

6G Application – Spectrum requirements

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National Conference on 6G
Spectrum, Technology and
Standardization by ITU, Bangalore



5GIF Spectrum workgroups

- Improve the visibility of 3GPP technologies amongst Indian stakeholders and regulatory bodies
 - Hosting of 3GPP centric events
 - Facilitating the 3GPP meetings in India
 - technical activities including the generation of Technical Reports, performance studies and drafting Recommendations
 - IMT-2020 Technology Evaluation

- **6G Initiatives and engagements in India**
- **Contributions towards IMT-2030**
- **WRC-23 and WRC-27** studies and technical studies at National preparatory meetings

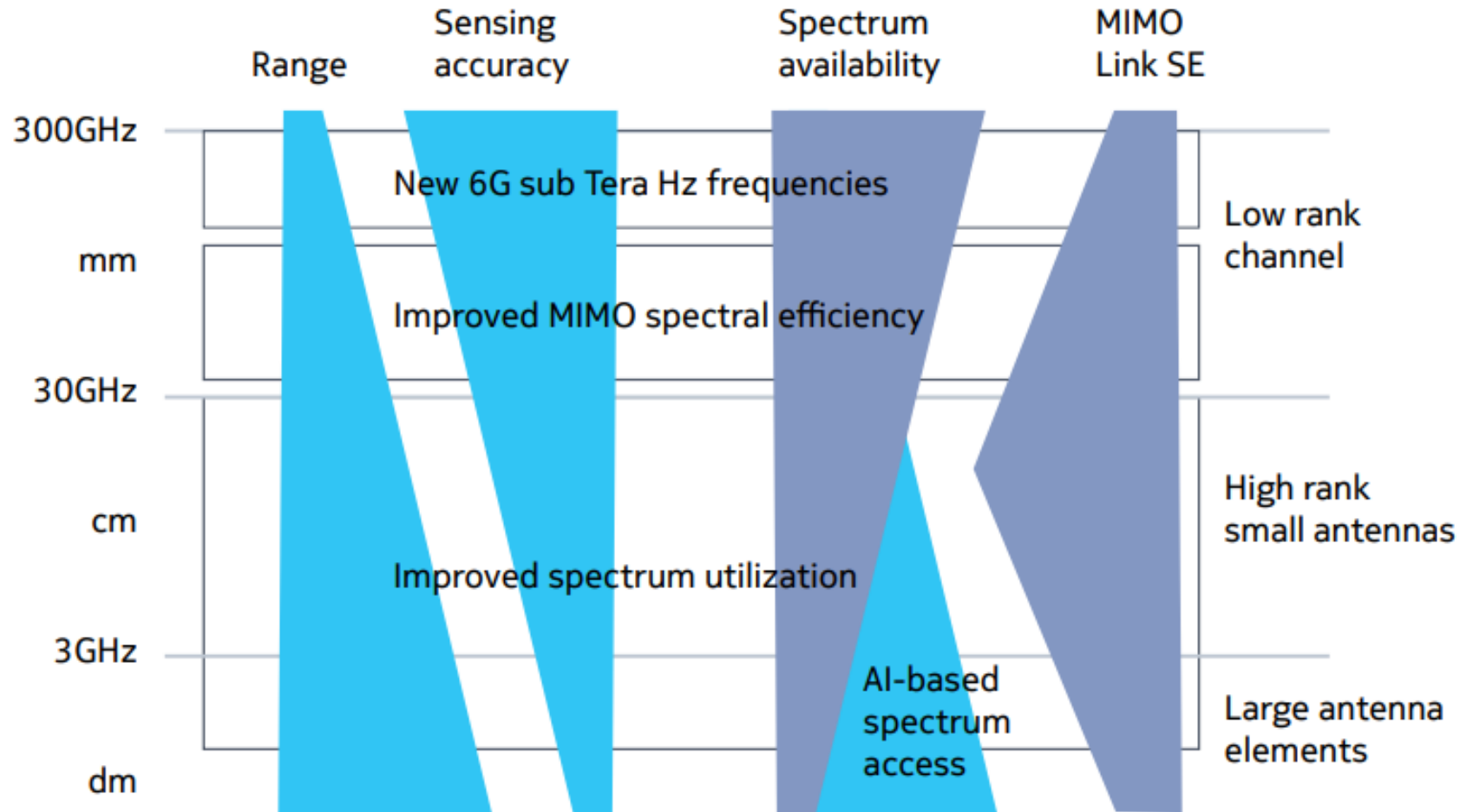
WG Standards & Technology

WG Spectrum studies

WG Vertical Industries

Technology Evaluation Group

Spectrum Characteristics for 6G



6G Driving Applications

A

Traditional Mobile Broadband

Serving more people and increasingly data-hungry mobile applications (**Mobile network data traffic doubled in the last 2 years ****).

B

Adv-XR and Holographic communications

XR and its evolution to support **Holographic communications** is expected to be the **next paradigm shift after the smartphone**, thus a **main driver**.

C

Massive digital twin

Smart cities and high precision positioning such as interactive 4D maps of whole cities that are precise in position and time are yet another driving force.

D

Internet of senses

Interacting with our senses of **sight, sound, taste, smell** and **touch** across the internet may further drive network traffic.

The centimetric range is key to enable mobility for many 6G use cases

Communication trends towards 2030



2D video communication

Today's audio-visual digital communication is only a start and will **in the future** evolve to include **additional sensory experiences**



3D augmented communication

Our **digital experiences are getting more immersive**, starting with XR and evolving toward **Holographic communication** in ~2030



Sensory communication

Multisensory extensions will over time increase the level of immersion beyond audio-visual, to other senses such as **touch, taste and smell**



Spectrum Needs

Leverage Technology Advancement

- IMT-2030/6G will have advanced development of its air-interface technology compared to IMT-2020/5G, Codecs etc.,
- For several use-cases such as immersive XR, advanced video codec, VVC (Versatile Video Coding), optimistic assumption on compression (e.g., 800:1)
 - a) Spectrum Efficiency
 - b) Sensing/Positioning Applications (wider bandwidth),

6G specific use cases

- Immersive communication (cloud XR), fully immersive (16K x 16K) - be 0.45 Gbit/s (20ms to 10ms)
- Holographic - (830MHz ~ 1.1GHz) , 3D voxels - volumetric media ~1Tbps (indoor)
- Joint Sensing - 50cm ~300MHz, 20cm- 750MHz, Industrial Indoor (~1cm – ~15GHz)

Multiple Network , existing eMBB usage

Innovations opportunities in new spectrum bands for 6G Applications

- Traffic forecast-based approach,
- Application-based approach and technical performance-based approach
- More accurate spectrum needs calculations would require many assumptions including country/deployment dependent (density of population, IMT-2030/6G penetration, etc.) data.

Thank you



For more information visit
<https://5gindiaforum.in>