**3GPP TSG-RAN WG4 Meeting # 98-e R4-210xxxx**

**Electronic Meeting, 25th Jan. – 05th Feb., 2021**

**Agenda item:** 11.10.1, 11.10.2, 11.10.3, 11.10.6

**Source:** Moderator (LG Electronics)

**Title:** Email discussion summary for [98e][142] NRSL\_enh\_part1

**Document for:** Information

# Introduction

In this paper, RAN4 treat the SL enhancement in Rel-17 for UE transmitter/Receiver requirements for SL enhancement including 5G V2X enhancement and Public safety using PC5 operation.

The provided technical docs list of email discussion are shown in Reference in the end of the paper.

Candidate target of email discussion for 1st round are listed as following

* 1st round: RAN4 discuss Public safety operating scenarios and operating bands such as n14 and studied the related system parameters and SL UE Tx/Rx requirements for SL enhancement. Also RAN4 discuss whether or not study the coexistence evaluations for SL enhancement.
  + Topic #1-1: System parameters & RF requirements for SL enh. UE
  + Sub-Topic #1-1-1: System parameters
  + Sub-Topic #1-1-2: UE Tx/Rx requirements for SL enhancement.
  + Topic #1-2: Public safety using SL operation in n14
  + Sub-Topic #1-2-1: Operating scenarios
  + Sub-Topic #1-2-2: CBW for SL operation
  + Topic #1-3: Coexistence evaluation for public safety
  + Sub-Topic #1-3-1: FDD band coexistence evaluation for public safety
  + Sub-Topic #1-3-2: Whether study for coexistence evaluation in n14 or not
  + Topic #1-4: Draft TR38.xxx
  + Sub-Topic #1-4-1: TR skeleton
* 2nd round: FFS

# Topic #1: UE RF requirements for SL enh.

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

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2100282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100282.zip) | LG Electronics France | TR38.xxx v0.0.1 TR Skeleton for SL enhancement in Rel-17  - LGE provide TR 38.xxx skeleton to capture the new system/RF requirements for SL enh. Also RAN4 capture the additional RF requirements for leftover issues from rel-16 such as partial used V2X operation and PC2 V2X UE. |
| [R4-2100417](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100417.zip) | CATT | System parameters for newly introduced SL bands   * **Channel bandwidth**   **Observation 1: The principle of introducing channel bandwidths for NR V2X licensed bands is that channel bandwidths defined for NR V2X licensed band should be a subset of UE channel bandwidths for the same licensed band in NR.**  **Proposal 1: It is proposed to specify 10MHz CBW for 15kHz/30kHz SCS for band n14. If operators have the potential demand on smaller channel bandwidth for band n14, 5MHz CBW for 15kHz SCS should be considered as second priority.**   * **Channel raster**   **Observation 2: Only shift set 2 (7.5 kHz) for channel raster is applied to band n14 since band n14 is LTE refarming band of band 14. The N value should be 0 signalled by the network or configured by pre-configuration parameters when band n14 is operated for NR V2X.** |
| [R4-2100418](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100418.zip) | CATT | UE Tx RF requirement for NR SL enhancement  **Proposal 1: RAN4 to take Table 1 into consideration to specify V2X UE Tx requirements for band n14.** |
| [R4-2100419](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100419.zip) | CATT | UE Rx RF requirement for NR SL enhancement  **Proposal 1: The reference sensitivity for band n14 should be specified based on above equation per CBW/SCS, wherein the noise figure of band n14 is 9dB.**  **Proposal 2: RAN4 to take Table 1 into consideration to specify V2X UE Rx requirements for band n14.** |
| [R4-2101857](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101857.zip) | AT&T | Additional Information for SL Operation in NR Band n14  - AT&T provide more information for n14 SL operating scenarios.  1) PC1 or PC3 for SL operation or both PC1 & PC3 in n14?  🡪 It is expected that only PC3 will be considered for SL operation in NR Band n14.  2) Is there any legacy Uu operation in n14 or B14?  🡪 Yes, there is legacy Uu operation in NR Band n14 and LTE Band 14. However, the use case for sidelink operation in NR Band n14 is for emergency situations where the UE is out of network coverage for NR and LTE and Uu operation is not possible.  **Proposal: RAN4 is requested to take the additional information provided above into account when developing the performance requirements for NR Band n14 as an NR sidelink operating band.** |
| R4-2101938 | Huawei | Discussion on the adjacent channel coexistence simulation between SL and Uu in license band  **Observation 1: In Rel-16, RAN4 only discussed the simulation assumptions and provided the results in the ITS spectrum and FR1 TDD licensed spectrum for PC3. For FR1 FDD licensed spectrum** **(case 7 and case 8), there is no further discussion in Rel-16.**  **Observation 2: In Rel-17, if there are some legacy Uu operation in band n14, such as LTE and NR Uu, RAN4 should further evaluate the adjacent coexistence simulation between SL and Uu in FR1 FDD licensed spectrum (case 7 and case 8) including PC3 or both PC3 and PC1.**  **Observation 3:** **It’s deserved to further check whether there is coexistence scenario between sidelink and Uu interface in the same channel in band n14.**  **Observation 4: It’s necessary to consider more companies’ input about coexistence simulation results in licensed band and align with each other, so that we can further check the observations for coexistence evaluations in licensed spectrum.**  **Proposal 1: It’s proposed to perform the adjacent channel coexistence simulations between SL and Uu in FR1 FDD licensed band in Rel-17.**  **Proposal 2: The coexistence simulation parameters in clause 5.2.2 from TR 38.886 can be a baseline. It’s noted that the following aspects can further discussed:** |
| R4-2102342 | Ericsson | Bandwidth for SL operating in n14  **Observation#1: The bandwidth needed for the PPDR service is 2 x 10MHz for 400MHz and 700MHz spectrum.**  **Proposal#1: Minimum bandwidth for the NR SL based public safety operating in n14 shall be 10 MHz.** |
| [R4-2102344](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102344.zip) | Ericsson | Coexisting simulation assumption for public safety UC  **Observation#1: LTE ProSe has coexisting deployment scenario specifically for public safety.**  **Proposal: Discuss the public safety coexisting simulation scenario and related parameter and adopt it for NR SL coexisting simulation.** |

## 1.2 Open issues summary

*Based on provided contributions, RAN4 mainly treat the following UE general parameters and RF requirements for SL enhancement WI to support public safety and other SL operation. Also RAN4 discuss the operating scenarios for Public safety usage in n41 SL operation such as required the max. output power and supported CBW. Finally RAN4 need to decide whether study for the coexistence evaluation in public safety usage in n14 or not.*

* + Topic #1-1: System parameters & RF requirements for SL enh. UE
  + Sub-Topic #1-1-1: System parameters on CBW
  + Sub-Topic #1-1-2: System parameters on Channel raster
  + Sub-Topic #1-1-3: UE Tx requirements for SL enhancement
  + Sub-Topic #1-1-4: UE Rx requirements for SL enhancement
  + Topic #1-2: Public safety using SL operation in n14
  + Sub-Topic #1-2-1: Operating scenarios and max. output power
  + Sub-Topic #1-2-2: CBW for SL operation in n14.
  + Topic #1-3: Coexistence evaluation for public safety
  + Sub-Topic #1-3-1: FDD band coexistence evaluation for public safety
  + Sub-Topic #1-3-2: Whether study for coexistence evaluation in n14 or not
  + Topic #1-4: Draft TR38.xxx
  + Sub-Topic #1-4-1: TR skeleton

### 1.2.1 Sub-topic #1-1

*Sub-topic description:* **System parameters and RF requirements for SL enh. UE**

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

**Issue 1-1-1: *System parameters on CBW***

* Proposals
  + Option 1:Follow same principle to decide the supported CBW in public safety and other SL operation
  + Option 2: Other proposal are not precluded
* Recommended WF
  + RAN4 can agree with option 1 to the supported CBW for public safety usage in 1st round.

**Issue 1-1-2: *System parameters on Channel raster***

* Proposals
  + Option 1: Only shift set 2 (7.5 kHz) for channel raster is applied to n14
  + Option 2: Other proposal are not precluded.
* Recommended WF
  + RAN4 will decide the channel raster for public safety usage in 1st round.

**Issue 1-1-3: *UE Tx requirements for SL enhancement***

* Proposals
  + Option 1: only PC3 SL UE is allowed in n14 based on AT&T contribution (R4-2101857) and other Tx requirement can be reused the Tx requirements for NR V2X UE in Rel-16.
* Recommended WF
  + RAN4 allow only PC3 UE in n14 for public safety usage and other Tx requirement will be further discussed based on the contributions from interested companies.

**Issue 1-1-4: *UE Rx requirements for SL enhancement***

* Proposals
  + Option 1: To derive REFSENS and other Rx requirements in n14, RAN4 can follow same principle in TR38.886.
* Recommended WF
  + RAN4 can agree to follow same principle to derive each Rx requirements in n14.

### 1.2.2 Sub-topic #1-2

*Sub-topic description:* **Public safety using SL operation in n14**

**Issue 1-2-1: *Operating scenarios***

* Proposals
  + Option 1: For public safety service in n14, there was no legacy Uu operation to protect the victim system or UE in n14 since the PS UE only allowed in emergency situations where the UE is out of network coverage for NR and LTE
  + Option 2: Other proposal are not precluded.
* Recommended WF
  + RAN4 can consider the operating scenarios as option 1.

**Issue 1-2-2: *CBW for SL operation***

* Proposals
  + Option 1: Only allow 10MHz CBW in n14
  + Option 2: Other proposal are not precluded.
* Recommended WF
  + RAN4 will decide the supported CBW in n14 in 1st round.

### 1.2.3 Sub-topic #1-3

*Sub-topic description:* **Coexistence evaluation for public safety**

**Issue 1-3-1: *FDD band coexistence evaluation for public safety***

* Proposals
  + Option 1: RAN4 need coexistence evaluation in FDD band regardless of operator proposal in FDD band for SL operation
  + Option 2: RAN4 can consider the coexistence evaluation in FDD band based on operator proposal in FDD band for SL operation
* Recommended WF
  + RAN4 will further discuss based on 1st round feedback

**Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***

* Proposals
  + Option 1: RAN4 need coexistence evaluation in n14 based on Ericsson contribution (R4-2102344)
  + Option 2: No, RAN4 already verified the coexistence evaluation in Band 14 in D2D proximity service
* Recommended WF
  + RAN4 will further discuss based on 1st round feedback

### 1.2.4 Sub-topic #1-4

*Sub-topic description:* **Draft TR38.xxx**

**Issue 1-4-1: *TR skeleton for SL enh. in Rel-17***

* Proposals
  + Option 1: TR skeleton can be agreeable.
  + Option 2: Need further updating
* Recommended WF
  + RAN4 will further discuss based on 1st round feedback

## 1.3 Companies views’ collection for 1st round

### 1.3.1 Open issues

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| --- | --- |
| **Company** | **Comments** |
| xxx | Sub topic 1-1: System parameters and RF requirements for SL enh. UE  **Issue 1-1-1: *System parameters on CBW***  **Issue 1-1-2: *System parameters on Channel raster***  **Issue 1-1-3: *UE Tx requirements for SL enhancement***  **Issue 1-1-4: *UE Rx requirements for SL enhancement***  Sub topic 1-2: Public safety using SL operation in n14  **Issue 1-2-1: *Operating scenarios***  **Issue 1-2-2: *CBW for SL operation***  Sub topic 1-3: Coexistence evaluation for public safety  **Issue 1-3-1: *FDD band coexistence evaluation for public safety***  **Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***  Sub topic 1-4: Draft TR 38.xxx  **Issue 1-4-1: *TR skeleton for SL enh. in Rel-17*** |
| yyy |  |
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### 1.3.2 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** |
| **R4-2100282** | **XXX** |
| **YYY** |
| **ZZZ** |
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## 1.4 Summary for 1st round

### 1.4.1 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.*

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| --- | --- |
|  | **Status summary** |
| **Sub-Topic#1-1**  **System parameters and RF requirements for SL enh. UE** | **Issue 1-1-1: *System parameters on CBW*** |
| **Issue 1-1-1: *System parameters on Channel raster*** |
| **Issue 1-1-3: *UE Tx requirements for SL enhancement*** |
| **Issue 1-1-4: *UE Rx requirements for SL enhancement*** |
| **Sub-Topic#1-2**  **Public safety using SL operation in n14** | **Issue 1-2-1: *Operating scenarios*** |
| **Issue 1-2-2: *CBW for SL operation*** |
| **Sub-Topic#1-3**  **Coexistence evaluation for public safety** | **Issue 1-3-1: *FDD band coexistence evaluation for public safety*** |
| **Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not*** |
| **Sub-Topic#1-4**  **Draft TR38.xxx** | **Issue 1-4-1: *TR skeleton or SL enh. in Rel-17*** |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
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### 1.4.2 CRs/TPs

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
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## 1.5 Discussion on 2nd round (if applicable)

RAN4 will further discuss based on the WF and revised TPs/CRs in 2nd round.

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| **T-doc number** | **Company** | **Comments** |
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## 1.6 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*

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| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
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# Reference Tdoc lists

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Type** |
| [**R4-2100282**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100282.zip) | TR38.xxx v0.0.1 TR Skeleton for SL enhancement in Rel-17 | LG Electronics France | other |
| [**R4-2100417**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100417.zip) | Discussion on system parameters for newly introduced SL bands | CATT | discussion |
| [**R4-2100418**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100418.zip) | Discussion on UE Tx RF requirement for NR SL enhancement | CATT | discussion |
| [**R4-2100419**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100419.zip) | Discussion on UE Rx RF requirement for NR SL enhancement | CATT | discussion |
| [**R4-2101857**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101857.zip) | Additional Information for SL Operation in NR Band n14 | AT&T | discussion |
| [**R4-2101937**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101937.zip) | Discussion on n47 PC2 MPR simulation of Rel-17 SL enhancement | Huawei, HiSilicon | Other 🡪 It will treate by Leo |
| [**R4-2101938**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101938.zip) | Discussion on the adjacent channel coexistence simulation between SL and Uu in license band | Huawei, HiSilicon | other |
| [**R4-2102342**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102342.zip) | Bandwidth for SL operating in n14 | Ericsson | other |
| [**R4-2102344**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102344.zip) | coexisting simulation assumption for public safety UC | Ericsson | other |
| [**R4-2102346**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102346.zip) | SL UE Timing mask for Partially used SL operation with NR Uu operating bands | Ericsson | Other 🡪 it will treat by Yuan |