**3GPP TSG-SA WG4 Meeting #130S4-242162**

**USA, Orlando, 18 – 22 November 2024** Revision of **S4-241834**

**Source: Nokia, Qualcomm**

**Title: [FS\_5G\_RTP\_Ph2] Proposed conclusions for TR 26.822**

**Agenda item: 4.5**

**Document for: Agreement**

**1. Introduction**

SA4 is planning to conclude FS\_5G\_RTP\_Ph2 in the upcoming Orlando meeting in November. Therefore, SA4 needs to start working on conclusions and recommendations for normative work.

We note that some KIs were not progressed, and for some of the other KIs no potential normative work has been identified.

**2. Reason for Change**

Add conclusions for key issues in TR 26.822 and recommendations for normative work.

**3. Proposal**

It is proposed to add the conclusion below to TR 26.822.

\* \* \* First Change (all new text) \* \* \* \*

# 8 Conclusions

## 8.1 Key issues progress

Table 8.1-x summarizes the progress of each of the key issues.

Editor’s note: The open aspects in the table need to be completed before the study completion.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Key Issue #** | **Short Description** | **Progress** | **Objectives met** | **Normative work proposed** | **Convergence possible ?** | **Dependencies** |
| 1 | PSSize accuracy | #4 and #7 and #A (1800) | Partially | Yes (#4), Yes (#7), Yes (#A) | #4 and 7 same source, Complementary solutions  #A is not complementary | #7 depends on SA2  #4 is fully contained in SA4  #A has dependency on RAN feedback |
| 2 | Lone PDU | #2 and #15  #B(1798)  #C(1863p) | Partially | No (#2),  Yes (#15)  Yes (#B) | #2 provides gap analysis.  Complementary solutions in 15 and B | SA2 |
| 3 | FEC support | #5, #17 and #18 | Yes | Yes (#5), Yes (#17), Yes (#18) | Complementary solutions FEC schemes, congestion control and FEC awareness | None |
| 4 | FEC awareness | #8, #10, #17, #18, #19 | Yes | Yes #8 Yes #10 Yes #17 Yes #18 Yes #19 | Complementary solutions | RAN2, SA2 |
| 5 | RTP transport for XR | - | - | - | - | - |
| 6 | Encryption | #3 | Yes | Yes (but limited) | Single solution |  |
| 7 | RTCP messages for 5G | #14 | Yes | No | Single solution | none |
| 8 | RTP retransmission | #9 and #11 | Yes | Yes #9, Yes #11 | Same source | SA2/RAN2 |
| 9 | RTP Multiplexing | #12  #D (1799) | Yes | Yes #12 and #D | Complementary solutions | SA2 |
| 10 | Use cases | - | - | - | - | - |
| 11 | Enhancements to PDU Set HE | - | - | - | - | - |
| 12 | Data Burst marking | #6, #13, #16,  X3: 1901, X4:1902, X5: 1906a, X8: 1864 | Yes | Yes #6, Yes #16,  #13: Reinforces the normative work proposed in #6 and #16  X3: No X5: Yes  X8: Yes  X4:No, | Some solutions are complementary and convergence needed for others, possible way forward proposed in clause 8. | SA2, RAN2 |
| 13 | Applicability of PDU Set HE | #1 | Partially | Yes #1 | Single solution | SA2, RAN2 |
| 14 | QoS flow multiplex | #12 | Partially | Yes | Single solution | SA2 |
| 15 | Media and metadata | - | - | - | - | - |

## 8.1 Conclusions for Key Issue #1

Inaccuracy of the PDU Set Size (PSSize) information

The following aspects are concluded as principles for the normative work:

* Maintain 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 KI#1 candidate 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 Rel-18 towards normative work effectively solving the NAT46/64.
  + 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.

## 8.2 Conclusions for Key Issue #2

QoS handling requirements for lone PDU

The following aspects are concluded as principles for the normative work:

* 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 in TS 26.522

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

Editor’s note: Analysis and conclusion to be updated based on decision on 1863

## 8.3 Conclusions for Key Issue #3

Enhancements for application-layer FEC support

Existing AL-FEC and congestion control schemes were studied in this KI.

No recommendation for normative work to include new AL-FEC schemes in the 3GPP specifications was identified.

## 8.4 Conclusions for Key Issue #4

AL-FEC awareness for PDU Set handling

The following aspects are concluded as principles for the normative work:

* Agree on supporting PDU Set handling with AL-FEC awareness in Rel-19 5G\_RTP\_Ph2 normative work.

NOTE 1: The agreement is conditioned by RAN confirmation to feasibility of using content ratio information for discarding DL PDUs during congestion for RLC AM/UM mode based on the above SA2 principles in Rel-19. This would apply for success of delivery of a group of packets.

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

NOTE 2: 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.

NOTE 3: A generic mechanism to improve congestion control algorithms for AL-FEC encoded traffic considering intentional packet discarding by the network is FFS.

## 8.5 Conclusions for Key Issue #5

RTP transport of XR metadata

This key issue was not progressed, hence no recommendation for normative work.

## 8.6 Conclusions for Key Issue #6

PDU Set marking for XR streams with RTP end-to-end encryption

The following aspects are concluded as principles for the normative work:

* Extend the guidelines for support of SRTP in such cases in TS 26.522

No additional normative work has been identified for Rel-19 since SRTP usage is already supported in Rel-18.

## 8.7 Conclusions for Key Issue #7

RTCP messages to better support XR services in 5G

Existing RTCP messages and RTP HEs were studied in this KI.

No potential normative work has been identified for Rel-19.

## 8.8 Conclusions for Key Issue #8

RTP retransmission in supporting XR services in 5G

The following aspects are concluded as principles for the normative work:

- 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.

## 8.9 Conclusions for Key Issue #9

Feasibility of RTP multiplexing options for transport of XR media streams

The following aspects are concluded as principles for the normative work:

- Based on response from SA2, normative work on multiplexed RTP streams may be needed. Furthermore, we recommend to add guidelines to TS 26.522 for RTP senders that use multiplexing.

## 8.10 Conclusions for Key Issue #10

Use cases and intended deployment scenarios for enhancements of RTP header extension for PDU Set marking

This key issue was not progressed, hence no recommendation for normative work.

## 8.11 Conclusions for Key Issue #11

Enhancements of RTP header extension for PDU Set marking

This key issue was not progressed, hence no recommendation for normative work.

## 8.12 Conclusions for Key Issue #12

Enhancements of Data Burst Marking

The following aspects are concluded as principles for normative work:

* Do normative work for adding burst size notification, when deterministically known, from RTP senders in a HE.
* Revisit definition of a data burst in TS 26.522 to indicate what is meant by idle time and if it is required.
* Possibly inform SA2 and RAN2 about the SA4 about our work.
* Define 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.

[TTNB-parked: RAN2 has indicated that TTNB may be useful if provided in time and is reliable. SA4 needs further evaluation needs to be done before proceeding with normative work but it is recommended to do normative work if the evaluation shows that TTNB value can be signalled.]

## 8.13 Conclusions for Key Issue #13

Applicability of the RTP header extension for PDU Set marking to different PDU Set types

The following aspects are concluded as principles for normative work:

- Consider extending the PSI guidelines in TS 26.522 for the case when a PDU Set is defined as a tile (as opposed to a video frame or slice).

- Coordinate with SA2 and RAN2 on potential benefits of signalling PDU Set type to the 5G network.

## 8.14 Conclusions for Key Issue #14

Traffic detection and QoS flow mapping for multiplexed media stream data flows

The following aspects are concluded as principles for normative work:

- Based on response from SA2, normative work on multiplexed RTP streams may be needed. Furthermore, we recommend to add guidelines to TS 26.522 for RTP senders that use multiplexing. There may be potential normative aspects to be added to TS 26.510.

## 8.15 Conclusions for Key Issue #15

Media and metadata delivery over multiple sessions

This key issue was not progressed, hence no recommendation for normative work.