ETSI TS 123 289 V17.1.0 (2022-05)

5G;
Mission Critical services over 5G System;
Stage 2
(3GPP TS 23.289 version 17.1.0 Release 17)

Reference
RTS/TSGS-0623289vh10

Keywords
5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM**® and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Foreword

This Technical Specification 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.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

Introduction

The use of 5GS to support MC services (i.e., MCPTT defined in 3GPP TS 23.379 [6], MCVideo defined in 3GPP TS 23.281 [4], MCData defined in 3GPP TS 23.282 [5]) including common application plane and signalling plane entities is specified in the present document.

Each MC service supports several types of communications amongst the users (e.g. group communication, peer to peer communication). There are several general functions and entities (e.g. configuration, identity) which are used by the MC services. The general functional architecture to support MC services utilizes aspects of the IMS architecture specified in 3GPP TS 23.228 [2].

An MC service UE in the 5GS context obtains access to a MC service via 3GPP access (i.e., E-UTRA, 5G NR), wireless non-3GPP access (e.g. WLAN or Satellite) and/or wireline access using the 5GS architecture defined in 3GPP TS 23.501 [7]. Certain MC service functions such as dispatch and administrative functions can be supported using MC service UEs with 3GPP access and non-3GPP wireless/wireline access. External applications usage of MC services can be enabled via 3GPP access and/or non-3GPP access.

NOTE: Dispatch consoles and devices used by MC service administrators are considered as MC service UEs to support MC services.

1 Scope

The present document specifies the use of the 5G System (5GS) considering common functional architecture, procedures and information flows needed to support mission critical services encompassing the common services core architecture.

The corresponding service requirements applied in 3GPP TS 23.280 [3], 3GPP TS 22.179 [11], 3GPP TS 22.280 [12], 3GPP TS 22.281 [13] and 3GPP TS 22.282 [14] also apply here.

The corresponding MC service specific procedures and information flows are defined in TS 23.379 [6], TS 23.281[4], and TS 23.282 [5].

The present document is applicable primarily to mission critical services using 3GPP access (5G NR and/or E-UTRA) and non-3GPP access (WLAN, Satellite and/or wireline) based on the 5GC architecture defined in 3GPP TS 23.501 [7].

The common functional architecture to support mission critical services can be used for public safety applications and for general commercial applications e.g. utility companies and railways.

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 TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[3] 3GPP TS 23.280: "Common functional architecture to support mission critical services; Stage 2".

[4] 3GPP TS 23.281: "Functional architecture and information flows to support Mission Critical Video (MCVideo); Stage 2".

[5] 3GPP TS 23.282: "Functional architecture and information flows to support Mission Critical Data (MCData); Stage 2".

[6] 3GPP TS 23.379: "Functional architecture and information flows to support Mission Critical Push To Talk (MCPTT); Stage 2".

[7] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[8] 3GPP TS 23.002: "Network Architecture".

[9] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System (5GS); Stage 2".

[10] 3GPP TS 23.502: "Procedures for the 5G System (5GS)".

[11] 3GPP TS 22.179: "Mission Critical Push to Talk (MCPTT); Stage 1".

[12] 3GPP TS 22.280: "Mission Critical Services Common Requirements (MCCoRe); Stage 1".

[13] 3GPP TS 22.281: "Mission Critical (MC) Video".

[14] 3GPP TS 22.282: "Mission Critical (MC) Data".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

For the purposes of the present document, the following terms given in 3GPP TS 23.280 [3] apply:

MC service
MC service user
MC service UE
MC system
MC user

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

Void.

4 MC service system resource requirements

4.1 Multiple Access

4.1.1 General

5GS provides simultaneous integration of different access types 3GPP and non-3GPP (wireline and wireless), defined in 3GPP TS 23.501 [7]. Accordingly, this enables the MC service UE to be used under both stationary and non-stationary conditions.

With the convergence of multiple access technologies in 5GS, service features can be assigned agnostically without taking the access type into account for the MC service user.

4.1.2 Requirements

With the use of 5GS, MC services shall be available via 3GPP access as well as via non-3GPP access. To enable access to the MC service system, the use of the various access types shall be authorized by the 5GC. The simultaneous use of different access types (Access Traffic Steering, Switching and Splitting) is defined in 3GPP TS 23.501 [7] and its characteristics are subject to respective operators policy.

4.2 Session connectivity

4.2.1 General

The access from 5GS to the MC service environment takes place via the Data Network (DN) in accordance with 3GPP TS 23.501 [7]. A Data Network Name (DNN) as part of the 5GS user profile allows access to the Data Network with up to 8 connectivity sessions (PDU sessions) each with up to 64 communication flows (QoS flows). Different data networks require different DNNs.

4.2.2 Requirements

For MC service UEs who only utilize 5GS, a single DNN may be used for:

- for the SIP-1 reference point;
- for the HTTP-1 reference point; and
- for the CSC-1 reference point.

The DNN shall be made available to the MC service UE either via UE (pre)configuration or via initial UE configuration on a per HPLMN and optionally also per VPLMN basis.

NOTE 1: The Data Network access can also be shared with the "IMS" access taking into account the communication flow limits.

The MC service UE may exploit secondary authentication/authorization by a DN-AAA server during the establishment of session connectivity as specified in 3GPP TS 23.501 [7] using the Extensible Authentication Protocol (EAP) to access the DN identified by the MC service DNN. If required, DN access credentials shall be made available to the MC service UE via initial MC service UE configuration on a per DNN basis.

The DN connection to the DNN defined within the present subclause can be of PDU session type "IPv4", "IPv6", "IPv4v6", Ethernet or Unstructured (see 3GPP TS 23.501 [7]). If a DN connection to an DNN defined within the present subclause is of type "IPv4v6" then the MC service client shall use configuration data to determine whether to use IPv4 or IPv6.

NOTE 2: In accordance to 3GPP TS 23.501 [7], the use of PDU session type Ethernet and Unstructured has limited support in the Session and Service Continuity context.

For MC service UEs who utilize EPS and 5GS 3GPP TS 23.280 [3] clause 5.2.7 applies.

4.3 QoS characteristics

4.3.1 General

In 5GS, quality of service is enforced at QoS flow level and corresponding packets are classified and marked with an identifier in accordance with 3GPP TS 23.501 [7]. Every QoS flow is characterized by a QoS profile provided by the 5GC. and can be used for all connectivity types (PDU sessions) in accordance with 3GPP TS 23.501 [7].

5G QoS characteristics, standardized or non-standardized, are indicated through the 5QI value in accordance with 3GPP TS 23.501 [7]. Standardized 5QI values have a one-to-one mapping to a standardized combination of 5G QoS characteristics and non-standardized 5QI values allows a dynamic assignment of QoS parameter values.

NOTE 1: The use of non-standardized 5QI values can be subject for harmonisation within the individual user area.

The QoS parameter Allocation Retentions Priority (ARP) determines the priority level, the pre-emption capability and the pre-emption vulnerability of each QoS flow. ARP priority level defines the relative importance of a resource request to allow in deciding whether a new QoS Flow may be accepted or needs to be rejected in the case of resource limitations in accordance with 3GPP TS 23.501 [7].

NOTE 2: The use of ARP is regulated by the individual MC service.

4.3.2 QoS requirements for general purposes

The selection, deployment, initiation, and termination of QoS signalling and resource allocation shall consider the QoS mechanisms described in 3GPP TS 23.501 [7], 3GPP TS 23.502 [10] and 3GPP TS 23.503 [9].

MC system as well as MC service UE may share one DNN using multiple QoS flows for the settlement of MC services, application plane and signalling plane.

For the transport of SIP-1 reference point signalling, the standardized 5QI value of 69 in accordance with 3GPP TS 23.501 [7] shall be used.

For the transport of HTTP-1 reference point signalling, the standardized 5QI value of 8 in accordance with 3GPP TS 23.501 [7] or better shall be used.

MC services shall use standardized 5QI values or may use non-standardized 5QI values in accordance with 3GPP TS 23.501.

When the MC system utilizes IMS services, at least one QoS flow shall be associated for IMS signalling. The generic mechanisms for interaction between QoS and session signalling applicable for the use of IMS in the 5GS context are defined in 3GPP TS 23.228 [2].

4.3.3 QoS requirements for Mission Critical Push to Talk

4.3.3.1 General

The requirements listed here apply for the use of 5GS and replace the corresponding requirements in 3GPP TS 23.379 [6].

4.3.3.2 5QI values for MCPTT

The MCPTT system may use the N5 reference point or Rx reference point for direct interaction with 5GS PCF to determine the required QoS flow parameters. Alternatively, the MCPTT system may use the N33 reference point for indirect interaction with 5GS NEF. A QoS flow for an MCPTT voice call and MCPTT-4 reference point signalling shall utilize 5QI value 65 in accordance with 3GPP TS 23.501 [7].

4.3.3.3 Use of priorities

The QoS flow for an MCPTT emergency call shall have highest priority level among MCPTT call types. The QoS flow for MCPTT imminent peril call shall have higher priority level than one for a MCPTT call.

Depending on operators' policy, the MCPTT system may be able to request modification of the priority (ARP) of an established QoS flow.

NOTE: Operators' policy takes into account regional/national requirements.

4.3.4 QoS requirements for Mission Critical Video

4.3.4.1 General

The requirements listed here apply for the use of 5GS and replace the corresponding requirements in 3GPP TS 23.281.

4.3.4.2 5QI values for MCVideo

The MCVideo system may use the N5 reference point or Rx reference point for direct interaction with 5GS PCF to determine the required QoS flow parameters. Alternatively, the MCVideo system may use the N33 reference point for indirect interaction with 5GS NEF. Video media and control of the video media (i.e. MCVideo-4 and MCVideo-7) may use independent QoS flows and utilizes 5QI values depending on the MCVideo mode of the MCVideo call/session, as per table 4.3.4.2-1.

Table 4.3.4.2-1: MCVideo mode associated 5QI values

MCVideo mode	5QI value utilized (in accordance with 3GPP TS 23.501 [7])
Urgent real-time mode	67
Non-urgent real-time mode	67
Non real-time mode	4

For transmission and reception control signalling, the 5QI value 69 is recommended in accordance with 3GPP TS 23.501 [7].

4.3.4.3 Use of priorities

The MCVideo audio media and video media may transmit over dedicated QoS flows, in which case the priority for each QoS flow is determined by the operator policy.

MCVideo services shall be able to use ARP pre-emption capability and the pre-emption vulnerability of each individual QoS flow according to operators' policy. Depending on operators' policy, the MCVideo system may be able to request modification of the priority (ARP) of an established QoS flow.

NOTE: Operator policy takes into account regional/national requirements.

4.3.5 QoS requirements for Mission Critical Data

4.3.5.1 General

The requirements listed here apply for the use of 5GS and replace the corresponding requirements in 3GPP TS 23.282.

4.3.5.2 5QI values for MCData

The MCData system may use the N5 reference point or Rx reference point for direct interaction with 5GS PCF to determine the required QoS flow parameters. Alternatively, the MCData system may use the N33 reference point for indirect interaction with 5GS NEF. A QoS flow for MCData media may utilize standardized 5QI value 70 or may utilize non-standardized 5QI values in accordance with 3GPP TS 23.501 [7].

4.3.5.3 Use of priorities

The QoS flows for MCData emergency communications shall have highest priority level among MCData communication types. The QoS flow for MCData imminent peril call shall have higher priority level than one for a MCData communication.

MCData services shall be able to use ARP pre-emption capability and the pre-emption vulnerability of each individual QoS flow according to operators' policy.

NOTE: Operators' policy takes into account regional/national requirements.

4.4 Network Slicing

4.4.1 General

Network slicing in accordance with 3GPP TS 23.501 [7] can be used for several purposes such as to separate MC service users, UEs as well as applications in accordance with the various QoS requirements independent from 3GPP or non-3GPP access.

The corresponding slice information identifies a network slice across the 5G core, access network and the UE. In accordance with 3GPP TS 23.501 [7] standardized and non-standardized slice selection information can be used.