**3GPP TSG-RAN WG4 Meeting #** **104-e R4-2214814**

**Electronic Meeting, August. 15-26, 2022**

**Agenda Item:** 11.5.1

**Source:** Qualcomm Incorporated

**Title:** Work plan for Rel-18 FR2 OTA testing enhancements

**Document for:** Approval

# 1 Introduction

The new study on FR2 OTA testing enhancements was approved in RAN #95e meeting with the following objectives [1]:

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| The objectives for FR2-1 OTA testing for UEs with multi-panel reception and 4DL layer are as follows.* Define a test methodology for RF/RRM/Demodulation requirements testing for devices that can receive simultaneously from multiple Angle of Arrival (AoA)
	+ The multiple AoA test setup should enable testing of up to 2 DL Layers with dual polarization for each angle
	+ For RRM, the target should be to allow testing of 4 AoAs with 2 simultaneously active AoAs
	+ Define a test methodology for up to 4 DL MIMO layer demodulation testing
	+ Note: Revisit whether or not to include the case of transmitting simultaneously in RAN#97
	+ Note: Revisit whether or not to include other number of AoAs in RAN#97
* Smartphone form factor should be the first priority, other UE types should also be discussed as 2nd priority
* Develop the related preliminary uncertainty assessments for the test methodologies
* FR2 test methods defined in TR 38.810 and TR 38.884 should be used as the baseline.
* The tests shall take the test system reuse, test system complexity and test time into account to keep the whole test costs within a reasonable level.
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# 2 Work plan

In accordance with TU budget in [2], the core part for UE RF and RRM requirements will start from RAN4#104-e meeting and performance part for UE RRM and demodulation will start from RAN4#106-bis meeting. But in RAN4, this SI will be treated in BS RF, Demodulation and Testing session. Therefore, we suggest to studying the all the UE RF, RRM and Demd objectives from RAN4#104-e meeting.

**Table 1 Work plan for Rel-18 FR2 OTA testing enhancements**

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| **Timeline** | **UE RF objectives** | **UE RRM objectives** | **UE Demod objectives** |
| **RAN4 #104-e, Aug '22** | Approve the work plan |
| 1) Discuss the initial contributions on candidate measurement setups, e.g., IFF or DFF, for UE RF testing2) Discuss whether or not to include transmitting simultaneously | 1) Discuss the initial contributions for UE RRM testing2) Discuss whether or not to include other number of AoAs | 1) Discuss the initial contributions for UE Demod testing |
| **RAN #97e, Sept '22** |   |   |   |
| **RAN4 #104-bis-e, Oct '22** | 1) Evaluate the feasibility of supporting 2AoAs with full degrees of freedom2) Discuss potential baseline measurement setup for UE RF testing 2) Discuss initial measurement uncertainty (MU) element descriptions | 1) Discuss potential baseline measurement setup for UE RRM testing and evaluate the testability issues2) Discuss initial measurement MU element descriptions | 1) Discuss potential baseline measurement setup for UE demodulation testing and evaluate the testability issues 2) Discuss initial measurement MU element descriptions |
| **RAN4 #105, Nov '22** | 1) Evaluate the feasibility of supporting 2AoAs with full degrees of freedom and discuss on how many AoAs are needed.2) Make progress on baseline measurement setup for UE RF testing based on the progress of RF core requirements3) Make progress on MU element descriptions and MU budget values4) Discuss mapping between MU elements and UE RF requirement definitions in the multi-Rx WI5) Define work plan for alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE RRM testing based on the progress of RRM core requirements,2) Evaluate feasibility such as evaluate the angular separations, number of AoAs, etc.3) Make progress on MU element descriptions and MU budget values4) Discuss mapping between MU elements and UE RRM requirement definitions in the multi-Rx WI5) Define work plan for alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE Demod testing and evaluate the testability issues2) Make progress on MU element descriptions and MU budget values3) Discuss the propagation conditions if any |
| **RAN #98e, Dec '22** |  |  |  |
| **RAN4 #106, Feb '23** | 1) Make decision on how many AoAs and what the freedom for simultaneously active AoAs are needed2) Make progress on the baseline measurement setup for UE RF testing based on the progress of RF core requirements3) Make progress on MU element descriptions and MU budget values4) Make progress on mapping between MU elements and UE RF requirement definitions in the multi-Rx WI5) Discuss the alternate test methodologies (if applicable) | 1) Make progress on the baseline measurement setup for UE RRM testing based on the progress of RRM core requirements2) Make the decision on the angular separations, number of AoAs, etc.3) Make progress on MU element descriptions and MU budget values4) Make progress on mapping between MU elements and UE RRM requirement definitions in the multi-Rx WI5) Discuss the alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE Demod testing and evaluate the testability issues2) Make progress on MU element descriptions and MU budget values3) Make progress the propagation conditions if any |
| **RAN #99, Mar '23** |   |   |   |
| **RAN4 #106-bis, April '23** | 1) Make progress the baseline measurement setup for UE RF testing based on the progress of RF core requirements2) Make progress on MU element descriptions and MU budget values3) Make progress on mapping between MU elements and UE RF requirement definitions in the multi-Rx WI4) Make progress on the alternate test methodologies (if applicable) | 1) Make progress the baseline measurement setup for UE RRM testing based on the progress of RRM core requirements2) Make progress on MU element descriptions and MU budget values based on the progress of RRM core requirements3) Make progress on mapping between MU elements and UE RRM requirement definitions in the multi-Rx WI4) Make progress on the alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE Demod testing based on the progress of Demod requirements2) Make progress on MU element descriptions and MU budget values3) Make progress the propagation conditions if any |
| **RAN4 #107, May '23** | 1) Make progress the baseline measurement setup for UE RF testing based on the progress of RF core requirements2) Make progress on MU element descriptions and MU budget values3) Make progress on mapping between MU elements and UE RF requirement definitions in the multi-Rx WI4) Make progress on the alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE RRM testing based on the progress of RRM core requirements2) Discuss MU element descriptions and MU budget values3) Discuss mapping between MU elements and UE RRM requirement definitions in the multi-Rx WI4) Discuss alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE demodulation testing based on the progress of Demod requirements2) Make progress MU element descriptions and MU budget values3) Discuss mapping between MU elements and UE demodulation requirement definitions in the multi-Rx WI4) Discuss alternate test methodologies (if applicable) |
| **RAN #100,June '23** |  |  |  |
| **RAN4 #108, Aug '23** | 1) Make progress the baseline measurement setup for UE RF testing based on the progress of RF core requirements2) Make progress MU element descriptions and MU budget values3) Make progress mapping between MU elements and UE RF requirement definitions in the multi-Rx WI4) Make progress on the alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE RRM testing based on the progress of RRM core requirements2) Make progress MU element descriptions and MU budget values3) Make progress mapping between MU elements and UE RRM requirement definitions in the multi-Rx WI4) Make progress alternate test methodologies (if applicable) | 1) Make progress on baseline measurement setup for UE demodulation testing based on the progress of Demod requirements2) Make progress MU element descriptions and MU budget values3) Make progress mapping between MU elements and UE demodulation requirement definitions in the multi-Rx WI4) Make progress alternate test methodologies (if applicable) |
| **RAN #101,Sept '23** | Provide the TR for information at RAN plenary |  |  |
| **RAN4 #108-bis, Oct '23** | Finalize baseline and alternate test methodologies  | Finalize baseline and alternate test methodologies | 1) Make progress on baseline measurement setup for UE demodulation testing based on the progress of Demod requirements2) Make progress MU element descriptions and MU budget values3) Make progress mapping between MU elements and UE demodulation requirement definitions in the multi-Rx WI4) Make progress alternate test methodologies (if applicable) |
| **RAN4 #109, Nov '23** | Finalize outcome from baseline and alternate test methodologies  | Finalize outcome from baseline and alternate test methodologies | Finalize outcome from baseline and alternate test methodologies |
| **RAN #79, Dec '23** | Conclude the study item and present the TR for approval at RAN plenary |

**Proposal 1: To adopt the work plan, as shown in Table 1, for Rel-18 FR2 OTA testing enhancements study item.**

# 3 Conclusions

This contribution provided the work plan for Rel-18 FR2 OTA testing enhancements study item and made the following proposal:

**Proposal 1: To adopt the work plan, as shown in Table 1, for Rel-18 FR2 OTA testing enhancements study item**

# 4 References

1. RP-220988, “New SI: Study on NR frequency range 2 (FR2) Over-the-Air (OTA) testing enhancements,” Qualcomm Incorporated
2. RP-221753, “Revised WID: Requirement for NR frequency range 2 (FR2) multi-Rx chain DL reception,” Qualcomm Incorporated