

RECOMMENDATION ITU-R BO.1785

**Intra-service sharing criteria for GSO BSS systems
in the band 21.4-22.0 GHz in Regions 1 and 3**

(Questions ITU-R 22-1/6 and ITU-R 104/6, WRC-07 Agenda items 6 and 7.1)

(2007)

Scope

This Recommendation addresses the intra-service sharing for GSO BSS systems in the band 21.4-22.0 GHz in Regions 1 and 3 that may be applied for systems operating in accordance with Resolution 525 (Rev.WRC-03).

The ITU Radiocommunication Assembly,

considering

- a) that the allocation to the broadcasting-satellite service (BSS) in the band 21.4-22.0 GHz in Regions 1 and 3 shall come into effect on 1 April 2007;
- b) that the use of this band is subject to the provisions of Resolution 525 (Rev.WRC-03);
- c) that the BSS systems in the 21.4-22.0 GHz band have the possibility to deliver wideband RF (radio-frequency) signals;
- d) that high e.i.r.p. (equivalent isotropically radiated power) is needed to compensate for high rain attenuation;
- e) that in order to operate BSS systems in this band, new intra-service sharing criteria are necessary;
- f) that such sharing criteria can be expressed as a power flux-density (pfd) mask;
- g) that to generate a pfd mask a reference co-polar antenna pattern is required;
- h) that there is no established reference receiving earth station antenna pattern in the band 21.4-22.0 GHz;
- j) that in the absence of an established reference pattern for this band, Recommendation ITU-R BO.1213 could be used,

recommends

1 that the following pfd values should be used, under clear-sky conditions, for reference for sharing among GSO BSS systems in the band 21.4-22.0 GHz:

$-143.2 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $0^\circ \leq \theta < 0.268^\circ$
$-131.8 + 20 \log \theta \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $0.268^\circ \leq \theta < 1.18^\circ$
$-134.7 + 3.12 \theta^2 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $1.18^\circ \leq \theta < 2.59^\circ$
$-124.5 + 25 \log \theta \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $2.59^\circ \leq \theta < 6.03^\circ$
$-105.0 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $6.03^\circ \leq \theta$

where θ is the minimum geocentric orbital separation in degrees between the wanted and interfering space stations, taking into account the respective east-west station-keeping accuracies;

2 that until such time as a competent radiocommunication conference has established a Plan for the BSS in the band 21.4-22.0 GHz, the values in *recommends* 1 should be considered as trigger levels for coordination between systems of the BSS in the band 21.4-22.0 GHz.

NOTE 1 – Appendix 1 gives the derivation of the pfd values given in *recommends* 1 above.

NOTE 2 – The pfd values in *recommends* 1 were derived using the Recommendation ITU-R BO.1213 co-polar antenna pattern.

Appendix 1

Derivation of the pfd values

The pfd values for sharing within the BSS in the band 21.4-22.0 GHz are derived by the *C/I* approach.

The protection of the antennas ranging from 45 cm to 120 cm is based on the assumption that the wanted pfd is reduced dB per dB with increasing receive antenna gain, in such a way that the performance of the link is maintained constant. The protection requirement is set to be $-105 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ at the orbital separation of 6 degrees; hence the protection criterion becomes a *C/I* single entry of 29.7 dB. The permissible interfering pfd limit is calculated with the same formula in all cases:

$$\text{Interfering pfd limit } (\theta) = \text{pfd wanted} - 29.7 + \Delta G (\varphi)$$

where $\Delta G (\varphi)$ is the off-axis angular discrimination for the corresponding topocentric angle ($\varphi = 1.1 \theta$) for the antenna size considered. This pfd mask is shown in Fig. 1. This pfd mask is the lower bound of the group of curves that are shown in Fig. 2.

FIGURE 1

Proposed threshold pfd for the BSS in the band 21.4-22.0 GHz
(*CI* requirement = 29.7 dB, reference pfd = -105 dB(W/(m² · MHz)))

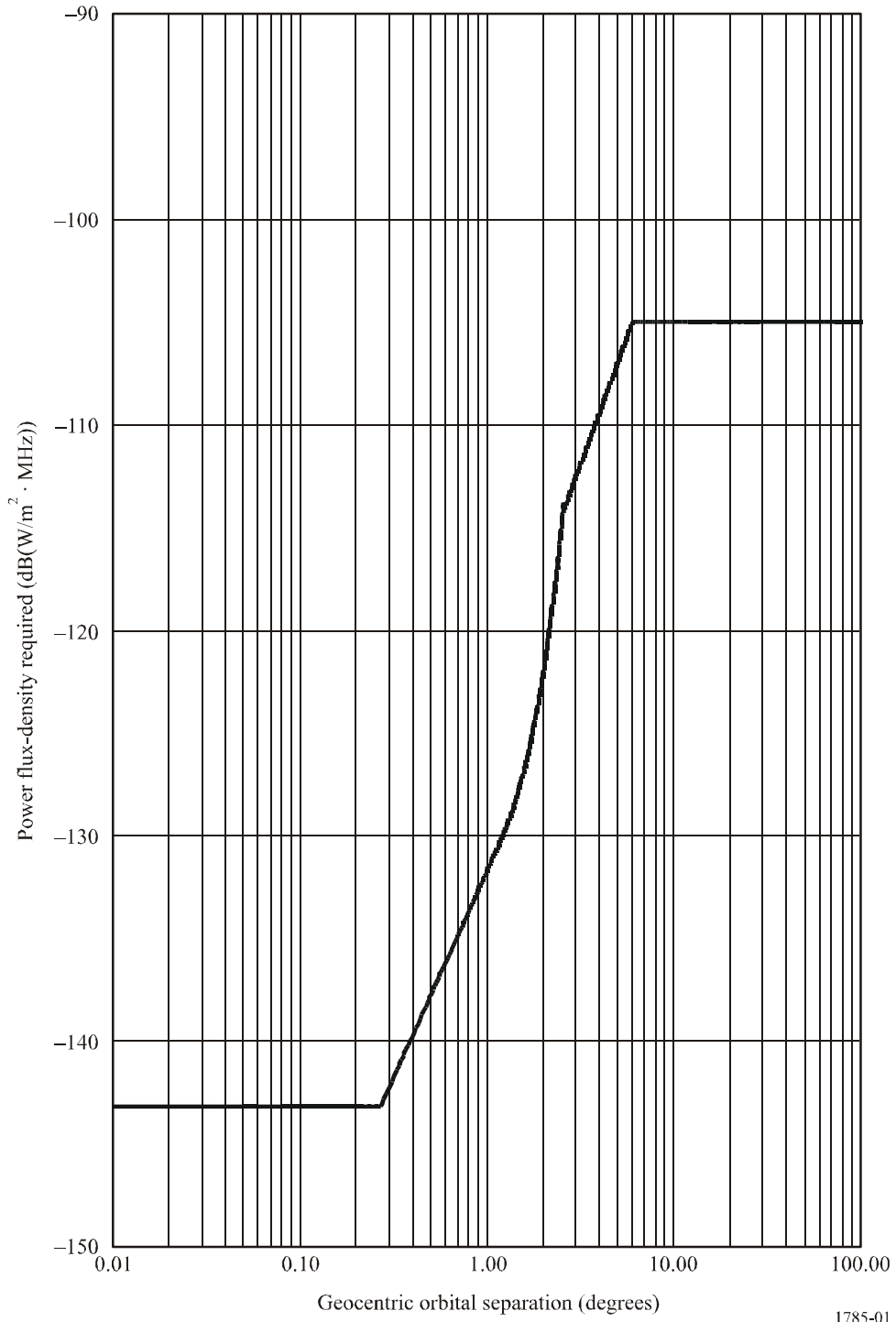


FIGURE 2

Protection requirements for 45 cm to 120 cm antennas
 (CI requirement = 29.7 dB, reference pfd = -105 dB(W/m² · MHz))

