SLOVENSKI STANDARD
SIST EN 302 480 V2.1.1:2016

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Sistemi mobilnih komunikacij v letalih (MCOBA) - Harmonizirani standard, ki zajema bistvene zahteve člena 3.2 direktive za radijsko opremo 2014/53/EU

Mobile Communication On Board Aircraft (MCOBA) systems - Harmonised Standard covering the essential requirements of article 3.2 of the Radio Equipment Directive 2014/53/EU

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Mobile Communication On Board Aircraft (MCOBA) systems; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

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Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG).

For non EU countries the present document may be used for regulatory (Type Approval) purposes.

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.9] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A-1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

National transposition dates	
Date of adoption of this EN:	21 April 2016
Date of latest announcement of this EN (doa):	31 July 2016
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2017
Date of withdrawal of any conflicting National Standard (dow):	31 January 2018

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

The present document is part of a set of standards developed by ETSI that are designed to fit in a modular structure to cover radio equipment within the scope of the Radio Equipment Directive 2014/53/EU [i.1]. The present document is produced following the guidance in ETSI EG 203 336 [i.2] as applicable.

1 Scope

The present document applies to the following equipment types:

1) An Onboard Base Transceiver System (OBTS) supporting GSM, UMTS or LTE communication protocols including specific functions for restricting the transmit power of the MSs or UEs, respectively associated with the OBTS.

2) 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 Base stations are capable of operating in all or any part of the frequency bands given in table 1-1.

Table 1-1: Base station operating bands

Band designation	Direction of transmission	Base Station operating bands
UTRA I	BS Transmit	2 110 MHz to 2 170 MHz (UMTS)
	BS Receive	1 920 MHz to 1 980 MHz (UMTS)
E-UTRA 3	BS Transmit	1 805 MHz to 1 880 MHz (LTE)
	BS Receive	1 710 MHz to 1 785 MHz (LTE)
DCS 1800	BS Transmit	1 805 MHz to 1 880 MHz (GSM)
	BS Receive	1 710 MHz to 1 785 MHz (GSM)

These NCU is capable of operating in all of the frequency bands given in table 1-2.

Table 1-2: NCU operating bands

NCU operating bands	Comment
460 MHz to 470 MHz	
791 MHz to 821 MHz	LTE
921 MHz to 960 MHz	GSM
1 805 MHz to 1 880 MHz	GSM / LTE
2 110 MHz to 2 170 MHz	UMTS
2 570 MHz to 2 620 MHz	LTE
2 620 MHz to 2 690 MHz	LTE

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 Commission Decision 2013/654/EU [i.3].

The present document contain requirements to demonstrate that Radio equipment both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference.

In addition to the present document, other ENs that specifie technical requirements in respect of essential requirements under other parts of Article 3 of the Radio Equipment 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 MCOBA 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 [i.6].

2 References

2.1 Normative 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 referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

[1] ETSI EN 301 908-14 (V11.1.1) (05-2016): "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)".

[2] ETSI TS 145 005 (V12.5.0) (04-2015): "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception (3GPP TS 45.005 version 12.5.0 Release 12)".

[3] ETSI TS 145 010 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization (3GPP TS 45.010 version 12.0.0 Release 12)".

[4] ETSI TS 145 008 (V12.4.0) (01-2015): "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control (3GPP TS 45.008 version 12.4.0 Release 12)".

[5] ETSI TS 136 141 (V12.9.0) (10-2015): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 12.9.0 Release 12)".

[6] ETSI TS 151 021 (V12.3.0) (01-2015): "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 12.3.0 Release 12)".

[7] ETSI EN 301 908-3 (V11.1.2) (07-2016): "IMT cellular networks; Harmonized Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS)".

[8] ETSI EN 301 908-18 (V11.1.1) (07-2016): "IMT cellular networks; Harmonized Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)".

[9] ETSI TS 125 141 (V12.7.0) (10-2015): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 12.7.0 Release 12)".

[10] ETSI TS 125 331 (V12.7.0) (10-2015): "Universal Mobile Telecommunications System (UMTS); Radio Resource Control (RRC); Protocol specification (3GPP TS 25.331 version 12.7.0 Release 12)".

[11] ETSI TS 136 101 (V12.9.0) (10-2015): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (3GPP TS 36.101 version 12.7.0 Release 12)".

[12] ETSI TS 136 331 (V12.7.0) (10-2015): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (3GPP TS 36.331 version 12.7.0 Release 12)".

[13] ETSI TS 125 133 (V12.8.0) (07-2015): "Universal Mobile Telecommunications System (UMTS); Requirements for support of radio resource management (FDD) (3GPP TS 25.133 version 12.8.0 Release 12)".

2.2 Informative 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 referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (Radio Equipment Directive).

[i.2] ETSI EG 203 336 (V1.1.1) (08-2015): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".

[i.3] Commission Decision 2013/654/EU amending Decision 2008/294/EC to include additional access technologies and frequency bands for mobile communications services on aircraft (MCA services), 12.11.2013.

[i.4] CEPT/ERC/REC 74-01 (01-2011) (equivalent to Recommendation ITU-R SM.329-12): "Unwanted emissions in the spurious domain".

[i.5] ETSI TR 100 028 (all parts) (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[i.6] EUROCAE ED-14 (Equivalent to RTCA DO-160G (12-2010)): "Environmental Conditions and Test Procedures for Airborne Equipment".

[i.7] 3GPP2 C.S0011-C (V2.0): "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations".

[i.8] ETSI TS 125 104 (V12.6.0) (10-2015): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 12.6.0 Release 12)".

[i.9] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

[i.10] ETSI EN 301 908-1 (V11.1.1) (07-2016): "IMT cellular networks; Harmonized Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Introduction and common requirements".

3 Definitions, symbols 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, UMTS or LTE 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

Mobile Communication OnBoard Aircraft system (MCOBA): system comprising the functions provided by the NCU and the OBTS

Network Control Unit (**NCU):** component of the GSM, UTRA or E-UTRA 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, UTRA or E-UTRA onboard aircraft system responsible for radio transmission and reception to or from the onboard mobile terminals

3.2 Symbols

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

Bw	Bandwidth of one band
dB	decibel
dBm	decibel relative to 1 mW
Fc	centre frequency of the band
P_{max}	Maximum output power (per band)
$P_{max,c}$	Maximum output power (per carrier)

3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
ACU	Antenna Coupler Unit
AGL	Above Ground Level
BCCH	Broadcast Control CHannel
BCH	Broadcast Channel
BER	Bit Error Rate
BLER	Block Error Rate
BS	Base Station
BSSTE	Base Station System Test Equipment
BTS	Base Transceiver Station
BW	Bandwidth
CACLR	Cumulative Adjacent Channel Leakage Ratio
CW	Continuous Wave
DCS	Digital Cellular System
DL-SCH	DownLink Shared Channel
DTM	Dual Transfer Mode
e.i.r.p.	equivalent isotropically radiated power
ECC	Electronic Communications Committee
EFTA	European Free Trade Association
EMC	ElectroMagnetic Compatibility
FDD	Frequency Division Duplexing
FER	Frame Error Rate
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
IMT	International Mobile Telecommunications
LTE	Long Term Evolution
MCOBA	Mobile Communication OnBoard Aircraft
MS	Mobile Station
NCU	Network Control Unit
OBTS	Onboard Base Transceiver Station
PBCCH	Packet Broadcast Control CHannel
RACH	Random Access CHannel
RBER	Residual BER

RBW	Resolution BandWidth
RF	Radio Frequency
rms	root mean square
RRC	Radio Resource Control
SIB	System Information Block
STE	Special Test Equipment
TCH	Traffic CHannel
UE	User Equipment
UL	UpLink
UMTS	Universal Mobile Telecommunications System
UTRA	Universal Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network
VBW	Video BandWidth
WCDMA	Wide band Code Division Multiple Access

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 manufacturer. 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 MCOBA system states

Figure 4.1.2-1 represents the state diagram of the MCOBA system.

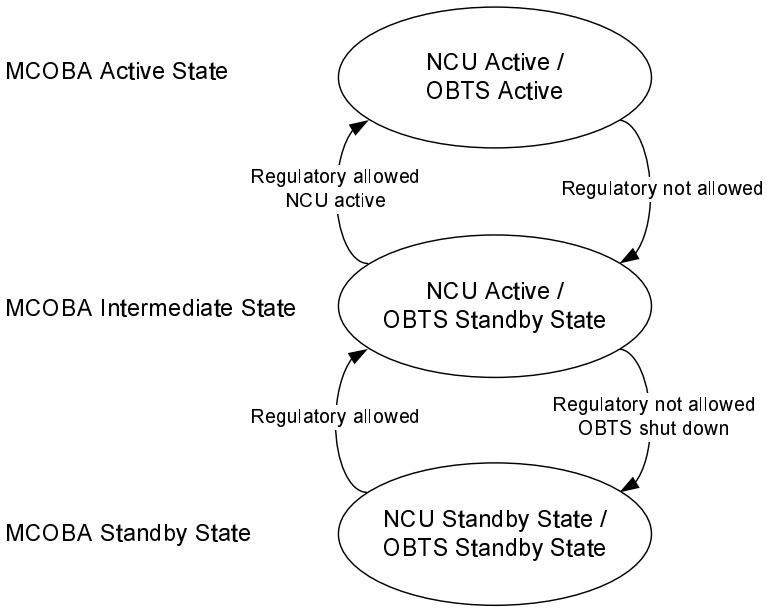

Figure 4.1.2-1: State diagram of an MCOBA system which includes an NCU

When the NCU function of the MCOBA system is in NCU Active state the Transmitter of the NCU is transmitting, whereas when the NCU function of the MCOBA system is in NCU Standby state the Transmitter of the NCU is not transmitting.

When the OBTS function of the MCOBA system is in OBTS Active state the Transmitter of the OBTS is transmitting, whereas when the OBTS function of the MCOBA system is in OBTS Standby state the Transmitter of the OBTS is not transmitting.

When the MCOBA system is in Active state, both the OBTS and the NCU are in Active state, whereas when the MCOBA system is in Standby state, both OBTS and NCU are in Standby state. When the MCOBA system is in Intermediate State, the NCU is in Active state and the OBTS is in Standby state. The Intermediate State is introduced to ensure a stable going-into-service of the MCOBA system with the NCU running first and the OBTS afterwards. The NCU function for the relevant frequency band(s) of the MCOBA 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 MCOBA 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 of the MCOBA system enters the "Standby" state:

- when the aircraft reaches the regulatory condition as authorized by the regulatory authority of the country/countries passed over which do not allow to operate a MCOBA system; or
- if the OBTS functionality of the MCOBA service is intentionally deactivated.

The NCU function of the MCOBA system enters the "Standby" state:

- when the aircraft reaches the regulatory condition as authorized by the regulatory authority of the country/countries passed over which do not allow to operate a MCOBA system. In both cases it has to be ensured by operational means, that all user equipment radio functionality has been deactivated at the time the NCU function enters the "Standby" state.

The evaluation of the regulatory condition is outside of this MCOBA system defined here, and given as input trigger to the MCOBA system shown above. This includes e.g. the evaluation of the 3000m above ground requirement defined in Commission Decision 2013/654/EU [i.3].

4.2 Conformance requirements

4.2.1 Introduction

The requirements in the present document are based on the assumption that the operating band (see table 1-1) is shared between systems of the IMT family (for band III and VIII also GSM) or systems having compatible characteristics.

To meet the essential requirement under article 3.2 of Directive 2014/53/EU [i.1] for IMT Base Stations (BS) the essential parameters in addition to those in ETSI EN 301 908-1 [i.10] have been identified. Table 4.2.1-1 provides a cross reference between these seven essential parameters and the corresponding technical requirements for equipment within the scope of the present document.