Introduction to 3GPP Release 19 and 6G Planning

Wanshi Chen (Qualcomm, Chair of 3GPP RAN Plenary)
Puneet Jain (Intel, Chair of 3GPP System Architecture)
Moderated by Iain Sharp (ATIS, Principal Technologist)

April 3, 2024

Agenda

Introduction

Iain Sharp
ATIS

3GPP RAN: Current Status and Beyond

Wanshi Chen
Qualcomm
3GPP RAN Plenary Chair

3GPP SA Release 19 Status Update and 6G Planning

Puneet Jain
Intel Corporation
3GPP SA Plenary Chair

Q&A

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3GPP RAN: Current Status and Beyond

Wanshi Chen

3GPP TSG RAN Chair

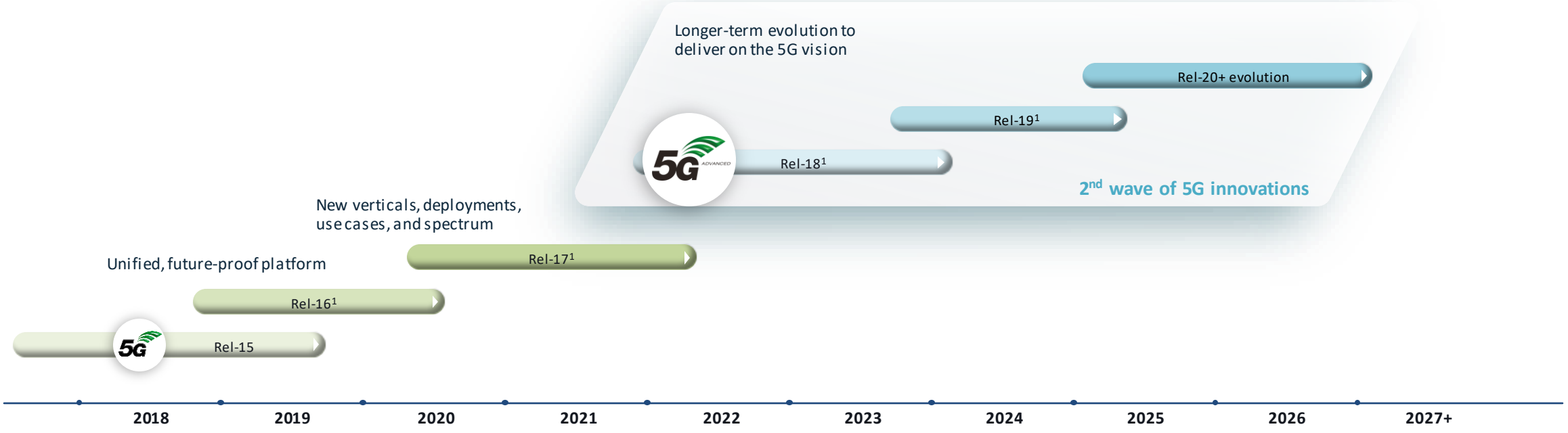
Sr. Director, Technology, Qualcomm Technologies, Inc.

Outline

- Overview
- 3GPP RAN Release 18 (Rel-18)
- 3GPP RAN Rel-19
- Initial 6G Discussion

Overview

5G and 5G-Advanced in 3GPP



Rel-15 eMBB Focus

- 5G NR foundation
- Smartphones, FWA, PC
- Expanding to venues, enterprises

Rel-16 Industry Expansion

- eURLLC and TSN for IIoT
- NR in unlicensed
- 5G V2X sidelink
- Multicast
- In-band eMTC/NB-IoT
- Positioning

Rel-17 Continued Expansion

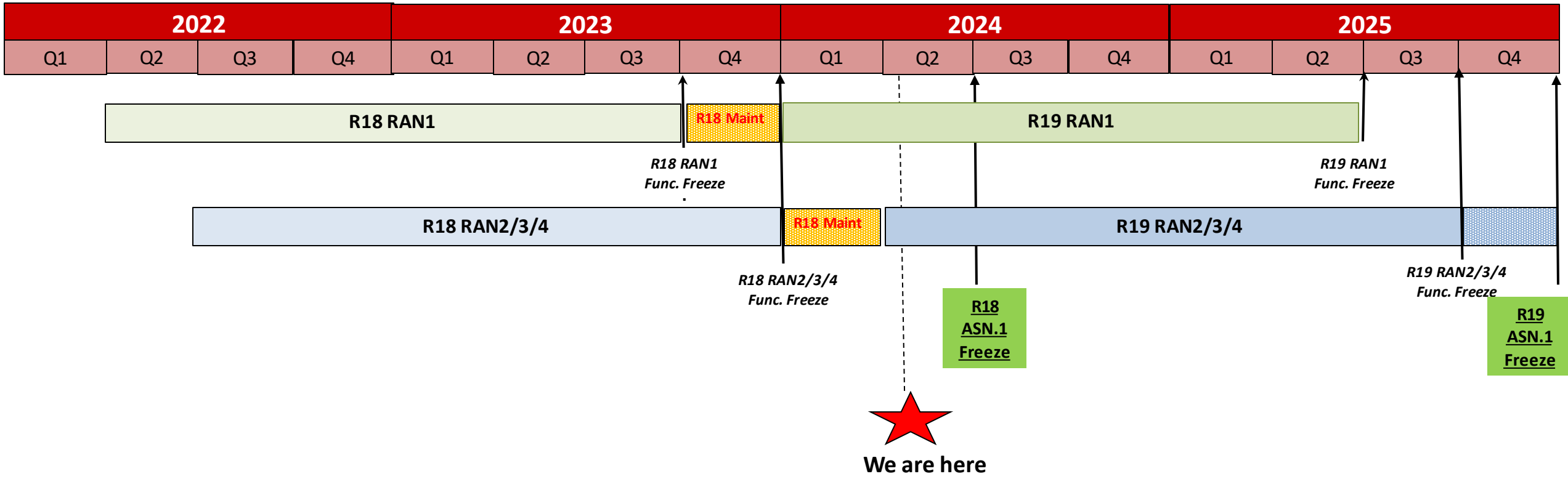
- Lower complexity RedCap
- Non-terrestrial communication (satellites)
- Unlicensed/licensed spectrum in 60 GHz
- Improved IIoT, positioning V2X, IAB, …

5G-Advanced: Rel-18, 19, …

- Next set of 5G releases (i.e., 18, 19, 20, …)
- Rel-18 work completed in Dec'2023
- Rel-19 work started from 1Q'2024

1. 3GPP start date indicates approval of study package (study item->work item->specifications), previous release continues beyond start of next release with functional freezes and ASN.1

3GPP RAN Rel-18 and Rel-19 Timeline

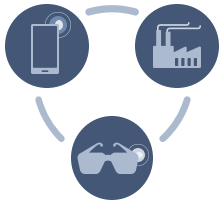


RAN Rel-18

RAN Rel-18

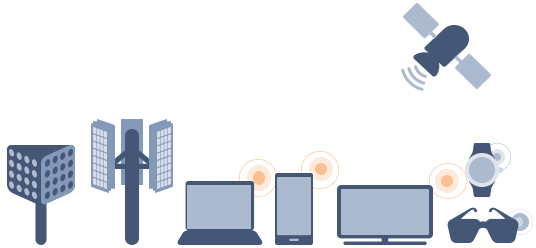
Driving a balanced 5G evolution

Mobile broadband evolution vs. further vertical expansion



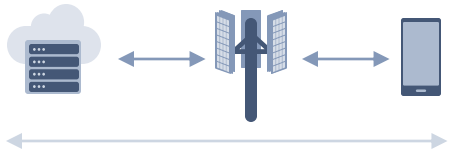
Deliver enhanced mobile broadband experiences and extend 5G's reach into new use cases

Immediate commercial needs vs. longer-term 5G vision



Drive new value in commercialization efforts and fully realize 5G's potential with future deployments

New and enhanced devices vs. network evolution



Focus on the end-to-end technology evolution of the 5G system to bring new levels of performance

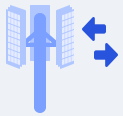
Release 18 takes into consideration of 5G Advanced evolution
and beyond (i.e., many Study Items defined to set up for Work Items in later releases)

Release 18

3GPP Release 18 sets off the 5G Advanced Evolution

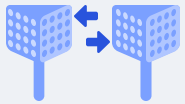
The package has a wide range of projects — nominal work started in Q2 2022 with functional freeze in Q4 2023

Strengthen the end-to-end 5G system foundation



Advanced DL/UL MIMO

Enhanced mobility



Mobile IAB, smart repeater

Evolved duplexing

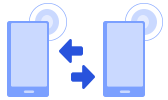
AI/ML data-driven designs

Green networks

Proliferate 5G to virtually all devices and use cases

Boundless extended reality

RedCap evolution



Expanded sidelink

Expanded positioning

Drones & expanded satellites comm.

Multicast & other enhancements

RAN Rel-19

5G Advanced Release 19 focus areas

RAN1/2/3 package approved in Dec ‘23

RAN4 package approved in Mar ‘24

3GPP Release 19

Realizing the full potential of 5G

Addressing real and urgent commercial needs

Mobile broadband evolution and further vertical expansion

Continue to enhance mobile experiences and extend 5G’s reach into new areas

Immediate and longer-term commercial needs

Drive new value in commercialization efforts and efficiently enable advanced deployments

New and enhanced devices and network evolution

Focus on the end-to-end 5G technology evolution to bring new levels of performance

3GPP Release 19

Bridging to 6G

Establishing the technical foundation

Revolutionary system innovations

Conduct advanced research to prepare for formal 6G Study Items in Release 20

New spectrum bands and enabling technologies

Study feasibility of new band ranges and types (e.g., upper mid-band in 7-24 GHz)

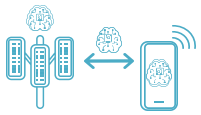
New 5G System Capabilities and a Direction for 6G

5G ADVANCED Release 19

MIMO

Ambient IoT

Duplexing evolution



Wireless AI/ML

Mobility

Satellites evolution

Higher mid-band spectrum
(i.e., 7—16 GHz)

Network energy savings

Topology

SON/MDT

XR and metaverse

Integrated sensing and communication

Low-power wakeup receiver

RAN1-Led Rel-19 Projects: More Details

Projects	SID/WID	Notes
Channel model for 7-24GHz, SI	RP-234018	Study for the entire release. Validate using measurements channel model in TR38.901 at least for 7-24GHz
Channel model for ISAC, SI	RP-240799	Study for the entire release, focusing on channel modeling with frequency range 0.5-52.6GHz, to support object detection and/or tracking. Possible scope expansion beyond channel modeling to be checked in 09/24
Ambient IOT, SI	RP-240826	Study till Dec'24 for possible WI conversion. Harmonized design for backscattered (up to ~1μW) & active transmission (≤ a few hundred μW) Licensed FR1 FDD. Focusing on two topologies: BS directly to tags, and UE as an intermediate node under network control.
NR MIMO Phase 5, WI	RP-240087	UE initiated/event-driven beam management; CSI support or up to 128 CSI-RS ports; UE reporting enhancements or cohere joint-transmission under non-ideal sync and backhaul; non-coherent UL codebook for 3Tx; enhanced asymmetric TRP operations
NR duplex operation Evo, WI	RP-240789	A continuation from Rel-18 study, now converting to specifications. Subband full-duplex operation at the gNB side, including signalling/resource management, random access enhancements, measurement, and cross-link interference enhancements
AI/ML for NR air interface, WI	RP-240774	Largest project in Rel-19; a continuation from Rel-18 study, now converting to specifications, including normative work on one-sided general framework, beam management and positioning, while continuing study two-sided modeling, data collection, and testing
Low Power WUS/WUR, WI	RP-240801	A continuation from Rel-18 study, now converting to specifications, including waveform, low-power sync signal, RRM etc.
Network Energy Savings Enh, WI	RP-240170	Continuation of Rel-18 enhancements, including on-demand SSB Scell, adapt tx signal/channel, and study of on-demand SIB1 for idle UEs

* Additional new & small project(s) may be approved in September 2024, see RP-232745

RAN2-Led Rel-19 Projects: More Details

RAN2-led	SID/WID	Notes
AI/ML for Mobility, SI	RP-240082	New full release study expanding from Rel-18 for AI/ML, focusing on network triggered layer 3 mobility only. AI/ML based RRM measurement and event prediction.
NR Mobility enh Phase 4, WI	RP-240299	Continuation from earlier release; focusing on further enhancements to layer 1/2 triggered mobility (LTM), including inter-CU LTM, measurement enhancements for LTM, conditional LTM, and related RRM enhancements
XR for NR Phase 3, WI	RP-240791	Continuation from earlier releases, focusing on study of potential multi-modality within a UE, enhancements related to measurement gap/scheduling restriction, study of uplink scheduling using delay/deadline information, and user plane latency reduction.
NTN for NR Phase 3, WI	RP-240775	Continuation from earlier releases, focusing on DL coverage enhancements, UL capacity enhancements, regenerative payload, RedCap full-duplex/half-duplex. Including also a spin-off as in RP-240846 (Inter RAT mobility support from E-UTRAN TN to NR-NTN)
NTN for IoT Phase 3, WI	RP-240776	Continuation from earlier releases, focusing on store & forward, and UL capacity enhancements
Multi-hop Sidelink Relays, WI	N/A	WID to be available soon, focusing on layer 2 U2N Relay. Starting with one additional hop, limited service continuity.

* Additional new & small project(s) may be approved in September 2024, see RP-232745

RAN3-Led Rel-19 Projects: More Details

RAN3-led	SID/WID	Notes
AI/ML for NG-RAN, SI->WI	RP-240323	Continuation from previous release; two new use cases – network slicing & coverage and capacity optimizations (COOs). Also Rel-18 leftovers. 6 months study followed by WI
Topological Enh, SI->WI	RP-240319	New project. 6 months study followed by WI, focusing on wireless access backhaul (WAB) and 5G femto cells
SON/MDT Enh, WI	RP-234038	Continuation from previous releases; mobility robustness optimization, intra-NTN mobility and network slicing. R18 leftovers

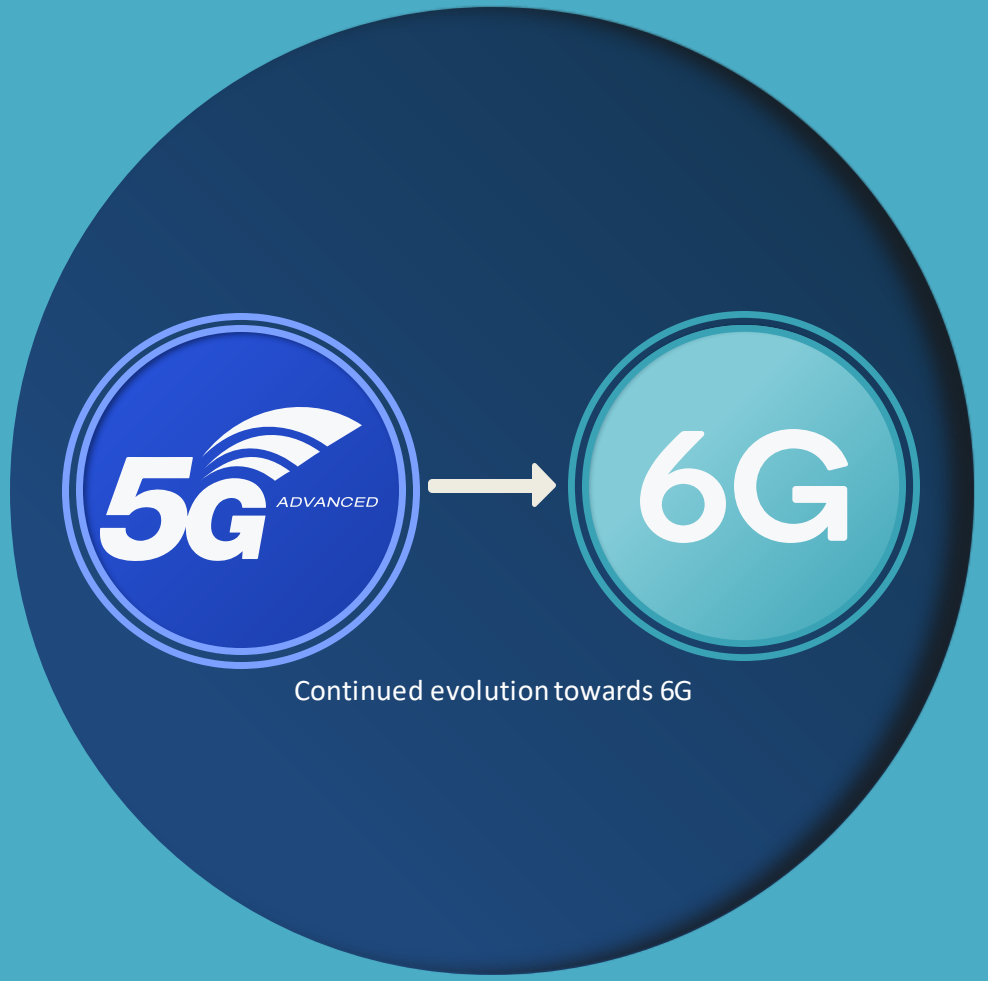
* Additional new & small project(s) may be approved in September 2024, see RP-232745

RAN4-led Rel-19 Projects: More Details

RAN4-led	SID/WID	Notes
UE RF enhancements, WI	RP-240828	Higher UE Tx power for CA, power reduction (MPR/A-MPR) reduction enhancements, 6Rx requirements
Base Station RF enhancements, WI	RP-240829	EIRP mask definition for 6GHz based on ITU definition and OTA test reduction
NTN enhancements, WI	RP-240857	Higher UE power classes, enhanced channel models with varying Dopplers for testing, 3MHz channel bandwidth for NTN FR1 bands
RRM enhancements, WI	RP-240830	Measurement delay reduction for FR2 for CA and UEs capable of multi-Rx, faster SCell activation with early measurement report
Demod enhancements, WI	RP-240831	8Rx enhancements with MMSE-IRC and Base Station demod requirements with MMSE IRC
OTA enhancements, WI	RP-240841	Test methodology for head-worn XR devices, test methodology for FR1 NTN, MIMO OTA with dynamic channel for FR1, TRP/TRS and MIMO OTA requirements for more bands
OTA enhancements, SI	RP-240856	Test methodology for FR2 UE simultaneous Tx on multiple panels (STxMP); check in 09/24 for potentially new FR2 test methodology for AI/ML
Sidelink, WI	RP-240849	Contiguous and non-contiguous CA in n48, PC2
Non-Collocated CA/DC, WI	RP-240838	Requirements for non-collocated deployments with 4 layer MIMO
<5MHz for TN, WI	RP-240832	Inter-band CA for 3MHz channel BW
ATG enhancements, WI	RP-240839	CA for ATG (intra-band and inter-band), 2Tx UL MIMO
Study on IMT parameters	RP-240787	Triggered by ITU WP5D request, IMT parameters for 4400-4800 MHz, 7125-8400 MHz and 14.8-15.35 GHz
Spatial channel model study	N/A	Study new channel models with a spatial component to be used for demod tests, see RP-240792. SID available soon
Study on Fragmented Spectrum/Carriers	N/A	Study ways to reduce the number of Rx chains used to aggregate non-contiguous CCs in a single band (aggregated BW<100MHz), see RP-240768. SID available soon.

* New spectrum items are to be discussed/approved in June 2024. Additional new & small non-spectrum project(s) may be approved in December 2024, see RP-240019

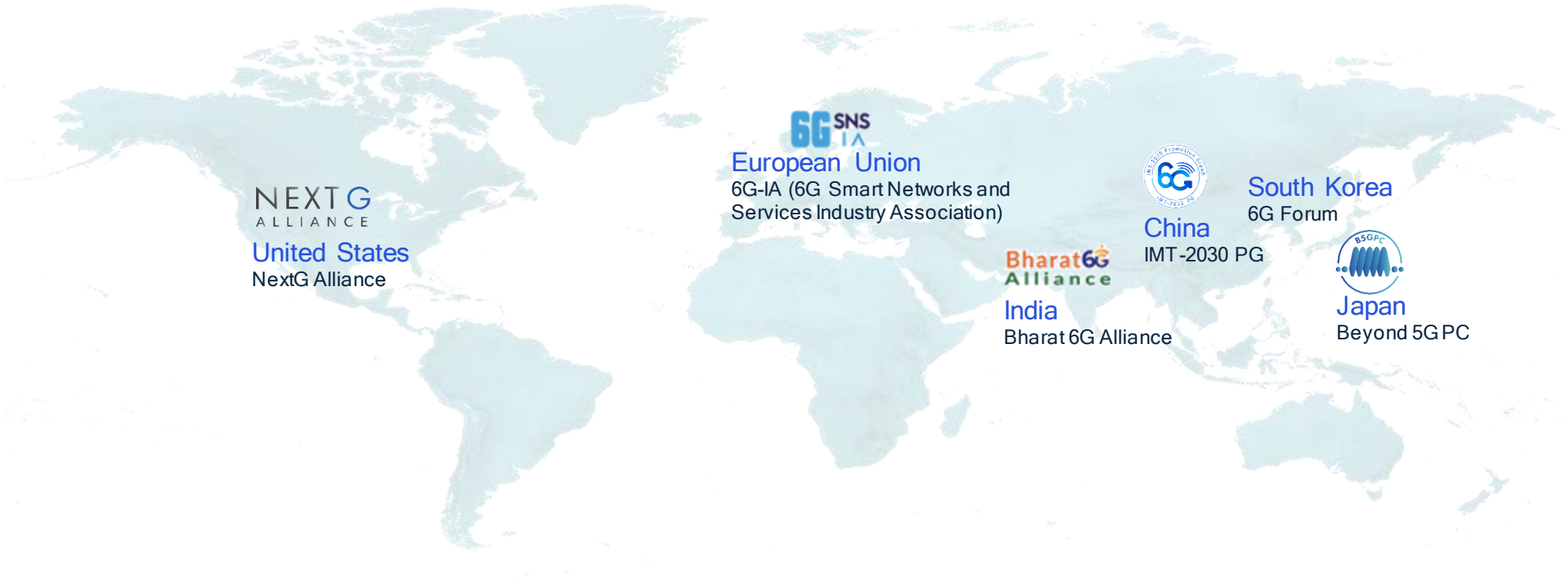
Initial 6G Discussion



Global Momentum for 6G is Growing

IMT-2030 defines next-gen mobile system requirements for 2030 and beyond

The standards body responsible for global 6G technology standardization



6G Discussion in 3GPP

- 3GPP is expected to develop an input to the IMT-2030 process

- Initial 6G discussion in 3GPP RAN
  - First (*very brief*) 6G timeline discussion in RAN#101 (September 2023)
    - Triggered by the liaison from ITU-R WP5D in RP-231518: On completion of draft new Recommendation ITU-R M.[IMT.FRAMEWORK FOR 2030 AND BEYOND]
  - High-level considerations for 6G timeline discussed in RAN#102 (December 2023), including a TSG-wide joint session, resulting in the endorsed way forward in RP-233985
  - Additional considerations for 6G timeline discussed in RAN#103 (March 2024), including another TSG-wide joint session, resulting in the endorsed way forward in RP-240823

…

6G Timeline Considerations: RAN-Specifics 1/2

(As in RP-233985 and RP-240823)

- **First 3GPP TSG-wide 6G workshop: March 10th – 11th(Monday – Tuesday), 2025**
  - Right before the planned Rel-19 RAN1 functional freeze (June 2025).
  - Details TBD (e.g., whether to have a joint or separate workshop across TSGs, how to handle contributions, etc.)
  - TSG#107 plenary meetings are to be scheduled subsequently in the same week
- **Studies for 6G** in 3GPP: from **Release 20**
- **RAN plenary work is split into an ITU focused SI (study item) and General RAN SI**
  - IMT-2030 discussion is expected in RAN from 09/24 to 12/24
  - RP SI Rel-20 focusing on ITU– IMT-2030: approval 12/24 until 06/25
  - RP SI Rel-20 focusing on 6G General (e.g., radio requirements and KPIs) : approval 03/25 (after WS), until 06/26

…

6G Timeline Considerations: RAN-Specifics 2/2

(As in RP-233985 and RP-240823)

RAN WGs in Rel-20

- **For 5G-Advanced: 18-month**. Assuming no delay of Rel-19
  - Stage-1 freeze : Jun 2025
  - Stage-2 freeze : Jun 2026 (>=80%); Sep 2026 (100%)
  - Stage-3 freeze : Mar 2027
  - ASN.1/OpenAPI freeze: June 2027
- **For 6G SI: 21 months**
  - **RAN1 starts in 3Q/25 until 1Q/27**
  - **RAN2/3/4 start in 4Q/25 until 2Q/27**

IMT-2030 submission and normative work for 6G in 3GPP are expected to start from Release 21

- **Release 21** is expected to produce the 1st set of 3GPP **6G technical specifications**, and will be the release for **IMT-2030 submission** before 2030
- **Release 21** is expected to be delivered with a **single drop** (i.e., a single code freeze)
- Rel-21 timeline is to be decided no later than **June 2026**
  - However, ASN.1/OpenAPI freeze date is no earlier than March 2029

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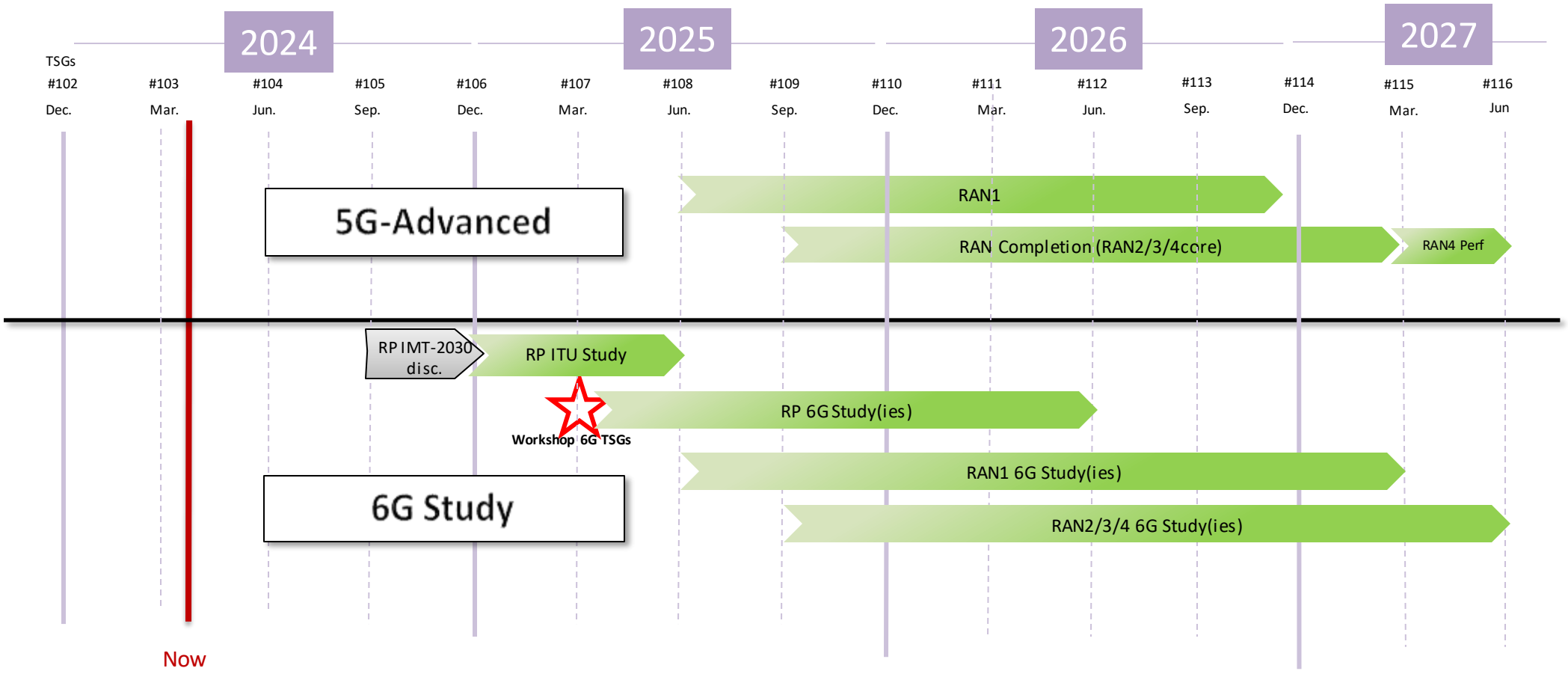
Illustration of 3GPP RAN Rel-20 Timeline



3GPP SA REL-19 STATUS UPDATE AND 6G PLANNING

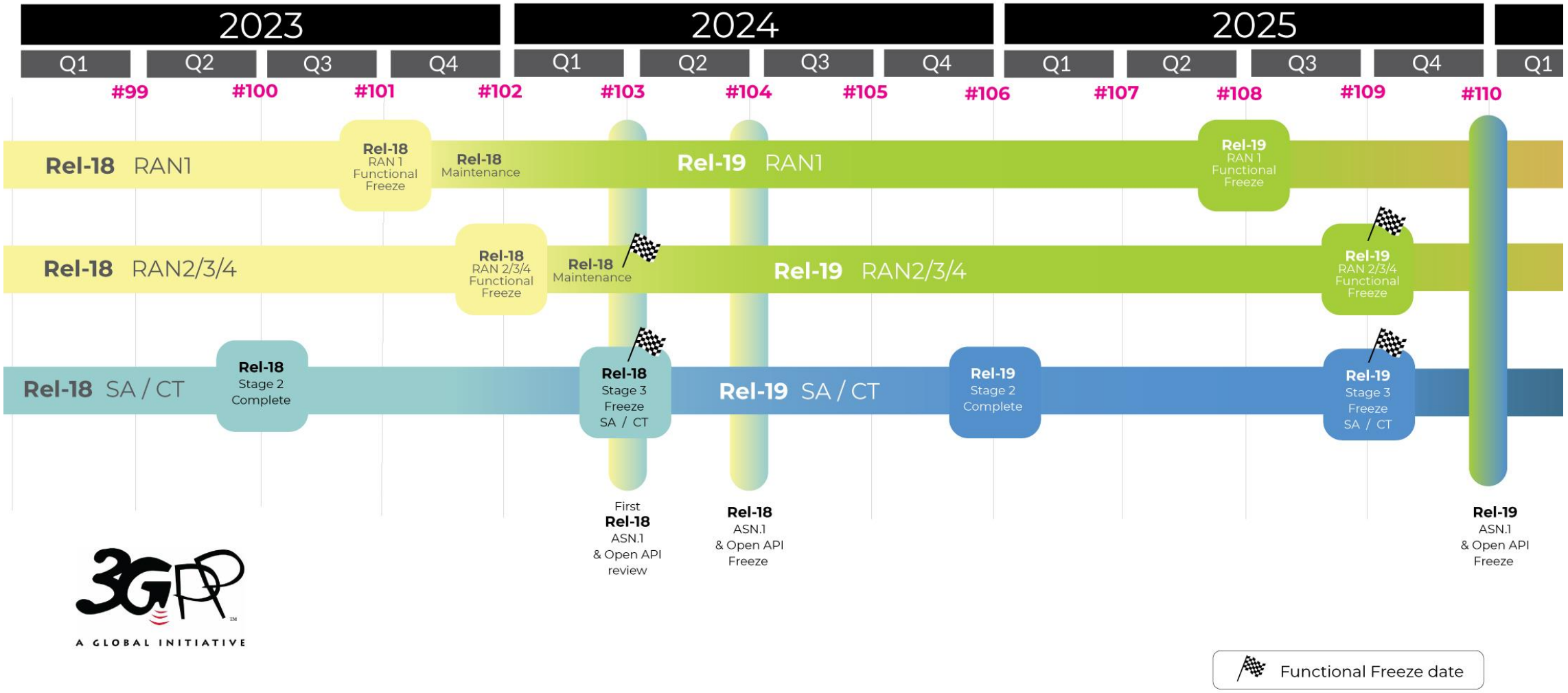
Puneet Jain

3GPP SA Plenary Chair

Sr. Principal Engineer & Sr. Director, Intel Corporation

April 3, 2024

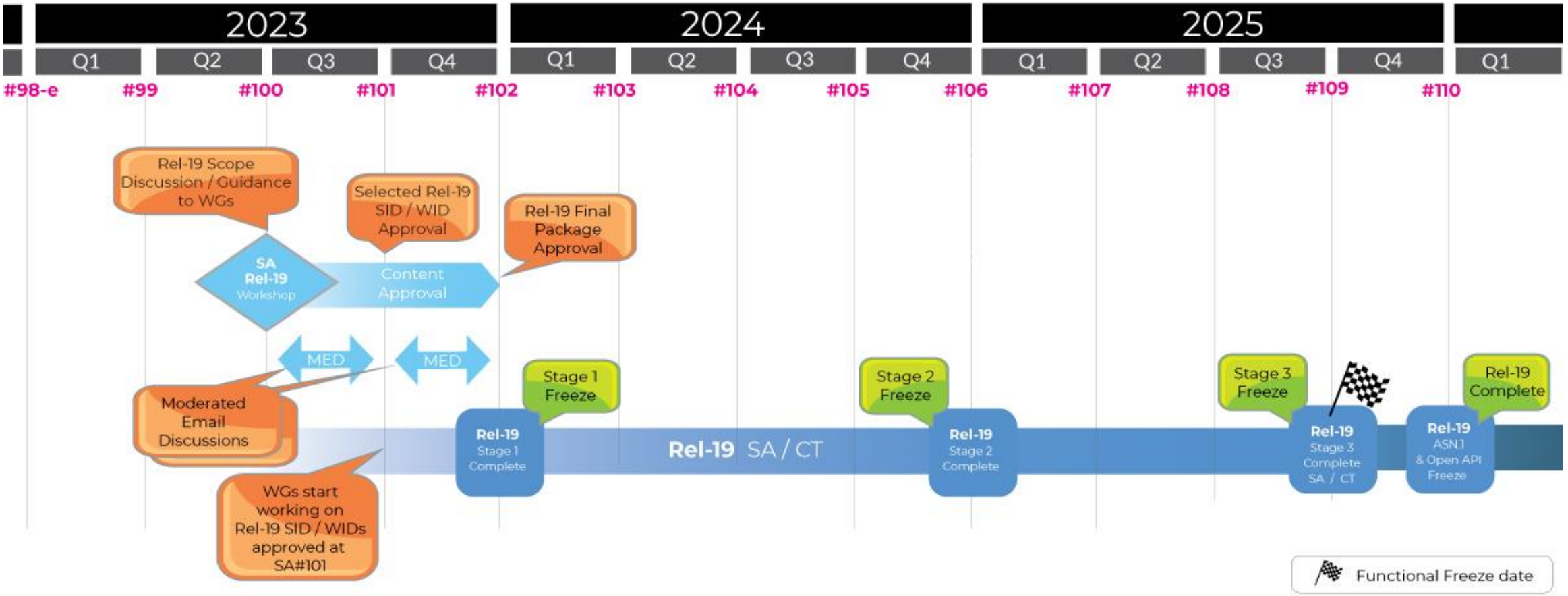
3GPP Rel-18 and Rel-19 Timeline



Rel-19 Target Dates (Unchanged)

- Key target dates for Rel-19
  - Stage-1 target freeze: Dec 2023 (**Stage-1 has been frozen**)
  - Stage-2 target freeze: Dec 2024
  - Stage-3 target freeze: Sep 2025
  - ASN.1/Code target freeze: Dec 2025

SA Rel-19 Content Definition Process



SA Rel-19 Content Planning (Step 1)

TSG SA Core & Miscellaneous topics for inclusion in Release 19

Core topics:

1. Satellite Architecture Enh.
2. XRM Enh. and Metaverse
3. AI / ML Enh.
4. Multi-access (Dual 3GPP + ATSSS Enh.
5. Integrated Sensing and Communication
6. Ambient IoT
7. Energy Efficiency/Energy Saving as a Service
8. IMS and NG_RTC Enh.
9. Edge Computing Enh.
10. Proximity Services Enh.
11. TSC/URLLC/TRS Enh.
12. Network Sharing
13. User Identities + Id of device behind RG/AP
14. 5G Femto
15. UAS Enh.
16. VMR Enh.
17. UPEAS Enh.

Misc. topics:

1. SBA framework Enh. / 5GS Enh. for Cloud Native Deployment
2. Network Slicing
3. 5G SA Roaming services and Intermediaries (GSMA 5MRR request)
4. Traffic Management (Monitoring + + QUIC)
5. Enh. in handling of Radio Capabilities
6. 5GC Enh. for IP routing
7. Enh. Emergency Services when Zero CS network coverage
8. NPN Enh.
9. Ranging Phase 2
10. LCS Enh.
11. Mobile VPN
12. Architecture Enh. for Energy Utilities
13. eUEPO (UE Policy) Enh.
14. Interworking of Non-3GPP Digital Terrestrial Broadcast Networks with 5GS Multicast Broadcast Services
15. RVAS (Roaming Value-Added Services)

Green denotes topics for which SIDs were agreed at SA#101 meeting

Cyan denotes topics that will discussed further in Q423

The remaining topics will not be part of Rel-19 content

SA Rel-19 Content Planning (Step 2)

- After lengthy online and offline discussions, the SA Chair prepared a proposal (**in SP-231760**) on Rel-19 content, reflecting a balance of Rel-19 priority from the Operators and Vendors side, which was endorsed
- Based on SP-231760, SA#102 approved a package of 15 study items (green in the table)
  - **AI/ML study**: whether SA2 can start work on Work Tasks 1.1, 1.2, and 1.3 will be discussed at SA#105 (Sep. 2024) based on the outcome of the related work in the involved RAN WGs
  - **Ambient IoT**: check in TSG#106 (Dec'24) for further Ambient IoT work taking into account RAN Ambient IoT progress
- The Sensing study (cyan in the table) was only endorsed. The work on this study is postponed until Sep 2024 when it will be determined if/when to start the study
- Three study item proposals (yellow in the table) will be considered as a small technical enhancement (TEI19)
- The remaining items (red in the table) were not considered as part of Rel-19 content

Tdoc#	Rel-19 Study Title	Rapporteur(s)/ Comment
SP-231805	Study on Architecture enhancement for XRM Ph2	Nokia, Meta
SP-231391	Study on 5GS Enhancement for Energy Efficiency and Energy Saving as Service Criteria	Samsung, Lenovo
SP-231196	Study on system architecture for next generation real time communication services Ph 2	China Mobile
SP-231199	Study on Integration of satellite components in the 5G architecture Phase III	THALES, CATT
SP-231672	Study on MPS for IMS Messaging and SMS services	Peraton Labs
SP-231795	Study on UPF enhancement for Exposure and SBA Phase 2	ZTE, Vodafone
SP-231796	Study on Enhancement of support for Edge Computing in 5G Core network phase 3	Intel
SP-231797	Study on architecture aspects of 5G Femto	NTT DOCOMO
SP-231798	Study on System Enhancement for Proximity-based Services in 5GS - Phase 3	AT&T, KPN
SP-231799	Study on Architecture Enhancements for Vehicle Mounted Relays (VMR) Phase 2	Qualcomm, Sony
SP-231800	Study on Core Network Enhanced Support for AI/ML	vivo, MediaTek
SP-231801	Study on Phase 3 for UAS, UAV and UAM	LG Electronics, Ericsson
SP-231802	Study on Multi-Access (Dual 3GPP access + ATSSS Enhancements)	Apple, China Telecom
SP-231803	Study on Architecture support of Ambient power-enabled Internet of Things	Huawei, OPPO Only Study. Check in Dec 2024
SP-231804	Study on the Enhancement of Usage of User Identifiers in the 5G System	InterDigital, Inc.
SP-231754	Study on Architecture Enhancement to support Integrated Sensing and Communication	No study. Check in Sep 2024
SP-231052	Network Sharing Enhancements SA WG2 Status	Possible TEI19
SP-231503	New WID on Architecture support of Roaming Value Added Services	Possible TEI19
SP-231674	Study on Improvements of network controlled Network Slicing Selection	Possible TEI19
SP-231757	Study on enhancement of Timing Resiliency, TSC&URLLC and LAN	Noted
SP-231701	Study on Enhanced Traffic Management	Noted
SP-231682	New WID on Study on Sidelink time synchronisation	Noted

Source: SP-231760

SA1 Release 19 SIDs/WIDs

Name	Acronym	%Complete	Hyperlink	Impacted TSs and TRs
Study on Energy Efficiency as service criteria	FS_EnergyServ	100%	SP-230235	22.882
Stage 1 of Energy Efficiency as Service Criteria	EnergyServ	100%	SP-230520	22.261
Study on AI/ML Model Transfer Phase2	FS_AIML_MT_Ph2	100%	SP-220439	22.875; 22.876
AI/ML Model Transfer Phase 2	AIML_MT_Ph2	100%	SP-230514	22.261
Study on Ambient power-enabled Internet of Things	FS_AmbientIoT	100%	SP-220085	22.84
Stage 1 of Ambient power-enabled Internet of Things	AmbientIoT	95%	SP-231403	**22.261**
Study on satellite access - Phase 3	FS_5GSAT_Ph3	100%	SP-220679	
Stage 1 of Satellite access Phase 3	5GSAT_Ph3	100%	SP-230516	22.261
Study on Localized Mobile Metaverse Services	FS_Metaverse	100%	SP-220353	22.856
Stage 1 of Localized Mobile Metaverse Services	Metaverse	100%	SP-230509	new 22.156, 22.261 ; 22.156
Supporting UE Mobility for XR Services	XRMobility	100%	SP-230233	22.261
Study on Integrated Sensing and Communication	FS_Sensing	100%	SP-220717	22.837
Stage 1 of Integrated Sensing and Communication	Sensing	100%	SP-230750	22.137
Study on (Stage 1 of) UAV Phase 3	FS_UAV_Ph3	100%	SP-220954	
Stage 1 of Uncrewed Aerial System Phase 3	UAS_Ph3	100%	SP-230518	
Study on Network Sharing Aspects	FS_NetShare	100%	SP-220087	22.851
Indirect Network Sharing	NetShare	100%	SP-230511	22.261
Study on Upper layer traffic steering, switching and split over dual 3GPP access	FS_DualSteer	100%	SP-220445	22.841
Upper layer traffic steering and switching over dual 3GPP access	DualSteer	95%	SP-231412	**22.261**
Edge Computing Considering the Operational Needs of Service Hosting Environment	EdgeOpNeeds	100%	SP-231037	22.261
Study on FRMCS Phase 5	FS_FRMCS_Ph5	100%	SP-220437	22.989
FRMCS Phase 5	FRMCS_Ph5	100%	SP-230512	22.280; 22.179; 22.289; 22.261
Study on Supporting of Railway Smart Station Services	FS_RAILSS	100%	SP-190838	New ; 22.890
Study on Network of Service Robots with Ambient Intelligence	FS_SOBOT	100%	SP-220447	22.916
Study on roaming value added services	FS_RVAS	100%	SP-220442	22.877
Roaming Value-Added Services	RVAS	100%	SP-230231	22.261
Study on Interconnect of SNPN	FS_ISN	65%	SP-230236	22.848
Interconnect of SNPN	ISN	100%	SP-240194	
Edge Computing for Industrial Scenarios	EDGINDUS	100%	SP-230229	22.104
PS Data Off for IMS Data Channel Service	IMSDCDataOff	100%	SP-230227	22.011
Multi-path relay	MultiRelay	100%	SP-220943	22.261
UE-to-UE multi-hop relay	UEMHopRelay	100%	SP-230521	22.261; 22.280
Interworking of Non-3GPP Digital Terrestrial Broadcast Networks with 5GS Multicast Broadcast Services	DTT4MBS	100%	SP-220941	22.261
MPS for Messaging services	MPS4msg	100%	SP-220939	22.153
Minimization of Service Interruption During Core Network Failure Phase 2	MINT_Ph2	100%	SP-220992	22.261
Measurement Data Collection	MeasureData	100%	SP-221263	22.261
Local traffic routing for multi-access UE	LTR_MA	100%	SP-231035	22.261
Non-Public Network (NPN) security considerations	SecNPN	100%	SP-230523	22.261

SA2 Release 19 SIDs

Name	Acronym	%Complete	Hyperlink	Impacted TSs and TRs
Study on Energy Efficiency and Energy Saving	FS_EnergySys	55%	SP-231391	23.700-66
Study on Core Network Enhanced Support for Artificial Intelligence (AI)/Machine Learning (ML)	FS_AIML_CN	25%	SP-231800	23.700-84
Study on Architecture support of Ambient power-enabled Internet of Things	FS_AmbientIoT	25%	SP-231803	23.700-13
Study on Integration of satellite components in the 5G architecture Phase 3	FS_5GSAT_Ph3_ARCH	55%	SP-231199	23.700-29
Study on Extended Reality and Media service (XRM) Phase 2	FS_XRM_Ph2	45%	SP-231671	23.700-70
Study on (Stage 2 of) Phase 3 for UAS, UAV and UAM	FS_UAS_Ph3	50%	SP-231801	23.700-59
Study on Multi-Access (DualSteer and ATSSS_Ph4)	FS_MASSS	30%	SP-231802	23.700-54
Study on Enhancement of support for Edge Computing in 5G Core network - Phase 3	FS_eEDGE_5GC_Ph3	50%	SP-231796	23.700-49
Study on System aspects of 5G NR Femto	FS_5G_Femto	40%	SP-231797	23.700-45
Study on Proximity-based Services in 5GS Phase 3	FS_5G_ProSe_Ph3	45%	SP-231798	23.700-03
Study on Vehicle Mounted Relays Phase 2	FS_VMR_Ph2	40%	SP-231799	23.700-06
Study on User Identities and Authentication Architecture	FS_UIA_ARC	35%	SP-231804	23.700-32
Study on UPF enhancement for Exposure And SBA Phase 2	FS_UPEAS_Ph2	45%	SP-231795	23.700-54
Study on system architecture for next generation real time communication services phase 2	FS_NG_RTC_Ph2	45%	SP-231196	23.700-77
Study on MPS for IMS Messaging and SMS services	FS_MPS4msg	70%	SP-231197	23.700-75

SA2 Release 19 Normative TEI19 miniWIDs

Name	Acronym	%Complete	Hyperlink
(Stage 2 of) Indirect Network Sharing	TEI19_NetShare	0%	SP-240117
Architecture support of roaming value-added services	TEI19_RVAS	0%	SP-240119
ProSe support in NPN	TEI19_ProSe_NPN	0%	SP-240122
5GS enhancement on On-demand broadcast of GNSS assistance data	TEI19_OBGAD	0%	SP-240116
Minimize the Number of Policy Associations	TEI19_MINPA	0%	SP-240118
Spending Limits for UE Policies in Roaming scenario	TEI19_SLUPiR	0%	SP-240120
Enhancing Parameter Provisioning with static UE IP address and UP security policy	TEI19_IP_SP_EXP	0%	SP-240121
Multiple Location Procedure for Emergency LCS Routing	TEI19_MLR4RTR	0%	SP-240123
Roaming traffic offloading via session breakout in HPLMN	TEI19_HSBO	0%	SP-240124
Deferred 5GC-MT-LR Procedure for Periodic Location Events based NRPPa Periodic Measurement Reports	TEI19_DLPMR	0%	SP-240125
5GS enhancement on QoS monitoring enhancement	TEI19_QME	0%	SP-240126
Subscription control for reference time distribution in EPS	TEI19_TIME_SUB_EPS	0%	SP-240127
Providing per-subscriber VLAN instructions from UDM and DN-AAA	TEI19_VLANSUB	0%	SP-240128
NF discovery and selection by target PLMN	TEI19_TPlmnNfSel	0%	SP-240129

SA3 Release 19 SIDs/WIDs

Name	Acronym	%Complete	Hyperlink	Impacted TSs and TRs
Study on Security Aspects of 5G Satellite Access Phase 3	FS_5GSAT_Ph3_SEC	10%	SP-231790	33.700-29
5G Security Assurance Specification (SCAS) for the Unified Data Repository (UDR)	SCAS_5G_UDR	10%	SP-230864	33.926
5G Security Assurance Specification (SCAS) for the Short Message Service Function (SMSF)	SCAS_5G_SMSF	40%	SP-231158	33.529
Addition of 256-bit security Algorithms	256_Algo	100%	SP-231159	35.248; 35.247; 35.246; 35.245; 35.244; …
Addition of Milenage-256 algorithm	Milenage_256	5%	SP-231792	35.237; 35.236; 35.235; 35.234
Study on enabling a cryptographic algorithm transition to 256-bits	FS_CAT256	10%	SP-231788	33.700-41
Study on enablers for Zero Trust Security	FS_eZTS	20%	SP-231784	33.794
Mission critical security enhancements for release 19	MCXSec4	0%	SP-231783	33.18
Study on the security support for the Next Generation Real Time Communication services phase 2	FS_NG_RTC_SEC_Ph2	0%	SP-231785	33.79
Study on security for PLMN hosting a NPN	PLMNNPN_SEC	25%	SP-231786	33.757
Study of ACME for Automated Certificate Management in SBA	FS_ACME_SBA	0%	SP-231787	33.776
3GPP profiles for cryptographic algorithms and security protocols	CryptoSP	0%	SP-231793	33.127; 33.203; 33.210; 33.222; 33.246; …
Study on mitigations against bidding down attacks	FS_MiBiDA	0%	SP-231789	33.701
Security for mobility over non-3GPP access to avoid full primary authentication	FS_Non3GPPMob_Sec	0%	SP-231791	33.702
Study on security aspects of energy saving in 5G	FS_EE_5G_SEC	0%	SP-240512	
Study on security aspects of Core Network Enhanced Support for AIML	FS_AIML_SEC	0%	SP-240509	
Study on Security Aspect of Ambient IoT Services in 5G	FS_AIOT_Sec	0%	SP-240506	
Study on security aspects of 5G Mobile Metaverse services	FS_Metaverse_Sec	0%	SP-240508	
Study on UAS security enhancements	FS_UAS3_Sec	0%	SP-240504	
Study on security aspects for Multi-Access (DualSteer + ATSSS Ph-4)	FS_MASSS_Sec	0%	SP-240511	
Study on Security Aspects of Enhancement of Support for Edge Computing in 5GC phase 3	FS_EDGE_Ph3	0%	SP-240510	
Study on security aspects of 5G NR Femto Document for: Approval	FS_5G_Femto_Sec	0%	SP-240505	
Study on Security Aspects of Enhancement for Proximity Based Services in 5GS Phase 3	FS_5G_ProSe_Ph3_SEC	0%	SP-240513	
Study on security aspects of User Identities and Authentication	FS_UIA_Sec	0%	SP-240507	
Security aspects for MSGin5G Service Phase 3	5GMARCH_SEC_Ph3	0%	SP-240516	33.501
Security Assurance Specification for maintenance of 5G features	SCAS_5G_Maint	0%	SP-240515	

SA4 Release 19 SIDs/WIDs

Name	Acronym	%Complete	Hyperlink	Impacted TSs and TRs
Study on Media enerGy consumption exposuRE and EvaluatioN framework in 5G services	FS_MediaGREEN	0%	SP-240481	26.942
Video Operating Points - Harmonization and Stereo MV-HEVC	VOPS	0%	SP-240060	26.116; 26.118; 26.119; 26.143; 26.511
Split rendering over IMS	SR_IMS	0%	SP-240492	26.264
Study on Media Messaging Phase 2 (MeMe2)	FS_MeMe	0%	SP-240477	26.841
Study on Advanced Media Delivery	FS_AMD	0%	SP-240514	26.802; 26.804
Study of 5G Real-time Transport Protocol Configurations, Phase 2	FS_5G_RTP_Ph2	0%	SP-240482	26.822
Study on Beyond 2D Video	FS_Beyond2D	0%	SP-240479	26.956
Study on Audio Codec APIs	FS_ACAPI	0%	SP-240480	26.858
Study on Diverse audio Capturing system for End-user Devices	FS_DaCED	70%	SP-221330	26.933

SA5 Release 19 SIDs/WIDs

Name	Acronym	%Complete	Hyperlink	Impacted TSs and TRs
Study on energy efficiency and energy saving aspects of 5G networks and services	FS_Energy_OAM_Ph3	10%	SP-231723	28.866
Study on AI/ML management - phase 2	FS_AIML_MGT_Ph2	0%	SP-231780	
Study on intent driven management services for mobile network phase 3	FS_IDMS_MN_Ph3	0%	SP-231737	
Study on closed control loop management	FS_CCLM	0%	SP-231735	
Study on Cloud Aspects of Management and Orchestration	FS_Cloud_OAM	0%	SP-231781	
Study on Service Based Management Architecture enhancement phase 3	FS_SBMA_Ph3	0%	SP-231725	
Study on data management regarding subscriptions and reporting	FS_Data_SREP	0%	SP-231732	
Study on Management Aspects of NTN Phase 2	FS_NTN_OAM_Ph2	0%	SP-231733	
Study on management of IAB nodes	FS_NR_mobile_IAB_OAM	0%	SP-231729	
Study on Management of Network Sharing Phase3	FS_NetShare_OAM_Ph3	0%	SP-231731	
Study on Enablers for Security Monitoring	FS_SECM	0%	SP-231736	28.87
Study on management aspects of RedCap feature	FS_NR_RedCap_OAM	0%	SP-231734	
Study on management aspects of Network Digital Twin	FS_NDT	0%	SP-231428	28.915
Study on Management Data Analytics (MDA) Phase 3	FS_eMDAS_Ph3	0%	SP-231726	
Study on Enhancement of Management Aspects related to NWDAF Phase 2	FS_NWDAF_OAM_Ph2	0%	SP-231724	
Study on Management of planned configurations	FS_PlanM	0%	SP-231721	28.872
Study on Enhanced OAM for management exposure to external consumers	FS_MExpo	0%	SP-231728	
Data management phase 2	MADCOL_Ph2	0%	SP-231746	28.622; 28.623
5G performance measurements and KPIs phase 4	PM_KPI_5G_Ph4	0%	SP-231747	28.552; 32.425; 28.554; 28.532; 28.550; 28.abc
5G Advanced NRM features phase 3	AdNRM_Ph3	0%	SP-231745	28.540; 28.541; 28.622; 28.623
Subscriber and Equipment Trace and QoE collection management	TraceQoE_OAM	0%	SP-231748	32.421; 32.422; 32.423; 28.404; 28.405; 28.406; 28.622; 28.623

SA6 Release 19 SIDS/WIDs

Name	Acronym	%Complete	Hyperlink	Impacted TSs and TRs
Study on application layer support for AI/ML services	FS_AIMLAPP	55%	SP-231182	23.700-82
Study on application enablement for Satellite access enabled 5G Services	FS_5GSAT_Ph3_App	25%	SP-240296	23.700-01
Study on application enablement for Localized Mobile Metaverse Services	FS_Metaverse_App	30%	SP-231806	23.700-21
Study on Application enabler for XR Services	FS_XRApp	20%	SP-2315739	23.700-23
Study on Sensing application enabler for vertical applications	FS_SensingAPP	0%	SP-231579	
Application Architecture for UAS applications Phase 3	UASAPP_Ph3	40%	SP-230991	23.255; 23.434
Study on Service aspects for supporting the eMMTel service	FS_eMMTelAPP	35%	SP-230779	23.222 ; 23.700-92
Study on enhanced application layer support for location services	FS_eLSAPP	40%	SP-240295	23.434 ; 23.700-72
Sharing of administrative configuration between interconnected MC service systems	MCShAC	90%	SP-230692	23.280; 23.379; 23.281; 23.282
5GMSG Service phase 3	5GMARCH_Ph3	35%	SP-230781	
Railways specific Enhancements to Mission Critical Services	enh4FRMCS	40%	SP-230780	23.280; 23.281; 23.282; 23.379; 23.283; 23.289
Enhanced Mission Critical Architecture	enhMC	40%	SP-230988	23.280; 23.379; 23.281; 23.282; 23.283; 23.289
SEAL DD (Data Delivery) Phase 2	SEALDD_Ph2	35%	SP-230989	
Architecture for enabling Edge Applications Phase 3	EDGEAPP_Ph3	35%	SP-231160	23.558
Guidelines for CAPIF Usage	CAPIF_EXT	55%	SP-231161	23.946
Study on CAPIF Phase 3	FS_CAPIF_Ph3	20%	SP-231741	23.700-22

6G Timeline – Summary

Background

- ITU-R has agreed on the timeline for IMT-2030
- In **Dec ‘23**, 3GPP agreed on some first key aspects of the 6G timeline (SP-231693)
- In **Mar ‘24**, 3GPP agreed on some additional consideration for 6G timeline (SP-240458)
- 3GPP is expected to discuss further details of the 6G timeline in future meetings

Key agreements from SA #102/#103

- **May ‘24** – 3GPP Stage-1 workshop on IMT-2030 use cases
- **March ‘25** – 3GPP wide workshop to kick off Rel-20 technical studies in SA and RAN
- **June ‘25** - Approval of SA2 studies on 6G
- 6G Studies in Release 20 and 6G normative work in Release 21
- Release 21 is expected to be delivered with a **single drop** (i.e., a single code freeze)

6G timeline – Planning (1/2)

Stage-1 Workshop on IMT2030 Use Cases: May 8th – 10th (Wednesday – Friday), 2024

First 3GPP TSG-wide 6G Workshop: March 10th – 11th (Monday – Tuesday), 2025

Details TBD (e.g., whether to have a joint or separate workshop across TSGs, how to handle contributions, etc.)

TSG#107 plenary meetings are to be scheduled subsequently in the same week

Studies for 6G in 3GPP: from **Release 20**

See Next Slide for more details

Normative Work for 6G in 3GPP: from **Release 21**

Release 21 is expected to produce the 1st set of 3GPP **6G technical specifications**, and will be the release for **IMT-2030 submission** before 2030

Release 21 is expected to be delivered with a **single drop** (i.e., a single code freeze)

Rel-21 timeline is to be decided no later than June 2026. However, ASN.1/OpenAPI freeze date is no earlier than March 2029

6G timeline – Planning (2/2)

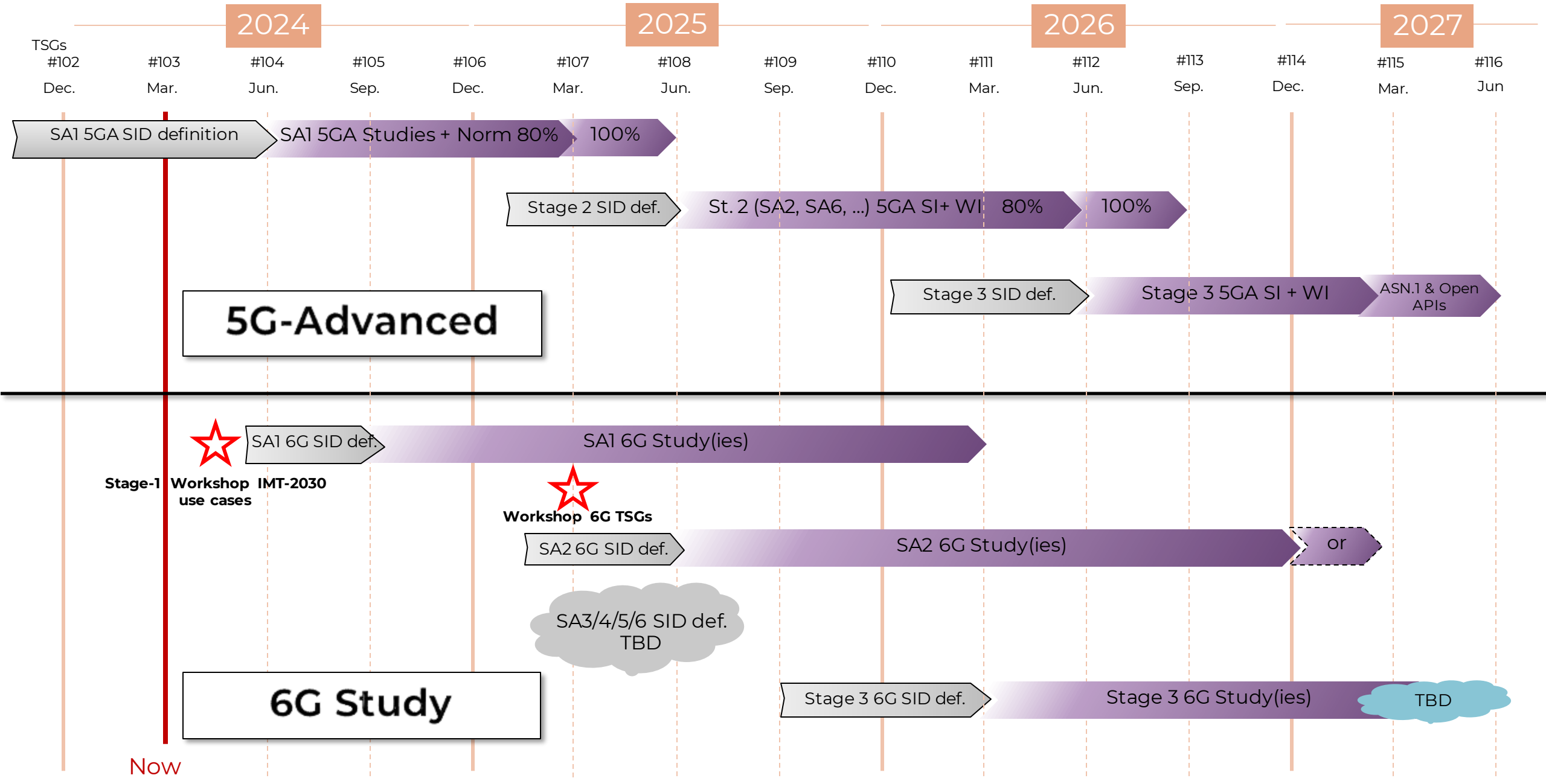
Rel-20 (5G-Advanced)

- **For 5G-Advanced: 18-month. Assuming no delay of Rel-19**
  - Stage-1 freeze : Jun 2025
  - Stage-2 freeze : Jun 2026 (>=80%); Sep 2026 (100%)
  - Stage-3 freeze : Mar 2027
  - ASN.1/OpenAPI freeze: June 2027

Rel-20 (6G Study Item)

- **6G SI Approval**
  - SA1 SI approval: TSG#105 (Sept 2024)
  - SA2 SI approval: TSG#108 (Jun 2025)
  - Other SA WG (SA3, SA4, SA5, SA6) SI approval: TBD at future TSG meeting
  - SA1/SA2 6G SI may continue beyond Stage-1/Stage-2 freeze dates for 5G-Advanced
- **6G SI Completion (this may use time from Rel-21)**
  - SA1 6G SI completion: Mar 2026
  - SA2 6G SI completion: Dec 2026 or Mar 2027 (To be confirmed at future TSG meeting)

Illustration of 3GPP SA Rel-20 Timeline



3GPP Stage 1 Workshop on IMT 2030 Use Cases

3GPP Stage 1 Workshop on IMT 2030 Use Cases

(May 8 - 10; Rotterdam, Netherlands)

(For details see - SP-240456)

The objective of the workshop is to bring 3GPP closer to the ongoing initiatives of various global/regional research organizations and MRPs regarding 6G use cases.

This collaborative effort is particularly crucial as SA1 embarks on defining the requirements and use cases for 6G in Rel-20.

Presentations from 3GPP MRPs (e.g. GSMA, 5GAA, …), regional research alliances (Next G Alliance, China IMT 2030 Promotion Group, Japan B5GPC, Kora 6G Forum, Bharat 6G Alliance), and global organizations/institutions (e.g. NGMN, ITU-R).

Conference-style event with a restricted agenda

Draft Agenda: 3GPP Stage 1 Workshop on IMT 2030 use cases

Time	Wednesday May 8th *Opening, Operators, Verticals*	Thursday May 9th *Research Alliances*	Friday May 10th *ITU, 3GPP, Closing*
1st session	08.45-09.15: Registration 09.15-09.30: Opening --- **Operators** 09.30-10.00: GSMA 10.00-10.30: NGMN	09:00-09.45: Japan (B5GPC) 09.45-10.30: South Korea (6G Forum)	09.00-09.30: ITU-R 09.30-10.00: 3GPP 10.00-10.30: **Panel#4:** "ITU & 3GPP synergies for 6G"
Morning break	*Morning break (10.30-11.00)*	*Morning break (10.30-11.00)*	*Morning break (10.30-11.00)*
2nd session	11.00-11.40: **Panel#1**: "6G Drivers for Operators" --- **Verticals** 11.45-12.10: Automotive (5GAA) 12.10-12.35: Industry (5G-ACIA)	11.00-11.45: China (IMT2030 Promotion Group) 11.45-12.30: India (Bharat 6G Alliance)	11.00-11.40: Summary read-out of the Workshop 11.40-12.00: Next steps 12.00-12.30: Closing
Lunch break	*Complimentary lunch (12.35-14.00)*	*Complimentary lunch (12.30-14.00)*	***Workshop ends 12.30 latest***
3rd session	14.00-14.25: Multimedia (5GMAG) 14.25-14.50: Satellite (GSOA) 14.50-15.15: Public Safety (TCCA) 15.15-15.40: WBA	14.00-14.45: America (ATIS Next G Alliance) 14.45-15.30: Europe (6G-SNS)	
Afternoon break	Afternoon break (15.40-16.10)	Afternoon break (15.30-16.00)	
4th session	16.10-17.00: **Panel#2** : "6G Drivers for Verticals"	16.00-17.00: **Panel#3**: "Building a Global 6G View"	

Note: the order of presentations within the Verticals and within the Research Alliances is subject to change

(Source: SP-240456)

Questions and Answers

Moderator

Iain Sharp
ATIS

3GPP RAN: Current Status and Beyond

Wanshi Chen
Qualcomm
3GPP RAN Plenary Chair

3GPP SA Release 19 Status Update and 6G Planning

Puneet Jain
Intel Corporation
3GPP SA Plenary Chair

Slides and recording will be provided after the event.

Thanks to the speakers and participants

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