30 June 2016

Introduction to WRC15 outcome and impact on 5G

—— What role can existing IMT Spectrum play in 5G

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Head of HUAWEI Wireless Standard

WRC-15 Outcomes

(Nearly) Global IMT Bands

i.e. identified for IMT in (nearly) all countries globally

- **700 MHz** 694/698-790 MHz
- **L-Band** 1427-1518 MHz
- **C-Band** 3400-3600 MHz

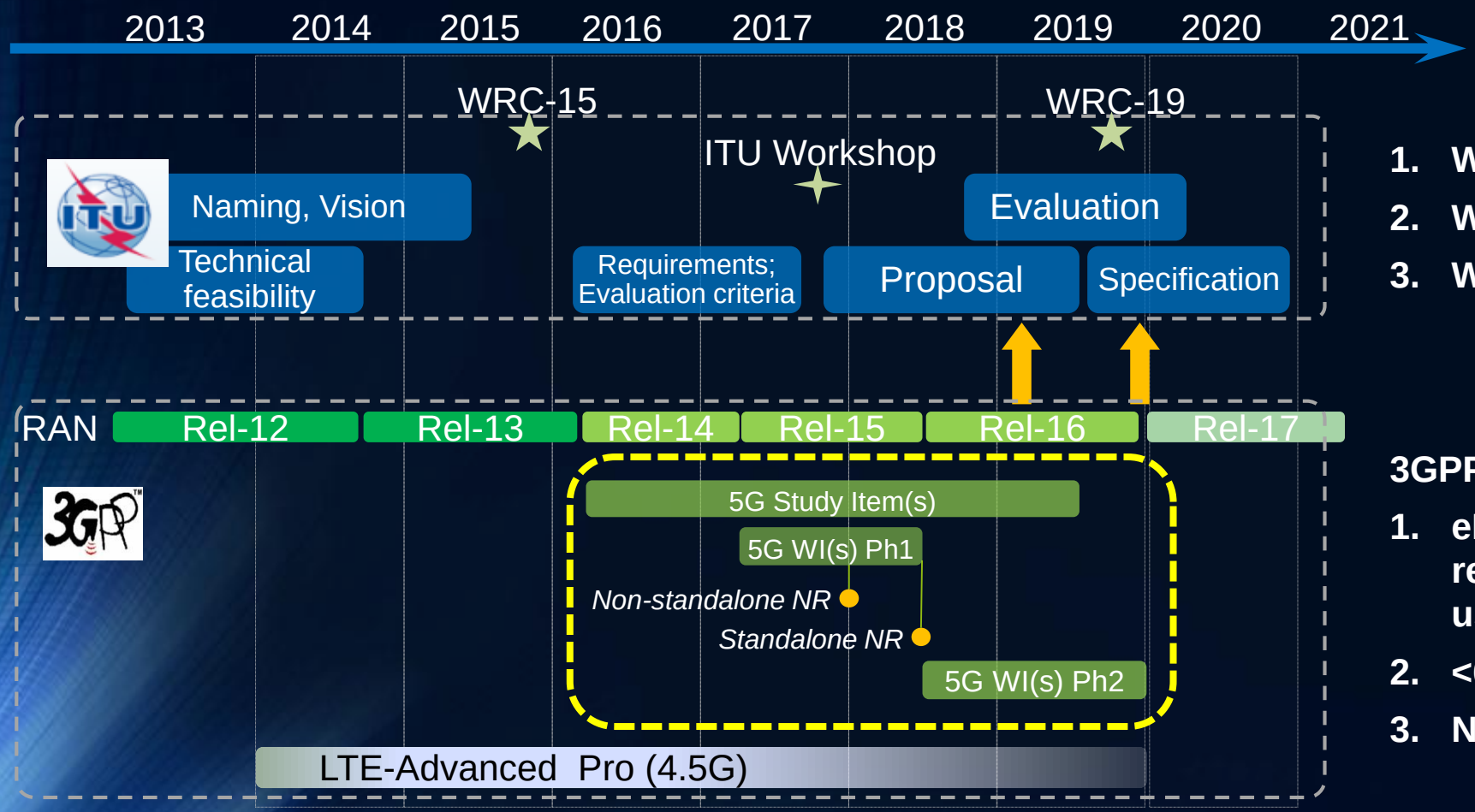
Multi-country IMT Bands

i.e. Identified for IMT in a limited number of countries / regions

- **Sub-700 UHF** (470-694/698 MHz)
- **C-band** 3300-3400 MHz 3600-3700 MHz
- **C-band** 4800-4990 MHz

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Timeline for IMT-2020 (5G) Development



1. **WRC-15 AI1.1 : *470 MHz – 6 GHz***
2. **WRC-19 AI1.13 : *24.25 – 86 GHz***
3. **WRC-23 : *470 – 694 MHz for Region 1***

3GPP 5G NR Phase1 focus on:

1. **eMBB and low latency and high reliability (to enable some URLLC use cases)**
2. **<6GHz and >6GHz licensed spectrum**
3. **Non-standalone and standalone NR**

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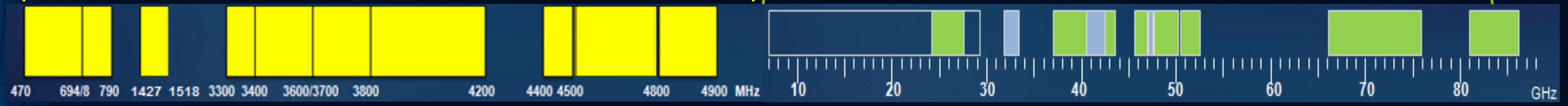
IMT-2020 bands impact on 5G — PHY design & Topology perspectives

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- Possible 5G bands below 6GHz
- In scope of WRC-19, allocated to Mobile Service already
- In scope of WRC-19, may require allocation to Mobile Service
- Not in scope of WRC-19

Coverage and Capacity bands

Capacity bands



UHF bands (470-790 MHz)	C bands (3300-4990 MHz)	Group 30	Group 40	Group 50	Group 80
FDD	TDD				
Carrier BW ≧ 20 MHz	≧ 100 MHz	≧ 500 MHz			≧ 1000 MHz

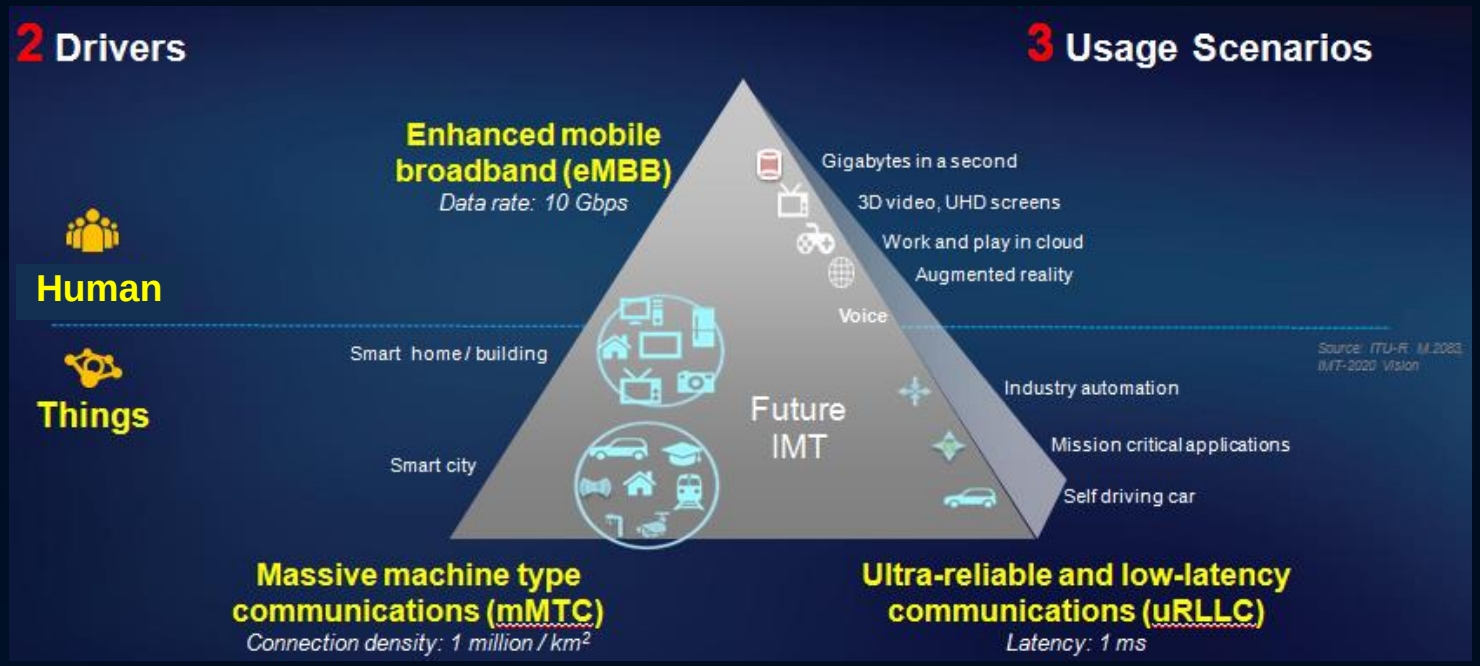
C-band will enable very wide carrier BW within bands below 6GHz for 5G



Cell Size

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IMT-2020 bands impact on 5G —— usage scenario perspectives

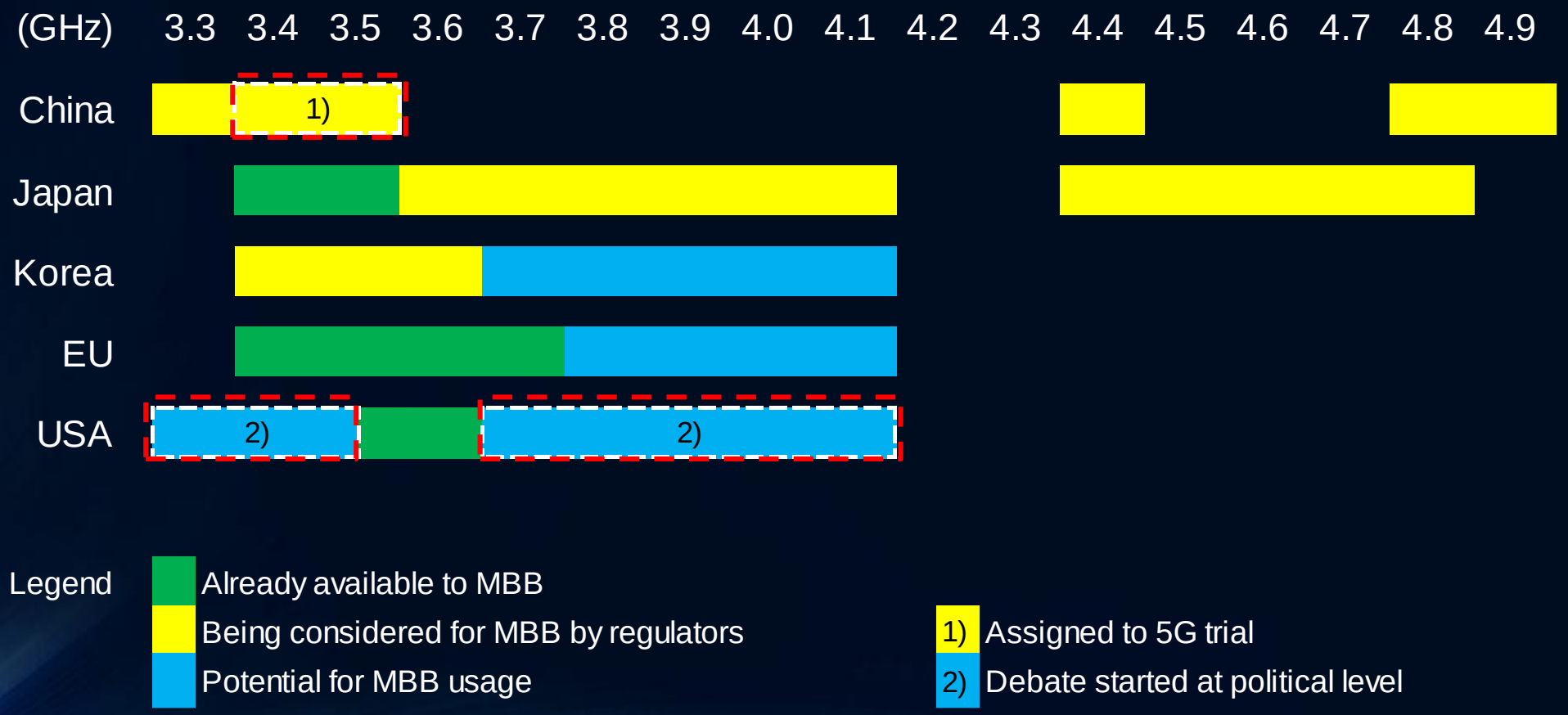


Usage scenario	Test environment	Suitable spectrum bands
eMBB	***Indoor hotspot***	LF (below 6 GHz) and/or HF (above 6 GHz)
	Dense urban	LF (below 6 GHz) and/or HF (above 6 GHz)
	Rural coverage	LF (below 6 GHz)
	High speed	LF (below 6 GHz)
mMTC	***Urban coverage with massive connection***	LF (below 6 GHz)
uRLLC	***Urban coverage with auto-driving***	LF (below 6 GHz)

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5G Spectrum Highlights: C-Band w. Growing Momentum

Strong potential for harmonization for 5G



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5G Spectrum Highlights: UHF-Band Key Issues

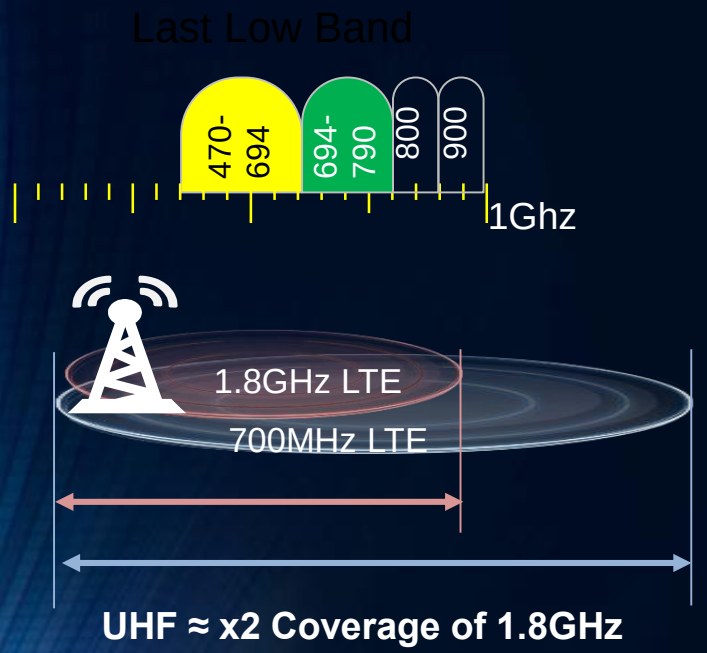


Table : Current situation on 700MHz & sub-700MHz in the world

Regions	470-694/698 MHz	694/698-790 MHz
Region 1	Possible WRC-23 Agenda Item 1. EU “Flexibility” concept 2. Strong interest in some Arab countries 3. Work Item in ATU	Nearly global IMT band : Identified for IMT in R1, R2 and 26 countries in R3
Region 2	1. 7 Countries : footnote identification for IMT at WRC-15 2. FCC reverse auction is about to start	
Region 3	1. 7 Countries : footnote identification for IMT at WRC-15 2. Interest from India remains high	

UHF-Band for IMT usage: key issues

1. Timing and Business model for the usage of IMT in the bands
2. Concerns on regulatory obligations (i.e. must carry obligations)

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