**3GPP TSG-SA WG2 Meeting #129S2-18XXXX**

**Dongguan, China, 15 – 19 October, 2018 (*revision of S2-18xxxx*)**

**Source: LG Electronics**

**Title: QoS handling of MA-PDU Session**

**Document for: Approval**

**Agenda Item: 6.8 Study on Access Traffic Steering, Switch and Splitting support in the 5G system architecture**

**Work Item / Release: FS\_ATSSS / Rel-16**

*Abstract of the contribution:* *This contribution proposes QoS handling method for Multi-Access PDU Session.*

# Discussion

Based on discussion paper…

# Proposal

\* \* \* \* Start of 1st Change \* \* \* \* (All New Text)

## 6.X Solution X: QoS framework for Multi-Access PDU Session

### 6.x.1 General

This solution provides overall description on how to support QoS for a Multi-Access PDU Session.

The QoS Flow is the finest granularity of QoS differentiation in the Multi-Access PDU Session and the QoS Flow is not associated with specific access, i.e. access agnostic. When a data flow is steered between two accesses, the same QoS Flow is used.

The SMF provides QoS rule(s) to the UE when a Multi-Access PDU Session is established. The UE performs the classification and marking of UL User plane traffic, i.e. the association of UL traffic to QoS Flows, based on QoS rules and the classification is independent of ATSSS steering rules. The SMF provides a default QoS rule to the UE.

The SMF provides Packet Detection Rule(s) (PDR) to the UPF when a Multi-Access PDU Session is established. The UPF performs the classification and marking of User Plane traffic, based on PDR and the classification is independent of ATSSS steering rules.

The SMF provides QoS profile to the RAN and the N3IWF when a Multi-Access PDU Session is established. The RAN and N3IWF establishes required resources for the QoS Flow, e.g. establishment of radio bearer, IPsec SA, updating QoS Flows to AN resources mapping. This enables dynamic traffic steering between 3GPP and non-3GPP accesses.

When a GBR QoS Flow is established, the UE may enter CM-IDLE state in a single access. For example, when there is no traffic over 3GPP access, the RAN may request to release N2 connection due to user inactivity over 3GPP access. Then the UE enters CM-IDLE in 3GPP access. Moreover, the UE may enter CM-IDLE state in non-3GPP access when the UE moves out of non-3GPP access coverage. In such case, the SMF does not releases GBR QoS Flow and does not update QoS Rule and PDR associated with the GBR QoS Flow. When the UE becomes CM-CONNECTED, the SMF request AN to establish AN resources for GBR QoS Flow. In order to guarantee AN resource is established, the UE initiates PDU Session Modification procedure to indicate that the UE is going to send GBR QoS Flow to the other access. When the SMF receives this indication and if AN resource for the GBR QoS Flow is not established, the SMF requests AN to establish AN resources for GBR QoS Flow.

### 6.x.2 PDU Session Modification procedure

The following figure shows PDU Session Modification procedure for Multi-Access PDU Session. The procedure is based on the PDU Session Modification procedure in TS 23.502 [6]. Note that for the sake of simplicity, some of steps are not shown (e.g. PDU Session Modification Command Ack from the UE, AMF-SMF interaction, etc). This procedure is used to indicate that the UE is going to send GBR QoS Flow to the other access.



Figure 6.x.2-1: QoS Flow Establishment procedure for Multi-Access PDU Session

0. The UE is sending a data flow of a GBR QoS Flow over non-3GPP access and the UE may be CM-IDLE in 3GPP access.

1. When the UE needs to switch data flow of a GBR QoS Flow to the 3GPP access, the UE initiates PDU Session Modification procedure to send switching indication. If the UE is in CM-IDLE, the UE initiates Service Request procedure before sending PDU Session Modification Request message. The UE sends the PDU Session Modification Request message over the 3GPP access. In the PDU Session Modification Request message, the UE includes the same QoS information with the GBR QoS Flow the UE want to move so that the SMF knows which QoS Flow is moved to the 3GPP access.

2. The SMF derives affected QoS Flow based on information received in step 1. The SMF decides to request RAN to establish required RAN resources for the QoS Flow.

3. The SMF sends N2 Setup message to the RAN. The SMF also include PDU Session Modification Command message and indicate that the UE may start sending data flow over 3GPP access.

4. RAN performs radio resource establishment. The RAN sends PDU Session Modification Command message to the UE. After receiving PDU Session Establishment Command message, the UE switches data flow according to the steering rule.

5. The RAN sends N2 Setup response message. If the RAN rejected establishment of the QoS Flow, the SMF may update QoS rule and / or steering rule.

6. The SMF triggers N4 Session Modification procedure to provide tunnelling information of 3GPP access.

### 6.x.3 Notification control

In Rel-15, Notification control is only supported in 3GPP access and it is not supported in non-3GPP access. In addition, Notification control is designed to support end-to-end rate adaptation. In a Multi-Access PDU Session, notification from RAN does not helpful for rate adaptation because even if the RAN is congested, end-to-end data rate may not be impacted if the UE steers the data flow over the non-3GPP access. So In Rel-16, Notification control is not supported for a Multi-Access PDU Session.

\* \* \* \* End of Changes \* \* \* \*