**Source: Nokia Corporation1**

**Title: [FS\_5G\_RTP\_Ph2] Key Issue: Applicability of the PDU Set header extension to different PDU Set types**

**Agenda Item: 10.8**

**Document for: Discussion and Agreement**

# Introduction

A new study item FS\_5G\_RTP\_Ph2 was approved at SA#103. One of the objectives of the study is:

1. *Document the following Key Issues in more detail, and in particular how they relate to RTP and RTCP for WebRTC and IMS-based XR services:*
2. ***Enhancements of RTP header extension for PDU Set marking.*** *In TS 26.522, an RTP header extension for PDU Set marking is specified. Additional enhancements may be considered, namely: 1) The definition of a default value for PDU Set Importance for the case when it is not specified by the sender. 2) Guidelines for an AS that is on the media path between two or more UEs, (e.g., an MRF or MCU). 3) Study the applicability of the PDU Set concept for the cases where the PDU Set is not a video frame or slice (e.g., an HEVC tile, metadata, audio, text, image, etc.)*

Objective A.10 includes different aspects. This document focuses on the aspect 3.

In the Rel-18 work, it was mainly assumed that the PDU Set framework is applied to PDU Sets comprising either video frames or slices. However, the PDU Set definition in TS 23.501 does not limit a PDU Set to be a video frame or slice.

* ***PDU Set:*** *One or more PDUs carrying the payload of one unit of information generated at the application level (e.g. frame(s) or video slice(s) etc. for eXtended Reality (XR) Services). All the PDUs of a PDU set are transmitted within the same QoS Flow.*

As evident from the definition, a PDU Set carries the payload of one unit of information at the application level. This would include both video and other media types as well as any other application-layer units that are meaningful to the application (e.g., sub-picture constructs) for specific use cases.

**Non-video data types**

The Rel-18 work only briefly discussed the marking of PDU Sets comprising non-video data such as audio PDUs. Within a PDU Set, all PDUs are assigned the same priority ranking denoted as the PDU Set Importance (PSI). TS 26.522 recommends relatively high PSI values for PDU Sets comprising audio data. However, no detailed guidelines on audio are given. According to the clause 4.2.6.2.1:

*PDU Sets that contain audio data should be assigned a lower PSI value (i.e., higher importance) compared with PDU Sets that contain other media types.*

*NOTE 1:PDU Sets that carry immersive audio data are not necessarily assigned a lower PSI value compared with the other media PDU Sets. The PSI value of immersive audio PDU Sets is FFS.*

Moreover, in Rel-18 there has been little discussion on the applicability of PDU Set handling to other data types such as metadata, real-time text, etc. Feasibility of using the RTP header extension for PDU Set marking for such data needs to be studied within FS\_5G\_RTP\_Ph2.

**Picture partitioning mechanisms**

New generation of video codecs such as H.265/HEVC allow spatially partitioning a picture into different constructs like tiles.

**Tiles** are independently decodable rectangular regions of a picture that are encoded with some shared header information. The initial motivation behind the development of HEVC tiles was to increase the capability for parallel processing rather than provide error resilience like slices do. However, use cases for immersive media in recent years demonstrated that tiles can also be used for spatial random access to different regions of a picture. This feature makes tiles suitable for use in viewport-dependent delivery of immersive media.

Feasibility of marking PDU Sets comprising tiles needs to be studied to identify the potential benefits and challenges of such marking for different use cases.

# Proposal

A key issue description on “Applicability of the RTP header extension for PDU Set marking to different PDU Set types” is proposed for incorporation into TR 26.822.

**============================= CHANGE 1 =============================**

# 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 26.522: "5G Real-time Media Transport Protocol Configurations".

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

**========================= CHANGE 2 (all new) ==========================**

## 5.x Key Issue #x: Applicability of the RTP header extension for PDU Set marking to different PDU Set types

### 5.X.1 Description

In the Rel-18 work, it was mainly assumed in TS 26.522 [x] that the PDU Set framework is applied to PDU Sets comprising either video frames or slices. However, the PDU Set definition in TS 23.501 [y] does not limit a PDU Set to be a video frame or slice.

* ***PDU Set:*** *One or more PDUs carrying the payload of one unit of information generated at the application level (e.g. frame(s) or video slice(s) etc. for eXtended Reality (XR) Services). All the PDUs of a PDU set are transmitted within the same QoS Flow.*

The objective of this key issue is to study the applicability of the PDU Set concept for the cases where the PDU Set is not a video frame or slice.

This key issue aims at addressing the following points:

* Study and document applicability criteria of PDU Set marking to different media types and formats.
* Whether and how to apply PDU Set marking to non-video data: metadata, audio, text, image.
* Whether and how to apply PDU Set marking to picture partitioning constructs other than slices such as tiles.