3GPP TSG-RAN Meeting # 102
Edinburgh, Scotland, December 11-15, 2023

RP-233280
Agenda Item 9.1.4.3

MediaTek Views on RAN4 Rel-19: RRM and Demod

MediaTek Inc.

Outline

- A summary of all MTK’s Rel-19 proposals
- Detail proposals to RRM and Demod areas

A summary of all MediaTek Rel-19 RAN4 proposals

Area	Proposed objectives
RF & OTA (RP-233279)	Study on UE antenna correlation for FR1 multiple antennas (SI)
	MPR Reduction for RedCap (via relaxed emission requirements)
	3Tx for 2 bands with UL Tx switching between 1T2T and 2T1T

Area	Proposed objectives
RRM (RP-233280)	HO interruption minimization
	Relaxed RLM/BFD measurement for Redcap
	TS38.133 Spec clean-up (Kp calculation; MG integration)
	[MG] Pre-configured NCSG
	[MG] NCSG enh for SCell
Demod (RP-233280)	App layer throughput enh: OLLA and 4-layer
	CQI report for R-ML SU-MIMO receiver

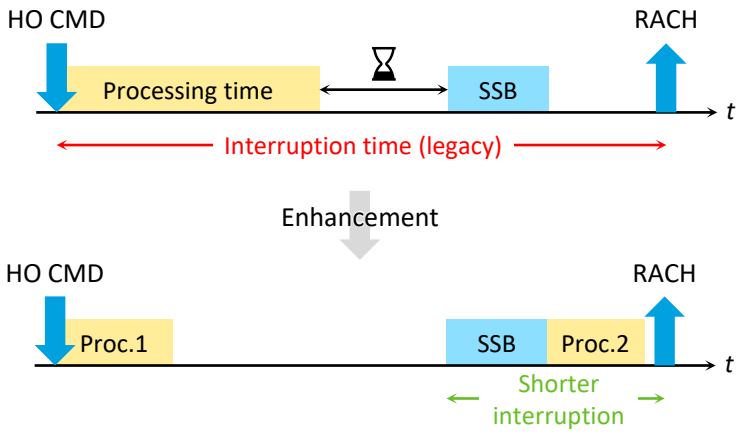
Area	Proposed objectives
Cross-session (RP-233281)	Enhanced NTN testing for NGSO
	NTN RedCap UE Support
	NR NTN 3MHz channel bandwidth
	IoT NTN HPUE support
	In-band/guard-band co-existence of NB-IoT w/ NR

OLLA: Outer-Loop Link Adaptation

RRM enhancement

HO interruption minimization; Relaxed RLM/BFD meas for RedCap

- Motivation – HO interruption minimization
  - In current spec, UE stops source cell data Tx/Rx after receiving HO command. However, during HO delay, most of the time were spent waiting for SSB of the target cell. This waiting time can be better leveraged to reduce interruption.



- Motivations – Relaxed RLM/BFD measurement for Redcap
  - Power saving is very important to Redcap UE, but unfortunately these 2 Rel-17 features did not consider jointly in Rel-17 due to parallel discussions.

- Objectives – HO interruption minimization
  - Introduce an enhanced HO delay requirement by leveraging the waiting time of SSB to reduce interruption.
  - Phase 1: Start from Rel-15 HO requirements.
  - Phase 2: FFS whether and how to extend to conditional HO, HO with PSCell and LTM cell switch.
  - If needed, LS can be sent to RAN2 to trigger RRC signaling change, based on RAN4 consensus

- Objectives – Relaxed RLM/BFD measurement for Redcap
  - Extend Rel-17 RLM/BFD measurement relaxation requirements to Redcap UEs

RRM enhancement
TS38.133 clean-up

- Motivations
  - TS38.133 clean-up: Calculation of K_p
    - Current RRM spec contains 3 different approaches of calculating Kp (the delay extension parameter due to RS punctured by MG or shared between L1/L3 measurements).
      - One inherited from Rel-15
      - One introduced by Rel-17 MG enh.
      - One introduced by Rel-18 LTM
    - This makes it difficult a) to maintain the spec and b) to add new features
  - TS38.133 clean-up: MG integration
    - In Rel-18 MG enh discussions, it was found that the current spec structure is very complicated due to the definitions of
      - Intra-freq, inter-freq, inter-RAT
      - Measurement with gap, with NCSG, with interruption and without gap
      - Measurement within gap, within NCSG, outside gap
    - It is suggested to re-check the current spec structure and discuss how to simplify the spec

- Objectives
  - TS38.133 clean-up: Calculation of K_p
    - Study the current spec structure
    - Discuss the potential approaches to simplify the spec.
    - Implement the selected approach into 38.133
  - TS38.133 clean-up: MG integration
    - Study the current spec structure
    - Discuss the potential approaches to simplify the spec.
    - Implement the selected approach into 38.133
  - Note: The above 2 objectives should be completed at least [2] quarters before the start of CR drafting phase of other Rel-19 WIs
  - Note: No technical core requirements changes are expected

RRM enhancement
Measurement gap enhancement

- Motivations
  - Pre-configured NCSG
    - Leftover of Rel17/18 MGE
    - Benefit for faster and low-overhead on-off NCSG in scenarios like BWP switch or Scell activation/deactivation, i.e., avoid the delay and overhead RRC reconfiguration.
  - NCSG enh for Scell
    - Issue identified in Rel-18
    - Current UE capability report of NCSG for serving cell does not distinguish whether
      - SCell is deactivated, or
      - SCell is activated with SSB outside of active BWP
    - This leads to ambiguity in UE behavior or more conservative reporting.

- Objectives
  - Pre-configured NCSG
    - Introduce the RRM requirements when UE is pre-configured with NCSG
  - NCSG enhancement for SCell
    - Introduce an additional UE capability to distinguish the support of NCSG for deactivated SCell and activated SCell with SSB outside of active BWP
    - Define the corresponding RRM requirement.
    - Consider to extend the concept to NeedforGap after the discussions of NCSG are stable.

Demod Enhancement

- Motivations
  - Application layer throughput enh: OLLA and 4-layer
    - Leftover of Rel-18 Demod work.
    - Extending the current scope to consider OLLA and 4-layer provides an **even better assessment of UE performance in the real deployment scenario**.
  - CQI report for R-ML SU-MIMO receiver
    - Advanced R-ML SU-MIMO receiver is already considered in current PDSCH demodulation test, but not in the CQI test.
    - This mismatch needs to be fixed to improve close-loop link adaptation efficiency.

- Objectives
  - App layer throughput enh: OLLA and 4-layer
    - Specify absolute physical layer throughput requirements with link adaptation with
      - Outer-loop link adaptation at gNB side enabled, and/or
      - 4-layer MIMO
  - CQI report for R-ML receiver
    - Introduce the CQI test cases for advanced R-ML receivers

Thank you!