

# ETSI EN 301 908-3 V4.2.1 (2010-03)

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*Harmonized European Standard (Telecommunications series)*

**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 and E-UTRA FDD) (BS)  
covering the essential requirements  
of article 3.2 of the R&TTE Directive**

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**Reference**

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## Foreword

This Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [i.1] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [i.2] 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 ("the R&TTE Directive").

Technical specifications relevant to Directive 1999/5/EC [i.2] are given in annex A.

The present document is part 3 of a multi-part deliverable covering the Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks, as identified below:

- Part 1: "Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 2: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 3: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";**
- Part 4: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 5: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 6: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 7: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- 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";
- 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";

- Part 10: "Harmonized EN for IMT-2000, FDMA/TDMA (DECT) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 11: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 12: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 13: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 14: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 15: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (FDD Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 16: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 17: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".

<b>National transposition dates</b>	
Date of adoption of this EN:	19 February 2010
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Date of withdrawal of any conflicting National Standard (dow):	30 November 2011

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## Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.2]. The modular structure is shown in EG 201 399 [i.3].

# 1 Scope

The present document applies to the following radio equipment type:

- Base Stations for IMT-2000 CDMA Direct Spread (UTRA FDD and E-UTRA FDD).

This radio equipment type is capable of operating in all or any part of the frequency bands given in table 1-1.

**Table 1-1: UTRA FDD Base Station operating bands**

UTRA FDD band	Direction of transmission	UTRA FDD Base Station operating bands
I	Transmit	2 110 MHz to 2 170 MHz
	Receive	1 920 MHz to 1 980 MHz
III	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
VII	Transmit	2 620 MHz to 2 690 MHz
	Receive	2 500 MHz to 2 570 MHz
VIII	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
XV	Transmit	2 600 MHz to 2 620 MHz
	Receive	1 900 MHz to 1 920 MHz
XVI	Transmit	2 585 MHz to 2 600 MHz
	Receive	2 010 MHz to 2 025 MHz

The present document covers requirements for UTRA FDD Base Stations for Releases 99, 4, 5, 6, 7 and 8 and E-UTRA FDD Base Stations for Release 8. In addition, the present document covers requirements for UTRA FDD Base Stations in the operating bands specified in TS 102 735 [i.4].

The present document is intended to cover the provisions of Directive 1999/5/EC [i.2] (R&TTE Directive), article 3.2, which states that "... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of article 3 of the R&TTE Directive [i.2] may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site <http://www.newapproach.org/>.

# 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;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.



## 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.

- [1] Void.
- [2] ETSI TS 125 141 (V8.8.0): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 8.8.0 Release 8)".
- [3] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".
- [4] ITU-T Recommendation O.153 (1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [5] ETSI EN 301 908-1 (V4.1.2): "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 the essential requirements of article 3.2 of the R&TTE Directive".
- [6] ETSI TS 145 004 (V8.0.0): "Digital cellular telecommunications system (Phase 2+); Modulation (3GPP TS 45.004 version 8.0.0 Release 8)".
- [7] ETSI EN 301 908-14 (V4.1.2): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 14: Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".

## 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 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [i.2] 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.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".
- [i.4] ETSI TS 102 735 (V7.0.1): "Universal Mobile Telecommunications System (UMTS); Band-specific requirements for UMTS Frequency Division Duplex (FDD) operation in the bands 1 900 MHz to 1 920 MHz paired with 2 600 MHz to 2 620 MHz and 2 010 MHz to 2 025 MHz paired with 2 585 MHz to 2 600 MHz".
- [i.5] ETSI TR 102 215 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Recommended approach, and possible limits for measurement uncertainty for the measurement of radiated electromagnetic fields above 1 GHz".
- [i.6] ETSI TR 100 028 (all parts) (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

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

**ancillary equipment:** equipment (apparatus) used in connection with a Base Station

NOTE: This is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a BS to provide additional operational and/or control features to the radio equipment, (e.g. to extend control to another position or location);
- the equipment cannot be used on a stand alone basis to provide user functions independently of a BS; and
- the BS to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

**Base Station class:** wide area Base Station, medium range Base Station, local area Base Station or home Base Station, as declared by the manufacturer

**chip rate:** rate of "chips" (modulated symbols after spreading) per second

NOTE: The UTRA FDD chip rate is 3,84 Mchip/s.

**downlink operating band:** part of the operating band designated for downlink (BS transmit)

**environmental profile:** range of environmental conditions under which equipment, within the scope of the present document, is required to comply with the provisions of the present document

**home Base Station:** Base Stations characterized by requirements derived from femtocell scenarios

**local area Base Station:** Base Stations characterized by requirements derived from picocell scenarios with a BS to UE minimum coupling loss equal to 45 dB

**maximum output power:** mean power level per carrier of the Base Station measured at the antenna connector in a specified reference condition

**mean power:** power (transmitted or received) in a bandwidth of at least  $(1 + \alpha)$  times the chip rate of the radio access mod, when applied to a WCDMA-modulated signal. The period of measurement shall be at least one timeslot unless otherwise stated

NOTE:  $\alpha = 0,22$  is the roll-off factor of the WCDMA signal.

**medium range Base Station:** Base Stations characterized by requirements derived from microcell scenarios with a BS to UE minimum coupling loss equal to 53 dB

**operating band:** frequency range that is defined with a specific set of technical requirements, in which UTRA FDD operates

NOTE: The operating band(s) for a UTRA FDD BS is declared by the manufacturer according to the designations in table 1-1.

**output power:** mean power of one carrier of the Base Station, delivered to a load with resistance equal to the nominal load impedance of the transmitter

**rated output power:** rated output power of the Base Station is the mean power level per carrier that the manufacturer has declared to be available at the antenna connector

**RRC filtered mean power:** mean power as measured through a root raised cosine filter with roll-off factor  $\alpha$  and a bandwidth equal to the chip rate of the radio access mode

NOTE: The RRC filtered mean power of a perfectly modulated WCDMA signal is 0,246 dB lower than the mean power of the same signal.

**uplink operating band:** part of the operating band designated for uplink (BS receive)

**wide area Base Station:** Base Stations characterized by requirements derived from Macro Cell scenarios with a BS to UE minimum coupling loss equal to 70 dB

NOTE: This Base Station class has the same requirements as the general purpose Base Station in Releases 99, 4 and 5.

## 3.2 Symbols

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

$\Delta f$	Separation between the carrier centre frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency
$\Delta f_{\max}$	The largest value of $\Delta f$ used for defining the requirement
CPICH $\hat{E}_c$	Common Pilot Channel code power (on the adjacent channel)
$F_{\text{high}}$	The highest BS transmit frequency of the downlink operating band
$F_{\text{low}}$	The lowest BS transmit frequency of the downlink operating band
$F_{\text{uw}}$	Frequency of unwanted signal
$I_{\text{oh}}$	Total received power density excluding own Home BS signal
$P_{\max}$	Maximum output power

## 3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
ATT	Attenuator
AWGN	Additive White Gaussian Noise
B	appropriate frequency in the Bottom of the operating band of the BS
BER	Bit Error Ratio
BS	Base Station
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
CPICH	Common Pilot Channel
CW	Continuous Wave
DC	Direct Current
DCS	Digital Cellular System
DUT	Device Under Test
E-UTRA	Evolved Universal Terrestrial Radio Access
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
FDD	Frequency Division Duplexing
GMSK	Gaussian Minimum Shift Keying
GSM	Global System for Mobile communications
IMT-2000	International Mobile Telecommunications 2000
M	appropriate frequency in the Middle of the operating band of the BS
MIMO	Multiple Input Multiple Output
MS	Mobile Station
PCCPCH	Primary Common Control Physical CHannel
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency

RMS	Root Mean Square
RRC	Root-Raised Cosine
Rx	Receiver
SCCPCH	Secondary Common Control Physical CHannel
T	appropriate frequency in the Top of the operating band of the BS
TDD	Time Division Duplexing
Tx	Transmitter
UARFCN	UTRA Absolute Radio Frequency Channel Number
UE	User Equipment
UL	Up Link (reverse link)
UMTS	Universal Mobile Telecommunications System
UTRA	Universal Terrestrial Radio Access
WCDMA	Wideband Code Division Multiple Access

## 4 Technical requirements specifications

### 4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

For guidance on how a supplier can declare the environmental profile, see annex C.

### 4.2 Conformance requirements

The requirements in the present document are based on the assumption that the operating band (e.g. band I, III, VII, VIII, XV and XVI) is shared between systems of the IMT-2000 family (for band III and VIII also GSM) or systems having compatible characteristics. Requirements for E-UTRA FDD Base Stations are given in EN 301 908-14 [7].

#### 4.2.1 Introduction

To meet the essential requirement under article 3.2 of Directive 1999/5/EC [i.2] (R&TTE Directive) for IMT-2000 Base Stations (BS), seven essential parameters in addition to those in EN 301 908-1 [5] have been identified. Table 4.2.1-1 provides a cross reference between these seven essential parameters and the corresponding ten technical requirements for equipment within the scope of the present document.

**Table 4.2.1-1: Cross references**

Essential parameter	Corresponding technical requirements
Spectrum emissions mask	4.2.2 Spectrum emissions mask
	4.2.3 Adjacent Channel Leakage power Ratio (ACLR)
	4.2.11 Home BS output power for adjacent channel protection
Conducted spurious emissions from the transmitter antenna connector	4.2.4 Transmitter spurious emissions
Accuracy of maximum output power	4.2.5 Base Station maximum output power
Intermodulation attenuation of the transmitter	4.2.6 Transmit intermodulation
Conducted spurious emissions from the receiver antenna connector	4.2.7 Receiver spurious emissions
Impact of interference on receiver performance	4.2.8 Blocking characteristics
	4.2.9 Receiver intermodulation characteristics
Receiver adjacent channel selectivity	4.2.10 Receiver Adjacent Channel Selectivity (ACS)

The supplier shall declare the Base Station class and operating band(s) for the Base Station. The technical requirements in the present document apply for Base Stations supporting UTRA FDD, for the declared Base Station class and operating band(s) as outlined for each requirement. For a Base Station supporting more than one operating band, conformance testing for each technical requirement in clause 5 shall be performed for each operating band. Base Stations supporting E-UTRA FDD shall fulfil requirements in EN 301 908-14 [7].

The technical requirements also apply to the BS configurations described in annex B.

## 4.2.2 Spectrum emissions mask

### 4.2.2.1 Definition

Out-of-band emissions are unwanted emissions immediately outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out-of-band emission limit is specified in terms of a spectrum emission mask and adjacent channel leakage power ratio for the transmitter.

### 4.2.2.2 Limit

The requirement shall be met by a Base Station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 4.2.2.2-1 to 4.2.2.2-4 for the appropriate BS maximum output power, in the frequency range from  $\Delta f = 2,5$  MHz to  $\Delta f_{\max}$  from the carrier frequency, where:

- $\Delta f$  is the separation between the carrier frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency;
- $f_{\text{offset}}$  is the separation between the carrier frequency and the centre of the measurement filter;
- $f_{\text{offset}_{\max}}$  is either 12,5 MHz or the offset to the UMTS Tx band edge as defined in clause 1, whichever is the greater;
- $\Delta f_{\max}$  is equal to  $f_{\text{offset}_{\max}}$  minus half of the bandwidth of the measuring filter.

**Table 4.2.2.2-1: Spectrum emission mask values, BS maximum output power  $P \geq 43$  dBm**

Frequency offset of measurement filter - 3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2,5 \text{ MHz} \leq \Delta f < 2,7 \text{ MHz}$	$2,515 \text{ MHz} \leq f_{\text{offset}} < 2,715 \text{ MHz}$	-12,5 dBm	30 kHz
$2,7 \text{ MHz} \leq \Delta f < 3,5 \text{ MHz}$	$2,715 \text{ MHz} \leq f_{\text{offset}} < 3,515 \text{ MHz}$	$-12,5 \text{ dBm} - 15 \times \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2,715 \right) \text{ dB}$	30 kHz
	$3,515 \text{ MHz} \leq f_{\text{offset}} < 4,0 \text{ MHz}$	-24,5 dBm	30 kHz
$3,5 \text{ MHz} \leq \Delta f \leq \Delta f_{\max}$	$4,0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\max}}$	-11,5 dBm	1 MHz

**Table 4.2.2.2-2: Spectrum emission mask values, BS maximum output power  $39 \text{ dBm} \leq P < 43 \text{ dBm}$**

Frequency offset of measurement filter - 3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2,5 \text{ MHz} \leq \Delta f < 2,7 \text{ MHz}$	$2,515 \text{ MHz} \leq f_{\text{offset}} < 2,715 \text{ MHz}$	-12,5 dBm	30 kHz
$2,7 \text{ MHz} \leq \Delta f < 3,5 \text{ MHz}$	$2,715 \text{ MHz} \leq f_{\text{offset}} < 3,515 \text{ MHz}$	$-12,5 \text{ dBm} - 15 \times \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2,715 \right) \text{ dB}$	30 kHz
	$3,515 \text{ MHz} \leq f_{\text{offset}} < 4,0 \text{ MHz}$	-24,5 dBm	30 kHz
$3,5 \text{ MHz} \leq \Delta f < 7,5 \text{ MHz}$	$4,0 \text{ MHz} \leq f_{\text{offset}} < 8,0 \text{ MHz}$	-11,5 dBm	1 MHz
$7,5 \text{ MHz} \leq \Delta f \leq \Delta f_{\max}$	$8,0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\max}}$	$P - 54,5 \text{ dB}$	1 MHz

**Table 4.2.2.2-3: Spectrum emission mask values, BS maximum output power  $31 \text{ dBm} \leq P < 39 \text{ dBm}$** 

Frequency offset of measurement filter - 3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2,5 \text{ MHz} \leq \Delta f < 2,7 \text{ MHz}$	$2,515 \text{ MHz} \leq f_{\text{offset}} < 2,715 \text{ MHz}$	$P - 51,5 \text{ dB}$	30 kHz
$2,7 \text{ MHz} \leq \Delta f < 3,5 \text{ MHz}$	$2,715 \text{ MHz} \leq f_{\text{offset}} < 3,515 \text{ MHz}$	$P - 51,5 \text{ dB} - 15 \times \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2,715 \right) \text{ dB}$	30 kHz
	$3,515 \text{ MHz} \leq f_{\text{offset}} < 4,0 \text{ MHz}$	$P - 63,5 \text{ dB}$	30 kHz
$3,5 \text{ MHz} \leq \Delta f < 7,5 \text{ MHz}$	$4,0 \text{ MHz} \leq f_{\text{offset}} < 8,0 \text{ MHz}$	$P - 50,5 \text{ dB}$	1 MHz
$7,5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$8,0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 54,5 \text{ dB}$	1 MHz

**Table 4.2.2.2-4: Spectrum emission mask values, BS maximum output power  $P < 31 \text{ dBm}$** 

Frequency offset of measurement filter - 3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2,5 \text{ MHz} \leq \Delta f < 2,7 \text{ MHz}$	$2,515 \text{ MHz} \leq f_{\text{offset}} < 2,715 \text{ MHz}$	$-20,5 \text{ dBm}$	30 kHz
$2,7 \text{ MHz} \leq \Delta f < 3,5 \text{ MHz}$	$2,715 \text{ MHz} \leq f_{\text{offset}} < 3,515 \text{ MHz}$	$-20,5 \text{ dBm} - 15 \times \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2,715 \right) \text{ dB}$	30 kHz
	$3,515 \text{ MHz} \leq f_{\text{offset}} < 4,0 \text{ MHz}$	$-32,5 \text{ dBm}$	30 kHz
$3,5 \text{ MHz} \leq \Delta f < 7,5 \text{ MHz}$	$4,0 \text{ MHz} \leq f_{\text{offset}} < 8,0 \text{ MHz}$	$-19,5 \text{ dBm}$	1 MHz
$7,5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$8,0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$-23,5 \text{ dBm}$	1 MHz

For Home BS, the requirements in tables 4.2.2.2-5 or 4.2.2.2-6 apply in addition to the requirements in tables 4.2.2.2-1 to 4.2.2.2-4.

**Table 4.2.2.2-5: Additional spectrum emission mask values for Home BS, BS maximum output power  $6 \leq P \leq 20 \text{ dBm}$** 

Frequency offset of measurement filter - 3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level (additional)	Measurement bandwidth
$12,5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$13 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 54,5 \text{ dB}$	1 MHz

**Table 4.2.2.2-6: Additional spectrum emission mask values for Home BS, BS maximum output power  $P < 6 \text{ dBm}$** 

Frequency offset of measurement filter - 3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level (additional)	Measurement bandwidth
$12,5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$13 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$-48,5 \text{ dBm}$	1 MHz

### 4.2.2.3 Conformance

Conformance tests described in clause 5.3.1 shall be carried out.

## 4.2.3 Adjacent channel leakage power ratio (ACLR)

### 4.2.3.1 Definition

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the RRC filtered mean power centred on the assigned channel frequency to the RRC filtered mean power centred on an adjacent channel frequency.

### 4.2.3.2 Limits

The limit for ACLR shall be as specified in table 4.2.3.2-1.

**Table 4.2.3.2-1: BS ACLR limits**

BS channel offset below the first or above the last carrier frequency transmitted	ACLR limit
5 MHz	44,2 dB
10 MHz	49,2 dB
NOTE: For Home BS, the adjacent channel power (the RRC filtered mean power centered on an adjacent channel frequency) shall be less than or equal to -42,7 dBm/3,84 MHz or as specified by the ACLR limit, whichever is the higher.	

### 4.2.3.3 Conformance

Conformance tests described in clause 5.3.2 shall be carried out.

## 4.2.4 Transmitter spurious emissions

### 4.2.4.1 Definition

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out-of-band emissions. This is measured at the Base Station RF output port.

The requirement applies at frequencies within the specified frequency ranges, which are more than 12,5 MHz under the first carrier frequency transmitted or more than 12,5 MHz above the last carrier frequency transmitted.

The requirements of clause 4.2.4.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

Unless otherwise stated, all requirements are measured as mean power.

### 4.2.4.2 Limits

#### 4.2.4.2.1 Spurious emissions

The power of any spurious emission shall not exceed the limit specified in tables 4.2.4.2.1-1 or 4.2.4.2.1-2 depending on the declared operating band.

**Table 4.2.4.2.1-1: BS spurious emissions limits for operating band I, III, VII, XV and XVI**

Frequency range	Maximum level	Measurement bandwidth	Note
9 kHz to 150 kHz	-36 dBm	1 kHz	see note 1
150 kHz to 30 MHz	-36 dBm	10 kHz	see note 1
30 MHz to 1 GHz	-36 dBm	100 kHz	see note 1
1 GHz to $F_{low} - 10$ MHz	-30 dBm	1 MHz	see note 1
$F_{low} - 10$ MHz to $F_{high} + 10$ MHz	-15 dBm	1 MHz	see note 2
$F_{high} + 10$ MHz to 12,75 GHz	-30 dBm	1 MHz	see note 3
NOTE 1: Bandwidth as in ITU-R Recommendation SM.329-10 [3], section 4.1.			
NOTE 2: Limit based on ITU-R Recommendation SM.329-10 [3], section 4.3 and annex 7.			
NOTE 3: Bandwidth as in ITU-R Recommendation SM.329-10 [3], section 4.1. Upper frequency as in ITU-R Recommendation SM.329-10 [3], section 2.5, table 1.			
Key:			
$F_{low}$ :	The lowest BS transmit frequency of the operating band as defined in table 1-1.		
$F_{high}$ :	The highest BS transmit frequency of the operating band as defined in table 1-1.		

**Table 4.2.4.2.1-2: BS spurious emissions limits for operating band VIII**

Frequency range	Maximum level	Measurement bandwidth	Note
9 kHz to 150 kHz	-36 dBm	1 kHz	see note 1
150 kHz to 30 MHz	-36 dBm	10 kHz	see note 1
30 MHz to $F_{low} - 10$ MHz	-36 dBm	100 kHz	see note 1
$F_{low} - 10$ MHz to $F_{high} + 10$ MHz	-16 dBm	100 kHz	see note 2
$F_{high} + 10$ MHz to 1 GHz	-36 dBm	100 kHz	see note 1
1 GHz to 12,75 GHz	-30 dBm	1 MHz	see note 3
NOTE 1: Bandwidth as in ITU-R Recommendation SM.329-10 [3], section 4.1.			
NOTE 2: Limit based on ITU-R Recommendation SM.329-10 [3], section 4.3 and annex 7.			
NOTE 3: Bandwidth as in ITU-R Recommendation SM.329-10 [3], section 4.1. Upper frequency as in ITU-R Recommendation SM.329-10 [3], section 2.5, table 1.			
Key:			
$F_{low}$ : The lowest BS transmit frequency of the operating band as defined in table 1-1.			
$F_{high}$ : The highest BS transmit frequency of the operating band as defined in table 1-1.			

#### 4.2.4.2.2 Co-existence with other systems

This requirement shall be applied for the protection of UE/MS and BS/BTS receivers of other systems.

The power of any spurious emission shall not exceed the limit specified in table 4.2.4.2.2-1.

**Table 4.2.4.2.2-1: Spurious emissions limits for protection of other systems**

Protected system	Frequency range for co-existence requirement	Maximum Level	Measurement Bandwidth	Note
GSM900	921 MHz to 960 MHz	-57 dBm	100 kHz	This requirement does not apply to UTRA FDD BS operating in band VIII.
	876 MHz to 915 MHz	-61 dBm	100 kHz	For the frequency range 880 MHz to 915 MHz, this requirement does not apply to UTRA FDD BS operating in band VIII, since it is already covered by the requirement in clause 4.2.4.2.4.
DCS1800	1 805 MHz to 1 880 MHz	-47 dBm	100 kHz	This requirement does not apply to UTRA FDD BS operating in band III.
	1 710 MHz to 1 785 MHz	-61 dBm	100 kHz	This requirement does not apply to UTRA FDD BS operating in band III, since it is already covered by the requirement in clause 4.2.4.2.4.
UTRA FDD Band I, E-UTRA Band 1	2 110 MHz to 2 170 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band I.
	1 920 MHz to 1 980 MHz	-49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band I, since it is already covered by the requirement in clause 4.2.4.2.4.
UTRA FDD Band III, E-UTRA Band 3	1 805 MHz to 1 880 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band III.
	1 710 MHz to 1 785 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band III, since it is already covered by the requirement in clause 4.2.4.2.4.
UTRA FDD Band VII, E-UTRA Band 7	2 620 MHz to 2 690 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band VII, XV or XVI.
	2 500 MHz to 2 570 MHz	-49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band VII, since it is already covered by the requirement in clause 4.2.4.2.4.
UTRA FDD Band VIII, E-UTRA Band 8	925 MHz to 960 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band VIII.
	880 MHz to 915 MHz	-49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band VIII, since it is already covered by the requirement in clause 4.2.4.2.4.
UTRA FDD Band XV	2 600 MHz to 2 620 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band VII, XV or XVI.
	1 900 MHz to 1 920 MHz	-49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band XV, since it is already covered by the requirement in clause 4.2.4.2.4.



Protected system	Frequency range for co-existence requirement	Maximum Level	Measurement Bandwidth	Note
UTRA FDD Band XVI	2 585 MHz to 2 600 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band VII, XV or XVI.
	2 010 MHz to 2 025 MHz	-49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band XVI, since it is already covered by the requirement in clause 4.2.4.2.4.
UTRA TDD in Band a), E-UTRA Band 33	1 900 MHz to 1 920 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band XV.
UTRA TDD in Band a), E-UTRA Band 34	2 010 MHz to 2 025 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band XVI.
UTRA TDD in Band d), E-UTRA Band 38	2 570 MHz to 2 610 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band XV or XVI.

NOTE: Where the table has two entries for the same or overlapping frequency ranges, both limits shall be applied.

#### 4.2.4.2.3 Co-existence with services in adjacent frequency bands

This requirement shall be applied for the protection in bands adjacent to Operating Bands I, III and VII.

The power of any spurious emission shall not exceed the limits specified in table 4.2.4.2.3-1, depending on the declared operating band.

**Table 4.2.4.2.3-1: Spurious emissions limits for protection of adjacent band services**

Operating Band	Frequency range (f)	Maximum level	Measurement bandwidth
I	2 100 MHz to 2 105 MHz	-30 + 3,4 (f - 2 100 MHz) dBm	1 MHz
	2 175 MHz to 2 180 MHz	-30 + 3,4 (2 180 MHz - f) dBm	1 MHz
III	1 795 MHz to 1 800 MHz	-30 + 3,4 (f - 1 795 MHz) dBm	1 MHz
	1 885 MHz to 1 890 MHz	-30 + 3,4 (1 890 MHz - f) dBm	1 MHz
VII	2 610 MHz to 2 615 MHz	-30 + 3,4 (f - 2 610 MHz) dBm	1 MHz
	2 695 MHz to 2 700 MHz	-30 + 3,4 (2 700 MHz - f) dBm	1 MHz

#### 4.2.4.2.4 Protection of the BS receiver of own or different BS

This requirement shall be applied in order to prevent the receivers of the BSs being desensitized by emissions from a BS transmitter.

The power of any spurious emission shall not exceed the limit specified in tables 4.2.4.2.4-1, 4.2.4.2.4-2 or 4.2.4.2.4-3 depending on the declared Base Station class and operating band.

**Table 4.2.4.2.4-1: Spurious emissions limits for protection of a Wide Area BS receiver**

Operating band	Frequency range	Maximum level	Measurement bandwidth
I	1 920 MHz to 1 980 MHz	-96 dBm	100 kHz
III	1 710 MHz to 1 785 MHz	-96 dBm	100 kHz
VII	2 500 MHz to 2 570 MHz	-96 dBm	100 kHz
VIII	880 MHz to 915 MHz	-96 dBm	100 kHz
XV	1 900 MHz to 1 920 MHz	-96 dBm	100 kHz
XVI	2 010 MHz to 2 025 MHz	-96 dBm	100 kHz

**Table 4.2.4.2.4-2: Spurious emissions limits for protection of a Medium Range BS receiver**

Operating band	Frequency range	Maximum level	Measurement bandwidth
I	1 920 MHz to 1 980 MHz	-86 dBm	100 kHz
III	1 710 MHz to 1 785 MHz	-86 dBm	100 kHz
VII	2 500 MHz to 2 570 MHz	-86 dBm	100 kHz
VIII	880 MHz to 915 MHz	-86 dBm	100 kHz
XV	1 900 MHz to 1 920 MHz	-86 dBm	100 kHz
XVI	2 010 MHz to 2 025 MHz	-86 dBm	100 kHz

**Table 4.2.4.2.4-3: Spurious emissions limits for protection of a Local Area BS and Home BS receiver**

Operating band	Frequency range	Maximum level	Measurement bandwidth
I	1 920 MHz to 1 980 MHz	-82 dBm	100 kHz
III	1 710 MHz to 1 785 MHz	-82 dBm	100 kHz
VII	2 500 MHz to 2 570 MHz	-82 dBm	100 kHz
VIII	880 MHz to 915 MHz	-82 dBm	100 kHz
XV	1 900 MHz to 1 920 MHz	-82 dBm	100 kHz
XVI	2 010 MHz to 2 025 MHz	-82 dBm	100 kHz

#### 4.2.4.2.5 Co-existence with Home BS operating in other bands

These requirements shall be applied for the protection of Home BS receivers operating in other bands. These requirements are only applicable to Home BS.

The power of any spurious emission shall not exceed the limits of table 4.2.4.2.5-1 for a Home BS.

**Table 4.2.4.2.5-1: Spurious emissions limits for protection of a Home BS receiver**

Protected band	Frequency range	Maximum level	Measurement bandwidth
I	1 920 MHz to 1 980 MHz	-82 dBm	100 kHz
III	1 710 MHz to 1 785 MHz	-82 dBm	100 kHz
VII	2 500 MHz to 2 570 MHz	-82 dBm	100 kHz
VIII	880 MHz to 915 MHz	-82 dBm	100 kHz
XV	1 900 MHz to 1 920 MHz	-82 dBm	100 kHz
XVI	2 010 MHz to 2 025 MHz	-82 dBm	100 kHz

#### 4.2.4.3 Conformance

Conformance tests described in clause 5.3.3 shall be carried out.

### 4.2.5 Base Station maximum output power

#### 4.2.5.1 Definition

Maximum output power,  $P_{\max}$ , of the Base Station is the mean power level per carrier measured at the antenna connector in specified reference condition.

#### 4.2.5.2 Limit

In normal conditions, the Base Station maximum output power shall remain within +2,7 dB and -2,7 dB of the manufacturer's rated output power.

In extreme conditions, the Base Station maximum output power shall remain within +3,2 dB and -3,2 dB of the manufacturer's rated output power.

### 4.2.5.3 Conformance

Conformance tests described in clause 5.3.4 shall be carried out.

## 4.2.6 Transmit intermodulation

### 4.2.6.1 Definition

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non-linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

The transmit intermodulation level is the power of the intermodulation products when a WCDMA-modulated interference signal is injected into an antenna connector at a mean power level of 30 dB lower than that of the mean power of the wanted signal. The frequency of the interference signal shall be  $\pm 5$  MHz,  $\pm 10$  MHz and  $\pm 15$  MHz offset from the subject signal carrier frequency, but excluding interference frequencies that are outside of the allocated frequency band for UTRA-FDD downlink specified in clause 1.

The requirements are applicable for a single carrier.

### 4.2.6.2 Limit

In the frequency range relevant for this test, the transmit intermodulation level shall not exceed the out-of-band emission or the spurious emission requirements of clauses 4.2.2.2, 4.2.3.2 and 4.2.4.2 in the presence of a WCDMA-modulated interference signal with a mean power level 30 dB lower than the mean power of the wanted signal.

### 4.2.6.3 Conformance

Conformance tests described in clause 5.3.5 shall be carried out.

## 4.2.7 Receiver spurious emissions

### 4.2.7.1 Definition

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.

### 4.2.7.2 Limit

The power of any spurious emission shall not exceed the limit specified in table 4.2.7.2-1. In addition, the power of any spurious emission shall not exceed the limit specified in table 4.2.7.2-2 depending on the declared operating band.

**Table 4.2.7.2-1: Spurious emission minimum requirement (general)**

Frequency range	Maximum level	Measurement bandwidth	Note
30 MHz to 1 GHz	-57 dBm	100 kHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency transmitted by the BS transmitter.
1 GHz to 12,75 GHz	-47 dBm	1 MHz	

**Table 4.2.7.2-2: Spurious emission minimum requirement (operating band specific)**

Operating band	Frequency range	Maximum level	Measurement bandwidth	Note
I	1 900 MHz to 1 980 MHz and 2 010 MHz to 2 025 MHz	-78 dBm	3,84 MHz	
III	1 710 MHz to 1 785 MHz	-78 dBm	3,84 MHz	
VII	2 500 MHz to 2 570 MHz	-78 dBm	3,84 MHz	
VIII	880 MHz to 915 MHz	-78 dBm	3,84 MHz	
XV	1 900 MHz to 1 920 MHz	-78 dBm	3,84 MHz	
XVI	2 010 MHz to 2 025 MHz	-78 dBm	3,84 MHz	

### 4.2.7.3 Conformance

Conformance tests described in clause 5.3.6 shall be carried out.

## 4.2.8 Blocking characteristics

### 4.2.8.1 Definition

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 4.2.8.2-1, 4.2.8.2-2 or 4.2.8.2-3.

### 4.2.8.2 Limit

The BER shall not exceed 0,001 for the parameters specified in tables 4.2.8.2-1, 4.2.8.2-2 or 4.2.8.2-3 depending on the declared Base Station class and operating band.

In addition for Base Stations operating in band III or VIII, the BER shall not exceed 0,001 for the parameters specified in tables 4.2.8.2-4, 4.2.8.2-5 or 4.2.8.2-6, depending on the declared Base Station class and operating band.

Table 4.2.8.2-1: Blocking characteristics for Wide Area BS

Operating band	Centre frequency of interfering signal	Interfering signal mean power	Wanted signal mean power	Minimum offset of interfering signal	Type of interfering signal
I	1 920 MHz to 1 980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 900 MHz to 1 920 MHz 1 980 MHz to 2 000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 900 MHz 2 000 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier
III	1 710 MHz to 1 785 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 690 MHz to 1 710 MHz 1 785 MHz to 1 805 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 690 MHz 1 805 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier
VII	2 500 MHz to 2 570 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	2 480 MHz to 2 500 MHz 2 570 MHz to 2 590 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 2 480 MHz 2 590 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier
VIII	880 MHz to 915 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	860 MHz to 880 MHz 915 MHz to 925 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 860 MHz 925 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier
XV	1 900 MHz to 1 920 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 880 MHz to 1 900 MHz 1 920 MHz to 1 940 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 880 MHz 1 940 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier
XV and I (see note 2)	1 900 MHz to 1 980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 880 MHz to 1 900 MHz 1 980 MHz to 2 000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 880 MHz 2 000 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier
XVI	2 010 MHz to 2 025 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 990 MHz to 2 010 MHz 2 025 MHz to 2 045 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 990 MHz 2 045 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

NOTE 1: The characteristics of the WCDMA interference signal are specified in TS 125 141 [2], annex I.  
NOTE 2: This requirement applies for a BS supporting both Band XV and Band I.

Table 4.2.8.2-2: Blocking characteristics for Medium Range BS

Operating band	Centre frequency of interfering signal	Interfering signal mean power	Wanted signal mean power	Minimum offset of interfering signal	Type of interfering signal
I	1 920 MHz to 1 980 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 900 MHz to 1 920 MHz 1 980 MHz to 2 000 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 900 MHz 2 000 MHz to 12 750 MHz	-15 dBm	-105 dBm	-	CW carrier
III	1 710 MHz to 1 785 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 690 MHz to 1 710 MHz 1 785 MHz to 1 805 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 690 MHz 1 805 MHz to 12 750 MHz	-15 dBm	-105 dBm	-	CW carrier
VII	2 500 MHz to 2 570 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	2 480 MHz to 2 500 MHz 2 570 MHz to 2 590 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 2 480 MHz 2 590 MHz to 12 750 MHz	-15 dBm	-105 dBm	-	CW carrier
VIII	880 MHz to 915 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	860 MHz to 880 MHz 915 MHz to 925 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 860 MHz 925 MHz to 12 750 MHz	-15 dBm	-105 dBm	-	CW carrier
XV	1 900 MHz to 1 920 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 880 MHz to 1 900 MHz 1 920 MHz to 1 940 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 880 MHz 1 940 MHz to 12 750 MHz	-15 dBm	-105 dBm	-	CW carrier
XV and I (see note 2)	1 900 MHz to 1 980 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 880 MHz to 1 900 MHz 1 980 MHz to 2 000 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 880 MHz 2 000 MHz to 12 750 MHz	-15 dBm	-105 dBm	-	CW carrier
XVI	2 010 MHz to 2 025 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 990 MHz to 2 010 MHz 2 025 MHz to 2 045 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 990 MHz 2 045 MHz to 12 750 MHz	-15 dBm	-105 dBm	-	CW carrier

NOTE 1: The characteristics of the WCDMA interference signal are specified in TS 125 141 [2], annex I.  
NOTE 2: This requirement applies for a BS supporting both Band XV and Band I.

**Table 4.2.8.2-3: Blocking characteristics for Local Area BS and Home BS**

Operating band	Centre frequency of interfering signal	Interfering signal mean power	Wanted signal mean power	Minimum offset of interfering signal	Type of interfering signal
I	1 920 MHz to 1 980 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 900 MHz to 1 920 MHz 1 980 MHz to 2 000 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 900 MHz 2 000 MHz to 12 750 MHz	-15 dBm	-101 dBm	-	CW carrier
III	1 710 MHz to 1 785 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 690 MHz to 1 710 MHz 1 785 MHz to 1 805 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 690 MHz 1 805 MHz to 12 750 MHz	-15 dBm	-101 dBm	-	CW carrier
VII	2 500 MHz to 2 570 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	2 480 MHz to 2 500 MHz 2 570 MHz to 2 590 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 2 480 MHz 2 590 MHz to 12 750 MHz	-15 dBm	-101 dBm	-	CW carrier
VIII	880 MHz to 915 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	860 MHz to 880 MHz 915 MHz to 925 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 860 MHz 925 MHz to 12 750 MHz	-15 dBm	-101 dBm	-	CW carrier
XV	1 900 MHz to 1 920 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 880 MHz to 1 900 MHz 1 920 MHz to 1 940 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 880 MHz 1 940 MHz to 12 750 MHz	-15 dBm	-101 dBm	-	CW carrier
XV and I (see note 2)	1 900 MHz to 1 980 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 880 MHz to 1 900 MHz 1 980 MHz to 2 000 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 880 MHz 2 000 MHz to 12 750 MHz	-15 dBm	-101 dBm	-	CW carrier
XVI	2 010 MHz to 2 025 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 990 MHz to 2 010 MHz 2 025 MHz to 2 045 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal (see note 1)
	1 MHz to 1 990 MHz 2 045 MHz to 12 750 MHz	-15 dBm	-101 dBm	-	CW carrier

NOTE 1: The characteristics of the WCDMA interference signal are specified in TS 125 141 [2], annex I.  
NOTE 2: This requirement applies for a BS supporting both Band XV and Band I.

**Table 4.2.8.2-4: Narrowband blocking characteristics for Wide Area BS (operating band III and VIII)**

Operating band	Centre frequency of interfering signal	Interfering signal mean power	Wanted signal mean power	Minimum offset of interfering signal	Type of interfering signal
III	1 710 MHz to 1 785 MHz	-47 dBm	-115 dBm	2,8 MHz	GMSK modulated (see note)
VIII	880 MHz to 915 MHz	-47 dBm	-115 dBm	2,8 MHz	GMSK modulated (see note)

NOTE: GMSK modulation as defined in TS 145 004 [6].

**Table 4.2.8.2-5: Narrowband blocking characteristics for Medium Range BS  
(operating band III and VIII)**

Operating band	Centre frequency of interfering signal	Interfering signal mean power	Wanted signal mean power	Minimum offset of interfering signal	Type of interfering signal
III	1 710 MHz to 1 785 MHz	-42 dBm	-105 dBm	2,8 MHz	GMSK modulated (see note)
VIII	880 MHz to 915 MHz	-42 dBm	-105 dBm	2,8 MHz	GMSK modulated (see note)

NOTE: GMSK modulation as defined in TS 145 004 [6].

**Table 4.2.8.2-6: Narrowband blocking characteristics for Local Area BS and Home BS  
(operating band III and VIII)**

Operating band	Centre frequency of interfering signal	Interfering signal mean power	Wanted signal mean power	Minimum offset of interfering signal	Type of interfering signal
III	1 710 MHz to 1 785 MHz	-37 dBm	-101 dBm	2,8 MHz	GMSK modulated (see note)
VIII	880 MHz to 915 MHz	-37 dBm	-101 dBm	2,8 MHz	GMSK modulated (see note)

NOTE: GMSK modulation as defined in TS 145 004 [6].

### 4.2.8.3 Conformance

Conformance tests described in clause 5.3.7 shall be carried out.

## 4.2.9 Receiver intermodulation characteristics

### 4.2.9.1 Definition

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 receive 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.

### 4.2.9.2 Limit

The BER shall not exceed 0,001 for the parameters specified in tables 4.2.9.2-1, 4.2.9.2-2 or 4.2.9.2-3, depending on the declared Base Station class.

In addition for Base Stations operating in band III or VIII, the BER shall not exceed 0,001 for the parameters specified in tables 4.2.9.2-4, 4.2.9.2-5 or 4.2.9.2-6, depending on the declared Base Station class and operating band.

**Table 4.2.9.2-1: Interferer signals for Wide Area BS  
intermodulation performance requirement**

Type of signal	Offset	Signal mean power
Wanted signal	-	-115 dBm
CW signal	10 MHz	-48 dBm
WCDMA signal (see note)	20 MHz	-48 dBm

NOTE: The characteristics of the WCDMA interference signal are specified in TS 125 141 [2], annex I.



**Table 4.2.9.2-2: Interferer signals for Medium Range BS intermodulation performance requirement**

Type of signal	Offset	Signal mean power
Wanted signal	-	-105 dBm
CW signal	10 MHz	-44 dBm
WCDMA signal (see note)	20 MHz	-44 dBm
NOTE: The characteristics of the WCDMA interference signal are specified in TS 125 141 [2], annex I.		

**Table 4.2.9.2-3: Interferer signals for Local Area BS and Home BS intermodulation performance requirement**

Type of signal	Offset	Signal mean power
Wanted signal	-	-101 dBm
CW signal	10 MHz	-38 dBm
WCDMA signal (see note)	20 MHz	-38 dBm
NOTE: The characteristics of the WCDMA interference signal are specified in TS 125 141 [2], annex I.		

**Table 4.2.9.2-4: Narrowband interferer signals for Wide Area BS intermodulation performance requirement (operating band III and VIII)**

Type of signal	Offset	Signal mean power
Wanted signal	-	-115 dBm
CW signal	3,5 MHz	-47 dBm
GMSK signal (see note)	5,9 MHz	-47 dBm
NOTE: GMSK modulation as defined in TS 145 004 [6].		

**Table 4.2.9.2-5: Narrowband interferer signals for Medium Range BS intermodulation performance requirement (operating band III and VIII)**

Type of signal	Offset	Signal mean power
Wanted signal	-	-105 dBm
CW signal	3,5 MHz	-43 dBm
GMSK signal (see note)	5,9 MHz	-43 dBm
NOTE: GMSK modulation as defined in TS 145 004 [6].		

**Table 4.2.9.2-6: Narrowband interferer signals for Local Area BS and Home BS intermodulation performance requirement (operating band III and VIII)**

Type of signal	Offset	Signal mean power
Wanted signal	-	-101 dBm
CW signal	3,5 MHz	-37 dBm
GMSK signal (see note)	5,9 MHz	-37 dBm
NOTE: GMSK modulation as defined in TS 145 004 [6].		

### 4.2.9.3 Conformance

Conformance tests described in clause 5.3.8 shall be carried out.

## 4.2.10 Receiver adjacent channel selectivity

### 4.2.10.1 Definition

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  $F_{uw}$ . The interference signal shall be a WCDMA signal as specified in TS 125 141 [2], annex I.

### 4.2.10.2 Limit

The BER shall not exceed 0,001 using the parameters specified in tables 4.2.10.2-1, 4.2.10.2-2, 4.2.10.2-3 and/or 4.2.10.2-4 depending on the declared Base Station class.

**Table 4.2.10.2-1: Adjacent channel selectivity for Wide Area BS**

Parameter	Level	Unit
Reference measurement channel data rate	12,2	kbit/s
Wanted signal mean power	-115	dBm
Interfering signal mean power	-52	dBm
$F_{uw}$ offset (modulated)	$\pm 5$	MHz

**Table 4.2.10.2-2: Adjacent channel selectivity for Medium Range BS**

Parameter	Level	Unit
Reference measurement channel data rate	12,2	kbit/s
Wanted signal mean power	-105	dBm
Interfering signal mean power	-42	dBm
$F_{uw}$ offset (modulated)	$\pm 5$	MHz

**Table 4.2.10.2-3: Adjacent channel selectivity for Local Area BS and Home BS**

Parameter	Level	Unit
Reference measurement channel data rate	12,2	kbit/s
Wanted signal mean power	-101	dBm
Interfering signal mean power	-38	dBm
$F_{uw}$ offset (modulated)	$\pm 5$	MHz

**Table 4.2.10.2-4: Adjacent channel selectivity for Home BS (additional requirement)**

Parameter	Level	Unit
Reference measurement channel data rate	12,2	kbit/s
Wanted signal mean power	-91	dBm
Interfering signal mean power	-28	dBm
$F_{uw}$ offset (modulated)	$\pm 5$	MHz
NOTE:	This additional requirement for Home BS ensures the performance is met over a large dynamic range.	

### 4.2.10.3 Conformance

Conformance tests described in clause 5.3.9 shall be carried out.

## 4.2.11 Home BS output power for adjacent channel protection

### 4.2.11.1 Definition

The Home BS shall be capable of adjusting the transmitter output power to minimize the interference level on the adjacent channels while optimize the Home BS coverage, in case an adjacent channel is licensed to another operator in the same geographical area. These requirements are only applicable to Home BS. The requirements in this clause are applicable for AWGN radio propagation conditions.

### 4.2.11.2 Limit

The output power,  $P_{out}$ , of the Home BS shall be as specified in table 4.2.11.2-1 under the following input conditions:

- $CPICH \hat{E}_c$ , measured in dBm, is the code power of the Primary CPICH on one of the adjacent channels presented at the Home BS antenna connector for the CPICH received on the adjacent channels. If Tx diversity is applied on the Primary CPICH,  $CPICH \hat{E}_c$  shall be the sum (in W) of the code powers of the Primary CPICH transmitted from each antenna.
- $I_{oh}$ , measured in dBm, is the total received power density, including signals and interference but excluding the own Home BS signal, presented at the Home BS antenna connector on the Home BS operating channel.

The input conditions defined for the requirements in this clause are specified at the antenna connector of the Home BS. For Home BS receivers with diversity, the requirements apply to each antenna connector separately, with the other one(s) terminated or disabled. The requirements are otherwise unchanged. For Home BS(s) without measurement capability, a reference antenna with a gain of 0 dBi is assumed for converting these power levels into field strength requirements.

**Table 4.2.11.2-1: Home BS output power for adjacent operator channel protection**

Input Conditions	Output power, $P_{out}$ (without transmit diversity or MIMO)	Output power, $P_{out}$ (with transmit diversity or MIMO)
$I_{oh} > CPICH \hat{E}_c + 43$ dB and $CPICH \hat{E}_c \geq -105$ dBm	$\leq 10$ dBm	$\leq 7$ dBm
$I_{oh} \leq CPICH \hat{E}_c + 43$ dB and $CPICH \hat{E}_c \geq -105$ dBm	$\leq \max(8 \text{ dBm}, \min(20 \text{ dBm},$ $CPICH \hat{E}_c + 100 \text{ dB}))$	$\leq \max(5 \text{ dBm}, \min(17 \text{ dBm},$ $CPICH \hat{E}_c + 97 \text{ dB}))$
$CPICH \hat{E}_c < -105$ dBm	$\leq + 20$ dBm	$\leq + 17$ dBm

In normal operating conditions, the output power,  $P_{out}$ , of the Home BS shall be equal to or less than the value specified in table 4.2.11.2-1 plus 2,7 dB.

In extreme operating conditions, the output power,  $P_{out}$ , of the Home BS shall be equal to or less than the value specified in table 4.2.11.2-1 plus 3,2 dB.

### 4.2.11.3 Conformance

Conformance tests described in clause 5.3.10 shall be carried out.

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## 5 Testing for compliance with technical requirements

### 5.1 Environmental conditions for testing

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile.

Where technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions (within the boundary limits of the declared operational environmental profile) to give confidence of compliance for the affected technical requirements.

Normally it should be sufficient for all tests to be conducted using normal test conditions except where otherwise stated. For guidance on the use of other test conditions to be used in order to show compliance reference can be made to TS 125 141 [2], clause 4.4.

Many tests in the present document are performed with appropriate frequencies in the bottom, middle and top of the operating frequency band of the BS. These are denoted as RF channels B (bottom), M (middle) and T (top) and are defined in TS 125 141 [2], clause 4.8.

The measurement system required for each test is described in TS 125 141 [2], annex B.

## 5.2 Interpretation of the measurement results

The interpretation of the results recorded in a test report for the measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit will be used to decide whether equipment meets the requirements of the present document;
- the value of the measurement uncertainty for the measurement of each parameter shall be included in the test report;
- the recorded value of the measurement uncertainty shall be, for each measurement, equal to or lower than the figures in table 5.2-1.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  (which provides a confidence level of 95 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Principles for the calculation of measurement uncertainty are contained in TR 100 028 [i.6] or TR 102 215 [i.5].

Table 5.2-1 is based on this expansion factor.

In all the relevant clauses in this clause all Bit Error Ratio (BER) measurements shall be carried out according to the general rules for statistical testing defined in ITU-T Recommendation O.153 [4] and TS 125 141 [2], annex C.

**Table 5.2-1: Maximum uncertainty of the test system**

Parameter	Conditions	Uncertainty
Spectrum emissions mask		±1,5 dB
Adjacent Channel Leakage power Ratio (ACLR)	ACLR limit Adjacent channel power limit Absolute limit for Home BS ±1,5 dB	±0,8 dB ±2,0 dB
Transmitter spurious emissions	For "Spurious emissions": f ≤ 2,2 GHz 2,2 GHz < f ≤ 4 GHz f > 4 GHz For the co-existence requirements For protection of the BS receiver	±1,5 dB ±2,0 dB ±4,0 dB ±2,0 dB ±3,0 dB
Base Station maximum output power, Home BS output power for adjacent channel protection		±0,7 dB
Transmit intermodulation	For spectrum emissions mask For ACLR For "Spurious emissions": f ≤ 2,2 GHz 2,2 GHz < f ≤ 4 GHz f > 4 GHz For co-existence requirements Interference signal	±2,5 dB ±2,2 dB ±2,5 dB ±2,8 dB ±4,5 dB ±2,8 dB ±1,0 dB
Receiver spurious emissions	For BS receive bands (-78 dBm) Outside the BS receive bands: f ≤ 2,2 GHz 2,2 GHz < f ≤ 4 GHz f > 4 GHz	±3,0 dB ±2,0 dB ±2,0 dB ±4,0 dB

Parameter	Conditions	Uncertainty
Blocking characteristics	For offset < 15 MHz	±1,4 dB
	For offset ≥ 15 MHz and:	
	f ≤ 2,2 GHz	±1,1 dB
	2,2 GHz < f ≤ 4 GHz	±1,8 dB
	f > 4 GHz	±3,2 dB
Receiver intermodulation characteristics		±1,3 dB
Receiver Adjacent Channel Selectivity (ACS)		±1,1 dB
NOTE 1: For RF tests it should be noted that the uncertainties in table 5.2-1 apply to the test system operating into a nominal 50 Ω load and do not include system effects due to mismatch between the EUT and the test system.		
NOTE 2: If the test system for a test is known to have a measurement uncertainty greater than that specified in table 5.2-1, this equipment can still be used, provided that an adjustment is made follows: any additional uncertainty in the test system over and above that specified in table 5.2-1 is used to tighten the test requirements - making the test harder to pass (for some tests, e.g. receiver tests, this may require modification of stimulus signals). This procedure will ensure that a test system not compliant with table 5.2-1 does not increase the probability of passing an EUT that would otherwise have failed a test if a test system compliant with table 5.2-1 had been used.		

## 5.3 Essential radio test suites

This clause describes the test suites for UTRA FDD. E-UTRA FDD Base Station test suites are in EN 301 908-14 [7].

### 5.3.1 Spectrum emission mask

#### 5.3.1.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: B, M and T; see clause 5.1.

- 1) Set-up the equipment as shown in TS 125 141 [2], annex B.  
As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity, efficiency and avoiding e.g. carrier leakage, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.
- 2) Measurements with an offset from the carrier centre frequency between 2,515 MHz and 4,0 MHz shall use a 30 kHz measurement bandwidth.
- 3) Measurements with an offset from the carrier centre frequency between 4,0 MHz and  $(f_{\text{offset}_{\text{max}}} - 500 \text{ kHz})$  shall use a 1 MHz measurement bandwidth.
- 4) Detection mode: true RMS voltage or true average power.

#### 5.3.1.2 Procedures

- 1) Set the BS to transmit a signal in accordance to test model 1 in TS 125 141 [2] at the manufacturer's specified maximum output power.
- 2) Step the centre frequency of the measurement filter in contiguous steps and measure the emission within the specified frequency ranges with the specified measurement bandwidth and note that the measured value does not exceed the specified value.

The results obtained shall be compared to the limits in clause 4.2.2.2 in order to prove compliance.

## 5.3.2 Adjacent Channel Leakage power Ratio (ACLR)

### 5.3.2.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: B, M and T with multiple carriers if supported; see clause 5.1.

- 1) Connect measurement device to the Base Station RF output port as shown in TS 125 141 [2], annex B.
- 2) The measurement device characteristics shall be:
  - measurement filter bandwidth: defined in clause 4.2.3.1;
  - detection mode: true RMS voltage or true average power.
- 3) Set the Base Station to transmit a signal modulated in accordance with TS 125 141 [2] Test model 1. The mean power at the RF output port shall be the maximum output power as specified by the manufacturer.
- 4) Set carrier frequency within the frequency band supported by BS. Minimum carrier spacing shall be 5 MHz and maximum carrier spacing shall be specified by manufacturer.

### 5.3.2.2 Procedure

Measure Adjacent channel leakage power ratio and Adjacent channel power for 5 MHz and 10 MHz offsets both side of channel frequency. In multiple carrier case only offset frequencies below the lowest and above the highest carrier frequency transmitted shall be measured.

The results obtained shall be compared to the limits in clause 4.2.3.2 in order to prove compliance.

## 5.3.3 Transmitter spurious emissions

### 5.3.3.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: B, M and T with multiple carriers if supported; see clause 5.1.

- 1) Connect the BS antenna connector to a measurement receiver using an attenuator or a directional coupler if necessary.
- 2) Measurements shall use a measurement bandwidth in accordance to the tables in clause 4.2.4.2.
- 3) Detection mode: true RMS voltage or true average power.
- 4) Configure the BS with transmitters active at their maximum output power.

### 5.3.3.2 Procedure

- 1) Set the BS to transmit a signal in accordance with TS 125 141 [2] Test model 1 and at the manufacturer's specified maximum output power.
- 2) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value.

The results obtained shall be compared to the limits in clause 4.2.4.2 in order to prove compliance.

## 5.3.4 Base Station maximum output power

### 5.3.4.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: B, M and T; see clause 5.1.

In addition, on one UARFCN only, the test shall be performed under extreme power supply as defined in TS 125 141 [2], clause 4.4.4.

NOTE: Tests under extreme power supply also test extreme temperature.

- 1) Connect the power measuring equipment to the Base Station RF output port.

### 5.3.4.2 Procedure

- 1) Set the Base Station to transmit a signal modulated with a combination of PCCPCH, SCCPCH and dedicated physical channels specified as test model 1 in TS 125 141 [2], clause 6.1.1.1.
- 2) Measure the mean power at the RF output port.

The results obtained shall be compared to the limits in clause 4.2.5.2 in order to prove compliance.

## 5.3.5 Transmit intermodulation

### 5.3.5.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: B, M and T; see clause 5.1.

- 1) Test set-up in accordance to TS 125 141 [2], annex B.

### 5.3.5.2 Procedures

- 1) Generate the wanted signal in accordance to test model 1 in TS 125 141 [2], clause 6.1.1.1 at specified maximum BS output power.
- 2) Generate the interference signal in accordance to test model 1 in TS 125 141 [2], clause 6.1.1.1 with frequency offset of 5 MHz relative to the wanted signal, but excluding interference frequencies that are outside of the allocated frequency band for UTRA-FDD downlink specified in the scope of the present document.
- 3) Adjust ATT1 so the level of the WCDMA-modulated interference signal at BS is 30 dB below the wanted signal.
- 4) Perform the out-of-band emission tests as specified in clauses 5.3.1 and 5.3.2 for all third and fifth order intermodulation products which appear in the frequency ranges defined in clauses 5.3.1 and 5.3.2. The width of the intermodulation products shall be taken into account.
- 5) Perform the spurious emission test as specified in clause 5.3.3 for all third and fifth order intermodulation products which appear in the frequency ranges defined in clause 5.3.3. The width of the intermodulation products shall be taken into account.
- 6) Verify that the emission level does not exceed the required level with the exception of interference signal frequencies.
- 7) Repeat the test for interference frequency off set of -5 MHz, but excluding interference frequencies that are outside of the allocated frequency band for UTRA-FDD downlink specified in clause 1.

- 8) Repeat the test for interference frequency off set of  $\pm 10$  MHz and  $\pm 15$  MHz, but excluding interference frequencies that are outside of the allocated frequency band for UTRA-FDD downlink specified in clause 1.

NOTE: The third order intermodulation products are  $(F1 \pm 2F2)$  and  $(2F1 \pm F2)$ , the fifth order intermodulation products are  $(2F1 \pm 3F2)$ ,  $(3F1 \pm 2F2)$ ,  $(4F1 \pm F2)$ , and  $(F1 \pm 4F2)$ , where  $F1$  represents the subject signal frequencies of 5 MHz channel and  $F2$  represents the interference signal frequencies of 5 MHz channel. The width of intermodulation products is 15 MHz for third order intermodulation products and 25 MHz for fifth order intermodulation products based on a bandwidth of 5 MHz for subject and interference signal.

The results obtained shall be compared to the limits in clause 4.2.6.2 in order to prove compliance.

## 5.3.6 Receiver spurious emissions

### 5.3.6.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: M, with multi-carrier if supported; see clause 5.1.

- 1) Connect a measurement receiver to the BS antenna connector as shown in TS 125 141 [2], annex B.
- 2) Enable the BS receiver.
- 3) Start BS transmission with channel configuration as specified in TS 125 141 [2], tables 6.1 and 6.2 (Test model 1) at  $P_{max}$ .

### 5.3.6.2 Procedure

- 1) Terminate the BS Tx antenna connector as shown in TS 125 141 [2] annex B.
- 2) Set measurement equipment parameters as specified in table 5.3.6.2-1.
- 3) Measure the spurious emissions over each frequency range described in clause 4.2.7.2.
- 4) Repeat the test using diversity antenna connector if available.

**Table 5.3.6.2-1: Measurement equipment parameters**

<b>Measurement bandwidth</b>	as in table 4.2.7.2-1
<b>Sweep frequency range</b>	30 MHz to 12,75 GHz
<b>Detection</b>	true RMS voltage or true average power

The results obtained shall be compared to the limits in clause 4.2.7.2 in order to prove compliance.

## 5.3.7 Blocking characteristics

### 5.3.7.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: M; see clause 5.1. The BS shall be configured to operate as close to the centre of the operating band as possible.

- 1) Connect WCDMA signal generator at the assigned channel frequency of the wanted signal and a signal generator to the antenna connector of one Rx port.
- 2) Terminate any other Rx port not under test.



- 3) Transmit a signal from the WCDMA signal generator to the BS. The characteristics of the signal shall be set according to the UL reference measurement channel (12,2 kbit/s) specified in TS 125 141 [2], clause A.2.1. The level of the WCDMA signal measured at the BS antenna connector shall be set to the level specified in clause 4.2.8.2.

### 5.3.7.2 Procedure

- 1) Set the signal generator to produce an interfering signal at a frequency offset  $F_{uw}$  from the assigned channel frequency of the wanted signal which is given by:

$$F_{uw} = \pm(n \times 1 \text{ MHz});$$

where n shall be increased in integer steps from n = 10 up to such a value that the centre frequency of the interfering signal covers the range from 1 MHz to 12,75 GHz. The interfering signal level measured at the antenna connector shall be set in dependency of its centre frequency, as specified in tables 4.2.8.2-1 to 4.2.8.2-6. The type of the interfering signal is either equivalent to a continuous WCDMA signal with one code of chip frequency 3,84 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off  $\alpha = 0,22$ , a CW signal or a GMSK modulated signal; see tables 4.2.8.2-1 to 4.2.8.2-6.

For narrowband blocking, the GMSK modulated interfering signal shall have an ACLR of at least 72 dB in order to eliminate the impact of interference signal adjacent channel leakage power on the intermodulation characteristics measurement.

- 2) Measure the BER of the wanted signal at the BS receiver.
- 3) Interchange the connections of the BS Rx ports and repeat the measurements according to steps 1) to 2).

NOTE: TS 125 141 [2], annex C describes the procedure for BER tests taking into account the statistical consequence of frequent repetition of BER measurements within the blocking test. The consequence is: a DUT exactly on the limit may fail due to the statistical nature 2,55 times (mean value) in 12 750 BER measurements using the predefined wrong decision probability of 0,02 %. If the fail cases are  $\leq 12$ , it is allowed to repeat the fail cases one time before the final verdict.

The results obtained shall be compared to the limits in clause 4.2.8.2 in order to prove compliance.

## 5.3.8 Receiver intermodulation characteristics

### 5.3.8.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: B, M and T; see clause 5.1.

- 1) Set-up the equipment as shown in TS 125 141 [2], annex B.

### 5.3.8.2 Procedures

- 1) Generate the wanted signal (reference signal) and adjust ATT1 to set the signal level to the BS under test to the level specified in table 4.2.9.2-1 to 4.2.9.2-6.
- 2) Adjust the signal generators to type of interfering signal and frequency offset from the frequency of the wanted signal, as specified in tables 4.2.9.2-1 to 4.2.9.2-6. The type of the interfering signal is either equivalent to a continuous WCDMA signal with one code of chip frequency 3,84 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off  $\alpha = 0,22$ , a CW signal or a GMSK modulated signal; see tables 4.2.9.2-1 to 4.2.9.2-6.

For narrowband blocking, the GMSK modulated interfering signal shall have an ACLR of at least 72 dB in order to eliminate the impact of interference signal adjacent channel leakage power on the intermodulation characteristics measurement.

- 3) Adjust the ATT2 and ATT3 to obtain the specified level of interference signal at the BS input.

- 4) Measure the BER.
- 5) Repeat the test for interference signal frequency offset of -10 MHz and -20 MHz for CW and WCDMA modulated respectively.
- 6) Repeat the whole test for the port which was terminated.

The results obtained shall be compared to the limits in clause 4.2.9.2 in order to prove compliance.

## 5.3.9 Adjacent Channel Selectivity (ACS)

### 5.3.9.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: B, M and T; see clause 5.1.

- 1) Set-up the equipment as shown in TS 125 141 [2], annex B.

### 5.3.9.2 Procedure

- 1) Generate the wanted signal and adjust the ATT1 to set the input level to the Base Station under test to the level specified in tables 4.2.10.2-1 to 4.2.10.2-4.
- 2) Set-up the interference signal at the adjacent channel frequency and adjust the ATT2 to obtain the specified level of interference signal at the Base Station input defined in tables 4.2.10.2-1 to 4.2.10.2-4. Note that the interference signal shall have an ACLR of at least 63 dB in order to eliminate the impact of interference signal adjacent channel leakage power on the ACS measurement.
- 3) Measure the BER.
- 4) Repeat the test for the port, which was terminated.

The results obtained shall be compared to the limits in clause 4.2.10.2 in order to prove compliance.

## 5.3.10 Home BS output power for adjacent channel protection

### 5.3.10.1 Initial conditions

Test environment: Normal; see TS 125 141 [2], clause 4.4.1.

RF channels to be tested: M; see clause 5.1.

- 1) Set-up the equipment as shown in TS 125 141 [2], annex B.
- 2) The Home BS is configured such that the adjacent channel is known to belong to another operator.

### 5.3.10.2 Procedure

- 1) Connect the combined downlink interfering signals (referred to as point D in figure B.7 of TS 125 141 [2]) to the dedicated measurement port (referred to as point 1 in figure B.7 of TS 125 141 [2]) if available, otherwise connect to point 2.
- 2) Configure the signal generator for co-channel interference to transmit AWGN over a 3,84 MHz bandwidth centred on RF channel M.
- 3) Configure the signal generator for adjacent channel DL signal to transmit test model 1 in TS 125 141 [2] at the centre frequency equal to RF channel M + 5 MHz.
- 4) Switch on signal generators delivering co-channel and adjacent channel interferers, and adjust the ATT1 and ATT2 such that CPICH  $\hat{E}_c = -80$  dBm and  $I_{oh} = -50$  dBm.
- 5) Trigger the Home BS power adjustment mechanism.

- 6) Configure the Home BS to transmit test model 1 in TS 125 141 [2]. Test model 1 shall be transmitted with the maximum allowed output power.
- 7) Measure Home BS output power,  $P_{out}$ , and check it is below the required value according to the CPICH  $\hat{E}_c$  and  $I_{oh}$  values determined in step 4.
- 8) Repeat steps 3) to 7) with the frequency in step 3 set to RF channel M - 5 MHz.
- 9) Repeat steps 3) to 8) with different settings for ATT1 and ATT2 to arrive the CPICH  $\hat{E}_c$  and  $I_{oh}$  pairs as specified in table 5.3.10.2-1.

**Table 5.3.10.2-1: Test parameter settings**

Test Case	CPICH $\hat{E}_c$ (dBm)	$I_{oh}$ (dBm)
1	-80	-50
2	-90	-60
3	-100	-70
4	-100	-50

The results obtained shall be compared to the limits in clause 4.2.11.2 in order to prove compliance.

## Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT)

The HS Requirements and conformance Test specifications Table (HS-RTT) in table A-1 serves a number of purposes, as follows:

- it provides a statement of all the requirements in words and by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it provides a statement of all the test procedures corresponding to those requirements by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it qualifies each requirement to be either:
  - Unconditional: meaning that the requirement applies in all circumstances, or
  - Conditional: meaning that the requirement is dependent on the manufacturer having chosen to support optional functionality defined within the schedule.
- in the case of Conditional requirements, it associates the requirement with the particular optional service or functionality;
- it qualifies each test procedure to be either:
  - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement shall be demonstrated to be met in accordance with the referenced procedures;
  - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.

**Table A-1: HS Requirements and conformance Test specifications Table (HS-RTT)**

<b>Harmonized Standard EN 301 908-3</b>						
The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive						
<b>Requirement</b>			<b>Requirement Conditionality</b>		<b>Test Specification</b>	
<b>No</b>	<b>Description</b>	<b>Reference: Clause No</b>	<b>U/C</b>	<b>Condition</b>	<b>E/O</b>	<b>Reference: Clause No</b>
1	Spectrum emissions mask	4.2.2	U		E	5.3.1
2	Adjacent channel leakage power ratio (ACLR)	4.2.3	U		E	5.3.2
3	Transmitter spurious emissions	4.2.4	U		E	5.3.3
4	Base Station maximum output power	4.2.5	U		E	5.3.4
5	Transmit intermodulation	4.2.6	U		E	5.3.5
6	Receiver spurious emissions	4.2.7	U		E	5.3.6
7	Blocking characteristics	4.2.8	U		E	5.3.7
8	Receiver intermodulation characteristics	4.2.9	U		E	5.3.8
9	Receiver adjacent channel selectivity (ACS)	4.2.10	U		E	5.3.9
10	Home BS output power for adjacent channel protection	4.2.11	C	Applies to BS declared as Home Base Station.	E	5.3.10

**Key to columns:****Requirement:**

**No** A unique identifier for one row of the table which may be used to identify a requirement or its test specification.

**Description** A textual reference to the requirement.

**Clause Number** Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

**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.

**Clause Number** Identification of clause(s) defining the test specification in the present document unless another document is referenced explicitly. Where no test is specified (that is, where the previous field is "X") this field remains blank.

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## Annex B (normative): Base Station configurations

### B.1 Receiver diversity

For the tests in clause 5 of the present document, the requirement applies at each receiver antenna connector. If the manufacturer has declared the receiver paths to be equivalent, it is sufficient to apply the specified test signal at any one of the receiver antenna connectors, with the remaining receiver(s) disabled or their antenna connectors being terminated.

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### B.2 Duplexers

The requirements of the present document shall be met with a duplexer fitted, if a duplexer is supplied as part of the BS. If the duplexer is supplied as an option by the manufacturer, sufficient tests should be repeated with and without the duplexer fitted to verify that the BS meets the requirements of the present document in both cases.

The following tests should be performed with the duplexer fitted, and without it fitted if this is an option:

- 1) clause 5.3.4, Base Station maximum output power, for the highest static power step only, if this is measured at the antenna connector;
- 2) clause 5.3.3, output RF spectrum emissions; outside the BS transmit band;
- 3) clause 5.3.5, transmit intermodulation; for the testing of conformance, the carrier frequencies should be selected to minimize intermodulation products from the transmitters falling in receive channels. The remaining tests may be performed with or without the duplexer fitted.

NOTE 1: When performing receiver tests with a duplexer fitted, it is important to ensure that the output from the transmitters does not affect the test apparatus. This can be achieved using a combination of attenuators, isolators and filters.

NOTE 2: When duplexers are used, intermodulation products will be generated, not only in the duplexer but also in the antenna system. The intermodulation products generated in the antenna system are not controlled by the specifications, and may degrade during operation (e.g. due to moisture ingress). Therefore, to ensure continued satisfactory operation of a BS, an operator will normally select UARFCNs to minimize intermodulation products falling on receive channels. For testing of complete conformance, an operator may specify the UARFCNs to be used.

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### B.3 Power supply options

If the BS is supplied with a number of different power supply configurations, it may not be necessary to test RF parameters for each of the power supply options, provided that it can be demonstrated that the range of conditions over which the equipment is tested is at least as great as the range of conditions due to any of the power supply configurations.

This applies particularly if a BS contains a DC rail which can be supplied either externally or from an internal mains power supply. In this case, the conditions of extreme power supply for the mains power supply options can be tested by testing only the external DC supply option. The range of DC input voltages for the test should be sufficient to verify the performance with any of the power supplies, over its range of operating conditions within the BS, including variation of mains input voltage, temperature and output current.

## B.4 Ancillary RF amplifiers

The requirements of the present document shall be met with the ancillary RF amplifier fitted. At tests according to clause 5, the ancillary amplifier is connected to the BS by a connecting network (including any cable(s), attenuator(s), etc.) with applicable loss to make sure the appropriate operating conditions of the ancillary amplifier and the BS. The applicable connecting network loss range is declared by the manufacturer. Other characteristics and the temperature dependence of the attenuation of the connecting network are neglected. The actual attenuation value of the connecting network is chosen for each test as one of the applicable extreme values. The lowest value is used unless otherwise stated.

Sufficient tests should be repeated with the ancillary amplifier fitted and, if it is optional, without the ancillary RF amplifier to verify that the BS meets the requirements of the present document in both cases.

When testing, the following tests should be repeated with the optional ancillary amplifier fitted according to table B.4-1, where x denotes that the test is applicable:

**Table B.4-1: Table of tests applicable to Ancillary RF Amplifiers**

	Clause	Tx amplifier only	Rx amplifier only	Tx/Rx amplifiers combined (see note)
<b>Receiver Tests</b>	5.3.7		X	X
	5.3.8		X	X
	5.3.6		X	
<b>Transmitter Tests</b>	5.3.4	X		X
	5.3.2	X		X
	5.3.3	X		X
	5.3.5	X		X
NOTE: Combining can be by duplex filters or any other network. The amplifiers can either be in Rx or Tx branch or in both. Either one of these amplifiers could be a passive network.				

In test according to clause 5.3.4, the highest applicable attenuation value is applied.

## B.5 BS using antenna arrays

A BS may be configured with a multiple antenna port connection for some or all of its transceivers or with an antenna array related to one cell (not one array per transceiver). This clause applies to a BS which meets at least one of the following conditions:

- the transmitter output signals from one or more transceiver appear at more than one antenna port; or
- there is more than one receiver antenna port for a transceiver or per cell and an input signal is required at more than one port for the correct operation of the receiver thus the outputs from the transmitters as well as the inputs to the receivers are directly connected to several antennas (known as "aircombining"); or

NOTE: Diversity reception does not meet this requirement.

- transmitters and receivers are connected via duplexers to more than one antenna.

In case of diversity or MIMO, multiple antennas are not considered as an antenna array.

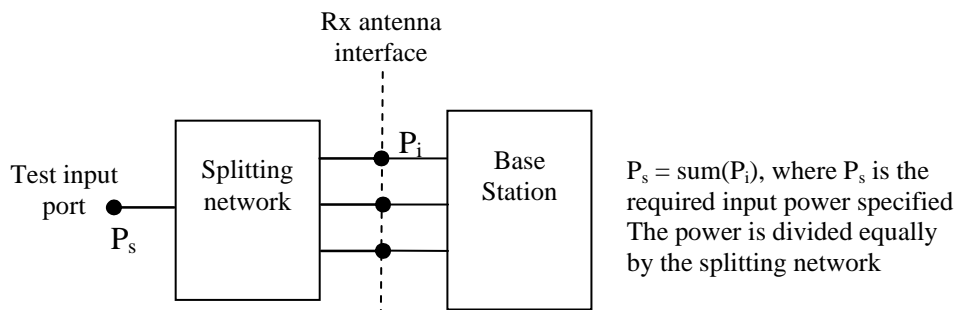
If a BS is used, in normal operation, in conjunction with an antenna system which contains filters or active elements which are necessary to meet the UTRA requirements, the conformance tests may be performed on a system comprising the BS together with these elements, supplied separately for the purposes of testing. In this case, it must be demonstrated that the performance of the configuration under test is representative of the system in normal operation, and the conformance assessment is only applicable when the BS is used with the antenna system.

For conformance testing of such a BS, the following procedure may be used.

## B.5.1 Receiver tests

For each test, the test signals applied to the receiver antenna connectors shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) specified in the test.

An example of a suitable test configuration is shown in figure B.5.1-1.



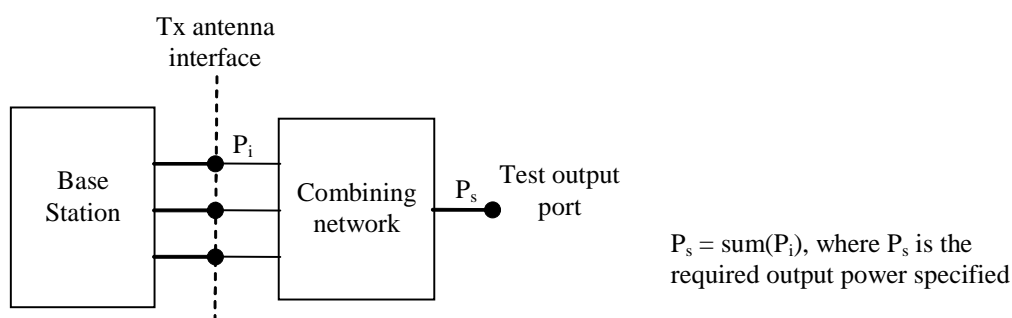
**Figure B.5.1-1: Receiver test set-up**

For spurious emissions from the receiver antenna connector, the test may be performed separately for each receiver antenna connector.

## B.5.2 Transmitter tests

For each test, the test signals applied to the transmitter antenna connectors ( $P_i$ ) shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) ( $P_s$ ) specified in the test. This may be assessed by separately measuring the signals emitted by each antenna connector and summing the results, or by combining the signals and performing a single measurement. The characteristics (e.g. amplitude and phase) of the combining network should be such that the power of the combined signal is maximized.

An example of a suitable test configuration is shown in figure B.5.2-1.



**Figure B.5.2-1: Transmitter test set-up**

For intermodulation attenuation, the test may be performed separately for each transmitter antenna connector.

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## B.6 Transmit diversity and MIMO transmission

Unless otherwise stated, for the tests in clause 5, the requirement applies for each transmitter antenna connector. If the manufacturer has declared the transmitter paths to be equivalent, it is sufficient to measure the signal at any one of the transmitter antenna connectors, with the remaining antenna connector(s) being terminated.



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## B.7 BS with integrated Iuant BS modem

Unless otherwise stated, for the tests in the present document, the integrated Iuant BS modem shall be switched off. Spurious emissions according to clauses 5.3.3 and 5.3.6 shall be measured only for frequencies above 20 MHz with the integrated Iuant BS modem switched on.

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## Annex C (informative): Environmental profile specification

The following environmental conditions may be declared by the supplier:

- barometric pressure: minimum and maximum;
- temperature: minimum and maximum;
- relative humidity: minimum and maximum;
- power supply: lower and upper voltage limit.

When operating outside the boundary limits of the declared operational environmental profile the equipment should not make ineffective use of the radio frequency spectrum so as to cause harmful interference.

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## Annex D (informative): The EN title in the official languages

The enlargement of the European Union (EU) resulted in a requirement from the EU for a larger number of languages for the translation of the titles of Harmonized Standards and mandated ENs that are to be listed in the Official Journal to support the implementation of this legislation.

For this reason the title translation concerning the present document can be consulted via the [e-approval](#) application.

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## Annex E (informative): Bibliography

Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC (text with EEA relevance) (EMC Directive).

ETSI TS 125 104: "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104)".

Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

CEPT/ERC/REC 74-01E (Siófok 1998, Nice 1999, Sesimbra 2002, Hradec Kralove 2005): "Unwanted Emissions in the Spurious Domain".

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## History

<b>Document history</b>			
V1.1.1	January 2002	Publication	
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V4.1.1	April 2009	Public Enquiry	PE 20090828: 2009-04-30 to 2009-08-28
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