

ITU Workshop on
Spectrum Management for
Internet of Things Deployment
(Geneva, 22 November 2016)

**Brief Summary of the
ITU-R Study Group 1 related studies
(incl. RA-15 and WRC-15 related outcomes)**

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ITU WORKSHOP ON SPECTRUM
MANAGEMENT FOR INTERNET
OF THINGS DEPLOYMENT

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Resolution ITU-R 54

Importance of SRD Harmonization



- RA-15 recognized in Res. ITU-R 54-2 the **role played by some short-range devices (SRDs) in the Internet of Things (IoT)**
- Studies in SG 1 (mainly WP 1B) to **achieve harmonization for SRDs:**
 - **Needs for economies of scale; technological advances / tuning ranges; spectrum sharing; integration in consumer products/crossing borders**
 - **harmonization of technical and operating parameters**
(implementation of advanced technologies for SRDs)
 - **measurement procedures to verify these parameters**
 - **requirements of SRDs to promote efficient spectrum use**
(collecting information to understand SRDs capabilities, meanwhile ensuring protection to radiocommunication services)
 - **deployment in specific bands, harmonised globally or regionally**
(mechanism, that may ease the use of relevant frequency bands/ tuning ranges, preferably on a global or regional basis)

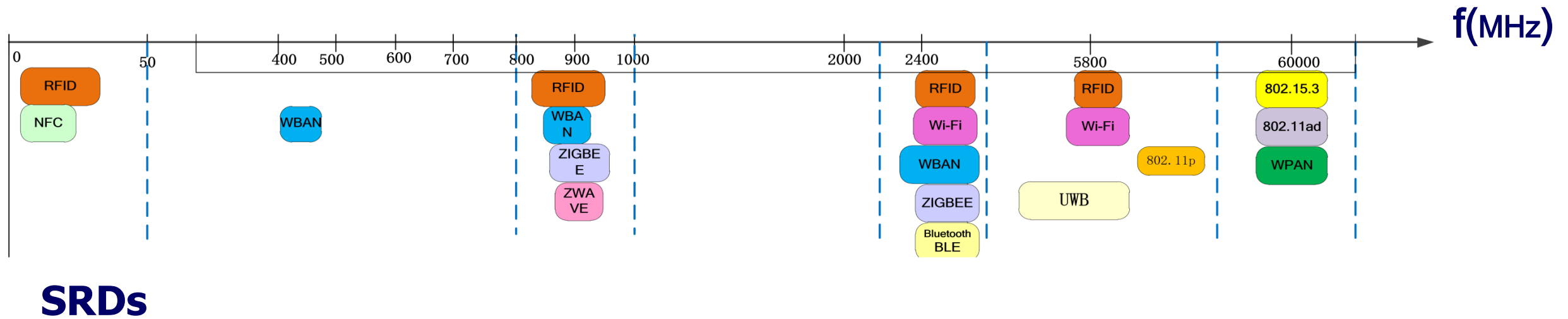


SRDs use in many countries & regions



- **Report ITU-R SM.2153 - Technical and operating parameters and spectrum use for SRDs**
(replaces former Rec. ITU-R SM.1538)
 - Provides SRD definitions and short description of different applications using SRDs: **Telecommand, Telemetry, Voice and video, For detecting avalanche victims, RLANs, Railway applications, Road transport and traffic telematics, For detecting movement and equipment for alert, Alarms, Model control, Inductive applications (e.g. car access), Radio microphones, RFID, ULP-active medical implant, Wireless audio applications (e.g. cordless loudspeakers), RF (radar) level gauges,** among many others not listed
 - Indicates typical technical characteristics/limitations: **Common frequency ranges; Required radiated power or magnetic/electric field-strength values to allow satisfactory operation** (for CEPT countries, USA(FCC)/B/CAN, J and KOR, etc.); **Antenna requirements**
 - Explains administrative requirements: **Certification and verification; Licensing requirements; Mutual agreements between countries/regions**
 - **Provides also useful information on national/regional rules**
(incl. technical and operational parameters and spectrum use)
- **Report updated on regular basis!**

Some widely deployed SRD technologies in Sub 6GHz bands



➤ [Rec. ITU-R SM.1896](#)

Frequency ranges for global/regional harmonization of SRDs

○ **ranges appropriate for global harmonization:**

9-148.5 kHz; **3 155-3 400** kHz (low power wireless hearing aids, RR No. 1.116);

and following ISM bands listed in RR Nos. 1.138 and 1.150:

6 765-6 795 kHz; **13 553-13 567** kHz; **26 957-27 283** kHz; **40.66-40.7** MHz;

2 400-2 500 MHz (2 483.5 MHz in some countries); **5 725-5 875** MHz;

24.00-24.25 GHz; **61.0-61.5** GHz; **122-123** GHz; **244-246** GHz

○ **ranges appropriate for regional* harmonization:**

(* bands entirely or just partly available in a Region or only in some countries)

7 400-8 800 kHz; **312-315** MHz; **433.050-434.790** MHz;

862-875 MHz (not in Reg. 2); **875-960** MHz

- PDN Rec. ITU-R SM.[SRD–CATEGORIES] –
Global harmonization of SRD categories
 - **to facilitate the global harmonization process**
(e.g. global identification of freq. ranges)
 - **benefits for end users, manufacturers and regulators** (e.g. economies of scale)
- WD2PDN RECOMMENDATION ITU-R SM.[G.WNB-FREQ]
Narrow-band wireless home networking transceivers Specification of spectrum related components
- **Contributing to studies in response to Res. 958 (WRC-15) Annex Item 3:** to support the implementation of narrowband & broadband machine-type communication infrastructures (WP1B as a contributing group)



Thank you!

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Short Range (radio or radiocommunication) Devices (SRDs)

Report ITU-R SM.2153-5 (2015) referred to in Rec. ITU-R SM.1896-0 (2011)

- For the purpose of this Report the term **SRD** is intended to **cover radio transmitters which provide either unidirectional or bidirectional communication and which have low capability of causing interference to other radio equipment**
- **SRDs are permitted to operate on a non-interference and non-protected basis**
- **SRDs use either integral, dedicated or external antennas and all types of modulation and channel pattern can be permitted, subject to relevant standards or national regulations**
- **Simple licensing requirements may be applied, e.g. general licences or general frequency assignments or even licence exemption, however, information about the regulatory requirements for placing short-range radiocommunication equipment on the market and for their use should be obtained by contacting individual national administrations**

Report ITU-R SM.2255-0 (2012)

RFID: Radio-Frequency Identification

RFID tag: any transponder plus the information storage mechanism attached to the object

RFID system:

- an automatic identification and data capture system comprising one or more RFID reader (interrogators) and one or more RFID tags (transponders) in which data transfer is achieved by means of suitably modulated inductive or radiating electromagnetic energy.
- A tag is attached to the item to be identified, and a transmitter/receiver unit interrogates the tag and receives identification data back from the tag.

RFID devices are considered:

active if self-powered – i.e. contain their own batteries and are always on, and passive if receive power from an external source – i.e. radio frequencies transmitted by readers

Recommendation ITU-R SM.1755-0 (2006)

Ultra-wideband technology (UWB):

- Technology for short-range radiocommunication, involving the intentional generation and transmission of radio-frequency energy that spreads over a very large frequency range, which may overlap several frequency bands allocated to radiocommunication services
- **Devices using UWB technology typically have intentional radiation from the antenna with either a –10 dB bandwidth of at least 500 MHz or a –10 dB fractional bandwidth greater than 0.2**
(see calculation formulae in Rec. ITU-R SM.1755)

Notes: Administrations authorizing/licensing use of UWB devices:

- **should ensure this use on a non-interference/non-protection basis with respect to radiocommunication services (RS) operating in accordance with provisions of the Radio Regulations;**
- **should take immediate action(s) to eliminate interference to RS**



Terms and Definitions - ISM



Definition as per **No. 1.15** of Radio Regulations (RR):

Industrial, Scientific and Medical (ISM) applications (of radio energy)

Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications.

Bands designated for ISM are listed in RR Nos. **5.138 and **5.150****

as well as in No. **5.280 for some European countries**

RR No. **15.13: mandatory provisions to ADMS to ensure that radiation from ISM equipment is minimal in ISM bands and is at a level that does not cause harmful interference outside ISM bands to a radiocommunication service and, in particular, to a radionavigation or any other safety service operating in accordance with RR provisions.**

(Similar provisions as above for “outside ISM bands exist in **RR No. **15.12**** for electrical apparatus or installations of any kind)

(Administrations should be guided by the latest relevant ITU-R Recommendations)

WRC-12 agenda item 1.22: Examination of the **effect of emissions from SRDs on radiocommunication services**, in accordance with Res. 953 (WRC 07)

- **Report ITU-R SM.2210** (2011): Impact of emissions from SRDs on radiocommunication services (RS)
 - Different approaches can ensure RS protection from SRDs: define SRD emission masks and exclusion, restricted or harmonized bands;
 - **Noting that SRDs are certified and regulated at the national level;**
 - Further developments and studies can be carried within ITU-R and lead to new/revised Rec. & Rep. providing guidance to administrations
- **See CPM Report on WRC-12 agenda item 1.22**
- **WRC-12 outcomes on agenda item 1.22**
 - No need to modify the Radio Regulations, except from SUP Res. 953 (WRC-07)
 - **ITU-R harmonization studies can continue in response to Res. ITU-R 54**



Other SG 1 deliverables related to SRDs



- [Report ITU-R SM.2154](#) – SRD spectrum occupancy measurement techniques
Issues to be considered in the Measurement (based on an example of a 863-870 MHz monitoring campaign): locations, time period, scanning speed, sensitivity, real-time and mobile measurement, detection threshold, antenna, receiving system quality
- [Report ITU-R SM.2179](#) – SRD measurements
Complete the set of ITU-R Recommendations and Reports by documenting the measurement methods available for SRDs in: CEPT, USA (FCC), CAN and IEC/ISO
- [Report ITU-R SM.2255](#) – Technical characteristics, standards and frequency bands of operation for RFID and potential harmonization opportunities
Outlines key standards, operating parameters & freq. bands for deployment of RFIDs in various administrations
Includes information on harmonization possibilities and framework for future work



Other SG 1 deliverables related to UWB



- [Recommendation ITU-R SM.1754](#)
Measurement techniques of UWB transmissions
- [Recommendation ITU-R SM.1755](#)
Characteristics of UWB technology
- [Recommendation ITU-R SM.1757](#)
Impact of devices using UWB technology on systems operating within radiocommunication services
- [Report ITU-R SM.2057](#)
Studies related to the impact of devices using UWB technology on radiocommunication services
- [Recommendation ITU-R SM.1756](#)
Framework for the introduction of devices using UWB technology