



Perspectives and research progress on 5G Spectrum

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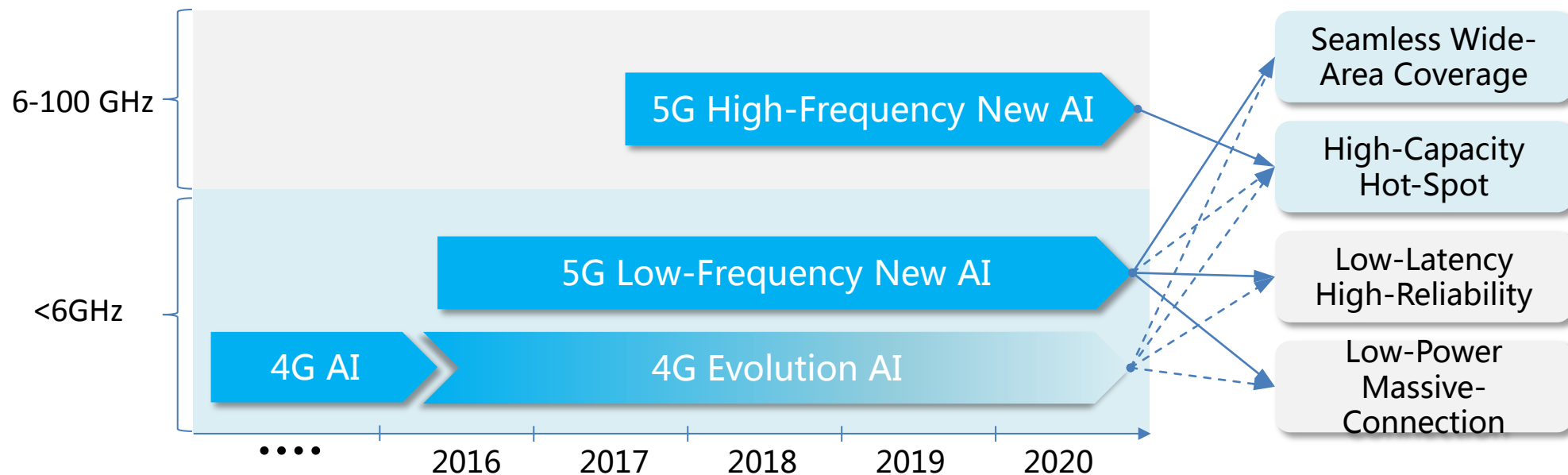
October 20, 2015

Key Points

- 5G frequency planning plays a vital role in 5G global standardization.
- Earlier announcement of frequency planning benefits the development of 5G industry.
- China is actively participating in international cooperation and promoting global harmonization of 5G frequency planning.

Preliminary views

- 5G frequency planning should consist of lower frequency (below 6GHz) and higher frequency (above 6GHz)
 - Lower frequency bands are basic for 5G system, which enables seamless wide area coverage capability and also applies to internet of vehicles and internet of things scenarios;
 - Higher frequency bands are important supplemental for 5G system, which enables high-capacity wideband transmission capability

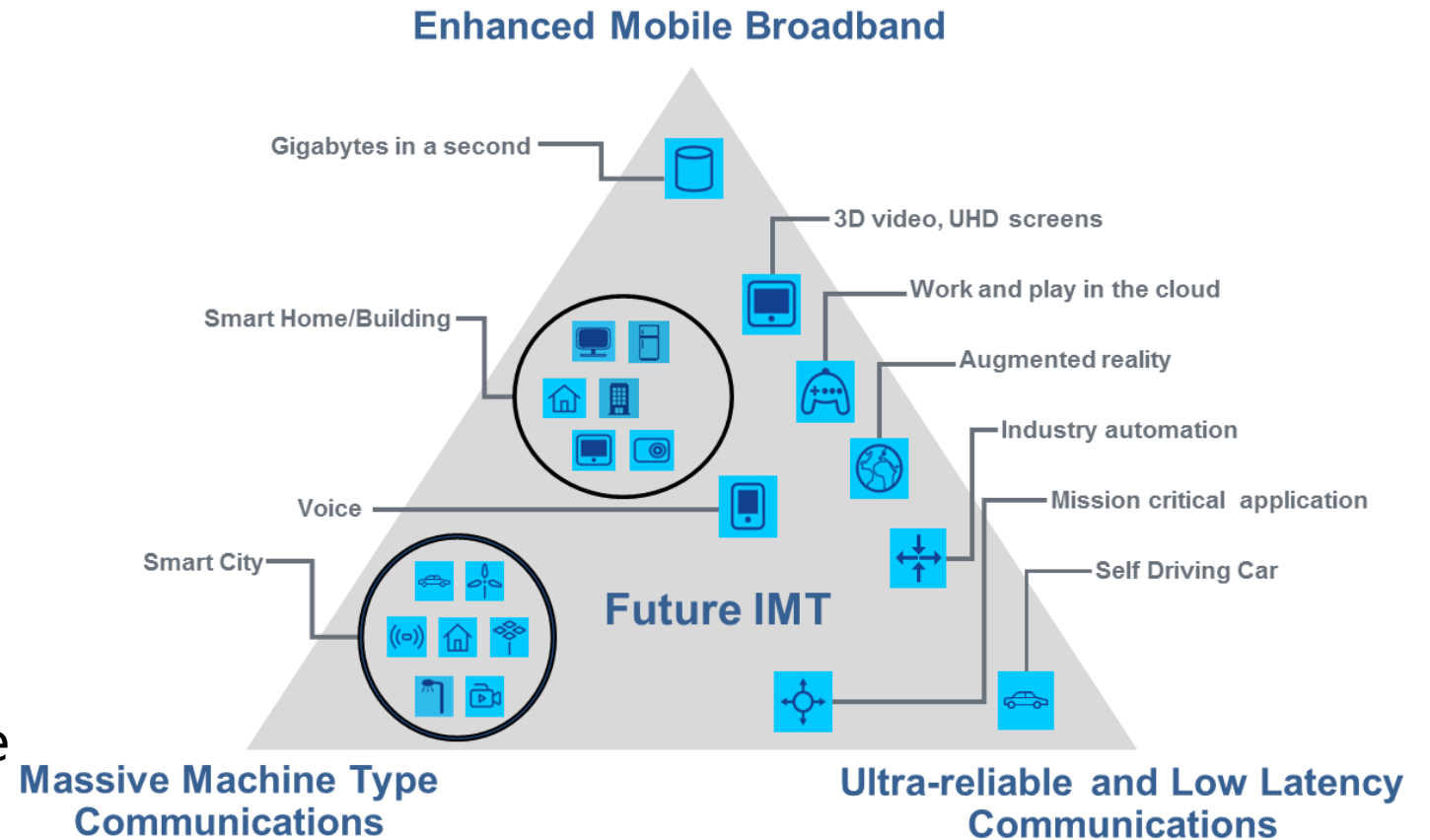


Preliminary views

- Frequency planning for below 6GHz should be promoted recently
 - Considering the 5G frequency requirement at current stage, and the needs of research & development on 5G product
 - Also in preparation on WRC-15.
 - 5G Frequency planning should be finalized within three to five years in the future.
- Frequency planning for above 6GHz should also be studied and carried out
 - 5G system research on higher frequency (6 to 100 GHz) is a global trend
 - Most important agenda item for next WRC
 - Difficult point for frequency coordination among countries

Preliminary views

- Frequency usage requirement of relative industries needs overall consideration
 - 5G application will extend to internet of things, where the relative industry applications should be considered in frequency planning
 - Coexistence with other services, such as space service and meteorological service, should also be considered to obtain the maximum common benefits



R&D Projects on spectrum



National Science and Technology Major Project

2015

Overall

- Network Architecture
- Standard Evaluation Platform
- Analysis and Evaluation on Candidate Bands

Technology

- mmWave Key Technologies
- Low-Latency High-Reliability Solution
- Next Generation WLAN

2016

Overall & Component

- 5G Standardization
- AD/DA for Base Station
- High-Freq PA for Base Station
- High-Freq Filter for Base Station

Wireless Technology

- Wide-Area Coverage
- Low-Power Massive-Connections
- High-Freq. Comm.
- Ultra-Dense Network
- Novel Multiple Access

Network & Service

- RAN Architecture
- 5G Indoor Positioning
- Key Technology for Self-Driving Cars

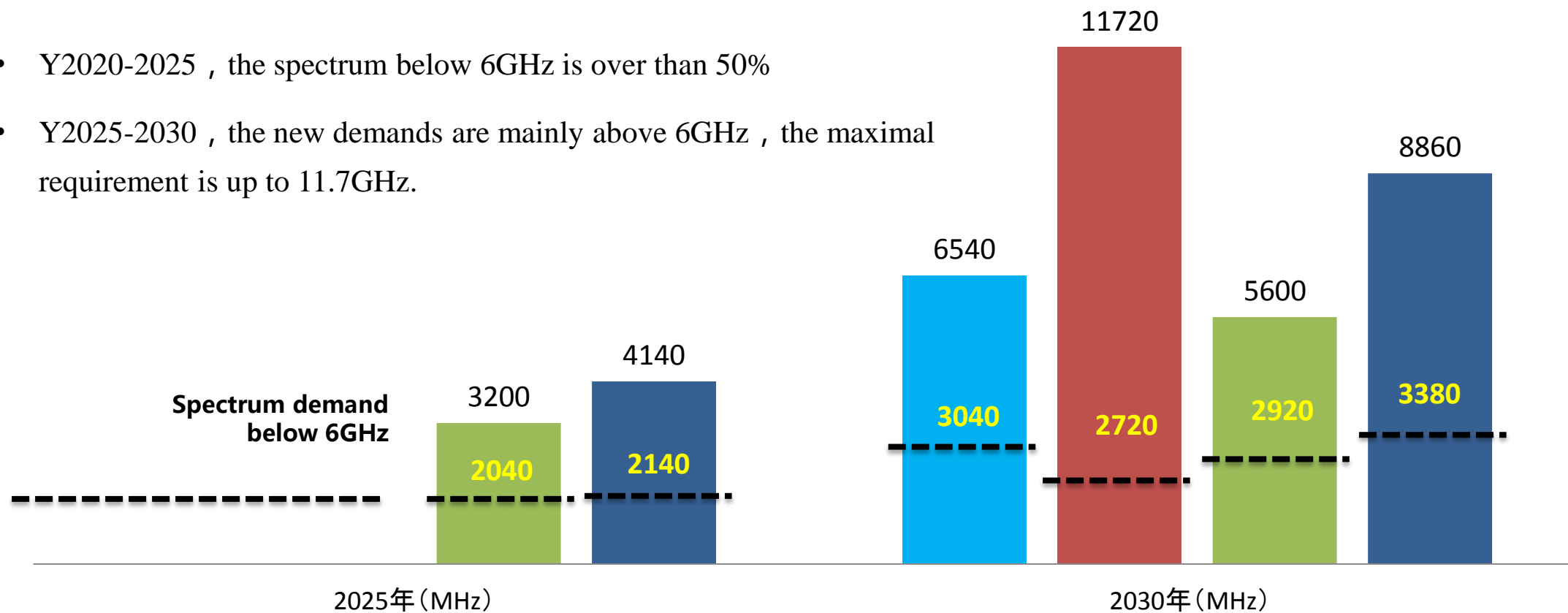
- Research on candidate bands
- Research on High-Freq Core electronic components

Spectrum Demand Estimation (Preliminary result)

IMT-2020-Y2030 frequency demand estimation

■ IMT-2020 PG Method ■ KPI Method ■ ITU-R M.1768 Method ■ FCC Method

- Y2020-2025 , the spectrum below 6GHz is over than 50%
- Y2025-2030 , the new demands are mainly above 6GHz , the maximal requirement is up to 11.7GHz.



Potential Candidate Bands for 5G(FFS)

Low-frequency bands below 6GHz are always necessary for IMT

2015

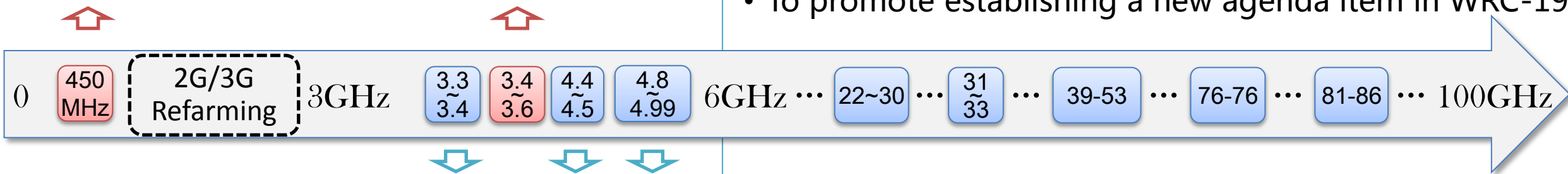


High-frequency bands within 6~100 GHz can be introduced in 2019 and beyond

2019

- Exploit the bands identified for IMT in the Radio Regulations, including 450~470MHz, 698~806MHz, and 3400~3600MHz

- Several potential candidate bands within 6~100GHz are selected.
- Different bands have different channel properties and coexistence situations.
- Studies on channel measurement, modeling and coexistence are ongoing.
- To promote establishing a new agenda item in WRC-19.



Get new bands below 6GHz in WRC-15 AI 1.1

Recent Work Plan

- Promote low-frequency bands for IMT systems in WRC-15.
- Identify the potential candidate bands in 6 – 100 GHz.
- Accelerate studies on higher frequency (above 6GHz) propagation characters and sharing studies, release relative study reports.
- Promote the corporation between ICT and vertical industries, carry out technology coordination on 5G frequency planning, create a good environment for 5G application in vertical industries.
- Actively participate in international coordination, promote ITU related agenda item work, and aim to achieve global common views.



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Thanks for your attention

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