



An Coimisiún um  
**Rialáil Cumarsáide**  
Commission for  
**Communications Regulation**

## Permitted Short Range Devices in Ireland

This document has been superseded  
by a more recent version of ComReg  
02/71 which can be found on [https://  
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General Document

**Reference:** ComReg 02/71 R12

**Date:** 08/04/2020

## Additional Information

Document Version	Date	Nature of Update
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

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# 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<sup>1</sup>, as amended, all apparatus for Wireless Telegraphy<sup>2</sup> 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<sup>3</sup> and S.I. 405 of 2002<sup>4</sup>. 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.

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<sup>1</sup> <http://www.irishstatutebook.ie/eli/1926/act/45/enacted/en/html>

<sup>2</sup> “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.

<sup>3</sup> <http://www.irishstatutebook.ie/eli/2006/si/160/made/en/print>

<sup>4</sup> <http://www.irishstatutebook.ie/eli/2002/si/405/made/en/print>

## 1.1 Radio Equipment Directive

5. The Radio Equipment Directive<sup>5</sup> (“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 (“R&TTE”) 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.<sup>6</sup> 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<sup>7</sup> 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 restrictions has been designated as Class 1. A list of Class 1 radio and

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<sup>5</sup> [http://ec.europa.eu/growth/sectors/electrical-engineering/red-directive\\_en](http://ec.europa.eu/growth/sectors/electrical-engineering/red-directive_en)

<sup>6</sup> [http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/red\\_en](http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/red_en)

<sup>7</sup> <http://www.eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:097:0013:0014:EN:PDF>

telecommunications terminal equipment is maintained on the CEPT website.<sup>8</sup> 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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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 revision aligns the short-range devices exemptions in Ireland with EC Decisions 2019/1345(EU), 2019/785(EU), 2018/1538(EU) and ERC/REC 70-03.
16. A new section has been included to address Ultra-Wideband applications.

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



17. A number of frequency entries have been added for applications in the following tables:

- Non-Specific;
- Tracking, Tracing and Data Acquisition;
- Wideband Data Transmission Systems;
- Road Transport and Traffic Telematics;
- Radiodetermination;
- Inductive Applications; and
- Radio Frequency Identification.

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## 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	442.2 – 450.0 kHz	7 dB $\mu$ A/m at 10 m	Channel spacing $\geq$ 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 dB $\mu$ A/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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
5a	26990-27000 kHz	100 mW e.r.p.	≤ 0.1 % duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	Model control devices <sup>9</sup> may operate without duty cycle restrictions.
5b	27040-27050 kHz	100 mW e.r.p.	≤ 0.1 % duty cycle	-	(EU) 2019/1345 ERC Rec 70-03	Model control devices <sup>9</sup> 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 <sup>9</sup> 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 <sup>9</sup> 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 <sup>9</sup> 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 <sup>10</sup> , the duty cycle limit is 10,0% This frequency band is also identified in Table 2 and 10.

<sup>9</sup> “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.

<sup>10</sup> “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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
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.
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. and Power density limited to -13 dBm/10 kHz for wideband modulation with a bandwidth greater than 250 kHz.		Not specified	(EU) 2019/1345 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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
12c	434.04 – 434.79 MHz	10 mW e.r.p.	Duty Cycle: 100%	≤ 25 kHz <sup>11</sup>	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.  On-site <sup>12</sup> 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 <sup>13</sup>	25 mW e.r.p.	Duty Cycle: ≤ 0.1%	≤ 350 kHz	2019/1345/EC ERC/REC 70-03	-

<sup>11</sup> 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.

<sup>12</sup> 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

<sup>13</sup> 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

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
15b	863 – 865 MHz	25 mW e.r.p.	Duty Cycle: $\leq 0.1\%$ or LBT+AFA	-	2019/1345/EC ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply. <sup>14</sup> This frequency band is also identified in Table 3, 10 and 13
15c	863 - 870 MHz	25 mW e.r.p.	Duty cycle: $\leq 0.1\%$ . <sup>15</sup> The duty cycle applies to the entire transmission (not to each hop channel).	$\leq 100$ kHz for 47 or more channels	2013/752/EU ERC/REC 70-03	Frequency bands for alarms are excluded
15d	863 - 870 MHz	25 mW e.r.p. Power density: -4.5 dBm/100 kHz <sup>16</sup>	Duty cycle: $\leq 0.1\%$ , or LBT + AFA	-	2013/752/EU ERC/REC 70-03	Frequency bands for alarms are excluded.
15e	865 – 868 MHz	25 mW e.r.p	Duty cycle: $\leq 0.1\%$ . The duty cycle applies to the entire transmission (not to each hop channel).	$\leq 50$ kHz for 58 or more hop channels	ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply. <sup>14</sup> This frequency band is also identified in Table 2 and 11.
15f	865 – 868 MHz	25 mW e.r.p	Duty Cycle: $\leq 1\%$ or LBT + AFA	-	2019/1345/EC ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply. <sup>14</sup> This frequency band is also identified in Table 2 and 11.
15g	865 – 868 MHz	500 mW	Duty Cycle: $\leq 10\%$ for Network Access Points; $\leq 2.5\%$ otherwise.  Transmissions only permitted within the bands	$\leq 200$ kHz	2019/1345/EC	This set of usage conditions is only available for data networks <sup>17</sup>

<sup>14</sup> 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.

<sup>15</sup> Duty cycle may be increased to 1% if the band is limited to 865 - 868 MHz.

<sup>16</sup> 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.

<sup>17</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			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.			Requirements on techniques to access spectrum and mitigate interference apply. <sup>14</sup> This frequency band is also identified in Table 2 and 11.
15h	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. <sup>14</sup>
15i	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. <sup>14</sup>
15j	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. <sup>14</sup>
15k	869.7 – 870 MHz	5 mW e.r.p.	-	-	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/voice applications are excluded.
15l	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. <sup>14</sup>
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.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
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	2018/1538/EU	This set of usage conditions is only available for data networks.  All devices within the data networks shall be under the control of network access points. <sup>18 14</sup>
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	917.3 – 918.9 MHz	500 MHz 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	2018/1538/EU	All devices within the data networks shall be under the control of network access points. <sup>18 14</sup>  This frequency band is also identified in Table 2

<sup>18</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
20	917.4 – 919.4 MHz	25 mW	Duty Cycle: ≤1%	≤ 600 kHz	2018/1538/EU	All devices within the data networks shall be under the control of network access points. <sup>18 14</sup>  This frequency band is also identified in Table 2 and 3
21	1 349 MHz	500 mW	-	-	Video Senders Only 2019/1345/EC	National SRD Solution only.
22a	2 400 – 2 483.5 MHz	10 mW e.i.r.p.	-	-	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.
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. <sup>19</sup>	-	-	(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	-

<sup>19</sup> These limits should be measured with an rms detector and an averaging time of 1 ms or less.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
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

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## 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	442.2 – 450.0 kHz	7 dB $\mu$ A/m @ 10m		Continuous Wave (CW) – no modulation. Channel spacing $\geq$ 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 dB $\mu$ A/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: $\leq$ 10%	$\leq$ 50 kHz	ECC/DEC(05)02 ERC/REC 70-03	This frequency band is also identified in Table 1 and 10.

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
4	865 – 868 MHz	500 mW e.r.p.	<p>≤ 10% duty cycle for network access points; ≤ 2.5% duty cycle otherwise.</p> <p>Transmissions only permitted within the frequency ranges 865.6-865.8 MHz, 866.2-866.4 MHz, 866.8-867.0 MHz and 867.4-867.6 MHz.</p> <p>Adaptive Power Control (APC) required for spectrum sharing.<sup>20</sup></p>	≤ 200 kHz	ERC/REC 70-03	Data Networks. <sup>21</sup> 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.
5	870 – 874.4MHz	500 mW e.r.p.	<p>≤ 10% duty cycle for network access points; ≤ 2.5% duty cycle otherwise.</p> <p>Adaptive Power Control (APC) required for spectrum sharing.<sup>20</sup></p>	≤ 200 kHz	ERC/REC 70-03	Data networks <sup>21</sup> . 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.	<p>Transmissions only permitted within the frequency ranges 917.3-917.7 MHz and 918.5-918.9 MHz.</p>	≤ 200 kHz	ERC/REC 70-03	Data networks <sup>21</sup> . All nomadic and mobile devices within the data network shall be

<sup>20</sup> Alternatively other mitigation techniques which achieve at least an equivalent level of spectrum compatibility.

<sup>21</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			<p>≤ 10% duty cycle for network access points; ≤ 2.5% duty cycle otherwise.</p> <p>Adaptive Power Control (APC) required for spectrum sharing.<sup>20</sup></p>			<p>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</p>
7	915 – 919.4 MHz	25 mW e.i.r.p.	≤ 1% Duty Cycle	≤ 600 kHz	ERC/REC 70-03	<p>Data networks<sup>21</sup>. 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.</p>
8	5 725 – 5 875 MHz	400 mW e.i.r.p.	<p>APC required.</p> <p>Adequate spectrum sharing mechanisms (e.g. DFS and DAA) shall be implemented.</p>	≥1 MHz and ≤20 MHz	ERC/REC 70-03	<p>This frequency band is also identified in Table 1</p>

**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

<sup>22</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	863 – 868 MHz	25 mW e.i.r.p.	$\leq 10\%$ duty cycle for network access points, $\leq 2.8\%$ otherwise	$> 600 \text{ kHz} \leq 1 \text{ MHz}$	(EU)2019/1345 ERC/REC 70-03	Requirements on techniques to access spectrum and mitigate interference apply. <sup>14</sup> This frequency band is also identified in Table 1, 10 and 13.
2a	915.8 – 919.4 MHz	25 mW e.i.r.p.	$\leq 10\%$ duty cycle for network access points, $\leq 2.8\%$ otherwise	$> 600 \text{ kHz} \leq 1 \text{ MHz}$	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	$\leq 10\%$ duty cycle for network access points, $\leq 2.8\%$ otherwise	$\leq 600 \text{ kHz}$	2018/1538/EU	All devices within the data networks shall be under the control of network access points. <sup>18 23</sup> This frequency band is also identified in Table 1 and 2
3	2 400 – 2483.5 MHz	100 mW e.i.r.p. 100 mW/100 kHz e.i.r.p. density applies when frequency hopping modulation is used.			(EU)2019/1345 ERC/REC 70-03	<sup>23</sup> This frequency band is also identified in Table 1.

<sup>23</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
		For wide band modulations other than FHSS, the maximum e.i.r.p. density is limited to 10 mW/MHz				
4	5.15 – 5.35 GHz	200 mW mean e.i.r.p.  Power Density: (Max mean) 10 mW/MHz in any 1 MHz band	Equipment shall implement adequate spectrum sharing mechanisms (eg. Listen-Before-Talk, Detect and Avoid) in order to facilitate sharing between the various technologies and applications. <small>24</small>		(EC)2007/90 ECC/DEC/(04)08	Indoor use only. Not included in ERC/REC 70-03 – National SRD solution only. <sup>25</sup>
5	5.470 – 5.725 GHz	1 W mean e.i.r.p. Power Density: (Max mean) 50 mW/MHz in any 1 MHz band	Equipment shall implement adequate spectrum sharing mechanisms (eg. Listen-Before-Talk, Detect and Avoid) in order to facilitate sharing between the various technologies and applications. <small>24</small>		(EC)2007/90 ECC/DEC/(04)08	Not included in ERC/REC 70-03 National SRD solution only. <sup>25</sup>
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 (eg. Listen-Before-Talk, Detect and Avoid) in order to facilitate sharing between the		ECC/REC (06)04	Registration Required <small>26</small>  National SRD solution only.

<sup>24</sup> WAS/RLANs operating in the bands 5250 – 5350 MHz and 5470 – 5725 MHz shall use mitigation techniques that give at least the same protection as the detection, operational, and response requirements described in EN 301 893 to ensure compatible operation with radio determination systems (radars). Such mitigation techniques shall equalise the probability of selecting a specific channel for all available channels so as to ensure, on average, a near-uniform spread of spectrum loading. Specific information about the applicability of EN 301 893 can be found at [http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/rte/index\\_en.htm](http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/rte/index_en.htm)

<sup>25</sup> WAS/RLANs operating in the bands 5250 – 5350 MHz and 5470 – 5725 MHz shall employ transmitter power control (TPC) which provides, on average a mitigation factor of at least 3 dB on the maximum permitted output power of the systems. If TPC is not in use the maximum permitted mean EIRP and the corresponding mean EIRP density limits shall be reduced by 3 dB.

<sup>26</sup> See ComReg document 03/42 or [http://www.comreg.ie/licensing\\_and\\_services/5\\_8\\_ghz\\_registration.683.ghzlic.html](http://www.comreg.ie/licensing_and_services/5_8_ghz_registration.683.ghzlic.html)

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			various technologies and applications.			
7	17.1 – 17.3 GHz <sup>27</sup>	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
8a	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. <sup>23</sup>  This frequency band is also identified in Table 1
8b	57 – 71 GHz	40 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and maximum transmit power of 27 dBm at the antenna port or ports			(EC)2019/1345 ERC/REC 70-03	<sup>23</sup> This frequency band is also identified in Table 1
8c	57 – 71 GHz	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and transmit antenna gain $\geq 30$ dBi			(EC)2019/1345 ECC Report 288  ERC/REC 70-03	Applies only to fixed outdoor installations <sup>23</sup>  This frequency band is also identified in Table 1

<sup>27</sup> 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 – Radiodeterminaton Applications.



**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 302 567 – sub-band 8a (8b & 8c to be defined)

SUPERSEDED - NO LONGER IN FORCE

## 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	984 – 7484 kHz <sup>28</sup>	9 dB $\mu$ A/m at 10m	Duty Cycle: $\leq 1\%$ Centre frequency 4234 kHz		(EC)2019/1345 ERC/REC 70-03	Centre frequency is 4234 kHz <sup>29 30</sup>
2	7.3 – 23 MHz <sup>31</sup>	7 dB $\mu$ A/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. <sup>29 32</sup> Centre frequency is 13.547 MHz
3	27.09 – 27.10 MHz	42 dB $\mu$ A/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.

<sup>28</sup> Balise up-link (ground to train) systems including Eurobalise

<sup>29</sup> This set of usage conditions is only available for Eurobalise transmissions in the presence of trains and using the 27 MHz band for telepowering

<sup>30</sup> 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.

<sup>31</sup> Loop up-link (ground to train) systems including Euroloop

<sup>32</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						Centre frequency is 27.095 MHz Frequency band also identified in Table 1.
4	76-77 GHz <sup>33</sup>	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

<sup>33</sup> 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 4: Regulatory parameters for Road Transport and Traffic Telematics (RTTT)**

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	5.795 – 5.815 GHz	2 W e.i.r.p.	<sup>34</sup>		(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. <sup>35</sup>
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	<sup>34</sup>		(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	<sup>34</sup>		(EU)2019/1345	This set of usage conditions is only available to vehicle-vehicle, vehicle-to-infrastructure and

<sup>34</sup> 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

<sup>35</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						infrastructure-to-vehicle systems.
4	21.65 – 26.65 GHz	<p>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.;</p> <p>Peak Power Density: 0 dBm/50 MHz e.i.r.p.</p>			Decision 2005/50/EC, as amended. ECC/DEC/(04)10	<p>Temporary designation for automotive Short Range Radar (SRR) for collision mitigation and traffic safety applications only.</p> <p>For automotive Short Range Radars (SRR)  * See detailed requirements in related ECC Decision.</p> <p>New SRR equipment shall not be placed onto the market as of 1 July 2013.</p>
5	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
6	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
7	24.075 – 24.150 GHz	100 mW e.i.r.p.	<p>≤4µs/40 kHz dwell time for every 3 ms  34</p>		Decision 2005/50/EC, as amended. (EU)2019/1345 ERC/REC 70-03	<p>For automotive radars.</p> <p>The mitigation requirement is given for devices mounted behind a bumper. If mounted without a bumper, the</p>

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						requirement should be 3 $\mu$ s/40 kHz maximum dwell time every 3 ms
8	24.075 – 24.150 GHz	100 mW e.i.r.p.	$\leq$ 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.
9	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.
10	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. <sup>36</sup>
11	63.72 – 65.88 GHz	40 dBm e.i.r.p.			(EU)2019/1345	This set of usage conditions is only available to vehicle-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems. <sup>37</sup>

<sup>36</sup> 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.

<sup>37</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
12	76 – 77 GHz	55 dBm peak e.i.r.p. 50 dBm average power or 23.5 dBm average power for pulse radar only.	34		(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
13	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

**Harmonised Standards**

- EN 300 674 – sub-bands: 1, 2
- EN 301 091 – sub-bands: 12
- EN 302 288 – sub-bands: 4 & 10
- EN 302 858 – sub-bands: 5 - 9
- EN 303 360 – sub-bands: 13

## 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	100 Hz – 148 kHz	46 dB $\mu$ A/m at 10 m distance at 100 Hz outside the NMR device	-	-	ERC/REC 70-03	For enclosed Nuclear Magnetic Resonance (NMR) applications. Magnetic field strength descending 10 dB/decade above 100 Hz
2	148 kHz – 5 MHz	-15 dB $\mu$ A/m at 10 m distance outside the NMR device	-	-	ERC/REC 70-03	For enclosed Nuclear Magnetic Resonance (NMR) applications.
3	5 – 30 MHz	-5 dB $\mu$ A/m at 10 m distance outside the NMR device	-	-	ERC/REC 70-03	For enclosed Nuclear Magnetic Resonance (NMR) applications.
4	30 – 130 MHz	-36 dBm e.r.p. outside the NMR device	-	-	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 Radars) Order 2013.	For Ground and Wall Probing Radar (GPR / WPR) imaging systems, subject to an appropriate licensing regime. See detailed requirements in related ECC decision. <sup>38</sup>
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	



	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
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 <sup>43</sup>
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. <sup>38 43</sup>
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 <sup>38 43</sup>  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	500 mW e.i.r.p.			ERC/REC 70-03	
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 <sup>38 39</sup> - DAA 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

<sup>38</sup> 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>

<sup>39</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
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. <sup>40</sup> <sup>41 42</sup>		(EC)2019/1345	This set of usage conditions is only available to Level Probing Radar. <sup>43 43</sup> Established exclusion zones around radio astronomy sites must be obeyed. <sup>38</sup>
16c	24.05-27 GHz	43 dBm e.i.r.p. <sup>44</sup>	<sup>40</sup>		(EC)2019/1345	This set of usage conditions is only available to Tank Level Probing Radar. <sup>38 43</sup>
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). <sup>43</sup>

<sup>40</sup> 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.

<sup>41</sup> Antenna requirements that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant restrictions are described in harmonised standards or parts thereof the references of which have been published in the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these restrictions shall be ensured.

<sup>42</sup> 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.

<sup>43</sup> 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>

<sup>44</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			mitigate interference apply. <sup>45</sup> <sub>46 47</sub>			
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 <sup>43</sup>
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 <sup>43</sup>
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. <sup>48</sup> <sub>49 50</sub>		(EC)2019/1345	This set of usage conditions is only available to Level Probing Radar. <sup>43</sup>
17c	57-64 GHz	43 dBm e.i.r.p.	<sub>40</sub>		(EC)2019/1345	For industrial level probing radar (LPR).

<sup>45</sup> 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.

<sup>46</sup> Antenna requirements that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant restrictions are described in harmonised standards or parts thereof the references of which have been published in the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these restrictions shall be ensured.

<sup>47</sup> 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.

<sup>48</sup> 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.

<sup>49</sup> Antenna requirements that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant restrictions are described in harmonised standards or parts thereof the references of which have been published in the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these restrictions shall be ensured.

<sup>50</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						* see detailed requirements in related ECC Decision <sup>43</sup>
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 <sup>43</sup>
18a	75 – 85 GHz	-41.3 dBm/MHz e.i.r.p.			2013/752/EU ERC/REC 70-03	Tank Level Probing Radar (TLPR) only <sup>43</sup>
18b	75 – 85 GHz	*	*	-	ECC/DEC/(11)02 ERC/REC 70-03	For industrial level probing radar (LPR). * see detailed requirements in related ECC Decision <sup>43</sup>
18c	75 - 85 GHz	34 dBm/50 MHz peak e.i.r.p and -3 dBm/MHz mean e.i.r.p	<sup>48 49 50</sup>	-	(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. <sup>43</sup>
18d	75 - 85 GHz	43 dBm e.i.r.p	<sup>48</sup>		(EC)2019/1345	This set of usage conditions is only available to Tank Level Probing Radar. <sup>43</sup>

### Harmonised Standards

EN 300 440 - sub-bands 6, 7, 8, 13, 14, 15, 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  
 Sub-bands 1- 4 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	868.600 – 868.700 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 for high-speed data transmission.
2	869.200 – 869.250 MHz	10 mW e.r.p.	≤ 0.1 % Duty cycle	≤ 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

SUPERSEDED - NO LONGER IN FORCE

## 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	100 Hz – 9kHz	82 dB $\mu$ A/m @ 10m	-	-	ERC/REC 70 03	Antenna size of $< 1/20\lambda$ <sup>51</sup>
2	9 – 90 kHz	72 dB $\mu$ A/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 <sup>52</sup>
3	90 – 119 kHz	42 dB $\mu$ A/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 dB $\mu$ A/m @ 10m	-	<sup>53</sup>	(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 <sup>52</sup>

<sup>51</sup> The antenna size is described by the distance between those 2 points on the antenna that have the largest distance between them.

<sup>52</sup> In case of loop antenna used within bands 2 & 4 integral or dedicated within an area between 0.05 m<sup>2</sup> and 0.16 m<sup>2</sup>, the field strength is reduced by  $10 \cdot \log(\text{area}/0.16 \text{ m}^2)$ ; for an antenna area less than 0.05 m<sup>2</sup> the field strength is reduced by 10 dB.

<sup>53</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
5	135 – 140 kHz	42 dB $\mu$ A/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 dB $\mu$ A/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	-5 dB $\mu$ A/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 dB $\mu$ A/m at 10m for systems operating at bandwidths larger than 10 kHz whilst keeping the density limit (-15 dB $\mu$ A/m at 10m) Frequency band also identified in Table 6
8	400 – 600 kHz	-8 dB $\mu$ A/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 dB $\mu$ A/m at 10 m for systems operating at bandwidths larger than 10 kHz measured at the centre frequency, whilst keeping the



	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						density limit (-8 dB $\mu$ A/m in a bandwidth of 10 kHz.)  These systems should operate with a minimum operating bandwidth of 30 kHz.
9	3.155 – 3.400 MHz	13.5 dB $\mu$ A/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 dB $\mu$ A/m @ 10m			(EU)2019/1345 ERC/REC 70-03	
11	7.4 – 8.8 MHz	9 dB $\mu$ A/m @ 10m			(EU)2019/1345 ERC/REC 70-03	
12	5 – 30 MHz	-20 dB $\mu$ A/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 dB $\mu$ A/m at 10m for systems operating at bandwidths larger than 10 kHz whilst keeping the density limit (-20 dB $\mu$ A/m at 10m)
13	10.2 – 11 MHz	9 dB $\mu$ A/m @ 10m			(EU)2019/1345 ERC/REC 70-03	Frequency Table also identified in Table 1

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
14	13.553 – 13.567 MHz	42 dBµA/m @ 10m			(EU)2019/1345 ERC/REC 70-03	This frequency band is also identified in Table 1. <sup>54</sup>
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. <sup>54</sup>
16	26.957 – 27.283 MHz <sup>55</sup>	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 303 660 – sub-band 1

EN 303 447 – sub-bands 1, to 6

EN 303 454 – sub-bands 1 to 6

EN 302 536 – sub-bands 7

<sup>54</sup> 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.

<sup>55</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	100 Hz – 9 kHz	120 dB $\mu$ A/m at 10m	-	-	ERC/REC 70-03	Inductive loop systems to assist the hearing impaired. Antenna size < 1/20 $\lambda$ . <sup>56</sup>
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. <sup>57</sup>
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	(EU)2019/1345 ERC/REC 70-03	Aids for the hearing impaired.

<sup>56</sup> The antenna size is described by the distance between those 2 points on the antenna that have the largest distance between them

<sup>57</sup> 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 / Maximum 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.	<sup>58</sup> <sup>59</sup>	50 kHz	(EU)2019/1345 ERC/REC 70-03	Assistive Listening Device (ALD). On a tuning range basis. Individual licence may be required.
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
9	470 – 786 MHz	50 mW e.r.p.	-	-	ERC/REC 70-03	Radio microphones. On a tuning range basis. Individual license may be required
10	786 – 789 MHz	12 mW e.r.p.		-	ECC/DEC/(09)03 ERC/REC 70-03	Radio microphones. On a tuning range basis. Individual license may be required
11	823 – 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. Individual licence may be required. 100 mW restricted to body worn equipment.

<sup>58</sup> A threshold of 35dB $\mu$ V/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.

<sup>59</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
12	826 – 832 MHz	100 mW e.i.r.p.		200 kHz	ECC/DEC/(09)03 ERC/REC 70-03	Radio microphones. Individual licence may be required. 100 mW restricted to body worn equipment.
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. Individual license may be required. 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. Individual licence required. 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. Individual licence required. 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. Individual Licence may be required. See conditions in Annex 4 of ECC Report 270.
18	1785 – 1795 MHz	20 mW e.i.r.p./50 mW e.i.r.p.	-	-	ERC/REC 70-03	Radio microphones. Individual licence may be

	Frequency Band	Power / Magnetic Field	Spectrum Access & Mitigation Requirements	Modulation / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
						required. <sup>60</sup> 50 mW restricted to body worn equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1785 – 1804.8 MHz band
19	1795 – 1800 MHz	20 mW e.i.r.p./50 mW e.i.r.p.	-	-	ERC/REC 70-03	Radio microphones. Individual licence may be required. <sup>60</sup> 50 mW restricted to body worn equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1785 – 1804.8 MHz band.
20	1800 – 1804.8 MHz	20 mW e.i.r.p./50 mW e.i.r.p.	-	-	ERC/REC 70-03	Radio microphones. Individual licence may be required. <sup>60</sup> 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
- EN 303 348 – sub-bands 1

<sup>60</sup> <https://www.comreg.ie/industry/radio-spectrum/licensing/search-licence-type/programme-making-and-special-events-pmse/>

## 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	865 - 868 MHz	2W e.i.r.p. <sup>61</sup>	<sup>62</sup>	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	<sup>63</sup>
3	865.6 – 867.6 MHz	2 e.r.p.		200 kHz	ERC/REC 70-03	<sup>63</sup>
4	867.6 – 868.0 MHz	500 mW e.r.p.		200 kHz	ERC/REC 70-03	<sup>63</sup>
5	915 – 921 MHz	4 W e.r.p. <sup>64</sup>		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

<sup>61</sup> 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.

<sup>62</sup> 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

<sup>63</sup> 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.

<sup>64</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
6	916.1 – 918.9 MHz	4 W e.r.p. <sup>64</sup>		400 kHz	(EU)2018/1538	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

SUPERSEDED - NO LONGER IN FORCE



## 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
1	9 – 315 kHz	30 dB $\mu$ A/m @ 10m	$\leq$ 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 dB $\mu$ A/m @ 10m	$\leq$ 10% Duty Cycle		2013/752/EU ERC/REC 70-03	Animal implantable devices
3	12.5 – 20 MHz	-7 dB $\mu$ A/m @ 10m	$\leq$ 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 / Maximum 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 <sup>65 66</sup>	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 <sup>67 68</sup>
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

<sup>65</sup> 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%.

<sup>66</sup> 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%.

<sup>67</sup> 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.

<sup>68</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			increased bandwidth up to 300 kHz. <sup>69 70</sup>			
7	405 – 406 MHz	25 µW e.r.p.	<p>≤ 0.1% Duty Cycle                      Unless devices use LBT or equally efficient mitigation technique in which case there is no duty cycle restriction.<sup>65</sup></p> <p><sup>66</sup></p>	25 kHz	2013/752/EU ERC/REC 70-03	<p>For Ultra Low Power Active Medical Implants and accessories covered by the applicable harmonised standard and not covered by 402 – 405 MHz.</p> <p>Individual transmitters may combine adjacent 25kHz channels for increased bandwidth up to 100 kHz<sup>67</sup></p> <p><sup>68</sup></p>
8	458.6375 – 458.8375 MHz	10 mW e.r.p.		25 kHz		<p>ECG monitoring only</p> <p>Not included in ERC/REC 70-03</p> <p>National SRD solution only.</p>
9	2483.5 – 2500 MHz	10 dBm e.i.r.p.	<p>LBT + AFA and less than 10% duty cycle</p> <p>The equipment shall implement a spectrum access mechanism as described in the applicable</p>	1 MHz	2017/1483/EU	For Low Power Active Medical Implants and associated peripherals, covered by the

<sup>69</sup> The equipment shall implement a spectrum access mechanism as described in the applicable harmonised standard or an equivalent spectrum access mechanism.

<sup>70</sup> 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 / Maximum Occupied Bandwidth	EC/ECC/ERC Deliverable	Notes
			harmonised standard or an equivalent spectrum access mechanism			applicable harmonised standard. 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

SUPERSEDED - NO LONGER IN FORCE

## 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	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
2	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
3	49.82 – 49.98 MHz	10 mW e.r.p.				National SRD solution only.  Baby monitors <sup>71</sup> This frequency band is also identified in Table 1.
4	87.5 – 108 MHz	50 nW e.r.p.		200 kHz	(EU)2019/1345 ERC/REC 70-03	

<sup>71</sup> 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
5	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.
6	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
7	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
8	864.8 – 865.0 MHz	10 mW e.r.p.		50 kHz	ERC/REC 70-03	Narrow band analogue voice devices
9	1880 – 1900 MHz	250 mW e.r.p. (Peak)			ERC/DEC/(94)03 ERC/DEC/(98)22	National SRD solution only. DECT Cordless Phones  National Legislation: S.I. 168 of 1994

**Harmonised Standards**

EN 300 220 – sub-bands 3 &amp; 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

SUPERSEDED - NO LONGER IN FORCE

## 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 $\leq 10\%$ 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 $\leq 2\%$ 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

	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	$\leq 1.6$ GHz	- 90 dBm/MHz	- 50 dBm	2019/785/EC	
2	1.6 – 2.7 GHz	- 85 dBm/MHz	- 45 dBm	2019/785/EC	
3	$2.7 < f \leq 3.1$ GHz	- 70 dBm/MHz	- 36 dBm	2019/785/EC	
4	$3.1 < f \leq 3.4$ GHz	- 70 dBm/MHz or - 41.3 dBm/MHz using LDC or DAA	- 36 dBm or 0 dBm	2019/785/EC	72 73
5	$3.4 < f \leq 3.8$ GHz	- 80 dBm/MHz or - 41.3 dBm/MHz using LDC or DAA	- 40 dBm or 0 dBm	2019/785/EC	72 73
6	$3.8 < f \leq 4.8$ GHz	- 70 dBm/MHz or - 41.3 dBm/MHz using LDC or DAA	- 30 dBm or 0 dBm	2019/785/EC	72 73
7	$4.8 < f \leq 6$ GHz	- 70 dBm/MHz	- 30 dBm	2019/785/EC	
8	$6 < f \leq 8.5$ GHz	- 41.3 dBm/MHz	0 dBm	2019/785/EC	
9	$8.5 < f \leq 9$ GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	73

<sup>72</sup> Within the 3.1 GHz to 4.8 GHz band the Low Duty Cycle (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 levels of spectrum protection in order to comply with the corresponding essential requirements of Directive 2014/53/EU.

<sup>73</sup> 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 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

	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
		or – 41.3 dBm/MHz using DAA	or 0 dBm		
10	$9 < f \leq 10.6$ GHz	– 65 dBm/MHz	– 25 dBm	2019/785/EC	
11	$f > 10.6$ GHz	– 85 dBm/MHz	– 45 dBm	2019/785/EC	

### 2.15.2 Location Tracking Systems (Type 1)

	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	$f \leq 1,6$ GHz	– 90 dBm/MHz	– 50 dBm	2019/785/EC	
2	$1.6 < f \leq 2.7$ GHz	– 85 dBm/MHz	– 45 dBm	2019/785/EC	
3	$2.7 < f \leq 3.4$ GHz	– 70 dBm/MHz	– 36 dBm	2019/785/EC	
4	$3.4 < f \leq 3.8$ GHz	– 80 dBm/MHz	– 40 dBm	2019/785/EC	
5	$3.8 < f \leq 6.0$ GHz	– 70 dBm/MHz	– 30 dBm	2019/785/EC	
6	$6 < f \leq 8.5$ GHz	– 41.3 dBm/MHz	0 dBm	2019/785/EC	
7	$8.5 < f \leq 9$ GHz	– 65 dBm/MHz or – 41.3 dBm/MHz using DAA	– 25 dBm or 0 dBm	2019/785/EC	74
8	$9 < f \leq 10.6$ GHz	– 65 dBm/MHz	– 25 dBm	2019/785/EC	
9	$f > 10.6$ GHz	– 85 dBm/MHz	– 45 dBm	2019/785/EC	

<sup>74</sup> The DAA mitigation technique and its limits are defined in ETSI Standard EN 302 065-2. 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 2019/785/EU.

## 2.15.3 Motor 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	$f \leq 1.6$ GHz	- 90 dBm/MHz	- 50 dBm	2019/785/EC	
2	$1.6 < f \leq 2.7$ GHz	- 85 dBm/MHz	- 45 dBm	2019/785/EC	
3	$2.7 < f \leq 3.1$ GHz	- 70 dBm/MHz	- 36 dBm	2019/785/EC	
4	$3.1 < f \leq 3.4$ GHz	- 70 dBm/MHz or - 41.3 dBm/MHz using LDC + e.l. or - 41,3 dBm/MHz using TPC + DAA + e.l.	- 36 dBm or $\leq 0$ dBm or $\leq 0$ dBm	2019/785/EC	<sup>75 76 77 78</sup>
5	$3.4 < f \leq 3.8$ GHz	- 80 dBm/MHz or - 41.3 dBm/MHz using LDC + e.l. or - 41,3 dBm/MHz using TPC +DAA + e.l.	- 40 dBm or $\leq 0$ dBm or $\leq 0$ dBm	2019/785/EC	<sup>75 76 77 78</sup>
6	$3.8 < f \leq 4.8$ GHz	- 70 dBm/MHz or - 41.3 dBm/MHz using LDC + e.l. or	- 30 dBm or $\leq 0$ dBm or	2019/785/EC	<sup>75 76 77 78</sup>

<sup>75</sup> The LDC mitigation technique and its limits are defined in ETSI Standard EN 302 065-3. 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 2019/785/EU.

<sup>76</sup> The DAA mitigation technique and its limits are defined in ETSI Standard EN 302 065-3. 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 2019/785/EU.

<sup>77</sup> The Transmit Power Control (TPC) mitigation technique and its limits are defined in ETSI Standard EN 302 065-3. 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 off Directive 2014/53/EU.

<sup>78</sup> The Exterior Limit (e.l.)  $\leq -53.3$  dBm/MHz is required. The e.l. is defined in ETSI standard EN 302 065-3. 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 off 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 +DAA + e.l.	≤ 0 dBm		
7	4.8 < f ≤ 6 GHz	– 70 dBm/MHz	– 30 dBm	2019/785/EC	
8	6 < f ≤ 8.5 GHz	– 53,3 dBm/MHz or – 41,3 dBm/MHz using LDC + e.l. or – 41.3 dBm/MHz using TPC + e.l.	– 13.3 dBm or ≤ 0 dBm or ≤ 0 dBm	2019/785/EC	75 76 77 78
9	8.5 < f ≤ 9 GHz	– 65 dBm/MHz or – 41.3 dBm/MHz using TPC +DAA + e.l.	– 25 dBm or ≤ 0 dBm	2019/785/EC	76 77 78
10	9 < f ≤ 10.6 GHz	– 65 dBm/MHz	– 25 dBm	2019/785/EC	
11	F > 10.6 GHz	– 85 dBm/MHz	– 45 dBm	2019/785/EC	

#### 2.15.4 On-board Aircraft

	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	2019/785/EC	
2	1.6 < f ≤ 2.7 GHz	– 85 dBm/MHz	– 45 dBm	2019/785/EC	
3	2.7 < f ≤ 3.4 GHz	– 70 dBm/MHz	– 36 dBm	2019/785/EC	
4	3.4 < f ≤ 3.8 GHz	– 80 dBm/MHz	– 40 dBm	2019/785/EC	
5	3.8 < f ≤ 6.0 GHz	– 70 dBm/MHz	– 30 dBm	2019/785/EC	
6	6.0 < f ≤ 6.650 GHz	– 41,3 dBm/MHz	0 dBm	2019/785/EC	
7	6.650 < f ≤ 6.6752 GHz	– 62,3 dBm/MHz	– 21 dBm	2019/785/EC	notch of 21 dB should be implemented to meet the – 62,3 dBm/MHz level. <sup>79</sup>
8	6.6752 < f ≤ 8.5 GHz	– 41,3 dBm/MHz	0 dBm	2019/785/EC	7.25 to 7,75 GHz (FSS and MetSat (7.45 to 7.55 GHz) protection)

<sup>79</sup> Alternative mitigation techniques, such as the use of shielded portholes, may be used if they ensure at least an equivalent performance.

	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
					7.75 to 7.9 GHz (MetSat protection). 79 80 81
9	$8.5 < f \leq 10.6$ GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	
10	$f > 10.6$ GHz	- 85 dBm/MHz	- 45 dBm	2019/785/EC	

### 2.15.5 Contact Base Material Sensing Devices

	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	$f \leq 1.73$ GHz	- 85 dBm/MHz	- 45 dBm	2019/785/EC	82
2	$1.73 < f \leq 2.2$ GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	
3	$2.2 < f \leq 2.5$ GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	
4	$2.5 < f \leq 2.69$ GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	82 83
5	$2.69 < f \leq 2.7$ GHz	- 55 dBm/MHz	- 15 dBm	2019/785/EC	84 85

<sup>80</sup> 7.25 – 7.75 GHz (Fixed Satellite Service) and 7.45 – 7.55 GHz (Meteorological Satellite) protection:

-51.3 – 20\*log(10[km]/x[km])(dBm/MHz) for heights above ground or over 1 km, where x is the aircraft height above ground in km, -71.3 dBm/MHz for heights above ground of 1 km and below.

<sup>81</sup> 7.75 – 7.9 GHz (Meteorological Satellite) protection:

-44.3 – 20\*log(10[km]/x[km])(dBm/MHz) for heights above ground or over 1 km, where x is the aircraft height above ground in km, -64.3 dBm/MHz for heights above ground of 1 km and below.

<sup>82</sup> Devices using the Listen Before Talk (LBT) mechanism are permitted to operate in the 1.215 - 1.75 GHz frequency range with a maximum mean e.i.r.p. spectral density of -70 dBm/MHz and in the 2.5 – 2.69 GHz and 2.7 – 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 defined in ETSI Standard EN 302 065-4.

<sup>83</sup> To protect the radio services, non-fixed installations must fulfil the following requirement for total radiated power:

- a) in the 2.5 – 2.69 GHz and 4.8 – 5 GHz frequency ranges, the total power spectral density must be 10 dB below the maximum e.i.r.p. spectral density.
- b) in the 3.4 – 3.8 GHz frequency range, the total power spectral density must be 5 dB below the maximum e.i.r.p. spectral density.

<sup>84</sup> To protect the Radio Astronomy Service (RAS) in the 2.69 – 2.7 GHz and 4.8 – 5 GHz frequency bands, the total power spectral density must be below -65 dBm/MHz.

<sup>85</sup> Limitation of the Duty Cycle to 10% per second

	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
6	2.7 < f ≤ 2.9 GHz	- 70 dBm/MHz	- 30 dBm	2019/785/EC	82
7	2.9 < f ≤ 3.4 GHz	- 70 dBm/MHz	- 30 dBm	2019/785/EC	82 86 87
8	3.4 < f ≤ 3.8 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	83 86 87 87
9	3.8 < f ≤ 4.8 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	86 87
10	4.8 < f ≤ 5.0 GHz	- 55 dBm/MHz	- 15 dBm	2019/785/EC	83 84 85
11	5.0 < f ≤ 5.25 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	
12	5.25 < f ≤ 5.35 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	
13	5.35 < f ≤ 5.6 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	
14	5.6 < f ≤ 5.65 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	
15	5.65 < f ≤ 5.725 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	
16	5.725 < f ≤ 6.0 GHz	- 50 dBm/MHz	- 10 dBm	2019/785/EC	
17	6.0 < f ≤ 8.5 GHz	- 41.3 dBm/MHz	0 dBm	2019/785/EC	88
18	8.5 < f ≤ 9.0 GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	87
19	9.0 < f ≤ 10.6 GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	
20	f > 10.6 GHz	- 85 dBm/MHz	- 45 dBm	2019/785/EC	

<sup>86</sup> Within the 3.1 – 4.8 GHz band, devices implanting LDC mitigation techniques 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 define in 50 MHz. the LDC mitigation technique and its limits are define in ETSI standard EN 302 065-1. When LDC is implemented note 15.16 applies.

<sup>87</sup> Within the 3.1 – 4.8 GHz and 8.5 – 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. When DAA is implemented note 15.12 applies.

<sup>88</sup> No Fixed outdoor installation is permitted.

### 2.15.6 Non-Contact Base Material Sensing Devices

	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	$f \leq 17.3$ GHz	- 85 dBm/MHz	- 60 dBm	2019/785/EC	89
2	$1.73 < f \leq 2.2$ GHz	- 70 dBm/MHz	- 45 dBm	2019/785/EC	
3	$2.2 < f \leq 2.5$ GHz	- 50 dBm/MHz	- 25 dBm	2019/785/EC	
4	$2.5 < f \leq 2.69$ GHz	- 65 dBm/MHz	- 40 dBm	2019/785/EC	89 90
5	$2.69 < f \leq 2.7$ GHz	- 70 dBm/MHz	- 45 dBm	2019/785/EC	91 92
6	$2.7 < f \leq 2.9$ GHz	- 70 dBm/MHz	- 45 dBm	2019/785/EC	89
7	$2.9 < f \leq 3.4$ GHz	- 70 dBm/MHz	- 45 dBm	2019/785/EC	89 93 94
8	$3.4 < f \leq 3.8$ GHz	- 70 dBm/MHz	- 45 dBm	2019/785/EC	93 92 93 94
9	$3.8 < f \leq 4.8$ GHz	- 50 dBm/MHz	- 25 dBm	2019/785/EC	93 94
10	$4.8 < f \leq 5.0$ GHz	- 55 dBm/MHz	- 30 dBm	2019/785/EC	90 91 92

<sup>89</sup> 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 defined in ETSI Standard EN 302 065-4. 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.

<sup>90</sup> To protect the radio services, non-fixed installations must fulfil the following requirement for total radiated power:

In the 2.5 GHz to 2.69 GHz and 4.8 GHz to 5 GHz frequency ranges, the total power spectral density must be 10 dB below the maximum e.i.r.p. spectral density. In the 3.4 GHz to 3.8 GHz frequency range, the total power spectral density must be 5 dB below the maximum e.i.r.p. spectral density.

<sup>91</sup> 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 power spectral density must be below - 65 dBm/MHz.

<sup>92</sup> Limitation of duty cycle to 10% per second

<sup>93</sup> 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 <sup>88</sup> applies.

<sup>94</sup> 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 <sup>88</sup> applies.

	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
11	5.0 < f ≤ 5.25 GHz	- 55 dBm/MHz	- 30 dBm	2019/785/EC	
12	5.25 < f ≤ 5.35 GHz	- 50 dBm/MHz	- 25 dBm	2019/785/EC	
13	5.35 < f ≤ 5.6 GHz	- 50 dBm/MHz	- 25 dBm	2019/785/EC	
14	5.6 < f ≤ 5.65 GHz	- 50 dBm/MHz	- 25 dBm	2019/785/EC	
15	5.65 < f ≤ 5.725 GHz	- 65 dBm/MHz	- 40 dBm	2019/785/EC	
16	5.725 < f ≤ 6.0 GHz	- 60 dBm/MHz	- 35 dBm	2019/785/EC	
17	6.0 < f ≤ 8.5 GHz	- 41.3 dBm/MHz	0 dBm	2019/785/EC	<sup>95</sup>
18	8.5 < f ≤ 9.0 GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	<sup>94</sup>
19	9.0 < f ≤ 10.6 GHz	- 65 dBm/MHz	- 25 dBm	2019/785/EC	
20	f > 10.6 GHz	- 85 dBm/MHz	- 45 dBm	2019/785/EC	

<sup>95</sup> No fixed outdoor installation is permitted.



## 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/ODTR Document

17/34R, 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: Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive.

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: Broadband Radio Access Networks (BRAN); 5,8 GHz fixed broadband data transmitting systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

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: Broadband Radio Access Networks (BRAN); 60 GHz Multiple-Gigabit WAS/RLAN Systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive.

### **CEPT Documentation**

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).

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

### European Legislation

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.**

SUPERSEDED - NO LONGER IN FORCE