

Technical Report Supporting a Form 349 Minor Construction Permit Application

Pursuant to 47 C.F.R. Section 74:

for

*W298CA.L - Greenfield, MA
(Facility ID: 25008)*

*Change in Site Location &
New Directional Antenna Pattern*

as a

*Commercial, Fill-In
AM Translator for
WHMQ(AM) - Greenfield, MA*

July, 2017

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EXPLANATION OF PROPOSAL: This Form 349 Filing and accompanying technical report supports a Minor Construction Permit Application for FM Translator W298CA.L - Greenfield, MA (Facility ID: 25008). This FCC Form 349 Filing requests a new site location and new directional antenna pattern. Continued operation on CH298D (107.5 MHz) with a power of 0.250 kW ERP (circular polarization) at a COR of 278 meters AMSL is requested. This Form 349 Filing will continue to specify rebroadcast of Class C, AM Primary Station WHMQ(AM) - Greenfield, MA (1240 kHz); Facility ID No. 25834. The Translator will remain licensed to the community of Greenfield, MA.

FACILITY COMPLIANCE SHOWINGS: A map of the proposed 60 dB μ service contour in relation to the present 60 dB μ service contour has been included in *Exhibit 1*. The minor change proposed service area will overlap a portion of the present service area as noted in the exhibit. The proposed 60 dB μ contour of the Translator lies wholly inside the larger of the AM primary daytime 2.0 mV/m contour or a 25 mile radius around the AM site. The primary station service contour relationship has been plotted in *Exhibit 2*.

The proposed facility will be located on an existing 27.4 meter tower which does not require Antenna Structure Registration. In support of this filing, a copy of USGS Topographic Aerial Photomapping of the existing tower site has been included in *Exhibit 3*. A depiction of the tower and antenna configuration has been included in *Exhibit 4*. Further notification to the FAA or ASR governing authorities is not required as this proposal will not increase the overall tower height.

The applicant would like to note use of the NED 03 second terrain database for all allocation, contour and HAAT showings contained herein. A copy of the proposed HAAT calculation has been included in *Exhibit 5*.

ALLOCATION COMPLIANCE SHOWINGS: The proposed Translator remains in compliance with C.F.R. 47 Section 74.1204 toward all allocation protection concerns with the exception of a Reservation Allotment for RSV-297B - Westborough, MA. However, Reservation Allotments need not be protected by FM Translator filings. A general allocation study for this proposal is found in **Exhibit 6**. There are four additional facilities, existing or proposed, close enough to merit further study. Therefore, a supplemental contour protection study has been provided toward each facility as included in **Exhibit(s) 7(a-d)**. It is believed sufficient clearance exists, precluding the need for additional contour protection showings. A copy of the manufacturer's directional antenna pattern data has been included in **Exhibit 8**.

Regarding protection of international concerns, the facility is and will remain within 320 km from the common border between the United States and Canada. However full protection will be afforded all Canadian concerns as noted in **Exhibit 6**.

ENVIRONMENTAL COMPLIANCE SHOWINGS: The proposed facility complies with the maximum permissible radiofrequency electromagnetic exposure limits for "*restricted access*" controlled environments as set forth under §1.1310 and/or §1.1307(b)(3) of the Commission's rules and the guidelines for RF radiation protection guidelines as set forth in OET Bulletin No. 65 (Edition 97-01), and the accompanying Supplement A, (Edition 97-01). Compliance has been demonstrated in the attached **RF Appendix 1** of this filing. The facility is, or will be, properly marked with signs. Entry is, or will be, restricted by means of fencing with locked doors or gates. In addition, coordination with other users of the site will be secured to reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Regarding compliance with the NEPA, Nationwide Programmatic Agreement and NHPA Section 106 for tower co-location, compliance with the Agreement is not required where no new tower construction is being proposed and the tower is not being substantially altered. Specifically, compliance is not necessary where only an existing antenna and feed-line are being added to an existing structure, as here. However, should the Commission determine compliance is necessary, upon notification to the applicant, the applicant will file FCC Form 621.

CERTIFICATION OF TECHNICAL CONSULTANT: *I declare, under penalty of perjury, that the contents of this report are true and accurate to the best of my knowledge and belief. I further certify I have over eighteen years of experience as a broadcast technical consultant before the Federal Communications Commission ("the FCC"); and am familiar with the Code of Federal Regulations Title 47 ("the Rules") as pertaining to this report and its contents herein. The underlying data utilized in this report was taken directly from FCC databases or indirectly through third party software vendors securing data directly from FCC databases. This firm cannot be held liable for errors or omissions resulting from the underlying data. The information contained herein is believed accurate to the date reported below.*



Justin W. Asher, Technical Consultant
July 15, 2017

Exhibit 1
Service Contour Study:
Present vs Proposed Operations

Proposed 60 dBμ F(50:50) Contour

Licensed 60 dBμ F(50:50) Contour

W298CA.L
Greenfield, MA
BLFT20160608HSV
Facility ID: 25008
Latitude: 42-35-20 N
Longitude: 072-37-05 W
ERP: 0.25 kW
Channel: 298D (107.5 MHz)
AMSL Height: 91.0 m
Horiz. Pattern: Omni

60 dBμ F(50:50) Contour
Total Population: 25,323
Total Area: 159.2 sq. km

W298CA.P
Greenfield, MA
Proposed Operation
Facility ID: 25008
Latitude: 42-32-01 N
Longitude: 072-35-35 W
ERP: 0.25 kW
Channel: 298A (107.5 MHz)
AMSL Height: 278.0 m
Horiz. Pattern: Directional

60 dBμ F(50:50) Contour
Total Population: 37,531
Total Area: 391.3 sq. km

NED 03 SEC Terrain Database
US Census 2010 PL Database

Terrain
29 677 m

Scale 1:200,000
0 3 6 9 km

Asher Broadcast Consulting LLC
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1 (202) 875-2986

nnington

Windham

25 mile Radius from AM Site

Exhibit 2

Service Contour Study: Proposed vs Primary Operations

WHMQ 1240 kHz
Greenfield, Massachusetts
Station Class: C
Region 2 Class: C
Facility ID: 25834
File Number: BML-20031112AJB
42-35-20.0 N 72-37-06.0 W (NAD 27)
42-35-20.3 N 72-37-04.3 W (NAD 83)
Power: 1 kW, Non-Directional
Hours: Daytime
Pattern Type: Theoretical
Towers: 1 Augmentations: 0
Tower Elec Height: 68.1 Deg; 45.73 m
RMS Theoretical: 292.9 mV/meter

Primary 2 mV/m Daytime Contour

**Proposed 60-dBμ
F(50:50) Contour**

WHMQ(AM)

Franklin

W298CA.P

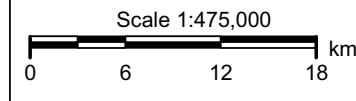
Hampshire

W298CA.P
Greenfield, MA
Proposed Operation
Facility ID: 25008
Latitude: 42-32-01 N
Longitude: 072-35-35 W
ERP: 0.25 kW
Channel: 298D (107.5 MHz)
AMSL Height: 278.0 m
Horiz. Pattern: Directional

Worcester

NED 03 SEC Terrain Database
US Census 2010 PL Database

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V-Soft Communications LLC ©

Exhibit 3 - USGS Topographic Aerial Photomap of Existing Site

▲ 842 ft/257 m

Site Coordinates

(NGS NADCON)

	<u>Latitude</u>	<u>Longitude</u>
NAD 27 datum:	42 32 1.18792	72 35 34.77996
NAD 83 datum:	42 32 1.50000	72 35 33.10000

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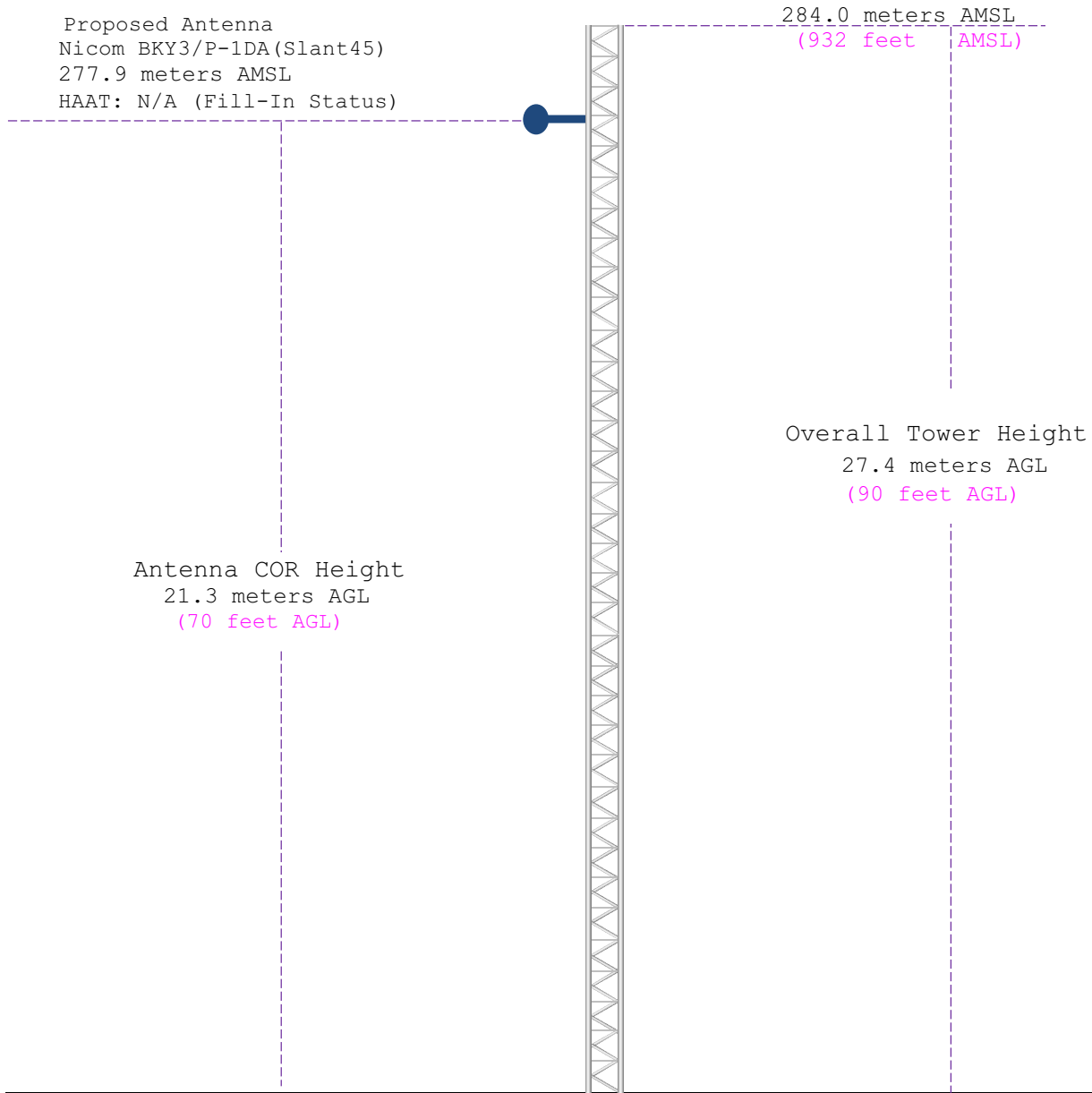


0 100 200ft

USGS
The National Map

Exhibit 4

Vertical Plan of Antenna System



Ground Elevation: 256.6 meters AMSL (842 feet AMSL)		
Address: On top of Pocumtuck Rock		
City: Greenfield	<u>Latitude (D M S)</u> <u>Longitude (D M S)</u>	
County: Franklin	NAD 27 datum values: 42 32 1.18792 72 35 34.77996	
State: Massachusetts	NAD 83 datum values: 42 32 1.50000 72 35 33.10000	
Antenna Structure Registration	Drawing	Asher Broadcast Consulting, LLC
Not Required	Is Not	justinasher@consultant.com
	To Scale	1(202)875-2986

Exhibit 5

HAAT and Miscellaneous Coordinate Information

HAAT Calculation (1927):

N. Lat. = 423201.0 W. Lng. = 723535.0
 HAAT and Distance to Contour,
 FCC, FM 2-10 Mi, 51 pts Method - NED 03 SEC

Azi.	AV EL	HAAT	ERP kW	dBk	Field	60-F5
000	127.2	150.8	0.2500	-6.02	1.000	15.95
030	98.2	179.8	0.0756	-11.21	0.550	12.92
060	137.1	140.9	0.0306	-15.14	0.350	9.11
090	246.8	31.2	0.0625	-12.04	0.500	5.09
120	229.4	48.6	0.0306	-15.14	0.350	5.36
150	122.8	155.2	0.0225	-16.48	0.300	8.89
180	71.4	206.6	0.0225	-16.48	0.300	10.30
210	136.9	141.1	0.2500	-6.02	1.000	15.33
240	264.5	13.5	0.2500	-6.02	1.000	7.09
270	221.1	56.9	0.2500	-6.02	1.000	9.92
300	172.2	105.8	0.2500	-6.02	1.000	13.23
330	206.2	71.8	0.2500	-6.02	1.000	11.02

Ave El= 169.48 M HAAT= 108.52 M AMSL= 278.0

NAD 1983 to NAD 1927 Conversion:

	<u>Latitude</u>	<u>Longitude</u>
NAD 27 datum values:	42 32 1.18792	72 35 34.77996
NAD 83 datum values:	42 32 1.50000	72 35 33.10000

Various Coordinate Conversion Calculations (NAD 1983):

Position Type	Lat Lon
Degrees Lat Long	42.5337500°, -072.5925278°
Degrees Minutes	42°32.02500', -072°35.55167'
Degrees Minutes Seconds	42°32'01.5000", -072°35'33.1000"
UTM	18T 697711mE 4711849mN
UTM centimeter	18T 697711.36mE 4711849.54mN
MGRS	18TXN9771111849
Grid North	1.6°
GARS	215MB48
Maidenhead	FN32QM88VC54
GEOREF	HJCN24443202

Exhibit 6

Tabulation of Proposed Allocation

Green Text indicates Allotment Reservations which do not require protection.

Blue Text indicates contour protection studies toward select allocation concern(s) as included in **Exhibit(s) 7(a-d)**.

Saga Communications Of New England, Llc											
REFERENCE		CH#	298D	- 107.5 MHz, Pwr= 0.25 kW DA, HAAT= 108.5 M,				COR= 278 M		DISPLAY DATES	
42 32 01.0 N.		Average Protected F(50-50)= 13.39 km								DATA 07-14-17	
72 35 35.0 W.		Standard Directional								SEARCH 07-14-17	
CH	CALL	TYPE	ANT	AZI	DIST	LAT	PWR (kW)	INT (km)	PRO (km)	*IN*	*OUT*
CITY		STATE		<--	FILE #	LNG	HAAT (M)	COR (M)	LICENSEE	(Overlap	in km)
298D	W298CA	LIC_C_		341.6	6.47	42 35 20.0	0.250	23.8	7.1	-33.5*	-53.0*
Greenfield		MA		161.6	BLFT20160608HSV	72 37 05.0		91	Saga Communications Of New		
297B	AL6775	RSV-A		114.0	62.55	42 18 11.0	50.000	68.2	55.5	-11.4*<	-4.5<
Westborough		MA		294.4	RM10220	71 53 52.0	150	389			
297B	WAAF	LIC_ZCX		106.7	75.26	42 20 09.0	9.600	71.9	61.6	-3.1<	0.7
Westborough		MA		287.3	BLH20051019ABP	71 42 57.0	335	480	Entercom License, Llc		
298D	W298BT	LIC_DC_		28.4	50.20	42 55 50.0	0.250	19.3	5.8	18.0	1.8
Keene		NH		208.6	BLFT20140416AAH	72 18 00.0	-93	193	Saga Communications Of New		
298A	DWRUT	VAC__N		343.8	119.82	43 34 04.0	6.000	100.7	38.8	2.0	26.6
West Rutland		VT		163.5	RM9706	73 00 30.0	100	472	Great Casco Bay Wireles		
Accepted by Canada on Channel 298A by letter dated 30 August 2000.											
299L1	WAIY-LP	LIC__		153.4	23.02	42 20 54.0	0.100			4.6<	4.0
Belchertown		MA		333.5	BLL20161031ABH	72 28 04.0	12	160	Dwight Chapel Inc.		
299L1	WVEW-LP	LIC__		2.6	34.31	42 50 31.0	0.100			10.6	5.1
Brattleboro		VT		182.6	BLL20120412AAN	72 34 27.0		179	Vermont Earth Works, Inc.		
299B	WGNA-FM	LIC_CN		276.2	115.53	42 38 13.0	12.500	91.8	76.5	12.9	16.4
Albany		NY		95.2	BMLH19910606KC	73 59 51.0	300	539	Townsquare Media Of Albany		
295B	WCCC	LIC_C_		191.7	83.65	41 47 48.0	23.000	5.2	60.7	61.6	21.4
Hartford		CT		11.6	BMLD20140930ACT	72 47 52.0	221	310	Educational Media Foundati		
298L1	WMMM-LP	LIC__		198.2	84.49	41 48 40.2	0.100			47.7	21.5
Collinsville		CT		18.0	BLL20160407ABC	72 54 40.4	27	199	Huckleberry Hill Music Soc		
244A	WTSA-FM	LIC_CN		357.6	39.53	42 53 21.0	5.200	5.5	1.8	9.5R	30.0M
Brattleboro		VT		177.6	BLH19910821KF	72 36 47.0	41	330	Four Seasons Media, Inc.		
Proposed to Canada as B1 on 910327-Accepted by Canada 910416											
299L1	WACC-LP	LIC__		179.4	62.29	41 58 24.0	0.100			43.3	41.9
Enfield		CT		359.4	BMLL20130620ABE	72 35 05.0	12	69	Asnuntuck Community Colleg		
299A	WTPL	LIC_DEX		43.0	94.84	43 09 17.0	1.250	36.7	24.4	44.7	50.1
Hillsboro		NH		223.5	BLH20040607ADF	71 47 44.0	217	427	Great Eastern Radio, Llc		
296A	WZLF	LIC_CN		15.7	78.04	43 12 33.0	1.150	2.0	26.7	61.1	50.6
Bellows Falls		VT		195.9	BMLH19920522KC	72 19 58.0	162	475	Wbin Media Co., Inc.		
297D	W239AG	CP_DH_		184.7	85.55	41 46 00.0	0.099	17.5	11.9	54.6	53.3
New Britain		CT		4.6	BMPFT20170130AAY	72 40 38.0		183	Trignition Media, Llc		
298C1	WFNK	LIC_NCX		46.3	239.88	44 00 12.0	100.000	170.8	71.5	55.9	125.1
Lewiston		ME		227.8	BLH20050310AAL	70 25 24.0	283	408	Wbin Media Co., Inc.		
300B	WXKS-FM	LIC_CN		99.0	125.61	42 20 50.0	20.500	5.8	65.6	114.2	59.2
Medford		MA		280.0	BLH19911018KE	71 04 59.0	235	258	Amfm Radio Licenses, L.L.c		

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM
 Contour distances are on direct line to and from reference station. Reference zone= East Zone, Co to 3rd adjacent.
 All separation margins (if shown) include rounding.
 Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
 "*"affixed to 'IN' or 'OUT' values = site inside restricted contour.
 < = Contour Overlap

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

Saga Communications Of New England, Llc

FMCommander Single Allocation Study - 07-14-2017 - NED 03 SEC
W298CA.P's Overlaps (In= -3.15 km, Out= 0.71 km)

W298CA.P CH 298 D DA
Lat= 42 32 01.0, Lng= 72 35 35.0
0.25 kW 108.5 m HAAT, 278 m COR
Prot.= 60 dBu, Intef.= 48 dBu

WAAF CH 297 B 73.215 Z BLH20051019ABP
Lat= 42 20 09.0, Lng= 71 42 57.0
9.6 kW 335 m HAAT, 480 m COR
Prot.= 54 dBu, Intef.= 54 dBu

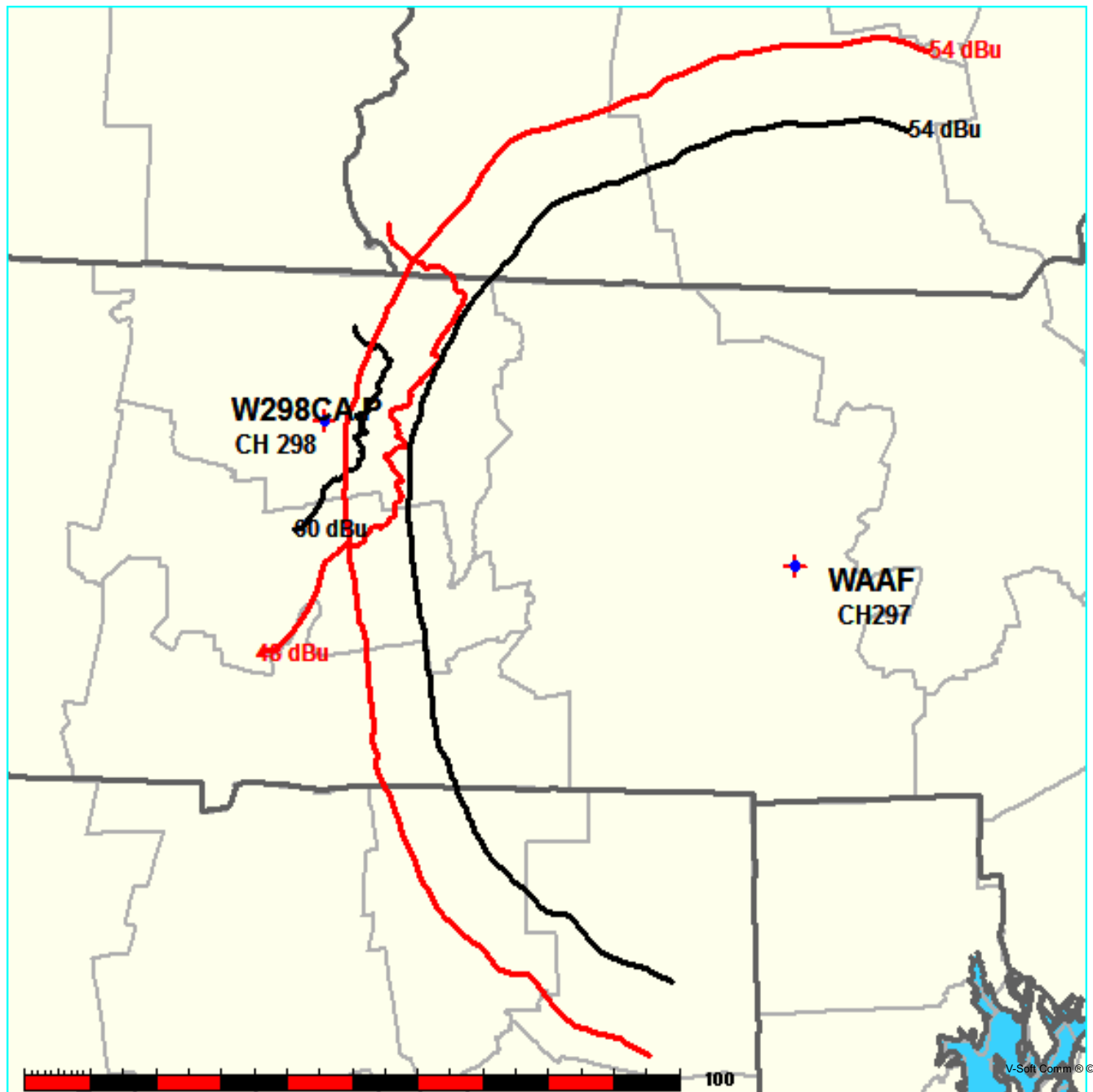


Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOver Analysis

W298CA.P

WAAF BLH20051019ABP

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 278 m

N. Lat. 42 32 01.0

W. Lng. 72 35 35.0

Protected

60 dBu

Channel = 297B

Max ERP = 9.6 kW

RCAMSL = 480 m

N. Lat. 42 20 09.0

W. Lng. 71 42 57.0

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
066.0	000.2500	0118.7	014.0	295.3	009.6000	0293.1	065.3	56.60*	7.34
067.0	000.2500	0107.8	013.3	294.8	009.6000	0293.2	065.6	56.51*	7.09
068.0	000.2500	0102.7	013.0	294.4	009.6000	0292.8	065.6	56.48*	7.00
069.0	000.2500	0101.1	012.9	294.2	009.6000	0292.4	065.5	56.50*	7.06
070.0	000.2500	0095.1	012.6	293.8	009.6000	0292.3	065.6	56.45*	6.93
071.0	000.2500	0084.3	011.9	293.3	009.6000	0291.4	066.0	56.29*	6.47
072.0	000.2500	0075.0	011.2	292.8	009.6000	0289.8	066.3	56.11*	6.00
073.0	000.2500	0071.6	011.0	292.6	009.6000	0288.8	066.4	56.06*	5.84
074.0	000.2500	0069.4	010.8	292.3	009.6000	0288.3	066.4	56.04*	5.79
075.0	000.2500	0066.6	010.7	292.1	009.6000	0287.8	066.4	56.01*	5.70
076.0	000.2500	0062.9	010.4	291.9	009.6000	0286.9	066.5	55.94*	5.52
077.0	000.2500	0058.5	010.1	291.6	009.6000	0285.9	066.7	55.84*	5.24
078.0	000.2500	0056.1	009.9	291.3	009.6000	0285.4	066.8	55.80*	5.13
079.0	000.2500	0053.8	009.6	291.1	009.6000	0285.1	066.9	55.76*	5.01
080.0	000.2500	0051.6	009.4	290.9	009.6000	0285.0	067.0	55.72*	4.91
081.0	000.2500	0046.3	008.9	290.6	009.6000	0285.2	067.4	55.59*	4.52
082.0	000.2500	0039.4	008.1	290.1	009.6000	0285.6	068.0	55.38*	3.94
083.0	000.2500	0030.5	007.1	289.7	009.6000	0286.2	068.8	55.12*	3.21
084.0	000.2500	0023.6	007.1	289.6	009.6000	0286.3	068.8	55.13*	3.22
085.0	000.2500	0019.9	007.1	289.5	009.6000	0286.4	068.7	55.15*	3.28
086.0	000.2500	0019.3	007.1	289.4	009.6000	0286.4	068.7	55.17*	3.33
087.0	000.2500	0021.8	007.1	289.3	009.6000	0286.4	068.6	55.18*	3.38
088.0	000.2500	0025.0	007.1	289.2	009.6000	0286.4	068.6	55.20*	3.42
089.0	000.2500	0028.2	007.1	289.1	009.6000	0286.4	068.5	55.21*	3.46
090.0	000.2500	0031.2	007.2	289.0	009.6000	0286.3	068.4	55.27*	3.62
091.0	000.2500	0034.6	007.6	289.0	009.6000	0286.3	068.0	55.40*	3.98
092.0	000.2500	0038.0	007.9	289.0	009.6000	0286.3	067.6	55.54*	4.38
093.0	000.2500	0041.7	008.4	289.0	009.6000	0286.3	067.2	55.69*	4.82
094.0	000.2500	0043.1	008.5	288.9	009.6000	0286.2	067.0	55.76*	5.01
095.0	000.2500	0043.8	008.6	288.8	009.6000	0286.1	066.9	55.80*	5.11
096.0	000.2500	0043.7	008.6	288.6	009.6000	0286.1	066.8	55.81*	5.14
097.0	000.2500	0045.4	008.8	288.6	009.6000	0286.2	066.6	55.88*	5.35

Exhibit 7a
Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
098.0	000.2500	0048.4	009.1	288.5	009.6000	0286.3	066.3	56.01* 5.72
099.0	000.2500	0051.8	009.5	288.4	009.6000	0286.3	065.9	56.15* 6.09
100.0	000.2500	0054.8	009.7	288.3	009.6000	0286.4	065.6	56.26* 6.41
101.0	000.2500	0056.5	009.9	288.1	009.6000	0286.5	065.4	56.33* 6.59
102.0	000.2500	0055.2	009.8	288.0	009.6000	0286.7	065.5	56.30* 6.51
103.0	000.2500	0053.0	009.6	287.8	009.6000	0286.8	065.7	56.23* 6.33
104.0	000.2500	0055.2	009.8	287.7	009.6000	0286.7	065.5	56.31* 6.54
105.0	000.2500	0060.4	010.2	287.5	009.6000	0286.4	065.1	56.45* 6.95
106.0	000.2500	0067.1	010.7	287.4	009.6000	0286.0	064.6	56.61* 7.40
107.0	000.2500	0073.8	011.2	287.2	009.6000	0285.5	064.1	56.76* 7.81
108.0	000.2500	0075.7	011.3	287.1	009.6000	0285.1	064.0	56.79* 7.91
109.0	000.2500	0073.3	011.1	286.9	009.6000	0284.5	064.2	56.71* 7.68
110.0	000.2500	0066.7	010.7	286.7	009.6000	0284.1	064.6	56.53* 7.17
111.0	000.2500	0061.4	010.3	286.6	009.6000	0283.7	065.0	56.37* 6.74
112.0	000.2500	0058.9	010.1	286.5	009.6000	0283.3	065.2	56.29* 6.50
113.0	000.2500	0057.2	009.9	286.3	009.6000	0282.9	065.4	56.22* 6.30
114.0	000.2500	0056.4	009.9	286.2	009.6000	0282.2	065.5	56.16* 6.15
115.0	000.2500	0054.6	009.7	286.1	009.6000	0281.7	065.7	56.08* 5.91
116.0	000.2500	0054.2	009.7	285.9	009.6000	0281.2	065.7	56.04* 5.79
117.0	000.2500	0055.4	009.8	285.8	009.6000	0280.5	065.7	56.04* 5.81
118.0	000.2500	0054.9	009.8	285.6	009.6000	0280.0	065.7	56.00* 5.68
119.0	000.2500	0050.8	009.4	285.6	009.6000	0279.8	066.2	55.84* 5.24
120.0	000.2500	0048.6	009.1	285.5	009.6000	0279.6	066.4	55.74* 4.96
121.0	000.2500	0049.1	009.2	285.3	009.6000	0279.2	066.4	55.73* 4.93
122.0	000.2500	0051.8	009.5	285.1	009.6000	0278.8	066.2	55.79* 5.11
123.0	000.2500	0057.7	010.0	284.8	009.6000	0278.2	065.7	55.93* 5.51
124.0	000.2500	0064.0	010.5	284.6	009.6000	0277.4	065.3	56.04* 5.83
125.0	000.2500	0070.4	010.9	284.3	009.6000	0276.4	065.0	56.14* 6.10
126.0	000.2500	0077.5	011.4	283.9	009.6000	0275.5	064.6	56.24* 6.38
127.0	000.2500	0086.2	012.0	283.6	009.6000	0274.0	064.2	56.35* 6.69
128.0	000.2500	0092.5	012.4	283.2	009.6000	0272.6	063.9	56.40* 6.84
129.0	000.2500	0096.2	012.6	283.0	009.6000	0271.5	063.8	56.40* 6.84
130.0	000.2500	0094.7	012.5	282.8	009.6000	0271.0	064.0	56.32* 6.61
131.0	000.2500	0092.2	012.4	282.7	009.6000	0270.7	064.2	56.22* 6.34
132.0	000.2500	0095.2	012.6	282.5	009.6000	0270.0	064.1	56.22* 6.34
133.0	000.2500	0101.4	012.9	282.1	009.6000	0269.2	063.9	56.27* 6.49
134.0	000.2500	0106.3	013.3	281.8	009.6000	0268.7	063.8	56.30* 6.57
135.0	000.2500	0111.3	013.6	281.5	009.6000	0267.9	063.7	56.32* 6.63
136.0	000.2500	0113.4	013.7	281.2	009.6000	0267.4	063.7	56.29* 6.54
137.0	000.2500	0114.9	013.8	281.0	009.6000	0266.6	063.8	56.24* 6.40
138.0	000.2500	0114.0	013.7	280.9	009.6000	0266.0	063.9	56.15* 6.15
139.0	000.2500	0113.4	013.7	280.7	009.6000	0265.3	064.1	56.06* 5.91
140.0	000.2500	0114.1	013.7	280.5	009.6000	0264.5	064.2	55.99* 5.71
141.0	000.2500	0119.2	014.0	280.2	009.6000	0263.5	064.2	55.98* 5.68
142.0	000.2500	0125.6	014.4	279.8	009.6000	0263.2	064.1	56.00* 5.75

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOver Analysis

WAAF BLH20051019ABP

W298CA.P

Channel = 297B

Max ERP = 9.6 kW

RCAMSL = 480 m

N. Lat. 42 20 09.0

W. Lng. 71 42 57.0

Protected

54 dBu

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 278 m

N. Lat. 42 32 01.0

W. Lng. 72 35 35.0

Interfering

48 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
242.0	009.6000	0278.2	061.1	160.1	000.0156	0191.1	054.1	29.06	
243.0	009.6000	0279.3	061.2	160.3	000.0155	0192.7	053.1	29.51	
244.0	009.6000	0278.5	061.1	160.4	000.0155	0193.1	052.0	29.94	
245.0	009.6000	0274.7	060.8	160.2	000.0156	0192.1	050.9	30.33	
246.0	009.6000	0267.9	060.3	159.7	000.0158	0189.0	049.8	30.68	
247.0	009.6000	0266.4	060.2	159.7	000.0158	0188.8	048.7	31.09	
248.0	009.6000	0264.5	060.1	159.6	000.0159	0188.2	047.7	31.49	
249.0	009.6000	0258.0	059.6	159.0	000.0162	0185.0	046.6	31.86	
250.0	009.6000	0253.4	059.2	158.6	000.0165	0181.6	045.6	32.20	
251.0	009.6000	0251.8	059.1	158.4	000.0166	0179.7	044.6	32.58	
252.0	009.6000	0248.6	058.9	158.0	000.0169	0176.0	043.5	32.90	
253.0	009.6000	0245.6	058.6	157.6	000.0171	0172.1	042.5	33.23	
254.0	009.6000	0243.9	058.5	157.3	000.0173	0169.0	041.5	33.58	
255.0	009.6000	0242.7	058.4	157.0	000.0175	0167.3	040.5	34.01	
256.0	009.6000	0239.9	058.2	156.5	000.0179	0165.2	039.6	34.44	
257.0	009.6000	0237.5	058.0	156.0	000.0182	0163.1	038.6	34.88	
258.0	009.6000	0237.0	058.0	155.7	000.0185	0161.4	037.6	35.33	
259.0	009.6000	0234.1	057.8	155.0	000.0189	0159.6	036.7	35.80	
260.0	009.6000	0233.2	057.7	154.5	000.0193	0158.8	035.7	36.32	
261.0	009.6000	0234.2	057.8	154.2	000.0195	0158.9	034.7	36.87	
262.0	009.6000	0235.7	057.9	153.9	000.0197	0158.8	033.7	37.43	
263.0	009.6000	0237.8	058.1	153.6	000.0199	0158.7	032.7	37.99	
264.0	009.6000	0238.3	058.1	153.0	000.0203	0159.3	031.7	38.61	
265.0	009.6000	0239.8	058.2	152.6	000.0206	0160.8	030.7	39.31	
266.0	009.6000	0238.2	058.1	151.6	000.0213	0161.7	029.9	40.03	
267.0	009.6000	0239.0	058.1	150.9	000.0218	0159.2	028.9	40.56	
268.0	009.6000	0240.0	058.2	150.1	000.0224	0155.6	028.0	41.05	
269.0	009.6000	0242.5	058.4	149.5	000.0229	0154.1	027.0	41.70	
270.0	009.6000	0244.7	058.6	148.7	000.0235	0150.9	026.0	42.27	

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
271.0	009.6000	0246.2	058.7	147.7	000.0243	0148.9	025.1	42.93
272.0	009.6000	0246.7	058.7	146.5	000.0252	0142.7	024.2	43.32
273.0	009.6000	0247.3	058.8	145.1	000.0263	0139.8	023.4	43.94
274.0	009.6000	0249.8	059.0	143.8	000.0274	0137.7	022.4	44.65
275.0	009.6000	0253.0	059.2	142.6	000.0284	0128.4	021.5	44.92
276.0	009.6000	0256.5	059.5	141.2	000.0296	0120.5	020.6	45.30
277.0	009.6000	0258.5	059.6	139.3	000.0306	0113.4	019.7	45.59
278.0	009.6000	0261.0	059.8	137.4	000.0306	0114.8	018.9	46.36
279.0	009.6000	0263.1	060.0	135.2	000.0306	0111.7	018.1	46.75
280.0	009.6000	0263.2	060.0	132.4	000.0306	0097.8	017.5	46.06
281.0	009.6000	0266.5	060.2	129.8	000.0306	0095.3	016.8	46.45
282.0	009.6000	0269.0	060.4	126.9	000.0306	0085.2	016.1	46.02
283.0	009.6000	0271.5	060.6	123.6	000.0306	0061.6	015.5	43.86
284.0	009.6000	0275.6	060.9	120.2	000.0306	0048.6	014.9	42.15
285.0	009.6000	0278.6	061.1	116.4	000.0306	0054.2	014.4	43.71
286.0	009.6000	0281.5	061.3	112.3	000.0306	0058.7	014.0	44.87
287.0	009.6000	0284.9	061.6	108.0	000.0306	0075.8	013.7	47.38
288.0	009.6000	0286.7	061.7	103.4	000.0306	0053.3	013.6	44.62
289.0	009.6000	0286.3	061.7	098.9	000.0334	0051.6	013.7	44.50
290.0	009.6000	0285.7	061.6	094.6	000.0463	0043.5	014.0	43.99
291.0	009.6000	0285.0	061.6	090.5	000.0605	0033.2	014.4	42.35
292.0	009.6000	0287.4	061.8	086.3	000.0625	0019.9	014.6	41.42
293.0	009.6000	0290.5	062.0	082.2	000.0625	0037.6	014.9	42.88
294.0	009.6000	0292.3	062.1	078.5	000.0570	0054.8	015.4	45.69
295.0	009.6000	0293.3	062.2	075.2	000.0457	0066.2	016.0	45.73
296.0	009.6000	0293.7	062.2	072.2	000.0367	0073.8	016.7	45.07
297.0	009.6000	0294.9	062.3	069.4	000.0306	0099.4	017.4	46.32
298.0	009.6000	0296.3	062.4	066.9	000.0306	0108.6	018.1	46.49
299.0	009.6000	0296.8	062.5	064.7	000.0306	0135.5	019.0	47.71
300.0	009.6000	0295.5	062.4	063.1	000.0306	0147.8	019.9	47.76
301.0	009.6000	0297.0	062.5	061.2	000.0306	0151.3	020.8	47.30
302.0	009.6000	0300.4	062.7	059.2	000.0343	0134.4	021.6	46.05
303.0	009.6000	0301.0	062.8	057.8	000.0410	0130.0	022.6	45.79
304.0	009.6000	0301.6	062.8	056.6	000.0474	0129.1	023.6	45.63
305.0	009.6000	0303.6	063.0	055.3	000.0547	0133.0	024.5	45.82
306.0	009.6000	0307.1	063.2	053.9	000.0633	0142.3	025.5	46.39
307.0	009.6000	0308.1	063.3	053.0	000.0690	0144.0	026.5	46.17
308.0	009.6000	0310.0	063.4	052.1	000.0750	0149.0	027.5	46.18
309.0	009.6000	0309.4	063.4	051.6	000.0782	0153.0	028.6	45.92
310.0	009.6000	0308.6	063.3	051.3	000.0807	0156.8	029.7	45.62
311.0	009.6000	0308.3	063.3	050.9	000.0833	0159.8	030.8	45.30
312.0	009.6000	0309.2	063.4	050.4	000.0867	0161.5	031.9	44.98
313.0	009.6000	0310.1	063.4	050.0	000.0897	0164.0	033.0	44.69
314.0	009.6000	0311.0	063.5	049.7	000.0900	0167.0	034.0	44.29

Exhibit 7b
Contour Protection Studies Toward Select Allocation Concern(s)

Saga Communications Of New England, LLC

FMCommander Single Allocation Study - 07-14-2017 - NED 03 SEC
W298CA.P's Overlaps (In= 18.04 km, Out= 1.8 km)

W298CA.P CH 298 D DA
Lat= 42 32 01.0, Lng= 72 35 35.0
0.25 kW 108.5 m HAAT, 278 m COR
Prot.= 60 dBu, Intef.= 40 dBu

W298BT CH 298 D DA BLFT20140416AAH
Lat= 42 55 50.0, Lng= 72 18 00.0
0.25 kW -92.6 m HAAT, 193 m COR
Prot.= 60 dBu, Intef.= 40 dBu

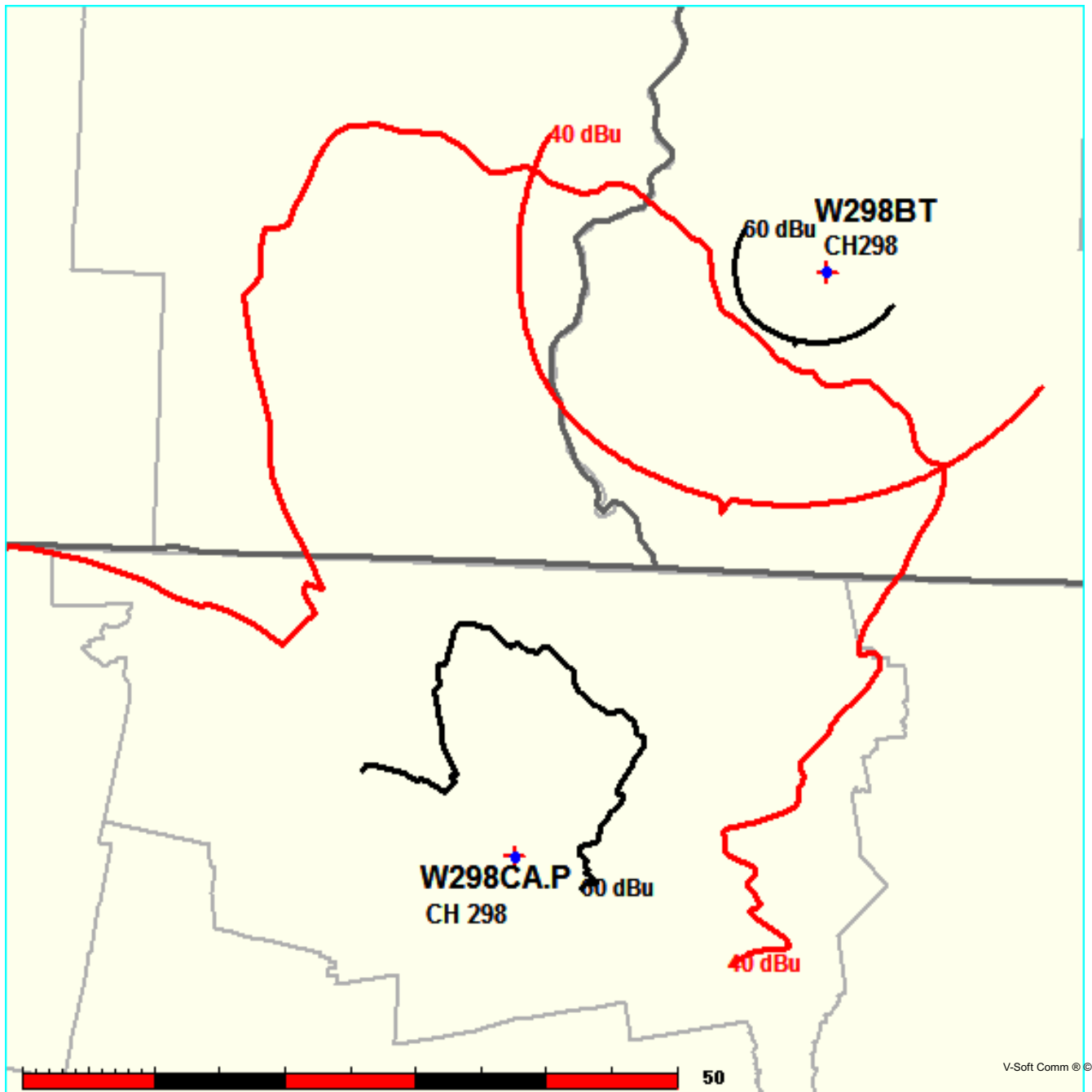


Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOver Analysis

W298CA.P

W298BT BLFT20140416AAH

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 278 m

N. Lat. 42 32 01.0

W. Lng. 72 35 35.0

Protected

60 dBu

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 193 m

N. Lat. 42 55 50.0

W. Lng. 72 18 00.0

Interfering

40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
346.0	000.2500	0185.1	017.9	226.6	000.2300	-0095.3	038.9	32.50	
347.0	000.2500	0187.7	018.0	226.5	000.2302	-0095.1	038.6	32.61	
348.0	000.2500	0185.6	017.9	226.1	000.2311	-0094.3	038.4	32.70	
349.0	000.2500	0184.6	017.8	225.8	000.2319	-0093.8	038.1	32.79	
350.0	000.2500	0181.5	017.7	225.4	000.2330	-0093.9	038.0	32.87	
351.0	000.2500	0177.2	017.5	224.9	000.2344	-0093.3	037.8	32.94	
352.0	000.2500	0176.1	017.4	224.5	000.2352	-0091.8	037.6	33.03	
353.0	000.2500	0174.2	017.3	224.1	000.2363	-0089.7	037.4	33.11	
354.0	000.2500	0172.6	017.3	223.7	000.2373	-0086.4	037.3	33.19	
355.0	000.2500	0167.3	017.0	223.1	000.2390	-0081.0	037.2	33.23	
356.0	000.2500	0162.1	016.7	222.4	000.2406	-0077.3	037.2	33.26	
357.0	000.2500	0152.9	016.1	221.5	000.2431	-0071.2	037.4	33.24	
358.0	000.2500	0149.2	015.8	220.9	000.2445	-0067.1	037.4	33.27	
359.0	000.2500	0148.0	015.8	220.5	000.2456	-0064.6	037.3	33.33	
000.0	000.2500	0150.8	015.9	220.4	000.2459	-0064.0	037.0	33.45	
001.0	000.2401	0155.5	016.1	220.2	000.2465	-0062.9	036.7	33.55	
002.0	000.2304	0155.6	015.9	219.7	000.2471	-0060.6	036.7	33.57	
003.0	000.2209	0154.3	015.6	219.1	000.2473	-0058.3	036.7	33.56	
004.0	000.2116	0155.7	015.5	218.6	000.2474	-0058.1	036.6	33.59	
005.0	000.2025	0158.4	015.5	218.3	000.2475	-0058.2	036.5	33.63	
006.0	000.1936	0159.9	015.4	217.8	000.2477	-0057.7	036.4	33.66	
007.0	000.1849	0165.9	015.5	217.6	000.2477	-0057.4	036.2	33.75	
008.0	000.1764	0176.2	015.9	217.4	000.2478	-0057.3	035.8	33.90	
009.0	000.1681	0182.1	015.9	217.1	000.2479	-0057.0	035.6	33.96	
010.0	000.1600	0185.6	015.8	216.7	000.2480	-0057.3	035.5	33.99	
011.0	000.1521	0186.3	015.7	216.1	000.2482	-0058.1	035.6	33.98	
012.0	000.1444	0187.9	015.5	215.6	000.2483	-0058.3	035.6	33.97	
013.0	000.1369	0188.4	015.3	215.1	000.2485	-0057.2	035.7	33.94	
014.0	000.1296	0190.7	015.2	214.6	000.2486	-0055.9	035.7	33.94	
015.0	000.1225	0193.1	015.0	214.2	000.2488	-0052.5	035.7	33.93	
016.0	000.1156	0193.4	014.8	213.7	000.2489	-0047.6	035.9	33.89	
017.0	000.1089	0199.2	014.8	213.3	000.2490	-0043.3	035.8	33.91	
018.0	000.1024	0200.7	014.6	212.8	000.2492	-0039.4	035.9	33.88	

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
019.0	000.0961	0190.8	014.1	212.2	000.2493	-0034.1	036.4	33.70
020.0	000.0900	0186.4	013.7	211.7	000.2495	-0030.8	036.7	33.60
021.0	000.0885	0179.1	013.4	211.2	000.2496	-0027.5	037.0	33.51
022.0	000.0870	0179.4	013.4	210.9	000.2497	-0023.7	037.0	33.51
023.0	000.0856	0179.3	013.3	210.5	000.2499	-0020.6	037.0	33.51
024.0	000.0841	0180.6	013.3	210.1	000.2500	-0017.4	037.0	33.51
025.0	000.0827	0179.2	013.2	209.8	000.2500	-0013.6	037.1	33.49
026.0	000.0812	0179.2	013.1	209.4	000.2500	-0009.8	037.1	33.47
027.0	000.0798	0178.6	013.1	209.1	000.2500	-0006.6	037.2	33.45
028.0	000.0784	0175.4	012.9	208.7	000.2500	-0003.0	037.3	33.39
029.0	000.0770	0177.9	012.9	208.4	000.2500	0001.5	037.3	33.40
030.0	000.0756	0179.8	012.9	208.0	000.2500	0006.7	037.3	33.40
031.0	000.0770	0178.1	012.9	207.7	000.2500	0011.4	037.3	33.40
032.0	000.0784	0180.7	013.1	207.3	000.2500	0014.6	037.2	33.44
033.0	000.0798	0175.1	012.9	207.0	000.2500	0016.5	037.3	33.39
034.0	000.0812	0174.7	013.0	206.6	000.2500	0018.6	037.3	33.39
035.0	000.0827	0179.4	013.2	206.2	000.2500	0020.5	037.1	33.46
036.0	000.0841	0186.2	013.5	205.8	000.2500	0023.6	036.9	33.54
037.0	000.0856	0189.6	013.6	205.4	000.2500	0027.5	036.8	33.58
038.0	000.0870	0187.8	013.6	205.0	000.2500	0031.1	036.8	33.79
039.0	000.0885	0186.3	013.6	204.7	000.2500	0032.8	036.9	34.15
040.0	000.0900	0183.1	013.6	204.3	000.2500	0034.0	037.0	34.34
041.0	000.0900	0185.0	013.7	203.9	000.2500	0033.5	037.0	34.24
042.0	000.0900	0185.1	013.7	203.6	000.2500	0031.3	037.1	33.76
043.0	000.0900	0180.7	013.5	203.3	000.2500	0029.9	037.3	33.40
044.0	000.0900	0175.7	013.3	203.1	000.2500	0028.6	037.5	33.32
045.0	000.0900	0171.7	013.2	202.8	000.2500	0026.9	037.8	33.24
046.0	000.0900	0170.3	013.1	202.6	000.2500	0024.9	037.9	33.19
047.0	000.0900	0172.8	013.2	202.2	000.2500	0022.3	037.9	33.19
048.0	000.0900	0177.5	013.4	201.7	000.2500	0018.9	037.9	33.21
049.0	000.0900	0172.4	013.2	201.6	000.2500	0017.0	038.1	33.12
050.0	000.0900	0164.3	012.9	201.5	000.2500	0016.4	038.5	32.99
051.0	000.0827	0159.3	012.4	201.5	000.2500	0016.9	039.0	32.82
052.0	000.0756	0149.6	011.7	201.8	000.2500	0019.1	039.7	32.60
053.0	000.0689	0143.9	011.2	201.9	000.2500	0020.2	040.3	32.43
054.0	000.0625	0141.5	010.9	201.9	000.2500	0020.5	040.7	32.30
055.0	000.0564	0134.4	010.3	202.1	000.2500	0021.9	041.2	32.13
056.0	000.0506	0130.1	009.9	202.2	000.2500	0022.8	041.7	31.99
057.0	000.0452	0128.5	009.6	202.3	000.2500	0023.3	042.1	31.88
058.0	000.0400	0130.1	009.3	202.3	000.2500	0023.2	042.3	31.80
059.0	000.0352	0134.1	009.2	202.3	000.2500	0022.9	042.6	31.74
060.0	000.0306	0140.9	009.1	202.1	000.2500	0022.1	042.7	31.69
061.0	000.0306	0150.6	009.5	201.7	000.2500	0018.4	042.6	31.74
062.0	000.0306	0151.8	009.5	201.5	000.2500	0016.4	042.6	31.72

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOver Analysis

W298BT BLFT20140416AAH

W298CA.P

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 193 m

N. Lat. 42 55 50.0

W. Lng. 72 18 00.0

Protected

60 dBu

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 278 m

N. Lat. 42 32 01.0

W. Lng. 72 35 35.0

Interfering

40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
164.0	000.0770	0005.9	005.3	032.9	000.0797	0175.7	046.6	38.35	
165.0	000.0771	0009.2	005.3	032.9	000.0796	0176.2	046.5	38.39	
166.0	000.0773	0012.6	005.3	032.8	000.0795	0176.7	046.5	38.44	
167.0	000.0774	0014.4	005.3	032.7	000.0794	0177.3	046.4	38.49	
168.0	000.0776	0017.9	005.3	032.6	000.0793	0177.8	046.3	38.53	
169.0	000.0777	0020.5	005.3	032.5	000.0792	0178.3	046.3	38.58	
170.0	000.0778	0023.2	005.3	032.5	000.0791	0178.7	046.2	38.62	
171.0	000.0782	0024.6	005.3	032.4	000.0789	0179.1	046.1	38.66	
172.0	000.0786	0024.4	005.3	032.3	000.0788	0179.5	046.1	38.70	
173.0	000.0789	0010.5	005.3	032.2	000.0787	0179.9	046.0	38.74	
174.0	000.0793	-0010.1	005.3	032.1	000.0786	0180.3	045.9	38.77	
175.0	000.0797	-0031.4	005.3	032.0	000.0785	0180.6	045.9	38.81	
176.0	000.0800	-0046.7	005.3	032.0	000.0783	0180.8	045.8	38.84	
177.0	000.0804	-0052.7	005.3	031.9	000.0782	0181.0	045.7	38.86	
178.0	000.0808	-0046.9	005.3	031.8	000.0781	0181.1	045.7	38.88	
179.0	000.0811	-0039.2	005.3	031.7	000.0780	0181.2	045.6	38.90	
180.0	000.0815	-0026.1	005.4	031.6	000.0778	0181.0	045.6	38.91	
181.0	000.0822	-0021.9	005.4	031.5	000.0777	0180.7	045.5	38.91	
182.0	000.0828	-0016.6	005.4	031.4	000.0776	0180.3	045.5	38.91	
183.0	000.0835	-0014.7	005.4	031.3	000.0774	0179.8	045.4	38.90	
184.0	000.0842	-0015.7	005.4	031.2	000.0773	0179.2	045.4	38.89	
185.0	000.0848	-0024.1	005.4	031.1	000.0772	0178.6	045.3	38.87	
186.0	000.0855	-0025.9	005.4	031.0	000.0770	0178.2	045.2	38.87	
187.0	000.0862	-0019.7	005.4	030.9	000.0769	0177.8	045.2	38.86	
188.0	000.0868	-0020.0	005.4	030.8	000.0767	0177.8	045.2	38.88	
189.0	000.0875	-0025.4	005.4	030.7	000.0766	0177.9	045.1	38.89	
190.0	000.0882	-0023.0	005.5	030.6	000.0764	0178.1	045.1	38.91	
191.0	000.0892	-0018.3	005.5	030.5	000.0763	0178.3	045.0	38.93	
192.0	000.0902	-0017.2	005.5	030.4	000.0761	0178.6	045.0	38.96	
193.0	000.0913	-0020.3	005.5	030.3	000.0760	0179.0	044.9	38.99	
194.0	000.0923	-0014.1	005.5	030.1	000.0758	0179.3	044.9	39.01	
195.0	000.0933	-0005.7	005.5	030.0	000.0757	0179.7	044.8	39.04	
196.0	000.0944	-0000.1	005.6	029.9	000.0757	0179.9	044.8	39.07	

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
197.0	000.0954	-0003.4	005.6	029.8	000.0759	0179.9	044.8	39.09
198.0	000.0965	-0007.2	005.6	029.7	000.0761	0179.8	044.7	39.11
199.0	000.0975	-0005.9	005.6	029.6	000.0762	0179.7	044.7	39.13
200.0	000.0986	0002.9	005.6	029.4	000.0764	0179.4	044.7	39.14
201.0	000.1003	0013.3	005.6	029.3	000.0766	0179.0	044.6	39.15
202.0	000.1020	0021.0	005.7	029.2	000.0767	0178.6	044.6	39.16
203.0	000.1037	0028.1	005.7	029.1	000.0769	0178.3	044.5	39.16
204.0	000.1055	0033.8	006.0	029.0	000.0770	0177.9	044.2	39.30
205.0	000.1073	0031.3	005.8	028.8	000.0772	0177.6	044.4	39.22
206.0	000.1090	0021.8	005.8	028.7	000.0774	0177.4	044.4	39.20
207.0	000.1108	0016.3	005.8	028.6	000.0776	0177.2	044.4	39.21
208.0	000.1126	0006.8	005.8	028.4	000.0778	0176.8	044.4	39.21
209.0	000.1144	-0006.1	005.8	028.3	000.0780	0176.4	044.4	39.21
210.0	000.1163	-0016.2	005.9	028.2	000.0781	0176.0	044.4	39.21
211.0	000.1182	-0025.0	005.9	028.0	000.0783	0175.6	044.3	39.21
212.0	000.1201	-0032.8	005.9	027.9	000.0785	0175.2	044.3	39.21
213.0	000.1221	-0041.1	005.9	027.8	000.0787	0175.1	044.3	39.22
214.0	000.1240	-0050.8	005.9	027.6	000.0789	0175.1	044.3	39.24
215.0	000.1260	-0056.9	006.0	027.5	000.0791	0175.4	044.3	39.26
216.0	000.1280	-0058.3	006.0	027.4	000.0793	0176.0	044.3	39.31
217.0	000.1300	-0057.1	006.0	027.2	000.0795	0177.0	044.3	39.37
218.0	000.1321	-0058.0	006.0	027.1	000.0797	0178.1	044.3	39.44
219.0	000.1341	-0057.9	006.1	026.9	000.0799	0178.9	044.3	39.48
220.0	000.1362	-0062.0	006.1	026.8	000.0801	0179.3	044.3	39.51
221.0	000.1390	-0067.6	006.1	026.7	000.0803	0179.2	044.2	39.52
222.0	000.1419	-0074.4	006.2	026.5	000.0805	0179.0	044.2	39.53
223.0	000.1448	-0080.4	006.2	026.4	000.0807	0178.7	044.2	39.53
224.0	000.1478	-0088.8	006.2	026.2	000.0809	0178.9	044.2	39.54
225.0	000.1507	-0093.5	006.2	026.1	000.0811	0179.0	044.2	39.56
226.0	000.1537	-0094.1	006.3	025.9	000.0813	0179.4	044.3	39.58
227.0	000.1568	-0096.0	006.3	025.8	000.0815	0179.7	044.3	39.61
228.0	000.1598	-0095.4	006.3	025.6	000.0817	0179.7	044.3	39.61
229.0	000.1629	-0094.3	006.4	025.5	000.0819	0179.5	044.3	39.61
230.0	000.1661	-0095.6	006.4	025.3	000.0822	0179.1	044.3	39.59
231.0	000.1694	-0096.5	006.4	025.2	000.0824	0178.9	044.3	39.59
232.0	000.1728	-0098.8	006.5	025.0	000.0826	0179.1	044.3	39.60
233.0	000.1762	-0098.1	006.5	024.9	000.0828	0179.7	044.4	39.62
234.0	000.1797	-0099.3	006.5	024.8	000.0830	0180.2	044.4	39.65
235.0	000.1832	-0101.6	006.6	024.6	000.0832	0180.6	044.4	39.67
236.0	000.1867	-0106.3	006.6	024.5	000.0834	0180.8	044.5	39.68
237.0	000.1903	-0109.5	006.6	024.3	000.0837	0180.9	044.5	39.67
238.0	000.1939	-0109.1	006.7	024.2	000.0839	0180.8	044.5	39.67
239.0	000.1975	-0114.5	006.7	024.0	000.0841	0180.6	044.6	39.65

Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

Saga Communications Of New England, LLC

FMCommander Single Allocation Study - 07-14-2017 - NED 03 SEC

W298CA.P's Overlaps (In= 4.61 km, Out= 4.01 km)

W298CA.P CH 298 D DA

Lat= 42 32 01.0, Lng= 72 35 35.0

0.25 kW 108.5 m HAAT, 278 m COR

Prot.= 60 dBu, Intef.= 54 dBu

WAIY-LP CH 299 L1 BLL20161031ABH

Lat= 42 20 54.0, Lng= 72 28 04.0

0.1 kW 12 m HAAT, 160 m COR

Prot.= 60 dBu, Intef.= 54 dBu

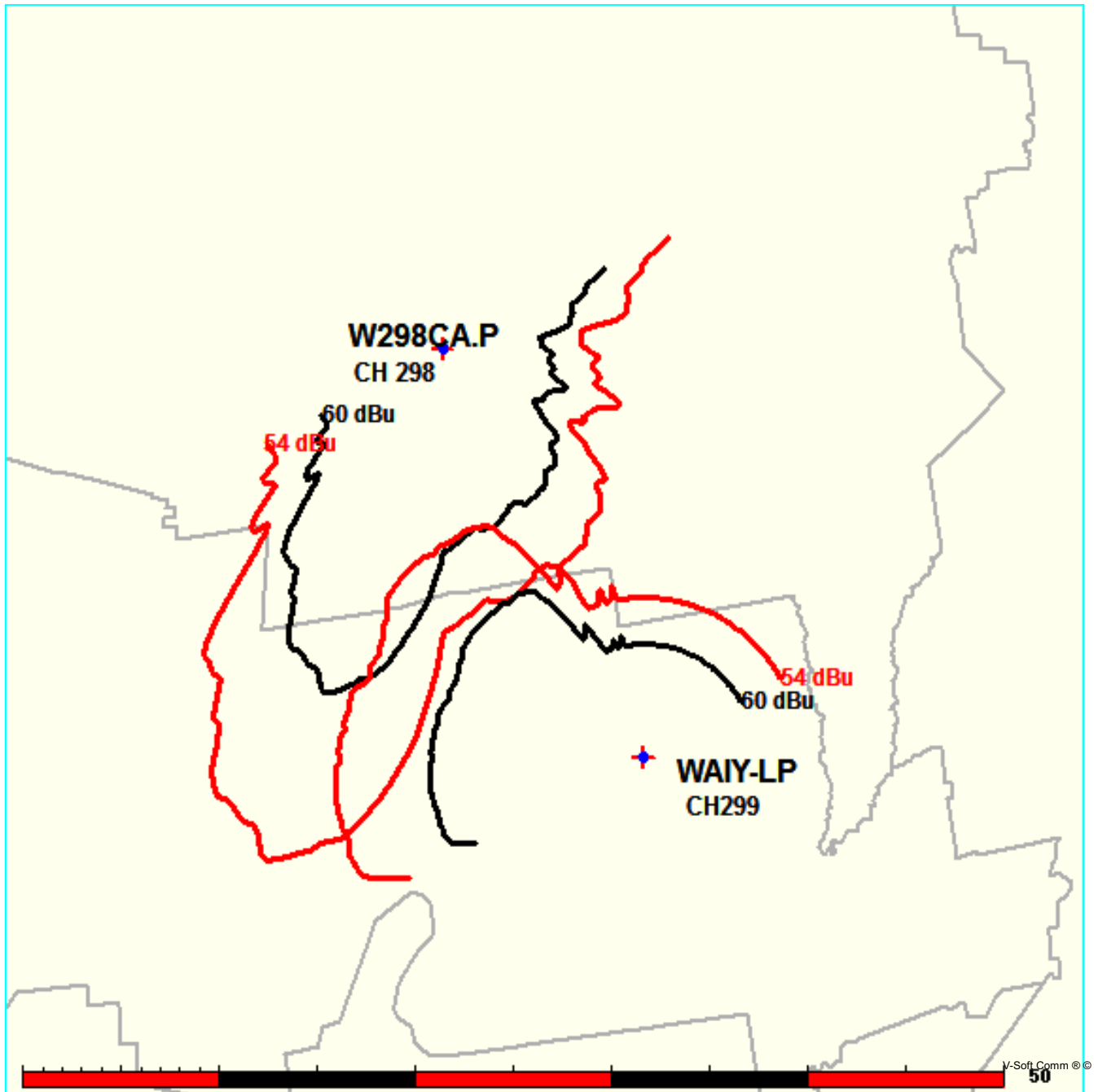


Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOver Analysis

W298CA.P

WAIY-LP BLL20161031ABH

Channel = 298D
 Max ERP = 0.25 kW
 RCAMSL = 278 m
 N. Lat. 42 32 01.0
 W. Lng. 72 35 35.0
 Protected
 60 dBu

Channel = 299L1
 Max ERP = 0.1 kW
 RCAMSL = 160 m
 N. Lat. 42 20 54.0
 W. Lng. 72 28 04.0
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
112.0	000.0306	0058.9	005.9	345.4	000.0956	0034.4	019.0	40.54	
113.0	000.0306	0057.2	005.8	345.0	000.0953	0035.2	019.0	40.75	
114.0	000.0306	0056.4	005.8	344.7	000.0950	0034.8	018.9	40.70	
115.0	000.0306	0054.6	005.7	344.3	000.0946	0033.8	018.9	40.45	
116.0	000.0306	0054.2	005.7	344.1	000.0944	0033.1	018.8	40.31	
117.0	000.0306	0055.4	005.7	344.0	000.0943	0033.3	018.7	40.45	
118.0	000.0306	0054.9	005.7	343.7	000.0941	0033.3	018.7	40.49	
119.0	000.0306	0050.8	005.5	343.0	000.0934	0028.4	018.8	39.56	
120.0	000.0306	0048.6	005.4	342.6	000.0930	0022.7	018.8	39.52	
121.0	000.0306	0049.1	005.4	342.4	000.0929	0021.2	018.7	39.58	
122.0	000.0306	0051.8	005.5	342.5	000.0929	0021.9	018.5	39.73	
123.0	000.0306	0057.7	005.8	342.9	000.0933	0026.5	018.2	39.99	
124.0	000.0306	0064.0	006.1	343.2	000.0936	0029.5	017.9	40.23	
125.0	000.0306	0070.4	006.4	343.5	000.0938	0031.6	017.7	40.88	
126.0	000.0306	0077.5	006.7	343.8	000.0941	0033.5	017.3	41.65	
127.0	000.0306	0086.2	007.1	344.2	000.0945	0033.5	017.0	41.97	
128.0	000.0306	0092.5	007.4	344.4	000.0947	0034.2	016.7	42.42	
129.0	000.0306	0096.2	007.5	344.4	000.0947	0034.0	016.5	42.53	
130.0	000.0306	0094.7	007.4	343.9	000.0942	0033.6	016.5	42.42	
131.0	000.0306	0092.2	007.3	343.3	000.0937	0030.4	016.5	41.58	
132.0	000.0306	0095.2	007.5	343.2	000.0935	0029.3	016.3	41.61	
133.0	000.0306	0101.4	007.7	343.2	000.0936	0029.8	016.0	41.85	
134.0	000.0306	0106.3	007.9	343.1	000.0935	0029.0	015.8	42.05	
135.0	000.0306	0111.3	008.1	343.0	000.0934	0028.0	015.6	42.24	
136.0	000.0306	0113.4	008.2	342.7	000.0931	0023.9	015.4	42.34	
137.0	000.0306	0114.9	008.2	342.3	000.0927	0019.8	015.3	42.42	
138.0	000.0306	0114.0	008.2	341.7	000.0922	0018.5	015.3	42.42	
139.0	000.0306	0113.4	008.2	341.2	000.0917	0018.6	015.2	42.44	
140.0	000.0306	0114.1	008.2	340.7	000.0913	0020.2	015.2	42.48	
141.0	000.0298	0119.2	008.3	340.4	000.0910	0020.9	015.0	42.60	
142.0	000.0289	0125.6	008.5	340.0	000.0907	0021.5	014.8	42.79	
143.0	000.0281	0131.8	008.6	339.6	000.0898	0022.4	014.6	42.95	

Exhibit 7c
Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
144.0	000.0272	0138.3	008.8	339.2	000.0889	0024.1	014.5	43.13
145.0	000.0264	0139.9	008.7	338.6	000.0875	0029.7	014.4	43.09
146.0	000.0256	0140.7	008.7	338.0	000.0860	0036.1	014.4	44.48
147.0	000.0248	0146.1	008.8	337.5	000.0849	0041.0	014.3	45.70
148.0	000.0240	0149.4	008.9	336.9	000.0836	0043.2	014.2	46.19
149.0	000.0233	0152.5	008.9	336.3	000.0822	0046.0	014.2	46.75
150.0	000.0225	0155.2	008.9	335.7	000.0809	0049.3	014.2	47.35
151.0	000.0218	0159.7	009.0	335.1	000.0796	0050.3	014.1	47.58
152.0	000.0210	0161.6	008.9	334.4	000.0782	0047.5	014.1	46.95
153.0	000.0203	0159.4	008.8	333.8	000.0768	0043.9	014.2	45.96
154.0	000.0196	0158.9	008.7	333.2	000.0755	0043.1	014.3	45.61
155.0	000.0189	0159.7	008.6	332.6	000.0742	0041.8	014.4	45.19
156.0	000.0182	0163.1	008.7	332.0	000.0730	0042.6	014.4	45.30
157.0	000.0176	0167.0	008.7	331.4	000.0717	0048.3	014.4	46.40
158.0	000.0169	0175.8	008.8	330.7	000.0703	0054.0	014.2	47.51
159.0	000.0163	0184.8	009.0	330.0	000.0689	0060.3	014.1	48.49
160.0	000.0156	0190.8	009.0	329.3	000.0671	0064.4	014.1	48.91
161.0	000.0154	0196.8	009.1	328.6	000.0651	0070.9	014.0	49.66
162.0	000.0150	0205.2	009.3	327.8	000.0631	0077.7	013.9	50.42
163.0	000.0146	0209.7	009.3	327.1	000.0613	0082.2	013.9	50.78
164.0	000.0144	0215.1	009.4	326.4	000.0594	0089.2	013.9	51.40
165.0	000.0140	0219.3	009.4	325.7	000.0577	0095.0	013.9	51.80
166.0	000.0138	0220.1	009.4	325.1	000.0562	0096.8	014.0	51.76
167.0	000.0136	0221.7	009.4	324.5	000.0547	0097.4	014.1	51.62
168.0	000.0132	0222.9	009.4	323.9	000.0534	0097.8	014.1	51.43
169.0	000.0129	0222.5	009.3	323.5	000.0522	0098.5	014.3	51.23
170.0	000.0127	0221.2	009.2	323.0	000.0512	0099.2	014.4	51.06
171.0	000.0136	0219.7	009.4	322.2	000.0493	0100.3	014.4	51.04
172.0	000.0144	0217.0	009.4	321.5	000.0476	0101.1	014.4	50.95
173.0	000.0154	0215.1	009.6	320.7	000.0458	0101.3	014.4	50.81
174.0	000.0163	0214.8	009.7	319.8	000.0439	0101.4	014.4	50.66
175.0	000.0172	0213.2	009.8	319.0	000.0422	0101.6	014.4	50.48
176.0	000.0182	0211.2	009.9	318.2	000.0406	0101.9	014.4	50.30
177.0	000.0193	0211.0	010.0	317.4	000.0387	0103.1	014.4	50.20
178.0	000.0203	0210.6	010.1	316.5	000.0370	0103.9	014.4	50.04
179.0	000.0215	0208.6	010.2	315.8	000.0355	0104.7	014.5	49.87
180.0	000.0225	0206.6	010.3	315.1	000.0341	0105.1	014.6	49.65
181.0	000.0289	0212.5	011.1	312.2	000.0288	0105.7	014.1	49.45
182.0	000.0361	0218.2	011.9	309.3	000.0240	0107.3	013.8	49.17
183.0	000.0441	0222.0	012.5	306.5	000.0200	0108.1	013.6	48.72
184.0	000.0529	0223.7	013.1	303.8	000.0166	0108.8	013.5	48.12
185.0	000.0625	0222.9	013.6	301.4	000.0138	0109.2	013.4	47.40
186.0	000.0729	0222.0	014.1	299.1	000.0122	0106.0	013.5	46.58

Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOVer Analysis

WAIY-LP BLL20161031ABH

W298CA.P

Channel = 299L1

Max ERP = 0.1 kW

RCAMSL = 160 m

N. Lat. 42 20 54.0

W. Lng. 72 28 04.0

Protected

60 dBu

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 278 m

N. Lat. 42 32 01.0

W. Lng. 72 35 35.0

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
291.0	000.1000	0101.2	010.4	178.0	000.0203	0210.7	016.9	51.63	
292.0	000.1000	0101.2	010.4	177.7	000.0200	0210.8	016.7	51.72	
293.0	000.1000	0101.2	010.4	177.4	000.0198	0210.8	016.6	51.80	
294.0	000.1000	0102.0	010.4	177.3	000.0196	0210.9	016.4	51.92	
295.0	000.1000	0103.4	010.5	177.2	000.0195	0210.9	016.2	52.07	
296.0	000.1000	0105.0	010.6	177.1	000.0195	0211.0	016.0	52.23	
297.0	000.1000	0104.9	010.6	176.8	000.0191	0211.0	015.8	52.28	
298.0	000.1000	0105.1	010.6	176.5	000.0188	0211.1	015.7	52.34	
299.0	000.1000	0105.9	010.6	176.3	000.0185	0211.1	015.5	52.44	
300.0	000.1000	0107.7	010.7	176.1	000.0184	0211.1	015.3	52.58	
301.0	000.1000	0108.9	010.7	175.9	000.0181	0211.2	015.1	52.68	
302.0	000.1000	0109.4	010.8	175.6	000.0178	0211.4	014.9	52.48	
303.0	000.1000	0109.0	010.7	175.1	000.0172	0213.0	014.8	52.58	
304.0	000.1000	0108.8	010.7	174.6	000.0168	0214.2	014.7	52.67	
305.0	000.1000	0108.6	010.7	174.1	000.0163	0214.8	014.5	52.74	
306.0	000.1000	0108.3	010.7	173.5	000.0159	0214.7	014.4	52.76	
307.0	000.1000	0108.0	010.7	173.0	000.0154	0215.1	014.3	52.80	
308.0	000.1000	0107.7	010.7	172.4	000.0148	0216.0	014.1	52.82	
309.0	000.1000	0107.3	010.7	171.8	000.0143	0217.6	014.0	52.87	
310.0	000.1000	0107.1	010.7	171.2	000.0138	0219.2	013.9	52.94	
311.0	000.1000	0106.5	010.6	170.6	000.0132	0220.6	013.8	52.92	
312.0	000.1000	0105.9	010.6	169.9	000.0127	0221.4	013.7	52.91	
313.0	000.1000	0105.2	010.6	169.2	000.0128	0222.2	013.6	53.11	
314.0	000.1000	0104.7	010.5	168.5	000.0130	0223.0	013.6	53.32	
315.0	000.1000	0105.2	010.6	167.9	000.0133	0222.8	013.4	53.55	
316.0	000.1000	0104.5	010.5	167.2	000.0135	0222.1	013.4	53.70	
317.0	000.1000	0103.5	010.5	166.4	000.0137	0220.6	013.3	53.77	
318.0	000.1000	0102.2	010.4	165.6	000.0139	0219.9	013.3	53.85	
319.0	000.1000	0101.6	010.4	164.8	000.0141	0219.0	013.2	53.95	
320.0	000.1000	0101.4	010.4	164.1	000.0144	0215.6	013.2	53.99	
321.0	000.1000	0101.2	010.4	163.3	000.0146	0210.7	013.1	53.94	

Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)		Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
322.0	000.1000	0100.5	010.3		162.5	000.0148	0208.4	013.1	53.96
323.0	000.1000	0099.2	010.3		161.7	000.0151	0202.8	013.1	53.82
324.0	000.1000	0097.7	010.2		160.9	000.0154	0195.9	013.1	53.59
325.0	000.1000	0097.0	010.2		160.1	000.0156	0191.2	013.1	53.46
326.0	000.1000	0093.2	010.0		159.1	000.0162	0185.4	013.2	53.17
327.0	000.1000	0083.1	009.4		157.9	000.0169	0175.1	013.7	52.23
328.0	000.1000	0076.7	009.1		157.0	000.0176	0167.0	014.0	51.53
329.0	000.1000	0066.6	008.4		156.0	000.0182	0163.2	014.6	50.74
330.0	000.1000	0060.3	008.0		155.3	000.0187	0160.0	015.0	50.38
331.0	000.1000	0051.9	007.4		154.6	000.0192	0159.0	015.6	49.92
332.0	000.1000	0042.5	006.6		154.1	000.0196	0158.9	016.4	49.39
333.0	000.1000	0042.7	006.7		153.7	000.0198	0158.7	016.4	49.45
334.0	000.1000	0044.6	006.8		153.2	000.0201	0159.1	016.2	49.67
335.0	000.1000	0050.2	007.3		152.8	000.0205	0160.1	015.8	50.18
336.0	000.1000	0047.5	007.0		152.3	000.0208	0161.2	016.0	50.11
337.0	000.1000	0042.9	006.7		152.0	000.0210	0161.6	016.4	49.88
338.0	000.1000	0036.1	006.1		151.8	000.0212	0161.7	016.9	49.45
339.0	000.1000	0025.7	005.6		151.7	000.0213	0161.7	017.4	49.05
340.0	000.1000	0021.6	005.6		151.4	000.0215	0161.5	017.4	49.08
341.0	000.1000	0019.5	005.6		151.0	000.0217	0159.8	017.4	49.01
342.0	000.1000	0018.4	005.6		150.7	000.0220	0158.4	017.5	48.96
343.0	000.1000	0028.0	005.6		150.4	000.0222	0156.6	017.5	48.88
344.0	000.1000	0033.3	005.9		149.9	000.0226	0154.8	017.2	49.04
345.0	000.1000	0035.2	006.1		149.4	000.0229	0154.0	017.1	49.15
346.0	000.1000	0029.4	005.6		149.5	000.0229	0154.1	017.6	48.80
347.0	000.1000	0026.5	005.6		149.2	000.0231	0153.3	017.6	48.77
348.0	000.1000	0031.7	005.8		148.7	000.0235	0151.0	017.5	48.77
349.0	000.1000	0036.2	006.1		148.0	000.0241	0149.4	017.2	49.03
350.0	000.1000	0029.7	005.6		148.3	000.0238	0149.7	017.7	48.59
351.0	000.1000	0016.3	005.6		148.0	000.0241	0149.4	017.7	48.58
352.0	000.1000	-0001.3	005.6		147.7	000.0243	0148.8	017.8	48.55
353.0	000.1000	-0021.5	005.6		147.4	000.0245	0147.7	017.8	48.48
354.0	000.1000	-0036.3	005.6		147.1	000.0247	0146.6	017.9	48.41
355.0	000.1000	-0047.8	005.6		146.8	000.0249	0144.8	017.9	48.30
356.0	000.1000	-0058.6	005.6		146.5	000.0252	0143.1	017.9	48.19
357.0	000.1000	-0060.5	005.6		146.3	000.0254	0142.1	018.0	48.12
358.0	000.1000	-0066.1	005.6		146.0	000.0256	0140.7	018.0	48.02
359.0	000.1000	-0071.5	005.6		145.7	000.0258	0139.9	018.1	47.96
000.0	000.1000	-0075.6	005.6		145.5	000.0260	0139.6	018.2	47.93
001.0	000.1000	-0080.9	005.6		145.2	000.0262	0139.6	018.2	47.92
002.0	000.1000	-0084.5	005.6		145.0	000.0264	0140.0	018.3	47.93
003.0	000.1000	-0092.9	005.6		144.7	000.0266	0140.0	018.3	47.92
004.0	000.1000	-0100.0	005.6		144.5	000.0268	0139.7	018.4	47.88
005.0	000.1000	-0103.7	005.6		144.3	000.0270	0139.2	018.5	47.82

Exhibit 7d

Contour Protection Studies Toward Select Allocation Concern(s)

Saga Communications Of New England, Llc

FMCommander Single Allocation Study - 07-14-2017 - NED 03 SEC
W298CA.P's Overlaps (In= 10.64 km, Out= 5.1 km)

W298CA.P CH 298 D DA
Lat= 42 32 01.0, Lng= 72 35 35.0
0.25 kW 108.5 m HAAT, 278 m COR
Prot.= 60 dBu, Intef.= 54 dBu

WVEW-LP CH 299 L1 BLL20120412AAN
Lat= 42 50 31.0, Lng= 72 34 27.0
0.1 kW 0 m HAAT, 179 m COR
Prot.= 60 dBu, Intef.= 54 dBu

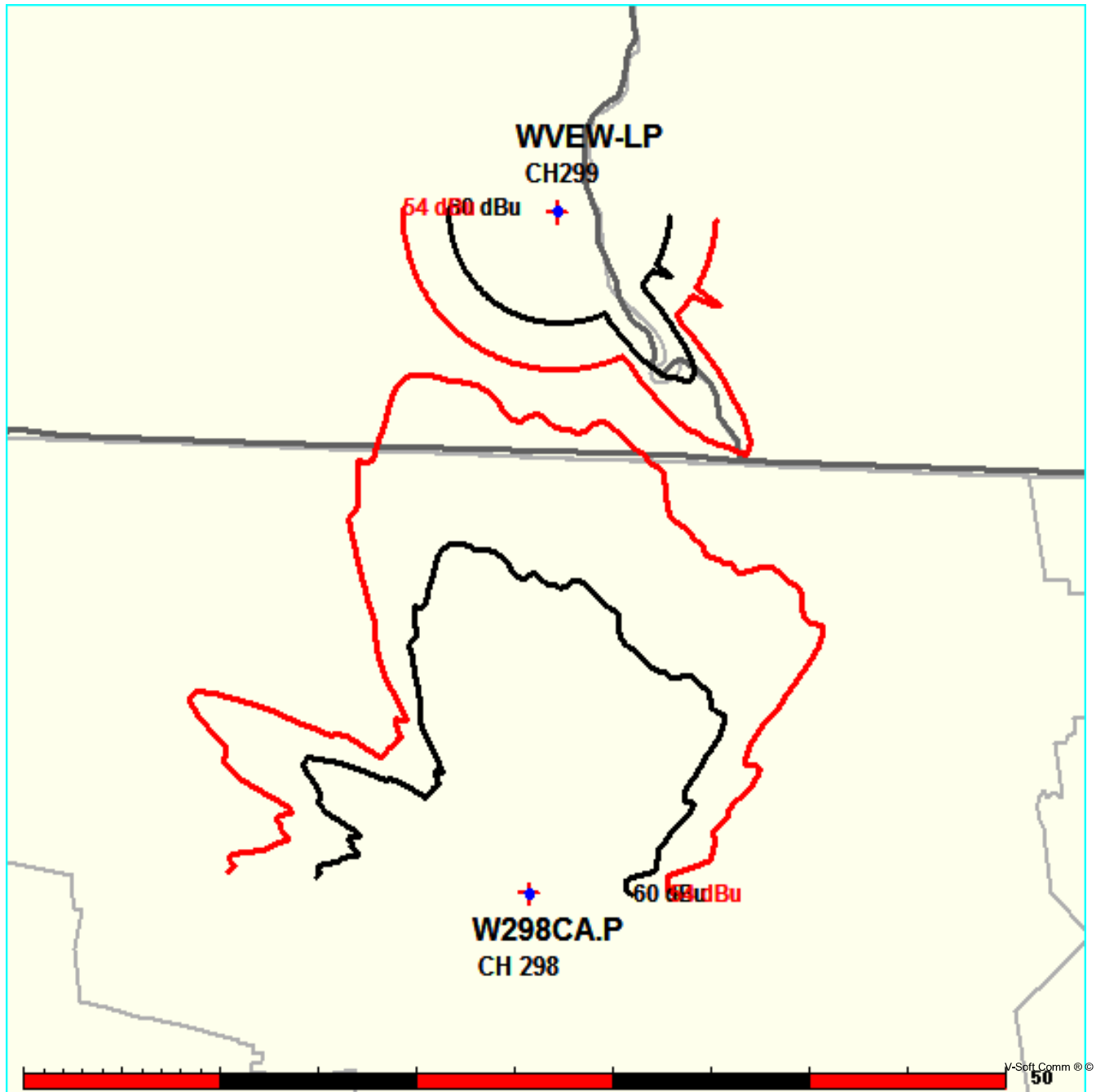


Exhibit 7d

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOver Analysis

W298CA.P

WVEW-LP BLL20120412AAN

Channel = 298D

Max ERP = 0.25 kW

RCAMSL = 278 m

N. Lat. 42 32 01.0

W. Lng. 72 35 35.0

Protected

60 dBu

Channel = 299L1

Max ERP = 0.1 kW

RCAMSL = 179 m

N. Lat. 42 50 31.0

W. Lng. 72 34 27.0

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
323.0	000.2500	0034.5	007.5	192.2	000.1000	-0121.7	028.9	32.81	
324.0	000.2500	0033.4	007.4	191.8	000.1000	-0126.8	028.9	32.82	
325.0	000.2500	0039.9	008.1	192.7	000.1000	-0111.7	028.3	33.14	
326.0	000.2500	0051.7	009.4	194.5	000.1000	-0058.4	027.3	33.70	
327.0	000.2500	0059.5	010.1	195.3	000.1000	-0037.8	026.7	34.05	
328.0	000.2500	0064.4	010.5	195.6	000.1000	-0034.9	026.4	34.29	
329.0	000.2500	0067.6	010.7	195.7	000.1000	-0034.2	026.1	34.47	
330.0	000.2500	0071.8	011.0	195.9	000.1000	-0034.0	025.7	34.69	
331.0	000.2500	0081.0	011.6	196.6	000.1000	-0034.9	025.1	35.07	
332.0	000.2500	0092.8	012.4	197.5	000.1000	-0040.9	024.5	35.53	
333.0	000.2500	0104.7	013.2	198.4	000.1000	-0054.6	023.8	36.01	
334.0	000.2500	0116.5	013.9	199.3	000.1000	-0063.2	023.1	36.49	
335.0	000.2500	0117.6	013.9	198.9	000.1000	-0060.3	022.9	36.64	
336.0	000.2500	0121.4	014.1	198.9	000.1000	-0059.7	022.6	36.88	
337.0	000.2500	0134.0	014.9	199.7	000.1000	-0065.7	021.9	37.41	
338.0	000.2500	0144.5	015.5	200.3	000.1000	-0068.7	021.2	37.92	
339.0	000.2500	0141.8	015.4	199.5	000.1000	-0064.7	021.1	37.96	
340.0	000.2500	0142.1	015.4	199.0	000.1000	-0060.4	021.0	38.10	
341.0	000.2500	0149.8	015.9	199.2	000.1000	-0062.7	020.4	38.54	
342.0	000.2500	0155.6	016.3	199.2	000.1000	-0062.9	019.9	38.91	
343.0	000.2500	0162.8	016.7	199.3	000.1000	-0063.7	019.4	39.33	
344.0	000.2500	0171.9	017.2	199.5	000.1000	-0065.0	018.8	39.81	
345.0	000.2500	0179.5	017.6	199.4	000.1000	-0064.5	018.3	40.21	
346.0	000.2500	0185.1	017.9	199.1	000.1000	-0061.5	017.9	40.53	
347.0	000.2500	0187.7	018.0	198.4	000.1000	-0054.5	017.7	40.75	
348.0	000.2500	0185.6	017.9	197.4	000.1000	-0039.6	017.6	40.81	
349.0	000.2500	0184.6	017.8	196.4	000.1000	-0034.4	017.5	40.91	
350.0	000.2500	0181.5	017.7	195.3	000.1000	-0037.9	017.5	40.92	
351.0	000.2500	0177.2	017.5	194.1	000.1000	-0069.2	017.5	40.86	
352.0	000.2500	0176.1	017.4	193.1	000.1000	-0102.4	017.5	40.91	
353.0	000.2500	0174.2	017.3	192.1	000.1000	-0122.7	017.5	40.93	

Exhibit 7d
Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
354.0	000.2500	0172.6	017.3	191.1	000.1000	-0134.8	017.4	40.93
355.0	000.2500	0167.3	017.0	189.9	000.1000	-0128.2	017.6	40.77
356.0	000.2500	0162.1	016.7	188.7	000.1000	-0117.5	017.9	40.59
357.0	000.2500	0152.9	016.1	187.5	000.1000	-0104.7	018.4	40.17
358.0	000.2500	0149.2	015.8	186.5	000.1000	-0091.8	018.6	40.01
359.0	000.2500	0148.0	015.8	185.6	000.1000	-0082.8	018.6	39.98
000.0	000.2500	0150.8	015.9	184.8	000.1000	-0077.5	018.4	40.15
001.0	000.2401	0155.5	016.1	184.0	000.1000	-0071.6	018.3	40.26
002.0	000.2304	0155.6	015.9	183.1	000.1000	-0063.8	018.4	40.12
003.0	000.2209	0154.3	015.6	182.2	000.1000	-0052.5	018.7	39.90
004.0	000.2116	0155.7	015.5	181.4	000.1000	-0040.6	018.8	39.81
005.0	000.2025	0158.4	015.5	180.6	000.1000	-0024.6	018.8	39.78
006.0	000.1936	0159.9	015.4	179.8	000.1000	-0014.9	019.0	39.68
007.0	000.1849	0165.9	015.5	178.9	000.1000	-0002.1	018.9	39.76
008.0	000.1764	0176.2	015.9	178.0	000.1000	0005.2	018.6	39.99
009.0	000.1681	0182.1	015.9	177.1	000.1000	-0005.2	018.6	39.99
010.0	000.1600	0185.6	015.8	176.3	000.1000	-0019.7	018.7	39.89
011.0	000.1521	0186.3	015.7	175.6	000.1000	-0028.4	019.0	39.68
012.0	000.1444	0187.9	015.5	175.0	000.1000	-0035.0	019.2	39.50
013.0	000.1369	0188.4	015.3	174.4	000.1000	-0037.6	019.5	39.28
014.0	000.1296	0190.7	015.2	173.8	000.1000	-0037.4	019.7	39.11
015.0	000.1225	0193.1	015.0	173.2	000.1000	-0034.4	019.9	38.94
016.0	000.1156	0193.4	014.8	172.8	000.1000	-0034.8	020.2	38.71
017.0	000.1089	0199.2	014.8	172.1	000.1000	-0042.8	020.3	38.61
018.0	000.1024	0200.7	014.6	171.7	000.1000	-0050.1	020.6	38.40
019.0	000.0961	0190.8	014.1	171.8	000.1000	-0048.7	021.2	37.91
020.0	000.0900	0186.4	013.7	171.7	000.1000	-0050.3	021.6	37.58
021.0	000.0885	0179.1	013.4	171.5	000.1000	-0052.7	022.0	37.29
022.0	000.0870	0179.4	013.4	171.0	000.1000	-0058.7	022.2	37.18
023.0	000.0856	0179.3	013.3	170.6	000.1000	-0065.2	022.3	37.05
024.0	000.0841	0180.6	013.3	170.1	000.1000	-0072.4	022.5	36.95
025.0	000.0827	0179.2	013.2	169.8	000.1000	-0076.6	022.7	36.79
026.0	000.0812	0179.2	013.1	169.4	000.1000	-0079.0	022.9	36.65
027.0	000.0798	0178.6	013.1	169.1	000.1000	-0079.2	023.1	36.51
028.0	000.0784	0175.4	012.9	168.9	000.1000	-0078.8	023.3	36.31
029.0	000.0770	0177.9	012.9	168.4	000.1000	-0076.3	023.5	36.23
030.0	000.0756	0179.8	012.9	168.0	000.1000	-0072.9	023.6	36.12
031.0	000.0770	0178.1	012.9	167.6	000.1000	-0069.9	023.8	36.02
032.0	000.0784	0180.7	013.1	166.9	000.1000	-0065.7	023.8	35.98
033.0	000.0798	0175.1	012.9	166.8	000.1000	-0064.0	024.1	35.80
034.0	000.0812	0174.7	013.0	166.4	000.1000	-0057.7	024.2	35.70
035.0	000.0827	0179.4	013.2	165.6	000.1000	-0045.4	024.2	35.68
036.0	000.0841	0186.2	013.5	164.8	000.1000	-0038.4	024.2	35.68
037.0	000.0856	0189.6	013.6	164.1	000.1000	-0039.3	024.3	35.63

Exhibit 7d

Contour Protection Studies Toward Select Allocation Concern(s)

07-14-2017

Terrain Data: NED 03 SEC

FMOver Analysis

WVEW-LP BLL20120412AAN

W298CA.P

Channel = 299L1
 Max ERP = 0.1 kW
 RCAMSL = 179 m
 N. Lat. 42 50 31.0
 W. Lng. 72 34 27.0
 Protected
 60 dBu

Channel = 298D
 Max ERP = 0.25 kW
 RCAMSL = 278 m
 N. Lat. 42 32 01.0
 W. Lng. 72 35 35.0
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
138.0	000.1000	0093.4	010.0	017.0	000.1088	0199.3	028.1	50.00	
139.0	000.1000	0101.9	010.4	017.6	000.1051	0201.9	027.7	50.20	
140.0	000.1000	0106.7	010.6	017.8	000.1038	0201.9	027.4	50.33	
141.0	000.1000	0109.9	010.8	017.8	000.1035	0201.7	027.2	50.47	
142.0	000.1000	0111.6	010.9	017.7	000.1040	0201.9	027.0	50.63	
143.0	000.1000	0107.9	010.7	017.2	000.1074	0200.8	026.9	50.76	
144.0	000.1000	0102.6	010.4	016.6	000.1118	0197.0	027.0	50.77	
145.0	000.1000	0098.6	010.2	016.0	000.1157	0193.3	026.9	50.77	
146.0	000.1000	0095.4	010.1	015.5	000.1191	0193.1	026.9	50.91	
147.0	000.1000	0090.2	009.8	014.8	000.1238	0193.0	026.9	51.05	
148.0	000.1000	0084.3	009.5	014.1	000.1292	0190.9	027.0	51.07	
149.0	000.1000	0078.3	009.1	013.3	000.1347	0188.4	027.2	51.05	
150.0	000.1000	0071.9	008.8	012.5	000.1406	0188.6	027.3	51.14	
151.0	000.1000	0063.8	008.2	011.6	000.1478	0187.6	027.6	51.12	
152.0	000.1000	0055.5	007.7	010.6	000.1553	0185.7	028.0	51.02	
153.0	000.1000	0047.7	007.1	009.6	000.1630	0185.0	028.4	50.94	
154.0	000.1000	0043.7	006.7	009.1	000.1676	0182.4	028.6	50.83	
155.0	000.1000	0035.2	006.1	008.1	000.1755	0177.1	029.1	50.47	
156.0	000.1000	0024.9	005.6	007.5	000.1807	0172.7	029.4	50.19	
157.0	000.1000	0013.7	005.6	007.3	000.1821	0171.2	029.3	50.18	
158.0	000.1000	0005.8	005.6	007.2	000.1835	0168.6	029.3	50.10	
159.0	000.1000	-0004.8	005.6	007.0	000.1849	0165.9	029.2	50.02	
160.0	000.1000	-0020.5	005.6	006.8	000.1864	0163.9	029.2	49.97	
161.0	000.1000	-0032.7	005.6	006.7	000.1879	0162.5	029.1	49.95	
162.0	000.1000	-0041.1	005.6	006.5	000.1894	0161.0	029.1	49.93	
163.0	000.1000	-0042.0	005.6	006.3	000.1910	0160.2	029.1	49.94	
164.0	000.1000	-0039.2	005.6	006.1	000.1925	0159.8	029.0	49.98	
165.0	000.1000	-0038.0	005.6	005.9	000.1941	0159.9	029.0	50.04	
166.0	000.1000	-0052.0	005.6	005.8	000.1957	0160.0	029.0	50.10	
167.0	000.1000	-0066.2	005.6	005.6	000.1974	0159.9	028.9	50.15	
168.0	000.1000	-0073.0	005.6	005.4	000.1990	0159.8	028.9	50.20	
169.0	000.1000	-0079.1	005.6	005.2	000.2007	0159.3	028.9	50.23	
170.0	000.1000	-0074.0	005.6	005.0	000.2024	0158.5	028.8	50.23	

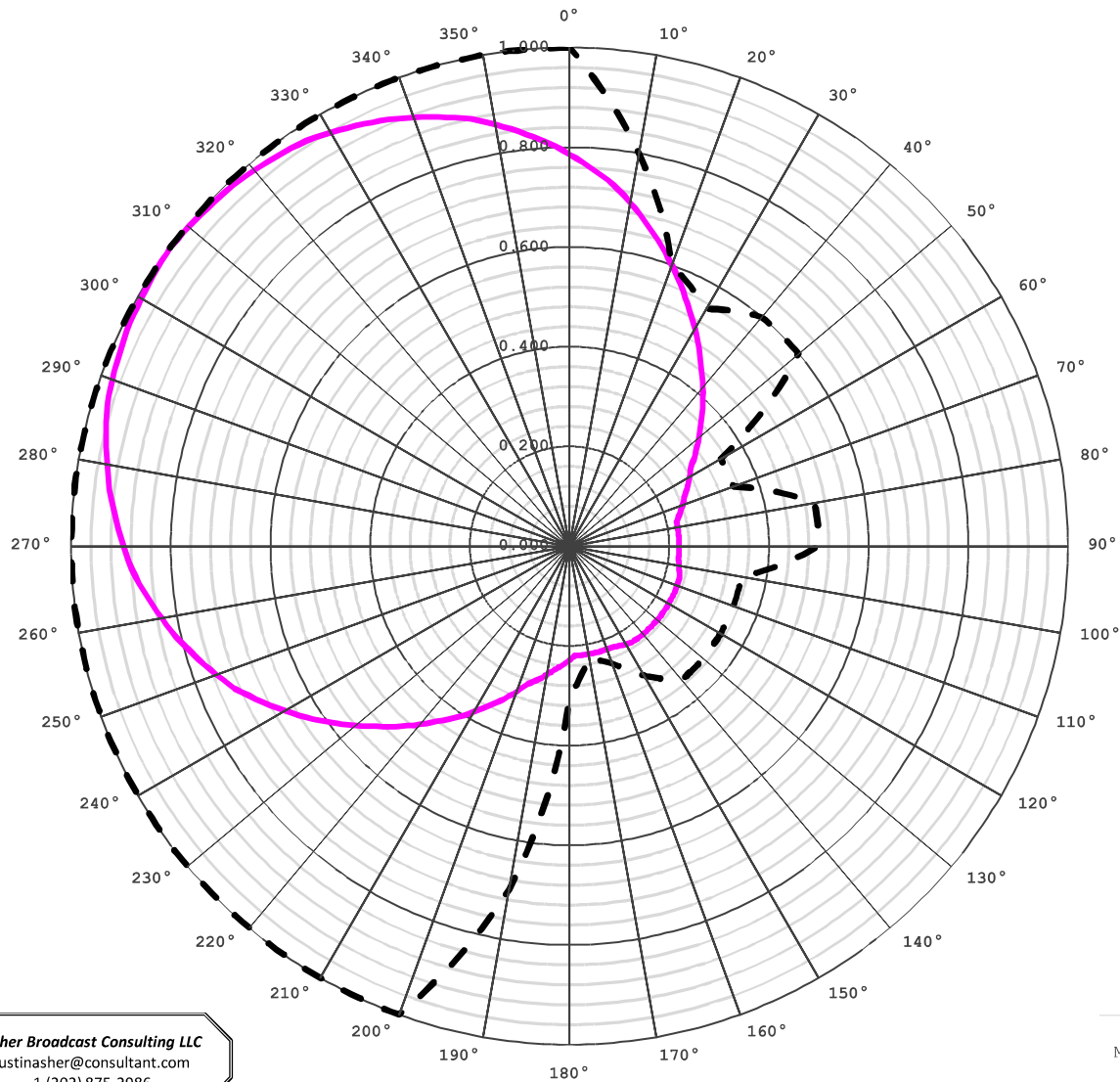
Exhibit 7d
Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)		Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
171.0	000.1000	-0059.0	005.6		004.8	000.2041	0157.5	028.8	50.23
172.0	000.1000	-0044.5	005.6		004.6	000.2058	0156.8	028.8	50.23
173.0	000.1000	-0033.7	005.6		004.4	000.2076	0156.2	028.8	50.25
174.0	000.1000	-0038.2	005.6		004.2	000.2093	0156.0	028.8	50.28
175.0	000.1000	-0034.8	005.6		004.1	000.2111	0155.7	028.7	50.31
176.0	000.1000	-0024.3	005.6		003.9	000.2129	0155.5	028.7	50.34
177.0	000.1000	-0006.7	005.6		003.7	000.2147	0155.4	028.7	50.38
178.0	000.1000	0005.1	005.6		003.5	000.2165	0155.1	028.7	50.41
179.0	000.1000	-0002.9	005.6		003.3	000.2183	0154.9	028.7	50.44
180.0	000.1000	-0017.4	005.6		003.1	000.2201	0154.4	028.7	50.45
181.0	000.1000	-0032.5	005.6		002.9	000.2220	0154.2	028.7	50.48
182.0	000.1000	-0049.7	005.6		002.7	000.2239	0154.0	028.7	50.50
183.0	000.1000	-0062.9	005.6		002.5	000.2257	0154.1	028.7	50.54
184.0	000.1000	-0071.8	005.6		002.3	000.2276	0154.7	028.7	50.61
185.0	000.1000	-0078.6	005.6		002.1	000.2295	0155.4	028.7	50.69
186.0	000.1000	-0086.0	005.6		001.9	000.2313	0155.8	028.7	50.75
187.0	000.1000	-0096.8	005.6		001.7	000.2332	0156.2	028.7	50.80
188.0	000.1000	-0111.5	005.6		001.5	000.2351	0156.3	028.7	50.83
189.0	000.1000	-0119.7	005.6		001.3	000.2370	0155.7	028.7	50.82
190.0	000.1000	-0130.5	005.6		001.1	000.2389	0155.4	028.7	50.83
191.0	000.1000	-0135.1	005.6		000.9	000.2408	0155.5	028.8	50.86
192.0	000.1000	-0123.9	005.6		000.7	000.2427	0155.3	028.8	50.87
193.0	000.1000	-0105.3	005.6		000.5	000.2446	0154.5	028.8	50.85
194.0	000.1000	-0073.6	005.6		000.4	000.2465	0153.3	028.8	50.79
195.0	000.1000	-0044.7	005.6		000.2	000.2484	0151.9	028.8	50.73
196.0	000.1000	-0033.7	005.6		360.0	000.2500	0150.7	028.9	50.67
197.0	000.1000	-0036.9	005.6		359.8	000.2500	0149.8	028.9	50.59
198.0	000.1000	-0048.1	005.6		359.6	000.2500	0149.3	028.9	50.54
199.0	000.1000	-0060.8	005.6		359.4	000.2500	0148.9	029.0	50.50
200.0	000.1000	-0067.2	005.6		359.2	000.2500	0148.3	029.0	50.44
201.0	000.1000	-0071.0	005.6		359.1	000.2500	0148.1	029.0	50.41
202.0	000.1000	-0073.8	005.6		358.9	000.2500	0147.9	029.1	50.37
203.0	000.1000	-0086.5	005.6		358.7	000.2500	0147.6	029.1	50.33
204.0	000.1000	-0092.7	005.6		358.5	000.2500	0147.6	029.1	50.30
205.0	000.1000	-0101.9	005.6		358.3	000.2500	0148.0	029.2	50.30
206.0	000.1000	-0102.8	005.6		358.2	000.2500	0148.6	029.2	50.31
207.0	000.1000	-0104.4	005.6		358.0	000.2500	0149.2	029.3	50.32
208.0	000.1000	-0104.0	005.6		357.8	000.2500	0149.4	029.3	50.30
209.0	000.1000	-0105.1	005.6		357.7	000.2500	0149.9	029.4	50.30
210.0	000.1000	-0100.5	005.6		357.5	000.2500	0150.2	029.4	50.29
211.0	000.1000	-0104.8	005.6		357.4	000.2500	0150.6	029.5	50.28
212.0	000.1000	-0107.0	005.6		357.2	000.2500	0151.3	029.5	50.30
213.0	000.1000	-0109.6	005.6		357.0	000.2500	0152.5	029.6	50.34

Manufacturer's	Make/Model	Orientation	Power
Element 1:	BKY3P(Slant45)	307° True	100.0%
Element 2:			
Element 3:			
Element 4:			

Composite Power: 100%

Exhibit 8 Manufacturer's Directional Antenna Pattern Data



Azimuth ° True	FCC Pattern	Manufacturer's Pattern
0°	1.000	0.786
10°	0.800	0.700
20°	0.600	0.600
30°	0.550	0.503
40°	0.600	0.416
50°	0.600	0.339
60°	0.350	0.278
70°	0.350	0.241
80°	0.500	0.220
90°	0.500	0.220
100°	0.350	0.223
110°	0.350	0.230
120°	0.350	0.230
130°	0.350	0.230
140°	0.350	0.230
150°	0.300	0.227
160°	0.250	0.220
170°	0.225	0.220
180°	0.300	0.229
190°	0.700	0.262
200°	1.000	0.311
210°	1.000	0.384
220°	1.000	0.467
230°	1.000	0.560
240°	1.000	0.660
250°	1.000	0.754
260°	1.000	0.831
270°	1.000	0.895
280°	1.000	0.942
290°	1.000	0.976
300°	1.000	0.993
310°	1.000	0.997
320°	1.000	0.984
330°	1.000	0.958
340°	1.000	0.915
350°	1.000	0.859

FCC Pattern: - - -
Manufacturer's Pattern: —

Asher Broadcast Consulting LLC
justinasher@consultant.com
1 (202) 875-2986

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 307.0°T) (public record copy)

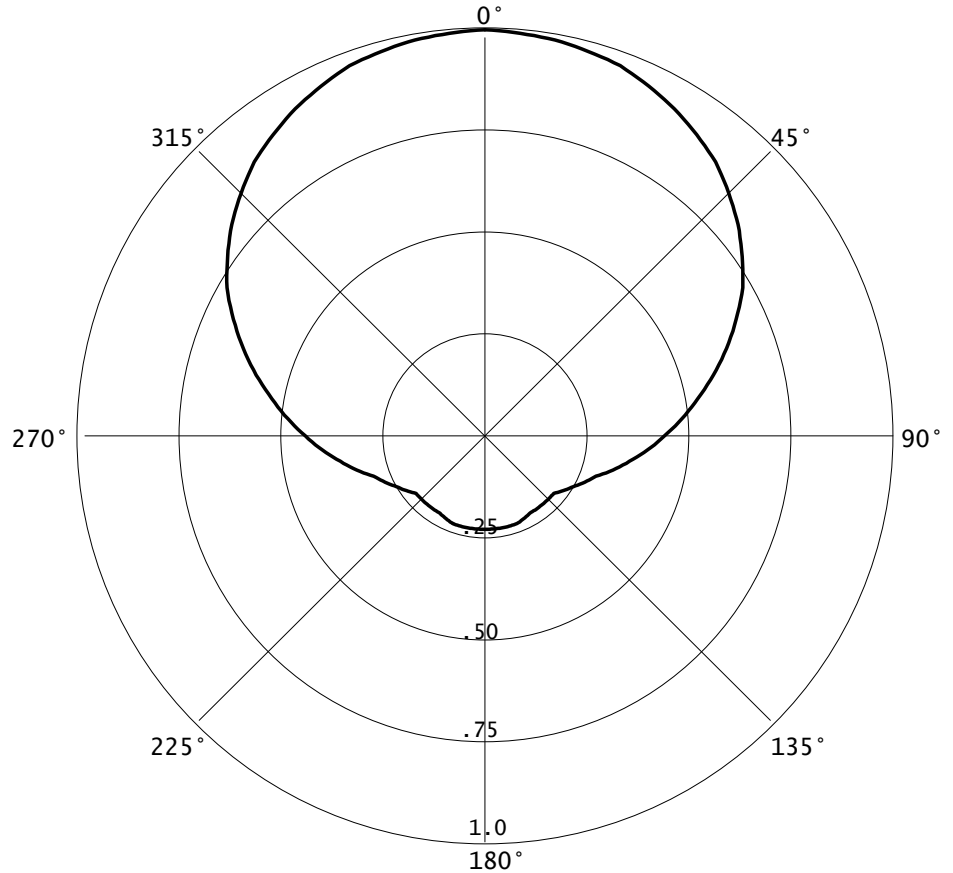
BKY3/P-1DA(Slant45)

RMS(V)= .608

COMPOSITE PATTERN

Graph is Relative Field

Azi	Field	dbk
000	1.000	-10.000
010	0.990	-10.087
020	0.970	-10.265
030	0.930	-10.630
040	0.880	-11.110
050	0.810	-11.830
060	0.730	-12.734
070	0.630	-14.013
080	0.530	-15.514
090	0.440	-17.131
100	0.360	-18.874
110	0.290	-20.752
120	0.250	-22.041
130	0.220	-23.152
140	0.220	-23.152
150	0.220	-23.152
160	0.230	-22.765
170	0.230	-22.765
180	0.230	-22.765
190	0.230	-22.765
200	0.230	-22.765
210	0.220	-23.152
220	0.220	-23.152
230	0.220	-23.152
240	0.250	-22.041
250	0.290	-20.752
260	0.360	-18.874
270	0.440	-17.131
280	0.530	-15.514
290	0.630	-14.013
300	0.730	-12.734
310	0.810	-11.830
320	0.880	-11.110
330	0.930	-10.630
340	0.970	-10.265
350	0.990	-10.087



The directional antenna pattern will be produced by means of a Nicom Dipole Reflector BKY3/P broadcast element mounted at a 45° (degree) slant orientation to achieve horizontal and vertical polarization. The BKY3/P-1DA(Slant45) Directional Pattern is therefore a maximum composite pattern of the current horizontal and vertical broadcast patterns as notified by Nicom USA, Inc.

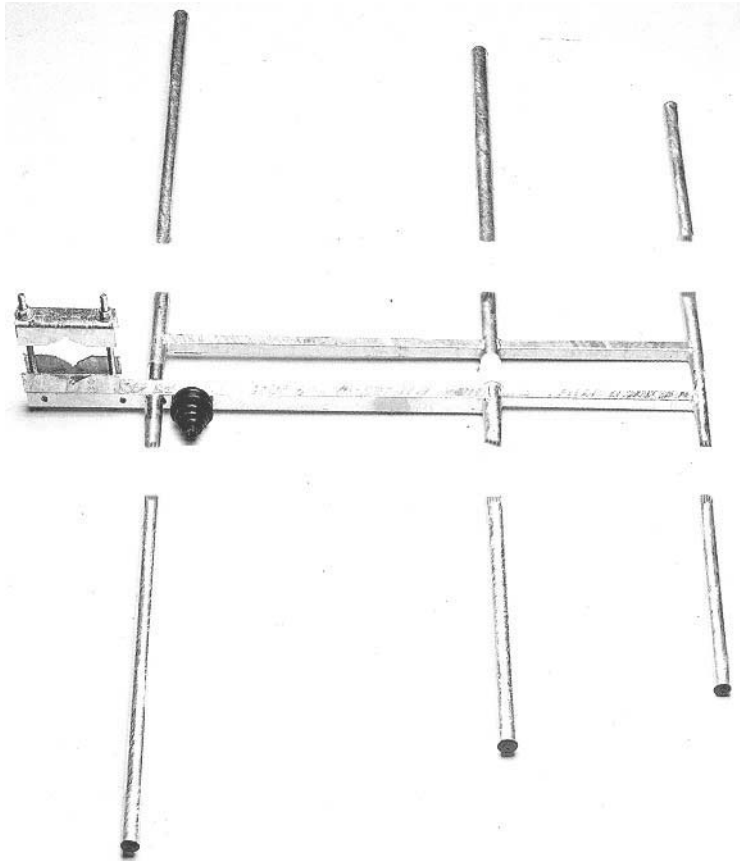
The maximum antenna gain for a single BKY3/P-1DA(Slant45) element will be 1.5 dBd or the common horizontal or vertical maximum antenna gain of 4.5 dBd adjusted by 3 dBd for dual broadcast in the Horizontal and Vertical planes (1.5 dBd = 4.5 dBd - 3.0 dBd). The maximum gain for multiple bay options of the Nicom BKY3/P-DA(Slant45) antenna would therefore also be adjusted by -3 dBd to account for operation in the horizontal and vertical planes.

The antenna proposed in this application will be mounted in accordance with specific instructions provided by the antenna manufacturer. The directional antenna will be mounted on the tower which is of uniform cross section. No other antennas of any type are or will be mounted on the same tower level as the directional antenna.

No antenna is or will be mounted within any vertical or horizontal distance specified by the antenna manufacturer as being necessary for proper operation of the directional antenna. In addition, the antenna will be assembled under the supervision of a qualified engineer and installed pursuant to the manufacturer's instructions and manufacturer specified antenna orientation.

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 307.0°T) (public record copy)



NiCOM
BKY3/P
Medium Power
Portable
Broadband FM
Directional Antenna
Antena Portátil
Direccional
de FM Banda Ancha

This broadband dipole antenna constructed of stainless steel is designed to last a long time in any weather condition. Because of its sturdy construction it can support up to 2 kw of input power with the appropriate connector. Since it has a wide angle of radiation it is strongly recommended for omnidirectional arrays. Due to the fact that it is easily disassembled and reassembled, it can be placed in a compact container making it very portable and

inexpensive to ship.

Esta antena dipolo de banda ancha, fabricada de acero inoxidable fue concebida para ser duradera en cualquier condición de clima. Debido a su robusta construcción puede soportar hasta 2 kw de potencia de entrada con el conector apropiado. Esta antena es recomendada para formaciones omnidireccionales ya que tiene un gran ángulo de irradiación. Dado al hecho que es fácil de armar y desarmar esta antena puede ser enviada en un contenedor muy compacto rendiéndola portátil y económica para envíos.

TECHNICAL SPECIFICATIONS

Antenna type	3 element directional antenna	Front-to-back ratio	18 dB
Frequency range	87.5 - 108 MHz	Lightning protection	all parts grounded
Bandwidth	20 MHz	Max wind velocity	130 mph (208 km/h)
Impedance	50 Ohms	Wind load	48.4 Lbs (22 kg)
Connectors	N type (1 kw) - EIA 7/8 (2 kw)	Wind surface	2.0 ft ² (0.19 m ²)
Power rating	2000 Watts max.	Materials (external)	stainless steel
VSWR	< 1.2 max.	Mounting	from 2" to 4"
Polarization	vertical or horizontal	Weight	20 Lbs (9 kg)
Gain	4.5 dB (referred to half-wave dipole)	Dimensions	50"×72"×3" (1250×1800×60mm)
H plane	150 degrees	Packing	53"×19"×4" (1300×480×100mm)
V plane	70 degrees		

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation

(Actual Antenna Pattern rotated to 307.0°T)

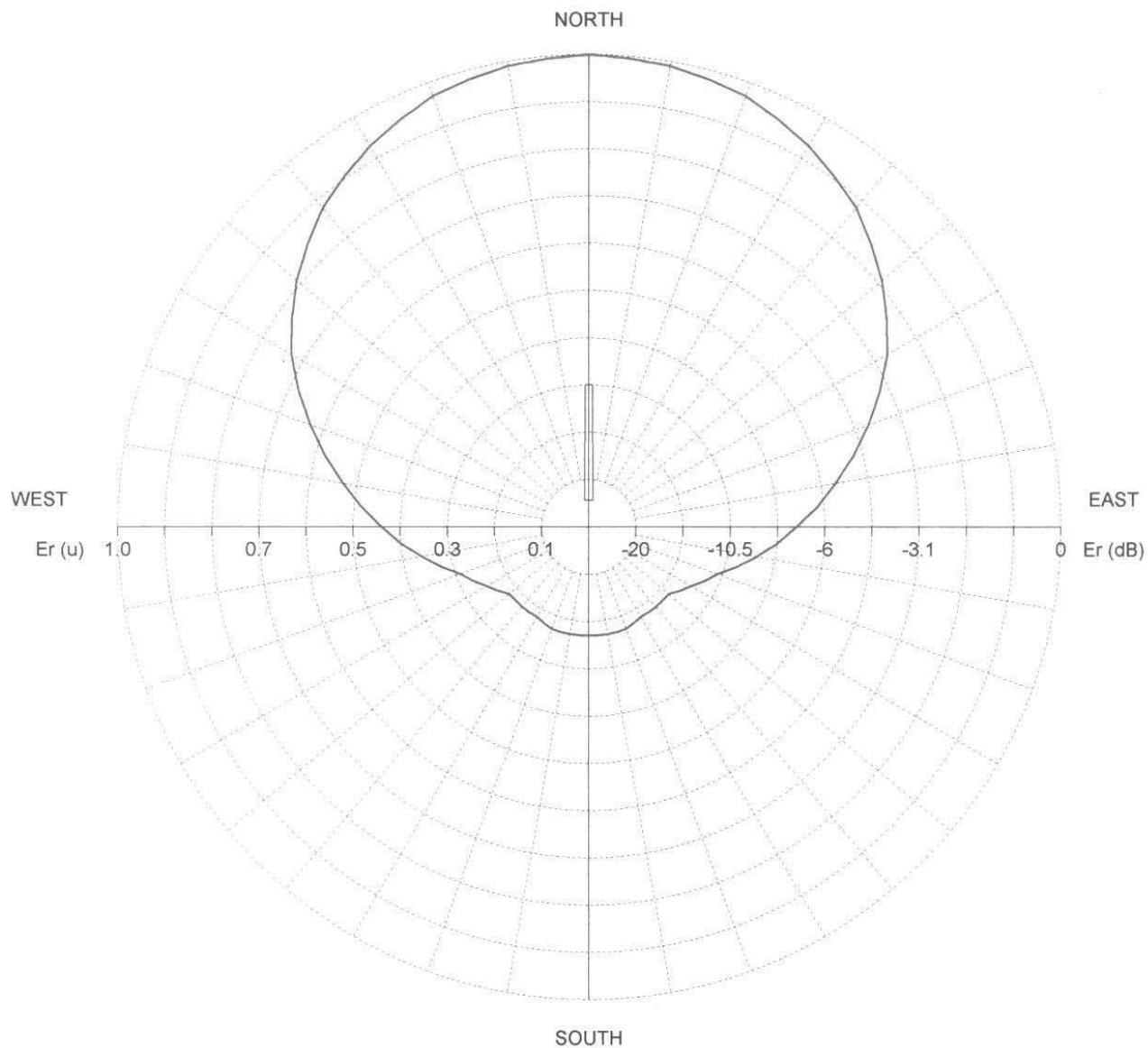
(public record copy)

TX station: BKY/3

Site name:

Frequency: 98.00 MHz

Horizontal diagram



—— 0.0° depres. (Total antenna), Gain (dBd): 3.6 ERP T.max (KW): 2.291

ERP E.max (KW): 1.778

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 307.0°T) (public record copy)

TX station: BKY/3

Site name:

Frequency: 98.00 MHz

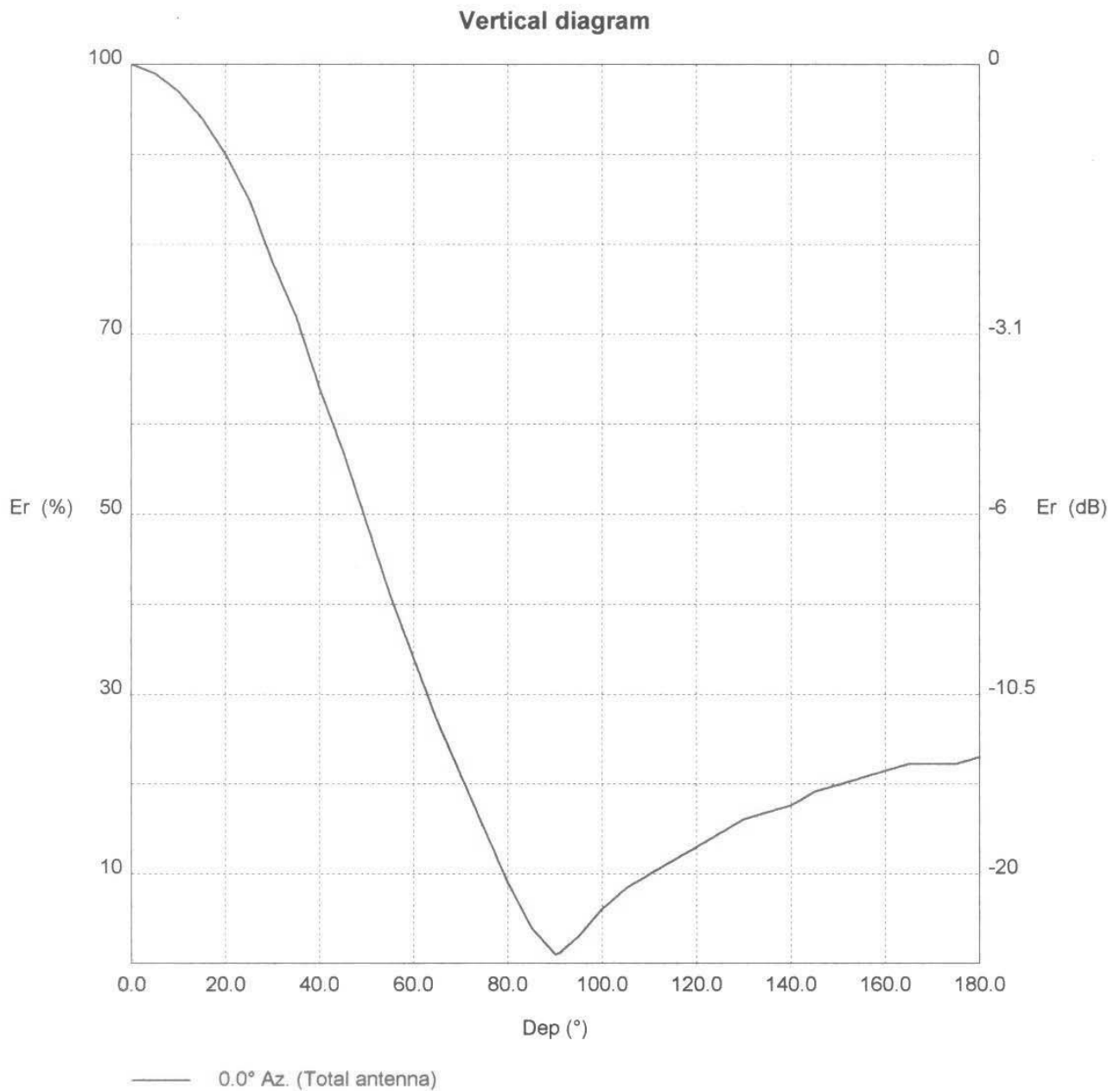


Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 307.0°T) (public record copy)

TX station: BKY/3

Site name:

Frequency: 98.00 MHz

Vertical diagram at an azimuth of 0° degrees

Dep (°)	Er (%)	ERP (KW)	Dep (°)	Er (%)	ERP (KW)	Dep (°)	Er (%)	ERP (KW)
0.0	100.0	1.78	60.0	34.0	0.21	120.0	13.0	0.03
2.0	99.6	1.76	62.0	31.2	0.17	122.0	13.6	0.03
4.0	99.2	1.75	64.0	28.4	0.14	124.0	14.3	0.04
6.0	98.6	1.73	66.0	25.8	0.12	126.0	14.9	0.04
8.0	97.8	1.70	68.0	23.4	0.10	128.0	15.5	0.04
10.0	97.0	1.67	70.0	21.0	0.08	130.0	16.1	0.05
12.0	95.8	1.63	72.0	18.6	0.06	132.0	16.4	0.05
14.0	94.6	1.59	74.0	16.2	0.05	134.0	16.7	0.05
16.0	93.2	1.54	76.0	13.8	0.03	136.0	17.0	0.05
18.0	91.6	1.49	78.0	11.4	0.02	138.0	17.3	0.05
20.0	90.0	1.44	80.0	9.0	0.01	140.0	17.6	0.06
22.0	88.0	1.38	82.0	7.0	0.01	142.0	18.2	0.06
24.0	86.0	1.32	84.0	5.0	0.00	144.0	18.9	0.06
26.0	83.6	1.24	86.0	3.4	0.00	146.0	19.3	0.07
28.0	80.8	1.16	88.0	2.2	0.00	148.0	19.6	0.07
30.0	78.0	1.08	90.0	1.0	0.00	150.0	19.9	0.07
32.0	75.6	1.02	92.0	1.7	0.00	152.0	20.2	0.07
34.0	73.2	0.95	94.0	2.6	0.00	154.0	20.5	0.08
36.0	70.4	0.88	96.0	3.7	0.00	156.0	20.9	0.08
38.0	67.2	0.80	98.0	4.9	0.00	158.0	21.2	0.08
40.0	64.0	0.73	100.0	6.1	0.01	160.0	21.5	0.08
42.0	61.2	0.67	102.0	7.1	0.01	162.0	21.8	0.08
44.0	58.4	0.61	104.0	8.0	0.01	164.0	22.1	0.09
46.0	55.4	0.55	106.0	8.7	0.01	166.0	22.2	0.09
48.0	52.2	0.48	108.0	9.4	0.02	168.0	22.2	0.09
50.0	49.0	0.43	110.0	10.0	0.02	170.0	22.2	0.09
52.0	45.8	0.37	112.0	10.6	0.02	172.0	22.2	0.09
54.0	42.6	0.32	114.0	11.2	0.02	174.0	22.2	0.09
56.0	39.6	0.28	116.0	11.8	0.02	176.0	22.4	0.09
58.0	36.8	0.24	118.0	12.4	0.03	178.0	22.7	0.09

TX station: BKY/3

Site name:

Frequency: 98.00 MHz

Horizontal diagram at 0.0° depres. (Total antenna)

Az (°)	Er (%)	ERP (KW)	Az (°)	Er (%)	ERP (KW)	Az (°)	Er (%)	ERP (KW)
0.0	100.0	1.78	120.0	25.0	0.11	240.0	25.0	0.11
10.0	99.0	1.74	130.0	22.0	0.09	250.0	29.0	0.15
20.0	97.0	1.67	140.0	22.0	0.09	260.0	36.0	0.23
30.0	93.0	1.54	150.0	22.0	0.09	270.0	44.0	0.34
40.0	88.0	1.38	160.0	23.0	0.09	280.0	53.0	0.50
50.0	81.0	1.17	170.0	23.0	0.09	290.0	63.0	0.71
60.0	73.0	0.95	180.0	23.0	0.09	300.0	73.0	0.95
70.0	63.0	0.71	190.0	23.0	0.09	310.0	81.0	1.17
80.0	53.0	0.50	200.0	23.0	0.09	320.0	88.0	1.38
90.0	44.0	0.34	210.0	22.0	0.09	330.0	93.0	1.54
100.0	36.0	0.23	220.0	22.0	0.09	340.0	97.0	1.67
110.0	29.0	0.15	230.0	22.0	0.09	350.0	99.0	1.74