EUROPEAN
COMMISSION

Brussels, XXX
[…](2019) XXX

ANNEX

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to the

COMMISSION IMPLEMENTING DECISION

amending Decision 2006/771/EC as regards technological and market developments in the area of radio spectrum use for short-range devices

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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 the present 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 must 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 must 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) of this Decision, 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 must 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 must 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) must not compromise the essential requirements set out in Article 3 of Directive 2014/53/EU and must apply without prejudice to that Directive.

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

'**duty cycle**' means the ratio, expressed as a percentage, of Σ(Ton)/(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. . This typically includes devices for car immobilisation, animal identification, alarm systems, cable detection, waste management, personal identification, wireless voice links, access control, proximity sensors, anti-theft systems as well as RF anti-theft induction

[1] 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).

	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 must not be used neither 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.

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 dBµA/m at 10 metres			1 July 2014
2	9-315 kHz	Active medical implant devices	30 dBµA/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 dBµA/m at 10 metres			1 July 2014
4	60.250-74.750 kHz	Inductive devices	72 dBµA/m at 10 metres			1 July 2014
5	74.750-75.250 kHz	Inductive devices	42 dBµA/m at 10 metres			1 July 2014
6	75.250-77.250 kHz	Inductive devices	72 dBµA/m at 10 metres			1 July 2014
7	77.250-77.750 kHz	Inductive devices	42 dBµA/m at 10 metres			1 July 2014
8	77.750-90 kHz	Inductive devices	72 dBµA/m at 10 metres			1 July 2014

9	90-119 kHz	Inductive devices	42 dBµA/m at 10 metres			1 July 2014
10	119-128.6 kHz	Inductive devices	66 dBµA/m at 10 metres			1 July 2014
11	128.6-129.6 kHz	Inductive devices	42 dBµA/m at 10 metres			1 July 2014
12	129.6-135 kHz	Inductive devices	66 dBµA/m at 10 metres			1 July 2014
13	135-140 kHz	Inductive devices	42 dBµA/m at 10 metres			1 July 2014
14	140-148.5 kHz	Inductive devices	37.7 dBµA/m at 10 metres			1 July 2014
15	148.5-5 000 kHz [1]	Inductive devices	-15 dBµA/m at 10 metres in any bandwidth of 10 kHz. Furthermore the total field strength is -5 dBµA/m at 10 m for systems operating at bandwidths larger than 10 kHz			1 July 2014
17	400-600 kHz	Radio Frequency Identification (RFID) devices	-8 dBµA/m at 10 metres			1 July 2014
85	442.2-450.0 kHz	Non-specific short-range devices	7 dBµA/m at 10 m	Channel spacing ≥ 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 dBµA/m at 10 m		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 dBµA/m at 10 m	Duty cycle limit: 1 %	This set of usage conditions is only available for Eurobalise transmissions in the presence of trains and using the 27 MHz band for telepowering.	1 July 2014
20	3 155-3 400 kHz	Inductive devices	13.5 dBµA/m at 10 metres			1 July 2014
21	5 000-30 000 kHz [2]	Inductive devices	-20 dBµA/m at 10 metres in any bandwidth of 10 kHz. Furthermore the total field strength is -5 dBµA/m at 10 m for systems operating at bandwidths larger than 10 kHz			1 July 2014
22	6 765-6 795 kHz	Inductive devices	42 dBµA/m at 10 metres			1 July 2014
23	7 300-23 000 kHz	Transport and Traffic Telematics devices	-7 dBµA/m at 10 m	Antenna restrictions that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU apply. If relevant restrictions are	This set of usage conditions is only available for Euroloop transmissions in the presence of trains and using the 27 MHz band	1 July 2014

				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.	for telepowering.	
24	7 400-8 800 kHz	Inductive devices	9 dBµA/m at 10 metres			1 July 2014
25	10 200-11 000 kHz	Inductive devices	9 dBµA/m at 10 metres			1 July 2014
27a	13 553-13 567 kHz	Inductive devices	42 dBµA/m at 10 metres	Transmission mask and antenna requirements for all combined frequency segments 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		1 January 2020

				European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.		
27b	13 553-13 567 kHz	Radio Frequency Identification (RFID) devices	60 dBµA/m at 10 metres	Transmission mask and antenna requirements for all combined frequency segments 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.		1 July 2014
27c	13 553-13 567 kHz	Non-specific short-range	10 mW e.r.p.			1 July 2014

		devices				
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		1 July 2014

				cycle restrictions.		
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
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],		1 July 2014

				the duty cycle limit is 10.0%		
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 Janaury 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 dBµV/m is required to ensure the protection of a DAB receiver located at 1.5m from the ALD device, subject to DAB signal strength measurements taken around the ALD operating site.The ALD device should operate under all		1 January 2018

				circumstances at least 300 kHz away from the channel edge of an occupied DAB channel. 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.		
41	401-402 MHz	Active medical implant devices	25 µW e.r.p.	Channel spacing: 25 kHz. Individual transmitters may combine adjacent channels for increased	This set of usage conditions is only available for systems specifically designed for the purpose of providing	1 July 2014

				bandwidth up to 100 kHz. 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. Alternatively a duty cycle limit of 0.1 % may also be used.	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.	
42	402-405 MHz	Active medical implant devices	25 µW e.r.p.	Channel spacing: 25 kHz. Individual transmitters may combine adjacent channels for increased	This set of usage conditions is only available to active implantable medical	1 July 2014

				bandwidth up to 300 kHz. 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. They shall provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU. 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.	devices.	

43	405-406 MHz	Active medical implant devices	25 µW e.r.p.	Channel spacing: 25 kHz Individual transmitters may combine adjacent channels for increased bandwidth up to 100 kHz. 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. Alternatively a duty cycle limit of 0,1 % may also be used.	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.	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)		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. and -13 dBm/10 kHz power density for bandwidth modulation larger than 250 kHz		Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.	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.	Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.	1 July 20141 June 2019
83	446.0-446.2 MHz	PMR446	500 mW e.r.p.	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive		1 January 2018

				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.		
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.	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		1 January 2018

				the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured. Alternatively a duty cycle limit of 0.1% may also be used.		
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.	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	This set of usage conditions is only available for wideband SRDs in data networks. [g]	1 January 2018

				the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured. Bandwidth: > 600 kHz and ≤ 1 MHz. Duty cycle: ≤ 10% for network access points [g] Duty cycle: ≤ 2.8% otherwise		
47	865-868 MHz	Non-specific short-range devices	25 mW e.r.p.	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		1 January 2020

				Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured. Alternatively a duty cycle limit of 1 % may also be used.		
47a	865-868 MHz [6]	Radio Frequency Identification (RFID) devices	2 W e.r.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 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.	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.		1 January 2018

				Bandwidth ≤ 200 kHz		
47b	865-868 MHz	Non-specific short-range devices	500 mW e.r.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. Adaptive Power Control (APC) required. Alternatively other mitigation technique with at least an equivalent level of spectrum compatibility.	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. Bandwidth: ≤ 200 kHz Duty cycle: ≤ 10% for network access points [g] Duty cycle: ≤ 2.5%	This set of usage conditions is only available for data networks. [g]	1 January 2018

				otherwise		
48	868-868.6 MHz	Non-specific short-range devices	25 mW e.r.p.	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. Alternatively a duty cycle limit of 1 % may also be used.		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-	This set of usage conditions is only available to alarm systems. [e]	1 July 2014

				speed data transmission. Duty cycle limit: 1.0%		
50	868.7-869.2 MHz	Non-specific short-range devices	25 mW e.r.p.	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. 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	1 July 2014

					devices [b].	
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.	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		1 January 2020

				ensured. Alternatively a Duty cycle limit of 10% may also be used.		
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.r.p.	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		1 January 2020

				European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured. Alternatively a duty cycle limit of 1 % may also be used.		
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	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		1 July 2014

				Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.		
58	2 446-2 454 MHz	Radio Frequency Identification (RFID) devices	500 mW e.i.r.p.	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.		1 July 2014
59	2 483.5-2 500 MHz	Active medical implant devices	10 mW e.i.r.p.	Techniques to access spectrum and mitigate interference that provide an appropriate level of	This set of usage conditions is only available to active implantable medical	1 July 2014

				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. 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.	devices. Peripheral master units are for indoor use only.	
59a	2 483.5-2 500 MHz	Medical data acquisition devices	1 mW e.i.r.p.	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential	The set of usage conditions is only available for medical body area network system (MBANS) [f] for indoor use within	1 January 2018

				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. Modulation Bandwidth: ≤ 3 MHz. In addition, a duty cycle: ≤ 10% applies.	healthcare facilities	
59b	2 483.5-2 500 MHz	Medical data acquisition devices	10 mW e.i.r.p.	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 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

				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. Modulation Bandwidth: ≤ 3 MHz. In addition, a duty cycle: ≤ 2% applies		
60	4500-7000 MHz	Radio determination devices	24 dBm e.i.r.p. [3]	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,	This set of usage conditions is only available to Tank Level Probing Radar [c].	1 July 2014

				performance at least equivalent to these techniques shall be ensured.		
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.	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.	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	Techniques to access spectrum and mitigate	This set of usage conditions is only	1 January 2020

			and a Transmit Power Control (TPC) range of 30 dB	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.	available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-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) range of 30 dB	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	This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.	1 January 2020

				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.		
63	6000-8500 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 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	This set of usage conditions is only available to Level Probing Radar. Established exclusion zones around radio astronomy sites must be obeyed.	1 July 2014

				ensured.		
64	8 500-10 600 MHz	Radio determination devices	30 dBm e.i.r.p. [3]	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.	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.	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.	This set of usage conditions is only available to ground-based systems.	1 July 2014

				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.		
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 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	This set of usage conditions is only available to Level Probing Radar. Established exclusion zones around radio astronomy sites must be obeyed.	1 July 2014

				the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.		
68	24.05-27 GHz	Radio determination devices	43 dBm e.i.r.p. [3]	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.	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	100 mW e.i.r.p.	Techniques to access spectrum and mitigate	This set of usage conditions is only	1 July 2014

		Telematics devices		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.	available to ground-based vehicle radars.	
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 10dBm			1 January 2020

74b	57-64 GHz	Radio determination devices	43 dBm e.i.r.p. [3]	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.	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 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.	This set of usage conditions is only available to Level Probing Radar.	1 July 2014

				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.		
75	57-71 GHz	Wideband data transmission devices	40 dBm e.i.r.p. and 23 dBm/MHz e.i.r.p. density	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	Fixed outdoor installations are excluded.	1 January 2020

				techniques shall be ensured.		
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	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.		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 ≥ 30 dBi	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive	This set of usage conditions is only available to fixed outdoor installations.	1 January 2020

				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.		
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 techniques to access spectrum and	This set of usage conditions is only available to Level Probing Radar.	1 July 2014

				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.	Established exclusion zones around radio astronomy sites must be obeyed.	
78b	75-85 GHz	Radio determination devices	43 dBm e.i.r.p. [3]	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	This set of usage conditions is only available to Tank Level Probing Radar [c].	1 July 2014

				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.		
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	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. Fixed transportation	This set of usage conditions is only available to ground-based vehicle and infrastructure systems.	1 June 2020

				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.		
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: ≤ 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 e.i.r.p/ 250 MHz 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 functionnality, 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[2] and for the weights and dimensions enforcement in Article 10d of Directive 2015/719[3].

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 must comply with the essential requirements of Directive 2014/53/EU.

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[2] 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).

[3] 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)."