

RECOMMENDATION ITU-R SA.1261*

**FEASIBILITY OF SHARING BETWEEN SPACEBORNE CLOUD RADARS
AND OTHER SERVICES IN THE RANGE OF 92-95 GHz**

(Question ITU-R 140/7)

(1997)

The ITU Radiocommunication Assembly,

considering

- a) that spaceborne cloud radar can determine the vertical profile of clouds and their global distribution;
- b) that these parameters are very important for determination of the Earth's radiation budget and thereby predictions of global warming;
- c) that measurement of reflectivity from clouds as low as -30 dBZ is necessary;
- d) that scattering from clouds at millimeter wavelengths increases approximately as the frequency raised to the fourth power;
- e) that worldwide, repetitive measurements of clouds require the use of spaceborne active sensors;
- f) that the 92-95 GHz range of frequencies would be suitable to satisfy all requirements, including bandwidth requirements, for spaceborne cloud radars;
- g) that Recommendation ITU-R SA.577 establishes requirements for spaceborne cloud radar measurements in this frequency range;
- h) that, using available technology, these requirements cannot be satisfied in any frequency band currently allocated for active spaceborne sensors;
- j) that Resolution 712 (Rev.WRC-95) of the World Radiocommunication Conference (Geneva, 1995) seeks provision of up to 1 GHz of frequency spectrum around 95 GHz for use by space-based active sensors;
- k) that the 92-95 GHz band is allocated to the fixed, mobile, fixed-satellite (FSS) (Earth-to-space) and radio-location services on a co-primary basis;
- l) that the 86-92 GHz band is allocated on a co-primary basis to passive services including radioastronomy, Earth exploration-satellite (passive) and space research (passive);
- m) that sharing between a spaceborne cloud radar and other services has been studied;
- n) that spaceborne cloud radars would produce power flux-densities at the Earth's surface in excess of the power flux-density levels likely to be imposed in frequency bands near 95 GHz allocated to the fixed and mobile services in order to protect fixed and mobile operations;
- o) that sharing with the FSS (Earth-to-space) is not feasible due to excessive interference to the spaceborne cloud radar;
- p) that the spectrum between 90 and 100 GHz contains many molecular resonances of interest to radio-astronomers;
- q) that co-frequency operation by spaceborne cloud radars and radioastronomy observatories could result in disruption to radioastronomy observations with a remote possibility of irreversible damage to the radioastronomy receiver;
- r) that current technology limits the use of filters in radioastronomy receivers to reject emissions from spaceborne cloud radars;

* This Recommendation should be brought to the attention of Radiocommunication Working Parties 4A, 7D, 8A, 8B and 9D.

- s) that the band 78-79 GHz is suitable for active sensor applications in this region of the spectrum other than for cloud radars;
- t) that a bandwidth of 100 MHz is sufficient for use by spaceborne cloud radars;
- u) that methods have been identified to mitigate the potential impact to radioastronomy observations,

recommends

- 1** that spaceborne cloud radars and fixed and mobile services not share common frequency bands;
 - 2** that spaceborne cloud radars and the FSS (Earth-to-space) not share common frequency bands;
 - 3** that sufficient techniques be employed in the spaceborne radar to meet the harmful interference criterion of -222 dB(W/(m²/Hz)) given in Recommendation ITU-R RA.769 to protect radioastronomy observations in the band 86-92 GHz;
 - 4** that sharing with the radiolocation service in the frequency range of 92-95 GHz is feasible;
 - 5** that technical and operational measures be adopted by the radioastronomy service and active sensor operators to minimize effects on radioastronomy operations;
 - 6** that use of frequencies in the range 92-95 GHz by spaceborne active sensors be limited to spaceborne cloud radars.
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