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| Vienna, Austria, 14th - 17th March 2017 |
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| Subject:  | Draft CEPT Brief on WRC-19 Agenda Item 9.1 issue 9.1.9 |
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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

CEPT supports studies on evaluation of additional spectrum needs for development of the fixed-satellite service in accordance with resolves to invite ITU‑R 1 of Resolution 162 (WRC‑15). Such studies should be concluded before possible regulatory actions can be proposed under this issue of Agenda item 9.1.

CEPT supports the sharing and compatibility studies with existing services for consideration of 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.

To ensure the protection of the EESS (passive), operating in the band 52.6-54.25 GHz, CEPT supports to study the effects of aggregate interference from FSS GSO satellite networks in 51.4-52.4 GHz band and stations of existing terrestrial services allocated in 51.4-52.6 GHz band.

CEPT supports studies regarding the impact on radio astronomy observations in the band 51.4-54.25 GHz.

# 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.

Latest WP 4A meeting (28 September - 06 October 2016, Geneva) received contributions, which contained example of HTS technical characteristics, some considerations on sharing studies with incumbent services, including terrestrial and passive services, propagation analysis in Q/V band, and considerations on spectrum needs.

Currently HTS systems seek for 5 GHz spectrum available for uplink and downlink Q/V band. It was noted, for HTS systems, that there are difficulties of simultaneous use of existing FSS allocations, having opposite transmission directions in adjacent bands 37.5-42.5 GHz (space-to-Earth) and 42.5-43.5 GHz (Earth-to-space), and use frequency bands 42.5-43.5 GHz and 50.4-51.4 GHz for (Earth-to-space) in one system. These will lead to the increase of complexity and cost of manufacturing wide bandwidth FSS satellites in specified frequency bands.

WP 4A also discussed the protection of passive servicers above 51.4 GHz. Resolution 750 (Rev.WRC-12) imposes out of band power limits to active services, in order to protect the EESS (passive) and the SRS (passive), which are allocated in the frequency band over 52.6 GHz. It will be necessary to verify the compatibility with these services and to decide which out of band limits need to be implemented. The analysis of the unwanted (out of band) emission power limits in adjacent bands above 52.6 GHz should take into account the FSS networks deployment model, including the total number of FSS satellites and frequency reuse factor for the feeder link Earth stations transmitting in the same frequency bands, as well as effects of aggregate interference including impact from stations of existing terrestrial services allocated in the 51.4-52.6 GHz band.

As a result WP 4A meeting updated:

* Working Document [towards a Preliminary Draft new Report] on spectrum needs;
* Working document [towards a Preliminary Draft new Report] on sharing with incumbent services in the 51.4-52.4 GHz band and adjacent and nearby bands;
* Work plan for WRC-19 Agenda item 9.1 issue 9.1.9.

# List of relevant documents

**ITU-R Documentation**

* Document 4A/201 – Liaison statement to WP 4A from WP 7D on the protection criteria for the RAS in the band 51.4-54.25 GHz
* Document 4A/221 – Liaison statement to WP 4A from WP 5A on technical characteristics of systems in the MS in the frequency band 51.4-52.4 GHz
* Annex 12 to Document 4A/196 – Working document [towards a preliminary draft new Report] on spectrum needs
* Annex 13 to Document 4A/196 – Working document [towards a preliminary draft new Report] on sharing with incumbent services in the 51.4-52.4 GHz band and adjacent and nearby bands
* Annex 36 to Document 4A/196 – Work plan for WRC-19 Agenda item 9.1 issue 9.1.9
* Recommendation ITU-R RS.515 – Frequency bands and bandwidths used for satellite passive remote sensing
* Recommendation ITU-R RS.1259 – Feasibility of sharing between space borne passive sensors and the fixed service from 50 to 60 GHz
* 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
* Recommendation ITU-R RS.2064 – Typical technical and operating characteristics and frequency bands used by space research service (passive) observation systems
* Recommendation ITU-R SM.1542 – The protection of passive services from unwanted emissions
* Recommendation ITU-R SM.1633 – Compatibility analysis between a passive service and an active service allocated in adjacent and nearby bands
* Report ITU-R SM.2092 – Studies related to the impact of active services allocated in adjacent or nearby bands on Earth exploration-satellite service (passive)

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

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

# Actions to be taken

* To conduct studies with a view of demonstrating additional spectrum needs for development of the fixed-satellite service
* To finalise the technical characteristics and deployment model required for the studies listed below
* To conduct sharing studies between FSS (Earth-to-space) limited to feeder links for GSO use and stations in the FS operating in the band 51.4-52.4 GHz.
* To consider the information on characteristics and protection requirements of MS systems in the frequency band 51.4-52.4 GHz and if available, conduct the sharing studies with FSS (Earth-to-space) limited to feeder links for GSO use

To conduct studies to determine the limits of unwanted emission power from GSO FSS earth stations limited to feeder links operating in the 51.4-52.4 GHz band within the EESS (passive band) 52.6-54.25 GHz band when conducting such studies the effect of unwanted emissions from stations of existing terrestrial services allocated in 51.4-52.6 GHz band should also be considered

* To prepare proposals on revision of Resolution 750 (Rev.WRC-15), based on studies of aggregate interference effects from FSS GSO satellite networks in 51.4-52.4 GHz band and stations of existing terrestrial services allocated in the 51.4-52.6 GHz band
* To study the possible impact from FSS (Earth-to-space) on radio astronomy observations that may be carried out under national arrangements according to No 5.556
* To coordinate the activity with ECC PT1
* To prepare proposals to the draft CPM Report
* To prepare proposals to ECP, if necessary

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

## European Union (date of proposal)

## Regional telecommunication organisations

APT (date of proposal)

ATU (date of proposal)

Arab Group (date of proposal)

CITEL (date of proposal)

RCC (16 September, 2016)

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 frequency bands currently 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).

The RCC Administrations consider that during the studies it is needed to identify priority frequency bands which are non-overlapped with the bands in the Agenda item 1.13 (IMT).

## International organisations

IATA (date of proposal)

ICAO (date of proposal)

IMO (date of proposal)

SFCG, ESA (June, 2016)

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 (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 (November 2016)

EUMETNET:

No opposition to the possible allocation of the frequency band 51.4-52.4 GHz to the FSS (E-s) provided that protection of EESS (passive) and ground-based radiometers is ensured

## Regional organisations

Eurocontrol (date of proposal)

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal)

GSMA (date of proposal)

CRAF (date of proposal)