

# Technical Report Supporting a Form 349 Minor Change in Licensed Facility Construction Permit Application

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

*for*

*W267BA.L - Harrisonburg, VA  
(Facility ID: 141357)*

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*“Relocation to A New Site”*

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*as a*

*Commercial, Fill-In  
FM Translator for  
WQPO(FM)-HD2 - Harrisonburg, VA*

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## **Supplemental Appendix(s):**

RF Appendix 1 - Radio Frequency Radiation Compliance Showing

**EXPLANATION OF PROPOSAL:** This Form 349 Filing and accompanying technical report supports a Minor Change in Licensed Facility Construction Permit Application for FM Translator W267BA.L - Harrisonburg, VA (Facility ID: 141357). Continued operation on the present frequency of CH267D (101.3 MHz) with a power of 0.099 kW ERP circular polarization (H&V) is requested. The FM Translator will operate from a new site with a new COR of 561 meters AMSL. A new antenna will be proposed with triplexing of W261CV (Facility ID: 139550); W267BA (Facility ID: 141357); and W295CP (Facility ID: 200014). This Form 349 Filing will continue to specify rebroadcast of Class B FM Primary Station WQPO(FM)-HD2 - Harrisonburg, VA; CH264B; Facility ID No. 39492. The Translator will remain licensed to the current community of Harrisonburg, VA.

**FACILITY COMPLIANCE SHOWINGS:** A map of the proposed 60 dB $\mu$  service contour in relation to the present 60 dB $\mu$  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 54 dB $\mu$  contour of the Translator lies wholly inside the larger FM Class B primary 54 dB $\mu$  contour. The primary station service contour relationship has been plotted in ***Exhibit 2***.

The proposed facility will be located on the tower bearing Antenna Structure Registration Number 1018184. In support of this filing, a copy of the existing ASRN 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 47 C.F.R. Section 74.1204 toward all allocation protection concerns with the exception of WQPO(FM) - Harrisonburg, VA (CH264B). A general allocation study for this proposal is found in **Exhibit 6**.

The applicant would like to note the existence of a 47 C.F.R. Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WQPO(FM) - Harrisonburg, VA (CH264B) as noted in **Exhibit 8**. Both stations are co-located on the same tower, therefore the interference area will not leave the base of the tower. However out of an overabundance of caution, protection of a worst case 140 dBμ F(50:10) interference contour has been demonstrated through a downward radiation study. Full protection will be afforded the facility in question as this area will not reach the ground nor a five meter artificial plane representing a standard one and a half story home when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. A copy of the antenna manufacturer specifications has been included in **Exhibit 9**.

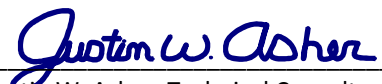
There are two additional facilities, existing or proposed, close enough to merit further study. Therefore, a supplemental contour protection study has been provided toward each facility as included in **Exhibit(s) 7(a-b)**.

Regarding protection of international concerns, the facility is, and will remain, more than 320 km from the common border between the United States and Canada or Mexico. As a result, no further international protection showings are believed required.

**ENVIRONMENTAL COMPLIANCE SHOWINGS:** The proposed facility complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled 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, 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 antenna and feed-line are being modified on 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 twenty 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.*



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Justin W. Asher, Technical Consultant  
August 22, 2019

# Exhibit 1

## Service Contour Study: Present vs Proposed Operations

*Present 60 dBμ F(50:50) Contour*

*Proposed 60 dBμ F(50:50) Contour*

**W267BA.L**  
Harrisonburg, VA  
BLFT20150916AAS  
Facility ID: 141357  
Latitude: 38-26-40 N  
Longitude: 078-44-05 W  
ERP: 0.10 kW  
Channel: 267D (101.3 MHz)  
AMSL Height: 970.0 m  
Horiz. Pattern: Directional

60 dBμ F(50:50) Contour  
Total Population: 122,211  
Total Area: 1,510.8 sq. km

**W267BA.P**  
Harrisonburg, VA  
Proposed Operation  
Facility ID: 141357  
Latitude: 38-27-08 N  
Longitude: 078-54-32 W  
ERP: 0.099 kW  
Channel: 267D (101.3 MHz)  
AMSL Height: 561.0 m  
Horiz. Pattern: Directional

60 dBμ F(50:50) Contour  
Total Population: 79,886  
Total Area: 409.6 sq. km

Terrain  
79 1245 m

Scale 1:300,000  
0 5 10 15 km

NED 03 SEC Terrain Database  
US Census 2010 PL Database

**Primary 54 dBu F(50:50) Contour**

## **Exhibit 2**

### **Service Contour Study: Proposed vs Primary Operations**

**Proposed 54 dBu F(50:50) Contour**

**W267BA.P**  
**WQPO(FM)-HD2**

**WQPO(FM)-HD2**  
Harrisonburg, VA  
BLH19851001KA  
BDNH-20151211ABC  
Facility ID: 39492  
Latitude: 38-27-08 N  
Longitude: 078-54-32 W  
ERP: 50.00 kW  
Channel: 264B (100.7 MHz)  
AMSL Height: 589.0 m  
Horiz. Pattern: Omni

**W267BA.P**  
Harrisonburg, VA  
Proposed Operation  
Facility ID: 141357  
Latitude: 38-27-08 N  
Longitude: 078-54-32 W  
ERP: 0.099 kW  
Channel: 267D (101.3 MHz)  
AMSL Height: 561.0 m  
Horiz. Pattern: Directional

Terrain  
-4 1480 m

Scale 1:850,000  
0 15 30 45 km

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

V-Soft Communications LLC ©



# Exhibit 3

## Copy of Existing Antenna Structure Registration

(public record copy)

**Registration Detail**

Reg Number	1018184	Status	Constructed
File Number	A1026432	Constructed	09/20/1985
EMI	No	Dismantled	
NEPA	No		

**Antenna Structure**

Structure Type TOWER - Free standing or Guyed Structure used for Commu

**Location** (in NAD83 Coordinates)

Lat/Long	38-27-08.0 N 078-54-31.0 W	Address	RT 33 W
City, State	HARRISONBURG , VA		
Zip	22801	County	ROCKINGHAM
Center of AM Array		Position of Tower in Array	

**Heights (meters)**

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
445.0	152.0
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
597.0	151.0

**Painting and Lighting Specifications**

FCC Paragraphs 1, 3, 4, 13, 21

**FAA Notification**

FAA Study	85-AEA-0299-OE	FAA Issue Date	
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**Owner & Contact Information**

FRN	0009269473	Owner Entity Type	Limited Liability Company
Assignor FRN	0003794302	Assignor ID	L00078067

**Owner**

Tidewater Communications, LLC  
 73 Kercheval Avenue  
 Grosse Pointe Farms , MI 48236

P: (313)886-7070  
 F:  
 E: FCCLICENSES@SAGACOM.COM

**Contact**

Atkins , Tom  
 73 Kercheval Avenue  
 Grosse Pointe Farms , MI 48236

P: (313)886-7070  
 F:  
 E: FCCLICENSES@SAGACOM.COM

**Last Action Status**

Status	Constructed	Received	05/06/2016
Purpose	Change Owner	Entered	05/06/2016
Mode	Interactive		

**Related Applications**

05/06/2016	A1026432 - Change Owner (OC)
03/22/2012	A0758135 - Admin Update (AU)
03/22/2012	A0758146 - Admin Update (AU)

Related applications (4)

**Comments****Comments**

07/30/1997	CORRECTED FCC PARAGRAPHS FROM A1,H TO MATCH THE TOWER FILE RECORD ATTACHED TO 854 BASED ON OWNER'S CALL TO CONSUMER ASSISTANCE.
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**History****Date****Event**

05/07/2016	Registration Printed
05/07/2016	Change of Ownership Letter Sent
05/06/2016	Change of Ownership Received

All History (10)

**Automated Letters**

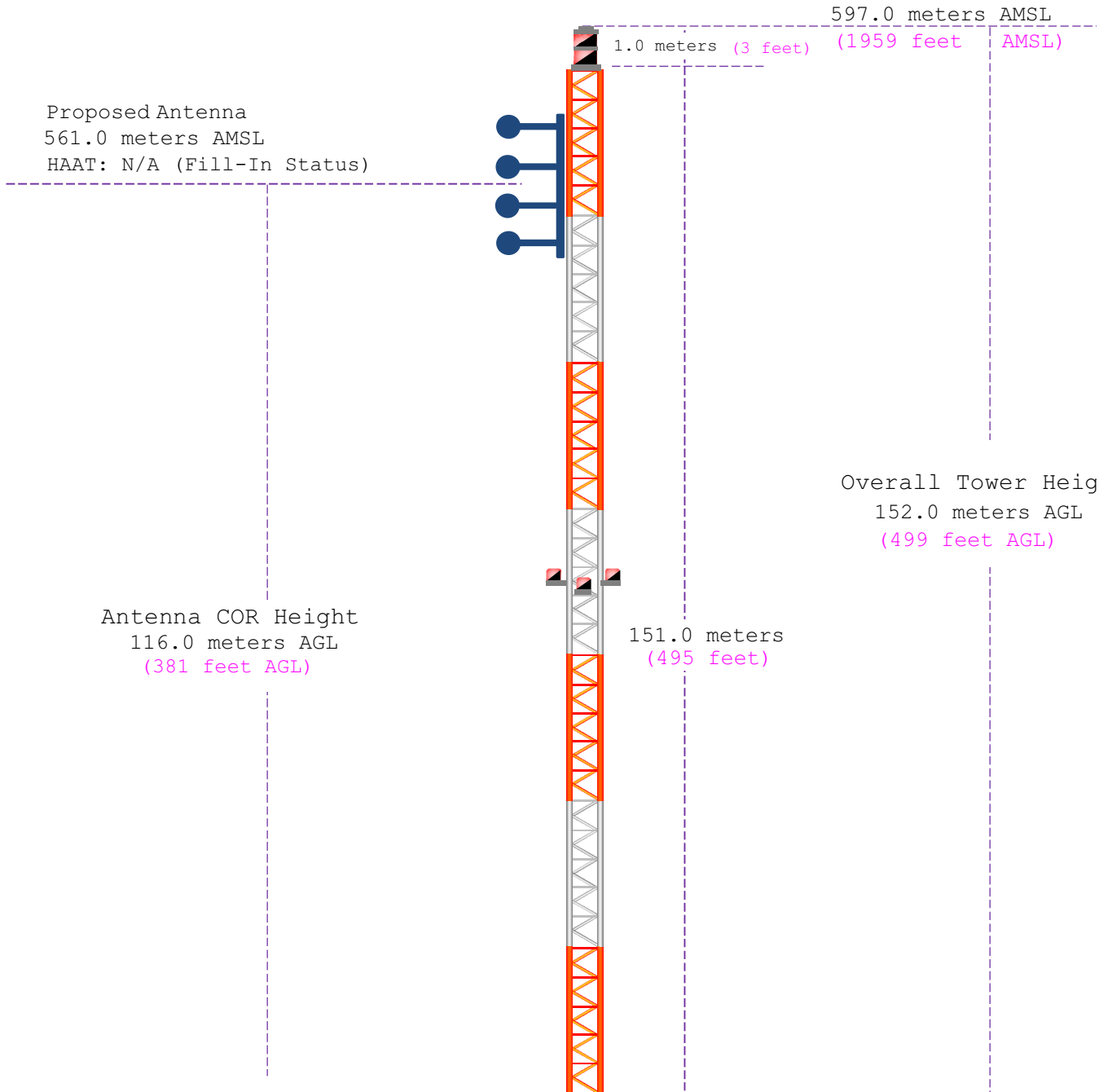
05/07/2016	Authorization, Reference
05/07/2016	Ownership Change, Reference 912804
03/23/2012	Authorization, Reference

All letters (4)



# Exhibit 4

## Vertical Plan of Antenna System



Ground Elevation: 445.0 meters AMSL (1460 feet AMSL)		
<b>Address:</b> Route 33 West <b>City:</b> Harrisonburg <b>County:</b> Rockingham <b>State:</b> Virginia	<b>Latitude (D M S)</b>	
	<b>Longitude (D M S)</b>	
<b>Antenna Structure Registration</b> 1018184	NAD 27 datum values:	
	NAD 83 datum values:	
Drawing Is Not To Scale	38 27 7.55235	
	38 27 8.00000	
Asher Broadcast Consulting, LLC justinasher@consultant.com 1(202)875-2986		

## ***Exhibit 5***

### **HAAT and Miscellaneous Coordinate Information**

#### **HAAT Calculation (1927):**

N. Lat. = 382708.0    W. Lng. = 785432.0  
 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	463.2	97.8	0.0990	-10.04	1.000	10.18
030	380.9	180.1	0.0990	-10.04	1.000	13.81
060	396.5	164.5	0.0990	-10.04	1.000	13.19
090	501.5	59.5	0.0990	-10.04	1.000	7.93
120	475.6	85.4	0.0990	-10.04	1.000	9.53
150	397.2	163.8	0.0990	-10.04	1.000	13.16
180	379.7	181.3	0.0802	-10.96	0.900	13.16
210	380.5	180.5	0.0990	-10.04	1.000	13.82
240	393.9	167.1	0.0990	-10.04	1.000	13.30
270	444.0	117.0	0.0990	-10.04	1.000	11.08
300	492.6	68.4	0.0990	-10.04	1.000	8.51
330	522.1	38.9	0.0990	-10.04	1.000	6.34

Ave El= 435.64 M    HAAT= 125.36 M    AMSL= 561.0

#### **NAD 1983 to NAD 1927 Conversion:**

	<u>Latitude</u>	<u>Longitude</u>
NAD 27 datum values:	38 27 7.55235	78 54 31.89956
NAD 83 datum values:	38 27 8.00000	78 54 31.00000

#### **Various Coordinate Conversion Calculations (NAD 1983):**

Position Type	Lat Lon
<b>Degrees Lat Long</b>	38.4522222°, -078.9086111°
<b>Degrees Minutes</b>	38°27.13333', -078°54.51667'
<b>Degrees Minutes Seconds</b>	38°27'08.0000", -078°54'31.0000"
<b>UTM</b>	17S 682494mE 4258063mN
<b>UTM centimeter</b>	17S 682494.34mE 4258063.68mN
<b>MGRS</b>	17SPC8249458063
<b>Grid North</b>	1.3°
<b>GARS</b>	203LS12
<b>Maidenhead</b>	FM08NK08XM28
<b>GEOREF</b>	GJM05482713

# Exhibit 6

## Tabulation of Proposed Allocation

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

Yellow Highlighted Text denotes the existence of a 47 C.F.R. Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver as included in **Exhibit 8**.

Tidewater Communications, Llc																
REFERENCE		CH#	267D	- 101.3 MHz, Pwr= 0.099 kW DA, HAAT= 125.4 M, COR= 561 M										DISPLAY DATES		
38 27 08.0 N.		Average Protected F(50-50)= 11.44 km										DATA 08-17-19				
78 54 32.0 W.		Standard Directional										SEARCH 08-20-19				
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)					
267D	W267BA	LIC DC_		93.2	15.18	38 26 40.0	0.100					---Reference---				
Harrisonburg		VA		273.3	BLFT20150916AAS	78 44 05.0			970			Tidewater Communications,				
264B	WQPO	LIC CN		0.0	0.00	38 27 08.0	50.000		5.5	61.5	-15.7*<	-62.9*<				
Harrisonburg		VA		0.0	BLH19851001KA	78 54 32.0	150		589			Tidewater Communications,				
266D	W266BQ	LIC DC_		167.3	43.99	38 03 58.0	0.195		34.5	22.6	-3.7<	1.5				
Crozet		VA		347.4	BLFT20100809CJM	78 47 54.0			887			Stu-comm, Inc				
267B	WBRB	LIC CN		296.8	123.08	38 56 40.0	50.000	115.2	36.3	-0.4<		46.4				
Buckhannon		WV		116.0	BLH19900125KA	80 10 46.0	150	694				West Virginia Radio Corpor				
267L1	WVAI-LP	LIC		137.4	56.45	38 04 39.0	0.021			23.9		7.4				
Charlottesville		VA		317.7	BLL20151014AEV	78 28 21.0	65	230				Air Mix Virginia				
268D	W268AC	LIC CN		180.9	37.46	38 06 55.0	0.013	10.1	7.2	14.0		10.3				
Waynesboro		VA		0.9	BLFT19970904TA	78 54 56.0	64	501				Bible Broadcasting Network				
Translator for WYFJFM, Ashland, VA																
270A	WHITE-FM	LIC CN		117.0	36.84	38 18 05.0	6.000	1.6	15.8	27.0		20.4				
Ruckersville		VA		297.2	BLH19930607KB	78 31 57.0	68	456				Monticello Media Llc				
269A	WELD-FM	LIC CX		0.0	58.98	38 58 58.0	0.285	1.2	24.7	47.6		33.6				
Moorefield		WV		180.0	BLH20070924AVH	78 54 30.0	455	1003				Thunder Associates, Llc				
267A	WXJK	LIC CN		159.9	133.54	37 19 23.0	6.000	85.6	27.5	34.7		62.3				
Farmville		VA		340.2	BLH19920731KD	78 23 23.0	100	221				David W. Layne				
To change to 267C3 per one-step application 960927IB																
266A	WWPN	LIC NCX		352.0	104.49	39 22 58.0	0.320	47.6	30.5	48.9		62.6				
Westernport		MD		171.9	BMLH20110307AAB	79 04 43.0	417	954				Ernest F. Santmyire				
267D	W267AK	LIC DC_		40.3	104.84	39 10 07.0	0.250	10.5	3.3	81.7		59.5				
Winchester		VA		220.8	BMLFT20171016ABD	78 07 19.0	26	235				Bible Broadcasting Network				
268B	WBQB	LIC DCN		95.3	132.61	38 19 57.0	50.000	55.3	48.1	69.4		68.5				
Fredericksburg		VA		276.2	BLH19910701KC	77 23 41.0	150	186				Centennial Licensing Ii, L				
269C3	WAWX	RSV-A __N		180.3	113.99	37 25 37.0	25.000	4.6	43.2	96.2		70.1				
Lynchburg		VA		0.3		78 55 00.0	100	315				Educational Media Foundati				
270D	W270BJ	LIC C_		213.5	87.96	37 47 29.0	0.025	0.4	6.8	74.1		80.5				
Lexington		VA		33.2	BLFT20060316AAC	79 27 43.0	10	430				Virginia Tech Foundation,				
266B	WWDC	LIC C_		68.7	171.72	38 59 59.0	22.500	78.2	66.0	80.9		78.8				
Washington		DC		249.8	BMLH20130909ABL	77 03 27.0	232	313				Amfm Radio Licenses, L.l.c				
270A	WJVR	LIC C_		231.0	115.73	37 47 35.0	0.560	1.5	29.4	101.1		85.7				
Iron Gate		VA		50.4	BLH20121018AAA	79 55 59.0	322	876				Wvjt, Llc				
265A	WIQO-FM	LIC CX		200.7	116.61	37 28 13.0	0.170	0.9	29.3	102.1		86.6				
Forest		VA		20.4	BLH20190322AAK	79 22 35.0	568	884				3 Daughters Media, Inc.				

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  
 Reference station has protected zone issue: WV Quiet Zone- AM tower

# ***Exhibit 7a***

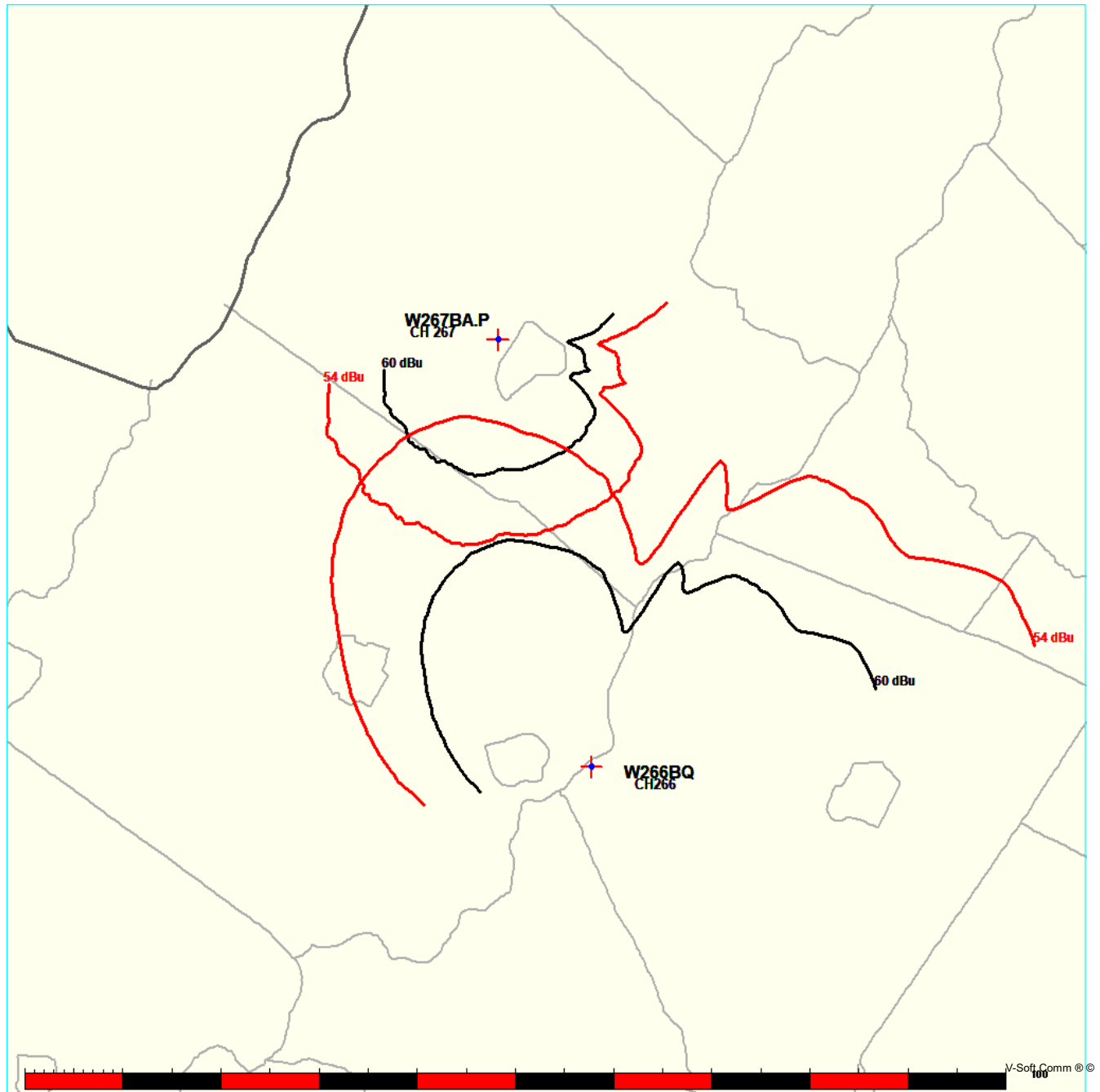
## **Contour Protection Studies Toward Select Allocation Concern(s)**

Tidewater Communications, Llc

FMCommander Single Allocation Study - 08-20-2019 - NED 03 SEC  
W267BA.P's Overlaps (In= -3.71 km, Out= 1.52 km)

W267BA.P CH 267 D DA  
Lat= 38 27 08.0, Lng= 78 54 32.0  
0.099 kW 125.4 m HAAT, 561 m COR  
Prot.= 60 dBu, Intef.= 54 dBu

W266BQ CH 266 D DA BLFT20100809CJM  
Lat= 38 03 58.0, Lng= 78 47 54.0  
0.195 kW 0 m HAAT, 887 m COR  
Prot.= 60 dBu, Intef.= 54 dBu



# ***Exhibit 7a***

## **Contour Protection Studies Toward Select Allocation Concern(s)**

08-20-2019

Terrain Data: NED 03 SEC

FMOver Analysis

W267BA.P

W266BQ BLFT20100809CJM

Channel = 267D  
Max ERP = 0.099 kW  
RCAMSL = 561 m  
N. Lat. 38 27 08.0  
W. Lng. 78 54 32.0  
Protected  
60 dBu

Channel = 266D  
Max ERP = 0.195 kW  
RCAMSL = 887 m  
N. Lat. 38 03 58.0  
W. Lng. 78 47 54.0  
Interfering  
54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
125.0	000.0990	0132.2	011.7	360.0	000.0039	0308.0	036.2	34.93	
126.0	000.0990	0140.4	012.1	000.2	000.0039	0305.5	035.8	35.07	
127.0	000.0990	0143.8	012.3	000.2	000.0039	0305.5	035.5	35.19	
128.0	000.0990	0147.4	012.4	000.2	000.0039	0305.5	035.3	35.32	
129.0	000.0990	0149.5	012.5	000.2	000.0039	0306.4	035.0	35.45	
130.0	000.0990	0150.9	012.6	000.0	000.0039	0307.7	034.8	35.57	
131.0	000.0990	0149.1	012.5	359.7	000.0039	0309.9	034.7	35.68	
132.0	000.0990	0150.4	012.6	359.5	000.0039	0310.8	034.5	35.80	
133.0	000.0990	0152.5	012.7	359.4	000.0039	0312.4	034.3	35.96	
134.0	000.0990	0152.3	012.6	359.1	000.0039	0315.5	034.1	36.11	
135.0	000.0990	0153.3	012.7	358.9	000.0039	0318.2	034.0	36.28	
136.0	000.0990	0155.8	012.8	358.7	000.0039	0319.7	033.7	36.43	
137.0	000.0990	0159.4	013.0	358.6	000.0039	0320.7	033.5	36.59	
138.0	000.0990	0160.6	013.0	358.4	000.0039	0323.2	033.3	36.75	
139.0	000.0990	0160.6	013.0	358.1	000.0038	0327.0	033.1	36.92	
140.0	000.0990	0161.4	013.0	357.8	000.0038	0330.8	033.0	37.11	
141.0	000.0990	0163.4	013.1	357.6	000.0038	0334.1	032.7	37.30	
142.0	000.0990	0160.7	013.0	357.2	000.0038	0339.1	032.7	37.45	
143.0	000.0990	0160.6	013.0	356.8	000.0038	0341.8	032.6	37.58	
144.0	000.0990	0162.2	013.1	356.6	000.0038	0343.7	032.4	37.71	
145.0	000.0990	0162.8	013.1	356.2	000.0038	0346.0	032.3	37.84	
146.0	000.0990	0163.3	013.1	355.9	000.0038	0348.7	032.1	37.98	
147.0	000.0990	0162.2	013.1	355.5	000.0038	0352.2	032.0	38.10	
148.0	000.0990	0162.2	013.1	355.1	000.0038	0355.8	031.9	38.24	
149.0	000.0990	0164.0	013.2	354.8	000.0038	0358.5	031.8	38.40	
150.0	000.0990	0163.8	013.2	354.5	000.0038	0361.5	031.7	38.52	
151.0	000.0990	0163.2	013.1	354.1	000.0038	0364.1	031.6	38.61	
152.0	000.0990	0161.5	013.1	353.6	000.0038	0367.1	031.6	38.70	
153.0	000.0990	0161.8	013.1	353.2	000.0038	0370.2	031.5	38.82	
154.0	000.0990	0161.8	013.1	352.8	000.0038	0373.4	031.4	38.93	
155.0	000.0990	0161.8	013.1	352.5	000.0038	0376.2	031.4	39.04	
156.0	000.0990	0161.8	013.1	352.1	000.0037	0379.3	031.3	39.14	
157.0	000.0990	0163.0	013.1	351.7	000.0037	0382.4	031.2	39.27	

***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)
158.0	000.0990	0164.5	013.2	351.3	000.0037	0385.3	031.1	39.40
159.0	000.0990	0165.4	013.2	350.9	000.0037	0388.4	031.0	39.52
160.0	000.0990	0166.2	013.3	350.5	000.0037	0391.7	030.9	39.64
161.0	000.0990	0166.4	013.3	350.1	000.0037	0393.9	030.8	39.72
162.0	000.0990	0164.8	013.2	349.6	000.0038	0395.6	030.9	39.89
163.0	000.0990	0164.6	013.2	349.2	000.0040	0396.8	030.9	40.10
164.0	000.0990	0166.1	013.3	348.8	000.0042	0397.3	030.8	40.32
165.0	000.0990	0166.7	013.3	348.4	000.0043	0397.9	030.7	40.53
166.0	000.0990	0165.8	013.2	347.9	000.0045	0399.1	030.8	40.71
167.0	000.0990	0165.7	013.2	347.5	000.0046	0400.8	030.8	40.91
168.0	000.0990	0167.8	013.3	347.1	000.0048	0403.8	030.7	41.19
169.0	000.0990	0168.6	013.4	346.6	000.0050	0406.9	030.6	41.43
170.0	000.0990	0168.4	013.4	346.2	000.0052	0409.8	030.7	41.65
171.0	000.0970	0169.1	013.3	345.8	000.0053	0412.3	030.7	41.83
172.0	000.0951	0170.4	013.3	345.3	000.0055	0414.3	030.8	42.00
173.0	000.0931	0170.9	013.3	344.9	000.0057	0416.1	030.8	42.15
174.0	000.0912	0171.8	013.2	344.5	000.0059	0418.2	030.9	42.30
175.0	000.0893	0172.4	013.2	344.1	000.0061	0420.2	031.0	42.43
176.0	000.0875	0174.2	013.2	343.7	000.0063	0421.9	031.0	42.58
177.0	000.0856	0174.8	013.1	343.3	000.0064	0422.8	031.1	42.68
178.0	000.0838	0176.0	013.1	342.9	000.0066	0424.0	031.2	42.79
179.0	000.0820	0179.1	013.2	342.5	000.0068	0426.0	031.2	42.95
180.0	000.0802	0181.3	013.2	342.1	000.0070	0428.2	031.3	43.09
181.0	000.0820	0184.1	013.3	341.6	000.0073	0430.8	031.2	43.34
182.0	000.0838	0187.2	013.5	341.0	000.0075	0433.3	031.1	43.58
183.0	000.0856	0186.2	013.5	340.6	000.0077	0435.8	031.2	43.74
184.0	000.0875	0187.4	013.6	340.1	000.0080	0438.4	031.2	43.93
185.0	000.0893	0187.5	013.7	339.7	000.0084	0440.7	031.2	44.22
186.0	000.0912	0187.5	013.8	339.2	000.0090	0442.9	031.3	44.54
187.0	000.0931	0187.5	013.9	338.8	000.0097	0445.1	031.3	44.85
188.0	000.0951	0185.3	013.9	338.4	000.0102	0446.6	031.4	45.05
189.0	000.0970	0185.3	013.9	338.0	000.0108	0448.3	031.5	45.32
190.0	000.0990	0185.8	014.0	337.5	000.0115	0449.8	031.5	45.59
191.0	000.0990	0182.8	013.9	337.2	000.0119	0450.6	031.8	45.65
192.0	000.0990	0184.0	013.9	336.8	000.0126	0451.8	031.9	45.84
193.0	000.0990	0185.4	014.0	336.4	000.0132	0452.9	032.0	46.03
194.0	000.0990	0183.4	013.9	336.2	000.0137	0453.9	032.2	46.09
195.0	000.0990	0182.7	013.9	335.8	000.0142	0454.7	032.3	46.19
196.0	000.0990	0179.2	013.8	335.6	000.0145	0455.2	032.6	46.18
197.0	000.0990	0178.4	013.7	335.4	000.0150	0456.3	032.8	46.26
198.0	000.0990	0175.9	013.7	335.2	000.0153	0457.0	033.0	46.26
199.0	000.0990	0177.1	013.7	334.8	000.0159	0458.1	033.1	46.39
200.0	000.0990	0174.2	013.6	334.7	000.0162	0458.6	033.4	46.36
201.0	000.0990	0173.4	013.6	334.4	000.0167	0459.0	033.6	46.39
202.0	000.0990	0174.0	013.6	334.1	000.0172	0459.2	033.7	46.46

## Exhibit 7a

### Contour Protection Studies Toward Select Allocation Concern(s)

08-20-2019

Terrain Data: NED 03 SEC

FMOver Analysis

W266BQ BLFT20100809CJM

W267BA.P

Channel = 266D

Max ERP = 0.195 kW

RCAMSL = 887 m

N. Lat. 38 03 58.0

W. Lng. 78 47 54.0

Protected

60 dBu

Channel = 267D

Max ERP = 0.099 kW

RCAMSL = 561 m

N. Lat. 38 27 08.0

W. Lng. 78 54 32.0

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
302.0	000.0679	0480.9	020.6	193.7	000.0990	0183.6	033.0	46.08	
303.0	000.0711	0482.0	020.9	194.0	000.0990	0183.4	032.5	46.30	
304.0	000.0745	0482.2	021.1	194.2	000.0990	0183.3	032.1	46.52	
305.0	000.0779	0483.3	021.4	194.4	000.0990	0183.2	031.7	46.76	
306.0	000.0814	0482.1	021.6	194.5	000.0990	0183.1	031.2	46.99	
307.0	000.0849	0482.1	021.8	194.6	000.0990	0183.0	030.8	47.23	
308.0	000.0886	0480.9	022.0	194.7	000.0990	0183.0	030.4	47.48	
309.0	000.0923	0479.6	022.2	194.7	000.0990	0183.0	029.9	47.73	
310.0	000.0961	0480.6	022.5	194.8	000.0990	0182.9	029.5	48.00	
311.0	000.0991	0480.5	022.6	194.8	000.0990	0182.9	029.1	48.27	
312.0	000.1022	0478.1	022.7	194.6	000.0990	0183.0	028.7	48.52	
313.0	000.1053	0478.4	022.9	194.6	000.0990	0183.1	028.2	48.80	
314.0	000.1084	0481.1	023.1	194.6	000.0990	0183.1	027.8	49.10	
315.0	000.1116	0482.3	023.3	194.5	000.0990	0183.1	027.3	49.40	
316.0	000.1148	0482.0	023.5	194.4	000.0990	0183.2	026.9	49.69	
317.0	000.1181	0480.0	023.6	194.1	000.0990	0183.3	026.5	49.97	
318.0	000.1215	0476.8	023.7	193.7	000.0990	0183.6	026.1	50.24	
319.0	000.1248	0477.0	023.8	193.5	000.0990	0184.1	025.7	50.56	
320.0	000.1283	0476.7	024.0	193.2	000.0990	0184.9	025.2	50.90	
321.0	000.1303	0475.4	024.0	192.7	000.0990	0185.9	024.9	51.20	
322.0	000.1323	0475.2	024.1	192.2	000.0990	0184.7	024.5	51.42	
323.0	000.1343	0474.2	024.2	191.7	000.0990	0183.4	024.1	51.62	
324.0	000.1363	0473.9	024.3	191.2	000.0990	0182.7	023.8	51.86	
325.0	000.1384	0474.4	024.4	190.6	000.0990	0183.7	023.4	52.18	
326.0	000.1405	0472.5	024.4	190.0	000.0989	0185.9	023.1	52.52	
327.0	000.1426	0469.0	024.4	189.2	000.0973	0185.3	022.8	52.63	
328.0	000.1447	0469.0	024.5	188.5	000.0960	0185.1	022.4	52.83	
329.0	000.1468	0470.2	024.6	187.8	000.0948	0185.6	022.1	53.07	
330.0	000.1490	0469.0	024.6	187.0	000.0932	0187.3	021.8	53.32	
331.0	000.1498	0467.0	024.6	186.1	000.0914	0187.5	021.5	53.42	
332.0	000.1507	0464.2	024.6	185.1	000.0895	0187.5	021.3	53.48	
333.0	000.1516	0461.2	024.5	184.0	000.0875	0187.4	021.1	53.53	
334.0	000.1525	0459.4	024.5	183.0	000.0856	0186.2	020.9	53.53	



***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)
335.0	000.1534	0457.5	024.5	181.9	000.0837	0187.3	020.8	53.63
336.0	000.1543	0454.3	024.4	180.8	000.0816	0183.6	020.6	53.46
337.0	000.1552	0451.4	024.4	179.7	000.0808	0180.5	020.5	53.38
338.0	000.1561	0448.1	024.3	178.5	000.0829	0177.6	020.4	53.44
339.0	000.1570	0444.1	024.3	177.3	000.0851	0175.3	020.3	53.49
340.0	000.1579	0439.0	024.2	176.1	000.0873	0174.2	020.3	53.57
341.0	000.1559	0433.6	023.9	174.8	000.0898	0172.0	020.4	53.49
342.0	000.1538	0428.5	023.7	173.5	000.0922	0171.2	020.5	53.47
343.0	000.1517	0423.5	023.5	172.3	000.0946	0170.3	020.6	53.43
344.0	000.1496	0420.6	023.4	171.1	000.0969	0169.3	020.7	53.41
345.0	000.1476	0415.7	023.2	169.9	000.0990	0168.4	020.9	53.33
346.0	000.1456	0410.9	023.0	168.8	000.0990	0168.4	021.1	53.19
347.0	000.1436	0404.2	022.7	167.7	000.0990	0166.9	021.3	52.93
348.0	000.1416	0398.9	022.5	166.6	000.0990	0165.2	021.5	52.66
349.0	000.1396	0397.0	022.4	165.6	000.0990	0166.5	021.7	52.63
350.0	000.1376	0394.1	022.2	164.6	000.0990	0166.5	021.8	52.48
351.0	000.1386	0387.6	022.1	163.6	000.0990	0165.3	022.0	52.28
352.0	000.1396	0379.7	021.9	162.7	000.0990	0164.3	022.2	52.05
353.0	000.1406	0372.2	021.7	161.8	000.0990	0165.1	022.5	51.92
354.0	000.1416	0364.4	021.6	161.0	000.0990	0166.4	022.7	51.81
355.0	000.1425	0357.1	021.4	160.2	000.0990	0166.0	023.0	51.60
356.0	000.1436	0348.0	021.2	159.4	000.0990	0165.9	023.3	51.37
357.0	000.1446	0340.5	021.0	158.7	000.0990	0165.9	023.6	51.16
358.0	000.1456	0328.3	020.7	158.1	000.0990	0164.5	024.0	50.77
359.0	000.1466	0316.7	020.4	157.6	000.0990	0164.4	024.4	50.46
000.0	000.1476	0307.7	020.1	157.1	000.0990	0163.1	024.8	50.12
001.0	000.1483	0300.9	019.9	156.5	000.0990	0162.2	025.1	49.83
002.0	000.1490	0295.4	019.8	156.0	000.0990	0161.8	025.4	49.61
003.0	000.1497	0283.6	019.4	155.6	000.0990	0161.6	025.9	49.25
004.0	000.1505	0258.2	018.5	155.9	000.0990	0161.7	026.8	48.63
005.0	000.1512	0249.2	018.2	155.6	000.0990	0161.6	027.2	48.34
006.0	000.1519	0233.3	017.6	155.7	000.0990	0161.6	027.9	47.90
007.0	000.1526	0212.9	016.8	156.0	000.0990	0161.8	028.7	47.38
008.0	000.1534	0202.0	016.4	155.9	000.0990	0161.8	029.3	47.06
009.0	000.1541	0189.7	015.9	156.0	000.0990	0161.8	029.8	46.71
010.0	000.1548	0173.2	015.2	156.3	000.0990	0162.1	030.6	46.31
011.0	000.1554	0164.2	014.7	156.3	000.0990	0162.1	031.1	46.03
012.0	000.1559	0151.0	014.1	156.6	000.0990	0162.3	031.8	45.66
013.0	000.1565	0145.6	013.8	156.6	000.0990	0162.2	032.1	45.46
014.0	000.1570	0146.1	013.8	156.2	000.0990	0161.9	032.2	45.38
015.0	000.1576	0151.9	014.2	155.5	000.0990	0161.5	032.1	45.41
016.0	000.1582	0164.0	014.8	154.4	000.0990	0162.0	031.8	45.61
017.0	000.1587	0176.8	015.4	153.3	000.0990	0161.8	031.5	45.75
018.0	000.1593	0198.6	016.4	151.7	000.0990	0161.3	031.0	45.99
019.0	000.1599	0229.4	017.7	149.5	000.0990	0163.3	030.4	46.47

# ***Exhibit 7b***

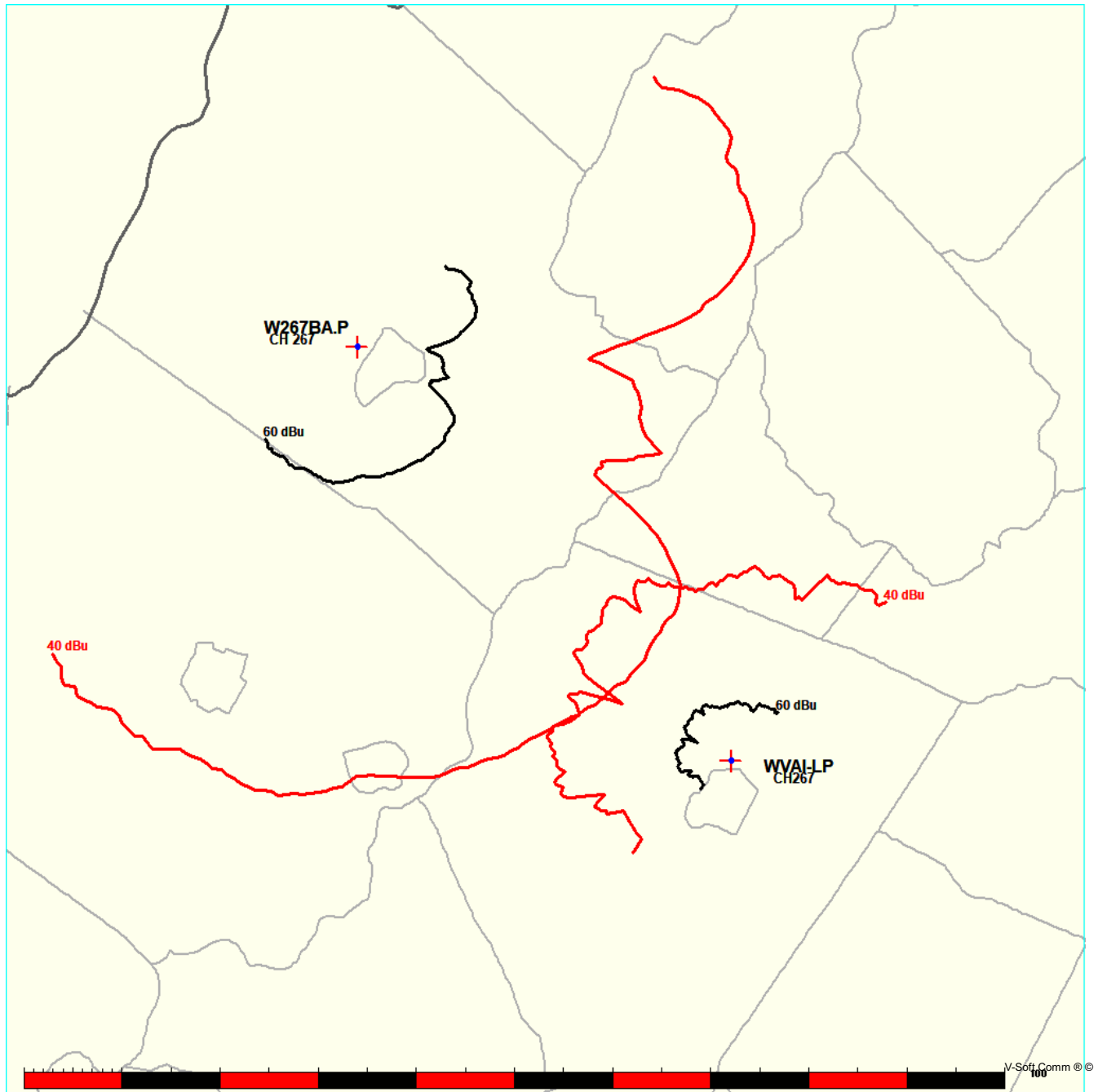
## ***Contour Protection Studies Toward Select Allocation Concern(s)***

Tidewater Communications, LLC

FMCommander Single Allocation Study - 08-20-2019 - NED 03 SEC  
W267BA.P's Overlaps (In= 23.87 km, Out= 7.41 km)

W267BA.P CH 267 D DA  
Lat= 38 27 08.0, Lng= 78 54 32.0  
0.099 kW 125.4 m HAAT, 561 m COR  
Prot.= 60 dBu, Intef.= 40 dBu

WVAI-LP CH 267 L1 BLL20151014AEV  
Lat= 38 04 39.0, Lng= 78 28 21.0  
0.021 kW 64.6 m HAAT, 230 m COR  
Prot.= 60 dBu, Intef.= 40 dBu



# ***Exhibit 7b***

## **Contour Protection Studies Toward Select Allocation Concern(s)**

08-20-2019

Terrain Data: NED 03 SEC

FMOver Analysis

W267BA.P

WVAI-LP BLL20151014AEV

Channel = 267D  
 Max ERP = 0.099 kW  
 RCAMSL = 561 m  
 N. Lat. 38 27 08.0  
 W. Lng. 78 54 32.0  
 Protected  
 60 dBu

Channel = 267L1  
 Max ERP = 0.021 kW  
 RCAMSL = 230 m  
 N. Lat. 38 04 39.0  
 W. Lng. 78 28 21.0  
 Interfering  
 40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
095.0	000.0990	0056.5	007.7	323.6	000.0049	0077.8	051.0	18.56	
096.0	000.0990	0062.0	008.1	323.8	000.0049	0077.6	050.7	18.59	
097.0	000.0990	0068.8	008.5	324.0	000.0048	0077.4	050.3	18.63	
098.0	000.0990	0069.8	008.6	324.0	000.0048	0077.5	050.1	18.71	
099.0	000.0990	0071.8	008.7	323.9	000.0048	0077.5	049.9	18.79	
100.0	000.0990	0073.0	008.8	323.9	000.0048	0077.6	049.7	18.87	
101.0	000.0990	0073.8	008.9	323.8	000.0049	0077.6	049.6	18.95	
102.0	000.0990	0075.2	008.9	323.7	000.0049	0077.5	049.4	19.03	
103.0	000.0990	0075.0	008.9	323.6	000.0049	0077.8	049.3	19.13	
104.0	000.0990	0075.1	008.9	323.4	000.0050	0078.0	049.2	19.24	
105.0	000.0990	0076.9	009.0	323.4	000.0050	0078.1	049.1	19.33	
106.0	000.0990	0078.3	009.1	323.3	000.0051	0078.2	048.9	19.43	
107.0	000.0990	0080.5	009.2	323.2	000.0051	0078.3	048.7	19.52	
108.0	000.0990	0084.5	009.5	323.2	000.0051	0078.3	048.4	19.62	
109.0	000.0990	0090.1	009.8	323.3	000.0051	0078.2	048.1	19.72	
110.0	000.0990	0086.0	009.6	322.9	000.0052	0078.2	048.2	19.79	
111.0	000.0990	0080.4	009.2	322.6	000.0053	0078.8	048.3	19.90	
112.0	000.0990	0078.7	009.1	322.4	000.0054	0078.5	048.3	19.95	
113.0	000.0990	0074.5	008.9	322.0	000.0056	0078.2	048.5	19.97	
114.0	000.0990	0068.3	008.5	321.7	000.0057	0078.2	048.8	19.99	
115.0	000.0990	0064.5	008.3	321.4	000.0058	0078.0	048.9	20.01	
116.0	000.0990	0066.1	008.4	321.3	000.0059	0077.6	048.8	20.06	
117.0	000.0990	0064.2	008.2	321.1	000.0060	0076.7	048.8	20.03	
118.0	000.0990	0064.6	008.3	320.9	000.0060	0076.3	048.7	20.06	
119.0	000.0990	0072.1	008.7	321.0	000.0060	0076.4	048.2	20.23	
120.0	000.0990	0085.4	009.5	321.1	000.0059	0077.0	047.4	20.50	
121.0	000.0990	0095.7	010.1	321.2	000.0059	0077.1	046.9	20.70	
122.0	000.0990	0106.7	010.6	321.2	000.0059	0077.1	046.3	20.90	
123.0	000.0990	0114.4	011.0	321.1	000.0059	0076.8	045.9	21.04	
124.0	000.0990	0121.7	011.3	321.0	000.0060	0076.4	045.6	21.17	
125.0	000.0990	0132.2	011.7	320.9	000.0060	0076.2	045.1	21.35	
126.0	000.0990	0140.4	012.1	320.8	000.0061	0076.1	044.7	21.52	
127.0	000.0990	0143.8	012.3	320.6	000.0062	0076.1	044.5	21.66	

***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)
128.0	000.0990	0147.4	012.4		320.3	000.0063	0076.5	044.2	21.85
129.0	000.0990	0149.5	012.5		320.1	000.0064	0076.1	044.1	21.93
130.0	000.0990	0150.9	012.6		319.8	000.0065	0075.5	044.0	21.98
131.0	000.0990	0149.1	012.5		319.5	000.0066	0075.5	044.1	22.05
132.0	000.0990	0150.4	012.6		319.2	000.0067	0075.3	044.0	22.14
133.0	000.0990	0152.5	012.7		319.0	000.0068	0075.2	043.8	22.25
134.0	000.0990	0152.3	012.6		318.7	000.0070	0074.6	043.8	22.26
135.0	000.0990	0153.3	012.7		318.4	000.0071	0073.6	043.8	22.26
136.0	000.0990	0155.8	012.8		318.1	000.0072	0072.6	043.7	22.27
137.0	000.0990	0159.4	013.0		317.8	000.0073	0072.2	043.5	22.37
138.0	000.0990	0160.6	013.0		317.5	000.0075	0071.9	043.4	22.43
139.0	000.0990	0160.6	013.0		317.2	000.0076	0071.5	043.4	22.46
140.0	000.0990	0161.4	013.0		316.9	000.0077	0071.1	043.4	22.51
141.0	000.0990	0163.4	013.1		316.6	000.0079	0070.6	043.3	22.55
142.0	000.0990	0160.7	013.0		316.3	000.0080	0069.8	043.5	22.49
143.0	000.0990	0160.6	013.0		316.0	000.0081	0068.8	043.5	22.44
144.0	000.0990	0162.2	013.1		315.7	000.0083	0068.6	043.5	22.51
145.0	000.0990	0162.8	013.1		315.4	000.0084	0069.1	043.5	22.63
146.0	000.0990	0163.3	013.1		315.1	000.0085	0069.0	043.5	22.68
147.0	000.0990	0162.2	013.1		314.8	000.0087	0069.0	043.6	22.72
148.0	000.0990	0162.2	013.1		314.5	000.0088	0068.6	043.7	22.73
149.0	000.0990	0164.0	013.2		314.2	000.0090	0069.4	043.6	22.89
150.0	000.0990	0163.8	013.2		313.9	000.0091	0069.7	043.7	22.96
151.0	000.0990	0163.2	013.1		313.7	000.0092	0069.8	043.8	23.00
152.0	000.0990	0161.5	013.1		313.4	000.0094	0069.9	043.9	23.02
153.0	000.0990	0161.8	013.1		313.1	000.0095	0069.5	044.0	23.02
154.0	000.0990	0161.8	013.1		312.8	000.0096	0070.0	044.1	23.10
155.0	000.0990	0161.8	013.1		312.6	000.0098	0070.5	044.2	23.19
156.0	000.0990	0161.8	013.1		312.3	000.0099	0070.8	044.3	23.25
157.0	000.0990	0163.0	013.1		312.0	000.0101	0070.7	044.3	23.28
158.0	000.0990	0164.5	013.2		311.7	000.0102	0070.6	044.3	23.32
159.0	000.0990	0165.4	013.2		311.4	000.0104	0071.1	044.4	23.41
160.0	000.0990	0166.2	013.3		311.1	000.0105	0071.2	044.5	23.46
161.0	000.0990	0166.4	013.3		310.9	000.0106	0071.8	044.6	23.53
162.0	000.0990	0164.8	013.2		310.7	000.0108	0071.8	044.8	23.51
163.0	000.0990	0164.6	013.2		310.4	000.0109	0071.2	044.9	23.46
164.0	000.0990	0166.1	013.3		310.1	000.0110	0070.2	045.0	23.39
165.0	000.0990	0166.7	013.3		309.9	000.0112	0069.1	045.1	23.29
166.0	000.0990	0165.8	013.2		309.7	000.0113	0068.1	045.3	23.16
167.0	000.0990	0165.7	013.2		309.4	000.0114	0067.4	045.4	23.07
168.0	000.0990	0167.8	013.3		309.1	000.0115	0066.7	045.5	23.02
169.0	000.0990	0168.6	013.4		308.9	000.0116	0066.6	045.6	23.01
170.0	000.0990	0168.4	013.4		308.7	000.0117	0066.5	045.8	22.99
171.0	000.0970	0169.1	013.3		308.5	000.0118	0066.7	045.9	22.97

# ***Exhibit 7b***

## **Contour Protection Studies Toward Select Allocation Concern(s)**

08-20-2019

Terrain Data: NED 03 SEC

FMOVer Analysis

WVAI-LP BLL20151014AEV

W267BA.P

Channel = 267L1  
 Max ERP = 0.021 kW  
 RCAMSL = 230 m  
 N. Lat. 38 04 39.0  
 W. Lng. 78 28 21.0  
 Protected  
 60 dBu

Channel = 267D  
 Max ERP = 0.099 kW  
 RCAMSL = 561 m  
 N. Lat. 38 27 08.0  
 W. Lng. 78 54 32.0  
 Interfering  
 40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
273.0	000.0210	0061.3	005.5	141.6	000.0990	0161.4	052.7	36.22	
274.0	000.0210	0064.3	005.6	141.7	000.0990	0161.3	052.5	36.27	
275.0	000.0210	0063.8	005.6	141.6	000.0990	0161.5	052.5	36.31	
276.0	000.0210	0065.8	005.7	141.6	000.0990	0161.6	052.4	36.36	
277.0	000.0210	0067.2	005.7	141.5	000.0990	0161.7	052.2	36.41	
278.0	000.0210	0067.4	005.7	141.5	000.0990	0162.0	052.2	36.45	
279.0	000.0210	0064.5	005.6	141.3	000.0990	0162.5	052.2	36.47	
280.0	000.0210	0065.7	005.7	141.2	000.0990	0162.6	052.1	36.51	
281.0	000.0210	0062.7	005.5	141.1	000.0990	0163.1	052.1	36.53	
282.0	000.0210	0059.9	005.4	140.9	000.0990	0163.6	052.1	36.55	
283.0	000.0210	0057.6	005.3	140.8	000.0990	0163.6	052.2	36.54	
284.0	000.0210	0055.9	005.3	140.6	000.0990	0163.4	052.2	36.53	
285.0	000.0210	0054.6	005.2	140.5	000.0990	0162.9	052.2	36.50	
286.0	000.0210	0051.0	005.0	140.3	000.0990	0162.1	052.3	36.42	
287.0	000.0210	0051.2	005.0	140.2	000.0990	0161.9	052.2	36.43	
288.0	000.0210	0052.5	005.1	140.2	000.0990	0161.8	052.1	36.47	
289.0	000.0210	0053.3	005.1	140.1	000.0990	0161.6	052.0	36.49	
290.0	000.0210	0054.4	005.2	140.1	000.0990	0161.5	051.9	36.53	
291.0	000.0210	0059.5	005.4	140.1	000.0990	0161.6	051.7	36.62	
292.0	000.0210	0059.5	005.4	140.0	000.0990	0161.4	051.6	36.63	
293.0	000.0210	0056.0	005.3	139.9	000.0990	0161.1	051.7	36.58	
294.0	000.0210	0054.3	005.2	139.7	000.0990	0160.8	051.7	36.55	
295.0	000.0210	0046.6	004.8	139.5	000.0990	0160.6	052.1	36.41	
296.0	000.0210	0040.5	004.4	139.2	000.0990	0160.5	052.4	36.29	
297.0	000.0210	0031.7	003.9	138.9	000.0990	0160.6	052.8	36.12	
298.0	000.0210	0041.5	004.5	139.1	000.0990	0160.6	052.3	36.34	
299.0	000.0210	0049.6	004.9	139.2	000.0990	0160.5	051.8	36.52	
300.0	000.0210	0057.8	005.3	139.2	000.0990	0160.5	051.4	36.68	
301.0	000.0210	0058.9	005.4	139.2	000.0990	0160.5	051.3	36.71	
302.0	000.0210	0061.9	005.5	139.1	000.0990	0160.6	051.2	36.76	
303.0	000.0210	0066.7	005.7	139.1	000.0990	0160.6	051.0	36.85	
304.0	000.0210	0070.7	005.9	139.0	000.0990	0160.6	050.8	36.92	
305.0	000.0210	0070.4	005.9	138.9	000.0990	0160.6	050.8	36.92	

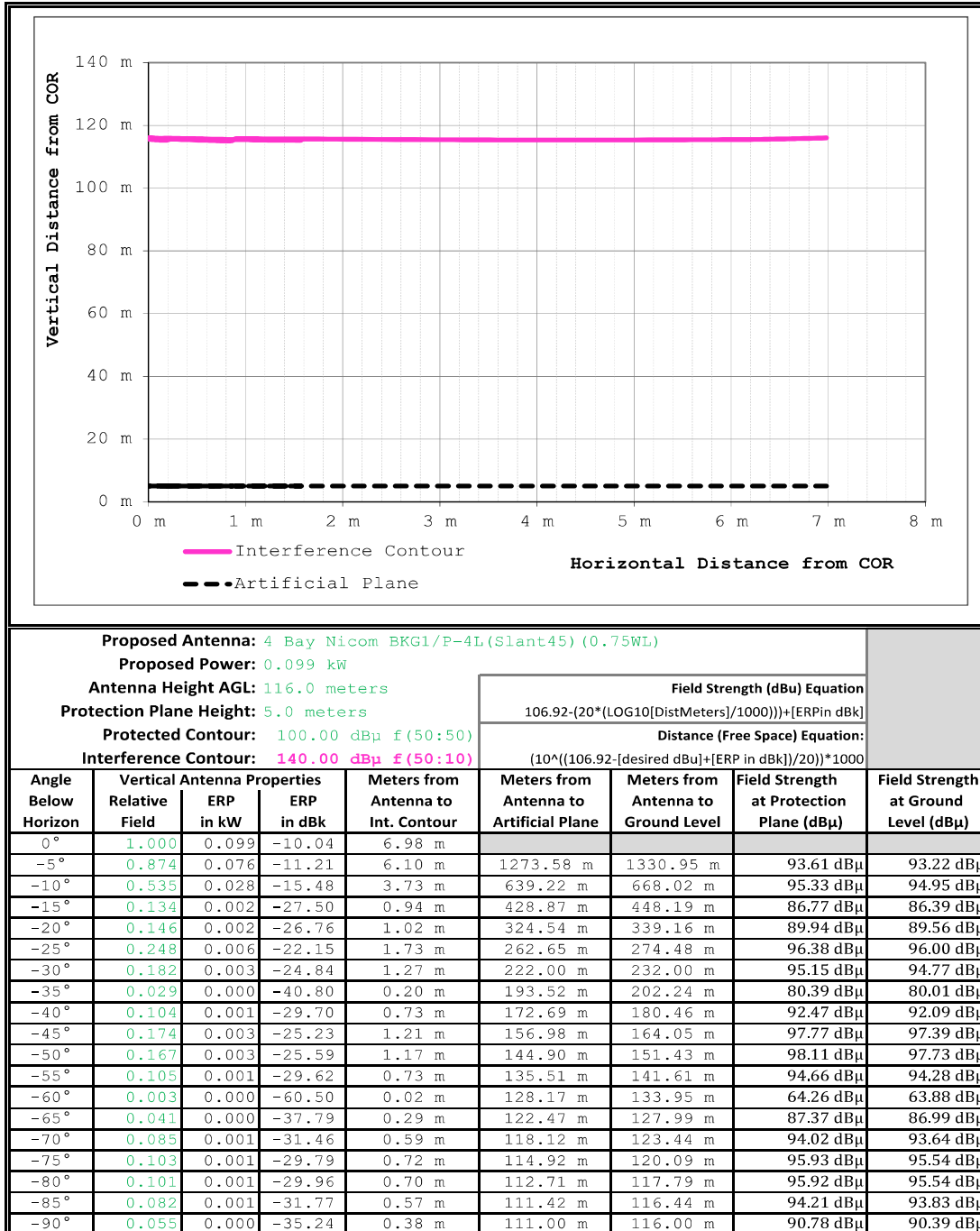
***Exhibit 7b***  
**Contour Protection Studies Toward Select Allocation Concern(s)**

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
306.0	000.0210	0067.6	005.7	138.7	000.0990	0160.6	050.8	36.89
307.0	000.0210	0066.7	005.7	138.6	000.0990	0160.5	050.9	36.88
308.0	000.0210	0066.7	005.7	138.5	000.0990	0160.6	050.8	36.89
309.0	000.0210	0066.6	005.7	138.4	000.0990	0160.6	050.8	36.90
310.0	000.0210	0069.7	005.8	138.3	000.0990	0160.6	050.7	36.95
311.0	000.0210	0071.5	005.9	138.2	000.0990	0160.6	050.6	36.98
312.0	000.0210	0070.7	005.9	138.1	000.0990	0160.6	050.6	36.97
313.0	000.0210	0069.6	005.8	138.0	000.0990	0160.6	050.7	36.96
314.0	000.0210	0069.7	005.8	137.9	000.0990	0160.5	050.6	36.96
315.0	000.0210	0069.0	005.8	137.7	000.0990	0160.5	050.7	36.95
316.0	000.0210	0068.7	005.8	137.6	000.0990	0160.4	050.7	36.95
317.0	000.0210	0071.3	005.9	137.5	000.0990	0160.4	050.6	36.98
318.0	000.0210	0072.3	005.9	137.4	000.0990	0160.2	050.5	36.99
319.0	000.0210	0075.3	006.0	137.3	000.0990	0160.0	050.4	37.03
320.0	000.0210	0075.8	006.1	137.1	000.0990	0159.7	050.4	37.02
321.0	000.0210	0076.5	006.1	137.0	000.0990	0159.5	050.4	37.02
322.0	000.0210	0078.3	006.2	136.9	000.0990	0159.2	050.3	37.03
323.0	000.0210	0078.2	006.2	136.8	000.0990	0158.8	050.3	37.00
324.0	000.0210	0077.4	006.1	136.7	000.0990	0158.5	050.4	36.97
325.0	000.0210	0074.2	006.0	136.6	000.0990	0158.2	050.5	36.90
326.0	000.0210	0070.9	005.9	136.5	000.0990	0157.8	050.7	36.82
327.0	000.0210	0064.5	005.6	136.4	000.0990	0157.6	050.9	36.71
328.0	000.0210	0058.2	005.4	136.4	000.0990	0157.4	051.2	36.60
329.0	000.0210	0067.4	005.7	136.2	000.0990	0156.5	050.8	36.69
330.0	000.0210	0073.6	006.0	136.0	000.0990	0155.7	050.6	36.72
331.0	000.0210	0076.4	006.1	135.8	000.0990	0155.0	050.5	36.72
332.0	000.0210	0078.5	006.2	135.7	000.0990	0154.5	050.5	36.71
333.0	000.0210	0075.8	006.1	135.6	000.0990	0154.2	050.6	36.65
334.0	000.0210	0075.0	006.0	135.5	000.0990	0154.0	050.7	36.61
335.0	000.0210	0076.1	006.1	135.4	000.0990	0153.6	050.7	36.59
336.0	000.0210	0072.2	005.9	135.3	000.0990	0153.4	050.9	36.52
337.0	000.0210	0069.1	005.8	135.3	000.0990	0153.3	051.0	36.45
338.0	000.0210	0067.1	005.7	135.2	000.0990	0153.3	051.1	36.41
339.0	000.0210	0066.1	005.7	135.1	000.0990	0153.3	051.2	36.38
340.0	000.0210	0067.6	005.7	135.0	000.0990	0153.4	051.2	36.39
341.0	000.0210	0064.6	005.6	134.9	000.0990	0153.4	051.3	36.33
342.0	000.0210	0062.9	005.6	134.9	000.0990	0153.4	051.4	36.29
343.0	000.0210	0062.6	005.5	134.8	000.0990	0153.5	051.5	36.28
344.0	000.0210	0060.9	005.5	134.7	000.0990	0153.5	051.6	36.24
345.0	000.0210	0061.2	005.5	134.6	000.0990	0153.5	051.6	36.22
346.0	000.0210	0059.1	005.4	134.6	000.0990	0153.5	051.8	36.17
347.0	000.0210	0058.8	005.4	134.5	000.0990	0153.3	051.8	36.14
348.0	000.0210	0057.1	005.3	134.5	000.0990	0153.2	051.9	36.09
349.0	000.0210	0057.8	005.3	134.4	000.0990	0152.9	052.0	36.07

## Exhibit 8

### 47 C.F.R. Section 74.1204(d) Second / Third Adjacent Given Interference Waiver Request

Yellow Highlighted Text denotes the existence of a 47 C.F.R. Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WQPO(FM) - Harrisonburg, VA (CH264B) as noted in **Exhibit 8**. Both stations are co-located on the same tower, therefore the interference area will not leave the base of the tower. However out of an overabundance of caution, protection of a worst case 140 dBμ F(50:10) interference contour has been demonstrated through a downward radiation study. Full protection will be afforded the facility in question as this area will not reach the ground nor a five meter artificial plane representing a standard one and a half story home when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. A copy of the antenna manufacturer specifications has been included in **Exhibit 9**.

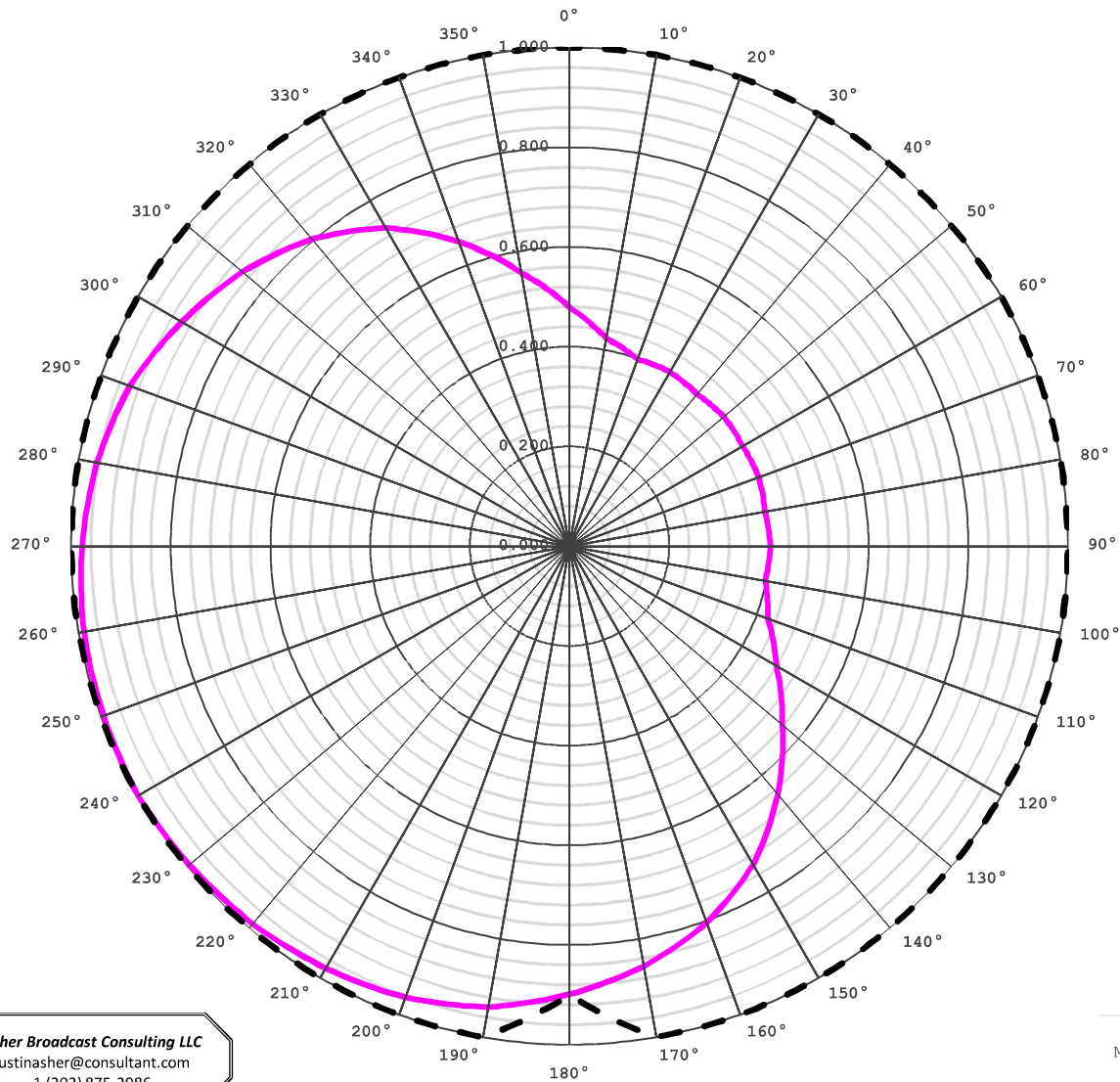




Manufacturer's	Make/Model	Orientation	Power
Element 1:	BKG1P(Slant45)	240° True	100.0%
Element 2:			
Element 3:			
Element 4:			

Composite Power: 100%

## Exhibit 9 - Copy of Manufacturer's Directional Antenna Pattern Data



Azimuth ° True	FCC Pattern	Manufacturer's Pattern
0°	1.000	0.479
10°	1.000	0.423
20°	1.000	0.399
30°	1.000	0.403
40°	1.000	0.398
50°	1.000	0.404
60°	1.000	0.401
70°	1.000	0.404
80°	1.000	0.398
90°	1.000	0.403
100°	1.000	0.399
110°	1.000	0.423
120°	1.000	0.479
130°	1.000	0.557
140°	1.000	0.650
150°	1.000	0.737
160°	1.000	0.804
170°	1.000	0.856
180°	0.900	0.899
190°	1.000	0.939
200°	1.000	0.963
210°	1.000	0.978
220°	1.000	0.989
230°	1.000	0.995
240°	1.000	1.000
250°	1.000	0.995
260°	1.000	0.989
270°	1.000	0.978
280°	1.000	0.963
290°	1.000	0.939
300°	1.000	0.899
310°	1.000	0.856
320°	1.000	0.804
330°	1.000	0.737
340°	1.000	0.650
350°	1.000	0.557

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

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

## Exhibit 9

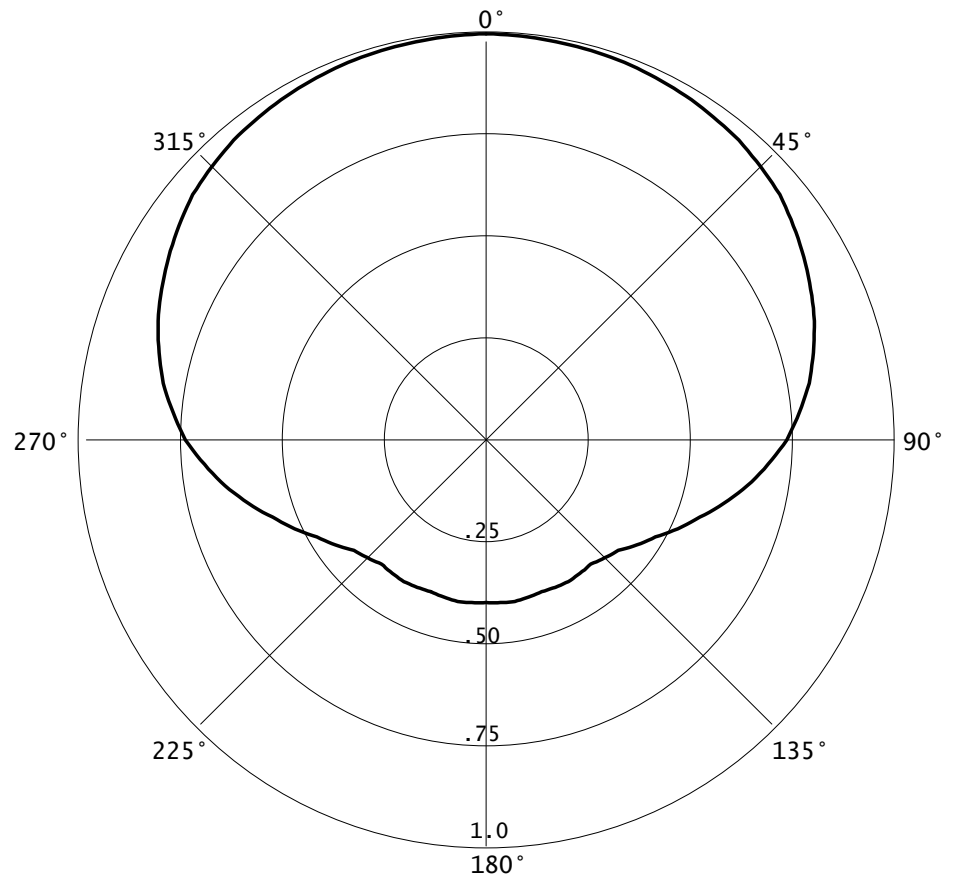
### *Copy of Manufacturer's Directional Antenna Documentation* (Actual Antenna Pattern rotated to 240.0°T) (public record copy)

#### BKG1/P-4DA(Slant45) COMPOSITE PATTERN

RMS(V)= .739

Graph is Relative Field

Azi	Field	dBk
000	1.000	-10.000
010	0.995	-10.044
020	0.989	-10.096
030	0.978	-10.193
040	0.963	-10.327
050	0.939	-10.547
060	0.899	-10.925
070	0.856	-11.351
080	0.804	-11.895
090	0.737	-12.651
100	0.650	-13.742
110	0.557	-15.083
120	0.479	-16.393
130	0.423	-17.473
140	0.399	-17.981
150	0.403	-17.894
160	0.398	-18.002
170	0.404	-17.872
180	0.401	-17.937
190	0.404	-17.872
200	0.398	-18.002
210	0.403	-17.894
220	0.399	-17.981
230	0.423	-17.473
240	0.479	-16.393
250	0.557	-15.083
260	0.650	-13.742
270	0.737	-12.651
280	0.804	-11.895
290	0.856	-11.351
300	0.899	-10.925
310	0.939	-10.547
320	0.963	-10.327
330	0.978	-10.193
340	0.989	-10.096
350	0.995	-10.044



The directional antenna pattern will be produced by means of a Nicom Dipole BKG1/P broadcast element mounted at a 45° (degree) slant orientation to achieve horizontal and vertical polarization. The BKG1/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 BKG1/P-1DA(Slant45) element will be -3.0 dBd or the common horizontal or vertical maximum antenna gain of 0.0 dBd adjusted by 3 dBd for dual broadcast in the Horizontal and Vertical planes (-3.0 dBd = 0.0 dBd - 3.0 dBd). The maximum gain for multiple bay options of the Nicom BKG1/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 9

## Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 240.0°T) (public record copy)



Your Number 1 Source For Radio And Digital TV Gear

### BKG1/P

Medium Power Portable Broadband FM Dipole

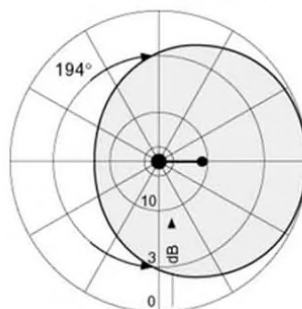
This broadband dipole antenna is constructed of stainless steel and is designed to last a long time in any weather condition. Because of its sturdy construction, it can support up to 2.5 KW of input power with the appropriate connector. Since it has a wide angle of radiation, it is strongly recommended for omni-directional 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.

#### TECHNICAL SPECIFICATIONS

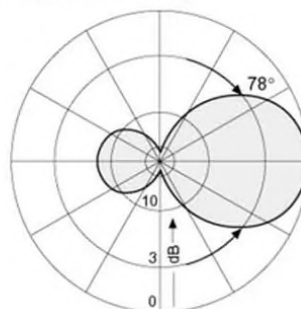
**Antenna Type:** dipole  
**Front-to-Back Ratio:** 7 dB  
**Frequency Range:** 87.5 - 108 MHz  
**Polarization:** vertical  
**Gain:** 0 dBd (unity gain)  
**Bandwidth:** 20 MHz Max  
**VSWR:** < 1.3  
**H Plane:** 194 degrees  
**V Plane:** 78 degrees  
**Impedance:** 50 Ohms  
**Connectors:** N type (1 kw) - 7/8 type (2 kw)  
**Power Rating:** 2000 Watts max.  
**Wind Load:** 39.6 Lbs (18 kg)  
**Wind Velocity:** 119 mph (190 km/h)  
**Wind Surface:** 1.2 ft<sup>2</sup> (0.11 m<sup>2</sup>)  
**Lightning Protection:** all parts grounded  
**Material:** (external) stainless steel  
**Mounting:** from 2" to 4"  
**Weight:** 18 Lbs (8.1kg)  
**Average Dimensions:** 50"x30"x2"  
**Packing:** 46"x22"x4"



#### Radiation Patterns (at mid-band)



in H-plane  
Horizontal Radiation Pattern



in E-plane  
Vertical Radiation Pattern

## Exhibit 9

# Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 240.0°T) (public record copy)

TX station: BKG1/P

Site name:

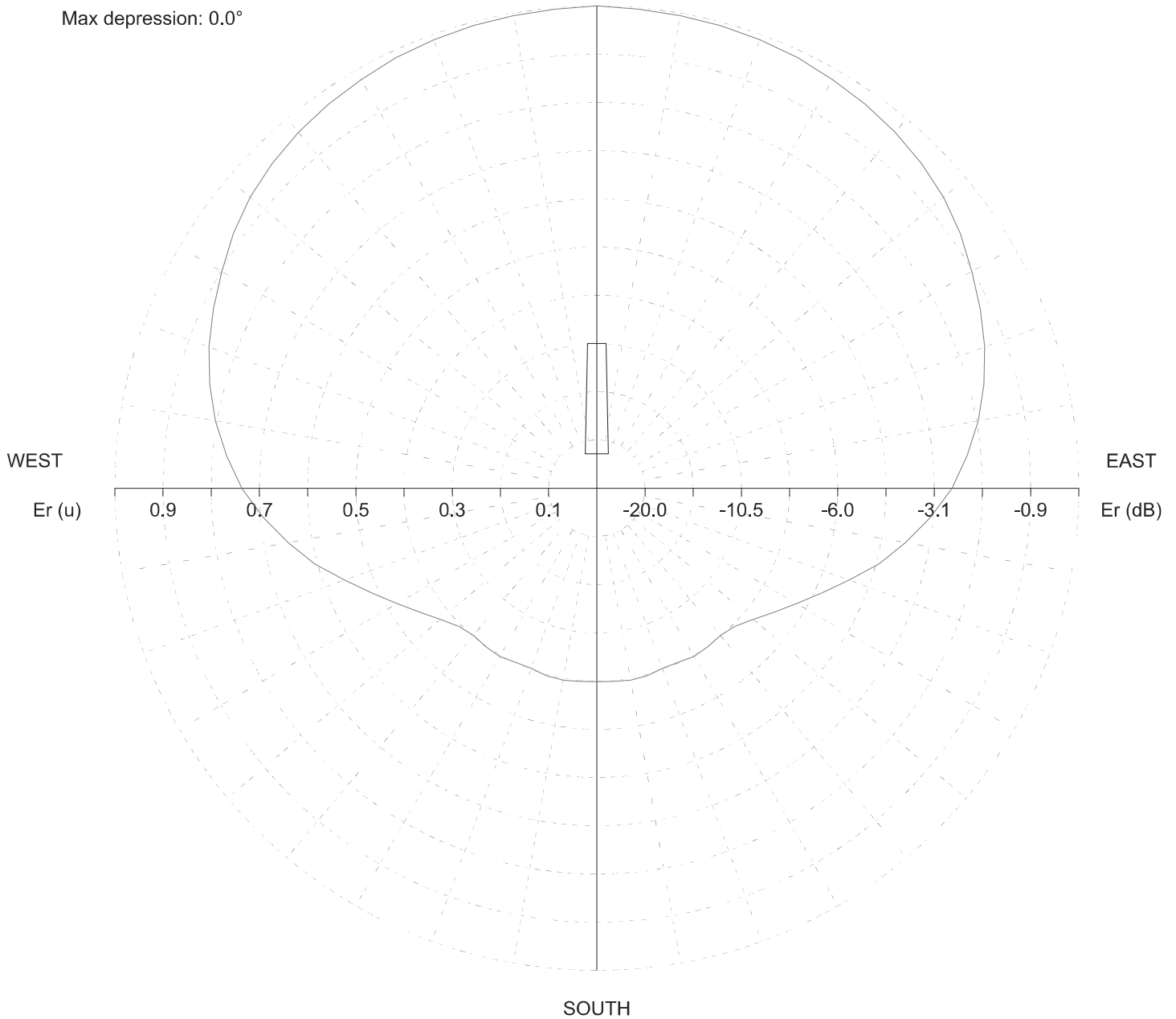
Frequency: 100.00 MHz

### Horizontal diagram of Maxima

NORTH

Max azimuth: 0°

Max depression: 0.0°



—— 0.0° depres. (Total antenna), Gain (dBd): 0.00 ERP T.max (KW): 1.

ERP E.max (KW): 0.776

## Exhibit 9

# Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 240.0°T) (public record copy)

TX station: BKG1/P

Site name:

Frequency: 100.00 MHz

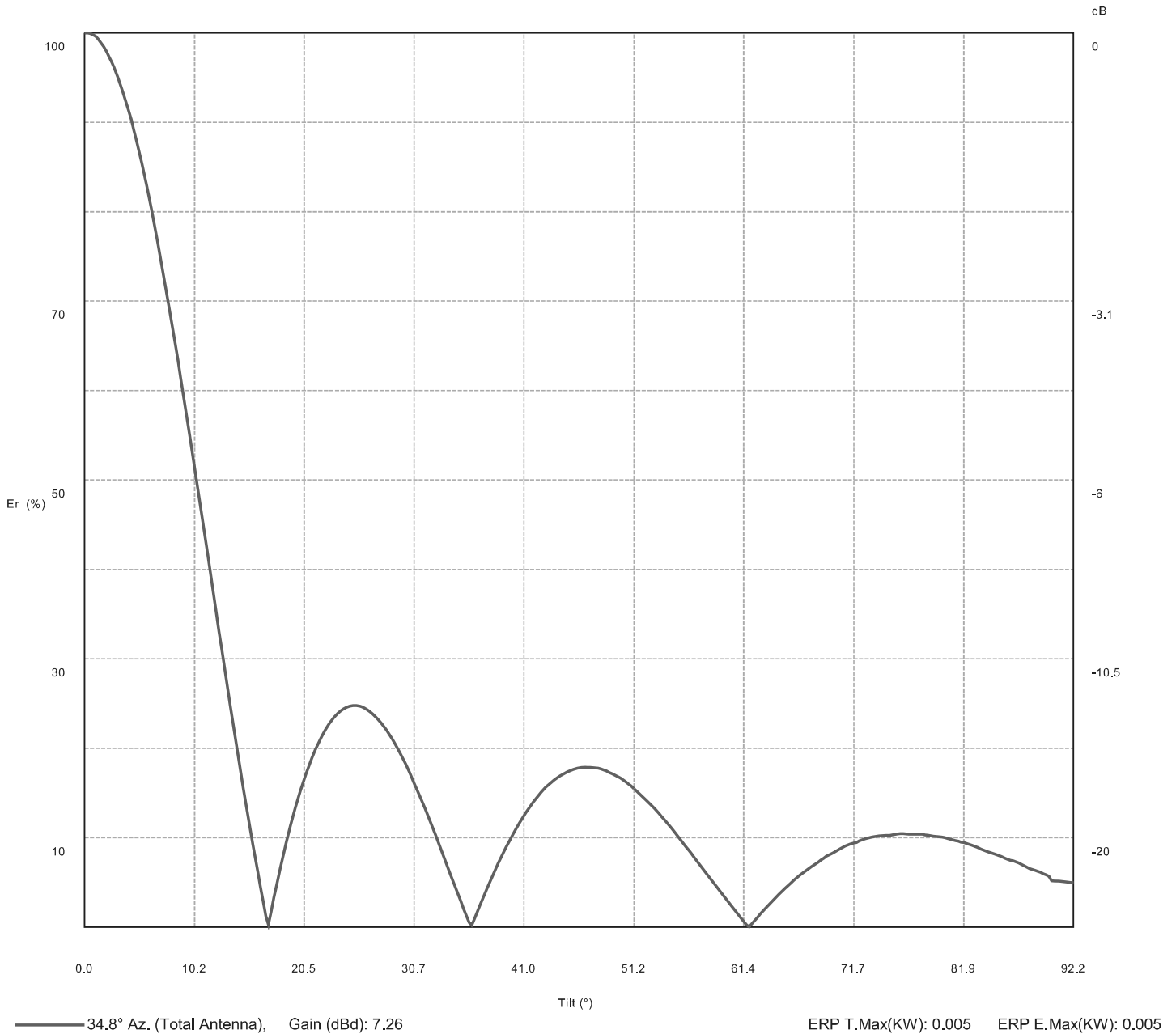
### Horizontal diagram of Maxima

Az (°)	Dep (°)	Er (%)	ERP (W)	Az (°)	Dep (°)	Er (%)	ERP (W)	Az (°)	Dep (°)	Er (%)	ERP (W)
0.0	0.0	100.0	776.2	120.0	0.0	47.9	178.0	240.0	0.0	47.9	178.0
5.0	0.0	99.7	772.1	125.0	0.0	44.8	156.0	245.0	0.0	51.5	205.9
10.0	0.0	99.5	768.1	130.0	0.0	42.3	139.1	250.0	0.0	55.7	240.8
15.0	0.0	99.3	765.7	135.0	0.0	40.5	127.4	255.0	0.0	60.6	285.0
20.0	0.0	98.9	759.7	140.0	0.0	39.9	123.3	260.0	0.0	65.0	328.3
25.0	0.0	98.5	753.4	145.0	0.0	40.1	125.1	265.0	0.0	69.5	374.7
30.0	0.0	97.8	743.2	150.0	0.0	40.3	126.0	270.0	0.0	73.7	421.3
35.0	0.0	97.2	733.2	155.0	0.0	39.9	123.5	275.0	0.0	77.1	461.6
40.0	0.0	96.3	720.1	160.0	0.0	39.8	122.8	280.0	0.0	80.4	501.4
45.0	0.0	95.2	703.9	165.0	0.0	40.3	126.1	285.0	0.0	83.2	536.8
50.0	0.0	93.9	684.4	170.0	0.0	40.4	126.9	290.0	0.0	85.6	569.2
55.0	0.0	92.1	658.3	175.0	0.0	40.3	125.8	295.0	0.0	87.8	598.3
60.0	0.0	89.9	627.1	180.0	0.0	40.1	125.0	300.0	0.0	89.9	627.1
65.0	0.0	87.8	598.3	185.0	0.0	40.3	125.8	305.0	0.0	92.1	658.3
70.0	0.0	85.6	569.2	190.0	0.0	40.4	126.9	310.0	0.0	93.9	684.4
75.0	0.0	83.2	536.8	195.0	0.0	40.3	126.1	315.0	0.0	95.2	703.9
80.0	0.0	80.4	501.4	200.0	0.0	39.8	122.8	320.0	0.0	96.3	720.1
85.0	0.0	77.1	461.6	205.0	0.0	39.9	123.5	325.0	0.0	97.2	733.2
90.0	0.0	73.7	421.3	210.0	0.0	40.3	126.0	330.0	0.0	97.8	743.2
95.0	0.0	69.5	374.7	215.0	0.0	40.1	125.1	335.0	0.0	98.5	753.4
100.0	0.0	65.0	328.3	220.0	0.0	39.9	123.3	340.0	0.0	98.9	759.7
105.0	0.0	60.6	285.0	225.0	0.0	40.5	127.4	345.0	0.0	99.3	765.7
110.0	0.0	55.7	240.8	230.0	0.0	42.3	139.1	350.0	0.0	99.5	768.1
115.0	0.0	51.5	205.9	235.0	0.0	44.8	156.0	355.0	0.0	99.7	772.1

## Exhibit 9

*Copy of Manufacturer's Directional Antenna Documentation*  
(Actual Antenna Pattern rotated to 240.0°T) (public record copy)

Vertical diagram at an azimuth of 34.8°



**Exhibit 9**  
**Copy of Manufacturer's Directional Antenna Documentation**  
*(Actual Antenna Pattern rotated to 240.0°T) (public record copy)*

**Vertical diagram at an azimuth of 34.8°**

Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)
0.0	100.0	5.3	15.4	11.5	0.1	30.7	16.1	0.1
0.3	100.0	5.3	15.6	9.7	0.1	31.0	15.4	0.1
0.5	100.0	5.3	15.9	8.0	0.0	31.2	14.7	0.1
0.8	99.8	5.3	16.1	6.2	0.0	31.5	14.0	0.1
1.0	99.6	5.3	16.4	4.5	0.0	31.7	13.2	0.1
1.3	99.3	5.3	16.6	2.9	0.0	32.0	12.5	0.1
1.5	98.9	5.2	16.9	1.3	0.0	32.3	11.7	0.1
1.8	98.5	5.2	17.2	0.3	0.0	32.5	11.0	0.1
2.0	97.9	5.1	17.4	1.8	0.0	32.8	10.2	0.1
2.3	97.3	5.0	17.7	3.3	0.0	33.0	9.4	0.0
2.6	96.7	5.0	17.9	4.8	0.0	33.3	8.6	0.0
2.8	95.9	4.9	18.2	6.2	0.0	33.5	7.8	0.0
3.1	95.1	4.8	18.4	7.5	0.0	33.8	6.9	0.0
3.3	94.3	4.7	18.7	8.8	0.0	34.0	6.1	0.0
3.6	93.4	4.6	18.9	10.1	0.1	34.3	5.3	0.0
3.8	92.4	4.5	19.2	11.3	0.1	34.6	4.5	0.0
4.1	91.3	4.4	19.5	12.4	0.1	34.8	3.7	0.0
4.4	90.3	4.3	19.7	13.5	0.1	35.1	2.9	0.0
4.6	89.2	4.2	20.0	14.6	0.1	35.3	2.1	0.0
4.9	88.0	4.1	20.2	15.6	0.1	35.6	1.3	0.0
5.1	86.7	4.0	20.5	16.5	0.1	35.8	0.6	0.0
5.4	85.3	3.9	20.7	17.4	0.2	36.1	0.2	0.0
5.6	83.9	3.7	21.0	18.3	0.2	36.4	1.0	0.0
5.9	82.4	3.6	21.2	19.1	0.2	36.6	1.7	0.0
6.1	80.8	3.5	21.5	19.8	0.2	36.9	2.5	0.0
6.4	79.2	3.3	21.8	20.5	0.2	37.1	3.2	0.0
6.7	77.6	3.2	22.0	21.1	0.2	37.4	4.0	0.0
6.9	75.9	3.1	22.3	21.7	0.3	37.6	4.7	0.0
7.2	74.3	2.9	22.5	22.2	0.3	37.9	5.4	0.0
7.4	72.5	2.8	22.8	22.7	0.3	38.1	6.0	0.0
7.7	70.8	2.7	23.0	23.2	0.3	38.4	6.7	0.0
7.9	69.0	2.5	23.3	23.5	0.3	38.7	7.4	0.0
8.2	67.2	2.4	23.6	23.9	0.3	38.9	8.0	0.0
8.4	65.3	2.3	23.8	24.1	0.3	39.2	8.6	0.0
8.7	63.4	2.1	24.1	24.3	0.3	39.4	9.2	0.0
9.0	61.4	2.0	24.3	24.5	0.3	39.7	9.8	0.1
9.2	59.5	1.9	24.6	24.7	0.3	39.9	10.4	0.1
9.5	57.5	1.8	24.8	24.8	0.3	40.2	10.9	0.1
9.7	55.5	1.6	25.1	24.8	0.3	40.4	11.5	0.1
10.0	53.5	1.5	25.3	24.8	0.3	40.7	12.0	0.1
10.2	51.5	1.4	25.6	24.8	0.3	41.0	12.5	0.1
10.5	49.4	1.3	25.9	24.7	0.3	41.2	13.0	0.1
10.8	47.4	1.2	26.1	24.5	0.3	41.5	13.4	0.1
11.0	45.3	1.1	26.4	24.3	0.3	41.7	13.8	0.1
11.3	43.3	1.0	26.6	24.1	0.3	42.0	14.2	0.1
11.5	41.2	0.9	26.9	23.8	0.3	42.2	14.6	0.1
11.8	39.2	0.8	27.1	23.5	0.3	42.5	15.0	0.1
12.0	37.1	0.7	27.4	23.2	0.3	42.8	15.3	0.1
12.3	35.1	0.7	27.6	22.8	0.3	43.0	15.7	0.1
12.5	33.1	0.6	27.9	22.5	0.3	43.3	16.0	0.1
12.8	31.1	0.5	28.2	22.0	0.3	43.5	16.2	0.1
13.1	29.0	0.4	28.4	21.5	0.2	43.8	16.5	0.1
13.3	27.0	0.4	28.7	21.0	0.2	44.0	16.7	0.1
13.6	25.0	0.3	28.9	20.5	0.2	44.3	16.9	0.2
13.8	23.0	0.3	29.2	20.0	0.2	44.5	17.1	0.2
14.1	21.0	0.2	29.4	19.4	0.2	44.8	17.2	0.2
14.3	19.0	0.2	29.7	18.8	0.2	45.1	17.4	0.2
14.6	17.1	0.2	30.0	18.2	0.2	45.3	17.5	0.2
14.8	15.2	0.1	30.2	17.5	0.2	45.6	17.7	0.2
15.1	13.4	0.1	30.5	16.8	0.2	45.8	17.8	0.2



## Exhibit 9

### Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 240.0°T) (public record copy)

#### Vertical diagram at an azimuth of 34.8°

Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)
46.1	17.8	0.2	61.4	0.7	0.0	76.8	10.4	0.1
46.3	17.9	0.2	61.7	0.3	0.0	77.1	10.4	0.1
46.6	17.9	0.2	62.0	0.1	0.0	77.3	10.4	0.1
46.8	17.9	0.2	62.2	0.4	0.0	77.6	10.4	0.1
47.1	17.9	0.2	62.5	0.8	0.0	77.8	10.4	0.1
47.4	17.9	0.2	62.7	1.1	0.0	78.1	10.4	0.1
47.6	17.8	0.2	63.0	1.5	0.0	78.3	10.3	0.1
47.9	17.8	0.2	63.2	1.8	0.0	78.6	10.3	0.1
48.1	17.7	0.2	63.5	2.2	0.0	78.8	10.2	0.1
48.4	17.6	0.2	63.7	2.5	0.0	79.1	10.2	0.1
48.6	17.5	0.2	64.0	2.8	0.0	79.4	10.1	0.1
48.9	17.3	0.2	64.3	3.2	0.0	79.6	10.1	0.1
49.2	17.2	0.2	64.5	3.5	0.0	79.9	10.1	0.1
49.4	17.0	0.2	64.8	3.8	0.0	80.1	10.0	0.1
49.7	16.9	0.2	65.0	4.1	0.0	80.4	9.9	0.1
49.9	16.7	0.1	65.3	4.4	0.0	80.6	9.8	0.1
50.2	16.5	0.1	65.5	4.7	0.0	80.9	9.8	0.1
50.4	16.3	0.1	65.8	5.0	0.0	81.2	9.7	0.0
50.7	16.0	0.1	66.0	5.2	0.0	81.4	9.6	0.0
50.9	15.8	0.1	66.3	5.5	0.0	81.7	9.6	0.0
51.2	15.5	0.1	66.6	5.8	0.0	81.9	9.5	0.0
51.5	15.2	0.1	66.8	6.0	0.0	82.2	9.4	0.0
51.7	14.9	0.1	67.1	6.2	0.0	82.4	9.3	0.0
52.0	14.6	0.1	67.3	6.5	0.0	82.7	9.2	0.0
52.2	14.3	0.1	67.6	6.7	0.0	82.9	9.1	0.0
52.5	14.0	0.1	67.8	6.9	0.0	83.2	8.9	0.0
52.7	13.7	0.1	68.1	7.1	0.0	83.5	8.8	0.0
53.0	13.4	0.1	68.4	7.3	0.0	83.7	8.7	0.0
53.2	13.1	0.1	68.6	7.5	0.0	84.0	8.5	0.0
53.5	12.8	0.1	68.9	7.8	0.0	84.2	8.4	0.0
53.8	12.4	0.1	69.1	7.9	0.0	84.5	8.3	0.0
54.0	12.0	0.1	69.4	8.1	0.0	84.7	8.3	0.0
54.3	11.7	0.1	69.6	8.3	0.0	85.0	8.2	0.0
54.5	11.3	0.1	69.9	8.4	0.0	85.2	8.0	0.0
54.8	10.9	0.1	70.1	8.6	0.0	85.5	7.9	0.0
55.0	10.5	0.1	70.4	8.8	0.0	85.8	7.8	0.0
55.3	10.2	0.1	70.7	9.0	0.0	86.0	7.6	0.0
55.6	9.8	0.1	70.9	9.1	0.0	86.3	7.5	0.0
55.8	9.4	0.0	71.2	9.3	0.0	86.5	7.4	0.0
56.1	9.0	0.0	71.4	9.4	0.0	86.8	7.3	0.0
56.3	8.6	0.0	71.7	9.4	0.0	87.0	7.2	0.0
56.6	8.2	0.0	71.9	9.5	0.0	87.3	7.1	0.0
56.8	7.8	0.0	72.2	9.6	0.0	87.6	6.9	0.0
57.1	7.4	0.0	72.4	9.8	0.1	87.8	6.7	0.0
57.3	7.0	0.0	72.7	9.9	0.1	88.1	6.6	0.0
57.6	6.6	0.0	73.0	10.0	0.1	88.3	6.5	0.0
57.9	6.2	0.0	73.2	10.0	0.1	88.6	6.4	0.0
58.1	5.8	0.0	73.5	10.1	0.1	88.8	6.3	0.0
58.4	5.4	0.0	73.7	10.1	0.1	89.1	6.2	0.0
58.6	5.0	0.0	74.0	10.2	0.1	89.3	6.0	0.0
58.9	4.6	0.0	74.2	10.2	0.1	89.6	5.9	0.0
59.1	4.2	0.0	74.5	10.2	0.1	89.9	5.7	0.0
59.4	3.8	0.0	74.8	10.2	0.1	90.1	5.2	0.0
59.6	3.4	0.0	75.0	10.3	0.1	90.4	5.2	0.0
59.9	3.0	0.0	75.3	10.3	0.1	90.6	5.2	0.0
60.2	2.6	0.0	75.5	10.4	0.1	90.9	5.2	0.0
60.4	2.2	0.0	75.8	10.4	0.1	91.1	5.1	0.0
60.7	1.8	0.0	76.0	10.5	0.1	91.4	5.1	0.0
60.9	1.4	0.0	76.3	10.4	0.1	91.6	5.0	0.0
61.2	1.0	0.0	76.5	10.4	0.1	91.9	5.0	0.0