NON-OFFICIAL TRANSLATION

The Appendix of Resolution
No. 37, 2020 of the
Communications Regulatory
Commission of Mongolia

SHORT RANGE DEVICES SPECTRUM AND TECHNICAL REGULATION

1. GENERAL REQUIREMENTS

1.1 This document defines the minimum technical and spectrum requirements for short range devices (hereinafter “devices”).

1.2. These device users/operators shall comply according to this document defines technical specifications and requirements.

1.3. The devices/equipment are can be used fixed and mobile in all sectors such as telecommunications, mining, health, transportation, manufacturing, trade, arts and sports, environment, and agriculture.

1.4 The devices shall be used simultaneously with incumbent services specified in the National Radio Frequency Allocation Table, and shall not interference to incumbent services.

1.5. The devices are shall be fully compliant technical standards, conditions, and requirements regardless of the type of service, scope, and type of technology, according to Article 14.1.3 of the Law on Radio Waves, and shall have a certificate of conformity.

2. DEVICES CLASSIFICATIONS, USAGE

2.1. The usage and general classification of the devices are shown in Table 1.

Table 1

№	Classification	Scope	Usage/Notes
1	The active medical implant device	The active medical implant device category covers the radio part of active implantable medical devices that are intended to be totally or partially introduced, surgically or medically.	into the human body or that of an animal, and where applicable their peripherals.
2	The non-specific device	The non-specific short-range device category covers all kinds of radio devices, regardless of the application or the purpose, which fulfil the technical conditions as specified for a given frequency band. Typical uses include telemetry, telecommand, alarms, data transmissions in general and other applications.	**Telecommand**-The use of radiocommunication for the transmission of signals to initiate, modify or terminate functions of equipment at a distance. **Telemetry-**The use of radiocommunication for indicating or recording data at a distance.
3	Assistive listening device	The assistive listening device (ALD) category covers radio	Typical system installations include one or more radio

		communications systems that allow persons suffering from hearing disability to increase their listening capability.	transmitters and one or more radio receivers.
4	The metering device	The metering device category covers radio devices that are part of bidirectional radio communications systems which allow remote monitoring, measuring and transmission of data in smart grid infrastructures,	Used for electricity, gas in the household, water
5	Social alarm devices	**Social alarms** The social alarm devices are radio communication systems that an emergency assistance service intended to allow people to signal that they are in distress and allow them to receive the appropriate assistance.	Alarm signals are received and appropriate steps are taken to provide the required assistance (calling a doctor, the fire brigade, etc.)
6	The high duty cycle/continuous transmission device	The high duty cycle/continuous transmission device category covers radio devices that rely on low latency and high duty cycle transmissions. Typical uses are for personal wireless audio and multimedia streaming systems, combined audio/video transmissions, and audio/video sync signals.	Used for mobile phones, wireless home entertainment system, wireless microphones, cordless loudspeakers, cordless headphones, in-ear, wireless microphones for use at concerts or other stage productions, and low power analogue FM transmitters
7	The radio determination device	The radio determination device category covers radio devices that are used for determining the position, velocity and/or other characteristics of an object, or for obtaining information relating to these parameters.	Radiodetermination equipment typically conducts measurements to obtain such characteristics
8	Model control devices	'Model control devices' are a specific kind of telecommand and telemetry radio equipment	The purpose of controlling /measuring/ distance, level, weight, and height of the object by the movement of the model, in the air, on land, or over or under the water surface.
9	Radio-frequency identification (RFID)	Include 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.	The RFID technology enables all kinds of networked application fields and scenarios, often also described as the "internet of things" or "machine-to-machine communications" and is application neutral. Generally, used in the form of ID cards and tag
10	The transport and traffic telematics device	The transport and traffic telematics device category covers radio devices that are used in the fields of transport (road, rail, water or air), traffic management, navigation, mobility management and in intelligent transport systems.	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) as well as communication from and to users.

11	The inductive device/applications	Inductive loop systems are communication systems based on magnetic fields generally at low RF frequencies. Inductive applications include for example car immobilizers, car access systems or car detectors, animal identification, alarm systems, item management and logistic systems, cable detection, waste management, personal identification, wireless voice links, access control, proximity sensors, anti-theft systems including RF anti-theft induction systems, data transfer to handheld devices, automatic article identification, wireless control systems and automatic road tolling	
12	The low duty cycle/high reliability device	The low duty cycle/high reliability device category covers radio devices that rely on low overall spectrum utilisation and low duty cycle spectrum access rules to ensure highly reliable spectrum access and transmissions in shared bands.	Typical uses include alarm systems that use radio communication for indicating an alert condition at a distant location and social alarms systems that allow reliable communication for a person in distress.
13	Wideband data transmission devices	The wideband data transmission device category covers radio devices that use wideband modulation techniques to access the spectrum.	Typical uses include wireless access systems such as radio local area networks (WAS/RLANs) or wideband SRDs in data networks.
14	The medical data acquisition device	The medical data acquisition category covers the transmission of non-voice data to 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.	Used for medical sensor's data aggregation devices.
15	PRM446 Private radio mobile	PMR446 equipment is hand portable (no base station or repeater use) to be carried on a person or manually operated and uses integral antennas only in order to maximise sharing and minimise interference	PMR 446 equipment operates in short range peer-to-peer mode and shall be used neither as a part of infrastructure network nor as a repeater. 8 to 16 channels, bandwidth 6.25 кHz, 12.5 кHz
16	Alarm	An alarm system is a device which uses radio communication support for indicating an alert to a system or a person, as a main functionality, at a distant location when a problem or a specific situation occurs.	Radio alarms include social alarms and alarms for security and safety.
17	Ultra-Wide Band (UWB)	Ultra-Wide Band (UWB) is a technology for the transmission of data using techniques which cause a spreading of the radio energy over a very wide frequency band, with a very low power spectral density.	The low power spectral density limits the interference potential with conventional radio systems, and the high bandwidth can allow very high data throughput for communications devices, or high precision for location and imaging devices.

2.2. The below annex defines the minimum technical requirements for short range devices frequency bands, technical specifications, and scope. These include:

Annex 1: The non-specific device
Annex 2: Social alarm devices
Annex 3: Wideband data transmission devices
Annex 4: The transport and traffic telematics device
Annex 5: The radio determination device
Annex 6: Model control devices
Annex 7: The inductive system
Annex 8: Assistive listening device
Annex 9: Radio-frequency identification (RFID)
Annex 10: Medical devices
Annex 11: The high duty cycle/continuous transmission device
Annex 12: Ultra-Wide Band (UWB)
Annex 13: Internet of Things (IoT) and Machine to Machine (M2M) devices
Annex 14: The metering device

3. CONTROL AND OTHER

3.1 If the equipment/device exceeds the radio frequency (RF), field strength, or maximum output power specified in the Annex, required for radio frequency license or certificate from Communications Regulatory Commission (CRC).

3.2. The Communication Regulatory Commission and the State Communications Inspector shall inspect the implementation of these regulations and conditions in accordance with the relevant legislation.

3.3. This document can be amended as necessary.

4. LIST OF REFERENCE

International radio frequency allocation, standards technical specifications, and reports were considered. These include:

- "Annual Update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices" 059-2016.06.17 (CEPT Report 059)
- Annual Update of the technical annex of the Commission Decision on the technical harmonization of radio spectrum for use by short range devices 070-2019.03.08 (CEPT Report 070)
- Global harmonization of short-range devices categories Recommendation ITU-R SM.2103-0
- The protection requirements of radiocommunications systems below 10.6 GHz from generic UWB applications
- "Ultra-wideband technology to clarify the technical parameters in view" report of European Conference of Postal and Telecommunications Administrations 045-2013.06.28 (CEPT Report 045)
- "Ultra-Wideband technology in view of a potential update" report of European Conference of Postal and Telecommunications Administrations 069-2018.10.26 (CEPT Report 069)

ANNEX 1: NON-SPECIFIC DATA TRANSMISSION DEVICES

This category covers all types of short-range radio communications devices which regardless of their technical condition, usage, and purpose of else to Data transmission equipment such as Telemetry, Telecommand.

The frequency bands in this category are also used to other categories the radio communications equipment such as Social alarms, Wideband data transmission, Radio Frequency Identification (RFID), Internet of Things (IoT), Machine to Machine (M2M).

Table 2. Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	442.2-450.0 kHz;	7 dBμA/m at 10 m	Bandwidth ≤ 150 Hz
2	456.9-457.1 kHz		
3	13.553-13.567 MHz	10 mW e.r.p.	This set of usage conditions is also available to RFID and Inductive devices
4	26.957-27.283 MHz	10 mW e.r.p.	
4.1	26.990-27.000 MHz 27.040-27.050 MHz, 27.090-27.100 MHz 27.140-27.150 MHz 27.190-27.200 MHz	100 mW e.r.p.	Duty cycle ≤ 0.1%
4.2	40.660-40.700 MHz	10 mW e.r.p	
5	169.400-169.475 MHz	500 mW e.r.p.	Bandwidth ≤ 50 kHz Duty cycle ≤ 0.1% This set of usage conditions is also available to assistive listening devices
5.1	169.400-169.4875 MHz	10 mW e.r.p	Duty cycle limit [vi]: ≤ 0.1%
5.2	169.4875-169.5875 MHz	10 mW e.r.p	This set of usage conditions is also available to assistive listening devices Bandwidth ≤ 50 kHz Duty cycle ≤ 0.1%
5.3	169.5875-169.8125 MHz	10 mW e.r.p	Duty cycle ≤ 0.1%
6	312-318 MHz	50 mW e.r.p	
7	433.050-434.790 MHz	10 mW e.r.p	Duty cycle ≤ 10% This set of usage conditions is available to IoT and M2M.
7.1	433.050-434.790 MHz	1 mW e.r.p	
7.2	434.040-434.790 MHz	10 mW e.r.p	Channel spacing =25kHz Duty cycle ≤ 100%
8	862-863 MHz	25 mW e.r.p	Bandwidth ≤ 200 kHz Duty cycle ≤ 0.1% This set of usage conditions is available for IoT and M2M.
8.1	863-865 MHz	25 mW e.r.p	This set of usage conditions is also available for IoT, M2M system and High duty cycle/continuous transmission devices
8.2	865-868 MHz	25 mW e.r.p	Also, RFID may also be used in these frequency bands
8.3		200 mW e.r.p	Bandwidth ≤ 200 kHz

			Duty cycle ≤ 10% for network access points Duty cycle ≤ 2.5% otherwise This set of usage conditions is also available for IoT, M2M
8.4	868.000-868.600 MHz	25 mW e.r.p	Bandwidth ≤ 200 kHz Or may use the entire bands. This set of usage conditions is also available for IoT, M2M
8.5	868.7-869.0 MHz	25 mW e.r.p	
8.6	915-921 MHz	200 mW e.r.p	This set of usage conditions is also available to RFID, IoT, M2M and Wideband data transmission devices Bandwidth ≤ 200 kHz Duty cycle ≤ 10% for network access points Duty cycle ≤ 2.5%
9	2400.0-2483.5 MHz	10 mW e.r.p	This set of usage conditions is also available for Wideband data transmission system, IoT, M2M, and The radio determination devices.
10	5725-5875 MHz	25 mW e.r.p	This set of usage conditions is also available for Wideband data transmission system, IoT, and M2M.
11	24.15-24.25 GHz	100 mW e.i.r.p.	This set of usage conditions is also available for The transport and traffic telematics device.
12	61-61.5 GHz	100 mW e.i.r.p.	
12.1	57-64 GHz	100 mW e.i.r.p.	This set of usage conditions is also available for The radio determination devices
13	122.0-122.25 GHz	10 dBm e.i.r.p	Bandwidth=250 MHz and 0.000015 mW/MHz at 30°
13.1	122.25-123.0 GHz	100 mW e.i.r.p.	
14	244-246 GHz	100 mW e.i.r.p.	

Harmonized standards:

EN 300 220-1: Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 1: Technical characteristics and methods of measurement

EN 300 220-2: Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 2: Harmonised Standard for access to radio spectrum for non-specific radio equipment

EN 300 330-1: 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; Part 1: Technical characteristics and test methods

EN 300 330: 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 300 440-1: Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods

EN 300 440-2 v2.2.1: Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard for access to radio spectrum

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ANNEX 2: SOCIAL ALARMS, TRACKING, TRACING AND DATA ACQUISITION

This annex covers frequency band and requirement of the Low duty cycle/continuous transmission devices

It also includes low power area network systems used for the transmission of non-voice data to and from medical devices for the purposes of monitoring, diagnosing and treating patients as prescribed by duly authorised healthcare professionals, and are defined devices for receiving information related such as fire, theft, and patient health.

Table 3: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	868.6-868.7 MHz	10 mW e.r.p.	Channel spacing: 25 kHz Duty cycle ≤ 1%
2	2483.5-2500 MHz	10 mW e.i.r.p.	This frequency bands are also used for medical devices.

Harmonised Standards

EN 300 718-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Avalanche Beacons; Transmitter-receiver systems; Part 1: Technical characteristics and test methods

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ANNEX 3: WIDEBAND DATA TRANSMISSION SYSTEM

This annex covers frequency bands and regulatory as well as informative parameters recommended for Wideband Data Transmission Systems and Wireless Access Systems including Radio Local Area Networks (WAS/RLANs) within the bands 900 MHz/ 2.4 GHz/ 5 GHz/ 57-71 GHz. Also, using the IoT, M2M connection system in the bands below.

Table 4: Regulatory Parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	863-868 MHZ	25 mW e.r.p.	This frequency bands may also be used for RFID and The high duty cycle/continuous transmission devices Bandwidth > 600 kHz and ≤ 1 MHz. Duty cycle ≤ 10% for network access points Duty cycle ≤ 2.5% otherwise
2	915-921 MHz	25 mW e.r.p.	Bandwidth > 600 kHz and ≤ 1 MHz. Duty cycle ≤ 10% for network access points Duty cycle ≤ 2.5% otherwise
3	2400.0-2 483.5 MHz	100 mW e.r.p.	For wide band modulations other than FHSS, the maximum e.i.r.p. density is limited to 10 mW/MHz Bandwidth ≥ 20 MHz
4	5150-5350 MHz	200 mW e.r.p.	Solely, covers devices for used indoor
5	5470-5725 MHz	200 mW e.r.p.	
6	5725-5925 MHz	200 mW e.i.r.p.	Bandwidth ≥ 20 MHz This frequency bands may also be used for the Transport and Traffic Telematics.
7	57-71 GHz	43 dBm e.i.r.p	Fixed outdoor installations are not allowed. This frequency bands may also be used for the Radio determination device and the Transport and Traffic Telematics.

Harmonised standards

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 wide band modulation techniques;

EN 302 567: Broadband Radio Access Networks (BRAN); 60 GHz Multiple-Gigabit WAS/RLAN Systems;

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ANNEX 4: TRANSPORT AND TRAFFIC TELEMATICS

Table 5: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	984-7484 kHz	9 dBμA/m at 10m	Duty cycle ≤ 1% This frequency bands may also be used inductive devices
2	7.3-23.0 MHz	-7 dBμA/m at 10m	Maximum field strength specified in a bandwidth of 10 kHz, spatially averaged over any 200m length of the loop. Centre frequency is 13.547 MHz This frequency bands are also used for inductive devices.
3	5795-5815 MHz	2 W e.i.r.p.	This frequency bands are also used for the Wideband data transmission devices.
4	5855-5875 MHz	33 dBm e.i.r.p.	
5	76-77 GHz	55 dBm e.i.r.p.	This frequency bands are also used for the Radio determination devices. If Duty cycle limit [vi]: ≤ 56%, power limit is 30 dBm e.i.r.p.
6	24.05 -26.65 GHz	20 mW e.i.r.p.	For automotive Short Range Radars (SRR). If bandwidth=50 MHz, power limit 26 dBm e.i.r.p.
7	77-81 GHz	10 mW e.i.r.p.	For vehicle radars
8	24.050-24.075 GHz	100 mW e.i.r.p.	
9	24.075-24.150 GHz	100 mW e.i.r.p.	
10	24.150-24.250 GHz	100 mW e.i.r.p.	
11	63.72-65.88 GHz	10 mW e.i.r.p.	

Harmonized standards:

EN 302 608: Electromagnetic compatibility and Radio spectrum matters (ERM)-Short range devices (SRD)-Radio equipment for Eurobalise railway systems

EN 302 609: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment for Euroloop railway systems;

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 302 288-1; Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range; Part 1: Technical requirements and methods of measurement

EN 302 264-1: 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; Part 1: Technical requirements and methods of measurement

EN 302 858-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Automotive radar equipment operating in the 24,05 GHz up to 24,25 GHz or 24,50 GHz frequency range; Part 1: Technical characteristics and test methods

EN 300 761-1: 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; Part 1: Technical characteristics and methods of measurement

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ANNEX 5: RADIODETERMINATION DEVICES

Table 6: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	2400.0-2483.5 MHz	25 mW e.i.r.p.	This set of usage conditions is also available for The wideband data transmission and RFID.
2	4500-7000 MHz	24 dBm e.i.r.p.	This set of usage conditions is also available for The transport and traffic telematics devices
2.1	6000-8500 MHz	7 dBm e.i.r.p.	Bandwidth=50MHz
2.2	8500-9500 MHz	30 dBm e.i.r.p.	
2.3	9500-9975 MHz		
3	9975-10500 MHz		
4	10.5-10.6 GHz		
5	17.1-17.3 GHz	26 dBm e.i.r.p.	
6	24.05-27. GHz	20 mW e.i.r.p.	This set of usage conditions is also available for The transport and traffic telematics devices If bandwidth=50MHz, power limit is 26 dBm e.i.r.p.
7	57-64 GHz	20 mW e.i.r.p.	This set of usage conditions is also available for The wideband data transmission devices If bandwidth=50MHz, power limit is 35 dBm e.i.r.p.
8	75-85 GHz	20 mW e.i.r.p.	This set of usage conditions is also available for The wideband data transmission devices If bandwidth=50MHz, power limit is 34 dBm e.i.r.p.

Harmonized standards:

EN 302 372-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Equipment for Detection and Movement; Tanks Level Probing Radar (TLPR)
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operating in the frequency bands 5,8 GHz, 10 GHz, 25 GHz, 61 GHz and 77 GHz; Part 1: Technical characteristics and test methods

EN 302 729-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Level Probing Radar (LPR) equipment operating in the frequency ranges 6 GHz to 8,5 GHz, 24,05 GHz to 26,5 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz; Part 1: Technical characteristics and test methods

EN 305 550: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 40 GHz to 246 GHz frequency range; Part 1: Technical characteristics and test methods

EN 302 066-1:Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground- and Wall- Probing Radar applications (GPR/WPR) imaging systems; Part 1: Technical characteristics and test methods

EN 302 435-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Technical characteristics for SRD equipment using Ultra WideBand technology (UWB); Building Material Analysis and Classification equipment applications operating in the frequency band from 2,2 GHz to 8,5 GHz; Part 1: Technical characteristics and test methods

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ANNEX 6: MODEL CONTROL

This annex covers frequency bands and regulatory as well as informative parameters recommended 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.

Table 7: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	26.990-27.000 MHz 27.040-27.050 MHz 27.090-27.100 MHz 27.140-27.150 MHz 27.190-27.200 MHz	100 mW e.r.p	Duty cycle ≤ 0.1%
2	34.995-35.225 MHz	100 mW e.r.p	Only for flying models Channel spacing: 10 kHz
3	40.660-40.670 MHz 40.670-40.680 MHz 40.680-40.690 MHz 40.690-40.700 MHz	10 mW e.r.p	

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ANNEX 7: INDUCTIVE SYSTEM

Table 8: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1.1	9 - 90 kHz	72 dBμA/m at 10 m	
1.2	90-119 kHz	42 dBμA/m at 10 m	For used to wireless charger devices into 80-300 kHz bands
1.3	119-135 kHz	66 dBμA/m at 10 m	
2	135-140 kHz	42 dBμA/m at 10 m	
3	140-148.5 kHz	37.7 dBμA/m at 10 m	
4	6765-6795 kHz	42 dBμA/m at 10 m	
5	7400-8800 kHz	9 dBμA/m at 10 m	
6	13.553-13.567 MHz	42 dBμA/m at 10 m	Used for only Radio frequency identification (RFID) (NFC)
6.1	13.410-13.553 MHz 13.567-13.710 MHz	9 dBμA/m at 10 m	
	13.110-13.410 MHz 13.710-14.010 MHz	-3.5 dBμA/m at 10 m	
	12.660-13.110 MHz 14.010-14.460 MHz	-10 dBμA/m at 10 m	
	11.810-12.660 MHz 14.460-15.310 MHz	-16 dBμA/m at 10 m	
6.2	13.460-13.553 MHz 13.567-13.660 MHz	27 dBμA/m at 10 m	
	13.360-13.460 MHz 13.660-13.760 MHz	27-3.5 dBμA/m at 10 m	
	13.110-13.360 MHz 13.760-14.010 MHz	-3.5 dBμA/m at 10 m	
	12.660-13.110 MHz 14.010-14.460 MHz	-5 dBμA/m at 10 m	
7	26.957-27.283 MHz	42 dBμA/m at 10 m	
8	10.200-11.000 MHz	9 dBμA/m at 10 m	
9	3155-3400 kHz	13.5 dBμA/m at 10 m	
10.1	148.5 kHz - 5 MHz	-15 dBμA/m BW≤10 kHz -5 dBμA/m BW≥10 kHz at 10m	
10.2	5 - 30 MHz	-20 dBμA/m BW≤10 kHz -5 dBμA/m BW≥10 kHz at 10 m	
10.3	26.990-27.000 MHz 27.040-27.050 MHz, 27.090-27.100 MHz 27.140-27.150 MHz 27.190-27.200 MHz	100 mW e.r.p. at 10 m	For also used to the model control devices

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ANNEX 8: ASSISTIVE LISTENING DEVICES

A hearing aid (also referred to as assistive listening devices) is a special type of radio microphone that receives acoustic signals from a radio transmitter

Table 9: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	169.4-169.475 MHz	500 mW e.r.p.	Bandwidth ≤ 50 kHz
1.1	169.4875-169.5875 MHz		
2	173.965-174.015 MHz	10 mW e.r.p.	

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ANNEX 9: RADIO FREQUENCY IDENTIFICATION SYSTEM (RFID)

These category devices operate the same principle with the inductive device and are used simultaneously in some frequency bands.

Table 10: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	400-600 kHz	-8 dBµA/m at 10 m	
2	13553-13567 kHz	60 dBµA/m at 10 m	
3	865-868 MHz	25 mW e.r.p.	Bandwidth ≤ 200 kHz
4	2446-2454 MHz	500 mW e.i.r.p.	Used for also Wideband data transmission devices

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ANNEX 10: ACTIVE MEDICAL IMPLANTS AND THEIR ASSOCIATED PERIPHERALS

This annex covers frequency bands and regulatory as well as informative parameters recommended for Active Medical Implants and their associated peripherals.

Table 11: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	9-315 kHz	30 dBµA/m at 10m	The application is for Ultra Low Power Active Medical Implant systems using inductive loop techniques for telemetry purposes
2	315-600 kHz	-5 dBµA/m at 10m	The application is for animal implantable devices
3	30.0-37.5 MHz	1 mW e.r.p.	The applications is for Ultra Low Power medical membrane implants for blood pressure measurements.

4	401-402 MHz	25 µW e.r.p.	Bandwidth ≤ 100 kHz
5	402-405 MHz		Bandwidth ≤ 300 kHz
6	405-406 MHz		Bandwidth ≤ 100 kHz
7	430-440 MHz	-50 dBm e.r.p.	
8	12.5-20.0 MHz	-7 dBµA/m at 10m	The application is for 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: 1,9mW bandwidth 300 kHz 0.01W bandwidth 800 kHz 0.1W bandwidth 2 MHz
9	2483.5-2500 MHz	10 mW (e.i.r.p.)	For Low Power Active Medical Implants and associated peripherals, covered by the applicable harmonised standard. Peripheral units are for indoor use only Channel spacing = 1MHz

Harmonised Standards:

EN 302 195-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio equipment in the frequency range 9 kHz to 315 kHz for Ultra Low Power Active Medical Implants (ULP-AMI) and accessories; Part 1: Technical characteristics and test methods

EN 302 536-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 315 kHz to 600 kHz; Part 1: Technical characteristics and test methods

EN 302 510-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio equipment in the frequency range 30 MHz to 37,5 MHz for Ultra Low Power Active Medical Membrane Implants and Accessories; Part 1: Technical characteristics and test methods

EN 301 559-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Low Power Active Medical Implants (LP-AMI) operating in the frequency range 2 486,5 MHz to 2 500 MHz; Part 1: Technical characteristics and test methods

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ANNEX 11: THE HIGH DUTY CYCLE/CONTINUOUS TRANSMISSION DEVICE

This annex covers frequency bands and regulatory as well as informative parameters recommended for 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 12: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	87.5-108 MHz	0.05 mW e.r.p.	This set of usage conditions is only available to wireless audio and multimedia streaming transmitters with analogue frequency modulation (FM). Channel spacing ≤ 200 kHz
2	446-446.2 MHz	500 mW e.r.p.	The set of usage conditions is cover mobile station devices other than the base station and repeater. 8-16 channels, bandwidth 6.25 kHz, 12.5 kHz. For household use only.
3	863-865 MHz	10 mW (e.r.p.)	Wireless Audio and Multimedia Streaming Devices

Harmonized standards:

EN 301 357-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Cordless audio devices in the range 25 MHz to 2 000 MHz; Part **1:** Technical characteristics and test methods;

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ANNEX 12: ULTRA WIDE BAND (UWB) DEVICE

Ultra-wideband is a radio technology that can use a very low energy level for short-range, high-bandwidth communications over a large portion of the radio spectrum. UWB applications are ground-penetrating radar, location sensing, communication, target sensor data collection, precision locating, astronomy, and tracking.
The devices are classified in the following usage:

- Requirements for Generic UWB applications (Table 13)
- Devices using UWB technology onboard aircraft (Table 13)
- Requirements for UWB devices for ground-based vehicular applications; (Table 14)

Table 13: Maximum value of mean power spectral density limit (e.i.r.p.)

№	Frequency range [GHz]	The maximum value of the mean power spectral density limit (e.i.r.p.)	The maximum value of mean power spectral density limit (defined in 50 MHz)
1	f ≤ 1.6	-90 dBm/MHz	-50 dBm
2	1.6 < f ≤ 2.7	-85 dBm/MHz	-45 dBm
3	2.7 < f ≤ 3.4	-70 dBm/MHz	-36 dBm
4	3.4 < f ≤ 3.8	-80 dBm/MHz	-40 dBm
5	3.8 < f ≤ 4.2	-70 dBm/MHz	-30 dBm
6	4.2 < f ≤ 4.8	-70 dBm/MHz	-30 dBm
7	4.8 < f ≤ 6	-70 dBm/MHz	-30 dBm
8	6 < f ≤ 8.5	-41.3 dBm/MHz	0 dBm
9	8.5 < f ≤ 10.6	-65 dBm/MHz	-25 dBm
10	10.6 < f	-85 dBm/MHz	-45 dBm

NOTE 1: Within the band, 3,1 GHz to 4,8 GHz, devices implementing Low Duty Cycle (LDC) mitigation technique (see clause 4.5.3) 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.

NOTE 2: Within the bands, 3,1 GHz to 4,8 GHz and 8,5 GHz to 9 GHz, devices implementing Detect And Avoid (DAA) mitigation technique (see clause 4.5.1) 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.

Requirements for UWB devices for ground-based vehicular applications:

Table 14: Maximum value of mean power spectral density limit (e.i.r.p.)

№	Frequency range [GHz]	The maximum value of the mean power spectral density limit (e.i.r.p.)	The maximum value of mean power spectral density limit (defined in 50 MHz)
1	f ≤ 1.6	-90 dBm/MHz	-50 dBm
2	1.6 < f ≤ 2.7	-85 dBm/MHz	-45 dBm
3	2.7 < f ≤ 3.4	-70 dBm/MHz	-36 dBm
4	3.4 < f ≤ 3.8	-80 dBm/MHz	-40 dBm
5	3.8 < f ≤ 4.2	-70 dBm/MHz	-30 dBm
6	4.2 < f ≤ 4.8	-70 dBm/MHz	-30 dBm
7	4.8 < f ≤ 6	-70 dBm/MHz	-30 dBm
8	6 < f ≤ 8.5	-53.3 dBm/MHz	-13.3 dBm
9	8.5 < f ≤ 10.6	-65 dBm/MHz	-25 dBm
10	10.6 < f	-85 dBm/MHz	-45 dBm

NOTE 1: Within the band, 3,1 GHz to 4,8 GHz and 6 GHz to 8,5 GHz, devices implementing Low Duty Cycle (LDC) mitigation technique (see clause 4.5.3) 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. Operation is also subject to the implementation of an exterior limit (see clause 4.3.4) of -53,3 dBm/MHz.

NOTE 2: Within the bands, 3,1 GHz to 4,8 GHz and 8,5 GHz to 9 GHz, devices implementing Detect And Avoid (DAA) mitigation technique (see clause 4.5.1) 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. Operation is also subject to the implementation of the Transmit Power Control (TPC) mitigation technique (see clause 4.6) and an exterior limit (see clause 4.3.4) of -53,3 dBm/MHz.

NOTE 3: Within the band, 6 GHz to 8,5 GHz devices implementing Transmit Power Control (TPC) mitigation technique (see clause 4.7.1) and an exterior limit (see clause 4.3.4) of -53,3 dBm/MHz 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.

Harmonized standards:

4.1.7. EN 302 065-1 v2.1.1: Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements; Part 1: Requirements for Generic UWB applications;

4.1.8. EN 302 500-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD) using Ultra-Wideband (UWB) technology; Location Tracking equipment operating in the frequency range from 6 GHz to 9 GHz; Part 1: Technical characteristics and methods of measurement

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ANNEX 13: INTERNET OF THINGS (IoT), MACHINE TO MACHINE (M2M) DEVICES

This annex covers frequency band and requirement of the IoT devices

IoT and M2M devices depend on short-range devices and defined the main differences in Table 15.

Table 15

№	Machine to Machine (M2M)	Internet of Things (IoT)
1	A device is a computing machine	Terminal is a sensor
2	Hardware-based technology	Software-based technology
3	Uses non-IP protocol	Uses IP protocol
4	No require to use the internet protocol	The Internet protocol may be used
5	Main function is to monitor and control	Multiple application

Radio equipment is used for public and private purposes and is divided according to the standard showing in table 16

Table 16

№	Standards	Technology
1	Fixed, Short-range	RFID, Bluetooth, ZigBee, WiFi
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2	3 GPP non-standard	LoRa, LoRaWan, Sigfox, Weightless, PRMA
3	3 GPP standard	LTE-MTC/eMTC, NB-IoT, EC-GSM-IoT

Table 17: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	433.05-434.79 MHz	10 мВт (e.r.p.)	Duty cycle ≤ 10% Channel spacing = 25 кHz
2	862-865 MHz	25 мВт (e.r.p.)	Duty cycle ≤ 1% Bandwidth ≤ 200 кHz
3	865-868 MHz	200 мВт (e.r.p.)	Bandwidth ≤ 200 кHz Duty cycle ≤ 0.1%
4	868.7-869.0 MHz	25 мВт (e.r.p.)	
5	915-921 MHz	200 мВт (e.r.p.)	Bandwidth ≤ 200 кHz Duty cycle ≤ 0.1%
6	2400-2483.5 MHz	10 мВт (e.i.r.p.)	
7	5725-5875 MHz	25 мВт (e.i.r.p.)	This set of usage conditions is also available for wideband data transmission devices.
8	3GPP bands	200 мВт (e.r.p.)	Only for terminal

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ANNEX 14: THE METERING DEVICE

This annex covers technical parameters 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

Table 18: Regulatory parameters

№	Frequency bands	Transmit power limit/ field strength limit/power density limit	Notes
1	169.4-169.475 MHz	500 mW e.r.p.	This set of usage conditions is also available to hearing aid device/assistive listening devices. The duty cycle is 10.0%
2	865-868 MHz	200 mW e.r.p.	
3	915-921 MHz	200 mW e.r.p.	

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