**3GPP TSG-WG SA2 Meeting #153E e-meeting *S2-220XXXX***

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

**Source: Huawei, HiSilicon**

**Title: KI#5: Evaluation update**

**Document for: Approval**

**Agenda Item: 9.26**

**Work Item / Release: FS\_5G\_ProSe\_Ph2 / Rel-18**

*Abstract: Update of KI#5 evaluation based on the update of solution#29.*

# 1. Introduction/Discussion

This paper proposes the update of KI#5 evaluation based on the update of Sol#29 (S2-220XXXX).

# 2. Text Proposal

It is proposed to capture the following changes vs. TR 23.700-33.

\* \* \* \* First change \* \* \* \*

7.5 Key Issue #5: Support of multi-path transmission for UE-to-Network Relay

The Key Issue #5 covers two aspects:

- Aspect #1: Whether and how Policy authorization is used for path selection between direct Uu and indirect path via Layer 2/3 U2N Relay UE: Transmitting some service data flow via U2N Relay path if available with policy guidance.

- Aspect#2: Whether and how to enhance the existing procedures to support Multi-path Transmission: Transmitting service data flow simultaneously via direct Uu path and U2N Relay path.

For Aspect #1, there are two solutions:

* Sol #25 mainly addresses policy aspects and is applicable for both Layer 2 and layer 3 U2N Relay. It proposes to enhance the URSP to allow the UE to be able to re-evaluate the URSP rule to determine to use direct Uu path, indirect Uu path via U2N Relay or both paths based on the availability of U2N Relay path.
* Sol #29 focuses on the policy and authorization for Multi-path Transmission via Layer-3 UE-to-Network Relay without N3IWF. It proposes to use the similar mechanism as Rel-17 ProSe to enhance URSP with the RSD including a new item "Multi-Path ProSe Layer-3 UE-to-Network Relay Offload indication" alongside the existing "ProSe Layer-3 UE-to-Network Relay Offload" and keeping them separate.

For Aspect #1, on policy authorization aspect, Sol #25 can be used for all solutions addressing Layer 3 U2N Relay without N3IWF and Layer 2 U2N Relay. Sol #29 is used for Layer 3 U2N Relay without N3IWF case.

For Aspect #2, there are following solutions:

* Sol #26 addresses Layer 2 U2N Relay aspect and mainly focuses on the high level description of multiple path transmission, which has significant RAN dependency.
* Sol #27 addresses Layer 3 U2N Relay without N3IWF aspect and reuses existing ProSe Policy and URSP design. Remote UE determination of the Multipath establishment is based on the ProSe policy. After legacy URSP evaluation, if the first path is Layer-3 relay without N3IWF, when to establish the Uu path, the Remote UE initiates the PDU Session establishment via direct Uu path based on the PDU session parameters associated to the RSC in ProSe Policy. If the first path is direct Uu path and there is corresponding ProSe policy configured for Layer-3 relay without N3IWF, the Remote UE uses the configured ProSe policy for Layer 3 U2N Relay UE discovery, selection and relay connection establishment. It requires the Remote UE to establish PDU Session via direct Uu path by evaluating ProSe Policy.
* Sol #28 addresses both Layer 2 U2N Relay case and Layer 3 U2N Relay with/without N3IWF cases. For Layer 3 U2N Relay with N3WIF case, it relies on MA PDU session support (defined by ATSSS feature) in 5GS. For Layer 3 U2N Relay without N3IWF case, it relies on Application layer’s decision on when to set up the multi-path connectivity and how to aggregate/split the traffic on both paths. For layer 2 U2N Relay, it provides some high level description on how to support multi-path transmission, which relies on work in RAN WGs.
* Sol #39 and Sol #40 address how to support multi-path transmission for Layer 2 U2N Relay case, they propose to use URLLC like mechanism under a single NG-RAN node for redundant transmission. Sol #40 relies on MR-DC transmission under one single NG-RAN node, while Sol #39 relies on dual PDU Sessions transmission under one single NG-RAN node.
* Solution #41 meets the requirement of end-to-end redundant communication by supporting redundancy handling at a single NG-RAN node when receiving the path identifications from 5GC, in case of Layer 3 U2N Relay with/without N3IWF. Its method has RAN impact then confirmation and decision from RAN group is needed. AS a comparison Sol #39 and 40 support redundancy handling at a single NG-RAN node using URLLC like mechanism in case of Layer 2 U2N Relay. For case of Layer 3 U2N Relay with N3IWF case, Sol #41 propose to use ATSSS feature which is similar with what Sol #28 proposed, with the difference that Sol #41 focus on redundancy communication using the feature defined in R18 ATSSS\_Ph3.

For multi-path transmission via Layer 2 U2N Relay:

* for MR-DC based mechanism (e.g. Sol#26, Sol #40), it mainly relies on work in RAN WGs to support multi-path transmission via Layer 2 U2N Relay UE, with the difference being that Sol#26 has no normative work is required for SA2, whereas Sol#40 does;
* for dual PDU Session based mechanism (i.e. Sol #39), from SA2 aspect, the enhancement may be on policy authorization for multi-path transmission (i.e. proposed in Sol#25), it would also require work in RAN WGs.

For multi-path transmission via Layer 3 U2N Relay without N3IWF, it can be achieved via application layer as proposed in Sol #28 and Sol #41.

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