

**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**

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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 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 [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").

The requirements relevant to Directive 1999/5/EC [1] are summarised in annex A.

The present document is part 1 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 the 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".

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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 [1]. The modular structure is shown in EG 201 399 [i.3].

The technical requirements in the present document are adapted from the requirements in EN 301 908-1 [3] and EN 301 908-3 [4]. The adaptations include a variable channel bandwidth and frequency band changes to the MSS band.

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1 Scope

The present document applies to Complementary Ground Components (CGC) operating as part of a satellite network. These Complementary Ground Components (CGC) transmit only to the User Equipment or transmit and receive to/from the User Equipment in the frequency bands allocated to the Mobile Satellite Service (MSS) on a primary basis as defined in table 1.

NOTE 1: The CGC may include various types of interfaces, to terrestrial and/or satellite networks, but their specifications are out of the scope of the present document.

The present document applies to Complementary Ground Component (CGC) radio equipment type deployed in Mobile Satellite Services systems which have the following characteristics:

- These CGCs may have both transmit and receive capabilities and are part of a hybrid Satellite/terrestrial network.
- These CGCs operate with an assigned channel signal bandwidth (CBw) of 1 MHz or greater.
- These CGCs may be local coverage, medium coverage or wide coverage ground components.
- These CGCs may be an element in a multi-mode base station. It may consist of a number of modules with associated connections, or may be a self contained single unit.

If the CGC is an element in a multi-mode base station, unless otherwise stated in the present document, its requirements apply only to the CGC element of the terminal operating in the Mobile Satellite Service (MSS) frequency bands given in table 1.

The present document applies to the following terminal equipment types:

- 1) Complementary Ground Components for Wideband Satellite Systems.

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 Complementary Ground Component frequency bands

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

The present document only applies to the radio interface between the CGC and the User Equipment.

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 2: In addition to the unwanted emission limits defined in clause 4.2.2 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 [1] may apply to equipment within the scope of the present document.

NOTE 3: 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 specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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 necessary for the application of the present document.

- [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 TS 125 141 (V6.19.0) (2008-04): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 6.19.0 Release 6)".
- [3] ETSI EN 301 908-1 (V3.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive".
- [4] ETSI EN 301 908-3 (V3.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 3: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive".
- [5] ITU-R Recommendation SM.329-10 (02/2003): "Unwanted emissions in the spurious domain".
- [6] ITU-T Recommendation O.153 (10/1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [7] IEC 60068-2-1 (2007): "Environmental testing - Part 2-1: Tests - Test A: Cold".
- [8] IEC 60068-2-2 (2007): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".
- [9] IEC 60068-2-6 (2007): "Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [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] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".
- [i.4] ETSI TR 102 215: "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.5] ETSI EN 302 574-2: "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".
- [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".
- [i.7] IEC 60721-3-3 (2002): "Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weatherprotected locations".
- [i.8] IEC 60721-3-4 (1995): "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weather protected locations".

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 a CGC, which is considered as ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with an CGC to provide additional operational and/or control features to the radio equipment, (e.g. to extend control to another position or location);
- the equipment cannot be used on a stand alone basis to provide user functions independently of an CGC; and
- the CGC 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 multiplex: set of one or several RF carriers forming one coherent signal

Complementary Ground Component (CGC): ground-based infrastructure at fixed locations used to enhance satellite coverage in zones where communications with one or several space stations cannot be ensured with the required quality

CGC class: wide coverage CGC, medium coverage CGC or local coverage CGC, as declared by the manufacturer

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

local coverage CGC: CGC characterized by requirements derived from picocell scenarios with a CGC to UE minimum coupling loss equal to 45 dB

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

mean power: average power (transmitted or received) supplied to the antenna port during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions

medium coverage CGC: CGC characterized by requirements derived from microcell scenarios with a CGC to UE minimum coupling loss equal to 53 dB

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

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

wide coverage CGC: CGC characterized by requirements derived from macrocell scenarios with a CGC to UE minimum coupling loss equal to 70 dB

NOTE: The coupling loss is defined as the space loss that will depend on the propagation channel: Line of Sight, Urban, Suburban, etc.

3.2 Symbols

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

α	roll-off factor of the transmitter filter
CBw	Channel multiplex bandwidth (multiplex spacing)
CBw _{assigned}	Assigned channel multiplex bandwidth (multiplex spacing)
CBw _{adjacent}	Adjacent channel multiplex bandwidth (multiplex spacing)
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.

Ω	Ohm
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3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
ATT	Attenuator
BER	Bit Error Ratio
BS	Base Station
CDMA	Code Division Multiple Access
CGC	Complementary Ground Component
CW	Continuous Wave (unmodulated signal)
EUT	Equipment Under Test
FDD	Frequency Division Duplexing
F _{uw}	Frequency of unwanted signal
GSM	Global System for Mobile communications
HYB	Hybrid
MS	Mobile Station
MSS	Mobile Satellite Service
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
RMS	Root Mean Square
RRC	Root-Raised Cosine
Rx	Receiver
TDD	Time Division Duplexing
TTE	Telecommunications Terminal Equipment
Tx	Transmitter
UE	User Equipment
UTRA	Universal Terrestrial Radio Access
WCDMA	Wideband Code Division Multiple Access

4 Technical requirements specifications

4.1 Environmental profile

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

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

4.2 Conformance requirements

The requirements in the present document are based on the assumption that the operating band 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 Complementary Ground Component (CGC) seven essential parameters have been identified. Table 2 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 2: Cross-references

Essential parameter	Corresponding technical requirements (clause)
Spectrum emissions mask	4.2.2
	4.2.3
Conducted spurious emissions from the transmitter antenna connector	4.2.4
Accuracy of maximum output power	4.2.9
Intermodulation attenuation of the transmitter	4.2.6
Conducted spurious emissions from the receiver antenna connector	4.2.7
Impact of interference on receiver performance	4.2.8
	4.2.9
Receiver adjacent channel selectivity	4.2.10

The supplier shall declare the CGC class and operating band(s) for the CGC. The technical requirements apply for the declared CGC class and operating band(s) as outlined for each requirement. For a CGC supporting more than one operating band, conformance testing for each technical requirement in clause 5 shall be performed for each operating band.

The technical requirements also apply to the CGC configurations described in annex C.

4.2.2 Spectrum emission mask

4.2.2.1 Definition

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