

ETSI EN 302 208 V3.4.1 (2023-12)



**Radio Frequency Identification Equipment operating in the
band 865 MHz to 868 MHz with power levels up to 2 W and
in the band 915 MHz to 921 MHz with power levels up to 4 W;
Harmonised Standard for access to radio spectrum**

[ETSI EN 302 208 V3.4.1 \(2023-10\)](https://standards.iteh.ai/catalog/standards/etsi/28057e20-1845-4208-bc00-1cf4486985d3/etsi-en-302-208-v3-4-1-2023-10)

<https://standards.iteh.ai/catalog/standards/etsi/28057e20-1845-4208-bc00-1cf4486985d3/etsi-en-302-208-v3-4-1-2023-10>

ReferenceREN/ERM-TG34-270

Keywordsharmonised standard, ID, radio, RFID, SRD

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 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	7
Foreword.....	7
Modal verbs terminology.....	8
1 Scope	9
2 References	9
2.1 Normative references	9
2.2 Informative references.....	10
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 General requirements	13
4.2.1 Functional requirements	13
4.2.2 Designated frequencies	13
4.2.2.1 Lower band	13
4.2.2.2 Upper band.....	14
4.2.3 Testing of operational frequencies.....	15
4.2.4 Interrogator Category.....	15
4.2.5 Choice of samples for test suite	15
4.3 Interrogator transmitter conformance requirements	15
4.3.1 Frequency error.....	15
4.3.1.1 Applicability.....	15
4.3.1.2 Definition	15
4.3.1.3 Limits	16
4.3.1.4 Conformance.....	16
4.3.2 Frequency stability under low voltage conditions	16
4.3.2.1 Applicability.....	16
4.3.2.2 Definition	16
4.3.2.3 Limits	16
4.3.2.4 Conformance.....	16
4.3.3 Effective radiated power.....	16
4.3.3.1 Applicability.....	16
4.3.3.2 Definition	16
4.3.3.3 Limits	16
4.3.3.3.1 Operation in the lower band (865 MHz to 868 MHz)	16
4.3.3.3.2 Operation in the upper band (915 MHz to 921 MHz)	17
4.3.3.4 Conformance.....	17
4.3.4 Transmitter antenna beam-width	17
4.3.4.1 Applicability.....	17
4.3.4.2 Definition	17
4.3.4.3 Limits	17
4.3.4.4 Conformance.....	17
4.3.5 Transmitter spectrum masks	17
4.3.5.1 Applicability.....	17
4.3.5.2 Definition	17
4.3.5.3 Limits	18
4.3.5.3.1 Limits for lower band (865 MHz to 868 MHz)	18
4.3.5.3.2 Limits for upper band (915 MHz to 921 MHz)	18
4.3.5.4 Conformance.....	19
4.3.6 Transmitter spurious emissions.....	19
4.3.6.1 Applicability.....	19
4.3.6.2 Definition	19

4.3.6.3	Limits	19
4.3.6.4	Conformance	20
4.3.7	Transmission times	20
4.3.7.1	Applicability.....	20
4.3.7.2	Definition	20
4.3.7.3	Limits	20
4.3.7.4	Conformance.....	21
4.4	Interrogator receiver conformance requirements.....	21
4.4.1	Adjacent channel selectivity	21
4.4.1.1	Applicability.....	21
4.4.1.2	Definition	21
4.4.1.3	Limits	21
4.4.1.4	Conformance	21
4.4.2	Blocking or desensitization.....	21
4.4.2.1	Applicability.....	21
4.4.2.2	Definition	21
4.4.2.3	Limits	21
4.4.2.4	Conformance.....	21
4.4.3	Void	22
4.4.4	Receiver spurious response rejection.....	22
4.4.4.1	Applicability.....	22
4.4.4.2	Definition	22
4.4.4.3	Limits	22
4.4.4.4	Conformance	22
4.4.5	Receiver sensitivity.....	22
4.4.5.1	Applicability.....	22
4.4.5.2	Definition	22
4.4.5.3	Limits	22
4.4.5.4	Conformance.....	22
4.4.6	Receiver radio-frequency intermodulation	23
4.4.6.1	Applicability.....	23
4.4.6.2	Definition	23
4.4.6.3	Limits	23
4.4.6.4	Conformance.....	23
4.5	Tag transmitter conformance requirements.....	23
4.5.1	Radiated power (e.r.p.)	23
4.5.1.1	Applicability.....	23
4.5.1.2	Definition	23
4.5.1.3	Limits	23
4.5.1.4	Conformance.....	24
4.5.2	Unwanted emissions	24
4.5.2.1	Applicability.....	24
4.5.2.2	Definition	24
4.5.2.3	Limits	24
4.5.2.4	Conformance.....	25
5	Testing for compliance with technical requirements.....	25
5.1	Environmental conditions for testing	25
5.1.0	General conditions	25
5.1.1	Thermal test conditions.....	25
5.1.2	Test power sources.....	26
5.1.2.1	General considerations	26
5.1.2.2	External test power source	26
5.1.2.3	Internal test power source	26
5.2	Interpretation of the measurement results	26
5.3	Submission for testing	26
5.3.1	Void	26
5.3.2	General conditions for testing of transmitters.....	26
5.3.2.1	Test signals.....	26
5.3.2.2	Artificial antenna.....	27
5.3.2.3	Test sites and general arrangements for radiated measurements.....	27
5.3.2.4	Receiver measurements.....	27

5.3.2.5	Testing of operational frequencies	27
5.4	Presentation of equipment for testing	27
5.4.1	Void	27
5.4.2	Choice of model for testing	27
5.4.2.1	General considerations	27
5.4.2.2	EUT with an external RF connector.....	27
5.4.2.3	EUT without an external RF connector.....	28
5.4.2.3.1	General Considerations	28
5.4.2.3.2	EUT with an internal connector.....	28
5.4.2.3.3	EUT with a temporary antenna connector	28
5.4.2.3.4	Use of a Test Fixture	28
5.4.3	Adjustable carrier levels	28
5.4.4	Test mode.....	28
5.5	Essential interrogator transmitter test suites	29
5.5.1	Measurement of frequency error for mains operated equipment	29
5.5.2	Frequency stability under low voltage conditions	29
5.5.3	Effective radiated power (e.r.p.)	30
5.5.3.1	General	30
5.5.3.2	Method of measurement.....	30
5.5.3.2.1	General	30
5.5.3.2.2	Radiated measurement.....	30
5.5.3.2.3	Conducted measurement.....	31
5.5.4	Transmitter antenna beam-width	32
5.5.4.1	General	32
5.5.4.2	Radiated measurement	32
5.5.5	Transmitter spectrum mask.....	33
5.5.5.1	Method of measurement.....	33
5.5.6	Transmitter spurious emissions.....	34
5.5.6.1	Method of measurement.....	34
5.5.6.2	Method of measuring the spurious power level in a specified load, clause 5.5.6.1 a) i)	34
5.5.6.3	Method of measuring the spurious effective radiated power, clause 5.5.6.1 a) ii)	35
5.5.6.4	Method of measuring spurious effective radiated power, clause 5.5.6.1 b)	36
5.5.7	Transmission times	36
5.5.7.1	Method of measurement.....	36
5.5.8	Void	37
5.5.9	Channel use.....	37
5.5.9.1	Method of measurement.....	37
5.6	Essential interrogator receiver test suites	38
5.6.1	Adjacent channel selectivity	38
5.6.1.1	General	38
5.6.1.2	Method 1: Measuring radiated signals	38
5.6.1.3	Method 2: Conducted method of measurement.....	39
5.6.2	Blocking or desensitization.....	40
5.6.2.1	General	40
5.6.2.2	Method 1: Measuring radiated signals	40
5.6.2.3	Method 2: Conducted method of measurement.....	41
5.6.3	Receiver spurious response rejection.....	42
5.6.3.1	General	42
5.6.3.2	Method 1: Measuring radiated signals	42
5.6.3.3	Method 2: Conducted method of measurement.....	43
5.6.4	Receiver sensitivity.....	44
5.6.4.1	Method of measurement.....	44
5.6.5	Receiver radio-frequency intermodulation	45
5.6.5.1	General	45
5.6.5.2	Method 1: Measuring radiated signals	45
5.6.5.3	Method 2: Conducted method of measurement.....	46
5.7	Essential tag transmitter test suites	48
5.7.1	Tag radiated power (e.r.p.).....	48
5.7.1.1	General Requirements.....	48
5.7.1.2	Measurement setup.....	48
5.7.1.3	Method of measuring the power in an un-modulated sub-carrier, clause 5.7.1.1 a).....	49
5.7.1.4	Method of measuring the power in a modulated sub-carrier, clause 5.7.1.1 b).....	50

5.7.2	Unwanted emissions	51
5.7.2.1	Method of measurement.....	51
Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	54
Annex B (normative):	Radiated measurement.....	56
B.1	Test sites and general arrangements for measurements involving the use of radiated fields	56
B.1.1	General	56
B.1.2	Anechoic chamber	56
B.1.3	Anechoic chamber with a conductive ground plane.....	57
B.1.4	Open Area Test Site (OATS)	58
B.1.5	Test antenna.....	59
B.1.6	Substitution antenna	59
B.1.7	Measuring antenna	60
B.1.8	Stripline arrangement	60
B.1.8.1	General.....	60
B.1.8.2	Description.....	60
B.1.8.3	Calibration	60
B.1.8.4	Mode of use	60
B.2	Guidance on the use of radiation test sites	60
B.2.1	General	60
B.2.2	Verification of the test site	61
B.2.3	Preparation of the EUT.....	61
B.2.4	Power supplies to the EUT	61
B.2.5	Range length.....	61
B.2.6	Site preparation	62
B.3	Coupling of signals.....	62
B.3.1	General	62
B.3.2	Data signals	62
B.4	Standard test position	63
B.5	Test fixture	63
B.5.1	General	63
B.5.2	Description	63
B.5.3	Calibration.....	64
B.5.4	Mode of use.....	65
Annex C (normative):	Void	66
Annex D (informative):	Maximum measurement uncertainty.....	67
Annex E (informative):	Receiver parameter assessment.....	68
Annex F (informative):	Bibliography.....	69
Annex G (informative):	Change history	70
History		71

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 Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.10] 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.3].

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.

The present document replaces all previous versions of ETSI EN 302 208.

National transposition dates	
Date of adoption of this EN:	18 December 2023
Date of latest announcement of this EN (doa):	31 March 2024
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 September 2024
Date of withdrawal of any conflicting National Standard (dow):	30 September 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.

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

[ETSI EN 302 208 V3.4.1 \(2023-10\)](#)

<https://standards.iteh.ai/catalog/standards/etsi/28057e20-1845-4208-bc00-1cf4486985d3/etsi-en-302-208-v3-4-1-2023-10>

1 Scope

The present document specifies technical characteristics and methods of measurements for Radio Frequency Identification (RFID) devices used in the frequency band 865 MHz to 868 MHz and 915 MHz to 921 MHz.

Power limits up to a maximum of 2 W e.r.p. are specified for this equipment in the frequency band 865 MHz to 868 MHz and up to a maximum of 4 W e.r.p. in the frequency band 915 MHz to 921 MHz.

NOTE 1: The term frequency band is used for reference to dedicated bands as described in ERC Recommendation 70-03 [i.9], while frequency range is used in the other cases.

The frequency usage conditions for RFID are EU wide harmonised in the band 865 MHz to 868 MHz according to Decision (EU) 2017/1483 [i.15] and in the band 915 MHz to 921 MHz according to Decision (EU) 2018/1538 [i.14]. According to Decision (EU) 2018/1538 [i.14], EU member states are requested to implement 3 channels only in the 915 MHz to 921 MHz band.

It should be noted that the frequency band 915 MHz to 921 MHz has only a limited implementation status within the European Union and the CEPT countries. ERC Recommendation 70-03 [i.9] provides in appendix 1 an overview of countries where the band is implemented.

The present document applies to RFID interrogators and tags operating together as a system. For each specified band, multiple high power channels are made available for use by interrogators. The tags respond with a modulated signal preferably in the adjacent low power channels. Interrogators may be used with either integral or external antennas.

The types of equipment covered by the present document are as follows:

- fixed interrogators;
- portable interrogators;
- batteryless tags;
- battery assisted tags;
- battery powered tags.

These types of radio equipment are capable of operating in the frequency ranges given in table 1 and table 2.

The present document contains requirements to demonstrate that the specified radio equipment both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference.

NOTE 2: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.3] 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] Void.

- [2] [IEEE/ANSI C63.5-2017](#): "American National Standard for Electromagnetic Compatibility-- Radiated Emission Measurements in Electromagnetic Interference (EMI) Control--Calibration and Qualification of Antennas (9 kHz to 40 GHz)".
- [3] Void.

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] Void.
- [i.2] Void.
- [i.3] [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.4] IEC 60489-3 Appendix J Second edition (1988): "Methods of measurement for radio equipment used in the mobile services. Part 3: Receivers for A3E or F3E emissions" (pages 156 to 164).
- [i.5] Void.
- [i.6] Void.
- [i.7] Void.
- [i.8] Void.
- [i.9] [ERC Recommendation 70-03](#): "Short Range Devices (SRD)".
- [i.10] [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.11] Void.
- [i.12] Void.
- [i.13] ETSI TR 102 273 (all parts) (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".
- [i.14] [Commission implementing Decision \(EU\) 2018/1538](#) of 11 October 2018 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands.
- [i.15] [Commission implementing Decision \(EU\) 2017/1483](#) of 8 August 2017 amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC.
- [i.16] [ERC Recommendation 74-01](#): "Unwanted emissions in the spurious domain", Approved 1998 amended 29 May 2019.
- [i.17] ISO/IEC 18046-2: "Information technology - Radio frequency identification device performance test methods - Part 2: Test methods for interrogator performance".

- [i.18] Void.
- [i.19] ETSI EG 203 336: "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".
- [i.20] ISO/IEC 18000-63: "Information technology - Radio frequency identification for item management - Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

adaptive frequency agility: technique that allows an interrogator to change its frequency of operation automatically from one channel to another

battery assisted tag: transponder that includes a battery to enhance its receive performance and power its internal circuitry

batteryless tag: transponder that derives all of the power necessary for its operation from the field generated by an interrogator

battery powered tag: transponder that uses the power from its battery to perform all of its operational functions

conducted measurements: measurements which are made using a direct 50 Ω connection to the equipment under test

dedicated antenna: removable antenna supplied and type tested with the radio equipment, designed as an indispensable part of the equipment

dense interrogator mode: RFID operating mode in which multiple interrogators can transmit simultaneously in the same channel while tags respond in the adjacent channels

designated frequency band: frequency band within which the emission by a device is authorized

effective radiated power: product of the power supplied to the antenna and its gain relative to a half wave dipole in the direction of maximum gain

ER-GSM: extended band of 918 MHz to 921 MHz used by the railways

external antenna: antenna that may be connected to an interrogator via its external connector

global scroll: test mode in which an interrogator is able to read the same tag continuously

integral antenna: permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment

interrogator: equipment that will activate an adjacent tag and read its data

NOTE: It may also enter or modify the information in a tag.

lower band: frequency band 865,0 MHz to 868,0 MHz designated for use by RFID

manufacturer: person or company who makes a product, either through assembly of components or through production of raw materials

radiated measurements: measurements which involve the absolute measurement of a radiated field

R-GSM: interoperable band of 921 MHz to 960 MHz used by the railways

tag: transponder that holds data and responds to an interrogation signal

talk mode: transmission of intentional radiation by an interrogator

upper band: frequency band 915,0 MHz to 921,0 MHz designated for use by RFID

3.2 Symbols

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

C_L	Total cable loss in dB
dB	decibel
d	distance
dB _i	decibel relative to an isotropic radiator
dB _m	dB relative to 1 milliwatt
dB μ V	decibel microvolt
f	frequency measured under normal test conditions
f _c	centre frequency of carrier transmitted by interrogator
G_{IC}	Gain of a circular antenna in dB _i c
G_{MR}	Gain Measurement Receiver
mW	milliwatt
nW	nanowatt
Ω	Ohms
P_C	Power Carrier
P_{MR}	Signal strength received at the measurement receiver
μ W	microwatt
λ	wavelength

3.3 Abbreviations

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

AM	Amplitude Modulation
ANSI	American National Standards Institute
BER	Bit Error Ratio
BL	Blocking Level
BLF	Bit Link Frequency
BW	Bandwidth
CEPT	European Conference of Postal and Telecommunications administrations
DR	Divide Ration
e.r.p.	effective radiated power
EFTA	European Free Trade Association
EMC	ElectroMagnetic Compatibility
emf	electromotive force
ERC	European Radio communication Committee
ER-GSM	Extended Railways GSM
EUT	Equipment Under Test
GSM	Global System for Mobile
MHz	Mega Hertz
NaCl	sodium chloride
OATS	Open Area Test Site
ppm	part per million
RBW	Resolution Bandwidth
RF	Radio Frequency
RFID	Radio Frequency Identification
R-GSM	Railway GSM
RMS	Root Mean Square
S_{ACH}	Selectivity Adjacent Channel
SBL	Signal Blocking Level
SRD	Short Range Device
TX	Transmitter

UHF Ultra High Frequency
VSWR Voltage Standing Wave Ratio

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment (EUT), which shall be in accordance with its intended use as defined in the EUT documentation. The equipment (EUT) shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the operational environmental profile defined by its intended use.

The environmental profile in the EUT documentation shall at least define the intended operating range for:

- temperature;
- humidity;
- power supply.

4.2 General requirements

4.2.1 Functional requirements

Interrogators shall transmit only in the high power channels specified in clause 4.2.2 for the purpose of communicating with tags at power levels up to the limits specified in clause 4.3.3.3.

An interrogator may transmit a continuous signal on any of the high power channels for a period not exceeding the limit defined in clause 4.3.7.3. At the end of the transmission the interrogator shall not transmit again on the same channel for the period as defined in clause 4.3.7.3. Alternatively the interrogator may switch immediately to any one of the other high power channels and send a further continuous transmission in accordance with the requirements of clause 4.3.7.3. There is no limit to the number of times that this process may be repeated.

Interrogators may also operate in a presence-sensing mode in which they periodically transmit to determine whether tags have entered their interrogation zones. When operating in this mode, interrogators shall restrict the length of each transmission to less than 1 s and the period between successive transmissions shall be no less than 100 ms. Once an interrogator has determined the presence of tags, it will commence its reading routine.

Interrogators shall transmit for no longer than is necessary to complete the intended operation and shall additionally meet the requirements and timeframe in clause 4.3.7.3.

In some countries parts of the upper band are allocated for the exclusive use of the military and government services.

Interrogators capable of operating in the upper band 915 MHz to 921 MHz shall provide a means to prevent operation at the restricted frequencies in the applicable member states.

Where an interrogator is only able to transmit on a single band, testing shall be performed in the applicable band.

It is permissible for interrogators to transmit simultaneously in both the lower and upper bands.

4.2.2 Designated frequencies

4.2.2.1 Lower band

Interrogators operating in the lower band, 865 MHz to 868 MHz, shall use any of the four specified high power channels illustrated in figure 1 and table 1. The centre frequency of the lowest channel shall be 865,7 MHz and the bandwidth of each high power channel shall be 200 kHz. The remaining three high power channels shall be spaced at equal intervals of 600 kHz. Tags shall respond within the low power channels.

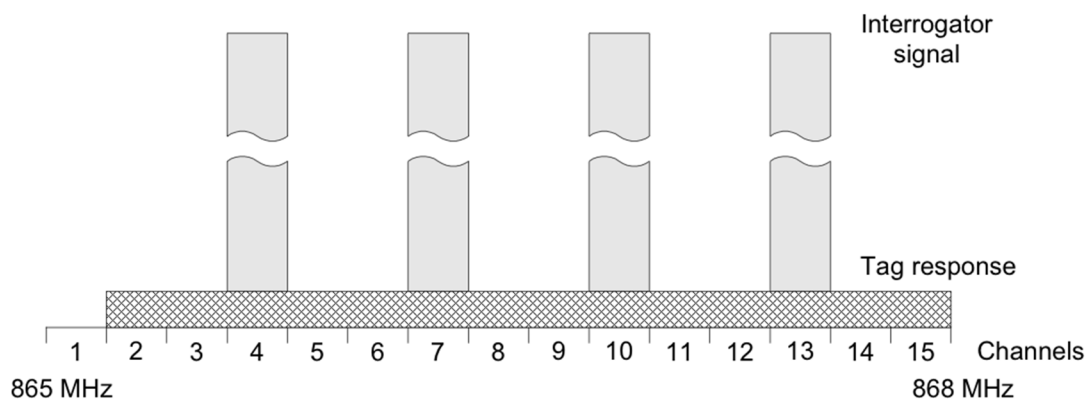


Figure 1: Channel plan for lower band

Table 1: Interrogator frequencies of operation in the lower band

Equipment	Operating frequencies	Centre frequency
Interrogator Transmit channel 4	865,6 MHz to 865,8 MHz	865,7 MHz
Interrogator Transmit channel 7	866,2 MHz to 866,4 MHz	866,3 MHz
Interrogator Transmit channel 10	866,8 MHz to 867,0 MHz	866,9 MHz
Interrogator Transmit channel 13	867,4 MHz to 867,6 MHz	867,5 MHz

4.2.2.2 Upper band

Interrogators operating in the upper band, 915 MHz to 921 MHz, shall use any of the three specified high power channels illustrated in figure 2 and table 2. The centre frequency of the lowest channel shall be 916,3 MHz and the bandwidth of each high power channel shall be 400 kHz. The remaining high power channels shall be spaced at equal intervals of 1,2 MHz. Tags shall respond within the low power channels.

Interrogators shall have means that limit the channels to be used for operation, whereas such means shall be tested according to clause 5.5.9.

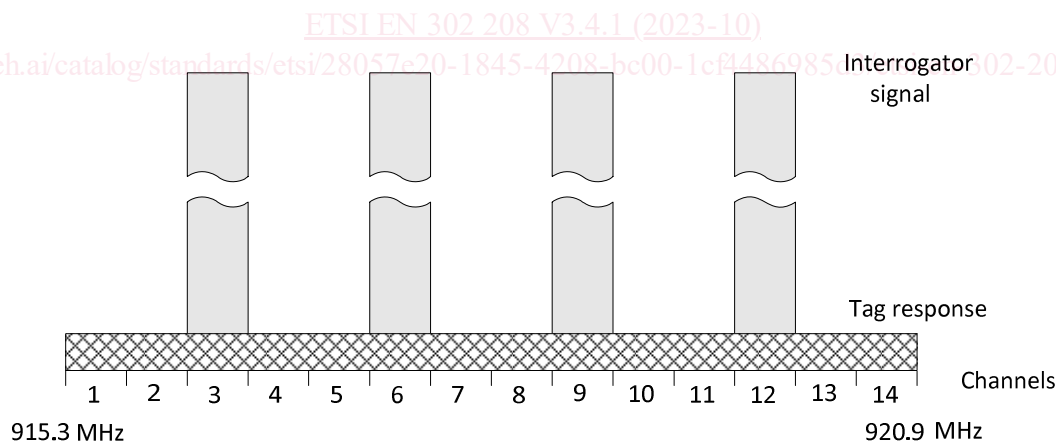


Figure 2: Channel plan for upper band