**3GPP TSG-RAN WG4 Meeting # 95-e DRAFT R4-2008325**

**Electronic Meeting, 25 May – 5 June, 2020**

**Agenda item:** 9.2

**Source:** Moderator (Huawei)

**Title:** Email discussion summary for [95e][135] FS\_7to24GHz\_NR

**Document for:** Information

# Introduction

This is the email discussion summary for [95e][135] FS\_7to24GHz\_NR on 7 – 24 GHz SI, with the following topics covered:

* General aspects
* Spectrum and regulatory matters
* Deployment scenarios
* NR BS architecture
* NR BS requirements

As there was a limited number of TPs submitted, all of them were listed in a single Topic (i.e. TPs to TR 38.820) in this summary to ease readability and review process.

Conclusion of the first round should conclude if the submitted TPs can be agreed or need to be revised.

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

* 1st round: TBA
* 2nd round: TBA

# Topic #1: TPs to the TR 38.820

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2008138 | Huawei | TP to TR 38.820: editorial cleanup  It is expected that this TP may be revised during the meeting to incorporate more corrections. |
| R4-2008139 | Huawei | TP to TR 38.820: deployment scenarios cleanup  Scenarios with no entries (i.e. HST, highway, urban grid) removed from the TR. Clarification text added for the “IMT for fixed wireless broadband in fixed services bands” topic from WRC-19 conclusions. |
| R4-2008140 | Huawei | TP to TR 38.820: clarification on WRC-19 resolution for IMT for fixed wireless broadband in fixed services bands  Clarification added on the WRC-19 resolution COM6/18 on the IMT for fixed wireless broadband in fixed services bands. |
| R4-2006925 | Ericsson | TP to TR 38.820: Addition of antenna parameter selection guideline in subclause 7.2.3  Additional technical background for how to determine antenna parameters for different array geometries is added, based on the reference to the 10GHz band discussion for IMT. |
| R4-2006105 | Nokia, Nokia Shanghai Bell | TP to TR 38.820: Summary Tables for Transmitter Requirements  TP to fill empty entries in the summary tables for Tx requirements in the TR, according to the contents in the related discussion sections. |
| R4-2006106 | Nokia, Nokia Shanghai Bell | TP to TR 38.820: Summary Tables for Receiver Requirements  TP to fill empty entries in the summary tables for Rx requirements in the TR, according to the contents in the related discussion sections. |

## Open issues summary

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2008138 | Huawei: it is proposed to revise it for the purpose of the final editorial cleanup during this meeting. |
| R4-2008139 | Nokia: Why do we need to additionally mention ‘FWA and fixed wireless broadband’ scenarios, but completely remove ‘High speed train, Highway scenario and Urban Grid for Connected Car’ scenarios? |
| Huawei: introduction of the ‘FWA and fixed wireless broadband’ case is motivated by the related resolution from WRC-19. Our intention is to directly address this case as it is seen as applicable to 7-24GHz range.  For the deletion of ‘High speed train, Highway scenario and Urban Grid for Connected Car’: there were no specific inputs provided to the TR so the removal is basically considered as a cleanup. Still, we are open to somehow keep them in - feel free to propose suggested text revision. |
| Nokia: We can add the sentence in the same paragraph after the statement on ‘FWA and fixed wireless broadband’ scenarios:  “Also high speed train, highway scenario and urban grid for connected car were proposed as deployment scenarios during the study item, but no further analyses were done for those either.” |
| Huawei: I will take Nokia proposal as the starting point for the revision. Probably it should work. |
| R4-2008140 |  |
| R4-2006925 | Nokia:  In general: this topic is not specific to 7-24GHz but also applies to other frequency ranges, hence it should be put into the AAS TR37.840; the model is a very general one and something similar is used in coexistence studies, e.g. the model captured in 38.803, there is no need to duplicate similar content in many TRs.  In particular:  - What is the meaning of 'nonphysical gain response'?  - Coexistence scenario should also be considered when selecting the antenna parameters.  - There is typo 'beam with product'.  - Not sure how 'The element directivity can be calculated based on the pattern described by Table 2-1 assuming that Ge,max is equal to 0 dBi', and Table 2.2 and Eq. 2-3 point to each other when calculating element radiation pattern and peak element directivity.  - Does the Dv for 2x1 sub-array in Table 2.2 denote the vertical distance between any two elements inside the same sub-array or the vertical distance between two sub-arrays?  - The parameters in Table 2.3 are discussed under the ITU reply LS agenda item. |
| Ericsson: Clearly, we need to document how antenna parameters are selected, which we are happy to do in all TRs if required. Here for this frequency range the current version of TR 38.820 has a section about antenna topologies. In this section, sub-arrays are mentioned. Therefore, this TP was created to show an example on how the antenna model in TR 37.840 can be used to support sub-arrays.  The meaning of no-physical gain response means that the model with incorrect parameter values will break energy conservation. It will produce power; hence the gain will be incorrect.  About assuming 0 dBi gain. It does not matter since it will be directivity normalized.  dv is always the element separation between two element, also in the case of sub-arrays. With 2x1 sub-arrays, the distance will be twice the distance as for a single element geometry.  The parameters in Table 2.3 is just an example for this frequency range. |
| Huawei: even though the proposed model may look as frequency agnostic, we agree that it is good idea to capture it in the TR 38.820 in order to align with the proposal we are making for IMT evaluations for the 10-10.5 GHz band (which is related to 7-24GHz SI).  Besides, updating Rel-11 TR 37.840 does not seem to be allowed anymore.  There is a need to update/correct some text in this TP. Some more specific comments below:  - For consistency reasons, it would be good to align the text on “Candidate for deployment” with the Deployments scenarios section 5.6 and content of table 5.6-1 which was referring to the BS array size.  - The "(M,N)" terminology for the array size conflicts with the "N" antenna elements terminology in clause 7.2.3.  - Symbol in table 7.2.3-1 are not added the Symbols section, and are not explained (even if the reader could guess their meaning).  - Table with the AS examples lists some configurations which were not considered in the previous 3gpp studies – this list may require some modifications. Meaning of the Note on "2x1 subarray" is unclear.  - Text on the “computing time” does not seem to be needed.  - Part of bullets on the workflow for the antenna parameters selection does not seem to be needed (e.g. related to the coverage range and ISD, etc.) – this is not realty related to the antenna model, but antenna selection for a specific scenario.  - More corrections to the text were identified – those can be provided for the revised TP (if revision agreed). |
| Ericsson: Thanks for the input, I will start to draft a revised version. |
| Nokia: We have different understanding of the term dv, we agree that it is always the element separation between two elements, also in the case of sub-arrays; therefore, with 2x1 sub-arrays which has two elements in each sub-array, dv will also be the distance between the two elements in each sub-array, so it will not be twice the distance as for a single element geometry. We need to clarify this definition first. |
| R4-2006105 | Huawei:  Intention of the text for the Protection of the BS receiver of own or different BS is clear but the wording used (i.e. “*the noise figure and hence the receiver sensitivity will be higher*”) requires some clarification, i.e. the higher the NF, the higher the required Rx sensitivity power level (PREFSENS) for the requirement (which is actually worsen sensitivity as such),  Additional spurious emissions requirements: additional requirements depends on the available regulations. Suggest to reword/remove the “should” wording.  If need, those aspects shall be corrected in the requirements sections as well, accordingly. We can check it during the second round. |
| Ericsson: Protection of different BS, cannot assume noise figure to be higher if FR1 is protected. Maybe we need to consider changing the text for this entry. Previously we used one value for noise figure. Now when noise figure is different within 7 to24 GHz we need to find a better who this requirement is derived. Depending on what frequency that is considered the noise figure can be lower and higher. |
| Nokia responses to Huawei:  The word “*the noise figure and hence the receiver sensitivity will be higher*” is indeed copied from clause 7.4.1.10.2. Agree this should be changed to “*the noise figure will be higher and hence the receiver sensitivity will be lower*”.  OK to remove the “should” wording.  Nokia responses to Ericsson:  The “Protection of the BS receiver of own or different BS” requirement aim to protect BS operating in the same band, so there should not be two different NF; protection of BS operating in other bands are specified as coexistence or co-location requirements. |
| R4-2006106 | Huawei:  It was noticed that the summary table text and the requirement’s section text on Rx spur includes the following wording “receiver spurious emissions should not significantly increase” which suggest some kind of requirement. It is suggested to reword it (requirement section and summary table) to something like “is not expected to increase”.  Some editorials for the co-location text. |
| Nokia responses to Huawei:  OK to “is not expected to increase” wording. |

## Summary for 1st round

### Open issues

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2008138 | *to be revised* |
| R4-2008139 | *to be revised* |
| R4-2008140 | *agreeable* |
| R4-2006925 | *to be revised* |
| R4-2006105 | *to be revised* |
| R4-2006106 | *to be revised* |

## Discussion on 2nd round (if applicable)

## 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”* |