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Federal Communications Commission  
Office of the Secretary

October 16, 2008

**Via Courier**

Marlene H. Dortch  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, D.C. 20554

Re: DIRECTV Enterprises LLC  
File Nos. SAT-AMD-20080908-00166; SAT-AMD-20080321-00080;  
SAT-AMD-20080114-00017; SAT-AMD-20051118-00224; SAT-  
LOA-19970605-00051 (Call Sign S2244)

Dear Ms. Dortch:

Pegasus Development DBS Corporation (“Pegasus”) hereby submits this letter in response to the October 6, 2008 letter of DIRECTV Enterprises LLC (“DIRECTV”) regarding the above-referenced application to operate a 17/24 GHz Broadcasting Satellite Service (“BSS”) satellite at the 118.4°W orbital location.<sup>1</sup> On September 26, 2008, Pegasus submitted a letter indicating that, contrary to the Commission’s rules, the operations of the proposed DIRECTV satellite at that location would cause more interference to Pegasus’ proposed satellite at 115.0°W than if the DIRECTV satellite were located at precisely 119.0°W. Pegasus showed that DIRECTV improperly considered atmospheric losses in its computation of power flux-density (“PFD”) and that DIRECTV incorrectly calculated the PFD using a 36 MHz transponder bandwidth, rather than a 30 MHz noise bandwidth. Properly calculated, DIRECTV would need to reduce peak EIRP of its proposed satellite by 2.5 dB and not 0.1 dB, as DIRECTV suggests in its recent amendment. Nothing in DIRECTV’s October 6 Letter refutes Pegasus’ conclusions. Accordingly, the Commission should not grant DIRECTV’s application unless DIRECTV further amends its application.

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<sup>1</sup> See Letter from William Wiltshire to Marlene Dortch (October 6, 2008) (“October 6 Letter”).

In the October 6 Letter, DIRECTV concedes that Pegasus' methodology is a legitimate way of calculating satellite PFD (October 6 Letter, at 2) but argues that it is not a requirement of the FCC's rules. *Id.* at 1. DIRECTV further contends that its own methodology is acceptable and indeed reflects the "industry standard." October 6 Letter, at 1, 4. As discussed below, DIRECTV's contentions are incorrect.

### **PFD Calculations Should Not Include Atmospheric Losses**

The FCC made clear in its 17/24 GHz Notice of Proposed Rulemaking that it proposed to extend and apply to the 17.3-17.8 GHz downlink band<sup>2</sup> the ITU's fixed satellite service ("FSS") PFD limits under Article 21 of the ITU Radio Regulations, which assumes free-space propagation conditions.<sup>3</sup> No party to the proceeding objected to the free-space propagation conditions.<sup>4</sup> Indeed, in the context of discussing the provision of domestic services in the 17.7-17.8 GHz band, DIRECTV itself supported applying the PFD limits established under Article 21.<sup>5</sup>

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<sup>2</sup> See, e.g., *In the Matter of The Establishment of Policies and Service Rules for the Broadcasting-Satellite Service at the 17.3-17.7 GHz Frequency Band and at the 17.7-17.8 GHz Frequency Band Internationally, and at the 24.75-25.25 GHz Frequency Band for Fixed Satellite Services Providing Feeder Links to the Broadcast-Satellite Service and for the Satellite Services Operating Bi-directionally in the 17.3-17.8 GHz Frequency Band*, Notice of Proposed Rulemaking, 21 FCC Rcd 7426, at ¶ 55 (2006) ("*17/24 GHz NPRM*") ("We seek comment on whether the Commission should adopt pfd or other downlink power level values in the 17.3-17.7 GHz band . . . [and] whether the ITU's FSS pfd limits, with an upper limit of -115/dBW/MHz/m<sup>2</sup>, should be applied in the 17.3-17.7 GHz band.") (citations omitted); *id.* at ¶ 32 (proposing to extend Article 21 of the ITU Radio Regulations to the 17.7-17.8 GHz band).

<sup>3</sup> Article 21.16 of the ITU Radio Regulations provides: "The power flux-density at the Earth's surface produced by emissions from a space station, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limit given in Table 21-4. The limit relates to the power flux-density which would be obtained under assumed free-space propagation conditions . . . ."

<sup>4</sup> See, e.g., Intelsat Comments, at 10 ("[T]he same Article 21 FSS pfd limits should apply to the full 17.3-17.8 GHz band.") (October 16, 2006); EchoStar Comments, Technical Annex, at 24-25 (compliance with Article 21 should ensure protection to terrestrial fixed services) (October 16, 2006).

<sup>5</sup> DIRECTV Comments, at 34 ("There is very little chance that downlink transmissions from a 17/24 GHz BSS satellite would cause interference to the much stronger transmissions of the terrestrial services operating in this portion of the band, particularly if the satellite downlink transmissions

(... continued)

In its order authorizing the use of the 17.7-17.8 GHz band for international service, the FCC specifically adopted the PFD limits of Article 21 and implicitly the free-space propagation conditions.<sup>6</sup> With respect to the 17.3-17.7 GHz band, the FCC adopted one of the Article 21 PFD limits for the southeast U.S. region and lower PFD limits for the other geographic regions of the country.<sup>7</sup> There is nothing in the *17/24 GHz Order* or in the record of the proceeding, for that matter, to suggest that the FCC intended for 17/24 GHz applicants to use anything other than the Article 21 free-space propagation conditions in determining compliance with the PFD limits.

DIRECTV's reliance on ITU-R P.618-8,<sup>8</sup> which discusses factors to consider in evaluating actual system performance, is inapposite. The consideration of atmospheric and other losses, which necessarily vary over time and location, would be inappropriate for assessing compliance with a maximum PFD limit.

DIRECTV's apparent contention that consideration of atmospheric losses for calculating compliance with PFD limits is an "industry standard" (October 6 Letter, at 1, 4) is flatly rejected by the FCC's rules, which explicitly require a free-space propagation assumption for essentially all other frequency bands.<sup>9</sup> Moreover, a review of the pending 17/24 GHz applications shows that Echostar, Intelsat, and

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(... continued)

meet the PFD limits already established in Article 21 of the ITU Radio Regulations for FSS systems operating in the 17.7-19.7 GHz band.") (October 16, 2008).

<sup>6</sup> See *In the Matter of The Establishment of Policies and Service Rules for the Broadcasting-Satellite Service at the 17.3-17.7 GHz Frequency Band and at the 17.7-17.8 GHz Frequency Band Internationally, and at the 24.75-25.25 GHz Frequency Band for Fixed Satellite Services Providing Feeder Links to the Broadcast-Satellite Service and for the Satellite Services Operating Bi-directionally in the 17.3-17.8 GHz Frequency Band*, Report and Order, 22 FCC Rcd 8842, at Appendix B (2007) ("*17/24 GHz Order*").

<sup>7</sup> See, e.g., *17/14 GHz Order*, at ¶ 102. Article 21 establishes a maximum PFD limit of -115dBW/m<sup>2</sup>/MHz for arrival angles between 0 and 5 degrees at 17.7 GHz.

<sup>8</sup> ITU-R P. 618-8 has been superseded by ITU-R P. 618-9.

<sup>9</sup> See, e.g., 47 C.F.R. § 25.208(a)-(v) ("These limits relate to the power flux density which would be obtained under assumed free-space propagation conditions.").

Spectrum Five assumed free-space propagation conditions for purposes of calculating compliance with PFD limits.<sup>10</sup>

### **PFD Calculations Should be Based on Noise Bandwidth Rather Than Transponder Bandwidth**

The spectral power density of a transmitted digital signal is not uniformly distributed over the transmission bandwidth. For this reason, the maximum spectral power density around the center of the carrier should be used in computing the PFD. This concept of noise bandwidth, which is well described in the literature (see, e.g., Philip F. Panter, *Modulation, Noise, and Spectral Analysis*, McGraw-Hill Book Company, pages 139-140 (1965)), is used to account for the maximum spectral power density in PFD calculations.<sup>11</sup> Calculating PFD based on noise bandwidth is, therefore, more accurate than doing so based on total transponder bandwidth. The emission designator value may be the same or less than the transponder bandwidth. When they are the same, applicants basing PFD calculations on total transponder bandwidth will underestimate PFD typically by approximately 0.8 dB compared to the noise bandwidth calculation. As a result, the corresponding satellite EIRP used to calculate PFD at the surface of the Earth is overestimated by the same amount. This approach in proving the compliance with PFD limits may be acceptable in cases where the PFD limits are met with a margin, such as is the case with the Pegasus applications referenced in DIRECTV's letter.<sup>12</sup>

For these reasons, Pegasus requests that the Commission not grant DIRECTV's application for a 17/24 GHz BSS satellite at 118.4°W unless DIRECTV

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<sup>10</sup> See, e.g., Intelsat Applications, File Nos. SAT-AMD-20080617-00123 to 00126, at Exhibit 8; Spectrum Five Application, File No. SAT-LOI-20080910-00178, at Technical Narrative p. 15. Echostar does not list the assumptions or provide the equations it uses to calculate satellite PFD in its applications, but Pegasus' PFD calculations for the Echostar satellites based on free-space propagation conditions and noise bandwidth are within a tenth of a dB or less of Echostar's provided PFD values. See Echostar Applications, File Nos. SAT-AMD-20080114-00018 to 00022, at Schedule S.

<sup>11</sup> Intelsat uses in exhibit 8 of its applications the term "carrier occupied bandwidth" and in exhibit 11 the term "noise bandwidth," but the two values are identical.

<sup>12</sup> October 6 Letter, at 3 fn. 5. DIRECTV's contention that the use of transponder bandwidth is an industry standard is further belied by its own use of noise bandwidth in calculating its link budget. See DIRECTV Application, File No. SAT-AMD-20080114-00017, at Table A-1.

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further amends its application, consistent with the comments Pegasus has provided in this proceeding.

Very truly yours,

A handwritten signature in blue ink, appearing to read 'BDJ', is written over the typed name 'Bruce D. Jacobs'.

Bruce D. Jacobs  
Tony Lin

**CERTIFICATE OF SERVICE**

I, Renee Williams, hereby certify that on this 16th day of October 2008 I served a true copy of the foregoing by first-class United States mail, postage prepaid, upon the following:

Andrea Kelly\*  
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Renee Williams

\*By Hand Delivery