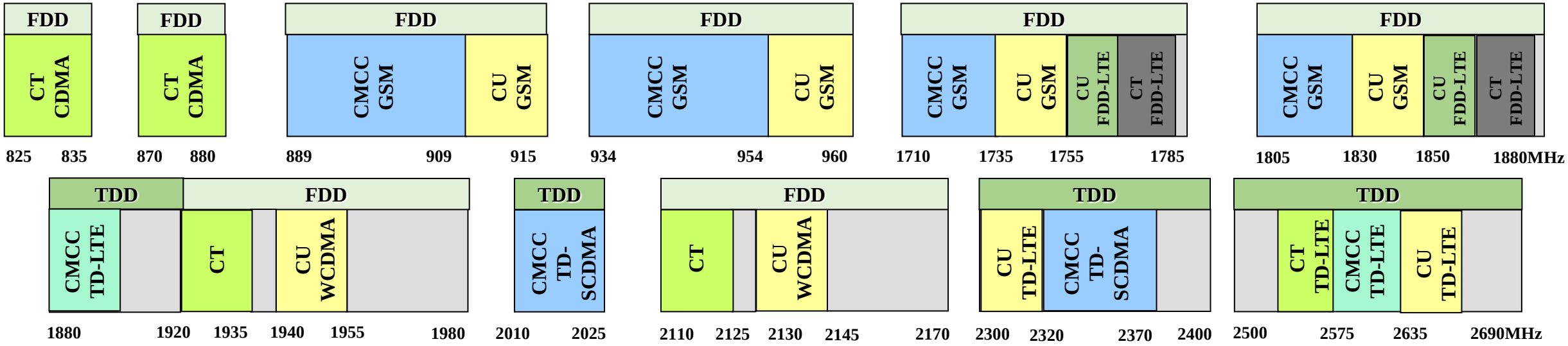
5G Spectrum Research Status in China

IMT-2020 (5G) Promotion Group

Oct.20th ,2015

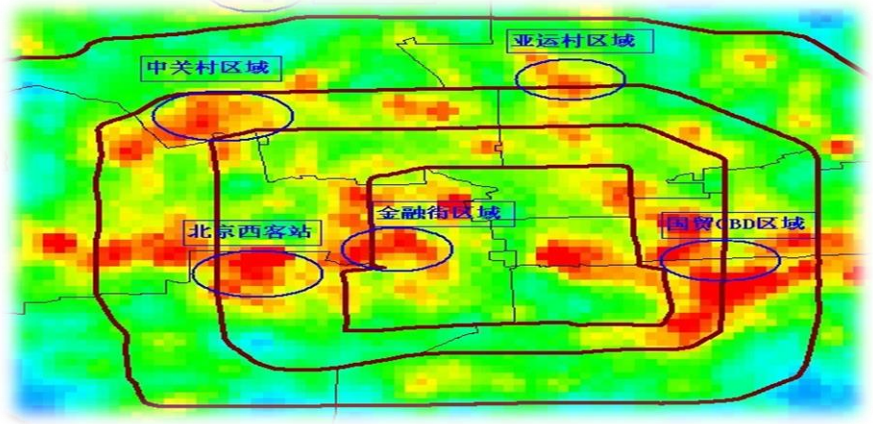
IMT frequency band Planned in China



- Frequency band plan for IMT in China is 687MHz which 477MHz are allotted . With FDD 272MHz and TDD 205MHz.
- Mainly in 800/900MHz，1.8GHz，2GHz，2.3GHz，2.6GHz.

Y2020 Spectrum Demand

- **Spectrum demand estimate towards 2020 for Beijing downtown based on the data from 3 incumbent operators**

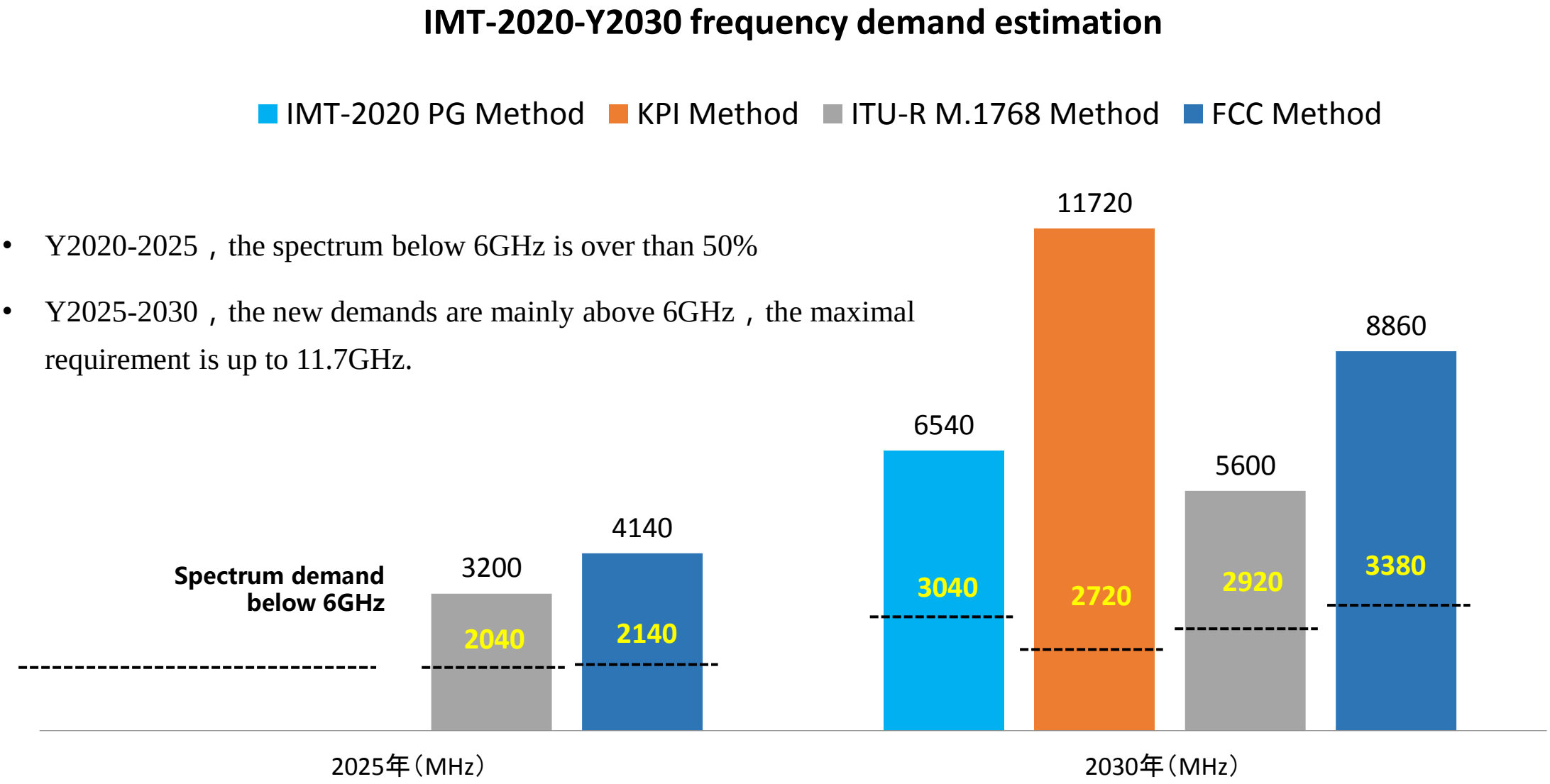


Deficit in 2020 is over 1GHz

Estimation methods	Spectrum demand of China in 2020 (MHz)
IMT-2020 (5G) PG	**1350-1810**
M.1768	1490-1810
FCC	1540-1800
GSMA	1865

Note: Global demand (WP 5D) 1340 - 1960 MHz

Y2030 Spectrum Demand (preliminary result)

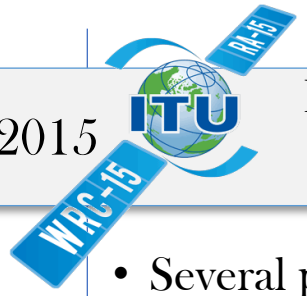


- Y2020-2025，the spectrum below 6GHz is over than 50%
- Y2025-2030，the new demands are mainly above 6GHz，the maximal requirement is up to 11.7GHz.

Potential Candidate Bands for 5G

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

- 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.

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

0 | 450 MHz | 2G/3G refarming | 3GHz | 3.3~3.4 | 3.4~3.6 | 4.4~4.5 | 4.8~4.99 | 6GHz ··· | 24~30 | ··· | 31~34 | ··· | 40-50 | ··· | 71-76 | ··· | 81-86 | ··· 100GHz

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

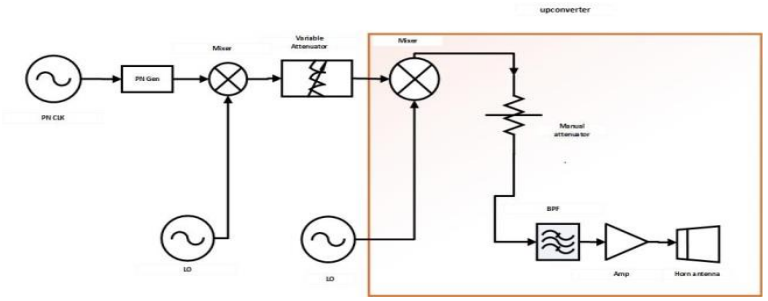
Propagation characteristics

Scenarios

airport gym railway station office shopping mall

Platform

broadband measurement platform supporting millimeter wave band



Channel modeling

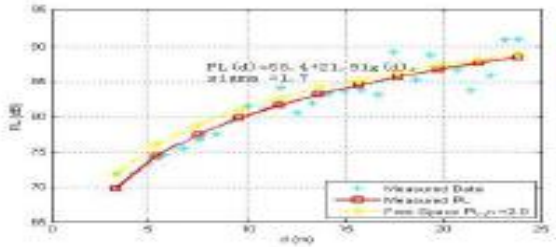
Channel model

- Large scale: pathloss, shadowing
- Small scale: delay, angel spread, doppler

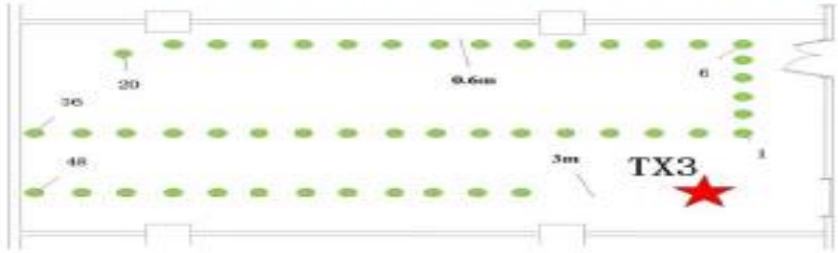
Preliminary channel measurements at 28GHz

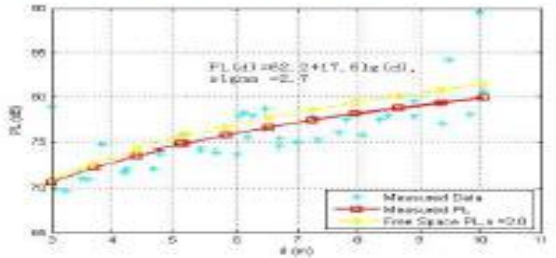
Preliminary **indoor** channel measurements at 28GHz.

Hall

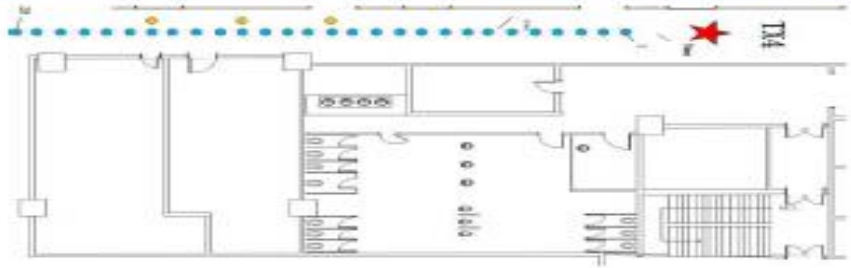


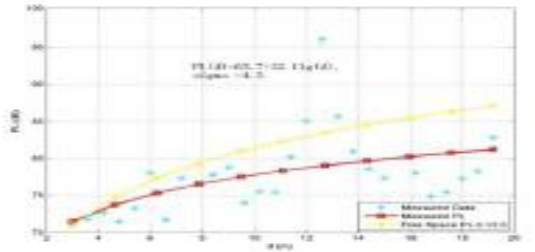
Office





Corridor





Frequency	28GHz
Bandwidth	1GHz
Distance	<30m

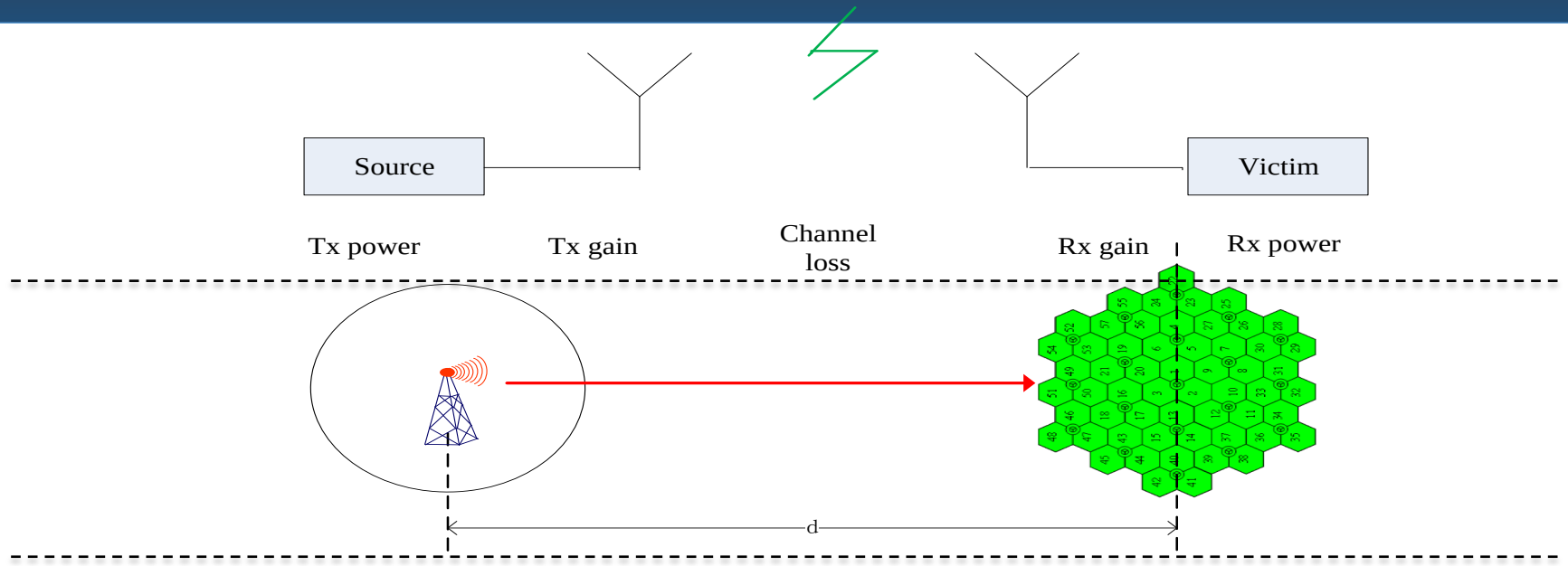
	exponent
Hall	2.19
Office	1.76
Corridor	1.21

Coexistence study

Link budget calculation

Simulation

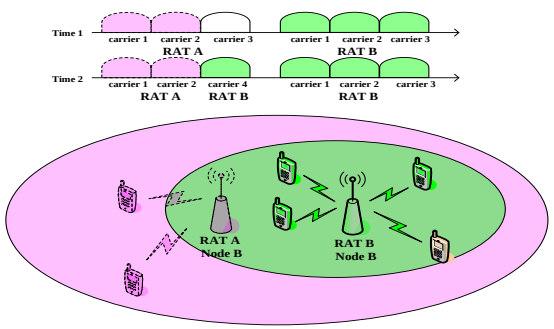
Semi-real test



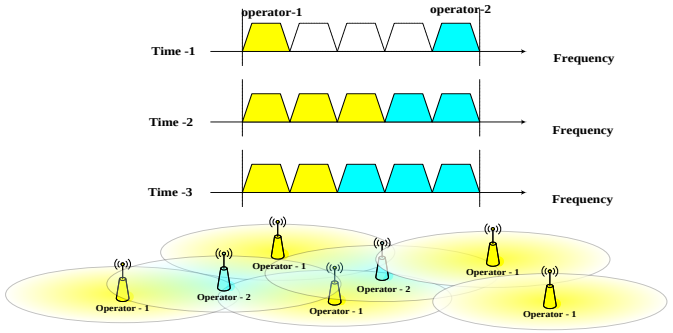
LTE and RDSS compatibility test

Spectrum Sharing Tech.

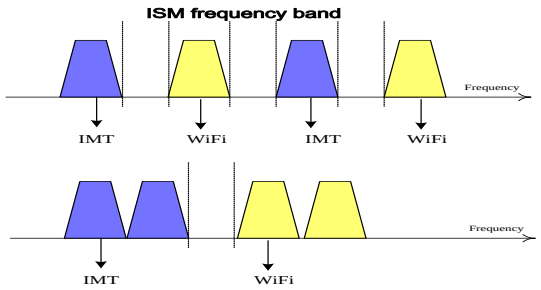
Spectrum Sharing Scenarios



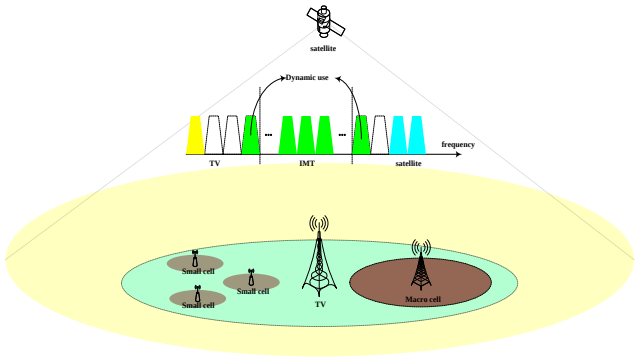
Intra-operator inter-RAT



Inter-operator



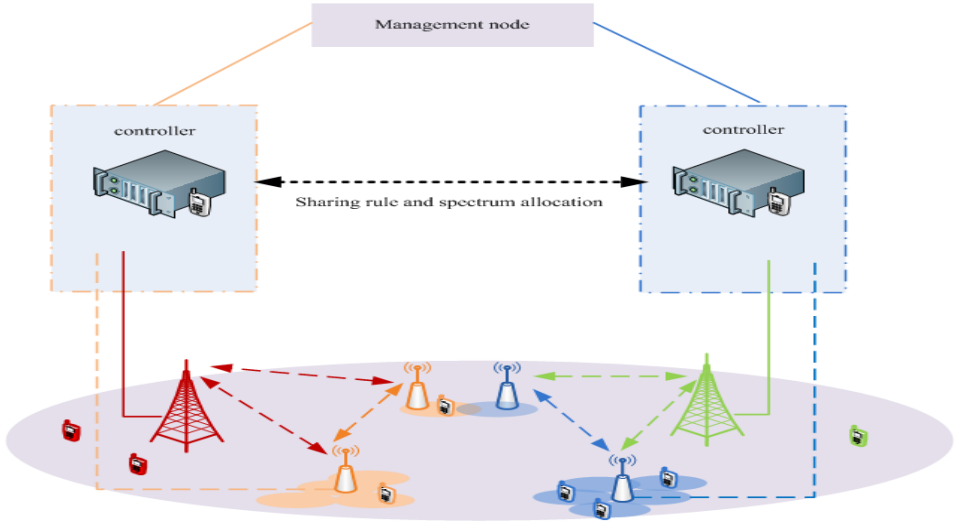
Sharing in unlicensed band



Sharing in secondary access band

Key Technologies

- Network architecture and interface
- High layer technology
- Physical layer technology
- RF technology
- Coexistence and network design
- Security



Some Views for IMT-2020 Spectrum

- eMBB and IoT are the key drivers for IMT-2020.
- The deficit in Y2020 is above 1GHz. Low-frequency bands below 6GHz are always necessary for IMT. We hope to get new bands below 6GHz in WRC-15 AI 1.1.
- The frequency bands above 6GHz will be use after Y2019. Studies on channel measurement, modeling and coexistence are ongoing work. To promote establishing a new agenda item in WRC-19.
- We should strength the cooperation and do our best to found the common spectrums for 5G.

Thank You

www.imt-2020.cn