



**IWG-2/004 (Rev. 2)**  
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**UNITED STATES**  
**PRELIMINARY VIEWS ON WRC-07**

**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)**;

**ISSUE:** Suitability of Current Non-GSO FSS Power Flux-Density Limits for Non-GSO FSS Satellites in Highly-Inclined Elliptical Orbits

**BACKGROUND:** The ITU-R has been considering the sharing aspects of highly elliptical orbit (HEO) satellite systems in a number of contexts and under a number of different names in recent years. HEO 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. All HEO systems are treated as non-GSO systems by the ITU when they are examined for regulatory compliance. WRC-97 and WRC-2000 modified the Article **21** power flux-density (pfd) limits that apply to non-GSO FSS systems to protect terrestrial systems in the 17.7-19.7 GHz frequency band.

In Resolution 141 (WRC-03), the ITU-R has been 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. WRC-07 Agenda item 1.18 limits the review of the current non-GSO limits to non-GSO satellite systems using highly inclined orbits, and defines these systems as having orbit apogee altitudes greater than 18,000 kilometers and orbital inclination between 35° and 145°. 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.

In preparation for WRC-03 Agenda Item 1.37 on highly-elliptical orbit (HEO) satellites, some studies were commenced on the subject of HEO interference into FS systems in 17.7-19.7 GHz, but no conclusions were reached in the ITU as whether it is technically appropriate to apply the Art. 21 pfd limits for non-GSO satellites to HEO satellites. The ITU has begun the process of responding to Resolution 141 (WRC-03). ITU-R Working Party 4-9S has looked at prior work, and determined that the FS and FSS parameters used in the collected studies, along with the FS protection criteria and methodologies for developing/assessing pfd masks all needed further review. It has begun the process of gathering the relevant materials from the responsible working parties in ITU-R Study Groups 4 and 9.

Resolution 141 (WRC-03) is a follow-on item from WRC-03 Agenda Item 1.37 on HEO satellites. Unfortunately, when it used the term “highly inclined orbit” non-GSO satellite systems instead of the term HEO in Resolution 141, WRC-03 unintentionally introduced some ambiguity into the

scope of the studies it was requesting, as the term highly-inclined orbit, by itself, can include not only the HEO systems that were under study pursuant to the unfinished business from WRC-03 Agenda Item 1.37, but also some circular-orbit non-GSO systems that were never part of the Agenda Item 1.37 studies. This ambiguity already has been noted in early discussions within the ITU-R Working Parties responsible for and interested in this agenda item, and could prove to be an unwelcome distraction if the intended scope of the agenda item is not readily clarified.

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.

#### **U.S. VIEWS:**

1. The U.S., which has looked closely at this issue over the last three years, believes now, as it did at WRC-03, that the non-GSO FSS pfd limits for the 17.7-19.3 GHz band that were included in Art. 21 at WRC-2000 remain adequate to protect the terrestrial services from non-GSO FSS satellites in highly-elliptical orbits without unduly constraining HEO non-GSO FSS systems.

2. That Agenda Item 1.18 and its associated resolution, although ambiguously worded so as to encompass some circular-orbit non-GSO systems that meet the apogee altitude and orbital inclination criteria in *considering g*) of Resolution 141 (WRC-03), was intended to apply to highly-inclined (i.e., between 35° and 145°) non-circular-orbit non-GSO FSS satellite systems with orbital apogee altitudes greater than 18,000 km **and orbital perigee altitudes that are less than the orbital apogee altitudes**. Consequently, there is no need to review the limits that apply to those non-GSO satellite systems using circular orbits, such as medium earth orbits (MEO), that satisfy both the apogee altitude criterion and the inclination criterion.