**United States of America**

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 9, Issue 9.1.9:** 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)

**BACKGROUND:**

Resolution **162 (WRC-15)** resolves to invite ITU-R to conduct studies considering additional spectrum needs for development of the fixed-satellite service (FSS) and conduct sharing and compatibility studies with existing services to determine the suitability of new primary allocations to the FSS in the frequency band 51.4-52.4 GHz (Earth-to-space) limited to FSS gateway links for geostationary orbit use, and the possible associated regulatory actions.

ITU-R has conducted studies required by Resolution **162 (WRC-15)**. The results of analysis of additional spectrum needs are contained in DN Report ITU-R S.[SPECTRUM\_NEEDS]. The results of sharing and compatibility studies with incumbent services including the fixed service (FS), mobile service (MS), Earth exploration-satellite service (EESS) (passive), radio astronomy service (RAS), and sharing with potential IMT-2020 applications are contained in PDN Report ITU-R S.[SPECTRUM\_SHARING].

The spectrum needs were analyzed and it was concluded that the additional allocation to the FSS being considered is beneficial to make broadband connections accessible to communities as achieved by HTS (High Throughput Satellite) systems.

Additionally, the outcome of the studies has demonstrated the possibility of sharing and compatibility with the appropriate protection measures. Studies included sharing and compatibility between FSS and other primary services in the band, such as fixed service and mobile service (including IMT-2020). Studies were also performed for the protection of Earth Exploration-Satellite Service (EESS) and Space Research Service (SRS) allocated in adjacent bands.

Based on the results of the sharing and compatibility studies this proposal supports an allocation of the frequency band 51.4-52.4 GHz to the fixed-satellite service (Earth-to-space), limited to FSS gateway links for geostationary orbit use while protecting currently allocated services in the same frequency band and in adjacent bands as follows:

To protect FS stations, separation distances up to 33 km are required when assuming flat terrain, which means that the distance can be reduced when real terrain is taken into consideration. Regarding the possible IMT-2020 applications of the MS in the same frequency band, the required separation distances between FSS earth stations and IMT base station and IMT user equipment are 260 and 330 meters, respectively.

The protection of non-GSO EESS (passive) sensors operating in the frequency band 52.6‑54.25 GHz can be achieved by limiting the FSS earth station unwanted emissions falling in the passive band.

Regarding the protection of future GSO EESS (passive) sensors, a footnote in article 5 will require coordination between a FSS network and a notified GSO EESS network when the orbital separation between the GSO EESS space station and the FSS space station is less than 1.8 degrees.

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations  
(See No. 2.1)

MOD USA/9.1.9/1

51.4-55.78 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 51.4-52.4 FIXED-SATELLITE (Earth-to-space) ADD 5.A919 ADD 5.B919  FIXED  MOBILE  5.547 5.556 MOD 5.338A | | |
| 52.4-52.6 FIXED MOD 5.338A  MOBILE  5.547 5.556 | | |

**Reasons**: Creates an allocation to the FSS (Earth-to-space) in 51.4-52.4 GHz.

MOD USA/9.1.9/2

5.338A In the frequency bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30‑31.3 GHz, 49.7‑50.2 GHz, 50.4-50.9 GHz, 51.4-52.6 GHz, 81-86 GHz and 92‑94 GHz, Resolution **750 (Rev.WRC‑19)** applies.     (WRC‑19)

**Reasons:** Applies the limits for FSS ES unwanted emissions as contained in the proposed revision to Resolution **750 (Rev.WRC-15).**

ADD USA/9.1.9/1

5.A919 The use of the bands 51.4-52.4 GHz by the fixed-satellite service (Earth-to-space) is limited to earth stations in geostationary satellite networks with a minimum antenna diameter of 4.5 meters.

Reasons: Limits the new allocation to gateways operating in FSS GSO networks.

ADD USA/9.1.9/2

5.B919 An administration that has notified a GSO EESS space station in the frequency band 52.6-54.25 GHz may seek the agreement of administrations who have submitted coordination requests for fixed-satellite service systems under No. 9.7 that are within 1.8 degrees of the notified GSO EESS space station.  The administration with the fixed-satellite service system shall cooperate with the EESS administration and take reasonable steps in order to find a mutually acceptable solution.  The BR shall make no examination or finding under Articles 9 or 11 pursuant to this provision.

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section II − Power limits for terrestrial stations

MOD USA/9.1.9/3

TABLE **21-2**     (Rev.WRC‑19)

|  |  |  |
| --- | --- | --- |
| Frequency band | Service | Limit as specified in Nos. |
| … | … | … |
| 10.7-11.7 GHz 5 (Region 1) 12.5-12.75 GHz 5 (Nos. 5.494 and 5.496) 12.7-12.75 GHz 5 (Region 2) 12.75-13.25 GHz 13.75-14 GHz (Nos. 5.499 and 5.500) 14.0-14.25 GHz (No. 5.505) 14.25-14.3 GHz (Nos. 5.505 and 5.508) 14.3-14.4 GHz 5 (Regions 1 and 3) 14.4-14.5 GHz 14.5-14.8 GHz 51.4-52.4 GHz | Fixed-satellite | 21.2**,** 21.3and21.5 |
| … | … | … |

**Reasons:** Applies the limits in Nos. 21.2**,** 21.3and21.5 to the new allocation.

Section III − Power limits for earth stations

MOD USA/9.1.9/4

TABLE **21-3**     (Rev.WRC‑19)

|  |  |  |
| --- | --- | --- |
| Frequency band | | Services |
| … | … | … |
| 14.3-14.4 GHz 6 | (for Regions 1 and 3) |  |
| 14.4-14.8 GHz |  |  |
| 17.7-18.1 GHz |  | Fixed-satellite |
| 22.55-23.15 GHz |  | Earth exploration-satellite |
| 27.0-27.5 GHz 6 | (for Regions 2 and 3) | Mobile-satellite |
| 27.5-29.5 GHz |  | Space research |
| 31.0-31.3 GHz | (for the countries listed in No. 5.545) |  |
| 34.2-35.2 GHz | (for the countries listed in No. 5.550 with respect to the countries listed in No. 5.549) |  |
| 51.4-52.4 GHz |  | Fixed-satellite |

**Reasons:** Applies the limits in No. 21.8 to the new FSS frequency band

APPENDIX 7 (REV.WRC‑15)

Methods for the determination of the coordination area around an earth  
station in frequency bands between 100 MHz and 105 GHz

ANNEX 7

System parameters and predetermined coordination distances for determination of the coordination area around an earth station

MOD USA/9.1.9/5

TABLE 7c    (Rev.WRC‑19)

Parameters required for the determination of coordination distance for a transmitting earth station

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting space radiocommunication service designation | | Fixed- satellite | Fixed- satellite 2 | Fixed- satellite 3 | Space research | Earth  exploration-satellite, space research | Fixed-satellite, mobile-satellite, radionavigation-satellite | Fixed-satellite | Fixed- satellite 2 | |
| Frequency bands (GHz) | | 24.65-25.25 27.0-29.5 | 28.6-29.1 | 29.1-29.5 | 34.2-34.7 | 40.0-40.5 | 42.5-47 47.2-50.2 50.4-51.4 | 51.4-52.4 | 47.2-50.2 | |
| Receiving terrestrial  service designations | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile, radiolocation | Fixed, mobile | Fixed, mobile, radionavigation | Fixed, mobile | Fixed, mobile | |
| Method to be used | | § 2.1 | § 2.2 | § 2.2 |  | § 2.1, § 2.2 | § 2.1, § 2.2 | § 2.1 | § 2.2 | |
| Modulation at terrestrial station 1 | | N | N | N |  | N | N | N | N | |
| Terrestrial station interference parameters and criteria | *p*0 (%) | 0.005 | 0.005 | 0.005 |  | 0.005 | 0.005 | 0.005 | 0.001 | |
| *n* | 1 | 2 | 1 |  | 1 | 1 | 1 | 1 | |
| *p* (%) | 0.005 | 0.0025 | 0.005 |  | 0.005 | 0.005 | 0.005 | 0.001 | |
| *NL* (dB) | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | |
| *Ms* (dB) | 25 | 25 | 25 |  | 25 | 25 | 25 | 25 | |
| *W* (dB) | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | |
| Terrestrial station parameters | *Gx* (dBi) 4 | 50 | 50 | 50 |  | 42 | 42 | 42 | 46 | |
| *Te* (K) | 2 000 | 2 000 | 2 000 |  | 2 600 | 2 600 | 2 600 | 2 000 | |
| Reference bandwidth | *B* (Hz) | 106 | 106 | 106 |  | 106 | 106 | 106 | 106 | |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | −111 | −111 | −111 |  | −110 | −110 | -110 | −111 | |
| 1 A: analogue modulation; N: digital modulation.  2 Non-geostationary satellites in the fixed-satellite service.  3 Feeder links to non-geostationary-satellite systems in the mobile-satellite service.  4 Feeder losses are not included. | | | | | | | | | |

MOD USA/9.1.9/6

RESOLUTION 750 (Rev.WRC‑19)

Compatibility between the Earth exploration-satellite service (passive) and relevant active services

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

…

noting

*a)* that the compatibility studies between relevant active and passive services operating in adjacent and nearby frequency bands are documented in Report ITU-R SM.2092 and in [PDN] Report ITU-R S.[SPECTRUM\_SHARING];

*b)* that the compatibility studies between IMT systems in the frequency bands 1 375‑1 400 MHz and 1 427-1 452 MHz and EESS (passive) systems in the frequency band 1 400‑1 427 MHz are documented in Report ITU-R RS.2336;

*c)* that Report ITU-R F.2239 provides the results of studies covering various scenarios between the fixed service, operating in the frequency band 81-86 GHz and/or 92-94 GHz, and the Earth exploration-satellite service (passive), operating in the frequency band 86-92 GHz;

*d)* that Recommendation ITU-R RS.2017 provides the interference criteria for satellite passive remote sensing,

TABLE 1-1

|  |  |  |  |
| --- | --- | --- | --- |
| EESS (passive) band | Active service band | Active service | Limits of unwanted emission power from active service stations in a specified bandwidth within the EESS (passive) band1 |
| … | … | … | … |
| 52.6-54.25 GHz | 51.4-52.6 GHz | Fixed | For stations brought into use after the date of entry into force of the Final Acts of WRC‑07:  −33 dBW in any 100 MHz of the EESS (passive) band |
| 52.6-54.25 GHz | 51.9-52.4 GHz | Fixed-satellite (E‑to‑s) | For earth stations brought into use after the date of entry into force of the Final Acts of WRC-19:  -37 dBW in any 100 MHz of the EESS (passive) band for earth stations with antenna elevation angles lower than 75°  -52 dBW in any 100 MHz of the EESS (passive) band for earth stations with antenna elevation angles equal or higher than 75° |

**Reasons:** Limit the unwanted emissions from the FSS Earth stations falling in the band 52.6‑54.25 GHz to protect the EESS (passive) according to their elevation angle.