

# Possible Candidate bands for IMT for WRC-15

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HUAWEI Technologies Co. LTD  
JIAO JIAN  
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Huawei Proprietary - Restricted Distribution

# Outline

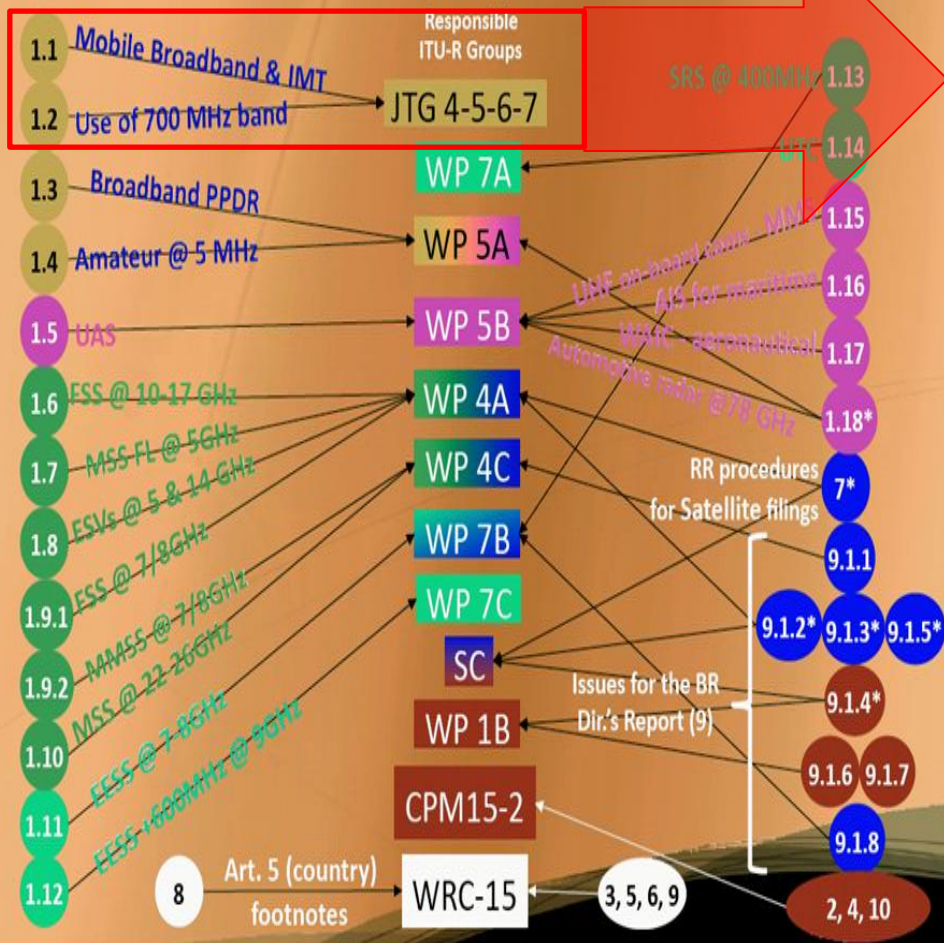
1. **WRC-15 Agenda items related with IMT and timeline**
2. **Situation and Suitability of Possible candidate bands under WRC-15 AI1.1**
3. **700MHz topics in relation to WRC-15 AI1.2**
4. **Summary**

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# WRC-15 Agenda items related with IMT

## Agenda items & Resp. Groups



## ITU-R Studies for WRC-15 on IMT

### Agenda items for WRC-15 (Res. 807 (WRC-12)):

1.1 - Res. 233 (WRC-12)

- consider additional spectrum allocations to MS on a primary basis
- identify additional frequency bands for IMT
- related regulatory provisions to facilitate development of terrestrial mobile broadband applications

1.2 - Res. 232 (WRC-12)

examine the results of ITU-R studies on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take appropriate measures;

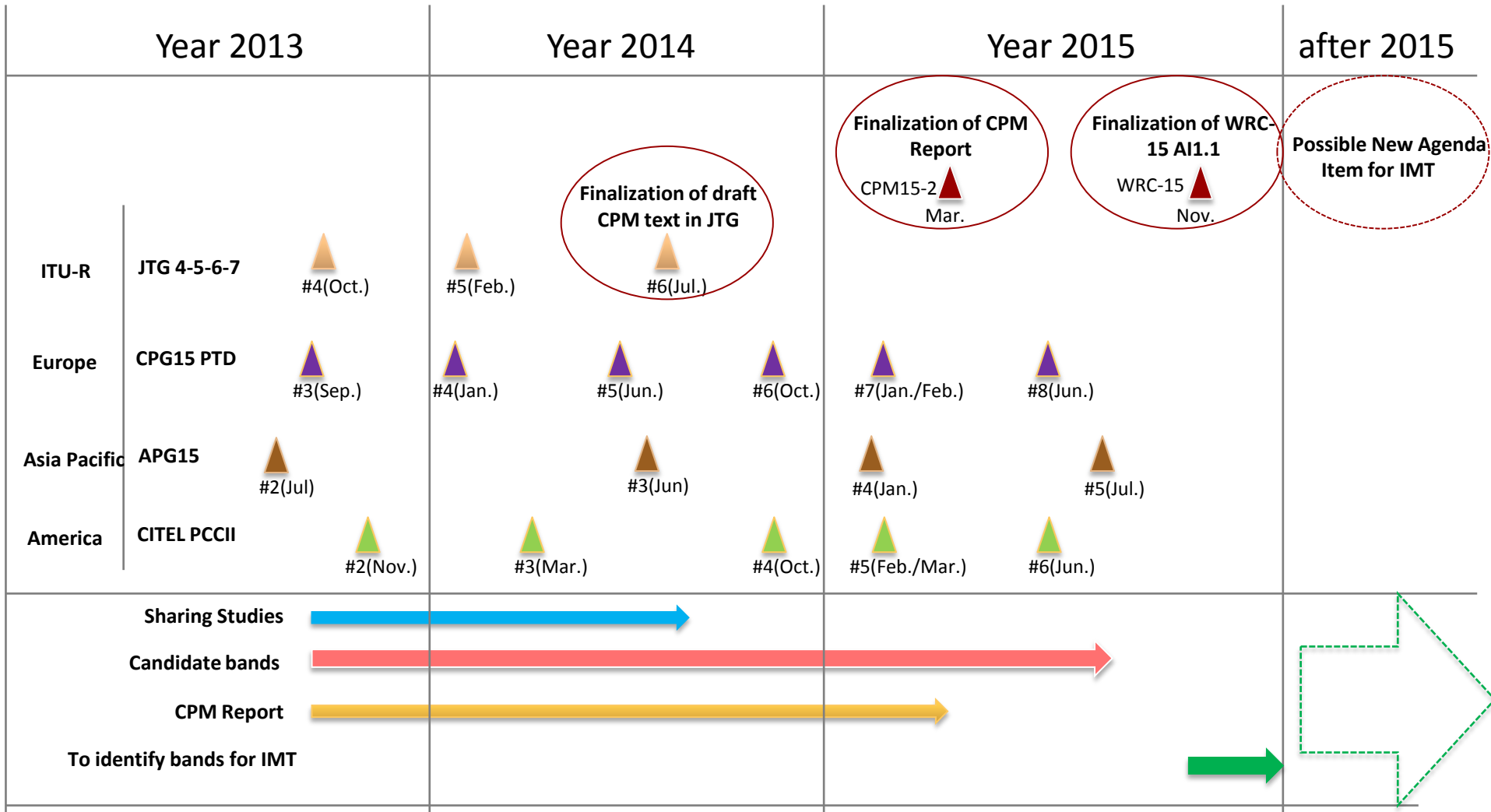
### Spectrum requirements for the mobile service

including suitable frequency ranges, and other specific requirements including channelling arrangements (WP 5D)

### Spectrum sharing and compatibility with other services

including consolidation of draft CPM text (JTG 4-5-6-7)

# WRC-15 AI1.1/1.2 timeline



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# Suitability criteria of bands for IMT

## Suitability criteria include:

- **Cost** and **Coverage** based on propagation characteristics
- **Capacity** based on possibility for large, contiguous bands
- Reduced **equipment complexity** based on proximity to current deployments

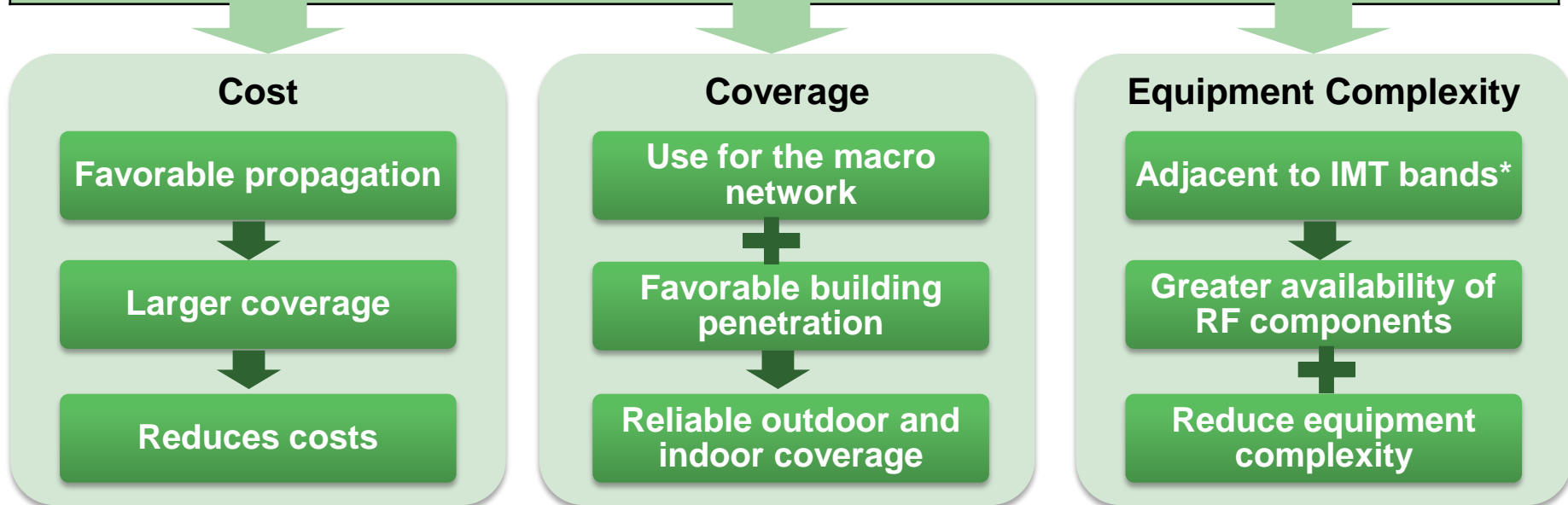
## Suitability criteria show:

- **Multiple frequency ranges would be needed** because:
  - No single frequency range satisfies all the criteria.
  - The capacity and coverage requirements of IMT systems need to be met
- **Large, contiguous bandwidths** can provide high capacity and high speed data rates
- **Proximity to current IMT deployments** can reduce the equipment complexity.

# Possible candidate bands below 1GHz

Situation of bands below 1GHz		
Description	Spectrum	Incumbent users
Bands below 1GHz	<b>470-694MHz</b>	Fixed, Radio astronomy, Broadcasting (TV, PMSE)

**Suitability of bands below 1GHz**



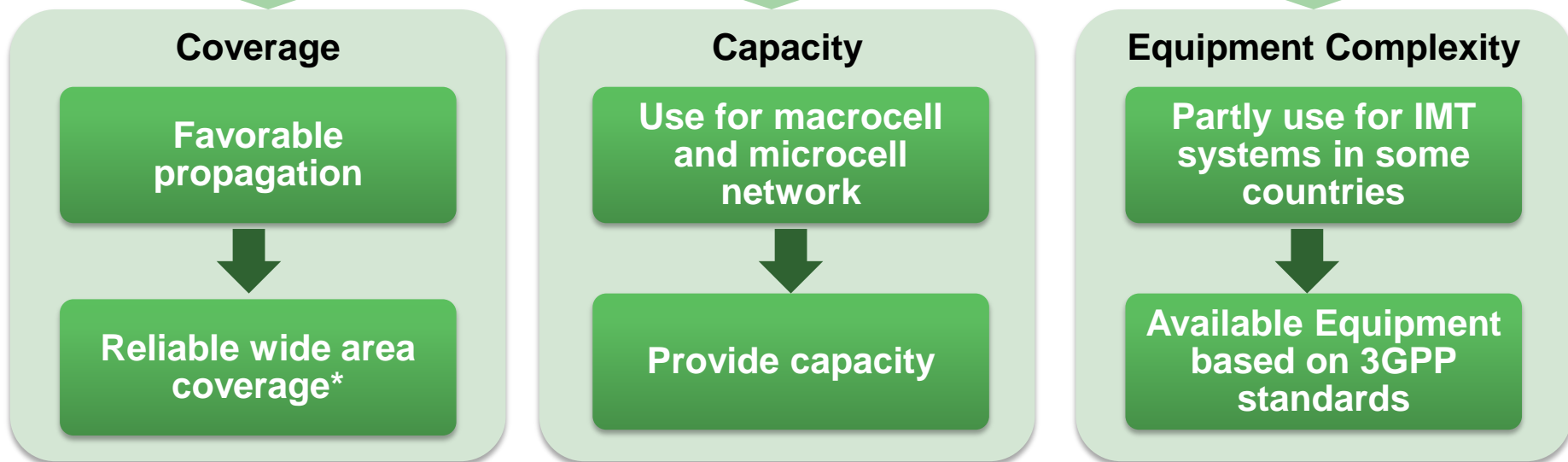
\*450-470 MHz and 698-960 MHz



# Possible candidate bands around 1.5 GHz

Situation of bands around 1.5 GHz		
Description	Spectrum	Incumbent users
Bands around 1.5GHz	<b>1 300-1 400 MHz</b>	Radiolocation, Fixed, EESS
	<b>1 427-1 525 MHz</b>	Aeronautical telemetry, BSS, Fixed

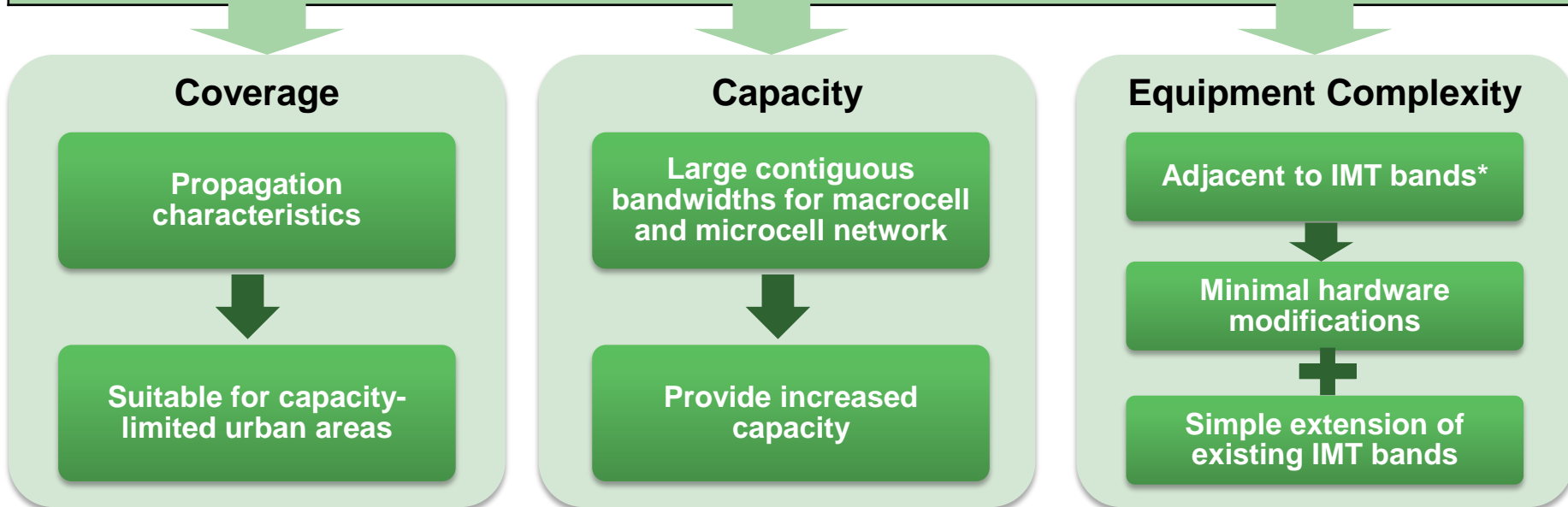
**Suitability of bands around 1.5 GHz**



\*Urban and rural areas

# Possible candidate bands around 2 GHz

Situation of bands around 2 GHz		
Description	Spectrum	Incumbent users
Bands around 2 GHz	<b>2 025-2 110 &amp; 2 200-2 290 MHz</b>	Fixed, EESS
	<b>2 700-2 900 MHz</b>	Radiolocation, Radio astronomy



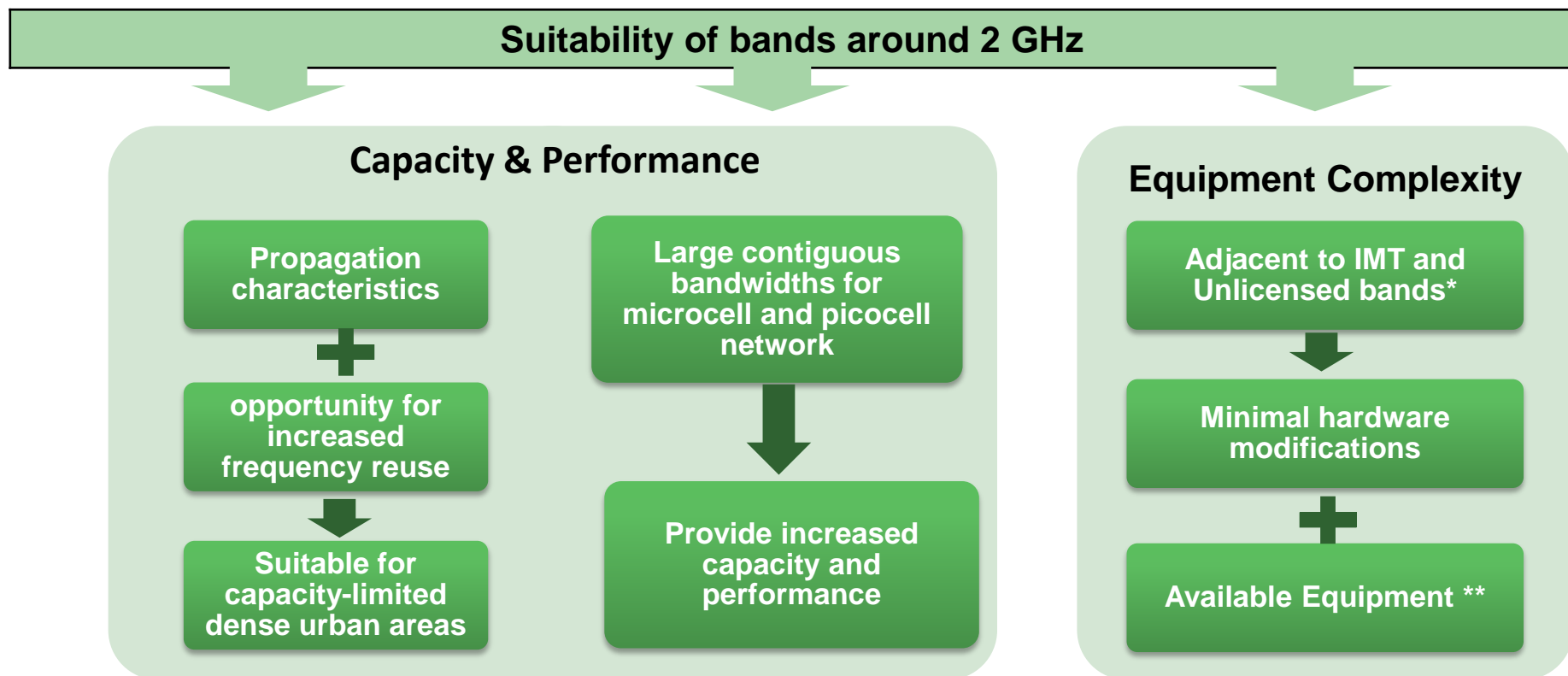
\* 1 710 - 2 025, 2 110 - 2 200, 2 500 - 2 690 MHz

# Possible candidate bands between 3 and 6 GHz(1/2)

Situation of bands between 3 and 6 GHz		
Description	Spectrum	Incumbent users
Bands between 3GHz and 6GHz	<b>3.3-3.4 GHz</b>	Radar
	<b>3.4 - 3.6 GHz*</b>	FSS
	<b>3.6 - 3.8 GHz</b>	FSS
	<b>3.8-4.2GHz</b>	FSS
	<b>4.4-4.5 GHz</b>	Fixed, Aeronautical telemetry
	<b>4.5-4.8 GHz</b>	FSS
	<b>4.8-5 GHz</b>	FSS, FS
	<b>5.925-6.425 GHz</b>	Radar, FSS

\* Around 90 countries have identified the band 3.4-3.6 GHz for IMT by footnote 5.430A, 5.432A, 5.432B, 5.433A in RR.

# Possible candidate bands between 3 and 6 GHz(2/2)



\*3.4-3.6 GHz for IMT and Parts frequencies in 5-6 GHz as unlicensed band used by RLAN

\*\*RF components, antennas and amplifiers, , as well as design solutions

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# 700MHz topics in relation to WRC-15 AI1.2

Mobile industry supports 3GPP Band 28 (APT-700) to be deployed also in Middle East, Africa, Latin America and Europe.

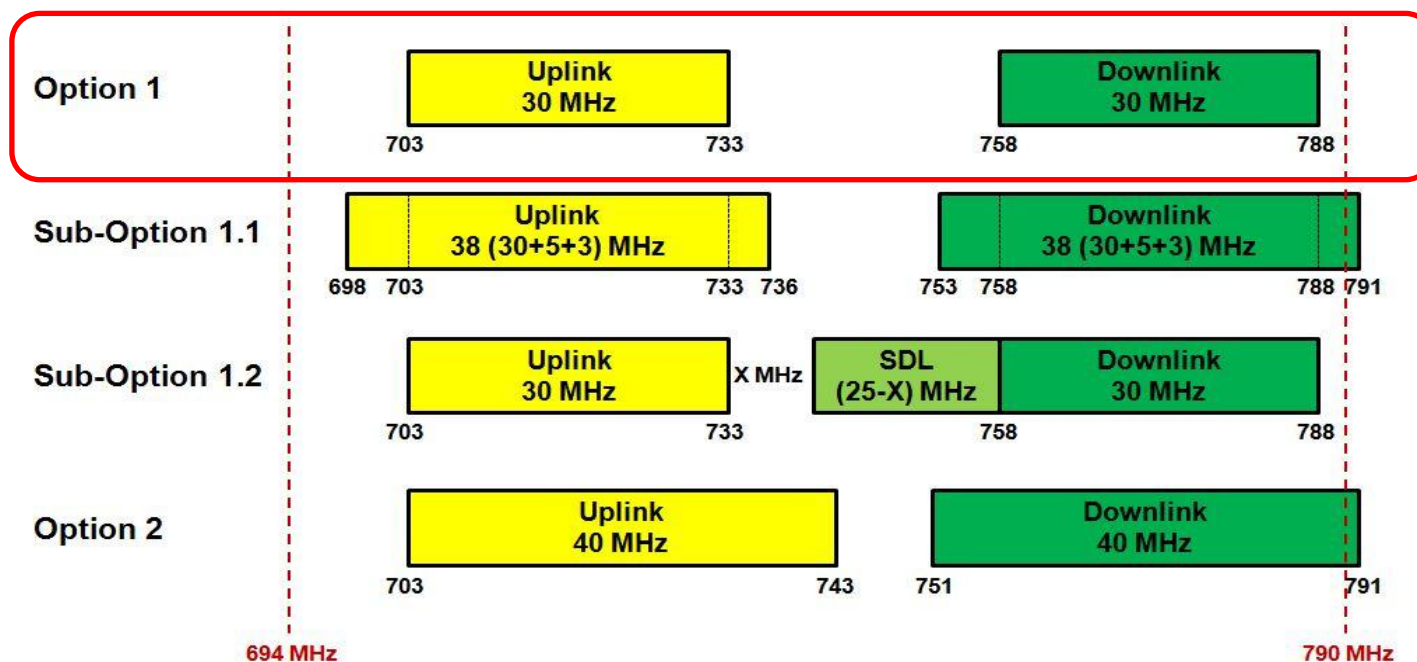
Related to OOB limit below the band 694-790 MHz, many simulation studies and analysis show **a very low interference probability (IP) (~0.0x%)** even for the worst case (urban, all RBs for 1 UE) and almost zero IP in the majority of scenarios and parameter combinations.

Simulations have indicated that **at IP depends a lot of the DTT ACS (TV receiver sensitivity)**. This means that for typical ACS, after certain breaking point, more stringent OOB does not decrease IP anymore.

It can be concluded that **APT-700 (3GPP band 28) OOB limit is sufficient to avoid interference** to frequencies below 694 MHz.

# Cont...

- Lower edge of the allocation has been discussed and initial agreement is **694 MHz** which is supported by mobile industry.
- Related to band plans for 694 - 790 MHz, mobile industry **supports a band plan based on lower 2x30MHz duplexer in APT-700** (3GPP band 28).



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# Summary

- Multiple frequency ranges for IMT would be needed under WRC-15 AI1.1, including bands below 1GHz, around 1.5 GHz, around 2 GHz, between 3 and 6 GHz.
- Mobile industry supports 3GPP Band 28 (APT-700) to be deployed also in Middle East, Africa, Latin America and Europe.

# Thank you

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