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| APTlogogreen3 | ASIA-PACIFIC TELECOMMUNITY | **Document No:** |
| **The 4th Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-4)** | **APG19-4/OUT-44** |
| 7 – 12 January 2019, Busan, Republic of Korea | **11 January 2019** |

Working Party 6

**PRELIMINARY VIEWs on WRC-19 agenda item 9.1 (ISSUE 9.1.6)**

**Agenda Item 9.1, Issue 9.1.6:**

*9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:*

*9.1 on the activities of the Radiocommunication Sector since WRC-15;*

*9.1.6 Issue 1) in the annex to Resolution 958 (WRC-15)*

*Urgent studies required in preparation for the 2019 World Radiocommunication Conference:*

*1) Studies concerning Wireless Power Transmission (WPT) for electric vehicles:*

*a) to assess the impact of WPT for electric vehicles on radiocommunication services;*

*b) to study suitable harmonized frequency ranges which would minimize the impact on radiocommunication services from WPT for electrical vehicles.*

*These studies should take into account that the International Electrotechnical Commission (IEC), the International Organization for Standardization (ISO) and the Society of Automotive Engineers (SAE) are in the process of approving standards intended for global and regional harmonization of WPT technologies for electric vehicles.*

**1. Background**

Wireless power transmission (WPT) technologies are being developed worldwide to support many applications and WPT for electric vehicles (WPT-EV) is one of the promising applications. However, since the WPT-EV requires relatively high power, it should be developed not to cause harmful interference to radiocommunication services.

Resolution **958 (WRC-15)** requested the ITU-R to study the impact of WPT-EV on radiocommunications and suitable harmonized frequency ranges. The CPM19-1 identified the studies on WPT-EV as Issue 9.1.6 under Agenda Item 9.1.

Report ITU-R SM.2303-2 ‘Wireless power transmission using technologies other than radio frequency beam’ contains various results of technical studies on the impact of WPT, including WPT-EV, on radiocommunication services.

The work on the preliminary draft revision of Recommendation ITU-R SM.2110-0 “Frequency ranges for operation of non-beam wireless power transmission systems” which indicates harmonized frequency ranges are expected to be completed in June 2019.

As a responsible group for Issue 9.1.6, WP 1B submitted the draft CPM report in June 2018. The draft CPM report indicates frequency ranges, e.g. 19‑25 kHz, 55-5X kHz, 6Y-65 kHz, and 79-90 kHz for WPT-EV. The values of X and Y will be determined in May/June block meeting of Study Group 1.

The draft CPM report and studies thereafter show the following:

The studies indicate that the operation of WPT-EV in the 19-25 kHz, 55-5X kHz, 6Y‑65 kHz, and 79-90 kHz bands is compatible with existing radiocommunication services operating at other frequencies, provided that the WPT-EV unwanted emissions are tightly controlled. The exact limits and mitigation techniques, as well as potential other matters, still need to be defined through further studies.

Methodology and guidance to administrations are/will be included in several ITU-R documents.

Consequently, there is no need for activity related to WRC-19 to amend the RR.

The ITU-R will need to continue to closely collaborate with SDOs. This is to ensure that appropriate frequency ranges and technical limits are incorporated into standards to protect radiocommunication services.

**2. Documents**

* Input Documents APG19-4/INP-9(Rev.1) (Chairman, APG-19), 20 (AUS), 34 (THA), 50 (IRN), 64 (J), 81 (KOR), 102 (CHN) and 106 (CHN)
* Information Documents APG19-4/INF-01 (BR, ITU), 02 (WMO), 03 (IARU), 04 (ICAO), 22 (CITEL), 23 (CEPT) and 24 (RCC)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Australia** - **Document APG19-4/INP-20**

Australia supports the studies being carried out by ITU-R in accordance with Resolution **958 (WRC‑15)** to assess the impacts of WPT for electric vehicles on radiocommunication services, to study suitable harmonised frequency ranges.

**3.1.2 Thailand** - **Document APG19-4/INP-34**

Thailand agrees with the conclusion of ITU-R studies stated in the draft CPM Text report and is of the view that no change to the RR is required. Nevertheless, Thailand supports further ITU-R studies related to Wireless Power Transmission (WPT) to develop methodology and guidance to administrations in the following aspects:

* appropriate bands are specified in preliminary draft revision of Recommendation ITU-R SM.2110-0;
* limits on unwanted emissions, including harmonics, are expected to be specified in a new ITU-R Recommendation; and
* results of related studies and examples of existing national implementations throughout the Regions are provided in Report ITU-R SM.2303-2 and WDPDN Report ITU-R SM.[WPT-SPEC-MNGM].

**3.1.3 Iran (Islamic Republic of)** - **Document APG19-4/INP-50**

The Administration of the Islamic Republic of Iran supports the results of ITU-R studies that further work be continued within the ITU-R and no change to the RR is required. The ITU-R will need to continue to closely collaborate with SDOs to ensure that appropriate frequency ranges and technical limits are incorporated into standards to protect radiocommunication services.

**3.1.4 Japan** - **Document APG19-4/INP-64**

Japan proposes the following as APT preliminary views as of APG19-4;

* The frequency range 79-90 kHz should be included as a frequency range for WPT for EVs in an ITU-R Recommendation and the Recommendation should be approved at the latest by RA-19; and
* ITU-R studies for WPT should be continued after WRC-19, and APT should consider the possibilities of necessary proposals in the future depending on upcoming progress of ITU‑R studies.

**3.1.5 Korea (Rep. of)** - **Document APG19-4/INP-81**

APT Members support the studies carried out by ITU-R in accordance with Resolution **958 (WRC‑15)** to assess the impacts of WPT for electric vehicles on radiocommunication services and to study suitable harmonized frequency ranges which would minimize the impact on radiocommunication services from WPT-EV.

APT Members are of the view that all radiocommunication services must be adequately protected from harmful interference that may be generated by WPT-EV, both at the fundamental frequency and from spurious and out-of-band emissions.

APT Members support consideration of the inclusion of one or more frequency ranges for WPT-EV in an ITU-R Recommendation based on completion of ITU-R studies.

APT Members are of the view that there is no need to change the Radio Regulations (RR) at WRC-19.

**3.1.6 China (People’s Republic of)** - **Document APG19-4/INP-102**

Based on the above study results, China is of the following views:

1. China supports the studies carried out by ITU-R in accordance with Resolution **958 (WRC‑15)** to assess the impacts of WPT-EV on radiocommunication services.
2. China supports the band of 79 kHz - 90 kHz as globally or regionally harmonized frequency band for WPT-EV.
3. China supports the inclusion of one or more frequency ranges for WPT for EVs in an ITU-R Recommendation based on completion of ITU-R studies.
4. China proposes to modify the draft CPM text of WRC-19 AI 9.1, Issue 9.1.6 according to the latest study results of ITU-R Working Party 1B.

**3.2 Summary of issues raised during the meeting**

The ITU-R studies on this issue are progressing but have not yet come to conclusions.

Although it was agreed that there is no need to change the RR at WRC-19, necessity of the change in the future was not discussed.

It was recognized that some views of other international organizations have not yet been considered by APG and APG19-5 might need to consider them.

**4. APT Preliminary View(s)**

* APT Members support the studies carried out by ITU-R in accordance with Resolution **958 (WRC‑15)** to assess the impacts of WPT-EV on radiocommunication services and to study suitable harmonized frequency ranges which would minimize the impact on radiocommunication services from WPT-EV.
* APT Members are of the view that all radiocommunication services must be adequately protected from harmful interference that may be generated by WPT-EV, both at the fundamental frequency and from spurious and out-of-band emissions.
* APT Members support consideration of the inclusion of one or more frequency ranges for WPT-EV in an ITU-R Recommendation based on completion of ITU-R studies.
* APT Members supports further ITU-R studies related to WPT-EV to develop methodology and guidance to administrations in the following aspects:
  + - one or more appropriate frequency ranges for WPT-EV are specified in a revision of Recommendation ITU-R SM.2110-0;
    - limits on unwanted radiation, including harmonics, are expected to be specified in a new ITU-R Recommendation; and
    - results of related studies and examples of existing national implementations throughout the Regions are provided in Report ITU-R SM.2303-2 and WDPDN Report ITU-R SM.[WPT\_EV\_IMPACT] and are expected to be provided in one or more ITU-R Reports on regulatory matters of WPT.
* Consequently, APT Members are of the view that there is no need for activity related to WRC-19 to amend the RR.
* APT Members support that ITU-R studies for WPT-EV should be continued after WRC-19, and APT Members are encouraged to consider necessary proposals depending on upcoming progress of ITU-R studies
* APT Members are of the view that ITU-R will need to continue to closely collaborate with SDOs to ensure that appropriate frequency ranges and technical limits are incorporated into standards to protect radiocommunication services.

**5. Other View(s) from APT Members**

* Some APT Members support a frequency range 79-90 kHz as a globally or regionally harmonized frequency range for WPT-EV.
* Some APT Members are of the view that a Recommendation on frequency ranges for WPT-EV should be approved at the latest at RA-19.

**6. Issues for Consideration at Next APG Meeting**

* Assessment of outputs of ITU-R SG 1 block meetings to be held in May/June 2019
* Other views expressed by APT Members at APG19-4 which need further consideration to develop harmonized views among APT Members
* CEPT’s views on the use of 19-21 kHz range and no use of any frequency range above 90 kHz for WPT-EV
* Views on the possible modification of Resolution **958 (WRC-15)**

**7. Views from Other Organisations**

**7.1 Regional Groups**

**7.1.1 ASMG** - **Document APG19-4/INP-09(Rev.1)**

ASMG Position:

* + Support the current studies to assess the impact of (WPT) for electric vehicles on radiocommunication services; and to study suitable frequency ranges which would minimize the impact on radiocommunication services from (WPT) for electrical vehicles.
  + Ensure the protection of the incumbent services and not add any additional constraints on these services.
  + Emphasize the importance of universally harmonized frequency bands to achieve a global standardization.

**7.1.2 ATU** - **Document APG19-4/INP-09(Rev.1)**

**APM19-3 - SUMMARY OF AFRICAN PRELIMINARY POSITIONS**

**Support, as a matter of principle,** the on-going sharing and compatibility studies between Wireless Power Transfer (WPT) systems and existing services.

**7.1.3 CEPT - Document APG19-4/INF-23**

**Preliminary CEPT position:**

CEPT is of the view that no regulatory action to the RR will be required in order to resolve AI 9.1, issue 9.1.6. ITU-R Report SM.[WPT.SPEC.MNGM] and Recommendations ITU-R SM.2110 and ITU-R SM.[WPT-UNWANTED], are considered sufficient to specify suitable frequency bands and limits on unwanted emissions for WPT-EV, along with determination of the related centre frequencies.

CEPT has identified the following candidate bands as suitable for WPT-EV, which can minimise the impact of WPT-EV on radiocommunication services:

* 19-21 kHz for the highest power category (specific heavy-duty electric vehicles), and
* 79-90 kHz for the medium power category (all types of electric vehicles).

In addition, CEPT is of the view that no bands above 90 kHz should be considered for use by WPT-EV.

CEPT is of the view that bands at 60 kHz and 77.5 kHz used by applications of the standard frequency and time signal service are not suitable for WPT-EV and require specific protection.

**7.1.4 CITEL - Document APG19-4/INF-22 and APG19-4/INP-09(Rev.1)**

**Preliminary Proposal (Document APG19-4/INP-09(Rev.1))**

**Mexico**

**NOC**MEX/9.1/9.1.6/1

**Radio Regulations, Volumes 1 and 2**

MOD MEX/9.1/9.1.6/2

**Resolution 958 (WRC-15) Annex to Resolution 958 (WRC-15)**

**Reasons:** It is deemed appropriate to continue the compatibility studies on the “wireless power transmission for electric vehicles” for the purpose of avoiding harmful interferences with existing, planned, and future radiocommunication services. Therefore, it is not necessary to introduce any modification to the Radio Regulations or to take any regulatory measures under this Agenda Item.

Draft Inter-American Proposal (**Document APG19-4/INF-22)**

NOC

**7.1.5 RCC** - **Document APG19-4/INF-24**

POSITION OF THE RCC COMMUNICATIONS ADMINISTRATIONS

The RCC Administrations consider that any modifications to the Radio Regulations provisions related to regulation of using wireless power transmission devices are not necessary.

The RCC Administrations are in favour of harmonizing frequency bands to be used for Wireless Power Transmission (WPT) for electric vehicles, which could be implemented by the development of relevant Recommendation ITU-R.

The RCC Administrations support the development of conditions for use of the frequency band 79-90 kHz by WPT devices, which would provide protection to stations of radiocommunication services from possible interference, and which have relevant allocations in the Radio Regulations on a primary or secondary basis.

**7.2 International Organisations**

**7.2.1 ICAO** - **Document APG19-4/INF-04**

ICAO Position:

To ensure that the protection of aeronautical systems is appropriately taken into account during the studies called for in response to Resolution **958** **(WRC-15)**.

**7.2.2 WMO** - **Document APG19-4/INF-02**

WRC-19 agenda item that may have an impact on WMO interests

Agenda item 9.1.6

The frequency range initially mentioned under this Agenda Item is 20 to 6800 kHz. If this frequency range is confirmed, details on WPT principles and related propagation conditions will be needed to assess the potential impact of WPT on lightning detection networks and oceanographic radars deployed by the meteorological community.

WMO will monitor this AI to ensure that any possible change will not adversely impact any service used for meteorological operations.

**7.2.3 IARU** - **Document APG19-4/INF-03**

**IARU view on agenda item 9, issue 9.1.6**

The IARU is of the view that, although no change is required to the RR, based on these study results, further work must continue within the ITU-R to ensure that appropriate levels of spurious emission limits are defined to provide proper protection to existing radiocommunication services.

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