**3GPP TSG RAN WG2 Meeting #118-e R2-220xxxx  
E-Conference, 9th -20th May 2022**

**Agenda item: 6.7.2.1**

**Source: Qualcomm Incorporated**

**Title: Summary report of [AT118-e][620][Relay] System information issues (Qualcomm)**

**WID/SID: NR\_SL\_Relay-Core – Release 17**

**Document for: Discussion and Decision**

# Introduction

This is a summary report for below offline discussion:

* [AT118-e][620][Relay] System information issues (Qualcomm)

      Scope: Discuss the system information proposals from agenda item 6.7.2.1 (R2-2204585, R2-2204586, R2-2204674, R2-2204886, R2-2205064, R2-2205065, R2-2205319, R2-2205609) and determine handling of the technical issues.

      Intended outcome: Report to Monday CB session

      Deadline:  Friday 2022-05-13 1800 UTC

# Discussion

## Format of on demand SIB request by Remote UE

Proposals 1 and 2 in [1], change 1 in [2], and Proposal 1 [3], are reconfirming the below agreements from RAN2#116bis-e and RAN2#113-e and further discussing how the SIB request IEs in the RemoteUEInformationSidelink message should be defined. These proposals are essentially for input to the RRC spec CR.

* Any SIB which the RRC\_IDLE/RRC\_INACTIVE remote UE has a requirement to use (e.g. for relay purpose) can be requested by the remote UE (from the relay UE or the network). RAN2 not pursue further specification work for remote UE using an indirect connection to network to make use of a SIB if it is not supported based on the current spec.

Rapporteur thinks that it is efficient to focus the discussion in this section only on the format of the IEs and not on reconfirming the agreement above. There are two options on the format of the IEs in the RemoteUEInformationSidelink message:

* Option 1: Remote UE indicate the requestedSIB-List, i.e. a list of SIB(s)
* Option 2: Remote UE indicate the requested-SI-List, i.e. a list of SI messages with each SI message corresponding to one or more mapped SIBs

L2 Remote UE in RRC\_IDLE/RRC\_INACTIVE state requesting SIB(s) via Relay UE and receiving the response via dedicated PC5-RRC message is like the Uu RRC\_CONNECTED UE performing DedicatedSIBRequest explicitly indicating the interested SIBs and receiving SIBs via dedicated RRCReconfiguration message. Also, UuMessageTransferSidelink, has sl-SystemInformationDelivery IE to transfer SIB(s) individually to the Remote UE. With that comparison, Rapporteur’s view is that option 2 is reasonable to support and aligns with Uu. It also helps Relay UE to know exactly which SIB(s) to update for the Remote UE.

**~~Q1) Do you agree to support option 1 or option 2 as the format of IEs for a Remote UE to request SIBs from the Relay UE in the RemoteUEInformationSidelink message?~~**

* ~~Option 1: Remote UE indicate the perSIB list like the requestedSIB-List~~
* ~~Option 2: Remote UE indicate the perSI list like the requested-SI-List, i.e. with each SI message corresponding to one or more mapped SIBs~~

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| ~~Company~~ | ~~Response (Yes / No)~~ | ~~Comments~~ |
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## Unsolicited SIB1 forwarding to Remote UE corrections

Rapporteur thinks that Proposal 3 in [1], is to capture the below agreement from RAN2#116bis-e in the TS38.331 spec , section 5.8.9.9.2, CR accurately.

* Recommendation 1-3 [19/23]: For SIB1, both request-based delivery (i.e., SIB1 request by the remote UE) and unsolicited forwarding are supported, of which the usage is left to relay UE implementation.

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| 5.8.9.9.2 Actions related to transmission of *UuMessageTransferSidelink* message The L2 U2N Relay UE initiates the Uu message transfer procedure when one of the following conditions is met:  1> upon receiving *Paging* message related to the connected L2 U2N Remote UE from network;  1> upon acquisition of the SIBs requested by the connected L2 U2N Remote UE (as indicated in *sl-Requested-SI-List* in the *RemoteUEInformationSidelink*);  1> upon receiving the updated SIB1 and the SIBs have been requested by the connected L2 U2N Remote UE from network;  The L2 U2N Relay UE shall set the contents of *UuMessageTransferSidelink* message as follows:  1> include *sl-PagingDelivery* if the *Paging* message received from network containing the associated *ue-Identity* of the L2 U2N Remote UE;  1> include *sl-SystemInformationDelivery* if any of the conditions for initiating Uu message transfer procedure related to System Information are met;  1> submit the *UuMessageTransferSidelink* message to lower layers for transmission.  NOTE: The L2 U2N Relay UE always forwards SIB1 to the L2 U2N Remote UE. |

Based on input requested by companies for Q2 in [Pre118-e][608][Relay] Summary of AI 6.7.2.1 on control plane (Lenovo), it seems some companies think that the unsolicited SIB1 forwarding is mandatory and some think it is optional. Rapporteur thinks as per the agreement from RAN2#116bis-e, UE implementation choice is only relevant for unsolicited SIB1 forwarding and not for request based SIB1, as for request based SIB1 Relay UE is required to send SIB1 like other SIBs.

**Q2) Do you agree that unsolicited SIB1 forwarding support is not mandatory for Relay UE as per the below agreement from RAN2#116bis-e?**

* Recommendation 1-3 [19/23]: For SIB1, both request-based delivery (i.e., SIB1 request by the remote UE) and unsolicited forwarding are supported, of which the usage is left to relay UE implementation.

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| Company | Response (Yes / No) | Comments |
| Xiaomi | Yes | It’s not mandatory for relay UE |
| OPPO | Yes |  |
| Ericsson | Yes |  |
| Apple | Yes |  |
| Samsung | Yes |  |
| CATT | Yes |  |
| vivo | Yes |  |
| MediaTek | Yes |  |
| Nokia | yes |  |
| Sharp | Yes |  |
| Lenovo | Need further clarification | If we leave it to Relay UE implementation and a certain Relay UE indeed chooses to not forward it then there can be a situation when SIB1 is missing at the remote UE until it eventually receives it (e.g., when SIB1 is updated).  However, if the agreement from Monday (below) means that the remote UE can also request SIB1 explicitly (as SIB1 is also “any SIB”), then we are fine to leave SIB1 forwarding to Relay UE’s implementation. But if “any SIBs” does not apply to SIB1, then a Relay UE should be mandated to forward SIB1 to a new connected Remote UE.  *“A Remote UE indicates its interests for any SIBs (not SI-messages) to Relay UE via RemoteUEInformationSidelink” and ASN.1 changes are made accordingly to enable this.*” |
| Spreadtrum | Yes |  |

There are two options on how the corrections can be made to support the unsolicited SIB1 forwarding RAN2#116bis-e agreement in section 5.8.9.9.2 of TS 38.331

* Option 1: Cover the unsolicited SIB1 forwarding behavior through a NOTE

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| 5.8.9.9.2 Actions related to transmission of *UuMessageTransferSidelink* message The L2 U2N Relay UE initiates the Uu message transfer procedure when one of the following conditions is met:  1> upon receiving *Paging* message related to the connected L2 U2N Remote UE from network;  1> upon acquisition of the SIBs requested by the connected L2 U2N Remote UE (as indicated in *sl-Requested-SI-List* in the *RemoteUEInformationSidelink*);  1> upon receiving the updated SIBs have been requested by the connected L2 U2N Remote UE from network;  The L2 U2N Relay UE shall set the contents of *UuMessageTransferSidelink* message as follows:  1> include *sl-PagingDelivery* if the *Paging* message received from network containing the associated *ue-Identity* of the L2 U2N Remote UE;  1> include *sl-SystemInformationDelivery* if any of the conditions for initiating Uu message transfer procedure related to System Information are met;  1> submit the *UuMessageTransferSidelink* message to lower layers for transmission.  NOTE: The L2 U2N Relay UE may support unsolicited SIB1 forwarding, i.e. send updated SIB1 received from network without a request from Remote UE, to the L2 U2N Remote UE based on L2 U2N Relay UE implementation. |

* Option 2: Add the unsolicited SIB1 forwarding in the trigger condition and remove NOTE

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| 5.8.9.9.2 Actions related to transmission of *UuMessageTransferSidelink* message The L2 U2N Relay UE initiates the Uu message transfer procedure when one of the following conditions is met:  1> upon receiving *Paging* message related to the connected L2 U2N Remote UE from network;   1. upon acquisition of the SIBs requested by the connected L2 U2N Remote UE (as indicated in *sl-Requested-SI-List* in the *RemoteUEInformationSidelink*);   1> upon receiving the updated SIBs have been requested by the connected L2 U2N Remote UE from network;   1. upon unsolicited SIB1 forwarding to the connected L2 U2N Remote UE based on Relay UE implementation;   The L2 U2N Relay UE shall set the contents of *UuMessageTransferSidelink* message as follows:  1> include *sl-PagingDelivery* if the *Paging* message received from network containing the associated *ue-Identity* of the L2 U2N Remote UE;  1> include *sl-SystemInformationDelivery* if any of the conditions for initiating Uu message transfer procedure related to System Information are met;  1> submit the *UuMessageTransferSidelink* message to lower layers for transmission. |

**Q3) Do you agree to support the corrections to TS38.331 spec, section 5.8.9.9.2, using option 1 or option 2?**

* Option 1: Cover the unsolicited SIB1 forwarding behavior through a NOTE
* Option 2: Add the unsolicited SIB1 forwarding in the trigger condition and remove NOTE

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| Company | Response (Yes / No) | Comments |
| Xiaomi | Option 1 | Since it’s up to UE implementation, NOTE is enough |
| OPPO | Comment | We are fine with the version in 6077 as output from [602] |
| Ericsson | Option 1 | We tend to prefer a note to describe the fact that is up to relay UE implementation to send the SIB1 or wait for the request from the remote UE. |
| Apple | Option 1 | Agree with Ericsson that a NOTE is sufficient. |
| Samsung | Option 1 |  |
| CATT | Option 1 | Agree with Xiaomi and Ericsson. |
| vivo | Comments | This issue has already been fixed in the Pre118-e #602 email. please have a check which is shown as below (CR [R2-2206077](file:///C:\\Users\\mtk16923\\Documents\\3GPP%20Meetings\\202205%20-%20RAN2_118-e,%20Online\\Docs\\R2-2206077.zip" \o "C:Usersmtk16923Documents3GPP Meetings202205 - RAN2_118-e, OnlineDocsR2-2206077.zip)).  NOTE: The L2 U2N Relay UE always either forwards *SIB1* requested by the connected L2 U2N Remote UE or performs unsolicited forwarding to the L2 U2N Remote UE based on L2 U2N Relay UE implementation. |
| MediaTek | Option 1 or current version | Option 1 and the version in 6077 as output from [602] |
| Noia | Option 1 |  |
| Sharp | Option 1 |  |
| Huawei, HiSilicon | Comments | As commented by OPPO and vivo, in pre#602, based on RIL comments the draft CR implemented the proposed changes on this aspect, including updates on the procedural text and the NOTE: 5.8.9.9.2 Actions related to transmission of *UuMessageTransferSidelink* message The L2 U2N Relay UE initiates the Uu message transfer procedure when at least one of the following conditions is met:  1> upon receiving *Paging* message related to the connected L2 U2N Remote UE from network (including *Paging* message within *RRCReconfiguration* message);  1> upon acquisition of the SIB(s) requested by the connected L2 U2N Remote UE (as indicated in *sl-Requested-SIB-List* in the *RemoteUEInformationSidelink*) or upon receiving the updated SIB(s) from network which has been requested by the connected L2 U2N Remote UE;1> upon unsolicited SIB1 forwarding to the connected L2 U2N Remote UE or upon receiving the updated *SIB1* from network;  NOTE: The L2 U2N Relay UE always either forwards *SIB1* requested by the connected L2 U2N Remote UE or performs unsolicited forwarding to the L2 U2N Remote UE based on L2 U2N Relay UE implementation. |
| Lenovo | Comments | We are fine to use the Note as pointed out by other companies above (from pre#602) and below some suggestion is made to prune it (the original version seems verbose):  NOTE: The L2 U2N Relay UE always forwards *SIB1* either requested by the connected L2 U2N Remote UE or in an unsolicited manner. |
| Spreadtrum | Option 1 |  |

## Other SI handling issues

Proposal 1 in [4] is on a TP to include a NOTE in TS 38.331 to cover the L2 Remote UE behaviour “RRC\_IDLE/RRC\_INACTIVE Remote UE which has connected to Relay UE does not have to perform PRACH based on-demand SI acquisition procedure over Uu.” This proposal seems narrow and does not cover the below agreement from RAN2#116-e. Instead of the suggested TP in proposal 1 in [4], Rapporteur thinks that changes captured via a paragraph in section 5.2.2.2.1 of 38.331 CR update in [Pre118-e][602][Relay] 38331 CR and rapporteur resolutions (Huawei) to address RIL List # E084, H593 is broader and enough.

* Proposal 9: As a baseline, in-coverage Remote UE is allowed to acquire some necessary SIB over Uu irrespective of its PC5 connection to Relay UE. [23/23]

**Q4) Do you agree that the changes covered via below added paragraph in section 5.2.2.2.1 of 38.331 CR update, for [Pre118-e][602][Relay] 38331 CR and rapporteur resolutions (Huawei) to address RIL List # E084, H593, support the concerns of Proposal 1 in [4]?**

A L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE can decide whether to perform the SI acquisition procedure over Uu interface as defined in clause 5.2.2.3 by UE implementation. Instead, it can inform the interested SIB(s) to the connected L2 U2N Relay UE as defined in clause 5.8.9.8.2 and receive the SIB(s) from the L2 U2N Relay UE as defined in clause 5.8.9.8.3. A L2 U2N Remote UE in RRC\_CONNECTED is not required to obtain SI over Uu interface, and it receives SIB(s) in *RRCReconfiguration* message and performs on-demand SI request as defined in clause 5.2.2.3.5 and 5.2.2.3.6.

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| Company | Response (Yes / No) | Comments |
| Xiaomi | Yes |  |
| OPPO | Yes |  |
| Ericsson | No with comment | We are fine with most of the paragraph but we would prefer to rephrase the last sentence as follow:  A L2 U2N Remote UE in RRC\_CONNECTED can chose by implementation to obtain SI over Uu interface or to receive SIB(s) in the *RRCReconfiguration* message and performs on-demand SI request as defined in clause 5.2.2.3.5 and 5.2.2.3.6. |
| Apple | Yes | Ericsson's version also acceptable to us. |
| Samsung | Yes |  |
| CATT | Yes |  |
| Vivo | No with comments | We think the wording “Instead” leads to some ambiguity.  Our question is that do we support both cases that an in-coverage Remote UE may acquire some SIB over Uu and acquire some SIB via the connected L2 U2N Relay UE?  We assume the answer should be YES, and make the wording “Instead” more clear as follows:  A L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE can decide whether to perform the SI acquisition procedure over Uu interface as defined in clause 5.2.2.3 by UE implementation. ~~Instead~~Besides, it can inform the interested SIB(s) to the connected L2 U2N Relay UE as defined in clause 5.8.9.8.2 and receive the SIB(s) from the L2 U2N Relay UE as defined in clause 5.8.9.8.3. A L2 U2N Remote UE in RRC\_CONNECTED is not required to obtain SI over Uu interface, and it receives SIB(s) in *RRCReconfiguration* message and performs on-demand SI request as defined in clause 5.2.2.3.5 and 5.2.2.3.6. |
| MediaTek | Yes |  |
| Nokia | Yes |  |
| Sharp | Yes |  |
| Huawei, HiSilicon | Yes | Fine with vivo’s suggested modification.  Regarding Ericsson’s version, it is strange to say “receiving RRCReconfiguration message” is up to UE implementation, as some SIBs (e.g. Rel-15 SIBs including SIB1) can not be requested by connected UE via on-demand approach, for which network will always provide the updates in RRC reconfiguration message. |
| Lenovo |  | Some edits/ clean-up may be useful:  A L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE can decide whether to perform the SI acquisition procedure over Uu interface as defined in clause 5.2.2.3. If it decides to not perform SI acquisition over Uu interface or SI acquisition over Uu interface is not successful, it can inform the connected L2 U2N Relay UE about SIB(s) of interest to it, as defined in clause 5.8.9.8.2 and, receive the SIB(s) from the L2 U2N Relay UE as defined in clause 5.8.9.8.3. A L2 U2N Remote UE in RRC\_CONNECTED is not required to obtain SI over Uu interface, and it receives SIB(s) including SIB1 in RRCReconfiguration message and performs on-demand SI request as defined in clause 5.2.2.3.5 and 5.2.2.3.6, if required. |
| Spreadtrum | Yes |  |

Proposal 2 in [4] is on a TP to include a NOTE in TS 38.331 to cover “in case RRC\_IDLE or RRC\_INACTIVE Remote UE in out of coverage but is connected with Relay UE to NW, the Remote UE does not perform the actions for MIB acquisition in clause 5.2.2.5”. Rapporteur thinks this proposal is reasonable as there is no requirement on Remote UE to acquire MIB while connected to Relay UE and hence asks for company views on the proposed change.

**~~Q5) Do you agree to include a NOTE “~~**~~When RRC\_IDLE or RRC\_INACTIVE L2N Remote UE is out of coverage and has connected to network via L2 U2N Relay UE, the Remote UE does not perform the actions specified in clause 5.2.2.5 if the Remote UE is unable to acquire the MIB.” In section~~ **~~5.2.2.3.1 of TS 38.331 as per Proposal 2 in [4]?~~**

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| ~~Company~~ | ~~Response (Yes / No)~~ | ~~Comments~~ |
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Change 5 in [2] is to correct TS 38.331 for “sl-SIB1-Delivery” is missing in procedure 5.8.9.9.3. Rapporteur thinks this change is straightforward and can be agreed for TS 38.331 CR.

**Q6) Do you support the change 5 in [2], Add ‘sl-SIB1-Delivery and’ in the first bullet 4 in clause 5.8.9.9.3. of TS 38.331 CR?**

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| Company | Response (Yes / No) | Comments |
| Xiaomi | Yes |  |
| OPPO | Yes |  |
| Ericsson | Yes |  |
| Apple | Yes |  |
| Samsung | Yes |  |
| CATT | Yes |  |
| vivo | Yes with comments | **Generally agree but with some modification to add “and/” to cover more cases, see in red.****5.8.9.9.3 Reception of the *UuMessageTransferSidelink*** Upon receiving the *UuMessageTransferSidelink* message, the L2 U2N Remote UE shall:  1> if *sl-PagingDelivery* is included:  2> perform the procedure as defined in clause 5.3.2.3;  1> if *sl-SIB1-Delivery* and/or *sl-SystemInformationDelivery* is included:  2> perform the actions specified in clause 5.2.2.4; |
| MediaTek | Yes |  |
| Nokia | Yes |  |
| Sharp | Yes |  |
| Huawei, Hisilicon | Yes |  |
| Lenovo | Yes | Fine to use “and/ or” as vivo suggested. |
| Spreadtrum | Yes |  |

Change 7 in [2] is to correct TS 38.331 for “According to agreement, for SIB-update in case of RRC\_CONNECTED remote UE(s), relay on network to send updated SIB(s) when they are updated, no further restriction in specification. PWS SIBs acquisition of RRC\_CONNECTED remote UE should also rely on network.” Rapporteur thinks this change is straightforward and can be agreed.

**Q7) Do you support the change 7 in [2],** Add ‘or the L2 U2N Remote UE in RRC\_CONNECTED’ in the RRCReconfiguration-IEs field descriptions ‘dedicatedSystemInformationDelivery’ **in TS 38.331 CR?**

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| Company | Response (Yes / No) | Comments |
| Xiaomi | Yes |  |
| OPPO | Yes |  |
| Ericsson | No with comment | The first sentence is related to the UE in IDLE or INACTIVE. We are fine with the addition but this should be done in the second sentence that has been added for the RRC\_CONNECTED case. We prefer to have the change as follows:  This field is used to transfer *SIB6*, *SIB7*, *SIB8* to the UE with an active BWP with no common search space configured. For Ues in RRC\_CONNECTED or the L2 U2N Remote UE in RRC\_CONNECTED, this field is used to transfer the SIBs requested on-demand. |
| Apple | Yes |  |
| Samsung | Yes |  |
| CATT | Yes |  |
| vivo | Yes |  |
| MediaTek | Yes |  |
| Nokia | Yes |  |
| Sharp | Yes |  |
| Huawei, Hisilicon | Yes |  |
| Lenovo | Yes | With slight modification:  “or to the L2 U2N Remote UE in RRC\_CONNECTED”  And in addition, we expect the same change needs to be made to SIB1 as well:  ***dedicatedSIB1-Delivery***  *This field is used to transfer SIB1 to the UE including the L2 U2N Remote UE. The field has the same values as the corresponding configuration in servingCellConfigCommon.* |
| Spreadtrum | Yes |  |

[5] has proposals to clarify the Relay UE ehaviour on how the relay UE decides which SIBs to update to Remote Ues. The proposals are about Relay UE storing the request information from Remote Ues and using that to send updated SIBs without explicit request from Remote UE for SIB updates. Rapporteur thinks the proposals are covering Relay UE implementation and is not necessary to specify in RRC spec. Also, the changes covered for Q3) in this document cover these aspects.

**Q8) Do you agree that proposals in [5] are covered by trigger condition 3 in option 1 or option 2 provided in Q3?**

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| Company | Response (Yes / No) | Comments |
| Xiaomi | Yes |  |
| OPPo | Yes |  |
| Ericsson | Yes |  |
| Apple | Yes |  |
| Samsung | Yes |  |
| CATT | Yes |  |
| vivo | Yes |  |
| MediaTek | Yes |  |
| Nokia | Yes |  |
| Sharp | Yes |  |
| Huawei, HiSilcon | Yes |  |
| Lenovo | Yes | It was already covered in [608] |
| Spreadtrum | Yes |  |

[6] has below proposals. Rapporteur thinks these proposals are reasonable based on the arguments in [6]

**Proposal 1: Adding a Note in specification to clarify that, when the remote UE is connected to the relay UE and two copies of the same SIB have been acquired by the remote UE (one copy via indirect link from relay UE and the other copy from Uu interface), the one from indirect link via relay UE should be applied by the remote UE.**

**Proposal 2: If Proposal 1 is agreeable, adopt the TP provided in Section 5.**

**Q9) Do you agree to support proposal 1 and proposal 2 in [6]?**

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| Company | Response (Yes / No) | Comments |
| Xiaomi | No | When remote UE is connected with relay UE, remote UE is aware of the relay UE’s serving cell. Therefore, the SIB via indirect path is provided by relay UE’s serving cell. Also, remote UE can tell the SIB is provided by which cell via direct path.  If the SIBs via direct and indirect are from different cell, there is no additional work, since there is no need to prioritize.  If the SIBs via direct and indirect are from the same cell, UE shall use the latest one, identified by value tag.  Therefore, there seems to be no spec impact. |
| OPPO | No | It seems to be an over-specified thing. |
| Ericsson | No | We think that it should be up to the relay UE implementation how to discard the duplicated SIBs. |
| Apple | No | This is about UE's internal variable/configuration management, which should be left to UE implementation. |
| Samsung | No | This should be up to UE implementation. |
| CATT | No | The question is only for the case that the SIBs via direct and indirect are same. Hence, there isn’t different which one is applied by the remote UE. How to discard the duplicated SIBs can be up to the remote UE implementation. |
| vivo | Yes with comments | We want to clarify that this is for the case that different contents are received for the same SIB type via direct and indirect, especially for SIB3/4/5. This is also aligned with the discussion happened on RAN2 #117e which can reflect some companies’ common understanding, when discussing about the SIB3/4/5 acquisition on direct/indirect link (shown as below). At least the note is necessary for SIB3/4/5 on how to perform cell reselection procedure.  *RAN2 #117e chairman minutes*  *Discussion:*  *vivo have a question about the serving cell concept and the acquisition of SIB3/4/5, in relation to P5; they think this issue should be clarified in discussion, but there may not be spec impact.*  *Ericsson agree that the UE can acquire the SIBs either via direct or indirect link, but we have agreed that when the remote UE is connected via a relay, its serving cell is the serving cell of the relay, so it would not use SIB3/4/5 acquired via the direct link from a different cell; if the relay disappears, the remote UE could apply stored SIB3/4/5. OPPO have the same understanding as Ericsson*. |
| MediaTek | Yes |  |
| Nokia | No | Up to (remote) UE implementation |
| Sharp | No | This should be up to UE implementation. |
| Huawei, HiSilcon | No |  |
| Lenovo | No | It was already covered in [608] |
| Spreadtrum | No |  |

## posSIB support

[7] discuss about corrections to RemoteUEInformationSidelink message to support forwarding of positioning SIBs to the Remote UE via Relay UE. Before we discuss the details, rapporteur would like to point out the below agreements from RAN2#116bis-e and RAN2#113bis-e

* Any SIB which the RRC\_IDLE/RRC\_INACTIVE remote UE has a requirement to use (e.g. for relay purpose) can be requested by the remote UE (from the relay UE or the network). RAN2 not pursue further specification work for remote UE using an indirect connection to network to make use of a SIB if it is not supported based on the current spec.
* [603] For RRC\_Connected remote UE, RAN2 confirm that DedicatedSIBRequest procedure is re-used for the Remote UE to request the SI via relay UE.

As per the above agreements, it seems reasonable to support corrections to include posSIBs request in RemoteUEInformationSidelink message for L2 Remote UE in RRC\_IDLE/RRC\_INACTIVE to have consistent behavior as RRC\_CONNECTED L2 Remote UE (Option1). However, during the ASN.1 adhoc discussions and responses for Proposal5b in [Pre118-e][608][Relay] Summary of AI 6.7.2.1 on control plane (Lenovo), it seems some companies think that posSIBs forwarding via Relay UE should not be supported (option 2) or some exceptions on which posSIBs can be forwarded via Relay UE have to be discussed (Option 3).

As positioning SIBs are used by upper layers, it is not clear how can upper layers selectively know when to support positioning feature as there is no indication from AS layer to upper layers that UE is operating on 5G connection via Relay UE. Option 2 or Option 3 may result in inconsistent behaviour for positioning support. Also, for option 2 or option 3, we may have to make some exceptions for L2 Remote UE which need to be reverted later. Further for option 3, we may need coordination with positioning WI to decide what to exclude.

Considering the late stage of Rel-17, rapporteur thinks that a compromise option could be a NOTE is added in specs (option 4) to clarify that Rel-17 only supports the signaling framework to support posSIBs to L2 Remote UE connected to a Relay UE and it does not guarantee the optimal working of the positioning feature. To summarize, the below options are possible for L2 Remote UE positioning SIBs handling:

* Option 1: support posSIBs request in RemoteUEInformationSidelink message as per existing RAN2 agreements for L2 Remote UE in any RRC state
* Option 2: Do not support posSIBs for L2 Remote UE in any RRC state + make corrections to RRC spec to not allow L2 Remote UE in any state request posSIBs
* Option 3: Support posSIBs request in RemoteUEInformationSidelink message as per existing RAN2 agreements for L2 Remote UE in any RRC state + make some exceptions on which posSIBs can be requested and may need coordination with positioning WI.
* Option 4: Option1 + add a NOTE to clarify that Rel-17 only supports the signaling framework to support posSIBs to L2 Remote UE connected to a Relay UE and it does not guarantee the optimal working of the positioning feature.
* Option 5: Support posSIBs request in RemoteUEInformationSidelink message as per existing RAN2 agreements for L2 Remote UE in any RRC state + make corrections to RRC spec to allow L2 Remote UE in any state request posSIBs

Rapporteur thinks that option 1 or option 4 are the simplest changes to the RRC specs. Whereas, option 2 or option 3 require further discussion on what changes to make to the RRC specs and may require coordination with positioning WI.

**Q10) Do you agree to support Option 1, option 2, option 3 or option 4 for L2 Remote UE positioning SIBs handling in Rel-17?**

|  |  |  |
| --- | --- | --- |
| Company | Response (Yes / No) | Comments |
| Xiaomi | Option 2 or 5 | If no additional signaling is introduced, positioning can’t be supported, since the time of posSIB reception is essential. |
| Ericsson | None | The WI has been closed 100% and now adding the support of posSIB is clearly the addition of a new functionality and we are not okay with it.  During the ASN.1 ad-hoc meeting companies expressed concerns about UE that have a requirement to keep updated version of posSIB but for us this is not an issue. This is because:   * If the remote UE is in-coverage can always acquire posSIB via broadcast * If the remote UE is out-of-coverage there is no requirement to have updated version of SIB since this is not the case in Uu and also we are wondering how a remote UE out-of-coverage can make use of the positioning SIB.   Further, we are also not sure that all the posSIB are useful to the remote UE and thus we need to spend a lot of time to decide which ones are useful and which ones are not.  In conclusion, this should be handled in Rel-18 since we have already a WI that will address this topic. |
| Apple | None | We think more discussion is needed before agreeing any options above because Rel-18 will specify sidelink positioning anyway. For example, it seems only GNSS assistance information is meaningful to OOC UEs. Then, the new IE for posSIB request from the remote UE shall be limited to those posSIBs, not all the posSIBs. In other words, the relay UE shall be only burdened with SIB forwarding for which is deemed necessary, not any SIBs in Rel-17. As long as there is a chance that the NW refuse to give OOC remote UE OTDOA/DL-TDOA posSIBs, the relay UE shall not be allowed to support forwarding those posSIBs. |
| Samsung | None | We share the view from Ericsson and Apple that this feature does not have to be handled in Rel-17. |
| CATT | Option 4 or Option 1 | The current issue has no relationship with the rel-18 SL Positioning WI at all. We should support it in Rel-17, since there is simply no reason to punish remote UEs by limiting positioning functionality. Also considering the change to the RRC spec is acceptable. |
| vivo | Prefer None | We also think not every PoSIB is useful to L2 Remote UE positioning especially for OOC case. For example, the RAT-dependent related PosSIB requires to measure PRS from the gNB and thus cannot work well for OOC L2 Remote UE. Leaving it to TEI or Rel-18 to handle this specific issue is preferred for such a late stage. Otherwise, extra time and specification efforts are forseen, e.g., the supported/not supported PosSIB for L2 Remote UE and how to handle the case when the connected L2 Relay UE doesn’t support PosSIB.. |
| MediaTek | Option1 | We see the importance to support posSIB forwarding at Rel-17 to ensure the support of public satefy features as required by operators |
| Nokia | None | Agree with Ericsson |
| Sharp | None | We share the same view with Ericsson and Apple |
| Huawei, HiSilicon | Option 1/5/4? | First, we understand the previous RAN2 agreement that ANY SIB can be requested/forwarded should not be reverted for no good reason. In previous RAN2 meeting, there has been a lot of debate on whether the SIBs not to be used by remote UE can be requested/forwarded, and the compromise is to define a generic and unified signaling/procedure to allow remote UE request any SIB. We do not see the reason to exclude positioning SIB now.  Then we feel option1 is enough, the only thing we need is to add positioning SIB request in RemoteUEInformationSidelink in a similar format of existing SIB request. We do not see the difference in option 5/4. |
| Lenovo | None | Can be brought up in Rel. 18 |
| Spreadtrum | None | Same view as Ericsson and Apple. |

**Q11) If you agree to support Option1, option3 or option 4 or option 5in Q10, do you agree to support perSIB request or perSIrequest as the format of IEs for a Remote UE to request posSIBs as clarified in Q1?**

|  |  |  |
| --- | --- | --- |
| Company | Response (Yes / No) | Comments |
| Xiaomi | perSIB | Aligend with Uu |
| Ericsson | None | See reply in Q10 |
| Apple | None |  |
| Samsung | None | Same as Q10 |
| CATT | perSIB | Align with SIBs acquired via L2 U2N relay. |
| MediaTek | perSIB | Agree with Xiaomi and CATT |
| Sharp | None |  |
| Huawei, HiSilicon | Per-SIB | A list for posSIB similar like the existing one *sl-Requested-SIB-List* |

[8] discusses about a case where the L2 remote UE supports posSIBs but L2 Relay UE does not. It is not clear when can such scenario happen, i.e. if both are Rel-17 UEs and the gNB supports posSIB(s), then both Remote UE and Relay UE should support posSIBs acquisition.

**Q12) If you agree to support option1, option 3 or option4 or option 5, do you agree that the case of L2 remote UE supports posSIBs but L2 Relay UE does not support posSIBs is possible?**

|  |  |  |
| --- | --- | --- |
| Company | Response (Yes / No) | Comments |
| Xiaomi | Yes | Relay and positioning are separate features. It’s possible relay UE is not capable of positioning. |
| Ericsson | None | See reply to Q10 |
| Apple | None |  |
| Samsung | None | Same as Q10 |
| CATT | Yes | Agree with Xiaomi, relay and positioning are separate features. |
| MediaTek | Yes |  |
| Sharp | None |  |
| Huawei, HiSilicon | Yes | This is the agreement and the same handling for other SIBs, i.e. relay UE just forwarding the requested SIBs irrespective of whether relay supports the feature provided by the SIB or not. |

[8], to support the case discussed above, proposes that L2 relay UE need to indicate its posSIBs support indication to L2 Remote UE and Remote UE can use this information to decide when to include posSIBs request in RemoteUEInformationSidelink message. [8] further raises an issue as below and proposes to introduce changes to indicate the received timing information to Remote UE. Rapporteur thinks these proposals are to check the correctness of positioning feature and it is not appropriate to consider these for discussion at this stage of Rel-17. Such changes can be deferred to later release of the standard by supporting a NOTE in option 4 above.

“Even if the relay UE supports positioning and posSIB(s) forwarding, the posSIB(s) may require target UE, i.e. remote UE, to know the time of the posSIB(s) reception, as indicated by following spec in [2] TS 37.355. The IE *GNSS-ReferenceTime* is carried by posSIB. Apparently, the remote UE is not aware of the time of reception of posSIB(s) by relay UE. To enable the positioning functionality, relay UE shall provide the time of reception of the posSIB(s) to remote UE.”

**Q13) If answer to Q12 is yes and/or if there are changes necessary to support the correct operation of positioning feature in Rel-17, do you agree to add a NOTE as in option 4 and not support any changes other than posSIBs forwarding in Rel-17?**

|  |  |  |
| --- | --- | --- |
| Company | Response (Yes / No) | Comments |
| Xiaomi | No, changes are needed to support pos in relay | We understand positionging can’t be supported without reference time, not in a suboptimal way. The details can be found in [8] |
| Ericsson | None | The WI has been closed 100% and now adding the support of posSIB is clearly the addition of a new functionality and we are not okay with it.  During the ASN.1 ad-hoc meeting companies expressed concerns about UE that have a requirement to keep updated version of posSIB but for us this is not an issue. This is because:   * If the remote UE is in-coverage can always acquire posSIB via broadcast * If the remote UE is out-of-coverage there is no requirement to have updated version of SIB since this is not the case in Uu and also we are wondering how a remote UE out-of-coverage can make use of the positioning SIB.   Further, we are also not sure that all the posSIB are useful to the remote UE and thus we need to spend a lot of time to decide which ones are useful and which ones are not.  In conclusion, this should be handled in Rel-18 since we have already a WI that will address this topic. |
| Apple | None | We think more discussion is needed before agreeing any options above because Rel-18 will specify sidelink positioning anyway. For example, it seems only GNSS assistance information is meaningful to OOC UEs. Then, the new IE for posSIB request from the remote UE shall be limited to those posSIBs, not all the posSIBs. In other words, the relay UE shall be only burdened with SIB forwarding for which is deemed necessary, not any SIBs in Rel-17. As long as there is a chance that the NW refuse to give OOC remote UE OTDOA/DL-TDOA posSIBs, the relay UE shall not be allowed to support forwarding those posSIBs. |
| CATT | Yes | Positioning can be supported without reference time because the reference time is just needed in some case. We prefer to support it in Rel-17, since there is simply no reason to punish remote UEs by limiting positioning functionality. |
| MediaTek | No | We have the same understanding as Xiaomi |
| Sharp | No |  |

# Conclusion

TBD based on company inputs

# References

[1] R2-2205064, Discussion on remote UE’s SIB(s) acquisition and paging monitoring, ZTE, Sanechips

[2] R2-2205065, Corrections on remote UE’s SIB(s) acquisition and paging monitoring, ZTE, Sanechips

[3] R2-2204585, General SIB forwarding for Remote UE [M119][H629], MediaTek Inc

[4] R2-2205609, Clarification of SI acquisition for RRC\_IDLE/RRC\_INACTIVE Remote UE (RIL#: E084, H593), Samsung

[5] R2-2204886, Discussion on SI forwarding, NEC

[6] R2-2204674, [E083][H593] Two copies of a same SIB and related remote UE behaviour, vivo

[7] R2-2204586, PosSIBs Forwarding for Remote UE [M119][H629], MediaTek Inc

[8] R2-2205319, Discussion on how to support posSIB(s) forwarding, Xiaomi