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| U.S. Radiocommunications Sector  Fact Sheet | |
| **Working Party:** ITU-R WP1A | **Document No:** USWP1A23\_11\_FS – WD PDN Recommendation SM.[WPT.BEAM.FRQ] |
| **Ref:**  Report on the sixth 2015-2019 meeting of Working Party 1A– [Annex 04](https://www.itu.int/dms_ties/itu-r/md/15/wp1a/c/R15-WP1A-C-0454!N04!MSW-E.docx) – Working document towards a preliminary draft new Recommendation ITU-R SM.[WPT.BEAM.FRQ] | **Date:** 4 April 2021 |
| Document Title: Proposed revisions to Working Document Towards a Preliminary Draft New Recommendation ITU-R SM.[WPT.BEAM.FRQ] | |
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| **Purpose/Objective:** Submit further information on frequencies with existing approvals or authorizations for use by Beam WPT systems, and elevate the status of the document to Preliminary New Recommendation. | |
| **Abstract:** This contribution adds a list of existing device approvals and certifications for WPT systems currently operating globally, to provide further context on some of the frequencies commonly designated by national governments for their use. In addition to the growing number of certifications, several companies and interest groups support Beam WPT for 917-920 MHz, including:  Energous Corporation  AirFuel Alliance (AFA)  SK Telesys Co.,Ltd.  Gokhale Method Enterprise  Xiamen New Sound Technology Company., Ltd  At the same time, the document is proposed to be elevated to the status of a Preliminary New Recommendation—as the detailed work plan suggests. | |

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| **Radiocommunication Study Groups** |  |
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| Received: 12 May 2021  Subject: Question [ITU-R 210-3/1](https://www.itu.int/pub/R-QUE-SG01.210) | **Document 1A/14-E** |
| **13 May 2021** |
| **English only** |
| United States of America | |
| Proposed Revisions To Working Document Towards a Preliminary DRaft New Recommendation ITU-R SM.[WPT.BEAM.FRQ] | |
| Frequency ranges for operation of wireless power transmission systems via radio frequency beam | |

Background

During the November-December 2020 meeting of Working Party (WP) 1A, the frequency recommendations proposed in this document for the use of Beam WPT systems were discussed, and a consensus was reached on the text of the recommendation. The text of the recommendation is now stable.

An accompanying work plan was created for this document, entitled “Detailed work plan for the development of a working document towards a preliminary draft new Recommendation ITU-R SM.[WPT.BEAM.FRQ]”. According to the agreed upon work plan, at this meeting, a new version of this working document should be produced. Furthermore, the plan states that based on the progress of the aforementioned reports, this document should be considered for status elevation.

**Market developments**

Current wireless charging systems on the market are mainly inductive markets. Several companies’ products have been approved for Beam WPT in the US, Europe, South America, Middle East and Asia.

Proposal

In line with the work plan, the United States proposes to update this document based on new information added to working document towards a preliminary draft new Report ITU-R SM.[WPT.BEAM.IMPACTS] and working document towards a preliminary draft revision of Report ITU-R SM.2392-0. The United States also proposes, in accordance with the work plan, to elevate the status of this document to preliminary draft new Recommendation ITU-R SM.[WPT.BEAM.FRQ]. Finally, any proposed frequency bands that the Working Party does not reach an agreement on should not postpone the elevation of this document—as they can be added later as modifications to the upgraded recommendation or in future revisions of the approved document.

**Attachment:** 1

Attachment

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| WORKING DOCUMENT TOWARDS A Preliminary Draft New RECOMMENDATION ITU-R SM.[WPT.BEAM.FRQ] |
| Frequency ranges for operation of wireless power  transmission systems via radio frequency beam |

Scope

This Recommendation provides guidelines for the use of frequency ranges for the operation of wireless power transmission (WPT) via radio frequency beam, including wireless charging of mobile/portable devices, but not including WPT for electric vehicles.

Keywords

Wireless power transmission, short-range devices, ISM, radio frequency beam

Abbreviations/Glossary

CISPR: In French “Comité International Spécial des Perturbations Radioélectriques”,   
 International Special Committee on Radio Interference

ICNIRP: International Commission on Non‑ionizing Radiation Protection

IEC: International Electrotechnical Commission

ISM: Industrial, Scientific, Medical

RR: Radio Regulations

WHO: World Health Organization

WPT: wireless power transmission

Related ITU Recommendations, Reports

Recommendation ITU-R SM.1056; Recommendation ITU-R SM.1896; Report ITU-R SM.2153; Report ITU-R SM.2392.

The ITU Radiocommunication Assembly,

considering

*a)* that wireless power transmission (WPT) is defined as the transmission of power from a power source to an electrical load wirelessly using an electromagnetic field;

*b)* that WPT technologies utilize various mechanisms, such as transmission via radio frequency beams, inductive, resonant and capacitive coupling;

*c)* that WPT technologies may be useful in applications of wireless charging for different types of devices, including mobile/portable devices;

*d)* that WPT standards are currently being developed at national, regional, and international levels for wireless charging technologies;

*e)* that wireless charging of mobile/portable devices for applications of WPT via radio frequency beam using beam short range are being studied and developed;

*f*) that radiation outside the bands used by WPT should be minimized in order to preserve the RF spectrum of radiocommunication services;

*g)* that to mitigate the impact of WPT devices on the operation of radiocommunication services some solutions utilize frequency bands designated for Industrial, Scientific, Medical (ISM) applications;

*h)* that issues of non-ionizing radiation exposure are dealt with by international organizations such as the World Health Organization (WHO), the International Commission on Non‑ionizing Radiation Protection (ICNIRP), and International Electrotechnical Commission TC106, and that ICNIRP 2010 provides guidelines for limiting exposure (up to 10 MHz), and ICNIRP 1998 provides Guidelines for limiting exposure (up to 300 GHz);

*i*) that wireless powered sensor networks comprise interconnected sensor nodes exchanging sensed data by wired or wireless communication,

recognizing

*a)* that WPT has no status in the RR and that, under Nos. **15.12** and **15.13**, administrations shall take all practicable steps to ensure this equipment does not cause harmful interference to a radiocommunication service, in particular, to a radionavigation or any other safety service;

*b)* that both consumers and manufacturers will benefit from common spectrum bands used for WPT technologies;

*c)* that frequency bands designated for ISM applications have been successfully used in the past for development and proliferation of innovative technologies in accordance with the RR;

*d)* that some non-ISM bands are taken into consideration for the global or regional harmonized use of specific WPT applications;

*e)* that the WPT can be treated separately from data communications, especially when the receiving device receives data communications at a different frequency to the energy transmission;

*f)* that some Administrations classify the Beam WPT as an ISM application, even for operation outside bands designated for ISM use;

*g*) that some Administrations classify Beam WPT systems as Short-Range Devices, operating in some bands listed in Recommendation ITU-R SM.1896 and Report ITU-R SM.2153;

*h*) that duration or power limits can be placed on WPT,

noting

*a)* that the International Electrotechnical Commission (IEC) has published a Technical Report IEC/TR 62869 on “Wireless Power Transfer for audio, video and multimedia systems and equipment” developed by TC 100;

*b)* that this Recommendation will assist administrations in applying No. **15.13** to prevent harmful interference to a radiocommunication service from WPT equipment used for industrial, scientific and medical applications;

*c)* that Recommendation ITU-R SM.1056 on the limitation of radiation from ISM equipment recommends that administrations consider the use of the latest edition of CISPR publication 11;

*d)* that Report ITU-R SM.2392 discusses applications of wireless power transmission via radio frequency beam;

*e)* that [working document toward preliminary draft new Report ITU-R SM.[WPT.BEAM.IMPACTS]] provides impact studies information related to the use of some Beam WPT systems,

recommends

1 that administrations should consider the use of the frequency ranges listed in the following Table for the operation of Beam WPT systems;

2 that Beam WPT applications not cause harmful interference to radiocommunication services ensuring that they remain protected from WPT operations, including consideration of unwanted radio frequency energy (such as radiated electromagnetic disturbances) falling into all bands;

3 that the occupied bandwidth and e.i.r.p. for the adequate operation of Beam WPT applications should be limited to the absolute minimum based on the other services and applications present in the same frequency band.

TABLE 1

Frequency ranges for operation of Beam WPT systems

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| Frequency range | Suitable Beam WPT technologies and applications |
| 863-870 MHz | Wireless Charging of Mobile/Portable Devices  Wireless Powered & Charging of Sensor Networks |
| 917-920 MHz |
| 2 400-2 500 MHz |
| 5 470-5 770 MHz |
| 5 725-5 875 MHz |
| Note: The list of frequency bands in this table may not be available for Beam WPT applications in some countries. For example, in some administrations in Europe, the 917-920 MHz band is used by other services. | |

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