**3GPP TSG-RAN WG4 Meeting #97-e *R4-2017602***

**Electronic Meeting, 2 – 13 November, 2020**

**Agenda item:** 4.4, 4.5.2.2, 7.19.4

**Source:** Moderator (Ericsson)

**Title:** Email discussion summary for [97e][302] NR\_BSRF\_Maintenance

**Document for:** Information

# Introduction

The e-mail discussion covers Rel-15 and Rel-16 NR BS RF Core maintenance, including MSR specifications, i.e. Agenda items 4.4, 4.5.2.2 and 7.19.4.

The BS RF core spec TS 38.104 is very stable in Rel-15 and Rel-16 and there are few contributions in this area. Contributions were submitted within the following Topics:

1. Maintenance based on updated European regulation and standards
2. AAS capability set and support for NR+UTRA
3. Other maintenance

All topics include CRs for corrections, but no discussion papers.

# Topic #1: Maintenance based on updated European regulation and standards

A set of CRs refer to the LS in R4-2017800 from ETSI MSG TFES concerning Release 15 of the European Harmonised Standards.

## Companies’ contributions summary (CRs)

(Cat A CRs are not listed)

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2016345 R4-2016347 | Ericsson | **CR to 38.104/38.141-2 on Category B OTA spurious emissions for Band n257**  Summary of change:  The CR adds Band n257 to Category B limits for OTA spurious emissions. The step frequencies are aligned with the already existing ones for Rx spurious emissions. |
| R4-2016349 R4-2016351 | Ericsson | **CR to 37.104/37.141 on Removal of additional limit for Band 1**  Summary of change:  The additional limit for Band 1 is removed from the specification. |
| R4-2016353 R4-2016355 R4-2016357 | Ericsson | **CR to 37.105/37.141-1/37.141-2 on Removal of additional limit for Band 1**  Summary of change:  The additional limit for Band 1 is removed from the specification. |
| R4-2016359 R4-2016361 | Ericsson | **CR to 36.104/36.141 on Removal of additional limit for Band 1**  Summary of change:  The additional limit for Band 1 is removed from the specification. |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2016345 | Huawei: this is ok, but it would be useful to have the T-doc number of the LS mentioned in the reason for change (only if there is need for an update) |
| Samsung: as state in LS n257 operation in EU will be limited within 26.5-27.5GHz. It is suggested to include this as a note in Table 5.2-2 of TS38.104 to keep clarity. In addition, not sure whether this update will have impact on TS38.101-2. It seems no analysis or contribution on this aspect. |
| Ericsson: Regarding adding a note on the restricted band, this is not needed, and it is also not appropriate – what bands that are used in a certain region (or country) is a matter for the regulators and local administrations. It does not have any impact on BS or UE capabilities or requirements. We already have a range of these restrictions regionally and locally that are not documented by 3GPP, such as the parallel use of bands 5 and 8 in many countries, where it is necessary to restrict the use on one of the bands or both, with different solutions applied locally. Also, the ETSI Harmonised Standard presently has restricted use of bands 28, 32, 41, 77 and 78, which are not documented in 3GPP. |
| R4-2016349 | Huawei: again this is ok but it would be good to have T-doc reference for the LS mentioned in reason for change |
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| R4-2016353 | Huawei: the requirement has been removed from 9.7 (OTA), however it is still present in 6.6 (conducted), in the conducted section a versioned reference is used for example 6.6.5.2.4 references 37.104 [9] subclause 6.6.2.4 – but the reference list states [9] is version 14.4.0 which of course will still have this requirement in it.  In addition there are some issues related to these sections identified in R4-2016072 and a CR R4-2016077 which deals with the same section. These CRs should perhaps be merged or at least made compatible. |
| Ericsson: Regarding the versioned reference, that is a very unusual way of referring to another specification. Question for the 37.105 Rapporteur: Why was not a non-specific reference used to 37.104, as is usually done? Is there something specific in v14.40 that it tries to catch? Otherwise the reference should be changed to non-specific.  Regarding R4-2016077, there is as I understand not an overlap in terms of the clauses updated, but the content of the text added in that CR also contains the Band 1 additional limit. In that case, that CR (and possibly this one) should be updated to align. |
| Ericsson: It is noted that there is a similar protection limit for Band VII operation remaining for UTRA in 37.105 and 37.145-2, but not in the other LTE or MSR specifications. This should also not have any reason to remain, since it is not known to be in European regulation. We could simply remove it to align with other specs now, or we could send an LS to double-check with ETSI. |
| R4-2016355 | Huawei: This seems ok, no cross over with Huawei CR |
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| R4-2016357 | Huawei: similar subject (additional requirements) is addressed in R4-2016075, but I don’t think they cross over (note R4-2016075 needs updating to remove this requirement). But I think this CR is ok. |
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## Summary for 1st round

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2016345 R4-2016347 | The CRs are Return to |
| R4-2016349 R4-2016351  R4-2016350 R4-2016352 | The CRs are agreeable  The corresponding Cat A CRs are agreeable |
| R4-2016353 R4-2016357 | To be revised in R4-2017430 and R4-2017431 respectively.  (Need to resolve the version specific reference to TS 37.104 in 16353 and to make sure the changes align with the CR in R4-2016077.)  (For both 16353 and 16357, we should also determine whether we should remove the Band VII additional OTA limit to align with other specs.) |
| R4-2016355  R4-2016356 | The CR is agreeable  The corresponding Cat A CR is agreeable |
| R4-2016359 R4-2016361  R4-2016360 R4-2016362 | The CRs are agreeable  The corresponding Cat A CRs are agreeable |

## Discussion on 2nd round (if applicable)

### CRs/TPs comments collection

(Cat A CRs not listed)

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| **CR/TP number** | **Comments collection** |
| R4-2016345 R4-2016347 | Samsung: as we discussed in the end of 1st round. It's Ok to agree those CR and capture the motivation in Chairman note such as:  R4-2016345 and R4-2016347 are updated due to EU regulation update as informed in LS R4-2017800 “to facilitate roaming of Band n257 UEs in Europe” to be operating within 26.5-27.5GHz. |
| Company B |
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| R4-2017430 | Nokia: In the reference list, some references are changed to v15.x.x but ‘(Release 14)’ remain. There is also a typo ‘Voidf’ in one clause heading. |
| Company B |
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| R4-2017431 | Company A |
| Company B |
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## 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: AAS capability set and support for NR+UTRA (CRs)

This is a continuing topic from RAN3 #96-e (Topic #2 for [302]), where three CRs were discussed and postponed. For this meeting, there are two sets of CRs available.

## Companies’ contributions summary

(Cat A CRs are not listed)

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2016367 | Ericsson | **CR to 37.105 on NR+UTRA support for AAS**  Summary of change:  It is added explicitly to the General section that for AAS BS, GSM/EDGE operation is not supported and that UTRA operation is only supported as single-RAT or in combination with E-UTRA. |
| R4-2015967 | Huawei | **CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**  Summary of change: - 6.6.5.2.2, 6.6.5.2.3: conducted OBUE applicability table introduced for Band Category 1, 2, 3; table headers updated - 7.4.2.1: conducted general blocking table updated - 7.7.2.1: conducted Tx IMD table updated - 10.5.2.1: OTA general blocking table updated - 10.8.2.1: OTA Tx IMD table updated |
| R4-2015968 | Huawei | **CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**  Summary of changes: - 4.9: introduction of CSA3B for UTRA, EUTRA, NR multi-RAT case. - 4.11.2.8.1.2 (ATC5a): applicabiltiy table updated with new CS - 4.11.2.8.2 (ATC5b): MSR changes reflected. Applicabiltiy table updated with new CS - 4.11.2.9, 4.11.2.10 (ATC6, ANTC6): MSR changes reflected. Power allocation section updated.  - 4.11.2.13, 4.11.2.14 (ATC8, ANTC8): new section for UTRA, E-UTRA and NR multi-RAT operation - 5.2: Test configuration applicability table updated with nes CSA3B test case  - 6.6.5.5.2, 6.6.5.5.3: conducted OBUE applicability table introduced for Band Category 1, 2, 3; table headers updated - 7.4.5.1.1: general blocking table updated - 7.7.5.1.1: Tx IMD table updated |
| R4-2015969 | Huawei | **CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**  Summary of changes: - 4.9: introduction of RCSA3B for UTRA, EUTRA, NR multi-RAT case. - 4.11.2.8.1.2 (ATCR5): applicability table updated with new CS - 4.11.2.8.2 (ATCR5b): MSR changes reflected. Applicabiltiy table updated with new CS - 4.11.2.9, 4.11.2.10 (ATCR7, ANTCR7): MSR changes reflected. Power allocation section updated.  - 4.11.2.13, 4.11.2.14 (ATCR9, ANTCR9): new section for UTRA, E-UTRA and NR multi-RAT operation - 5.2: Test configuration applicability table updated with nes RCSA3B test case  - 6.6.5.5.2, 6.6.5.5.3: conducted OBUE applicability table introduced for Band Category 1, 2, 3; table headers updated - 7.8.5.1.1: Tx IMD table updated |

## Open issues summary

### Sub-topic 2-1 Options for Capability sets including UTRA in AAS specs

In the work item MSR\_GSM\_UTRA\_LTE\_NR, the MSR BS specification was extended with additional Capability Sets and requirements for NR + UTRA/GSM combinations. These were not reflected in the AAS specifications, which were not part of the work item.

The CRs submitted provides two different solutions for the AAS specifications.

**Issue 2-1: Options for Capability sets including UTRA in AAS specs**

* Proposals
  + **Option 1: (CR in R4-2016367)**Add an explicit statement in the AAS core spec that UTRA operation is only supported as single-RAT or in combination with E-UTRA.
  + **Option 2: (CRs in R4-2015967, R4-2015968, R4-2015969)**Update relevant AAS core and test requirements to cover combined NR & UTRA support, and add a new Capability Set for AAS with NR, E-UTRA and UTRA, plus two new Test Configurations.
* Recommended WF

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## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| Ericsson | Sub topic 2-1: Ericsson supports Option 1, where the present state of the specifications is clarified. |
| Nokia | Sub topic 2-1: OK for option 1, for option 2 we would like to know if any operator is interested in UTRA+E-UTRA+NR CS in AAS specifications.  ….  Others: |
| Huawei | Sub topic 2-1:  For Rel-15: ok with option 1  For Rel-16 (and onwards): option 2 (plus clarification that GSM/EDGE is not supported by AAS BS spec)  We have received concrete request to introduce AAS BS supporting UTRA+EUTRA+NR CS. We can check if any more information can be shared in RAN4 on this particular topic. |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2016367  R4-2016368 | Nokia: OK |
| Huawei: This clarification CR is OK for Rel-15, but not ok for Rel-16 as this is against the proposal in Huawei CRs last meeting (postponed) and this meeting (R4-2015967 – 69) which are introducing new CS for the UTRA+EUTRA+NR in Rel-16.  We would like to introduce new CS for the AAS to support UTRA+EUTRA+NR, as per MSR\_GSM\_UTRA\_LTE\_NR WI.  For Rel-16 it is still fine to clarify that GSM/EDGE is not supported by AAS BS – revision can be used for that purpose with Cat F (not Cat A). |
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| R4-2015967 | Huawei: This is our CR but revision needed to also add similar modifications to the OTA requirement in 9.7.5.2.  One correction was overlooked: Table 6.6.5.2.2-0: in one of the rows band 7 and 38 was supposed to be also removed (as those are not applicable to AAS). |
| Company B |
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| R4-2016430 | Huawei: again this is our CR but revision needed to also add similar modifications to the OTA, similar as noted in R4-2015967. |
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| R4-2016184 -  R4-2016187 | Huawei: This is ok but the same mode is also applicable to AAS test specs (37-145-1 and 37.145-2), it would be good to modify all affected specs. |
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## Summary for 1st round

### Open issues

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|  | **Status summary** |
| **Sub-topic#2-1** | Candidate options: There are still two options where Ericsson and Nokia support Option 1 and Huawei supports Option 2.  Recommendations for 2nd round: Discussions should continue. |

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2016367 R4-2015967 R4-2015968 R4-2015969 | Status is Return to. |

## Discussion on 2nd round (if applicable)

### Open issues

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| **Company** | **Comments** |
| Huawei | Sub topic 2-1:  Based on the comments from the first round, in order to progress on this topic elements from CRs belonging to both option 1 and option 2 are needed.   * For rel-15: clarification on lack of GSM/UTRA support in AAS is OK and clarification on lack of UTRA+NR is OK (but not for Rel-16), based on Ericsson CR. * For rel-16: clarification on lack of GSM/UTRA support in AAS is OK. New CS (MSR mirror) for UTRA+NR is needed based on Huawei CRs. |
| Ericsson | Ericsson still supports Option 1 and does not see the advantage of introducing the new CS. UTRA (and GSM) are legacy technologies where specifications are no longer maintained. We should therefore not spread the support of UTRA in present specifications, since it will only make specifications more complicated and increases the risk of errors in requirements. This holds for both Rel-15 and Rel-16, which is clarified through the Ericsson CR in R4-2016367 (and a mirror CR in R4-2016368). |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2016367 | Huawei: same comments as in first round – issue 2-1 to be clarified first. If we would followed the WF proposed by Huawei: R4-2016367 is ok, but its Cat A CR in R4-2016368 is NOT ok. |
| Company B |
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| R4-2015967 R4-2015968 R4-2015969 | Company A |
| Company B |
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## 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 #3: Other maintenance (CRs)

A number of diverse topics are covered by CRs under “Other maintenance”.

## Companies’ contributions summary

(Cat A CRs are not listed)

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015957 | Huawei | **CR to TS 37.104: addition of missing note for BC1/BC3 OBUE applicability table for WA BS, Rel-16**  Summary of change:  Addition of the missing note in table 6.6.2.1-0. |
| R4-2015966 | Huawei | **CR to TR 38.820: correction in the NF analysis for NR BS, Rel-16**  Summary of change: 5.5.1.2: cross-reference is corrected to point to the figure with the collection of the state-of-the-art LNA-only noise figure publications. |
| R4-2016184 R4-2016186 | Nokia, Nokia Shanghai Bell | **CR to 37.104/37.141: Correction to ACLR limit in non-contiguous spectrum (Rel-15)**  Summary of change:  “NR” is removed in NOTE 3 to address E-UTRA carrier transmitted at the other edge of the gap. |
| R4-2016206 | Nokia, Nokia Shanghai Bell | **CR to 38.141-2: Correction to test system uncertainty**  Summary of change:  Test System uncertainty is extended up to 43.5GHz. |
| R4-2016363 R4-2016365 | Ericsson | **CR to 37.104/37.141 on MSR Blocking correction**  Summary of change:  The reference to the Void table (previously containing the frequency ranges) is removed. |
| R4-2016430 R4-2016431 R4-2016432 | Huawei | **CR to TS 37.105/37.145-1/37.145-2: addition of the OBUE applicability table, Rel-15**  Summary of change:  OBUE applicability table introduced for Band Category 1, 2, 3; table headers updated to align with MSR. |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2015966 | Ericsson objects to such a minor editorial CR to an 800-series TR |
| Huawei: please refer to the explanation in the CR cover page: this is not editorial modification. The existing text is mistakenly referring to the incorrect set of data: the corrected text in on state-of-the-art LNA-only noise figure publications, while it mistakenly refers to the ETSI TR data on typical NF.  As rapporteur of this TR, we want to correct this mistake. |
| Ericsson still objects. While the reference is incorrect, anyone with a reasonable reading comprehension will be able to sort it out through the context.  The point is that this is an internal TR for a closed work item that is not published outside of 3GPP and it does not affect any requirement or interpretation of requirement. The “Consequences if not approved” is therefore null. Having this type of content-less CR only has the effect of increasing the blood pressure of anyone who clicks on the document before the meeting. After this the disturbance just continues. The CR will need to be assigned to the agenda, tabulated in Tdoc lists, E-mail summaries and Chairman’s notes, finally being entered into the Meeting report – even if there is no discussion. After this, the MCC will have to assign it to TSG RAN and tabulate it again together with other CRs, and submitting it for TSG RAN approval. And now the real mess starts, since this is the *only* CR for this deliverable – MCC will have to create a new TR version, implement the change, put it up for review and then publish the new TR. All this for a change of the word “table” to “figure”.  No. |
| Huawei: as the rapporteur of this TR, we are fixing technical error in the text to improve TR quality – motivation was well explained, even though the modification may look as “editorial” of the reader does not read the Reason for modification on the CR cover page. We can further check with MCC. |
| R4-2016206 | Ericsson agrees that the change to 43.5 GHz is correct, as stated in Annex C. We also note that the upper limit will soon be raised to 48.5 GHz, based on the 47 GHz work item. |
| Company B |
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| R4-2016430 R4-2016431 R4-2016432 | Ericsson thinks this needs careful consideration, since it is not obvious that the applicability table adds clarity, which should be the purpose. There are fewer tables to refer to here than in the MSR specs, so the applicability table is less useful.  Also, it looks like the Band n1 requirement is changed, from “or BS supporting n1” to “except for n1”. |
| Nokia: different wordings 'except operating', 'except operation', 'not supporting' would lead to different interpretations. |
| Huawei:  @Ericsson: the applicability tables is needed to clarify the required testing and not to apply unnecessary requirements – there is significant test effort behind it. AAS spec is also MSR spec and the same approach was used in those CRs as in MSR so if the table is unclear, it shall be corrected/implemented both in MSR and AAS specs. Even if there are fewer tables in AAS to refer to, there is still need to clarify which requirements needs to be tested for certain products (and which are not necessary to be tested). The long list of OBUE tables itself is not any more clearer without applicability table.  For Band n1 correction: this was to align wording with MSR spec – this is the same meaning.  @Nokia: Potential wording corrections can be addressed in the revision to avoid any confusions. The same approach as in MSR was used so if there is error, it shall be corrected both in MSR and AAS.  R4-2016430 needs to be revised anyway, to add related modification to the OTA sections as well (conducted requirements was corrected, only). |
| Ericsson:  If we agree that the applicability tables are needed, the wording will have to be addressed – it is quite confusing. We agree that the wording may also need update in 37-sereies to align. This could either be done in parallel or at the next meeting. Agree also that conducted and OTA sections should be treated the same way. |
| Huawei: applicability table were needed in MSR. They are found to be needed in AAS as well. We still don’t know what is confusing here – those CRs are mirroring MSR modifications. |

## Summary for 1st round

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2015957 | The CR is agreeable. |
| R4-2015966 | The status is return to. |
| R4-2016184 R4-2016186  R4-2016185 R4-2016187 | The CRs are agreeable.  The corresponding Cat A CRs are agreeable. |
| R4-2016206 | The CR is agreeable. |
| R4-2016363 R4-2016365  R4-2016364 R4-2016366 | The CRs are agreeable.  The corresponding Cat A CRs are agreeable. |
| R4-2016430 R4-2016431 R4-2016432 | The CRs are revised to R4-2017432, R4-2017433 and R4-2017434 respectively.  (Need to resolve discussions of the wording for the table titles). |

## Discussion on 2nd round (if applicable)

### CRs/TPs comments collection

(Cat A CRs not listed)

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| **CR/TP number** | **Comments collection** |
| R4-2015966 | Company A |
| Company B |
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| R4-2017432 R4-2017433  R4-2017434 | Huawei: missing OTA OBUE applicability table was added in R4-2017432. OBUE table headings were double-checked for alignment with MSR spec. |
| Nokia: Table headings that are changed to ‘not supporting NR (except for BS operating in Band x)’ would create ambiguity as the sentence have double negation now (not...except), also the ‘n’ before the ‘x’ should not be removed as the original intention was referring to NR operating band. |
| Ericsson: It is correct that the table aligns with MSR specs. We get second thoughts however when looking at those headings – maybe also the MSR specs will ultimately need updating! The problem is (as Nokia also points out) that saying “not supporting” and then “except…” really has no meaning. The original text actually has meaning and should be kept. We should possibly revise MSR specs at the next meeting.  There is also a problem with the table, where reference is given to Table 6.6.5.2.2.1 for NR band operation “None”, “Band 1 in Europe” and “any”. It the table is for “any” band, why bother having an applicability table reference at all? The “any” row should be deleted. In the original MSR spec, that row was for NB-IoT operation (with or without NR), where the MSR stricter mask should be applied, but NB-IoT is not included here. |

## 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”* |