

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Amendment of Parts 2 and 25 of the)	
Commission's Rules to Permit Operation)	ET Docket No. 98-206
of NGSO FSS Systems Co-Frequency with)	RM-9147
GSO and Terrestrial Systems in the Ku-Band)	RM-9245
Frequency Range;)	
)	
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;)	
)	
Applications of Broadwave USA,)	
PDC Broadband Corporation, and)	
Satellite Receivers, Ltd. to Provide a)	
Fixed Service in the 12.2-12.7 GHz band)	

**PETITION FOR RECONSIDERATION
OF THE BOEING COMPANY**

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SUMMARY

The Boeing Company (“Boeing”) petitions the Commission to reconsider its authorization of Multichannel Video and Data Distribution Service (“MVDDS”) systems, such as that proposed by Northpoint Technology, Ltd. (“Northpoint”), in the 11.7-12.7 GHz band (“Ku-band”). Such an authorization is clearly incompatible with the Commission’s intent to make Non-Geostationary Orbit Fixed-Satellite Service (“NGSO FSS”) networks into viable providers of services to the public. NGSO FSS operators require access to the entire 11.7-12.7 GHz band in order to make their networks commercially and technically viable. The record shows, however, that MVDDS systems would be unable to share spectrum with other users of the Ku-band, and would restrict NGSO FSS operators to less than half of the amount of spectrum needed to make NGSO FSS networks viable.

Furthermore, the record does not support – or expressly contradicts – the justifications cited by the Commission for authorizing MVDDS systems in the Ku-band. The extensive technical record in this proceeding shows that MVDDS is incapable of sharing spectrum with other users of the Ku-band and would deny NGSO FSS operators access to adequate spectrum resources. Frequency diversity is not commercially or technically feasible for NGSO FSS networks because such an approach fundamentally misunderstands how a point-to-multipoint network such as Boeing’s operates, and would restrict NGSO FSS operators to less than half of the spectrum needed to implement their networks. The exclusion zones caused by MVDDS transmitters in which NGSO FSS receivers would be unable to operate are both greater in size and number than the Commission acknowledges in the Order. No amount of flexible deployment could protect Boeing’s NGSO FSS network from the harmful interference caused by MVDDS systems, because such interference comes into the sidelobes of Boeing’s consumer receivers.

Natural or artificial shielding of NGSO FSS receivers is both technically and economically infeasible due to the size and cost of the shielding, and the fact that often Boeing's NGSO FSS receivers must point directly towards MVDDS transmitters in order to communicate with NGSO satellites in the northern sky. In addition, NGSO FSS operators cannot simply rely on rules meant to protect Direct Broadcast Satellite ("DBS") systems from harmful interference from MVDDS transmitters. NGSO FSS networks are inherently different from DBS systems, and NSO FSS operators cannot rely on incidental third-party protection to launch a multi-billion dollar network.

Finally, reconsideration is needed because the allocation for MVDDS violates the Commission's long-standing practice of not basing new services on patented technology. Northpoint claims that its MVDDS system (which is the basis for the Commission's authorization of MVDDS in the Ku-band) is based on patented technology. The Commission, however, has routinely refused to incorporate patented technologies in its rules for radio communications services unless the patent holder agrees to make the patent available to other parties on reasonable terms and conditions without unfair discrimination. Because Northpoint has made it clear in recent pleadings that it hopes to prevent other parties from serving consumers using its technology, the Commission should withdraw its allocation for MVDDS.

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**PETITION FOR RECONSIDERATION
OF THE BOEING COMPANY**

The Boeing Company (“Boeing”), by its attorneys and pursuant to Section 1.429 of the Commission’s Rules, 47 C.F.R. § 1.429, hereby submits this Petition for Reconsideration of portions of the Commission’s First Report and Order (“*Order*”) in the above referenced proceeding.¹

¹ *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*, FCC 00-418, First Report and Order and Further Notice of Proposed Rule Making (Dec. 8, 2000) (“*Order*” or “*Further Notice*”).

I. INTRODUCTION

In the *Order*, the Commission authorized Non-Geostationary Orbit (“NGSO”) Fixed-Satellite Service (“FSS”) networks to operate co-frequency in the Ku-band in the United States with existing satellite and terrestrial services, such as Geostationary Orbit (“GSO”) FSS and the Direct Broadcast Satellite (“DBS”) service, and adopted rules for their operation. In addition, the Commission also created a new terrestrial service – the Multichannel Video Distribution and Data Service (“MVDDS”) – and authorized it to operate in a portion of the Ku-band that the Commission allocated for NGSO FSS and DBS systems, even though the Commission deferred the adoption of rules for MVDDS pending the outcome of a *Further Notice*.

Boeing seeks reconsideration of the authorization of MVDDS in the Ku-band for three reasons. First, such an authorization contradicts the Commission’s own intent that NGSO FSS networks become viable providers of services to the public. Although the Commission attempts to “split the baby” and authorize both NGSO FSS and MVDDS operations in the Ku-band, the fact is that MVDDS is plainly incompatible with the ability of NGSO FSS operators to implement their networks in the Ku-band. Second, the record in this proceeding does not support – or contradicts – the five justifications put forth by the Commission for the conclusion that MVDDS can share spectrum with NGSO FSS networks. The only way the Commission can avoid this fact is by selectively adopting the claims of MVDDS operators, while ignoring the extensive technical record compiled by NGSO FSS operators and deferring hard decisions as part of the *Further Notice*. Finally, the Commission violates its own practice of not basing new services on patented technologies, as Northpoint claims MVDDS to be.

For all these reasons, the Commission must reconsider its decision in the *Order* and withdraw its allocation for MVDDS in the Ku-band.

II. THE AUTHORIZATION OF MVDDS IN THE KU-BAND IS CLEARLY INCOMPATIBLE WITH THE VIABILITY OF NGSO FSS NETWORKS AND SHOULD BE RECONSIDERED

Although the Commission clearly intends for NGSO FSS networks to be viable service providers, the authorization of MVDDS in the Ku-band is incompatible with this intent because MVDDS would prevent NGSO FSS networks from operating in the 12.2-12.7 GHz band and would restrict NGSO FSS operations to the 11.7-12.2 GHz band. This is less than half of the spectrum required by NGSO FSS networks to be commercially and technically viable. Accordingly, if the Commission is serious about making NGSO FSS a viable service, it should reconsider its authorization of MVDDS in the Ku-band.

A. The Commission Clearly Intends for NGSO FSS Networks to be Viable

The Commission clearly intends for NGSO FSS networks, such as the one proposed by Boeing,² to become viable providers of service to the public. Indeed, the Commission expressly recognizes that the implementation of NGSO FSS networks will serve the public interest by allowing new advanced services to be available to the public, by providing increased competition to existing satellite and terrestrial services, and by bringing advanced services to rural and unserved areas.³

² See *Application for Authority to Launch and Operate a Non-Geostationary Medium Earth Orbit Satellite System in the Fixed Satellite Service*, File No. SAT-LOA-19990108-00006 (Jan. 8, 1999).

³ See *Order*, ¶ 19 (“We conclude that the public interest will be served by permitting NGSO FSS use of the Ku-band.”).

In order to make these public benefits possible, the Commission and the U.S. government have invested tremendous effort on both the international and domestic fronts. Internationally, the U.S. government and the Commission have actively participated at the 1997 and 2000 World Radiocommunication Conferences, as well as in all the associated conference preparatory meetings and working groups, to establish rules that permit the introduction of NGSO FSS services on a global basis. Domestically, Commission staff has dedicated four years developing detailed sharing rules that allow NGSO FSS networks to operate in the United States without causing harmful interference to incumbent satellite and terrestrial spectrum users.⁴

In order to provide public benefits, however, NGSO FSS networks must not only be authorized by the Commission, but must also be authorized in such a way that they are capable of being technically and commercially viable. Without such viability, all the efforts to realize the implementation of NGSO FSS networks will in all probability go to waste, and the public will not receive any of the benefits that such networks are capable of offering.

B. The Authorization of MVDDS in the Ku-Band Contradicts the Commission's Intent that NGSO FSS Networks Be Viable Because It Will Deny NGSO FSS Networks Access to Adequate Spectrum Resources

Although the Commission clearly intends NGSO FSS to be technically and commercially viable, the authorization of MVDDS in the same spectrum as NGSO FSS networks is completely inconsistent with this intent and should be reconsidered. Despite repeated demonstrations that

⁴ As noted in the *Order*, the Commission began looking into allowing NGSO FSS operations co-frequency in the Ku-band in response to a Petition for Rule Making filed by SkyBridge L.L.C. (“SkyBridge”) in 1997. *See Order*, ¶ 3. Since that time, Commission staff has invested enormous time and effort in working towards the implementation of NGSO FSS networks, including analyzing over 670 submissions in the underlying docket and drafting an extraordinarily complex set of rules for NGSO/GSO sharing.

NGSO FSS networks require access to entire 11.7-12.7 GHz band for space-to-Earth service links to become viable service providers, the authorization of MVDDS in the Ku-band would reduce the amount of spectrum available to NGSO FSS networks to less than half of this requirement. It is highly doubtful that private companies would be willing to risk the enormous capital investments necessary to implement NGSO FSS networks without the assurance of adequate spectrum resources to make such networks technically and commercially viable. Thus, the authorization of MVDDS in the Ku-band is directly contrary to the intent of the Commission to make NGSO FSS a viable service and should be withdrawn.

1. As demonstrated in the record, NGSO FSS networks require access to the entire 11.7-12.7 GHz band in order to be viable

As Boeing has demonstrated repeatedly in this proceeding, NGSO FSS networks require access to the entire 11.7-12.7 GHz band in order to be viable service providers.⁵ This spectrum requirement is driven by two fundamental commercial and technical factors. First, the commercial viability of the Boeing NGSO FSS network depends on adequate bandwidth capacity in the forward service links to provide broadband services to end users.⁶ As is well known, the

⁵ See, e.g., *Letter to Magalie Roman Salas, Secretary, Federal Communications Commission, from David A. Nall, Counsel for The Boeing Company*, ET Docket No. 98-206 at 2 (July 18, 2000) (“*Boeing July 18, 2000 Letter*”); *Letter to Hon. William E. Kennard, Chairman, Federal Communications Commission, from David A. Nall, Counsel for The Boeing Company*, ET Docket No. 98-206 at 2 (May 1, 2000) (“*Boeing May 1, 2000 Letter*”); *Letter to Hon. William E. Kennard, Chairman, Federal Communications Commission, from David A. Nall, Counsel for The Boeing Company*, ET Docket No. 98-206 at 3-4 (Feb. 22, 2000) (“*Boeing Feb. 22, 2000 Letter*”) (including the attached “*Northpoint Interference Analysis*”); *Letter to Hon. William E. Kennard, Chairman, Federal Communications Commission, from David A. Nall, Counsel for The Boeing Company*, ET Docket No. 98-206 at 12 (Feb. 16, 2000) (“*Boeing Feb. 16, 2000 Letter*”).

⁶ See, e.g., *Boeing Feb. 16, 2000 Letter* at 12 (alerting the Commission to the fact that “almost all of the revenue generating potential of Boeing’s network is variable – dependent directly on the amount of throughput, or spectrum capacity that is available for Boeing’s use”).

critical bottleneck for modern networks – whether satellite- or terrestrial-based – is the forward throughput capacity of the system.⁷ The vast majority of broadband applications demand substantial forward transmission capacity with comparatively low return transmission capacity.⁸ Yet it is exactly this forward link, space-to-Earth segment that is diminished by the authorization of MVDDS in the Ku-band.

Because bandwidth is correlated to the amount of available spectrum, any loss in available spectrum will cause a loss in bandwidth capacity. A loss of bandwidth affects the number of customers that can be potentially served by the network, as well as the quality and speed of the service provided. Any loss of bandwidth will affect the potential revenues from NGSO FSS networks and make it less likely that private companies will make the enormous capital investments necessary to construct and operate such networks and compromises the network's viability as a cost-effective competitor to existing providers of advanced services.

The second factor driving the spectrum requirements of NGSO FSS networks is the necessity to share spectrum with other NGSO FSS network operators. NGSO FSS networks must have unfettered access to the entire 11.7-12.7 GHz band in order to implement such sharing between multiple NGSO FSS operators.⁹ There are eight NGSO FSS applications pending before the Commission, and numerous other NGSO FSS networks being designed by other countries. Because co-frequency spectrum sharing between four or more NGSO FSS networks may be

⁷ *See id.*

⁸ *See, e.g., Boeing Feb. 22, 2000 Letter* at 3 (noting that the forward throughput capacity is “the most bandwidth intensive part of a network.”).

⁹ *See, e.g., Boeing July 18, 2000 Letter* at 2-3; *Boeing May 1, 2000 Letter* at 2; *Boeing Feb. 22, 2000 Letter* at 3-4.

impossible as a technical matter, a significant possibility exists that NGSO FSS operators will eventually need to segment the band into two NGSO FSS spectrum sharing groups.¹⁰

Boeing may be willing to launch its NGSO FSS network and accept the risk to its commercial plans if the 11.7-12.7 GHz band is later divided into two NGSO FSS spectrum sharing segments of 500 MHz each. It is extremely unlikely, however, that Boeing could accept the financial risk of launching its system if a possibility exists that Boeing may be forced to operate in less than 500 MHz of space-to-Earth service link spectrum in the United States. Thus, NGSO FSS operators must have access to the entire 11.7-12.7 GHz band in order to implement their networks and provide service to the public.

2. Authorization of MVDDS in the Ku-band will restrict NGSO FSS networks to less than half of the amount of spectrum needed to be viable

Even though it is demonstrated that NGSO FSS networks require access to the entire 11.7-12.7 GHz band in order to be viable, the authorization of MVDDS in the Ku-band will reduce the amount of spectrum available to NGSO FSS networks to less than half of that requirement. As is discussed below in Part III, none of the justifications put forward by the Commission for the assertion that MVDDS will be able to share the 12.2-12.7 GHz band with NGSO FSS networks are supported by the record in this proceeding. In fact, the record demonstrates the opposite – that MVDDS is incapable of operating in the 12.2-12.7 GHz without causing harmful interference to other users. As a result, even though NGSO FSS and MVDDS are intended to be co-primary services in the 12.2-12.7 GHz band, the effect of the Commission’s authorization of MVDDS will be to compel NGSO FSS networks to accept a *de facto* secondary status to MVDDS operators in

¹⁰ See *Boeing May 1, 2000 Letter* at 2.

the 12.2-12.7 GHz band and to restrict NGSO FSS network operations solely to the 11.7-12.2 GHz band. The Commission appears to recognize this probable outcome and even uses the fact that NGSO FSS operators will still have access to the 11.7-12.2 GHz band for their networks to justify the authorization of MVDDS in the 12.2-12.7 GHz band.¹¹ Such a justification is unwarranted and clearly unsupported by the record.

Furthermore, NGSO FSS networks are unlikely to have full access to even the 11.7-12.2 GHz band, because the Commission contemplates no limits on the amount of out-of-band emissions that can be produced by MVDDS networks operating in the 12.2-12.7 GHz band. Under the current Commission authorization, MVDDS operators, such as Northpoint, will be able to operate their networks without any incentive or obligation to limit harmful interference into neighboring spectrum. The Commission considered – but failed to adopt – an out-of-band emission limits for MVDDS systems as part of its authorization, even though the Commission has adopted and enforced prohibitions on out-of-band emissions for almost every radio communications service that exists in the United States. The Commission’s failure to adopt out-of-band emission limits for MVDDS is remarkable considering that SkyBridge and Northpoint apparently negotiated an agreeable out-of-band emission limit, which was described in *ex parte* filings submitted to the Commission for inclusion in the record.¹² Without out-of-band emission limits, NGSO FSS networks will often be unable to serve consumers in the bands below 12.2 GHz, eliminating any possibility of establishing a competitive service in the United States.

¹¹ See *Order*, ¶ 225.

¹² See *SkyBridge July 10, 2000 Letter* at 4-5; see also *Ex Parte Submission of Northpoint Technology, Ltd. and BroadwaveUSA*, ET Docket No. 98-206, at 13 (Aug. 29, 2000).

III. THE AUTHORIZATION OF MVDDS IN THE KU-BAND SHOULD BE WITHDRAWN BECAUSE THE RECORD DOES NOT SUPPORT, OR EXPRESSLY CONTRADICTS, THE COMMISSION’S JUSTIFICATIONS FOR SUCH AN AUTHORIZATION

In addition to the strong public interest benefits that can be provided by NGSO FSS networks, the Commission authorized the operation of NGSO FSS networks in the Ku-band because it determined that such networks are capable of sharing spectrum with incumbent services “without causing unacceptable interference to them and without unduly constraining the future growth of incumbent services or NGSO FSS system flexibility.”¹³ Thus, the ability to share scarce spectrum resources with other users is essential to operations in the Ku-band.

In the same *Order*, the Commission authorized the operation of MVDDS in the 12.2-12.7 GHz band, even though it acknowledged that MVDDS transmitters would cause harmful interference to both DBS and NGSO FSS receivers.¹⁴ The Commission claimed that this harmful interference could be mitigated or avoided by DBS and NGSO FSS networks.¹⁵ However, as demonstrated in the record of this proceeding, NGSO FSS operators often cannot mitigate interference from MVDDS transmitters and will receive unacceptable interference from such transmitters, which will result in the constraint or prevention of the implementation of viable NGSO FSS networks.

¹³ *Order*, ¶¶ 1, 19, 166.

¹⁴ *See, e.g., id.*, ¶ 208 (noting that “Northpoint acknowledges that close to its transmitters there will be areas where the Northpoint signals would be strong enough to interfere with DBS receivers.”); *Id.*, ¶ 225 (noting that interference from MVDDS transmitters into NGSO FSS receivers “could occur when an earth station that is in the vicinity of an MVDDS transmitter tracks the NGSO FSS satellite into view of the transmitter, or when energy from the MVDDS transmitter enters the side and back lobes of the earth station at a sufficient signal strength to cause harmful interference.”).

¹⁵ *See id.*, ¶¶ 225-226.

The Commission offers five justifications in its *Order* why it believes that NGSO FSS networks can survive harmful interference from MVDDS transmitters.¹⁶ As discussed in detail below, each of these five justifications is either unsupported by the record in this proceeding, or does not support the authorization of MVDDS in the Ku-band. Because the record does not support (or directly contradicts) the Commission’s justifications for authorizing MVDDS in the Ku-band, the authorization should be withdrawn on reconsideration.

A. Frequency Division is not Commercially or Technically Feasible

As an initial justification for the authorization of MVDDS in the Ku-band, the Commission notes that although NGSO FSS networks may be encumbered by MVDDS operations in the 12.2-12.7 GHz band, NGSO FSS networks will still be able to operate downlinks in the 11.7-12.2 GHz band.¹⁷ Accordingly, the Commission appears to accept the result that the Ku-band will be initially segmented between NGSO FSS and MVDDS operators, with MVDDS operations occupying the 12.2-12.7 GHz band and NGSO FSS networks restricted to the 11.7-12.2 GHz band. However, as discussed in detail in Part II above, such frequency segmentation is neither commercially or technically feasible, because such a division would deny NGSO FSS networks adequate spectrum resources required to justify the enormous investments needed to implement such networks, as well as to permit spectrum sharing between separate NGSO FSS networks.¹⁸

Furthermore, the record shows that Boeing’s medium earth orbit (“MEO”) FSS constellation (with two service beams of about 1800 kilometers each in diameter and including

¹⁶ See *id.*, ¶¶ 224-228.

¹⁷ See *id.*, ¶¶ 224-225.

¹⁸ See Part II.B., *supra*.

two 166.6 MHz channels in each beam) cannot be used to serve some customers in the 11.7-12.2 GHz band and other customers in the 12.2-12.7 GHz band.¹⁹ Northpoint has proposed that Boeing segregate the two 166.6 MHz channels in each satellite beam, operating one channel in the 11.7-12.2 GHz band (where Northpoint will not produce interference) and operating the other channel in the 12.2-12.7 GHz band (co-frequency with Northpoint).²⁰ Northpoint argues that Boeing could use the lower channel to serve customers inside the exclusion zones created by MVDDS operations in the Ku-band and could use both channels to serve customers outside of the exclusion zones. As demonstrated in the record and discussed in detail below, this “solution” is neither commercially nor technically possible.

Northpoint’s proposal might be appropriate for a satellite system that is designed to carry traditional point-to-point telephone services, in which each call originates at one point and terminates at another discrete point.²¹ Unfortunately, very few of Boeing’s customers are expected to use its NGSO FSS network in this manner. Instead, most transmissions will involve point-to-multipoint communications, such as a corporation or government agency transmitting the same information to numerous recipients, or an Internet Service Provider using “smart push” technologies to update continuously an Internet page being viewed simultaneously by thousands of viewers.²²

¹⁹ See, e.g., *Boeing Feb. 22, 2000 Letter, Northpoint Interference Analysis* at 19-20.

²⁰ See *Letter to Donald Abelson, Chief, International Bureau, from Antoinette Cook Bush, Counsel for Northpoint Technology, Ltd.*, at 2 n.3 (Jan. 20, 2000) (“*Northpoint Jan. 20 2000 Letter*”).

²¹ See, e.g., *Boeing Feb. 22, 2000 Letter, Northpoint Interference Analysis* at 20; *Boeing Feb. 16, 2000 Letter* at 11.

²² See *id.*

Because of the point-to-multipoint nature of Boeing's proposed services, any spectrum mitigation technique that forces Boeing to isolate many of its consumers in a single 166.6 MHz channel would significantly reduce the effective capacity of Boeing's network.²³ Indeed, Boeing would be forced to accommodate all point-to-multipoint communications in the lower 166.6 MHz channel assignment in order to ensure that intended recipients inside Northpoint exclusion zones successfully receive transmissions. Given that the vast majority of Boeing's services will be point-to-multipoint in nature, Boeing's network would be left with inadequate spectrum capacity that would be unencumbered by Northpoint interference, which would seriously compromise the financial viability of Boeing's global NGSO FSS network.²⁴

B. Exclusion Zones will be Much Larger and More Numerous than the Commission Recognizes

The Commission's second justification for authorizing MVDDS in the Ku-band is that although MVDDS networks will create exclusion zones in front of each MVDDS transmitter, the zones will be relatively small compared to the overall MVDDS coverage area.²⁵ Such a justification, however, is contradicted by the record, which shows that these exclusion zones will be much larger and far more numerous than the Commission recognizes. The increased size and frequency of the exclusion zones created by MVDDS transmitters will have a serious harmful effect on the ability of MVDDS systems to share the Ku-band with other users and contradicts the Commission's justification of its authorization of MVDDS in the Ku-band.

²³ *See id.*

²⁴ *See id.*

²⁵ *See Order*, ¶ 225.

Although the Commission concludes only “a very small percentage of potential NGSO FSS subscribers would have any interference from MVDDS deployment,”²⁶ it reaches this conclusion without determining the exact distance at which harmful interference from MVDDS transmitters would extend. The Commission merely notes that this distance is “disputed by the parties in this proceeding.”²⁷ The reaching of such an important conclusion, without making the necessary underlying factual determination, is not indicative of reasoned decision making and further supports reconsideration of the allocation of MVDDS in the Ku-band.

The record, however, demonstrates that each MVDDS transmitter – even those operating at a nominal power level – will create an exclusion zone in front of the transmitter that will displace Boeing’s NGSO FSS receivers within a range of more than two kilometers.²⁸ In addition, the Commission appears ready to allow MVDDS transmitters to operate at proposed higher power levels.²⁹ The operation of MVDDS at such higher power levels would create exclusion zones extending nearly fifty kilometers.³⁰ Furthermore, MVDDS exclusion zones will extend to more than 87 kilometers using the power levels included in Northpoint’s Broadwave affiliates’ applications.³¹

²⁶ *See id.*

²⁷ *Id.*

²⁸ *See Boeing May 1, 2000 Letter* at 1.

²⁹ *See Further Notice*, Appendix E, § 101.113(a) n.10 (indicating a maximum power level for MVDDS systems of +10 dBw).

³⁰ *See Comments of The Boeing Company*, ET Docket No. 98-206 at 25, Table 4 (Mar. 12, 2000).

³¹ *See Boeing May 1, 2000 Letter* at 1.

No only will the exclusion zones be larger than recognized by the Commission, but the record also shows that such zones will be more numerous.³² NGSO FSS receivers will suffer unacceptable interference both when they are in the vicinity of MVDDS transmitters and when they are in areas where the signals of multiple MVDDS transmitters overlap— both side to side and front and back. The exclusion zones created by transmitter signal overlap will greatly increase the size and number of areas where NGSO FSS networks will be prohibited from serving the public.

These transmitter signal overlap areas will be particularly numerous if the MVDDS transmitters are deployed in an uneven manner. Northpoint acknowledges, however, that it will need to vary the spacing and design of its transmitters in order to accommodate variations in “topography, obstructions, and population density.”³³ The record shows that two factors are especially likely to lead to a lack of uniform deployment. First of all, overlapping coverage zones will be especially problematic in urban centers where large numbers of MVDDS transmitters may be needed to work around buildings or other obstructions to MVDSS signals.³⁴ Because the Commission is proposing no limits on the density of MVDDS transmitters, NGSO FSS may suffer innumerable exclusion zones in urban centers where MVDDS transmitters signals may need to be located in close proximity to each other.

³² See *Boeing Feb. 16, 2000 Letter* at 3.

³³ See *Northpoint Jan. 20, 2000 Letter* at 4.

³⁴ See *Boeing Feb. 22, 2000 Letter, Northpoint Interference Analysis* at 9-10; *Boeing Feb. 16, 2000 Letter* at 3.

Second of all, Northpoint intends to place its MVDDS transmitters on towers about 150 meters above average terrain level – a height roughly equivalent to a forty-story building.³⁵ It seems highly improbable that a MVDDS operator could afford to construct towers of this size solely for its transmitters. Instead, MVDDS licensees will undoubtedly attempt to place their transmitters on existing structures. This will significantly constrain the locations for transmitters, necessitating further adjustments in MVDDS transmitter spacing and power level requirements.

Additionally, it appears highly unlikely that suburban land use regulations would permit MVDDS licensees to construct 150-meter towers in suburban areas.³⁶ Rather, MVDDS operators would be forced to construct shorter towers, *e.g.*, 30 meters (over eight stories), which would need to be more numerous and operate at higher power levels to overcome terrain and blockage. Such MVDDS network designs, presuming that there are permissible land-use regulations, will increase the number and size of the exclusion zones within which NGSO FSS operators will be unable to provide service.³⁷

Because both the size and the number of the exclusion zones will be greater than recognized by the Commission in the Order, the record does not support – but rather expressly contradicts – the Commission’s conclusion that the authorization of MVDDS in the Ku-band will only cause harmful interference to a very small percentage of NGSO FSS subscribers.

³⁵ See *Comments of Northpoint Technology, Ltd.*, ET Docket No. 98-206, Technical Annex at 2, Table 1 (Mar. 2, 1999) (“*Northpoint Comments*” or “*Northpoint Technical Annex*”).

³⁶ See *Boeing Feb. 22, 2000 Letter, Northpoint Interference Analysis* at 10; *Boeing Feb. 16, 2000 Letter* at 3.

³⁷ See *id.*

C. No Amount of Flexible Deployment Could Protect Boeing's NGSO FSS Network from Experiencing Harmful Interference from MVDDS Operators

As a third justification for its authorization of MVDDS in the Ku-band, the Commission observes that most planned NGSO FSS systems are designed for flexible deployment because they must track multiple satellites, avoid interference from GSO satellites, and avoid blockage from tall buildings and trees.³⁸ The Commission asserts that flexible deployment could also avoid interference from nearby MVDDS transmitters.³⁹ In reality, the record does not support such an assertion.

Simply put, no amount of flexible deployment could protect Boeing's NGSO FSS receivers from experiencing unacceptable levels of interference from MVDDS transmitters inside the exclusion zones. Interference from MVDDS transmitters will come into the sidelobes of Boeing's consumer receivers and, as a result, no amount of flexible deployment could protect Boeing's customers from suffering unacceptable levels of interference from MVDDS transmitters inside the exclusion zones.⁴⁰ No matter which way the Boeing receiver is pointed, the interference level from Northpoint's MVDDS transmitters will be approximately the same or greater.⁴¹ At the same time, the power transmitted by Boeing's satellites will be insufficient to overcome the interference, regardless of which satellite is selected.⁴²

³⁸ *See Order*, ¶ 226.

³⁹ *See id.*

⁴⁰ *See Boeing Feb. 22, 2000 Letter* at 3; *Boeing Feb. 16, 2000 Letter* at 8.

⁴¹ *See Boeing Feb. 16, 2000 Letter* at 8.

⁴² *See id.*

As a result, switching NGSO FSS receivers to different satellites will not change the antenna gain in the direction of the interference source and will not mitigate the interference caused by MVDDS operations in the Ku-band.

D. Shielding Will Not Work or Will be Prohibitively Costly

As a fourth justification for authorizing MVDDS in the Ku-band, the Commission suggests that many instances of backlobe interferences into NGSO FSS receivers from MVDDS systems could be eliminated through shielding.⁴³ The Commission fails to acknowledge, however, that the record in this proceeding has demonstrated that artificial and natural shielding will not work or would be prohibitively expensive. Furthermore, any use of shielding would require extensive coordination between NGSO FSS and MVDDS licensees, which the Commission has not proposed to adopt.

Boeing has demonstrated in this proceeding that it cannot use natural or artificial shielding to protect its NGSO FSS network from harmful interference from MVDDS operations in the Ku-band. The earth station antenna for a NGSO system generally must be able to see in all directions to enable handoffs between multiple NGSO satellites going in and out of view.⁴⁴ Boeing cannot use natural shielding because its consumer receivers must be able to see in all directions down to a 30° elevation angle in order to communicate with its NGSO satellites.⁴⁵ Boeing usually will be unable to employ artificial shielding, because such shielding would need to be unreasonably tall

⁴³ See *Order*, ¶ 226.

⁴⁴ See *Boeing Feb. 22, 2000 Letter, Northpoint Interference Analysis* at 15; *Boeing Feb. 16, 2000 Letter* at 8.

⁴⁵ See *id.*

and, in many cases, would block access to Boeing's satellites. In order to shield a Boeing receiver, a wall would have to be constructed between the receiver and Northpoint's transmitter that is tall enough to block interference from Northpoint, but far away enough from Boeing's receiver to prevent distortion from signals reflected off the wall.⁴⁶ Such a wall would need to be at least ten feet in height to shield a Boeing receiver within one kilometer of a Northpoint transmitter.⁴⁷ Any closer to the transmitter and the wall's height increases geometrically, exceeding thirty feet in height for a receiver that is within four hundred yards from the Northpoint transmitter location.⁴⁸ Such walls would be prohibitively expensive and unacceptable to users, zoning boards, and land managers.

Furthermore, in order to avoid the geostationary arc and to avoid causing harmful interference into GSO FSS networks, Boeing receivers will often communicate with NGSO satellites positioned to the north of Boeing's receivers. This will require the receivers to point directly towards the source of Northpoint's interference.⁴⁹ Obviously, shielding cannot be used in such circumstances because it would also block access to Boeing's satellites.

⁴⁶ See *Boeing Feb. 22, 2000 Letter* at 3; *Boeing Feb. 16, 2000 Letter* at 8-9.

⁴⁷ See *Boeing Feb. 22, 2000 Letter, Northpoint Interference Analysis* at 16-18; *Boeing Feb. 16, 2000 Letter* at 9.

⁴⁸ See *id.*

⁴⁹ See *Boeing Feb. 22, 2000 Letter* at 3.

In any event, as Northpoint itself acknowledges, any use of shielding would require coordination between NGSO FSS and MVDDS licensees.⁵⁰ The Commission does not propose to adopt such coordination requirements as part of its authorization of MVDDS in the Ku-band.

E. NGSO FSS Operators Cannot Rely on Rules Meant to Protect DBS Operators from Harmful Interference from MVDDS Operations in the Ku-Band

In apparent recognition of the lack of interference protection provided by its other options, the Commission argues that MVDDS operators will be deploying their transmitters so as to avoid harmful interference to DBS receivers, and this will also lend some protection to NGSO FSS earth stations.⁵¹ Although Boeing fully supports the need to protect DBS systems from harmful interference from MVDDS operators, NGSO FSS networks are inherently different from DBS receivers and cannot rely on incidental protection provided by rules meant to protect other third parties – especially when such rules do not even provide adequate protection to DBS. Accordingly, the existence of rules that are meant to protect DBS does not provide adequate protection to NGSO FSS networks and cannot justify the allocation of MVDDS in the Ku-band.

As an initial point, NGSO FSS and DBS are inherently different systems, and interference limits designed for the one service will offer only limited and unpredictable protection for the other service. For example, whereas DBS receivers face south to receive signals from satellites on the geostationary arc, NGSO FSS receivers must be able to face in multiple directions to receive signals from satellites in a variety of orbits. In addition, DBS does not generally operate in commercial, non-residential areas, while NGSO FSS and MVDDS may both seek to serve

⁵⁰ See *Northpoint Jan. 20, 2000 Letter* at 3 (observing that “[t]he use of shielding would require coordination with Northpoint.”).

customers in such areas.⁵² Furthermore, DBS does not operate in the United States in the 11.7-12.2 GHz band, and thus will not be negatively affected by any out-of-band emissions caused by the operation of MVDDS transmitters. Finally, it seems highly unlikely that MVDDS operators will alter their transmissions to protect DBS receivers. Instead, in most cases MVDDS operators may correct for interference by relocating DBS receivers so that they benefit from natural shielding – a mitigation method that, as demonstrated above, will do nothing for customers of NGSO FSS networks.

In any event, NGSO FSS operators cannot rely on inadvertent interference protection spilling over from the Commission’s rules to protect DBS networks. Incidental third party benefits would not create an adequate private right of action that NGSO FSS operators could use to seek enforcement through the Commission or the courts. As a simple matter, a corporation such as Boeing cannot launch a multi-billion dollar network based on rules designed and intended to mitigate the level of interference into a third party’s system. Accordingly, rules meant to protect DBS cannot serve as a justification for the premise that MVDDS will not cause harmful interference to NGSO FSS networks, and the allocation for MVDDS in the Ku-band should be withdrawn.

IV. THE COMMISSION SHOULD WITHDRAW ITS ALLOCATION FOR MVDDS BECAUSE IT VIOLATES THE COMMISSION’S PRACTICE OF BASING NEW SERVICES ON PATENTED TECHNOLOGIES.

(. . . continued)

⁵¹ See *Order*, ¶ 225.

⁵² As the Commission acknowledges, the service offerings of MVDDS appear to be continuously changing and appear to offer services similar to those contemplated by NGSO FSS networks. See *Order*, ¶¶ 164, 211 n.449.

Northpoint has frequently alluded to its claimed patent for terrestrial point-to-multipoint transmission equipment. Only recently, however, has Northpoint made it clear that it hopes to use its patents to block other potential applicants for MVDDS licenses. Specifically, Northpoint recently indicated that it believes that the MVDDS applications of PDC Broadband Corporation (“Pegasus”) and Satellite Receivers, Ltd. (“Satellite Receivers”) are based on technology that “is, in fact, the Northpoint patented technology.”⁵³

The Commission has routinely refused to incorporate patented technologies in its rules for radio communications services unless the patent holder agrees to make the patent available to all other parties “on reasonable terms and conditions without unfair discrimination.”⁵⁴ The Commission’s policies on patented technologies originated in 1961 with the publication of its Revised Patent Procedures⁵⁵ and are still applied today “to prevent the public benefits of systems” adopted by the Commission “from being derogated by unreasonable exercise of patent

⁵³ *Letter to The Honorable Chairman Kennard, Federal Communications Commission, from Michael K. Kellogg*, at 2 (Jan. 12, 2001).

⁵⁴ *See Revision of the Commission's Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, 14 FCC Rcd 10954, 10984 n.114 (1999) (citing *Revised Patent Procedures of the Federal Communications Commission*, Public Notice (Dec. 1961), reprinted, 3 FCC 2d 26 (1966) (“*FCC Revised Patent Procedures*”)) (declining to require CMRS providers to use a single patented technology, but noting that the holder of the relevant patent has complied with the Commission’s patent procedures by offering to make the patented technology available for use by others); *see also Amendment of the Commission's Rules to Establish a Single AM Radio Stereophonic Transmitting Equipment Standard*, 8 FCC Rcd 8216, 8221 (1993) (citing *FCC Revised Patent Procedures*) (requiring Motorola to license its patents for an AM stereo standard to other parties); *Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service*, Second Report And Order/Further Notice of Proposed Rule Making, 7 FCC Rcd 3340, 3341, (1992) (“*Advanced Television Systems*”) (conditioning the selection of an ATV system on the winning proponent’s adoption of reasonable and nondiscriminatory patent licensing policies).

⁵⁵ *See FCC Revised Patent Procedures*.

rights.”⁵⁶ For example, the Commission has indicated that it “would not adopt rules requiring the use of components which can be furnished only by a single supplier (*e.g.*, where a patent holder refuses to license others to make that product).”⁵⁷

When the Commission adopted a single regulatory standard for AM radio stereophonic equipment, it conditioned the adoption on a requirement that the patent holder – Motorola – license its patent to other parties under fair and reasonable terms.⁵⁸ The Commission also endorsed a requirement that, prior to considering a patented technology for inclusion in its standards for Advanced Television, the patent holders were required to indicate to the Commission’s ATV Advisory Committee that they would make their patents available to all other parties either free of charge or on reasonable, nondiscriminatory terms.⁵⁹ Furthermore, in 1996, when the Commission formally adopted its DTV transmission standard, it noted that all of the private sector entities that participated in the DTV testing conducted by the Advisory Committee executed an agreement to either license their technology at no cost or on reasonable, nondiscriminatory terms.⁶⁰

⁵⁶ *Amendment Of Part 73 Of The Commission’s Rules And Regulations (Radio Broadcast Services) to Provide For Subscription Television Service*, 15 FCC 2d 466, 532 (1968) (“*Subscription Broadcasting Order*”) (declining to adopt a single technology for subscription television services in part because of concerns expressed about patented technologies).

⁵⁷ *Comparable Television Tuning*, 43 FCC 2d 395, 401 (1973).

⁵⁸ *See Amendment of the Commission’s Rules to Establish a Single AM Radio Stereophonic Transmitting Equipment Standard*, 8 FCC Rcd 8216, 8221 (1993) (*citing FCC Revised Patent Procedures*) (requiring Motorola to license its patents for an AM stereo standard to other parties).

⁵⁹ *See Advanced Television Systems* at 3341 (*citing Advisory Committee ATV Test Procedures Test Management Plan* at Section 2.1) (Sept. 25, 1990)).

⁶⁰ *See Advanced Television Systems and Their Impact Upon Existing Television Broadcast Service*, Fourth Report and Order, 11 FCC Rcd 17771, 17794 (1996).

The Commission has an identical policy with respect to incorporating *unpatented* proprietary information into its rules for new services. For example, the Commission indicated that no proprietary data is to be incorporated in any standard ultimately recommended for receivers used for public safety services in the 700 MHz band unless the owner of the proprietary data agrees to “either (a) make its technology available to applicants without compensation, or (b) license its technology to applicants under reasonable terms and conditions that are demonstrably free of any unfair discrimination.”⁶¹

As the Commission has acknowledged, its approach on patented and proprietary technologies is consistent with the policies of the International Organization for Standardization and the American National Standards Institute, both of which refuses to consider including patented technology in a standard unless the patent holder certifies that (1) a license will be made available without compensation to applicants desiring to utilize the license for the purpose of implementing the standard, or (2) a license will be made available to applicants under reasonable terms and conditions that are demonstrably free of any unfair discrimination.⁶² As the Commission has also acknowledged, such an approach is also consistent with the terms of the National Technology Transfer and Advancement Act of 1995, along with Office of Management

⁶¹ *The Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010; Establishment of Rules and Requirements For Priority Access Service*, Memorandum Opinion and Order on Reconsideration, 14 FCC Rcd 8059, 8068 (1999) (“*Public Safety Proceeding*”) (establishing criteria for any standards that are adopted for receivers used for public safety services in the 700 MHz band).

⁶² See *Advanced Television Systems* at 3341 (citing *Advisory Committee ATV Test Procedures Test Management Plan*, Appendix A, Section D.2 (Sept. 25, 1990)); *Implementation of Section 273 of the Communications Act of 1934, as amended by the Telecommunications Act of 1996*, Notice of Proposed Rulemaking, 11 FCC Rcd 21784, 21815 (1996).

and Budget policies, which “recommend that federal agencies participate in and support the voluntary standards process and that patents essential to a standard be licensed on terms that are reasonable and non-discriminatory.”⁶³

Requiring patent holders to agree to license all relevant patents also helps “to avoid having the Commission assume a continuing burden of general analyses of relative patent positions of various parties,” which the Commission staff has described as a potentially “exhaustive” process involving continually changing legal rights. Recognizing this, should the Commission move forward with an allocation for MVDDS in the Ku-band, the Commission should advance the public interest by conditioning its action on a requirement that Northpoint and its affiliates make their patents available to all other parties on reasonable terms and conditions without unfair discrimination.

⁶³ *Public Safety Proceeding* at 8068 (1999) (citing Office of Management and Budget (“OMB”) Circular A-119, 63 Fed. Reg. 8545, §§ 4a, 6j (Feb. 18, 1998)) (establishing criteria for any standards that are adopted for receivers used for public safety services in the 700 MHz band).

V. CONCLUSION

The authorization of MVDDS in the Ku-band is clearly incompatible with the viability of NGSO FSS networks because it will deny NGSO FSS operators of the spectrum resources needed to make their networks commercially and technically viable. Furthermore, the justifications on which the Commission relies for its conclusion that MVDDS can share spectrum with other users of the Ku-band are either not supported by the record or expressly contradicted by the record. For all these reasons, the Commission should reconsider and withdraw the authorization of MVDDS systems in the 12.2-12.7 GHz band.

Respectfully submitted,

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