



# CEPT Report 70

In response to the EC Permanent Mandate on the

”Annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices”

**Report approved on 8 March 2019 by the ECC**

## 0 EXECUTIVE SUMMARY

This Report describes the proposed Seventh Update of the technical annex to the EC Decision on the technical harmonisation of radio spectrum for use by Short Range Devices (SRD) and has been developed in the 2017-2018 timeframe by the European Conference of Postal and Telecommunications Administrations (CEPT) in response to the Permanent Mandate to CEPT regarding the annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices.

As part of the Seventh Update, the following changes are proposed to the technical annex:

### **Task a.) To consider the bands recently added or currently under discussion for addition to ERC Recommendation 70-03 for potential inclusion in the next update of the SRD Decision**

It is proposed:

- to add a new entry for person detection and collision avoidance devices within the non-specific SRD category (same category as for 457 kHz devices) in the band 442.2-450.0 kHz;
- to express the power limit in entry 27c in mW e.r.p. and introduce the mask requirement in entry 27a as for entry 27b (RFID) and in line with note 2 in Annex 9 of ERC Recommendation 70-03;
- to withdraw the text on equivalent mitigation techniques for entries 38, 39b and 40 as for the other similar entries;
- to add a new entry in the frequency range 430-440 MHz for the Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE) application, including amendments of the existing definitions for medical data acquisition category and MBANS application together with a proposal for the definition of the ULP-WMCE application;
- to add a new entry in the frequency range 862-863 MHz for non-specific SRD with 25 mW e.r.p., a duty cycle of 0.1% and a maximum bandwidth of 350 kHz;
- to add a minimum bandwidth of 600 kHz in entry 84 for wideband data transmission in 863-868 MHz, so that the balance is maintained with non-specific SRD;
- to withdraw entries 71 to 73 for WLAM applications in the band 24.25-24.50 GHz from the EC Decision for SRD since the application failed to materialise in the market;
- to shift entry 77 for ITS under the TTT category from 63-64 GHz to 63.72-65.88 GHz;
- to add two new usage opportunities for wideband data transmission devices in 57-66 GHz with maximum e.i.r.p. of 55 dBm for fixed outdoor application and 40 dBm e.i.r.p. with no other usage restriction, while the existing entry 75 (as well as 74a) is updated with regard to the power density: the three entries are sought to complement each other;
- to add to entry 79a for TTT in 76-77 GHz a reference to the Harmonised European Standard (or equivalent) and a new note, but the implementation date for this change is delayed by one year to give ETSI the time to create the new version of ETSI EN 301 091-2.

### **Task b.) To re-assess the relevance and appropriateness of all 'other usage restrictions' for the relevant SRD categories, having regard in particular to requests from stakeholders**

It is proposed:

- to merge entries 44a and 45a into one band entry, and gather all restrictions in column [v];
- to gather all restrictions in column [v] for entries 45c and 56a;
- to merge entries 44b and 45b into one band entry, and delete all other usage restrictions which have become obsolete;
- to delete in entry 56b all other usage restrictions which have become obsolete;
- to amend the PMR446 definition with regard to hand portable in order to be in line with the revised ECC Decision (15)05;
- to delete in entries 47, 48, 50 and 54 all other usage restrictions which have become obsolete;
- to remove some ambiguity with regard to the applicable frequency band for the duty cycle in entry 47b (as already done for entries 1 and 4 in Decision (EU) 2018/1538 [49]);
- to add a note to entry 47a on RFID tags, as already done for entry 3 in Decision (EU) 2018/1538 and to remove some ambiguity with regard to the RFID tag frequency range.

**Task c.) To investigate, where useful, more enhanced aspects of duty cycle mechanisms in cooperation with ETSI, as well as other enablers for further spectrum sharing (e.g., channelling and/or channel access and occupation rules)**

- None.

**Task d.) To review the intertwining and working together of harmonised European standards and Decision 2006/771/EC**

- CEPT considers that is fully appropriate to maintain the current balanced between harmonised standards and spectrum regulation for SRD in order to avoid destabilisation of the market and to maintain confidence.
- CEPT considers that the current text to describe additional parameters in the technical annex could be improved in line with EC Decision (EU) 2018/1538 [49] on the bands 874-874.4 MHz and 915-921 MHz:

*“Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.”*

**Task e.) To undertake a more detailed review to identify opportunities for cognitive-radio enabled SRD where rewarding principles could be introduced, having regard in particular to requests from stakeholders**

- None.

**Task f.) To consider compatibility parameters for smart-tachograph and weight and dimensions applications for addition to the Annex of Decision 2006/771/EC in time for their deployment starting as of 15 June 2019**

- It is proposed to include smart tachograph, weight and dimension applications in entry 62 within the TTT category and the other usage restriction ‘for smart tachograph, weight and dimension applications’ since the technical studies in ECC Report 291 [37] are very specific for these applications with very low usage density and cannot be broadened to a wider scope of application. In addition, a footnote should be added defining smart tachograph, weight and dimension applications as remote enforcement of the tachograph in Appendix 14 of the Commission Implementing Regulation 2016/799 [45] and for the weights & dimensions enforcement in Article 10d of the Directive 2015/719 [46].

**Task g.) To consider adding the frequency range 5855-5875 MHz as a new entry for non-safety applications of ITS under the TTT device category to the Annex of Decision 2006/771/EC**

- It is proposed to add two new entries for non-safety ITS applications in 5855-5865 MHz and 5865-5875 MHz under the TTT category.

**The following items for further work were identified for the Eighth Update:**

- To continue investigating more complex aspects of duty cycle mechanisms in cooperation with ETSI, as an enabler for further spectrum sharing;
- Possibility of introducing mobile NAP for wideband data transmission in the sole 863-868 MHz band;
- Possibility of introducing 500 mW SRD in the lowest RFID interrogator channel at 916.3 MHz;
- If needed, to conduct additional studies for smart tachograph, weight and dimensions applications within the eighth Update process;

- If needed, to have additional considerations on cross interference between ITS in 63.72-65.88 GHz and fixed outdoor applications;
- To reconsider the WIA usage opportunity (included in Annex 2 of ERC Recommendation 70-03) in 5725-5875 MHz.
- To investigate whether the new license-exempt regulation for wideband data transmission can be widened to the whole frequency range 57-71 GHz. To note that the ECC has made a revision of Annex 3 of ERC Recommendation 70-03 which proposes to extend the new conditions for 57-66 GHz to the whole of the 57-71 GHz band. WG FM has approved Annex 3 for Public consultation until the 5 April 2019.

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## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Explanation</b>
<b>ALD</b>	Assistive Listening Device
<b>BBDR</b>	Broadband Disaster Relief
<b>BFWA</b>	Broadband Fixed Wireless Access
<b>CBTC</b>	Communications-based train control
<b>CEPT</b>	European Conference of Postal and Telecommunications Administrations
<b>CW</b>	Continuous Wave
<b>DAA</b>	Detect-And-Avoid
<b>DC</b>	Duty Cycle
<b>DFS</b>	Dynamic Frequency Selection
<b>DSRC</b>	Dedicated Short Range Communications (as standardized by the European Committee for Standardization (CEN))
<b>EAS</b>	Electronic Article surveillance
<b>EC</b>	European Commission
<b>ECA</b>	European Common Allocation Table
<b>ECC</b>	Electronic Communications Committee
<b>EESS</b>	Earth Exploration-Satellite Service
<b>e.i.r.p</b>	Equivalent isotropically radiated power
<b>e.r.p.</b>	Effective Radiated Power
<b>EN</b>	European Standard
<b>ERC</b>	European Radiocommunications Committee
<b>ETSI</b>	European Telecommunications Standards Institute
<b>EU</b>	European Union
<b>FWA</b>	Fixed Wireless Access
<b>IMT</b>	International Mobile Telecommunications
<b>ISM</b>	Industrial, Scientific and Medical frequency band
<b>ITS</b>	Intelligent Transport Systems
<b>ITU</b>	International Telecommunication Union
<b>IVC</b>	Inter-Vehicle Communications
<b>MBANS</b>	Medical Body Area Network System
<b>MFCN</b>	Mobile Fixed Communications Network
<b>NAP</b>	Network Access Point
<b>OBE</b>	On Board Equipment
<b>OBU</b>	On Board Unit
<b>REDCR</b>	Remote Early Detection Communication Reader
<b>RED</b>	Directive 2014/53/EU - Radio Equipment Directive

<b>RFID</b>	Radio Frequency Identification
<b>SRD</b>	Short Range Devices
<b>TLPR</b>	Tank Level Probing Radar
<b>TPC</b>	Transmit Power Control
<b>TR</b>	Technical Report
<b>TTT</b>	Transport and Traffic Telematics
<b>UE</b>	User Equipment
<b>UHF</b>	Ultra High Frequency
<b>ULP-WMCE</b>	Ultra Low Power Wireless Medical Capsule Endoscopy
<b>WG FM</b>	Working Group Frequency Management
<b>WIA</b>	Wireless Industrial Applications
<b>WLAM</b>	Wideband Low Activity Mode
<b>WRC</b>	World Radiocommunications Conference

## 1 INTRODUCTION

This Report has been developed in 2017/2018 by the European Conference of Postal and Telecommunications Administrations (CEPT) in response to the Permanent Mandate to CEPT regarding the annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices.

Pursuant to Article 4 of the Radio Spectrum Decision, the Commission may issue mandates to the CEPT for the development of technical implementing measures with a view to ensuring harmonised conditions for the availability and efficient use of radio spectrum; such mandates shall set the task to be performed and the timetable thereof.

This Report for the **seventh update** of the technical annex of the SRD Decision 2006/771/EC [9] has been developed within SRD/MG and approved by WG FM and the ECC with contributions from administrations, ETSI and industry.

It was submitted to the European Commission in accordance with the timescales of the Guidance to CEPT regarding the annual update of the technical annex of the SRD Decision 2006/771/EC which is given in Annex 1 to this Report.



## 2 GENERAL PRINCIPLES

This Report takes into account a number of general principles. Most of these principles are set out in ECC Reports or previous CEPT Reports on updates of the technical annex of the EC SRD Decision. References to the relevant reports are made to avoid copying of material.

**SRD strategy:** the SRD strategy is described in CEPT Report 14 [7], and a detailed explanation is in section 3.1 of CEPT Report 26 [13]. One important element from the strategy is not to create new application specific frequency designations, i.e. use existing SRD bands on the basis of equal access to spectrum (no exclusive access to spectrum) as much as possible. In addition to this, Appendix 1 of the ERC Recommendation 70-03 [4] provides an indication of the level of harmonisation of frequency bands for usage by SRD within CEPT countries. The terminology “soft harmonisation” refers to situations when considering the removal of as many as possible of the national barriers within existing SRD designations whilst ensuring the protection of the radio services. This means the inclusion in ERC Recommendation 70-03 first and then achieves the status of “harmonised” or “nearly harmonised”. The same applies for the introduction of “new” (application neutral) frequency ranges.

**Application and technology neutrality:** The debate on application and technology neutrality for SRD is set out in CEPT Report 44 [8] and ECC Report 181 [10]. The consensus is that application neutrality in ERC Recommendation 70-03 should be strived for as much as possible, but technology neutrality is in conflict with spectrum efficiency. This should, besides the need for protection of primary services, be the main argument to have technology specific requirements for different frequency ranges.

**Predictable sharing environment:** For intra-SRD sharing, this is the minimum set of technical regulatory parameters with which the Harmonised European Standard addresses the sharing question. ECC compatibility studies in combination with the required technical application performance provide the technical base for this regulation. Traditionally, the definition of an application category was used for this; nowadays CEPT works more towards a technical spectrum access definition. Section 5 of CEPT Report 44 provides a detailed explanation.

**Requirements and technical parameters:** CEPT will provide the Commission with only those requirements and technical parameters considered essential to meet the objectives of equitable and efficient sharing of spectrum by SRD as formulated in the Radio Equipment Directive [6].

**Spectrum efficiency for SRD as a goal:** Spectrum efficiency for SRD is inter-alia described in ECC Report 181. ECC Report 181 outlines how to achieve good group spectrum efficiency by describing the sharing environment with a minimum set of technical parameters. The EC SRD Decision and ERC Recommendation 70-03 traditionally have their main focus on the physical and session layer of the OSI model, leaving the rest to be described in Harmonised European Standards. Developments in the area of cognitive radio may be beneficial to spectrum efficiency but also may require some guidance on solutions in the application layer, assisting the more technical physical and session layer based techniques. When doing so, one has to keep in mind the principle from CEPT Report 14 that intra-SRD sharing is addressed in Harmonised European Standards while the regulation has to ensure an equal access to the spectrum.

### **3 BANDS RECENTLY ADDED TO ERC RECOMMENDATION 70-03 OR UNDER DISCUSSION**

#### **3.1 NEW ENTRY IN 442.2-450.0 KHZ: PERSON DETECTION AND COLLISION AVOIDANCE**

The purpose of the proposed person detection and collision avoidance application is to detect up to 50 persons/objects at the same time; something which is not possible with the current 457 kHz applications. The application can use the ETSI EN 300 330 [14].

The system of this application is typically composed of a group of transceivers and a receiver installed in the vehicle/machine. Each transceiver is carried on a person (e.g. a worker). When pedestrians are near a machine within a predefined area, the operator is alerted visibly and acoustically. The operator is also informed of the number of detected pedestrians (possible detection of up to about 50 pedestrians).

In order to ensure the protection of the emergency detections of buried victims and valuable items devices and of the ADF/NDB receiver, it has been shown in ECC Report 284 [24] that the person detection and collision avoidance application should not transmit higher than 450 kHz and using a channel spacing of at least 150 Hz. To allow the application to operate with a number of devices corresponding to the terrain demand, the person detection and collision avoidance application should operate in the band 442.2-450.0 kHz with a magnetic field strength of 7 dB $\mu$ A/m @ 10 metres per channel (continuous wave (CW) – no modulation).

Like for the 457 kHz applications, the proposed new entry can use the non-specific SRD category with another usage restriction for person detection and collision avoidance devices only due to the assumptions made in ECC Report 284 are very specific for this application.

#### **3.2 CLARIFICATION OF ENTRIES 27A AND 27C IN 13553-13567 KHZ**

Both entries have the same power limit of 42 dB $\mu$ A/m at 10m distance and thus seem to be the same. The inductive application however has an antenna limitation dictated by the nature of the inductive application. The two entries are therefore in fact not the same.

In order to clarify the purpose of these entries, it is proposed to keep the entries 27a and 27c separate and to express the power limit of entry 27c as 10 mW e.r.p.

For entry 27a, it is proposed to introduce the mask requirement (this is a protection requirement for broadcast and military applications) in the same way as it is for entry 27b (RFID) and in line with note 2 in Annex 9 of the ERC Recommendation 70-03.

#### **3.3 CLARIFICATION OF ENTRIES 38, 39B AND 40 IN 169.4-169.8125 MHZ**

Entries 38, 39b and 40 are equivalent to equivalent entries f2) to f4) in REC 70-03 Annex 1, which specifies no alternative to the DC limitation. Similarly, ETSI EN 300 220-2 does not mention “or polite spectrum access” for these two entries, and ECC Decision (05)02 is in line with REC 70-03. While the EC Decision allows equivalent mitigation techniques, it is thus proposed to withdraw the text on equivalent mitigation techniques for entries 38, 39b and 40, as this is done for similar entries.

#### **3.4 NEW ENTRY IN 430-440 MHZ: ULTRA-LOW POWER WIRELESS MEDICAL CAPSULE ENDOSCOPY**

The ULP-WMCE application is designed for use in medical doctor-patient scenarios with the aim of acquiring high resolution optical internal images of human digestive tract and thus providing a tool for non-invasive diagnosis and treatment of gastrointestinal diseases.

It consists of two elements:

- a disposable miniature optical imaging camera implemented in the shape of a capsule – a capsule camera, which is swallowed by the patient and transmits imaging data;
- a wearable data recorder placed on the patient to receive and store the imaging data transmitted by the capsule camera.

It was concluded in ECC Report 267 [21] that ULP-WMCE would not create significant risk of interference to other established users of the band.

ULP-WMCE is proposed to be added to the Technical Annex of the EC Decision for SRD. The medical data acquisition category fits to this new application. At the same time, the studies in ECC Report 267 are based on a very specific use case and study results cannot be applied in a more generic way. Hence, the other usage restriction 'for ULP-WMCE' should be applied. This solution is basically the same approach as found for MBANS, as had been proposed in CEPT Report 59 [26] and was taken to the Technical Annex of the EC Decision. This solution also prepares for the possibility that other medical data acquisition applications having similar power levels could consider to use this frequency range in the future. ETSI established the new ETSI EN 303 520 [23] for ULP-WMCE.

Following CEPT Report 59, CEPT aligned the ERC Recommendation 70-03 with the EC Decision for SRD and MBANS and ULP-WMCE are included in the new Annex 13 of ERC Recommendation 70-03 for medical data acquisition applications (same as the medical data acquisition category in the EC Decision for SRD). The definitions have been reviewed, also to sufficiently differentiate between the medical data acquisition category and the two applications (MBANS, ULP-WMCE) within this category as well as to avoid redundancy. As a consequence, amendments of the existing definitions for medical data acquisition category and MBANS application are proposed, together with a proposal for the definition for the ULP-WMCE application. These proposals are in line with the definitions in ERC Recommendation 70-03 and in the related Harmonised European Standards for MBANS and ULP-WMCE.

### 3.5 NEW ENTRY IN 862-863 MHZ FOR NON-SPECIFIC SRD

The opportunity to harmonise the 862-863 MHz frequency band for non-specific SRD with 25 mW e.r.p. and maximum duty cycle of 0.1% is discussed hereafter.

In a [survey](#) in 2012 [25], 35 CEPT administrations saw a possibility for SRD use in this band. Due to the fact that eight CEPT administrations had governmental services in this band in 2012, partially highly classified and with no time limitation, it is envisaged that this band can be added to the harmonisation approach as long as the SRD applications use a very low DC limit of 0.1%. This possibility seems justified also taking into account the aspect of the already existing interference contribution from LTE UE's into this band as per the LTE UE transmitter mask as defined by ECC Decision (09)03 [40].

In principle, SRD vendors wishing to use the band 862-863 MHz should weigh the risks and accept responsibility for deciding themselves whether their specific applications shall be capable of operating in the presence of comparatively high ambient noise levels from LTE UEs' out-of-band emissions and design their products accordingly. Hence the benefit of such an opportunity in addition to existing regulations is limited.

ECC Report 261 [41] indicates that non-specific SRD devices with an e.r.p. of up to 25 mW, a DC of up to 0.1% and with up to 350 kHz bandwidth were shown to have minimal interference to cordless audio devices in 863-865 MHz and to LTE below 862 MHz under the condition that the transmitters use the emission mask Option 1, making their implementation feasible, i.e. compliant with -54dBm/100kHz limits in the spurious domain. Therefore, to ensure that equipment complies with this requirement, the Harmonised European Standard should respect the emission mask Option 1. The applicable Harmonised European Standard for non-specific SRD equipment operating in 862-863 MHz is ETSI EN 300 220 [12].

It is proposed to add a new entry in the frequency range 862-863 MHz for non-specific SRD with 25 mW e.r.p., a duty cycle of 0.1% and a maximum bandwidth of 350 kHz;

### **3.6 WIDEBAND DATA TRANSMISSION IN 863-868 MHZ**

This sections deals with entry 84.

ECC Report 246 [42] and ECC Report 261 [41] only considered 1 MHz channel bandwidth for wideband data transmission systems and no study was performed with smaller or higher bandwidth.

The entry 84 considered here competes with entries intended for non-specific SRD with a typical bandwidth of 200 or 600 kHz. In order to maintain the balance between non-specific SRD and wideband data transmission, it is proposed to add a minimum bandwidth of 600 kHz to entry 84.

Entry 84 is still rather new and was only introduced at the Sixth Update. There are also entries for non-specific SRD with 25 mW and bandwidth of  $\leq 600$  kHz in the frequency range 863-868. The introduction of the minimum bandwidth of 600 kHz is not sought to need any grandfathering clause.

Within CEPT, a new study on wideband data transmission systems for mobile network access points (NAP) with duty cycle of up to 10% has been agreed and is on-going. These new studies are expected to assess the possibility of having mobile NAP for applications such as used at containers, in wearable mobile devices, or in vehicles. A different duty cycle template may be considered. In the band 915-921 MHz, the requirement for fixed NAP needs to be maintained. Results of the study are expected to be available for the Eighth Update of the EC Decision for SRD.

Nevertheless, it has been discussed whether mobile network access points (NAP) of wideband data transmission systems in 863-868 MHz (entry 84) could use a duty cycle of up to 2.8%. Considering the necessity to amend the definitions of "network access point" and "data network" which would impact other entries and applications, this proposal is not part of the Seventh Update.

### **3.7 ASSISTIVE LISTENING SYSTEMS IN 1656.5-1660.5 MHZ**

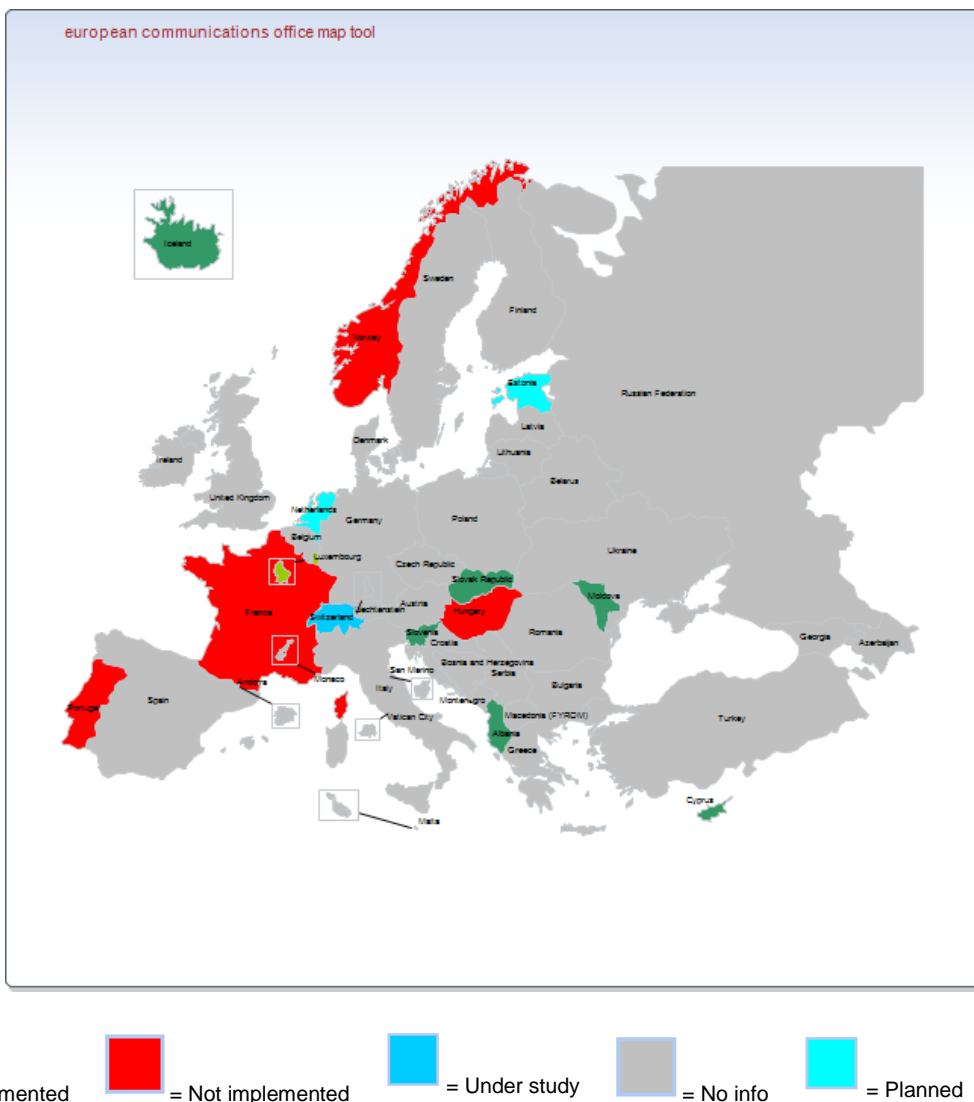
Assistive Listening Systems (ALS) operated in the 1656.5-1660.5 MHz range have been studied in ECC Report 270 [43]. They are for use by the hearing impaired in public spaces such as airports, railway stations, churches and theatres, where the transmitter is connected to the audio programme or public address system and the receiver is worn by hearing-impaired users, or integrated into users' hearing aids. An opportunity for ALS with maximum emissions of 2 mW/600kHz e.i.r.p and operating in the band 1656.5-1660.5 MHz has been included in ERC Recommendation 70-03 Annex 10. This opportunity foresees the possibility to individually authorise such installations and Annex 4 of ECC Report 270 provides guidance to administrations with regard to the installation requirements for such systems, mostly to be used in public spaces. Hence, no proposal for harmonisation in the EC Decision for SRD is made in this CEPT Report.

### **3.8 WIRELESS INDUSTRIAL APPLICATION (WIA) IN THE FREQUENCY RANGE 5725-5875 MHZ**

A spectrum utilisation opportunity for Wireless Industrial Applications (WIA) to be used in industrial environments including monitoring and worker communications, wireless sensors and actuators, is included in Annex 2 of ERC Recommendation 70-03 for the band 5725-5875 MHz based on existing compatibility studies in ECC Report 206. Such devices can use up to 400 mW e.i.r.p. in combination with several spectrum mitigation techniques (APC, DFS and DAA). The ETSI EN 303 258 [18] is expected to be published in 2019 by ETSI. Because of the importance of the spectrum mitigation techniques to be set out in a Harmonised European Standard, publication of the standard is seen as a pre-requisite [19]. In addition, registration and/or notification of WIA use may be required by some national regulatory authorities. Other authorities, such as the United Kingdom, have recently opened or study a new usage opportunity for WAS/RLAN in the frequency band with emissions restricted to 200 mW e.i.r.p.

It is proposed not to include the WIA usage opportunity (included in annex 2 of ERC Recommendation 70-03) in 5725-5875 MHz within the Seventh Update process but to reconsider the situation under the Eighth Update process.

The Figure 1 below shows that the present overall implementation of WIA in 5725-5875 MHz is still very moderate.



**Figure 1: The present overall implementation of WIA in 5725-5875 MHz**

### 3.9 WITHDRAWAL OF ENTRIES 71 TO 73 FOR WLAM IN 24.25-24.5 GHZ

The WLAM mode in the band 24.25 GHz to 24.50 GHz is basically not used or planned to be used in the future. Automotive radar applications increasingly move towards the frequency range 76-81 GHz.

Feedback was collected from ETSI and the automotive industry (ACEA and CLEPA) which confirmed that no product is on the market, which use WLAM in the band 24.25-24.50 GHz.

This concerns entries 71 to 73 in the EC Decision 2017/1483/EU which are included in the EC Decision since 1 July 2014; equivalent entries are included in ERC Recommendation 70-03 Annex 5 entries e1) and e2) for automotive radars. The activity of the Wideband Low Activity Mode (WLAM) is limited to avoid the risk of interference and this mode is only activated in specific configurations as a complementary to designation d1) to d5) in ERC Recommendation 70-03 in the band 24.05-24.25 GHz as described in ECC Report 164.

CEPT/ECC has harmonised the 24.25-27.5 GHz band for Europe for 5G before WRC-19 through the adoption of a harmonisation decision (ECC Decision (18)06 [27]) in order to promote it for worldwide harmonisation by an IMT identification. Based on this situation, the frequency range is also not attractive anymore for automotive radar use in the future.

It is proposed to withdraw these opportunities for WLAM applications in the band 24.25-24.50 GHz from the ERC Recommendation 70-03 as well as from the EC Decision for SRD (entries 71 to 73). A withdrawal without any need of grandfathering is seen as the best way forward and giving a clear sign to the automotive industry as well as the mobile industry planning to use the frequencies above 24.25 GHz for 5G applications. Concerning the aspect of potential grandfathering, it should be noted that the WLAM mode only works as a complementary mode for automotive radars operating in 24-05-24.25 GHz. A grandfathering provision can also carry difficulties, e.g. interference from 5G into such WLAM devices cannot be avoided in the future.

### **3.10 SHIFT OF ENTRY 77 FOR ITS (TTT) FROM 63-64 GHZ TO 63.72-65.88 GHZ**

It is proposed to move the existing entry for TTT applications, with the scope limited to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems, currently in the 63-64 GHz band to the 63.72-65.88 GHz band.

The underlying spectrum compatibility considerations are in ECC Report 113 [29].

The ETSI system reference document TR 103 583 (under development) also considers this possible rearrangement, so that the TTT entry can better aligned with the channelization of wideband data transmission systems operating in 57-66 GHz. CEPT received a liaison statement from ETSI in favour of the frequency shift for ITS.

During the revision making of ECC Decision (09)01 [16] in 2016, it was observed that real TTT/ITS equipment implementations in the market for 63-64 GHz are expected to occur in the future with first indications of available radio chipsets and development of traffic efficiency solutions. It is therefore important not to wait with this move of the frequency range for TTT applications while the overall impact on the market is still considerable small.

TTT devices placed on the market before the 1 January 2020 are 'grandfathered', i.e. they are continuously permitted to be used in line with the provisions set out in EC Decision 2017/1483/EU band no 77 (63-64 GHz).

A revision of ECC Decision (09)01 and the ETSI EN 302 686 [30] will be conducted.

Additional considerations may be needed within the eighth Update process concerning ITS in 63.72-65.88 GHz to consider cross interference between ITS and fixed outdoor applications, but this should not postpone the shift as indicated above. See also the following chapter 3.11 introducing the new regulatory concept for wideband data transmission systems in the frequency range 57-66 GHz including fixed outdoor applications.

### **3.11 WIDEBAND DATA TRANSMISSION SYSTEMS IN 57-66 GHZ**

In ITU Region 1, the 57-66 GHz band is allocated on a primary basis to the Fixed Service and, in the 57-64 GHz sub-band, to the mobile service. This band can also be used in CEPT by wideband data transmission devices. Point-to-point applications in the fixed service are regulated by ECC Recommendation (05)02 and ECC Recommendation (09)01, and by ETSI EN 302 217-2 for equipment. So far, SRD applications are regulated by the EC Decision and Annex 3 of ERC Recommendation 70-03, which impose a 40 dBm maximum e.i.r.p. to such devices and does not allow use as fixed outdoor installations as well as by ETSI EN 302 567 for equipment.

CEPT conducted studies to review the conditions applicable to the 57-66 GHz band in order to ensure less restrictive, flexible and streamlined regulations for wideband data transmission, while ensuring coexistence with the fixed service and taking into account ITS. The results are included in ECC Report 288 [44].

These studies, including proper mitigation effects, in conjunction with knowledge of the effective use of the band, allow the following conclusions:

- The utilisation of wideband data transmission devices is compatible, in the majority of cases, with current use of the fixed service in this band, provided that common technical conditions are adopted;

- The establishment of a common set of technical conditions under which fixed service applications and other outdoor envisaged uses/applications may coexist within the 57-66 GHz range in the same uncoordinated deployment is considered feasible.

As per ECC Report 288 [44], the adoption of interference mitigation technique such as APC (Adaptive Power Control) / DAA (Detect And Avoid) is also highly beneficial to keep the overall interference probability low enough so that the license-exempt regulation is attractive enough for 5G application providers, e.g. for fixed wireless access solutions or backhauling and fronthauling to and from small high capacity cells using 5G technology.

The DAA functionality is already available and is required to be included in the standard for wideband data transmission systems. APC is a concept very well-known and used since many years in fixed services, and showed to be the most effective mechanism in the studies made recently for 60 GHz. It is important to note that APC works on received power, compensating only for propagation attenuation. Every amplifier reduces output power to the minimum level at which the reception performance on the receiver side is still good, such that there is a global reduction of interference in the environment, and the overall capacity is maximised. APC and DAA or alternative equivalent mitigation techniques are highly recommended in the harmonised standard for the proposed new entries, to provide flexibility for implementations.

A requirement, to limit the potential interference area confined within the main beam angle of the antenna (see Annex 3 in ECC Report 288), by using a slope of 2 dB e.i.r.p. increase for each dB of antenna gain, starting from 30 dBi and ending at 37.5 dBi as a transition between 40 dBm e.i.r.p. and 55 dBm e.i.r.p., was considered.

The practical implication of the limited use of licensed fixed service applications in CEPT countries have been considered and the studies confirm that only a limited percentage of interference can be expected towards the fixed service (and vice versa) if some interference control mechanisms are used by new wideband data transmission system applications. This can be considered in network planning procedures. The expected cases of already installed FS links affected by interference coming from new applications are very limited. For such cases, solution on a case-by-case basis should be considered.

In order to limit coexistence problems for the future, due considerations should be given on the possibility to discourage the applications of traditional point-to-point fixed service links (individually licensed, high reliability, high quality) in this band, and also the possible migration of currently used FS, since compatibility with such FS P-P links is not considered as possible.

In conclusion, it is proposed to add two new usage opportunities for wideband data transmission in the 57-66 GHz band:

- power density in entry '75' (now '75a') appears to be obsolete<sup>1</sup> (intended to protect legacy narrowband systems according to ECC Report 176) and is updated with a new value of 23 dBm/MHz (similar to new '75b') so that high-power narrowband systems are avoided;
- a complementary entry '75b' for 40 dBm e.i.r.p. devices, with a power density of 23 dBm/MHz e.i.r.p. (i.e. 40 dBm/50MHz, noting that fixed links have a bandwidth of at least 50 MHz according to ECC Report 176) to avoid narrowband systems, and allowing fixed outdoor installations with a maximum output power of 27 dBm. Specifying the power limit in this way will both limit interference probabilities amongst applications, thanks to directive antennas, and enable use of omnidirectional antennas at lower e.i.r.p.;
- a new entry '75c' for 55 dBm e.i.r.p. devices limited to fixed outdoor installations, with a power density of 38 dBm/MHz e.i.r.p. and with a minimum antenna gain of 30 dBi to limit interference probabilities amongst applications. Specifying the power limit in this way will avoid high-power narrowband systems.

In the future, CEPT will also investigate whether the new license-exempt regulation can be widened to the whole range 57-71 GHz (as in the USA). The frequency band 66-71 GHz shows differences compared with 57-66 GHz for the propagation characteristics and there is also neither FS allocation nor operational fixed

<sup>1</sup> The situation is similar for entry '74a' where the power density is withdrawn

service in 66-71 GHz. A new RSPG opinion<sup>2</sup> recommends considering the band 66-71 GHz for new innovative applications (5G and other technologies) under license-exempt regulation.

It is noted that the ECC has made a revision of Annex 3 of ERC Recommendation 70-03 which proposes to extend the new conditions for 57 – 66 GHz to the whole of the 57 – 71 GHz band. WG FM has approved Annex 3 for Public consultation until the 5<sup>th</sup> April 2019.

With this regulatory approach, Europe adopts similar usage opportunities as other major trading nations (Japan, United States, Canada, South Korea and China).

### **3.12 AMENDMENT TO ENTRY 79A FOR TTT IN 76-77 GHZ**

Compatibility studies were conducted in ECC Report 262 [36] related to surveillance radar equipment operating in the 76 to 77 GHz range. As a result, the following note was added in Annex 5 of ERC Recommendation 70-03 for the 76-77 GHz entry for ground based systems: *'fixed transportation infrastructure radars have to be of a scanning nature in order to limit the illumination time and ensure a minimum silent time to achieve coexistence with automotive radar systems'*.

This requirement has still to be included in the ETSI EN 301 091-2 [28]. CEPT invited ETSI to include the requirement in the Harmonised European Standard. However, the new version of ETSI EN 301 091-2 has not been created yet. It is therefore proposed to delay the implementation date for this change by one year to give ETSI the time to create the new version of ETSI EN 301 091-2. The advantage of this solution is that the requirement only applies to fixed transportation infrastructure radars when placed on the market in the future and that grandfathering of such systems which were put into operating under the existing entry 79A is not needed.

The purpose of this amendment is to ensure the continued coexistence between fixed transportation infrastructure radar systems and automotive radars in the frequency range 76-77 GHz in the future.

It is proposed to add the generic reference to the Harmonised European Standard (or equivalent) and a new note to the entry 79a to harmonise the entries in ERC Recommendation 70-03 and the EC Decision for SRD. It is proposed to delay the implementation date for this change by one year to give ETSI the time to create the new version of ETSI EN 301 091-2.

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<sup>2</sup> STRATEGIC SPECTRUM ROADMAP TOWARDS 5G FOR EUROPE - RSPG Second Opinion on 5G networks



## **4 RELEVANCE AND APPROPRIATENESS OF ALL 'OTHER USAGE RESTRICTIONS'**

### **4.1 SIMPLIFICATION OF ENTRIES 44A TO 45C IN 433.05-434.79 MHZ AS WELL AS 56A AND 56B IN 869.7-870 MHZ**

Entries 44a and 45a are equivalent to the sole entry g2) in ERC Recommendation 70-03 Annex 1. Thus it is proposed to merge entries 44a and 45a into one entry. The usage allowance and restrictions should be clearly in 'Other usage restrictions [v]' and not partly under the technical parameters in column [iv] as today. So all restrictions are gathered in column [v]. This also applies to entries 45c and 56a.

Entries 44b and 45b are equivalent to the sole entry g1) in ERC Recommendation 70-03 Annex 1. Thus it is proposed to merge entries 44b and 45b into one entry. However, the entry g1) in ERC Recommendation 70-03 Annex 1 does not contain any other usage restrictions and the national implementation status information does actually not indicate that there is widespread use of such other application-specific restrictions. Risks of deleting the other usage restrictions are seen as limited in this situation. Thus it is proposed to delete the 'other usage restrictions'. This also applies to entry 56b.

### **4.2 ENTRY 83 IN 446,0-446,2 MHZ FOR PMR446**

Following the revision of ECC Decision (15)05 [2], undertaken in line with ETSI, an amendment of the PMR446 definition in the EC Decision for SRD is proposed to bring the definition in line with the ECC Decision (15)05. Hand portable means not that the equipment must be held in hand but could also be carried on a person or can be manually operated (e.g. in a car to support hands-free use when driving).

### **4.3 SIMPLIFICATION OF ENTRIES 47 TO 54 ON NON-SPECIFIC SRD IN 863-869.7 MHZ**

In the UHF frequency ranges for entries 47, 48, 50 and 54, it is proposed to delete the other usage restrictions which have become obsolete with the changes in the 865-869.7 MHz spectrum environment in recent years. This will also align with entry 46a where these restrictions are already withdrawn, with recent developments in ERC Recommendation 70-03 Annex 1 [4] and with the ETSI EN 300 220-2 [12].

### **4.4 NON-SPECIFIC SRD IN 865-868 MHZ WITH 500 MILLIWATT**

For the entry 47b, it is proposed to remove some ambiguity with regard to the applicable frequency band for the duty cycle for SRD in data networks. The ambiguity comes from using two times the wording 'band', in the headline 'band no' but also when mentioning the four frequency ranges which are co-frequent with the RFID interrogator channels in 865-868 MHz. It is proposed to use the wording 'frequency ranges' instead of 'bands'. In effect, the duty cycle has to be applied for the band 47b in total for the four frequency ranges by one transmitting device. This is also in-line with entries 1 and 4 in Decision 2018/1538/EU [49].

### **4.5 RFID IN 865-868 MHZ**

This section deals with entry 47a in Decision 2017/1483/EU.

Entry 3 of Decision 2018/1538/EU, Note [10] provides additional information on RFID tags. It is proposed to add a similar note to entry 47a of Decision 2017/1483/EU, so that RFID tags will be explicitly covered from now on. In order to avoid misinterpretation, the wording 'frequency band' is replaced by 'frequency range' to identify the operating frequencies for both the interrogators and the tags.

Furthermore, the bandwidth limitation is moved to the 'Additional parameters' column for consistency purpose.

## **5 INVESTIGATION ON MORE ENHANCED ASPECTS OF DUTY CYCLE MECHANISMS AS WELL AS OTHER ENABLERS FOR FURTHER SPECTRUM SHARING**

At this stage, there are no related activities in ETSI which could lead to proposals for new duty cycle templates for some frequency bands within the Seventh Update. In relation to mobile NAP (see section 3.6), a different duty cycle template may be considered for mobile NAP of wideband data transmission systems in 863-868 MHz in new investigations, but this could materialise at the Eighth Update at the earliest opportunity.

## 6 REVIEW OF THE INTERTWINING AND WORKING TOGETHER OF HARMONISED EUROPEAN STANDARDS AND DECISION 2006/771/EC

Further to the RSPG Opinion on streamlining EU regulation, the CEPT/ECC, ETSI and the European Commission developed a brochure to better describe and explain the complex European regulatory Framework. This has been updated further to the adoption of the RED Directive.

A cooperation process is in place to maintain a confidence with the EU regulatory Framework and to improve this confidence. See in particular the following extract from the common ETSI/CEPT/EC brochure:

*“The essential requirements for radio equipment, which include constructing radio equipment to both effectively use and support the efficient use of radio spectrum in order to avoid harmful interference, are harmonised via the Radio Equipment Directive (RED), Directive 2014/53/EU, which repeals the R&TTE Directive (as of 13 June 2016), subject to one year transition period. The RED regulates the requirements that products, within its scope, must meet in order to be placed on the market and put into service (without prejudice to conditions attached to authorisations for the use of radio spectrum or other applicable EU legislation). The most common way for manufacturers to comply with these requirements is to apply the voluntary Harmonised Standards developed by ETSI under the standardization request contained in the M/536 Commission Implementing Decision of the EC (if voluntary harmonised standards whose references are published in the OJEU are applied, they provide a presumption of conformity, therefore a manufacturer may apply other equivalent practices or specifications). The Directive is enforced at national level by Member States, in particular by Market Surveillance Authorities.”*

One main pillar of this confidence is the coherence between the Harmonised European Standards (including additional parameters) and the relevant spectrum regulation (which refers to relevant additional parameters to be included in the HS). This approach is developed in permanent cooperation between ETSI and CEPT. This is carefully assessed when drafting a spectrum regulation and HS. **CEPT considers that is fully appropriate to maintain the current balanced between Harmonised Standards and spectrum regulation for SRD in order to avoid destabilisation of the market and to maintain confidence.**

CEPT considers that the current text to describe additional parameters in the technical annex could be improved in line with EC Decision on the bands 874-874.4 MHz and 915-921 MHz:

*“Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.”*

## 7 COMPATIBILITY PARAMETERS FOR SMART-TACHOGRAPH AND WEIGHT AND DIMENSIONS APPLICATIONS

Compatibility studies between smart tachograph, weight and dimension applications in the band 5795-5815 MHz and other systems in the band and adjacent bands have been conducted in ECC Report 291 [37], in particular with radiolocation systems, road tolling systems and Road ITS based on ITS-G5 technology. Due to the lack of time, more studies may be needed in the future with regard to other applications within this frequency range but the aforementioned systems seem to have the highest interference potential when studying the coexistence with smart tachograph, weight and dimensions applications. The technology to be taken into account for the studies was CEN DSRC for smart tachograph, weight and dimension applications.

The background to start this study was that a new regulation for smart tachograph and a new directive for weight and dimension which was introduced by EU:

- Regulation (EU) 165/2014 of the European Parliament and of the Council (2014-02): on tachographs in road transport, repealing Council Regulation (EEC) No 3821/85 on recording equipment in road transport and amending Regulation (EC) No 561/2006 of the European Parliament and of the Council on the harmonisation of certain social legislation relating to road transport”;
- Directive (EU) 2015/719 [46]: “Amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic”.

The studies were based on input from ETSI in ETSI TR 103 441 [47]: System Reference document for Pan-European harmonized communications equipment operating in the 5 GHz frequency range for regulated applications for commercial vehicles.

From 2019 all new trucks must be equipped with a smart tachograph vehicle unit. The enforcement equipment which is the equipment communicating with the vehicle units is expected in a low volume and low usage density, maybe a few hundreds in whole Europe. Taking into account the limited communication zone area, it is only a very small fraction of the European area that will be used for smart tachograph radio communication.

The demand on national authorities to start enforcement of smart tachographs becomes mandatory in 2034. Each EU country must have minimum one road side unit. A very rough estimation made has been that each country buys one device for each one million of inhabitants which means for Germany 82 units, Portugal 11 units and Estonia 1 unit.

The results of the studies show that:

- The worst-case interference was from smart tachograph REDCR into road toll OBU with a needed separation distance of 200 m which is equal to minimum required distance between smart tachograph and road toll according to Commission Implementing Regulation 2016/799 [45];
- RLAN, if used at 5.8 GHz, is equipped with a DFS mechanism that might work as a mitigation mechanism because the RLAN will switch to another channel when detecting the smart tachograph signal. This needs to be further investigated;
- With radars operating below 5850 MHz, interference is possible though might be limited due to the 33 dBm power limitation for smart tachograph in combination with a low usage density;
- The interference probability from smart tachograph and weight and dimension applications into ITS receivers is considered low because of the high selectivity of the ITS receivers.

It is proposed to include smart tachograph, weight and dimension applications in entry 62 within the TTT category and the other usage restriction ‘for smart tachograph, weight and dimension applications’ since the technical studies in ECC Report 291 are very specific for these applications with very low usage density and cannot be broadened to a wider scope of application. In addition, a footnote should be added defining smart tachograph, weight and dimension applications as remote enforcement of the tachograph in Appendix 14 of the Commission Implementing Regulation 2016/799 [45] and for the weights & dimensions enforcement in Article 10d of the Directive 2015/719 [46].

The ETSI EN 300 674 (scope: TTT, i.e. already wider than just road tolling) will be applicable for smart tachograph, weight and dimension applications. CEPT may conduct additional studies but this should not postpone the adoption of a regulatory approach now since first countries might put the new application into operation as of 2019.

## **8 ADDITION OF THE FREQUENCY RANGE 5855-5875 MHZ AS A NEW ENTRY FOR NON-SAFETY RELATED APPLICATIONS OF ITS**

ECC Recommendation (08)01 [31] addresses frequency usage for non-safety applications of Intelligent Transport Systems (ITS) in the band 5855-5875 MHz. This frequency band is allocated to the Mobile Service, the Fixed Service and the Fixed-Satellite Service (Earth-to-space) on a primary basis in ITU Region 1 and in accordance with the European Common Allocation Table (ECA) [11]. It is part of the ISM band from 5725 MHz to 5875 MHz in accordance with RR 5.150.

The non-safety frequency band for ITS has been identified by ETSI within the system reference document TR 102 492-2 and is based on the same technical parameters as ITS safety applications above 5875 MHz but on a non-protected and non-interference basis.

The use of the band 5855-5875 MHz for non-safety ITS applications has been considered within the general compatibility studies for ITS applications in the band 5855-5925 MHz in ECC Report 101 [35] and in ECC Report 228 [32].

The minimum technical requirements for accessing the spectrum in 5855-5875 MHz under new entries for the TTT category are proposed as follows:

1. The maximum spectral power density for ITS stations should be limited to 23 dBm/MHz e.i.r.p. but the total power should not exceed 33 dBm e.i.r.p. with a Transmit Power Control (TPC) range of 30 dB.
2. The spectrum for ITS services is split into two channels with a bandwidth of 10 MHz each, i.e. 5855-5865 MHz and 5865-5875 MHz.
3. As per ECC Report 228 [32], regarding unwanted emissions at the antenna, a level of -65 dBm/MHz e.i.r.p. is required in the band 5795-5815 MHz for truck installation and -60 dBm/MHz e.i.r.p. for car installation respectively. Furthermore, an unwanted emission limit of -30 dBm/MHz e.i.r.p. is sufficient for the protection of the FS above 5925 MHz. These requirements are already part of the relevant Harmonised European Standard ETSI EN 302 571, while equivalent mitigation techniques may be used. Hence, it is important to refer for the entries to the Harmonised European Standard or equivalent specifications.
4. As per considering m) of ECC Recommendation (08)01 [31], duty cycle restrictions and specified frequency re-use conditions (e.g. for periodic ITS messages and ITS channel congestion control considerations) are not only beneficial for the compatibility with other systems in the same or adjacent frequency bands but also for the efficient use of the spectrum by cooperative ITS systems. Furthermore, as per considering n), only one ITS transmitting device uses an ITS frequency channel at any one time using listen before talk, transmitter power reduction and duty cycle restriction. The average conveyed ITS message duration is assumed to be below 1 millisecond. The ETSI EN 302 571 for ITS contains in detail duty cycle restrictions under an unconditional requirement (i.e. to be fulfilled by all ITS devices) for the decentralised congestion control within the ITS service channels. Hence, it is important to refer for the entries to the Harmonised European Standard or equivalent specifications.

The 5855-5875 MHz band does not apply to Urban Rail (CBTC) ITS since it is not well suited to support CBTC messages which are Urban Rail (CBTC) safety related.

New studies in ECC Report 290 [48] on Road-ITS based on LTE-V2X technology show that this regulatory approach can also be used by ITS based on LTE-V2X.

It is proposed to add two new entries for non-safety ITS applications in 5855-5865 MHz and 5865-5875 MHz under the TTT category.

## 9 OVERVIEW OF CEPT PROPOSAL

As part of the Seventh Update, the following changes are proposed to the technical annex of the EC Decision for SRD:

### **Task a.) To consider the bands recently added or currently under discussion for addition to ERC Recommendation 70-03 for potential inclusion in the next update of the SRD Decision**

It is proposed:

- to add a new entry for person detection and collision avoidance devices within the non-specific SRD category (same category as for 457 kHz devices) in the band 442.2-450.0 kHz;
- to express the power limit in entry 27c in mW e.r.p. and introduce the mask requirement in entry 27a as for entry 27b (RFID) and in line with note 2 in Annex 9 of ERC Recommendation 70-03;
- to withdraw the text on equivalent mitigation techniques for entries 38, 39b and 40 as for the other similar entries;
- to add a new entry in the frequency range 430-440 MHz for the Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE) application, including amendments of the existing definitions for medical data acquisition category and MBANS application together with a proposal for the definition of the ULP-WMCE application;
- to add a new entry in the frequency range 862-863 MHz for non-specific SRD with 25 mW e.r.p., a duty cycle of 0.1% and a maximum bandwidth of 350 kHz;
- to add a minimum bandwidth of 600 kHz in entry 84 for wideband data transmission in 863-868 MHz, so that the balance is maintained with non-specific SRD;
- to withdraw entries 71 to 73 for WLAM applications in the band 24.25-24.50 GHz from the EC Decision for SRD since the application failed to materialise in the market;
- to shift entry 77 for ITS under the TTT category from 63-64 GHz to 63.72-65.88 GHz;
- to add two new usage opportunities for wideband data transmission devices in 57-66 GHz with maximum e.i.r.p. of 55 dBm for fixed outdoor application and 40 dBm e.i.r.p. with no other usage restriction, while the existing entry 75 (as well as 74a) is updated with regard to the power density: the three entries are sought to complement each other;
- to add to entry 79a for TTT in 76-77 GHz a reference to the Harmonised European Standard (or equivalent) and a new note, but the implementation date for this change is delayed by one year to give ETSI the time to create the new version of ETSI EN 301 091-2.

### **Task b.) To re-assess the relevance and appropriateness of all 'other usage restrictions' for the relevant SRD categories, having regard in particular to requests from stakeholders**

It is proposed:

- to merge entries 44a and 45a into one band entry, and gather all restrictions in column [v];
- to gather all restrictions in column [v] for entries 45c and 56a;
- to merge entries 44b and 45b into one band entry, and delete all other usage restrictions which have become obsolete;
- to delete in entry 56b all other usage restrictions which have become obsolete;
- to amend the PMR446 definition with regard to hand portable in order to be in line with the revised ECC Decision (15)05;
- to delete in entries 47, 48, 50 and 54 all other usage restrictions which have become obsolete;
- to remove some ambiguity with regard to the applicable frequency band for the duty cycle in entry 47b (as already done for entries 1 and 4 in Decision (EU) 2018/1538 [49]);
- to add a note to entry 47a on RFID tags, as already done for entry 3 in Decision (EU) 2018/1538 and to remove some ambiguity with regard to the RFID tag frequency range;

### **Task c.) To investigate, where useful, more enhanced aspects of duty cycle mechanisms in cooperation with ETSI, as well as other enablers for further spectrum sharing (e.g., channelling and/or channel access and occupation rules)**

- None.

**Task d.) To review the intertwining and working together of Harmonised European Standards and Decision 2006/771/EC**

- CEPT considers that is fully appropriate to maintain the current balanced between Harmonised European Standards and spectrum regulation for SRD in order to avoid destabilisation of the market and to maintain confidence.
- CEPT considers that the current text to describe additional parameters in the technical annex could be improved in line with EC Decision (EU) 2018/1538 [49] on the bands 874-874.4 MHz and 915-921 MHz:

*“Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the Official Journal of the European Union under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.”*

**Task e.) To undertake a more detailed review to identify opportunities for cognitive-radio enabled SRD where rewarding principles could be introduced, having regard in particular to requests from stakeholders**

- None.

**Task f.) To consider compatibility parameters for smart-tachograph and weight and dimensions applications for addition to the Annex of Decision 2006/771/EC in time for their deployment starting as of 15 June 2019**

- It is proposed to include smart tachograph, weight and dimension applications in entry 62 within the TTT category and the other usage restriction ‘for smart tachograph, weight and dimension applications’ since the technical studies in ECC Report 291 [37] are very specific for these applications with very low usage density and cannot be broadened to a wider scope of application. In addition, a footnote should be added defining smart tachograph, weight and dimension applications as remote enforcement of the tachograph in Appendix 14 of the Commission Implementing Regulation 2016/799 and for the weights & dimensions enforcement in Article 10d of the Directive 2015/719 [46].

**Task g.) To consider adding the frequency range 5855-5875 MHz as a new entry for non-safety applications of ITS under the TTT device category to the Annex of Decision 2006/771/EC**

- It is proposed to add two new entries for non-safety ITS applications in 5855-5865 MHz and 5865-5875 MHz under the TTT category.



## 10 WORK ITEMS FOR FURTHER INVESTIGATIONS (EIGHTH UPDATE)

The following items for further work were identified:

- To continue investigating more complex aspects of duty cycle mechanisms in cooperation with ETSI, as an enabler for further spectrum sharing;
- Possibility of introducing mobile NAP for wideband data transmission in the sole 863-868 MHz band;
- Possibility of introducing 500 mW SRD in the lowest RFID interrogator channel at 916.3 MHz;
- If needed, to conduct additional studies for smart tachograph, weight and dimensions applications within the eighth Update process;
- If needed, to have additional considerations on cross interference between ITS in 63.72-65.88 GHz and fixed outdoor applications;
- To reconsider the WIA usage opportunity (included in Annex 2 of ERC Recommendation 70-03) in 5725-5875 MHz.
- To investigate whether the new license-exempt regulation for wideband data transmission can be widened to the whole frequency range 57-71 GHz. To note that the ECC has made a revision of Annex 3 of ERC Recommendation 70-03 which proposes to extend the new conditions for 57-66 GHz to the whole of the 57-71 GHz band. WG FM has approved Annex 3 for Public consultation until the 5 April 2019.

**ANNEX 1: GUIDE TO CEPT REGARDING THE ANNUAL UPDATE OF THE TECHNICAL ANNEX OF THE SRD COMMISSION DECISION (SEVENTH UPDATE)**

**GUIDANCE TO CEPT**

**ON THE SEVENTH UPDATE OF THE SRD DECISION**

**1. PERMANENT MANDATE ON UPDATING THE TECHNICAL ANNEX TO THE SRD DECISION**

This document provides the Commission services' guidance to CEPT for the seventh update of the technical annex to the Short Range Devices (SRD) Decision 2006/771/EC. Such guidance is foreseen in the permanent Mandate to CEPT regarding the annual update of the technical annex of the Commission Decision on harmonisation of radio spectrum for use by short range devices<sup>1</sup>. As guiding principles, the proposed evolution of the European regulatory framework for short-range devices should take into due consideration backward compatibility with current SRD systems in harmonised bands and relevant incumbent non-SRD usages, as well as efficient use of spectrum and spectrum sharing.

**2. RECOMMENDED FOCUS FOR THE NEXT UPDATE**

New entries are regularly added to ERC Recommendation 70-03 based on spectrum demand expressed in ETSI SRDocs and assessed in compatibility studies. The non-mandatory, flexible harmonisation on the CEPT level within ERC Recommendation 70-03 is a beneficial source for future EU harmonisation. Adding its entries, where possible, to the SRD Decision, leads to legally binding implementation across the EU and allows producers and users of SRDs to profit from the benefits of the Digital Single Market.

The Commission invites CEPT to:

- a. consider the bands recently added or currently under discussion for addition to ERC Recommendation 70-03 for potential inclusion in the next update of the SRD decision;*

Some 'usage restrictions', currently in the annex of Decision 2006/771/EC, may require re-assessment on a case by case basis. Removing or relaxing them where compatibility with the radio services operating in the corresponding bands allows, may create new opportunities for the quick deployment of SRD solutions in certain categories and hence increase market penetration and socio-economic benefits of SRDs (e.g., Wireless Access Systems/Radio LANs in 57-66 GHz).

The Commission invites CEPT to:

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<sup>1</sup> RSCOM06-27 Rev (5 July 2006)

- b. *re-assess the relevance and appropriateness of all 'other usage restrictions' for the relevant SRD categories, having regard in particular to requests from stakeholders;*

During the sixth update, the duty cycle definitions in ERC/REC 70-03 - Annex 5 and the Annex to Decision 2006/771/EC have been aligned. The new definition allows for observation times different from the current standard of one hour for a given SRD entry and hence opens the possibility to improve spectrum sharing. The development of additional parameters (such as channelling and/or channel access and occupation rules) could enable a future withdrawal of some existing 'other usage restrictions' (see also point b)).

The Commission invites CEPT to:

- c. *investigate, where useful, more enhanced aspects of duty cycle mechanisms in cooperation with ETSI, as well as other enablers for further spectrum sharing (e.g., channelling and/or channel access and occupation rules).*

Some entries of Decision 2006/771/EC refer to relevant harmonised standards adopted under Directive 2014/53/EU (the Radio Equipment Directive – RED) in, e.g., column (iv) "additional parameters". An assessment of which requirements need reflection directly in the regulatory environment and which techniques should rather be specified in harmonised standards as a performance baseline allowing also equivalent alternate approaches can help to streamline the regulatory environment and improve clarity for spectrum users. This includes assessment of the necessity and validity of the referenced parameters in light of the regulatory environment as well as scope for their possible relaxation.

The Commission invites CEPT to:

- d. *review the intertwining and working together of harmonised European standards and Decision 2006/771/EC.*

Radio resources can be shared in frequency, time and space. Cognitive techniques<sup>2</sup> allow for an increased level of efficient use of spectrum by sharing along all of these three dimensions and hence cognitive-radio enabled SRDs could open new frequency bands for SRDs in the future. CEPT Report 59 contains an initial analysis of cognitive techniques for SRDs and comes to the conclusion that such an approach to spectrum usage could be further encouraged by rewarding principles (e.g., increased duty cycle allowances when certain cognitive techniques are applied).

The Commission invites CEPT to:

- e. *undertake a more detailed review to identify opportunities for cognitive-radio enabled SRDs where rewarding principles could be introduced, having regard in particular to requests from stakeholders.*

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<sup>2</sup> The terms "cognitive techniques" and "cognitive radio" are often understood as limited to sensing of other use only. In this context they are used with a broad meaning and also include other approaches such as geo-location databases, without prejudgment of any specific solution.

Smart tachograph (2014/165/EU and 2016/799/EU) and weight and dimensions (96/53/EC amended by 2015/719/EU) applications aim to increase road safety and will be mandatory in new vehicles registered as of 15 June 2019. The 52<sup>nd</sup> Radio Spectrum Committee meeting agreed to add corresponding parameters to the Annex of Decision 2006/771/EC.

The Commission invites CEPT to:

- f. consider compatibility parameters for smart-tachograph and weight and dimensions applications for addition to the Annex of Decision 2006/771/EC in time for their deployment starting as of 15 June 2019.*

The frequency band 5875-5905 MHz is harmonised in Decision 2008/671/EC for safety-related applications of Intelligent Transport Systems (ITS) and the frequency band 5905-5925 MHz is under discussion to be added to the same Decision. The frequency range 5855-5875 MHz is currently recommended by ECC REC (08)01 for ITS non-safety applications on a non-protected and non-interference basis, but not harmonized across the EU. Since the recommended regulatory environment of ECC REC (08)01 is in line with the SRD Decision 2006/771/EC and ITS applications already harmonized in this decision, ITS non-safety applications in 5855-5875 MHz could profit from an EU-wide harmonization by being added to the Annex of the SRD Decision 2006/771/EC as a new entry under the "Transport and Traffic Telematics" (TTT) device category.

The Commission invites CEPT to:

- g. consider adding the frequency range 5855-5875 MHz as a new entry for non-safety applications of ITS under the TTT device category to the Annex of Decision 2006/771/EC.*

The above does not pre-empt CEPT to pursue their investigations on the specific work items already identified in CEPT Report 59 and its Addendum or other specific work items of relevance.

### **3. ROADMAP FOR THE 2017/2018 UPDATE CYCLE**

1. ECC (November 2017): launch of the seventh update cycle. CEPT starts work on the update proposal pursuant to the permanent Mandate and this guidance document.
2. ECC (October 2018): Approval for public consultation of the draft CEPT Report.
3. RSC (December 2018): CEPT to submit its report (subject to public consultation) pursuant to the permanent Mandate. Commission services examine the CEPT proposal for amendment of the technical annex.
4. RSC (March 2019): CEPT submits final CEPT report and the Commission services present a draft Commission Decision updating the technical annex to

the SRD Decision. If agreement is reached swiftly on the draft text, publication can be envisaged until June 2019.

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**ANNEX 2: EC MANDATE TO CEPT**



EUROPEAN COMMISSION

Information Society and Media Directorate-General

Electronic Communications Policy

**Radio Spectrum Policy**

Brussels, 5 July 2006

DG INFSO/B4



**FINAL**

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**PERMANENT MANDATE TO CEPT REGARDING THE ANNUAL  
UPDATE OF THE TECHNICAL ANNEX OF THE COMMISSION  
DECISION ON THE TECHNICAL HARMONISATION OF RADIO  
SPECTRUM FOR USE BY SHORT RANGE DEVICES**

**This mandate is issued to the CEPT without prejudice to the one-month right of scrutiny by the European Parliament, pursuant to Council Decision 1999/468/EC of 28 June 1999 (OJ L 184, 17.7.1999, p. 23) on Comitology procedure.**

**This one-month period is extended until 28 September 2006.**

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## **Title**

Permanent Mandate to CEPT regarding the annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices.<sup>5</sup>

## **Purpose**

Pursuant to Article 4 of the Radio Spectrum Decision, the Commission may issue mandates to the CEPT for the development of technical implementing measures with a view to ensuring harmonised conditions for the availability and efficient use of radio spectrum; such mandates shall set the task to be performed and the timetable therefor.

Pursuant to this permanent Mandate, CEPT shall provide the Commission with a yearly report on needs for revising the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices (SRDs).

The yearly proposal will serve as a basis for an amendment, when needed, of the technical annex of the Commission Decision on SRDs.

## **Justification**

The Commission Decision for SRDs foresees a regular update of the list of frequencies, as well as their associated conditions of use. This update should be performed on a regular basis in order to take due account of the rapid technological and market developments prevailing in this area. This permanent Mandate to CEPT is to formalise the preparation of the yearly proposal by CEPT for updating the technical annex of Commission Decision on SRDs.

## **Objectives**

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<sup>5</sup>Commission Decision 2006/ 771/EC on the technical harmonisation of radio spectrum for use by short range radio devices.



In addition to the core objectives of the Decision itself, the aim of this permanent mandate is to provide relevant technical information necessary to:

1. Modify, whenever appropriate, the technical conditions of use of the frequency bands included in the technical annex;
2. Identify new frequency bands and/or new applications (types of SRDs) which should be added to the list included in the technical annex of the Decision in order to further the “Class I” equipment category and providing such equipment with legal certainty on EU level, thereby consolidating the Single Market through spectrum harmonisation;
3. Remove frequency bands (and hence types of SRDs) from the list included in the technical annex, when required and duly justified (e.g. in case a particular use has become obsolete);
4. Continuously improve the presentation of the technical annex to reflect best practices.

The European Commission may provide, on a yearly basis, input and orientation to CEPT reflecting EU policy priorities requiring special attention in the context of spectrum usage by SRDs. This input and orientation, which aims at focussing the CEPT analysis, would be delivered in time to allow to be taken into account by CEPT when preparing the annual report with proposals for revising the technical annex.

The Commission, with the assistance of the Radio Spectrum Committee (RSC) pursuant to the Radio Spectrum Decision, may consider applying the results of this permanent Mandate in the European Union.

### **Duration**

This mandate will be kept as long as the Commission Decision on SRDs is applicable.

However, the Commission, having received the advice of the RSC in the matter and with due consultation with CEPT, may terminate or modify this mandate at a specified point in time in case it would have become redundant, obsolete or needs to be updated.

## Order and Schedule

1. CEPT is hereby mandated to undertake all relevant work to meet the objectives stated above.
2. The CEPT is mandated to produce a yearly report to the European Commission including the proposed revision of the technical annex of the Commission Decision on SRDs. This report shall take into account the input and orientation given by the Commission if provided. The CEPT report shall be delivered in **July** of each year.
3. An indicative schedule of the process is given in table 1.
4. In implementing this mandate, the CEPT shall, where relevant, take the utmost account of Community law applicable, notably the RTTE Directive, 1999/5/EC, and to support the principles of technological neutrality, non-discrimination and proportionality.

Table 1 – **Schedule for review of SRD Decision** (revolving cycle)

The reference date of the annual cycle of revision of the technical annex of the Commission Decision on SRDs is July of each year at which time CEPT is expected to deliver its annual report containing the proposal for revising the technical annex of the Commission Decision on SRDs.

*Year Y -1*

November-December	Optional: input and orientation presented by the Commission to the RSC in view of formal transmission to CEPT by the end of year Y-1
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*Year Y*

July	CEPT to finalise the response to the Mandate for year Y and submit formally a report to the Commission.
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**ANNEX 3: PROPOSED AMENDMENTS TO THE TECHNICAL ANNEX OF THE EC DECISION FOR SRD****Table 1: Harmonised frequency bands and technical parameters for short range devices**

<b>Band no</b>	<b>Frequency band [i]</b>	<b>Category of short-range devices [ii]</b>	<b>Transmit power limit/ field strength limit/power density limit [iii]</b>	<b>Additional parameters (channelling and/or channel access and occupation rules) [iv]</b>	<b>Other usage restrictions [v]</b>
1	9-59.750 kHz	Inductive devices [14]	72 dB $\mu$ A/m at 10 metres		
2	9-315 kHz	Active medical implant devices [1]	30 dB $\mu$ A/m at 10 metres	Duty cycle limit [vi]: 10%	This set of usage conditions is only available to active implantable medical devices [7].
3	59.750-60.250 kHz	Inductive devices [14]	42 dB $\mu$ A/m at 10 metres		
4	60.250-74.750 kHz	Inductive devices [14]	72 dB $\mu$ A/m at 10 metres		
5	74.750-75.250 kHz	Inductive devices [14]	42 dB $\mu$ A/m at 10 metres		
6	75.250-77.250 kHz	Inductive devices [14]	72 dB $\mu$ A/m at 10 metres		
7	77.250-77.750 kHz	Inductive devices [14]	42 dB $\mu$ A/m at 10 metres		
8	77.750-90 kHz	Inductive devices [14]	72 dB $\mu$ A/m at 10 metres		
9	90-119 kHz	Inductive devices [14]	42 dB $\mu$ A/m at 10 metres		
10	119-128.6 kHz	Inductive devices [14]	66 dB $\mu$ A/m at 10 metres		
11	128.6-129.6 kHz	Inductive devices [14]	42 dB $\mu$ A/m at 10 metres		

12	129.6-135 kHz	Inductive devices [14]		66 dB $\mu$ A/m at 10 metres		
13	135-140 kHz	Inductive devices [14]		42 dB $\mu$ A/m at 10 metres		
14	140-148.5 kHz	Inductive devices [14]		37.7 dB $\mu$ A/m at 10 metres		
15	148.5-5 000 kHz [17]	Inductive devices [14]		-15 dB $\mu$ A/m at 10 metres in any bandwidth of 10 kHz.  Furthermore the total field strength is -5 dB $\mu$ A/m at 10 m for systems operating at bandwidths larger than 10 kHz		
17	400-600 kHz	Radio Identification devices [12]	Frequency (RFID)	-8 dB $\mu$ A/m at 10 metres		
18a	442.2-450.0 kHz	Non-specific devices [3]	short-range	7 dB $\mu$ A/m at 10 m	Channel spacing $\geq$ 150 Hz	This set of usage conditions is only available for person detection and collision avoidance devices.
18b	456.9-457.1 kHz	Non-specific devices [3]	short-range	7 dB $\mu$ A/m at 10 m		This set of usage conditions is only available for emergency detections of buried victims and valuable items devices.

19	984-7484 kHz	Transport and Traffic Telematics devices [13]	9 dB $\mu$ A/m at 10 m	Duty cycle limit [vi]: 1 %	This set of usage conditions is only available for Eurobalise transmissions in the presence of trains and using the 27 MHz band for telepowering.
20	3 155-3 400 kHz	Inductive devices [14]	13.5 dB $\mu$ A/m at 10 metres		
21	5 000-30 000 kHz [18]	Inductive devices [14]	-20 dB $\mu$ A/m at 10 metres in any bandwidth of 10 kHz. Furthermore the total field strength is -5 dB $\mu$ A/m at 10 m for systems operating at bandwidths larger than 10 kHz		
22	6 765-6 795 kHz	Inductive devices [14]	42 dB $\mu$ A/m at 10 metres		
23	7 300-23 000 kHz	Transport and Traffic Telematics devices [13]	-7 dB $\mu$ A/m at 10 m	Antenna restrictions apply that provide at least equivalent performance to the techniques described in the harmonised standards adopted under Directive 2014/53/EU.	This set of usage conditions is only available for Euroloop transmissions in the presence of trains and using the 27 MHz band for telepowering.
24	7 400-8 800 kHz	Inductive devices [14]	9 dB $\mu$ A/m at 10 metres		
25	10 200-11 000 kHz	Inductive devices [14]	9 dB $\mu$ A/m at 10 metres		

27a	13 553-13 567 kHz	Inductive devices [14]		42 dB $\mu$ A/m at 10 metres	The transmission mask and antenna requirements for all combined frequency segments have to provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU.	
27b	13 553-13 567 kHz	Radio Identification devices [12]	Frequency (RFID)	60 dB $\mu$ A/m at 10 metres	The transmission mask and antenna requirements for all combined frequency segments have to provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU.	
27c	13 553-13 567 kHz	Non-specific devices [3]	short-range	10 mW e.r.p.		
28	26 957-27 283 kHz	Non-specific devices [3]	short-range	10 mW e.r.p.		
29	26 990-27 000 kHz	Non-specific devices [3]	short-range	100 mW e.r.p.	Duty cycle limit [vi]: 0.1 %. Model control devices may operate without duty cycle restrictions [11].	
30	27 040-27 050 kHz	Non-specific devices [3]	short-range	100 mW e.r.p.	Duty cycle limit [vi]: 0.1 %. Model control devices may operate without duty cycle restrictions [11].	

31	27 090-27 100 kHz	Non-specific devices [3]	short-range	100 mW e.r.p.	Duty cycle limit [vi]: 0.1 %. Model control devices may operate without duty cycle restrictions [11].	
32	27 140-27 150 kHz	Non-specific devices [3]	short-range	100 mW e.r.p.	Duty cycle limit [vi]: 0.1 %. Model control devices may operate without duty cycle restrictions [11].	
33	27 190-27 200 kHz	Non-specific devices [3]	short-range	100 mW e.r.p.	Duty cycle limit [vi]: 0.1 %. Model control devices may operate without duty cycle restrictions [11].	
34	30-37.5 MHz	Active medical devices [1]	implant	1 mW e.r.p.	Duty cycle limit [vi]: 10 %	This set of usage conditions is only available to ultra-low power medical membrane implants for blood pressure measurements within the definition of active implantable medical devices [7] in Directive 90/385/EEC.
35	40.66-40.7 MHz	Non-specific devices [3]	short-range	10 mW e.r.p.		



36	87.5-108 MHz	High duty cycle/continuous transmission devices [8]	50 nW e.r.p.	Channel spacing up to 200 kHz.	This set of usage conditions is only available to wireless audio and multimedia streaming transmitters with analogue frequency modulation (FM).
37a	169.4-169.475 MHz	Assistive Listening Devices (ALD) [4]	500 mW e.r.p.	Channel spacing: max 50 kHz.	
37c	169.4-169.475 MHz	Non-specific short-range devices [3]	500 mW e.r.p.	Channel spacing: max 50 kHz. Duty cycle limit [vi]: 1.0%. For metering devices [5], the duty cycle limit [vi] is 10.0%	
38	169.4-169.4875 MHz	Non-specific short-range devices [3]	10 mW e.r.p.	Duty cycle limit [vi]: 0.1%.	
39a	169.4875-169.5875 MHz	Assistive Listening Devices (ALD) [4]	500 mW e.r.p.	Channel spacing: max 50 kHz.	
39b	169.4875-169.5875 MHz	Non-specific short-range devices [3]	10 mW e.r.p.	Duty cycle limit [vi]: 0.001%. Between 00:00h and 06:00h local time a duty cycle limit [vi] of 0.1 % may be used.	
40	169.5875-169.8125 MHz	Non-specific short-range devices [3]	10 mW e.r.p.	Duty cycle limit [vi]: 0.1 %.	

82	173.965-216 MHz	Assistive Listening Devices (ALD) [4]	10 mW e.r.p.	<p>On a tuning range basis [25].</p> <p>Channel spacing: max 50 kHz.</p> <p>A threshold of 35 dB<math>\mu</math>V/m is required to ensure the protection of a DAB receiver located at 1.5m from the ALD device, subject to DAB signal strength measurements taken around the ALD operating site. The ALD device should operate under all circumstances at least 300 kHz away from the channel edge of an occupied DAB channel.</p> <p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p>	
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41	401-402 MHz	Active medical implant devices [1]	25 $\mu$ W e.r.p.	<p>Channel spacing: 25 kHz.</p> <p>Individual transmitters may combine adjacent channels for increased bandwidth up to 100 kHz.</p> <p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Alternatively a duty cycle limit [vi] of 0.1 % may be used.</p>	<p>This set of usage conditions is only available for systems specifically designed for the purpose of providing non-voice digital communications between active implantable medical devices [7] and/or body-worn devices and other devices external to the human body used for transferring non-time critical individual patient-related physiological information.</p>
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42	402-405 MHz	Active medical implant devices [1]	25 $\mu$ W e.r.p.	<p>Channel spacing: 25 kHz.</p> <p>Individual transmitters may combine adjacent channels for increased bandwidth up to 300 kHz.</p> <p>Other techniques to access spectrum or mitigate interference, including bandwidths greater than 300 kHz, can be used provided they result at least in an equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU to ensure compatible operation with the other users and in particular with meteorological radiosondes.</p>	<p>This set of usage conditions is only available to active implantable medical devices [7].</p>
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43	405-406 MHz	Active medical implant devices [1]	25 $\mu$ W e.r.p.	<p>Channel spacing: 25 kHz</p> <p>Individual transmitters may combine adjacent channels for increased bandwidth up to 100 kHz.</p> <p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Alternatively a duty cycle limit [vi] of 0,1 % may be used.</p>	<p>This set of usage conditions is only available for systems specifically designed for the purpose of providing non-voice digital communications between active implantable medical devices [7] and/or body-worn devices and other devices external to the human body used for transferring non-time critical individual patient-related physiological information.</p>
NEW	430-440 MHz	Medical data acquisition [20]	-50 dBm/100kHz e.r.p. power density but not exceeding a total power of -40 dBm/10MHz (both limits are intended for measurement outside of the patient's body)		<p>The set of usage conditions is only available for Ultra-Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE) applications [27].</p>

44a	433.05-434.79 MHz	Non-specific devices [3]	short-range	1 mW e.r.p. and -13 dBm/10kHz power density for bandwidth modulation larger than 250 kHz		Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.
44b	433.05-434.79 MHz	Non-specific devices [3]	short-range	10 mW e.r.p.	Duty cycle limit [vi]: 10 %	
45	434.04-434.79 MHz	Non-specific devices [3]	short-range	10 mW e.r.p.	Duty cycle limit [vi]: 100 % subject to channel spacing up to 25 kHz.	Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.
83	446.0-446.2 MHz	PMR446 [21]		500 mW e.r.p.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	
New	862-863 MHz	Non-specific devices [3]	short-range	25 mW e.r.p.	Duty cycle limit [vi]: 0.1%. Bandwidth: $\leq$ 350 kHz.	

46a	863-865 MHz	Non-specific short-range devices [3]	25 mW e.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Alternatively a duty cycle limit [vi] of 0.1 % may be used.</p>	
46b	863-865 MHz	High duty cycle/continuous transmission devices [8]	10 mW e.r.p.		This set of usage conditions is only available to wireless audio and multimedia streaming devices.

84	863-868 MHz	Wideband data transmission devices [16]	25 mW e.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Bandwidth: &gt; 600 kHz and <math>\leq</math> 1 MHz.</p> <p>Duty cycle [vi]: <math>\leq</math> 10% for network access points [26]</p> <p>Duty cycle [vi]: <math>\leq</math> 2.8% otherwise</p>	<p>This set of usage conditions is only available for wideband SRDs in data networks. [26]</p>
47	865-868 MHz	Non-specific short-range devices [3]	25 mW e.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Alternatively a duty cycle limit [vi] of 1 % may be used.</p>	



47a	865-868 MHz [29]	Radio Identification devices [12]	<p>Frequency (RFID)</p> <p>2 W e.r.p.</p> <p>Interrogator transmissions at 2 W e.r.p. only permitted within the four channels centred at 865.7 MHz, 866.3 MHz, 866.9 MHz and 867.5 MHz</p> <p>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.</p>	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Bandwidth <math>\leq</math> 200 kHz</p>	
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47b	865-868 MHz	Non-specific devices [3] short-range	<p>500 mW e.r.p.</p> <p>Transmissions only permitted within the frequency ranges 865.6-865.8 MHz, 866.2-866.4 MHz, 866.8-867.0 MHz and 867.4-867.6 MHz.</p> <p>Adaptive Power Control (APC) required. Alternatively other mitigation technique with at least an equivalent level of spectrum compatibility.</p>	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Bandwidth: <math>\leq 200</math> kHz</p> <p>Duty cycle [vi]: <math>\leq 10\%</math> for network access points [26]</p> <p>Duty cycle [vi]: <math>\leq 2.5\%</math> otherwise</p>	This set of usage conditions is only available for data networks. [26]
48	868-868.6 MHz	Non-specific devices [3] short-range	25 mW e.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Alternatively a duty cycle limit [vi] of 1 % may be used.</p>	
49	868.6-868.7 MHz	Low duty cycle /high reliability devices [15]	10 mW e.r.p.	<p>Channel spacing: 25 kHz The whole frequency band may be used as a single channel for high-speed data transmission.</p> <p>Duty cycle limit [vi]: 1.0%</p>	This set of usage conditions is only available to alarm systems. [22]

50	868.7-869.2 MHz	Non-specific short-range devices [3]	25 mW e.r.p.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.  Alternatively a duty cycle limit [vi] of 0,1 % may be used.	
51	869.2-869.25 MHz	Low duty cycle /high reliability devices [15]	10 mW e.r.p.	Channel spacing: 25 kHz. Duty cycle limit [vi]: 0.1 %	This set of usage conditions is only available to social alarm devices [6].
52	869.25-869.3 MHz	Low duty cycle /high reliability devices [15]	10 mW e.r.p.	Channel spacing: 25 kHz Duty cycle limit [vi]: 0.1 %	This set of usage conditions is only available to alarm systems. [22]
53	869.3-869.4 MHz	Low duty cycle /high reliability devices [15]	10 mW e.r.p.	Channel spacing: 25 kHz Duty cycle limit [vi]: 1.0 %	This set of usage conditions is only available to alarm systems. [22]

54	869.4-869.65 MHz	Non-specific short-range devices [3]	500 mW e.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Alternatively a Duty cycle limit [vi] of 10% may be used.</p>	
55	869.65-869.7 MHz	Low duty cycle /high reliability devices [15]	25 mW e.r.p.	Channel spacing: 25 kHz Duty cycle limit [vi]: 10%	This set of usage conditions is only available to alarm systems. [22]
56a	869.7-870 MHz	Non-specific short-range devices [3]	5 mW e.r.p.		Voice applications are allowed with advanced mitigation techniques. Other audio and video applications are excluded.

56b	869.7-870 MHz	Non-specific short-range devices [3]	25 mW e.r.p.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.  Alternatively a duty cycle limit [vi] of 1 % may be used.
57a	2400-2483.5 MHz	Non-specific short-range devices [3]	10 mW equivalent isotropic radiated power (e.i.r.p.)	
57b	2400-2483.5 MHz	Radio determination devices [9]	25 mW e.i.r.p.	
57c	2400-2483.5 MHz	Wideband data transmission devices [16]	100 mW e.i.r.p. and 100 mW/100 kHz e.i.r.p. density applies when frequency hopping modulation is used, 10 mW/MHz e.i.r.p. density applies when other types of modulation are used	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.
58	2446-2454 MHz	Radio Identification devices [12]	Frequency (RFID) 500 mW e.i.r.p.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.

59	2 483.5-2 500 MHz	Active medical implant devices [1]	10 mW e.i.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Channel spacing: 1 MHz. The whole frequency band may be used dynamically as a single channel for high-speed data transmissions.</p> <p>In addition, a duty cycle limit [vi] of 10 % applies.</p>	<p>This set of usage conditions is only available to active implantable medical devices [7].</p> <p>Peripheral master units are for indoor use only.</p>
59a	2 483.5-2 500 MHz	Medical data acquisition [20]	1 mW e.i.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Modulation Bandwidth: <math>\leq 3</math> MHz.</p> <p>In addition, a duty cycle [vi]: <math>\leq 10\%</math> applies.</p>	<p>The set of usage conditions is only available for medical body area network system (MBANS) [23] for indoor use within healthcare facilities</p>

59b	2 483.5-2 500 MHz	Medical data acquisition [20]	10 mW e.i.r.p.	<p>Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.</p> <p>Modulation Bandwidth: <math>\leq 3</math> MHz. In addition, a duty cycle [vi]: <math>\leq 2\%</math> applies.</p>	The set of usage conditions is only available for medical body area network system (MBANS) [23] for indoor use within the patient's home
60	4 500-7 000 MHz	Radio determination devices [9]	24 dBm e.i.r.p. [19]	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Tank Level Probing Radar [10].
61	5 725-5 875 MHz	Non-specific short-range devices [3]	25 mW e.i.r.p.		
62	5 795-5 815 MHz	Transport and Traffic Telematics devices [13]	2 W e.i.r.p.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions applies only to road tolling applications and smart tachograph, weight and dimension applications [30].

new	5 855-5 865 MHz	Transport and Traffic Telematics devices [13]	33 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and a Transmit Power Control (TPC) range of 30 dB	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.
new	5 865-5 875 MHz	Transport and Traffic Telematics devices [13]	33 dBm e.i.r.p., 23 dBm/MHz e.i.r.p. density and a Transmit Power Control (TPC) range of 30 dB	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.
63	6 000-8 500 MHz	Radio determination devices [9]	7 dBm/50 MHz peak e.i.r.p. and -33 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as equivalent techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Level Probing Radar. Established exclusion zones around radio astronomy sites must be obeyed.



64	8 500-10 600 MHz	Radio determination devices [9]	30 dBm e.i.r.p. [19]	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Tank Level Probing Radar [10].
65	17.1-17.3 GHz	Radio determination devices [9]	26 dBm e.i.r.p.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to ground-based systems.
66	24.05-24.075 GHz	Transport and Traffic Telematics devices [13]	100 mW e.i.r.p.		
67	24.05-26.5 GHz	Radio determination devices [9]	26 dBm/50 MHz peak e.i.r.p. and -14 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as equivalent techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Level Probing Radar.  Established exclusion zones around radio astronomy sites must be obeyed.

68	24.05-27 GHz	Radio determination devices [9]	43 dBm e.i.r.p. [19]	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Tank Level Probing Radar [10].
69a	24.075-24.15 GHz	Transport and Traffic Telematics devices [13]	100 mW e.i.r.p.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used. Dwell time limits and frequency modulation range apply as specified in harmonised standards.	This set of usage conditions is only available to ground-based vehicle radars.
69b	24.075-24.15 GHz	Transport and Traffic Telematics devices [13]	0.1 mW e.i.r.p.		
70a	24.15-24.25 GHz	Non-specific short-range devices [3]	100 mW e.i.r.p.		
70b	24.15-24.25 GHz	Transport and Traffic Telematics devices [13]	100 mW e.i.r.p.		
74a	57-64 GHz	Non-specific short-range devices [3]	100 mW e.i.r.p. and maximum transmit power of 10 dBm		

74b	57-64 GHz	Radio determination devices [9]	43 dBm e.i.r.p. [19]	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Tank Level Probing Radar [10].
74c	57-64 GHz	Radio determination devices [9]	35 dBm/50 MHz peak e.i.r.p. and -2 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as equivalent techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Level Probing Radar.
75a	57-66 GHz	Wideband data transmission devices [16]	40 dBm e.i.r.p. and 23 dBm/MHz e.i.r.p. density	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	Fixed outdoor installations are excluded.

75b	57-66 GHz	Wideband data transmission devices [16]	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	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	
75c	57-66 GHz	Wideband data transmission devices [16]	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and transmit antenna gain $\geq$ 30 dBi	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to fixed outdoor installations.
76	61-61.5 GHz	Non-specific short-range devices [3]	100 mW e.i.r.p.		
77	63.72-65.88 GHz	Transport and Traffic Telematics devices [13]	40 dBm e.i.r.p.	TTT devices placed on the market before the 1 January 2020 are 'grandfathered', i.e. they are continuously permitted to be used in line with the provisions set out in EC Decision 2017/1483/EU band no 77 (63-64 GHz).	This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems.

78a	75-85 GHz	Radio determination devices [9]	34dBm/50 MHz peak e.i.r.p. and -3 dBm/MHz mean e.i.r.p.	Automatic power control and antenna requirements as well as equivalent techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Level Probing Radar.  Established exclusion zones around radio astronomy sites must be obeyed.
78b	75-85 GHz	Radio determination devices [9]	43 dBm e.i.r.p. [19]	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used.	This set of usage conditions is only available to Tank Level Probing Radar [10].
79a	76-77 GHz	Transport and Traffic Telematics devices [13]	55 dBm peak e.i.r.p. and 50 dBm mean e.i.r.p. and 23.5 dBm mean e.i.r.p. for pulse radars	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 2014/53/EU must be used. [28]	This set of usage conditions is only available to ground-based vehicle and infrastructure systems.
79b	76-77 GHz	Transport and Traffic Telematics devices [13]	30 dBm peak e.i.r.p. and 3 dBm/MHz average power spectral density	Duty cycle limit [vi]: ≤ 56 %/s	This set of usage conditions is only available to obstacle detection systems for rotorcraft use [24].

80a	122-122.25 GHz	Non-specific devices [3]	short-range	10 dBm e.i.r.p/ 250 MHz and -48 dBm/MHz at 30° elevation		
80b	122.25-123 GHz	Non-specific devices [3]	short-range	100 mW e.i.r.p.		
81	244-246 GHz	Non-specific devices [3]	short-range	100 mW e.i.r.p.		

[i] Member States must allow adjacent frequency bands within this table to be used as a single frequency band provided the specific conditions of each of these adjacent frequency bands are met.

[ii] As defined in Article 2(3)

[iii] Member States must allow the usage of spectrum up to the transmit power, field strength or power density given in this table. In accordance with Article 3(3), they may impose less restrictive conditions, i.e. allow the use of spectrum with higher transmit power, field strength or power density, provided that this does not reduce or compromise the appropriate coexistence between short-range devices in bands harmonised by this Decision.

[iv] Member States may only impose these ‘additional parameters (channelling and/or channel access and occupation rules)’, and shall not add other parameters or spectrum access and mitigation requirements. Less restrictive conditions within the meaning of Article 3(3), mean that Member States may completely omit the ‘additional parameters (channelling and/or channel access and occupation rules)’ in a given cell or allow higher values, provided that the appropriate sharing environment in the harmonised band is not compromised.

[v] Member States may only impose these ‘other usage restrictions’ and shall not add additional usage restrictions. As less restrictive conditions may be introduced within the meaning of Article 3(3), Member States may omit one or all of these restrictions, provided that the appropriate sharing environment in the harmonised band is not compromised.

[vi] ‘Duty cycle’ is defined as the ratio, expressed as a percentage, of  $\Sigma(\text{Ton})/(\text{Tobs})$  where Ton is the “on” time of a single transmitter device and Tobs is the observation period. Ton is measured in an observation frequency band (Fobs). Unless otherwise specified in this technical annex, Tobs is a continuous one hour period and Fobs is the applicable frequency band in this technical annex. Less restrictive conditions within the meaning of Article 3(3), mean that Member States may allow a higher value for ‘duty cycle’.

- [1] 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.
- [3] 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.
- [4] The assistive listening device (ALD) category covers radio communications systems that allow persons suffering from hearing disability to increase their listening capability. Typical system installations include one or more radio transmitters and one or more radio receivers.
- [5] 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, such as electricity, gas and water.
- [6] 'Social alarm devices' are radio communications systems that allow reliable communication for a person in distress in a confined area to initiate a call for assistance. Typical uses of social alarm are to assist elderly or disabled people.
- [7] 'Active implantable medical devices' as defined in Council Directive 90/385/EEC of 20 June 1990 on the approximation of the laws of the Member States relating to active implantable medical devices (OJ L 189, 20.7.1990, p. 17).
- [8] 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 used for combined audio/video transmissions and audio/video sync signals, mobile phones, automotive or home entertainment system, wireless microphones, cordless loudspeakers, cordless headphones, radio devices carried on a person, assistive listening devices, in-ear monitoring, wireless microphones for use at concerts or other stage productions, and low power analogue FM transmitters (band 36).
- [9] 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. Any kind of point-to-point or point-to-multipoint radio communications is outside of this definition.
- [10] 'Tank Level Probing Radar' (TLPR) is a specific type of radiodetermination application, which is used for tank level measurements and is installed in metallic or reinforced concrete tanks, or similar structures made of material with comparable attenuation characteristics. The purpose of the tank is to contain a substance.
- [11] 'Model control devices' are a specific kind of telecommand and telemetry radio equipment that is used to remotely control the movement of models (principally miniature representations of vehicles) in the air, on land or over or under the water surface.
- [12] The radio frequency identification (RFID) device category covers tag/interrogator based radio communications systems, consisting of radio devices (tags) attached to animate or inanimate items and of transmitter/receiver units (interrogators) which activate the tags and receive data back. Typical uses include the tracking and identification of items, such as for electronic article surveillance (EAS), and collecting and transmitting data relating to the items to which tags are attached, which may be either battery-less, battery assisted or battery powered. The responses from a tag are validated by its interrogator and passed to its host system.

- [13] The transport and traffic telematics device category covers radio devices that are used in the fields of transport (road, rail, water or air, depending on the relevant technical restrictions), traffic management, navigation, mobility management and in intelligent transport systems (ITS). 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.
- [14] The inductive device category covers radio devices that use magnetic fields with inductive loop systems for near field communications. Typical uses include devices for car immobilisation, 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, data transfer to hand-held devices, automatic article identification, wireless control systems and automatic road tolling.
- [15] 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.
- [16] 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.
- [17] In band 20 higher field strengths and additional usage restrictions apply for inductive applications.
- [18] In bands 22a, 24, 25, 27a, and 28a higher field strengths and additional usage restrictions apply for inductive applications.
- [19] The power limit applies inside a closed tank and corresponds to a spectral density of -41,3 dBm/MHz e.i.r.p. outside a 500 litre test tank."
- [20] 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.
- [21] 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.
- [22] 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.
- [23] Medical Body Area Network Systems (MBANS) are used for medical data acquisition and are intended for low-power wireless networking of a plurality of body-worn sensors and/or actuators as well as of a hub device placed on/around the human body.
- [24] Member States can specify exclusion zones or equivalent measures in which the obstacle detection application for rotorcraft use shall not be used for the protection of the radioastronomy service or other national use. Rotorcraft is defined as EASA CS-27 and CS-29 (resp. JAR-27 and JAR-29 for former certifications);



- [25] Devices shall implement the whole frequency range on a tuning range basis.
- [26] A network access point in a data network is a fixed terrestrial short range device that acts as a connection point for the other short range devices in the data network to service platforms located outside of that data network. The term data network refers to several short range devices, including the network access point, as network components and to the wireless connections between them.
- [27] Wireless medical capsule endoscopy is used for medical data acquisition designed for use in medical doctor-patient scenarios with the aim of acquiring images of human digestive tract.
- [28] Fixed transportation infrastructure radars have to be of a scanning nature in order to limit the illumination time and ensure a minimum silent time to achieve coexistence with automotive radar systems.
- [29] RFID tags respond at a very low power level (-20 dBm e.r.p.) in a frequency range around the RFID interrogator channels and must comply with the essential requirements of Directive 2014/53/EU.
- [30] Smart tachograph, weight and dimension applications are defined as remote enforcement of the tachograph in Appendix 14 of the Commission Implementing Regulation 2016/799 and for the weights and dimensions enforcement in Article 10d of the Directive 2015/719.

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## ANNEX 4: LIST OF REFERENCES

- [1] Commission Decision 2006/804/EC of 23 November 2006 on the harmonisation of the radio spectrum for radio frequency identification (RFID) devices operating in the ultra high frequency (UHF) band
- [2] ECC Decision (15)05: "The harmonised frequency range 446.0-446.2 MHz, technical characteristics, exemption from individual licensing and free carriage and use of analogue and digital PMR 446 applications"
- [3] void
- [4] ERC Recommendation 70-03: "Relating to the use of Short Range Devices (SRD)"
- [5] void
- [6] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC
- [7] CEPT Report 14: "Report from CEPT to the European Commission in response to the Mandate to: Develop a strategy to improve the effectiveness and flexibility of spectrum availability for Short Range Devices (SRDs)"
- [8] CEPT Report 44: "In response to the EC Permanent Mandate on the "Annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices"
- [9] Commission Decision 2006/771/EC on the harmonisation of the radio spectrum for use by short-range devices (SRD)
- [10] ECC Report 181: "Improving spectrum efficiency in the SRD bands"
- [11] ERC Report 25: "The European table of frequency allocations and applications in the frequency range 9 kHz to 3000 GHz (ECA)"
- [12] ETSI Harmonised European standard EN 300 220: "Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW"
- [13] CEPT Report 26: "Annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by SRDs"
- [14] ETSI Harmonised European standard 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"
- [15] void
- [16] ECC Decision (09)01: "The harmonised use of the 63-64 GHz frequency band for Intelligent Transport Systems (ITS)"
- [17] ECC Report 206: "Compatibility studies in the band 5725-5875 MHz between SRD equipment for wireless industrial applications and other systems"
- [18] ETSI Harmonised European standard EN 303 258: "Wireless industrial automation; Radio equipment to be used in the 5,725 GHz to 5,875 GHz frequency range with power levels ranging up to 400 mW"
- [19] FM(13)116 - Annex 17: "liaison statement from ECC WGFM to ETSI ERM on wireless industrial applications"
- [20] void
- [21] ECC Report 267: "Coexistence of Wideband Ultra-Low Power Wireless Medical Capsule Endoscopy Application operating in the frequency band 430-440 MHz"
- [22] void
- [23] ETSI EN 303 520: "Harmonised European Standard for Ultra Low Power (ULP) wireless medical capsule endoscopy"
- [24] ECC Report 284: "Person detection and collision avoidance application operating in the 446-457.1 kHz range"
- [25] Summary of the WGFM questionnaire for 862-863 MHz
- [26] CEPT Report 59: "Annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range device"
- [27] ECC Decision (18)06: "The harmonised technical conditions for Mobile/Fixed Communications Networks (MFCN) in the band 24.25-27.5 GHz"
- [28] ETSI EN 301 091-2 V2.1.1: "Radar equipment operating in the 76 GHz to 77 GHz range; Fixed infrastructure radar equipment"
- [29] ECC Report 113: "Compatibility studies around 63 GHz between Intelligent Transport Systems (ITS) and other systems"

- [30] ETSI EN 302 686: "Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 63 GHz to 64 GHz frequency band"
- [31] ECC Recommendation (08)01: "Use of the Band 5855-5875 MHz for Intelligent Transport Systems (ITS)"
- [32] ECC Report 228: "Compatibility studies between Intelligent Transport Systems (ITS) in the band 5855-5925 MHz and other systems in adjacent bands"
- [33] ETSI EN 302 571: "Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5855 MHz to 5925 MHz frequency band"
- [34] ETSI TS 102 792: "Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range"
- [35] ECC Report 101: "Compatibility studies in the band 5855– 5925 MHz between Intelligent Transport Systems (ITS) and other systems"
- [36] ECC Report 262: "Studies related to surveillance radar equipment operating in the 76 to 77 GHz range for fixed transport infrastructure"
- [37] ECC Report 291: "Compatibility studies between smart tachograph, weight and dimension applications and systems operating in the band 5795-5815 MHz and systems operating in adjacent bands"
- [38] ECC Report 109: "The aggregate impact from the proposed new systems (ITS, BBDR and BFWA) in the 5725-5925 MHz band on the other services/systems currently operating in this band"
- [39] ECC Report 110: "Compatibility studies between Broad-Band Disaster Relief (BBDR) and other systems"
- [40] ECC Decision (09)03: "Harmonised conditions for mobile/fixed communications networks (MFCN) operating in the band 790 - 862 MHz"
- [41] ECC Report 261: "Short Range Devices in the frequency range 862-870 MHz"
- [42] ECC Reports 246: "Wideband and Higher DC Short Range Devices in 870-875.8 MHz and 915.2-920.8 MHz (companion to ECC Report 200)"
- [43] ECC Report 270: "Sharing studies between Telecoil Replacement Systems (TRS) and Mobile Satellite Service (MSS) in the frequency range 1656.5-1660.5 MHz"
- [44] ECC Report 288: "Conditions for the coexistence between Fixed Service and other envisaged outdoor uses/applications in the 57 66 GHz range"
- [45] COMMISSION IMPLEMENTING REGULATION (EU) 2016/799 of 18 March 2016 implementing Regulation (EU) No 165/2014 of the European Parliament and of the Council laying down the requirements for the construction, testing, installation, operation and repair of tachographs and their components
- [46] DIRECTIVE (EU) 2015/719 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2015 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic
- [47] ETSI TR 103 441 System Reference document (SRdoc): "Pan-European harmonized communications equipment operating in the 5 GHz frequency range for regulated applications for commercial vehicles"
- [48] ECC Report 290: "Studies to examine the applicability of ECC Reports 101 and 228 for various ITS technologies under EC Mandate (RSCOM 17-26Rev.3)"
- [49] Commission Implementing Decision 2018/1538/EU of 11 October 2018 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands