**3GPP TSG-RAN WG4 Meeting # 96-e draft** **R4-2011873**

**Electronic Meeting, 17 – 21 Aug., 2020**

**Agenda item:** 10.24

**Source:** Hisashi Onozawa (Nokia)

**Title:** Email discussion summary for [96e][135] NR\_47GHz\_Band

**Document for:** Information

# Introduction

New work item (RP-201232): introduction of NR 47 GHz band by T-Mobile USA and Dish Network was approved in RAN#88-e. This is the first RAN4 meeting to kick off the work item. The work plan, TR, and initial analysis of requirements are going to be discussed.

# Topic #1: Workplan and TR structure

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2010520**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010520.zip)  Workplan for Introduction of NR 47 GHz band | Nokia, Nokia Shanghai Bell | |  |  | | --- | --- | | **Meeting** | **RF** | | RAN4#96-e  August 2020 | **Discussions on**   * Regulatory backgrounds * Table of contents of TR * Band plan, Band number, and System parameters * Initial discussion on RF, Demod, and RRM requirements   **Expected Agreements on**   * Workplan * TR structure | | RAN4#97-e  October 2020 | **Discussions on**   * System parameters * Coexistence requirements (such as 3GPP band coexistence) * UE RF requirement   + Band specific Tx/Rx requirements such as EIRP/EIS requirement including spherical coverage and Multi-band relaxations * BS RF requirement   + Band specific Tx/Rx requirements * RRM requirements * UE Demod requirements * BS conformance requirements * draft CRs   **Expected Agreements on**   * Completed TPs to TR on the above topics. | | RAN4#98  March 2021 | **Discussions on**   * Remaining issues from RAN4#97-e   **Expected Agreements on**   * Final draft TR * All CRs (to TS 38.101-2, TS 38.133, TS 38.104, TS 38.141-2, TS 38.101-4) | |
| [**R4-2010445**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010445.zip)  TR 38xxx Introduction of NR Band 26x (47Ghz band) | Ericsson | Contents  Foreword  1 Scope  2 References  3 Definitions of terms, symbols and abbreviations  3.1 Terms  3.2 Symbols  3.3 Abbreviations  4 Background  5 NR Frequency band definition  6 Channel numbering and channel bandwidth  7 Configurations for intra-band contiguous CA  8 RF requirements  8.1 UE specific  8.1.1 Transmitter characteristics  8.1.2 Receiver characteristics  8.2 BS specific  8.2.1 Transmitter characteristics  8.2.2 Receiver characteristics  9 RRM  9.1 Frequency bands grouping  9.2 Conditions for RRM requirements applicability for operating bands  9.2.1 Minimum SSB\_RP values for Rx Beam Peak angle of arrival  9.2.2 Minimum SSB\_RP values for angle of arrival within Spherical coverage  Annex A (informative): Change history |

## Open issues summary

The discussion is open to suggest improvement or modification to the work plan and TR structure if any.

### Sub-topic 1-1 Workplan

Sub-topic 1-1: Please leave the first round comments in 1.3.1 to the proposed work plan.

### Sub-topic 1-2 Draft TR

Sub-topic 1-2: Please leave the first round comments in 1.3.1 to the proposed TR structure.

## Companies views’ collection for 1st round

### Open issues

|  |  |
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| **Company** | **Comments** |
| Rohde & Schwarz | Sub Topic 1-1: Testability should be considered when discussing the requirements for this new band. Since this new band extends beyond the currently defined upper frequency of 43.5 GHz, the impact on testability needs to be investigated. In our understanding, whether this needs to be part of this work plan or should be part of the testability SI can be discussed, but it needs to be taken into account. |
| Apple | We agree with R&S and also agree to pull the testability aspects into the scope of FR2\_enhTestMethods |
| MediaTek | Sub Topic 1-1 (Workplan):  R&S’s comment is made sense for us, too. |
| Intel | Sub topic 1-1: Workplan  We also agree, testability aspects should be discussed and addressed |

### CRs/TPs comments collection

N/A

## Summary for 1st round

### Open issues

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| --- | --- |
|  | **Status summary** |
| **Sub-topic#1-1** | Tentative agreements: Other than the testability issues, the contents of R4-2010520 is agreeable.  Recommendations for 2nd round: As suggested by Apple and R&S, it appears necessary to ask SI: FS\_FR2\_enhTestMethods to cover the UE testability aspect above 43.5 GHz.   * WF is assigned to summarize how to treat UE testability aspects above 43.5 GHz.   Core requirement can be worked on according to the proposed workplan. Further check if the workplan needs to be revised.  BS testability issue is summarized in Topic #5 BS RF since BS conformance is already in the scope of this WI. |
| **Sub-topic#1-2** | Tentative agreements: TR skeleton (R4-2010445) is recommended agreed. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on UE testability above 43.5 GHz | R&S, Apple |

### CRs/TPs

N/A

## Discussion on 2nd round (if applicable)

The purpose of the 2nd round discussion is to agree the WF and Workplan.

Possible contents of the WF on UE testability above 43.5 GHz are

* Issues of testing UE above 43.5 GHz.
* Scopes to add in the testability SI (such as MU/TT budgets, etc).

Is workplan agreeable for the core part of the work item?

|  |  |
| --- | --- |
|  | **Comments** |
| **WF on UE testability above 43.5 GHz.** | Company name: Comments |
| **Workplan** | Company name: Comments |

## 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 #2: Reguratory requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2009957**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009957.zip) | Apple | Observation 1: The Max EIRP requirement of 43 dBm for Power Class 3 defined in TS38.101-2 is applicable to the new 47 GHz band.  Observation 2: The general NR spectrum emission mask for FR2 is aligned with the FCC regulation.  Observation 3: RAN4 should study whether A-MPR is needed for UEs operating in the new 47 GHz band to comply with the FCC requirement of unwanted emissions power in the band 50.2-50.4 GHz shall not exceed −20 dBW/200 MHz.  Observation 4: FCC does not define unwanted emission limits for FSS protection in the 48.2 – 50.2 GHz frequency range beyond the general emission maks.  Observation 5: There exists the potential for the FCC to take further action to define emission requirements for the protection of FSS in 24.75-25.25 GHz, 47.2-48.2 GHz, and 50.4-51.4 GHz frequency ranges.  Observation 6: At this time, only regional regulations provided by the FCC are available for the new 47 GHz band.  Proposal 1: Companies are encouraged to reach a common understanding of the regulatory requirements for the new 47 GHz band.  Proposal 2: RAN4 should discuss how to define general and regional emission requirements in a way that can allow for future extensions of the requirements to additonal regions.  Moderator: UE RF issues are treated in Topic 4. |
| [**R4-2010447**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010447.zip)  47GHz band - Regulatory overview – Band plan - System parameters | Ericsson | Regulatory overview; no particular proposal.  Moderator: System parameters are treated in Topic 3. |
| [**R4-2010521**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010521.zip)  Regulatory Background of 47 GHz band | Nokia | Observation 1: There is no specific coexistence requirement in RR for the BS and UE to protect other services in terms of the scope of 3GPP work.  Observation 2: The band can be reused outside of even if additional coexistence requirement is introduced in future using the network signaling mechanism.  Observation 3: The general emission requirements for 47.2 – 48.2 GHz in FCC are aligned with the requirements of band n260 and n261.   |  |  | | --- | --- | | Channel arrangement | 47.2-47.3 GHz; 47.3-47.4 GHz; 47.4-47.5 GHz; 47.5-47.6 GHz; 47.6-47.7 GHz; 47.7-47.8 GHz; 47.8-47.9 GHz; 47.9-48.0 GHz; 48.0-48.1 GHz; and 48.1-48.2 GHz | | Power limit (EIRP) | Base station +75 dBm/100MHz  Mobile station +43 dBm  Transportable station +55 dBm | | Unwanted emissions | +5 dBm/MHz (within 10% of channel bandwidth separation)  +13 dBm/MHz (outside more than 10% of channel bandwidth apart) | |

## Open issues summary

The overview of regulatory requirement is presented in three contributions above. Other than IMT identification by ITU-R, only available regulations up to date are the FCC rules.

### Sub-topic 2-1 Max EIRP and unwanted emissions

Sub-topic 2-1: There seems to be the common understanding in Apple and Nokia papers that the maximum EIRP and spectrum emission mask are aligned with existing FR2 band requirement.

Further discussion on UE power class and BS can be made in Topic 4 and 5 (UE and BS RF.)

In this sub-topic, only regulatory issue will be discussed if there is a different view from Apple and Nokia.

### Sub-topic 2-2 Coexistence with FSS

Sub-topic 2-2: Apple points out FSS coexistence requirement, where general mask works except −20 dBW/200 MHz for 50.2-50.4 GHz. It should be discussed if A-MPR should be defined or not. In order to support regulations possibly specified by FCC and/or other regulators later, the band should be specified with flexibility to include such future extension.

Please indicate if there is a different view from Apple.

A-MPR value and NS framework can be discussed in Topic 4 (UE RF).

### Sub-topic 2-3 Additional regulations

Sub-topic 2-3: Although there are no available regulations than FCC, it seems agreeable to specify this band as a global band and support regulations possibly made in future.

NS and A-MPR can be further discussed in topic 4 (UE RF). however, if there is anything to discuss on this issue, please leave comments in 2.3.1.

### Sub-topic 2-4 Others

Sub-topic 2-4: If something is not covered above, please propose a new issue.

## Companies views’ collection for 1st round

### Open issues

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| --- | --- |
| **Company** | **Comments** |
| Nokia | Sub topic 2-2: We understand that FSS protection is not applicable for stations in 47.2-48.2GHz. There is no need to study NS and A-MPR for FSS protection in the US.  Sub topic 2-3: Using a flexible NS framework, we think we can incorporate the regulatory requirement specified in the future. |
| T-Mobile USA | Sub topic 2-2: We do not understand why Apple concludes that RAN4 should study A-MPR for UEs in 47.2-48.2 GHz band to comply with the FCC requirement of unwanted emissions power in the band 50.2-50.4 GHz to not exceed −20 dBW/200 MHz. We’ve found nothing in Apple’s contribution R4-2009957 that can arrive at such a conclusion. R4-2009957 states that “There exists the potential for the FCC to take further action to define emission requirements for the protection of FSS in 47.2-48.2 GHz,…” Our view is that RAN4 need not study something for FCC’s potential future action. RAN4 has the option to introduce future requirements if needed via NS signalling.  Sub topic 2-3: We think a flexible NS framework can incorporate the regulatory requirement specified in the future. |
| Ericsson | Sub topic 2-1: We share the same analysis than Nokia and Apple for EIRP and unwanted emissions  Sub topic 2-2: First, we don’t think US156 is applicable to 47.2-48.2 GHz band, FCC mentions this is for the bands 49.7-50.2GHz and 50.4-50.9Ghz.  And even this would be require, -20dBW/200 MHz would correspond to -13dBm/MHz (being even less stringent) which corresponds to UE SEM limit.  Sub topic 2-3: Our view is that the NS mechanism could manage if needed Regulatory updates other than FCC  Sub topic 2-4: No other issue |
| Huawei | Sub topic 2-3: support to specify this band as a global band and regulations possibly made in future by NS mechanism. |
| Apple | Sub-topic 2-1: We agree with the Moderator’s summary  Sub-topic 2-2: We appreciate the comments on FSS coexistence and further clarification; we can accept the group’s majority view  Sub-topic 2-3: The NS mechanism can be used |

### CRs/TPs comments collection

N/A

## Summary for 1st round

### Open issues

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| --- | --- |
|  | **Status summary** |
| **Sub-topic#2-1** | Tentative agreements: Max EIRP and unwanted emissions are based on FCC rules.   |  |  | | --- | --- | | Power limit (EIRP) | Base station +75 dBm/100MHz  Mobile station +43 dBm  Transportable station +55 dBm | | Unwanted emissions | -5 dBm/MHz (within 10% of channel bandwidth separation)  -13 dBm/MHz (outside more than 10% of channel bandwidth apart) | |
| **Sub-topic#2-2** | Tentative agreements: No specific coexistence requirement with FSS is studied in this WI until further actions by regulators are taken to specify additional regulatory requirement. |
| **Sub-topic#2-3** | Tentative agreements: RAN4 understands that the NS framework can be used if additional regulations are made to this band by regulators (not restricted to FCC) in future. |

As the above issues do not look controversial, WF is not assigned to capture the formal agreement. Moderator suggests TP is prepared next meeting based on the tentative agreements above.

### CRs/TPs

N/A

## Discussion on 2nd round (if applicable)

None.

## 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 #3: Band and system parameters

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2010447**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010447.zip) | Ericsson | |  |  |  | | --- | --- | --- | | NR *operating band* | Uplink (UL) and Downlink (DL) *operating band* BS transmit/receive UE transmit/receive  FUL,low – FUL,high  FDL,low – FDL,high | Duplex mode | | n262 | 47200 MHz – 48200 MHz | TDD |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | NR band / SCS / *BS channel bandwidth* | | | | | | | NR Band | SCS  kHz | 50 MHz | 100 MHz | 200  MHz | 400 MHz | | n262 | 60 | Yes | Yes | Yes |  | | 120 | Yes | Yes | Yes | Yes |  |  |  |  | | --- | --- | --- | | NR *operating band* | ΔFRaster  (kHz) | Uplink and Downlink  range of NREF  (First – <Step size> – Last) | | n262 | 60 | 2399166 – <1> – 2415832 | | 120 | 2399167 – <2> – 2415831 |  |  |  |  |  | | --- | --- | --- | --- | | NR *operating band* | SS Block SCS | SS Block pattern (note) | Range of GSCN  (First – <Step size> – Last) | | n262 | 120 kHz | Case D | 23586 – <1> – 23641 | | 240 kHz | Case E | 23588 – <2> – 23640 | |
| [**R4-2010522**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010522.zip) | Nokia | |  |  |  |  | | --- | --- | --- | --- | | **Band number** | **UL** | **DL** | **Duplex mode** | | n262 | 47.2 – 48.2 GHz | 47.2 – 48.2 GHz | TDD |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | NR band | | Channel bandwidth | | | | | Band number | data SCS(kHz) | 50 MHz | 100 MHz | 200 MHz | 400 MHz | | n262 | 60 | Yes | Yes | Yes |  | | 120 | Yes | Yes | Yes | Yes |  |  |  |  | | --- | --- | --- | | NR Operating Band | ΔFRaster  (kHz) | Uplink and Downlink  Range of NREF  (First – <Step size> – Last) | | n262 | 60 | 2399166 – <1> – 2415832 | | 120 | 2399167 – <2> – 2415831 |  |  |  |  |  | | --- | --- | --- | --- | | NR Operating Band | SS Block SCS | SS Block pattern1 | Range of GSCN  (First – <Step size> – Last) | | n262 | 120 kHz | Case D | 23586 – <1> – 23641 | | 240 kHz | Case E | 23588 – <2> – 23640 | | NOTE 1: SS Block pattern is defined in subclause 4.1 in TS 38.213. | | | | |

## Open issues summary

The proposed system parameters by the two contributions are all aligned.

The proposed band number, channel bandwidths, channel raster and sync raster seem to be agreeable.

### Sub-topic 3-1 System parameters

Sub-topic 3-1: Please leave comments in 3.3.1 if there is any different view from the proposed system parameters.

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
|  | No comment is received in the first round. |

### CRs/TPs comments collection

N/A

## Summary for 1st round

### Open issues

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|  | **Status summary** |
| **Sub-topic#1** | Tentative agreements: R4-2010447 and R4-2010522 are recommended approve.  Band number n262 is used to work on TP/CR in coming meeting. |

### CRs/TPs

N/A

## Discussion on 2nd round (if applicable)

None.

## 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: UE RF requirement

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2009957**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009957.zip)  Preliminary views on the new 47 GHz band | Apple | Moderator: Potential Band specific requirements are picked up from the paper. CA and UL MIMO requirement are excluded as they seem to be reusable from non CA requirement.   |  |  | | --- | --- | | **Clause** | **Potential work scope for 47 GHz** | | 6.2.1 UE maximum output power | mmWave array EM sim, NW performance sim, multi-band framework | | 6.2.3 UE maximum output power with additional requirements | TBD whether NS values specific to 47 GHz band are needed | | 6.5.2.3 Adjacent channel leakage ratio | New round of coexistence simulations if ACLR from n260 cannot be reused | | 6.5.3.1 Spurious emission band UE co-existence | Requirements protecting the new band and existing bands are needed | | 6.5.3.2 Additional spurious emissions | TBD whether NS values specific to the 47 GHz band are needed | | 6.6 Beam correspondence | Beam correspondence tolerance sim | | 7.3.2 Reference sensitivity power level | Determine common assumption on UE receiver noise figure, reuse mmWave array sim and multi-band framework | | 7.3.4 EIS spherical coverage | Reuse mmWave array sim and multi-band framework | | 7.5 Adjacent channel selectivity | New round of coexistence simulations if ACS from n260 cannot be reused | | 7.6.2 In-band blocking | Analyze IBB scenario for the 47 GHz band and define new requirements |   Proposal 3: The big CR introducing requirements for the new 47 GHz band shall only be agreed after all of the requirements are understood with agreement on corresponding parameters and values, including single-carrier requirements, CA aspects, and the multi-band relaxation framework.  Moderator: Regulations are treated in Topic 2. |
| [**R4-2010523**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010523.zip)  UE RF requirements for 47 GHz band | Nokia | It is found that the general requirement as well as the band specific UE RF requirements can be aligned with the requirement for 39 GHz bands, i.e. band n259 and n260.  ***Observation 1: The further study is needed for the following UE RF requirements taking into account of transmitter/receiver and antenna array characteristics of 47 GHz band.***   * ***Peak EIRP*** * ***EIRP spherical coverage*** * ***Reference sensitivity*** * ***EIS spherical coverage*** |
| [**R4-2011455**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011455.zip)  Discussion on 48G RF components | Qualcomm Incorporated | We shared preliminary expectations for array gain, PA performance and LNA noise figure at 48G, as extrapolated from existing FR2 bands. Based on these somewhat crude estimates, peak EIRP capability at 48G may be suppressed from n258 value by about 9.5 dB, based on the following observations:   * array gain can be between 4 and 6 dB lower at 48G than in n258 * PA will be between 3.5 and 5.5 dB less capable at 48G, compared to n258   Similarly REFSENS at 48G may degrade from n258 values by about 11 dB, based on the following observations:   * array gain can be between 4 and 6 dB lower at 48G than in n258 * NF degrades at 48G by a factor between 5.5 and 6.5 dB from its value at n258   It may be possible for UEs to improve on antenna design relative to these estimates, but there may be limitations in technology that limit IC performance for commercially viable processes.  Network design would benefit from early consideration of effects similar to the extrapolated estimates listed in this contribution. |
| [**R4-2010446**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010446.zip)  Requirement overview for 47 GHz frequency band | Ericsson | Proposal 2:  RAN4 should consider the bands n259/n260 UE and RRM requirements also for 47 GHz band, similar to BS approach.  Moderator: BS RF and RRM are treated in Topic 5 and 6. |

## Open issues summary

### Sub-topic 4-1 Coexistence simulation

New round of coexistence simulation is proposed by Apple, while Nokia paper mentions that ACLR/ACS is already informed to ITU-R. Ericsson in general seems to propose to reuse n260 requirement.

Subtopic 4-1: Coexistence simulation

Issue 4-1-1: Whether if a new coexistence simulation is needed?

Issue 4-1-2: If needed, what parameter has to be changed from existing simulation assumption? Is there any conflict with WRC-19 if the parameters are changed?

### Sub-topic 4-2 Maximum output power and power reduction

Qualcomm indicates up to 9.5 dB suppression from n260 may be expected. Both Apple and Nokia seem to suggest new simulations for 47GHz to derive peak EIRP and EIRP spherical coverage.

Nokia points out power class 1, 2, 3 and 4 are the scope of the work item.

There seems no proposal to have different MPR than the existing one.

Issue 4-2-1: Do we need a simulation campaign for deriving peak EIRP/EIS?

Issue 4-2-2: Are all power class 1, 2, 3 and 4 simulated?

Issue 4-2-3: What is the UE model/parameter for simulations. What is different from n260?

Issue 4-2-4: Can we confirm that no MPR study is needed for 47 GHz? (i.e., to reuse existing MPR.)

### Sub-topic 4-3 NS and A-MPR

Apple proposes to study A-MPR.

Issue 4-3-1: Do we need A-MPR for FSS protection (if the regulatory requirement is confirmed.)

Issue 4-3-2: Any proposed NS framework for FSS protection?

Issue 4-3-3: Is there any other NS and A-MPR to be studied?

### Sub-topic 4-4 Other transmitter requirement if any

Sub-topic 4-4: There seems no band specific issue in other Tx requirement (for a single CC). Please provide your view if different.

### Sub-topic 4-5 Refsens and EIS spherical coverage

Qualcomm paper indicates up to 11 dB degradation from n260 may be expected. Both Apple and Nokia seem to suggest new simulations for 47GHz to derive REFSENS and EIS spherical coverage.

Issue 4-5-1: Do we need a simulation campaign for deriving REFSENS/EIS spherical coverage?

Issue 4-5-2: Are all power class 1, 2, 3 and 4 simulated?

Issue 4-5-3: What is the UE model/parameter (in particular for the receiver) for simulations. What is different from n260? NF is already communicated to ITU-R. Can we change it?

### Sub-topic 4-6 In-band blocking and other receiver requirements

IBB analysis is proposed by Apple. Nokia propose reusing n260 requirement.

Issue 4-6-1: Can we reuse n260 IBB? If not, how to specify IBB? Is it the same as ACS?

### Sub-topic 4-7 Beam Correspondence

Apple proposes a simulation for beam correspondence tolerance requirement.

Sub-topic 4-7: Please provide you view if it is different from Apple.

### Sub-topic 4-8 Multiband relaxation

Apple proposed to define the multi band relaxation framework. Nokia proposed MBR the same as n260.

Sub-topic 4-8:

Issue 4-8-1: Is MBR framework is required?

Issue 4-8-2: Can we reuse n260 MBR? if not, what should be specified?

### CA requirement

Potential Band specific UL-MIMO requirements are taken from Apple paper.

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| --- | --- |
| **Clause** | **Potential work scope for 47 GHz** |
| 6.2A.1 UE maximum output power for CA | Reuse requirements from 6.2.1 under CA configuration |
| 6.2A.3 UE maximum output power with additional requirements for CA | TBD whether NS values specific to 47 GHz band are needed |
| 6.5A.2.3 Adjacent channel leakage ratio for CA | Reuse requirements from 6.5.2.3 under CA configuration |
| 6.5A.3.1 Spurious emission band UE co-existence for CA | Requirements protecting the new band and existing bands are needed |
| 6.5A.3.2 Additional spurious emissions for CA | TBD whether NS values specific to the 47 GHz band are needed |
| 7.3A.2 Reference sensitivity power level for CA | Reuse requirements from 7.3.2 under CA configuration |
| 7.6A.2 In-band blocking for CA | Analyze IBB scenario for the 47 GHz band and define new requirements |

Sub-topic 4-9: Please provide if there is a different view.

### UL MIMO requirement

Potential Band specific UL-MIMO requirements are taken from Apple paper. The requirements are proposed to be reused from non-MIMO requirement.

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| **Clause** | **Potential work scope for 47 GHz** |
| 6.2D.1 UE maximum output power for UL-MIMO | Reuse requirements from 6.2.1 under UL-MIMO configuration |
| 6.2D.3 UE maximum output power with additional requirements for UL- MIMO | Reuse requirements from 6.2.3 under UL-MIMO configuration |
| 6.5D.2.3 Adjacent channel leakage ratio for UL-MIMO | Reuse requirements from 6.5.2.3 under UL-MIMO configuration |
| 6.5D.3.1 Spurious emission band UE co-existence for UL-MIMO | Reuse requirements from 6.5.3.1 under UL-MIMO configuration |
| 6.5D.3.2 Additional spurious emissions for UL-MIMO | TBD whether NS values specific to the 47 GHz band are needed |
| 7.3D Reference sensitivity for UL-MIMO | Reuse requirements from 7.3.2 under UL-MIMO configuration |
| 7.6D Blocking characteristics for UL-MIMO | Reuse requirements from 7.6.2 under UL-MIMO configuration |

Sub-topic 4-10: Please provide if there is a different view.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Sub topic 4-1:  Issue 4-1-1: No new simulation is needed  Issue 4-1-2: The coexistence parameters must be the same as 39GHz as already concluded in the LS to WP5D.  Sub topic 4-2:  Issue 4-2-1: Yes, unless 39GHz requirement can be reused  Issue 4-2-2: Yes, unless 39GHz requirement can be reused  Issue 4-2-3: Only antenna model can be changed in our view. PA, LNA should be the same as 39GHz model.  Issue 4-2-4: No new MPR is needed  Sub topic 4-3:  Issue 4-3-1: No.  Issue 4-3-2: Nothing is needed.  Issue 4-3-3: Only NS\_200 is needed for now  Sub topic 4-4: Agree  Sub topic 4-5:  Issue 4-5-1: Yes, unless 39GHz requirement can be reused.  Issue 4-5-2: Yes, unless 39GHz requirement can be reused  Issue 4-5-3: Only antenna model can be changed in our view. PA, LNA should be the same as 39GHz model.  Sub topic 4-6:  Issue 4-6-1: yes we shall reuse (to be consistent with ACS).  Sub topic 4-7: As there is not much difference for BC tolerance between 28 and 39GHz, we propose to reuse n260 value.  Sub topic 4-8:  Issue 4-8-1: : Required for Power class 3 UEs.  Issue 4-8-2: Yes.  Sub topic 4-9: In principle we agree with Ericsson. The draft CR needs to be further check in coming meetings.  Sub topic 4-10: In principle we agree with Ericsson. The draft CR needs to be further check in coming meetings.  Others: |
| Ericsson | Sub topic 4-1:  Issue 4-1: We don’t think we need to redo any coexistence simulation for this frequency range, we could reuse ACLR/ACS from bands n260/n259. We don’t see why the coex studies done so far could not be reused here. Form their contribution, it looks like Apple has some concerns, we would appreciate if Apple could elaborate on those concerns.  Sub topic 4-2:  Issue 4-2-1 and 4-2-2: most likely, yes.  Issue 4-2-4: No MPR is needed  Sub topic 4-3:  Issue 4-3-1: As mentioned in sub topic 2-2, no A-MPR is needed.  Issue 4-3-2: Not needed  Issue 4-3-3: No A-MPR/NS study for the time being, to be reconsidered when other Regulatory Body will release this band.  Sub topic 4-4: Agree  Sub topic 4-5:  Issue 4-5-1 and 4-5-2: most likely yes  Issue 4-5-3: We should keep same NF without further justifications.  Sub topic 4-6:  Issue 4-6-1: As we would reuse outcomes from already done coex studies, IBB should be reuse from n260.  Sub topic 4-7:  Issue 4-7-1: similar view than Nokia, we should reuse n260 values.  Sub topic 4-8:  Issue 4-8-1: for PC3  Issue 4-8-2: same as n259/n260 |
| Huawei | Sub topic 4-1:  Issue 4-1-1: new simulation is needed  Issue 4-1-2: BS parameter can be updated from the experience data.  Sub topic 4-2:  Issue 4-2-1: simulation for spherical coverage EIRP is needed.  Issue 4-2-2: RAN4 evaluate on the UE type which is applied for 47GHz within the SI.  Sub topic 4-3:  Issue 4-3-3: if any regulation requirement is raised, NS signaling is needed.  Sub topic 4-4: min output power.  Sub topic 4-5:  Issue 4-5-1: No. NF for 47GHz can be studied.  Issue 4-5-2: RAN4 evaluate on the UE type which is applied for 47GHz within the SI.  Sub topic 4-6:  Issue 4-6-1: Reuse .  Sub topic 4-7: need simulation.  Sub topic 4-8:  Issue 4-8-1: need MBR  Issue 4-8-2: need evaluation.  Sub topic 4-9: The draft CR needs to be further check in coming meetings.  Sub topic 4-10: The draft CR needs to be further check in coming meetings. |
| Apple | Sub-topic 4-1  Issue 4-1-1: Based on Nokia’s information related to ACLR/ACS, we can agree to reuse n260 requirements  Sub-topic 4-2  Issue 4-2-1: We suggest following the same approach we had used for band n259. Step 1: derive peak EIRP and REFSENS based on an alignment of the Tx/Rx budget across companies. Step 2: derive spherical coverage EIRP and EIS based on an alignment of the peak-spherical coverage difference across companies. Step 3: define the multi-band relaxation values within the MBR framework  Issue 4-2-2: We suggest prioritizing PC3 requirements  Issue 4-2-3: We suggest referring to [R4-1910511](http://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_92/Docs/R4-1910511.zip) for the list we had used with band n259  Issue 4-2-4: We can reuse existing MPR  Issue 4-3-2: If the FCC, or any other regulatory body, introduces new coexistence requirements in the future, then new NS signaling might become necessary. RAN4 should have a common understanding how to introduce new NS in that eventuality. One approach can be to define an NS\_X value specific for the US region and to map it to general requirements (i.e. no power reduction, since no coexistence requirements currently exist). If, in the future, the FCC does introduce limits which require A-MPR, then this NS value can be repurposed.  Sub-topic 4-5  Issue 4-5-1: We suggest following the same approach we had used for band n259. Step 1: derive peak EIRP and REFSENS based on an alignment of the Tx/Rx budget across companies. Step 2: derive spherical coverage EIRP and EIS based on an alignment of the peak-spherical coverage difference across companies. Step 3: define the multi-band relaxation values within the MBR framework  Issue 4-5-2: We suggest prioritizing PC3 requirements  Issue 4-5-3: We suggest referring to [R4-1910511](http://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_92/Docs/R4-1910511.zip) for the list we had used with band n259  Sub-topic 4-7: Rel-15 defined beam correspondence tolerance differently for n260 than for the 28 GHz bands; RAN4 should determine whether the n260 can be reused or if simulations justify a new value.  Sub-topic 4-8  Issue 4-8-1: Yes  Issue 4-8-2: We suggest keeping MBR open for one meeting cycle to give companies a chance to check their analysis of antenna array performance in band n262 for UEs which support multiple FR2 bands. If no data-driven proposals emerge next meeting, then we are fine to take the n260 value as the baseline. |
| MediaTek | **Sub-topic 4-2**  Issue 4-2-1: Yes.  Issue 4-2-2: Yes.  Issue 4-2-3: Leverage prior parameter table for discussion is made sense. And we may no need to limit companies to use “absolute value or relative value”, and may no need to classify what shall be “same as or different from” n260 in advanced.  **Sub-topic 4-5**  Issue 4-5-1: Yes.  Issue 4-5-2: Yes.  Issue 4-5-3: Leverage prior parameter table for discussion is made sense. And we may no need to limit companies to use “absolute value or relative value”, and may no need to classify what shall be “same as or different from” n260 in advanced.  **Sub-topic 4-7:** It makes sense to do revisit beam correspondence tolerance requirement.  **Sub-topic 4-8**  Issue 4-8-1: Yes  Issue 4-8-2: It’s too early to say reuse n260 MBR or not, further analysis and discussion are needed. |
| Samsung | Sub-topic 4-1:  In our view, since this frequency range is covered by FR2, further study on new coexistence is not needed for this band.  Sub-topic 4-2:  At least the link budget study is necessary to derive the requirements as we did for n259 in Rel-16. Even though n259 is overlapped with n260, it has different numbers with n260.  Sub-topic 4-3:  If the regulation is confirm, it is necessary to start the A-MPR study for FSS protection.  Sub-topic 4-5:  We have similar feeling and reason as 4-2. Although we can guess that the delta from the peak values would be very similar with n259/n260, we cannot say that the study is not needed at this stage regardless of the previous communication with ITU-R.  Sub-topic 4-7:  Although we believe that the gap between bit-1 and bit-0 UE is similar with other FR2 bands, it would be better to see the beam correspondence tolerance performance if necessary.  Sub-topic 4-8:  Yes with similar feelings and reasons as 4-2 and 4-5. |
| Intel | **Issue 4-2-1: Do we need a simulation campaign for deriving peak EIRP/EIS? :**  As we move up in frequency, more analysis and discussions are needed to determine what an attainable min peak EIRP/EIS is for this frequency range. A link budget discussion is needed.  **Issue 4-2-2: Are all power class 1, 2, 3 and 4 simulated?**  All power classes should be considered. If needed, RAN4 can align on a prioritization order.  **Issue 4-2-3: What is the UE model/parameter for simulations. What is different from n260?**  As a starting point, it is best to reuse the budget derivation tables we previously used in FR2 and capture any potential differences as the discussion progresses. As Apple pointed out, these were last captured in R4-1910511.  **Issue 4-2-4: Can we confirm that no MPR study is needed for 47 GHz? (i.e., to reuse existing MPR.)**  Since this is a new band, many Tx design parameters are not finalized yet. It may be too early to draw the conclusion that existing MPR can be reused (better to confirm once we have better understanding).  **Issue 4-3-1: Do we need A-MPR for FSS protection (if the regulatory requirement is confirmed.)**  If there is regulatory requirement on FSS protection now, evaluation for FSS protection needs to be performed to decide whether A-MPR is needed. If no regulatory requirements on FSS protection now, A-MPR is not needed now.  **Issue 4-3-3: Is there any other NS and A-MPR to be studied?**  It depends on if there is any other requirement. Need some investigations.  **Issue 4-5-1: Do we need a simulation campaign for deriving REFSENS/EIS spherical coverage?**  Yes  **Issue 4-5-2: Are all power class 1, 2, 3 and 4 simulated?**  All FR2 power classes should be considered and discussed. If needed, a prioritization order can be agreed  **Issue 4-5-3: What is the UE model/parameter (in particular for the receiver) for simulations. What is different from n260? NF is already communicated to ITU-R. Can we change it?**  As with Issue 4-2-3, we should leverage the budget derivation tables we previously used and capture any potential differences as the discussion progresses  **Issue 4-8-1: Is MBR framework is required?**  Yes, discussions are needed for MBR, for all power classes  **Issue 4-8-2: Can we reuse n260 MBR? if not, what should be specified?**  Maybe, further discussion is needed to have a better understanding of any relevant performance differences before this can be agreed  **Sub-topic 4-9: CA**  Needs further checking  **Sub-topic 4-10: UL MIMO requirement**  Needs further checking |
| Qualcomm: | Issue 4-2-1: Do we need a simulation campaign for deriving peak EIRP/EIS? :  We believe technological challenges are unique to the 47 GHz band, and UE RF requirement values derived for other bands like n259 cannot be simply re-used. A study of budgets may suffice, rather than a simulation campaign  Issue 4-2-2: Are all power class 1, 2, 3 and 4 simulated?  PC1-4 are in scope for 47 GHz  Issue 4-2-3: What is the UE model/parameter for simulations. What is different from n260?  To fit into the WI schedule, we propose adopting UE assumptions from other bands for number of elements per panel and number of panels. Doing otherwise would create more degrees of freedom.  Issue 4-2-4: Can we confirm that no MPR study is needed for 47 GHz? (i.e., to reuse existing MPR.)  Since it appears that the TRP limitation for all UE classes remain the same as in other FR2 bands, we believe MPR can be reused. The most challenging UL waveform may change from other bands, but this detail can be absorbed to some degree with PA sizing and peak EIRP requirement  Issue 4-3-1: Do we need A-MPR for FSS protection (if the regulatory requirement is confirmed.)  Yes, further study needed  Issue 4-3-2: Any proposed NS framework for FSS protection?  FFS  Issue 4-3-3: Is there any other NS and A-MPR to be studied?  Depends on RAN4 view of regulatory landscape, as driven by contributions from stakeholders  Issue 4-5-1: Do we need a simulation campaign for deriving REFSENS/EIS spherical coverage?  yes  Issue 4-5-2: Are all power class 1, 2, 3 and 4 simulated?  Yes  Issue 4-5-3: What is the UE model/parameter (in particular for the receiver) for simulations. What is different from n260? NF is already communicated to ITU-R. Can we change it?  Dear moderator, Please elaborate on ITU-R NF angle. To fit into the WI schedule, we propose adopting UE assumptions from other bands for number of elements per panel and number of panels. Doing otherwise would create more degrees of freedom  Issue 4-6-1: Can we reuse n260 IBB? If not, how to specify IBB? Is it the same as ACS?  We are not aware of any consideration unique to this new band. Would like to understand justification for new study better.  Issue 4-8-1: Is MBR framework is required?  yes  Issue 4-8-2: Can we reuse n260 MBR? if not, what should be specified?  FFS  Sub-topic 4-9: CA  UL CA requirements get complicated if NS is defined and CA AMPR has to be determined. We are ok to leave ULCA for future enhancement |

### CRs/TPs comments collection

N/A

## Summary for 1st round

### Open issues

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#4-1 Coex sim** | It looks now only one company is supporting a new coexistence simulation with the updated BS parameters. Following the majority view, is it acceptable to conclude ACLR/ACS in the previous agreement (LS to WP5D) unless further justification to update BS parameters is provided?  In other word, can we agree that ACLR is 16 dB and ACS is 22 dB for n262?  To be confirmed in the second round. |
| **Sub-topic#4-2 Max power** | * Peak EIRP/EIS and spherical coverage and MBR   As proposed by several companies, the link budget analysis is first needed like n259 (R4-1910511 and R4-1912977). Some companies think the spherical coverage simulations are needed but it may not be needed according to one company. Either way, moderator recommends the approach proposed by Apple.   * + Step 1: derive peak EIRP and REFSENS based on an alignment of the Tx/Rx budget across companies.   + Step 2: derive spherical coverage EIRP and EIS based on an alignment of the peak-spherical coverage difference across companies.   + Step 3: define the multi-band relaxation values within the MBR framework   WF on link budget template will be assigned for the work to proceed.   * Power class   All power classes 1/2/3/4 need to be studied according to the scope of this work item. One company commented PC3 should be prioritized.   * MPR   Majority view is that existing MPR can be reused. One company commented it needs further study. Further analysis is encouraged for the next meeting. |
| **Sub-topic#4-3 NS and A-MPR** | Tentative agreements: A-MPR study is not needed until specific regulatory requirement is identified. |
| **Sub-topic#4-4 Other Tx** | Huawei proposes to study min output power for n262. To be further discussed.  No other Tx requirement has so far been found band specific to n262. |
| **Sub-topic#4-5 REFSENS EIS spherical coverage** | See #4-2. |
| **Sub-topic#4-6 Other Rx** | No objection to reuse existing IBB requirement is made.  Tentative agreements: IBB requirement is reused from n259/n260.  No other Rx requirement has so far been found band specific to n262. |
| **Sub-topic#4-7 BC** | Many UE vendors propose that BC tolerance should be studied for n262. Further analysis is encouraged for the next meeting.  Also See #4-2. |
| **Sub-topic#4-8 MBR** | Majority view of UE vendors seems that more study is needed on MBR framework for n262. Further analysis is encouraged for the next meeting.  Also See #4-2. |
| **Sub-topic#4-9 CA** | Further checking is needed.  It is possible that UL CA is discussed later if some issues are identified. |
| **Sub-topic#4-10 UL MIMO** | Further checking is needed. |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on link budget parameters for Tx/Rx of n262 | Huawei, HiSilicon, Apple |
| #2 | WF on UE RF requirement for 47 GHz band | Qualcomm |

### CRs/TPs

N/A

## Discussion on 2nd round (if applicable)

The purpose of the 2nd round discussion is to agree the WF on link budget parameters for UE and the WF on UE RF.

Possible contents of the first WF is to prepare the link budget template similar to R4-1910511 but for n262.

Possible contents of the second WF is to capture the tentative agreements and open issues (other than captured in the first WF), so that all companies can make future contributions easily based on the agreed WF.

|  |  |
| --- | --- |
|  | **Comments** |
| **WF on link budget** | Company name: Comments |
| **WF on UE RF** | Company name: Comments |

## 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 #5: BS RF requirement

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2010446**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010446.zip)  Requirement overview for 47 GHz frequency band | Ericsson | Observation 1:  Extensive feasibility and co-existence studies have already been performed for 45GHz proxy frequency to specify the existing FR2 bands.  Proposal 1:  For new 47 GHz band, adopt the RF requirements from band n260 to the largest extend possible and add additional requirements if global and regional regulation would require.  Moderator: UE RF and RRM are treated in Topic 4 and 6. |
| [**R4-2011412**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011412.zip)  BS RF requirements for 47 GHz band | Nokia | This contribution provides the summary of expected changes to 38.104 and 38.141-2. It is proposed to agree on the proposal 1 below. Furthermore, companies are encouraged to provide their views on above mentioned test requirements and test tolerances to be applicable up to 48.2GHz.  **Proposal 1: Introduce the following step frequencies for defining the radiated Tx/Rx spurious emission limits for n262:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Operating band | Fstep,1 (GHz) | Fstep,2 (GHz) | Fstep,3 (GHz) | Fstep,4 (GHz) | Fstep,5 (GHz) | Fstep,6 (GHz) | | n262 | 37.2 | 45.2 | 45.7 | 49.7 | 50.2 | 58.2 | |

## Open issues summary

Two paper summarizes the impact to BS requirements.

### Sub-topic 5-1 BS core requirement

Subtopic 5-1: Ericsson paper considers that BS requirement for 47GHz requirement can be largely reused from n260 requirement. Nokia paper also assumes generic requirement is ready for 47GHz. We would like to collect views in 6.3.1.

### Sub-topic 5-2 BS conformance requirement

Subtopic 5-2: Nokia paper summarize the spec impacts to TS 38.141-2. Please indicate if they are acceptable. Please also indicate if there are more impacts.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Sub topic 5-1: While we agree most of requirements can be reused from n260, there are few which need further consideration. They are explained in R4-2011412. |
| Ericsson | Sub topic 5-1: our view is that requirements from n260/n259 could be reused in a large extent, but of course spurious frequencies break shall be calculated according to the new band |
| Huawei | Sub topic 5-1: n259 could be reused better than n260. |
| Keysight | Sub topic 5-2: for conformance requirement where MU=TT, we need study on MU because it was done up to existing freq, mostly actually 40G and some 43.5G for n259. Over 40G requires careful study in general. As it’s discussed in subtopic 1, it’s OK to work on MU in testability WI but for MU=TT values, need to wait for the result to set TT for conformance requirement. |

### CRs/TPs comments collection

N/A

## Summary for 1st round

### Open issues

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#5-1** | Majority view seems to be that most BS RF core requirement can be reused from band n259/n260. The proposal 1 in Ericsson paper looks agreeable once taking Huawei comment into account.  Nokia paper may be agreeable.  Recommendations for 2nd round: Make possible agreements. |
| **Sub-topic#5-2** | This WI covers BS conformance aspect in the scope of WID. There is no corresponding SI/WI for BS testability in Rel-17, while there is SI for UE, FS\_FR2\_enhTestMethods.  Tentative agreements: MU/TT for BS shall be further discussed in this WI.  Companies are encouraged to analyze them next meeting. |

### CRs/TPs

N/A

## Discussion on 2nd round (if applicable)

Please discuss if the following items for #5-1 are agreeable in the 2nd round.

Issue 5-1-1: Is this agreeable? For new 47 GHz band, adopt the BS RF requirements from band n259/n260 to the largest extend possible and add additional requirements if global and regional regulation would require.

Issue 5-1-1: Is R4-2011412 agreeable?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 5-1-1:  Issue 5-1-2: |

## 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*

|  |  |
| --- | --- |
| **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: RRM requirement

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2010446**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010446.zip)  Requirement overview for 47 GHz frequency band | Ericsson | Proposal 2:  RAN4 should consider the bands n259/n260 UE and RRM requirements also for 47 GHz band, similar to BS approach.  Moderator: BS and UE RF are treated in Topic 4 and 5. |

## Open issues summary

### Sub-topic 6-1

Subtopic 6-1: RRM requirement

Ericsson paper considers that RRM requirement for 47GHz requirement can be largely reused from n260 requirement. We would like to collect views in 6.3.1.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Sub topic 6-1: In principle we agree with Ericsson. The draft CR needs to be further check in coming meetings. |
| Apple | Sub-topic 6-1: we should treat RRM requirements related to FR2 inter-band CA between n262 and other FR2 bands separately from existing agreements on FR2 inter-band CA in Rel-16 |

### CRs/TPs comments collection

N/A

## Summary for 1st round

### Open issues

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | This WI only covers the single band requirement. There seems to be no objection to assume that RRM requirement in single band operation can be largely reused from n259/n260 as proposed by Ericsson.  Tentative agreements: RAN4 should consider the bands n259/n260 RRM requirements for 47 GHz band.   * Inter-band CA requirement can be discussed in corresponding FR2 WI.   Further analysis is encouraged in next meeting. |

### CRs/TPs

N/A

## Discussion on 2nd round (if applicable)

None

## 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”* |