**3GPP TSG RAN WG1 #109-e R1-22xxxxx**

**e-Meeting, May 9th – 20th, 2022**

**Source: Moderator (vivo)**

**Title: [109-e-R17-Sidelink-01] Email discussion on LS (R1-2203042) on inter-UE coordination mechanism**

**Agenda item: 8.11**

**Document for:** **Discussion and Decision**

Introduction

This document is to summarize the discussion of the following email thread.

[109-e-R17-Sidelink-01] Email discussion on LS ([R1-2203042](file:///D%3A%5CDocuments%5C3GPP%20documents%5CRAN1%5CTSGR1_109-e%5CDocs%5CR1-2203042.zip)) on inter-UE coordination mechanism, including issues 2-11 and 2-10 as summarized in section 4 of [R1-2205117](file:///D%3A%5CDocuments%5C3GPP%20documents%5CRAN1%5CTSGR1_109-e%5CDocs%5CR1-2205117.zip), until May 12 – Zichao (vivo)

Companies are highly appreciated providing your inputs before the 1st checkpoint:

* **1st checkpoint: 9:59 AM UTC, May 10**

Background

In RAN1#107bis-e, RAN1 achieved the following agreements regarding how to determine the priority values of the MAC CEs for inter-UE coordination.

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| Agreement* For inter-UE coordination information triggered by an explicit request in Scheme 1, the priority value of the inter-UE coordination information is (pre)configured priority value if it is provided by (pre)configuration. Otherwise, the priority value is the same as indicated by UE-B’s explicit request.
	+ For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data

Agreement* For inter-UE coordination information triggered by an explicit request in Scheme 1, the priority value of explicit request is (pre)configured priority value if it is provided by (pre)configuration. Otherwise, the priority value is the same as that of a TB to be transmitted by UE-B.
	+ For the case when the explicit request is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the explicit request and data

Agreement* For inter-UE coordination information triggered by a condition other than explicit request reception in Scheme 1, the priority value of the inter-UE coordination information is (pre)configured priority value if it is provided by (pre)configuration.
	+ FFS: Otherwise, the priority value is determined by UE-A’s implementation.
	+ For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data
 |

On the other hand, RAN2 has reached the following agreements on the priority of IUC related MAC CEs in RAN2 #117-e meeting:

5: The priority order of a MAC CE for UE-B’s explicit request is between SL CSI reporting MAC CE and SL DRX command MAC CE (when priority of IUC REQ MAC CE is fixed as “1”).

6: The priority order of a IUC Information MAC CE is between SL CSI reporting MAC CE and SL DRX command MAC CE (when priority of IUC Information MAC CE is fixed as “1”).

7: Send LS to RAN1 to inform RAN2 understanding on the priority of IUC INFO/IUC REQ MAC CE and RAN2 preference to fix the priority of IUC INFO/IUC REQ MAC CE as “1”.

In the LS sent from RAN2 [1], RAN2 informs the following three aspects of priority for IUC MAC CE and IUC request MAC CE discussed in RAN2:

1. The priority value of IUC MAC CE and IUC request MAC CE (similar as the priority of CSI report MAC CE defined in section 6.1.3.35 in TS 38.321)
2. The priority order of IUC MAC CE and IUC request MAC CE which is used for LCP and multiplexing (to be defined in section 5.22.1.4.1.3 in TS 38.321)
3. Priority value included in IUC MAC CE and IUC request MAC CE, which may be used for UE-A's sensing and/or candidate resource (re-)selection.

Additionally, RAN2 indicates that a fix priority value (i.e., “1”) for IUC MAC CE and IUC request MAC CE is preferred at least for the first and second aspects with the following reasons:

For the first aspect, RAN2 would like to inform RAN1 that RAN2 prefers to fix the priority value of IUC MAC CE and IUC request MAC CE as “1”. This is because if the priority value of IUC MAC CE and IUC request MAC CE is configurable, the priority order in LCP of IUC MAC CE and IUC request MAC CE will depend on the configured priority value, which is not aligned with the legacy manner and makes the MAC specification complicated. For the second aspect, when the priority value is fixed as “1”, the priority order in LCP of an IUC request MAC CE and of an IUC MAC CE, are both between SL CSI reporting MAC CE and SL DRX command MAC CE.

Based on that, RAN2 would like to ask RAN1 to confirm:

**Q1**: Whether the priority value indicated by higher layer parameters *priorityScheme1CoordInfoExplicit*, *priorityScheme1Request*, and *priorityScheme1CoordInfoCondition* refers to the priority value of the MAC CE itself which affects its priority order used for LCP and multiplexing, or refers to the priority value which is used for sensing and/or candidate resource (re-)selection?

In the former case (which is RAN2 assumption), RAN2 would like to ask RAN1 to remove these RRC parameters, or in the latter case, RAN2 would like to ask RAN1 to update the field description of these parameters if needed.

Discussion

## Round 1

From the contributions submitted in this meeting, moderator observes that the views are divergent among companies. Some companies prefer to revert the previous RAN1 agreements (i.e., by removing the RRC parameters *priorityScheme1CoordInfoExplicit*, *priorityScheme1Request*, and *priorityScheme1CoordInfoCondition*), so that a single priority value is used for LCP, multiplexing and sensing/resource (re-)selection procedures, while the other companies prefer to keep the previous RAN1 agreements, but restrict the RRC parameters only applicable to sensing and resource (re-)selection procedures.

Although the views are divergent, moderator observes that no company proposes to revert RAN2’s agreement, i.e., to make the priority order of the IUC-related MAC CEs configurable. Even the companies that prefer keeping the RRC parameters seem to agree that these RRC parameters should be applicable to sensing and resource (re-)selection procedures only. Therefore, the following proposal is made.

***Moderator Proposal 1: It is RAN1’s understands that the*** ***priority order used for LCP and multiplexing for the IUC MAC CE and IUE request MAC CE (i.e., the first and second aspects in the LS) should be determined by RAN2, regardless of the higher layer parameters priorityScheme1CoordInfoExplicit, priorityScheme1Request, and priorityScheme1CoordInfoCondition.***

**Q1: Do you agree with the Moderator Proposal 1 above?**

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| --- | --- | --- |
| **Company** | **Acceptable or not** | **Comment** |
| ZTE,Sanechips | Yes | Intention of the moderator is well understood. However, considering it is quite likely that the higher layer parameters end up being removed as it is indeed designed to affect the LCP/MUX procedure underlying the corresponding RAN1 agreement, we had better not reach an agreement related to the parameters themselves beyond what RAN2's asking. As a suggestion, we can try to directly discuss the following which echoes what RAN2 asks, appearing uncontroversial given moderator's observation that even those support keeping these parameters would like to decouple them from what motivated their introduction in the first place.***Proposal: It's RAN1's understanding that higher layer parameters priorityScheme1CoordInfoExplicit, priorityScheme1Request, and priorityScheme1CoordInfoCondition refers to the priority value of the MAC CE itself which affects its priority order used for LCP and multiplexing*** |
| Qualcomm | Yes | RAN2 similarly determined the priority order used for LCP and multiplexing of SL CSI reports in Rel-16. |
| Huawei, HiSilicon | Acceptable | LCP and multiplexing for the IUC MAC CE and IUC request MAC CE are not within RAN1’s expertise. |
| Nokia, NSB | Yes |  |
| Apple | Yes |  |
| NTT DOCOMO | Yes |  |
| Samsung | Yes | It should be noted that the intention of the RAN1 agreements in RAN1#107b-e is that the “priority value” is used for the transmission of the IUC message or the IUC. Therefore, agreeing to having a fixed priority value as suggested by RAN2 already reverts the RAN1 agreements. |
| Intel | Yes | In our understanding these parameters have the target to enable the system profiling to restrict the transmission of IUC information in the case of a highly congested medium, as this can increase the congestion instead of improving the situation. Thus, it is acceptable to enable RAN2 to continue with a fixed priority value for LCP and multiplexing. |
| Futurewei | Acceptable | Ok with the proposal to leave priority order for LCP and multiplexing determined by RAN2. |
| Ericsson | Yes | In our view, the priority value of the RRC parameters corresponds to the value indicated in the SCI, i.e., the value used for sensing and/or resource allocation procedure, and it is up to RAN2 to decide whether this value is the same as the priority value of the MAC CE itself or not. |
| xiaomi | Yes | The priority order used for LCP and multiplexing shall be determined by RAN2. |
| OPPO | Comments | Firstly, it seems ambiguous on the wording “UE-A's sensing and/or candidate resource (re-)selection” in the 3) aspect of RAN2 LS. As in IUC operation, UE-A may perform sensing for either **a)** **determining preferred resource set** or **b) determining resource for transmission IUC**. We are not sure what is the exact meaning of the wording in RAN2 LS, as they using “Priority value included in IUC MAC CE and IUC request MAC CE”, looks like the priority indicated in the explicit request for preferred resource set determination, i.e., a). If the case, seems RAN2’s question is to confirm whether the parameters are for a), if not, they suggest RAN1 to remove the parameters (i.e., regardless of whether they are used for sensing and resource (re-)selection for **IUC/Request transmission** or not).We believe “sensing and resource (re-)selection procedures” in FL summary is for b), and the 3 RRC parameters defined by RAN1 are also for b). We think it is necessary to figure out the relationship between the priority for LCP and multiplexing and the priority for b), in the current RAN2 specification, although there is no clear description, seems the priority indicate to PHY layer for sensing and the priority used for LCP and multiplexing should be the same. If so, we are not sure whether we can decouple the priority for LCP and multiplexing and the priority for sensing (to transmit the MAC CE). |
| MediaTek | Yes | Up to MAC layer operation decided by RAN2. |
|  CATT, GOHIGH | Comment | We agree that the priority order used for LCP and multiplexing shall be determined by RAN2.However, we share the similar views as OPPO, the relationship between the priority value in SCI format 1 and priority order in LCP and multiplexing should be figured out. According to the legacy behavior, both of them are aligned. From our understanding, this principle should be respected, otherwise, there would be more issues to be addressed, especially for RAN2.  |
| LGE | No | The point here is that when such priority order is decided by RAN2, from the technical perspective, it would be difficult to independently determine it without considering the priority values indicated by higher layer parameters priorityScheme1CoordInfoExplicit, priorityScheme1Request, and priorityScheme1CoordInfoCondition. In this sense, we think that the wording of “regardless of the higher layer parameters priorityScheme1CoordInfoExplicit, priorityScheme1Request, and priorityScheme1CoordInfoCondition” in the proposal is **not correct**. Also from our perspective, **it does not need to agree this proposal**.  |
| Fraunhofer | Yes |  |

Regarding the controversial part, some technical discussion may be helpful to achieve consensus among companies. On one hand, it is understandable that having a unified priority value for all the three aspects are beneficial, while restricting the configurable priority values only in sensing and resource (re-)selection procedures may not be fully aligned with RAN1’s intention, at least in some companies’ view. Moreover, a unified design for handling the priority values of all the MAC CE (i.e., both the CSI reporting and IUC-related MAC CEs) are preferable.

On the other hand, it is really desirable not to revert previous agreements that RAN1 had spent a lot of efforts working on, especially in this maintenance stage. Although it is not favorable, restricting the configurable priority values only to sensing and resource (re-)selection procedures seems workable. In the current RAN1 specification, the priority value is obtained by higher layer, and used only in sensing and resource (re-)selection procedures. Moreover, the sub-bullet of the previous agreements (e.g., “*For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data*”) seems to imply that the “priority value” in the agreements only refers to the priority value of the TB *after multiplexing*, which also aligned with current RAN1 specifications. Thus, it seems no problem if the RAN1’s agreements (as well as the RRC parameters) are kept for the third aspect, together with RAN2’s agreements for the first and second aspects.

**Companies are invited to provide the views on the following questions.**

**Q2: Do you see any critical issue(s) if the priority values for the IUE MAC CE and IUC request MAC CE are fixed to ‘1’ (i.e., removing the three RRC parameters)?**

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| **Company** | **Agree or not** | **Comment** |
| **ZTE,Sanechips** | **No critical issue** |  |
| Qualcomm | Critical issues exist | Fixing the IUC priority to 1 for all IUC operations will make IUC information the highest priority transmissions in the system, i.e. it will allow them to interfere with and preempt safety-critical messages. This was not RAN1’s intention and could degrade the reliability of safety messages in the system.Another issue is that it reverts the RAN1 agreement. We do not agree with that, especially since this is the maintenance phase and a solution that does not require reverting any agreements exists.  |
| Huawei, HiSilicon | Agree (remove parameters) | No critical issue if IUC and IUC request MAC CEs are with fixed priority value as “1”. It is noted that SL CSI report MAC CE as defined in Rel-16 is also with fixed priority value as “1”. Thus this can be regarded as reusing Rel-16 design.Note that removal is already handled in the RAN1 agreements under the “if not provided” case. See Q5. |
| Nokia, NSB | Undesirable to remove the RRC parameters | Similar view to Qualcomm.RAN1, after long discussion, introduced these parameters to provide control over the priority of IUC transmissions. It is undesirable to remove them.Moreover, the issue is not just about the parameters. The agreements also cover the case when these parameters are not (pre)configured, e.g. priority value of explicit request is the same as that of a TB to be transmitted by UE-B.It seems problematic that an IUC request and information message for a TB of e.g. priority value 8 should always get priority value 1 and hence be able to pre-empt a transmission of e.g. priority value 2. |
| Apple | Not agree to remove the RRC parameters | If the priority values for IUC MAC CE and IUC request MAC CE is fixed to 1, then the corresponding transmission is always prioritized over other sidelink data. This is not preferred, considering some high priority sidelink data transmissions in the system.  |
| NTT DOCOMO | Not agree | Same view with QC/Nokia/Apple. |
| Samsung | Not Critical (See comment) | Fixing the priority to “1” can work in many cases. IUC messages and requests can typically be small messages. An issue can occur when multiplexing the IUC message/request with other SL data and the other SL data has a high priority value (low priority) and the other SL data is large, this makes that SL transmission have a fixed priority value of “1” this is following the RAN1 agreement: “*For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and* data”, which could become detrimental to other high priority SL data. |
| Intel | Critical issue exists | Based on our understanding of the target of this parameter (See Question Q1) this would remove flexibility for system profiling to adjust the priority of these transmissions. |
| Futurewei | No critical issues | We are ok to keep the parameters but no critical issue if they are not there or set to 1 always. |
| Ericsson | Do not agree | If the value of the IUC MAC CE and IUC request MAC CE is fixed to 1, in our view this is not aligned with the RAN1 agreements related to the following text:For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data |
| xiaomi | Not agree | If the priority values for the IUE MAC CE and IUC request MAC CE are fixed to ‘1’, the transmission of IUC a low priority data Tx will preempt other high priority data transmission, which is undesirable.  |
| OPPO | Comments | We are sort of open on the issues, i.e., fixed to 1 or keeping the parameters. However, as commented in the Q1, in the current specification, it seems same priority is used for LCP/multiplexing and sensing/resource (re-)selection for the data/MCS CE transmission, as it is not reasonable to use a higher priority for sensing and then use the selected resource to transmit a lower priority data. If the case, RAN1 should ask RAN2 to revert their agreement (i.e. fix the priority of IUC INFO/IUC REQ MAC CE as “1”) if the parameters are kept in the end. |
| MediaTek | No critical issue | It may not be optimized but it can work and is simple. Besides, it seems that RAN2 has made the agreements and captured them in the spec for the fixed priority value. There is no need to revert it unless there is the critical issue. To be noted, SL-CSI report also has the fixed priority “1” in R16 without any concern or critical issue. Similarly, there should be no critical issue for IUC messages either with the fixed priority “1”. |
| CATT, GOHIGH | No critical issues | We think it is similar as that of SL-CSI, even the priority level of a TB which triggered SL-CSI feedback may not be 1, but the priority level of the SL-CSI MAC-CE is fixed to 1. We don’t see critical issues here.  |
| LGE | Comment  | We are open to decide that the priority values of IUC Information MAC CE/IUC Request MAC CE are fixed to “1” in Rel-17.One point we would like to emphasize is that when making the agreements regarding the priority values of IUC Information MAC CE/IUC Request MAC CE in RAN1, it was assumed that they will be at least used **in the physical procedures such as sensing/candidate resource (re-)selection**, **congestion control**, **prioritization between NR SL and NR UL or between NR SL and LTE SL**. |
| Fraunhofer | Not agree | We agree with QC and Ericsson that this would be detrimental to the system, and goes against an existing agreement. |

**Q3: Do you agree that restricting the higher layer configurable priority values only to sensing and resource (re-)selection procedures is workable? If not, what is the critical issue(s)?**

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| **Company** | **Agree or not** | **Comment** |
| **ZTE, Sanechips** | **No** | The usage of these parameters are unclear if we change its definition to those priority values to be used in sensing and resource (re-)selection procedure. We need additional RAN1 agreement and discussion to clarify this aspect, which reverts additionally the RAN1 agreement belowAgreement* For sidelink transmission carrying inter-UE coordination information in Scheme 1,
	+ UE-A performs its resource (re)selection according to the same procedure in TS 38.214 Section 8.1.4 to transmit the inter-UE coordination information to UE-B.
* For sidelink transmission carrying request in Scheme 1,
	+ UE-B performs its resource (re)selection according to the same procedure in TS 38.214 Section 8.1.4 to transmit the request for the inter-UE coordination information to UE-A if UE-B performs sensing/resource exclusion. Otherwise, at least UE-B can perform random selection
* Note: RAN1 does not pursue specific enhancement of Rel-17 resource (re)selection for the transmission of inter-UE coordination information and its request.

**What really matters is as stated in our response to Q1, the underlying RAN1 consensus agreeing to those introducing the parameters in the first place. To us, the answer is the priority values used for LCP/MUX, which is aligned with RAN2 assumption. Thus we had better confirm this and delete those parameters as per RAN2 request.** |
| Qualcomm | Yes | This is workable.We do not think there is an issue with the agreement cited by ZTE, the two agreements were made in the same RAN1 meeting and we do not see any contradiction between them. |
| Huawei, HiSilicon | See comment, and further reply under “Q5 other” | **These parameters in the LS are not used for UE-A’s sensing procedure on determining preferred resource set**The related RAN1 agreements are copied below:

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| **Agreement***For Condition 1-A-1 of Scheme 1, the set of resources preferred for UE-B’s transmission is a form of candidate single-slot resource as specified in Rel-16 TS 38.214 Section 8.1.4** *When the inter-UE coordination information transmission is triggered by UE-B’s explicit request, the candidate single-slot resource(s) are determined in the same way according to Rel-16 TS 38.214 Section 8.1.4 with at least following parameters provided by signaling from UE-B. FFS whether or not to apply RSRP threshold increase in Step 7) of Rel-16 TS 38.214 Section 8.1.4.*
	+ *Priority value to be used for PSCCH/PSSCH transmission*
		- *It replaces prio\_TX*
	+ *Number of sub-channels to be used for PSSCH/PSCCH transmission in a slot*
		- *It replaces L\_subCH*
	+ *Resource reservation interval*
		- *It replaces P\_rsvp\_TX*
	+ *FFS: Starting/ending time location of resource selection window*
* *FFS : In addition to Rel-16 procedure, use inter-UE coordination information from other UEs*
	+ *If there is no consensus in RAN1#106bis-e, no further discussions for Rel-17*

Agreement* *For determining preferred resource set in Scheme 1, when inter-UE coordination information transmission is triggered by a condition other than explicit request reception,*
	+ *Values of following parameters are (pre)configured for a resource pool. If there is no (pre)configuration, UE-A determines by its implementation the values of the following parameters*
		- *prio\_TX*
		- *L\_subCH*
		- *P\_rsvp\_TX*
	+ *UE-A determines by its implementation values of following parameters*
		- *n+T\_1, n+T\_2*
	+ *FFS: Whether/how to support (pre)configuration of n+T\_1 and n+T\_2*
	+ *Note that it is up to RAN2 decision whether/how the values of these parameters are provided by PC5-RRC signaling from UE-B to UE-A and UE-A uses the received information to determine the preferred resource set*
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According to the RAN1 agreements, the priority used for UE-A’s sensing procedure is determined as follows:* When IUC information is triggered by UE-B’s explicit request, priority value is provided by UE-B’s explicit request
* When IUC information is triggered by a condition other than explicit request, this priority value is (pre-)configured value. If there is no (pre-)configuration, it’s determined by UE-A’s implementation.
* This parameter is *priorityPreferredResourceSetScheme1*

RAN2’s LS does not mention this parameter. |
| Nokia, NSB | Yes | We don’t see a fundamental problem with decoupling priority used in LCP and the priority used in the physical layer for resource (re)selection and 1st stage SCI priority field.Regarding Huawei’s comment above, this seems to confuse the priority used for determining a preferred resource set with the priority used in resource selection for transmission of the set. |
| Apple | Agree |  |
| NTT DOCOMO | Agree |  |
| Samsung | No | The intention of the RAN1 design is that the “priority value” used for SL transmission is used for sensing and resource selection. This has been the principle used in Rel-16 and applies to Rel-17. |
| Intel | Yes | In addition to making them applicable to sensing and resource selection they would in our understanding also be applicable for congestion control.  |
| Sharp | See comment | For sensing, it seems the priority is provided by MAC layers, instead of via RRC configuration. We are not quite sure about what exactly it means when referring the configurable parameters only apply for sensing. As for resource selection, it seems it is performed by MAC layers. PHY only identifies the candidate resource set.  |
| Futurewei |  | There does not seem to be a critical issue if we decide to do this, but more discussion seems necessary on the point HW raised. |
| Ericsson | Agree |  |
| xiaomi | Agree | We do not see problem if three higher layer configurable priority values are only used for sensing and resource (re-)selection procedure. |
| OPPO | Comments | As commented above, RAN1 should try to align the understanding on the relationship between the priority for LCP/multiplexing and the priority for sensing firstly.  |
| MediaTek | No | From RAN1/PHY perspective, UE will just use the single priority value indicated by the MAC layer for resource selection. Now it seems that PHY has to consider the additional priority values from RRC parameters. And the priority used for LCP operation is different from the RRC priority value for the same IUC messages. It is complicated and confused. Instead, such three RRC parameters can be removed as proposed in approach-1 in Q4.  |
| CATT, GOHIGH | No | We think it will break the legacy principle on the priority level determination of SCI format 1.  |
| LGE | No | When this proposal is adopted, does it mean that the priority values of IUC Information MAC CE/IUC Request MAC CE are fixed to "1” for **the physical procedures such as** **congestion control**, **prioritization between NR SL and NR UL or between NR SL and LTE SL**? If so, from our perspective, **it doesn't make technical sense** because a low-priority MAC CE in the sensing and resource (re-)selection procedures could be regarded as the highest-priority MAC CE in other physical procedures such as congestion control, prioritization between NR SL and NR UL or between NR SL and LTE SL. |
| Fraunhofer | Agree |  |

**Q4: What is your opinion on the two approaches?**

**Approach-1: The priority values for the IUE MAC CE and IUC request MAC CE are fixed to ‘1’ (i.e., removing the three RRC parameters).**

**Approach-2: The higher layer parameters (*priorityScheme1CoordInfoExplicit*, *priorityScheme1Request*, and *priorityScheme1CoordInfoCondition*) are kept and applicable only in sensing and resource (re-)selection procedures.**

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| **Company** | **Approach-1****(preferred, acceptable, unacceptable)** | **Approach-2****(preferred, acceptable, unacceptable)** | **Comment** |
| **ZTE, Sanechips** | **Preferred** | **Unacceptable** |  |
| Qualcomm | Unacceptable | Preferred |  |
| Huawei, HiSilicon | Preferred | Unacceptable | Approach-2 contradicts existing agreement. It is noted without Approach-2, the system works with no error.However, RAN2 does not ask these questions, and does not offer RAN1 any scope to advise them on such. |
| Nokia, NSB | Not preferred | Preferred |  |
| Apple  | Not preferred | Preferred |  |
| NTT DOCOMO | Unacceptable | Preferred |  |
| Samsung | Acceptable/preferred | Unacceptable |  |
| Intel | Unacceptable | Preferred |  |
| Futurewei | Acceptable based on RAN2 feedback |  | More discussion seems to be needed for Approach-2. |
| Ericsson | Unacceptable | Preferred | In our view fixing the priority value of the IUC message and request to 1 is not aligned with the RAN1 agreements. |
| xiaomi | unacceptable | Preferred |  |
| OPPO | acceptable | Should be modified | We are fine with Approach 1.If majority companies prefer to keep the parameters, “**and applicable only in sensing and resource (re-)selection procedures**” should be removed, as it may impact the existing manner in RAN2 specification if the priority for LCP and multiplexing is fixed to 1. RAN1 can only inform RAN2 that RAN1 prefer to keep the parameters and clarify that the parameters are used for UE-A's sensing and/or candidate resource (re-)selection **for transmission of the MAC CE.** |
| MediaTek | Preferred | Not preferred | Fixing the priority is still aligned with RAN1 agreement. It can be understood as the pre-configured value with “1”.  |
| CATT, GOHIGH | Acceptable | Unacceptable | From our understanding, the priority value in SCI format 1 should be better to align with the priority values in LCP and multiplexing procedure. We can not accept Approach-2.From this perspective, we think there are two options to deal with this issue: One is to respect RAN2 agreements that the priority values of *priorityScheme1CoordInfoExplicit*, *priorityScheme1Request*, and *priorityScheme1CoordInfoCondition* are fixed to “1”, and remove these RRC parameters. The other is to respect RAN1 agreements that the (pre-)configured priority values of *priorityScheme1CoordInfoExplicit*, *priorityScheme1Request*, and *priorityScheme1CoordInfoCondition* are used for LCP and multiplexing procedure.  |
| LGE | Open | Unacceptable | As already commented in Q2, we would like to emphasize is that when making the agreements regarding the priority values of IUC Information MAC CE/IUC Request MAC CE in RAN1, it was assumed that they will be at least used **in the physical procedures such as sensing/candidate resource (re-)selection**, **congestion control**, **prioritization between NR SL and NR UL or between NR SL and LTE SL**. |
| Fraunhofer | Unacceptable | Preferred |  |

Regarding the specification issue of how to capture the priority values of IUC-related MAC CEs raised in [16], Moderator believes these should be captured in RAN2 specification, similar to that for CSI reporting MAC CE. In the reply LS to RAN2, RAN1 can clarify this to RAN2.

**Q5: Is there any other issues (including the abovementioned specification work) should be discussed? Please provide your opinion if any.**

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| --- | --- |
| **Company** | **Comment** |
| Huawei, HiSilicon | The proposals do not address the question in the LS.Note that the parameters referred to can be identified in RAN1 agreements as follows, showing that they are not used in the sensing + resource (re)selection procedures:*priorityScheme1CoordInfoExplicit, priorityScheme1Request, priorityScheme1CoordInfoCondition**Agreement** *For inter-UE coordination information triggered by an explicit request in Scheme 1, the priority value of the inter-UE coordination information is (pre)configured priority value if it is provided by (pre)configuration. Otherwise, the priority value is the same as indicated by UE-B’s explicit request.*
	+ *For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data*

*Agreement** *For inter-UE coordination information triggered by an explicit request in Scheme 1, the priority value of explicit request is (pre)configured priority value if it is provided by (pre)configuration. Otherwise, the priority value is the same as that of a TB to be transmitted by UE-B.*
	+ *For the case when the explicit request is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the explicit request and data*

*Agreement** *For inter-UE coordination information triggered by a condition other than explicit request reception in Scheme 1, the priority value of the inter-UE coordination information is (pre)configured priority value if it is provided by (pre)configuration.*
	+ *FFS: Otherwise, the priority value is determined by UE-A’s implementation.*
	+ *For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data*
 |
| NTT DOCOMO | The necessity would be dependent on outcome of above discussion (i.e. approach 1 vs approach 2). And if we go with approach 2 (i.e. only used for PHY procedure), it seems that priority can be captured in e.g. the beginning of 8.1.4 in 214. Anyway, firstly we need to conclude Q1-Q4. |
| Ericsson | RAN2 has also requested RAN1 to provide text to update update the field description of these parameters if needed. Our proposal is to update the RRC parameter description to include the following text in each of them:* priorityScheme1CoordInfoExplicit: Indicate a priority value indicated in SCI format 1-A for a transmission of inter-UE coordination information triggered by an explicit request in Scheme 1
* priorityScheme1Request: Indicate a priority value indicated in SCI format 1-A for a transmission of an explicit request for inter-UE coordination information in Scheme 1
* priorityScheme1CoordInfoCondition: Indicate a priority value indicated in SCI format 1-A for a transmission of inter-UE coordination information triggered by a condition other than explicit request reception in Scheme 1
 |
| **OPPO** | RAN1 should discuss the exact meaning of “UE-A's sensing and/or candidate resource (re-)selection” in the 3) aspect of RAN2 LS. As in IUC operation, is it **a) determining preferred resource set** or **b) determining resource for transmission IUC**.  |
| **CATT, GOHIGH** | From our understanding, the priority value in SCI format 1 is provided by RAN2, we think it would be better for RAN2 to make a final decision on this issue. From RAN1’s perspective, we can just answer the intention of these RRC parameters.  |
|  |  |
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**Summary of 1st round discussion**

On Q1, except one company, all the companies agree that the priority order used for LCP and multiplexing for the IUC MAC CE and IUE request MAC CE should be determined by RAN2. It is moderate’s understanding that LGE’s comment is on whether the priority for LCP, multiplexing, and other physical layer procedures can be separately determined. In this case it seems LGE would not disagree if priority order used for LCP and multiplexing for the IUC MAC CE and IUE request MAC CE is determined by RAN2 (e.g., fixed to “1”). Nevertheless, moderator also observes there are some additional comments, such as having a fixed priority value would anyway revert the RAN1 agreements, the relationship between the priority value in SCI format 1 and priority order in LCP and multiplexing should be figured out, the proposal is not needed, etc. Especially, it seems companies have different understanding on the meaning of the 3rd aspect in the LS, i.e., the “priority value *included* in IUC MAC CE and IUC request MAC CE” are used for UE-A's sensing and candidate resource (re-)selection either

* 1. to determine the recommended resource set for UE-B’s transmission, or
	2. to determine the resources for transmitting UE-A’s TB carrying the IUC MAC CE

On Q2, the following problems are raised by companies for removing these three RRC parameters:

1. Degrading system reliability, i.e., the IUC MAC CEs for lower priority data preempting higher priority data
2. Reverting previous RAN1 agreements

On Q3, the following problems are raised by companies if the RRC parameters are kept and used in UE’s sensing and resource (re-)selection procedure.

1. Breaking the existing principle/behavior on the priority value determination of MAC CE
2. Not aligning with previous RAN1 agreements (or intention)

On Q4, the positions of the companies are summarized below:

Approach-1:

* Preferred: ZTE, Sanechips, HW, HiSilicon, Samsung, MediaTek, CATT, GOHIGH, (*8 companies*)
* Acceptable (including not preferred): Futurewei, OPPO, LGE, Nokia (Not preferred), NSB (Not preferred), Apple (Not preferred) (*6 companies*)
* Unacceptable: QC, NTT DOCOMO, Intel, Ericsson, Xiaomi, Fraunhofer, (*6 companies*)

Approach-2:

* Preferred: QC, Nokia, NSB, Apple, NTT DOCOMO, Intel, Ericsson, Xiaomi, Fraunhofer, (*9 companies*)
* Acceptable (including not preferred): OPPO (should be modified), MediaTek (Not preferred), (*2 companies*)
* Unacceptable: ZTE, Sanechips, HW, HiSilicon, Samsung, CATT, GOHIGH, LGE, (*8 companies*)

## Round 2

Based on the comments in the first round, it seems some clarifications for the 3rd aspect may be needed, i.e., whether the “priority value *included* in IUC MAC CE and IUC request MAC CE” are used for UE-A's sensing and candidate resource (re-)selection either

1. to determine the recommended resource set for UE-B’s transmission, or
2. to determine the resources for transmitting UE-A’s TB carrying the IUC MAC CE

In moderator’s view, RAN1’s common understanding is the RRC parameters were introduced to determine the resources for transmitting the TB carrying the IUC MAC CE, not for determining the resource set for UE-B’s transmission. Companies are invited to clarify this.

**Q6: Do you agree that** **the RRC parameters (***priorityScheme1CoordInfoExplicit, priorityScheme1Request, priorityScheme1CoordInfoCondition***) were introduced by RAN1 to determine the resources for transmitting the TB carrying the IUC MAC CE, not for determining the resource set for UE-B’s transmission? Please provide your views/comments especially if you disagree.**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| **MediaTek** | **Agreed in principle. However, to be clarified, these parameters introduced by RAN1 were related to transmission of TB carrying the IUC MAC CE (for LCP and multiplexing) but not determining the resources directly (i.e., sensing and resource selection), considering questions in RAN2 LS.** |
| **OPPO** | **agree** |
| **Qualcomm** | Yes, though *priorityScheme1Request* is for the request, not the IUC MAC-CE. RAN1 already made the following agreements on the topic and included them in the RRC parameter list. **Agreement**For inter-UE coordination information triggered by an explicit request in Scheme 1, the priority value of the inter-UE coordination information is (pre)configured priority value if it is provided by (pre)configuration. Otherwise, the priority value is the same as indicated by UE-B’s explicit request.* For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data

**Agreement**For inter-UE coordination information triggered by an explicit request in Scheme 1, the priority value of explicit request is (pre)configured priority value if it is provided by (pre)configuration. Otherwise, the priority value is the same as that of a TB to be transmitted by UE-B.* For the case when the explicit request is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the explicit request and data

**Agreement**For inter-UE coordination information triggered by a condition other than explicit request reception in Scheme 1, the priority value of the inter-UE coordination information is (pre)configured priority value if it is provided by (pre)configuration. * FFS: Otherwise, the priority value is determined by UE-A’s implementation.
* For the case when inter-UE coordination information is transmitted together with other data, the priority value of the multiplexed sidelink transmission is determined by the smallest priority value between the inter-UE coordination information and data
 |
| **Futurewei** | Agree |
| **Samsung** | The three agreements say: “the priority value of … is (pre)configured priority value if it is provided by (pre)configuration”. This would imply that this is the priority of the TB which is used prioritization among other TBs (e.g., in MAC) and for determining the resources of the TB, not just the priority used only for sensing/resource selection. |
| **CATT, GOHIGH** | Agree |
| **Spreadtrum** | Agree |
| **Apple** | Agree |
| **Sharp** | Agree |
| **Intel** | Agree |
| **Xiaomi** | Agree |
| ZTE,Sanechips | Agreed |

Regarding the two approaches, the views in the first round are not convergent at all. On the other hand, it seems in either approach the system can work. It is acknowledged that if the priority value is fixed to “1” for the MAC CE, the IUC MAC CEs for lower priority data may preempt the higher priority data, e.g., safety-critical messages. However, this seems to already happen for the CSI reporting MAC CE from Rel-16, as it may not be convincing that a CSI reporting MAC CE is more important than a safety-critical message. It is also acknowledged that if the RRC parameters are kept and used in UE’s sensing and resource (re-)selection procedure, the priority value determination procedure of these Rel-17 MAC CEs is different from the CSI reporting. However, it seems the related spec changes are limited, and especially no change to RAN1 (as the priority value of a TB is provided by MAC).

Considering that either approach is workable, approach-1 is more acceptable and less objected by the companies, while approach-2 has more RAN2 specification works than approach-1, Moderator suggests the group to take approach-1. Companies are invited to provide your view on this proposal.

***Moderator Proposal 2a: The* *RRC parameters* (***priorityScheme1CoordInfoExplicit, priorityScheme1Request, priorityScheme1CoordInfoCondition****) are removed, and the priority values for the IUE MAC CE and IUC request MAC CE are fixed to ‘1’ according to RAN2’s agreements.***

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| **Company** | **Acceptable or not** | **Comment** |
| **MediaTek** | **Acceptable/preferred** |  |
| **OPPO** | **acceptable** |  |
| **Qualcomm** | Not acceptable | The priority that MAC uses for LCP and multiplexing can be different from what PHY uses for resource selection. There is no requirement to tie the two together.RAN1 agreed to introduce (pre-)configurable values for the priorities used to select resources for IUC and associated requests to protect system performance we do not see any reason not to honor those agreements and we do not agree to revert them. |
| **Futurewei** | Acceptable |  |
| **Samsung** | Acceptable | If the priority of IUC request/message is fixed to “1”, there is no use for these parameters and hence should be removed. |
| **CATT, GOHIGH** | Acceptable |  |
| **Spreadtrum** | Acceptable |  |
| **Apple** | No | We should avoid reverting RAN1 agreements in the maintenance phase unless it is not working. Right now, we still have a way of not reverting RAN1 agreements, i.e., these RRC parameters are only used for the resource selection for transmitting the TB carrying the IUC MAC CE or IUC request MAC CE (in case consensus is achieved on Q6).  |
| **Sharp** | Acceptable |  |
| **Intel** | Comment | We agree with Qualcomm and Apple that as there is a workaround that does keep the past RAN1 agreements we should use it and not instead revert RAN1 agreements at this stage.Besides the procedural considerations there is also a system performance impact that would need to be studied if these agreements are reverted.  |
| **xiaomi** | comment | We share similar view with Qualcomm, Apple and Intel, the fixed priority to ‘1’ will impact the reliability. |
| ZTE,Sanechips | Preferred |  |

Considering that the specification changes are mostly in RAN2, an alternative is that, RAN1 only clarifies the intention of the RRC parameters, but leaves the decision to RAN2. Companies are invited to provide your view on this proposal.

***Moderator Proposal 2b: RAN1 clarifies the intention of the RRC parameters* (***priorityScheme1CoordInfoExplicit, priorityScheme1Request, priorityScheme1CoordInfoCondition****) to RAN2. It is up to RAN2 to decide whether to remove these parameters.***

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| **Company** | **Acceptable or not** | **Comment** |
| **MediaTek** | **Acceptable** | We may refer to RAN2 LS to clarify the definition of the parameters, i.e., *The priority value indicated by higher layer parameters priorityScheme1CoordInfoExplicit, priorityScheme1Request, and priorityScheme1CoordInfoCondition refers to the priority value of the MAC CE itself which affects its priority order used for LCP and multiplexing.* Even though they may be further used to derive the priority for sensing and resource (re-)selection, they are not the necessarily same as the ones used for sensing and resource (re-)selection. |
| **OPPO** | **Acceptable** |  |
| **Qualcomm** | Not acceptable | As mentioned in our reply to 2a, RAN1 introduced those parameters to ensure system performance and we do not think they should be removed, even by RAN2.Based on the question from RAN2, RAN1 should propose updated descriptions for the parameters, similar to the text Ericsson proposed in Q5. |
| **Futurewei** | Acceptable | We are ok to leave it to RAN2 to decide whether to remove the parameters. |
| **Samsung** | No | If the priority is fixed to “1” by RAN2, these parameters should be removed. Leaving them creates confusion on how to use them. |
| **CATT, GOHIGH** | Acceptable |  |
| **Spreadtrum** | Acceptable |  |
| **Apple** |  | From the RAN2 LS, we think they are asking RAN1 to either remover these RRC parameters or modify the descriptions of these RRC parameters if needed. A simple way is to modify the RRC parameters description and leave the remaining work to RAN2 (in case consensus is achieved in Q6).  |
| **Sharp** | Acceptable |  |
| **Intel** | Comment | We prefer to only update description and not leave keeping these parameters to RAN2.  |
| **xiaomi** | comment | We support RAN1 clarifies the intention of the RRC parameters, but we don’t support “It is up to RAN2 to decide whether to remove these parameters”, RRC parameters shall be kept, otherwise, the priority of request and IUC can’t be indicated. |
| ZTE,Sanechips | Acceptable |  |

Summary

TBD

Reference

1. R1-2203042, “LS to RAN1 on the inter-UE coordination mechanism”, RAN2, vivo
2. R1-2203356, “About LS on Inter-UE coordination from RAN2”, ZTE, Sanechips
3. R1-2203414, “Draft reply LS on the inter-UE coordination mechanism”, CATT, GOHIGH
4. R1-2203493, “Draft reply LS on the inter-UE coordination mechanism”, vivo
5. R1-2203709, “Discussion on LS to RAN1 on the inter-UE coordination mechanism”, LG Electronics
6. R1-2203768, “[Draft] Reply LS on the inter-UE coordination mechanism”, xiaomi
7. R1-2203848, “Draft Reply LS to RAN1 on the inter-UE coordination mechanism”, Samsung
8. R1-2203969, “Discussion on the LS from RAN2 on the inter-UE coordination mechanism”, OPPO
9. R1-2203970, “Draft reply on LS from RAN2 on the inter-UE coordination mechanism”, OPPO
10. R1-2204195, “Draft reply LS on inter-UE coordination mechanism”, Apple
11. R1-2204734, “[Draft] Reply LS to the RAN2 LS on the inter-UE coordination mechanism”, Ericsson
12. R1-2204735, “Discussion on the LS from RAN2 on the inter-UE coordination mechanism”, Ericsson
13. R1-2204899, “Discussion on LS from RAN2 on the inter-UE coordination mechanism”, Huawei, HiSilicon
14. R1-2204968, “Draft Reply LS to RAN2 on the inter-UE coordination mechanism”, Qualcomm Incorporated
15. R1-2203361, “Maintenance on inter-UE coordination”, ZTE, Sanechips
16. R1-2204353, “Maintenance of sidelink resource allocation for reliability and latency”, NTT DOCOMO, INC.