

[eMBB] Sidelink Enhancements - LLeMBB

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)

eMBB	MIMO	DC/CA Enh.	Sidelink LLeMBB	NTN NR	MBS
	<ul style="list-style-type: none"> CSI enh. BM: [subject to R17] Stationary: 8Rx, overhead redux UL sub-band precod. UL 4+ layers 	<ul style="list-style-type: none"> X-carrier HARQ: feedback & re-Tx Fast re-Tx split bearer Temporal RS PScell act Scalable x-carrier sch. 	<ul style="list-style-type: none"> SL-U esp. <7GHz, FR2 Low latency 1Gbps SL-U RedCap <p>XR/CG Enh. [SA-led]</p> <ul style="list-style-type: none"> QoS+, x-layer opt. 	<ul style="list-style-type: none"> R17 leftovers Mobility Regenerative arch VoNR, MBS, HD-FDD 	<ul style="list-style-type: none"> SFN+ QoS+ (Tput, reliab.) TV (ATSC3.0 ref) <p>(may also be seen as non-eMBB)</p>
Non-eMBB	URLLC	RedCap		NTN IoT	
	<ul style="list-style-type: none"> DL control efficiency NR-U enh 	<ul style="list-style-type: none"> PA-less (POS) NO LPWA 		<ul style="list-style-type: none"> R17 leftovers Mobility (connected) 	(UAV: neutral)
X-areas New areas	System Energy	Sidelink Relay	POS (NR, SL, RedCap)	<i>SID</i> NTN f sharing	<i>SID</i> AI/ML integr.
	<ul style="list-style-type: none"> DCI-based pwr sav mTRP and mPanel gNB/TRP dormancy (UE -trig. / -imposed) Eval. Methodology (Pwr. Cons. Models) 	<ul style="list-style-type: none"> U2U relay UE scheduling UE mPath, mHop Mobility (Remote, Relay) Network coding 	<ul style="list-style-type: none"> cm-level (Tx + meas related to signal ϕ) SL (-based, -assisted) RedCap UE R17 leftovers 	<ul style="list-style-type: none"> Study scenarios, target spectrum and regulation status 	<ul style="list-style-type: none"> 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..)
	[FR2] Mobility	Smart Repeaters		<i>SID</i> gNB Full Duplex	<i>SID</i> AI traffic
	<ul style="list-style-type: none"> L1/L2 trig. CHO Inter-/intra-cell beam switching delay redux RRC DAPS HO mPanel 	<ul style="list-style-type: none"> Beamforming Interf. Mgmt (T/F DD) Integration (UE authorization) 		<ul style="list-style-type: none"> Partitioning, scenarios, interf. 	<ul style="list-style-type: none"> Traffic and arch. Overhead optim.



Sidelink Enhancements

RAN1-led

Support for Sidelink operation in any spectrum i.e. licensed and unlicensed.

Performance improvements enabling low-latency 1Gbps.

Objective I: Support for SL-U sub-7GHz, FR2, SL-U Sub-71GHz [RAN1, 4]

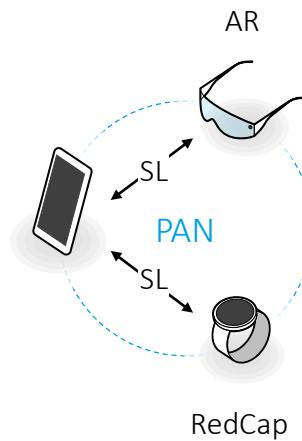
Focus on 5/6GHz unlicensed spectrum leveraging NR-U design.

Objective II: Enable Low-latency 1Gbps Sidelink [RAN1, 2, 4]

1. MIMO: a) CSI enhancement (PMI support, CSI reporting) b) >2layers
2. CA support: Sidelink + Sidelink incl. licensed + unlicensed
3. Reduced latency: mode 2d enhancements (UE scheduling UE) without redesign of PHY structure

3GPP TUs (Total w/ 9 meetings)			
RAN1	RAN2	RAN3	RAN4
16-18	10-11	-	6

SA/CT Dependency: No



Sidelink Enhancements

- Support for SL-U sub-7GHz, FR2, SL-U Sub-71GHz [RAN1, 4]
 - leverage NR-U design for reusing of components/hardware and avoidance of co-existence study of SL-U/WIFI.
 - FR2 such as 60GHz is also preferred if possible for the less interference and high throughput to enable high-end commercial use cases.
- Enable Low-latency 1Gbps Sidelink [RAN1, 2, 4]
 - MIMO enhancement: Enhance the performance to enable high-end commercial use cases.
 - CA support: Higher capacity and performance by increased BW across licensed and/or unlicensed spectrum.
 - Reduced latency: Mode 2d enhancements (UE scheduling UE) with optimized PHY layer procedure and minimized PHY structure changes for lower latency and more efficient scheduling (assisted by BS).
 - Others: SL WUS for enhanced SL power saving.

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.