3GPP RAN TSG Meeting #92-e RP-21xxxx

Electronic meeting, June 14 – 18, 2021

**Agenda item:** 9.7.4.8

**Source:** Moderator (Nokia)

**Title:** Email discussion summary of [92-e-22-RF-FR2-WI]

**Document for:** Information

# Introduction

In RAN#92-e, an email thread [92-e-22-RF-FR2-WI] is assigned to discuss the following tdocs: RP-211174, 1175, 1394, 1395, 1460.

The plan is to discuss on the proposed changes to the WID first. Then the rapporteur can update the WID, if needed, based on the outcome of this email thread.

# Topic #1: RP-211174 and RP-211175

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| RP-211174 and RP-211175 | Nokia, Nokia Shanghai Bell | This WID revision proposes to   * To put this objective on hold until there is a operator request for band combination. **Study and if feasible define UE RF requirements for inter-band CA within the same freq. group (e.g. 28GHz + 28GHz) for (IBM) based on explicitly requested band combinations** * Remove these objectives from UL gaps for self-calibration and monitoring.   + **PA efficiency and power consumption**   + **Transceiver calibration due to temperature variation** * Add a new objective   + **Enhancement of beam correspondence during initial access and RRC\_INACTIVE state [RAN4 RF]**      - **SSB-based without UL beam sweeping**     - **For initial access, verification of beam correspondence based on msg1 spherical coverage (at least)** |

## Company views

**Is WID revision acceptable?**

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| **Company** | **Comments** |
| Ericsson | We are fine with the proposed updates/revisions. |
| Apple | We are fine with the revisions as described in the first two bullet points but have concern on the third bullet point to add a new objective for “Enhancement of beam correspondence during initial access and RRC\_INACTIVE state”. We think UE beam correspondence can be well verified in the connected mode. There is no need and not practical to define new requirements for beam correspondence based on msg1 spherical coverage during initial access. If a UE can successfully enter the connected mode, that already implies the UE can pass the requirement for initial access. |
| Qualcomm | We support the amendment, especially considering the SDT motivation |
| MTK | We have concern on the new objective to be added. If the intention is to check UE’s beam correspondence for rough beam, we think it is already covered by existing RRM test cases, e.g.,   * A.7.3.2.1.2 Inter-frequency RRC Re-establishment in FR2   + Beam type: rough   + AoA setup #3: 2 AoAs which are from the set of directions corresponding to the EIS spherical coverage percentile of the DUT as defined in clause 7.3.4 of TS 38.101-2 [19] for each UE power class. The relative angular offset between the directions (AoAs) of the 2 active probes, shall be changed for each test iteration.   Since RRC re-establishment is a mandatory test for FR2 standalone UE, we wonder what additional goal is to be achieved via this new objective. |
| Intel | We are ok with the first two updates (putting inter-band objective on hold and removing PA efficiency and Transceiver calibration from UL gap objectives).  Regarding the new objective for beam correspondence, the LS R1-2106309 asks RAN4 whether there is a need to define the beam correspondence requirements for Small Data Transmission (Configured Grant SDT and/or Random Access SDT) in RRC\_INACTIVE state. Further discussion in RAN4 is needed before considering this objective. Also, the discussion has already taken place in the previous meetings and there was no consensus to define initial access BC. |
| Nokia | Yes, we support this WID revision. |
| Samsung | New objective for beam correspondence enhancement was once proposed in previous RAN4 meeting as well as new objective for intra-band CA BW class extension to 1600MHz. We expressed our concern then that maybe only one new objective can be adopted due to RAN4 TU consideration. Now that CA BW class extension was already adopted so we think there is no much room left for beam correspondence enhancement in Rel-17 FR2 RF enhancement WI. |
| LG Electronics | We’re fine with 1st and 2nd bullet in revised WID. However, we have concern on 3rd bullet. The beam correspondence on initial access has been discussed in RAN many times and removed in WI scope. Also we are not sure whether beam correspondence in the initial access is really necessary. |
| Huawei, HiSilicon | For beam correspondence objective, we believe RAN4 requirement already include beam correspondence ability for initial access (idle state) or inactive state, it is verified under connected state and such measurement result can represent the UE’s BC ability under different state. Additionally, the LS R1-2106309 was sent to RAN4 and asks whether there is a need to define the beam correspondence requirements for inactive state. It still need RAN4 experts to discuss on the question in next WG meeting. |
| Sony | We support the revision in general. For the IBM within the same frequency group, an alternative to wait for the operator’s input could be that we wait until the CBM requirement is finalized. |
| vivo | We are fine with the updates in the first two bullets (inter-band CA and UL gaps).  Regarding new requirements for initial access BC, we share similar views with Apple that UE beam correspondence has been well verified in the connected mode. |
| ZTE | We are fine with the proposed changes. |
| AT&T | We support the proposed WID revision. |

## Initial Summary

# Topic #2: RP-211394 and RP-211395

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| RP-211394 and RP-211395 | Huawei, HiSilicon | Add a new objective under UL gaps for self-calibration and monitoring.   * **Coherent uplink MIMO** |

## Company views

**Is the proposed new objective agreeable?**

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| **Company** | **Comments** |
| Apple | We are okay with the objective. |
| Intel | The objective is fine |
| Nokia | No  Like discussed in the last RAN4 meeting this objective should not be added to the WID. Instead the study for phase I should continue and companies proposing UL gaps for coherent UL MIMO need to first show that this proposal will provide testable performance gains compared to the current requirements without UL gaps. RAN4 has already agreed that these studies can be done under the current WID without revisions. |
| Huawei, HiSilicon | As the proponent of this proposal, we support to add the objective.  in the agreed WF in R4-2107857, it clearly states that  • UL gap for coherent UL MIMO is within the scope of WI for FR2 enhancement.  Response to Nokia: we add this objective into the WID which includes phase 1 study. |
| Sony | To our understanding, RAN4 has agreed this objective can be further discussed without explicitly adding a new objective in the WI in the last meeting. Therefore, it is not clear to us the necessity of this revision. |
| vivo | We are OK with the new objective. |

## Initial Summary

# Topic #3: RP-211460

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| RP-211460 | MediaTek Inc. | * **Proposal 1: Plenary intervention is needed to resolve current situation on MRTD and MTTD for FR2 inter band CA with CBM in RAN4.** * **Proposal 2: If MRTD 260ns is not agreeable, remove** **CBM related objectives in the WID.** |

## Company views

**Is MRTD 260ns for CBM UE agreeable? If not is CBM related objectives removed from WID?**

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| **Company** | **Comments** |
| Ericsson | We do NOT agree with MRTD of 260 ns for CBM. We suggest to keep the current objective on CBM in the WID.  In R4-2108037, “WF on RRM requirements for FR2 Inter-band DL CA and UL CA” was approved. It has 3 options and option 2 (3 us but with degradation after certain value) was new. Companies are investigating different options until August meeting. |
| Apple | We agree that MRTD should be less than half of the CP length for 120kHz SCS for CBM and 260ns defined for intra-band DL CA can also be specified for inter-band DL CA from the same frequency group. If there is no demand for inter-band CA from the same frequency group, we think the CBM objective can be removed from the WID. |
| Qualcomm | We are ok with restricting the MRTD for CBM UEs to 260 ns. Given the current deadlock on MRTD value, we can consider a value greater than 260 ns for CBM UEs only if an agreeable requirement framework to verify MRTD capability is developed. |
| MTK | This issue has been discussed for roughly 2 years. If compromise is possible, it should not have remained open at this moment. Also, since companies have been insisting their positions for 2 years, we do not see the difficulty to keep the same position for 1 or 2 more meetings.  This issue has consumed non-trivial GTW online time for almost every meeting. As RAN4 workload remains high in this year, we suggest to serious consider whether to keep this objective in the WI scope. |
| Intel | We would like to further look at the possibility of convergence on any of the options in the next WG meeting. Our observation is that there are potential deployments which guarantee the TD within 260ns so that a CBM UE can work properly under. We also understand the typical MRTD value is always 3us though. The network deployment is transparent to UE. We believe it is fair to introduce a UE capability to indicate its MRTD handling ability so that the network understands it and configure CBM inter-band CA accordingly. Let’s try to converge in RAN4 for one more meeting if there is still no consensus, maybe the objective needs to be removed. |
| Nokia | Not acceptable  We could agree to remove the CBM objective from interband CA and leave it only for intraband CA. We would also like to agree an example band combination for IBM UEs within the same frequency group to allow progress of the work before an operator request for band combination. |
| Samsung | MRTD is under discussion in RRM session. Even 260ns MRTD for CBM UE is not agreed, that does not mean CBM related objectives need to be removed since some performance degradation is allowed as indicated in the WID objectives. |
| LG Electronics | Our preference is 260ns. However, based on the agreed WF(R4-2108037), further study on 3 candidate options is necessary in RAN4 working group. |
| Huawei,  HiSilicon | We do not agree to restrict the MRTD for CBM type to 260ns. From the latest RAN4 discussion status, options on MRTD for CBM are still open and allow further discussion in next WG meeting.  To solve the issue, there are several solutions we used to propose in RAN4. One solution is to define ≥ 3us MRTD and allow performance degradation for CBM, or UE can report capability on MRTD requirement and gNB configure CA based on UE capability. |
| Sony | We do not agree to remove the CBM related objectives. We think it is a important for a UE implementation to support inter-band CA, which may support both the same frequency group and different frequency groups; therefore, CBM needs to be specified. |
| vivo | We are OK with 260ns for CBM UE.  Regarding CBM inter-band CA issue, several proposals are under discussion in RAN4 which could potentially resolve this issue. We think further discussion in WG level would be good. If no consensus in Q3, removing this objective may be acceptable for us. |
| ZTE | We cannot accept a 260ns MRTD for CBM. Other solutions could be further investigated and more discussions are needed under the current objectives in RAN4 before concluding this issue. |
| AT&T | We do not agree with a restriction of 260ns for MRTD for CBM. There are options being pursued in RAN4 for convergence and we should allow RAN4 to further analyze these options. |

## Initial Summary

# Final proposals/recommendations