3GPP TSG-RAN #99
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RP-230612

Way forward on the support of 2Rx for XR device

Apple Inc., Samsung, CATT, Spark NZ, ABS, Xiaomi, Google, Meta

RAN#99 2Rx XR | Proposed Way Forward

- Proposed Way Forward
  - Specify mechanism to enable (XR) wearable devices to support only 2Rx antenna ports in the NR bands in which 4Rx antenna ports is mandated in legacy under the control of operators, consider the combination of the following mechanisms.
    - For 2Rx wearable UE, network based identification is required for authorization purposes.
      - Consider the solution based on SPID value in 36.300 and 38.300, e.g., [254].
    - Consider restrictive description of 2Rx wearable UE in TS 38.101-1 to restrict the applicability of 2Rx relaxation.
      - Text Proposal: “ 2Rx wearable UE: A UE which is intended to be wore on human head with assigned SPID of [254] ”.
    - UE reports the 2Rx antenna port support explicitly via capability reporting, e.g., using the existing UE capability signaling for # of MIMO layers to differentiate 2Rx UE from 4Rx UE.
    - Declare and differentiate 2Rx (XR) wearable UE through 3GPP compliance testing via GCF/other certification organizations.
      - UE is expected to be 3GPP compliant.
    - Consider RAN4 OTA (TRP/TRS) requirement work to minimize the performance gap between 2Rx and 4Rx XR devices for 2Rx relaxation, e.g., consider the feasibility of unifying OTA performance requirement of 2Rx and 4Rx XR devices.

Appendix

RAN#99 2Rx XR | Background

- In current NR, for NR Bands n7, n38, n41, n77, n78, and n79, the UE is mandated to support 4Rx ports (RP-172788).
  - Except for vehicular UE and RedCap UE

- Current NR already supports relaxation for vehicular and RedCap UE such that vehicular and Redcap UE is only mandated to support 2Rx ports in NR Bands n7, n38, n41, n77, n78, and n79. Following is the quote from TS38.101

> "Vehicular UE: A UE embedded in a vehicle, permanently connected to an embedded antenna system that radiates externally for NR operating bands.
> NOTE: Vehicular UE does not refer to other UE form factors placed inside the vehicle.
>
> NOTE 1: Four Rx antenna ports shall be the baseline for this operating band except for two Rx vehicular UE. Four Rx antenna ports for RedCap UE is not supported for this operating band."

- It is crucial for 3GPP to support a new type of devices, such as XR wearable considering the following factors
  - 4Rx antennas may not be feasible due to the form factor limitation
  - Large BW (e.g., 100MHz in FR1) and CA is feasible and important for high demanding XR services

RAN#99 2Rx XR | Endorsed RAN#98 WF

- RAN#98 endorsed the WF (Way Forward) in RP-223493

Way Forward on 2Rx for XR

- Keep the discussion in RAN plenary – no WG discussions!
- Allow companies more time to bilaterally and multilaterally discuss the key aspects until March, e.g.:
  - What type of XR devices can have 2Rx relaxation, what are the exact physical (e.g form factor) limitations that make such a relaxation for these XR devices important?
  - How to identify these XR devices in the network?
  - How to prevent mis-use of the 2Rx relaxation by other devices (e.g. smartphones)?
  - Is any further relaxation foreseen to be needed for these devices, e.g. on BW?
  - etc..
- Come back at RAN#99 in March and try to define a way forward

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