SA WG2 Meeting #143E (e-meeting) S2-21xxxxx

Elbonia, Feb 24 – Mar 9, 2021

**Source: Qualcomm Incorporated**

**Title: Closing outstanding issues for UE-to-Network Relay conclusions**

**Document for: Discussion/Approval**

**Agenda Item: 8.8**

**Work Item / Release: FS\_5G\_ProSe/Rel-17**

*Abstract of the contribution: This contribution proposes changes to close the outstanding issues to conclude, KI#3: UE-to-NW relay, considering RAN2 WG input.*

# Discussion

Below are the outstanding issues to approve the interim conclusions (in clause 8.3 of TR 23.752) for KI #3: Support of UE-to-Network Relay in SA2 study phase:

1) UE-to-Network Relay conclusions are subject to confirmation from RAN WG2 and SA WG3 for normative work.

2) The final decision on whether or not to proceed with Layer-2 and/or Layer-3 into normative work will be made in cooperation with other WGs.

Issue 1) above is dependent on the technical feasibility analysis of UE-to-Network relay solutions in RAN WG2 and SA WG3 SIs. Issue 2) is going to be dependent on the decision of the RAN WG2 on which architecture option (L3 or L2 or both) and which feature under each architecture option is suitable for Rel-17 normative work.

RAN2 provided an LS response [1] to SA2, including the RAN workplan and the technical progress on UE-to-Network relay study after the RAN2#112-E meeting. The RAN2 LS response [1] indicated that both L3 and L2 UE-to-Network relay are considered feasible from RAN2 study. The same has been confirmed by RAN2 as per the below agreements at RAN2#113-E.

Agreements:

Update the TR with the following changes:

- Remove “Editor’s note: Service continuity related CP procedure is captured in 4.5.4” from section 4.5.5

- Remove “Editor’s note: RAN2 needs to consider SA3 input” from section 5.5.3 and add the sentence “Security aspects require confirmation from SA3” to the text.

- Revise the following sentence as: “For the inter-gNB cases, compared to the intra-gNB cases, potential different parts on RAN2 Uu interface in details can be discussed in WI phase.” in section 4.5.4.

RAN2 confirm the decision of last meeting that L2 and L3 are both feasible for U2N and U2U, aligned with the LS sent to SA2 from RAN2#112-e (this is not a conclusion on the recommendation for normative work).

**Observation 1: RAN2 WG study conclusion on NR Sidelink Relay (FS\_NR\_SL\_Relay) reaffirmed the feasibility of both L3 and L2 UE-to-Network relay architecture options provided to SA2 in [1].**

In the LS response [1], RAN2 identified the topics that are beyond RAN2 scope and should be concluded by SA2 independently. As per the workplan provided by RAN2 in [1] and agreements above, the conclusion on which of the UE-to-Network relay options will be considered for Rel-17 normative work is not going to be made in the study phase of RAN2. RAN WG plenary, and discussion is necessary for normative work decision. SA2 can wait for conclusion on what to be covered in the normative work until after the RAN plenary and SA3 confirmation.

Considering RAN2 feasibility input and progress so far, we think that it is suitable for SA2 to agree on the interim conclusions as final conclusions for the UE-to-Network technical evaluation in study phase.

**Proposal 1: Considering the RAN2 study conclusions, SA2 agree to remove the open issues in clause 8.3 of TR 23.752 to conclude the technical study in SA2.**

**Proposal 2: SA2 coordinate with RAN WG and SA WG3 in working planning to further decide which UE-to-Network relay options to proceed to the normative work in Rel-17.**

Below are few ENs in the interim conclusions for UE-to-Network relay.

Editor's note: The radio aspects of relay (re-)selection criteria and procedures, and service continuity for L3 U2N Relay are still under discussion in RAN WG2 in TR 38.836 [32] and will be determined by RAN WG2.

Editor's note: For mobility issue, SA WG2 may need further study after RAN WG progress.

For first part of EN#1 above, RAN2 captured the details on the radio aspects of relay (re-)selection criteria and procedures in clause 4.3 of RAN2 TR 38.836[2], with no editor’s notes for open issues. It also clarified that the additional AS criteria and details can be considered in WI phase. Considering the RAN2 status, SA2 can convert the first part of EN#1 to a normal note.

For second part of EN#1 above, clause 4.6.4 in RAN2 TR [2] on L3 service continuity makes working assumption that no AS layer solution will be studied to guarantee the service continuity, and leave it to the upper layer (e.g. application layer) solution. Thus, we think that for study phase, SA2 can remove the second part of EN#1 on service continuity and add a note.

EN#2 on L2 UE-to-Network relay, does not specify the details of the mobility issue. Our understanding from clause 4.5.4 and 4.5.5 of RAN2 TR, mobility and service continuity for L2 UE-to-Network relay is to be handled by RAN and CN based on the Rel-15/16 Uu mobility procedures. Thus, we think there is no open issue left for SA2 to discuss in the study phase. SA2 can remove the EN#2 and add text to clarify that SA2 can coordinate with RAN WG during normative work to support the mobility procedures based on Rel-15/16 for L2 UE-to-Network relay architecture option.

# Text Proposal

It is proposed to consider the changes below for conclusions clause 8.3 for Key Issue #3 in TR 23.752.

**>>>>Start Changes<<<<**

8.3 Key Issue #3: Support of UE-to-Network Relay

The following are concluded for the L3 UE-to-Network Relay solution:

- No showstopper has been identified by SA WG2 for L3 UE-to-Network solution. SA WG2 recommends L3 UE-to-Network Relay proceed into normative work, subject to RAN WG2 and SA WG3 conclusion.

- Solution #6 is taken as baseline in case the UE-to-Network Relay is a trusted entity by the Remote UE. Solution#23 is agreed to be used to provide end-to-end security for the Remote UE in case the UE-to-Network Relay is not a trusted entity by the Remote UE.

- For L3 Relay discovery procedure, it is proposed to adopt the standalone discovery procedure (i.e. Model A and Model B), and, the additional information advertised by Relay UE as described in Sol#28 as the basis for normative work.

- For the L3 relay operation support, Remote UE uses URSP rules to route the traffic on suitable communication path (as described in Sol#26).

- Security aspects require confirmation from SA WG3.

NOTE 1: The procedures to support authentication of Remote UE and Relay UE by the network will be determined by SA WG3.

- For the Remote UE to use the network resources (e.g. PDU Session and Network Slice) of the Relay UE's serving network, the network-controlled authorization procedures will be determined in the normative phase with coordination with SA WG3. The alignment with the associated security procedures to authenticate the Remote UE and Relay UE will be carried out in normative phase via coordination with SA WG3.

- The secondary authentication for a Remote UE will be determined by SA WG3. The alignment with the associated security procedures for secondary authentication of the Remote UE will be carried out in normative phase via coordination with SA WG3.

- For QoS handling, following aspects in Solution #24 and Option #2 of Solution #25 are selected as basis for normative work:

- L3 Relay can be configured with the 5QIs and PQIs mapping. Based on the mapping or, in case of a non-configured mapping of a requested QoS parameter, based on its implementation, the L3 relay translates the Uu QoS parameters to PC5 QoS parameters and vice versa.

- To support the dynamic QoS handling, relay UE determines the Uu QoS parameters and PC5 QoS parameters by taking into account the end-to-end QoS requirements provided by remote UE based on its configured QoS mapping information or, in case of a non-configured mapping of a requested QoS parameter, based on its implementation, and initiates PDU session modification procedure and L2 link modification procedure to setup corresponding QoS Flows over Uu and PC5.

- The SMF of the L3 Relay provides the corresponding QoS rules and flow level QoS parameters to the L3 Relay as part of the PDU session establishment or modification procedures as defined in TS 23.502 [8], clause 4.3.2 and 4.3.3. Alternatively, reflective QoS control over Uu as defined in TS 23.501 [6], clause 5.7.5.3 can be leveraged for dynamic QoS handling of Remote UE to save on signalling between SMF and L3 Relay.

- Based on signalled QoS rules (via SMF) or derived QoS rules (Uplink Uu via reflective QoS), the UE-to-Network Relay may use the L2 Link Modification procedures as defined in TS 23.287 [5], clause 6.3.3.4 to either move the corresponding ProSe service(s) to the mapped existing PC5 QoS flow or to set up a new PC5 QoS flow.

- Service continuity for L3 UE-to-Network Relay can be supported using application layer mechanisms.

NOTE 2: The radio aspects of relay (re-)selection criteria and procedures for L3 UE-to-Network Relay are covered by RAN WG2 in TR 38.836[32].

The followings are concluded for the L2 UE-to-Network Relay solution:

- No showstopper has been identified by SA WG2 for L2 UE-to-Network Relay solution. SA WG2 recommends L2 UE-to-Network Relay solution proceed into normative work, subject to RAN WG2 and SA WG3 conclusion.

- Adopt Control and User Plane Protocols as described in Annex A, with confirmation from RAN WGs.

- The Remote UE has a NAS connection with 5GC and Remote UE Registration and Connection establishment/management, the related procedure in solution #7 can be taken as baseline.

- For Relay discovery, the standalone discovery is used, and both Model A and Model B are supported.

- For paging the concluded solution in clause 6.6.2 of TR 23.733 [26] can be reused based on the assumption captured in clause 4.5.5.2 of TR 38.836 [32] adopted by RAN WG2.

- For mobility, RAN2 WG agreed on reusing the Rel-15/16 NR handover procedure as the baseline AS layer solution to guarantee service continuity described in clause 4.5.3 of TR 38.836 [32].

NOTE 3: It is left to RAN WG2 and to decide how to support end-to-end QoS between the Remote UE and RAN.

NOTE 4: It is left to RAN WG2 and SA WG3 to decide the details of how to support end-to-end security between the Remote UE and RAN.

NOTE 5: The radio aspects of relay (re-)selection criteria and procedures for L2 UE-to-Network Relay are covered by RAN WG2 in TR 38.836[32].

**>>>>End Changes<<<<**

# References

[1] R2-2010862 Reply LS on Direct Discovery and Relay

[2] 38.836 Study on NR sidelink relay;(Release 17)