Image Share Interoperability Specification
Version 2.0
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Table of Contents

1 Introduction

1.1 Overview

This document describes the terminal interoperable Image (Live & Pre-stored) Share service.

The terminal interoperable Image Share service allows users to share Images between them over PS connection with ongoing CS call, thus enhancing and enriching end-users voice communication. Image Share is a one-to-one combinational service utilizing 3GPP compliant IMS core system and 3GPP CSI (TS 24.279) based solution, session is set up using SIP and image data is transferred using MSRP.

The Message Session Relay Protocol (MSRP), as used by OMA SIMPLE IM specification (following the IETF draft on Alternative Connection Model, draft-ietf-simple-msrp-acm-00.txt), is mandatory for the Image Share Service. Image data information settings in SIP/SDP follow IETF RFC 5547.

It should be noted that Image Share uses just parts of RFC 5547 that are necessary, i.e. it is not necessary to use all the features of RFC 5547 for Image Share purposes. For example Image Share uses single body (just SDP) SIP messages instead of such as multi-body (both SDP+icon) messages. Also wrapper (message/cpim) is not utilized in this specification version, since only one-to-one sharing is in the scope of Image Share. However, Image Share implementations need to be able to understand and handle all SIP/SDP parameters described in above mentioned RFC 5547 when receiving a request for Image Share. This is needed in order to ensure compatibility with terminals supporting all the features of the RFC 5547 e.g. terminal supporting possible newer release of Image Share service.

Image Share uses P2P model, i.e. applications are built in terminals thus a separate Application Server in the network is not needed.

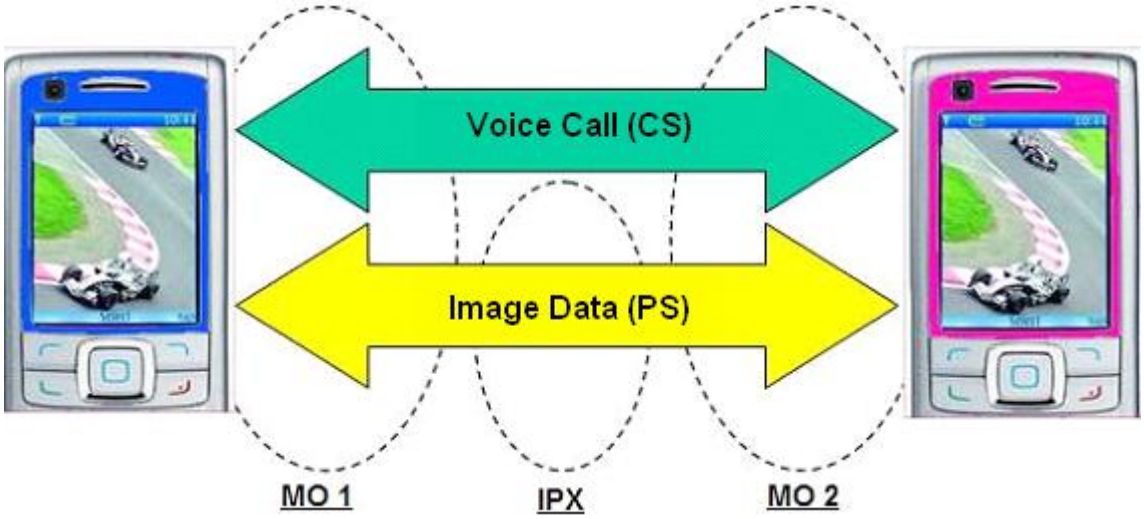

Figure 1: High-Level Figure of Image Share Connection

The Image Share service is a vendor independent application, i.e. interoperable between different terminals, as well as between terminals and different IMS core systems.

Note: The term “*P2P*” in this context means “Peer-to-Peer”.

1.2 Scope

The aim of this document is to present the technical principles for the terminal interoperable Image Share service.

Out of scope for this particular document are general issues not directly related to the Image Share service itself. For example 3GPP compliant IMS core systems are a prerequisite for Image Share, but they are not detailed in this document.

Conformance testing/certification in general are out of scope for this document.

Also out of scope for this release of document are:

- Other services/applications
- PSTN related issues
- Commercial issues
- Back-office functions (e.g. O&M)
- Load-balancing, high availability, etc.

1.3 References

Ref	Doc Number	Title
[1]	3GPP TS 24.008	Mobile radio interface Layer 3 specification; Core network protocols; Stage 3
[2]	3GPP TS 24.229	Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3
[3]	3GPP TS 24.279	Combining Circuit Switched (CS) and IP Multimedia Subsystem (IMS) services; Stage 3
[4]	3GPP TS 26.141	IP Multimedia System (IMS) Messaging and Presence; Media formats and codecs
[5]	IETF RFC 4975	The Message Session Relay Protocol
[6]	IETF RFC 5547	A Session Description Protocol (SDP) Offer/Answer Mechanism to Enable File Transfer
[7]	GSMA IR.74	Video Share Interoperability Specification
[8]	OMA Presence SIMPLE	Presence SIMPLE Enabler
[9]	OMA SIMPLE IM	SIMPLE IM Enabler

2 Image Share

2.1 General

Basically Image Share session consists of the following steps:

1. CS call setup
2. Capability query
3. Invitation procedure (SIP)
4. Image transmission (MSRP)
5. Termination procedure (SIP)
6. Teardown of CS call

The following figure illustrates the general flows used in Image Share. Note that the figure is simplified for clarity reasons, for example network elements between UEs are not shown.

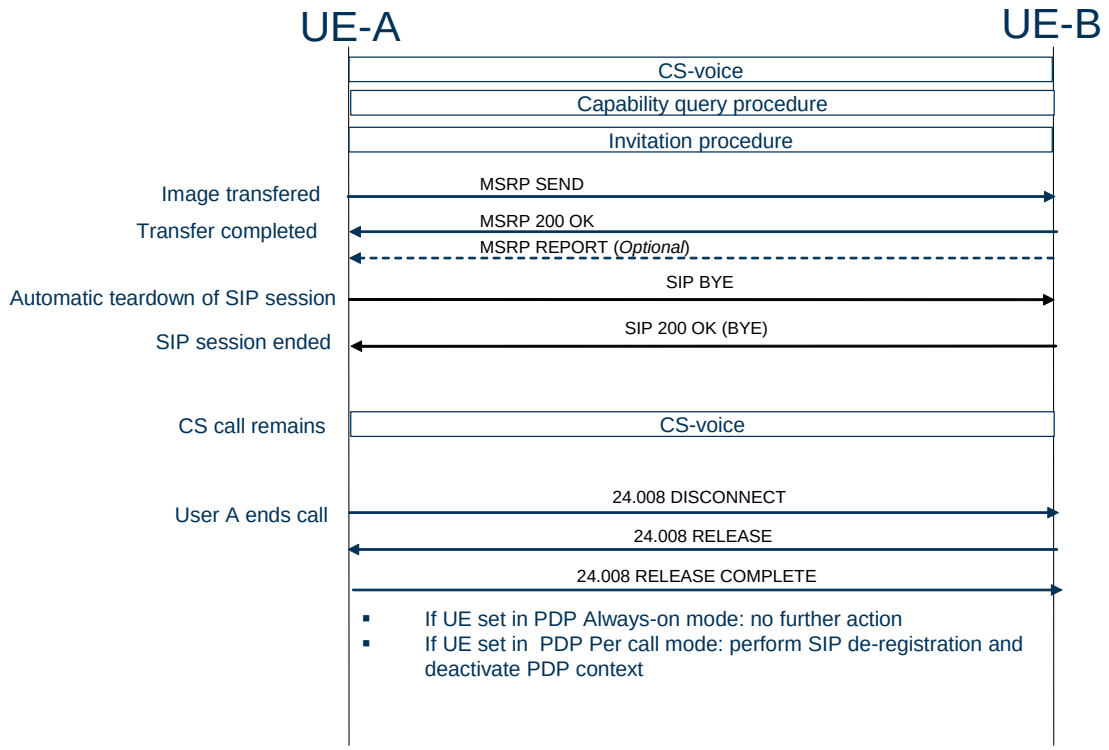

Figure 2: General View of Flows for the Image Share Service

Closing of IS session is performed by both sides tearing down the SIP session. After this is done each side shall initiate closing of the TCP connection.

Besides the case in figure 2 above, the SIP session is torn down by the terminal (A or B) party that may have lost the MSRP(TCP) connection with the other terminal e.g. due to the other terminal having made a handover to a non-DTM 2G access during the image transmission phase.

The end-user can send multiple pictures during the CS session by establishing a new SIP session for transferring the next picture after the previous session has been torn down.
This allows an operator utilizing a peer-to-peer architecture (see chapter 1) to offer the multiple image service and still be able to provide per image charging.

2.2 Service Identification

Service identifier (based on 3GPP TS 24.229) indicates that the terminal is capable of supporting certain media features. Service identifier tag is used to identify the media aspects of service/application for a variety of purposes both by terminal and network. Terminals can use service identifier to indicate their capabilities to the network. Service identifier can also be included in CDRs and inter-operator agreements as a part of a service based agreement and charging framework across operators.

The service identification structure used for Image Share consists of:

1. Communication Service ID
2. Application ID

1. Refers 3GPP Communication Service ID (ICSI) as specified in subclause 7.2A.8 of 3GPP TS 24.229.
2. Refers to 3GPP specified IMS Application Reference Identifier (IARI) as specified in subclause 7.2A.9 of 3GPP TS 24.229. Using IARI *urn:urn-7:3gpp-application.ims.iari.gsma-is* indicates that terminal supports the Image Share IMS service.

Image Share terminal supporting CS voice uses the CSI feature tag *+g.3gpp.cs-voice* together with the Image Share IARI *urn:urn-7:3gpp-application.ims.iari.gsma-is*. The *+g.3gpp.cs-voice* feature tag is defined in 3GPP TS 24.279 and used by a terminal that supports voice in a circuit switched environment within the context of combining a circuit switched voice call with an IMS session.

IARI is coded as a URN and included into the Accept-Contact and Contact headers of SIP messages by using the 3GPP defined media feature tag: *+g.3gpp.iari-ref*. Note that any colons in URN are replaced by "%3A" when included in media feature tags. For example:

+g.3gpp.iari-ref="urn%3Aurn-7%3A3gpp-application.ims.iari.gsma-is"

The following SIP messages carry these service identifiers:

- INVITE (in Accept-Contact and Contact header)
  - 200 OK (in Contact header)
- OPTIONS (in Accept-Contact and optionally in Contact header)
  - 200 OK (in Contact header)
- REGISTER (in Contact header, handling of service identifier in REGISTER method in the network is optional)
  - 200 OK (in Contact header)

In addition, an Image Share UE must populate the P-Preferred-Service, and the network must populate the P-Asserted-Service, with the ICSI for use with Image Share.
The ICSI to be used for Image Share is: "urn:urn-7:3gpp-service.ims.icsi.oma.cpm.largemsg".

NOTE: The ICSI is originally defined by OMA CPM Standalone Messaging – Large Message Mode. Due to the similarities in network behaviour for the service, this ICSI is also reused for Image Share.

In order to make service identifiers actually useful for the purposes listed above, usage of all the service identifiers as listed above is mandatory. Note that only the Communication Service ID can be part of OPTIONS message, since IARI doesn't add any value for the purpose of network routing the OPTIONS message. See Chapter 2.3. for further details on service identifier used with OPTIONS.

NOTE: Other possible service identifiers (such as for the PoC service) are not excluded. For example, a terminal may optionally in the SIP messages above set an additional service identifier(s) besides the Image Share specific ones. The sending terminal shall not require the receiving terminal to understand the additional service identifier(s).

Hence, the receiving terminal may ignore the additional service identifier(s) and handle only the Image Share specific service identifiers. A terminal that chooses to utilize the Image Share service identifiers and additional service identifier(s) when sending SIP messages, shall be able to receive SIP messages (INVITE, OPTIONS, 200 OK) that do not include any additional service identifier(s), and still invoke Image Share.

The preferred way is to let service identifier(s) be set in every SIP message that can carry a service identifier i.e. in every SIP message that has a contact header and/or an accept-contact header, both requests and responses.

In addition to the ICSI/IARI mechanism described above, it is possible to utilize OMA Presence Simple enabler for exchanging the capability information. Value "*org.gsma.imageshare"* of the field <service-id> inside the Presence data element <service-description> indicates support for Image Share service. For further information refer to OMNA Presence <service-description> Registry:

http://www.openmobilealliance.org/Tech/omna/omna-prs-PidfSvcDesc-registry.aspx

2.3 Capability Query

Image Share session begins with CS call between UE A and UE B. After the CS call is set up, the capabilities of the other terminal can be queried to find out if the recipient is capable of supporting Image Share session or not. This is performed with the SIP OPTIONS method. A positive response to the query is sent using 200 OK. Both UEs perform this query. Additionally it is possible to utilize OMA Presence Simple enabler for exchanging capabilities. This is performed using the Presence <service-description> element as illustrated in the previous Chapter.

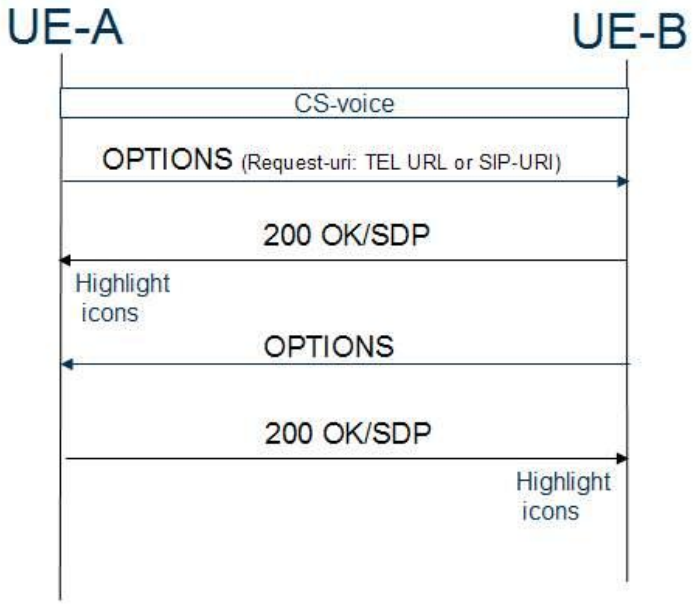

Figure 3: Capability Query using SIP OPTIONS

Icons can be used in the terminal UI to show the user that an Image Share session towards a particular recipient can be set up if that recipient has indicated supports for Image Share service.

SDP information contains the following kind of information for Image Share (UE B responses with 200 OK to OPTIONS query):

m=message 0 TCP/MSRP *
a=accept-types:text/plain text/html image/jpeg image/gif image/bmp image/png
a=file-selector
a=max-size:4096

SDP information contains the following kind of information for a terminal capable of Video Share only (see IR.74 *Video Share Interoperability Specification*)

m=video 0 RTP/AVP 96
a=rtpmap:96 H263-2000/90000

SDP information contains the following kind of information for a terminal capable of *both* Video Share (see IR.74) and Image Share:

m=video 0 RTP/AVP 96
a=rtpmap:96 H263-2000/90000
m=message 0 TCP/MSRP *
a=accept-types:text/plain text/html image/jpeg image/gif image/bmp image/png
a=file-selector
a=max-size:4096

SDP of the 200 OK in response to the OPTIONS query shall contain only a single message media description session indicating all the supported content types.

Note that in some cases only one UE uses OPTIONS query. For example if UE A has capability information about UE B already available (cached from earlier query), then UE A does not need to send an OPTIONS query.

According to 3GPP specifications it is possible to use either parallel or sequential method of capability query. UE B can send OPTIONS immediately (in parallel to UE A) or UE B can send OPTIONS only after being queried first by UE A.

Instead of 200 OK it is possible to receive an error response, such as 4xx (except 480), 5xx or 6xx SIP error. If *480 Temporary Unavailable* is received, UE may retry 1~3 times after each X seconds. Upon receiving any other error message or upon receiving 480 on the last retry or, the UE should treat the remote party as not having the Image Share Service enabled. Note: an error response can also come from the network instead of UE.

OPTIONS message shall include the CSI feature tag *+g.3gpp.cs-voice* in the Accept-Contact header. Response to OPTIONS query:

- A responding Image Share only capable terminal shall include the Image Share IARI *urn%3Aurn-7%3A3gpp-application.ims.iari.gsma-is* in Contact header of 200 OK (OPTIONS)

2.4 Session Setup

After capabilities of both ends are known and the user has located the target image, the next step is the actual Image Share session setup. SIP session setup for Image Share SHALL use IETF mode of SIP signaling:

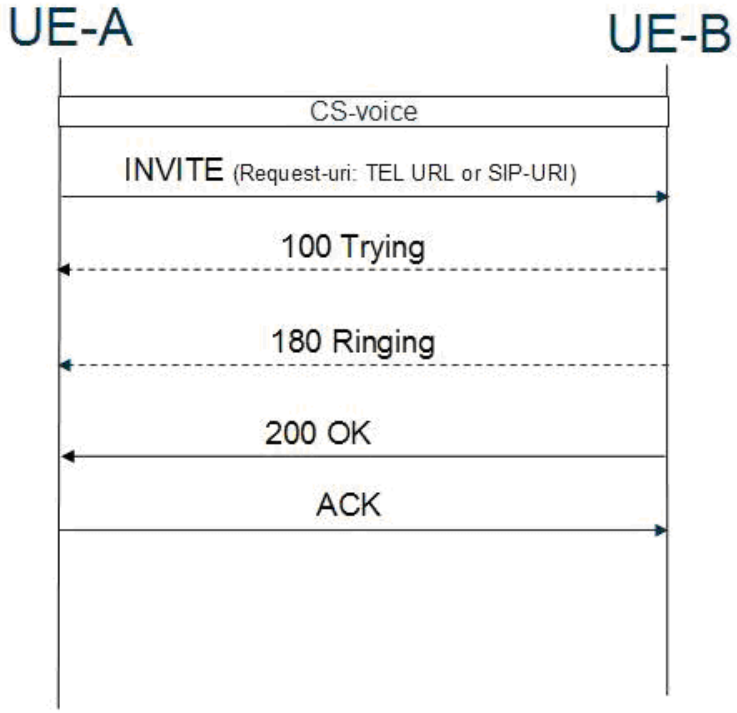

Figure 4: Session Setup in Image Share

The following example between two terminals supporting CS voice and Image Share shows what kind of information is carried within SDP in invitation procedure:

Note that sect

INVITE
(Accept-Contact:; +g.3gpp.cs-voice; +g.3gpp.iari-ref ="urn%3Aurn-7%3A3gpp-application.ims.iari.gsma-is"; explicit)*
m=message [*portUE-A*] TCP/MSRP *
i=This is my latest picture
a=sendonly
a=path:[*MSRP URL UE-A*];tcp
a=accept -types:*
a=file-selector:name:"My cool picture.jpg" type:image/jpeg size:32349
a=file-transfer-id:vBnG916bdberum2fF
a=file-disposition:render

200 OK
(Contact: +g.3gpp.cs-voice; +g.3gpp.iari-ref ="urn%3Aurn-7%3A3gpp-application.ims.iari.gsma-is")
m=message [*portUE-B*] TCP/MSRP *
a=recvonly
a=path:[*MSRP URL UE-B*];tcp
a=accept -types:*
a=file-selector:name:"My cool picture.jpg" type:image/jpeg image/jpeg size:32349
a=file-transfer-id:vBnG916bdberum2fF

Sections within brackets are service identifiers. Sections in square brackets are session related information.

INVITE message can contain more standard headers than the ones explicitly mentioned above. One of them is the P-Asserted-Identity header. If it is included and it contains the tel URI of the sender, the recipient UE can use this value to check whether the incoming SIP request matches the user in the CS call. Replies to the incoming INVITE message shall be SIP 603 in case the recipient does not accept the Image Share invitation.

- SDP attribute optionality is described below:

- a=recvonly (Shall be set by session terminating side)
- a=sendonly (Shall be set by session originating side)
- a=path (Shall be set)
- a=accept-types (Shall be set)
- a=file-selector (Shall be set)
- a=file-transfer-id (Shall be set)
- a=file-disposition (May be set by originating side)
- i= (May be set by originating side)
- m-line (Shall be set)

It is recommended to follow the RFC 5547as referenced in Chapter 1, namely that both sender and receiver shall include the a=file-selector attribute. The 'file-selector' attribute is composed of one or more selectors which parametrize the file to be transferred. According to RFC 5547 there are four selectors in this attribute: 'name', 'size', 'type', and 'hash'. But for Image Share it shall contain at least the 'type' parameter since the content-type must be known a priori anyhow in order to transfer the image data ('type' must be set in Content-Type header of MSRP SEND).

A terminal knowing the size of the image would be strongly recommended to set a=file-selector:type:image/jpeg size:<*size of the file in octets*>.

The ‘file-transfer-id’ attribute shall be set to uniquely identify the file transfer session.

Default disposition of the received image is to immediately render the image on the display. Originating terminal may set a=file-disposition: render attribute.

2.5 Image Transmission

After the SIP session is established, the image data will then be transmitted from UE A to UE B via a uni-directional MSRP connection. The following figure shows the general message flow in the user plane.

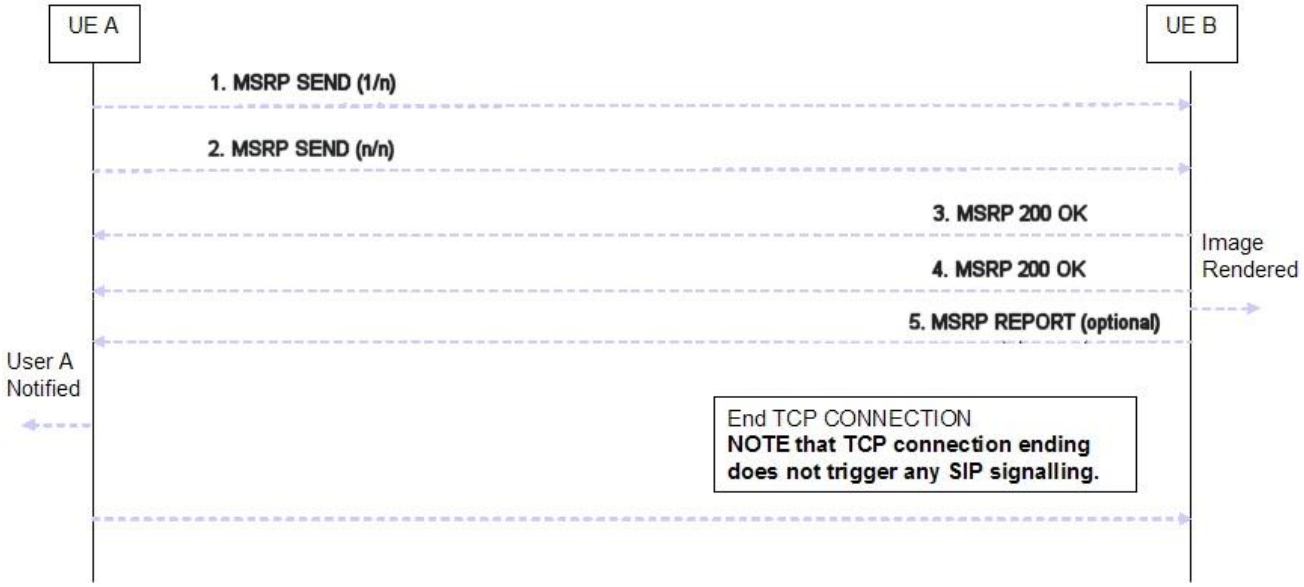

Figure 5: Data Transmission in Image Share

UE A is not mandated to request a successful REPORT. If no successful REPORT is requested, then UE A will need to determine from the last MSRP 200 OK that transfer was successful. Expectations on reports are set in MSRP headers.

It is recommended for the sender to send all data en-block in one MSRP SEND message. Receiver should though be ready to receive all data in chunks.

2.6 Other Features

Radio access for Image Share is WCDMA*

- Interactive class used

Image format

- JPEG mandatory
- GIF is optional
- BMP is optional
- PNG is optional

Details for image format as specified in 3GPP TS 26.141 *IMS Messaging and Presence: Media Formats and codecs* will be followed.

An IMS authentication scheme must be supported (no special authentication of Image Share service as such). The authentication used should be independent of the set-up profile.

SigComp can be used, but it is not mandatory.

Both PDP Always-on and PDP Per Call modes can be used. The Always-on method is preferred over the Per call method due to it decreasing the risk of SIP registration racing conditions and causing less radio access traffic load

- If PDP Per Call mode is used, SIP registration and PDP activation performed upon CS call

Both tel URI and SIP URI addressing schemes can be used

- Networks, terminals and Image Share application need to support tel URI addressing
- Terminals need to support tel URI / MSISDN carried within SIP OPTIONS
- It is assumed that UE B receives the Calling Line presentation in E.164 format

IPv4 will be used for Image Share (terminals might support also IPv6).

Image Share Session Termination: Either subscriber shall have the option to end the Image Share session and maintain the voice call. Upon termination of the host voice call, the Image Share session shall be terminated. The SIP BYE message must be sent if Image Share is dropped. Users should be able to share image, stop sharing, and restart sharing all within a single voice call. The re-initiation must include the whole setup procedure, including the SIP INVITE and SIP BYE.

*) Image Share over EDGE/DTM networks is not excluded. Implementations may use DTM class 5 or 9 or 11, and interactive for the image transmission. DTM Class 11 gives higher bandwidth throughput than DTM class 5 (around 60 kbps vs 30 kbps in average). Interactive class is recommended for the sake of radio resource saving.

*) Image Share over LTE network is not excluded. Implementations may use LTE Quality of Service class identifier (QCI) 8 or 9 for the image transmission.

Annex A Document Management

A.1 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
0.1 -0.93	4 July 2006 - 17 January 2008	Initial draft versions		
1.0	28 January 2008	Final version for public distribution		
1.1	10 April 2008	Incorporated Minor CR01 (Packet Doc 34_013)		
1.2	24 August 2009	Incorporated Minor CR02 (Packet Doc 40_004 rev2)		
1.3	20 December 2010	Incorporated Minor CR03 (RILTE Doc 13_011)	RILTE#13	Tero Jalkanen / TeliaSonera
1.4	29 March 2011	Incorporated Minor CR04 (RILTE Doc 16_014)	RILTE#16	Tero Jalkanen / TeliaSonera
2.0	28 October 2014	Incorporated Major CR1001 (Updates for Service Identification)	IREG	Tero Jalkanen / TeliaSonera

A.2 Other Information

Type	Description
Document Owner	IREG
Editor / Company	Tero Jalkanen / TeliaSonera

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