

**WRC-2003 Advisory Committee**

**IWG-3**

**Draft U.S. Proposal on WRC-03 Agenda Item 1.37**

**Agenda Item 1.37:** *“to consider the regulatory and technical provisions for satellite networks using highly elliptical orbits (HEOs);”*

**Background information**

The ITU-R has been considering the sharing aspects of HEO satellite systems (occasionally referred to as “quasi-geostationary” systems) in a number of contexts over the last several years.

A subcategory of non-GSO systems, HEO systems are intended for operation or are already operational in several FSS bands above 3 GHz. In certain configurations, HEO systems offer promise in terms of their ability to facilitate the introduction of large numbers of such co-frequency non-GSO FSS systems, as well as in terms of their potential ability to co-exist successfully with GSO networks and terrestrial systems.

To date, several categories of orbits that are encompassed within the term “highly elliptical” have been identified within the ITU-R. All highly-elliptical orbits, however, are non-geostationary orbits, and all HEO systems are non-geostationary systems. In this regard, recent studies in certain frequency bands between 10 and 30 GHz resulted in a series of new regulations in Articles **S21** and **S22** that were adopted at the 1997 and 2000 WRCs, including pfd limits on non-GSO FSS systems to protect terrestrial systems and epfd limits on non-GSO FSS systems to protect GSO FSS and BSS networks. The pfd and epfd limits and associated provisions that were imposed on non-GSO FSS systems in the applicable segments of the 10-30 GHz band apply to non-GSO FSS systems in highly elliptical orbits.

The following proposals under Agenda Item 1.37 are intended to avoid any potential confusion regarding the applicability of newly-adopted regulations in Articles **S21** and **S22** to all non-GSO systems, including those employing highly-elliptical orbits.

It is expected that there will be additional proposals under this agenda item to address HEO use of other frequency bands.

**Proposals:**  
**USA/xx/1**  
**NOC**

TABLE S21-4 (continued)

Frequency band	Service*	Limit in dB(W/m <sup>2</sup> ) for angle of arrival ( $\delta$ ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
* * *					
10.7-11.7 GHz	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	-126	$-126 + 0.5(\delta - 5)$	-116	1 MHz
11.7-12.5 GHz (Region 1) 12.5-12.75 GHz (Region 1 countries listed in Nos. S5.494 and S5.496) 11.7-12.7 GHz (Region 2) 11.7-12.75 GHz (Region 3)	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	-124	$-124 + 0.5(\delta - 5)$	-114	1 MHz
* * *					
17.7-19.3 GHz <sup>7, 8</sup>	Fixed-satellite (space-to-Earth) Meteorological-satellite (space-to-Earth)	-115 <sup>12bis</sup> or $-115 - X$ <sup>12</sup>	$-115 + 0.5(\delta - 5)$ <sup>12bis</sup> or $-115 - X + ((10 + X)/20)(\delta - 5)$ <sup>12</sup>	-105 <sup>12bis</sup> or $-105$ <sup>12</sup>	1 MHz
* * *					

**Reasons:** The current limits and associated provisions in Section V of Article S21 that were finalized at WRC-2000 for all non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits. No additional regulatory provisions are needed for HEO systems in these bands.

**USA/xx/2**  
**NOC**

## ARTICLE S22

### Space services<sup>1</sup>

#### Section II – Control of interference to geostationary-satellite systems

**Reasons:** The current limits and associated provisions in Section II of Article S22 that were finalized at WRC-2000 for all non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits and are necessary for the protection of co-frequency GSO FSS and BSS

systems. No additional regulatory provisions are needed for HEO systems in these bands, and no lessening of the protection required by GSO systems in the same bands should be considered.

**USA/xx/3**

**NOC**

## RESOLUTION 76 (WRC-2000)

### **Protection of geostationary fixed-satellite service and geostationary broadcasting-satellite service networks from the maximum aggregate equivalent power flux-density produced by multiple non-geostationary fixed-satellite service systems in frequency bands where equivalent power flux-density limits have been adopted**

**Reasons:** The current provisions in Resolution **76 (WRC-2000)** for protection of GSO FSS and BSS networks from the maximum aggregate epfd produced by multiple non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits and are necessary for the protection of co-frequency GSO FSS and BSS systems. No additional regulatory provisions are needed for HEO systems in these bands, and no lessening of the protection required by GSO systems in the same bands should be considered.