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COMMISSION DECISION

of 21 February 2007

on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community

(notified under document number C(2007) 522)

(Text with EEA relevance)

(2007/131/EC)

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**COMMISSION DECISION****of 21 February 2007****on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community***(notified under document number C(2007) 522)***(Text with EEA relevance)**

(2007/131/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision) ⁽¹⁾, and in particular Article 4(3) thereof,

Whereas:

- (1) The European Council has recognised the significant contribution to growth and jobs by building a fully inclusive information society, based on widespread use of information and communication technologies (ICTs) in public services, SMEs and households ⁽²⁾. With the i2010 initiative, the Commission emphasised ICT as a major driver of competitiveness, growth and jobs ⁽³⁾.
- (2) The creation of an open and competitive single market for information society equipment and media services within the Community is critical to ICT uptake. The Community regulatory framework for electronic communications services and equipment can enhance competitiveness and foster competition in the ICT sector, *inter alia* by ensuring the timely introduction of new technologies.
- (3) Ultra-wideband technology, typically characterised by very low power radiation over a very large radio bandwidth, could provide a host of communications, measurement, location, medical, surveillance and imaging applications of benefit to various Community policies, including the information society and the internal market. In this context, it is important to establish regulatory conditions which will encourage the development of economically viable markets for applications of ultra-wideband technology as commercial opportunities arise.
- (4) The timely deployment and uptake of applications using ultra-wideband technology within the Community will be assisted by harmonising radio spectrum use rules across the Community, thus establishing an effective single market for these applications, with consequent economies of scale and benefits to the consumer.

⁽¹⁾ OJ L 108, 24.4.2002, p. 1.

⁽²⁾ European Council Conclusions 7619/1/05 Rev. 1 of 23.3.2005.

⁽³⁾ COM(2005) 229.

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- (5) Although ultra-wideband signals are typically of extremely low power, the possibility of harmful interference with existing radio-communication services exists and needs to be managed. Therefore, the regulatory framework for use of the radio spectrum for ultra-wideband technology must respect the rights to protection against harmful interference (including access to the radio spectrum by radio astronomy, earth exploration satellite and space research systems) and balance the incumbent services' interests against the overall policy objective of providing favourable conditions for the introduction of innovative technologies for the benefit of society.
- (6) The use of spectrum is subject to the requirements of Community law for public health protection in particular Directive 2004/40/EC of the European Parliament and of the Council of 29 April 2004 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields), ⁽¹⁾ and Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) ⁽²⁾. Health protection for radio equipment is ensured by conformity of such equipment to the essential requirements pursuant to 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 (the R&TTE Directive) ⁽³⁾.
- (7) Pursuant to Article 4(2) of the Radio Spectrum Decision, the Commission has given three mandates ⁽⁴⁾ to the European Conference of Postal and Telecommunications Administrations (hereinafter referred to as the CEPT) to undertake all necessary work to identify the most appropriate technical and operational criteria for the harmonised introduction of ultra-wideband-based applications in the European Union.
- (8) This Decision is based on the technical studies undertaken by the CEPT under EC mandate. These compatibility studies include, *inter alia*, the presumption that equipment using ultra-wideband technology will be operated predominantly indoors and that it will cease transmission within 10 seconds unless it receives an acknowledgement from an associated receiver that its transmission is being received. Furthermore, video signals will be transmitted using predominantly high-efficiency coding.

⁽¹⁾ OJ L 159, 30.4.2004, p. 1, as amended by OJ L 184, 24.5.2004, p. 1.

⁽²⁾ OJ L 199, 30.7.1999, p. 59.

⁽³⁾ OJ L 91, 7.4.1999, p. 10. Directive amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).

⁽⁴⁾ Mandate to the CEPT to harmonise radio spectrum use for ultra-wideband systems in the European Union (Mandate 1); mandate to the CEPT to identify the conditions necessary for harmonising radio spectrum use for ultra-wideband systems in the European Union (Mandate 2); mandate to CEPT to identify the conditions relating to the harmonised introduction in the European Union of radio spectrum applications based on Ultra-Wideband (UWB) technology (Mandate 3).

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- (9) Outdoor use of equipment using ultra-wideband technology covered by this Decision should not include use at a fixed outdoor location or connected to a fixed outdoor antenna or in vehicles. The potential interference caused by such uses requires further study.
- (10) Equipment using ultra-wideband technology covered by this Decision falls within the scope of the R&TTE Directive. Nevertheless, the use of frequency bands by equipment using ultra-wideband technology for air traffic management communications in aircraft and safety-of-life applications in ships does not fall under the R&TTE Directive and any use of such equipment in these safety-of-life environments should be determined by appropriate sector-specific regulation.
- (11) Pursuant to the R&TTE Directive, the European Commission has given a mandate (M/329) to the European standardisation organisations to establish a set of Harmonised Standards covering ultra-wideband applications to be recognised under this Directive, and resulting in a presumption of conformity with its requirements.
- (12) In response to mandate M/329 from the EC, the ETSI is developing European standards such as Harmonised Standard EN 302 065 for ultra-wideband technology which will take account of potential aggregate effects, if such effects could lead to harmful interference, and of the compatibility studies of the CEPT. Harmonised Standards should be maintained and evolve over time to ensure protection of emerging services for which bands as yet have not been designated.
- (13) Furthermore, when a Member State considers that equipment using ultra-wideband technology within the scope of the R&TTE Directive and of any Harmonised Standards adopted pursuant thereto does not comply with the requirements of the abovementioned Directive, safeguard measures may be applied in accordance with Articles 9 and 5 of the Directive respectively.
- (14) The use of radio spectrum by equipment using ultra-wideband technology under this Decision is to be allowed on a non-interference and non-protected basis and therefore should be subject to Article 5(1) of Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services ⁽¹⁾.
- (15) For the purpose of ensuring the continued relevance of the conditions specified in this Decision and given the rapid changes in the radio spectrum environment, national administrations ought to monitor, where possible, use of the radio spectrum by equipment using ultra-wideband technology, so as to subject this Decision to active review. Such review should take into account technological development and changes in the market situation and verify that the initial assumptions concerning the operation of equipment using ultra-wideband technology in the frequency range specified in this Decision are still relevant.

⁽¹⁾ OJ L 108, 24.4.2002, p. 21.

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- (16) In order to ensure adequate protection of existing services, this Decision should lay down conditions that are deemed adequate to protect currently operating services.
- (17) Appropriate mitigation techniques (including detect-and-avoid or low-duty-cycle approaches) studied and specified by CEPT and ETSI under the respective EC Mandates, should be included in Harmonised Standards under the R&TTE Directive once stable and proven to provide equivalent protection to the emission levels identified in this Decision.
- (18) The conditions in the 4,2 to 4,8 GHz band for equipment using ultra-wideband technology without appropriate mitigation techniques should be time limited and be replaced by more restrictive conditions beyond the date of 31 December 2010, because there is an expectation that equipment of this type should operate exclusively above 6 GHz in the longer term.
- (19) The measures provided for in this Decision are in accordance with the opinion of the Radio Spectrum Committee,

HAS ADOPTED THIS DECISION:

Article 1

The purpose of this Decision is to allow the use of the radio spectrum by equipment using ultra-wideband technology and to harmonise the conditions of such use in the Community.

This Decision shall apply without prejudice to Directive 1999/5/EC (the R&TTE Directive) and to any Community provisions allowing use of the radio spectrum by specific types of equipment using ultra-wideband technology.

Article 2

For the purposes of this Decision:

1. 'equipment using ultra-wideband technology' means equipment incorporating, as an integral part or as an accessory, technology for short-range radiocommunication, involving the intentional generation and transmission of radio-frequency energy that spreads over a frequency range wider than 50 MHz, which may overlap several frequency bands allocated to radiocommunication services;
2. 'non-interference and non-protected basis' means that no harmful interference may be caused to any radiocommunication service and that no claim may be made for protection of these devices against harmful interference originating from radiocommunication services;
3. 'indoors' means inside buildings or places in which the shielding will typically provide the necessary attenuation to protect radiocommunication services against harmful interference;

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4. 'automotive vehicle' means any vehicle as defined by Council Directive 70/156/EEC ⁽¹⁾;
5. 'railway vehicle' means any vehicle as defined by Regulation (EC) No 91/2003 of the European Parliament and of the Council ⁽²⁾;
6. 'e.i.r.p.' means equivalent isotropic radiated power;
7. 'mean e.i.r.p. density' means the mean power measured with a 1 MHz resolution bandwidth, a root-mean-square (RMS) detector and an averaging time of 1 ms or less;
8. 'peak e.i.r.p. density' means the peak level of transmission contained within a 50 MHz bandwidth centred on the frequency at which the highest mean radiated power occurs. If measured in a bandwidth of x MHz, this level is to be scaled down by a factor of $20\log(50/x)$ dB;
9. 'maximum e.i.r.p. density' means the highest signal strength measured in any direction at any frequency within the defined range;

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10. 'building material analysis' (BMA) means a field disturbance sensor that is designed to detect the location of objects within a building structure or to determine the physical properties of a building material;
11. 'radiated into the air' means those parts of the signal emitted by specific applications of ultra-wideband technology which are not absorbed by their shielding or by the material under investigation.

▼ B*Article 3*

The Member States shall, as early as possible and no later than six months following the entry into force of this Decision, allow the use of the radio spectrum on a non-interference and non-protected basis by equipment using ultra-wideband technology provided that such equipment meets the conditions set out in the Annex to this Decision and it is either used indoors or, if it is used outdoors, it is not attached to a fixed installation, a fixed infrastructure, a fixed outdoor antenna, or an automotive or railway vehicle.

Article 4

Member States shall keep the use of the bands identified in the Annex by equipment using ultra-wideband technology under scrutiny, in particular with regard to the continued relevance of all the conditions specified in Article 3, and report their findings to the Commission to allow a timely review of this Decision.

Article 5

This Decision is addressed to the Member States.

⁽¹⁾ OJ L 42, 23.2.1970, p. 1.

⁽²⁾ OJ L 14, 21.1.2003, p. 1.

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ANNEX

Maximum e.i.r.p. densities and appropriate mitigation techniques

1. GENERIC UWB USAGE

1.1. **Maximum e.i.r.p. densities**

Frequency range (GHz)	Maximum mean e.i.r.p. density (dBm/MHz)	Maximum peak e.i.r.p. density (dBm/50MHz)
Below 1,6	– 90,0	– 50,0
1,6 to 2,7	– 85,0	– 45,0
2,7 to 3,4	– 70,0	– 36,0
3,4 to 3,8	– 80,0	– 40,0
3,8 to 4,2	– 70,0	– 30,0
4,2 to 4,8	– 41,3 <i>(until 31 December 2010)</i> – 70,0 <i>(beyond 31 December 2010)</i>	0,0 <i>(until 31 December 2010)</i> – 30,0 <i>(beyond 31 December 2010)</i>
4,8 to 6,0	– 70,0	– 30,0
6,0 to 8,5	– 41,3	0,0
8,5 to 10,6	– 65,0	– 25,0
Above 10,6	– 85,0	– 45,0

1.2. **Appropriate mitigation techniques**

Equipment using ultra-wideband technology shall also be allowed to use the radio spectrum with higher e.i.r.p. limits than mentioned in the table in section 1.1 when applying additional mitigation techniques as described in the relevant harmonised standards adopted under Directive 1999/5/EC or other mitigation techniques on condition that it achieves at least an equivalent level of protection as provided by the limits in the table in section 1.1. The following mitigation techniques are presumed to provide such protection:

1.2.1. *'Low duty cycle' (LDC) mitigation*

A maximum mean e.i.r.p. density of – 41,3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm measured in 50 MHz shall be allowed in the 3,1-4,8 GHz bands provided that a low duty cycle restriction is applied in which the sum of all transmitted signals is less than 5 % of the time each second and less than 0,5 % of the time each hour, and provided that each transmitted signal does not exceed 5 ms.

1.2.2. *'Detect and avoid' (DAA) mitigation*

A maximum mean e.i.r.p. density of – 41,3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm measured in 50 MHz shall be allowed in the 3,1-4,8 GHz and 8,5-9,0 GHz bands provided that a detect and avoid (DAA) mitigation technique as described in the relevant harmonised standards adopted under Directive 1999/5/EC is used.

▼ **M1**1.3. **Operation of equipment using ultra-wideband technology in automotive and railway vehicles**

In derogation to Article 3 of this Decision, use of ultra-wideband equipment shall also be allowed in automotive and railway vehicles when in accordance with the following parameters.

1.3.1. *Maximum e.i.r.p. densities for operation of ultra-wideband technology in automotive and railway vehicles*

Equipment using ultra-wideband technology in automotive and railway vehicles shall be allowed to use the radio spectrum with the e.i.r.p. limits given in section 1.1 provided that for the bands 4,2–4,8 GHz and 6,0–8,5 GHz the following parameters are applied:

Frequency range (GHz)		Maximum mean e.i.r.p. density (dBm/MHz)
4,2 to 4,8	<i>until 31 December 2010</i>	– 41,3 provided that techniques to mitigate aggregate interference are applied that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 1999/5/EC must be used. These require a transmitter power control (TPC) range of at least 12 dB. – 53,3 (otherwise)
	<i>beyond 31 December 2010</i>	– 70,0
6,0 to 8,5		– 41,3 provided that techniques to mitigate aggregate interference are applied that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 1999/5/EC must be used. These require a transmitter power control (TPC) range of at least 12 dB. – 53,3 (otherwise)

1.3.2. *Appropriate mitigation techniques in automotive and railway vehicles*

Operation of equipment using ultra-wideband technology in automotive and railway vehicles shall also be allowed with other e.i.r.p. limits than mentioned in section 1.3.1 when applying additional mitigation techniques as described in the relevant harmonised standards adopted under Directive 1999/5/EC or other mitigation techniques on condition that it achieves at least an equivalent level of protection as provided by the limits in the previous tables. The following mitigation techniques are presumed to provide such protection:

1.3.2.1. 'Low duty cycle' (LDC) mitigation

The operation of equipment using ultra-wideband technology in automotive and railway vehicles which applies the LDC mitigation technique in the 3,1–4,8 GHz band as described in section 1.2.1, shall be allowed with the same e.i.r.p. limits as described in that section

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1.2.1. The e.i.r.p. limits mentioned in section 1.1 shall apply for the other frequency ranges.

1.3.2.2. 'Detect and avoid' (DAA) mitigation

The operation of equipment using ultra-wideband technology in automotive and railway vehicles which applies the DAA mitigation technique in the 3,1-4,8 GHz and 8,5-9,0 GHz bands shall be allowed with an e.i.r.p. limit of $-41,3$ dBm/MHz provided that techniques to mitigate interference are applied that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 1999/5/EC. These require a transmitter power control (TPC) range of at least 12 dB. In other cases an e.i.r.p. limit of $-53,3$ dBm/MHz applies.

2. SPECIFIC UWB USAGE

Signals that are radiated into the air that do not exceed the limits in the table below shall be allowed.

2.1. Building material analysis (BMA)

Frequency range (MHz)	Maximum mean e.i.r.p. density (dBm/MHz)	Maximum peak e.i.r.p. density (dBm/50 MHz)
Below 1 730	-85	-45
1 730 to 2 200	-65	-25
2 200 to 2 500	-50	-10
2 500 to 2 690	-65	-25
2 690 to 2 700	-55	-15
2 700 to 3 400	-82	-42
3 400 to 4 800	-50	-10
4 800 to 5 000	-55	-15
5 000 to 8 000	-50	-10
8 000 to 8 500	-70	-30
Above 8 500	-85	-45

BMA equipment using mitigation techniques that provide at least equivalent performance to the techniques described in the relevant harmonised standards adopted under Directive 1999/5/EC, is permitted to operate in frequency ranges 1,215 to 1,73 GHz, with a maximum mean e.i.r.p. density of -70 dBm/MHz, and in the frequency ranges 2,5 to 2,69 GHz and 2,7 to 3,4 GHz, with a maximum mean e.i.r.p. density of -50 dBm/MHz on condition that at least an equivalent level of protection as provided by the limits in the above table is achieved.

In order to protect Radio Astronomy Services; in the frequency range 2,69 GHz to 2,70 GHz and in the frequency range 4,8 to 5 GHz; the total radiated power density has to be below -65 dBm/MHz as described in the relevant harmonised standards adopted under Directive 1999/5/EC.