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September 14, 2000

Magalie Roman Salas, Secretary  
Federal Communications Commission  
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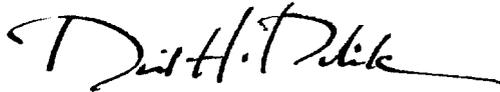
Re: Ex Parte Submission of Northpoint Technology, Ltd.  
ET Docket No. 98-206/RM-9147, RM-9245

Dear Ms. Salas:

In accordance with Section 1.206 of the Commission's rules, 47 CFR § 1.1206, this letter is written to notify you that on September 13, 2000, Sophia Collier, President of Northpoint Technology, Ltd. and BroadwaveUSA sent the enclosed letter and its appendices to Donald Abelson of the International Bureau and Dale Hatfield of the Office of Engineering and Technology.

An original and six copies of this letter and its attachment are submitted for inclusion in the public record for the above-captioned proceedings. Please direct any questions concerning this submission to the undersigned.

Respectfully submitted,



David H. Pawlik  
Counsel for Northpoint Technology, Ltd.

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September 13, 2000

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FEDERAL COMMUNICATIONS COMMISSION  
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Dale Hatfield  
Chief – Office of Engineering and Technology  
Federal Communications Commission  
Seventh Floor, Room C155  
445 12<sup>th</sup> Street, S.W.  
Washington, D.C. 20554

Dear Messrs. Abelson and Hatfield:

The purpose of this letter is to provide Northpoint's views on appropriate standards for Northpoint-DBS sharing. Northpoint does not believe that the "increased unavailability" approach that has been used to estimate satellite-to-satellite interference is an appropriate standard to use for establishing rules for Northpoint terrestrial-to-DBS interference. Instead, we believe a more appropriate standard can be found in the Digital Television ("DTV") regulations (47 C.F.R. 73.623, see Appendix A) that are currently in force. These rules are the basis of all digital terrestrial broadcast allocations and specifically address co-channel interference between two digital broadcast services in the same geographic area, an identical case to Northpoint-DBS sharing. Since DBS is a broadcast service, it makes sense to apply the digital broadcast standards to DBS as these standards are used for all other digital broadcasters in the United States.

This DTV standard calls for a 15 dB Carrier to Interference Ratio ("C/I")<sup>1</sup> ratio for a digital into digital interference.<sup>2</sup> The DTV standard was developed after a truly extensive FCC proceeding that lasted over 10 years and had six Memorandum Opinions and Orders and Notices of Further Rulemaking. Over 450 parties provided over 3,300 filings and comments including input from virtually every major broadcaster and telecom

<sup>1</sup> This ratio is also referred to as "Desired to Undesired ratio" or "D/U."

<sup>2</sup> Digital terrestrial broadcasters use 8-VSB modulation in contrast to the QPSK modulation used by satellite providers and Northpoint. 8-VSB, a "multi-level" modulation scheme, is more sensitive to interference than QPSK. Since 8-VSB is less robust than QPSK and 15 dB is sufficient for 8-VSB, it is obviously more than sufficient for QPSK.

technology provider, including the current manufacturers of DBS set top boxes such as North American Philips, Thompson Consumer Electronics and Sony. As a sample of some of the other well-known participants, please note that the four largest television networks provided extensive comments as did Motorola, Nextel, General Instruments, Lucent (then AT&T) and numerous others.

It is also significant that the DTV standard was developed by the very companies who will live under the standard themselves, both in terms of providing the 15 dB protection to their neighbors, as well as operating with neighbors that provided them the same 15 dB of protection. A standard that is developed with this type of bi-lateral approach usually reflects an honest outcome and certainly could not be considered to be a burden placed on a new entrant by its incumbent competitor, as might be considered the case if detrimental satellite standards were imposed on terrestrial services.

While Northpoint did not plan to advocate for the 15 dB DTV standard for Northpoint DBS sharing, the DTV standard - a current regulation governing co-channel digital services - is solid precedent for Northpoint's 20 dB proposal.

Another point that Northpoint would like to bring to your attention is the concept of using the NGSO 10% interference budget as a "buffer" zone during the initial phase of Northpoint's deployment prior to deployment of the NGSO systems. With this approach Northpoint-based services would be allowed to access the 10% unavailability budget for NGSOs prior to the deployment of NGSOs, in addition to the separate interference budget allocated to Northpoint under the 20 dB proposal. Since all of the NGSO applicants are at least 3 years from deployment and Northpoint's Broadwave affiliates are ready to deploy now, the public would benefit from the quicker build out that this plan would permit and DBS operators would not experience any additional interference. Additionally, DBS operators would benefit from this approach because it decreases Northpoint visits to DBS customers for the purpose of determining if mitigation is needed, at least during the initial 3 year phase-in period, because fewer homes would be located in the potential mitigation zone in the initial 3 year period.

As illustrated on the attached graphics at Appendix B, the net effect of the application of the 10% NGSO interference budget to Northpoint's mitigation zone would be to reduce the size of the mitigation zone from a 20 dB contour to a 17.9 dB contour. This would result in an average reduction of approximately 50% in size for the mitigation zone. Interestingly, we believe it will also result in a much greater corresponding reduction of the households subject to mitigation. The reason for the disproportionate reduction is that few people tend to live immediately under transmission towers. Thus, as shown in Northpoint's Conceptual Deployment in Washington, D.C, as one moves closer to the tower disproportionately fewer people are located within the zone. By reducing the mitigation zone to the 17.9 dB contour surrounding the tower almost all homes will likely be eliminated from mitigation visits.

Under this plan, when NGSOs are actually deployed, Northpoint can perform additional mitigation in the instances when it is actually needed. However, at that point, the mitigation strategy will be based on an actual Northpoint deployment record. In addition an analysis can be made of the extent to which NGSOs are actually using the 10% allocation and whether Northpoint interference is in fact cumulative to NGSO interference. Using the three-year (or greater) period prior to the deployment of NGSOs to develop this record is a reasoned approach. The sufficiency of the initial 17.9 dB contour, after the application of the NGSO interference budget, is also fully supported by 47 C.F.R. 73.623, which provides 15 dB for co-channel digital broadcast as discussed above.

Northpoint is also concerned about the method to be used to calculate generic C/I ratios. Our concern is that we want to make sure that any regulations that stipulate a contour include the needed input points for all of the parameters involved in a real world deployment. Further, and most importantly we also want to make sure the standard is subject to verification by actual measurement in the field. Appendix C lists the factors we believe are necessary to accurately calculate a contour. In our view omission of any of these inputs may result in a contour that would not accurately forecast the C/I ratio that would be found along the points that comprise the contour in real world conditions.

As a final point, I would share with you the results of our national survey of 401 representative DBS customers performed the week of September 5, 2000 by Bennett, Petts & Blumenthal wherein we asked actual DBS customers about their sensitivity to increased DBS outages. After asking a few question about the DBS service in general we asked this question:

*Let me ask you a different question. Because of the introduction of new services in your area, the government may soon require that companies service the dish of customers like you who may experience an increased loss of satellite signal. If you experienced an increased loss of signal, you could make an appointment with a service technician to come to your home and service your equipment.*

*This service call would take one to three hours and might require moving or changing your satellite dish, but would be offered at no charge to you. How many total minutes of viewing time would you have to lose due to loss of satellite signal in a TYPICAL MONTH for you to request this service?*

Messrs. Abelson and Hatfield

September 13, 2000

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Ninety-eight percent<sup>3</sup> of all DBS homes surveyed said that it would take *at least* 5 minutes per month or 1 hours per year for them to request service; 97% would require at least 10 minutes per month or 2 hours per year; 95% would require at least 15 minutes per month or 3 hours per year; 91% would require at least 30 minutes per month or 6 hours per year; 80% required at least 40 minutes or 8 hours a year and a full 60% would not request service unless the outages reached at least 90 minutes per month which is 18 annual hours or almost three full days of viewing at the Nielsen average of 7 hours per day.

These findings highlight the inappropriate nature of the satellite-to-satellite "increased unavailability" interference measurement criterion proposed by DBS. As you know, applying a standard of 2.86% increased unavailability would result in only a few *minutes of annual* unavailability anywhere in the nation while at the same time imposing an enormous burden on Northpoint in order to meet this standard. Clearly, our survey demonstrates that even several hours of outages are too trivial for the vast majority of DBS consumers to concern themselves with even to the extent of requesting a free service call. This survey is further support for looking to the DTV standard, rather than an inappropriate satellite-to-satellite criterion.

Please feel free to contact me if you have any questions regarding the above proposals.

Sincerely yours,



Sophia Collier

cc: See Attached Distribution List

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<sup>3</sup> 1.5% of homes would request service if any at all outage was found; another 0.5% would request service at the one minute a month level or 12 minutes per year. The full results of the survey on this question are provided at Appendix D.

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## **Appendix A**

\*\*\* THIS SECTION IS CURRENT THROUGH THE AUGUST 18, 2000 ISSUE OF \*\*\*  
\*\*\* THE FEDERAL REGISTER \*\*\*

TITLE 47 -- TELECOMMUNICATION

CHAPTER I -- FEDERAL COMMUNICATIONS COMMISSION

SUBCHAPTER C -- BROADCAST RADIO SERVICES

PART 73 -- RADIO BROADCAST SERVICES

SUBPART E -- TELEVISION BROADCAST STATIONS

47 CFR 73.623

§ 73.623 DTV applications and changes to DTV allotments.

(a) General. This section contains the technical criteria for evaluating applications requesting DTV facilities that do not conform to the provisions of § 73.622 and petitions for rule making to amend the DTV Table of Allotments (§ 73.622(b)). Petitions to amend the DTV Table (other than those also expressly requesting amendment of this section) and applications for new DTV broadcast stations or for changes in authorized DTV stations filed pursuant to this section will not be accepted for filing if they fail to comply with the requirements of this section.

(b) In considering petitions to amend the DTV Table and applications filed pursuant to this section, the Commission will use geographic coordinates defined in § 73.622(d) as reference points in determining allotment separations and evaluating interference potential.

(c) Minimum technical criteria for modification of DTV allotments included in the initial DTV Table of Allotments and for applications filed pursuant to this section. No petition to modify a channel allotment included in the initial DTV Table of Allotments or application for authority to construct or modify a DTV station assigned to such an allotment, filed pursuant to this section, will be accepted unless it shows compliance with the requirements of this paragraph.

(1) Requests filed pursuant to this paragraph must demonstrate compliance with the principal community coverage requirements of section 73.625(a).

(2) Requests filed pursuant to this paragraph must demonstrate that the requested change would not result in more than an additional 2 percent the population served by another station being subject to interference; provided, however, that no new interference may be caused to any station that already experiences interference to 10 percent or more of its population or that would result in a station receiving interference in excess of 10 percent of its population. The station population values for existing NTSC service and DTV service contained in Appendix B of the Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order in MM Docket No. 87-268, FCC 98-24, adopted January 29, 1998, referenced in § 73.622(c), are to be used for the purposes of determining whether a power increase or other change is

permissible under this de minimis standard. For evaluating compliance with this requirement, interference to populations served is to be predicted based on the procedure set forth in OET Bulletin No. 69, including population served within service areas determined in accordance with section 73.622(e), consideration of whether F(50,10) undesired signals will exceed the following desired-to-undesired (D/U) signal ratios, assumed use of a directional receiving antenna, and use of the terrain dependent Longley-Rice point-to-point propagation model. Copies of OET Bulletin No. 69 may be inspected during normal business hours at the: Federal Communications Commission, 1919 M St., N.W., Dockets Branch (Room 239), Washington, DC 20554. These documents are also available through the Internet on the FCC Home Page at <http://www.fcc.gov>. The threshold levels at which interference is considered to occur are:

	D/U Ratio
Co-channel:	
DTV-into-analog TV	+34
Analog TV-into-DTV	+2
DTV-into-DTV	+15
First Adjacent Channel:	
Lower DTV-into-analog TV	-14
Upper DTV-into-analog TV	-17
Lower analog TV-into-DTV	-48
Upper analog TV-into-DTV	-49
Lower DTV-into-DTV	-28
Upper DTV-into-DTV	-26
Other Adjacent Channel (Channels 14-69 only)	
DTV-into-analog TV, where N = analog TV channel and DTV Channel:	
N-2	-24
N+2	-28
N-3	-30
N+3	-34
N-4	-34
N+4	-25
N-7	-35
N+7	-43
N-8	-32
N+8	-43
N+14	-33
N+15	-31

(3) The values in paragraph (c) (2) of this section for co-channel interference to DTV service are only valid at locations where the signal-to-noise ratio is 28 dB or greater for interference from DTV and 25 dB or greater for interference from analog TV service. At the edge of the noise-limited service area, where the signal-to-noise (S/N) ratio is 16 dB, these values are 21 dB and 23 dB for interference from analog TV and DTV, respectively. At locations where the S ratio is greater than 16 dB but less than 26 dB, D/U values for co-channel interference to DTV are as follows:

(i) For DTV-to-DTV interference, the minimum D/U ratios are computed from the following formula:

$$D/U = 15 + 10 \log_{10} [1.0 / (1.0 - 10^{-(x/10)})]$$

Where  $x = S/N-15.19$  (minimum signal to noise ratio)

(ii) For analog-to-DTV interference, the minimum D/U ratios are found from the following Table (for values between measured values, linear interpolation can be used):

Signal-to-noise ratio (dB)	Desired-to-undesired ratio (dB)
16.00	21.00
16.35	19.94
17.35	17.69
18.35	16.44
19.35	7.19
20.35	4.69
21.35	3.69
22.35	2.94
23.35	2.44
25.00	2.00

(4) Due to the frequency spacing that exists between Channels 4 and 5, between Channels 6 and 7, and between Channels 13 and 14, the minimum adjacent channel technical criteria specified in paragraph (c) (2) of this section shall not be applicable to these pairs of channels (see § 73.603(a)).

(5) A DTV station application that proposes to expand the DTV station's allotted or authorized coverage area in any direction will not be accepted if it is predicted to cause interference to a Class A TV station or to a digital Class A TV station authorized pursuant to Subpart J of this part, within the protected contour defined in § 73.6010 of this part. This paragraph applies to all DTV applications filed after May 1, 2000, and to DTV applications filed between December 31, 1999 and April 30, 2000 unless the DTV station licensee or permittee notified the Commission of its intent to "maximize" by December 31, 1999.

(i) Interference is predicted to occur if the ratio in dB of the field strength of a Class A TV station at its protected contour to the field strength resulting from the facilities proposed in the DTV application (calculated using the appropriate F(50,10) chart from Figure 9a, 10a, or 10c of § 73.699 of this part) fails to meet the D/U signal ratios for "DTV-into-analog TV" specified in paragraph (c) (2) of this section.

(ii) Interference is predicted to occur if the ratio in dB of the field strength of a digital Class A TV station at its protected contour to the field strength resulting from the facilities proposed in the DTV application (calculated using the appropriate F(50,10) chart from Figure 9a, 10a, or 10c of § 73.699 of this part) fails to meet the D/U signal ratios for "DTV-into-DTV" specified in paragraphs (c) (2) and (c) (3) of this section.

(iii) In support of a request for waiver of the interference protection requirements of this section, an applicant for a DTV broadcast station may make full use of terrain shielding and Longley-Rice terrain dependent propagation methods to demonstrate that the proposed facility would not be likely to cause interference to Class A TV stations. Guidance on using the Longley-Rice

methodology is provided in OET Bulletin No. 69, which is available through the Internet at [http://www.fcc.gov/oet/info/documents/bulletins\[\]69](http://www.fcc.gov/oet/info/documents/bulletins[]69).

(d) Minimum geographic spacing requirements for DTV allotments not included in the initial DTV Table of Allotments. No petition to add a new channel to the DTV Table of Allotments or modify an allotment not included in the initial DTV Table will be accepted unless it shows compliance with the requirements of this paragraph.

(1) Requests filed pursuant to this paragraph must demonstrate compliance with the principle community coverage requirements of section 73.625(a).

(2) Requests filed pursuant to this paragraph must meet the following requirements for geographic spacing with regard to all other DTV stations, DTV allotments and analog TV stations:

Channel relationship	Separation requirement
VHF Channels 2-13:	
Co-channel, DTV to DTV	Zone I: 244.6 km. Zones II & III: 273.6 km.
Co-channel, DTV to analog TV	Zone I: 244.6 km. Zone II & III: 273.6 km.
Adjacent Channel: DTV to DTV	No allotments permitted between: Zone I: 20 km and 110 km. Zones II & III: 23 km and 110 km.
DTV to analog TV	No allotments permitted between: Zone I: 9 km and 125 km. Zone II & III: 11 km and 125 km.
UHF Channels:	
Co-channel, DTV to DTV	Zone I: 196.3 km. Zone II & III: 223.7 km.
Co-channel, DTV to analog TV	Zone I: 217.3 km. Zone II & III: 244.6 km.
Adjacent Channel: DTV to DTV	No allotments permitted between: All Zones: 24 km and 110 km.
DTV to analog TV	No allotments permitted between: All Zones: 12 km and 106 km.
Taboo Channels, DTV to analog TV only (DTV channels +/-2, +/-3, +/-4, +/-7, +/-8, and 14 or 15 channels above the analog TV channel)	No allotments permitted between: Zone I: 24.1 km and 80.5 km. Zone II & III: 24.1 km and 96.6 km.

(3) Zones are defined in § 73.609. The minimum distance separation between a DTV station in one zone and an analog TV or DTV station in another zone shall be that of the zone requiring the lower separation.

(4) Due to the frequency spacing that exists between Channels 4 and 5, between Channels 6 and 7, and between Channels 13 and 14, the minimum geographic

spacing requirements specified in paragraph (d) (3) of this section shall not be applicable to these pairs of channels (§ 73.603(a)).

(e) Protection of land mobile operations on channels 14-20. The Commission will not accept petitions to amend the DTV Table of Allotments, applications for new DTV stations, or applications to change the channel or location of authorized DTV stations that would use channels 14-20 where the distance between the DTV reference point as defined in section 73.622(d), would be located less than 250 km from the city center of a co-channel land mobile operation or 176 km from the city center of an adjacent channel land mobile operation. Petitions to amend the DTV Table, applications for new DTV stations, or requests to modify the DTV Table that do not meet the minimum DTV-to-land mobile spacing standards will, however, be considered where all affected land mobile licensees consent to the requested action. Land mobile operations are authorized on these channels in the following markets:

City	Channels	Latitude	Longitude
Boston, MA	14, 16	42 [degrees] 21'24"	71 [degrees] 03'25"
Chicago, IL	14, 15	41 [degrees] 52'28"	87 [degrees] 38'22"
Dallas, TX	16	32 [degrees] 47'09"	96 [degrees] 47'37"
Houston, TX	17	29 [degrees] 45'26"	95 [degrees] 21'37"
Los Angeles, CA	14, 16, 20	34 [degrees] 03'15"	118 [degrees] 14'28"
Miami, FL	14	25 [degrees] 46'37"	80 [degrees] 11'32"
New York, NY	14, 15	40 [degrees] 45'06"	73 [degrees] 59'39"
Philadelphia, PA	19, 20	39 [degrees] 56'58"	75 [degrees] 09'21"
Pittsburgh, PA	14, 18	40 [degrees] 26'19"	80 [degrees] 00'00"
San Francisco, CA	16, 17	37 [degrees] 46'39"	122 [degrees] 24'40"
Washington, DC	17, 18	38 [degrees] 53'51"	77 [degrees] 00'33"

(f) Parties requesting new allotments on channel 6 be added to the DTV Table must submit an engineering study demonstrating that no interference would be caused to existing FM radio stations on FM channels 200-220.

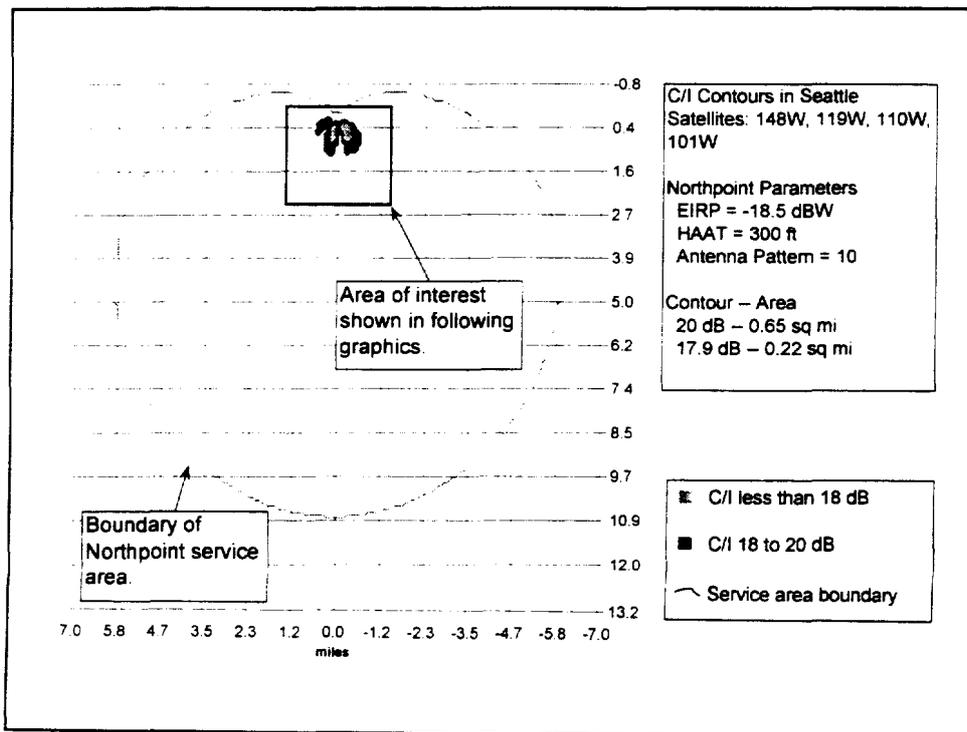
(g) Negotiated agreements on interference. Notwithstanding the minimum technical criteria for DTV allotments specified above, DTV stations operating on allotments that are included in the initial DTV Table may: operate with increased ERP and/or antenna HAAT that would result in additional interference to another DTV station or an analog TV station if that station agrees, in writing, to accept the additional interference; and/or implement an exchange of channel allotments between two or more licensees or permittees of TV stations in the same community, the same market, or in adjacent markets provided, however, that the other requirements of this section and of section 73.622 are met with respect to each such application. Such agreements must be submitted with the application for authority to construct or modify the affected DTV station or stations. The larger service area resulting from a negotiated change in ERP and/or antenna HAAT will be protected in accordance with the provisions of paragraph (c) of this section. Negotiated agreements under this paragraph can include the exchange of money or other considerations from one station to another, including payments to and from noncommercial television stations assigned reserved channels. Applications submitted pursuant to the provisions of this paragraph will be granted only if the Commission finds that such action is consistent with the public interest.

## **Appendix B**

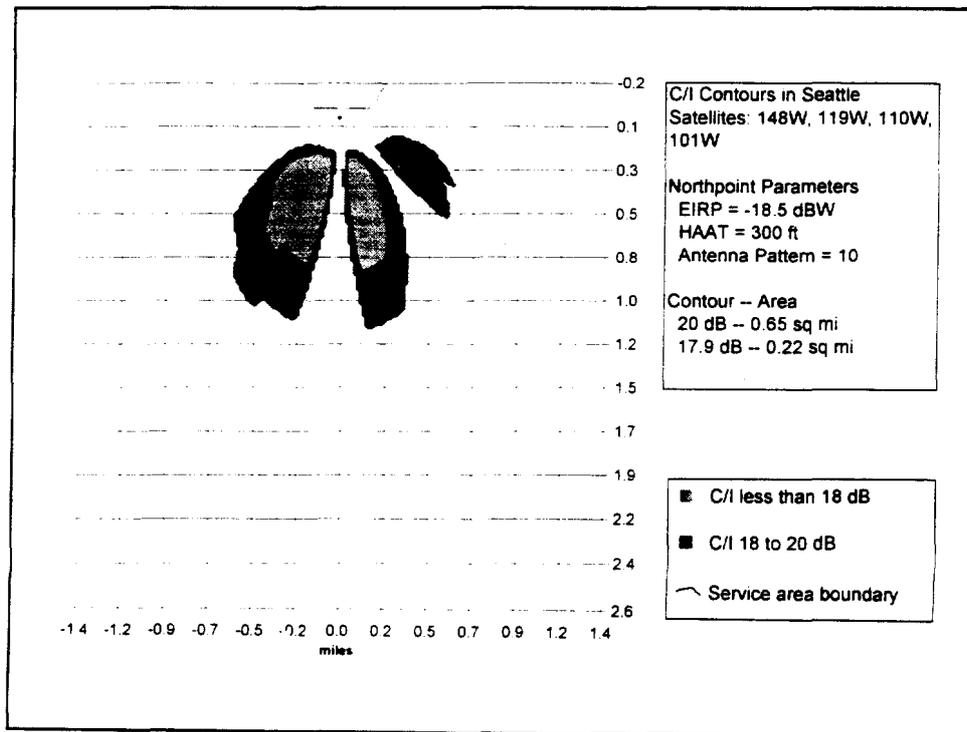
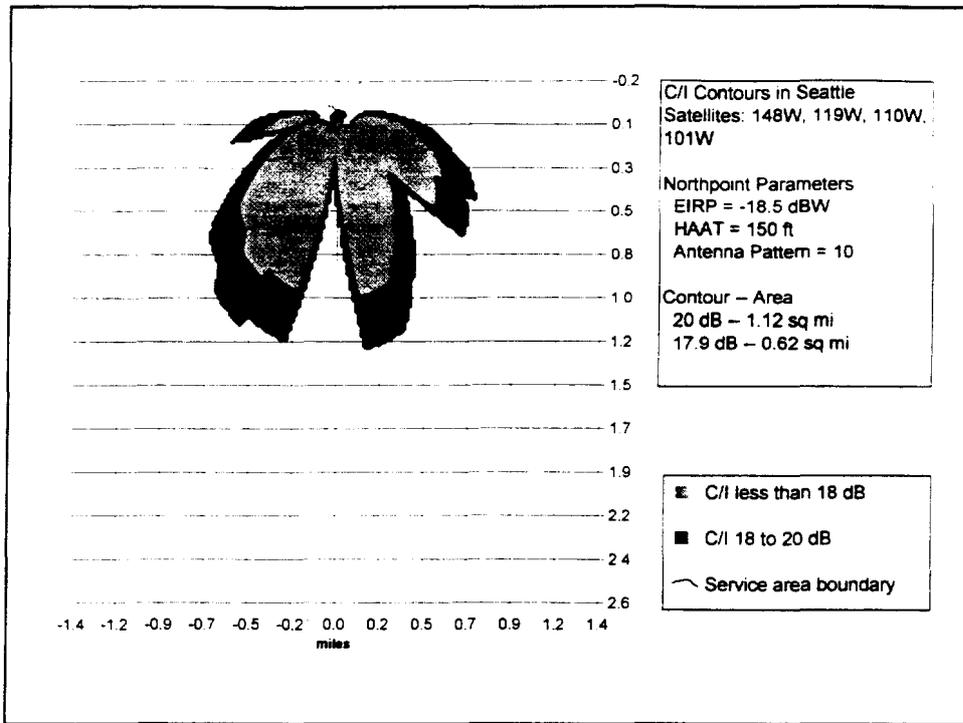
## Appendix B - Contours

The contours in this annex show the concept of using the NGSO 10% interference budget as a "buffer" zone during the initial phase of Northpoint's deployment. As illustrated on the following pages, the effect of the application of the NGSO interference budget to Northpoint's mitigation zone would reduce the size of the mitigation zone approximately 50% or more.

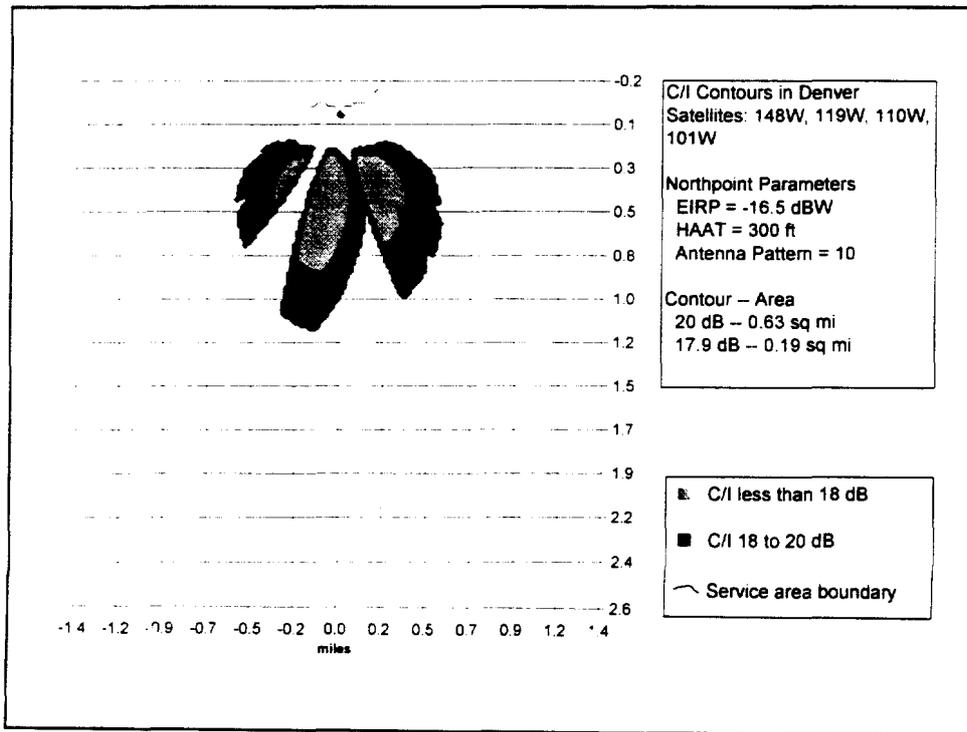
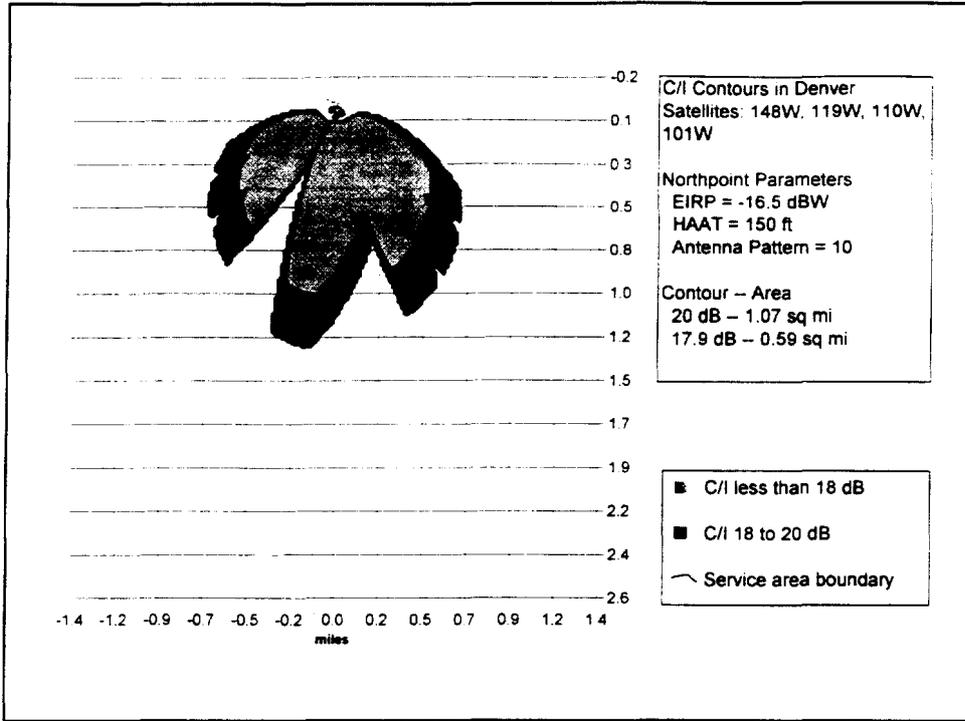
The attached examples show the contours in various cities throughout the U.S. at two different transmitter heights, 150 and 300 feet. The average transmitter height in the Washington D.C. conceptual deployment is over 330 feet; a transmitter height of 300 is then representative of a typical case. The lower transmitter height is provided for comparison. Each example is a close-up view of the area near the transmitter, as illustrated on the graphic below.



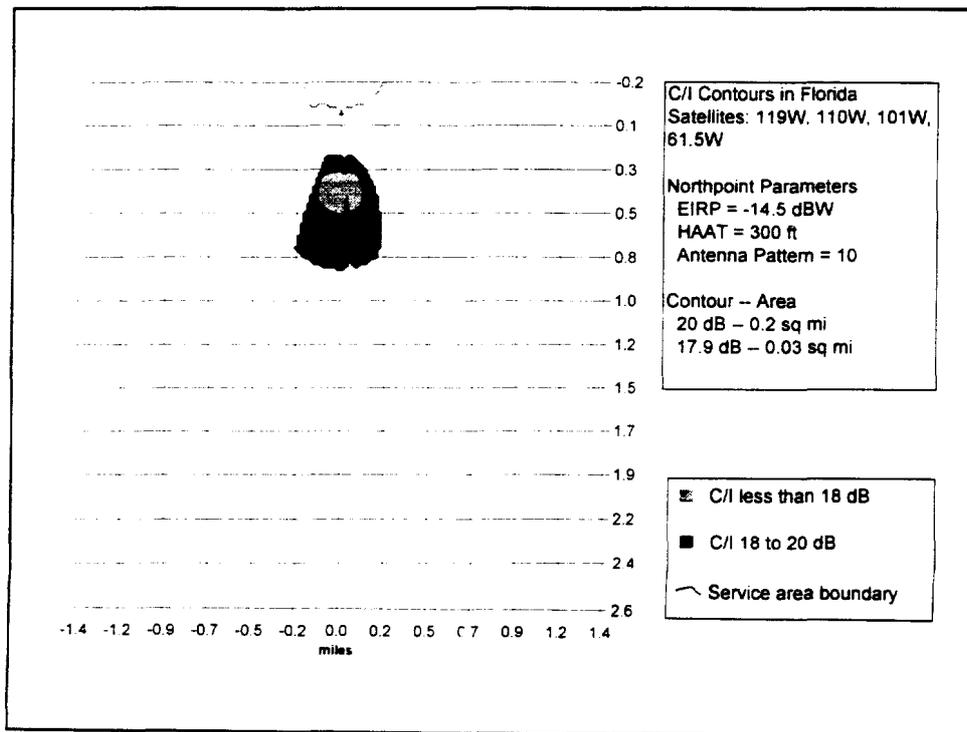
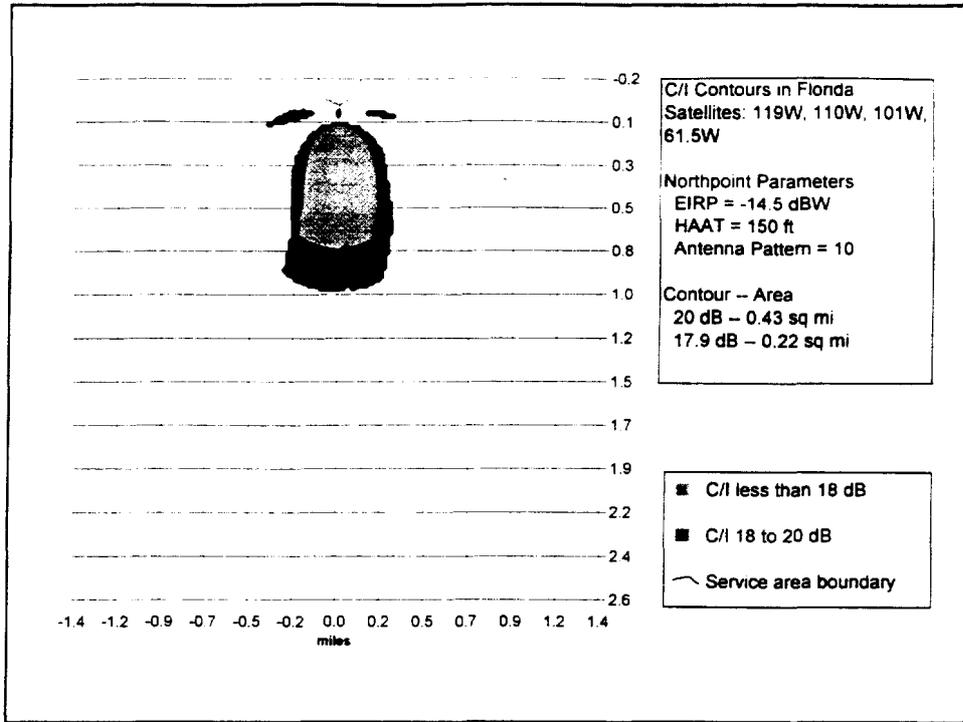
## Appendix B - Contours



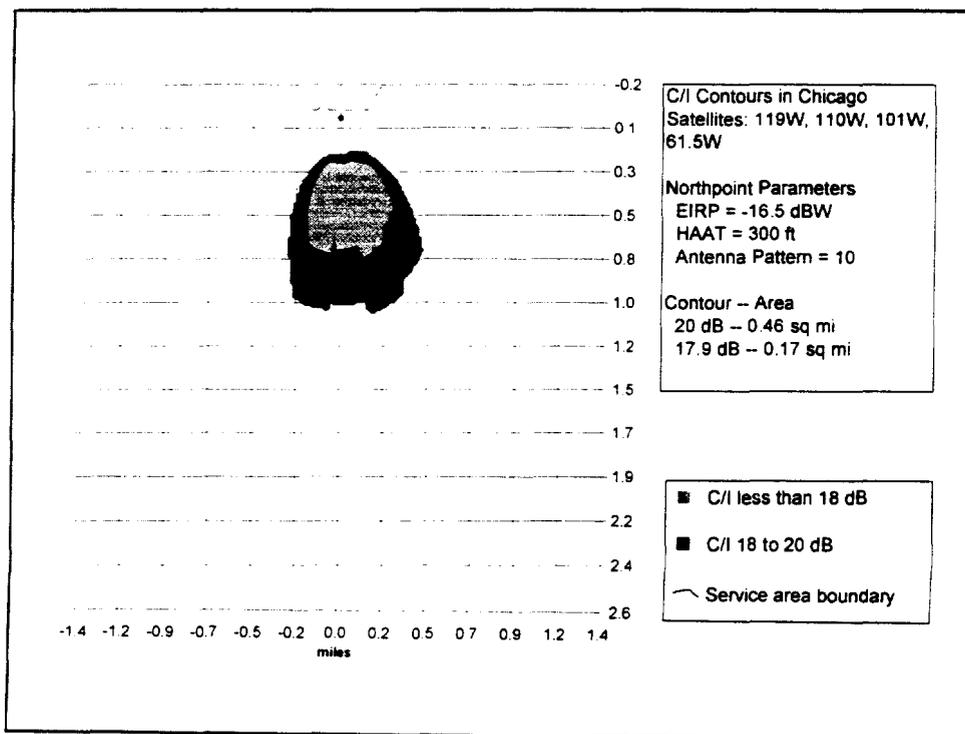
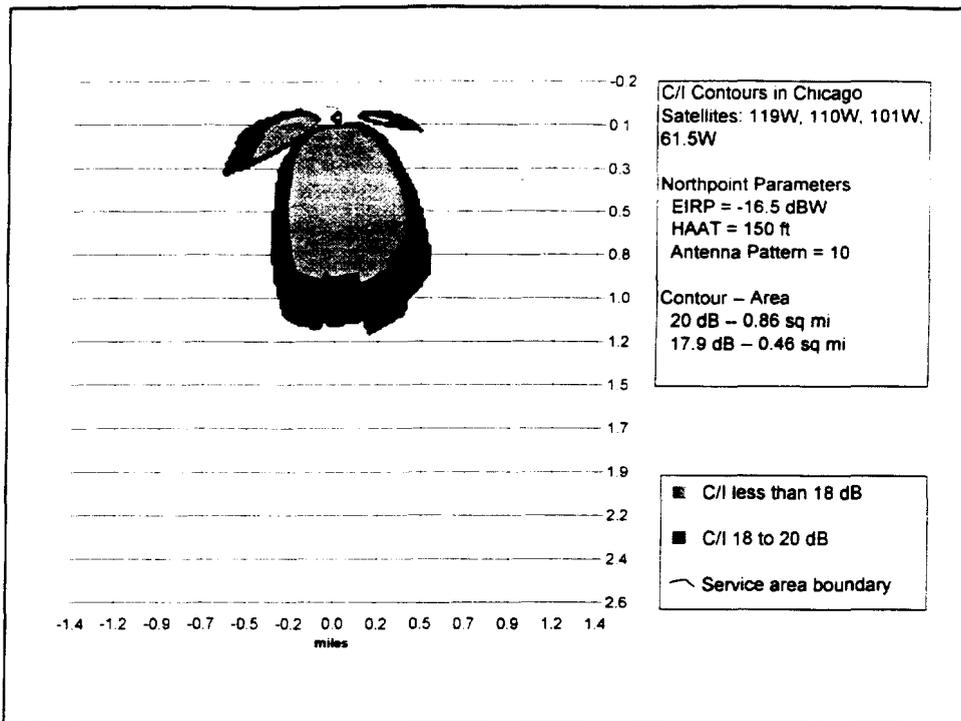
# Appendix B - Contours



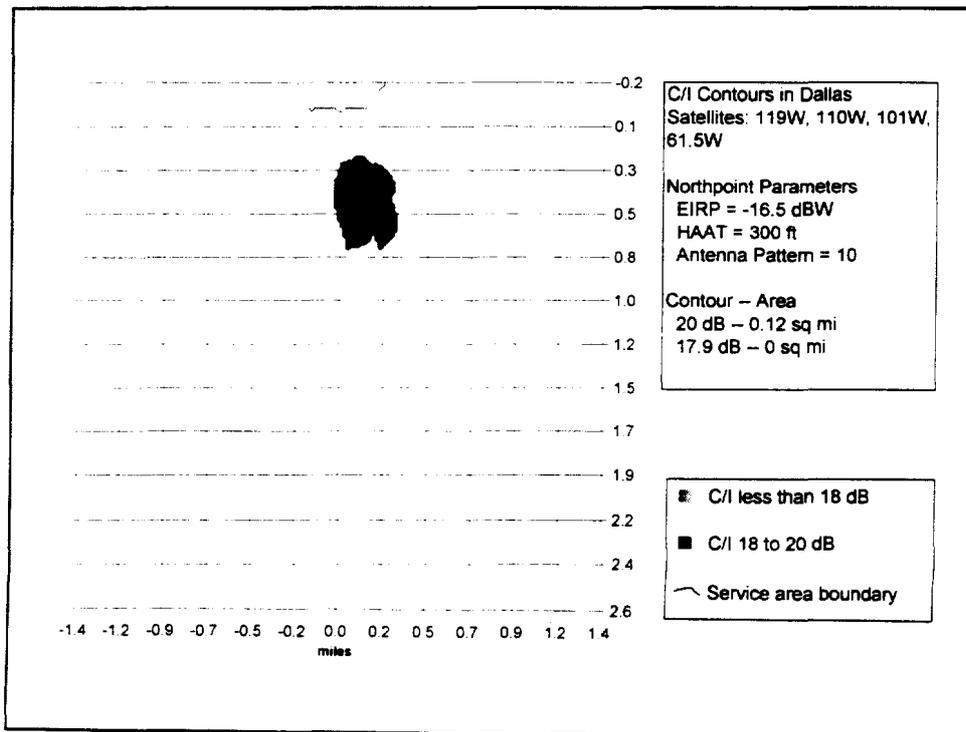
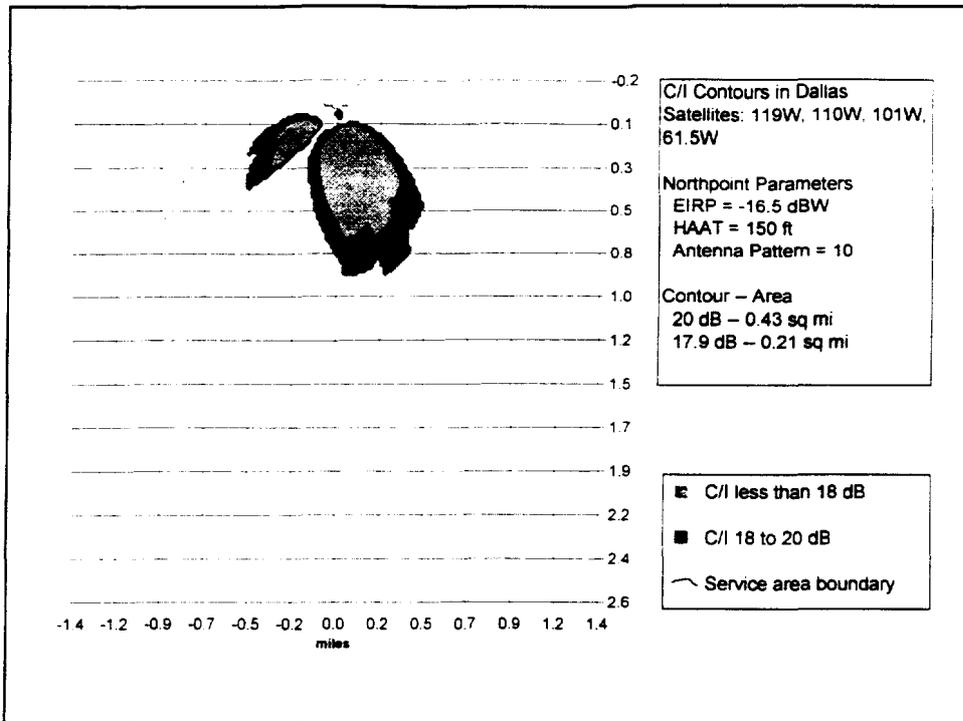
## Appendix B - Contours



# Appendix B - Contours



# Appendix B - Contours



## **Appendix C**

## Appendix C

### Factors Needed to Calculate C/I Ratios and Contours

#### Northpoint System Factors

- Transmit power
- Transmitter height above terrain
- Transmitter antenna pattern in elevation and azimuth
- Transmitter boresight orientation in azimuth and elevation
- Transmit polarization
- Transmit modulation type and bandwidth
- Transmit frequency

#### Environmental Factors

- Terrain
- Propagation losses

#### DBS System Factors

- DBS carrier power\*
- Antenna gain towards the Northpoint transmitter\*
- Receive polarization
- Receive modulation type and noise bandwidth
- Receive frequency

\*As measured at the same point of reference, typically at the input to the LNB

## **Appendix D**

Appendix D  
Data Table National Survey of DBS Customers

Homes reporting	% of total	% Cumulative	Service Threshold Loss of viewing time needed to request service				% Requiring this or a greater threshold to request service
			Service threshold Minutes per month	Equivalent Minutes per year	Equivalent Hours per year	Equivalent Days per year	
6	1.5	1.5	-	-	-	-	100.0
2	0.5	2.0	1	12	0	0.0	98.5
4	1.0	3.0	5	60	1	0.0	98.0
8	2.0	5.0	10	120	2	0.1	97.0
9	2.2	7.2	15	180	3	0.1	95.0
7	1.7	9.0	20	240	4	0.2	92.8
1	0.2	9.2	24	288	5	0.2	91.0
1	0.2	9.5	25	300	5	0.2	90.8
44	11.0	20.4	30	360	6	0.3	90.5
1	0.2	20.7	40	480	8	0.3	79.6
4	1.0	21.7	45	540	9	0.4	79.3
73	18.2	39.9	60	720	12	0.5	78.3
1	0.2	40.1	63	756	13	0.5	60.1
3	0.7	40.9	90	1,080	18	0.8	59.9
1	0.2	41.1	92	1,104	18	0.8	59.1
54	13.5	54.6	120	1,440	24	1.0	58.9
1	0.2	54.9	150	1,800	30	1.3	45.4
26	6.5	61.3	180	2,160	36	1.5	45.1
2	0.5	61.8	190	2,280	38	1.6	38.7
3	0.7	62.6	200	2,400	40	1.7	38.2
10	2.5	65.1	240	2,880	48	2.0	37.4
2	0.5	65.6	250	3,000	50	2.1	34.9
20	5.0	70.6	300	3,600	60	2.5	34.4
5	1.2	71.8	380	4,560	76	3.2	29.4
1	0.2	72.1	420	5,040	84	3.5	28.2
5	1.2	73.3	480	5,760	96	4.0	27.9
1	0.2	73.6	500	6,000	100	4.2	26.7
7	1.7	75.3	600	7,200	120	5.0	26.4
4	1.0	76.3	720	8,640	144	6.0	24.7
1	0.2	76.6	840	10,080	168	7.0	23.7
1	0.2	76.8	900	10,800	180	7.5	23.4
1	0.2	77.1	1,087	13,044	217	9.1	23.2
11	2.7	79.8	1,440	17,280	288	12.0	22.9
1	0.2	80.0	1,800	21,600	360	15.0	20.2
1	0.2	80.3	2,000	24,000	400	16.7	20.0
1	0.2	80.5	2,800	33,600	560	23.3	19.7
1	0.2	80.8	2,880	34,560	576	24.0	19.5
3	0.7	81.5	4,000	48,000	800	33.3	19.2
1	0.2	81.8	4,320	51,840	864	36.0	18.5
1	0.2	82.0	4,950	59,400	990	41.3	18.2
1	0.2	82.3	5,000	60,000	1,000	41.7	18.0
1	0.2	82.5	7,200	86,400	1,440	60.0	17.7
70	17.5	100.0	N/A	N/A	N/A	N/A	17.5
401	Total						