



**Recommendation SFCG 24-1R1**

**FREQUENCY ASSIGNMENT GUIDELINES FOR ACTIVE REMOTE  
SENSING IN THE MARS REGION**

The SFCG,

CONSIDERING

- a) that concurrent active remote sensors and a regional communication network can be expected in the foreseeable future at Mars as missions to Mars increase in number and variety;
- b) that frequencies for spaceborne active sensors are provided in the existing allocations to the space research service (SRS) (active);
- c) that frequencies for direct communication between a spacecraft at Mars and an Earth station are provided in the existing allocations to SRS;
- d) that the SFCG has resolved to provide assistance to member agencies in coordinating frequency assignment for communications on deep space missions, including missions to Mars (see RES SFCG A 21-1);
- e) that special frequencies may be required for the study of physical characteristics of Mars and its moons;
- f) that in accordance with Resolution SFCG 23-5, agencies planning to develop active remote sensors for use in the Mars region, work together with IUCAF to study issues of compatibility with radio astronomy observatories in the shielded zone of the Moon;

RECOGNIZING

- a) that Mars active remote sensors must not interfere with the direct communication links between space and the Earth using frequency bands allocated in the ITU Radio Regulations;

- b) that Mars active remote sensors also need to avoid interference with frequencies used by Mars relay networks and other communication equipment in the Mars environment;

#### RECOMMENDS

1. that agencies select frequencies from Table 1 for active remote sensing in the Mars region according to the specific applicability and precautions recommended in Table 2;
2. that assignment of Mars active remote sensing frequencies be coordinated within the SFCG in accordance with RES SFCG A24-1, with special attention given to ensure compatibility with communication links in the Mars region.

Table 1: Summary of Frequency Bands for Active Remote Sensing in the Mars Region

<b>Frequency Band (MHz)</b>
1-6
50-52
125-175*
460-480
1215-1300
2380-2385
3100-3300
5250-5570
8550-8650
9300-9900
13250-13750
17200-17300
35500-36000
78000-79000
94000-94100

\*Note: This frequency band will be useful for estimation of dielectric properties of Mars' moons

**Table 2 – Notes on Select Mars Active Sensing and Radiocommunications Links Frequencies Recommended in Table 1**

Active Sensing Frequencies	Instrument	Adjacent Radiocommunications Links allocated in Rec 22-1R1	Guardband, Minimum Separation between Bands	Interference Mitigation
460-480 MHz	SAR Imager	435-450 MHz relay	10 MHz	Bandwidth to range from 2.5 MHz to 7.5 MHz (as for Mars Eagle) with center frequency of 465 MHz; sensor band moved to 460-480 MHz for 10 MHz guardband
2.38-2.385 GHz	SAR Imager	2.29-2.3 GHz relay and space-to-Earth	80 MHz	Bandwidth about 1 MHz with center frequency of about 2.385 GHz (as for Magellan ); sensor could move to the right if necessary but stay within allocated band 2.38-2.385 GHz
8.55 - 8.65 GHz	active sensor	8.45-8.50 GHz relay	50 MHz	Bandwidth for typical SAR about 20 MHz with center frequency of 8.6 GHz; could move to the right but stay within allocated band 8.55-8.65 GHz
13.25 - 13.75 GHz	active sensor	14.5-15.35 GHz relay	750 MHz	Bandwidth for high resolution altimeter around 320 MHz (similar to TOPEX/JASON) with center frequency of 13.5 GHz; could move to left but stay within allocated band 13.25-13.75 GHz
35.5 – 36.0 GHz	active sensor, topographic mapper	34.2-34.7 GHz Earth-to-Space	800 MHz	Bandwidth for high resolution altimeter around 320 MHz (similar to TOPEX/JASON) with center frequency of 35.75 GHz; could move to right but stay within allocated band 35.5-36.0 GHz; Bandwidth for high resolution topographic mapper up to 500 MHz with center frequency of 35.75 GHz; if less than 500 MHz, could move to right but stay within allocated band 35.5-36.0 GHz