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**APT SURVEY REPORT ON**

**300 – 400 KHZ, 1610 – 1950 KHZ AND 1950 – 2150 KHZ FOR NON-BEAM WPT FOR MOBILE AND PORTABLE DEVICES**

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**The 29th Meeting of APT Wireless Group**

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**No. APT/AWG/REP-120**

**aPt Survey Report oN**

 **300 – 400 khz, 1610 - 1950 KHz and 1950 – 2150 kHz FOR NON-BEAM WPT FOR MOBILE and Portable DEVICES**

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# Introduction

Wireless Power Transmission (WPT) is a technology that allows to transmit electrical energy from a power source to an electrical load without an interconnection. Wireless power transmission has proven useful especially where connecting devices with wires is inconvenient or sometimes dangerous.

At the AWG-26th meeting, a recommendation for 100 – 148.5 kHz band using inductive technology was approved in the plenary meeting, on top of the previously approved 6765 – 6795 kHz frequency band using magnetic resonant technology.

The WPT industry continues to be in a period of fast development and growth. The market demand for WPT continues to increase rapidly and more and more consumer electronic products are covered. Broader availability of WPT frequencies will play an important role in the success of innovation and the improvement of consumer experience.

With respect to the current WPT inductive technology market, additional frequencies other than 100-148.5kHz are being used to pursue a higher efficiency and faster charging speed for the mobile and portable non-beam WPT devices. Therefore, it is important to start studying these other frequencies, such as frequency ranges 300-400 kHz, 1610 – 1950 kHz and 1950 – 2150 kHz.

Under these circumstances, the APT Wireless Group (AWG) approved the [Questionnaire on non-beam WPT in 300-400 kHz, 1610-1950 kHz and 1950-2150 kHz](https://www.apt.int/sites/default/files/Upload-files/Circulars/Questionnaire_on_non-beam_WPT_in_300_-_400_KHz_1610_-_1950_KHz_and_1950_-2150_KHz.docx)[1] in AWG-27 meeting, and circulated it to the administrations thereafter. A revision questionnaire [2] with slight modifications was circulated again after AWG-28 meeting to facilitate administrations’ responses. The questionnaire is intended to gather the information on the allowance of the listed frequency ranges for non-beam WPT at the moment. It’s also to collect incumbent radio system information to facilitate future impact study if any administrations have a concern to these bands.

This Survey Report is developed based on the responses to the questionnaire from the APT members. The Report is helpful to understand the regulatory status of WPT in the Asia-Pacific region and can be a guide for further development of APT Recommendation(s)/Report(s).

The responses are summarized below.

# Respondents

14 APT Members responded to the questionnaire. The information to the corresponding input documents is consolidated in below Table 2.1.

**Table 2.1 Received Survey responses**

|  |  |  |
| --- | --- | --- |
| **No.** | **Source** | **Input document** |
| 1 | Australia | [AWG-28/INP-47](https://www.apt.int/sites/default/files/2021/08/AWG-28-INP-47_AUS_2_Response_to_questionnaire_on_non-beam_WPT_in_300__400_KHz_1610__1950_KHz_and_1950_-2150_KHz.docx) |
| 2 | Cambodia | [AWG-29/INP-90](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-90_Cambodia-Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-_2150_kHz.docx) |
| 3 | China (People’s Republic of) | [AWG-29/INP-60(Rev.1)](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-60Rev.1_China-Response_to_revised_questionnaire_on_Non_Beam_WPT.docx) |
| 4 | Indonesia | [AWG-29/INP-44](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-44_Republic_of_Indonesia-Response_to_questionnaire_on_non_beam_WPT.docx) |
| 5 | Islamic Republic of Iran | [AWG-29/INP-08](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-08_Iran-Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.docx) |
| 6 | Japan | [AWG-28/INP-26](https://www.apt.int/sites/default/files/2021/08/AWG-28-INP-26_J-11.docx) |
| 7 | Korea (Republic of) | [AWG-28/INP-12](https://www.apt.int/sites/default/files/2021/08/AWG-28-INP-12_KOR_REPONSE_TO_APT_QUESTIONNAIRE_ON_NON-BEAM_WPT_IN_300_-_400kHz_1610_-_1950_kHz_AND_1950_-2150kHz.docx) |
| 8 | Malaysia | [AWG-29/INP-07(Rev.1)](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-07Rev.1_Malaysia-Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.docx) |
| 9 | Mongolia | [AWG-29/INP-14](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-14_Mongolia-Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.docx) |
| 10 | Myanmar | [AWG-29/INP-10](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-10_Myanmar-Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.pdf) |
| 11 | Philippines | [AWG-29/INP-13](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-13_Philippines_Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.pdf) |
| 12 | Singapore | [AWG-29/INP-15](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-15_Singapore-Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.pdf) |
| 13 | Thailand | [AWG-29/INP-18](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-18_Thailand-Response_to_revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.docx) |
| 14 | Viet Nam (Socialist Republic of) | [AWG-29/INP-84](https://www.apt.int/sites/default/files/2022/03/AWG-29-INP-84_VTN-06_Revised_questionnaire_on_non-beam_WPT_in_300_-_400_kHz_1610_-_1950_kHz_and_1950_-2150_kHz.docx) |

# Summary of Questionnaire Responses

This section summarizes the responses from Australia, Cambodia, China (People’s Republic of), Indonesia, Islamic Republic of Iran, Japan, Korea (Republic of), Malaysia, Mongolia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam (Socialist Republic of) to the Questionnaire. A full copy of the questionnaire is included in Appendix 1.

# 3.1 Openness for WPT in 300 – 400 kHz, 1610 – 1950 kHz and 1950 – 2150 kHz

Question #1 is aimed to collect the WPT status in the APAC region, specifically, whether non-beam WPT devices can operate in the above-mentioned frequency ranges or not.

**Q1:**

Can non-beam WPT mobile and portable devices operate in the below frequency ranges in your country?

300 – 400 kHz:

[ ] Yes

[ ] Yes, partial of it \_\_\_\_\_\_\_\_\_\_ (please specify the range)

[ ] Yes, plan to use in future

[ ] No, \_\_\_\_\_\_\_\_\_\_ (please specify the reason)

1610 – 1950 kHz:

[ ] Yes

[ ] Yes, partial of it \_\_\_\_\_\_\_\_\_\_ (please specify the range)

[ ] Yes, plan to use in future

[ ] No, \_\_\_\_\_\_\_\_\_\_ (please specify the reason)

1950 – 2150 kHz:

[ ] Yes

[ ] Yes, partial of it \_\_\_\_\_\_\_\_\_\_ (please specify the range)

[ ] Yes, plan to use in future

[ ] No, \_\_\_\_\_\_\_\_\_\_ (please specify the reason)

If it’s not appropriate to answer Question 1 by checking the check boxes, please explain the situation in your country below.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A summary table (Table 3.1.1) has been made based on the inputs from above mentioned countries. The detailed comments from administration are listed under the table.

**Table 3.1.1 Q1 Response Summary**

|  |
| --- |
| **Openness for non-beam WPT mobile and portable devices** |
| **Country/Region** | **300 – 400 kHz** | **1610 – 1950 kHz** | **1950 – 2150 kHz** |
| Australia | Yes | Yes | Yes |
| Cambodia | Yes | Yes | Yes, plan to use in future |
| China (People’s Republic of) | No,The Interim Regulations (draft for comments) do not include the frequency band mentioned above. |
| Indonesia | No | No | No |
| Islamic Republic of Iran | Yes | Yes | Yes |
| Japan | <50W, do not require installation permission |
| Korea (Republic of) | No | No | No |
| Malaysia | Yes | Yes | Yes |
| Mongolia | Yes | Yes | Yes |
| Myanmar | Yes | Yes | Yes |
| Philippines | Yes | Yes | Yes |
| Singapore | Yes | Yes | Yes |
| Thailand | Yes | Yes | Yes |
| Viet Nam (Socialist Republic of) | Yes, 326.5-340 kHz; 353-373.5 kHz | Yes, 1640-1800 kHz | No,there are no demands from industries and/or general users yet. |

Comments from administrations:

**China (People’s Republic of):**

The Interim Regulations (draft for comments) do not include the frequency band mentioned above.

**Indonesia:**

This frequency range is allocated for other radio communication service.

**Japan:**

 The situation in Japan is not so simple as to check the above boxes and it is explained as follows:

In Japan there is a regulatory system to grant an individual installation permission to the application to use any frequencies for what is called ‘Equipment Utilizing High Frequency Current’, which may include non-beam WPT mobile and portable devices, if the equipment complies with the technical requirements stipulated in the Ministerial Ordinances of the MIC and certified that the frequency use by the equipment does not cause interferences to other communications. However, as far as checked, there have been no permission granted for the above-mentioned frequency ranges.

The individual installation permission can be exempted if such equipment is listed for what is called ‘Type Specification’ for the ‘Equipment Utilizing High Frequency Current’, but the current list is not applicable to non-beam WPT mobile and portable devices using the above-mentioned frequency ranges.

On the other hand, non-beam WPT mobile and portable devices whose high frequency output power is 50 W or less do not require the above-mentioned individual installation permission at any frequency ranges including the above three rages. However, if the radio wave or high frequency current incidentally generated by such a device causes continuous and serious damages to the function of radio equipment for radiocommunication services, the Minister of MIC may order the owner of the device to take necessary measures for removing the damages. Since possibilities of such damages are not clear, such devices are not put into the market in Japan.

**Myanmar:**

Posts and Telecommunications Department (PTD) issued Technical Specification on

SRD in 2016. In this specification is on non-protection and non-interference basis of SRD to the licensed system.

**Thailand:**

Non-beam WPT mobile and portable devices can operate as an electrical apparatus. The devices shall not cause harmful interference to radio communication services.

# 3.2 Regulation method

This question is to understand the method to regulate non-beam WPT mobile and portable devices in APAC countries.

A summary table 3.2.1 has been developed based on the inputs from above mentioned countries.

**Q2:**

What kind of category is non-beam WPT mobile and portable device regulated as in your country?

A. SRD

B. WPT

C. ISM

D. Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (please specify)

**Table 3.2.1 Q2 Response Summary**

|  |
| --- |
| **Regulation method for non-beam WPT mobile and portable device** |
| **Country/Region** | **SRD** | **WPT** | **ISM** | **Others** |
| Australia | — | — | — | As non-beam WPT devices are not deemed radiocommunications transmitters, they are regulated under EMC arrangements. |
| Cambodia | Yes | — | — | — |
| China (People’s Republic of) | — | — | — | radiate radio waves but not belong to any kind of radio device |
| Indonesia | Yes | — | — | — |
| Islamic Republic of Iran | Yes | — | — | — |
| Japan | — | — | — | Equipment Utilizing High Frequency Current |
| Korea (Republic of) | — | Yes | Yes | — |
| Malaysia | Yes | — | — | Inductive Applications |
| Mongolia | Yes | — | — | — |
| Myanmar | Yes | — | — | — |
| Philippines | Yes | — | — | — |
| Singapore | Yes | — | — | — |
| Thailand | — | — | — | Electrical Apparatus |
| Viet Nam (Socialist Republic of) | Yes | Yes | — | — |

# 3.3. Regulations for non-beam WPT

This question is to understand the regulation or standard name in APAC countries to regulate non-beam WPT mobile and portable devices.

Inputs from administrations are summarized in Table 3.3, while some countries provided detailed comments to this question, which are listed under the table 3.3.

**Q3:**

What is the regulation or standard applicable to non-beam WPT for mobile and portable devices in your country for 300 – 400 kHz, 1610 - 1950 and 1950 – 2150 kHz?

**Table 3.3.1 Q3 Response Summary**

|  |
| --- |
| **Regulation for non-beam WPT mobile and portable devices** |
| **Country/Region** | **300 – 400 kHz** | **1610 – 1950 kHz** | **1950 – 2150 kHz** |
| Australia | CISPR 11 or EN55011 or AS/NZS CISPR 11. |
| Cambodia | Drafting |
| China (People’s Republic of) | No regulations or standards applicable. |
| Indonesia | No regulations or standards applicable. |
| Islamic Republic of Iran | -CLASS LICENSE Technical Specifications and Operational Conditions of Short-Range Transmitting Devices (SRDs) NO. CRA-DEC9000-01.-ETSI standard No. EN 300 330 |
| Japan | -Radio Act (Articles 100 and 101)-Ordinance for Enforcement of the Radio Act (Articles 45, 46 and 46-2)-Regulations for Radio Equipment (Articles 65 and 66) |
| Korea (Republic of) | No regulations or standards applicable. |
| Malaysia | -Regulated under unlicensed frequency bands (Class Assignment for Inductive Applications)-Technical Code for the Specification for Short Range Devices – Specifications (MCMC MTSFB TC T007:2020) |
| Mongolia | The SRD Radio frequency allocation and regulation document in Mongolia |
| Myanmar | -EN 300 224-1 (150-5000 kHz) -EN 300 330-1 (150-5000 kHz)  |
| Philippines | Memorandum Circular No. 001-04-2021, 02-02-2015 and 03-05-2007  |
| Singapore | -EN 300 330-EN 303 417  |
| Thailand | Related Electromagnetic Compatibility (EMC) standards |
| Viet Nam (Socialist Republic of) | Un-licensed radio equipment |

Comments from administrations:

**China (People’s Republic of):**

In China, the Interim Regulations about WPT under discussion didn't include all above frequency bands. Meanwhile, the China compulsory standard for WPT equipment is under study.

**Indonesia:**

Those frequency range are not allowed to be used for WPT.

**Korea (Republic of):**

Republic of Korea doesn’t have regulations or standards applicable to WPT for the proposed frequency bands.

**Thailand:**

Non-beam WPT mobile and portable device is treated as an electrical apparatus and shall conform to related Electromagnetic Compatibility (EMC) standards. No other specific regulations are in force.

# 3.4 Incumbent radio systems to be investigated

This is to collect information on incumbent radios systems in 300 – 400 kHz, 1610 – 1950 kHz and 1950 -2150 kHz.

The incumbent radios systems are summarized in 3 separate tables, concerning the different frequency ranges.

* Table 3.4.1: Incumbent radio systems in 300 – 400 kHz.
* Table 3.4.2: Incumbent radio systems in 1610 – 1950 kHz.
* Table 3.4.3: Incumbent radio systems in 1950 – 2150 kHz.

The original responses from administrations with more details are available in Appendix 2.

**Q4:**

What are the incumbent radio systems to be protected from non-beam WPT devices operating in 300 – 400 kHz, 1610 – 1950 kHz and 1950 – 2150 kHz in your country? (Please include the exact ranges of the allocations)

300 – 400 kHz: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1610 – 1950 kHz: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1950 – 2150 kHz: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Table 3.4.1 Incumbent radio systems in 300 – 400 kHz**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Country/Region** | **Aeronautical Radionavigation** | **Maritime Radionavigation** | **Aeronautical mobile** | **Radionavigation** | **Others** |
| Australia | Aeronautical Radionavigation: Non-Directional Beacons285-405 kHz | Maritime Radionavigation: Differential-GPS285-325 kHz | -- | -- | Low powered devices:-Low interference potential devices 325-415 kHz-Ultra-wide band devices300 – 400 kHz |
| Cambodia | N/A |
| China (People’s Republic of) | (No response) |
| Indonesia | Aeronautical Radionavigation | Maritime Radionavigation (radiobeacons) | Aeronautical mobile | -- | -- |
| Islamic Republic of Iran | Aeronautical radio navigation:Non-Directional radio Beacon (NDB) stations | Maritime Radionavigation | -- | -- | -- |
| Japan | Aeronautical Radio Beacon160-405 kHz | -- | -- | -- | -- |
| Korea (Republic of) | Aeronautical service308, 315 and 323 kHzRadiobeacon station300, 310, 313, 319, and 323 kHz | Maritime service308, 315 and 323 kHz | -- | -- | -- |
| Malaysia | -- | -- | -- | Radionavigation service | -- |
| Mongolia | Aeronautical radionavigation283.5-405 kHz | -- | -- | -- | -- |
| Myanmar | (No response) |
| Philippines | Aeronautical radionavigation285-405 kHz | Maritime Radionavigation (radiobeacons)285-325 kHz | -- | -- | -- |
| Singapore | Aeronautical radionavigation300-400 kHz | Maritime Radionavigation (radiobeacons)300-315 kHz | -- | -- | -- |
| Thailand | Aeronautical Radionavigation300-400 kHz | Maritime Radionavigation300-325 kHz | -- | -- | -- |
| Viet Nam (Socialist Republic of) | ARNS | MRNS | -- | -- | -- |

**Table 3.4.2 Incumbent radio systems in 1610 – 1950 kHz**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country/Region** | **Fixed** | **Mobile** | **Land Mobile** | **Radiolocation** | **Radionavigation** | **Amateur** | **Maritime** | **Others** |
| Australia | Fixed Broadcasting services1606.5-1800 kHz1875-1975 kHz | -- | Land Mobile services1606.5-1800 kHz1875-1975 kHz | -- | -- | -- | -- | RFID Transmitters1770 – 2170 kHzRadiodetermination for mining, environmental research and other services 1606.5-1800 kHz1825-1975 kHz |
| Cambodia | N/A |
| China (People’s Republic of) | (No response) |
| Indonesia | Fixed | Mobile (except for aeronautical mobile) | -- | Radiolocation | Radionavigation | Amateur | -- | -- |
| Islamic Republic of Iran | Fixed | Mobile | -- | Radiolocation | Radionavigation | -- | -- | NBDP (Narrow Band Direct Printing),DSC (Digital Selective Calling),Radiotelephone  |
| Japan | -- | -- | -- | -- | -- | Amateur1800 – 1875 kHz1907.5 – 1912.5 kHz | Maritime Radio Communications1825 – 1907.5 kHz1912.5 -2000kHzFishery Radio Buoy1632 – 1800 kHz | Roadside Radio Communication1606.5 – 1632 kHz |
| Korea (Republic of) | -- | -- | -- | -- | -- | Amateur1812.5 kHz | Radio buoy station,1615 - 1725 kHzLoran system1850 and 1950 kHz | -- |
| Malaysia | -- | -- | Land Mobile Services | -- | -- | Amateur | -- | -- |
| Mongolia | Fixed1606.5-1625 kHz1635-1800 kHz1850-1950 kHz | Mobile1606.5-1625 kHz1635-1800 kHz1850-1950 kHz  | -- | Radiolocation1625-1635 kHz1800 – 1810 kHz | -- | Amateur1810-1850 kHz | -- | -- |
| Myanmar | (No response) |
| Philippines | Fixed1606.5-2000 kHz | -Mobile1606.5-1800 kHz-Mobile (except aeronautical mobile)1800-2000 kHz | -- | Radiolocation1606.5-1800 kHz | Radionavigation1606.5-2000 kHz | Amateur1800-2000 kHz | -- | -- |
| Singapore | -- | Mobile1610-1800 kHz | -- | -- | Radionavigation1800-1950 kHz | Amateur1800-1950 kHz | Loran system1850 or 1950 kHz | -- |
| Thailand | Fixed1610-1800 kHz1825-1950 kHz | -- | -- | -- | -- | Amateur1800-1825 kHz | -- | -- |
| Viet Nam (Socialist Republic of) | -- | -- | -- | RLS | RNS | -- | -- | -- |

**Table 3.4.3 Incumbent radio systems in 1950 – 2150 kHz**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country/Region** | **Fixed** | **Mobile** | **Land mobile** | **Radiolocation** | **Radionavigation** | **Amateur** | **Maritime** | **Others** |
| Australia | Fixed point to point communication for radio research, maritime emergency and defence1925-2065 kHz2107-2170 kHz  | Land mobile (ambulatory)1925-2065 1925-2065 kHz2107-2170 kHz  | -- | - | -- | -- | Maritime Mobile services2065 – 2107 kHz | RFID Transmitters,1770 – 2170 kHzAeronautical assigned systems1925-2065 kHz2107-2170 kHzOutpost radio service: stations to provide radio to remote locations1925 – 2065 kHz |
| Cambodia | N/A |
| China (People’s Republic of) | (No response) |
| Indonesia | Fixed | Mobile (except for aeronautical mobile) | -- | Radiolocation | Radionavigation | Amateur | Maritime Mobile | -- |
| Islamic Republic of Iran | Fixed | Mobile | -- | Radiolocation | Radionavigation service | -- | -- | NBDP (Narrow Band Direct Printing),DSC (Digital Selective Calling),Radiotelephone |
| Japan | -- | -- | -- | -- | -- | -- | Maritime Radio Communications1912.5 – 3000 kHz | Aeronautical Radio Communications2000 – 3155 kHz |
| Korea (Republic of) | -- | -- | -- | -- | -- | -- | Radio buoy station2002.5 kHz | Distress, emergency and safety service2089.5-2092.5 kHz |
| Malaysia | -- | -- | Land Mobile Services | -- | -- | Amateur | -- | -- |
| Mongolia | Fixed1950-2150 kHz | Mobile1950-2150 kHz | -- | -- | -- | -- | -- | -- |
| Myanmar | (No response) |
| Philippines | Fixed1800-2065 kHz2107-2170 kHz | -Mobile2000-2065 kHz2107-2170 kHz-Mobile (except aeronautical mobile)1800-2000 kHz | -- | -- | Radionavigation1800-2000 kHz | Amateur1800-2000 kHz | Maritime Mobile2065-2107 kHz | -- |
| Singapore | Fixed Service Communicating2065-2107 kHz | Mobile2107-2150 kHz | Land Mobile2000-2065 kHz | -- | Radionavigation1950-2000 kHz | Amateur1950-2000 kHz | Maritime Mobile2065-2107 kHzLoran system1950 kHz | -- |
| Thailand | Fixed1950-2150 kHz | Mobile2000-2150 kHz | -- | -- | -- | Amateur1950-2000 kHz | -- | -- |
| Viet Nam (Socialist Republic of) | -- | -- | -- | -- | RNS | -- | MMS | -- |

# 3.5 Country contact for WPT standards and questionnaire discussion

This is the response summary for **question#5**.

For questions regarding the WPT frequency, regulations and incumbent radio systems within specific countries, please reach out to below contacts.

**Q5:**

Who is the contact person to discuss the standard and regulation for WPT frequency plan in your country?

**Table 3.5 Q5 Response Summary**

|  |  |
| --- | --- |
| **Country/Region** | **Contact** |
| Australia | info@acma.gov.au |
| Cambodia | -Mr. Vuthy LAYPosition: Official of Radio Frequency Regulation BureauEmail: vuthylay@trc.gov.khContact Number: +855976241038-Mr. Vanak ICHPosition: Official of Radio Frequency Regulation BureauEmail: ich.vannak@trc.gov.kh |
| China (People’s Republic of) | -liqingyang@miit.gov.cn**Person in charge**Radio Administration BureauMinistry of Industry and Information Technology of the People’ Republic of China -duhao@srtc.org.cnThe State Radio\_monitoring\_center Testing Center |
| Indonesia | -Cendrawasih Ardhi Putri (cend001@kominfo.go.id)-Muh Arief Nugroho(muha115@kominfo.go.id) |
| Islamic Republic of Iran | **Name of the institution:**Communications Regulatory Authority of Iran**Name of contact person:**Mr. Alireza Darvishi**Mailing Address:**Communications Regulatory Authority (CRA) Tower, Entrance NO.17, Shariati St., Seyed Khandan Bridge, Tehran, Iran.**Phone:**+98-2189662201**Email Address:** darvishi@cra.ir |
| Japan | gijutsukanri@ml.soumu.go.jp**Person in charge**-MATSUMIYA, Shima（Ms.）Electromagnetic Environment DivisionRadio Department, Telecommunications Bureau Ministry of Internal Affairs and Communications (MIC), Japan |
| Korea (Republic of) | Sungsik KONG skong@korea.krNational Radio Research Agency |
| Malaysia | Ms Siti Hajar Mohd YakopSpectrum Coordination and Policy DepartmentMalaysian Communications and Multimedia Commissionsiti.hajar@mcmc.gov.my |
| Mongolia | -Mrs. Tuyajargal OrgilSpecialist of Type Approval, Spectrum Management Department, Communications Regulatory Commission of Mongolia -Mr.Batkhuu TsedenbaljirOfficer of Radio Frequency Planning and Research, Spectrum Management Department, Communications Regulatory Commission of Mongolia  |
| Myanmar | -U Oakar PhyoAssistant DirectorPosts and Telecommunications Department -U Aung Myint WinAssistant DirectorPosts and Telecommunications Department -U Nyi Nyi LwinStaff OfficerPosts and Telecommunications Department  |
| Philippines | Crispin A. Dinglasan Radio Spectrum Planning Division (RSPD) spectrum@ntc.gov.ph (Philippines) |
| Singapore | spectrum\_admin@imda.gov.sg  |
| Thailand | Mr. Sukrit Chaiharn (sukrit.c@nbtc.go.th)Office of The National Broadcasting and Telecommunications Commission87 Phaholyothin 8, Samsen Nai, Phayathai, Bangkok Thailand 10400+662 670 8888 |
| Viet Nam (Socialist Republic of) | Ms. Vu Thu Hien Head of Spectrum policy and planning DivisionAuthority of Radio Frequency (ARFM)Email: hienvt@rfd.gov.vn |

# Conclusion

This report has summarized the responses from APT countries to the questionnaire on non-beam WPT mobile and portable devices working in frequency ranges of 300 – 400 kHz, 1610 – 1950 kHz and 1950 – 2150 kHz, the regulation statuses, the regulation methods, and the incumbent systems operating in these frequency ranges.

From the consolidated results in Table 3.1.1, a majority of the 14 countries have already allowed non-beam WPT mobile and portable devices to operate in 300 – 400 kHz, 1610 – 1950 kHz and 1950 – 2150 kHz, and one country allows to operate in parts of 300 – 400 kHz and 1610 – 1950 kHz.

The frequency ranges of 300 – 400 kHz and 1610 – 1950 kHz are allowed by more countries compared to 1950 – 2150 kHz.

From Table 3.2.1 and Table 3.3.1 summary, many APT countries regulate WPT devices operating in these frequency ranges using relevant SRD standards. 2 countries use EMC arrangements at the moment.

Table 3.4.1, Table 3.4.2 and Table 3.4.3 consolidated a list of incumbent radio systems operating in 300 – 400 kHz, 1610 – 1950 kHz and 1950 – 2150 kHz separately. An impact study may be further explored against the systems in these tables, in order to figure out the frequency ranges suitable for future APT recommendations.

# Appendix 1

The questions below are specifically related to the operation of non-beam WPT mobile charging devices operating in the 300-400 kHz, 1610 – 1950 kHz and 1950 – 2150 kHz frequency range:

**Questionnaire Part**

**Questions:**

1. Can non-beam WPT mobile and portable devices operate in below frequency ranges in your country?

300 – 400 kHz:

[ ] Yes

[ ] Yes, partial of it \_\_\_\_\_\_\_\_\_\_ (please specify the range)

[ ] Yes, plan to use in future

[ ] No, \_\_\_\_\_\_\_\_\_\_ (please specify the reason)

1610 – 1950 kHz:

[ ] Yes

[ ] Yes, partial of it \_\_\_\_\_\_\_\_\_\_ (please specify the range)

[ ] Yes, plan to use in future

[ ] No, \_\_\_\_\_\_\_\_\_\_ (please specify the reason)

1950 – 2150 kHz:

[ ] Yes

[ ] Yes, partial of it \_\_\_\_\_\_\_\_\_\_ (please specify the range)

[ ] Yes, plan to use in future

[ ] No, \_\_\_\_\_\_\_\_\_\_ (please specify the reason)

If it’s not appropriate to answer Question 1 by checking the check boxes, please explain the situation in your country below.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What kind of category is non-beam WPT mobile and portable device regulated as in your country?

A. SRD

B. WPT

C. ISM

D. Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (please specify)

1. What is the regulation or standard applicable to non-beam WPT for mobile and portable devices in your country for 300 – 400 kHz, 1610 - 1950 and 1950 – 2150 kHz?
2. What are the incumbent radio systems to be protected from non-beam WPT devices operating in 300 – 400 kHz, 1610 – 1950 kHz and 1950 – 2150kHz in your country? (Please include the exact ranges of the allocations)

300 – 400 kHz: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1610 – 1950 kHz: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1950 – 2150 kHz: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Who is the contact person for further discussion of these WPT questions in your country?

# Appendix 2

This is the original responses of Q4 (the incumbent radio systems to be protected from non-beam WPT devices operating in 300 – 400 kHz, 1610 – 1950 kHz and 1950 – 2150kHz).

1. **Australia**
2. **– 400 kHz:**
* Maritime Radionavigation: Differential-GPS in the frequency range 285-325 kHz.
* Aeronautical Radionavigation: Non-Directional Beacons in the frequency range 285-405 kHz.
* Low powered devices:
	+ Low interference potential devices operated in the range 325-415 kHz in accordance with the [Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/Details/F2021C00407)
	+ Ultra-wide band devices operating in 300-400 kHz in accordance with the [Radiocommunications Licence Conditions (Scientific Licence) Determination 2015](https://www.legislation.gov.au/Details/F2018C00076)

**1610 – 1950 kHz:**

* Radiodetermination for mining, environmental research and other services operating in the frequency ranges 1606.5-1800 kHz and 1825–1975 kHz.
* Land mobile services operating in the frequency ranges 1606.5-1800 kHz and 1875–1975 kHz.
* Fixed Broadcasting services operating in the frequency ranges 1606.5-1800 kHz and 1875–1975 kHz.
* RFID Transmitters operating in 1770-2170 kHz in accordance with the [Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/Details/F2021C00407)

**1950 – 2150 kHz:**

* Land mobile (ambulatory) and aeronautical assigned systems operating in the frequency ranges 1925-2065 kHz and 2107–2170 kHz.
* Fixed point to point communication for radio research, maritime emergency and defence, operating in the frequency ranges 1925-2065 kHz and 2107-2170 kHz.
* Maritime Mobile services operating in the frequency range 2065-2107 kHz.
* Outpost radio service: stations to provide radio to remote locations, operating in the frequency range 1925-2065 kHz.
* RFID Transmitters operating in 1770 - 2170 kHz in accordance with the [Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/Details/F2021C00407).
1. **Cambodia**

300 – 400 kHz: N/A

1610 – 1950 kHz: N/A

1. – 2150 kHz: N/A
2. **China (People’s Republic of)**

No response.

1. **Indonesia**

300 – 400 kHz: AERONAUTICAL RADIONAVIGATION, MARITIME RADIONAVIGATION (radiobeacons), aeronautical mobile

1610 – 1950 kHz: FIXED, MOBILE (except for aeronautical mobile), RADIOLOCATION, RADIONAVIGATION, AMATEUR,

1950 – 2150 kHz: FIXED, MOBILE (except for aeronautical mobile), RADIOLOCATION, RADIONAVIGATION, AMATEUR, MARITIME MOBILE

1. **Islamic Republic of Iran**

**300 – 400 kHz:**

**Answer:** *According the table of national frequency allocation of Islamic republic of Iran, the frequency band 300 – 400 kHz has been allocated to the aeronautical radio navigation and maritime radio navigation services on a primary basis,* *and this band has been assigned to the Non-Directional radio Beacon (NDB) stations which have individual license.*

**1610 – 1950 kHz:**

**Answer:** *According the table of national frequency allocation of Islamic republic of Iran, the frequency band 1610 – 1950 kHz has been allocated to the fixed, mobile, radiolocation, radio navigation services on a primary basis,* *and this band has been identified for the usages of NBDP (Narrow Band Direct Printing), DSC (Digital Selective Calling) and Radiotelephone which have individual license.*

**1950 – 2150 kHz:**

**Answer:** *According the table of national frequency allocation of Islamic republic of Iran, the frequency band* 1950 – 2150 kHz *has been allocated to the fixed, mobile and radio navigation services on a primary basis and radiolocation service on a secondary basis. Also this band has been identified for the usages of NBDP (Narrow Band Direct Printing), DSC (Digital Selective Calling) and Radiotelephone which have individual license.*

1. **Japan**
2. – 400 kHz:

Aeronautical Radio Beacon(160-405kHz)

1610 – 1950 kHz:

Roadside Radio Communication(1606.5-1632kHz)

Fishery Radio Buoy (1632 - 1800 kHz)

 Amateur(1800-1875kHz, 1907.5- 1912.5 kHz)

 Maritime Radio Communications(1825-1907.5 kHz, 1912.5-2000kHz)

1950 – 2150 kHz:

Maritime Radio Communications(1912.5-3000kHz)

Aeronautical Radio Communications( 2000-3155kHz))

1. **Korea (Republic of)**

300 – 400 kHz:

**Radiobeacon station: 300, 310, 313, 319 and 323 kHz**

**Maritime and Aeronautical services: 308, 315 and 323 kHz**

1610 – 1950 kHz:

**Radio buoy station: 1615, 1630, 1632.5, 1635, 1640, 1645, 1647.5, 1657.5, 1662.5, 1667.5, 1675, 1677.5, 1680, 1682.5, 1685, 1687.5, 1695, 1697.5 and 1725 kHz**

**Amateur service: 1812.5 kHz**

**Loran system: 1850 and 1950 kHz**

1950 – 2150 kHz:

**Radio buoy station: 2002.5 kHz**

**Distress, emergency and safety service: 2089.5-2092.5 kHz**

1. **Malaysia**

300 – 400 kHz: Radionavigation Service

1610 – 1950 kHz: Land Mobile and Amateur Services

1950 – 2150 kHz: Land Mobile and Amateur Services

1. **Mongolia**

300 – 400 kHz: 283.5-405 kHz (Aeronautical radionavigation)

1610 – 1950 kHz: 1606.5-1625 kHz (Fixed and Mobile)

 1625-1635 kHz (Radiolocation)

 1635-1800 kHz (Fixed and Mobile)

 1800-1810 kHz (Radiolocation)

 1810-1850 kHz (Amateur)

 1850-1950 kHz (Fixed and Mobile)

1950-2150 kHz (Fixed and Mobile)

1. **Myanmar**

No response.

1. **Philippines**

|  |  |
| --- | --- |
| 285 - 325 KHz: | AERONAUTICAL RADIONAVIGATIONMARITIME RADIONAVIGATION (radiobeacons) |
| 325 - 405 KHz: | AERONAUTICAL RADIONAVIGATION |
| 1606.5 - 1800 KHz: | FIXEDMOBILERADIOLOCATIONRADIONAVIGATION |
| 1800 - 2000 KHz: | AMATEURFIXEDMOBILE except aeronautical mobileRADIONAVIGATION |
| 2000 - 2065 KHz: | FIXEDMOBILE |
| 2065 - 2107 KHz: | MARITIME MOBILE |
| 2107 - 2170 kHz: | FIXEDMOBILE |

1. **Singapore**

300 – 400 kHz:

300 – 400 kHz, AERONAUTICAL RADIONAVIGATION
300 – 315 kHz MARITIME RADIONAVIGATION (radiobeacons)

1610 – 1950 kHz:

1610 – 1800kHz, MOBILE
1800 – 1950 kHz, AMATEUR, RADIONAVIGATION, Loran system on 1850 kHz or 1950 kHz

1950 – 2150 kHz:

1950 – 2000 kHz, AMATEUR, RADIONAVIGATION, Loran system on 1950 kHz
2000 – 2065 kHz, LAND MOBILE
2065 – 2107 kHz, MARITIME MOBILE (including Fixed Service Communicating between 2065 kHz and 2107 kHz)
2107 – 2150 kHz, MOBILE

1. **Thailand**

300 – 400 kHz:

|  |  |
| --- | --- |
| Frequency Range (kHz) | Incumbent Radio System |
| 300-325 | Aeronautical RadionavigationMaritime Radionavigation |
| 325-400 | Aeronautical Radionavigation |

1610 – 1950 kHz:

|  |  |
| --- | --- |
| Frequency Range (kHz) | Incumbent Radio System |
| 1610-1800 | Fixed |
| 1800-1825 | Amateur |
| 1825-1950 | FixedAmateur |

1950 – 2150 kHz:

|  |  |
| --- | --- |
| Frequency Range (kHz) | Incumbent Radio System |
| 1950-2000 | FixedAmateur |
| 2000-2150 | FixedMobile |

1. **Viet Nam (Socialist Republic of)**

300 – 400 kHz: ARNS, MRNS

1610 – 1950 kHz: RLS, RNS

1950 – 2150 kHz: RNS, MMS

# REFERENCES

[1] APT AWG-27, Questionnaire on non-beam WPT in 300-400 kHz, 1610-1950 kHz and 1950-2150 kHz

[2] APT AWG-28, Revision of questionnaire on non-beam WPT in 300-400 kHz, 1610-1950 kHz and 1950-2150 kHz