Question ITU-R 230-1/7

Preferred frequency bands and protection criteria
for radio astronomy measurements in space

(2000-2010)

The ITU Radiocommunication Assembly,

considering

*a)* that space-based radio telescopes provide information which cannot be obtained with ground-based radio telescopes, particularly as they enable observations:

– with angular resolution not achievable with ground-based interferometry;

– with unprecedented sensitivity in measuring the cosmic microwave background radiation;

– at frequencies below approximately 10 MHz where the Earth’s ionosphere blocks radiation;

– in some millimetre and sub-millimetre bands, where the Earth’s atmosphere significantly attenuates (or completely blocks) radiation;

*b)* that space-based VLBI, cosmic microwave background observations, very low frequency observations and observations in the atmospherically-opaque millimetre and sub-millimetre bands may be the only means to provide answers to certain fundamental questions of modern astronomy;

*c)* that protection criteria for radio astronomy observations with space-based radio telescopes may differ from those for ground-based radio astronomy due to the location of the space-based telescopes in orbit, their distance from the Earth, and their orientation relative to man-made emissions;

*d)* that radio astronomy observations from space may be conducted in the frequency bands utilized by the space research service (passive);

*e)* that, when conducting radio astronomy observations from space in bands shared by the active and passive services, the needs and requirements of both active and passive services need to be considered;

*f)* that, unlike ground-based radio telescopes, space-based radio telescopes are located in close proximity to transmitters and receivers which are used for space operations and for data transmission;

*g)* that highly successful space radio astronomy missions have already been flown and launch and operation of more such missions are envisaged in the future;

*h)* that relevant technologies are being developed to enable such missions (deployable antennas, cooling systems, high data rate recording, transmission and processing systems, accurate pointing and stabilization of space based radio telescopes, etc.) and that such technology may be used by other telecommunication services in the future;

*i)* that there is no specific provision in the Radio Regulations for the protection of space‑based radio astronomy (except for applications in the space research (passive) service in the band 1 668‑1 668.4 MHz),

decides that the following Questions should be studied

1 What are the preferred frequency bands in which space-based radio astronomy observations could be conducted?

2 What are the typical technical and operational characteristics of space-based radio astronomy observation systems?

3 What are the performance requirements, and protection criteria for space-based radio astronomy observations?

further decides

1 that the results of the above studies should be included in (a) Recommendation(s) and/or (a) Report(s);

2 that the above studies should be completed by 2027.

Category: S2