3GPP TSG RAN Rel-18 Workshop
June 28th – July 2nd 2021

RWS-210099
Agenda Item 4.3

[x-area] Smart Repeaters Enhancements

MediaTek Inc.

eMBB consumer

MIMO
- CSI enh.
- BM: [subject to R17]
- Stationary: 8Rx, overhead redux
- UL sub-band precod.
- UL 4+ layers

DC/CA Enh.
- X-carrier HARQ: feedback & re-Tx
- Fast re-Tx split bearer
- Temporal RS PScell act
- Scalable x-carrier sch.

XR/CG Enh.
- QoS+, x-layer opt.

MBS
- SFN+
- QoS+ (Tput, reliab.)
- TV (ATSC3.0 ref)

NW Topology

Sidelink LLeMBB
- SL-U esp. <7GHz, FR2
- Low latency 1Gbps
- SL-U RedCap

Sidelink Relay
- U2U relay
- UE scheduling UE
- mPath, mHop
- Mobility (Remote, Relay)
- Network coding

Smart Repeaters
- Beamforming
- Interf. Mgmt (T/F DD)
- Integration (UE authorization)

NTN Evolution

NTN NR
- Mobility
- Regenerative arch
- HD-FDD, VoNR, MBS
- R17 leftovers

NTN IoT
- Mobility (connected)
- R17 leftovers

SID Spectr. sharing
- Study scenarios, target spectrum and regulation status

Long-term explor.

SID AI/ML integr.
- NG-RAN/AS integrat.
- DMRS ch. est., Rx noise suppress, CSI-RS overhead, CSI feedback
- (UE-based) Mobility predict., Pos. enh.
- NW functions (load balancing, radio resource planning..)

SID AI traffic
- Traffic and arch.
- Overhead optim.

SID >71GHz
- Spectrum charac.

Common tech.

[FR2] Mobility
- L1/L2 trig. CHO
- Inter-/intra-cell beam switching delay redux
- RRC DAPS HO mPanel

System Energy
- DCI-based pwr sav mTRP and mPanel
- gNB/TRP dormancy (UE -trig. / -imposed)
- Eval. Methodology (Pwr. Cons. Models)

POS (NR, SL, RedCap)
- cm-level (Tx + meas related to signal ϕ)
- SL (-based, -assisted)
- RedCap UE
- R17 leftovers

SID gNB Full Duplex
- Partitioning, scenarios, interf.

Verticals

URLLC
- DL control efficiency
- NR-U enh

RedCap
- PA-less
- (POS)
- NO LPWA

(UAV: neutral)

SID = SID only Others: SI+WI / WI

Sorting for 3GPP RAN#92e Rel-18 Workshop

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XR/CG Enh. [SA-led]
- QoS+, x-layer opt.

NTN NR
- R17 leftovers
- Mobility
- Regenerative arch
- VoNR, MBS, HD-FDD

MBS
- SFN+
- QoS+ (Tput, reliab.)
- TV (ATSC3.0 ref)

(may also be seen as non-eMBB)

Non-eMBB

URLLC
- DL control efficiency
- NR-U enh

RedCap
- PA-less
- (POS)
- NO LPWA

NTN IoT
- R17 leftovers
- Mobility (connected)

(UAV: neutral)

X-areas New areas

System Energy
- DCI-based pwr sav mTRP and mPanel
- gNB/TRP dormancy (UE -trig. / -imposed)
- Eval. Methodology (Pwr. Cons. Models)

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SID NTN *f* sharing
- Study scenarios, target spectrum and regulation status

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Smart Repeaters Enhancements
RAN1-led

3GPP TUs (Total w/ 9 meetings)			
RAN1	RAN2	RAN3	RAN4
15	6	-	-

SA/CT Dependency: Yes (authorization)

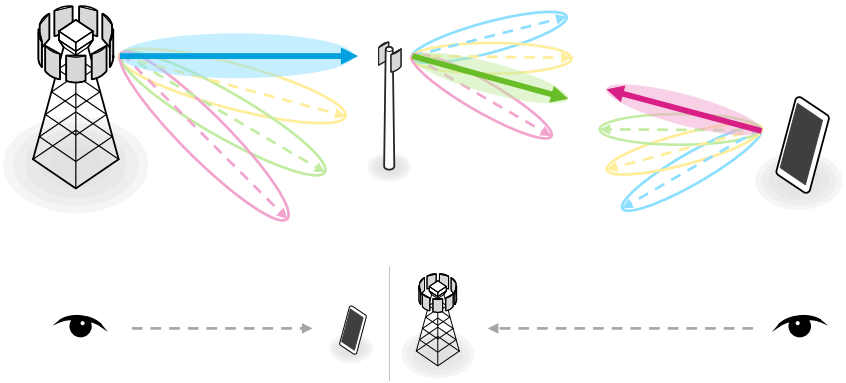
Ensure service coverage & availability where service is to be consumed
Limit additional interference via Tx power control at the repeater (i.e. Repeater to gNB/UE)

Objective I: Support for beamforming (Tx/Rx aspects) [RAN1]
- SSB beam
- System information
- CSI-RS beam for PDCCH/PDSCH
- SRS beam for PUCCH/PUSCH
- Control information and dynamicity

Objective II: Interference Management [RAN1]
- Support *both* TDD and FDD
  - For TDD: consider same TDD pattern only (i.e. no cross-link interference) and semi-static TDD
- Control mechanism for Repeater Tx power i.e. to gNB/UE to reduce same link interference

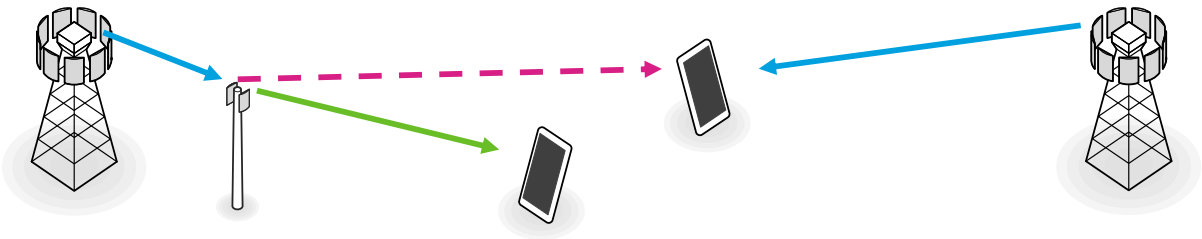
Objective III: Repeater Integration and Operation [RAN2]
- Integration: Repeater as a UE with OAM integration
  - Initial access, capability reporting, registration & authorization (+ notification to RAN), normal IP connectivity followed by OAM incl. set-up
- Operation: necessary signaling to support Objectives I & II

NOTE: necessary backwards compatibility with legacy NR UEs



Smart Repeaters Enhancements

- Interference Management
  - For both FDD and TDD, deploying repeaters creates additional interference to all co-channel devices
  - Power control or ON/OFF should be studied to mitigate co-channel interference
  - Prioritize interference management in same transmission direction



Thank You!

MediaTek TDocs to RAN Rel-18 Workshop

RWS-210092	MediaTek Views on Rel-18 content	MediaTek Inc.
RWS-210093	[eMBB] MIMO Enhancements	MediaTek Inc.
RWS-210094	[eMBB] DC/CA Enhancements	MediaTek Inc.
RWS-210095	[eMBB] XR/CG Enhancements	MediaTek Inc.
RWS-210096	[eMBB/Other] MBS Enhancements	MediaTek Inc.
RWS-210097	[eMBB] Sidelink Enhancements - LLeMBB	MediaTek Inc.
RWS-210100	[eMBB] NTN NR Enhancements	MediaTek Inc.
RWS-210101	[non-eMBB] NTN IoT Enhancements	MediaTek Inc.
RWS-210108	[non-eMBB] URLLC Enhancements	MediaTek Inc.
RWS-210109	[non-eMBB] NR RedCap Enhancements	MediaTek Inc.
RWS-210098	[x-area] Sidelink Relay Enhancements	MediaTek Inc.
RWS-210099	[x-area] Smart Repeaters Enhancements	MediaTek Inc.
RWS-210102	[x-area] NTN/TN Spectrum Sharing	MediaTek Inc.
RWS-210103	[x-area] AI/ML Integration	MediaTek Inc.
RWS-210104	[x-area] AI/ML Traffic	MediaTek Inc.
RWS-210105	[x-area] Mobility Enhancements	MediaTek Inc.
RWS-210106	[x-area] System Energy Enhancements	MediaTek Inc.
RWS-210107	[x-area] Positioning Enhancements	MediaTek Inc.
RWS-210197	[x-area] Sub-band Full-duplex for gNB	MediaTek Inc.
RWS-210110	Draft WID: System Energy Enhancements	MediaTek Inc.
RWS-210111	Draft WID: Mobility Enhancements	MediaTek Inc.
RWS-210112	Draft WID: DC/CA Enhancements	MediaTek Inc.
RWS-210113	Draft WID: NTN IoT Evolution	MediaTek Inc.