**3GPP TSG-RAN WG2 Meeting #121bis-eR2-230xxxx**

**Online, April 17 – 26, 2023**

**Title: [draft] LS to SA2 on authorization for multi-path Scenario 2**

**Response to:**

**Release:** **Rel-18**

**Work Item: NR\_SL\_relay\_enh, FS\_5G\_ProSe\_Ph2**

**Source:** **vivo (to be RAN2)**

**To: SA2**

**Cc: RAN3**

**Contact Person:**

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**1. Overall Description:**

The SL relay WID has considered two multi-path scenarios as follows [RP-223501]:

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| 1. Specify mechanisms to support the following multi-path scenarios [RAN2, RAN3]:    1. A UE is connected to the same gNB using one direct path and one indirect path via 1) Layer-2 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2) without precluding the possibility of excluding a part of the solutions which is unnecessary for the operation for 2).   Note 3A: The mechanisms to support scenario 1 and scenario 2 are specified based on the assumptions and restrictions agreed in study phase.  Note 3B: UE-to-Network relay in scenario 1 reuses the Rel-17 solution as the baseline.  Note 3C: Support of Layer-3 UE-to-Network relay in multi-path scenario is assumed to have no RAN impact and the work and solutions are subject to SA2 to progress. |

From the WID the two multi-path scenarios are classified as:

* **Scenario 1**: The remote UE is remote UE is connected to the same gNB using one direct path and one indirect path via Layer-2 UE-to-Network relay
* **Scenario 2**: the remote UE is connected to the same gNB using one direct path and one indirect path via another UE (where the UE-UE inter-connection is assumed to be ideal).

On multi-path Scenario 2, RAN2 has made the following agreements:

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| **RAN2 agreements on Scenario 2**:   * RAN2 assumes that the relation between remote UE and relay UE in scenario 2 is pre-configured or static and how the relation is pre-configured or static is out of the 3GPP scope. * For Scenario 2, different Uu logical channels are configured for identification of data directed to/originating from the relay UE and data relayed from/to the remote UE over the Uu link of the indirect path, as in Rel-17. * RAN2 assumes that in Scenario 2, without the adaptation layer over non-3GPP link, a PDCP PDU can be delivered to an intended PDCP entity or RLC entity for support of more than one RB over UE-to-UE link based on UE implementation. * RAN2 does not impose a requirement for interoperability between two UEs from different vendors for scenario 2 in this release. * RAN2 understand that UE identification in L2 PDU over non-3GPP link is not in 3GPP scope in Scenario 2. * Do not specify adaptation layer over UE-to-UE link for scenario 2 in RAN2. * UE identification is not needed over Uu link in Scenario 2, if relay UE serves only one remote UE and different Uu RLC channels can be assumed for the remote UE and the relay UE. * Multi-path Relay is applicable to RRC\_CONNECTED remote-UE, for scenario-1 and scenario-2. * Multi-path Relay is NOT applicable to RRC\_IDLE remote-UE, for scenario-1 and scenario-2. * For UE-UE link in Scenario-2, whether/how to have failure detection is out of 3GPP scope. * RAN2 confirms the following WA for Scenario 2.   + Bearer identification except LCID is not needed in L2 PDU over Uu link in Scenario 2. Only 1:1 bearer mapping is supported over Uu link for the indirect path. FFS how to configure the mapping.   + Without the adaptation layer over Uu link in scenario 2, a PDCP PDU can be delivered to an intended PDCP entity or RLC entity for support of more than one RB over Uu link e.g. by configuring 1:1 bearer mapping and different Uu RLC channels for relay UE local traffic and relay traffic for PDU delivery.   + Do not specify adaptation layer over Uu link for scenario 2 in RAN2. * As agreed before, RAN2 deprioritizes association mechanism between remote UE and relay UE from CN to RAN. gNB provides bearer mapping information to relay UE through dedicated signalling. |

Scenario 1 has been discussed in SA2 corresponding FS\_5G\_ProSe\_Ph2 WI. And In the newest TS23.304, the authorization function and subscription management for the remote UE in multi-path Scenario 1 (i.e. via a SL L2 U2N relay UE) are specified as followings:

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| 4.3.4 AMF In addition to the functions defined in TS 23.501 [4], the AMF performs the following functions:  ----------------------------skip--------------------------------  - Obtain PC5 QoS parameters from the PCF and store them as part of the UE context data.  - Provision the NG-RAN with indication about the UE authorization status about the following:  - 5G ProSe Direct Discovery and 5G ProSe Direct Communication (i.e. as 5G ProSe-enabled UE for ProSe Direct Discovery, as 5G ProSe-enabled UE for ProSe Direct Communication);  - 5G ProSe UE-to-Network Relay Discovery and Communication (i.e. as 5G ProSe Layer-2 Remote UE, as 5G ProSe Layer-2 UE-to-Network Relay, as 5G ProSe Layer-3 UE-to-Network Relay);  - Multi-path transmission via direct Uu path and via 5G ProSe Layer 2 UE-to-Network Relay as a 5G ProSe Layer-2 Remote UE.  - Provision the NG-RAN with PC5 QoS parameters related to 5G ProSe Direct Communication.  ----------------------------skip-------------------------------- 4.3.5 UDM In addition to the functions defined in TS 23.501 [4], the UDM performs the following functions:  - Subscription management for 5G ProSe Direct Discovery and Communication.  - Subscription management for 5G ProSe UE-to-Network Relay Discovery and Communication.  - Subscription management for multi-path transmission via direct Uu path and via 5G ProSe Layer 2 UE-to-Network Relay as a 5G ProSe Layer-2 Remote UE. |

But, as Scenario 2 is not in the scope *FS\_5G\_ProSe\_Ph2* WI, SA2 has not discussed any issues. While RAN2 had discussed some issues that have SA2 impact e.g., multi-path transmission authorization and subscription function for a UE acting as the remote or relay UE in Scenario 2, related to the ideal UE-UE inter-connection. RAN2 would like to further check with SA2 whether there is any requirement for support of multi-path transmission authorization and subscription function in Scenario 2, which can be similar to Scenario 1, as following:

* Support of multi-path transmission authorization function for a UE acting as the remote UE
* Support of multi-path transmission subscription function for a UE acting as the remote UE
* Support of multi-path transmission authorization function for a UE acting as the relay UE
* Support of multi-path transmission subscription function for a UE acting as the relay UE

**2. Actions:**

**To SA2:**

**ACTION:** RAN2 kindly asks SA2 to take account aforementioned RAN2 agreements on multi-path Scenario 2 and provide feedback on potential requirements, if any.

**3. Date of Next TSG-RAN2 Meetings:**

TSG-RAN2 Meeting #122 22-26 May 2023 Incheon, KR

TSG-RAN2 Meeting #123 21-25 August 2023 Toulouse, FR