3GPP TSG SA WG-4 Meeting #133-e S4-2512xx

Online, July 19 – 23 2025 In revision of S4-251283

**Source: Huawei, [Interdigital], [Qualcomm]**

**Title: New SID on Usage of Dynamically Changing Traffic Characteristics and enhanced QoS support in Media Applications and Services**

**Document for: Agreement**

**Agenda Item: 17.1**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>   
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Usage of Dynamically Changing Traffic Characteristics and enhanced QoS support in Media Applications and Services

Acronym: FS\_DCTC\_eQOS\_MED

Unique identifier: xxxx

{A number to be provided by MCC at the plenary}

Potential target Release: Rel-20

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | x |  |  |  |
| No |  |  | x | x | x |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a study

|  |  |
| --- | --- |
| x | Study |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| N/A |  |  |  |

### 2.3 Other related Work Items and dependencies

FS\_XRTraffic defined traffic models and quality evaluation methods for media and XR Services in the 5G Network (see TR 26.926). FS\_TyTrac studied typical traffic characteristics of media services and defined the generic traffic characteristics (see TR 26.925).

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
| 870013 | FS\_XRTraffic | Modelling and evaluation of end-to-end XR services in 5G network |
| 810005 | FS\_TyTrac | Defines the basic (aggregate) traffic characteristics such as bit-rate media format etc. for XR services |
| 1030000 | FS\_5G\_RTP\_PH2 | Studied some of the dynamically changing traffic characteristics for the case of RTP |
| 960046 | 5G\_RTP | Defined some of the user plane signaling for dynamic traffic characteristics in RTP |

# 3 Justification

Additional support for transmission of content with dynamically changing traffic characteristics and enhanced QoS was added to the 5G System. Table 1 shows an overview of these features from TS 23.501 for dynamically changing traffic characteristics. In that case the 5G System takes advantage of the bursts of the transmission over time to enable more efficient and power optimized transmission. However, usage of these characteristics in media applications and services are not well understood. Other QoS features available in the 5G system relevant to this study are documented in Table 2 and can also benefit from additional guidelines for different relevant scenarios from a media application and service implementation perspective.

Table 1 5GS features defined in TS 23.501 for dynamically changing traffic characteristics (originally targeting XR applications)

|  |  |  |
| --- | --- | --- |
| **Feature** | **Reference** | **Benefit** |
| a) Data Burst Size | TS 23.501  clause 5.37.10.1 | Data burst for improved scheduling of the transmission |
| b) Time to Next Burst | TS 23.501  clause 5.37.10.2 | Time to next burst for improved transmission and resource saving |
| c) Expedited data transfer with reflective QoS | TS 23.501  clause 5.37.10.3 | Improve data transmission by using alternative QoS enabling expedited data transfer in case temporarily a higher bit-rate is needed |

Table 2 Other (enhanced) QoS features in the 5G System relevant for media applications and services

|  |  |  |
| --- | --- | --- |
| **Feature** | **Reference** | **Benefit** |
| a) PDU Set QoS Parameters | TS 23.501 clause 5.7.7 | Grouped transmission and combined QoS for groups of packets (PDU Set Based Handling) |
| b) Policy for multi modal service | TS 23.501 clause 5.37.2 | Policy for multimodal services |
| c) End of data burst indication | TS 23.501 clause 5.37.8.2 | Indication of end of a data burst |
| d) 5G QoS model | TS 23.501 clause 5.7 | General QoS framework in 5G system |

This study aims at further documenting using enhanced QoS features in the 5G System in the context of media applications and services, and identifying possible gaps in existing SA4 frameworks.

the current QoE/QoS framework in SA4 does not specify PSI for low bitrate streams (e.g. audio) due to the overhead introduced by PDU Set marking relative to the bitstream bitrate.

New types of streams exhibit patterns of data bursts and aperiodicity with either high bitrate as identified for high bitrate conversational services in XR 5G RTP Phase 2 and FS\_XR\_Traffic or irregular bursty trafficpattern with low bitrate for haptics media or animation and/or pose streams sent uplink for AR/VR services.

In the current framework, Video and Audio have been considered rather independently from a QoE/QoS perspective. As these new types of streams are becoming mainstream in emerging services, assessing the desired QoS granularity for these is increasingly relevant, particularly in multimodal services, where prioritization should be carefully considered.

Besides, the study will take different use cases corresponding to media applications and services and study the traffic characteristics in different test scenarios. Test setups corresponding to these realistic scenarios and implementations will be documented. The main emphasis is on identifying dynamically changing traffic characteristics and using related QoS features. The study will explore the usage, related benefits and deployment aspects. Use cases will include common cases such as real-time communication, streaming and short form video download and upload.

An emerging use-case of transmitting media to be leveraged by an AI enhanced application can impact traffic characteristics in new ways. On the uplink, media is transmitted that may include, chunks of video, audio and text generating a periodic or aperiodic burst pattern.

The study should identify meaningful usage of features specified in Table 1 and potentially Table 2 for providing better QoS and QoE to the uplink media in different use cases. In addition, observed dynamic traffic characteristics in different test cases will be documented.

The overall QoE and QoS granularity may also consider the dependency between the uplink and downlink streams to meet the latency sensitive service requirements.

# 4 Objectives

The objectives are:

1. Document popular media applications and service scenarios that may exhibit dynamically changing traffic characteristics (as defined in Table 1), such as:
   1. Real-Time Communication for conversational, XR and/or gaming applications and services, both on the uplink and downlink.
   2. Video on demand streaming and progressive download
   3. Live Streaming
   4. Short form video download
   5. Media transmission for upstream AI inference.

NOTE: The applications and services documented will be based on representative workflows and implementations used in practice to enable realistic evaluation

NOTE: The aim is to strengthen the generic support for these applications not to include them in an SA4 architecture or make them part of a new SA4 specification.

1. For a relevant subset of the media applications/service scenarios defined above do the following:
   1. Develop observation tests to evaluate these scenarios. Tests will for example collect network traffic traces in real and emulated network.
   2. Execute the tests and collect relevant information to what extent the reference applications exhibit dynamically changing traffic characteristics.
   3. Document possible benefits of applying QoS features as defined in Table 1 and potentially Table 2

NOTE: All tests will be documented sufficiently to enable reproducing the tests.

1. Based on the findings in the tests from 2 do the following:
   1. Document and describe observed dynamic traffic characteristics in media applications and services.
   2. Document potential improvements when applying different QoS features from Table 1 or Table 2, for uplink, downlink and with dependent UL/DL flows, these may include:
      1. PDU Set marking overhead for each media stream and for a set of multi-modal streams.
      2. Effectiveness of using PSI for one or more media streams, taking into account the desired QoS granularity and synchronization.
      3. Other potential improvements
   3. Map the reference scenarios to end-to-end procedures and
      1. document guidelines on how to enable the features,
      2. identify the impacts when implementing the features, for example PDU set marking overhead
      3. identify and document potential gaps in the tested applications to support the features.
      4. Identify potential improvements to usage of the QoS framework to exploit existing signalling in applications.
      5. Identify improvements to QoE metrics, if any
2. Based on the findings in 3, do one or more of the following
   1. Document guidelines on how to identify and characterize dynamic traffic characteristics in media applications and services.
   2. Refinesdefined
   3. Identify gaps in stage-2 and stage-3 specifications, if any.
   4. Develop solutions for identified gaps and recommend potential updates to SA4’s stage-2 and stage-3 specifications.
   5. Provide recommendations for normative work.

# 5 Expected Output and Time scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| New specifications | | | | | |
| Type | TS/TR number | Title | For info  at TSG# | For approval at TSG# | Rapporteur |
| TR 26.xxx |  | Study on usage of dynamically changing traffic characteristics and enhanced QoS support in 5GS for media applications and services | SA#111 (Mar ´26) | *SA#113*  (Sep ´26) | TBD |

|  |  |  |  |
| --- | --- | --- | --- |
| Impacted existing TS/TR | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
| TR 26.926 | Additional information on dynamically changing traffic characteristics | SA#113 (Sep ’26) | Add additional updates and finding of this study to report 26.926 |
| TR 26.925 | Additional information about dynamically changing traffic characteristics | SA#113  (Sep ’26) | Add additional updates and finding of this study to report 26.925 |
| *TR 26.822* | *Study on 5G Real-time Transport Protocol Configurations, Phase 2* | *SA#113 (Sep ’26)* | *Optional in case there are updates relating to 5G RTP* |
| *TR 26.812* | *Additional QoE metric handling* | SA#113  (Sep ’26) | *Optional in case there are updates related to XR use cases* |

# 6 Work item Rapporteur(s)

*Rufael Mekuria Rufael.mekuria@huawei.com*

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

*SA2 on possible architectural aspects and signaling*

*RAN 2 on potential clarification of* RAN 2 related features

*MPEG/IETF* for potential format related issues

# 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Huawei |
| HiSilicon |
| Interdigital Communications |
| Peng Cheng Laboratory |
| Meta |
| CMCC |
| CATT |
| Vivo |
| Qualcomm |