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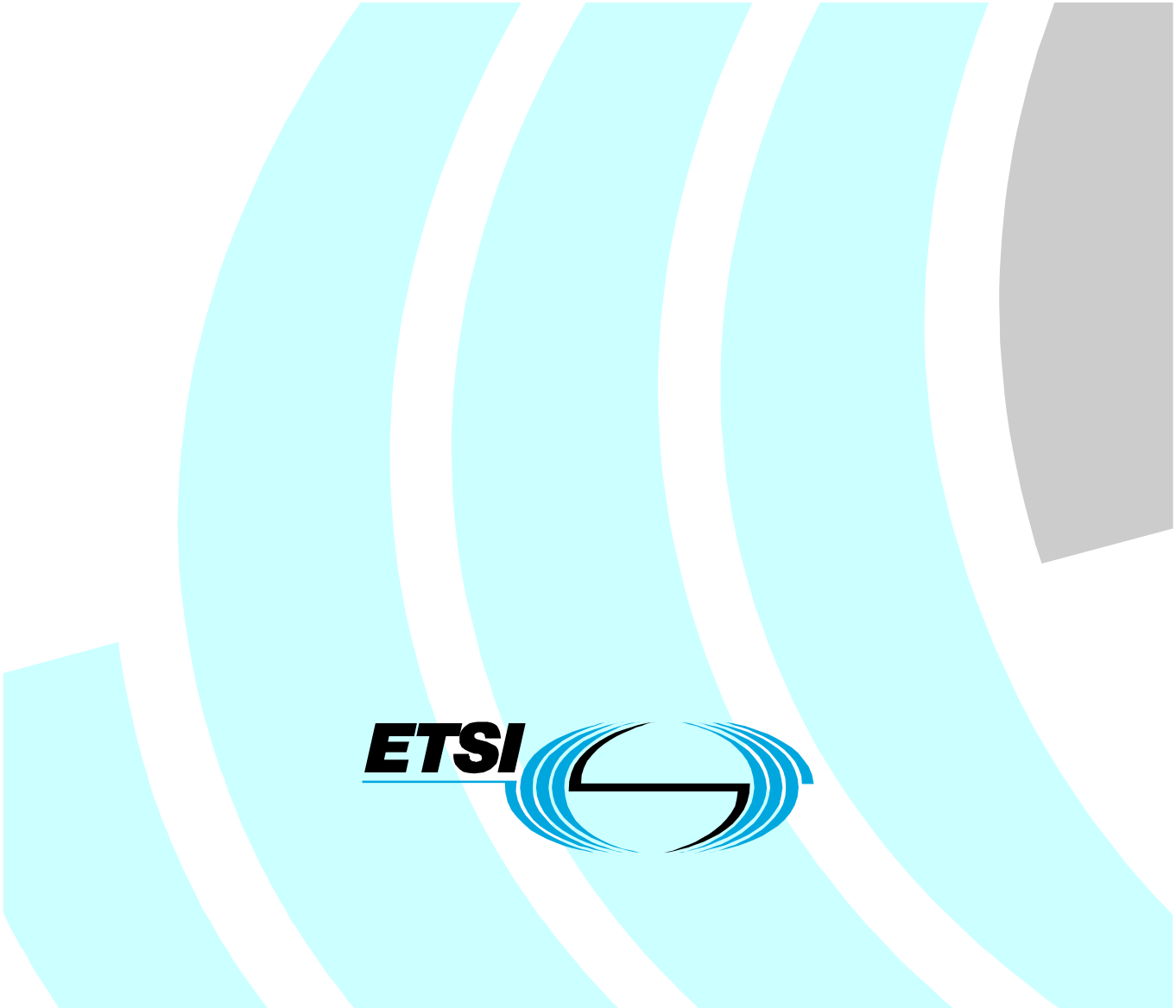
Candidate Harmonized European Standard (Telecommunications series)

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



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Contents

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Foreword

This Candidate 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 Vote 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 (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 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").

The present document is part 2 of a multi-part deliverable covering the Base Stations (BS) 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 essential requirements of article 3.2 of the R&TTE Directive";

Part 2: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 3: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 4: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 5: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 6: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 7: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD) (BS) covering 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".

Technical specifications relevant to Directive 1999/5/EC are given in annex A.

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 designed to fit in a modular structure to cover all radio and telecommunications terminal equipment under the R&TTE Directive [1]. Each standard is a module in the structure. The modular structure is shown in figure 1.

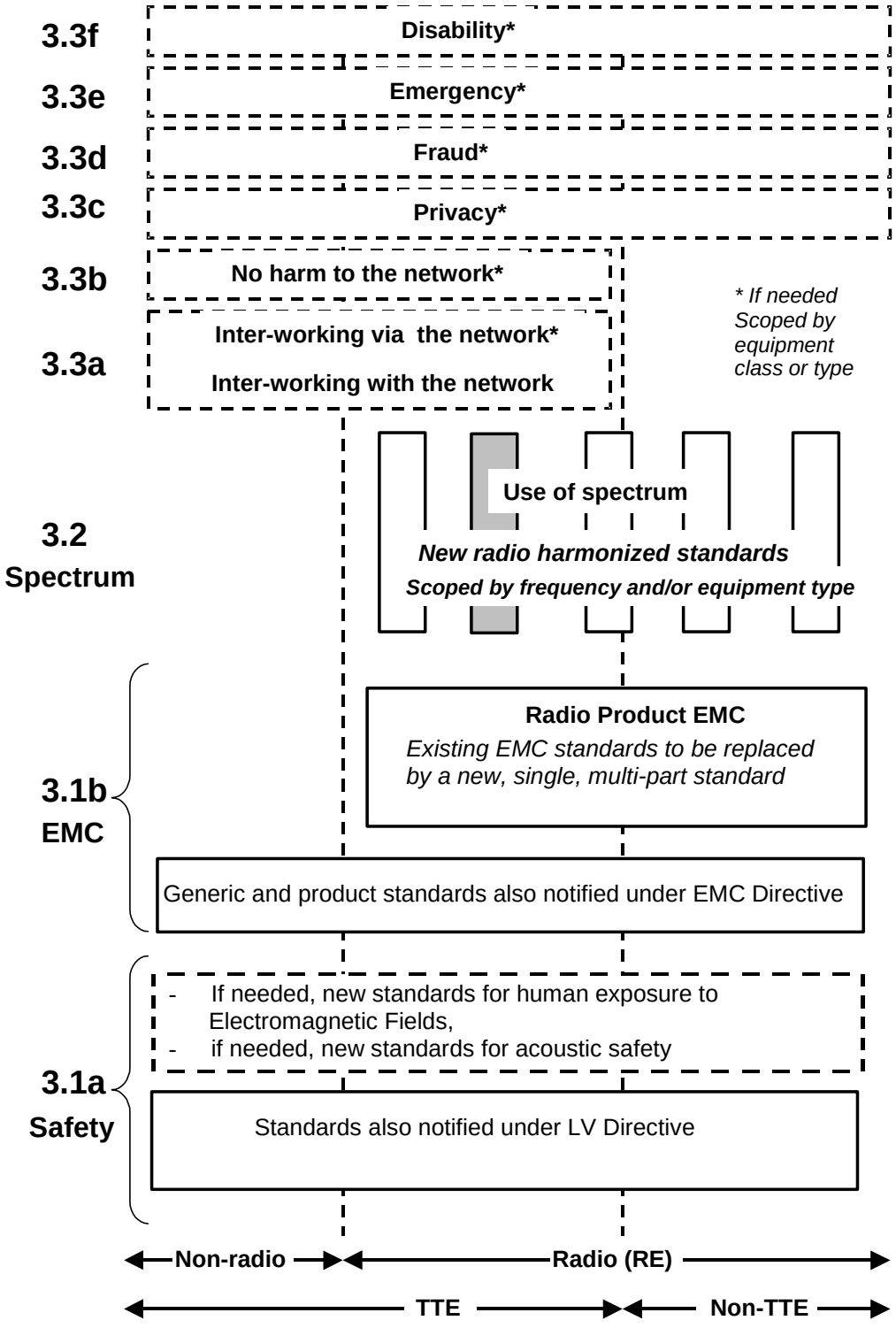

Figure 1: Modular structure for the various standards used under the R&TTE Directive

The left hand edge of figure 1 shows the different clauses of article 3 of the R&TTE Directive [1].

For article 3.3 various horizontal boxes are shown. Dotted lines indicate that at the time of publication of the present document essential requirements in these areas have to be adopted by the Commission. If such essential requirements are adopted, and as far and as long as they are applicable, they will justify individual standards whose scope is likely to be specified by function or interface type.

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum by radio equipment. The scopes of these standards are specified either by frequency (normally in the case where frequency bands are harmonized) or by radio equipment type.

For article 3.1b figure 1 shows EN 301 489 [9], the multi-part product EMC standard for radio, and the existing collection of generic and product standards currently used under the EMC Directive [2].

For article 3.1a figure 1 shows the existing safety standards currently used under the LV Directive [3] and new standards covering human exposure to electromagnetic fields. New standards covering acoustic safety may also be required.

The bottom of figure 1 shows the relationship of the standards to radio equipment and telecommunications terminal equipment. A particular equipment may be radio equipment, telecommunications terminal equipment or both. A radio spectrum standard will apply if it is radio equipment. An article 3.3 standard will apply as well only if the relevant essential requirement under the R&TTE Directive [1] is adopted by the Commission and if the equipment in question is covered by the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the R&TTE Directive [1] may be covered in a set of standards.

The modularity principle has been taken because:

- it minimizes the number of standards needed. Because equipment may, in fact, have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment;
- it provides scope for standards to be added:
  - under article 3.2 when new frequency bands are agreed; or
  - under article 3.3 should the Commission take the necessary decisions

  without requiring alteration of standards that are already published;
- it clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

The product specifications upon which all parts of EN 301 908 is based, differ in presentation; and this is reflected in the present document

1 Scope

The present document applies to the following radio equipment type:

- User Equipment for IMT-2000 CDMA Direct Spread (UTRA FDD).

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

Table 1: CDMA Direct Spread service frequency bands

Direction of transmission	CDMA Direct Spread service frequency bands
Transmit	1 920 MHz to 1 980 MHz
Receive	2 110 MHz to 2 170 MHz

The present document is intended to cover the provisions of Directive 1999/5/EC [1] (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 [1] will 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

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

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

[2] 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).

[3] 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).

[4] ETSI TR 100 028 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[5] ETSI TS 125 101 V3.8.0 (2001): "Universal Mobile Telecommunications System (UMTS); UE Radio Transmission and Reception (FDD) (3GPP TS 25.101 version 3.8.0 Release 1999)".

[6] ETSI TS 134 121 V3.6.0 (2001): "Universal Mobile Telecommunications System (UMTS); Terminal Conformance Specification; Radio Transmission and Reception (FDD) (3GPP TS 34.121 version 3.6.0 Release 1999)".

[7] ETSI TS 134 108 V3.5.0 (2001): "Universal Mobile Telecommunications System (UMTS); Common Test Environments for User Equipment (UE) Conformance Testing (3GPP TS 34.108 version 3.5.0 Release 1999)".

[8] ETSI TS 134 109 V3.4.0 (2001): "Universal Mobile Telecommunications System (UMTS); Terminal logical test interface; Special conformance testing functions (3GPP TS 34.109 version 3.4.0 Release 1999)".

[9] ETSI EN 301 489: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [1] and the following apply:

average power: thermal power as measured through a Root Raised Cosine (RRC) filter with roll-off $\alpha = 0.22$ and a bandwidth equal to the chip rate of the radio access mode

NOTE: The period of measurement shall be one power control group (timeslot) unless otherwise stated.

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

maximum Output power: measure of the maximum power the UE can transmit (i.e. the actual broadband power as would be measured assuming no measurement error)

nominal Maximum Output power: nominal power defined by the UE power class

3.2 Abbreviations

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

ACS	Adjacent Channel Selectivity
BER	Bit Error Ratio
CW	Continuous Wave (un-modulated signal)
DPCCH	Dedicated Physical Control Channel
DPCH_Ec	Average energy per PN chip for DPCH.
DPDCH	Dedicated Physical Data CHannel
E_c	Average energy per PN chip.
EMC	Electro-Magnetic Compatibility
FDD	Frequency Division Duplex
F_{uw}	Frequency of unwanted signal. This is specified in bracket in terms of an absolute frequency(s) or a frequency offset from the assigned channel frequency.
Information Data Rate	Rate of the user information, which must be transmitted over the Air Interface. For example, output rate of the voice codec.
I_{or}	The total transmit power spectral density of the down link at the Node B antenna connector.
$\hat{I}_{or}$	The received power spectral density of the down link as measured at the UE antenna connector.
LV	Low Voltage
Node B	A logical node responsible for radio transmission/reception in one or more cells to/from the User Equipment.
OCNS	Orthogonal Channel Noise Simulator, a mechanism used to simulate the users or control signals on the other orthogonal channels of a downlink link.
PN	PseudoNoise
R&TTE	Radio equipment and Telecommunications Terminal Equipment
SS	System simulator (see TS 134 121 [6])
TPC	Transmit Power Control
UARFCN	UTRA Absolute Radio Frequency Channel Number
UE	User Equipment

UTRA Universal 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.

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

4.2 Conformance requirements

4.2.1 Introduction

To meet the essential requirement under article 3.2 of the R&TTE Directive [1] for IMT-2000 user equipment (UE) eight essential parameters have been identified. Table 2 provides a cross reference between these essential parameters and the corresponding technical requirements for equipment within the scope of the present document.

Table 2: Cross references

Essential parameter	Corresponding technical requirements
Spectrum emissions mask	4.2.3 Transmitter Spectrum emissions mask
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	4.2.11 Out of synchronization handling of output power

4.2.2 Transmitter maximum output power

4.2.2.1 Definition

The nominal maximum output power and its tolerance are defined according to the Power Class of the UE. The nominal power is defined in the broadband transmit power of the UE.

4.2.2.2 Limits

The UE maximum output power shall be within the shown value in table 3 even for the multi-code transmission mode.

Table 3: UE power classes

Power Class	Nominal maximum output power	UE Tolerance
3	+24 dBm	+1,7 / -3,7 dB
4	+21 dBm	±2,7 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, which are between 2,5 MHz and 12,5 MHz away from the UE centre carrier frequency. The out of channel emission is specified relative to the UE output power measured in a 3,84 MHz bandwidth.

4.2.3.2 Limits

The power of any UE emission shall not exceed the levels specified in table 4.

Table 4: Spectrum emission mask requirement

Δf* in MHz	Minimum requirement	Measurement bandwidth
2,5 - 3,5	$\left\{-33{,}5-15\cdot\left(\frac{\Delta f}{MHz}-2{,}5\right)\right\}dBc$	30 kHz **
3,5 - 7,5	$\left\{-33{,}5-1\cdot\left(\frac{\Delta f}{MHz}-3{,}5\right)\right\}dBc$	1 MHz ***
7,5 - 8,5	$\left\{-37{,}5-10\cdot\left(\frac{\Delta f}{MHz}-7{,}5\right)\right\}dBc$	1 MHz ***
8,5 - 12,5	-47,5 dBc	1 MHz ***

* Δf is the separation between the carrier frequency and the centre of the measuring filter.

** The first and last measurement position with a 30 kHz filter is at Δf equals to 2,515 MHz and 3,485 MHz.

*** The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth.

NOTE: The lower limit shall be -48,5 dBm/3,84 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 emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

4.2.4.2 Limits

The limits shown in table 5 and table 6 are only applicable for frequencies, which are greater than 12,5 MHz away from the UE centre carrier frequency.

Table 5: General spurious emissions requirements

Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
9 kHz ≤ f < 150 kHz	1 kHz	-36 dBm
150 kHz ≤ f < 30 MHz	10 kHz	-36 dBm
30 MHz ≤ f < 1 000 MHz	100 kHz	-36 dBm
1 GHz ≤ f < 12,75 GHz	1 MHz	-30 dBm

Table 6: Additional spurious emissions requirements

Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
1 893,5 MHz < f < 1 919,6 MHz	300 kHz	-41 dBm
925 MHz ≤ f ≤ 935 MHz	100 kHz	-67 dBm *
935 MHz < f ≤ 960 MHz	100 kHz	-79 dBm *
1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm *
NOTE: * The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in table 5 are permitted for each UARFCN used in the measurement.		

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 when the power is set to a minimum value. The minimum transmit power is defined as an averaged power in a time slot measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate.

4.2.5.2 Limits

The minimum output power shall be less than -49 dBm.

4.2.5.3 Conformance

Conformance tests described in clause 5.3.4 shall be carried out.

4.2.6 Receiver adjacent channel selectivity

4.2.6.1 Definition

Adjacent channel selectivity (ACS) is a measure of a receiver's ability to receive a W-CDMA 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

For the UE of power class 3 and 4, the BER shall not exceed 0,001 for the parameters specified in table 7. This test condition is equivalent to the ACS value 33 dB.

Table 7: Test parameters for adjacent channel selectivity

Parameter	Unit	Level/Status
DPCH_Ec	dBm/3,84 MHz	-103
Îor	dBm/3,84 MHz	-92,7
I_{oac} (modulated)	dBm/3,84 MHz	-52
Fuw (offset)	MHz	-5 or +5
NOTE 1: For Power class 3 the average transmit power shall be +20 dBm. NOTE 2: For Power class 4 the average transmit power shall be +18 dBm. NOTE 3: The I_{oac} (modulated) signal consists of the common channels and the 16 dedicated data channels as specified in [5].		

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 BER shall not exceed 0,001 for the parameters specified in table 8 and table 9. For table 9 up to 24 exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size.

Table 8: Test parameters for in-band blocking characteristics

Parameter	Unit	10 MHz offset	15 MHz offset
DPCH_Ec	dBm/3,84 MHz	-114	-114
Îor	dBm/3,84 MHz	-103,7	-103,7
$I_{blocking}$ (modulated)	dBm/3,84 MHz	-56	-44
Fuw (offset)	MHz	+10 or -10	+15 or -15
NOTE 1: For Power class 3 the average transmit power shall be +20 dBm. NOTE 2: For Power class 4 the average transmit power shall be +18 dBm. NOTE 3: The $I_{blocking}$ (modulated) signal consists of the common channels and the 16 dedicated data channels as specified in [5].			

Table 9: Test parameters for out-of-band blocking characteristics

Parameter	Unit	Band 1	Band 2	Band 3
DPCH_Ec	dBm/3,84 MHz	-114	-114	-114
Îor	dBm/3,84 MHz	-103,7	-103,7	-103,7
$I_{blocking}$ (CW)	dBm	-44	-30	-15
Fuw (absolute frequency)	MHz	2 050 < f < 2 095 2 185 < f < 2 230	2 025 < f < 2 050 2 230 < f < 2 255	1 < f < 2 025 2 255 < f < 12 750
NOTE 1: For Power class 3 the average transmit power shall be +20 dBm. NOTE 2: For Power class 4 the average transmit power shall be +18 dBm. NOTE 3: For Fuw (absolute frequency) in bands, from 2 095 MHz < f < 2 110 MHz and 2 170 MHz < f < 2 185 MHz, the appropriate in-band blocking or adjacent channel selectivity in clause 4.2.6 and table 8 shall be applied.				

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 blocking limit is not met.

4.2.8.2 Limits

The BER shall not exceed 0,001 for the parameters specified in table 10.

Table 10: Test parameters for spurious response

Parameter	Unit	Level
DPCH_Ec	dBm/3,84 MHz	-114
$\hat{I}_{or}$	dBm/3,84 MHz	-103,7
$I_{blocking}$ (CW)	dBm	-44
NOTE 1: For Power class 3 the average transmit power shall be +20 dBm. NOTE 2: For Power class 4 the average transmit power shall be +18 dBm.		

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 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 BER shall not exceed 0,001 for the parameters specified in table 11.

Table 11: Receive intermodulation characteristics

Parameter	Unit	Level	
DPCH_Ec	dBm/3,84 MHz	-114	
$\hat{I}_{or}$	dBm/3,84 MHz	-103,7	
I_{ouw1} (CW)	dBm	-46	
I_{ouw2} (modulated)	dBm/3,84 MHz	-46	
F_{uw1} (offset)	MHz	10	-10
F_{uw2} (offset)	MHz	20	-20
NOTE 1: For Power class 3 the average transmit power shall be +20 dBm. NOTE 2: For power class 4 the average transmit power shall be +18 dBm. NOTE 3: I_{ouw2} (modulated) consists of the common channels and the 16 dedicated data channels as specified in [5].			

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 power of any narrow band CW spurious emission shall not exceed the maximum level specified in table 12 and table 13.

Table 12: General receiver spurious emission requirements

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

Table 13: Additional receiver spurious emission requirements

Frequency Band	Measurement Bandwidth	Maximum level	Note
1 920 MHz ≤ f ≤ 1 980 MHz	3,84 MHz	-60 dBm	Mobile transmit band in URA_PCH, Cell_PCH and idle state
2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm	Mobile receive band

4.2.10.3 Conformance

Conformance tests described in clause 5.3.9 shall be carried out.

4.2.11 Out-of-synchronization handling of output power

4.2.11.1 Definition

The UE shall monitor the DPCCH quality in order to detect a loss of the signal on Layer 1. The threshold Q_{out} specifies at what DPCCH quality levels the UE shall shut its power off. The threshold is not defined explicitly, but is defined by the conditions under which the UE shall shut its transmitter off, as stated in this clause.

The DPCCH quality shall be monitored in the UE and compared to the threshold Q_{out} for the purpose of monitoring synchronization. The threshold Q_{out} should correspond to a level of DPCCH quality where no reliable detection of the TPC commands transmitted on the downlink DPCCH can be made. This can be at a TPC command error ratio level of e.g. 30 %.

4.2.11.2 Limits

When the UE estimates the DPCCH quality over the last 160 ms period to be worse than a threshold Q_{out}, the UE shall shut its transmitter off within 40 ms.

For the parameters defined in table 14, figure 2 shows a scenario where the $\frac{DPCCH\_E_c}{I_{or}}$ ratio varies from a level where the DPCH is demodulated under normal conditions down to a level where the UE shall shut its power off.

Table 14: DCH parameters for test of out-of-synchronization handling

Parameter	Value	Unit
$\hat{I}_{or}/I_{oc}$	-1	dB
I_{oc}	-60	dBm/3,84 MHz
$\frac{DPDCH\_E_c}{I_{or}}$	See figure 2: Before point A -16.6 After point A not defined	dB
$\frac{DPCCH\_E_c}{I_{or}}$	See figure 2	dB
Information Data Rate	12,2	kbit/s

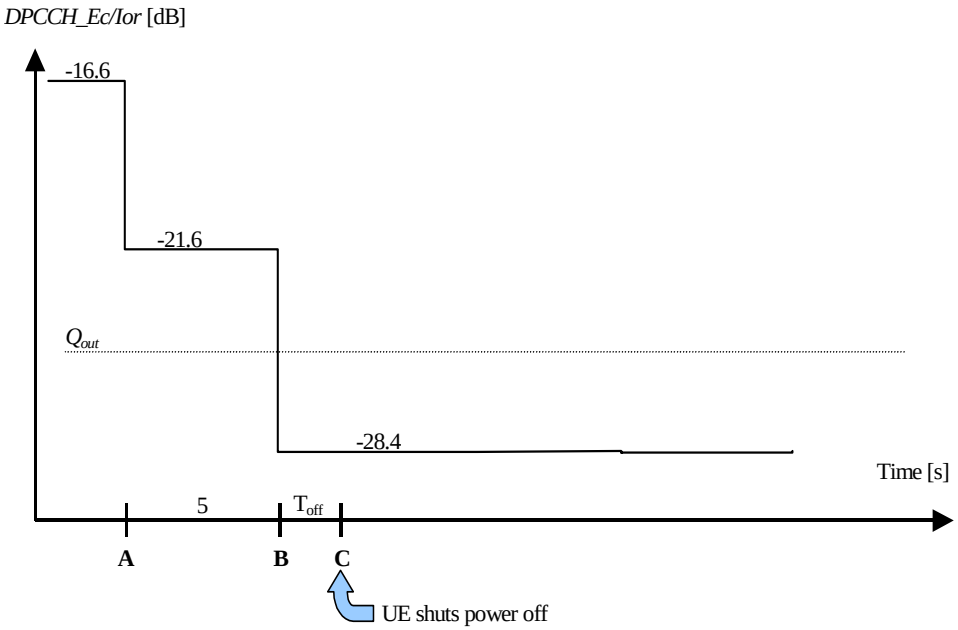

Figure 2: Conditions for out-of-synch handling in the UE

The requirements for the UE are that it shall shut its transmitter off before point C.

The UE transmitter is considered to be off if the transmitter power is less than -55 dBm in the transmit frequency band.

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 134 121 [6].

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 134 108 [7].

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 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 15.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028 [4] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Table 15 is based on such expansion factors.

Table 15: 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	f ≤ 2,2 GHz 2,2 GHz < f ≤ 4 GHz f > 4 GHz Co-existence band (>-60 dBm) Co-existence band (<-60 dBm)	±1,5 dB ±2,0 dB ±4,0 dB ±2,0 dB ±3,0 dB
Transmitter Minimum output power		±1,0 dB
Receiver Adjacent Channel Selectivity (ACS)		±1,1 dB
Receiver Blocking characteristics	f <15 MHz offset: 15 MHz offset ≤ f ≤ 2,2 GHz 2,2 GHz < f ≤ 4 GHz f > 4 GHz:	±1,4 dB ±1,0 dB ±1,7 dB ±3,1 dB
Receiver spurious response	f ≤ 2,2 GHz 2,2 GHz < f ≤ 4 GHz f > 4 GHz	±1,0 dB ±1,7 dB ±3,1 dB
Receiver intermodulation characteristics		±0,6 dB
Receiver spurious emissions	For UE receive band (-60 dBm) For UE transmit band (-60 dBm) Outside the UE receive band: f ≤ 2,2 GHz 2,2 GHz < f ≤ 4 GHz f > 4 GHz	±3,0 dB ±3,0 dB ±2,0 dB ±2,0 dB ±4,0 dB
Out of synchronization of handling power	DPCCH Ec/Ior Transmit OFF power	±0,4 dB ±1,0 dB

NOTE 1: For RF tests it should be noted that the uncertainties in table 15 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 [4] 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 15, 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 15 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 15 does not increase the probability of passing an EUT that would otherwise have failed a test if a Test System compliant with table 15 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 and extreme (for guidance see annex B).

The frequencies to be tested are low range, mid range and high range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure.

3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] respectively.

5.3.1.1.2 Procedure

1) Set and send continuously Up power control commands to the UE.

2) Measure the output power of the UE.

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 (for guidance see annex B).

The frequencies to be tested are low range, mid range and high range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure.

3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] respectively.

5.3.2.1.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be at the maximum level.
2) Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 4.
3) Measure the wanted output power according to TS 134 121 [6] annex B.
4) Calculate the ratio of the power 2) with respect to 3) in dBc.

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 (for guidance see annex B).

The frequencies to be tested are low range, mid range and high range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.
2) A call is set up according to the Generic call setup procedure.
3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] 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 mean 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 and extreme (for guidance see annex B).

The frequencies to be tested are mid range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure.

3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8].

5.3.4.1.2 Procedure

1) Set and send continuously Down power control commands to the UE.

2) Measure the output power of the UE.

5.3.4.2 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 Receiver adjacent channel selectivity (ACS)

5.3.5.1 Method of test

5.3.5.1.1 Initial conditions

Test environment: normal (for guidance see annex B).

The frequencies to be tested are mid range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to table 7.

3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] respectively.

5.3.5.1.2 Procedure

1) Set the parameters of the interference signal generator as shown in table 7.

2) Measure the BER of DCH received from the UE.

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 (for guidance see annex B).

The frequencies to be tested are mid range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to table 8 and table 9.

3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] respectively.

5.3.6.1.2 Procedure

1) Set the parameters of the CW generator or the interference signal generator as shown in table 8 and table 9. For table 9 the frequency step size is 1 MHz.

2) Measure the BER of DCH received from the UE.

3) For table 9, record the frequencies for which the BER exceeds the test 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 (for guidance see annex B).

The frequencies to be tested are mid range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to table 10.

3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] respectively.

5.3.7.1.2 Procedure

1) Set the parameter of the CW generator as shown in table 10. The spurious response frequencies are determined in step 3) of clause 5.3.6.1.2.

2) Measure the BER of DCH received from the UE.

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 (for guidance see annex B).

The frequencies to be tested are mid range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure as per TS 134 108 [7], and RF parameters are set up according to table 11.

3) Enter the UE into loopback test mode and start the loopback test using the procedure defined in TS 134 109 [8].

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] respectively.

5.3.8.1.2 Procedure

1) Measure the BER of DCH received from the UE.

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

5.3.9.1.1 Initial conditions

Test environment: normal (for guidance see annex B).

The frequencies to be tested are mid range as defined in TS 134 108 [7].

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

2) UE shall be in CELL_FACH state.

3) The UE shall be setup such that UE will not transmit during the measurement. (For guidance see TS 134 121 [6].)

5.3.9.1.2 Procedure

1) Sweep the spectrum analyser (or other suitable test equipment) over a frequency range from 30 MHz to 12,75 GHz and measure the mean 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 Out-of-synchronization handling of output power

5.3.10.1 Method of test

5.3.10.1.1 Initial conditions

Test environment: normal (for guidance see annex B).

The frequencies to be tested are mid range as defined in TS 134 108 [7].

1) Connect the SS to the UE antenna connector.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to table 14 with DPCCH_Ec/Ior ratio level at -16,6 dB.

3) Enter the UE into loopback test mode and start the loopback test.

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 134 121 [6] annexes A to E, TS 134 108 [7] and TS 134 109 [8] respectively.

5.3.10.1.2 Procedure

1) The SS sends continuously Up power control commands to the UE until the UE transmitter power reach maximum level.

2) The SS controls the DPCCH_Ec/Ior ratio level to -21,6 dB.

3) The SS controls the DPCCH_Ec/Ior ratio level to -28,4 dB. The SS waits 200 ms and then verifies that the UE transmitter has been switched off.

4) The SS monitors the UE transmitted power for 5 seconds and verifies that the UE transmitter is not switched on during this time.

5.3.10.2 Test requirements

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

Annex A (normative): The EN Requirements Table (EN-RT)

The EN Requirements Table (EN-RT) serves a number of purposes, as follows:

- it provides a tabular summary of all the requirements;
- it shows the status of each EN-R, whether it is essential to implement in all circumstances (Mandatory), or whether the requirement is dependent on the supplier having chosen to support a particular optional service or functionality (Optional). In particular it enables the EN-Rs associated with a particular optional service or functionality to be grouped and identified;
- when completed in respect of a particular equipment it provides a means to undertake the static assessment of conformity with the EN.

Table A.1: EN Requirements Table (EN-RT)

EN Reference		**EN 301 908-2**				**Comment**
No.	**Reference**	**EN-R** (note)	**Status**			
1	4.2.2	Transmitter maximum output power	M			
2	4.2.3	Transmitter spectrum emission mask	M			
3	4.2.4	Transmitter spurious emissions	M			
4	4.2.5	Transmitter minimum output power	M			
5	4.2.6	Receiver Adjacent Channel Selectivity (ACS)	M			
6	4.2.7	Receiver blocking characteristics	M			
7	4.2.8	Receiver spurious response	M			
8	4.2.9	Receiver Intermodulation response	M			
9	4.2.10	Receiver spurious emissions	M			
10	4.2.11	Out-of-synchronization handling of output power	M			
NOTE: These EN-Rs are justified under article 3.2 of the R&TTE Directive.						

Key to columns:

No Table entry number;

Reference Clause reference number of conformance requirement within the present document;

EN-R Title of conformance requirement within the present document;

Status	Status of the entry as follows:
M	Mandatory, shall be implemented under all circumstances;
O	Optional, may be provided, but if provided shall be implemented in accordance with the requirements;
O.n	this status is used for mutually exclusive or selectable options among a set. The integer "n" shall refer to a unique group of options within the EN-RT. A footnote to the EN-RT shall explicitly state what the requirement is for each numbered group. For example, "It is mandatory to support at least one of these options", or, "It is mandatory to support exactly one of these options".
Comments	To be completed as required.

Annex B (informative): Environmental profile

B.1 General

B.1.1 Introduction

This informative annex specifies the environmental profile of the UE.

B.1.2 Temperature

The UE should fulfil all the requirements in the full temperature range as given in table B.1.

Table B.1: Temperatures

Range	Conditions
+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 publications 68-2-1 and 68-2-2)

The low and high extreme temperature conditions are denoted as TL (temperature low, -10 °C) and TH (temperature high, +55 °C).

B.1.3 Voltage

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

The supplier should 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 should not be higher, and the higher extreme voltage should not be lower than that specified in table B.2.

Table B.2: Power sources

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 0,90 × nominal	 nominal nominal	 nominal nominal

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 should 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 should 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): Bibliography

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.

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

Language	EN title
Danish	
Dutch	
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 2: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive
Finnish	
French	Compatibilité électromagnétique et Radioélectrique (ERM); Stations de Base (BS) et Equipement Utilisateur (UE) pour les réseaux cellulaires de troisième génération IMT-2000; Partie 2: Norme harmonisée pour l'IMT-2000, CDMA à étalement direct (UTRA FDD) (UE) couvrant les exigences essentielles de l'article 3.2 de la Directive R&TTE
German	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM); Feststationen (BS) und Einrichtungen für den Nutzer (UE) für digitale zellulare IMT-2000 Funknetze der 3. Generation, Teil 2: Harmonisierte Europäische Norm (EN) für IMT-2000, CDMA-Direkt-Spreizspektrum-Einrichtungen (UTRA FDD) für den Nutzer (UE) mit wesentlichen Anforderungen nach R&TTE-Richtlinie Artikel 3.2
Greek	
Italian	Compatibilità elettromagnetica e problematiche di Spettro Radio (ERM); Stazioni Base (BS) e Terminali Mobili (UE) per le reti cellulari di terza generazione IMT-2000; Parte 2: Norma armonizzata per IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) relativa ai requisiti essenziali dell'articolo 3.2 della Direttiva R&TTE
Portuguese	
Spanish	Compatibilidad electromagnética y espectro radio (ERM); estaciones base (BS) y equipos de usuario (UE) de redes móviles de tercera generación IMT-2000; Parte 2: EN harmonizada que cubre los requisitos mínimos del artículo 3.2 de la directiva de R&TTE (1999/5/EC); CDMA con ensanchamiento por secuencia directa (UTRA FDD) (UE)
Swedish	Elektromagnetisk kompatibilitet och radio-spektrumfrågor (ERM); Basstationer (BS) och Mobilstationer (UE) för tredje generationens mobilnät IMT-2000; Del 2:Harmoniserad EN för IMT-2000, CDMA med direkspridning (UTRA FDD) (UE) omfattande väsentliga krav enligt artikel 3.2 i R&TTE-direktivet

History

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