BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

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;	)	ET Docket No. 98-206 RM-9147 RM-9245
	)	
Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz 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 12.2-12.7 GHz Band	)	
	)	

TECHNICAL APPENDIX TO COMMENTS OF PEGASUS BROADBAND CORPORATION TO MITRE REPORT

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May 15, 2001

Summary

Pegasus commends MITRE on its thorough and professional technical analysis of MVDDS interference to DBS services in the Ku band. Pegasus concurs with MITRE's general conclusion that MVDDS systems can operate in the 12.2-12.7 GHz band without causing harmful interference to incumbent DBS receivers if and only if certain MVDDS operational characteristics are suitably constrained and proper and suitable mitigation techniques are employed. The results of the analysis and testing performed by MITRE are consistent with the record before the Commission created by the various parties concerning MVDDS interference and mitigation to DBS. MITRE's analysis and testing also identifies mitigation techniques and system characteristics that will provide more flexibility in mitigating MVDDS interference.

MITRE also proposes a specific licensing and mitigation process through which interference issues would largely be resolved prior to operation of an MVDDS system. Pegasus generally supports MITRE's proposed process but believes that a modification allocating direct mitigation responsibility (but not financial responsibility) to the DBS service provider is necessary to protect the integrity and quality of DBS service.

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TECHNICAL APPENDIX TO COMMENTS OF PEGASUS BROADBAND CORPORATION TO MITRE REPORT

The purpose of this Technical Appendix is to explain and clarify the issues and recommendations contained in the Comments of Pegasus Broadband Corporation ("Pegasus") to the MITRE Corporation Report, *Analysis of Potential Harmful Interference to DBS from Proposed Terrestrial Services in the 12.2-12.7 GHz Band* (April 23, 2001) ("MITRE Report").

Background

Pegasus Broadband Corporation. Pegasus is both a Direct Broadcast Satellite ("DBS") service provider and an applicant for Multichannel Video Distribution and Data Service

("MVDDS") in the 12.2-12.7 GHz band.[1] As a result, Pegasus has a unique perspective on the MVDDS technical rules and mitigation techniques appropriate to protect DBS services.

To assist the MITRE analysis, Pegasus participated in several meetings with MITRE to discuss sharing issues between the services and submitted information on its MVDDS system design. In these meetings, Pegasus helped clarify design parameters and identified significant factors influencing sharing potential, including MVDDS tower height, the possibility of better-shielded DBS antennas and quantitative measurements of metal and building shielding.

In response to the Commission's Further Notice of Proposed Rulemaking in this proceeding,[2] Pegasus proposed technical service rules for MVDDS systems designed to permit a viable terrestrial service while protecting incumbent DBS service.[3] Specifically, Pegasus urged the Commission to adopt explicit operating requirements for MVDDS as a primary method of mitigating interference and encouraged the Commission to adopt a detailed mitigation process in order to provide a foundation to facilitate coordination between MVDDS and DBS service providers.

The MITRE Report. Based on equipment and antenna patterns provided by Northpoint and Pegasus, and DBS receivers provided by DirecTV and Echostar, MITRE performed interference simulations and analyses to determine the effectiveness of various MVDDS design parameters and mitigation techniques for reducing interference to DBS receivers. *See* MITRE

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[1] *See* PDC Broadband Corporation, Application for License to Provide New Terrestrial Transport Service in the 12.2-12.7 GHz Band (April 18, 2000).

[2] *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*, ET Docket No. 98-206, FCC 00-418 (December 8, 2000) ("FNPRM").

Report, at 1-1 to 1-4. MITRE's conclusions, contained in Section 6-1 of the Report, are as follows:

- MVDDS sharing of the 12.2-12.7 GHz band currently reserved for DBS poses a significant interference threat to DBS operation in many realistic operational situations.

- However, a wide variety of mitigation techniques exists that, if properly applied under appropriate circumstances, can greatly reduce the geographical extent of the regions of potential MVDDS interference impact upon DBS.

- MVDDS bandsharing appears feasible if and only if suitable mitigation measures are applied. Different combinations of measures are likely to prove 'best' for different locales and situations.

With the completion of the MITRE Report, the record before the Commission is clear and consistent. Because the available, practical mitigation techniques for a consumer product are limited, MVDDS systems, unless properly constrained, will cause harmful interference to ubiquitously-deployed DBS. High performance, including high availability due to rain, are key to the ability of DBS to provide an acceptable service and to compete with cable systems. Therefore, an effective mitigation process is required which protects the high performance achieved by DBS, and which DBS subscribers have come to expect. The specific analyses and conclusions are discussed below.

Discussion

MITRE classifies the potential mitigation techniques into two separate categories: limitation of MVDDS operational parameters in order to minimize interference to DBS, and mitigation at DBS receiver locations. *See* MITRE Report, at 6-2 to 6-5. Consistent with

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[3] Pegasus hereby incorporates by reference its Comments ("Pegasus Comments") (March 12, 2001) and Reply Comments (April 5, 2001) filed in this proceeding.

MITRE's analysis, Pegasus recommends that the Commission acknowledge several of MITRE's identified mitigation techniques as available for MVDDS providers, providing more flexibility in design and operation. These mitigation techniques, if selected by an MVDDS operator, would reduce the need for mitigation or restrict the range of mitigation required. *See* Pegasus Comments, at 3-7.

MITRE also proposes a specific licensing and mitigation process through which interference issues would largely be resolved prior to the full operation of an MVDDS system. *See* MITRE Report, at 6-5 to 6-6. The proposed process involves computation and careful selection of a mitigation zone, pre-operational mitigation and a test period with supplemental mitigation. *See* MITRE Report, at 6-5 to 6-6. Pegasus generally supports the MITRE mitigation process, which is similar to that proposed by Pegasus, but believes that a modification allocating direct mitigation responsibility (but not financial responsibility) to the affected DBS service providers is necessary to protect the integrity and quality of the DBS service. *See* Pegasus Comments, at 7-13.

I. TECHNICAL RULES FOR SHARING AND OPERATIONS IN THE 12.2-12.7 GHZ BAND

As the primary method of mitigation, MITRE recommends the limitation of MVDDS operating requirements in order to limit the mitigation required. *See* MITRE Report, at 6-2. Consistent with this analysis, Pegasus urges the adoption of specific MVDDS operating requirements to lessen the need to involve DBS subscribers and to ensure the reasonableness of subscriber-related mitigation measures. *See* Pegasus Comments, at 3-7.

A. Operating Requirements for MVDDS Systems

1. Unavailability

MITRE recommends the use of a relative increase in unavailability as a measure of assessing interference. *See* MITRE Report, at 6-6. In making this determination, MITRE explicitly rejects alternative measures of interference. *See id*. MITRE concludes that the use of a "relative increase in unavailability is particularly advantageous, since it prevents large increases in unavailability where initial unavailability is small [, and the approach] recognizes that the increase in unavailability that is noticeable to the consumer depends on what the consumer is used to." *Id*. This conclusion supports both the Commission's proposal and Pegasus' Comments.

Pegasus supports the use of the Commission's proposed 2.86% increase in unavailability from each MVDDS system and, in addition, proposes a 10% cumulative limit from multiple MVDDS systems in the same area. *See* Pegasus Comments, at 4. This proposal adopts the same unavailability criterion that was negotiated and implemented for NGSO FSS and DBS sharing in the 12.2-12.7 GHz band and limits the worst case scenario, for both NGSO/FSS and MVDDS to a total 20% relative increase in unavailability, 10% from NGSO FSS systems and another 10% from MVDDS systems. Moreover, as illustrated in Figure 5-2 of the MITRE Report, the C/I values corresponding to a 2.86% criterion, 27 to 33 dB, are within the range of acceptable interference values commonly coordinated, for the FSS and other space and terrestrial systems, both nationally and internationally. A value in the range of 25 dB also has been calculated in the FNPRM appendices and by DirecTV. *See generally* FNPRM, Appendices G and H.

MITRE comments on Page 6-6, Paragraph 7, that it believes that "relative increase in unavailability is particularly advantageous, since it prevents large increases in absolute unavailabilty where initial unavailability is small. This approach recognizes that the increase in

unavailability that is noticeable to the consumer depends on what the consumer is used to." Pegasus believes that this definition of unavailability due to MVDDS interference (2.86% increase per MVDDS system) protects all consumers, regardless of their location and local environment and, therefore, is the desirable definition.

2. Maximum Radiation Limitations

MITRE states that “keeping the MVDDS transmitter power as low as possible without sacrificing coverage requirements is often a prerequisite for minimizing interference to DBS.” MITRE Report, at 6-2. The Commission has proposed and Pegasus has supported a maximum eirp, for urban, suburban and rural areas, of 12.5 dBm, the value used in the USA Today and Oxon Hill testing. This value pertains to any location which contains or might contain DBS receivers. The gain of the MVDDS antennas proposed by Northpoint and Pegasus are in the range of 11 to14 dBi, depending on type. Therefore, the transmitter power for an eirp of 12.5 dBm is +/- 1.5 dBm. The MITRE computation on Page B-36 depicts a high power case for a transmitter power of 10 dBm, corresponding to a very high eirp, indicating substantial MVDDS interference almost to the horizon. Page B-40 indicates the case with a 30 dBm transmitter power. Clearly, MVDDS power/eirp must be constrained so that reasonable mitigation results.

The Commission proposes no upper limit to eirp for cases where DBS receivers cannot be located near the MVDDS transmitter. Paragraph 313 of the FNPRM suggests that this upper limit is 1640 watts, 32 dBW. The interference indicated in the MITRE Report on page B-40 indicates that the area, extending to the horizon, which cannot contain, or cannot potentially contain, any DBS receivers. DirecTV is a favorite form of entertainment for hunters and vacationers in wildlife areas, such as deserts and mountain regions. There cannot be many instances where high power MVDDS would be permitted and still serve a significant population. The Commission may be well advised to drop the high power limit. In those rare instances

where a potential MVDDS operator believes he can operate under high eirp conditions, whether this is 15 dBm or 32 dBW, the application and notice procedure provides adequate flexibility to these potential MVDDS operators and safety to possibly affected DBS consumers. The MITRE Report also supports an MVDDS eirp limitation but does not propose a value. The 12.5 dBm limit was proposed by the FNPRM for the service rules, a value also supported by the interference tests conducted by Northpoint and DirecTV/Echostar. The omission in the service rules of the maximum radiation limit of 32 dBW does not eliminate high power systems, but the resulting notice process enables DBS service providers to evaluate the interference effects in these remote regions.

3. Rain Fade Power Reduction

MITRE, at Page 6-3, "Real Time Power Control," advocates power control as an important method for controlling interference into DBS. Pegasus agrees, but has recommended in its Comments that real time power control not be required in the Commission's service rules because it is costly, and there will be many situations where it is not required in order to accomplish mitigation. *See* Pegasus Comments, at 5. Rather, Pegasus recommends that real time power control be listed as one of a number of techniques that might be selected by a potential MVDDS operator, at its option, in order to achieve a benign interference environment. *See* Pegasus Comments, at 5.

4. Antenna Azimuth

MITRE concludes that in situations where the local DBS antennas all have a high elevation, better performance occurs if the MVDDS transmitter is pointed northward, instead of southward. *See* MITRE Report, at 6-2. This condition results because at high elevation angles

BS antenna sidelobes on the front side of the DBS antenna are lower in level than the "butterfly" lobes on the back side of the DBS antenna.[4]

This result does not, however, support a recommendation that MVDDS transmitters be allowed to point in any direction; such a lax requirement would only exacerbate mitigation. Instead, MITRE's conclusion merely suggests that legitimate conditions may exist in which an MVDDS operator may wish to point the transmitter in a non-southerly direction. As a result, Pegasus recommends that an MVDDS operator generally be limited to selecting a transmitting antenna azimuth, location, and horizontal beamwidth such that radiation of the 3dB beamwidth of the transmitting antenna is at least 48 degrees from the boresight azimuth of the DBS antennas in the region.[5] This requirement is taken from Section 25.209 of the Commission's Rules (*see* 47 C.F.R. § 25.209) assuming that an antenna in the BSS should not be required to have better sidelobe characteristics than an antenna in the FSS. Nonetheless, an MVDDS operator may request in its application a waiver of this rule if the operator can show that a different antenna pointing direction would not worsen the interference environment.

5. Maximum Degradation Level

Pegasus proposed in its Comments that MVDDS operators be prohibited from designing systems where an existing or future DBS receiver would experience a C/I degradation of more than 23 dB from interference from any MVDDS transmitter. *See* Pegasus Comments, at 6. This is based on the assumption that only antennas and external shielding similar in size to existing

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[4] This condition may not be present if improved DBS antennas are used.

[5] *See* Pegasus Comments, at 5-6. Pegasus' analysis assumes that the DBS antenna conforms to the antenna specifications provided in Section 25.209 of the Commission's Rules.

DBS antennas are acceptable and that these antennas have at least the same communications performance and the same environmental performance in wind, rain, snow and ice (as MITRE notes, however, the ForTel planar array antenna has large grating lobes and, in this respect, appears to be worse than standard 18" DBS antennas). Under conservative estimates, replacement of the antenna with one with improved sidelobes will reduce interference by 13 dB and relocation or metallic shielding of an antenna will reduce interference by 10 dB. This is based on the maximum far sidelobe level of Section 25.209, which is -10 dBi.[6] The alternative to this restriction is to limit the MVDDS transmission by specifying tower height, vertical beamwidth, vertical sidelobe rolloff and vertical beam tilt. Pegasus suggests that limiting the extent of the required mitigation provides more flexibility to the MVDDS operator in designing his system.

6. Miscellaneous

The FNPRM and the MITRE Report consider a number of techniques that might aid in the mitigation process. These may be used, like the real time power control cited above, at the option of the MVDDS operator, in order to improve the mitigation possibilities. The following is a listing of technologies which may be employed at the option of the MVDDS operator, but which should not be required by the service rules.

a. Receive Antenna

Based on proposals by Pegasus, MITRE notes that the mitigation zone can be reduced by increasing the MVDDS receiver size to 67 cm, thereby increasing antenna G/T to 15.2 dB/K.

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[6] This is advocated as a minimum requirement of the service rules. Actual antennas and shields may prove to yield better performance. In this case, this would be resolved during the mitigation process.

See MITRE Report, at 5-10. As a result, Pegasus would be able to reduce transmitter power by 4 dB, keeping its coverage boundary constant while correspondingly reducing its interference. *See id*. In many urban areas where DBS local-into-local broadcast stations are offered a larger dual-feed parabolic reflector is already necessary, and consumers have demonstrated no appreciable resistance to the slightly larger antenna size.

b. Frequency Offset

MITRE notes that use of a 7-MHz frequency offset of MVDDS channels improves the isolation by 1.7 dB, due to the effect of the spectral shape of the PSK signal and the effect of guardbands. *See* MITRE Report, at 6-2. This is a well known result in digital satellite communications wherein the isolation between orthogonally polarized transponder carrying digital signals achieves an additional isolation of the same approximate level. However, frequency offset should not be required in the service rules because it may not be necessary to achieve mitigation. However, a potential MVDDS operator may claim this isolation if the operator chooses to offset his channels from those of DBS.

c. MVDDS Transmitting Antenna Characteristics

MITRE's analysis shows that additional isolation to nearby DBS receivers is attainable by increasing the height of the MVDDS transmitting antenna. *See* MITRE Report, at 6-2. Appreciable gains in isolation, however, are not likely to be present until heights exceed 100 or even 200 meters. *See id.* MITRE states that antenna tilt impacts the mitigation zone but is not otherwise an effective mitigation tool because any adjustments simultaneously affect the MVDDS coverage area. *See* MITRE Report, at 6-2.

This analysis is consistent with the interference studies conducted by Northpoint, Pegasus and the DBS industry.[7] Antenna height, vertical beamwidth, tilt and vertical sidelobe rolloff all can be selected by the MVDDS operator in order to minimize mitigation of nearby DBS receivers. However, there is no "one design" or one parameter that fits all situations. Pegasus believes that there are too many variables in these parameters to permit their use in the service rules. Alternatively, Pegasus has proposed that the MVDDS design be such as to limit the range of mitigation required, leaving to the MVDDS operator the selection of particular MVDDS characteristics. *See* Pegasus Comments, at 5-6.

d. Multiple Antenna Beams

MITRE suggests that the use of multiple MVDDS transmitting-antenna beams, each having a much narrower azimuthal beamwidth, might provide much better flexibility than current antenna designs in shaping the mitigation zone. *See* MITRE Report, at 6-3. Without commenting further, this technique clearly should not be part of the service rules because it is not generally applicable, but rather should be considered by an MVDDS operator in the design of his system.

e. Circularized Polarization

MITRE suggests, without characterizing the measured advantages, that the MVDDS operator may achieve substantial isolation by radiating the opposite polarization, on a channel by channel basis. *See* MITRE Report, at 6-4. MITRE also notes that this method is incompatible with the use of a 7-MHz frequency offset. *See id*. This method may not be effective if

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[7] *See e.g.*, Northpoint, Progress Report WA2XMY (October 1999); DirecTV and EchoStar, Report of the Interference Impact on DBS Systems from Northpoint Transmitter Operating at Oxon Hill, MD (July 25, 2000).

subscribers use improved DBS antennas that eliminate butterfly lobes. Further, the reflection of sidelobes from objects near the DBS receiver, like mounting walls, chimneys, etc., can have a substantial effect on the direction and polarization of these sidelobes. Again, this is a technique that an MVDDS operator might choose for his system design, but certainly should not be part of the service rules.

f. Effect of N/I on Eb/No

MITRE notes that the effect of N/I on Eb/No thresholds is significant for values of N/I approximating the value "one" because noise and interference have different spectral characteristics. However, the effect of N/I on Eb/No threshold is negligibly small for interfering C/I values associated with the 2.86% unavailability criterion. *See* MITRE Report, at 3-1 to 3-11, 3-15 to 3-23. This phenomena should not be part of the service rules.

7. Waveforms

The MITRE Report is based on the assumption that MVDDS and DBS use similar waveforms based on the DBS channel plan described in the Radio Regulations. Any proposed modification to the use of this waveform will be identified in the MVDDS application (as proposed by Pegasus) and analyzed by the DBS service providers as part of the mitigation process. It will be the obligation of the MVDDS operator to prove that the new waveform causes no more interference than the standard waveform. If the waveform is not acceptable to the DBS service providers then the MVDDS operator must change the waveform or institute a new proceeding. *See* MITRE Report, at 6-7.

8. Back Radiation

Pegasus, in its Comments on the USA Today Building testing by Northpoint, raised the issue of back radiation from MVDDS antennas located on towers. In this case, the back radiation may be significant, the range short and the DBS antenna gain high in the direction of

the MVDDS tower, resulting in areas behind the antenna that may cause interference to DBS. *See* MITRE Report, at 5-7. The plot on Page B-7 of the MITRE Report shows these interference effects behind the MVDDS antenna. This back radiation requires that the MVDDS radiation measurements, submitted in each MVDDS application, be valid for 360 degrees around each MVDDS transmitting site. This is important information that should be required by the service rules.

B. Mitigation Process

In MITRE's conclusions, at Section 6-3 of the Report, MITRE appears to advance recommendations concerning the mitigation process itself, essentially assigning to the MVDDS operator the responsibility for accomplishing the mitigation. Although Pegasus generally supports MITRE's mitigation process, Pegasus recommends that the DBS service provider, not the MVDDS operator, as MITRE proposes, be responsible for the physical implementation of any mitigation measures directed at DBS receivers. *See* Pegasus Comments, at 10-11.

The mitigation process advocated by MITRE is not discussed in Section 1 of the MITRE Report as either a task assignment or task objective; nor is the mitigation process discussed in the technical sections, 2 through 5. Therefore, Pegasus has assumed that the process described in 6-3 is illustrative only, in order to provide a framework for a summary of the technical issues involved in the mitigation process and that MITRE did not intend this to be considered a recommendation to the FCC for an actual coordination process.

MITRE advocates an active role in the determination of the need for mitigation, i.e., MITRE states that depending on DBS subscriber complaints is not desirable; most subscribers are not sensitive to the issue of increases in unavailability due to interference and have no meaningful way to measure this increase. If the interference is bad enough they will simply "churn" to another system. Thus, the economic success, and the ability of DBS to provide a

quality service in competition with cable systems, can be affected by the mitigation process. The whole approach taken by MITRE is proactive; calculate/measure the interference and mitigate. Pegasus wholeheartedly agrees with this approach but believes the DBS service provider should perform the actual mitigation. Only the DBS service provider is qualified to represent the interests of DBS consumers in the mitigation process and only the DBS provider is strongly motivated to maintain the DBS qualify of service that has gained such wide acceptance as a premier service and has, thereby, provided effective competition to cable systems.

Moreover, MITRE flatly rejects the proposal to base mitigation on consumer complaints. *See* MITRE Report, at 6-8. Consistent with Pegasus' Comments, MITRE states that "DBS customers may not know what is causing a particular outage, or the reason for its duration." MITRE Report, at 6-8; *see also* Pegasus Comments, at 10. Moreover, such an approach discourages responsible MVDDS operations, is unfair to DBS subscribers and is detrimental to DBS service. Such a proposal would severely impair the DBS industry and jeopardize its ability to maintain high quality service. Accordingly, Pegasus supports MITRE's proposal for mitigation based on a detailed, proactive mitigation process and not on a reactive consumer complaint process.

DBS operators and service providers have the motivation and ultimate responsibility to maintain the quality of the service and, in the context of this proceeding, to assure that the availability due to rain and MVDDS interference meets the objectives of the service and the requirements of the Commission. To interject a third party into this relationship between the DBS parties and their customers, who also is a competitor to DBS, cannot be good policy and will surely interfere with this relationship. The MVDDS operator cannot be responsible for the quality of the DBS service. The Commission can depend only on the DBS operators and service providers to protect the quality of DBS. The mitigation process, a cooperative activity of the

MVDDS and DBS parties, monitored by the Commission, is sufficient to protect the interests of each MVDDS operator. The process recommended by Pegasus meets these objectives and requirements and is consistent with other coordination processes formally or informally invoked in the national and international arenas for the mitigation of interference. This five-step process, as outlined by Pegasus, is as follows:

1. Application

MITRE proposes that in order to obtain a construction permit MVDDS applicants compute the mitigation zone and select a configuration that would minimize interference to DBS receivers in the area. *See* MITRE Report, at 6-5. Pegasus supports this proposal and recommends that the application for the construction permit contain all relevant technical data, including radiation characteristics 360 degrees around the proposed site. *See* Pegasus Comments, at 8.

2. Notice

The Commission places the application on Notice so that the DBS operators and service providers can review the application and confirm/develop a mitigation plan identifying DBS receivers that potentially might require mitigation and estimate the extent of the mitigation required (shield, new antenna, new location, etc.).

3. Pre-operational Mitigation

After an MVDDS applicant obtains a construction permit, MITRE proposes that the applicant implement interference mitigation techniques to all DBS receivers located in the mitigation zone. *See* MITRE Report, at 6-5. Such mitigation would include, but not be limited to, shielding, relocation, and/or replacement of the DBS antenna. *See id*. In some instances, no mitigation may be necessary because the line-of-sight to the MVDDS transmitter is blocked. Pegasus supports the idea of pre-operational mitigation assessment but notes that such activity is

more appropriately handled by the DBS service providers of the affected DBS subscribers. The actual mitigation is recommended to take 60 days, a period required in order to ship shields and antennas to the location, schedule mitigation activities and report results. The SEQ can be noted for various sites which might have marginal performance in the presence of MVDDS (when the MVDDS transmitter is energized). Like other mitigation procedures, the process advocated by Pegasus attempts the major mitigation before the MVDDS transmitter is authorized to radiate, minimizing the effects of the radiation to operating DBS receivers. Full account of blockage in the MVDDS path, or the effect of surrounding objects and walls on the sidelobe characteristics of DBS antennas may need to be assessed later when the MVDDS system is operating. This is a "best efforts" activity, requiring a later "Spot Check" to confirm that the mitigation has, indeed, been completed.

4. Authorization to Radiate and Spot Check

Once the pre-operational mitigation has been performed, MITRE recommends that MVDDS operators enter a testing period to ensure that mitigation to affected DBS receivers is effective. *See* MITRE Report, at 6-5 to 6-6. During this test period, MITRE suggests the service provider measure C/I values at the output of the LNB for all DBS receivers in the mitigation zone and implement any further mitigation techniques necessary. *See id*. Pegasus notes that measurements are necessary only at sites where the mitigation is likely to be marginal or uncertain. Visits to every DBS receiver location would not be necessary. From a practical viewpoint, Pegasus proposes that DBS service providers be allowed to assess interference using any reasonable interference measure such as measurements of C/I, PFD and SEQ indications, the latter both before and after MVDDS radiation. *See* Pegasus Comments, at 8-9.

5. Cost of Mitigation

The MVDDS operator is billed for the cost of mitigation in time and materials. MITRE does not specifically propose that MVDDS operators be responsible for the costs of mitigation measures implemented as a result of MVDDS operations, however, such an implication is logical given MITRE's assumption that MVDDS operators will be responsible for all mitigation measures. *See generally,* MITRE Report, at 6-2 to 6-6.

The DBS service provider should be required to take cost effective mitigation measures and submit to the MVDDS operator an itemized report of its mitigation efforts. Mitigation is performed according to the mitigation plan established at the onset of the mitigation process. *See* Pegasus Comments, at 11.

II. OTHER ISSUES IDENTIFIED IN THE MITRE REPORT

A. New DBS Satellites

The MITRE Report concludes that new or different DBS satellites could be at risk in unforeseen ways as a result of MVDDS operations in the Ku band. *See* MITRE Report, at 6-7. As a result, MITRE recommends that any satellites not addressed in the current report be studied further. In fact, any new DBS proposed for service in the U.S., including the satellites and orbital locations of other administrations, would be the subject of a new rulemaking, providing an ample process for the resolution of any new issues.

B. Protection of Weakly Covered DBS areas

MITRE proposes that only DBS satellites with baseline unavailabilities of 100 hours/year be protected. *See* MITRE Report, at 6-7. Pegasus disagrees. DBS is provided over the entire U.S. From a subscriber and public interest viewpoint, subscribers in areas where the satellite signal is weaker should also be protected. The same 2.86% criteria for increased unavailability due to MVDDS interference still can be used. MVDDS, as MITRE has observed using this

criteria, provides an increment of unavailability to the unavailability that the subscriber already is used to and accepts.

C. Duration of Mitigation Obligations

MITRE unequivocally states that "future DBS customers should be protected for as long as the MVDDS transmitter operates." MITRE Report, at 6-6. Both Pegasus and Northpoint[8] support MITRE's conclusion which is fully consistent with the designation of MVDDS as a secondary service in the 12.2-12.7 GHz band. *See* Pegasus Comments, at 12.

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[8] *See e.g.*, Ex Parte Letter to Magalie Salas from J.C. Rozendaal, Annotated Version of MITRE Technical Report, at xix (April 25, 2001) (Northpoint supports requirement to protect existing and future DBS customers as long as MVDDS transmitter operates).

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Certification

I, John Kiesling, Engineering Consultant for Pegasus Broadband Corporation, hereby certify the following under penalty of perjury:

I have reviewed the foregoing "Comments of Pegasus Broadband Corporation to MITRE Report" and the accompanying "Technical Appendix to Comments of Pegasus Broadband Corporation to MITRE Report. " The technical information contained in these documents is complete and accurate to the best of my knowledge.

/s/
John Kiesling

Dated: May 15, 2001