

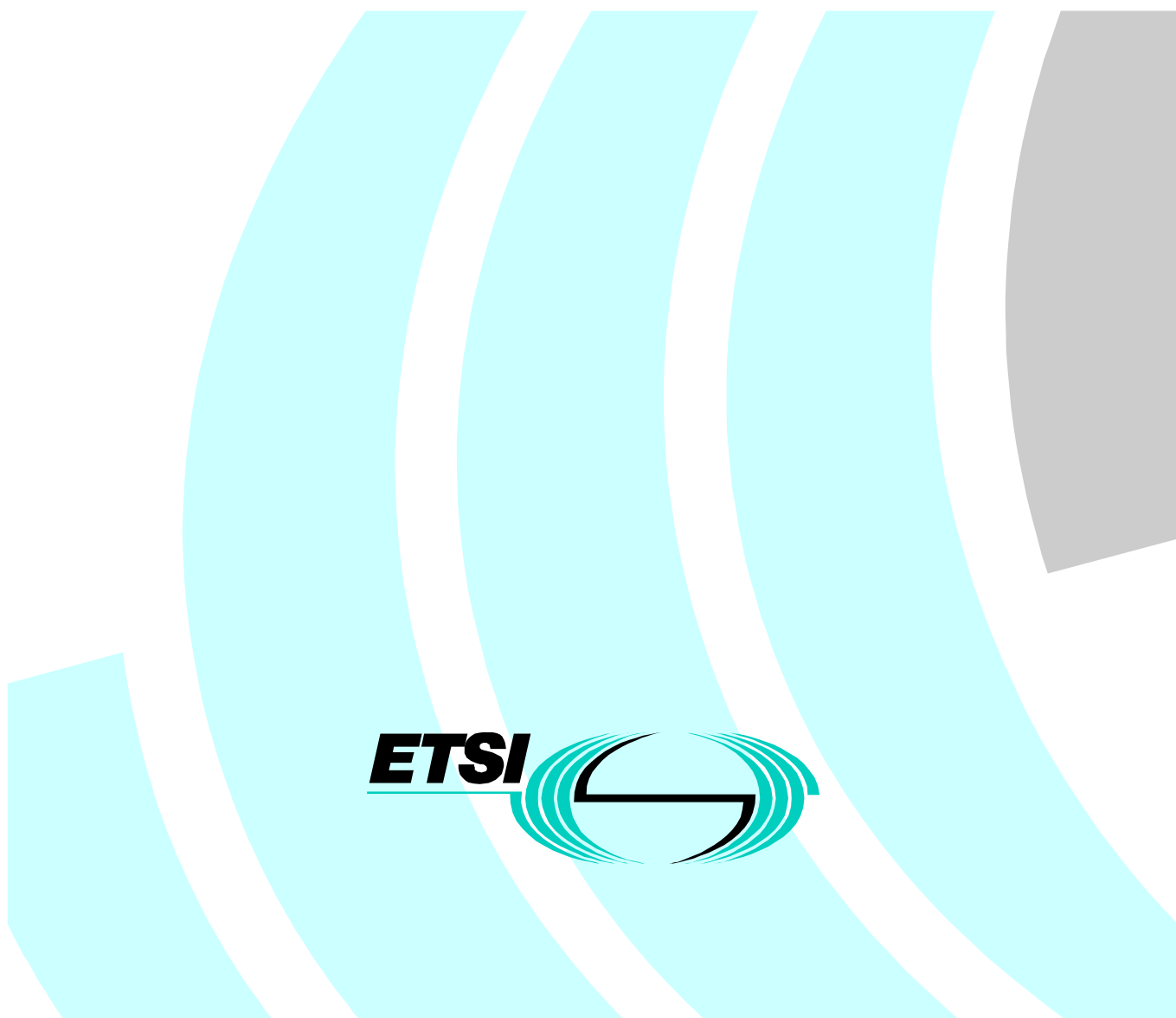
Final draft **ETSI EN 301 126-2-1** V1.1.1 (2000-09)

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*European Standard (Telecommunications series)*

**Fixed Radio Systems;  
Conformance testing;  
Part 2-1: Point-to-Multipoint equipment;  
Definitions and general requirements**

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**Reference**

DEN/TM-04026-2-1

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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  
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## Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM), and is now submitted for the Vote phase of the ETSI standards Two-step Approval Procedure.

The present document defines the test methods for conformity assessment procedures and testing requirements for radio specific parameters required directly by the relevant radio relay EN/ETS for point-to-multipoint. Harmonized test methods, and test report format, for these parameters are also contained herein.

In addition to the main body of the present document there are two annexes, namely the Supplier Declaration (annex A) and the Test Report (annex B). The parameters in the two annexes are according to the main body of the present document.

The purpose of the test report form is to achieve uniform and comprehensive presentation of the supplier declaration and test results.

The test report includes forms for presenting the measurement results, measurement uncertainty, limits for the measured values, references to the relevant test procedures and space for declaring the test equipment used.

Part 1 of the present document (EN 301 126-1) contains definitions and general requirements for conformance testing of P-MP systems. Parts 2-2 to 2-5 contain the appropriate test procedures for the different access methods.

It is recommended that where a clarification of a test procedure or an agreed test procedure is required, this should be described on the final page of the test report titled "Additional information supplementary to the test report".

The present document is part 2-1 of a multi-part deliverable covering the Fixed Radio Systems; Conformance testing, as identified below:

Part 1: "Point-to-point equipment - Definitions, general requirements and test procedures";

**Part 2-1: "Point-to-Multipoint equipment; Definitions and general requirements";**

Part 2-2: "Point-to-Multipoint equipment; Test procedures for FDMA systems";

Part 2-3: "Point-to-Multipoint equipment; Test procedures for TDMA systems";

Part 2-4: "Point-to-Multipoint equipment; Test procedures for FH-CDMA systems";

Part 2-5: "Point-to-Multipoint equipment; Test procedures for DS-SS systems";

Part 3-1: "Point-to-Point antennas - Definitions, general requirements and test procedures";

Part 3-2: "Point-to-Multipoint antennas - Definitions, general requirements and test procedures".

<b>Proposed national transposition dates</b>	
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):	6 months after doa

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# 1 Scope

The present document details standardized procedures for conformance testing of equipment for Point-to-MultiPoint digital (P-MP) radio relay systems.

Standardized procedures are required in order to fulfil CEPT/ERC/DEC/(97)10 [1] on the mutual recognition, within CEPT, of the results of conformance tests on equipment carried out in individual CEPT Countries. Furthermore the procedures described in the present document are relevant to be able to fulfil the Conformance assessment procedure described in Chapter II of the R&TTE Directive 1999/5/EC [10] in order to demonstrate the compliance of the DRRS with the relevant essential requirements identified in article 3.2 of the R&TTE Directive 1999/5/EC [10].

Point-to Multipoint radio relay systems may use different access methods, taking into account the basic physical parameters of the frequency, the code and the time. The test procedures for the following basic access methods are covered by the present document, namely:

- Part 2-2: Frequency Division Multiple Access Methods (FDMA);
- Part 2-3: Time Division Multiple Access Methods (TDMA);
- Part 2-4: Frequency Hopping Code Division Multiple Access Methods (FH-CDMA);
- Part 2-5: Direct Sequence Code Division Multiple Access Methods (DS-CDMA).

The present document reflects the principles and definitions set out in TR 101 036-2 [2] which defines the generic format for the editorial and technical content for all individual equipment ENs/ETSS relating to Point to Multipoint digital radio relay systems. The present document describes harmonized test objectives and test procedures for the parameters detailed in TR 101 036-2 [2]. Thus, it is intended to be applied in conjunction with the individual equipment ENs/ETSS and will enable commonality of test results, irrespective of the Accredited Body carrying out the test.

The conformance tests described in the present document are those related to radio specific parameters required directly by the relevant radio relay ENs/ETSS. Conformance tests to other boundary EN/ETS (e.g. those for system input/output interfaces and related base band process) are outside the scope of the present document.

---

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] CEPT/ERC/DEC(97)10 ERC Decision of 30 June 1997 on the mutual recognition of conformity assessment procedures including marking of radio equipment and radio terminal equipment.

[2] ETSI TR 101 036-2: "Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Generic wordings for standards on DRRS characteristics; Part 2: Additional parameters for point-to-multipoint equipment".

NOTE: At the time of vote for the present document, this reference is still under preparation by ETSI TC TM, WG 4.

[3] ETSI ETS 300 019 (Parts 1 and 2): "Equipment engineering; Environmental conditions and environmental tests for telecommunications equipment".

- [4] ETSI ETS 300 132: "Equipment engineering; Power supply interface at the input to telecommunications equipment".
- [5] ETSI EN 300 385: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for fixed radio links and ancillary equipment".
- [6] EN 60835: "Methods of measurement for equipment used in digital microwave radio transmission systems".
- [7] EN 60835-1-2 (1993): "Methods of measurement for equipment used in digital microwave radio transmission systems - Part 1: Measurements common to terrestrial radio-relay systems and satellite earth stations - Section 2: Basic characteristics".
- [8] EN 60835-2-4 (1995): "Methods of measurement for equipment used in digital microwave radio transmission systems - Part 2: Measurements on terrestrial radio-relay systems - Section 4: Transmitter/receiver including modulator/demodulator".
- [9] EN 60835-1-4 (1995): "Methods of measurement for equipment used in digital microwave radio transmission systems - Part 1: Measurements common to terrestrial radio-relay systems and satellite earth stations - Section 4: Transmission performance".
- [10] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.
- [11] EN 45001: "General criteria for the operation of testing laboratories".
- [12] ISO/IEC Guide 25: "General Requirements for the competence of calibration and testing laboratories".
- [13] ISO 9002: "Quality systems - Model for quality assurance in production, installation and servicing".
- [14] ISO/IEC Guide 28: "General rules for a model third-party certification system for products".
- [15] EN 45002: "General criteria for the assessment of testing laboratories".
- [16] ETSI EN 301 126-2-2: "Fixed Radio Systems; Conformance testing; Part 2-2: Point-to-Multipoint equipment; Test procedures for FDMA systems".
- [17] ETSI EN 301 126-2-3: "Fixed Radio Systems; Conformance testing; Part 2-3: Point-to-Multipoint equipment; Test procedures for TDMA systems".
- [18] ETSI EN 301 126-2-4: "Fixed Radio Systems; Conformance testing; Part 2-4: Point-to-Multipoint equipment; Test procedures for FH-CDMA systems".
- [19] ETSI EN 301 126-2-5: "Fixed Radio Systems; Conformance testing; Part 2-5: Point-to-Multipoint equipment; Test procedures for DS-CDMA systems".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

**accreditation:** formal recognition that a testing laboratory is competent to carry out specific tests or specific types of test

**accreditation body:** body that conducts and administers a laboratory accreditation system and grants accreditation

**accreditation system:** system that has its own rules of procedure and management for carrying out laboratory accreditation



**accredited laboratory:** testing laboratory to which accreditation has been granted in accordance with the ISO guides 25 [12] and 28 [14] or EN 45001 [11] and EN 45002 [15]

**approval testing:** is required for approval of the IUT by the appropriate authority for regulatory purposes. In this context approval implies that the IUT has met the essential requirements of the ETS against which it has been tested

**complementary requirements:** in an EN/ETS all those requirements not part of the essential requirements are complementary requirements

**conformance testing:** type testing process to verify to what extent the IUT conforms to the EN/ETS

**essential requirements:** basic set of parameters and functions, which are necessary to meet any regulatory obligations imposed for radio frequency co-ordination and EMC

**full conformance:** status of the IUT when it has successfully passed all the requirements of the conformance testing process and therefore meets all the mandatory requirements of the EN/ETS

**mandatory requirements:** is defined as one that the IUT (implementation under test) shall meet. To achieve full conformance all EN/ETS requirements are mandatory

**optional requirements:** term "optional" is used in EN/ETS with two different meanings:

- 1) optional in the sense that the parameter or function itself is mandatory but there is more than one possible value or configuration which may be chosen (e.g. class of output power, base band interface, etc.). Once an option is selected it becomes mandatory
- 2) optional in the sense that the feature is not mandatory (e.g. ATPC, service channels, etc.). However, once such an option has been implemented it becomes mandatory that it conforms to the requirements of the EN/ETS

**supplier:** organization requesting the approval

**supplier's declaration:** procedure by which a supplier gives written assurance that a parameter or function conforms to the EN/ETS

**type approval authority:** national regulatory/licensing authority

**type approval testing:** process of type testing for approval. A type test is to be carried out successfully in order to achieve approval

**type testing:** when a representative sample of equipment is tested. The test result is considered to be applicable and representative for all other pieces of equipment manufactured identically

## 3.2 Symbols

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

dB	decibel
dBm	decibel relative to 1 milli Watt

## 3.3 Abbreviations

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

ATPC	Automatic Transmit Power Control
BB	Base Band
BER	Bit Error Rate / Bit Error Ratio
CR	Complementary Requirement
CRS	Central Radio Station
DRRS	Digital Radio Relay System
EMC	ElectroMagnetic Compatibility
ER	Essential requirement
Ext	Extreme conditions
IUT	Implementation Under Test

OR	Optional Requirement
P-MP	Piont-to-Multipoint
Ref	Reference conditions
RF	Radio Frequency
RSL	Receive Signal Level
RTPC	Remote Transmit Power Control
SD	Supplier Declaration
TMN	Telecommunications Management Network
TR	Test Required
TS	Terminal Station

---

## 4 Requirements related to P-MP equipment conformance test

### 4.1 General requirements

The present document is intended to cover the conformance testing procedures (for both direction of each transceiver, i.e. CRS and TS) of all the common parameters usually required by digital radio relay system equipment standards. Where a test method is not included in the present document, a suitable method shall be agreed between the Supplier, Accredited Test Laboratory and the Type Approval Authority, prior to testing, and a description of the test method included in the Test Report.

EN 60835 [6] test methods are adopted, where applicable. Clear distinction is made between "Essential Parameters" which require the "Approval test" for regulatory purpose and "Complementary Requirements or "Optional Requirements" which fulfil the "Conformance test" against the relevant standard.

Distinction and allowance for "Supplier Declaration" (SD), listed in normative Annex A, on some parameters are provided too.

Conformance to other boundary EN/ETS (e.g. those for system input/output interfaces and related base band processing, TMN interface and power supply) is subject to SD and any specific ENs/ETSS on their related conformance tests.

The supplier shall be considered legally responsible for any statement in the Supplier Declaration and shall take necessary action to ensure that all equipment of the same type will conform to the IUT presented for type approval testing.

When the base band interface precludes the use of a Bit Error Ratio detector, e.g. in a packet data system, another measure of error performance may be specified by the supplier provided that its numerical equivalence to the BER test can be shown. This proof of equivalence should be recorded in the report.

Normative Annex B contains the Test Report template for the parameters listed in Table 1.

### 4.2 P-MP requirements classification

In Table 1 the generic clauses and parameters contained in the TR 101 036-2 [2] are classified, for conformance test purposes, in terms of the various categories defined in clause 4. The table also provides for defining the climatic conditions applicable during testing of the parameters e.g. reference or extreme conditions.

Table 1: "Generic requirements" classification

Function or Parameter Description	Status for conformance			Requirement for conformance test			Power supply conditions		Climatic conditions for test		Test method	
	ER	CR	OR	SD (note 1)	TR	SD + TR (note 1)	Ref	Ref + Ext	Ref.	Ref. + Ext.	Clause Ref. EN 301 126, parts 2-1 to 2-5	EN 60835 [6] or other Ref.
Channel plan/operating frequency range	X			X							Annex A	
Duplex frequency separation	X			X							Annex A	
Co-polar channel spacing	X			X							Annex A	
Compatibility requirement		X	X	X							Annex A	
Environmental conditions-												
Weather protected locations	X (note 2)		X	X (note 3)							Annex A	ETS 300 019 [3]
Non-Weather protected locations	X (note 2)		X	X (note 3)							Annex A	ETS 300 019 [3]
Power supply		X	X	X (note 4)							Annex A	ETS 300 132 [4]
EMC	X			X (note 5)							Annex A	EN 300 385 [5]
TMN interface		X	X	X (note 6)							Annex A	
Synchronization of interface bit rates		X	X	X							Annex A	
Branching/feeder/antenna requirements												
Waveguide flanges (or other connectors)		X	X	X							Annex A	
Return Loss (note 10)		X		X							Annex A	EN 60835-1-2 [7]
Parameters for P-MP Systems												
Transmission capacity (note 10)	X		X	X							Annex A	
System capacity		X		X							Annex A	
Transparency		X		X							Annex A	
Round trip delay		X		X							Annex A	
Voice coding methods		X		X							Annex A	
Transmitter Characteristics												
Transmitter power range												
Nominal Power Maximum value (note 9)	X					X (note 8)		X		X	-y.2.1	EN 60835 Part 1-2 [7] Part 2-4 [8]
Nominal Power Minimum value (notes 9, 10)		X	X			X (note 7)		X		X	-y.2.2	EN 60835 Part 1-2 [7] Part 2-4 [8]

Function or Parameter Description	Status for conformance			Requirement for conformance test			Power supply conditions		Climatic conditions for test		Test method	
	ER	CR	OR	SD (note 1)	TR	SD + TR (note 1)	Ref	Ref + Ext	Ref.	Ref. + Ext.	Clause Ref. EN 301 126, parts 2-1 to 2-5	EN 60835 [6] or other Ref.
Automatic Tx. Power Control, (ATPC) (note 10)		X	X			X (note 7)	X		X		-y.2.3	EN 60835 Part 1-2 [7] Part 2-4 [8]
Remote Tx. Power Control, (RTPC) (note 10)		X	X			X (note 7)	X		X		-y.2.4	EN 60835 [6]
Remote frequency control (RFC) (note 10)		X	X			X (note 7)	X		X		-y.2.7	EN 60835 [6]
RF spectrum mask (note11)	X					X (note 8)		X		X	-y.2.6	EN 60835 Part 1-2 [7] Part 2-4 [8]
Spurious emissions (TX.) external	X				X (note 7)		X		X		-y.2.9	EN 60835 Part 1-2 [7] Part 2-4 [8]
Spurious emissions (TX.) Internal (note 10)		X		X			X		X		-y.2.9	EN 60835 Part 1-2 [7] Part 2-4 [8]
Radio frequency tolerance short-term portion	X					X (note 8)		X		X	-y.2.5	EN 60835 Part 1-2 [7] Part 2-4 [8]
Radio frequency tolerance long-term portion	X			X							Annex A	
Hopping Period (if applicable)	X			X							Annex A	
Receiver Characteristics												
Input level range, (if applicable)		X			X (note 7)		X		X		-y.3.1	EN 60835 Part 1-2 [7] Part 2-4 [8]
Spurious emissions (Rx)	X				X (note 7)		X		X		-y.3.2	EN 60835 Part 1-2 [7] Part 2-4 [8]
Receiver image rejection (note 10)		X		X							Annex A	
System Characteristics												
Dynamic level range (if applicable)		X			X (note 7)		X		X		4.4.1	
BER vs. Rx signal level (note 12)	X				X (note 8)		X			X	4.4.2	EN 60835 Part 1-4 [9] Part 2-4 [8]
Equipment background BER		X		X			X		X		4.4.3	
Interference sensitivity												

Function or Parameter Description	Status for conformance			Requirement for conformance test			Power supply conditions		Climatic conditions for test		Test method	
	ER	CR	OR	SD (note 1)	TR	SD + TR (note 1)	Ref	Ref + Ext	Ref.	Ref. + Ext.	Clause Ref. EN 301 126, parts 2-1 to 2-5	EN 60835 [6] or other Ref.
Co-channel interference sensitivity external	X				X (note 7)		X		X		4.4.4.1	
Adjacent channel interference sensitivity	X				X (note 7)		X		X		4.4.4.2	
CW spurious interference	X				X (note 7)		X		X		4.4.4.3	
Types of interfaces												
User interfaces (note 12)	X		X	X			X		X			
Network interfaces (note 13)	X		X	X			X		X			
Parameters for co-ordination purposes (note 14)												
Tx Bandwidth				X							Annex A	
Rx Bandwidth				X							Annex A	
Rx noise figure				X							Annex A	
Receiver mask				X							Annex A	

Light shading has been added to the first of each of the column types to aid reading.

Heavily shaded areas in the row indicate a title for the following parameters.

- NOTE 1: The Suppliers Declaration (SD; Normative Annex A) is intended for appropriate selection from available options, or to provide information on the intended usage of the equipment, or for information necessary to carry out the test.
- NOTE 2: Essential from the point of view of the impact of environment on the other essential parameters.
- NOTE 3: SD for selection from classes 3.1, 3.2, 3.3, 3.4, 3.5 in ETS 300 019 [3] foreseen by the relevant standard or others.
- NOTE 4: SD for selection of voltage ranges provided by ETS 300 132 [4] (Part 2 and / or Part 1) or others.
- NOTE 5: SD for selection of the classes provided by EN 300 385 [5].
- NOTE 6: The TMN interface, if the option of standardized interface is selected, cannot currently be tested. However as soon as work on testing is completed by ETSI such methods shall be used.
- NOTE 7: Testing required on the nominal middle channel only.
- NOTE 8: Testing required on the lower, middle and upper channels.
- NOTE 9: With and without ATPC.
- NOTE 10: If applicable.
- NOTE 11: A spectrum analyser resolution bandwidth shall be required, see respective clause of the present document.

NOTE 12: This parameter is considered essential for the assessment of the essential parameters of co-channel and adjacent channel interference sensitivity. Thus some administrations consider that this item is essential for type approval.

NOTE 13: User (Network) Interfaces and Network (Node) Interfaces, selected by SD are considered essential only for choosing the reference base band test signal for relevant Tx/Rx tests. Selection of SDH, PDH, ISDN, digital channels base band interfaces, analogue channels base band interfaces or others. Relevant ITU-T Recommendations and/or ETSI TM standards may be included in SD.

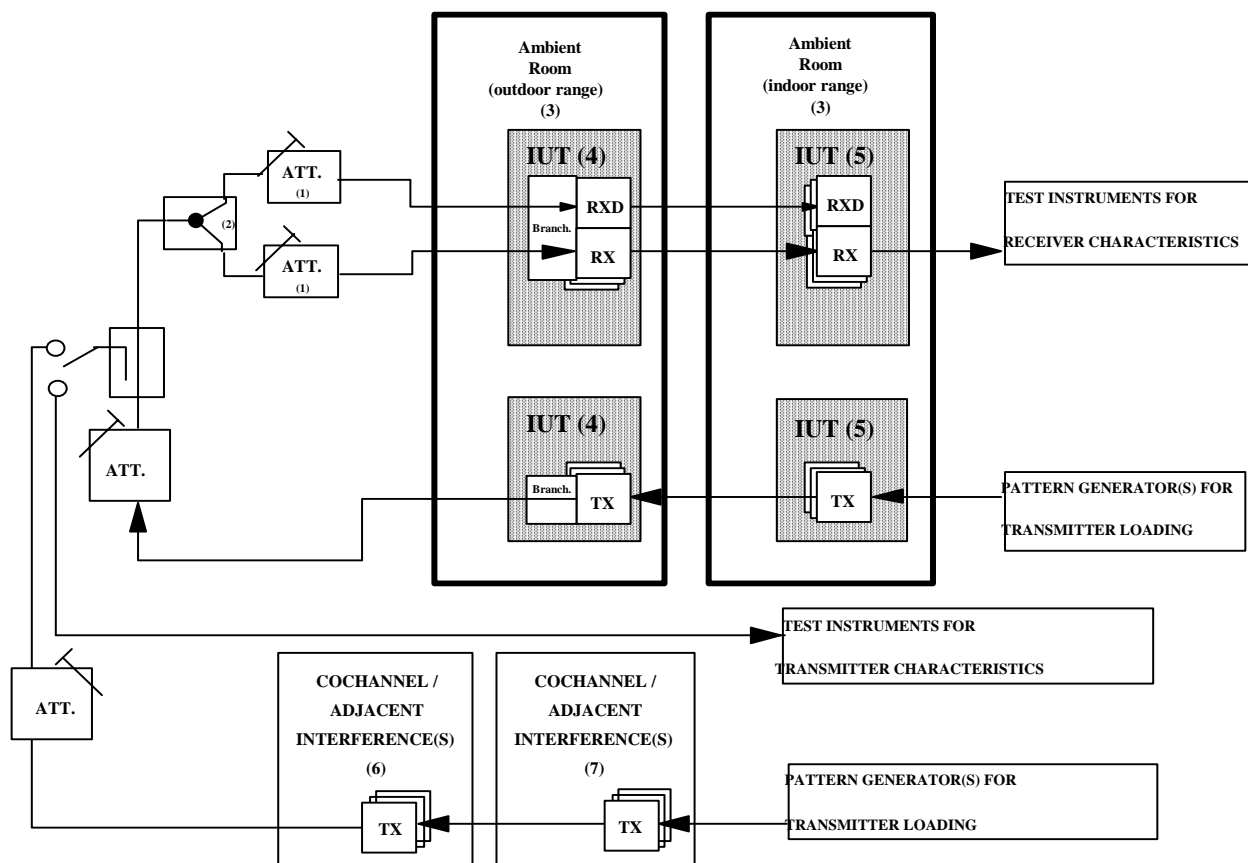
NOTE 14: The parameters denoted below are for co-ordination purposes only. Those parameters shall be provided by the manufacturer within the test report and are not subject to any conformance testing.

### 4.3 IUT test arrangement for conformance test

General scheme for full indoor and split indoor/outdoor test arrangement is shown in Figure 1 (e.g. IUT and climatic rooms with generic RF test bed for stand alone transceiver requirements and interference sensitivity).

Transceivers are respectively a central station at one side and a terminal station at the other side. Further terminal stations and repeaters could be added to test under full capacity load conditions.

All the test configurations shown in the document are typical/recommended. Alternatives may be used and should be recorded in accordance with the requirements of EN 45001 [11] / ISO/IEC Guide 25 [12].



NOTE: (1) for level balance;  
 (2) power splitter for space diversity option;  
 (3) two ambient ranges if applicable;  
 (4) outdoor section of IUT (if applicable);  
 (5) indoor section of IUT (if applicable);  
 (6) outdoor sections of IUT (support for test);  
 (7) indoor sections of IUT (support for test).

Figure 1: Typical Test Set Up

Corresponding transmitter and receiver are tested at the same temperature. Transmitter and receiver are tested on the same end of the link.

When a split indoor/outdoor IUT is being tested the climatic cycles of the two required ambient rooms will be produced with the rules stated in ETS 300 019 [3] series, in "tracking mode" (i.e. the same climatic boundary such as reference, lower or uppermost conditions, will be produced in both).

The IUT presented for type approval shall be representative of production models and of a suitable conformation for the relevant test, i.e.:

- one single transceiver plus ancillary equipment's for EN/ETS conformance;
- a fully equipped self-standing mechanical shelf for EMC conformance purpose;
- at least two transceivers when 1 : 1 or n : 1 switching protection is to be included;
- additional terminal stations to test under full capacity load.

## 4.4 IUT environmental characteristics for conformance test

### 4.4.1 Test in the reference conditions

All conformance tests shall be carried out in environmental reference conditions. The result of the measurements under environmental reference conditions shall be taken to be reference performance. The reference performance will be used in comparison with representative measurements made at the climatic limits.

It is recognized that all requirements given in the EN/ETS are relevant for all combinations of temperature and humidity of the chosen climatic class. However some tests, as indicated in Table 1 and in the Conformance Test Report, may be carried out only in environmental reference conditions for reasons of practicality and convenience.

The environmental reference condition is one of the possible existing combinations of temperature, humidity and air pressure falling within the limits given below:

<b>temperature</b>	+10°C to +30°C
<b>relative humidity</b>	10 % to 80 %
<b>air pressure</b>	$8,6 \times 10^4$ Pa to $1,06 \times 10^5$ Pa

### 4.4.2 Test in the extreme conditions

Conformance test shall be carried out for temperature variation only; relative humidity, mechanical, chemical and biological environmental stresses are outside the scope of the present document. ETS 300 019 [3] series shall apply.

The IUT shall be tested under extreme conditions according to the required or the selected class of operation reported in ETS 300 019 [3] "Environmental conditions-Operation" series or any other foreseen by the relevant EN/ETS.

The extreme condition test shall be made under the procedures required by the relevant ETS 300 019 [3] "Environmental conditions-Test" series.

The selection among the optional classes foreseen by the relevant EN/ETS, if any, will be made by the supplier declaration.

When non ETS 300 019 [3] class is required by the relevant EN/ETS the test shall be carried out as the closest ETS 300 019 [3] class, provided that the extreme limits are widened or reduced accordingly.

Relative Humidity. The environmental tests should be conducted at the ambient relative humidity. Suppliers are to declare that the equipment remains operational, within the limits of the relevant EN/ETS, at the lower and upper limits quoted in ETS 300 019 [3]:

Before testing at temperature extremes a period of thermal stabilization is required at the temperature extreme. This is done by leaving the equipment under test powered off at the temperature extreme for a period of time sufficient to ensure that the thermal equilibrium condition is met. After reaching thermal equilibrium equipment under test shall have power applied. Measurements may be made as soon as the equipment is thermally stable, and should be within one hour of power being applied. If the time period is greater than one hour then this shall be detailed in the test report.

## 4.5 P-MP test report

The normative Annex B contains the harmonized Test Report based on the CEPT model. All test results shall be recorded by means of this Test Report format. Additional test details may be added to the Test Report where appropriate.

If a specific test parameter in a standard is not included in the standardized Test Report, the Report should be used for guidance in producing the necessary addendum.



# Annex A (normative): Suppliers Declaration

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 Suppliers Declaration proforma in this annex so that it can be used for its intended purposes and may further publish the completed Suppliers Declaration.

## A.1 Supplier declaration of conformity

Hereby we,

.....

Company name

.....

Company address

declare under our sole responsibility that the Fixed Radio Equipment

.....

Product name, description

.....

Product name/data rate(s)

is in conformity with the appended supplier specification:

Specification:.....

and the following relevant standards:

.....  
.....  
.....  
.....  
.....  
.....

Place, date

.....

Company

.....

Authorized signature

## A.1.1 Supplier declaration summary

Parameters	T	I	NA	Reference to remark
Channel plan/operating frequency range				
Duplex frequency separation				
Co-polar channel spacing				
Compatibility requirement				
<b>Environmental conditions-</b>				
Weather protected locations				
Non-Weather protected locations				
Power supply				
EMC				
TMN interface				
Synchronization of interface bit rates				
<b>Branching/feeder/antenna requirements</b>				
Waveguide flanges (or other connectors)				
Return Loss				
<b>Parameters for P-MP Systems</b>				
Transmission capacity				
System capacity				
Transparency				
Round trip delay				
Voice coding methods				
<b>Transmitter characteristics</b>				
<b>Transmitter power range</b>				
Nominal Power Maximum value				
Nominal Power Minimum value				
Automatic Tx. Power Control, (ATPC)				
Remote Tx. Power Control, (RTPC)				
Remote frequency control (RFC)				
RF spectrum mask				
Radio frequency tolerance short-term portion				
Radio frequency tolerance long-term portion				
Hopping Period (if applicable)				
<b>Receiver characteristics</b>				
Input level range, if applicable				
Receiver image rejection				
<b>System characteristics</b>				
System Type(s) (Class(es)), Modulation scheme(s), Full load conditions (if applicable)				
Dynamic level range (if applicable)				
Equipment background BER				
<b>Interference sensitivity</b>				
Co-channel interference sensitivity External				
Adjacent channel interference sensitivity				
<b>Types of interfaces</b>				
User network interfaces				
Network user interfaces				
<b>Parameters for co-ordination purposes</b>				
Tx Bandwidth				
Rx bandwidth				
Rx noise figure				
Receiver mask				
NOTE:	T:	Test to be carried out to the declared value.		
	I:	Information needed for testing, approval or co-ordination.		
	NA:	Supplier's declaration for this parameter is not applicable.		
		Classes of operation, if defined in the standard, are to be marked in the relevant row, in the "Reference to remark" column.		

## A.1.2 General characteristics

### A.1.2.1 Channel plan (operating frequency range), Centre gap, Channel spacing, Duplex frequency separation

Declare parameters for frequency band, channel arrangement and reference to relevant standard on channel plan used:

Channel plan reference:			
Frequency range: (GHz)			
Centre gap: (MHz)			
Transmitter receiver duplex frequency spacing: (MHz)			
Payload bit rate (Mbit/s)			
Equipment capacity (Mbit/s)			
RF Channel separation (MHz)			

### A.1.2.2 Compatibility requirements between systems

	Yes	No
The IUT fulfils the compatibility requirements given by the EN/ETS to which it is to be tested.		
Comment and additional information:		

### A.1.2.3 Environmental conditions

In this clause the environmental (climatic only) stresses which the equipment shall withstand shall be declared. The requirements are generally given in the ETS 300 019 [3], which defines weather protected and non-weather protected locations, classes and test severity.

#### A.1.2.3.1 Equipment within weather protected locations - indoor locations

	Yes	No
ETS 300 019 [3], class 3.1		
ETS 300 019 [3], class 3.2		
ETS 300 019 [3], class 3.3		
ETS 300 019 [3], class 3.4		
ETS 300 019 [3], class 3.5		
Other (Specify)		

#### A.1.2.3.2 Equipment for non weather-protected locations - outdoor locations

	Yes	No
ETS 300 019 [3], class 4.1		
ETS 300 019 [3], class 4.1E		
Other (Specify)		

### A.1.2.4 Power supply

State the following power supply parameters. They are to be used for setting up the correct test conditions.

Nominal input voltage (V)	
Maximum input voltage (V)	
Minimum input voltage (V)	
Type of voltage (AC or DC)	

### A.1.2.5 ElectroMagnetic compatibility (EMC)

Status of the EMC conformance test shall be indicated in the table below. The relevant standard to which the equipment conforms shall be declared as well.

	Status	Comments
Compliant		
Not tested		
Not Compliant		
Relevant standard or recommendation:		

NOTE: If a test or re-test is scheduled the date may be declared as a comment.

	Yes	No
The IUT conforms to EMC class A requirements:		
The IUT conforms to EMC class B requirements:		
Reference to certificate number:		

### A.1.2.6 TMN interface

	Yes	No
The IUT interface to a Telecommunication Management System is in accordance with the following standard _____		
Comment and additional information:		

### A.1.2.7 Synchronization of interface bit rates

	Yes	No
The IUT include methods enabling internal and external synchronization to the network.		
Comment and additional information:		

### A.1.2.8 Branching / feeder /antenna requirements

#### A.1.2.8.1 Waveguide flanges (or other connectors)

RF interface used:	
--------------------	--

NOTE: For systems with integrated antennas the above should be marked N/A, and the test interface should be recorded in the test report.

### A.1.2.8.2 Return loss

Minimum return loss of the branching system, ref. point C, (dB):	
Minimum return loss of the branching system, ref. point C', (dB):	

NOTE: For systems with integrated antennas there are no requirements on return loss.

## A.1.3 Parameters for digital P-MP systems

### A.1.3.1 Transmission capacity

Transmission capacity of the IUT (kbps)	
---	--

### A.1.3.2 System capacity

System capacity of the IUT (kbps)	
-----------------------------------	--

### A.1.3.3 Transparency

The equipment is transparent, as described in the relevant standard	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	N/A <input type="checkbox"/>	

### A.1.3.4 Round trip delay

Round trip delay is msec	
--------------------------	--

### A.1.3.5 Voice coding methods

The system apply voice coding method(s) according to the following standard(s):	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	N/A <input type="checkbox"/>	

### A.1.3.6 Transmitter characteristics

#### A.1.3.6.1 Transmitter output power range and Tx output power tolerance

Nominal output power $\pm$ tolerance; x dBm $\pm$ k dB	
Nominal output power, maximum value, dBm	
Nominal output power, minimum value, dBm	

NOTE: k shall be according to relevant EN/ETS. For some systems only the maximum Tx output power is relevant.

### A.1.3.6.2 Automatic Transmit Power Control (ATPC) and Remote Transmit Power Control (RTPC)

ATPC implemented:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
ATPC power range, Tx output ranges from X to Y (dBm)		
ATPC power tolerances: (dB)		
Activation threshold: (dBm)		
Deactivation threshold: (dBm)		
Activation and deactivation description (if relevant)		
RTPC implemented:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
RTPC power range: (dBm)		
RTPC power tolerances: (dB)		
RTPC step size: (dB)		

### A.1.3.6.3 Remote Frequency Control (RFC)

RFC implemented:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
RFC frequency range: (GHz)		
RFC frequency tolerances: (ppm / kHz)		

### A.1.3.6.4 RF spectrum mask

	Yes	No
The IUT transmitter spectrum mask conforms to the requirements in EN/ETS ____		
For the following values of Channel Spacing: _____ According to the following classes (if applicable): _____		
Comments and additional information		

### A.1.3.6.5 Spurious emissions internal

	Yes	No
The IUT internal spurious emissions conforms to the requirements in		
For the following values of Channel Spacing: _____		
Comments and additional information (LO arrangement)		

### A.1.3.6.6 Radio frequency tolerance short term portion

Short term radio frequency tolerance: (ppm / kHz)	
---	--

## A.1.3.6.7 Radio frequency tolerance long term portion

Long term radio frequency tolerances: (ppm / kHz)	
Expected long term tolerance: (years)	

## A.1.3.6.8 Hopping period (if applicable)

Frequency hopping period (msec)	
---------------------------------	--

## A.1.3.7 Receiver characteristics

## A.1.3.7.1 Input level range

The equipment input level range conforms to the requirements in the relevant standard (if applicable).	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	N/A <input type="checkbox"/>	

## A.1.3.7.2 Receiver image rejection

Receiver image rejection (if applicable acc. to the standard) dB	
--	--

## A.1.3.8 System characteristics without diversity

## A.1.3.8.1 System Type(s)(Class(es))

The IUT conforms to the requirements in EN/ETS:	Yes	No
_____	N/A <input type="checkbox"/>	
for the following System Types (Class): _____	N/A <input type="checkbox"/>	
applying the following Modulation scheme(s): _____	N/A <input type="checkbox"/>	
under the following Full Load conditions: _____	N/A <input type="checkbox"/>	
Comments and additional information		

A.1.3.8.2 Dynamic level range for BER  $10^{-6}$ 

The equipment dynamic level range for a BER $10^{-6}$ conforms to the requirements in the relevant standard (if applicable).	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	N/A <input type="checkbox"/>	

### A.1.3.8.3 Equipment background BER

The equipment BBER conforms to the requirements in the relevant standard (if applicable) for the following payload bitrates: _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	N/A <input type="checkbox"/>	
Comments and additional information		

### A.1.3.8.4 Interference sensitivity

#### A.1.3.8.4.1 Co-channel interference sensitivity external

	Yes	No
The IUT co-channel interference sensitivity conforms to the requirements in the relevant standard	<input type="checkbox"/>	<input type="checkbox"/>
For the following values of Channel Spacing: _____		
For the following classes of operation _____		
Comments and additional information		

#### A.1.3.8.4.2 Adjacent channel interference sensitivity

	Yes	No
The IUT adjacent channel interference sensitivity conforms to the requirements in the relevant standard	<input type="checkbox"/>	<input type="checkbox"/>
For the following values of Channel Spacing: _____		
For the following classes of operation _____		
Comments and additional information		

## A.1.4 Type of Interface

Status of the baseband conformance test(s) shall be indicated in the table below. The relevant standard to which the equipment conforms shall be declared as well.

### A.1.4.1 User Network / test interface(s)

Analogue interfaces	Status	Comments
Relevant standard or recommendation:		
Data channel baseband interface	Status	Comments
Relevant standard or recommendation:		



### A.1.4.2 Network Node / interface(s)

Analogue interfaces	Status	Comments
Relevant standard or recommendation:		
Data channel baseband interface	Status	Comments
Relevant standard or recommendation:		

## A.1.5 Additional parameters for coordination purposes

### A.1.5.1 Tx bandwidth

The 99 % bandwidth of the Tx signal at reference point B' (C') shall be stated by the supplier. The parameter is important for national and international co-ordination purposes.

Tx bandwidth (99 %): (MHz)	
----------------------------	--

### A.1.5.2 Rx bandwidth

The bandwidth of the receiver at reference point E shall be stated by the supplier. Either the noise bandwidth, the 3 dB bandwidth or the 6 dB bandwidth may be declared. The parameter is important for national and international co-ordination purposes.

Rx bandwidth: (MHz)	
---------------------	--

Type of bandwidth definition measured according to (tick appropriate alternative):

Bandwidth definition:	(X)
Noise bandwidth	
3 dB bandwidth	
6 dB bandwidth	

### A.1.5.3 Rx noise figure

The nominal noise figure of the receiver, at reference point C (B), shall be stated by the supplier. The parameter is important for national and international co-ordination purposes.

Noise figure: (dB)	
--------------------	--

#### A.1.5.4 Receiver mask

The receiver mask is required to obtain a generalized selectivity characteristic which can be used to compute, with a sufficient level of accuracy, the contribution of any interferer with a known and determined spectrum envelope.

"Receiver" should mean the complete receiving section, between the points C and Z, as defined in the generic block diagram of digital radio relay systems, as the selectivity of the branching filters and demodulator shall be taken into account.

For FDMA Type P-MP systems the "Receiver Mask" of a single receiver with largest bandwidth shall be stated.

Proposed measurement procedure:

- a CW signal of variable frequency and output level is used;
- the received level is set 3 dB above the actual threshold level corresponding to  $BER = 10^{-6}$ . The central frequency of the receiver is  $F_0$ ;
- the CW interferer is varied in frequency and level in order to cause a measured BER equal to  $10^{-6}$ . Both values, frequency and level, are recorded and plotted;
- the measurement is performed within the limits of  $F_0 \pm \Delta F$ . The level of the CW interferer is limited to 50 dB above the wanted signal.

The set of results can then be used to compute the contribution of each fractional part of the spectrum of the interferer.

Supply a plot and provide below annex reference.

Annex reference	
-----------------	--

## Annex B (normative): Test report

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 Test report proforma in this annex so that it can be used for its intended purposes and may further publish the completed Test report.

### B.1 Test results

#### B.1.1 Summary of tests

Parameter	C	NC	NT	NA	Reference to remark
Transmitter characteristics					
Transmitter power range					
Transmitter nominal output power					
Transmitter output power tolerance					
Maximum output power					
Minimum output power					
Automatic transmit power control (ATPC)					
Remote transmit power control (RTPC)					
Remote frequency control (RFC)					
RF spectrum mask (under FLC)					
Spurious emissions (Tx)					
Tx frequency tolerance (short term)					
Receiver characteristics					
Input level range for BER = 10 <sup>-x</sup>					
Spurious emissions					
System performance (applied modulation method)					
Dynamic Level range for BER =10 <sup>-x</sup>					
BER vs. Rx signal level(s)					
Interference sensitivity					
Co-channel interference (external)					
Adjacent channel interference (external)					
CW spurious interference					
NOTE:	C: The parameter is compliant with the requirements. NC: The parameter is not compliant with the requirements. NT: The parameter is not tested. NA: The test of this parameter is not applicable.				

## B.1.2 General information about the tests

General information about the tests shall be given below.

Name of accredited laboratory performing the tests	
Test report reference number	
Standard applied	
Dates of test (from - to)	
Name of supplier	
supplier's declared type designation	
Type of equipment	
Equipment serial number(s)	
Module:	Serial number
Software revision(s) of radio unit as tested	
Software revision(s) of baseband / modem unit(s) as tested	

## B.1.3 Test result forms

### B.1.3.1 Transmitter characteristics

#### B.1.3.1.1 Transmitter power range and tolerance

The test is divided in two parts. The first one is maximum (nominal) output power and the second one (if applicable) is minimum output power.

##### B.1.3.1.1.1 Maximum (nominal) output power

See EN 30X XXX (sub)clause yyy.

- Results:
  - ambient temperature: °C
  - relative humidity: %
  - rated output power: dBm
  - clause number:

Test Conditions		Transmitter maximum (nominal) power level (dBm)		
		RF channel Bottom (GHz)	RF channel middle (GHz)	RF channel top (GHz)
T nom ()	V nom ()			
T min IDU()	V min ()			
T Min ODU ()	V max ()			
T max IDU ()	V min ()			
T Max ODU ()	V max ()			
Measurement Uncertainty (dB)				

NOTE: Use the number of columns that are required depending on how many frequency channels are to be tested, normally bottom, middle and top channels.

Measurement uncertainty	
-------------------------	--

Limits

Maximum Allowed Power (dBm)	
Tolerance (Rated Power), All Test Conditions (dB)	

Test equipment used: (Item numbers)	
-------------------------------------	--

### B.1.3.1.1.2 Minimum output power

- Method of measurement:

See EN 30X XXX (sub)clause yyy.y1

- Results:
  - ambient temperature: °C
  - relative humidity: %
  - rated output power: dBm
  - clause number:

Test Conditions		Transmitter maximum (nominal) power level (dBm)		
		RF channel bottom (GHz)	RF channel middle (GHz)	RF channel top (GHz)
T nom ()	V nom ()			
T min IDU()	V min ()			
T Min ODU (.....)	V max ()			
T max IDU ()	V min ()			
T Max ODU (.....)	V max ()			
Measurement Uncertainty (dB)				

NOTE: Use the number of columns that are required depending on how many frequency channels are to be tested, normally bottom, middle and top channels.

Measurement uncertainty	
-------------------------	--

Limits

Test equipment used (Item numbers):	
-------------------------------------	--

### B.1.3.1.1.3 Automatic Transmit Power Control (ATPC)

- Method of measurement:

See EN 30X XXX (sub)clause yy.y3.

- Results:
  - ambient temperature: °C
  - relative humidity: %
  - input voltage,  $V_{nom}$ : V
  - clause number:

For results from Tx performance verification, the relevant sections for Transmitter power range, RF spectrum mask, Spurious emissions and Output power tolerance shall be used.

For the control loop performance, one of the directions shall be tested only, and the results stated below.

Control loop performance			Pass	Fail
Power level control functionality: Minimum power level increasing to maximum (nominal) level (according to declaration by the supplier:				
Power level control functionality: Maximum (nominal) decreasing to minimum power level (according to declaration by the supplier:				

Measurement uncertainty	
-------------------------	--

Test equipment used: (Item numbers)	
-------------------------------------	--

### B.1.3.1.1.4 Remote Transmit Power Control, (RTPC)

This measurement has been carried out under the „Output Power Tolerance“ tests, if applicable.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
--	------------------------------	-----------------------------	------------------------------

### B.1.3.1.1.5 Remote Frequency Control (RFC)

This measurement has been carried out under the radio frequency tolerance tests, if applicable.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
---	------------------------------	-----------------------------	------------------------------

### B.1.3.1.1.6 RF spectrum mask

- Method of measurement:

See EN 30X XXX (sub)clause yy.y6

- Results:

The results shall be represented by plots provided in the annex. Annex references shall be stated below.

NOTE: Use the number of tables that are required, depending on how many frequency channels are to be tested, normally bottom, middle and top channels.

- ambient temperature: °C
- relative humidity: %
- input voltage,  $V_{nom}$ : V
- clause number:

Test conditions		
Radio frequency channel (GHz) Bottom channel		Reference to plot
Tnom	Vnom	
Tmin IDU	Vmin	
Tmin ODU	Vmax	
Tmax IDU	Vmin	
Tmax ODU	Vmax	
Test conditions		
Radio frequency channel (GHz) Middle channel		Reference to plot
Tnom	Vnom	
Tmin IDU	Vmin	
Tmin ODU	Vmax	
Tmax IDU	Vmin	
Tmax ODU	Vmax	

Test conditions		
Radio frequency channel (GHz) Top channel		Reference to plot
Tnom	Vnom	
Tmin IDU	Vmin	
Tmin ODU	Vmax	
Tmax IDU	Vmin	
Tmax ODU	Vmax	

Measurement uncertainty	
-------------------------	--

Test equipment used: (Item numbers)	
-------------------------------------	--

### B.1.3.1.1.7 Spurious emissions (Tx) - external

- Method of measurement:

See EN 30X XXX (sub)clause yy.y.9.

- Limits:

Limits are specified in the relevant EN/ETS.

- Results:

The results shall be presented by plots, which shall be included in the report.

Annex references shall be stated below.

NOTE: If the measurement for "serious emissions (Tx) - external" and "serious emissions (Rx) - external" can be carried out at the same time the results may be presented in the same plots. In that case only one of these clauses will be used and this fact be clearly declared in the test report.

- ambient temperature: °C
- relative humidity: %
- input voltage,  $V_{nom}$ : V
- clause number:

Frequency (GHz)	Reference to plot	
	RF middle channel (GHz)	
By plot range	Measurement bandwidth	Maximum Spurious emission (dBm)
Measurement Uncertainty (dB)		

Limits

Frequency Range	Limit (dB)

Test equipment used: (Item numbers)	
-------------------------------------	--

#### B.1.3.1.1.8 Transmitter radio frequency tolerance (short term)

- Method of measurement:

See EN 30X XXX (sub)clause yyy.y5.

- Results:
  - ambient temperature: °C
  - relative humidity: %
- clause:

Test Conditions		Frequency Error (kHz / ppm)		
		RF channel Bottom (GHz)	RF channel middle (GHz)	RF channel top (GHz)
Tnom()	Vmin ()			
Tmin IDU()	Vmin ()			
T Min ODU ()	Vmax ()			
Tmax IDU()	Vmin ()			
T max ODU	Vmax ()			
Measurement Uncertainty (kHz/ppm)				



Limits:

Limit (kHz / $\pm$ ppm)	
-------------------------	--

Test equipment used: (Item numbers)	
-------------------------------------	--

### B.1.3.2 Receiver characteristics

#### B.1.3.2.1 Input level range for BER = $10^{-x}$

- Method of measurement:

See EN 30X XXX (sub)clause yy.yy.1.

- Results:
  - ambient temperature: °C
  - relative humidity: %
  - input voltage,  $V_{nom}$ : V
  - clause number

Test Conditions		RF channel mid (GHz)	
Upper level (dBm)			
Lower level (dBm)			
Input level range (dB)			

NOTE 1: Use the number of columns that are required, depending on how many frequency channels are to be tested.

NOTE 2: For DS-CDMA the upper / lower level should be changed to dBm per 64 kbit/s bearer.

Limits

	Limit Level (dBm)
Upper level	
Lower level	

Measurement uncertainty	
-------------------------	--

Test equipment used: (Item numbers)	
-------------------------------------	--

#### B.1.3.2.2 Spurious emissions (Rx) - external

- Method of measurement:

See EN 30X XXX (sub)clause yy.y.2.

- Limits:

Limits are specified in the relevant EN/ETS.

- Results:

The results shall be presented by plots which shall be included in the report.

Annex references shall be stated below.

NOTE: If the measurement for "Spurious emissions (Tx) - external" and "Spurious emissions (Rx) - external" can be carried out at the same time the results may be presented in the same plots. In that case only one of these clauses will be used and this fact be clearly declared in the test report.

Separate receiver test not required (Duplex system using a common transmit and receiver port)	Yes <input type="checkbox"/>	No <input type="checkbox"/>

- ambient temperature: °C
- relative humidity: %
- input voltage,  $V_{nom}$ : V
- clause number

Frequency (GHz)	Reference to plot	
	RF middle channel (GHz)	
By plot range	Measurement bandwidth	Maximum Spurious emission (dBm)
Measurement Uncertainty (dB)		

Limits

Frequency Range	Limit (dB)

Measurement uncertainty	
-------------------------	--

Test equipment used: (Item numbers)	
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### B.1.3.3 System performance

#### B.1.3.3.1 Dynamic level range at BER = 10<sup>-n</sup>

- Method of measurement:

See EN 30X XXX (sub)clause yy.yy.1.

- Results:
  - ambient temperature: °C
  - relative humidity: %
  - input voltage, V<sub>nom</sub>: V
  - clause number

Test Conditions		RF channel mid (GHz)	
Upper level (dBm)			
Lower level (dBm)			
Dynamic range (dB)			

NOTE 1: Use the number of columns that are required, depending on how many frequency channels are to be tested.

NOTE 2: For DS-CDMA the upper / lower level should be changed to dBm per 64 kbit/s bearer.

Limits

	Limit Level (dBm)
Upper level	
Lower level	

Measurement uncertainty	
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Test equipment used: (Item numbers)	
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#### B.1.3.3.2 BER vs. Rx signal level

- Method of measurement:

See EN 30X XXX (sub)clause yy.yy.1.

- Results:

The results can be presented in table form.

The relevant test points (BER-values) according to the EN/ETS shall be declared together with the measured received signal level values. Only one frequency channel will normally be tested. This test is generally only performed under reference climatic conditions.

- ambient temperature: °C
- relative humidity: %
- RF channel frequency: GHz
- input voltage, V<sub>nom</sub>: V

- clause number:

Climatic condition	Measured Received signal level (dBm)
Measured BER=10 <sup>x</sup>	
Measured BER=10 <sup>y</sup>	

Limits

	BER =10 <sup>x</sup>	BER =10 <sup>y</sup>
Limit level (dBm)		

NOTE 1: For DS-CDMA the table below may be used, with multiple versions if required for various climatic test conditions.

Class	Channel Spacing (MHz)	
	RSL @BER 10 <sup>3</sup> (dBm/64kbits/s bearer)	RSL @BER 10 <sup>6</sup> (dBm/64kbits/s bearer)
Number of 64 kbits/s traffic channels		

NOTE 2: Alternatively plots may be used and in that case be supplied in the annex and referenced to in the table above.

### B.1.3.3.3 Interference sensitivity

#### B.1.3.3.3.1 Co-channel interference sensitivity (external)

- Method of measurement:

See EN 30X XXX (sub)clauses yy.yy.2 and yy.yyy.3.

- Results:

The results shall be presented in table form. Testing shall be performed on one frequency channel (nominally mid channel) which will normally be tested under reference conditions only.

State the maximum C/I (dB) values measured.

- ambient temperature: °C
- relative humidity: %
- RF channel frequency: GHz
- input voltage, V<sub>nom</sub>: V
- clause number:


Degradation (dB)	Wanted Signal Level (dBm)	Unwanted Signal Level (dBm)	Specified C/I Ratio (dB)	Bit Error Ratio at required (C/I) ratio	Measured C/I ratio to degrade BER $10^{-6}$ threshold (dB) [optional]
-1					
-3					

Limits:

RSL @ BER:	RSL @ $10^{-6}$	
Degradation:	1 dB	3 dB
C/I Ratio (max):		

or:

Wanted Signal Level (dBm)	Unwanted Signal Level (dBm)	Specified W/U Ratio (dB)	Bit Error Ratio at required (W/U) ratio	Measured W/U ratio to degrade BER $10^{-6}$ threshold (dB) [optional]

Limits

	$10^{-5}$
C/I Limit (dB)	

NOTE: Some standards set the receive signal to a value set in the standard and look for the level of interferer signal to degrade the BER to  $10^{-5}$ .

#### B.1.3.3.3.2 Adjacent channel interference sensitivity

Method of measurement:

See EN 30X XXX (sub)clauses yy.yy.2 and yy.yyy.3.

Results:

The results shall be presented in table form. The results from both adjacent channel interference measurements shall be presented (Channel – 1 then Channel +1). Only one frequency channel (nominally middle channel) will normally be tested.

State the maximum C/I (dB) values measured.

- ambient temperature: °C
- relative humidity: %
- RF channel frequency: GHz
- input voltage,  $V_{nom}$ : V
- clause number

Adjacent Channel	Degradation (dB)	Wanted Signal Level (dBm)	Unwanted Signal Level (dBm)	Specified C/I ratio (dB)	Bit Error Ratio at required (C/I) ratio	Measured C/I ratio to degrade BER $10^{-6}$ threshold (dB)
+1	1					
-1	1					
+1	3					
-1	3					

Limits:

RSL @ BER:	RSL @ $10^{-6}$	
Degradation:	1 dB	3 dB
C/I Ratio (max):		

or

Channel Spacing	Wanted Signal Level (dBm)	Unwanted Signal Level (dBm)	Specified W/U Ratio (dB)	Bit Error Ratio At required W/U ratio	Measured W/U ratio to degrade BER $10^{-6}$ threshold (dB)[Optional]
+1					
-1					

Limits:

BIT ERROR Ratio UNDER NORMAL TEST CONDITIONS
$<10^{-5}$

NOTE: Some standards set the receive signal to a value set in the standard and look for the interferer signal to degrade the BER to  $10^{-5}$ .

#### B.1.3.3.3.3 CW spurious interference

- Method of measurement:

See EN 30X XXX (sub)clauses yy.y.5 and yy.y.4.

- Results:

Maximum registered BER for any CW frequency (according to the measurement methods) shall be presented in the table below. CW interferer frequency(ies) and level(s) at actual BER shall be presented as well. Only one frequency channel will normally be tested, and under nominal temperature conditions only.

- ambient temperature: °C
- relative humidity: %
- RF channel frequency: GHz
- input voltage,  $V_{nom}$ : V
- clause number:

CW spurious interference			
CW interferer frequency (band)	Minimum CW interferer level (dBm)	Measured BER	Measured C/I (dB)

Limits

Limit BER at C/I (dB)	BER=	C/I=
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Measurement uncertainty	
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Test equipment used: (Item numbers)	
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## B.2 Photographs of IUT

### B.2.1 ISO 9002 Accredited Manufacturer

If the manufacturer is ISO 9002 [13] accredited, photographic records of the external views of the equipment tested shall be required. Internal photographic records shall not be required. A copy of the manufacturing accreditation certificate shall be included in the report. Details of the equipment labelling shall be provided in the report.

### B.2.2 ISO 9002 Non-Accredited Manufacturer

If the manufacturer is not ISO 9002 [13] accredited, photographic records of the equipment tested shall be required as follows:

- 1) assembly of units or parts;
- 2) front of unit (showing controls, labelling, etc.);
- 3) rear of unit showing antenna connector, labelling, etc.).

If the label or identifying mark is affixed on a surface other than 2) or 3) above, a photograph of this shall be provided

The equipment (**only after type testing is completed**) shall be opened and photographs of the internal construction shall be made

The photographs shall be colour plate and of a size not less than 170 x 120 mm.

Each photograph shall be clearly identified and mounted on a separate page.

### B.3 Test equipment used for test

In the following table the test equipment used for the test shall be listed by the test laboratory.

In each separate part of the test report the used test equipment shall be stated. The instruments are then identified by a number which refers to the table below.

Principal measurement equipment (eg the RF power meter and the Spectrum analyser shall have a calibration meeting the requirements of EN 45001 [11] or equivalent.

No.	Test equipment	Type	Manufacturer	Serial number	Calibration due date
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

### B.4 Additional information supplementary to the test report

Remarks:

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## Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

- ITU-R Recommendation F.746-4: "Radio frequency channel arrangements for radio-relay systems".
- ITU-R Recommendation F.1191-1: "Bandwidth and unwanted emissions of digital radio-relay systems".

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## History

<b>Document history</b>			
V1.1.1	March 2000	Public Enquiry	PE 20000714: 2000-03-15 to 2000-07-14
V1.1.1	September 2000	Vote	V 20001124: 2000-09-25 to 2000-11-24