**3GPP TSG-WG SA2 Meeting #152E e-meeting *S2-220xxxx***

**Elbonia, August 17 – 26, 2022 (revision of S2-220xxxx)**

**Source: Huawei, HiSilicon**

**Title: KI#5, Multi-path transmission using Layer-3 UE-to-Network Relay**

**Document for: Discussion**

**Agenda Item: 9.26**

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

*Abstract: This contribution introduces a solution for multi-path transmission between UE and the AF using a direct path and an indirect path via a Layer 3 UE-to-Network Relay. The solution is transparent to the AF and does not rely on functionality other than UE-to-Network Relay.*

# 1. Discussion

This contribution outlines the key elements of a solution for Key Issue #5 for improved reliability of the communication between UE and Application using Layer-3 UE-to-Network Relay. Huawei will be happy to share detailed call flows prior the SA2#152 submission deadline.

Highlights of the solution:

* Multipath communication can be established by adding an indirect path to an existing direct path or by adding a direct path to an existing indirect path
* The solution considers the general case where the Remote UE and UE-to-Network relay are using different AMFs，SMFs and UPFs.
* The UPF used for the pre-existing path performs the role of anchor UPF and routes the traffic to and from the application function. A forwarding tunnel is established between the anchor UPF and the UPF of the other path.
* The establishment of multipath is triggered by the Remote UE taking into account policies in the relay. The UE can selectively enable multipath transmission with QoS flow granularity
* The solution does not requires N3IWF or ATSSS features to be deployed and is transparent to the AF
* In this release, the multipath policy is to only decode the strongest of the two paths and send to application

UE

/

Remote UE

NG-RAN

Layer-3

UE-to-Network

Relay

UPF-1

NG-RAN

UPF-2

AF

AMF-1/SMF-1

AMF-2/SMF-2

Figure 1: Multi-path transmission using a direct path and an indirect path with Layer-3 UE-to-Network Relay (showing the case where UPF1 acts as anchor UPF)