

ETSI EN 302 217-1 V3.4.1 (2025-07)



**Fixed Radio Systems;
Characteristics and requirements for
point-to-point equipment and antennas;
Part 1: Overview, common characteristics and
requirements not related to access to radio spectrum**

ETSI EN 302 217-1 V3.4.1 (2025-07)

<https://standards.iteh.ai/catalog/standards/etsi/bfb1049f-f6a6-4c7b-b708-4e5d1042e7aa/etsi-en-302-217-1-v3-4-1-2025-07>

ReferenceREN/ATTM-0457

Keywordsantenna, DFRS, digital, DRRS, FWS, point-to-point, radio, regulation, transmission

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 the
[ETSI Search & Browse Standards](#) application.

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 on [ETSI deliver](#) repository.

Users should be aware that the present document may be revised or have its status changed,
this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to
the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our
[Coordinated Vulnerability Disclosure \(CVD\)](#) program.

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 2025.
All rights reserved.

Contents

Intellectual Property Rights	7
Foreword.....	7
Modal verbs terminology.....	8
Introduction	8
1 Scope	9
2 References	9
2.1 Normative references	9
2.2 Informative references.....	11
3 Definition of terms, symbols and abbreviations.....	14
3.1 Terms.....	14
3.2 Symbols.....	20
3.3 Abbreviations	21
4 Structure and applicability of the ETSI EN 302 217 series.....	23
4.1 Generality	23
4.2 Summary of system options provided	24
4.3 User's guide	28
5 General characteristics	30
5.1 Frequency bands and channel arrangements	30
5.2 Special compatibility requirements between systems	30
5.3 Transmission capacity and spectral efficiency	30
5.4 Performance and availability requirements	30
5.5 Environmental profiles	31
5.5.0 Introduction.....	31
5.5.1 Environmental profile under Directive 2014/53/EU.....	31
5.5.2 ETSI standardized environmental profiles.....	31
5.5.2.0 Generality.....	31
5.5.2.1 Equipment intended for telecommunications applications installed in weather-protected locations (indoor locations)	32
5.5.2.2 Equipment intended for telecommunications applications installed in not-weather-protected locations (outdoor locations).....	32
5.5.3 Test environment profiles	32
5.6 Power supply	32
5.6.0 Introduction.....	32
5.6.1 Power supply profile under Directive 2014/53/EU.....	32
5.6.2 ETSI power supply profile.....	32
5.7 System block diagram	32
6 Baseband interfaces and parameters.....	33
6.0 Introduction	33
6.1 Ethernet interfaces.....	33
6.2 Plesiochronous interfaces	33
6.3 Synchronous digital hierarchy interfaces	34
6.4 Other baseband data interfaces.....	34
7 Main requirements.....	34
7.0 Introduction	34
7.1 General requirements	34
7.1.1 System identification	34
7.1.2 System nominal loading.....	35
7.1.3 Environmental profile.....	35
7.2 Transmitter characteristics.....	35
7.2.1 Transmitter power and power tolerance.....	35
7.2.1.1 Transmitter maximum power and EIRP.....	35
7.2.1.2 Transmitter combined output power and EIRP limits.....	35

7.2.1.3	Transmitter output power environmental variation	35
7.2.2	Transmitter power and frequency control	36
7.2.2.1	Transmitter Power and Frequency Control (ATPC, RTPC and RFC)	36
7.2.2.1.1	Automatic Transmit Power Control (ATPC)	36
7.2.2.1.2	Remote Transmit Power Control (RTPC)	37
7.2.2.1.3	Transmitter Remote Frequency Control (RFC)	37
7.2.3	Transmitter Radio Frequency spectrum mask	37
7.2.4	Transmitter discrete CW components exceeding the spectrum mask limit	37
7.2.4.1	Transmitter discrete CW components at the symbol rate	37
7.2.4.2	Transmitter other discrete CW components exceeding the spectrum mask limit	37
7.2.5	Transmitter unwanted emissions in the spurious domain	37
7.2.6	Transmitter dynamic change of modulation order	37
7.2.7	Transmitter radio frequency tolerance	37
7.2.8	Transmitter emission limitations outside the allocated band	38
7.3	Receiver characteristics	38
7.3.1	Unwanted emissions in the spurious domain	38
7.3.2	Receiver BER as a function of Receiver Signal Level (RSL)	38
7.3.3	Receiver selectivity	38
7.3.3.1	Introduction	38
7.3.3.2	Receiver co-channel, first and second adjacent channel interference sensitivity	38
7.3.3.3	Blocking (CW spurious interference sensitivity)	38
7.4	Antenna directional characteristics	38
8	Complementary requirements	39
8.0	Introduction	39
8.1	Branching/feeder requirements	39
8.1.1	Waveguide flanges (or other connectors)	39
8.1.2	Return loss of feeder/antenna systems at equipment antenna port (C/C' reference point)	40
8.2	Intermodulation products	41
8.3	Transmitter characteristics	41
8.3.1	Unwanted emissions - internal	41
8.3.2	Transmitter Radio Frequency (RF) spectrum mask when mixed manufacturer compatibility under same antenna is required	41
8.4	Receiver characteristics	42
8.4.1	Receiver maximum input level and input level range	42
8.4.2	Unwanted emissions - internal	43
8.4.3	Image rejection	43
8.4.4	Innermost channel selectivity	44
8.5	System performance without diversity	44
8.5.1	Equipment Residual BER (RBER)	44
8.5.2	Multipath distortion sensitivity	46
8.5.2.1	Introduction	46
8.5.2.2	Requirement	46
8.5.2.3	Assessment	48
8.5.3	Interference sensitivity for CCDP with XPIC operation	48
8.5.3.1	General	48
8.5.3.2	Co-channel "internal" interference sensitivity in flat fading conditions	48
8.6	System characteristics with diversity	49
8.6.0	Introduction	49
8.6.1	Differential delay compensation	49
8.6.2	BER performance	49

Annex A (normative): Transmitter Radio Frequency spectrum masks and receiver selectivity when mixed manufacturer compatibility is required50

A.0	Introduction	50
A.1	Transmitter Radio Frequency masks assessment	51
A.2	Normal channels - Emission mask floor for local TX to RX compatibility	51
A.2.1	Spectrum mask	51
A.2.2	Receiver selectivity	51

A.3	Innermost channels for channel arrangements from about 4 GHz to about 8,5 GHz with channel separation of 28 MHz to 30 MHz.....	52
A.3.0	Introduction	52
A.3.1	Innermost channels spectrum masks	52
A.3.2	Receiver innermost channel selectivity	54
A.4	Innermost channels for channel arrangements from about 4 GHz to 11 GHz with channel separation of 40 MHz.....	55
A.4.0	Introduction	55
A.4.1	Innermost channels spectrum masks	55
A.4.2	Receiver innermost channels selectivity.....	56
A.5	Innermost channels for 18 GHz channel arrangements with channel separation of 55 MHz	57
A.5.0	Introduction	57
A.5.1	Innermost channels spectrum masks	57
A.5.2	Receiver innermost channels selectivity.....	58
Annex B (normative):	Definition of equivalent data rates for packet data, PDH/SDH and other signals on the traffic interface.....	60
Annex C (informative):	Information on <i>Multi-channel</i> and <i>Channels-aggregation</i> differences and operation	61
C.1	Multi-channel and Channels-aggregation (two channel case).....	61
C.2	Channels-aggregation (more than two channels case)	62
Annex D (informative):	Additional information on relevant characteristics and operation	65
D.1	Residual Bit Error Ratio (RBER) and Residual Frame Error Ratio (RFER)	65
D.2	Measurement test set for XPI characteristics	66
D.3	Differential delay compensation range.....	67
D.4	FER/BER equivalence and FER performance measurement equipment settings (example).....	68
D.4.1	FER/BER equivalence.....	68
D.4.2	FER equipment settings and measurement techniques (example).....	69
D.5	Impact of power control (ATPC and/or RTPC), mixed-mode and bandwidth adaptive operation on spectrum mask and link design requirements.....	69
D.5.0	Introduction	69
D.5.1	ATPC and RTPC.....	69
D.5.1.1	ATPC.....	69
D.5.1.2	ATPC and RTPC implementation background.....	70
D.5.2	Mixed-mode and bandwidth adaptive operation impact.....	72
D.5.2.1	Mixed-mode basic concepts.....	72
D.5.2.2	Bandwidth adaptive	73
D.5.2.2.1	Basic concepts.....	73
D.5.2.2.2	Bandwidth (channel) occupancy	73
D.5.3	Impact on frequency co ordination.....	73
D.5.4	Impact of operating conditions on the access to radio spectrum through European Harmonised Standard	73
D.6	Typical interference sensitivity behaviour for frequency planning purpose	74
D.7	Band and Carrier Aggregation (BCA) operation.....	75
Annex E (informative):	Mechanical characteristics.....	76
Annex F (informative):	Mitigation techniques referred in CEPT/ERC/DEC(00)07 (18 GHz band)	77
Annex G (informative):	Bibliography.....	78
Annex H (informative):	Change history	79

History	80
---------------	----

i T h S t a n d a r d s
(h t t p s : / / s t a n d a r d s . i t
D o c u m e n t s

E T S I E N 3 3 4 2 1 2 (1 2 7 0 - 2 5 - 0 7)
h t t p s : / / s t a n d a r d s . i t e h . a i / c a t a l o g / s t a n d

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 IPR online database](#).

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™**, **LTE™** and **5G™** logo 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 European Standard (EN) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM).

The present document is part 1 of a multi-part deliverable covering the Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas, as identified below (see note):

Part 1: "Overview, common characteristics and requirements not related to access to radio spectrum";

Part 2: "Digital systems operating in frequency bands from 1 GHz to 174,8 GHz; Harmonised Standard for access to radio spectrum";

Part 4: "Antennas".

NOTE: In previous regulatory regime under Directive 1999/5/EC more parts (harmonised and non-harmonised standards) were published. Since Directive 2014/53/EU [i.1] repealed Directive 1999/5/EC the following parts have been replaced while the content has been moved to other parts of the series.

Those parts are:

Part 2-1: Technical content moved to present document (Part 1);

Part 2-2: Technical content reproduced in Part 2 (*);

(*) Part 2-2- was also published in the OJEU under Directive 2014/53/EU [i.1], presumption of conformity ceased on 31-12-2018;

Part 3: Technical content moved to Part 2 (including a complete new set of receiver parameters);

Part 4-1: Technical content reproduced in Part 4;

Part 4-2: Technical content reproduced in Part 4.