**3GPP TSG-WG SA2 Meeting #153E e-meeting *S2-2208568r15***

**Elbonia, October 10 – 17, 2022 (revision of S2-220xxxx)**

**Source: Huawei, HiSilicon, China Mobile, KDDI, Lenovo**

**Title: KI#4&5: Evaluation and Conclusion**

**Document for: Approval**

**Agenda Item: 9.19**

**Work Item / Release: FS\_XRM / Rel-18**

*Abstract: Evaluation and conclusion for KI#4&5 is proposed.*

# 1. Introduction

This paper proposes the evaluation and conclusion for KI#4&5 together.

# 2. Text Proposal

It is proposed to capture the following changes vs. TR 23.700-60.

\* \* \* \* First change (all new texts) \* \* \* \*

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## 8.X Conclusions for KI#4 and KI#5

The following aspects are concluded as principles for the normative work to support the following two key issues:

- Key Issue #4: PDU Set integrated packet handling

- Key Issue #5: Differentiated PDU Set Handling

NOTE: Further PDU Set handling for Uplink will be studied and led by RAN WG. SA2 can align with RAN’s progress and decision for Uplink, if any.

### 8.X.1 Control plane enhancements for supporting PDU Set in downlink

#### 8.x.1.1 PDU Set QoS Parameters

PDU Set QoS treatment is determined using dynamic or non-dynamic PCC.

The following PDU Set QoS parameters are defined to support PDU Set handling:

- PDU Set Error Rate:The PSER defines an upper bound for the ratio between the number of PDU Sets not successfully received and the total number of PDU Sets sent towards a recipient measured over a measurement window. A PDU Set is considered as error in case all or partial PDUs of the PDU Set are not successfully delivered.

Editor’s Note: it is FFS the criteria of determining PDU Set error when partial PDUs of the PDU Set are not successfully delivered.

Editor’s Note: Whether a “PDU Set Valid Time” is needed is FFS. (Potential SoH)

- PDU Set Delay Budget.

Editor’s Note: The definitions of PSER and PSDB are FFS.

- Whether all PDUs are needed for the usage of PDU Set by application layer (PDU Set Integrated Indication).

- Whether a PDU Set is still valid in case PSDB is exceeded (PDU Set Valid Indication)

- Whether relative QoS within PDU Set is expected (Relative PDU Set indication)

If PDU Set based QoS handling is used, PCF determines the above PDU Set QoS Parameters based on information provided by AF (described in 8.X.2) and/or local configuration. The PDU Set QoS parameters are sent to SMF as part of PCC rule, then SMF sends them to RAN.

#### 8.X.1.2 AF Information Provisioning

PDU Set related assistance information provisioning by AF is supported for dynamic PCC. AF may provision one or more of the following PDU Set related assistance information to NEF/PCF during AF QoS request procedure:

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- PDU Set QoS parameters listed in clause 8.x.1.1.

- Traffic periodicity

#### .X.1.3 PDU Set capability of RAN Node

* PDU Set handling capable RAN node provides SMF the PDU Set handling support indication upon PDU session establishment/modification procedure.

### 8.X.2 User plane enhancements for supporting PDU Set in downlink

#### 8.X.2.1 PDU Set Information

The following PDU Set related information may be identified by UPF to support PDU Set based handling:

- PDU Set SN

- Optional, Start PDU of the PDU Set

- Optional, End PDU of the PDU Set

- PDU SN within a PDU Set

- Optional, Number of PDUs within a PDU Set

NOTE: Either one among Start/End PDU of the PDU Set and Number of PDUs within a PDU Set needs to be supported.

- PDU Set Importance

Editor’s Note: Support of PDU Set dependency (i.e. dependency information between frames/slices/layers) are FFS. (Potential SoH)

#### 8.X.2.2 PDU Set Information identification on UPF and supported N6 protocols

The detection and marking of the DL PDU Sets sent to the NG-RAN shall be done by the PSA UPF.

PSA UPF may identify the PDU Set based on instruction from SMF and packet header of N6 protocols:

- by matching RTP/SRTP header and payload (RFC 3550/3711/6184/7798/draft-ietf-avtcore-rtp-vvc/draft-ietf-avtext-framemarking are supported).

- by matching new RTP header to be defined in SA4 5G\_RTP WI.

NOTE: The support of new RTP header defined in SA4 is TBD during normative phase based on progress of SA4.

NOTE: In above cases, it is assumed that the RTP/SRTP header and/or payload necessary for the identification of PDU Set Information is not encrypted.

- by reading the PDU Set Identification information included in the GTP-U header of DL packets arriving on N6.

Editor’s note: The exact information contained in the GTP-U extension headers on N6 is FFS and needs to be aligned with the information contained in the GTP-U extension headers on N3/N9 (refer to clause 8.X.2.2 Delivering PDU Set Information to RAN).

- by UPF implementation, e.g., PDU Set detection based on traffic characteristics. IP header parameters DSCP/TOS, IP port, IPv6 flow label may be used to detect PDU set, however detailed mechanisms in UPF for PDU Set information identification will not be standardized.

Editor’s Note: Other N6 protocols, e.g. HTTP/MASQUE, GTP-U, IP/TCP/UDP/QUIC options, carrying PDU Set information are FFS. (Potential SoH)

#### 8.X.2.3 Delivering PDU Set Information to RAN

PDU Set Information (listed in 8.X.2.1), except for “PDU Set Importance”, are informed by UPF to RAN via GTP-U header of user plane packet.

PDU Sets with different PDU Set Importance belonging to the same media stream are bound by the UPF on the same QoS Flow.

PDU Set Importance, together with other information listed in clause 8.X.3.1, is conveyed from UPF to NG-RAN via the GTP-U header of user plane packets.

While NG-RAN handling of PDU Sets with different PDU Set importance is in the scope of RAN2, the SA2 assumption is that the PDU Sets of the same media stream are delivered in order over the radio.

From SA2 perspective the PDU Set Importance is used by NG-RAN primarily for PDU Set-level packet dropping in presence of downlink congestion.

NOTE: RAN2 may identify additional use of PDU Set Importance, while keeping the assumption for in-order delivery on the radio.

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### 8.X.3 PDU Set based QoS handling

RAN performs PDU Set based QoS handling based on received PDU Set QoS Parameters via control plane, and PDU Set Information received via user plane. The details of RAN behaviours are defined in RAN WG.

UPF supports PDU Set dropping and informs downstream nodes (either UPF or RAN node).

Based on the feedback of PDU Set transmission failure from RAN, UPF may drop other PDU Sets which depends on the failed PDU Sets.

\* \* \* \* End of changes \* \* \* \*