

Global mobile Suppliers Association

ASMG meeting #32

13-16th May 2024

Amman Jordan

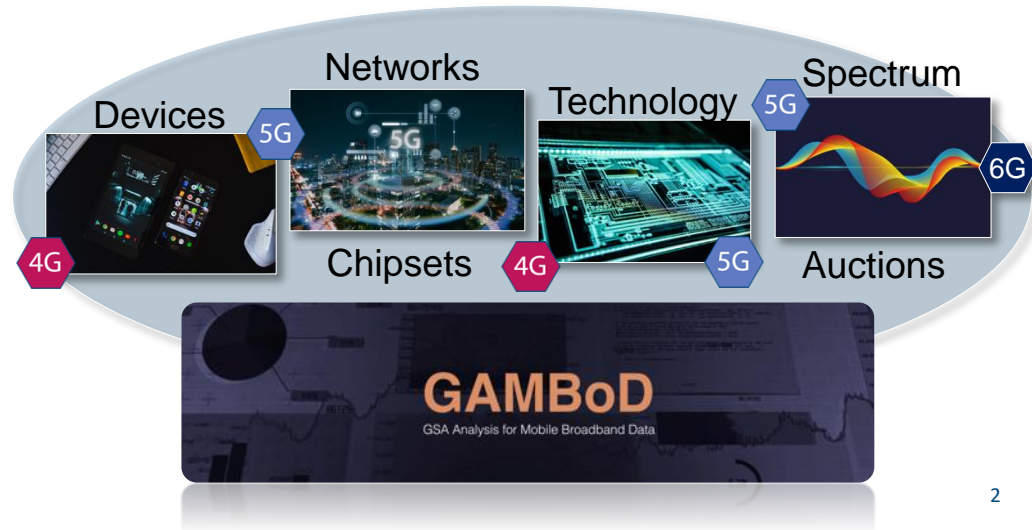
*Delivering the required connectivity for 6G
- key bands and connectivity models -*

GSA ASMG Group



About GSA

- Representing the global mobile ecosystem since 1998
- Extensive research & database
 - Free industry reports
 - Member reports & GAMBoD Access
- GSA Spectrum Group
 - 185+ participants regionally grouped
 - Advocacy, education and technical support
 - Cooperation with other industry groups such as COAI, CTIA, GSMA, TechUK, etc
- GSA Standards Group
 - 6G-Joint Working Group
- 87 Associates subscribing to GSA data
 - Regulators-Analysts-Operators etc.



Each IMT/3GPP generation enriches the user experience



Analog voice

1G (1984)



App-based touch screens

3G (2004)



High-speed eMBB and vertical services

5G (2019)



2G (1996)

Digital voice, text, e-mail



4G (2011)

True wireless Internet phone



6G (2030)

Extreme connectivity and immersive augmented experiences

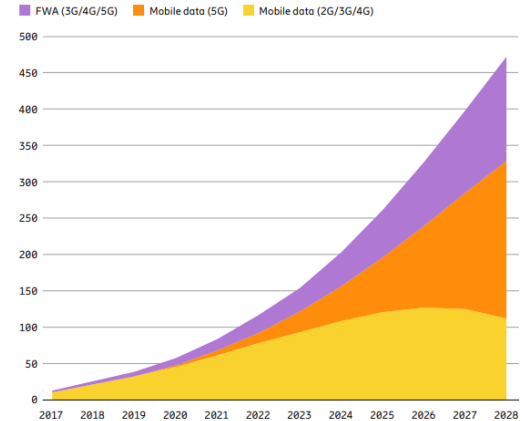
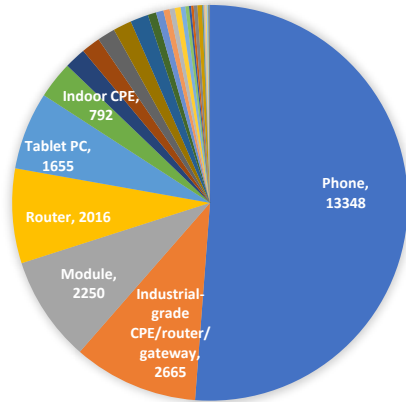


Continuing to Deliver the Global IMT/3GPP Vision

26k IMT2020 Devices*

8.4Bn Mobile Subscribers#

21GB per month+



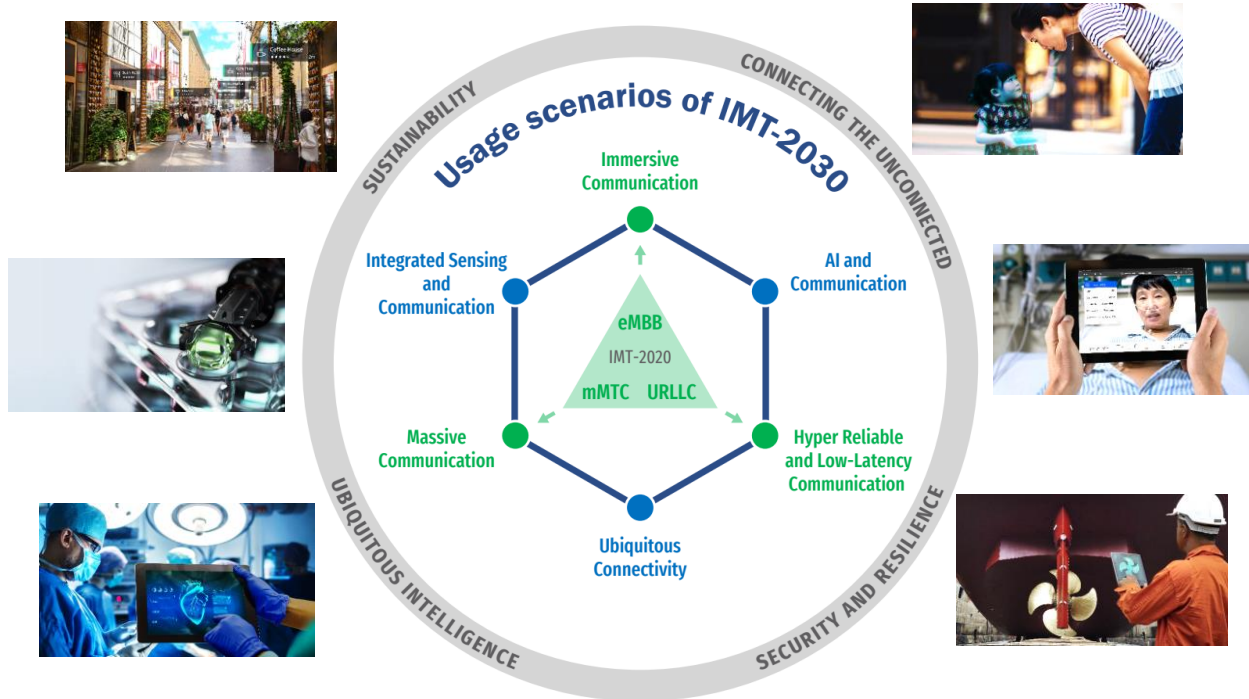
* Source: GSA GAMBoD, November 2023

Source: Ericsson Mobility Report, June 2023. Number of Mobile Subscriptions per region. For example, x1.49 denotes the number of mobile subscriptions per head of population within Europe.

+ Source: Ericsson Mobility Report, Nov 2023. Global Mobile Network Data Traffic (EB per month). 21 GB is the global average for Mobile data traffic per smartphone per month

The 6G vision

6G



6G extreme connectivity and immersive use cases will create a more communication-friendly society, with a significant impact on productivity and sustainability

*Source: Draft new Recommendation on the "IMT-2030 Framework", as adopted by SITU-R SG 5 in 09/23 (and sent for approval), document 5/141 as edited in SG 5

Delivering 6G new use cases will require additional capacity in mobile networks

Global 6G research framework and Strategies

China



www.caict.ac.cn

Europe



www.hexa-x.eu

Japan



www.b5g.jp/en

India



www.dot.gov.in/bharat-6g

Korea



Ministry of Science and ICT

www.msit.go.kr

ITU



www.itu.int

UK



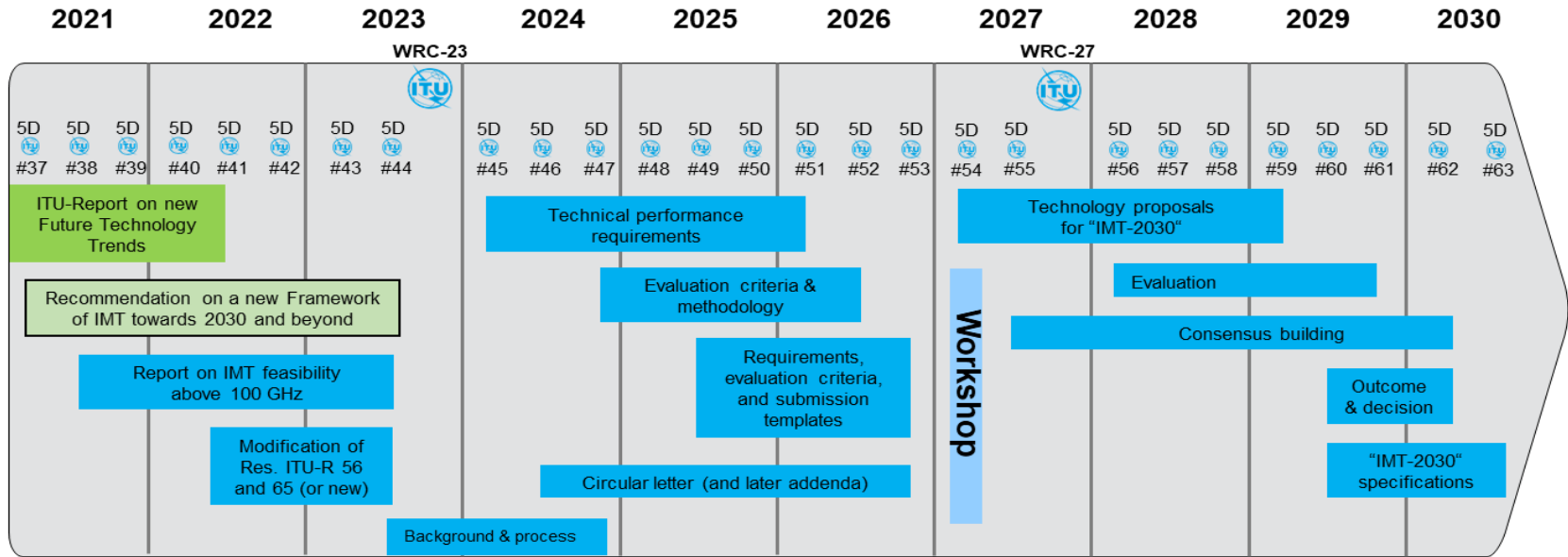
Pillars of the 6G strategy

USA



Next G Alliance
6G Spectrum Considerations

ITU-R IMT-2030 activities





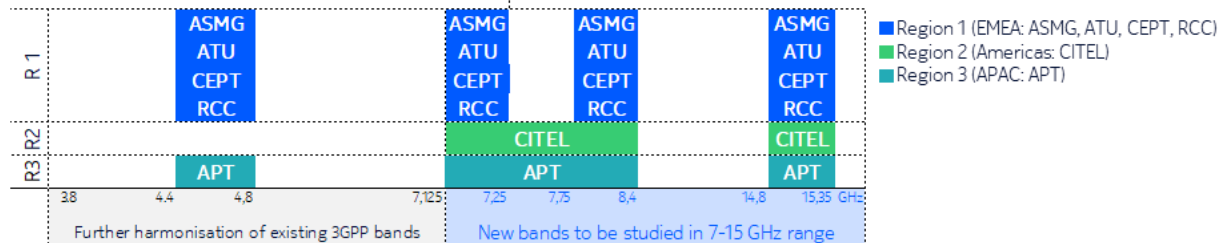
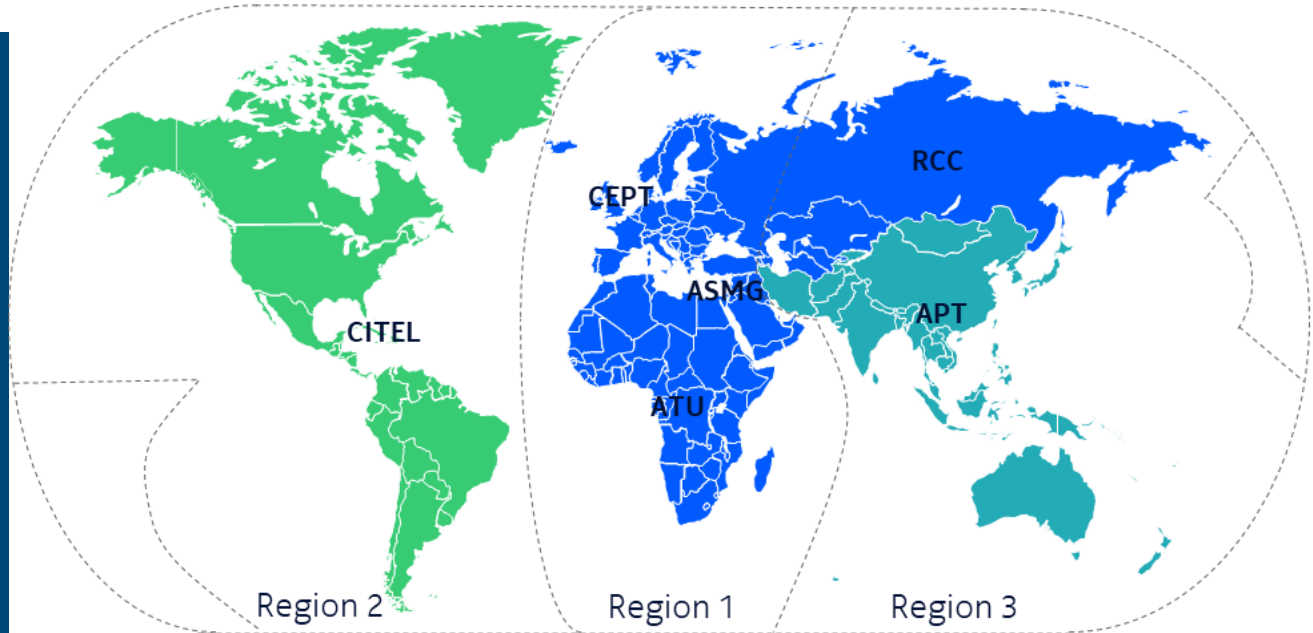
Close collaboration between ITU-R and 3GPP as an external organisation for the development of 3GPP proposals to IMT-2030



Spectrum to be studied for 6G (WRC-27 Agenda Item 1.7)

Agenda item 1.7 for **WRC-27** was approved in WRC-23 to study the following bands for IMT:

- 4400-4800 MHz
- 7125-8400 MHz
- 14.8-15.35 GHz



WRC-27 & IMT/6G – initial observations of bands to be studied

Agenda item 1.7 for WRC-27 :

- 4400-4800 MHz
- 7125-8400 MHz
- 14.8-15.35 GHz

- GSA supports studies for the bands under WRC-27 AI 1.7
- some (or parts) of the bands may not be considered for IMT in some countries and regions
- Work has already started in WP5D and 3GPP RAN4 to define necessary IMT deployment scenarios and parameters to be used in ITU-R sharing and compatibility studies

* for some of the bands, some GSA members also have interests in other wireless technologies / applications

4400-4800 MHz:

- + propagation
- + FSS use not very extensive in some countries
- military usage in some countries (Fixed, Mobile, inc aeronautical)

7125-8400 MHz*:

- + propagation
- + extension of “Upper 6GHz”*
- + 7125-7250MHz already been discussed within Europe
- military usage in some countries in parts of the band
- FS (Fixed Links), FSS and Science use

14.8-15.35 GHz:

- + considered for all ITU-R Regions
- + better diffraction below rooftops compared to mmW bands
- propagation
- military, FSS and SRS use, adjacent to EESS(p)

In addition to bands for AI 1.7, countries may consider and study bands outside the ITU WRC process, e.g., 12.7-13.25 GHz in the US.

How much wide-area spectrum in 7-15 GHz range to support 6G ?

Immersive XR



Mobile Hologram



Communication
+ Sensing



	XR	Holographic communications	Communication + Sensing
Wide area use cases (GHz)	1	1.1	0.3-0.75



500-750 MHz additional wide-area spectrum per network in addition to re-using existing spectrum*

Preliminary analysis and depends on the existing mid bands spectrum available for IMT and on the number of networks in a specific country

* APG23-5/INF-26 to the 5th Meeting of the APT Conference Preparatory Meeting (February 2023), CEPT PTA(23)047), and CITEC CCPII-2023-42-5952 PCC.II 42nd Meeting (August 2023)

Summary

- 6G research is globally accelerating
- IMT-2030/6G specifications to be completed by 2030 (ITU-R Working Party 5D in cooperation with external organisations such as 3GPP)
- Commercialization target of around year 2030 is expected for initial 6G deployments
- 6G will need the combination of various frequency ranges to meet coverage and enhanced capacity requirements as well serve new emerging use cases
- At least 500 MHz per network of new spectrum from within the range 7-15 GHz is estimated to be needed in addition to the re-use of existing spectrum
- GSA supports studies for bands under WRC-27 agenda item 1.7: 4.4-4.8, 7.125-8.4 and 14.8-15.35 GHz *
- In addition to bands for AI 1.7, countries may consider and study bands outside the ITU WRC process, e.g., 12.7-13.25 GHz in the US.
- Given that research and standardization of 6G/IMT-2030 is still ongoing, sharing and coexistence with other Radio Services could be reflected in that process.
- Global/regional harmonisation (spectrum, standards, timing, etc.) remains critical

* for some of the bands listed above, some GSA members also have interests in other wireless technologies / applications

Global mobile Suppliers Association

The Industry Voice of the Global
Mobile Ecosystem

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