**3GPP TSG-RAN WG4 Meeting # 102-e R4-2206315**

**Electronic Meeting, 21 February – 3 March, 2022**

**Agenda item:** 9.29

**Source:** Man Hung Ng (Nokia)

**Title:** Email discussion summary for [102-e][115] LTE\_NR\_HPUE\_FWVM

**Document for:** Information

# Introduction

Email discussion for contributions submitted under agenda item 9.29 for High-power UE operation for fixed-wireless/vehicle-mounted use cases in Band 12, Band 5, Band 13, Band n5, Band n13, and Band n71.

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

* 1st round: Discussion and potential approval of TR 37.828 v0.2.0, TPs to TR 37.828 on feasibility study and UE RF requirements.
* 2nd round: Approval of TR 37.828 v0.2.0, TPs to TR 37.828 on feasibility study and UE RF requirements.

# Topic #1: General

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2205849 | Nokia, Nokia Shanghai Bell | Proposal 1: Approve TR 37.828 v0.2.0Observation 1: |

## Open issues summary

### Sub-topic 1-1

**Issue 1-1: TR 37.828 v0.2.0**

* Proposals
	+ Option 1: Approve the TR.
	+ Option 2: Revise the TR.
* Recommended WF
	+ TBA

### Sub-topic 1-2

## Companies views’ collection for 1st round

### Open issues

Sub topic 1-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Option 1: Approve the TR. |

### CRs/TPs comments collection

## 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 #1-1** | *Tentative agreements:* *Option 1: Approve the TR.**Candidate options:**Recommendations for 2nd round: No need for 2nd round.* |

### CRs/TPs

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

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

|  |  |
| --- | --- |
| **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)

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

# Topic #2: Feasibility study

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2203648 | Nokia, Nokia Shanghai Bell | Proposal 1: Approve TP to TR 37.828: Coexistence study for High-power UE Vs adjacent channel Public Safety operation for fixed-wireless/vehicle-mounted use cases in Band 5 and Band n5Observation 1: |
| R4-2205926 | T-Mobile USA | Proposal 1: Approve TP for TR 37.828: Filter and PA data for n71, n26 and n12Observation 1: |

## Open issues summary

### Sub-topic 2-1

**Issue 2-1: TP to TP to TR 37.828: Coexistence study for High-power UE Vs adjacent channel Public Safety operation for fixed-wireless/vehicle-mounted use cases in Band 5 and Band n5**

* Proposals
	+ Option 1: Approve the TP.
	+ Option 2: Revise the TP.
	+ Option 3: Postpone the TP.
* Recommended WF
	+ TBA

### Sub-topic 2-2

**Issue 2-2: TP to TP to TR 37.828: Filter and PA data for n71, n26 and n12**

* Proposals
	+ Option 1: Approve the TP.
	+ Option 2: Revise the TP.
	+ Option 3: Postpone the TP.
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 2-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Option 1: Approve the TP. |

Sub topic 2-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Option 2: Revise the TP.1) typo 'may not only be suitable even for' in 7.x.3;2) tables size in 7.x.4, 7.y.4, 7.z.4 are too large, such that last two columns cannot be viewed even in Print Layout, this would create difficulty for TR maintenance. |

### CRs/TPs comments collection

## 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#2-1** | *Tentative agreements:* *Approve the TP.**Candidate options:**Recommendations for 2nd round: No need for 2nd round.* |
| **Sub-topic#2-2** | *Tentative agreements:* *TP to be revised according to received comments.**Candidate options:**Recommendations for 2nd round: Discuss and potentially approve the revised TP.* |

### 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)

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

Sub topic 2-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Revised TP is ok. |

## Summary for 2nd round

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#2-2** | *Tentative agreements:* *Approve the revised TP.* |

# Topic #3: UE RF requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2204786 | Nokia | Proposal 1: TP to 37.828: FWA MPRObservation 1: |
| R4-2205670 | Huawei Technologies France | Proposal 1: MPR studies for PCI FWA UEsObservation 1: The MPR simulations show that PC1 MPR values (using a PC3 PA model with ACLR=37dB) could be used for some cases but not all of them such as the case with modulation orders of 256QAM. |

## Open issues summary

### Sub-topic 3-1

**Issue 3-1: TP to 37.828: FWA MPR**

* Proposals
	+ Option 1: Approve proposal 1.
	+ Option 2: Revise proposal 1.
	+ Option 3: Postpone proposal 1.
* Recommended WF
	+ TBA

### Sub-topic 3-2

**Issue 3-2: MPR studies for PCI FWA UEs**

* Proposals
	+ Option 1: Note the contribution (no proposal or TP included in the contribution for approval).
	+ Option 2: Revise the contribution.
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 3-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Issue 3-1: Option 1 |
| AT&T | Issue 3-1: Option 1. The existing PC1 MPR table for n14 in Table 6.2.2-5 of 38.101-1 should be updated accordingly to show that the PC1 MPR table is generic. This would be in-line with the discussions concerning PC1 for n14 if the PC1 requirements could be generically applied to other operating bands. |

Sub topic 3-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Issue 3-2: Question to Huawei, For 256-QAM simulations what are you modulator assumptions? As can be seen from R4-166954 WF on MPR\AMPR simulation assumptions for UL 256QAM when doing MPR simulations for UL 256-QAM standard modulator minimum requirements cannot be used, for-example IQ imbalance needs to much better than 25 dBc. |
| Qualcomm | On the simulation results in R4-2205670, what type of PA model was used? Is this a PC1 PA? ET, APT, or something else? The reported backoff power is 7.4 dB. Is this from Psat, or what reference? Does Huawei expect to run a PA at 7.4 dB backoff to meet ACLR for QPSK? |
| Huawei | Thanks for the comments.@Nokia: we agree with you. IQ imbalance was set to 34dBc. We would like also to mention that the EVM budget is in accordance to WF R4-2005221@Qualcomm: We took the same approach as Nokia by calibrating our PA Model to be used for a maximum output power of 31dBm while respecting the ACLRPC1=37 dB and SEM of PC3, since it is more stringent. we should mention that the PA model was not based on a specific PC1 PA coefficient measurements. The backoff power is reference from the Psat. |

### CRs/TPs comments collection

## 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#3-1** | *Tentative agreements: Two companies supported option 1, and one company suggested updating TS 38.101-1 accordingly. TP can be approved, and new CR to be drafted for 2nd round discussion.* *Candidate options:**Recommendations for 2nd round: Discuss and potentially approve the new CR.* |
| **Sub-topic#3-2** | *Tentative agreements: Two companies raised questions on simulation assumptions, and answers were provided by source company.**Candidate options:**Recommendations for 2nd round: Continue discussion of the document.* |

### 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)

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

Sub topic 3-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | In addition of approving the TP we are open to discuss the CR proposed by AT&T. In addition to MPR some other requirements such as ACLR mentions n14 and these references should also be removed. |
| AT&T | We also agree with Nokia that the CR should be updated to reflect that the other RF requirements such as ACLR can be considered generic PC1 requirements as opposed to n14 specific requirements. |

Sub topic 3-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | We had some internal discussions about the MPR values. Since Huawei and Nokia MPR values for 5MHz, (CP and DFT-s-OFDM), (QPSK, 16QAM, 64QAM) are close together and below the thresholds given in Table 6.2.2-1 of 38.101-1, we have a full agreement on fact that the PC3 MPR values for these configurations are also valid for PC1 FWA UE. Regarding the MPR difference in 256QAM, Huawei and Nokia values are similar in the majority of the cases { MPR < 5dB (Dark Purple region) for Huawei and MPR < 4dB for Nokia(Magenta and Cyan  regions); PC3 Spec MPR <6.5 dB }. The high MPR values in the middle range have the same trend in both simulations, for instance, both simulation have large values for RB\_start =13 LCRB=1, where the EVM is impacted by the presence of the DC leakage. We consider that the high jump in the MPR in this region (from 5 to 20) is related to the fact that our PA model is adapted for PC3 applications and the actual MPR, in this region, does not need to be so high. cid:image003.jpg@01D82CA4.1B754AC0cid:image004.jpg@01D82CA4.1B754AC0To sum up We agree with generalizing PC3 MPR values for PC1 FWA UEs over all bands.It would be better to have a joint CR (Nokia and Huawei) about this change in the spec. |

## Summary for 2nd round

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#3-1** | *Tentative agreements:* *Agree the CR (which is cosigned by Huawei).* |
| **Sub-topic#3-2** | *Tentative agreements:* *Note the document.* |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
| *CR to TS 38.101-1 on PC1 MPR table* | *Nokia* | *New Rel-17 Cat-B CR.* |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-2205849 | TR 37.828 v0.2.0 | Nokia, Nokia Shanghai Bell | Agreeable |  |
| R4-2203648 | TP to TR 37.828: Coexistence study for High-power UE Vs adjacent channel Public Safety operation for fixed-wireless/vehicle-mounted use cases in Band 5 and Band n5 | Nokia, Nokia Shanghai Bell | Agreeable |  |
| R4-2205926 | TP for TR 37.828: Filter and PA data for n71, n26 and n12 | T-Mobile USA | Revised |  |
| R4-2204786 | TP to 37.828: FWA MPR | Nokia | Agreeable |  |
| R4-2205670 | MPR studies for PCI FWA UEs | Huawei Technologies France | Return to |  |

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** |
| R4-22xxxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
| R4-2206455 | CR to TS 38.101-1 on PC1 MPR table | Nokia, Huawei | Agreeable | *Please add Huawei as cosignee in chairman report and tdoc list.* |
| R4-2206456 | TP for TR 37.828: Filter and PA data for n71, n26 and n12 | T-Mobile USA | Agreeable |  |
| R4-2205670 | MPR studies for PCI FWA UEs | Huawei Technologies France | 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

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Nokia | Petri Vasenkari | petri.j.vasenkari@nokia.com |
| Nokia | Man Hung Ng | man\_hung.ng@nokia.com |
| AT&T | Ron Borsato | ronald.borsato@att.com |
| Qualcomm Incorporated | Gene Fong | gfong@qti.qualcomm.com |
| Huawei  | Mohammad ABDI ABYANEH | Mohammad.abdi.abyaneh@Huawei.com |

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)