**3GPP TSG RAN meeting #103 Revised RP-240274**

**Maastricht, Netherlands, March 18-21, 2024**

**Source:** Ericsson, Apple

**Title:** TP to TR 37.890 – WRC-23 outcomes

**Agenda item:** 9.2.1

**Document for:** Approval

# Introduction

The RAN-led study item on 6 GHz band for LTE and NR captures the latest status of Regulators decision for the 6 GHz frequency range.

This contribution is capturing WRC-23 outcomes on the upper 6 GHz frequency band.

# Text proposal

<Start of changes>

# 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.

[3] ITU-R Radio Regulations, Articles, Edition 2016.

[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.

[19] PART 15 - Radio Frequency Devices, Title 47 of electronic Code of Federal Regulations.

[20] The European Table of Frequency Allocations and applications in the frequency range 8.3 kHz and 3000 GHz (ECA Table), October 2017.

[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.

[25] FCC Notice of Proposed Rulemaking. FCC 18-147. October 24, 2018.

[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.

[34] ECC Decision (20)01; “On the harmonised use of the frequency bands 5945 to 6425 MHz for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLAN)”, November 2020.

[35] ETSI TR 103 524, "System Reference document (SRDoc); Wireless access systems including radio local area networks (WAS/RLANs) in the band 5925 MHz to 6725 MHz".

[36] EN 303 687, "6 GHz RLAN Harmonised Standard for access to radio spectrum", Draft

[37] RP-201438, LS to 3GPP TSG RAN – ENG (18th meeting of the RCC Commission on Spectrum and Satellite Orbits),

[38] CEPT Report 073, "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 A: Assessment and study of compatibility and coexistence scenarios for WAS/RLANs in the band 5925-6425 MHz, Approved on 6 March 2020 by ECC.

[39] Korea’s Ministry of Science and ICT, "Technical standards for radio equipment for radio stations", URL: <https://www.law.go.kr/admRulLsInfoP.do?admRulSeq=2100000196974>

[40] Ofcom, "Improving spectrum access for Wi-Fi; Spectrum use in the 5 GHz and 6 GHz bands", July 2020, URL: <https://www.ofcom.org.uk/__data/assets/pdf_file/0036/198927/6ghz-statement.pdf>

[41] Communications & Information Technology Commission, "Spectrum Outlook for Commercial and Innovative Use 2021- 2023", January 2021, URL: <https://www.citc.gov.sa/ar/new/publicConsultation/Documents/Spectrum%20Outlook%20for%20Commercial%20and%20Innovative%20(2021-2023).pdf>

[42] Innovation, Science and Economic Development Canada, "Decision on the Technical and Policy Framework for Licence-Exempt Use in the 6 GHz Band", May 2021, URL: <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11698.html>

[43] National Telecommunications Agency (ANATEL), "ACT NO. 1306", February 2021, URL: <https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?eEP-wqk1skrd8hSlk5Z3rN4EVg9uLJqrLYJw_9INcO7uvjUt3vSOwT_4Z5fukj9yIzPErY4KWH5cpE9W_9hcTZkCG-vLPIdpXyuhgMG-L9M-uBLoSdAAXO0clb3SIt1i>

[44] Ministerio de Transportes y Comunicaciones, "Resolución Ministerial N° 373-2021-MTC/01", April 2021, URL: <https://cdn.www.gob.pe/uploads/document/file/1861732/Resolución%20Ministerial%20nro%20373-2021-MTC/01.pdf>

[45] MINISTERIO DE TRANSPORTES Y TELECOMUNICACIONES; SUBSECRETARÍA DE TELECOMUNICACIONES, "RESOLUCIÓN 1985 EXENTA", October 2020, URL: <https://www.bcn.cl/leychile/navegar?idNorma=1109333&idParte=9841504&idVersion=&r_c=6>

[46] RP-210957, Liaison statement to 3GPP TSG RAN on inclusion of the frequency band 6425-7125 MHz in 3GPP specification for 5G-NR/IMT-2020 systems, Regional Commonwealth in the filed of Communications.

[47] COMMISSION IMPLEMENTING DECISION (EU) 2021/1067, on the harmonised use of radio spectrum in the 5 945-6 425 MHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs), 17 June 2021.

[48] The National Telecommunications Commission (CONATEL) of Honduras, "Resolution NR 003/21", March 2021, URL: http://www.conatel.gob.hn/doc/Regulacion/resoluciones/2021/NR003-21.pdf

[49] The Superintendencia de Telecomunicaciones (SUTEL), "DECRETO EJECUTIVO N° 42924-MICITT", April 2021, URL: <https://www.imprentanacional.go.cr/pub/2021/04/30/ALCA87_30_04_2021.pdf>

[50] Communications & Information Technology Commission, "Radio Spectrum Allocation and Use Regulation for WLAN Application", June 2021, URL: <https://www.citc.gov.sa/en/new/publicConsultation/Documents/144207-en.pdf>

[51] Communications & Information Technology Commission, “Public Consultation on Spectrum Light Licensing”, August 2021, URL: <https://www.citc.gov.sa/ar/new/publicConsultation/Documents/EN_PublicConsultationonLightLicensing-144301.pdf>

[52] Communications & Information Technology Commission, “WLAN regulations”, January 2022, URL: https://www.citc.gov.sa/en/mediacenter/pressreleases/Pages/2022022101.aspx

[53] UAE Telecommunication Regulatory Authority, "Ultra-Wide Band and Short Range Devices", Version 4.0, December 2020, URL: https://tdra.gov.ae/-/media/About/regulations-and-ruling/EN/UWB-and-SRD-Regs-V4-0-pdf.ashx

[54] National Telecommunications Regulatory Agency (ANRT), "Decision ANRT/DG/N°07/21", May 2021, URL: https://www.anrt.ma/sites/default/files/decision\_a2fp\_-vf-\_mod\_07.05.2021.pdf

[55] MINISTERIO DE TRANSPORTES Y TELECOMUNICACIONES; SUBSECRETARÍA DE TELECOMUNICACIONES, "RESOLUCIÓN 1325 EXENTA", July 2021, URL: <https://www.bcn.cl/leychile/navegar?idNorma=1162978&idParte=10255091>

[56] Agencia Nacional del Espectro (ANE), "Por medio de la cual se modifica la Resolución 105 de 2020 y se actualiza el Cuadro Nacional de Atribución de Bandas de Frecuencia", October 2021, URL: <https://www.ane.gov.co/Documentos%20compartidos/ArchivosDescargables/Normatividad/Planeacion_del_espectro/RESOLUCIÓN%20No%20000105%20DE%2027-03-2020(1)%20(1).pdf>

[57] African Telecommunication Union, "ATU-R Recommendation 005-0", July 2021, URL: https://www.atuuat.africa/wp-content/uploads/2021/08/En\_ATU-R-Recommendation-005-0.pdf

[58] African Telecommunication Union, "2nd ATU Preparatory Meeting for WRC-23 (APM23-2); Agenda Item 1.2", September 2021, URL: https://docs.google.com/document/d/1u0Oz6o3gnH6oTGY-sE6\_BTarNf2RUuSx/edit

[59] RCC Recommendation 1/21 "Harmonization of the technical conditions for 5G-NR / IMT-2020 systems in the RCC countries in the frequency band 6 425-7 125 MHz or in its portions" (RP-213605).

[60] Recommendation ITU-R SM.329-12, Unwanted emissions in the spurious domain, 09/2012.

[61] The Australian Communications and Media Authority, "Radiocommunications (Low Interference Potential Devices) Class Licence Variation 2022 (No. 1)", March 2022, URL: <https://www.legislation.gov.au/Details/F2022L00249/Html/Text>

[62] HKCA 1081, "PERFORMANCE SPECIFICATION FOR RADIOCOMMUNICATIONS APPARATUS OPERATING IN THE 6 GHz BAND FOR WIRELESS LOCAL AREA NETWORK", April 2022, URL: https://www.ofca.gov.hk/filemanager/ofca/en/content\_401/hkca1081.pdf

[63] Radio Spectrum Management, "WLAN use in the 6 GHz Band: Outcomes and Other Updates", August 2022, URL: <https://www.rsm.govt.nz/projects-and-auctions/completed-projects/wlan-use-in-the-6-ghz-band/>

[64] Ministry of Internal Affairs and Communications, "Technical conditions for introduction of 6GHz band wireless LAN", April 2022, URL: <https://www.soumu.go.jp/menu_news/s-news/01kiban12_02000142.html>

[65] Malaysian Communications and Multimedia Commission (MCMC), "Class Assignment No. 1 of 2022", January 2022, URL: <https://www.mcmc.gov.my/skmmgovmy/media/General/CA-No-1-of-2022_-signed_19012022.pdf>

[66] Communications Authority of Kenya (CAK), "Guidelines On the Use of Radiofrequency Spectrum by Short Range Devices", June 2022, URL: <https://www.ca.go.ke/wp-content/uploads/2022/07/Guidelines-on-the-Use-of-Radiofrequency-Spectrum-by-Short-Range-Devices-2022.pdf>

[67] Communications Regulatory Authority (CRA), "Class License for the use of RLAN devices over 5925-6425 MHz Band", April 2022, URL: <https://www.cra.gov.qa/-/media/System/D/2/5/8/D258CF18B83A5613B0D590193CB799CB/Class-License-WIFI-6E-Final-English-032022--V3.ashx>

[68] The Hashemite Kingdom of Jordan Telecommunications Regulatory Commision (TRC), "Short Range Station License", May 2022, URL: <https://trc.gov.jo/EchoBusV3.0/SystemAssets/PDF/AR/الطيف%20الترددي%20الراديوي/ترخيص%20الترددات/التعليمات%20والاجراءات/20be3e3e-3013-47cf-8cbc-b0280118acc0_SRD%20license.pdf>

[69] <void>

[70] MINISTERIO DE TRANSPORTES Y TELECOMUNICACIONES; SUBSECRETARÍA DE TELECOMUNICACIONES, "RESOLUCIÓN 2844 EXENTA MODIFICA RESOLUCIÓN N° 1.985 EXENTA, DE 2017, DE LA SUBSECRETARÍA DE TELECOMUNICACIONES", September 2022, URL: <https://www.bcn.cl/leychile/navegar?idNorma=1181305&idVersion=2022-09-14>

[71] Agencia Nacional del Espectro (ANE), "RESOLUCIÓN No. 000737", November 2022, URL: <https://www.mintic.gov.co/portal/715/articles-273182_recurso_1.pdf>

[72] Instituto Dominicano de las Telecomunicaciones (INDOTEL), "RESOLUCIÓN NÚM. 082-2022", September 2022, URL: <https://transparencia.indotel.gob.do/media/217225/res_082_2022.pdf>

[73] Korea’s Ministry of Science and ICT, "Technical standards for radio equipment for radio stations", URL: <https://www.law.go.kr/admRulLsInfoP.do?admRulSeq=2100000217697&vSct=202275>

[74] Ministry of the digital development and communication, "Заседание ГКРЧ от 23 декабря 2022 г. (протокол № 22-65)", December 2022, URL: <https://digital.gov.ru/ru/documents/8628/>

[75] Instituto Federal de Telecomunicaciones, "El pleno del IFT clasifica la banda de 5925-6425 MHz como espectro libre", February 2023, press release 013/2023

[76] Ente Nacional de Comunicaciones (ENACOM), "Resolución 756/2023", May 2023, URL: <https://www.boletinoficial.gob.ar/detalleAviso/primera/287126/20230524>

[77] Ministry of Industry and Information Technology, "中华人民共和国无线电频率划分规定", July 2023, URL: <https://www.miit.gov.cn/cms_files/filemanager/1226211233/attach/20236/9086700eed45430bafe236efd1096fd3.pdf>

[78] Public Consultation on Assignment Arrangements of Spectrum in 6/7 GHz Band Launched. URL: [*https://www.coms-auth.hk/en/media\_focus/press\_releases/index\_id\_2325.html*](https://www.coms-auth.hk/en/media_focus/press_releases/index_id_2325.html)

[79] Independent Communications Authority of South Africa (ICASA), "NOTICE TO AMEND ANNEXURE B OF THE RADIO FREQUENCY SPECTRUM REGULATIONS", May 2023, URL: https://www.icasa.org.za/uploads/files/Notice-to-amend-Annexure-B-of-the-Radio-Frequency-Spectrum.pdf

[80] The Infocomm Media Development Authority (IMDA), "Technical Specification for Short Range Devices", September 2023, URL: <https://www.imda.gov.sg/~/media/imda/files/regulation%20licensing%20and%20consultations/ict%20standards/telecommunication%20standards/radio-comms/imdatssrd.pdf>

[81] FCC, "Unlicensed Use of the 6 GHz Band; Second Report and Order, Second Further Notice of Proposed Rulemaking, and Memorandum Opinion and Order", ET Docket No. 18-295; GN Docket No. 17-183, September 2023, URL: https://docs.fcc.gov/public/attachments/DOC-397315A1.pdf

[82] Resolution COM4/7 (WRC-23), Terrestrial component of International Mobile Telecommunications (IMT) within the frequency band 6 425-7 125 MHz, Provisional Final Acts: <https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.15-2023-PDF-E.pdf>

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## 4.0 General

The Mobile allocation in the frequency range 5.925-7.125 GHz, which is allocated at International level to Mobile services on a primary basis in all Regions, as per ITU Table of frequency allocation [3] summarized in Table 4.0-1, has not yet been implemented at National level in most countries. On the contrary, this frequency range is already used by several services which may impose constraints on any new users.

Table 4.0-1: ITU allocation to services in 5.925-7.145 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range [MHz] | Allocations | | |
| Region 1 | Region 2 | Region 3 |
| 5 925 - 6 700 | FIXED 5.457  FIXED SATELLITE (Earth-to-space) 5.457A 5.457B  MOBILE 5.457C  5.149 5.440 5.458 | | |
| 6 700 - 7 075 | FIXED  FIXED SATELLITE (Earth-to-space) (space-to-Earth) 5.441  MOBILE  5.458 5.458A 5.458B | | |
| 7 075 – 7 145 | FIXED  MOBLE  5.458 5.459 | | |

The FCC notice of proposed rulemaking is available in [25].

The CEPT 5925-6425 MHz regulatory requirements are available in [34].

## 4.0a WRC-23

WRC-23 (20 November - 15 December 2023) approved Resolution COM4/7 [82], adding the footnotes 5.6A12, 5.6B12 and 5.6C12 to frequency ranges 5 925-6 700 MHz, 6 700-7 075 MHz and 7 075-7 145 MHz, as shown in Figure 4.4-1.

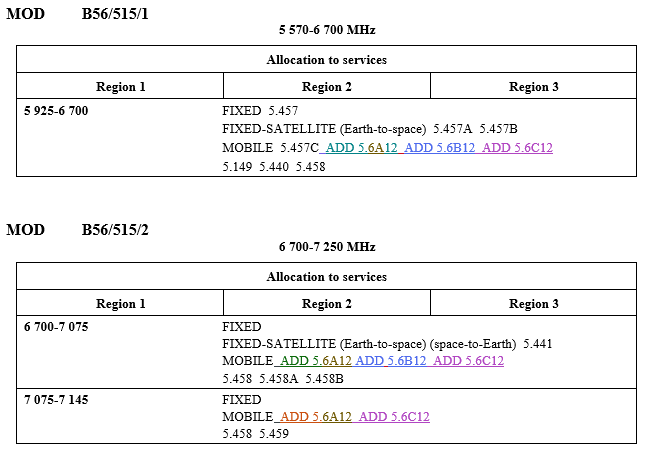


Figure 4.4-1: Radio Regulations updates approved in WRC-23

With the following footnotes:

* **5.6A12** The frequency bands 6 425-7 125 MHz in Region 1 and 7 025-7 125 MHz in Region 3 are identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution **COM4/7 (WRC-23)** applies.

The frequency bands are also used for the implementation of wireless access systems (WAS), including radio local area networks (RLANs). (WRC-23)

* **5.6B12** In Cambodia, Lao P.D.R. and the Maldives, the frequency band 6 425-7 025 MHz is identified for the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution **COM4/7 (WRC-23)** applies. (WRC-23)
* **5.6C12** In Brazil and Mexico, the frequency band 6 425-7 125 MHz is identified for the terrestrial component of International Mobile Telecommunications (IMT). The use of this frequency band for the implementation of IMT is subject to seeking agreement under No. **9.21** with neighbouring countries. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution **COM4/7 (WRC‑23)** applies.

The frequency band is also used for the implementation of wireless access systems (WAS), including radio local area networks (RLANs). (WRC-23)

The Resolution COM4/7 [82] resolves that, when implementing IMT:

* In order to ensure protection of FSS (Earth-to-space), the level of expected EIRP spectral density emitted by an IMT base station as a function of the vertical angle above the horizon shall not exceed the values specified in Table 4.4-1.

Table 4.4-1: EIRP density mask

|  |  |
| --- | --- |
| Vertical angle range θ*L* ≤ θ < θ*H* (vertical angle θ above horizon) | Expected EIRP  (dBm/MHz)  (See NOTES 1, 2 and 3) |
| 0° ≤ θ < 5° | 27 |
| 5° ≤ θ < 10° | 23 |
| 10°≤ θ < 15° | 19 |
| 15°≤ θ < 20° | 18 |
| 20°≤ θ <30° | 16 |
| 30°≤ θ < 60° | 15 |
| 60°≤ θ ≤ 90° | 15 |
| NOTE 1: The expected EIRP is defined as the average value of the EIRP, with the averaging being performed:  ‒ over horizontal angles from −180° to +180°, with the IMT base station beamforming in a specific direction within its horizontal and vertical steering range,  ‒ over different beamforming directions within the IMT base station horizontal and vertical steering range, and  ‒ over the specified vertical angle range θL ≤ θ < θH.  NOTE 2: An IMT base station shall comply with the specified limits on expected EIRP spectral density for all mechanical tilts with which it can be deployed, taking into account considering m).  NOTE 3: The Annex to the Resolution COM 4/7 [82] provides additional details on how the expected EIRP can be calculated for this frequency band, see Annex A. | |

* Administrations wishing to implement IMT in the frequency band 6 700-7 075 MHz shall - ensure the protection, continued use and future development of FSS (space-to-Earth) stations through the adoption of site-specific coordination.

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#### 4.1.1.3 Unlicensed operations

##### 4.1.1.3.0 Background

In December 2017, EC Radio Spectrum Committee finalized the Mandate to CEPT [21] to study and identify harmonised compatibility and sharing technical conditions for a sustainable and efficient use on a shared basis of the frequency range 5.925-6.425 GHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLANs).

CEPT created two project teams, ECC SE 45 (coexistence) and ECC FM 57 (regulatory). ECC SE 45 was tasked to undertake compatibility and sharing studies in the 5.925-6.425 GHz frequency range to support ECC FM 57, and the latter defined the regulatory rules for the band. The scope of the work items in these groups was the introduction of low power wireless access systems (including RLAN) in the frequency range 5.925-6.425 GHz under a licence-exempt / general authorisation regulatory regime, ensuring certainty of continued operation, development and protection of existing services (Fixed Services (FS), Fixed Satellite Service (FSS)) considering RR 5.440 and 5.458.

ETSI has published the TR 103 524 [22] providing information on the technical parameters for WAS/RLANs to support the CEPT Work Items activities covering the frequency range 5.925 GHz to 6.425 GHz. In addition, it contains a request for considering additional frequencies up to 6.725 GHz. Furthermore, ETSI published TR 103 631 [27] providing information on the intended applications, the technical parameters, mitigation techniques, the relation to the existing spectrum regulation and additional new radio spectrum requirements for technology neutral wireless access systems including radio local area networks (WAS/RLANs) capable of operating in the 6725 MHz to 7125MHz range.

The ECC Report 302 [24] on sharing and compatibility studies related to Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) in the frequency band 5925-6425 MHz, developed by ECC SE45, used the technical characteristics specified in the ETSI TR 103 524 [22] for RLAN as starting point, and the technical parameters provided from ECC SE19 and ECC SE40 for FS and FSS respectively. It is to be noted that some of the technical parameters (for example max EIRP, TX unwanted emissions, etc.) for RLAN in the ETSI TR 103 524 may differ from the final rules for the band, depending on the results of the compatibility studies done by CEPT.

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Annex A: Annex to Resolution COM4/7 (WRC-23)

The EIRP of an IMT base station in the horizontal (azimuth) direction −π ≤ φ ≤ π and vertical (elevation) direction 0 ≤ θ ≤ π/2 above the horizon can be written as P(θ, φ; α, β). The parameters α and β are the horizontal and vertical beamforming directions, i.e. the angles towards which the base station electronically steers a beam. These are illustrated in Figure A-1 below.

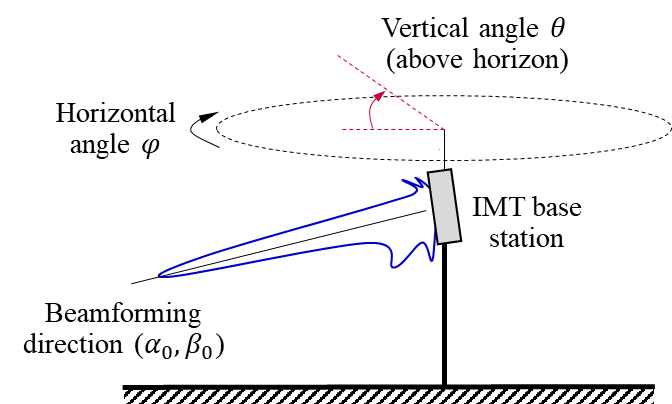


Figure A-1: Illustration of horizontal (azimuth) angle, vertical (elevation) angle and beamforming directions

The expected EIRP  of an IMT base station within a vertical angle range θ*L* ≤ θ < θ*H* can be calculated by averaging the EIRP *P*(θ, φ; α, β) of the base station as follows:

**1) Averaging over beamforming directions for a given vertical angle** θ0 **and horizontal angle** φ0**: for an AAS base station within a given horizontal and vertical steering range,** a sufficient sampling of *N* beamforming directions (α*n*, β*n*) *n*= 1 ... *N* is necessary to allow an accurate averaging of the expected EIRP.

The beamforming directions (α*n*, β*n*) have a uniform statistical angular distribution within the steering range of the IMT base station. In other words:



where *wn* refers to the weight for the *n*th beamforming direction, i.e. the fraction of the steering range represented by the *n*th beamforming direction. For example, *wn* = 1/*N* in the case that *N* uniform equispaced beams are assumed in the azimuth and elevation, respectively, and where each beam covers an equal range of angles.

The set of base station configurations over which the base station complies with the limits on expected EIRP (for example, power of steering range as one of the parameters) shall be declared and the BS shall be used within one of these configurations.

The set of EIRP values used to calculate the expected EIRP for each vertical angle range shall be a mathematical summation of both polarization states of the IMT base station antenna with no polarization discrimination.

**For a non-AAS base station,** *P*1(θ0, φ0) = *P*(θ0, φ0; α1, β1)where α1 = 0 and β1 is the electrical tilt.

It is noted that the compliance with the limits on expected EIRP should be limited to a defined range of electrical tilts.

**2) Averaging over horizontal and vertical angles**: the expected EIRP is then calculated by averaging the results of step 1 over horizontal angles φfrom −π to +π with respect to the base station horizontal boresight, and vertical angles θ within vertical angle measurement window θ*L* ≤ θ < θ*H* with respect to the horizon. In other words:



The averaging processes in steps 1 and 2 shall allow for accurate averaging of the expected EIRP (e.g. to the confidence interval of 95%).

Annex B: Change history

<End of changes>