Economic and Social Impact of Unlicensed Access in 6 GHz Band
Colin Thomson, Head of Practice, Infrastructure, Access Partnerships

Colin provides support to wireless network operators, systems integrators and equipment manufacturers to ensure laws and regulation the swift delivery of these services to market. His work includes the development of authorisation processes for new wireless technologies, and adjustment of regulation to ensure that clients’ service offerings are compliant with international and national regulatory requirements. Colin is active in a number of European Conference of Postal and Telecommunications Administrations (CEPT) and Electronic Communications Committee (ECC) working groups, and maintains daily contact with Europe’s national regulatory authorities.

Colin joined Access Partnership in 2005 from Vislink Communications Ltd., where he was Technical Director, responsible for the development of communications technologies for the broadcast and defence markets. Colin has also held management and engineering positions with a global network operator, where he supported some of the world’s leading energy companies, and with EADS where he served as a project manager and engineer. Colin began his career as a research scientist with the UK Defence Research Agency working on naval research projects.
▪ Agostinho Linhares, Manager, Spectrum, Orbit and Broadcasting Division, Agência Nacional de Telecomunicações (ANATEL), Brazil

▪ Chris Woolford, Director of International Spectrum Policy, Ofcom

▪ Eric Fournier, Director for Spectrum Planning and International Affairs, Agence nationale des frequences (ANFR)

▪ Chuck Lukaszewski, Vice President, Wireless Strategy & Standards, Hewlett Packard Enterprise
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6 GHz Release Process for WAS/RLAN in Brazil

AGOSTINHO LINHARES
ANATEL - BRAZIL
MONTH 00, 2020
WRC-03 was a milestone for WAS/RLAN

- In 2004 Brazil reflected this result in its regulation, adding 5 150 – 5 350 MHz and 5 470 – 5 725 MHz for RLAN

Anatel's Board Decisions at 30th April 2020

- Approve Resolution nr.726, that updates the Restricted Radiation Devices Rules (equivalent to Short-Range Devices) – entered into force 1st September 2020;

- The Board will decide about the Technical and Operational Characteristics of the Restricted Radiation Systems operating in the 5,925 – 7,125 MHz;

- Establish that Technical Division shall present a proposal of Technical Specification in 90 days.

Ordinary Order signed at 5th May 2020

Technical Division concluded this work in 21st July 2020
Regarding spectrum availability: FCC or CEPT approach

- Evaluate technical studies in order to protect incumbent services
  - Consider long-term and short-term criteria;
  - The 5,925 – 6,425 MHz and 6,425 – 7,125 MHz bands are widely used by P2P links and ENG;

Regarding power limits

<table>
<thead>
<tr>
<th>Device Class</th>
<th>Max EIRP</th>
<th>Max PSD (EIRP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPI (AP)</td>
<td>30 dBm</td>
<td>5 dBm/MHz</td>
</tr>
<tr>
<td>User device connected to LPI-AP</td>
<td>24 dBm</td>
<td>-1 dBm/MHz</td>
</tr>
<tr>
<td>VLP (indoor or outdoor)</td>
<td>17 dBm</td>
<td>-8 dBm/MHz</td>
</tr>
</tbody>
</table>

WRC-23 will consider possible IMT identification of 6,425 - 7,025 MHz only for R1, and only 7,025 - 7,125 worldwide
There is a split support in the industry and mobile operators of who is supporting what:

- In general, American companies (Intel, Qualcomm, big Techs) and DSA associates are supporting FCC’s approach, while European and Chinese companies are supporting CEPT’s approach. 3 of 4 main mobile operators in Brazil are supporting CEPT’s approach, while some ISP are supporting FCC’s approach to be applied in Brazil.

The Board will decide which frequency band Brazil will deploy WAS/RLAN (e.g. Wi-Fi 6e);

The Board will decide if they will keep the initial proposal and approve technical specifications or if they will keep the delegation to SOR (the Superintendency responsible for spectrum, certification, numbering and grants) to approve it;

After this, a Public Consultation is needed (usually 60 days);

Back to the Technical Team to analyse contributions;

Depending of the Board first decision, SOR approves a new Act (updates Act 14,448) or the Board approves it;

It’s expected that NR-U will also use the band identified for WAS/RLAN.
Meeting the needs of users in the 6 GHz band

Chris Woolford
Director, International Spectrum Policy
November 2020
Opening up more spectrum

Different spectrum bands, with varying characteristics, will be required by different users to meet the requirements of a range of business models

More spectrum for WiFi at 6 GHz will enable more connected devices
• Demand for greater bandwidth, lower latency and improved coverage
• Enable innovation
• Improved wireless experience
Ofcom Statement on 5925 – 6425 MHz in July 2020

• Statement published in July 2020
  – followed a consultation issued in January 2020
  – 38 responses received to the consultation

• Statement confirmed 5925 – 6425 MHz being made available for WiFi and other related wireless technologies
  – enabling indoor and very low power outdoor use
  – permits up to 250mW indoor and 25mW outdoor

• Ofcom emphasised the benefits of global harmonisation
  – we are engaging in international discussions
  – we have sought to promote the benefits of a simple regulatory regime
Work on 5925-6425 MHz also being undertaken within CEPT

• Studies in CEPT addressing suitability of 5925 – 6425 MHz band for very low power (VLP) and low power indoor (LPI) devices
  – Extensive discussions have taken place in both WGFM and WGSE

• Discussions ongoing for both LPI and VLP, including out-of-band emissions below 5935 MHz
  – Band plan for WAS/RLANs proposed to start at 5945 MHz

• Areas of debate have included:
  – Protection of Communication Based Train Control (CBTC) below 5935 MHz
  – Protection of fixed links operating across the band

• To be discussed at the November ECC meeting
6425 – 7125 MHz

- Ofcom’s consultation and statement focused on 5925-6425 MHz
- 6425-7125 MHz will be discussed at WRC-23 under Agenda Item 1.2
- European preparations currently at an early stage
  - Being taken forward by ECC CPG as part of the European preparatory process for WRC-23
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6 GHz band in Europe

ERIC FOURNIER
• 5945-6425 MHz to be harmonised for RLAN in Europe
  – CEPT expected to adopt ECC decision in 2 weeks time
  – EU mandatory harmonisation will follow swiftly
• Two categories of RLAN
  – LPI (low power indoor) max. 200 mW
  – VLP (very low power) max. 25 mW
• Simple sharing conditions
  – No geolocation/database needed
  – OOB limits to protect ITS/CBTC systems below 5935 MHz. Stringent limit for VLP (-45 dBm/MHz) for further revision before end 2024
• What about “standard-power access point” (ie, 36 dBm eirp) in Europe at 6 GHz?
  – Possible interest: internet-access, wireless camera network …
  – Industry wanted to focus on mass-market RLAN, but “niche” market may bring socio-economic benefits
  – Reluctance with geolocation/database implementation from both industry and regulators

• To be harmonised in a second step?
  – Then, key question is geolocation/database in the European context
  – ANFR has developed a proof of concept based on blockchain
• 6425-7125 MHz is part of WRC-23 agenda item for IMT in Region 1
  – Key agenda item for mobile industry
  – Satellite protection will be challenging

• In case of IMT identification, including adequate measures to address satellite issue, what Europe will do?
  – Mid-band is critical for IMT in Europe: what next after 3400-3800 MHz?
  – Socio-economic impact of IMT vs unlicensed?
  – Measures to address fixed links: sharing or long-term refarming
Agostinho Linhares, Manager, Spectrum, Orbit and Broadcasting Division, Agência Nacional de Telecomunicações (ANATEL), Brazil

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6 GHz Global Momentum & Dynamic Access for Outdoor RLANs

CHUCK LUKASZEWSKI
VICE PRESIDENT, WIRELESS STRATEGY & POLICY
HEWLETT PACKARD ENTERPRISE
New DSA Whitepapers on 6 GHz

How to Realise the Full Potential of 6 GHz Spectrum
A White Paper
OCTOBER 2019

Automated Frequency Coordination

Automated Frequency Coordination
An Established Tool for Modern Spectrum Management
Global Regulator Momentum: Decisions, Consultations & RFIs

Issued

- **Chile** - October 22
- Costa Rica - Due Nov 2
- **Korea** - October 16
- Saudi Arabia - September
- Taiwan - August
- United Arab Emirates - June
- **United Kingdom** - July 24
- United States - April 23

Expected in Next 6 Months

- Brazil
- Canada
- Colombia
- **European Union** - March
- Mexico
- Japan
- Peru
**Device Classes in 6 GHz (FCC)**

**Low Power Indoor (LPI) AP**
- Fixed indoor only
- Up to 63X lower energy
- No antenna connectors
- No weatherproofing
- Wired power

**Subordinate Indoor Device**
- Same rules as LPI AP, **plus**
  - Under AP control
  - No direct Internet connection

**Standard Power (SP) AP**
- Fixed indoor / outdoor
- Controlled by AFC database
- Automated geolocation
- Pointing angle restriction

**Mobile Client**
- Indoor / outdoor
- 4X less power than connected AP

**Fixed Outdoor Device**
- Same rules as SP AP, **plus**
  - Attached to structure

**Very Low Power (VLP) AP**
- Mobile indoor / outdoor
- 160X lower energy

~2 Gbps throughput with sub-ms latency at 3m
6 GHz Channels in United States & Europe/CEPT

UNII-5

59 x 20 MHz
29 x 40 MHz
14 x 80 MHz
7 x 160 MHz

UNII-6

UNII-7

UNII-8

5925 MHz - 6425 MHz

5925 MHz
6425 MHz

5925 - 6425

24 x 20 MHz
12 x 40 MHz
6 x 80 MHz
3 x 160 MHz

= Low Power Indoor (LPI) Only
= LPI & Automatic Frequency Coordination (AFC)
= LPI & Very Lower Power (VLP)
= Preferred Scanning Channels (PSC)
**Tri-band access points** with **overlapping coverage layers** in 2.4 G Hz, 5 G Hz & 6 G Hz.
To protect licensed FS incumbents, a lightweight spectrum database solution called AFC will govern all standard power APs.

Each AFC AP is required to send its 3D geolocation to its AFC system before transmitting and every 24 hours thereafter.

Using the AFC systems calculate a protection area in front of every FS receiver using data in the FCC’s Universal Licensing System.

The AFC sends each AP a list of permissible operating frequencies in its location.
Dallas has numerous long-haul FS paths terminating on high-rise buildings downtown.

The Dallas Metroplex is relatively flat, resulting in reduced spectrum availability outdoors.
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Thank You