



**Fixed Radio Systems;  
Characteristics and requirements for  
point-to-point equipment and antennas;  
Part 1: Overview, common characteristics and  
system-dependent requirements**

Full Standard Preview  
<https://standards.iteh.ai/catalog/standards/sist/302-217-1-v305/etsi-en-302-217-1-2017-05>  
4a6a-9198-c5b8674f7a68

---

Reference

REN/ATTM-04028

---

Keywords

antenna, DFRS, DRRS, FWA, point-to-point,  
radio, 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 only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

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.

© European Telecommunications Standards Institute 2016.

All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

# Contents

Intellectual Property Rights .....	6
Foreword.....	6
Modal verbs terminology.....	6
Introduction .....	7
1 Scope .....	14
2 References .....	15
2.1 Normative references .....	15
2.2 Informative references.....	17
3 Definitions, symbols and abbreviations .....	19
3.1 Definitions .....	19
3.2 Symbols.....	25
3.3 Abbreviations .....	25
4 General characteristics .....	28
4.1 Frequency bands and channel arrangements .....	28
4.2 Special compatibility requirements between systems .....	28
4.3 Transmission capacity and spectral efficiency .....	28
4.4 Performance and availability requirements .....	28
4.5 Environmental profiles .....	29
4.5.0 Introduction.....	29
4.5.1 Environmental profile declared under Directive 2014/53/EU .....	29
4.5.2 ETSI environmental profiles .....	29
4.5.2.0 Generality.....	29
4.5.2.1 Equipment within weather-protected locations (indoor locations).....	30
4.5.2.2 Equipment for not-weather-protected locations (outdoor locations).....	30
4.5.3 Test environment profiles.....	30
4.6 Power supply .....	30
4.6.0 Introduction.....	30
4.6.1 Power supply profile declared under Directive 2014/53/EU .....	30
4.6.2 ETSI power supply profile.....	31
4.7 System block diagram .....	31
5 Baseband interfaces and parameters.....	31
5.0 Introduction .....	31
5.1 Ethernet interfaces .....	32
5.2 Plesiochronous interfaces .....	32
5.3 Synchronous digital hierarchy interfaces .....	32
5.4 Other baseband data interfaces .....	32
6 Main requirements.....	33
6.0 Introduction .....	33
6.1 General requirements .....	33
6.1.1 System identification .....	33
6.1.2 System nominal loading.....	33
6.1.3 Environmental profile .....	33
6.2 Transmitter characteristics.....	34
6.2.1 Transmitter power and power tolerance.....	34
6.2.1.1 Maximum power and EIRP.....	34
6.2.1.2 Combined TX power and EIRP limits .....	34
6.2.1.3 Output power tolerance .....	34
6.2.2 Transmitter power and frequency control.....	35
6.2.2.1 Transmitter power control (ATPC and RTPC) .....	35
6.2.2.1.1 Automatic Transmitter Power Control (ATPC).....	35
6.2.2.1.2 Remote Transmitter Power Control (RTPC) .....	35
6.2.2.2 Remote Frequency Control (RFC) .....	36

6.2.3	Radio Frequency (RF) spectrum mask.....	36
6.2.4	Discrete CW components exceeding the spectrum mask limit .....	36
6.2.4.1	Discrete CW components at the symbol rate .....	36
6.2.4.2	Other discrete CW components exceeding the spectrum mask limit .....	36
6.2.5	Unwanted emissions in the spurious domain - external.....	36
6.2.6	Dynamic change of modulation order.....	36
6.2.7	Radio frequency tolerance .....	36
6.2.8	Emission limitations outside the allocated band .....	36
6.3	Receiver characteristics .....	37
6.3.1	Unwanted emissions in the spurious domain - external.....	37
6.3.2	BER as a function of receiver signal level.....	37
6.3.3	Receiver selectivity.....	37
6.3.3.1	Introduction.....	37
6.3.3.2	Co-channel "external", first and second adjacent channel interference sensitivity .....	37
6.3.3.3	CW spurious interference (blocking and spurious response) .....	37
6.4	Antenna characteristics.....	37
7	Complementary requirements .....	38
7.0	Introduction .....	38
7.1	Branching/feeder requirements .....	38
7.1.1	Waveguide flanges (or other connectors) .....	38
7.1.2	Return loss of feeder/antenna systems at equipment antenna port (C/C' reference point).....	39
7.2	Intermodulation products .....	39
7.3	Transmitter characteristics.....	40
7.3.1	Unwanted emissions - internal.....	40
7.3.2	Radio Frequency (RF) spectrum mask when mixed manufacturer compatibility is required.....	40
7.4	Receiver characteristics.....	41
7.4.1	Maximum input level and input level range .....	41
7.4.2	Spurious emissions - internal .....	42
7.4.3	Image rejection .....	42
7.4.4	Innermost channel selectivity .....	43
7.5	System performance without diversity .....	43
7.5.1	Equipment Residual BER (RBER).....	43
7.5.2	Distortion sensitivity.....	45
7.5.2.1	Introduction.....	45
7.5.2.2	Requirement .....	45
7.5.2.3	Assessment.....	46
7.5.3	Interference sensitivity for CCDP with XPIC operation.....	47
7.5.3.1	General .....	47
7.5.3.2	Co-channel "internal" interference sensitivity in flat fading conditions.....	47
7.6	System characteristics with diversity .....	47
7.6.0	Introduction.....	47
7.6.1	Differential delay compensation .....	47
7.6.2	BER performance .....	47

## **Annex A (normative): Spectrum masks and receiver selectivity when mixed manufacturer compatibility is required .....48**

A.0	Introduction .....	48
A.1	TX masks assessment.....	49
A.2	Normal channels - Emission mask floor .....	49
A.2.1	RBER impact.....	49
A.2.2	Local TX to RX compatibility.....	49
A.2.2.1	Spectrum mask.....	49
A.2.2.2	Receiver selectivity.....	50
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.....	50
A.3.0	Introduction .....	50
A.3.1	Innermost channels spectrum masks .....	50
A.3.2	Receiver innermost channel selectivity .....	52

A.4	Innermost channels for channel arrangements from about 4 GHz to 11 GHz with channel separation of 40 MHz.....	53
A.4.0	Introduction .....	53
A.4.1	Innermost channels spectrum masks .....	53
A.4.2	Receiver innermost channels selectivity.....	54
A.5	Innermost channels for 18 GHz channel arrangements with channel separation of 55 MHz .....	55
A.5.0	Introduction .....	55
A.5.1	Innermost channels spectrum masks .....	55
A.5.2	Receiver innermost channels selectivity.....	56
<b>Annex B (normative): Definition of equivalent data rates for packet data, PDH/SDH and other signals on the traffic interface.....</b>		<b>58</b>
<b>Annex C (informative): Information on <i>Multi-channel</i> and <i>Channel-aggregation</i> differences and operation.....</b>		<b>59</b>
<b>Annex D (informative): Additional information.....</b>		<b>61</b>
D.1	Residual Bit Error Ratio (RBER) and Residual Frame Error Ratio (RFER) .....	61
D.2	Measurement test set for XPI characteristics .....	62
D.3	Differential delay compensation range.....	63
D.4	FER/BER equivalence and FER performance measurement equipment settings (example).....	64
D.4.1	FER/BER equivalence.....	64
D.4.2	FER equipment settings and measurement techniques (example).....	65
D.5	Automatic Transmitter Power Control (ATPC) .....	65
<b>Annex E (informative): Mechanical characteristics.....</b>		<b>67</b>
<b>Annex F (informative): Mitigation techniques referred in ERC/DEC(00)07 (18 GHz band) .....</b>		<b>68</b>
<b>Annex G (informative): Notification of interfaces under article 8 of Directive 2014/53/EU .....</b>		<b>69</b>
G.0	Introduction .....	69
G.1	Applicability of TCAM-RIS model of radio interface specifications to Fixed Service .....	69
G.2	Proposed list of radio interface specifications for Fixed Service .....	70
<b>Annex H (informative): Change History .....</b>		<b>71</b>
<b>Annex I (informative): Bibliography .....</b>		<b>72</b>
History .....		73

## Intellectual Property Rights

IPRs essential or potentially essential to the present document 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.

## Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

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 system-dependent requirements";**

Part 2: "Digital systems operating in frequency bands from about 1,3 GHz to 86 GHz; Harmonized Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU";

Part 4: "Antennas".

NOTE: In previous regulatory regime of harmonised standards under Directive 1999/5/EC more parts were published, which have been superseded since Directive 2014/53/EU repealed Directive 1999/5/EC; they are:

Part 2-1: which technical content merged in the present document (Part 1)

Part 2-2: which technical content is merged in Part 2

Part 3: which technical content is merged in Part 2 (with addition of a complete set of receiver parameters)

Part 4-1: which technical content is merged in Part 4

Part 4-2: which technical content is merged in Part 4

### Proposed national transposition dates

Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

## 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

### (i) Generality and historical background

Digital Fixed Radio Systems (DFRS), used in European countries, had been historically specified in a relatively large number of specific European Norms produced by ETSI.

Those previous documents, already superseded by first publication of this ETSI EN 302 217 series, contained both essential requirements and other requirements that, even if not considered essential under Directive 2014/53/EU [i.1] 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, may still be applicable.

For the correct understanding and application of the requirements in the whole ETSI EN 302 217 multipart series, the definitions summarized in clause 3.1 of the present document are also relevant; those definitions are generally hereby identified with the use of *italic characters* (e.g. *mixed-mode*).

Standards for point-to-point systems, including antennas, cover a very large range of traffic capacities, channel separations (CS), modulation formats and applications over a very wide range of frequency bands that are summarized in table 1.

**Table 1: Digital Fixed Radio Systems (DFRS) parameters**

Parameter	Range
Frequency bands	from 1 GHz to 86 GHz (see note)
Traffic capacities	from 9,6 kbit/s to 622 Mbit/s and to Gbit/s and above in the highest bands
Channel separations	from 25 kHz to 112 MHz and to GHz and above in the highest bands
Modulation formats	from 2 states to 2 048 states (amplitude and/or phase and/or frequency modulated states)
Typical applications	<p><b>POINT-TO-POINT (P-P) CONNECTIONS:</b> rural and urban low/medium/high capacity links for mobile access infrastructure (backhaul), transport/trunk (long haul), FWA/BWA/ access, fixed LAN extensions (FLANE) governmental (non-military) links, private fixed networks, SAP/SAB P-P audio and video links with <i>integral</i> or <i>dedicated antenna</i>.</p> <p><b>STAND ALONE ANTENNAS:</b> for all of the above applications when <i>integral</i> or <i>dedicated antennas</i> are not employed</p>
NOTE:	Market demand will likely extend the upper limits.

The regulatory framework for placing radio systems on the market, established by Directive 2014/53/EU [i.1] also requires the availability of Harmonised Standards covering the essential requirements under article 3.2 of Directive 2014/53/EU [i.1]. ETSI EN 302 217 series meet this demand by providing a rational subdivision of technical characteristics into:

- general system independent parameters, defined in the present document;
- system dependent "main" parameters relevant to the "essential" requirements of art 3.2 of Directive 2014/53/EU [i.1], briefly summarized in the present document but specifically defined in ETSI EN 302 217-2 [18];
- system dependent "complementary" parameters NOT relevant to the "essential" requirements of art 3.2 of Directive 2014/53/EU [i.1]. Nevertheless they have been commonly agreed for proper system operation and deployment when specific deployment conditions or compatibility requirements are present; they are also defined in the present document.

ETSI EN 302 217-4 [19] includes electrical and mechanical characteristics for development of any kind of DFRS P-P antenna and represent relevant reference in ETSI EN 302 217-2 [18] defining directional parameters of P-P radio relevant to essential requirements under article 3.2 of Directive 2014/53/EU [i.1] for *integral* and *dedicated antennas*.

In the present document, equipment is grouped into families of either similar frequency bands or applications. Nine families are identified for frequency bands corresponding, in ETSI EN 302 217-2 [18], to annexes referenced from annex B to annex J and one family associated with applications of packet data and combination of other signals mapped into proprietary transport modules, detailed in annex N.

- B frequency bands from 1,4 GHz to 2,4 GHz;
- C frequency bands from 3 GHz to 11 GHz (channel separation around 60 MHz and from 1,75 MHz up to around 30 MHz);
- D frequency bands from 3 GHz to 11 GHz (channel separation 40 MHz);
- E frequency bands 13 GHz, 15 GHz and 18 GHz;
- F frequency bands from 23 GHz to 42 GHz;
- G frequency bands from 50 GHz to 55 GHz;
- H frequency bands from 57 GHz to 66 GHz;
- I frequency bands from 64 GHz to 66 GHz;
- J frequency bands from 71 GHz to 76 GHz and 81 GHz to 86 GHz;
- N definition of equivalent data rates for packet data, PDH/SDH and other signals on the traffic interface.

(ii) Cross references to previously relevant ENs and TSs

The ETSI EN 302 217 series replaced and superseded a number of older standards (frequency and/or capacity oriented), which remained, only as "historical" documents, in the ETSI data base. Provided that they may still be referenced in some documentation, previous version of the present document (ETSI EN 302 217-1 V2.1.1 [i.12]) provides their list.

(iii) Summary of system options provided

A number of options for equipment implementation are identified in ETSI EN 302 217 series; the set of characteristics applicable to each option is uniquely identified through three parameters:

- operating frequency band;
- operating radio frequency channel separation (CS);
- spectral efficiency class (as defined in ETSI EN 302 217-2 [18]).

Each option so identified has a "nominal" payload requirement in term of minimum RIC (Radio Interface Capacity) to be fulfilled when packet payloads are used (e.g. Ethernet, ATM, etc.); in case PDH/SDH traffic are alternatively provided, annex N of ETSI EN 302 217-2 [18] gives the translation from the minimum RIC to the minimum hierarchic interfaces.

Table 2 and table 3 summarize the relevant cross-references between channel separation in various Fixed Service frequency bands and the available options of equipment provided in ETSI EN 302 217 series. They are shown in term of the minimum RIC payload, which, depending on the channel separation, correspond to a specific spectral efficiency class detailed in clause 1.2 of ETSI EN 302 217-2 [18] (identified, with increasing spectral efficiency, as classes 1, 2, 3, 4L, 4H, 5L, 5H, 6L, 6H 7 and 8). In classes from 5L to 8, two further sub-classes suffix (i.e. A and B) are provided for the same channel separation depending on whether ACAP or CCDP operation is, respectively, considered for the equipment use.

The minimum RIC payload in table 2 and table 3 are the minimum required for conformance to the present document and are based on the "minimum RIC density" defined, for each spectral efficiency class, in clause 1.2 of ETSI EN 302 217-2 [18] (see note).

NOTE: In ETSI EN 302 217-2 [18] only some cases of systems in annex B, due to the smaller channel separation provided, are (exceptionally) labelled with typical *gross bit rate* rather than minimum RIC capacity rates.



However, equipment may offer a variety of base band interfaces, e.g. typical hierarchical rates PDH or SDH, ISDN, Ethernet as well as mixture of these or other standardized interfaces. Mapping/multiplexing of the various base-band interfaces into common frame(s) suitable for radio transmission may be done using standardized higher hierarchical frames or other proprietary methods.

Table N.1a through table N.1h in annex N of ETSI EN 302 217-2 [18] summarize the "minimum RIC" considered in the present document and, when only PDH or SDH interfaces are provided, give the equivalent capacity in term of number of 2 048 Mbit/s streams provided as multiple or single multiplexed PDH or SDH interfaces. These minimum capacities are associated to the relevant channel separation and spectral efficiency classes defined.

The cells in table 2 and table 3 are filled only on the basis of available physical single equipment transmission capacity (up to a minimum RIC of 862 Mbit/s for class 8 systems in conventional channel arrangements with CS up to 112 MHz or even up to about 3 Gbit/s in bands above 57 GHz where larger CS are possible), which is relevant for Directive 2014/53/EU [i.1] article 3.2 assessment. Doubled capacity is, in principle, possible for any option using CCDP operation or, more in general, subdividing the payload over two channels; however, specific test procedures are provided in ETSI EN 302 217-2 [18] only for STM-4 interface or other high speed data interfaces when their payload is split over two or more equipment or on *channels-aggregation* equipment.

**ITEH STANDARD PREVIEW**  
(standards.iteh.ai)  
Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/0bab6e11-36fc-4a6a-9198-c5b86747a68/etsi-en-302-217-1-v3.1.1-2017-05>

**Table 2: Cross reference of available equipment and antenna requirements in parts and annexes of ETSI EN 302 217 series:  
bands from 1,4 GHz to 18 GHz**

ETSI EN 302 217 series																	
General requirements⇒		Part 1 (present document) (System common characteristics and system-independent requirements)															
Antenna requirements⇒		Part 4 [19] (Antenna general and complementary requirements)															
Equipment main requirements⇒		Part 2 [18] (HS for equipment characteristics relevant to article 3.2 of Directive 2014/53/EU [i.1])															
Relevant annex in Part 2 [18]⇒		B				C or E									D		
Frequency band (GHz)⇒		1,4; 2,4	2,1	1,4; 2,1	2,1		Annex C : 3,5 ; 4 ; U4 ; L6 ; U6 ; 7 ; 8 ; 10,5 ; 11 Annex E : 13 ; 15 ; 18									Annex C : U6	4, U4, U6, 8, 11
Minimum RIC (Mbit/s) provided with relevant equipment characteristics	Channel separation (MHz) ⇔		CS < 1,75 and 2	1,75	3,5	7	14	1,75	3,5	7	13,75 / 14 / 15	27,5 / 28 / 29 / 29,65 / 30	55 / 56 / 58 / 59,3 / 60	110 (note 1)	20	40	
	Spectral efficiency ⇓																
	Reference index ⇓	Class ⇓															
		1	1	(note 2)		2											
		2	2	(note 2)	2	4	8	16	2	4	8	16	32	64	128		
		3	3						3	6	12	24	48	96	191		
		4	4L	(note 2)	4	8	16	32	4	8	16	32	64	128	256	45	
		5	4H							12 (a)	24	49	98	196	392		
		6	5L								29	58					
		6	5LA, 5LB										117	235	470		168
		7	5H							17 (a)	34	68					
		7	5HA, 5HB										137	274 (b)	548		137 (c) 196
		8	6L								39	78					
	8	6LA, 6LB										156	313	627		224	
	9	6H									88						
	9	6HA, 6HB										176	352	705		252 (b)	
	10	7									98						
	10	7A, 7B										196	392	784		280	
	11	8									107						
	11	8A, 8B										215	431	862		308	
Equivalent capacity for hierarchic-only systems		Annex D of the present document and annex N of Part 2 [18]															

NOTE 1: CS 110 MHz available only in 18 GHz band.  
NOTE 2: For channel separations of 2 MHz and other various smaller than 1,75 MHz, only typical "gross bit rates" are defined.  
(a): These systems are intended only for the transport of subSTM-0 capacities only in 18 GHz band.  
(b): STM-4 capacity as combination of two 2 × STM-1 equipment operating on two channels in ACAP or CCDP or even non adjacent operation is also described.  
(c): Minimum RIC 137 Mbit/s option is special provision only for commonality of use of 5HB/28 MHz like equipment modulation also into 40 MHz channel arrangements.

Table 3: Cross reference of available equipment and antenna requirements in parts and annexes of ETSI EN 302 217 series:  
bands from 23 GHz to 80 GHz

ETSI EN 302 217 series																									
Common requirements ↕		Part 1 (present document) (System common characteristics and system-independent requirements)																							
Antenna requirements ↕		Part 4 [19] (Antenna general and complementary requirements)																							
Equipment requirements ↕		Part 2 [18] (HS for equipment characteristics relevant to article 3.2 of Directive 2014/53/EU [i.1])																							
Relevant annex Part 2 [18] ↕		F						G					J										I	H	
Frequency band (GHz) ↕		23, 26, 28, 31, 32, 38, 42						50, 52, 55					71 to 76 and 81 to 86 (note)										64 to 66	57 to 66 (note)	
Minimum RIC (Mbit/s) provided with relevant equipment characteristics	Spectral efficiency ↕		Channel separation (MHz)						Channel separation (MHz)					Channel separation (MHz)										Channel size free or multiple of predefined slots from 30/50 MHz to 2 000 MHz	
	Reference index ↕	Class ↕	3,5	7	14	28	56	112	3,5	7	14	28	56	62,5	125	250	500	750	1 000	1 250	1 500	1 750	2 000		
	1	1							2	4(c)	8(c)	16(c)	32	35	71	142	285	427	570	712	855	997	1 140	See minimum spectral efficiency reported in Tables H.2 and I.2 of the relevant annexes.	
	2	2	4(b)	8	16	32	64	128	4	8	16	32	64	71	142	285	570	855	1 140(a)	1 425	1 710	1 995	2 280		
	3	3	6(b)	12	24	48	96	191	6	12	24	48	96	106	212	425	850	1 275	1 700	2 125(a)	2 550	2 975	3 400		
	4	4L	8(b)	16	32	64	128	256		16	32	64	128	142	285	570	1 140(a)	1 710	2 280(a)	2 850					
	5	4H		24	49	98	196	392						219	438	875	1 750	2 625							
	6	5L		29	58																				
	6	5LA, 5LB				117	235	470						262	525	1 050(a)	2 100(a)	3 150(a)							
	7	5H		34	68																				
	7	5HA, 5HB				137	274(c)	548						306	612	1 225	2 450								
	8	6L		39	78																				
	8	6LA, 6LB				156	313	627						350	700	1 400	2 800								
9	6H			88																					
9	6HA, 6HB				176	352	705																		
10	7			98																					
10	7A, 7B				196	392	784																		
11	8			107																					
11	8A, 8B				215	431	862																		
Equivalent capacity for hierarchic only systems		Annex D of the present document and annex N of Part 2 [18]																							
NOTE:		Alternative, in overlapping band, to annex I.																							
(a):		RIC rounded down to closest $N \times 1$ Gbit/s rate are also considered valid.																							
(b):		Not provided in 42 GHz band.																							
(c):		STM-4 capacity as combination of two $2 \times$ STM-1 equipment operating on two channels in ACAP or CCDP or even non adjacent operation is also described.																							

(iv) User's guide

The symbols abbreviations and definitions, which apply to the whole ETSI EN 302 217 series, are listed in the present document. In particular, correct understanding of the definitions is necessary for the correct application of all the requirements.

The requirements applicable to a specific point to point digital fixed radio systems (including its antenna) are summarized in table 4 showing the major structure of the whole ETSI EN 302 217 series. The requirements are subdivided across the three parts of the EN series corresponding to their four major categories.

**The first category** (the present document) corresponds to "common" system independent characteristics which are either common to the whole family of equipment, i.e. performance and availability, environmental profiles, power supply, system block diagram, mechanical characteristics and baseband interfaces and parameters. The present document defines those requirements and characteristics set out in the other parts of ETSI EN 302 217 series.

**The second category** (also described in the present document) corresponds to "complementary" characteristics and requirements, which are NOT relevant to article 3.2 of Directive 2014/53/EU [i.1] but may guarantee better performance to the actual deployed links. Therefore, the manufacturer may wish to claim compliance to all or some of these requirements for showing enhanced characteristics of its product.

Complementary requirements are requirements that are not related to essential requirements under article 3.2 of Directive 2014/53/EU [i.1]. Nevertheless they are considered, having been commonly agreed for proper system operation and deployment when specific deployment conditions or compatibility requirements are present. Compliance to all or some of these requirements is made on a voluntary basis.

The limits for main and complementary requirements that are not common or parameterized for all of the equipment covered by one part, but specific to one frequency range, one RIC or PDH/SDH capacity, etc., are located in annexes.

**The third category** (summarized in the present document and detailed in ETSI EN 302 217-2 [18]) is for equipment in any frequency bands; it corresponds to essential characteristics, with respect to article 3.2 of Directive 2014/53/EU [i.1] and are consequently defined in a harmonised standard. A complete set of TX and RX parameters is retained essential. The limiting values associated with the essential requirements which are not common to all of the equipment covered by one part, but specific to one frequency range, one RIC or PDH/SDH capacity, etc., are located in annexes. In annex A of ETSI EN 302 217-2 [18] a correspondence table between the technical requirements and article 3.2 of Directive 2014/53/EU [i.1] summarizes those requirements to be addressed in order to claim compliance.

**The fourth category** (ETSI EN 302 217-4 [19]) provides the antenna characteristics to be used for any P-P system in all operating bands; some of these characteristics are also referenced in ETSI EN 302 217-2 [18] as being "essential parameters" for radio equipment with *integral* or *dedicated antenna*. These latter characteristics might also be used by the manufacturer of radio equipment placed on the market with external *dedicated antenna* or other *stand-alone antenna* (possibly independently substituted or purchased by the user itself), for respecting obligations in other articles of Directive 2014/53/EU [i.1] (e.g. article 10 recital 8 of Directive 2014/53/EU [i.1]), ETSI EN 302 217-2 [18] provides suitable guidelines for the description in the user instruction of the antenna characteristics "*information required to use radio equipment in accordance with its intended use*".

To conclude, ETSI EN 302 217 series is used as a comprehensive document that, starting from the present document down to the relevant annexes of parts ETSI EN 302 217-2 [18] and ETSI EN 302 217-4 [19]. Table 4 shows the major clauses and annexes of the series.

Table 4: Structure of the ETSI EN 302 217 series

ETSI EN 302 217-1 (present document) Overview, common characteristics and system-dependent requirements		ETSI EN 302 217-2 [18] (Harmonised Standard) Digital systems operating in frequency bands from 1,3 GHz to 86 GHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU	
3	Definitions, symbols and abbreviations	4	Technical requirements specifications
4	General characteristics	4.1	General requirements
5	Baseband interfaces and parameters	4.1.1	Requirements framework
6	Main requirements	4.1.2	System identification and traffic loading
7	Complementary requirements	4.1.3	Environmental profile
Annex A (normative)	Spectrum masks and receiver selectivity when mixed manufacturer compatibility is required	4.2	Transmitter requirements
Annex B (normative)	Definition of equivalent data rates for packet data, PDH/SDH and other signals on the traffic interface	4.3	Receiver requirements
Annex C (informative)	Additional information:	4.4	Antenna characteristics
C.1	Residual Bit Error Ratio (RBER) and Residual Frame Error Ratio (RFER)	5	Testing for compliance with technical requirements
C.2	Measurement test set for XPI characteristics	Annex A (normative)	Relationship between the present document and the essential requirements of Directive 2014/53/EU
C.3	Differential delay compensation range	Annex B (normative)	Frequency bands 1,4 GHz to 2,6 GHz
C.4	FER/BER equivalence and FER performance measurement	Annex C (normative)	Frequency bands from 3 GHz to 11 GHz (CS up to 30 MHz and 56/60 MHz)
C.5	Automatic Transmitter Power Control (ATPC)	Annex D (normative)	Frequency bands from 3 GHz to 11 GHz (CS 40 MHz)
Annex D (informative)	Information on Multi-channel and Channel-aggregation differences and operation	Annex E (normative)	Frequency bands 13 GHz, 15 GHz and 18 GHz
Annex E (informative)	Mechanical characteristics	Annex F (normative)	Frequency bands from 23 GHz to 42 GHz
		Annex G (normative)	Frequency bands from 50 GHz to 55 GHz
		Annex H (normative)	Frequency band 57 GHz to 66 GHz
		Annex I (normative)	Frequency band 64 GHz to 66 GHz
		Annex J (normative)	Frequency bands 71 GHz to 86 GHz
		Annexes K, L and M	Void (for future use)
		Annex N (normative)	Definition of equivalent data rates for packet data, PDH/SDH and other signals on the traffic interface
		Annex O (normative)	Test report in relation to flexible systems applications
		Annex P (informative)	Impact of power control (ATPC and/or RTPC), mixed mode and bandwidth adaptive operation on spectrum mask and link design requirements
		Annex Q (informative)	Typical interference sensitivity behaviour for frequency planning purpose
		Annex R (informative)	Receiver selectivity evaluation
<b>ETSI EN 302 217-4 Antennas</b>			
4	Technical requirements specifications		
4.3	Environmental profile		
4.4	Radiation Pattern Envelope (RPE)		
4.5	Cross-Polar Discrimination (XPD)		
4.6	Antenna gain		
5	Testing for compliance with technical requirements		
Annex A (informative)	Additional information		
A.1	Mechanical characteristics		
A.2	Antenna input connectors		
A.3	Return loss at the input ports		
A.4	Inter-port isolation		
Annex B (informative)	Antenna gain and radiation pattern information		
B.1	Impact of antenna gain on the frequency planning		
B.2	Gain and typical radiation pattern for circular symmetric antennas		