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Harmonized European Standard (Telecommunications series)

**Satellite Earth Stations and Systems (SES);
Harmonized standard for satellite earth stations for
MSS operating in the 1 980 MHz to
2 010 MHz (earth-to-space) and 2 170 MHz to
2 200 MHz (space to-earth) frequency bands;
Part 2: User Equipment (UE) for wideband systems:
Harmonized EN covering 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 Satellite Earth Stations and Systems (SES), 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 [1] 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 [1] are given in annex A.

The present document is part 2 of a multi-part deliverable covering the Harmonized Standard for satellite earth stations for MSS operating in the 1 980 MHz to 2 010 MHz (earth-to-space) and 2 170 MHz to 2 200 MHz (space-to-earth) frequency bands, as identified below:

Part 1: "Complementary Ground Component (CGC) for wideband systems: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive";

Part 2: "User Equipment (UE) for wideband systems: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive";

Part 3: "User Equipment (UE) for narrowband systems: Harmonized EN covering 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 User Equipment (UE) radio equipment type which has the following characteristics:

- these UEs have both transmit and receive capabilities and operate in an hybrid Satellite/terrestrial network i.e. a satellite and/or Complementary Ground Component (CGC) network,
- the satellite component is based on GSO,
- these UEs operate with an assigned channel signal bandwidth (CBw) of 1 MHz or greater,
- these UEs may be handset, handheld, portable, vehicle-mounted, host connected, semi-fixed or fixed equipment, or may be an element in a multi-mode terminal. It may consist of a number of modules with associated connections and user interface, or may be a self contained single unit,
- if the UE is an element in a multi-mode terminal, unless otherwise stated in the present document, its requirements apply only to the UE element of the terminal operating in the Mobile Satellite Service (MSS) frequency bands given in Table 1.

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

Table 1: Mobile Satellite Service UE frequency bands

Operating band	Direction of transmission	UE frequency bands
I	Transmit	1 980 MHz to 2 010 MHz
	Receive	2 170 MHz to 2 200 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".

NOTE 1: In addition to the unwanted emission limits defined in clauses 4.2.4 & 4.2.5 of the present document, additional operational constraints may be required to prevent harmful interference into services operating in the neighbouring bands outside the operational band defined in Table 1.

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 2: 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] 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] ETSI TR 100 028 (V1.4.1) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics.

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

[4] 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 TS 125 101: "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (FDD)".

[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 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.

[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] ETSI EN 302 574-1: "Satellite Earth Stations and Systems (SES); Harmonized standard for satellite earth stations for MSS operating in the 1 980 MHz to 2 010 MHz (earth-to-space) and 2 170 MHz to 2 200 MHz (space-to-earth) frequency bands; Part 1: Complementary Ground Component (CGC) for wideband systems: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.6] ETSI EN 302 574-3: "Satellite Earth Stations and Systems (SES); Harmonized Standard for satellite earth stations for MSS operating in the 1 980 MHz to 2 010 MHz (earth-to-space) and 2 170 MHz to 2 200 MHz (space-to- earth) frequency bands; Part 3: User Equipment (UE) for narrowband systems: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive".

3 Definitions, symbols 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:

ancillary equipment: equipment (apparatus), used in connection with User Equipment (UE) is considered as ancillary equipment (apparatus) if:

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

channel raster: grade for a Centre Frequency: the centre frequency must be an integer multiple of the channel raster

3.2 Symbols

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

α	roll-of factor of the transmitter filter
Car_Bw	Sub-Carrier spacing for multi carrier signals
CBw	Channel signal bandwidth (channel spacing)
$CBw_{assigned}$	Assigned channel signal bandwidth (channel spacing)
$CBw_{adjacent}$	Adjacent channel signal bandwidth (channel spacing).
C_{raster}	Channel raster
F_{uw}	Frequency of unwanted signal

NOTE: This is specified in bracket in terms of an absolute frequency(s) or a frequency offset from the assigned channel frequency.

NBw Noise bandwidth

NOTE: In case of single carrier signal, it is equivalent to the Symbol Rate. NBw (MHz) = Symbol_rate.

In case of Multicarrier signal (for example OFDM), NBw (MHz) = (N+1) × Car_Bw (MHz), where N is the number of used sub-carriers.

<REFSENS> Reference sensitivity level

NOTE: Corresponding to the minimum mean power received at the UE antenna port at which the Bit Error Ratio (BER) shall not exceed a specific value (see [i.1]).

3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
BER	Bit Error Ratio
CDMA	Code Division Multiple Access
CGC	Complementary Ground Component
CW	Continuous Wave

NOTE: Unmodulated signal.

FDD	Frequency Division Duplexing
F_{uw}	Frequency of unwanted signal
GSM	Global System for Mobile communications
MSS	Mobile Satellite Services
OFDM	Orthogonal Frequency Division Multiplexing
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
Rx	Receiver
SS	System Simulator
TH	Temperature High
TL	Temperature Low
ToL	Tolerance
TTE	Telecommunications Terminal Equipment
UE	User Equipment
VH	Voltage High
VL	Voltage Low
WCDMA	Wideband Code Division Multiple Access

4 Technical requirements specifications

4.1 Environmental profile

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

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

4.2 Conformance requirements

The requirements in the present document are based on the assumption that the operating band is shared between systems of the IMT-2000 satellite family or systems having compatible characteristics.

4.2.1 Introduction

To meet the essential requirements 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 eight essential parameters and the corresponding twelve technical requirements for equipment within the scope of the present document.

Table 2: Cross references

Essential parameter	Corresponding technical requirements
Spectrum emissions mask	4.2.4 Spectrum emission mask
	4.2.7 Adjacent Channel Leakage Power Ratio (ACLR)
Conducted spurious emissions from the transmitter antenna connector	4.2.5 Transmitter spurious emissions
Accuracy of maximum output power	4.2.3 Maximum output power
Prevention of harmful interference through control of power	4.2.6 Minimum Output Power
Conducted spurious emissions from the receiver antenna connector	4.2.13 Receiver spurious emissions
Impact of interference on receiver performance	4.2.10 Blocking characteristics
	4.2.11 Receiver spurious response
	4.2.12 Receiver inter-modulation characteristics
Receiver adjacent channel selectivity	4.2.9 Receiver Adjacent Channel Selectivity (ACS)
Control and monitoring functions	4.2.2 Control and monitoring functions
	4.2.8 Out of synchronisation handling of output power

4.2.2 Control and monitoring functions

4.2.2.1 Definition

This requirement, together with other control and monitoring technical requirements identified in the table of cross references in the applicable part, verifies that the control and monitoring functions of the UE prevent it from transmitting in the absence of a valid network.

This test is applicable to radio communications equipment and ancillary equipment.

This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

4.2.2.2 Limit

The maximum measured power during the duration of the test shall not exceed -30 dBm.

4.2.2.3 Conformance

Conformance tests described in clause 5.4.1 shall be carried out.

4.2.3 Maximum output power

4.2.3.1 Definition

The nominal maximum output power and its tolerance are defined according to the power class of the UE.

The nominal power defined is the broadband transmit power of the UE, i.e. the power in a bandwidth of at least (1 + α) times the symbol rate of the radio access mode. The duration of the measurement shall be at least 50 % of one contiguous unit of transmission time.

Note for both TDMA and OFDM, the unit of transmission time corresponds to a frame