WRC-23 Results and Where Now ?

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(1) WHY DID CISCO ATTEND WRC-23?

To protect and support our current and future investments in Wireless Networking Technologies (both IMT and Wi-Fi)

Advocate for important ***new identifications/allocations*** in Low and mid band spectrum to increase harmonized use of IMT and Mobile Technologies worldwide

- Additional mid band IMT identifications for countries and regions outside Europe in 3GHz & 10 GHz (AI 1.2)

- To upgrade existing mobile allocation in 3.6-3.8 GHz in EMEA from secondary to primary status (AI 1.3)
- To provide a new mobile allocation for Low-band spectrum in 470-694 MHz (AI 1.5)
- Future Agenda item for study of potential IMT/6G mid band spectrum identification/allocation @ WRC-27 (AI 10),

(2) WHY DID CISCO ATTEND WRC-23?

ITUWRC

To protect and support our current and future investments in Wireless Networking Technologies (both IMT and Wi-Fi)

Promote ***harmonized Wi-Fi use across the 6GHz bands*** not IMT (AI1.2)

- To counter arguments from IMT equipment vendors, China, Russia and France proposing only IMT use in upper 6GHz (6425 – 7125 MHz) worldwide
- Work with WFA and DSA to demo real products and services that can be delivered today using all the 6GHz band
- Support enabling harmonized Wi-Fi use throughout the whole 6GHz band (5925 – 7125 MHz) worldwide.

- To highlight in 6GHz the environmental, cost and spectral efficiency benefits and other advantages of providing indoor coverage via indoor Wi-Fi networks rather than providing indoor coverage via outdoor high power IMT macro cells.
- Explain that opening the 6GHz band is critical to enable enhanced: determinism, throughput, handover, QoS and latency in future indoor Wi-Fi networks.

WRC-23 - High level results IMT/Wi-Fi

ITUWRC

Strong outcome for IMT carriers/vendors in majority of IMT agenda items

- Several mid-band spectrum bands upgraded/allocated/identified for mobile wireless
- Low-band spectrum allocated for mobile use in EMEA
- Study of potential new bands for 6G spectrum for WRC-27

Mixed outcome for IMT and Wi-Fi interests in 6GHz Band

- Whole Upper 6 GHz band identified for IMT in Region 1 only
- Only Top 100 MHz of upper 6 GHz identified in Region 3, “no change” region-wide in Region 2 in whole band and in Region 3 in bottom 600MHz.
- Skepticism over application of the “expected eirp mask” to protect FSS from possible IMT use outside Region 1

- Neighboring countries (India, Japan, Korea etc) blocked China and other Region 3 countries to identify in a national footnote in all upper 6GHz for IMT due to FS/FSS protection concerns
- Upper 6 GHz band identifications explicitly did not give IMT priority and recognized that spectrum is used by other mobile systems like Wi-Fi

- Strong positive feedback to the real 6GHz capable Wi-FI products showcased at WRC conference venue (smart phones, APs, AR/MR/VR headsets, laptops, tablets, firesticks, etc.)
- IMT 6GHz demos could only provide service to a cumbersome trolley outdoors only

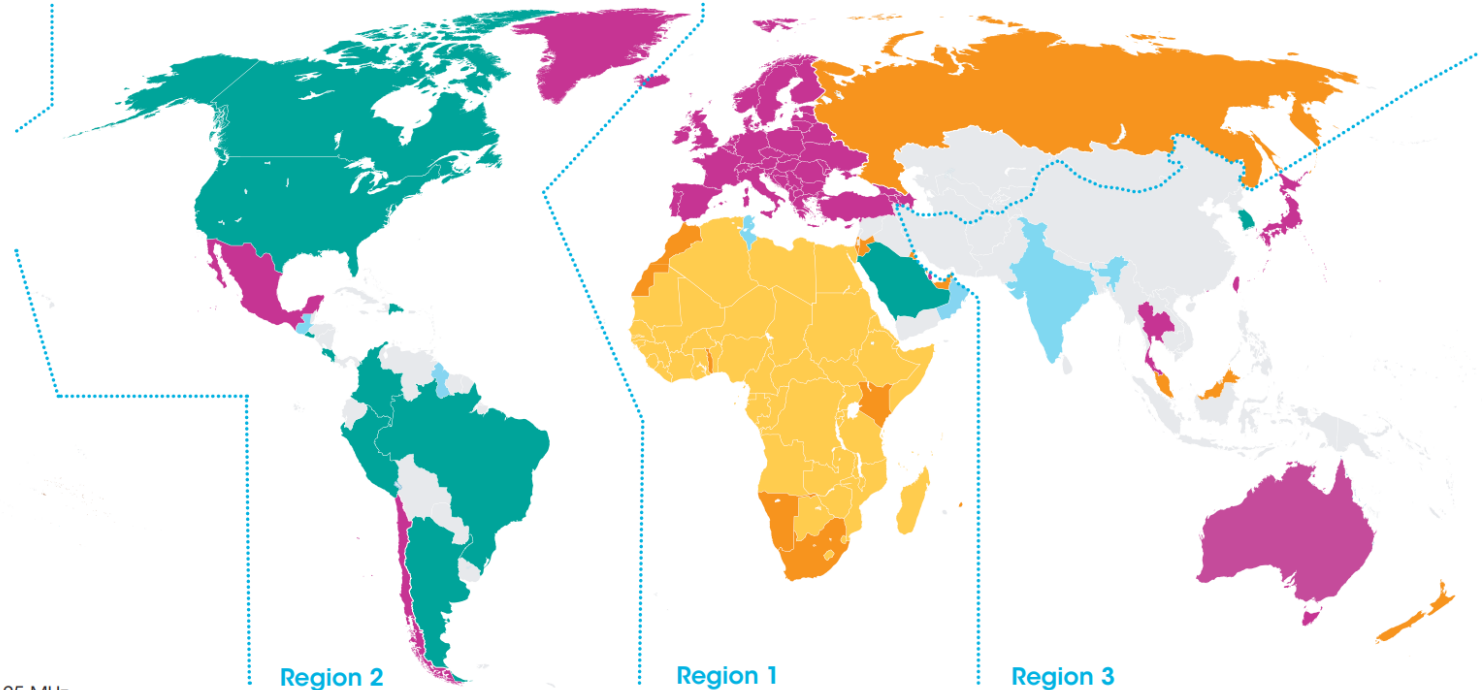
Additional Considerations and What Next ?

- Future Agenda item -- good to see studies for WRC-27 on mid band spectrum for IMT/Mobile but disappointing that the full 7- 8.5 GHz range was not agreed to be studied in Region 1
- On the 470 – 690 MHz band maybe higher power LAA instead on White Space could be investigated as a way of phasing in future IMT taking account of the different broadcasting needs across the different CEPT Countries.
- In 6GHz there is no harmonized IMT identification world-wide in 6GHz only in Region 1
  - 5 countries in the world, outside of Region 1, insisted on a national footnote identifying the band for IMT even if there were no studies for their regions.
  - Brazil and Mexico in Region 2, adopted a footnote where coordination with neighbour countries required before any national deployments. Brazil had already opened the full 1200 MHz for Wi-Fi.
  - The IMT identifications clearly indicate that IMT has no **priority** and recognize other mobile users of the band such as Wi-Fi.
  - Still uncertainty in whether the outcome in upper 6GHz band will be Wi-Fi, IMT or both in EMEA and APAC markets, Wi-Fi already dominates in region 2.
  - Rejected efforts at region-wide identification of upper 6 GHz band for mobile in Americas and APAC
  - No future WRC agenda items for upper 6GHz and conference affirmed the right of neighboring countries to object to future IMT identifications due to possible interference

Post WRC23 6GHz update for Region 1

- **WRC awarded equal status to RLAN (Wi-Fi) and IMT (5G) in 6425-7125 MHz for Region 1 (EMEA) in the International Radio Regulations Treaty.**
- **This is completely new territory. Russia plans to give 100% of the band to IMT and Saudi Arabia has already allocated all 1200MHz (5925-7125) to Wi-Fi for both indoor and outdoor use.**
- **Large installed base of FS in CEPT in upper 6GHz that cannot share with outdoor macro cell IMT (estimated up to 10 years to re-farm links)**
- **Europe is likely to do something more complicated and the rules and implementations may ultimately differ from country to country**
- **CEPT currently has 3 ongoing work items studying 6GHz use cases**
  - Outdoor and higher power use in the bottom of the band (5945-6425 MHz)
  - Low Power Indoor (LPI) use in 6425-7125 MHz
  - Hybrid sharing of 6425-7125, where Wi-Fi would operate indoors and IMT would operate outdoors in dense urban where needed

GLOBAL PROGRESS TOWARDS LICENCE-EXEMPT ACCESS TO THE 6 GHZ BAND



- Adopted 5925-7125 MHz
- Adopted 5925/45-6425 MHz, and evaluating 6425-7125 MHz
- Adopted 5925-6425 MHz
- Recommended 5925-6425 MHz
- Under consultation

Region 2

1200 MHz

- Canada
- USA
- Honduras
- Costa Rica
- Brazil
- Peru
- Dominican Republic
- Colombia
- Argentina
- El Salvador

500 MHz (& evaluating 1200 MHz)

- Chile
- Mexico

Region 1

1200 MHz

- Saudi Arabia

500 MHz (& evaluating 1200 MHz)

- CEPT Area
- European Union (480 MHz)
- Qatar
- United Kingdom

500 MHz

- Morocco
- UAE
- Jordan
- Kuwait
- Kenya
- Israel
- Mauritius (480 MHz)
- Bahrain
- Togo
- Russia
- South Africa
- Namibia
- Africa / ATU

Region 3

1200 MHz

- South Korea

500 MHz (& evaluating 1200 MHz)

- Australia
- Japan
- Taiwan
- Thailand

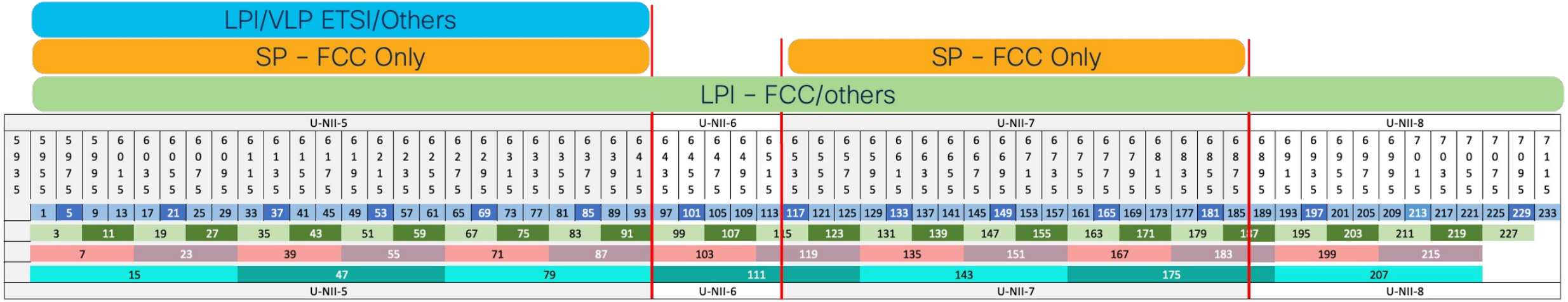
500 MHz

- Hong Kong
- Malaysia
- New Zealand
- Singapore

The new 6 GHz band

- Two main proposals being reviewed or accepted by world regulators
  - FCC = 1200 MHz
  - ETSI = 500 MHz

20 MHz Channel
40 MHz Channel
80 MHz Channel
160 MHz Channel
Primary “PSC” channel



20 and 40 MHz channels will continue to be default for 500 MHz countries

2x2 Client 40 MHz 1024 QAM = 574 Mbps

Width	FCC Channels	ETSI Channels
20 MHz	59	24
40 MHz	29	12
80 MHz	14	6
160 MHz	7	3

80 and 160 MHz channels will be the default for 1200 MHz countries

2x2 Client 160 MHz 1024 QAM = 2.4 Gbps

The bridge to possible