

Boone, North Carolina  
Long Form Application for FM Translator 1564617  
File Number BNPFT-20030317FRQ  
On Channel 233  
by  
Wake Forest University

Exhibit 13  
Interference Analysis

August 2013

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Declaration

I declare, under penalty of perjury, that I am a technical consultant to broadcasting and other communications systems, that I have over twenty-five years of experience in the engineering of broadcast and other communications systems, that I am familiar with the Federal Communications Commission's Rules found in the Code of Federal Regulations Title 47, that I am a Professional Engineer registered in North Carolina, that I have prepared or supervised the preparation of the attached Exhibit 13, Interference Analysis, for Wake Forest University, and that all of the facts therein, except for facts of which the Federal Communications Commission may take official notice, are true to the best of my knowledge and belief.



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27 August 2013

### Narrative

This Exhibit supports a long form application for CDBS application ID 1564617, an amended “Tech Box” application in response to a filing window<sup>1</sup> for FM translator file number BNPFT-20030317FRQ, CDBS application ID 649140, on Channel 233 in Boone, North Carolina. Allocation details are provided in this exhibit. The application proposes new technical parameters. Specifically, this application proposes decreased elevation, and reduced power. The directional antenna pattern has been updated by the manufacturer. Because there are changes, a new preclusion showing is provided.

This proposal creates no new mutual exclusivities with any Auction 83 Tech Box filings or any other facility.

Figure 1 shows the proposed 60 dBu F(50,50) coverage area. The primary station WXIT (AM) 2 mV/m contour and 25 mile radius circle are also shown.

### Allocations

This application proposes service to Boone, North Carolina, on channel 233. An updated Table 1: Allocations is included in this exhibit with a list of the stations, construction permits, allocations, and applications studied. All are protected by this application, with the exception of facilities which are listed in Table 2 below. Those facilities are protected by the Desired to Undesired (D/U) Ratio method which is described below. Where the outgoing protection is provided by interference contours with a separation of less than 3.2 kilometers (2

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<sup>1</sup> *Public Notice, Media Bureau Announces FM Translator Auction 83 Filing Window and Filing Procedures, August 30, 2013 Deadline Set for Form 349 Applications for Certain Non-Mutually Exclusive Tech Box Proposals*, Report No. AUC-03-83-E, DA13-1675, released July 31, 2013.

miles), the lack of overlap is plotted in figures in this exhibit, and the output of the FM Over program is provided. For this application, there is one (1) facility for which additional detail is provided.

Figure and Table	Call Sign	Location	Channel, class and relationship
3	637687	Boone, North Carolina	234D, first adjacent

Table 1: Allocations

Allocation Study											
Wake Forest University											
REFERENCE	CH# 233D - 94.5 MHz, Pwr= 0.03 kw DA, HAAT= 402.5 M, COR= 1437 M								DISPLAY DATES		
36 14 05.0 N.	Average Protected F(50-50)= 15.3 km								DATA 08-27-13		
81 42 13.0 W.	Standard Directional								SEARCH 08-27-13		
CH CITY	CALL	TYPE	ANT STATE	AZI. <--	DIST FILE #	LAT. LNG.	Pwr(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
233C Greenville	WGTV-FM	LIC	CX SC	204.2 23.8	157.17 BLH20080425ABD	34 56 29.0 82 24 41.0	100.000 454	187.2 760	83.6 Caron Broadcasting, Inc.	-42.2*	36.1
233C1 Eden	WPTI	LIC	DE NC	85.0 266.1	161.75 BMLH20010514AAN	36 20 48.0 79 54 30.0	100.000 299	173.0 522	73.1 Clear Channel Broadcasting	-12.3*	85.1
230C Marion	WMEV-FM	LIC	DEX VA	10.9 191.0	75.33 BLH20060512AAB	36 54 04.0 81 32 35.0	100.000 452	12.3 1187	84.8 Holston Valley Broadcasting	60.6	-9.5*
Protected by U/D signal levels, see text and figures.											
233D Boone	1564617	APP	DC NC	0.0 0.0	0.00 BNPFT20030317FRQ	36 14 05.0 81 42 13.0	0.080	4.8 1439	1.2 Wake Forest University	-5.2*	-3.8*
Tech box facility being modified in this long form application.											
234D Boone	637687	APP	C NC	133.8 313.9	5.84 BNPFT20030317LQY	36 11 54.0 81 39 24.0	0.010 -10	4.4 966	3.2 Blue Ridge Broadcasting Co	0.1	0.3
232D Lenoir	W232AV	LIC	CN NC	152.1 332.2	41.17 BLFT19950504TB	35 54 25.0 81 29 22.0	0.010 296	13.6 699	9.3 Eastern Airwaves, LLC	23.8	30.6
Translator For WQUT, Johnson City, TN- Change of Primary FM station to WCQR-FM, Kingsport, TN.											
236C Charlotte	WNKS	LIC	CX NC	152.8 333.2	108.75 BMLH20030619AAE	35 21 44.0 81 09 19.0	100.000 470	12.2 707	83.4 Cbs Radio Stations Inc.	91.5	25.2
235C0 Greenville	WAEZ	LIC	DEX TN	259.0 78.5	90.58 BMLH20010504AAT	36 04 34.0 82 41 28.0	100.000 332	6.1 1042	43.7 Bristol Broadcasting Compa	69.2	26.8
232D Kingsport	W232BP	LIC	DC TN	292.6 112.1	85.61 BLFT20070907AFM	36 31 37.0 82 35 12.0	0.250 285	34.2 733	22.9 Holston Valley Broadcastin	37.3	45.8
231C1 Lexington	WWLV	CP	NCX NC	126.4 306.9	108.81 BPH20030303ACA	35 39 04.0 80 44 04.0	43.000 408	9.1 653	71.1 Davidson County Broadcasti	97.9	37.5
73.215 applicant.											
232C2 Jenkins	WIFX-FM	LIC	ZEX KY	322.0 141.5	131.90 BLH20070511ACW	37 09 59.0 82 37 13.0	6.300 410	76.9 956	51.8 Ajspd, LLC	44.8	76.1
233D Rogersville	W233BP	LIC	C TN	280.3 99.6	116.75 BLFT20091201ANJ	36 24 58.0 82 59 04.0	0.250 64	46.2 480	13.4 wrgs, Inc.	55.4	52.1
231C Lexington	WWLV	LIC	DCN NC	105.2 286.0	131.80 BLH19940909KH	35 55 02.0 80 17 37.0	100.000 309	10.4 543	73.6 Davidson County Broadcasti	120.2	58.0
231D Weaverville	W231AR	LIC	C NC	223.5 43.2	76.38 BLFT20060126ANW	35 44 06.0 82 17 10.0	0.010 922	0.2 2009	16.3 Radio Training Network, In	62.2	59.8

Terrain database is NGDC 30 SEC, R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM  
 In & Out distances between contours are shown at closest points. Reference Zone= East Zone, Co to 3rd adj.  
 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 protected contour.

**Table 2: Facilities Protected by U/D Method**

Facility	WMEV-FM Marion, Virginia
Relationship	230 C, third adjacent
Distance (km)	75.33
Bearing (degrees)	10.9
ERP (kW, on azimuth)	100
HAAT (m, on azimuth)	483.0
Ratio	40
Signal Strength (dBu)	64.3
Translator Signal Strength	104.3
Translator distance (km)	.234

**Undesired to Desired Method**

Protection to some facilities is provided through the use of Undesired to Desired Signal Strength Ratio (U/D) calculations. Table 2 lists the parameters studied. The proposed antenna is a Scala YA7 two level antenna, with the elements offset, in the forward direction, by  $\frac{1}{4}$  wavelength. The antenna harness is designed so that, in the forward direction, the antennas are in phase, while the rearward radiation is significantly reduced. The elevation pattern is shown in Figure 4. The elevation of the 104.3 dBu contour is shown in Figure 5. The horizontal plane pattern is shown in Figure 6 and the distance to the 104.3 dBu contour is plotted in Figure 7.

The WMEV-FM field strength calculated at ground level at the proposed 1564617 site is 64.3 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 104.3 dBu field strength distance is .234 kilometers in the horizontal plane. The proposed antenna location is 10 meters above ground. As Figure 5 shows, the 104.3 dBu signal level reaches the ground level or below in the antenna forward direction for most of the maximum extent of than .234

kilometers. However, the horizontal plane pattern results in the interference signal not reaching any occupied locations. Figure 7 is a horizontal plane plot of the distance to the 104.3 dBu contour, calculated using free space equations.

There are five (5) structures within distance of the proposed site which are studied further. Elevation differences are not significant. The sites are numbered clockwise from the West. The distances are shown on the topographic site map and aerial photograph.

Site	Bearing (degrees)	Distance (meters)	Relative Field	ERP (Watts)	104.3 dBu (meters)	Margin (meters)
1	281	193	0.632	11.98	148.00	45
2	302	182	0.247	1.83	58	124
3	53	128	0.01	0.00	2	126
4	84	155	0.01	0.00	2	153
5	112	269	0.028	0.02	7	262

Figure 8 is a topographic map of the transmitter site, showing that the site is on a mountain ridge. Figure 9 is an aerial photograph of the site, showing the absence of large structures in the area of interest. Figures 8 and 9 have lines distances to the nearest structures. As tabulated above, the structures are all well beyond the predicted interference signal contour. There is no population within the predicted interference area and therefore this facility is permitted under §74.1204(d).

The applicant recognizes that the U/D method is only a tool for predicting likely interference. Should any actual interference be experienced, the applicant will cooperate fully in correcting the interference. Corrective steps may require changes in the transmitting antenna or other steps which would require Commission authorization, may require that the translator cease operation except for brief equipment tests, or may require filtering at the receivers which report interference.



### Source of Data

Transmitter location, effective radiated power, directional antenna pattern, and elevation data are extracted from the Commission's CDBS. All contours for existing and proposed facilities are calculated using height above average terrain calculated at one degree horizontal increments.

The contours were evaluated using terrain extracted from the NGDC 30 second terrain database, formatted for use with V-Soft allocation and propagation software.

All population data is from 2010 U.S. Census PL data files. Population is counted by considering the location of the centroid of each census block. The data for each block is counted if it falls within the area being counted.

**Table 3: FM Over Output for Protection of 637687**

08-27-2013 Terrain Data: NGDC 30 SEC FMOver Analysis

1564617

637687 BNPFT20030317LQY

Channel = 233D  
 Max ERP = 0.03 kw  
 RCAMSL = 1437 M  
 N. Lat. 36 14 05.0  
 W. Lng. 81 42 13.0  
 Protected  
 60 dBu

Channel = 234D  
 Max ERP = 0.01 kw  
 RCAMSL = 966 M  
 N. Lat. 36 11 54.0  
 W. Lng. 81 39 24.0  
 Interfering  
 54 dBu

Azimuth (degrees)	ERP (kw)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kw)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
074.0	000.0000	0452.6	000.4	317.2	000.0100	-0145.1	005.7	49.92	
075.0	000.0000	0454.6	000.4	317.2	000.0100	-0145.1	005.7	49.94	
076.0	000.0000	0456.7	000.4	317.2	000.0100	-0145.1	005.6	49.96	
077.0	000.0000	0458.1	000.4	317.1	000.0100	-0145.0	005.6	49.98	
078.0	000.0000	0457.5	000.4	317.1	000.0100	-0145.0	005.6	50.00	
079.0	000.0000	0456.8	000.4	317.1	000.0100	-0144.9	005.6	50.02	
080.0	000.0000	0456.3	000.4	317.0	000.0100	-0144.8	005.6	50.03	
081.0	000.0000	0457.6	000.4	317.0	000.0100	-0144.7	005.6	50.05	
082.0	000.0000	0459.3	000.4	316.9	000.0100	-0144.6	005.6	50.07	
083.0	000.0000	0459.8	000.4	316.9	000.0100	-0144.5	005.6	50.08	
084.0	000.0000	0460.4	000.4	316.9	000.0100	-0144.4	005.6	50.10	
085.0	000.0000	0462.6	000.4	316.8	000.0100	-0144.3	005.6	50.12	
086.0	000.0000	0462.7	000.4	316.8	000.0100	-0144.1	005.6	50.13	
087.0	000.0000	0461.2	000.4	316.7	000.0100	-0143.9	005.6	50.15	
088.0	000.0000	0457.6	000.4	316.7	000.0100	-0143.8	005.6	50.16	
089.0	000.0000	0453.7	000.4	316.6	000.0100	-0143.6	005.6	50.18	
090.0	000.0000	0449.7	000.4	316.6	000.0100	-0143.4	005.6	50.20	
091.0	000.0000	0447.1	000.4	316.7	000.0100	-0143.8	005.6	50.25	
092.0	000.0000	0448.7	000.4	316.8	000.0100	-0144.1	005.5	50.31	
093.0	000.0000	0450.4	000.4	316.9	000.0100	-0144.4	005.5	50.37	
094.0	000.0000	0452.8	000.5	316.9	000.0100	-0144.6	005.5	50.43	
095.0	000.0000	0462.7	000.5	317.0	000.0100	-0144.8	005.5	50.49	
096.0	000.0000	0475.0	000.5	317.1	000.0100	-0144.9	005.5	50.56	
097.0	000.0000	0487.5	000.5	317.1	000.0100	-0145.0	005.4	50.62	
098.0	000.0000	0499.3	000.5	317.2	000.0100	-0145.1	005.4	50.68	
099.0	000.0000	0508.9	000.6	317.2	000.0100	-0145.2	005.4	50.75	
100.0	000.0000	0519.6	000.6	317.3	000.0100	-0145.2	005.4	50.82	
101.0	000.0000	0531.2	000.6	317.5	000.0100	-0145.3	005.3	50.95	
102.0	000.0000	0540.0	000.7	317.6	000.0100	-0145.3	005.3	51.08	
103.0	000.0000	0544.7	000.7	317.8	000.0100	-0145.2	005.2	51.21	
104.0	000.0000	0547.0	000.7	317.9	000.0100	-0145.0	005.2	51.34	
105.0	000.0000	0548.1	000.8	318.1	000.0100	-0144.8	005.2	51.48	
106.0	000.0000	0551.5	000.8	318.2	000.0100	-0144.5	005.1	51.62	
107.0	000.0000	0555.8	000.9	318.3	000.0100	-0144.2	005.1	51.76	
108.0	000.0000	0559.1	000.9	318.4	000.0100	-0143.9	005.0	51.91	
109.0	000.0000	0558.5	001.0	318.5	000.0100	-0143.6	005.0	52.05	
110.0	000.0000	0553.4	001.0	318.5	000.0100	-0143.4	004.9	52.20	
111.0	000.0000	0545.6	001.0	318.5	000.0100	-0143.5	004.9	52.31	
112.0	000.0000	0539.6	001.1	318.5	000.0100	-0143.6	004.9	52.43	
113.0	000.0000	0534.1	001.1	318.4	000.0100	-0143.7	004.8	52.55	
114.0	000.0000	0526.5	001.1	318.4	000.0100	-0143.9	004.8	52.67	
115.0	000.0000	0516.0	001.2	318.3	000.0100	-0144.1	004.8	52.79	
116.0	000.0000	0503.8	001.2	318.2	000.0100	-0144.3	004.7	52.91	
117.0	000.0000	0493.7	001.2	318.1	000.0100	-0144.6	004.7	53.03	
118.0	000.0000	0486.7	001.2	318.0	000.0100	-0144.9	004.7	53.16	
119.0	000.0000	0481.7	001.3	317.9	000.0100	-0145.0	004.6	53.29	
120.0	000.0000	0476.4	001.3	317.7	000.0100	-0145.2	004.6	53.42	
121.0	000.0000	0471.1	001.3	317.5	000.0100	-0145.3	004.6	53.44	
122.0	000.0000	0466.2	001.3	317.2	000.0100	-0145.1	004.6	53.47	
123.0	000.0000	0461.9	001.3	316.9	000.0100	-0144.5	004.6	53.49	
124.0	000.0000	0457.3	001.3	316.6	000.0100	-0143.5	004.6	53.51	
125.0	000.0000	0452.2	001.3	316.4	000.0100	-0142.3	004.6	53.52	
126.0	000.0000	0446.9	001.3	316.1	000.0100	-0140.7	004.6	53.54	
127.0	000.0000	0442.4	001.3	315.8	000.0100	-0138.9	004.5	53.55	
128.0	000.0000	0438.2	001.3	315.5	000.0100	-0136.8	004.5	53.56	
129.0	000.0000	0433.1	001.3	315.2	000.0100	-0134.6	004.5	53.57	
130.0	000.0000	0426.1	001.3	314.9	000.0100	-0132.3	004.5	53.58	
131.0	000.0000	0417.1	001.3	314.6	000.0100	-0129.7	004.6	53.42	
132.0	000.0000	0406.2	001.2	314.3	000.0100	-0127.3	004.6	53.26	

133.0	000.0000	0395.5	001.2	314.0	000.0100	-0125.1	004.7	53.10
134.0	000.0000	0388.5	001.1	313.8	000.0100	-0123.2	004.7	52.94
135.0	000.0000	0388.1	001.1	313.6	000.0100	-0121.3	004.8	52.78
136.0	000.0000	0395.3	001.0	313.4	000.0100	-0119.6	004.8	52.62
137.0	000.0000	0407.8	001.0	313.2	000.0100	-0118.1	004.9	52.47
138.0	000.0000	0421.3	000.9	313.0	000.0100	-0116.7	004.9	52.32
139.0	000.0000	0432.5	000.9	312.9	000.0100	-0115.5	005.0	52.16
140.0	000.0000	0441.4	000.8	312.8	000.0100	-0114.4	005.0	52.01
141.0	000.0000	0448.8	000.8	312.7	000.0100	-0113.6	005.0	51.85
142.0	000.0000	0453.5	000.8	312.6	000.0100	-0112.9	005.1	51.70
143.0	000.0000	0452.9	000.7	312.6	000.0100	-0112.3	005.1	51.54
144.0	000.0000	0447.2	000.7	312.6	000.0100	-0112.0	005.2	51.39
145.0	000.0000	0441.5	000.6	312.6	000.0100	-0111.9	005.2	51.24
146.0	000.0000	0439.7	000.6	312.6	000.0100	-0111.9	005.3	51.09
147.0	000.0000	0439.5	000.5	312.6	000.0100	-0112.2	005.3	50.94
148.0	000.0000	0436.6	000.5	312.6	000.0100	-0112.6	005.4	50.79
149.0	000.0000	0432.0	000.4	312.7	000.0100	-0113.1	005.4	50.64
150.0	000.0000	0430.9	000.4	312.7	000.0100	-0113.8	005.5	50.50
151.0	000.0000	0433.2	000.4	312.7	000.0100	-0113.1	005.5	50.49
152.0	000.0000	0433.9	000.4	312.6	000.0100	-0112.5	005.5	50.48
153.0	000.0000	0429.0	000.4	312.5	000.0100	-0111.8	005.5	50.48
154.0	000.0000	0419.5	000.4	312.5	000.0100	-0111.1	005.5	50.47
155.0	000.0000	0409.1	000.4	312.4	000.0100	-0110.4	005.5	50.46
156.0	000.0000	0400.0	000.4	312.3	000.0100	-0109.7	005.5	50.45
157.0	000.0000	0392.7	000.4	312.3	000.0100	-0109.0	005.5	50.44
158.0	000.0000	0384.5	000.4	312.2	000.0100	-0108.3	005.5	50.44
159.0	000.0000	0375.2	000.4	312.2	000.0100	-0107.6	005.5	50.43
160.0	000.0000	0366.7	000.4	312.1	000.0100	-0106.9	005.5	50.42
161.0	000.0000	0359.9	000.4	312.0	000.0100	-0106.1	005.5	50.40
162.0	000.0000	0354.6	000.4	312.0	000.0100	-0105.4	005.5	50.39
163.0	000.0000	0353.2	000.4	311.9	000.0100	-0104.7	005.5	50.38
164.0	000.0000	0358.4	000.4	311.9	000.0100	-0104.0	005.5	50.37
165.0	000.0000	0368.4	000.4	311.8	000.0100	-0103.2	005.5	50.36
166.0	000.0000	0378.8	000.4	311.7	000.0100	-0102.4	005.5	50.35
167.0	000.0000	0387.0	000.4	311.7	000.0100	-0101.8	005.5	50.34
168.0	000.0000	0394.4	000.4	311.6	000.0100	-0101.0	005.5	50.33
169.0	000.0000	0403.7	000.4	311.6	000.0100	-0100.3	005.5	50.31
170.0	000.0000	0411.0	000.4	311.5	000.0100	-0099.6	005.5	50.30
171.0	000.0000	0415.6	000.5	310.8	000.0100	-0090.1	005.5	50.52
172.0	000.0000	0420.9	000.6	310.1	000.0100	-0080.1	005.4	50.73
173.0	000.0000	0424.8	000.7	309.3	000.0100	-0070.9	005.3	50.93
174.0	000.0000	0426.1	000.8	308.5	000.0100	-0063.4	005.3	51.11
175.0	000.0000	0430.6	000.9	307.6	000.0100	-0057.3	005.2	51.29
176.0	000.0000	0437.8	001.0	306.7	000.0100	-0051.4	005.2	51.46
177.0	000.0000	0445.9	001.1	305.7	000.0100	-0044.3	005.1	51.61
178.0	000.0000	0454.8	001.2	304.7	000.0100	-0035.3	005.1	51.75
179.0	000.0000	0452.0	001.2	303.7	000.0100	-0025.1	005.0	51.88
180.0	000.0000	0439.8	001.3	302.7	000.0100	-0015.0	005.0	51.99
181.0	000.0001	0427.5	001.6	299.9	000.0100	0005.9	004.9	52.36
182.0	000.0001	0412.6	001.8	297.8	000.0100	0014.0	004.8	52.54
183.0	000.0001	0396.4	002.1	294.8	000.0100	0010.2	004.8	52.79
184.0	000.0001	0385.4	002.3	291.9	000.0100	0006.3	004.7	52.94
185.0	000.0002	0378.8	002.5	289.2	000.0100	0015.7	004.7	53.01
186.0	000.0002	0381.1	002.7	286.3	000.0100	0025.4	004.7	53.02
187.0	000.0002	0386.8	003.0	283.7	000.0100	0026.2	004.7	52.96
188.0	000.0003	0391.2	003.2	280.9	000.0100	0003.0	004.7	52.84
189.0	000.0003	0395.8	003.4	278.2	000.0100	-0017.9	004.8	52.66
190.0	000.0003	0399.7	003.6	275.7	000.0100	-0035.1	004.9	52.43
191.0	000.0004	0408.7	004.0	271.5	000.0100	-0040.9	005.0	52.07
192.0	000.0005	0419.5	004.4	267.5	000.0100	-0046.8	005.1	51.58
193.0	000.0006	0424.8	004.7	264.1	000.0100	-0052.7	005.3	51.02

08-27-2013 Terrain Data: NGDC 30 SEC FMOVer Analysis

637687 BNPFT20030317LQY

1564617

Channel = 234D  
 Max ERP = 0.01 kw  
 RCAMSL = 966 M  
 N. Lat. 36 11 54.0  
 W. Lng. 81 39 24.0  
 Protected  
 60 dBu

Channel = 233D  
 Max ERP = 0.03 kw  
 RCAMSL = 1437 M  
 N. Lat. 36 14 05.0  
 W. Lng. 81 42 13.0  
 Interfering  
 54 dBu

Azimuth (degrees)	ERP (kw)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kw)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
254.0	000.0100	-0134.4	003.2	166.4	000.0000	0382.2	005.0	35.47	
255.0	000.0100	-0125.8	003.2	166.4	000.0000	0382.4	005.0	35.60	
256.0	000.0100	-0118.1	003.2	166.4	000.0000	0382.4	004.9	35.73	
257.0	000.0100	-0112.0	003.2	166.4	000.0000	0382.4	004.9	35.85	
258.0	000.0100	-0105.3	003.2	166.4	000.0000	0382.3	004.8	35.98	
259.0	000.0100	-0099.3	003.2	166.4	000.0000	0382.1	004.8	36.11	
260.0	000.0100	-0089.4	003.2	166.4	000.0000	0381.8	004.7	36.23	
261.0	000.0100	-0078.1	003.2	166.3	000.0000	0381.4	004.7	36.36	
262.0	000.0100	-0069.0	003.2	166.3	000.0000	0380.9	004.6	36.49	
263.0	000.0100	-0059.5	003.2	166.2	000.0000	0380.3	004.6	36.62	
264.0	000.0100	-0053.0	003.2	166.1	000.0000	0379.5	004.5	36.75	
265.0	000.0100	-0048.7	003.2	166.0	000.0000	0378.6	004.4	36.88	
266.0	000.0100	-0047.1	003.2	165.9	000.0000	0377.5	004.4	37.01	
267.0	000.0100	-0047.1	003.2	165.7	000.0000	0376.3	004.3	37.13	
268.0	000.0100	-0045.8	003.2	165.6	000.0000	0374.8	004.3	37.26	
269.0	000.0100	-0044.0	003.2	165.4	000.0000	0373.0	004.2	37.39	
270.0	000.0100	-0042.0	003.2	165.2	000.0000	0370.9	004.2	37.51	
271.0	000.0100	-0040.7	003.2	165.0	000.0000	0368.7	004.1	37.63	
272.0	000.0100	-0041.8	003.2	164.8	000.0000	0366.4	004.1	37.75	
273.0	000.0100	-0043.7	003.2	164.6	000.0000	0363.9	004.0	37.88	
274.0	000.0100	-0045.4	003.2	164.3	000.0000	0361.3	004.0	38.00	
275.0	000.0100	-0042.2	003.2	164.0	000.0000	0358.7	003.9	38.12	
276.0	000.0100	-0032.5	003.2	163.7	000.0000	0356.4	003.9	38.24	
277.0	000.0100	-0025.2	003.2	163.4	000.0000	0354.6	003.8	38.37	
278.0	000.0100	-0019.4	003.2	163.1	000.0000	0353.3	003.8	38.50	
279.0	000.0100	-0011.9	003.2	162.7	000.0000	0352.9	003.7	38.65	
280.0	000.0100	-0003.8	003.2	162.3	000.0000	0353.5	003.7	38.80	
281.0	000.0100	0004.0	003.2	161.9	000.0000	0355.0	003.6	38.95	
282.0	000.0100	0014.5	003.2	161.5	000.0000	0357.1	003.6	39.11	
283.0	000.0100	0022.3	003.2	161.0	000.0000	0359.8	003.5	39.28	
284.0	000.0100	0027.8	003.2	160.5	000.0000	0362.9	003.5	39.44	
285.0	000.0100	0028.9	003.2	160.0	000.0000	0366.6	003.4	39.61	
286.0	000.0100	0026.2	003.2	159.5	000.0000	0370.8	003.4	39.78	
287.0	000.0100	0023.4	003.2	158.9	000.0000	0376.0	003.3	39.96	
288.0	000.0100	0019.3	003.2	158.3	000.0000	0381.6	003.3	40.13	
289.0	000.0100	0016.3	003.2	157.7	000.0000	0387.2	003.3	40.29	
290.0	000.0100	0012.9	003.2	157.0	000.0000	0392.3	003.2	40.45	
291.0	000.0100	0008.5	003.2	156.4	000.0000	0397.3	003.2	40.60	
292.0	000.0100	0006.1	003.2	155.6	000.0000	0402.9	003.1	40.75	
293.0	000.0100	0005.7	003.2	154.9	000.0000	0410.0	003.1	40.90	
294.0	000.0100	0007.7	003.2	154.1	000.0000	0418.1	003.1	41.04	
295.0	000.0100	0011.0	003.2	153.3	000.0000	0426.2	003.0	41.18	
296.0	000.0100	0014.3	003.2	152.5	000.0000	0432.2	003.0	41.30	
297.0	000.0100	0015.1	003.2	151.6	000.0000	0434.2	003.0	41.41	
298.0	000.0100	0013.5	003.2	150.8	000.0000	0432.6	002.9	41.51	
299.0	000.0100	0010.2	003.2	149.9	000.0000	0430.7	002.9	41.76	
300.0	000.0100	0005.1	003.2	148.9	000.0000	0432.4	002.9	42.78	
301.0	000.0100	-0001.2	003.2	147.9	000.0000	0436.9	002.9	43.72	
302.0	000.0100	-0009.0	003.2	146.9	000.0000	0439.5	002.8	44.60	
303.0	000.0100	-0018.1	003.2	145.9	000.0000	0439.8	002.8	45.43	
304.0	000.0100	-0027.9	003.2	144.9	000.0000	0442.1	002.8	46.21	
305.0	000.0100	-0037.8	003.2	143.8	000.0000	0448.5	002.8	46.94	
306.0	000.0100	-0046.5	003.2	142.7	000.0000	0453.7	002.8	47.64	
307.0	000.0100	-0053.4	003.2	141.6	000.0000	0452.2	002.7	48.28	
308.0	000.0100	-0060.0	003.2	140.5	000.0000	0445.2	002.7	48.88	
309.0	000.0100	-0068.1	003.2	139.4	000.0000	0435.8	002.7	49.44	
310.0	000.0100	-0079.1	003.2	138.2	000.0000	0423.8	002.7	49.96	
311.0	000.0100	-0092.6	003.2	137.0	000.0000	0408.4	002.7	50.44	
312.0	000.0100	-0105.8	003.2	135.9	000.0000	0394.1	002.7	50.87	
313.0	000.0100	-0116.3	003.2	134.7	000.0000	0387.5	002.7	51.29	
314.0	000.0100	-0124.8	003.2	133.5	000.0000	0391.0	002.7	51.73	
315.0	000.0100	-0132.8	003.2	132.4	000.0000	0402.1	002.7	52.17	
316.0	000.0100	-0140.2	003.2	131.2	000.0000	0415.0	002.7	52.57	
317.0	000.0100	-0144.8	003.2	130.0	000.0000	0425.8	002.7	52.94	
318.0	000.0100	-0144.9	003.2	128.9	000.0000	0433.8	002.7	52.94	

319.0	000.0100	-0141.5	003.2	127.7	000.0000	0439.4	002.7	52.91
320.0	000.0100	-0136.4	003.2	126.6	000.0000	0444.1	002.7	52.87
321.0	000.0100	-0130.8	003.2	125.5	000.0000	0449.6	002.7	52.83
322.0	000.0100	-0126.4	003.2	124.4	000.0000	0455.4	002.8	52.78
323.0	000.0100	-0124.5	003.2	123.3	000.0000	0460.6	002.8	52.72
324.0	000.0100	-0126.2	003.2	122.3	000.0000	0465.1	002.8	52.66
325.0	000.0100	-0132.0	003.2	121.2	000.0000	0470.1	002.8	52.59
326.0	000.0100	-0141.3	003.2	120.2	000.0000	0475.3	002.8	52.52
327.0	000.0100	-0153.2	003.2	119.2	000.0000	0480.5	002.9	52.28
328.0	000.0100	-0167.2	003.2	118.2	000.0000	0485.4	002.9	51.99
329.0	000.0100	-0181.9	003.2	117.3	000.0000	0491.1	002.9	51.71
330.0	000.0100	-0196.2	003.2	116.4	000.0000	0499.2	003.0	51.42
331.0	000.0100	-0210.2	003.2	115.5	000.0000	0509.4	003.0	51.13
332.0	000.0100	-0224.1	003.2	114.7	000.0000	0519.8	003.0	50.85
333.0	000.0100	-0237.1	003.2	113.9	000.0000	0527.7	003.0	50.55
334.0	000.0100	-0250.2	003.2	113.1	000.0000	0533.6	003.1	50.26
335.0	000.0100	-0262.9	003.2	112.3	000.0000	0538.0	003.1	49.97
336.0	000.0100	-0271.8	003.2	111.6	000.0000	0541.7	003.2	49.67
337.0	000.0100	-0274.5	003.2	110.9	000.0000	0546.4	003.2	49.38
338.0	000.0100	-0271.4	003.2	110.2	000.0000	0551.8	003.2	49.10
339.0	000.0100	-0265.0	003.2	109.6	000.0000	0556.1	003.3	48.77
340.0	000.0100	-0256.8	003.2	109.0	000.0000	0558.6	003.3	48.43
341.0	000.0100	-0248.0	003.2	108.4	000.0000	0559.5	003.4	48.08
342.0	000.0100	-0238.3	003.2	107.8	000.0000	0558.7	003.4	47.73
343.0	000.0100	-0226.8	003.2	107.3	000.0000	0557.0	003.5	47.39
344.0	000.0100	-0212.4	003.2	106.8	000.0000	0555.0	003.5	47.05
345.0	000.0100	-0194.8	003.2	106.3	000.0000	0552.9	003.5	46.71
346.0	000.0100	-0175.4	003.2	105.9	000.0000	0551.0	003.6	46.38
347.0	000.0100	-0158.5	003.2	105.4	000.0000	0549.4	003.6	46.06
348.0	000.0100	-0146.8	003.2	105.0	000.0000	0548.2	003.7	45.74
349.0	000.0100	-0142.9	003.2	104.7	000.0000	0547.6	003.7	45.43
350.0	000.0100	-0142.7	003.2	104.3	000.0000	0547.3	003.8	45.13
351.0	000.0100	-0146.7	003.2	104.0	000.0000	0547.0	003.8	44.83
352.0	000.0100	-0152.4	003.2	103.7	000.0000	0546.4	003.9	44.55
353.0	000.0100	-0158.3	003.2	103.4	000.0000	0545.7	003.9	44.27
354.0	000.0100	-0157.7	003.2	103.1	000.0000	0545.0	004.0	44.00
355.0	000.0100	-0158.6	003.2	102.9	000.0000	0544.2	004.0	43.74
356.0	000.0100	-0162.1	003.2	102.6	000.0000	0543.4	004.1	43.49
357.0	000.0100	-0169.2	003.2	102.4	000.0000	0542.4	004.2	43.24
358.0	000.0100	-0177.0	003.2	102.2	000.0000	0541.4	004.2	43.00
359.0	000.0100	-0184.3	003.2	102.1	000.0000	0540.3	004.3	42.78
000.0	000.0100	-0176.7	003.2	101.9	000.0000	0539.3	004.3	42.56
001.0	000.0100	-0164.6	003.2	101.7	000.0000	0538.3	004.4	42.35
002.0	000.0100	-0152.5	003.2	101.6	000.0000	0537.2	004.4	42.15
003.0	000.0100	-0139.3	003.2	101.5	000.0000	0536.3	004.5	41.97
004.0	000.0100	-0130.0	003.2	101.4	000.0000	0535.4	004.5	41.79
005.0	000.0100	-0122.6	003.2	101.3	000.0000	0534.7	004.6	41.62
006.0	000.0100	-0117.3	003.2	101.3	000.0000	0534.0	004.6	41.46
007.0	000.0100	-0114.3	003.2	101.2	000.0000	0533.4	004.7	41.31
008.0	000.0100	-0110.7	003.2	101.2	000.0000	0533.0	004.7	41.16
009.0	000.0100	-0103.0	003.2	101.1	000.0000	0532.6	004.8	41.03
010.0	000.0100	-0095.9	003.2	101.1	000.0000	0532.5	004.9	40.91
011.0	000.0100	-0088.5	003.2	101.1	000.0000	0532.4	004.9	40.80
012.0	000.0100	-0083.1	003.2	101.1	000.0000	0532.4	005.0	40.69
013.0	000.0100	-0076.3	003.2	101.1	000.0000	0532.6	005.0	40.59

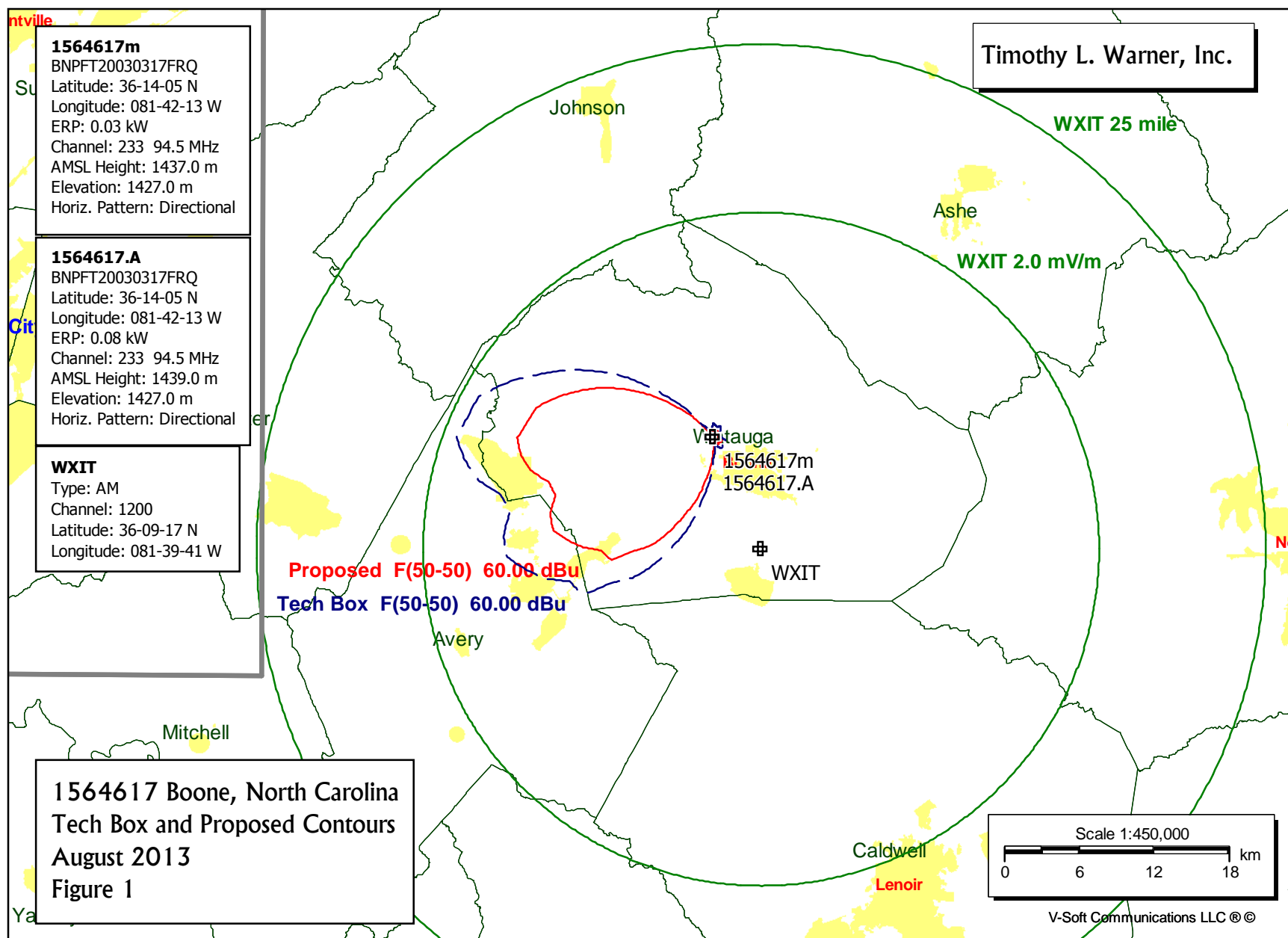


Figure 2: Allocation Study: WMEV-FM  
Wake Forest University

FMCommander Single Allocation Study - 08-27-2013 - NGDC 30 SEC  
1564617's Overlaps (In= 60.63 km, Out= -9.51 km)

1564617 CH 233 D DA  
Lat= 36 14 05.0, Lng= 81 42 13.0  
0.03 kW 402.5 M HAAT, 1437 M COR  
Prot.= 60 dBu, Intef.= 100 dBu

WMEV-FM CH 230 C DA BLH20060512AAB  
Lat= 36 54 04.0, Lng= 81 32 35.0  
100.0 kW 452 M HAAT, 1187 M COR  
Prot.= 60 dBu, Intef.= 100 dBu

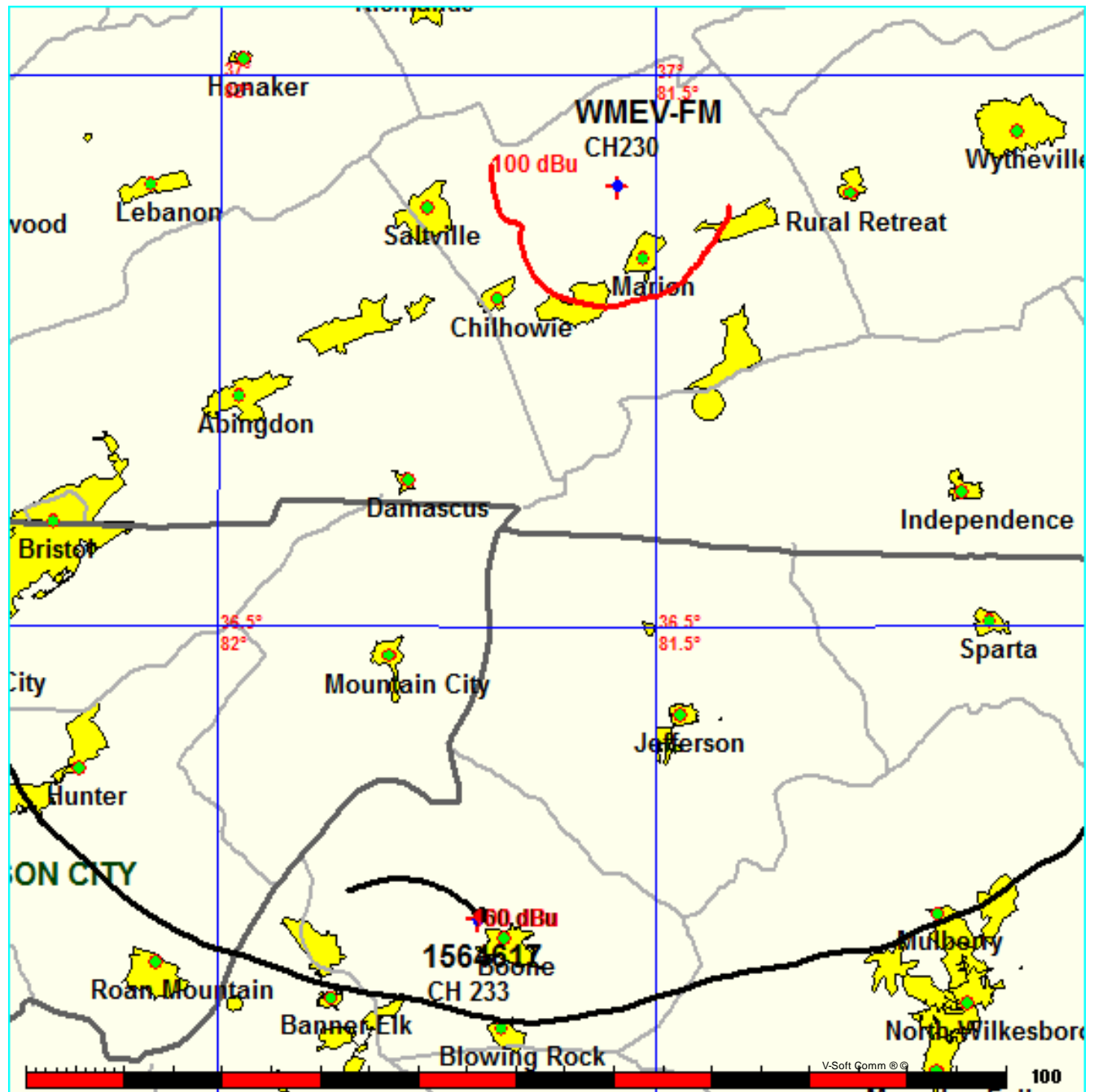


Figure 3: Allocation Study: 637687  
Wake Forest University

FMCommander Single Allocation Study - 08-27-2013 - NGDC 30 SEC  
1564617's Overlaps (In= 0.11 km, Out= 0.27 km)

1564617 CH 233 D DA  
Lat= 36 14 05.0, Lng= 81 42 13.0  
0.03 kW 402.5 M HAAT, 1437 M COR  
Prot.= 60 dBu, Intef.= 54 dBu

637687 CH 234 D BNPFT20030317LQY  
Lat= 36 11 54.0, Lng= 81 39 24.0  
0.01 kW -9.6 M HAAT, 966 M COR  
Prot.= 60 dBu, Intef.= 54 dBu

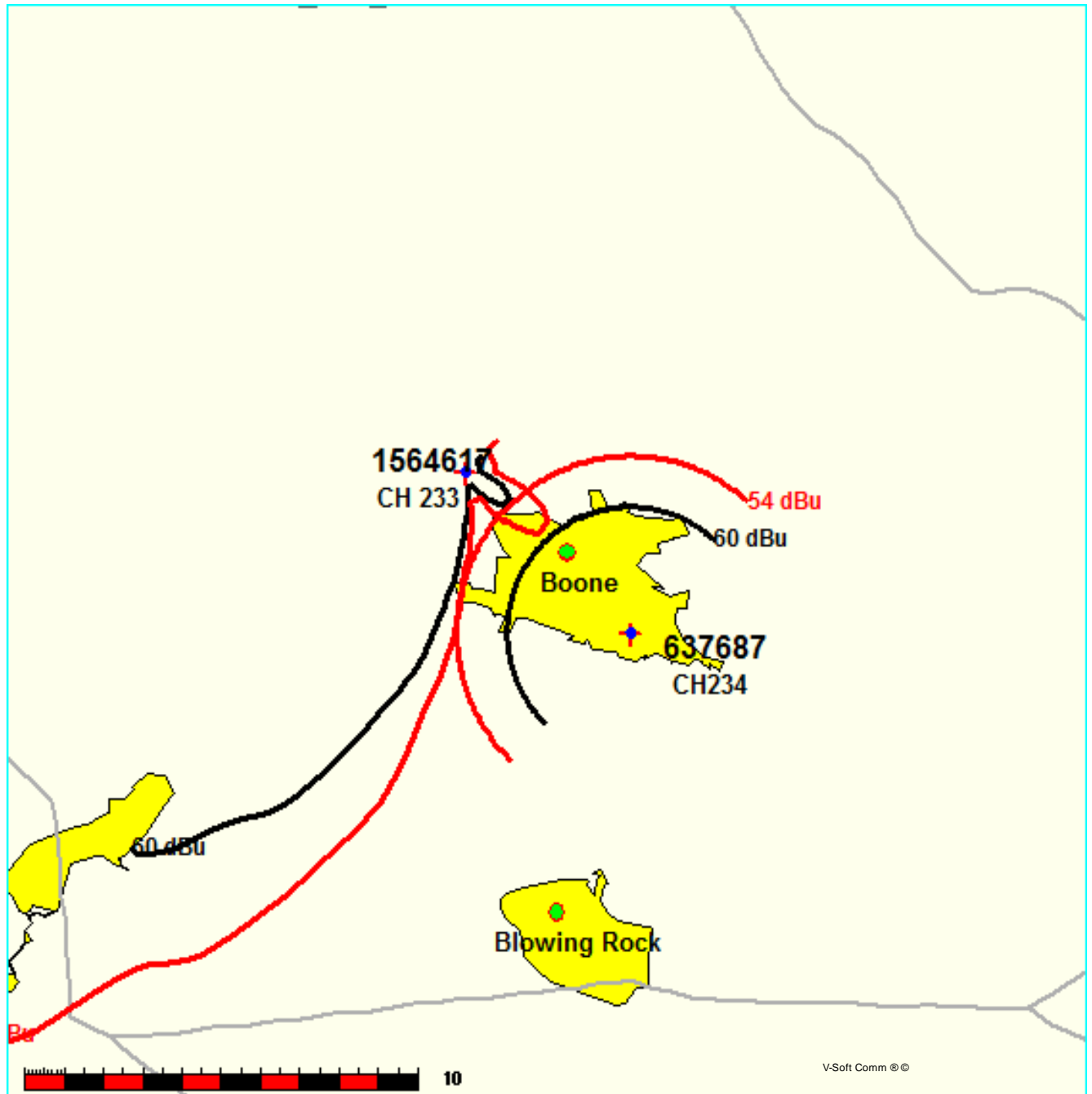


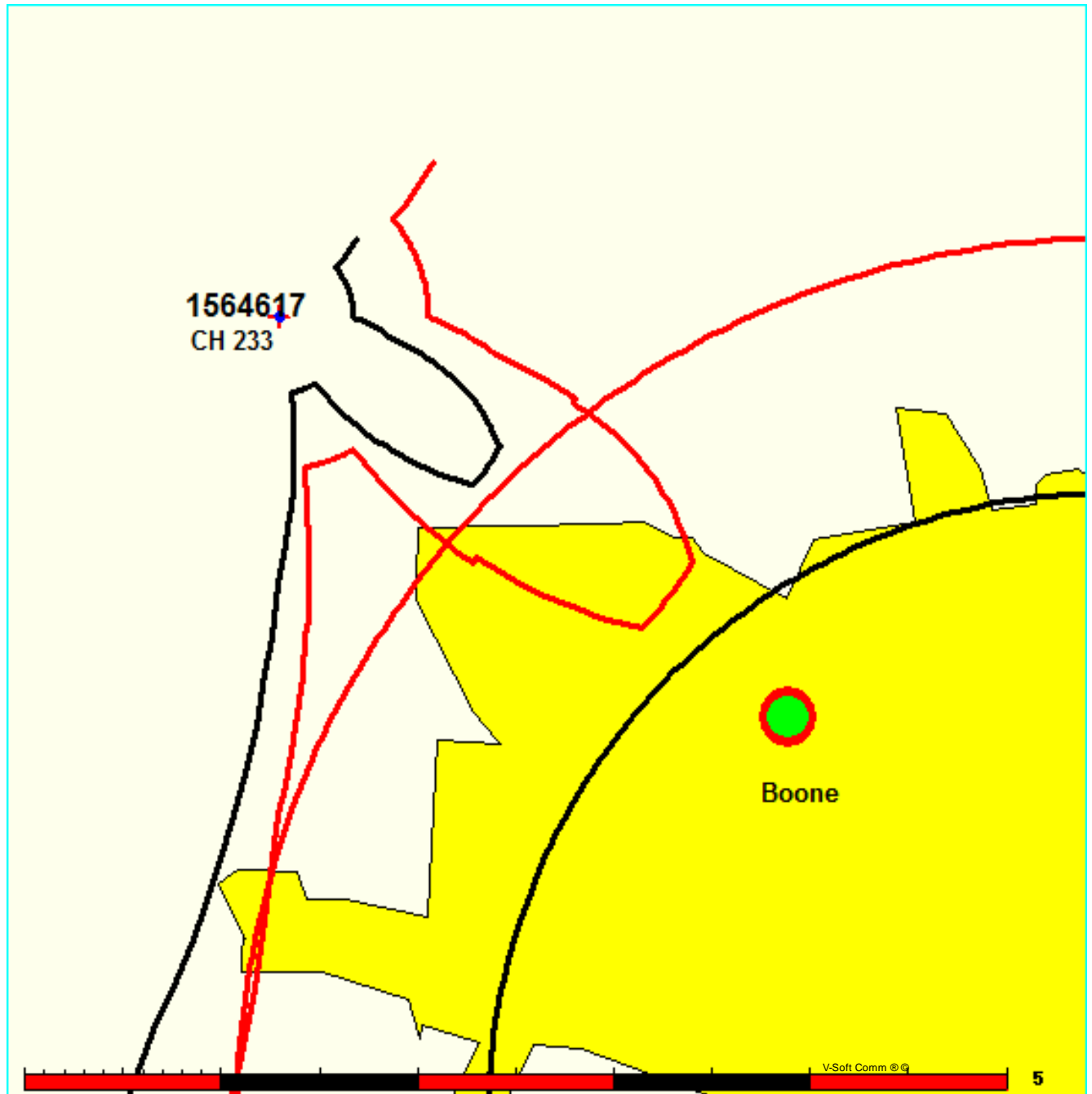


Figure 3A: Allocation Study: 637687 Detail  
Wake Forest University

FMCommander Single Allocation Study - 08-27-2013 - NGDC 30 SEC  
1564617's Overlaps (In= 0.11 km, Out= 0.27 km)

1564617 CH 233 D DA  
Lat= 36 14 05.0, Lng= 81 42 13.0  
0.03 kW 402.5 M HAAT, 1437 M COR  
Prot.= 60 dBu, Intef.= 54 dBu

637687 CH 234 D BNPFT20030317LQY  
Lat= 36 11 54.0, Lng= 81 39 24.0  
0.01 kW -9.6 M HAAT, 966 M COR  
Prot.= 60 dBu, Intef.= 54 dBu



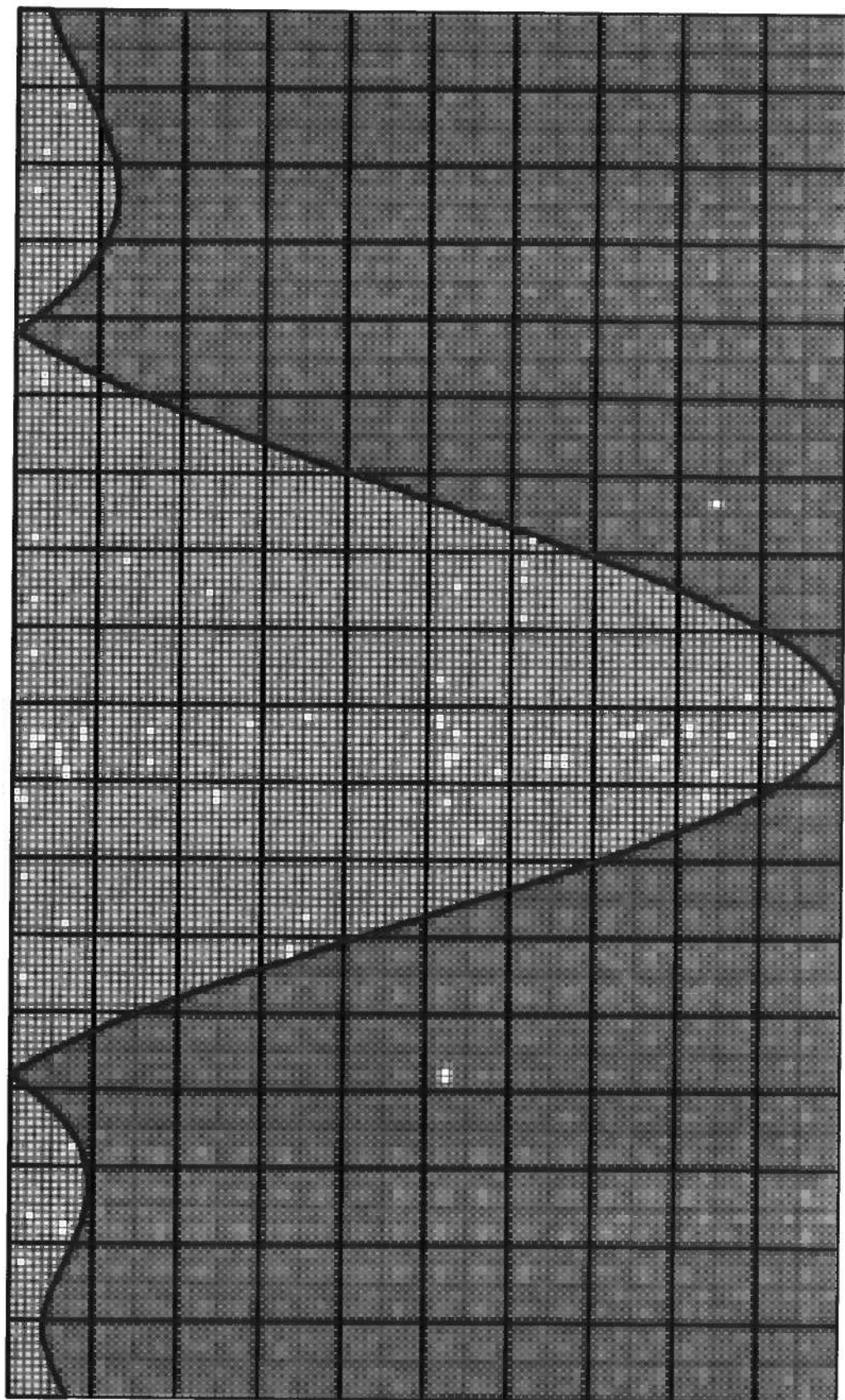
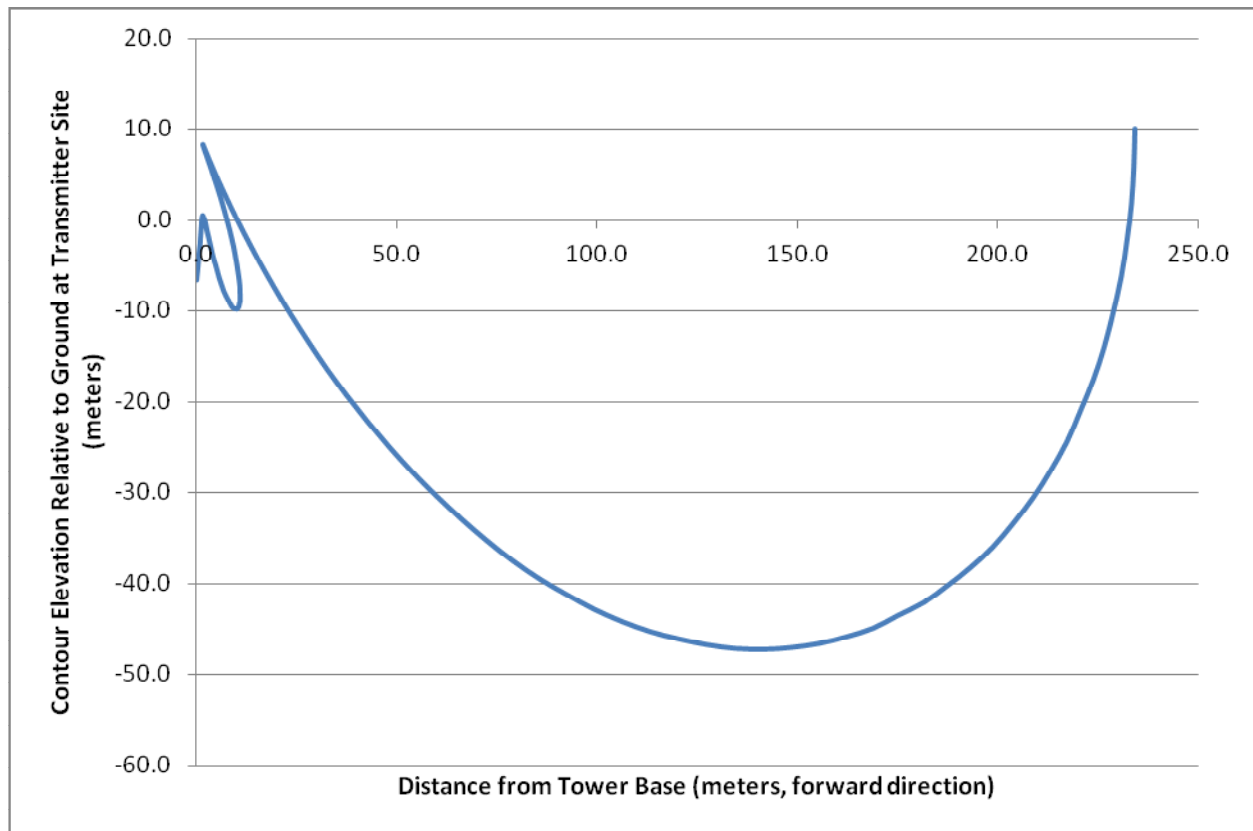


Figure 4

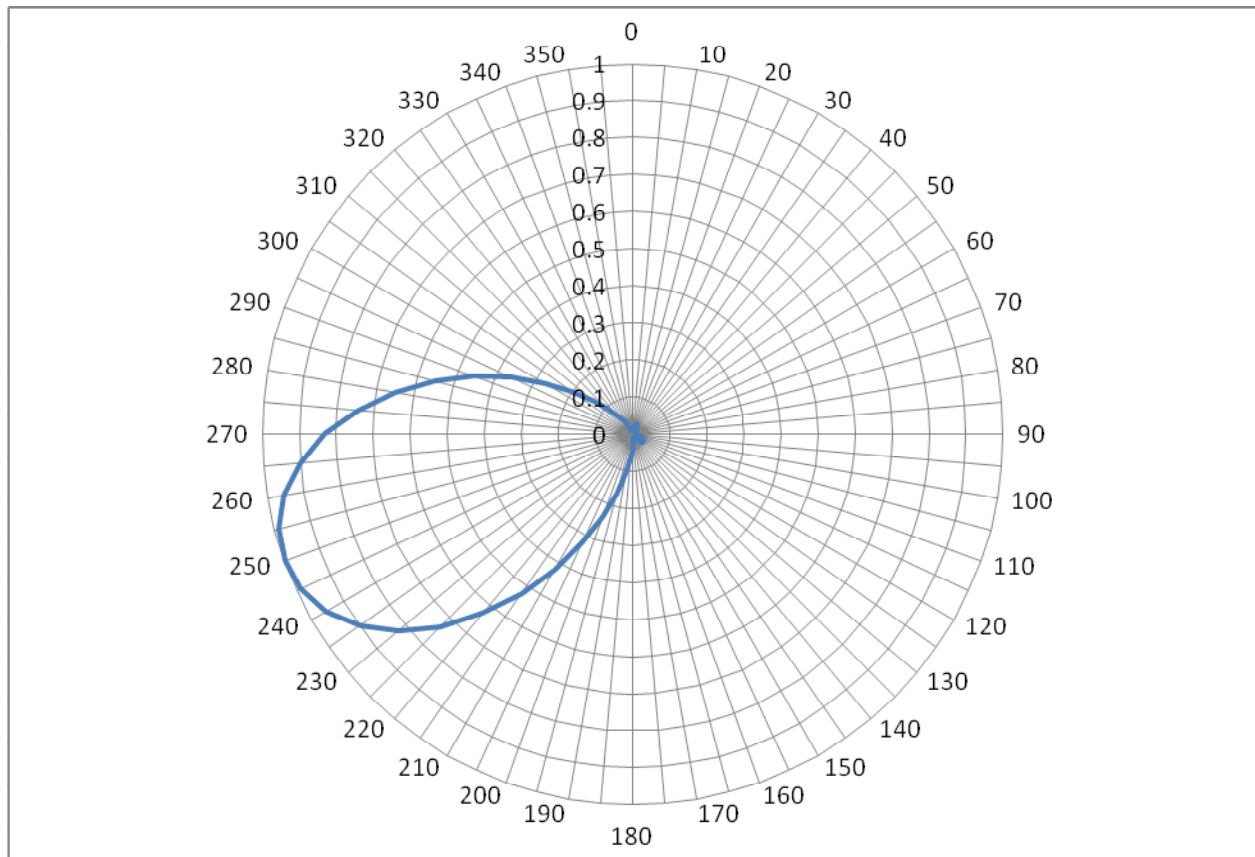
Interference Contour Elevation

Free space propagation

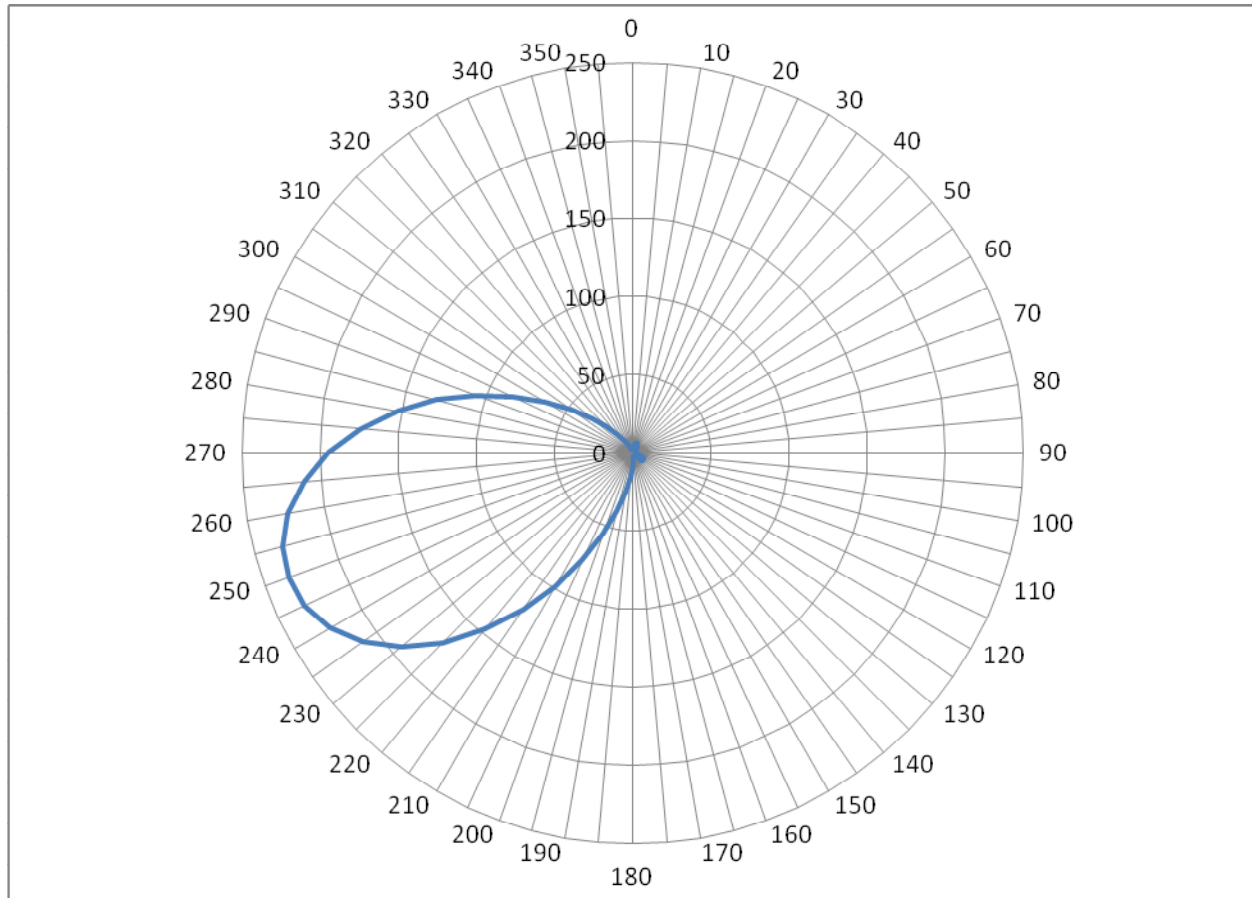
Scala Two YA7 ¼ wave offset reduced rear signal

Center of Radiation 10 meters Above Ground Level

ERP 30 Watts

Horizontal Plane Antenna Relative Field Pattern

Interference Contour Horizontal Plane Plot  
(distance in meters)





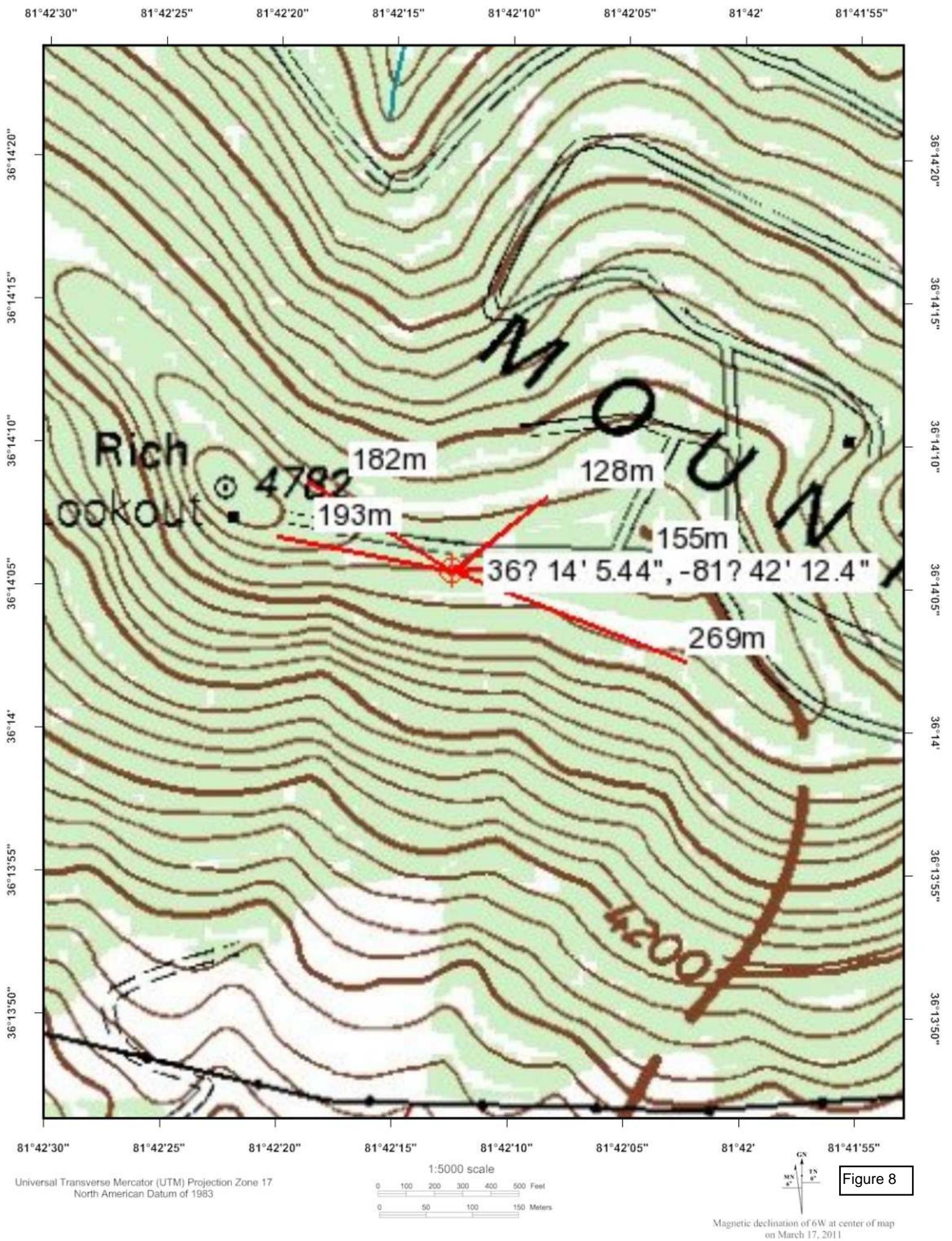






Figure 9