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Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for the GSM onboard aircraft system 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 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 [12] (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 [11] 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 [11] 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
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Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive. The modular structure is shown in EG 201 399 [13].

1 Scope

The present document applies to a system comprising the following radio equipment types:

1) an Onboard GSM Base Transceiver System (OBTS) supporting the GSM 1800 functions with specific protocols for power constraints;

2) a Network Control Unit (NCU) preventing direct connection of the onboard mobile terminals with mobile networks on the ground by raising the noise floor in the cabin.

These radio equipment types are capable of operating in all or any part of the frequency bands given below:

Table 1: Radiocommunications service frequency bands

	Radiocommunications service frequency bands
Transmit 1 (OBTS)	1 805 MHz to 1 880 MHz
Receive 1 (OBTS)	1 710 MHz to 1 785 MHz
Transmit 2 (NCU)	460 MHz to 470 MHz
Transmit 2 (NCU)	921 MHz to 960 MHz
Transmit 2 (NCU)	1 805 MHz to 1 880 MHz
Transmit 2 (NCU)	2 110 MHz to 2 170 MHz

It applies to equipment for continuous and discontinuous transmission of data and digital speech.

The present document applies only to radio equipment using a dedicated transmitting antenna that is designed as an indispensable part of the system for usage on board an aircraft.

The system covered by the present document operates in accordance with the operational requirements as outlined in the Decision CEPT/ECC/DEC/(06)07 [14].

The present document covers the provisions of Directive 1999/5/EC (the 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.

The present document does not cover equipment compliance with relevant civil aviation regulations. In this respect, a GSMOBA system, for its installation and operation on board an aircraft is subject to additional national or international civil aviation airworthiness certification requirements, for example to EUROCAE ED-14E [10].

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.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

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 145 005: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception (3GPP TS 45.005 version 6.14.0 Release 6)".

[2] ETSI TS 145 010: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization (3GPP TS 45.010 version 6.6.0 Release 6)".

[3] ETSI TS 145 008: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control (3GPP TS 45.008 version 6.19.0 Release 6)".

[4] 3GPP2 C.S0011-C (V2.0): "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations".

NOTE: http://www.3gpp2.org/Public_html/specs/C.S0011-C_v2.0_060315.pdf

[5] ETSI TS 125 104: "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 6.16.0 Release 6)".

[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 TS 151 021: "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 6.3.0 Release 6)".

[8] ETSI TS 145 004: "Digital cellular telecommunications system (Phase 2+); Modulation (3GPP TS 45.004 version 6.0.0 Release 6)".

[9] CISPR 16-2-1 (2005): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements".

[10] EUROCAE ED-14E (2005) (Equivalent to RTCA DO-160E): "Environmental Conditions and Test Procedures for Airborne Equipment".

2.2 Informative references

[11] 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).

[12] 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.

[13] ETSI EG 201 399 (V2.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

[14] CEPT/ECC/DEC/(06)07: "ECC Decision of 1 December 2006 on the harmonized use of airborne GSM systems in the frequency bands 1710-1785 and 1805-1880 MHz".

[15] CEPT/ERC/REC 74-01 (2005) (equivalent to ITU-R Recommendation SM.329-10): "Unwanted emissions in the spurious domain".

3 Definitions and abbreviations

3.1 Definitions

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

Base Station System Test Equipment (BSSTE): functional tool for the purpose of acceptance testing of GSM Base Station Systems

NOTE: The BSSTE functionally carries out all tests described in the OBTS specification.

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

GSM onboard aircraft system: system comprising the functions provided by the NCU and the OBTS

Network Control Unit (**NCU):** component of the GSM onboard aircraft system preventing direct connection of the onboard mobile terminals with mobile networks on the ground by raising the noise floor in the cabin

Onboard Base Transceiver Station (OBTS): component of the GSM onboard aircraft system responsible for radio transmission and reception to or from the onboard mobile terminals

3.2 Abbreviations

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

ACU	Antenna Coupler Unit
AGL	Above Ground Level
BER	Bit Error Rate
BCCH	Broadcast Control CHannel
BLER	Block Error Rate
BSSTE	Base Station System Test Equipment
BTS	Base Transceiver Station
dB	decibel
dBm	decibel relative to 1 mW
DTM	Dual Transfer Mode
e.i.r.p.	equivalent isotropically radiated power

ECC	Electronic Communications Committee
FER	Frame Error Rate
GGW	Ground GateWay
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
GSMOBA	GSM OnBoard Aircraft
MS	Mobile Station
MSC	Mobile Switching Centre
NCU	Network Control Unit
OBTS	Onboard Base Transceiver Station
PBCCH	Packet Broadcast Control CHannel
R&TTE	Radio and Telecommunications Terminal Equipment
RACH	Random Access CHannel
RBER	Residual BER
RBW	Resolution BandWidth
RF	Radio Frequency
rms	root mean square
SGSN	Serving GPRS Support Node
STE	Special Test Equipment
TCH	Traffic CHannel
VBW	Video BandWidth

4 Technical requirements specifications

4.1 General

4.1.1 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 and for the environmental conditions (as specified in clause B.3).

4.1.2 GSMOBA system states

Figure 1 represents the state diagram of the GSMOBA system.

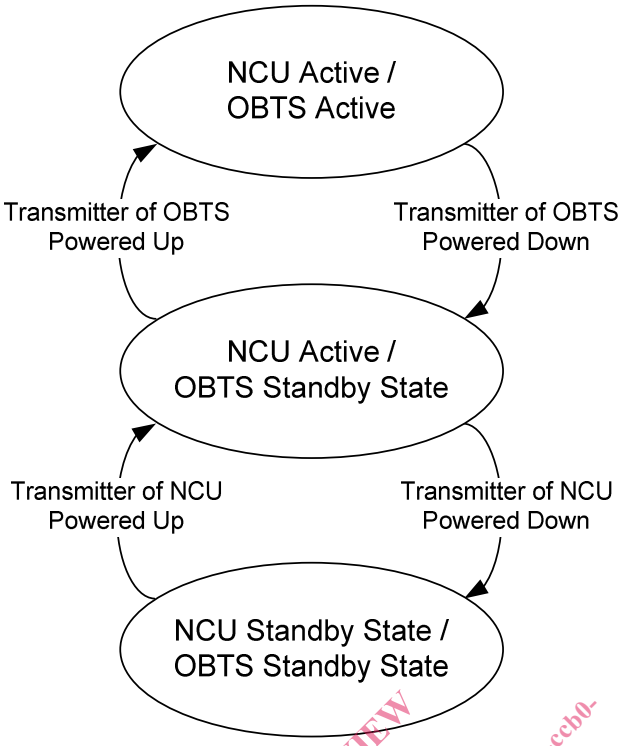

Figure 1: State diagram of GSMOBA system

When the NCU function of the GSMOBA system is in NCU Active state the Transmitter of the NCU is powered up, whereas when the NCU function of the GSMOBA system is in NCU Standby state the Transmitter of the NCU is powered down.

When the OBTS function of the GSMOBA system is in OBTS Active state the Transmitter of the OBTS is powered up, whereas when the OBTS function of the GSMOBA system is in OBTS Standby state the Transmitter of the OBTS is powered down.

When the GSMOBA system is in Active state, both the OBTS and the NCU are in Active state, whereas when the GSMOBA system is in Standby state, both OBTS and NCU are in Standby state.

The NCU function for the relevant frequency band(s) of the GSMOBA system is allowed to enter the "Active" state after take-off or to remain in the "Active" state during the flight only when the regulatory conditions for the service operation as authorized by the regulatory administration of the country passed over are satisfied.

The OBTS function of the GSMOBA system is allowed to enter the "Active" state after the take-off or to remain in the "Active" state during the flight only when the regulatory condition for the service operation as authorized by the regulatory administration of the country passed over are satisfied and proper NCU initialization has been reached. The OBTS function is not allowed to be in the "Active" state unless the NCU function is also in the "Active" state.

The OBTS function of the GSMOBA system enters the "Standby" state:

- when the aircraft reaches during the descend phase the regulatory condition as authorized by the regulatory administration of the country/countries passed over when approaching the airport, or
- before the aircraft enters into the airspace of a country whose regulatory administration does not allow the use of GSMOBA services in the airspace above its territory.

The NCU function of the GSMOBA system enters the "Standby" state after the OBTS has entered the "Standby" state and:

- when the aircraft reaches during the descend phase the regulatory condition as authorized by the regulatory administration of the country/countries passed over when approaching the airport; or
- before the aircraft enters into the airspace of a country whose regulatory administration does not allow the use of GSMOBA services in the airspace above its territory.