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WI/SI: FS\_6GHz\_LTE\_NR

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# 1 Introduction

Study on 6 GHz for LTE and NR in Licensed and Unlicensed Operations is the RAN level study item, which aims at capturing the latest information and status of the regulatory decisions for the 6GHz frequency range. In this discussion paper we present a text proposal for the corresponding TR 37.890 that captures new regulatory decisions in the ITU region 1 (EU/CEPT, Morocco, UAE), and Region 2 (Chile, Columbia).

# 2 Text proposal

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] RP-172804: “Feasibility Study on 6 GHz for LTE and NR”, Ericsson, Verizon Wireless, Qualcomm Incorporated.

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[4] FCC ONLINE TABLE OF FREQUENCY ALLOCATIONS, 47 C.F.R. § 2.106, December 13, 2017;

[5] FCC 17-104, Notice of Inquiry, “Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz”;

[6] Comments of IEEE 802, in GN Docket No. 17-183;

[7] APPLE INC., BROADCOM LIMITED,,CISCO SYSTEMS, INC., FACEBOOK, INC., GOOGLE LLC, HEWLETT PACKARD ENTERPRISE, INTEL CORPORATION,MEDIATEK INC., MICROSOFT CORPORATION, and QUALCOMM INCORPORATED, in GN Docket No. 17-183;

[8] Reply Comments of the Wireless Internet Service Providers Association, in GN Docket No. 17-183;

[9] Comments of Ericsson, in GN Docket No. 17-183;

[10] Comments of T-Mobile USA, in GN Docket No. 17-183;

[11] Comments of Verizon, in GN Docket No. 17-183;

[12] Reply Comments of the Satellite Industry Association, in GN Docket No. 17-183;

[13] Reply Comments of the Fixed Wireless Communications Coalition, in GN Docket No. 17-183;

[14] Comments of Dynamic Spectrum Alliance, in GN Docket No. 17-183;

[15] Comments of the National Spectrum Management Association, in GN Docket No. 17-183;

[16] Comments of CTIA, in GN Docket No. 17-183;

[17] Reply Comments of Cisco Systems, Inc., in GN Docket No. 17-183;

[18] Reply Comments of WI-FI Alliance, in GN Docket No. 17-183;

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[21] RSCOM17-53rev1- Mandate to CEPT to study and identify harmonised compatibility and sharing conditions for wireless access systems including radio local area networks in the band 5925-6425 MHz for the provision of wireless broadband services.

[22] ETSI TR 103 524 System Reference document (SRdoc), “Wireless Access Systems including Radio Local Area Networks (WAS/RLANs) in the band 5 925 MHz to 6 725 MHz”, v1.1.1, October 2018

[23] CEPT/ERC/REC 74-01: “Unwanted Emissions in the Spurious Domain”;

[24] ECC Report 302, “Sharing and compatibility studies related to Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) in the frequency band 5925-6425 MHz, May 2019.

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[26] ETSI TR 103 612, "IMT cellular networks; Mobile/Fixed Communication Network (MFCN) in the frequency range 6 425 - 7 125 MHz", v1.1.1, December 2019

[27] ETSI TR 103 631, "Wireless Access Systems including Radio Local Area Networks (WAS/RLANs) in the band 6 725 MHz to 7 125 MHz", v1.1.1, March 2019

[28] ECC Report 302, “Sharing and compatibility studies related to Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) in the frequency band 5925-6425 MHz”

[29] CCSA-TC5-WG8-2019-003 Project Proposal on the feasibility study of IMT system using 5925-7125MHz frequency band, [http://www.ccsa.org.cn/tc/meeting.php?meeting\_id=6243#](http://www.ccsa.org.cn/tc/meeting.php?meeting_id=6243)

[30] World Radiocommunication Conference 2019 (WRC-19) Provisional Final Acts, ITU-R <https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.13-2019-PDF-E.pdf>

[31] Report and order and further notice of proposed rulemaking, FCC 20-51

[32] ECC Report 316, “Sharing studies assessing short-term interference from Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) into Fixed Service in the frequency band 5925-6425 MHz”, 21 May 2020

[33] CEPT Report 075, “to study feasibility and identify harmonised technical conditions for Wireless Access Systems including Radio Local Area Networks in the 5925-6425 MHz band for the provision of wireless broadband services”; Report B: Harmonised technical parameters for WAS/RLANs operating on a coexistence basis with appropriate mitigation techniques and/or operational compatibility/coexistence conditions, operating on the basis of a general authorisation. , November 2020

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### 4.1.4 Saudi Arabia

On 28th January 2021, Saudi Arabia Communications & Information Technology Commission announced its intention to allocate the entire 5925 – 7125 MHz band for license-exempt [41].

On 10th June 2021 Saudi Arabia Communications & Information Technology Commission (CICT) opened a public consultation to update the Radio Spectrum Allocation and Use Regulation for WLAN Applications [50].

On 22nd of August 2021, CITC opened a further consultation [51] on Light Licensing regime to optimize efficient use of spectrum addressing seven frequency ranges within 4-94 GHz, including the 6 GHz band for high power WLAN and Low Power 5G services (NR-U) (mobile).

On 1st January 2022, Saudi Arabia Communications & Information Technology Commission has published “WLAN Regulations” [52] which is now in effect and replaces previously published “Wireless Local Area Networks (WLAN/Wi-Fi) Usage Regulations”. Technical conditions for operation in the 5925-7125MHz frequency range are as follows:

- indoor access point with maximum EIRP of 1000mW and PSD of 10mW/MHz;

- indoor client device with maximum EIRP of 250mW and PSD of 10mW/MHz.

### 4.1.5 United Arab Emirates

On December 2020, the telecommunications Regulatory Authority (TRA) has designated an additional 500 MHz radio spectrum, specifically 5925-6425MHz, for indoor use at an EIRP of 250 mW under class authorization [53].

### 4.1.6 African Telecommunication Union

In July 2021, ATU approved the ATU-R Recommendation 005-0 [57] recommending to its member states to designate the frequency band 5925–6425 MHz for use by WAS/RLAN equipment restricted to VLP (both outdoor and indoor use) and LPI use only on a non-exclusive, non-interference and non-protected basis, with the following main operating conditions:

- Low power indoor:

- 23dBm mean EIRP and 10dBm/MHz mean EIRP density;

- Restricted to indoor use only, Outdoor use (including in road vehicles) is not permitted;

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- Very low power indoor and outdoor:

- 14dBm mean EIRP and 1dBm/MHz mean EIRP density;

- Very Low Power device is a portable device. Use on drones is prohibited;

In September 2021, in its 2nd ATU Preparatory Meeting for World Radiocommunication Conference 2023 (APM23-2), ATU supported, as a preliminary decision, to identify the 6.425-7.125 GHz band for IMT, taking into account ITU coexistence studies outcomes [58].

### 4.1.7 Morocco

On May 2021, the Moroccan National Telecommunications Regulatory Agency (ANRT) published a new decision on Short Range Devices (SRD) in 5925-6425MHz frequency range [54] with the following technical parameters:

- 23dBm EIRP for indoor usage only, not allowed inside vehicles;

- 14dBm EIRP for indoor and outdoor usage for the portable devices, not allowed for unmanned flying devices (i.e. drones).

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### 4.2.5 Chile

On 22th October 2020, Ministry of Transport and Communication of Chile published Resolution 1985 according to which low power access equipment, also referred to as AP, may operate in the frequency band 5925-7125 MHz under exclusive use for indoor environment and the following transmission power requirements:

- maximum EIRP of 30dBm;

- maximum spectral density of 5dBm/MHz.

- low-power AP equipment may only have integrated antennas, which cannot be removable or replaceable, nor may they have connectors that allow the connection of additional external antennas;

- likewise, they should not be able to operate with internal batteries or have spaces for their installation

User terminal devices that are associated with low power AP equipment must operate at the following power levels:

- maximum EIRP of 24dBm;

- maximum spectral density of -1dBm/MHz.

On July 2021, the Chilean authority developed Resolution 1321 [55] on July 2021 updating Resolution 1985 and covering the technical standard for short range devices in Chile:

- very low power devices with personal reach may operate outdoors, using internal batteries, in the 5925-7125 MHz frequency band;

- the maximum average EIRP power is 17 dBm.

### 4.2.6 Mexico

The Instituto Federal de Telecomunicaciones (IFT) in Mexico has opened a public consultation for the 5925-7125 MHz frequency band with the objectives to establish the technical operating conditions of WAS/RLAN systems that could make use of the of the 5925-7125 MHz frequency band and to increase the harmonization based on international best practices and existing technological advances.

### 4.2.7 Honduras

The National Telecommunications Commission (CONATEL) of Honduras has published Resolution NR 003/21 [48], which updates the National Frequency Allocation Plan (PNAF) to open the use of the 5925-7125MHz frequency range for the license-exempt usage.

### 4.2.8 Costa Rica

The Superintendencia de Telecomunicaciones (SUTEL) in Costa Rica has published its Plan Nacional de Atribución de Frecuencias (PNAF) [49], according to which the 5925-7125MHz frequency range is opened for the license-exempt usage with the following technical conditions:

- maximum EIRP is 30dBm;

- maximum output power of the equipment is 24dBm;

- unlicensed usage is allowed at the following conditions:

- low power indoor applications (LPI) in accordance with the power limits indicated above;

- very low power (VLP) indoors and outdoors with a maximum EIRP of 14 dBm;- LPI applications are restricted to operation inside buildings for RLAN type systems (wireless local area networks) or similar, which use contention protocols to get access to the environment;

- VLP applications are for portable or similar type devices, limited in power, allowing connectivity over short distances.

### 4.2.9 Colombia

On October 2021, Colombian National Agency (Agencia Nacional del Espectro) released a new resolution [56] according to which the 5925-7125MHz frequency range is opened for the license-exempt operation with the following main technical parameters:

- only indoor usage is allowed;

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- maximum EIRP of 30dBm for AP devices with maximum PSD of 5dBm/MHz;

- maximum EIRP of 24dBm for CL devices with maximum PSD of -1dBm/MHz;

- the spectral density should be attenuated 20 dB at a distance of 1 MHz from the end of the channel, 28 dB at a distance of one channel apart from the center of the channel, and 40 dB at a distance of 1.5 channels apart from the center of the channel;

- emissions outside the 5925-7125MHz frequency range should be limited to -27 dBm/MHz;

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## 4.5 Regulatory parameters comparative for license-exempt

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Region | Country | Permissible operation  (Note 1) | Frequency range | Maximum mean EIRP for in-band emissions | Maximum mean EIRP density for in-band emissions | Maximum mean EIRP density for out-of-band emissions |
| Region 1 | EU/CEPT | LPI (see 4.1.1) | 5945 – 6425MHz | 23dBm | 10dBm/MHz | -22 dBm/MHz  (below 5935MHz) |
| VLP (see 4.1.1) | 14dBm | 1dBm/MHz  10dBm/MHz (for the narrowband usage) | -45 dBm/MHz  (below 5935MHz); |
|  |  |  |  |  |  |
| UK | LPI (see 4.1.3) | 5925 – 6425MHz | 24dBm | 11dBm/MHz | In accordance with directive 2014/53/EC |
| VLP (see 4.1.3) | 14dBm |  |
|  |  |  |  |  |  |
| UAE | LPI (see 4.1.5) | 5925 – 6425MHz | 24 dBm |  |  |
|  |  |  |  |  |  |
| Morocco | LPI (see 4.1.7) | 5925 – 6425MHz | 23 dBm |  |  |
| VLP (see 4.1.7) | 14 dBm |  |  |
|  |  |  |  |  |  |
| Saudi Arabia | LPI (see 4.1.4) | 5925 – 7125MHz | 30dBm (AP)  24dBm (CL) | 10dBm/MHz |  |
|  |  |  |  |  |  |  |
| Region 2 | US | SP (see 4.2.1) | 5925 – 6425MHz  6525 – 6875MHz | 36dBm (AP)  30dBm (CL) | 23dBm/MHz (AP)  17dBm/MHz (CL) | -27 dBm/MHz  (outside operational range) |
| LPI (see 4.2.1) | 5925 – 7125MHz | 30dBm (AP)  24dBm (CL) | 5 dBm/MHz (AP)  -1 dBm/MHz (CL) |
|  |  |  |  |  |  |
| Canada | SP (see 4.2.2) | 5925-6875 MHz | 36dBm | 23dBm/MHz |  |
| LPI (see 4.2.2) | 5925-7125 MHz | 30dBm | 5 dBm/MHz |  |
| VLP (see 4.2.2) | 14dBm | -8dBm/MHz |  |
|  |  |  |  |  |  |
| Brazil | LPI (see 4.2.3) | 5925 – 7125MHz | 30dBm (AP)  24dBm (CL) | 5dBm/MHz (AP)  -1dBm/MHz (CL) | -27 dBm/MHz (outside operational range) |
| VLP (see 4.2.3) | 17 dBm | -5 dBm/MHz |
|  |  |  |  |  |  |
| Peru | LPI (see 4.2.4) | 5925 – 7125MHz | 30dBm (AP)  24dBm (CL) | 5dBm/MHz (AP)  -1dBm/MHz (CL) |  |
|  |  |  |  |  |  |
| Chile | LPI (see 4.2.5) | 5925 – 7125MHz | 30dBm (AP)  24dBm (CL) | 5dBm/MHz (AP)  -1dBm/MHz (CL) |  |
| VLP (4.2.5) | 17 dBm |  |  |
|  |  |  |  |  |  |
| Colombia | LPI (see 4.2.9) | 5925 – 7125MHz | 30dBm (AP)  24dBm (CL) | 5dBm/MHz (AP)  -1dBm/MHz (CL) | -27 dBm/MHz (outside operational range) |
|  |  |  |  |  |  |  |
| Region 3 | South Korea | LPI (see 4.3.2) | 5925 – 7125MHz | 24dBm | 2dBm/MHz | -27 dBm/MHz (outside operational range) |
| VLP (see 4.3.2) | 5925 – 6425MHz | 14dBm | 1dBm/MHz | -34 dBm/MHz (outside operational range of the VLP mode) |
| Note 1: For the exact conditions of operation, refer to the sub-clause which is mentioned in parenthesis (e.g. for the exact conditions for operating SP in US, refer to sub-clause 4.2.1.) | | | | | | |

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