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**APT REPORT ON**

**THE FREQUENCY BANDS FOR HARMONIZED USE OF SHORT-RANGE DEVICES (SRDS)**

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**APT report on the frequency bands**

**for harmonized use of short-range devices (SRDs)**

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# Introduction

The APT Wireless Group developed the Report [APT/AWG/REP-07 (Rev.3)](http://www.apt.int/sites/default/files/Upload-files/AWG/APT-AWG-REP-07-R3-APT_Report_on_SRD_operations.docx)  on “APT Survey Report on Operation of Short-Range Devices (SRDs)” that contains information on frequencies and characteristics of the short-range devices (SRDs) of some APT Members with findings of some frequency bands already harmonized among those countries.

Meanwhile, the ITU-R Study Group 1 had developed an ITU-R Recommendation to fulfil the purpose of the Resolution ITU-R 54-1 “studies to achieve harmonization for the short-range devices (SRDs)” that is to study and advise on a mechanism that may ease the use of relevant frequency bands and/or frequency tuning ranges, preferably on a global or regional basis, suitable for SRDs. The Recommendation ITU-R SM.1896 as “Frequency ranges for global or regional harmonization of short-range devices (SRDs)” contains frequency ranges to be used as recommended ranges for SRD applications requiring operation on a global or regional harmonized basis.

In order to achieve ultimate goal of regional harmonization on frequencies of SRDs, during the AWG-10 meeting held in Thailand, March 2011, the Technology WG made the questionnaire on the regulatory status for frequency bands specified in the Preliminary draft New Recommendation ITU-R SM.1896 in APT Region based on the received input contributions ([AWG-10-INP-54](http://www.apt.int/sites/default/files/2011/03/AWG-10-INP-54_KOR-Work_of_harmonization_of_SRD_frequency.doc)) and proceeded as output ([AWG-10-OUT-01](http://www.apt.int/sites/default/files/2011/03/AWG-10-OUT-01Rev.1_TECH_WG_compiled_questionnaires_rev1.doc)).

This Report is based on the feedback and answers from Administrations and contains implementation status and frequency bands for harmonized use of SRDs.

# SRD’s definitions

According to the definition in Report ITU-R SM.2153, SRD devices are intended to cover radio transmitters which provide either unidirectional or bidirectional communication and which have low capability of causing interference to other radio equipment. Such devices are permitted to operate on a non-interference and non-protected basis.

SRDs use either integral, dedicated or external antennas and all type of modulation and channel pattern can be permitted subject to relevant standards or national regulations.

As there is an increasing demand for and use of SRDs for a wide variety of applications throughout the world, many different applications provided by these devices, such as, telecommand, telemetry, voice and video, detecting system, broadband radio local area networks, railway applications, road transport and traffic telematics, alarms, model control, inductive applications, radio microphones, RFID systems, ultra-low power active medical implant, RF level gauges, etc.

# Implementation Status of SRDs operating in certain bands

Table 1 below summarizes commonalities and differences of each APT member for SRD implementation in certain bands. In order to operate SRDs on a regional harmonized basis, the frequency bands as specified in table 1 should be considered, as appropriate.

Some administrations in table 1 are required to update their status by the competent AWG meetings. Detailed regulatory status of SRDs operation bands among APT members are found in Annex 1.

x 1.

TABLE 1

Implementation status for SRDs in Asia-Pacific region

| **Frequency band** | **Remarks** 　 | **AFG** | **AUS** | **BGD** | **BTN** | **BRU** | **CTN** | **CHN** | **FJI** | **HKC** | **IND** | **INS** | **IRN** | **J** | **KOR** | **DPR** | **LAO** | **MLA** | **MLD** | **MYN** | **FSM** | **Macao** | **BRM** | **NRU** | **NPL** | **NZL** | **PAK** | **PAL** | **PHL** | **PNG** | **RMI** | **SMO** | **SNG** | **SLM** | **CLN** | **THA** | **TON** | **VUT** | **VTN** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9-148.5 kHz | 　 |  | **Y** |  | **P** | **P** | **Y** | **Y** |  | **Y** |  |  | **Y** | **N** | **Y** |  | **Y** | **Y** |  | **N** |  | **Y** |  |  |  | **Y** |  |  | **Y** | **N** | **N** |  | **Y** |  |  | **P** |  |  | **P** |
| 148.5-315 kHz | 　 |  | **N** |  | **P** | **N** | **U** | **P** |  | **P** |  |  | **N** | **N** | **P** |  | **N** | **Y** |  | **N** |  | **N** |  |  |  | **P** |  |  | **Y** | **U** | **N** |  | **N** |  |  | **N** |  |  | **N** |
| 3 155-3 400 kHz | RR No.5.116 |  | **Y** |  | **P** | **Y** | **U** | **Y** |  | **N** |  |  | **Y** |  **P** | **Y** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **N** |  |  | **Y** | **U** | **N** |  | **N** |  |  | **N** |  |  | **N** |
| 6 765-6 795 kHz | RR No.5.138 |  | **N** |  | **N** | **Y** | **Y** | **Y** |  | **N** |  |  | **Y** | **Y** | **U** |  | **U** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **N** |  |  | **N** |  |  | **N** |
| 7 400-8 800 kHz | 　 |  | **Y** |  | **N** | **Y** | **Y** | **P** |  | **N** |  |  | **Y** | **N** | **P** |  | **N** | **U** |  | **N** |  | **N** |  |  |  | **N** |  |  | **Y** | **U** | **N** |  | **N** |  |  | **N** |  |  | **N** |
| 13.553-13.567 MHz | RR No.5.150 |  | **Y** |  | **Y** | **Y** | **Y** | **Y** |  | **Y** |  |  | **Y** | **Y** | **Y** |  | **Y** | **Y** |  | **Y** |  | **Y** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **Y** |  |  | **Y** |  |  | **Y** |
| 26.957-27.283 MHz | RR No.5.150 |  | **Y** |  | **P** | **Y** | **Y** | **Y** |  | **P** |  |  | **Y** | **Y** | **P** |  | **Y** | **Y** |  | **Y** |  | **Y** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **Y** |  |  | **P** |  |  | **Y** |
| 40.66-40.7 MHz | RR No.5.150 |  | **Y** |  | **P** | **Y** | **Y** | **Y** |  | **Y** |  |  | **Y** | **Y** | **Y** |  | **Y** | **Y** |  | **Y** |  | **Y** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **Y** |  |  | **P** |  |  | **Y** |
| 312-315 MHz | 　 |  | **Y** |  | **N** | **Y** | **N** | **P** |  | **P** |  |  | **N** | **Y** | **N** |  | **N** | **Y** |  | **Y** |  | **N** |  |  |  | **Y** |  |  | **P** | **U** | **N** |  | **Y** |  |  | **Y** |  |  | **Y** |
| 433.05-434.79 MHz | 　 |  | **Y** |  | **Y** | **Y** | **Y** | **Y** |  | **Y** |  |  | **Y** | **P** | **P** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **[P]** |  | **Y** |  |  | **Y** |  |  | **Y** |
| 401-402 MHz | 　 |  | **Y** |  | **N** | **N** | **U** | **N** |  | **N** |  |  | **N** | **N** | **U** |  | **Y** | **U** |  | **N** |  | **N** |  |  |  | **N** |  |  | **N** | **U** | **N** |  | **Y** |  |  | **Y** |  |  | **Y** |
| 402-405 MHz | 　 |  | **Y** |  | **N** | **N** | **U** | **Y** |  | **Y** |  |  | **Y** | **Y** | **Y** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **N** | **U** | **N** |  | **N** |  |  | **Y** |  |  | **Y** |
| 405-406 MHz | 　 |  | **Y** |  | **N** | **N** | **U** | **N** |  | **N** |  |  | **N** | **N** | **U** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **N** | **U** | **N** |  | **N** |  |  | **Y** |  |  | **Y** |
| 862-875 MHz | 　 |  | **N** |  | **P** | **P** | **P** | **P** |  | **P** |  |  | **P** | **N** | **N** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **P** |  |  | **P** | **U** | **U** |  | **P** |  |  | **N** |  |  | **P** |
| 875-960 MHz | 　 |  | **N** |  | **N** | **P** | **P** | **P** |  | **N** |  |  | **N** | **P** | **P** |  | **N** | **Y** |  | **N** |  | **N** |  |  |  | **P** |  |  | **N** | **N** | **[P]** |  | **P** |  |  | **P** |  |  | **P** |
| 2 400-2 483.5 MHz | RR No.5.150 |  | **Y** |  | **P** | **Y** | **Y** | **Y** |  | **Y** |  |  | **Y** | **Y** | **Y** |  | **Y** | **Y** |  | **Y** |  | **Y** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **Y** |  |  | **Y** |  |  | **Y** |
| 5 150-5 350 MHz |  |  | **Y** |  | **P** | **P** | **Y** | **N** |  | **Y** |  |  | **Y** | **Y** | **Y** |  | **Y** | **N** |  | **Y** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **[P]** |  | **Y** |  |  | **Y** |  |  | **Y** |
| 5 470-5 725 MHz | 　 |  | **Y** |  | **N** | **P** | **Y** | **N** |  | **Y** |  |  | **Y** | **Y** | **P** |  | **Y** | **N** |  | **Y** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **[P]** |  | **Y** |  |  | **Y** |  |  | **Y** |
| 5 725-5 875 MHz | RR No.5.150 |  | **Y** |  | **P** | **Y** | **Y** | **Y** |  | **P** |  |  | **Y** | **Y** | **P** |  | **Y** | **Y** |  | **Y** |  | **P** |  |  |  | **Y** |  |  | **Y** | **U** | **[P]** |  | **Y** |  |  |  **P** |  |  | **P** |
| 24.00-24.25 GHz | RR No.5.150 |  | **Y** |  | **N** | **Y** | **Y** | **Y** |  | **N** |  |  | **Y** | **Y** | **P** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **[P]** |  | **Y** |  |  | **P** |  |  | **Y** |
| 61.0-61.5 GHz | RR No.5.138 |  | **Y** |  | **N** | **N** | **Y** | **N** |  | **N** |  |  | **Y** | **Y** | **Y** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **Y** |  |  | **U** |  |  | **N** |
| 76-77 GHz | 　 |  | **Y** |  | **N** | **Y** | **Y** | **Y** |  | **Y** |  |  | **Y** | **Y** | **Y** |  | **N** | **Y** |  | **Y** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **Y** |  |  | **Y** |  |  | **N** |
| 122-123 GHz | RR No.5.138 |  | **N** |  | **N** | **U** | **Y** | **N** |  | **N** |  |  | **Y** | **Y** | **U** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **N** |  |  | **N** |  |  | **N** |
| 244-246 GHz | RR No.5.138 |  | **N** |  | **N** | **U** | **Y** | **N** |  | **N** |  |  | **Y** | **Y** | **U** |  | **Y** | **Y** |  | **N** |  | **N** |  |  |  | **Y** |  |  | **Y** | **U** | **N** |  | **N** |  |  | **N** |  |  | **N** |

Y: Yes, implemented already P: Partially implemented U: Under implementation N: Not [available or undecided]

# Benefits of global/regional harmonization

Globally/regionally harmonized use for SRDs provides a number of benefits for SRD end users, manufacturers and regulators, such as:

– greater user confidence in the reliable functioning of devices when travelling abroad;

– a broader manufacturing base and increased volume of equipment (globalization of markets) resulting in economies of scale and expanded equipment availability;

– improved spectrum utilization;

– potential reduction in the influx of illegal or non-conforming SRDs into the marketplace of some countries

# Frequency band/technical differences

To facilitate regional harmonization for SRDs, the followings should be harmonized:

– Frequency bands and typical applications;

– RF output power levels.

As can be seen from the summary table above (Table 1), there are differences in implementation status, power limits and other technical parameters for SRDs in Asia-Pacific region. However, regionally harmonized frequency bands and technical rules for SRDs would be desirable. It is also noted that many countries have regulated some of SRD frequency bands in a common manner with similar levels of allowed field strength.

# Frequency bands for harmonized use of SRDs

There are certain frequency bands which are used for SRDs in all regions. Recommendation ITU-R SM.1896 recommends the frequency ranges 9-148.5 kHz, 3155-3400 kHz, 6765-6795 kHz, 13.553-13.567 MHz, 26.957-27.283 MHz, 40.66-40.7 MHz, 2400-2500 MHz, 5725-5875 MHz, 24.00-24.25 GHz, 61.0-61.5 GHz, 122-123 GHz, and 244-246 GHz for globalharmonization of SRDs. Most of these frequency bands are industrial, scientific and medical (ISM) bands and SRDs are allowed to be operated within these bands under the condition accepting harmful interference which may be caused by these applications (see RR Nos 5.138 and 5.150).

In Asia-pacific region, the followings are possible frequency bands for harmonization of SRD taking into account implementation status in table 1 and usage in APT Recommendations and Reports.

TABLE 2

Possible frequency bands for harmonization of SRD within Asia-Pacific region

| Frequency band | Typical Application | Remarks |
| --- | --- | --- |
| 402-405 MHz | Medical Implant | [APT REC-05](http://www.apt.int/sites/default/files/APT-AWF-REC-05_Rec_on_Low_Power_Heart_Transmiter.pdf) |
| 433.05-434.79 MHz | RFID | [APT REP-07](http://www.apt.int/sites/default/files/Upload-files/AWG/APT-AWF-REP-07Rev.2_APT_Report_on_SRDs.doc) |
| 862-960 MHz | RFID | [APT REC-03](http://www.apt.int/sites/default/files/APT-AWF-REC-03_Final_RFID_Recommendation_with_3rd_updates_to_table.doc) |
| 5150-5350 MHz | WLAN | [APT REC-06](http://www.apt.int/sites/default/files/APT-AWF-REC-06_Rec_on_5GHz_LAN_onboard.pdf) |
| 5470-5725 MHz | WLAN |  |
| 76-77 GHz | Vehicle Radar | [APT REP-07](http://www.apt.int/sites/default/files/Upload-files/AWG/APT-AWF-REP-07Rev.2_APT_Report_on_SRDs.doc) |

If required, further compatibility studies should be considered within AWG to assess whether these bands could be harmonized regionally.

This Table 2 can be used as a framework for the future work to achieve harmonization of frequency bands and technical rules for SRDs.

Annex 1
The Detailed Implementation Status for SRDs in Asia-Pacific Region

The detailed regulatory status for SRDs of APT members from Table 1 is as bellows: Australia, Republic of Korea, Marshall Islands, Viet Nam, Papua New Guinea, Macao, Singapore, Sri Lanka, Myanmar, Laos, Malaysia, Brunei Darussalam, China, Japan and Thailand.

[AWG-11-INP-22](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-22_AUS3_1.doc) from Australia (AUS)

[AWG-11-INP-28](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-28_KOR-response_for_questionnaires_SM_SRD_0.doc) from the Republic of Korea (KOR)

[AWG-11-INP-85](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-85_Marshall_Island_Response.pdf) from Marshall Islands (RMI)

[AWG-11-INP-86](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-86_VIET_NAM_The_AWG_QUESTIONNAIRE_final.doc) from Viet Nam (VTN)

[AWG-11-INP-87](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-87_Survey_Questionnaire_PNG.doc) from Papua New Guinea (PNG)

[AWG-11-INP-88](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-88_Survey_Questionnaire_Circular_MAC_Final.doc) from Macao, [China]

[AWG-11-INP-89](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-89_Singapore.pdf) from Singapore (SNG)

[AWG-11-INP-90](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-90_Survey_Questionnaire_Circular.doc) from Sri Lanka (CLN)

[AWG-11-INP-97](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-97_Response_Myanmar.pdf) from Myanmar (MYN)

[AWG-11-INP-98](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-98_Lao_Response_on_Questionnaire_on_SRDS_10_Aug_2011_1.doc) from Laos (LAO)

[AWG-11-INP-99](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-99_Response_Malaysia_0.doc) from Malaysia (MLA)

[AWG-11-INP-100](http://www.apt.int/sites/default/files/2011/09/AWG-11-INP-100_Brunei_Questionnaire_ITU-R_SM._SRD_v2.doc) from Brunei Darussalam (BRU)

[AWG-12/INP-45](http://www.apt.int/sites/default/files/2012/04/AWG-12-INP-45_REPONSE_TO_THE_QUESTIONNAIRE_FOR_THE_REGULATORY_STATUS_of_SRD-BY_CHN.doc) from China

[AWG-12/INP-94](http://www.apt.int/sites/default/files/2012/04/AWG-12-INP-94_JPN-3_Response.doc) from Japan

[AWG-13/INP-105](http://www.apt.int/sites/default/files/2012/09/AWG-13-INP-105_SRD_application_THA.doc) from Thailand

[AWG-17/INP-54](http://www.apt.int/sites/default/files/2014/09/AWG-17-INP-54-Rep_7_35_SRD_-_WG_Technology-R1.docx) from Austria(AUS), Bhutan(BTN), People’s Republic of China(CHN), Islamic Republic of Iran(IRN), New Zealand(NZL), Singapore(SNG), Thailand(THA) and Viet Nam(VTN)

[AWG-18/INP-15](http://www.apt.int/sites/default/files/2015/02/AWG-18-INP-15-HKG-APT_Report_35.docx)from Hong Kong, China (HKC)

[AWG-18/INP-47](http://www.apt.int/sites/default/files/2015/03/AWG-18-INP-47-PHL-Proposed__Modification_to___APT_AWGREP-35.docx)from Philippines (PHL)

Annex 2

The Detailed Technical Regulation for SRDs in Asia-Pacific Region

[APT/AWG/REP-07 (Rev.3)](http://www.apt.int/sites/default/files/Upload-files/AWG/APT-AWG-REP-07-R3-APT_Report_on_SRD_operations.docx) provide more detailed technical regulations for SRDs from Bhutan, Brunei Darussalam, China, Hong Kong China, Iran (Islamic Rep. of), Japan, Korea (Rep. of), Malaysia, Philippines, New Zealand, Singapore, Thailand and Vietnam.

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