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ANNEX

ANNEX

to the

**Commission Implementing Decision**

**amending Commission Decision 2006/771/EC updating harmonised technical conditions in the area of radio spectrum use for short-range devices and repealing Commission Decision 2014/641/EU on harmonised technical conditions of radio spectrum use by wireless audio programme making and special events equipment in the Union**

## ‘ANNEX

### **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  $\Sigma(T_{on})/(T_{obs})$  where  $T_{on}$  is the “on” time of a single transmitter device and  $T_{obs}$  is the observation period.  $T_{on}$  is measured in an observation frequency band ( $F_{obs}$ ). Unless otherwise specified in this technical annex,  $T_{obs}$  is a continuous one hour period and  $F_{obs}$  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 (SRD)	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 <sup>1</sup> .
Assistive listening devices (ALD)	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.
Audio Programme Making and Special Events (PMSE) devices	Covers radio devices used for transmission of analogue or digital audio signals between a limited number of transmitters and receivers, such as radio microphones, in-ear monitors or audio links, used mainly for the production of broadcast programmes or private or public social or cultural events.
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.
Reliable alarm devices	Covers radio devices that use 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

<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).

	and alarms for security and safety.
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/RLAN) or wideband SRD in data networks.

**Table 2**

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

<b>Band no</b>	<b>Frequency band</b>	<b>Category of short-range devices</b>	<b>Transmit power limit/ field strength limit/power density limit</b>	<b>Additional parameters (channelling and/or channel access and occupation rules)</b>	<b>Other usage restrictions</b>	<b>Implementa- -tion deadline</b>
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 metres at a reference of 100 Hz, outside the Nuclear Magnetic Resonance (NMR) device.  Magnetic field strength descending 10 dB/decade above 100 Hz.		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 $\leq$ 10 %		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			1 July 2014

			dB $\mu$ A/m at 10 metres for systems operating at bandwidths larger than 10 kHz.			
91	148-5 000 kHz	Radio determination devices	-15 dB $\mu$ A/m at 10 metres outside the Nuclear Magnetic Resonance (NMR) device.		For enclosed Nuclear Magnetic Resonance (NMR) applications [j].	1 July 2022
16	315-600 kHz	Active medical implant devices	-5 dB $\mu$ A/m at 10 metres	Duty cycle $\leq$ 10 %	This set of usage conditions is only available for animal implant devices.	1 July 2025
17	400-600 kHz	Radio Frequency Identification (RFID) devices	-8 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 metres for systems operating at bandwidths larger than 10 kHz.	Bandwidth $\geq$ 30 kHz		1 July 2025
85	442.2-450.0 kHz	Non-specific short-range devices	7 dB $\mu$ A/m at 10 metres	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 metres		This set of usage conditions is only	1 July 2014

					available for emergency detections of buried victims and valuable items devices.	
19	984-7484 kHz	Transport and Traffic Telematics devices	9 dB $\mu$ A/m at 10 metres	Duty cycle $\leq$ 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 metres 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 10 metres 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 metres	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
26	12 500-20 000 kHz	Active medical implant devices	-7 dB $\mu$ A/m at 10 metres in any bandwidth of 10 kHz	Duty cycle $\leq$ 10 %	This set of usage conditions is only available for indoor use by animal implant devices.	1 July 2025

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 $\leq 0.1\%$ 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 $\leq 0.1\%$ 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 $\leq 0.1\%$ Model control devices		1 July 2014

				[d] may operate without duty cycle restrictions.		
32	27 140-27 150 kHz	Non-specific short-range devices	100 mW e.r.p.	Duty cycle $\leq 0.1\%$ 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 $\leq 0.1\%$ 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 $\leq 10\%$	This set of usage conditions is only available for ultra-low power medical membrane implants for blood pressure measurements.	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	Non-specific short-range devices	50 nW e.r.p.	Bandwidth $\leq 200$ kHz.	This set of usage conditions is only	1 July 2025

					available for audio transmitters with analogue frequency modulation (FM).	
37a	169.4-169.475 MHz	Assistive Listening Devices (ALD)	500 mW e.r.p.			1 July 2025
37c	169.4-169.475 MHz	Non-specific short-range devices	500 mW e.r.p.	Duty cycle $\leq 1.0\%$ For metering devices [a], the duty cycle $\leq 10\%$		1 July 2025
38	169.4-169.4875 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle $\leq 0.1\%$		1 January 2020
39a	169.4875-169.5875 MHz	Assistive Listening Devices (ALD)	500 mW e.r.p.			1 July 2025
39b	169.4875-169.5875 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle $\leq 0.001\%$ Between 00:00h and 06:00h local time a duty cycle $\leq 0.1\%$ may be used.		1 January 2020
40	169.5875-169.8125 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle $\leq 0.1\%$		1 January 2020
82	173.965-216 MHz	Assistive Listening Devices (ALD)	10 mW e.r.p.	On a tuning range basis [5]. A threshold of 35		1 July 2025

				<p>dB<math>\mu</math>V/m is required to ensure the protection of a DAB receiver located at 1.5 metres 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.</p> <p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p>		
41	401-402 MHz	Active medical implant devices	25 $\mu$ W e.r.p.	<p>Bandwidth <math>\leq</math> 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 % applies.</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-</p>	1 July 2025

					worn devices and other devices external to the human body used for transferring non-time critical individual patient-related physiological information.	
42	402-405 MHz	Active medical implant devices	25 $\mu$ W e.r.p.	<p>Bandwidth <math>\leq</math> 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>		1 July 2025
43	405-406 MHz	Active medical implant devices	25 $\mu$ W e.r.p.	<p>Bandwidth <math>\leq</math> 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 % applies.</p>	This set of usage conditions is only available for systems specifically designed for the purpose of providing non-voice digital communications between active	1 July 2025

					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.	
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)		The set of usage conditions is only available for Ultra-Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE) applications [h].	1 January 2020
44a	433.05-434.79 MHz	Non-specific short-range devices	1 mW e.r.p.			1 July 2025
44b	433.05-434.79 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle $\leq 10\%$		1 January 2020
45c	434.04-434.79 MHz	Non-specific short-range devices	10 mW e.r.p.	Duty cycle $\leq 100\%$ subject to bandwidth $\leq 25$ kHz.		1 July 2025
83	446.0-446.2 MHz	PMR446	500 mW e.r.p.	Requirements on techniques to access		1 January 2018

				spectrum and mitigate interference apply [7].		
94	821.5-826 MHz	Audio PMSE devices	100 mW e.i.r.p. for body-worn devices 20 mW e.i.r.p. for other devices			1 July 2025
95	826-832 MHz	Audio PMSE devices	100 mW e.i.r.p.			1 July 2025
87	862-863 MHz	Non-specific short-range devices	25 mW e.r.p.	Duty cycle $\leq 0.1\%$ Bandwidth $\leq 350$ 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 $\leq 0.1\%$ applies.		1 January 2018
46b	863-865 MHz	Audio PMSE devices	10 mW e.r.p.		This set of usage conditions is also available for personal cordless audio devices.	1 July 2025
84	863-868 MHz	Wideband data transmission devices	25 mW e.r.p.	Requirements on techniques to access spectrum and mitigate	This set of usage conditions is only available for wideband SRD in data	1 January 2018



				interference apply [7]. Bandwidth > 600 kHz and $\leq 1$ MHz Duty cycle $\leq 10\%$ for network access points [g] Duty cycle $\leq 2.8\%$ otherwise	networks [g].	
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 $\leq 1\%$ applies.		1 January 2020
47a	865-868 MHz [6]	Radio Identification Frequency (RFID) devices	Interrogator transmissions at 2 W e.r.p. only permitted within the channels centred at 865.7 MHz, 866.3 MHz, 866.9 MHz and 867.5 MHz RFID interrogator devices placed on the market before the repeal date of EC Decision 2006/804/EC are 'grandfathered', i.e. they are continuously	Requirements on techniques to access spectrum and mitigate interference apply [7]. Bandwidth $\leq 200$ kHz		1 January 2018

			permitted to be used in line with the provisions set out in EC Decision 2006/804/EC before the repeal date.			
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 200</math> kHz</p> <p>Duty cycle <math>\leq 10\%</math> for network access points [g]</p> <p>Duty cycle <math>\leq 2.5\%</math> 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 <math>\leq 1\%</math> applies.</p>		1 January 2020
49	868.6-868.7 MHz	Reliable alarm devices	10 mW e.r.p.	Bandwidth $\leq 25$ kHz. The whole frequency band may also be used		1 July 2025

				as a single channel. Duty cycle $\leq 1\%$		
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 $\leq 0,1\%$ applies.		1 January 2020
51	869.2-869.25 MHz	Reliable alarm devices	10 mW e.r.p.	Channel spacing: 25 kHz. Duty cycle $\leq 0.1\%$	This set of usage conditions is only available for social alarm devices [b].	1 July 2014
52	869.25-869.3 MHz	Reliable alarm devices	10 mW e.r.p.	Bandwidth $\leq 25$ kHz Duty cycle $\leq 0.1\%$		1 July 2025
53	869.3-869.4 MHz	Reliable alarm devices	10 mW e.r.p.	Bandwidth $\leq 25$ kHz Duty cycle $\leq 1\%$		1 July 2025
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 $\leq 10\%$ applies.		1 January 2020
55	869.65-869.7 MHz	Reliable alarm devices	25 mW e.r.p.	Bandwidth $\leq 25$ kHz		1 July 2025

				Duty cycle $\leq 10\%$		
56a	869.7-870 MHz	Non-specific short-range devices	5 mW e.i.r.p.			1 July 2025
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 $\leq 1\%$ applies.		1 January 2020
96	1785-1804.8 MHz	Audio PMSE devices	50 mW e.i.r.p. for body-worn devices or devices implementing Spectrum Scanning Procedure (SSP). 20 mW e.i.r.p. for other devices.			1 July 2025
57a	2400-2483.5 MHz	Non-specific short-range devices	10 mW e.i.r.p.			1 July 2014
57b	2400-2483.5 MHz	Radio determination devices	25 mW e.i.r.p.			1 July 2014
57c	2400-2483.5 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.	Requirements on techniques to access spectrum and mitigate interference apply [7].		1 July 2014

			10 mW/MHz e.i.r.p. density applies when other types of modulation are used.			
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.	<p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p> <p>Bandwidth <math>\leq 1</math> MHz. The whole frequency band may also be used dynamically as a single channel to maintain a communications session.</p> <p>Duty cycle <math>\leq 10\%</math> for peripherals.</p>	Peripheral master units are for indoor use only.	1 July 2025
59a	2 483.5-2 500 MHz	Medical data acquisition devices	1 mW e.i.r.p.	<p>Requirements on techniques to access spectrum and mitigate interference apply [7].</p> <p>Bandwidth <math>\leq 3</math> MHz.</p> <p>Duty cycle <math>\leq 10\%</math>.</p>	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]. Bandwidth $\leq 3$ MHz. Duty cycle $\leq 2\%$ .	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 for 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) able to reduce the total power from its maximum to 3	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available for vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-	1 July 2025

			dBm e.i.r.p.		vehicle systems.	
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) able to reduce the total power from its maximum to 3 dBm e.i.r.p.	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available for vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.	1 July 2025
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 for Level Probing Radar. Exclusion zones around radio astronomy sites shall apply.	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 for 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 for ground-based SAR systems [k].	1 July 2025
66	24.05-24.075 GHz	Transport and Traffic	100 mW e.i.r.p.			1 July

		Telematics devices				2014
67	24.05-26.5 GHz	Radio devices determination	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 for Level Probing Radar. Exclusion zones around radio astronomy sites shall apply.	1 July 2014
68	24.05-27 GHz	Radio devices determination	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 for 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 for 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 for 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 for 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	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density	Requirements on techniques to access	This set of usage conditions is only	1 January

		transmission devices	and a transmit antenna gain $\geq 30$ dBi	spectrum and mitigate interference apply [7].	available for fixed outdoor installations.	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
97	69.8-79.9 GHz	Radio determination devices	7 dBm e.i.r.p.		This set of usage conditions is available for security scanners [1] operated indoors.	1 July 2025
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 for Level Probing Radar. Exclusion zones around radio astronomy sites shall apply.	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 for 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 for 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 e.i.r.p. density	Duty cycle $\leq 56\%$	This set of usage conditions is only available for obstacle detection systems for rotorcraft use [4]. Exclusion zones around radio astronomy sites shall apply.	1 July 2025

98	76-77 GHz	Radio determination devices	48 dBm mean e.i.r.p. and 18 dBm/MHz mean e.i.r.p. density	Requirements on techniques to access spectrum and mitigate interference apply [7].	This set of usage conditions is only available for ground-based SAR systems [k]. Exclusion zones around radio astronomy sites shall apply.	1 July 2025
99	76.5-80.5 GHz	Radio determination devices	19 dBm peak e.i.r.p.	At least 23 dB out-of-band attenuation relative to the maximum allowed peak e.i.r.p. is required.	This set of usage conditions is only available for security scanners [l] operated indoors.	1 July 2025
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 in a given area for a person in distress 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.
- [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>2</sup> and for the weights and dimensions enforcement in Article 10d of Directive 2015/719<sup>3</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.
- [k] Ground-based Synthetic Aperture Radar (SAR) systems are intended for deformation monitoring of terrain and natural or man-made structures, performed by interferometry radar.
- [l] Security scanners are a specific type of radio determination applications which are used to detect objects carried by a person or on a person’s body for security screening purposes without making any physical contact.

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<sup>2</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 (Text with EEA relevance) (OJ L 139, 26.5.2016, p. 1).

<sup>3</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 (Text with EEA relevance) (OJ L 115, 6.5.2015, p. 1).”

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.
- [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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