**3GPP TSG-RAN WG4 Meeting # 98-e R4-2103329**

**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: RAN4 discuss the 2 WFs to determine necessity of coexistence evaluations for NR SL enhancement in Rel-17. Also try to make consensus on the detail system parameters and operating CBW in n14.

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| **R4-2103241** | Way forward on coexistence evaluation for NR SL enhancement in Rel-17 | LG Electronics France | WF |
| **R4-2103242** | Way forward on system parameters and operating CBW in n14 for NR SL enhancement | CATT, AT&T | WF |
| **R4-2103243** | TR38.xxx v0.0.1 TR Skeleton for SL enhancement in Rel-17  | LG Electronics France | other |

# 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) 🡪revised R4-2103005 | 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 both PC1 and 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** |
| vivo | Sub topic 1-1: System parameters and RF requirements for SL enh. UE**Issue 1-1-1: *System parameters on CBW***If the same principle means ‘channel bandwidths defined for NR V2X licensed band should be a subset of UE channel bandwidths for the same licensed band in NR.’, then we are ok with option 1.**Issue 1-1-2: *System parameters on Channel raster***These options are about the frequency shift for n14 for SL services. However, we should firstly agree on the specific channel raster, then discuss the frequency shift based on the agreed channel raster.**Issue 1-1-3: *UE Tx requirements for SL enhancement***Only PC3 for n14 is based on operator’s request. We are OK with Option 1.**Issue 1-1-4: *UE Rx requirements for SL enhancement***What is the same principle implying for deriving Rx requirements for n14? We need clarification of that. From our understanding, N14 is an FDD band partially used for PS services through SL, and this case is new in R17. We are not sure whether the same principle still applies.Sub topic 1-2: Public safety using SL operation in n14**Issue 1-2-1: *Operating scenarios***We are OK with Option 1. Does Option 1 imply that there is no need to consider the co-existence between Uu and SL in n14?**Issue 1-2-2: *CBW for SL operation***From the contributions in this meeting, only 10M is proposed for PS services through SL. Option 1 is OK for us.Sub topic 1-3: Coexistence evaluation for public safety**Issue 1-3-1: *FDD band coexistence evaluation for public safety***We can figure out the FDD scenarios first then decide this issue.**Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***For n14, SL services only are supported when UE is out of the coverage of the network， which means SL does not co-exists with LTE/NR Uu in (n)14. Then no co-existence evaluation is needed.Sub topic 1-4: Draft TR 38.xxx**Issue 1-4-1: *TR skeleton for SL enh. in Rel-17***For the TR skeleton, we think section 5 can be integrated in other parts. It is overlapping with other sections. For 5.1, Power class 2 sidelink UE can be incorporated in 8.1 SL enhancement UE Tx requirements. For 5.2, Partial used SL operation in a licensed band can be incorporated in Secition 7 operating bands.To vivo, LGE: chapter 5 is for left over issues. So it is not incorporated in chapter 7 or 8 for new SL enh. general part or RF requirementsWe think this skeleton can be further improving. |
| AT&T | Issue 1-1-3: AT&T has provided a draft revision to R4-2101857 in the topic directory modifying the additional information to consider both PC1 and PC3 for SL operation in NR Band n14 as was the case in LTE for Band 14 as shown below. FirstNet was added as a co-source. We ask the moderator to revise the proposal and way forward for Issue 1-1-3.1) PC1 or PC3 for SL operation or both PC1 & PC3 in n14?It is expected that both PC1 and PC3 will be considered for SL operation in NR Band n14 as was the case in LTE for Band 14. |
| Xiaomi | Sub topic 1-1: System parameters and RF requirements for SL enh. UE**Issue 1-1-1: *System parameters on CBW***Not sure about the “same principle” means. But the subset as mentioned in CATT contribution is agreeable.**Issue 1-1-3: *UE Tx requirements for SL enhancement***It seems operator has changed their request to both PC3 and PC1 for band n14. We are ok with that.**Issue 1-1-4: *UE Rx requirements for SL enhancement***The principle is agreeable, however, the requirements need to be considered one by one.Sub topic 1-2: Public safety using SL operation in n14**Issue 1-2-1: *Operating scenarios***Based on operator input, we are ok with option 1.**Issue 1-2-2: *CBW for SL operation***Agree with option 1.Sub topic 1-3: Coexistence evaluation for public safety**Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***Considering the issue 1-2-1 as operating scenarios, it seems option 2 is prefered.Sub topic 1-4: Draft TR 38.xxx**Issue 1-4-1: *TR skeleton for SL enh. in Rel-17***For the TR skeleton, we prefer one more sub-clause to capture the timing issue as discussed in thread [143].To Xiaomi, LGE: More sub-clause will be added based on interested companies proposal when ther prepare Text Proposal. |
| CATT | Sub topic 1-1: System parameters and RF requirements for SL enh. UE**Issue 1-1-1: *System parameters on CBW***Support option 1. The same principle agreed in Rel-16 should be followed so that we propose 10MHz CBW for band n14 SL.**Issue 1-1-2: *System parameters on Channel raster***The channel raster 100kHz for NR Uu band n14 can be reused for NR V2X band n14 as what we did for band n38. The frequency shift for V2X band n14 should be specified based on whether there is other Uu operation in band n14. Based on the additional information provided by operator, the SL operation in Band n14 is for emergency situations where the UE is out of network coverage for NR and LTE. If in this case, only V2X service operates in band n14, there is no frequency shift applied.**Issue 1-1-3: *UE Tx requirements for SL enhancement***Support option 1.**Issue 1-1-4: *UE Rx requirements for SL enhancement***Support option 1. We think REFSENS requirements can follow the same principle in TR 38.886 as well as other Rx requirements. **Issue 1-2-1: *Operating scenarios***Support option 1. If only SL operates in band n14 for public service, it is expected no coexistence evaluation will be needed.**Issue 1-2-2: *CBW for SL operation***We can support option 1 at this stage.Sub topic 1-3: Coexistence evaluation for public safety**Issue 1-3-1: *FDD band coexistence evaluation for public safety***Prefer option 2.**Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***We share the same view with Xiaomi. Based on Issue 1-2-1, only SL service operates in band n14 without Uu service. So no coexistence evaluation is expected.Sub topic 1-4: Draft TR 38.xxx**Issue 1-4-1: *TR skeleton for SL enh. in Rel-17***Support this TR skeleton at this stage. Some sub-clauses can be added based on further discussion.  |
| LGE | Sub topic 1-1: System parameters and RF requirements for SL enh. UE**Issue 1-1-1: *System parameters on CBW***Prefer Option 1:Follow same principle to decide the supported CBW in public safety and other SL operation**Issue 1-1-2: *System parameters on Channel raster***In licensed band, RAN4 can follow same channel raster as n38 SL operation in Rel-16 for new SL enh. operating bands. So, prefer Option 1: Only shift set 2 (7.5 kHz) for channel raster is applied to n14. But RAN4 can further discuss which channel raster will be used when the SL enh. UE only used in the out-of-network coverage.**Issue 1-1-3: *UE Tx requirements for SL enhancement***RAN4 need further discussion since AT&T request to revise their paper to support both PC1 and PC3 NR SL enh. UE. So need further discussion in 2nd round.**Issue 1-1-4: *UE Rx requirements for SL enhancement***Prefer option1 for UE Rx requirements in n14. But RAN4 need further discussion which can be impact to support PC1 UE.Sub topic 1-2: Public safety using SL operation in n14**Issue 1-2-1: *Operating scenarios***Prefer Option 1 and do not need to co-existence evaluation in n14.**Issue 1-2-2: *CBW for SL operation***Based on ETSI PPDR regulatory requirements, only 10MHz CBW is allowed in n14. Option 1 is OK.Sub topic 1-3: Coexistence evaluation for public safety**Issue 1-3-1: *FDD band coexistence evaluation for public safety***Prefer option2: RAN4 can consider the coexistence evaluation in FDD band based on operator proposal in FDD band for SL operation. Since in WID, the coexistence evaluation shall be needed in the exact operating band request.**Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***Prefer option2: No, RAN4 already verified the coexistence evaluation in Band 14 in D2D proximity service. Also, there was no victim system to protect the legacy RAT.Sub topic 1-4: Draft TR 38.xxx**Issue 1-4-1: *TR skeleton for SL enh. in Rel-17***Based on the 1st round feedback, the TR skeleton can be updated. |
| Ericsson | **Issue 1-1-1:** Ok with option 1.**Issue 1-1-2:** for n14, it will depend on whether or not operator have spectrum sharing for n14/B14 between NR SL and LTE Uu for the case of NR SL 15kHz SCS. If so, to solve the non-orthogonal receiving FFT grid, 7.5kHz should be introduced for NR SL for n14.**Issue 1-1-3:** AT&T has updated their paper and seems PC1 also included now.**Issue 1-1-4:** ok with option 1.**Issue 1-2-1:** n14 only has 10MHz frequency range. It will be good for AT&T to clarify on operation scenario: Does network need to control NR SL via NR/LTE Uu or not? Or NR SL only support in out of coverage means that NR SL UE will not connect to network so public safety UC only possible for NR SL between SL UE. This needs further operator clarification. For example, if we only consider 10MHz channel for n14 and n14 only have 10MHz frequency, meaning there will be co-channel interference between NR SL UE and NR Uu/LTE Uu service.**Issue 1-2-2:** for public safety UC, 10MHz CBW is needed. Should clarify if this for Public safety service only.**Issue 1-3-1:** seems this is in scope of the WID, we cannot skip the work. Now we have n14 as FDD band meaning both option1 and option 2 the same now? Below is copy from SL\_enh WID.*Support of new sidelink frequency bands for single-carrier operations [RAN4]** *Support of new sidelink frequency bands should ensure coexistence between sidelink and Uu interface in the same and adjacent channels in licensed spectrum.*

**Issue 1-3-2:** This need further clarification from AT&T. Does network need to control NR SL via NR/LTE Uu or not? Or NR SL only support in out of coverage means that NR SL UE will not connect to network so public safety UC only possible between NR SL UE:es. This needs further operation clarification. For example, if we only consider 10MHz channel for n14 and n14 only have 10MHz frequency, meaning there will be co-channel interference between NR SL UE and NR Uu/LTE Uu service. |
| AT&T | **Issue 1-1-1: *System parameters on CBW***Support option 1. However, the same principle agreed in LTE should be followed so that the UE can utilize 5 MHz or 10 MHz CBW for discovery while supporting 10MHz CBW for direct communication for n14 SL.**Issue 1-1-2: *System parameters on Channel raster***Support Option 1. PS UEs will exist for both n14 and B14 which will need to support SL operation in a spectrum sharing manner.**Issue 1-1-3: *UE Tx requirements for SL enhancement***Proposal is revised in R4-2103005 to include PC1 and deferred to round 2 based on moderator comment.**Issue 1-1-4: *UE Rx requirements for SL enhancement***We would prefer to derive the REFSENS requirements for SL enhancements using the same principles used for ProSe Rx requirements in LTE in the case of similar operating frequency ranges. **Issue 1-2-1: *Operating scenarios***Other proposal: In accordance with our discussion paper, there is legacy Uu operation in NR Band n14 and LTE Band 14 for PS operation. However, sidelink operation in NR Band n14 is for emergency situations where the UE is out of network coverage for NR and LTE. To respond to Ericsson, NR SL operation in n14 will not need control via NR/LTE Uu. The NR PS UE will connect to the network for public safety communication when the NR or LTE network is available. NR SL will operate in out of coverage.**Issue 1-2-2: *CBW for SL operation***See response to Issue 1-1-1.**Issue 1-3-1: *FDD band coexistence evaluation for public safety***Prefer option 2.**Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***Prefer option 2. Based on operating scenario for NR SL operation in n14, we don’t expect the need for co-existence evaluation with n14 Uu service at this time. However, we would not object to the Ericsson proposal in R4-2102344 as it could provide valuable information for any possible future application of NR sidelink relay functionality based on the outcome of the RAN2 Rel-17 SI and supplement the co-existence evaluation in Band 14 in D2D proximity service.In either case, coexistence studies should not impact the completion of the work on NR SL operation in n14 for the targeted out-of-network operation for PS. |
| Huawei, HiSilicon | **Issue 1-1-1: *System parameters on CBW***It’s not clear of the “same principle” in option 1. If some general principle needs to be considered for SL, for CBW we think that the max 40MHz CBW for licensed band adopted in Rel-16 should also be considered in Rel-17. Regarding the proposal of 10MHz CBW for n14, we are ok with it. **Issue 1-1-2: *System parameters on Channel raster***If LTE Uu is also used for the spectrum, frequency shift needs to be considered for the shared scenario, which should be clarified firstly.**Issue 1-1-3: *UE Tx requirements for SL enhancement***We don’t even have NR Uu PC1 requirements so far. More aspects should be considered for PC1, e.g. the UE architecture, co-existence issues. If both power classes are considered in Rel-17, PC3 should have higher priority. **Issue 1-1-4: *UE Rx requirements for SL enhancement***Methodology would be the same as used in TR38.886, but the requirements need to be analyzed band by band. **Issue 1-2-1: *Operating scenarios***Option 2. It’s not clear that whether the out of coverage scenario is for one operator or for all operators in the same band, which will have impact to the co-existence consideration. Also, we think that the study should be generic for all possible scenarios. **Issue 1-2-2: *CBW for SL operation***Option 1Sub topic 1-3: Coexistence evaluation for public safety**Issue 1-3-1: *FDD band coexistence evaluation for public safety***Option 1. Simulation assumptions shall be further discussed. **Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***Option 1. As the first proposed FDD band for NR V2X, we think co-existence study should be general for all licensed bands as there is no conclusion in Rel-16.Sub topic 1-4: Draft TR 38.xxx**Issue 1-4-1: *TR skeleton for SL enh. in Rel-17***We propose to add a sub-clause of TxD requirements for the leftover issue. How to reflect the TxD requirements in the spec can be further discussion, e.g. as previously discussed, it can be added by a TEI16 CR.To Huawei, LGE: TxD requirements will be added from Rel-16 in TS38.101-1 based on previous agreements. So we think no need to add the TxD requirements in chapter 5 for leftover issue. |
| Qualcomm | Sub topic 1-1: System parameters and RF requirements for SL enh. UE**Issue 1-1-1: *System parameters on CBW***If following the same principle means that the NR V2X licensed band should be a subset of UE channel bandwidths for the same licensed band in NR then we are agreeable to option 1 to decide the supported CBW in public safety and other SL operation. **Issue 1-1-2: *System parameters on Channel raster***Option 2: First a channel raster value should be selected for n14. Then we can agree on what frequency shifts should be selected for n14. **Issue 1-1-3: *UE Tx requirements for SL enhancement***Option 2: PC3 SL UE is allowed in n14. Additional Tx requirement can be further discussed.**Issue 1-1-4: *UE Rx requirements for SL enhancement***Option 2: To derive REFSENS and other Rx requirements in n14, RAN4 can generally follow same principle as outlined in TR38.886. However, the REFSENS and other Rx requirements for SL n14 should not be more stringent than they are currently for the Uu link as specified in 38.101-1. Therefore, certain factors such as the frequency specifications for NF outlined in TR38.886 will have to be increased for n14 in order for it to conform with the Uu NF specifications. Sub topic 1-2: Public safety using SL operation in n14**Issue 1-2-1: *Operating scenarios***Option 2: RAN4 should seek input from other companies as to whether additional operating scenarios should be considered.**Issue 1-2-2: *CBW for SL operation***Option 2: Allow 10MHz CBW in n14 for now and add 5MHz BW later if requiredSub topic 1-3: Coexistence evaluation for public safety**Issue 1-3-1: *FDD band coexistence evaluation for public safety***Option 3: RAN4 needs to have further discussion on the public safety coexistence scenarios that need to be evaluated. Then RAN4 can determine whether further coexistence evaluations in FDD band is required.**Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not***RAN4 needs further discussion on whether more coexistence cases need to be considered. Based on outcome of this discussion it can be agreed as to whether any coexistence evaluations are required. Sub topic 1-4: Draft TR 38.xxx**Issue 1-4-1: *TR skeleton for SL enh. in Rel-17***TR skeleton is agreeable. It can be updated based of further discussions. |

### 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.*

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| **CR/TP number** | **Comments collection** |
| **R4-2100282** | **LGE: it will be update based on 1st & 2nd round discussion** |
| **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***In 1st round, most companies support to reuse same principle in 5G V2X Rel-16. It means that RAN4 already agreed that the supported CBW in SL operation will be chosen in the subset of the NR Uu operating bands. So we propose as follow***- Tentative agreements: Option1*** * Option 1:Follow same principle to decide the supported CBW in public safety and other SL operation

***- Recommendation on 2nd round :*****If need more clarification in this issue 1-1-1, RAN4 can further discuss in 2nd round**. |
| **Issue 1-1-2: *System parameters on Channel raster***In 1st round, most companies support option1 with 7.5kHz shift for LTE prose and NR SL in a operating band. Generally, moderator support option 1 will be applied to NR SL operation in refarming NR band. But only use NR SL operation in NR band, then the NR Uu channel raster will be considered. So based on the 1st round feedback, we propose as follow***- Candidate options*** * Option 1:7.5 kHz shift will be considered in NR refarming bands (e.g. n14) to use LTE prose and NR SL operation. If only NR SL operation is allowed, then NR Uu channel raster will be considered.
* Option 2: Regardless of sharing LTE prose/SL and NR SL, RAN4 firstly need to decide which channel raster will be considered for SL enh. operation

***- Recommendation on 2nd round :*****Based on the candidate options, RAN4 further discuss the general principle for channel raster.** |
| **Issue 1-1-3: *UE Tx requirements for SL enhancement*** In 1st round, AT&T proposed both PC1 and PC3 is available in n14 SL enh. operation. So RAN4 need further discussion how to support UE Tx RF requirements. So moderator propose as follow***- Candidate options*** * Option 1:Forboth PC1 and PC3 UE, RAN4 specify the RF requirements for n14 SL operation.
* Option 2: Only need to define PC3 UE in n14 as baseline.

***- Tentative agreements*** * RAN4 need to define both PC1 and PC3 RF requirements in n14.
* For PC3 SL enh. UE, RAN4 can reuse the Tx requirements for NR V2X UE in Rel-16.
* For PC1 SL enh. UE, RAN4 need to decide MPR/A-MPR simulation assumptions in next RAN4 meeting

***- Recommendation on 2nd round :*****Based on the candidate options and tentative agreement, RAN4 need further discussion.** |
| **Issue 1-1-4: *UE Rx requirements for SL enhancement***In 1st round, AT&T propose to derive the REFSENS requirements for SL enhancements using the same principles of ProSe Rx requirements in LTE. But most companies support follow REFSENS equation for NR SL licensed band in TR38.886. So moderator propose as follow***- Candidate options*** * Option 1:n14 REFSENS and other rx requirements for SL enh. will be followed in TR38.886. The detail Rx requirements will be discussed one by one.
* Option 2: n14 REFSENS can be follow LTE prose, other rx requirements will be discussed one by one.

***- Recommendation on 2nd round :*****Based on the candidate options, RAN4 further discuss the detail Rx requirements.** |
| **Sub-Topic#1-2****Public safety using SL operation in n14** | **Issue 1-2-1: *Operating scenarios***In 1st round, AT&T provide their operating scenario in n14. Most companies support option1 only n14 SL enh. UE will operated in out-of-coverage. So there is no victim system to protect from n14 SL UE. Minor comments are that RAN4 need further find some other operating scenarios from other operator in SL enh. operating bands.***- Candidate options*** * 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: RAN4 look for the other operating scenarios in SL enh. operating bands which will be considered for the SL enh. operation.

***- Recommendation on 2nd round :*****Based on the candidate options, RAN4 further discuss the detail operating scenarios in n14 and others.** |
| **Issue 1-2-2: *CBW for SL operation***In 1st round, AT&T propose 5MHz CBW also consider as same LTE prose in n14. Most companies support option1 only support 10MHz CBW in n14 SL enh. So RAN4 need further discuss on the CBW supporting in n14 as follow.***- Candidate options*** * Option 1: Only allow 10MHz CBW in n14.
* Option 2: Both 5MHz and 10MHz CBW in n14.

***- Recommendation on 2nd round :*****Based on the candidate options, RAN4 further discuss on the supported CBW in n14.** |
| **Sub-Topic#1-3****Coexistence evaluation for public safety** | **Issue 1-3-1: *FDD band coexistence evaluation for public safety*** In 1st round, most companies prefer option2 based on AT&T coexistence scenarios in n14. A few companies propose to coexistence study in general FDD operation. So, moderator want to separate the coexistence issues as two part. One is n14 coexistence necessity that will be covered in issue 1-3-1 and the other is FDD general coexistence necessity that will be covered in issue 1-3-2. So, in issue 1-3-1, RAN4 need to discuss whether the general FDD band coexistence evaluation or not in 2nd round.***- Candidate options*** * 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.

***- Recommendation on 2nd round :*****Based on the candidate options, RAN4 further discuss on the FDD band coexistence evaluation.** |
| **Issue 1-3-2: *Whether study for coexistence evaluation in n14 or not*** In 1st round, most companies prefer option2 based on AT&T coexistence scenarios in n14. A few companies propose to coexistence study in general FDD operation. So, moderator want to separate the coexistence issues as two part. One is n14 coexistence necessity that will be covered in issue 1-3-1 and the other is FDD general coexistence necessity that will be covered in issue 1-3-2.So RAN4 need to discuss whether the coexistence evaluation in n14 is needed or not in 2nd round.***- Candidate options*** * Option 1: RAN4 need coexistence evaluation in n14
* Option 2: No, RAN4 do not need coexistence evaluation for both PC1 and PC3 since NR SL operation in n14 is only allowed in out-of-coverage based in AT&T operating scenarios.

***- Recommendation on 2nd round :*****Based on the candidate options, RAN4 further discuss for the coexistence evaluation in n14.** |
| **Sub-Topic#1-4****Draft TR38.xxx** | **Issue 1-4-1: *TR skeleton or SL enh. in Rel-17***In 1st round, most companies support the basic TR skeleton in rel-17. Before 2nd round discussion, TR rapporteur replied on the each companies’ comment. So need further check the feedback and RAN4 still discuss on the following candidate options in 2nd round.***- Candidate options*** * Option 1: TR skeleton can be agreeable.
* Option 2: Need further update. The detail proposal will be directly updated in the draft version.

***- Recommendation on 2nd round :*****Based on the candidate options, RAN4 further discuss for TR skeleton.** |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| **R4-210xxxx** | **WF on coexistence evaluation for NR SL enhancement in Rel-17** | **LGE** |
| **R4-210xxxx** | **WF on system parameters and operating CBW in n14 for NR SL enhancement** | **CATT, AT&T** |

### 1.4.2 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**  |
| **R4-2100282** | **The TR skeleton will update based on e-mail discussion** |
|  |  |
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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.

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Comments** |
| **R4-2103241**WF on coexistence evaluation for NR SL enhancement in Rel-17 | **XXX** |  |
| **YYY** |  |
| **ZZZ** |  |
| **R4-2103242**WF on system parameters and operating CBW in n14 for NR SL enhancement | **XXX** |  |
| **YYY** |  |
| **ZZZ** |  |
| **R4-2103243**TR38.xxx v0.0.1 TR Skeleton for SL enhancement in Rel-17 | **XXX** |  |
| **YYY** |  |
| **ZZZ** |  |

## 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*

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

# 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 |
| **R4-2103241** | Way forward on coexistence evaluation for NR SL enhancement in Rel-17 | LG Electronics France | WF |
| **R4-2103242** | Way forward on system parameters and operating CBW in n14 for NR SL enhancement | CATT, AT&T | WF |
| **R4-2103243** | TR38.xxx v0.0.1 TR Skeleton for SL enhancement in Rel-17  | LG Electronics France | other |