

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of

NGSO FSS Results from the)
Conference Preparatory Meeting)
on Technical, Operational and)
Regulatory/Procedural Matters)
to be Considered by the 2000)
World Radiocommunication)
Conference)

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FEDERAL COMMUNICATIONS COMMISSION
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Release-Number: DA 99-2733
ET Docket No. 98-206

COMMENTS OF NORTHPOINT TECHNOLOGY, LTD.

In response to certain *ex parte* submissions in the above-referenced docket, the Commission issued a public notice seeking comment on Chapter 3 from the Report of the 2000 World Conference Preparatory Meeting held in Geneva, Switzerland, November 15-26, 1999 (the "CPM Report"). The CPM Report reaches certain conclusions concerning the criteria for protection of fixed services ("FS") in the 12.2 - 12.7 GHz band. Northpoint Technology, Ltd. ("Northpoint") has proposed to operate a novel terrestrial service in the 12.2 -12.7 GHz band and is a participant in ET Docket No. 98-206. By undersigned counsel, Northpoint hereby submits the following comments on the CPM Report in order to clarify the scope of the conclusions reached in the CPM Report concerning the protection of FS in the 12.2 -12.7 GHz band.

Section 3.1.4.1.1(d) of the CPM Report concludes that the current Article S21 per satellite pfd limits are adequate to protect the FS in the 10.7 - 12.75 GHz band from aggregate interference from three assumed non-homogeneous, non-GSO FSS systems. This conclusion is based on certain studies conducted in the ITU. It is important to note, however, that the FS systems analyzed in those studies were of a

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highly specialized nature and certainly do not represent the FS system proposed by Northpoint. The ITU studies of sharing between FS and NGSO systems only considered high-powered FS point-to-point systems that operate primarily in the 10.7 - 11.7 GHz band and not in the Northpoint band (i.e., 12.2 – 12.7 GHz).¹ These indiscriminately pointed, high powered, point-to-point microwave systems are a type of FS system that has vastly different characteristics than Northpoint, as shown in Table 1.

Table 1. Comparison of Typical 11 GHz Microwave and Northpoint Terrestrial Systems

Characteristic	Units	Typical Microwave	Northpoint
Transmit EIRP	DBW	45	-17.5
Transmit 3 dB Beamwidth	Degrees	2	110
Modulation		Analog	Digital
Required BER	BER	10 ⁻⁸ or higher	10 ⁻⁶
Transmit Distance	Km	10 - 50 (per link)	<16
Noise Floor	Kelvin	1000-5000	300
Required Availability	%	99.95	99.7
Fade Margin Required (to meet availability) ²	DB	30	3

Moreover, Northpoint demonstrated in its comments in ET Docket No. 98-206 that the CPM pfd limits are insufficient to protect point-to-multipoint FS systems.³

Accordingly, while Northpoint does not dispute the conclusion that the Article S21 pfd limits are sufficient to protect the kinds of FS systems analyzed in those studies, it is crucial to recognize that the Article S21 pfd limits are insufficient to protect a point-to-multipoint, unidirectional FS system such as Northpoint's. Simply put, the CPM Report cannot be understood to represent the final word on sharing between NGSO FSS and FS

¹ In fact, the only Region 2 FS system characteristics submitted for the 12.2 – 12.7 GHz band were those of Northpoint. See ITU document JTG 4-9-11/88.

² The fade margin and availability are given at the edge of coverage for Northpoint. The availability is higher everywhere inside the edge of coverage.

³ See Comments of Northpoint Technology, Ltd., filed March 2, 1999, at Exhibit 1 (the "Technical Annex"), p. 28

in the 12.2 - 12.7 GHz band.

The Commission would be missing an extraordinary opportunity to promote further sharing in the Ku-band if it fails to acknowledge the limited scope of the conclusions reached in the CPM Report. In this regard, in ET Docket No. 98-206, Northpoint identified protection criteria⁴ and the associated pfd limit to protect its system.⁵ The criteria to protect Northpoint from NGSO FSS transmissions are based upon the need to maintain robust link availability and incorporate the following principles:

- a. NGSO FSS should not cause a loss of signal to Northpoint in clear air, and
- b. NGSO FSS should not cause an unacceptable increase in system unavailability for Northpoint.

These are the same requirements that were agreed to between NGSO FSS and the BSS for protection of BSS operations. Northpoint and BSS receive equipment are fundamentally identical. A loss of signal in clear air would occur if the $C/(N+I)$ ratio falls below the critical value of 5.0 dB.⁶ At the edge of coverage, the Northpoint composite C/N is 7.9 dB in clear air, with 2.9 dB of link margin.⁷ An I/N of 0 dB would cause a 3 dB loss of link margin, resulting in an outage in clear air. Therefore, these criteria have a sound engineering basis.

The pfd limit to protect Northpoint was developed using the above mentioned short-term criterion, and protects Northpoint systems with an elevation angle

⁴ See Technical Annex at 20 (noting a protection criteria of I/N of 0 dB for no more than 0.001% of time and I/N of -13 dB for no more than 10% of the time).

⁵ *Id.* at 27.

⁶ This is a function of the receive equipment, and this value has been repeatedly validated by DBS operators, as well as by Northpoint, in field-testing.

⁷ See Technical Annex at 6.

as high as 1 degree, the maximum elevation angle anticipated at the edge of coverage. The Northpoint pfd limit is nearly identical to the provisional pfd limits proposed at WRC-97 (See curve 1 in Figure 1 below). The only required change is a tightening of the pfd below five degrees in elevation, from -124 to -134 dB(W/(m²·MHz)). The pfd limit to protect Northpoint is as follows:⁸

- In the 12.2 – 12.7 GHz band:

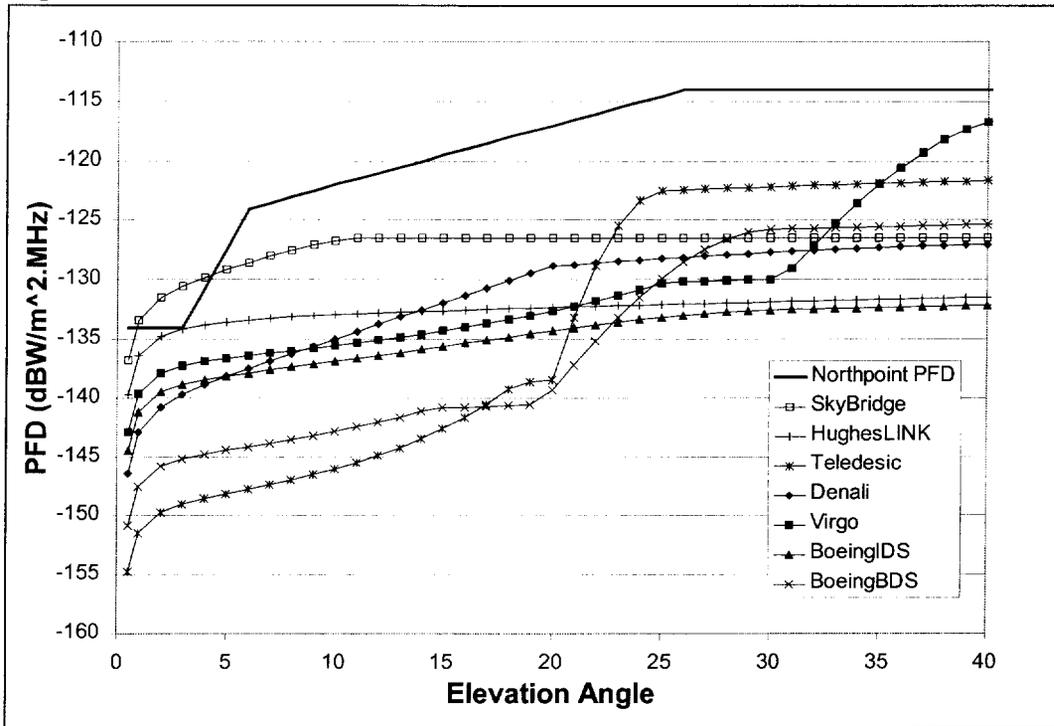
-134	dB(W/(m ² ·MHz)) for 0° ≤ δ < 2°
-134 + 3.33(δ-2)	dB(W/(m ² ·MHz)) for 2° ≤ δ < 5°
-124 + (δ-5)/2	dB(W/(m ² ·MHz)) for 5° ≤ δ < 25°
-114	dB(W/(m ² ·MHz)) for 25° ≤ δ < 90°,

where δ is the angle of arrival above the horizontal plane. An NGSO FSS system operating above this pfd limit may cause outages resulting in an effective loss of service area for point-to-multipoint systems with Northpoint's technical characteristics.

The Northpoint pfd limit does not impose an undue burden on NGSO FSS systems. All NGSO FSS systems proposed for operation in the 12.2 – 12.7 GHz band meet the Northpoint pfd limit (except for Skybridge). The Skybridge system may exceed the pfd limit by 3 dB, but only when operating at maximum power as specified in its application. At nominal power, Skybridge meets the pfd limit. Further, even when operating at higher than nominal power, Skybridge can meet the pfd limit through its existing design, without impact to its ability to serve customers.

⁸ This value has been modified to correspond to the measurement bandwidth specified in the CPM Report.

Figure 1:

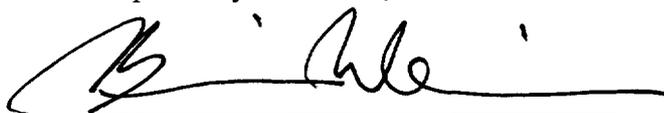


There are several different alternatives available for Skybridge to meet the Northpoint pfd limit; none of these solutions affect Skybridge's ability to serve its customers. Either “beam pointing” or “beam forming” solutions would provide non-impacting solutions to meet the Northpoint pfd limit. Skybridge has the capability to meet the Northpoint pfd limit with its phased array antenna design through beam forming. This beam forming is based upon the need to maintain a circle-shaped footprint on the ground at a constant power level. Since beam forming is already a part of the Skybridge antenna design, it is a matter of making minor adjustments to the transmit pattern and only at very low service elevation angles. The matter of attenuating 3-4 dB off boresight is trivial by comparison with the need for radical beam forming already used by Skybridge. Since it would only be used with the combination of maximum power

and low elevation angles, it would be employed less than 1% of the time. These adjustments are minor and would have no impact on Skybridge's ability to provide service. It is important to reiterate that all other proposed NGSO FSS Ku-band systems can operate with Northpoint's proposed pfd limits. The Commission should not permit Skybridge's exceptional requirements to dictate what the rule should be for all other proposed systems in the Ku-band.

In sum, the ITU studies supporting the pfd limits specified in the CPM Report are incomplete with respect to protection of FS point-to-multipoint systems. The record in ET Docket No. 98-206 shows that a tightening of the pfd limits below five degrees would be in order to protect fully systems such as Northpoint. This tightening would not hinder the development of NGSO FSS systems in the 12.2 – 12.7 GHz band. Northpoint urges the Commission to adopt the Northpoint pfd limit in the 12.2 – 12.7 GHz band as described herein.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'B. Weimer', is written over a horizontal line.

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Dated: December 20, 1999

CERTIFICATE OF SERVICE

I, Tanisha Cobb, hereby certify that on this 20th day of December, copies of the foregoing Comments of Northpoint Technology, Ltd. were served by hand-delivery on the following parties:

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Creating Cable Competition with Northpoint Technology

CERTIFICATION

I, Robert A. Combs, am Director, System Development for Broadwave USA, Inc. I have an ME in Communication Systems Engineering from the University of Virginia, and a BS in Aerospace Engineering from the University of Texas (Austin). I am familiar with the technical and operational characteristics of the Northpoint system.

I certify that I am the technically qualified person responsible for the preparation of the technical material in this filing. The contents are complete and accurate to the best of my knowledge.

A handwritten signature in black ink, appearing to read "R. Combs", written over a horizontal line.

Robert A. Combs
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Dated: December 20, 1999