

Draft **ETSI EN 301 893** V2.2.0 (2023-11)



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

(<https://standards.iteh.ai>)

Document Preview

[ETSI EN 301 893 V2.2.0 \(2023-11\)](https://standards.iteh.ai/catalog/standards/sist/0ca77ecb-2545-4982-8d9b-77e8a8e379fc/etsi-en-301-893-v2-2-0-2023-11)

<https://standards.iteh.ai/catalog/standards/sist/0ca77ecb-2545-4982-8d9b-77e8a8e379fc/etsi-en-301-893-v2-2-0-2023-11>



Reference

REN/BRAN-230016

Keywordsaccess, broadband, LAN, layer 1, radio, regulation,
testing

ETSI650 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 noticeThe 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	10
Foreword.....	10
Modal verbs terminology.....	11
Introduction	11
1 Scope	12
2 References	12
2.1 Normative references	12
2.2 Informative references.....	13
3 Definition of terms, symbols and abbreviations.....	14
3.1 Terms.....	14
3.2 Symbols.....	16
3.3 Abbreviations	17
4 Technical requirements for equipment operating in sub-band 1, sub-band 2 or sub-band 3.....	18
4.1 Environmental profile.....	18
4.2 Conformance requirements	19
4.2.1 Nominal centre frequency.....	19
4.2.1.1 General	19
4.2.1.2 Definition	19
4.2.1.3 Limits	19
4.2.1.4 Conformance.....	19
4.2.2 Nominal channel bandwidth and occupied bandwidth	19
4.2.2.1 Definition	19
4.2.2.2 Limits	19
4.2.2.3 Conformance.....	20
4.2.3 RF output power, Transmit Power Control (TPC) and Power Spectral Density (PSD).....	20
4.2.3.1 Definition	20
4.2.3.1.1 RF output power	20
4.2.3.1.2 Transmit Power Control (TPC)	20
4.2.3.1.3 Power Spectral Density (PSD)	20
4.2.3.2 Limits	20
4.2.3.2.1 General requirements.....	20
4.2.3.2.2 Limits for RF output power and PSD.....	20
4.2.3.3 Conformance.....	21
4.2.4 Transmitter unwanted emissions.....	21
4.2.4.1 Transmitter unwanted emissions outside the transmitter's operating bands.....	21
4.2.4.1.1 Definition.....	21
4.2.4.1.2 Limits	21
4.2.4.1.3 Conformance	21
4.2.4.2 Transmitter unwanted emissions within the transmitter's operating bands	22
4.2.4.2.1 Definition.....	22
4.2.4.2.2 Limits	22
4.2.4.2.3 Conformance	24
4.2.5 Receiver spurious emissions	24
4.2.5.1 Definition	24
4.2.5.2 Limits	24
4.2.5.3 Conformance.....	25
4.2.6 Dynamic Frequency Selection (DFS)	25
4.2.6.1 DFS general requirements.....	25
4.2.6.1.1 DFS function	25
4.2.6.1.2 DFS applicable frequency range.....	25
4.2.6.1.3 DFS operational modes	25
4.2.6.1.4 DFS operation.....	25
4.2.6.2 DFS technical requirements	27
4.2.6.2.1 Applicability.....	27

4.2.6.2.2	Channel Availability Check (CAC).....	27
4.2.6.2.3	Off-channel CAC.....	28
4.2.6.2.4	In-service monitoring	28
4.2.6.2.5	Channel shutdown	28
4.2.6.2.6	Non-occupancy period.....	29
4.2.6.2.7	Uniform spreading.....	29
4.2.7	Adaptivity (channel access mechanism).....	30
4.2.7.1	Applicability.....	30
4.2.7.2	Definition	30
4.2.7.3	Limits	30
4.2.7.3.1	Frame Based Equipment (FBE).....	30
4.2.7.3.2	Load Based Equipment (LBE)	33
4.2.7.3.3	Short Control Signalling (SCS) transmissions (FBE and LBE)	38
4.2.7.4	Conformance.....	38
4.2.8	Receiver blocking	38
4.2.8.1	Applicability.....	38
4.2.8.2	Definition	38
4.2.8.3	Performance criteria	39
4.2.8.4	Limits	39
4.2.8.5	Conformance.....	39
4.2.9	Adjacent channel selectivity	39
4.2.9.1	Applicability.....	39
4.2.9.2	Definition	39
4.2.9.3	Performance criteria	39
4.2.9.4	Limits	39
4.2.9.5	Conformance.....	40
4.2.10	User Access Restrictions (UAR)	40
4.2.10.1	Definition	40
4.2.10.2	Requirements	40
4.2.10.3	Conformance.....	40
5	Testing for compliance with technical requirements.....	41
5.1	Environmental conditions for testing	41
5.1.1	General conditions	41
5.1.2	Normal test conditions	41
5.1.2.1	Normal temperature and humidity	41
5.1.2.2	Normal power source	41
5.1.3	Extreme test conditions.....	41
5.2	Interpretation of the measurement results	41
5.3	Definition of other test conditions.....	42
5.3.1	Test sequences and traffic load.....	42
5.3.1.1	General test transmission sequences	42
5.3.1.2	Test transmission sequences for DFS tests.....	42
5.3.2	Test channels	42
5.3.3	Antennas	43
5.3.3.1	Integrated and dedicated antennas.....	43
5.3.3.2	Transmit operating modes.....	44
5.3.3.2.1	Operating mode 1 (single antenna).....	44
5.3.3.2.2	Operating mode 2 (multiple antennas, no beamforming)	44
5.3.3.2.3	Operating mode 3 (multiple antennas, with beamforming)	44
5.3.4	Presentation of equipment	44
5.3.5	Measurement methods	44
5.4	Essential radio test suites.....	45
5.4.1	Product information	45
5.4.2	Nominal centre frequency.....	47
5.4.2.1	Test conditions	47
5.4.2.2	Test methods	48
5.4.2.2.1	Conducted measurement.....	48
5.4.2.2.2	Radiated measurement.....	48
5.4.2.2.3	Test fixture measurement	48
5.4.3	Occupied bandwidth	48
5.4.3.1	Test conditions	48

5.4.3.2	Test methods	49
5.4.3.2.1	Conducted measurement.....	49
5.4.3.2.2	Radiated measurement.....	49
5.4.3.2.3	Test fixture measurement	49
5.4.4	RF output power, Transmit Power Control (TPC) and Power Spectral Density (PSD).....	50
5.4.4.1	Test conditions	50
5.4.4.2	Test methods	50
5.4.4.2.1	Conducted measurement.....	50
5.4.4.2.2	Radiated measurement.....	59
5.4.4.2.3	Test fixture measurement	59
5.4.5	Transmitter unwanted emissions outside the transmitter's operating bands.....	59
5.4.5.1	Test conditions	59
5.4.5.2	Test methods	60
5.4.5.2.1	Conducted measurement.....	60
5.4.5.2.2	Radiated measurement.....	62
5.4.5.2.3	Test fixture measurement	62
5.4.6	Transmitter unwanted emissions within the transmitter's operating bands.....	62
5.4.6.1	Test conditions	62
5.4.6.2	Test methods	62
5.4.6.2.1	Conducted measurement.....	62
5.4.6.2.2	Radiated measurement.....	64
5.4.6.2.3	Test fixture measurement	64
5.4.7	Receiver spurious emissions	64
5.4.7.1	Test conditions	64
5.4.7.2	Test methods	65
5.4.7.2.1	Conducted measurement.....	65
5.4.7.2.2	Radiated measurement.....	67
5.4.7.2.3	Test fixture measurement	67
5.4.8	Dynamic Frequency Selection (DFS).....	67
5.4.8.1	Test conditions	67
5.4.8.1.1	General test conditions	67
5.4.8.1.2	Selection of radar test signals	67
5.4.8.1.3	Test setups	68
5.4.8.2	Test methods	69
5.4.8.2.1	Conducted measurement.....	69
5.4.8.2.2	Radiated measurement.....	76
5.4.8.2.3	Test fixture measurement	76
5.4.9	Adaptivity (channel access mechanism).....	77
5.4.9.1	Test conditions	77
5.4.9.2	Test methods for Frame Based Equipment (FBE)	77
5.4.9.2.1	Additional test conditions	77
5.4.9.2.2	Conducted measurements	77
5.4.9.2.3	Generic test procedure for measuring channel/frequency usage	81
5.4.9.2.4	Radiated measurements	82
5.4.9.2.5	Test fixture measurement	82
5.4.9.3	Test methods for Load Based Equipment (LBE).....	82
5.4.9.3.1	Additional test conditions	82
5.4.9.3.2	Conducted measurements	82
5.4.9.3.3	Generic test procedure for measuring channel/frequency usage	90
5.4.9.3.4	Radiated measurements	91
5.4.9.3.5	Test fixture measurement	91
5.4.10	Receiver blocking	91
5.4.10.1	Test conditions	91
5.4.10.2	Test methods	91
5.4.10.2.1	Conducted measurements	91
5.4.10.2.2	Radiated measurements	93
5.4.10.2.3	Test fixture measurement	93
5.4.11	Adjacent channel selectivity	93
5.4.11.1	Test conditions	93
5.4.11.2	Test methods	93
5.4.11.2.1	Conducted measurements	93
5.4.11.2.2	Radiated measurements	95

5.4.11.2.3	Test fixture measurement	95
5.4.12	User Access Restrictions (UAR)	95
5.4.12.1	Introduction	95
5.4.12.2	Assessment conditions	95
5.4.12.3	Assessment procedure	95
Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	96
Annex B (normative):	Equipment operating within the band 5 725 MHz to 5 850 MHz (sub-band 4)	99
B.1	Scope	99
B.2	Technical requirements for equipment operating in sub-band 4	99
B.2.1	Environmental profile	99
B.2.2	Conformance requirements	99
B.2.2.1	Nominal centre frequency	99
B.2.2.1.1	General	99
B.2.2.1.2	Definition	99
B.2.2.1.3	Limits	99
B.2.2.1.4	Conformance	100
B.2.2.2	Nominal channel bandwidth and occupied bandwidth	100
B.2.2.2.1	Definition	100
B.2.2.2.2	Limits	100
B.2.2.2.3	Conformance	100
B.2.2.3	RF output power, Transmit Power Control (TPC) and Power Spectral Density (PSD)	100
B.2.2.3.1	Definition	100
B.2.2.3.2	Limits	100
B.2.2.3.2.1	General requirements	100
B.2.2.3.2.2	Limits for RF output power and PSD	101
B.2.2.3.3	Conformance	101
B.2.2.4	Transmitter unwanted emissions	101
B.2.2.4.1	Transmitter unwanted emissions outside the transmitter's operating bands	101
B.2.2.4.1.1	Definition	101
B.2.2.4.1.2	Limits	101
B.2.2.4.1.3	Conformance	101
B.2.2.4.2	Transmitter unwanted emissions within the transmitter's operating bands	101
B.2.2.4.2.1	Definition	101
B.2.2.4.2.2	Limits	101
B.2.2.4.2.3	Conformance	101
B.2.2.5	Receiver spurious emissions	101
B.2.2.5.1	Definition	101
B.2.2.5.2	Limits	102
B.2.2.5.3	Conformance	102
B.2.2.6	Void	102
B.2.2.7	Adaptivity (channel access mechanism)	102
B.2.2.7.1	Applicability	102
B.2.2.7.2	Definition	102
B.2.2.7.3	Limits	102
B.2.2.7.3.1	Frame Based Equipment (FBE)	102
B.2.2.7.3.2	Load Based Equipment (LBE)	103
B.2.2.7.3.3	Short Control Signalling (SCS) transmissions (FBE and LBE)	104
B.2.2.7.4	Conformance	104
B.2.2.8	Receiver blocking	104
B.2.2.8.1	Applicability	104
B.2.2.8.2	Definition	104
B.2.2.8.3	Performance criteria	104
B.2.2.8.4	Limits	105
B.2.2.8.5	Conformance	105
B.2.2.9	Adjacent channel selectivity	105
B.2.2.9.1	Applicability	105

B.2.2.9.2	Definition	105
B.2.2.9.3	Performance criteria	105
B.2.2.9.4	Limits	105
B.2.2.9.5	Conformance.....	105
B.2.2.10	User Access Restrictions (UAR)	105
B.2.2.10.1	Definition	105
B.2.2.10.2	Requirements	105
B.2.2.10.3	Conformance.....	105
B.2.2.11	Country determination capability	106
B.2.2.11.1	Definition	106
B.2.2.11.2	Applicability.....	106
B.2.2.11.3	Requirements	106
B.2.2.11.4	Conformance.....	106
B.3	Testing for compliance with technical requirements.....	106
B.3.1	Environmental conditions for testing	106
B.3.2	Interpretation of the measurement results	106
B.3.3	Definition of other test conditions.....	106
B.3.3.1	Test sequences and traffic load.....	106
B.3.3.2	Test channels	107
B.3.3.3	Antennas	107
B.3.3.4	Presentation of equipment	108
B.3.3.5	Measurement methods	108
B.3.4	Essential radio test suites.....	108
B.3.4.1	Product information	108
B.3.4.2	Nominal centre frequency.....	109
B.3.4.3	Occupied bandwidth	109
B.3.4.4	RF output power, Transmit Power Control (TPC) and Power Spectral Density (PSD).....	109
B.3.4.4.1	Test conditions	109
B.3.4.4.2	Test methods	110
B.3.4.4.2.1	Conducted measurement.....	110
B.3.4.4.2.2	Radiated measurement.....	114
B.3.4.4.2.3	Test fixture measurement	115
B.3.4.5	Transmitter unwanted emissions outside the transmitter's operating bands.....	115
B.3.4.6	Transmitter unwanted emissions within the transmitter's operating bands.....	115
B.3.4.7	Receiver spurious emissions	115
B.3.4.8	Void	115
B.3.4.9	Adaptivity (channel access mechanism).....	115
B.3.4.10	Receiver blocking	115
B.3.4.11	Adjacent channel selectivity	115
B.3.4.12	User Access Restrictions (UAR)	116
B.3.4.13	Country determination capability	116
B.3.4.13.1	Test conditions	116
B.3.4.13.2	Test method.....	116
Annex C (informative):	Maximum measurement uncertainties	118
Annex D (normative):	DFS parameters	119
Annex E (normative):	Test sites and arrangements for radiated measurements.....	122
E.1	Introduction	122
E.2	Radiated test sites	122
E.2.1	Open Area Test Site (OATS)	122
E.2.2	Semi Anechoic Room (SAR)	123
E.2.3	Fully Anechoic Room (FAR)	124
E.2.4	Measurement distance	125
E.3	Antennas.....	126
E.3.1	Introduction	126
E.3.2	Measurement antenna.....	126
E.3.3	Substitution antenna	126

E.4	Test fixture	126
E.4.1	Introduction	126
E.4.2	Description of the test fixture	127
E.4.3	Using the test fixture for relative measurements at the lower and upper extreme temperatures	127
E.4.4	Using the test fixture for normalized measurements	127
E.4.5	Using the test fixture for level independent measurements	128
E.5	Arrangement of the radiated test sites	128
E.5.1	Introduction	128
E.5.2	Power supplies for the battery powered UUT	128
E.5.3	Site preparation	128
E.6	Coupling of signals.....	129
E.6.1	General	129
E.6.2	Data signals	129
E.7	Interference signals used for adaptivity tests.....	129
E.7.1	Additive White Gaussian Noise (AWGN) test signal	129
E.7.2	OFDM test signal based on IEEE 802.11 PHY	129
E.7.3	OFDM test signal based on LTE PHY	129
E.7.4	Interference signal characteristics	129
E.7.4.1	Verification of flatness and bandwidth	129
E.7.4.2	Measurement of PSD	130
E.7.5	Waveforms for test signals	131
Annex F (normative): Procedures for radiated measurements		132
F.1	Introduction	132
F.2	Radiated measurements in an OATS or SAR.....	132
F.3	Radiated measurements in a FAR	133
F.4	Substitution measurement	133
F.5	Testing technical requirements on equipment with an integral antenna	133
F.5.1	Radio test suites and corresponding test sites.....	133
F.5.2	Testing adaptivity (channel access mechanism).....	134
F.5.2.1	Introduction.....	134
F.5.2.2	Measurement setup	134
F.5.2.3	Calibration of the measurement setup.....	134
F.5.2.4	Test method	135
F.5.3	Testing receiver blocking	135
F.5.3.1	Introduction.....	135
F.5.3.2	Measurement setup	135
F.5.3.3	Calibration of the measurement setup.....	135
F.5.3.4	Test method	136
F.5.4	Testing adjacent channel selectivity	136
F.5.4.1	Introduction.....	136
F.5.4.2	Measurement setup	136
F.5.4.3	Calibration of the measurement setup.....	137
F.5.4.4	Test method	137
Annex G (informative): Adaptivity flowchart.....		138
Annex H (informative): Application form for testing.....		139
H.1	The right to copy	139
H.2	Introduction	139
H.3	Information as required by ETSI EN 301 893 (V2.2.1), clause 5.4.1	139
H.4	Additional information provided by the manufacturer.....	150
H.4.1	Modulation	150
H.4.2	Duty cycle	150

H.4.3	About the UUT	150
H.4.4	List of ancillary and/or support equipment provided by the manufacturer.....	151
Annex I (informative): Examples of spectrum masks.....		152
I.1	Introduction	152
I.2	Equipment configured for multi-channel operation in groups of four adjacent channels	152
I.2.1	Example 1.....	152
I.2.2	Example 2.....	152
I.2.3	Example 3.....	153
I.2.4	Example 4.....	154
I.3	Equipment configured for multi-channel operation in groups of eight adjacent channels.....	154
I.3.1	Example 5.....	154
I.3.2	Example 6.....	155
I.3.3	Example 7.....	155
I.3.4	Example 8.....	156
I.3.5	Example 9.....	156
Annex J (informative): Bibliography.....		158
Annex K (informative): Change history		159
History		160

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

[ETSI EN 301 893 V2.2.0 \(2023-11\)](https://standards.iteh.ai/catalog/standards/sist/0ca77ecb-2545-4982-8d9b-77e8a8e379fc/etsi-en-301-893-v2-2-0-2023-11)

<https://standards.iteh.ai/catalog/standards/sist/0ca77ecb-2545-4982-8d9b-77e8a8e379fc/etsi-en-301-893-v2-2-0-2023-11>

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 draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Broadband Radio Access Networks (BRAN), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI Standardisation Request deliverable Approval Procedure.

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 [i.1] 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.

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.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

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

5 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 out as follows:

- ECC Decision (04)08 [i.6], Commission Implementing Decision (EU) 2022/179 [i.7] amended by Commission Implementing Decision (EU) 2022/2307 [i.8] for sub-band 1, sub-band 2 and sub-band 3 as shown in table 1.
- The operation in sub-band 4 as shown in table B.1 is subject to national frequency usage conditions. Hence, it should be verified whether national frequency usage conditions permit operations in this sub-band in accordance with the present document.

NOTE: An example for national frequency usage conditions is given in UK Interface Requirements IR 2030 [i.12].

It's Standards
(<https://standards.iteh.ai>)
Document Preview

[ETSI EN 301 893 V2.2.0 \(2023-11\)](#)

<https://standards.iteh.ai/catalog/standards/sist/0ca77ecb-2545-4982-8d9b-77e8a8e379fc/etsi-en-301-893-v2-2-0-2023-11>

1 Scope

The present document specifies technical characteristics and methods of measurement for Wireless Access Systems (WAS) including Radio Local Area Network (RLAN) equipment operating in the 5 GHz RLAN band.

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

Radio equipment capable of operating in all or parts of the service frequency bands given in table 1 is within the scope of the present document.

Table 1: Service frequency bands

	Sub-band 1	Sub-band 2	Sub-band 3
Transmit	5 150 MHz to 5 250 MHz	5 250 MHz to 5 350 MHz	5 470 MHz to 5 725 MHz
Receive	5 150 MHz to 5 250 MHz	5 250 MHz to 5 350 MHz	5 470 MHz to 5 725 MHz

Provisions for radio equipment capable of operating in all or parts of the 5 725 MHz to 5 850 MHz frequency band (sub-band 4 as given in table B.1) are contained in annex B. However, operation in sub-band 4 is subject to national frequency usage conditions. The present document also contains provisions for equipment operating on channels whose nominal channel bandwidth falls partly in sub-band 3 and partly in sub-band 4.

NOTE 1: The technical requirements for equipment operating in the service frequency bands identified in table 1 are contained in the main part of the present document (see clause 4) while the technical requirements for equipment operating in the service frequency band identified in table B.1 are contained in annex B.

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] [ETSI TS 136 141 \(V17.10.0\) \(07-2023\)](#): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 17.10.0 Release 17)".
- [2] [IEEE 802.11™-2020](#): "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".

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] [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.4] [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.5] [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.6] [ECC/DEC/\(04\)08](#): "On the harmonised use of the 5 GHz frequency bands for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN)" (approved 9 July 2004, latest amended 1 July 2022).
- [i.7] [Commission Implementing Decision \(EU\) 2022/179 of 8 February 2022](#) on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of Wireless Access Systems including Radio Local Area Networks and repealing Decision 2005/513/EC.
- [i.8] [Commission Implementing Decision \(EU\) 2022/2307 of 23 November 2022](#) amending Implementing Decision (EU) 2022/179 as regards designating and making available the 5 150–5 250 MHz, 5 250–5 350 MHz and 5 470–5 725 MHz frequency bands in accordance with the technical conditions set out in the Annex.
- [i.9] [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.10] [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.11] [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.12] IR 2030: "UK Interface Requirements 2030; Licence Exempt Short Range Devices".
- [i.13] [ERC Recommendation 74-01](#): "Unwanted emissions in the spurious domain" (approved 1998, corrected 23 May 2022).

- [i.14] [ECC Report 330](#): "To enable WAS/RLAN use on a national basis in the band 5725-5850 MHz but also ensure the protection of RTTT/Smart Tachograph and radars (including Fast Frequency Hopping) taking into account free circulation of WAS/RLAN" (approved 8 October 2021).
- [i.15] [ECO Report 06](#): "Country Determination Capability; National use of the 5725-5850 MHz frequency band by WAS/RLAN devices with maximum power higher than 25 mW and up to 200 mW e.i.r.p. in CEPT countries" (approved 9 June 2022).

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:

5 GHz DFS band: total frequency range within the 5 GHz RLAN band in which DFS is required

NOTE: The 5 GHz DFS band is defined in clause 4.2.6.1.2.

5 GHz RLAN band: service frequency bands for WAS/RLAN equipment within the scope of the present document

ad-hoc mode: operating mode in which an RLAN device establishes a temporary wireless connection with other RLAN devices without a controlling network infrastructure

antenna array: two or more antennas connected to a single device and operating simultaneously

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.

available channel: usable channel where the radar detection mechanism did not detect radar signals or where radar detection is not required

NOTE: Usable channels whose nominal channel bandwidth falls completely within sub-band 1 can be considered as available channels without further testing.

backoff procedure: procedure that facilitates the sharing of the medium by randomizing the transmission attempts from multiple devices competing for access to an operating 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 intentional transmission is made

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

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

EXAMPLE: For the purpose of the present document, an IEEE 802.11™-2020 [2] device operating in 40 MHz may be considered as operating in two adjacent channels simultaneously.

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

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