

RECOMMENDATION ITU-R SF.406-8*

MAXIMUM EQUIVALENT ISOTROPICALLY RADIATED POWER OF RADIO-RELAY SYSTEM TRANSMITTERS OPERATING IN THE FREQUENCY BANDS SHARED WITH THE FIXED-SATELLITE SERVICE

(1966-1970-1974-1978-1982-1990-1992-1993)

The ITU Radiocommunication Assembly,

considering

- a) that systems in the fixed-satellite service (FSS) and radio-relay systems share certain frequency bands in the range of 1 GHz to about 30 GHz;
- b) that, to avoid significant interference to reception in space station receivers, without excessive transmitter powers at the earth stations of systems in the FSS or excessively large antennas, it is necessary to define maximum allowable values for the equivalent isotropically radiated power (e.i.r.p.) of radio-relay systems;
- c) that the maximum allowable values of radiated power should be such as not to place undue restriction on the design of radio-relay systems;
- d) that it is desirable for radio-relay systems to employ highly directional antennas;
- e) that it is necessary to avoid relatively constant excessive levels of interference from radio-relay emissions directed at satellites in the FSS, and particularly those in the geostationary-satellite orbit (GSO);
- f) that the radio-relay system planner often has a choice in routing new systems without severe economic or other penalties being incurred,

recommends

1. that in those frequency bands** between 1 and 10 GHz, shared between systems in the FSS and radio-relay systems involving reception at the space station:
 - 1.1 the power delivered to the antenna input of any such radio-relay system transmitter shall not exceed +13 dBW;
 - 1.2 the maximum value of the e.i.r.p. of any such radio-relay system transmitter shall not, in any case, exceed +55 dBW;
 - 1.3 as far as practicable, sites for new transmitting stations, employing maximum values of e.i.r.p. exceeding +35 dBW should be selected so that the direction of maximum radiation of any antenna will be at least 2° away from the GSO;
 - 1.3.1 if, in a particular case, this should prove impracticable, the maximum values of e.i.r.p. for each transmitter shall not exceed:
 - 1.3.1.1 +47 dBW for any antenna beam directed within 0.5° of the GSO;
 - 1.3.1.2 +47 to +55 dBW, on a linear decibel scale (8 dB per angular degree), for any antenna beam directed between 0.5° and 1.5° of the GSO;

* Radiocommunication Study Groups 4 and 9 made editorial amendments to this Recommendation in 2000 in accordance with Resolution ITU-R 44.

** The frequency bands concerned are given in the Radio Regulations.

1.4 in new radio-relay systems built on existing routes* the maximum values of e.i.r.p. for each transmitter should not, as far as possible, exceed:

1.4.1 +47 dBW for any antenna beam directed within 0.5° of any location in the GSO which has been internationally notified, or, if practicable, the GSO (see Note 4);

1.4.2 +47 to +55 dBW, on a linear decibel scale (8 dB per angular degree), for any antenna beam directed between 0.5° and 1.5° of any location in the GSO which has been internationally notified, or, if practicable, the GSO (see Note 4);

2. that in those frequency bands** between 10 and 15 GHz, shared between systems in the FSS and radio-relay systems, involving reception at the space station:

2.1 the power delivered to the antenna input of any such radio-relay system transmitter shall not exceed +10 dBW;

2.2 the maximum value of the e.i.r.p. of any such radio-relay system transmitter shall not, in any case, exceed +55 dBW;

2.3 as far as practicable, sites for transmitting stations, employing maximum values of e.i.r.p. exceeding +45 dBW should be selected so that the direction of maximum radiation of any antenna will be at least 1.5° away from the GSO;

3. that in those frequency bands** above 15 GHz, shared between systems in the FSS and radio-relay systems involving reception at the space station:

3.1 the power delivered to the antenna input of any such radio-relay system transmitter shall not exceed +10 dBW;

3.2 the maximum value of the e.i.r.p. of any such radio-relay system transmitter shall, in all cases, not exceed +55 dBW;

3.3 there shall be no restriction as to the direction of maximum radiation.

Note 1 – The above § 1.3 and 2.3 should be interpreted as, taking into account the effects of atmospheric refraction: any emission within 2° or 1.5° from the direction of maximum radiation of a radio-relay antenna and going beyond the local horizon, should not reach the GSO. The method of calculation is described in Recommendation ITU-R SF.765.

Note 2 – Receiving stations in terrestrial systems operating in frequency bands between 1 and 15 GHz shared with space systems (space-to-Earth) may benefit from the antenna main beams avoiding the geostationary orbit, if their sensitivity is sufficiently high.

Note 3 – Definitive limits applicable in shared frequency bands are laid down in Article S21 of the Radio Regulations (RR) (Nos. S21.2 to S21.7). The question is continuing to be studied, and may lead in the future to a Recommendation that the limits should be revised. At the present time, no changes are proposed to the limits as laid down in the RR.

Note 4 – The operation of a radio-relay system established on an existing route and exceeding the limits given in § 1.4.1 and 1.4.2 may, in view of the characteristics of the terrestrial and space systems involved, result in objectionable levels of interference to a geostationary satellite whose position has been notified after the radio-relay system has been brought into service; in such a case the action to be taken with regard to both systems to reduce such an interference to a level which can be agreed by the administrations concerned, should be determined by consultation between those administrations.

Note 5 – The above limits for the bands above 10 GHz should normally afford adequate protection to digital satellite systems using 8-bit PCM encoded telephony.

* For the purpose of this Recommendation, an existing route is regarded as one already planned before the conclusion of the XIth CCIR Plenary Assembly (Oslo, 1966) and brought into service before 1 January 1973.

** The frequency bands concerned are given in the Radio Regulations.