**3GPP TSG-RAN WG4 Meeting # 94-e-Bis R4-2011845**

**Electronic Meeting, 20 – 30 Apr., 2020**

**Agenda item:** 5.2 and 6.5.2

**Source:** Skyworks Solution Inc.

**Title:** Email discussion summary for [96e][105] LTE UE RF maintenance

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion and provide some guidelines for email discussion if necessary.*

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

* 1st round: 5 topics to be discussed for agenda:
* 5.2: LTE UE RFmaintenance up to R15
	+ Topic 1.1: NB-IoT: FCC issue in 100kHz at band edge
	+ Topic 1.2: NB-IoT: power control for TDD
	+ Topic 2.1: H2 exception for B51 protection from B85
* 5.5.2: LTE UE RF maintenance up to R16
	+ Topic 3.1: Corrections to Bands and CA:
	+ Topic 4.1: CA\_48B A-MPR
	+ Topic 5.1: DeltaT SRS for LTE
* 2nd round: TBA

# Topic #1: 5.2 NB-IoT

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2011336**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011336.zip)Further considerations on NB-IoT to meet FCC regulatory requirements | Qualcomm Incorporated | Observation 1: **For FCC specification #27.53(c), the emission of -13dBm/30kHz is verifying at the band edge of Band 13 which spans from 777-787MHz.** Observation 2: **Even with 100kHz exclusion, the devices which are based on 3GPP SEM could not meet the FCC requirements of -13dBm/30kHz at immediate 100kHz outside the channel edge.**Proposal 1: **To meet FCC # 27.53 part (c) and part (g) requirements, 200kHz exclusion is needed for Band 13, 12, 17, 71 and 85.** Proposal 2: **The exclusion of first and last 100kHz for Band 4, 66, 2, 25, and 5 is needed to meet FCC # 27.53 part (h), # 24.238, and # 22.917 band-edge requirement.**Observation 3: **Multiple NS could solve the backward compatibility issue if NS\_04 is introduced to meet FCC regulation.**Propose 3: **Modify the NS\_04 to exclude the first and last 200kHz for Band 13, 12, 17, 71, 85 and exclude the first and last 100kHz for Band 4, 66, 2, 25, 5 .** |
| [**R4-2010581**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010581.zip)NBIOT standalone operation for FCC regulation considerations | MediaTek Inc. | Proposal 1: ***Proposal 1: We propose to modify NS\_04 for category NB1 and NB2 device for operating bands 2, 3, 4, 5, 12, 17, 25, 26, 66, 71, 85. The lower limit and upper limit of operating bands are 100KHz narrower from both lower and upper band edge defined in Table 5.5-1 to account for the FCC regulations.***Proposal 2: ***We propose to introduce the new network signalling from Rel-14.***Moderator: ***see associated CR below*** |
| [**R4-2011400**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011400.zip)Test frequencies for NB-IOT UE in standalone operation | Sony | Observation 1: TS 36.104 test conditions (test frequencies) for both stand-alone and guard-band NB-IoT operation are conflicting with FCC band-edge spectrum emission requirements.Observation 2: There is also an inconsistency between TS 36.508 and TS 36.104 regarding testing of NB-IOT UE in standalone operation.Proposal 1: RAN4 to confirm there is inconsistency between TS 36.508 and FCC regulation and between TS 36.104 and TS 36.508.Proposal 2: If so, send an LS to RAN5 with proposal to exclude the first and last EARFCNs in TS 36.104 test frequencies for both stand-alone and guard-band IoT operation modes for all frequency bands were FCC regulation applies. |
| [**R4-2010582**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010582.zip)CR for TS 36.101: CR for category NB1 against FCC regulation in standalone mode | MediaTek Inc. | R14 CR: Comment in CR table: R15/16 Mirror CRs R4-2010583, R4-2010584 |
| [**R4-2010937**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010937.zip)Update to NB-IOT aggregate power control tolerance for TDD | Huawei, HiSilicon | R15 CR Comment in CR table: R16 Mirror CR R4-2010963 |

## Open issues summary

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

### Sub-topic 1-1

*Sub-topic description:* New FCC requirement in 100kHz of the US bands edges cannot be fulfilled by NB-IoT. Qualcomm paper is propsing a 200kHz exclusion in some bands

*Open issues and candidate options before e-meeting:* Introduce CR to enable NS\_04 to reduce bands by proper amount

**Issue 1-1: FCC rule in 100kHz**

* Proposals
	+ Option 1: [**R4-2010581**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010581.zip)Modify NS\_04 for category NB1 and NB2 device for operating bands 2, 3, 4, 5, 12, 17, 25, 26, 66, 71, 85. The lower limit and upper limit of operating bands are 100KHz narrower from both lower and upper band
	+ Option 2: [**R4-2011336**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011336.zip)Modify the NS\_04 to exclude the first and last 200kHz for Band 13, 12, 17, 71, 85 and exclude the first and last 100kHz for Band 4, 66, 2, 25, 5.
	+ Option 3: [**R4-2011400**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011400.zip)Send an LS to RAN5 with proposal to exclude the first and last EARFCNs in TS 36.104 test frequencies for both stand-alone and guard-band IoT operation modes for all frequency bands were FCC regulation applies.
* Recommended WF
	+ Proponents to align on need for CR or simple modification of test frequencies
	+ Align on the list of bands
	+ Agree if 200kHz exclusion is needed in some bands?
	+ Align in MediaTek CR or send LS to RAN5

### Sub-topic 1-2

*Sub-topic description :*NB-IoT aggregate power control tolerance for TDD

*Open issues and candidate options before e-meeting:* introduce CR R4-2010937 to increase evaluation time to account for TDD operation

**Issue 1-2: Power control for TDD**

* Recommended WF
	+ Introduce CR, CR to be commented in CR section

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Sub topic 1-1: We understand a solution shoud be found to enable NB-IoT UE certification. As explained in previous meeting, specifying NS\_04 to address this issue looks very weird (if acceptable by FCC). If it’s not possible to add this restriction in the license agreement (in between FCC and operators then), we are still wondering if it won’t be better to clearly exclude the 100 kHz on band edge from the definition of those bands for NB-IoT SA. Note that this would require TS 36.104, TS 38.104 and TS 36.101 updates.Option 2 is not acceptable, there is no evidence 200 kHz shall be excluded, that was not even requested in previous contributions.Options 3 is based on wrong observations: - As we explained in previous meeting, NB-IoT operation in guard band is not an issue as there won’t be any such NB-IoT carrier deployed at 100 kHz from band edge, this is specified via Table 6.6.2F.1-2 in TS 36.101.- The 200 kHz frequency offset defined in TS 36.104) is used to specify where requirements (e.g. ACLR, OBUE, …) specification starts, and doesn’t specify any offset to band edge.Sub topic 1-2:We agree this CR is needed but we are wondering the rationale for the 81ms and 177ms values, how those values was calculated?  |
| CHTTL | Sub topic 1-1: In the last meeting, people are ok not to include the band 3 here, since band 3 is not a US band, is there any update on this? Cuz I saw band 3 is listed in Option 1. |
| MediaTek | Sub topic 1-1: To CHTTL, sorry that I missed removing band 3. CRs will be corrected accordingly if they are agreed. The CRs may be further updated according to discussion outcome.For option 2 observation, if we look at TS36.101 Table 6.6.2F.1-1, the emission mask of cat NB1/NB2 device is -8dBm/30KHz with ΔfOOB(starting from the ±edge of the assigned category NB1 or NB2 channel bandwidth) =150KHz which is obviously fail FCC regulation. Thus the proposal seems reasonable. |
| DISH | Sub-topic 1-1:Option 2 is not acceptable at all.We are ready to work on finding the best approach to address the 100kHz exclusion, but like said 200kHz is not ok. |
| Qualcomm | Sub topic 1-1: For FCC # 27.53 part (c) and part (g), the SEM is -13dBm/30kHz at immediate 100kHz outside the channel edge. While in Table 6.6.2F.1-1 of TS36.101, the 3GPP SEM is -5dBm atΔfOOB of ± 100 kHz. That means even 100kHz offset is applied, NB-IoT devices which have been designing based on 3GPP SEM will not pass the FCC requirements. Table 6.6.2F.1-1: category NB1 and NB2 UE spectrum emission mask

|  |  |  |
| --- | --- | --- |
| ΔfOOB (kHz) | Emission limit (dBm) | Measurement bandwidth |
| ± 0 | 26 | 30 kHz  |
| ± 100 | -5 | 30 kHz |
| ± 150 | -8 | 30 kHz |
| ± 300 | -29 | 30 kHz |
| ± 500-1700 | -35 | 30 kHz |

To align the SEM between FCC and 3GPP, 200kHz offset is needed for the bands which are related with 27.53 part (c) and part (g). For other bands, 100kHz is enough.We prefer to use NS solution. Adding a note in the spec to indicate the restrictions of 100kHz/200kHz offset will not solve the FCC certification issues.Sub topic 1-2:The explanations on how to derive the values of 81ms and 177ms are needed. |
| Huawei | Sub-topic 1-1:Option 1: Not sure if Multi-NS can really solve the backward compatibility issue. If a UE is allowed to fall back to NS\_01, it means NS\_04 is unnecessary. And from the spec point of view, it’s not clear if NS\_04 would be mandatory to be broadcasted when operating in the related bands. Overall, we do not object to exclude band edge frequencies for NB-IoT operations, but the proposed solution has some unanswered questions.Option 2: Same comments on Multi-NS. Additionally, it’s not clear why 200 kHz offset might be needed. For example, in Fig 1 why would the out-of-band measurement filter overlap frequencies within the band?Option 3: Agree with Ericsson. The said inconsistency is untrue.Sub-topic 1-2:The time duration values are calculated based on UL/DL configuration 1, NPDCCH period of 4 ms and scheduling delay of 8 ms. More details can be found in the spreadsheet shared in the draft folder

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| icon | [NB-IoT\_TDD\_Aggregated\_Power\_Control\_by\_Huawei.xlsx](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Inbox/Drafts/%5B105%5D%20LTE_Maintenance/NB-IoT_TDD_Aggregated_Power_Control_by_Huawei.xlsx) |

. |
| Sony | Sub topic 1-1: We think option 3 proposing 200kHz carrier offset (1 EARFCN exclusion) in BS spec TS 36.104 for both stand-alone and guard-band NB IoT modes is the simplest solution. This should be reflected also for the applicable test frequencies in TS 36.508 where we think a correction is needed. Correcting TS 36.508 doesn’t preclude the other options.The network signalling solution for all FCC regulated bands (like modified NS\_04 Option 1 or Option 2) is also acceptable for us. However, corresponding update of test frequencies in TS 36.508 will also be required. (Currently there is no such exclusion on band edges for stand-alone and guard-band operation)We agree also with QCOMM proposal (option 2). The 200kHz exclusion in Option 2 would provide alignment between 3GPP spectrum emission mask and FCC band edge requirements. Thus, the 3GPP compliance would guarantee compliance with FCC band-edge spectrum emission regulation providing formal matching between 3GPP spectrum emission mask requirements and FCC band-edge spectrum emission requirements. |
| T-Mobile USA | Sub topic 1-1: We think that more work is needed on this issue. For instance, we would like to get clarification from the FCC if the emission requirement of -13 dBm/30 kHz or -13 dBm/1% applies at the edge of the 3GPP band or the edge of the “FCC band.” As can be seen in this FCC document, the FCC acknowledges that the edge of the “FCC band” is not the same as the edge of the 3GPP band: <https://transition.fcc.gov/oet/ea/presentations/files/nov19/24-EMC-Measurement-Updates-DT.pdf> Since 3GPP already built in a 1 MHz guardband at the lower edge of Band 12, that should be more than adequate to meet the emissions requirements at the low edge of the FCC band/operator’s license at 698 MHz. If we exclude 100 kHz or (hopefully not) 200 kHz at the bottom edge of 3GPP Band 12 for NB-IoT, then will the labs start testing emissions at 699.1 or 699.2 MHz? Where does it end?As for the three options, we agree with DISH that Option 2 is completely unacceptable. While we understand Qualcomm’s point that based on the NB-IoT SEM 200 kHz offset would be required to meet -13 dBm/30 kHz, we think that the current NB-IoT SEM is extremely loose and we do not think that 200 kHz exclusion would be necessary. Simulations from Qualcomm and measurements from MediaTek have shown that -13 dBm/30 kHz can easily be met at 100 kHz. If there is concern about current designs not being able to meet -13 dBm/30 kHz at 100 kHz we think that NS signalling could be used to indicate a requirement of -13 dBm/30 kHz at 100 kHz from the NB-IoT channel edge. As we know from other bands, the FCC labs do testing with NS signalling turned off. So if the NS signalling one of the proposed NS signalling approaches that has been proposed to exclude the band edge is chosen, a UE would need to look at the country code to determine that it is operating in the USA, then not transmit if the NB-IoT carrier is too close to the edge of the band. So once these NB-IoT devices are deployed, they will never be able to operate in the USA in the excluded spectrum, even if rules or testing procedures change so that operation at the edge of the band would be legal. And since NB-IoT devices have potentially extremely long operating lives, it would be best to make sure the solution is both necessary and adequate before proceeding. We also think that clarification from the FCC is needed on whether the first measurement “bin” lies outside of the “band” or straddling the edge of the band. The FCC wording in 27.53 says “However, in the 100 kilohertz bands **immediately outside and adjacent to** a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.” But Figure 1 of R4-2011336 shows the 30 kHz measurement overlapping the Nb-IoT channel by 15 kHz. While that may be how labs are testing, we don’t think that is aligned with he wording in the regulations. We are more aligned with Option 3, but we think that it needs to be clarified if this offset applies at the edge of the 3GPP bands or the “FCC bands.” As we said above, we think that the offset is not necessary at the lower edge of Band 12 because the lower edge of 3GPP Band 12 is at 699 MHz, but the lower edge of FCC Band 12 and the US A block license is at 698 MHz, so there is 1 MHz guard band built in. We think that 38.104 would need to be modified to indicate that the 200 kHz Foffset that applies for standalone operation also applies for Guardband operation. Also, as we said, we think that the NB-IoT SEM would need to be modified so that the requirement is -13 dBm at 100 kHz. Based on simulations from Qualcomm in R4-2007564 and measurements from MediaTek in R4-2003987 -13 dBm/30 kHz 100 kHz from the edge of the NB-IoT channel should be easily achievable. For these reasons, we think that this issue needs further study and work with the FCC to find an acceptable solution.  |

### 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** |
| [**R4-2010582**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010582.zip)R14 CR | CHTTL: same comment as in 1.3.1. |
| DISH: Needs work on second round based on company’s views |
| Qualcomm: Need to check if 200kHz is needed for some bands to align the SEM between 3GPP and FCC regulation.T-Mobile USA: We do not agree with this CR. We think that NS signalling is an ugly solution. These NS values would never be transmitted because it would be like building a road and then putting up “Do Not Enter” signs everywhere. Also, we need FCC for clarification if the edge of the FCC band or the edge of the 3GPP band is where the emission requirements apply. |
| [**R4-2010937**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010937.zip)R15 CR | Qualcomm: The explanations on how to derive the values of 81ms and 177ms are needed. |
| Huawei: Regarding the time calculation, please see my comments in 1.3.1. |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

**Issue 1-1: FCC rule in 100kHz**

First Band 3 needs to be removed from the list of candidate bands: CRs must be revised for this

On the use of NS04 (or any NS): There are doubts from some companies that this will be able to solve the issue because test labs may not signal NS anyhow. So it may be useful to find other means to exclude 100 kHz from the band

There is no agreement that 200 kHz exclusion is needed depending on whether the measurement BW overlaps with the band or not. Based on NB-IoT SEM up to -5dBm/30kHz is allowed at 100kHz but this is for a 30kHz filter centered at 100kHz offset that would partially overlap the band.

There is consensus to find a solution to solve the 100kHz exclusion.

**Issue 1-2: Power control for TDD**

There is agreement that issue needs to be solved

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|  | **Status summary**  |
| **Sub-topic#1-1** | *Tentative agreements:*It is agreed that Band 3 is not part of this issue and needs to be removed from the list: Will ask chairman to add this in his notes*Candidate options:** Solve issue for 100kHz offset and discuss the most appropriate solution in round2
* Further Discuss/study the need for up to 200 kHz offset and if no agreement postpone to next meeting.

*Recommendations for 2nd round:** Discuss the most appropriate solution for 100 kHz exclusion that solves the certification issue
* Align understanding on 200 kHz issue or not. If needed a WF will can be assigned
 |
| **Sub-topic#1-2** | *Tentative agreements:* There is consensus that CR is needed but values should be justified*Candidate options:* Values from CR [R4-2010937](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010937.zip) and justification from [NB-IoT\_TDD\_Aggregated\_Power\_Control\_by\_Huawei.xlsx](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Inbox/Drafts/%5B105%5D%20LTE_Maintenance/NB-IoT_TDD_Aggregated_Power_Control_by_Huawei.xlsx)*Recommendations for 2nd round:* Above values are verified by other companies and if no other values can be justified agreed CR (or revise CR is other values are justified and agreed) |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

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| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| [**R4-2010582**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010582.zip)R14 CR | Needs revision in any case to remove Band 3. Beyond that it does not seem agreeable as is but may be revised to capture agreements on how to capture 100kHz exclusion |
| [**R4-2010937**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010937.zip)R15 CR | Depending on agreement on time calculations the CR is agreed or revised |

## Discussion on 2nd round (if applicable)

### Sub-topic 1-1-1

*Sub-topic description:* Discuss the most appropriate solution for 100 kHz exclusion that solves the certification issue

### Sub-topic 1-1-2

*Sub-topic description:* justification of need to exclude 200 kHz or not

### Sub-topic 1-2

*Sub-topic description:* confirmation or correction of time duration values from Huawei proposal in order to agree or Revise CR

### Open issues for 2nd round

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| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1-1: Sub topic 1-1-2: |

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

# Topic #2: 5.2 Band 85 spurious emmisions

*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** |
| [**R4-2009546**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009546.zip)Correction to band 85 spurious emission limits UE co-existence | Sequans Communications | R15 CR Comment in CR table: R16 Mirror CR R4-2009547 |

## Open issues summary

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

### Sub-topic 2-1

*Sub-topic description:* Request of an exception to band protection for harmonic 2 of band 85 in band 51

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

**Issue 2-1: H2 exception for band 51 protection by band 85**

* Recommended WF
	+ Discuss validity of exception in the CR comment

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1: ….Others: |
| Sony | We support the Proposal in R4-2009546 |
| T-Mobile USA | We agree with the need to note the harmonic exception. |

### 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** |
| [**R4-2009546**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009546.zip)R15 CR |  T-Mobile USA: We agree with the CR. |
| Mediatek: Agree with the CR. The uplink 2nd harmonic exception need to be considered. |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

No opposing comment to the CR and supported by two companies

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

*Suggestion on WF/LS assignment*

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

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| [**R4-2009546**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009546.zip)R15 CR | Agreeable, with R16 mirror CR R4-2009547 |

# Topic #3: 6.5.2 Corrections to Bands and CA

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2009938**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009938.zip)Coexistence cleanup for 36101 Rel16 | Apple Inc. | Removes some band protections in CA\_4\_28Moderator: R16 CR, Comment in CR table |
| [**R4-2011521**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011521.zip)CR to 36.101 Removal band 10 protection | Skyworks Solutions Inc. | E-UTRA Band 10 protection: removed from E-UTRA bands 2,4,5,7,13,14,24,25,26,27,30,38,41,42,43,66,70,85Moderator: R16 CR, Comment in CR table |
| [**R4-2010702**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010702.zip)CR to 36.101 to correct band combinations in Rel-16 | Ericsson | This CR correct the following band combinations:CA\_20A-41A, CA\_20A-41C, CA\_20A-41DModerator: R16 CR, Comment in CR table |
| [**R4-2011525**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011525.zip)CR to 36.101 Removal of CA\_NS\_08 | Skyworks Solutions Inc. | CA\_NS\_08 is no longer needed as B42 networks are synchronized Moderator: R16 CR, Comment in CR table |
| [**R4-2011526**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011526.zip)CR to 36.101 Correction to CA\_NS\_10 | Skyworks Solutions Inc. | CA\_NS\_10: A-MPR for some region border RB allocations is undefined Moderator: R16 CR, Comment in CR table |

## Open issues summary

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

### Sub-topic 3-1

*Sub-topic description:* Corrections of band protections

### Sub-topic 3-2

*Sub-topic description;* Corrections of CA\_20-41 cases

### Sub-topic 3-2

*Sub-topic description;* Corrections of NS\_08 and NS\_10

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 3-1: Sub topic 3-2:Sub topic 3-3: |

### 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** |
| [**R4-2009938**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009938.zip)R16 CR | Skyworks. Thanks for bringing the clean-up CR. It seems further simplification could be achieved in this CR by removing e-utra band 28 from the first row as suggested below (see yellow highlight).Justification: Band 28 Rx band is protection is already guaranteed by the last two rows in frequency ranges 758-773 (-32dBm/MHz), and 773-803 (-50 dBm/MHz). So B28 protection level of -50dBm/MHz in first row can be removed. We believe this is a copy and paste inheritance from the band 4 protection list.See below:Band 4 protection list:Band 28 protection list: |
| Apple: Sounds fine for us. Changes will be provided in a revision. |
|  |
| [**R4-2010702**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010702.zip)R16 CR | Company A |
| Company B |
|  |
| [**R4-2011521**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011521.zip)R16 CR | Huawei: Question for clarification: please explain why band 10 protection becomes unnecessary. |
| Skyworks: To Huawei, the rationale is that as far as we are aware, we believe band 10 has never been deployed. |
|  |
| **[R4-2011525](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011525.zip)**R16 CR | Nokia: What about single carrier A-MPR and NS-signaling for bands 42 and 43, Anyway we are ok with this as there are no un-synchronized networks as far we know. |
| Huawei: Question for clarification: please explain why the ASE requirement becomes unnecessary. The cover sheet says it’s because B42 networks are synchronized. If so, what about NS\_22 and NS\_23 for non-CA? |
| Skyworks: To Huawei. Good point. The motivation is that as far as we are aware, there are no un-synchronized networks, that’s why we propose this CR. For your question about NS\_22, and NS\_23, you are making a good point. We received similar offline comments and we intend to file a CR for NS\_22 and NS\_23 at next meeting unless we are allowed to make that change in a revision of this CR at this meeting. |
|  |
| [**R4-2011526**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011526.zip)R16 CR | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

Please find below the recommended WF in the CR/TP section

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| [**R4-2009938**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009938.zip) | To be revised to remove B28 from CA\_4-28 protected band list as the B28 frequency range has already specified protection levels. |
| [**R4-2010702**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010702.zip) | Agreeable as there is no comment |
| [**R4-2011521**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011521.zip) | Huawei to confirm if Skyworks’ answer is acceptable. If so CR is agreable |
| [**R4-2011525**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011525.zip) | Comments from companies’ question why some other NS are not removed since the same reasoning applies. After further consolidation of all NS that can be removed due to B42 synchronous operation, the CR is revised to include those |
| [**R4-2011526**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011526.zip) | Agreeable as there is no comment |

## Discussion on 2nd round (if applicable)

### Sub-topic 3-1

*Sub-topic description:* consolidation of all NS that can be removed due to B42 synchronous operation to revise [**R4-2011525**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011525.zip)

### Open issues for 2nd round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 3-1:  |

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #4: 6.5.2 CA\_48B A-MPR

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2010227**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010227.zip)A-MPR definition for CA\_48B | Nokia | E-UTRA UL CA configuration CA\_48B is already specified in clause 5 but A-MPR is missing. This CR is based on simulation results presented in R4-2006493.Moderator: Comment in CR table |

## Open issues summary

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

### Sub-topic 4-1

*Sub-topic description:*A-MPR for CA\_48B is proposed

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

**Issue 4-1: CA\_48B A-MPR**

* Recommended WF
	+ Moderator note: Similar discussion is happening for CA\_n48B with input from more companies, which for DFT-s-OFDM 15kHz cases is comparable with CA\_48B with only some RB allocation differences.
	+ WF: Align outcome with CA\_n48B if possible

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Sub topic 4-1: We prefer to re-use NS\_27 A-MPR. The discussion for NR CA\_n48 is ongoing. Suggest to aligning A-MPR between LTE and NR.Others: |

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2010227**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010227.zip)R16 CR | Skyworks: We suggest aligning A-MPR definitions between NR DFT-s-OFDM NR and LTE for CA\_48B. This is discussed in thread [113]. |
| Qualcomm: We prefer to re-use NS\_27 A-MPR. The discussion for NR CA\_n48 is ongoing. Suggest to aligning A-MPR between LTE and NR. |
| Nokia: We are ok with moderator proposal, we do not think it is easy to use single carrier A-MPR for UL CA. We have done the simms, why not use the results. |
| Huawei: Share similar views with Skyworks and Qualcomm. |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

This topic is linked to same discussion in NR in #113 and it is suggested to adopt the same solution and values than what is proposed for NR DFT-s-OFDM NS27 for n48B. For NR there is consensus that non-contiguous outer allocations A-MPR is higher than what is proposed here. CR [**R4-2010227**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010227.zip)is revised to capture these agreements.

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

*Suggestion on WF/LS assignment*

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

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| [**R4-2010227**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010227.zip) | CR is revised to capture agreements based on n48B discussion in #113 |

## Discussion on 2nd round (if applicable)

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #5: 6.5.2 DeltaT SRS for LTE

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2011527**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011527.zip)DeltaTRxSRS for LTE Pcmax | Skyworks Solutions Inc. | Proposal 1**: Introduce** **ΔTRxSRS term in LTE Pcmax equation for operation in bands whose FUL\_high is lower than 4.4 GHz.**Proposal 2: **For LTE operation in bands whose FUL\_high is lower than 4.4GHz, adopt ΔTRxSRS = [3dB].** |

## Open issues summary

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

### Sub-topic 5-1

*Sub-topic description:* SRS switching is a feature in LTE and DeltaT SRS is missing

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

**Issue 5-1: DeltaTRxSRS in LTE**

* Proposals
	+ Option 1: Introduce ΔTRxSRS term in LTE Pcmax equation for operation in bands whose FUL\_high is lower than 4.4 GHz. ΔTRxSRS = [3dB]
	+ Option 2: TBA
* Recommended WF
	+ Discuss need and value in Round 1
	+ If introduction is agreed in round1 a CR can be allocated.

### Sub-topic 5-2

*Sub-topic description*

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

**Issue 5-2: TBA**

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

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Sub topic 5-1: Clarification questions: Does the DeltaTRxSRS only for LTE TDD bands? What’s release will be impacted?Sub topic 5-2:….Others: |
| Huawei | Sub-topic 5-1:Which release would this CR target for? Note that the LTE specs are already very stable, the impact to existing networks should be minimized. Additionally, LTE SRS-TxSwitching is a bit different from NR, e.g. LTE supports 2T4R-3pairs. Further study may be needed. |

### 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** |
| [**R4-2011527**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011527.zip)R15 CR | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

There is more discussion needed to introduce DeltaTRxSRS for LTE. Discussion can continue in round 2 to allow WF for next meeting. There is no formal objection to the introduction but mare questions needs to be addressed by proponent.

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

*Suggestion on WF/LS assignment*

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

### CRs/TPs

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

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

## Discussion on 2nd round

### Sub-topic 5-1

*Sub-topic description:* SRS switching is a feature in LTE and DeltaT SRS is missing

*Open issues for second round:*

**Issue 5-1:** which release will be impacted?

**Issue 5-2:** introduced only for LTE TDD bands?

**Issue 5-3:** applicability of NR requirement to LTE specifics.

### Open issues for second round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXXX | issue 5-1:  |

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |