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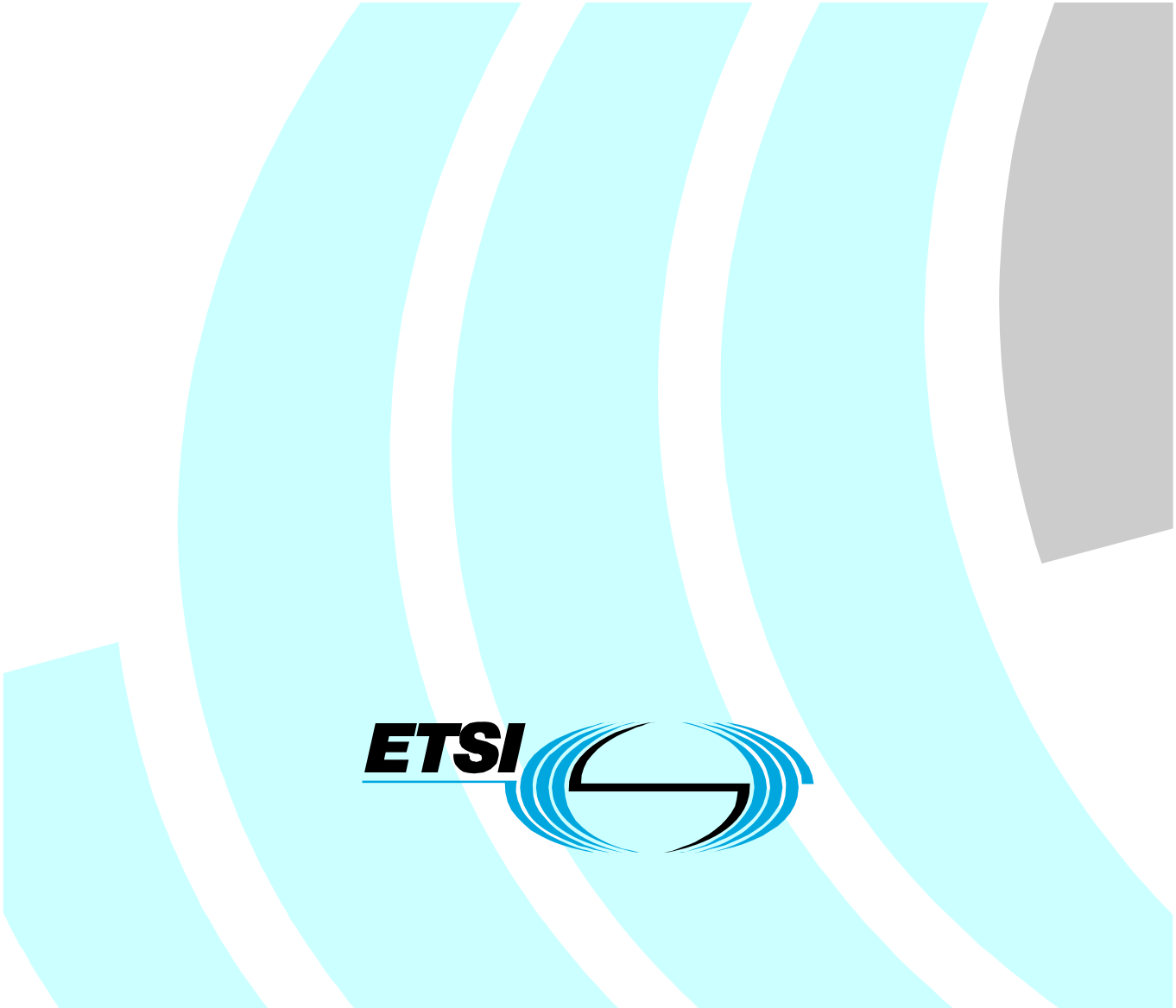
Technical Report

Electromagnetic compatibility and Radio spectrum Matters (ERM); Aspects and implications of the inclusion of receiver parameters within ETSI standards



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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 Technical Report (TR) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

Introduction

During the drafting of ETSI harmonized standards the inclusion or not of parameters, in particular of those relating to receiver performance, has triggered very intense debates in the various ETSI Technical Bodies. So far it has been agreed that such an inclusion would be discussed on a case by case basis.

In January 2007 the OCG-R&TTE-D initiated action point 35/5 in order to address improving receiver specifications in Harmonized Standards and repeated during its meeting 36:

> "After discussion it was clarified that receiver parameters may be specified in relation to the essential requirements of the R&TTE Directive [i.1] to use the spectrum effectively so as to avoid harmful interference. For example, poor receiver immunity (e.g. inadequate and/or absence of specification of selectivity or blocking) can make it impossible for other users to operate in adjacent spectrum without causing harmful interference. This is to be assessed on a case-by-case basis by the responsible TB following the guidance in EG 201 399 [i.2], which implements the decision of TCAM#7. ERM TG Rx should discuss economic issues in refining the guidelines for the specification of technical parameters and if necessary, essential test suites for receivers. It was stressed that the fact that there are receiver specifications in a standard does not necessarily imply that the corresponding test suites are considered as essential radio test suites."

In the RSPG document 07-191 [i.4] (Draft Request by the European Commission to the Radio Spectrum Policy Group for an Opinion on Streamlining the regulatory environment for the use of spectrum) it is stated:

> "Another debate relates to the importance of receiver parameters in ensuring an efficient spectrum management. Some of these receiver parameters determine the immunity of equipment against interference from other sources. These parameters are regulated under the R&TTE Directive [i.1], either as EMC immunity requirements or requirements to avoid harmful interference. Harmonized standards however do not always detail these into technical requirements, thereby leaving some ambiguities whether in case of harmful interference this is due to insufficient immunity or to emissions. ETSI is currently considering the issue. Therefore, adequate receiver immunity may become increasingly necessary to facilitate the introduction of new systems, to extend sharing opportunities and, eventually, to ensure efficient spectrum management."

The present document addresses these issues.

In view of the diversity of views across the ETSI Membership, this report includes, when a consensus has not been reached, enough views to provide a representative "picture" of the situation.

1 Scope

The present document provides the more recent views of ETSI in relation to the inclusion of receiver requirements in harmonized standards.

Apart from a survey of all existing harmonized standards, it also contains the opinion of a number of Technical Bodies and of Task Groups. The impact on EG 201 399 [i.2] as well as interpretation difficulties of article 3.2 of the R&TTE Directive [i.1] are discussed.

On these bases, some recommendations are made.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
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Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area**.** For non-specific references, the latest version of the referenced document (including any amendments) applies.

[i.1] 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. (R&TTE Directive).

[i.2] ETSI EG 201 399 (V2.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

[i.3] ETSI EN 301 908-1 (V3.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive".

[i.4] RSPG document 07-191: "Draft Request by the European Commission to the Radio Spectrum Policy Group for an Opinion on Streamlining the regulatory environment for the use of spectrum)".

[i.5] ETSI TR 102 137: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Use of radio frequency spectrum by equipment meeting ETSI standards".

[i.6] ITU Radio Regulations.

[i.7] ETSI EN 301 893: "Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.8] ETSI EN 302 502: "Broadband Radio Access Networks (BRAN); 5,8 GHz fixed broadband data transmitting systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.9] ETSI EN 302 544: "Broadband Data Transmission Systems operating in the 2 500 MHz to 2 690 MHz frequency band; Part 1: TDD Base Stations; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.10] ETSI EN 302 567: "Broadband Radio Access Networks (BRAN); 60 GHz Multiple-Gigabit WAS/RLAN Systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.11] ETSI EN 302 623: "Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Mobile Terminal Stations; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.12] ETSI EN 301 406: "Digital Enhanced Cordless Telecommunications (DECT); Harmonized EN for Digital Enhanced Cordless Telecommunications (DECT) covering essential requirements under article 3.2 of the R&TTE Directive; Generic radio".

[i.13] ETSI EN 301 489-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz".

[i.14] ETSI EN 300 220-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive.

[i.15] ETSI TR 101 506: "Fixed Radio Systems; Generic definitions, terminology and applicability of essential requirements under the article 3.2 of 1999/05/EC Directive to Fixed Radio Systems".

[i.16] ETSI EN 301 751: "Fixed Radio Systems; Point-to-Point equipments and antennas; Generic harmonized standard for Point-to-Point digital fixed radio systems and antennas covering the essential requirements under article 3.2 of the 1999/5/EC Directive".

[i.17] ETSI EN 302 217 (all parts): "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas".

[i.18] ETSI EN 301 908-11: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 11: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (Repeaters) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.19] ETSI EN 302 426: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for CDMA spread spectrum Repeaters operating in the 450 MHz cellular band (CDMA450) and the 410 MHz, 450 MHz and 870 MHz PAMR bands (CDMA-PAMR) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.20] ETSI EN 300 607-1: "Digital cellular telecommunications system (Phase 2+) (GSM); Mobile Station (MS) conformance specification; Part 1: Conformance specification (GSM 11.10-1 version 8.1.1 Release 1999)".

[i.21] ETSI EN 300 162-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands; Part 1: Technical characteristics and methods of measurement".

[i.22] ETSI EN 301 025-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC); Part 1: Technical characteristics and methods of measurement".

[i.23] ETSI EN 301 178-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands (for non-GMDSS applications only); Part 1: Technical characteristics and methods of measurement".

[i.24] ETSI EN 300 698-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Radio telephone transmitters and receivers for the maritime mobile service operating in the VHF bands used on inland waterways; Part 1: Technical characteristics and methods of measurement".

[i.25] ETSI EN 300 720-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Ultra-High Frequency (UHF) on-board communications systems and equipment; Part 1: Technical characteristics and methods of measurement".

[i.26] ETSI EN 301 929-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF transmitters and receivers as Coast Stations for GMDSS and other applications in the maritime mobile service; Part 1: Technical characteristics and methods of measurement".

[i.27] ETSI EN 300 086 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment with an internal or external RF connector intended primarily for analogue speech".

[i.28] ETSI EN 300 296 (all parts): "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Radio equipment using integral antennas intended primarily for analogue speech".

[i.29] ETSI EN 300 341-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Land Mobile Service (RP 02); Radio equipment using an integral antenna transmitting signals to initiate a specific response in the receiver; Part 1: Technical characteristics and methods of measurement".

[i.30] ETSI EN 300 390-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Radio equipment intended for the transmission of data (and speech) and using an integral antenna; Part 1: Technical characteristics and test conditions".

[i.31] ETSI EN 301 166 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment for analogue and/or digital communication (speech and/or data) and operating on narrow band channels and having an antenna connector".

[i.32] ETSI EN 302 561: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment using constant or non-constant envelope modulation operating in a channel bandwidth of 25 kHz, 50 kHz, 100 kHz or 150 kHz; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive".

[i.33] ETSI EN 300 113 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna connector".

[i.34] ETSI EN 300 761-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Automatic Vehicle Identification (AVI) for railways operating in the 2,45 GHz frequency range; Part 1: Technical characteristics and methods of measurement".

[i.35] ETSI EN 300 220-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods".

[i.36] ETSI EN 300 330-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 1: Technical characteristics and test methods".

[i.37] ETSI EN 300 440-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods".

[i.38] ETSI EN 301 908-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 2: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.39] ETSI TS 125 141: "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 8.4.0 Release 8)".

[i.40] ETSI EN 301 908-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 3: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.41] ETSI EN 301 908-4: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 4: Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (UE) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.42] ETSI EN 301 908-5: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 5: Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (BS) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.43] ETSI EN 301 908-6: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 6: Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.44] ETSI EN 301 908-7: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 7: Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.45] ETSI EN 301 908-8: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 8: Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (UE) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.46] ETSI EN 300 219-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Radio equipment transmitting signals to initiate a specific response in the receiver; Part 1: Technical characteristics and methods of measurement".

[i.47] ETSI EN 300 433-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Double Side Band (DSB) and/or Single Side Band (SSB) amplitude modulated citizen's band radio equipment; Part 1: Technical characteristics and methods of measurement".

[i.48] ETSI EN 301 908-9: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 9: Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (BS) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.49] ETSI EN 300 373-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime mobile transmitters and receivers for use in the MF and HF bands; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive".

[i.50] ETSI TS 101 087: "Digital cellular telecommunications system (Phase 2 and Phase 2+); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 11.21 version 8.9.0 Release 1999)".

[i.51] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

[i.52] ETSI EN 300 396-2: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 2: Radio aspects".

[i.53] ETSI EN 300 396-4: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 4: Type 1 repeater air interface".

[i.54] ETSI EN 300 396-7: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 7: Type 2 repeater air interface".

[i.55] ETSI EN 300 396-5: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 5: Gateway air interface".

[i.56] ETSI EN 301 908-10: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 10: Harmonized EN for IMT-2000, FDMA/TDMA (DECT) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.57] ETSI EN 302 195-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio equipment in the frequency range 9 kHz to 315 kHz for Ultra Low Power Active Medical Implants (ULP-AMI) and accessories; Part 1: Technical characteristics and test methods".

[i.58] ETSI EN 302 510-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio equipment in the frequency range 30 MHz to 37,5 MHz for Ultra Low Power Active Medical Membrane Implants and Accessories; Part 1: Technical characteristics and test methods".

[i.59] ETSI EN 302 571: "Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5 855 MHz to 5 925 MHz frequency band; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.60] ETSI TS 151 010-1: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specification; Part 1: Conformance specification (3GPP TS 51.010-1 version 4.9.0 Release 4)".

[i.61] ETSI EN 300 065-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Part 1: Technical characteristics and methods of measurement".

[i.62] ETSI EN 300 609-4: "Digital cellular telecommunications system (Phase 2 and Phase 2+) (GSM); Base Station System (BSS) equipment specification; Part 4: Repeaters (GSM 11.26 version 8.0.2 Release 1999)".

[i.63] ETSI EN 301 908-12: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 12: Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (Repeaters) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.64] ETSI EN 301 783-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Commercially available amateur radio equipment; Part 1: Technical characteristics and methods of measurement".

[i.65] ETSI EN 301 526: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for CDMA spread spectrum mobile stations operating in the 450 MHz cellular band (CDMA 450) and 410, 450 and 870 MHz PAMR bands (CDMA-PAMR) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.66] ETSI EN 300 471-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Rules for Access and the Sharing of common used channels by equipment complying with EN 300 113; Part 1: Technical characteristics and methods of measurement".

[i.67] ITU-T Recommendation O.41: "Psophometer for use on telephone-type circuits".

[i.68] ITU-T Recommendation P.53: "Psophometer for use on telephone-type circuits".

[i.69] ETSI EN 302 480: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for the GSM onboard aircraft system covering the essential requirements of Article 3.2 of the R&TTE Directive".

[i.70] ETSI EN 301 449: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for CDMA spread spectrum base stations operating in the 450 MHz cellular band (CDMA 450) and 410, 450 and 870 MHz PAMR bands (CDMA-PAMR) covering essential requirements of article 3.2 of the R&TTE Directive".

[i.71] ETSI EN 300 328: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential equirements under article 3.2 of the R&TTE Directive".

[i.72] ETSI EN 302 288-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range; Part 1: Technical requirements and methods of measurement".

[i.73] ETSI EN 300 422-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement".

[i.74] ETSI EN 301 357-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Cordless audio devices in the range 25 MHz to 2 000 MHz; Part 1: Technical characteristics and test methods".

[i.75] ETSI EN 301 797: "Electromagnetic compatibility and Radio Spectrum Matters (ERM); Harmonized EN for CT2 cordless telephone equipment covering essential requirements under article 3.2 of the R&TTE directive".

[i.76] ETSI EN 302 064-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless Video Links (WVL) operating in the 1,3 GHz to 50 GHz frequency band; Part 1: Technical characteristics and methods of measurement".

[i.77] ETSI EN 302 291-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Close Range Inductive Data Communication equipment operating at 13,56 MHz; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive".

[i.78] ETSI EN 302 500-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD) using Ultra WideBand (UWB) technology; Location Tracking equipment operating in the frequency range from 6 GHz to 8,5 GHz; Part 1: Technical characteristics and test methods".

[i.79] ETSI EN 302 208-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W; Part 1: Technical requirements and methods of measurement".

[i.80] ETSI EN 302 065: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Ultra WideBand (UWB) technologies for communication purposes; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.81] CEPT Recommendation 74-01: "Spurious Emissions".

[i.82] ETSI EN 300 674-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band; Part 1: General characteristics and test methods for Road Side Units (RSU) and On-Board Units (OBU)".

[i.83] ETSI EN 300 224-1: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); On-site paging service; Part 1: Technical and functional characteristics, including test methods".

[i.84] ETSI EN 301 091-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Radar equipment operating in the 76 GHz to 77 GHz range; Part 1: Technical characteristics and test methods for radar equipment operating in the 76 GHz to 77 GHz range".

[i.85] ETSI EN 301 839-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Ultra Low Power Active Medical Implants (ULP AMI) and Peripherals (ULP AMI P) operating in the frequency range 402 MHz to 405 MHz; Part 1: Technical characteristics, and test methods".

[i.86] ETSI EN 302 537-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Ultra Low Power Medical Data Service Systems operating in the frequency range 401 MHz to 402 MHz and 405 MHz to 406 MHz; Part 1: Technical characteristics and test methods".

[i.87] ETSI EN 302 536-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 315 kHz to 600 kHz; Part 1: Technical characteristics and test methods".

[i.88] ETSI EN 300 135-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Citizens' Band (CB) radio equipment; Angle-modulated Citizens' Band radio equipment (PR 27 Radio Equipment); Part 1: Technical characteristics and methods of measurement".

[i.89] ECC Recommendation (02)01: "Specification of Reference Receiver Performance Parameters.".

[i.90] ETSI EN 302 774: "Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Base Stations; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.91] ETSI EN 300 330-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive".

[i.92] ETSI EN 300 440-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive".

[i.93] ETSI EN 302 326: "Fixed Radio Systems; Multipoint Equipment and Antennas".

[i.94] http://www.ero.dk/RX

[i.95] ETSI EN 300 910: "Digital cellular telecommunications system (Phase 2+) (GSM); Radio transmission and reception (GSM 05.05)".

3 Definitions, and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in annex A of the present document apply.

3.2 Abbreviations

For the purposes of the present document the abbreviations given in the Liaison Statements in clause 4 of the present document and the following apply:

ACS	Adjacent Channel Selectivity
AM	Amplitude Modulation
BER	Bit Error Ratio

BPSK	Binary Phase Shift Keying
CR	Cognitive Radio
DFS	Dynamic Frequency Selection
EP	ETSI Project
FER	Frame Error Rate
FS	Fixed Service
GoS	Grade of Service
LBT	Listen Before Talk
LBT/DAA	Listen Before Talk/Detect And Avoid
OFDM	Orthogonal Frequency Division Multiplexing
PMR	Private Mobile Radio
RLAN	Radio Local Area Network
RRC	Radio Resource Control
RRS	Reconfigurable Radio Systems
Rx	Receiver
SDR	Software Defined Radio
TAP	Two-step Approval Procedure
TB	Technical Body
TFES	ERM/MSG task force for IMT-2000 Harmonised Standards
TG	Technical Group
TGRx	Task Group Receiver parameters
Tx	Transmitter
WAS	Wireless Access Systems

4 Current Practice

This clause includes material received from a variety of ETSI TBs and TGs.

Among the various statements received, some may have been considered as not being fully accurate. However, the contents have not been modified in the text quoted below, in order to provide a "picture" as complete as possible of the present situation.

4.1 History

In order to evaluate the current practice, ETSI TC-ERM questioned the other TBs and a number of TGs in ETSI:

Receiver parameters for conventional radio equipment which could be included in HSs are listed in clause A.2 of EG 201 399 [i.2]. The evaluation of parameters described in 6.1.4 of EG 201 399 [i.2] quotes:

> "Usually radio receiver parameters (other than spurious emissions) are not to be specified in HSs addressed by the present document. The exceptions are where a receiver parameter directly affects the operation of a transmitter parameter with a consequent risk of harmful interference and/or where an article 3.3 essential requirement requires a receiver parameter to be specified to fulfil the obligations set out in the associated Commission Decision."

TC-ERM considers that it is the responsibility of all ETSI TBs to define which specific receiver parameters should be included in an HS, taking into account the efficient use of the spectrum, in particular when it is difficult to share a frequency band.

In order to improve spectrum sharing, including the on-going work on flexible bands, receiver parameters need to be specified. Due consideration of the existing users of the spectrum is also needed.

Since all receivers have, to some degree, the potential to decrease the efficient and effective use of the spectrum, the relevant TB could determine which receiver parameters are regarded as essential under Articles 3.2 and 3.3 of the R&TTE Directive [i.1].

Depending upon the technology being standardized and taking into account the intended application, the relative importance of particular receiver parameters may be different.

Should a revision of the guide EG 201 399 [i.2] and in particular its annex 2 be required, TC-ERM would welcome the views of the ETSI groups on this topic.

4.2 Liaison Statements from TBs/TGs detailing the inclusion of receiver parameters in HSs

As a result of the request of TC-ERM, liaison statements on the inclusion of receiver requirements in Harmonized Standards were received from a number of TBs and TGs. They have been split into three different groups, depending on the number of receiver parameters typically used in their standards. This grouping is quite arbitrary and could have been done in several different ways.

It can be noted that that some TBs/TGs may have followed different approaches in different standards.

4.2.1 TBs/TGs including the minimum set or a very limited set of receiver parameters in HSs

Liaison Statements received from TC-SES

In the Liaison Statements, the following opinion was provided:

"As a rule, TC SES following the RTT&E Directive with respect to Essential Requirements, article 3.2, considers that only emission sources can create potential harmful interference, as such we only specify requirements for emissions.

Both carrier on and carrier off states are specified and the latter includes any unwanted receiver emission."

Liaison Statement received from TG DMR of ERM

In the Liaison Statement, the following opinion was provided**:**

- Standards that support digital transmissions (EN 300 113, EN 301 166): these standards were recently revised and are already approved via the TAP and you see the outcome (excerpt of HS-RTT table in EN 300 113) below. These standards apply for e.g. DMR and Digital PMR 446. We decided for most receiver parameters to be conditional on the implementation of LBT (receiver parameter directly affects the operation of a transmitter parameter).
- Standards that support analogue transmissions (EN 300 086, EN 300 296): the revision making process is ongoing and we consider the situation for analogue equipment to be different compared with digital equipment. This may be reflected in the HS-RTT table to the extent that the receiver parameters are all essential radio test suites (i.e. one has to conduct the tests exactly as defined in the standard) since for example, other input test signals can not be foreseen. In addition, the definition and declaration on LBT implementation has to be further defined in the analogue standards compared with digital standards.

Receiver spurious radiations	U		E
Receiver maximum useable sensitivity	C	Applies only to equipment using listen-before-transmit.	O
Receiver co-channel rejection	C	Applies only to equipment using listen-before-transmit.	O
Receiver adjacent channel selectivity	C	Applies only to equipment using listen-before-transmit.	O
Receiver spurious response rejection	C	Applies only to equipment using listen-before-transmit.	O
Receiver inter-modulation response	C	Applies only to equipment using listen-before-transmit.	O
Receiver blocking or desensitization	C	Applies only to equipment using listen-before-transmit.	O

Requirement Conditionality:

U/C Indicates whether the requirement is to be *unconditionally* applicable (U) or is *conditional* upon the manufacturers claimed functionality of the equipment (C).

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

Test Specification:

E/O Indicates whether the test specification forms part of the Essential Radio Test Suite (E) or whether it is one of the Other Test Suite (O).

NOTE: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement . The completion of all tests classified "E" as specified with satisfactory outcomes is a necessary condition for a presumption of conformity. Compliance with requirements associated with tests classified "O" or "X" is a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

Liaison Statement received from TG 31B and 31C of TC-ERM

In the Liaison Statement, the following opinion was provided:

"1) Rx parameters are only required in case the receiver is used to control the transmitter function and characteristics. Rx function and Parameters of the equipment as standardized in EN's in our groups are not controlling the TX operation.

2) The necessary Rx parameters for the individual applications to ensure the proper performance and functionality of UWB sensor and SRR devices have already been taken into account by TG31B and C.

This has considered the relevant regulatory RF environmental conditions and including possible adjacent or in-band allocations of services for the frequency bands in use.

3) Therefore is no need to introduce, e.g. generic, Rx parameters in HS in addition to the mandatory spurious and EMC parameters.

For future applications and frequency ranges to be used, TG31B and TG31C will decide on receiver parameters to be added to spurious and EMC parameters on a case by case basis."

Liaison Statement received from TC-BRAN

In the Liaison Statement, the following opinion was provided**:**

"All TC BRAN harmonized standards have been produced with consideration to compatibility with other services/systems operating in the same bands or adjacent bands. The essential requirements were identified by BRAN for each harmonized standard, based on the ETSI guidance published in EG 201 399 [i.2] and the relevant sharing studies carried out in CEPT/ECC Working Group SE and/or the expected deployment of systems under a multi-operator scenario. To this end receiver parameters have been included in those cases where it can be shown that they are necessary to protect the services/systems concerned or to be deployed in a controlled interference scenario. A list of BRAN Harmonized Standards (both published, and in preparation) is included in table 4.2.1.1. For each, the receiver related parameters which have been included, are listed.

Table 4.2.1.1: Receiver Parameters Included in BRAN harmonized standards

Harmonized Standard	Parameters
EN 301 893 [i.7]; 5 GHz high performance RLAN	- DFS - Receiver spurious emissions
EN 302 502 [i.8]; 5,8 GHz fixed broadband data transmitting systems	- DFS - Receiver spurious emissions
(Draft) EN 302 544 [i.9] Broadband Data Transmission Systems operating in the 2 500 MHz to 2 690 MHz frequency band	- Receiver spurious emissions - Receiver adjacent and alternate channel rejection - Receiver blocking characteristics - Receiver intermodulation characteristics - Receiver spurious response (for the User Equipment only)
(Draft) EN 302 567 [i.10]; 60 GHz Multiple-Gigabit Wireless LAN Systems	- Receiver unwanted emissions
(Draft) EN 302 623 [i.11]; Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Mobile Terminal Stations	-Receiver spurious emissions - Receiver adjacent and alternate channel rejection
(Draft) EN 302 774 [i.90]; Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Base Stations	- [Receiver parameters TBD]

Receiver performance for equipment using Dynamic Frequency Selection (DFS)

The harmonized standards covering broadband Wireless Access Systems in the 5 GHz to 6 GHz bands (EN 301 893 [i.7] and EN 302 502 [i.8]) include a mitigation technique known as DFS (Dynamic Frequency Selection). This is an essential requirement as it allows the avoidance of harmful interference to the radiodetermination service. The DFS requirement allows WAS / RLAN systems to share the 5 GHz to 6 GHz bands with the radiodetermination service by avoiding co-channel operation when a radar is detected. These radar signals can consist of pulse widths as short as 0,8 µs at a
level -64 dBm.

The receiver performance of RLAN equipment needs to be adequate to allow the detection of radar signals; otherwise DFS would not work as required. It is also desirable, from a performance point of view, that the RLAN receiver is able to differentiate the radar signals from other non-radar signals, such as urban noise, that are present in the operating environment.

Conclusion

In summary, TC BRAN believes that this combination of essential requirements and market driven performance criteria, ensures that adequate receiver performance is guaranteed, with DFS where appropriate, without the need for specifying additional receiver parameters. We believe that in general only a minimal number of receiver parameters are required and that identification of required receiver parameters should be done on a case by case basis. TC BRAN will continue to follow this approach depending upon the sharing requirements of the spectrum in question, to ensure that all essential parameters are included and justified."

4.2.2 TBs/TGs including a medium set of receiver parameters in HSs

Liaison Statement received from TC-ERM/TC-MSG TFES (IMT-2000)

In the Liaison Statement, the following opinion was provided**:**

> "The "essential parameters" specified in the HS for IMT-2000 (EN 301 908 [i.3]) defined by TFES include a number of receiver characteristics:
>
> 1) Conducted spurious emissions.
>
> 2) Impact of interference on receiver performance (Spurious response, Receiver Intermodulation and Blocking).
>
> 3) Receiver Adjacent Channel Selectivity (ACS).

The work in TFES was based on the following guiding principle as indicated in EG 201 399 [i.2]:

> *"Usually radio receiver parameters (other than spurious emissions) are not to be specified in Harmonized Standards. The exceptions are where a receiver parameter directly affects the operation of a transmitter parameter with a consequent risk of harmful interference…" Regarding the proposed revision of the guide [i.2] and in particular clause A2, the view of TFES is the following;*
>
> 1) The above mentioned guiding principle could be used to address the future inclusion or exclusion of Rx parameters in the Harmonized Standards.
>
> 2) The list of phenomena on clause A.2 can be regarded as examples of Rx parameters that need to be reviewed in conjunction with the guiding principles. However it should be the responsibility of the technical body to consider the Rx parameters on a case by case basis.
>
> 3) ETSI ERM may wish to consider if the equipments attributes specified in clause A.1 can be re-considered, as for example it is not clear which attribute(s) would apply to a Base station."

Liaison Statement received from TC-DECT

In the Liaison Statement, the following opinion was provided**:**

> "The evaluation of parameters described in 6.1.4 of EG 201 399 [i.2] quotes:
>
> > *"Usually radio receiver parameters (other than spurious emissions) are not to be specified in HSs addressed by the present document. The exceptions are where a receiver parameter directly affects the operation of a transmitter parameter with a consequent risk of harmful interference* and/or where an article 3.3 essential requirement requires a receiver parameter to be specified to fulfil the obligations set out in the associated Commission Decision."*
>
> It is clear that the exceptions apply to DECT. The DECT spectrum is shared by a number of uncoordinated DECT systems in the same local site and/or in the vicinity of each other. And the most significant service to be provided is high quality real-time connections, (using a single unique MAC DCS definition). A key concept for DECT providing and maintaining high quality connections in a quasi-stationary multi-system environment, is the specific DECT instant DCS procedures. The required traffic capacity and other important channel selection features, are based on the current receiver parameters (blocking and adjacent channels selectivity). If those receiver requirements were removed, and some equipment had very bad blocking and if filter selectivity, the capacity would be heavily reduced for their own system, but their transmitters would also be forced to make many channel set up attempt that would fail, and furthermore, the channels selected would often not be the least interfered ones, seen from the surrounding system's point of view, and would therefore often cause increased interference and forced handovers in surrounding systems."

Receiver parameters to be tested (see EN 301 406 [i.12]):

Radio receiver sensitivity:

- Radio receiver reference BER and FER.
- Radio receiver interference performance.
- Radio receiver blocking case 1: owing to signals occurring at the same time but on other frequencies.
- Radio receiver blocking case 2: owing to signals occurring at a different time.
- Receiver intermodulation performance.
- Spurious emissions when the PP has no allocated transmit channel.

The detailed information about the receiver testing can be found in clause 5.3.7 of EN 301 406 [i.12].

Liaison Statement received from TG28 of TC-ERM (General SRDs)

In the Liaison Statement, the following opinion was provided**:**

> "Receiver specifications / requirements in Harmonized Standards ref. to Short Range Devices:
>
> > ERM TG 28 received the 16-07-07 ERM liaison statement on the improvement of receiver parameters in Harmonized Standards.
> >
> > It is important to remind that at TCAM#07 meeting (14 and 15 December 2000), after 3 years debate between members of ETSI, CEPT and EC, an agreement was reached about Receiver specifications versus essential requirements.
> >
> > This resulted in a new version of the ETSI guide for drafting Harmonized Standards (EG 201 399 [i.2]) that in some cases consider receiver specifications as essential requirements under the R&TTE Directive [i.1]. In these cases, the receiver specifications are to be included in the appropriate Harmonized Standard.
> >
> > Considering all above, a careful exercise was made (2000-2006) by ERM TG28 to review the three key Harmonized Standards for Generic SRDs that covers most of SRD market i.e. EN 300 220-2 [i.14]; EN 300 330-2 [i.91] and EN 300 440-2 [i.92].
> >
> > A particular care was given to assess the cases of "Conditional Receiver (Rx) essential requirements".
> >
> > Full consideration was given to TCAM#07 decision together with the EG 201 399 [i.2] guidance and its list of phenomena as the **maximum** for evaluation and assessment by the Technical Body as relevant.

For SRDs, as Equipment Attribute (g) ref. to EG 201 399 [i.2], the receiver specifications as essential requirements to be assessed are:

1) Adjacent channel selectivity.
2) Spurious response rejection (inc. duplex).
3) Inter-modulation response rejection.
4) Blocking or desensitization (inc. duplex).
5) Spurious emissions.

It was undoubtedly clear that item 5) always applies, i.e. **unconditional**.

It was then agreed that some or all items (1) to (4) are **conditional** and could be applied for Transceivers, where the Rx directly affects the operation of a Transmitter (TX). For example applies to cases where the SRD transceiver is using an adaptive power control for the transmitter or when the transmission is depending on the proper reception of commands or sensing before transmitting, such as Listen Before Talk (or equivalent techniques); this because a possible missed command or acknowledge may result in a harmful interference consequence.

Further aspects on items (1) to (4) as **conditional**, for Receiver only, were considered in respect of:

a) SRDs in general operate in shared bands and are not permitted to cause harmful interference to other radio services;

b) SRDs cannot claim protection from other radio services;

c) SRDs vs. SRDs in general operate on equally shared licence-exemption rule basis, therefore spectrum coordination is made to reasonably avoid harmful interference based on average levels of various equipments unit densities (this approach is opposite to individually licensed equipments);

d) (b) and (c) facts are functional to SRDs self protection from harmful interference which depends of protection distances that proportionally change as function of Rx specs';

e) TCAM#07 identified critical issue how to inform users, particularly an unskilled user, by easy-to-understand language in the end user manual on whether the equipment, which he has bought, if some extent of protection is offered (i.e. reasonably reliable operations);

f) SRDs generic Harmonized Standards are technology neutral, as a principle.

To accomplish (b) to (f), it was felt that the sole viable solution was to establish three different categories of receiver functional reliability. Each category was associated with a set of essential requirements as relevant.

Each of these categories is in principle **conditional** because it is fully left to a manufacturer's responsibility to choose his receiver category.

However there are cases where an Rx category cannot be chosen freely by a manufacturer (i.e. **unconditional** case), for example as said above, in a transceiver when the transmission is depending on the proper reception of commands or sensing before transmitting, such as Listen Before Talk (or equivalent techniques).

Each receiver category has then an associated minimum set of information (see table 4.2.2.1) that can be offered to the user (this accomplishes the TCAM#07 decision).

Table 4.2.2.1: Receiver categories

1	Safety critical SRD communication media; i.e. for devices serving systems where failure may result in a physical risk to a person.
2	Function critical SRD communication media; i.e. when a failure to operate correctly causes loss of function but does not constitute a safety hazard.
3	Non-critical SRD communication media whose failure to operate correctly causes loss of function which can be overcome by parallel means.

NOTE 1: Same categorization is in the SRDs -EMC- Harmonized Standard EN 301 489-3 [i.13].

NOTE 2: It is worth noting that after TCAM#07 all above referenced SRD Harmonized Standards passed through (six years) two times revision based on above principles that were fully blessed by 100 % achieved European votes, thus further confirming the solidity of the principle.

TG28 fully believes that the above principles are still valid.

However it is worth to note that work is in progress to update more the Harmonized Standards for Generic Short Range Devices.

For example for the EN 300 220 [i.14] the following improvements should be noted:

- tables specifying the operating frequency bands within 25 MHz to 1 000 MHz range and the associated essential requirements (that are also constraints in the regulatory deliverables) of power limits and duty cycle/LBT;
- "Receiver classes" to be renamed "Receiver categories" and wording amendment to better clarify when receiver specifications are unconditional or conditional essential requirements."

Liaison Statement received from TC-TETRA

In the Liaison Statement, the following opinion was provided**:**

> "As future spectrum assignments become more technology neutral greater emphasis will be placed on the need for efficient spectrum management balanced with the need to maintain the required Grade of Service (GoS) for specific wireless users and applications.
>
> In the case of narrow band and wideband PMR spectrum usage (the market served by TETRA), there is a need for all technologies deployed in these frequency bands to have good receiver performance specifications to aid spectrum engineering and thus maximize spectrum efficiency. This need is specifically important for PMR users who require a high GoS free from interference, for example, public safety, transportation, utilities, military, etc.
>
> Also, it is expected that Reconfigurable Radio Systems (RRS), Cognitive Radio (CR) and SDR (Software Defined Radio) will eventually become practical product solutions (performance, size and cost) for roaming and interoperability between different technologies and between different frequency bands, particularly for Public Safety, Military and PPDR applications. It is also believed that the development of RRS, CR and SDR will become a valuable technology in maximizing spectrum utilization.

In summary, the TC TETRA MC would welcome the inclusion of realistic and practical receiver performance specifications in all Harmonized Standards for all wireless technologies that could share the same spectrum bands. Equally important, TC TETRA does not support the use of a "catch all" minimum receiver performance specification for different technologies that could share the same PMR spectrum bands."

4.2.3 TBs/TGs including a large set of receiver parameters in HSs

Liaison Statement received from TC-ATTM

In the Liaison Statement, the following opinion was provided**:**

"Present ATTM/WG-TM4 practice for receiver parameters within HS for Fixed Service.

Since initial R&TTED publication, WG TM4 has actively followed the original development (within OCG_TG6) of ETSI guidance for the production of harmonized standards, consolidated into EG 201 399 [i.2].

Since long time, the frequency coordination practice in FS (Fixed Service) is using well established methodology and terminology, to which WG TM4 standards were aligned; the ETSI Guide obviously used a more "generic" terminology for defining the parameters that might affect essential requirements of the R&TTED Article3.x, which use might confuse the FS specific world.

In addition the ETSI Guide offered a wide choice of options for defining which parameters, including Rx ones, might be considered essential or not, depending on the radio application.

For the purpose of "translating" the EG 201 399 [i.2] terminology into FS practice and for giving background to the selected "essentials" among those provided in the Guide, WG TM4 has specifically developed TR 101 506 [i.15] (V1.1.1). This TR punctually describes the terminology translation and the relevant "essentials" used since then in the FS relevant HS EN 301 751 [i.16] and, more recently, in the superseding multipart HS EN 302 217 [i.17] and EN 302 326 [i.93] series.

Regarding receiver parameters (other than unwanted emissions in the spurious domain) in those HSs, WG TM4 considered since the beginning that they are to be included in HS for equipment deployed in bands subject to frequency coordination, while they are not to be in bands where deployment is uncoordinated. In addition, ATPC operation is also commonly operated by the far end receiver implying, according to ERM/TG18 conclusions endorsed by TCAM, that receiver parameters can be considered essential.

Therefore, Adjacent Channel Rejection, Blocking and Receiver Sensitivity are usually included in HS ENs for frequency bands with coordinated deployment. In particular, being FS links generally part of the fixed network, they have stringent availability requirements, dictated by the ITU Recommendations, that have to be obtained through a carefully designed "link budget" to which Rx sensitivity concur as well as TX power; therefore, poor sensitivity would automatically imply higher output power with consequent increase of potentially harmful interference situations with other co-primary Services.

TM4 believes that the above TM4 understanding is already in line with the spirit of the ERM query about "improvement of receiver parameters in HS" and understand that no particular change of attitude is needed from the FS harmonized EN point of view.

EG 201 399 [i.2] improvement

From WG TM4 point of view clause A.2 is sufficiently flexible and clear, in line with current TM4 practice.

Regarding other possible improvement, we believe that the understanding that Rx parameters should more carefully considered (which led to TGRx establishment) should stimulate clarifications throughout the EG text for eliminating any ambiguity in Rx parameters relationship with R&TTE.

For example the sentence in clause 6.1.4 [i.2]:

> "Usually radio receiver parameters (other than spurious emissions) are not to be specified in HSs addressed by the present document. The exceptions are where a receiver parameter directly affects the operation of a transmitter parameter with a consequent risk of harmful interference and/or where an article 3.3 essential requirement requires a receiver parameter to be specified to fulfil the obligations set out in the associated Commission Decision".

seems too limiting, showing sensitive inconsistency with an already significant spread of Rx parameters among various equipment attributes in clause A.2."

4.3 Survey of existing harmonized standards

TGRx also conducted a survey of all existing ETSI Harmonized Standards, to identify whether they contain receiver parameters, and if so, how the receiver parameters are described in the standard. Annex A gives an overview of the different receiver parameter descriptions that are found, and the standards in which they appear.

Annex B provides an overview of all Harmonized Standards and their receiver parameters. The information is made available by means of a zipfile attachment to the present document, tr_102914v010101p0.zip, enabling the reader to customize his or her view on the information provided.

4.4 Observations

From the liaison statements, from lively discussions in TC-ERM (and in particular in TGRx), as well as from discussions in other Technical Bodies, it was observed that there are two clearly conflicting opinions within ETSI, on whether/how the receiver parameters should be addressed in the Harmonized Standards. Combinations or intermediate approaches may also have been considered.

Both opinions get support from a considerable number of ETSI members, making it hard to find a solution or compromise that is acceptable to all. To give proper credit to both opinions, they are worded below in a concise way.

4.4.1 Opinion 1: Receiver parameters need not be included as a normative requirement in HS

Some ETSI members believe that receiver parameters are not an essential requirement to comply with the R&TTE Directive [i.1], and hence do not need to be included in the Harmonized Standard. This is often based on two ideas:

a) That an inferior receiver performance would not adversely impact on the interference experienced by other users of the radio spectrum, and that the receiver parameters are primarily to ensure that the radio performs satisfactorily for the user.

b) That the sharing studies identify the transmitter characteristics which would be permitted to avoid harmful interference, and that any transmitter operating within those permitted limits would not be considered as causing harmful interference.

As a consequence, the receiver parameters could be included in a deliverable which is not a Harmonized Standard, for example an ETSI Technical Specification (TS) or an ES (ETSI Standard), or could be included in the Harmonized Standard as informative (rather than normative) text.

4.4.2 Opinion 2: Receiver parameters need to be included as a normative requirement in HS

Other ETSI Members believe that receiver parameters should be in a HS, as is the case, for example, in 2G, 3G and many PMR standards. This is based on the thought that harmful interference according to article 3.2 of the R&TTE Directive [i.1] may just as well be caused by:

- unwanted transmitter characteristics in an environment of robust and well-designed receivers; as by
- undesirable receiver characteristics in an environment of clean and well-designed transmitters;

or a mix of both.

They consider the ability of consumers to judge and/or influence the technical quality of products that come on the market very limited and totally insufficient to create a proper feedback loop to enhance receiver quality.

They therefore believe it is necessary to define the receiver parameters as well as the transmitter parameters. They believe that the typical values for the receiver performance should be included in the Harmonized Standard. These values should be the same as those used in compatibility studies.

Especially in the case of shared / flexible bands it is utmost important that there is sufficient legal certainty concerning the level of the receiver performances to be expected from victim system. Moreover, from the fair competition perspective it is expected that an operator having a system with adequate receiver parameters would not be requested to take extra measures in order to protect systems with poor receiver performance.

4.4.3 Pragmatism

Both groups are searching for pragmatic and logical solutions.

As the individual applications and their specific interference environments are very diverse, there are those who consider it the best solution to let the inclusion of receiver parameters be a responsibility of the Technical Body drafting the Harmonized Standard.

5 R&TTE Directive and receiver parameters

5.1 Technical requirements and essential test suites

A number of Harmonized Standards include clauses addressing both:

- essential test suites;
- other test suites.

(Typically, ETSI Harmonized Standards include all the necessary methods of measurement).

A detailed analysis of the R&TTE Directive [i.1], and discussions with the Commission Services led to the view that:

- Article 10.3 of the R&TTE Directive [i.1] covers, in particular, receivers and the receiver part of radio equipment.
- Article 10.4 of the R&TTE Directive [i.1] covers, in particular, transmitters and the transmitter part of radio equipment.

This implies that:

- Annexes II, IV and V of the Directive are applicable for receivers and the receiver part of radio equipment.
- Annexes III, IV and V of the Directive are applicable for transmitters and the transmitter part of radio equipment.

As a result, it is understood that, when the Harmonized Standards include the appropriate methods of measurement:

- in the case of receiver parameters (see Annex II of the R&TTE Directive [i.1]), even when the corresponding technical requirements are included in the appropriate Harmonized Standard, there is no need for the manufacturer or his representative to make the corresponding measurements in compliance with the "(other) test suite" as defined in that standard;
- however, in the case of transmitter parameters (see Annexes II & III of the R&TTE Directive [i.1]), harmonized standards are to include the appropriate technical requirements (often the limit of a particular parameter) and the corresponding "essential test suites", and these have to be used in order for equipment to benefit from presumption of conformity (see, in particular, Article 5 of the Directive) - if not, Annex IV.

As a result, there are two distinct situations:

- in the case of receiver parameters included in Harmonized Standards, the requirement is to be complied with in order for the equipment to benefit of the presumption of conformity, while the way to assess its value is at the discretion of the manufacturer (or his representative);
- in the case of transmitter parameters, both the requirement and the "essential test suite" are to be found in the Harmonized Standards and complied with in order for the equipment to benefit of the presumption of conformity.

See also the quote from the discussions held during the 36th meeting of OCG-R&TTE D, in the "Introduction" of the present document.

5.2 Legal Aspects

An analysis of the relations between receiver parameters and the R&TTE Directive [i.1] which is supported by a significant part of the ETSI membership can be found in clause 6.2 of the present document.

See also the excerpts of minutes of meetings of the OCG R&TTE D, found in the Introduction.

5.3 Analogies with the EMC Directive

There are analogies between the R&TTE Directive [i.1] and EMC Directive:

In the EMC Directive, a distinction is made between unwanted radiation and unwanted susceptibility of equipment; both are controlled by measurement suites and imposing normative limit values.

An analogy could be drawn with article 3.2 of the R&TTE Directive [i.1] where radio equipment is concerned:radio transmitters may have unwanted emissions, and radio receivers may have insufficient immunity to interference.

Both unwanted emissions and insufficient immunity may be considered to be the reason for having observed harmful interference.

6 EG 201 399: possible revision of the Guide

6.1 List of parameters

During the discussions, it was noted that the list of parameters in EG 201 399 [i.2] was inspired from usual parameters for FM type equipment at the time when the Guide was initially drafted.

A table such as table 6.1.1, is suggested for use by TGs, TCs and EPs to establish the required receiver performance parameters, bearing in mind that not all of these parameters may be required in any particular application.

Cross-modulation, for example, would only be applicable in receivers intended for use with a modulation scheme that included a high degree of AM, such as OFDM or BPSK. AM rejection would be more applicable to certain implementations such as direct conversion or direct digitization implementations, while LBT/DAA thresholds would only be required where LBT/DAA (including DFS as relevant) is used for channel access purposes. Multi-path sensitivity may become important in some applications requiring longer range. The differentiation between gain compression and phase noise desensitization may be required for applications where the RF signal numbers are large, but not necessarily of great intensity.

Table 6.1.1

Receiver parameters			
Applicability	**Yes**	**Maybe**	**No**
(Maximum usable) sensitivity (inc. duplex)			
Co-channel rejection			
Adjacent channel selectivity			
Alternate channel selectivity			
Spurious response rejection (inc. duplex)			
Inter-modulation response rejection			
Cross-modulation rejection			
Blocking or de-sensitization (inc. duplex) - gain compression			
De-sensitization - receiver phase noise			
AM rejection			
Spurious emissions	YES		
Multi-path sensitivity			
LBT/DAA threshold			

6.2 A Possible Further Analysis and Interpretation of the Directive

The analysis and interpretation in this clause, as well as the conclusion reached, may not be supported by all ETSI members.

As a result of the following analysis, clause 6.1.4 of EG 201 399 [i.2] may need to be changed.

Background

Article 3.2 of the R&TTE Directive [i.1] (Dir 99/05/EC) states:

> "In addition, radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communication and orbital resources so as to avoid harmful interference"

and there does not seem to be any restriction on the scope of this statement (beyond the scope of the R&TTE Directive [i.1] itself).

Hence all equipment, and not just only a particular subset, has to be constructed so as to avoid harmful interference.

In order to be placed on the market, the "preferred" route is that equipment fulfils the requirements of the appropriate Harmonized Standard.

As a result, in order to ensure that all equipment is constructed so as to avoid harmful interference, as required by article 3.2, the appropriate Harmonized Standard (i.e. the standard that covers the equipment where interference is to be avoided - the standards relating to the potential victim(s) has to include the parameters required for those receivers in order to avoid the potential interfering transmitters generating harmful interference.

NOTE: It is recognized that in cases where no receiver parameters are currently specified, the situation where "harmful interference" may be caused is very dependent upon the particular electro-magnetic environment scenario encountered. Thus the same receiver parameters that give rise to harmful interference in one application may well lead in another situation, to no interference being experienced. It should also be noted that the adequacy of any particular set of receiver parameters included in standards to avoid receiving harmful interference is generally dependent upon the assumptions made in compatibility studies carried out prior to the production of the standard.

There is a consensus in ETSI that in general, receiver parameters should be included in some ETSI deliverable, recognizing that special situations may occur where this is not feasible.

Case 1

If receiver parameters are included in an HS, as for example, in 2G, 3G and many PMR standards, the situation is clear and satisfactory.

Case 2

If receiver parameters are covered in a deliverable which is not a Harmonized Standard, for example an ETSI technical specification (TS) or an ES (ETSI Standard), the result is that there may be equipment, on the market and in use, that fulfils the requirements of such a document relating to Receiver performance while others will not necessarily fulfil those requirements.

In the case of "Equipment fulfilling those requirements" it can be expected that the appropriate HS (i.e. the HS corresponding to the transmitter - the potential interferer) can be understood as fulfilling its role, and, therefore, ensure that article 3.2 requirements are fulfilled, but this is true ONLY in respect of equipment complying with those requirements.

Therefore, in the case where Receiver Parameters are not in the appropriate HS, there still may be equipment, on the market and in use that does not fulfil the requirements of the document on receiver performance.

As a result, notwithstanding the fact that the transmitter fulfils the requirements of the HS, a receiver may nevertheless experience harmful interference, and the requirements of article 3.2 may have not been fulfilled (i.e. avoiding harmful interference), while if the transmitter complies with an HS there is presumption of conformity with the essential requirements of the Directive.

So, the lack of Receiver Parameters in the appropriate HS may lead to the situation where both types of equipment (i.e. the receiver and the transmitter) are presumed to conform with the requirements of article 3.2 of the R&TTE Directive [i.1], while there still is a clear risk of harmful interference for a number of receivers.

Conclusion

The conclusion is that the only fully satisfactory solution is that ETSI Technical Bodies include the appropriate Receiver Parameters in Harmonized Standards.

NOTE: see also Article 3.13 of the ITU Radio Regulations [i.6].

6.3 Improved text for EG 201 399

Clause 6.1.4 of EG 201 399 [i.2] has to be modified accordingly.

To improve the wording of the second paragraph of clause 6.1.4 of EG 201 399 [i.2], the ETSI Guide to the production of candidate Harmonized Standards, to give the TBs and TCs more freedom to include receiver parameters in specific cases where there is a motivated and justified cause to do so.

For example, the original text could be changed to (shown by underlined text):

"In the past, radio receiver parameters (other than spurious emissions) have not always been specified in HSs addressed by the present document. The exceptions were <u>when</u> a receiver parameter directly affected the operation of a transmitter parameter with a consequent risk of harmful interference, and/or where an article 3.3 essential requirement requires a receiver parameter to be specified to fulfil the obligations set out in the associated Commission Decision. <u>Receiver parameters can also be specified when this is required to avoid harmful interference according to article 3.2 of the R&TTE Directive [i.1]</u>".

7 Conclusions

7.1 Receiver parameters in general

While it is commonly understood that the amount of traffic is dependent on the amount of spectrum available, it is often overlooked that the minimum separation distance for co-existence between radio equipment is very directly dependent on the receiver parameters.

It is also clear that in many situations, for the same service area (e.g. link budget), and the same quality of service (e.g. throughput) should the receiver sensitivity drop by 1 dB, the transmitter power should be raised also by 1 dB, which is not supportive of the ETSI - and European - "Green Agenda".

There is also pressure from Member States to reduce the field strength resulting from radio equipment, for human safety of life reasons (also addressed in Article 3.1 of the R&TTE Directive [i.1]). Under such conditions, reduction of sensitivity of radio equipment will most likely result in reduction of service area, reduction of quality of service, or both.

It is also clear that in networks where there is "power control", poor receiver performance may result in an increase of the power transmitted by the associated transmitter, which in turn may generate an increase of the interference potential.

Last but not least, is can be argued that, in general, receiver and transmitter parameters of a particular system have to be carefully matched.

7.2 Receiver parameters in HSs

The main body of the present document shows that there are diverse views in relation to which receiver parameters should be included in the HS, however a significant part of the membership would be supportive of the inclusion of appropriate receiver parameters in the relevant harmonized standards.

7.3 Summary of the ERO report

ERO conducted a study (http://www.ero.dk/RX [i.94]) on the impact of receiver standards on spectrum management. One major finding is that authorities responsible for spectrum management face the problem of allocating frequencies to new services while avoiding potential interference to existing services. If these existing services rely on poorly performing receivers, which are or may be subject to interference from the new service, then the frequency spectrum cannot be used efficiently. Either the existing service is subject to interference and to a reduction of its utility, or a new service is subject to technical regulatory restrictions, or denied altogether. Either way, there is a loss of utility. This may or may not exceed the gain of utility which accrues from not regulating receiver standards effectively.

Hence there is in general always a case in introducing new services, (and in managing existing ones) to identify what are the appropriate receiver parameter limit values, and to consider the best mechanism. Hence it became obvious that it would be beneficial to identify the set of receiver parameters that should be introduced in a product standard on a case by case basis. Where necessary for spectrum management purposes, the ETSI TBs should introduce specific receiver parameter values in relevant Harmonized Standards.

Receiver parameters included in Harmonized Standards, or other ETSI or ECC (e.g. ECC REC (02)01 [i.89]) deliverables should periodically be reviewed and where appropriate updated to bring them in line with the state of the art technology. Legacy and transition issues would need to be appropriately addressed.

7.4 CEPT requirements for receiver parameters

The CEPT use receiver parameters when performing compatibility studies and therefore the results are based upon the assumptions made on the receiver performance.

Therefore if they are not stated somewhere within the ETSI deliverables the manufacturers may be unaware that a minimum set of parameters have been assumed for the receiver performance. As a consequence they may produce equipment that does not meet these assumptions and therefore interference may occur, which was not foreseen in the compatibility studies.

7.5 Economic issues and receiver parameters

While it has been argued that the addition of parameters, in particular receiver parameters, to a standard can add to the costs of the corresponding product, it can be noted that one of the radio products that has been standardized in great detail, with a number of very stringent parameters is GSM, and experience shows that GSM radios are among the cheapest on the market. Obviously, the key for low costs is mass production and therefore, good products.

7.6 Visibility of effects of interference

Interference affecting traditional analogue radio equipment can usually be clearly identified by the user: for example, by a sudden increase of the noise or "cross-talk". In the case when images are transmitted, lines across the image shown by the receiver may be noticed.

In the case of radars, repetitive spots or lines in one particular direction have been used to show interference by RLANs.

However, digital systems usually use error correction, so the degradation of performance resulting from interference is more difficult to identify: when there are too many transmission errors, the code correction may become insufficient, and there may be a clear (and sudden) degradation of the service - without any chance for the user to understand why.

As a result, when a user notices that his equipment no longer operates in a satisfactory manner (or not at all), it is increasingly difficult for him to identify if his equipment is out of order (e.g. batteries to be recharged), if he has moved out of the service area or if his equipment is suffering from interference.

8 Recommendations

8.1 Proposals for the way forward within ETSI

Recommendation 1

Each ETSI Technical Body and Task Group producing Harmonized Standards should consider the receiver performance parameters required for the satisfactory operation of equipment covered by the standard, while keeping in mind the essential requirements in article 3.2 of the R&TTE Directive [i.1].

Recommendation 2

Where certain receiver parameters are considered unimportant, the justification for such consideration should be given.

8.2 Future improvement of the R&TTE

The structure and wording of the text of the R&TTE Directive [i.1] is such that there is not always a common understanding. For example, the phrasing mentioning of transmitter related issues as "radio equipment other than receivers" is very indirect, and the formulation of the reference to annexes is confusing.

This results in a variety of interpretations, which includes the two opposed opinions on which receiver parameters to include in HS, as shown in the present document, clause 4. This in turn incites discussions on the accurate interpretation of the Directive, slowing down the process of standardization in ETSI technical bodies and technical committees and stimulates a non-uniform approach. It may, finally, generate non compliance with the Essential Requirements of the Directive, as shown in clause 6.2.

Therefore ETSI would welcome a clearer wording in a further revision of the R&TTE Directive [i.1] (if any).

8.3 Co-operation with CEPT on the efficient use of spectrum

Cooperation with CEPT on clarification of "efficient and effective use of the spectrum" is needed: beyond the definitions found in Article 2 of the R&TTE Directive [i.1], precise definitions of spectrum efficiency and effective use of the spectrum (R&TTE) are needed.

As addressed in the report from ERO (see clause 7.3), there may be a need to recommend further receiver parameters - in cooperation with CEPT - in case of particular frequency sharing difficulties, e.g.:

- SRDs.
- Flexible bands.
- Review licensed/Unlicensed applications (versus receiver parameters).

Annex A:
Definitions of receiver parameters currently found in ETSI Harmonized Standards under article 3.2 of the R&TTE Directive

TG Rx reviewed all the Harmonized Standards in order to have a complete overview of the receiver parameters already included.

It was also noticed that there were various definitions of the receiver parameters in the different Harmonized Standards. The results of the overview can be found in annexes A and B.

The definitions themselves can be found in the tables of annex A.

The definitions are on the left hand side of the table and, on the right hand side, are the standards where they can be found.

Generally, these definitions are found in the set:

"Definition, Method of Measurement, Limit".

NOTE: This format is similar to the one used on TErms and Definitions Database Interactive TEDDI (http://webapp.etsi.org/Teddi/), but since these definitions are in clauses other than in clause 3.1, they do not appear in the TEDDI database.

A.1 Adjacent channel rejection

A.1.1 Adjacent channel rejection ratio

Table A.1.1: Definitions of adjacent channel rejection ratio

Definition	Declared in documents
Adjacent Channel Rejection Ratio (ACRR) is the ratio of the RRC weighted gain per carrier of the Repeater in the pass band to the RRC weighted gain of the Repeater on an adjacent channel. The requirement shall apply to the Uplink and Downlink of Repeater where the donor link is maintained via antennas (over the air Repeater).	EN 301 908-11 (V3.2.1) [i.18],clause 4.2.7.1
Adjacent Channel Rejection Ratio (ACRR) is the ratio of the RRC weighted gain per carrier in the passband to the RRC weighted gain per carrier immediately outside the passband. The measurements shall apply to both paths up-link and down-link of the repeater.	EN 302 426 (V1.1.1) [i.19], clause 4.2.7.1

A.1.2 Adjacent channel rejection - speech channels

Table A.1.2: Definitions of adjacent channel rejection - speech channels

Definition	Declared in documents
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal in the adjacent channel. The adjacent channel can be adjacent in the RF spectrum or in time. There are therefore two types of adjacent channel selectivity: 1) Adjacent RF channel selectivity which is specifically tested in this clause. 2) Adjacent Time Slot selectivity, which is implicitly tested in test 2.1. The requirements and this test apply to MS supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.5.1.1

A.2 Adjacent channel selectivity

Table A.2.1: Definitions of adjacent channel selectivity

Definition	Declared in documents
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal which differs in frequency from the wanted signal by the nominal channel spacing.	EN 300 162-1 (V1.4.1) [i.21] clause 9.5.1 EN 301 025-1 (V1.3.1) [i.22], clause 9.5.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.5.1
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal which differs in frequency from the wanted signal by 25 kHz.	EN 300 698-1 (V1.2.1) [i.24], clause 9.5.1 EN 300 720-1 (V1.2.1) [i.25], clause 9.5.1 EN 301 025-1 (V1.3.1) [i.22], clause 10.3.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.15.1
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal which differs in frequency from the wanted signal by an amount equal to the adjacent channel separation for which the equipment is intended.	EN 300 086-1 (V1.3.1) [i.27], clause 8.4.1 EN 300 296-1 (V3.2.1) [i.28], clause 9.4.1 EN 300 341-1 (V1.3.1) [i.29], clause 9.3.1 EN 300 390-1 (V1.2.1) [i.30], clause 9.4.1
The adjacent channel selectivity is the measure of the capability of the receiver to receive a wanted modulated signal at the nominal frequency without exceeding a given degradation due to the presence of an unwanted signal which differs in frequency from the wanted signal by an amount equal to the adjacent CSP for which the equipment is intended.	EN 301 166-1 (V1.3.1) [i.31], clause 8.5.1
The adjacent channel selectivity is the measure of the capability of the receiver to receive a wanted modulated signal at the nominal frequency without exceeding a given degradation due to the presence of an unwanted signal which differs in frequency from the wanted signal in the 25 kHz channels adjacent to the channel for which the equipment is intended. The CSP of the equipment shall be declared by the manufacturer.	EN 302 561 (V3.2.1) [i.32], clause 8.4.1
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal which differs in frequency from the wanted signal by an amount equal to the adjacent channel separation for which the equipment is intended. The equipment (transmission and/or reception) under test shall be operated in its normal transmission mode (which may be continuous or discontinuous).	EN 300 113-1 (V1.6.1) [i.33], clause 8.6.1
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding degradation due to the presence of an unwanted signal differing in	EN 300 761-1 (V1.2.1) [i.34], clause 8.3.4.1

Definition	Declared in documents
frequency by an amount equal to the adjacent channel separation for which the equipment is intended.	
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal at the nominal frequency without exceeding a given degradation due to the presence of an unwanted modulated signal in the adjacent channel.	EN 301 929-1 (V1.2.1) [i.26], clause 9.6.1
The adjacent channel selectivity is a measure of the capability of the receiver to operate satisfactorily in the presence of an unwanted signal that differs in frequency from the wanted signal by an amount equal to the adjacent channel separation for which the equipment is intended.	EN 300 220-1 (V2.1.1) [i.35], clause 9.3.1 EN 300 330-1 (V1.5.1) [i.36], clause 8.1.1 EN 300 440-1 (V1.4.1) [i.37], clause 8.1.1
Adjacent Channel Selectivity (ACS) is a measure of a receiver's ability to receive a WCDMA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).	EN 301 908-2 (V3.2.1) [i.38], clause 4.2.6.1
Adjacent Channel Selectivity (ACS) is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receiver filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s). The interference signal is offset from the wanted signal by the frequency offset Fuw. The interference signal shall be a WCDMA signal as specified in TS 125 141 [i.39], annex I.	EN 301 908-3 (V3.2.1) [i.40], clause 4.2.10.1
Adjacent channel selectivity is a measure of the ability to receive a CDMA signal on the assigned channel frequency in the presence of another CDMA signal that is offset from the centre frequency of the assigned channel by ±2,5 MHz for spreading rate 1 or ±5 MHz for spreading rate 3.	EN 301 908-4 (V3.2.1) [i.41], clause 4.2.8.1
Adjacent channel selectivity is a measure of the ability to receive a CDMA signal or an HRPD signal on the assigned channel frequency in the presence of another interfering CDMA signal that is offset from the centre frequency of the assigned channel by ±2,5 MHz for spreading rate 1 or ±5 MHz for spreading rate 3.	EN 301 908-5 (V3.2.1) [i.42], clause 4.2.8.1
Adjacent Channel Selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receiver filter attenuation on the adjacent channel(s).	EN 301 908-6 (V3.2.1) [i.43], clause 4.2.10.1
Adjacent channel selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of a single code CDMA modulated adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receiver filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).	EN 301 908-7 (V3.2.1) [i.44], clause 4.2.10.1
The receiver adjacent channel selectivity is a measure of the capability of the receiver to receive wanted data packets without exceeding a given degradation due to the presence of an interfering signal (I1) in the adjacent channel. "Wanted signal" in this test is the signal generated by the transmitted RLC data blocks.	EN 301 908-8 (V3.2.1) [i.45], clause 4.2.3.6.1
The adjacent channel selectivity is a measure of the capability of the receiver to achieve a specific successful response ratio when receiving a wanted modulated signal in the presence of an unwanted modulated signal which differs in its frequency from the wanted signal by an amount equal to the adjacent channel separation for which the equipment is intended.	EN 300 219-1 (V1.2.1) [i.46], clause 9.5.1
The adjacent channel selectivity is the capability of the receiver to receive a wanted modulated signal at the nominal frequency without exceeding a given degradation due to the presence of an unwanted modulated signal in the adjacent channel.	EN 300 433-1 (V1.1.3) [i.47], clause 9.2.1

A.3 Adjacent and alternate channel selectivity and desensitization

Table A.3.1: Definitions of adjacent and alternate channel selectivity and desensitization

Definition	Declared in documents
The adjacent channel selectivity and desensitization of a receiver is a measure of its ability to receive a modulated input signal on its assigned channel frequency in the presence of a second modulated input frequency spaced either one channel (30 kHz) above or one channel (30 kHz) below the assigned channel frequency. The alternate channel selectivity and desensitization of a receiver is a measure of its ability to receive a modulated input signal on its assigned channel frequency in the presence of a second modulated input frequency spaced either two channels (60 kHz) above or two channels (60 kHz) below the assigned channel frequency.	EN 301 908-8 (V3.2.1) [i.45], clause 4.2.2.6.1 EN 301 908-9 (V3.2.1) [i.48], clause 4.3.7.1
The adjacent channel selectivity of a receiver is a measure of its ability to receive, without degradation of performance, a wanted input signal on its assigned channel frequency, in the presence of a second modulated signal at other frequencies.	EN 301 908-9 (V3.2.1) [i.48], clause 4.4.7.1

A.4 Adjacent signal selectivity

Table A.4.1: Definition of adjacent signal selectivity

Definition	Declared in documents
Adjacent signal selectivity is defined as the ability of the receiver to discriminate between a wanted signal (to which the receiver is tuned) and unwanted signals existing simultaneously in channels adjacent to that of the wanted signal or an increase of the bit error ratio to 10^{-2}.	EN 300 373-2 (V3.2.1) [i.49], clause 4.2.7.1

A.5 AM suppression characteristics

Table A.5.1: Definitions of AM suppression characteristics

Definition	Declared in documents
Amplitude Modulation (AM) suppression is a measure of the receiver's rejection of the amplitude variations caused by interfering signals.	EN 301 908-9 (V3.2.1) [i.48], clause 4.4.6.1.1
AM suppression is a measure of the ability of a BSS receiver to receive a wanted GSM modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal.	TS 101 087 (V8.5.0) [i.50], clause 7.8.1

A.6 Blocking

A.6.1 Blocking

Table A.6.1: Definitions of blocking

Definition	Declared in documents
The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.	EN 301 908-2 (V3.2.1) [i.38], clause 4.2.7.1
The blocking characteristics are a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels. The blocking performance requirement applies as specified in tables 14, 14a and 14b.	EN 301 908-3 (V3.2.1) [i.40], clause 4.2.8.1
Blocking is a measure of the capability of the receiver to receive a modulated wanted input signal in the presence of an unwanted un-modulated input signal on frequencies other than those of the spurious responses or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit.	EN 300 392-2 (V3.2.1) [i.51], clause 6.5.1.1 EN 300 396-2 (V1.3.1) [i.52], clause 6.5.1.1 EN 300 396-4 (V1.3.1) [i.53], clause 12.3.5 EN 300 396-7 (V1.2.1) [i.54], clause 12.3.5 EN 300 396-5 (V1.2.1) [i.55], clause 16.3.5
The receiver blocking characteristic is a measure of the receiver's ability to receive a CDMA signal at its assigned channel frequency in the presence of a single tone on frequencies other than those of the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit.	EN 301 908-4 (V3.2.1) [i.41], clause 4.2.6.1
Receiver blocking is a measure of the ability to receive a CDMA signal or an HRPD signal on the assigned channel frequency in the presence of a single tone that is offset from the centre frequency of the assigned channel on frequencies other than those of the adjacent channels.	EN 301 908-5 (V3.2.1) [i.42], clause 4.2.6.1
The blocking characteristic is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occurs.	EN 301 908-6 (V3.2.1) [i.43], clause 4.2.7.1
The blocking characteristics are a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels.	EN 301 908-7 (V3.2.1) [i.44], clause 4.2.8.1
Receiver blocking is a measure of the receiver's ability to correctly detect and decode the wanted signal at sensitivity levels, when other signals, much stronger but of different frequency channels, are also present at the receiver input. The blocking characteristics of the receiver are specified separately for in-band and out-of-band performance as identified in table 20.	EN 301 908-9 (V3.2.1) [i.48], clause 4.4.6.3.1

A.6.2 Radio receiver blocking case 1: owing to signals occurring at the same time but on other frequencies

Table A.6.2: Definition of radio receiver blocking case 1: owing to signals occurring at the same time but on other frequencies

Definition	Declared in documents
The receiver should work in the presence of strong signals on other frequencies. These interferers may be modulated carriers or single continuous - wave carriers.	EN 301 406 (V1.5.1) [i.12], clause 4.5.7.4 EN 301 908-10 (V2.1.1) [i.56], clause 4.5.8.4.1

A.6.3 Radio receiver blocking case 2: owing to signals occurring at a different time

Table A.6.3: Definition of radio receiver blocking case 2: owing to signals occurring at a different time

Definition	Declared in documents
When a high level interferer is present in a physical channel other than the one the receiver is on, the receiver is able to continue receiving the desired signal.	EN 301 406 (V1.5.1) [i.12], clause 4.5.7.5 EN 301 908-10 (V2.1.1) [i.56], clause 4.5.8.5.1

A.6.4 Blocking or desensitization

Table A.6.4: Definitions of blocking or desensitization

Definition	Declared in documents
Blocking is a change (generally a reduction) in the wanted output power of the receiver or a reduction of the SINAD ratio due to an unwanted signal on another frequency.	EN 300 162-1 (V1.4.1) [i.21], clause 9.8.1 EN 300 698-1 (V1.2.1) [i.24], clause 9.8.1 EN 301 025-1 (V1.3.1) [i.22], clause 9.8.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.8.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.9.1
Blocking is a change (generally a reduction) in the wanted audio frequency output power of the receiver or a reduction of the SINAD ratio due to an unwanted signal on another frequency.	EN 300 720-1 (V1.2.1) [i.25], clause 9.8.1
Blocking is a change (generally a reduction) in the wanted output power of a receiver, or a reduction in the SINAD ratio, or an increase in the bit error rate due to an unwanted signal on another frequency.	EN 300 373-2 (V3.2.1) [i.49], clause 4.2.8.1
Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the receiver spurious responses and adjacent channel selectivity, see clause 8.1.	EN 300 330-1 (V1.5.1) [i.36], clause 8.2.1
Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses adjacent selectivity. Receivers implanted in a human body that use error detection coding and recognize a limited command set such as pacemakers, defibrillators, etc., are not required to perform this test.	EN 302 195-1 (V3.2.1) [i.57], clause 8.1.1
Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels or bands.	EN 300 220-1 (V2.1.1) [i.35], clause 9.4.1 EN 300 440-1 (V1.4.1) [i.37], clause 8.2.1
Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels.	EN 300 086-1 (V1.3.1) [i.27], clause 8.7.1 EN 300 390-1 (V1.2.1) [i.30], clause 9.7.1 EN 301 166-1 (V1.3.1) [i.31], clause 8.8.1 EN 302 561 (V3.2.1) [i.32], clause 8.3.1
Blocking or desensitization is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal at any frequency other than those of the spurious responses or of the adjacent channels.	EN 300 296-1 (V3.2.1) [i.28], clause 9.7.1 EN 300 341-1 (V1.3.1) [i.29], clause 9.6.1
Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels. The equipment (transmission and/or reception) under test shall be operated in its normal transmission mode (which may be continuous or discontinuous).	EN 300 113-1 (V1.6.1) [i.33], clause 8.9.1
Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses in adjacent channels or bands (see clause 3.1). Class 3 receivers are exempt from this requirement.	EN 302 510-1 (V3.2.1) [i.58], clause 8.1.1
Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels or bands. This requirement applies only to equipment operating in the frequency range from 5 855 MHz to 5 875 MHz.	EN 302 571 (V3.2.1) [i.59], clause 6.7.1
Blocking is a measure of the capability of the receiver to achieve a specific successful response ratio when receiving the wanted signal in the presence of an unwanted unmodulated high level signal on frequencies other than those of spurious responses or adjacent channels.	EN 300 219-1 (V1.2.1) [i.46], clause 9.8.1

A.6.5 Blocking and spurious response in EGPRS configuration

Table A.6.5: Definition of blocking and spurious response in EGPRS configuration

Definition	Declared in documents
Blocking is a measure of the ability of the receiver to receive a modulated wanted input signal in the presence of an unwanted input signal, on frequencies other than those of the spurious responses or the adjacent channels, without exceeding a given degradation. "Wanted signal" in this test is the signal generated by the transmitted RLC data blocks. The requirements and this test apply to all types of MS which are capable of EGPRS operation.	TS 151 010-1 (V4.9.0) [i.60], clause 14.18.5.1

A.6.6 Blocking and spurious response - speech channels

Table A.6.6: Definition of blocking and spurious response - speech channels

Definition	Declared in documents
Blocking is a measure of the ability of the receiver to receive a modulated wanted input signal in the presence of an unwanted input signal, on frequencies other than those of the spurious responses or the adjacent channels, without exceeding a given degradation. The requirements and this test apply to MS supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.7.1.1 TS 151 010-1 (V4.9.0) [i.60], clause 14.7.1.1

A.6.7 Blocking and spurious response - speech channels for MS supporting the R-GSM band

Table A.6.7: Definition of blocking and spurious response - speech channels for MS supporting the R-GSM band

Definition	Declared in documents
Blocking is a measure of the ability of the receiver to receive a modulated wanted input signal in the presence of an unwanted input signal, on frequencies other than those of the spurious responses or the adjacent channels, without exceeding a given degradation. The requirements and this test apply to R-GSM MS supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.7.3.1 TS 151 010-1 (V4.9.0) [i.60],clause 14.7.3.1

A.6.8 Blocking and spurious response - control channels for MS supporting the R-GSM band

Table A.6.8: Definition of blocking and spurious response - control channels for MS supporting the R-GSM band

Definition	Declared in documents
Blocking is a measure of the ability of the receiver to receive a modulated wanted input signal in the presence of an unwanted input signal, on frequencies other than those of the spurious responses or the adjacent channels, without exceeding a given degradation. The requirements and this test apply to R-GSM MS not supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.7.4.1

A.6.9 Blocking and spurious response rejection

Table A.6.9: Definition of blocking and spurious response rejection

Definition	Declared in documents
Blocking and spurious response rejection is a measure of the ability of a BSS receiver to receive a wanted GSM modulated signal in the presence of an interfering signal; the level of the interfering signal is higher for the test of blocking than for spurious response.	TS 101 087 (V8.5.0) [i.50], clause 7.6.1

A.7 Co-channel rejection

A.7.1 Co-channel rejection

Table A.7.1: Definition of co-channel rejection

Definition	Declared in documents
The co-channel rejection is the receiver's ability to receive a wanted signal in the presence of an unwanted signal, with both signals being at the nominal frequency of the wanted channel.	EN 300 065-1 (V1.1.3) [i.61], clause 5.3.1
The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.	EN 300 162-1 (V1.4.1) [i.21], clause 9.4.1 EN 300 698-1 (V1.2.1) [i.24], clause 9.4.1 EN 300 720-1 (V1.2.1) [i.25], clause 9.4.1 EN 301 025-1 (V1.3.1) [i.22], clause 9.4.1 EN 301 025-1 (V1.3.1) [i.22], clause 10.2.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.4.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.5.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.14.1 EN 300 086-1 (V1.3.1) [i.27], clause 8.3.1 EN 300 296-1 (V3.2.1) [i.28], clause 9.3.1 EN 300 341-1 (V1.3.1) [i.29], clause 9.2.1 EN 300 390-1 (V1.2.1) [i.30], clause 9.3.1 EN 302 561 (V3.2.1) [i.32], clause 8.6.1
The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver. The equipment (transmission and/or reception) under test shall be operated in its normal transmission mode (which may be continuous or discontinuous).	EN 300 113-1 (V1.6.1) [i.33], clause 8.5.1
The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal, both being at the nominal frequency of the receiver.	EN 300 761-1 (V1.2.1) [i.34], clause 8.3.3.1
The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver. "Wanted signal" in this test is the signal generated by the transmitted RLC data blocks.	EN 301 908-8 (V3.2.1) [i.45], clause 4.2.3.5.1
The co-channel rejection is a measure of the capability of the receiver to achieve a specific successful response ratio when receiving the wanted signal in the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.	EN 300 219-1 (V1.2.1) [i.46], clause 9.4.1

A.7.2 Co-channel rejection - TCH/FS

Table A.7.2: Definition of co-channel rejection - TCH/FS

Definition	Declared in documents
The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver. The requirements and this test apply to MS supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.4.1.1

A.8 DAA threshold

Table A.8.1: Definition of DAA threshold

Definition	Declared in documents
The DAA threshold is defined as the received signal power level at GBSAR antenna connector above which the equipment shall determine the presence of a radar system. Different DAA thresholds are defined according to the actual radar system signal characteristics, see clause E.4.2, table E.1.	EN 300 440-1 (V1.4.1) [i.37], clause E.4.3.1

A.9 Receiver desensitization with simultaneous transmission and reception

Table A.9.1: Definitions of receiver desensitization with simultaneous transmission and reception

Definition	Declared in documents
The desensitization is the degradation of the sensitivity of the receiver resulting from the transfer of power from the transmitter to the receiver due to coupling effects. It is expressed as the difference in dB of the maximum usable sensitivity levels with simultaneous transmission and without.	EN 300 162-1 (V1.4.1) [i.21], clause 10.1.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.17.2.1
The desensitization is the degradation of the sensitivity of the receiver resulting from the transfer of power from the transmitter to the receiver due to coupling effects. It is expressed as the difference in dB of the maximum usable sensitivity levels (data or messages, conducted), with and without simultaneous transmission.	EN 300 113-1 (V1.6.1) [i.33], clause 9.1.1
The desensitization is the degradation of the sensitivity of the receiver resulting from the transfer of power from the transmitter to the receiver due to coupling effects. It is expressed as the difference in dB between the maximum usable sensitivity levels, with and without simultaneous transmissions.	EN 300 219-1 (V1.2.1) [i.46], clause 10.1.1

A.10 Receiver / Bad frame indication - TCH/FS - frequency hopping and downlink DTX

Table A.10.1: Definition of receiver/ bad frame indication - TCH/FS - frequency hopping and downlink DTX

Definition	Declared in documents
The performance of the Bad Frame Indication (BFI) is a measure of the effectiveness of the MS under DTX conditions. It includes the effect of the 3 bit Cyclic Redundancy Check (CRC) and all other processing associated with the DTX function. The BFI is measured on a full rate speech TCH (TCH/FS) by counting the number of undetected bad frames whilst the input signal is a randomly modulated carrier. The requirements and this test only apply to MS supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.1.1.2.1

A.11 Receiver / Bad frame indication - TCH/HS - frequency hopping and downlink DTX

Table A.11.1: Definition of receiver/ bad frame indication - TCH/HS - frequency hopping and downlink DTX

Definition	Declared in documents
The performance of the Bad Frame Indication (BFI) is a measure of the effectiveness of the MS under DTX conditions. It includes the effect of the 3 bit Cyclic Redundancy Check (CRC) and all other processing associated with the DTX function. The BFI is measured on a half rate speech TCH (TCH/HS) by counting the number of undetected bad frames whilst the input signal is a randomly modulated carrier. The requirements and this test only apply to MS supporting half rate speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.1.2.2.1

A.12 Out of band gain

Table A.12.1: Definition of out of band gain

Definition	Declared in documents
To test the net gain of the repeater outside the relevant MS or BTS transmit band. This test shall also check the net gain at harmonic frequencies.	EN 300 609-4 (V8.0.2) [i.62], clause 7
Out of band gain refers to the gain of the Repeater immediately outside the pass band. The measurements shall apply to both paths Uplink and Downlink of the Repeater.	EN 301 908-11 (V3.2.1) [i.18], clause 4.2.6.1
Out of band gain refers to the gain of the repeater immediately outside the pass band. The measurements shall apply to both paths up-link and down-link of the repeater.	EN 302 426 (V3.2.1) [i.19], clause 4.2.6.1
In the intended application of a Repeater, the out-of-band gain of the Repeater must be less than the coupling loss to the donor Base Station in order to ensure that emissions from the Base Station are not amplified to levels that exceed emissions limits.	EN 301 908-12 (V3.1.1) [i.63], clause 4.2.6.1

A.13 Conducted RF immunity

Table A.13.1: Conducted RF immunity

Definition	Declared in documents
This test assesses the ability of receivers, transmitters, transceivers, transverters, RF amplifiers to operate as intended in the presence of a radio frequency conducted disturbance at the receiver antenna port. This test is applicable to base station, mobile, portable and ancillary equipment. This test shall not apply to RF low-noise preamplifiers intended for location directly at the antenna. In normal use, amateur radio transmitting equipment is not collocated with other radio transmitters operating within 10 % of its own carrier frequency, so that inter-transmitter intermodulation will not occur. Therefore immunity testing of the transmitter antenna port is not justified and is not included in the present document.	EN 301 783-1 (V3.2.1) [i.64], clause 4.2.3.1

A.14 Reference interference level

Table A.14.1: Definition of reference interference level

Definition	Declared in documents
The reference interference level is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal at the same carrier frequency (co-channel interference) or at any adjacent carrier frequencies (adjacent channel interference).	TS 101 087 (V8.5.0) [i.50], clause 7.5.1

A.15 Radio receiver interference performance

Table A.15.1: Definition of radio receiver interference performance

Definition	Declared in documents
The ability of DECT equipment to continue receiving in the presence of an interfering signal on the same or different DECT RF channel.	EN 301 406 (V1.5.1) [i.12], clause 4.5.7.3.1 EN 301 908-10 (V2.1.1) [i.56], clause 4.5.8.3.1

A.16 Interference rejection and blocking immunity

Table A.16.1: Definitions of interference rejection and blocking immunity

Definition	Declared in documents
Interference rejection and blocking immunity is the receiver's ability to discriminate between the wanted signal and unwanted signals on frequencies outside the receiver's passband.	EN 300 065-1 (V1.1.3) [i.61], clause 5.2.1

A.17 Intermodulation

A.17.1 Input intermodulation

Table A.17.1: Definitions of input intermodulation

Definition	Declared in documents
The input intermodulation is a measure of the capability of the Repeater to inhibit the generation of interference in the pass band, in the presence of interfering signals on frequencies other than the pass band. Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the Repeater to maintain the wanted frequency free of internally created interference. This test applies to Uplink and Downlink path of the Repeater.	EN 301 908-11 (V3.2.1) [i.18], clause 4.2.5.1
Input intermodulation spurious response attenuation is a measure of a Repeater's ability to rebroadcast an in-band signal in the presence of two interfering out-of-band CW signals at the input of the Repeater. For Repeaters specified by the manufacturer as not suitable for use as an Over the Air Repeater, this test only applies to the reverse link.	N 301 908-12 (V3.1.1) [i.63], clause 4.2.5.1
The input intermodulation is a measure of the capability of the Repeater to inhibit the generation of interference in the pass band, in the presence of interfering signals on frequencies other than the pass band. Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the repeater to maintain the wanted frequency free of internally created interference. This test applies to up-link path of the repeater.	EN 302 426 (V3.2.1) [i.19], clause 4.2.5.1

A.17.2 Intermodulation

Table A.17.2: Definitions of intermodulation

Definition	Declared in documents
Intermodulation is a process whereby signals are produced from two or more signals simultaneously present in a nonlinear circuit.	EN 300 065-1 (V1.1.3) [i.61], clause 5.4.1

A.17.3 Intermodulation response rejection

Table A.17.3: Definitions of intermodulation response rejection

Definition	Declared in documents
The intermodulation response is a measure of the capability of a receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.	EN 300 162-1 (V1.4.1) [i.21], clause 9.7.1 EN 300 698-1 (V1.2.1) [i.24], clause 9.7.1 EN 300 720-1 (V1.2.1) [i.25], clause 9.7.1 EN 301 025-1 (V1.3.1) [i.22], clause 9.7.1 EN 301 025-1 (V1.3.1) [i.22], clause 10.5.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.7.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.8.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.20.1
The intermodulation response rejection is a measure of the capability of the receiver to receive a wanted modulated signal, without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.	EN 300 220-1 (V2.1.1) [i.35], clause 9.5.1 EN 300 761-1 (V1.2.1) [i.34], clause 8.3.6.1 EN 300 086-1 (V1.3.1) [i.27], clause 8.6.1 EN 300 296-1 (V3.2.1) [i.28], clause 9.6.1 EN 300 341-1 (V1.3.1) [i.29], clause 9.5.1 EN 300 390-1 (V1.2.1) [i.30], clause 9.6.1 EN 301 166-1 (V1.3.1) [i.31], clause 8.7.1 EN 302 561 (V1.1.1) [i.32], clause 8.7.1
Intermodulation response rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency as defined in EN 300 113-1 [i.33].	EN 300 392-2 (V3.2.1) [i.51], clause 6.5.3.1 EN 300 396-2 (V1.3.1) [i.52], clause 6.5.3.1 EN 300 396-4 (V1.3.1) [i.53], clause 12.3.5 EN 300 396-7 (V1.2.1) [i.54], clause 12.3.5 EN 300 396-5 (V1.2.1) [i.55], clause 16.3.5
The intermodulation response rejection is a measure of the capability of the receiver to receive a wanted modulated signal, without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency. The equipment (transmission and/or reception) under test shall be operated in its normal transmission mode (which may be continuous or discontinuous).	EN 300 113-1 (V1.6.1) [i.33], clause 8.8.1
Intermodulation is a process by which signals are produced from two or more (generally unwanted) signals simultaneously present in a non-linear circuit.	EN 300 373-2 (V3.2.1) [i.49], clause 4.2.9.1
Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.	EN 301 908-2 (V3.2.1) [i.38], clause 4.2.9.1
Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.	EN 301 908-3 (V3.2.1) [i.40], clause 4.2.9.1 EN 301 908-6 (V3.2.1) [i.43], clause 4.2.8.1 EN 301 908-7 (V3.2.1) [i.44], clause 4.2.9.1
The intermodulation rejection characteristic of a receiver is a measure of its ability to receive a wanted modulated signal without exceeding a given performance degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency. "Wanted signal" in this test is the signal generated by the transmitted RLC data blocks.	EN 301 908-8 (V3.2.1) [i.45], clause 4.2.3.4.3.1
The mixing of wanted and unwanted signals in the receiver may cause intermodulation products produced by non-linear characteristics of RF front-end elements of the receiver. The effect of these unwanted products is reduced receiver sensitivity.	EN 301 908-9 (V3.2.1) [i.48], clause 4.4.6.2.1
The intermodulation response is a measure of the capability of the receiver to achieve a specific response ratio when receiving a wanted modulated signal in the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.	EN 300 219-1 (V1.2.1) [i.46], clause 9.7.1
The spurious response rejection is the capability of the receiver to discriminate between the wanted modulated signal at the nominal frequency and an unwanted signal at any other frequency at which a response is obtained.	EN 300 433-1 (V1.1.3) [i.47], clause 9.5.1

A.17.4 Receiver intermodulation performance

Table A.17.4: Definition of receiver intermodulation performance

Definition	Declared in documents
With a call set-up on a particular physical channel, two interferers are introduced so that they can produce an intermodulation product on the physical channel already in use.	EN 301 406 (V1.5.1) [i.12], clause 4.5.7.6.1 EN 301 908-10 (V2.1.1) [i.56], clause 4.5.8.6.1
This test measures the linearity of the receiver RF parts. It expresses the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.	TS 101 087 (V8.5.0) [i.50], clause 7.7.1

A.17.5 Intermodulation attenuation

Table A.17.5: Definition of intermodulation attenuation

Definition	Declared in documents
To verify that the level of intermodulation products, generated in non-linear elements of the repeater, in the presence of two RF input signals, do not exceed the specified limits.	EN 300 609-4 (V8.0.2) [i.62], clause 6.1

A.17.6 Intermodulation rejection - speech channels

Table A.17.6: Definition of intermodulation rejection - speech channels

Definition	Declared in documents
The intermodulation rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency. The requirements and this test apply to MS supporting speech. For E-GSM 900 and R-GSM 900 MS this test is only performed in the P-GSM band.	EN 300 607-1 (V8.1.1) [i.20], clause 14.6.1.1

A.17.7 Intermodulation spurious response attenuation

Table A.17.7: Definitions of intermodulation spurious response attenuation

Definition	Declared in documents
The intermodulation spurious response attenuation is a measure of a receiver's ability to receive a CDMA signal on its assigned channel frequency in the presence of two interfering CW tones. These tones are separated from the assigned channel frequency and are separated from each other such that the third order mixing of the two interfering CW tones can occur in the non-linear elements of the receiver, producing an interfering signal in the band of the desired CDMA signal. For mobile stations operating in 1x systems, the receiver performance is measured by the Frame Error Rate (FER). For mobile stations operating in HRPD systems, the receiver performance is measured by the Packet Error Rate (PER).	EN 301 526 (V3.2.1) [i.65], clause 4.2.12.1
The intermodulation spurious response attenuation is a measure of a receiver's ability to receive a CDMA signal or an HRPD signal on its assigned channel frequency in the presence of two interfering CW tones. These tones are separated from the assigned channel frequency and are separated from each other such that the third order mixing of the two interfering CW tones can occur in the non-linear elements of the receiver, producing an interfering signal in the band of the desired CDMA signal. For the case of multiple adjacent carrier receivers, the test places the CW tones outside the bandwidth of the receiver, which is approximately n □1,25 MHz, where n is the number of adjacent carriers.	EN 301 908-5 (V3.2.1) [i.42], clause 4.2.7.1
The intermodulation spurious response attenuation of the receiver is the measure of its ability to receive a modulated input RF signal frequency in the presence of one modulated signal and one unmodulated signal, so separated from the assigned input signal frequency and from each other that the nth order mixing of the two undesired signals can occur in the non-linear elements of the receiver, producing a third signal whose frequency is equal to that of the assigned input RF signal frequency.	EN 301 908-9 (V3.2.1) [i.48], clause 4.3.6.1

A.18 Receiver / Usable receiver input level range

Table A.18.1: Definitions of receiver / usable receiver input level range

Definition	Declared in documents
The usable receiver input level range is the range of the radio frequency input level of a specified modulated signal over which bit error ratio or frame erasure ratios stay between specified limits. The requirements and this test apply to MS supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.3.1

A.19 Receiver LBT threshold

Table A.19.1: Definitions of receiver LBT threshold

Definition	Declared in documents
The LBT threshold is defined as the received signal level above which the equipment can determine that the channel is not available for use. If the received signal is below the LBT threshold then the equipment can determine that the channel is available for use. This requirement applies only to equipment operating in the frequency range from 5 855 MHz to 5 875 MHz.	EN 302 571 (V3.2.1) [i.59], clause 6.6.1
The intermodulation spurious response attenuation is a measure of a receiver's ability to receive a CDMA signal on its assigned channel frequency in the presence of two interfering CW tones. These tones are separated from the assigned channel frequency and are separated from each other such that the third order mixing of the two interfering CW tones can occur in the non-linear elements of the receiver, producing an interfering signal in the band of the desired CDMA signal. For mobile stations operating in type 1 cdma2000 systems, the receiver performance shall be measured by the Frame Error Rate (FER). For mobile stations operating in type 2 cdma2000 systems, the receiver performance shall be measured by the Packet Error Rate (PER).	EN 301 908-4 (V3.2.1) [i.41], clause 4.2.7.1

A.20 Receiver LBT threshold and transmitter max on-time

Table A.20.1: Definition of receiver LBT threshold and transmitter max on-time

Definition	Declared in documents
The LBT threshold is defined as the received signal level above which the equipment can determine that the channel is not available for use . If the received signal is below the LBT threshold then the equipment can determine that the channel is available for use. The definition of the maximum transmitter on-time for an equipment with LBT facility is defined in clause 8.11.1.4.1.	EN 300 220-1 (V2.1.1) [i.35], clause 9.2.1

A.21 Receiver opening delay

Table A.21.1: Definition of receiver opening delay

Definition	Declared in documents
The receiver opening delay is the time which elapses between the application of a test signal ("test carrier") to the receiver and the moment when the receiver is able to receive information without exceeding a given degradation.	EN 300 471-1 (V1.2.1) [i.66], clause 8.2.1

A.22 Sensitivity

A.22.1 Average usable sensitivity (digital, field strength)

Table A.22.1: Definition of average usable sensitivity (digital, field strength)

Definition	Declared in documents
For the definition see EN 300 390-1 [i.30], clause 9.1. This measurement applies only to equipment without an external antenna connector.	EN 300 113-1 (V1.6.1) [i.33], clause 8.2.1

A.22.2 Average usable sensitivity (field strength, data or messages)

Table A.22.2: Definition of average usable sensitivity (field strength, data or messages)

Definition	Declared in documents
The average usable sensitivity (data) expressed as field strength is the average field strength, expressed in dBµV/m, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal (clause 7.1) which will, without interference, produce after demodulation a data signal with a specified bit error ratio or a specified successful message ratio. The specified bit error ratio is 10^{-2}. The specified successful message ratio is 80 %. The average is calculated from 8 measurements of field strength where the receiver is rotated in 45 increments starting at an arbitrary orientation.	EN 300 390-1 (V1.2.1) [i.30], clause 9.1.1
NOTE: The average usable sensitivity mostly differs only by a small amount from the maximum usable sensitivity to be found in a particular direction. This is due to the properties of the averaging process as used in the formula in clauses 9.1.2 step j) and 9.1.4 step j). For instance, an error not exceeding 1,2 dB can be found if the sensitivity is equal in seven directions and is extremely poor in the eighth direction. For the same reason the starting direction (or angle) can be selected randomly.	

A.22.3 Average usable sensitivity (field strength, responses)

Table A22.3: Definition of average usable sensitivity (field strength, responses)

Definition	Declared in documents
The average usable sensitivity (responses) expressed as field strength is the average field strength, expressed in dBµV/m, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal D-M3 (see clause 7.1) which will, without interference, produce after demodulation a specified successful response ratio. The average is calculated from 8 measurements of field strength when the receiver is rotated in 45 increments starting at a particular orientation.	EN 300 341-1 (V1.3.1) [i.29], clause 9.1.1
NOTE: The average usable sensitivity mostly differs only by a small amount from the maximum usable sensitivity to be found in a particular direction. This is due to the properties of the averaging process as used in the formula in clause 9.1.2 j). For instance, an error not exceeding 1,2 dB can be found if the sensitivity is equal in seven directions and is extremely bad in the eighth direction. For the same reason the starting direction (or angle) can be selected randomly.	

A.22.4 Average usable sensitivity (field strength, speech)

Table A.22.4: Definition of average usable sensitivity (field strength, speech)

Definition	Declared in documents
The average usable sensitivity (speech) expressed as field strength is the average field strength, expressed in dBμV/m, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal (see clause 7.1) which will, without interference, produce after demodulation a SINAD ratio of 20 dB measured through a psophometric weighting network. The average is calculated from 8 measurements of field strength when the receiver is rotated in 45ϱ increments starting at a particular orientation.	EN 300 296-1 (V3.2.1) [i.28], clause 9.1.1
NOTE: The average usable sensitivity mostly differs only by a small amount from the maximum usable sensitivity to be found in a particular direction. This is due to the properties of the averaging process as used in the formula in clause 9.1.2 g). For instance, an error not exceeding 1,2 dB can be found if the sensitivity is equal in seven directions and is extremely bad in the eighth direction. For the same reason the starting direction (or angle) can be selected randomly.	

A.22.5 Maximum usable sensitivity

Table A.22.5: Definitions of maximum usable sensitivity

Definition	Declared in documents
The maximum usable sensitivity of the receiver is the minimum level of the signal (emf) at the nominal frequency of the receiver which, when applied to the receiver input with normal test modulation will produce: - in all cases, an audio frequency output power equal to 50 % of the rated output power (see clause 9.1); and - a SINAD ratio of 20 dB, measured at the receiver output through a psophometric telephone filtering network such as described in ITU-T Recommendation O.41 [i.67].	EN 300 162-1 (V1.4.1) [i.21], clause 9.3.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.3.1
The maximum usable sensitivity (conducted) of the receiver is the minimum level of signal (emf) at the receiver input, at the nominal frequency of the receiver and with normal test modulation which will produce: - an audio frequency output power of at least 50 % of the rated power output; and - a SND/ND ratio of 20 dB, measured at the receiver output through a telephone psophometric weighting network as described in ITU-T Recommendation O.41 [i.67] Red Book 1984.	EN 300 086-1 (V1.3.1) [i.27], clause 8.1.1
The maximum usable sensitivity of the receiver is the minimum level of signal (emf) at the receiver input, at the nominal frequency of the receiver and with normal test modulation, (see clause 7.5), which will produce: - an audio frequency output power of at least 25 % of the rated power output, (see clause 7.3); and - a SND/ND ratio of 20 dB, measured at the receiver output through a telephone psophometric weighting network as described in CCITT Recommendation O.41 [i.67].	EN 300 433-1 (V1.1.3) [i.47], clause 9.1.1
The maximum usable sensitivity of the receiver is the minimum level of the signal (emf) at the receiver input, at the nominal frequency of the receiver which, and with normal test modulation, clause 6.3, which will produce: - a SINAD ratio of 20 dB, measured at the receiver output through a psophometric telephone weighting network as described in ITU-T Recommendation O.41 [i.67]. With the receivers set to an audio frequency output power of 50 % of the rated output power.	EN 301 929-1 (V1.2.1) [i.26], clause 9.4.1

Definition	Declared in documents
The maximum usable sensitivity is the minimum level of a radio frequency input signal with specified modulation which will produce at the receiver analogue outputs a chosen value of Signal plus Noise plus Distortion to Noise plus Distortion (SINAD) ratio and, at the same time an output power not less than the standard output power. In the case of digital outputs it is the minimum level of a radio frequency input signal with specified modulation which will produce a chosen value of bit error ratio.	EN 300 373-2 (V3.2.1) [i.49], clause 4.2.6.1
The maximum usable sensitivity of the receiver is the minimum level of the signal at the nominal frequency of the receiver which, when applied to the receiver antenna port with normal test modulation will produce: - in all cases, an audio frequency output power equal to 50 % of the rated output power (see clause 9.1); and - a SINAD ratio of 20 dB, measured at the receiver output port through a psophometric telephone filtering network such as described in ITU-T Recommendation P.53 [i.68].	EN 300 698-1 (V1.2.1) [i.24], clause 9.3.1 EN 300 720-1 (V1.2.1) [i.25], clause 9.3.1
The maximum usable sensitivity of the receiver is the minimum level of the signal (e.m.f.) at the nominal frequency of the receiver which, when applied to the receiver input with normal test modulation (see clause 6.4), will produce: - in all cases, an audio frequency output power equal to 50 % of the rated output power (see clause 9.1); and - a Signal + Noise + Distortion to Noise + Distortion (SINAD) ratio of 20 dB, measured at the receiver output through a psophometric telephone filtering network such as described in ITU-T Recommendation O.41 [i.67].	EN 301 025-1 (V1.3.1) [i.22], clause 9.3.1
The maximum usable sensitivity of the receiver is the minimum level of the signal (e.m.f.) at the nominal frequency of the receiver which when applied to the receiver input with a test modulation will produce a bit error ratio of 10^{-2}.	EN 301 025-1 (V1.3.1) [i.22], clause 10.1.1
The usable sensitivity is the minimum level of signal (electromotive force (emf) at the receiver input, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal modulation (see clause 6.1), which produces: - a SND/ND ratio of 20 dB, measured at the receiver output through a telephone psophometric weighting network as described in ITU-T Recommendation O.41 [i.67]; or - after demodulation, a data signal with a bit error ratio of 10^{-2}, provided that forward error correction, where provided, is disabled; or - after demodulation, a message acceptance ratio of 80 %. Where the indicated performance cannot be achieved, the provider shall declare and publish the performance criteria used to determine the performance of the receiver.	EN 300 220-1 (V2.1.1) [i.35], clause 9.1.1

A.22.6 Maximum usable sensitivity (analogue, conducted)

Table A.22.6: Definition of maximum usable sensitivity (analogue, conducted)

Definition	Declared in documents
The maximum usable sensitivity (analogue) of the receiver is the minimum level of signal (emf) at the receiver input, produced by a carrier at the nominal frequency of the receiver, modulated with the receiver analogue test signal (see clause 6.1.2), which will, without interference, produce after demodulation: - an audio frequency output power of at least 50 % of the rated power output (see clause 6.11); and - a SINAD ratio of 20 dB, measured at the receiver output through a telephone psophometric weighting network as described in ITU-T Recommendation O.41 [i.67].	EN 301 166-1 (V1.3.1) [i.31], clause 8.1.1

A.22.7 Maximum usable sensitivity (analogue, field strength)

Table A.22.7: Definition of maximum usable sensitivity (analogue, field strength)

Definition	Declared in documents
The maximum usable sensitivity (analogue) expressed as field strength is the field strength, expressed in dBμV/m, produced by a carrier at the nominal frequency of the receiver, modulated with the receiver analogue test signal (see clause 6.1.2) which will, without interference, produce after demodulation a SINAD ratio of 20 dB measured through a psophometric weighting network.	EN 301 166-1 (V1.3.1) [i.31], clause 8.2.1

A.22.8 Maximum usable sensitivity (digital, conducted)

Table A.22.8: Definition of maximum usable sensitivity (digital, conducted)

Definition	Declared in documents
The maximum usable sensitivity (data or messages, conducted) is the minimum level of signal (emf) at the receiver input, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal (see clause 6.3), which will, without interference, produce after demodulation a data signal with a specified bit error ratio or a specified successful message ratio. The specified bit error ratio is 10^{-2}. The specified successful message ratio is 80 %.	EN 300 113-1 (V1.6.1) [i.33],
The maximum usable sensitivity (conducted) is the minimum average signal power at the receiver input, produced by a signal at the nominal frequency of the receiver, modulated with the normal test signal (see clause 6.3.2), which will, without interference, produce after demodulation a data signal with a specified bit error ratio or a specified successful message ratio. The specified bit error ratio is 10^{-2}. The specified successful message ratio is 80 %.	EN 302 561 (V3.2.1) [i.32], clause 8.1.1
The maximum usable sensitivity (data) of the receiver is the minimum level of signal (emf) at the receiver input, at the nominal frequency of the receiver, with test signal M2 or M7 as appropriate (see clause 6.1.3), which without interference will produce after demodulation a data signal with a specified bit error ratio or a specified successful message ratio. The specified bit error ratio is 10^{-2}. The specified successful message ratio is 0,8.	EN 301 166-1 (V1.3.1) [i.31], clause 8.3.1

A.22.9 Maximum usable sensitivity (digital, field strength)

Table A.22.9: Definitions of maximum usable sensitivity (digital, field strength)

Definition	Declared in documents
The maximum usable sensitivity (data) expressed as field strength is the field strength, expressed in dBμV/m, produced by a carrier at the nominal frequency of the receiver, modulated with the test signal M2 or M6 (see clause 6.1.3) which will, without interference, produce after demodulation a data signal with a specified bit error ratio or a specified successful message ratio. The specified bit error ratio is 10^{-2}. The specified successful message ratio is 0,8.	EN 301 166-1 (V1.3.1) [i.31], clause 8.4.1

Definition	Declared in documents
The maximum usable sensitivity (data) expressed as field strength is the average field strength, expressed in dBµV/m, produced by a signal at the nominal frequency of the receiver, modulated with the test signal M3 or M4 (see clause 6.3.2) which will, without interference, produce after demodulation a data signal with a specified bit error ratio or a specified successful message ratio. The specified bit error ratio is 10^{-2}. The specified successful message ratio is 80 %.	EN 302 561 (V3.2.1) [i.32], clause 8.2.1

A.22.10 Maximum usable sensitivity (responses, conducted)

Table A.22.10: Definition of maximum usable sensitivity (responses, conducted)

Definition	Declared in documents
The maximum usable sensitivity (responses, conducted) of the receiver is the minimum level of signal (emf) at the receiver input, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal D-M3 (see clause 7.3), which will, without interference, produce after demodulation a specified successful response ratio. The specified response ratio is 80 %.	EN 300 219-1 (V1.2.1) [i.46], clause 9.2.1

A.22.11 DSC receiver maximum usable sensitivity

Table A.22.11: Definition of DSC receiver maximum usable sensitivity

Definition	Declared in documents
The maximum usable sensitivity of the receiver is the minimum level of the signal (emf) at the nominal frequency of the receiver which when applied to the receiver input with a test modulation will produce a symbol error rate of 10^{-2}.	EN 301 929-1 (V1.2.1) [i.26], clause 9.13.1

A.22.12 Receiver call sensitivity

Table A.22.12: Definition of receiver call sensitivity

Definition	Declared in documents
The call sensitivity of the receiver is a defined level of the radio-frequency signal at which the receiver gives a character error ratio better than a defined value.	EN 300 065-1 (V1.1.3) [i.61], clause 5.1.1

A.22.13 Receiver sensitivity

Table A.22.13: Definition of receiver sensitivity

Definition	Declared in documents
The radio receiver sensitivity is defined as the power level at the receiver input at which the Bit Error Ratio (BER) is 0,001. The radio receiver sensitivity shall be 60 dBµV/m (-83 dBm) or better.	EN 301 406 (V1.5.1) [i.12], clause 4.5.7.1.1 EN 301 908-10 (V2.1.1) [i.56], clause 4.5.8.1.1

A.22.14 Reference sensitivity

Table A.22.14: Definition of reference sensitivity

Definition	Declared in documents
The static reference sensitivity level of the receiver is the level of signal at the receiver input with a standard test signal at which the receiver will produce after demodulation and channel decoding data with a Frame Erasure Ratio (FER), Residual Bit Error Ratio (RBER) Bit Error Ratio (BER) or Block Error Ratio (BLER) better than or equal to that specified for a specific logical channel type under static propagation conditions.	EN 302 480 (V1.1.2) [i.69], clause 4.2.2.1.1

A.22.15 Reference sensitivity - full rate data channels in multislot configuration

Table A.22.15: Definition of reference sensitivity - full rate data channels in multislot configuration

Definition	Declared in documents
The reference sensitivity for data channels is the signal level at the MS receiver input at which a certain BER must be achieved. The requirements and this test apply to all types of GSM 400, GSM 900 and DCS 1 800 MS and any multiband MS which are capable of HSCSD multislot operation.14.2.8.2 Conformance Requirement. 1. At reference sensitivity level, the TCH/F9,6, TCH/F4,8 and TCH/F2,4 BER shall meet the reference sensitivity performance of table 1 in EN 300 910 [i.95], clause 6,2).	EN 300 607-1 (V8.1.1) [i.20], clause 14.2.8.1

A.22.16 Reference sensitivity - TCH/FS for MS supporting the R-GSM band

Table A.22.16: Definition of reference sensitivity - TCH/FS for MS supporting the R-GSM band

Definition	Declared in documents
The reference sensitivity is the signal level at the MS receiver input at which a certain BER and FER must be achieved. The requirements and this test apply to R-GSM MS supporting speech.	EN 300 607-1 (V8.1.1) [i.20], clause 14.2.9.1

A.22.17 Multipath reference sensitivity level

Table A.22.17: Definition of multipath reference sensitivity level

Definition	Declared in documents
The multipath reference sensitivity level of the receiver is the level of signal at the receiver input with a standard test signal at which the receiver will produce after demodulation and channel decoding data with a Frame Erasure Ratio (FER), Residual Bit Error Ratio (RBER), Bit Error Ratio (BER) or Block Error Ratio (BLER) better than or equal to that specified for a specific logical channel type, under multipath propagation conditions.	TS 101 087 (V8.5.0) [i.50], clause 7.4.1

A.22.18 Static reference sensitivity level

Table A.22.18: Definition of static reference sensitivity level

Definition	Declared in documents
The static reference sensitivity level of the receiver is the level of signal at the receiver input with a standard test signal at which the receiver will produce after demodulation and channel decoding data with a Frame Erasure Ratio (FER), Residual Bit Error Ratio (RBER) Bit Error Ratio (BER) or Block Error Ratio (BLER) better than or equal to that specified for a specific logical channel type under static propagation conditions.	TS 101 087 (V8.5.0) [i.50], clause 7.3.1

A.23 Radio receiver reference BER and FER

Table A.23.1: Definition of radio receiver reference BER and FER

Definition	Declared in documents
The radio receiver reference BER and FER is the maximum allowed BER and FER for a power level at the receiver input of -73 dBm or greater (i.e. 70 dBµV/m).	EN 301 406 (V1.5.1) [i.12], clause 4.5.7.2.1 EN 301 908-10 (V2.1.1) [i.56], clause 4.5.8.2.1

A.24 Single tone desensitization

Table A.24.1: Definitions of single tone desensitization

Definition	Declared in documents
The single tone desensitization is a measure of the base station receiver's ability to receive a wanted signal on the assigned channel frequency in the presence of a continuous wave signal (single tone) that is offset from the centre frequency of the assigned channel.	EN 301 449 (V3.2.1) [i.70], clause 4.2.7
The receiver single tone desensitization characteristic is a measure of the receiver's ability to receive a CDMA signal at its assigned channel frequency in the presence of a single tone spaced at a given frequency offset from the centre frequency of the assigned channel, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit.	EN 301 526 (V3.2.1) [i.65], clause 4.2.11.1

A.25 Spurious emissions and radiations

A.25.1 Receiver conducted spurious emissions

Table A.25.1: Definitions of receiver conducted spurious emissions

Definition	Declared in documents
Conducted spurious emissions from the receiver are components at any frequency, present at the receiver input port.	EN 300 162-1 (V1.4.1) [i.21], clause 9.9.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.9.1
Receiver conducted spurious emissions are spurious emissions generated in the base station equipment and appearing at the receiver RF input ports. This requirement only applies if the base station is equipped with a separate RF input port.	EN 301 449 (V3.2.1) [i.70], clause 4.2.6
Conducted spurious emissions are spurious emissions generated or amplified in the base station equipment and appearing at the receiver RF input ports. This requirement only applies if the base station is equipped with a separate RF input port.	EN 301 908-5 (V3.2.1) [i.42], clause 4.2.5.1
Conducted spurious-output signals are those generated or amplified in a receiver and appearing at the receiver antenna terminals.	EN 301 908-9 (V3.2.1) [i.48], clause 4.3.5.1
Spurious emissions are emissions at frequencies other than those of the BTS transmitter operating and adjacent frequencies. This test measures spurious emissions at the BTS receiver antenna connector.	EN 301 908-9 (V3.2.1) [i.48], clause 4.4.5.1

A.25.2 Conducted spurious emissions when not transmitting

Table A.25.2: Definition of conducted spurious emissions when not transmitting

Definition	Declared in documents
Conducted spurious emissions when not transmitting are spurious emissions generated or amplified in a receiver that appear at the mobile station antenna connector.	EN 301 526 (V3.2.1) [i.65], clause 4.2.13.1

A.25.3 Receiver conducted spurious emissions conveyed to the antenna

Table A.25.3: Definition of receiver conducted spurious emissions conveyed to the antenna

Definition	Declared in documents
Conducted spurious emissions are components at any frequency generated in the receiver and radiated by its antenna. The level of spurious emissions shall be measured by their power level in a transmission line or antenna.	EN 300 698-1 (V1.2.1) [i.24], clause 9.9.1 EN 300 720-1 (V1.2.1) [i.25], clause 9.9.1

A.25.4 Receiver radiated spurious emissions

Table A.25.4: Definitions of receiver radiated spurious emissions

Definition	Declared in documents
Radiated spurious emissions from the receiver are components at any frequency radiated by the equipment cabinet and the structure.	EN 300 162-1 (V1.4.1) [i.21], clause 9.10.1
Radiated spurious emissions from the receiver are components at any frequency radiated by the equipment cabinet and the structure. Integral antenna equipment shall be tested with the normal antenna fitted.	EN 300 698-1 (V1.2.1) [i.24], clause 9.14.1 EN 300 720-1 (V1.2.1) [i.25], clause 9.10.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.10.1

A.25.5 Receiver spurious emissions

Table A.25.5: Definitions of receiver spurious emissions

Definition	Declared in documents
Spurious emissions are any radio-frequency emissions generated in the receiver and radiated by conduction from the antenna or from other conductors connected to the receiver or radiated by the receiver.	EN 300 065-1 (V1.1.3) [i.61], clause 5.5.1
Receiver spurious emissions are emissions at any frequency when the equipment is in received mode.	EN 300 328 (V1.7.1) [i.71], clause 4.3.7.1
Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.	EN 301 893 (V1.4.1) [i.7], clause 4.6.1 EN 302 502 (V1.2.1) [i.8], clause 4.5.1
Separate radiated spurious measurements need not be made on receivers co-located with transmitters. The definitions from clause 7.2.1 on transmitter spurious and out-of-band emissions apply.	EN 302 288-1 (V1.3.1) [i.72], clause 8.1.1
Spurious emissions from the receiver or receiver combiner are radio frequency emissions at any frequency, generated by the equipment, antenna, aerial amplifier, down converters or filter. Manufacturers shall provide a representative sample of the receiver system. The level of spurious emissions shall be measured by either: a) the power level from an external RF port; and their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or b) their effective radiated power when radiated by the cabinet and the integral antenna, in the case of hand-portable equipment fitted with such an antenna and no external RF port.	EN 300 422-1 (V1.3.2) [i.73], clause 9.1.1
Spurious emissions from the receiver are radio frequency emissions at any frequency, generated by the equipment, antenna, aerial amplifier, down converters or filter. Manufacturers shall provide a representative sample of the receiver system. The level of spurious emissions shall be measured by either: a) the power level from an external RF port; and b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or c) their effective radiated power when radiated by the cabinet and the integral antenna, in the case of equipment fitted with such an antenna and no external RF port.	EN 301 357-1 (V1.4.1) [i.74], clause 9.1.1

Definition	Declared in documents
Spurious emissions are emissions at frequencies other than those of the carrier and sidebands associated with normal modulation. The level of spurious emissions shall be measured as: 1) their power level in a transmission line or antenna; and 2) their effective radiated power when radiated by the cabinet and structure of the equipment. This is also known as "cabinet radiation". For equipment which can only be used with an integral antenna, only the measurement mentioned under (2) applies.	EN 301 797 (V3.2.1) [i.75], clause 5.4.1.1 (definition of spurious emissions of the combined transmitter/receiver)
The transponder spurious emissions are emissions at frequencies, other than those of the transponder and sidebands associated with normal modulation, radiated by the transponder. The spurious radiations are specified as the radiated power of any discrete signal.	EN 300 761-1 (V1.2.1) [i.34], clause 9.4.1
Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna. The level of spurious radiations shall be measured by either: a) i) their power level in a specified load (conducted spurious emission); and ii) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or b) their effective radiated power when radiated by the cabinet and the integral or dedicated antenna, in the case of portable equipment fitted with such an antenna and no permanent RF connector.	EN 302 064-1 (V1.1.2) [i.76], clause 8.1.1
Spurious emissions from the receiver are components at any frequency, radiated by the equipment and antenna. The level of spurious emissions shall be measured as either: a) - their power level in a specified load (conducted spurious emission); and - their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or b) - their effective radiated power when radiated by the cabinet and the integral antenna. Separate receiver radiated spurious measurements need not be made for co-located receiver and transmitters if the transmitter is operating at continuous duty.	EN 300 761-1 (V1.2.1) [i.34], clause 8.4.1
Spurious emissions by the receiver are either: 1) a) their conducted power in an artificial antenna (conducted spurious emission); and b) their effective radiated power or field strength when radiated by the cabinet and structure of the equipment (cabinet radiation); or 2) their effective radiated power or field strength when radiated by the cabinet and the integral antenna.	EN 302 291-2 (V3.2.1) [i.77], clause 4.3.1.1
Spurious emissions are any radio frequency emissions generated in the receiver and radiated either by way of conduction to the antenna or other conductors connected to the receiver, or radiated directly by the receiver. For the purposes of the present document only spurious emissions conducted by way of the antenna shall be considered.	EN 300 373-2 (V3.2.1) [i.49], clause 4.2.11.1

Definition	Declared in documents
Receiver spurious emissions are emissions at any frequency from the equipment which are not attributed to the transmitter. These may be emissions from a receiver circuit on the device, or other emissions from the device which are treated in the same manner (see clause 7.2).	EN 302 500-1 (V1.2.1) [i.78], clause 9.1.1
Spurious emissions from the receiver of an interrogator are on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.	EN 302 208-1 (V1.2.1) [i.79], clause 9.4.1
Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.	EN 302 065 (V3.2.1) [i.80], clause 4.1.5.1
Spurious emissions: Emission on a frequency, or frequencies, which are outside an exclusion band of ±2,5 times the channel spacing around the selected centre frequency *f*Tx, and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of-band emissions (see also CEPT Recommendation 74-01 [i.81]).	EN 300 674-1 (V1.2.1) [i.82], clause 3.1
Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.	EN 302 571 (V3.2.1) [i.59], clause 6.5.1
The spurious emissions power is the power of emissions, generated or amplified in a receiver, which appear at the UE antenna connector. The requirements in UE transmit bands are valid in URA_PCH, Cell_PCH and idle state.	EN 301 908-2 (V3.2.1) [i.38], clause 4.2.10.1
The spurious emission power is the power of the emissions, generated or amplified in a receiver, which appear at the BS antenna connector. The requirements apply to all BS with separate Rx and Tx antenna port. The test shall be performed when both Tx and Rx are on with the Tx port terminated. For all BS with common Rx and Tx antenna port the transmitter spurious emission as specified in clause 4.2.4 is valid.	EN 301 908-3 (V3.2.1) [i.40], clause 4.2.7.1
The spurious emissions power is the power of emissions generated or amplified in a receiver that appears at the UE antenna connector.	EN 301 908-6 (V3.2.1) [i.43], clause 4.2.6.1
The spurious emissions power is the power of emissions, generated or amplified in a receiver, which appear at the BS antenna connector. The requirements apply to all BS with separate Rx and Tx antenna port. The test shall be performed when both Tx and Rx are on with the Tx port terminated. For BS equipped with only a single antenna connector for both transmitter and receiver, the requirements of clause 4.2.4 Transmitter spurious emissions shall apply to this port, and this test need not be performed.	EN 301 908-7 (V3.2.1) [i.44], clause 4.2.7.1
Spurious emissions from receivers are any emissions radiated from the unit. They are specified as the radiated power of any discrete signal.	EN 300 224-1 (V1.3.1) [i.83], clause 8.1.1.1
Spurious emissions are discrete radio frequency signals conveyed from the antenna socket by conduction or radiated by the receiver. They are specified as the power level of any discrete signal measured by the measuring device within the specified frequency range.	EN 300 224-1 (V1.3.1) [i.83], clause 8.2.13.1
Spurious emissions from receivers are emissions at frequencies outside the loop frequency band (see clause 9.1), radiated from the chassis and case of the receiver. It is specified as the radiated power of a discrete signal.	EN 300 224-1 (V1.3.1) [i.83], clause 9.3.1.1

A.25.6 Receiver spurious emissions from the receiver antenna connector

Table A.25.6: Definition of receiver spurious emissions from the receiver antenna connector

Definition	Declared in documents
Spurious emissions are emissions at frequencies other than those of the BTS transmitter ARFCNs and adjacent frequencies. This test measures spurious emissions from the BTS receiver antenna connector.	TS 101 087 (V8.5.0) [i.50], clause 7.9.1

A.25.7 Receiver spurious emissions (idle mode)

Table A.25.7: Definition of receiver spurious emissions (idle mode)

Definition	Declared in documents
The receiver conducted emissions are those out of band RF average power emissions measured at the UE antenna connector when the UE is in Idle Mode.	EN 301 908-8 (V3.2.1) [i.45], clause 4.2.2.7.1 EN 301 908-8 (V3.2.1) [i.45], clause 4.2.3.7.1

A.25.8 Spurious emissions when the PP has no allocated transmit channel

Table A.25.8: Definition of spurious emissions when the PP has no allocated transmit channel

Definition	Declared in documents
The power level of any spurious emission when the PP has not been allocated a transmit channel.	EN 301 406 (V1.5.1) [i.12], clause 4.5.7.7.1 EN 301 908-10 (V2.1.1) [i.56], clause 4.5.8.7.1

A.25.9 Receiver spurious emissions at the antenna

Table A.25.9: Definition of receiver spurious emissions at the antenna

Definition	Declared in documents
Spurious emissions from the receiver are components at any frequency, present at the receiver input port. The level of spurious emissions shall be measured as the power level at the antenna.	EN 301 025-1 (V1.3.1) [i.22], clause 9.9.1 EN 301 025-1 (V1.3.1) [i.22], clause 10.7.1
Spurious emissions from the receiver are components at any frequency radiated by the equipment. Spurious emissions from the antenna are measured by their power level in a specified load, connected to the antenna port of the receiver (conducted spurious emissions). Spurious emissions from the cabinet and structure of the equipment are measured by their effective radiated power, ERP (radiated spurious emissions).	EN 301 929-1 (V1.2.1) [i.26], clause 9.11.1

A.25.10 Receiver cabinet radiated spurious emissions

Table A.25.10: Definition of receiver cabinet radiated spurious emissions

Definition	Declared in documents
Radiated spurious emissions from the receiver are components at any frequency radiated by the equipment cabinet and the structure. This test is performed for both the telephony receiver and the DSC receiver.	EN 301 025-1 (V1.3.1) [i.22], clause 9.10.1

A.25.11 Unwanted emissions in the spurious domain

Table A.25.11: Definitions of unwanted emissions in the spurious domain

Definition	Declared in documents
Unwanted emissions in the spurious domain are emissions at frequencies, other than those of the transmitter carrier and sidebands associated with normal modulation at the adjacent frequencies.	EN 302 480 (V1.1.2) [i.69], clause 4.2.2.2.1

A.25.12 Unwanted emissions, conducted

Table A.25.12: Definitions of unwanted emissions, conducted

Definition	Declared in documents
These are any emissions from the antenna port of the equipment in receive (or transmit standby) mode, or any emission outside of exclusion band defined from the necessary bandwidth in transmit mode.	EN 301 783-1 (V3.2.1) [i.64], clause 4.2.1.1

A.25.13 Unwanted conducted emissions in reception

Table A.25.13: Definition of unwanted conducted emissions in reception

Definition	Declared in documents
Unwanted emissions from the equipment when in reception are defined as conducted emissions at any frequency, when the equipment is in the non-transmit state.	EN 300 392-2 (V3.2.1) [i.51], clause 6.5.4.1 EN 300 396-2 (V1.3.1) [i.52], clause 6.5.4.1 EN 300 396-4 (V1.3.1) [i.53], clause 12.3.5 EN 300 396-7 (V1.2.1) [i.54], clause 12.3.5 EN 300 396-5 (V1.2.1) [i.55], clause 16.3.5

A.25.14 Unwanted radiated emission

Table A.25.14: Definition of unwanted conducted emissions in reception

Definition	Declared in documents
Unwanted radiated emissions are emissions radiated by the cabinet and structure of the equipment (MS or BS) in the non-transmit state. This is also known as cabinet radiation. The limits given in clause 6.5.4.2 shall apply for frequencies between 30 MHz and 4 GHz only.	EN 300 392-2 (V3.2.1) [i.51], clause 6.5.5
Unwanted radiated emissions are emissions radiated by the cabinet and structure of the equipment in the non-Tx state. This is also known as cabinet radiation. The limits given in clause 6.5.4.2 shall apply.	EN 300 396-2 (V1.3.1) [i.52], clause 6.5.5 EN 300 396-4 (V1.3.1) [i.53], clause 12.3.5 EN 300 396-7 (V1.2.1) [i.54], clause 12.3.5 EN 300 396-5 (V1.2.1) [i.55], clause 16.3.5
These are any emissions from the enclosure of the equipment in active, receive (or transmit standby) mode, or any emission outside of exclusion band defined from the necessary bandwidth in transmit mode.	EN 301 783-1 (V3.2.1) [i.64], clause 4.2.2.1

A.25.15 Receiver spurious radiations

Table A.25.15: Definitions of receiver spurious radiations

Definition	Declared in documents
Spurious radiation from receivers are emissions radiated from the antenna, the chassis and case of the receiver. It is specified as the radiated power of a discrete signal.	EN 300 330-1 (V1.5.1) [i.36], clause 8.3.1
Spurious radiations from the receiver are components at any frequency radiated by the equipment and its antenna. They are specified as the radiated power of any discrete signal.	EN 301 091-1 (V1.3.3) [i.84], clause 8.1.1 EN 300 296-1 (V3.2.1) [i.28], clause 9.8.1 EN 300 341-1 (V1.3.1) [i.29], clause 9.7.1 EN 300 390-1 (V1.2.1) [i.30], clause 9.8.1
Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna. The level of spurious radiations shall be measured by: a) either: i) their power level in a specified load (conducted spurious emission); and ii) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or b) their effective radiated power when radiated by the cabinet and the integral antenna, in the case of portable equipment fitted with such an antenna and no external RF connector.	EN 300 220-1 (V2.1.1) [i.35], clause 9.7.1
Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna. The level of spurious radiations shall be measured by either: a) i) their power level in a specified load (conducted spurious emission); and ii) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or b) their effective radiated power when radiated by the cabinet and the integral or dedicated antenna, in the case of portable equipment fitted with such an antenna and no permanent RF connector.	EN 300 440-1 (V1.4.1) [i.37], clause 8.3.1
Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna.	EN 300 219-1 (V1.2.1) [i.46], clause 9.9.1

Definition	Declared in documents
The level of spurious radiations shall be measured by: either a) their power level in a specified load (conducted spurious emission); and b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or c) their effective radiated power when radiated by the cabinet and the integral antenna, in the case of handportable equipment fitted with such an antenna and no external RF connector.	
Spurious radiations from the receiver are emissions at any frequency, radiated by the equipment and its antenna. The level of spurious radiations shall be measured by: either: a) their power level in a specified load (conducted spurious emission); and b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or c) their effective radiated power when radiated by the cabinet and by the integral antenna, in the case of hand portable equipment fitted with such an antenna and no external RF connector.	EN 300 086-1 (V1.3.1) [i.27], clause 8.8.1 EN 300 113-1 (V1.6.1) [i.33], clause 8.10.1 (does not include note 1)
Spurious radiations from the receiver are components at any frequency, generated and radiated by active receiver circuitry and the antenna.	EN 301 839-1 (V1.2.1) [i.85], clause 9.1.1
Spurious radiations from the receiver are components at any frequency, generated and radiated by receiver circuitry and/or the antenna. The level of spurious radiation shall be measured by: - their effective radiated power when radiated by the cabinet and the integral antenna; or - their effective radiated power when radiated by the cabinet and any dedicated antenna provided by the provider.	EN 302 537-1 (V1.1.2) [i.86], clause 9.1.1
Spurious radiation from receivers consists of emissions radiated from the antenna, the chassis and case of the receiver. It is specified as the radiated power of a discrete signal. Included in this definition are modulation products that are outside the 20 dB down point on either side of the fundamental emission.	EN 302 195-1 (V3.2.1) [i.57], clause 8.2.1 EN 302 510-1 (V3.2.1) [i.58], clause 8.2.1 EN 302 536-1 (V3.2.1) [i.87], clause 9.1.1
Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna. The level of spurious radiations shall be measured by: a) their power level in a specified load (conducted spurious emission); and b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or c) their effective radiated power when radiated by the cabinet and the integral antenna, in the case of handportable equipment fitted with such an antenna and no external RF connector.	EN 300 135-1 (V1.2.1) [i.88], clause 8.1.1

Definition	Declared in documents
Spurious radiation from the receiver are components at any frequency, radiated by the equipment and antenna. The level of spurious radiation shall be measured by: a) their power level in a specified load (conducted spurious emission), and b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation), or c) their effective radiated power when radiated by the cabinet and the integral antenna, in the case of hand-portable equipment fitted with such an antenna and no external RF connector.	EN 300 433-1 (V1.1.3) [i.47], clause 9.4.1
Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna. For equipment with an external 50 Ω antenna connector, the level of spurious radiations are considered to be either: a) their power level in a specified load (conducted spurious emission); and b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation). For equipment without an external antenna connector, spurious radiations are considered to be: c) their effective radiated power when radiated by the cabinet and the integral antenna, in the case of handportable equipment fitted with such an antenna and no external RF connector.	EN 301 166-1 (V1.3.1) [i.31], clause 8.9.1
Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna. For equipment with an external 50 Ω antenna connector, the level of spurious radiations are considered to be: a) their power level in a specified load (conducted spurious emission); and b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or for equipment without an external antenna connector; c) their effective radiated power when radiated by the cabinet and the integral antenna. (See note 2)	EN 302 561 (V3.2.1) [i.32], clause 8.5.1
NOTE 1: i.e. a) and b) or c). NOTE:2 There only two options allowed either both a) and b) or only c).	

A.26 Spurious response

A.26.1 Spurious response and blocking immunity

Table A.26.1: Definitions of spurious response and blocking immunity

Definition	Declared in documents
The spurious response and blocking immunity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal with frequencies outside the pass band of the receiver.	EN 301 025-1 (V1.3.1) [i.22], clause 10.4.1
Blocking is defined as the desensitization of the receiver by a signal separated in frequency from the wanted signal by at least three channels. The signal frequencies that may block the receiver range from the lowest intermediate frequency of the receiver to at least three times the wanted signal frequency (fc, see clause 4.2.2.5.2) of the receiver. A spurious response is defined as the desensitization of the receiver by signals in a specific small band of frequencies which has a bandwidth (bs, see clause 4.2.2.5.2) of the same order as the channel bandwidth. The frequencies of signals that may produce spurious responses are in the same range as those that may cause blocking. The bandwidth (bs, see clause 4.2.2.5.2) of the spurious response is the continuous range of frequencies in which a signal at the level of the blocking level limit causes the error rate limit to be exceeded.	EN 301 908-8 (V3.2.1) [i.45], clause 4.2.2.5.1

A.26.2 Spurious response rejection

Table A.26.2: Definitions of spurious response rejection

Definition	Declared in documents
The spurious response rejection is a measure of the capability of the receiver to discriminate between the wanted modulated signal at the nominal frequency and an unwanted signal at any other frequency at which a response is obtained.	EN 300 162-1 (V1.4.1) [i.21], clause 9.6.1 EN 300 698-1 (V1.2.1) [i.24], clause 9.6.1 EN 300 720-1 (V1.2.1) [i.25], clause 9.6.1 EN 301 025-1 (V1.3.1) [i.22], clause 9.6.1 EN 301 178-1 (V1.3.1) [i.23], clause 9.6.1 EN 301 929-1 (V1.2.1) [i.26], clause 9.7.1
The spurious response rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal at any other frequency outside ±2 MHz from the transmit frequency at which a response is obtained. This definition also includes blocking/desensitization.	EN 300 761-1 (V1.2.1) [i.34], clause 8.3.5.1
The spurious response rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal at any other frequency, at which a response is obtained.	EN 300 220-1 (V2.1.1) [i.35], clause 9.6.1 EN 300 086-1 (V1.3.1) [i.27], clause 8.5.1 EN 300 219-1 (V1.2.1) [i.46], clause 9.6.1 EN 300 296-1 (V3.2.1) [i.28], clause 9.5.1 EN 300 341-1 (V1.3.1) [i.29], clause 9.4.1 EN 300 390-1 (V1.2.1) [i.30], clause 9.5.1 EN 301 166-1 (V1.3.1) [i.31], clause 8.6.1
The spurious response rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal at any other frequency, at which a response is obtained. The equipment (transmission and/or reception) under test shall be operated in its normal transmission mode (which may be continuous or discontinuous).	EN 300 113-1 (V1.6.1) [i.33], clause 8.7.1

Definition	Declared in documents
Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out-of-band blocking limit as specified in table 9 is not met.	EN 301 908-2 (V3.2.1) [i.38], clause 4.2.8.1
Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained, i.e. for which the blocking limit is not met.	EN 301 908-6 (V3.2.1) [i.43], clause 4.2.9.1
The spurious response rejection is the capability of the receiver to discriminate between the wanted modulated signal at the nominal frequency and an unwanted signal at any other frequency at which a response is obtained.	EN 300 433-1 (V1.1.3) [i.47], clause 9.5.1
Spurious response rejection is a measure of the capability of a receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted un-modulated signal at any other frequency at which a response is obtained, i.e. for which the blocking limit is not met.	EN 300 392-2 (V3.2.1) [i.51], clause 6.5.2.2 EN 300 396-2 (V1.3.1) [i.52], clause 6.5.2.1 EN 300 396-4 (V1.3.1) [i.53], clause 12.3.5 EN 300 396-7 (V1.2.1) [i.54], clause 12.3.5 EN 300 396-5 (V1.2.1) [i.55], clause 16.3.5

A.26.3 Spurious response rejection ratio

Table A.26.3: Definition of spurious response rejection ratio

Definition	Declared in documents
The spurious response rejection ratio is the ratio of the input level of an unwanted signal, at the frequency of the spurious response to the input level of a wanted signal, when the wanted and unwanted signals individually produce the same SINAD ratio at the receiver output.	EN 300 373-2 (V3.2.1) [i.49], clause 4.2.10.1

A.26.4 Spurious response rejection (with simultaneous transmission and reception)

Table A.26.4: Definitions of spurious response rejection (with simultaneous transmission and reception)

Definition	Declared in documents
The spurious response rejection, under duplex operation, is a measure of the capability of the receiver to achieve a specific spurious response rejection ratio when receiving a wanted modulated signal in the presence of: a) an unwanted signal at any other frequency, at which a response may be obtained; and b) the unmodulated signal of the transmitter operating at duplex frequency distance, at the rated output power and attenuated by the duplex filter or by the distance between the antennas.	EN 300 086-1 (V1.3.1) [i.27], clause 9.2.1

Definition	Declared in documents
The spurious response rejection, under duplex operation, is a measure of the capability of the receiver to achieve a specific successful response ratio when receiving a wanted modulated signal in the presence of: a) an unwanted unmodulated signal, which is added at any other frequency at which a response may be obtained; and b) the unmodulated signal of the transmitter operating at duplex frequency distance at the rated output power and attenuated by the duplex filter or the distance between the antennas.	EN 300 219-1 (V1.2.1) [i.46], clause 10.2.1
The spurious response rejection, under duplex operation, is a measure of the capability of the receiver to achieve a specific spurious response rejection ratio when receiving a wanted modulated signal in the presence of: a) an unwanted signal at any other frequency, at which a response may be obtained; and b) the signal of the transmitter operating at duplex frequency distance, at the maximum output power and attenuated by the duplex filter and/or by the decoupling between the antennas.	EN 301 166-1 (V1.3.1) [i.31], clause 9.2.1

Annex B:
Overview of receiver parameters in ETSI Harmonized Standards (Excel sheet)

A table is contained in an attachment to the present document, tr_102914v010101po.zip as an Excel object. This table gives an overview of the receiver parameters in ETSI Harmonized Standards under article 3.2 of the R&TTE Directive [i.1].

The column "notes" is used for notes, such as whether a new version is in preparation. The versions in a stage other than National Voting have not been included since they may not be mature.

The column "ETSI deliverable" indicates the ETSI deliverable in which the receiver parameters in the Excel sheet are found.

The column "status of ETSI deliverable" indicates whether the title of the Harmonized Standard in the column "ETSI deliverable" has been published in the Official Journal of the European Union (OJEU). Some of the ETSI deliverables have already been voted positive and are published but are waiting for the next publication of the OJEU list of Harmonized Standards.

The column "Application" is the same as used in TR 102 137 (V1.2.1) [i.5] "Use of Radio Frequency Spectrum by Equipment meeting ETSI standards", which follows the terminology of EFIS and the European Common Allocation table (ERC Report 25) as much as possible.

The column "Group" indicates the ETSI task group, task force, or Technical Body who has drafted the standard.

In a given row, the receiver parameters in the ETSI deliverable are marked with "U" for unconditional, "C" for conditional. This terminology is the same as in the HS-RTT tables in Harmonized Standards.

Annex C: Bibliography

More than a hundred Harmonized Standards have already been published by ETSI. Annex A contains a number of definitions of receiver parameters extracted from those standards.

The topic of receiver parameters has also been discussed by RSP: the corresponding "Opinion" has been approved a tthe end of 2008. It can be found as:

- RSPG08-246: "RSPG opinion on "streamlining" the regulatory environment for the use of spectrum".

History

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