**3GPP TSG-RAN WG4 Meeting # 95-e R4-200XXXX**

**Electronic Meeting, 25 May – 5 June, 2020**

**Agenda item:** 6.4.2

**Source:** Moderator (vivo)

**Title:** Email discussion summary for [95e][113] 5G\_V2X\_NRSL\_SysParameters

**Document for:** Information

# Introduction

*In the last RAN4 meeting, the following WFs were approved in the section for NR V2X system parameters:*

|  |  |  |
| --- | --- | --- |
| *R4-2005637* | *WF on remaining issues for NR V2X system parameters* | *vivo* |
| *R4-2005638* | *WF on BS impact on NR V2X* | *CATT* |

*The main issues left in the last meeting are the technical issues for allowing licensed bands partially used for SL transmission and the BS impact of NR V2X.*

*In this meeting, the open issues listed below will be discussed:*

1. *The principles of introducing NR V2X licensed bands for SL transmission.*

* *Band proposals from operators*
* *Channel bandwidths for NR V2X licensed bands*
* *UE operations for NR licensed bands partially used for SL transmission*
* *RF architectures for NR V2X UE*
* *Impacts on the core requirements for NR V2X*
* *The synchronization mechanism of Uu and SL in the TDD licensed bands*

1. *BS impact of NR V2X*

* *Introduce NR V2X bands and system parameters in TS 38.104*
* *Introduce BS co-existence spurious emission requirement to protect V2X UE RX in band n47 in TS 38.104.*

1. *TPs and CRs*

* *8200, TP on Switching Period for Indevice Coexistence*
* *7091, Revisions on the CR on NR V2X UE RF requirements for single carrier in TS38.101-1*

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: Collect companies’ views on the open issues. A WF may be needed for the second round on these topics. New Toc numbers may be needed according to the email discussion in this meeting.
* 2nd round: Final decisions and revisions should be reached for these issues. All the progress and agreements will be captured in the assigned WF on this topic. TP/CR in this topic should be revised according to the reasonable suggestions in this meeting.

# Topic #1: System parameters

## Companies’ contributions summary

**NR V2X licensed bands for SL transmission**

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2006762 | CMCC | Title: Discussion the remaining issues for n79 NR-V2X  Proposal 1: introduce the entire n79 licensed band for NR-V2X SL operation.  Observation 1: n79 FDM UL and SL operation could reuse the same RF structure and related RF component capability of the n79 2UL intra-band CA.  Proposal 2: RF requirements of the n79 2UL intra-band CA could apply to the synchronized UL and SL FDM operation in licensed band n79.  Proposal 3: to avoid the possible interference from SL to BS UL receiver, SL timing should be aligned with the UL timing not the DL timing. |
| R4-2007092 | vivo | Title: Further discussion on the synchronization mechanism between SL and Uu in the same TDD licensed band  Proposal 1: In Rel-16, introduce licensed bands partially used for SL on the condition that NR V2X UE can only support PC5 interface accessing the licensed bands partially used for SL transmission.  Observation 1: For NR V2X communication, the maximum channel bandwidth for a single SL carrier is 40MHz; for NR V2X con-current operation, the maximum channel bandwidth is 60MHz (40MHz for SL carrier and 20MHz for Uu carrier).  Proposal 2: For NR V2X UE, if only SL transmission is allowed for the licensed bands partially used for SL, the RF architecture would be similar to the scenario where licensed bands wholly used for SL transmission.  Proposal 3: RF requirements for single carrier operation for NR V2X apply for the NR V2X UE in the scenario where licensed bands partially used for SL transmission under the condition that intra-band con-current operation is excluded in Rel-16.  Proposal 4: For the synchronous operation between Uu and SL in the same licensed TDD bands, NR SL should use network as the synchronization reference source. |
| R4-2006757 | LGE | Title: Discussion on SL-Uu simultaneous transmission in a UE in licensed band in rel-16  Observation 1: For both candidate NR V2X RF architecture, the NR uplink transmission or SL transmission will interfere to the SL received signal or NR received signal in a UE due to the different transmission timing between NR uplink and NR SL transmission.  Proposal 1: RAN4 allow single transmission between V2X SL operation and Uu uplink transmission in intra-band con-current V2X operation.  Proposal 2: Firstly, RAN4 carefully check the frequency separation between V2X SL operation and Uu uplink transmission in n79 for con-current V2X operation. Then, the V2X\_n79-n79 can support in Rel-17. |
| R4-2008220 | Huawei, HiSilicon | Title: On synchronization scenario for NR V2X in licensed band  Observation 1: For the synchronization scenario, due the different power control schemes for SL and UL, the performance of SL reception may suffer a lot.  Observation 2: For both shared carrier and different carrier cases under sync scenarios, it would be difficult to finish the requirements in time.  Proposal: Deprioritize the synchronization scenario for licensed bands in Rel-16. |

**BS impact of NR V2X**

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2006260 | CATT | Title: Discussion on BS impact of NR V2X  Proposal 1: To introduce the frequency bands for NR V2X in TS 38.104.  Proposal 2: To specify co-existence spurious emission requirement in TS 38.104 for the protection of UE Rx in band n47. |
| R4-2006264 | CATT, vivo | Title: CR for TS38.104, Introduce BS impact of NR V2X  Introduce band n38 and n47 for NR V2X to section 5.2.  Introduce channel bandwidth for NR V2X to section 5.3.5  Introduce BS co-existence spurious emission requirement to protect V2X UE RX in band n47 to section 6.6.5.2.3. |

**TPs and CRs**

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2008200 | Futurewei | Title: TP on Switching Period for Indevice Coexistence  This contribution provides text proposal for the section 6 Evaluation of Indevice Coexistence in the TR 38.886 [1]. |
| R4-2007091 | vivo | Title: Revisions on the CR on NR V2X UE RF requirements for single carrier in TS38.101-1  Change the applicability of frequency shift requirements as ‘For NR V2X’ instead of ‘For NR V2X UE at n47’. |

## Open issues summary

### Sub-topic 1-1 Band and channel bandwidths for NR V2X

*Sub-topic description: We will discuss the band proposal from the operator in this part.*

*Open issues and candidate options before e-meeting:*

**Issue 1-1-1: Band proposal from the operator**

* Proposals
  + Option 1: Introduce the entire n79 licensed band for NR-V2X SL operation.
  + Option 2: Do not introduce the entire n79 licensed band for NR-V2X SL operation.
* Recommended WF
  + Option 1.

**Issue 1-1-2: Channel bandwidths for NR V2X licensed bands**

* Proposals

Restriction for introducing the channel bandwidths for NR licensed bands

For NR V2X communication, the maximum channel bandwidth for a single SL carrier is 40MHz; for NR V2X con-current operation, the maximum channel bandwidth is 60MHz (40MHz for SL carrier and 20MHz for Uu carrier).

* + Option 1: Follow the above restriction in Rel-16.
  + Option 2: Do not follow the above restriction in Rel-16.
* Recommended WF
  + Option 1.

### Sub-topic 1-2 licensed bands partially used for SL transmission

*Sub-topic description: For the scenario licensed bands partially used for SL transmission, UE operations, RF architecture, the impact on the core requirements, and the synchronization issues will be discussed in this part.*

*Open issues and candidate options before e-meeting:*

**Issue 1-2-1: UE operations for licensed bands partially used for SL transmission**

* Proposals
  + Option 1: In Rel-16, introduce licensed bands partially used for SL on the condition that NR V2X UE can only support PC5 interface accessing the licensed bands partially used for SL transmission.
  + Option 2: Deprioritize the synchronization scenario for licensed bands in Rel-16.
  + Option 3: RAN4 allow single transmission between V2X SL operation and Uu uplink transmission in intra-band con-current V2X operation.
* Recommended WF
  + TBA

**Issue 1-2-2: RF architecture for V-UE operating in licensed bands partially used for SL**

* Proposals
  + Option 1: n79 FDM UL and SL operation could reuse the same RF structure and related RF component capability of the n79 2UL intra-band CA.
  + Option 2: For NR V2X UE, if only SL transmission is allowed for the licensed bands partially used for SL, the RF architecture would be similar to the scenario where licensed bands wholly used for SL transmission.
* Recommended WF
  + TBA

**Issue 1-2-3: The core RF requirements**

* Proposals
  + Option 1: RF requirements of the n79 2UL intra-band CA could apply to the synchronized UL and SL FDM operation in licensed band n79.
  + Option 2: RF requirements for single carrier operation for NR V2X apply for the NR V2X UE in the scenario where licensed bands partially used for SL transmission under the condition that intra-band con-current operation is excluded in Rel-16.
* Recommended WF
  + TBA

**Issue 1-2-4: The synchronization issues**

* Proposals
  + Option 1: RAN4 carefully check the frequency separation between V2X SL operation and Uu uplink transmission in n79 for con-current V2X operation. Then, the V2X\_n79-n79 can support in Rel-17.
  + Option 2: To avoid the possible interference from SL to BS UL receiver, SL timing should be aligned with the UL timing not the DL timing.
  + Option 3: For the synchronous operation between Uu and SL in the same licensed TDD bands, NR SL should use network as the synchronization reference source.
* Recommended WF
  + TBA

### Sub-topic 1-3 BS impact of NR V2X

*Sub-topic description: This sub-topic has been discussed in the past two meetings and no consensus was reached. In this meeting, final decisions will be made and companies are encouraged to provide technical arguments on this sub-topic.*

*Open issues and candidate options before e-meeting:*

**Issue 1-3-1: Introduce NR V2X frequency band in 38.104**

* Proposals
  + Option 1: To introduce the frequency band and channel arrangement for NR V2X in TS 38.104.
  + Option 2: No need to introduce the frequency band and channel arrangement for NR V2X in TS 38.104.
* Recommended WF
  + TBA

**Issue 1-3-2: Introduce co-existence spurious emission for ITS band n47**

* Proposals
  + Option 1: To specify co-existence spurious emission requirement to protect V2X UE Rx in band 47.
  + Option 2: No need to specify co-existence spurious emission requirement to protect V2X UE Rx in band 47.
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2008200  TP on Switching Period for Indevice Coexistence | Company A |
| Company B |
|  |
| R4-2007091  Revisions on the CR on NR V2X UE RF requirements for single carrier in TS38.101-1 | Company A |
| Company B |
|  |

## 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** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## 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** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: Title

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |

## Open issues summary

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

### Sub-topic 2-1

*Sub-topic description:*

*Open issues and candidate options before e-meeting:*

**Issue 2-1: TBA**

* Proposals
  + Option 1: TBA
  + Option 2: TBA
* Recommended WF
  + TBA

### Sub-topic 2-2

*Sub-topic description*

*Open issues and candidate options before e-meeting:*

**Issue 2-2: TBA**

* Proposals
  + Option 1: TBA
  + Option 2: TBA
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  ….  Others: |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

## 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** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Suggestion on WF/LS assignment*

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

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## 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** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |