## 1 Issue 1: Proposal 13 in R2-2309639

**P13: For co-channel co-existence issue at 30kHz SCS, the procedure for selecting resource in the first slot overlapping with an LTE SL subframe is captured in normative text, as following TP.**

Co-ex-related RAN1 agreements are a mix of UE implementation and non-UE implementation, and in the latter case, capturing it as normative text seems complicated from the MAC reporter's perspective, so basically, I prefer to specify co-ex related agreements in NOTE.

Option 1: NOTE based approach

Option 2: Normative text based approach

Option 3: Normative texts for specified behaviour, plus NOTE for UE implementation based behaviour.

**Q1: Which of the two options does your company prefer to capture RAN1 agreements of co-existence issue to MAC specification?**

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| --- | --- | --- |
| Company | NOTE based approach/Normative text based approach | Further comments |
| LG | NOTE based approach | Co-ex-related RAN1 agreements are a mix of UE implementation and non-UE implementation, and in the latter case, capturing it as normative text seems complicated from the MAC reporter's perspective, so basically, I prefer to specify co-ex related agreements in NOTE. |
| Apple | Option 1 | Option 2 may be hard to converge on normative text wording at this stage. |
| Huawei, HiSilicon | Option 3 | We understand choosing Option 1 is mainly from spec implementation concern, and we will provide TP (which is straightforward based on RAN1 agreement) and hopefully eliminate such concern.  At least for the non-UE implementation based parts of RAN1 agreement (marked in cyan), it has to be specified with normative texts according to specification convention.   |  | | --- | | o For NR PSCCH/PSSCH transmissions in 30kHz SCS, NR SL UE selects in MAC layer at least the first of NR SL slots overlapping with an LTE SL subframe, and can select the subsequent overlapping NR SL slot in MAC layer |   In details, the procedure for selecting resource in the first slot overlapping with an LTE SL subframe is interaction-based "normative" behaviour and it is agreed in RAN1 that UE shall select resource from the candidate resource set reported by PHY. Thus, this selecting action should be specified in the procedure of creating select SL grant and there is no space for UE implementation based behaviour. Then in the second slot overlapping with an LTE SL subframe, it is up to UE implementation on how to avoid selecting resource only in the second slot overlapping with an LTE SL subframe, which can be described with Notes after the above mentioned normative text.  We suggest the following TP for multiple MAC PDUs (marked in green, at similar level for R17 IUC). For the case of single MAC PDU, the same TP can be copied.  ---------------------------- Start of Text Proposal for TS 38.321 -------  5.22.1.1 SL Grant reception and SCI transmission  < Unchanged parts are omitted >  1> if the MAC entity has selected to create a selected sidelink grant corresponding to transmissions of multiple MAC PDUs, and SL data is available in a logical channel:  2> if the TX resource (re-)selection is triggered as the result of the TX resource (re-)selection check:  < Unchanged parts are omitted >  3> In case of dynamic co-channel coexistence of LTE sidelink and NR sidelink as specified in TS 38.214 [7],  4> randomly select the time and frequency resources for one transmission opportunity from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7], according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier.  4> when SCS of NR SL is (pre-)configured as , select the time and frequency resources at least in the first of NR SL slots overlapping with an LTE SL subframe.  NOTE 1x: it is up to UE implementation to select the time and frequency resources in the subsequent overlapping NR SL slot, i.e. avoid select the time and frequency resource only in the subsequent NR SL slot overlapping with an LTE SL subframe.  NOTE 1y: when the same TB or different TBs are transmitted on the NR SL slots overlapping with the LTE SL subframe, it is up to UE implementation how to avoid transmitting NR PSCCH/PSSCH only in the subsequent NR SL slot overlapping with an LTE SL subframe for NR PSCCH/PSSCH transmissions of 30kHz SCS.  3> use the randomly selected resource to select a set of periodic resources spaced by the resource reservation interval for transmissions of PSCCH and PSSCH corresponding to the number of transmission opportunities of MAC PDUs determined in TS 38.214 [7].  3> if one or more HARQ retransmissions are selected:  4> In case of dynamic co-channel coexistence of LTE sidelink and NR sidelink as specified in TS 38.214 [7],  5> randomly select the time and frequency resources for one transmission opportunity from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7], according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier.  5> when SCS of NR SL is (pre-)configured as , select the time and frequency resources at least in the first of NR SL slots overlapping with an LTE SL subframe.  NOTE 2x: it is up to UE implementation to select the time and frequency resources in the subsequent overlapping NR SL slot, i.e. avoid select the time and frequency resource only in the subsequent NR SL slot overlapping with an LTE SL subframe.  NOTE 2y: when the same TB or different TBs are transmitted on the NR SL slots overlapping with the LTE SL subframe, it is up to UE implementation how to avoid transmitting NR PSCCH/PSSCH only in the subsequent NR SL slot overlapping with an LTE SL subframe for NR PSCCH/PSSCH transmissions of 30kHz SCS.  ------------------------------ End of Text Proposal ----------------------- |
| Toyota | Option 2 | Agreements need to be captured on a technical and correctness basis, rather than apparent easiness.  1- Adding as an informative note the text on the procedure for selecting resource in the **first** slot overlapping with an LTE SL subframe, would go against the earlier RAN1 assumption. This is part of the co-channel co-existence agreed solution in RAN and RAN1 that the UE behaviour is mandatory in the case of dynamic co-channel coexistence here:  RAN#99 agreement:   |  | | --- | | o For NR PSCCH/PSSCH transmissions in 30kHz SCS, NR SL UE selects in MAC layer at least the first of NR SL slots overlapping with an LTE SL subframe, and can select the subsequent overlapping NR SL slot in MAC layer |   Putting it as up to UE implementation would mean that the UE behaviour is unpredictable and the solution does not work.  Note: The UE capability for dynamic co-channel coexistence is a separate discussion, which was also discussed by RAN1. However, if the feature is supported, UE requirements should be complete.  2- For the selection of the **subsequent** overlapping NR SL slot in MAC layer, the proper solution is to use “The UE may”, in a normal sentence (not a Note). Notes are here to explain the “why” in Specifications, not the “how”. Notes should not be used to describe UE requirements (may they be optional). |
| Xiaomi | Option 1 | As long as the note is clear enough to reflect the agreement. |
| Toyota | | Option 2 | We will not elaborate again how it is impossible that an informative Note reflects the above agreement.  Trying to help the Editor, one potential issue may be that the corresponding paragraph in TS 38.321 subclause 5.22.1.1 starts with a “shall”. While the text related with the first overlapping slot would then correctly inherit from this “shall”, the text related with the subsequent slot overlapping needs to use a “may” instead.  There are precedents in the RRC specifications where a mix of may/shall are used in a clear way. They way how it is done is that some additional text refers to a “may”, inside a general “shall”. The optionality is included inside a mandatory requirement and takes precedence. Especially, dual connectivity procedures make use of this provision very often. For example, 5.3.5.5.9 SCell Addition/Modification starts with:  *The UE shall:*  But in the end of the procedure it reads:  *2> if the SCellConfig contains the goodServingCellEvaluationBFD:*  *3> the UE may perform the evaluation of the good serving cell quality criterion for this serving cell as specified in 5.7.13.2.*  Even MAC does similar, this time with shall/should in 5.4.3.1:  -    The UE shall also follow the rules below during the scheduling procedures above:  -    the UE should not segment an RLC SDU (or partially transmitted SDU or retransmitted RLC PDU) if the whole SDU (or partially transmitted SDU or retransmitted RLC PDU) fits into the remaining resources of the associated MAC entity;  -    if the UE segments an RLC SDU from the logical channel, it shall maximize the size of the segment to fill the grant of the associated MAC entity as much as possible;  -    the UE should maximise the transmission of data.  Therefore, if we re-use the earlier suggestion from Huawei, this could be achieved with the following:  ---------------------------- Start of Text Proposal for TS 38.321 -------  5.22.1.1 SL Grant reception and SCI transmission  < Unchanged parts are omitted >  1> if the MAC entity has selected to create a selected sidelink grant corresponding to transmissions of multiple MAC PDUs, and SL data is available in a logical channel:  2> if the TX resource (re-)selection is triggered as the result of the TX resource (re-)selection check:  < Unchanged parts are omitted >  3> In case of dynamic co-channel coexistence of LTE sidelink and NR sidelink as specified in TS 38.214 [7],  4> randomly select the time and frequency resources for one transmission opportunity from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7], according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier.  4> when SCS of NR SL is (pre-)configured as , select the time and frequency resources ~~at least~~ in the first of NR SL slots overlapping with an LTE SL subframe.  5> may additionally select the time and frequency resources in the subsequent NR SL slot overlapping with the LTE SL subframe.  NOTE 1y: when the same TB or different TBs are transmitted on the NR SL slots overlapping with the LTE SL subframe, it is up to UE implementation how to avoid transmitting NR PSCCH/PSSCH only in the subsequent NR SL slot overlapping with an LTE SL subframe for NR PSCCH/PSSCH transmissions of 30kHz SCS.  3> use the randomly selected resource to select a set of periodic resources spaced by the resource reservation interval for transmissions of PSCCH and PSSCH corresponding to the number of transmission opportunities of MAC PDUs determined in TS 38.214 [7].  3> if one or more HARQ retransmissions are selected:  4> In case of dynamic co-channel coexistence of LTE sidelink and NR sidelink as specified in TS 38.214 [7],  5> randomly select the time and frequency resources for one transmission opportunity from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7], according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier.  5> when SCS of NR SL is (pre-)configured as , select the time and frequency resources ~~at least~~ in the first of NR SL slots overlapping with an LTE SL subframe.  6> may additionally select the time and frequency resources in the subsequent NR SL slot overlapping with the LTE SL subframe.  NOTE 2y: when the same TB or different TBs are transmitted on the NR SL slots overlapping with the LTE SL subframe, it is up to UE implementation how to avoid transmitting NR PSCCH/PSSCH only in the subsequent NR SL slot overlapping with an LTE SL subframe for NR PSCCH/PSSCH transmissions of 30kHz SCS.  ------------------------------ End of Text Proposal -----------------------  With this, we are ok to keep the two other Notes 1y and 2y, as they comply with the purpose of a Note to provide further explanations. |
| Fraunhofer | | Option 2 | We agree with Toyota that the RAN#99 agreement needs to be captured. We support Option 2 and are supportive of Toyota’s proposal based on the TP provided by Huawei. |
| Qualcomm | | Option 2 w. comment | Understand Option 2 may cause more spec work, but leaning to Option 2. |
| ZTE | | Option1 | A note is enough to capture the agreement. |
| Continental Automotive Technologies GmbH | | Option 2 | RAN#99 agreement must be clearly reflected. Also supports Toyota’s proposal. |
| Nokia | | Option 3 | We agree with Huawei, but it seems counter intuitive that we first select the time and frequency resource and then select the time and frequency resoruce?  Maybe instead in a single section;  4> In case of dynamic co-channel coexistence of LTE sidelink and NR sidelink as specified in TS 38.214 [7], and if SCS of NR SL is (pre-)configured as Image  5> randomly select the time and frequency resources for one transmission opportunity being either a first of NR SL slots overlapping with an LTE SL subframe or a subsequent resource to an already selected resource in the first of NR SL slots overlapping with an LTE SL subframe from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7], according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier.  Also, maybe we should just check the field *absenceOfAnyOtherTechnology*? |
| vivo | | Option 3 | Option 3 is the most reasonable one to us. We should try best to avoid specifying the UE “may” behavior in procedural text even though there is some exceptional case in the current spec. |
| Lenovo | | Option 3 | No strong view but seems non-implementation UE behavior is better to be specified in normative text. Can follow majority |

**[Summary]**

**NOTE2B of 5.22.1.1 will be modified as normative text in the next Rapp\_version.**

## 2 Issue 2: whether NR CA should also inherit the LTE CA behavior in which only one resource pool is selected on each SL carrier frequency.

In LTE CA, the RRC will indicate the selected pool on each SL carrier configured to the MAC, so that from MAC perspective, there is only one selected pool on each SL carrier frequency.

- If the zone based pool selection is configured, the UE will select a pool on each SL carrier frequency configured based on the zone based operation;

- If the zone based pool selection is not configured, the UE will select a pool on each SL carrier frequency configured based on UE implementation.

According to Rapporteur's understanding of NR sidelink operation, zone based pool selection is not supported in NR SL. Additionally, the MAC entity performs a pool selection procedure based on HARQ attribute while considering multiple resource pools configured in RRC. In other words, in NR CA, the UE procedure of performing carrier selection by considering the CBR of all resource pools included in the carrier as the carrier CBR is considered a more reasonable UE procedure. Rapporteur think that excluding resource pools other than the selected resource pool in the carrier (re-)selection procedure is not a correct UE procedure in terms of performance. From that perspective, Rapporteur think a carrier CBR based carrier selection procedure that including [at least] in current running CR is correct UE behaviour.

Current running CR text:

6> the carrier includes [at least] one pool of resources configured with PSFCH resources among the pools of resources except the pool(s) in *sl-BWP-DiscPoolConfig* or *sl-BWP-DiscPoolConfigCommon*, if configured.

**Q2: Which of the two options does your company prefer to capture carrier CBR-based carrier (re-)selection procedure in MAC specification?**

**Option 1: delete the [at least]**

**Option 2: keep the [at least]**

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| --- | --- | --- |
| Company | Option 1/Option 2 | Further comments |
| LG | Option 2 |  |
| OPPO | 1 | Zoning is still supported by SL (clause 5.8.11 in TS 38.331), while zoning may not be the key point / issue here.  The problem due to “[at least]” is that if we select more than 1 pool on one carrier, it would be problematic w.r.t how to decide on the per-carrier CBR from the more-than-1 pools.  Given 123 agreement as follows:  *Agreements on per-carrier CBR*  *1: Confirms the working assumption “Same principle as LTE V2X CA is applied to determine per-carrier CBR” as an agreement.*  For which our understanding is that the key point to inherit from LTE is that a single pool is selected for one carrier, before decision of carrier-selection, so that no need to worry about the determination of per-carrier CBR. |
| Nec | OPTION 2 with comment | Firstly we are quite confused on rapporteur’s rationale to associate “carrier CBR based…” with whether to have “at least”, since if the HARQ feedback attribute is set as disabled, the the UE still can select resource pools among any configured resource pool of the specific carrier, so the issue on how to determine the CBR of the carrier is still existing.  Secondly, instead of referring to LTE based solution, we think it is more proper to refer to Rel-16/17 NR solution. In details, multiple resource pools should be allowed on single carrier.  Thirdly, regarding on how to determine the carrier CBR, follow LTE solution, UE should firstly determine which pool can be used on the carrier, so the CBR of the pool can be regard on the CBR of the carrier. Similar procedure can be adopted while how to select the pool is a separate issue. |
| Apple | Option 2 | At least two RPs should be allowed, e.g. one RP is with HARQ enable and the other RP is with HARQ disable. On OPPO's question on further RP selection behavior, we think it can be left to UE implementation (e.g. captured as a NOTE). This way should have smallest spec impact. |
| Xiaomi | Option 2 | This bullet is related to the condition to consider a carrier as a candicate carrier, so we think at least should be kept, when there is HARQ enabled LCH, the candidate should include at least one RP configured with PSFCH.  Even at least is kept, UE can still select only one RP as in legacy based on CBR, there is no impact on RP selection, but is a condition to consider the carrier as a candidate carrier. |
| Huawei, HiSilicon | Option 2 with comments | Regarding OPPO’s comments, zone in NR SL is used for range determination for groupcast, while zone-based resource pool selection is not supported in NR SL.  We think, as in current spec, the per carrier-CBR is up to UE implementation, i.e. which RP’s CBR(s) are used to determine the carrier-CBR is up to UE implementation. It does not mean that the RP(s) used to determine carrier-CBR will be selected in RP selection procedure finally. The carrier (re)selection procedure and the RP (re)selection procedure can be de-coupled, which means the "eventual" RP (re)selection procedure will be performed after carrier (re)selection procedure. |
| Fraunhofer | Option 2 |  |
| Qualcomm | Option 1 | Zone is used only for NACK only HARQ feedback. Zone based resource pool selection is not supported. So, one pool is less confusing - at least for now since we haven’t discussed how the per-carrier measurements are conducted. |
| ZTE | Option1 | Same view with OPPO.  To determine per carrier CBR, we have agreed that single resource pool is selected for each carrier. |
| Nokia | Option 2 | The intention of having ‘at least’ is to select a carrier for which PSFCH resource pool is there if HARQ feedback is enabled. We are not sure why this is releated to per-carrier CBR determination. |
| vivo | Option 2 | Share the same view as Xiaomi and Huawei. |
| Lenovo | Option 2 | Share the view from Apple, Xiaomi and Huawei |

**[Summary]**

**Option 1: 3**

**Option 2: 9**

**Square bracket (i.e., [at least]) will be removed in the next rapp\_version.**

## 3 Issue 3: TX resource pool selection behaviors are specified before TX carrier selection. P4a/4b in R2-2310969 are related to this issue.

In LTE CA, carrier CBR is assumed to be the CBR of the selected resource pool, so pool selection occurs before carrier selection. It is necessary to consider whether NR CA will stick to this principle. As mentioned in Issue 2, rapporteur believes that the UE behavior of considering the CBR of all resource pools included in the carrier as carrier CBR is a more reasonable procedure from the perspective of flexibility in carrier selection.

**Q3: Which of the two options below for resource pool selection does your company prefer?**

**Option 1: TX resource pool selection behaviors are performed before TX carrier selection**

**Option 2: In the carrier selection procedure, selecting one resource pool for CBR measurement among multiple resource pools on each carrier frequency is up to UE implementation.**

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| --- | --- | --- |
| Company | Option 1/Option 2 | Further comments |
| LG | Option 2 |  |
| OPPO | 1 with comment | Not sure what the consequence is for option-1/2, seems literally both would ensure a pool is selected no later than carrier-selection decision? (or is the main diff is that option-2 tends to leave this to UE implementation?)  **Option 1: TX resource pool selection behaviors are performed before TX carrier selection**  **Option 2: In the carrier selection procedure, selecting one resource pool for CBR measurement among multiple resource pools on each carrier frequency is up to UE implementation.**  Anyway, our preference would be as described by Rapp, i.e., to follow “In LTE CA, carrier CBR is assumed to be the CBR of the selected resource pool, so pool selection occurs before carrier selection.”, in order to align with agreement from 123  *Agreements on per-carrier CBR*  *1: Confirms the working assumption “Same principle as LTE V2X CA is applied to determine per-carrier CBR” as an agreement.*  [Rapp] Your observation in option 2 is correct.  The reason for suggesting option 2 is that changing the format of the existing CR requires a lot of modification. Therefore, as an option I thought about, I wanted to add Option 2 NOTE to specify that pool selection can be performed before carrier selection.  If option 2 includes that implication, would you also accept the option of adding to NOTE a UE behaviour where pool selection is performed before carrier selection? |
| NEC | 2 | Option 1 is not practical, since UE should perform pool selection only upon it has buffered data, e.g. to check the HARQ attribute, while UE can perform carrier selection upon multiple time beings, e.g. due to RLF on specific carrier which is agreed in this meeting. |
| Apple | Option 1 / Option 2 | Since we confirm the WA in RAN2#123 that same principle as LTE V2X CA, it is Option 1.  On Option 2, our understanding is that Rapporteur may intend to say UE implementation for RP selection for multiple RPs, as we commented in Question 2. We support to keep "at least" and leave to UE implementation on which RP to selection in transmission. |
| Xiaomi | Option 2 | In our understanding, when resource selection is triggered, carrier (re)selection is triggered. In this case, during the carrier (re)selection, UE needs to check if the carrier is a candidate carrier based on CBR while the CBR is associated with a RP and the RP is randomly selected by UE within the carrier. From this point of view, we think option 2 is more accurate and when the carrier is finally selected, the RP randomly selected on the carrier for CBR measurement is considered as the selected RP. |
| Huawei, HiSilicon | Option 2 | Similar to our comments for Q2:  The per carrier-CBR determination is up to UE implementation, i.e. which RP’s CBR(s) are used to determine the carrier-CBR is up to UE implementation. It does not mean that the RP(s) used to determine carrier-CBR will be selected in RP selection procedure finally. The carrier (re)selection procedure and the RP (re)selection procedure can be de-coupled, which means the RP (re)selection procedure will be performed after carrier (re)selection procedure. |
| Qualcomm | Option ~~1~~ 2 w. comment | Resource pools are configured in each SL BWP (e.g., each carrier). Therefore carrier selection should be conducted first.  Regarding per-carrier CBR measurement, which of the follows wil be supported (may need some discussion on the stage 3 design)?   1. At least one pool across all sub-channels within the SL BWP of the selected/concerned carrier 2. A pool configured for per-carrier CBR measurement only |
| ZTE | Option1 | I am quite confused on this issue. We have agreed that “*Same principle as LTE V2X CA is applied to determine per-carrier CBR” as an agreement*”, so option1 is correct understanding of LTE spec and current agreement. |
| Nokia | Option 2 | Share the view from Xiaomi. |
| vivo | Option 2 | If Option 2 is agreed, we suggest to further clarify that per-carrier CBR measurement e.g., it’s up to UE implementation to decide one resource pool within the carrier for checking whether the measured CBR meets the carrier (re)selection criterion. |
| Lenovo | Option 2 | Selection RP pool for CBR measurement can based on UE implementation in carrier selection procedure |

**[Summary]**

**Option 1: 3**

**Option 2: 9**

**A NOTE (“In the TX carrier (re-)selection procedure, selecting one resource pool for CBR measurement among multiple resource pools on each carrier frequency is up to UE implementation.”) will be added to section 5.22.1.11 in the next rapp\_version.**

## Conclusion