

International Telecommunication Union

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R SM.1896-1
(09/2018)

**Frequency ranges for global or regional
harmonization of short-range devices**

SM Series
Spectrum management

Foreword

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Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R SM.1896-1*

Frequency ranges for global or regional harmonization of short-range devices

(2011-2018)

Scope

This Recommendation contains frequency ranges to be used as recommended ranges for short-range devices (SRDs) applications requiring operation on a global or regional harmonized basis.

Keywords

Short range devices, frequency range, harmonization

The ITU Radiocommunication Assembly,

considering

- a) that the 2007 Radiocommunication Assembly approved Resolution ITU-R 54 – Studies to achieve harmonization for short-range radiocommunication devices (SRDs);
- b) that there is an increasing demand for and use of SRDs for a wide variety of applications throughout the world;
- c) that SRD applications are deployed in both bands designated for industrial, scientific and medical (ISM) applications and bands not designated for ISM applications;
- d) that SRDs are not ISM applications as defined in No. **1.15** of the Radio Regulations (RR);
- e) that, by their nature, SRDs are being used on a worldwide basis, either as an independent device or as an integral part of other systems, and are often carried and used across national borders;
- f) that, in some frequency bands, specific interference mitigation techniques may facilitate the operation of SRDs;
- g) that some SRDs may employ advanced spectrum access techniques;
- h) that using SRDs with similar technical characteristics, such as interference potential and mitigation techniques, in suitable spectrum with appropriate emission limits could enhance the coexistence of SRDs;
- i) that SRD applications are increasing, which may result in increasing spectrum demands (some examples are UWB, RFID, etc.);
- j) that it may be necessary to use the existing spectrum more efficiently and economically,

further considering

- a) that SRDs may create the potential for harmful interference to radiocommunication services, and some of them can be carried by individuals across national boundaries and,

* Radiocommunication Study Group 1 made editorial amendments to this Recommendation in the year 2019 in accordance with Resolution ITU-R 1.

noting

- a) that Resolution ITU-R 54 states that the ITU-R should continue its studies to enable implementation of advanced technologies for SRDs, thereby in particular focusing on a strategy for the future;
- b) that frequency ranges, power levels and other technical and operating parameters commonly used by SRDs are listed in Report ITU-R SM.2153 – Technical and operating parameters and spectrum use for short-range radiocommunication devices,

recognizing

- a) that the regulatory framework for SRDs, such as the decision on frequency bands for use by SRDs, is a national matter;
- b) that there are a number of benefits of global or regional harmonization of frequency ranges for SRD usage for end users, manufacturers and regulators, such as:
- a broader manufacturing base and increased volume of devices, resulting in economies of scale and equipment availability;
 - improved spectrum utilization;
- c) that, in principle, SRDs have no requirement for an individual licence as they generally use the radio spectrum on a non-interference and non-protected basis. However, in specific cases licensing or registration may be required,

recommends

that for SRDs requiring operation on a global or regional harmonized basis, the frequency ranges as specified in Annex 1 and Annex 2 may be considered, if appropriate.

Introduction to Annexes 1 and 2

Many SRD applications and the frequency bands in which they are deployed are described in Report ITU-R SM.2153 – Technical and operating parameters and spectrum use for short-range radiocommunication devices. Table 1 of this Recommendation lists common frequency bands that are used for the deployment of SRDs in all regions of the world. However, not all of these bands listed as common bands are harmonized for SRD use either globally or regionally.

Annex 1 of this Recommendation indicates frequency ranges that may be globally harmonized under certain technical conditions and Annex 2 of this Recommendation indicates frequency ranges that may be regionally harmonized under certain technical conditions.

Further studies may need to be undertaken in ITU-R to determine whether global or regional harmonization of these ranges, or portions thereof, is feasible, given that there are many SRD applications, such as those operating across national borders, which would benefit from worldwide harmonization.

Example applications of such SRDs are the following: medical applications; SRD applications used inside and outside aircraft; SRDs for supporting ID cards; some Intelligent Transport System (ITS) applications; RFID applications for luggage handling systems in airports, item management, logistics, livestock, electronic article surveillance (EAS) and near field communication (NFC). ISO and other international standardization bodies have developed standards for many of these applications.

Where SRDs operate in bands that are not harmonized either on a global or a regional basis, risks to radiocommunication services increase. Moreover, differences in spectrum access conditions and technical rules increase the costs to consumers of SRDs. Common frequency bands and technical

rules, such as recommended power levels and mitigation techniques, should be developed in ITU-R Recommendations and Reports as guidance for national administrations.

Advanced spectrum access and mitigation techniques are being developed and these techniques may allow SRDs to operate automatically within the tuning ranges that encompass frequency bands that cannot be fully harmonized throughout the Regions. For low-cost SRDs, such as RFID tags, these techniques may impose significant cost constraints and/or power limitations such as battery lifetime. Therefore, these techniques may not be applicable to every SRD application.

Annex 1

Frequency ranges for global harmonization of SRDs¹

Frequency ranges as contained in Table below are based on information from Report ITU-R SM.2153 and contributions from administrations attending relevant ITU-R meetings. The Table may not reflect the actual situation. In this regard, further information is to be sought from administrations.

Frequency range	Relevant Recommendation	Remarks
9-148.5 kHz		Inductive SRD applications
3 155-3 400 kHz	ITU-R M.1076	Inductive SRD applications RR No. 5.116
6 765-6 795 kHz		Inductive SRD applications ISM band (RR No. 5.138) Centre frequency 6 780 kHz
13.553-13.567 MHz		Inductive SRD applications ISM band (RR No. 5.150) Centre frequency 13.560 MHz Level of side band suppression is dependent on national regulations
26.957-27.283 MHz		Inductive SRD applications/non-specific SRDs ISM band (RR No. 5.150) Centre frequency 27 120 kHz
40.66-40.7 MHz		ISM band (RR No. 5.150) Centre frequency 40.68 MHz
2 400-2 500 MHz		ISM band (RR No. 5.150) ⁽¹⁾ Centre frequency 2 450 MHz
3.7-4.8 GHz 7.25-9 GHz	ITU-R SM.1755; ITU-R SM.1756; ITU-R SM.1757	UWB application for communication, location tracking, radiodetermination ^{(2) (3)}
5 725-5 875 MHz		ISM band (RR No. 5.150) Centre frequency 5 800 MHz
24.00-24.25 GHz		ISM band (RR No. 5.150) Centre frequency 24.125 GHz

¹ See also Recommendations ITU-R SM.1755 – Characteristics of ultra-wideband technology, and ITU-R SM.1756 – Framework for the introduction of devices using ultra-wideband technology.

Frequency range	Relevant Recommendation	Remarks
61.0-61.5 GHz		ISM band (RR No. 5.138) Centre frequency 61.25 GHz
122-123 GHz		ISM band (RR No. 5.138) Centre frequency 122.5 GHz
244-246 GHz		ISM band (RR No. 5.138) Centre frequency 245 GHz

Notes to the Table:

- (1) In some countries the upper limit is 2 483.5 MHz.
- (2) Frequency ranges and relevant regulations for UWB applications are different per country. In this regard, further information is to be sought from administrations.
- (3) UWB regulations are commonly referred to as underlay regulations in the sense that they spread over a very large frequency range, which may overlap several frequency bands allocated to radiocommunication services. UWB applications are a subset of SRD applications and use the radio spectrum on a non-interference and non-protected basis with respect to radiocommunication services.

Annex 2**Frequency ranges for regional harmonization of SRDs²**

Frequency ranges and their availability in various Regions as contained in the Table below are based on information from Report ITU-R SM.2153 and contributions from administrations attending relevant ITU-R meetings. The Table may not reflect the actual and prevailing situation in each country and/or Region. In this regard, further information is to be sought from administrations.

Frequency range	Relevant Recommendation	Remarks	Region 1	Region 2	Region 3
7 400-8 800 kHz			Available	Available	Available in some countries
312-315 MHz		These bands are exchangeable in terms of applications but not always available at the same time in one country. 433.050-434.790 MHz is an ISM band (RR No. 5.138 in Region 1)	Available in some countries	Available	Available in some countries
433.050-434.790 MHz		except for countries mentioned in RR No. 5.280 . Centre frequency 433.92 MHz. The whole of these bands can be considered as a tuning range. However, they may not be completely available in some countries. See national regulations.	Available	Available in some countries	Available in some countries

² See also Recommendations ITU-R SM.1755 – Characteristics of ultra-wideband technology, and ITU-R SM.1756 – Framework for the introduction of devices using ultra-wideband technology.

Frequency range	Relevant Recommendation	Remarks	Region 1	Region 2	Region 3
862-875 MHz		The whole of this band can be considered as a tuning range. Only parts of this tuning range are operationally available in each country due to the use by commercial mobile systems. See national regulations.	Available	Not available	Available in some countries
875-960 MHz		902-928 MHz is an ISM band in Region 2 (RR No. 5.150). Centre frequency 915 MHz. The whole band can be considered as a tuning range. Only parts of this tuning range are operationally available in some countries. The band 880-960 MHz is not available for SRDs in a number of countries due to the use by commercial mobile systems.	Available in some countries	Available. See remarks	Available in some countries
3.1-4.8 GHz 6-9 GHz	ITU-R SM.1755; ITU-R SM.1756; ITU-R SM.1757	UWB application for communication, location tracking, radio determination ⁽¹⁾	Available in some countries	–	Available in some countries

Note to the Table:

- ⁽¹⁾ UWB regulations are commonly referred to as underlay regulations in the sense that they spread over a very large frequency range, which may overlap several frequency bands allocated to radiocommunication services. UWB applications are a subset of SRD applications and use the radio spectrum on a non-interference and non-protected basis with respect to radiocommunication services.