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# Views on Rel-19 RAN4 OTA topics

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# Background of NR MIMO OTA

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**From Rel-11 to Rel-18, 3GPP methodologies for measuring multi-antenna reception performance of UEs have been pursuing**

- test conditions more closely resembling the realistic channel environment, and
- support for more advanced technologies/UE features/frequencies.

- **HSPA and LTE MIMO OTA**
  - A set of comparable methodologies were defined in TR 37.977.
  - One of the objectives in the WID “the utilization of Variable Reference Channels and other-cell interference shall also be studied at a later stage”, however, is unfinished.

- **NR MIMO OTA**
  - In Rel-16, measurement methodologies were defined for FR1 and FR2 UEs in TR 38.827. One of the objectives in the SID “MIMO throughput under dynamic geometry environment”, however, is unfinished.
  - In Rel-17, performance requirements for bands n41 and n78 were defined in TS 38.151.
  - In Rel-18, the measurement methodologies and performance requirements are being enhanced.

# Rel-19 NR MIMO OTA enhancement

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- **Motivation**
  - Legacy MIMO OTA test plans only specified stationary channel models, i.e., the large scale channel characteristics in the test zone is fixed during testing. Dynamic channel is more closely resembling the realistic channel environment.
  - m-TRP brings capacity gains and improves cell edge performance, meeting the needs of operators.
  - Existing test plan only applicable to UEs with sizes less than 20cm, free-space scenarios, FR1 and FR2-1.
  - In Rel-18, enhancements for scenarios with body phantoms are being investigated, but are likely to be leftovers.
- **Potential Rel-19 objectives: FR1 and FR2**
  - **Test methodology enhancement**
    - introduce “dynamic” channel models
    - m-TRP test with NCJT (Non Coherent Joint Transmission) under dynamic channel
    - implement a future-proof quite/test zone size
    - Rel-18 leftovers
      - phantom-based test methodology
  - **MIMO OTA requirements**
    - FR1 and FR2 requirements for new bands based on operators' interest
    - FR1 and FR2 unfinished bands in Rel-18 (if any)

# Rel-19 FR1 TRP TRS enhancement

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- **Motivation**
  - For the leftovers of Rel-18, as well as requirements for more bands, UE types can be further considered as part of R19 WI.
- **Potential Rel-19 objectives:**
  - **Test methodology enhancement**
    - more UE types, e.g., XR...
    - more phantoms
      - phantoms for XR
      - phantoms for wearable Redcap UE other than forearm phantom
    - CA
      - potential R18 leftovers
      - to support more UL/DL configurations
    - futher optimization on test methodology
      - other test time reduction solutions
  - **TRP TRS requirement**
    - potential R18 leftovers
      - any unfinished R18 bands for 1Tx
      - PC2 requirement for 2Tx
    - more FR1 bands for handheld UE based on operators' interest
    - Redcap UE requirements
    - PC1.5 requirement for 2Tx
    - CA requirements

# Rel-19 FR2 OTA enhancement

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- **Motivation**
  - R18 FR2 OTA enhanced SI focus on FR2-1 OTA testing for UEs with multi-panel reception and 4DL layer. RAN4 is discussing the requirements for multi-Tx , the corresponding test method can be considered in Rel-19.
- **Potential Rel-19 objectives:**
  - **Test methodology enhancement**
    - RF/RRM/Demod test methodology to support simultaneous transmission with multi-panel
    - any leftovers on multi-Rx test methodology in Rel-18

# Rel-19 NTN OTA

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- **Motivation**
  - UL transmission capability of UE is important to ensure NTN coverage and stable connectivity.
  - Traditional FR1 UE adopted sphercial antenna radiation pattern, and corresponding OTA performance metric is also based on spherical integrated method (TRP/TRS). However, for NTN UE, the directional radiation pattern may be more reasonable and the corresponding test method and performance metrics need to be studied.
- **Potential Rel-19 objectives:**
  - OTA Test method for NTN UEs
  - Performance metric for NTN OTA performance

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# THANKS

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