provided through Circuit Switched Fall-Back. A CS voice call is not possible for a device that only has Wi-Fi coverage.

R15-5-3 For requirement R15-1-2, such zero rating is possible for the Home Public Landline Mobile Network (HPLMN) operator as well as for the Visited Public Landline Mobile Network (VPLMN) operator for the voice service itself. For the configuration of supplementary service by a VoLTE subscriber, the HPLMN operator can zero rate based on the specific destination of the traffic. Given that a home routed APN is used for XCAP, such differentiation of traffic may not be possible for the VPLMN operator.

NOTE: Rating in the VPLMN is only relevant for inter-operator charging and thus not directly for the end user. The inter-operator charging model should be such though that the end user model makes sense from business perspective.

R15-5-4 For requirement R15-1-3, see R15-5-2.

R15-5-5 Requirement R15-1-4 shall be implemented locally on the device taking into account the behaviour of RCS services in relation to the current data off setting configured as per R15-5-21.

R15-5-6 For requirement R15-1-5, see R15-5-3.

R15-5-7 Requirement R15-1-6 shall be implemented locally on the device when the operator has configured RCS IP Voice to be available over Wi-Fi (see 'IP Voice Call', page 113). Since the device has no defined way to find out automatically, compliancy to the airline policy for enabling Wi-Fi is up to the end user.

R15-5-8 Requirement R15-1-7 is fulfilled through the RCS IP voice service as described in 'IP Voice Call', page 113.

R15-5-9 For requirement R15-2-1, such zero rating is possible for the HPLMN operator for all services because messages and signalling always pass through the home network and target well defined addresses. That allows to differentiation from other traffic.

R15-5-10 For the VPLMN for requirement R15-2-1, zero rating would always be possible for SMS whereas MMS and File Transfer via HTTP use a home routed APN which will prevent the VPLMN from applying such differentiated charging in an easy way allowing only for generic volume based charging without differentiation between signalling and media. For the enablers for the other operator messaging services (RCS Chat, Standalone Messaging and File Transfer via MSRP) the situation for the VPLMN operator depends on whether or not IMS roaming is in place for RCS. Without IMS roaming or if RCS is not using IMS roaming (i.e. TE2), zero rating will not be possible allowing only for generic volume based charging without differentiation between signalling and media. If IMS roaming is in place, the VPLMN can differentiate between the signalling to establish the session and the media streams, but for the media stream itself only volume based charging can be applied without further differentiation.

R15-5-11 Requirement R15-2-2 shall be implemented locally on the device. Since the device has no defined way to find out automatically, compliancy to the airline policy for enabling Wi-Fi is up to the end user.

R15-5-12 Requirement R15-2-3 shall be implemented locally on the device taking into account the behaviour of RCS services in relation to the current data off setting configured as per R15-5-21.

R15-5-13 Requirement R15-2-4 is fulfilled for SMS over CS. When using SMS over SGs (Signalling Gateways) in LTE coverage, the device shall establish a data connection even when data is turned off in which case the device shall not allow any data over that connection (unless allowed as per R15-5-21). SMS over IP shall only be possible when Data is switched on or when SMS over IP is allowed when Data is off as per R15-5-21.

R15-5-14 For requirement R15-2-5, the HPLMN operator can apply any tariff scheme for any operator messaging service. For the VPLMN operator tariffs the restrictions in R15-5-10 should be taken into account.

R15-5-15 For requirement R15-2-6 MMS shall be available when data is off if allowed as per R15-5-21. This shall be implemented locally on the device.

R15-5-16 Requirement R15-2-7 shall be implemented locally on the device.

R15-5-17 Requirement R15-2-8 shall be implemented locally on the device when connected on Wi-Fi. When connected on cellular and when using the IMS APN, RCS messaging shall be available as per SMSOIP DATA OFF described in R15-5-21. When RCS is using the internet APN (TE2), RCS messaging shall be available as per section 2.9.1.4 of [RCC.07]: if data is on, RCS messaging shall be available. If data is off and RCS is using the internet APN, the RCSE-ONLY APN shall be used if configured and RCS Messaging shall be available on cellular networks if allowed as per R15-5-21. If no value is configured for the RCSE ONLY APN configuration parameter, RCS Messaging shall not be available on cellular networks in those circumstances.

R15-5-18 For requirement R15-2-9, a Fair Use Policy in the home network shall be possible as a consequence of R15-5-9. The operator can differentiate on whether the user is in the home or visited network based on the P-Access-Network-Info header field in the SIP signalling.

R15-5-19 For requirement R15-3-1, R15-3-2, R15-3-4 and R15-3-5, this shall be implemented locally on the device.

R15-5-20 For requirement R15-3-3, signalling generated by a 3rd party service cannot be differentiated from user traffic of that 3rd party service because the signalling is defined in a proprietary way by the 3rd party without involvement of the operator. As a consequence such signalling shall be considered as regular data traffic.

R15-5-21 Requirements R15-4-1 and R15-4-2 shall be realised according t section 2.9.1.5 and 2.9.1.6 of [RCC.07].

16 RCS Settings

16.1 Description

RCS is a Service Platform for Operators to develop and implement new communication services. To allow users to manage their RCS services appropriately, a "Settings" function needs to be implemented into devices / clients.

16.2 User Stories and Feature Requirements

US16-1 **As a user, I want to switch between RCS instances on one device to ensure smooth operation.**

NOTE: Details of the behaviour of this switch are described in 'Differences to previous versions

RCS Common Core 1.1 is a maintenance update that provides further clarification to existing requirements. The technical information has also been updated to align with RCS 5.3 (see section 1.5 of [RCC.07])

16.2.1   Summary of Changes

- Device Provisioning
  - o Alignment with [RCC.14] and [RCC.15]
- Capability Discovery and Service Availability
  - o Clarification on the behaviour of the CAPABILITY VALIDITY timer (see requirement R3-3-7-5-6)
- Operator Messaging
  - o Clarification to the Integrated Messaging requirements for proposed message selection (see section 4.2.1.1)
  - o Clarification on the DELIVERY TIMEOUT behaviour and technology selection logic for Integrated Messaging variant 1 (see section 4.2.3)
- One-to-One Chat
  - o Additional requirements for handling unseen messages and files (see requirements for user story US5-13).
- Group Chat
  - o Additional requirement introduced to allow the user to see who set up the Group Chat (see requirement R6-6-2).
- IP Voice Call
  - o Additional user story included to allow the user to see what the call bearer is in use for the call (see requirements for user story US10-12).
- Introduction of LED notifications for received one to one, group chat and file transfer messages
- Editorial clarifications to Audio Messaging and Messaging for Multi-device sections.

NOTE: Further improvements to the Messaging for Multi-device section (such as introduction of synchronisation triggers) are expected once the work of the Multi-device Messaging Operator Interest Group has been concluded

Device Provisioning', page 10.

R16-1-1 A RCS "Master Switch" shall be available to activate / deactivate the native RCS functionality on the device.

R16-1-2 There shall be various entry points on the device for the Master Switch, for example:

- Wireless and Networks settings on the device (if available)
- "Messaging" -> "Settings" (if implemented)
- "Messaging" -> "Settings" -> "Chat Service" (if implemented)

R16-1-3 If the Master Switch is visible from more than one location on the device, then the implementation shall be consistent (i.e. if the Master Switch is changed in one location, the change shall be consistent for all locations).

R16-1-4   Any download applications that have been installed on a device shall have own means to activate / deactivate the application (this may be provided by the application or the operating system of the device).

US16-2   **As a user, I want to set an RCS Chat Alias.**

R16-2-1   The user shall have the option to customise the name label which is presented during RCS Communications to participants for whom the user is not in the contact list.

US16-3   **As a user, I want to enable or disable IP Voice Calls.**

R16-3-1   Users shall be allowed to activate/deactivate the RCS IP Call using an appropriate switch.

R16-3-2   Default position shall be 'Activated'.

R16-3-3   This user setting shall be visible only when RCS IP Call is activated by the MNO.

US16-4   **[For Integrated Messaging] As a user, I want to switch on/off SMS Delivery Notification.**

R16-4-1   The user shall have the option to select or deselect automatically sending a Delivery Notification for SMS they receive in an Integrated Messaging scenario.

R16-4-2   The default setting shall be based on individual operator configuration.

US16-5   **As a user, I want to enable or disable automatic MMS download in Integrated Messaging.**

R16-5-1   The user shall have the option to enable or disable automatic MMS download in Integrated Messaging.

R16-5-2   The default setting shall be "enabled".

US16-6   **[Integrated Messaging only] As a user, I want to enable or disable MMS download in roaming case in Integrated Messaging.**

R16-6-1   The user shall have the option to enable or disable the automatic download of MMS whilst they are roaming.

R16-6-2   The default setting shall be "disabled".

US16-7   **As a user, I want to personalize my device and need access to settings that allow me to do so.**

R16-7-1   The user should have the option to personalize the native or downloadable RCS client. The following features should be covered:

- Notification sounds for incoming RCS events (e.g. One-to-One Messages, Group Messages, File Transfers)
- Notification preferences
- Customized ringtones (for RCS IP calls or Video over IP)

- Visual customization for chat (for example fonts, bubble styles, backgrounds etc.)

US16-8 **As a user, I want to enable or disable the sending of the notification that tells the sender the message was displayed.**

R16-8-1 The user shall have the option to enable or disable the sending of a notification to the sender that tells the sender the message was displayed.

R16-8-2 The default for this setting shall be "enabled".

US16-9 **As a user, I want to enable or disable automatic acceptance for File Transfer.**

R16-9-1 The user shall have the option to enable or disable auto-acceptance for incoming File Transfer:

R16-9-1-1 FT Auto Accept: I/O (default value set to I)

R16-9-1-2 FT Auto Accept while roaming: I/O (default value set to O)

US16-10 **As a user, I want to be able to control the image resizing options in RCS File Transfer.**

R16-10-1 The user shall have to option to set one of the following selections:

R16-10-1-1 always resize a selected option which is then stored as default value

R16-10-1-2 always ask

R16-10-1-3 never resize

R16-10-2 The default setting shall be "always ask".

R16-10-3 For downscaling pictures, the following requirements shall apply:

R16-10-3-1 The size of the image shall be reduced using following algorithm: Scale both dimensions by the same factor F (same for width and height so the aspect ratio is maintained). Compress as JPG with q=75%. Compare the new image size with the original, and only offer the possibility to resize if the resulting file is smaller than the original one.

R16-10-3-2 The default scale factor F for the image shall be, F = min (1280/w, 1280/h, 1.0). It shall be noted the w (width) and the h (height) shall be used in pixels for the calculation.

R16-10-3-3 If the factor (F) is 1, the original image shall be transferred.

US16-11 **As a user, I want to be able to control the video resizing options in RCS File Transfer.**

R16-11-1 The user shall have to option to set one of the following selections:

R16-11-1-1 Always resize to a selected option which is then stored as default value

R16-11-1-2 Always ask

*R16-11-1-3*Never resize

R16-11-2 The default setting shall be "always ask".

R16-11-3 The resizing options shall be based on OEM / developer choices including the default value of 480p @ 1200kbps.

R16-11-4 When the set of resizing options are presented to the user, the default one highlighted or selected shall be 480p encoded at a rate of 1200 kpbs.

R16-11-5 The video resizing shall be accomplished in the background and the user shall be able to take control of the phone instantly (to e.g., but not limited to, answer incoming calls, make a call, etc.).

US16-12 **As a user, I want to enable or disable the LED notification (if such function is supported by my device).**

R16-12-1 The user shall have the option to enable or disable the device LED for incoming message or File Transfer notification.

R16-12-2 The default setting shall be "enabled".

US16-13 **As a user, I want to enable or disable vibration notification for new incoming RCS messages or File Transfers.**

R16-13-1 The user shall have the option to enable or disable the device vibration for incoming message or File Transfer notification.

R16-13-2 The default setting shall be "enabled".

US16-14 **As a software developer, I want to display on request an 'about' page that explains details of the RCS client.**

R16-14-1 The device shall provide the user with an 'about' page that indicated the version of the device and the RCS implementation to allow efficient identification of the client / device details.

US16-15 **[FOR INTEGRATED MESSAGING] As a user, I want to be able to change my preference for whether undelivered RCS messages are automatically sent again by SMS or not.**

R16-15-1 The user shall be able to set one of the following options:

R16-15-1-1 Always resend undelivered RCS messages as SMS,

R16-15-1-2 Always ask,

R16-15-1-3 Never resend undelivered RCS messages as SMS.

R16-15-2 The default setting shall be "always ask".

16.3 Technical Information

> *US16-16* A number of requirements for service configuration parameters on the client are provided.The technical implementation of the requirements for user story US16-1 are provided in ''Differences to previous versions

RCS Common Core 1.1 is a maintenance update that provides further clarification to existing requirements. The technical information has also been updated to align with RCS 5.3 (see section 1.5 of [RCC.07])

16.3.1   Summary of Changes

- Device Provisioning
  - Alignment with [RCC.14] and [RCC.15]
- Capability Discovery and Service Availability
  - Clarification on the behaviour of the CAPABILITY VALIDITY timer (see requirement R3-3-7-5-6)
- Operator Messaging
  - Clarification to the Integrated Messaging requirements for proposed message selection (see section 4.2.1.1)
  - Clarification on the DELIVERY TIMEOUT behaviour and technology selection logic for Integrated Messaging variant 1 (see section 4.2.3)
- One-to-One Chat
  - Additional requirements for handling unseen messages and files (see requirements for user story US5-13).
- Group Chat
  - Additional requirement introduced to allow the user to see who set up the Group Chat (see requirement R6-6-2).
- IP Voice Call
  - Additional user story included to allow the user to see what the call bearer is in use for the call (see requirements for user story US10-12).
- Introduction of LED notifications for received one to one, group chat and file transfer messages
- Editorial clarifications to Audio Messaging and Messaging for Multi-device sections.

> NOTE: Further improvements to the Messaging for Multi-device section (such as introduction of synchronisation triggers) are expected once the work of the Multi-device Messaging Operator Interest Group has been concluded

> *R16-16-2* Device Provisioning', page 10.

> *R16-16-3* The requirements for user story US16-2 shall be implemented locally on the device. The value of the parameter is used by the client to populate the User Alias as defined in 2.5.3.3 of [RCC.07].

> *R16-16-4* The requirements for user story US16-3 shall be implemented locally on the device. The client configuration is only relevant if the service provider has activated the IP Voice Call on the device via the PROVIDE RCS IP VOICE CALL configuration parameter defined in section A.1.13 of [RCC.07]. If IP

Voice Call is disabled by the user the device shall behave with regard to the procedures in [RCC.07] as it has been disabled by the service provider.

R16-16-5 As a clarification to the requirements for user story US16-4, it shall be noted that the SMS STATUS REPORT to notify the sender of a successful delivery is sent by the Service Centre and not by the receiving device. To prevent the SC to send SMS STATUS report the originating client shall not request an SMS STATUS REPORT when submitting a short message. Thus the client configuration *Shall* allow the sending client to request or not request SMS STATUS REPORT for sent messages.

NOTE: This is only relevant when the MessagingUX parameter is set to 1

R16-16-6 The configuration parameter defined in the requirements for user stories US16-5 and US16-6, controls the retrieval behaviour (immediate or deferred retrieval) of the MMS user agent of the integrated messaging client.

NOTE: This setting shall only be available when the MessagingUX parameter is set to 1

R16-16-7 The requirements for user story US16-7 shall be implemented locally on the device.

R16-16-8 If generating notifications about messages being displayed is disabled in accordance with the requirements for user story US16-8, then a client receiving a message or file shall disregard the disposition notification header with value "display" and not generate a notification for "displayed".

R16-16-9 The configuration parameters for automatic acceptance of File Transfer shall be implemented locally on the device. The parameters shall overwrite the service provider auto acceptance settings provided by the FT AUT ACCEPT defined in section A.1.5 of [RCC.07]. The FT AUT ACCEPT value received in the client configuration provides the default settings of the FT Auto Accept parameter controlled by the user. Once the user has altered the settings the value of FT AUT ACCEPT from the device configuration becomes irrelevant.

R16-16-10 The requirements for user stories US16-10 to US16-15 shall be implemented locally on the device.

Annex A   Supporting requirements

A.1   Personal Card format

Current implementations of the vCard standard by different device manufacturers leads today to data loss of certain contact information, when this information is exchanged among devices or synced with network address books. An RCS compliant device shall support receiving at a minimum, vCard 2.1 [vCard21] and vCard 3.0 formats [RFC2425], [RFC2426], and may support also the Personal Contact Card (PCC) format [CAB_TS].

The following fields are considered key fields. No data of these fields should be lost when contact information is exchanged by any means (peer to peer contact sent, uploaded, synchronized, etc.):

- Name
- Telephone numbers
- Email addresses
- Address information
- Personal information

- The Minimum subtypes that should be supported are defined in the PCC definition in [CAB_TS]:
- Name: Composed names (such as "Jean-Baptiste") shall be supported properly
- Personal Information

  - Nickname
  - Photo
  - Birthdate
  - Comment

- Telephone number: At least the following subtypes of telephone number shall be supported:

  - Land home
  - Land work
  - Land other
  - Mobile home
  - Mobile work
  - Mobile other
  - Fax work
  - Fax other
  - Beeper
  - Other

- Email addresses: The following subtypes shall be supported:

  - Email work 1
  - Email work 2
  - Email home 1
  - Email home 2

          o   Other

- Address information

        o   Address
        o   Geographic Position
        o   Time zone

Sending and receiving a contact card via File Transfer is technically the same as sending any other file.

If the format for pushing a contact card file is vCard 2.1 or 3.0 formats, the MIME (Multipurpose Internet Mail Extensions) type that shall be used for the File Transfer is "*text/vcard*".

If the format for pushing the contact card is CAB (Converged Address Book) 1.0 PCC XML format, then the CAB PCC MIME type "*application/vnd.oma.cab-pcc+xml*" shall be used.

On the receiving side, after the receiving RCS user accepts the contact card file delivered through File Transfer, the receiving RCS client shall apply the mapping of the RCS supported fields between the received format (CAB PCC XML for example) and the used format of the local address book database[4].

vCard 3.0 format is recommended in RCS.

If the receiving side does not support the offered format identified in *the a=file-selector* attribute of the SIP INVITE SDP, it should reject the File Transfer invitation with an error response indicating it does not support the content-type, which then causes the sending side to initiate a second File Transfer, this time sending the contact card in a different format.

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[4] If the conversion between PCC and vCard is required, please see [CAB_TS] section 5.4.3 "Format Adaptation".

A.2   Emoticon conversion table

Standard Emoticons

Emoticons	Character sequences	Examples describing graphical renditions
Happy, smile	☺ or :)	A happy or smiling face
Sad	:-(or :(	A sad face
Wink	;-) or ;) or ;o) or ;O)	A winking face
Big grin	:-D or :D or :oD or :-d or :d or :od or :Od or :OD	A big grin face
Confused	:-/ or :-\	A confused face
Blushing, embarrassed	:'-) and :"-) or :') or :'> or :-$ or :$	A blushing, embarrassed face
Stick-out tongue	:-P or :P or :oP or :-p or :p or :op or :OP or :Op	A stick-out tongue face
Kiss, red lips	:-* or :*	A kissing face or red lips
Shocked, surprised	:-O or :-o or :o or :O	A shocked, surprised face
Angry	:-@ or :@ or X-(or X(or x-(or x(or xo(or XO(	An angry face
Cool, sunglasses	B) or B-) or (H) or (h) or Bo) or BO)	A face with sunglasses
Worried	:-S or :S or :-s or :s or :oS	A worried face
Devilish	>:-) or >:) or >:o) or >:O)	A devilish face
Crying	:,-(or :,(or :'-(or :'(or :,o(or :'o(or :,O(or :'O(	A crying face
Laughing	:-)) or :)) or :o)) or :O))	A laughing face
Straight face, disappointed	:-| or :| or :o| or :O|	A straight face
Angel, innocent	O:-) or O:) or o:-) or o:)	An innocent face
Nerd	:-B or :B	A nerdish face
Sleepy	|-O or |O or |-o or |o	A sleepy face
Rolling eyes	8-) or 8) or 8o) or 8O)	A rolling eyes face
Sick, ill	:-& or :& or ;o& or :O&	A sick/ill face
Shhh! No speak, lips sealed	:-SS or :SS or :ss or :-ss	A face with sealed lips
Thinking, pensive	:-? or :?	A pensive face
Raised eyebrow, sarcastic look	/:-) or /:) or /:o) or /:O)	A raised eyebrow face or a face with a sarcastic look
Rose, flower	@):-	A rose
Cup of coffee	~o)	A cup of coffee
Drink, cocktail	)-|	A cocktail glass
Idea (light bulb)	*-:-) or *-:)	A light bulb

Emoticons	Character sequences	Examples describing graphical renditions
Love struck, heart	(L) or <3	A heart
Beer	(b) or (B)	A pint of beer
Broken Heart	(u) or (U) or \Z/	A heart broken in two
rock on!	\m/	A smiling face with rockstar fingers
pirate	:ar!	A face with eye patch
silly	8-}	A face with wobbly mouth and spinning eyes
applause	=D>	A face with clapping hands
Penguin	<(')	A small penguin
Music Note	-8	A semi quaver
Star	(*)	A gold star
Clock	(o) or (O)	A clock face
Pizza	(pi) or (PI)	A slice of pizza or a whole pizza
Money	(mo) or (MO)	Coins or notes or coins and notes
Sheep	(bah) or (BAH)	A sheep
Pig	:8)	A pig's face
Sun	(#)	A shining sun
Rain Cloud	(st) or (ST)	A cloud with rain or cloud with rain drop
Umbrella	(um) or (UM)	An open umbrella
Aeroplane	(pl) or (PL)	A plane
Birthday Cake	(^)	A cake with candles
Party!	<:o)	A face wearing a party hat and blowing a party blower
Film	(~)	A roll of film or strip of film
Gift	(g) or (G)	A gift wrapped present with bow
Phone	(t) or (T)	A hand receiver with cable
Wave	:-h	A face with hand waving
Big hug	>:D<	A face with hands hugging itself

A.3　Unicode Standard "Emoji" Emoticons

The list of required Emoji that must be graphically rendered and offered to the user, and the mapping to relevant Unicode blocks, is detailed in document "joyn Blackbird Unicode Standard Emoji Emoticons version 1.0", available from http://www.gsma.com/network2020/wp-content/uploads/2013/05/RCS-joyn-Blackbird-Unicode-Standard-emoji-emoticons-v1-0-2.pdf.

Annex B　Document Management

B.1　Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	16/09/2014	New PRD RCC.61	PSMC	Wadé Owojori / GSMA
2.0	03/03/2015	Maintenance update and alignment with RCS 5.3	GFRG	Wadé Owojori / GSMA

B.2　Other Information

Type	Description
Document Owner	RCS Global Functional Requirements Group
Editor / Company	Wadé Owojori / GSMA

It is our intention to provide a quality product for your use. If you find any errors or omissions, please contact us with your comments. You may notify us at prd@gsma.com

Your comments or suggestions & questions are always welcome.