**3GPP TSG-RAN WG4 Meeting # 101-e-Bis R4-2202326**

**Electronic Meeting, January 17-25, 2022**

**Agenda item:** 6.15.4

**Source:** Moderator (Huawei, HiSilicon)

**Title:** Email discussion summary for [101-bis-e][126] NRSL\_enh\_Part\_3

**Document for:** Information

# Introduction

This email thread discuss Rel-17 PC2 HPUE for NR sidelink enhancements. The contributions are in agenda 6.15.4, which includes:

* Topic #1: Pcmax definition on inter-band V2X UE
* Topic #2: Co-existence study

# Topic #1: Pcmax definition for inter-band V2X UE

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2201501 | Xiaomi | **Observation 1: PC2 has been agreed to be supported for band n47 and n79 and corresponding capability signalling has been agreed.**  **Observation 2: Current V2X band combinations need to be clarified whether PC2 or PC3 is supported.**  **Proposal: The proposed updated configured power is as following:** |
| R4-2201498 | Xiaomi | **draft CR for TS 38.101-3 on Pcmax definition on inter-band V2X UE**  **It is the draft CR based on R4-2201501.** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Issue 1-1: Pcmax definition for inter-band V2X UE

***Whether need to update the Pcmax definition for inter-band V2X UE***

* ***Option 1:***

**To update the configured power is as following:**



* ***Option 2: No change***

***Moderator’s recommendation:***

* Recommended WF
  + TBA based on 1st round discussion

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Issues** | **Company Comments** |
| Issue 1-1 | ***Whether need to update the Pcmax definition for inter-band V2X UE***  LGE: we are fine to update the proposed equation since RAN4 agreed to define the capability signaling for PC2/PC3 single carrier V2X UE and PC2/PC3 intra/inter-band con-current V2X UE from Rel-16. It will be check the RAN2 specification for the capability signaling.  Huawei, HiSilicon: We disagree to have this kind of change for inter-band con-current operation. The issue has been discussed twice before, as it was also an agreement from LTE-V that there is no power class limit for inter-band case. We don’t think the group still need to have further discussion for it.  CATT: As mentioned by Huawei, RAN4 discussed this issue before and made an agreement of no power class limit for inter-band case. For the existing inter-band band combinations, there is no PC2 support. So we prefer to not reopen the same discussion for upper power bound.  We also realize the MOP requirements for band combinations are not in use for configured transmitted power. To avoid confusion, we bring the draft CR to apply MOP requirements per RAT (being discussed in thread 124). Seems Xiaomi has the similar intention to avoid ambiguity in specs.  QCOM: We don’t agree with this change. It should be possible to use Ppowerclass for the V2x concurrent case.  Vivo: There are two draft CRs in [124] about removing the upper bound power for inter-band con-current operation. Since RAN4 already agreed that no upper power bound, we think this change is not needed.  Xiaomi: As mentioned in the discussion, we might need proponent of band combinations to clarify whether PC2 is supported in current V2X band combination WID.  Furthermore, as captured in the WF last meeting as:    As PC2 is introduced in Rel-17 and that is the reason to further discuss the Pcmax in Rel-17 to consider PC2. Although Huawei and CATT has pointed out that for LTE-V it has been agreed that no power limit is set for inter-band concurrent operation then we can agree to not update the configured power equation. However, since currently the high power limit for inter-band CA is also under discussion, we see some relationship between both topics while we can come back when there is combination with licensed band + licensed band inter-band concurrent operation. |
|  |  |
|  |  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| Topic #1 | **Issue 1-1: Whether need to update the Pcmax definition for inter-band V2X UE**  *Candidate options:*  *Option 1: yes, update the configured power (2 companies)*  *Option 2: no change (4 companies)*  *Recommendations for 2nd round:*  *The majority view is no change. Further check in 2nd round whether Option 2 is agreeable.* |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

## Discussion on 2nd round (if applicable)

|  |  |
| --- | --- |
| **Issues** | **Company Comments** |
| Moderator | Comments can be found in the WF R4-2202363 |
|  |  |

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
|  |  |

# Topic #2: Co-existence study

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2201499 | Xiaomi | **Observation 1: the licensed band and frequency can be used for NR-V out-of-coverage scenario.**  **Observation 2: Adjacent channel co-existence of NR Uu BS and NR V2X UE is guaranteed by power control.**  **Observation 3: The partial coverage scenario will cause two interference scenario, as victim of SL service or victim of NR service.**  **Proposal: Not to use RAN4 requirement to guarantee the above co-channel co-existence.** |
| R4-2201708 | Ericsson | **Observation-1: co-channel interference may occur from PC2 NR V2X UE operating PC5 at OOC to the PC3 NR Uu UE in the same frequency.**  **Observation-2: Same/co-channel coexisting is within the RAN4 scope according to WID[3].**  **Observation-3: The highest supported power class for V2X may be different with highest supported power class for Uu.**  **Observation#4: PC2 V2X UE could generate the co-channel interference before detecting in-coverage of network using current in-coverage detection criteria.**  **Proposal-1: Discuss the above compensation for NR SL UE in-coverage area.**  **Proposal-2: LS could be sent to RAN2 on the co-channel interference issue once the solution would be agreed.** |
| R4-2201951 | Huawei, HiSilicon | ***Observation 1: According to existing specification, it’s not likely the SL UE could use the same carrier as Uu when it is in out-of-coverage.***  ***Proposal 1: The co-channel co-existence issue can be closed in RAN4 and it will have no impact to the completion of the SL WI.*** |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Issue 2-1: Co-existence scenario

***Whether the licensed band and frequency can be used for NR-V out-of-coverage scenario?***

* ***Option 1****: yes*
* ***Option 2****: no*
* ***Option 3****: TBD*

***Moderator’s recommendation:***

* Recommended WF
  + TBA based on 1st round discussion

### Issue 2-2: *WF discussion*

***If this is an issue, should the co-channel co-existence in this case need to be guaranteed by RAN4 requirements?***

* ***Option 1****: No, not to use RAN4 requirement to guarantee the co-channel co-existence and the issue can be closed in RAN4.*
* ***Option 2****: Discuss the solution in* R4-220*1708 and an LS could be sent to RAN2 on the co-channel interference issue once the solution would be agreed.*

***Moderator’s recommendation:***

* Recommended WF
  + TBA based on 1st round discussion

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Issues** | **Company Comments** |
| Issue 2-1: | LGE: Yes, the deployment scenarios will support both in-coverage and out-of coverage in n14.  Huawei, HiSilicon: n14 is a special case, the preconfigured frequency is also belong to a specific operator. Generally speaking, can a V2X UE pre-configure a frequency which may be used by Uu? We think that for a licensed band, the preconfigured frequency should be planed carefully, which should not have impact to the normal Uu communication.  In addition, besides pre-configuration, SL UE may still able to receive SIB12, but the cell does not comply with S-criteria for out-of-coverage. In such case, the RAN2 spec described that SL UE can perform NR sidelink communication on the frequency which provides inter-carrier NR sidelink configuration by SIB12. In our understanding, that is not the same frequency as Uu.  Ericsson: Agree with LG, for n14, the same frequency could be used for NR V2X in both in-coverage and out-of-coverage.  QCOM: Yes, n14 as pointed out by LGE and Ericsson  Vivo: Option 1:Yes.  Xiaomi: Agree with option 1.  AT&T: Option 1 for defined deployment scenarios for NR band n14. Although out-of-coverage also applies to the case where the macro-network is not available due to service interruption also. |
| Issue 2-2: | LGE: Option 1  Huawei, HiSilicon: Option 1.  Ericsson: The potential solution discussed in paper (1708) is not setting/impacting any RAN4 RF requirement, but potential impact is RAN2 specification. The co-channel issue is listed as one objective in WI and should be treated in RAN4, if RAN4 cannot agree on the solution, suggesting a LS to RAN2/RAN1 with question asking to evaluate the co-channel interference scenario proposed in (1708&1499). With that said, we propose option 3 below:  Option 3: LS to RAN2/RAN1 to evaluate the potential co-channel interference issue in (1708 and 1499)  Vivo: Option 1.  Xiaomi: Option 1.  AT&T: Option 1. |
| Others |  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| Issue 2-1: Co-existence scenario | *Candidate options:*  ***Whether the licensed band and frequency can be used for NR-V out-of-coverage scenario?***   * ***Option 1****: yes (5 companies)* * ***Option 2****: no (1 company)* * ***Option 3****: TBD*   *Recommendations for 2nd round:*  The majority view is option 1, i.e. the deployment scenarios for n14 support both in-coverage and out-of-coverage. Moderator suggests to agree on Option 1 and no further discussion for 2nd round. |
| Issue 2-2: | *Candidate options:*  ***If this is an issue, should the co-channel co-existence in this case need to be guaranteed by RAN4 requirements?***   * ***Option 1****: No, not to use RAN4 requirement to guarantee the co-channel co-existence and the issue can be closed in RAN4. (5 companies)* * ***Option 2****: Discuss the solution in* R4-220*1708 and an LS could be sent to RAN2 on the co-channel interference issue once the solution would be agreed. (1 company)* * ***Option 3:*** *LS to RAN2/RAN1 to evaluate the potential co-channel interference issue in (1708 and 1499) (1 company)*   *Recommendations for 2nd round:*  The majority view is option 1. Moderator suggests to further check whether option 1 is agreeable for 2nd round. |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

## Discussion on 2nd round (if applicable)

|  |  |
| --- | --- |
| **Issues** | **Company Comments** |
| Moderator | Comments can be found in the WF R4-2202363 |
|  |  |

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
|  |  |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on PC2 HPUE for NR sidelink enhancements | Huawei |  |
|  |  |  |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2201498 | draft CR for TS 38.101-3 on Pcmax definition on inter-band V2X UE | Xiaomi | Noted |  |
| R4-2201499 | further discussion on co-existence issue for HPUE | Xiaomi | Noted |  |
| R4-2201501 | further discussion on Pcmax definition on inter-band V2X UE | Xiaomi | Noted |  |
| R4-2201708 | Co-channel existing | Ericsson | Noted |  |
| R4-2201951 | On co-channel existence issue in RAN4 | Huawei, HiSilicon | Noted |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2202363 | *WF on PC2 HPUE for NR sidelink enhancements* | *Huawei* | Agreeable |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents