

3GPP TSG RAN#103

March 18 – 21, 2024

Maastricht, The Netherlands

RP-240452

Agenda Item 9.1.4

MediaTek Views on RAN4 Rel-19: Overview

Introduction

- This contribution provides comments for discussion on the details provided in RP-240019
- NOTE: Supporting Tdocs are provided in RP-240453, 454, 455, 456

RAN4 Rel-19: HPUE CA views

UE RF: High power UE (HPUE) for CA in TN

📶 References: [RP-233918](#)

📶 Potential objectives:

- High power UE (HPUE) for CA (non-spectrum item for the combinations which need generic requirements)
 - PC1.5 UE for intra-band contiguous CA with or without UL MIMO with 2Tx
 - PC1.5 UE for two band inter-band CA with 2Tx and/or 3Tx for handheld and FWA
- Generic framework of support increasing UE power high limit for inter-band CA HPUE (only for TN) [for different power classes](#)

1

→ - **3Tx specifics: Also PC2?, EN-DC?**

2

→ - **Do we need a study phase, e.g., in 2Q'24 (1 quarter)?**

3

- **Further discussion on other type of HPUE CA band combinations.**
- **Further discussion on whether to introduction of HPUE for EN-DC**
- **Further discussion on whether to introduce PC1.5 for intra-band non-contiguous**

MediaTek views

1. 3Tx specifics: Include 3Tx switching (2T+1T <-> 1T+2T) to boost UL MIMO availability with total 3 Tx chains across 2 frequency bands – **see [RP-240453](#)**
2. Generic Framework for UE power limit: more than 1 quarter study is recommended to ensure any such framework is clear
3. Focus on “Inter-band CA” only

RAN4 Rel-19: Power boosting/MPR reduction views

UE RF: Power boosting and/or MPR reduction

References: [RP-233918](#)

Potential objectives:

1

- **(Ensure reasonable load)** Power boosting or MPR reduction for PC2/PC3 with ACLR relaxation with BS indication (Study on whether and how much the requirement can be relaxed first and how often the power boosting can be done, and at least lower modulation order need be studied and FFS on higher modulation order) for FR1 and FR2

- A study phase is necessary
- Is there a need to consider RedCap?

2

- MPR reduction for UL contiguous CA in FR1/FR2
 - How about a single active UL carrier case when CA is configured?
- MPR reduction for RedCap via relaxed emission requirements with BS indication (Study on whether and how much the requirement can be relaxed first, and at least lower modulation order need be studied)
- Need further clarification and discussion on including Pi/4 QPSK in the study and check whether there is RAN1 impact
- Need further discussions on whether PAPR reduction is included.
- Need further discussion on whether EVM will be relaxed.
- Need further discussions on whether the power boosting or MPR reduction should be network transparent only

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See [RP-240453](#)

1. Power boosting scope: **RedCap UE** in >20MHz spectrum block is the most natural case where gain from ACLR/SEM relaxation achievable
 - There is no justification to exclude RedCap
 - More relevant aspects to consider in constraining the Power Boosting workload are:
 - Clarify that focus shall be on existing reference Tx PA models and waveforms, not improved PA models
 - Clarify whether ACLR/SEM relaxation is allowed only when UE CBW < spectrum block size, or also where UE CBW = spectrum block size
 - Higher order modulation is EVM limited, so unclear what the proposal is for that in context of ACLR relaxation
2. CA MPR: Focus on single CC UL scenarios seems most relevant operating scenario

RAN4 Rel-19: 6Rx views

UE RF: 6 Rx

📶 References: [RP-233918](#)

📶 Potential objectives:

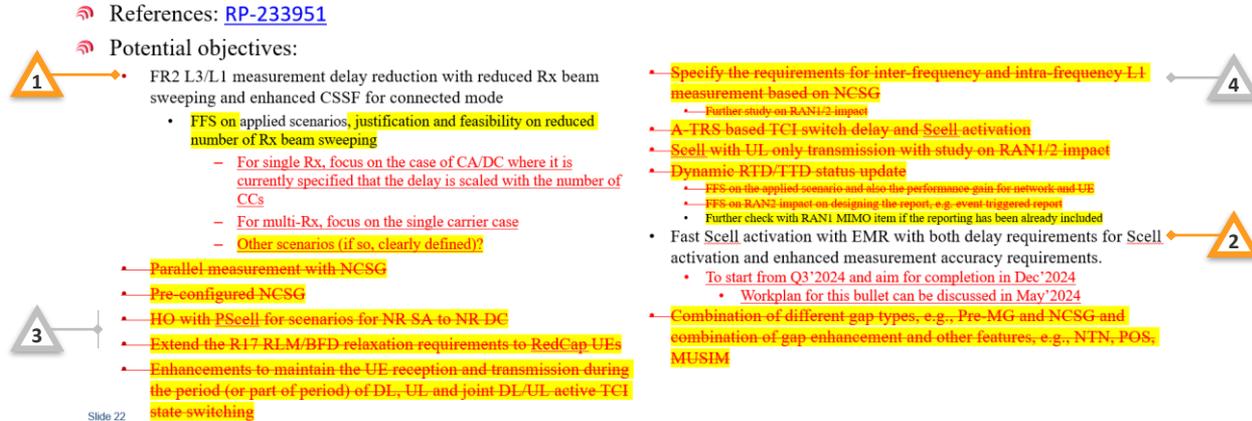
1. Do we need a feasibility study?
 - Investigate and enable 6Rx on higher frequency bands (>2.5GHz) targeting at support of smartphone and FWA
 - Specify the requirements to support SRS antenna switching
2. FFS on the MIMO layer to be supported.
 - Further discussions on the following potential objective:
3. Improved SRS reporting for antenna switching usage

MediaTek views

1. Need for FWA 6Rx capability unclear (vs. 4/8Rx)
2. Focus on 4 layers: Most practical
3. SRS insertion loss reporting: no gain observed
 - UE can/should self-compensate for power imbalance from insertion loss by using available Tx power
 - SRS insertion loss reporting as alternative has been shown to be inferior to UE self-compensation (see e.g. [R1-2308034](#))

RAN4 Rel-19: RRM views

RRM



MediaTek views: Focus on “maintenance” in the beginning of Rel-19. Slow start is preferred (and corresponding TU allocation)

See [RP-240454](#)

- Single Rx: current delay scaling factor can be extended by adding more searchers at UE side (this only reduces the measurement delay of Scell, because Pcell already has a dedicated searcher)

Multi-Rx: always activating mPanels for measurement leads to high UE power consumption. Conditions for activating mPanels for L3 measurements should be discussed: L3 procedures (HO or PScell addition) can be used as a starting point.
- Need to clarify the exact direction
4. To be discussed in December 2024 or as TE119: HO with PScell, RLM/BFD relaxation reqs for RedCap, L1 measurement req. for NCSG

RAN4 Rel-19: Demod views

Demod

References: [RP-233951](#)

Potential objectives:

1

- To start from Q3'2024
- UE performance requirements with inter cell and with intra-cell inter-use interference for 8Rx CPE/FWA/vehicle/industrial devices
 - Further check if such objectives can be done in R18 performance
- MMSE-IRC receiver for uplink taking LTE interference profile as starting point. FFS on other interference profile.
- Further check if 1024QAM + 4layers for indoor scenario for 4Rx UE and 8Rx CPE/FWA/vehicle/industrial devices shall be included in the scope
- UE CRI reporting requirements with multiple CSI-RS configured with priority on FR1
 - Further check if any other RRM requirements beyond Demod for FR2 CRI reporting
- Enhanced UE CSI reporting requirements with R-ML receiver for SU-MIMO with study on whether the UE with R-ML report incorrect CSI

2

- Channel model with spatial component for performance requirements with following alternatives for study the test feasibility
 - Alternative 1: Extending TDL channel model
 - Alternative 2: CDL channel model
 - For this bullet, can the contents be clearly defined during March/RAN#103?

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See [RP-240455](#)

1. Reasonable SINR target to be considered (avoid corner case optimization).
 - E.g. at SINR < [-6]dB, it is better to handover the UE to the strongest neighboring cell rather than keeping it on the same cell and relying on UE Rx to handle interference
2. MIMO channel model with spatial component study:
 - More clarifications are expected, e.g., FR1 only? Limited to 2-codeword scenarios? Whether conducted testing is still used?
 - Strongly prefer minimum change to current TDL channel model, e.g., a new antenna correlation model
 - Level of device antenna correlation is an important component of MIMO performance and should be included as a component of any studies

RAN4 Rel-19: Cross Session – NTN views

UE RF: High power UE (HPUE) for NTN

References: [RP-233918](#)

Potential objectives:

- Important to ensure reasonable load
- Introduce PC2 for NR/IoT NTN UE in NTN FR1 bands for both handheld and non-handheld (need confirmation on the co-existence)
- Introduce PC1 for NR NTN UE in NTN FR1 bands for non-handheld (the study on co-existence is needed)
- Introduce PC1.5 for NR NTN UE in NTN FR1 bands (the study on co-existence is needed)
- Need further discussion on whether the PC1.5 and PC1 are supported for non-handheld UE only or both handheld UE and non-handheld UE.
- Need further discussion on whether IoT NTN UE can support PC1 and PC1.5.
- Need further discussion on the prioritization of NTN work in terms of co-existence study.
- Need further discussion on high power UE in NTN FR2 bands for non-handheld UE

NTN testing for NGSO

References: [RP-233920](#)

Potential objectives:

- NTN performance requirements/testing for NGSO for UEs
- FFS: whether the new core requirement is needed for NGSO

NR Channel BW less than 5 MHz (NTN)

References: [RP-233920](#)

Potential objectives:

- Aim for minimal spec impact
- NR Channel BW less than 5 MHz (focusing on 3MHz) (study phase is needed)
 - No RAN1 impact is expected

MediaTek views

See [RP-240456](#)

1. Power Class: Coexistence studies will be needed for any higher Power Class. Focus on Power Class 2 for NR and IoT NTN
 - Specific need for PC1 and PC1.5 need more discussion and likely require additional considerations on coexistence modelling vs. PC2
2. NGSO testing: Focus on the performance part (test case) change without revisiting core part (RF & RRM) requirements
3. <5MHz Channel BW: First verify that existing TN spec can be re-applied
4. Mobile VSAT: Recently requested by NTN stakeholders
 - Compelling use-cases (e.g. automotive)
 - WRC-23 Resolution COM5/3 enabling non-GSO ESIMs in misc. frequency bands >10GHz

Thank you!