to be included within the accepted criteria for NGSO FSS systems, and the DirecTV assertion is in error.

ITU Recommendation treats NGSO FSS systems as secondary to the BSS

The regulatory conditions under which the Study Group 11 criteria were developed are also relevant. Considering (j) of the same document provides additional insight into these conditions:

> j) that No. S22.2 of the Radio Regulations states that non-GSO satellite systems **shall not cause unacceptable interference** to GSO satellite systems in the FSS and BSS operating in accordance with these Regulations;

Note ITU Radio Regulations state that terrestrial services in the band 12.2 – 12.7 GHz shall not cause "harmful interference."[32] It is common knowledge that "acceptable interference" is a *lower level of interference* than "harmful interference."[33] As the attached Exhibit D demonstrates, Northpoint meets the criteria that DirecTV proposes as acceptable interference in over 99.5% of the Northpoint service area and on the average, is dramatically below the accepted interference levels throughout the service area.[34]

DirecTV agrees that interference criteria should consider technical and operational system aspects

There are other reasons why the NGSO criteria should not be applied to Northpoint. The NGSO FSS criteria were developed with the specific operational characteristics of those systems. As DirecTV states, this was "a compromise ...between BSS systems and the operational restrictions placed on NGSO system operators."[35] In other words, the NGSO FSS operators agreed to the levels because their systems can meet the required power levels (the "epfd" levels) developed from the criteria while still providing a valuable service to their customers. As terrestrial systems are fundamentally different from NGSO FSS systems, a different concept for development of interference criteria is required. Any criteria developed for protection of DBS from Northpoint should take into account the operational characteristics of terrestrial systems such as Northpoint.

DirecTV acknowledges this fact when they state that "the BSS protection criteria needed to be refined before interference protection limits [from NGSO FSS systems] could be developed. Of specific importance was the fact that the interference would vary with earth station location...and with time. To develop these criteria, numerous analyses were performed."[36] Northpoint has taken into account the technical and operational

---

[32] Footnote 844 of the ITU RR.

[33] If a level of interference were deemed "harmful", then it would not have been deemed "acceptable". Conversely, an "acceptable" level of interference could not be defined as "harmful" at the same time.

[34] DirecTV states that a C/I of 27.2 dB is acceptable. *See* DirecTV Filing, at Appendix A, Table 2.

[35] DirecTV Filing at 32.

[36] *Ibid.*

characteristics of both DBS and low-power terrestrial services, (one key factor absent in the DirecTV analysis is the existence of natural shielding) and has performed numerous analyses before proposing criteria that would allow for coexistence of both the BSS and Northpoint.[37] Instead of taking into account the unique nature of terrestrial systems in general, and Northpoint specifically, DirecTV continues to rely on the NGSO FSS criteria, which as explained above, are not relevant to a non-time-varying system such as Northpoint.

In summary, all regulatory information reviewed shows there is no precedent for DirecTV's claims. The Study Group 11 recommendation directly refutes the DirecTV argument that terrestrial interference should be included within the NGSO criteria. All the regulatory provisions reject DirecTV's proposed criteria. In fact, regulatory provisions state that the terrestrial service should be allocated at least as much as NGSO FSS systems would be allocated. DirecTV agrees that the technical and operational characteristics of each system must be taken into account when developing interference criteria, yet fails to do so with respect to Northpoint.

[37] *See* Comments of Northpoint Technology, March 2, 1999.

5 A Discussion of the DirecTV and Radio Dynamics Methodology for Calculating Carrier to Interference Ratios

DirecTV presents the results of a method for calculating C/I ratios and plots the resulting contours on maps of the Washington, D.C. area including the areas immediately around the Northpoint transmit location at USA Today. DirecTV also took data at various points within the described contours. It is interesting that *in no event do the contours described by the DirecTV model agree with DirecTV's own measured data.* For instance, in DirecTV's Figure 5.5-1, which is DirecTV's contour map for its satellite at 101 degrees, site DTV-7 was measured as having an 84% increase in unavailability when the site is clearly within the contour predicted to have a 2.86% increase in unavailability. As can also be seen, DTV-8 and DTV-9 were each measured to have less than a 3% increase in unavailability while it was predicted that both should be in the contour representing a 10% increase in unavailability. A similar review of Figure 5.5-2, which is the contour map for Echostar's satellite at 61.5 degrees, presents the same discrepancies. Sites DTV-4 and DTV-8 were both predicted to be within the 10% increase in unavailability contour yet they both were measured by DirecTV to have less than a 3% increase in unavailability.

When field data does not agree with the prediction of the model, they cannot both be right. The data may be wrong, the model may be wrong, or both may be wrong. However, both cannot be right. DirecTV ignored this principal. DirecTV acknowledges the serious differences between its predicted and measured values, yet does not explain these differences.[38] This is in contradiction to the scientific method. When collecting data to challenge or support a hypothesis, one must take serious note of facts that contradict one's model and assumptions.

Methodology used by DirecTV and Radio Dynamics

The propagation loss model that was utilized by Radio Dynamics to create the Carrier-to-Interference ratio contours was the OHLOSS (Over the Horizon) model. This model is typically used for point-to-point microwave links and takes into account free space, scatter and diffraction losses for receive sites beyond Line-of-Sight (LOS), or "over the horizon". Actual path profiles, including path obstructions such as terrain, trees, buildings, etc. are supposed to be taken into account. When receive sites are truly LOS, i.e., no obstructions hinder the receiver site, then the path losses default to free space loss.

While Radio Dynamics may have considered terrain for some of its calculations and flat earth for others, it does not appear that it ever took into account obstructions such as buildings, trees, and other obstructions. Thus, since the receive sites that are of particular concern when analyzing the impact of Northpoint on DBS are close-in, and

[38] *See* DirecTV Filing at 49.

therefore LOS, and since no obstruction data apparently was used, Radio Dynamics use of the OHLOSS Model defaults to a free-space-loss model.

Northpoint developed C/I contours, presented in Exhibit B, using the fully documented methodology described in Exhibit C. The two contours are different in both shape and size. One of the most important criteria to be used in the creation of the carrier-to-interference ratio contours is the receive antenna gain pattern. In a March 1999 filing by DirecTV,[39] it used an antenna horizon gain of 0 dB for all azimuths, even though the actual gain varies from -2 dB down to -16 dB. In the DirecTV Filing, DirecTV tried to excuse its previous use of such an inaccurate methodology by stating that "the interference zone calculations ... have been updated" and that the "significant differences are that the assumed number of NGSO-FSS systems to be used ... has been decided."[40] However, the number of NGSO-FSS systems, or any other systems for that matter, has no bearing on whether DirecTV should have used actual antenna characteristics when analyzing the impact from Northpoint. Now, DirecTV is attempting to create a "worst case horizon gain template" which has no gains lower than -10 dB, rather than using the actual antenna gain characteristics. This persistent refusal to use actual antenna characteristics, which are published and readily available, is counterproductive.

DirecTV's and Radio Dynamics' creation of composite interference contours are misguided. While it is an important design criterion for Northpoint to know and understand the composite contours that surround each potential transmit site, all that matters to any one particular DBS entity are those contours that apply to it. For instance, the mitigation zone in which DirecTV claims it will receive increased unavailability is important to it, however, any mitigation zone areas for other DBS providers has no bearing on DirecTV.

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[39] Comments of DirecTV, Inc., March 2, 1999.

[40] DirecTV Filing at 65.

6 Conceptual Layout of the Washington D.C. Area

In its report, DirecTV provides a conceptual layout for Northpoint coverage of the Washington D.C. area using multiple cells. Beginning on page 54, DirecTV describes a composite array of Northpoint transmitters based on the USA Today site as a starting point. DirecTV places five cells 16 km apart, and arbitrarily sets the transmitter height at 250 feet above ground level (AGL). Using the OH Loss model for propagation effects, DirecTV then presents in Figure 6.1.2-2 its concept for a layout in Washington D.C.

The most notable item about DirecTV's conceptual Northpoint layout is its startling lack of engineering. The placement of terrestrial transmitters allows for localized engineering techniques to optimize a layout given the local features. Undertaking a conceptual design requires much more than placing a grid on a map. Indeed, it is an iterative boundary condition problem where the maximum population must be served while minimizing both the numbers of transmitters and minimizing interference into populated areas. Existing towers are preferred to the cost of erecting new ones. At the same time, each transmit location is different and due attention must be paid to the individual antenna height, transmit antenna tilt, transmit azimuth, and the EIRP at each site.

In the DirecTV concept, no consideration is given to the location and nature of existing antenna farms, towers, or tall buildings, nor population density. Take for example the Vienna, Virginia location as shown in Figure 1. DirecTV places a transmit antenna 16 km west of the USA Today building at a height of 250 feet. Had DirecTV performed a proper analysis, they would have examined the database of existing tower locations. The Vienna transmitter (Figure 6.1.2-3) is placed indiscriminately in a residential area. By comparison, the Merrifield Tower, an existing tower with a height of 640 feet AGL, is only a few kilometers to the southwest as shown in Figure 4. Obviously, had DirecTV performed their analysis using existing towers and a little engineering, its study would have yielded vastly different results.

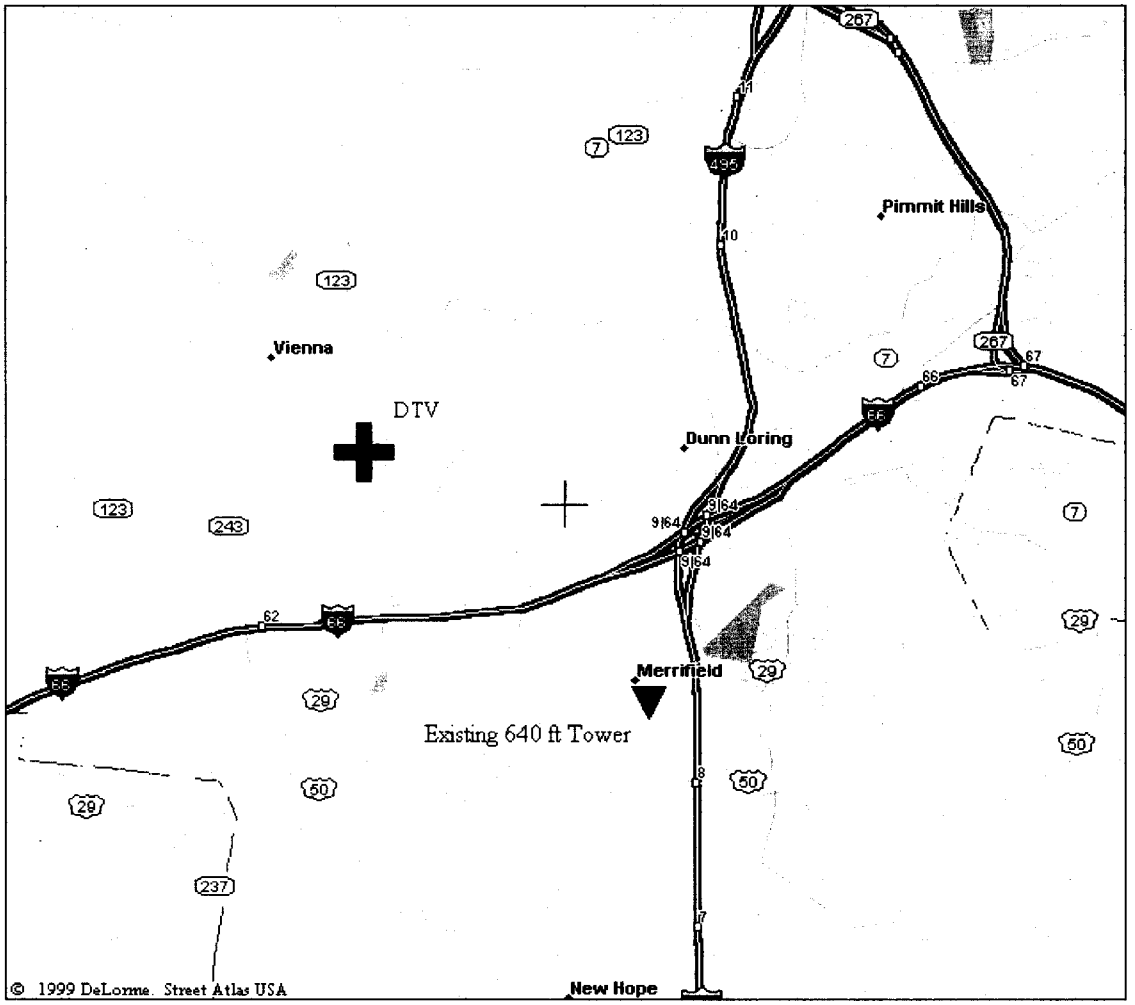

Figure 4. Tower Locations in Vienna, Virginia

The Merrifield tower location in Figure 4 was used in the actual Northpoint conceptual design for Washington, D.C., which is attached as Exhibit C. This design has 24 Northpoint transmitters at 23 locations in the Washington D.C. area. The specific design considerations for this concept are detailed in Exhibit C. Contrary to DirecTV claims, there is sufficient coverage in this design to serve 1.3 million households in the D.C. metro area.

Interestingly, other than the USA Today building, none of the DirecTV proposed locations were used by Northpoint in its conceptual design, as depicted in the following, Figure 5. The Northpoint conceptual design locations are shown as triangles, the DBS concept locations are shown as crosses. Clearly, some of the Northpoint transmitter locations are closer than 16 km apart, yet as described in the attachment, this does not yield a detrimental sharing situation. In Northpoint's Washington, D.C. design, the average antenna height is over 330 feet and a variety of azimuth orientations and beam tilt combinations were used.

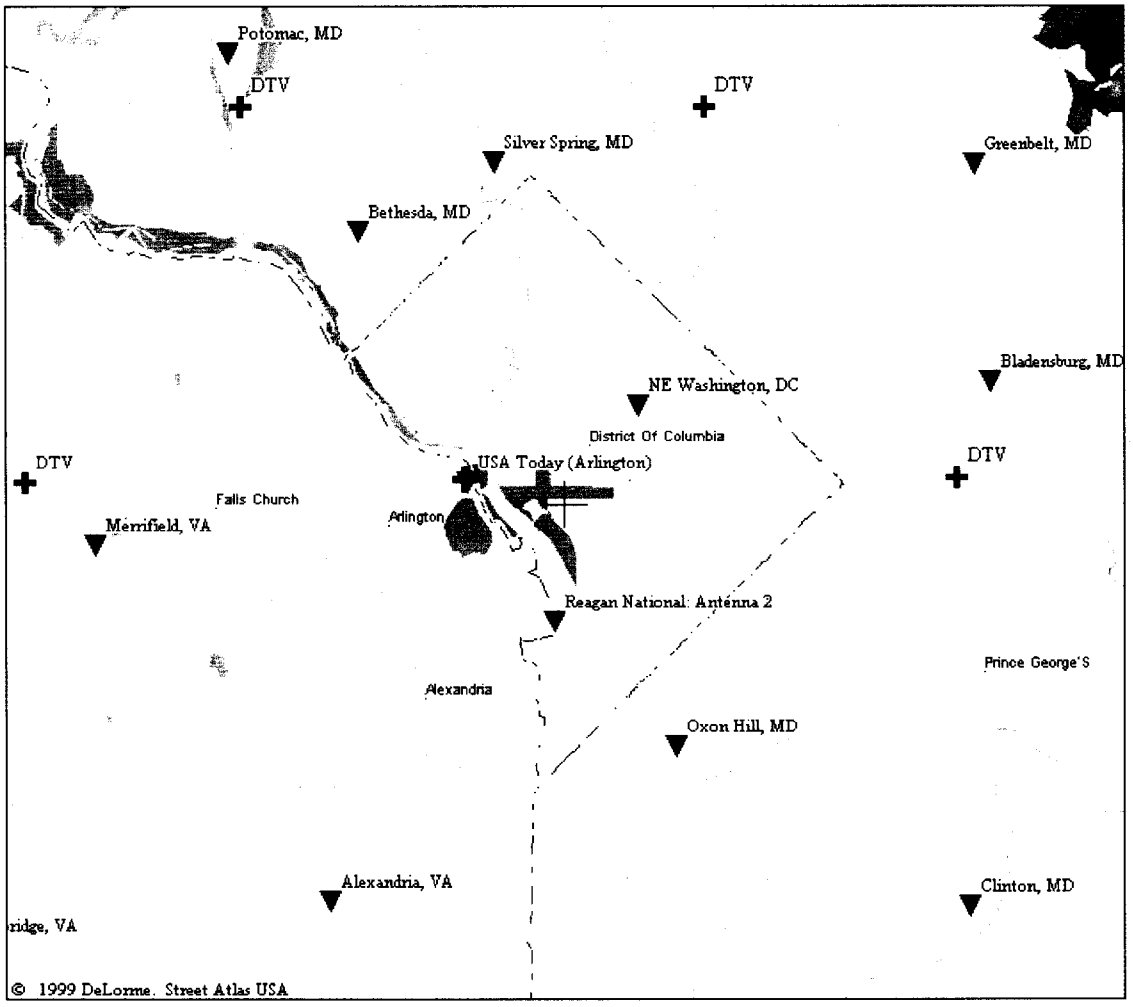

Figure 5. Washington D.C. Conceptual Design

Of the 1.3 million households served in the Northpoint conceptual design, fewer than 10 of these households would exist inside of a 20 dB C/I contour and be a DBS subscriber. This figure of 10 households is determined based upon the detailed methodology for determination of C/I contours discussed within Exhibit C. The figure of 10 DBS households with a C/I ratio of 20 dB includes contributions for natural shielding of 86%, and a DBS market penetration rate of 20%. In practice, if any household would experience harmful interference due to Northpoint, this interference would be mitigated.

In summary, the DirecTV method for placing terrestrial transmitters on a grid is not representative of an engineering design. An actual design would require an iterative process to develop a solution that is cost effective and provides good coverage while minimizing interference into DBS.

7 Conclusions

The DirecTV Filing at first look appears to be a nice collection of graphs and charts. However, this DirecTV report is lacking experimental and analytical substance. Even if the report is accepted at face value, DirecTV is unable to show that Northpoint causes harmful interference. The highest level of interference recorded by DirecTV was found at site 5, where DirecTV recorded a change in signal meter reading of 3.[41]

The DirecTV Washington D.C. test data is poorly documented, unreliable and directly contradicted by independent readings made by the FCC. DirecTV presents only one set of empirical data; the Northpoint transmitter was "Off" during that time period. DirecTV applies its IRD calibration data from one IRD to data taken with another IRD, a method that DirecTV itself disclaims. DirecTV even attempts to compare IRD readings between Echostar's DVB system with the DirecTV DSS system. However, DirecTV affirms a key finding of the Northpoint testing: the DBS system has a variance, and this variance is larger than the fidelity that DirecTV attempts to measure.

The DirecTV "Spring Creek" tests serve only to substantiate that rain causes link outages. During four months of testing, DirecTV is able to document 100 seconds of outage that it attributes to Northpoint. However, the rain test data, which could have been potentially useful, is invalid. DirecTV's purported "identical" IRD units are seriously mismatched. DirecTV states it does not understand major discrepancies in its own data, yet still claims the results duplicate conditions seen in Washington D.C. In fact, its data shows the interference injected was twice the power that it intended to inject.

In this report, it was also demonstrated that there is no regulatory basis for the DirecTV proposed criteria. ITU Recommendations exclude Northpoint from the NGSO FSS allocation of noise. DirecTV agrees that development of interference criteria should take into account the technical and operational aspects of each type of system, yet it fails to do so. Even so, Northpoint meets the proposed criteria in 99.5% of its service area.

With respect to methodologies for predicting C/I contours, it is interesting that *in no event do the contours described by the DirecTV model agree with DirecTV's own measured data.* Nor do the contours described by DirecTV agree with contours developed by Northpoint. In contrast, Northpoint provides a fully documented methodology for predicting interference contours.

In a similar fashion, the DirecTV proposed conceptual layout for Washington D.C. uses a cookie-cutter method for placing terrestrial transmitters on a grid, and is not representative of an engineering design. An actual design would require an iterative process to develop a solution that is cost effective and provides good coverage while minimizing interference into DBS. Northpoint provides an example of such a layout. This example shows how Northpoint can serve over 1.3 million households in the

---

[41] *See supra* at 6.

Washington D.C. metropolitan area, while at the same time fewer than 10 households would be within a C/I contour of 20 dB.

Exhibits:

A. FCC Compliance and Information Bureau Report
B. C/I Contours for USA TODAY and Ft. Lincoln
C. Methodology Paper (w/ conceptual design)
D. Analysis of all fifty US DBS links submitted to the ITU
E. Northpoint Transmitter Log Entries
F. Lucent Report
G. DirecTV Chart

CERTIFICATE OF SERVICE

I, Jeven Adami, hereby certify that a copy of the foregoing, Response to DirecTV, this 17th day of March, 2000, has been delivered via courier or prepaid, first class U.S. mail (*) to the following:

Donald Abelson, Chief
International Bureau
Federal Communications Commission
445 Twelfth Street, S.W.
Room 6-A302
Washington, D.C. 20554

Julius Knapp, Chief
Office of Engineering & Technology
Federal Communications Commission
445 Twelfth Street, S.W.
Room 7-B133
Washington, D.C. 20554

Thomas Tycz, Chief
Satellite & Radio Communication Div.
International Bureau
Federal Communications Commission
445 Twelfth Street, S.W.
Room 6-B665
Washington, D.C. 20554

Kimberly Baum
Satellite Engineering Branch
International Bureau
Federal Communications Commission
445 Twelfth Street, S.W.
Room 6-B540
Washington, D.C. 20554

Thomas Stanley
Wireless Telecommunications Bureau
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Dale Hatfield
Office of Engineering & Technology
Federal Communications Commission
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Room 7-C155
Washington, D.C. 20554

Robert Calaff
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Office of Engineering & Technology
Federal Communications Commission
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Room 7-A123
Washington, D.C. 20554

Douglas Young
Office of Engineering & Technology
Federal Communications Commission
445 Twelfth Street, S.W.
Room 7-A332
Washington, D.C. 20554

Jeven Adami

EXHIBIT A

Federal Communications Commission

Compliance and Information Bureau

Report

October 6, 1999

ROUTING AND TRANSMITTAL SLIP Date 10/06/99

TO: *(Name, office symbol, room number, building, Agency/Post)*	*Initials*	*Date*
1. James Burtle		
2.		
3.		
4.		
5.		

	Action		File		Note and Return
	Approval		For Clearance		Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate		For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

Attached is CIB's final report regarding the test conducted on Diversified's system.

DO NOT use this form as a RECORD of approvals,concurrences,disposals clearances, and similar actions

FROM: *(Name, org. symbol, Agency/Post)*	Room
George R. Dillon	Phone

5041-102

* U.S. GPO: 1990-281-781

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

FEDERAL COMMUNICATIONS COMMISSION

COMPLIANCE AND INFORMATION BUREAU

BACKGROUND

On September 28, 1999, the Compliance and Information Bureau received a request from the Office of Engineering and Technology to investigate an allegation that Diversified Communications Engineering (licensee of experimental station WA2XMY), Northpoint Communications, and Broadwave Communications, hereafter Diversified, was causing harmful interference to the operation of EchoStar and DirectTV.

Harmful interference is defined in the Commission's Rules as interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with the (international) Radio Regulations. 47 C.F.R. § 2.1.

OET noted that Diversified was testing its system in the Washington D.C. area and that DirecTV and EchoStar have alleged that the test is causing harmful interference to their operations. Further, according to OET, DirecTV and EchoStar have submitted test results showing that harmful interference exists. According to OET, Diversified has set up a test at the same site used by DirecTV and EchoStar and they have concluded that no harmful interference exists.

OET stated that a condition attached to the Diversified grant provides that the FCC shall determine if harmful interference exists in the case of a dispute and requested assistance from CIB to resolve the issue.

TEST procedure

On September 29, 1999, George Dillon, James Higgins and James Walker met with Dr. Darrell Word, Saleem Tawil, Sofia Collier, Katherine Reynolds and others representing Diversified.

The test was conducted at a traffic circle at the entrance to West Potomac Park (river side) southwest of intersection of Ohio Drive SW and Independence Ave SW, Washington, DC. The testing took place from approximately 10:00 a.m. to 12:00 noon. The test consisted of turning the Diversified transmitter on and off while observing television monitors tuned to EchoStar's and DirecTV's programming. The location was selected by Diversified and Diversified stated that it was the same location at which EchoStar and Direct TV reported the interference.

Mr. James T. Higgins accompanied Ms. Reynolds to the transmitter site, which was located on the rooftop of the USA Today building in Rosslyn, VA. Also at the transmitter was operator Floyd Nelson.

Mr. Dillon and Mr. Walker observed Diversified's monitors at Potomac Park. Diversified's transmitter was switched on and off while observations were made at the Potomac Park receive site of; a receiver "s-meter"; and of the TV picture.

Power levels at the transmitter during this testing were observed to be in the range (-0.5 dBm to -1.61 dBm), as indicated by a Hewlett Packard Power meter connected to the drop side of a directional coupler at the output of the transmitter. The transmitter operator in most cases adjusted levels to keep them nominally around -1.1 to -1.3 dBm range. Mr. Tawil stated that a reading of –1.5 dBm at the drop side of the directional coupler corresponds to an effective radiated power of +12.5 dBm. Testing was conducted on 12.47 GHz, then repeated on 12.4135 GHz. According to Mr. Tawil, the modulating signal was digital video with a 24 MHz bandwidth.

The results of the "s-meter" observations are shown in the following tables. Table 1 shows the predominant "s-meter" readings. Table 2 shows the number of samples, the average value of the samples and the standard deviation of the samples. We recognize that the sample size is small.

Table 1.

Diversified transmitter	EchoStar 61.5° (transponder 18)	EchoStar 61.5° (transponder 14)	EchoStar 119° (transponder 18)	Direct TV 101° (transponder 18)
	"s-meter" readings	"s-meter" readings	"s-meter" readings	"s-meter" readings
off	91 to 92	89 to 90	86 to 87	84 to 87
on	87 to 88	87 to 89	86 to 87	83 to 87.

Table 2

EchoStar 119 Transponder 18 channel 171		Echostar 61.5 Transponder 14 Channel 218		DirecTV Transponder 18 Channel 371	
Average "s-meter" reading when Diversified transmitter was on. Ten samples.	86.30	Average "s-meter" reading when Diversified transmitter was on. Twenty-nine samples.	88.34	Average "s-meter" reading when Diversified transmitter was on. Fifteen samples.	84.47
Average "s-meter" reading when Diversified transmitter was off. Fourteen samples.	86.21	Average "s-meter" reading when Diversified transmitter was off. Twenty-nine samples.	89.52	Average "s-meter" readings when Diversified transmitter was off. Twenty-five samples.	84.88
Standard deviation of "s-meter" readings when Diversified transmitter was on	0.48	Standard deviation of "s-meter" readings when Diversified transmitter was on.	0.86	Standard deviation of "s-meter" readings when Diversified transmitter was on.	1.92
Standard deviation of "s-meter" readings when Diversified transmitter was off	0.43	Standard deviation of "s-meter" readings when Diversified transmitter was off.	0.83	Standard deviation of "s-meter" readings when Diversified transmitter was off.	1.67

Test Results.

Diversified contends that the receiver "s-meter" is a relative indication of the signal or carrier to noise ratio and ranges from "0" to "100", "100" being the most desirable. We do not know what the variation in "s-meter" readings is between different receivers. We do know, however, that for the values of "s-meter" reading that we observed that we had a very good TV picture, TASO Grade 5.

Observations of TV programming showed no detectable degradation of the picture on EchoStar 119° channel 171 or Direct TV channel 317 when Diversified turned its transmitter on. As programming was not accessible on any EchoStar 61.5° channel operating on transponder 18, the tests were repeated on transponder 14 (channel 218) and again no degradation of the picture was noted.

We did not observe any harmful interference as defined in § 2.1 during this testing.

EXHIBIT B

DeLawder C/I Curves for

USA Today Building and Ft. Lincoln Apartments

DELAWDER COMMUNICATIONS, INC.
TELECOMMUNICATIONS CONSULTANTS
5568 GENERAL WASHINGTON DRIVE • SUITE A218 • ALEXANDRIA, VIRGINIA 22312
(703) 658-5390
(703) 658-5394 TELECOPIER
DARRYL K. DELAWDER, *PRESIDENT*
DAVID R. MIETUS, *VICE PRESIDENT*

February 10, 2000

Via Courier
Ms. Sofia Collier
Broadwave
400 North Capitol St., NW
Suite 368
Washington, DC 20001

(Client 1128-104)

RE: New C/I Maps for USA Today and Ft. Lincoln Sites

Dear Sofia:

As requested, please find new C/I ratio maps for the USA Today and Ft. Lincoln sites. The following maps are attached:

a. Figures 1A through 1E: Maps showing individual and composite satellite 15 dB and 20 dB mitigation zones for the USA Today;

b. Figures 2A through 2E: Maps showing individual and composite satellite 21.9 dB and 27.2 dB mitigation zones for the USA Today;

c. Figures 3A through 3E: Maps showing individual and composite satellite 15 dB and 20 dB mitigation zones for Fort Lincoln.

Please call if you have any questions.

Sincerely,

D. Mietus for
Darryl K. DeLawder

s:DKD
enclosures

cc Bob Combs, w/encls.
Carmen Tawil, P.E., w/encls.

MSITE™: washdc3.map

Prop. model: Free Space + RMD
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Groundcover: none
Atmospheric Abs.: none
K Factor: 1.333
RX Antenna - Type: DA
Height: 9.1 m AGL Gain: 31.85 dBd

Notes

CONTOURS:
BLUE: 15 DB C/I MITIGATION ZONE (NONE)
GREEN: 20 DB C/I MITIGATION ZONE
*

Site: N38-53-36; W77-04-07; EIRP:-17.5 dBW
Antenna Rad. Center: 134.4 m AMSL

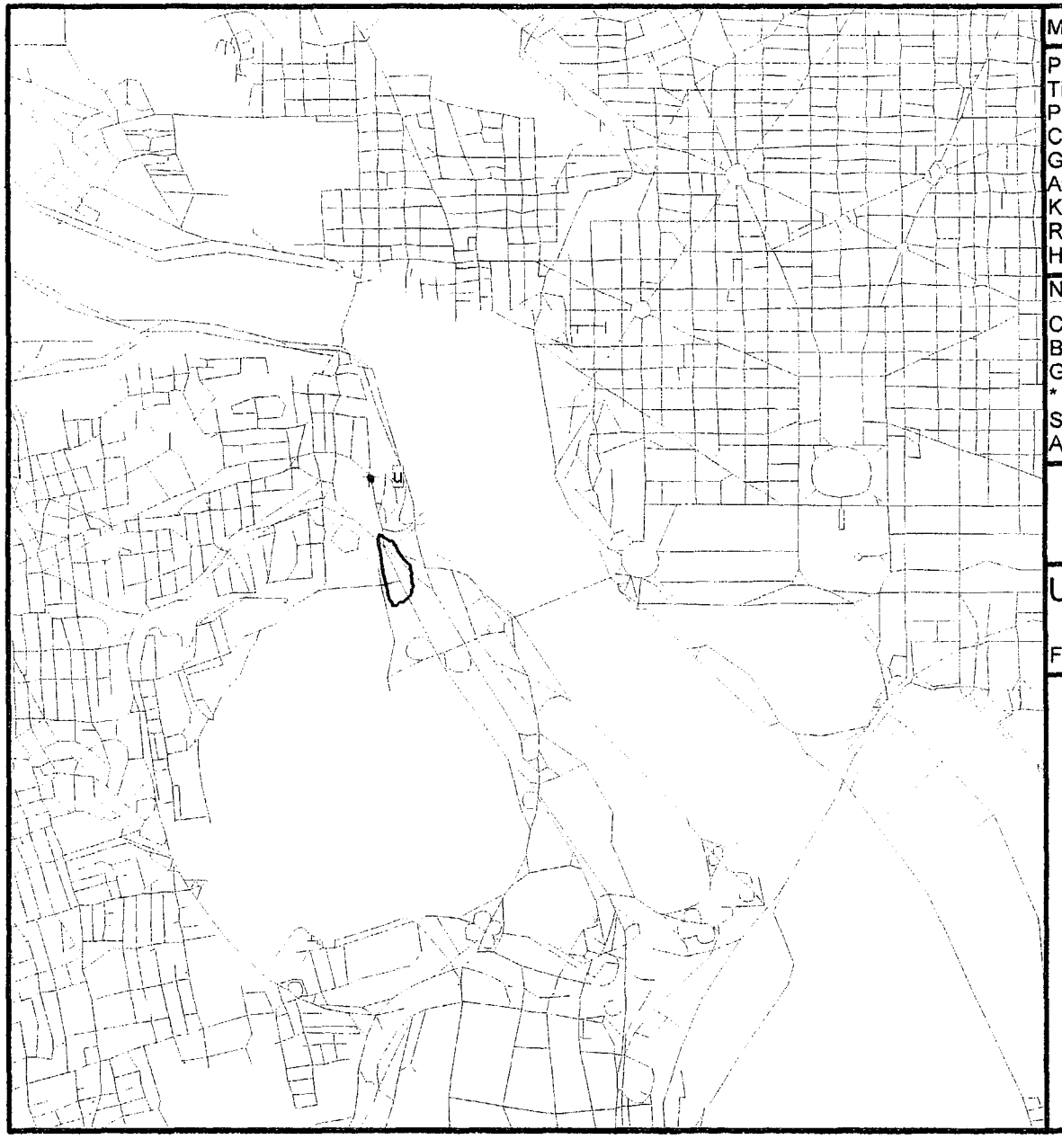
KILOMETERS

-1 0 1

USA TODAY(Oriented at 113 deg)

SAT:61.5

FIGURE 1A 02-08-00



MSITE™: washdc3.map

Prop. model: Free Space + RMD
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Groundcover: none
Atmospheric Abs.: none
K Factor: 1.333
RX Antenna - Type: DA
Height: 9.1 m AGL Gain: 31.85 dBd

Notes

CONTOURS:
BLUE: 15 DB C/I MITIGATION ZONE (NONE)
GREEN: 20 DB C/I MITIGATION ZONE
*
Site: N38-53-36; W77-04-07; EIRP:-17.5 dBW
Antenna Rad. Center: 134.4 m AMSL

KILOMETERS

-1 0 1

USA TODAY(Oriented at 113 deg)

SAT: 101

FIGURE 1B 02-08-00

MSITE™: washdc3.map

Prop. model: Free Space + RMD
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Groundcover: none
Atmospheric Abs.: none
K Factor: 1.333
RX Antenna - Type: DA
Height: 9.1 m AGL Gain: 31.85 dBd

Notes

CONTOURS:
BLUE: 15 DB C/I MITIGATION ZONE (NONE)
GREEN: 20 DB C/I MITIGATION ZONE
*
Site: N38-53-36; W77-04-07; EIRP:-17.5 dBW
Antenna Rad. Center: 134.4 m AMSL

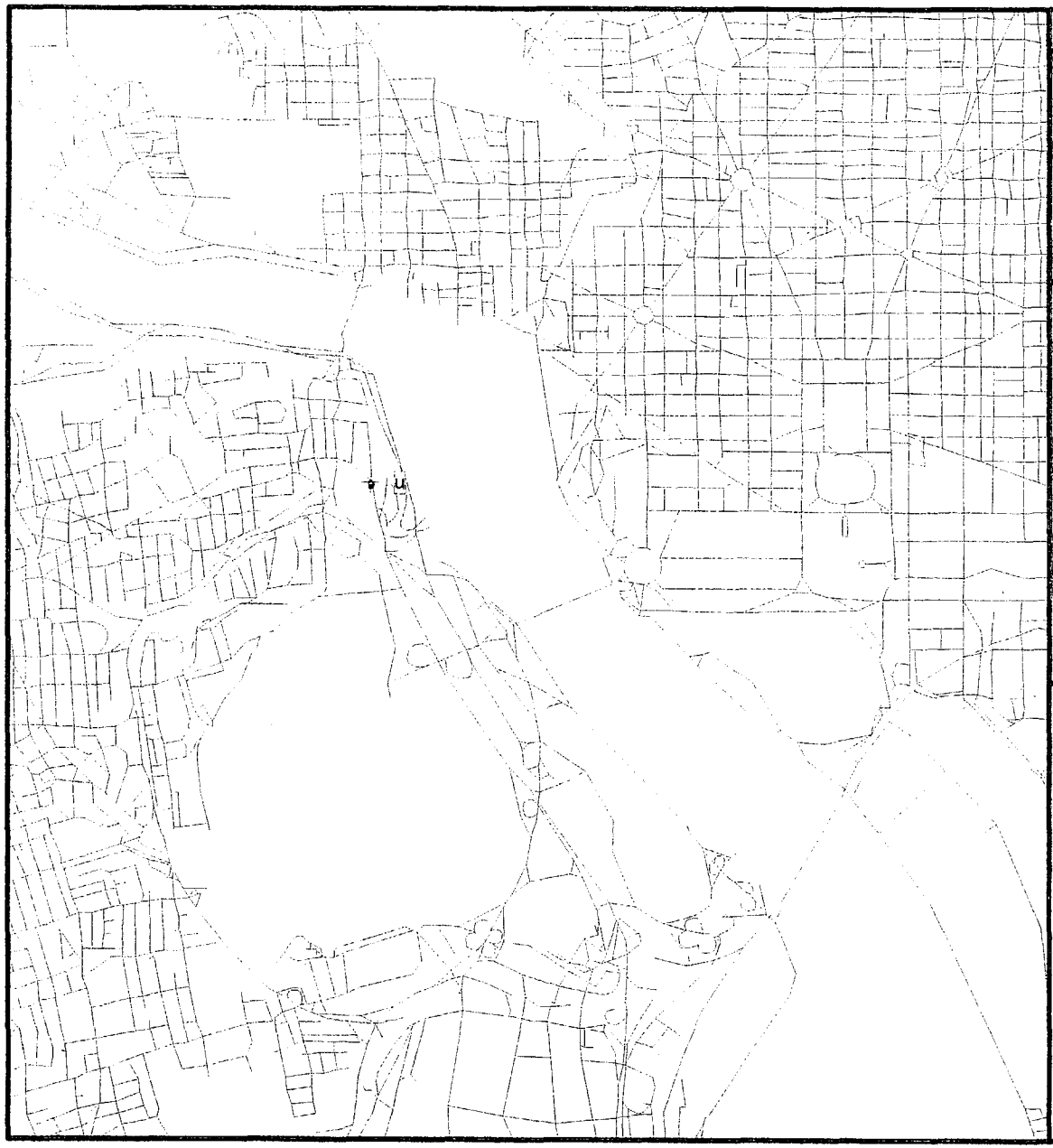
KILOMETERS

-1 0 1

USA TODAY(Oriented at 113 deg)

SAT: 110

FIGURE 1C 02-08-00



MSITE™: washdc3.map

Prop. model: Free Space + RMD
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Groundcover: none
Atmospheric Abs.: none
K Factor: 1.333
RX Antenna - Type: DA
Height: 9.1 m AGL Gain: 31.85 dBd

Notes

CONTOURS:
BLUE: 15 DB C/I MITIGATION ZONE (NONE)
GREEN: 20 DB C/I MITIGATION ZONE (NONE)
*
Site: N38-53-36; W77-04-07; EIRP:-17.5 dBW
Antenna Rad. Center: 134.4 m AMSL

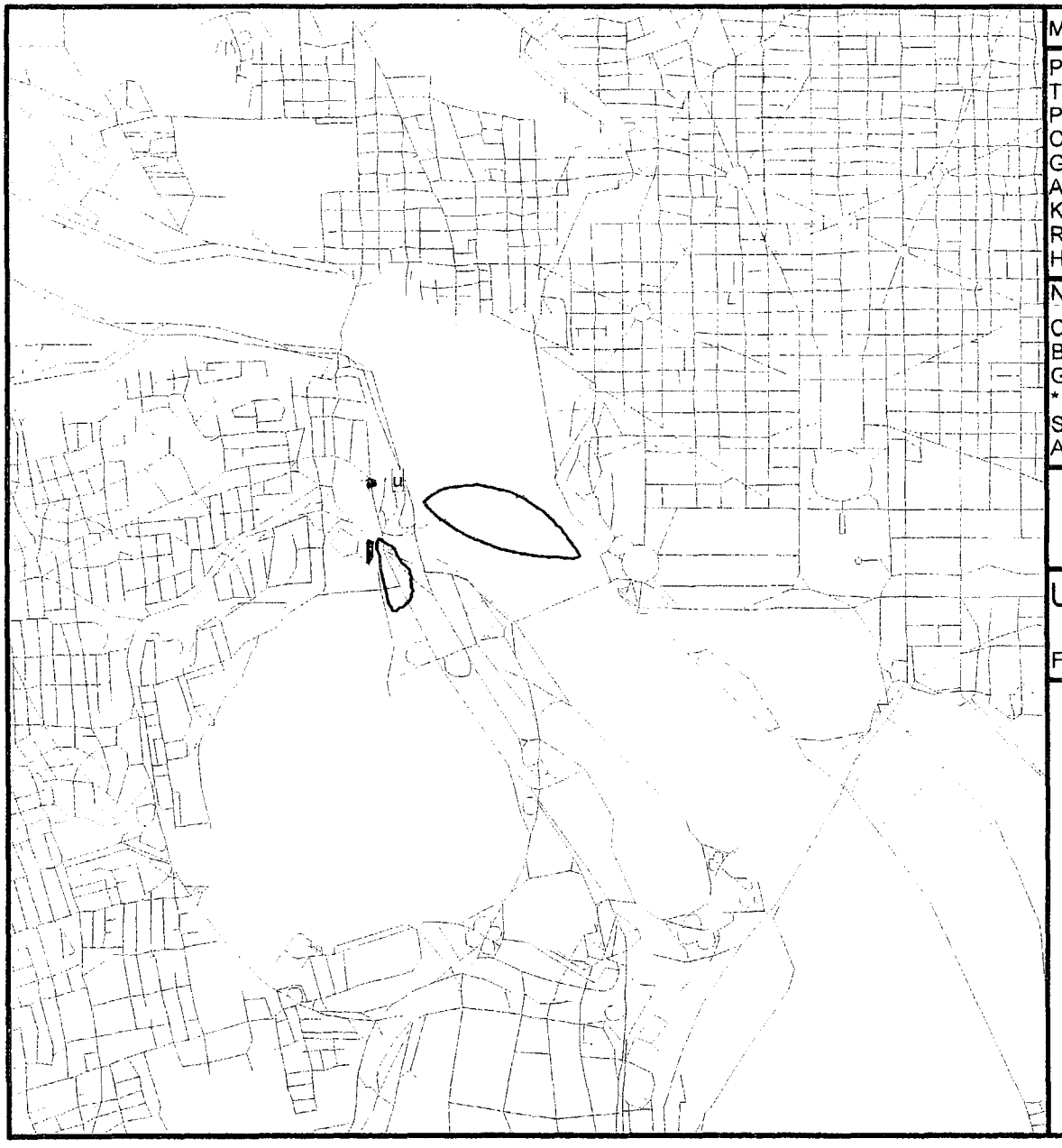
KILOMETERS

-1 0 1

USA TODAY(Oriented at 113 deg)

SAT: 119

FIGURE 1D 02-08-00



MSITE™: washdc3.map

Prop. model: Free Space + RMD
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Groundcover: none
Atmospheric Abs.: none
K Factor: 1.333
RX Antenna - Type: DA
Height: 9.1 m AGL Gain: 31.85 dBd

Notes

CONTOURS:
BLUE: 15 DB C/I MITIGATION ZONE (NONE)
GREEN: 20 DB C/I MITIGATION ZONE
*
Site: N38-53-36; W77-04-07; EIRP:-17.5 dBW
Antenna Rad. Center: 134.4 m AMSL

KILOMETERS

-1 0 1

USA TODAY(Oriented at 113 deg)

SATs:61.5,101,110 & 119

FIGURE 1E 02-08-00

MSITE™: washdc3.map

Prop. model: Free Space + RMD
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Groundcover: none
Atmospheric Abs.: none
K Factor: 1.333
RX Antenna - Type: DA
Height: 9.1 m AGL Gain: 31.85 dBd

Notes

CONTOURS:
BLUE: 21.9 DB C/I MITIGATION ZONE
GREEN: 27.2 DB C/I MITIGATION ZONE
*

Site: N38-53-36; W77-04-07; EIRP:-17.5 dBW
Antenna Rad. Center: 134.4 m AMSL

KILOMETERS

-1 0 1

USA TODAY(Oriented at 113 deg)

SAT: 61.5

FIGURE 2A 02-08-00