**3GPP TSG-RAN WG4 Meeting # 97-e R4-200XXXX**

**Electronic Meeting, 2 – 13 Nov., 2020**

**Agenda item:** 10.20

**Source:** Moderator (China Unicom)

**Title:** Email discussion summary for [97e] [123] ENDC\_UE\_PC2\_R17\_NR\_TDD

**Document for:** Information

# Introduction

This summary discusses the Rel-17 WI of High Power UE (Power Class 2) for EN-DC with 1 LTE band + 1 NR TDD band.

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

* 1st round: Confirming and agreeing the content of TR skeleton and TPs, as well as determining the release-independent issue for this WI.
* 2nd round: TBA

# Topic #1: PC2 for EN-DC

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014649 | China Unicom | TR Skeleton for TR 37.826 |
| R4-2014679 | China Unicom | TP for TR 37.826 to introduce PC2 for DC\_1A\_n78A |
| R4-2014680 | China Unicom | TP for TR 37.826 to introduce PC2 for DC\_8A\_n78A |

## 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: TR Skeleton

* Recommended WF
  + It is recommended to approve the TR Skeleton R4-2014649

### Sub-topic 1-2: TP for TR 37.826

* Recommended WF
  + It is recommended to approve TP R4-2014679 and R4-2014680

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Sub topic 1-1: Agree with moderator’s recommendation  Sub topic 1-2: Agree with moderator’s recommendation  ….  Others: |
| Xiaomi | Sub topic 1-1: Agree with moderator’s recommendation  Sub topic 1-2: Agree with moderator’s recommendation. The proposed MSD values seems reasonable for us.  ….  Others: |
| CHTTL | Subtopic 1-2:  R4-2014679 & R4-2014680:  - One minor comment that the UL LCRB for 10MHz n78 should be 50 RB in the MSD table. |

### 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:* |

*Recommendations 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 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: General Issues

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015793 | CHTTL | Proposal 1: The power class 2 of 1 LTE FDD band and 1 NR TDD band EN-DC is release independent from Rel.15.  Proposal 2: The changes for TS 38.307 will be based on the changes in section 5. |
| R4-2016440 | Qualcomm | Proposal 1: For PC2 band combinations where harmonic, harmonic mixing, and/or 2UL IMD MSD exceeds [10] dB with conventional assumptions, a second MSD shall also be defined using more aggressive assumptions such as filter rejection and PCB isolation of 90 dB or better. The UE reports which MSD it complies with. |

## 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: Release-Independent Issue

*Sub-topic description: Discussion on release-independent issue for this basket WI. Companies are encouraged to provide comments on the attached draftCR in R4-2015793.*

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

* Proposals: The power class 2 of 1 LTE FDD band and 1 NR TDD band EN-DC is release independent from Rel.15
* Recommended WF
  + TBA

### Sub-topic 2-2: MSD for PC2 Combinations

*Sub-topic description: Discussion on improving PC2 MSD for EN-DC and UL CA. The contribution (R4-2016440) is submitted for discussion.*

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

* Proposals: It is proposed that a second MSD shall also be defined using more aggressive assumptions for UL CA and EN-DC PC2 combinations.
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Sub topic 2-1: In our understanding, so far duty cycle signaling for PC2 ENDC are not supported in Rel-15, if it is release independent from Rel-15, that’s means the duty cycle scheme will not be used for Rel-15 UE although it is optional scheme. In other words, only P-MPR is used for PC2 UE in Rel-15. If that’s the common understanding, then we are fine with the proposal.  Sub topic 2-2: Actually there are several RF components which will cause intermodulation, such as antenna switch, diplexer/triplexer, duplexer, filter, PA etc, sometimes dominated IMD products caused by antenna switch, duplexer or diplexer, and sometime dominated IMD products caused by PA, depending on different intermodulation types. It seems the better PCB isolation(~90dB) can only improve the IMD caused by PA but no effect on the IMD caused by antenna switch, diplexer/triplexer or diplexer.  Moreover, when discussing the MSD for LTE, if my memory is correct, the higher PCB isolation design is bottleneck means better PCB isolation may not easy to be achieved. Consequently, 60~70dB PCS isolation is used at that time.  For the proposal, we understand the intention, indeed high MSD values are not attractive by operator. So improving the MSD value is feasible. However, except for PCB isolation, we wonder if there is possible that more aggressive assumptions for the other component RF parameters such as IPx (dBm)(x=2,3,4,5) for antenna switch, diplexer, duplexer, triplexer, PA, except for PCB isolation.  ….  Others: |
| Verizon | Sub topic 2-2:  Indeed, we support this Qualcomm proposal, as well as all of the other possible efforts, to lower down the MSD values and enhance the performance requirements. If it is correct, this Qualcomm contribution, in yearly RAN4 works, first time provides a new method to both industry and operator for the qualified MSD values. We expect other more aggressive assumptions to enhance the other RF parameters too.  In our view, RAN4 should accept the Qualcomm new assumptions directly to all of the RAN4 the PC2 band combination requirements as the only mothed from this time and without [10] dB with conventional assumptions if it is possible. |
| LGE | Sub topic 2-1: Release-Independent Issue  PC2 FDD+TDD DC combinations are studied and specified in Rel-16. Furthermore the solution to satisfy SAR regulation was specified in Rel-16. So we prefer PC2 FDD+TDD DC band combinations will be applied from Rel-16.  Sub topic 2-2: MSD for PC2 Combinations  In LTE CA, RAN4 already discussed the PCB isolation to use reasonable isolation level such as 60dB to derive MSD issue by harmonic/ intermodulation product. So the 55~65 dB PCB isolation shall be considered in HPUE DC combinations.  The 90dB PCB isolation is quite difficult to achieve in current small UE form factor to support PC2 DC combination. Also 5G NR smart phone shall support both LTE and NR with variable DC/CA band combinations. From the situation, 90dB isolation is quite aggressive level in UE vendor perspective. |
| Xiaomi | Sub topic 2-1: we are fine with the proposal. Same as release independent manner for NSA TDD+TDD  Sub topic 2-2: we think MSD value is just for testing. It will not directly used for BS deciding whether the band combination could be configurable or not in real deployment. The MSD value in current spec is just the minimum requirements, which doesn’t preclude any UEs with better MSD. In this case, We don’t think this second MSD requirement is necessary. |
| CHTTL | Sub topic 2-1: to ZTE, Yes, we have the same understanding as you, the PC2 FDD+TDD EN-DC can be release independent from Rel.15 with consideration when the duty cycle signalling is absent, i.e. the P-MPR solution. Regarding this topic, we would like to gather more companies’ view.  Note that in the current spec the PC2 TDD-TDD EN-DC is release independent from Rel.15.  Sub topic 2-2:  Share the same view as Verizon. |

### CRs/TPs comments collection

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| Company B |
|  |
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|  |

## Summary for 1st round

### Open issues

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|  |  |
| --- | --- |
|  | **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*

|  |  |
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## 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”* |