

RECOMMENDATION ITU-R S.1594

Technical characteristics of high density fixed-satellite service earth stations transmitting towards geostationary fixed-satellite service space stations in the 30 GHz range*

(Question ITU-R 266/4)

(2002)

The ITU Radiocommunication Assembly,

considering

- a) that the earth stations of various different geostationary (GSO) satellite networks in the fixed-satellite service (FSS) are planning to commence operation in the 30 GHz frequency range in the near future;
- b) that there are both technical and operational differences among these various GSO FSS networks;
- c) that a number of these GSO FSS networks are expected to provide a wide range of services to ubiquitously deployed high density FSS satellite user earth stations;
- d) that these GSO FSS networks, and their associated earth stations, are subject to coordination under various provisions of the Radio Regulations;
- e) that the identification by the ITU-R of technical characteristics for ubiquitously deployed high density earth stations of FSS networks can assist in carrying out sharing studies between these networks and other services;
- f) that some administrations have planned to deploy high density FSS earth stations in certain frequency sub-bands using technical characteristics similar to those found in Annex 1, without the need for individual site coordination;
- g) that this type of deployment needs to take into account sharing with terrestrial services, where such services are allocated on a co-primary basis;
- h) that this type of deployment needs to take into account existing and planned FSS networks with other types of earth stations and characteristics,

recommends

- 1 that the technical characteristics found in Annex 1 may be used as design guidelines and for carrying out sharing studies between high density FSS earth stations and other services;
- 2 that administrations seeking guidance on technical characteristics for high density FSS earth stations may utilize the technical characteristics found in Annex 1.

* Two administrations are of the opinion that in the absence of a clear definition of “high density fixed-satellite service”, there is no difference between these systems and other fixed-satellite service systems.

ANNEX 1

This Annex contains technical characteristics for FSS earth stations intended to be operated with GSO high density FSS networks in certain portions of the 30 GHz band without the need for individual site coordination. The characteristics of this Annex summarize the maximum unwanted emission requirements for such earth stations both as a function of frequency range and as a function of off-axis direction from the antenna. Certain essential network control functions are also defined.

Each time the expression “earth station” is used in this Recommendation, it refers to a user terminal of a high density FSS network.

This Recommendation applies for earth stations whose antenna diameter does not exceed 1.80 m or equivalent corresponding aperture.

Definitions

Carrier-off state: An earth station is in this state when it is authorized by the network control facility (NCF) to transmit, but when it does not transmit any signal. For earth stations designed for continuous transmission mode there may be no carrier-off state.

Carrier-on state: An earth station is in this state when it is authorized by the NCF to transmit and when it transmits a signal in a continuous or non-continuous mode.

Transmission disabled state: An earth station is in this state when it is not authorized by the NCF to transmit.

Control channel (CC): Channel or channels by which earth stations receive control information from the NCF for their network. Typically the control channel(s) is/are carried via the same satellite as used for transmission of user data and within the internal protocol structure of the broadcast system.

Nominated bandwidth: Bandwidth of the earth station radio frequency transmission nominated by the manufacturer. The nominated bandwidth does not exceed five times the occupied bandwidth and is wide enough to encompass all spectral components of the transmission that have a level greater than the specified radiation levels. The nominated bandwidth is also wide enough to take account of the transmit carrier frequency instability.

Occupied bandwidth: For the purpose of this Recommendation, the width of the signal spectrum 10 dB below the maximum in-band density.

Unwanted radiation: For the purposes of this Recommendation, any radiation outside the nominated bandwidth.

e.i.r.p._{max}: maximum e.i.r.p. capability of the earth station.

e.i.r.p._{nom}: either *e.i.r.p._{max}* or, when uplink power control is implemented, the maximum required e.i.r.p. of the earth station under clear-sky condition.

1 Unwanted radiation

1.1 Off-axis unwanted radiation

The following specifications apply to the earth station transmitting at e.i.r.p. values up to and including e.i.r.p._{max}.

- The earth station radiated interference field strength over the frequency range from 30 MHz to 1 000 MHz should not exceed the values given in Table 1.

TABLE 1

**Levels of radiated field strength at a test distance
of 10 m in a 120 kHz bandwidth**

Frequency range (MHz)	Quasi-peak levels (dB(μV/m))
30-230	30
230-1 000	37

The lower levels apply at the transition frequency.

- When the earth station is in the “Transmission disabled” state, the off-axis unwanted radiation from the earth station, in any 100 kHz band, should not exceed the levels in Table 2, for all off-axis angles greater than 7°.

TABLE 2

Levels of unwanted radiation – “Transmission disabled” state

Frequency band (GHz)	e.i.r.p. level (dB(pW))
1.0-2.0	40
2.0-10.7	48
10.7-21.2	54
21.2-40	60

The lower levels should apply at the transition frequency.

- For the “Carrier-on” and “Carrier-off” states, the off-axis e.i.r.p. of unwanted radiation in the specified measurement bandwidth from the earth station, should not exceed the levels in Table 3, for all off-axis angles greater than 7°. These levels apply outside the nominated bandwidth.