**3GPP TSG-RAN WG4 Meeting # 98 R4-21XXXXX**

**Electronic Meeting, Jan. 25-Feb. 5, 2021**

**Agenda item:** 4.10, 15.1

**Source:** Moderator (Xiaomi)

**Title:** Email discussion summary for [98e][154] NR\_reply\_LS\_Part\_1

**Document for:** Information

# Introduction

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

This email thread discusses the two topics on response to RAN5 LS R5-206900, and RAN2 LS R2-2011270 as follow:

Topic #1: RAN5 LS on frequency Bands for testing of A-GNSS Sensitivity requirements in NR and LTE

Back ground: At RAN5 #89e, RAN5 discussed the testing requirements for A-GNSS Sensitivity and sent the LS to RAN4 in asking for guidance:

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| **To RAN 4 group**  **ACTION**: RAN5 respectfully asks RAN 4 for guidance on the LTE and NR frequency bands, and band combinations, impacting the A-GNSS Sensitivity requirements in LTE and NR, and in particular in EN-DC, taking into account possible intermodulation and other interference mechanisms that may affect the GNSS bands.  In the case that this action is expected to take some time to complete, RAN 5 would greatly appreciate one or more status reports on the progress. |

Topic #2: RAN2 LS on questions to RAN WGs on dual Radio UE (2Rx/2Tx or 2Rx/1Tx) support for simultaneous communication with both SNPN and PLMN

Back ground: In RAN2 #112-e meeting, RAN2 responded with an answer to SA2 with RAN4 in cc about the questions to RAN WGs on dual Radio UE (2Rx/2Tx or 2Rx/1Tx) support for simultaneous communication with both SNPN and PLMN.

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| Q1: is a) technically feasible without any new Access-Stratum mechanism and standardization?  A1: For scenario a) dual radio UE using independent Rx/Tx per network, RAN2 concluded that it is technically feasible for the UE to simultaneous communicate with both SNPN and PLMN (assuming a single RAT) without new AS mechanisms.  This assumes that the UE’s RF frontend is able to operate independently on the carrier frequencies/bands in use in each network. In other words, this assumes that independent operation in both networks does not result in significant interference between the two radios. Handling of such interference can be left to UE implementation without requiring standard impact, or minimum performance requirements may need to be standardized by RAN4*.* |

The candidate target of email discussion for 1st round and 2nd round are as follow for each topic:

* 1st round: Discussion on issues based on companies’ contribution input
* 2nd round: Achieve agreements on the reply LS. If not, a WF shall be strived for the next meeting.

# Topic #1: RAN5 LS on frequency Bands for testing of A-GNSS Sensitivity requirements in NR and LTE

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2100196 | Apple | 1. For LTE bands operating in SA single carrier modes, only four bands, i.e. 13, 14, 24, 44 may have interference to A-GNSS operating in the RNSS band 1559-1610MHz. RAN5 testing the A-GNSS Sensitivity requirements should be focused on the four bands only. 2. For NR bands operating in SA single carrier modes, only five bands, i.e. n13, n14, n24, n79 and n96 may have interference to A-GNSS operating in the RNSS band 1559-1610MHz. RAN5 testing the A-GNSS Sensitivity requirements should be focused on the four bands only. 3. For EN-DC band combinations, there are a total of 111 that may have IMD interference to A-GNSS operating in the RNSS band 1559-1610MHz. If only up to 3rd IMDs are identified to have an impact on GNSS receiver, the number of EN-DC band combinations would go down to 50. RAN5 testing the A-GNSS Sensitivity requirements should be conducted for those only.   It is proposed that RAN4 takes the above conclusions into account when providing a reply LS to RAN5. |
| R4-2101923 | Qualcomm Incorporated | **Proposal 1:** For EN-DC operation mode, the A-GNSS Sensitivity tests need to be repeated only on "high-risk UL band combinations" that can cause impacts to A-GNSS sensitivity that are not present when either UL component is assigned individually.  **Proposal 2:** The "high-risk UL band combinations" for testing the A-GNSS Sensitivity requirements should be those UL band combinations that can generate second or third order intermodulation (IM) products falling into the GNSS bands. |

## Open issues summary

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

### Sub-topic 1-1: Guidance on SA single carrier modes when testing the A-GNSS Sensitivity requirements

*Sub-topic description:*

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

**Issue 1-1-1: LTE bands that should be tested when GNSS operating in 1559-1610MHz**

* Proposals
  + Option 1: only four bands, i.e. 13, 14, 24, 44
  + Option 2: others
* Recommended WF
  + TBA

**Issue 1-1-2: NR bands that should be tested when GNSS operating in 1559-1610MHz**

* Proposals
  + Option 1: only five bands, i.e. n13, n14, n24, n79, n96
  + Option 2: others
* Recommended WF
  + TBA

**Issue 1-1-3: Other proposals**

People are encouraged to provide proposals when GNSS operating in other frequency bands

* Recommended WF
  + TBA

### Sub-topic 1-2: Guidance on EN-DC modes when testing the A-GNSS Sensitivity requirements

*Sub-topic description*

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

**Issue 1-2-1: Does only the "high-risk UL band combinations" need to be tested?**

* Proposals
  + Option 1: Yes
  + Option 2: No
* Recommended WF
  + TBA

**Issue 1-2-2: How to identify the "high-risk UL band combinations"?**

* Proposals
  + Option 1: only IM2 or IM3 falling into A-GNSS bands is considered
  + Option 2: others
* Recommended WF
  + TBA

**Issue 1-2-3: Other proposals**

People are encouraged to provide proposals when GNSS operating in other frequency bands

* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  **Issue 1-1-1: LTE bands that should be tested when GNSS operating in 1559-1610MHz**  **Issue 1-1-2: NR bands that should be tested when GNSS operating in 1559-1610MHz**  **Issue 1-1-3: Other proposals**  Sub topic 1-2:  **Issue 1-2-1: Does only "high-risk UL band combinations" need to be tested?**  **Issue 1-2-2: How to identify the "high-risk UL band combinations"?**  **Issue 1-2-3: Other proposals**  ….  Others: |

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

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

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

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

## Discussion on 2nd round (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*

|  |  |
| --- | --- |
| **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: RAN2 LS on questions to RAN WGs on dual Radio UE (2Rx/2Tx or 2Rx/1Tx) support for simultaneous communication with both SNPN and PLMN

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2100547 | Sony | **Observation 1 No TU are allocated for RAN4 but a reply LS explaining the situation in RAN4 would be appropriate.**  **Observation 2 It is not obvious that independent operation in both networks, given any band combination, does not result in interference between the two radios.**  **Proposal 1 RAN4 to send a reply LS to RAN2 and SA2 explaining the situation in RAN4.** |

## Open issues summary

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

### Sub-topic 2-1

*Sub-topic description:*

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

**Issue 2-1-1: Is a reply LS, explaining the situation in RAN4, needed?**

* Proposals
  + Option 1: Yes
  + Option 2: No
* Recommended WF
  + TBA

**Issue 2-1-2: Is the observation 2 in 0547 agreeable?**

* Proposals
  + Option 1: Yes
  + Option 2: No

**Issue 2-1-3: Send the reply LS as proposed in 0547?**

* Proposals
  + Option 1: Yes, contents for the LS follows the annex of 0547
  + Option 2: others

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  **Issue 2-1-1: Is a reply LS, explaining the situation in RAN4, needed?**  **Issue 2-1-2: Is the observation 2 in 0547 agreeable?**  **Issue 2-1-3: Send the reply LS as proposed in 0547?** |

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

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

*Suggestion on WF/LS assignment*

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

### CRs/TPs

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

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

## Discussion on 2nd round (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*

|  |  |
| --- | --- |
| **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”* |