STATUS
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CEPT/ERC RECOMMENDATION 70-03

RELATING TO THE USE OF SHORT RANGE DEVICES (SRD)
Including Appendixes and Annexes
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	Text	Page	Edition
Recommendation		1 2 and 3	June 22, 1998 October , 1997
Appendix 1	Applications and Parameter Tables	1 2 3 4 5	June 22, 1998 October 21, 1998 October 6, 1997 December 15, 1997 February 12, 1999
Appendix 2	List of relevant ERC Decisions, Recommendations and ETSI Standards	1 2	December 15, 1997 June 22, 1998
Appendix 3	List of national restrictions	1 2 3 4 5 6 7 8	February 12, 1999 February 12, 1999 February 12, 1999 February 12, 1999 February 12, 1999 February 12, 1999 February 12, 1999 February 12, 1999
Spreadsheet showing frequencies generally available for Short Range Devices			June 22, 1998
Annex 1	Non-specific Short Range Devices	1 2	June 22, 1998 March 16, 1998
Annex 2	Devices for Detecting Avalanche Victims	1	October 6, 1997
Annex 3	Local Area Networks, RLANs and HIPERLANs	1 2	October 6, 1997 June 22, 1998
Annex 4	Automatic Vehicle Identification for Railways (AVI)	1 and 2	October 21, 1998
Annex 5	Road Transport & Traffic Telematics (RTTT)	1	October 21, 1998
Annex 6	Equipment for Detecting Movement and Equipment for Alert	1	June 22, 1998
Annex 7	Alarms	1	June 22, 1998
Annex 8	Model Control	1	June 22, 1998
Annex 9	Inductive applications	1 and 2	June 22, 1998
Annex 10	Radio microphones	1 and 2	October 21, 1998
Annex 11	In preparation		
Annex 12	Ultra Low Power Active Medical Implants	1	June 22, 1998
Annex 13	Title: Wireless Audio Applications	1	June 22, 1998

CEPT/ERC RECOMMENDATION 70-03 (Tromsø 1997)

RELATING TO THE USE OF SHORT RANGE DEVICES (SRD)

Recommendation adopted by the Frequency Management, Radio Regulatory and Spectrum Engineering Working Groups

Foreword

This Recommendation sets out the general position on common spectrum allocations for Short Range Devices (SRDs) for countries within the CEPT. In using this Recommendation it should be remembered that it represents the most widely accepted position within the CEPT but it should not be assumed that all allocations are available in all countries. An indication of where allocations are not available or where deviations from the CEPT position occur is to be found in Appendix 3.

It should also be remembered that the pattern of radio use is not static. It is continuously evolving to reflect the many changes that are taking place in the radio environment; particularly in the field of technology. Spectrum allocations must reflect these changes and the position set out in this Recommendation is therefore subject to continuous review.

Moreover, many administrations still have national allocations that do not conform to the CEPT position set out in this Recommendation.

For these reasons, those wishing to develop or market SRDs based on this Recommendation are advised to contact the relevant national administration to verify that the position set out herein still applies.

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

INTRODUCTION

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 standards for the majority of these devices.

The term "Short Range Device" (SRD) is intended to cover the radio transmitters which provide either uni-directional or bi-directional communication and which have low capability of causing interference to other radio equipment. SRDs use either integral, dedicated or external antennas and all modes of modulation can be permitted subject to relevant standards. Due to the many different services provided by these devices, no description can be exhaustive, however, the following categories are amongst those covered:

Telecommand and Telecontrol
Telemetry
Alarms
Speech and Video

This Recommendation describes the requirements for SRDs relating to allocated frequency bands, maximum power levels, equipment antenna, channel spacing, duty cycle, licensing, conformity assessment, marking and free circulation requirements.

Appendix 1 Table 1 lists the applications covered by this Recommendation. Tables 2 to 7 in Appendix 1 list parameters relevant to these applications. The Tables in the following annexes give the possible combinations which may be utilised for different applications. For example, in Annex 1 for the frequency band 40.660-40.700 MHz as mentioned in the fourth row of the first column, equipment may operate with maximum radiated power level 8 (i.e., 10 mW e.r.p.). Equipment in the frequency band 61.0-61.5 GHz may operate with maximum radiated power level 11 (i.e., 100 mW e.i.r.p.). In neither case are individual licences required and both antenna type 1 (integral antenna) and type 2 (dedicated antenna) may be applied. The same allotment applies to channel spacing, duty cycle, conformity assessment, marking and free circulation.

Relevant ERC Decisions and standards produced by ETSI are mentioned in Appendix 2 of this Recommendation. Relevant ETSI Standards are also mentioned by their ETS or EN number in the corresponding annexes.

"The European Conference of Postal and Telecommunications Administrations,

considering

a) that SRDs in general operate in shared bands and are not permitted to cause harmful interference to other radio services;

b) that in general SRDs cannot claim protection from other radio services;

c) that due to the increasing interest in the use of SRDs for a growing number of applications it is necessary to harmonise frequencies and regulations for these devices;

d) that ETSI has developed technical standards covering different kinds of SRDs;

e) that for some applications CEPT Recommendations detail frequency allocations without ETSI having yet developed standards,

recognising

a) that there is a need to distinguish between different applications;

b) that additional applications and associated annexes will be added as necessary;

c) that the list of applications currently covered by this Recommendation is shown in Appendix 1, Table 1;

d) that conformity assessment , marking and free circulation requirements which have been developed in the CEPT are applicable to SRDs;

e) that maintenance of Appendices 2 and 3 and also the related cross-references in the Annexes may be undertaken by the ERO based on information from Administrations,

noting

a) that information about the regulatory requirements for placing SRD equipment on the market and for their use should be obtained by contacting individual administrations, especially with regard to equipment operating in frequencies or frequency bands that may be designated for SRDs by administrations in addition to those covered in this recommendation;

b) that, for those countries implementing this Recommendation, national restrictions in respect of the annexes can be found in Appendix 3;

c) that the CEPT should amend or abrogate relevant parts of CEPT Recommendations where indicated in the annexes but equipment marketed before the adoption of this ERC Recommendation marked with abbreviations defined in the CEPT Recommendations to be abrogated should be allowed continuation of free circulation and use,

recommends

1) that CEPT Administrations implement the parameters listed in Appendix 1 (Applications and Parameter Tables) in accordance with the indications mentioned in the annexes;

2) that technical parameter limits should not be exceeded by any function of the equipment;

3) that whenever there are ERC Decisions harmonising the radio parameters and adopting European standards so that the ERC Decision ERC/DEC/(97)10 is applicable, CEPT Administrations should accept the conformity assessment performed by bodies in other CEPT member countries without requiring national conformity assessment;

4) that whenever recommends (3) cannot be applied but there is an ETSI standard mentioned in the Annexes, CEPT Administrations should accept the test results reached by an accredited test laboratory in another country in accordance with ERC Recommendation CEPT/ERC/REC 01-06 (Brussels 1994) (Procedure for mutual recognition of type testing and type-approval for radio equipment);

5) that in cases not covered by recommends 3 and 4, Administrations should introduce national conformity assessment based on national type testing;

6) that CEPT Administrations should allow visitors from other countries to carry and use their equipment temporarily without any further formalities whenever free circulation and the use of the equipment is indicated in the annexes, unless there are national restrictions as shown in Appendix 3."

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Appendix 1

Applications and Parameter Tables.

Table 1: Applications

Annex	Application
1	Non-specific Short Range Devices
2	Equipment for Detecting Avalanche Victims
3	Local Area Networks, RLANs and HIPERLANs
4	Automatic Vehicle Identification for Railways (AVI)
5	Road Transport & Traffic Telematics (RTTT)
6	Equipment for Detecting Movement and Equipment for Alert
7	Alarms
8	Model Control
9	Inductive Applications
10	Radio Microphones *
11	RF Identification Systems *
12	Ultra Low Power Active Medical Implants
13	Wireless Audio Applications

* Annexes in preparation

Table 2: Radiated Power or Field Strength

	Maximum power level
1.	7 dBμA/m at 10 metres
2.	42 dBμA/m at 10 metres
3.	72 dBμA/m at 10 metres (at 30 kHz descending 3.5 dB/octave)
4.	38 dBμA/m at 10 metres (at 135 kHz descending 3.5 dB/octave to 4.78 MHz)
5.	9 dBμA/m at 10 metres
5a.	25 μW [1]
6.	1 mW [1]
7.	2 mW [1]
7a.	5 mW [1]
8.	10 mW [1]
9.	25 mW [1]
10.	50 mW [1]
11.	100 mW [1]
12.	500 mW [1]
13.	1 W [1]
14.	2 W [1]
15.	8 W [1]
16.	*To be determined (t.b.d.)* [1]
17.	55 dBm peak power[1] 50 dBm average power[1] 23.5 dBm average power[1] [2]
18.	Power requirements defined in relevant annex.

[1] Levels are either effective radiated power (e.r.p.) or equivalent isotropically radiated power (e.i.r.p.) as indicated in the relevant annex.

[2] Pulsed radar only.

Table 3: Transmitter antenna source

	Type of transmitter antenna
1.	Integral (no external antenna socket)
2.	Dedicated (type approved with the equipment)
3.	External (equipment type approved without an antenna)

Table 4. Channel spacing permitted

	Channel spacing
1.	5 kHz
2.	6.25 kHz
3.	10 kHz
4.	12.5 kHz
5.	20 kHz
6.	25 kHz
7.	50 kHz
8.	75 kHz
9.	100 kHz
10.	150 kHz
11.	200 kHz
12.	Other channel spacing - see specific annex
13.	No channel spacing – whole stated frequency band may be used

In the frequency bands where channel spacing is defined the centre frequency of the first channel is at a distance of *channel spacing/2* from the lower frequency band edge.

Table 5: Licensing requirements

	Individual licence
1.	Required [3]
2.	Not required

Table 6: Conformity assessment, marking requirements and free circulation.

	Conformity assessment	Marking	Free circulation and use
1.	Mutual recognition of conformity assessment ERC/DEC/(97)10	Rxxxx SRD Aa[4]	Yes[5]
2.	Mutual recognition of test results (CEPT/ERC/REC 01-06 (Brussels 1994))	CEPT SRD Aa Y[2]	Yes[3]
3.	National conformity assessment[6]	National marking	No

[3] A licence may not be necessary in certain CEPT countries.

[4] 'xxxx' is the identification number of the responsible conformity assessment body. The updated list of these identification numbers will be available from the ERO.

'A' is the number of the relevant Annex associated with this recommendation.

'a' is the letter of the leftmost column in the Annexes defining the frequency band alternative. 'a' may be more than one letter in the case of multi-band equipment. All frequency bands in which equipment is intended to operate must be specified.

'Y' is the symbol for the country which issued the type approval.

[5] There are restrictions as defined in Appendix 3

[6] National conformity assessment may also be based on mutual recognition of test results (CEPT/ERC/REC 01-06).

Table 7: Duty cycle categories

For the purposes of this Recommendation the duty cycle is defined as the ratio, expressed as a percentage, of the maximum transmitter “on” time on one or more carrier frequencies, relative to a one hour period.

Where an acknowledgement message is required, the additional transmitter “on” time shall be included.

For pre-programmed devices the maximum transmitter “on” time and minimum “off” time are given in the following table.

	Name	Transmitting time/Full cycle	Maximum transmitter "on” time [7] (seconds)	Minimum transmitter “off” time [1] (seconds)	Explanation
1	Very Low	<0.1%	0.72	0.72	For example, 5 transmissions of 0.72 seconds within one hour.
2	Low	<1.0%	3.6	1.8	For example, 10 transmissions of 3.6 seconds within one hour.
3	High	<10%	36	3.6	For example, 10 transmissions of 36 seconds within one hour
4	Very High	Up to 100%	-	-	Typically continuous transmissions but also those with a duty cycle greater than 10%

[7] These limits are advisory with a view to facilitating sharing between systems in the same frequency band.

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Appendix 2

List of relevant ERC Decisions, Recommendations and ETSI Standards

ERC Decisions

ERC/DEC/(92)02	On the frequency bands to be designated for the coordinated introduction of Road Transport Telematics Systems.
ERC/DEC/(96)03	On the harmonised frequency band to be designated for the introduction of High Performance Radio Local Area Networks (HIPERLANs).
ERC/DEC/(95)01	On the free circulation of radio equipment in CEPT member countries.
ERC/DEC(97)06	On the harmonised frequency band to be designated for Social Alarm Systems.
ERC/DEC/(97)10	On the mutual recognition of conformity assessment procedures including marking of radio equipment and radio terminal equipment.
ERC/DEC/(98)05	On adoption of national type approval regulations for short range devices operating in the frequency range 25 to 1000 MHz with power levels of up to 500mW based on the European Standard (Telecommunications Series) EN 300 220-1.

ERC Recommendations

CEPT/ERC/REC 01-06	Procedure for mutual recognition of type testing and type-approval for radio equipment.

ETSI Standards

Generic standards

EN 300 220-1	Radio Equipment and Systems (RES); Short range devices; Technical characteristics and test methods for radio equipment to be used in the 25 MHz to 1000 MHz frequency range with power levels ranging up to 500 mW.
EN 300 330	Radio Equipment and Systems (RES); Short range devices (SRDs); Technical characteristics and test methods for radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz.
I-ETS 300 440	Radio Equipment and Systems (RES); Short range devices; Technical characteristics and test methods for radio equipment to be used in the 1 GHz to 25 GHz frequency range.

Specific standards

ETS 300 328	Radio Equipment and Systems (RES); Wideband transmission systems; Technical characteristics and test conditions for data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques.
I-ETS 300 422	Radio Equipment and Systems (RES); Technical characteristics and test methods for wireless microphones in the 25 MHz to 3 GHz frequency range.
ETS 300 454	Radio Equipment and Systems (RES); Wide band audio links; Technical characteristics and test methods.
ETS 300 836-1	Radio Equipment and Systems (RES); HIgh PErformance Radio Local Area Network (HIPERLAN) Type 1 Conformance Testing Specification.
EN 300 674	Radio Equipment and Systems (RES); Road Transport and Traffic Telematics (RTTT); Technical characteristics and test methods for data transmission equipment operating in the 5.8 GHz Industrial, Scientific and Medical (ISM) band. [Approval subject to resolution meeting]
ETS 300 718	Radio Equipment and Systems (RES); Avalanche beacons; Transmitter-receiver systems.
EN 300 761	Radio Equipment and Systems (RES); Automatic Vehicle Identification (AVI) for Railways.
EN 301 091	Radio Equipment and Systems (RES); Automotive radar systems in the 76-77 GHz frequency band.

Appendix 3

List of national restrictions
for those countries implementing this Recommendation
(see Foreword)

Annex	Administration	Remarks/Restrictions
All annexes	Austria	Only the marking RxxxxSRD Aa in accordance with Appendix 1, Table 6 category 1 is recognised.
	Belgium	No implementation of the marking.
	France	France does not recognise the former marking CEPT SRD Aa Y and CEPT RLAN Y recommended by T/R 01-04 and T/R 10-01 respectively. The free circulation and use of products bearing these old markings must then be confined to existing equipments and to countries which have already adopted these markings. The marking CEPT SRD Aa Y proposed by T/R 70-03 will not be recognised in France, and a national marking will be used instead, although the recommendation T/R 01-06 is and will be applied by France.
	Germany	Mutual recognition of conformity assessment based on ERC Decision ERC/DEC/(97)10 is not possible for all SRD applications (Appendix 1, Table 6, No. 1.). Germany does not intend to commit itself to this Decision. Although essential parts of the provisions of this Decision are at present reflected by the relevant national regulations, Germany holds the view that all of them will be superseded by the R&TTE Directive which will most probably enter into force at the beginning of 2000, whereafter this Decision needs to be amended.
	Italy	Present legislation requires that use of SRD is subject to licence. Only door openers and radio-toys are excluded from this provision. Free circulation is not allowed.
	Portugal	Portugal is not in a position to commit to the ERC/DEC/(97)10 on the mutual recognition of conformity assessment procedures including marking of radio equipment and radio terminal equipment. In accordance with the national legal framework Portugal is unable to utilise the mark as specified in Annex 2 of ERC/DEC/(97)10 aimed at the placing of these types of equipment on the market. The present legislation requires that only equipment marked with the CE mark or, in its absence, with a national mark can be placed on the market. Concerning free circulation, and in accordance with the present legislation, Portugal is not in a position to support and allow the free circulation of these types of equipment. The current legislation is being reviewed.

Annex	Administration	Remarks/Restrictions
1	Austria	Bands *a, b, h, l - q* not yet implemented (implementation is planned). Band *r* currently not available.
	Croatia	Band 138.2-138.45 MHz excluded, bands *o, p, q* excluded.
	Denmark	Audio and voice signals are only allowed in the band 433.050-434.790 MHz if the e.r.p. is below 100 μW. The implementation of the frequency band 24.00-24.25 GHz is presently under study. The frequency bands 61.0-61.5 GHz, 122-123 GHz and 244-246 GHz are not yet implemented. (Awaiting an ETSI standard).
	Finland	Band 'c': channel spacing 10 kHz; CB channels are not allowed to be used. Band 'd': channel spacing 10 kHz.
	France	Band 138.2-138.45 MHz not available. 2400-2446 MHz excluded, 2454-2483.5 MHz limited to indoor video applications. 24-24.25, 61-61.5, 122-123 and 244-246 GHz excluded. No duty cycle limit in the band 433.05-434.79 MHz.
	Germany	Frequency bands *a, r, o, p* and *q* under review. Implementation of frequency bands *f, g, h, i* and *k* in preparation; draft type approval specification: Reg TP 324 ZV 131.
	Hungary	Voice signals are not allowed in the band 433.05 – 434.79 MHz. Bands 138.2-138.45 MHz and 869-870 MHz excluded.
	Italy	Superseded Recommendation T/R 01-04 has been implemented "de facto". 138.2-138.45 MHz, 869.3-869.4 MHz and 869.4-869.65 MHz will be excluded. Audio and voice signals will not be allowed in the frequency band 433.05-434.79 MHz.
	Lithuania	Band 'c': operation not allowed in the CB channels. Band 'd': channel spacing 10 kHz. Band 'e': audio is not allowed. Bands 'f' to 'm': licences required.
	Luxembourg	In the band 433.050-434.790 MHz audio and voice signals are not allowed. In the band 26.957-27.283 MHz according to ERC/DEC(96)02 are not allowed.
	The Netherlands	Use of SRDs in the band 138.2-138.45 MHz is excluded.
	Portugal	Band 138.2-138.45 MHz not implemented. 868-870 MHz: implementation planned; in the meantime a licence will be required.
	Romania	Band 138.2-138.45 MHz not available. Only 6765-6795 kHz, 13.553-13.567 MHz, 26.957-26.960 MHz, 40.660-40.700 MHz, 433.050-434.790 MHz.

Annex	Administration	Remarks/Restrictions
1	Slovenia	Band 138.2-138.45 MHz not available.
	Sweden	The bands in Annex 8 are also applicable for non-specific SRDs. Inductive loop systems in the frequency range 9 kHz to 30 MHz are not considered as being radio transmitters and thereby not subject to national regulatory requirements under the Radiocommunications Act. In bands 26.957 - 27.283 MHz and 40.660 - 40.700 MHz, 100 mW is currently allowed. In bands 433.050 - 434.790 MHz and 2400 - 2483.5 MHz, 25mW is currently allowed. The bands 868 - 870 MHz and 5725 - 5875 MHz are under implementation. At the moment the use of these bands requires a licence. In band 24.00 - 24.25 GHz, 500 mW is currently allowed. These higher power limits are under consideration at the moment.
	Switzerland	138.2-138.45 MHz excluded.
	UK	Bands *a* and *b*: not allowed, see Annex 9. Band *c*: only allowed on 26.995, 27.045, 27.095, 27.145, 27.195 MHz @ 10 kHz, e.r.p. 1 mW. For Inductive applications see Annex 9. Band *r*: currently excluded. Band *e*: Audio and Voice is excluded. Band *f, g* and *k*: The sub bands are based on 25 kHz channel spacing. Where the modulation used results in wide band, then channel spacing up to and including 200 kHz may be used. The narrowest channel spacing shall be used based on Appendix 1 Table 4. Band *l*: Channel spacings of ≤ 20 MHz are permitted only where the modulation used justifies such bandwidth. Video and associated audio channel may be used in this band. Band *m*: currently excluded Band *n*: only 24.150-24.250 GHz Band *o, p* and *q*: under review.
2	Austria	Band *b* not yet implemented (implementation is planned).
	Denmark	Not implemented.
	Germany	Implementation in preparation.
	Lithuania	Not implemented.
	Portugal	Implementation under study.

Annex	Administration	Remarks/Restrictions
3	Austria	Bands *b* and *d* not yet implemented (implementation is planned). Band *c* currently not available.
	Croatia	Band *a* 2400-2483.5 MHz only. Bands *b*, *c*, *d* licences required.
	Denmark	An individual licence is required for HIPERLANs.
	Finland	Bands 'c' and 'd': frequencies available in the national frequency allocation table but not included yet in the licence exemption and type approval requirements regulations.
	France	The band for RLAN is limited to 2446.5-2483.5 MHz with some geographical constraints and the e.i.r.p. is limited to -20 dBW/MHz. 5250-5300 MHz and 17.1-17.3 GHz excluded.
	Germany	Frequency bands *b*, *c* (with restrictions) and *d*: implementation in preparation. 5255-5300 MHz excluded. System provider for third party traffic may require a Telecommunications Act licence.
	Hungary	In the band 2400-2483.5 MHz: processing gain: min. 10dB, antenna type: integral, or external with a gain of max. 6 dBi. 5250-5300 MHz excluded.
	Lithuania	Bands 'a', 'b', 'c': licences required.
	Luxembourg	System provider for third party traffic may require a Telecommunications Act Licence.
	Portugal	5150-5250 MHz, 5250-5300 MHz, and 17.1-17.3 GHz: implementation planned; in the meantime a licence will be required.
	Romania	Only 2400-2483.5 MHz (on a secondary basis). T/R 22-06 not implemented.
	Sweden	In bands 5150 - 5250 MHz, 5250 - 5300 MHz, 17.1 - 17.3 GHz HIPERLANs are currently allowed with a licence. As soon as the relevant standards are implemented the use will be licence exempted.
	Turkey	17.1-17.3 GHz excluded.
	UK	System provider for third party traffic may require a Wireless Telegraphy and /or Telecommunications Act Licence.

Annex	Administration	Remarks/Restrictions
4	Croatia	Band *a* 2446-2454 MHz only. Band *b* licences required.
	Denmark	An individual license is required.
	Finland	New frequency (27.095 MHz) for Eurobalise: existing system at 27.115 MHz.
	Germany	Implementation in preparation.
	Lithuania	Licences required.
	Portugal	2446-2454 MHz: implementation planned.
	Romania	Not implemented.
	Sweden	A licence is required.
5	Croatia	Band *a* 5795-5805 MHz only.
	Finland	Frequencies available in the national frequency allocation table but not included yet in the licence exemption and type approval requirements regulations.
	France	5805-5815 MHz excluded. In the band 5795-5805 MHz, the power limit is 2 W e.i.r.p.
	Germany	System provider may require a Telecommunications Act licence in addition to frequency assignment. A general frequency assignment will be granted for the end users (vehicle units). Band 76-77 GHz under review.
	Lithuania	Licences required.
	Luxembourg	For the time being a licence is required for the band 5805-5815 MHz.
	Portugal	For the time being a licence is required. Licence exemption is under consideration.
	Romania	Not implemented.
	Sweden	Licence exemption is under consideration.
	UK	System provider may require a Wireless Telegraphy and/or Telecommunications Acts licence to operate at 5795-5805 and/or 5805-5815 MHz. The end user (vehicle units) will be licence exempted.

Annex	Administration	Remarks/Restrictions
6	Austria	10.5-10.6 GHz excluded.
	Croatia	10.5-10.6 GHz excluded.
	Denmark	9200-9500 MHz, 9540-9975 MHz, 10.5-10.6 GHz and 13.4-14.0 GHz are presently under study.
	Finland	Band 'b': not available. Band 'd': not available. Available band: 10.45 GHz to 10.50 GHz. Band 'e': not available
	France	2400-2483.5 MHz limited to 2446-2454 MHz with an e.i.r.p. max of 500 mW. 9.5-9.975 MHz is limited to 9.88-9.92 GHz with an e.i.r.p. max of 50 mW. 10.57-10.61 GHz applicable with an e.i.r.p. max of 20 mW. Individual licence is not required. 24.05-24.25 GHz is limited to 24.175-24.275 GHz. The e.i.r.p. is 100 mW (from July 1st 1999), a higher power can be allowed after agreement with the armed forces.
	Germany	9500-9975 MHz and 10.5-10.6 GHz excluded. Frequency bands *a, b, e* and *f* partly implemented. Frequency bands *b, e and f*: operation of equipment with higher transmitter powers possible; individual frequency assignment required.
	Hungary	10.5-10.6 GHz: maximum e.i.r.p. 25mW
	Italy	Superseded Recommendation T/R 60-01 has been implemented "de facto". 2400-2483.5 MHz, 9200-9500 MHz and 10.5-10.6 GHz will be excluded.
	Lithuania	Band 'd' is not allowed.
	Luxembourg	In the band 10.5-10.6 GHz the e.i.r.p. is limited to 25mW.
	Portugal	2400-2483.5 MHz: maximum e.i.r.p. of 10mW. 9200-9500 MHz, 10.5-10.6 GHz and 24.05-24.25 GHz: implementation under study.
	Romania	13.4-13.75 GHz and 24.05-24.25 GHz excluded.
	Sweden	2400 - 2483.5 MHz, 9200 - 9500 MHz and 9500 - 9975 MHz excluded. Only 10.51 - 10.58 MHz (No licence required). Also 10.25 - 10.28 and 10.35 - 10.38 MHz licence exempted. In band 13.4 - 14.0 GHz licence is required. In band 24.00 - 24.25 GHz, 500 mW is allowed.

Annex	Administration	Remarks/Restrictions
6	Turkey	10.5-10.6 GHz and 13.4-14.0 GHz excluded.
	UK	Band *a*: Only 2445-2455 MHz, Band *b* and *c*: These bands may be used for Radar Level Gauges on a license per site basis only; Band *d*: Only 10.577-10.597 GHz, Band *f*: Only 24.15-24.25 GHz
7	Denmark	"Alarms in general" are presently under study.
	Germany	Implementation in preparation.
	Hungary	868.6-868.7 MHz and 869.2-869.25 MHz only.
	Lithuania	Under study.
	Portugal	Implementation planned; in the meantime a licence will be required.
	Romania	Only 869.2-869.25 MHz.
	Sweden	These bands are under implementation. Alarm systems are currently allowed on 26.55 MHz (100 mW), 169.3875 MHz (25 mW) and 429.450 MHz (500 mW).
8	Denmark	In the 35 MHz band only 35.010-35.200 MHz is allowed. An extension of this band is under study.
	France	Not implemented.
	Germany	Band *b* only; individual frequency assignment required in this frequency band.
	Italy	Band *a*: 27.235 and 27.275 MHz additional channels. Band *b* will be excluded. Band *c*: 40.715, 40.725, 40.735, 40.765, 40.775, 40.785, 40.815, 40.825, 40.835, 40.865 and 40.875 MHz additional channels; 72.080 and 72.240 MHz are also available for these applications.
	Lithuania	Band 'b': licences required.
	Portugal	In band 'b': only 35.005-35.205 MHz allowed. Band 'c': except 40.675 MHz and 40.685 MHz.
	Romania	In the band 34.995-35.225 MHz: only 35.090 MHz, 35.111 MHz, 35.140 MHz, 35.190 MHz. Individual licence is required for equipment with e.r.p. of more than 100 mW.
	Sweden	Other applications, in accordance with Annex 1, are allowed in the 27 MHz and 40 MHz bands. Also 26.825, 26.865 and 26.885 MHz. Only 35.030 - 35.200 MHz. Also 40.705, 40.715, 40.725, 40.735 and 40.745 MHz.

Annex	Administration	Remarks/Restrictions
9	Croatia	Band *e* 7400-8800 kHz excluded.
	Finland	Inductive equipment fulfilling I-ETS/EN 300 330 are not considered as radio equipment in Finland, thus type approval is not required.
	France	Band ‘e’ band is for anti-theft detection devices. Band ‘g’ band is excluded.
	Germany	9-70 kHz within the frequency ranges 9-57 kHz and 67-70 kHz the value of the maximum field strength is 42 dBμA/m at 10 metres. 119-135 kHz within the frequency range 127-135 kHz the value of the maximum field strength is 42 dBμA/ 10 metres. 6765-6795 kHz under review.
	Hungary	19.95-20.05 kHz excluded.
	Italy	Bands e) and g) will be excluded.
	Portugal	Inductive applications limited to car immobilisers. Bands 9–70 kHz and 119–135 kHz: maximum radiated power 42 dBuA/m at 10 metres. Bands 6765–6795 kHz, 7400–8800 kHz, 13.553–13.567 MHz and 26.957–27.283 MHz: implementation under study.
	Romania	Only 6765-6795 kHz, 13.553-13.567 MHz, 26.957-26.960 MHz.
	Sweden	In bands 26.957-27.283 MHz 100mW is currently allowed.

Annex	Administration	Remarks/Restrictions
10	Finland	Band *a* (narrow band audio): available frequencies (max bandwidth 180 kHz) listed in TAC regulation THK 15. Band *b* (aids for the handicapped): not available. Band *d* (professional radio microphones in 174-216 MHz): not available. Band *e* (470-862 MHz): individually licensed radio microphones 800.100-819.900 MHz, 855.500, 856.000, 857.250, 860.375, 861.500 and 861.875 MHz.
	France	Only band '*d*' is implemented with 300 kHz of channel spacing and specification ETS 300 454. 175.5 – 178.5 MHz and 183.5 – 186.5 MHz implemented with national specification, e.r.p. of 10 mW and channel spacing of 200 kHz.
	Luxembourg	
	Portugal	*Aids for the handicapped*: implementation under study. *Consumer radio microphones*: 863-865 MHz planned to be available soon.
	UK	Band *a*: Radio Microphone applications are subject to a license. Band *e*, *f* and *g*: Radio Microphone applications are subject to a license.
11 *(not available)*		
12	Portugal	Licence exemption under study.
13	France	Implemented with specification ETS 300 454 and channel spacing of 300 kHz.
	Italy	Band not available.
	Portugal	Licence exemption under study.
	UK	Band *a*: Baby monitors are not currently permitted

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This spreadsheet is intended to give a rough guide to the frequencies generally available for Short Range Devices.

It should not be taken as a definitive statement of availability and the appropriate annexes should be referred to for the fine detail.

It should also be noted that not all the frequencies listed are available in all CEPT countries and therefore information on free circulation is only indicative

	2275 Hz	9-135 kHz	457 kHz	6.765-6.795 MHz	7.40-8.80 MHz	13.553-13.567 MHz	26.957-27.283 MHz	35.03-35.20 MHz	40.660-40.700 MHz	138.2-138.45 MHz	402-405 MHz	433.050-434.790 MHz	863.00-865.00 MHz	868.000-868.600 MHz	868.600-868.700 MHz	868.700-869.200 MHz	869.200-869.250 MHz	869.250-869.300 MHz	869.300-869.650 MHz	869.650-869.700 MHz	869.700-870.000 MHz	2400-2483.5 MHz	2446-2454 MHz	5150-5250 MHz	5250-5300 MHz	5725-5875 MHz	5795-5805 MHz	5805-5815 MHz	9200-9500 MHz	9500-9975 MHz	10.5-10.6 GHz	13.4-14.0 GHz	17.1-17.3 GHz	24.05-24.25 GHz	61.0-61.5 GHz	63-64 GHz	76-77 GHz	122-123 GHz	244-246 GHz	Maximum Power Level	Integral	Dedicated	External	Permitted Channel	Individual Licence	No Individual Licence	Rxxxx SRD Aa	CEPT SRD Aa Y	National Approval	Free Circulation	Very low, < 0.1%	Low, < 1%	High, < 10%	Very High, up to 100%
	Frequency Bands																																						Power Levels	Equipment Antenna Source			Channel Spacing	Licensing Require-ment		Marking and free circulation				Duty cycle			
Non-specific Short Range Devices				Y		Y	Y																																	See Anne	Y	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
Annex 1							Y		Y			Y										Y																		10 mW	Y	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
										Y																														10 mW	Y	Y	No	All	-	Y	Y	Y	-	Y	-	Y	-	-
																										Y														25 mW	Y	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
														Y																										25 mW	Y	Y	No	25 kHz	-	Y	Y	-	-	Y	-	Y	-	-
																Y																								25 mW	Y	Y	No	25 kHz	-	Y	Y	-	-	Y	Y	-	-	-
																			Y																					500 mW	Y	Y	No	25 kHz	-	Y	Y	-	-	Y	-	-	Y	-
																					Y																			5 mW	Y	Y	No	25/50 kH	-	Y	Y	-	-	Y	-	-	-	Y
																																		Y						100 mW	Y	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
																																			Y			Y	Y	100 mW	Y	Y	No	All	-	Y	-	-	Y	No	-	-	-	-
Avalanche Detection Equipment	Y																																							See Anne	Y	No	No	-	-	Y	Y	-	-	Y	-	-	-	-
Annex 2			Y																																					See Anne	Y	No	No	-	-	Y	Y	-	-	Y	-	-	-	-
Radio Local Area Networks, Annex 3																						Y																		100 mW	-	Y	No	250 kbit/s	-	Y	Y	-	-	Y	-	-	-	-
5 GHz HIPERLANs																								Y																1 W	-	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
5 GHz HIPERLANs																									Y															1 W	-	Y	No	All	-	Y	-	Y	-	No	-	-	-	-
17 GHz HIPERLANs, Annex 3																																	Y							100 mW	-	Y	No	All	-	Y	-	Y	-	No	-	-	-	-
AVI for Railways, Annex 4																							Y																	500 mW	Y	Y	No	Annex 4	-	Y	Y	-	-	Y	-	-	-	-
Road Transport Telematics																											Y													2 W or 8 W	Y	Y	No	See Anne	-	Y	Y	-	-	Y	-	-	-	-
Annex 5																												Y												2 W or 8 W	Y	Y	No	See Anne	Y	-	-	-	Y	No	-	-	-	-
																																				Y				t.b.d.	-	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
																																					Y			t.b.d.	-	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
Movement detection, Annex 6																														Y		Y								25 mW	Y	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
																					Y								Y											25 mW	Y	Y	No	All	-	Y	-	Y	-	No	-	-	-	-
																																		Y						100 mW	Y	Y	No	All	-	Y	Y	-	-	Y	-	-	-	-
																															Y									500 mW	Y	Y	No	All	Y	-	-	-	Y	No	-	-	-	-
Alarms, Annex 7															Y			Y																						10 mW	Y	Y	No	25 kHz	-	Y	Y	-	-	Y	Y	-	-	-
																				Y																				25 mW	Y	Y	No	25 kHz	-	Y	Y	-	-	Y	-	-	Y	-
Social alarms, Annex 7																	Y																							10 mW	Y	Y	No	25 kHz	-	Y	Y	-	-	Y	Y	-	-	-
Model Control, Annex 8							Y	Y	Y																															100 mW	-	Y	No	10 kHz	-	Y	Y	-	-	Y	-	-	-	-
Inductive Applications, Annex 9		Y		Y	Y	Y	Y																																	See Anne	Y	Y	Y	All	-	Y	Y	-	-	Y	-	-	-	-
Radio Microphones, Annex 10																																																						
(under development)																																																						
RFIDs (under development)																																																						
Medical Implants, Annex 12											Y																													25 ? W	Y	Y	No	25 kHz	-	Y	Y	Y	-	Y	-	-	-	-
Wireless Audio, Annex 13													Y																											10 mW	Y	No	No	300 kHz	-	Y	Y	Y	-	-	-	-	-	Y

Annex 1

Title: Non-specific Short Range Devices

This annex is primarily for Telemetry, Telecommand, Alarms, Data in general and other similar applications. Video applications only above 2.4 GHz.

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

Applicable ETSI Standard:

Product Standards:	EN 300 220-1 EN 300 330 I-ETS 300 440
Superseded Recommendations:	CEPT Recommendation T/R 01-04 CEPT Recommendation T/R 20-03

Note: Equipment marketed before the adoption of this ERC Recommendation marked with the abbreviation CEPT LPD Y according to the abrogated CEPT Recommendation T/R 01-04 should be allowed continuation of free circulation and use.

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	6765 - 6795 kHz [8]	2	1 or 2	13	2	1 or 2	[-]
b	13.553 - 13.567 MHz [1]	2	1 or 2	13	2	1 or 2	[-]
c	26.957 - 27.283 MHz [1]	2 or 8 [9]	1 or 2	13	2	1 or 2	[-]
d	40.660 - 40.700 MHz [1]	8 [2]	1 or 2	13	2	1 or 2	[-]
r	138.2 - 138.45 MHz	8 [2]	1 or 2	13	2	1 or 2	2
e	433.050 - 434.790 MHz [1, 10]	8 [2]	1 or 2	13	2	1 or 2	[-]

The table continues on the next page.

[8] The band is also designated for industrial, scientific and medical (ISM) application.

[9] e.r.p.

[10] Audio and voice signals should be avoided in the band 433.050-434.790 MHz.

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
f	868.000 - 868.600 MHz [11]	9 [2]	1 or 2	6 [12,13]	2	1 or 2	2
g	868.700 - 869.200 MHz	9 [2]	1 or 2	6 [5,6]	2	1 or 2	1
[h	869.300 – 869.400 MHz [14]	t.b.d.	1 or 2	6	2	1 or 2	t.b.d.]
i	869.400 - 869.650 MHz	12 [2]	1 or 2	6 [15]	2	1 or 2	3
k	869.700 - 870.000 MHz	7a [2]	1 or 2	6 or 7 [5]	2	1 or 2	4
l	2400 - 2483.5 MHz [1]	8 [16]	1 or 2	13	2	1 or 2	[-]
m	5725 - 5875 MHz [1]	9 [9]	1 or 2	13	2	1 or 2	[-]
n	24.00 - 24.25 GHz [1]	11 [9]	1 or 2	13	2	1 or 2	[-]
o	61.0 - 61.5 GHz [1,17]	11 [9]	1 or 2	13	2	3	[-]
p	122 - 123 GHz [1,10]	11 [9]	1 or 2	13	2	3	[-]
q	244 - 246 GHz [1,10]	11 [9]	1 or 2	13	2	3	[-]

[11] To avoid mutual interference between CT2 and SRDs it is recommended that SRDs below 868.5 MHz should avoid using a dedicated frequency channel and instead use a technology that allows automatic channel selection of a free channel within the band.

[12] The frequency band may also be used for wideband data (frequency varying transmitters).

[13] The frequency band may also be used for spread spectrum technology with a maximum bandwidth of around 100 kHz

[14] [SRD applications in the band 869.3-869.4 MHz should use an access protocol in accordance with EN XXX XXX]

[15] The whole frequency band may also be used as 1 channel for high speed data transmission.

[16] e.i.r.p.

[17] No ETSI standard currently available

Annex 2

Title: Devices for Detecting Avalanche Victims

Applicable ETSI Standard:

Product Standards: ETS 300 718

Superseded Recommendations: CEPT Rec T/R 24-02

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequencies	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	2275 Hz	2	1	12 [18]	2	1 or 2	4
b	457 kHz	1	1	12 [1]	2	1 or 2	4

[18] Continuous wave (CW) – no modulation

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Annex 3

Title: Local Area Networks, RLANs and HIPERLANs

Radio Local Area Networks (RLANs) (formerly known as wideband data transmission systems)

Applicable ETSI Standard:

Product Standards: ETS 300 328

Superseded Recommendations: CEPT Recommendation T/R 10-01

Note: Equipment marketed before the adoption of this ERC Recommendation marked with the abbreviation CEPT RLAN Y according to the abrogated CEPT Recommendation T/R 10-01 should be allowed continuation of free circulation and use.

Technical and regulatory parameters: For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	2400 - 2483.5 MHz	11 [19,20]	1 or 2	13 [21]	2	1 or 2	-

[19] e.i.r.p.

[20] For direct sequence spread spectrum, the maximum spectrum power density is limited to -20 dBW/1 MHz.
For frequency hopping spread spectrum, the maximum spectrum power density is limited to -10 dBW/100 kHz.

[21] Minimum data rate: 250 kbit/s.

High Performance Radio Local Area Networks (HIPERLANs)

Applicable ETS:
Product Standards: EN 300 836-1

Spectrum relevant ERC Decision: ERC/DEC/(96)03

Superseded Recommendations: CEPT Recommendation T/R 22-06

Technical and regulatory parameters: For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
b	5150-5250 MHz	13 [1]	2	13	2	1 or 2	-
c	5250-5300 MHz [22]	13 [1]	2	13	2	3	-
d	17.1-17.3 GHz [23]	11 [1]	2	13	2	3	-

[22] Only available in some countries.

[23] No ETSI standard currently available.

Annex 4

Title: Railway applications

This annex covers applications specifically intended for use on railways including automatic vehicle identification and balises (train control systems).

Automatic Vehicle Identification for Railways (AVI)

Applicable ETSI Standard:

Product Standards: EN 300 761

Superseded Recommendations: None

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	2446-2454 MHz	12 [24]	1 or 2	12 [25]	2	1 or 2	-

Eurobalise

Applicable ETSI Standard:

Product Standards: I-ETS 300 330

Superseded Recommendations: None

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
b	27.095 MHz	18 [26]	2	12 [3]	2	1 or 2	-

The maximum allowed H-field for the Eurobalise system is illustrated in Figure 1 overleaf.

[24] e.i.r.p., transmitting only in presence of train.

[25] 5 channels, each 1.5 MHz wide, within the band 2446-2454 MHz, i.e: 2447.0, 2448.5, 2450.0, 2451.5, 2453.0 MHz.

[26] See spectrum mask in Figure 1.

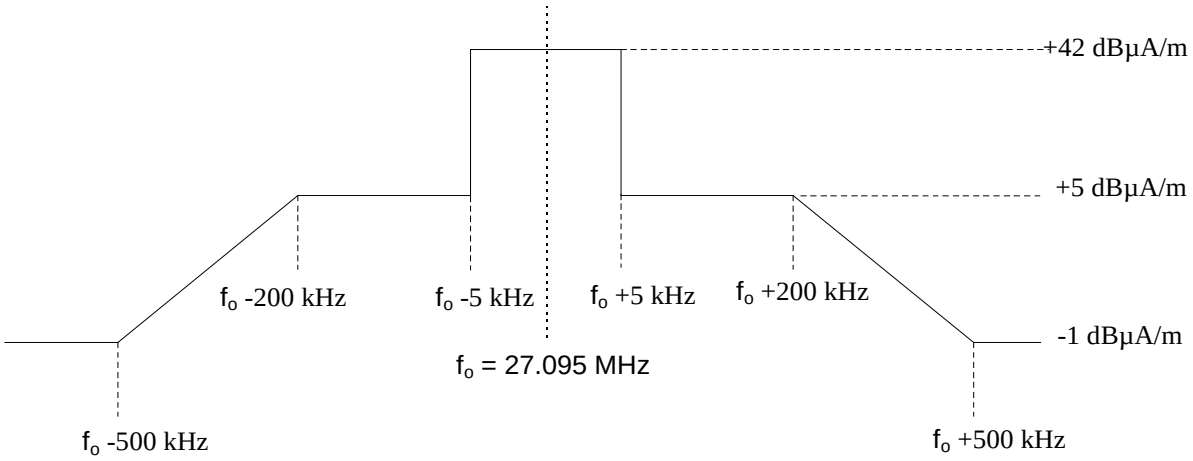

Figure 1. Magnetic field limits at 10 metre measurement distance for the Eurobalise system

Annex 5

Title: Road Transport &Traffic Telematics (RTTT)

Applicable ETSI Standard:

Product Standards: EN 300 674
EN 301 091
ES 201 674-1
ES 201 674-2

Spectrum relevant ERC Decision: ERC/DEC/(92)02

Superseded Recommendations: CEPT Recommendation T/R 22-04

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	5795-5805 MHz [1]	14 or 15 [2]	1 or 2	12 [3]	2	1 or 2	-
b	5805-5815 MHz [4]	14 or 15 [2]	1 or 2	12 [3]	1	3	-
c	63-64 GHz [5]	16 [2]	2	13	2	1 or 2	-
d	76-77 GHz [6]	17 [2]	2	13	2	1 or 2	-

---

1 5795-5805 MHz road to vehicle systems, particularly (but not exclusively) road toll systems.

2 e.i.r.p.

3 For 5 MHz channel spacing systems, frequencies are: 5800 MHz – 2.5 MHz; 5800 MHz + 2.5 MHz; 5810 MHz – 2.5 MHz; 5810 MHz + 2.5 MHz. For 10 MHz channel spacing systems, frequencies are 5800 MHz and 5810 MHz.

4 5805-5815 MHz on a national basis for multi-lane road junctions, particularly, but not exclusively, road toll systems.

5 Vehicle to vehicle and road to vehicle systems

6 Vehicle radar systems

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Annex 6

Title: Equipment for Detecting Movement and Equipment for Alert

Applicable ETSI Standard:

Product Standards: I-ETS 300 440

Superseded Recommendations: CEPT Recommendation T/R 60-01

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	2400-2483.5 MHz	9 [27]	1 or 2	13	2 [28]	3	-
b	9200-9500 MHz	9 [1]	1 or 2	13	2 [2]	3	-
c	9500-9975 MHz	9 [1]	1 or 2	13	2 [2]	1 or 2	-
d	10.5-10.6 GHz	12 [1]	1 or 2	13	1	3	-
e	13.4-14.0 GHz	9 [1]	1 or 2	13	2 [2]	1 or 2	-
f	24.05-24.25 GHz	11 [1]	1 or 2	13	2 [2]	1 or 2	-

[27] e.i.r.p.

[28] Some countries may allow equipment with transmitter powers between 25 mW and 500 mW in which case an individual licence or a general licence may be required.

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Annex 7

Title: Alarms

This annex covers frequency bands recommended exclusively for alarm systems including social alarms and alarms for security and safety.

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

Applicable ETSI Standard:

Product Standards: EN 300 220-1

Spectrum relevant ERC Decision: ERC/DEC/(97)06

Superseded Recommendations:

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

Alarms in general

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	868.600-868.700 MHz [29]	8 [30]	1 or 2	6	2	1 or 2	1
b	869.250-869.300 MHz	8 [2]	1 or 2	6	2	1 or 2	1
c	869.650-869.700 MHz	9 [2]	1 or 2	6	2	1 or 2	3

Social Alarms

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
d	869.200-869.250 MHz	8 [2]	1 or 2	6	2	1 or 2	1

[29] The frequency band may be used for high speed data transmissions.

[30] e.r.p.

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Annex 8

Title: Model Control

This annex covers the application of model control equipment, which is solely for the purpose of controlling the movement of the model, in the air, on land or over or under the water surface. Although the bands are not harmonised, the parameters given in the table are common in a majority of CEPT countries. Additional frequencies or frequency bands may be available for use in particular countries. It should be noted that the bands are not exclusive for this type of application.

Applicable ETSI Standard:

Product Standards: EN 300 220-1

Superseded Recommendations: CEPT Recommendation T/R 20-03
CEPT Recommendation T/R 20-04

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Bands or Channels	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	26.995, 27.045, 27.095, 27.145, 27.195 MHz	11 [31]	2	3	2	1 or 2	-
b	34.995-35.225 MHz [32]	11 [1]	2	3	2	1 or 2	-
c	40.665, 40.675, 40.685, 40.695 MHz	11 [1]	2	3	2	1 or 2	-

[31] e.r.p.

[32] Only allowed for flying models.

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Annex 9

Title: Inductive applications

Inductive applications include for example car immobilisers, animal identification, alarm systems, cable detection, waste management, personal identification, wireless voice links, access control, proximity sensors, anti-theft systems including RF anti-theft induction systems[33], data transfer to handheld devices, automatic article identification, wireless control systems and automatic road tolling.

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

Particular attention should also be paid to the more stringent protection requirements identified by the ITU for global distress and safety communications frequencies in the same or adjacent bands.

Applicable ETSI Standard:

Product Standards: EN 300 330

Superseded Recommendations: None

Technical and regulatory parameters: For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	9-70 kHz	3	1, 2 or 3 [2]	13	2	1 or 2	-
b	70-119 kHz	2	1, 2 or 3 [2]	13	2	1 or 2	-
c	119-135 kHz	3	1, 2 or 3 [34]	13	2	1 or 2	-

The maximum allowed H-field is illustrated in Figure 1 overleaf

	Frequency Band[35]	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
d	6765 - 6795 kHz	2	1, 2 or 3 [2]	13	2	1 or 2	-
e	7400 - 8800 kHz	5	1, 2 or 3 [2]	13	2	1 or 2	-
f	13.553 - 13.567 MHz	2	1, 2 or 3 [2]	13	2	1 or 2	-
g	26.957 - 27.283 MHz	2	1, 2 or 3 [2]	13	2	1 or 2	-

[1] Other types of anti-theft systems can be operated in accordance with other relevant annexes.
[34] In the case of type 3 antennas only loop coil antennas should be employed.
[35] Other frequency bands within the range 1650 kHz to 30 MHz are under study.

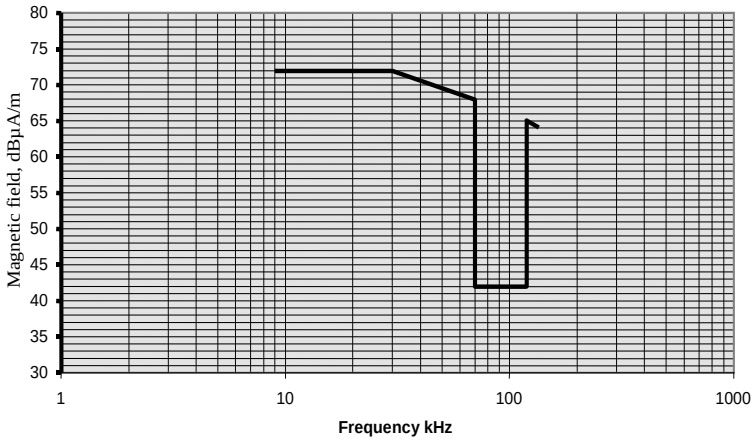

Figure 1. 9-135 kHz magnetic field limits at 10-metre measurement distance

Annex 10

Title: Radio microphones

Radio microphones (also referred to as wireless microphones or cordless microphones) are small, low power (50mW or less) transmitters designed to be worn on the body, or hand held, for the transmission of close, personal sound. The receivers are more tailored to specific uses and may range from small and portable to rack mounted modules as part of a multichannel system. This annex covers professional and consumer radio microphones, both hand-held and body-worn, and aids for the handicapped.

Applicable ETSI Standard
Product Standards: EN 300 422

Superseded recommendations: CEPT Recommendation T/R 20-06.

Technical and regulatory parameters:
For interpretation of codes, see Appendix 1.

Frequency Bands:
Because of the difficulty in determining harmonised frequency bands for radio microphones, frequency band limits should be regarded as tuning ranges within which a device can be designed to operate. In most cases, Appendix 3 indicates those parts of a range that are not available in individual countries but this does not apply to the broadcasting bands at 174-216 MHz and 470-862 MHz where national geographical restrictions are likely to exist and the national administration should be contacted.

Narrow Band Audio

	Frequency Band	Power (Table2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty Cycle (Table 7)
a	29.7-47.0 MHz [36, 37]	8 [38]	1 or 2	7 [39]	2	2 or 3	4

Aids for the handicapped

	Frequency Band	Power (Table2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty Cycle (Table 7)
b	173.965-174.015 MHz [40]	7 [3]	1 or 2	7 [4]	2	1 or 2	4

[36] Tuning range – national restrictions may apply.
[37] 30.3 – 30.5 MHz, 32.15 – 32.45 MHz and 41.015 – 47.000 MHz are harmonised military bands.
[38] Maximum permitted e.r.p..
[39] Maximum permitted channel spacing.
[40] This allocation may be subjected to high levels of interference from broadcasting services in some countries.

Consumer radio microphones

	Frequency Band	Power (Table2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty Cycle (Table 7)
c	863-865 MHz	8 [3]	1 or 2	11 [4]	2	1 or 2	4

Professional radio microphones

	Frequency Band	Power (Table2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty Cycle (Table 7)
d	174-216 MHz [1]	8 [3] or 10 [3, 6]	1 or 2	11 [4]	1	1 or 2	4
e	470-862 MHz [1]	8 [3] or 10 [3, 6]	1 or 2	11 [4]	1	1 or 2	4
f	1785-1800 MHz [7]	8 [8] or 10 [6, 8]	1 or 2	11 [4]	1	1 or 2	4

[6] Body-worn radio microphones
[7] Guard bands at 1785.0-1785.7 and 1799.4-1800 MHz may be required to protect services in adjacent bands
[8] Maximum permitted eirp

Annex 12

Title: Ultra Low Power Active Medical Implants

This annex covers active implantable medical devices (for a convenient definition see the EC directive 90/385/EEC (Active Implantable Medical Device directive)).

Applicable ETSI Standard

Product Standards: EN 300 220-1

Superseded recommendations: None

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	402-405 MHz	5a[41]	1 or 2	6 [42]	2	1 or 2	-

[41] e.r.p.
[42] Individual transmitters may combine adjacent channels for increased bandwidth up to 300 kHz.

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Annex 13

Title: Wireless Audio Applications

Applications for wireless audio systems include the following, cordless loudspeakers; cordless headphones; cordless headphones for portable use, for example portable CD, cassette or radio players 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.

Radio microphones are not included in this Annex.

Systems should be designed so that in the absence of an audio input there should be no transmission of an RF carrier.

Applicable ETSI Standard

Product Standards: EN 300 220-1[43]

Superseded recommendations: None

Technical and regulatory parameters:

For interpretation of codes, see Appendix 1

	Frequency Band	Power (Table 2)	Antenna (Table 3)	Channel spacing (Table 4)	Licensing requirement (Table 5)	Approvals (Table 6)	Duty cycle (Table 7)
a	863-865 MHz	8[44]	1	13[45]	2	1 or 2	4

[1] Until a new ETSI Standard is available on Wireless Audio Applications, EN 300 220 may be used.
[2] e.r.p.
[3] In the case of analogue systems the maximum occupied bandwidth should not exceed 300 kHz. Digital systems are under study.