

STN	Bezdrôtové priemyselné aplikácie (WIA) Zariadenia pracujúce vo frekvenčnom rozsahu od 5 725 MHz do 5 875 MHz s vyžiareným výkonom do 400 mW Harmonizovaná norma pre prístup k rádiovému spektru	STN EN 303 258 V1.1.1 87 3258
------------	--	---

Wireless Industrial Applications (WIA); Equipment operating in the 5 725 MHz to 5 875 MHz frequency range with power levels ranging up to 400 mW; 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. 10/20

Obsahuje: EN 303 258 V1.1.1:2020

131427

ETSI EN 303 258 V1.1.1 (2020-04)



**Wireless Industrial Applications (WIA);
Equipment operating in the 5 725 MHz to 5 875 MHz
frequency range with power levels ranging up to 400 mW;
Harmonised Standard for access to radio spectrum**

Reference

DEN/ERM-TG41-003

Keywords

harmonised standard, radio, regulation, spread spectrum, SRD, testing, transmission

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 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://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/CommiteeSupportStaff.aspx>

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 2020.

All rights reserved.

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.

Contents

Intellectual Property Rights	7
Foreword.....	7
Modal verbs terminology.....	7
Introduction	8
1 Scope	9
2 References	9
2.1 Normative references	9
2.2 Informative references.....	9
3 Definition of terms, symbols and abbreviations.....	11
3.1 Terms.....	11
3.2 Symbols.....	12
3.3 Abbreviations	12
4 Technical requirements specifications	13
4.1 Environmental profile.....	13
4.2 Conformance requirements	13
4.2.1 RF output power and Adaptive Power Control.....	13
4.2.1.1 Definitions.....	13
4.2.1.1.1 RF Output Power	13
4.2.1.1.2 Adaptive Power Control	13
4.2.1.2 Limits	13
4.2.1.2.1 General requirements.....	13
4.2.1.2.2 Limits for RF output power and APC range.....	13
4.2.1.3 Conformance	13
4.2.2 Occupied channel bandwidth.....	14
4.2.2.1 Definition	14
4.2.2.2 Limits	14
4.2.2.3 Conformance	14
4.2.3 Transmitter unwanted emissions in the spurious domain	14
4.2.3.1 Definition	14
4.2.3.2 Limits	14
4.2.3.3 Conformance.....	14
4.2.4 Receiver spurious emissions	15
4.2.4.1 Definition	15
4.2.4.2 Limits	15
4.2.4.3 Conformance.....	15
4.2.5 Receiver Blocking	15
4.2.5.1 Applicability.....	15
4.2.5.2 Definition	15
4.2.5.3 Performance Criteria	15
4.2.5.4 Limits	15
4.2.5.5 Conformance.....	16
4.2.6 Dynamic Frequency Selection	16
4.2.6.1 General DFS operation.....	16
4.2.6.1.1 Applicability	16
4.2.6.1.2 General requirements.....	16
4.2.6.1.3 Applicable frequency range.....	16
4.2.6.1.4 DFS operational modes	16
4.2.6.1.5 DFS operation.....	17
4.2.6.2 DFS technical requirements specifications	17
4.2.6.2.1 Applicability	17
4.2.6.2.2 In-Service Monitoring	18
4.2.6.2.3 Channel Shutdown.....	18
4.2.6.2.4 Non-Occupancy Period	19
4.2.7 Adaptive Channel Access Mechanism.....	19

4.2.7.1	Overview	19
4.2.7.1.1	General requirements	19
4.2.7.1.2	Applicability	19
4.2.7.1.3	Applicable frequency range	19
4.2.7.2	DAA technical requirements specifications except ITS and TTT	20
4.2.7.2.1	Minimum Tx-off time	20
4.2.7.2.2	DAA minimum listening time	20
4.2.7.2.3	Maximum transmitter on-time (Tx on-time)	20
4.2.7.2.4	DAA threshold	21
4.2.7.3	DAA technical requirements specifications for ITS	21
4.2.7.3.1	General	21
4.2.7.3.2	Applicable frequency range	22
4.2.7.3.3	ITS Channel Availability Check time	22
4.2.7.3.4	<i>ITS Maximum TX_{on-time}</i>	22
4.2.7.3.5	<i>ITS Minimum TX_{off-time}</i>	22
4.2.7.3.6	<i>ITS DAA latency</i>	23
4.2.7.3.7	<i>ITS DAA Probability</i>	23
4.2.7.3.8	<i>ITS Non-Occupancy Period</i>	23
4.2.7.3.9	<i>ITS DAA threshold</i>	24
4.2.7.4	DAA technical requirements specifications for TTT, general conditions and applicable frequency range	24
4.2.7.5	DAA using TTT signal detection	24
4.2.7.5.1	General	24
4.2.7.5.2	DAA threshold for TTT	24
4.2.7.5.3	TTT Channel Availability Check	25
4.2.7.5.4	<i>TTT Non-Occupancy Period</i>	25
4.2.7.5.5	<i>TTT DAA Latency</i>	25
4.2.7.5.6	<i>TTT In-Service Monitoring</i>	26
4.2.8	User Access Restrictions	26
4.2.8.1	Definition	26
4.2.8.2	Requirement	26
4.2.9	Geo-localization capability	27
4.2.9.1	Applicability	27
4.2.9.2	Definition	27
4.2.9.3	Requirements	27
4.2.10	TTT Detection and Avoidance using a Geolocation Database	27
4.2.10.1	Applicability	27
4.2.10.2	Definition	27
4.2.10.3	Requirements	28
4.2.10.4	Conformance	28
5	Testing for compliance with technical requirements	28
5.1	Environmental conditions for testing	28
5.1.1	General requirements	28
5.1.2	Normal and extreme test conditions	28
5.1.3	Test sequences and traffic load	28
5.1.3.1	General test transmission sequences	28
5.1.3.2	Test transmission sequences for DFS tests	29
5.1.4	Test channels	29
5.1.5	Antennas	30
5.1.5.1	Integrated and dedicated antennas	30
5.1.5.2	Transmit operating modes	30
5.1.5.2.1	Operating mode 1 (single antenna)	30
5.1.5.2.2	Operating mode 2 (multiple antennas, no beamforming)	30
5.1.5.2.3	Operating mode 3 (multiple antennas, with beamforming)	30
5.2	Void	30
5.3	Conformance tests	30
5.3.1	Product information	30
5.3.2	RF output power and Adaptive Power Control	32
5.3.2.1	Test conditions	32
5.3.2.2	Test method	32
5.3.2.2.1	Conducted measurement	32

5.3.2.2.2	Radiated measurement.....	34
5.3.3	Occupied Channel Bandwidth	34
5.3.3.1	Test conditions	34
5.3.3.2	Test method.....	35
5.3.3.2.1	Conducted measurement.....	35
5.3.3.2.2	Radiated measurement.....	35
5.3.4	Transmitter unwanted emissions in the spurious domain	36
5.3.4.1	Test conditions	36
5.3.4.2	Test method.....	36
5.3.4.2.1	Conducted measurement.....	36
5.3.4.2.2	Radiated measurement.....	38
5.3.5	Receiver spurious emissions	38
5.3.5.1	Test conditions	38
5.3.5.2	Test method.....	39
5.3.5.2.1	Conducted measurement.....	39
5.3.5.2.2	Radiated measurement.....	41
5.3.6	Receiver Blocking	41
5.3.6.1	Test frequencies	41
5.3.6.2	Test conditions	41
5.3.6.3	Test Method	41
5.3.6.3.1	Conducted measurements	41
5.3.6.3.2	Radiated measurements	42
5.3.7	Dynamic Frequency Selection	43
5.3.7.1	Test conditions	43
5.3.7.1.1	General requirements.....	43
5.3.7.1.2	Selection of radar test signals	43
5.3.7.1.3	Test set-ups.....	43
5.3.7.2	Test method.....	45
5.3.7.2.1	Conducted measurement.....	45
5.3.7.2.2	Radiated measurement.....	47
5.3.8	Adaptivity (channel access mechanism) except for ITS and TTT	47
5.3.8.1	Test conditions	47
5.3.8.2	Test method.....	47
5.3.8.2.1	Conducted measurements	47
5.3.8.2.2	Generic test procedure for measuring channel/frequency usage	49
5.3.8.2.3	Radiated measurements	49
5.3.8.2.4	DAA minimum listening time measurements	50
5.3.9	Adaptivity (channel access mechanism) for ITS	51
5.3.9.1	General requirements	51
5.3.9.2	ITS test signal.....	51
5.3.9.3	Initial start-up test	51
5.3.9.3.1	Start-up procedure	51
5.3.9.3.2	Test without an ITS victim test signal during the <i>ITS Channel Availability Check time</i> , $T_{ITS_check_time}$	51
5.3.9.3.3	Test with an ITS victim test signal during the <i>ITS Channel Availability Check time</i> , $T_{ITS_check_time}$	52
5.3.9.4	Test of $ITS_Maximum_TX_{on}$ and $ITS_minimum_TX_{off}$	53
5.3.9.5	ITS in-service DAA test with continuous ITS test signal	53
5.3.9.6	ITS in-service DAA test with ITS test signal switched off after detection	54
5.3.10	Adaptivity (channel access mechanism) for TTT	55
5.3.10.1	General	55
5.3.10.2	TTT test signal	55
5.3.10.3	Initial start-up test	56
5.3.10.3.1	Start-up procedure	56
5.3.10.3.2	Test without a TTT victim test signal during the <i>TTT Channel Availability Check time</i> , $T_{TTT_check_time}$	56
5.3.10.3.3	Test with a TTT victim test signal during the <i>TTT Channel Availability Check time</i>	56
5.3.10.4	TTT in-service DAA test with continuous TTT test signal.....	57
5.3.10.5	TTT in-service DAA test with TTT test signal switched off after detection.....	58
5.3.10.6	TTT DAA using a Geolocation Database	59

Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	60
Annex B (normative):	Test sites and arrangements for radiated measurements.....	62
B.1	General requirements	62
B.2	Radiation test sites.....	62
B.2.1	Open Area Test Site	62
B.2.2	Semi Anechoic Room.....	63
B.2.3	Fully Anechoic Room	64
B.2.4	Measurement Distance	65
B.3	Antennas.....	66
B.3.1	General requirements	66
B.3.2	Measurement antenna.....	66
B.3.3	Substitution antenna	66
B.4	Test fixture	66
B.4.1	General requirements	66
B.4.2	Description of the test fixture.....	67
B.4.3	Using the test fixture for relative measurements	67
B.5	Guidance on the use of radiation test sites	67
B.5.1	General requirements	67
B.5.2	Power supplies for the battery powered UUT	67
B.5.3	Site preparation	68
B.6	Coupling of signals.....	68
B.6.1	General requirements	68
B.6.2	Data Signals.....	68
B.7	Interference Signal used for Adaptivity Tests	69
Annex C (normative):	Procedures for radiated measurements.....	70
C.1	General requirements	70
C.2	Radiated measurements in an OATS or SAR.....	70
C.3	Radiated measurements in a FAR	71
C.4	Substitution measurement	71
C.5	Guidance for testing technical requirements	71
C.5.1	Conformance tests and corresponding test sites	71
C.5.2	Guidance for testing Adaptivity (Channel Access Mechanism).....	71
C.5.2.1	General requirements.....	71
C.5.2.2	Measurement Set-up	72
C.5.2.3	Calibration of the measurement Set-up.....	72
C.5.2.4	Test method	72
Annex D (normative):	DFS parameters	73
D.1	Test signals.....	73
Annex E (informative):	Receiver parameters.....	76
E.1	General	76
E.2	Receiver parameters	76
Annex F (informative):	Bibliography.....	78
Annex G (informative):	Change History	79
History		80

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is 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 IPR Policy, no investigation, 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.

Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.3] 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.2].

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:	31 March 2020
Date of latest announcement of this EN (doa):	30 June 2020
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2020
Date of withdrawal of any conflicting National Standard (dow):	31 December 2021

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

The market is in need of network solutions, each with different performance characteristics and functional capabilities, matching diverse application requirements. Industrial automation applications, covering different industrial application domains such as:

- process automation, covering for example the following industry branches:
 - oil and gas, refining;
 - chemical;
 - pharmaceutical;
 - mining;
 - pulp and paper;
 - water & wastewater;
 - steel;
- electric power like:
 - power generation, e.g. wind turbine;
 - power distribution (grid);
- factory automation, e.g. covering the following industry branches:
 - food and beverage;
 - automotive;
 - machinery;
 - semiconductor.

The technical characteristics and applications specific to radio spectrum requirements are identified in ETSI TR 102 889-2 [i.18].

In industrial automation, many different wireless communication networks may operate in the same premises. Examples of these networks are IEC 62591 (WirelessHART[®], see note) [i.10], IEC 62601 (WIA-PA) [i.11] and IEC 62734 (ISA100.11a) [i.12]; all these networks use IEEE 802.15.4 [i.6] for the process automation applications. Other examples of wireless networks are specified in IEC 61784-1 [i.8] and IEC 61784-2 [i.9] CPs that use IEEE 802.11 [i.4] and IEEE 802.15.1 [i.5] for factory automation applications. Different to wired fieldbuses, the wireless communication interfaces can interfere with others on the same premises or environment, disturbing each other. Therefore, without a predictable assuredness of coexistence, it could be problematic to have multiple wireless communication networks in the same facility or environment, especially because the time-criticality, the safety and the security of the operation may not be ensured in such an environment.

NOTE: WirelessHART[®] is the registered trade name of the HART Communication Foundation. This information is given for the convenience of users of the present document and does not constitute an endorsement by ETSI of the product named. Equivalent products may be used if they can be shown to lead to the same results.

The mitigation techniques which have to be implemented to protect primary radio services limit the applicability to non-real-time applications with relaxed latencies e.g. above 1 s and limits the probability to fulfil the demands on high reliability and high Quality of Services (non-critical links) of the wireless industrial applications. Thus, the 5,8 GHz WIA band may be appropriate for non-real time, non-critical purposes, e.g. monitoring in wireless industrial applications.

Equipment covered by the present document is operated in accordance with the CEPT ECC ERC Recommendation 70-03 [i.7], annex 2.

1 Scope

The present document specifies technical characteristics and methods of measurements for Wireless Industrial Applications equipment operating in the 5 725 MHz to 5 875 MHz frequency band. The present document also specifies spectrum sharing mechanisms to enable co-existence with other equipment operating in the 5 725 MHz to 5 875 MHz frequency band.

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.2] under the conditions identified in annex A.

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version 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.

Not applicable.

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] IEC/EN 62657-1 (Edition 1): "Industrial communication networks - Wireless communication networks - Part 1: Wireless communication requirements and spectrum considerations".
- [i.2] 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.3] 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.4] IEEE Std. 802.11™-2016: "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".
- [i.5] IEEE Std. 802.15.1™: "IEEE Standard for Information technology - Wireless medium access control (MAC) and physical layer (PHY) specifications for wireless personal area networks (WPANs)".

- [i.6] IEEE Std. 802.15.4TM-2015: "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements. Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs)".
- [i.7] CEPT ECC ERC Recommendation 70-03: "Relating to the use of Short Range Devices (SRD)".
- [i.8] IEC 61784-1: "Industrial communication networks - Profiles - Part 1: Fieldbus profiles".
- [i.9] IEC 61784-2: "Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3".
- [i.10] IEC 62591: "Industrial communication networks - Wireless communication network and communication profiles - WirelessHART®".
- [i.11] IEC 62601: "Industrial communication networks - Fieldbus specifications - WIA-PA communication network and communication profile".
- [i.12] IEC 62734: "Industrial communication networks - Fieldbus specifications - Wireless Systems for Industrial Automation: Process Control and Related Applications (based on ISA 100.11a)".
- [i.13] ETSI TR 100 028-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".
- [i.14] ETSI TR 100 028-2 (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".
- [i.15] ETSI TR 102 273-2: "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.16] ETSI TR 102 273-3: "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.17] ETSI TR 102 273-4: "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.18] ETSI TR 102 889-2 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); System Reference Document; Short Range Devices (SRD); Part 2: Technical characteristics for SRD equipment for wireless industrial applications using technologies different from Ultra-Wide Band (UWB)".
- [i.19] CEN EN 12253:2004: "Road transport and traffic telematics - Dedicated short-range communication - Physical layer using microwave at 5,8 GHz".
- [i.20] CEN EN 12795:2003: "Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC data link layer: medium access and logical link control".
- [i.21] CEPT ECC Report 206: "Compatibility studies in the band 5725-5875 MHz between SRD equipment for wireless industrial applications and other systems".
- [i.22] ETSI EG 203 336 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".

koniec náhľadu – text ďalej pokračuje v platenej verzii STN