

**COMMISSION IMPLEMENTING DECISION (EU) 2022/180****of 8 February 2022****amending Decision 2006/771/EC as regards the update of harmonised technical conditions in the area of radio spectrum use for short-range devices***(notified under document C(2022) 644)***(Text with EEA relevance)**

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 <sup>(1)</sup>, and in particular Article 4(3) thereof,

Whereas:

- (1) Short-range devices are typically mass-market or portable radio equipment, or both, that can easily be carried and used across borders. Differences in spectrum access conditions in the internal market risk creating harmful interference with other radio applications and services, prevent their free movement, and increase their production costs.
- (2) Commission Decision 2006/771/EC <sup>(2)</sup> harmonises the technical conditions for spectrum use for a wide variety of short-range devices in applications areas such as alarms, local communications, telecommand, medical implants and medical data gathering, intelligent transport systems and the 'Internet of Things' including radio-frequency identification ('RFID'). As a result, short-range devices that respect those harmonised technical conditions are subject to no more than a general authorisation under national law.
- (3) Commission Implementing Decision (EU) 2018/1538 <sup>(3)</sup> additionally harmonises the technical conditions for spectrum use by short-range devices within the 874-874,4 and 915-919,4 MHz frequency bands. As in those frequency bands, the sharing environment is different, a specific regulatory regime is required. That Decision enables technically advanced RFID solutions as well as the 'Internet of Things' applications based on networked short-range devices in data networks.
- (4) Decision 2006/771/EC and Implementing Decision (EU) 2018/1538 constitute the regulatory framework for short-range devices, which supports innovation for a wide range of applications within the digital single market.
- (5) New applications for short-range devices emerge due to the growing importance of these devices for the economy and to the rapid changes in technology and societal demands. Such applications require regular updates of harmonised technical conditions for spectrum use.
- (6) Based on the permanent mandate issued to the European Conference of Postal and Telecommunications Administrations ('CEPT') in July 2006, pursuant to Article 4(2) of Decision No 676/2002/EC, to update the Annex to Decision 2006/771/EC in order to reflect technological and market developments in the area of short-range devices, that Annex has been amended seven times. The work carried out on the basis of the permanent mandate was also the basis for Implementing Decision (EU) 2018/1538 providing additional spectrum for short-range devices within the 874-874,4 and 915-919,4 MHz frequency ranges.

<sup>(1)</sup> OJ L 108, 24.4.2002, p. 1.

<sup>(2)</sup> Commission Decision of 9 November 2006 on harmonisation of the radio spectrum for use by short-range devices (2006/771/EC) (OJ L 312, 11.11.2006, p. 66).

<sup>(3)</sup> Commission Implementing Decision (EU) 2018/1538 of 11 October 2018 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands (OJ L 257, 15.10.2018, p. 57).

- (7) On 16 July 2019, the Commission issued its guidance letter for the eighth update cycle. In response to the permanent mandate and in accordance with that guidance, CEPT submitted to the Commission its Report 77 on 5 March 2021. In addition to improvements to existing entries applicable to transport and traffic telematics devices, CEPT proposed to add new entries to the Annex to Decision 2006/771/EC. Those new entries should enable the use of spectrum for enclosed Nuclear Magnetic Resonance ('NMR') applications. Therefore, that report should be the technical basis for this Decision.
- (8) Short-range devices operating within the conditions set out in this Decision should also comply with Directive 2014/53/EU of the European Parliament and of the Council <sup>(4)</sup>.
- (9) Decision 2006/771/EC should therefore be amended.
- (10) 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 2006/771/EC is amended as follows:

- (1) the following Article 4a is inserted:

*'Article 4a*

Member States shall report to the Commission on the implementation of this Decision by 1 October 2022 at the latest.'

- (2) the Annex is replaced by the text set out in the Annex to this Decision.

*Article 2*

This Decision is addressed to the Member States.

Done at Brussels, 8 February 2022.

*For the Commission*  
Thierry BRETON  
*Member of the Commission*

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<sup>(4)</sup> 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 (OJ L 153, 22.5.2014, p. 62).

### Frequency bands with corresponding harmonised technical conditions and implementation deadlines for short-range devices

Table 1 defines the scope of different categories of short-range devices (defined in Article 2(3)) to which this Decision applies. Table 2 specifies different combinations of frequency band and category of short-range devices, and the harmonised technical conditions for spectrum access and implementation deadlines applicable thereto.

General technical conditions applicable to all bands and short-range devices that fall within the scope of this Decision:

- Member States shall allow adjacent frequency bands set out in Table 2 to be used as a single frequency band provided the specific conditions of each of these adjacent frequency bands are met.
- Member States shall allow the usage of spectrum up to the **transmit power, field strength or power density** set out in Table 2. Pursuant to Article 3(3), they may impose less restrictive conditions, that is to say allow the use of spectrum with higher transmit power, field strength or power density, provided it does not reduce or compromise the appropriate coexistence between short-range devices in bands harmonised by this Decision.
- Member States may only impose the **additional parameters** (channelling and/or channel access and occupation rules) set out in Table 2, and shall not add other parameters or spectrum access and mitigation requirements. Less restrictive conditions pursuant to Article 3(3), means that Member States may completely omit these additional parameters in a given cell or allow higher values, provided that the appropriate sharing environment in the harmonised band is not compromised.
- Member States may only impose the **other usage restrictions** set out in Table 2 and shall not add additional usage restrictions. Since less restrictive conditions may be applied pursuant to Article 3(3), Member States may omit one or all of these restrictions, provided that the appropriate sharing environment in the harmonised band is not compromised.
- Less restrictive conditions pursuant to Article 3(3) shall apply without prejudice to Directive 2014/53/EU.

For the purposes of this Annex, the following **duty cycle** definition applies:

'**duty cycle**' means the ratio, expressed as a percentage, of  $\Sigma(\text{Ton})/(\text{Tobs})$  where Ton is the 'on' time of a single transmitter device and Tobs is the observation period. Ton is measured in an observation frequency band (Fobs). Unless otherwise specified in this technical annex, Tobs is a continuous one hour period and Fobs is the applicable frequency band in this technical annex. Less restrictive conditions within the meaning of Article 3(3), mean that Member States may allow a higher value for 'duty cycle'.

Table 1

#### Categories of short-range devices pursuant to Article 2(3) and their scope

Category of short-range devices	Scope
Non-specific short-range devices (SRDs)	Covers all kinds of radio devices, regardless of the application or their purpose, which fulfil the technical conditions as specified for a given frequency band. Typical uses include telemetry, telecommand, alarms, data transmissions in general and other applications.

Active medical implant devices	Covers the radio part of active implantable medical devices that are intended to be fully or partially introduced, surgically or medically, into the human body or that of an animal, and where applicable their peripherals. Active implantable medical devices are defined in Council Directive 90/385/EEC (1).
Assistive listening devices (ALDs)	Covers radio communications systems that allow persons with hearing impairment to increase their listening capability. Typical system installations include one or more radio transmitters and one or more radio receivers.
High duty cycle/continuous transmission devices	Covers radio devices that rely on low latency and high duty cycle transmissions. These devices are typically used for personal wireless audio and multimedia streaming systems used for combined audio/video transmissions and audio/video sync signals, mobile phones, automotive or home entertainment system, wireless microphones, cordless loudspeakers, cordless headphones, radio devices carried on a person, assistive listening devices, in-ear monitoring, wireless microphones for use at concerts or other stage productions, and low power analogue FM transmitters.
Inductive devices	Covers radio devices that use magnetic fields with inductive loop systems for near field communications and determination applications. This typically includes devices for car immobilisation, animal identification, alarm systems, cable detection, waste management, personal identification, wireless voice links, access control, proximity and metal sensors, anti-theft systems as well as RF anti-theft induction systems, data transfer to hand-held devices, automatic article identification, wireless control systems and automatic road tolling.
Low duty cycle/high reliability devices	Covers radio devices that rely on low overall spectrum utilisation and low duty cycle spectrum access rules to ensure highly reliable spectrum access and transmissions in shared bands. Typical applications include alarm systems that use radio communication for indicating an alert condition at a distant location and social alarm systems that allow reliable communication for a person in distress.
Medical data acquisition devices	Covers the transmission of non-voice data to and from non-implantable medical devices in order to monitor, diagnose and treat patients in healthcare facilities or in their homes as prescribed by duly authorised healthcare professionals.
PMR446 devices	Covers hand portable equipment (without base station or repeater use) carried on a person or manually operated, which uses integral antennas only in order to maximise sharing and minimise interference. PMR 446 equipment operates in short-range peer-to-peer mode and shall not be used as a part of infrastructure network nor as a repeater.
Radio determination devices	Covers radio devices used for determining the position, velocity and/or other characteristics of an object, or for obtaining information relating to these parameters. Radio determination equipment typically conducts measurements to obtain such characteristics. Radio determination devices exclude any kind of point-to-point or point-to-multipoint radio communications.
Radio frequency identification (RFID) devices	Covers tag/interrogator based radio communications systems, consisting of (i) radio devices (tags) attached to animate or inanimate items and (ii) transmitter/receiver units (interrogators) which activate the tags and receive data back. Typical applications include the tracking and identification of items, for instance for the purpose of electronic article surveillance (EAS), and collecting and transmitting data relating to the items to which tags are attached, which may be either battery-less, battery assisted or battery powered. The responses from a tag are validated by its interrogator and passed to its host system.

Transport and traffic telematics devices	Covers radio devices that are used in the fields of transport (road, rail, water or air, depending on the relevant technical restrictions), traffic management, navigation, mobility management and in intelligent transport systems (ITS). Typical applications include interfaces between different modes of transport, communication between vehicles (e.g. car to car), between vehicles and fixed locations (e.g. car to infrastructure) as well as communication from and to users.
Wideband data transmission devices	Covers radio devices that use wideband modulation techniques to access the spectrum. Typical uses include wireless access systems such as radio local area networks (WAS/RLANs) or wideband SRDs in data networks.

(<sup>1</sup>) Council Directive 90/385/EEC of 20 June 1990 on the approximation of the laws of the Member States relating to active implantable medical devices (OJ L 189, 20.7.1990, p. 17).

Table 2

**Frequency bands with corresponding harmonised technical conditions and implementation deadlines for short-range devices**

Band no	Frequency band	Category of short-range devices	Transmit power limit/field strength limit/power density limit	Additional parameters (channelling and/or channel access and occupation rules)	Other usage restrictions	Implementation deadline
1	9-59,750 kHz	Inductive devices	72 dB $\mu$ A/m at 10 metres			1 July 2014
90	9-148 kHz	Radio determination devices	46 dB $\mu$ A/m at 10 m distance at a reference of 100 Hz, outside the Nuclear Magnetic Resonance (NMR) device. Magnetic field strength descending 10 dB/decade above 100Hz.		For enclosed Nuclear Magnetic Resonance (NMR) applications [j].	1 July 2022
2	9-315 kHz	Active medical implant devices	30 dB $\mu$ A/m at 10 metres	Duty cycle limit: 10 %	This set of usage conditions is only available to active implantable medical devices.	1 July 2014
3	59,750-60,250 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres			1 July 2014
4	60,250-74,750 kHz	Inductive devices	72 dB $\mu$ A/m at 10 metres			1 July 2014
5	74,750-75,250 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres			1 July 2014

6	75,250-77,250 kHz	Inductive devices	72 dB $\mu$ A/m at 10 metres			1 July 2014
7	77,250-77,750 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres			1 July 2014
8	77,750-90 kHz	Inductive devices	72 dB $\mu$ A/m at 10 metres			1 July 2014
9	90-119 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres			1 July 2014
10	119-128,6 kHz	Inductive devices	66 dB $\mu$ A/m at 10 metres			1 July 2014
11	128,6-129,6 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres			1 July 2014
12	129,6-135 kHz	Inductive devices	66 dB $\mu$ A/m at 10 metres			1 July 2014
13	135-140 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres			1 July 2014
14	140-148,5 kHz	Inductive devices	37,7 dB $\mu$ A/m at 10 metres			1 July 2014
15	148,5-5 000 kHz [1]	Inductive devices	-15 dB $\mu$ A/m at 10 metres in any bandwidth of 10 kHz. Furthermore the total field strength is -5 dB $\mu$ A/m at 10 m for systems operating at bandwidths larger than 10 kHz			1 July 2014
91	148-5 000 kHz	Radio determination devices	-15 dB $\mu$ A/m at 10 m distance outside the Nuclear Magnetic Resonance (NMR) device.		For enclosed Nuclear Magnetic Resonance (NMR) applications [j].	1 July 2022
17	400-600 kHz	Radio Frequency Identification (RFID) devices	-8 dB $\mu$ A/m at 10 metres			1 July 2014
85	442,2-450,0 kHz	Non-specific short-range devices	7 dB $\mu$ A/m at 10 m	Channel spacing $\geq$ 150 Hz	This set of usage conditions is only available for person detection and collision avoidance devices.	1 January 2020

18	456,9-457,1 kHz	Non-specific short-range devices	7 dB $\mu$ A/m at 10 m		This set of usage conditions is only available for emergency detections of buried victims and valuable items devices.	1 July 2014
19	984-7 484 kHz	Transport and Traffic Telematics devices	9 dB $\mu$ A/m at 10 m	Duty cycle limit: 1 %	This set of usage conditions is only available for Eurobalise transmissions in the presence of trains using the 27 090-27 100 kHz band for telepowering pursuant to the conditions set for band 28.	1 July 2014
20	3 155-3 400 kHz	Inductive devices	13,5 dB $\mu$ A/m at 10 metres			1 July 2014
21	5 000-30 000 kHz [2]	Inductive devices	-20 dB $\mu$ A/m at 10 metres in any bandwidth of 10 kHz. Furthermore the total field strength is -5 dB $\mu$ A/m at 10 m for systems operating at bandwidths larger than 10 kHz			1 July 2014
92	5 000-30 000 kHz	Radio determination devices	-5 dB $\mu$ A/m at 10m distance outside the Nuclear Magnetic Resonance (NMR) device.		For enclosed Nuclear Magnetic Resonance (NMR) applications [j].	1 July 2022
22	6 765-6 795 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres			1 July 2014
23	7 300-23 000 kHz	Transport and Traffic Telematics devices	-7 dB $\mu$ A/m at 10 m	Antenna requirements apply [8].	This set of usage conditions is only available for Eurobalise transmissions in the presence of trains using the 27 090-27 100 kHz band for telepowering pursuant to the conditions set for band 28.	1 July 2014
24	7 400-8 800 kHz	Inductive devices	9 dB $\mu$ A/m at 10 metres			1 July 2014
25	10 200-11 000 kHz	Inductive devices	9 dB $\mu$ A/m at 10 metres			1 July 2014

27a	13 553-13 567 kHz	Inductive devices	42 dB $\mu$ A/m at 10 metres	Transmission mask and antenna requirements for all combined frequency segments apply [8], [9].		1 January 2020
27b	13 553-13 567 kHz	Radio Frequency Identification (RFID) devices	60 dB $\mu$ A/m at 10 metres	Transmission mask and antenna requirements for all combined frequency segments apply [8], [9].		1 July 2014
27c	13 553-13 567 kHz	Non-specific short-range devices	10 mW e.r.p.			1 July 2014
28	26 957-27 283 kHz	Non-specific short-range devices	10 mW e.r.p.			1 July 2014
29	26 990-27 000 kHz	Non-specific short-range devices	100 mW e.r.p.	Duty cycle limit: 0,1 %. Model control devices [d] may operate without duty cycle restrictions.		1 July 2014
30	27 040-27 050 kHz	Non-specific short-range devices	100 mW e.r.p.	Duty cycle limit: 0,1 %. Model control devices [d] may operate without duty cycle restrictions.		1 July 2014
31	27 090-27 100 kHz	Non-specific short-range devices	100 mW e.r.p.	Duty cycle limit: 0,1 %. Model control devices [d] may operate without duty cycle restrictions.		1 July 2014



32	27 140-27 150 kHz	Non-specific short-range devices	100 mW e.r.p.	Duty cycle limit: 0,1 %. Model control devices [d] may operate without duty cycle restrictions.		1 July 2014
33	27 190-27 200 kHz	Non-specific short-range devices	100 mW e.r.p.	Duty cycle limit: 0,1 %. Model control devices [d] may operate without duty cycle restrictions.		1 July 2014
34	30-37,5 MHz	Active medical implant devices	1 mW e.r.p.	Duty cycle limit: 10 %	This set of usage conditions is only available to ultra-low power medical membrane implants for blood pressure measurements within the definition of active implantable medical devices.	1 July 2014
93	30-130 MHz	Radio determination devices	-36 dBm e.r.p. outside the Nuclear Magnetic Resonance (NMR) device.		For enclosed Nuclear Magnetic Resonance (NMR) applications [j].	1 July 2022
35	40,66-40,7 MHz	Non-specific short-range devices	10 mW e.r.p.			1 January 2018
36	87,5-108 MHz	High duty cycle/continuous transmission devices	50 nW e.r.p.	Channel spacing up to 200 kHz.	This set of usage conditions is only available to wireless audio and multimedia streaming transmitters with analogue frequency modulation (FM).	1 July 2014
37a	169,4-169,475 MHz	Assistive Listening Devices (ALD)	500 mW e.r.p.	Channel spacing: max 50 kHz.		1 July 2014

37c	169,4-169,475 MHz	Non-specific short-range devices	500 mW e.r.p.	Channel spacing: max 50 kHz. Duty cycle limit: 1,0 %. For metering devices [a], the duty cycle limit is 10,0 %		1 July 2014
38	169,4-169,4875 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle limit: 0,1 %.		1 January 2020
39a	169,4875-169,5875 MHz	Assistive Listening Devices (ALD)	500 mW e.r.p.	Channel spacing: max 50 kHz.		1 July 2014
39b	169,4875-169,5875 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle limit: 0,001 %. Between 00:00h and 06:00h local time a duty cycle limit of 0,1 % may be used.		1 January 2020
40	169,5875-169,8125 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle limit: 0,1 %.		1 January 2020
82	173,965-216 MHz	Assistive Listening Devices (ALD)	10 mW e.r.p.	On a tuning range basis [5]. Channel spacing: max 50 kHz. A threshold of 35 dB $\mu$ V/m is required to ensure the protection of a DAB receiver located at 1,5 m from the ALD device, subject to DAB signal strength measurements taken around the ALD operating site. The ALD device should operate under all circumstances at least 300 kHz away from the channel edge of an occupied DAB channel.		1 January 2018

				Requirements on techniques to access spectrum and mitigate interference apply [7].		
41	401-402 MHz	Active medical implant devices	25 $\mu$ W e.r.p.	<p>Channel spacing: 25 kHz.</p> <p>Individual transmitters may combine adjacent channels for increased bandwidth up to 100 kHz.</p> <p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p> <p>Alternatively, a duty cycle limit of 0,1 % may also be used.</p>	<p>This set of usage conditions is only available for systems specifically designed for the purpose of providing non-voice digital communications between active implantable medical devices and/or body-worn devices and other devices external to the human body used for transferring non-time critical individual patient-related physiological information.</p>	1 July 2014
42	402-405 MHz	Active medical implant devices	25 $\mu$ W e.r.p.	<p>Channel spacing: 25 kHz.</p> <p>Individual transmitters may combine adjacent channels for increased bandwidth up to 300 kHz.</p> <p>Other techniques to access spectrum or mitigate interference, including bandwidths greater than 300 kHz, can be used provided they ensure compatible operation with the other users and in particular with meteorological radiosondes [7].</p>	<p>This set of usage conditions is only available to active implantable medical devices.</p>	1 July 2014

43	405-406 MHz	Active medical implant devices	25 $\mu$ W e.r.p.	<p>Channel spacing: 25 kHz</p> <p>Individual transmitters may combine adjacent channels for increased bandwidth up to 100 kHz.</p> <p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p> <p>Alternatively a duty cycle limit of 0,1 % may also be used.</p>	<p>This set of usage conditions is only available for systems specifically designed for the purpose of providing non-voice digital communications between active implantable medical devices and/or body-worn devices and other devices external to the human body used for transferring non-time critical individual patient-related physiological information.</p>	1 July 2014
86	430-440 MHz	Medical data acquisition devices	-50 dBm/100kHz e.r.p. power density but not exceeding a total power of -40 dBm/10MHz (both limits are intended for measurement outside of the patient's body)		<p>The set of usage conditions is only available for Ultra-Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE) applications [h].</p>	1 January 2020
44a	433,05-434,79 MHz	Non-specific short-range devices	1 mW e.r.p. and -13 dBm/10 kHz power density for bandwidth modulation larger than 250 kHz		<p>Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.</p>	1 July 2014
44b	433,05-434,79 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle limit: 10 %		1 January 2020
45c	434,04-434,79 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle limit: 100 % subject to channel spacing up to 25 kHz.	<p>Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.</p>	1 January 2020
83	446,0-446,2 MHz	PMR446	500 mW e.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7].		1 January 2018

87	862-863 MHz	Non-specific short-range devices	25 mW e.r.p.	Duty cycle limit: 0,1 %. Bandwidth: ≤ 350 kHz.		1 January 2020
46a	863-865 MHz	Non-specific short-range devices	25 mW e.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Alternatively, a duty cycle limit of 0,1 % may also be used.		1 January 2018
46b	863-865 MHz	High duty cycle/continuous transmission devices	10 mW e.r.p.		This set of usage conditions is only available to wireless audio and multimedia streaming devices.	1 July 2014
84	863-868 MHz	Wideband data transmission devices	25 mW e.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Bandwidth: > 600 kHz and ≤ 1 MHz. Duty cycle: ≤ 10 % for network access points [g] Duty cycle: ≤ 2,8 % otherwise	This set of usage conditions is only available for wideband SRDs in data networks [g].	1 January 2018
47	865-868 MHz	Non-specific short-range devices	25 mW e.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Alternatively, a duty cycle limit of 1 % may also be used.		1 January 2020

47a	865-868 MHz [6]	Radio Frequency Identification (RFID) devices	<p>2 W e.r.p.</p> <p>Interrogator transmissions at 2 W e.r.p. only permitted within the four channels centred at 865,7 MHz, 866,3 MHz, 866,9 MHz and 867,5 MHz</p> <p>RFID interrogator devices placed on the market before the repeal date of EC Decision 2006/804/EC are 'grandfathered', i.e. they are continuously permitted to be used in line with the provisions set out in EC Decision 2006/804/EC before the repeal date.</p>	<p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p> <p>Bandwidth <math>\leq</math> 200 kHz</p>		1 January 2018
47b	865-868 MHz	Non-specific short-range devices	<p>500 mW e.r.p.</p> <p>Transmissions only permitted within the frequency ranges 865,6-865,8 MHz, 866,2-866,4 MHz, 866,8-867,0 MHz and 867,4-867,6 MHz.</p> <p>Adaptive Power Control (APC) required. Alternatively other mitigation technique with at least an equivalent level of spectrum compatibility.</p>	<p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p> <p>Bandwidth: <math>\leq</math> 200 kHz  Duty cycle: <math>\leq</math> 10 % for network access points [g]  Duty cycle: <math>\leq</math> 2,5 % otherwise</p>	This set of usage conditions is only available for data networks [g].	1 January 2018
48	868-868,6 MHz	Non-specific short-range devices	25 mW e.r.p.	<p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p> <p>Alternatively, a duty cycle limit of 1 % may also be used.</p>		1 January 2020

49	868,6-868,7 MHz	Low duty cycle/high reliability devices	10 mW e.r.p.	Channel spacing: 25 kHz. The whole frequency band may also be used as a single channel for high-speed data transmission. Duty cycle limit: 1,0 %	This set of usage conditions is only available to alarm systems [e].	1 July 2014
50	868,7-869,2 MHz	Non-specific short-range devices	25 mW e.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Alternatively a duty cycle limit of 0,1 % may also be used.		1 January 2020
51	869,2-869,25 MHz	Low duty cycle/high reliability devices	10 mW e.r.p.	Channel spacing: 25 kHz. Duty cycle limit: 0,1 %	This set of usage conditions is only available to social alarm devices [b].	1 July 2014
52	869,25-869,3 MHz	Low duty cycle/high reliability devices	10 mW e.r.p.	Channel spacing: 25 kHz. Duty cycle limit: 0,1 %	This set of usage conditions is only available to alarm systems [e].	1 July 2014
53	869,3-869,4 MHz	Low duty cycle/high reliability devices	10 mW e.r.p.	Channel spacing: 25 kHz. Duty cycle limit: 1,0 %	This set of usage conditions is only available to alarm systems [e].	1 July 2014
54	869,4-869,65 MHz	Non-specific short-range devices	500 mW e.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Alternatively, a Duty cycle limit of 10 % may also be used.		1 January 2020
55	869,65-869,7 MHz	Low duty cycle/high reliability devices	25 mW e.r.p.	Channel spacing: 25 kHz Duty cycle limit: 10 %	This set of usage conditions is only available to alarm systems [e].	1 July 2014

56a	869,7-870 MHz	Non-specific short-range devices	5 mW e.r.p.		Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.	1 July 2014
56b	869,7-870 MHz	Non-specific short-range devices	25 mW e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Alternatively, a duty cycle limit of 1 % may also be used.		1 January 2020
57a	2 400-2 483,5 MHz	Non-specific short-range devices	10 mW equivalent isotropic radiated power (e.i.r.p.)			1 July 2014
57b	2 400-2 483,5 MHz	Radio determination devices	25 mW e.i.r.p.			1 July 2014
57c	2 400-2 483,5 MHz	Wideband data transmission devices	100 mW e.i.r.p. and 100 mW/100 kHz e.i.r.p. density applies when frequency hopping modulation is used, 10 mW/MHz e.i.r.p. density applies when other types of modulation are used	Requirements on techniques to access spectrum and mitigate interference apply [7].		1 July 2014
58	2 446-2 454 MHz	Radio Frequency Identification (RFID) devices	500 mW e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7].		1 July 2014
59	2 483,5-2 500 MHz	Active medical implant devices	10 mW e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Channel spacing: 1 MHz. The whole frequency band may also be used dynamically as a single channel for high-speed data transmissions. In addition, a duty cycle limit of 10 % applies.	This set of usage conditions is only available to active implantable medical devices. Peripheral master units are for indoor use only.	1 July 2014



59a	2 483,5-2 500 MHz	Medical data acquisition devices	1 mW e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Modulation Bandwidth: $\leq 3$ MHz. In addition, a duty cycle: $\leq 10$ % applies.	The set of usage conditions is only available for medical body area network system (MBANS) [f] for indoor use within healthcare facilities	1 January 2018
59b	2 483,5-2 500 MHz	Medical data acquisition devices	10 mW e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7]. Modulation Bandwidth: $\leq 3$ MHz. In addition, a duty cycle: $\leq 2$ % applies	The set of usage conditions is only available for medical body area network system (MBANS) [f] for indoor use within the patient's home	1 January 2018
60	4 500-7 000 MHz	Radio determination devices	24 dBm e.i.r.p. [3]	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to Tank Level Probing Radar [c].	1 July 2014
61	5 725-5 875 MHz	Non-specific short-range devices	25 mW e.i.r.p.			1 July 2014
62	5 795-5 815 MHz	Transport and Traffic Telematics devices	2 W e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions applies only to road tolling applications and smart tachograph, weight and dimension applications [i].	1 January 2020
88	5 855-5 865 MHz	Transport and Traffic Telematics devices	33 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and a Transmit Power Control (TPC) range of 30 dB	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.	1 January 2020

89	5 865-5 875 MHz	Transport and Traffic Telematics devices	33 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and a Transmit Power Control (TPC) range of 30 dB	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.	1 January 2020
63	6 000-8 500 MHz	Radio determination devices	7 dBm/50 MHz peak e.i.r.p. and -33 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as requirements on techniques to access spectrum and mitigate interference apply [7], [8] [10].	This set of usage conditions is only available to Level Probing Radar. Established exclusion zones around radio astronomy sites shall be obeyed.	1 July 2014
64	8 500-10 600 MHz	Radio determination devices	30 dBm e.i.r.p. [3]	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to Tank Level Probing Radar [c].	1 July 2014
65	17,1-17,3 GHz	Radio determination devices	26 dBm e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to ground-based systems.	1 July 2014
66	24,05-24,075 GHz	Transport and Traffic Telematics devices	100 mW e.i.r.p.			1 July 2014
67	24,05-26,5 GHz	Radio determination devices	26 dBm/50 MHz peak e.i.r.p. and -14 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as requirements on techniques to access spectrum and mitigate interference apply [7], [8], [10]	This set of usage conditions is only available to Level Probing Radar. Established exclusion zones around radio astronomy sites shall be obeyed.	1 July 2014
68	24,05-27 GHz	Radio determination devices	43 dBm e.i.r.p. [3]	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to Tank Level Probing Radar [c].	1 July 2014

69a	24,075-24,15 GHz	Transport and Traffic Telematics devices	100 mW e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to ground-based vehicle radars.	1 July 2014
69b	24,075-24,15 GHz	Transport and Traffic Telematics devices	0,1 mW e.i.r.p.			1 July 2014
70a	24,15-24,25 GHz	Non-specific short-range devices	100 mW e.i.r.p.			1 July 2014
70b	24,15-24,25 GHz	Transport and Traffic Telematics devices	100 mW e.i.r.p.			1 July 2014
74a	57-64 GHz	Non-specific short-range devices	100 mW e.i.r.p. and a maximum transmit power of 10 dBm			1 January 2020
74b	57-64 GHz	Radio determination devices	43 dBm e.i.r.p. [3]	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to Tank Level Probing Radar [c].	1 July 2014
74c	57-64 GHz	Radio determination devices	35 dBm/50 MHz peak e.i.r.p. and -2 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as requirements on techniques to access spectrum and mitigate interference apply [7] [8], [10].	This set of usage conditions is only available to Level Probing Radar.	1 July 2014
75	57-71 GHz	Wideband data transmission devices	40 dBm e.i.r.p. and 23 dBm/MHz e.i.r.p. density	Requirements on techniques to access spectrum and mitigate interference apply [7].	Fixed outdoor installations are excluded.	1 January 2020
75a	57-71 GHz	Wideband data transmission devices	40 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and maximum transmit power of 27 dBm at the antenna port or ports	Requirements on techniques to access spectrum and mitigate interference apply [7].		1 January 2020
75b	57-71 GHz	Wideband data transmission devices	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and a transmit antenna gain $\geq 30$ dBi	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to fixed outdoor installations.	1 January 2020

76	61-61,5 GHz	Non-specific short-range devices	100 mW e.i.r.p.			1 July 2014
77	63,72-65,88 GHz	Transport and Traffic Telematics devices	40 dBm e.i.r.p.	TTT devices placed on the market before the 1 January 2020 are 'grandfathered', i.e. they are permitted to use the previous frequency range 63-64 GHz, and otherwise the same conditions apply.	This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.	1 January 2020
78a	75-85 GHz	Radio determination devices	34dBm/50 MHz peak e.i.r.p. and -3 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as requirements on techniques to access spectrum and mitigate interference apply [7], [8], [10].	This set of usage conditions is only available to Level Probing Radar. Established exclusion zones around radio astronomy sites shall be obeyed.	1 July 2014
78b	75-85 GHz	Radio determination devices	43 dBm e.i.r.p. [3]	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available to Tank Level Probing Radar [c].	1 July 2014
79a	76-77 GHz	Transport and Traffic Telematics devices	55 dBm peak e.i.r.p. and 50 dBm mean e.i.r.p. and 23,5 dBm mean e.i.r.p. for pulse radars	Requirements on techniques to access spectrum and mitigate interference apply [7]. Fixed transportation infrastructure radars have to be of a scanning nature in order to limit the illumination time and ensure a minimum silent time to achieve coexistence with automotive radar systems.	This set of usage conditions is only available to ground-based vehicle and infrastructure systems.	1 June 2020

79b	76-77 GHz	Transport and Traffic Telematics devices	30 dBm peak e.i.r.p. and 3 dBm/MHz average power spectral density	Duty cycle limit: $\leq 56\%/s$	This set of usage conditions is only available to obstacle detection systems for rotorcraft use [4].	1 January 2018
80a	122-122,25 GHz	Non-specific short-range devices	10 dBm/250MHz e.i.r.p. and -48 dBm/MHz at 30° elevation			1 January 2018
80b	122,25-123 GHz	Non-specific short-range devices	100 mW e.i.r.p.			1 January 2018
81	244-246 GHz	Non-specific short-range devices	100 mW e.i.r.p.			1 July 2014

Applications and devices referred to in Table 2:

- [a] 'Metering devices' means radio devices that are part of bidirectional radio communications systems which allow remote monitoring, measuring and transmission of data in smart grid infrastructures, such as electricity, gas and water.
- [b] 'Social alarm devices' means radio communications systems that allow reliable communication for a person in distress in a confined area to initiate a call for assistance. Typical uses of social alarm are to assist elderly or disabled people.
- [c] 'Tank Level Probing Radar' (TLPR) means a specific type of radiodetermination application, which is used for tank level measurements and is installed in metallic or reinforced concrete tanks, or similar structures made of material with comparable attenuation characteristics. The purpose of the tank is to contain a substance.
- [d] 'Model control devices' means a specific kind of telecommand and telemetry radio equipment that is used to remotely control the movement of models (principally miniature representations of vehicles) in the air, on land or over or under the water surface.
- [e] An alarm system is a device which uses radio communication support for indicating an alert to a system or a person, as a main functionality, at a distant location when a problem or a specific situation occurs. Radio alarms include social alarms and alarms for security and safety.
- [f] Medical Body Area Network Systems (MBANSs) are used for medical data acquisition and are intended for low-power wireless networking of a plurality of body-worn sensors and/or actuators as well as of a hub device placed on/around the human body.
- [g] A network access point in a data network is a fixed terrestrial short-range device that acts as a connection point for the other short-range devices in the data network to service platforms located outside of that data network. The term data network refers to several short-range devices, including the network access point, as network components and to the wireless connections between them.
- [h] Wireless medical capsule endoscopy is used for medical data acquisition designed for use in medical doctor-patient scenarios with the aim of acquiring images of human digestive tract.

[i] Smart tachograph, weight and dimension applications are defined as remote enforcement of the tachograph in Appendix 14 of Commission Implementing Regulation 2016/799 <sup>(1)</sup> and for the weights and dimensions enforcement in Article 10d of Directive 2015/719 <sup>(2)</sup>.

[j] Enclosed NMR sensors are devices where the material/object under investigation is put inside the enclosure of the NMR device. NMR techniques use nuclear magnetic resonance excitation and magnetic field strength response of a material/object under test to get information about material properties based on resonance frequency responses of isotopes of atoms. Nuclear magnetic resonance imaging and magnetic resonance tomography systems are not included in this scope.

Other technical requirements and clarifications referred to in Table 2:

[1] In band 20 higher field strengths and additional usage restrictions apply for inductive applications.

[2] In bands 22, 24, 25, 27a, and 28 higher field strengths and additional usage restrictions apply for inductive applications.

[3] The power limit applies inside a closed tank and corresponds to a spectral density of -41,3 dBm/MHz e.i.r.p. outside a 500 litre test tank.

[4] Member States can specify exclusion zones or equivalent measures in which the obstacle detection application for rotorcraft use shall not be used for the protection of the radioastronomy service or other national use. Rotorcraft is defined as EASA CS-27 and CS-29 (resp. JAR-27 and JAR-29 for former certifications).

[5] Devices shall implement the whole frequency range on a tuning range basis.

[6] RFID tags respond at a very low power level (-20 dBm e.r.p.) in a frequency range around the RFID interrogator channels and shall comply with the essential requirements of Directive 2014/53/EU.

[7] Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the *Official Journal of the European Union* under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.

[8] Antenna requirements that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant restrictions are described in harmonised standards or parts thereof the references of which have been published in the *Official Journal of the European Union* under Directive 2014/53/EU, performance at least equivalent to these restrictions shall be ensured.

<sup>(1)</sup> Commission Implementing Regulation (EU) 2016/799 of 18 March 2016 implementing Regulation (EU) No 165/2014 of the European Parliament and of the Council laying down the requirements for the construction, testing, installation, operation and repair of tachographs and their components (OJ L 139, 26.5.2016, p. 1).

<sup>(2)</sup> Directive (EU) 2015/719 of the European Parliament and of the Council of 29 April 2015 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic (OJ L 115, 6.5.2015, p. 1).

- [9] Transmission mask that provides an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant restrictions are described in harmonised standards or parts thereof the references of which have been published in the *Official Journal of the European Union* under Directive 2014/53/EU, performance at least equivalent to these restrictions shall be ensured.
- [10] Automatic power control that provides an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant restrictions are described in harmonised standards or parts thereof the references of which have been published in the *Official Journal of the European Union* under Directive 2014/53/EU, performance at least equivalent to these restrictions shall be ensured.'
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