

United States of America

**DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE**

**WRC-07 Agenda Item 1.18:** to review pfd limits in the band 17.7-19.7 GHz for satellite systems using highly inclined orbits, in accordance with Resolution **141 (WRC-03)**;

**ISSUES:**

1. Whether the current pfd limits in Article 21 for non-geostationary (non-GSO) systems in the FSS are adequate to protect the fixed service in the 17.7-19.7 GHz band from non-GSO systems using Highly Inclined Orbits (HIO) having an apogee altitude greater than 18000 km and an orbital inclination between 35° and 145°, without unduly constraining the use of these non-GSO FSS systems.
2. Whether there are technical and operational measures in the band 17.7-19.7 GHz that could be implemented in the fixed service to mitigate interference from FSS space stations in HIO.

**BACKGROUND:** The ITU-R has been considering the sharing aspects for non-GSO fixed-satellite service systems using highly-inclined orbits (“HIOs”), including highly elliptical orbit (HEO) satellite systems, in a number of contexts and under a number of different names in recent years. Several categories of non-GSOs are encompassed within the term “highly-inclined,” but all HIO systems are non-geostationary satellite orbit (non-GSO) systems, and hence are subject to all limitations that apply to non-GSO systems in the Radio Regulations. Specifically, all HIO systems are treated as non-GSO systems by the ITU when they are examined for regulatory compliance. WRC-95 adopted provisional limits on the pfd produced at the surface of the Earth by non-GSO satellites operating in the FSS (space-to-Earth) in the band 17.7-19.7 GHz in order to protect terrestrial services. WRC-97 and WRC-2000 modified the Article **21** power flux-density (pfd) limits that apply to non-GSO FSS system satellites, including HIO satellites, to adequately protect terrestrial systems in the 17.7-19.7 GHz frequency band.

In Resolution **141 (WRC-03)**, the ITU-R was invited to determine whether the current pfd limits for non-GSO FSS satellite systems in Article **21** are adequate to protect the fixed service in the 17.7 to 19.7 GHz band from non-GSO systems using highly inclined orbits, without unduly constraining the use of these non-GSO systems. Resolution **141** also calls for a determination to be made as to whether there are technical and operational measures that could be implemented by the fixed service to mitigate interference from FSS space stations.

Studies performed in the ITU-R, using conservative but feasible assumptions for satellite operations, show conclusively that systems of HIO satellites operating at the pfd limits from Article **21**, Table **21-4**, applicable to non-GSO FSS satellites in the 17.7-19.7 GHz

band adequately protect the fixed service. It is noteworthy that at least one HEO system has been operating in the 17.7-19.7 GHz band for years at the power levels in the applicable portion of Article 21, and that to date, there have been no reports of interference from the non-GSO FSS into the fixed service.

The following proposals under Agenda Item 1.18 are intended to resolve the question of the appropriate pfd limits to apply to non-GSO FSS systems using highly-inclined orbits having an apogee altitude greater than 18 000 km and an orbital inclination between 35° and 145° -- especially, but not exclusively, those operating in highly-elliptical orbits.

**USA/ /1**  
**NOC**

**ARTICLE 1**  
**Terms and definitions**

**Reasons:** Satellite networks using highly-inclined orbits, including HEOs, should continue to be considered as non-GSOs so there is no need to modify the terms and definitions in the Radio Regulations to accommodate HIO-type or HEO-type non-GSO operations.

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

TABLE 21-4 (continued) \*

Frequency band	Service*	Limit in dB(W/m <sup>2</sup> ) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
....					
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(δ - 5) <sup>12bis</sup> or -115 - X + ((10 + X)/20)(δ - 5) <sup>12</sup>	-105 <sup>12bis</sup> or -105 <sup>12</sup>	1 MHz
19.3-19.7 GHz 22.55-23.55 GHz 24.45-24.75 GHz 25.25-27.5 GHz	Fixed-satellite (space-to-Earth) Earth exploration-satellite (space-to-Earth) Inter-satellite Space research (space-to-Earth)	-115	-115 + 0.5(δ - 5)	-105	1 MHz

**Reasons:** The current pfd limits and associated provisions in Section V of Article 21 that were finalized at WRC-2000 for all non-GSO FSS systems in the 17.7-19.3 GHz frequency band, and the limits that apply to all FSS satellites in the 19.3-19.7 GHz band, are adequate to protect the fixed service in the 17.7-19.7 GHz band from non-GSO FSS systems using highly-inclined orbits having an apogee altitude greater than 18 000 km and an orbital inclination between 35° and 145. Satellite networks using HIOs, including non-GSO systems using HEO, should continue to be considered as non-GSOs and have the same regulatory standing as other types of non-GSOs. No additional regulatory provisions are needed for such systems.

USA/ 13  
SUP

### **RESOLUTION 141 (WRC-03)**

#### **Sharing between certain types of non-geostationary-satellite systems in the fixed-satellite service and stations in the fixed service in the 17.7-19.7 GHz band**

**Reasons:** All of the actions required under this Resolution have been completed and it may be suppressed. The technical studies confirmed that the current pfd limits for non-GSO FSS systems in Article 21 are adequate to protect the fixed service in the 17.7-19.7 GHz band from non-GSO systems having an apogee altitude greater than 18 000 km and an orbital inclination between 35° and 145, without unduly constraining the non-GSO FSS systems. With the suppression of this Resolution, there is no need for the Radiocommunication Bureau to review or revise any findings made on the compliance with the limits contained in Article 21 of a highly-inclined orbit non-GSO FSS system for which complete advance publication information has not been received prior to 5 July 2003.

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