3GPP RAN: Current Status and Beyond

Wanshi Chen

3GPP TSG RAN Chair

Sr. Director, Technology, Qualcomm Technologies, Inc.

Outline
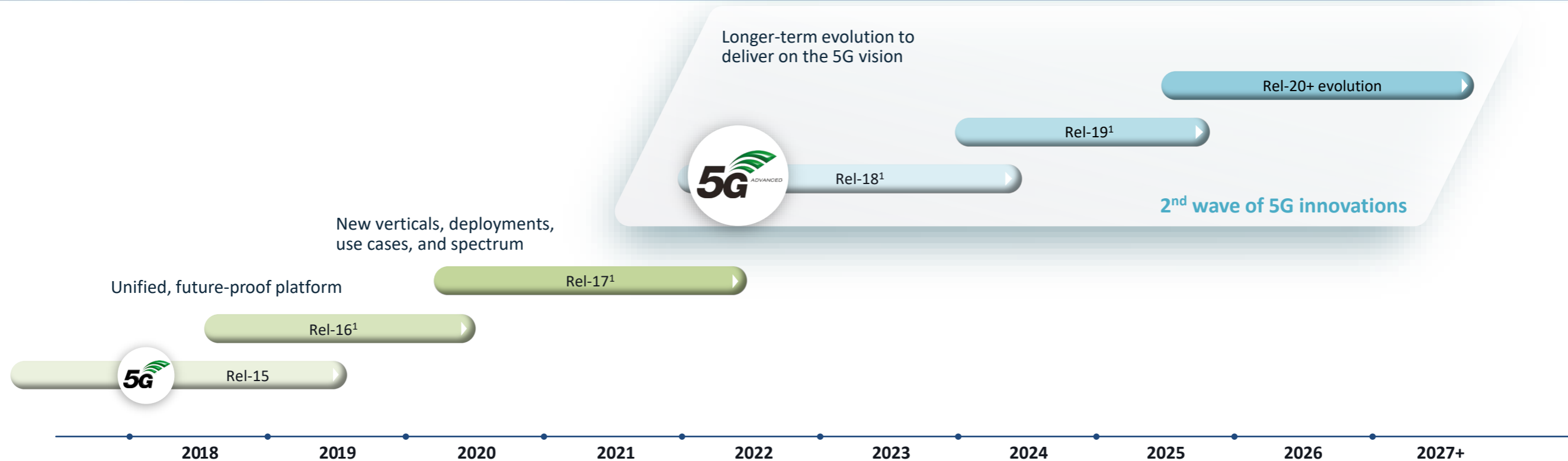
- Overview

- 3GPP RAN Rel-19

- Initial 6G Discussion

Overview

5G and 5G-Advanced in 3GPP

Longer-term evolution to deliver on the 5G vision

Rel-20+ evolution

Rel-19[1]

5G ADVANCED

Rel-18[1]

2nd wave of 5G innovations

New verticals, deployments, use cases, and spectrum

Rel-17[1]

Unified, future-proof platform

Rel-16[1]

5G

Rel-15

| 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027+ |

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
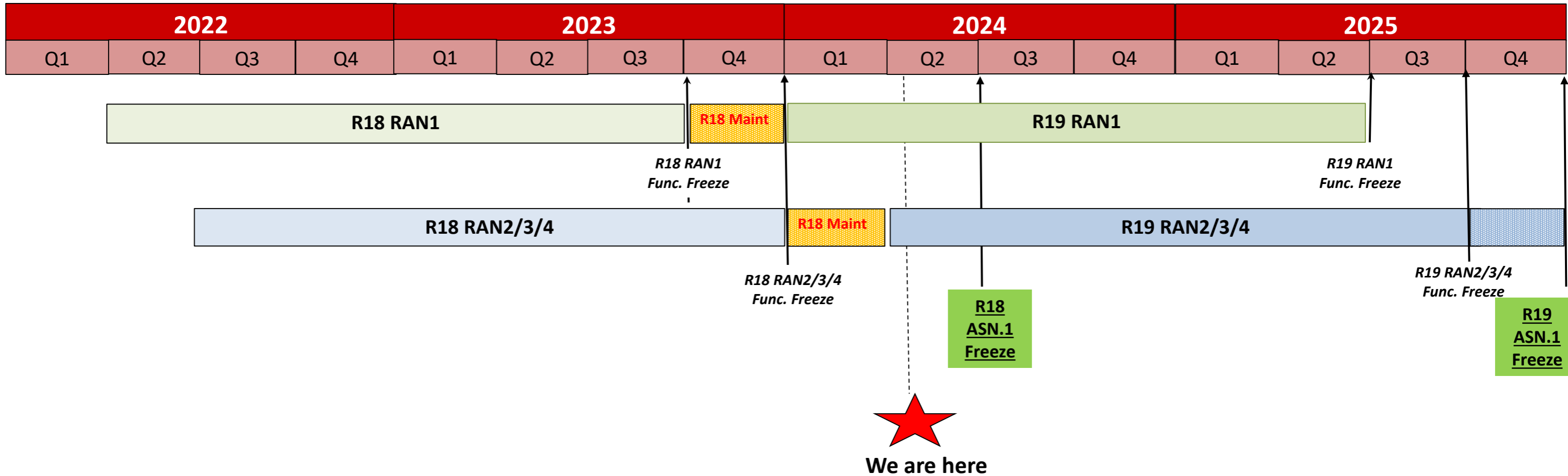- Multicast
- In-band eMTC/NB-IoT
- Positioning

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

	2022				2023				2024				2025			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

R18 RAN1

R18 Maint

R19 RAN1

*R18 RAN1
Func. Freeze*

*R19 RAN1
Func. Freeze*

R18 RAN2/3/4

R18 Maint

R19 RAN2/3/4

*R18 RAN2/3/4
Func. Freeze*

*R19 RAN2/3/4
Func. Freeze*

**R18
ASN.1
Freeze**

**R19
ASN.1
Freeze**

⭐

We are here

RAN Rel-19

5G Advanced Release 19 focus areas

RAN1/2/3 package approved in Dec'23

RAN4 package approved in Mar'24

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

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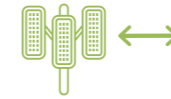Study feasibility of new band ranges and types (e.g., upper mid-band in 7-24 GHz)

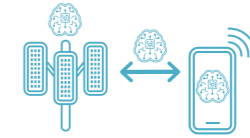# New 5G system capabilities and a direction for 6G

5G ADVANCED — Release 19

MIMO

Ambient IoT

Duplexing evolution

Wireless AI/ML

Mobility

Satellites evolution

Higher mid-band spectrum

Network energy savings

Topology

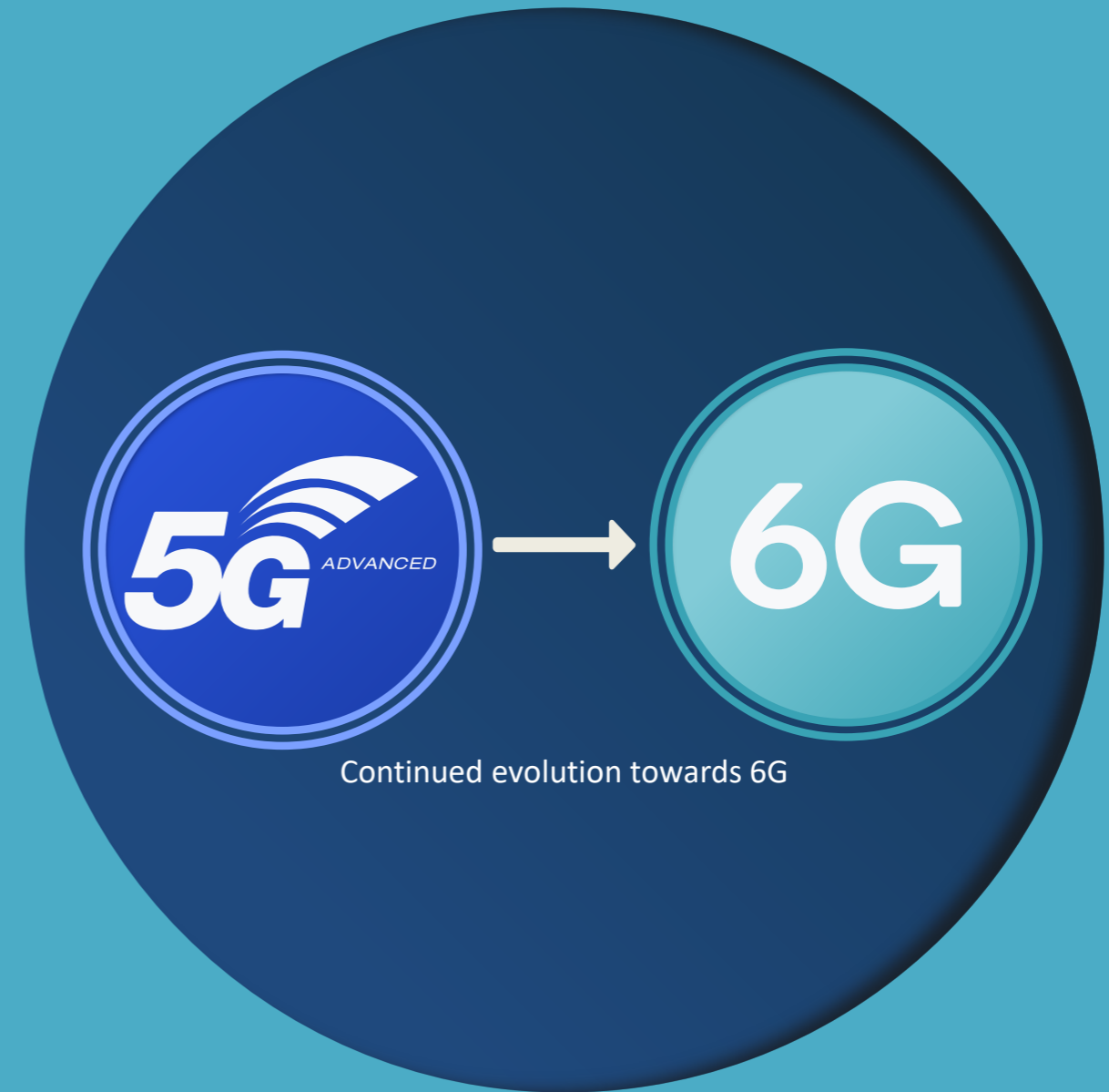SON/MDT

XR and metaverse

Integrated sensing and communication
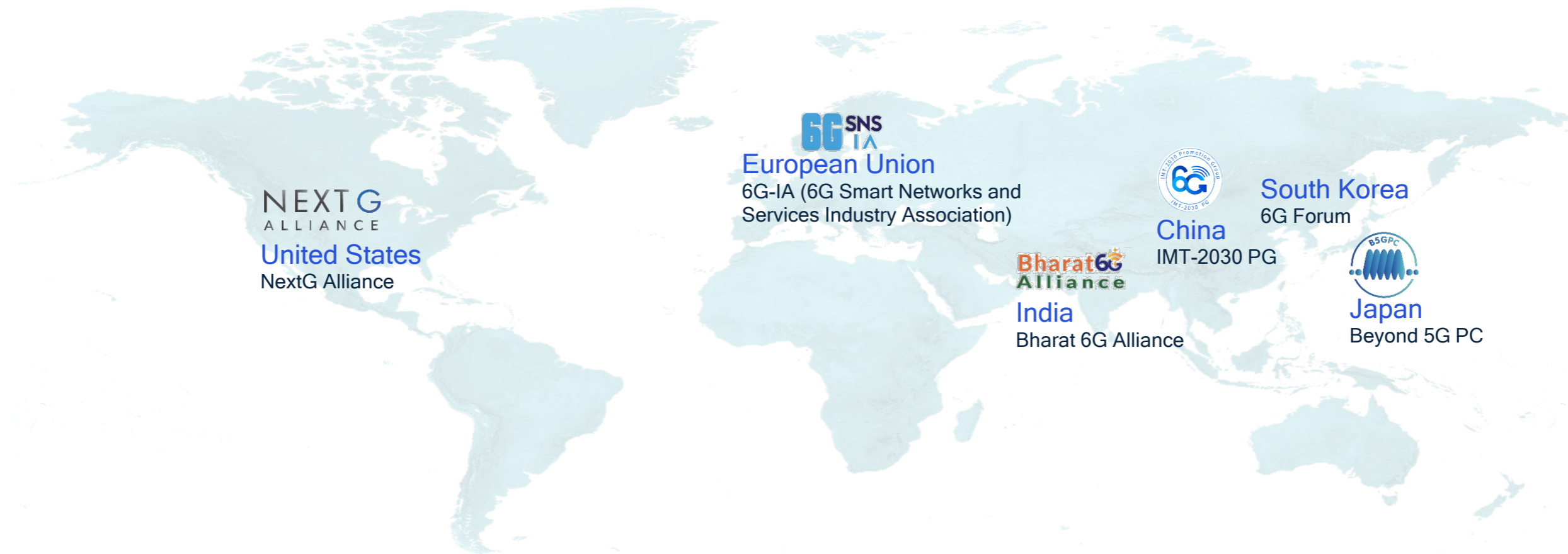
Low-power wakeup receiver

Initial 6G Discussion

Continued evolution towards 6G

Global Momentum for 6G is Growing

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

3GPP TM
A GLOBAL INITIATIVE
The standards body responsible for global 6G technology standardization

NEXT G ALLIANCE
United States
NextG Alliance

6G-SNS IA
European Union
6G-IA (6G Smart Networks and Services Industry Association)

Bharat6G Alliance
India
Bharat 6G Alliance

China
IMT-2030 PG

South Korea
6G Forum

B5GPC
Japan
Beyond 5G PC

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

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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

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6G Timeline Considerations: RAN-Specifics 2/2
(As in RP-233985 and RP-240823)

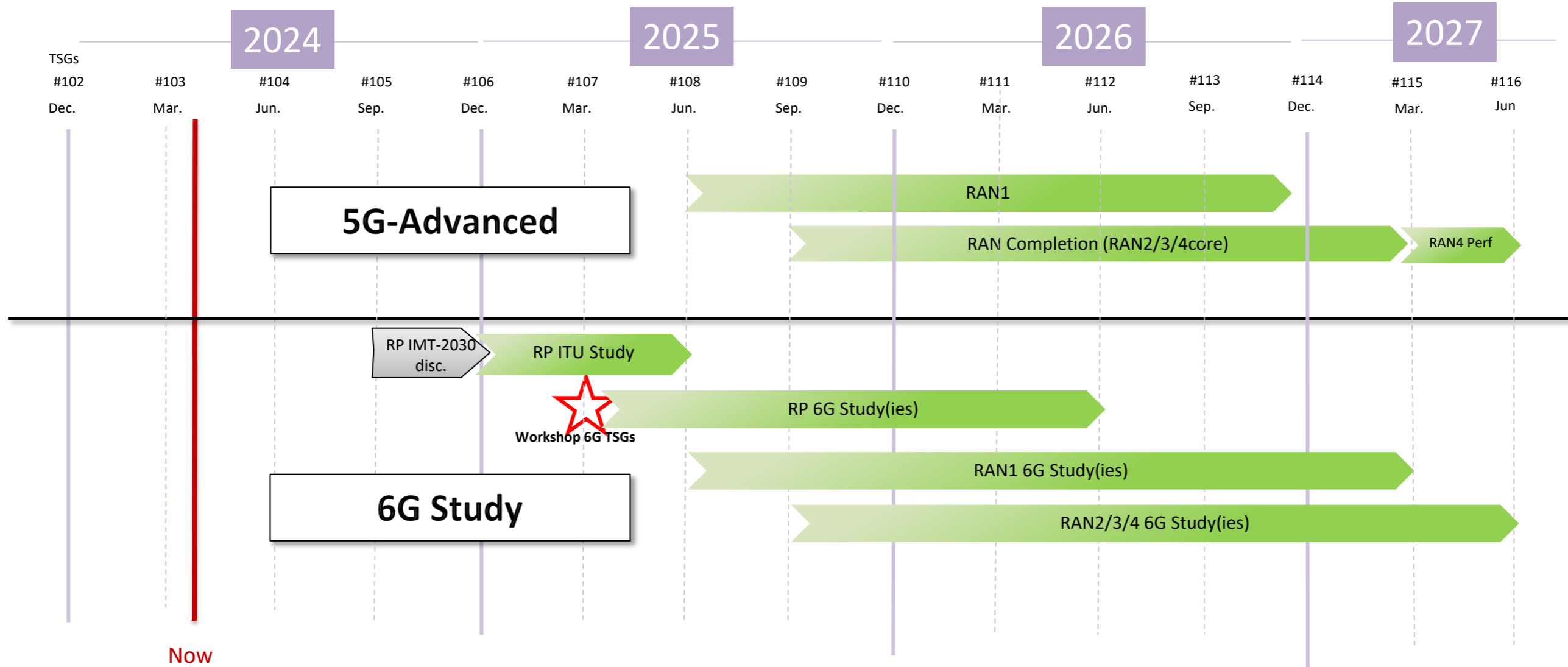- **RAN WGs in Rel-20**
  - **For 5G-Advanced: 18-month**. Assuming no delay of Rel-19
    - Stage-1 freeze : Jun 2025
    - Stage-2 freeze : Jun 2026 (>=80%); Sep 2026 (100%)
    - Stage-3 freeze : Mar 2027
    - ASN.1/OpenAPI freeze: June 2027
  - **For 6G SI: 21 months**
    - **RAN1 starts in 3Q/25 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

Questions/Comments?

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