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| U.S. Radiocommunications SectorFact Sheet |
| **Working Party:** ITU-R WP1A | **Document No:** USWP1A-06\_Final |
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| Document Title: Proposed revisions to, and approval of, Preliminary Draft New Recommendation ITU-R SM.[WPT.BEAM.FRQ] |
| **Author(s)/Contributors(s):**Matthew GreenspanTelecommunications Management Group, Inc. (TMG) | **Email**: mgreenspan@tmgtelecom.com**Phone**: +1 (703) 472-0897 |
| **Purpose/Objective:** Align the frequency recommendation table with the work on the document WPT.BEAM.IMPACTS, and elevate the status of the document WPT.BEAM.FRQ to Draft New Recommendation. |
| **Abstract:** This contribution updates the frequencies in Table 1 to reflect those agreed in principle during the previous two meetings of ITU-R WP1A. At the same time, based on the maturity of the content and as detailed in the agreed upon work plan, the document is proposed to be elevated to the status of a Draft New Recommendation. |

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| Proposed revisions to, and approval of, 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.

 Additional work was performed on the recommendation that followed the approved WP1A “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 work plan, at this WP1A meeting, a new version of this document should be produced and if stable, a possible elevation to DNR status.

Proposal

This contribution updates the frequencies in Table 1 to reflect those agreed in principle during the previous two meetings of ITU-R WP1A. Based on the maturity of the text contained in this input contribution, and the good progress made by previous WP1A meetings, the United States supports the elevation of this recommendation to DNR status and its approval by WP1A at this meeting for submission to Study Group 1. The U.S. is also of the view that further updates to include additional frequency ranges supporting WPT Beam could be considered in subsequent revisions to this recommendation based on input contributions to future meetings of WP1A.

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|  | **Annex 4 toDocument 1A/179-E** |
| **23 November 2021** |
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| Annex 4 to Working Party 1A Chairman's Report |
| 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 |

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;

*h)* that in order to address adequate protections for radiocommunication services from any harmful interference, some administrations may classify certain applications of WPT Beam operation as a radio service.

*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 |
|  |
| 61.0-61.5 GHz |
| 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. |

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