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LATHAM & WATKINS LLP

September 1, 2005

BY HAND

Robert G. Nelson
Chief, Engineering Branch
Satellite Division
International Bureau
Federal Communications Commission
Washington, DC 20554

Re: Application of ORBIMAGE, Inc.
Call Sign S2348
File No. SAT-MOD20050511-0097

Dear Mr. Nelson:

In response to your letter of August 11, 2005, concerning the above application, ORBIMAGE has prepared the attached letter providing the information you requested. Please feel free to call or email me if you have any further questions.

Very truly yours,

James F. Rogers
of LATHAM & WATKINS LLP

Enclosure

cc: Fern Jarmulnek (International Bureau)
Sylvia Lam (International Bureau)
Lee F. Demitry (ORBIMAGE)
William Lee Warren, Esq. (ORBIMAGE)
David Kenyon (ORBIMAGE)

August 30, 2005

Robert G. Nelson
Chief Engineering Branch
Satellite Division
International Bureau
Federal Communications Commission
Washington, D.C. 20554

Re: Application of ORBIMAGE, Inc.
Call Sign S2348
File No. SAT-MOD20050511-00097

Dear Mr. Nelson:

ORBIMAGE, Inc. ("ORBIMAGE") hereby responds to your letter dated August 10, 2005 requesting supplemental information concerning the above-referenced application to modify its existing license to add an additional satellite, OrbView-5 ("OV-5").

The letter indicated that further clarification and additional information was needed in order to facilitate the coordination between the Commission and NTIA. Accordingly, ORBIMAGE was asked to supply three items of information: First, the Commission requested that ORBIMAGE provide the frequency response of the filter described in Exhibit 2, Technical Annex, page 7 of the application and to explain whether these characteristics are the same as those of the current constellation. Second, ORBIMAGE was asked to provide the maximum power spectral density ("PSD") in the frequency range of 8400 MHz-8450 MHz for the Telemetry Downlink. Finally, the letter requested that ORBIMAGE provide the crossing time of the ascending node of OV-5.

In response to the first inquiry, ORBIMAGE provides the filter response in the attached Exhibit A. The OV-5 filter characteristics are not the same as those on the current constellation, OV-3. The OV-5 x-band downlink covers a wider bandwidth (370 MHz) than the OV-3 downlink (150 MHz). In addition, the OV-3 center frequency of 8190 MHz differs from the OV-5 center frequency of 8210 MHz. In response to the second inquiry, ORBIMAGE provides the maximum PSD in the attached Exhibit B.

ORBIMAGE is aware that the Commission may have a particular concern about the potential for interference with the Deep Space Network ("DSN"). Accordingly, ORBIMAGE examined the potential for interference with the DSN in the context of the ITU regulations. Because the OV-5 transmitters are deactivated, except when over a ground station, the only potential for interference is between ORBIMAGE's Dulles Ground station and DSN's Goldstone antenna. As demonstrated in the attached exhibits, ORBIMAGE calculated the worst-case

scenario for this potential interference and found that the interference potential is well within the ITU's recommendations.

In response to the Commission's third inquiry, the satellite crossing time of the descending node is controlled to be 10:30 AM +/- 20 minutes. Thus, the ascending nodal crossing time is 10:30 PM.

If you have additional questions concerning the above-referenced application, please contact the undersigned.

Respectfully submitted,

Lee F. Demitry for
William L. Warren

EXHIBIT A

DSN Filter Response

Figure 1 shows the OV-5 DSN filter response. Series 1 is the ideal filter response and Series 2 is the actual filter response.

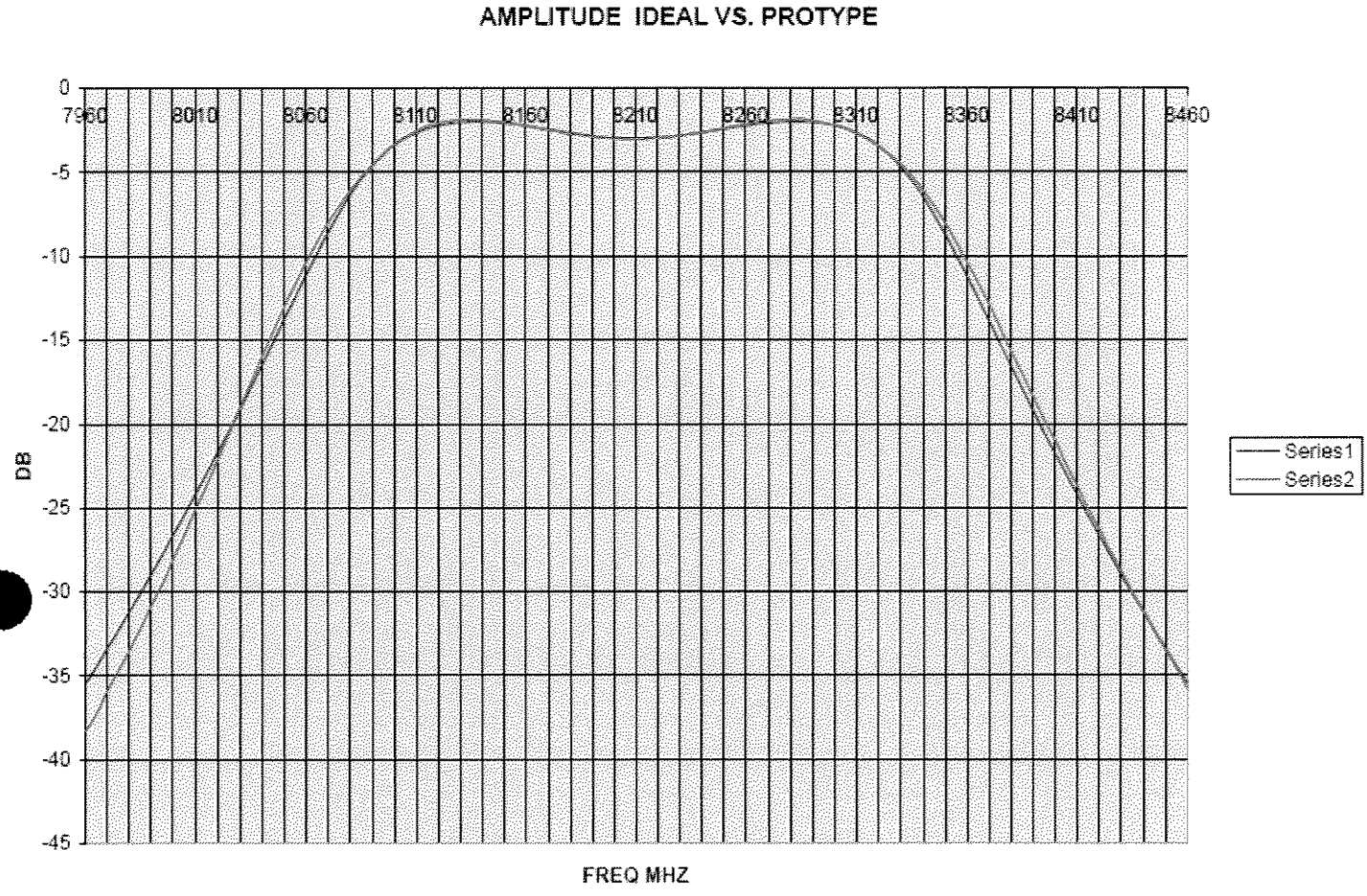

Figure 1. OV-5 DSN Filter Response

The following calculations show that the 370 Mbps wideband downlink meets the ITU Recommendation ITU-R SA.1157 Protection Criteria for Deep-Space Research with at least 6.85 dB of margin.

Power Flux Density Calculation @ 4 kHz Integration

The NTIA and ITU PFD recommendations specify a not to exceed PFD value for all ground point locations. The recommendations dictate that the PFD shall be integrated over a 4 kHz bandwidth. This can be seen in the below equation.

$$PFD = Tx(dBW) + SCAntennaGain(dB) + Losses(dB) + 10 * Log(\frac{1}{4\pi * D(m)\text{^}2}) + 10 * Log(\frac{4000}{BW}) + ModLoss$$

(Worst Case Scenario)

Simulations showed that the angle between the boresight of the antenna during a contact with the Dulles, VA ground station and the 70-meter DSN antenna at Goldstone to be $\geq 76^{\circ}$. Calculations where made for a worst-case PFD in which the maximum gain (of angles $\geq 76^{\circ}$) and closest range (when both sites are in

view) are used. The maximum amount of PFD at the ground at the downlink channel center frequency becomes:

(Assuming)

Tx (dBW)	=	10 Watt Transmitter = 10 dBW
Tx Frequency	=	8210 MHz
SCAntennaGain (dB)	=	3 dBi Antenna Gain
Losses (dB)	=	-8 dB Filter + Cable + Gimbal
D(m)	=	2027 km slant range ~ 2,027,000 m (closest approach)
BW (MHz)	=	370 MHz
Modulation Loss	=	0 dB

PFD = (10 dBW) + (3dB) + (-8 dB) + (-137.13 dB/m^2) + (-49.66 dB/4kHz) + (0 dB)

PFD = -181.79 dB(W/m^2/4kHz)

Converting the 4 kHz BW to 1 Hz BW:

10 log (4000) = 36.02 dB

PFD = (-181.79 dBW/m^2/4kHz) - (36.02 dB)

PFD = -217.81 dB(W/m^2/Hz)

The ITU Recommendation ITU-R SA.1157 Protection Criteria for Deep-Space Research states that the maximum allowable interference power spectral flux-density into a DSN receiver is -255.1 dB(W/m^2/Hz).

The rejection required in the Deep-Space Research band is:

Required Rejection = Max SC PFD - DSN specification

Required Rejection = (-217.81 dB(W/m^2/Hz)) - (- 255.1 dB(W/m^2/Hz))

Required Rejection = 37.29 dB

The spectral density of the signal = P/SR $Sin^2(\pi\Delta f/SR)/(\pi\Delta f/SR)^2$; where SR is the symbol rate and Δf is the delta frequency from center the frequency.

Freq	(f-fc/SR)	10 log [(sin^2x)/x^2] (dB)
8400	1.027027	-31.60
8410	1.081081	-22.59
8420	1.1351	-18.75
8430	1.189189	-16.48
8440	1.243243	-15.03
8450	1.297297	-14.10

The required filter attenuation by frequency is:

Required filter attenuation = 37.29 dB + 10 log((sin^2x)/x^2) In the 8400 to 8450 MHz band

Required filter attenuation @ 8400 MHz = (37.29 dB) + (-31.60 dB)
Required filter attenuation @ 8400 MHz = 5.69 dB
Actual filter attenuation @ 8400 MHz = 21 dB

Margin @ 8400 MHz = 15.31 dB

Required filter attenuation @ 8410 MHz = (37.29 dB) + (-22.59 dB)
Required filter attenuation @ 8410 MHz = 14.70 dB
Actual filter attenuation @ 8410 MHz = 24 dB

Margin @ 8410 MHz = 9.30 dB

Required filter attenuation @ 8420 MHz = (37.29 dB) + (-18.75 dB)
Required filter attenuation @ 8420 MHz = 19.15 dB
Actual filter attenuation @ 8420 MHz = 26 dB

Margin @ 8420 MHz = 6.85 dB

Required filter attenuation @ 8430 MHz = (37.29 dB) + (-16.48 dB)
Required filter attenuation @ 8430 MHz = 20.81 dB
Actual filter attenuation @ 8430 MHz = 28 dB

Margin @ 8430 MHz = 7.19 dB

Required filter attenuation @ 8440 MHz = (37.29 dB) + (-15.03 dB)
Required filter attenuation @ 8440 MHz = 22.26 dB
Actual filter attenuation @ 8440 MHz = 31 dB

Margin @ 8440 MHz = 8.74 dB

Required filter attenuation @ 8450 MHz = (37.29 dB) + (-14.10 dB)
Required filter attenuation @ 8450 MHz = 23.19 dB
Actual filter attenuation @ 8450 MHz = 33 dB

Margin @ 8450 MHz = 9.81 dB

EXHIBIT B

Power Spectral Density in the frequency range of 8400 to 8450 MHz for the telemetry downlink

The PSD of the telemetry downlink is at the most -70 dBc in the 8400 to 8450 MHz range. This is due to spurious emissions rather than modulated data. The following calculations show that the telemetry downlink meets the ITU Recommendation ITU-R SA.1157 Protection Criteria for Deep-Space Research with 8.09 dB of margin.

Power Flux Density Calculation @ 4 kHz Integration

The ITU PFD recommendations specify a not to exceed PFD value for all ground point locations. The recommendations dictate that the PFD shall be integrated over a 4 kHz bandwidth. This can be seen in the below equation:

$$PFD = Tx(dBW) + SCAntennaGain(dB) + Losses(dB) + 10 * Log(1/4\pi * D(m)\text{^}2) + 10 * Log(4000/BW) + ModLoss$$

Simulations showed that the closest slant range to the 70 Meter antenna at Goldstone (when both Goldstone and the Dulles ground site are in view) is 2027 km. This is the only time that the TLM Transmitter can be on. The maximum amount of PFD at the ground at the downlink channel center frequency becomes:

(Assuming)		
Tx	=	2 Watt Transmitter = 3 dBW
Tx Frequency	=	8394 MHz
SC Antenna Gain	=	0 dBi Maximum Antenna Gain at 8400 MHz
Losses	=	-11 dB (Attenuator + Cable + Coupler)
D	=	2027 km slant range ~ 2,027,000 m (closest approach)
BW	=	64 kHz
Modulation Loss	=	0 dB

PFD = (3 dBW) + (0dB) + (-11 dB) + (-137.13 dB/m^2) + (-12.04 dB/4kHz) + (0 dB)

PFD = -157.17 dB(W/m^2/4kHz)

The TLM signal is -70 dBc at 8400 to 8450 MHz. This is the spurious behavior of the transmitter; the data PSD at this distance from the center frequency is lower.

PSD at 8400 MHz = PFD + TLM PSD at 8400 MHz

PFD at 8400 MHz = (-157.17 dBW/m^2/4kHz) + (-70 dB)

PFD at 8400 MHz = -227.17 dB(W/m^2/4kHz)

The ITU Recommendation ITU-R SA.1157 Protection Criteria for Deep-Space Research states that the maximum allowable interference power spectral flux-density into a DSN receiver is -255.1 dB(W/m^2/Hz).

Converting the 4 kHz BW to 1 Hz BW:

10 log (4000) = 36.02 dB

PFD at 8400 MHz = (-227.17 dBW/m^2/4kHz) - (36.02 dB)

PFD at 8400 MHz = -263.19 dB(W/m^2/Hz)

Margin to ITU-R SA.1157 = (-263.19 dB(W/m^2/Hz)) - (-255.1 dB(W/m^2/Hz))

Margin to ITU-R SA.1157 = 8.09 dB