

United States of America

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

WRC-11 Agenda Item: 1.13 *to consider the results of ITU-R studies in accordance with Resolution 551 (WRC-07) and decide on the spectrum usage of the 21.4-22 GHz band for the broadcasting-satellite service and the associated feeder-link bands in Regions 1 and 3;*

Background information:

In the U.S., the 23 GHz band is widely used in urban areas for many applications. The primary ones are for backhauling wireless telephone traffic and for carrying business data and communications in corporate networks. The propagation characteristics at 23 GHz make it particularly suitable for wireless backhaul over relatively short distances. These links provide connectivity between mobile cell towers and the central network facilities of the local carrier. The growing sophistication of end-user wireless devices and services, from cell phones to advanced wireless services and from voice to music and to real-time video, contributes to increases in demand for backhaul capacity. At the same time, as wireless providers continue subdividing their cells to extract maximum usage from costly spectrum, the number of towers requiring backhaul increases in proportion. The band provides a vital resource for meeting this need. As of June 2007, there were more than 4500 assignments in the sub-band 21.4-22 GHz in the U.S. alone. There are numerous deployments in this frequency band in other Region 2 countries as well. It is therefore imperative to ensure that WRC-11 adopt regulatory solution(s) that preserve the basic principle of equality to spectrum access in all Regions consistent with No. 4.8.

WARC-92 allocated the BSS in Regions 1 and 3 in the 21.4-22 GHz band with 1 April 2007 as the date of entry into force of the allocation. It also adopted Resolution 525 which provided interim procedures for the introduction, before and after 1 April 2007, of high definition television systems (HDTV) of the broadcasting-satellite service (BSS) in the band 21.4-22.0 GHz in Regions 1 and 3 on a first-come-first-served basis. Resolution 525 has been revised several times since 1992. Prior to 1 April 2007, in Regions 1 and 3, an interim coordination procedure applied to operational BSS (HDTV) systems in the band 21.4 – 22.0 GHz for the protection of terrestrial services operating in the same band based on pfd coordination thresholds. WRC-07 modified Resolution 525 by removing protection of terrestrial networks and removing the procedures of No. 9.11. However,

since Resolution **525** is applied by footnote 5.530, which appears to the right of the broadcasting-satellite service allocations in Regions 1 and 3, the Resolution **525** (Rev. WRC-07) provisions do not apply to any service in Region 2. (See No. **5.50** and **5.51**). Thus, the procedures for the protection of terrestrial services in Region 2 from the BSS in Regions 1 and 3 are not addressed in Resolution **525**.

With regard to Region 2, the coordination requirements for the BSS systems that were introduced in the 21.4-22 GHz band prior to 1 April 2007 are explicitly clear. Inter-Regional protection of the FS was provided by Resolution **33** (Rev. WRC-03) which included a coordination procedure applicable in all frequency bands allocated to the BSS. The WRC-03 version of Resolution **525** (Rev. WRC-03) was consistent with Resolution **33** (Rev. WRC-03) in that these systems are subject to No. **9.11** coordination procedures. Resolution **525** (Rev. WRC-03) required coordination if the power flux-density at the Earth's surface produced by emissions from a space station, on the territory of any other country, exceeded:

- $-115 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band for angles of arrival between 0° and 5° above the horizontal plane; or
- $-105 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band for angles of arrival between 25° and 90° above the horizontal plane; or
- values to be derived by linear interpolation between these limits for angles of arrival between 5° and 25° above the horizontal plane.

These threshold values for triggering coordination with terrestrial services are consistent with reference power flux density for the BSS values that have been developed and given in Recommendation ITU-R BO.1776. They are also consistent with the power flux-density limits recommended for this band in Recommendation ITU-R F.760. It is important to recognize that the ITU-R BO.1776 is referenced in Resolutions **525** (Rev. WRC-07) and **551** (Rev. WRC-07).

The coordination requirements for the BSS systems in the 21.4-22.0 GHz band introduced after 1 April 2007 in respect to terrestrial services of Region 2 are conflicting and ambiguous. Resolution **525** (Rev. WRC-07), as discussed previously, only applies to Regions 1 and 3 while Resolution **33** (Rev. WRC -03) applies for inter-Regional coordination, but it has no pfd criterion for triggering coordination.

Considering the ambiguity associated with the implementation of the BSS allocation and the difficulty of coordinating space stations with terrestrial stations, the U.S. notes that sharing between satellite services in Regions 1 and 3 and terrestrial services in Region 2 can be most simply implemented through a pfd limits regime in Article **21**, Section **V**. In the present case, the pfd values developed and given in Recommendation ITU-R BO.1776 and also applied to the BSS systems that were introduced in the subject band prior to 1 April 2007 could be used as a power flux-density limit that would apply to all BSS systems in region 1 and 3 for purposes of sharing with the Fixed and Mobile services in Region 2. Such a limit would only apply to BSS satellite networks' beams on the territories of Region 2 countries.

Proposal:

/USA/1.23/1 MOD

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section V – Limits of power flux-density from space stations

TABLE 21-4 (CONTINUED) (Rev.WRC-07)

Frequency band	Service*	Limit in dB(W/m ²) for angles of arrival (δ) above the horizontal plane			Reference bandwidth h
		0°-5°	5°-25°	25°-90°	
19.3-19.7 GHz 22.55-23.55 GHz 24.45-24.75 GHz 25.25-27.5 GHz 27.500- 27.501 GHz	Fixed-satellite (space-to-Earth) Earth exploration-satellite (space-to-Earth) Inter-satellite Space research (space-to-Earth)	-115 ^{13A}	-115 + 0.5(δ - 5) ^{13A}	-105 ^{13A}	1 MHz
<u>21.4-22.0 GHz</u>	<u>Broadcasting –satellite (space-to-Earth)</u>	<u>-115 ^{14bis}</u>	<u>-115 + 0.5(δ - 5) ^{14bis}</u>	<u>-105 ^{14bis}</u>	<u>1 MHz</u>
31.0-31.3 GHz 34.7-35.2 GHz (space-to-Earth transmissions referred to in No. 5.550 on the territories of countries listed in No. 5.549)	Space research	-115	-115 + 0.5(δ - 5)	-105	1 MHz

^{14bis} **21.16.X** These limits shall apply only on territories of Region 2 countries.

Reasons: Sharing between satellite services in Regions 1 and 3 and terrestrial services in Region 2 can be implemented most simply through power flux density (pfd) limits specified in Article 21, Section V. The proposed pfd values are consistent with Recommendation ITU-R BO.1776. It is important to recognize that ITU-R BO.1776 is referenced in Resolutions 525 (Rev. WRC-07) and 551 (Rev. WRC-07). It is also

important to recognize that these same pfd values are applied to the BSS systems that were introduced in the 21.4-22.0 GHz band prior to 1 April 2007. The proposed modification would provide regulatory certainty to satellite services as a defined set of pfd limits would be known and extensive coordination with uncertain outcome would not be required. The proposed modification would also reduce the administrative burden for administrations in all Regions.
