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Satellite and  
Radiocommunications Division  
International Bureau

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of )  
 )  
AvL TECHNOLOGIES )  
 )  
Application for Earth Station Authority )  
in the Fixed-Satellite Service )

File No. SES-MOD-20040225-00277  
E030130

**REPLY**

Pursuant to Section 25.154(d) of the Commission’s Rules, 47 C.F.R. §25.154(d), SWE-DISH Satellite Communications, Inc. (“SWE-DISH”), by its attorneys, hereby replies to the Opposition to Petition to Deny (“Opposition”) filed by AvL Technologies (“AvL”) on May 19, 2004, in connection with the above-referenced application (“Application”). Unfortunately, AvL has still failed (1) to provide a sufficient level of information necessary for its Application to be properly evaluated; and (2) to respond to a number of the substantive concerns raised in SWE-DISH’s Petition to Deny. As such, we submit that there continues to be no basis on the record before the Federal Communications Commission (“FCC” or “Commission”) upon which this Application could be granted.

At the outset we wish to highlight the one issue about which we are in total agreement with AvL – that being the importance of assuring that harmful interference is not caused by non-conforming antennas of less than 1.2 meters, which interference could harm the development of this potential new area of commerce for the U.S. satellite communications industry (and for that matter globally as well). Unlike AvL, however, SWE-DISH has not anointed itself as the sole arbiter of when this consideration has or has not been satisfied. Moreover, unlike AvL, SWE-

DISH has never sought to portray this as a confrontation between “U.S. manufacturers, such as AvL [that] have the satellite antennas and equipment expertise to produce smaller than 1.2M aperture antennas that do not cause harmful interference to satellites spaced uniformly at 2°” and other unnamed, but – by implication – non-U.S. manufacturers, such as SWE-DISH, whose products, in AvL’s estimation, should be “restrict[ed]” since they “may be sold for other markets” and therefore somehow “prevent” the “promot[ion of] commerce for the satellite communications industry.” (AvL Opposition at 4-5.)

As a matter of general principle, SWE-DISH firmly believes that the marketplace is the preferred arbiter of many of these concerns. But given that companies other than SWE-DISH were the ones that had first chosen to interject these issues into FCC licensing reviews, considerations of fairness and equitability demand that *all* such applications pending before the FCC be subject to the same degree of scrutiny concerning such matters.

As demonstrated more fully below, when subjected to the level of scrutiny that AvL has sought to apply to others, its own Application falls far short in many respects.

#### **I. The AvL Application is Still Missing Critical Information**

In our Petition to Deny, we identified a number of areas in which critical information was missing from the AvL Application. The AvL Opposition has done little to remedy those deficiencies. Indeed, most of SWE-DISH’s requests for such additional information have either been ignored or gone unanswered. For example:

- AvL still has not provided necessary information regarding peaking error in the different operational modes (manual and auto-acquisition) and pointing error in operational wind speeds. (See SWE-DISH Petition to Deny at 5.)
- AvL has yet to disclose any the information necessary to validate the pointing accuracy of the AvL Roto-Lok® Drive. In particular, AvL has yet to provide any of the information that in a previously-filed Petition to Deny PanAmSat had indicated as

necessary, such as “specific details about the auto-acquisition system and its Roto-Lok drive system patent, including the patent itself” and “detailed information about its installation procedures, including whether a unit will be permanently attached to each respective antenna or whether each unit is removable.”<sup>1</sup> (See SWE-DISH Petition to Deny at 6.)

- AvL has not provided the elevation plots with the 29-25\*Log(theta) envelope necessary to justify polarization alignment by antenna boresight rotation when operating on both horizontal and vertical polarization without manual adjustment. (See SWE-DISH Petition to Deny at 7.)
- AvL has not shown the close-in plots with the mainlobe and the first sidelobe for the 0.96 meter antenna and has not shown the 29-25\*Log(theta) envelope from 1.25° for the 0.75 meter antenna.<sup>2</sup> (See SWE-DISH Petition to Deny at 8-9.)

Thus, contrary to AvL’s assertion that it has submitted “an accurate and complete demonstration of compliance with all applicable Commission rules” (AvL Opposition at 1), glaring deficiencies with the information provided still abound.

## **II. AvL Still Has Not Addressed the Major Substantive Issues Raised by SWE-DISH**

In our Petition to Deny, SWE-DISH raised a number of concerns relating to pointing accuracy, potential radiation hazard, and ability to transmit on both polarizations. None of these concerns has been adequately addressed by AvL in its Opposition.

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<sup>1</sup> Petition to Deny filed by PanAmSat Corporation (“PanAmSat Petition”), File No. SES-LIC-20030602-00727 (July 10, 2003) at 3. While AvL asserts that it has now satisfied PanAmSat’s concerns, even if true, none of the information has been placed in the public record for all, including SWE-DISH and the Commission, to be able to evaluate.

<sup>2</sup> A general problem with the AvL Application is their failure to clearly label some of the materials provided. Thus, with respect to the .75 meter antenna, for example, it was difficult to determine whether the plots provided were elevation plots or azimuth plots. Upon closer examination it would appear to be the latter, which would mean that AvL has yet to provide a complete set of elevation plots for the .75 meter antenna.

**A. Pointing Accuracy Concerns**

The AvL Opposition does nothing to address the various concerns regarding pointing accuracy raised by SWE-DISH in our Petition to Deny. Rather, AvL simply asserts, without detail, that the AvL Roto-Lok® Drive with TracStar Auto-acquisition Controller<sup>3</sup> has been “demonstrated and proven by the major satellite operators to perform precise beam center alignment.” (AvL Opposition at 2.) Yet, in addition to having failed to provide even minimal information about the Roto-Lok® Drive and TracStar Auto-acquisition Controller, as noted above, AvL has failed to address our concerns regarding possible misalignment relating either to windload or deformation of the reflecting surface and the optical path, particularly when polarization adjustments are made. Our request that AvL attempt to measure the magnitude of this latter effect on each of their antenna systems has similarly been ignored. Thus, the many questions posed in our Petition to Deny regarding the actual pointing accuracy of the AvL antennas still remain unanswered.

**B. Radiation Hazard Concerns**

Rather than meaningfully address SWE-DISH’s concerns about radiation hazard, AvL has instead attempted to deflect these concerns by converting them into a debate over the relative merits of single-reflector optics antennas versus dual-reflector optics antennas. This effort, however, is to no avail. The alleged preference among manufacturers for one design over another is not a proper response to legitimately-based questions and concerns regarding radiation

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<sup>3</sup> To avoid any future confusion, SWE-DISH wishes to state for the record that it is fully aware that the TracStar Auto-acquisition Controller is not a satellite tracking system and never intended to suggest otherwise in its Petition to Deny.

hazard exposure.<sup>4</sup> As AvL well knows, the real issue here is not how many manufacturers favor one design over the other, but whether specific concerns that we raised regarding radiation hazard exposure have been addressed by AvL – and the short answer is that they still have not been able to present convincing arguments or data to address our concerns.

Nor do AvL's gratuitous attacks on the SWE-DISH design or performance resolve these issues either. For the record, the SWE-DISH IPT SUITCASE involves the application of high precision mechanics and sophisticated antenna design in which the reflector illumination is properly optimized (constant reflector edge illumination). What we do find alarming, however, is the attempt to label any effort to improve back radiation performance as "a poor utilization of resources" (AvL Opposition at 3), which in our view exhibits nothing more than a callous disregard for the safety of the antenna operator, as well as a source for picking up thermal noise which results in a degrading G/T. That safety (of the antenna operator) is better assured by proper antenna design, not by resort to energy absorbing material around the edge of the reflector.

Much of our concern with regard to the AvL 1 meter antenna dealt with the +20 dBi spike shown on the supporting materials accompanying the AvL Application. AvL now dismisses that spike as being "clearly due to range reflections." (AvL Opposition at 3.) In our

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<sup>4</sup> SWE-DISH would like to point out that the freedom of design of the dual-reflector optics concept is a major advantage, allowing optimal design of gain/efficiency, side/backlobe and cross-polarization performance. We therefore do not agree with AvL's assertion that dual-optics antennas are normally only used where significant off-axis cross-polarization improvement is desired. We are not alone in this judgment for, contrary to AvL's assertion, a number of antenna manufacturers in fact do use the dual-reflector optics design for antennas smaller than 1.2 meters in order to meet mandatory requirements at Ku-band. For example, a number of such antennas have been type-accepted by Eutelsat. *See* Eutelsat, Type Approval of Antennas and VSATs PDF (visited May 26, 2004) <<http://www.eutelsat.com/satellites/pdf/typeapproval.pdf>>

experience, when spikes of that magnitude are due to range reflection, this is normally specifically indicated in the report, which we note was not the case herein.

With regard to the test data run on the antenna test range at Georgia Tech Research Institute on March 23, 2004, that has been provided by AvL to rebut the radiation hazard concern, at this stage that test data is more noteworthy for the multitude of unanswered questions it poses than anything helping to bolster AvL's case. Fundamentally, AvL has not submitted a complete report of test results, but simply offered two pages of plots without any additional explanatory information. Notably missing from the test data is any information whatsoever about what envelope was used, what feed was used, or what polarization was used. Basic information is missing even as to what kind of test range was used (indoor/outdoor, i.e. near field or far field), whether the same range was used for all sets of measurements, as well as the serial number of the equipment tested. None of this additional test data can be evaluated without such information being provided and properly certified.

Moreover, we find it peculiar, to say the least, that these tests were run at the Georgia Tech Research Institute on March 23, 2004, well before the AvL Application was ever placed on public notice, yet no action was taken to immediately provide these results to the FCC as a supplement to the pending Application, since they appear to correct some obvious deficiencies in the original Application as filed. It was only after SWE-DISH filed its Petition to Deny that such information was forthcoming.

AvL's Opposition is now also accompanied by an "expanded" radiation hazard analysis. While no explanation is provided as to why an obviously incomplete analysis was included with the initial Application, we do note that the expanded analysis largely serves to confirm that the

FCC's standards are not met in a number of circumstances and that no attention has been given to the corresponding safety issues.

### **C. Polarization Concerns**

With regard to polarization changes, our basic concern has yet to be addressed. Indeed, AvL seems to want it both ways. When touting the purported advantages of single-reflector optics antennas over dual-reflector optics antennas, AvL makes the point that its "technical staff believes the advantages of single-offset [single-reflector optics] antennas for small aperture and especially temporary-fixed applications (flyaway and vehicle mounted) far outweigh any disadvantages." (AvL Opposition at 2.) Yet a scant two pages later, AvL attempts to dismiss the significance of the polarization issue by stating that "[f]or a majority of applications, these antennas are operated in fixed networks on the same satellite and transponder (e.g., the same polarization) and the antennas are delivered to a specific customer with the feed (OMT) set to the correct orientation."<sup>5</sup> (AvL Opposition at 4.)

Whichever version is accurate, the fact remains that in those installations, however many or few, where the antenna is not fixed, the polarization issue is still present. And AvL's response here is sorely lacking because the manual adjustment of polarization, when needed, must be aligned with high precision to the correct angle. This is not easily done in the field without mechanical references or detailed technical training. We further note that on some satellites the polarization is permanently offset, meaning the polarization must be manually offset by a certain degree away from 0° or 90° in reference to the major axis. The significance of this is that

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<sup>5</sup> AvL certainly gives every indication of marketing the 1 meter dish as a temporary-fixed product, describing it in marketing correspondence as a "motorized, cased based flyaway" and on their web page as a "portable satellite antenna system." See AvL Technologies, Technical Specifications PDF (visited May 26, 2004) <[http://www.avltech.com/avl\\_pdf/Model1000SpecSheet.pdf](http://www.avltech.com/avl_pdf/Model1000SpecSheet.pdf)>

polarization alignment by rotation of the entire antenna system around the boresight will not align the antenna azimuth with the satellite orbital arc.

***D. Other Matters***

One final matter warrants further comment. SWE-DISH in its Petition to Deny did seek simple confirmation that the antenna used for the 1 meter test patterns was a cut reflector and not a solid reflector. Given that AvL manufactures both types of 1 meter reflectors and there was no indication in the material submitted as to which type was used, we thought this was a reasonable inquiry. But rather than provide a straight response to this question, AvL instead has attempted to portray this as a challenge by SWE-DISH to the credibility of the first test range operator (TriPoint Global), which was certainly never our intention. The question did not go to the accuracy of the results, where we have full confidence in TriPoint Global's capabilities, but simply as to the nature of the reflector used in the tests, which is not an issue implicating TriPoint Global at all, and which, curiously, still has not been directly answered.

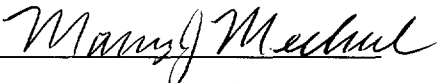


## CONCLUSION

Very little has changed in the record of this proceeding from the time that SWE-DISH submitted its Petition to Deny. There are still significant amounts of data that are either missing or of questionable validity and a significant number of unanswered questions. Thus, as SWE-DISH has previously urged, the Commission should (1) require AvL to supplement its Application to supply the additional information that continues to be missing; and (2) fully and completely review the sufficiency of such additional information to resolve the issues identified herein before taking action on AvL's Application.

Respectfully submitted,

SWE-DISH SATELLITE COMMUNICATIONS, INC.

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May 27, 2004

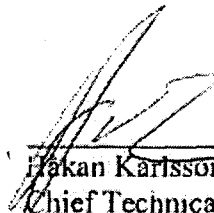
## **DECLARATION**

I, Håkan Karlsson, Chief Technical Officer of SWE-DISH Satellite Systems AB, the parent company of SWE-DISH Satellite Communications, Inc., hereby declare under penalty of perjury under the laws of the United States, that:

(1) I have read the foregoing "Reply" submitted by SWE-DISH Satellite Communications, Inc. concerning the application filed by AvL Technologies.

(2) The facts and technical information set forth therein are true and correct to the best of my knowledge, information and belief.

Executed this 27<sup>th</sup> day of May, 2004.

  
Håkan Karlsson  
Chief Technical Officer  
SWE-DISH Satellite Systems, AB

**CERTIFICATE OF SERVICE**

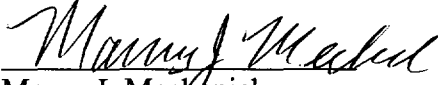
I hereby certify that a true and correct copy of the foregoing was sent by first-class mail, postage prepaid, this 27<sup>th</sup> day of May, 2004, to the following:

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