**3GPP TSG-WG SA2 Meeting #140E e-meeting *S2-200xxxx***

**Elbonia, August 19 – September 1, 2020 (revision of S2-200xxxx)**

**Source: Huawei, HiSilicon**

**Title: Clarification on steering mode**

**Document for: Approval**

**Agenda Item: 8.6**

**Work Item / Release: ATSSS / Rel-17**

*Abstract: This contribution solves the Editor’s Notes with solution 2.*

# Introduction/Discussion

Regarding the new defined Autonomous steering mode and Redundancy steering mode, this paper clarifies which steering methods can apply these new steering modes and removes the corresponding Editor’s Notes.

# 2. Text Proposal

It is proposed to capture the following changes in the TR 23.700.

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

## 6.2 Solution #2: New steering mode - Autonomous steering mode

### 6.2.1 Introduction

This solution addresses KI#1 on Additional Steering Modes.

As specified in ATSSS Rel-16, the traffic of MA PDU session could be distributed across both accesses by using different steering modes. There are four steering modes as defined in R16, i.e. Active-Standby, Smallest Delay, Priority-based and Load balancing. All the R16 steering modes are decided by the network side, and performed by the UE and UPF based on the link performance measurement. For example, if one access becomes unavailable, the UE and UPF can switch all the traffic to the other available access. However, except the access available/unavailable status, the UE and UPF cannot flexibility distribute the traffic over both accesses according to the link performance in real time. To be more specific, for the Load balancing mode, the traffic splitting weight is statically set by the network based on the operators' requirement instead of the link performance measurement. For the Priority-based mode, the traffic can take over both access resources only when one access is congested. In sum, both of these steering modes do not allow the UE or the UPF to adjust the traffic splitting weight over both accesses dynamically based on the link status, not even mention Active-Standby and Smallest Delay.

### 6.2.2 High-level Description

This steering mode, called Autonomous steering mode, provides to both the UE and the UPF flexibility on the traffic splitting control when two accesses are applicable for this traffic. See Figure 6.2.2-1 for details, where one single packet flow is shown as an example for UL and DL respectively. The weight factor for the traffic over each access, e.g. 30% for UL and 50% for DL on 3GPP access, and 70% for UL and 50% for DL on non 3GPP access, as shown in the figure, is decided by the UE and the UPF independently for both UL and DL, subject to link status.



Figure 6.2.2-1: Autonomous steering mode

This autonomous steering mode can be applied by the MPTCP, ATSSS-LL and (MP)QUIC steering methods. To be more specific, for the MPTCP (as defined in R16 TS 23.501 and TS 23.502) or (MP)QUIC (as defined in solution 7 and 8) steering methods, as the packet reordering is supported by the MPTCP or (MP)QUIC protocol, one packet flow splitting per packet with flexible weight factor on both accesses can be applied based on the autonomous steering mode. For the ATSSS-LL (as defined in R16 TS 23.501 and TS 23.502) steering method, only different packet flow via different access, i.e. traffic splitting per packet flow, can be supported in the autonomous steering mode.

### 6.2.3 Procedures

The procedure is the same as the ATSSS procedures defined in TS 23.502 with the following difference:

 - steering mode parameter is extended to include the autonomous steering mode.

\* \* \* \* Second change \* \* \* \*

## 6.4 Solution #4: New steering mode - Redundant steering mode

### 6.4.1 Introduction

This solution addresses KI#1 on Additional Steering Modes.

### 6.4.2 High-level Description

During Rel-16 ATSSS study, the redundancy steering mode is documented (see clause 6.3.1.1, 6.4.1 in the TR 23.793 [13]) for the loss rate sensitive traffic, such as IMS singling, video, and some TCP-based traffic. It allows the traffic transmitted via 3GPP and non-3GPP accesses in a redundant way to achieve the lowest latency and lower the loss rate. It is proposed to further enhance the redundancy steering mode as described in the TR 23.793 [13], with which the traffic will always be transmitted over both accesses once applied, to make it possible that the traffic transmission goes via both accesses if necessary or via only one access to save the transport resource. In details, when the traffic is allowed on both accesses, the UE and the UPF can decide to transport the traffic via one access or both accesses based on the link performance measurement (e.g. based on the packet loss rate and the threshold of the loss rate). For example, if the loss rate on one access does not exceed the threshold, then only this one access is applied, otherwise, redundant transmission is triggered. Especially, the redundancy transmission solution may be triggered during the traffic switching phase to avoid the packet lost in the handover procedure. See below Figure 6.4.2-1 for details, where UL packet flow is taken as an example. The DL shares the same mechanism.

This redundancy steering mode can be applied by the MPTCP (as defined in R16) and (MP)QUIC (as defined in solution 7/8) steering methods. For the ATSSS-LL (as defined in R16 TS 23.501 and TS 23.502), the redundancy steering mode is not supported.



Figure 6.4.2-1: Redundancy steering mode

The enhancement on link performance measurement as described in the clause 6.3.2 and definition of thresholds for traffic steering/switching/splitting in the clause 6.3.3 are also applicable to this Redundancy steering mode.

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