

RECOMMENDATION ITU-R SF.1573*

Maximum allowable values of power flux-density at the surface of the Earth by geostationary satellites in the fixed-satellite service operating in the 37.5-42.5 GHz band to protect the fixed service

(Questions ITU-R 217/9 and ITU-R 250/4)

(2002)

The ITU Radiocommunication Assembly,

considering

- a) that the band 37.5-42.5 GHz is allocated to the fixed service (FS) and the fixed-satellite service (FSS) (space-to-Earth) on a co-primary basis;
- b) that it is necessary to ensure that emissions from satellites do not cause unacceptable interference to FS systems in the band 37.5-42.5 GHz;
- c) that FS systems can be adequately protected from the aggregate emissions from multiple satellites by placing suitable limits on the power flux-density (pfd) in a reference bandwidth produced by individual satellites at the surface of the Earth;
- d) that any limitations of the pfd produced at the surface of the Earth in these bands should not place undue restrictions on geostationary (GSO) fixed-satellite systems;
- e) that within the band 39.5-42 GHz, some administrations plan to deploy FSS systems using ubiquitous very small aperture terminals;
- f) that Resolution 84 (WRC-2000) invited the ITU-R to conduct as a matter of urgency and in time for WRC-03, studies to determine whether the pfd limits included in Radio Regulations (RR) Table 21-4 adequately protect the FS in the bands 37.5-40 GHz and 42-42.5 GHz from FSS and mobile satellite service (MSS) space-to-Earth transmissions;
- g) that Resolution 84 (WRC-2000) also invited the ITU-R to conduct as a matter of urgency and in time for WRC-03, studies to determine whether the pfd limits in RR Table 21-4 adequately protect the FS in the band 40.5-42 GHz from FSS space-to-Earth transmissions, taking into account the requirements of the FSS and *considering* e) above;
- h) that any limitations of the pfd produced at the surface of the Earth should ensure a proper balance in terms of the impact on both the FS and space services sharing the same band;
- j) that some FS systems employing small net fade margins may not be fully protected from interference from FSS systems without unduly constraining those services,

* This Recommendation should be brought to the attention of Radiocommunication Study Groups 4 (Working Party (WP) 4A), 6 (WP 6S), 7 (WP 7E), 8 (WP 8D) and 9 (WP 9A, WP 9B and WP 9D).

noting

- a) that certain broadband wireless access (BWA) FS deployments may contain some receivers, presenting specific parameter combinations (high elevation angles, short hop lengths, low fade margins and high antenna gain), that point directly through the GSO arc without being able to implement the “arc avoidance” mitigation technique;
- b) that if the cases described in *noting* a) occur within the service area of a GSO FSS satellite, operational measures may be needed to adequately protect the affected FS receivers,

recognizing

that the case presented in the *notings* may be addressed by each affected administration,

recommends

- 1** that in the bands 37.5-40 GHz and 42-42.5 GHz, which are shared between GSO fixed-satellite systems and systems in the FS, the maximum allowable pfd at the surface of the Earth from any one satellite should not exceed, in any 1 MHz band (see Note 1):

-127	dB(W/m ²)	for $0^\circ \leq \theta \leq 5^\circ$
$-127 + (4/3)(\theta - 5)$	dB(W/m ²)	for $5^\circ < \theta \leq 20^\circ$
$-107 + 0.4(\theta - 20)$	dB(W/m ²)	for $20^\circ < \theta \leq 25^\circ$
-105	dB(W/m ²)	for $25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival (degrees above the horizontal plane);

- 2** that in the band 40-40.5 GHz, which is shared between GSO fixed-satellite systems and systems in the FS, the maximum allowable pfd at the surface of the Earth from any one satellite should not exceed, in any 1 MHz band:

-115	dB(W/m ²)	for $0^\circ \leq \theta \leq 5^\circ$
$-115 + 0.5(\theta - 5)$	dB(W/m ²)	for $5^\circ < \theta \leq 25^\circ$
-105	dB(W/m ²)	for $25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival (degrees above the horizontal plane);

- 3** that in the band 40.5-42 GHz, which is shared between GSO fixed-satellite systems and systems in the FS, the maximum allowable pfd at the surface of the Earth from any one satellite should not exceed, in any 1 MHz band:

-120	dB(W/m ²)	for $0^\circ \leq \theta \leq 5^\circ$
$-120 + (\theta - 5)$	dB(W/m ²)	for $5^\circ < \theta \leq 15^\circ$
$-110 + 0.5(\theta - 15)$	dB(W/m ²)	for $15^\circ < \theta \leq 25^\circ$
-105	dB(W/m ²)	for $25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival (degrees above the horizontal plane);

4 that the aforementioned levels relate to the pfd which would be obtained under free-space propagation conditions.

NOTE 1 – Some administrations in Region 2 have determined that in order to adequately protect certain BWA FS deployments in the 37.5-40 GHz band, it will be necessary for a GSO FSS satellite providing services within their territory to reduce the pfd levels that are produced during clear-sky operation by 12 dB from the levels in *recommends* 1.
