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**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of )  
 )  
MDS OPERATIONS, INC. ) WT Docket No. 07-255  
 )  
Petition for Waiver to Increase Effective )  
Isotropic Radiated Power Limitations )  
Applicable to Multichannel Video Distribution )  
and Data Service Stations WQAR560, *et al.* )

To: Chief, Wireless Telecommunications Bureau

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**REPLY COMMENTS OF  
MDS OPERATIONS, INC.**

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## SUMMARY

The DBS Operators accuse MDSO of simply reiterating comments made in the MVDDS rulemaking proceeding, but the reverse is in fact the case. In response to MDSO's detailed technical study, the DBS Operators do no more than recycle their prior, abstract claims of harmful interference from MVDDS operations. The Oppositions are simply further attempts by the DBS Operators to delay the entry of competitive services, and should be rejected.

As demonstrated in MDSO's technical report, and further detailed in the Declaration attached to this Reply, MDSO's test operations did not cause any harmful interference – or even perceptible noise – to DBS reception, nor will MDSO's proposed commercial systems. The results from the Albuquerque test can readily be applied to other MDSO's other markets; Albuquerque was chosen as a test market because it presented the most challenging spectrum environment in MDSO's licensed DMAs. Among other factors, the dry climate ensured that there would be no attenuation of MDSO's signal due to climatic conditions; there was nothing to skew the readings of MDSO's signal strength at any of the test receivers. The Albuquerque area also has a mix of urban, suburban and rural areas, allowing for observation of high-powered MVDDS in a variety of conditions. Moreover, the relatively high population of the city of Albuquerque ensured a statistically significant number of DBS subscribers with whom to potentially interfere. The Albuquerque market, and the test design used, presented the worst-case scenario available to MDSO; if the system did not cause harmful interference to DBS subscribers there (and the facts indicate that it did not), a similarly-designed system will not do so in any of MDSO's licensed DMAs.

Moreover, MDSO's test system met the EPFD limits at all sites. Although the Petition had requested a waiver of the EPFD limits out of an abundance of caution, the test report is clear that MDSO's systems will not need to rely on a waiver of the EPFD limits, and therefore that request is withdrawn. MDSO also clarifies that its test transmitter continued to operate at high power in the evenings after testing was completed and on weekends; despite this high-powered operation during prime viewing periods, the DBS Operators can point to no instances of signal degradation or interruption, or to any customer complaints. Simply put, MDSO has provided the FCC with objective evidence that the specific operations it proposes will not cause harmful interference to DBS reception.

It is clear from the detailed technical study provided by MDSO, and the limited waiver of the EIRP limit sought, that it is not seeking reconsideration of the MVDDS rules. Moreover, as demonstrated in MDSO's Supplement, ample precedent demonstrates the appropriateness of proceeding by waiver in cases such as this. The requested waiver will speed deployment of competitive services, including service to rural and underserved areas, without harmful interference to third parties; a waiver will therefore serve the public interest and should be expeditiously granted.

## TABLE OF CONTENTS

Summary.....	i
I. General Overview .....	1
A. MDSO’s System Design Caused No Interference.....	2
B. DBS Systems are Co-Primary with MVDDS Systems.....	2
II. The Requested Waiver is Appropriate and Justified.....	4
A. Denial of the Waiver Would Frustrate the Commission’s Purposes in Allocating this Spectrum to MVDDS.....	4
B. A Waiver is the Appropriate Vehicle for MDSO’s Requested Relief.....	5
1. The Petition Does Not Seek Reconsideration or Amendment of the FCC’s Rules.....	5
2. MDSO’s Proposal is Technically Sound.....	7
III. No Interference to DBS Customers.....	11
Conclusion .....	13

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To: Chief, Wireless Telecommunications Bureau

**REPLY COMMENTS OF MDS OPERATIONS, INC.**

MDS Operations, Inc. (“MDSO”), by its attorneys and pursuant to the Wireless Telecommunications Bureau’s (the “Bureau”) Public Notice,<sup>1</sup> submits these Reply Comments (the “Reply”) in response to the oppositions to MDSO’s above-captioned petition for rule waiver (the “Petition”)<sup>2</sup> filed by DirecTV, Inc. (“DirecTV”) and EchoStar Satellite L.L.C. (“EchoStar,” collectively with DirecTV, the “DBS Operators”). Attached hereto as Exhibit One is the Declaration of Dr. Bahman Badipour (the “Technical Declaration”), which addresses each DBS Operator’s technical arguments in turn. In support hereof the following is respectfully shown:

**I. General Overview.**

It is unsurprising that the duopoly DBS service providers have opposed MDSO’s Petition. Both of MDSO’s opponents strenuously opposed the Commission’s creation of MVDDS services in the first instance. In response to the clear facts laid out in MDSO’s field

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<sup>1</sup> *Wireless Telecommunications Bureau Seeks Comment on Petition of MDS Operations, Inc. for Waiver of Multichannel Video Distribution and Data Service Technical Rules, Public Notice*, DA 07-4575 (rel. November 9, 2007).

<sup>2</sup> All references to the Petition are to the corrected version filed on August 29, 2007.

test results, the Oppositions do little more than reiterate the arguments that the DBS Operators made in the Commission's rulemaking proceeding.

**A. MDSO's System Design Caused No Interference.**

Most tellingly, neither opposition provides anything more than supposition to contradict this core fact: MDSO's experimental system was operating for approximately 26 days side by side with DBS operations, at power levels equal to – and often higher than – those proposed in the Petition, without a single instance of a customer or licensee complaining of interference. Given these DBS Operators' strenuous and prolonged opposition to MVDDS service, one would think that if there had been any interference problems, they would have been quick to bring them to MDSO's and the FCC's attention long before the FCC put the Petition out for public comment. Their oppositions repeatedly refer to harm to DBS subscribers, but, neither produced any evidence that a single subscriber, in an admittedly large and well-populated service area, lodged a single complaint about MDSO's test operations. Consequently, there is no empirical basis for these oppositions. Rather, these duopolists are raising the same speculative concerns that they raised when they opposed the creation of the competitive MVDDS service.

**B. DBS Systems are Co-Primary with MVDDS Systems.**

The tenor of the DBS Operators' oppositions seems to suggest that their licensed systems are entitled to some higher degree of regulatory protection than is the case for MVDDS licensees. That is not the case. MVDDS licensees are primary licensees. *See Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range; Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7GHz Band by Direct Broadcast Satellite Licensees and Their Affiliates; and Applications of Broadwave USA,*

*PDC Broadband Corporation, and Satellite Receivers, Ltd. to Provide A Fixed Service in the 12.2-12.7GHz Band, Memorandum Opinion and Order and Second Report and Order*,<sup>17</sup> FCC Rcd. 9614, 9626 (2002) (“*Second R&O*”). According to the FCC’s web pages for Auction Nos. 53 and 63, MVDDS licensees collectively paid more than \$118 million dollars for their spectrum rights, in two FCC auctions. MVDDS licensees will also need to spend millions more to construct and operate their systems. By contrast, at least one of these DBS licensees obtained its FCC license for free. MDSO is surely mindful of and conscientious about its obligations to avoid interference to DBS operations; but, DBS licensees are not entitled to regulatory or operational deference with respect to competitive, licensed services.

Both DBS Operators were informed in writing about MDSO’s intent to conduct field testing. One of them opposed MDSO’s experimental license grant, and neither of them made any effort to put their technical people in touch with MDSO’s. As was the case at the inception, they have opted instead to use legal pleadings, rather than operational and technical facts, to stall or block a potential competitor. The FCC’s rules clearly state that all licensees, MVDDS and DBS, are expected to cooperate with each other to avoid co-channel interference; there is no evidence that either of these DBS licensees have honored that regulatory edict to date.

The FCC’s initial power limitation rules were based on field tests far more limited in scope than the real-world tests that MDSO’s engineering contractor performed. Hence, the premise for these two oppositions, that MDSO is essentially seeking reconsideration of prior FCC findings, is false. The Petition presents new facts obtained through independent testing of an operational MVDDS system; these findings present the FCC with an empirical basis for doing what it invited licensees to do when the conservative technical rules were first adopted: come

forward and present the FCC with a technical showing as to why the rules should be waived in this instance.

**II. The Requested Waiver is Appropriate and Justified.**

**A. Denial of the Waiver Would Frustrate the Commission's Purposes in Allocating this Spectrum to MVDDS.**

The DBS Operators seem to suggest that it is too soon for the FCC to consider a waiver of its technical rules. *Cf.*, EchoStar Opposition at 1-2 (referencing time period between adoption of MVDDS rules and filing of the Petition); DirecTV Opposition at 1 (referring to "limited" tests). To the contrary, for millions of rural customers who have only the duopoly service providers from which to choose, it is getting late. The Commission's MVDDS rulemaking spanned nearly six years from the earliest filings seeking more flexible use of the 12.2-12.7 GHz band to the initial adoption of service rules for this new service; more than two additional years elapsed before the first MVDDS licenses were issued.<sup>3</sup> It has now been three and one-half years since the FCC first licensed MVDDS systems, and the build-out deadlines for those licenses come due in July 2009.

It is telling that not a single MVDDS system has been constructed to date. Some are owned by entities with connections to DBS or cable interests. For example, SOUTH.COM LLC, a licensee partly-owned by an EchoStar affiliate, holds some 37 licenses throughout the Nation, including licenses in approximately 12 of the top 20 Designated Market Areas ("DMAs"). Other licenses, however, are held by smaller, independent operators who have obviously found it difficult under the existing rules to economically build and operate these systems.

Hence, the passage of time without any deployment of these networks confirms that the underlying purpose of the MVDSS rules -- provision of competitive services on an interference-

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<sup>3</sup> See generally, *Second R&O* at 9619-22.

free basis -- would indeed be undermined if the rule were not waived under these circumstances. As shown by MDSO's Petition, its system design renders higher power operations efficient and interference-free. Consistent with the FCC's rules and long-standing judicial precedents, this waiver should be granted precisely because it will ensure that the FCC's regulatory purposes are not frustrated.

**B. A Waiver is the Appropriate Vehicle for MDSO's Requested Relief.**

Both EchoStar and DirecTV attempt to categorize the Petition as seeking reconsideration of the Commission's MVDDS rules. EchoStar refers to the Petition as "a back-door attempt to re-adjudicate this settled matter." EchoStar Opposition at 4. DirecTV claims that "[t]he Commission has repeatedly determined that MVDDS operations at such power levels would cause unacceptable interference to DBS operators." DirecTV Opposition at 9. Nothing could be further from the truth. While the DBS Operators themselves are rehashing old arguments about purported interference without benefit of empirical evidence, MDSO has spent considerable time and money to prove that its affiliate, MDS America, Inc.'s ("MDSA") commercial network design, used in MVDDS systems abroad and tested under the difficult circumstances of the Albuquerque DMA, will not cause harmful interference to DBS operations.

**1. The Petition Does Not Seek Reconsideration or Amendment of the FCC's Rules.**

As a preliminary matter, MDSO notes that, contrary to DirecTV's assertion, the Commission has made no finding that the power levels proposed by MDSO would cause harmful interference to DBS. The DBS Operators conveniently ignore the Commission's explicit statements in its MVDDS allocation orders, recognizing that the rules it adopted were very conservative. *See, e.g., Second R&O* at 9646. In reply to MDSA's comments and petition for reconsideration, the Commission did not hold that MDSA's proposed power limits would likely

cause interference; rather, the FCC stressed that the power limits it adopted “are sufficiently conservative to ensure that any potential interference to DBS should be held below any level that can be considered harmful under our rules.” *Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range; Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7GHz Band by Direct Broadcast Satellite Licensees and Their Affiliates; and Applications of Broadwave USA, PDC Broadband Corporation, and Satellite Receivers, Ltd. to Provide a Fixed Service in the 12.2-12.7GHz Band*, Fourth Memorandum Opinion and Order, 18 FCC Rcd. 8428, ¶ 87 (2003) (“*Fourth MO&O*”). Rather than determining the extreme operational parameters at which an MVDDS signal would truly interfere with DBS, the Commission found it “prudent to craft a conservative criterion” at the outset, but to allow for waivers following independent testing by an MVDDS licensee. *Id.* See also, *Second R&O* at 9704.

Moreover, contrary to EchoStar’s claims that the Commission sought to limit MVDDS technical flexibility, the Commission stated the opposite intention: “While we are mindful of the need to protect current and future entities from harmful interference within the band, we seek to allow flexible use of the spectrum and, as such, do not wish to limit current and future technological innovations.” *Second R&O* at 9704. MDSO’s Petition is consistent with the Commission’s stated goals in adopting the MVDDS rules, and requires no reconsideration of those rules.

EchoStar’s further claim that a grant of MDSO’s Petition would constitute a modification to the MVDDS rules requiring a rulemaking is incorrect. As MDSO demonstrated in its Supplement, this case is perfectly appropriate for a rule waiver. The cases cited therein show

that the Commission has granted waivers for cases seeking far more extensive relief than that sought by MDSO. *See, e.g., Hye Crest Management, Inc.*, 6 FCC Rcd. 332 (1991) (waiver to permit use of point-to-point 28 GHz band for point-to-multipoint video services); *AirCell, Inc.*, 14 FCC Rcd. 806, ¶ 20 (Wir. Tel. Bur. 1998) (granting waiver of ban on cellular use in airplanes). Moreover, MDSO does not ask that the requested waiver apply to any equipment or system design other than that pioneered by its affiliate.<sup>4</sup> That MDSO holds the largest number of MVDDS licenses does not make a waiver granted to it automatically applicable to all MVDDS licensees.

## 2. MDSO's Proposal is Technically Sound.

DirecTV devotes a significant portion of its Opposition to challenging MDSO's test design, system parameters and other aspects of MDSO's technical demonstration. EchoStar raises fewer technical arguments, mainly questioning the choice of Albuquerque as a test market. All of those arguments are unsupported by empirical evidence and are baseless. Each of Dr. Badipour's responses to the DBS Operators' claims, set forth in the Technical Declaration, is incorporated by reference as fully as if stated in the body of this Reply. Nonetheless, MDSO wishes to respond further to some of these technical allegations.

First, MDSO wishes to stress its reasons for choosing the Albuquerque-Santa Fe DMA to test high-powered operations of its affiliate MDSA's system design.<sup>5</sup> Simply put, Albuquerque,

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<sup>4</sup> Contrary to EchoStar's claim that MDSO seeks "national relief ... in DMAs 1 to 120," MDSO does not seek relief for any license not issued to it, and it most assuredly does not request that the waiver extend to the 37 DMAs held by EchoStar's affiliate. Whether or how any other licensee chooses to construct its system is beyond MDSO's control, and outside the scope of its Petition.

<sup>5</sup> DirecTV claims that the Albuquerque system was not, in fact, MDSA's; that is incorrect. The Albuquerque system was a commercial MVDDS system, using the same equipment and design that MDSA uses in its systems overseas. ACS was retained as an independent tester; to ensure the validity of its test results, it insisted upon a testing environment in which a standard MDSA commercial system was deployed in a market and from a transmitter site that was most likely to result in interference if MDSA's theories about high-powered operation proved erroneous. Additionally, MDSA will obtain appropriate equipment registrations with the Commission prior to

NM presented the most difficult environment of all the markets licensed to MDSO, and the one in which interference was most likely to occur if the MDSA system did not work as intended. Because rain attenuates DBS *and* MVDDS signals, the climate of the Albuquerque area eliminated a factor that might have mitigated higher-power operations or otherwise influenced the test results. Instead, without any attenuation of MDSO's signal, the test shows that operation of MDSO's system at higher power had *no* adverse impact on the noise level or DBS carrier signals throughout the test area.

Moreover, the relatively high population density of the city of Albuquerque, the presence of suburban and rural areas around it, and restrictions on tower siting in that vicinity, created an environment in which MDSO's higher power operations would be more likely to cause harmful interference to DBS customers than anywhere else in its other licensed DMAs. Thus, of all of MDSO's licensed DMAs, Albuquerque presented a true "worst-case scenario" in which to test a system designed for higher power commercial operations.

DirecTV's claim that, since most markets lack Albuquerque's topography, with a mountain looking onto flat territory, the MVDDS licensee will need "multiple transmitters" resulting in higher EPFD (and thus higher likelihood of interference), is not necessarily accurate and it is irrelevant to the requested rule waiver. *See* Technical Declaration at ¶ 16. Even if multiple transmitters were required for markets with different topography, the signal strength in the overlap areas between transmitters would not be high enough to create harmful interference. *Id.* Moreover, earlier testing demonstrated that even from relatively small towers, in areas with flat terrain, EIRP levels above those permitted by the rules are possible without interference. *Id.* at ¶ 21.

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commercial deployment. *Cf.* DirecTV Opposition at 16. It should be noted that experimental licenses permit the development and testing of equipment as well as techniques. 47 C.F.R. § 5.3.

Second, the DBS Operators allege that MDSO is seeking an unrestricted waiver of the equivalent power flux density (“EPFD”) limits of the Commission’s rules. That is not the case. MDSO does not, in fact, need a waiver of the EPFD limits, and hereby withdraws that request, which was made out of an abundance of caution, in the highly unlikely event that the EPFD might be slightly exceeded at a particular location. As the field report attached as Exhibit One to the Petition (the “Report”) makes clear, at the power levels tested by MDSO’s consulting firm, ACS, the EPFD limits were met. *See* Report at 35; *see also*, Technical Declaration at ¶¶ 4, 9-10. To the extent that it is not clear from the Petition, MDSO fully intends to operate at EIRPs lower than 40 dBm per 24 MHz of spectrum if necessary to honor the existing EPFD limits.

Third, DBS Operators claim that MDSO would violate the power flux density (“PFD”) limits of the FCC’s rules, but has not sought a waiver of 47 C.F.R. § 101.105(a)(4)(i). DirecTV Opposition at 21-22. That rule section applies to the protection of non-geostationary orbit fixed satellite services (“NGSO FSS”) facilities. The DBS Operators make no effort to demonstrate standing to raise this issue on behalf of NGSO FSS licensees, none of whom have protested the Petition. Moreover, the Commission’s rules regarding the protection of such facilities fundamentally rely on the placement of an MVDDS transmitting antenna 10 kilometers or more from the NGSO FSS receiver. *See* 47 C.F.R. § 101.129(b). Complying with distance separation requirements is obviously more easily accomplished in a system consisting of one or two transmitters, as proposed by MDSO, than by a system that must rely on multiple transmitters to cover its service area. Moreover, as indicated in the Technical Declaration, the PFD levels were in fact met at all power levels at which the EPFD limits were met.<sup>6</sup> *See* Technical Declaration at ¶¶ 30-31.

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<sup>6</sup> In any event, the Petition specifically asks that the Commission waive any of its rules necessary to permit operation at the EIRP levels requested by MDSO. *See* Petition at 1.

Fourth, DirecTV criticizes the use of shielding during the field tests. *See* DirecTV Opposition at 13. As noted in the Technical Declaration, some sites were tested with and without shielding simply to determine how shielding would impact the test results. *See* Technical Declaration at ¶ 11. Shielding is a common technique in the design of microwave systems, and, the Commission contemplated that shielding might be used in the deployment of MVDDS systems. *See, e.g., Second R&O* at 9652. Certainly, in a testing context, there is nothing unreasonable about evaluating how shielding might work in a real-world MVDDS system.

Finally, DirecTV quotes out of context an isolated statement in the attachment to an *ex parte* statement filed by MDSO's counsel to inaccurately claim that MDSO seeks primarily to serve urban areas and leave rural areas without service. DirecTV Opposition at 13. It is obvious from where MDSO chose to bid for these licenses that its primary goal is to provide new or competitive services in smaller markets, including rural areas. A higher power design would enable MDSO to deploy in urban and rural areas quicker and more cost-effectively. To summarize MDSO's proposal, its system design would start with a high-powered transmitter located relatively high above ground level in the areas to be served. Towers suitable to such systems would generally be outside the urbanized areas in the DMA. The sparsely populated areas nearest the tower would receive coverage from the moment the transmitter is placed in operation. Hence, a grant of the Petition will undoubtedly speed the deployment of MVDDS service to rural areas.

DirecTV seems to be arguing in favor of a slavish devotion to the FCC's initial proposal, even though MDSO's real world tests now reveal a better approach, better not just for MDSO but for the DBS licensees and their customers. DirecTV's approach serves no one's interest,

least of all the consumers who receive DBS or who wish to receive the new broadband and video services that MVDDS can provide. The DBS Operators' challenges to MDSO's careful, real-world engineering study are a combination of unsupported assertions and attacks upon statements taken out of context. The oppositions are little more than attempts to further delay competition, and should be rejected.

### **III. No Interference to DBS Customers.**

DirecTV challenges the relevance of the lack of customer complaints during the trial, and derides MDSO's commitment to comply with the Commission's DBS customer notice requirements. DirecTV Opposition at 17-120. Both DBS Operators find the notice given them by MDSO faulty. *Id.* at 18; EchoStar Opposition at 2-3.

MDSO's tests were conducted under an experimental license, Call Sign WC9XKW. The notice requirements of Section 101.1440 do not apply to experimental licenses, which are governed by Part 5 of the Commission's Rules. The Commission encourages, but does not require, coordination between MVDDS licensees seeking a technical rule waiver and DBS operators. *Fourth R&O* at n. 235. Nonetheless, both DBS Operators were notified in writing to their authorized agents of MDSO's planned testing under the experimental license. See Exhibit Two and Exhibit Three, attached hereto. Indeed, EchoStar opposed testing Experimental License WC9XKW before it even began, for no other reason than that the power levels to be tested were "significantly higher than the maximum EIRP value of +14 dBm per 24 MHz that is allowed[.]"<sup>7</sup> See Exhibit Four, attached hereto. Yet, when the test transmitter was actually turned on, no complaints were ever heard from EchoStar; they are apparently predisposed to protest any variance from the MVDDS technical rules, regardless of the merits. It is therefore

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<sup>7</sup> The Albuquerque tests were ultimately conducted under a renewal of Station WC9XKW, but, to the extent the MVDDS coordination rules applied to experimental licenses at all, renewals are exempt from those requirements. See 47 C.F.R. §101.1440(f).

somewhat disingenuous for EchoStar to suggest that it was open to coordinating with MDSO in the conduct of those tests. Furthermore, since neither EchoStar nor DirecTV provided MDSO with a list of covered subscribers, or attempted to communicate with MDSO's technical personnel in response to the notices they did receive, they cannot now be heard to complain that they or their customers may not have been fully informed about this test. *Cf.*, DirecTV Opposition at 17.

In any case, as the Technical Declaration clarifies, the test transmitter was left operating after each day's test had ended, and on weekends, during prime viewing hours, at a significantly higher EIRP than the maximum requested in the Petition. *See* Technical Declaration at ¶ 29. Nothing in either DBS Operator's Opposition indicates that any customer experienced any difference in their DBS availability. Indeed, it is implicit in DirecTV's erroneous claim that the test transmitter only operated during the day<sup>8</sup> that no one even noticed the high-powered transmissions. It is inconceivable that no customers in the densely-populated urban areas within the test area would have complained had there been a sudden increase in signal problems or outages. It is likewise inconceivable that the two DBS Operators would have failed to investigate any such customer complaints, or noticed complaints of service degradation unrelated to any weather issue. Surely any such evidence of customer impact would be in the DBS Operators' own records, yet, despite every incentive to do so, neither of them has come forward with evidence of that nature. The obvious inference is that customers were unaffected; absent any harm to DBS subscribers, there is no public interest justification to delay the deployment of advanced services that a grant of the Petition would permit.

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<sup>8</sup> DirecTV Opposition at 17. The fact that the pictures accompanying the Report were taken during the day does not mean that no testing was conducted at night. The pictures were provided to show the Commission and interested parties what the receive areas looked like; pictures taken after dark would not have served that purpose very well.

**Conclusion**

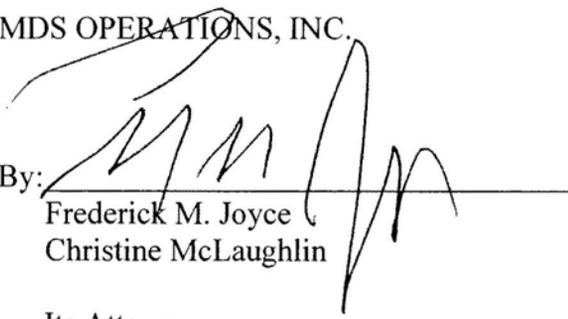
The Commission has repeatedly expressed a desire to accelerate the deployment of communications services in rural areas. *See, e.g., In the Matter of High-Cost Universal Service Support, Recommended Decision*, Statement of Chairman Kevin J. Martin, FCC 07J-4 (rel. November 20, 2007) (noting the Commission’s “long history and tradition” of ensuring rural communities have similar access to communications services; praising the Joint Board’s recommended program for dissemination of broadband to unserved areas as a “laudable goal”). MDSO’s Petition presents the Commission with a simple, expedient means of accomplishing that policy goal for the benefit of thousands of rural consumers.

WHEREFORE, for all the reasons stated herein, MDSO respectfully requests that the Commission expeditiously deny the oppositions of the DBS Operators and grant the waiver requested by MDSO’s Petition.

Respectfully submitted,

MDS OPERATIONS, INC.

By:

  
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DATE: January 18, 2008

**EXHIBIT ONE**

## **DECLARATION OF DR. BAHMAN BADIPOUR**

I, Bahman Badipour, do hereby declare under penalty of perjury as follows:

1. I am the President of Analytic Consulting Services (“ACS”), which provides RF engineering consulting services. I hold a Doctorate of Science in Electrical Engineering from George Washington University and have more than 20 years experience in telecommunications engineering. In addition to broad expertise with wireless systems, I have experience with MVDDS technology from the time of the FCC’s rulemaking for this service, when I was involved in testing the technology, and developed on behalf of a former client a terrestrial-satellite frequency reuse methodology that was subsequently patented by that company.
2. I am making this Declaration on behalf of MDS Operations, Inc. (“MDSO”), in response to oppositions filed by DirecTV and EchoStar against MDSO’s request for waiver of the MVDDS technical rules.
3. Along with its request for waiver, MDSO submitted an independent report by ACS, which conducted a real world test of MDSO affiliate MDS America’s (“MDSA”) MVDDS broadband wireless technology, which shares the use of the 12.2-12.7 GHz band with Direct Broadcast Satellite (DBS) systems. As discussed in that report, the primary objective for the test in Albuquerque was to measure possible presence and extent of interference of MDSA terrestrially broadcasted signal with DBS satellite reception (DirecTV and EchoStar), when set up in a commercial configuration. DirecTV and EchoStar each filed oppositions to MDSO’s waiver request, with DirecTV’s being the more detailed document. In its opposition to MDSO’s waiver request, DirecTV has concluded that the ACS report is a “flawed technical report that cannot possibly be universalized to support a waiver.”<sup>1</sup>

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<sup>1</sup> Opposition of DIRECTV at 22.

4. The principle argument of the DBS operators is that tens of millions of DBS subscribers may experience harmful interference as a result of this new terrestrial service and that to avoid such a scenario strict limits should be imposed on the EIRP of terrestrial transmitters even beyond the current EPFD limit. These assertions are simply not true. As discussed in the ACS report, the EIRP value associated with the detection threshold of  $-137.1 \text{ dBW/m}^2/4\text{kHz}$ , corresponding to EPFD limit of  $-171.1 \text{ dBW/m}^2/4\text{kHz}$  under the worst-case analysis<sup>2</sup>, is approximately 30 dBm per 24 MHz of spectrum,<sup>3</sup> an EIRP that is significantly higher than the current EIRP limit. Thus, the EPFD limit for this region has been honored and confirmed by the ACS report to be equivalent to the detection threshold of MVDDS signal by a 34 dBi gain DBS antenna under the worst possible interference scenario. It is this parameter – which will be met at power levels proposed by MDSO - that offers DBS customer protection against any number of MVDDS transmitters configured in various geographical and operational characteristics.

5. In its opposition to MDSO's waiver request, DirecTV has raised a number of technical arguments, each of which will be addressed in turn.

6. Before addressing these technical arguments, it is useful to review the specific interference protection criterion that has been established by the Commission for the protection of DBS subscribers in the DBS rules. Section 101.105 (ii) of the Commission's rules sets forth the Equivalent Power Flux Density (EPFD) limits as the specific measure of interference protection criterion for co-primary Direct Broadcast Satellite service earth stations. As stated in the *Second Report and Order*:

“EPFD is a direct measure of the MVDDS power that can cause interference. It is administratively simple to apply and enforce. It is similar to the approach adopted internationally for sharing between DBS and NGSO service.”<sup>4</sup>

7. The FCC further stated: “Using a 10% increase in DBS service unavailability criterion as an initial benchmark to establish EPFD limits for MVDDS strikes a

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<sup>2</sup> ACS report at 36.

<sup>3</sup> Unless otherwise stated, references to dBm in this Declaration should be read as “dBm per 24 MHz of spectrum.”

<sup>4</sup> *Memorandum Opinion and Order and Second Report and Order* in ET Docket No. 98-206, 17 FCC Rcd. 9614, 9763 (2002).

reasonable balance between protecting DBS from interference and deploying new MVDDS services.”<sup>5</sup> The Commission has specified four separate EPFD limits so as to account for the regional differences in satellite signal strength and climate patterns that occur across the country. “[T]he regional EPFD requirements are based on permitting a small percentage increase in the unavailability or outage of DBS service. In general, DBS service unavailability or outage currently occurs only during periods of heavy rain or precipitation. The EPFD requirements would ensure that the effect of an MVDDS signal would be only a small increase in the DBS service outages that occur during this heavy precipitation, *e.g.*, the onset of the rain outage may begin sooner or the rain outage may last somewhat longer.”<sup>6</sup> Thus, EPFD limits ensures that the impact of new deployment MVDDS on DBS signal reception is limited essentially to 10% increase in unavailability of DBS service across the country.

Claim 1: “Results from testing of one Transmitter in one DMA cannot be universalized to support a waiver in dozens of other markets.”<sup>7</sup>

8. The Albuquerque market was specifically chosen because it presents such a difficult environment that results from Albuquerque can, in fact, be universalized to MDSO’s other DMAs. Albuquerque’s climate and topography are such that there will be exceptionally little attenuation of the MVDDS signal. In most other markets, the MVDDS signal will experience more attenuation due to foliage, obstructions and weather. The Albuquerque transmitter site is surrounded by a mix of urban, suburban and rural areas; ACS tested with higher power throughout all of these areas. The presence of densely-populated urban locales, as found in Albuquerque, was also important for testing because there are simply more potential DBS customers with whom to interfere. Albuquerque is also in close proximity to the two adjacent DMAs, and Albuquerque has limited available tower sites, making siting especially challenging in that market.

9. ACS testing showed that an MVDDS transmitter can very well co-exist with the DBS transmission at a much higher level of EIRP than is currently required, as this

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<sup>5</sup> *Id.* at 9764.

<sup>6</sup> *Id.*

<sup>7</sup> Opposition of DIRECTV at 10.

higher level results in EPFDs that are still well within the FCC's current limits. The current EIRP provides no additional protection to the DBS customer beyond the EPFD limit (*i.e.*, the DBS interference protection criterion) for all regions. The current EIRP limit for MVDDS stations is 14 dBm per 24 MHz. This single number does not take into consideration a particular MVDDS system design, its operational characteristics, or even its geographical location.

10. With respect to extrapolating the result of this test to other locations, certainly the EIRP level corresponding to achieving EPFD interference protection limit may not be the same in other locations as the EIRP level in Albuquerque, since this parameter depends on a number of variables, as noted above. However, this fact should not be alarming to DBS operators: as the test clearly demonstrated and as acknowledged by DirecTV,<sup>8</sup> it is the EPFD limit that provides protection to the DBS service. The various regional EPFD limits will continue to provide protection, as intended by the Commission, to DBS service regardless of where the DBS earth station is located, even in the absence of an EIRP limit. Consequently, while EIRP levels in other markets may not be the same as in Albuquerque, nevertheless the protection offered to the DBS service there can be universalized to any other market in the country.

Claim 2: “[T]here are questions about the procedures used for the test - e.g., apparently shielding was used at some of the sites, collected test data was ‘filtered’ to eliminate outlier and 11% of the entries on Table 3 indicate that interference decreased in the presence of the MVDDS transmission.”<sup>9</sup>

11. DirecTV's comments regarding the testing procedures are designed to cast doubt on a report that has taken every effort to describe in detail every procedure so as provide a complete picture to the reader. Some sites were tested with and without shielding simply to see to what extent shielding affected the test results. At every test site the FCC's EPFD limits were honored even without shielding.

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<sup>8</sup> “[T]he ACS Report confirms that the established EPFD limits are appropriate.” *See* Opposition of DIRECTV at 19.

<sup>9</sup> *Id.* at 13.

12. Regarding “filtering” of collected data, as fully described in the report, filtering was used only for the SAT-9520 data and then only to eliminate outliers and records that were poor due to the reset command inadvertently set by the acquisition software of the manufacturer of the device (*see*, pg. 24). The outlier criteria used in the test is well known to professionals that conduct real world data collection and processing.

13. Regarding the 11% of the entries on Table 3 that indicate interference decreased in the presence of the MVDDS transmission, the response is twofold. First, the results in this table are based on the data that was collected using the SAT-9520 satellite installer device and, as noted in the report, when looking purely on the SAT-9520 performance parameters, impact of atmospheric conditions cannot be separated from the impact of MVDDS transmission (*see*, pg. 26). Second, in some cases the difference between the respective averaged IRD readings of MVDDS ON and MVDDS OFF is so small that these differences can be attributed to normal fluctuation of the DBS signal or the inherent noise level of the collection device. It should be noted at this point that SAT-9520 is one of the devices that MITRE Corporation employed when they were conducting their test.

Claim 3: “[T]he primary rationale cited by MDSO for its requested waiver is the avowed goal of providing MVDDS service to rural areas. Indeed, MDSO has suggested that, if the Commission grants its petition, ‘most of [MDSO's] small, sparsely populated DMAs can be served from a single site.’ Why, then, did ACS test a system designed to serve the urban center of Albuquerque - the most densely populated area in New Mexico (as shown in Figure 2 below)?”<sup>10</sup>

14. MDSO’s and ACS’ test planning philosophy from the outset was to design MDSO’s high power test around the worst-case interference scenario possible. Albuquerque presented the most complex propagation conditions of all of MDSO’s licensed DMAs. The Albuquerque-Santa Fe DMA includes densely-populated urban area, suburban area, and sparsely populated rural area. While providing service to rural areas is of significant importance to MDSO, all of their licensed DMAs generally include urban and suburban areas as well. For sufficient power, the theoretical coverage area for the MVDDS directional antenna used in the testing exceeds 5,000 square kilometers, which encompasses all of Albuquerque *and* substantial outlying rural areas. Thus, using

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<sup>10</sup> *Id.* at 13.

only a single directional antenna significant rural areas surrounding Albuquerque were also covered throughout ACS' test.

15. Unlike sparsely populated areas with potentially very few DBS subscribers, a densely populated area, with statistically significant numbers of DBS subscribers directly below a transmitter of potential source of interference, presents a great opportunity to determine practical impact of such transmission since at least a portion of interfered-with subscribers would be likely to contact their service provider regarding interruption to their DBS service. This would demonstrate succinctly the real world impact of MVDDS transmission in a way that would be hard to argue against. It therefore seemed evidently reasonable and appropriate to include a more densely populated area such as Albuquerque in the test region.

Claim 4: "How would MDSO propose to serve other, less populous areas within its licensed service area? Clearly, additional transmitters would be needed, and would have to have overlapping beams in order to avoid gaps in coverage. This, in turn, would raise the EPFD in such overlap areas. Yet the ACS Report does not in any way assess the potential interplay between multiple transmitters needed to serve the large rural areas MDSO purports to target."<sup>11</sup>

16. The FCC should keep in mind that with only one transmitter, the service coverage area included not only the downtown areas of Albuquerque, but also outlying rural areas, and, it is certainly possible that just one transmitter will suffice for many of MDSO's licensed DMAs. Nonetheless, it is well known that EPFD generally has its greatest value at sites near the transmitter within the center of the main beam, and not at fringes of coverage area in the overlap areas. However, to clarify this point, the following simple example is provided. Assuming two isotropic transmitters having equal EIRPs of X dBm, with coverage area of 43 km and overlapping the coverage radius by 2 kilometers, then using the free space path loss model at frequency of 12.45 GHz the total power at the 2 km overlap point along the shortest path between the transmitters is X dBm – 143.79 dB. In comparison, received power at a site 21 km from one of the transmitters is X dBm – 140.78 dB. Consequently, the power for EPFD calculation at 21 km site is 3

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<sup>11</sup> *Id.* at 14

dB (2 times) higher than the power at 41 km site. Thus, it is clear that the overlap areas are inconsequential in comparison to the sites closer to the transmitter.

Claim 5: “[A] large majority of the test points used in the ACS Report are located more than 20 km from the MVDDS transmitter, ensuring that the energy of the interfering signal would be greatly attenuated”.<sup>12</sup>

17. As noted in the report, the test in Albuquerque was designed to measure the impact of a commercially configured MDSA terrestrially broadcasting system on the DBS satellite reception. As such, this system is configured to provide coverage for Albuquerque DMA. MVDDS transmit antenna was pointed at 230° with respect to true North and down tilted approximately - 4.5°. The transmit antenna was positioned at 3269 meters AMSL and directed toward downtown Albuquerque. The main beam of the antenna touched ground at approximately 21 km from the transmitter in the downtown area. Therefore it was entirely appropriate to perform sufficient number of tests at sites in and around the main beam of antenna where the MVDDS transmission is at its maximum power. It should also be mentioned that a total of six test sites (3, 16, 24, 26, 30, and 33) are exactly at the location where the main beam touches ground. Moreover, MDSA’s system design contemplates that the high-powered transmitter will be located well away from the population centers in the DMA, so that the test design mimicked a real-life system.

Claim 6: “[T]he closest sites to the transmitter chosen for testing are located (1) at such severe elevation differentials that the gain of the MVDDS transmitting antenna is approximately 0 dBi (compared to a peak of 17.4 dBi ) and (2) on azimuths outside of the main beam of the MVDDS transmitter by 10.5° to 24.8°, again ensuring an MVDDS signal of lower intensity.”<sup>13</sup>

18. First, it should be noted that DirecTV’s statement, that closest test sites (11, 13A, and 14) are “on azimuths outside of the main beam of the MVDDS transmitter by 10.5° to 24.8°,” is entirely incorrect. As shown in Table 2 of the report, the azimuths for sites 11, 13A, and 14 are 219.5°, 254.8°, and 251.2°, respectively, and as noted above (and also in the report), the MVDDS transmit antenna is pointed in the direction of 230°.

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<sup>12</sup> *Id.* at 15

<sup>13</sup> Opposition of DIRECTV at 15-16.

Furthermore, the beamwidth of MVDDS antenna as shown in Figure 10 of the report is 60°, meaning the azimuthal coverage of the main beam extends from 200° to 260°. Therefore, the azimuths for sites 11, 13A, and 14 are well within the azimuthal coverage of the main beam of the MVDDS antenna.

19. Second, even if we assume the 0 dBi gain that was cited by DirecTV, that would still mean that the EIRP looking down at the closest sites is 26.6 dBm, given the maximum power of 44 dBm at the peak of 17.4 dBi, which is significantly higher than the current EIRP limit of 14 dBm.

Claim 7: “What ACS did *not* test was the case most likely to reveal the true extent of the interference created by its high-power operations - a nearby site along the azimuth and elevation of the MVDDS transmitter's main beam.”<sup>14</sup>

20. As noted above in response to DirecTV’s argument number 5, a total of six test sites lie exactly at the location where the main beam touches ground. These test sites are the closest on-beam sites located in the center of the main beam. The system was configured to provide coverage for the Albuquerque DMA, and as such was located at the Sandia Park tower complex, which is where nearly every TV and radio station providing coverage for Albuquerque and the surrounding area is located. Second, as also noted above, the closest off-beam sites (11, 13A, and 14) are still exposed to EIRP of 26.6 dBm, well beyond the current EIRP limit of 14 dBm.

Claim 8: “This scenario [i.e., a site along the azimuth and elevation of MDSO’s main transmitter beam] will most certainly occur in service areas with flatter terrain, such as the southeastern U.S.”<sup>15</sup>

21. My prior company, LCC, conducted a relatively low power (21 dBm) MVDDS test in July of 2001 in Clewiston, Florida. *See Second Report & Order, supra*, 17 FCC Rcd. at 9621, n. 28. For this test, the MVDDS transmitter was installed on an existing telecommunications tower at a *height of only 28 meters*, outside of the very small town of Clewiston in rural south central Florida, with miles of flat terrain in the direction of the MDS antenna. The transmit antenna

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<sup>14</sup> *Id.* at 16.

<sup>15</sup> *Id.* at 16.

was pointed 110 degrees away from true North direction. The impact of the MDS transmitter on the DBS service was tested at 12 separate locations around the transmitter, nearly all test sites were within the mean beam of the antenna. The distance between the test locations and the MDS transmitter site ranged from 77 m to 16.6 km, with the height of the receive antennas varying from 1.7 m to 12.4 m. Thus, clearly the Clewiston test provided nearly all, if not all the conditions that DirecTV has complained about with respect to the Albuquerque test. Yet, when this report was submitted to the FCC for review and comment, neither DirecTV nor Dish Network chose to comment on the Clewiston report. It is only reasonable to assume that the DBS operators did not have any problem with the Clewiston test and the conclusions drawn therefrom, which of course is a matter of record.

Claim 9: “DBS antennas are typically deployed on top of the subscriber's roof - *i.e.*, above the surrounding ground clutter that **could** attenuate a terrestrial MVDDS signal. Thus, the experimental set-up would tend to decrease the MVDDS signal's effect more than would actually be experienced by a subscriber with a rooftop antenna, thus biasing the result.”<sup>16</sup> (emphasis added)

22. First, it should be noted that the reason the DBS antennas are deployed on rooftops is that rooftops are less vulnerable to interference from ground clutter and multipath, and as such rooftop installation is the preferred choice of the DBS operator. While this may be the preferred choice of the operators, it is not, however, the worst case from the perspective of testing for harmful interference. DBS antennas that are attached to sides of buildings or on poles near buildings present the worst case interference situations. As such, ACS chose to consider the worst case interference scenario for its independent test.

23. Second, DirecTV has alleged that the surrounding ground clutter could attenuate a terrestrial MVDDS signal. As discussed in the report, a simple Free Space Path Loss (FSPL) model was created to provide an expected estimate of power flux density at each site (*see*, pg. 13). For example, the difference between the FSPL prediction and

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<sup>16</sup> *Id.* at 16

measured MVDDS power when averaged across all the test sites is 3 dB, the measured power being approximately 3 dB higher than the FSPL prediction. The reasons for such difference may be the cross polarization leakage associated with sites near the transmitter resulting in higher than expected power in band; such cross polarization leakage was not considered in the FSPL model (*see*, pgs. 14, 31, and 32). In general, FSPL prediction of received power seemed very accurate within the main beam and not as accurate off the beam (*see*, pg. 14). As such, strong correlation between the measured power and FSPL prediction indicate that the ground clutter around the selected test sites did not attenuate the MVDDS signal. Due to the particular DBS antenna configuration that is more susceptible to interference than rooftop antennas, the test design in fact represents the worst-case interference condition. Thus, any “bias” in the test design was toward creating conditions in which interference would be most likely to occur, not less.

Claim 10: “MDSO states that it ‘seeks only authority to operate the specific types of equipment tested by it, using its tested system design techniques.’ However, MDSA did *not* design the system tested in Albuquerque.”<sup>17</sup>

24. MDSA designed and installed the MVDDS transmitter at the site. As described in the report, MDSO selected Albuquerque for installation of the first commercial MVDDS system in the United States, with ACS specifying the antenna location and configuration within that DMA (*see*, pg. 2). As noted in the report, site engineering is an essential part of MVDDS system design (*see*, pg. 35). For example, as mentioned above, MDSA’s system design contemplates the high-powered transmitter will be located well away from the population centers in the DMA. Another aspect of MDSA’s system design is selection of highest possible point for installation of the transmit antenna. So as to reflect the MDSA design philosophy, both of their system design recommendations were followed by ACS in the selection of Sandia Park tower complex for installation of MDS antenna. However, with respect to antenna orientation (particular direction and down tilt of the antenna), ACS followed its test planning philosophy of designing MDSO’s high power test around the worst-case interference scenario. The motivation for such a selection being that the luxury of selecting antenna orientation may not be available in all

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<sup>17</sup> *Id.* at 16.

the transmitter locations. The equipment installed at Albuquerque was the same as commercial systems used by MDSA in its MVDDS operations overseas, and system design (including a relatively high powered transmitter operating on a tall tower at high elevation) is the same that MDSA employs elsewhere in the world. The equipment and design is the same as that which will be commercially deployed in the U.S. ACS, in its role as an independent tester retained to evaluate the feasibility of high-powered MVDDS operations, insisted that any test conducted reflect the worst-case scenario. That is, before ACS would be willing to support the claim that interference-free, high-powered commercial MVDDS was feasible, it wanted to put that claim to the test in the worst possible interference environment for which its client was licensed.

Claim 11: “Does the requested waiver apply only to the type of MDSA equipment used in the Albuquerque experiment, or would it apply to other MDSA equipment currently available or to be developed in the future?”<sup>18</sup>

25. The system design techniques that lead to the system that was tested in Albuquerque have been applied to existing MDSA systems and will be applied to all MDSO systems in the U.S., all of which will use substantially similar equipment. ACS and MDSO obviously can’t determine the technical impact of equipment that hasn’t been invented yet, and, the waiver request doesn’t ask the FCC to speculate on that score. If at some future date, new equipment is developed that would change the propagation characteristics and interference potential of the MDSA-designed equipment, and MDSO wishes to deploy that equipment, it would seek appropriate FCC authority (including experimental authorization for testing purposes) at that time.

Claim 12: “And exactly what characteristics of system design would MDSA deploy?”<sup>19</sup>

26. With respect to DirecTV position number 12, to the best of my knowledge, MDSA will design and install their equipment using their extensive experience in deployment of similar systems in many places around world. MDSA has stated repeatedly that its MVDDS transmission system exists and is operational in several countries around the world. I am in no position to reveal MDSA’s trade secrets, and

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<sup>18</sup> *Id.* at 17.

<sup>19</sup> *Id.*

MDSA has indicated no intention to provide materials containing its trade secrets and intellectual property to competitors. However, it is my understanding that the DBS companies have been invited by MDSA to visit and discuss its systems on-site. It is my further understanding that EchoStar has already visited an MDSA customer and had extensive discussions with the management of the system and so would already be aware that the MDSA system exists, is commercial, and operating in the shadow of DBS.

Claim 13: “Would it only operate an MVDDS transmitter from a mountain top located to the north of an intended service area?”<sup>20</sup>

27. The MVDDS transmitter for the Albuquerque test is not located to the north of the city but 50° east of the true North (*i.e.*, closer to East than North). Where mountain tops are available, that is always the most desirable site for placement of MVDDS transmitters or any other wireless service seeking the greatest coverage area such as, for example, television and radio stations. The particular antenna orientation in Albuquerque represents one of the worst possible interference scenarios, and as such it is not a desirable antenna orientation from MVDDS perspective. A better antenna placement may be to locate the MVDDS transmitter south of the areas to be served; this is particularly true where the DBS antenna’s elevation angle is high.

Claim 14: “MDSA claims that its MVDDS systems deployed in other countries typically include ‘a small reflector in the coverage area that will reflect a portion of the RF beam at a very small elevation angle back across the exclusion area near the MVDDS transmitter. Yet the system tested in Albuquerque included no such reflector. If MDSO truly intends to use MDSA’s ‘tested system design techniques’, the ACS Report has failed to reflect those techniques accurately.”<sup>21</sup>

28. The ACS test was designed to address important aspects of commercial deployment of an MVDDS transmitter as it relates to reception of DBS signals. The ancillary aspects of such deployment are generally deductive from results of the test. Thus, if the worst-case EPFD value at the site of the reflector is below the EPFD limit, which will be the case by design, then the worst-case EPFD value in the exclusion zone

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<sup>20</sup> *Id.*

<sup>21</sup> *Id.*

generally cannot exceed the EPFD limit, since only a controlled portion of the RF beam is reflected back by the reflector on to the exclusion zone.

Claim 15: “[T]he lack of complaint should not be ascribed to a lack of interference. For example, the pictures accompanying the report make clear that testing was performed during the day - a period when most viewers are at work and not in a position to witness interference on their televisions at home. Moreover, the test transmissions were run sporadically, not continuously, and only for a sixteen-day period.”<sup>22</sup>

29. First, the MVDDS transmitter was left on transmitting at its maximum EIRP limit of 44 dBm subsequent to completion of daily measurement routine until the start of the following day of measurement, including weekends. As a result, the number of days that DBS subscribers were exposed to potential interference by MVDDS transmission is in fact 26 days and not 16 days as stated by DirecTV. Second, Albuquerque has a population of approximately 500,000 people. Assuming a market penetration of 5%, then the pool of DBS subscribers potentially susceptible to interference is 25,000 subscribers. Further, assuming that only 20% of the subscribers are at home watching the DBS service at *any* time of the day or night when the transmitter was operating, and only 10% are being interrupted by the MDS transmission, then under these most conservative assumptions the number of complaint calls the DBS operators should have received regarding this matter would be roughly 500 calls a day for 26 days. It is inconceivable that the DBS operators would not have been able to deduce the cause of such massive interruption to be inference from the MVDDS transmitter, even if the start of the testing period was beyond the initial 90 day notice period.

Claim 16: “Every single test conducted with a transmit power of 34 dBm or more resulted in an average PFD level that exceeds the allowable limit ... Similarly, every single test conducted at all three test sites located within 7km of the MVDDS transmitter resulted in an average PFD level that exceeds the allowable limit - even though those sites are situated from 10.5° to 24.8° off the main beam. ... Even limiting the sample to those tests conducted at no more than the 40 dBm power level requested by MDSO, the PFD limit was exceeded by as much as 12 dB (at a test site over 21 km away from the MVDDS transmitter). ... Indeed, the PFD limit

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<sup>22</sup> *Id.*

was also exceeded at a level as low as 27 dBm at a site located more than 21 km from the MVDDS transmitter.”<sup>23</sup>

30. First, it should be mentioned that the PFD limit is not designed to provide protection to the DBS service but to NGOS FSS earth stations; consequently, we are addressing all of DirecTV’s arguments in this regard collectively. In the Albuquerque test, the EIRP value that met the EPFD limit in that test environment is 30 dBm and not 34 dBm. Second, for all the above sites, the EIRP level exceeds that EIRP level that met the EPFD limits. As such, the cited examples are not relevant because the MVDDS station will not be operating at these levels.

31. In particular, the reference to a site at which the PFD limit was exceeded at 27 dBm is a typographical error which, when corrected, indicates that power levels up to at least 30 dBm would be consistent with the PFD requirement. The spectrum analyzer plots associated with this site are shown in Figures 529 and 530 in the report. As shown there, the power flux density for vertical polarization is  $-69.28 \text{ dBm/m}^2$ , while the power flux density for horizontal polarization is  $-72.88 \text{ dBm/m}^2$ , resulting in average power flux density of  $-138.18 \text{ dBw/m}^2/4 \text{ kHz}$ . That is below the NGSO FSS PFD limit.

32. As all the foregoing responses indicate, DirecTV’s conclusion that “the test design does not reflect MDSO’s likely operations and is biased in ways that would understate the true extent of interference caused by MVDDS transmissions”<sup>24</sup> is simply untrue. The test was designed to mimic a commercial MVDDS system of the kind operated by MDSA overseas, the same type that MDSO plans to deploy in the U.S. Moreover, to the extent that there was any “bias” in the test design, it was toward creating conditions in which interference would be *most* likely to occur. The fact remains that MDSO’s commercial system will offer full protection to DBS at power levels in excess of those allowed by the FCC’s current rules, in worst-case scenarios, should this rule waiver be granted.

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<sup>23</sup> *Id.* at 21-22.

<sup>24</sup> *Id.* at 18.

33. In its opposition to MDSO's waiver request, EchoStar has taken the following position:

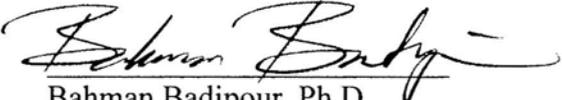
"First, a single study in a dry area of the country is a poor choice to evaluate interference effects on a rain-sensitive DBS service. Indeed, Albuquerque "bask[s] in 310 days of sunshine" a year.<sup>3</sup> The Commission's DBS/MVDDS rules recognize the need for a regional approach to DBS interference matters because of the different characteristics of DBS service throughout the nation, including rainfall amounts and effects.<sup>4</sup> MDSO, however, provides no explanation as to why its test was so limited, or why other tests were not conducted to corroborate these findings in more appropriate markets."<sup>25</sup>

34. In response, it is noted that the availability of DBS service is a function of the EPFD limits. As long as the EPFD value at any location is below or at the level set by the FCC for the corresponding region, then there will be no additional decrease to the availability of DBS service beyond that set by the FCC's rule on the DBS protection criterion. If an MVDDS system meets the EPFD limits for a region where a particular DMA is located, then it has met the DBS service availability requirement for that region. It should also be mentioned that in the Albuquerque test the worst-case EPFD limit was determined by the threshold of detection of MDS signal by DBS antenna; this worst-case EPFD limit is the current EPFD limit required to be met in this region of the country. With respect to other regions of the country, if the worst-case EPFD limit is below or at the respective EPFD limit for the DMAs within that region, as it will be by MDSA's design, then there will not be any additional decrease to availability of DBS service in that DMA.

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<sup>25</sup> EchoStar Opposition to Waiver at 2.

35. I hereby declare under penalty of perjury that I have reviewed the foregoing statements, and they are true and correct to the best of my knowledge, information and belief.

  
Bahman Badipour, Ph.D.

DATE: 1/17/08

**EXHIBIT TWO**

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April 3, 2006

**VIA FACSIMILE/FIRST CLASS MAIL**

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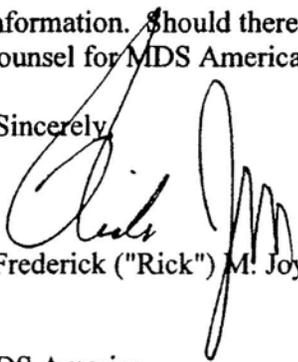
Re: Echostar/MVDDS interference analysis

Dear Mr. Michalopoulos:

Undersigned counsel for MDS America, Incorporated, licensee of MVDDS station WC9XKW, hereby submits the attached interference analysis pursuant to Section 101.1440 of the Federal Communications Commission's rules. According to FCC records, you are the contact representative for DBS licensee EchoStar Satellite LLC. Would you kindly forward this interference analysis to EchoStar for their review. MDS America intends to commence operations within 90 days of the date of this letter.

Thank you for your attention to this information. Should there be any questions in regard to this matter, please contact undersigned counsel for MDS America.

Sincerely,

  
Frederick ("Rick") M. Joyce

cc: Kirk Kirkpatrick, Pres./MDS America  
cc: Grigory Kholodkov, Chief Engineer/MDS America

Herold W Kirkpatrick, 800 SE Lincoln Ave., Stuart, FL 34994

**United States of America  
FEDERAL COMMUNICATIONS COMMISSION  
EXPERIMENTAL  
SPECIAL TEMPORARY AUTHORIZATION**

EXPERIMENTAL  
(Nature of Service)

XD FX  
(Class of Station)

WC9XKW  
(Call Sign)

0738-EX-ST-2005  
(File Number)

**NAME** MDS America, Incorporated

This Special Temporary Authorization is granted upon the express condition that it may be terminated by the Commission at any time without advance notice or hearing if in its discretion the need for such action arises. Nothing contained herein shall be construed as a finding by the Commission that the authority herein granted is or will be in the public interest beyond the express terms hereof.

This Special Temporary Authorization shall not vest in the grantee any right to operate the station nor any right in the use of the frequencies designated in the authorization beyond the term hereof, nor in any other manner than authorized herein. Neither the authorization nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934. This authorization is subject to the right of use of control the Government of the United States conferred by Section 706 of the Communications Act of 1934.

Special Temporary Authority is hereby granted to operate the apparatus described below:

**Purpose Of Operation:**

Testing and demonstrating MDS America technology.

**Station Locations**

(1) Sandia Park (SAN JUAN), NM - NL 35-13-01; WL 106-27-08

**Frequency Information**

Sandia Park (SAN JUAN), NM - NL 35-13-01; WL 106-27-08

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
12200-12700 MHz	FX	500MG1F	23.6 W (ERP)	4.0E-6 %

**Special Conditions:**

(1) Operation is subject to prior coordination with DBS licensees in accordance with 47 CFR, Part 101.1440.

This authorization effective February 08, 2006 and  
will expire 3:00 A.M. EST August 02, 2006

**FEDERAL  
COMMUNICATIONS  
COMMISSION**

**EXHIBIT THREE**

April 4, 2006

**VIA FACSIMILE/FIRST CLASS MAIL**

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12<sup>th</sup> Floor  
Washington, DC 20036

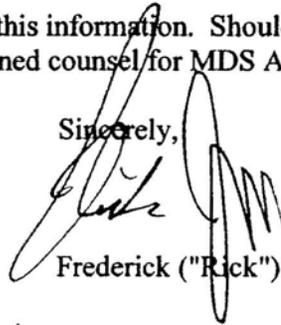
Re: Direct TV/MVDDS interference analysis

Dear Mr. Wiltshire:

Undersigned counsel for MDS America, Incorporated, licensee of MVDDS station WC9XKW, hereby submits the attached interference analysis pursuant to Section 101.1440 of the Federal Communications Commission's rules. According to FCC records, you are the contact representative for DBS licensee Direct TV Satellite LLC. Would you kindly forward this interference analysis to Direct TV for their review. MDS America intends to commence operations within 90 days of the date of this letter.

Thank you for your attention to this information. Should there be any questions in regard to this matter, please contact undersigned counsel for MDS America.

Sincerely,



Frederick ("Rick") M. Joyce

cc: Kirk Kirkpatrick, Pres./MDS America  
cc: Grigory Kholodkov, Chief Engineer/MDS America

**Interference Analysis**

Attached to this interference analysis is a copy of MDS America's FCC experimental/special temporary license authorization for MVDDS services in the Sandia Park, New Mexico area. This license authorization allows MDS America to conduct system testing and demonstrations of MDS America's MVDDS technology in the subject area through August 2 of 2006.

1. **DBS Customer Survey:** Pursuant to FCC Rule Section 101.1440(b), MDS America has conducted a survey of the area surrounding Sandia Park, NM, in particular in the vicinity of MDS America's proposed transmitter/station location, and has determined that there are no DBS customers in that area that may be potentially affected by the introduction of MVDDS services. Should you have reason to believe that there are DBS customers that might be potentially affected by MDS America's proposed service, we request that you promptly contact MDS America, providing the specific locations/coordinates of the DBS customers that you believe will be potentially affected by MDS America's transmissions, and providing data to indicate why you believe these customers may be subjected to harmful interference. Contact information for MDS America's technical staff is as follows:

MDS America, Inc.  
800 SE Lincoln Avenue  
Stuart, FL 34994  
Tel: (772) 463-8338  
ATTN: Grigory Kholodkov  
Email: [grigory@mdsamerica.com](mailto:grigory@mdsamerica.com)

2. **Signal Level Assessment:** MDS America has determined that the signal level from its system, under deployment, would not exceed the appropriate EPFD levels of -171 dBW/m<sup>2</sup>/4kHz at any DBS customer locations, to the best of its knowledge. MDS America has made this assessment using results computed with a specialized radio planning software and taking into consideration the EPFD contour model developed by the FCC, as described in Section 101.1440(b) of the FCC's Rules.

3. **Coordination with DBS Licensees:** Attached hereto is a copy of MDS America's interference analysis. That analysis contains the following information, as required by Section 101.1440(d) of the FCC's Rules:

- (i) Geographic location (including NAD 83 coordinates) of MDS America's proposed station location- 35°13'1" NL -106°27'8" WL at Sandia Park (San Juan), NM;
- (ii) Maximum EIRP of the transmitting antenna system- +22dBm EIRP for 24 MHz band;

- (iii) Height above ground level for the transmitting antenna- 80 ft AGL;
- (iv) Antenna type along with main beam azimuth and altitude orientation information, and description of the antenna radiation pattern- a sector antenna with Vertical and Horizontal polarization pointed to 190° Azimuth and -5° Tilt;
- (v) Description of the proposed service area- Albuquerque, NM; and
- (vi) Survey results along with a technical description of how MDS America determined compliance with the appropriate EPFD level at all DBS subscriber locations.

To determine compliance with the appropriate EPFD level of -171 dBW/m<sup>2</sup>/4kHz at all DBS subscriber locations, the following steps were taken:

- site surveys in Albuquerque, NM and at Sandia Park (San Juan), NM where the MDS America transmitter is planned to be placed;
- data analyses using the mapping software, Google Earth Pro and DeLorme Street Atlas;
- computer prediction of EPFD (equivalent power flux density) produced at a direct broadcast service (DBS) receive earth station, taking into account shielding effect and the off-axis discrimination of the receiving antenna assumed to be pointing at the appropriate DBS satellite(s) from the MDS America transmission antenna and the recommendations developed by the FCC, as described in Section 101.1440(b) of the FCC's Rules.

Based on these analyses, MDS America believes that in the coverage area, Albuquerque, NM, the appropriate EPFD level of -171 dBW/m<sup>2</sup>/4kHz will not be exceeded at any DBS subscriber locations.

Should there be any questions about this interference analysis, please contact MDS America's technical staff, as indicated above.

Harold W Kirkpatrick, 800 SE Lincoln Ave., Stuart, FL 34994

United States of America  
FEDERAL COMMUNICATIONS COMMISSION  
EXPERIMENTAL  
SPECIAL TEMPORARY AUTHORIZATION

EXPERIMENTAL  
(Nature of Service)  
XD FX  
(Class of Station)

WC9XKW  
(Call Sign)  
0738-EX-ST-2005  
(File Number)

NAME MDS America, Incorporated

This Special Temporary Authorization is granted upon the express condition that it may be terminated by the Commission at any time without advance notice or hearing if in its discretion the need for such action arises. Nothing contained herein shall be construed as a finding by the Commission that the authority herein granted is or will be in the public interest beyond the express terms hereof.

This Special Temporary Authorization shall not vest in the grantee any right to operate the station nor any right in the use of the frequencies designated in the authorization beyond the term hereof, nor in any other manner than authorized herein. Neither the authorization nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934. This authorization is subject to the right of use of control the Government of the United States conferred by Section 706 of the Communications Act of 1934.

Special Temporary Authority is hereby granted to operate the apparatus described below:

Purpose Of Operation:

Testing and demonstrating MDS America technology.

Station Locations

(1) Sandia Park (SAN JUAN), NM - NL 35-13-01; WL 106-27-08

Frequency Information

Sandia Park (SAN JUAN), NM - NL 35-13-01; WL 106-27-08

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
12200-12700 MHz	FX	500MG1F	23.6 W (ERP)	4.0E-6 %

Special Conditions:

(1) Operation is subject to prior coordination with DBS licensees in accordance with 47 CFR, Part 101.1440.

This authorization effective February 06, 2006 and  
will expire 3:00 A.M. EST August 02, 2006

FEDERAL  
COMMUNICATIONS  
COMMISSION

**EXHIBIT FOUR**

STEPTOE & JOHNSON<sup>LLP</sup>  
ATTORNEYS AT LAW

Pantelis Michalopoulos  
202.429.6494  
pmichalo@steptoe.com

1330 Connecticut Avenue, NW  
Washington, DC 20036-1795  
Tel 202.429.3000  
Fax 202.429.3902  
steptoe.com

May 10, 2006

Via HAND DELIVERY

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

**Re: Multichannel Video Distribution and Data Service (“MVDDS”) Station WC9XKW**

Dear Ms. Dortch:

On behalf of EchoStar Satellite Operating Corporation (“EchoStar”), I am writing to oppose the continued operation of MDS America, Incorporated (“MDS America”) under the experimental special temporary authorization (“STA”) with a call sign of WC9XKW. By the attached letter and interference analysis, MDS America informed EchoStar that MDS America plans to conduct system tests and demonstrations of its MVDDS technology around Sandia Park, New Mexico. These operations are scheduled to begin around July 2, 2006.

The interference analysis provided by MDS America proposes operations that are not in compliance with the Commission’s rules regarding MVDDS operations. In particular, the interference analysis states that MDS America is proposing a maximum EIRP for the transmitting system of +22 dBm per 24 MHz. This value is significantly higher than the maximum EIRP value of +14 dBm per 24 MHz that is allowed under the Commission’s rules for MVDDS stations.<sup>1</sup> In adopting these rules, the

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<sup>1</sup> See 47 C.F.R. § 101.113(a) (“The EIRP for MVDDS stations is limited to 14.0 dBm per 24 MHz (-16.0 dBW per 24 MHz).”).

Marlene H. Dortch  
May 10, 2006  
Page 2

Commission emphasized in numerous places that limiting the MVDDS transmitting power to +14 dBm per 24 MHz was critical to prevent degradation of service to DBS customers.<sup>2</sup>

Thus, MDS America is proposing to operate at power levels that significantly exceed the Commission's limits on MVDDS transmitting power. With firm rules promulgated for the band, the time for experimentation is over. For these reasons, EchoStar respectfully requests that the Office of Engineering and Technology cancel the experimental STA for call sign WC9XKW to ensure that its operation does not cause harmful interference to DBS customers in the area and certainly not renew the experimental STA.

If you have any questions regarding this matter, please feel free to contact me.

Sincerely,

  
Pantelis Michalopoulos

*Counsel for EchoStar Satellite Operating Corporation*

CC: Frederick M. Joyce

Enclosures

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<sup>2</sup> See, e.g., *In the Matter of Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range*, Memorandum Opinion and Order and Second Report and Order, FCC 02-116, ¶ 88 (Rel. May 23, 2002) ("Second, the MVDDS transmitting system power must not exceed 14 dBm per 24 MHz EIRP. We believe this power limit reduces the likelihood that MVDDS operations would significantly degrade DBS service to both existing and new DBS customers.") and *Id.* at ¶ 68 ("The EPFD limits we adopt, in conjunction with a maximum MVDDS power limit of 14 dBm per 24 megahertz EIRP will ensure that the DBS service is protected from harmful interference.").

April 3, 2006

**VIA FACSIMILE/FIRST CLASS MAIL**

Pantellis Michalopoulos, Esq.  
Steptoe & Johnson  
1330 Connecticut Ave, NW  
Washington, DC 20026

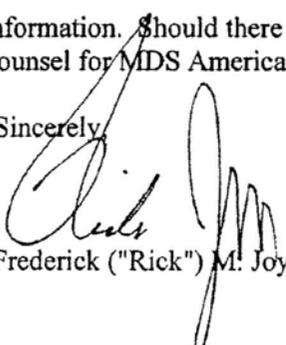
Re: Echostar/MVDDS interference analysis

Dear Mr. Michalopoulos:

Undersigned counsel for MDS America, Incorporated, licensee of MVDDS station WC9XKW, hereby submits the attached interference analysis pursuant to Section 101.1440 of the Federal Communications Commission's rules. According to FCC records, you are the contact representative for DBS licensee EchoStar Satellite LLC. Would you kindly forward this interference analysis to EchoStar for their review. MDS America intends to commence operations within 90 days of the date of this letter.

Thank you for your attention to this information. Should there be any questions in regard to this matter, please contact undersigned counsel for MDS America.

Sincerely,

  
Frederick ("Rick") M. Joyce

cc: Kirk Kirkpatrick, Pres./MDS America  
cc: Grigory Kholodkov, Chief Engineer/MDS America

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MDS America, Inc.  
800 SE Lincoln Avenue  
Stuart, FL 34994  
Tel: (772) 463-8338  
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Should there be any questions about this interference analysis, please contact MDS America's technical staff, as indicated above.

Herold W Kirkpatrick, 800 SE Lincoln Ave., Stuart, FL 34994

United States of America  
FEDERAL COMMUNICATIONS COMMISSION  
EXPERIMENTAL  
SPECIAL TEMPORARY AUTHORIZATION

EXPERIMENTAL  
(Nature of Service)  
XD FX  
(Class of Station)

WC9XKW  
(Call Sign)  
0738-EX-ST-2005  
(File Number)

NAME MDS America, Incorporated

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This authorization effective February 06, 2006 and  
will expire 3:00 A.M. EST August 02, 2006

FEDERAL  
COMMUNICATIONS  
COMMISSION

## CERTIFICATE OF SERVICE

I, Elaine Simons, a legal administrative assistant in the law firm of Venable LLP, do hereby certify that on this 18<sup>th</sup> day of January, 2008, copies of the foregoing Reply Comments of MDS Operations, Inc. were sent *via* e-mail to the following:

Joel D. Taubenblatt, Chief  
Broadband Division  
Wireless Telecommunications Bureau  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
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Peter J. Daronco, Assistant Chief  
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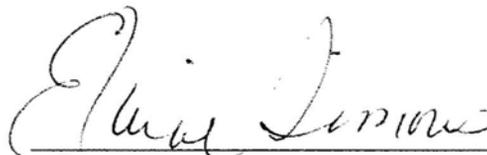
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\_\_\_\_\_  
Elaine Simons

\* denotes delivery of an additional copy by U.S. first class mail, postage prepaid.