**3GPP TSG-RAN WG4 Meeting #109 R4-2318150**

Chicago, US, November 13 – 17, 2023

**Agenda item: 8.30.6**

**Source:** Moderator (LG Electronics)

**Title:** Topic summary for [109][144] NR\_SL\_enh2\_UERF\_part2

**Document for:** Information

# Introduction

*This topic summary is for Rel-18 NR Sidelink Evolution in Agenda 8.30.2.2, and 8.30.2.4 as follows.*

* *Topic#1: Con-current operation on Uu and sidelink*
* *Topic#2: Co-channel coexistence for LTE sidelink and NR sidelink*

# Topic #1: Con-current operation on Uu and SL-U

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2318807 | LG Electronics | **Draft CR**  Based on the endorsed draft big CR (R4-2317793) and the agreed TP (R4-2315963), the missing UE RF requirements for SL-U con-current operation are added.   * 5.2E.2F Operating bands for SL-U con-current operation * 5.3E.2F Channel bandwidth for SL-U con-current operation * 6.2E.2F.x MPR for SL-U con-current operation * 6.2E.3F.x A-MPR for SL-U con-current operation * 6.3E.1F.1 Minimum outpur power for SL-U con-current operation * 6.3E.2F.1 Transmit OFF power for SL-U con-current operation * 6.3E.3F.4 Transmit ON/OFF time mask for SL-U con-current operation * 6.3E.4F.3 Power control for SL-U con-current operation * 6.4E.1F.1 Frequency error for SL-U con-current operation * 6.4E.2F.5 Transmit modulation quality for SL-U con-current operation * 6.5E.1F.1 Occupied bandwidth for SL-U con-current operation * 6.5E.2F.2.1 Spectrum emission mask for SL-U con-current operation * 6.5E.2F.4.1 Adjacent channel leakage ratio for SL-U con-current operation * 6.5E.3F.2.1 Spurious emissions for SL-U con-current operation * 6.5E.4F.1 Transmit intermodulation for SL-U con-current operation |
| R4-2319000 | vivo | **Draft CR**   * 5.2E.2F Operating bands for SL-U con-current operation * 7.3E, 7.4E, 7.5E, 7.6E, 7.7E, 7.8E |
| R4-2319930 | OPPO | **Draft CR**   * 5.2E.2F Operating bands for SL-U con-current operation * 5.3E.2F Channel bandwidth for SL-U con-current operation * 6.2E.1F.1 General * 6.2E.1F.2 UE Maximum output power for inter-band con-current operation * 6.2E.3F.7 A-MPR for V2X con-current operation * 6.2E.4F.1 General * 7.3E.3F.1 General * 7.3E.3F.2 Reference sensitivity power level for SL-U con-current operation |
|  |  |  |

## Open issues summary

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

### Sub-topic 1-1 : draft CR for TS 38.101-1

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 1-1: draft CR on con-current operation on Uu and sidelink**

* Draft CR
  + R4-2318807 (LG Electronics)
  + R4-2319000 (vivo)
  + R4-2319930 (Oppo)
* Recommended WF
  + R4-2318807 is revised for Operating bands and Tx part
  + R4-2319000 is revised for Rx part
  + R4-2319930 is merged to the revisions of R4-2318807 and R4-2319000

# Topic #2: Co-channel coexistence for LTE SL & NR SL

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2319927 | Oppo | **Observation 1: RAN1 specification has already define the requirement to limit the power of 2nd NR slot.**  **Proposal 1: No need to define RAN4 RF requirement for NR LTE SL co-existence.**  **Proposal 2: To add note for PUMAX,f,c to clarify the output power apply for 1st slot of NR when there is NR LTE SL co-channel co-existence.** |
| R4-2319928 | Oppo | **TP**  8.2. Relative slot power tolerance for V2X UE supporting co-channel coexistence with LTE SL  …  Currently in RAN WG1 specification TS 38.213, it has been clearly stated that “For sidelink co-channel coexistence between E-UTRA and NR, and for NR PSCCH/PSSCH transmissions with SCS configuration in slots that overlap with an E-UTRA subframe on the sidelink, the UE transmits NR PSCCH/PSSCH in the earlier overlapping slot with a power that is larger than or equal to the power in the later overlapping slot.” In such case, there is no need to define additional RAN4 UE RF requirement for this. |
| R4-2319929 | Oppo | **Draft CR**  6.2E.4 Configured transmitted power for V2X  6.2E.4.1 General  …  When NR V2X UE is configured to co-channel coexistence operation with LTE V2X and NR SCS is configured to 30kHz, the evaluation period for PUMAX,c for NR V2X sidelink is the first slot of NR SL slots overlapping with an LTE SL subframe. |
| R4-2318806 | Qualcomm Technologies Int | **Proposal 1: Capture RF requirements for NR SL 2nd slot power limitation agreement from RAN1 for NR operation at 30 KHz SCS in the 3GPP RAN4 standard.**  **Proposal 2: PUMAX,f,c should be based on Tx power measurement in the first slot only.** |
| R4-2319258 | LG Electronics Finland | **Proposal 1:** Clarify the sub-clause 6.2E.4.1 General and reference to clause 6.2.4 as proposed below:  **Text proposal into TR38.786:**  ----- START of TEXT PROPOSAL for TR38.786 -----  8.1. Configured transmitted power for V2X UE supporting co-channel coexistence with LTE SL  For the measured configured maximum output power PUMAX,*c* for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions, the same requirement as in clause 6.2.4 shall be applied. When NR V2X UE is configured to co-channel coexistence operation with LTE V2X and NR SCS is configured to 30kHz, the evaluation period for PUMAX,c for NR V2X sidelink is the first slot of NR SL slots overlapping with an LTE SL subframe.  When NR V2X UE is configured to co-channel coexistence operation with LTE V2X and NR SCS is configured to 30kHz, the PCMAX,f,c tolerances in Table 6.2.4-1 are relaxed by 1dB i.e. T(PCMAX,f,c) = T(PCMAX,f,c) +1 (dB).  ----- END of TEXT PROPOSAL for TR38.786 -----  **Draft CR into TS38.101:**  ----- START of CHANGES in TS38.101-1 -----  6.2E.4 Configured transmitted power for V2X  6.2E.4.1 General  …  For the measured configured maximum output power PUMAX,*c* for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions, the same requirement as in clause 6.2.4 shall be applied.  When NR V2X UE is configured to co-channel coexistence operation with LTE V2X and NR SCS is configured to 30kHz, the PCMAX,f,c tolerances in Table 6.2.4-1 are relaxed by 1dB i.e. T(PCMAX,f,c) = T(PCMAX,f,c) +1 (dB).  For NR V2X UE supporting SL MIMO or Tx Diversity, the transmitted power is configured per each UE.  …  ----- END of CHANGES in TS38.101-1 -----  **Proposal 2:** Define Relative Power Tolerance requirement for NR V2X UE supporting co-channel coexistence with LTE V2X into 38.101-1 as follows:  **Text proposal into TR38.786:**  ----- START of TEXT PROPOSAL for TR38.786 -----  8.2. Relative slot power tolerance for V2X UE supporting co-channel coexistence with LTE SL  Relative slot power tolerance is defined for NR V2X supporting co-channel coexistence to ensure the RX performance of the LTE V2X UE operating within the same channel. This requirement applies only to transmissions with 30kHz SCS.  The relative slot power tolerance for V2X UE supporting co-channel coexistence with LTE SL is the ability of the NR V2X UE operating with 30kHz SCS to control the output power of transmitted slots during PSCCH/PSSCH transmission consisting of two slots overlapping with an LTE SL subframe (500us). The reference slot is the 1st slot overlapping with LTE SL subframe and target slot is the subsequent NR SL slot overlapping with the LTE SL subframe. The measurement period is one NR SL slot with guard symbol omitted.  The power of the target slot must not exceed the power of the reference slot by more than relative slot power tolerance of +1 dB.  ----- END of TEXT PROPOSAL for TR38.786 -----  **Draft CR into TS38.101:**  ----- START of CHANGES in TS38.101-1 -----  6.3E.4.4 Relative slot power tolerance for V2X UE supporting co-channel coexistence with LTE SL  Relative slot power tolerance is defined for NR V2X supporting co-channel coexistence to ensure the RX performance of the LTE V2X UE operating within the same channel. This requirement applies only to transmissions with 30kHz SCS.  The relative slot power tolerance for V2X UE supporting co-channel coexistence with LTE SL is the ability of the NR V2X UE operating with 30kHz SCS to control the output power of transmitted slots during PSCCH/PSSCH transmission consisting of two slots overlapping with an LTE SL subframe (500us). The reference slot is the 1st slot overlapping with LTE SL subframe and target slot is the subsequent NR SL slot overlapping with the LTE SL subframe. The measurement period is one NR SL slot with guard symbol omitted.  The power of the target slot must not exceed the power of the reference slot by more than relative slot power tolerance of +1 dB.  ----- END of CHANGES in TS38.101-1 ----- |
| R4-2319263 | LG Electronics Finland | **TP** based on Proposal 1 & Proposal 2 nR4-2319258 |
| R4-2319265 | LG Electronics Finland | **Draft CR** based on Proposal 1 & Proposal 2 nR4-2319258 |

## Open issues summary

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

### Sub-topic 2-1 : LTE SL and NR SL co-channel coexistence scenarios

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 2-1-1: 6.2E.4.1 General RF requirement impact due to NR 2nd slot power limitation of RAN1 agreement for LTE SL and NR SL co-channel coexistence scenario)**

* Proposals
  + Option 1: Clarify the sub-clause 6.2E.4.1 (LGE)
    - When NR V2X UE is configured to co-channel coexistence operation with LTE V2X and NR SCS is configured to 30kHz, the PCMAX,f,c tolerances in Table 6.2.4-1 are relaxed by 1dB i.e. T(P,f,c) = T(P,f,c) +1 (dB).
  + Option 2: Add note for PUMAX,f,c to clarify the output power apply for 1st slot of NR when there is NR LTE SL co-channel co-existence (Oppo, QC)
    - When NR V2X UE is configured to co-channel coexistence operation with LTE V2X and NR SCS is configured to 30kHz, the evaluation period for PUMAX,c for NR V2X sidelink is the first slot of NR SL slots overlapping with an LTE SL subframe.
  + Option 3: Capture RF requirements for NR SL 2nd slot power limitation agreement from RAN1 for NR operation at 30 KHz SCS in the 3GPP RAN4 standard (QC)
* Recommended WF
  + Option 2 was already captured in the agreed TR v1.1.0.
  + For efficient discussion, let’s focus on option 1 and option 3.
  + If there is no strong technical problem on option 1, consider Option 1 as well.

Agreement:

* Agree on Option 1.

**Issue 2-1-2: Relative slot power tolerance due to NR 2nd slot power limitation of RAN1 agreement for LTE SL and NR SL co-channel coexistence scenario)**

* Proposals
  + Option 1: Define relative slot power tolerance (LGE)
    - The power of the target slot must not exceed the power of the reference slot by more than relative slot power tolerance of +1 dB
  + Option 2: No need to define RAN4 RF requirement for NR LTE SL co-existence (Oppo)
* Recommended WF
  + Need further discussion. If there is no strong technical problem on option 1, consider Option 1.

LGE: we received feedback on draft CR. We will upload the revised version.

Agreement:

* Agree on Option 1.

### Sub-topic 2-2 : TP for TR 38.786

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 2-2-1: TP for TR 38.786 co-channel coexistence**

* TPs on co-channel coexistence
  + R4-2319263 (LGE)
  + R4-2319928 (Oppo)
* Recommended WF
  + Discuss it after making agreement on Sub-topic 2-1.

### Sub-topic 2-3 : draft CR

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 2-3-1: draft CR for co-channel coexistence**

* Draft CR on co-channel coexistence
  + R4-2319265 (LGE)
  + R4-2319929 (Oppo)
* Recommended WF
  + Discuss it after making agreement on Sub-topic 2-1.