

ETSI EN 304 220-1 V1.2.1 (2024-08)



**Wideband data transmission SRD;
Harmonised Standard for access to radio spectrum;
Part 1: Wideband data transmission devices: network access
points operating in the frequency bands 863 MHz to 868 MHz
and 915,8 MHz to 919,4 MHz**

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Contents

Intellectual Property Rights	8
Foreword.....	8
Modal verbs terminology.....	9
1 Scope	10
2 References	10
2.1 Normative references	10
2.2 Informative references.....	11
3 Definition of terms, symbols and abbreviations.....	12
3.1 Terms.....	12
3.2 Symbols.....	14
3.3 Abbreviations	14
4 Technical requirements specifications	15
4.1 Environmental profile.....	15
4.2 General performance criteria	15
4.3 Requirements for transmitters	15
4.3.1 Frequency error.....	15
4.3.1.1 Applicability.....	15
4.3.1.2 Description	16
4.3.1.3 Limits	16
4.3.1.4 Conformance.....	16
4.3.2 Effective radiated power	16
4.3.2.1 Applicability.....	16
4.3.2.2 Description	16
4.3.2.3 Limits	16
4.3.2.4 Conformance.....	16
4.3.3 Occupied bandwidth	16
4.3.3.1 Applicability.....	16
4.3.3.2 Description	16
4.3.3.3 Limits	16
4.3.3.4 Conformance.....	17
4.3.4 Transmitter spectrum emission mask.....	17
4.3.4.1 Applicability.....	17
4.3.4.2 Description	17
4.3.4.3 Limits	17
4.3.4.4 Conformance.....	17
4.3.5 Transmitter unwanted emissions in the spurious domain	18
4.3.5.1 Applicability.....	18
4.3.5.2 Description	18
4.3.5.3 Limits	18
4.3.5.4 Conformance.....	18
4.3.6 Duty cycle.....	18
4.3.6.1 Applicability.....	18
4.3.6.2 Description	18
4.3.6.3 Limits	19
4.3.6.4 Conformance.....	19
4.3.7 Transient power	19
4.3.7.1 Applicability.....	19
4.3.7.2 Description	19
4.3.7.3 Limits	19
4.3.7.4 Conformance.....	19
4.4 Requirements for receivers.....	19
4.4.1 Receiver sensitivity.....	19
4.4.1.1 Applicability.....	19
4.4.1.2 Description	19

4.4.1.3	Limits	20
4.4.1.4	Conformance	20
4.4.2	Adjacent channel selectivity	20
4.4.2.1	Applicability	20
4.4.2.2	Description	20
4.4.2.3	Limits	20
4.4.2.4	Conformance	20
4.4.3	Receiver spurious response rejection	20
4.4.3.1	Applicability	20
4.4.3.2	Description	21
4.4.3.3	Limits	21
4.4.3.4	Conformance	21
4.4.4	Blocking	21
4.4.4.1	Applicability	21
4.4.4.2	Description	21
4.4.4.3	Limits	21
4.4.4.4	Conformance	21
4.4.5	Receiver spurious emission	21
4.4.5.1	Applicability	21
4.4.5.2	Description	21
4.4.5.3	Limits	22
4.4.5.4	Conformance	22
4.4.6	Receiver maximum input signal level	22
4.4.6.1	Applicability	22
4.4.6.2	Description	22
4.4.6.3	Limits	22
4.4.6.4	Conformance	22
4.5	Requirements for spectrum access	22
4.5.1	Clear channel assessment threshold	22
4.5.1.1	Applicability	22
4.5.1.2	Description	22
4.5.1.3	Limits	23
4.5.1.4	Conformance	23
4.5.2	Listen Before Talk (LBT)	23
4.5.2.1	Applicability	23
4.5.2.2	Description	23
4.5.2.3	Limits	23
4.5.2.4	Conformance	24
4.6	Functional Requirements	24
4.6.1	Master Network Access Point	24
4.6.1.1	Applicability	24
4.6.1.2	Description	24
4.6.1.3	Limits	24
4.6.1.4	Conformance	24
4.6.2	Network Access Point	24
4.6.2.1	Applicability	24
4.6.2.2	Description	25
4.6.2.3	Limits	25
4.6.2.4	Conformance	25
5	Testing for compliance with technical requirements	25
5.1	Environmental conditions for testing	25
5.2	General conditions for testing	25
5.2.1	General considerations	25
5.2.2	Presentation of equipment for testing purposes	25
5.2.2.1	General Considerations	25
5.2.2.2	Choice of model for testing	25
5.2.2.2.1	General considerations	25
5.2.2.2.2	EUT with an external RF connector	26
5.2.2.2.3	EUT without an external RF connector	26
5.2.2.3	Testing of modular equipment	26
5.2.3	Test power source	26

5.2.3.1	General	26
5.2.3.2	External test power source	27
5.2.3.3	Internal test power source	27
5.2.4	Thermal test conditions	27
5.2.5	Conducted measurements	27
5.2.5.1	Artificial antenna	27
5.2.6	Radiated measurements	27
5.2.7	Applicable measurement methods	27
5.2.8	Test signals for data	28
5.2.9	Measuring receiver	29
5.2.9.1	Description	29
5.2.9.2	Reference bandwidth	29
5.3	Conformance methods of measurement for transmitters	30
5.3.1	Frequency error	30
5.3.1.1	Test conditions	30
5.3.1.2	Radiated measurement	31
5.3.1.3	Conducted measurement	31
5.3.1.4	Measurement procedure for D-M1 test signal	31
5.3.1.5	Measurement procedure for other test signal	31
5.3.2	Effective radiated power	32
5.3.2.1	Effective Radiated Power (conducted measurement)	32
5.3.2.1.0	General	32
5.3.2.1.1	Test conditions	32
5.3.2.1.2	Measurement procedure	32
5.3.2.2	Effective radiated power (radiated measurement)	33
5.3.2.2.0	General	33
5.3.2.2.1	Test conditions	33
5.3.2.2.2	Measurement procedure	33
5.3.3	Occupied bandwidth	33
5.3.3.1	Test conditions	33
5.3.3.2	Radiated measurement	34
5.3.3.3	Conducted measurement	34
5.3.3.4	Measurement procedure	34
5.3.4	Transmitter spectrum emission mask	35
5.3.4.1	Test conditions	35
5.3.4.2	Radiated measurement	35
5.3.4.3	Conducted measurement	35
5.3.4.4	Measurement procedure	35
5.3.5	Transmitter unwanted emission in the spurious domain	35
5.3.5.1	Test conditions	35
5.3.5.2	Radiated measurement	36
5.3.5.3	Conducted measurement	36
5.3.5.4	Measurement procedure	36
5.3.5.4.1	Pre-scan	36
5.3.5.4.2	Measurement of the emissions identified during the pre-scan	37
5.3.6	Duty cycle	38
5.3.6.1	Test conditions	38
5.3.6.2	Radiated measurement	38
5.3.6.3	Conducted measurement	38
5.3.6.4	Measurement procedure	39
5.3.7	Transient power	39
5.3.7.1	Test conditions	39
5.3.7.2	Radiated measurement	39
5.3.7.3	Conducted measurement	39
5.3.7.4	Measurement procedure	40
5.4	Conformance test suites for receivers	41
5.4.1	Receiver sensitivity	41
5.4.1.1	Test Conditions	41
5.4.1.2	Radiated measurement	41
5.4.1.3	Conducted measurement	41
5.4.1.4	Measurement procedure	41
5.4.2	Adjacent channel selectivity	42

5.4.2.1	Test conditions	42
5.4.2.2	Radiated measurement	42
5.4.2.3	Conducted measurement	42
5.4.2.4	Measurement procedure	42
5.4.3	Receiver spurious response rejection	43
5.4.3.1	Test conditions	43
5.4.3.2	Radiated measurement	43
5.4.3.3	Conducted measurement	43
5.4.3.4	Measurement procedure	44
5.4.4	Blocking	44
5.4.4.1	Test conditions	44
5.4.4.2	Radiated measurement	45
5.4.4.3	Conducted measurement	45
5.4.4.4	Measurement procedure	45
5.4.5	Receiver spurious emission	46
5.4.5.1	Test conditions	46
5.4.5.2	Radiated measurement	46
5.4.5.3	Conducted measurement	46
5.4.5.4	Measurement procedure	46
5.4.5.4.1	Conducted measurement	46
5.4.5.4.2	Radiated measurement	47
5.4.6	Receiver maximum input signal level	47
5.4.6.1	Test conditions	47
5.4.6.2	Radiated measurement	47
5.4.6.3	Conducted measurement	48
5.4.6.4	Measurement procedure	48
5.5	Conformance test suites for spectrum access	49
5.5.1	Clear channel assessment threshold	49
5.5.1.1	Test conditions	49
5.5.1.2	Radiated measurement	49
5.5.1.3	Conducted measurement	49
5.5.1.4	Measurement procedure	50
5.5.2	Listen before talk	51
5.5.2.1	Test conditions	51
5.5.2.2	Radiated measurement	51
5.5.2.3	Conducted measurement	51
5.5.2.4	Measurement procedure	51
5.6	Conformance test suites for functional requirements	53
5.6.1	Master Network Access Point	53
5.6.1.1	Test conditions	53
5.6.1.2	Radiated measurement	53
5.6.1.3	Conducted measurement	53
5.6.1.4	Measurement procedure	54
5.6.2	Network Access Point (NAP)	54
5.6.2.1	Test conditions	54
5.6.2.2	Measurement Procedure	55

Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	57
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Annex B (normative):	Test sites and arrangements for radiated measurement	59
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B.1	General considerations	59
B.2	Radiation test sites	59
B.2.1	Open Area Test Site (OATS)	59
B.2.2	Semi Anechoic Room	60
B.2.3	Fully Anechoic Room (FAR)	61
B.2.4	Measurement Distance	62
B.3	Antenna	63
B.3.1	General considerations	63
B.3.2	Measurement antenna	63

B.3.3	Substitution antenna	63
B.4	Guidance on the use of radiation test sites	64
B.4.1	General considerations	64
B.4.2	Power supplies for the battery powered EUT	64
B.4.3	Site preparation	64
B.5	Coupling of signals	64
B.5.1	General	64
B.5.2	Data signals	65
B.6	Measurement procedures for radiated measurement	65
B.6.1	General considerations	65
B.6.2	Radiated measurements in an OATS or SAR	65
B.6.3	Radiated measurements in a FAR	66
B.6.4	Substitution measurement	66
B.6.5	Radiated measurement methods for receivers	66
B.7	Guidance for testing radiated technical requirements	66
B.7.0	General	66
B.7.1	Radio test suites and corresponding test sites	67
Annex C (informative): Selection of receiver parameters.....		68
C.0	Introduction	68
C.1	Receiver sensitivity	68
C.2	Receiver co-channel rejection	68
C.3	Receiver adjacent signal selectivity	68
C.4	Receiver spurious response rejection	68
C.5	Receiver blocking	68
C.6	Receiver radio-frequency intermodulation	69
C.7	Receiver dynamic range	69
C.8	Desensitization	69
C.9	Receiver unwanted emissions in the spurious domain	69
Annex D (normative): T_{On} time measurements		70
D.1	Measurement procedure	70
D.2	T _{Disregard} procedure	70
Annex E (normative): Test fixture		72
E.1	General considerations	72
E.2	Validation of the test-fixture in the temperature chamber	73
E.3	Mode of use	74
Annex F (informative): Properties of EUT		75
Annex G (informative): Maximum Measurement uncertainty		76
Annex H (informative): Bibliography		77
History		78

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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.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.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 1 of a multi-part deliverable covering Wideband data transmission SRD; Harmonised Standard for access to radio spectrum, as identified below:

- Part 1: "Wideband data transmission devices: network access points operating in the frequency bands 863 MHz to 868 MHz and 915,8 MHz to 919,4 MHz";**
- Part 2: "Wideband data transmission devices: terminal node operating in designated bands 863 MHz to 868 MHz and 915,8 MHz to 919,4 MHz".

National transposition dates	
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Modal verbs terminology

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1 Scope

The present document specifies technical characteristics and test methods to be used in the conformance assessment of wideband data transmission Short Range Device (SRD) network access point equipment in the frequency range 863 MHz to 868 MHz and 915,8 MHz to 919,4 MHz. The wideband data transmission device category covers radio devices that use wideband modulation techniques to access the spectrum. The present document specifies technical characteristics and methods of measurements for equipment operated in the following designated frequency bands given in Table 1-1.

Table 1-1: Designated frequency bands

SRD frequency bands	
863 MHz to 868 MHz	According to band no 84 of Commission Implementing Decision (EU) 2022/180 [i.7] and Annex 3 band a1 of CEPT/ERC/REC 70 03 [i.2].
915,8 MHz to 919,4 MHz	According to band a2 of Annex 3 of CEPT/ERC/REC 70 03 [i.2].
917,4 MHz to 919,4 MHz	According to band no 2 of Commission Implementing Decision (EU) 2022/172 [i.8].

In the designated bands the following types of equipment are defined:

- Type 1: Wideband Data Transmission Network Access Point (NAP) in data networks in 863,0 MHz to 868,0 MHz.
- Type 2: Wideband Data Transmission Master Network Access Point (NAP) in data networks in 915,8 MHz to 919,4 MHz and in 917,4 MHz to 919,4 MHz.
- Type 3: Wideband Data Transmission Network Access Point (NAP) in data networks in 915,8 MHz to 919,4 MHz and in 917,4 MHz to 919,4 MHz.

NOTE 1: The availability of the frequency bands for type 2 and type 3 equipment in the European Union and CEPT countries can be obtained from EFIS (<https://efis.cept.org/>) and is also listed in Appendices 1 and 3 of CEPT/REC 70-03 [i.2].
In addition, it should be noted that, in some countries, part or all of the bands for type 2 and type 3 equipment may be unavailable, and/or other frequency bands may be available, for networked and/or network based short range devices. See National Radio Interfaces (NRI) as relevant for additional guidance.

NOTE 2: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.1] is given 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.

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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] [CEPT/ERC/REC 70-03 \(12 February 2022\)](#): "Relating to the use of Short Range Devices (SRD)".
- [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] [ECC Report 261 \(01-2017\)](#): "Short Range Devices in the frequency range 862-870 MHz".
- [i.5] [ECC Report 246 \(01-2017\)](#): "Wideband and Higher DC Short Range Devices in 870-875.8 MHz and 915.2-920.8 MHz (companion to ECC Report 200)".
- [i.6] Recommendation ITU-T O.153 (10/92): "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [i.7] [Commission Implementing Decision \(EU\) 2022/180 of 8 February 2022](#) amending Decision 2006/771/EC as regards the update of harmonised technical conditions in the area of radio spectrum use for short-range devices.
- [i.8] [Commission Implementing Decision \(EU\) 2022/172 of 7 February 2022](#) amending Implementing Decision (EU) 2018/1538 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands.
- [i.9] [ERC Recommendation 74-01 \(October 2021\)](#): "Unwanted Emission in the spurious domain".
- [i.10] EN 55016-1-1 (2019) part 1-1: "Specification for radio disturbance and immunity measuring apparatus and methods; Part 1: Radio disturbance and immunity measuring apparatus - Measuring apparatus", produced by CENELEC.
- [i.11] ETSI TR 100 028 (all parts) (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.12] ETSI EG 203 336: "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.13] 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.14] 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.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".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

adjacent channel: frequency range equal to the width of the operating channel immediately above and immediately below the operating channel

NOTE: See Figure 3.1-1.

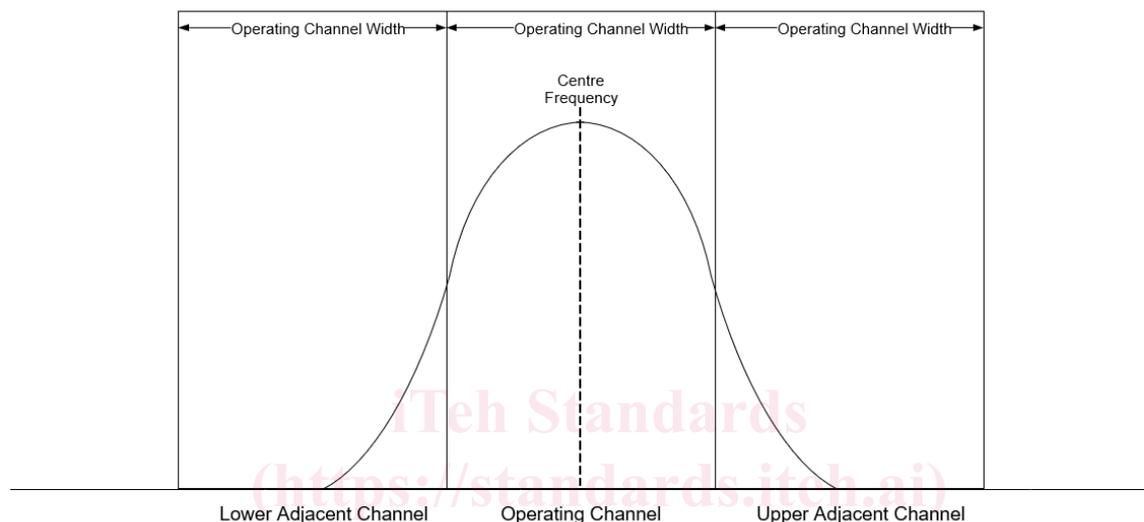


Figure 3.1-1: Adjacent channel definitions

Clear Channel Assessment (CCA): procedure of sensing the operating channel to determine whether or not it is occupied by a transmission

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

centre frequency: centre frequency of the transmitted signal

continuous transmission: modulated transmission without interruption for the period of the test

data network: group of wirelessly communicating SRDs composed of a network access point and one or more terminal nodes

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

dialog: repeated transmit-response cycle between two devices within a transmission

disregard time ($T_{\text{Disregard}}$): interval below which two separate radio emissions in a channel are considered a single continuous transmitted burst

duty cycle: ratio, expressed as a percentage, of the cumulative duration of transmissions in an observation bandwidth within an observation interval divided by the observation interval

fixed SRD: SRD able to operate only at a fixed geographical location

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

Listen Before Transmit (LBT): mechanism by which an equipment applies Clear Channel Assessment (CCA) before transmission (also known as Listen Before Talk)

master NAP: NAP which enables the operation of nomadic and/or mobile devices

NOTE: Nomadic and mobile terminal nodes are under the control of master NAP in the frequency range of 915,8 MHz - 919,4 MHz and of 917,4 MHz - 919,4 MHz in Europe according to CEPT/ERC/REC 70-03 [i.2] and Commission Implementing Decision (EU) 2022/172 [i.8].

maximum transmission duration ($T_{\text{On-Max}}$): longest permitted transmission

minimum inter-transmission interval ($T_{\text{Off-Min}}$): minimum interval in a channel between two transmissions by the same device

mobile equipment: equipment in operation while moving

Network Access Point (NAP): fixed terrestrial SRD connecting one or more terminal nodes to an external network or service

network control information: data intended to construct or maintain a data network

network data: application data carried over a data network

nomadic equipment: equipment for which the location may change but is stationary while in use

nominal operating frequency: frequency at mid-point of the Operating Channel

observation bandwidth: bandwidth in which the energy of an equipment is considered for the purposes of assessing transmission timings

observation period: reference interval of time

occupied bandwidth: width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0,5 % of the total mean power of a given emission

NOTE: See Figure 3.1-2.

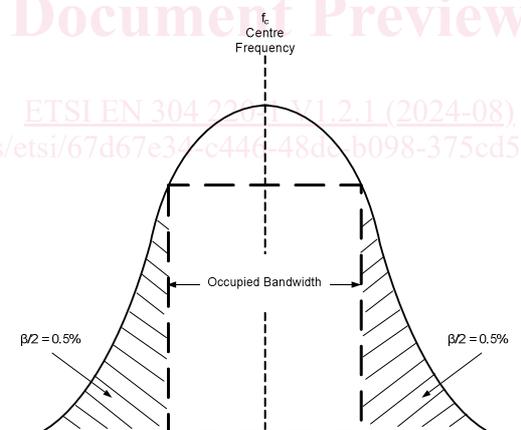


Figure 3.1-2: Signal Occupied Bandwidth

operating channel: frequency range in which transmissions occur

operating channel width: difference between frequency values of the high and low operating channel edges

Permitted Frequency Band (PFB): frequency band or sub-band within which the device is authorized to operate and to perform the intended function of the equipment

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

signal threshold ($P_{\text{Threshold}}$): absolute signal level (in dBm) above which a transmission is considered to exist for a given receiver bandwidth

Terminal Node (TN): SRD generating and/or consuming network data

transmission: continuous radio emission, or sequence of emissions each separated by an interval $< T_{\text{Disregard}}$, with a signal level greater than the signal threshold in an operating channel

NOTE: See Figure 3.1-3.

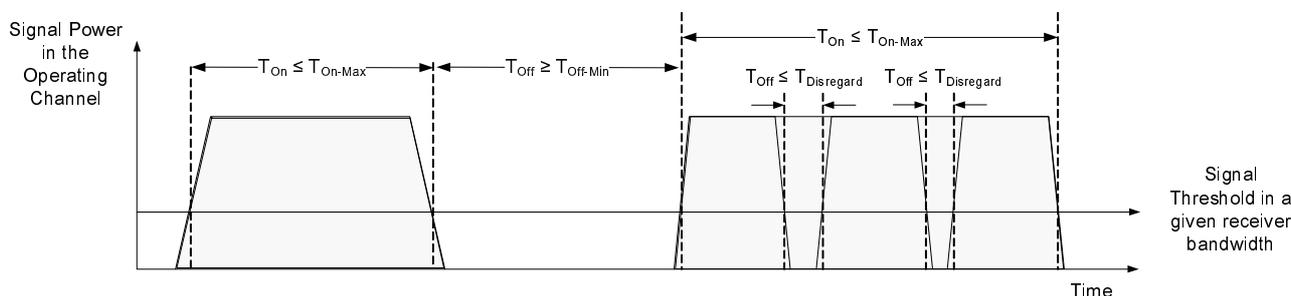


Figure 3.1-3: Transmission definitions

3.2 Symbols

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

dB	decibel
dBc	dB relative to the carrier
dBm	power level unit expressed in decibel with reference to one milliwatt
kbps	kilobits per second
Mbps	Megabits per second
p	probability of bit error
ppm	frequency error relative to desired frequency expressed in parts per million
R	data rate
S	sensitivity of receiver
T_F	fixed listening time in CCA
T_L	total listening time in CCA
T_{PS}	pseudo random listening time in CCA
T_{MRI}	maximum response interval in CCA
T_{MRD}	maximum response duration in CCA
λ	wavelength

3.3 Abbreviations

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

ACS	Adjacent Channel Selectivity
ARQ	Automatic Repeat reQuest
BER	Bit Error Ratio
CCA	Clear Channel Assessment
CEPT	European Conference of Postal and Telecommunications Administrations
CF	Centre Frequency
e.r.p.	effective radiated power
EC	European Commission
ECC	Electronic Communications Committee
EFIS	European Communications Office Frequency Information System
EU	European Union
EUT	Equipment Under Test
FAR	Fully Anechoic Room
FEC	Forward Error Correction
FOBWhigh	upper Frequency edge of Occupied Bandwidth
FOBWlow	lower Frequency edge of Occupied Bandwidth
ITU-R	International Telecommunication Union - Radiocommunication
LBT	Listen Before Talk