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Discussion on FR1 TRP TRS in Rel-18

OPPO

Background

- The Rel-17 FR1 TRP/TRS discussion is ongoing in RAN4. And the potential FR1 TRP/TRS in Rel-18 was proposed in RAN#93-e [1] as below table.
- Based on current Rel-17 progress and outcome, this paper discuss the potential work on Rel-18 FR1 TRP/TRS.

- Specify TRP/TRS requirements for RedCapUEs
  - UE with 1Rx receiver, including several device types
  - Use Forearm Phantom for wearable UEs
- Study the test procedure for UE with multi-carriers
  - DL/UL CA
- Consider other UE types, if interested
- Rel-17 leftovers if any

Requirements for RedCap UEs

- The differences between Redcap UE and normal NR UE are less Tx/Rx antennas and smaller CBWs which might have impact to TRP/TRS tests.
- Regarding max power, it should be noticed that the power classes for Redcap UE in FR1 is still same as normal UE, i.e. PC3 as baseline and PC2 based on operator requests. Therefore, it can be seen that there is no difference for TRP between redcap and normal UEs under same power class.

Observation 1: There is no difference for TRP between redcap and normal UEs with same power class.

Requirements for RedCap UEs

- Regarding sensitivity, it is impacted by the reduced number of Rx antennas, e.g. from 4Rx to 2Rx, and RAN4 is discussing how much dB relaxation is applied e.g. 2.5dB. Once the sensitivity relaxations are defined for Redcap UE. Then TRS will also be determined. From this point, there is no need to further discuss the Redcap UE TRS in Rel-18.

Observation 2: There is no need to discuss the Redcap UE TRS since it can be derived from normal UE TRS and the relaxation. Once the sensitivity relaxations are defined in Rel-17, then Redcap TRS will also be determined.

Study for UE with multi-carriers

- The justification of specifying TRP TRS for UE with multi-carriers is needed.
  - Previous experience of carrier aggregation deployment reveals that TRP TRS performance of UE's has very low correlation with the UE's CA performance, no matter uplink and downlink.
  - TRP and TRS are the performance metrics to characterize the extreme access performance of UE under edge/poor coverage area. Meanwhile, from the commercial application perspective in the network, the carrier aggregation, as a throughput increase capability, is rarely scheduled at the edge/poor coverage area of the network.

Observation 4: the UEs' carrier aggregation performance is not reflected by TRP TRS OTA performance of UE to some extent. And the justification of specifying TRP and TRS for UE with multi-carriers is needed.

Views on other UE types

- As the 1st priority of FR1 TRP TRS OTA WI in Rel-17, the test method and requirement for smartphone are defined and developed.
- Whether developing the requirement for other UE types depends on network operator's demand.

Views on Rel-17 leftovers

- Rel-17 leftovers should be high priority work for Rel-18. The work scope highly depends on the progress of Rel-17 WI.
- It is too early to talk about Rel-17 leftovers for now.

Conclusion

- There is no need to further discuss OTA requirements for RedCap UEs in Rel-18.
- The justification of specifying TRP and TRS for UE with multi-carriers is needed before considering about the test procedure study.
- Market demands and justifications of specifying other UE types are needed before consider them in Rel-18.
- Rel-17 is ongoing, its too early to be considered in Rel-18.

Reference

[1] RP-212019 Views on RAN4 UE RF in Rel-18, vivo, RAN #93-e, Sep. 2021

[2] 3GPP TR 25.914

[3] 3GPP TR 37.902

[4] 3GPP TR 38.834