



ECC Decision (08)08

The harmonised use of GSM systems in the 900 MHz and 1800 MHz bands, UMTS systems in the 2 GHz band and LTE systems in the 1800 MHz and 2.6 GHz bands on board vessels

Approved 31 October 2008

Amended 04 March 2016

EXPLANATORY MEMORANDUM

1 INTRODUCTION

There is increasing demand to use mobile electronic communications from wherever you are located, including the use of GSM, UMTS or LTE terminals on board vessels. However, to ensure successful operation of systems which will facilitate this there is a need to establish a basis for the harmonised use of GSM, UMTS or LTE systems on board vessels within Europe and to provide access to the required spectrum.

2 BACKGROUND

This decision covers the radio regulatory aspects of operation of GSM, UMTS or LTE systems on board vessels (GSMOBV, UMTSOBV and LTEOBV respectively) in the “territorial sea”, as defined in the UN Convention on the Law of the Sea (UNCLOS, 1982), excluding internal waters, harbours, and ports. Regarding the usage of LTEOBV, this decision also covers operational and technical conditions outside territorial waters, between 12NM and 41NM.

The territorial sea is understood as being on the waterway side of the baseline, as illustrated below in Figure 1¹.

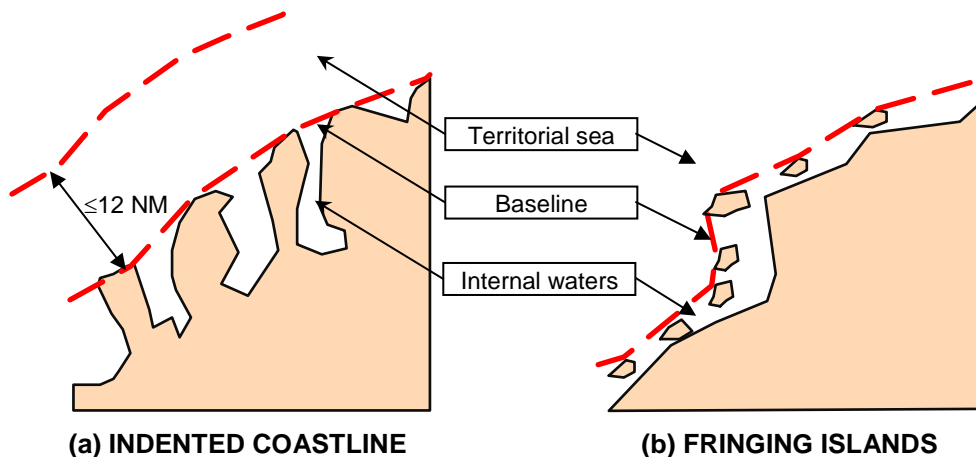


Figure 1: Illustration of baseline between internal waters and territorial sea (NM – nautical miles)

Maritime safety aspects (both technical and human factors related) are out of the scope of this Decision and fall under the responsibilities of the relevant maritime authorities.

The system under consideration in this Decision, (i.e. the equipment necessary to establish a GSM-900 and/or GSM-1800 MHz, a UMTS 2 GHz (1920-1980 / 2110-2170 MHz), a LTE 1800 MHz (1710-1785 / 1805-1880 MHz) and/or 2.6 GHz (2500-2570 / 2620-2690 MHz) pico-cell² system on board a vessel, “the System”), is intended to provide an interface to on board GSM, UMTS, or LTE terminals providing the full range of services normally provided on a GSM, an UMTS, or a LTE network. The link between the System and other networks is out of the scope of this Decision.

¹ The breadth of the territorial sea of a state may vary and be less than 12 NM.

² Pico cells are cells, predominantly used indoors and in this case on the vessel.

There is a need for a harmonised approach to the System together with its harmonised use to ensure the provision of service whilst vessels cross territorial sea borders of various countries and to reduce the regulatory requirements placed on administrations, land-based network operators and vessels operators.

An agreed regulatory approach is required to ensure that the spectrum utilised by the System can be used in any territorial sea that the vessel is crossing, provided that the System conforms to agreed limits in order to prevent harmful interference to land networks.

For the purposes of this Decision only it is assumed that the responsibility for the authorisation of the spectrum utilised on board a vessel as part of the System should be that of the vessel flag state.

Seaworthiness certification of the System is the separate responsibility of the relevant maritime authorities for the vessel flag state.

3 REQUIREMENT FOR AN ECC DECISION

There is a need for an ECC Decision to allow for the harmonised use of the System in, and to permit access to, the frequency bands 880-915 / 925-960 MHz and 1710-1785 / 1805-1880 MHz, 1920-1980 / 2110-2170 MHz and 2500-2570 / 2620-2690 MHz.

ECC DECISION OF 31 OCTOBER 2008 ON THE HARMONISED USE OF GSM SYSTEMS IN THE 900 MHz AND 1800 MHz BANDS, UMTS SYSTEMS IN THE 2 GHz BAND AND LTE SYSTEMS IN THE 1800 MHz AND 2.6 GHz BANDS ON BOARD VESSELS (ECC/DEC/(08)08) AMENDED 04 MARCH 2016

“The European Conference of Postal and Telecommunications Administrations,

considering

- a) that every state has sovereignty over its territorial sea, including the radio spectrum;
- b) that the frequency bands 880-915 / 925-960 MHz, 1710-1785 / 1805-1880 MHz, 1920-1980 / 2110-2170 MHz and 2500-2570 / 2620-2690 MHz are allocated to the mobile service on a primary basis with other services in Region 1 in the ITU Radio Regulations;
- c) that a system (i.e. the equipment necessary to establish a GSM-900 and/or GSM-1800 MHz, an UMTS 2GHz, a LTE 1800 MHz and 2.6 GHz pico-cell system on board a vessel, hereby designated as “the System”) will be able to provide mobile services on board vessels;
- d) that within CEPT the frequency band 880-915 / 925-960 MHz and the frequency band 1710-1785 / 1805-1880 MHz have been designated for GSM, UMTS, and LTE;
- e) that within CEPT the frequency band 1920-1980 / 2110-2170 MHz has been designated for MFCN including UMTS and LTE;
- f) that within CEPT the frequency band 2500-2570 / 2620-2690 MHz has been designated for MFCN including LTE;
- g) that in some European countries the frequency band 862-960 MHz is also allocated to aeronautical radionavigation services on a primary basis under RR 5.323;
- h) that, provided the System is operated in accordance with the conditions set out in the Annex 1, Annex 2, or Annex 3, it is not possible to connect to the System from a land based GSM/UMTS/LTE terminal;
- i) that, provided the System is operated in accordance with the conditions set out in the Annex 1, Annex 2, or Annex 3, it is possible to ensure that there is no harmful interference to any other authorised system;
- j) that the effect of the System can be confined to the vessel;
- k) that, without prejudice to the requirements set out in the Annexes, and taking into account the other authorised uses of spectrum, administrations may place additional geographic restrictions on the operation of the System in their territorial sea;
- l) that for the purposes of this Decision the vessel is considered to be subject to the control of the vessel flag state and the System will only be used on board the vessel;
- m) that accordingly responsibility for the authorisation of the spectrum utilised on board a vessel by the System will be that of the vessel flag state, in accordance with the authorisation regime of that state;
- n) that the use of the relevant frequencies will be authorised by one administration but those frequencies could also be used within the territorial sea, excluding internal waters, ports and harbours, of other countries;
- o) that the installation and use of the System on the vessel will be subject to regulation by the relevant national maritime authorities of the vessel flag state, and the System cannot be put into operation until it complies with these requirements, and in particular with those ensuring the proper operation of the safety systems on board the vessel;

- p) that both the terminals and the communication link between the System and other networks are outside the scope of this Decision;
- q) that all necessary measures should be taken to monitor that the System and its installation conform to the relevant technical parameters given in the Annex 1, Annex 2, or Annex 3;
- r) that, despite measures to ensure avoidance of harmful interference referred to in considering h), i), j), k), and q), it may remain necessary for administrations to assist each other with the resolution of reports of interference in a timely manner, in accordance with appropriate ITU procedures;
- s) that, ECC Report 122 addresses the compatibility between GSM use on board vessels and land-based networks;
- t) that, ECC Report 237 addresses the compatibility between UMTS on board vessels, LTE on board vessels and terrestrial mobile networks;
- u) that the maximum bandwidth used by the System is 5 MHz (duplex) by frequency band (1800 MHz or 2600 MHz bands);
- v) that this Decision shall not impede EU/EFTA countries from fulfilling their obligations according to Community laws;
- w) that the Decision is without prejudice to the right of “innocent passage”, as defined in the UN Convention on the Law of the Sea (UNCLOS, 1982);
- x) that in EU/EFTA countries the radio equipment that is under the scope of this Decision shall comply with the R&TTE Directive or the Radio Equipment Directive³ (2014/53/EU) once effective. Conformity with the essential requirements of the R&TTE Directive or RED may be demonstrated by compliance with the applicable harmonised European standard(s) or by using the other conformity assessment procedures set out in the R&TTE Directive or RED.

³ It should be noted that the Radio Equipment Directive will be the only framework applicable by June 2016

DECIDES

1. that **administrations shall** allow the use of the GSM System on board vessels within their territorial sea, excluding internal waters, harbours and ports in the frequency bands 880-915 / 925-960 MHz and 1710-1785 / 1805-1880 MHz, provided that the System operator is authorised to operate the System (including the right to use the necessary spectrum) by the vessel flag state in accordance with that state's authorisation regime and in accordance with the restrictions referred to in considering k);
2. that **administrations shall** allow the use of the UMTS System on board vessels within their territorial sea, excluding internal waters, harbours and ports in the frequency bands 1920-1980 / 2110-2170 MHz, provided that the System operator is authorised to operate the System (including the right to use the necessary spectrum) by the vessel flag state in accordance with that state's authorisation regime and in accordance with the restrictions referred to in considering k);
3. that **administrations shall** allow the use of the LTE (5 MHz channel bandwidth only) System on board vessels within their territorial sea, excluding internal waters, harbours and ports in the frequency bands 1710-1785 / 1805-1880 MHz and/or 2500-2570 / 2620-2690 MHz, provided that the System operator is authorised to operate the System (including the right to use the necessary spectrum) by the vessel flag state in accordance with that state's authorisation regime and in accordance with the restrictions referred to in considering k);
4. that the System shall not cause harmful interference to, or claim protection from, any other authorised system;
5. that the use of the System shall comply with the technical and operational requirements set out in Annexes 1, 2 and 3 as relevant, otherwise it shall be switched off;
6. that this Decision **enters into force** on 04 March 2016;
7. that the preferred **date for implementation** of this Decision shall be 05 September 2016;
8. that CEPT **administrations shall** communicate the national measures implementing this Decision to the ECC Chairman and the Office when the Decision is nationally implemented;
9. that CEPT administrations shall communicate to the Office any additional measures supplementing this Decision in accordance with considering (k), which shall be made publicly available on the Office web site (<http://www.cept.org>)."

Note:

Please check the Office documentation database <http://www.ecodocdb.dk> for the up to date position on the implementation of this and other ECC Decisions.

ANNEX 1: TECHNICAL AND OPERATIONAL REQUIREMENTS FOR GSM SYSTEMS ONBOARD VESSELS)

A1.1 DESCRIPTION OF THE GSM SYSTEM ONBOARD VESSELS (GSMOBV)

The GSM system onboard vessels (e.g. cruise liners, ferries, cargo ships), hereinafter referred to as “the GSM System”, enables onboard use of GSM terminals (v-MS) within the territorial sea as illustrated in the Background section of the Decision. GSM access onboard a vessel is to be provided by one or more pico-cell BTS (v-BS).

The System operates in the GSM-900 or GSM-1800 frequency band. The land-based GSM, UMTS, and/or LTE networks to be protected are those operating in frequency bands:

- 880-915 MHz (uplink) / 925-960 MHz (downlink);
- 1710-1785 MHz (uplink) / 1805-1880 MHz (downlink).

A1.2 TECHNICAL AND OPERATIONAL REQUIREMENTS FOR THE SYSTEM

Any operation of the System within territorial sea shall comply with the following:

- the System shall be OFF between 0 and 2 NM from the baseline;
- The system outdoor antennas shall be OFF between 2 and 12 NM from the baseline⁴;
- DTX⁵ has to be activated on the System uplink;
- the timing advance⁶ value of v-BS must be set to minimum;
- all v-MS shall be controlled to use the minimum output power (5 dBm in 900 MHz and 0 dBm in 1800 MHz bands);
- Within 2-3 NM from the baseline the v-MS receiver sensitivity and the disconnection threshold (ACCMIN⁷ & min RXLEV⁸ level) shall be ≥ -70 dBm/200 kHz;
- Within 3-12 NM from the baseline the v-MS receiver sensitivity and the disconnection threshold (ACCMIN & min RXLEV level) shall be ≥ -75 dBm/200 kHz;
- the v-BS emissions from the indoor System antenna measured anywhere external to the vessel (i.e. at ship perimeter or on its open deck areas) shall not exceed -80 dBm/200 kHz (assuming a 0 dBi measurement antenna gain).

Note: For information on implementation of the technical measures described in this section, see ECC Report 122.

⁴ See Background section of this Decision.

⁵ DTX (discontinuous transmission, as described in GSM standard 3GPP TS 148.008)

⁶ Timing advance (as described in GSM standard 3GPP TS 144.018)

⁷ ACCMIN (RX_LEV_ACCESS_MIN, as described in GSM standard 3GPP TS 144.018)

⁸ RXLEV (RXLEV-FULL-SERVING-CELL, as described in GSM standard 3GPP TS 148.008)

ANNEX 2: TECHNICAL AND OPERATIONAL REQUIREMENTS FOR UMTS SYSTEMS ONBOARD VESSELS

A2.1 DESCRIPTION OF THE UMTS SYSTEM ONBOARD VESSELS (UMTSOBV)

The System operates in the UMTS 2 GHz frequency band (1920-1980 / 2110-2170 MHz). The land-based UMTS and/or LTE networks to be protected are those operating in frequency band:

- 1920-1980 MHz (uplink) /2110-2170 MHz (downlink).

A2.2 TECHNICAL AND OPERATIONAL REQUIREMENTS FOR THE SYSTEM

The compatibility between UMTS system on board vessels in the 1920-1980 MHz (uplink) /2110-2170 MHz (downlink) (the "System") and land mobile network systems (UMTS and/or LTE) can be met under the following conditions:

- The System shall be OFF between 0 and 2 NM from the baseline;
- The System outdoor antennas shall be OFF between 2 and 12 NM from the baseline;
- The maximum bandwidth used by the System is 5 MHz (duplex);
- The maximum UE transmission power is limited to 0 dBm / 5 MHz;
- The quality criteria $qRxLevMin$ is set to a value greater than or equals to -87 dBm / 5 MHz between 2 and 12 NM;
- The indoor System antenna emission on deck is limited to -102 dBm/ 5 MHz (CPICH);
- The RRC inactivity timer of the System is set to 2 seconds;
- The timing advance value is set according to a cell range for the System distributed antenna system of 600m;
- The PLMN network selection timer is set to 10 minutes in the national water;
- The System carrier centre frequency shall not be aligned with land network carriers.

Table 1: System specific values to protect land mobile networks systems (UMTS and LTE in the 1920-1980 / 2110-2170 MHz bands)

System	On/off border (from baseline)	Outdoor antennas on/off (from baseline)	On board vessels UE max tx power	Quality criteria $qRxLevMin$	Indoor on board BS emission limit on deck	RRC inactivity release timer	Cell range for the DAS*
UMTS (2100 MHz)	2 NM	12 NM	0 dBm / 5 MHz	≥ -87 dBm / 5 MHz between 2 and 12 NM	- 102 dBm / 5 MHz (CPICH)	2 seconds	600m

*The timing advance parameter has to be set according to the corresponding cell range.

Note: For information on implementation of the technical measures described in this section, see ECC Report 237.

ANNEX 3: TECHNICAL AND OPERATIONAL REQUIREMENTS FOR LTE SYSTEMS ONBOARD VESSELS

A3.1 DESCRIPTION OF THE LTE SYSTEM ONBOARD VESSELS (LTEOBV)

The System operates in the LTE 1800 MHz (1710-1785 MHz (uplink) / 1805-1880 MHz (downlink) or LTE 2600 MHz (2500-2570 MHz (uplink) / 2620-2690 MHz (downlink) frequency bands . The land-based GSM and LTE networks to be protected are those operating in frequency bands:

- 1710-1785 MHz (uplink) / 1805-1880 MHz (downlink);
- 2500-2570 MHz (uplink) / 2620-2690 MHz (downlink).

A3.2 TECHNICAL AND OPERATIONAL REQUIREMENTS FOR THE SYSTEM

The compatibility between LTE on board vessels in the 1800 MHz (1710-1785 MHz (uplink) / 1805-1880 MHz (downlink)) and 2600 MHz (2500-2570 MHz (uplink) / 2620-2690 MHz (downlink)) (The "System") and land network systems (GSM and LTE for the 1800 MHz band an LTE for the 2600 MHz band) can be met under the following conditions:

- The System shall be OFF between 0 and 4 NM from the baseline;
- The System outdoor antennas shall be OFF between 4 and 12 NM from the baseline;
- The maximum bandwidth used by the System is 5 MHz in 1800 MHz or 2600 MHz frequency bands;
- The maximum UE transmission power is limited to 0 dBm (PcMax);
- The quality criteria qRxLevMin is set to a value greater than or equals to -105 dBm / 15kHz (-83 dBm / 5 MHz) between 4 and 12 NM from the baseline;
- The indoor System antenna emission on deck is limited to -120 dBm /15kHz (-98 dBm / 5 MHz);
- The RRC inactivity timer of the System is set to 2 seconds;
- The timing advance value is set according to a cell range for the System distributed antenna system of 400 m;
- The PLMN network selection timer is set to 10 minutes in the national water;
- The System carrier centre frequency shall not be aligned with land network carriers.

In order to avoid a harmful interference from the System in the international waters (ie. above 12NM from the baseline) towards terrestrial mobile networks base stations, it is recommended to limit Tx power of UE connected to System in the bands 1800 MHz and 2600 MHz in accordance with the following formula:

$$\text{UE Tx Power (dBm)} = 2+(D-12)*0.75,$$

where:

D is the distance from the baseline and,
 $12 < D \leq 41$ NM.

This limitation could be included in the license granted by the flag state and the established procedure for complaint in case of interference, as contained in ITU RR could be applied.

**Table 2: System specific values to protect land networks systems
(GSM and LTE in the 1800 MHz band / LTE in the 2600 MHz band)**

System	On/off border (from baseline)	Outdoor antennas on/off (from baseline)	On board UE max tx power	Quality criteria QRxLevMin	Indoor on board BS emission limit on deck	RRC inactivity release timer	Cell range for the DAS*
LTE (1800 MHz and 2600 MHz)	4 NM	12 NM	0 dBm (PcMax)	>= -105 dBm / 15 kHz (>= -83 dBm / 5 MHz) between 4 and 12 NM from the baseline	-120 dBm / 15 kHz (-98 dBm / 5 MHz)	2 seconds	400m

* The timing advance parameter has to be set according to the corresponding cell range
 Note: For information on implementation of the technical measures described in this section, see ECC Report 237.