3GPP RAN Rel-19 Workshop RWS-230264

June 15th-16th, 2023, Taipei, Taiwan

Agenda Item: 4

Qualcomm views on Rel-19 package

Qualcomm Incorporated

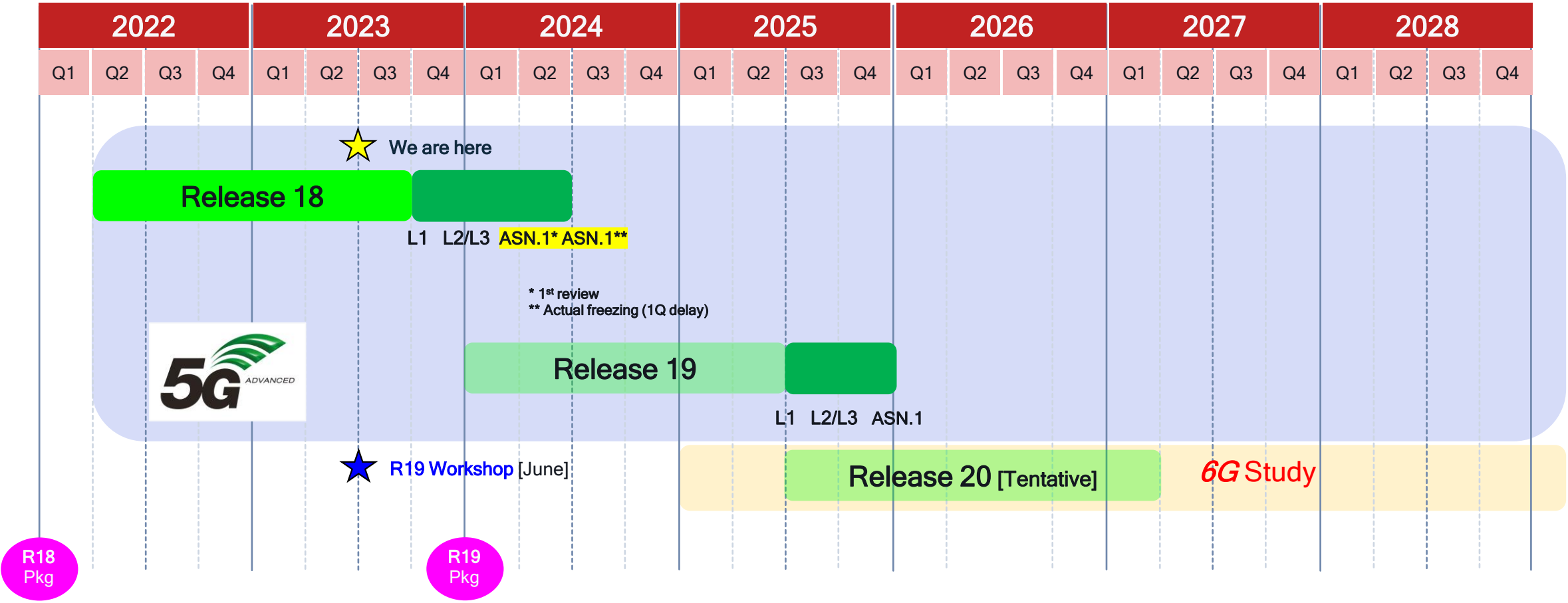
Summary

- Rel-19 is the **5th Release** of 5G and the **2nd Release** of 5G-Advanced
  - It is expected to be the **last 3GPP Release** before the 6G SI starts (3GPP schedule proposal in next slide)
- Some projects in Rel-19 would be in their Phase 4 from their inception…
  - Need to take into consideration commercial uptake of previous releases before loading up another Release of features without much commercial prospects
- Some of the most 5G-Advanced defining projects in Rel-18 were Release-long studies which are expected to be converted to WI
- We present our Rel-19 views considering the following priorities:
  - Top priority, High priority, Mid priority, Neutral

Confidential - Qualcomm Technologies, Inc. and/or its affiliated companies - May Contain Trade Secrets

3GPP Schedule

Rel-19: last Release exclusive of 5G/5G-Advanced
Rel-20: expected to launch 6G study
Rel-21: expected to create first 6G specifications



Qualcomm Rel-19 Priorities

Top priority*:

- Duplexing evolution, WI (R1) [1]
- AI/ML for Air Interface, WI (R1) [2]
- Wireless Access Backhaul, WI (R3)
  - "IAB" velcro solution [3]
- Channel modeling for new spectrum, SI (R1) [4]

High priority*:

- Ambient IoT, SI (R1) [5]
- ISAC, SI (R1) [6]
- Coverage enh Phase 3, WI (R1) [7]
- XR & Metaverse Ph 2, WI (R2) [8]
- NR NTN Phase 3, WI (R2) [9]
- NTN IOT Phase 3, WI (R2) [9]
- MUSIM Phase 3, WI (R2) [10]

Mid priority*:

- NW energy savings Ph 2, WI (R1) [11]
- Low-Power WUS, WI (R1) [12]
- CA enh Phase 4, WI (R1) [13]
- NR MIMO Phase 4, WI (R1) [14]
- NR Sidelink Phase 4, WI (R1) [15]
- UAVs Phase 2, WI (R2) [16]

Neutral*:

- Positioning Phase 4, WI (R1)
- NCR Phase 2, WI (R1)
- RIS, SI (R1)
- MBS Phase 3, WI (R2)
- Mobility enh Phase 3, WI (R2)
- Sidelink Relays Phase 3, WI (R2)
- SON/MDT Phase 4, WI (R3)
- AI/ML for NG-RAN Ph 2, SI (R3)
- TaaS & timing resiliency, WI (R2/3)

RAN4-led:

- RAN4-led items for R19 [17]

*: selected objectives

Confidential - Qualcomm Technologies, Inc. and/or its affiliated companies - May Contain Trade Secrets

Top Priority Projects & Objectives

- Duplexing evolution, WI (R1) – outcome of SI
  - Specification of SBFD at gNB (focusing on SI scenario)
  - Dynamic TDD enh – common techniques with SBFD only
- AI/ML for Air Interface, WI (R1) – outcome of SI
  - Use-cases in R18 SI:
    - CSI compression (**2-sided***); CSI time-prediction; *assuming RAN4 framework finalized in the SI
    - BM spatial-prediction; BM time-prediction;
    - Positioning direct; Positioning assistance;
  - New study areas
- Wireless Access Backhaul (WAB), WI (R3) – mainly SA2 proposal with RAN3 component
  - “WAB” gNB+UE velcro solution
- Channel modeling for new spectrum, SI (R1)
  - 7-24GHz (“FR3”) with high priority & >100GHz (“FR4”) with lower priority

Confidential - Qualcomm Technologies, Inc. and/or its affiliated companies - May Contain Trade Secrets

High Priority Projects & Objectives

- Ambient IoT, SI (R1)
  - RAN1: new air interface design – L1/L2 procedures/protocols to support A-IoT devices op based on harvested energy
  - RAN2/RAN3: protocol simplif/enh, conn-ctrl for device (whether/not connection to CN & context stored in 5GC)
- Integrated Sensing & Comm (ISAC), SI (R1)
  - Channel model, bi-static & mono-static (gNB & UE) leverage positioning protocol framework & techniques
- Coverage enh Phase 3, WI (R1/R2 & R4)
  - DPA left-overs (R4-led); protocol enh for 2.4kbps voice
  - PRACH rep with diff UE beams assoc w same SSB
  - Techniques to reduce UL imbalance
- XR & Metaverse enh Phase 2, WI (R2)
  - **XR awareness**: delivery deadline, awareness of APP level FEC in RAN; **PowS enh**: DRX enh for reduced PDCCH monitoring & HARQ re-tx; **Cap enh**: dynamic msmrt. gaps
- NR NTN Phase 3, WI (R2)
  - DL coverage enh incl. pre-paging notification; improved UL capacity (OCC); HD-RedCap over NTN;
  - UE PowS with discontinuous coverage; SA2 alignment (Store & Forward, local switch without feeder-link)
- NTN IOT Phase 3, WI (R2)
  - Improved UL capacity (OCC); Discontinuous coverage enh (cell DTX to save sat power); UE loc w/o LPP; SA2 alignment (Store & Forward, local switch without feeder-link)
- MUSIM enh Phase 3, WI (R2)
  - UAI for paging collision; MUSIM gaps enh (per CC/FG & differentiating MN/SN); single-operator optimizations; dynamic UE capability update left-overs

Mid-priority Projects and Objectives

- Low Power WUS, WI (R1)
  - Specification of LP-WUS & LP-WUR for IOT use case
- NW energy savings Phase 2, WI (R1)
  - On-demand SSB/SIB1 Tx & adaptation of common signal Tx patterns
- CA enh Phase 4, WI (R1)
  - eSUL
- NR-MIMO Phase 4, WI (R1)
  - UE initiated beam/CSF update
  - PTRS rate matching for mDCI mTRP
  - UL 1024QAM
  - Scheduling adaptation enhancements
- NR Sidelink Phase 4, WI (R1)
  - Multi-beam SL (FR2), SL for eRedCap
- UAVs Phase 2, WI (R2=>R1?)
  - PRACH & DMRS SL CS enh; Mob enh (CHO based on height & flight path, inter-RAT HO); FR1 beamforming;

Confidential - Qualcomm Technologies, Inc. and/or its affiliated companies - May Contain Trade Secrets

Neutral Projects and Objectives

- Positioning Phase 4, WI (R1)
  - Multi-path positioning enh; SL-PRS in unlic
  - Multi NTN sat positioning, FR2-2 positioning
- Network Controlled Repeater Phase 2, WI (R1)
  - Power control
- RIS, SI (R1)
  - Channel model
- MBS Phase 3, WI (R2)
  - Other features' combination with MBS
- Mobility enh Phase 3, WI (R2)
  - MCG selective activation for Multi-PCG config
  - LTM enh: conditional, inter-CU
- Sidelink Relays Evolution Phase 3, WI (R2)
  - Multi-hop Relay
- AI/ML for NG-RAN Phase 2, SI (R3)
  - New use cases
- SON/MDT Phase 4, WI (R3)
  - NTN; Mob enh; SDT; MBS; IAB; SL
- TaaS & timing resiliency WI (R2/3)
  - For eMTC and NBIOT

Confidential - Qualcomm Technologies, Inc. and/or its affiliated companies - May Contain Trade Secrets

References

	Tdoc#	Title
[1]	RWS-230170	Duplexing evolution
[2]	RWS-230171	AI-ML for Air Interface
[3]	RWS-230172	Wireless Access Backhaul
[4]	RWS-230173	Channel modeling for new spectrum
[5]	RWS-230174	Ambient IoT
[6]	RWS-230175	Integrated Sensing and Communications
[7]	RWS-230176	Coverage Enhancements
[8]	RWS-230177	XR and Metaverse
[9]	RWS-230178	NR and IoT NTN
[10]	RWS-230179	MUSIM

	Tdoc#	Title
[11]	RWS-230180	NW Energy Savings
[12]	RWS-230181	Low-Power WUS
[13]	RWS-230182	CA Enhancements
[14]	RWS-230183	NR MIMO
[15]	RWS-230184	NR Sidelink Enhancements
[16]	RWS-230185	UAVs
[17]	RWS-230225	RAN4-led Items for Rel-19

Confidential - Qualcomm Technologies, Inc. and/or its affiliated companies - May Contain Trade Secrets

Qualcomm

Thank you

Follow us on:

For more information, visit us at:

www.qualcomm.com & www.qualcomm.com/blog

All data and information contained in or disclosed by this document is confidential and proprietary information of Qualcomm Technologies, Inc. and/or its affiliated companies and all rights therein are expressly reserved. By accepting this material the recipient agrees that this material and the information contained therein will not be used, copied, reproduced in whole or in part, nor its contents revealed in any manner to others without the express written permission of Qualcomm Technologies, Inc. Nothing in these materials is an offer to sell any of the components or devices referenced herein.

©2018-2021 Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved.

Qualcomm is a trademark of Qualcomm Incorporated, registered in the United States and other countries. Other products and brand names may be trademarks or registered trademarks of their respective owners.

References in this presentation to “Qualcomm” may mean Qualcomm Incorporated, Qualcomm Technologies, Inc., and/or other subsidiaries or business units within the Qualcomm corporate structure, as applicable. Qualcomm Incorporated includes our licensing business, QTL, and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of our engineering, research and development functions, and substantially all of our products and services businesses, including our QCT semiconductor business.