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| **US Radiocommunication Sector****FACT SHEET** |
| **Study Group:** USWP 7B | **Document No:** US7B\_27\_005\_NC |
| **Reference:** RES **COM6/8 (WRC-23)** and RES **COM6/10** | **Date:** 17 January 2024 |
| **Document Title:** Working documenttowards a preliminary draft new recommendation containing characteristics of SRS and EESS systems in the 2025 – 2120 MHz band. |
| **Authors**Richard TsengNASA Bashaer ZakiNASATed Berman, Peraton for NASAJames BrasePeraton for NASADennis LeeNASA JPL | **Telephone**301-286-1826301-323-3627240-449-0884703-483-1575818-354-6908 | **E-Mail**richard.s.tseng@nasa.govbashaer.e.zaki@nasa.govtheodore.e.berman@nasa.govjames.m.brase@nasa.govdennis.k.lee@jpl.nasa.gov |
| **Purpose:** To document characteristics of SOS, SRS, and EESS systems operating (s-s) and (E-s) links in the 2 025 – 2 110 MHz and 2 110 – 2 120 MHz bands for use in studies of compatibility with proposed MSS operations in the (s-E) and (E-s) directions in adjacent and near-adjacent bands as part of WRC-27 agenda items 1.12 and 1.14.  |
| **Abstract:** WRC-27 agendaitems 1.12 calls for the consideration, based on the results of studies, of possible allocations to the mobile satellite service and possible regulatory actions in frequency bands including the 2 010 - 2 025 MHz band in the (space-to-Earth) and (Earth-to-space) directions required for the future development of low-data-rate non-geostationary mobile satellite systems. The adjacent 2 025 – 2 110 MHz band is allocated to the space operations, space research, and earth exploration-satellite services in the (s-s) and (E-s) directions and is heavily utilized by international space agency missions. In addition, WRC-27 agenda item 1.14 calls for the consideration of possible allocations to the mobile satellite service in the (space-to-Earth) direction in the 2 120 – 2 160 MHz band in all regions, and in the 2 160 – 2 170 MHz band in Regions 1 and 3. The 2 110 – 2 120 MHz band is allocated to the SRS (deep space) service which features system characteristics and protection criteria which differ from those applicable to near-Earth SRS systems in the 2 025 – 2 110 MHz band. This contribution begins the development of a preliminary draft new recommendation documenting the characteristics of SOS, SRS, and EESS systems for use in adjacent band studies associated with WRC-27 agenda items 1.12 and 1.14.  |
| **Fact Sheet Preparer:** James Brase, Peraton for NASA |

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| **Radiocommunication Study Groups** |  |
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| **English only** |
| WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R SA.[2.0 GHZ SRS & EESS CHAR] |
| Technical and operational characteristics of the space research service (SRS) and earth exploration satellite service (EESS) systems that use the 2 025-2 120 MHz (Earth-to-space) frequency band to be used for assessing interference and for conducting sharing studies |

(202X)

Scope

This Recommendation provides technical and operational characteristics to be used in sharing studies for the space research service (SRS) and earth exploration satellite service (EESS) that use the 2 025-2 120 MHz (Earth-to-space) frequency band related to science missions.

Keywords

SRS, EESS, DRS

Related ITU-R Recommendations and Reports

Recommendation [ITU-R SA.1018](https://www.itu.int/rec/R-REC-SA.1018) – *Hypothetical reference system for systems comprising data relay satellites in the geostationary orbit and user spacecraft in low Earth-orbits*

Recommendation [ITU-R SA.1020](https://www.itu.int/rec/R-REC-SA.1020) – *Hypothetical reference system for the Earth exploration-satellite and meteorological satellite services*

Recommendation ITU-R SA.1014 – *Radiocommunication requirements for manned and unmanned deep space research*

Recommendation [ITU-R SA.1414](https://www.itu.int/rec/R-REC-SA.1414) – *Characteristics of data relay satellite systems*

[The ITU Radiocommunication Assembly,

considering

*a)* that the frequency band 2 025-2 110 MHz is allocated to the SRS and EESS on a primary basis among other services in the Earth-to-space and space-to-space directions;

*b)* that the frequency band 2 110-2 120 MHz is allocated to the SRS (deep space) on a primary basis among other services in the Earth-to-space direction;

*c)* that in order to carry out sharing studies, technical and operational characteristics of SRS and EESS systems for use in the frequency band 2 025-2 120 MHz are needed, where applicable,

*d)* that technical, technical and operational characteristics of data relay satellite (DRS) systems are contained in Recommendation ITU-R SA.1414.

recommends

that the technical and operational system characteristics for the space research service (SRS) and earth exploration satellite service (EESS) operating in the 2 025-2 110 MHz (Earth-to-space) and for the SRS (deep space) (Earth-to-space) operating in the 2 110-2 120 MHz frequency bands detailed in the Annex should be used in sharing studies.

Annex

Technical and operational characteristics of the space research service (SRS) and earth exploration satellite service (EESS) systems that use the 2 025-2 120 MHz (Earth-to-space) frequency band to be used for assessing interference and for conducting sharing studies

This Recommendation provides the technical and operational characteristics of the SRS and EESS systems in the 2025-2120 MHz band.

The frequency band 2 025-2 110 MHz is allocated to the SRS and EESS (Earth-to-space) and the frequency band 2 110-2 120 MHz is allocated to the SRS (deep space) (Earth-to-space). Typical characteristics for systems in these frequency bands are listed below in Tables 1 through 4.

# 1 Earth-to-Space Links, 2 025-2 110 MHz Band

Tables 1 and 2 list the transmit and receive parameters, respectively, for Earth-space (E-s) links in the 2 025-2 110 MHz band for SRS and EESS systems.

TABLE 1

E-s Transmit Links

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** |  | **System A**  | **System B** | **System C** |
| Earth station location | deg. | USA |  |
| Transmit antenna gain | dBi |  45.4 |  45.7 |  |
| Transmit antenna pattern |   | RR Appendix 8, Annex III |  |
| Transmit power | dBW |  23.0 |  23.0 |  |
| Max pwr spectral density | dBW/Hz | -15.3 | -25.1 |  |
| Transmit bandwidth | MHz |  .036 | .128 |   |
| Modulation Type |   |  PSK/PM |  BPSK |   |
| Subcarrier | kHz |  4.0 |  - |   |
| Range tone | kHz |  - |  - |   |
| Minimum elevation angle | deg |  5.0 |  5.0 |   |

Table 2

E-s Receive Links

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** |  | **System A** | **System B** | **System C** |
| Altitude | km |  529 |  407 |   |
| Eccentricity |   |  0.0 |  0.0 |   |
| Inclination (deg) |   |  97.9 |  65.0 |   |
| Sun Synchronous? (Y/N) |   |  N |  N |   |
| Receive Antenna Gain | dBi |  3.0 |  23.0 |   |
| Receive antenna temperature | k  |  460 |  226 |   |
| Receive antenna pattern |   | Rec. ITU-R S.672  |  |

# 2 Earth-to-Space Links, 2 110-2 120 MHz Band

Tables 3 and 4 list the transmit and receive parameters, respectively, for Earth-space (E-s) links in the 2 110-2 120 MHz band for SRS (deep space) systems.

TABLE 3

E-s Transmit Links

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** |  | **System DS-A** | **System DS-B** | **System DS-C** |
| Earth station location | deg. | USA | Australia | India |
| Transmit antenna gain | dBi | 55.2 | 62.7 | 53.5 |
| Transmit antenna pattern |   | Rec. ITU-R SA.509-3 | Rec. ITU-R S.580-6 |
| Transmit power | dBW | 43 | 54.7 | 43 |
| Max pwr spectral density | dBW/Hz | 7 | 18.7 | 4 |
| Transmit bandwidth | MHz | 2.5 | 2.5 | 2.5 |
| Modulation Type |   | PCM/PSK/PM | PCM/PSK/PM | PCM/PSK/PM |
| Subcarrier | kHz | 16 | 16 | 8 |
| Range tone | kHz | 1033 | 1033 | 1033 |
| Minimum elevation angle | deg | 10 | 10 | 10 |

Table 4

E-s Receive Links

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** |  | **System DS-A** | **System DS-B** | **System DS-C** |
| Minimum distance from Earth (Launch & Early Cruise, Earth flybys) | km | 200 | 3000 | 264 |
| Maximum distance from Earth | km | 4.01 x 108 | 1.52 x 109 | 4.01 x 108 |
| Receive Antenna Gain | dBi | -2 (LGA)28.7 (HGA) | 7 (LGA)34.6 (HGA) | 0 (LGA)32.5 (HGA) |
| Receive antenna temperature | deg K  | 400 | 1500 | 600 |
| Receive antenna pattern |   | Rec. ITU-R S.672 |