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Collaboration between regulators and industry make a successful 5G

Huang Yuhong

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- GTI introduction
- 5G bring new opportunities
- Promising 5G frequency bands
- Harmonization for 5G in Asia (CJK)

GTI Introduction

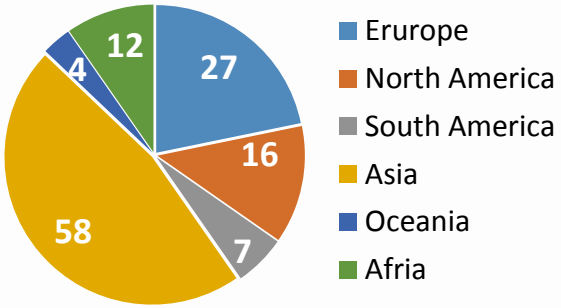
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GTI—Global TD-LTE Initiative is an operators-driven industry platform aiming to:

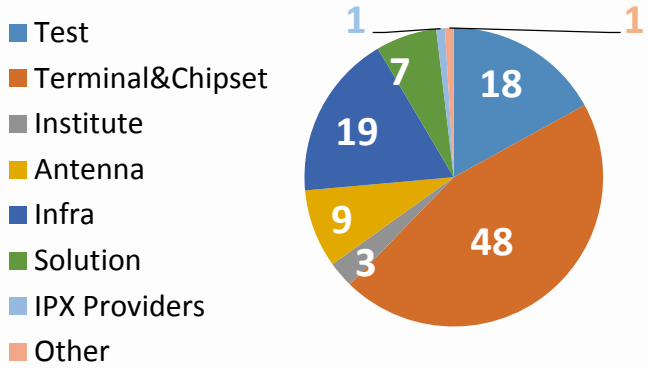
- ✓ Construct a robust ecosystem of TD-LTE
- ✓ Speed up the commercialization of TD-LTE
- ✓ Promote the convergent development of LTE TDD and FDD



***124** operators have joined GTI*



***106** vendors have joined GTI Partner Forum*



Vertical Industry Members

Haier Hisense SGAI 北京首钢自动化信息技术有限公司 BEIJING SHOUGANG AUTOMATION INFORMATION TECHNOLOGY CO.,LTD

WirelessCar Neusoft Beyond Technology 资信物联 POLYCIS 欧孚通信 Oviphone

GTI 5G Innovation Program

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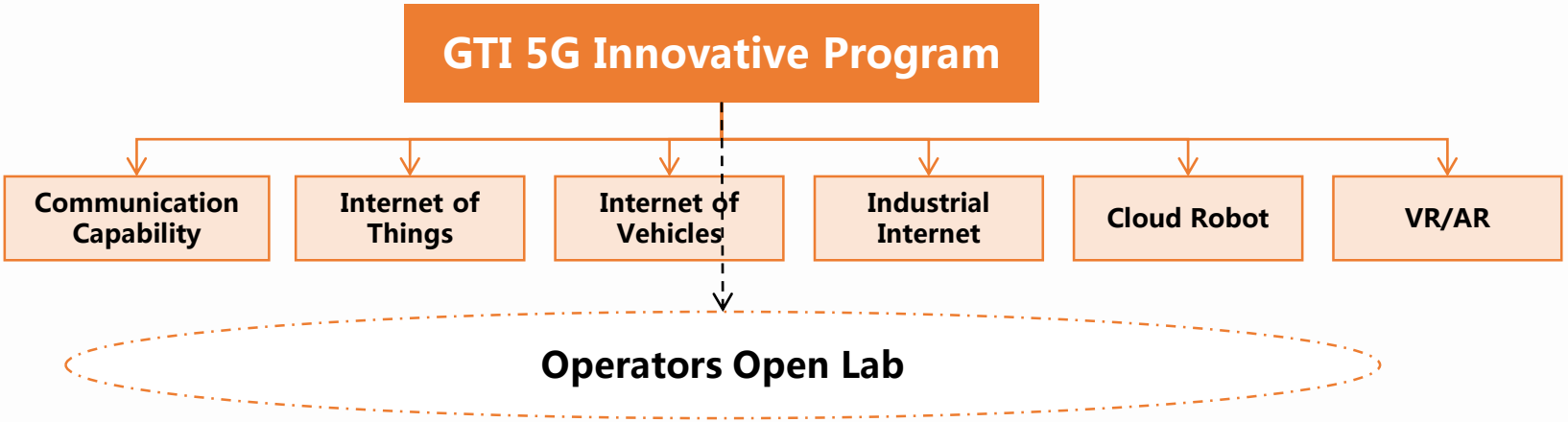
GOAL

Accelerate 5G development

Promote the vertical industry collaboration

Build end-to-end ecosystem

Sub-6GHz



Address the key challenges in the development of 5G by GTI workshops, seminars and forums.

Build broader co-operation with cross-industry partners to jointly develop new business and new services through GTI platform.

Encourage GTI leading operators to establish 5G Open Labs to carry out research and test for 5G products and services.

Release and promote new products and services through GTI summits, workshops and exhibitions.

5G will Change the Life

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New Bussiness of VR/AR



Internet of Things



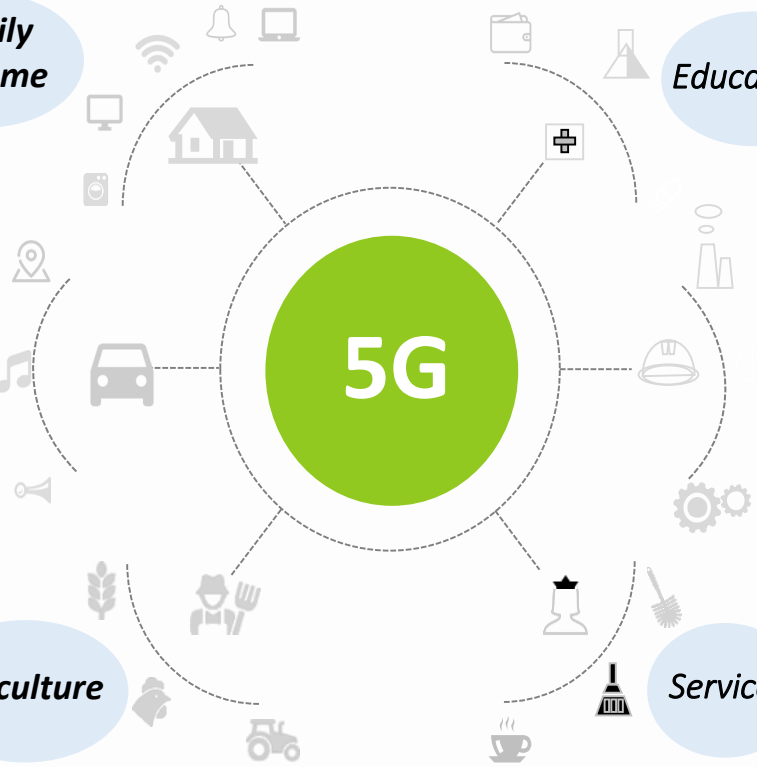


Industrial Internet



V2X/Automatic Driving





Cloud Intelligent Robots



5G Brings New Opportunity

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New Services

New Industies

New Market



Higher Flexibility and reliability

Massive Connection

Higher Energy efficiency

Higher data rate ~20Gbps

User Experienced Data Rate 1Gbps

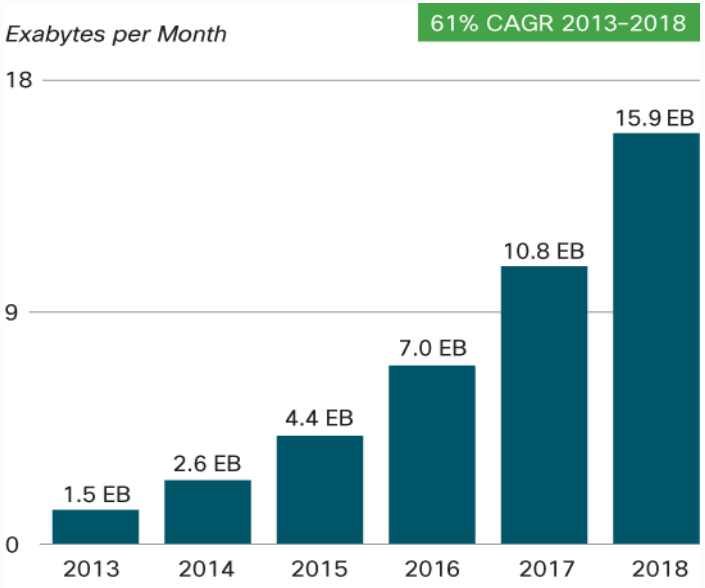
Lower Latency of ~ms Level

5G demands more Spectrum by year 2020

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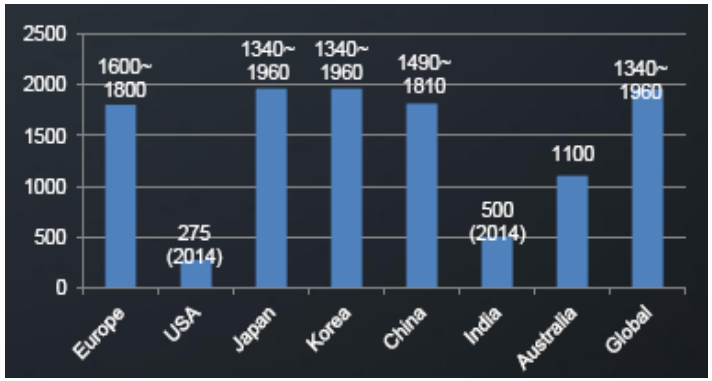
Global Mobile Data Traffic Will Increase 1000 Times During 2011-2020

Mobile data traffic per month by 2018



Source : Cisco VNI

Estimated Spectrum Requirement in 2020: 1340-1960MHz

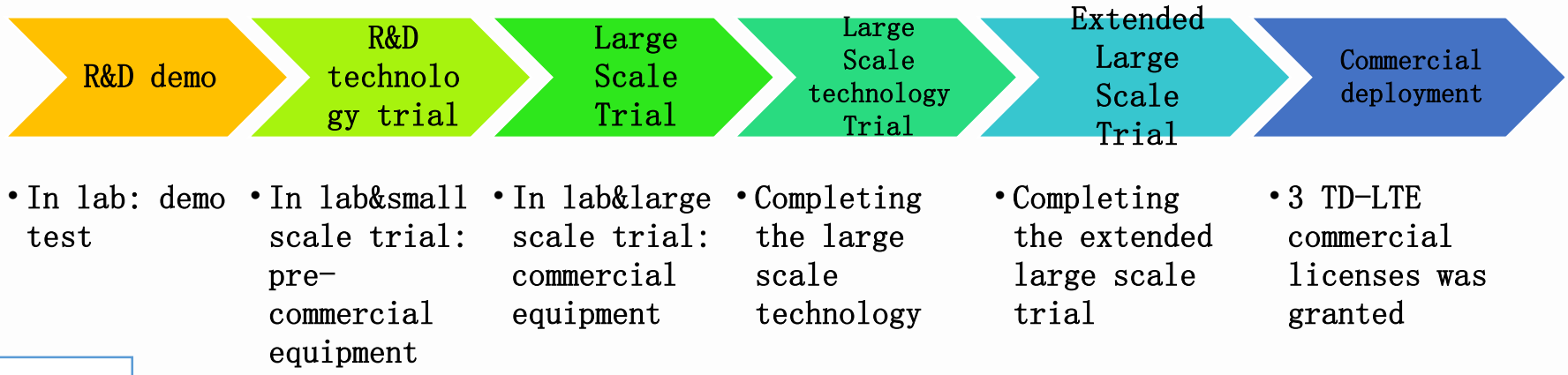


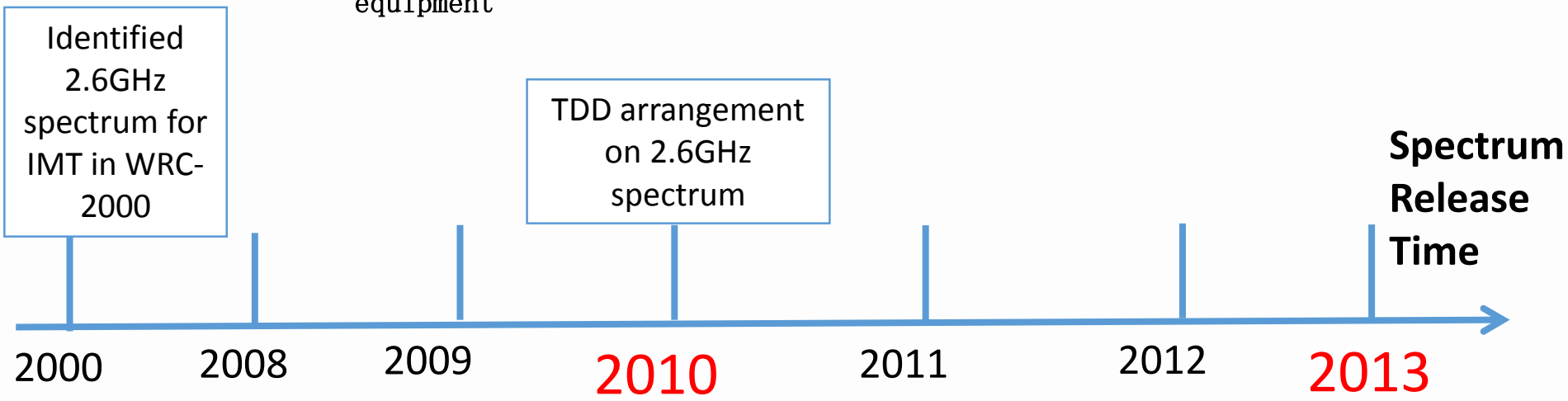
Source : ITU

Spectrum is the pre-condition to start the 5G Industrialization

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Chipset/device needs time to cultivate, typical 3~4 years



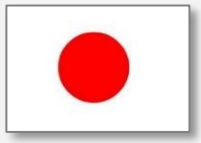


Enough Spectrum and Earliest Release Enable a Successful 5G Era

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MIIT has kicked off 5G R&D trial on 3.5GHz band



MIC has planned to released 1700MHz spectrum for MBB before 2020 in Japan



MSIP announced "Mobile Broadband Plan v2.0" to secure more than 1,190MHz bandwidth release for mobile broadband services by 2023



5GPPP plans to start the 5G technology trial in 2018



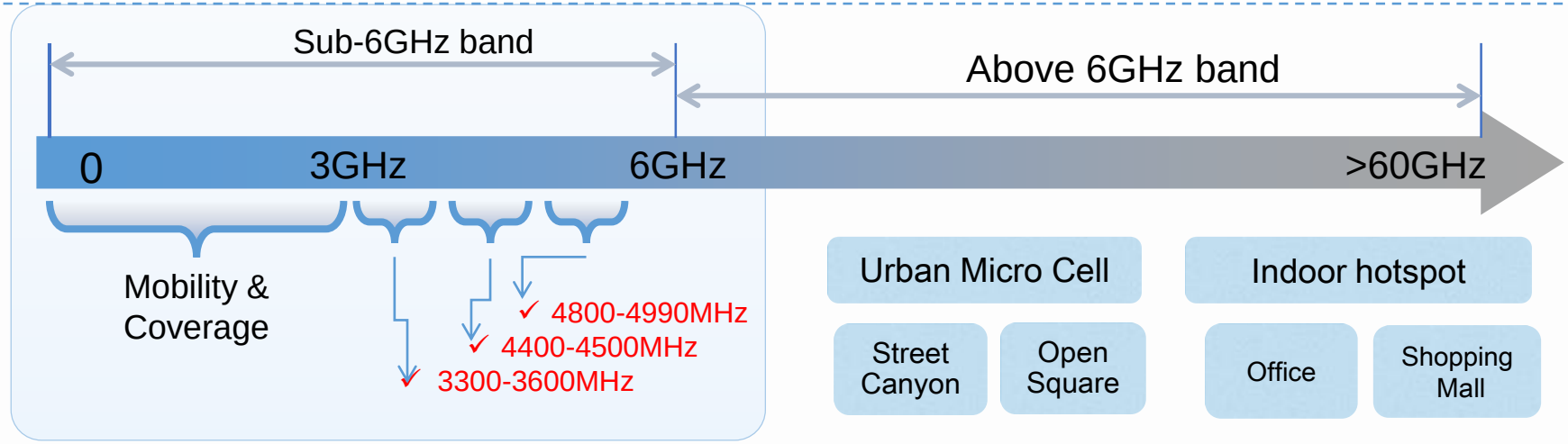
DCMS announced Enabling UK growth – Releasing public spectrum to lay down the strategy for 500MHz spectrum release by 2020

Where is the 5G spectrum?

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Different deployment scenarios demands different frequency bands: eMBB, uRLLC, mMTC

- **Sub-6GHz could be the core band for 5G** :
  - Large contiguous bandwidth (100MHz at least each operator)
  - already started ecosystem development
  - Global band and large coverage for consistent user experience
- **Above 6GHz is the complementary band for 5G** :
  - Larger contiguous bandwidth for high data rate
  - Much larger pathloss and penetration loss
  - Available around year 2022 in most countries

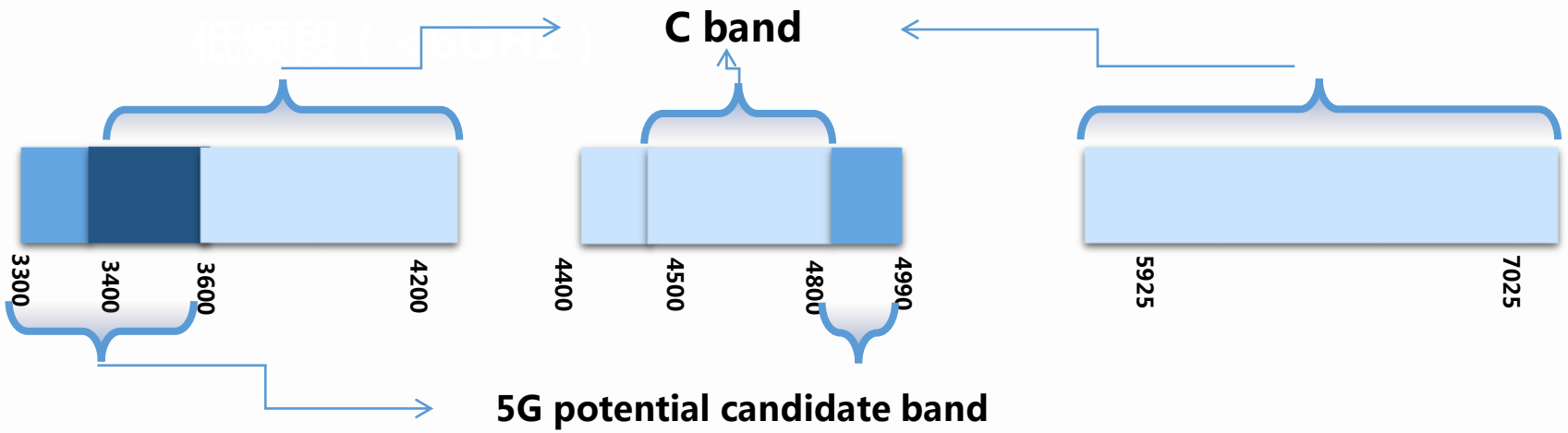


C band could be the core part of Sub-6GHz

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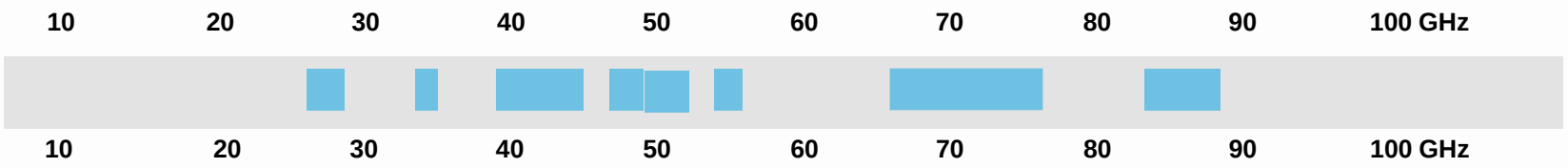
Release the whole C band for IMT would light a great future for 5G

- **In short term**
  - Release as much spectrum around 3.5GHz band as possible for IMT
    - 3.3-3.6/4.4-4.5/4.8-4.99GHz in China, 3.3-3.7GHz in Korea, 4.4-4.9GHz and 3.5GHz in Japan
  - Release more IMT spectrum identified by WRC-15, such as 3.3-3.4GHz, 4.4-4.5 and 4.4-4.99GHz in more countries
- **In long term**
  - Release the left spectrum of C band



Above 6GHz spectrum is the complementary band for 5G

- Above 6GHz need few years to cultivate the industry
- Harmonized on the high band as early as possible at least in CJK will help to guide the industry
  - mobile service on a primary basis 24.25-27.5 GHz2, 37-40.5 GHz, 42.5-43.5 GHz, 45.5-47 GHz, 47.2-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz and 81-86 GHz
  - require additional allocations to the mobile service on a primary basis 31.8-33.4 GHz, 40.5-42.5 GHz and 47-47.2 GHz



Proposals for band harmonization of 5G

- Band planning for 5G deployment towards 2020 should be finished as early as possible in CJK to ensure enough time for 5G industrialization
- Band harmonization among CJK will help to enlarge the market scale and improve the user experience on device cost and regional roaming
- Global alignment on spectrum from an early stage is strongly recommended
  - The Spectrum around C band could be a good resource pool for 5G and provide large contiguous spectrum for eMBB, which is a good candidate for global 5G deployment
  - 28GHz is possible for early deployment towards 2020 and joint effort is encouraged to make it happen globally
  - Band alignment helps to narrow down the candidate bands for above 6GHz, and could avoid the market fragmentation as much as possible



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