

3GPP TR 22.953 V11.0.0 (2012-09)

Technical Report

3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Multimedia Priority Service feasibility study (Release 11)



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Keywords

LTE, UMTS, priority

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

<http://www.3gpp.org>

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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

This Technical Report (TR) presents the results of the feasibility study on Multimedia Priority Service. The intent of this feasibility study is to assess the ability of 3GPP specifications to meet high-level requirements identified for Multimedia Priority Service. This feasibility study consisted of a multi-step process, namely:

- Identify high-level requirements for Multimedia Priority Service.
- Determine relevant 3GPP specifications for Multimedia Priority Service.
- Perform a gap analysis to assess the ability of existing 3GPP specifications to meet the high-level Multimedia Priority Service requirements.

As defined in this document, Multimedia Priority Service allows qualified and authorized users to obtain priority access to the next available radio channel on a priority basis before other PLMN users during situations when PLMN congestion is blocking session establishment attempts. In addition, Multimedia Priority Service supports priority sessions on an "end-to-end" priority basis.

Multimedia Priority Service is intended to be used by qualified and authorized users, i.e., emergency service personnel, only during times of emergency situations and network congestion. Access to Multimedia Priority Service is limited to key personnel and those with leadership responsibilities and is not intended for use by all emergency service personnel. This is to ensure that emergency service personnel cannot "take over" the network and deny other non-emergency service subscribers a reasonable level of service.

Multimedia Priority Service providers should adhere to uniform, nationwide operating access procedures. Multimedia Priority Service can provide significant benefits for public safety. There may be times during emergencies when non-Service Users will be unable to obtain access to their wireless services (because Multimedia Priority Service personnel are using the channels); nevertheless, the benefits of Multimedia Priority Service outweigh any inconvenience to non-Service Users.

It is assumed that Multimedia Priority Service will be available at all times in equipped markets in both the HPLMN and VPLMN within a country where the PLMN provider is offering the service. The capability for pre-emption could be supported, with the option to turn it on/off depending on regional requirements. Multimedia Priority Service is applicable to both GERAN and UTRAN and is activated on a per session basis using Multimedia Priority Service procedure described in clause 4.8.

Multimedia Priority Service, supported by the 3GPP system set of services and features, is one element in the ability to deliver calls of a high priority nature from mobile to mobile networks, mobile to fixed networks, and fixed to mobile networks.

1 Scope

This Technical Report (TR) presents the results of the feasibility study on Multimedia Priority Service. The intent of this feasibility study is to assess the ability of 3GPP specifications to meet high-level requirements identified for Multimedia Priority Service. This feasibility study consisted of a multi-step process, namely:

- Identify high-level requirements for Multimedia Priority Service.
- Determine relevant 3GPP specifications for Multimedia Priority Service.
- Perform a Gap Analysis to assess the ability of existing 3GPP specifications to meet the high-level Multimedia Priority Service requirements.

Additional functionalities not documented in this TR are considered outside the scope of this TR. Such additional functionality may be on a network-wide basis, nation-wide basis or particular to a group of users..

The Multimedia Priority Service is intended to be utilised for both Voice and Data in the Packet-switched (PS) domain and the IP Multimedia Subsystem (IMS).

The Multimedia Priority Service is intended to interwork with external networks to provide an end-to-end service. Therefore, service interactions with external networks are considered within the scope of this document, although the specification of these interactions may be in other standards. If this occurs, a reference to that specification is made.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TS 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.228: "Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS); Stage 1".
- [3] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [4] 3GPP TS 24.229: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".
- [5] 3GPP TS 23.002: "Network architecture".
- [6] 3GPP TR 22.952: "Priority Service Guide".
- [7] IETF RFC [4412]: "Communications Resource Priority for Session Initiation Protocol (SIP)".
- [8] 3GPP TR 22.950: "Priority Service feasibility study".

3 Definitions and abbreviations

Refer to [1] for definitions and abbreviations used in this document that are not defined below.

3.1 Definitions

Service User: Subscriber to Multimedia Priority Service

3.2 Abbreviations

MPS Multimedia Priority Service

4 High-level requirements

The following clauses describe the high-level requirements to support Multimedia Priority Service. These high-level requirements are used as a basis for the gap analysis described in Clause 6.

4.1 Priority Session origination

A session shall receive priority ingress treatment (priority access to voice or traffic channels) for session origination, when the session is setup by a Service User using the multimedia priority service procedure described in clause 4.8.

4.2 Priority Session establishment to called party

A session shall receive priority egress treatment (priority access to voice or traffic channels) for session delivery to the terminating resource/user (e.g., called party), when the session is setup by a Service User using the priority service procedure described in clause 4.8.

4.3 Priority Session progression

The Service User shall receive priority session treatment/progression through the mobile network(s). A priority session should be given higher priority over normal sessions in the originating mobile network, the interconnected networks and the terminating network.

4.4 Priority radio resource queuing

Multimedia Priority Service assumes a signalling channel is available.

When a Multimedia Priority Service session encounters a "no radio available" condition in the session path involving an ingress or egress air-interface, or both, and,

- at session origination, and upon recognition of the Multimedia Priority Service code, the Multimedia Priority Service session request is queued in the cell serving the calling party and processed for the next available radio channel in that cell in accordance with the caller's priority level and session initiation time.
- at session termination upon recognition of a priority session indication in an incoming session request, the Multimedia Priority Service session request is queued in the cell serving the called party and processed for the next available radio channel in that cell in accordance with the session's priority level and request arrival time.

4.5 Priority levels

A Service User shall be assigned one of n priority levels. Priority levels are defined as 1, 2, 3, ..., n , with 1 being the highest priority level and n being the lowest priority level.

4.6 Invocation on demand

Multimedia Priority Service is invoked only when requested and an idle voice or traffic channel required for an origination request is not available.

If an idle voice or traffic channel is available when Multimedia Priority Service is requested, the origination request is allowed to proceed normally without delay.

Invocation of Multimedia Priority Service at ingress access (origination), during session progression (end-to-end), or egress access (termination) is considered complete when one of the following occurs:

- A radio (voice or traffic) channel is assigned to the session (at origination or termination),
- The loss of radio contact or roaming to another PLMN provider's system (at origination only),
- The Service User cancels the request,
- Expiration of the maximum allowed time to hold for the next available radio (voice or traffic) channel (at origination or termination), or
- Deletion of the Multimedia Priority Service request due to arrival of a higher priority request coupled with lack of queue capacity (at origination or termination).

4.7 Applicability to telecommunications services

Multimedia Priority Service shall be applicable to PS-based services.

4.8 Multimedia Priority Service code/identifier

Multimedia Priority Service is requested by including the Multimedia Priority Service code/identifier in the origination request.

4.9 Roaming

Multimedia Priority Service shall be able to be supported during roaming when the roaming network supports Multimedia Priority Service.

4.10 Handover

Multimedia Priority Service shall be able to be supported during handover.

4.11 Charging

The system should record the following Multimedia Priority Service charging information, in addition to non-Multimedia Priority Service information:

- Multimedia Priority Service invocation attempts.
- Session information (origination and/or termination) on which Multimedia Priority Service was used to gain access to the radio channel.
- Recording of appropriate Multimedia Priority Service information (e.g., Priority Level).

4.12 Queuing requests for bearer resources

Multimedia Priority Service shall be able to support queuing of Multimedia Priority Service requests for bearer resources. Queuing request provides the capability to place a Multimedia Priority Service request that has experienced a congestion condition for bearer resources into a queue associated with the resource until the resource becomes available or until a maximum queuing time has expired.

4.13 Reversion from UTRAN to RAN

As a service provider option, when resources are congested or not available on UTRAN, it shall be possible for Multimedia Priority Service calls intended to be established on UTRAN to revert to RAN. Reversion may occur for ingress or egress radio access.

5 Additional description of multimedia priority service

5.1 Priority Session setup/invocation

If a Service User invokes Multimedia Priority Service and sufficient resources (e.g., a radio (voice or traffic) channel) are available, then session establishment proceeds in the originating system. The session is given priority treatment during establishment.

If a Service User invokes Multimedia Priority Service but sufficient resources (e.g., a radio (voice or traffic) channel) are not available, if the queue for the resource is not full, then the session request is queued in accordance with the user's priority level and session request initiation time, until sufficient resources (e.g., the next available radio (voice or traffic) channel in the cell) are available. The user should be given an indication that session establishment is progressing. The network treats the user as busy, if applicable for the bearer service, while a multimedia priority session request for the user is queued.

If a Service User invokes Multimedia Priority Service but sufficient resources (e.g., a radio (voice or traffic) channel) are not available, if the queue for the resource is full, and if the user's Multimedia Priority Service priority is higher than one or more Priority Service session requests already in the queue, then the lowest, most recent session request in the queue is dropped from the queue. The user's session request is placed in the queue in accordance with the user's priority level and session request initiation time. The user should be given an indication that session establishment is progressing. The network treats the user as busy, if applicable for the bearer service, while a multimedia priority session request for the user is queued.

When sufficient resources (e.g., a radio (voice or traffic) channel) become available and are assigned to the session, session establishment proceeds in the originating system.

It is desirable that if the system changes the resources allocated to a Service User (e.g., cell handover), then the session establishment should proceed as if the resources had remained the same (e.g., queue status).

The following indications should be provided to the Service User:

- Acceptance of a Multimedia Priority Service request.
- Rejection of a Multimedia Priority Service request.
- Loss of a pending request (e.g., loss of radio contact and possibly roaming to another system).

A Multimedia Priority Service session request may be removed from the queue by the Service User cancelling the request. The session request shall also be removed by the system, if radio contact is not maintained with the requesting UE.

5.2 Priority session progression

The Multimedia Priority Service session request receives priority treatment for session establishment to interconnected networks supporting priority.

5.3 Priority session establishment to called party

If sufficient resources (e.g., a terminating radio (voice or traffic) channel) are available, then the session is established with the called party.

If sufficient resources (e.g., a terminating radio (voice or traffic) channel) are not available and the queue for the resource serving the called party is not full, then the session request is queued in accordance with the session's priority

level, until sufficient resources (e.g., the next available radio (voice or traffic) channel in the cell) serving the called party are available.

If sufficient resources (e.g., a terminating radio (voice or traffic) channel) are not available, the queue for the resource serving the called party is full, and the session's priority level is higher than one or more Multimedia Priority Service session requests in the queue, then the lowest, most recent session request in the queue is dropped from the queue. The user's session request is placed in the queue in accordance with the session's priority level.

When sufficient resources (e.g., a terminating radio (voice or traffic) channel) become available and are assigned to the session, the session is established with the called party.

It is desirable that if the system changes the resources allocated to the called party (e.g., cell handover), then the session establishment should proceed, as if the resources had remained the same (e.g., queue status).

5.4 Exception procedures or unsuccessful outcome

During session establishment, the following exceptions or unsuccessful outcomes can occur:

- If a non-Service User invokes Multimedia Priority Service, then session request is not allowed to proceed and the session is dropped.
- If a Service User invokes Multimedia Priority Service but the UE times out while the session request is undergoing Multimedia Priority Service queue processing, then the UE returns to the null state and the session is dropped.
- If a Service User invokes Multimedia Priority Service, sufficient resources (e.g., a radio (voice or traffic) channel) are not available, and the queue for the resource is full, and the user's Multimedia Priority Service priority is lower than all of the Multimedia Priority Service session requests in the queue, then the session is dropped.
- If a Service User invokes Multimedia Priority Service, and is queued for a resource, but the user loses coverage, then the session request is removed from the queue and is dropped.
- If a Service User invokes Multimedia Priority Service, and is queued for a resource, but the maximum allowed time in queue expires before a resource becomes available in the cell, then the session request is removed from the queue and is dropped.
- If a Service User invokes Multimedia Priority Service, and is queued for a trunk resource (if applicable for the bearer service), but the user loses coverage, then the session request is removed from the trunk queue and is dropped.
- If a Service User invokes Multimedia Priority Service, and is queued for a trunk resource (if applicable for the bearer service), but the maximum allowed time in queue expires before a trunk resource becomes available in the cell, then the session request is removed from the trunk queue and is dropped.

At session establishment to the Called Party, the following exceptions or unsuccessful outcomes can occur:

- If sufficient resources (e.g., a radio (voice or traffic) channel) are not available and the queue for the cell is full, but the calling party's priority is lower than all of the Priority Service session requests in the queue, then the session is not established and the Service User is given an appropriate indication.
- If the session request is queued for a resource but the called party's UE loses coverage, then the session request is removed from the queue and the Service User is given an appropriate indication.
- If the session request is queued for a resource but the maximum allowed time in queue expires before a resource becomes available in the designated terminating cell, then the session request is removed from the queue and the Service User is given an appropriate indication.

6 Multimedia priority service gap analysis

6.1 IP multimedia subsystem (IMS)

IP Multimedia Subsystem (IMS) is specified in:

- 3GPP TS 22.228, "Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS); Stage 1" [2].
- 3GPP TS 23.228, "IP Multimedia Subsystem (IMS); Stage 2" [3].
- 3GPP TS 24.229, "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3" [4].

6.2 Summary of IMS capabilities

The IMS comprises all 3GPP capabilities and elements for provision of IP multimedia services. This includes signalling and bearer related capabilities and network elements as specified in 3GPP TS 23.002 [5].

To achieve access independence and to facilitate interoperation with terminals across the Internet, the IMS supports protocols based on IETF "Internet standards". For example, IP multimedia services are supported based on an IETF defined session control capability (i.e., Session Initiation Protocol (SIP)).

The IMS enables PLMN operators to offer their subscribers IP multimedia services based on and built upon Internet applications, services and protocols. The IMS is intended to enable the convergence of, and access to, voice, video, messaging, data and web-based technologies for the wireless user.

6.3 Support for Multimedia Priority Service

The IMS provides a useful set of functions and resources to support Multimedia Priority Service. 3GPP TS 24.229 [4] specifies IP multimedia session/call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), which apply to Multimedia Priority Service.

IETF RFC [4412] [7], "Communications Resource Priority for Session Initiation Protocol (SIP)" specifies the protocol and procedures for two SIP header fields for communicating request for resource priority, namely "Resource-Priority" and "Accept-Resource-Priority". The "Resource-Priority" request header field is included in a SIP request to invoke procedures for prioritized access to resources. The "Accept-Resource-Priority" response header field is included in a SIP response to indicate the resource values that a SIP user agent server can process.

In addition, IETF RFC [4412] [7] specifies five unique namespaces for application of the "Resource-Priority" and "Accept-Resource-Priority" capability, namely, "DSN", "DRSN", "Q735", "ETS" and "WPS". The "WPS" namespace is derived from "Wireless Priority Service" as described in GSM/UMTS [3GPP TR 22.952] [6] and other wireless technologies.

Based on this analysis, a gap exists in that 3GPP TS 24.229, v 7.x.y [4] does not include support for IETF RFC [4412] [7].

IETF RFC [4412] [7] should be considered as one of the possible solutions to support Multimedia Priority Service.

7 Conclusion

The objectives of this feasibility study for Multimedia Priority Service were to:

- Identify high-level requirements for Multimedia Priority Service.
- Determine relevant 3GPP specifications for Multimedia Priority Service.

- Perform a Gap Analysis to assess the ability of existing 3GPP specifications to meet the high-level Multimedia Priority Service requirements.

The following high-level requirements were identified to support Multimedia Priority Service:

- Priority Session Origination,
- Priority Session Establishment,
- Priority Session Progression,
- Priority Radio Resource Queuing,
- Priority Levels,
- Invocation on Demand,
- Applicability to Telecommunications Services,
- Multimedia Priority Service Code/Identifier,
- Roaming,
- Handover,
- Charging Data Record,
- Queuing Requests for Bearer Resources,
- Revision from UTRAN to RAN.

The following primary capabilities were identified to support Multimedia Priority Service:

- IMS,
- IETF Resource Priority Header.

This Feasibility Study recommends that a new TS be developed to capture the MPS stage 1 requirements.

Annex A (informative): Use Cases

Overview and assumptions

3GPP TR 22.950 Priority Service feasibility study [8] and 3GPP TR 22.952 Priority Service Guide [6] describe Priority Service support for circuit switched voice service. Similar service (both real time and non-real time) is also required for the non-circuit switched service. The following use cases are for initial discussion to begin the feasibility study on Multimedia Priority Service (MPS).

Service Users should be able to initiate MPS in the IP Multimedia Subsystem (IMS) and should receive priority over other subscribers in the establishment and completion of a voice call or a data/multimedia session. A Service User should be able to establish/complete a voice call, initiate/complete a data/multimedia session, or a combination of both concurrently.

Service Users shall be able to use any IMS Basic Multimedia Service (non-priority) to which they are subscribed. Should a service disruption occur, Priority Service voice and data services must be capable of being re-provisioned, repaired, or restored to required service levels on a priority basis.

The system should be able to identify Service Users and set a priority indicator to identify or mark the priority traffic (voice calls or data/multimedia sessions). There should be procedures and processes to handle priority service traffic that maintains the end quality of service (QoS) to support the communication. The types of processes required for MPS include priority access, priority call set up or session establishment, priority termination, and exemption from restrictive management controls.

MPS users should be given service regardless of user location or deployment status. Means by which this may be accomplished include "follow me", functional numbering, call forwarding, or functional directories.

User perspective (user interface)

A user's main interface is a User Equipment (UE). While the UE interface may be proprietary to the manufacturer, the interaction between the user and the network should be uniform.

The user should be able to make a priority call and use priority data services in the IMS, using any UE. Either the network or the UE may support the authorization function for MPS. If the UE does the authorization, there should be a user-involved authentication (e.g., Personal Identification Number (PIN)). The user should not have multiple telephone numbers/Public User Identities.

There should be a user-friendly MMI or invocation mechanism to initiate and authenticate MPS. MPS users should be able to invoke MPS either as a permanent subscription or on a per-call/per-session basis. Access can be via the use of a special code/dialing sequence/URL and/or a PIN.

Generic use cases

The generic requirements for MPS are identical to the generic requirements for Basic Voice and Multimedia Services. A user should be able to invoke priority in all IP multimedia applications that are provisioned to support Service Users in a network. These include, but are not limited to, email, instant messaging, remote printing, web access, file transfer, broadcast/multicast video, interactive video, and domain name server (DNS) lookups. Also included is interworking with existing Priority Service and non-Priority Service voice and data networks for both fixed (e.g., PSTN, ISDN, internet, etc.) and mobile users.

The user should be able to make a voice call in a congested area (due to either increased call volume or in infrastructure damage).

The user should be able use data services in a congested area (due to either increased call volume or in infrastructure damage).

The user should be able to send priority and receive priority short messages. The user should have the ability to reject or accept the message. Again, the initiator sets the priority level of the session.

The user should be able send/receive e-mail, voice-mail, fax etc.

The user should be able to query on-line databases and make a transaction (e.g., buy blankets, cots, water, etc).

The user should be able to take video footage of a disaster area and should be able to transmit this video to a response centre outside the disaster area.

The user is a medical technician and should be able to transmit a digital picture of a patient's condition to a remote hospital for advice.

Detailed use case scenario #1 (initiation of a Single Media Session)

As the user attempts to initiate the session, the network recognizes the user as a Service Users requesting priority service and allocates network resources to this user first before servicing other non-priority subscribers attempting to initiate sessions.

If network resources are not immediately available, the network places the Service Users in queue for the next available resource. The queue is managed by priority level and (within each level) time of entry into the queue.

The network provides feedback to the Service Users (either tones or short messages) on the status of their session.

Detailed use case scenario #2 (support of Multi-Media Sessions)

A Service User is involved in a single media session (i.e., involved in a video-teleconference) and also needs to send an SMS to a different destination. Bandwidth is limited in the congested area, so the Service User lowers the QoS and bandwidth requirements on the video-teleconference so that the SMS capability is supported. After transmission of the SMS, the QoS and bandwidth requirements are restored to their initial settings.

Detailed use case scenario #3 (inter working with other services)

A Service User desires to make a voice call to a (circuit switched) subscriber. The Service User initiates a voice session and the priority information is used for mobile origination and is passed to the circuit-switched domain for the session.

A (circuit-switched) Priority Service subscriber desires to make a voice call to a Service User. The priority information of the originator is passed to the MPS domain and the priority level is available for use, if needed, to complete the voice call.

The same treatment is expected in the U.S., if a legacy PSTN priority call (i.e., from a Government Emergency Telecommunications Service (GETS) subscriber) is calling into the MPS network.

A Service User desires to make a priority international voice call (assuming the Service User is authorized to make an International Emergency Preference Scheme (IEPS) call and there are network operator agreements to support this). The Service User initiates a voice session and the appropriate priority information (e.g., IEPS calling party's category marker) is passed to the circuit-switched domain for the session.

A MPS subscriber desires to make a priority international multimedia session (several assumptions here: that there is a recognized International Emergency Multimedia Service (IEMS) defined by the ITU, that the MPS subscriber is authorized to use the IEMS service, and there are network operator agreements to support this). The MPS subscriber initiates the requested session and the appropriate priority information is passed across the international networks to the terminating network for the session.

Detailed use case scenario #4 (termination of Multimedia Sessions)

If possible, the priority service subscriber will be available for other types of media sessions while awaiting the completion of an initiated session. If the UE can only handle a single session, the user needs to receive an overriding indication of an incoming communication so the user can determine which session with which to continue. The destination could then suspend non-emergency communications to free resources for the incoming emergency communication. If pre-emption were an option, non-emergency communications to the destination could be terminated. Should the destination have "communication forwarding" initiated, the network should then continue to reroute and process the emergency communication with preferential treatment to the new destination.

Detailed use case scenario #5 (Initiation of a Voice over IP (VoIP) session)

As the Service User attempts to initiate a VoIP session, the network recognizes the user as a Priority Service subscriber requesting priority service and allocates network resources to this user first before servicing other non-priority subscribers attempting to initiate sessions.

If network resources are not immediately available, the network places the VoIP session request in queue for the next available resource. The queue is managed by priority level and (within each level) time of entry into the queue.

The network provides feedback to the Service User (either tones or short messages) on the status of the session request.

Priority information associated with the VoIP session is conveyed end-to-end to be used for the mobile termination portion of the session, if applicable.

Detailed use case scenario #6 (Initiation of a Push to talk Over Cellular (POC) session)

As the Service User attempts to initiate a POC session, the network recognizes the user as a Priority Service subscriber requesting priority service and allocates network resources to this user first before servicing other non-priority subscribers attempting to initiate sessions.

If network resources are not immediately available, the network places the POC session request in queue for the next available resource. The queue is managed by priority level and (within each level) time of entry into the queue.

The network provides feedback to the Service User (either tones or short messages) on the status of the session request.

Priority information associated with the POC session is conveyed end-to-end to be used for the Mobile Termination portion of the session, if applicable.

Annex B (informative): Change history

| Change history | | | | | | | | | | | |
|----------------|-----------|-----------|--------|------|-----|-------|-----|---|--------|--------|-----------|
| TSG SA# | SA Doc. | SA1 Doc | Spec | CR | Rev | Rel | Cat | Subject/Comment | Old | New | Work Item |
| | | | ab.cde | | | | | Initial draft presented at SA1#23 | 0.0.0 | 0.1.0 | PRIOR-MM |
| | | S1-040592 | ab.cde | | | | | Input version 0.2.0 to SA1 #25 | 0.1.0 | 0.2.0 | PRIOR-MM |
| | | S1-040698 | 22.953 | | | | | Output version 0.3.0 from SA1 #25 | 0.2.0 | 0.3.0 | PRIOR-MM |
| | | S1-050096 | 22.953 | | | | | Output version 0.4.0 from SA1 #26 | 0.3.0 | 0.4.0 | PRIOR-MM |
| | | S1-050361 | 22.953 | | | | | Output version 0.5.0 from SA1 #27 | 0.4.0 | 0.5.0 | PRIOR-MM |
| | | S1-050638 | 22.953 | | | | | Output version 0.6.0 from SA1 #28 | 0.5.0 | 0.6.0 | PRIOR-MM |
| | | S1-051020 | 22.953 | | | | | Output version 0.7.0 from SA1 #29 | 0.6.0 | 0.7.0 | PRIOR-MM |
| | | S1-060011 | 22.953 | | | | | Output version 0.8.0 from SA1 #30 | 0.7.0 | 0.8.0 | PRIOR-MM |
| | | S1-060025 | 22.953 | | | | | Raised to version 1.0.0 for presentation to SA #31 | 0.8.0 | 1.0.0 | PRIOR-MM |
| SP-32 | SP-060328 | S1-060517 | 22.953 | - | - | Rel-7 | - | Raised to version 2.0.0 for presentation to SA for approval | 1.0.0 | 2.0.0 | PRIOR-MM |
| SP-32 | SP-060328 | S1-060517 | 22.953 | - | - | Rel-7 | - | Approved at SA #32 | 2.0.0 | 7.0.0 | PRIOR-MM |
| SP-33 | SP-060475 | S1-060884 | 22.953 | 0001 | - | Rel-7 | F | CR to 22.953 on clarification of terminology | 7.0.0 | 7.1.0 | PRIOR-MM |
| SP-33 | SP-060475 | S1-060959 | 22.953 | 0002 | - | Rel-7 | F | CR to 22.953 on clarification of conclusion | 7.0.0 | 7.1.0 | PRIOR-MM |
| SP-42 | - | - | 22.953 | | | Rel-8 | | Updated from Rel-7 to Rel-8 | 7.0.0 | 8.0.0 | |
| SP-46 | - | - | - | - | - | - | - | Updated to Rel-9 by MCC | 8.0.0 | 9.0.0 | |
| 2011-03 | - | - | - | - | - | - | - | Update to Rel-10 version (MCC) | 9.0.0 | 10.0.0 | |
| 2012-09 | - | - | - | - | - | - | - | Updated to Rel-11 by MCC | 10.0.0 | 11.0.0 | |