**3GPP TSG-RAN WG4 Meeting #112 *R4-241zzzz***

**Maastricht, Netherlands, 19th – 23rd August 2024**

**Agenda item:** 7.1

**Source:** Moderator (Nokia)

**Title:** Topic summary for [112][113] NR\_LTE\_NR\_Bands

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

Summary of contributions under agenda item 7.13 (NR\_FDD\_1400MHz), 7.14 (LTE\_FDD\_1800\_1830MHz\_CAN), 7.15 (NR\_bands\_n87\_n88) and 7.16 (NR\_band\_n68).

# Topic #1: Introduction of the 1.4 GHz Band

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2411167](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411167.zip) | Apple | ***Observation 1****: For the new NR 1.4GHz band, the UE RF requirements shall be specified based on symmetric UL/DL channel BW at 3MHz.*  ***Proposal 1****: For the new NR 1.4GHz band, the intended UL/DL duplex spacing shall be clarified such that there would be no ambiguity on how the UL channel is to be allocated.*  ***Observation 2****: For the new NR 1.4GHz band, as the smallest UL/DL gap is already more than 12 channel BW apart, the UL induced noise impact to the DL is expected to be rather negligible except for the UL IM2 noise caused by Rx down-conversion mixer.*  ***Observation 3****: For the new NR 1.4GHz band, the 3MHz REFSENS is expected to be the same over the possible duplex spacing range.*  ***Proposal 2****: For the new NR 1.4GHz band, the REFSENS requirement is specified as below:*   |  |  |  |  | | --- | --- | --- | --- | | **Operating Band** | **SCS (kHz)** | **3MHz** | | | nxxx | 15 | **REFSENS (dBm)** | **UL Configuration (RB)** | | -101.7 | 15 | |
| [R4-2411219](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411219.zip) | Ericsson | **Proposal1: Specify the new NR band 1.4 GHz with band number n111.**   |  |  |  |  | | --- | --- | --- | --- | | **NR Operating Band** | **Uplink (UL) operating band BS receive / UE transmit**  **FUL,low – FUL,high**  **(MHz)** | **Downlink (DL) operating band BS transmit /UE receive**  **FDL,low – FDL,high**  **(MHz)** | **Duplex mode** | | n111 | 1390 – 1395 | 1432 – 1435 | FDD |   **With the following channel BW and SCS:**   | **NR Band** | **SCS (kHz)** | ***BS channel bandwidth* (MHz)** | | | | | | | | | | | | | | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **3** | **5** | **10** | **15** | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **60** | **70** | **80** | **90** | **100** | |  | 15 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | n111 | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   **Proposal2: Specify the following NR-ARFCN channel number for band n111 in table 5.4.2.3-1:**   |  |  |  |  | | --- | --- | --- | --- | | **NR *operating band*** | **ΔFRaster**  **(kHz)** | **Uplink**  **range of NREF**  **(First – <Step size> – Last)** | **Downlink**  **range of NREF**  **(First – <Step size> – Last)** | | n111 | 100 | 278000 – <20> – 279000 | 286400 – <20> – 28700 |   **Proposal3: Specify the following SS raster entries for band n111 in table 5.4.3.3-4:**   |  |  |  |  | | --- | --- | --- | --- | | **NR operating band** | **SS Block SCS** | **SS Block pattern (NOTE 1)** | **Range of GSCN**  **(First – <Step size> – Last)** | | n111 | 15 kHz | Case A | 33802 – <1> – 33804 | |
| [R4-2411901](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411901.zip) | ZTE Corporation, Sanechips | **Proposal 1: The new NR 1.4GHz band can be numbered as n110.**  **Proposal 2: Approve Table 2-1 to Table 2-6 on system parameters for new Rel-19 specification.**  **Proposal 3: Approve Table 2-7 and Table 2-8 on RF requirements for new Rel-19 specification.**  **Proposal 4: Add this new 1.4GHz band into FDL\_high < 2700 MHz and FUL\_high < 2700 MHz tables for IBB and OBB, and add this new 1.4GHz band into NBB table for new Rel-19 specification.** |
| [R4-2411998](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411998.zip) | Nokia, MidWave Wireless. | draft CR |
| [R4-2412397](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412397.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2412893](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412893.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2412894](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412894.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2412895](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412895.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2412896](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412896.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2412897](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412897.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2413117](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413117.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2413118](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413118.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2413119](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413119.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2413120](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413120.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2413121](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413121.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2413122](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413122.zip) | Nokia, MidWave Wireless | draft CR |
| [R4-2413123](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413123.zip) | Nokia, MidWave Wireless | draft CR |

## 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

*Sub-topic description: Band number*

*Open issues and candidate options before meeting:*

**Issue 1-1: Band number**

* Proposals
  + Option 1: n110
  + Option 2: n111
* Recommended WF
  + TBD

Moderator: we have two bands to be introduced.

Agreement: use band number n110.

### Sub-topic 1-2

*Sub-topic description: UE REFSENS*

*Open issues and candidate options before meeting:*

**Issue 1-2: UE REFSENS**

* Proposals
  + Option 1: -101.7 dBm (Apple)
  + Option 2: -102.2 dBm (Nokia, MidWave Wireless, ZTE, Sanechips)
* Recommended WF
  + Option 2

Apple: we understand that the number is directly scaled. But scaling works for TDD band rather than FDD band. There may be some noise. It should be more closed to what is defined for LTE.

Nokia: This is IP2 thing.

Qualcomm: We have possible filter. We are fine to keep [ ]. If Tx isolation is there, we may consider Apple proposal.

Agreement:

* UE REFSENS is [-102.2] dBm

### Sub-topic 1-3

*Sub-topic description: UE Tx-Rx frequency separation*

*Open issues and candidate options before meeting:*

**Issue 1-3: UE Tx-Rx frequency separation**

* Proposals
  + Option 1: 42 MHz (ZTE, Sanechips)
  + Option 2: 40-42 MHz (Nokia, MidWave Wireless)
* Recommended WF
  + TBD

Moderator: suggest to go offline.

Qualcomm: For option 2, it can be any number?

Nokia: we need wait for comments on what is actually deployed.

ZTE: there is no information whether to define fix or flexible Tx-Rx separation. Here we define the fixed one.

CATT: The channel bandwidth is 3MHz not 5MHz. Asymmetric, the flexible one is needed. For option 2, there should be limited number rather than the range.

Apple: need to wait from midwave wireless delegate.

### Sub-topic 1-4

*Sub-topic description: Synchronization raster*

*Open issues and candidate options before meeting:*

**Issue 1-4: Synchronization raster (range of GSCN)**

* Proposals
  + Option 1: 33802-33804 (Ericsson, ZTE, Sanechips)
  + Option 2: 33802-33806 (Nokia, MidWave Wireless)
* Recommended WF
  + Option 1

Agreement: Agree on Option 1.

### Sub-topic 1-5

*Sub-topic description: CR responsibility*

*Open issues and candidate options before meeting:*

**Issue 1-5: CR responsibility**

* Proposals
  + Option 1:

|  |  |  |
| --- | --- | --- |
| **Specification** | **Company which contributed to RAN4#112** | **Proposed company for formal CR** |
| 38.101-1 | Nokia | Nokia |
| 38.133 | ZTE | ZTE |
| 38.106 | Nokia | Nokia |
| 38.115-1 | Nokia | Nokia |
| 38.174 | Nokia | Nokia |
| 38.176-1 | Nokia | Nokia |
| 38.176-2 | Nokia | Nokia |
| 36.104 | Nokia | Nokia |
| 36.141 | Nokia | Nokia |
| 37.104 | Nokia | Nokia |
| 37.141 | Nokia | Nokia |
| 38.104 | Nokia | Nokia |
| 38.141-1 | Nokia | Nokia |
| 38.141-2 | Nokia | Nokia |
| 37.105 |  |  |
| 37.145-1 |  |  |
| 37.145-2 |  |  |
| 38.101-5 |  |  |
| 38.307 |  |  |

* + Option 2: TBD
* Recommended WF
  + Option 1

Moderator: we can note all the CRs and in the next meeting we can provide CRs according to work split.

Huawei: we would like to clarify. We should not start from draft CR. We should postpone them. This is the first meeting. We need to clarify the open issues. One more issue is that the issue of collocation and co-existence issue.

Moderator: Draft CRs for other bands. For collocation coexistence, there is proposal in RAN. We can try it in TEI. We want to finish the band timely.

# Topic #2: Introduction of LTE FDD band in 1800-1830 MHz for Canada

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2411031](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411031.zip) | NOVAMINT, Ubiik, Semtech, Telit, Sequans Communications | Work plan |
| [R4-2411032](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411032.zip) | NOVAMINT, Ubiik, Semtech, Telit, Sequans Communications | **Observation 1 – the regulation is relevant to fixed point-to-point and point-to-multipoint digital radio systems**  **Observation 2 – the definition of the channel arrangement (UL 1800-1810 MHz; DL 1820-1830 MHz) is considered feasible with state of the art components, by assuming large devices (CPEs) and margins as requested by the regulation.**  **Proposal 1 – Specify the channel arrangement FDD, UL 1800-1810 MHz; DL 1820-1830 MHz**  **Observation 3 – the regulation is not in line with the 3GPP channel raster, but the Regulator indicated the willingness to adapt it after completion of the work in 3GPP**  **Proposal 2 – specify a 100 kHz channel raster**  **Observation 4 – The recommended transmitter power allows the deployment of wide area base stations**  **Observation 5 – The regulation provides out-of-band emission limits**  **Proposal 3 -specify the most stringent values between the current regulation and 3GPP out-of-band limits for band 3**  **Observation 6 – The regulation allows the use of UEs with omni directional antennas and power class of 23 dBm. The use of large devices (CPEs) with directional antennas is encouraged.** |
| [R4-2411033](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411033.zip) | NOVAMINT, Ubiik, Semtech, Telit, Sequans Communications | **Observation 1: since the agreement in [1] is not to impose new UE requirements with this new band as the protected band from the existing 3GPP bands (i.e., Table 6.6.3.2-1 in TS 36.101, and Table 6.5.3.2-1 in TS 38.101-1), the introduction of the new band implies mainly the addition of a new row in existing table, using when needed the values defined for band 3.**  **Observation 2: Concerning the requirement in 36.101 ”6.2.4 A-MPR,” it is to be noted that:**  **The UL for the new band (1800-1810 MHz) is far from band 2 and 25 (40 MHz). Therefore,it is assumed that no A-MPR requirement is needed.**  **The UL for the new band (1800-1810 MHz) is far from band 4 (45 MHz) and 66 (20 MHz). Therefore,it is assumed that no A-MPR requirement is needed.**  **Proposal 1: it is proposed to endorse the analysis in Table 1**  **Proposal 2: it is proposed to agree on the values proposed in Table 2 for the modifications required to introduce the new LTE band 1800-1830 MHz for Canada** |
| [R4-2411034](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411034.zip) | NOVAMINT, Ubiik, Semtech, Telit, Sequans Communications | **Observation 1: According to [1] band [110] does not require protection from other bands**  **The introduction of the new band can be done according to a number of options: 1. do not add band [110] to the table since it does not require further protection from other bands 2. add band [110] with a note that it does not require protection 3. add band [110] with a note that this requirement does not apply to band 2, 4, 25, 66 and n2, n4, n25, n66**  **Option 3. is proposed**  **Proposal 1: it is proposed to agree on the values proposed in Table 1 for the modifications required to introduce the new LTE band 1800-1830 MHz for Canada** |
| [R4-2411035](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411035.zip) | NOVAMINT, Ubiik, Semtech, Telit, Sequans Communications | **Proposal 1: it is proposed to agree on the values proposed in Table 1 for the modifications required to introduce the new LTE band 1800-1830 MHz for Canada** |
| [R4-2411220](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411220.zip) | Ericsson | **Proposal1: Specify the new LTE band 1800-1830 MHz with band number 110.**   |  |  |  |  | | --- | --- | --- | --- | | **E‑UTRA Operating Band** | **Uplink (UL) operating band BS receive UE transmit**  **FUL,low – FUL,high** | **Downlink (DL) operating band BS transmit  UE receive**  **FDL,low – FDL,high** | **Duplex mode** | | 110 | 1800 MHz – 1810 MHz | 1820 MHz – 1830 MHz | FDD |   **With the following channel BW and SCS:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **E-UTRA band / Channel bandwidth** | | | | | | | | **E-UTRA Band** | **1.4 MHz** | **3 MHz** | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** | | 110 | Yes | Yes | Yes | Yes |  |  |   **Proposal2: Specify the following E-UTRA channel number for band 110 in table 5.7.3-1:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **E-UTRA Operating Band** | **Downlink** | | | **Uplink** | | | | **FDL\_low** [MHz] | **NOffs-DL** | **Range of NDL** | **FUL\_low** [MHz] | **NOffs-UL** | **Range of NUL** | | 106  (NOTE 6) | 935 | 70656 | 70656 - 70705 | 896 | 134292 | 134292 - 134341 | | 107 (NOTE 7) | 612 | 70706 | 70706 – 71105 | N/A | | | | 108 (NOTE 7) | 470 | 71106 | 71106 – 73385 | N/A | | | | 110 | 1820 | 73386 | 73386 – 73485 | 1800 | 134342 | 134342 – 134441 | |
| [R4-2412618](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412618.zip) | Qualcomm France | **Observation 1:** Based on initial assessment, RF filter may not help at least significantly in own DL protection.  **Observation 2**: Simulations are needed to see what kind UE emission levels are expected for eMTC devices at own DL without RF filter attenuation. |

## 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

*Sub-topic description: Work plan*

*Open issues and candidate options before meeting:*

**Issue 2-1: Work plan**

* Proposals
  + Option 1: Agree work plan in R4-2411031
  + Option 2: TBD
* Recommended WF
  + Option 1

### Sub-topic 2-2

*Sub-topic description: Band number*

*Open issues and candidate options before meeting:*

**Issue 2-2: Band number**

* Proposals
  + Option 1: Band 110
  + Option 2: Band 111
* Recommended WF
  + TBD

Agreement: use band number 111.

### Sub-topic 2-3

*Sub-topic description: System parameters*

*Open issues and candidate options before meeting:*

**Issue 2-3: System parameters**

* Proposals
  + Option 1: Agree system parameters in R4-2411220
  + Option 2: TBD
* Recommended WF
  + Option 1

Skyworks: there is only 10MHz gap. We need consider the impact of it.

NOVAMINT: the parameter is dependent on Canada regulation.

Skyworks: channel bandwidth is for uplink. We need discuss the scope of this potential issue.

Agreement: Agree on system parameters in R4-2411220 in principle.

### Sub-topic 2-4

*Sub-topic description: UE RF requirements*

*Open issues and candidate options before meeting:*

**Issue 2-4: UE RF requirements**

* Proposals
  + Option 1: Agree UE RF specification impact in R4-2411033
  + Option 2: TBD
* Recommended WF
  + TBD

Skyworks: Need more time. Cannot agree on the numbers in this week.

Qualcomm: co-existence. Band 3, we should consider differen numbers.

Apple: There are some observations about the A-MPR requirements. Why to look at uplink to uplink separation rather than uplink to downlink of other band.

### Sub-topic 2-5

*Sub-topic description: BS RF requirements*

*Open issues and candidate options before meeting:*

**Issue 2-5: BS RF requirements**

* Proposals
  + Option 1: Agree BS RF specification impact in R4-2411034
  + Option 2: TBD
* Recommended WF
  + TBD

Nokia: it is better to see the requirements in draft CR. Need to ensure the co-existence requirements. We make clarification for the co-existence.

Ericsson: for co-existence, we prefer option 2.

Huawei: This is business as usual to protect other bands. We can simply follow the usual way. This band is deployed in the way of non-collocated with other IMT.

Novamint: to Nokia, there is only one overlapping band Band3. Band 3 is not used in Canada. To Huawei, there is an agreement in RAN.

### Sub-topic 2-6

*Sub-topic description: RRM requirements*

*Open issues and candidate options before meeting:*

**Issue 2-6: RRM requirements**

* Proposals
  + Option 1: Agree RRM specification impact in R4-2411035
  + Option 2: TBD
* Recommended WF
  + TBD

Nokia: there are requirement depending on UE RF REFSENS.

### Sub-topic 2-7

*Sub-topic description: CR responsibility*

*Open issues and candidate options before meeting:*

**Issue 2-7: CR responsibility**

* Proposals
  + Option 1:

|  |  |  |
| --- | --- | --- |
| **Specification** | **Company which contributed to RAN4#112** | **Proposed company for formal CR** |
| 36.101 |  |  |
| 36.133 |  |  |
| 38.106 |  |  |
| 38.115-1 |  |  |
| 38.174 |  |  |
| 38.176-1 |  |  |
| 38.176-2 |  |  |
| 36.104 |  |  |
| 36.141 |  |  |
| 37.104 |  |  |
| 37.141 |  |  |
| 38.104 |  |  |
| 38.141-1 |  |  |
| 38.141-2 |  |  |
| 37.105 |  |  |
| 37.145-1 |  |  |
| 37.145-2 |  |  |
| 36.307 |  |  |

* + Option 2: TBD
* Recommended WF
  + TBD

Huawei: we suggest to have one draft CR for BS. The content is quite similar.

Moderator: we discussed the potential option, which is complicated.

# Topic #3: Introduction of NR bands n87 and n88

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2411086](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411086.zip) | CATT | **Proposal 1: Both NR and NB-IoT are supported on bands n87 and n88.**  **Proposal 2: The system parameters which need to be updated for new NR bands n87 and n88 are shown in Table 1 to Table 6.** |
| [R4-2411087](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411087.zip) | CATT | BS impact |
| [R4-2411088](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411088.zip) | CATT | draft CR |
| [R4-2411089](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411089.zip) | CATT | draft CR |
| [R4-2411210](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411210.zip) | Ericsson | **Proposal: Agree with the changes listed in this contribution.** |
| [R4-2411211](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411211.zip) | Ericsson | **Proposal: Agree with the changes listed in this contribution.** |
| [R4-2411212](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411212.zip) | Ericsson | draft CR |
| [R4-2411213](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411213.zip) | Ericsson | draft CR |
| [R4-2411214](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411214.zip) | Ericsson | draft CR |
| [R4-2411215](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411215.zip) | Ericsson | draft CR |
| [R4-2411216](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411216.zip) | Ericsson | draft CR |
| [R4-2411217](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411217.zip) | Ericsson | draft CR |
| [R4-2411218](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411218.zip) | Ericsson | draft CR |
| [R4-2411899](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411899.zip) | ZTE Corporation, Sanechips | **Proposal 1: Approve Table 2-1 to Table 2-7 on system parameters for new Rel-19 specification.**  **Proposal 2: Approve Table 2-8 and Table 2-9 on RF requirements for new Rel-19 specification.**  **Proposal 3: Add n87, n88 into FDL\_high < 2700 MHz and FUL\_high < 2700 MHz tables for IBB and OBB, and add n87, n88 into NBB table for new Rel-19 specification.** |
| [R4-2411902](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411902.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411903](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411903.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411904](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411904.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411905](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411905.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411906](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411906.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411907](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411907.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411908](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411908.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411909](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411909.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411910](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411910.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411911](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411911.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411912](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411912.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411913](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411913.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411945](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411945.zip) | Nokia | draft CR |
| [R4-2411999](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411999.zip) | Nokia | Work plan |
| R4-2412000 | Nokia | Revised WID, not available? |
| [R4-2412001](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412001.zip) | Nokia | Expected changes |
| [R4-2412395](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412395.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2413103](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413103.zip) | Nokia | draft CR |
| [R4-2413104](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413104.zip) | Nokia | draft CR |
| [R4-2413105](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413105.zip) | Nokia | draft CR |
| [R4-2413106](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413106.zip) | Nokia | draft CR |
| [R4-2413107](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413107.zip) | Nokia | draft CR |
| [R4-2413108](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413108.zip) | Nokia | draft CR |
| [R4-2413109](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413109.zip) | Nokia | draft CR |
| [R4-2413258](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413258.zip) | Huawei, HiSilicon | **Proposal 1**: Consider TR 36.762 as baseline for further NR-related analyses.  **Proposal 2**: Consider ECC/Dec/(16)02 and ECC/Dec/(19)02 regulatory decisions as baseline for evaluation, together with underlying ECC Report 283 on compatibility studies.  **Proposal 3**: During n87/n88 investigations, cover analysis of regulatory requirements for NB-IoT operation in 410-430 MHz frequency range.  **Proposal 4:** As theECC/Dec/(19)02 and ECC/Dec/(19)02 regulations were already analysed in existing TR 36.762, stick to the WI agreements and not introduce another TR for n87/n88 introduction.  **Proposal 5:** Further check with MCC if it would be allowed to reuse the existing TR 36.762 for the purpose of NR-related updated for bands n87/n88.  **Proposal 6:** Before RAN4 initiates work on co-ex/co-location table updates for n87/n88 introduction, follow-up on work-load reduction framework during remaining Rel-19 timeframe. |
| [R4-2413259](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413259.zip) | Huawei, HiSilicon | **Proposal 1:** Analyze table 6 and table 7 of Annex 3 in ECC/Dec/(16)02 for the identification of any applicable UE RF requirements for n87 and n88.  **Proposal 2:** Analyze table 5 and table 6 of Annex 2 in ECC/Dec/(19)02 for the identification of any applicable UE RF requirements for n87 and n88.  **Proposal 3:** baseline performance for receiver selectivity and blocking performance to follow specification of band n31/n72. |
| [R4-2413260](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413260.zip) | Huawei, HiSilicon | **Proposal 1:** Analyse annex 3 in ECC/Dec/(16)02 for the identification of any applicable BS RF requirements for n87 and n88.  **Proposal 2:** Analyse annex A2.2 and A2.3 in ECC/Dec/(19)02 for the identification of any applicable BS RF requirements for n87 and n88.  **Proposal 3:** Baseline performance for receiver selectivity and blocking performance to follow specification of band n31/n72.  **Proposal 4**: Analyse annex 4 in ECC/Dec/(19)02 for the identification of any applicable requirements for in-band/guardband/standalone NB-IoT operation in bands n87 and n88. |

## 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 3-1

*Sub-topic description: Work plan*

*Open issues and candidate options before meeting:*

**Issue 3-1: Work plan**

* Proposals
  + Option 1: Agree work plan in R4-2411999
  + Option 2: TBD
* Recommended WF
  + Option 1

### Sub-topic 3-2

*Sub-topic description: System parameters*

*Open issues and candidate options before meeting:*

**Issue 3-2: System parameters**

* Proposals
  + Option 1: Agree system parameters in R4-2411086 (CATT) and R4-2413107 (Nokia) – no need for enhanced channel raster
  + Option 2: Agree system parameters in R4-2411899 (ZTE) – there is a need for enhanced channel raster
* Recommended WF
  + TBD

CATT: regarding the need of enhanced channel raster, this band is requested as release independent.

Nokia: There is no use case for enh. Raster.

ZTE: We did not put the enhanced channel raster as mandatory. Both option 1 and option 2 are in the same direction.

Nokia: There is another band 51.

Agreement:

* Use the system parameters in R4-2411086 (CATT) and R4-2413107 (Nokia) as the starting point.
  + No need for enhanced channel raster

### Sub-topic 3-3

*Sub-topic description: CR responsibility*

*Open issues and candidate options before meeting:*

**Issue 3-3: CR responsibility**

* Proposals
  + Option 1:

|  |  |  |
| --- | --- | --- |
| **Specification** | **Company which contributed to RAN4#112** | **Proposed company for formal CR** |
| 38.101-1 | CATT, Ericsson, ZTE, Nokia | CATT |
| 38.133 | Ericsson, ZTE | Ericsson |
| 38.106 | ZTE | ZTE |
| 38.115-1 | ZTE | ZTE |
| 38.174 | ZTE | ZTE |
| 38.176-1 | ZTE | ZTE |
| 38.176-2 | ZTE | ZTE |
| 36.104 | Ericsson, Nokia | Ericsson |
| 36.141 | Nokia | Nokia |
| 37.104 | Ericsson, Nokia | Nokia |
| 37.141 | Nokia | Nokia |
| 38.104 | CATT, Ericsson, ZTE, Nokia | Nokia |
| 38.141-1 | Ericsson, ZTE, Nokia | Ericsson |
| 38.141-2 | Ericsson, ZTE, Nokia | Ericsson |
| 38.307 | ZTE | ZTE |
| 37.105 |  |  |
| 37.145-1 | ZTE | ZTE |
| 37.145-2 | ZTE | ZTE |

* + Option 2: TBD
* Recommended WF
  + Option 1

Huawei: ACS issue is not addressed here.

Nokia: we have a paper for UE RF requirement and system parameter and we can revise it.

# Topic #4: Introduction of NR band n68

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2411199](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411199.zip) | Ericsson | Work plan |
| [R4-2411200](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411200.zip) | Ericsson | **Proposal: Agree with the changes listed in this contribution.** |
| [R4-2411201](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411201.zip) | Ericsson | **Proposal: Agree with the changes listed in this contribution.** |
| [R4-2411202](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411202.zip) | Ericsson | draft CR |
| [R4-2411203](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411203.zip) | Ericsson | draft CR |
| [R4-2411204](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411204.zip) | Ericsson | draft CR |
| [R4-2411205](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411205.zip) | Ericsson | draft CR |
| [R4-2411206](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411206.zip) | Ericsson | draft CR |
| [R4-2411207](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411207.zip) | Ericsson | draft CR |
| [R4-2411208](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411208.zip) | Ericsson | draft CR |
| [R4-2411209](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411209.zip) | Ericsson | draft CR |
| [R4-2411633](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411633.zip) | Qualcomm Technologies Int | **Proposal 1: To introduce band 68 to NR NS\_26 and NS\_36 specifications must be verified not only with SCS=15kHz and DFTS waveforms but also with the NR specific metrics of SCS=30kHz and CPOFDM waveforms.**  **Proposal2: For simulations use the following parameters:**   * + **PA model calibration**     - **DFT-s-OFDM QPSK 20MHz**     - **100RB0**     - **4dB post PA loss**     - **1dB MPR**   + **Carrier Leakage: 28dBc**   + **IQ Image: 28dBc**   + **CIM3: 60dBc**   + **EVM: 17.5%**   + **SCS: 15kHz, 30kHz**   + **Waveform type: DFT-s-OFDM, CPOFDM**   + **ACLR: 30dB for PC3, 31dB for PC2** |
| [R4-2411900](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411900.zip) | ZTE Corporation, Sanechips | **Proposal 1: Approve Table 2-1 to Table 2-6 on system parameters for new Rel-19 specification.**  **Proposal 2: Approve Table 2-7 and Table 2-8 on RF requirements for new Rel-19 specification.**  **Proposal 3: Add n68 into FDL\_high < 2700 MHz and FUL\_high < 2700 MHz tables for IBB and OBB, and add n68 into NBB table for new Rel-19 specification.** |
| [R4-2411914](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411914.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411915](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411915.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411916](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411916.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411917](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411917.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411918](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411918.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411919](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411919.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411920](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411920.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411921](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411921.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411922](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411922.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411923](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411923.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411924](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411924.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2411946](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411946.zip) | Nokia | System parameters |
| [R4-2412396](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412396.zip) | ZTE Corporation, Sanechips | draft CR |
| [R4-2413110](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413110.zip) | Nokia | draft CR |
| [R4-2413111](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413111.zip) | Nokia | draft CR |
| [R4-2413112](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413112.zip) | Nokia | draft CR |
| [R4-2413113](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413113.zip) | Nokia | draft CR |
| [R4-2413114](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413114.zip) | Nokia | draft CR |
| [R4-2413115](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413115.zip) | Nokia | draft CR |
| [R4-2413116](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413116.zip) | Nokia | draft CR |

## 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 4-1

*Sub-topic description: Work plan*

*Open issues and candidate options before meeting:*

**Issue 4-1: Work plan**

* Proposals
  + Option 1: Agree work plan in R4-2411199
  + Option 2: TBD
* Recommended WF
  + Option 1

### Sub-topic 4-2

*Sub-topic description: System parameters*

*Open issues and candidate options before meeting:*

**Issue 4-2: System parameters**

* Proposals
  + Option 1: Agree system parameters in R4-2411900 and R4-2411946
  + Option 2: TBD
* Recommended WF
  + Option 1

Agreement: Use system parameters in R4-2411900 and R4-2411946 as the starting point.

### Sub-topic 4-3

*Sub-topic description: System parameters*

*Open issues and candidate options before meeting:*

**Issue 4-3: UE RF simulations**

* Proposals
  + Option 1: Agree to perform simulations according to R4-2411633
  + Option 2: TBD
* Recommended WF
  + TBD

Agreement: Agree to perform simulations according to R4-2411633

### Sub-topic 4-4

*Sub-topic description: CR responsibility*

*Open issues and candidate options before meeting:*

**Issue 4-4: CR responsibility**

* Proposals
  + Option 1:

|  |  |  |
| --- | --- | --- |
| **Specification** | **Company which contributed to RAN4#112** | **Proposed company for formal CR** |
| 38.101-1 | ZTE, Ericsson | Ericsson |
| 38.133 | ZTE, Ericsson | Ericsson |
| 38.106 | ZTE | ZTE |
| 38.115-1 | ZTE | ZTE |
| 38.174 | ZTE | ZTE |
| 38.176-1 | ZTE | ZTE |
| 38.176-2 | ZTE | ZTE |
| 36.104 | Nokia, Ericsson | Ericsson |
| 36.141 | Nokia | Nokia |
| 37.104 | Nokia, Ericsson | Nokia |
| 37.141 | Nokia | Nokia |
| 38.104 | Nokia, ZTE, Ericsson | Nokia |
| 38.141-1 | Nokia, ZTE, Ericsson | Ericsson |
| 38.141-2 | Nokia, ZTE, Ericsson | Nokia |
| 38.307 |  |  |
| 37.105 | Ericsson | Ericsson |
| 37.145-1 | ZTE | ZTE |
| 37.145-2 | ZTE | ZTE |
| 38.101-5 |  |  |

* + Option 2: TBD
* Recommended WF
  + Option 1