come close to offering the level of effort or detailed analysis that has characterized the DBS/NGSO FSS technical effort.[32/]

At this juncture, it would be grossly arbitrary and discriminatory for the Commission to move forward on the Northpoint proposal in any way - whether allocation, service rules, or licensing. As it did in the case of NGSO FSS systems, the Commission must require Northpoint to establish, in a technically rigorous fashion, its claims of compatibility. ***Northpoint must be held to the same standard to which the NGSO FSS proponents have been held.***

Moreover, any action on the Northpoint proposal by the Commission -- even a preliminary allocation -- that is not accompanied by detailed ground rules for Northpoint operation, would hinder the ability of the NGSO FSS applicants to reach a coordination agreement. The uncertainty that would be generated on the impact of Northpoint on NGSO operations would make it impossible to develop a concrete NGSO/NGSO sharing plan. Moreover, Northpoint operations in the band, as currently proposed in Northpoint's FCC applications, will dramatically impact the cost of the space and ground segments (including the user terminals). ***Until it can be definitively determined that specific constraints on Northpoint operation will permit a reasonable sharing arrangement with NGSO systems, the Commission cannot rationally move forward with even a conditional allocation for Northpoint.***

While studies of the Northpoint system are ongoing, the Commission should proceed expeditiously to complete the NGSO FSS proceeding. The development of service rules for NGSO FSS systems is at a dramatically more advanced stage than the Northpoint proposal, and expeditious action is appropriate. There is in fact no reason why the NGSO FSS and Northpoint proceedings should be linked at all. Consistent with its treatment of SkyBridge and the other NGSO FSS applicants, the Commission should act on the Northpoint proposal only when it has satisfied its obligation to fully demonstrate its compatibility with DBS and NGSO FSS systems. Rural America's hope for a near-term bridge over the digital divide should not be held hostage awaiting Northpoint's ability to actually prove its case.

C. Northpoint is not entitled to expedited treatment at the expense of DBS and NGSO FSS operators.

Northpoint claims that "Congress provided in the [SHVA] that applicants such as Northpoint that can share spectrum . . . be given expedited treatment at the Commission."[33/] Putting aside for the moment the obvious unproven

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32/ Id.

33/ Northpoint January 6 Letter at 4.

assumption in Northpoint's statement, a review of the relevant provisions of the SHVA reveals a somewhat different Congressional mandate.

Section 2005(a) of the SHVA states that the Commission shall, within one year of the date of enactment:

> take all actions necessary to make a determination regarding licenses or other authorizations for facilities that will utilize, for delivering local broadcast television signals to satellite television subscribers in unserved and underserved local television markets, spectrum otherwise allocated to commercial use.[34/]

The statute's limited mandate extends only to facilities using certain spectrum for delivering "local broadcast television station signals to satellite television subscribers in unserved and underserved" locations. Such a service -- particularly in the rural areas claimed by Northpoint to be so much of its focus -- requires only a tiny fraction of the 500 MHz sought by Northpoint; by Northpoint's own admission, local broadcast service constitutes a relatively insignificant segment of its most recent multi-channel video/data service plans. Thus, it is not clear that Northpoint's most recent business plan conforms with the intent of Section 2005.

More importantly, for the technical reasons noted above, ***Northpoint will not be able to provide local channels that are truly integrated with satellite television services, and will not quickly, if ever, serve rural subscribers.*** Thus, the extent to which Northpoint even qualifies for any consideration under Section 2005 is not self-evident.

Finally, ***Section 2005(b)(2) cautions that any service eventually licensed must be found not to cause harmful interference to "primary users" of the spectrum in question. The legislative history makes clear that the protection against harmful interference to "primary users" of the 12.2-12.7 GHz band extends not only to existing DBS systems, but to future NGSO FSS systems as well.***[35/] Even under Northpoint's "typical" deployment scenario, it admits that its service would cause harmful interference (in this case complete service outages) to SkyBridge customers located in no less than 8% of each Northpoint transmitter's service area; under its

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[34/] As an initial matter, while the Commission is directed to expedite its consideration of such services, no mandate to grant licenses within one year (or any other timeframe) exists. For example, if the critical "no harmful interference" standard cannot be met, no further Commission action is required.

[35/] See Cong. Rec., 106th Cong., 1st Sess. at 515014.

worst-case scenario, it would cause interference to SkyBridge customers throughout each of its service areas. Northpoint would similarly cause unacceptable interference to DBS receivers located near Northpoint transmitters. In short, it is not at all clear why Northpoint finds succor in the SHVA. By its own admission, it cannot meet the SHVA's strict technical standards.

III. NORTHPOINT'S "SHARING" PROPOSALS THREATEN THE FUNDAMENTAL TECHNICAL/ECONOMIC BASIS OF NGSO FSS SYSTEMS.

As discussed above, Northpoint has utterly failed to demonstrate that it can share spectrum with either DBS or NGSO FSS systems without causing widespread harmful interference. Indeed, with respect to certain NGSO systems, Northpoint admits that this is so, and further concedes that SkyBridge and other NGSO operators "would need to alter their systems or operations to protect Northpoint."[36/] Putting aside the fact that Northpoint cites to no authority for the proposition that SkyBridge is obligated to accommodate Northpoint -- and the SHVA states just the opposite -- Northpoint proposes that SkyBridge either redesign its satellite constellation or its spacecraft antennas to afford Northpoint greater protection.

In addition, to reduce the inevitable Northpoint interference into SkyBridge user terminals, Northpoint has offered a variety of "sharing" proposals, including NGSO use of satellite diversity, frequency diversity, or band segmentation. Unfortunately, Northpoint has made these proposals without a thorough understanding of SkyBridge design and operation. Each of the Northpoint proposals would place all the sharing burden on NGSO FSS systems, and result in enormous and completely unwarranted costs to NGSO FSS operators.

In brief, in making its proposals Northpoint significantly mischaracterizes both the nature and extent of the flexibility of the SkyBridge system. As the Commission well knows, the SkyBridge system was painstakingly designed to protect a variety of existing systems in the Ku-band, including GSO systems throughout the bands, as well as FS, Radiolocation, and Space Science systems in certain bands.[37/] It was not designed to protect against interference from ubiquitously-deployed, point-to-multipoint transmitters, such as those proposed by Northpoint. ***In fact, the strict power limitations that SkyBridge and other NGSO systems will be required to honor to protect GSO systems in the 12 GHz band make NGSO systems***

36/ Northpoint NPRM Comments at 26.

37/ It was also designed to permit NGSO/NGSO sharing to allow multiple entry of NGSO systems. It should be noted that frequency sharing with similar systems is a feature Northpoint distinctly lacks.

particularly sensitive to the addition of new high power transmitters in that band. Any requirement to adhere to any of Northpoint's sharing proposals to date would come with enormous costs -- either in redesign of the satellite system, or in reduced capacity or coverage, or both.

At a certain point, the size of this impact completely undermines the system's business case; at that point, the system will not be built, leaving the "digital divide" to be closed by other means. For example, as discussed in detail below, ***Northpoint's proposal that SkyBridge increase its elevation angle to 18° to protect Northpoint receivers would require an addition of 40 satellites at a cost of upwards of $1.5 billion for both construction and launch costs***. Other Northpoint proposals similarly fail to have any basis in marketplace reality.

Finally, Northpoint suggests in the January 6 Letter and in other filings that, among the NGSO FSS systems, only SkyBridge would have significant difficulty sharing with its proposed system.[38] However, Boeing made very clear in a December 20, 1999, filing that its proposed NGSO FSS system also would suffer significantly if forced to coexist with Northpoint,[39] and Hughes made the point that Northpoint's potential impact on NGSO operations in general was sufficient that it could adversely affect the ability of the various NGSO systems to devise a sharing regime.[40] In short, Northpoint's repeated claims that only SkyBridge presents a problem are flatly erroneous.

A. Northpoint has not justified its need for tighter PFD limits.

The first of Northpoint's proposals involves a tightening of the power flux-density ("PFD") limits applicable to NGSO FSS systems in the 12 GHz band. These limits were recently agreed to internationally (with strong U.S. support) by the Conference Preparatory Meeting ("CPM") held in Geneva in November, 1999, and the Commission should reject Northpoint's proposal to change them at this juncture.[41]

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[38] Northpoint January 6 Letter at 1, Technical Annex at 10 (claiming "SkyBridge is by far the 'dirtiest' system in terms of sharing.").

[39] Letter to Mr. Donald Abelson from Bruce A. Olcott et al., ET Docket No. 98-206, RM-9147, RM-9245, December 20, 1999 ("Boeing December 20 Letter"), at 7.

[40] Supplemental Comments of Hughes Communications, Inc., ET Docket No. 98-206, RM-9147, RM-9245, Dec. 20, 1999, at 3.

[41] Northpoint attempted to participate in the international process leading up to this agreement, but its papers were rejected for inclusion in the output of the

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Northpoint's request is based on its self-declared protection criteria for its system. However, the protection criteria specified by Northpoint for its system are wholly unsupported, and greatly at odds with all other terrestrial services.[42] Although Northpoint characterizes itself as just another FS operator (when convenient), it argues that it requires up to 10 dB more protection than the PFD limits that have already been agreed by the CPM to protect FS services in the exact band that Northpoint proposes to enter.[43] No adequate technical explanation or justification for this discrepancy has been provided by Northpoint.

Northpoint tries to minimize this discrepancy by arguing that it only needs this additional protection at elevation angles below 5°. However, it is the low elevation angles that are most critical for most FS systems, and, for this reason, the limits at low elevation angles are the most contentious. A 10 dB change to the PFD limits below 5° is a dramatic departure from the international agreement already reached on this issue.

Instead of applying the FS protection methodologies, Northpoint claims its protection criteria is consistent with that developed internationally for GSO BSS,[44] to which Northpoint compares its equipment. However, Northpoint provides no indication that it has rigorously applied the BSS methodologies, which require use of detailed link budgets, performance thresholds and propagation modeling using the computational methodologies (sometimes referred to as "Methodology D") developed by the international study groups. It is entirely unclear how Northpoint has assessed the impact of the statistical interference from an NGSO systems (i.e., the "equivalent" PFD or "EPFD" received from the system as a whole) on Northpoint's availability, or how it has used such information to derive an acceptable per-satellite

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41/ (...continued)
meetings, in large measure because the technical experts present were unable to conduct any meaningful analysis of the Northpoint system, based on the parameters presented. See SkyBridge NPRM Comments at 111-112. Northpoint now complains about this self-inflicted wound.

42/ See SkyBridge NPRM Comments at 113; SkyBridge NPRM Reply Comments at 98.

43/ Chapter 3 Report of the Conference Preparatory Committee to WRC-2000 ("CPM Report"), Section 3.1.4.1.1(d). These limits were based on application of detailed methodologies for assessing FS protection developed in WP 9A and WP 4-9S. Northpoint has apparently not applied these methods to its system.

44/ These methodologies were developed in JWP 10-11S and JTG 4-9-11.

PFD. Whatever Northpoint's ultimate justification, its claims must be tested using universally accepted methodologies. To date, Northpoint refuses to do so.

Finally, when Northpoint originally proposed its PFD mask, it noted that its proposal was based on preliminary studies and that further work was required.[45] No evidence of such further study has been submitted, either domestically or internationally. Indeed, although Northpoint has stated that its proposals are subject to the outcome of studies in the ITU-R,[46] Northpoint has not recently participated in any of the ITU-R study groups that would be the logical venue for such work; but now it explicitly rejects the applicability of the results of those international studies to its system.

For these reasons alone, the Commission must reject Northpoint's unsubstantiated claims for greater protection.

B. Northpoint's proposals for reducing NGSO system PFD are inconsistent with the basic technical/economic compromises that are fundamental to such systems.

Northpoint claims that SkyBridge can meet its proposed tighter PFD by pointing its beams only to elevation angles greater than 18° (at beam center). Alternatively, Northpoint states that use of "beam forming" to adjust the transmit antenna pattern to attenuate the signal by 3-4 dB at very low service elevation angles will have no impact on SkyBridge service.[47] Northpoint's naive and self-serving attempts to tell SkyBridge how to build and operate a satellite system should be rejected out-of-hand. These proposals do not take into account fundamental principles of satellite system design or operation.

1. An increase in the minimum elevation angle of the SkyBridge system would require a significant increase in the number of satellites.

Northpoint is simply wrong when it states that use of a minimum 18° elevation angle for the center of the beam will have no impact on SkyBridge.[48] Use of an 18° elevation angle would mean that user terminals at the edge of coverage would be at elevation angles well above the 10° for which the system was designed. Such a

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[45] Northpoint NPRM Comments, Technical Annex at 26.

[46] Id.

[47] Northpoint January 6 Letter, Technical Annex at 8 -9.

[48] Id. at 8.

change would translate directly into a loss of usable satellite resources, and hence a loss of the ability to provide continuous service to users. Northpoint's proposal would require adding satellites to make up for the capacity lost by increasing the minimum elevation angle.

The additional cost involved in a change of elevation angle is a simple matter of geometry. With an increase in elevation angle, fewer satellites are in the usable "cone" above each user terminal. To keep capacity constant, satellites would have to be added to make up for satellites that would fall outside the smaller cone. For an increase in elevation angle of 30° (as Northpoint apparently once proposed), the number of satellites would roughly double, from 80 to ***160, at a cost in excess of $3 billion (for construction and launch). For an increase in elevation angle of 18°, as Northpoint now proposes, the number of satellites would have to be increased to about 120, at a construction/launch cost on the order of $1.5 billion.***

2. An increase in the antenna discrimination is not feasible.

Further demonstrating its lack of understanding of the SkyBridge system, Northpoint claims that a 3-4 dB improvement in SkyBridge's satellite antenna discrimination would be "trivial".[49] Indeed, if such an improvement were possible, SkyBridge could have significantly reduced the time and effort involved in the studies for sharing with GSO systems in the band; as the Commission's engineering staff is well aware, antenna performance was a key element of this debate.

The need for low weight and high performance are critical factors driving satellite design. In the case of SkyBridge, the antennas are optimized to provide, for any pointing direction, the maximum directivity and antenna discrimination to enable SkyBridge to protect, as necessary, GSO, FS, and other NGSO systems. To suggest that SkyBridge could further improve the antenna performance with the same antenna, while still maintaining service to all customers, ignores the trade-offs inherent in satellite antenna design. SkyBridge is already employing state-of-the-art satellite antennas, with performance capable of protecting a variety of terrestrial and satellite services with proven protection requirements.[50]

Put simply, a 3-4 dB improvement in antenna discrimination would require a major increase in the size of the spacecraft antennas and related equipment. It would also lead to extensive problems in the implementation of the necessary additional controls, amplifiers, and filters associated with the additional radiating elements. The impact on antenna design would spill over to the spacecraft design,

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[49] Id. at 9.

[50] For example, the SkyBridge antenna is able to adjust its beamwidth from more than 20° down to a couple of degrees.

affecting, for example, the thermal system design and the shape of the spacecraft. Any redesign along the lines suggested by Northpoint could, as noted above with regard to enlarging the constellation, enormously increase system costs. The impact on launch costs alone -- due to increased spacecraft size and concomitant increase the number of launches required for the SkyBridge constellation[51] -- could run in the hundreds of millions of dollars. Even assuming *arguendo* a business case could be found to justify these cost increases, this would be a profound waste of resources, particularly given that Northpoint admits that the extra discrimination it seeks would be used less than 1% of the time.[52]

Therefore, Northpoint's claims that its "beam-forming" and "beam-shaping" proposals are "non-impacting," and that SkyBridge "would probably not need to make any changes to its operation," are pure fabrication.[53] Indeed, the potential impact of these proposals is self-evident to any technically competent observer.[54] If Northpoint truly is unaware of the real ramifications of it proposals, then all of its technical assertions -- even those regarding its own system's needs -- must be viewed with the utmost suspicion.

C. As Northpoint admits, interference to NGSO FSS user terminals in the area surrounding each Northpoint transmitter is inevitable.

As explained in detail below, an "exclusion zone" will exist around each Northpoint transmitter, in which all NGSO FSS user terminals will receive

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[51] As described in the SkyBridge FCC application, SkyBridge plans to launch multiple satellites on each launch vehicle. See SkyBridge 1999 Amendment at A-46.

[52] Northpoint January 6 Letter, Technical Annex at 9. Northpoint tries to minimize the impact of its proposal by claiming that the excess power only occurs below 4° in elevation, and is not needed to serve the SkyBridge customer (which are all served at a minimum of 10°). Id. at 7. However, as Northpoint well knows, the sidelobe power coming in at 4° is directly related to the main beam power coming in at 10°, and, for the reasons given above, one cannot be reduced without reducing the other.

[53] Northpoint January 6 Letter, Technical Annex at 8-9.

[54] Moreover, even if Northpoint's proposals were technically and economically feasible, they do not take into account the fact that the SkyBridge system design is finalized and construction is due to begin shortly. This design has been carefully balanced to meet an enormous number of technical requirements. Any change at this juncture would necessarily entail tremendous cost and delays, in addition to the increases in hardware and launch costs.

harmful interference. ***Assuming the worst-case power level*** of 45 dBm specified in the Northpoint applications, ***SkyBridge residential user terminals would receive interference over 100% of the typical Northpoint service area (approximately 16 km).***[55] Boeing has demonstrated a similar impact to its NGSO FSS system.[56] Even using what Northpoint claims is its "typical" power of 12.5 dBm, Northpoint has estimated that the exclusion zone for SkyBridge customers around each of its transmitters would extend 4 kilometers, covering an area of about 20 square kilometers.[57]

Because numerous transmitters will be required to serve each Northpoint market, and Northpoint proposes to serve all U.S. television markets, such exclusion zones will blanket the country. Taking Northpoint's recent figure of one transmitter for every 150 square miles,[58] ***there could be up to approximately 1000 Northpoint transmitters in each of SkyBridge's 350 km (218 mile) radius cells, each blocking out, in the "best case" scenario proposed by Northpoint, a 20 square km area.***

In other words, in the "sharing" environment proposed by Northpoint, an NGSO FSS operator would: (1) be unable to provide services to any consumers within the vicinity of any of Northpoint's tens of thousands of transmitters; (2) be unable to sell user terminals to any customer without initially conducting a survey of the customer's premises *vis-a-vis* Northpoint interference; and (3) be subject to loss of an existing customer every time Northpoint expands into a new community and erects its numerous transmitters. This would be clearly unacceptable for any consumer service.

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[55] See Letter to Ms. Magalie Roman Salas from Jeffrey H. Olson, et al. in ET Docket No. 98-206, November 10, 1999 ("SkyBridge November 10 Letter") at 7.

[56] Boeing December 20 Letter at 2.

[57] Northpoint NPRM Comments, Technical Annex at 32-33.

[58] Letter to Ms. Magalie Roman Salas from Brian Weimer, ET Docket No. 98-206, RM-9147, RM-9245, January 10, 2000 ("Northpoint January 10 Letter") at 2.

1. NGSO user terminals in proximity to Northpoint transmitters would receive harmful Northpoint interference over large angular spans of pointing directions, leading to exclusion zones on the ground where deployment would not be possible.

To illustrate the magnitude of the problem, it can be seen that even simply avoiding line-of-sight configurations between the Northpoint transmitters and SkyBridge user terminals can lead to a large "non-operating" zone in the sky for the user terminals, effectively creating a large exclusion zone on the ground where SkyBridge user terminals would receive interference while pointing in a significant portion of the sky [59] This threshold geometrical constraint is due to the fact that, even at the edge of coverage of each Northpoint service area, and even assuming Northpoint's "typical power," the Northpoint power (-156 dBW/24 MHz, or -150.4 dBW/m^2/4 kHz) is higher than the power received by the SkyBridge user terminals from the SkyBridge satellites.[60] As a result, anywhere within the Northpoint service area, if the SkyBridge user terminal can "see" the Northpoint transmitter above the 10° minimum elevation angle, it is clear that the user terminals will receive harmful interference during a significant portion of their tracking paths.[61] This "line-of-sight"

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[59] See Letter to Ms. Magalie Roman Salas from Jeffrey H. Olson et al., ET Docket No. 98-206, February 10, 2000 (containing further details of the analysis summarized herein).

[60] As the user terminal gets closer to the transmitter, this power increases by 10-15 dB.

[61] The actual size of the angular avoidance zone required to protect against such line-of-sight interference events depends on the power received. As the NGSO user terminals gets further from the Northpoint transmitter, the power from Northpoint decreases, as does the elevation angle at which the transmitter is seen by the victim receiver. As a consequence, the angular avoidance needed around the Northpoint transmitter eventually decreases and falls below the minimum operating elevation angle of the NGSO user terminal.

Northpoint is just one of many time-varying sources of interference to SkyBridge user terminals. In order to simplify the analysis for illustration purposes, a typical satellite interference criterion (maximum I/N = - 12.2 dB) can be used to avoid the complication of splitting the interference allowance among different systems, including different NGSO systems. For a maximum I/N of -12.2 dB, sufficient angular discrimination is needed to ensure that the maximum PFD received is less than -169.6 dBW/m^2/4 kHz. From these simplified parameters, the size of the angular avoidance zone can be estimated.

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exclusion zone would extend to nearly 1 km for a Northpoint transmitter at Northpoint's minimum height 150 m, increasing linearly to nearly 5 km for a Northpoint transmitter at a height of 850 m, for example.

And this computation is only the first step in assessing the constraints on NGSO user terminal deployment; it only shows the constraints imposed to avoid clearly-problematic line-of-sight events. It does not assess the larger zones necessary to achieve adequate protection of the SkyBridge user terminals from Northpoint interference in general, which depend on a detailed analysis of the exact Northpoint deployment scenario.[62] Moreover, it assumes Northpoint is operating at its "typical" power of 12.5 dBm, and not at its maximum power of 45 dBm. Obviously, the higher the power, the larger the exclusion zones on the ground. Even this overly-conservative analysis, however, serves to illustrates the practical difficulty of sharing between high-power, high-density, point-to-multipoint transmitters and ubiquitous satellite receivers.

2. The exclusion zones would overlap important NGSO FSS customer bases.

Northpoint claims that it can site transmitters in areas where the population density is far lower than the average throughout the service area.[63] However, Northpoint's architecture depends on use of a series of overlapping cells,

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[61] (...continued)
For example, the angular avoidance needed at the SkyBridge residential user terminal located at the edge of the Northpoint service area (16 km for a 12.5 dBm transmitter at 150 m height) is 9.5° and the transmitter is seen at a 0.5° elevation. In such a case the angular avoidance zone is below the minimum operating elevation angle, and therefore does not impact the SkyBridge service. However, as the user terminal gets closer to the Northpoint transmitter (or as the Northpoint transmitter power or height is increased), the avoidance angle increases, impacting the SkyBridge service. For example, at 10 km from the same transmitter, the angular avoidance required is 17° and the transmitter is seen at a 1.5° elevation, which already would require the user terminal to avoid operating several degrees above its normal minimum elevation angle.

[62] As discussed below, such an analysis requires a detailed assessment of the particular Northpoint transmitter deployment, including power, height, tilt angle, etc. The size of the actual exclusion zone depends on all these parameters.

[63] Northpoint NPRM Comments at 22.

each with a transmitter serving a 10-20 kilometer service region.[64] As SkyBridge has noted from the start, it is absolutely clear that many transmitters will necessarily be sited in the middle of populated areas.[65] Moreover, Northpoint has every incentive to place its transmitters as close to its customers as possible, in order to maximize its link availability.

Further, the deployment density of Northpoint transmitters will generally mirror the deployment density of SkyBridge user terminals. That is, both services will have the greatest density deployment in urban and suburban areas. Therefore, although rural SkyBridge user terminals may be less directly affected Northpoint interference, the total number of terminals affected will be quite high, including in areas critical to SkyBridge's business plan.

Making matters worse, Northpoint claims it will have multiple line-of-sight paths from *any* subscriber to *at least three* Northpoint transmitters.[66] This use of heavily overlapping cells will greatly increase the number of transmitters and the total Northpoint interference into NGSO (and DBS) receivers. The aggregate impact of the powers generated by these transmitters must be taken into account.

3. The impact of the exclusion zones must be assessed using the worst-case Northpoint interference scenario.

In its January 6 Letter, Northpoint continues to dispute the large impact of these exclusion zones, basing its analysis on use of lower Northpoint transmitter powers. However, Northpoint has never committed to, or even adequately explained, its actual deployment scenario, including the powers to be used and the spacing and height of the transmitters.[67] Rather, Northpoint insists that it needs the flexibility to

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[64] Northpoint NPRM Comments, Technical Annex at 2.

[65] See Opposition of SkyBridge, RM No. 9245, April 20, 1998 ("SkyBridge Opposition to Northpoint Petition") at 6.

[66] Northpoint NPRM Comments at 5.

[67] Northpoint recently provided an example of deployment in the San Antonio, Texas DMA. However, the proposed scenario exhibits a surprisingly regular transmitter pattern, considering the terrain features that generally must be overcome, and, even if feasible for San Antonio, cannot be used as generic example. Moreover, several critical elements are missing from the description that would be necessary to conduct a sharing analysis with NGSO FSS systems, including range of antenna heights, and maximum power to which Northpoint would commit to operate.

operate at high powers,[68] freely site its transmitters, and control its service area size in order to overcome natural obstacles and adapt to local conditions.[69]

These uncertainties thwart any detailed sharing studies, which require clear assumptions and restrictions.[70] Any proper analysis of the impact of Northpoint transmissions into SkyBridge necessarily must assess the situation using the worst-case parameters specified by Northpoint, and not the "typical" parameters used by Northpoint in its analysis. This is the only way an operator can safely quantify the impact sharing will have on its system, since the victim system does not have control over the interferer's network deployment or operation. For this reason, such worst-

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[68] Northpoint further claims that if it uses higher powers, this actually benefits SkyBridge, arguing that the proportion of the mitigation area will grow slower than the size of the service area. Northpoint January 6 Letter, Technical Annex at 11-12. However, with higher power, the area of the exclusion zone will increase, and Northpoint has made no commitments on how power will relate to service area size. Therefore, there is no guarantee that higher power will lead to larger service areas (and hence a reduction in the number of transmitters), or that the additional interference will be fully compensated by the decreasing elevation angle at which the Northpoint transmitter will be seen as the receiver gets further away. Moreover, the technical problems associated with operation near a high power transmitter (e.g., filtering, protection of equipment) become vastly more complicated.

[69] Northpoint NPRM Comments, Technical Annex at 2, n.2 (explaining that the already vast range specified for Northpoint's key technical parameters "is not to limit in any way the possibility of other values being used"). The sheer number of variables presented by Northpoint also complicates the analysis. For example, the impact of a given power level is dependent on a the transmitter height. Northpoint proposes large ranges for both parameters, as well as the resulting service area, even though not all combinations would even appear feasible. For example, Northpoint's "typical" transmitter height of 150 m would result in an elevation angle of about 0.5° at the edge of a typical 16 km service area. Adequate service is unlikely in such a scenario, indicating that the transmitter height will almost certainly be much higher for such a service area. Such an observation is critical for sharing studies with NGSO FSS systems, as the higher the transmitter height, the greater the exclusion zone for any given Northpoint transmitter power.

[70] Even where some measure of flexibility is available, it must be constrained at some point to permit frequency sharing. In the FS for example, systems operating with automatic transmit power control (ATPC) may exceed the coordinated power, but only in some weather/propagation conditions and only for a very limited percentage of time.

case analysis is exactly what was required of SkyBridge in the NGSO FSS/DBS sharing studies conducted internationally in the same band. As a result, each NGSO system will be required to meet strict limits on the absolute worst case interference statistics it is capable of generating, even if it would never actually do so. Northpoint's repeated use of "typical" parameters in its analysis is not acceptable to NGSO FSS operators for the same reason that use of "typical" NGSO FSS parameters was not acceptable to DBS operators.[71]

In response, Northpoint argues that its power levels will be inherently constrained due to its obligation to protect DBS services.[72] However, as discussed above, Northpoint makes no commitment about what these lower power levels will be, and acknowledges that higher powers will be needed in some cases. In this situation, NGSO operators must rely on the worst-case parameters identified by Northpoint, which are completely unacceptable.

Northpoint also argues that natural shielding will often protect SkyBridge user terminals.[73] First, however, natural shielding will also attenuate the Northpoint signal. In most cases, Northpoint will need to ensure that its transmitter is properly located and its signal is of a sufficient strength to limit the number of areas in which service cannot be provided. Second, NGSO user terminals will be located to offer a maximum field of view in all azimuths. Therefore, the number of cases in which natural shielding will help protect SkyBridge can be expected to be quite limited.

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[71] Northpoint argues that its maximum power will generally be used only to overcome natural obstacles such as rivers or lakes, over which NGSO systems would have no users. However, if this is the case, it should be easy for Northpoint to specify a maximum power that would be received *at NGSO user terminals*, which would presumably be lower than that which must be assumed with the 45 dBm figure cited in the Broadwave Applications. This would permit NGSO operators to at least begin to conduct a worst-case interference analysis using a power level that Northpoint could not dismiss as unrealistic. Northpoint appears unwilling to constrain its operations in this way, and therefore, any interference analysis must be conducted using the maximum 45 dBm at which it has requested to operate.

[72] Northpoint January 6 Letter, Technical Annex at 12.

[73] Id.

D. None of Northpoint's proposals for mitigating the inevitable interference to NGSO user terminals are technically or economically viable.

Under any of Northpoint's scenarios, harmful interference will be suffered by NGSO systems in every Northpoint service area. This cannot be denied. Putting aside Northpoint's repeated failure to justify -- legally or equitably -- why all its proposed solutions to this problem place the entire burden on the satellite operator (in violation of the clear intent of even the SHVA), as demonstrated below, none of Northpoint's proposals to remedy this problem has any technical or economic viability.

The enormous number and size of the exclusion zones created by Northpoint transmitters render all of Northpoint's proposed interference mitigation techniques useless. The Commission and the ITU have both recognized on numerous occasions the enormous, often intractable, problems inherent in frequency-sharing among high-density, point-to-multipoint terrestrial services and ubiquitous satellite earth stations.[74] As the Commission is well aware, SkyBridge itself has accepted

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[74] See, e.g., Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, 11 FCC Rcd 19005 (1996); Amendment of the Commission's Rules to Relocate the Digital Electronic Message Service From the 18 GHz Band to the 24 GHz Band and to Allocate the 24 GHz Band for Fixed Service, 13 FCC Rcd 15147 (1998).

On the other hand, *non-ubiquitous* satellite earth stations can often operate co-frequency with terrestrial services. This requires individual coordinations to ensure than neither service receives interference. For example, coordination will permit sharing between terrestrial FS stations and NGSO FSS gateways in the 10.7-11.7 GHz band. It would also permit sharing between Northpoint and NGSO FSS gateways in the 17.3-17.8 GHz band. See Section II.A supra. However, coordination would not be practical between FS stations and ubiquitous NGSO FSS user stations, a situation that is closely analogous to the Northpoint proposal. It is simply not feasible to coordinate ubiquitous NGSO FSS user terminals with Northpoint's essentially ubiquitous transmitters. This is precisely the reason Northpoint proposes to evict NGSO FSS systems from the 12 GHz band in the vicinity of Northpoint transmitter operations. See Section III.C.3.

such technical conclusions, even when this required forgoing use of a particular band for certain types of NGSO FSS operations.[75]

As was recently recognized by the CPM, the high-density deployment of both NGSO FSS earth stations and terrestrial stations in the same geographical area may cause one or both services to be "excessively constrained or prevented from offering a viable service."[76] Northpoint's proposals are designed to ensure that it is NGSO FSS systems, and not Northpoint, that suffer this fate.

1. Northpoint interference cannot be eliminated by NGSO use of satellite diversity.

Northpoint proposes that NGSO systems protect themselves from Northpoint interference by use of satellite diversity. Under this scenario, *primary* NGSO systems would be forced to avoid communicating with satellites at low elevation angle in interference configurations, and switch to satellites at higher elevation angle, where Northpoint interference is less of a concern. Northpoint, on the other hand, an ostensibly secondary service, would do nothing to mitigate its interference into NGSO systems. Northpoint attempts to justify this self-serving proposal by arguing that NGSO systems already have such diversity ability in order to protect GSO systems and to allow coordination among NGSO systems.

Although it is true that NGSO systems have satellite diversity capabilities, Northpoint has grossly mischaracterized the nature and extent of this feature. The satellite diversity capabilities of such systems were specifically designed

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[75] It was for this reason that SkyBridge proposed to operate only non-ubiquitous gateways in the lower 10.7-11.7 GHz band, which is heavily used for FS operations. It is, in fact, this need to accommodate important, and growing, FS operations in the 10.7-11.7 GHz band that dictates that SkyBridge and other NGSO FSS operators deploy user terminals in the 11.7-12.7 GHz bands, including the subject 12.2-12.7 GHz band. This is feasible only because this band has long been cleared of FS operations. Northpoint's proposal threatens to reverse this situation.

[76] CPM Report, Section 3.1.4.3. The U.S. proposal to the CPM took an even more pessimistic view of this scenario, explaining that "as the deployment density of either service [FS or FSS] increases, proposed interference mitigation techniques rapidly become ineffective," and that "frequency sharing between FS and FSS in the same geographic area is difficult if either service deploys large numbers of stations." Document CPM 99-2/31, "Modifications to Section 3.1.4.3 of the Draft CPM-99 Report Regarding Sharing Between Non-GSO Earth Stations and FS Stations," United States of America, October 28, 1999.

to meet the existing, considerable, obligations of NGSO systems to protect the GSO arc and to ensure that the band can be shared by multiple NGSO entrants. The number of Northpoint transmitters proposed (up to 1000 per SkyBridge cell) will blanket each cell with large exclusion zones. Despite Northpoint's claims, using satellite diversity to protect affected user terminals on such a massive scale is not feasible.

In general, satellite diversity is used in the SkyBridge system on a cell-wide basis to switch all of the user terminals in the cell to a new satellite when, for example, the satellite previously serving that cell has entered the exclusion zone protecting GSO services. The system is not designed to permit each of the user terminals in a cell to individually be assigned to *any* of the different satellites in visibility, many of which may be using all of their resources to serve other cells.[77]

Moreover, avoiding interference in the exclusion zones would add tremendously to the already extensive constraints used in the algorithm for optimizing use of the satellite resources, and hence the capacity of the system. Such constraints therefore result in loss of capacity. In sum, the capability to employ satellite diversity on the enormous scale contemplated by Northpoint would either substantially reduce the availability of the SkyBridge service, or require an increase in the number of beams required to serve each cell, necessitating a substantial increase in the number of satellites or beams per satellite. As demonstrated supra, this is not a solution.[78]

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[77] Northpoint seems to assume that a given user terminal could be freely assigned to any of the satellites visible at a given time. This is simply not the case. First, some satellites that are visible may be in the exclusion zone used to protect GSO communications. Second, the satellites simply do not have enough beams to cover every cell within its field of view. The system is designed to ensure that at least one satellite can cover a given cell at all times. In practice, two to three may be used at times, to respond to increased traffic from a cell, for example. However, there are simply not enough satellites or beams to ensure that every earth station in the 1000 Northpoint exclusion zones in a given SkyBridge cell can point at all times to a satellite located at an angle from the relevant Northpoint transmitter sufficient to reduce the Northpoint interference level to acceptable levels. Further, it is not the case that user terminals are simply free to switch satellites at will. Resource allocation is handled by the gateways, which pre-plan use of the satellites to optimize use of the resources.

[78] The impact on the number of satellites and/or beams per satellite that would have to be added is a function of the power transmitted by Northpoint, as well as the height of the Northpoint transmitter. Thus, the worst-case deployment scenario would have to be taken into account to ensure enough additional

(continued...)

Essentially, Northpoint's satellite diversity proposal would require SkyBridge and other NGSO systems to protect a new "terrestrial arc" which would add considerably to the burdens already undertaken to protect existing services. This arc would constitute an additional "non-operating zone" for the NGSO system, adding to that already imposed by the obligation to protect GSO systems.[79] It is important to understand that the "non-operating zone" that would exist for a given user terminal is only part of the burden faced by the NGSO system. A beam can only be used to communicate with a group of user terminals if it is outside the non-operating zone for *all* the user terminals served by the beam.[80] Thus, the worst-case interference situation governs the size of the zone.

2. Northpoint interference cannot be eliminated by NGSO use of frequency diversity.

Northpoint has also requested the Commission to require *primary* NGSO FSS systems to forgo using frequencies in the 12.2-12.7 GHz band -- half of the spectrum available for NGSO FSS downlinks to customer user terminals -- whenever there is an interference configuration between a secondary Northpoint transmitter and surrounding NGSO FSS earth stations.[81] Again, under this proposal, Northpoint itself would do nothing to mitigate interference to the NGSO systems.

As SkyBridge has explained on a number of occasions, SkyBridge does not dispute that frequency diversity may be technically feasible and useful to facilitate sharing in certain limited circumstances, such as with limited numbers of directional point-to-point systems. As SkyBridge has explained in detail, however, studies cited by Northpoint on this sharing scenario are not directly applicable to the high-density,

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78/ (...continued)
resources to accommodate all scenarios. The result is a cost well beyond any rational business case.

79/ As SkyBridge has discussed elsewhere, its system was designed first to offer continuous coverage while avoiding interference to GSO and FS systems, and then optimized to provide sufficient capacity to users. These dual goals required a significant increase in the number of satellites that would be needed, but for the necessity of avoiding the GSO arc. The consequences of having to avoid a new Northpoint arc are self-evident.

80/ This is the same as in the GSO context. The $\pm 10°$ exclusion zone honored by SkyBridge to protect the GSO arc is, in practice, several degrees larger, due to the fact that *all* of the user terminals in the 350-km radius area served by a beam must simultaneously be outside the $\pm 10°$ exclusion zone.

81/ Northpoint terms this proposal "Alternate Beam Assignment" ("ABA").

point-to-multipoint environment proposed by Northpoint.[82] In addition, Northpoint simply ignores the other side of the debate -- the assessment of the constraints put on the NGSO FSS systems in such cases.[83]

a. Frequency diversity will not always be possible.

As noted above, there could be nearly 1000 Northpoint transmitters within each SkyBridge cell. Each Northpoint transmitter would generate, by Northpoint's own admission, a large exclusion zone. Depending on Northpoint transmitter power and antenna height, the exclusion zone could be coterminous with the Northpoint service area. In such cases, the use of frequency diversity is clearly impossible.

Even if it could be assured (via power limitations on Northpoint) that the size of the exclusion zones was reduced, SkyBridge operations would be significantly impacted, and none of Northpoint's proposed solutions are feasible.[84]

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[82] See Letter to Magalie Roman Salas from Jeffrey H. Olson, et al., ET Docket No. 98-206, dated December 15, 1999 ("SkyBridge December 15 Letter"). When it suits its purposes, Northpoint is quick to point out the differences between its system and traditional point-to-point systems, such as when it is trying to justify its alleged greater protection requirements. Nonetheless, it argues that sharing studies with such point-to-point systems are directly applicable to Northpoint. In its most recent filing on this topic, it makes the incredible claim that, like point-to-point systems, its beams are "directional" (i.e., they all point roughly south), and, therefore, that point-to-point studies are relevant to its situation. See Letter to Ms. Magalie Roman Salas from Antoinette Cook Bush, ET Docket Nos. 98-206, RM-9147, and RM-9245, January 27, 2000, at 2. This is purely disingenuous. Northpoint is well aware of the differences presented by the focused point-to-point links at issue in the study it cites versus the overlapping fan-shaped beams employed by Northpoint to cover the entirety of a service market. While the beamwidth of point-to-point FS beams are generally under 1°, the beamwidth of the Northpoint transmitter is 102°. Such technically absurd arguments are emblematic of Northpoint's resort to rhetoric over engineering principles in its pleadings in this proceeding. If Northpoint truly believes that these papers are relevant to the current debate, it should conduct the same kind of analysis as the papers it relies on, using Northpoint's wide-beam 12 GHz transmitters.

[83] See SkyBridge December 15 Letter at 2.

[84] Moreover, as SkyBridge has explained before, multiple NGSO FSS systems will be sharing the band with many other users, and Northpoint's proposal will (continued...)

As SkyBridge has pointed out before -- contrary to Northpoint's speculation -- ***the beam covering a given cell will not always use frequencies outside the Northpoint frequencies that could be assigned to user terminals in the exclusion zone. Not all the frequencies are used in all beams.***[85]

As indicated in the SkyBridge application, SkyBridge uses three transponders to serve user terminals, one of which is entirely within Northpoint's proposed band.[86] If a cell is to be served by this transponder alone, no frequency diversity could be implemented to protect against Northpoint interference. There are several scenarios in which this transponder alone would be used to serve a cell. For example:

- SkyBridge uses "relay links" to serve user terminals in cells not yet served by a gateway, via a gateway in a neighboring cell.[87] In such cases, the available frequencies will necessarily be split among different cells. In such cases, some cells will employ only Northpoint frequencies, and frequency diversity will not be possible. As noted above, these relay links are critical in ensuring universal coverage by the SkyBridge system, particularly in the early stages of system deployment; moreover, in low traffic areas, they may be used throughout the lifetime of the system to ensure seamless national coverage.

- The SkyBridge system is designed to serve low traffic areas with single transponders, as this technique permits optimum use of the system. In such cases, the satellite beam and frequency resource allocation of the system is

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[84] (...continued)
place significant constraints on the assigning of frequencies to users. This will decrease the number of NGSO systems that can be accommodated in the Ku-band and dramatically increase the cost per customer of such systems. Northpoint is simply wrong when it states that frequency diversity flexibility is not needed to coordinate NGSO/NGSO systems. Both satellite and frequency diversity flexibility will likely be needed to accommodate the high demand for NGSO use of the band.

[85] See SkyBridge November 10 Letter at 7-9. As noted above, resource allocation is controlled by the gateways to ensure capacity optimization. All constraints on frequency usage affect the ability of the gateway to make maximum use of the frequency resources allocated to its cell, and hence can cause a decrease in total capacity. The constraints introduced by the presence of 1000 interference zones in a cell would lead to just such a result.

[86] See SkyBridge 1999 Amendment at A-20.

[87] See SkyBridge 1999 Amendment at A-6.

optimized to reduce the internal interference of the system, and thereby optimize the capacity of the system. In low traffic areas, there is therefore less frequency diversity capability than in high traffic areas.[88] If SkyBridge were forced to operate all transponders in all cells, the internal interference of its system would increase, capacity would decrease, and customer costs would rise.

b. Even with frequency diversity, high performance filters would have to be added to every SkyBridge user terminal.

Moreover, frequency diversity alone cannot solve the Northpoint interference problem. ***Even if NGSO systems did have sufficient frequency diversity capability to always avoid frequencies used by Northpoint in interference configurations --which they do not -- the high powers used by Northpoint would require the implementation of high performance rejecting filters in every NGSO user terminal.***

First, the receivers would have to be adequately protected against the worst-case Northpoint interference at the RF stage, to prevent damage. Northpoint's computations of the level of filtering required are based on its "typical" power, and not its maximum power, and therefore fail to address this concern.

Furthermore, the SkyBridge user terminals have to be able to receive carriers across the 11.7-12.7 GHz band. Consequently, as in other multi-carrier systems, there are no filters implemented at the first IF layer of the receiver. Without Northpoint in the band, this will work well. However, with Northpoint emissions, and without such filters, the noise floor of all of the SkyBridge user terminals will be increased, as a function of the power of the power received from Northpoint. Moreover, those user terminals located in line-of-sight interference zones would suffer a significant increase in receiver noise when pointing over large angular zones.

The filters required to exclude Northpoint frequencies would have to be in the arm of the antenna, and would therefore need to be quite small and specialized. Such filters would significantly increase the complexity and price of the residential user terminals, perhaps by as much as 25%, at a time when, as the Commission is

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[88] Northpoint has attempted to propose an "optimal SkyBridge frequency assignment plan" that would ensure that there are always non-Northpoint frequencies in each SkyBridge beam. Northpoint January 6 Letter, Technical Annex 15. However, the plan simply does not take into account actual satellite transponder usage, and is therefore both factually inaccurate and irrelevant.

well aware, containing consumer equipment costs is critical to success in the marketplace.

3. Northpoint's band segmentation proposal is not the answer.

In view of these difficulties, Northpoint now proposes as a possible "sharing" scenario that the Commission segment the band, and that SkyBridge be restricted to using for downlinks to user terminals only the 11.7-12.2 GHz band not used by Northpoint. Northpoint makes the incredible assertion that "SkyBridge can fully provide its proposed service without using the 12.2-12.7 GHz band at all."[89] Northpoint bases its proposal on its assertion that "applicants for space station licenses frequently request far more spectrum than they need or even realistically want, " claiming that "[i]t is highly unlikely that SkyBridge or any of the other NGSO FSS applicants would reject an offer by the Commission to license all applicants with a fraction of the requested spectrum."[90]

Once again, Northpoint's glib assertions regarding the plans of satellite operators reveal either its own ignorance or an astonishing lack of concern for the accuracy of its assertions. Any serious examination of the SkyBridge application demonstrates that the amount of spectrum requested by SkyBridge is fully consistent with the broadband services and capacity proposed therein, and the need to protect a variety of services in various bands, including GSO FSS, GSO BSS, FS, Radiolocation, and Space Sciences. Each of these obligations poses constraints on the SkyBridge system that are simply ignored by Northpoint. For example, an obvious way to increase the capacity of a system to counteract a decrease in bandwidth would be to increase power. However, this option is simply not available to SkyBridge because of its obligations to honor strict power limits to protect GSO systems in the 12 GHz band. ***Northpoint's proposal to exclude SkyBridge from half of the downlink frequencies available for communications to user terminals would cut the capacity of the affected NGSO FSS systems in half, which could result in a doubling of projected subscriber costs, assuming arguendo that a business case still could be made for such a severely constrained system.***

Northpoint attempts to demonstrate, via naive back-of-the-envelope calculations, that SkyBridge satellites have the capability (i.e., power) to use only 50% of the spectrum SkyBridge proposes to use.[91] Northpoint, however, has made several critical errors in its analysis, including the following:

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[89] Northpoint January 6 Letter at 3.

[90] Northpoint January 6 Letter, Technical Annex at 4.

[91] Northpoint January 6 Letter, Technical Annex at 15-16.

- Northpoint assumes each beam uses dual polarization. This is not the case; half of the beam uses one polarization, and the other half uses the other polarization, resulting in the use of half of the power assumed by Northpoint in its computations.

- Northpoint assumes that all carriers are operated at full power, without taking into account that SkyBridge employs power control to ensure that the power of the satellite, a critical determinant of the weight and cost of the satellite, is put to the optimized use. The satellites are not configured to operate all carriers in all beams at the maximum power.

- As discussed in the previous section, the use of three blocks of frequencies across the 11.7-12.7 GHz band[92] will be optimized, according to traffic demand, to reduce internal interference. Being required to use the same frequencies in all the cells, especially in low traffic areas, would be a tremendous constraint, as it would increase the internal system interference.

For these reasons, the capacity of the SkyBridge satellites, and therefore of the system, is based on access to the full spectrum requested in the SkyBridge application. Northpoint's uninformed speculation to the contrary cannot change the facts.

CONCLUSION

The technical debate on Northpoint sharing in the 12 GHz band appears to have been overtaken by political exigencies. However, the perceived merits of the Northpoint technology, and its claimed ability to simultaneously address a number of public policy concerns, simply do not withstand scrutiny. Nor do Northpoint's claims regarding the ability of its system to co-exist with primary DBS and NGSO FSS systems.

As demonstrated above, deployment of a terrestrial system requiring installation of transmitters as closely as 10 km apart will not happen quickly, if ever, in rural areas. The very purpose of the SkyBridge system, on the other hand, is to serve such markets. Moreover, without the cooperation of DBS providers, which Northpoint distinctly lacks, it will not be able, from a technical standpoint, to integrate local channels with satellite broadcasting services. For both these reasons, its promises of providing local-into-local service is patently illusory.

At best, what Northpoint will offer is some minimal competition to cable in urban and suburban markets. While this level of competition will be severely

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[92] See SkyBridge 1999 Amendment at A-20.

marginalized as two-way cable modems enter the market, there no doubt would be some vestigial value in having Northpoint as an additional wireless competitor. However, Northpoint is free today to acquire spectrum for its system in the 700 MHz, 2.5 GHz, 24 GHz, 28 GHz and 38 GHz bands. There is nothing that Northpoint can do at 12 GHz -- except interfere with (or even preclude) NGSO FSS and DBS services -- that it cannot do in these other bands. Given Northpoint's abandonment of its initial scheme to "piggyback" its service onto DBS services, there is no technical or marketing rationale whatsoever for Northpoint's continued insistence that it be permitted to operate at 12 GHz.

With respect to its ability to co-exist with primary DBS and NGSO FSS services, Northpoint must be held to at least the same high standard of proof that NGSO FSS systems have been required to meet in their long and intensive effort to develop a workable sharing solution with the DBS licensees in this band. Any other result would be patently arbitrary and discriminatory. To date, Northpoint has failed this test; indeed, with respect to NGSO systems, Northpoint has not even attempted to pass muster.

Rather, admitting that it would cause interference to NGSO operations, and that NGSO systems would have to be altered to protect Northpoint, Northpoint has put forth a series of "sharing" proposals, which it has misleadingly claimed would not impact NGSO operation. As demonstrated above, these proposals do not take into account either fundamental satellite system design principles or marketplace realities. Nor do they take into account the constraints already placed on SkyBridge to protect DBS operations in the band. They would place potentially enormous burdens on NGSO systems.

Put in its starkest terms, Northpoint's operation in the 12 GHz band would directly and significantly threaten the availability of affordable advanced telecommunications services in non-urban America. As noted above, LEO systems such as SkyBridge represent the only technology that can economically solve the rural broadband access problem in the near future, and SkyBridge in particular has the capability and incentive to begin to deliver those services as soon as possible. Northpoint's insistence on operating in the same band as SkyBridge threatens to postpone indefinitely the day when Americans who do not live in urban areas can enjoy real access to the information age.

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this filing, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this filing, and that it is complete and accurate to the best of my knowledge and belief.

By:

Hélène Fauve
Senior Systems Engineer
SkyBridge

Dated: February 18, 2000