**3GPP TSG SA4 Meeting #130S4-242238**

**Orlando, FL, U.S.A., 18 - 22 November 2024 revision of S4-242237**

**Source: Nokia, AT&T, Interdigital Communications, Lenovo, Samsung Electronics CO., LTD, Huawei, Ericsson LM, China Mobile**

**Title: 5G Real-time Transport Protocol Configurations, Phase 2**

**Document for:** **Approval**

**Agenda Item: 17**

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: Work Item on 5G Real-time Transport Protocol Configurations, Phase 2

Acronym: 5G\_RTP\_Ph2

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | X |  | 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  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
| X | Normative – Stage 3 |
|  | Normative – Other\* |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| 5G\_RTP | SA4 | 960046 | Real-Time Transport Protocol Configurations |
| FS\_5G\_RTP\_Ph2 | SA4 | 1030007 | Study of 5G Real-time Transport Protocol Configurations, Phase 2 |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 810006 | Extended Reality (XR) in 5G | Relevant XR use cases in the conversational space |
| 820003 | Support of Immersive Teleconferencing and Telepresence for Remote Terminals | Previous work in MTSI related to 360-degree immersive communication in IMS |
| 850042 | Study on evolution of IMS multimedia telephony service | Feasibility study on AR call |
| 880011 | Study on 5G Glass-type AR/MR Devices | Feasibility study on 5G support of AR/MR devices including AR conversational services |
| 920029 | Stage 1 of Evolution of IMS Multimedia Telephony Service | Requirements to support AR telephony communication as specified in TS 22.261 |
| 940066 | Study on system architecture for next generation real time communication services | Study on system architecture enhancement for next-generation real-time communication in IMS. |
| 950014 | Immersive Real-Time Communication for WebRTC | iRTCW is expected to reference a WebRTC configuration of RTP developed in this work item |
| 960042 | IMS-based AR Conversational Services | IBACS is expected to reference an IMS configuration of RTP developed in this work item |
| 960045 | Split Rendering Media Service Enabler | The Split Rendering Media Service Enabler spec is expected to reference an IMS configuration of RTP developed in this work item |
| 950013 | Study on Smartly Tethering AR Glasses | RTP header extensions are recommended in clause 7.2 and clause 8 of TR 26.806 for supporting in-band end-to-end delay measurements.  |
| 870013 | Traffic Models and Quality Evaluation Methods for Media and XR Services in 5G Systems | Aspects related to XR Split rendering and AR Conversational may be relevant as background information. |
| 1010032 | Study on Extended Reality and Media service (XRM) Phase 2 | Cross-layer aspects related to enhancing support of RTP configurations and extensions developed in this work item for extended reality and media services in 5G.  |

# 3 Justification

Earlier work on AR and MR, such as TR 26.998 (5G Glass-type AR/MR), identified multiple aspects of normative work to support “5G/AR Real-time Communication” (clause 8.4). TR 26.998 identified normative work needed to support delivery of immersive media via RTP for IMS-based and WebRTC-based conversational services. Such normative work has not been fully exploited during Release 18 when the 5G\_RTP WI was completed at the SA4 #127 meeting. TS 26.522 includes three new RTP header extensions and a new RTCP extended report for supporting the delivery of traditional conversational media and the new XR media in the 5G System.

SA2 has studied enhanced QoS handling for XR services in the Release-19 study FS\_XRM\_ph2. SA2 identified the key issues such as enhancements for support of PDU set based QoS handling, PDU set information identification for end-to-end encrypted XRM traffic, traffic detection and QoS flow mapping for multiplexed data flows and QoS handling for dynamically changing traffic characteristics. SA2 required support from SA4 for handling some key issues related to the RTP protocol perspective. For this reason, SA4 has launched and completed a Rel. 19 study item on the topic (FS\_5G\_RTP\_Ph2). The study conclusions recommended doing normative specification for several key issues related to RTP and RTCP in order to better support real-time media transport for conversational services in the 5G system for both WebRTC and IMS. These are described in TR 26.822.

This work item focuses on optimizing the use of RTP for the transport of real-time XR media (including conversational media) and associated metadata.

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NOTE 2: The use of the IMS Data Channel is outside the scope of this work.

# 4 Objective

The work item aims to:

1. Based on the results of the study item FS\_5G\_RTP\_Ph2 included in TR 26.822, do normative specification work to TS 26.522, TS 26.510, TS 26.113 and TS 26.114 as needed in the below 5G RTP areas for WebRTC and IMS-based XR services based on the results of the study item FS\_5G\_RTP\_Ph2 included in TR 26.822, as follows:
	1. Inaccuracy of the PDU Set Size (PSSize) information.
		* Maintain the Rel-18 general principle and verify (by means of LS to: RAN2, cc: SA2) the SA4 assumptions regarding the RAN accuracy needs regarding the PDU Set size values.
		* Consider towards normative work solutions from Rel-18 and Sol#4 from TR 26.822, conditionally based on RAN2 feedback as:
			+ If exact PDU Set Size accuracy is required by RAN, consider reusing the Rel-18 NAT46/64 solution.
			+ If PDU Set Size accuracy may slightly vary at RAN, consider Sol#4 from TR 26.822 towards normative work based on RTCP feedback mechanisms to indicate the correction factor.
		* The solution on PDU Set Size overprovisioning may be generally regarded as implementation aspect in determining the PDU Set size in the GTP-U header for PDU Set Information. Based on RAN2 feedback, PDU Set Size overprovisioning informative guidelines may be considered.

Conduct normative work towards solutions that mitigate the potential inaccuracy of PDU Set Size Information.

* 1. QoS handling requirements for lone PDU.
		+ Extend the RTC provisioning feature in TS 26.510 and TS 26.113 to include PDU Set Importance values for PDUs of protocols that may be treated as lone PDUs in the UPF.
		+ Consider guidelines for handling lone PDU.

NOTE 1: Coordinate with SA2 on whether Protocol Description needs to be extended with the lone PDU information.

Extend the RTC provisioning feature in TS 26.510 and TS 26.113 to include PDU Set Importance values for PDUs of protocols that may be treated as lone PDUs in the UPF.

Develop guidelines for handling of lone PDUs at the UPF. NOTE 1: Objectives 2 and 3 need coordination with SA2 on whether Protocol Description needs to be extended with the lone PDU information.

* 1. AL-FEC awareness for PDU Set handling.
		+ Specify support for PDU Set handling with AL-FEC awareness in Rel-19 5G\_RTP\_Ph2 normative work.

NOTE 2: The specification of support for PDU Set handling with AL-FEC awareness is conditional to RAN confirmation to feasibility of using content ratio information for discarding downlink PDUs during congestion for RLC AM/UM mode based on the SA2 principles in Rel-19. This would apply for successful delivery of a group of packets.

* + - Specify any necessary (S)RTP HE enhancements for PDU Set marking with AL-FEC awareness.

NOTE 3: To realize Stage-3 aspects of the agreed SA2 design over 5G-RTC, other impacted technical specifications are not precluded (e.g., TS 26.510, TS 26.113).

* + - Specify requirements and guidelines for MDS AL-FEC coding schemes necessary for PDU Set handling with AL-FEC awareness by the 5GS.

Establish support for PDU Set handling with AL-FEC awareness and specify any necessary (S)RTP header extension enhancements for PDU Set marking with AL-FEC awareness.

Specify requirements and guidelines for MDS AL-FEC coding schemes necessary for PDU Set handling with AL-FEC awareness by the 5GS.

NOTE 2: Objectives 4 and 5 require coordination with SA2 and RAN2.

NOTE 3: Objectives 4 and 5 are conditioned by RAN confirmation on feasibility of using content ratio information for discarding DL PDUs during congestion for RLC AM/UM mode.

* 1. RTP retransmission in supporting XR services in 5G.
		+ Coordinate with SA2 and RAN2 on network awareness of retransmitted PDUs as well as core network and RAN handling of retransmitted PDUs based on the information provided by the application.
		+ Based on SA2 and RAN2 guidance, consider sending information related to end-to-end retransmissions from the application to the 5G Core Network.

Conduct normative work on network awareness of retransmitted PDUs as well as core network and RAN handling of retransmitted PDUs based on the information provided by the application.

NOTE 4: This objective requires coordination with SA2 and RAN2.

* 1. Traffic detection and QoS flow mapping support for RTP multiplexed media streams.
		+ Further normative work on multiplexed RTP streams QoS mapping support may be needed, based on coordination with SA2, including further guidelines for RTP senders that use multiplexing.

Conduct normative work on multiplexed RTP streams and define guidelines in TS 26.522 for RTP senders that use multiplexing.

NOTE 5: This objective requires coordination with SA2.

* 1. Enhancements of data burst and dynamic traffic characteristics marking
		+ Do normative work for adding burst size notification, when deterministically known, from RTP senders in a HE.
		+ Revisit the current definition of a data burst to indicate what is meant by idle time and if it is required and coordinate with SA2 and RAN2.
		+ Do normative work to enable the application to provide data boosting indication to the 5G network for downlink using RTP/RTCP signalling.
		+ Define TTNB with coordination with SA2 and RAN2.

NOTE 4: RAN2 has indicated that TTNB may be useful if provided in time and is reliable. SA4 needs further evaluation to be done before proceeding with normative work.

Conduct normative work on burst size, time to next burst, data boosting indication and the definition of data burst.

NOTE 6: RAN2 has indicated that TTNB may be useful if provided in time and is reliable. SA4 needs further evaluation before proceeding with normative work.

* 1. Applicability of the RTP header extension for PDU Set marking to different PDU Set types.
		+ Extend the PSI guidelines for the case when a PDU Set is defined as a video tile (as opposed to a video frame or slice).
	2. Coordinate with SA2 and RAN2 on potential benefits of signalling PDU Set type to the 5G network.

Conduct normative work on guidelines for marking PDU Sets that are not defined as video frames or slices and potentially signalling PDU Set type to the 5G network.

NOTE 7: This objective requires coordination with SA2.

1. Coordinate work with other 3GPP working groups (RAN2 and/or SA2) and external organizations as needed.

# 5 Expected Output and Time scale

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TS 26.522 | Updates to the specification via change requests (all KIs subject to normative work) | SA#109 (September 2025) |  |
| TS 26.510 | Updates to the specification via change requests(KI #2, #4, #14) | SA#109 (September 2025) |  |
| TS 26.113 | Updates to the specification via change requests(KI #2, #4) | SA#109 (September 2025) |  |
| TS 26.114 | Updates to the specification via change requests (if needed) | SA#109 (September 2025) |  |

# 6 Work item Rapporteur(s)

Igor Curcio, Nokia Corporation, igor.curcio@nokia.com

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

Coordination with SA2 and RAN groups may be necessary.

# 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Nokia Corporation |
| AT&T |
| InterDigital Communications |
| Lenovo |
| Samsung Electronics CO., LTD |
| Huawei |
| Ericsson LM |
| China Mobile |