

3GPP TSG RAN#86

Sitges, Spain – December 9th-12th, 2019

RP-192669

Agenda Item 9.1.0

Rel-17 Package

MediaTek Inc.

Unleash wireless – everyone, everything, everywhere



Enhanced Performance

Main drivers

eMBB

Critical enablers

UE Power Saving, MIMO, MR-DC/CA
UDC, Small Data, HL Enh., Cloud Gaming/XR
>52.6GHz, *Broadcast*, (MuSIM)



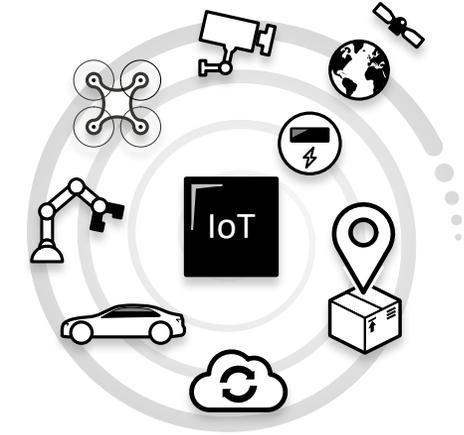
Ubiquitous Coverage

Main drivers

eMBB, mMTC

Critical enablers

Coverage Enh., Sidelink Relay, *IAB*
NTN NR, NTN NB-IoT



IoT Ecosystem

Main drivers

URLLC, eMBB, mMTC, V2X¹

Critical enablers

URLLC/IIoT, NR Light, NR-U
(Indoor) Positioning
Sidelink/V2X Enh., NB-IoT Evo.

NOTE 1: NR V2X enablers defined pre-Rel-17

NOTE 2: *Italic caption*: items needed in Rel-17

Rel-17 Package Overview



RAN1-led	RAN1	RAN2	RAN3
MIMO <i>Mobility, mTRP, FR1, FR2, TDD FDD reciprocity</i>	21	7	
Sidelink Enhancements <i>UE Power Saving, Mode 2(d), R16 leftovers*</i>	11	12	
FS Coverage Enhancement <i>Focus on key deployment scenarios</i>	5	2	
NTN NR <i>PRACH, BM, RLC Enh.</i>	10.5	8	3
NB-IoT (incl. study phase) <i>PRACH, BM</i>	6	4	
NB-IoT Evo. <i>16QAM, coverage/carrier, low PC</i>	3.5	2.5	
FS >52.6GHz <i><71GHz OFDM+scaled FR2 numerology confirmation >71GHz waveform study</i>	20		
IIoT/URLLC <i>Unlicensed</i>	12	6	
FS Cloud Gaming, XR <i>Traffic Models I) Cloud Gaming II) XR</i>	10	2	
NR Light <i>Reduced UE Cap., Coverage comp. NR light specific UE power saving (incl. eDRX)</i>	10	9	
Positioning <i>Indoor positioning</i>			

RAN2-led	RAN1	RAN2	RAN3
UE Power Saving <small>MEDIATEK</small> <i>Idle/inactive, (FR2)Connected, [other]</i>	10.5 [+1.5]	8 [+5]	
Sidelink Relay <i>L2 Relay, Relay selection. Reuse FeD2D work</i>	5	11	4
Higher Layer Protocol Opt. <small>MEDIATEK</small> <i>TCP/QUIC</i>		10	
MUSIM <i>Paging, service prio., graceful RRC release</i>		6	
MR-DC/CA Enh. <i>>0ms HO, Fast SN/SCell deactivation</i>		10	3
Small Data <i>EDT 2/4-step RACH, Stationary</i>	[4]	6	
UDC <i>Import LTE DEFLATE</i>		4	
UAV <i>Import LTE solution</i>			
IAB <i>SDM/FDM</i>			
RAN Slicing <i>Backwards Compatibility R15/R16 UEs</i>			

RAN3-led	RAN1	RAN2	RAN3
NR Broadcast/Multicast <i>SC-PTM</i>			
Data Collection (MDT/SON)			
NPN			

- NOTES:
- TUs assume a limited preferred scope per item
 - **Yellow** refers to yellow highlights in UE Power Saving WI (RP-192674)
 - Listed Expected items are items anticipated in Rel-17 but not HIGH/MID MTK Priority items

HIGH	MID	Expected
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* SL R16 leftovers: Simultaneous modes 1+2, CSI reporting for unicast, RLM, groupcast.

Rel-17 MediaTek Priorities

HIGH



Topic	WG Lead	Motivation, Focus	RAN1	RAN2	RAN3
UE Power Saving (MediaTek)	RAN2	<p>Poor battery life implies poor user experience threatening mass market 5G adoption.</p> <ul style="list-style-type: none"> FR2 connected-mode power consumption is significantly higher than FR1, dominated by PDCCH monitoring without data scheduled NR SA Idle mode battery life is much worse NR NSA (NSA UEs rely on LTE idle mode) <p>Required Network and UE Features to address fundamental issues not addressed in Rel-16 <i>No overlap with NR Light</i></p>	10.5	8.0	0.0
Coverage Enhancements	RAN1	<p>Study to identify & document coverage problems/scenarios based on real practical deployments</p> <ul style="list-style-type: none"> Scenarios to be agreed as part of the SI scope (RAN#86) and documented in the TR SI work focusing on evaluation of the scenarios – completion by RAN#88/June 2020 Normative work not limited to this SI/WI (e.g. complementary work with SL Relay, IAB) 	5.0	2.0	0.0
Sidelink Relay	RAN2	<p>Coverage is a real issue esp. indoors. Relaying is one of several complementary solutions</p> <p>L2 Relay architecture, Relay discovery/selection</p>	5.0	11.0	4.0
Sidelink-V2X Enhancements	RAN1	<p>Some sidelink enhancements are needed, but the scope must be kept reasonable i.e.</p> <p>Power Saving, Mode 2(d), Selected Rel-16 left-overs (Simultaneous modes 1+2, CSI reporting for unicast, RLM, some groupcast aspects)</p>	11.0	12.0	2.0
MIMO Enhancements	RAN1	<p>Resolve performance and mobility issues</p> <ul style="list-style-type: none"> Need for improvement for speed as low as 30km/h for FR1 and 10km/h for FR2 Address blockage and cell edge issues with FR2 (Shifting focus from FR1 to FR2) Mitigate UL/DL imbalance esp. for FR2 Enable refarming LTE FDD bands for NR <p>Mobility enh., Multi TRP, UL MIMO, TDD & FDD channel reciprocity</p>	21.0	7.0	0.0

TUs assume a limited scope per item

Rel-17 MediaTek Priorities

HIGH



Topic	WG Lead	Motivation, Focus	RAN1	RAN2	RAN3
NTN	RAN1	NR <ul style="list-style-type: none"> • NR eMBB smart phone, with smartphone form-factor • LEO=600 km with fixed-earth beam, 200km max beam size (edge to edge) • Minimize changes to UE and network 	10.5	8.0	3.0
		NB-IoT – Urgency for a global standard <ul style="list-style-type: none"> • Rel-17 is <u>critical</u> to compete with <ul style="list-style-type: none"> • unlicensed LPWAN technologies providing satellite coverage • proprietary satellite IoT technologies • Complementary terrestrial/satellite approach • Preserve existing NB-IoT cost structure and energy efficiency – single implementation for terrestrial+satellite • Establish true global coverage for NB-IoT • GEO / LEO=600km <ul style="list-style-type: none"> • Inband: Fixed-earth beam, 200 km max beam size (edge-to-edge) • Standalone: Moving earth beams, 1000 km beam size (edge-to-edge) 	6.0	4.0	0.0
NB-IoT Evolution (non-NTN)	RAN1	<ul style="list-style-type: none"> • Best performance NB-IoT guaranteeing existing cost structure, high energy efficiency and LTE-M differentiation • 16QAM, coverage class/carrier, low power class 	3.5	2.5	0.0

TUs assume a limited scope per item

Rel-17 MediaTek Priorities

MID



Topic	WG Lead	Motivation, Focus	RAN1	RAN2	RAN3
Cloud Gaming, XR	RAN1	Traffic models for 1) Cloud gaming and 2) XR Gap analysis prioritizing <ul style="list-style-type: none"> 1) Cloud Gaming 2) XR Operator networks Study (methodology and gap analysis) in RAN1 with support from RAN2 (gap analysis) 3GPP to decide thereafter whether to have normative work and if so in which Rel-17 WI (e.g. IIoT/URLLC)	10.0	2.0	0.0
IIoT/URLLC Enhancements	RAN1	<ul style="list-style-type: none"> Enabling IIoT/URLLC over unlicensed spectrum (i.e. local/private networks) Pause <u>other</u> enhancements pending IIoT (Rel-15/Rel-16) deployments 	12.0	6.0	0.0
NR Light	RAN2	NR-Light will <u>not</u> take off without major economies of scale. It is important to define a device that is reusable in several scenarios. Sufficient differentiation vs LTE Cat 4 is essential and more important than cost. NR Devices with size constraints. Coverage compensation. No overlap with UE Power Saving	10.0	9.0	0.0
>52.6GHz <i>Study</i>	RAN1	Waveform study is the priority for all bands @52.6GHz and above <ul style="list-style-type: none"> <71GHz: OFDM + scaled numerology to be confirmed >71GHz: long-term study (2nd priority) 	20.0	0.0	0.0
MR-DC/CA Enhancements	RAN2	2nd order optimization based on Rel-16 DC/CA and mobility WI <ul style="list-style-type: none"> >0ms HO (SN change without MN change), Fast SCG (de)activation Scope could be finalized at RAN#87 	0.0	10.0	2.0

TUs assume a limited scope per item

Rel-17 MediaTek Priorities

MID



Topic	WG Lead	Motivation, Focus	RAN1	RAN2	RAN3
Small Data	RAN2	Start with solutions designed in NB-IoT EDT idle/inactive 2/4-step RACH, stationary opt.	[4.0]	6.0	0.0
Uplink Data Compression	RAN2	Resolve VoNR coverage issue caused by SIP signaling in adverse coverage Adopt LTE UDC as is (i.e. DEFLATE)	0.0	4.0	0.0
Higher Layer Protocol Enhancements	RAN2	TCP and QUIC-related optimizations to unleash NR data rates Prioritize ACK over Data; Prevent FR2 blocking (incl. QUIC); Inter-RAT HO (incl. QUIC); AQM	0.0	10.0	0.0
MuSIM	SA2 (RAN2)	Simple UE-based solution with no unnecessary network impact or optimizations Any unnecessary complexity implies persistence of proprietary solutions Paging indication + service prioritization, paging collision avoidance; graceful RRC Release	0.0	6.0	0.0

Release 17 Timeline

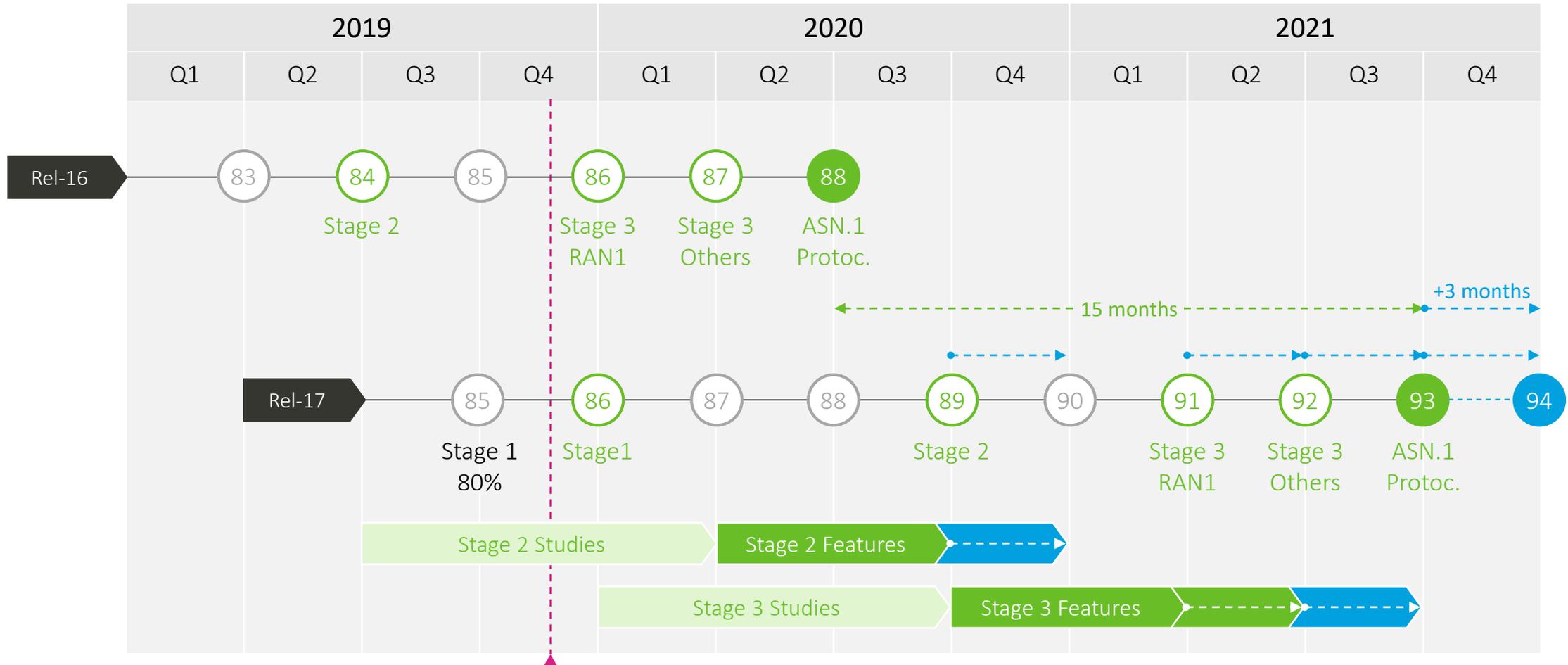
Release 17 timeline

15-month release to 18-month release

- MediaTek recommends a Rel-17 content based on a **15-month schedule**
- Maintenance (Rel-15/Rel-16), with dedicated TU budget, is critical
- A reasonable Rel-17 buffer will be adequate without expanding the scope
 - 18-month schedule only allows limited additional capacity but will be helpful
 - 2 more RAN1 meetings
 - 1 more RAN2 meeting
- **MediaTek recommends** an 18-month release with a 15-month content

Release 17 timeline

15-month release to 18-month release



Thank You!