

ITU WRC-23

3rd ISMC October 2023

Håkan Ohlsén, Standards & Industry –APAC

Ericsson Group Function Technology



ITUWRC
DUBAI 2023

Agenda



- ITU-R and WRC: brief background
- Agenda Item for WRC-27: future/6G/IMT-2030 spectrum
- WRC-23 decisions
 - New mid-band spectrum: upper 6 GHz
 - Other spectrum opportunities: UHF, mid-band and 10 GHz



ITU WRCs

Terms of Reference

Responsible for modifications of Radio Regulations

- Internationally binding regulations (treaty)
- Spectrum and usage conditions

Held once every 4th year

- Expect 3000+ participants
- Around 150 countries
- Around 100 meeting sessions per day at peak

Decide agenda for future WRCs

- WRC-23 decides for WRC-27 and prel WRC-31

WRCs designate use of spectrum

- Opportunities for future IMT



Spectrum is our "oxygen"

WRC-23 Agenda Items overview

Opportunity for Mobile
 Possible Mobile impact
 Possible Fixed Service impact
 Others



Fixed, Mobile and Broadcasting issues	Aeronautical and maritime issues	Science issues	Satellite issues	General issues
<p>1.1 4800-4990 MHz</p> <p>1.2 IMT identification</p> <p>1.3 3600-3800 MHz mobile allocation</p> <p>1.4 HIBS below 2.7GHz</p> <p>1.5 470-694 MHz R1 broadcast and mobile</p> <p>10 AIs-future Conferences</p> <p>Focus is on mid-band, UHF and WRC-27</p>	<p>1.6 sub-orbital vehicles</p> <p>1.7 AMRS 130 MHz</p> <p>1.8 Res 155 and No.548B</p> <p>1.9 Appendix 27</p> <p>1.10 AMS 22 and 15GHz</p> <p>1.11 GMDSS</p>	<p>1.12 EESS (active) 45MHz</p> <p>1.13 SRS 15 GHz</p> <p>1.14 EESS (passive) 231-252 GHz</p>	<p>1.15 Earth stations aircraft/vessels 13 GHz with GSO</p> <p>1.16 ESIM 17-20/27-30 GHz with NGSO</p> <p>1.17 ISL 12, 18-20 and 28GHz</p> <p>1.18 MSS allocations</p> <p>1.19 FSS 17 GHz</p> <p>7 Res 86</p>	<p>2 incorporation by ref in RR</p> <p>4 editorial review</p> <p>9.1 a Space weather sensors</p> <p>9.1 b Radionavigation 1.3GHz</p> <p>9.1 c IMT for FWA under FS</p> <p>9.1.d EESS protection 36-37GHz</p>

No. 21.5 – not AI, but topic of interest (BR Director’s report under 9.1)



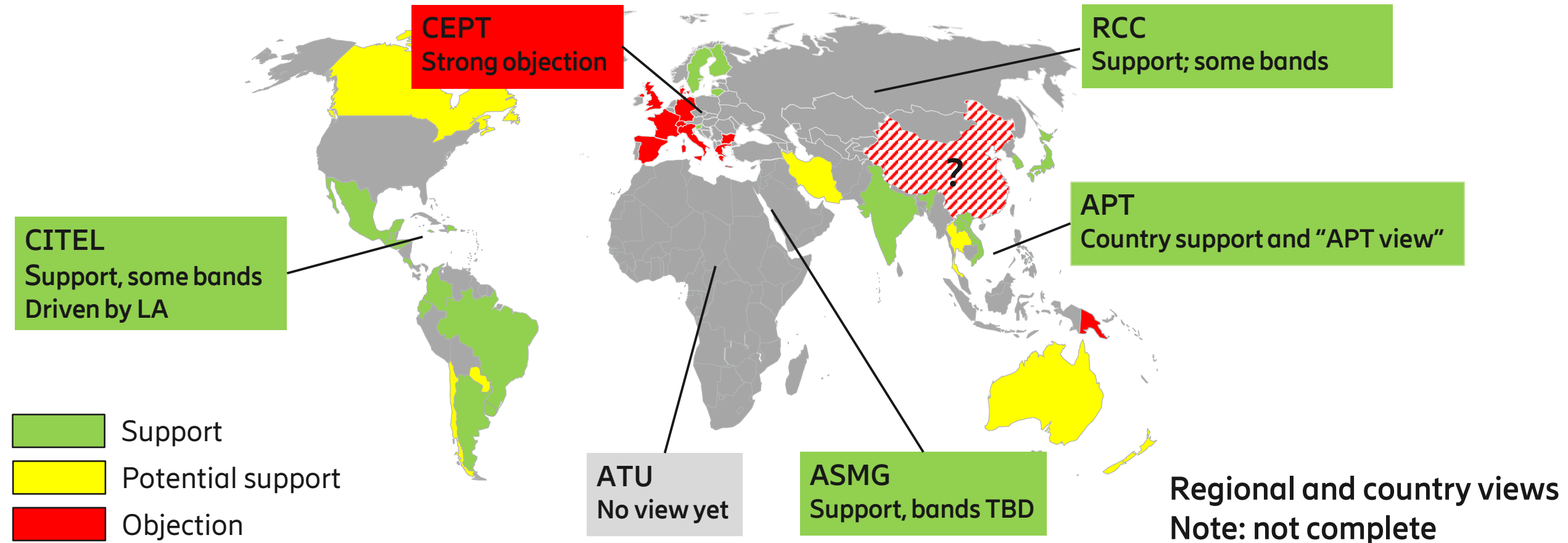
Agenda Item for WRC-27 (AI 10)

Future IMT spectrum

Prioritized frequency range: 7 – 15 GHz

Future Mobile Spectrum at WRC-27

Timely availability of harmonized spectrum, 7 – 15 GHz

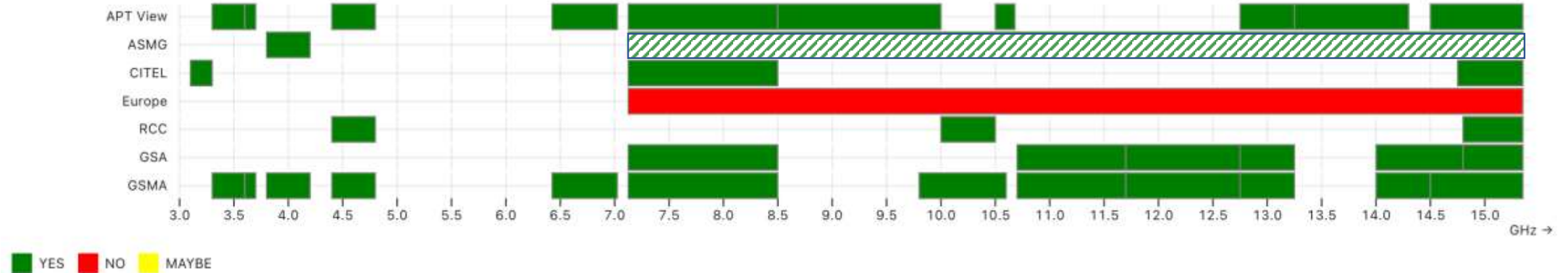


Decision at WRC-23 needed for Agenda Item towards WRC-27

Delayed availability of harmonized spectrum prevents timely deployment of 6G/IMT-2030

Regional positions

GSA and GSMA included for reference



- Mid-band proposals to be supported, but should be clear that not replacement for 7 – 15 GHz
- ASMG, CITEL, RCC: common proposals (= regional agreement)
- APT: “view”, not common proposal, parts of frequency ranges for discussion at WRC-23
- ASMG: specific frequency bands FFD (not proposing entire 7 – 15 GHz range)
- Europe connects this with 6 GHz: If WRC-27 AI for IMT disturbing security/space then no 6 GHz

Summary



- Regional support and multi-country contributions expected directly to WRC-23
- No proposals for sub-THz spectrum
- Europe difficult

- Interest to drive discussions at WRC-23 for studies towards WRC-27
- Currently difficult to predict outcome of discussions
- In particular regarding additional support for 7.1 – 8.5 GHz and 13 GHz



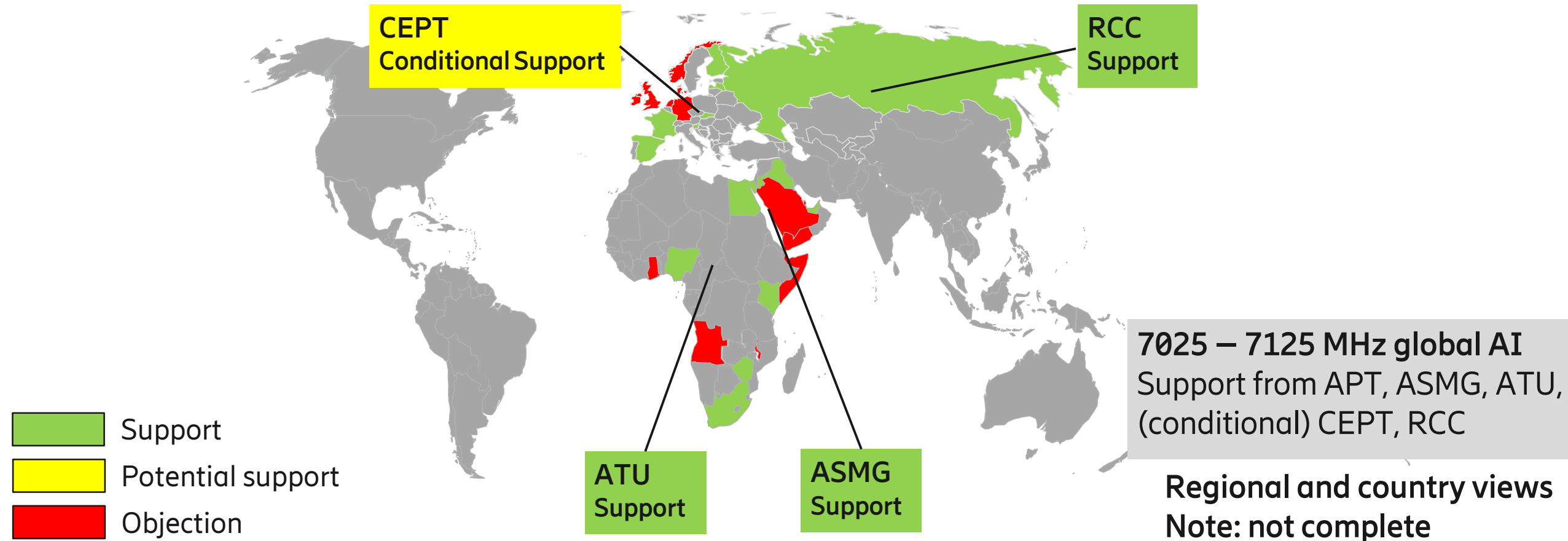
New mid-band spectrum (AI 1.2)

6425 – 7025 MHz (R1)

7025 – 7125 MHz (Global)

6425-7025 MHz at WRC-23

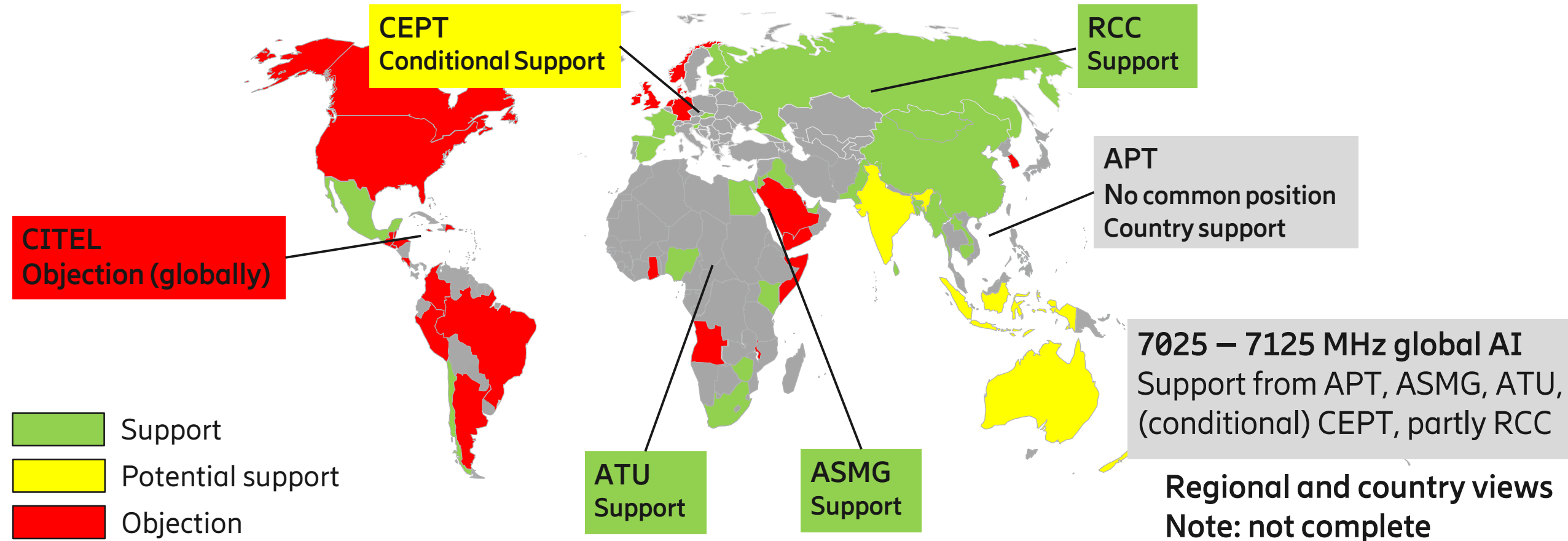
A crucial opportunity for additional mid-band spectrum



WRC-23 agenda item for Region 1 only
For most countries upper 6 GHz is the only remaining substantial mid-band spectrum

6425-7025 MHz at WRC-23

A crucial opportunity for additional mid-band spectrum



WRC-23 agenda item for Region 1 only, but additional initiatives expected for Regions 2 and 3
For most countries upper 6 GHz is the only remaining substantial mid-band spectrum

Summary



- Three out of four (sub-)regions within Region 1 support, one lukewarm (Europe)
- Europe indicating additional regional work post WRC-23

- Momentum towards IMT identification for 6425 – 7125 MHz in Region 1
- Likely extension to some Region 3 countries at WRC-23 and/or WRC-27

- ACP on 7025-7125 MHz use Method 5C, make sense 6425-7025 MHz use 4C
- Technical conditions (satellite protection) to enable macro BS



Other spectrum opportunities

UHF, mid-band and 10 GHz

470 – 694 MHz

3300 – 3400 MHz

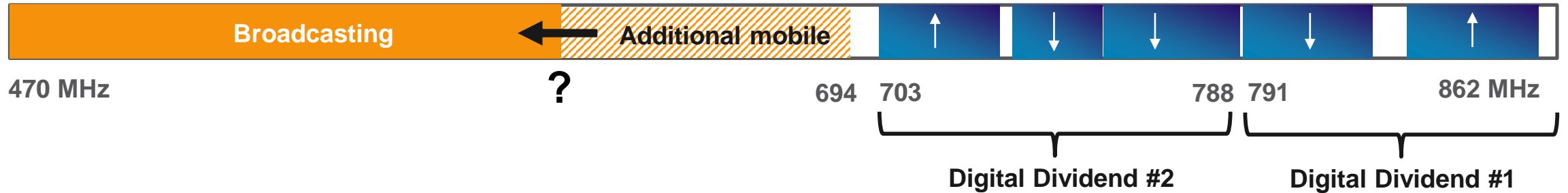
3600 – 3800 MHz

4800 – 4990 MHz

10 – 10.5 GHz

UHF Spectrum, 470 – 694 MHz, Region 1

AI 1.5



- Possibility for a third digital dividend in UHF spectrum – US600/APT600
- CEPT delaying, RCC and ATU want NOC, some ASMG countries IMT with focus on 614 – 694 MHz

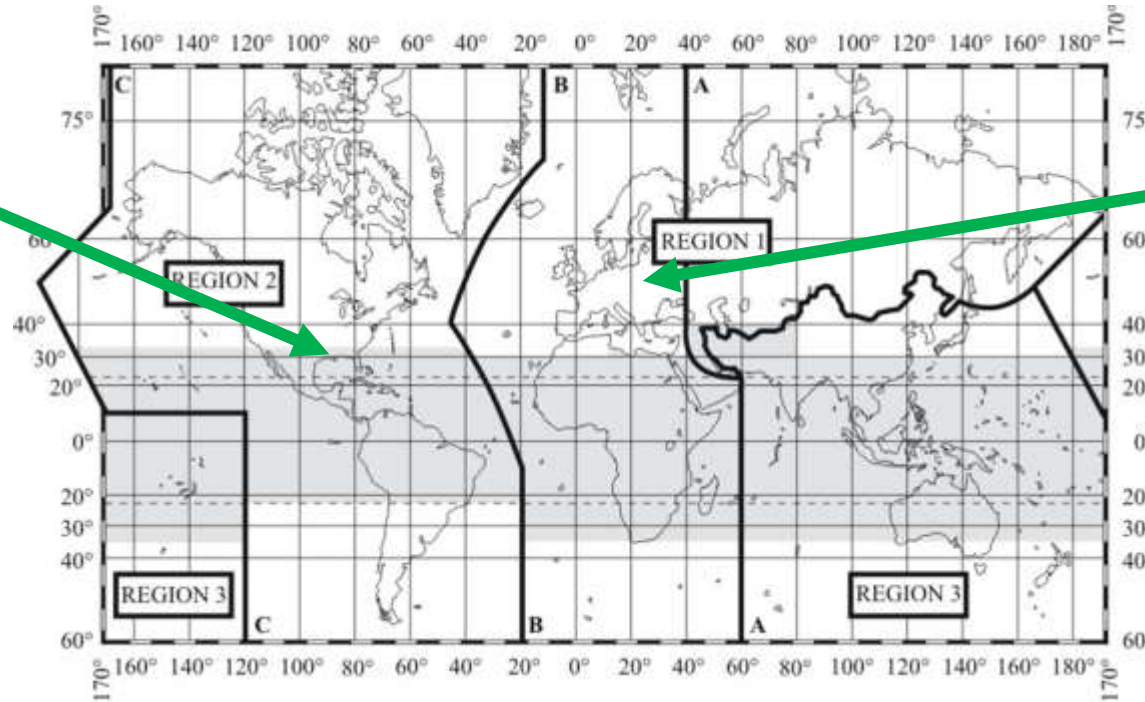
- Additional countries for IMT identification in whole/parts of the band, also outside Region 1
- Europe coming back to this at WRC-31

Geographical expansion of mid-band spectrum



Region 2

- 3 300 - 3 400 MHz
- 3 600 - 3 800 MHz



Region 1

- 3 300 - 3 400 MHz
(add countries)

Region 2

- 3300-3400 GHz: IAP supporting IMT Coordinate with neighbors' radio-location Service
- 3600-3700 MHz: IAP supporting IMT
- 3700-3800 MHz: IAP supporting IMT Per country basis (country footnotes)

Region 1

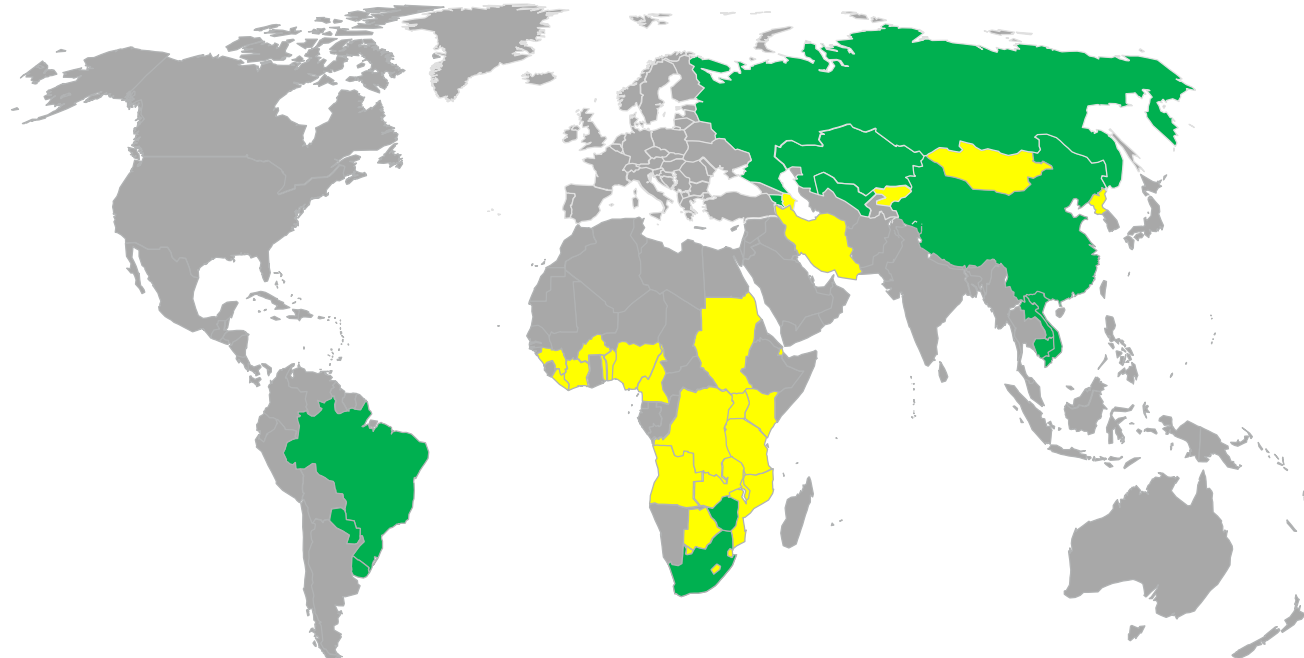
- Current restriction: only allowed below 30th parallel north, protection of radio-location service (CEPT)
- Africa and Arab countries supporting IMT for entire Region 1, Europe resisting
- Expected outcome: Additional country footnotes

IAP = Inter American Proposal

Geographical expansion of mid-band spectrum, cont'd

4800 – 4990 MHz

- Identified, no pfd
- Identified, pfd applies



- 42 countries identified for IMT at WRC-15 and WRC-19
 - Most with harsh pfd limit – protection of services in international water/air space, preventing use
 - NATO countries (Europe) vs Russia, China, Brazil, Viet Nam, South Africa, etc.
-
- Principle regulatory discussion about protection of operations in international waters & airspace
 - Expected outcome: Updated technical conditions (if any), new country footnotes

10.0 – 10.5 GHz, Region 2



- No Inter-American Proposal achieved, opposing views
 - IMT support by **Brazil**, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Jamaica, Mexico, Paraguay, Peru and Uruguay
 - Opposition: Argentina, Bahamas, Canada, Chile, Grenada, Panama, United States
 - Difficult protection of incumbents (e.g., EESS), possibly implying low BS power
-
- Not a replacement for the 6 GHz band
 - Expected outcome: No identification for IMT in entire Region 2, unless active earth-exploration satellite service can be protected, maybe country footnote(s)

