WRC-23

Update for IMT agenda item 1.2 for WRC-23

Presentation to CTU July 27 2023, Virtual

GSMA For the benefit of billions

Digital Equality

Low-band

470-694 MHz

Harmonisation

3.5 GHz

3.3-3.8 GHz

Expansion

6 GHz

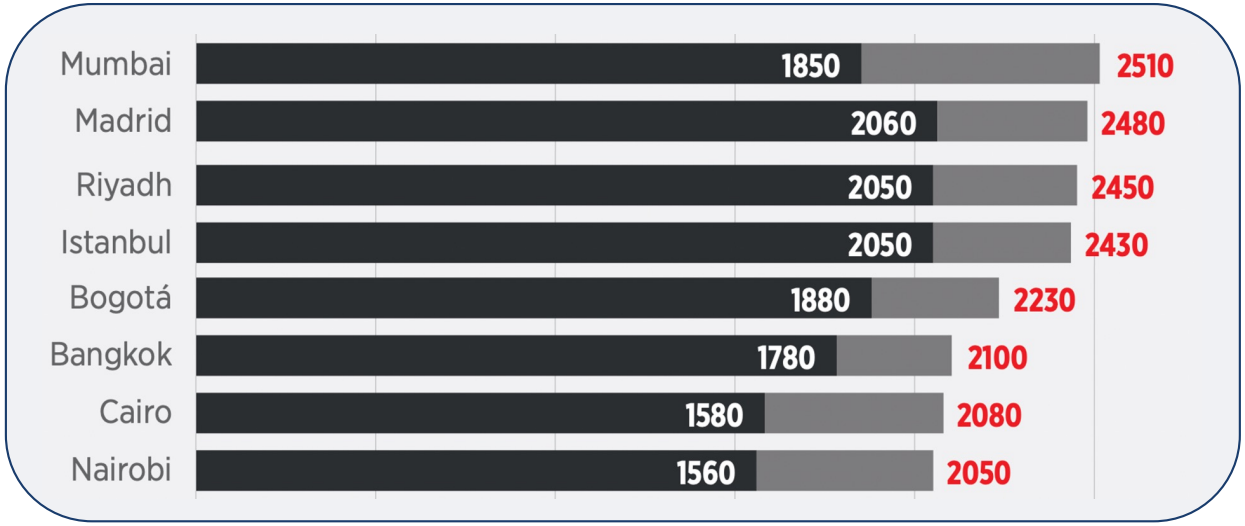
6.425-7.125 GHz

2 GHz of mid-band

spectrum is needed for

5G in each market

Mid-Band Spectrum Needs



1. On a global basis an average of 2 GHz of mid-band spectrum will be required for 5G
2. Cities require similar amounts everywhere in the world
3. With less spectrum, IMT-2020 requirements are under risk or 5x more base stations are needed
4. Agenda Item 1.1, 1.2 and 1.3 will all help raise harmonised mid-band capacity

https://www.gsma.com/spectrum/resources/5g-mid-band-spectrum-needs-vision-2030/

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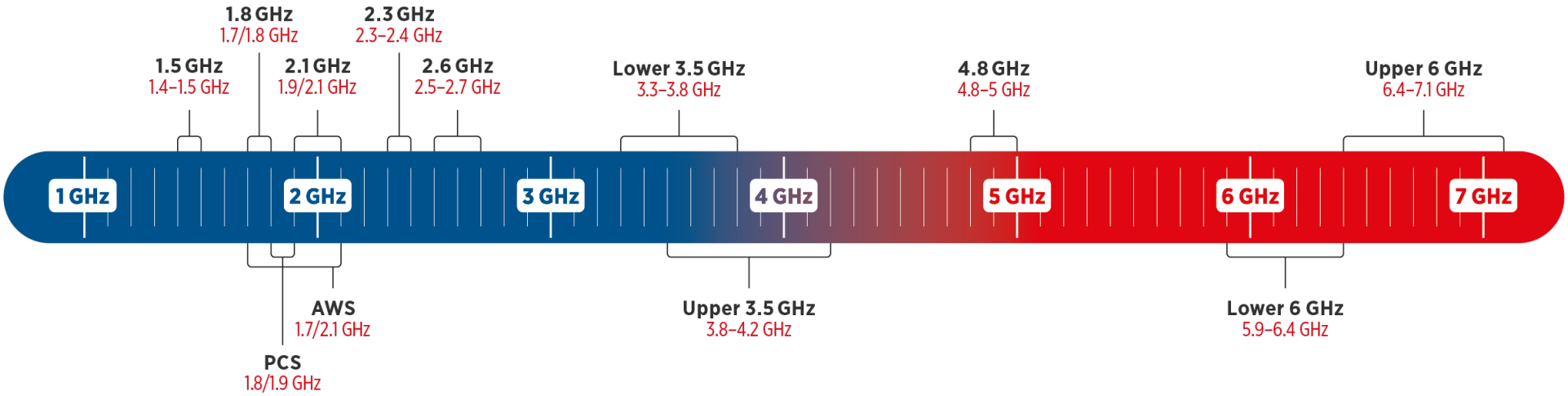
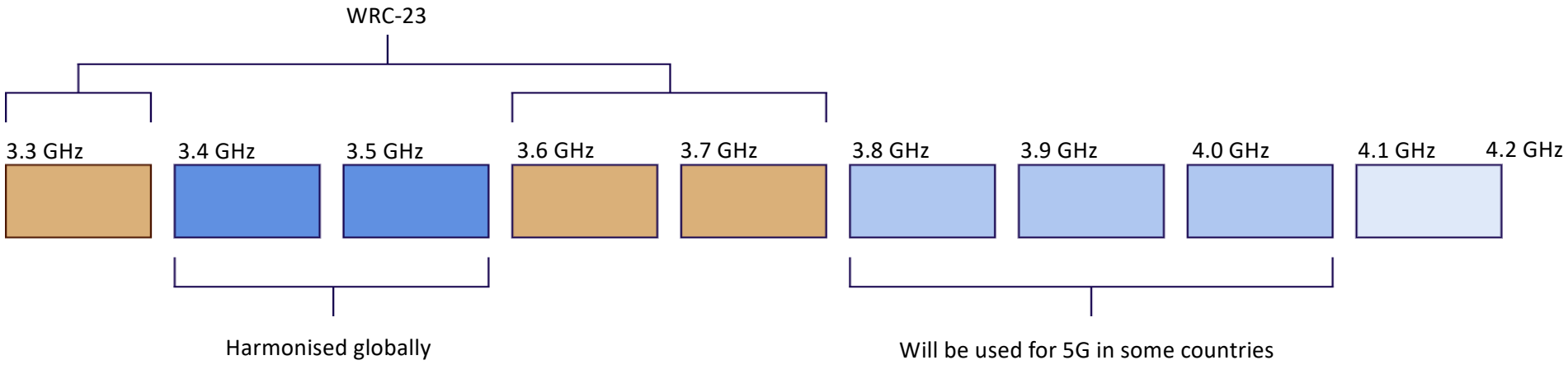
Mid-Band Options



3.5 GHz range- WRC-23 Agenda Item 1.2

100 MHz channels improve performance and reduce cost of connectivity



3.3-3.8 GHz | 5G Launch Band

- Global mobile demand for 3.5 GHz range within and outside IMT identifications
- Multiple WRCs have treated the band but in-country assignments still reach far beyond ITU agreements in early-adopter countries
- WRC-23 Agenda Item 1.3 takes softest possible approach and offers Africa the chance to join global club with MOBILE allocation

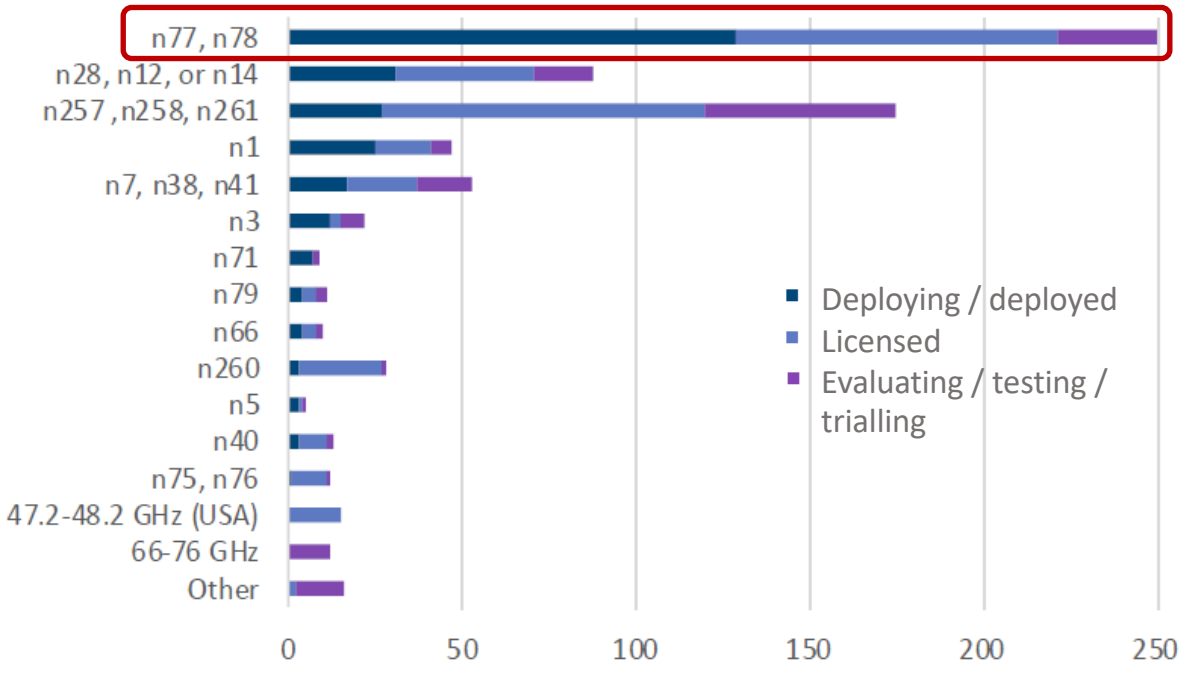
WRC-07	WRC-12	WRC-15	WRC-19	WRC-23
80 countries sign into footnotes for 3.4-3.6 GHz	New Agenda Item agreed to discuss 3.4-4.2 GHz, inter alia	3.4-3.6 GHz harmonised; some additional identifications at 3.3-3.4 and 3.6-3.7 GHz	New Agenda Item agreed for WRC-23	Parts of 3.3-3.8 GHz being discussed for Regions 1 and 2

Fair Sharing 3.5 GHz:
IMT / FSS Co-existence

- Incumbents: FSS
- IMT and FSS co-existence occurring all over the world both in-band (geographically separated) and adjacent band
- Existing methodologies allow regulators to make informed decision on spectrum sharing before WRC decisions or IMT deployment
- Significant volumes of existing research on co-existence including: https://www.gsma.com/spectrum/wp-content/uploads/2021/04/Transfinite-3.4-3.8-GHz-Compatibility.pdf

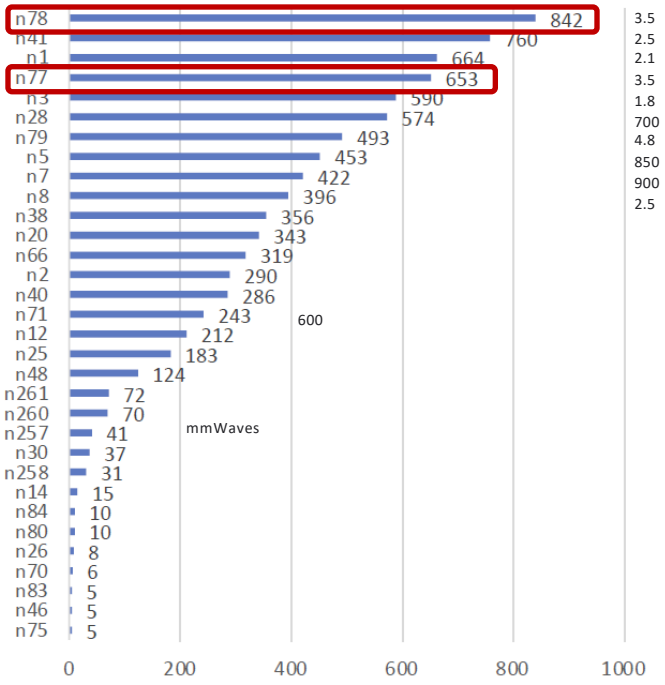
3.3-3.8 GHz - Device Ecosystem

+200 operators licensed or deployed / deploying in 3.3-3.8 GHz



Number of operators investing in key 5G spectrum bands.
Source: GSA December 2021

650+ devices live; more than 800 announced



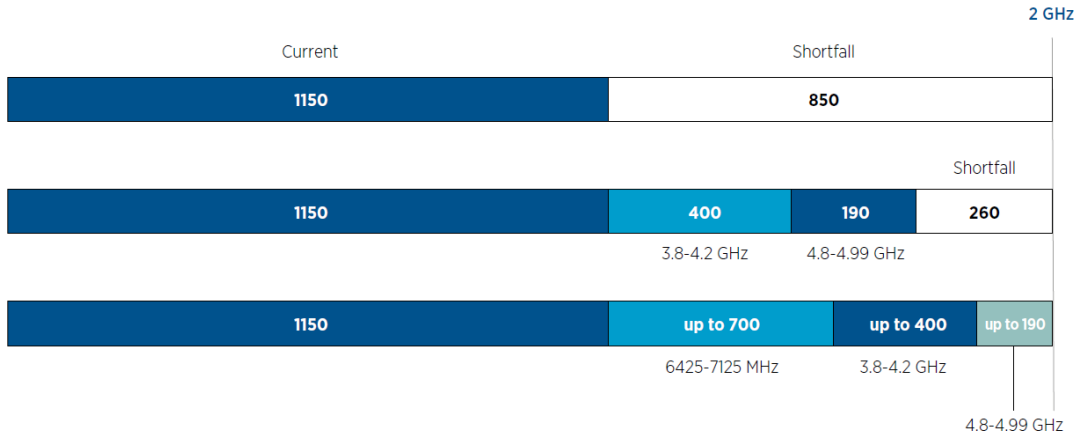
Announced 5G device models supporting 5G bands
Source: GSA January 2022

Agenda Item 1.2 – 6 GHz

2 GHz of mid-band spectrum is required by 2030

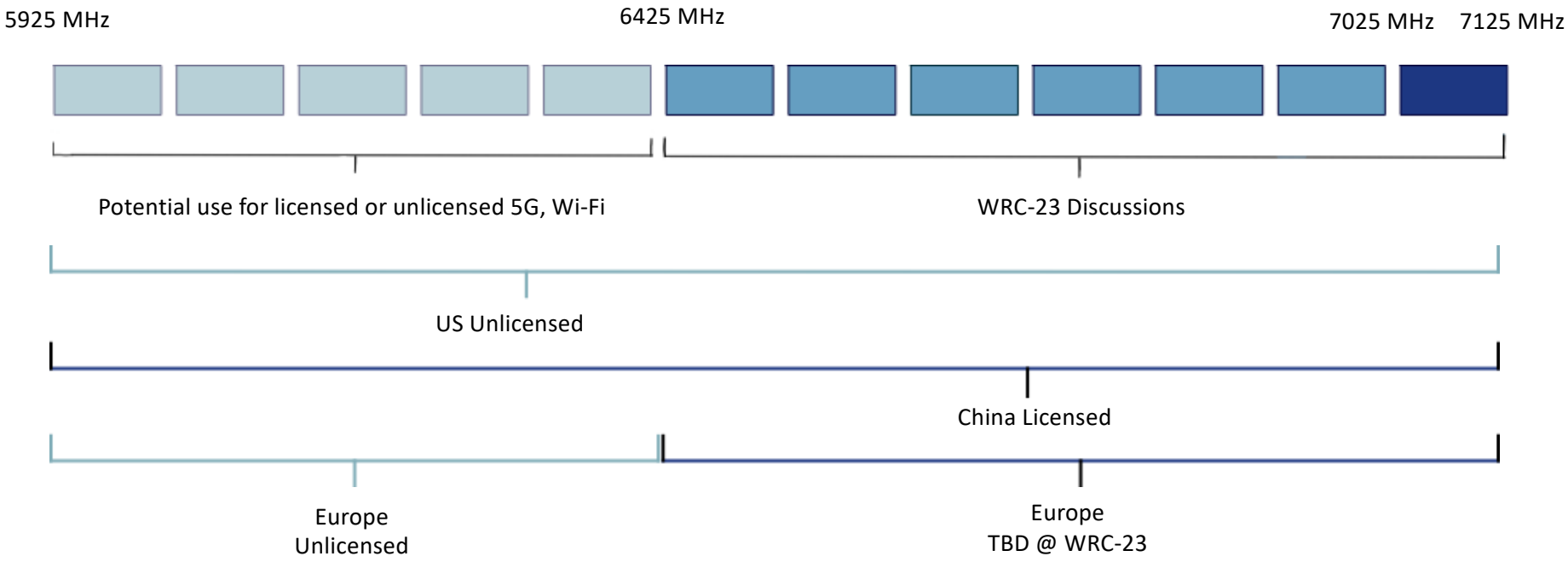
Mid-bands will drive eMBB and industrial connectivity

Sufficient spectrum will lower costs and carbon



Vision 2030: Insights for Mid-Band Spectrum Needs

6 GHz Band


5925 MHz
6425 MHz
7025 MHz
7125 MHz
Potential use for licensed or unlicensed 5G, Wi-Fi
WRC-23 Discussions
US Unlicensed
China Licensed
Europe
Unlicensed
Europe
TBD @ WRC-23

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6 GHz for 5G

- Globally allocated to the mobile service on a primary basis.
- Good balance between coverage and capacity
- Can support large contiguous blocks (700 MHz with 6425 – 7125 MHz).
- Existing support gives economies of scale.
- Wide industry support: high priority band for most mobile operators and vendors. 3GPP has started standardization work
- Demand driven by fixed wireless access, smart cities and mobile broadband

Fair Sharing 6 GHz:

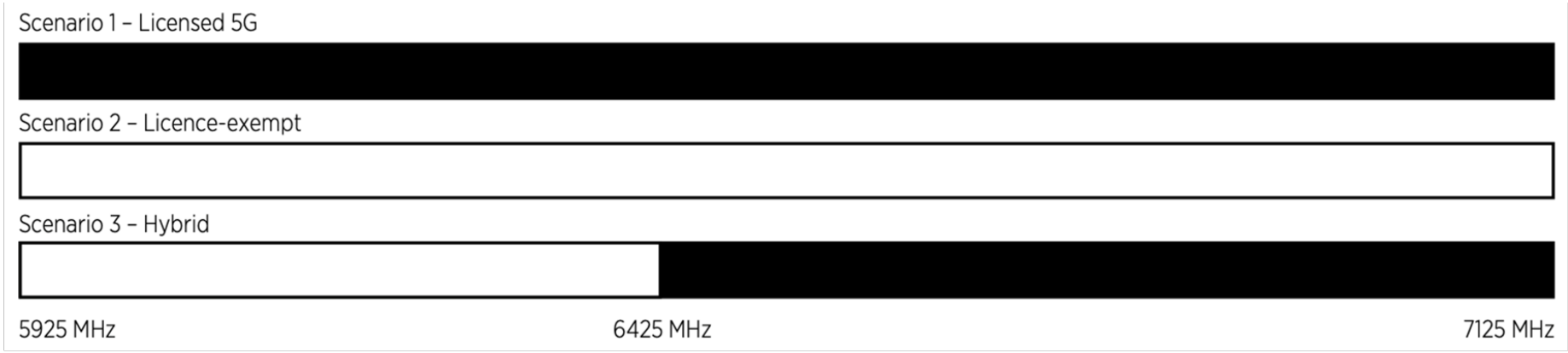
IMT, FS & FSS Co-existence

WRC-23 AI1.2 on 6425-7125 MHz:

- Incumbents: FSS, FS
- IMT parameters and propagation models for WRC-23 studies on-going in ITU
- Coexistence can be facilitated by the adoption of Active Antenna Systems with beamforming (Massive MIMO)
- IMT identification will give MNOs flexibility to use for backhaul or access
- Latest and most accurate clutter loss, building entry loss and propagation models must be used

FSS UL CO-EXISTENCE IS A GLOBAL ISSUE: AGREEMENT AT ITU IS IMPORTANT

6 GHz Band: Cost Benefit Analysis



1 GSMA Intelligence research studied 24 countries and found that unlicensed use across the whole 6 GHz band was not the most beneficial in any scenario.

The study made two core findings…

2
- For all countries studied, the most benefit to society comes from assigning between 700-1200 MHz of 6 GHz spectrum to licensed 5G
- For all countries studied, there is never a scenario where the allocation of the full 6 GHz band to unlicensed use generates the greatest benefit to society.

The Socio Economic Benefits of the 6 GHz Band, GSMA Intelligence, 2022

Spectrum and Cost-Efficiency

Planning 5G with enough spectrum to allow sufficient bandwidth will increase performance and significantly reduce costs.

Wider channels mean fewer base stations

CHANNEL SIZE IMPACT

100 MHz

64%

60 MHz

INCREASE IN NUMBER OF CELL SITES

WRC-23 can make huge savings on 5G roll-out

LATIN AMERICA BENEFITS

Adding additional bandwidth to the baseline 200 MHz in 3.5 GHz range*

ADDITIONAL 300MHz

$3.5bn

ADDITIONAL 700MHz

$5bn

https://www.gsma.com/spectrum/resources/3-5-ghz-range-for-5g/

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Summary

3.3-3.8 GHz

- 3.6-3.8 GHz required at or soon after 5G launch; 100 MHz channels required
- IMT identification in 3.3-3.4 GHz will provide broad harmonisation
- 5G launch band with biggest device ecosystem

6 GHz

- Interest in use of 700 MHz by IMT in some Latin American countries
- Important band for licensed 5G
- Identification of 6425-7125MHz needed through WRC-23 to allow 5G expa
- Without 6 GHz spectrum for IMT there would be pressure to release
- 3.8-4.2 GHz for IMT for 5G expansion
- Significant scale happening through decision in Asia

Status in Citel

3.6-3.8 GHz

Positive with challenges

5 proposals for IMT, support 3.6-3.7 GHz or 3.7-3.8 GHz or 3.6-3.8 GHz, with conditions or without conditions through Regional or country footnotes

6425 – 7125 MHz

7 countries support NOC for all Regions

Canada supports NOC for top 100 MHz only

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Our Ask

Our ask is for CTU countries to support at the August Citel meeting in Ottawa:

- 3.3 -3.4 GHz IAP (Inter-American Proposal): 13 countries support making IMT regional while giving priority to the RL
- USA DIAP for IMT in 3.6-3.8 GHz
- For 6 GHz there should be a balanced approach: IMT in 6425-7125 MHz and WI-FI in 5925-6425 MHz