



**ESWATINI
COMMUNICATIONS
COMMISSION**

GENERAL NOTICE NO. Notice 8/2024

**GUIDELINES ON THE USE OF LICENCE EXEMPT
SPECTRUM BANDS IN ESWATINI, 2024**

Date: May 2024

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I. Introduction

Apparatus exempted from spectrum licensing, are telecommunication devices which provide either unidirectional or bi-directional communication and have low capability of causing interference to other radio equipment. Their applications range from household appliances, toys, medical devices, vehicular applications, railway applications, livestock (farming), security, Radio Frequency Identification (RFID) systems, wireless audio systems, cordless telephones to mention a few. This wide range of applications have made these devices an integral part of wireless communications globally and increased the demand for their use cases.

Licence-exempt apparatus operate on the same bands as licenced primary telecommunication services using integral, dedicated or external antennas. However, since they are licence exempt, they operate on these bands on a non-interference and non-protection bases (NINP). This points out that licence-exempt apparatus can potentially cause harmful interference to other spectrum users hence interference mitigation measures should be put in place to ensure that this does not occur. Secondly, licence-exempt apparatus are operated individually as part of an ecosystem and are low powered, which means they proliferate and have the potential of being carried across borders in portable devices such as laptops, tablets, etc. This ease of movement necessitates global harmonization of licence-exempt apparatus to facilitate licence-exempt spectrum use whilst avoiding harmful interference.

The country has had licence-exempt apparatus uses in the past, in devices such as wireless microphones and hearing aids, however, similarly to global trends, there has been a surge in new use cases for licence-exempt apparatus such as; soil moisture content monitoring and cattle tracking and tracing. These new use cases are due to the adoption of emerging technologies worldwide like LoraWan and Sigfox. These emerging technologies have increased the licence-exempt apparatus use cases and thus the need for a regulatory tool to be in place for Eswatini. This regulatory tool seeks to ensure that the adopted technologies work in line with the regional and national Frequency Allocation Plan (NFAP) for the protection of licenced services from licence-exempt spectrum usage in Eswatini.

I.1. Powers of the Commission

The Commission intends to establish a legal framework to regulate the usage of current and emerging technologies in the licence-exempt spectrum and to also provide guidance on how to use any other licence-exempt apparatus in the country to ensure efficient spectrum usage and further mitigate any harmful interference.

The Electronic Communications (Radio Communications and Frequency Spectrum) Regulations 2016 establish the following requirements in relation to radio frequency spectrum equipment:

Regulation of electronic communications equipment

40. (1) The Commission shall adopt technical standards through regulations prescribed by the Minister on the recommendation of the Commission, which regulations shall be made applicable to all electronic communications equipment and customer premises equipment in order to avoid harm which may be caused by that equipment to electronic communications networks or services, public health, safety or the environment.

(2) The Commission shall ensure that the regulation of equipment and standards that the Commission may adopt shall be only the minimum standards necessary to ensure the safe and efficient provisions of electronic communications networks and services.

(3) In recommending the standards under this Part, the Commission shall consider standards enacted by countries within the region and, where feasible, coordinate with such countries in the setting of standards through participation in international standards-setting bodies, through consideration of the policies adopted by industry standard-setting organizations.

(5) A person licenced to provide an electronic communications network service, or who supplies electronic communications equipment, shall not use or supply an electronic communications equipment that does not comply with the technical standards prescribed by the Commission.



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**GUIDELINES ON THE USE OF LICENCE EXEMPT
SPECTRUM BANDS IN ESWATINI, 2024**

The Eswatini Communications Commission ('the Commission') hereby publishes the Guidelines on the use of Licence-Exempt Spectrum Bands in terms of section 38(b) of the Eswatini Communications Commission Act, 2013 read together with sections 40, 41 and 42 of the Electronic Communications Act, 2013..

(1) Citation

These Guidelines may be cited as the “Guidelines on the use of licence exempt spectrum bands, 2024”.

(2) Power to issue the guidelines.

These guidelines are issued in accordance with section 38(b) of the Eswatini Communications Commission Act, 2013 read together with sections 40, 41 and 42 of the Electronic Communications Act, 2013.

(3) Application

The guidelines shall apply to:

- (i) all spectrum users holding a valid individual and or general licence issued by the Commission including operators and electronic communication service providers.
- (ii) all users of apparatus that utilize licence exempt spectrum bands in accordance with the Electronic Communications Act, 2013 and Electronic Communications (Radio Frequency Spectrum) Regulations, 2016.

(4) Purpose of the guidelines

The purpose of the guidelines is:

to review the existing provisions on apparatus exempt from radio frequency spectrum licenses.

to provide guidance on the applicable technical standards and requirements for operating SRD's, including emerging technologies in Eswatini.

to give guidance on the use of license exempt spectrum bands for wireless access systems (WAS/RLAN) in Broadband Fixed Wireless Access (BFWA) applications, to ensure that users of these bands do not experience any harmful interference.

(5) Interpretations

For the purpose of these guidelines;

Licence exempt apparatus shall mean a device that operates on a licence exempt basis on licence exempt bands and any other licenced bands in a non-interference non-protection basis. This includes low power devices and short-range devices designed to work on a licence-exempt basis.

Licence Exempt Spectrum shall mean radio frequency spectrum designated for the use of licence exempt devices based on defined technical specifications and standards.

Broadband Fixed Wireless Access (BFWA) networks are based on a central radio base station, which communicates with equipment located in a multiplicity of subscriber premises in the surrounding area.

Type Approval The authorization of communications equipment for importation and usage in Eswatini. This is done through verification of the equipment/device compliance to the standards and other regulatory requirements.

ICNIRP International Commission on Non-Ionizing Radiation Protection

DFS Dynamic Frequency Selection is a channel allocation scheme designed to prevent harmful interference by automatically selecting the channel with least interference.

ERC European Radiocommunications Committee

CEPT European Conference of Postal and Telecommunications Administrations

ETSI European Telecommunications Standards Institute

R&TTE Radio & Telecommunication Terminal Equipment directive

ISM radio bands are frequencies reserved internationally for the use of radio frequency (RF) energy for industrial, scientific and medical.

EIRP Effective Isotropic Radiated Power

RLAN Radio local area network

WAS Wireless access system

UWB Ultra wide band

(6) General Requirements

All users of licence-exempt apparatus in the country should comply with these requirements:

- (i) Ensure that the equipment that they intend to use is type approved by the Commission and follows all Type Approval regulations set by the Commission.
- (ii) Ensure that the equipment operates on the permissible frequency bands as outlined in the Appendix of these guidelines.
- (iii) Ensure that the equipment operates in accordance with the permissible power limits as outlined in the Appendix of these guidelines.
- (iv) The devices (Sensors, actuators, aggregators, appliances, etc.), used in the deployment of a network, shall comply with the International Commission on Non-ionizing Radiation Protection (ICNIRP) guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields.
- (v) Suitable IP addressing in IPv4 is permitted, however, migration to IPv6 is encouraged.

- (vi) The licencees providing the IoT services must comply with all the applicable, existing, or future laws, regulations, and requirements issued by the Commission or other authorities concerning data management including security, privacy, retention, and protection of data.
- (vii) Backhauling services are not permitted on all SRD bands.
- (viii) Dynamic Frequency Selection (DFS) is not permitted on WAS/RLAN access systems for BFWA. Only static frequency selection is permitted in accordance with the channelling arrangements in [Appendix 3](#) of this document.

(7) AI / IoT device requirements

Internet of Things and Artificial Intelligence devices that fall within the licence exempt bands shown in the Appendix of these guidelines shall be allowed to operate on a licence exempt basis subject to the following conditions:

- i). All devices under this category shall comply with the limits/parameters, allowed applications, general operating conditions etc. as per the Appendix of these guidelines.
- ii). All devices under this category as specified in Appendix, shall require type approval from the Commission.
- iii). All devices under this category shall be allowed to operate on a secondary non-interference non-protection basis as well as shall not cause interference with other authorized radio communication services and be able to tolerate any interference caused by other radio communication services.
- iv). If any IoT or AI devices are found to be interfering with any primary service, the operation will be shut down immediately.

(8) Applicable standards

- i). The licence exempt frequency bands and specifications in Eswatini are referenced from ERC Recommendation 70-03. ERC Recommendation 70-03 sets out the general position on common spectrum allocations for SRDs for countries within the “European Conference of Postal and Telecommunications Administrations (CEPT). It is also intended that it can be used as a reference document by the CEPT member countries when preparing their national regulations in order to keep in line with the provisions of the Radio & Telecommunication Terminal Equipment (R&TTE) Directive.
- ii). The CEPT has adopted recommendations to deal with low power devices, and specific short-range devices. The European Telecommunications Standards Institute (ETSI) has now developed harmonised standards for the majority of these

devices. Other standards or technical specifications might be applicable within the framework of the R&TTE Directive.

- iii). Recommendation 70-03 describes the spectrum management requirements for SRDs relating to allocated frequency bands, maximum power levels, channel spacing and duty cycle.

APPENDIX I: LORAWAN TECHNOLOGY

LoraWan specification is a low power, wide area networking protocol designed to wirelessly connect batter operated devices to the internet in regional national or global networks, and targets key Internet of Things requirements such as bi-directional communication, end to end security and localization services. The applicable frequencies in Eswatini for LoRaWan application are shown in [Table 1](#) below.

Table 1. LoRaWan allowed frequency bands

Allowed Frequency band	Channel Plan	Harmonised Standards
433.05 – 434.79 MHz	EU433	EN 300 220
865 – 868.6 MHz	EU863-870	
868.7 – 869.2 MHz		
869.4 – 869.65 MHz		
869.7 – 870 MHz		

APPENDIX 2: SIGFOX TECHNOLOGY

SigFox Network is a global coverage network, operating in unlicensed bands worldwide, with radio frequencies ranging from 862 to 928 MHz. Using unlicensed bands enable devices to send their data to the cloud while using little power, at very low cost. Eswatini belongs to Region RC1 for Sigfox configurations.

The frequencies of operation for ITU region 1 where Eswatini falls part of are as shown below:

Table 2. SigFox Allowed Configuration

RC1		
Frequency of operation	Technical Specifications	Harmonised Standards
Uplink Centre frequency (MHz) – 868.13 Downlink Centre Frequency (MHz) - 869.525	Uplink data rate (bit/s)- is 100 Downlink data rate (bit/s) is 600 recommended EIRP (dBm) is 16 Duty Cycle is 1%	EN 300 220

APPENDIX 3: WAS/RLAN FOR BFWA

I. 2.4 GHz band (2400 MHz – 2483 MHz)

The 2.4 GHz band is a well-established industry scientific and medical bands (ISM), it starts from 2400 – 2483 MHz. The band is widely used for Wi-Fi and according to the Fixed Services band plan forms part of the 2300 MHz – 2500 MHz fixed link channels. The band can still be used for outdoor broadband fixed wireless access (BFWA). However, the users of the band for this use case may not claim protection from the primary services mentioned above. The users of the band should adhere to the following technical specifications.

- Point to multipoint Max EIRP – 36 dBm (4 W)
- Point to Point Max EIRP in accordance with Table 3 below.

Table 3. Max EIRP per transmitter power

Maximum Power from Transmitter	Maximum Antenna Gain (dBi)	EIRP (dBm)
30dBm or 1 watt	6	36
29dBm or 800mW	9	38
28dBm or 630mW	12	40
27dBm or 500mW	15	42
26dBm or 400mW	18	44
25dBm or 316mW	21	46
24dBm or 250mW	24	48
23dBm or 200mW	27	50
22dBm or 160mW	30	52

The user of these bands should ensure that their equipment is aligned to the following channelling arrangement, where the channels have a maximum bandwidth of 22 MHz.

Table 4. 2.4 GHz Channelling Arrangement

Channel No.	Lower frequency (MHz)	Center frequency (MHz)	Upper frequency (MHz)
1	2401	2412	2423
2	2406	2417	2428
3	2411	2422	2433
4	2416	2427	2438
5	2421	2432	2443
6	2426	2437	2448
7	2431	2442	2453
8	2436	2447	2458
9	2441	2452	2463
10	2446	2457	2468
11	2451	2462	2473
12	2456	2467	2478
13	2461	2472	2483

II. 5 GHz band (5150 – 5350 MHz, 5470 – 5725 MHz, 5725 – 5850 MHz)

The 5GHz band is mainly use for wireless access systems (WAS) and local area network (LAN) in indoor and localised environments. There have been technical developments that allow the use of these bands for outdoor BFWA services. The use of the 5GHz licence exempt bands for outdoor use in Eswatini is permitted but limited to holders of general electronic communications licences. The users who want to use the band for outdoor uses should ensure that they comply with the following technical specifications:

Table 5. power limits for 5 GHz outdoor use

Band	Max Power	Max EIRP
5150 – 5350 MHz	1 W 30dBm	125 mW 21 dBm
5470 – 5725 MHz	1 W 30dBm	-
5725 – 5850 MHz	1 W 30dBm	-

The channelling arrangement used in this band considers a channel bandwidth of 20 MHz and a channelling arrangement shown in [Table 6](#) below which has 24 channels. Users who will require more than one channel in a geographical area can request for more than one channel for more bandwidth.

Table 6. 5 GHz band Channelling Arrangement

Channel No.	Center Frequency (MHz)
36	5180
40	5200
44	5220
48	5240
52	5260
56	5280
60	5300
64	5320
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700
149	5745
153	5765
157	5785
161	5805
165	5825

III. 6 GHz band (5925 – 6425 MHz)

BFWA in the 6 GHz band will be permitted subject to the following power limits as shown in [Table 6](#) below and channelling arrangement in [Table 7](#). It must be noted that BFWA is a secondary service in this band and will operate on a none-protected and none-interference basis. Users of this band still have to be holders of general electronic communications licences.

Table 7. Power limits in the 6GHz band

Band	Max EIRP
5925 - 6425 MHz	36 dBm

The channelling arrangement to be used has 24 channels that have a 20 MHz channel bandwidth. Operators who would require more bandwidth in the band can request more than one channel to increase the bandwidth subject to availability and principles of equitable access to the RF spectrum.

Table 8. 6 GHz band Channelling Arrangement

Channel No.	Channel Centre Frequency (MHz)
1	5955
5	5975
9	5995
13	6015
17	6035
21	6055
25	6075
29	6095
33	6115
37	6135
41	6155
45	6175
49	6195
53	6215
57	6235
61	6255
65	6275
69	6295
73	6315
77	6335
81	6355
85	6375
89	6395
93	6415

APPENDIX 3: NON-SPECIFIC SHORT-RANGE DEVICES

NON-SPECIFIC SHORT-RANGE DEVICES				
<p>SCOPE: Parameters primarily for Telemetry, Telecommand, Alarms and Data in general and other similar applications. Video applications should be preferably used above 2.4 GHz. It also includes references to the generic UWB regulation primarily developed to allow communication applications using UWB technology in bands below 10.6 GHz; but enables other types of radio applications.</p>				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
13553-13567 kHz	10 mW e.r.p.	Not specified	EN 300 330	CEPT/ERC/REC 70-03
26957-27283 kHz	10mW e.r.p	Not specified	EN 300 220 EN 300 330	CEPT/ERC/REC 70-03
26990-27000 kHz	100 mW e.r.p ≤ 0.1 % duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
27040-27050 kHz	100 mW e.r.p ≤ 0.1 % duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
27090-27100 kHz	100 mW e.r.p ≤ 0.1 % duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
27140-27150 kHz	100 mW e.r.p ≤ 0.1 % duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
27190-27200 kHz	100 mW e.r.p ≤ 0.1 % duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
40.66-40.7 MHz	10 mW e.r.p.	Not specified	EN 300 220	CEPT/ERC/REC 70-03
138.2-138.45 MHz	10 mW e.r.p. ≤ 1 % duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
169.4-169.475 MHz	500 mW e.r.p.	≤ 50 kHz	EN 300 220	ECC/DEC/(05)02

NON-SPECIFIC SHORT-RANGE DEVICES

SCOPE: Parameters primarily for Telemetry, Telecommand, Alarms and Data in general and other similar applications. Video applications should be preferably used above 2.4 GHz. It also includes references to the generic UWB regulation primarily developed to allow communication applications using UWB technology in bands below 10.6 GHz; but enables other types of radio applications.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
	≤ 1 % duty cycle			
169.4-169.4875 MHz	10 mW e.r.p. ≤ 1 % duty cycle	Not specified	EN 300 220	ECC/DEC/(05)02
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%	Not specified	EN 300 220	ECC/DEC/(05)02
169.5875-169.8125 MHz	10 mW e.r.p. ≤ 0.1 % duty cycle	Not specified	EN 300 220	ECC/DEC/(05)02
433.05-434.79 MHz	10 mW e.r.p. ≤ 10 % duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
433.05-434.79 MHz	1 mW e.r.p. Power density: -13 dBm/10 kHz for wideband modulation with a bandwidth greater than 250 kHz	Not specified	EN 300 220	CEPT/ERC/REC 70-03
434.04-434.79 MHz	10 mW e.r.p.	≤ 25 kHz	EN 300 220	CEPT/ERC/REC 70-03
862-863 MHz	25 mW e.r.p.	≤ 350 kHz	EN 300 220	CEPT/ERC/REC 70-03

NON-SPECIFIC SHORT-RANGE DEVICES

SCOPE: Parameters primarily for Telemetry, Telecommand, Alarms and Data in general and other similar applications. Video applications should be preferably used above 2.4 GHz. It also includes references to the generic UWB regulation primarily developed to allow communication applications using UWB technology in bands below 10.6 GHz; but enables other types of radio applications.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
	≤ 0.1% duty cycle			
863-870 MHz	25 mW e.r.p. ≤ 0.1% duty cycle or LBT(listen before talk)	≤ 100 kHz for 47 or more channels	EN 300 220	CEPT/ERC/REC 70-03
865-868 MHz	25 mW e.r.p. ≤ 1% duty cycle	Not specified	EN 300 220	CEPT/ERC/REC 70-03
863-870 MHz	25 mW e.r.p. -4.5 dBm/100 kHz ≤ 0.1% duty cycle or LBT+AFA (Adaptive Frequency Agility)	Not specified	EN 300 220	CEPT/ERC/REC 70-03
863-865 MHz	25 mW e.r.p. ≤ 0.1% duty cycle or LBT +AFA	Not specified	EN 300 220	CEPT/ERC/REC 70-03
865-868 MHz	25 mW e.r.p. ≤ 1% duty cycle or LBT+AFA	Not specified	EN 300 220	CEPT/ERC/REC 70-03
868-868.6 MHz	500 mW e.r.p.	Not specified	EN 300 220	CEPT/ERC/REC 70-03

NON-SPECIFIC SHORT-RANGE DEVICES

SCOPE: Parameters primarily for Telemetry, Telecommand, Alarms and Data in general and other similar applications. Video applications should be preferably used above 2.4 GHz. It also includes references to the generic UWB regulation primarily developed to allow communication applications using UWB technology in bands below 10.6 GHz; but enables other types of radio applications.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
	≤ 10% duty cycle or LBT+AFA			
868.7-869.2 MHz	25 mW e.r.p. ≤ 0.1% duty cycle or LBT+AFA for 25 mW e.r.p	Not specified	EN 300 220	CEPT/ERC/REC 70-03
869.4-869.65 MHz	500 mW e.r.p. ≤ 10% duty cycle or LBT+AFA transmit ontime of 5ms/1s	Not specified	EN 300 220	CEPT/ERC/REC 70-03
869.7-870 MHz	5 mW e.r.p. limited to ≤ 0.01% and to a maximum transmit on time of 5ms/1s	Not specified	EN 300 220	CEPT/ERC/REC 70-03
869.7-870 MHz	25 mW e.r.p. ≤ 1% duty cycle or LBT +AFA	Not specified	EN 300 220	CEPT/ERC/REC 70-03
870-874.4 MHz	25 mW e.r.p. ≤ 1% duty cycle. For ER-GSM protection (873-876 MHz, where	≤ 600 kHz	EN 300 220	CEPT/ERC/REC 70-03 - For new implementations, administrations are encouraged to follow the

NON-SPECIFIC SHORT-RANGE DEVICES

SCOPE: Parameters primarily for Telemetry, Telecommand, Alarms and Data in general and other similar applications. Video applications should be preferably used above 2.4 GHz. It also includes references to the generic UWB regulation primarily developed to allow communication applications using UWB technology in bands below 10.6 GHz; but enables other types of radio applications.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
	applicable); the duty cycle is limited to $\leq 0.01\%$ and to a maximum transmit on time of 5ms/1s			technical conditions for SRD in data networks
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 $\leq 1\%$ duty cycle. For ER-GSM protection (918-921 MHz, where applicable); the duty cycle is limited to $\leq 0.01\%$ and to a maximum transmit ontime of 5ms/1s	≤ 600 kHz except within the RFID channels identified in note 5 where ≤ 400 kHz applies	EN 300 220	CEPT/ERC/REC 70-03 - For new implementations, administrations are encouraged to follow the technical conditions for SRD in data networks
2400-2483.5 MHz	10 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
5725-5875 MHz	25 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
3100-4800 MHz	Generic UWB regulation - See detailed requirements in related ECC Decision		EN 302 065	ECC/DEC/(06)04
6000-9000 MHz	Generic UWB regulation - See detailed requirements in related ECC Decision		EN 302 065	ECC/DEC/(06)04

NON-SPECIFIC SHORT-RANGE DEVICES

SCOPE: Parameters primarily for Telemetry, Telecommand, Alarms and Data in general and other similar applications. Video applications should be preferably used above 2.4 GHz. It also includes references to the generic UWB regulation primarily developed to allow communication applications using UWB technology in bands below 10.6 GHz; but enables other types of radio applications.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
6000-8500 MHz	UWB regulation on-board aircraft- See detailed requirements in related ECC Decision	Not specified	EN 302 065	ECC/DEC/(12)03
24-24.25 GHz	100 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
57-64 GHz	100 mW e.i.r.p. 10 mW output power	Not specified	EN 305 550	CEPT/ERC/REC 70-03
61-61.5 GHz	100 mW e.i.r.p.	Not specified	EN 305 550	CEPT/ERC/REC 70-03
122-122.25 GHz	10 dBm/250 MHz e.i.r.p. - 48 dBm/MHz at >30° elevation	Not specified	EN 305 550	CEPT/ERC/REC 70-03
122.25-123 GHz	100 mW e.i.r.p.	Not specified	EN 305 550	CEPT/ERC/REC 70-03
244-246 GHz	100 mW e.i.r.p.	Not specified	EN 305 550	CEPT/ERC/REC 70-03

APPENDIX 4: TRACKING, TRACING AND DATA ACQUISITION APPLICATIONS

TRACKING, TRACING AND DATA ACQUISITION				
<p>SCOPE: parameters for tracking, tracing and data acquisition applications including:</p> <ul style="list-style-type: none"> (a) Emergency detection of buried victims and valuable items such as detecting avalanche victims; (b) Person detection and collision avoidance; (c) Meter reading; (d) Sensors (water, gas, electricity, meteorology, pollution, etc.) and actuators (controlling devices such as street or traffic lights, etc.); (e) Data acquisition; (f) Wireless Industrial Applications (WIA) to be used in industrial environments including monitoring and worker communications, wireless sensors and actuators. 				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/notes
442.2-450 kHz	7 dB μ A/m at 10m	Continuous wave (CW) - no modulation, channel spacing \geq 150 Hz	To be defined	CEPT/ERC/REC 70-03: Person detection and collision avoidance
456.9-457.1 kHz	7 dB μ A/m at 10 m	Continuous wave (CW) at 457 kHz - no modulation	EN 300 718	CEPT/ERC/REC 70-03: Emergency detection of buried victims and valuable items
169.4-169.475 MHz	500 mW e.r.p. \leq 10% duty cycle	\leq 50 kHz	EN 300 220	CEPT/ERC/REC 70-03: Meter Reading. The frequency band
865-868 MHz	500 mW e.r.p. Adaptive Power Control (APC) required for spectrum sharing (note 1) and the following duty cycle restrictions also apply: \leq 10% duty cycle for network	\leq 200 kHz	EN 303 659	CEPT/ERC/REC 70-03: Data networks (note 2). APC is able to reduce the equipment's ERP from its maximum to \leq 5 mW.

TRACKING, TRACING AND DATA ACQUISITION

SCOPE: parameters for tracking, tracing and data acquisition applications including:

- (a) Emergency detection of buried victims and valuable items such as detecting avalanche victims;
- (b) Person detection and collision avoidance;
- (c) Meter reading;
- (d) Sensors (water, gas, electricity, meteorology, pollution, etc.) and actuators (controlling devices such as street or traffic lights, etc.);
- (e) Data acquisition;
- (f) Wireless Industrial Applications (WIA) to be used in industrial environments including monitoring and worker communications, wireless sensors and actuators.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/notes
	access points; $\leq 2.5\%$ duty cycle otherwise			
870-874.4 MHz	500 mW e.r.p. Adaptive Power Control (APC) required for spectrum sharing (note 1) and the following duty cycle restrictions also apply: $\leq 10\%$ duty cycle for network access points; $\leq 2.5\%$ duty cycle	≤ 200 kHz	EN 303 204	CEPT/ERC/REC 70-03 - Data networks. All nomadic and mobile devices within the data network shall be controlled by a master network access point (NAP). APC is able to reduce the equipment's ERP from its maximum to ≤ 5 mW.
917.3-918.9 MHz	500 mW e.r.p. Adaptive Power Control (APC) required for spectrum sharing and the following	≤ 200 kHz	EN 303 659	CEPT/ERC/REC 70-03: Data networks. All nomadic and mobile devices within the data network shall be controlled by a master network access point (NAP). APC is able to reduce the equipment's ERP from its maximum to ≤ 5 mW

TRACKING, TRACING AND DATA ACQUISITION

SCOPE: parameters for tracking, tracing and data acquisition applications including:

- (a) Emergency detection of buried victims and valuable items such as detecting avalanche victims;
- (b) Person detection and collision avoidance;
- (c) Meter reading;
- (d) Sensors (water, gas, electricity, meteorology, pollution, etc.) and actuators (controlling devices such as street or traffic lights, etc.);
- (e) Data acquisition;
- (f) Wireless Industrial Applications (WIA) to be used in industrial environments including monitoring and worker communications, wireless sensors and actuators.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/notes
915-919.4 MHz	25 mW e.r.p. ≤ 1% duty cycle	≤ 600 kHz	EN 303 659	CEPT/ERC/REC 70-03: Data networks . All nomadic and mobile devices within the data network shall be controlled by a master network access point (NAP).
5725-5875 MHz	400 mW e.i.r.p. Adaptive Power Control (APC) required	≥ 1 MHz and ≤ 20 MHz	EN 303 258	Wireless Industrial Applications (WIA). Registration and/or notification may be required. APC is able to reduce the e.i.r.p. to ≤ 25 mW. The frequency band is also identified in Appendix 3

APPENDIX 5: WIDEBAND DATA TRANSMISSION SYSTEMS

WIDEBAND DATA TRANSMISSION SYSTEMS				
SCOPE: Parameters for Wideband Data Transmission Systems				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/Notes
863-868 MHz	25 mW e.r.p. ≤ 10% duty cycle for network access points (note 1). ≤ 2.8% duty cycle otherwise	> 600 kHz ≤ 1 MHz	EN 304 220	CEPT/ERC/REC 70-03: Wideband data transmission in data networks
915.8-919.4 MHz	25 mW e.r.p. ≤ 10% duty cycle for network access points and polite spectrum access. ≤ 2.8% duty cycle otherwise and polite spectrum access	> 600 kHz ≤ 1 MHz	EN 304 220	CEPT/ERC/REC 70-03: Wideband data transmission in data networks. All nomadic and mobile devices within the data network shall be controlled by a master network access point (NAP).
2400-2483.5 MHz	100 mW e.i.r.p. Adequate spectrum sharing mechanism (e.g. LBT and DAA) shall be implemented	Not specified	EN 300 328	CEPT/ERC/REC 70-03: For wideband modulations other than FHSS, the maximum e.i.r.p. density is limited to 10 mW/MHz
57-71 GHz	40 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density Adequate spectrum sharing mechanism shall be implemented	Not specified	EN 302 567	Fixed outdoor installations are not allowed.

WIDEBAND DATA TRANSMISSION SYSTEMS**SCOPE:** Parameters for Wideband Data Transmission Systems

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/Notes
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	Not specified	To be defined	ECC Report 288
57-71 GHz	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and transmit antenna gain ≥ 30 dBi	Not specified	To be defined	ECC Report 288: Applies only to fixed outdoor installations

APPENDIX 6: RAILWAY APPLICATIONS

RAILWAY APPLICATIONS				
SCOPE: parameters for applications specifically intended for use on railways.				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
984-7484 kHz	9 dB μ A/m at 10m ≤ 1% duty cycle	Not specified	EN 302 608	CEPT/ERC/REC 70-03: Transmitting only on receipt of a Balise/ Eurobalise tele-powering signal from a train.
7300-23000 kHz	-7 dB μ A/m at 10m	Not specified	EN 302 609	CEPT/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. Spread Spectrum Signal, Code Length: 472 Chips. Note: Centre frequency is 13.547 MHz
27090-27100 kHz	42 dB μ A/m at 10 m	Not specified	EN 302 608	CEPT/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. Note: Centre frequency is 27.095 MHz

RAILWAY APPLICATIONS

SCOPE: parameters for applications specifically intended for use on railways.

76-77 GHz	55 dBm peak e.i.r.p.	Not specified	EN 301 091	CEPT/ERC/REC 70-03: Obstruction/Vehicle detection via radar Sensor at railway level crossings. 50 dBm average power or 23.5 dBm average power for pulse radar.
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APPENDIX 7: TRANSPORT AND TRAFFIC TELEMATICS APPLICATIONS

TRANSPORT AND TRAFFIC TELEMATICS (TTT)				
SCOPE: Parameters for 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), communication from and to users as well as radar system installations. Automotive radar is defined as a moving radar device supporting functions of the vehicle.				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
5795-5805 MHz	2 W e.i.r.p. / 8 W e.i.r.p.		EN 300 674	CEPT/ERC/REC 70-03: Individual licence may be required for the higher power of 8 W systems
5805-5815 MHz	2 W e.i.r.p. / 8 W e.i.r.p.		EN 300 674	CEPT/ERC/REC 70-03
21.65-26.65 GHz	See detailed requirements in related ECC Decision			ECC/DEC/(04)10: For automotive Short Range Radars (SRR).
24.25-26.65 GHz	See detailed requirements in related ECC Decision		EN 302 288	ECC/DEC/(04): For automotive Short Range Radars (SRR).10
24.05-24.075 GHz	100 mW e.i.r.p		EN 302 858	CEPT/ERC/REC 70-03: For automotive radars
24.075-24.15 GHz	0.1 mW e.i.r.p.		EN 302 858	CEPT/ERC/REC 70-03: For automotive radars
24.075-24.15 GHz	100 mW e.i.r.p ≤ 4µs/40 kHz dwell time every 3ms		EN 302 858	CEPT/ERC/REC 70-03: For automotive radars (road vehicles only). The spectrum access and mitigation requirement is given for devices mounted behind a bumper. If mounted without a bumper, the requirement should be 3µs/40kHz maximum dwell time every 3ms. A requirement for minimum

TRANSPORT AND TRAFFIC TELEMATICS (TTT)

SCOPE: Parameters for 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), communication from and to users as well as radar system installations. Automotive radar is defined as a moving radar device supporting functions of the vehicle.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
				frequency modulation range (applicable to FMCW or step frequency signals) or minimum instantaneous bandwidth (applicable to pulsed signal) of 250 kHz applies in addition to the requirement on maximum dwell time
24.075-24.15 GHz	100 mW e.i.r.p. ≤ 1ms/40 kHz dwell time every 40ms		EN 302 858	CEPT/ERC/REC 70-03: For automotive radars (road vehicles only). The spectrum access and mitigation requirement is given for devices mounted behind a bumper. If mounted without a bumper, the requirement should be 3µs/40kHz maximum dwell time every 3ms. A requirement for minimum frequency modulation range (applicable to FMCW or step frequency signals) or minimum

TRANSPORT AND TRAFFIC TELEMATICS (TTT)

SCOPE: Parameters for 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), communication from and to users as well as radar system installations. Automotive radar is defined as a moving radar device supporting functions of the vehicle.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
				instantaneous bandwidth (applicable to pulsed signal) of 250 kHz applies in addition to the requirement on maximum dwell time
24.15-24.25 GHz	100 mW e.i.r.p		EN 302 858	CEPT/ERC/REC 70-03: For automotive radars (road vehicles only)
76-77 GHz	55 dBm peak e.i.r.p.	Not specified	EN 301 091	ECC Report 262: 50 dBm average power or 23.5 dBm average power for pulse radar only. For ground based vehicle and infrastructure systems only.
76-77 GHz	See detailed requirements in related ECC Decision		EN 303 360	ECC/DEC/(16)01: For obstacle detection radars for rotorcraft use. Use is not possible in specific areas of some European countries due to exclusion zones implementation around RAS observatories
5855-5875 MHz	See detailed requirements in related ECC Decision		EN 302 571	ECC/REC/(08)01: For ITS non-safety applications

APPENDIX 8: RADIO-DETERMINATION APPLICATIONS

RADIODETERMINATION APPLICATIONS				
<p>SCOPE: Parameters for 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. Radiodetermination equipment typically conducts measurements to obtain such characteristics. Any kind of point-to-point or point-to-multipoint radio communications is outside of this definition.</p>				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Technical standards	Reference/Notes
30 MHz-12.4 GHz	* See detailed requirements in related ECC Decision		EN 302 066	CEPT/ERC/REC 70-03
2200-8000 MHz	* See detailed requirements in related ECC Decision		EN 302 065	CEPT/ERC/REC 70-03
2400-2483.5 MHz	25 mW e.i.r.p	Not specified	EN 300 440	CEPT/ERC/REC 70-03
3100-4800 MHz	* See detailed requirements in related ECC Decision		EN 302 065	CEPT/ERC/REC 70-03
3100-4800 MHz	* See detailed requirements in related ECC Decision		EN 302 065	CEPT/ERC/REC 70-03
4500-7000 MHz	-41.3 dBm/MHz e.i.r.p. outside the enclosed test tank structure	Not specified	EN 302 372	CEPT/ERC/REC 70-03
8500 MHz-10.6 GHz	41.3 dBm/MHz e.i.r.p. outside the enclosed test tank structure	Not specified	EN 302 372	CEPT/ERC/REC 70-03
24.05-27 GHz	-41.3 dBm/MHz e.i.r.p. outside the enclosed test tank structure	Not specified	EN 302 372	CEPT/ERC/REC 70-03
57-64 GHz	-41.3 dBm/MHz e.i.r.p. outside the enclosed test tank structure	Not specified	EN 302 372	CEPT/ERC/REC 70-03

RADIODETERMINATION APPLICATIONS

SCOPE: Parameters for 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. Radiodetermination equipment typically conducts measurements to obtain such characteristics. Any kind of point-to-point or point-to-multipoint radio communications is outside of this definition.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Technical standards	Reference/Notes
75-85 GHz	-41.3 dBm/MHz e.i.r.p. outside the enclosed test tank structure	Not specified	EN 302 372	CEPT/ERC/REC 70-03
6000-8500 MHz	*See detailed requirements in related ECC Decision		EN 302 729	CEPT/ERC/REC 70-03
24.05-26.5 GHz	*See detailed requirements in related ECC Decision		EN 302 729	CEPT/ERC/REC 70-03
57-64 GHz	*See detailed requirements in related ECC Decision		EN 302 729	CEPT/ERC/REC 70-03
75-85 GHz	*See detailed requirements in related ECC Decision		EN 302 729	CEPT/ERC/REC 70-03
9200-9500 MHz	25 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
9500-9975 MHz	25 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
10.5-10.6 GHz	500 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
13.4-14 GHz	25 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
17.1-17.3 GHz	26 dBm e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
24.05-24.25 GHz	100 mW e.i.r.p.	Not specified	EN 300 440	CEPT/ERC/REC 70-03
100 Hz-148 kHz	46 dB μ A/m at 10 m distance at 100 Hz outside the NMR device	Not specified	To be defined	For enclosed Nuclear Magnetic Resonance (NMR) applications. Magnetic field strength descending 10dB/decade above 100 Hz
148-5000 kHz	-15 dB μ A/m at 10 m distance outside the NMR device	Not specified	To be defined	For enclosed Nuclear Magnetic Resonance (NMR) applications

RADIODETERMINATION APPLICATIONS

SCOPE: Parameters for 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. Radiodetermination equipment typically conducts measurements to obtain such characteristics. Any kind of point-to-point or point-to-multipoint radio communications is outside of this definition.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Technical standards	Reference/Notes
5000 kHz-30 MHz	-5 dB μ A/m at 10m distance outside the NMR device	Not specified	To be defined	For enclosed Nuclear Magnetic Resonance (NMR) applications
30-130 MHz	-36 dBm e.r.p. outside the NMR device	Not specified	To be defined	For enclosed Nuclear Magnetic Resonance (NMR) applications
76-77 GHz	See detailed requirements in related ECC Decision		EN 303 661	ECC/DEC/(21)02: For High Definition Ground Based Synthetic Aperture Radar (HD-GBSAR) Use is not possible in specific areas of some European countries due to exclusion zones implementation around RAS observatories in case of free line of sight. RAS exclusion zones and DAA are required only in case of outdoor use of HD-GBSAR

APPENDIX 9: ALARMS

ALARMS				
SCOPE: Parameters exclusively for alarm systems including social alarms and alarms for security and safety.				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
868.6-868.7 MHz	10 mW e.r.p. ≤ 1.0 % duty cycle	25 kHz	EN 300 220	CEPT/ERC/REC 70-03: The whole frequency band may also be used as 1 channel for high speed data transmissions
869.2-869.25 MHz	10 mW e.r.p. ≤ 0.1 % duty cycle	25 kHz	EN 300 220	CEPT/ERC/REC 70-03: Social Alarms
869.25-869.3 MHz	10 mW e.r.p. ≤ 0.1 % duty cycle	25 kHz	EN 300 220	CEPT/ERC/REC 70-03
869.3-869.4 MHz	10 mW e.r.p. ≤ 1.0 % duty cycle	25 kHz	EN 300 220	CEPT/ERC/REC 70-03
869.65-869.7 MHz	25 mW e.r.p. ≤ 10 % duty cycle	25 kHz	EN 300 220	CEPT/ERC/REC 70-03

APPENDIX 10: MODEL CONTROL APPLICATIONS

MODEL CONTROL				
<p>SCOPE: Parameters for 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. Although the bands are not harmonised, the parameters given in the table are common in a majority of CEPT countries. It should be noted that the bands are not exclusive for this type of application.</p>				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
26990-27000 kHz	100 mW e.r.p	10 kHz	EN 300 220	CEPT/ERC/REC 70-03
27040-27050 kHz	100 mW e.r.p	10 kHz	EN 300 220	CEPT/ERC/REC 70-03
27090-27100 kHz	100 mW e.r.p	10 kHz	EN 300 220	CEPT/ERC/REC 70-03
27140-27150 kHz	100 mW e.r.p	10 kHz	EN 300 220	CEPT/ERC/REC 70-03
27190-27200 kHz	100 mW e.r.p	10 kHz	EN 300 220	CEPT/ERC/REC 70-03
34.995-35.225 MHz	100 mW e.r.p	10 kHz	EN 300 220	ERC/DEC/(01)11: Only for flying models
40.66-40.67 MHz	100 mW e.r.p	10 kHz	EN 300 220	ERC/DEC/(01)12
40.67-40.68 MHz	100 mW e.r.p	10 kHz	EN 300 220	ERC/DEC/(01)12
40.68-40.69 MHz	100 mW e.r.p	10 kHz	EN 300 220	ERC/DEC/(01)12
40.69-40.7 MHz	100 mW e.r.p	10 kHz	EN 300 220	ERC/DEC/(01)12

APPENDIX II: INDUCTIVE APPLICATIONS

INDUCTIVE APPLICATIONS				
<p>SCOPE: Parameters for inductive applications including for example:</p> <ul style="list-style-type: none"> • car immobilisers, • 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, NFC applications e.g. used for data transfer to handheld devices, anti-theft systems including RF antitheft induction systems (e.g. EAS), • wireless control systems, • animal identification, • cable detection, • wireless voice links, • automatic road tolling. 				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
100 Hz-9 kHz	82 dB μ A/m at 10m	Not specified	EN 303 660 EN 303 447 EN 303 454	Antenna size of $< 1/20 \lambda$ (see note 1 from ERC 70-03)
9-90 kHz	72 dB μ A/m at 10m	Not Specified	EN 303 447 EN 303 454 EN 300 330	In case of external antennas only loop coil antennas may be employed. Magnetic field strength level descending 3 dB/octave above 30 kHz
90-119 kHz	42 dB μ A/m at 10m	Not Specified	EN 303 447 EN 303 454: EN 300 330	In case of external antennas only loop coil antennas may be employed
119-135 kHz	66 dB μ A/m at 10m	See note 3 of CEPT/ERC/REC 70-03	EN 303 447 EN 303 454 EN 300 330	In case of external antennas only loop coil antennas may be employed. Magnetic field

INDUCTIVE APPLICATIONS

SCOPE: Parameters for inductive applications including for example:

- car immobilisers,
- 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, NFC applications e.g. used for data transfer to handheld devices, anti-theft systems including RF antitheft induction systems (e.g. EAS),
- wireless control systems,
- animal identification,
- cable detection,
- wireless voice links,
- automatic road tolling.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
				strength level descending 3 dB/octave above 119 kHz
135-140 kHz	42 dB μ A/m at 10m	Not Specified	EN 303 447 EN 303 454 EN 300 330	In case of external antennas only loop coil antennas may be employed
140-148.5 kHz	37.7 dB μ A/m at 10m	Not Specified	EN 303 447 EN 303 454 EN 300 330	In case of external antennas only loop coil antennas may be employed
400-600 kHz	-8 dB μ A/m at 10 m	Not Specified	EN 300 330	For RFID only. In 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 magnetic field strength is -5dB μ A/m at 10

INDUCTIVE APPLICATIONS

SCOPE: Parameters for inductive applications including for example:

- car immobilisers,
- 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, NFC applications e.g. used for data transfer to handheld devices, anti-theft systems including RF antitheft induction systems (e.g. EAS),
- wireless control systems,
- animal identification,
- cable detection,
- wireless voice links,
- automatic road tolling.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
				m for systems operating at bandwidths larger than 10 kHz measured at the centre frequency whilst keeping the density limit (-8dB μ A/m in a bandwidth of 10 kHz.) These systems should operate with a minimum operating bandwidth of 30 kHz
3155-3400 kHz	13.5 dB μ A/m at 10m	Not Specified	EN 300 330	In case of external antennas only loop coil antennas may be employed
6765-6795 kHz	42 dB μ A/m at 10m	Not Specified	EN 300 330	CEPT/ERC/REC 70-03
7400-8800 kHz	9 dB μ A/m at 10m	Not Specified	EN 300 330	CEPT/ERC/REC 70-03
10200-11000 kHz	9 dB μ A/m at 10m	Not Specified	EN 300 330	CEPT/ERC/REC 70-03
13553-13567 kHz	42 dB μ A/m at 10m	Not Specified	EN 300 330	CEPT/ERC/REC 70-03

INDUCTIVE APPLICATIONS

SCOPE: Parameters for inductive applications including for example:

- car immobilisers,
- 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, NFC applications e.g. used for data transfer to handheld devices, anti-theft systems including RF antitheft induction systems (e.g. EAS),
- wireless control systems,
- animal identification,
- cable detection,
- wireless voice links,
- automatic road tolling.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
13553-13567 kHz	60 dB μ A/m at 10m	Not Specified	EN 300 330	For RFID only: ECC report 208
148.5-5000 kHz	-15 dB μ A/m at 10 m	Not Specified	EN 300 330 EN 302 536	In case of external antennas only loop coil antennas may be employed. The maximum magnetic field strength is specified in a bandwidth of 10 kHz. The maximum allowed total magnetic field strength is -5 dB μ A/m at 10 m for systems operating at bandwidths larger than 10 kHz whilst keeping the density limit (-15 dB μ A/m in a bandwidth of 10 kHz)

INDUCTIVE APPLICATIONS

SCOPE: Parameters for inductive applications including for example:

- car immobilisers,
- 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, NFC applications e.g. used for data transfer to handheld devices, anti-theft systems including RF antitheft induction systems (e.g. EAS),
- wireless control systems,
- animal identification,
- cable detection,
- wireless voice links,
- automatic road tolling.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
5000 kHz-30 MHz	-20 dB μ A/m at 10 m	Not Specified	EN 300 330	In case of external antennas only loop coil antennas may be employed. The maximum magnetic field strength is specified in a bandwidth of 10 kHz. The maximum allowed total magnetic field strength is -5 dB μ A/m at 10 m for systems operating at bandwidths larger than 10 kHz whilst keeping the density limit (-20 dB μ A/m in a bandwidth of 10 kHz)

APPENDIX 12: RADIO MICROPHONE APPLICATIONS INCLUDING ASSISTIVE LISTENING DEVICES (ALD), WIRELESS AUDIO AND MULTIMEDIA STREAMING SYSTEMS.

RADIO MICROPHONE APPLICATIONS INCLUDING ASSISTIVE LISTENING DEVICES (ALD), WIRELESS AUDIO AND MULTIMEDIA STREAMING SYSTEMS

SCOPE: Parameters for radio microphone applications (also referred to as wireless microphones or cordless microphones), Assistive Listening Devices (ALD) (also referred to as aids for the hearing impaired) and wireless audio and multimedia streaming systems. It covers professional and consumer radio microphones, both hand-held and body-worn, in-ear monitoring devices and Assistive Listening Devices (ALD).

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/Notes
100 Hz-9 kHz	120 dB μ A/m at 10m	Not specified	EN 303 348 EN 300 422	Inductive loop systems intended to assist the hearing impaired. Antenna size of < 1/20 λ
29.7-47 MHz	10 mW e.r.p.	\leq 50 kHz	EN 300 422	Radio microphones. On a tuning range basis. Individual licence may be required
87.5-108 MHz	50 nW e.r.p.	200 kHz	EN 301 357	Band II low power FM transmitters
169.4-174 MHz	10 mW e.r.p.	\leq 50 kHz	EN 300 422	Assistive Listening Device (ALD). On a tuning range basis
169.4-169.475 MHz	500 mW e.r.p.	\leq 50 kHz	EN 300 422	Assistive Listening Device (ALD): ECC/DEC/(05)02
169.4875-169.5875 MHz	500 mW e.r.p.	\leq 50 kHz	EN 300 422	Assistive Listening Device (ALD): ECC/DEC/(05)02
173.965-216 MHz	10 mW e.r.p.	\leq 50 kHz	EN 300 422	Assistive Listening Device (ALD). On a tuning range basis. Individual licence may be required: ECC Report 230
174-216 MHz	50 mW e.r.p.	Not Specified	EN 300 422	Radio microphones. On a tuning range basis. Individual licence may be required

RADIO MICROPHONE APPLICATIONS INCLUDING ASSISTIVE LISTENING DEVICES (ALD), WIRELESS AUDIO AND MULTIMEDIA STREAMING SYSTEMS

SCOPE: Parameters for radio microphone applications (also referred to as wireless microphones or cordless microphones), Assistive Listening Devices (ALD) (also referred to as aids for the hearing impaired) and wireless audio and multimedia streaming systems. It covers professional and consumer radio microphones, both hand-held and body-worn, in-ear monitoring devices and Assistive Listening Devices (ALD).

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/Notes
470-786 MHz	50 mW e.r.p.	Not Specified	EN 300 422	Radio microphones. On a tuning range basis. Individual licence may be required
786-789 MHz	12 mW e.r.p.	Not Specified	EN 300 422	Radio microphones. On a tuning range basis. Individual licence may be required. See technical conditions for PMSE (including radio microphones): ECC/DEC/(09)03 section 3.1
823-826 MHz	20 mW e.i.r.p. / 100 mW e.i.r.p.	Not Specified	EN 300 422	Radio microphones. On a tuning range basis. Individual licence may be required. See technical conditions for PMSE (including radio microphones): ECC/DEC/(09)03 section 3.1
826-832 MHz	100 mW e.i.r.p.	Not Specified	EN 300 422	Radio microphones. On a tuning range basis. Individual licence may be required. See technical conditions for PMSE (including radio microphones): ECC/DEC/(09)03 section 3.1
863-865 MHz	10 mW e.r.p.	Not Specified	EN 300 422 EN 301 357	Radio microphones, wireless audio and multimedia streaming devices.
1350-1400 MHz	20 mW e.i.r.p. / 50 mW e.i.r.p.	Not Specified	EN 300 422	Radio microphones. Individual licence may be required. 50 mW restricted to body worn

RADIO MICROPHONE APPLICATIONS INCLUDING ASSISTIVE LISTENING DEVICES (ALD), WIRELESS AUDIO AND MULTIMEDIA STREAMING SYSTEMS

SCOPE: Parameters for radio microphone applications (also referred to as wireless microphones or cordless microphones), Assistive Listening Devices (ALD) (also referred to as aids for the hearing impaired) and wireless audio and multimedia streaming systems. It covers professional and consumer radio microphones, both hand-held and body-worn, in-ear monitoring devices and Assistive Listening Devices (ALD).

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/Notes
				equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1350-1400 MHz band
1492-1518 MHz	50 mW e.i.r.p	Not Specified	EN 300 422	Radio microphones. On a tuning range basis. Individual licence required. Restricted to indoor use
1518-1525 MHz	50 mW e.i.r.p.	Not Specified	EN 300 422	Radio microphones. On a tuning range basis. Individual licence required. Restricted to indoor use
1656.5-1660.5 MHz	2 mW/ 600 kHz e.i.r.p	Not Specified	EN 300 422	Assistive Listening Systems. Individual licence may be required. ECC Report 270
1785-1795 MHz	20 mW e.i.r.p. / 50 mW e.i.r.p	Not Specified	EN 300 422	Radio microphones. Individual licence may be required. 50 mW restricted to body worn equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1785-1804.8 MHz band

RADIO MICROPHONE APPLICATIONS INCLUDING ASSISTIVE LISTENING DEVICES (ALD), WIRELESS AUDIO AND MULTIMEDIA STREAMING SYSTEMS

SCOPE: Parameters for radio microphone applications (also referred to as wireless microphones or cordless microphones), Assistive Listening Devices (ALD) (also referred to as aids for the hearing impaired) and wireless audio and multimedia streaming systems. It covers professional and consumer radio microphones, both hand-held and body-worn, in-ear monitoring devices and Assistive Listening Devices (ALD).

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised standards	Reference/Notes
1795-1800 MHz	20 mW e.i.r.p. / 50 mW e.i.r.p.	Not Specified	EN 300 422 EN 301 357	Radio microphones including wireless audio and multimedia streaming devices. Individual licence may be required. 50 mW restricted to body worn equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1785-1804.8 MHz band
1800-1804.8 MHz	20 mW e.i.r.p. / 50 mW e.i.r.p.	Not Specified	EN 300 422	Radio microphones. Individual licence may be required 50 mW restricted to body worn equipment or equipment with Spectrum Scanning Procedure (SSP) implemented for the 1785-1804.8 MHz band

APPENDIX 13: ACTIVE MEDICAL IMPLANTS AND THEIR ASSOCIATED PERIPHERALS

APPLICATIONS

ACTIVE MEDICAL IMPLANTS AND THEIR ASSOCIATED PERIPHERALS				
SCOPE: Parameters for Active Medical Implants and their associated peripherals.				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
9-315 kHz	30 dB μ A/m at 10m $\leq 10\%$ duty cycle	Not specified	EN 302 195	The application is for Ultra Low Power Active Medical Implant systems using inductive loop techniques for telemetry purposes
30-37.5 MHz	1 mW e.r.p. $\leq 10\%$ duty cycle	Not specified	EN 302 510	The application is for Ultra Low Power medical membrane implants for blood pressure measurements.
2483.5-2500 MHz	10 dBm e.i.r.p. LBT+AFA and $\leq 10\%$ duty cycle	1 MHz	EN 301 559	For Low Power Active Medical Implants and associated peripherals, covered by the 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.

ACTIVE MEDICAL IMPLANTS AND THEIR ASSOCIATED PERIPHERALS

SCOPE: Parameters for Active Medical Implants and their associated peripherals.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/Notes
401-406 MHz	See detailed requirements in the related ERC Decision		EN 301 839 EN 302 537	For Ultra Low Power Active Medical Implant (ULP-AMI) communication systems. ERC/DEC/(01)17

APPENDIX 14: RADIO FREQUENCY IDENTIFICATION (RFID) APPLICATIONS

RADIO FREQUENCY IDENTIFICATION APPLICATIONS				
<p>SCOPE: Parameters for 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.</p>				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference
865-868 MHz	2 W e.r.p	≤ 200 kHz	EN 302 208	Operation only when necessary to perform the intended operation, i.e. when RFID tags are expected to be present.
865-865.6 MHz	100 mW e.r.p	≤ 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.
865.6-867.6 MHz	2 W e.r.p.	≤ 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.
867.6-868 MHz	500 mW e.r.p.	≤ 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

RADIO FREQUENCY IDENTIFICATION APPLICATIONS

SCOPE: Parameters for 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.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference
				permitted to be used in line with the provisions set out in EC Decision 2006/804/EC before the repeal date.
915-921 MHz	4 W e.r.p.	≤ 400 kHz	EN 302 208	Operation only when necessary to perform the intended operation, i.e. when RFID tags are expected to be present.
2446-2454 MHz	≤ 500 mW e.i.r.p.	Not Specified	EN 300 440	CEPT/ERC/REC 70-03
2446-2454 MHz	> 500 mW to 4 W e.i.r.p. ≤ 15% duty cycle FHSS techniques should be used	Not Specified	EN 300 440	Power levels above 500 mW are restricted to be used inside the boundaries of a building and the duty cycle of all transmissions shall in this case be ≤ 15 % in any 200 ms period (30 ms on /170 ms off)

APPENDIX 15: MEDICAL DATA ACQUISITION APPLICATIONS

MEDICAL DATA ACQUISITION				
SCOPE: Parameters for medical data acquisition applications. They cover transmission of nonvoice data to and from non-implantable medical devices for the purpose of monitoring, diagnosing and treating patients in healthcare facilities or patient's home				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference
430-440 MHz	-50 dBm/100kHz max e.r.p. density but not exceeding a total power of -40 dBm/10MHz (both limits are intended for measurement outside of the patient's body)	≤ 10 MHz	EN 303 520	CEPT/ERC/REC 70-03. Ultra-Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE)
2483.5-2500 MHz	1 mW e.r.p. Adequate spectrum sharing mechanisms (e.g. Listen-Before-Talk and Adaptive Frequency Agility) shall be implemented by the equipment and ≤ 10% duty cycle	≤ 3 MHz	EN 303 203	CEPT/ERC/REC 70-03. Medical Body Area Network System MBANS, indoor only within healthcare facilities.
2483.5-2500 MHz	10 dBm e.i.r.p. Adequate spectrum sharing mechanisms (e.g. Listen-Before-	≤ 3 MHz	EN 303 203	CEPT/ERC/REC 70-03: MBANS, indoor only within the patient's home.

MEDICAL DATA ACQUISITION

SCOPE: Parameters for medical data acquisition applications. They cover transmission of nonvoice data to and from non-implantable medical devices for the purpose of monitoring, diagnosing and treating patients in healthcare facilities or patient's home

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference
	Talk and Adaptive Frequency Agility) shall be implemented by the equipment and $\leq 2\%$ duty cycle			

APPENDIX 16: APPLICATIONS OPERATING UNDER GENERAL AUTHORISATION NOT COVERED IN ABOVE APPENDIXES

APPLICATIONS OPERATING UNDER GENERAL AUTHORISATION				
<p>SCOPE: Terrestrial applications for which frequency ranges are designated in ERC/ECC Decisions, and which are authorised by CEPT administrations under general authorisation (licence-exempt regulation-therefore protection of individual radio stations/radio equipment cannot be ensured.). The regulatory status of these radio applications, which may be different to the regulatory status of SRDs, are defined by the relevant ERC/ECC Decisions.</p>				
Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/notes
26960-27410 kHz	See detailed requirements in the related ECC Decision		EN 300 433	ECC/DEC/(11)03. For Citizens' Band (CB) radio equipment
446-446.2 MHz	See detailed requirements in the related ECC Decision		EN 303 405	ECC/DEC/(15)05. For analogue and digital PMR 446 applications
1880-1900 MHz	See detailed requirements in the related ECC Decision		EN 301 406	ERC/DEC/(94)03, ERC/DEC/(98)22. For DECT (Digital European Cordless Telecommunications) systems.
5150-5350 MHz	See detailed requirements in the related ECC Decision		EN 301 893	ECC/DEC/(04)08. For Wireless Access Systems including Radio Local Area Networks (WAS/RLANs).
5470-5725 MHz	See detailed requirements in the related ECC Decision		EN 301 893	ECC/DEC/(04)08. For Wireless Access Systems including Radio Local Area Networks (WAS/RLANs).
5875-5905 MHz	See detailed requirements in the related ECC Decision		EN 302 571	ECC/DEC/(08)01. For Intelligent Transportation Systems (traffic safety applications).

APPLICATIONS OPERATING UNDER GENERAL AUTHORISATION

SCOPE: Terrestrial applications for which frequency ranges are designated in ERC/ECC Decisions, and which are authorised by CEPT administrations under general authorisation (licence-exempt regulation-therefore protection of individual radio stations/radio equipment cannot be ensured.). The regulatory status of these radio applications, which may be different to the regulatory status of SRDs, are defined by the relevant ERC/ECC Decisions.

Frequency band	Max Radiated Power/Magnetic Field strength limits and Spectrum access and mitigation requirements	Modulation / maximum occupied bandwidth	Harmonised Standards	Reference/notes
63.72-65.88 GHz	See detailed requirements in the related ECC Decision		EN 302 686	ECC/DEC/(09)01. For For Intelligent Transportation Systems. ECC Decision
77-81 GHz	See detailed requirements in the related ECC Decision		EN 302 264	ECC/DEC/(04)03. For Automotive Short Range Radars.
5945-6425 MHz	See detailed requirements in the related ECC Decision		EN 303 687	ECC/DEC/(20)01 . For Wireless Access Systems including Radio Local Area Networks (WAS/RLAN)