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| Hilversum, The Netherlands, 27th - 30th November 2018 |
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| Summary:  |
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| Proposal: |
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1. The following pages are intended to be compiled in one CEPT Brief on AI 9

DRAFT CEPT BRIEF ON AGENDA ITEM 9.1 Issue 9.1.9 - **Resolution 162 (WRC‑15)**

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.

# ISSUE

According to Resolution 162 (WRC-15) “Studies relating to spectrum needs and possible allocation of the frequency band 51.4-52.4 GHz to the fixed-satellite service (Earth-to-space)” to conduct:

1. studies considering additional spectrum needs for development of the fixed-satellite service, taking into account the frequency bands currently allocated to the fixed-satellite service, the technical conditions of their use, and the possibility of optimizing the use of these frequency bands with a view to increasing spectrum efficiency;
2. subject to justification resulting from studies conducted under resolves to invite ITU‑R 1, sharing and compatibility studies with existing services, on a primary and secondary basis, including in adjacent bands as appropriate, to determine the suitability, including protection of fixed and mobile services, of new primary allocations to the FSS in the frequency band 51.4-52.4 GHz (Earth-to-space) limited to FSS feeder links for geostationary orbit use, and the possible associated regulatory actions;
3. studies towards possible revision of Resolution 750 (Rev.WRC-12) so that systems operating in the passive frequency band 52.6-54.25 GHz are protected;
4. studies regarding the protection of radio astronomy, as described in recognizing c), including regulatory measures, as appropriate.

# Preliminary CEPT position

Based on the results of studies on additional spectrum needs for development of the fixed-satellite service and on the sharing and compatibility studies conducted in accordance with Resolution 162 (WRC-15), CEPT supports the additional allocation of 1 GHz spectrum in 51.4-52.4 GHz band for the GSO FSS (Earth-to-space) gateways.

To ensure the protection of the EESS (passive) operating in the band 52.6-54.25 GHz CEPT is proposing an unwanted emission limit of [-37/-39] dBW/100 MHz associated to a maximum elevation angle of [74°/78°] for FSS Earth stations that would operate in the 51.4 - 52.4 GHz band. For elevation angles equal or higher than [74°/78°] the proposed unwanted emission limit is -52 dBW/100 MHz. This assumes a 3 dB apportionment of the EESS (passive) protection criterion to take into account the aggregate interference from all the active services allocated in the 51.4-52.4 GHz band. CEPT supports studies regarding the impact on radio astronomy observations in the band 51.4-54.25 GHz.

FSS gateways Earth stations shall operate with a minimum antenna diameter of [4.5] m.

# Background

High throughput satellites are satellites that have many times the throughput of traditional FSS satellites for the same amount of allocated frequency on orbit. According to Report ITU-R S.2361, these systems aim at reducing the Gbps (Giga Bits per second) cost by optimizing the design of the satellite to take advantage of frequency reuse and spot beams to increase the bit rate throughput for the service area coverage in order to multiply the total amount of spectrum available for the HTS system as compared to a traditional satellite system.

The first studies dealing with such type of systems were held in early 2000. The first generation of High Throughput Satellites (HTS) is already bringing fast internet access directly to households from the geostationary orbit.

The next generation of HTS systems needs to still improve its efficiency over previous ones. So, in order to increase their capacity, additional frequency bands are under study. Initial studies propose to utilize Q and V bands (i.e. 40 and 50 GHz frequency bands). The utilization of Q and V bands is of particular interest for very high speed gateways and it makes more Ka-band available for user terminals.

Previously, during the WP 4A meeting that took place from February 20th to 2nd of March 2018, , the document dealing with FSS spectrum needs in the 51.4-52.4 GHz band was upgraded to DNR ITU-R S.[SPECTRUM\_NEEDS] (Attachment to WP 4A Chairman´s report 4A/675).

During the latest meeting of WP4A (3-14 July 2018) progress was also reached on the document on sharing and compatibility studies between FSS and incumbent services (Annex 3 to 4A/826). The only contribution related to studies with incumbent terrestrial services was with the aim to calculate the required separation distances using a smaller FSS ES antenna size (4.5 m).

Concerning compatibility with EESS, four updates to studies were submitted and discussed. Two of the documents update the studies on the four sensors described in Recommendation ITU-R RS.1861-0. For protecting such sensors, the two studies propose the unwanted emissions limits already reflected in the preliminary CEPT position above. One of the documents analyses also an NGSO sensor JX, similar to J2, but with an altitude of 407 km and a future GSO sensor with characteristics provided in the draft revision of Rec. RS.1861. The protection of sensor JX would be covered by the same limitations as for the other NGSO sensors in ITU-R RS.1861-0; regarding the protection of the GSO sensor analysed, a separation in the GSO arc between the space stations in FSS and SETS in the order of 0.5° – 1.8° (for unwanted emissions of -52 dBW/100 MHz and -39 dBW/100 MHz, respectively) would need to be ensured.

An update to study #4 in the working document was also presented; in this case, nine measurement areas are considered to study the protection of sensor JX. The study concludes on unwanted emission limits in the passive band of ‒64 dBW/100 MHz without any limitation in the FSS ES elevation angles.

The fourth update concerns study #5, with elements on both, the static and dynamic analyses. This study concerns the single conical sensor known as Meteor-M and concludes on a limit to unwanted emissions from FSS ES falling in the passive band n the order of -37 dBW/100 MHz.

WP 4A reached consensus on a Method to allocate the 51.4-52.4 GHz to the FSS considering several options for the limitation on unwanted emissions required to protect EESS (passive); the method also considers two options to protect the future GSO EESS sensors. Another option (default) noted in the draft CPM text is no change to RR. The draft CPM text on this subject that is contained in 4A/TEMP/332.

CEPT has reached agreement for proposing power limits to emissions from FSS ES that fall in the frequency band 52.6 – 54.25 GHz. Such limits are [-37/-39] dBW/100 MHz associated to a maximum elevation angle of [74°/78°] for FSS Earth stations that would operate in the 51.4 - 52.4 GHz band. For elevation angles equal or higher than [74°/78°] the proposed unwanted emission limit is -52 dBW/100 MHz. The approach to take into account the aggregate interference due to existing terrestrial services allocated in the 51.4-52.6 GHz band was to consider an EESS protection criterion that is 3 dB more stringent.

# List of relevant documents

ITU-R Documentation

* Chairman’s Report WP 4A - 4A/826

Attachment – Preliminary draft new Report ITU-R S. [Spectrum\_needs]

Annex 3 – Working document towards a preliminary draft new Report ITU-R S. [Spectrum\_Sharing]

Annex 45 – Draft CPM Text for WRC-19 agenda item 9.1, issue 9.1.9

* Document 4A/692 – Liaison statement from Working Party 7C - WRC-19 agenda item 1.6 and 9.1, issue 9.1.9
* PT1 SWG 1.13 Annex 8 – Overlap of WRC-19 Agenda items relating to AI 1.13
* Recommendation ITU-R RS.1813 – Reference antenna pattern for passive sensors operating in the Earth exploration-satellite service (passive) to be used in compatibility analyses in the frequency range 1.4-100 GHz
* Recommendation ITU-R RS.1861 – Typical technical and operational characteristics of Earth exploration-satellite service (passive) systems using allocations between 1.4 and 275 GHz
* Recommendation ITU-R RS.2017 – Performance and interference criteria for satellite passive remote sensing

CEPT and/or ECC Documentation (Decisions, Recommendations, Reports)

EU Documentation (Directives, Decisions, Recommendations, other), if applicable

# Actions to be taken

* Reconcile the unwanted emission limit values as well as FSS Earth station elevation angle.

# Relevant information from outside CEPT (examples of these are below)

## European Union (date of proposal)

## Regional telecommunication organisations

APT (March, 2018)

APT Members support ITU-R studies relating to spectrum needs, sharing and compatibility between fixed-satellite service in the frequency band 51.4-52.4 GHz and other co-frequency, and adjacent band services in accordance with Resolution 162 (WRC-15).

APT Members are of the view that consideration of an allocation to the fixed-satellite service (Earth-to-space) in the frequency band 51.4-52.4 GHz limited to feeder links for geostationary satellite orbit use is subject to satisfactory outcomes of ITU-R studies related to spectrum needs and compatibility with existing services allocated to the same and adjacent bands.

ATU (September, 2017)

The APM19-2 agreed to:

1. Support studies on evaluation of additional spectrum needs for development of the FSS in accordance with resolves to invite ITU-R 1 of Resolution 162 (WRC 15).

2. Support sharing and compatibility studies with existing services for the consideration of a new primary allocation to the FSS in the frequency band 51.4-52.4 GHz (Earth-to-space) limited to FSS feeder links for geostationary orbit use as long as the protection of existing services are ensured.

3. Recall that 52% of responding countries to the ATU Questionnaire on the possible allocation of the band to FSS stated that they would support the allocation.

4. Invite administrations to consider developments under AI 1.13 due to potential overlaps of the bands.

Arab Group (April, 2018)

* Initial support to FSS allocation in 51.4-52.4, that is limited to FSS feeder links.
* Considering results of studies in AI1.13

CITEL (July, 2018)

Preliminary Views

The United States and Canada support the study of all aspects of spectrum needs for the development of the fixed-satellite service under Resolves 1 of Resolution 162. The United States and Canada further support the study as appropriate of possible primary allocation to the FSS of the frequency band 51.4-52.4 GHz (Earth-to-space), limited to GSO FSS feeder links, under the terms of Resolution 162 (WRC-15) to ensure compatibility with existing services, including adjacent bands as appropriate. Such studies should determine the suitability, including protection of fixed and mobile services, of a new primary allocation to the FSS in the frequency band 51.4-52.4 GHz (Earth-to-space), limited to FSS feeder links for geostationary orbit use, and the possible associated regulatory actions based on the results of these studies.

Canada and Brazil support the addition, in Article 5 of the Radio Regulations, of a new primary allocation for FSS in the frequency band 51.4-52.4 GHz (Earth-to-space), limited to GSO FSS gateways through a footnote introducing specific regulatory measures to prevent the deployment of ubiquitous Earth stations.

The Administration of Mexico supports the studies being conducted in ITU-R pursuant to Resolution 162 (WRC-15) on sharing and compatibility for a possible new FSS allocation (Earth-to-space) on a primary basis in the frequency band 51.4-52.4 GHz, bearing in mind protection of the fixed and mobile services already allocated in this band.

The Administration of Mexico is of the opinion that it could be feasible to add a new primary allocation to FSS in the band 51.4-52.4 GHz in the Earth-to-space direction, subject to the outcomes of the above-mentioned studies, as long as protection of the existing services allocated on a primary basis in this band is ensured.

RCC (March 2018)

The RCC Administrations are in favour of justification of additional spectrum needs for the development of the fixed-satellite service in the frequency bands above 50 GHz, taking into account technical aspects of using the frequency bands already allocated to this service in the ranges above 30 GHz as well as the possibility to optimize their use based on the technology of FSS satellites with multiple-beam antennas and frequency reuse.

The RCC Administrations consider that the technical conditions and regulatory provisions, which are subject to the ITU-R studies, for use of new primary allocations to the FSS (Earth-to-space) in the 51.4-52.4 GHz band, limited to GSO FSS feeder links, shall ensure protection of existing services and systems in the considered and adjacent frequency bands and development of possible related regulatory measures, including revision of Resolution 750 (Rev. WRC-15).

## International organisations

IATA (date of proposal)

ICAO (date of proposal)

IMO (date of proposal)

NATO (June 2018)

NATO Military Assessment: The frequency band 51.4 - 52.4 GHz is not listed in the NJFA and limited military usage is identified for this band. The aimed allocation would achieve balance between uplink and downlink, which should improve FSS usage efficiency that could possibly benefit to military operations in the future..

NATO Position: No position at this stage.

SFCG, ESA (September, 2018)

The SFCG objective is to ensure that any allocation in the band 51.4-52.4 GHz will not adversely impact the EESS (passive) allocation in the band 52.6-54.25 GHz and 50.2-50.4 GHz (both covered under RR No. 5.340). SFCG does not support an allocation until out of band sharing studies have been completed that show the EESS (passive) is not adversely affected and any required revision to Resolution 750 (rev. WRC 15) is agreed.

WMO and EUMETNET (June 2018)

WMO is not opposed to the possible allocation of the frequency band 51.4-52.4 GHz to the FSS (E-s) provided that protection of EESS (passive) in the bands 50.2-50.4 GHz and 52.6-54.25 GHz is ensured.

WMO requests that the necessary FSS unwanted emission limits be established to ensure the protection of all current and future EESS (passive) sensors. This may be accomplished by the establishment of appropriate limits in Resolution 750 (rev. WRC-15).

Furthermore, WMO would appreciate the development of a solution to ensure the continued operation of the ground-based radiometers in the 50.4-51.4 GHz frequency band.

## Regional organisations

EUROCONTROL (date of proposal)

EUMETSAT (April 2018)

EUMETSAT operates and will continue to operate passive sensors (AMSU, MWS and MWI) in the band 52.6-54.25 GHz on its current and future satellite systems Metop and Metop-SG (Second Generation). To ensure the protection of EESS (passive) operating in the band 52.6-54.25 GHz, EUMETSAT supports the establishment of an appropriate unwanted emission power limit for FSS Earth stations (-37 dBW/100 MHz associated to a maximum elevation angle of 74°) that would operate in the 51.4 - 52.4 GHz.

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal)

GSMA (date of proposal)

CRAF (date of proposal)