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6 GHz WAS/RLAN - Harmonizirani standard za dostop do radijskega spektra

6 GHz WAS/RLAN Harmonised Standard for access to radio spectrum

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**6 GHz WAS/RLAN;
Harmonised Standard for access to radio spectrum
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Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Broadband Radio Access Networks (BRAN).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.2] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive and associated EFTA regulations.

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Introduction

6 GHz Wireless Access Systems (WAS) including RLAN equipment are used in wireless local area networks which provide high speed data communications in between devices connected to the wireless infrastructure. The present document also addresses ad-hoc networking where devices communicate directly with each other, without the use of a wireless infrastructure.

The spectrum usage conditions for equipment within the scope of the present document are set in the ECC Decision (20)01 [i.3] and Commission Implementing Decision (EU) 2021/1067 of 17.6.2021 [i.11].

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1 Scope

The present document specifies technical characteristics and methods of measurements for 6 GHz Wireless Access Systems including Radio Local Area Network (WAS/RLAN) equipment.

6 GHz WAS/RLAN equipment within the scope of the present document are covered by ECC and EU regulation as follows:

- ECC Decision (20)01 on the harmonised use of frequency band 5 945 MHz to 6 425 MHz for WAS/RLAN [i.3].
- Commission Implementing Decision (EU) 2021/1067 on the harmonised use of radio spectrum in the 5 945 MHz to 6 425 MHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs) [i.11].

NOTE 1: Descriptions of 6 GHz WAS/RLAN equipment categories and sub-categories are provided in clause 4.2.

This radio equipment is capable of operating in all or parts of the frequency bands given in table 1.

Table 1: Service frequency band

	Service frequency band
Transmit	5 945 MHz to 6 425 MHz
Receive	5 945 MHz to 6 425 MHz

The present document describes spectrum access requirements to facilitate spectrum sharing with other equipment.

NOTE 2: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.1] is given in annex A.

2 References

2.1 Normative references

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- [1] [IEEE 802.11ax™-2021](#): "IEEE Standard for Information Technology - Telecommunications and Information Exchange between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 1: Enhancements for High-Efficiency WLAN".
- [2] [ETSI TS 138 141-1 \(V17.8.0\) \(01-2023\)](#): "5G; NR; Base Station (BS) conformance testing Part 1: Conducted conformance testing (3GPP TS 38.141-1 version 17.8.0 Release 17)".
- [3] [ETSI TS 138 141-2 \(V17.8.0\) \(01-2023\)](#): "5G; NR; Base Station (BS) conformance testing Part 2: Radiated conformance testing (3GPP TS 38.141-2 version 17.8.0 Release 17)".

2.2 Informative references

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- [i.1] [Directive 2014/53/EU](#) of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [i.2] [Commission Implementing Decision C\(2015\) 5376 final of 4.8.2015](#) on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.
- [i.3] [ECC/DEC/\(20\)01 \(11-2020\)](#): "On the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN)".
- [i.4] ETSI EG 203 367 (V1.1.1) (06-2016): "Guide to the application of harmonised standards covering articles 3.1b and 3.2 of the Directive 2014/53/EU (RED) to multi-radio and combined radio and non-radio equipment".
- [i.5] ETSI TR 100 028-1 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".
- [i.6] ETSI TR 100 028-2 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".
- [i.7] ETSI TR 102 273-2 (V1.2.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 2: Anechoic chamber".
- [i.8] ETSI TR 102 273-3 (V1.2.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 3: Anechoic chamber with a ground plane".
- [i.9] ETSI TR 102 273-4 (V1.2.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 4: Open area test site".
- [i.10] [ERC Recommendation 74-01](#) (approved 1998, amended 29 May 2019, updated 1 October 2021 and corrected 23 May 2022): "Unwanted emissions in the spurious domain".
- [i.11] [Commission Implementing Decision \(EU\) 2021/1067 of 17.6.2021](#) 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).
- [i.12] ETSI EN 301 893: "5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in Directive 2014/53/EU [i.1] and the following apply:

6 GHz WAS/RLAN band: frequency range of 5 945 MHz to 6 425 MHz

adjacent signal: signal adjacent to the wanted signal

alternate adjacent channels: channel(s) offset from the wanted channel by twice the channel spacing

antenna assembly: combination of the antenna (integral or dedicated), its coaxial cable and if applicable, its antenna connector and associated switching components

NOTE 1: This term (antenna assembly) refers to an antenna connected to one transmit chain.

NOTE 2: The gain of an antenna assembly G in dBi, does not include the additional gain that may result out of beamforming.

backoff procedure: procedure that facilitates the sharing of the medium by randomizing the transmission attempts from multiple devices competing for access to a channel

beamforming gain: additional (antenna) gain realized by using beamforming techniques in smart antenna systems

NOTE: Beamforming gain as used in the present document does not include the gain of the antenna assembly.

burst: period during which radio waves are intentionally transmitted, preceded and succeeded by periods during which no data transmission is made

channel: continuous part of the radio-frequency spectrum used for transmission and reception by WAS/RLAN equipment and identified by a nominal centre frequency and a nominal bandwidth

NOTE: WAS/RLAN equipment is permitted to operate (transmit/receive) in one or more adjacent or non-adjacent channels simultaneously.

channel access engine: mechanism that determines when a transmission attempt is permitted

channel plan: list of channels with their centre frequencies and for each of the centre frequencies, the nominal bandwidth(s)

Clear Channel Assessment (CCA): mechanism used by an equipment to identify other transmissions in the channel

Contention Window (CW): main parameter that determines the duration of the backoff procedure

dedicated antenna: antenna external to the equipment, using an antenna connector with a cable or a wave-guide and which has been designed or developed for one or more specific types of equipment

Energy Detect (ED): mechanism used to determine the presence of transmissions in the channel based on detecting the signal energy of the transmission

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

Fixed Frame Period (FFP): periodic timing of the transmit/receive structure for Frame Based Equipment (FBE)

Frame Based Equipment (FBE): equipment where the transmit/receive structure has a periodic timing with a periodicity equal to the Fixed Frame Period (FFP)

frequency hopping: mechanism in which equipment switches between different hop frequencies within the 6 GHz WAS/RLAN band for its operations

hop frequency: centre frequency used for operations in the context of frequency hopping

initiating device: equipment that initiates a sequence of one or more transmissions

integral antenna: antenna designed as a fixed part of the equipment (without the use of an external connector) which cannot be disconnected from the equipment by a user with the intent to connect another antenna

NOTE 1: The term integral antenna is equivalent to integrated antenna.

NOTE 2: An integral antenna may be fitted internally or externally. In the case where the antenna is external, a non-detachable cable or wave-guide can be used.

Listen Before Talk (LBT): mechanism by which an equipment applies Clear Channel Assessment (CCA) before using the channel

Load Based Equipment (LBE): equipment where the transmit/receive structure is not fixed in time but demand-driven

Low Power Indoor Access Point (LPI AP): LPI access point or LPI bridge

NarrowBand (NB) device: VLP device that operates with a bandwidth below 20 MHz

observation slot: period during which the channel is checked for the presence of other transmissions

occupied channel: channel on which the channel access mechanism detected transmissions

post backoff : backoff procedure that is applied after every successful transmission

prioritization period: period consisting of an initial deferral period followed by an observation period during which the channel is checked for the presence of other transmissions

receive chain: receiver circuit with an associated antenna

responding device: equipment that transmits in response to the actions of an initiating device

smart antenna systems: equipment that combines multiple transmit and/or receive chains with a signal processing function to increase the throughput and/or to optimize its radiation and/or reception capabilities

stand-alone equipment: equipment that is intended primarily as radio communications equipment and that is normally used on a stand-alone basis

unoccupied channel: channel on which the channel access mechanism did not detect transmissions

WAS/RLAN: broadband radio systems that allow wireless access for public and private applications regardless of the underlying network topology

WAS/RLAN devices: components or sub-assemblies which intentionally emit and/or receive radio waves for the purpose of radio communication and are intended for incorporation into WAS/RLAN equipment

NOTE: Categories and sub-categories are provided in clause 4.2.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

A	measured power output
CW_{\min}	minimum Contention Window size
CW_{\max}	maximum Contention Window size
D	measured Power Spectral Density
dB	decibel
dBc	dB relative to the transmit power
dB _i	dB relative to the gain of an isotropic antenna
dBm	dB relative to 1 mW
dB _r	dB relative to the reference level
E	field strength
E_0	reference field strength
f_c	nominal centre frequency for 20 MHz channels
f_{c_offset}	frequency offset from the nominal centre frequency
G	antenna Gain
GHz	Gigahertz