

STN	6 GHz WAS/RLAN Harmonizovaná norma pre prístup k rádiovému spektru	STN EN 303 687 V1.1.1 87 3687
------------	---	---

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

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/23

Obsahuje: EN 303 687 V1.1.1:2023

137406



Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2023
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii v znení neskorších predpisov.

ETSI EN 303 687 V1.1.1 (2023-06)



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

Reference

DEN/BRAN-230021

Keywords

access, broadband, LAN, radio, regulation, testing

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from:

<https://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

If you find a security vulnerability in the present document, please report it through our
Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2023.
All rights reserved.

Contents

Intellectual Property Rights	8
Foreword.....	8
Modal verbs terminology.....	9
Introduction	9
1 Scope	10
2 References	10
2.1 Normative references	10
2.2 Informative references.....	11
3 Definition of terms, symbols and abbreviations.....	12
3.1 Terms.....	12
3.2 Symbols.....	13
3.3 Abbreviations	14
4 Technical requirements specifications	15
4.1 Environmental profile.....	15
4.2 Equipment categories	15
4.2.1 Description of categories	15
4.2.2 LPI category.....	15
4.2.3 VLP category	15
4.3 Conformance requirements	16
4.3.1 Nominal centre frequencies and nominal bandwidth.....	16
4.3.1.1 General	16
4.3.1.2 Definition	16
4.3.1.3 Limits	16
4.3.1.4 Conformance.....	16
4.3.2 RF output power	16
4.3.2.1 Definition	16
4.3.2.2 Limits	17
4.3.2.3 Conformance.....	17
4.3.3 Power Spectral Density.....	17
4.3.3.1 Definition	17
4.3.3.2 Limits	17
4.3.3.3 VLP NB usage with a PSD above 1 dBm/MHz.....	17
4.3.3.4 Conformance.....	17
4.3.4 Transmitter unwanted emissions.....	18
4.3.4.1 Transmitter unwanted emissions in the out-of-band domain	18
4.3.4.1.1 Definition.....	18
4.3.4.1.2 Limits	18
4.3.4.1.3 Conformance	18
4.3.4.2 Transmitter unwanted emissions in the spurious domain.....	18
4.3.4.2.1 Definition.....	18
4.3.4.2.2 Limits	18
4.3.4.2.3 Conformance	19
4.3.4.3 Transmitter unwanted emissions within the 6 GHz WAS/RLAN band.....	19
4.3.4.3.1 Definition.....	19
4.3.4.3.2 Limits	19
4.3.4.3.3 Conformance	21
4.3.5 Receiver spurious emissions	22
4.3.5.1 Definition	22
4.3.5.2 Limits	22
4.3.5.3 Conformance.....	22
4.3.6 Channel access mechanism.....	22
4.3.6.1 Applicability.....	22
4.3.6.2 Definition	22
4.3.6.3 Requirements and limits.....	22

4.3.6.3.1	Channel access mechanism for Frame Based Equipment (FBE).....	22
4.3.6.3.2	Channel access mechanism for Load Based Equipment (LBE)	24
4.3.6.3.3	ED Threshold level (Energy Detection Threshold level, FBE and LBE).....	29
4.3.6.3.4	Short Control Signalling transmissions (FBE and LBE)	30
4.3.6.4	Conformance.....	30
4.3.7	Receiver blocking	30
4.3.7.1	Definition	30
4.3.7.2	Performance criteria	30
4.3.7.3	Limits	30
4.3.7.4	Conformance.....	31
4.3.8	Receiver selectivity	31
4.3.8.1	Definition	31
4.3.8.2	Performance criteria	32
4.3.8.3	Limits	32
4.3.8.4	Conformance.....	32
4.3.9	Mechanical and electrical design	32
4.3.9.1	Power feeding	32
4.3.9.1.1	Description of types of power supply	32
4.3.9.1.2	Wired power connection equipment	33
4.3.9.2	Antenna design.....	33
4.3.9.2.1	Description of types of antenna design.....	33
4.3.9.2.2	Integral antenna	33
4.3.9.3	Conformance.....	33
4.3.10	User Access Restrictions	33
4.3.10.1	Definition	33
4.3.10.2	Requirements	33
4.3.10.3	Conformance.....	33
5	Testing for compliance with technical requirements.....	34
5.1	Environmental conditions for testing	34
5.1.1	Introduction.....	34
5.1.2	Normal test conditions	34
5.1.2.1	Normal temperature and humidity	34
5.1.2.2	Normal power source	34
5.1.3	Extreme test conditions.....	34
5.2	Interpretation of the measurement results	34
5.3	Definition of other test conditions	35
5.3.1	Test sequences	35
5.3.2	Test channels	35
5.3.3	Antennas	36
5.3.3.1	Integrated and dedicated antennas.....	36
5.3.3.2	Transmit operating modes.....	36
5.3.3.2.1	Operating mode 1 (single antenna).....	36
5.3.3.2.2	Operating mode 2 (multiple antennas, no beamforming)	37
5.3.3.2.3	Operating mode 3 (multiple antennas, with beamforming).....	37
5.3.4	Presentation of equipment	37
5.3.5	Measurement methods	37
5.4	Essential radio test suites.....	38
5.4.1	Product information	38
5.4.2	Nominal centre frequencies	39
5.4.2.1	Test conditions	39
5.4.2.2	Test methods	39
5.4.2.2.1	Conducted measurement.....	39
5.4.2.2.2	Radiated measurement.....	40
5.4.2.2.3	Test fixture measurement	40
5.4.3	RF output power	40
5.4.3.1	Test conditions	40
5.4.3.2	Test methods	41
5.4.3.2.1	Conducted measurement.....	41
5.4.3.2.2	Radiated measurement.....	42
5.4.3.2.3	Test fixture measurement	43
5.4.4	Power Spectral Density.....	43

5.4.4.1	Test conditions	43
5.4.4.2	Test methods	43
5.4.4.2.1	Conducted measurement.....	43
5.4.4.2.2	Radiated measurement.....	46
5.4.4.2.3	Test fixture measurement	46
5.4.5	Transmitter unwanted emissions outside the 6 GHz WAS/RLAN band	46
5.4.5.1	Test conditions	46
5.4.5.2	Test method.....	46
5.4.5.2.1	Conducted measurement.....	46
5.4.5.2.2	Radiated measurement.....	49
5.4.5.2.3	Test fixture measurement	49
5.4.6	Transmitter unwanted emissions within the 6 GHz WAS/RLAN band.....	49
5.4.6.1	Test conditions	49
5.4.6.2	Test method.....	49
5.4.6.2.1	Conducted measurement.....	49
5.4.6.2.2	Radiated measurement.....	51
5.4.6.2.3	Test fixture measurement	51
5.4.7	Receiver spurious emissions	51
5.4.7.1	Test conditions	51
5.4.7.2	Test methods	52
5.4.7.2.1	Conducted measurement.....	52
5.4.7.2.2	Radiated measurement.....	54
5.4.7.2.3	Test fixture measurement	54
5.4.8	Channel access mechanism.....	54
5.4.8.1	Test conditions	54
5.4.8.2	Test method for FBE.....	54
5.4.8.2.1	Additional test conditions	54
5.4.8.2.2	Conducted measurements	54
5.4.8.2.3	Generic test procedure for measuring channel/frequency usage	58
5.4.8.2.4	Radiated measurements	58
5.4.8.2.5	Test fixture measurement	59
5.4.8.3	Test method for LBE.....	59
5.4.8.3.1	Additional test conditions	59
5.4.8.3.2	Conducted measurements	59
5.4.8.3.3	Generic test procedure for measuring channel/frequency usage	67
5.4.8.3.4	Radiated measurements	67
5.4.8.3.5	Test fixture measurement	68
5.4.9	Receiver blocking	68
5.4.9.1	Test conditions	68
5.4.9.2	Test methods	68
5.4.9.2.1	Conducted measurement.....	68
5.4.9.2.2	Radiated measurement.....	69
5.4.9.2.3	Test fixture measurement	69
5.4.10	Receiver selectivity.....	70
5.4.10.1	Test conditions	70
5.4.10.2	Test methods	70
5.4.10.2.1	Conducted measurement.....	70
5.4.10.2.2	Radiated measurements	71
5.4.10.2.3	Test fixture measurement	71
5.4.11	Mechanical and electrical design	72
5.4.12	VLP NB operation with a PSD exceeding 1 dBm/MHz	72
5.4.12.1	Test conditions	72
5.4.12.2	Test methods	72
5.4.12.2.1	Conducted measurements	72
5.4.12.2.2	Radiated measurements	73
5.4.12.2.3	Test fixture measurement	73
5.4.13	Assessment procedure for UAR.....	74
5.4.13.1	Introduction.....	74
5.4.13.2	Test conditions	74
5.4.13.3	Test Method	74

Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	75
Annex B (normative):	Test sites and arrangements for radiated measurements.....	77
B.1	Introduction	77
B.2	Radiated test sites	77
B.2.1	Open Area Test Site (OATS)	77
B.2.2	Semi Anechoic Room (SAR)	78
B.2.3	Fully Anechoic Room (FAR)	79
B.2.4	Measurement distance	80
B.3	Antennas	81
B.3.1	Introduction	81
B.3.2	Measurement antenna.....	81
B.3.3	Substitution antenna	81
B.4	Test fixture	81
B.4.1	Introduction	81
B.4.2	Description of the test fixture	82
B.4.3	Using the test fixture for relative measurements at the lower and upper extreme temperatures	82
B.4.4	Using the test fixture for normalized measurements	82
B.4.5	Using the test fixture for level independent measurements	83
B.5	Arrangement of the radiated test sites	83
B.5.1	Introduction	83
B.5.2	Power supplies for the battery powered UUT	83
B.5.3	Site preparation	83
B.6	Coupling of signals.....	84
B.6.1	General	84
B.6.2	Data signals	84
B.7	Interference signals used for channel access mechanism tests.....	84
B.7.1	Additive White Gaussian Noise (AWGN) test signal	84
B.7.2	OFDM test signal 1	84
B.7.3	OFDM test signal 2	85
B.7.4	Interference signal characteristics	85
B.7.4.1	Verification of flatness and bandwidth	85
B.7.4.2	Measurement of PSD	86
B.7.5	Waveforms for test signals	86
Annex C (normative):	Procedures for radiated measurements.....	87
C.1	Introduction	87
C.2	Radiated measurements in an OATS or SAR.....	87
C.3	Radiated measurements in a FAR	88
C.4	Substitution measurement	88
C.5	Testing technical requirements on equipment with an integral antenna	88
C.5.1	Radio test suites and corresponding test sites.....	88
C.5.2	Channel access mechanism testing.....	89
C.5.2.1	Introduction.....	89
C.5.2.2	Measurement set up	89
C.5.2.3	Calibration of the measurement set up.....	89
C.5.2.4	Test method	90
C.5.3	Receiver blocking testing	90
C.5.3.1	Introduction.....	90
C.5.3.2	Measurement set up	90
C.5.3.3	Calibration of the measurement set up.....	91
C.5.3.4	Test method	91
C.5.4	Receiver selectivity testing.....	92

C.5.4.1	Introduction.....	92
C.5.4.2	Measurement set up	92
C.5.4.3	Calibration of the measurement set up.....	92
C.5.4.4	Test method	93
Annex D (informative):	Maximum measurement uncertainty	94
Annex E (informative):	Examples of spectrum masks.....	95
E.1	Introduction	95
E.2	Equipment configured for multi-channel operation in groups of four adjacent channels	95
E.2.1	Example 1.....	95
E.2.2	Example 2.....	95
E.2.3	Example 3.....	96
E.2.4	Example 4.....	96
E.3	Equipment configured for multi-channel operation in 8 adjacent channels.....	97
E.3.1	Example 5.....	97
E.3.2	Example 6.....	98
E.3.3	Example 7.....	98
E.3.4	Example 8.....	99
E.3.5	Example 9.....	99
Annex F (informative):	Change history	100
History		101

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

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.

National transposition dates	
Date of adoption of this EN:	27 June 2023
Date of latest announcement of this EN (doa):	30 September 2023
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 March 2024
Date of withdrawal of any conflicting National Standard (dow):	31 March 2025

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

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].

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

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference/>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- [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

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [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".

koniec náhľadu – text ďalej pokračuje v platenej verzii STN