**3GPP TSG-RAN WG4 Meeting # 101-bis-e R4-220xxxx**

**Electronic Meeting, January 17-25, 2022**

**Agenda item:** 6.16.5

**Source:** Moderator (CATT)

**Title:** Email discussion summary for [101-bis-e][129] NR\_ext\_to\_71GHz\_Part\_3

**Document for:** Information

# Introduction

This email discussion is to discuss the co-existence simulation for extend to 71 GHz WI. The targets of the two rounds are as following,

* 1st round:
  + Discuss the updated simulation results and ACIR proposals provided in this meeting.
  + Reach tentative agreements for ACIR, ACLR and ACS requirements.
* 2nd round:
  + Agree the WF for ACIR, ACLR and ACS requirements.

# Topic #1: Observations from the co-existence simulations

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Observations** |
| [**R4-2200413**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200413.zip) | Nokia, Nokia Shanghai Bell | The increased horizontal directivity of the UE composite antenna pattern (with the increase number of columns of UE antenna elements) significantly increases the 5%-tile throughput of the victim UE, such that the impact of the adjacent channel interference from the interfering system becomes more significant compared to the impact of the co-channel interference from the own system for the cell-edge UE, and thus more stringent ACIR requirements are needed to limit the 5%-tile uplink throughput losses of the victim UE to 5% for the results in [3]. |
| [**R4-2200578**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200578.zip) | Korea Testing Laboratory | Observation 1: Antenna elements radiation pattern and transmission power have less influence than the number of transmitting antennas in determining ACIR requirement.  Observation 2: ACIR requirements become stringent as the number of transmitting antennas decreases.  Proposal 1: It is the implementing domain that determines the number of transmitting antennas. However, it is necessary to establish a minimum number of transmitting antennas to determine the DL ACIR requirements. |
| [**R4-2200846**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200846.zip) | Ericsson | **Table 2.2-1: Antenna parameter assumption**   | **Parameter**  **BS/UE** | **Parameter set A** | **Parameter set B** | | --- | --- | --- | | 3dB (degrees) | 130/90 | 90/90 | | 3dB (degrees) | 130/90 | 90/90 | | SLA (dB) | 25/25 | 30/30 | | Am (dB) | 25/25 | 30/30 | | GE,max (dBi) | 5.0/5.0 | 5.5/5.5 |   The comparison between parameter set A and parameters set B shows that the impact due to array element parameter selection does not significantly affect the end results.  The conclusion is that the impact is neglectable. |
| [**R4-2201455**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201455.zip) | ZTE Corporation | **Observation 1:** 3.8 dB tighten requirement are needed for 60GHz and 1.2 dB tighten requirement compared with required DL ACIR value agreed in TR38.803 are needed for 70GHz.  **Observation 2:**8.4 dB tighten requirement are needed for 60GHz and 2.56dB tighten requirement compared with required UL ACIR value agreed in TR38.803 are needed for 70GHz. |

## Open issues summary and companies views’ collection for 1st round

Companies provided some observations on the reason why the co-existence simulation results for 71 GHz shows more stringent requirements than the values in TR 38.803. There’re also some further updates on the simualtion results in this meeting. The same trends was shown in this meeting. Moderators thinks it’s valuable to capture the observations in the WF for reference in the future. So

### Issue 1-1: Observations to be captured in the WF

* Observations from companies
  + Observation 1: The simulation results provided by most of the companies showed the trends that more stringent requirements are needed using the simulation assumptions in the WF R4-2114993.
  + Observation 2: The increased number of columns of UE antenna elements significantly increases the 5%-tile throughput of the victim UE, such that the impact of the adjacent channel interference from the interfering system becomes more significant compared to the impact of the co-channel interference from the own system for the cell-edge UE.
  + Observation 3: Antenna elements radiation pattern and transmission power have less influence than the number of transmitting antennas in determining ACIR requirement.
  + Observation 4: ACIR requirements become stringent as the number of transmitting antennas decreases.
  + Observation 5: The impact due to array element parameter selection does not significantly affect the end results.
* Recommended WF
  + Please comment which observations can be captured in the WF. The detail wordings for the observations are also welcomed.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | No need to have observation 1 explicitly in the WF, the statement should be put in the background to explain why additional simulation results have been performed by companies. |

## 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.*

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

## Discussion on 2nd round (if applicable)

# Topic #2: ACIR, ACLR and ACS requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2200039**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200039.zip) | Qualcomm CDMA Technologies | Proposal 1: For 60 and 70 GHz, an ACIR of 15 and 13.8 dB would be enough to keep degradation due to ACI within 5% loss for DL and UL, respectively. Proposal 2: For UL transmission in 52.6-71 GHz, an EIRP = 20 dBm is sufficient to close the link budget and provide low degradation in the degradation cause by adjacent channel interference. Proposal 3: We can consider the ACIR limits considered in TR 38.803 for 70 GHz as a basis for 52.6-71 GHz. The ACIR limit is driven by indoor deployment scenario (while dense urban scenario is highly noise limited). |
| [**R4-2200082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200082.zip) | CATT | Proposal: 48GHz ACIR/ACLR/ACS requirements are reused for 71GHz for both DL and UL. |
| [**R4-2200413**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200413.zip) | Nokia, Nokia Shanghai Bell | Proposal: The proposed ACIR values in TR 38.803 at 70GHz carrier frequency can be reused as the required ACIR values for extending current NR operation to 71 GHz. |
| [**R4-2200846**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200846.zip) | Ericsson | Proposal: For the frequency range 52.6 to 71 GHz adopt following requirement limits: 15.0 dB for UE ACLR, 21.5 dB for BS ACS, 20.5 dB for UE ACS and 21.0 dB for BS ACLR. |
| [**R4-2200952**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200952.zip) | vivo | Proposal 1: Either reuse ACIR/ACLR/ACS in TR 38.803, or the current 48GHz ACLR/ACS requirements is acceptable. |
| [**R4-2201455**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201455.zip) | ZTE Corporation | Proposal 1: to reuse the existing requirement in TR 38.803 for 52.6-71GHz with round up to nearest integer. |

## Open issues summary and companies views’ collection for 1st round

### Issue 1-1: ACIR, ACLR and ACS requirements

* Proposals
  + Option 1: Reuse TR 38.803 ACIR and round up ACLR and ACS values to the nearest integers (Qualcomm, Nokia, ZTE, vivo)

**DL ACIR proposal in TR 38.803**

|  |  |  |
| --- | --- | --- |
| DL ACIR | BS ACLR | UE ACS |
| ~18.7 dB | 24 (rounded up from 23.5) dB | 21 (rounded up from 20.5) dB |

**UL ACIR proposal in TR 38.803**

|  |  |  |
| --- | --- | --- |
| UL ACIR | BS ACS | UE ACLR |
| 13.8 dB | 22 (rounded up from 21.5) dB | 15 dB |

* + Option 2: Reuse 48GHz requirements (CATT, vivo)

48 GHz DL requirements in the latest spec

|  |  |  |
| --- | --- | --- |
| *DL ACIR* | BS ACLR | UE ACS |
| *~20.5 dB* | 26 dB | 22 dB |

48 GHz UL requirements in the latest spec

|  |  |  |
| --- | --- | --- |
| *UL ACIR* | BS ACS | UE ACLR |
| *~15.2 dB* | 23 dB | 16 dB |

* + Option 3: The following proposal from Ericsson

|  |  |  |
| --- | --- | --- |
| *DL ACIR* | BS ACLR | UE ACS |
| *~17.7 dB* | 21.0 dB | 20.5 dB |

|  |  |  |
| --- | --- | --- |
| *UL ACIR* | BS ACS | UE ACLR |
| *~14.1 dB* | 21.5 dB | 15.0 dB |

* Recommended WF
  + Option 1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Propose option 1, which is also the middle ground between options 2 and 3. |

## 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.*

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

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| [R4-2200039](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200039.zip) | Discussions on coexistence requirements for 60GHz | Qualcomm CDMA Technologies | Noted |  |
| [R4-2200082](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200082.zip) | Discussion on ACIR requirement for 71 GHz | CATT | Noted |  |
| [R4-2200413](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200413.zip) | Proposals on coexistence simulation for extending current NR operation to 71 GHz | Nokia, Nokia Shanghai Bell | Noted |  |
| [R4-2200578](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200578.zip) | Discussion on ACIR requirements for 52.6-71 GHz | Korea Testing Laboratory | Noted |  |
| [R4-2200846](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200846.zip) | Update of coexistence simulation results relevant for NR extension to 71 GHz | Ericsson | Noted |  |
| [R4-2200952](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200952.zip) | Discussion on DL/UL ACIR and BS/UE ACLR/ACS for FR2-2 | vivo | Noted |  |
| [R4-2201455](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201455.zip) | Coexistence simulation results for 52.6-71GHz | ZTE Corporation | Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)