**3GPP TSG-RAN WG4 Meeting #94-e R4-20xxxxx**

**Electronic Meeting, Feb.24th – Mar.6th 2020**

**Agenda item:** 9.15

**Source:** Moderator (China Unicom)

**Title:** Email discussion summary for RAN4#94e\_#28\_ENDC\_UE\_PC2\_FDD\_TDD

**Document for:** Information

# Introduction

In RAN #86 meeting, a new WID was approved to standardize Power Class 2 high power UE for EN-DC (1 LTE FDD band + 1 NR TDD band). Two cases were included in the WI, i.e. case 1 for 23dBm LTE + 23dBm NR and case 2 for 23dBm LTE + 26dBm NR. The scope of the email discussion is to confirm the LTE reference configuration, UE-Network interaction mechanism as well as MSD values.

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

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

# Topic #1: High power UE (power class 2) for EN-DC (1 LTE FDD band + 1 NR TDD band)

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2000121 | vivo | Proposal 1: considering characteristics of ENDC traffic, typical NR UL/DL Configuration and LTE TDD UL/DL Configuration, it is proposed that two LTE configurations are DutyLTE1=70% and DutyLTE2=40%.Proposal2: corresponding to the LTE fixed dutycycle in proposal 1, the reported UE NR ul dutycycle capabilities (maxNRDuty1, maxNRDuty2) are proposed as* Corresponding to DutyLTE1=70%, maxNRDuty1 ∈ {30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, *Full\_duty\_supported*}, default value in case no reporting case1=30%, case2=15%
* Corresponding to DutyLTE2=40%, maxNRDuty2 ∈ {30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, *Full\_duty\_supported*}, default value in case no reporting case1=60%, case2=30%
 |
| R4-2000122 | vivo | Draft LS on UE capability for PC2 inter-band EN-DC (LTE FDD+NR TDD) |
| R4-2000447 | Xiaomi | Observation 1: the only Rx requirement which shall be re-evaluated for DC\_3\_n78 is intermodulation interference due to dual uplink operation for both case 1 and case 2.Observation 2: IMD2 and IMD4 falling into Band 3 shall be re-evaluated for DC\_3\_n78 both case 1 and case 2.Proposal 1: the MSD value as shown in table 4 is proposed for high power UE for DC\_3\_n78 for both case 1 and case 2. |
| R4-2000878 | CHTTL | Proposal 1: For each fixed LTE reference configuration of the PC2 FDD-TDD EN-DC, consider a conditional statement for 100% UL percentage with an upper limit of the UL power setting on the LTE side. If the network configuration PLTE is not larger than the upper limit, then 100% UL percentage needs to be supported, and the UE don’t need to check the percentage of the LTE uplink symbols. - The upper limit of the PLTE corresponding to fixed LTE reference configuration (70%, 40%) can be ([21], [19]) dBm respectively. |
| R4-2000908 | CMCC | CR to TS38.101-3 - CR for adding power class 2 output power requirement for DC\_3A\_n41A |
| R4-2000968 | ZTE | Proposal 1: reuse TDD-Patternconfiguration IE specified for the single uplink transmission EN-DC. |
| R4-2001037 | China Unicom | Proposal 1: To complete the WI base on the SAR compliance scheme 2 from TR37.815 as specified in its summary part. |
| R4-2001188 | LG Electronics | Proposal 1: For PC2 DC\_3A\_n78A UE, the proposed MSD levels in Table4 shall be considered in TS38.101-3. |
| R4-2001326 | Ericsson | Proposal 1: SAR compliance is the liability of the UE; for UEs providing a duty cycle capability, the fallback behaviour is ensured by the UE by its estimates of the actual UL duty cycle on both cell groups.Proposal 2: support for EN-DC power class 2 for FDD-TDD band combination is specified by combining the methods of NR duty-cycle reporting and reduced FDD power. |
| R4-2002097 | Qualcomm | Proposal 1: The “scheme 2” feedback-based method is preferred to enable the potential for higher performance for PC2 FDD-TDD EN-DC networks.Proposal 2: The “scheme 2” feedback-based scheme shall be used if the UE signals a capability. If no capability is signaled, then a blind scheme can be used. The scheme to modify $P\_{total}^{EN-DC}$based on network configured parameters is one such blind scheme that can be considered. Another blind scheme based on actual transmitted symbols similar to SA and TDD-TDD EN-DC can also be considered. |
| R4-2002101 | Ericsson | CR to TS38.101-3 - Introduction of EN-DC power class 2 for FDD-TDD band combinations |

## Open issues summary

Main open issues identified from the contributions are the LTE reference configuration, UE-Network interaction mechanisms as well as MSD values.

### Sub-topic 1-1

Sub-topic description: LTE reference configuration

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

**Issue 1-1: LTE reference configuration**

* Proposals
	+ Option 1: DutyLTE1=70% , DutyLTE2=40%
* Recommended WF
	+ TBA

### Sub-topic 1-2

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

**Issue 1-2-1: UE-Network interaction**

* Proposals
	+ Option 1: The “scheme 2” feedback-based scheme shall be used if the UE signals a capability. If no capability is signaled, then a blind scheme can be used. (Qualcomm)
		- Option 1-a: To consider a conditional statement for 100% LTE FDD UL percentage if the network configuration PLTE is not larger than the upper limit. (CHTTL)
	+ Option 2: support for EN-DC power class 2 for FDD-TDD band combination is specified by combining the methods of NR duty-cycle reporting and reduced FDD power. (Ericsson)
* Recommended WF
	+ TBA

**Issue 1-2-2: Capability signalling**

* Proposals
	+ Option1:

Corresponding to DutyLTE1=70%, maxNRDuty1 ∈ {30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, *Full\_duty\_supported*}, default value in case no reporting case1=30%, case2=15%

Corresponding to DutyLTE2=40%, maxNRDuty2 ∈ {30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, *Full\_duty\_supported*}, default value in case no reporting case1=60%, case2=30%

* Recommended WF
	+ TBA

### Sub-topic 1-3

Sub-topic description: MSD values.

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

**Issue 1-3: MSD value for high power UE for EN-DC**

* Proposals
	+ Option 1: IMD2: 31.8dB ;IMD4: 19.4dB
	+ Option 2: IMD2: 32.0dB ;IMD4: 17.5dB
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Xiaomi | Sub topic 1-1: we support option 1Sub topic 1-2: Sub topic 1-3: If MSD need to be defined in this meeting, we can compromise to accept the average approach like RAN4 usually do considering the difference is not so much. |
| LG Electronics | Sub-topic 1-1: In case of LTE (FDD) + NR(TDD), we prefer option1: Report UE NR UL duty cycles based on corresponding to the LTE fixed duty cycles. Sub topic 1-3: When RAN4 define the required MSD levels, we can merged all MSD levels as average manner like RAN4 usually considered for LTE-A CA and EN-DC basket WI.So the proposed MSD level for DC\_3A\_n78A power class 2 UE as follow- IMD2: 31.9 dB ; IMD4: 18.5dB |
| vivo | Issue 1-1: we support option1.Issue 1-2-1: we support option1. We are also fine with option1a as comprise for option2.Issue 1-2-2: we support option1 as in R4-2000121. |
| XXX | Sub topic 1-1: Sub topic 1-2:….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.*

|  |  |
| --- | --- |
|  | **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: Title

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:Observation 1: |

## 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: TBA**

* Proposals
	+ Option 1: TBA
	+ Option 2: TBA
* Recommended WF
	+ TBA

### Sub-topic 2-2

*Sub-topic description*

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

**Issue 2-2: TBA**

* Proposals
	+ Option 1: TBA
	+ Option 2: TBA
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1: Sub topic 2-2:….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.*

|  |  |
| --- | --- |
|  | **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”* |