

ETSI EN 300 220-4 V1.1.1 (2017-02)



HARMONISED EUROPEAN STANDARD

**Short Range Devices (SRD) operating
in the frequency range 25 MHz to 1 000 MHz;
Part 4: Harmonised Standard covering the essential
requirements of article 3.2 of Directive 2014/53/EU;
Metering devices operating in
designated band 169,400 MHz to 169,475 MHz**

Reference

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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.4] 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.

The present document is part 4 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

For non EU countries the present document may be used for regulatory (Type Approval) purposes.

National transposition dates	
Date of adoption of this EN:	27 January 2017
Date of latest announcement of this EN (doa):	30 April 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2017
Date of withdrawal of any conflicting National Standard (dow):	31 October 2018

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 present document is part 4 of a multi-part deliverable covering Metering devices in the designated frequency range 169,400 MHz to 169,475 MHz.

The present document is structured as follows:

Clause 2 provides references.

Clause 3 provides definitions of terms and abbreviations used.

Clause 4 provides technical requirements.

Annex A (informative): provides relationship between the present document and essential requirements of Directive 2014/53/EU [i.1].

Annex B (normative): EU designated frequency bands for metering equipment.

Annex C (informative): Application form for testing.

Annex D (informative): Selection of parameters.

Annex E (informative): Bibliography.

Annex F (informative): Change History.

1 Scope

The present document specifies technical characteristics and methods of measurements for Metering Devices category equipment types:

- Metering devices category is defined by the EU Commission Decision 2013/752/EU [i.2] as:
"The metering device category covers radio devices that are part of bidirectional radio communications systems which allow remote monitoring, measuring and transmission of data in smart grid infrastructures, such as electricity, gas and water".

The present document covers equipment intended for fixed, mobile or nomadic use, e.g.:

- stand-alone radio equipment;
- plug-in radio devices intended for use with or within a variety of host systems;
- plug-in radio devices intended for use within combined equipment.

These radio equipment types are capable of operating in the metering designated frequency band given in table 1.

Table 1: Metering SRDs frequency band

	Metering Short Range Devices frequency range
Transmit and receive	169,400 MHz to 169,475 MHz

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.1] 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.

- [1] ETSI EN 300 220-1 (V3.1.1) (02-2017): "Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 1: Technical characteristics and methods of measurement".

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 (RED Directive).
- [i.2] Commission Decision 2013/752/EU on harmonisation of the radio spectrum for use by short-range devices as amended by subsequent Commission Decisions.
- [i.3] 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.4] 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.5] Commission Decision 2000/299/EU on harmonisation of the radio spectrum for use by short-range devices as amended by subsequent Commission Decisions.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in the RE-Directive [i.1] and ETSI EN 300 220-1 [1] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI EN 300 220-1 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 300 220-1 [1] apply.

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, which shall be declared by the manufacturer. The equipment shall comply with all the technical requirements of the present document which are identified as applicable in annex A at all times when operating within the boundary limits of the declared operational environmental profile. Normal and extreme tests conditions are defined in ETSI EN 300 220-1 [1], clauses 4.3.3 and 4.3.4.

4.2 All equipment conformance requirements

4.2.0 Compliance

When an operational frequency band is selected from annex B for the equipment under test, the equipment shall comply with all parameters, exclusions and notes from the row in annex B unless a different National Radio Interface applies.

4.2.1 Operating frequency

4.2.1.0 Applicability

Clause 4.2.1 applies to all equipment.

4.2.1.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.1.1 applies.

4.2.1.2 Limits

The manufacturer may declare either one or more operating frequencies and operating channels.

Operating channel(s) shall be entirely within operational frequency bands allowed by annex B.

4.2.1.3 Conformance

The conformance for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.1.2.

4.2.2 Unwanted emissions in the spurious domain

4.2.2.0 Applicability

Clause 4.2.2 applies to all equipment.

4.2.2.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clauses 5.9.1.1 and 5.9.1.2 apply.

4.2.2.2 Limits

The EUT shall comply with reference limits defined in ETSI EN 300 220-1 [1], clause 5.9.2.

4.2.2.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.9.3.

Conformance shall be established under normal test conditions.

4.3 Transmitters conformance requirements

4.3.1 Effective Radiated Power

4.3.1.0 Applicability

Clause 4.3.1 applies to all transmitters.

4.3.1.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.2.1 applies.

4.3.1.2 Limits

The effective radiated power shall not be greater than the value allowed in annex B, table B.1 for the chosen operational frequency band(s). The signal shall be located within the operational frequency band.

4.3.1.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.2.2.

Conformance shall be established under normal and extreme test conditions.

4.3.2 Duty Cycle

4.3.2.0 Applicability

Clause 4.3.2 applies to all transmitters.

4.3.2.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.4.1 applies.

4.3.2.2 Limits

The Duty Cycle at the operating frequency shall not be greater than values in annex B for the chosen operational frequency band.

4.3.2.3 Conformance

The conformance for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.4.2.

4.3.3 Occupied Bandwidth

4.3.3.0 Applicability

Clause 4.3.3 applies to all transmitters.

4.3.3.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.6.1 applies.

4.3.3.2 Limits

Limits apply under normal and extreme conditions.

The EUT shall comply with reference limits defined in ETSI EN 300 220-1 [1], clause 5.6.2.

4.3.3.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.6.3.

Conformance shall be established under normal and extreme test conditions.

4.3.4 TX Out Of Band Emissions

4.3.4.0 Applicability

Clause 4.3.4 applies to all transmitters with OCW > 25 kHz.

4.3.4.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.8.1 applies.

4.3.4.2 Limits

The EUT shall comply with reference limits defined in ETSI EN 300 220-1 [1], clause 5.8.2.

4.3.4.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.8.3.

Conformance shall be established under normal and extreme test conditions.

4.3.5 Transient power

4.3.5.0 Applicability

Clause 4.3.5 applies to all transmitters.

4.3.5.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.10.1 applies.

4.3.5.2 Limits

The EUT shall comply with reference limits defined in ETSI EN 300 220-1 [1], clause 5.10.2 under normal test conditions.

4.3.5.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.10.3.

Conformance shall be established under normal test conditions.

4.3.6 Adjacent Channel Power

4.3.6.0 Applicability

Clause 4.3.6 applies to all transmitters with OCW \leq 25 kHz.

4.3.6.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.11.1 applies.

4.3.6.2 Limits

Where the operating channel width is less than or equal to 25 kHz, the power in the adjacent channels shall not exceed the values given in table 2.

Table 2: Adjacent channel power limits for transmitters with OCW \leq 25 kHz

		Adjacent Channel power integrated over 0,7 x OCW	Alternate Adjacent Channel power integrated over 0,7 x OCW
OCW < 20 kHz	Normal test conditions	-20 dBm	-20 dBm
	Extreme test conditions	-15 dBm	-20 dBm
OCW \geq 20 kHz	Normal test conditions	-33 dBm	-36 dBm
	Extreme test conditions	-23 dBm	-26 dBm

4.3.6.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.11.3.

Conformance shall be established under normal and extreme test conditions.

4.3.7 TX behaviour under Low Voltage Conditions

4.3.7.0 Applicability

Clause 4.3.7 applies to battery powered transmitters.

4.3.7.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.12.1 applies.

4.3.7.2 Limits

The EUT shall comply with reference limits defined in ETSI EN 300 220-1 [1], clause 5.12.2.

4.3.7.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.12.3.

Conformance shall be established under normal test conditions.

4.4 Receivers conformance requirements

4.4.1 RX sensitivity

4.4.1.0 Applicability

Clause 4.4.1 applies to all EUT with polite spectrum access.

4.4.1.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.14.1 applies.

4.4.1.2 Limits

The EUT shall comply with reference limits defined in ETSI EN 300 220-1 [1], clause 5.14.2.

4.4.1.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.14.3.

Conformance shall be established under normal test conditions.

4.4.2 Blocking

4.4.2.0 Applicability

Clause 4.4.2 applies to all receivers.

4.4.2.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.18.1 applies.

4.4.2.2 Limits

Limit applies at normal test conditions.

The blocking level shall be better or equal to category 2 reference limits level defined in ETSI EN 300 220-1 [1], clause 5.18.3.

4.4.2.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.18.6.

Conformance shall be established under normal test conditions.

4.4.3 Clear Channel Assessment threshold

4.4.3.0 Applicability

Clause 4.4.3 applies to all EUT with polite spectrum access.

4.4.3.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.21.2.1 applies.

4.4.3.2 Limits

The CCA threshold shall not exceed the limits given in ETSI EN 300 220-1 [1], clause 5.21.2.2.

4.4.3.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.21.2.3.

Conformance shall be established under normal test conditions.

4.4.4 Polite spectrum access timing parameters

4.4.4.0 Applicability

Clause 4.4.4 applies to all EUT with polite spectrum access.

4.4.4.1 Description

For the purpose of the present document, the description in ETSI EN 300 220-1 [1], clause 5.21.1 applies.

4.4.4.2 Limits

The EUT shall comply with reference limits defined in ETSI EN 300 220-1 [1], clause 5.21.3.1.

4.4.4.3 Conformance

The conformance tests for this requirement shall be as defined in ETSI EN 300 220-1 [1], clause 5.21.3.2.

Conformance shall be established under normal test conditions.

Annex A (informative): Relationship between the present document and the essential requirements of Directive 2014/53/EU

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.4] 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.

Table A.1: Relationship between the present document and the essential requirements of Directive 2014/53/EU

Harmonised Standard ETSI EN 300 220-4				
Requirement			Requirement Conditionality	
No	Description	Reference: Clause No	U/C	Condition
1	Operating frequency	4.2.1	U	
2	Unwanted emissions in the spurious domain	4.2.2	U	
3	TX Transmitter effective radiated power	4.3.1	U	
4	TX Duty cycle	4.3.2	U	
5	TX Occupied bandwidth	4.3.3	U	
6	TX out of band emissions	4.3.4	C	Applies to EUT with OCW > 25 kHz
7	TX Transient power	4.3.5	U	
8	TX Adjacent channel power	4.3.6	C	Applies to EUT with OCW ≤ 25 kHz
9	TX behaviour under low voltage conditions	4.3.7	C	Applies to battery powered EUT
10	RX sensitivity	4.4.1	C	Applies to EUT with polite spectrum access
11	Clear channel assessment threshold	4.4.3	C	Applies to EUT with polite spectrum access
12	Polite spectrum access timing parameters	4.4.4	C	Applies to EUT with polite spectrum access
13	RX Blocking	4.4.2	U	

Key to columns:

Requirement:

No A unique identifier for one row of the table which may be used to identify a requirement.

Description A textual reference to the requirement.

Clause Number Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

Requirement Conditionality:

U/C Indicates whether the requirement is unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C).

Condition Explains the conditions when the requirement is or is not applicable for a requirement which is classified "conditional".

Presumption of conformity stays valid only as long as a reference to the present document is maintained in the list published in the Official Journal of the European Union. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Other Union legislation may be applicable to the product(s) falling within the scope of the present document.

Annex B (normative): EU designated frequency bands for metering equipment

According to Article 8 (2) of Directive 2014/53/EU [i.1], the European Commission has adopted implementing acts establishing the equivalence between notified national radio interfaces and assigning a radio equipment class. So called Class 1 equipment is equipment that can be placed on the market and be put into service without restrictions. The Commission, in consultation with Member States, publishes an indicative and non-exhaustive list of equipment falling within the scope of Class 1. Table B.1 summarizes the relevant parameters in the band 25 MHz to 1 000 MHz from the latest list of class 1 equipment (December 2014). This table is in line with the harmonised frequency bands and technical parameters for short-range devices from EC Decision 2013/752/EU [i.2].

Table B.1: EU designated frequency band for metering equipment

	Frequency Band	Maximum radiated power, e.r.p.	Channel access and occupation rules	Maximum occupied bandwidth	Band number from EC Decision 2013/752/EU [i.2]	Class 1 sub-class number according Commission Decision 2000/299/EU [i.5]
A	169,400 MHz to 169,475 MHz	500 mW e.r.p.	≤ 10 % duty cycle	50 kHz	37b	123

Annex C (informative): Application form for testing

C.0 Introduction

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the application form in this annex so that it can be used for its intended purposes and may further publish the completed application form.

The form contained in this annex may be used by the manufacturer to comply with the requirement contained in clause 4 to provide the necessary information about the equipment to the test laboratory prior to the testing. It contains product information as well as other information which might be required to define which configurations are to be tested, which tests are to be performed as well the test conditions.

This application form should form an integral part of the test report.

C.1 Information as required by ETSI EN 300 220-4

In accordance with ETSI EN 300 220-4, clause 4, the following information is provided by the manufacturer.

- a) **The name of the manufacturer or his trademark**

.....

- b) **The type equipment designation**

.....

- c) **The Application(s) of the equipment**

.....

.....

- d) **The operating frequency(ies)**

.....

.....

- e) **The operational frequency band(s)**

.....

- f) **The operating channel(s) width(s)**

.....

.....

The operating channel is less than or equal to 25 kHz ?

- g) **Maximum radio-frequency power transmitted in the frequency band in which the radio equipment operates**

.....

- h) **What is the spectrum access mechanism of the equipment?**

Duty cycle

Polite spectrum access

i) In case of polite spectrum access

The CCA time implemented by the equipment is ms

The minimal unit of deferral period is

The deadtime T_{DIS} isms

j) Is the equipment battery powered?

Yes No

k) Is the equipment frequency agile?

Yes No

Annex D (informative): Selection of technical parameters

D.1 Introduction

ETSI EG 203 336 [i.3] lists candidate technical parameters to be included in a Harmonised Standard aimed at providing a presumption of conformity of radio equipment with the essential requirements in articles 3.1(b) and 3.2 of the Radio Equipment Directive 2014/53/EU [i.1].

Essential requirements are high level objectives described in European Directives. The purpose of the Harmonised Standard is to translate those high level objectives into detailed technical specifications.

This annex provides information regarding selected parameters that may be in or not in the present document.

D.2 Receiver parameters

Receiver sensitivity is specified in the case of polite spectrum access.

Adjacent channel selectivity is not specified in the present document because it is only applicable to category 1 receivers.

Receiver saturation at adjacent channel is not specified in the present document because it is only applicable to category 1 receivers.

Spurious response rejection is not specified in the present document because it is only applicable to category 1 receivers.

Behaviour at high wanted signal level is not specified in the present document because it is only applicable to category 1 receivers.

It has also to be noted that SRDs relevant for the present document are not operating in channelized bands.

Many receiver requirements fall under the general heading of linearity and these are covered in the present document by requirements on blocking performance.

Intermodulation performance is not specified in order to simplify testing. The risk of failure due to second order intermodulation products is considered low because the blocking specification leads to the ability to handle strong out of band signals. Manufacturers should assess the risk of intermodulation products when operating adjacent to high occupancy bands.

Annex E (informative): Bibliography

- Ketterling, H-P: "Verification of the performance of fully and semi-anechoic chambers for radiation measurements and susceptibility/immunity testing", 1991, Leatherhead/Surrey.
- ETSI TR 102 313 (V1.1.1): "Electromagnetic compatibility and Radio Spectrum Matters (ERM); Frequency-agile Generic Short Range Devices using listen-Before-Transmit (LBT); Technical Report".

Annex F (informative): Change History

Version	Information about changes
1.1.1	First published version covering Directive 2014/53/EU [i.1]. Major change is: <ul style="list-style-type: none"><li data-bbox="355 427 1378 479">• New multi-part structure of ETSI EN 300 220 which is described in ETSI EN 300 220-1 [1], clause "Foreword".

History

Document history		
V1.1.0	May 2016	EN Approval Procedure AP 20160801: 2016-05-03 to 2016-08-01
V1.1.1	November 2016	Vote V 20170127: 2016-11-28 to 2017-01-27
V1.1.1	February 2017	Publication