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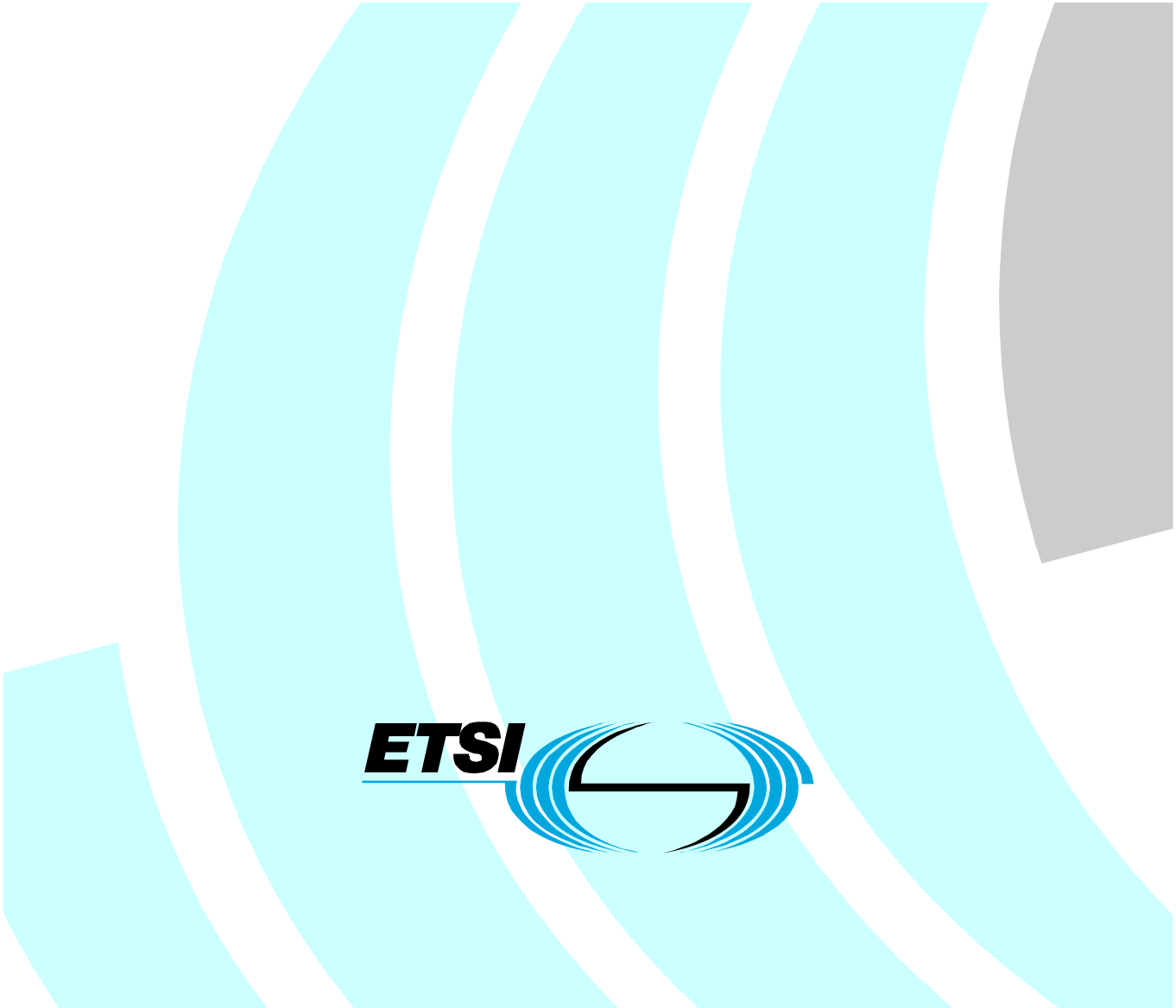
Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 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



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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), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

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.2] (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.3] 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.3] are given in annex A.

The present document is part 13 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".

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

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. The modular structure is shown in EG 201 399 [i.4].

1 Scope

The present document applies to the following radio equipment types:

- User equipment for Evolved Universal Terrestrial Radio Access (E-UTRA).

These radio equipment types are capable of operating in all or any part of the frequency bands given in table 1-1.

Table 1-1: E-UTRA UE operating bands

E-UTRA Band	Direction of transmission	E-UTRA operating bands
1	Transmit	1 920 MHz to 1 980 MHz
	Receive	2 110 MHz to 2 170 MHz
3	Transmit	1 710 MHz to 1 785 MHz
	Receive	1 805 MHz to 1 880 MHz
7	Transmit	2 500 MHz to 2 570 MHz
	Receive	2 620 MHz to 2 690 MHz
8	Transmit	880 MHz to 915 MHz
	Receive	925 MHz to 960 MHz
33	Transmit and Receive	1 900 MHz to 1 920 MHz
34	Transmit and Receive	2 010 MHz to 2 025 MHz
38	Transmit and Receive	2 570 MHz to 2 620 MHz

The present document is intended to cover the provisions of Directive 1999/5/EC [i.3] (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 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] ETSI TS 136 521-1 (V8.0.1): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: conformance testing (3GPP TS 36.521-1 version 8.0.1 Release 8)".

[2] ETSI TS 136 508 (V8.0.1): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing (3GPP TS 36.508 version 8.0.1 Release 8)".

[3] ETSI TS 136 509 (V8.0.1): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Special conformance testing function for User Equipment (UE) (3GPP TS 36.509 version 8.0.1 Release 8)".

[4] ETSI TS 136 101 (V8.4.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (3GPP TS 36.101 version 8.4.0 Release 8)".

[5] ETSI EN 301 908-1 (V4.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive".

[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".

[7] ETSI EN 301 908-2 (V4.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 2: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive".

[8] IEC 60068-2-1 (2007): "Environmental testing - Part 2-1: Tests - Test A: Cold".

[9] IEC 60068-2-2 (2007): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".

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] 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.2] 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.3] 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.4] 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.5] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

channel bandwidth: RF bandwidth supporting a single E-UTRA RF carrier with the transmission bandwidth configured in the uplink or downlink of a cell

NOTE: The channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

channel edge: lowest and highest frequency of the carrier, separated by the channel bandwidth

Maximum Output Power (MOP): mean power level per carrier of UE measured at the antenna connector in a specified reference condition

mean power: when applied to E-UTRA transmission this is the power measured in the operating system bandwidth of the carrier

NOTE: The period of measurement shall be at least one subframe (1ms) unless otherwise stated.

occupied bandwidth: width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage β/2 of the total mean power of a given emission

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

reference bandwidth: bandwidth in which an emission level is specified

transmission bandwidth: bandwidth of an instantaneous transmission from a UE or BS, measured in Resource Block units

transmission bandwidth configuration: highest transmission bandwidth allowed for uplink or downlink in a given channel bandwidth, measured in Resource Block units

transmit diversity: transmit diversity is based on space-frequency block coding techniques complemented with frequency-shift time diversity when four transmit antennas is used

3.2 Symbols

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

$BW_{Channel}$	Channel bandwidth
E_{RS}	Transmitted energy per RE for reference symbols during the useful part of the symbol, i.e. excluding the cyclic prefix, (average power normalized to the subcarrier spacing) at the eNode B transmit antenna connector
$\hat{E}_s$	The received energy per RE during the useful part of the symbol, i.e. excluding the cyclic prefix, averaged across the allocated RB(s) (average power within the allocated RB(s), divided by the number of RE within this allocation, and normalized to the subcarrier spacing) at the UE antenna connector
F	Frequency
$F_{Interferer}$ (offset)	Frequency offset of the interferer
$F_{Interferer}$	Frequency of the interferer
F_C	Frequency of the carrier centre frequency
F_{DL_low}	The lowest frequency of the downlink operating band
F_{DL_high}	The highest frequency of the downlink operating band
F_{UL_low}	The lowest frequency of the uplink operating band

F_{UL_high}	The highest frequency of the uplink operating band
I_o	The power spectral density of the total input signal (power averaged over the useful part of the symbols within the transmission bandwidth configuration, divided by the total number of RE for this configuration and normalized to the subcarrier spacing) at the UE antenna connector, including the own-cell downlink signal or the power spectral density of the total input signal at the UE antenna connector (power averaged over the useful part of the symbols within a given bandwidth and normalized to the said bandwidth), including the own-cell downlink signal
I_{or}	The total transmitted power spectral density of the own-cell downlink signal (power averaged over the useful part of the symbols within the transmission bandwidth configuration, divided by the total number of RE for this configuration and normalized to the subcarrier spacing) at the eNode B transmit antenna connector
$\hat{I}_{or}$	The total received power spectral density of the own-cell downlink signal (power averaged over the useful part of the symbols within the transmission bandwidth configuration, divided by the total number of RE for this configuration and normalized to the subcarrier spacing) at the UE antenna connector
I_{ot}	The received power spectral density of the total noise and interference for a certain RE (average power obtained within the RE and normalized to the subcarrier spacing) as measured at the UE antenna connector
N_{cp}	Cyclic prefix length
N_{DL}	Downlink EARFCN
N_{oc}	The power spectral density of a white noise source (average power per RE normalized to the subcarrier spacing), simulating interference from cells that are not defined in a test procedure, as measured at the UE antenna connector
$N_{Offs-DL}$	Offset used for calculating downlink EARFCN
$N_{Offs-UL}$	Offset used for calculating uplink EARFCN
N_{RB}	Transmission bandwidth configuration, expressed in units of resource blocks
N_{UL}	Uplink EARFCN
P	Number of cell-specific antenna ports
p	Antenna port number
Rav	Minimum average throughput per RB
$P_{Interferer}$	Modulated mean power of the interferer
ΔF_{OOB}	Δ Frequency of Out Of Band emission

3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage Ratio
ACS	Adjacent Channel Selectivity
BS	Base Station
CW	Continuous Wave
DL	DownLink
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
E-UTRA	Evolved UMTS Terrestrial Radio Access
FDD	Frequency Division Duplex
PSS	Primary Synchronization Signal
RE	Resource Element
REFSENS	Reference Sensitivity power level
SS	System Simulator
TDD	Time Division Duplex
TPC	Transmit Power Control
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications System
UTRA	UMTS Terrestrial Radio 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.

4.2 Conformance requirements

The requirements in the present document are based on the assumption that the operating band (e.g. band 1, 3, 7 and 8) is shared between systems of the IMT-2000 family (for band 3 and 8 also GSM) or systems having compatible characteristics.

4.2.1 Introduction

To meet the essential requirement under article 3.2 of Directive 1999/5/EC [i.3] (R&TTE Directive) for IMT-2000 User Equipment (UE) 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 nine 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	4.2.3 Transmitter Spectrum emissions mask
	4.2.12 Transmitter adjacent channel leakage power ratio
Conducted spurious emissions in active mode	4.2.4 Transmitter spurious emissions
Accuracy of maximum output power	4.2.2 Transmitter maximum output power
Prevention of harmful interference through control of power	4.2.5 Transmitter minimum output power
Conducted spurious emission in idle mode	4.2.10 Receiver spurious emissions
Impact of interference on receiver performance	4.2.7 Receiver Blocking characteristics
	4.2.8 Receiver spurious response
	4.2.9 Receiver Intermodulation characteristics
Receiver adjacent channel selectivity	4.2.6 Receiver Adjacent Channel Selectivity (ACS)
Control and Monitoring functions	EN 301 908-1 [5], clause 4.2.4 Control and Monitoring functions
NOTE: Out of synchronization requirement in EN 301 908-2 [7] is not included in the present document due to fact that E-UTRA has network controlled dynamic resource allocation mitigating the risk of interference in out of synchronization situation.	

4.2.2 Transmitter Maximum Output Power

4.2.2.1 Definition

The following UE Power Classes define the nominal maximum output power. The nominal power is defined as the broadband transmit power of the UE, i.e. the power in the channel bandwidth (clause 5.2 of EN 301 908-1 [5]) of the radio access mode. The period of measurement shall be at least one (timeslot/ frame/TTI).

4.2.2.2 Limits

The UE maximum output power shall be within the shown value in table 4.2.2.2-1.

Table 4.2.2.2-1: UE power classes

E-UTRA Band	Power Class 3 (dBm)	Tolerance (dB)	Corner frequency Δ_{TC} (MHz)
1	23	±2,7	[3]
3	23	±2,7	[3]
7	23	±2,7	[3]
8	23	±2,7	[3]
33	23	±2,7	[3]
34	23	±2,7	[3]
38	23	±2,7	[3]
NOTE 1: The above tolerances are applicable for UE(s) that support up to 4 E-UTRA operating bands. For UE(s) that support 5 or more E-UTRA bands the maximum output power is expected to decrease with each additional band.			
NOTE 2: When a transmission configuration is confined within FUL_low and FUL_low + Δ_{TC} or FUL_high - Δ_{TC} and FUL_high, the maximum power accuracy is relaxed by reducing the lower limit by 1,5 dB.			

4.2.2.3 Conformance

Conformance tests described in clause 5.3.1 shall be carried out.

4.2.3 Transmitter Spectrum Emission Mask

4.2.3.1 Definition

The spectrum emission mask of the UE applies to frequencies (Δf_{OOB}) starting from the ± edge of the assigned E-UTRA channel bandwidth.

4.2.3.2 Limits

The power of any UE emission shall fulfil requirements in table 4.2.3.2-1.

Table 4.2.3.2-1: General E-UTRA spectrum emission mask

Δf_{OOB} (MHz)	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth
±0 to 1	-8,5	-11,5	-13,5	-16,5	-18,5	-19,5	30 kHz
±1 to 2,5	-8,5	-8,5	-8,5	-8,5	-8,5	-8,5	1 MHz
±2,5 to 2,8	-23,5	-8,5	-8,5	-8,5	-8,5	-8,5	1 MHz
±2,8 to 5	-23,5						1 MHz
±2,5 to 5		-8,5	-8,5	-8,5	-8,5	-8,5	1 MHz
±5 to 6		-23,5	-11,5	-11,5	-11,5	-11,5	1 MHz
±6 to 10			-23,5	-11,5	-11,5	-11,5	1 MHz
±10 to 15				-23,5	-11,5	-11,5	1 MHz
±15 to 20					-23,5	-11,5	1 MHz
±20 to 25						-23,5	1 MHz

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 emissions, intermodulation products and frequency conversion products, but exclude out of band emissions. The spurious emission limits are specified in terms of general requirements inline with ITU-T Recommendation SM.329-10 [i.5] and E-UTRA operating band requirement to address UE co-existence.

4.2.4.2 Limits

The measured average power of spurious emission, derived in step 2), shall not exceed the described value in table 4.2.4.2-2.

The spurious emission limits apply for the frequency ranges that are more than Δf_{OOB} (MHz) from the edge of the channel bandwidth shown in table 4.2.4.2-1.

Table 4.2.4.2-1: Δf_{OOB} boundary between E-UTRA channel and spurious emission domain

Channel bandwidth	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Δf_{OOB} (MHz)	2,8	6	10	15	20	25

Table 4.2.4.2-2: General spurious emissions test requirements

Frequency range	Maximum level	Measurement bandwidth
9 kHz ≤ f < 150 kHz	-36 dBm	1 kHz
150 kHz ≤ f < 30 MHz	-36 dBm	10 kHz
30 MHz ≤ f < 1 000 MHz	-36 dBm	100 kHz
1 GHz ≤ f < 12,75 GHz	-30 dBm	1 MHz

4.2.4.3 Conformance

Conformance tests described in clause 5.3.3 shall be carried out.

4.2.5 Transmitter Minimum Output Power

4.2.5.1 Definition

The minimum controlled output power of the UE is defined as the broadband transmit power of the UE, i.e. the power in the channel bandwidth for all transmit bandwidth configurations (resource blocks), when the power is set to a minimum value.

4.2.5.2 Limits

The minimum output power measured shall not exceed the values specified in table 4.2.5.2-1.

Table 4.2.5.2-1: Minimum output power

	Channel bandwidth / minimum output power / measurement bandwidth					
	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Minimum output power	-39 dBm					
Measurement bandwidth	1,08 MHz	2,7 MHz	4,5 MHz	9,0 MHz	13,5 MHz	18 MHz

4.2.5.3 Conformance

Conformance tests described in clause 5.3.4 shall be carried out.

4.2.6 Transmitter Adjacent Channel Selectivity (ACS)

4.2.6.1 Definition

Adjacent Channel Selectivity (ACS) is a measure of a receiver's ability to receive a E-UTRA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

4.2.6.2 Limits

The throughput R_{av} shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] under the conditions specified in table 4.2.6.2-2, and also under the conditions specified in table 4.2.6.2-3.

Table 4.2.6.2-1: Adjacent channel selectivity

		Channel bandwidth					
Rx Parameter	**Units**	**1,4 MHz**	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
ACS	dB	33,0	33,0	33,0	33,0	30	27

Table 4.2.6.2-2: Test parameters for Adjacent channel selectivity, Case 1

Rx Parameter	**Units**	**Channel bandwidth**					
		1,4 MHz	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Wanted signal mean power	dBm	REFSENS + 14 dB					
$P_{Interferer}$	dBm	REFSENS +45,5 dB	REFSENS +45,5 dB	REFSENS +45,5 dB	REFSENS +45,5 dB	REFSENS +42,5 dB	REFSENS +39,5 dB
$BW_{Interferer}$	MHz	1,4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	1,4025	3,0075	5,0025	7,5075	10,0125	12,5025
NOTE 1: The transmitter shall be set to 4dB below the supported maximum output power. NOTE 2: The interferer consists of the Reference measurement channel specified in clause A.3.2 of TS 136 521-1 [1] with set-up according to clause C.3.1 TS 136 521-1 [1]. NOTE 3: REFSENS as defined in TS 136 521-1 [1].							

Table 4.2.6.2-3: Test parameters for Adjacent channel selectivity, Case 2

Rx Parameter	**Units**	**Channel bandwidth**					
		1,4 MHz	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Wanted signal mean power	dBm	-56,5	-56,5	-56,5	-56,5	-53,5	-50,5
$P_{Interferer}$	dBm	-25					
$BW_{Interferer}$	MHz	1,4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	1,4025	3,0075	5,0025	7,5075	10,0125	12,5025
NOTE 1: The transmitter shall be set to 24dB below the supported maximum output power. NOTE 2: The interferer consists of the Reference measurement channel specified in clause A.3.2 of TS 136 521-1 [1] with set-up according to clause C.3.1 TS 136 521-1 [1].							

4.2.6.3 Conformance

Conformance tests described in clause 5.3.5 shall be carried out.

4.2.7 Receiver Blocking Characteristics

4.2.7.1 Definition

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

4.2.7.2 Limits

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in tables 4.2.7.2-1 and 4.2.7.2-2.

Except for the spurious response frequencies the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in tables 4.2.7.2-3 and 4.2.7.2-4.

For table 4.2.7.2-4 in frequency range 1, 2 and 3, up to $6 \cdot \lceil N_{RB} / 6 \rceil$ exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size, where N_{RB} is the number of resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of clause 4.2.8 Spurious response are applicable.

Table 4.2.7.2-1: In-band blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Wanted signal mean power	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
$BW_{Interferer}$	MHz	1,4	3	5	5	5	5
$F_{loffset, case\ 1}$	MHz	2,1125	4,5075	7,5125	7,5025	7,5075	7,5125
$F_{loffset, case\ 2}$	MHz	3,5075	7,5075	12,5075	12,5125	12,5025	12,5075
NOTE 1: The transmitter shall be set to 4 dB below the supported maximum output power. NOTE 2: The interferer consists of the Reference measurement channel specified in clause A.3.2 of TS 136 521-1 [1] with a set-up according to clause C.3.1 of TS 136 521-1 [1]. NOTE 3: REFSENS as defined in TS 136 521-1 [1].							

Table 4.2.7.2-2: In-band blocking

E-UTRA band	Parameter	Units	Case 1	Case 2
	$P_{Interferer}$	dBm	-56	-44
	$F_{Interferer}$ (Offset)	MHz	$=-BW/2 - F_{loffset, case\ 1}$ and $=+BW/2 + F_{loffset, case\ 1}$	$\leq -BW/2 - F_{loffset, case\ 2}$ and $\geq +BW/2 + F_{loffset, case\ 2}$
1, 3, 7, 8, 33,34,38	$F_{Interferer}$	MHz	F_{DL_low} - 7,5 to F_{DL_high} + 7,5 (see note)	F_{DL_low} - 15 to F_{DL_high} + 15
NOTE: For each carrier frequency the requirement is valid for two frequencies: a. the carrier frequency -BW/2 -FIoffset, case 1; and b. the carrier frequency + BW/2 + FIoffset, case 1.				

Table 4.2.7.2-3: Out-of-band blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Wanted signal mean power	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
NOTE 1: The transmitter shall be set to 4dB below the supported maximum output power. NOTE 2: Reference measurement channel is clause A.3.2 of TS 136 521-1 [1]. NOTE 3: REFSENS as defined in TS 136 521-1 [1].							

Table 4.2.7.2-4: Out-of-band blocking

E-UTRA band	Parameter	Units	Frequency		
			Range 1	Range 2	Range 3
	$P_{Interferer}$	dBm	-44	-30	-15
1, 3, 7, 8, 33,34,38	$F_{Interferer}$ (CW)	MHz	F_{DL_low} - 15 to F_{DL_low} - 60	F_{DL_low} - 60 to F_{DL_low} - 85	F_{DL_low} - 85 to 1 MHz
			F_{DL_high} + 15 to F_{DL_high} + 60	F_{DL_high} + 60 to F_{DL_high} + 85	F_{DL_high} + 85 to +12 750 MHz
NOTE: Range 3 shall be tested only with the highest channel bandwidth.					

4.2.7.3 Conformance

Conformance tests described in clause 5.3.6 shall be carried out.

4.2.8 Receiver Spurious Response

4.2.8.1 Definition

Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out of band blocking limit as specified in table 4.2.7.2-4 is not met.

4.2.8.2 Limits

The throughput shall be $\geq$ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in tables 4.2.8.2-1 and 4.2.8.2-2.

Table 4.2.8.2-1: Spurious response parameters

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Wanted signal mean power	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
NOTE 1: The transmitter shall be set to 4 dB below the supported maximum output power. NOTE 2: Reference measurement channel is clause A.3.2 of TS 136 521-1 [1]. NOTE 3: REFSENS as defined in TS 136 521-1 [1].							

Table 4.2.8.2-2: Spurious Response

Parameter	Unit	Level
$P_{Interferer}$ (CW)	dBm	-44
$F_{Interferer}$	MHz	Spurious response frequencies

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

Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

4.2.9.2 Limits

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in table 4.2.9.2-1 for the specified wanted signal mean power in the presence of two interfering signals.

Table 4.2.9.2-1: Test parameters for Wide band intermodulation

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Wanted signal mean power	dBm	REFSENS + channel bandwidth specific value below					
		12	8	6	6	7	9
$P_{Interferer\ 1}$ (CW)	dBm	-46					
$P_{Interferer\ 2}$ (Modulated)	dBm	-46					
$BW_{Interferer\ 2}$		1,4	3	5			
$F_{Interferer\ 1}$ (Offset)	MHz	-BW/2 - 2,1 / +BW/2 + 2,1	-BW/2 - 4,5 / +BW/2 + 4,5	-BW/2 - 7,5 / +BW/2 + 7,5			
$F_{Interferer\ 2}$ (Offset)	MHz	$2 \times F_{Interferer\ 1}$					
NOTE 1: The transmitter shall be set to 4 dB below the supported maximum output power. NOTE 2: Reference measurement channel is clause A.3.2 of TS 136 521-1 [1]. NOTE 3: The modulated interferer consists of the Reference measurement channel specified in clause A.3.2 of TS 136 521-1 [1] with set-up according to clause C.3.1 of TS 136 521-1 [1].The interfering modulated signal is 5 MHz E-UTRA signal as described in annex D for channel bandwidth ≥ 5 MHz. NOTE 4: REFSENS as defined in TS 136 521-1 [1].							

4.2.9.3 Conformance

Conformance tests described in clause 5.3.8 shall be carried out.

4.2.10 Receiver Spurious Emissions

4.2.10.1 Definition

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

4.2.10.2 Limits

The measured spurious emissions derived in step 1), shall not exceed the maximum level specified in table 4.2.10.2-1.

Table 4.2.10.2-1: General receiver spurious emission requirements

Frequency Band	Measurement bandwidth	Maximum level	Note
30 MHz ≤ f < 1G Hz	100 kHz	-57 dBm	
1 GHz ≤ f ≤ 12,75 GHz	1 MHz	-47 dBm	

4.2.10.3 Conformance

Conformance tests described in clause 5.3.9 shall be carried out.

4.2.11 Transmitter Adjacent Channel Leakage Power Ratio

4.2.11.1 Definition

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

4.2.11.2 Limits

If the measured adjacent channel power is greater than -50 dBm then the measured E-UTRA$_{ACLR}$ shall be higher than the limits in table 4.2.11.2-1.

Table 4.2.11.2-1: E-UTRA UE ACLR

	Channel bandwidth / E-UTRA$_{ACLR1}$ / measurement bandwidth					
	1,4 MHz	**3,0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
E-UTRA$_{ACLR1}$	29,2 dB	29,2 dB	29,2 dB	29,2 dB	29,2 dB	29,2 dB
E-UTRA channel Measurement bandwidth	1,08 MHz	2,7 MHz	4,5 MHz	9,0 MHz	13,5 MHz	18 MHz
UE channel	+1,4 MHz or -1,4 MHz	+3 MHz or -3 MHz	+5 MHz or -5 MHz	+10 MHz or -10 MHz	+15 MHz or -15 MHz	+20 MHz or -20 MHz

If the measured UTRA channel power is greater than -50 dBm then the measured UTRA$_{ACLR1}$, UTRA$_{ACLR2}$ shall be higher than the limits in table 4.2.11.2-2.

Table 4.2.11.2-2: UTRA UE ACLR

	Channel bandwidth / UTRA$_{ACLR1/2}$ / measurement bandwidth					
	1,4 MHz	**3,0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
UTRA$_{ACLR1}$	32,2 dB	32,2 dB	32,2 dB	32,2 dB	32,2 dB	32,2 dB
UTRA$_{ACLR2}$	-	-	35,2 dB	35,2 dB	35,2 dB	35,2 dB
E-UTRA channel Measurement bandwidth	-	-	4,5 MHz	9,0 MHz	13,5 MHz	18 MHz
UTRA channel Measurement bandwidth	-	-	3,84 MHz	3,84 MHz	3,84 MHz	3,84 MHz
UE channel for UTRA$_{ACLR1}$	+2,5 MHz from upper band edge or -2,5 MHz from lower band edge					
UE channel for UTRA$_{ACLR2}$	+7,5 MHz from upper band edge or -7,5 MHz from lower band edge					

4.2.11.3 Conformance

Conformance tests described in clause 5.3.10 shall be carried out.

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 conditions to be used in order to show compliance reference can be made to TS 136 521-1 [1].

Many tests in the present document are performed with appropriate frequencies in the low, middle and high range of the operating frequency band of the UE. These frequencies are defined in TS 136 508 [2].

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 may be used to decide whether an 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 [6] or TR 102 215 [i.1]. For guidance on other measurement conditions reference can be made to annex (s) of TS 136 521-1 [1].

Table 5.2-1 is based on this expansion factor.

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

Parameter	Conditions	Test system uncertainty
Transmitter maximum output power		±0,7 dB
Transmitter spectrum emissions mask		±1,5 dB
Transmitter spurious emissions	9 kHz < f ≤ 4 GHz: ±2,0 dB 4 GHz < f ≤ 12,75 GHz: ±4,0 dB	±2,0 dB ±4,0 dB
Transmitter Minimum output power		±1,0 dB
Receiver Adjacent Channel Selectivity (ACS)		±1,1 dB
Receiver Blocking characteristics	1 MHz < $f_{interferer}$ ≤ 3 GHz 3 GHz < $f_{interferer}$ ≤ 12,75 GHz	±1,3 dB ±3,2 dB

Parameter	Conditions	Test system uncertainty
Receiver spurious response	1 MHz < $f_{interferer}$ ≤ 3 GHz 3 GHz < $f_{interferer}$ ≤ 12,75 GHz	±1,3 dB ±3,2 dB
Receiver intermodulation characteristics		±1,4 dB
Receiver spurious emissions	30 MHz ≤ f ≤ 4,0 GHz: ±2.0 dB 4 GHz < f ≤ 12,75 GHz: ±4,0 dB	±2,0 dB ±4,0 dB
Transmitter adjacent channel leakage power ratio	-	±0,8 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: Annex G of TR 100 028-2 [6] provides guidance for the calculation of the uncertainty components relating to mismatch. NOTE 3: 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 should be 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

5.3.1 Transmitter Maximum Output Power

5.3.1.1 Method of test

5.3.1.1.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; as specified in annex B.

Frequencies to be tested: mid range; as specified in TS 136 508 [2], clause 4.3.1.

Channel bandwidths to be tested: lowest, 5 MHz, and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

1) Connect the SS to the UE antenna connectors.

2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.

3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.0.

4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1].

5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

6) Ensure the UE is in State 4 and receiving payload data from the SS.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.1.1.2 Procedure

1) Send continuous uplink power control "up" commands to the UE to ensure that the UE transmits at its maximum power.

2) Measure the mean power of the UE in a bandwidth of at least (1+x) times the channel bandwidth of the radio access mode. The period of measurement shall be at least one (timeslot/ frame/TTI).

5.3.1.2 Test requirements

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

5.3.2 Transmitter Spectrum Emission Mask

5.3.2.1 Method of test

5.3.2.1.1 Initial conditions

Test environment: normal, as specified in annex B.

Frequencies to be tested: low range, mid range, high range; as specified in TS 136 508 [2], clause 4.3.1.

Channel bandwidths to be tested: lowest, 5 MHz, and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

1) Connect the SS to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.0.
4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1].
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 4 according to TS 136 508 [2], clause 4.2.4 and receiving payload data from the SS.

5.3.2.1.2 Procedure

1) Set the UE to initial power state as defined in TS 136 521-1 [1].
2) Measure the power of the transmitted signal for frequency ranges defined in table 4.2.3.2-1 with measurement bandwidths defined in table 4.2.3.2-1 as defined in TS 136 521-1 [1].
3) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

5.3.2.2 Test requirements

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

5.3.3 Transmitter Spurious Emissions

5.3.3.1 Method of test

5.3.3.1.1 Initial conditions

Test Environment: normal, as specified in annex B.

Frequencies to be tested: low range, mid range, high range; see TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz, and highest channel bandwidth as defined in TS 136 508 [2].

1) Connect the SS to the UE to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.0.
4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1].

5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

6) Ensure the UE is in State 4 according to TS 136 508 [2], clause 4.2.4 and receiving payload data from the SS.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.3.1.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Sweep the spectrum analyser (or equivalent equipment) over a frequency range and measure the average power of spurious emission.

5.3.3.2 Test requirements

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

5.3.4 Transmitter Minimum Output Power

5.3.4.1 Method of test

5.3.4.1.1 Initial conditions

Test Environment: normal, TL/VL, TL/VH, TH/VL, TH/VH ; as specified in annex B.

Frequencies to be tested: low range, mid range, high range; see TS 136 508 [2].

Channel bandwidths to be tested: lowest, 5 MHz, and highest channel bandwidth, as specified in TS 136 508 [2], clause 4.3.1.

1) Connect the SS to the UE antenna connectors as shown in TS 136 508 [2], annex A, in figure A.1.

2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.

3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.0.

4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1].

5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

6) Ensure the UE is in State 4 according to TS 136 508 [2], clause 4.2.4 and receiving payload data from the SS.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.4.1.2 Procedure

1) Send TPC commands to the UE to ensure that the UE transmits at its minimum power.

2) Measure the mean power of the UE in the associated measurement bandwidth specified in table 4.5.2.1-1 for the specific channel bandwidth under test. The period of measurement shall be one sub-frame (1 ms).

3) Repeat for applicable test frequencies, channel bandwidths, operating band combinations and environmental conditions.

5.4.2.2 Test requirements

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

5.3.5 Transmitter Adjacent Channel Selectivity (ACS)

5.3.5.1 Method of test

5.3.5.1.1 Initial conditions

Test Environment: normal, as specified in annex B.

Frequencies to be tested: mid range see TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz, and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

1) Connect the SS and interfering source to the UE antenna connectors.

2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.

3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.1.

4) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

5) Ensure the UE is in State 4 according to TS 136 508 [2], clause 4.2.4 and receiving payload data from the SS.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.5.1.2 Procedure

1) Send Uplink power control commands to the UE, to ensure that the UE output power is near the target level in table 4.2.6.2-1 (Case 1) for at least the duration of the Throughput measurement as defined in TS 136 521-1 [1].

2) Set the Downlink signal level to the value as defined in table 4.2.6.2-2 (Case 1).

3) Set the Interferer signal level to the value as defined in table 4.2.6.2-2 (Case 1), using a modulated interferer.

4) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].

5) Send Uplink power control commands to the UE, to ensure that the UE output power near the target level in table 4.2.6.2-2 (Case 2) for at least the duration of the Throughput measurement.

6) Set the Downlink signal level to the value as defined in table 4.2.6.2-3 (Case 2).

7) Set the Interferer signal level to the value as defined in table 4.2.6.2-3 (Case 2), using a modulated interferer.

8) Measure the average throughput for a duration sufficient to achieve statistical significance.

9) Repeat for applicable channel bandwidths in both Case 1 and Case 2.

5.3.5.2 Test requirements

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

5.3.6 Receiver Blocking Characteristics

5.3.6.1 Method of test

5.3.6.1.1 Initial requirements

Test Environment: normal, as specified in annex B.

Frequencies to be tested: one frequency chosen arbitrarily from low or high range; as specified in TS 136 508 [2], clause 4.3.1.

Channel bandwidth to be tested: lowest, 5 MHz, and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1. Range 3 of out-of-band blocking is tested only with highest bandwidth.

1) Connect the SS to the UE antenna connectors.

2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.

3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.1.

4) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

5) Ensure the UE is in State 4 according to TS 136 508 [2], clause 4.5.4 and receiving payload data from the SS according to the Reference Measurement channel in TS 136 521-1 [1], clause A.3.2.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.6.1.2 Procedure

1) Set the parameters of the CW signal generator for an interfering signal according to tables 4.2.7.2-1 to 4.2.7.2-4. The frequency step size is 1 MHz.

2) Set the output power level of the UE according to the tables 4.2.7.2-1 to 4.2.7.2-4 or send uplink power control commands to the UE, to ensure that the UE output power is near the target level in tables 4.2.7.2-1 to 4.2.7.2-4 for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].

3) Set the downlink signal level according to the tables 4.2.7.2-1 to 4.2.7.2-4.

4) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].

5) For table 4.2.7.2-4 record the frequencies for which the throughput does not meet the requirements.

5.3.6.2 Test requirements

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

5.3.7 Receiver Spurious Response

5.3.7.1 Method of test

5.3.7.1.1 Initial conditions

Test Environment: normal, as specified in annex B.

Bandwidths to be used: the same bandwidth as chosen in clause 5.3.6.1.1 for Blocking Characteristics Out-of-band.

Frequencies to be tested: the same frequency as chosen in clause 5.3.6.1.1 for Blocking Characteristics Out-of-band.

1) Connect the SS to the UE antenna connectors.

2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.

3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.1.

4) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

5) Ensure the UE is in State 4 according to TS 136 508 [2], clause 4.5.4 and receiving payload data from the SS according to the Reference Measurement channel in TS 136 521-1 [1], clause A.3.2.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.7.1.2 Procedure

1) Set the parameters of the CW signal generator for an interfering signal according to table 4.2.8.2-2. The spurious frequencies are taken from step 5) records in clause 5.3.6.1.2.

2) Set the output power level of the UE according to the table 4.2.8.2-1 or send uplink power control commands to the UE, to ensure that the UE output power is near the target level for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].

3) Set the downlink signal level according to the table 4.2.8.2-1.

4) For the spurious frequency, measure the average throughput for a duration sufficient to achieve statistical significance.

5.3.7.2 Test requirements

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

5.3.8 Receiver Intermodulation Characteristics

5.3.8.1 Method of test

5.3.8.1.1 Initial conditions

Test Environment: normal, as specified in annex B.

Frequencies to be tested: mid range; see TS 136 508 [2].

Channel bandwidths to be tested: lowest, 5 MHz, and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

1) Connect the SS and interfering sources to the UE antenna connectors.

2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.

3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.1.

4) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

5) Ensure the UE is in State 4 according to TS 136 508 [i.1], clause 4.5.4 and receiving payload data from the SS according to the Reference Measurement channel in TS 136 521-1 [1], clause A.3.2.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.8.1.2 Procedure

1) Send Uplink power control commands to the UE, to ensure that the UE output power is near the target level in table 4.2.9.2-1 for at least the duration of the Throughput measurement.

2) Set the Downlink signal level to the value as defined in table 4.2.9.2-1.

3) Set the Interfering signal levels to the values as defined in table 4.2.9.2-1, using a modulated interferer bandwidth as defined in annex D of TS 136 521-1 [1].

4) Measure the average throughput for a duration sufficient to achieve statistical significance.

5) Repeat for applicable channel bandwidths and band combinations.

5.3.8.2 Test requirements

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

5.3.9 Receiver Spurious Emissions

5.3.9.1 Method of test

Test Environment: normal, as specified in annex B.

Frequencies to be tested: low range, mid range, high range; as specified in TS 136 508 [2], clause 4.3.1.

Channel bandwidth to be tested: lowest, 5 MHz, and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

1) Connect a spectrum analyzer (or other suitable test equipment) to the UE antenna connectors.

2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.

3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.0.

4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1].

5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.

6) Ensure the UE is in State 3 according to TS 136 508 [2], clause 4.5.4.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.9.1.1 Procedure

Sweep the spectrum analyser (or other suitable test equipment) over a frequency range from 30 MHz to 12,75 GHz and measure the average power of the spurious emissions.

5.3.9.2 Test requirements

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

5.3.10 Transmitter Adjacent Channel Leakage Power Ratio

5.3.10.1 Method of test

5.3.10.1.1 Initial conditions

Test Environment: normal, TL/VL, TL/VH, TH/VL, TH/VH, as specified in annex B.

Frequencies to be tested: low range, mid range, high range; see TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz, 10 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

1) Connect the SS to the UE to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clause C.3.0.
4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1].
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 4 according to TS 136 508 [2], clause 4.5.4 and receiving payload data from the SS.

NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [3] respectively.

5.3.10.1.2 Procedure

1) Send continuous uplink power control "up" commands to the UE to ensure that the UE transmits at its maximum power.
2) Measure the filtered mean power for E-UTRA.
3) Measure the filtered mean power of the first E-UTRA adjacent channel.
4) Measure the RRC filtered mean power of the first and the second UTRA adjacent channel.
5) Calculate the ratio of the power between the values measured in step 3) over step 2) for $E\text{-}UTRA_{ACLR}$.
6) Calculated the ratio of the power between the values measured in step 4) over step 2) for $UTRA_{ACLR1}$, $UTRA_{ACLR2}$.

5.3.10.2 Test requirements

The results obtained shall be compared to the limits in clause 4.2.11.2 in order to show 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)

Harmonized Standard EN 301 908-13 The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive						
Requirement			**Requirement Conditionality**		**Test Specification**	
No	**Description**	**Reference: Clause No**	**U/C**	**Condition**	**E/O**	**Reference: Clause No**
1	Transmitter maximum output power	4.2.2				5.3.1
2	Transmitter spectrum emission mask	4.2.3				5.3.2
3	Transmitter spurious emissions	4.2.4				5.3.3
4	Transmitter minimum output power	4.2.5				5.3.4
5	Receiver adjacent channel selectivity (ACS)	4.2.6				5.3.5
6	Receiver blocking characteristics	4.2.7				5.3.6
7	Receiver spurious response	4.2.8				5.3.7
8	Receiver intermodulation characteristics	4.2.9				5.3.8
9	Receiver spurious emissions	4.2.10				5.3.9

Harmonized Standard EN 301 908-13 The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive						
Requirement			**Requirement Conditionality**		**Test Specification**	
No	**Description**	**Reference: Clause No**	**U/C**	**Condition**	**E/O**	**Reference: Clause No**
10	Transmitter adjacent channel leakage power ratio	4.2.11				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.

Annex B (normative): Environmental profile

B.1 General

B.1.1 Introduction

This annex specifies the environmental profile of the UE.

B.1.2 Temperature

The UE shall fulfil all the requirements in the full temperature range of:

Table B.1.2-1: Temperature Test Environment

+15 °C to +35 °C	for normal conditions (with relative humidity of 25 % to 75 %)
-10 °C to +55 °C	for extreme conditions (see IEC 60068-2-1 [8] and IEC 60068-2-2 [9])

Outside this temperature range the UE, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in TS 136 101 [4] for extreme operation.

The normative reference for this requirement is TS 136 101 [4], clause E.1.

Some tests are performed also in extreme temperature conditions. These test conditions are denoted as TL (Temperature Low, -10 °C) and TH (Temperature High, +55 °C).

B.1.3 Voltage

The UE shall fulfil all the requirements in the full voltage range, i.e. the voltage range between the extreme voltages.

The manufacturer shall declare the lower and higher extreme voltages and the approximate shutdown voltage. For the equipment that can be operated from one or more of the power sources listed below, the lower extreme voltage shall not be higher, and the higher extreme voltage shall not be lower than that specified below.

Table B.1.3-1: Voltage Test Environment

Power source	Lower extreme Voltage	Higher extreme voltage	Normal conditions voltage
AC mains	0,9 × nominal	1,1 × nominal	nominal
Regulated lead acid battery	0,9 × nominal	1,3 × nominal	1,1 × nominal
Non regulated batteries: Leclanché Lithium Mercury/nickel & cadmium	 0,85 × nominal 0,95 × nominal 0,90 × nominal	 Nominal 1,1 × Nominal	 Nominal 1,1 × Nominal Nominal

Outside this voltage range the UE if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in TS 136 101 [4] for extreme operation. In particular, the UE shall inhibit all RF transmissions when the power supply voltage is below the manufacturer declared shutdown voltage.

The normative reference for this requirement is TS 136 101 [4], clause E.2.

Some tests are performed also in extreme voltage conditions. These test conditions are denoted as VL (Lower extreme Voltage) and VH (Higher extreme Voltage).

B.1.4 Test environment

Where a normal environment is required then the normal conditions shown in clauses B.1.2 and B.1.3 shall be applied.

Where an extreme environment is required then the various combinations of extreme temperatures together with the extreme voltages shown in clauses B.1.2 and B.1.3 shall be applied. The combinations are:

- Low extreme Temperature/Low extreme Voltage (TL/VL);
- Low extreme Temperature/High extreme Voltage (TL/VH);
- High extreme Temperature/Low extreme Voltage (TH/VL);
- High extreme Temperature/High extreme Voltage (TH/VH).

Annex C (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.

Annex D (informative): Bibliography

- Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- 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).
- 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).

History

Document history			
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