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| APTlogogreen3 | ASIA-PACIFIC TELECOMMUNITY | **Document No:** |
| **The 3rd Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-3)** | **APG19-3/OUT-20** |
| 12 – 16 March 2018, Perth, Australia | **16 March 2018** |

Working Party 4

**PRELIMINARY VIEWs on WRC-19 agenda item 1.7**

**Agenda Item 1.7:**

*to study the spectrum needs for telemetry, tracking and command in the space operation service for non-GSO satellites with short duration missions, to assess the suitability of existing allocations to the space operation service and, if necessary, to consider new allocations, in accordance with Resolution* ***659 (WRC-15)****;*

**1. Background**

The need for more spectrum dedicated to telemetry, tracking and command (TT&C) requirement, particularly for small satellites operating in non-geostationary orbit (non-GSO), was considered at WRC-15.

Resolution **659 (WRC-15)** calls to study the spectrum needs for telemetry, tracking and command in the space operation service for NGSO satellites with short duration missions, to assess the suitability of existing allocations to the space operation service and, if necessary, to consider new allocations. Typical short duration missions are understood in this context to have a maximum lifetime of three years.

Resolution **659** **(WRC-15)** invites ITU-R:

1 to study the spectrum requirements for telemetry, tracking and command in the space operation service for the growing number of non-GSO satellites with short duration missions, taking into account RR No. **1.23**;

2 to assess the suitability of existing allocations to the space operation service in the frequency range below 1 GHz, taking into account current use and that the existing allocations to the space operation service below 1 GHz, where RR No. **9.21** applies, are not suitable for non-GSO satellites with short duration missions.

3 if studies of the current allocations to the space operations service indicate that requirements cannot be met under *invites ITU-R* 1 and 2, to conduct sharing and compatibility studies, and study mitigation techniques to protect the incumbent services, both in-band as well as in adjacent bands, in order to consider possible new allocations or an upgrade of the existing allocations to the space operation service within the frequency ranges 150.05-174 MHz and 400.15‑420MHz.

**Progress of ITU-R ongoing study**

A working document towards a preliminary draft new Report ITU-R SA.[SHORT DURATION NGSO] was developed in the April 2016 meetings of WP 7B which compiled elements related to background on WRC-19 agenda item **1.7**. At the subsequent October 2016 meetings of WP 7B, the working document was split into three separate PDN Reports in the interest of improving document clarity and work efficiency. At the April 2017 meetings of WP 7B, output documents were produced: four draft Reports and the draft CPM Text. At the October 2017 meeting of WP 7B, the seven output documents produced: a work plan, three Reports, draft CPM Text, and two liaison statements:

* Draft new Report ITU-R SA.[SHORT DURATION NGSO – CHARACTERISTICS] (Doc. [7/73](https://www.itu.int/md/R15-SG07-C-0073/en)) was completed during WP 7B’s October 2017 meeting and has been forwarded to SG 7’s meeting in September 2018 for approval.
* Draft new Report ITU-R SA.[SHORT DURATION NGSO – REQUIREMENTS] (Doc. [7/72](https://www.itu.int/md/R15-SG07-C-0072/en)) was completed during WP 7B’s October 2017 meeting and has been forwarded to SG 7’s meeting in September 2018 for approval.
* Preliminary draft new Report ITU-R SA.[SHORT DURATION NGSO – SHARING STUDIES] (Doc. [7B/238](https://www.itu.int/md/R15-WP7B-C-0238/en) Annex 15) is intended to be completed during WP 7B’s meeting in May 2018; it is intended to be forwarded to SG 7’s meeting in September 2018 for approval.
* Draft CPM Text on WRC-19 agenda item 1.7 (Doc. [7B/238](https://www.itu.int/md/R15-WP7B-C-0238/en) Annex 5) is intended to be completed during WP 7B’s meeting in May 2018.

**2. Documents**

* Input Documents: APG19-3/INP-20(INS), APG19-3/INP-24 (KOR) , APG19-3/INP-31 (IRN), APG19-3/INP-37 (NZL), APG19-3/INP-44 (AUS), APG19-3/INP-52 (J), APG19-3/INP-62 (THA), APG19-3/INP-89 (CHN).
* Information Documents: [APG19-2/OUT-39(Rev.1)](https://www.apt.int/sites/default/files/2017/07/APG19-2-OUT-39Rev.1_Preliminary_Views_AI1.7.docx), APG19-3/INF-06 (CEPT), APG19-3/INF-08 (Rev.1) (CITEL), APG19-3/INF-09 (IARU R3).

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Indonesia (Republic of)** - **Document APG19-3/INP-20**

* Indonesia is of the view to support the addition of the spectrum of non-GSO satellite mission of short duration for telemetry, tracking and command of the space operation service in the frequency range below 1 GHz, while taking into account the existing allocationsand current use.

**3.1.2 Korea (Republic of)** - **Document APG19-3/INP-24**

The Republic of Korea proposes modifications to the APT Preliminary View adopted at the APG19-2, as stated below:

* ITU-R studies should be continued in accordance with Resolution **659** (**WRC-15**).
* Appropriate protection of existing services is necessary and any new allocations or upgrades of existing allocations to the space operation service could be applied provided that no unacceptable constraints is caused to the incumbent services and their future development.
* The following frequency ranges should not be considered:
* Maritime mobile VHF radiocommunication in the frequency ranges 156-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, in accordance with RR No. **5.226** and Appendix **18** (**Rev. WRC-15**)**.**
* The frequency range 406-406.1 MHz that is dedicated for satellite emergency position-indicating radio beacons, in accordance with Resolution **205** (**Rev. WRC-15**); and
* Frequency bands used by Global Maritime Distress and Safety System (GMDSS) included in Appendix **15** of RR.

**3.1.3 Iran (Islamic Republic of)** - **Document APG19-3/INP-24**

Same as the view adopted by previous APG meeting:

APT Members are of the view that:

ITU-R studies should be continued in accordance with Resolution 659 (WRC-15).

Protection of existing services is necessary and any new allocations or upgrades of existing allocations to the space operation service could be applied without any constraint to the incumbent services and their future development.

The following frequency ranges should not be considered:

* Maritime mobile VHF radiocommunication in the frequency ranges 156-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, in accordance with RR No. 5.226 and Appendix 18 (Rev. WRC-15).
* The frequency range 406-406.1 MHz that is dedicated for satellite emergency position-indicating radio beacons, in accordance with Resolution 205 (Rev. WRC-15); and
* Frequency bands used by Global Maritime Distress and Safety System (GMDSS) included in Appendix 15 of RR.

**3.1.4 New Zealand - Document APG19-3/INP-37**

New Zealand supports the ITU-R studies undertaken in accordance with Resolution **659 (WRC-15)**. New Zealand considers that the existing allocation to space operation service in the band 148-149.9 MHz (RR No. **5.218**) could address the immediate TT&C demand for non-GSO satellites with short duration missions.

If the ITU-R studies indicate that requirement cannot be met within existing allocations, New Zealand’s preference is to consider possible new allocation to space operation service within the frequency range 400.15-406 MHz. New Zealand is also of the view that the following frequency ranges should not be considered:

* Maritime mobile VHF radiocommunication in the frequency ranges 156-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, in accordance with RR No. **5.226** and Appendix **18 (Rev. WRC-15)**; and
* Mobile-satellite service in the frequency range 406-406.1 MHz that is dedicated for satellite emergency position-indicating radio beacons, in accordance with Resolution **205 (Rev. WRC-15)**.

**3.1.5 Australia - Document APG19-3/INP-44**

Australia supports consideration of possible spectrum requirements, and the suitability of current allocations below 1 GHz for the space operation service (SOS) for telemetry, tracking and command for non-GSO satellites with short duration missions (i.e. missions less than three years), taking into account No. **1.23** based on the outcome of studies in accordance with Resolution **659 (WRC-15)**.

Should current allocations below 1 GHz be found to not meet requirements, Australia would consider ITU-R studies of possible new allocations or based on the results of sharing or compatibility studies, an upgrade of the existing SOS allocations within the frequency ranges 150.05-174 MHz and 400.15-420 MHz as identified in *invites ITU-R* 3 of Resolution **659 (WRC-15)**.

Any changes to the Radio Regulations will be dependent on satisfactory results of ITU-R sharing and compatibility studies and studies into possible mitigation techniques to protect incumbent services, both in-band as well as in adjacent bands.

**3.1.6 Japan - Document APG19-3/INP-52**

Japan supports ITU-R studies for the additional spectrum allocation in accordance with Resolution 659 (WRC-15), provided that the existing services are adequately protected.

**3.1.7 Thailand - Document APG19-3/INP-62**

Thailand reiterates its view mentioned at the APG19-2 in which Thailand supports studies currently undertaken by ITU-R Working Party 7B. Nevertheless, there exists a concern on sharing between existing services (meteorological aids service) and the upgrade of existing SOS allocations. Thai government agencies currently use radiosonde for weather forecast which operates in frequency band 400.15-406 MHz with 20 kHz bandwidth. Thailand is of the view that these usages must be protected from the possible new allocation of SOS.

**3.1.8 China (People’s Republic of) - Document APG19-3/INP-89**

As the number of non-GSO satellites for short duration missions is growing at a fast rate, China supports the studies in ITU-R WP7B on this Agenda item. If the studies show that sharing and compatibility, both in-band and out-of-band, is feasible with existing services and systems, China supports to satisfy the additional spectrum requirements by possible new allocations or an upgrade of the existing allocations to the SOS on a primary basis in accordance with Resolution 659 (WRC-15).

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

* The latest updates to the Draft new Reports did not change the previous conclusion that the spectrum requirements for short duration NGSO missions range from 0.625 MHz to 2.5 MHz in the space-to-Earth direction, and from 0.682 MHz to 0.938 MHz in the Earth-to-space direction, depending on the operational scenario.
* Only one method (Method A-NOC) has been agreed in this draft CPM text while another method (Method B - remaining in square brackets) proposes a 1 MHz allocation in the Earth-to-space direction to the space operations service, limited to non-GSO satellite systems, in the frequency range 403-404 MHz.
* The studies are not yet completed within ITU-R Working Party 7B.

**4. APT Preliminary Views**

APT Members are of the view that:

* ITU-R studies should be continued in accordance with Resolution **659** (**WRC-15**).
* Protection of existing services is necessary and any new allocations or upgrades of existing allocations to the space operation service should be applied without any constraint to the incumbent services and their future development, both in-band as well as adjacent bands.
* The following frequency ranges should not be considered:
* Maritime mobile VHF radiocommunication in the frequency ranges 156-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, in accordance with RR No. **5.226** and Appendix **18** (**Rev. WRC-15**)**.**
* The frequency range 406-406.1 MHz that is dedicated for satellite emergency position-indicating radio beacons, in accordance with Resolution **205** (**Rev. WRC-15**); and
* Frequency bands used by Global Maritime Distress and Safety System (GMDSS) included in Appendix **15** of RR.

**5. Other View from APT Members**

* None.

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

* APT Members are encouraged to participate in and submit their contributions to WP 7B and future APG meetings.

**7. Views from Other Organisations**

**7.1 Regional Groups**

**7.1.1 ASMG**

None

**7.1.2 ATU**

None

**7.1.3 CEPT - Document APG19-3/INF-06**

Preliminary CEPT position

* CEPT supports additional allocations or upgrades of existing allocations to the space operation service for short duration mission satellites provided that:
* Studies of spectrum requirements are based on satellite missions planned and constellation development.
* Studies of spectrum requirements show the need for additional allocations or upgrades of existing allocations.
* Studies show compatibility with existing services.
* CEPT recognises that studies with regard to the bands 399.9-400.05 MHz and 401-403 MHz, if any, will have to take into account the considerations under Agenda item 1.2. In addition, CEPT is of the view that co-channel sharing between Earth-to-space links of non-GSO short duration missions and GSO Data Collection Systems is not feasible in the band 401-403 MHz. CEPT recognises that all allocations to the space operation service in the Earth-to-space direction below 1 GHz are subject to coordination under No 9.21. The application of this provision is not suitable for short duration non-GSO satellites. Therefore, CEPT is of the view that, in addition to considering additional allocations to the space operation service in the Earth-to-space direction, there may be a need to consider modifying the current regulatory situation in the existing allocations.
* CEPT is of the view that consideration of the frequency band 154-156 MHz as candidate for operation of non-GSO satellites with short duration missions is not feasible due to difficulties in sharing with the incumbent services (the radiolocation service). CEPT is of the view that any consideration of bands for use under this agenda item must exclude the 406-406.1 MHz COSPAS-SARSAT band as well as its adjacent 405.9-406 MHz and 406.1-406.2 MHz bands (see resolves 1 of Resolution 205 (WRC-15)). CEPT is of the view that sharing between non-GSO satellites with short duration missions and the radio astronomy service in the frequency bands 150.05-153 MHz and 406.1-410 MHz is not feasible in the Earth-to-space direction as well as the space-to-Earth direction.

**7.1.4 CITEL - Document APG19-3/INF-08 (Rev.1)**

Preliminary views from a few countries support studies to support innovation and experimentation with cubesats. There is a need to avoid GMDSS, COSPAS/SARSAT and heavily used fixed and mobile bands.  A single spacecraft with a lifetime of less than typically three years, where the operator does not launch replenishment or replacement spacecraft, is considered a short duration mission

**7.1.5 RCC**

None

**7.2 International Organisations**

**7.2.1 IARU (R3) - Document APG19-3/INF-09**

**IARU preliminary view**

* The IARU supports satisfying the spectrum requirements for non-GSO satellites with short duration missions within the existing allocations for the space operation service or the frequency ranges identified in *invites ITU-R 3* of Resolution **659** (WRC-15), unless the satellites are amateur satellites as defined in RR Nos. **1.56** and **1.57**.

**7.2.1 ICAO**

None.

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