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| small APTlogogreen | ASIA-PACIFIC TELECOMMUNITY |  | | Document No: |
| **The 4th Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-4)** | | **APG19-4/OUT-48** | |
| 07 – 12 January 2019, Busan, Republic of Korea | | **12 January 2019** | |

Working Party 6

**preliminary VIEWS on WRC-19 agenda item 10 (New Agenda Items)**

**Agenda Item 10:**

*to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Article 7 of Convention;*

**1. Introduction:**

This document summarizes the discussion on the following proposed new items for inclusion in the agenda of WRC-23 under WRC-19 Agenda Item 10:

|  |  |
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| **Section 3:** | High altitude platform station as IMT base stations |
| **Section 4:** | VHF Space-Based Voice Communication Service |
| **Section 5:** | Revision of RR No. 5.522B relating to the use of 18.6-18.8 GHz for FSS NGSO systems |
| **Section 6:** | Allocation of the frequency bands 1518-1559 MHz, 1626.6-1660.5 MHz and 1668-1675 MHz to the MSS (space-to-space) |
| **Section 7:** | Space Weather Sensors (item 2.3 of Draft Agenda for WRC-23) |
| **Section 8:** | Stations on board sub-orbital vehicles |

**2. Documents**

***2.1 Input Documents:*** APG19-4/INP-06 (AWG), 64 (J), 95 (SNG), 102 (CHN)

***2.2 Information Documents: -***

**3 Proposal for a possible new WRC-23 agenda item to consider identification for use by high altitude platform station as IMT base stations (HIBS) in the frequency bands below 2.7 GHz identified for IMT**

**3.1 Background and summary of discussions**

Contribution from the Administration of Japan (Doc. Nos. APG19-3/INP-54, APG19-4/INP-64) which proposes a new topic for inclusion in the Agenda of WRC-23 was introduced. These Documents propose to consider identification to use high altitude platform station as IMT base stations (HIBS) in the frequency bands below 2.7 GHz that have been already identified to IMT (Nos. 5.286AA, 5.295, 5.296A, 5.308A, 5.313A, 5.317A, 5.341A, 5.341B, 5.341C, 5.346, 5.346A, 5.384A and 5.388), and whether changes are needed to the existing identification for HIBS.

Respond to request from APG-19 (APG19-3/OUT-35), AWG developed a working document towards a preliminary draft new APT Report consists of technical and operation analysis information to support further discussion in APG19-4 (APG19-4/INP-06). AWG will further develop this report and provide the information to APG19-5.

Some APT members concerned to include the frequency bands of 1 980-2 010 MHz and 2 170-2200 MHz in the proposed new agenda since these frequency bands have been studying under WRC-19 Agenda Item 9.1 Issue 9.1.1 in ITU-R and there are some difficulties to conclude the Issue at the time. This issue will be further discussed in APG19-5.

**3.2 APT Preliminary Views**

APT Members are considering the establishment of an agenda item for WRC-23 which aims at identifying frequency bands for HIBS subject to resolution of various issues related to the subject matter, including the choice of frequency bands, depending on the results of studies currently carried out by AWG, in a satisfactory manner.

The following Attachment 1 contains a description of the proposal and Attachment 2 contains draft text for a possible Resolution related to the proposed new agenda item.

**Attachment 1**

Source: APG19-3/INP54 (J), APG19-4/INP-64 (J)

ANNEX 2 TO RESOLUTION 804 (Rev. WRC-12)

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| ***Subject:***  Proposal for WRC-23 Agenda Item to consider identification of certain frequency bands below 2.7 GHz identified for IMT for use by high altitude platform station as IMT base stations (HIBS), and whether changes are needed to the set of existing bands identified for use by HIBS | |
| ***Origin:*** Japan | |
| ***Proposal:***  To study IMT applications using high altitude platform station as base stations. | |
| ***Background/reason:***  In light of growing demand for broadband, there is a need for a solution to provide broadband access to underserved areas with minimal ground-level infrastructure and maintenance. At WRC-15, Resolution **160 (WRC-15)** was adopted to study how to facilitate access to global broadband applications delivered by high altitude platform station in the fixed service and there is ongoing study under WRC-19 Agenda Item 1.14 on high altitude platform station using frequency bands above 6 GHz for broadband delivery.  At the same time, to utilize its capability to provide service to a large footprint (wider than 30,000 km2) at low latency (1/30 of LEO and 1/1800 of GEO), high altitude platform station may also be used as IMT base stations (HIBS) in the frequency bands below 2.7 GHz to provide mobile connectivity to underserved areas. Especially in providing connectivity for IoT, which is expected to become widespread in 2020 and beyond, mobile network operators (MNOs) are expected to meet the requirement for wider area coverage using their spectrum and at a reasonable cost. Indeed, satellite systems could also achieve wider area coverage, but it is difficult to achieve low latency similar to ground-based IMT network compared to HIBS.  At WRC-2000, the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Region 1 and 3 and the bands 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2 were identified in the mobile service for HIBS in RR No. **5.388A** and Resolution **221 (Rev.WRC-07)** stipulates technical conditions for HIBS necessary for the protection of ground-based IMT stations in neighboring countries and other services based on the sharing and compatibility studies with IMT-2000. Since 2000, there has been tremendous growth in the deployment of IMT systems and significant improvement in its radio access technology (i.e. IMT-Advanced and IMT-2020). Based on this situation, ITU-R WP 5D has initiated co-channel sharing analysis involving IMT-Advanced systems using HIBS in accordance with RR No. **5.388A**. However, this study does not intend to review the existing identification in RR, and therefore focuses on technical analysis of pfd values which can be exceeded if explicit agreement of the affected administration is provided as stipulated in the existing Resolution **221** **(Rev.WRC-07)**. In view of these advancements, it should be studied whether any changes are necessary to the existing identification for HIBS.  Moreover, HIBS is expected to be used as a part of terrestrial IMT networks and may use the same frequency bands with ground-based IMT base stations. Currently many terrestrial IMT networks are using multiple frequency bands and thus many user terminals support multiple bands. Therefore, to allow flexible use of frequency bands for HIBS, additional identification for HIBS may be required within existing bands in the frequency ranges below 2.7 GHz identified for IMT. | |
| ***Radiocommunication Services concerned:***  Mobile Service, Fixed Service, Broadcasting Service, Mobile Satellite Service, and other services | |
| ***Indication of possible difficulties:***  The proposed bands are widely used for terrestrial and space services on a co-primary basis. | |
| ***Previous/ongoing studies on the issue:***  Recommendation ITU-R M.1456 and M.1641 provide requirements and studies on the provision of mobile services from high altitude platform station using certain bands around 1.9/2.1 GHz.  ITU-R WP 5D is conducting co-channel sharing analysis involving IMT-Advanced systems using HIBS in accordance with RR No. **5.388A**. (See 5D/1110 Chapter 04, Attachment 4.17 and 4.18) | |
| ***Studies to be carried out by:***  ITU-R WP 5D | ***with participation of:***  Administrations and Sector members of the ITU-R |
| ***ITU-R Study Groups concerned:***  SG5 and other groups | |
| ***ITU resource implications, including financial implications (refer to CV 126):***  This proposed agenda item will be studied within the normal ITU-R procedures and planned budget. As the responsible group on IMT studies, ITU-R WP 5D usually has meetings three times a year which last 6 days each. | |
| ***Common regional proposal:***  [Yes/No] | ***Multicountry Proposal:*** [Yes/No]  ***Number of countries:*** |
| ***Remarks*** | |

**Attachment 2**

Draft New Resolution [HIBs] (WRC-19)

**Facilitating mobile connectivity using high altitude platform stations   
as IMT base stations [(HIBS)]**

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

*considering*

*a)* that studies on how to facilitate access to global broadband applications delivered by high altitude platform stations in the fixed service were conducted under WRC-19 Agenda Item 1.14 based on Resolution **160 (WRC-15)** in the frequency bands above 6 GHz;

*b)* that high altitude platform station may also be used as IMT base stations (HIBS) in the frequency bands below 2.7 GHz to expand mobile connectivity utilizing its capability to provide service to a large footprint at low latency;

*c)* that with recent technological advances (such as battery and solar-panel technologies) HIBS have become feasible;

*d)* that HIBS may be used as a part of terrestrial IMT networks to provide mobile connectivity to underserved communities and in rural and remote areas where it is difficult to be covered by ground-based IMT base stations at a reasonable cost;

*e)* that user terminals can be connected with HIBS or ground-based IMT base stations using the same frequency bands with spectrum coordination between HIBS and ground-based IMT base stations;

*f)* that many terrestrial IMT networks use multiple frequency bands and thus many user terminals support multiple bands,

*recognizing*

*a)* that high altitude platform station is defined in No. **1.66A** of the Radio Regulations as a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth;

*b)* that the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and the bands 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2 are identified in RR No.**5.388A** for HIBS and may be used in accordance with Resolution **221 (Rev.WRC-07)**;

*c)* that RR No.**5.388A** and Resolution **221 (Rev.WRC-07)** stipulate technical conditions for HIBS necessary for the protection of ground-based IMT stations in neighboring countries and other services based on the sharing and compatibility studies with IMT-2000;

*d)* that some frequency bands below 2.7 GHz are identified for IMT in accordance with RR Nos. **5.286AA**, **5.295**, **5.296A**, **5.308A**, **5.313A**, **5.317A**, **5.341A**, **5.341B**, **5.341C**, **5.346**, **5.346A**, **5.384A** and **5.388**,

*resolves to invite ITU-R*

1 to conduct sharing and compatibility studies with existing services allocated in the frequency bands below 2.7 GHz [globally/regionally identified for IMT] [identified for IMT indicated in *recognizing d)]* and, as appropriate, adjacent band, taking into account the results of studies already performed and in progress in ITU-R;

*[Editor’s note: APG19-5 will decide the candidate frequency bands taking in to account results of the studies in AWG-25 meeting.]*

2 to develop ITU-R Recommendations and Reports, as appropriate, taking into account *resolves to invite ITU-R* 1 above,

*further resolves to invite WRC-23*

to consider the results of the above studies and take necessary regulatory actions, as appropriate.

**4. Proposal for a possible new WRC-23 agenda item for VHF Space-Based Voice Communication Service**

4.1 Background

In order to apply radar-like or other similar reduced separation minima over oceanic and remote areas, appropriate surveillance and communications are required. In 2015, the World Radiocommunication Conference (“WRC-15”) allocated the frequency band 1087.7 – 1092.3 MHz for reception of aircraft Automatic Dependent Surveillance – Broadcast (“ADS-B”) messages by space stations. Following WRC-15, Aireon started the implementation of space-based ADS-B services using their satellite constellation. Space-based ADS-B is expected to perform like terrestrial ADS-B sensors without any need for avionic modification.

However, appropriate communication means is still an issue for oceanic and remote areas, and there is currently no suitable solution to provide Very High Frequency (“VHF”) voice services over these areas. Hence, Singapore proposed to consider a potential solution using VHF radios relay installed onboard satellites (“space-based VHF”), which would be an effective complimentary communication service to the space-based ADS-B.

Currently there is no practical and cost effective solution to provide VHF voice services over oceanic and some remote areas. Although High Frequency (“HF”) voice, satellite voice (“SATVOICE”) and controller-pilot data link communications (“CPDLC”) may be used in lieu of VHF voice, these technologies are currently not considered as direct controller-pilot communications (“DCPC”) for supporting radar-like or other similar reduced separation minima (e.g. 3, 5 or 10 NM). Moreover, not all aircraft are equipped with SATVOICE and/or CPDLC. Whereas, VHF voice communications relay would meet the required communication performance (“RCP”) for reduced separation minima, without modification to aircraft equipment.

Considering the advancements in satellite technologies as suitable communication equipment carriers, the potential for supporting radar-like or other reduced separation minima using space-based ADS-B in conjunction with space-based VHF voice is very real. Accordingly, the Civil Aviation Authority of Singapore (“CAAS”) has been working with various communications vendors to conduct design studies and trials/proof-of-concept for satellite mounted transceivers serving as VHF voice communication relay system.

Notwithstanding the above, CAAS presented on space-based VHF during the International Civil Aviation Organization (“ICAO”) Asia/Pacific Air Navigation Planning and Implementation Regional Group (“APANPIRG”) meeting held in September 2018 and the ICAO APANPIRG supported the operating concept for space-based VHF voice services.

4.2 APT Preliminary Views

The proposed new item for inclusion in the agenda of WRC-23 to consider the possible identification of the VHF frequency band 118 – 137 MHz for Aeronautical Mobile Satellite (Route) Service is forwarded to the next APG meeting for further consideration. Description of the proposal using the template in accordance with Annex 2 to Resolution **804** (**Rev. WRC-12**), is given below.

APT Members are encouraged to contribute on this issue.

ANNEX 2 TO RESOLUTION 804 (Rev.WRC‑12)

**Template for the submission of proposals for agenda items**

|  |  |
| --- | --- |
| **Subject:**  Proposal of WRC-19 Agenda Item 10 to consider the identification ofVHFfrequency bands forspace-based voice communication services in WRC-23 | |
| **Origin:** Singapore | |
| ***Proposal*:**  To consider the study and potential identification of the frequency band 118 – 137 MHz for Aeronautical Mobile Satellite (Route) Service (“AMS(R)S”) | |
| ***Background/reason*:**  In order to apply radar-like or other similar reduced separation minima over oceanic and remote areas, appropriate surveillance and communications are required. In 2015, the World Radiocommunication Conference (“WRC-15”) allocated the frequency band 1087.7 – 1092.3 MHz for reception of aircraft Automatic Dependent Surveillance – Broadcast (“ADS-B”) messages by space stations. Following WRC-15, Aireon started the implementation of space-based ADS-B services using their satellite constellation. Space-based ADS-B is expected to perform like terrestrial ADS-B sensors without any need for avionic modification.  However, appropriate communication means is still an issue for oceanic and remote areas, and there is currently no suitable solution to provide Very High Frequency (“VHF”) voice services over these areas. Hence, Singapore proposed to consider a potential solution using VHF radios relay installed onboard satellites (“space-based VHF”), which would be an effective complimentary communication service to the space-based ADS-B.  Currently there is no practical and cost effective solution to provide VHF voice services over oceanic and some remote areas. Although High Frequency (“HF”) voice, satellite voice (“SATVOICE”) and controller-pilot data link communications (“CPDLC”) may be used in lieu of VHF voice, these technologies are currently not considered as direct controller-pilot communications (“DCPC”) for supporting radar-like or other similar reduced separation minima (e.g. 3, 5 or 10 NM). Moreover, not all aircraft are equipped with SATVOICE and/or CPDLC. Whereas, VHF voice communications relay would meet the required communication performance (“RCP”) for reduced separation minima, without modification to aircraft equipment.  Considering the advancements in satellite technologies as suitable communication equipment carriers, the potential for supporting radar-like or other reduced separation minima using space-based ADS-B in conjunction with space-based VHF voice is very real. Accordingly, the Civil Aviation Authority of Singapore (“CAAS”) has been working with various communications vendors to conduct design studies and trials/ proof-of-concept for satellite mounted transceivers serving as VHF voice communication relay system.  Notwithstanding the above, CAAS presented on space-based VHF during the International Civil Aviation Organization (“ICAO”) Asia/Pacific Air Navigation Planning and Implementation Regional Group (“APANPIRG”) meeting held in September 2018 and the ICAO APANPIRG supported the operating concept for space-based VHF voice services. | |
| ***Radiocommunication services concerned*:**  Aeronautical Mobile (R) Service, Aeronautical Mobile (OR) Service, Maritime Mobile service and other services | |
| ***Indication of possible difficulties*:**  Sharing studies with existing AM(R)S and other services in the adjacent bands | |
| ***Previous/ongoing studies on the issue*:**  Not Applicable | |
| ***Studies to be carried out by*:**  ITU-R Working Party | ***with the participation of*:**  Administrations, ITU-R Sector members, ICAO and Aviation Authorities |
| ***ITU‑R Study Groups concerned*:**  SG 4 and 5 | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  This proposed agenda item will be studied as part of the regular ITU-R procedures and planned budget. | |
| ***Common regional proposal*:** ~~Yes~~/No | ***Multicountry proposal*:** ~~Yes~~/No  ***Number of countries*:** |
| ***Remarks*** | |

**5. Proposal for a possible new WRC-23 agenda item for revising footnote No. 5.522B relating to the use of 18.6-18.8 GHz for FSS non-GSO systems**

**5.1. Background**

The studies performed under agenda item 1.17 (WRC-2000) which led to the establishment of the current footnote No. 5.522B did not provide consideration for all types of fixed-satellite service (FSS) non-geostationary (non-GSO) satellite systems that could operate in this band. At that time, only one non-GSO satellite system was planning to use this band above an altitude of 20,000 km. Accordingly, the constraint was imposed without appropriate consideration of non-GSO systems operating with an apogee below 20,000 km. Since there is a growing demand for Low Earth Orbit (LEO) and Medium Earth Orbit (MEO) global satellite broadband services, revisiting the studies performed in the band 18.6-18.8 GHz while taking into account the latest technology developments, could help facilitate the deployment of non-GSO systems operating with an apogee below 20,000 km.

**5.2 APT Preliminary Views**

The proposed new item for inclusion in the agenda of WRC-23 to study the technical and regulatory issues associated with a possible revision to footnote No. 5.522B to enable the use of the band 18.6-18.8 GHz (space-to-Earth) by FSS non-GSO systems with an apogee below 20,000 km is forwarded to the next APG meeting for further consideration. Description of the proposal using the template in accordance with Annex 2 to Resolution **804** (**Rev. WRC-12**), is given below.

APT Members are encouraged to contribute on this issue.

ANNEX 2 TO RESOLUTION 804 (Rev.WRC‑12)

**Template for the submission of proposals for agenda items**

|  |  |
| --- | --- |
| **Subject:**  Proposal of WRC-19 Agenda Item 10 to consider the revision of footnote No. 5.522B relating to the use of 18.6-18.8 GHz for FSS non-GSO systems in WRC-23. | |
| **Origin:** Singapore | |
| ***Proposal*:**  To study the technical and regulatory issues associated with a possible revision to footnote No. 5.522B to enable the use of the 18.6-18.8 GHz (space-to-Earth) band by FSS non-GSO systems with an apogee below 20,000 km | |
| ***Background/reason*:**  The studies performed under agenda item 1.17 (WRC-2000) which led to the establishment of the current footnote No. 5.522B did not provide consideration for all types of non-geostationary (non-GSO) satellite systems that could operate in this band. At that time, only one non-GSO satellite system was planning to use this band above an altitude of 20,000 km. Accordingly, the constraint was imposed without appropriate consideration of non-GSO systems operating with an apogee below 20,000 km. Since there is a growing demand for Low Earth Orbit (LEO) and Medium Earth Orbit (MEO) global satellite broadband services, revisiting the studies performed in the band 18.6-18.8 GHz while taking into account the latest technology developments, could help facilitate the deployment of non-GSO systems operating with an apogee below 20,000 km. | |
| ***Radiocommunication services concerned*:**  FSS, EESS (passive), FS, Mobile, Space Research (passive) | |
| ***Indication of possible difficulties*:**  Protection of EESS (passive) in Regions 1 and 3 which was introduced in the 18.6.18.8 GHz band at WRC-2000 may limit non-GSO operations | |
| ***Previous/ongoing studies on the issue*:**  The 1997-2000 study period leading up to WRC-2000 | |
| ***Studies to be carried out by*:**  ITU-R | ***with the participation of*:**  Administrations, ITU-R members |
| ***ITU‑R Study Groups concerned*:**  SG-4 and SG-7 | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  This proposed agenda item will be studied as part of the regular ITU-R procedures and planned budget. | |
| ***Common regional proposal*:** ~~Yes~~/No | ***Multicountry proposal*:** ~~Yes~~/No  ***Number of countries*:** |
| ***Remarks*** | |

**6. Proposal for a possible new WRC-23 agenda item for the allocation of the frequency bands 1518-1559 MHz, 1626.6-1660.5 MHz and 1668-1675 MHz to the mobile-satellite service (space-to-space)**

**6.1 Background**

Many LEO satellites operate with limited and non-real-time support through a network of earth stations. Discussions with LEO satellite operators has revealed that the addition of space-to-space communications within the MSS would provide an effective means for continuous monitoring and control of such LEO satellites, which would enhance security and efficiency of operations.

To address this need, a new agenda item for WRC-23 is proposed to consider.

**6.2 APT Preliminary Views**

The proposed new item for inclusion in the agenda of WRC-23 to consider possible allocation of the frequency bands 1518-1559 MHz, 1626.6-1660.5 MHz and 1668-1675 MHz to the mobile-satellite service (space-to-space) is forwarded to the next APG meeting for further consideration. Description of the proposal using the template in accordance with Annex 2 to Resolution **804** (**Rev. WRC-12**), is given below.

APT Members are encouraged to contribute on this issue.

ANNEX 2 TO RESOLUTION 804 (Rev.WRC‑12)

**Template for the submission of proposals for agenda items**

|  |  |
| --- | --- |
| **Subject:**  Proposal of WRC-19 Agenda Item 10 to consider an allocation of the frequency bands 1518-1559 MHz, 1626.6-1660.5 MHz and 1668-1675 MHz to the mobile-satellite service (space-to-space), in accordance with Draft New Resolution **[APT/XXX] (WRC-19)** | |
| **Origin:** Singapore | |
| ***Proposal*:**  To consider an allocation of the frequency bands 1518-1559 MHz, 1626.6-1660.5 MHz and 1668-1675 MHz to the mobile-satellite service (space-to-space), in accordance with Draft New Resolution **[APT/XXX] (WRC-19)** | |
| ***Background/reason*:**  Many LEO satellites operate with limited and non-real-time support through a network of earth stations. Discussions with LEO satellite operators has revealed that the addition of space-to-space communications within the MSS would provide an effective means for continuous monitoring and control of such LEO satellites, which would enhance security and efficiency of operations. | |
| ***Radiocommunication services concerned*:**  MSS | |
| ***Indication of possible difficulties*:**  Sharing with MSS (space-to-Earth) and MSS (Earth-to space) needs to be studied. | |
| ***Previous/ongoing studies on the issue*:** None | |
| ***Studies to be carried out by*:**  Administrations and Sector members of the ITU-R | ***with the participation of*:**  Satellite operators, ICAO, IMO |
| ***ITU‑R Study Groups concerned*:**  WP 4C | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  This agenda item will be studied within the normal ITU-R procedures and associated budget. No extra cost is foreseen. | |
| ***Common regional proposal*:** ~~Yes~~/No | ***Multicountry proposal*:** ~~Yes~~/No  ***Number of countries*:** |
| ***Remarks*** | |

**7. Proposal for a possible new WRC-23 agenda item for Space Weather sensors**

**7.1 Background**

Space Weather refers to the physical processes occurring in the space environment, driven by the Sun and Earth’s upper atmosphere, and ultimately affecting human activities on Earth and in space. The solar wind and solar disturbances interact with the Earth's magnetic field and outer atmosphere in complex ways, causing strongly variable energetic particles and electric currents in the Earth’s magnetosphere, ionosphere and surface. Therefore space weather events can impact the operation and security of satellites, endanger human health, and damage power and communication infrastructure.

Since space weather observations are critical to monitor and forecast the occurrence probability of space weather disturbances, many kinds of radio spectrum-reliant space weather sensors have been developed, including ground-based, airborne and sapceborne systems, which obtain measurements by both active and passive sensing techniques. To address the requirements established in Resolution **657 (WRC-15)**, the ITU-R has developed Report ITU-R RS.[Space\_Weather\_Sensors] – *Technical and operational characteristics of RF-based space weather sensors*.

China supports that ITU-R should carry out necessary studies under a possible agenda item on space weather at WRC-23 with the objective of determining regulatory provisions related to space weather sensors while not placing additional constraints on incumbent services.

**7.2 APT Preliminary Views**

APT Members are encouraged to consider item 2.3 of the draft agenda of WRC-23 and contribute on this issue at the next APG meeting for further consideration.

**8. Proposal for a possible new WRC-23 agenda item for stations on board sub-orbital vehicles**

**8.1 Background**

Suborbital flight is a new mode emerged in the development of human aerospace. It needs to be studied in many fields, such as definition, the demarcation between atmosphere and space, flight mode, tracking and control, safety assurance and so on. Radio communication plays a crucial role in every major phases of suborbital flight.

ITU-R calls for studies to meet the needs of radio applications for the stations on board suborbital vehicles in accordance with Resolution **763** (**WRC-15**), which was identified as the issue 9.1.4. ITU-R WP 5B，as the responsible group for issue 9.1.4, has carried out through discussion and studies on issues of suborbital space flight, suborbital vehicle and stations on board of suborbital vehicle, etc., and developed a working document towards a preliminary draft new report ITU-R M.[Suborbital Vehicles], which addresses, “Radiocommunications for suborbital vehicles”. The report provided various definitions relative to suborbital vehicles and description of suborbital flight, and identified planned development that may require radio stations on-board suborbital vehicles to use frequencies allocated to space radiocommunications and terrestrial radiocommunications for the purpose of voice/data communications, navigation, surveillance, telemetry, tracking and command (TT&C), and safety of life and property. This document also provided a Doppler shift and link budget analysis for current aeronautical systems that may be used on suborbital vehicles, Suborbital flight phases and selection of radiocommunication spectrum, impact to air transportation and so on. The ITU-R study suggests that, no change to the Radio Regulations is proposed for WRC-19, and further operational, technical and regulatory questions/issues may need to be addressed, which require continuing studies, in particular of the status of the station aboard suborbital vehicles and type of applications, through the appropriate mechanism.

China supports further studies on this issue as a WRC-23 agenda item. The operational, technical and regulatory studies should be carried out, in particular of the status of the station aboard sub-orbital vehicles and type of applications, as well as to identify suitable frequency bands to radiocommunication stations on board sub-orbital vehicles. The compatibility studies should be conducted to avoid harmful interference between radio communication services in various suborbital flight application scenarios.

**8.2 APT Preliminary Views**

The proposed new item for inclusion in the agenda of WRC-23 for stations on board suborbital vehicles is forwarded to the next APG meeting for further consideration.

APT Members are encouraged to contribute on this issue.

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