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Permitted Short Range Devices in Ireland

Document 02/71 R17

General

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Additional Information

Document Version	Date	Nature of Update
02/71R17	28 November 2024	Implementation of Decision (EU) 2020/1426 - harmonised use of radio spectrum in the 5875-5935 MHz frequency band for safety-related applications; and Implementation of Decision (EU) 2024/1467 - harmonisation of radio spectrum for equipment using ultra-wideband technology in the Union
02/71R16	20 May 2024	Update of requirements for SRDs in Ireland
02/71R15	30 January 2024	Update of requirements for SRDs in Ireland Implementation of Decision (EU) 2022/2307
02/71R14	22 August 2022	Update of requirements for SRDs in Ireland Implementation of Decisions (EU)2022/180, (EU)2022/179, Decision (EU)2022/172, and (EU)2021/1067
02/71R13	07 July 2021	Update of requirements for SRDs in Ireland Implementation of ECC/DEC (20)01
02/71R12	08 April 2020	Update of requirements for SRDs in Ireland Implementation of Decision (EU) 2019/1345 Implementation of Decision (EU) 2019/785
02/71R11	31 January 2018	Update of requirements for SRDs in Ireland

02/71R10	09 May 2016	Update of requirements for SRDs in Ireland
02/71R9	07 March 2014	Implementation of Commission Decision 2013/752/EU
02/71R8	10 October 2013	Reinstated 17.1 - 17.3 GHz under Table 3: Wideband Data Transmission Systems (including WAS/RLANs)
02/71R7	03 September 2013	Update of requirements for SRDs in Ireland
02/71R6	19 December 2011	Update of requirements for SRDs in Ireland
02/71R5	23 December 2010	Update of requirements for SRDs in Ireland
02/71R4	22 December 2009	Update of requirements for SRDs in Ireland
02/71R3	21 July 2009	Update of requirements for SRDs in Ireland
02/71R2	21 January 2009	Update of requirements for SRDs in Ireland
02/71R1	23 November 2007	Inclusion of equipment for movement detection and alert in 10.4 - 10.42 GHz band and General Information section
02/71R	22 December 2006	Update of requirements for SRDs in Ireland
02/71	30 July 2002	Original Document

Content

Section Page

1 Introduction and Background

1. The term Short Range Device ("SRD") describes radio transmitters which provide uni-directional or bi-directional communication and which have low capability of causing interference to other radio equipment. SRDs include devices such as inductive applications, model control, Road Transport and Traffic Telematics systems, cordless telephones, alarms, field disturbance and doppler apparatus systems, wireless microphones, wireless audio systems and wideband data transmission systems.

2. Under the Wireless Telegraphy Act 1926[1], as amended, all apparatus for Wireless Telegraphy[2] require a licence unless that apparatus has been specifically exempted from licensing under Irish legislation by means of an exemption order. SRDs operate on a non-interference and non-protected basis in accordance with the requirements laid down in this document (and any revisions thereof) are exempt from licensing by exemption orders S.I. 160 of 2006[3] and S.I. 405 of 2002[4]. The legislation and documentation relevant to SRDs are listed in Section 3 of this document.

3. This document contains interface requirements for the operation of SRDs in Ireland for the purpose of the efficient and effective use of the radio spectrum. All radio equipment should operate so as to optimise the effective and appropriate use of the radio spectrum and so that it does not cause harmful interference to other authorised radio services. The use of SRDs does not absolve an operator from any requirement in law to obtain additional consents, permissions, authorisations or licences as may be necessary (e.g. for the provision of services to the public).

4. The Commission for Communications Regulation ("ComReg") may, from time to time, introduce additional interface requirements where necessary for the purposes of ensuring the effective and efficient use of the radio spectrum. Such additional requirements may be necessitated by, inter alia, changes to spectrum allocations and/or technological developments. ComReg reserves the right to amend interface requirements where necessary and this document is therefore subject to future revision.

[1] http://www.irishstatutebook.ie/eli/1926/act/45/enacted/en/html
[2] "Wireless Telegraphy" means and includes any system of communicating messages, spoken words, music, images, pictures, prints, or other communications, sounds, signs, or signals by means of radiated electro-magnetic waves originating in an apparatus or device constructed for the purpose of originating such communications, sounds, signs, or signals.
[3] http://www.irishstatutebook.ie/eli/2006/si/160/made/en/print
[4] http://www.irishstatutebook.ie/eli/2002/si/405/made/en/print

1.1 Radio Equipment Directive

5. The Radio Equipment Directive[5] ("RED") ensures a Single Market for radio equipment by setting essential requirements for safety and health, electromagnetic compatibility, and the efficient use of the radio spectrum. It applies to all products using the radio frequency spectrum. The RED supersedes the Radio and Telecommunication Terminal Equipment Directive.

6. All radio and telecommunications terminal equipment must comply with the essential requirements and other relevant provisions of the RED before being placed on the market or put into service in Ireland. In terms of the usage of SRDs in Ireland, such radio equipment must operate in accordance with the relevant interface requirements laid down in these documents.

1.2 Harmonised standards

7. Harmonised standards, although not compulsory, give a presumption of conformity to the relevant essential requirements of the RED under the scope of that standard. A list of harmonised standards under the RED is published in the Official Journal of the European Union ("OJEU") and is available electronically on the European Commission's website.[6] The OJEU maintains the list of harmonised standards and defines which parts and which versions are in force. Conformity to the harmonised standards which are in force at the time of putting into service is recommended. Users are advised to refer to the latest publication of the OJEU for information on current harmonised standards.

8. Where standards are contained in Irish Regulations, these refer to the standards in force at the time of writing of those Regulations. If a standard is superseded this should be read as referring to the relevant successor or most up-to-date revision of that standard.

1.3 Classifications for radio and telecommunications terminal equipment

9. Commission Decision 2000/299/EC[7] established classifications for radio and telecommunications terminal equipment. Radio and telecommunications terminal equipment which can be placed on the market and put into service without

[5] http://ec.europa.eu/growth/sectors/electrical-engineering/red-directive_en
[6] http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/red_en
[7] https://docdb.cept.org/download/180

restrictions has been designated as Class 1. A list of Class 1 radio and telecommunications terminal equipment is maintained on the CEPT website.[8] Radio equipment which has restrictions placed on it in terms of either placing on the market or putting into service is designated as Class 2 equipment and should accordingly be marked with the alert symbol.

1.4 Important Note

10. When selecting parameters for new SRDs which may have inherent safety of human life implications, manufacturers and users should pay particular attention to the potential for interference from other systems operating in the same or adjacent bands. Manufacturers should advise users on the risks of potential interference and its consequences.

11. The information in this document is made available by the ComReg on the understanding that it is for information purposes only. It is not intended to form the basis of any investment decision and should not be considered as a recommendation by ComReg or their advisors to participate in any tender for the allocation of radio spectrum.

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13. Recipients of this document in any format should take their own professional financial, legal or other advice in order to make an independent assessment of the potential value of any allocation of radio spectrum by whatever means applicable.

14. Web addresses referenced throughout this document are for information purposes and ComReg is not responsible for the content of external websites.

1.5 Summary of Changes

15. This version implements Commission implementing Decisions:

[8] http://www.cept.org/ecc/topics/short-range-device-regulations-and-indicative-list-of-equipment-sub-classes-in-accordance-with-the-rtte-directive-(19995ec)

a. (EU) 2020/1426 of 7 October 2020 on the harmonised use of radio spectrum in the 5875-5935 MHz frequency band for safety-related applications of intelligent transport systems (ITS)[9] ; and

b. (EU) 2024/1467 on harmonisation of radio spectrum for equipment using ultra-wideband technology in the Union.

16. Table 5 (Regulatory parameters for Road Transport and Traffic Telematics (RTTT)) has been amended with a new entry(ies), and Chapter 2.15 on the use of Ultra-Wideband Devices has been amended.

[9] https://docdb.cept.org/download/166

2 Interface Requirements for Short Range Devices

2.1 Non-Specific Short Range Devices

This section covers frequency bands and regulatory as well as informative parameters recommended primarily for Telemetry, Telecommand, Alarms and Data in general and other similar applications. Video applications should be preferably used above 2.4 GHz. This section also includes references to the generic UWB regulation which was primarily developed to allow communication applications using UWB technology in bands below 10.6 GHz; but enables also other types of radio applications.

Table 1: Regulatory Parameters for non-specific SRDs

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	442.2 – 450.0 kHz	7 dBµA/m at 10 m	Channel spacing ≥ 150 Hz	-	(EU) 2019/1345	This set of usage conditions is only available for person detection and collision avoidance devices. Frequency band also identified in Table 2.
2	456.9 – 457.1 kHz	7 dBµA/m at 10 m	-	-	(EU) 2019/1345	This set of usage conditions is only available for emergency detections of buried victims and valuable items devices. Frequency band also identified in Table 2.
3	13553-13567 kHz	10 mW e.r.p.	-	-	(EU) 2019/1345 ERC Rec 70-03	This frequency band is also identified in Table 9.
4	26957-27283 kHz	10 mW e.r.p.	-	-	(EU) 2019/1345 ERC Rec 70-03	This frequency band is also identified in Table 9.
5a	26990-27000 kHz	100 mW e.r.p.	≤ 0.1 % duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	Model control devices[10] may operate without duty cycle restrictions.

[10] "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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
5b	27040-27050 kHz	100 mW e.r.p.	≤ 0.1 % duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	Model control devices[10] may operate without duty cycle restrictions.
5c	27090-27100 kHz	100 mW e.r.p.	≤ 0.1 % duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	Model control devices[10] may operate without duty cycle restrictions. Frequency band also identified in Table 4
5d	27140-27150 kHz	100 mW e.r.p.	≤ 0.1 % duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	Model control devices[10] may operate without duty cycle restrictions.
5e	27190-27200 kHz	100 mW e.r.p.	≤ 0.1 % duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	Model control devices[10] may operate without duty cycle restrictions.
6	40.66-40.7 MHz	10 mW e.r.p.	-	-	(EU) 2019/1345 ERC Rec 70-03	This frequency band is also identified in Table 8
7	49.82-49.98 MHz	10 mW e.r.p.	-	-	-	National SRD solution only. This frequency band is also identified in Table 13
8	138.2-138.45 MHz	10 mW e.r.p.	≤ 1% duty cycle	-	ERC/REC 70-03	
9a	169.4-169.475 MHz	500 mW e.r.p.	≤ 1% duty cycle	≤ 50 kHz	ECC/DEC/(05)02 (EU) 2019/1345 ERC Rec 70-03	For metering devices[11], the duty cycle limit is 10,0% This frequency band is also identified in Table 2 and 10.
9b	169.4-169.4875 MHz	10 mW e.r.p.	≤ 0.1% duty cycle	-	ECC/DEC/(05)02 (EU) 2019/1345 ERC Rec 70-03	This frequency band is also identified in Table 2 and 10.

[11] "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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
9c	169.4875-169.5875 MHz	10 mW e.r.p.	≤ 0.001% duty cycle except for 00:00 h to 06:00 h local time where the duty cycle limit is ≤ 0.1%	-	ECC/DEC/(05)02 (EU) 2019/1345 ERC Rec 70-03	This frequency band is also identified in Table 2 and 10.
9d	169.5875-169.8125 MHz	10 mW e.r.p.	≤ 0.1% duty cycle	-	ECC/DEC/(05)02 (EU) 2019/1345 ERC Rec 70-03	This frequency band is also identified in Table 2 and 10.
10	173.2125 – 173.2375 MHz	10 mW e.r.p.	-	Maximum occupied bandwidth: 25 kHz	-	National SRD solution only for Telecommand.
11	173.2375 – 173.275 MHz	100 mW e.r.p.	-	Maximum occupied bandwidth: 25 kHz	-	National SRD solution only.
12a	433.05-434.79 MHz	10 mW e.r.p.	≤ 10% duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	
12b	433.05-434.79 MHz	1 mW e.r.p.		Not specified	(EU) 2019/1345 ERC Rec 70-03	
12c	434.04 – 434.79 MHz	10 mW e.r.p.	Duty Cycle: 100%	≤ 25 kHz[12]	2019/1345/EC ERC/REC 70-03	Voice applications are allowed with a maximum bandwidth of 25 kHz, with a spectrum access technique such as LBT or equivalent and a maximum transmit period of 1 minute for each transmission. Other audio/video applications are excluded.
13	458.4875 – 458.6375 MHz	500 mW e.r.p.	-	≤ 25 kHz	-	National SRD solution only.

[12] Audio and video applications are excluded. Voice applications (analogue or digital) are allowed with a maximum bandwidth of 25 kHz, and with spectrum access techniques such as LBT or equivalent and shall include a power output sensor controlling the transmitter period of 1 minute for each transmission.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						On-site[13] telemetry / telecommand only. Please note adjacent band use for ECG monitoring in hospitals (see Table 12)
14	458.8375 – 458.9875 MHz	500 mW e.r.p.	-	≤ 25 kHz	-	National SRD solution only. On-site telemetry / telecommand only. Please Note adjacent band use for ECG monitoring in hospitals (see Table 12)
15a	862 – 863 MHz[14]	25 mW e.r.p.	Duty Cycle: ≤ 0.1%	≤ 350 kHz	ERC/REC 70-03	-
15b	863 – 865 MHz	25 mW e.r.p.	Duty Cycle: ≤0.1% or LBT+AFA	-	2019/1345/EC	Requirements on techniques to access spectrum and mitigate interference apply.[15] This frequency band is also identified in Table 3, 10 and 13
15c	863 - 870 MHz	25 mW e.r.p.	Duty cycle: ≤ 0.1 %.[16] The duty cycle applies to the entire transmission (not to each hop channel).	≤ 100 kHz for 47 or more channels	ERC/REC 70-03	Frequency bands for alarms are excluded
15d	863 - 870 MHz	25 mW e.r.p. Power density:	Duty cycle: ≤ 0.1 % , or LBT + AFA	-	2013/752/EU ERC/REC 70-03	Frequency bands for alarms are excluded.

[13] Only systems for which both the transmitter and receiver are on the same site (e.g., a company premises, compound, complex, etc.) are considered to be on-site systems

[14] SRD vendors wishing to use the band 862-863 MHz should weigh the risks and accept responsibility for deciding themselves whether their specific applications shall be capable of operating in the presence of comparatively high ambient noise levels from LTE UEs' out-of-band emissions and design their products accordingly

[15] 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.

[16] Duty cycle may be increased to 1% if the band is limited to 865 - 868 MHz.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
		-4.5 dBm/100 kHz e.r.p.[17]				
15e	865 – 868 MHz	25 mW e.r.p	Duty Cycle: ≤ 1% or LBT + AFA	-	2019/1345/EC ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply.[15] This frequency band is also identified in Table 2 and 11.
15f	865 – 868 MHz	500 mW	Duty Cycle: ≤ 10% for Network Access Points; ≤ 2.5% otherwise. Transmissions only permitted within the bands 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.	≤ 200 kHz	2019/1345/EC	This set of usage conditions is only available for data networks[18] Requirements on techniques to access spectrum and mitigate interference apply.[15] This frequency band is also identified in Table 2 and 11.
15g	868.0 – 868.6 MHz	25 mW	Duty Cycle: ≤ 1%, or LBT + AFA	-	2019/1345/EC ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply.[15]
15h	868.7 – 869.2 MHz	25 mW e.r.p.	Duty cycle: ≤ 0.1 %, or LBT + AFA	-	2019/1345/EC ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply.[15]
15i	869.4 – 869.65 MHz	500 mW e.r.p.	Duty cycle: ≤ 10 %, or LBT + AFA	-	2019/1345/EC ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply.[15]
15j	869.7 – 870 MHz	5 mW e.r.p.	-	-	2019/1345/EC ERC/REC 70-03	Voice applications are allowed with a maximum bandwidth f 25 kHz, with a spectrum

[17] The power density can be increased to +6.2 dBm/100 kHz and -0.8 dBm/100 kHz if the band of operation is limited to 865 - 868 MHz and 865 - 870 MHz Respectively.

[18] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						access technique such as LBT or equivalent and a maximum transmit period of 1 minute for each transmission. Other audio/voice applications are excluded.
15k	869.7 – 870 MHz	25 mW e.r.p.	≤ 1% duty cycle or LBT +AFA	-	2019/1345/EC ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply.[15]
16	870 – 874.4 MHz	25 mW e.r.p.	Duty cycle: ≤ 1% For ER-GSM protection (873-876 MHz, where applicable), the duty cycle is limited to ≤ 0.01% and limited to a maximum transmit on-time of 5ms/1s	≤ 600 kHz	ERC/REC 70-03	This frequency band is also identified in Table 2.
17	874 – 874.4 MHz	500 mW e.r.p.	Duty Cycle: ≤10% for network access points, 2.5% otherwise Adaptive Power Control (APC) required, alternatively other mitigation techniques which achieve at least an equivalent level of spectrum compatibility	≤ 200 kHz	2022/172(EU)	This set of usage conditions is only available for data networks. All nomadic and mobile devices within the data network shall be controlled by a master network access point.[19] [15]
18	915 – 919.4 MHz	25 mW e.r.p. except within the RFID channels identified in note 5 where 100 mW e.r.p. applies	Duty Cycle: ≤ 1%. For ER-GSM protection (918 - 921 MHz, where applicable): the duty cycle is limited to ≤ 0.01% and to a maximum transmit on time of 5ms/1s.	≤ 600 kHz except within the RFID channels 916.3 MHz, 917.5 MHz, and 918.7 MHz, where ≤ 400 kHz applies	ERC/REC 70-03	This frequency band is also identified in Table 2 and 3.

[19] 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.'

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
19	917.3 – 918.9 MHz	500 mW e.r.p.	Duty Cycle: ≤10% for network access points, 2.5% otherwise. Transmissions only permitted within the frequency ranges 917.3 – 917.7 MHz, 918.5 – 918.9 MHz Adaptive Power Control (APC) required, alternatively other mitigation techniques which achieve at least an equivalent level of spectrum compatibility.	≤ 200kHz	2022/172/EU	This set of usage conditions is only available for data networks All nomadic and mobile devices within the data network shall be controlled by a master network access point.[19] [15] This frequency band is also identified in Table 2
20	917.4 – 919.4 MHz	25 mW e.r.p.	Duty Cycle: ≤1%	≤ 600 kHz	2022/172/EU	This set of usage conditions is only available for short-range device in data networks All nomadic and mobile devices within the data network shall be controlled by a master network access point.[19] [15] This frequency band is also identified in Table 2 and 3
21	1 349 MHz	500 mW	-	-		National SRD Solution only. Video Senders Only
22a	2 400 – 2 483.5 MHz	10 mW e.i.r.p.	-	-	2019/1345/EC ERC/REC 70-03	This frequency band is also identified in Table 3 and 6.
22b	2 400 – 2 483.5 MHz	25 mW e.i.r.p.	-	-	-	National SRD solution only. Video surveillance only. This frequency band is also identified in Table 3
23	5 725 – 5 875 MHz	25 mW e.i.r.p.	-	-	2019/1345/EC ERC/REC 70-03	This frequency band is also identified in Table 2.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
24a	24.00 – 24.25 GHz	100 mW e.i.r.p.	-		ERC/REC 70-03	Frequency bands are also identified in Table 5.
24b	24.15 – 24.25 GHz	100 mW e.i.r.p.	-	-	2019/1345/EC	This frequency band is also identified in Table 5
25	57 – 64 GHz	100 mW e.i.r.p., a maximum transmit power of 10 dBm.	-	-	2019/1345/EC ERC/REC 70-03	This frequency band is also identified in Table 3
26	61.0 – 61.5 GHz	100 mW e.i.r.p.	-	-	(EU)2019/1345 ERC/REC 70-03	-
27a	122.00 – 122.25 GHz	10 dBm e.i.r.p./250 MHz and -48 dBm/MHz at 30° elevation.[20]		-	(EU)2019/1345 ERC/REC 70-03	-
27b	122.25 – 123.00 GHz	100 mW e.i.r.p.	-	-	(EU)2019/1345 ERC/REC 70-03	-
28	244 – 246 GHz	100 mW e.i.r.p.	-	-	(EU)2019/1345 ERC/REC 70-03	-

Additional Information

Listen before talk (LBT) with Adaptive Frequency Agility (AFA) technique feature may be used instead of duty cycle. LBT is defined in EN 300 220.

Harmonised Standards

EN 300 220 - sub-bands 4, 5a – 5e, 6, 8, 9a - 9d, 12a – 12c, 15a – 18
EN 300 330 - sub-bands 3 & 4
EN 300 440 - sub-bands 22a – 24b
EN 305 550 - sub-bands 25 - 28

[20] These limits should be measured with an rms detector and an averaging time of 1 ms or less.

2.2 Tracking, Tracing and Data Acquisition Devices

This section covers frequency bands and regulatory as well as informative parameters recommended primarily for:

- Emergency detection of buried victims and valuable items, for example, avalanche search and rescue operations;
- Person detection and collision avoidance;
- Meter Reading;
- Sensors (water, gas and electricity; meteorological instruments; pollution measurement; environmental data, such as levels of allergens (pollen, dust); electromagnetic pollution (solar activity, noise) and actuators (controlling devices such as street or traffic lights);
- Data acquisition; and
- Wireless Industrial Applications (WIA) to be used for wireless links in industrial environments including monitoring and worker communications, wireless sensors and actuators.

Table 2: Regulatory parameters for Tracking, Tracing and Data Acquisition Devices

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	442.2 – 450.0 kHz	7 dBµA/m @ 10m		Continuous Wave (CW) – no modulation. Channel spacing ≥150 kHz	ERC/REC 70-03	Person detection and collision avoidance. This frequency band is also identified in Table 1.
2	456.9 – 457.1 kHz	7 dBµA/m @ 10m		Continuous Wave (CW) at 457 kHz – no modulation.	ERC/REC 70-03	Emergency Detection of buried victims and valuable items. This frequency band is also identified in Table 1.
3	169.4 – 169.475 MHz	500 mW e.r.p.	Duty Cycle: ≤10%	≤ 50 kHz	ECC/DEC(05)02 ERC/REC 70-03	This frequency band is also identified in Table 1 and 10.
4	865 – 868 MHz	500 mW e.r.p.	≤ 10% duty cycle for network access points; ≤ 2.5% duty cycle otherwise.	≤ 200 kHz	ERC/REC 70-03	Data Networks.[22] The APC is able to reduce a link's transmit power from its maximum to ≤ 5 mW. This frequency band is also identified in Table 1 and 11.

[22] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			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 for spectrum sharing.[21]			
5	870 – 874.4MHz	500 mW e.r.p.	≤ 10% duty cycle for network access points; ≤ 2.5% duty cycle otherwise. Adaptive Power Control (APC) required for spectrum sharing.[21]	≤ 200 kHz	ERC/REC 70-03	Data networks [22]. All nomadic and mobile devices within the data network shall be controlled by a master network access point (NAP).The APC control is able to reduce a link's transmit power from its maximum to ≤5mW. This frequency band is also identified in Table 1
6	917.3 – 918.8 MHz	500 mW e.r.p.	Transmissions only permitted within the frequency ranges 917.3-917.7 MHz and 918.5-918.9 MHz. ≤ 10% duty cycle for network access points; ≤ 2.5% duty cycle otherwise. Adaptive Power Control (APC) required for spectrum sharing.[21]	≤ 200 kHz	ERC/REC 70-03	Data networks [22]. All nomadic and mobile devices within the data network shall be controlled by a master network access point (NAP). APC is able to reduce the equipment's ERP from its maximum to ≤ 5 mW. This frequency band is also identified in Table 1 and 3
7	915 – 919.4 MHz	25 mW e.r.p.	≤ 1% Duty Cycle	≤ 600 kHz	ERC/REC 70-03	Data networks[22]. All nomadic and mobile devices within the data network shall be controlled by a master network access point (NAP).This frequency band is also identified in Table 1 and 3.

[21] Alternatively other mitigation techniques which achieve at least an equivalent level of spectrum compatibility.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
8	5 725 – 5 875 MHz	400 mW e.i.r.p.	APC required. Adequate spectrum sharing mechanisms (e.g. DFS and DAA) shall be implemented.	≥1 MHz and ≤20 MHz	ERC/REC 70-03	[23] Wireless Industrial Applications (WIA) This frequency band is also identified in Table 1. RLAN frequency range. Registration required https://www.comreg.ie/industry/licensing/5-8-ghz-registration/

Harmonised Standards

EN 300 718 – Sub-band 2
EN 300 220 - sub-band 3
EN 303 659 – sub-bands 4, 6 & 7
EN 303 204 – sub-band 5
EN 303 258 – sub-band 8
To be defined for sub-bands 1

[23] DFS is required in the frequency range 5725-5850 MHz to ensure an appropriate protection to the radiolocation service (including frequency hopping radars), DAA is required in the frequency range 5855-5875 MHz for the protection of ITS, in the frequency range 5725-5875 MHz for the protection of BFWA, and in the frequency range 5795-5815 MHz for the protection of TTT applications.

2.3 Wideband Data Transmission Systems (including WAS/RLANs)

This section covers wideband data transmission systems and Wireless Access Systems including Radio Local Area Networks (WAS/RLANs).

Table 3: Regulatory parameters for Wideband Data Transmission Systems (including WAS/RLANs)

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	863 – 868 MHz	25 mW e.r.p.	≤10% duty cycle for network access points, ≤2.8% otherwise	>600 kHz ≤1 MHz	(EU)2019/1345 ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply.[15] This frequency band is also identified in Table 1, 10 and 13.
2a	915.8 – 919.4 MHz	25 mW e.r.p.	≤10% duty cycle for network access points, ≤2.8% otherwise	>600 kHz ≤1 MHz	ERC/REC 70-03	Data Networks Only. This frequency band is also identified in Table 1 and 2.
2b	917.4 – 919.4 MHz	25 mW e.r.p.	≤10% duty cycle for network access points, ≤2.8% otherwise	> 600 kHz and ≤ 1 MHz	2022/172/EU	This set of usage conditions is only available for wideband short-range devices in data networks. All nomadic and mobile devices within the data network shall be controlled by a master network access point.[19] [24] This frequency band is also identified in Table 1 and 2
3	2 400 – 2483.5 MHz	100 mW e.i.r.p.			(EU)2019/1345	[24]

[24] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
		100 mW/100 kHz e.i.r.p. density applies when frequency hopping modulation is used. For wide band modulations other than FHSS, the maximum e.i.r.p. density is limited to 10 mW/MHz			ERC/REC 70-03	This frequency band is also identified in Table 1.
4a	5.15 – 5.25 GHz	Maximum mean equivalent isotropically radiated power (e.i.r.p.) for in-band emissions: 200 mW mean e.i.r.p. Exceptions: — 40 mW maximum mean e.i.r.p. applies for installations inside train carriages with an attenuation loss on average of less than 12 dB; — 40 mW maximum mean e.i.r.p. applies for installations inside road vehicles. Maximum mean e.i.r.p. density for in-band	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 of the European Parliament and of the Council shall be used. Where 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 in accordance with Directive 2014/53/EU, performance at least equivalent to the performance level associated with those techniques shall be ensured.		EU) 2022/2307 ECC/DEC/(04)08	Indoor use, including installations inside road vehicles, trains and aircraft, and limited outdoor use[25]. Use by unmanned aircraft systems (UAS) is limited to within the 5 170-5 250 MHz band.

[25] If used outdoors, equipment shall not be attached to a fixed installation or to the external body of road vehicles, a fixed infrastructure or a fixed outdoor antenna.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
		Emissions: 10 mW/MHz in any 1 MHz band				
4b	5.25 – 5.35 GHz	Maximum mean e.i.r.p. for in-band emissions: 200 mW Maximum mean e.i.r.p. density for in-band Emissions: 10 mW/MHz in any 1 MHz band	Transmitter power control (TPC) and dynamic frequency selection (DFS). Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU. TPC shall provide, on average, a mitigation factor of at least 3 dB on the maximum permitted output power of the systems; or, if transmitter power control is not in use, the maximum permitted mean e.i.r.p. and corresponding mean e.i.r.p. density limit shall be reduced by 3 dB. DFS is described in Recommendation ITU-R M. 1652-1 to ensure compatible operation with radiodetermination systems. The DFS mechanism shall ensure that the probability of selecting a given channel is the same for all available channels within the 5 250-5 350 MHz and 5 470-5 725 MHz bands. The DFS mechanism shall also ensure, on average, a near-uniform spread of the loading of the spectrum. WAS/RLAN shall implement a dynamic frequency selection		(EU) 2022/2307 ECC/DEC/(04)08	Indoor use: inside buildings only. Installations in road vehicles, trains and aircraft are not permitted[26] . Outdoor use is not permitted.

[26] Operation of WAS/RLAN installations in large aircraft (excluding multi-engined helicopters) is permitted until 31 December 2028 with a maximum mean e.i.r.p. for in-band emissions of 100 mW

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			providing a mitigation against interference to radar at least as efficient as DFS as described in ETSI Standard EN 301 893 V2.1.1. Settings (hardware and/or software) of WAS/RLAN related to DFS shall not be accessible to the user if changing those settings results in the WAS/RLAN no longer being compliant with the DFS requirements. This includes (a) not allowing the user to change the country of operation and/or the operating frequency band if that results in the equipment no longer being compliant with the DFS requirements and (b) not accepting software and/or firmware which results in the equipment no longer being compliant with the DFS requirements. 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. Where 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 in accordance with Directive 2014/53/EU, performance at least equivalent to the performance level associated with those techniques shall be ensured.			

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
5	5.470 – 5.725 GHz	Maximum mean e.i.r.p. for in-band emissions: 1 W Exceptions: — 200 mW maximum mean e.i.r.p. applies for installations in road vehicles. Maximum mean e.i.r.p. density for in-band Emissions: 50 mW/MHz in any 1 MHz band	Transmitter power control (TPC) and dynamic frequency selection (DFS). Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU. TPC shall provide, on average, a mitigation factor of at least 3 dB on the maximum permitted output power of the systems; or, if transmitter power control is not in use, the maximum permitted mean e.i.r.p. and the corresponding mean e.i.r.p. density limit shall be reduced by 3 dB. DFS is described in Recommendation ITU-R M. 1652-1 to ensure compatible operation with radiodetermination systems. The DFS mechanism shall ensure that the probability of selecting a given channel is the same for all available channels within the 5 250-5 350 MHz and 5 470-5 725 MHz bands. The DFS mechanism shall also ensure, on average, a near-uniform spread of the loading of the spectrum. WAS/RLAN shall implement a dynamic frequency selection		(EU) 2022/2307 ECC/DEC/(04)08	Indoor and outdoor use. Installations in road vehicles are permitted only for WAS/RLANs devices operating in slave[27] mode controlled by a fixed WAS/RLANs device with Dynamic Frequency Selection (DFS) functionality operating in master mode. Installations in trains and aircraft and use for UAS are not permitted. [28]

[27] Slave and master modes are defined in EN 301 893 V2.1.1.

[28] Operation of WAS/RLAN installations in large aircraft (excluding multi-engined helicopters), except in the frequency band 5 600 – 5 650 MHz, is permitted until 31 December 2028 with a maximum mean e.i.r.p. for in-band emissions of 100 mW.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			providing a mitigation against interference to radar at least as efficient as DFS as described in ETSI Standard EN 301 893 V2.1.1. Settings (hardware and/or software) of WAS/RLAN related to DFS shall not be accessible to the user if changing those settings results in the WAS/RLAN no longer being compliant with the DFS requirements. This includes (a) not allowing the user to change the country of operation and/or the operating frequency band if that results in the equipment no longer being compliant with the DFS requirements and (b) not accepting software and/or firmware which results in the equipment no longer being compliant with the DFS requirements. 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. Where 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 in accordance with Directive 2014/53/EU, performance at least equivalent to the performance level associated with those techniques shall be ensured.			

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
6	5.725 – 5.875 GHz	2 W e.i.r.p. (Max mean) Power Density (Max mean e.i.r.p.): 100mW/MHz	Equipment shall implement adequate spectrum sharing mechanisms (e.g. Listen-Before-Talk, Detect and Avoid) in order to facilitate sharing between the various technologies and applications.		ECC/REC (06)04	Registration Required [29] National SRD solution only.
7	5.945 – 6.425 GHz	23 dBm e.i.r.p and 10 dBm/MHz e.i.r.p density -for indoor use. -22 dBm/MHz maximum mean e.i.r.p. density for out-of-band emissions below 5 935 MHz	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 of the European Parliament and of the Council shall be used. Where 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 in accordance with Directive 2014/53/EU, performance at least equivalent to the performance level associated with those techniques shall be ensured.	*	ECC/DEC/(20)01 (EU)2021/1067	Low power indoor ('LPI') WAS/RLANs devices Restricted to indoor use, including in trains with metal-coated windows and aircraft. Outdoor use, including in road vehicles, is not permitted.
		14 dBm e.i.r.p and 1 dBm/MHz e.i.r.p density -for outdoor use Narrowband usage 10 dBm/MHz maximum				Very Low Power (VLP) WAS/RLAN devices. Indoor and outdoor portable use only. Use on Unmanned Aircraft Systems (UAS) is not permitted.

[29] See ComReg document 03/42 or http://www.comreg.ie/licensing_and_services/5_8_ghz_registration.683.ghzlic.html

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
		mean e.i.r.p. density for in-band emissions.[30] Maximum mean e.i.r.p. density for out-of-band emissions below 5 935 MHz – - 45 dBm/MHz until 31 December 2024				
8	17.1 – 17.3 GHz[31]	100 mW e.i.r.p.		-	-	Not included in ERC/REC 70-03 – National SRD solution only. This frequency band is also identified in Table 6
9a	57 – 71 GHz	40 dBm e.i.r.p. and 23 dBm/MHz e.i.r.p. density.	Adequate spectrum sharing mechanism shall be implemented.		(EC)2019/1345 ECC Report 288 ERC/REC 70-03	Fixed outdoor applications are excluded. [24] This frequency band is also identified in Table 1
9b	57 – 71 GHz	40 dBm e.i.r.p.,			(EC)2019/1345	[24]

[30] Narrowband (NB) devices are devices that operate in channel bandwidths below 20 MHz. NB devices also require a frequency hopping mechanism based on at least 15 hop channels to operate at a value of in-band power spectral density (PSD) above 1 dBm/MHz.
[31] 17.1 – 17.3 GHz has been removed from Annex 3 of ERC/REC/70-03, as such this frequency band may be subject to removal from future revisions of this document. Note that this frequency band is also identified in Table 6 – Radiodetermination Applications.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
		23 dBm/MHz e.i.r.p. density and maximum transmit power of 27 dBm at the antenna port or ports			ERC/REC 70-03	This frequency band is also identified in Table 1
9c	57 – 71 GHz	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and transmit antenna gain ≥ 30 dBi			(EC)2019/1345 ECC Report 288 ERC/REC 70-03	Applies only to fixed outdoor installations[24] This frequency band is also identified in Table 1

Harmonised Standards

EN 304 220 – Sub-bands 1, 2a & 2b
EN 300 328- sub-bands 3
EN 301 893- sub-bands 4 & 5
EN 301 489-4 - sub-bands 6
EN 301 489-17 - sub-bands 6
EN 302 326 - sub-bands 6
EN 302 502 - sub-bands 6
EN 303 687 – sub-band 7
EN 302 567 – sub-band 9a (9b & 9c to be defined)

2.4 Railway Applications

This section covers frequency bands and regulatory as well as informative parameters recommended primarily for applications specifically intended for use on railways.

Table 4: Regulatory parameters for Railway Applications

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	984 – 7484 kHz[32]	9 dBµA/m at 10m	Duty Cycle: ≤1% Centre frequency 4234 kHz		(EC)2019/1345 ERC/REC 70-03	Centre frequency is 4234 kHz [33] [34]
2	7.3 – 23 MHz[35]	-7 dBµA/m at 10m	Spread Spectrum Signal, Code Length: 472 Chips. Note: Centre frequency is 13.547 MHz		(EC)2019/1345 ERC/REC 70-03	Maximum field strength specified in a bandwidth of 10 kHz, spatially averaged over any 200m length of the loop. Transmitting only in presence of trains. [33] [36] Centre frequency is 13.547 MHz
3	27.09 – 27.10 MHz	42 dBµA/m at 10m	Centre Frequency 27.095 MHz		ERC/REC 70-03	Tele-powering and Down-link signal for Balise/ Eurobalise. May also be optionally used for the activation of the Loop/Euroloop.

[32] Balise up-link (ground to train) systems including Eurobalise
[33] This set of usage conditions is only available for Eurobalise transmissions in the presence of trains and using the 27 MHz band for telepowering
[34] Spectrum masks for Eurobalise and Euroloop are defined in ETSI standards EN 302 608 and EN 302 609, in accordance with the elements given in ECC Report 98.
[35] Loop up-link (ground to train) systems including Euroloop
[36] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						Centre frequency is 27.095 MHz Frequency band also identified in Table 1.
4	76-77 GHz[37]	55 dBm peak e.i.r.p., and 50 dBm mean e.i.r.p. or 23.5 dBm mean e.i.r.p. for pulse radar.			(EC)2019/1345 ERC/REC 70-03	Obstruction/Vehicle detection via radar Sensor at railway level crossings. Frequency band is also identified in Table 5

Harmonised Standards

EN 302 608 – sub-bands 1 & 3
EN 302 609 – sub-band 2
EN 301 091 – sub-band 4

[37] This frequency band is also identified in Table 4 – Road Transport and Traffic Telematics (RTTT)

2.5 Road Transport and Traffic Telematics (RTTT)

This section covers radio systems used in the field of transport and traffic telematics (road, rail and water depending on the relevant technical restrictions), traffic management, navigation and mobility management. Typical applications are used for interfaces between different modes of transport, communication between vehicles (e.g. car-to-car), between vehicles and fixed locations (e.g. car-to-infrastructure), and communication from and to users and radar system installations. Automotive radar is defined as a moving radar device supporting functions of the vehicle.

Table 5: Regulatory parameters for Road Transport and Traffic Telematics (RTTT)

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1a	5.795 – 5.815 GHz	2 W e.i.r.p.	[38]		(EU)2019/1345 ERC/REC 70-03	This set of usage conditions applies only to road tolling applications and smart tachograph, weight and dimension applications.[39]
1b	5.805 – 5.815 GHz	2 W e.i.r.p			ERC/REC 70-03	
2	5.855 – 5.865 GHz	33 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and a Transmit Power Control (TPC) range of 30 dB	[38]		(EU)2019/1345	This set of usage conditions is only available to vehicle-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.
3	5.865 – 5.875 GHz	33 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and a Transmit Power Control (TPC) range of 30 dB	[38]		(EU)2019/1345 ECC/REC/(08)01 ERC/REC 70-03	This set of usage conditions is only available to vehicle-vehicle, vehicle-to-infrastructure and

[38] 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 part 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 used

[39] Smart tachograph, weight and dimension applications are defined as remote enforcement of the tachograph in Appendix 14 of Commission Implementing Regulation 2016/7992 and for the weights and dimensions enforcement in Article 10d of Directive 2015/7193.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						infrastructure-to-vehicle systems.
4	5 875 – 5 935 MHz	Maximum spectral power density (mean e.i.r.p.): 23 dBm/MHz; Maximum total transmit power (mean e.i.r.p.): 33 dBm with a transmit power control (TPC) range of at least 30 dB	[40]	In the 5 875-5 925 MHz band, road ITS applications shall use channels within the boundaries of each 10 MHz block. In 5 875-5 915 MHz, urban rail ITS applications shall use channels within the boundaries of each 10 MHz block. In 5 915-5 935 MHz, the maximum channel bandwidth shall be 10 MHz for urban rail ITS applications.	(EU)2020/1426	Road ITS applications have priority below 5 915 MHz and urban rail ITS applications have priority above 5 915 MHz. Access by road ITS to the frequency range 5 915-5 925 MHz shall be limited to applications involving infrastructure-to-vehicle (I2V) connectivity only, coordinated, where appropriate, with urban rail ITS. Access by urban rail ITS to the frequency range 5 925-5 935 MHz is on a shared basis with fixed radio links having priority. Entities intending on deploying urban rail ITS must first contract

[40] Techniques to access spectrum and mitigate interference that provide an appropriate level of performance shall be used in line with Directive 2014/53/EU of the European Parliament and of the Council. 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 the performance level associated to those techniques shall be ensured.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						ComReg at licensing@comreg.ie prior to any planned deployment of networks and/or services.
5	21.65 – 26.65 GHz	Max Peak Power Density for frequencies below 22 GHz: -61.3 dBm/MHz e.i.r.p. Max Mean Power Density for frequencies above 22GHz: - 41.3 dBm/MHz e.i.r.p.; Peak Power Density: 0 dBm/50 MHz e.i.r.p.			Decision 2005/50/EC, as amended. ECC/DEC/(04)10 ERC/REC 70-03	Temporary designation for automotive Short Range Radar (SRR) for collision mitigation and traffic safety applications only. For automotive Short Range Radars (SRR) * See detailed requirements in related ECC Decision. New SRR equipment shall not be placed onto the market as of 1 July 2013.
6	24.05 – 24.075 GHz	100 mW	-		Decision 2005/50/EC, as amended. (EU)2019/1345 ERC/REC 70-03	For Vehicle Radars This frequency band is also identified in Table 1 and 6
7	24.075 – 24.150 GHz	0.1 mW e.i.r.p.	-		Decision 2005/50/EC, as amended. (EU)2019/1345 ERC/REC 70-03	For vehicle radars
8	24.075 – 24.150 GHz	100 mW e.i.r.p.	≤4μs/40 kHz dwell time for every 3 ms 38		Decision 2005/50/EC, as amended. (EU)2019/1345 ERC/REC 70-03	For automotive radars. The mitigation requirement is given for devices mounted

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						behind a bumper. If mounted without a bumper , the requirement should be 3 µs/40 kHz maximum dwell time every 3 ms
9	24.075 – 24.150 GHz	100 mW e.i.r.p.	≤ 1ms/40 kHz dwell time every 40ms		Decision 2005/50/EC, as amended. (EU)2019/1345 ERC/REC 70-03	For automotive radars. The spectrum access and mitigation requirement is given for devices mounted either behind a bumper or mounted without a bumper.
10	24.15 – 24.25 GHz	100 mW e.i.r.p.			Decision 2005/50/EC, as amended. (EU)2019/1345 ERC/REC 70-03	For vehicle radars. This frequency band is also identified in Table 1.
11	24.25 – 26.65 GHz	*			Decision 2005/50/EC, as amended. ERC/REC 70-03 ECC/DEC/(04)10	For automotive Short Range Radars (SRR). See detailed requirements in related ECC Decision. [41]
12	63.72 – 65.88 GHz	40 dBm e.i.r.p.			(EU)2019/1345 ECC/DEC/(09)01	This set of usage conditions is only available to vehicle-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.[42]

[41] SRR equipment may only be placed onto the market until 1 January 2018. This date is extended by 4 years for SRR equipment mounted on motor vehicles for which vehicle conformity compliance has been granted before 1 January 2018.
[42] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
13	76 – 77 GHz	55 dBm peak e.i.r.p. 50 dBm average power or 23.5 dBm average power for pulse radar only.	[38]		(EU)2019/1345 ERC/REC 70-03 ECC/DEC(04)03	This set of usage conditions is only available to ground-based vehicle and infrastructure systems. 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. Frequency band is also identified in Table 4
14	76 – 77 GHz	30 dBm peak e.i.r.p. 3 dBm/MHz average power spectral density	≤56%/s Duty Cycle		ECC/DEC(04)03 ECC/DEC(16)01 (EU)2019/1345 ERC/REC 70-03	This set of usage conditions is only available to obstacle detection systems for rotorcraft use. Frequency band is also identified in Table 4
15	77 – 81 GHz	Maximum mean power density of -3 dBm/MHz e.i.r.p. associated with an peak limit of 55 dBm e.i.r.p. The maximum mean power density outside a vehicle resulting from the operation of one Short Range Radar equipment shall not exceed -9 dBm/MHz e.i.r.p.			ECC/DEC/(04)03 ERC/REC 70-03	For Automotive Short Range Radars

Harmonised Standards
EN 300 674 – sub-bands: 1a,1b & 2
EN 301 091 – sub-bands: 13
EN 302 288 – sub-bands: 5 & 11
EN 302 858 – sub-bands: 6 – 10
EN 302 686 – sub-band 12
EN 303 360 – sub-bands: 14
EN 302 571 – sub-band 3, 4
EN 302 264 – sub-band 15

2.6 Radiodetermination Applications

This section covers SRD radiodetermination applications including equipment for detecting movement and alert. Radiodetermination is defined as the determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves.

Table 6: Regulatory parameters for Radiodetermination Applications

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	100 Hz – 148 kHz	46 dBµA/m at 10 m distance at 100 Hz outside the NMR device	-	-	(EU) 2022/180 ERC/REC 70-03	For enclosed Nuclear Magnetic Resonance (NMR) applications. Magnetic field strength descending 10 dB/decade above 100 Hz[43]
2	148 kHz – 5 MHz	-15 dBµA/m at 10 m distance outside the NMR device	-	-	(EU) 2022/180 ERC/REC 70-03	For enclosed Nuclear Magnetic Resonance (NMR) applications.
3	5 – 30 MHz	-5 dBµA/m at 10 m distance outside the NMR device	-	-	(EU) 2022/180 ERC/REC 70-03	For enclosed Nuclear Magnetic Resonance (NMR) applications.
4	30 – 130 MHz	-36 dBm e.r.p. outside the NMR device	-	-	(EU) 2022/180 ERC/REC 70-03	For enclosed Nuclear Magnetic Resonance (NMR) applications.
5	30 MHz – 12.4 GHz	*			ECC/DEC/(06)08 ERC/REC 70-03 S.I. No. 111/2013 - Wireless Telegraphy Act 1926 (section 3) (Exemption of Ground Probing and Wall Probing	For Ground and Wall Probing Radar (GPR / WPR) imaging systems, subject to an appropriate licensing regime. See detailed requirements in related ECC decision.[44]

[43] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
					Radars) Order 2013.	
6	2400 – 2483.5 MHz	25 mW e.i.r.p.			(EC)2019/1345 ERC/REC 70-03	
7	9.2 – 9.5 GHz	25 mW e.i.r.p.			ERC/REC 70-03	
8	9.500 – 9.975 GHz	25 mW e.i.r.p.			ERC/REC 70-03	
9	4.5 – 7.0 GHz	-41.3 dBm/MHz e.i.r.p.			(EC)2019/1345 ERC/REC 70-03	Tank Level Probing Radar (TLPR) only [49]
10	6.0 – 8.5 GHz	*			ECC/DEC/(11)02 (EC)2019/1345 ERC/REC 70-03	For Industrial Level Probing Radar (LPR). See detailed requirements in related ECC Decision.[44] [49]
11	8.5 – 10.6 GHz	-41.3 dBm/MHz e.i.r.p.			2013/752/EU ERC/REC 70-03	Tank Level Probing Radar (TLPR) only[44] [49] The radiated unwanted emissions within the frequency band 10.6-10.7 GHz outside the test tank enclosure shall be less than -60 dBm/MHz e.i.r.p.
12	10.4 – 10.42 GHz	500 mW e.i.r.p.				National SRD solution only.
13	10.5 – 10.6 GHz	25 mW e.i.r.p.			ERC/REC 70-03	Power is limited to 25mW due to the potential for interference to licenced Fixed Wireless Access Local Area (FWALA) users.
14	13.4 – 14 GHz	25 mW e.i.r.p.			ERC/REC 70-03	
15	17.1 – 17.3 GHz	26 dBm e.i.r.p.	DAA		(EC)2019/1345 ERC/REC 70-03	Ground Based Synthetic Aperture Radar [44] [45] - DAA

[44] For authorisation of ground and wall probing radar imaging systems & level probing radar devices see - https://www.comreg.ie/publication/authorisation-of-ground-and-wall-probing-radar-gprwpr-imaging-systems-level-probing-radar-lpr-devices-in-ireland

[45] Specific requirements for the radar antenna pattern and for the implementation of the Detect and Avoid (DAA) technique apply as described in EN 300 440 for Ground Based Synthetic Aperture Radar (GBSAR) systems.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						This frequency band is also identified in Table 3
16a	24.05 – 24.25 GHz	100 mW e.i.r.p.			ERC/REC 70-03	The frequency band 24.00 – 24.25 GHz is identified with the same emission parameters in Table 1 and 5
16b	24.05-26.5 GHz	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.[46] [47] [48]		(EC)2019/1345	This set of usage conditions is only available to Level Probing Radar.[49] [49] Established exclusion zones around radio astronomy sites must be obeyed.[44]
16c	24.05-27 GHz	43 dBm e.i.r.p.[50]	[46]		(EC)2019/1345	This set of usage conditions is only available to Tank Level Probing Radar.[44] [49]
16d	24.05 – 26.5 GHz	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		ECC/DEC/(11)02 (EC)2019/1345 ERC/REC 70-03	For industrial level probing radar (LPR). * see detailed requirements in related ECC Decision). [49]

[46] 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.
[47] 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.
[48] 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.
[49] Authorisation of ground and wall probing radar imaging systems & level probing radar devices in Ireland: https://www.comreg.ie/publication/authorisation-of-ground-and-wall-probing-radar-gprwpr-imaging-systems-level-probing-radar-lpr-devices-in-ireland
[50] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			mitigate interference apply.[51] [52] [53]			
16e	24.05 – 27 GHz	-41.3 dBm/MHz e.i.r.p. outside the enclosed tank test structure			ECC/DEC/(11)02 ERC/REC 70-03	Tank Level Probing Radar (TLPR) only[49]
17a	57 – 64 GHz	-41.3 dBm/MHz e.i.r.p. outside the enclosed tank test structure			ECC/DEC/(11)02 ERC/REC 70-03	Tank Level Probing Radar (TLPR) only [49]
17b	57-64 GHz	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.[54] [55] [56]		(EC)2019/1345	This set of usage conditions is only available to Level Probing Radar.[49]
17c	57-64 GHz	43 dBm e.i.r.p.	[46]		(EC)2019/1345	For industrial level probing radar (LPR). * see detailed requirements in related ECC Decision[49]

[51] 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.
[52] 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.
[53] 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.
[54] 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.
[55] 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.
[56] 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
17d	57 – 64 GHz	*	*	-	ECC/DEC/(11)02 ERC/REC 70-03	For industrial level probing radar (LPR). * see detailed requirements in related ECC Decision[49]
18	69.8-79.9 GHz	7 dBm e.i.r.p.	*	*	ERC/REC 70-03	For security scanners operated indoors
19a	75 – 85 GHz	-41.3 dBm/MHz e.i.r.p.			2013/752/EU ERC/REC 70-03	Tank Level Probing Radar (TLPR) only [49]
19b	75 – 85 GHz	*	*	-	ECC/DEC/(11)02 ERC/REC 70-03	For industrial level probing radar (LPR). * see detailed requirements in related ECC Decision[49]
19c	75 - 85 GHz	34 dBm/50 MHz peak e.i.r.p and -3 dBm/MHz mean e.i.r.p	54 55 56	-	(EC)2019/1345	This set of usage conditions is only available to Level Probing Radar. Established exclusion zones around radio astronomy sites must be obeyed.[49]
19d	75 - 85 GHz	43 dBm e.i.r.p	54		(EC)2019/1345	This set of usage conditions is only available to Tank Level Probing Radar.[49]
20	76 – 77 GHz				ECC/DEC/(21)02	For High Definition Ground Based Synthetic Aperture Radar (HD-GBSAR)
21	76.5-80.5 GHz	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)	*	*	*	For security scanners operated indoors
22	116-260 GHz	*	*	*	ECC/DEC/(22)03	For specific radiodetermination applications as Generic indoor surveillance radar, Radiodetermination systems for

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						industry automation (RDI), Level probing radar (LPR), Contour determination and acquisition radar (CDR), Tank level probing radar (TLPR), Exterior vehicular radar (EVR), In-cabin vehicular radar (IVR) and Radiodetermination systems for industry automation in shielded environments (RDI-S). * See detailed requirements in related ECC Decision

Harmonised Standards

EN 300 440 - sub-bands 6, 7, 8, 13 ,14, 16a
EN 302 065 - sub-bands 6,
EN 302 066 - sub-bands 5
EN 302 372 - sub-bands 9, 11, 16e, 17a, 18a
EN 302 729 - sub-bands 10, 16d, 17d 18b
EN 303 661 - sub-band 19
Sub-bands 1- 4, 20 to be defined.

2.7 Alarms

This section covers alarm systems including social alarms for security and safety.

Table 7: Regulatory parameters for Alarms

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	868.6 – 868.7 MHz	10 mW e.r.p.	≤ 1 % Duty cycle	≤ 25 kHz	(EU)2019/1345 ERC/REC 70-03	The whole frequency band may also be used as one single channel
2	869.2 – 869.25 MHz	10 mW e.r.p.	≤ 0.1 % Duty cycle	channel spacing = 25 kHz	(EU)2019/1345 ERC/REC 70-03	
3	869.25 – 869.3 MHz	10 mW e.r.p.	≤ 0.1 % Duty cycle	≤ 25 kHz	(EU)2019/1345 ERC/REC 70-03	
4	869.3 – 869.4 MHz	10 mW e.r.p.	≤ 1 % Duty cycle	≤ 25 kHz	(EU)2013/752 ERC/REC 70-03	
5	869.65 – 869.70 MHz	25 mW e.r.p.	≤ 10 % Duty cycle	≤ 25 kHz	(EU)2013/752 ERC/REC 70-03	

Harmonised Standards
EN 300 220 - sub-bands 1- 5

2.8 Model Control

This section covers the application of model control equipment, which is solely for the purpose of controlling the movement of the model, in the air, on land, or over or under the water surface.

Table 8: Regulatory parameters for Model Control

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	26.99 – 27.20 MHz (26.995, 27.045, 27.095, 27.145, 27.195 MHz)	100 mW e.r.p.		≤ 10 kHz	2017/1483/EU ERC/REC 70-03	
2	34.995 – 35.225 MHz	100 mW e.r.p.		≤ 10 kHz	ERC/DEC/(01)11 ERC/REC 70-03	Flying Models only
3	40.660 – 40.700 MHz	100 mW e.r.p.		≤ 10 kHz	ERC/DEC/(01)12 ERC/REC 70-03	This frequency band is also identified in Table 1

Harmonised Standards
EN 300 220 - sub-bands 1 - 3

2.9 Inductive Applications

This table covers inductive applications including, for example, car immobilisers, radio frequency identification (RFID) applications including automatic article identification, asset tracking, alarm systems, waste management, personal identification, access control, proximity sensors, location systems, data transfer to handheld devices (e.g., NFC) and wireless control systems, animal identification, cable detection, wireless voice links, automatic road tolling and anti-theft systems including RF anti-theft induction systems (e.g., EAS). It should be noted that other types of anti-theft systems can be operated in accordance with other relevant tables.

Table 9: Regulatory parameters for Inductive Applications

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	100 Hz – 9kHz	82 dBµA/m @ 10m	-	-	ERC/REC 70 03	Antenna size of < 1/20λ[57]
2	9 – 90 kHz	72 dBµA/m @ 10m	-	-	(EU)2017/1483 ERC/REC 70 03	In case of external antennas only loop coil antennas may be employed. Field strength level descending 3dB/octave at 30kHz[58]
3	90 – 119 kHz	42 dBµA/m @ 10m	-	-	(EU)2017/1483 ERC/REC 70 03	In case of external antennas only loop coil antennas may be employed.
4	119 – 135 kHz	66 dBµA/m @ 10m	-	[59]	(EU)2017/1483 ERC/REC 70 03	In case of external antennas only loop coil antennas may be employed. Field strength level descending 3dB/octave at 119 kHz[58]

[57] The antenna size is described by the distance between those 2 points on the antenna that have the largest distance between them.
[58] In case of loop antenna used within bands 2 & 4 integral or dedicated within an area between 0.05 m2 and 0.16 m2, the field strength is reduced by 10-log(area/0.16 m2); for an antenna area less than 0.05 m2 the field strength is reduced by 10 dB.
[59] RFIDs operating in the frequency sub-band 119 – 135 kHz shall meet the spectrum mask given in EN 300 330. Thus will permit a simultaneous use of the various sub-bands within the range 90 – 148.5 kHz.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
5	135 – 140 kHz	42 dBµA/m @ 10m.	-	-	(EU)2017/1483 ERC/REC 70 03	In case of external antennas only loop coil antennas may be employed.
6	140 – 148.5 kHz	37.7 dBµA/m @ 10m.	-	-	(EU)2017/1483 ERC/REC 70 03	In case of external antennas only loop coil antennas may be employed.
7	148.5 – 5 000 kHz	-15 dBµA/m @ 10m	-	-	(EU)2019/1345 ERC/REC 70 03	In the case of external antennas, only loop coil antennas may be employed. The maximum field strength is specified in a bandwidth of 10 kHz. The maximum allowed total field strength is -5 dBµA/m at 10m for systems operating at bandwidths larger than 10 kHz whilst keeping the density limit (-15 dBµA/m at 10m) Frequency band also identified in Table 6
8	400 – 600 kHz	-8 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	For RFID only. In the case of external antennas, only loop coil antennas may be employed. The maximum field strength is specified in a bandwidth of 10 kHz. The maximum allowed total field strength is -5 dBµA/m at 10 m for systems operating at bandwidths larger than 10 kHz measured at the centre frequency, whilst keeping the density limit (-8 dBµA/m in a bandwidth of 10 kHz.)

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						These systems should operate with a minimum operating bandwidth of 30 kHz.
9	3.155 – 3.400 MHz	13.5 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	In case of external antennas only loop coil antennas may be employed.
10	6.765 – 6.795 MHz	42 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	
11	7.4 – 8.8 MHz	9 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	
12	5 – 30 MHz	-20 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	In the case of external antennas, only loop coil antennas may be employed. The maximum field strength is specified in a bandwidth of 10 kHz. The maximum allowed total field strength is -5 dBµA/m at 10m for systems operating at bandwidths larger than 10 kHz whilst keeping the density limit (-20 dBµA/m at 10m)
13	10.2 – 11 MHz	9 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	Frequency Table also identified in Table 1
14	13.553 – 13.567 MHz	42 dBµA/m @ 10m			(EU)2019/1345	This frequency band is also identified in Table 1.[60]

[60] Devices operating in the 13.56 MHz band shall meet the transmission mask and antenna requirements for all combined frequency segments (including the limited in the sub-bands 7 & 16) as described in harmonised standard EN 300 330. This will permit the simultaneous use of the sub-band 18 & 19 together with the limits of the sub-band 7 & 16.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
					ERC/REC 70-03	
15	13.553 – 13.567 MHz	60 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	For RFID and EAS only. This frequency band is also identified in Table 1. [60]
16	26.957 – 27.283 MHz[61]	42 dBµA/m @ 10m	-	-	2013/752/EU	This frequency band is also identified in Table 1.

Harmonised Standards

EN 300 330 – all sub-bands except 1
EN 303 447 – sub-bands 1, to 6
EN 303 454 – sub-bands 1 to 6

[61] 26.957 – 27.283 MHz has been removed from Annex 9 of ERC/REC/70-03, as such this frequency band may be subject to removal from future revisions of this document

2.10 Radio Microphone Applications Including Aids for the Hearing Impaired

This section covers radio microphone applications (also referred to as wireless microphones or cordless microphones) including Assistive Listening Devices (ALD) (also referred to as aids for the hearing impaired). Radio microphones are small, low power (typically 50mW or less) transmitters designed to be worn on the body, or hand-held, for the transmission of sound. The receivers are tailored to specific uses and may range from small and portable to rack mounted modules as part of a multichannel system. This table covers professional and consumer radio microphones, both hand-held and body-worn, and Assistive Listening Devices (ALD). ALD are specific radio microphone applications which capture an acoustic signal that is transmitted by radio to the hearing aid receivers.

Table 10: Regulatory parameters for Radio Microphone Applications including Aids for the Hearing Impaired

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	100 Hz – 9 kHz	120 dBµA/m at 10m	-	-	ERC/REC 70-03	Inductive loop systems to assist the hearing impaired. Antenna size < 1/20λ.[62]
2	29.7 – 47.0 MHz	10 mW e.r.p.		50 kHz	ERC/REC 70-03	On a tuning range basis. The frequency bands 30.3 – 30.5 MHz, 32.15 – 32.45 MHz and 41.015 - 47.00 MHz are harmonised military bands in Europe.
3	87.5 – 108 MHz	50 nW e.r.p.		300 kHz	ERC/REC 70-03	Band II low power FM transmitters.[63]
4	169.4 – 174.0 MHz	10 mW e.r.p.		50 kHz	ERC/REC 70-03	Assistive Listening Devices (ALD). On a tuning range basis. This frequency band is also identified in Table 1.
5	169.400 – 169.475 MHz	500 mW e.r.p.		50 kHz	ECC/DEC/(05)02 (EU)2019/1345 ERC/REC 70-03	Aids for the hearing impaired.

[62] The antenna size is described by the distance between those 2 points on the antenna that have the largest distance between them
[63] The user interface of SRD shall permit as a minimum the selection of any and all possible frequencies within the 88.1 MHz to 107.9 MHz and as a maximum 87.6 MHz to 107.9 MHz. When audio signals are not present, apparatus must employ a transmission time out facility. Pilot tones that ensure continuity of transmission are not permitted.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						(Personal Hearing Aid System) This frequency band is also identified in Table 1 and 2.
6	169.4875 – 169.5875 MHz	500 mW e.r.p.		50 kHz	(EU)2019/1345 ERC/REC 70-03	Aids for the hearing impaired (Personal Hearing Aid System) – exclusive use. This frequency band is also identified in Table 1.
7	173.965 – 216 MHz	10 mW e.r.p.	[64] [65]	50 kHz	(EU)2019/1345 ERC/REC 70-03	Assistive Listening Device (ALD). On a tuning range basis.
8	174 – 216 MHz	50 mW e.r.p.	-	-	(EU)2017/1483 ERC/REC 70-03	Radio microphones. On a tuning range basis. Individual license may be required. See Programme Making and Special Events (PMSE) | Commission for Communications Regulation (comreg.ie)
9	470 – 703 MHz	50 mW e.r.p.	-	-	ERC/REC 70-03	Radio microphones. On a tuning range basis. Individual license required for higher powers. See Programme Making and Special Events (PMSE) | Commission for

[64] A threshold of 35dBµV/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.
[65] The ALD device should operate under all circumstances at least 300 kHz away from the channel edge of an occupied DAB channel.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						Communications Regulation (comreg.ie)
10	733 – 757.5 MHz	50 mW e.r.p.		-	ECC/DEC/(09)03 ERC/REC 70-03	Radio microphones. On a tuning range basis. Individual licence required for higher powers. See Programme Making and Special Events (PMSE) | Commission for Communications Regulation (comreg.ie)
11	821.5 – 826 MHz	20 mW e.i.r.p. / 100 mW e.i.r.p.	-	200 kHz	ECC/DEC/(09)03 ERC/REC 70-03	Radio microphones. On a tuning range basis. 100 mW restricted to body worn equipment. Individual licence required for higher powers.. See Programme Making and Special Events (PMSE) | Commission for Communications Regulation (comreg.ie)
12	826 – 832 MHz	100 mW e.i.r.p.		200 kHz	ECC/DEC/(09)03 ERC/REC 70-03	Radio microphones. Individual licence required for higher powers.. See Programme Making and Special Events (PMSE) | Commission for Communications Regulation (comreg.ie)

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
13	863 – 865 MHz	10 mW e.r.p.		200 kHz	ECC/DEC/(09)03 ERC/REC 70-03	Radio microphones, wireless audio and multimedia streaming devices. Also identified in Table 1 and 3
14	1350 – 1400 MHz	20 mW e.i.r.p./50 mW e.i.r.p.	-	-	ERC/REC 70-03	Radio microphones.. 50 mW restricted to body worn equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1350 – 1400 MHz band.
15	1492 – 1518 MHz	50 mW e.i.r.p.	-	-	ERC/REC 70-03	Radio microphones. On a tuning range basis. Restricted to indoor use.
16	1518 – 1525 MHz	50 mW e.i.r.p.	-	-	ERC/REC 70-03	Radio microphones. On a tuning range basis.. Restricted to indoor use.
17	1656.5 – 1660.5 MHz	2 mW/600 kHz e.i.r.p.	-	-	ERC/REC 70-03	Assistive Listening Systems. See conditions in Annex 4 of ECC Report 270.
18	1785 – 1805 MHz	20 mW e.i.r.p./50 mW e.i.r.p.	-	-	ERC/REC 70-03	Radio microphones.[66] 50 mW restricted to body worn equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1785 – 1804.8 MHz band

Harmonised Standards
EN 300 422 – all sub-bands except 3
EN 301 357 – sub-bands 3, 13 & 19

[66] https://www.comreg.ie/industry/radio-spectrum/licensing/search-licence-type/programme-making-and-special-events-pmse/

EN 303 348 – sub-bands 1

2.11 Radio Frequency Identification Applications (RFID)

This table covers radio frequency identification (RFID) applications including for example, automatic article identification, asset tracking, alarm systems, waste management, personal identification, access control, proximity sensors, anti-theft systems, location systems, data transfer to handheld devices and wireless control systems. It should be noted that other types of RFID systems can be operated in accordance with other relevant tables.

Table 11: Regulatory parameters for Radio Frequency Identification Applications (RFID)

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	865 - 868 MHz	2W e.i.r.p.[67]	[68]	200 kHz	(EU)2019/1345 ERC/REC 70-03	Operation only when necessary to perform the intended operation, i.e. when RFID tags are expected to be present. This frequency band is also identified in Table 1 and 2.
2	865.0 – 865.6 MHz	100 mW e.r.p.		200 kHz	ERC/REC 70-03	[69]
3	865.6 – 867.6 MHz	2 e.r.p.		200 kHz	ERC/REC 70-03	[69]
4	867.6 – 868.0 MHz	500 mW e.r.p.		200 kHz	ERC/REC 70-03	[69]
5	915 – 921 MHz	4 W e.r.p.[70]		400 kHz	ERC/REC 70-03	Operation only when necessary to perform the intended operation, i.e. when RFID tags are expected to be present

[67] Interrogator transmissions at 2 W e.r.p. are only permitted within the four channels centred at 865,7 MHz, 866,3 MHz, 866,9 MHz and 867,5 MHz; each with a maximum bandwidth of 200 kHz. 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.
[68] The maximum period of continuous interrogator transmission on a channel shall not exceed 4s and the period between consecutive transmissions of an interrogator on the same channel shall be at least 100ms in order to ensure most efficient use of available channels for the general benefit of all users
[69] 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.
[70] Interrogator transmissions in sub-band 5 at 4 Watts e.r.p. are only permitted within the three channels centred at 916.3 MHz, 917.5 MHz and 918.7 MHz; each with a maximum bandwidth of 400 kHz. RFID tags respond at a very low power level (-10 dBm e.r.p.) in the frequency range around the RFID interrogator channels.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
6	916.1 – 918.9 MHz	4 W e.r.p.[70] only permitted at the centre frequencies 916,3 MHz, 917,5 MHz, 918,7 MHz		400 kHz	2022/172/EU	Data Networks Only
7	2446 – 2454 MHz	≤500 mW			(EU)2019/1345 ERC/REC 70-03	
8	2446 – 2454 MHz	>500 mW – 4 W e.i.r.p.	≤15% Duty Cycle FHSS techniques should be used.		ERC/REC 70-03	Power levels above 500 mW are restricted to be used inside the boundaries of a building. Duty cycle ≤ 15 % in any 200 ms period (i.e. 30 ms on / 170 ms off)

Harmonised Standards

EN 300 440 – sub-bands 7 & 8

EN 302 208 – sub-bands 1 - 5

2.12 Active Medical Implants and Their Associated Peripherals

This category covers the radio part of active implantable medical devices, as defined in 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 and their peripherals.

Table 12: Regulatory parameters for Active Medical Implants and Their Associated Peripherals

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	9 – 315 kHz	30 dBµA/m @ 10m	≤ 10% Duty Cycle	-	EU/2019/1345 ERC/REC 70-03	The application is for Ultra Low Power Active Medical Implant systems using inductive loop techniques for telemetry purposes
2	315 – 600 kHz	-5 dBµA/m @ 10m	≤ 10% Duty Cycle		2013/752/EU ERC/REC 70-03	Animal implantable devices
3	12.5 – 20 MHz	-7 dBµA/m @ 10m per 10 kHz	≤ 10% Duty Cycle		2013/752/EU ERC/REC 70-03	This application is for Ultra Low Power (ULP) active animal implantable devices (ULP AID), limited to indoor only applications. The maximum field strength is specified in a bandwidth of 10 kHz. The transmission mask of ULP-AID is defined as follows: 3 dB Bandwidth 300 kHz 10 dB Bandwidth 800 kHz

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						20 dB Bandwidth 2 MHz
4	30.0 – 37.5 MHz	1 mW e.r.p.	≤ 10% Duty Cycle		EU/2019/1345 ERC/REC 70-03	The application is for Ultra Low Power medical membrane implants for blood pressure measurements.
5	401 – 402 MHz	25 µW e.r.p.	≤ 0.1% Duty Cycle unless devices use LBT or equally efficient mitigation technique in which case there is no duty cycle restriction[71] [72]	25 kHz	2013/752/EU ERC/REC 70-03	For Ultra Low Power Active Medical Implants and accessories covered by the applicable harmonised standard and not covered by 402 – 405 MHz. Individual transmitters may combine adjacent 25kHz channels for increased bandwidth up to 100 kHz[73] [74]
6	402 – 405 MHz	25 µW e.r.p.	Other channelling restriction: Individual transmitters may combine adjacent channels for	25 kHz	2013/752/EU ERC/DEC/(01)17 ERC/REC 70-03	Active Medical Implants

[71] Systems not providing frequency agility based on ambient RF field sensing are limited to a maximum permitted e.r.p. of 250 nanowatts with a duty cycle of ≤ 0.1%.
[72] Systems not providing frequency agility based on ambient RF field sensing are limited to a maximum permitted e.r.p. of 250 nanowatts with a duty cycle of ≤ 0.1%.
[73] Due to the limited available spectrum of 1 MHz, a maximum bandwidth of 100 kHz is permitted for these bands to ensure that several users could access the band concurrently.
[74] Due to the limited available spectrum of 1 MHz, a maximum bandwidth of 100 kHz is permitted for these bands to ensure that several users could access the band concurrently.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			increased bandwidth up to 300 kHz.[75] [76]			
7	405 – 406 MHz	25 µW e.r.p.	≤ 0.1% Duty Cycle Unless devices use LBT or equally efficient mitigation technique in which case there is no duty cycle restriction. [71] [72]	25 kHz	2013/752/EU ERC/REC 70-03	For Ultra Low Power Active Medical Implants and accessories covered by the applicable harmonised standard and not covered by 402 – 405 MHz. Individual transmitters may combine adjacent 25kHz channels for increased bandwidth up to 100 kHz[73] [74]
8	458.6375 – 458.8375 MHz	10 mW e.r.p.		25 kHz		ECG monitoring only Not included in ERC/REC 70-03 National SRD solution only.
9	2483.5 – 2500 MHz	10 dBm e.i.r.p.	LBT + AFA and less than 10% duty cycle The equipment shall implement a spectrum access mechanism as described in the applicable harmonised standard or an	1 MHz	2017/1483/EU	For Low Power Active Medical Implants and associated peripherals, covered by the applicable harmonised standard.

[75] The equipment shall implement a spectrum access mechanism as described in the applicable harmonised standard or an equivalent spectrum access mechanism.
[76] The equipment shall implement a spectrum access mechanism as described in the applicable harmonised standard or an equivalent spectrum access mechanism.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			equivalent spectrum access mechanism			Individual transmitters may combine adjacent channels on a dynamic basis for increased bandwidth higher than 1 MHz. Peripheral units are for indoor use only.

Harmonised Standards

EN 302 195 – sub-bands 1
EN 302 510 – sub-bands 4
EN 301 559 – sub-bands 9
EN 302 536 Sub-band 2)
EN 300 330 Sub-band 3)

2.13 Wireless Audio Applications

This table covers applications for wireless audio and multimedia streaming systems including the following, cordless loudspeakers; cordless headphones; cordless headphones for portable use, for example portable CD, cassette or radio devices carried on a person; cordless headphones for use in a vehicle, for example for use with a radio or mobile telephone etc.; in-ear monitoring, for use with concerts or other stage productions.

Table 13: Regulatory parameters for Wireless Audio Applications

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	26960 – 27410 kHz				ECC/DEC/(11)03 ERC/REC 70-03	For Citizens' Band (CB) radio equipment
2	31.025 – 30.325 MHz	10 mW e.r.p.			Ref to TTE 9 (see document ODTR 98/62R)	National SRD solution only. Analogue cordless phones only. National Legislation: S.I. 410 of 1997
3	39.925 – 40.255 MHz	10 mW e.r.p.			Ref to TTE 9 (see document ODTR 98/62R)	National SRD solution only. Analogue cordless phones only National Legislation: S.I. 410 of 1997
4	49.82 – 49.98 MHz	10 mW e.r.p.				National SRD solution only. Baby monitors[77] This frequency band is also identified in Table 1.
5	87.5 – 108 MHz	50 nW e.r.p.		200 kHz	(EU)2019/1345	

[77] When operating short range devices on these frequencies in close proximity to domestic television receivers care must be taken as the domestic television receivers may suffer interference

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
					ERC/REC 70-03	
6	446.0 – 446.1 MHz	500 mW e.r.p.	8 channels specified in S.I. 93 of 1998. Maximum occupied bandwidth: 12.5 kHz CTCSS or DCS tone control		(EU)2019/1345	National SRD solution only. PMR446 hand portable with integral antennas for speech communications. National Legislation: S.I. 93 of 1998.
7	446.1 – 446.2 MHz	50 mW e.r.p.		6.25 kHz or 12.5 kHz	ECC/DEC(05)12 2017/1483/EU	National SRD solution only. Digital PMR 446 hand portable
8	863 – 865 MHz	10 mW e.r.p.			(EU)2019/1345 ERC/DEC/(01)18 ERC/REC 70-03	This frequency band is also identified in Table 1, 3, and 10
9	864.8 – 865.0 MHz	10 mW e.r.p.		50 kHz	ERC/REC 70-03	Narrow band analogue voice devices
10	1880 – 1900 MHz	250 mW e.r.p. (Peak)			ERC/DEC/(94)03 ERC/DEC/(98)22 ERC/REC 70-03	DECT Cordless Phones National Legislation: S.I. 168 of 1994

Harmonised Standards

EN 300 433 – sub-bands 1
EN 300 220 – sub-bands 3 & 8
EN 301 357 – sub-bands 4
EN 300 296 – sub-bands 5
EN 300 113-2 – sub-bands 6
EN 301 166-2 – sub-bands 6

EN 301 357 – sub-bands 7
EN 301 406 – sub-bands 9

2.14 Medical Data Acquisition

This table covers applications frequency bands and regulatory as well as informative parameters recommended for medical data acquisition applications. They cover transmission of non-voice data and from non-implantable medical devices for the purpose of monitoring, diagnosing and treating patients in healthcare facilities or patient's home, as prescribed by duly authorised healthcare professionals, including;

- Ultra-Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE) application
- Medical Body Area Network System (MBANS)

Table 14: Regulatory parameters for Medical Data Acquisition

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	430 – 440 MHz	-50 dBm/100kHz max e.r.p. density but not exceeding a total power of -40 dBm/10 MHz (both limits are intended for measurement outside of the patient's body)		10 MHz	(EU)2019/1345 ERC/REC 70-03	ULP-WMCE This frequency band is also identified in Table 1 and 2.
2	2483.5 – 2500 MHz	1 mW e.i.r.p.	Adequate spectrum sharing mechanisms (e.g. Listen-Before-Talk and Adaptive Frequency Agility) shall be implemented by the equipment and ≤10% duty cycle	3 MHz	(EU)2019/1345 ERC/REC 70-03	MBANS, indoor only within healthcare facilities.
3	2483.5 – 2500 MHz	10 mW e.i.r.p.	Adequate spectrum sharing mechanisms (e.g. Listen-Before-Talk and Adaptive Frequency Agility) shall be implemented by the equipment and ≤2% duty cycle	3 MHz	(EU)2019/1345 ERC/REC 70-03	MBANS, indoor only within patients home.

Harmonised Standards
EN 303 520 – sub-band 1
EN 303 203 – sub-bands 2 & 3

2.15 Ultra-Wideband Devices

This SRD category covers a wide range of Ultra-Wideband applications including location tracking systems, motor & railway vehicles, aircraft, material sensing devices and other similar applications.

2.15.1 Generic Ultra-Wideband Devices

The technical requirements in the following table shall not apply to:

(1) devices and infrastructure used at a fixed outdoor location or connected to a fixed outdoor antenna;

(2) devices installed in flying models, aircraft and other aviation; and

(3) devices installed in road and railway vehicles.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	≤ 1.6 GHz	– 90 dBm/MHz	– 50 dBm	(EU) 2024/1467	
2	1.6 – 2.7 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	
3	2.7 < f ≤ 3.1 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
4	3.1 < f ≤ 3.4 GHz	– 70 dBm/MHz or – 41.3 dBm/MHz using LDC[78] or DAA[79]	– 36 dBm or 0 dBm	(EU) 2024/1467	

[78] Within the 3,1 GHz to 4,8 GHz band. The Low Duty Cycle ('LDC') mitigation technique and its limits are set out in clauses 4.5.3.1, 4.5.3.2 and 4.5.3.3 of ETSI Standard EN 302 065-1 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of 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).

[79] Within the 3,1 GHz to 4,8 GHz and 8,5 GHz to 9 GHz bands. The Detect and Avoid ('DAA') mitigation technique and its limits are set out in clauses 4.5.1.1, 4.5.1.2 and 4.5.1.3 of ETSI Standard EN 302 065-1 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
5	3.4 < f ≤ 3.8 GHz	– 80 dBm/MHz or – 41.3 dBm/MHz using LDC or DAA	– 40 dBm or 0 dBm	(EU) 2024/1467	
6	3.8 < f ≤ 4.8 GHz	– 70 dBm/MHz or – 41.3 dBm/MHz using LDC or DAA	– 30 dBm or 0 dBm	(EU) 2024/1467	
7	4.8 < f ≤ 6 GHz	– 70 dBm/MHz	– 30 dBm	(EU) 2024/1467	
8	6 < f ≤ 8.5 GHz	– 41.3 dBm/MHz	0 dBm	(EU) 2024/1467	
9	8.5 < f ≤ 9 GHz	– 65 dBm/MHz or – 41.3 dBm/MHz using DAA	– 25 dBm or 0 dBm	(EU) 2024/1467	
10	9 < f ≤ 10.6 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
11	f > 10.6 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	

2.15.2 Location Tracking Systems Type 1 (LT1)

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	f ≤ 1,6 GHz	– 90 dBm/MHz	– 50 dBm	(EU) 2024/1467	
2	1.6 < f ≤ 2.7 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	
3	2.7 < f ≤ 3.4 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
4	3.4 < f ≤ 3.8 GHz	– 80 dBm/MHz	– 40 dBm	(EU) 2024/1467	
5	3.8 < f ≤ 6.0 GHz	– 70 dBm/MHz	– 30 dBm	(EU) 2024/1467	
6	6 < f ≤ 8.5 GHz	– 41.3 dBm/MHz	0 dBm	(EU) 2024/1467	

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
7	8.5 < f ≤ 9 GHz	– 65 dBm/MHz or – 41.3 dBm/MHz using DAA	– 25 dBm or 0 dBm	(EU) 2024/1467	
8	9 < f ≤ 10.6 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
9	f > 10.6 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	

2.15.3 UWB DEVICES INSTALLED IN MOTOR AND RAILWAY VEHICLES – General technical requirements

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	f ≤ 1.6 GHz	– 90 dBm/MHz	– 50 dBm	(EU) 2024/1467	
2	1.6 < f ≤ 2.7 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	
3	2.7 < f ≤ 3.1 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
4	3.1 < f ≤ 3.4 GHz	– 70 dBm/MHz or – 41.3 dBm/MHz using LDC[80] + e.l. [81] or	– 36 dBm or ≤ 0 dBm or ≤ 0 dBm	(EU) 2024/1467	

[80] The LDC mitigation technique and its limits are set out in clauses 4.5.3.1, 4.5.3.2 and 4.5.3.3 of ETSI Standard EN 302 065-3 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU.

[81] The exterior limit (e.l.) ≤ –53,3 dBm/MHz is required. The exterior limit is set out in clauses 4.3.4.1, 4.3.4.2 and 4.3.4.3 of ETSI Standard EN 302 065-3 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
		– 41,3 dBm/MHz using TPC[82] + DAA[83] + e.I.			
5	3.4 < f ≤ 3.8 GHz	– 80 dBm/MHz or – 41.3 dBm/MHz using LDC + e.I. or – 41,3 dBm/MHz using TPC +DAA + e.I.	– 40 dBm or ≤ 0 dBm or ≤ 0 dBm	(EU) 2024/1467	
6	3.8 < f ≤ 4.8 GHz	– 70 dBm/MHz or – 41.3 dBm/MHz using LDC + e.I. or – 41.3 dBm/MHz using TPC +DAA + e.I.	– 30 dBm or ≤ 0 dBm or ≤ 0 dBm	(EU) 2024/1467	
7	4.8 < f ≤ 6 GHz	– 70 dBm/MHz	– 30 dBm	(EU) 2024/1467	
8	6 < f ≤ 8.5 GHz	– 53,3 dBm/MHz or – 41,3 dBm/MHz using LDC + e.I. or – 41.3 dBm/MHz using TPC + e.I.	– 13.3 dBm or ≤ 0 dBm or ≤ 0 dBm	(EU) 2024/1467	
9	8.5 < f ≤ 9 GHz	– 65 dBm/MHz or – 41.3 dBm/MHz using TPC +DAA + e.I.	– 25 dBm or ≤ 0 dBm	(EU) 2024/1467	
10	9 < f ≤ 10.6 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
11	F > 10.6 GHz	- 85 dBm/MHz	- 45 dBm	(EU) 2024/1467	

2.15.4 UWB DEVICES INSTALLED IN MOTOR AND RAILWAY VEHICLES – Specific technical requirements for vehicular access systems using

[82] The Transmit Power Control ('TPC') mitigation technique and its limits are set out in clauses 4.7.1.1, 4.7.1.2 and 4.7.1.3 of ETSI Standard EN 302 065-3 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of this Decision.
[83] The DAA mitigation technique and its limits are set out in clauses 4.5.1.1, 4.5.1.2 and 4.5.1.3 of ETSI Standard EN 30 2065-3 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of this Decision.

trigger-before-transmit

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	3.8 < f ≤ 4.2 GHz	– 41.3 dBm/MHz with trigger-before-transmit[84] operation and LDC ≤ 0,5 % (in 1h)	0 dBm	(EU) 2024/1467	
2	6 < f ≤ 8.5 GHz	– 41.3 dBm/MHz with trigger-before-transmit operation and LDC ≤ 0,5 % (in 1h) or TPC	0 dBm	(EU) 2024/1467	

2.15.5 Technical requirements for other vehicular applications in the 6-8,5 GHz band including applications that involve infrastructure-to-vehicle and vehicle-to-vehicle communications

The technical requirements in the table below are applicable to vehicular applications operating in the 6-8,5 GHz band, including applications that involve infrastructure-to-vehicle and vehicle-to-vehicle communications. The technical requirements applicable to emissions below 6 GHz and above 8,5 GHz are those set out in the table in section 3.1 ‘UWB devices installed in motor and railway vehicles – general technical requirements’.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	6 < f ≤ 8.5 GHz[85] [86]	– 41.3 dBm/MHz	0 dBm	(EU) 2024/1467	

[84] ‘Trigger-before-transmit’ mitigation is defined as a UWB transmission that is only initiated when necessary, specifically where the system indicates that UWB devices are nearby. The communication is either triggered by a user or by the vehicle. The subsequent communication can be considered as ‘triggered communication’. The existing LDC mitigation applies (or alternatively TPC in the 6 GHz to 8,5 GHz range). An exterior limit requirement must not be applied when using the trigger-before-transmit mitigation technique for vehicular access systems. Trigger-before-transmit mitigation techniques that provide an appropriate level of performance in order to comply with the essential requirements of Directive 2014/53/EU shall be used for vehicular access systems. 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.

[85] Within the 6-8,5 GHz band. The following additional requirements apply to fixed outdoor installations supporting communication with UWB devices installed in road and railway vehicles: Antennas are directive, down tilted and installed at a maximum height of 10 m. The duty cycle is limited to maximum 5 % per second.

[86] Within the 6-8,5 GHz band. The following additional requirements apply to UWB devices installed in road and railway vehicles: Antennas are installed at a maximum height of 4 m. The duty cycle is limited to maximum 1 % per second.

2.15.6 RADIODETERMINATION, LOCATION TRACKING, TRACING AND DATA ACQUISITION APPLICATIONS IN THE 6-8,5 GHz BAND – Specific applications that involve fixed outdoor installations

The technical requirements in the table below are applicable to devices and infrastructure used at a fixed outdoor location or connected to a fixed outdoor antenna and supporting radiodetermination, location tracking, tracing or data acquisition applications operating in the 6-8,5 GHz band.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	f ≤ 1.6 GHz	– 90 dBm/MHz	– 50 dBm	(EU) 2024/1467	
2	1.6 < f ≤ 2.7 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	
3	2.7 < f ≤ 3.1 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
4	3.1 < f ≤ 3.4 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
5	3.4 < f ≤ 3.8 GHz	– 80 dBm/MHz	– 40 dBm	(EU) 2024/1467	
6	3.8 < f ≤ 4.2 GHz	– 70 dBm/MHz	– 30 dBm	(EU) 2024/1467	
7	4.2 < f ≤ 4.8 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
8	4.8 < f ≤ 6 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
9	6 < f ≤ 8.5 GHz[87] [88] [89]	– 70 dBm/MHz	0 dBm	(EU) 2024/1467	
10	8.5 < f ≤ 10.6 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
11	f > 10.6 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	

2.15.7 RADIODETERMINATION, LOCATION TRACKING, TRACING AND DATA ACQUISITION APPLICATIONS IN THE 6-8,5 GHz BAND – Specific applications that involve enhanced indoor devices

The technical requirements in the table below are applicable to enhanced power devices operating indoor and supporting radiodetermination, location tracking, tracing or data acquisition applications operating in the 6-8,5 GHz band. The technical requirements applicable to emissions below 6 GHz and above 8,5 GHz are set out in the table in section 2.15.2 ‘Location tracking systems type 1 (LT1)’.

[87] Within the 6-8,5 GHz band, the duty cycle is limited to maximum 5 % per second and antennas are installed at a maximum height of 10 m.
[88] For antenna heights above 2,5 m the maximum total radiated power spectral density (TRPsd) is limited to –46,3 dBm/MHz and the antennas must be directive and down tilted.
[89] Antennas for data acquisition for authentication/access control (PACS) are excluded from the antenna directivity requirements given under note 2.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	6 < f ≤ 8.5 GHz[90]	– 31.3 dBm/MHz	10 dBm	(EU) 2024/1467	

2.15.8 UWB ONBOARD AIRCRAFT

The values for maximum mean power spectral density (e.i.r.p.) and maximum peak power (e.i.r.p.) for short-range devices using UWB technology, with or without use of mitigation techniques, are listed in the table below.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.)	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	f ≤ 1.6 GHz	– 90 dBm/MHz	– 50 dBm	(EU) 2024/1467	
2	1.6 < f ≤ 2.7 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	
3	2.7 < f ≤ 3.4 GHz	– 70 dBm/MHz	– 36 dBm	(EU) 2024/1467	
4	3.4 < f ≤ 3.8 GHz	– 80 dBm/MHz	– 40 dBm	(EU) 2024/1467	
5	3.8 < f ≤ 6.0 GHz	– 70 dBm/MHz	– 30 dBm	(EU) 2024/1467	
6	6.0 < f ≤ 6.650 GHz	– 41,3 dBm/MHz	0 dBm	(EU) 2024/1467	
7	6.650 < f ≤ 6.6752 GHz	– 62,3 dBm/MHz	– 21 dBm	(EU) 2024/1467	notch of 21 dB should be implemented to meet the – 62,3 dBm/MHz level.
8	6.6752 < f ≤ 8.5 GHz	– 41,3 dBm/MHz	0 dBm	(EU) 2024/1467	7.25 to7,75 GHz (FSS and MetSat (7.45 to 7.55 GHz) protection) 7.75 to 7.9 GHz (MetSat protection).
9	8.5 < f ≤ 10.6 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
10	f > 10.6 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	

[90] Within the 6-8,5 GHz band, the duty cycle is limited to maximum 5 % per second. Portable devices can operate with a maximum mean e.i.r.p. spectral density higher than –41,3 dBm/MHz and a maximum peak e.i.r.p. higher than 0 dBm defined in 50 MHz only within an identifiable network and subject to control by an indoor infrastructure.

2.15.9 MATERIAL SENSING DEVICES USING UWB TECHNOLOGY – Contact Base Material Sensing Devices

	Frequency Range	Maximum mean power spectral density (e.i.r.p.) [91] [92] [93] [94] [95]	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	f ≤ 1.73 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	
2	1.73 < f ≤ 2.2 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
3	2.2 < f ≤ 2.5 GHz	– 50 dBm/MHz	– 10 dBm	(EU) 2024/1467	
4	2.5 < f ≤ 2.69 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
5	2.69 < f ≤ 2.7 GHz[96]	– 55 dBm/MHz	– 15 dBm	(EU) 2024/1467	
6	2.7 < f ≤ 2.9 GHz	– 70 dBm/MHz	– 30 dBm	(EU) 2024/1467	
7	2.9 < f ≤ 3.4 GHz	– 70 dBm/MHz	– 30 dBm	(EU) 2024/1467	
8	3.4 < f ≤ 3.8 GHz[97]	– 50 dBm/MHz	– 10 dBm	(EU) 2024/1467	
9	3.8 < f ≤ 4.8 GHz	– 50 dBm/MHz	– 10 dBm	(EU) 2024/1467	

[91] Devices using the Listen Before Talk ('LBT') mechanism are permitted to operate in the 1,215 GHz to 1,73 GHz frequency range with a maximum mean e.i.r.p. spectral density of -70 dBm/MHz and in the 2,5 GHz to 2,69 GHz and 2,7 GHz to 3,4 GHz frequency ranges with a maximum mean e.i.r.p. spectral density of -50 dBm/MHz and a maximum peak e.i.r.p. of -10 dBm/50 MHz. The LBT mechanism is set out in clauses 4.5.2.1, 4.5.2.2 and 4.5.2.3 of ETSI Standard EN 302 065-4 V1.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU.

[92] To protect the radio services, non-fixed installations must fulfil the following requirement for total radiated power spectral density: a) In the 2,5 GHz to 2,69 GHz and 4,8 GHz to 5 GHz frequency ranges, the total radiated power spectral density must be 10 dB below the maximum e.i.r.p. spectral density. b) In the 3,4 GHz to 3,8 GHz frequency range, the total radiated power spectral density must be 5 dB below the maximum e.i.r.p. spectral density.

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

[94] Within the 3,1 GHz to 4,8 GHz band, devices implementing LDC mitigation technique are permitted to operate with a maximum mean e.i.r.p. spectral density of –41,3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm defined in 50 MHz. The LDC mitigation technique and its limits are set out in clauses 4.5.3.1, 4.5.3.2 and 4.5.3.3 of ETSI Standard EN 302 065-1 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of this Decision. No fixed outdoor installation is permitted when LDC is implemented.

[95] Within the 3,1 GHz to 4,8 GHz and 8,5 GHz to 9 GHz bands, devices implementing DAA mitigation technique are permitted to operate with a maximum mean e.i.r.p. spectral density of –41,3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm defined in 50 MHz. The DAA mitigation technique and its limits are set out in clauses 4.5.1.1, 4.5.1.2 and 4.5.1.3 of ETSI Standard EN 302 065-1 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of this Decision. No fixed outdoor installation is permitted when DAA is implemented.

[96] Limitation of the duty cycle to 10 % per second.

[97] Limitation of the duty cycle to 10 % per second.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.) [91] [92] [93] [94] [95]	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
10	4.8 < f ≤ 5.0 GHz[98]	– 55 dBm/MHz	– 15 dBm	(EU) 2024/1467	
11	5.0 < f ≤ 5.25 GHz	- 50 dBm/MHz	- 10 dBm	(EU) 2024/1467	
12	5.25 < f ≤ 5.35 GHz	- 50 dBm/MHz	- 10 dBm	(EU) 2024/1467	
13	5.35 < f ≤ 5.6 GHz	- 50 dBm/MHz	- 10 dBm	(EU) 2024/1467	
14	5.6 < f ≤ 5.65 GHz	- 50 dBm/MHz	- 10 dBm	(EU) 2024/1467	
15	5.65 < f ≤ 5.725 GHz	- 50 dBm/MHz	- 10 dBm	(EU) 2024/1467	
16	5.725 < f ≤ 6.0 GHz	- 50 dBm/MHz	- 10 dBm	(EU) 2024/1467	
17	6.0 < f ≤ 8.5 GHz	- 41.3 dBm/MHz[99]	0 dBm	(EU) 2024/1467	
18	8.5 < f ≤ 9.0 GHz	- 65 dBm/MHz	- 25 dBm	(EU) 2024/1467	
19	9.0 < f ≤ 10.6 GHz	- 65 dBm/MHz	- 25 dBm	(EU) 2024/1467	
20	f > 10.6 GHz	- 85 dBm/MHz	- 45 dBm	(EU) 2024/1467	

[98] Limitation of the duty cycle to 10 % per second.
[99] No fixed outdoor installation is permitted.

2.15.10 MATERIAL SENSING DEVICES USING UWB TECHNOLOGY – Non-Contact Base Material Sensing Devices

	Frequency Range	Maximum mean power spectral density (e.i.r.p.) [100] [101] [102] [103] [104]	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
1	f ≤ 17.3 GHz	– 85 dBm/MHz	– 60 dBm	(EU) 2024/1467	
2	1.73 < f ≤ 2.2 GHz	– 70 dBm/MHz	– 45 dBm	(EU) 2024/1467	
3	2.2 < f ≤ 2.5 GHz	– 50 dBm/MHz	– 25 dBm	(EU) 2024/1467	
4	2.5 < f ≤ 2.69 GHz	– 65 dBm/MHz	– 40 dBm	(EU) 2024/1467	
5	2.69< f ≤ 2.7 GHz[105]	– 70 dBm/MHz	– 45 dBm	(EU) 2024/1467	
6	2.7 < f ≤ 2.9 GHz	– 70 dBm/MHz	– 45 dBm	(EU) 2024/1467	

[100] Devices using the LBT mechanism are permitted to operate in the 1,215 GHz to 1,73 GHz frequency range with a maximum mean e.i.r.p. spectral density of -70 dBm/MHz and in the 2,5 GHz to 2,69 GHz and 2,7 GHz to 3,4 GHz frequency ranges with a maximum mean e.i.r.p. spectral density of -50 dBm/MHz and a maximum peak e.i.r.p. of -10 dBm/50 MHz. The LBT mechanism is set out in clauses 4.5.2.1, 4.5.2.2 and 4.5.2.3 of ETSI Standard EN 302 065-4 V1.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of this Decision.
[101] To protect the radio services, non-fixed installations must fulfil the following requirement for total radiated power spectral density: a) In the 2,5 GHz to 2,69 GHz and 4,8 GHz to 5 GHz frequency ranges, the total radiated power spectral density must be 10 dB below the maximum e.i.r.p. spectral density. b) In the 3,4 GHz to 3,8 GHz frequency ranges, the total radiated power spectral density must be 5 dB below the maximum e.i.r.p. spectral density.
[102] To protect the Radio Astronomy Service (RAS) in the 2,69 GHz to 2,7 GHz and 4,8 GHz to 5 GHz bands, the total radiated power spectral density must be below - 65 dBm/MHz.
[103] Within the 3,1 GHz to 4,8 GHz band, devices implementing LDC mitigation technique are permitted to operate with a maximum mean e.i.r.p. spectral density of –41,3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm defined in 50 MHz. The LDC mitigation technique and its limits are set out in clauses 4.5.3.1, 4.5.3.2 and 4.5.3.3 of ETSI Standard EN 302 065-1 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of this Decision. No fixed outdoor installation is permitted when LDC is implemented.
[104] Within the 3,1 GHz to 4,8 GHz and 8,5 GHz to 9 GHz bands, devices implementing DAA mitigation technique are permitted to operate with a maximum mean e.i.r.p. spectral density of –41,3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm defined in 50 MHz. The DAA mitigation technique and its limits are set out in clauses 4.5.1.1, 4.5.1.2 and 4.5.1.3 of ETSI Standard EN 302 065-1 V2.1.1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of this Decision. No fixed outdoor installation is permitted when DAA is implemented.
[105] Limitation of the duty cycle to 10 % per second.

	Frequency Range	Maximum mean power spectral density (e.i.r.p.) [100] [101] [102] [103] [104]	Maximum peak power (e.i.r.p.) (Defined in 50 MHz)	EC/ECC/ERC Deliverable	Notes
7	2.9 < f ≤ 3.4 GHz	– 70 dBm/MHz	– 45 dBm	(EU) 2024/1467	**Error! Bookmark not defined.** [106] [107]
8	3.4 < f ≤ 3.8 GHz[108]	– 70 dBm/MHz	– 45 dBm	(EU) 2024/1467	[106] Error! Bookmark not defined. [106] [107]
9	3.8 < f ≤ 4.8 GHz	– 50 dBm/MHz	– 25 dBm	(EU) 2024/1467	[106] [107]
10	4.8 < f ≤ 5.0 GHz[109]	– 55 dBm/MHz	– 30 dBm	(EU) 2024/1467	Error! Bookmark not defined. Error! Bookmark not defined. Error! Bookmark not defined.
11	5.0 < f ≤ 5.25 GHz	– 55 dBm/MHz	– 30 dBm	(EU) 2024/1467	
12	5.25 < f ≤ 5.35 GHz	– 50 dBm/MHz	– 25 dBm	(EU) 2024/1467	
13	5.35 < f ≤ 5.6 GHz	– 50 dBm/MHz	– 25 dBm	(EU) 2024/1467	
14	5.6 < f ≤ 5.65 GHz	– 50 dBm/MHz	– 25 dBm	(EU) 2024/1467	
15	5.65 < f ≤ 5.725 GHz	– 65 dBm/MHz	– 40 dBm	(EU) 2024/1467	
16	5.725 < f ≤ 6.0 GHz	– 60 dBm/MHz	– 35 dBm	(EU) 2024/1467	
17	6.0 < f ≤ 8.5 GHz	– 41.3 dBm/MHz	0 dBm	(EU) 2024/1467	[110]
18	8.5 < f ≤ 9.0 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	[107]
19	9.0 < f ≤ 10.6 GHz	– 65 dBm/MHz	– 25 dBm	(EU) 2024/1467	
20	f > 10.6 GHz	– 85 dBm/MHz	– 45 dBm	(EU) 2024/1467	

[106] Within the 3.1 GHz – 4.8 GHz band, devices implementing LDC mitigation technique are permitted to operate with a maximum mean e.i.r.p. spectral density of – 41.3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm defined in 50 MHz. The LDC mitigation technique and its limits are defined in ETSI Standard EN 302 065-1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of Decision 2014/53/EU. When LDC is implemented, note **Error! Bookmark not defined.** applies.

[107] Within the 3.1 GHz – 4.8 GHz and 8.5 GHz - 9 GHz bands, devices implementing DAA mitigation technique are permitted to operate with a maximum mean e.i.r.p. spectral density of – 41.3 dBm/MHz and a maximum peak e.i.r.p. of 0 dBm defined in 50 MHz. The DAA mitigation technique and its limits are defined in ETSI Standard EN 302 065-1. Alternative mitigation techniques may be used if they ensure at least an equivalent performance and level of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU and respect the technical requirements of Decision 2014/53/EU. When DAA is implemented, note **Error! Bookmark not defined.** applies.

[108] Limitation of the duty cycle to 10 % per second.

[109] Limitation of the duty cycle to 10 % per second.

[110] No fixed outdoor installation is permitted.

Peak power threshold values for the LBT mechanism to ensure the protection of radio services listed below are set out in the following table.

	Frequency Range	Radio service to be detected	Peak power threshold value	EC/ECC/ERC Deliverable	Notes
1	1,215 <f ≤ 1,4 GHz	Radiodetermination service	+ 8 dBm/MHz	(EU) 2024/1467	continuously listening and automatic switch-off within 10 ms for the related frequency range if the threshold value is exceeded (table with LBT mechanism). A silent time of at least 12 s while listening continuously is necessary before the transmitter can be switched on again. This silent time during which only the LBT receiver is active must be ensured even after the device is switched off.
2	1,61<f ≤ 1,66 GHz	Mobile satellite service	- 43 dBm/MHz	(EU) 2024/1467	
3	2,5 < f ≤ 2,69 GHz	Land mobile service	- 50 dBm/MHz	(EU) 2024/1467	
4	2,9 < f ≤ 3,4 GHz	Radiodetermination service	- 7 dBm/MHz	(EU) 2024/1467	continuously listening and automatic switch-off within 10 ms for the related frequency range if the threshold value is exceeded (table with LBT mechanism). A silent time of at least 12 s while listening continuously is necessary before the transmitter can be switched on again. This silent time during which only the LBT receiver is active must be ensured even after the device is switched off.

3 Relevant Documentation

National Legislation

Primary Legislation

Wireless Telegraphy Acts 1926 to 2009.

Secondary Legislation

S.I. 160 of 2006: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Short Range Devices) (Amendment) Order, 2006.

S.I. 405 of 2002: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Short Range Devices) Order, 2002.

S.I. 436 of 1998: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Citizens' Band (CB) Radios) Order, 1998.

S.I. 410 of 1997: Wireless Telegraphy (Cordless Telephones) Exemption Order, 1997.

S.I. 168 of 1994: European Communities (Digital European Cordless Telecommunications DECT) Regulations, 1994.

S.I. 93 of 1998: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Short Range Business Radios) Order, 1998.

ComReg Document

20/58R, as revised: Radio Frequency Plan for Ireland

03/42: Registration of 5.8 GHz Wireless Access Base Stations.

98/62R: TTE 9: Type Approval requirements for analogue cordless telephones for connection to switched public telecommunications networks in Ireland.

ETSI Documentation

ES 200 674: Electromagnetic compatibility and Radio Spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Part 1: Technical characteristics and test methods for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band.

EN 300 220: Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW.

ETS 300 131: Radio Equipment and Systems (RES); Common air interface specification to be used for the interworking between cordless telephone apparatus in the frequency band 864.1 MHz to 868.1 MHz, including public access services.

EN 300 328: Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques.

EN 300 330: Electromagnetic Compatibility and Radio Spectrum Matters (ERM);Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz.

EN 300 422: Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range.

EN 300 440: Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range.

EN 300 674: Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Technical characteristics and test methods for Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band.

EN 300 718: Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Avalanche Beacons; Transmitter-receiver systems.

EN 300 761: Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Automatic Vehicle Identification (AVI) for railways operating in the 2, 45 GHz frequency range.

EN 301 091: Electromagnetic compatibility and Radio Spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Technical characteristics and test methods for radar equipment operating in the 76 GHz to 77 GHz band.

EN 301 326: Fixed Radio Systems; Multipoint Equipment and Antennas

EN 301 357: Electromagnetic compatibility and Radio Spectrum Matters (ERM); Technical characteristics and test methods for analogue cordless wideband audio devices using integral antennas operating in the CEPT recommended 863 MHz to 865 MHz frequency range.

EN 301 489-4: Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 4: Specific conditions for fixed radio links, Broadband Data Transmission System Base stations, ancillary equipment and services.

EN 301 489-17: Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for Broadband Data Transmission Systems.

EN 301 893: 5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

EN 302 264: Electromagnetic compatibility and Radio spectrum Matters (ERM);Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short Range Radar equipment operating in the 77 GHz to 81 GHz band

EN 302 326: Fixed Radio Systems; Multipoint Equipment and Antennas.

EN 302 502: Wireless Access Systems (WAS); 5,8 GHz fixed broadband data transmitting systems; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

EN 302 537: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Ultra Low Power Medical Data Service Systems operating in the frequency range 401 MHz to 402 MHz and 405 MHz to 406 MHz.

EN 302 567: Multiple-Gigabit/s radio equipment operating in the 60 GHz band; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

CEPT Documentation

ECC/DEC/(22)03 of 18 November 2022 on technical characteristics, exemption from individual licensing and free circulation and use of specific radiodetermination applications in the frequency range 116-260 GHz

ERC/DEC/(01)11: ERC Decision of 12 March 2001 on harmonised frequencies, technical characteristics and exemption from individual licensing of Short Range Devices used for Flying Model control operating in the frequency band 34.995 - 35.225 MHz.

ERC/DEC/(01)12: ERC Decision of 12 March 2001 on harmonised frequencies, technical characteristics and exemption from individual licensing of Short Range Devices used for Model control operating in the frequencies 40.665, 40.675, 40.685 and 40.695 MHz.

ERC/DEC/(01)17: ERC Decision of 12 March 2001 amended 9 December 2011 on harmonised frequencies, technical characteristics and exemption from individual licensing of Short Range Devices used for Ultra Low Power Active Medical Implants operating in the frequency band 402 - 405 MHz.

ECC/DEC/(04)03: ECC Decision of 19 March 2004 on the frequency band 77-81 GHz to be designated for the use of Automotive Short Range Radars

ECC/DEC/(04)08: ECC Decision of 9 July 2004 on the harmonised use of the 5 GHz frequency bands for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs)

ECC/DEC/(04)10: ECC Decision of 12 November 2004 amended 1 June 2012 on the frequency bands to be designated for the temporary introduction of Automotive Short Range Radars (SRR) (2004/545/EC) and (2005/50/EC), amended by 2011/485/EU

ECC/DEC/(05)02: ECC Decision of 18 March 2005 on the use of the frequency band 169.4-169.8125 MHz.

ECC/Dec(15)05: ECC Decision of 2 March 2018 on the harmonised frequency range 446.0-446.2 MHz, technical characteristics, exemption from individual licensing and free carriage and use of analogue and digital PMR 446 applications.

ECC/DEC/(06)04: ECC Decision of 24 March 2006 amended 9 December 2011 on the harmonised conditions for devices using UWB technology in bands below 10.6 GHz.

ECC/DEC/(07)01: ECC Decision of 30 March 2007 on specific Material Sensing devices using Ultra-Wideband (UWB) Technology.

ECC/DEC/(12)03: ECC Decision of 2 November 2012 on the harmonised conditions for UWB applications on board aircraft.

ECC/REC/(06)04: Use of the band 5725 – 5875 for Broadband Fixed Wireless Access (BFWA).

ECC/DEC/(08)01: ECC Decision of march 2008 on the harmonised use of Safety-Related Intelligent Transport Systems (ITS) in the 5875-5935 MHz frequency band

ECC/DEC/(20)01: ECC Decision of 20 November 2020 on the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN)

ECC/DEC/(21)02: ECC Decision of 5 November 2021 on the harmonised frequency band 76-77 GHz, technical characteristics, exemption from individual licensing and free circulation and use of High Definition Ground Based Synthetic Aperture Radar (HD-GBSAR)

ECC/DEC/(09)01: ECC Decision of 5 July 2019 on Harmonised use of the 63.72-65.88 GHz frequency band for Intelligent Transport Systems (ITS)

ECC/DEC/(11)03: ECC Decision of 24 June 2011 on the harmonised use of frequencies for Citizens' Band (CB) radio equipment.

ERC/REC/70-03: Relating to the use of Short Range Devices (SRD).

European Legislation

Commission Implementing Decision (EU) 2022/2307 amending Implementing Decision (EU) 2022/179 as regards designating and making available the 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz frequency bands in accordance with the technical conditions set out in the Annex

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

Commission Implementing Decision (EU) 2022/172 of 7 February 2022 amending Implementing Decision (EU) 2018/1538 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands

Commission Decision 2021/1067/EU on the harmonised use of radio spectrum in the 5 945-6 425MHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs)

Commission Decision 2019/785/EU on the harmonisation of radio spectrum for equipment using ultra-wideband technology in the Union and repealing Decision 2007/131/EC

Commission Decision 2019/1345/EU amending Decision 2006/771/EC updating harmonised technical conditions in the area of radio spectrum use for short-range devices.

Commission Decision 2018/1538/EU on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands.

Commission Decision 2017/1483/EU amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC.

Commission Decision 2014/702/EU amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonized way in the Community.

Commission Decision 2013/752/EU amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices.

Commission Decision 2011/829/EU amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices.

Commission decision 2009/343/EC amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonized way in the Community.

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

Commission Decision 2007/90/EC amending Decision 2005/513/EC on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs).

Commission Decision 2006/804/EC on harmonisation of the radio spectrum for radio frequency identification (RFID) devices operating in the ultra high frequency (UHF) band.

Commission Decision 2006/771/EC, amended by 2008/432/EC, 2009/381/EC, 2010/368/EU and 2013/752/EU on the harmonisation of the radio spectrum for use by short-range devices.

Commission Decision 2005/513/EC on the Harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs).

Commission Decision 2005/50/EC amended by 2011/485/EU on the harmonisation of the 24 GHz range radio spectrum band for the time-limited use by automotive short-range radar equipment in the Community.

Commission Decision 2004/545/EC on the harmonisation of radio spectrum in the 79 GHz range for the use of automotive short-range radar equipment in the Community.

Commission Decision 2001/148/EC on the application of Article 3(3)(e) of Directive 1999/5/EC to avalanche beacons.

Please Note that all documentation is subject to updates and revision.