COMMISSION IMPLEMENTING DECISION

of 7 October 2014

amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community

(notified under document C(2014) 7083)

(2014/702/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

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) Commission Decision 2007/131/EC ([2]) as amended by Decision 2009/343/EC ([3]), harmonises the technical conditions for radio equipment using ultra-wideband (hereinafter 'UWB') technology in the Union. It ensures that the radio spectrum is available across the Union under harmonised conditions, eliminates barriers to the uptake of UWB technology and creates an effective single market for UWB systems with significant economies of scale and benefits to the consumer.

(2) Rapid changes in technology and in the use of the radio spectrum need to be adequately reflected in the regulation of UWB technology, to allow European society to benefit from the introduction of innovative applications based on this technology, while ensuring that other spectrum users are not adversely affected. The latest version of Decision 2007/131/EC therefore needs to be amended.

(3) For this reason, on 28 May 2012 the Commission issued a Fifth Mandate, pursuant to Decision No 676/2002/EC, to the European Conference of Postal and Telecommunications Administrations (CEPT) on UWB technology, to clarify technical parameters in the light of a potential update to Decision 2007/131/EC.

(4) In CEPT Report 45, approved on 21 June 2013 by the Electronic Communications Committee (ECC) and submitted in response to the fifth mandate, CEPT advised the Commission to take a more streamlined approach on subsequent amendments of Decision 2007/131/EC, taking into account the description of mitigation techniques with all the relevant detailed parameters within the harmonised European standards developed by the European Telecommunications Standards Institute (ETSI).

(5) CEPT Report 45 clarified the technical conditions under which specific mitigation techniques enable UWB equipment to be operated with higher transmission powers, while offering equivalent protection for existing UWB limits on generic use, Automotive and railway vehicles use and location-tracking equipment. In addition to the recommendations from this report, which should be applied across the EU, the definitions and the technical parameters of these mitigation techniques should also be made binding, as set out in the relevant standards, as these techniques only provide a mitigation effect when used with appropriate operational parameters.

(6) UWB equipment onboard aircraft should be permitted only on the condition that they fulfil air safety standards, with appropriate airworthiness certification and other relevant aeronautical provisions, and electronic communication standards. Airworthiness certificates valid throughout the Community are issued by the European Aviation Safety Agency, pursuant to Commission Regulation (EU) No 748/2012 ([4]).

([1]) OJ L 108 24.4.2002, p. 1.
([2]) Commission Decision 2007/131/EC 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 (OJ L 55, 23.2.2007, p. 33).
([3]) Commission Decision 2009/343/EC of 21 April 2009 amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community (OJ L 105, 25.4.2009, p. 9).
([4]) Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (OJ L 224, 21.8.2012, p. 1).

(7) Material sensing devices have a number of uses in detecting and characterising objects and materials or taking pictures of pipes, wires and other intra-wall structures in residential or commercial buildings. CEPT has advised the Commission that more relaxed limits on the use of material sensing devices are possible, as the way they are used, combined with their very low deployment densities and activity factors, further mitigate the possibility of harmful interference to radio-communication services. The revised limits are set out in ECC Decision ECC/DEC/(07)01 of 30 March 2007, as amended on 26 June 2009.

(8) Pursuant to Directive 1999/5/EC of the European Parliament and of the Council ([1]), the Commission has given mandate M/407 to the European standardisation organisations to draw up a set of harmonised standards. These will cover UWB equipment to be recognised under this Directive, and there will be a presumption of conformity with its requirements. In response to mandate M/407 from the Commission, ETSI has developed the harmonised standards: EN 302 065-1 on common technical requirements for short-range devices using UWB, EN 302 065-2, on requirements for UWB location tracking and EN 302 065-3 on requirements for UWB devices for road and rail vehicles.

(9) The Memorandum of Understanding between the ECC and ETSI, signed on 20 October 2004, ensures coordination of the development of harmonised standards and the regulatory conditions for the use of the spectrum relevant to such standards. Technical details of mitigation techniques are set through ETSI-harmonised European standards and ECC Decision (06)04, and these will remain aligned in any subsequent modifications, as set out in the ECC-ETSI Memorandum of Understanding. As a result, the Commission Decision should only list appropriate mitigation techniques.

(10) Decision 2007/131/EC should therefore be amended accordingly.

(11) The measures provided for in this Decision are in accordance with the opinion of the Radio Spectrum Committee,

HAS ADOPTED THIS DECISION:

Article 1

Decision 2007/131/EC is amended as follows:

(1) in Article 2, points 6, 7 and 8 are replaced by:

‘6. “e.i.r.p” means equivalent isotropically radiated power, which is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

7. “maximum mean power spectral density”, specified as e.i.r.p. of the radio device under test at a particular frequency, is the average power per unit bandwidth (centred on that frequency) radiated in the direction of the maximum level under the specified conditions of measurement;

8. “peak power”, specified as e.i.r.p., contained within a 50 MHz bandwidth at the frequency at which the highest mean radiated power occurs, radiated in the direction of the maximum level under the specified conditions of measurement;’;

(2) in Article 2, point 9 is deleted;

(3) in Article 2, point 11 is replaced by:

‘11. “total radiated power spectral density” means the average of the mean power spectral density values measured over a sphere around the measurement scenario with a resolution of at least 15 degree. The detailed measuring setup is contained within ETSI EN 302 435;’;

([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 (OJ L 91, 7.4.1999, p. 10).

(4) in Article 2, the following points 12 and 13 are added:

'12. "onboard aircraft" means the use of radio links for intra-aircraft communications purposes inside an aircraft;

13. "LT1" are systems intended for general location tracking of people and objects that can be put into service on an unlicensed basis.';

(5) Article 3, is replaced by the following:

'Article 3

The Member States shall 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 and it is used indoors or, if it is used outdoors, it is not attached to a fixed installation, a fixed infrastructure or a fixed outdoor antenna. Equipment using ultra-wideband technology which meets the conditions set in the Annex shall also be allowed in automotive and railway vehicles';

(6) the Annex is replaced by the text in the Annex to this Decision.

Article 2

This Decision shall take effect from 1 February 2015.

Article 3

This Decision is addressed to the Member States.

Done at Brussels, 7 October 2014.

For the Commission
Neelie KROES
Vice-President

ANNEX

1. GENERIC UWB USAGE

Technical requirements		
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)
f ≤ 1,6 GHz	– 90 dBm/MHz	– 50 dBm
1,6 < f ≤ 2,7 GHz	– 85 dBm/MHz	– 45 dBm
2,7 < f ≤ 3,1 GHz	– 70 dBm/MHz	– 36 dBm
3,1 < f ≤ 3,4 GHz	– 70 dBm/MHz or – 41,3 dBm/MHz using LDC (1) or DAA (2)	– 36 dBm or 0 dBm
3,4 < f ≤ 3,8 GHz	– 80 dBm/MHz or – 41,3 dBm/MHz using LDC (1) or DAA (2)	– 40 dBm or 0 dBm
3,8 < f ≤ 4,8 GHz	– 70 dBm/MHz or – 41,3 dBm/MHz using LDC (1) or DAA (2)	– 30 dBm or 0 dBm
4,8 < f ≤ 6 GHz	– 70 dBm/MHz	– 30 dBm
6 < f ≤ 8,5 GHz	– 41,3 dBm/MHz	0 dBm
8,5 < f ≤ 9 GHz	– 65 dBm/MHz or – 41,3 dBm/MHz using DAA (2)	– 25 dBm or 0 dBm
9 < f ≤ 10,6 GHz	– 65 dBm/MHz	– 25 dBm
f > 10,6 GHz	– 85 dBm/MHz	– 45 dBm

(1) Within the band 3,1 GHz to 4,8 GHz, The Low Duty Cycle mitigation technique and its limits are defined in ETSI Standard EN 302 065-1.
(2) Within the band 3,1 GHz to 4,8 GHz and 8,5G Hz to 9 GHz. The Detect and Avoid mitigation technique and its limits are defined in ETSI Standard EN 302 065-1.

2. LOCATION TRACKING SYSTEMS TYPE 1 (LT1)

Technical requirements		
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)
f ≤ 1,6 GHz	– 90 dBm/MHz	– 50 dBm
1,6 < f ≤ 2,7 GHz	– 85 dBm/MHz	– 45 dBm
2,7 < f ≤ 3,4 GHz	– 70 dBm/MHz	– 36 dBm
3,4 < f ≤ 3,8 GHz	– 80 dBm/MHz	– 40 dBm

Technical requirements		
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)
3,8 < f ≤ 6,0 GHz	– 70 dBm/MHz	– 30 dBm
6 < f ≤ 8,5 GHz	– 41,3 dBm/MHz	0 dBm
8,5 < f ≤ 9 GHz	– 65 dBm/MHz or – 41,3 dBm/MHz using DAA (1)	– 25 dBm or 0 dBm
9 < f ≤ 10,6 GHz	– 65 dBm/MHz	– 25 dBm
f > 10,6 GHz	– 85 dBm/MHz	– 45 dBm

(1) The Detect and Avoid mitigation technique and its limits are defined in ETSI Standard EN 302 065-2

3. UWB DEVICES INSTALLED IN ROAD AND RAIL VEHICLES

Technical requirements		
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)
f ≤ 1,6 GHz	– 90 dBm/MHz	– 50 dBm
1,6 < f ≤ 2,7 GHz	– 85 dBm/MHz	– 45 dBm
2,7 < f ≤ 3,1 GHz	– 70 dBm/MHz	– 36 dBm
3,1 < f ≤ 3,4 GHz	– 70 dBm/MHz or – 41,3 dBm/MHz using LDC (1) + e,l, (4) or – 41,3 dBm/MHz using TPC (3) + DAA (2) + e,l, (4)	– 36 dBm or ≤ 0 dBm or ≤ 0 dBm
3,4 < f ≤ 3,8 GHz	– 80 dBm/MHz or – 41,3 dBm/MHz using LDC (1) + e,l, (4) or – 41,3 dBm/MHz using TPC (3) + DAA (2) + e,l, (4)	– 40 dBm or ≤ 0 dBm or ≤ 0 dBm
3,8 < f ≤ 4,8 GHz	– 70 dBm/MHz or – 41,3 dBm/MHz using LDC (1) + e,l, (4) or – 41,3 dBm/MHz using TPC (3) + DAA (2) + e,l, (4)	– 30 dBm or ≤ 0 dBm or ≤ 0 dBm
4,8 < f ≤ 6 GHz	– 70 dBm/MHz	– 30 dBm
6 < f ≤ 8,5 GHz	– 53,3 dBm/MHz or – 41,3 dBm/MHz using LDC (1) + e,l, (4) or – 41,3 dBm/MHz using TPC (3) + e,l, (4)	– 13,3 dBm or ≤ 0 dBm or ≤ 0 dBm

Technical requirements		
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)
8,5 < f ≤ 9 GHz	– 65 dBm/MHz or – 41,3 dBm/MHz using TPC (3) + DAA (2) + e,l, (4)	– 25 dBm or ≤ 0 dBm
9 < f ≤ 10,6 GHz	– 65 dBm/MHz	– 25 dBm
f > 10,6 GHz	– 85 dBm/MHz	– 45 dBm

(1) The Low Duty Cycle (LDC) mitigation technique and its limits are defined in ETSI Standard EN 302 065-3
(2) The Detect and Avoid (DAA) mitigation technique and its limits are defined in ETSI Standard EN 302 065-3
(3) The Transmit Power Control (TPC) mitigation technique and its limits are defined in ETSI Standard EN 302 065-3
(4) The exterior limit (e,l,) ≤ – 53,3 dBm/MHz is required. The exterior limit is defined in ETSI Standard EN 302 065-3

4. UWB ONBOARD AIRCRAFT

The values for maximum mean power spectral density (e.i.r.p) and maximum peak power (e.i.r.p) for Short Range Devices (SRD) using Ultra Wide Band technology (UWB), with or without use of mitigation techniques are listed in the table below.

Technical requirements			
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)	Requirements for mitigation techniques
f ≤ 1,6 GHz	– 90 dBm/MHz	– 50 dBm	
1,6 < f ≤ 2,7 GHz	– 85 dBm/MHz	– 45 dBm	
2,7 < f ≤ 3,4 GHz	– 70 dBm/MHz	– 36 dBm	
3,4 < f ≤ 3,8 GHz	– 80 dBm/MHz	– 40 dBm	
3,8 < f ≤ 6,0 GHz	– 70 dBm/MHz	– 30 dBm	
6,0 < f ≤ 6,650 GHz	– 41,3 dBm/MHz	0 dBm	
6,650 < f ≤ 6,6752 GHz	– 62,3 dBm/MHz	– 21 dBm	notch of 21 dB should be implemented to meet a level – 62,3 dBm/MHz (1)
6,6752 < f ≤ 8,5 GHz	– 41,3 dBm/MHz	0 dBm	7,25 to7,75 GHz (FSS and MetSat (7,45 to 7,55 GHz) protection) (1) (2) 7,75 to 7,9 GHz (MetSat protection) (1) (3)
8,5 < f ≤ 10,6 GHz	– 65 dBm/MHz	– 25 dBm	
f > 10,6 GHz	– 85 dBm/MHz	– 45 dBm	

(1) Alternative mitigation techniques offering equivalent protection such as the use of shielded portholes could be a solution,
(2) 7,25 to 7,75 GHz (Fixed Satellite Service) and 7,45 to 7,55 GHz (Meteorological Satellite) protection: – 51,3 – 20*$\log_{10}$(10 [km]/x[km])(dBm/MHz) for heights above ground above 1 000 m, where x is the aircraft height above ground in kilometres, – 71,3 dBm/MHz for heights above ground of 1 000 m and below,
(3) 7,75 to 7,9 GHz (Meteorological satellite) protection: – 44,3 – 20*$\log_{10}$(10[km]/x[km]) (dBm/MHz) for heights above ground above 1 000 m, where x is the aircraft height above ground in kilometres, and – 64,3 dBm/MHz for heights above ground of 1 000 m and below.

5. MATERIAL SENSING DEVICES USING UWB TECHNOLOGY

5.1. **Material sensing devices**

Material sensing devices permitted under this Decision shall fulfil the following requirements:

— *Fixed installation (application A)*

  — The transmitter has to switch off if the machine is not running, 'running sensor';

  — The transmitter shall implement a TPC with a dynamic range of 10 dB, as described in the harmonised standard EN 302 498-2 for ODC (*Object Discrimination and Characterisation*) applications;

  — The transmitter shall be attached to a fixed installation.

— *Non-fixed installation (application B)*

  — Transmitter-on only if manually operated with a non-locking switch (e.g. it may be a sensor for the presence of the operators hand) plus being in contact or close proximity to the investigated material and the emissions being directed into the direction of the object (e.g. measured by a proximity sensor or imposed by the mechanical design);

  — The transmitter has to switch off if the machine is not running, 'running sensor'

Emissions radiating from material sensing devices permitted under this decision shall be kept to a minimum and in any case not exceed the e.i.r.p. density limits within the following Table. The compliance with the limits of the following Table for non-fixed installations (application B) has to be ensured with the device on a representative structure of the investigated material (e.g. representative wall as defined in ETSI EN 302 435-1 or ETSI EN 302 498-1).

Frequency range	Fixed installations (Application A)		Non-fixed installations (Application B) Maximum mean power spectral density (e.i.r.p)
	Maximum mean power spectral density (e.i.r.p)	Maximum mean power spectral density (e.i.r.p) in the horizontal plane (– 20° to 30° elevation)	
Below 1,73 GHz	– 85 dBm/MHz		– 85 dBm/MHz
1,73 to 2,2 GHz	– 65 dBm/MHz	– 70 dBm/MHz	– 70 dBm/MHz
2,2 to 2,5 GHz	– 50 dBm/MHz		– 50 dBm/MHz
2,5 to 2,69 GHz	– 65 dBm/MHz (1)	– 70dBm/MHz	– 65 dBm/MHz (1) (2)
2,69 to 2,7 GHz	– 55 dBm/MHz	– 75 dBm/MHz	– 70 dBm/MHz (3)
2,7 to 2,9 GHz	– 50 dBm/MHz	– 70 dBm/MHz	– 70 dBm/MHz
2,9 to 3,4 GHz	– 50 dBm/MHz	– 70 dBm/MHz	– 70 dBm/MHz (1)
3,4 to 3,8 GHz	– 50 dBm/MHz	– 70 dBm/MHz	– 50 dBm/MHz (2) (3)
3,8 to 4,8 GHz	– 50 dBm/MHz		– 50 dBm/MHz
4,8 to 5 GHz	– 55 dBm/MHz	– 75 dBm/MHz	– 55 dBm/MHz (2) (3)
5 to 5,25 GHz	– 50 dBm/MHz		– 50 dBm/MHz
5,25 to 5,35 GHz	– 50 dBm/MHz	– 60 dBm/MHz	– 60 dBm/MHz
5,35 to 5,6 GHz	– 50 dBm/MHz		– 50 dBm/MHz
5,6 to 5,65 GHz	– 50 dBm/MHz	– 65 dBm/MHz	– 65 dBm/MHz

Frequency range	Fixed installations (Application A)		Non-fixed installations (Application B) Maximum mean power spectral density (e.i.r.p)
	Maximum mean power spectral density (e.i.r.p)	Maximum mean power spectral density (e.i.r.p) in the horizontal plane (– 20° to 30° elevation)	
5,65 to 5,725 GHz	– 50 dBm/MHz	– 60 dBm/MHz	– 60 dBm/MHz
5,725 to 8,5 GHz	– 50 dBm/MHz		– 50 dBm/MHz
8,5 to 10,6 GHz	– 65 dBm/MHz		– 65 dBm/MHz
Above 10,6 GHz	– 85 dBm/MHz		– 85 dBm/MHz

The peak power (in dBm) measured in a bandwidth of 50 MHz shall be less than a limit that is obtained by adding a conversion factor (25 dB) to the 'maximum mean power spectral density' (in dBm/MHz) limit.

([1]) devices using a Listen Before Talk (LBT) mechanism, as described in the harmonised standard EN 302 498-2, are permitted to operate in frequency ranges 2,5 to 2,69 and 2,9 to 3,4 GHz with a maximum mean power spectral density of – 50 dBm/MHz,

([2]) to protect the radio services, non-fixed installations (application B) must fulfil the following requirement for total radiated power spectral density:

a) In the frequency ranges 2,5 to 2,69 GHz and 4,8 to 5 GHz, the total radiated power spectral density has to be 10 dB below the maximum mean power spectral density;

b) In the frequency ranges 3,4 to 3,8 GHz, the total radiated power spectral density has to be 5dB below the maximum mean power spectral density.

([3]) Limitation of the Duty Cycle to 10 % per second.

5.2. **Building material analysis devices (BMA)**

1. BMA Devices permitted under this Decision shall fulfil the following requirements:

(a) Transmitter-On only if manually operated with a non-locking switch plus being in contact or close proximity to the investigated material and the emissions being directed into the direction of the object;

(b) The BMA transmitter has to switch-off after max 10s without movement;

(c) The total radiated power spectral density has to be 5 dB below the maximum mean power spectral density limits in the table below;

2. Emissions radiating from BMA devices shall be kept to a minimum and in any case not exceed the maximum power limits within the table below with the BMA device on a representative wall as defined within ETSI Standards EN 302 435-1 and EN 302 498-2.

Technical requirements		
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)
Below 1,73 GHz	– 85 dBm/MHz ([1])	– 45 dBm
1,73 to 2,2 GHz	– 65 dBm/MHz	– 25 dBm
2,2 to 2,5 GHz	– 50 dBm/MHz	– 10 dBm
2,5 to 2,69 GHz	– 65 dBm/MHz ([1])	– 25 dBm
2,69 to 2,7 GHz	– 55 dBm/MHz ([2])	– 15 dBm
2,7 to 3,4 GHz	– 70 dBm/MHz ([1])	– 30 dBm
3,4 to 4,8 GHz	– 50 dBm/MHz	– 10 dBm

Technical requirements		
Frequency range	Maximum mean power spectral density (e.i.r.p)	Maximum peak power (e.i.r.p) (defined in 50 MHz)
4,8 to 5 GHz	– 55 dBm/MHz (2)	– 15 dBm
5 to 8,5 GHz	– 50 dBm/MHz	– 10 dBm
Above 8,5 GHz	– 85 dBm/MHz	– 45 dBm

(1) Devices using a Listen Before Talk (LBT) mechanism described in the harmonised standard EN 302 435-1 are permitted to operate in frequency range 1,215 to 1,73 GHz with a maximum mean power spectral density of – 70 dBm/MHz and in the frequency ranges 2,5 to 2,69 and 2,7 to 3,4 GHz with a maximum mean power spectral density of – 50 dBm/MHz.

(2) To protect the Radio Astronomy Service (RAS) bands 2,69 to 2,7 GHz and 4,8 to 5 GHz, the total radiated power spectral density has to be below – 65 dBm/MHz.