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| U.S. Radiocommunications SectorFact Sheet |
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| **Ref:**  Report on the second 2019-2023 meeting of Working Party 1A (25 May - 2 June 2021)– [Annex 04](https://www.itu.int/dms_ties/itu-r/md/19/wp1a/c/R19-WP1A-C-0133%21N04%21MSW-E.docx) – Preliminary draft new Recommendation ITU-R SM.[WPT.BEAM.FRQ] | **Date:** 2 June 2021 |
| Document Title: Preliminary Draft New Recommendation ITU-R SM.[WPT.BEAM.FRQ] |
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| **Purpose/Objective:** Submit further information on frequencies for use by Beam WPT systems and support the approval of the document at this meeting. |
| **Abstract:** This contribution adds 24 and 61 GHz, both ISM bands, to TABLE 1: Frequency ranges for operation of beam WPT systems.Based on the maturity of the document as well as the overall stability of the text, and in accordance with the agreed upon work plan, it proposes to approve the document and elevate it to Draft New Recommendation status during the November 2021 meeting of ITU-R WP1A.\*Note: Blue highlights are TMG contributions. |

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| **Radiocommunication Study Groups** |  |
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| United States of America |
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| Preliminary Draft New RECOMMENDATION ITU-R SM.[WPT.BEAM.FRQ] |
| Guidance on frequency ranges for operation of wireless power transmission via radio frequency beam systems for mobile/portable devices and sensor networks |

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Background

During the May-June 2021 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 recommendation was elevated by consensus to PDNR status.

An accompanying work plan was approved 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 elevation to DNR status.

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 Report ITU-R SM.2392-1. The United States also proposes, in accordance with the work plan, to elevate the status of this document to 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

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| Draft New RECOMMENDATION ITU-R SM.[WPT.BEAM.FRQ] |
| Guidance on frequency ranges for operation of wireless power transmission via radio frequency beam systems for mobile/portable devices and sensor networks |

[*Editor’s Note: The proposed elevation of this document to preliminary draft new Recommendation does not imply automatic elevation to Draft New Recommendation at a subsequent meeting. The elevation proposed simply reflects the maturity of the document at this point in time.*]

Scope

This Recommendation provides guidance on frequency ranges for the operation of wireless power transmission (WPT) via radio frequency beam (beam WPT) systems, including wireless charging of mobile/portable devices and wireless powered & charging of sensor networks, but not including WPT for electric vehicles.

Keywords

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

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 and 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;

[Report ITU-R SM.[WPT.BEAM.IMPACTS]].

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 radiation in the far field (beam WPT) and near-field inductive, resonant and capacitive coupling (non-beam WPT);

*c)* that beam WPT technologies may be useful in various applications, including wireless charging of mobile/portable devices and wireless powered and charging of sensor networks;

*d)* that there is potential customer demand for beam WPT technologies for such applications and associated applications;

*e)* that WPT standards are currently being developed at national, regional, and international levels;

*f*) that radiation from WPT systems should not cause harmful interferences to radiocommunication services;

*g)* that some beam WPT systems utilize frequency bands designated for Industrial, Scientific and Medical (ISM) applications and some systems utilize different frequency ranges;

*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;

*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 may benefit from harmonized frequency ranges and technical conditions 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 WPT can be treated separately from data communications, especially when the receiving device receives data communications at a frequency different from that for the energy transmission;

*f)* that some administrations classify beam WPT as an ISM application, even for operation outside the bands designated for ISM applications;

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

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

noting

*a)* that the International Electrotechnical Commission (IEC) has published Technical Reports IEC/TR 62869 on “Activities and considerations related to wireless power transfer (WPT) for audio, video and multimedia systems and equipment” and IEC/TR 63231 on “Consideration of energy efficiency in wireless power transfer technology” and IEC/TR 63239 on “Radio frequency beam wireless power transfer (WPT) for mobile devices” developed by TC 100;

*b)* that this Recommendation will assist administrations in applying Nos. **15.12** and **15.13** not to cause harmful interference to a radiocommunication service from the operation of WPT equipment used for non-ISM and ISM applications, respectively;

*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 [Report ITU-R SM.[WPT.BEAM.IMPACTS]] provides impact studies information related to the use of some beam WPT systems,

recommends

1 that necessary steps should be taken to ensure that beam WPT applications and equipment do not cause harmful interference to radiocommunication services, so that they remain protected from radio frequency energy emanating from WPT operations falling into all bands;

2 that administrations consider as guidance the use of the frequency ranges, or portions thereof, listed in the Table 1 below, for the operation of beam WPT systems for mobile/portable devices and sensor networks.

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 DevicesWireless Powered & Charging of Sensor Networks |
| 917-920 MHz |
| 2 400-2 500 MHz |
| 5 725-5 875 MHz |
| *24.1-24.15 GHz* |
| *61.0-61.5 GHz* |
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| Note: The frequency ranges listed in this table indicates those with possible use for beam WPT, noting that some frequency ranges may not be available for beam WPT applications in some countries, as a result of the different national allocations and regulatory conditions. |