

## RECOMMENDATION ITU-R SA.509-2\*

**Space research earth station and radio astronomy reference antenna radiation pattern for use in interference calculations, including coordination procedures**

(Question ITU-R 127/7)

(1978-1990-1998)

The ITU Radiocommunication Assembly,

*considering*

- a) that the application of coordination procedures between space research earth stations or radio astronomy observatories and stations of other services is dependent upon specific antenna radiation patterns;
- b) that where this information does not exist, it may be desirable to use a reference antenna radiation pattern which represents the side-lobe gain levels that are not expected to be exceeded at most off-axis angles in the majority of antennas used in the service;
- c) that measured data from some large ( $D/\lambda \geq 100$ ) parabolic Cassegrain antennas used in the Space Research Service indicate an off-axis discrimination that is as good as, or better than, that of the reference radiation pattern,

*recommends*

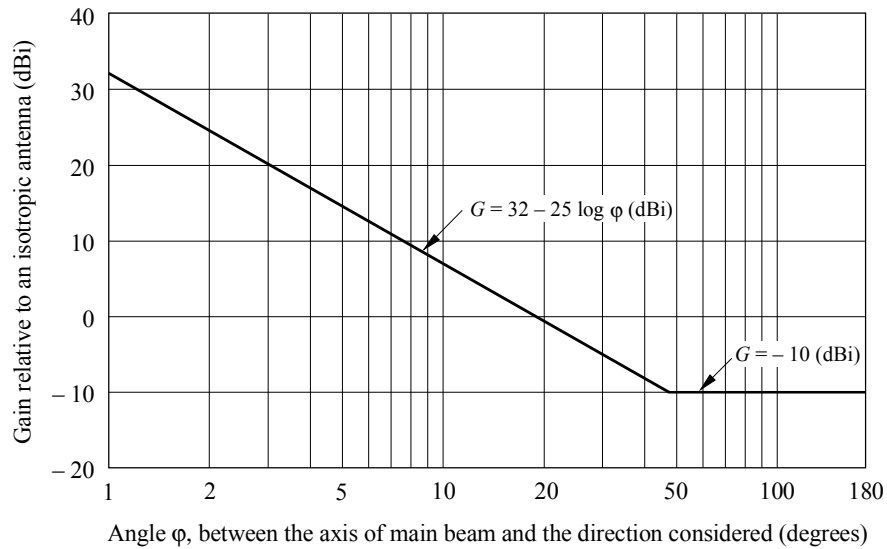
- 1 that in the absence of measured data on the levels of side-lobe response of a space research earth station or radio astronomy antenna which is subject to interference analyses or coordination procedures, the reference radiation pattern of Fig. 1 be used to represent the antenna side-lobe response;
- 2 that this reference radiation pattern be used only for antennas the diameters of which are greater than 100 wavelengths, for angles greater than  $1^\circ$  from the main beam axis and for frequencies between about 1 and 30 GHz;
- 3 that administrations be invited to submit measured antenna radiation patterns (see Annex 1) which may be used, if necessary, to revise the reference radiation diagram in Fig. 1.

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\* Radiocommunication Study Group 7 made editorial amendments to this Recommendation in 2003 in accordance with Resolution ITU-R 44.

FIGURE 1

Reference radiation diagram to be used in the absence of measured data



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## Annex 1

### Measured radiation patterns of space research earth station and radio astronomy antennas

#### 1 Lovell Mk1A radio astronomy antenna

Fig. 2 shows the measured gain of the Lovell Mk1A radio astronomy antenna at 1 420 MHz. This antenna has a single reflector of circular aperture and a diameter of 76.2 m. The peak in the measured response at around  $95^\circ$  is due to spillover.

FIGURE 2  
Measured side-lobe pattern at 1 420 MHz

