**3GPP TSG RAN WG2 Meeting #115-e R2-210xxxx  
Electronic Meeting, 16th - 27th August 2021**

**Agenda item: 8.7.1**

**Source: CATT**

**Title: [AT115-e][608][Relay] Reply LS to R2-2106967 (CATT)**

**Document for: Discussion and Decision**

# Introduction

This is email discussion for below offline discussion:

* [AT115-e][608][Relay] Reply LS to R2-2106967 (CATT)

Scope: Discuss the questions from SA2 in R2-2106967 and generate a reply LS.

Intended outcome: Approvable LS in R2-2108938

Deadline: Tuesday 2021-08-24 2000 UTC

The above email discussion is divided in two phases:

* **Phase I:** Companies are invited to provide feedback on the questions of this email discussion by 23th August 10:00 UTC.
* **Phase II:** Rapporteur submits a summary and proposals based on the feedback with draft LS reply, and companies can comments on the summary and draft LS reply by 24th August 20:00 UTC, to allow time for final draft LS reply reshaping and submission.

# Discussion

## Q1 of SA2 LS

**Q1)** SA2 has studied the possibility to transmit metadata or application layer discovery information in the PC5 discovery message and realized that it depends on the PC5 discovery message size (as described in clause 5.2.4 of TS 23.304). SA2 would like to ask RAN2 whether there is any limitation on the size of NR PC5 discovery message as similar to LTE PC5 discovery message.

During the online session, some companies proposed that according to the TS 23.304, it is obviously the discovery considered by SA2 is not limited to relay, but applicable to a non-relay PC5 link generally. With some discussion, one consensus was reached that we should focus on the current work scope of RAN2 Rel-17 SL Relay to answer current question.

In LTE, transport mode is used for D2D discovery message in AS layer, and the size limitation (232bit) of the D2D discovery message is due to the size of a specific PHY channel (PSDCH) to carry the discovery message.



**Figure-1 Stack for LTE ProSe discovery**

However, in NR, there is no new discovery transport channel for discovery. More specifically, the NR PSSCH is reused to carry NR PC5 discovery message. As captured in TR 38.836, the discovery related protocol stack is shown as below:



**Figure-2 Stack for NR ProSe discovery**

In [5][7], it was proposed that there should be no limitation for NR discovery message. In [6], it proposed that the NR discovery message’s size is variable and the Rel-16 NR PC5-S message (e.g., Direct Communication Request) can be referred for the supported message size for NR PC5 discovery message. In [10], it proposed that NR discovery message’s payload size is limited by a maximum size of TB for PSSCH and reuse the max TB size of 2976 bits for PDSCH carrying RMSI/OSI/Paging. In [9], it proposed that the size limitation is given by the smallest possible configuration of a resource pool yielding maximum 3360 bits for a sidelink transport block carrying a discovery message, and about 100 bits is needed from this to transmit AS level information. In [2], it proposed that discovery message’s payload size can’t exceed maximum size of PDCP SDU, i.e. 9000 bytes.

RAN2 has no conclusion on which RLC mode should be used for NR discovery message. That is to say, it is unclear whether both RLC UM and TM or only RLC TM can be used for NR sidelink discovery message. If RLC UM is used for NR PC5 discovery message, it can support RLC segmentation, and there will be no size limitation. Hence the only limitation is in PDCP layer. In section 4.3.1 of TS 38.323[12], it records that “The maximum supported size of a PDCP SDU is 9000 bytes”. That’s to say, its size should be restricted by the maximum size of a PDCP SDU size. However, if only RLC TM mode is used (i.e. no RLC segmentation), some other limitation may be introduced (i.e. maximum payload size for one PSSCH TB, similar to the limitation specified for Uu SIB in TS 38.331 in [10] or smallest possible configuration of a resource pool in [9]).

**Question 1-1: For NR PC5 discovery message, which RLC mode can be used? Please give your comments.**

* **Option 1: Only RLC UM.**
* **Option 2: Only RLC TM.**
* **Option 3: Both.**

|  |  |  |
| --- | --- | --- |
| **Companies** | **Option** | **Comments** |
| OPPO | 1 | We do not really understand option-3 on how to achieve “both”..  RLC TM is typically used with MAC in transparent mode and when PDCP is not needed, but it is not the case for discovery based on the stack we agreed. |
| Qualcomm | 1, but.. | We agree that RLC UM is more suitable because PDCP is agreed to be included in protocol stack of discovery.  However, we also think RLC segementation should be avoided in some cases because:   * Discovery has requirement of coverage and latency. When payload size is getting larger or RLC segementation is used, discovery’s coverage and/or latency performance will be degraded. * Typically, discovery is delieved in broadcast. Because it needs to consider the coverage of UE in poor coverage, we believe a discovery message with large payload size or multiple segementations should be avoided.   Considering SA2 will design how much application layer data can be included in discovery based on RAN2 reply, we believe RAN2 should not just provide a theoretical maximum value, which may mislead SA2 to design a very large discovery message. Instead, RAN2 can provide both theoterical maximum value and also point out the concern on coverage and latency, and recommand SA2 to assume a reasonable size of discovery. |
| Ericsson | Option 1 | As OPPO commented, RLC TM does not go thorough PDCP, which means that if the discovery is configured to support TM mode, in the discovery configuration, PDCP, and RLC will not be configured.  Therefore, in our understanding, Option 3 means that discovery can be configured with either RLC UM (i.e., with PDCP and RLC UM configuration) or RLC TM (i.e., without PDCP, and RLC). However, the discovery configuration can not be configured with both, since both options are excluding between each other.  Anyway, we prefer Option 1, since with Option 2, the functionalities in the PDCP and the RLC layer will be lost. For example, RLC segmentation functionality is important, which gives a possibility to let the discovery message go through in case of bad radio channel condition.  Meanwhile, we also agree with QC that, it will be also beneficial in the LS reply that RAN2 points out that the discovery message size shall be as small as possible from ensuring the discovery performance perspective. |
| Nokia | comments | First of all, we think the discovery message can and should be delivered without segmentation and as Qualcomm/Ericsson pointed out, the discovery message should be as small as possible i.e. only contain the absolute necessary information. Whether RLC UM or RLC TM is used depends on the logical channel that is used to carry the discovery message (SBCCH vs. SCCH). We do not have a strong preference for the RLC mode as long as segmentation is avoided. |
| MediaTek | Option-1 | Agree with Oppo and Ercisson. We did not understand how RLC TM works. |
| vivo | UM | A unified design for PC5 S and discovery message can be achieved |
| ZTE | UM | According to 38.322, RLC TM is used for SBCCH while RLC UM is used for SCCH, and STCH. If we assume the discovery message is delivered via SCCH similar to other SL-SRBs, RLC UM is suggested. If we assume the discovery message is delivered via SBCCH, RLC TM is suggested. To reduce the potential spec impact, it is better to treat the SL-SRB4 (discovery message) in the same way as other SL-SRBs, i.e. RLC UM |
| Xiaomi | Option-1 |  |
| Intel | Option 1 | We understand that currently NR sidelink communication of broadcast and groupcast support uni-directional RLC UM and similarly discovery message which is agreed to use communication channel can utilize RLC UM. |
| Samsung | Option 1 | The agreed protocols stack for discovery messsage has PDCP. So RLC UM is suitable. |
| InterDigit | Option 1 | Same understanding as other companies based on the protocol stack. |
| Kyocera | Option 1 | We agree with the above companies view that Option 2 or 3 won’t work with PDCP. |
| Apple | Option 1 |  |
| LG | Option 1 |  |

**Question 1-2: In Q1-1, if option 1 is selected, regarding to the NR PC5 discovery message size limitation, which option do you prefer? Please give your comments.**

* **Option 1: The maximum size of NR PC5 discovery message should be the maximum size of a PDCP SDU size, i.e., 9000 bytes.**
* **Option 2: There is no limitation on the size of NR PC5 discovery message.**
* **Option 3: NR PC5 discovery message size can be variable, the Rel-16 NR PC5-S message (e.g., Direct Communication Request) can be referred for the supported message size for NR PC5 discovery message.**
* **Option 4: ~~Other values (if any, please give the detailed values and how the value is calculated).~~ If RLC segmentation is performed, the theoretical maximum size is 9000 bytes (i.e., maximum size of a PDCP SDU size). However, large payload size and/or RLC segmentation may degrade latency and coverage performance of discovery. If RLC segmentation is not performed, the discovery message size should be <=2976 bits, as specified in TS 38.331.**

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| **Companies** | **Option** | **Comments** |
| OPPO | 1 with comment | We do not really understand option-3, DCR message format is defined by CT1 using a different LCH, what is the point to refer to that? |
| Qualcomm | 4 | We agree that Option 1 is the theoretical maximum value. However, we believe it is impossible to really have a discovery message with such big size. Please note that in LTE discovery, maximum payload size is only 232bit. And we even didn’t heard any complain or concern on this small payload size before.  As we replied in Q1-1, we think RAN2 should not just provide a theoretical maximum value, which may mislead SA2 to design a very large discovery message. Instead, RAN2 can provide both theoterical maximum value and also point out the concern on coverage and latency, and recommand SA2 to assume a reasonable size of discovery.  Below is text we suggested for SA2 response:  **If RLC segmentation is performed, the theoretical maximum size is 9000 bytes (i.e., maximum size of a PDCP SDU size). However, large payload size and/or RLC segmentation may degrade latency and coverage performance of discovery. If RLC segmentation is not performed, the discovery message size should be <=2976 bits, as specified in TS 38.331. Thus, RAN2 recommend SA2 to assume a reasonable message size for NR PC5 discovery message.** |
| Ericsson | Option 1 | For our understanding, for option 3, rapp means that the message size limitation of DCR can be reused for the discovery message.  In our views, Option 1 is the most reasonable one. Discovery message has different intention and comprise different message content compared to the other PC5-S message (e.g., DCR). Therefore, Option 3 is not supportive. |
| Nokia | Option 4 | We believe the rationale behind the calculation of the maximum discovery message size should be based on the assumption of a dedicated resource pool for discovery. Then the smallest resource pool configuration limits the size of the discovery message. Furthermore we believe that RAN2 should not confuse SA2 by stating several options and parameters that are irrelevant for SA2 (whether RLC UM or RLC TM is used). RAN2 should respond to SA2 in a straightforward manner (not leaving any room for SA2 interpretations or 2 choices that differ roughly by a factor of 24 between each other) only stating a clear answer with a single value for the max size of the discovery message “RAN2 confirms that there is a limitation on the size of NR PC5 discovery message. RAN2 considers the maximum size of the discovery message xxxx bits” |
| MediaTek | Option 4 | Meanwhile, if the intention is to send the discovery message in one shot in order to reduce the potential latency, physical layer may be checked to know if there is any constraints for one TBS size (to transmit the discovery message). |
| vivo | Option 2 | But we should notify SA2 that if the discovery message size to too large, the coverage range and latency performance would be downgraded. |
| ZTE | Option 1 | The maximum size of PDCP SDU need to be respected for packets including discovery message. |
| Xiaomi | Option 1 | Option 1 is the correct answer. However, we should also ask SA2 to keep the discovery message size as small as possible, otherwise there would be performance degradation, such as latency or coverage. |
| Intel | Option 1 | We think option 1 is reasonable, although we understand the intention of option 3. We agree that within the maximum allowed size, the discovery message size can be variable (depending on what is included). |
| Samsung | Option 1 |  |
| InterDigital | Option 1 |  |
| Kyocera | Option 4 | We assume this option means both RLC with and without segmentation can be supported, but that SA2 should keep in mind the possibility of latency in case discovery size above 2976 bits are used. |
| Apple | Option 1 | Strictly speaking, discovery message is not an AS layer message, so we think no further limitation is needed. |
| LG | Option 1 | Considering latency, the maximum discovery message size can be limited to the maximum size of PDCP SDU. Naturally, the discovey message can be variable within the maximum limited size. |

**Question 1-3: In Q1-1, if option 2 is selected, regarding to the NR PC5 discovery message size limitation, which option do you prefer? Please give your comments.**

* **Option 1:** **The maximum size of NR PC5 discovery message should be 2976 bits.**
* **Option 2: The maximum size of NR PC5 discovery message should be 3360 bits.**
* **Option 3: Other values (if any, please give the detailed values and how the value is calculated).**

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| **Companies** | **Option** | **Comments** |
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## Q2 of SA2 LS

**Q2)** SA2 has introduced new data unit type of ARP (i.e. Address Resolution Protocol) for broadcast and groupcast mode ProSe Direct Communication (as described in clause 5.3.1 of TS 23.304), and would like to check with RAN2 whether it is supported by AS layer.

In LTE PDCP specification TS 36.323[13], this new data unit type of ARP was captured. Hence in NR, RAN2 think it can be supported by AS layer with some update in TS38.323 specification.

**Question 2-1: Do you agree that the new data unit type of ARP for broadcast and groupcast mode ProSe Direct Communication can be supported by AS layer with some update in TS38.323 specification? Please give your comments.**

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| --- | --- | --- |
| **Companies** | **Yes/No** | **Comments** |
| OPPO | Yes |  |
| Qualcomm | Yes |  |
| Ericsson | Yes |  |
| Nokia | Yes |  |
| MediaTek | Yes |  |
| vivo | Yes | RAN2 can support the new data unit type of ARP, by using a reserved value (e.g., 010) to indicate “ARP” in the PDCP SDU type. |
| ZTE | Yes | The SDU type of ARP has been introduced in LTE PDCP specification. RAN2 may work on the new data unit type of ARP for NR specification. There is minor potential specification impact. |
| Xiaomi | Yes |  |
| Intel | Yes |  |
| Samsung | Yes |  |
| InterDigital | Yes |  |
| Kyocera | Yes |  |
| Apple | Yes |  |
| LG | Yes |  |

**Question 2-2: For the raised CR [4], it should be treated in which item?**

* **Option 1:** **Rel-17 sidelink enhancement;**
* **Option 2: Rel-17 sidelink relay;**
* **Option 3:** **Rel-17 TEI.**

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| --- | --- | --- |
| **Companies** | **Option** | **Comments** |
| Qualcomm |  | No strong view |
| Ericsson | Option 2 |  |
| Nokia | Option 2 |  |
| vivo | 2 |  |
| ZTE | Option 2 |  |
| Xiaomi | Option 2 | Seems more questions are related to relay. |
| Intel | Option 2 | No strong opinion. |
| InterDigital |  | No strong view |
| Apple | Option 2 |  |
| LG | Option 2 |  |

## Q3 of SA2 LS

Q3) PC5 operation in EPS for Public Safety UE is documented in clause 5.11 of TS 23.304, SA2 assumed EN-DC architecture is not in scope of RAN NR\_SL\_enh WI and asks RAN2 to confirm this assumption

For the RAN NR\_SL\_enh WI, according to stage 2 descriptions in TS 37.340, all the MR-DC architectures including EN-DC is not supported. The related text is shown as below:

## 13.2 Sidelink

NR Sidelink Communication and V2X Sidelink Communication cannot be configured in MR-DC in this release.

Hence, RAN2 can simply confirm SA2 that EN-DC is out of the scope in R17 NR\_SL\_enh WI.

**Question 3-1: Do you agree that RAN2 confirm SA2 assumption (EN-DC is out of the scope in R17 NR\_SL\_enh WI) directly? Please give your comments.**

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| --- | --- | --- |
| **Companies** | **Yes/No** | **Comments** |
| OPPO | Yes |  |
| Qualcomm | Yes | Per RAN2 TR 38.836 |
| Ericsson | Yes |  |
| Nokia | Yes |  |
| MediaTek | Yes |  |
| vivo | Yes | RAN2 to reply to SA2 with the following highlights:   * Clarify that there are two on-going SL related WIs in RAN. One is the RAN *NR\_SL\_enh* WI which is the evolution of Rel-16 V2X SL. The other one is *NR\_SL\_Relay-Core* which is for the L2 and L3 U2N Relay. * Confirm the SA2 assumption that EN-DC architecture is not in scope of the RAN *NR\_SL\_enh* WI. * Further confirm that EN-DC architecture is also not in scope of the RAN *NR\_SL\_Relay-Core* WI. |
| ZTE | Yes |  |
| Xiaomi | Yes |  |
| Intel | Yes | As per the note in the WID RP-211050:  “NOTE 3: Only NR Uu interface, i.e. gNB, and 5GC is considered, and it is limited to NR SA scenario in this release.” |
| Samsung | Yes |  |
| InterDigital | Yes |  |
| Kyocera | Yes |  |
| Apple | Yes |  |
| LG | Yes |  |

## Q4 of SA2 LS

**Q4)** Layer-2 UE-to-Network Relay protocol stack is documented in clause 6.1.1.7.2 of TS 23.304, SA2 understands the adaption layer **over PC5** is under design by RAN2 and would like RAN2 to confirm whether it is supported or not.

During the relay online session in 19th August, the below agreement was reached.

Agreement:

Support the adaptation layer on PC5 for bearer mapping only.

**Question 4-1: Do you agree that RAN2 reply SA2 the adaption layer over PC5 is supported? Please give your comments.**

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| --- | --- | --- |
| **Companies** | **Yes/No** | **Comments** |
| OPPO | Yes |  |
| Qualcomm | Yes, but | RAN2 should reply complete agreement, e.g. RAN2 agreed “Support the adaptation layer on PC5 for bearer mapping only”. |
| Ericsson | Yes |  |
| Nokia | Yes, comments | We would like to echo Qualcomm’s comment that RAN2 should accurately reflect the reached agreement in the response to SA2 “RAN2 has agreed to support for L2 UE-to-Network relay the adaptation layer over PC5 for bearer mapping only ” |
| MediaTek | Yes |  |
| vivo | Yes | Already agreed |
| ZTE |  |  |
| Xiaomi | Yes | Agree with QC. We shall also indicate the functionality restriction. |
| Intel | Yes |  |
| Samsung | Yes with comment | Same view as Qualcomm |
| InterDigital | Yes | We can simply confirm that it is supported. |
| Kyocera | Yes |  |
| LG | Yes | Same view with QC |

## Q5 of SA2 LS

**Q5)** For Layer-2 UE-to-Network Relay, the identified connection management states of Remote UE and UE-to-Network Relay are documented in clause 6.5.2.1.2 of TS 23.304, SA2 would like to know the **possible states of Remote UE and UE-to-Network Relay as well as combinations of the states**

According to the agreements, the below table listed the support of all the RRC states combinations between relay and remote UE. In the table, “Y” stands for the RRC state combination is supported and “N” stands for the RRC state combination is not supported.

**Table-1 RRC state combinations of relay UE and remote UE**

|  |  |  |  |
| --- | --- | --- | --- |
| Relay UE  RRC State  Remote UE  RRC State | RRC\_CONNECTED | RRC\_INACTIVE | RRC\_IDLE |
| RRC\_CONNECTED | Y | N | N |
| RRC\_INACTIVE | Y | Y | Y |
| RRC\_IDLE | Y | Y | Y |

**Question 5-1: Do you agree that RAN2 reply the RRC state combinations in Table-1 for Q5 of SA2 LS? Please give your comments.**

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| --- | --- | --- |
| **Companies** | **Yes/No** | **Comments** |
| OPPO | Yes |  |
| Qualcomm | Yes |  |
| Ericsson | Yes |  |
| Nokia | Yes |  |
| MediaTek | Yes |  |
| vivo | Yes | RAN2 to reply to SA2 as follows:   * The possible states of Remote UE and UE-to-Network Relay UE can be in any RRC state i.e., RRC\_IDLE, RRC\_INACTIVE or RRC\_CONNECTED. * The following RRC states combinations are excluded:   + Relay UE in RRC\_IDLE or RRC\_INACTIVE, and Remote UE(s) in RRC\_CONNECTED. * The following RRC states combinations are supported:   + Relay UE in RRC\_IDLE or RRC\_INACTIVE, and Remote UE (s) in RRC\_IDLE or RRC\_INACTIVE;   + Relay UE in RRC\_CONNECTED, and Remote UE(s) in RRC\_IDLE or RRC\_INACTIVE or RRC\_CONNECTED. |
| ZTE | Yes |  |
| Xiaomi | Yes |  |
| Intel | Yes |  |
| Samsung | Yes |  |
| InterDigital | Yes |  |
| Kyocera | Yes |  |
| Apple | Yes |  |
| LG | Yes |  |

## Q6 of SA2 LS

**Q6)** For Layer-2 UE-to-Network Relay, SA2 studied the trigger from Remote UE to UE-to-Network Relay in CM\_IDLE to perform Service Request (as described in step 4 of clause 6.5.2.2 of TS 23.304) and would like to know whether the trigger is from AS layer or not.

In 23.304[14], the clause 6.5.2.2 records the procedure of connection establishment as below:



**Figure-3 Connection establishment for L2 UE-to-Network relay**

For step 4, it records that “If the 5G ProSe UE-to-Network Relay is in CM\_IDLE state, triggered by the request received from the 5G ProSe Remote UE, the 5G ProSe ProSe UE-to-Network Relay performs Service Request procedure in the clause 4.2.3.2 of TS 23.502 [5]”. And SA2 was wondering whether the trigger for step4 can be step3 (Upper layer) or step 5(AS layer). There are two possible methods:

Option 1: Once relay UE receives the PC5-S direct communication request from remote UE for relay purpose in step 3, it can triggers service request procedure.

Option 2: The service request is triggered after relay UE receives the E2E RRC setup request message, which is step 5 in Figure-3.

Hence the following questions can be further discussed from AS perspective:

**Question 6-1: When relay UE in RRC\_IDLE receives the direct communication request message for relay connection establishment from remote UE, what is the relay UE behavior? Please give your comments.**

* **Option 1:** **The relay UE must enter RRC\_CONNECTED immediately.**
* **Option 2: The relay UE can still be kept in RRC\_IDLE until relay UE receives the E2E RRC connection establishment request message from remote UE.**

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| --- | --- | --- |
| **Companies** | **Option** | **Comments** |
| OPPO | 2 | We do not think there is a need to revisit the following R2 agreement as captured in TR    According to our S2 colleague, S2 has no intention to go for other options, considering the note in the S2 TS as follows  Editor's note: How the ProSe UE-to-Network Relay is triggered to perform Service Request procedure requires cooperation with RAN2. |
| Qualcomm | 2 | Same understanding as OPPO. It has been agreed and captured in RAN2 TR. |
| Ericsson | Option 2 |  |
| Nokia | Option 1 | Considering the table in section 2.5 for Q5 the possible combinations of RRC states for the remote-UE and relay-UE option 1 seems a contradiction. The relay-UE is not allowed to be in RRC\_IDLE/INACTIVE for the remote-UE in RRC\_CONNECTED. To our understanding the question is if the relay-UE candidate (in RRC\_IDLE) should trigger the RRC connection establishment with the gNB after step 3. *i.e. Once relay UE receives the PC5-S direct communication request from remote UE for relay purpose or after step 5: i.e. AS connection setup. In my opinion, the companies think that the remote UE can select a Relay UE, establish PC5 connection but can still wait until they want to resume the U2N relay service. Once the Remote UE decides to activate it...it performs step 5 and then the Relay UE should switch to RRC\_connected state...but before this the Relay UE can remain in RRC\_IDLE...*  The benefit of establishing the PC5 and then waiting is not clear to us. Option 1 has a clear benefit of decreasing the delay of the connection setup, as Relay starts creating the PDU session for Relay connection earlier. |
| MediaTek | Option 2 |  |
| vivo | 2 | When responding to SA2, CT1 should be CC-ed |
| ZTE | Option 2 | Actually, if the remote UE could indicate that the direction communication request is for relaying purpose, Option 1 could also be selected. Otherwise, the option 2 should be selected, which also has been agreed in SI phase. |
| Xiaomi | Option 2 | Option 2 is feasible. We are not sure whether option 1 is feasible. Is there an indication in PC5-S direct communication request to indicate relay purpose? Anyway, we understand option 1 is out of RAN2 scope. |
| Intel | Option 2 | We can follow the agreement as per TR mainly because as far as we understand, we do not have relay-specific DCR being considered. |
| Samsung | Option 2 |  |
| InterDigital | Option 2 | Agree with OPPO that the trigger was already agreed in RAN2 to be aligned with option 2. |
| Kyocera | Option 2 |  |
| Apple | Option 2 |  |
| LG | Option 2 | We have same understanding as OPPO |

**Question 6-2: If Option 1 is selected in Question 6-1, do companies agree that the service request should be triggered by upper layer, e.g., PC5-S direct communication request? Please give your comments.**

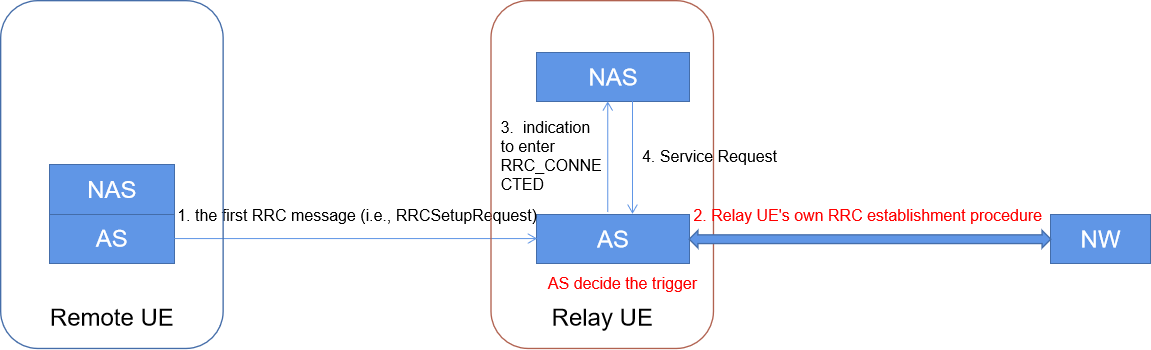
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| **Companies** | **Yes/No** | **Comments** |
| Nokia | Yes | service request should be triggered by AS layer |
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**Question 6-3: If Option 2 is selected in Question 6-1, do companies agree that the service request should be triggered, e.g., upon receiving the *RRCSetupRequest* message from remote UE? Please give your comments.**

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| --- | --- | --- |
| **Companies** | **Yes/No** | **Comments** |
| OPPO | See comment | Our preference is in the LS reply, simply respond the R2 agreement as cited above to S2, so that they can just remove the NOTE and capture RAN2 agreed procedure in their TS, there is no need to further look into the triggering issue, considering the UAC procedure is still pending CT1 response. |
| Qualcomm | See comments | We can simply reply “**the trigger is from AS layer**” or cite RAN2 agreement as OPPO suggested.  [vivo] it can be triggered by AS or NAS layer. We ndo not think RAN2 should make any decision without at least notifying CT1. We can tell them RAN2 preference and let CT1 confirm |
| Ericsson | Yes with comment | Same comment as Qualcomm |
| MediaTek | Yes |  |
| vivo | Yes | When responding to SA2, CT1 should be CC-ed |
| ZTE | See comments | Agree with QC that the “trigger from AS layer” is more generic. Not only RRCSetupRequest, but also the RRCResumeRequest, RRCReestablishmentRequest from remote UE may trigger the RRC IDLE/INACTIVE relay UE to enter RRC Connected and perform service request. So it is suggested not to confine to the RRCSetupRequest message only. |
| Xiaomi | Yes |  |
| Intel | Yes | Agree with Qualcomm’s comment. |
| Samsung | Yes with comment | Same view as Qualcomm |
| InterDigital | See comments | Agree with Qualcomm and ZTE. The trigger is from the AS layer, and this is not confined to only the setup request case. |
| Kyocera | Yes |  |
| Apple | Yes |  |
| LG | Yes | Same opinion as Qualcomm. |

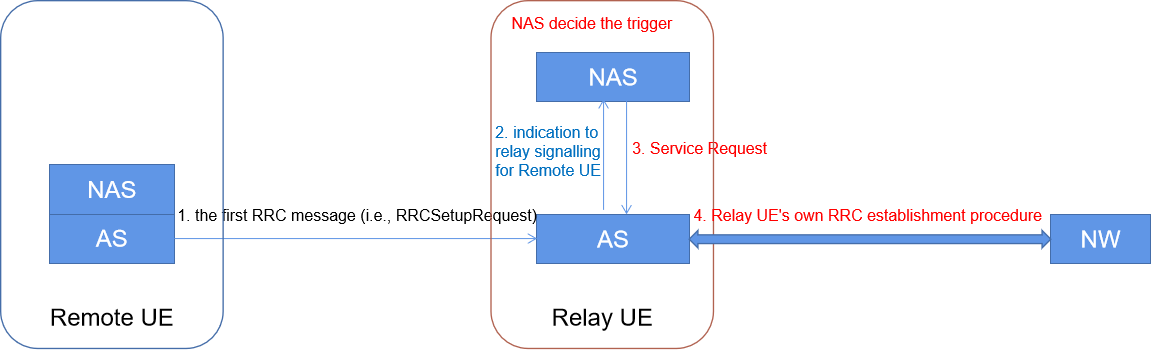
Furthermore, if Option 2 is selected, according to [6], RAN2 can further discuss the behavior of relay UE. Two models were discussed in [6]:

* Model 1: assuming the trigger of the Relay UE’s own connection establishment is decided by AS layer, see below Figure-4:



**Figure-4 Model 1: trigger by AS layer**

* Model 2: assuming the trigger of the Relay UE’s own connection establishment is decided by NAS layer, see below Figure-5:



**Figure-5 Model 2 trigger by NAS layer**

**Question 6-4: If Option 2 is selected in Question 6-1, which model do companies prefer? Please give your comments.**

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| --- | --- | --- |
| **Companies** | **Model 1/Model 2** | **Comments** |
| OPPO | No need to discuss now | We understand this part is pending the UAC related questions in the LS sent to CT1, and this issue anyway cannot be solved by R2 only, probably more up to CT1, so no need to look into this issue in this thread. |
| Qualcomm | No need for discussion | Please note SA2 just ask “would like to know **whether the trigger is from AS layer or not**.”. Thus, a simple answer “the trigger is from AS layer” is sufficient. SA2 didn’t ask RAN2 how to model this procedure, and it is SA2’s work.  [vivo] the point is not to focus on any particular model. The point is depending on relay behav ior it may triggered by AS or NAS layer. |
| Ericsson | No need to discuss | It seems that this question is irrrelevant to the LS reply. |
| MediaTek | No need to discuss |  |
| vivo | Model 2 | When responding to SA2, CT1 should be CC-ed |
| ZTE | See comments | Suggest to postpone this discussion |
| Xiaomi | No need to discuss |  |
| Intel | See comment | We can respond to SA2 that the trigger is from AS layer and need not expand further as per Qualcomm’s suggestion. As per OPPO’s input, we also agree to wait and see how CT1 prefer to implement the cause value for initiating Relay UE’s connection establishment procedure. |
| Samsung | No need to discuss | This question seems not related to the LS. |
| InterDigital | See comments | Model 1 is preferrable because it is aligned with INACTIVE, but we can delay this discussion for now. |
| Apple | No need to discuss | As this is related to the earlier LS to CT1 about UAC procedures, we think this can decided later after CT1’s reply LS. |
| LG | No need to discuss | We sugesst to postpond this issue. |

# Conclusion

# References

1. R2-2106967 LS on RAN dependency issues for 5G ProSe (S2-2104932; contact: CATT) SA2 LS in
2. R2-2108179 [Dratf] LS reply on RAN depandency issues CATT
3. R2-2108180 Discussion on LS reply on RAN depandency issues CATT
4. R2-2108181 Corrections on ARP SDU Type in Rel-17 CATT
5. R2-2107193 Discussion on RAN2 impact from S2-2104932 OPPO
6. R2-2107755 Discuss SA2 LS on RAN dependency issues for 5G ProSe vivo
7. R2-2108150 Draft LS reply on RAN dependency issues for 5G ProSe ZTE, Sanechips
8. R2-2108675 Draft Relay LS on RAN dependency issues for 5G ProSe Qualcomm Incorporated
9. R2-2107950 Further issues on the discovery message for NR sidelink relay Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SL\_relay-Core
10. R2-2107089 Remaining issues on relay discovery Qualcomm Incorporated discussion NR\_SL\_relay-Core
11. R2-2106994 Leftover Issues for Sidelink Discovery CATT discussion Rel-17 NR\_SL\_relay-Core
12. TS 38.323 Packet Data Convergence Protocol (PDCP) specification (Release 16) V16.4.0
13. TS 36.323 Packet Data Convergence Protocol (PDCP) specification(Release 15) V15.6.0
14. TS23.304 Proximity based Services (ProSe) in the 5G System (5GS) (Release 17) V1.0.0