



**Recommendation SFCG 14-2R5**

**USE OF THE 37 - 38 GHz SPACE RESEARCH SERVICE  
ALLOCATION**

The SFCG,

CONSIDERING

- a) that the 37-38 GHz band is allocated to the space research service in the space-to-Earth direction;
- b) that the band pair 37 – 37.5 GHz and 40 – 40.5 GHz was originally allocated for the purpose of supporting communications systems for manned planetary exploration as well as development and operation of manned planetary missions in the lunar environment;
- c) that this band pair is the only one allocated for this purpose and that the safety of astronauts/cosmonauts depends on the continued availability of this band pair;
- d) that, considering distance alone, the received PFDs from the planetary missions, manned or unmanned, are weaker by more than 50 dB compared to those of the Category A missions, including L2, Lunar, GSO, MEO, and LEO missions;
- e) that the 37-38 GHz space research allocation may be used for very high data rate transmission from the space-based VLBI observatories as they are more RFI-tolerant than the other Category A missions;
- f) that high density fixed service and fixed satellite service systems are planned to be operated in 37-38 GHz and 37.5-38 GHz respectively;

RECOMMENDS

- 1. that the 37 – 37.5 GHz band be maintained available for implementation of space-to-Earth links for manned and unmanned planetary missions and for development and operation of manned planetary missions in the Lunar environment, recognizing that manned missions have higher priority than unmanned missions ;
- 2. that Earth-to-space links for manned lunar and manned and unmanned planetary exploration be implemented in the band 40 – 40.5 GHz or other Earth-to-space bands as appropriate;

3. that to protect the manned planetary missions, all incompatible lunar missions cease their operations when manned planetary missions are present in the deep space environment;
4. that sun-Earth libration point (L2) missions considering to use the 37 – 38 GHz band implement their space-to-Earth links in the 37.5 – 38 GHz portion of the band, with associated Earth-to-space links in the 40 – 40.5 GHz band or other Earth to space bands as appropriate;
5. that Space VLBI systems implementing time-critical data downlinks requiring up to 1 GHz of real-time bandwidth utilize the band 37 – 38 GHz, recognizing the need for operational coordination, when required, with manned lunar and planetary exploration systems
6. that Category A space research service missions, that can share with FSS, be accommodated in the 37.5-38 GHz portion of the band with associated Earth-to-space links in appropriate bands;
7. that Member agencies take into account the information contained in the Annex when examining intra-service sharing in the 37-38 GHz band.

## ANNEX to Recommendation SFCG 14-2R5

### USE OF THE 37 - 38 GHz SPACE RESEARCH SERVICE ALLOCATION

This Recommendation provides guidelines for 37-38 GHz SRS downlink band partitioning. Some typical space research activities are recognized and a few major parameters of each activity are listed in Table I:

TABLE I

Activity:	Range (km)	Required or Requested Bandwidth (Min-Max) (MHz)	Spreading Loss Variation (dB) <sup>1</sup>	Range-Based Relative Performance (dB)
1) <u>Planetary Exploration Missions (Mars)</u>	min 60E6 max 39E7	80 – 8000 <sup>3</sup> 2 – 200 <sup>2</sup>	16	-52 +/-8
	2 000 000	(ITU Planetary/Near Earth Definition)		
2) <u>Libration point missions (L2, S-E)</u>	1 500 000	200 <sup>4</sup>	Nil	-6
3) <u>Lunar exploration missions</u>	380 000	500 <sup>5</sup>	Nil	0 (Ref.)
4) <u>High data rate space-based astronomy missions (e.g. S-VLBI)</u>	typ: 5 000 - 40 000 max:2 000-400 000	1 000 <sup>6</sup>	18 46	29 +/-9 23 +/-23
5) <u>Missions employing Near-Earth Orbiters</u>	200 - 2 000	500 <sup>7</sup>	20	56 +/-10

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- 1) For constant spacecraft EIRP.
  - 2) Present technology: (50W/5m dish)(50k/34m dish)(QPSK/R=1/2 code) supports 1-5 Mb/s at max Mars range (2-10 MHz required). Projected technology (100W/10m dish)(50k/70m dish)(Turbo) supports 100 Mb/s at max Mars range (200 MHz required). A bandwidth request of at least 100 MHz will not nearly fulfill the projected capability at min Mars range.
  - 3) Minimum range bandwidths derived from the bandwidths projected for the maximum range.
  - 4) ESA, 1999 proposal.
  - 5) NASDA, 1998 request (METS).
  - 6) NASA, 1998 request (ARISE). Two polarizations required.
  - 7) Suggested maximum.
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