

PAUL, WEISS, RIFKIND, WHARTON & GARRISON

1615 L STREET, NW

WASHINGTON, DC 20036-5694

TELEPHONE (202) 223-7300
FACSIMILE (202) 223-7420

JEFFREY H. OLSON
COMMUNICATIONS COUNSEL

TELEPHONE (202) 223-7326

E-MAIL: jolson@paulweiss.com

ORIGINAL
235 AVENUE OF THE AMERICAS
NEW YORK, NY 10019-6064
TELEPHONE (212) 373-3000
FACSIMILE (212) 757-3990

EX PARTE OR LATE FILED

RECEIVED

FEB 20 2002

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

62, RUE DU FAUBOURG SAINT-HONORÉ
75006 PARIS, FRANCE
TELEPHONE (33 1) 53 43 14 14
FACSIMILE (33 1) 53 43 00 23

FUKOKU SEIMEI BUILDING
2-2 UCHISAIWAICHO 2-CHOME
CHIYODA-KU, TOKYO 100-0011, JAPAN
TELEPHONE (81-3) 3597-8101
FACSIMILE (81-3) 3597-8120

2916 CHINA WORLD TOWER II
NO. 1 JIANGUOMENWAI DAJIE
BEIJING, 100004
PEOPLE'S REPUBLIC OF CHINA
TELEPHONE (86-10) 6505-6622
FACSIMILE (86-10) 6505-6830

12TH FLOOR, HONG KONG CLUB BUILDING
3A CHATER ROAD, CENTRAL
HONG KONG
TELEPHONE (852) 2536-9933
FACSIMILE (852) 2536-9622

February 20, 2002

By Hand

William F. Caton, Acting Secretary
Federal Communications Commission
445 12th Street, N.W.,
Washington, DC 20554

Re: Ex Parte Communication in ET Docket No. 98-206; RM-9147; RM-9245;
Applications of Broadwave USA et al., PDC Broadband Corporation,
and Satellite Receivers, Ltd., to provide a fixed service in the 12.2-
12.7 GHz Band; Requests of Broadwave USA et al. (DA 99-494),
PDC Broadband Corporation (DA 00-1841), and
Satellite Receivers, Ltd. (DA 00-2134) for Waiver of Part 101 Rules

Dear Mr. Caton:

This letter is written on behalf of SkyBridge L.L.C. ("SkyBridge") to correct numerous erroneous and misleading statements contained in a written *ex parte* filed by Northpoint Technology, Ltd. and Broadwave USA, Inc. (collectively, Northpoint) on January 14, 2002 (the "Northpoint Letter").¹ The Northpoint Letter takes issue with SkyBridge's proposal for power-flux density ("PFD") and equivalent power-flux density ("EPFD") limits, which are designed to permit co-primary operation in the 12.2-12.7 GHz band of non-geostationary orbit ("NGSO") Fixed-Satellite Service ("FSS") systems and Multichannel Video Distribution and Data Service ("MVDDS") systems (the "SkyBridge Proposal").²

No. of Copies rec'd 014
List ABCDE

¹ The Northpoint Letter was distributed to various Commission staff via e-mail on January 24, 2002.

² Attached hereto is a summary of the salient features of the SkyBridge proposal.

Before addressing the details of the Northpoint Letter, it appears necessary once again to emphasize the difficult goal sought to be achieved by the SkyBridge Proposal. As SkyBridge has explained in detail in numerous filings, sharing between NGSO FSS and MVDDS systems presents significant obstacles.³ This is particularly the case in view of the Commission's decision to allocate spectrum for both services on a co-primary basis. This allocation requires that any sharing regime ensure that: (1) both services can operate on both a technically and an economically sound basis; and (2) both services share equitably in the burdens necessary to co-exist in the allocated spectrum.

At the outset of this proceeding, SkyBridge was quite pessimistic that viable co-existence could be achieved. Nonetheless, SkyBridge accepted at face value certain critical Northpoint claims and promises concerning its proposed system's operation, and was able to develop a technical regime that would accommodate both Northpoint's and NGSO FSS system's stated needs. It must be emphasized that SkyBridge based its proposal not only on the protection requirements of its own system, but also on the needs of MVDDS systems, as typified by the Northpoint system parameters on file with the Commission.

It further must be emphasized that the sharing regime proposed by SkyBridge significantly constrains NGSO FSS systems; as a practical matter, they will be forced out of the entire 12.2-12.7 GHz band used by MVDDS systems, whenever NGSO user terminals are located sufficiently near MVDDS transmitters. To preserve the integrity of the co-primary allocation, any sharing regime must ensure that the number of NGSO user terminals deprived of access to the 12.2-12.7 GHz band remains small, and that user terminals operating outside of the 12.2-12.7 GHz band -- in spectrum not allocated to MVDDS operators -- will be unencumbered by MVDDS operations.⁴

As discussed below, SkyBridge believes that its proposal strikes the necessary balance that would permit both services to co-exist on a roughly equitable basis. However, the SkyBridge Proposal constitutes a precise and fragile balance. If fundamental assumptions are changed, or if components of the SkyBridge Proposal are altered or ignored, the viability of NGSO systems may be put at risk. If that occurs, the

³ International studies have consistently concluded that sharing between terrestrial and ubiquitous satellite services is very difficult, at best. This is particularly the case here, where the terrestrial service is not point-to-point, but rather uses wide beam antennas, and where the satellite user terminals track satellites, and often end up pointing in the general direction of the terrestrial transmitter. In such a case, there is no simple way to eliminate interference into a satellite user terminal from a nearby terrestrial transmitter.

⁴ As the result of technical agreements reached with the full support of the Commission, NGSO FSS systems were allocated internationally on a co-primary basis with DBS systems in the band that MVDDS systems now seek to enter. If the Commission cannot honor those agreements by adopting rules for NGSO FSS/MVDDS sharing that adequately take into account the reasonable requirements of international NGSO FSS operators to provide service to all of their U.S. customers, MVDDS should be accommodated in another band.

William F. Caton, Acting Secretary

3

two services cannot co-exist on a co-primary basis, under any reasonable definition of that term.

It is not clear from the Northpoint Letter that Northpoint actually shares SkyBridge's goal of creating an equitable sharing regime. Below, SkyBridge reviews and corrects the more glaring of the erroneous assertions contained in the Northpoint Letter.

I. INCORRECT NORTHPOINT ASSERTIONS REGARDING FREQUENCY DIVERSITY

Northpoint claims that “[i]nstead of the complicated SkyBridge proposal, SkyBridge could avoid any interference from terrestrial systems by employing frequency diversity.”⁵ Northpoint would have the Commission believe that the SkyBridge Proposal is a ruse for avoiding frequency constraints on NGSO FSS systems.

As SkyBridge has explained on numerous occasions, the SkyBridge proposal does not avoid use of frequency diversity by NGSO FSS systems. Rather, *the entire purpose of the SkyBridge proposal is to preserve the ability of NGSO FSS systems to use frequency diversity to avoid interference from MVDDS systems.* In order to use frequency diversity, it must be ensured that the number of NGSO FSS terminals required to change frequency to avoid MVDDS interference is small. Moreover, it is critical that those frequency-constrained terminals are protected against saturation. Each of the limits proposed by SkyBridge addresses one of these requirements, and nothing more.⁶

Northpoint continues to assert, without foundation, that SkyBridge's ability to perform frequency diversity will be protected if less than 50 percent of the SkyBridge service area is free from harmful interference.⁷ SkyBridge has explained in numerous filings why this is not the case.

Use of frequency diversity imposes significant constraints on the NGSO FSS operator, well beyond the 50 percent reduction in usable bandwidth imposed by MVDDS operation. If a large number of user terminals receive interference from MVDDS operations in the 12.2-12.7 GHz band, this can have a significant adverse affect

⁵ Northpoint Letter at 2.

⁶ Moreover, the only reason that the SkyBridge Proposal is “complicated” (a relative term) is that the proposal takes into account the operating requirements of MVDDS systems, and provides maximum flexibility to such systems to determine on a case-by-case basis how to meet the protection requirements of NGSO FSS systems. The SkyBridge Proposal could easily be simplified, while still protecting NGSO FSS systems, but it is unlikely that Northpoint would approve of the modifications.

⁷ Northpoint Letter at 2-3.

William F. Caton, Acting Secretary

4

on the loading of carriers and can greatly reduce the multiplexing capabilities of satellite systems, reducing system capacity.⁸

Additionally, in SkyBridge's case, the need to employ frequency diversity to compensate for MVDDS interference also severely constrains its ability to deploy its "relay links," which allow it to provide *immediate* service to rural areas, prior to the full deployment of all U.S. gateways. Use of relay links depends on the ability of SkyBridge to employ different transponders in the 11.7-12.7 GHz band to serve different cells. If each cell must have access to frequencies throughout the band, to permit frequency diversity on a large scale, this technique simply does not work.⁹ For all of the above reasons, the percentage of satellite terminals located in "diversity zone" must be kept small.

Moreover, Northpoint has repeatedly assured the Commission that the size of the largest "diversity zone" for any of the proposed NGSO FSS systems will be less than 10% of a Northpoint transmitter service area.¹⁰ This reasonably reflects the needs of NGSO FSS systems, and SkyBridge's willingness to engage in a good faith effort to accommodate both types of systems is based critically on Northpoint's representations. Such a limit would avoid imposition of frequency constraints on too many user terminals, permitting the NGSO FSS operator to maintain reasonable efficiency in the traffic multiplexing capabilities of the system. Higher values would lead to loss of capacity. Any diversity zone greater than 10% of the service area undermines a fundamental assumption of SkyBridge's proposal. *If Northpoint believes that it can no longer honor its representation that its system will protect NGSO FSS user terminals in all but 10% of its service area, SkyBridge must return to its original conclusion that co-primary sharing between NGSO FSS and MVDDS systems is simply not feasible.* For the reasons given above, the two points are inextricably linked.

II. INCORRECT NORTHPOINT ASSERTIONS REGARDING THE PROPOSED PDF LIMITS

Northpoint states that "a PFD cannot be used to estimate a level of interference for an NGSO FSS receiver, because the gain of the satellite receive antenna in the direction of the potential interferer is constantly changing."¹¹

⁸ See Comments of SkyBridge, ET Docket No. 98-206, RM-9147, RM-9245, March 12, 2001 ("SkyBridge Further Notice Comments"), at 27-28.

⁹ See *Ex Parte* of SkyBridge, ET Docket No. 98-206, February 18, 2000, at 34. The same is true in any scenario in which, to reduce intra-system interference, the available frequencies are split between physically-adjacent service cells. The ability to do this for low-traffic cells helps optimize use of system resources.

¹⁰ See, e.g., Comments of Northpoint Technologies, Ltd., ET Docket No. 98-206, RM-9147, RM-9245, March 2, 1999, Technical Annex, at 32.

¹¹ Northpoint Letter at 3.

The reason that SkyBridge proposed a PFD level instead of an interference level is that it simplifies the calculations needed to check the compliance of an MVDDS system with the limit. More importantly, Northpoint's claim that the PFD cannot be used to estimate the level of interference for an NGSO FSS receiver, because the gain of the satellite receive antenna in the direction of the potential interferer is constantly changing, is completely wrong. In fact, as discussed further below, *Northpoint has asked for a PFD limit to protect its user terminals against NGSO FSS satellite emissions, even though the gain of the Northpoint user terminal antenna in the direction of the potential interferer (in this case, the NGSO satellite) is constantly changing.* As the Commission well knows, a PFD limit can be used even in a time-varying interference environment, and this method has the advantage of simplifying the calculations a party must make to ensure that its operation will comply with the limits.

Northpoint states that "reducing Northpoint EIRP and shrinking the service area does not substantially change the percentage of service area impacted by the PFD."¹² Northpoint uses this argument to imply that its hands are tied in terms of complying with SkyBridge's proposed limits for the protection of NGSO FSS systems.¹³

SkyBridge agrees that reducing only EIRP does not substantially change the percentage of service area affected by the PFD. This is precisely the reason that the SkyBridge limits are defined not in terms of MVDDS transmitter EIRP, but in terms of a PFD at the NGSO FSS user terminal. Compliance with such limits depends not only on the EIRP, but also on MVDDS antenna pattern, transmitter height, antenna tilt angle, polarization, transmitter density, and terrain profile. As Northpoint acknowledges, limiting just one of these parameters, such as EIRP, does not ensure protection of NGSO FSS systems. Such a mono-dimensional approach also overly constrains MVDDS systems, by preventing them from using a higher power in cases where such higher power would not pose a threat to NGSO FSS systems.

Therefore, Northpoint's claim that adequately protecting SkyBridge operation against Northpoint emissions would constrain Northpoint power to the point that service is not viable is unsupported. As Northpoint elsewhere has acknowledged, *limiting transmitter power is not the only tool Northpoint has for reducing interference to NGSO FSS user terminals.* This fact, which Northpoint periodically ignores when convenient, is at the heart of the SkyBridge Proposal. Co-primary operation will only be possible if the entire toolbox of measures for mitigation of interference is exploited. Northpoint's continual efforts to pretend such measures do not exist -- in an effort to avoid their implementation -- work against achieving this critical goal.

¹² Northpoint Letter at 3.

¹³ More specifically, Northpoint argues that "one must reduce the EIRP such that the *maximum* PFD is below [the PFD limit] in order to comply with SkyBridge's proposed 90% PFD criteria." Northpoint Letter at 5. As will be demonstrated, this is simply not the case.

III. INCORRECT NORTHPOINT ASSERTIONS REGARDING THE PROPOSED EPFD LIMITS

Northpoint argues that protection of SkyBridge terminals at their inputs is not possible because “SkyBridge might place its receiver directly adjacent to an existing Northpoint transmitter, and then request that Northpoint reduce its power or cease operations to accommodate the new SkyBridge receiver.”¹⁴

The same type of concern affects both parties. Northpoint might place its transmitter in the middle of key market for NGSO FSS services, preventing service to a large base of SkyBridge customers. These possibilities represent precisely the scenarios that have thwarted sharing in the past among terrestrial services and ubiquitous satellite services. They present compelling arguments for why these two services should not be in the same band in the first place.

However, in this case, both parties have acknowledged that neither of the above scenarios is very likely to happen in the normal course of system deployment, due the particular characteristics of each system.¹⁵ Nevertheless, for this sharing arrangement to work at all, it must be ensured that neither party can deploy its system (intentionally or otherwise) in a way that significantly harms the other.

SkyBridge has proposed a set of EPFD limits to ensure these assumptions are met. The first limit was designed so that the MVDDS EPFD levels remain a safe distance (3 dB) from the saturation threshold for NGSO FSS terminals, over most of the service area. The second limit -- applicable in connection with an “operational” NGSO FSS terminal -- is designed to protect that NGSO FSS terminal in the unlikely event that it must be placed in a location where it would suffer saturation. This “operational” limit prevents the placement of a “hard” limit on MVDDS emissions near the transmitter, leaving Northpoint and other MVDDS operators as much flexibility as is possible. The combination of both limits is necessary to ensure protection of NGSO FSS systems without overly constraining MVDDS systems.

Northpoint appears to have two separate objections to the operational EPFD limit. First, it seems to think that honoring this EPFD limit -- in the rare cases that it becomes necessary -- will force Northpoint to limit its transmitter power to an impractically low level. This is not true. The EPFD limit is measured at the NGSO FSS receiver, and there are any number of steps that an MVDDS operator may take to lower the power *at the input of the receiver*. Transmitter pointing direction, transmitter height, and transmitter antenna pattern all play a role, just to name a few parameters, and a slight variation in any of these could protect an NGSO FSS terminal that is receiving power just over the saturation threshold. If none of these are possible without adversely affecting

¹⁴ Northpoint Letter at 8.

¹⁵ Northpoint refers to the “unlikely event” that SkyBridge should locate one of its receivers in the “tiny zone” where the saturation threshold might be reached. Northpoint Letter at 5.

provision of the MVDDS service to its customers, shielding of the NGSO FSS antenna may solve the problem.

Again, both parties acknowledge that, with expected deployment scenarios, saturation events will be rare. Nonetheless, the operational limit proposed by SkyBridge is absolutely necessary to NGSO FSS systems, precisely because of the threat Northpoint raises (albeit in the reverse) of a particular MVDDS transmitter precluding service to a large NGSO FSS market. Without the two EPFD limits, there will be no incentive for MVDDS operators to deploy their systems consistent with the assumptions used in the sharing studies filed in this proceeding, in order to ensure that the violation of the saturation threshold of the NGSO FSS terminals is indeed a very rare case. Without the EPFD limits, a large number of NGSO FSS terminals may be affected by saturation.

Northpoint's second concern with EPFD limits seems to be that, in Northpoint's view, they represent an attempt by SkyBridge to protect too many of its user terminals.¹⁶ This, too, is inaccurate, and the fact that Northpoint would even raise such an argument calls into question the nature of its "commitment" to working in good faith to find an equitable solution to these complex technical issues.

NGSO FSS is co-primary in this band, and its ability to provide service to customers must be protected. "Exclusion zones" are not consistent with co-primary status, particularly when no constraint is placed on the other service. It is patently obvious that Northpoint is not willing to constrain its system in order to protect NGSO FSS systems, if such constraints would limit its potential customer base. However, SkyBridge has not proposed any such constraints. Nonetheless, Northpoint continues to seek to impose such constraints on NGSO FSS systems, constraints that are entirely unnecessary to the successful operation of Northpoint's system (according to Northpoint's own representations). Northpoint's position is flatly inconsistent with the concept of co-primary status.

Moreover, these EPFD limits are designed to protect user terminals operating in the 11.7-12.2 GHz band, a band that is not allocated for MVDDS operations. The user terminals affected by the operational EPFD are terminals that have already been forced out of the 12.2-12.7 GHz band used by Northpoint, and would be constrained to operate in an adjacent band, not allocated for MVDDS. *It is a fundamental assumption of both the SkyBridge Proposal, and Northpoint's repeated assurances that frequency diversity will permit sharing, that NGSO FSS terminals will have unfettered (by MVDDS systems) access to the adjacent 11.7-12.2 GHz band.*

¹⁶ Northpoint Letter at 2, 5-7.

IV. INCORRECT NORTHPOINT ASSERTIONS COMPARING THE SKYBRIDGE SYSTEM TO DBS SYSTEMS

Northpoint repeatedly attempts to equate NGSO systems with DBS systems, with regard to the alleged ease with which an NGSO system can avoid interference from its proposed operations. These comparisons are beyond simplistic; they are grossly inaccurate and misleading.¹⁷

As discussed in detail below, NGSO FSS user terminals bear no resemblance to DBS terminals, and their protection criteria differ significantly for obvious and indisputable technical reasons. Unlike DBS dishes, NGSO FSS user terminals track moving satellites, and tend to point, with some regularity, in the direction of the MVDDS transmitters.¹⁸ Rules designed to protect DBS systems simply will not serve to adequately protect NGSO FSS systems. Northpoint's repeated suggestions that what is good enough for DBS should be good enough for NGSO FSS have no technical basis.

For example, Northpoint rejects SkyBridge's proposal for EPFD limits that would protect NGSO FSS terminals from saturation by MVDDS emissions, arguing that NGSO FSS operators can prevent saturation by "swapping in" a 500 MHz Low Noise Block ("LNB") in place of the 1000 MHz LNB, in affected terminals. Drawing analogies to DBS receivers, Northpoint claims that this will be simple and inexpensive.¹⁹

Northpoint's conclusion is wrong. The SkyBridge user terminal bears no resemblance whatsoever to the DBS equipment to which Northpoint constantly compares it. Each SkyBridge user terminal is a complex system, employing two tracking beams, sealed within a radome. Each terminal must be able to simultaneously track two moving low-earth orbit satellites, and seamlessly hand-off traffic from one beam to another. The beams are formed not with simple parabolic dishes, but with moving beam-generation structures.

The choice of LNB for an NGSO satellite terminal depends on several factors related to the entire system design. The LNB must be selected based on the

¹⁷ See, e.g., Northpoint Letter at 5, 6, n.14. Northpoint also complains that "protection of DBS operations already imposes severe restrictions on Northpoint's system parameters." Northpoint Letter at 1. This may or may not be true, but in either case, it is irrelevant to the question of sharing of with NGSO FSS systems.

¹⁸ Because NGSO FSS user terminals do not communicate with NGSO FSS satellites seen near the GSO arc (for protection of DBS services in the subject band), user terminals tend to communicate with satellites oriented to the north (in the Northern Hemisphere), in the direction of the proposed MVDDS transmitters. In other words, when both MVDDS and NGSO FSS systems point away from DBS receivers, they tend to point at each other, which gives rise to a more problematic interference configuration than in the case of DBS systems. See, e.g., SkyBridge Further Notice Comments at 22-23.

¹⁹ Northpoint Letter at 2, 9.

characteristics of the satellite link, the interference environment, the frequency stability of the LNB, the cost, size and weight of the LNB, and the manner in which the LNB is incorporated into the overall design of the terminal. This latter point is especially important in the case of SkyBridge, due to the fact that the antennas are not standard fixed antennas. As indicated above, the terminals have to track the satellite. The feed (transmit and receive) has to move, and therefore the size and weight of the LNB both have to be small.

Many difficult and complex design tradeoffs were necessary to package this advanced technology in a terminal that would be acceptable to consumers in terms of both size and cost. As the Commission well knows, these two factors can make or break a satellite (or, for that matter, any other) consumer service.

Ignoring design constraints -- in this case, the quality of the signal and size and weight of the parts -- may, of course, permit use of cheaper equipment, including LNBs. But Northpoint's proposed "solution" ignores the real world. Northpoint's unsupported claim that SkyBridge can use a \$30 LNB²⁰ is worse than useless (it is purely disingenuous), unless Northpoint can demonstrate that this LNB meets all of the SkyBridge requirements in terms of weight, dimension, frequency stability, and G/T. The SkyBridge user terminal was designed by a consortium that includes some of the world's leaders in the design and manufacture of consumer satellite terminals. It is highly unlikely that these experts would have overlooked the alternative proffered by Northpoint if implementation were as easy as Northpoint suggests. Northpoint's uninformed speculation on the matter is unworthy of Commission consideration.²¹

Since the beginning of this proceeding, Northpoint has spent more time trying to redesign the complex SkyBridge system, without understanding it, than it has looking for sharing solutions that accommodate the requirements of NGSO FSS operation. The Commission must reject Northpoint's proposals for redesigning the SkyBridge system, which are not based on the realities of NGSO FSS system design constraints.

Northpoint also takes issue with the saturation threshold cited by SkyBridge for its user terminals, again comparing the terminals to standard DBS dishes.²²

²⁰ Northpoint Letter at 9.

²¹ Moreover, even if it were *technically* feasible to "swap" SkyBridge user terminal LNBs on a case-by-case basis (which it is not), it would be neither easy nor inexpensive. The need to customize terminals used to provide a ubiquitous consumer service introduces technical, economical and logistical problems. This is particularly the case for SkyBridge terminals, due to their inherent complexity. Even if parts could be obtained that meet the requirements of the SkyBridge system, the cost of retrofitting a complex SkyBridge user terminal in the manner proposed by Northpoint would likely more than offset the profit in providing service to that customer. It is therefore simply not a viable option. The result would be that terminals could not be placed in geographic areas in which MVDDS power reaches saturation thresholds, a result inconsistent with co-primary sharing.

²² Northpoint Letter at 5.

First, as explained above, it is not possible to compare SkyBridge's user terminals to DBS receivers of any kind. They are simply two different systems designed to operate in different technical environments and provide different services. The saturation threshold cited by SkyBridge for its user terminals was provided by its design/manufacturing consortium. As discussed above, these manufacturers designed the terminals to meet the particular requirements of the SkyBridge satellite links and the size and cost constraints associated with consumer terminals.

The figure of -68 dBm is based on the characteristics of the entire receiving chain of the terminal. The LNB provides amplification, filtering and frequency conversion. Amplification is performed with a Low Noise Amplifier (LNA). The saturation of the LNB corresponds to the saturation of the LNA. In the SkyBridge terminal, the LNA is designed to cope with the satellite link budget and the G/T requirements of the SkyBridge system, which are not similar to those of DBS receivers. The complex SkyBridge user terminal simply cannot be assembled by connecting a series of cheap, off-the-shelf devices, contrary to Northpoint's repeated, uninformed speculation.

Second, if co-primary operation is to be feasible, it is necessary that both services honor the specified protection requirements of the other service. This is what was done in developing the limits for protection of GSO FSS and GSO BSS systems from NGSO FSS systems. Those limits were derived from the stated performance criteria for GSO systems provided by their operators.

In the same way, SkyBridge has attempted to honor the requirements Northpoint has defined for its system. As noted above, both the PFD and EPFD limits were developed to permit operation of MVDDS systems, as typified by the Northpoint parameters. Extensive flexibility was incorporated in the proposal as necessary (via percent-of-service area limitations on the applicability of some of the limits, and use of "operational" as opposed to "hard" limits), to ensure that this would be the case.²³

Furthermore, in its proposal for the PFD limits that will apply to NGSO FSS satellites for the protection of MVDDS receivers, SkyBridge has accepted Northpoint's claimed criteria at face value, despite the fact that it is significantly more stringent than that of other terrestrial systems.²⁴

²³ Northpoint's request that the Commission adopt even "more flexible criteria" (Northpoint Letter at 2) is a merely an attempt to ensure that the criteria pose no additional constraint whatsoever on MVDDS systems, notwithstanding the impact to co-primary NGSO FSS systems.

²⁴ As SkyBridge has explained on numerous occasions, Article S21 of the ITU Radio Regulations already imposes requirements on satellite emissions in the 12.2-12.7 GHz band for the protection of terrestrial services. However, Northpoint seeks an additional 10 dB of protection at low elevation angles, as compared to the Article S21 limits. Northpoint's request is based on its proposal to operate user terminals smaller than the standard antennas used by the Fixed Service in the 12 GHz band, and with much smaller margins and very different performance objectives. Although Northpoint's claimed protection requirements have been the subject of heated controversy within ITU-R study groups, and

William F. Caton, Acting Secretary

11

A solution to this very difficult sharing situation can only be found by looking at the actual protection criteria of each system, an exercise that requires an element of trust, and effort by both parties to understand the other's system. As demonstrated above, SkyBridge has attempted in good faith to develop a proposal that accepts the claimed protection criteria of both services.

V. INCORRECT NORTHPOINT ASSERTIONS REGARDING SKYBRIDGE'S NOVEMBER 15, 2001 EX PARTE FILING

Northpoint claims that in a November 15, 2001, *ex parte* filed by SkyBridge in the above-referenced dockets (the "SkyBridge Nov. 15 Ex Parte"), SkyBridge "revise[d] its proposals" for PFD and EPFD limits.²⁵ Northpoint objects to these "new SkyBridge proposals," claiming that its system cannot meet the SkyBridge proposal for a PFD limit applicable over 90% of the service area.²⁶

First, as is clear from the SkyBridge Nov. 15 Ex Parte, SkyBridge has not changed its proposal in any way. The SkyBridge proposal for PFD and EPFD limits has been before the Commission, unchanged, since July 10, 2000, and SkyBridge stands behind that proposal.²⁷

In the SkyBridge Nov. 15 Ex Parte, SkyBridge responded to specific questions received from Commission staff regarding how certain limits had been derived. In its response, SkyBridge illustrated how certain variations in those limits might be

have never been accepted by the participants, SkyBridge has nonetheless accepted them for the purpose of developing the SkyBridge Proposal. However, imposition of a hard limit at the level Northpoint has requested would severely constrain, and probably prevent, the NGSO FSS from serving regions with satellites seen at low elevation angles, thereby threatening the viability of proposed low-earth orbit NGSO FSS systems. Therefore, SkyBridge proposed a regulatory solution to this problem that would protect MVDDS receivers where they actually exist and actually require additional protection, but would not constrain NGSO FSS operation where there is no need. See, e.g., SkyBridge Further Notice Comments, at 29-32, 44-47.

Northpoint's insistence on its claimed criteria illustrates a common pattern in these proceedings. While Northpoint repeatedly attempts to ascribe to the SkyBridge system parameters employed by noncomparable satellite systems (such as DBS systems), Northpoint complains bitterly whenever any analogies are drawn between its system and other terrestrial systems. Northpoint cannot have it both ways.

²⁵ Northpoint Letter at 1.

²⁶ Northpoint Letter at 1-3.

²⁷ See, e.g., Ex Parte Communication of SkyBridge, ET Docket 98-206, 48-SAT-P/LA-97, 89-SAT-AMEND-97, 130 SAT-AMEND-98, July 10, 2000; SkyBridge Further Notice Comments, at 23-40, 49-51; Reply Comments of SkyBridge, ET Docket No. 98-206, RM-9147, RM-9245, April 5, 2001 ("SkyBridge Further Notice Reply Comments"), at 2-13; Ex Parte Communication of SkyBridge, ET Docket 98-206 et al., "SkyBridge Plan for NGSO FSS/MVDDS Frequency Sharing," February 1, 2002 (attached).

possible, variations that might be advantageous for Northpoint and other MVDDS operators. These variations do not affect the interference to NGSO FSS systems.

In particular, the SkyBridge Nov. 15 Ex Parte makes the observation that, if MVDDS systems were to be limited to a single polarization, then the PFD limit could be relaxed by 3 dB.²⁸ Northpoint should have no difficulty meeting these limits, assuming use of a single polarization.²⁹

²⁸ As explained in the SkyBridge Nov. 15 Ex Parte, if MVDDS systems are limited to a single linear polarization, the NGSO FSS receiver, using circular polarization, enjoys a 3 dB reduction in interference due to polarization discrimination. If the MVDDS transmitter uses two linear polarizations, or the same circular polarization as the NGSO FSS operator, this 3 dB discrimination is lost, and the interference to the NGSO FSS receiver is increased by 3 dB. If the MVDDS system is limited to a single polarization, the PFD limit can be relaxed by 3 dB to take this into account. SkyBridge Nov. 15 Ex Parte, Attachment at 1-2.

As also explained in the SkyBridge Nov. 15 Ex Parte, a 3 dB difference in the PFD value is roughly equivalent to a 10% difference in the service area to which it applies. Therefore, instead of relaxing the PFD limit by 3 dB, the Commission could apply the tighter PFD limit to all but 20% of the MVDDS service area, assuming, of course, that MVDDS systems are restricted to a single polarization. SkyBridge Nov. 15 Ex Parte, Attachment at 2. In other words, a limit applied to 10% of an MVDDS transmitter's service area, set at the PFD level at which NGSO FSS user terminals would need to start implementing frequency diversity, is equivalent to a limit applied to 20% of the service area, when combined with the same PFD level *and* a limitation that MVDDS systems employ only a single polarization. The resulting size of the *diversity zone* -- *i.e.*, the area within which the NGSO system would have to rely on frequency diversity to avoid interference -- would be the same in both cases (10%). This demonstrates how the percentage area to which the PFD limit applies has meaning only in conjunction with the rules governing MVDDS operations as a whole. SkyBridge can accept a PFD limit that applies over all but 20% of the MVDDS service area, if other restrictions, in this case a polarization restriction, ensure that the size of the *diversity zone* (as opposed to the size of the zone in which the PFD limit does not apply) remains at 10%.

²⁹ As SkyBridge explained in the SkyBridge Nov. 15 Ex Parte, the SkyBridge limits were based on both the SkyBridge system parameters, and parameters and calculations provided by Northpoint for its system during this proceeding. It was SkyBridge's understanding that Northpoint intended to use only a single polarization. Analysis indicated that the size of the "diversity zone" based on those Northpoint parameters, while still constraining to NGSO FSS systems, would nonetheless be acceptable. This result was critical to SkyBridge's decision to work toward a sharing regime in which both services could operate. The PFD limit was therefore based on the size of the diversity zone that would be generated by Northpoint, according to its published parameters. SkyBridge Nov. 15 Ex Parte, Attachment at 1.

However, the limits proposed for the Commission rules need to apply more generally to the emissions from any MVDDS transmitter, for all conditions and for all methods of modulation. As there is no clear definition of MVDDS operation, it was necessary to ensure that the limit would adequately protect NGSO FSS systems in the general case. Use of two polarizations at the permitted PFD level would increase the power into an NGSO FSS user terminal by 3 dB, increasing beyond an acceptable percentage the number of user terminals required to employ diversity. It was therefore necessary to scale the resulting value by 3 dB, to take into account the fact that, in the absence of a regulation to the contrary, an MVDDS system might choose to employ two polarizations in a single service area. SkyBridge Nov. 15 Ex Parte, Attachment at 1-2.

William F. Caton, Acting Secretary

13

Northpoint's attack on the SkyBridge Nov. 15 Ex Parte is puzzling. The simple variations pointed out by SkyBridge do not help SkyBridge in any way, but may help Northpoint.³⁰ What is remarkable is that Northpoint has not attempted to offer any similar proposals itself.

* * *

In sum, SkyBridge has proposed a sharing regime carefully crafted to minimize burdens to both NGSO FSS and MVDDS operators. Northpoint has failed to provide any reason why the SkyBridge Proposal fails to represent an equitable sharing framework. Rather, as it has throughout this proceeding, Northpoint continues to employ over-simplified, and often blatantly disingenuous, arguments and analogies, aimed solely at diverting attention from the merits of the SkyBridge Proposal, in an apparent attempt to avoid any responsibility for the protection of NGSO FSS systems. Northpoint's stance is flatly inconsistent with the concept of co-primary sharing. As is clear from the record before the Commission, both sides must accept equitable burdens if co-primary operation is to be feasible.

However, the Commission could limit MVDDS systems to a single polarization, instead of scaling up the PFD limit by 3 dB. SkyBridge Nov. 15 Ex Parte, Attachment at 2. It is entirely unclear to SkyBridge why Northpoint would claim that it could not meet a limit based on this approach, since it was developed taking into account Northpoint's own system parameters.

³⁰ It is therefore particularly inexplicable that Northpoint would characterize the options mentioned by SkyBridge as ones "which would severely constrain Northpoint without providing a corresponding benefit to NGSO FSS." Northpoint Letter at 1.

William F. Caton, Acting Secretary

If there are any questions regarding this matter, please contact the undersigned.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'J. H. Olson', with a long horizontal line extending to the right.

Jeffrey H. Olson
Diane C. Gaylor
Attorneys for SkyBridge L.L.C.

Attachment

Via Hand Delivery and Facsimile

cc: Chairman Michael Powell
Commissioner Kathleen Abernathy
Commissioner Michael Copps
Commissioner Kevin Martin
Peter Tenhula, Esq.
Bryan Tramont, Esq.
Paul Margie, Esq.
Monica Shah Desai, Esq.
Bruce Franca
Julius Knapp
Geraldine Matisse
Ira Keltz
Gary Thayer
Don Abelson
Thomas Tycz
Jennifer Gilsean, Esq.
Paul Locke

SKYBRIDGE PLAN FOR NGSO FSS/MVDDS FREQUENCY SHARING

NGSO FSS user terminals located near MVDDS transmitters (in the “Red Zone”) will receive harmful interference in the 12.2-12.7 GHz band. Therefore, user terminals in the Red Zone must employ frequency diversity, and operate only outside the 12.2-12.7 GHz band.

Even with frequency diversity, however, limitations on MVDDS power are still required:

- The Red Zone must be small.¹
- The user terminals in the Red Zone must be protected against saturation.²
- The MVDDS out-of-band emissions must be restricted.³

Failure to achieve these results will prevent the use of frequency diversity by NGSO FSS systems, undermining the fundamental premise of the sharing plan.

The power limitations must be defined from the point-of-view of the NGSO FSS receiver, not the MVDDS transmitter. This is because the interference received by the NGSO FSS user terminals depends not only on the MVDDS transmitter power, but also on antenna pattern, transmitter height, antenna tilt angle, polarization, transmitter density, terrain profile, and transmitter latitude. Limiting just one of these parameters, such as transmitter power, does not ensure protection of NGSO FSS systems. Such a mono-dimensional approach also overly constrains MVDDS systems, by preventing them from using a higher power in cases where such higher power would not pose a threat to NGSO FSS systems.

To meet the above requirements, SkyBridge has proposed a set of three power limits:

- PFD limit of $-120 \text{ dB(W/m}^2\text{/MHz)}$, applicable over 90% of the MVDDS service area
 - limits the size of the “red zone” to 10% of the MVDDS service area⁴
 - gives MVDDS operators significant flexibility in configuring their systems to achieve the necessary protection for NGSO systems
- EPFD limit of $-135.1 \text{ dB(W/m}^2\text{/4 kHz)}$, applicable over 99.8% of the MVDDS service area
 - guarantees that no more than 0.2% of the NGSO FSS user terminals could receive interference near the saturation threshold
 - provides flexibility to MVDDS to exceed the limit near the transmitter
- *operational* EPFD limit of $-132.1 \text{ dB(W/m}^2\text{/4 kHz)}$, applicable over the entire MVDDS service area
 - ensures that every *operational* NGSO FSS user terminal will be protected
 - takes into account the fact that simulations could identify saturation zones that would not pose a threat to any actual NGSO FSS user terminal, thus affording additional operational flexibility to MVDDS operators

NOTES

1. Use of frequency diversity imposes significant constraints on the NGSO FSS operator, well beyond the obvious reduction in usable bandwidth. If a large number of user terminals receive interference from MVDD operations in the 12.2-12.7 GHz band, this can adversely affect the load of carriers and impede the multiplexing capabilities of satellite systems, reducing system capacity. See SkyBridge Further Notice Comments, ET Docket No. 98-206, March 12, 2001 at 27-28. In the case of the SkyBridge, the need to employ frequency diversity to compensate for MVDDS interference also severely constrains the ability of SkyBridge to deploy its "relay links," which allow it to provide immediate service to rural areas, prior to the full deployment of all U.S. gateways. See Ex Parte of SkyBridge, ET Docket No. 98-206, February 18, 2000, at 34. Therefore, the percentage of satellite terminals located in Red Zones must be kept small.
2. Generally, NGSO FSS user terminals will use the entire 11.7-12.7 GHz band. The RF front end of the user terminal is therefore wideband, covering the full 1 GHz frequency range in which carriers can be received. Even when carriers in the lower half of that band (11.7-12.2 GHz) are employed by the NGSO FSS system, MVDDS interference into the upper half of the band (12.2-12.7 GHz) still can present a significant interference problem, because saturation of the NGSO FSS receiver from this interference in the upper band would prevent the user terminal from operating at all even in the lower band. See SkyBridge Further Notice Comments at 28. Therefore, the user terminals in the Red Zone must be protected against saturation.
3. High out-of-band emissions by MVDDS transmitters could, of course, prevent the use of frequency diversity by NGSO FSS systems. The Commission has proposed to require all MVDDS transmitters to meet the emission mask of Section 101.111(a)(2). SkyBridge believes that this proposal would adequately limit MVDDS out-of-band emissions, *so long as the maximum authorized bandwidth is expanded to no more than 24 MHz*, the bandwidth cited by Northpoint for its system. Further expansion of the maximum authorized bandwidth (currently at 20 MHz, see Section 101.109) would relax the emission mask, leaving NGSO FSS systems unprotected. See SkyBridge Further Notice Comments at 38-40.
4. Northpoint has stated that the size of the largest Red Zone for any of the proposed NGSO FSS systems in the Ku-band will be less than 10% of a Northpoint transmitter's service area. See Northpoint NPRM Comments, ET Docket No. 98-206, March 2, 1999, Technical Annex, at 32. Moreover, the 10% figure reflects the needs of NGSO FSS systems. Such a limit would avoid imposition of frequency constraints on too many user terminals, permitting the NGSO FSS operator to maintain reasonable efficiency in the traffic multiplexing capabilities of the system. Higher values would lead to loss of capacity.