Boone, North Carolina

Application for Minor Modification of

FM Translator W232CW

On Channel 232

by

Eastern Airwaves, LLC

Exhibit 13

Interference Analysis

July 2017

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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 Eastern Airwaves, LLC, 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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17 July 2017

Narrative

This Exhibit supports a minor modification application for FM translator W232CW, on Channel 232 in Boone, North Carolina. Allocation details are provided in this exhibit. This proposal complies fully with the requirements of 74 C.F.R. §74.1204(a), with the exception of facilities protected under 47 C.F.R. §74.1204(d) by the Undesired to Desired (U/D) method described below. The proposed modified facilities create no mutual exclusivities with any licensed facilities, construction permits, or applications as shown in the allocation table in this exhibit.

Figure 1 shows the licensed and proposed 60 dBu F(50,50) coverage areas. Figure 1 shows fill-in status confirmation.

The changes are a new directional antenna, addition of vertically polarized signal, and an increase in power.

Allocations

This application proposes service to Boone, North Carolina, on channel 232. 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 under §74.1204(a) contour protection by this application, with the exception of facilities protected by the Undesired to Desired (U/D) method. Facilities protected by the U/D method are listed in Table 2. The allocations table was prepared using the FCC 30 terrain database which is described below.

Directional Antenna

The proposed antenna is a Scala YA7 directional antenna array. The horizontal plane directional pattern is shown as Figure 2.

Table 1: Allocations

Allocation Study
Eastern Airwaves, Llc

REFERENCE — CH# 232D - 94.3 MHz, Pwr= 0.065 kW DA, HAAT= 421.9 M, COR= 1450 M — DISPLAY DATES
36 13 58.0 N. — Average Protected F(50-50)= 19.1 km — DATA 07-17-17
81 41 54.0 W. — Standard Directional — SEARCH 07-17-17

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*
232D Boone	W232CW!	LIC	DH NC	0.0 0.0	0.00 BLFT20160224AAE	36 13 58.0 81 41 54.0	0.045	9.3 1450	2.4 Eastern Airwaves, Llc	-15.7*	-24.2*
Facility being modified.											
231C1 Lexington	WWLV	CP	NCX NC	127.4 307.9	105.84 BPH20131212AII	35 39 05.0 80 46 02.0	53.000 355	100.5 603	69.0 Educational Media Foundati	-10.7	14.1
230C Marion	WMEV-FM	LIC	DEX VA	10.5 190.6	75.58 BLH20060512AAB	36 54 04.0 81 32 35.0	100.000 452	12.3 1187	84.8 Bristol Broadcasting Company	54.8	-9.4*
Protected by U/D signal ratio, see text and figures.											
234D Boone	W234CF	LIC	C NC	307.4 127.4	0.40 BLFT20170113AAK	36 14 06.0 81 42 07.0	0.004	0.1 1448	9.3 Isothermal Community Colle	-9.2*	-9.1*
Protected by U/D signal ratio, see text and figures.											
232C2 Jenkins	WIFX-FM	LIC	ZEX KY	321.9 141.4	132.39 BLH20070511ACW	37 09 59.0 82 37 13.0	6.300 410	125.9 956	51.7 Ajspd, Llc	-2.2	50.9
232D Kingsport	W232BP	LIC	DC TN	292.6 112.1	85.97 BLFT20070907AFM	36 31 37.0 82 35 12.0	0.250 285	68.7 733	22.9 Holston Valley Broadcastin	4.6	21.6
231C Lexington	WWLV	LIC	DCX NC	105.1 285.9	131.01 BMLED20170407AAN	35 55 02.0 80 17 37.0	100.000 309	106.7 543	73.7 Educational Media Foundati	11.5	38.0
233C Greenville	WGTK-FM	LIC	CX SC	204.4 24.0	157.38 BLH20080425ABD	34 56 29.0 82 24 41.0	100.000 454	124.3 760	83.7 Caron Broadcasting, Inc.	14.0	45.5
235C0 Greeneville	WAEZ	LIC	DEX TN	259.2 78.6	90.80 BMLH20010504AAT	36 04 34.0 82 41 28.0	100.000 332	5.9 1042	42.1 Bristol Broadcasting Compa	71.3	27.0
231D Weaverville	W231AR	LIC	C NC	223.9 43.5	76.54 BLFT20060126ANW	35 44 06.0 82 17 10.0	0.010 922	26.8 2009	16.3 Radio Training Network, In	30.7	31.4
233C1 Eden	WPTI	LIC	DE NC	85.0 266.0	160.90 BMLH20010514AAN	36 20 48.0 79 54 30.0	100.000 299	105.9 522	73.2 Clear Channel Broadcasting	43.6	75.0
233C1 Eden	WPTI	LIC	DEX NC	85.0 266.1	161.04 BLH20150227ABY	36 20 42.0 79 54 24.0	100.000 299	105.5 519	72.9 Clear Channel Broadcasting	44.2	75.4
234D Marion	W234CT	LIC	C VA	10.5 190.6	75.58 BLFT20160506AAP	36 54 04.0 81 32 35.0	0.099	0.7 1157	21.6 Liberty University, Inc.	66.4	53.8

Terrain database is FCC 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. Call signs with exclamation marks need not be protected.
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.

Table 2: Facilities Protected by U/D Method

Facility	WMEV-FM Marion, Virginia	W234CF Boone, North Carolina
Relationship	230C, second adjacent	234D, second adjacent
Distance (km)	75.59	0.4
Bearing (degrees)	10.5	307.4
ERP (kW, on azimuth)	100.0	0.004
HAAT (m, on azimuth)	472.0	457.9
Ratio	40	40
Signal Strength (dBu)	63.85	90.74
Translator Signal Strength	103.85	130.74
Translator distance (km)	.363	.016

Undesired to Desired Method under §74.1204(d)

A waiver of §74.1204(d) is requested to show protection to some facilities through the use of Undesired to Desired Signal Strength Ratio (U/D) calculations. Table 2 lists the parameters studied. The antenna is an array of SCALA YA7 antennas with slant polarization. The elevation pattern is shown in Figure 3. The elevation of the 103.85 dBu and 130.74 dBu contours, in directions where the directional antenna relative field is 1.000, not reduced, is shown in Figure 4. Figure 5 is a topographic map of the transmitter site, showing that the site is on a mountain ridge. Figure 6 is an aerial photograph of site with the 103.85 dBu and 130.74 dBu contours shown.

The WMEV-FM field strength calculated at ground level at the proposed W232CW site is 63.85 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 103.85 dBu field strength distance is .363 kilometers in the horizontal plane. The proposed antenna location is 30 meters above ground. The only structures within that interference contour are non-staffed equipment shelters.

The W234CF field strength calculated at ground level at the proposed W232CW site is 90.74 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 130.74 dBu field strength distance is .016 kilometers in the horizontal plane. The proposed antenna location is 30 meters above ground. The interference contour does not reach ground.

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 National Geophysical Data Center's (NGDC) 30 arcsecond terrain database, formatted by V-Soft Communications and edited to match the database in use at the Federal Communications Commission.

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.

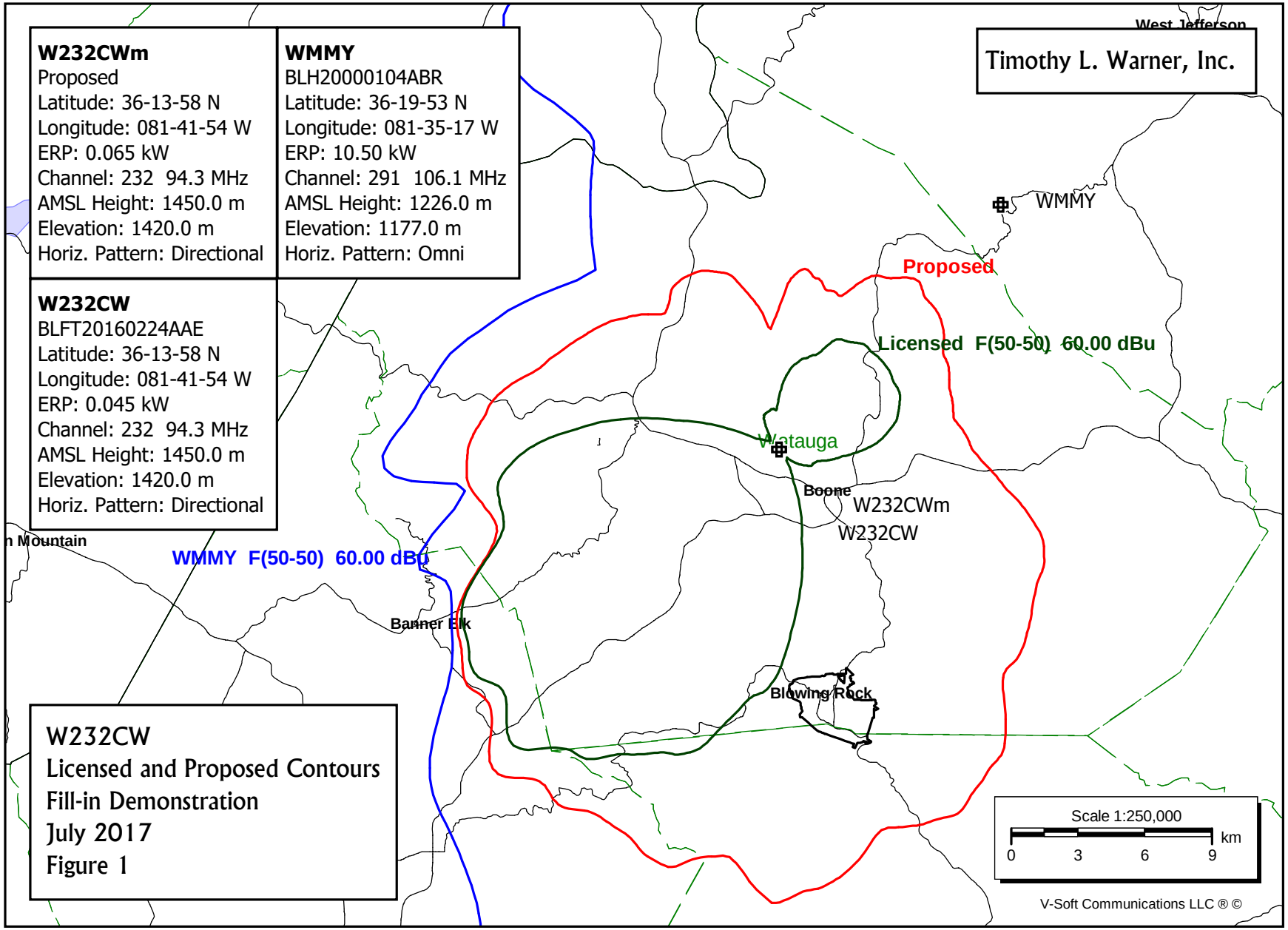
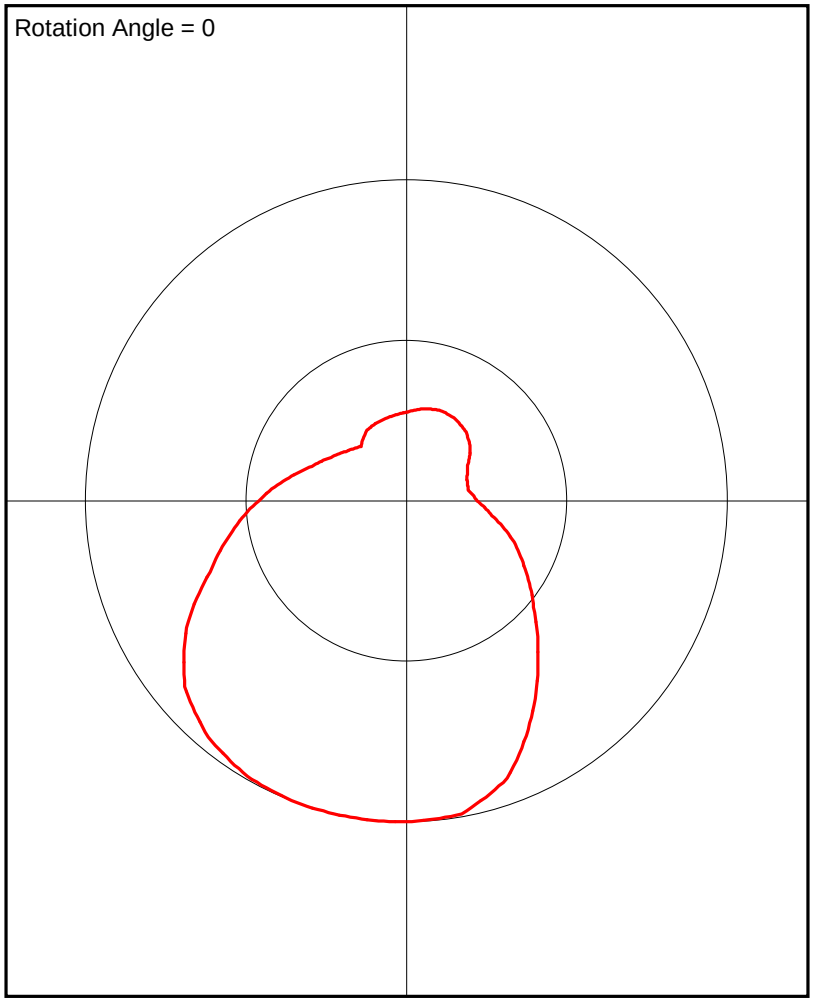

W232CWm
Proposed
Latitude: 36-13-58 N
Longitude: 081-41-54 W
ERP: 0.065 kW
Channel: 232 94.3 MHz
AMSL Height: 1450.0 m
Elevation: 1420.0 m
Horiz. Pattern: Directional
WMMY
BLH20000104ABR
Latitude: 36-19-53 N
Longitude: 081-35-17 W
ERP: 10.50 kW
Channel: 291 106.1 MHz
AMSL Height: 1226.0 m
Elevation: 1177.0 m
Horiz. Pattern: Omni
W232CW
BLFT20160224AAE
Latitude: 36-13-58 N
Longitude: 081-41-54 W
ERP: 0.045 kW
Channel: 232 94.3 MHz
AMSL Height: 1450.0 m
Elevation: 1420.0 m
Horiz. Pattern: Directional
Timothy L. Warner, Inc.
WMMY
Proposed
Licensed F(50-50) 60.00 dBu
Watauga
Boone
W232CWm
W232CW
WMMY F(50-50) 60.00 dBu
Banner Elk
Blowing Rock
W232CW
Licensed and Proposed Contours
Fill-in Demonstration
July 2017
Figure 1
Scale 1:250,000
km
0 3 6 9
V-Soft Communications LLC ® ©

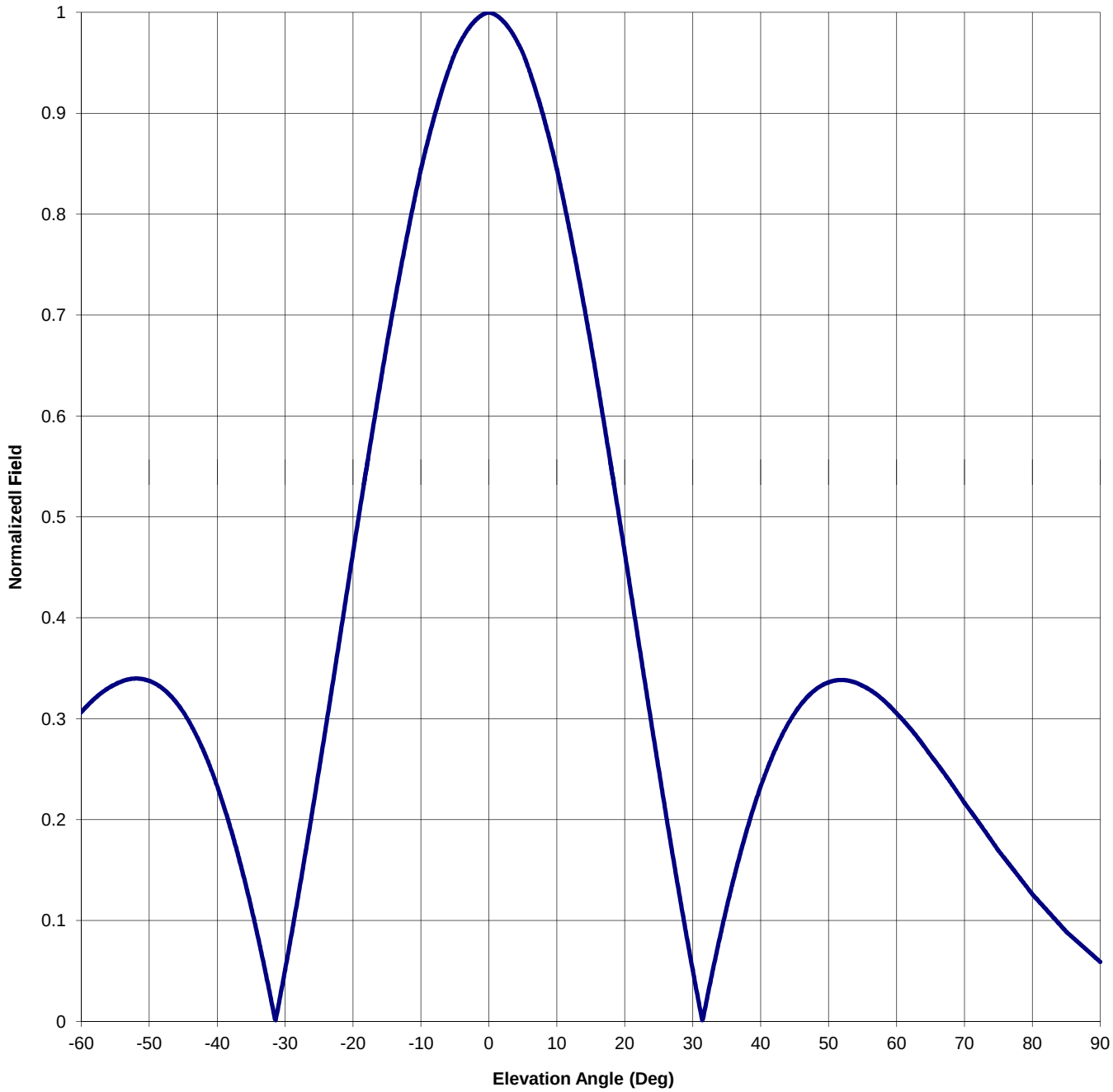
Figure 2: W232CW Proposed Antenna Pattern

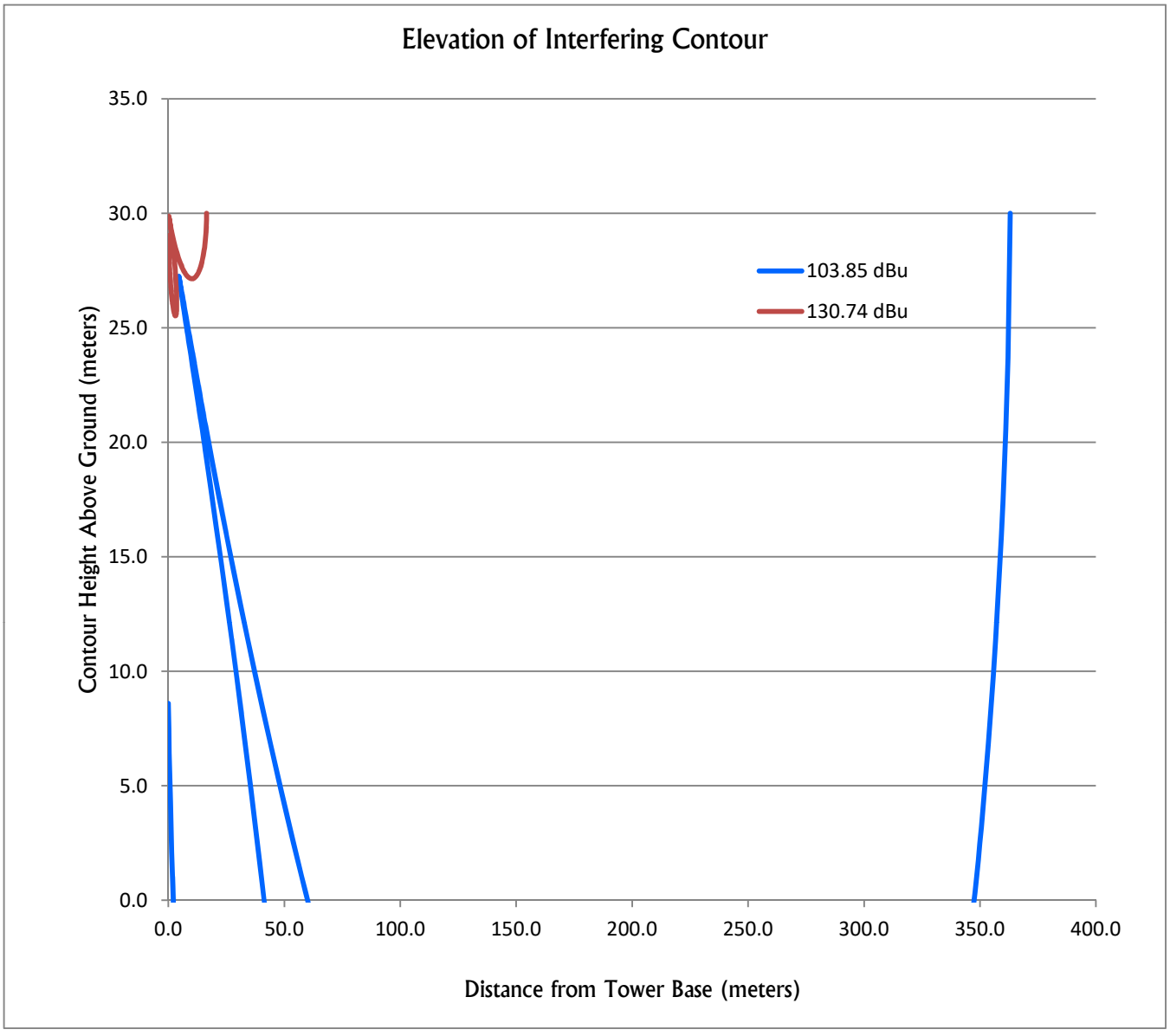
Pre-Rotation Antenna Pattern....

Azimuth (deg)	Relative Field
0.0	0.275
10.0	0.29
20.0	0.3
30.0	0.297
40.0	0.285
50.0	0.26
60.0	0.22
70.0	0.2
80.0	0.195
90.0	0.22
100.0	0.27
110.0	0.351
120.0	0.426
130.0	0.517
140.0	0.636
150.0	0.778
160.0	0.92
170.0	0.99
180.0	1.0
190.0	1.0
200.0	1.0
210.0	0.99
220.0	0.96
230.0	0.9
240.0	0.79
250.0	0.65
260.0	0.55
270.0	0.46
280.0	0.38
290.0	0.312
300.0	0.27
310.0	0.24
320.0	0.22
330.0	0.25
340.0	0.26
350.0	0.267



Antenna Mfg.:	**SCALA**			**Date: 7/17/2017**
Antenna Type:	**YA7 2 level**			
Station:	**W232CW**	**Beam Tilt**	**0**	
Frequency:	**94.3**	**Gain (Max)**	**1.127**	**0.518 dB**
Channel #:	**232**	**Gain (Horizon)**	**1.127**	**0.518 dB**
Figure:	**3**			




Elevation of Interfering Contour
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Contour Height Above Ground (meters)
103.85 dBu
130.74 dBu
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
Distance from Tower Base (meters)

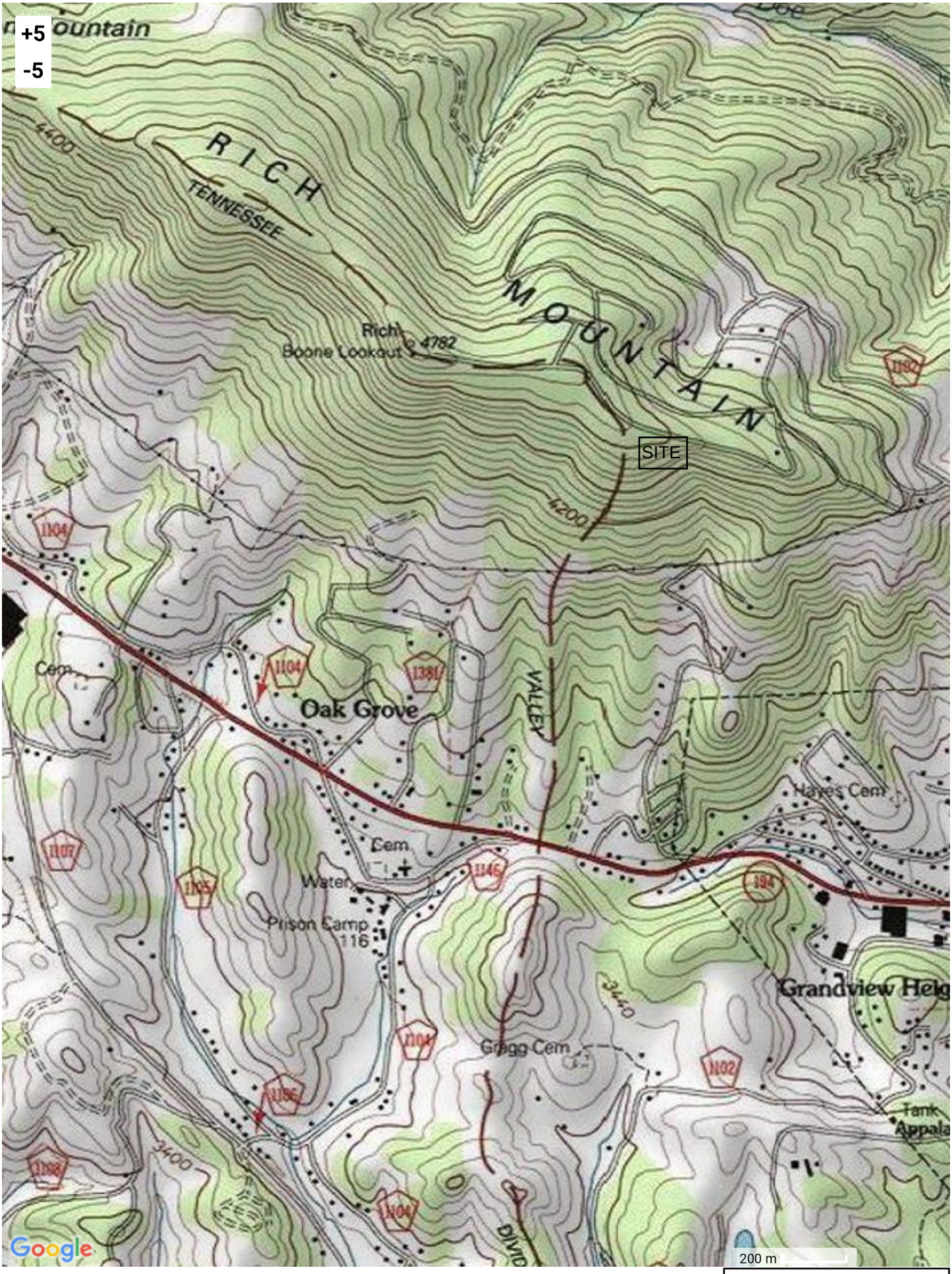


Figure 5: Topographic Map

W232CW

Aerial Photograph with Interference Contour
July 2017
Figure 6