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December 1, 2004

Via Hand Delivery

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

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Federal Communications Commission
Office of Secretary

Re: Mobile Satellite Ventures Subsidiary LLC
Ex Parte Presentation
IB Docket No. 01-185
File No. SAT-MOD-20031118-00333 (ATC application)
File No. SAT-AMD-20031118-00332 (ATC application)
File No. SES-MOD-20031118-01879 (ATC application)

Dear Ms. Dortch:

On November 23, 2004, Peter Karabinis, Chief Technical Officer of Mobile Satellite Ventures LP ("MSV"), and the undersigned, on behalf of MSV, spoke by telephone with Paul Locke and Kathryn Medley regarding certain issues raised by the recent order authorizing MSV to operate an Ancillary Terrestrial Component.¹ The discussion focused on MSV's concern that paragraph 83 of the order used incorrect Power Flux Density (PFD) limits.² In connection with this discussion, MSV submits as Attachment A a further discussion of this issue. MSV also discussed the reference in paragraph 83 to per-carrier EIRP limits and its apparent inconsistency with the Bureau's decision (in paragraph 79 of the order) to limit EIRP on a per-sector basis rather than a per-carrier basis. MSV also mentioned its concern that sub-paragraph (e) of the ordering clauses is inapplicable to CDMA deployments. Finally, the participants discussed MSV's proposed use of interference cancellation techniques to protect its own satellite system.

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¹ See *Mobile Satellite Ventures Subsidiary LLC, Order and Authorization*, DA 04-3553 (Chief, International Bureau, November 8, 2004).

² See MSV ATC Application, File No. SAT-MOD-20031118-00333 et al, at 21-22 (November 18, 2003); see also *MSV ex parte letter*, IB Docket No. 01-185 (November 18, 2003).

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Please contact me if you have any questions regarding this matter.

Very truly yours,


Bruce D. Jacobs

cc: Paul Locke
Kathryn Medley
John Janka, counsel to Inmarsat

Attachment A

Paragraph 83 (ii) states that the previously specified minimum separation distances (470 m for airports, 1500 m for waterways) must be increased for any base station sector transmitting more than 23.9 dBW aggregate EIRP (or 18.9 dBW toward the horizon) according to the following equation:

$$D = 10^{[(EIRP - PFD - 11)/20]} \quad (1)$$

where EIRP is defined as the per-carrier EIRP in the direction of the horizon.

As it stands, this equation produces minimum distance values that are unreasonably large. The equation should be modified to account for at least the same EIRP mitigating factors that the Commission used to derive the original separation distances (see Tables 2.2.1.3.A and 2.2.2.1.A in Appendix C2 of the *ATC Order*), namely:

- Base station antenna discrimination (-5 dB for waterways, -12.5 dB for airports)
- Base station power control (-5.2 dB)
- Voice activation (-1.8 dB for waterways, -1.4 dB for airports)

Applying these EIRP mitigating factors, the above equation becomes:

$$D = 10^{[(EIRP + BTS_ant_discrim + BTS_pwr_ctl + voice_act - PFD - 11)/20]} \quad (2)$$

where now the EIRP term refers to the peak EIRP per carrier, because we have applied the appropriate base station antenna discrimination for either the waterway or the airport.

To illustrate the validity of equations (1) and (2), let us assume that a base station is proximate to a waterway and is radiating three carriers per sector. Furthermore, let us assume that each carrier is radiated at 19.2 dBW EIRP (maximum EIRP at antenna boresight) and, therefore, the maximum aggregate per-sector EIRP is $19.2 + 10\log(3) = 24.0$ dBW (19 dBW aggregate EIRP toward the horizon). These levels are just over (by 0.1 dB) the specified limits that require recalculating the separation distance. For this example, we would therefore expect to find a separation distance of slightly greater than 1500 meters. However, as shown below, the Commission's formula significantly over-estimates the required separation distance.

For the stated example, the per-carrier maximum EIRP is 19.2 dBW and the per-carrier EIRP toward the horizon is $19.2 - 5 = 14.2$ dBW. Using the Commission's equation as specified in Paragraph 83 (ii) we find:

$$D = 10^{[(14.2 - (-64.6) - 11)/20]} = 2455 \text{ m.}$$

Recalculating the distance using the modified equation (equation (2) above) we find:

$$D = 10^{[(19.2 - 5 - 5.2 - 1.8 - (-64.6) - 11)/20]} = 1096 \text{ m.}$$

Whereas the Commission's formula (equation (1)) over-estimates the separation distance, equation (2) under-estimates the separation distance (the correct separation distance is slightly greater than 1500 m). The apparent invalidity of equation (2) may be resolved by realizing two things: (a) that the corrected PFD limit per carrier needs to be used in lieu of the PFD limit specified in the *ATC Order*,³ and (b) since we are evaluating separation distance from a waterway, we need to account for the "-1.9 dB margin" of Table 2.2.2.1.A (see Appendix C2 of the *ATC Order*).⁴ Using the corrected PFD value (-69.4 dBW/m²/carrier) and accounting for the negative margin remnant of Table 2.2.2.1.A we find:

$$D = 10^{[(19.2 - 5 - 5.2 - 1.8 - 1.9 - (-69.4) - 11)/20]} = 1531 \text{ m}$$

An equally valid and somewhat simpler approach would be to scale the current limits by the difference of the new sector EIRP minus the existing EIRP limit as follows:

$$D = D1 \times 10^{[(EIRP - 23.9)/20]} \quad (3)$$

where

D1 = original minimum separation limit (470 m for airports, 1500 m for waterways)

D = new minimum separation distance (m).

EIRP = aggregate base station sector EIRP (dBW).

Applying this approach to the above example yields:

$$D = 1500 \times 10^{[(24 - 23.9)/20]} = 1517 \text{ m}$$

The approach of using equation (3) is preferred because it converges seamlessly to the original limits. That is, for EIRP = 23.9 dBW, D = D1.

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³ *MSV ex parte letter*, IB Docket No. 01-185 (November 18, 2003); see *MSV ATC Application*, File No. SAT-MOD-20031118-00333 et al, at 21-22 (November 18, 2003).

⁴ Relative to an overload threshold of -90 dBW (-60 dBm) Table 2.2.2.1.A of the *ATC Order* indicates that a GMDSS receiver at 1500 m away from an ATC base station will experience a negative margin of 1.9 dB against overload (saturation). The Commission, however, concluded: "Because of the expected range in signal levels for saturation (-80 to -90 dBW) and the possibility of additional propagation loss above free space, the GMDSS receiver should be protected for the EIRP of 19.1 dBW and a separation distance of 1.5 km." See *ATC Order* Appendix C2 at 217.