

WRC-15: REGULATORY CONSIDERATIONS

Based on the final JTG meeting and Citel preparations

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AGENDA



WRC-15 candidate mobile bands: JTG outcome



Considerations for Citel's PCC II preparations



WHAT IS THE JTG?



PROVIDES THE TECHNICAL AND REGULATORY EVIDENCE TO HELP GOVERNMENTS FORM DECISIONS AND PROPOSALS FOR WRC-15

- **Joint Task Group 4-5-6-7 focuses on new mobile broadband identifications**
 - Principally under agenda item 1.1 (agenda item 1.2 is only for Region 1 i.e. EMEA)
- **It agrees the mobile portion of the CPM text which will be finalised in March/April 2015 and then supplied to governments attending WRC-15**
- **This includes candidate bands which could support mobile services**
 - Sharing studies are referenced & summarized to show the conditions whereby mobile services and incumbent services could both use the candidate band
 - Potential options for regulators to choose a mobile allocation and/or IMT identifications, or no change, are provided including associated regulatory provisions
- **The draft CPM text was agreed at the final JTG meeting in Geneva in August**

WE NOW KNOW THE CANDIDATE BANDS FOR NEW MOBILE BROADBAND IDENTIFICATIONS THAT WILL BE INCLUDED IN THE DRAFT CPM TEXT FOR WRC-15

LIST OF JTG CANDIDATE BANDS



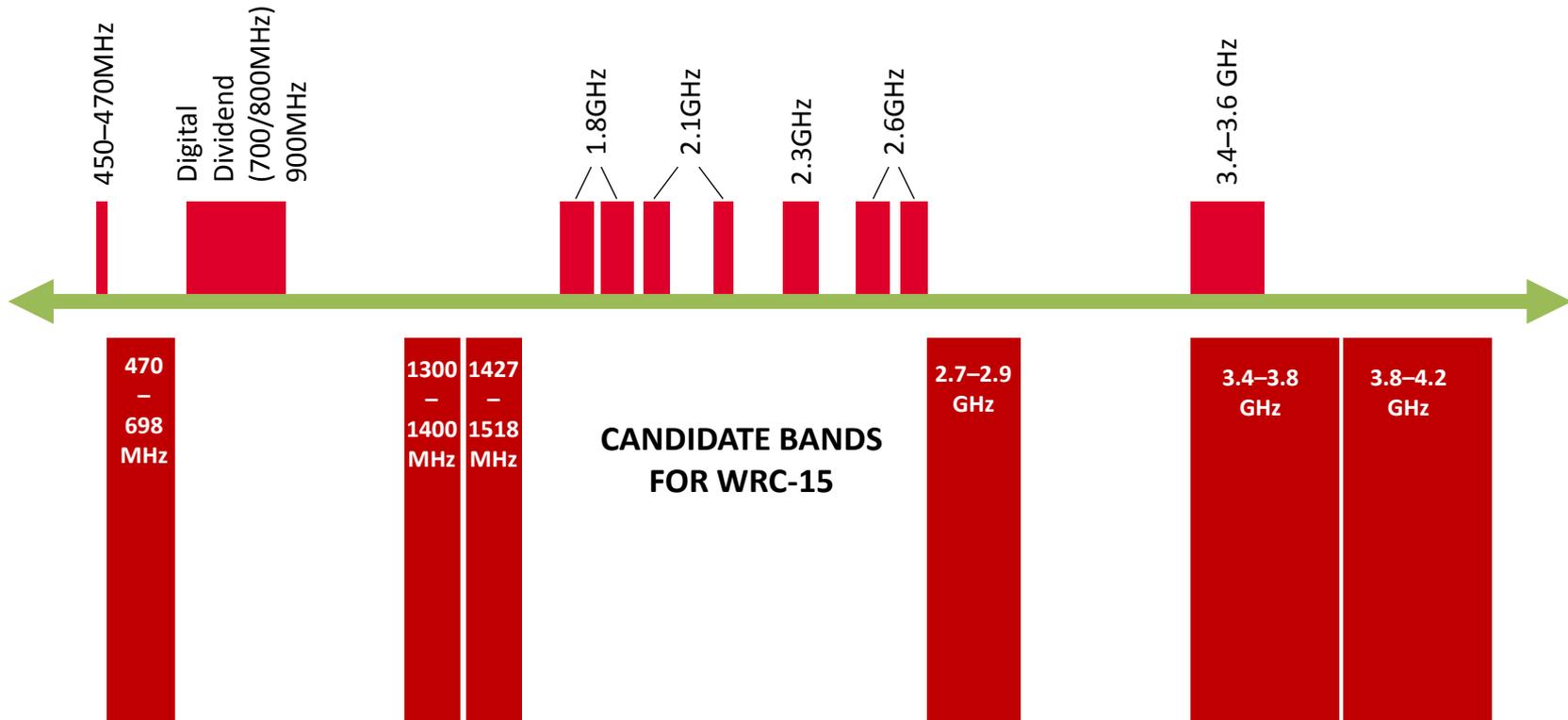
WRC-15 CANDIDATE BANDS IN THE DRAFT CPM TEXT ARE:

Band	Frequency ranges
UHF	470 - 694/698 MHz
L-band	1350 - 1400 MHz 1492 - 1518 MHz 1427 - 1452 MHz 1518 - 1525 MHz 1452 - 1492 MHz 1695 - 1710 MHz
S-band	2700 - 2900 MHz
C-band	3300 - 3400 MHz 4500 - 4800 MHz 3400 - 3600 MHz 4800 - 4990 MHz 3600 - 3700 MHz 5350 - 5470 MHz 3700 - 3800 MHz 5725 - 5850 MHz 3800 - 4200 MHz 5925 - 6425 MHz 4400 - 4500 MHz

NEW BANDS FOR MOBILE



RADIO SPECTRUM: IDENTIFIED MOBILE BANDS



CONSIDERATIONS FOR CITEL REGULATORS



LATAM SPECTRUM DEMANDS



ITU FORECAST: 1340-1960 MHz

COUNTRY	LOW SCENARIO	HIGH SCENARIO
Argentina	1,093 MHz	1,628 MHz
Brazil	1,129 MHz	1,676 MHz
Chile	893 MHz	1,327 MHz
Colombia	1,057 MHz	1,578 MHz
Mexico	977 MHz	1,454 MHz



REGULATORS' OPTIONS



THE OPTIONS OPEN TO CITEL REGULATORS REGARDING THE CANDIDATE BANDS ARE DETAILED IN THE CPM TEXT. THESE ARE:

1. **No Change** (in ITU terminology 'NOC') – i.e. opposition to new mobile provisions
2. **Allocation to the mobile service**
 - I. Either via allocation in the table in the ITU Radio Regulations (RRs)
 - II. Or via allocation through a footnote (referenced in the RRs)
3. **Identification for mobile broadband (in ITU terminology 'IMT')** through a footnote

E.G. ITU Radio Regulation table and accompanying footnote for a portion of the C-band - 3.4-3.5GHz - in Region 2 (ie. the Americas)

The mobile service has an existing secondary allocation as well as a primary allocation in several countries by footnote

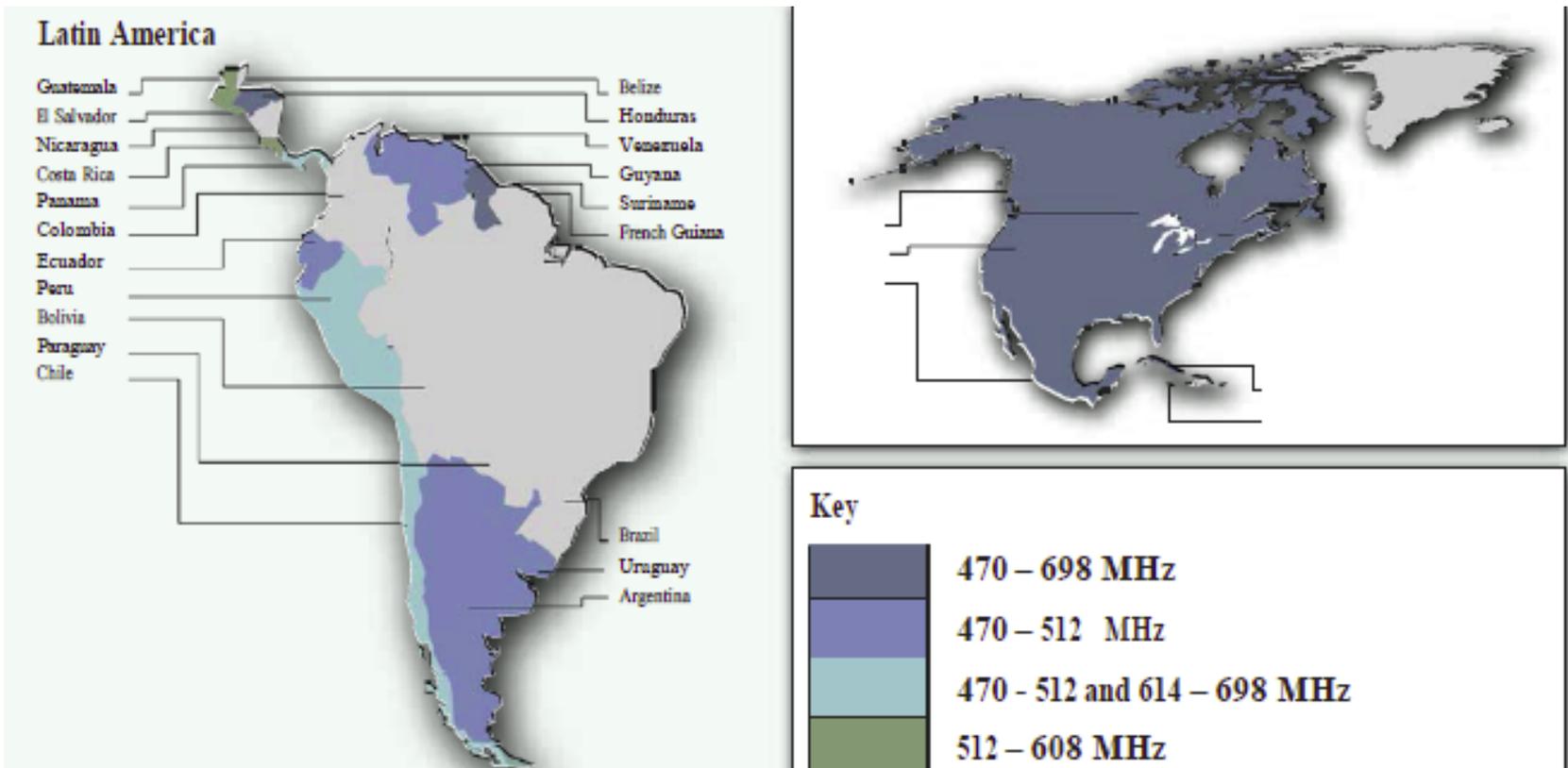
3 400-3 500
FIXED
FIXED-SATELLITE (space-to-Earth)
Amateur
Mobile 5.431A
Radiolocation 5.433
5.282

5.431A *Different category of service:* in Argentina, Brazil, Chile, Costa Rica, Cuba, French overseas departments and communities in Region 2, Dominican Republic, El Salvador, Guatemala, Mexico, Paraguay, Suriname, Uruguay and Venezuela, the band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. 9.21.

BAND FOCUS: SUB-700MHz (470-698 MHz)



THE BAND IS ALREADY ALLOCATED TO MOBILE IN MUCH OF THE AMERICAS



SUB-700MHz OPTIONS (470-698 MHz)



AS THE MOBILE SERVICE ALREADY HAS A PRIMARY ALLOCATION IN MANY REGION 2 COUNTRIES, THE OPTIONS FOR CITEL REGULATORS ARE:

- **No change:** The existing primary allocation in 17 region 2 countries would remain
 - This is one of the current proposals in Citel
- **Add an allocation to the mobile service in the radio regulations table in regions 1 & 2 and identify the band for IMT:** Giving regulators the flexibility to license mobile broadband in a portion when – and if – they see fit
 - This is one of the current proposals in Citel and includes provisions to protect broadcasting from interference (through existing procedures i.e. RR9.21)
- **Broadcasting can still be protected globally through careful coordination:** In region 1 the GE-06 applies while in region 3, a co-primary allocation exists and is subject to normal bilateral coordination with the neighbouring countries

THE SUCCESS OF THE DIGITAL DIVIDEND SO FAR HAS SHOWN THAT THE UHF BAND CAN BE USED FOR BOTH BROADCAST AND MOBILE SERVICES

L-BAND OPTIONS (1350-1518 MHz)



THE BAND IS USED BY MANY DIFFERENT SERVICES SO NEEDS TO BE CONSIDERED PER SUB-BAND:

- **1350-1400 MHz: only region 1 has a primary mobile allocation**
 - Option: Add a mobile primary allocation in region 2 & 3 with an IMT identification
 - Regulatory provisions needed to protect radar use in the same band and passive services in the adjacent band 1400-1427 MHz (under resolution 750)
- **1427-1518 MHz: Has a global mobile allocation with priority in region 2 for aeronautical mobile use**
 - Option: Identify some or all the band for IMT with protections for services in the adjacent band 1400-1427 MHz and for aeronautical mobile telemetry where used
 - Additional regulatory provisions could include emission limits (e.g. PFDs) for any broadcast satellite use (BSS) in the 1452-1492MHz range which is so minimal in region 2 that several countries do not include it in their national allocation tables

GSMA BELIEVES THE BAND IS UNDER-USED (E.G.1452-1492MHz) SO COULD SUPPORT A MOBILE BROADBAND IDENTIFICATION WITH APPROPRIATE INTERFERENCE MITIGATION MEASURES WHERE NECESSARY

2.7-2.9GHz OPTIONS



Region 1	Region 2	Region 3
2 700-2 900	AERONAUTICAL RADIONAVIGATION Radiolocation 5.423 5.424	5.337

- The band is allocated in all three ITU regions to the Aeronautical Radionavigation Service (ARNS) for ground based radars
 - As this use includes some air traffic control systems it is a safety of life band
- Studies show radars can be accommodated in less than 200MHz: so mobile broadband could use about half of the band through proper spectrum planning
- Option: Allocate the band to mobile with an IMT identification in a portion or the entirety: regulatory provisions could be included to protect radar

THE CPM TEXT SHOWS MOBILE BROADBAND COULD USE A PORTION THROUGH COORDINATION WITH RADARS AND APPROPRIATE MITIGATION TECHNIQUES

BAND FOCUS: C-BAND (3.4-4.2GHz)



Region 1

5.430A: Allocation to mobile service and identification to IMT in 81 countries in Region 1 in

3.4-3.6GHz

9.21 applies to mobile service

9.17 and 9.18 apply to IMT

pfd limit applies

Region 2

Allocation to mobile service on Regions 2 and 3 in 3.5-4.2GHz

5.431A: Allocation to mobile service in 14 countries in Region 2 in **3.4-3.5GHz** (WRC-07, 5.431A)

9.21 applies to mobile service

Region 3

3.4-3.5GHz

Korea, Japan, Pakistan: mobile allocation back in 2000. 9.21 does not apply. 5.432

Bangladesh, China, French overseas communities of Region 3, India, Iran (Islamic Republic of), New Zealand and Singapore: mobile allocation. 9.21 applies. 5.432

All of those countries identified 3.4-3.6GHz to IMT. 9.17 and 9.18 applies. Pfd limit applies 5.432A, 5.432B, 5.433A

C-BAND OPTIONS (3.4-4.2GHz)



AS THE MOBILE SERVICE ALREADY HAS A PRIMARY ALLOCATION IN A PORTION IT IS IMPORTANT TO UNDERSTAND THE REGULATORY OPTIONS

- **Region 2: A primary allocation in 3.4-3.5GHz and an IMT identification**
- **Regions 2 & 3: An IMT identification in part or all the 3.5-4.2GHz portion**
 - This is possible given this already has a co-primary allocation
 - The IMT identification would need to be subject to coordination with satellite services
- **Region 1: A primary allocation and IMT identification in part or all 3.6-4.2**
- **These options are all subject to coordination conditions including:**
 - The normal article 9 procedures to prevent interference with satellite
 - Emission limits for IMT stations on borders to prevent international interference (also in article 9 in the radio regulations)

EVIDENCE IN THE CPM TEXT PLUS REAL-WORLD SHARING BETWEEN C-BAND SATELLITE & MOBILE PROVES THE SERVICES CAN SHARE THE BAND

CANDIDATE BANDS IN CITEL



BAND	IMT	NOC
470-698 MHz	US/Canada 9.21 Colombia & Mexico possible	Brazil, Argentina, D. Republic, Ecuador, El Salvador, Guatemala, Nicaragua, Panama & Paraguay
1350-1400 MHz 1427-1517 MHz	Brazil (Possible: Argentina, Canada, Ecuador, Guatemala, Mexico)	US
2.7-2.9 GHz	Brazil considering	-
3.4-4.2 GHz	Brazil/Ecuador: 3.4-3.6 GHz US/Canada: [3.4-3.7 GHz]	Nicaragua, Bolivia, El Salvador & Mexico: 3.4-4.2 GHz Brazil/Ecuador: 3.6-4.2 GHz

SUMMARY



THE JTG TEXT SHOWS THAT THERE IS A VITAL NEED FOR ADDITIONAL MOBILE SPECTRUM AND THAT THE CANDIDATE BANDS CAN BE SHARED

- **It's important to remember that allocations at WRC-15 mostly won't be licensed until 2020-2025 when data demand will be much higher**
 - The ITU assumes a 44-80x increase in mobile data between 2010 and 2020
 - By comparison global mobile data rose 45x from 2008-2013
- **Governments won't license spectrum allocated at WRC-15 until they are ready – this will vary by market. New allocations provide vital flexibility.**
 - Existing services can continue & be protected through regulatory & technical conditions
- **Governments not planning to use WRC-15 bands in near-term will still benefit from lower cost equipment for their *later* roll-outs**
 - Early movers generate economies of scale so countries that deploy later benefit from cheaper smartphones and base stations etc..

1452-1492 MHz



- One option proposed is to have a pfd limit for BSS space stations to facilitate the coordination process with IMT stations in the 1452-1492 MHz
- Alternatively current Article 9 procedures apply to protect the BSS and IMT receivers

2700-2900 MHz



Region 1	Region 2	Region 3
2 700-2 900	AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 5.424	

- The aeronautical radionavigation service is restricted to ground based radars. Such radars are also used for meteorological purposes. Radar use is protected as a safety service (RR4.10)
- Sharing within the same area and same frequencies is not possible. Need mitigation techniques to protect radar use from IMT.
- More information required regarding the extent of usage by radars and possibility of replanning radar use within the upper 100 MHz of the band in order to provide spectrum for IMT use
- Regulatory provisions to allocate all or part of the band to mobile service globally/regionally/ in some countries and identify for IMT while ensuring protection to radar use

Current Res 750 limits to protect passive services in the band 1400-1427 MHz



EESS (passive) Band	Active service band	Active service	Recommended maximum level of unwanted emission power from active service stations in a specified bandwidth within the EESS (passive) band ¹
1 400-1 427 MHz	TABLE 1-2 1 350- 1 400 MHz	Radiolocation ²	í29 dBW in the 27 MHz of the EESS (passive) band
		Fixed	í45 dBW in the 27 MHz of the EESS (passive) band for point-to-point
		Mobile	í60 dBW in the 27 MHz of the EESS (passive) band for mobile service stations except transportable radio-relay stations í45 dBW in the 27 MHz of the EESS (passive) band for transportable radio-relay stations
	1 427- 1 429 MHz	Space operation (E-to-s)	í36 dBW in the 27 MHz of the EESS (passive) band
	1 427- 1 429 MHz	Mobile except aeronautical mobile	í60 dBW in the 27 MHz of the EESS (passive) band for mobile service stations except transportable radio-relay stations ³ í45 dBW in the 27 MHz of the EESS (passive) band for transportable radio-relay stations
		Fixed	í45 dBW in the 27 MHz of the EESS (passive) band for point-to-point
	1 429- 1 452 MHz	Mobile	í60 dBW in the 27 MHz of the EESS (passive) band for mobile service stations except transportable radio-relay stations ³ í45 dBW in the 27 MHz of the EESS (passive) band for transportable radio-relay stations í28 dBW in the 27 MHz of the EESS (passive) band for aeronautical telemetry stations ⁴
		Fixed	í45 dBW in the 27 MHz of the EESS (passive) band for point-to-point