

Hendersonville, North Carolina
Application for Minor Modification of
FM Translator W276CT
On Channel 276
by
Western North Carolina Public Radio, Inc.

Exhibit 13
Interference Analysis

May 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 Western North Carolina Public Radio, Inc., 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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Narrative

This Exhibit supports a minor modification application for FM translator W276CT, on Channel 276 in Hendersonville, 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 proposed 60 dBu F(50,50) coverage area. Figure 1 shows fill-in status confirmation.

The changes are a new directional antenna, a decrease in elevation, and an increase in power.

Allocations

This application proposes service to Hendersonville, North Carolina, on channel 276. 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 NED 03 terrain database which is described below.

Directional Antenna

The proposed antenna is a SWR FMEC/2-75-TA directional antenna. The horizontal plane directional pattern is shown as Figure 2.

Table 1: Allocations

Allocation Study											
Western North Carolina Public Radio, Inc.											
REFERENCE	CH# 276D - 103.1 MHz, Pwr= 0.099 kW DA, HAAT= 76.2 M, COR= 769 M								DISPLAY DATES		
35 20 18.0 N.	Average Protected F(50-50)= 9.0 km								DATA 05-25-17		
82 29 02.0 W.	Standard Directional								SEARCH 05-25-17		
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*
276D Hendersonville	W276CT!	LIC	C NC	0.0 0.0	0.00 BLFT20160615ABL	35 20 18.0 82 29 02.0	0.028	27.1 775	8.1 Western North Carolina Pub	-37.9	-44.8
Facility beinb modified.											
273C1 Hendersonville	WMYI	LIC	NC NC	206.9 26.9	24.98 BLH20110929AKK	35 08 15.6 82 36 30.6	44.000 416	6.9 1079	57.9 Capstar Tx, Llc	10.3	-33.5*
Protected by U/D Signal Ratio, see text and figures.											
279D Hendersonville	W279AI	LIC	C NC	225.1 45.1	4.55 BLFT19971204TG	35 18 34.0 82 31 10.0	0.010 262	0.2 967	9.8 Radio Training Network, In	-1.3*	-6.0*
Protected by U/D Signal Ratio, see text and figures.											
275D Waynesville	W275BU	LIC	DC NC	283.9 103.5	58.26 BLFT20161103ACI	35 27 43.0 83 06 26.0	0.125	49.0 1840	30.2 Western North Carolina Pub	-1.0	12.4
277A Greer	WRTH	LIC	CX SC	140.2 320.4	49.14 BMLH20150504ACF	34 59 54.0 82 08 17.0	2.700 151	37.7 420	25.2 Caron Broadcasting, Inc.	2.4	11.7
277L1 Asheville	WSFM-LP	LIC	NC	346.8 166.7	29.45 BMLL20160330AOH	35 35 48.0 82 33 31.0	0.100 1	730	Friends Of Community Radio	5.6	3.5
275C1 Hickory	WLKO	LIC	C NC	86.0 266.8	123.29 BMLH20120608AAZ	35 24 26.0 81 07 47.0	31.000 468	105.9 706	71.9 Capstar Tx, Llc	6.5	36.8
276A Tusculum	WIKQ	LIC	C TN	351.4 171.3	88.61 BMLH20110808ACY	36 07 40.0 82 37 57.0	6.000 -68	68.3 599	15.8 Radio Greeneville, Inc.	9.2	37.4
276A Honea Path	WHQA	LIC	C SC	182.9 2.9	101.42 BMLED20150323ABW	34 25 31.0 82 32 26.0	6.000 100	82.7 323	25.2 The Power Foundation	12.2	55.7
275D Greenville	W275BJ	LIC	DC SC	171.5 351.5	44.53 BLFT20150629ABO	34 56 29.0 82 24 41.0	0.250	19.8 733	13.1 Caron Broadcasting, Inc.	17.8	21.9
278D Clemson	W259CN	CP	DC SC	207.4 27.3	63.22 BMPFT20170410ACQ	34 49 57.3 82 48 12.7	0.250	1.1 492	16.2 Georgia-carolina Radiocast	54.6	45.9

Terrain database is NED 03 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	WMYI Hendersonville, North Carolina	W279AY Hendersonville, North Carolina
Relationship	273C1, third adjacent	279D, third adjacent
Distance (km)	24.99	4.55
Bearing (degrees)	206.9	225.1
ERP (kW, on azimuth)	44	0.01
HAAT (m, on azimuth)	235.4	247.1
Ratio	40	40
Signal Strength (dBu)	77.78	70.75
Translator Signal Strength	117.78	110.75
Translator distance (km)	.090	.202

Undesired to Desired Method under §74.1204(d)

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 an SWR FMEC/2-75-TA circularly polarized directional antenna with antenna bays spaced vertically three quarters of a wavelength.

The WMYI field strength calculated at ground level at the proposed W276CT site is 77.78 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 117.78 dBu field strength distance is .090 kilometers in the horizontal plane. The proposed antenna location is 74 meters above ground. Figure 3 is a plot of the elevation pattern of the proposed antenna. Figure 4 is a vertical plot of the interference contour, showing that it remains at least 53 meters above the ground level at the base of the structure.

The W279AY field strength calculated at ground level at the proposed W276CT site is 70.75 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 110.75 dBu field

strength distance is .202 kilometers in the horizontal plane. The proposed antenna location is 74 meters above ground. Figure 3 is a plot of the elevation pattern of the proposed antenna. Figure 4 is a vertical plot of the interference contour, showing that it remains at least 28 meters above the ground level at the base of the structure.

Figure 5 is a topographic map of the transmitter site, showing that the site is on a minor ridge. Figure 6 is a Google Earth aerial photograph with a 117.78 dBu and 110.75 field strength lines plotted. As shown, there are no tall buildings in the area. There are no major roadways with the predicted interference 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 National Elevation Dataset (NED) 03 terrain database. The NED 03 database is derived from the USGS National

Elevation Dataset 30 meter terrain database. The USGS National Elevation Dataset has been developed by merging the highest-resolution, best-quality elevation data available across the United States into a seamless raster format. NED is the result of the maturation of the USGS effort to provide 1:24,000-scale Digital Elevation Model (DEM) data for the conterminous US and 1:63,360-scale DEM data for Alaska.

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.

W276CTmod

Proposed
Latitude: 35-20-18 N
Longitude: 082-29-02 W
ERP: 0.099 kW
Channel: 276 103.1 MHz
AMSL Height: 769.0 m
Elevation: 695.0 m
Horiz. Pattern: Directional

WCQS

BLED19931012KA
Latitude: 35-35-23 N
Longitude: 082-40-26 W
ERP: 1.60 kW
Channel: 201 88.1 MHz
AMSL Height: 1100.0 m
Elevation: 1074.0 m
Horiz. Pattern: Directional

Timothy L. Warner, Inc.

Fletcher

Proposed F(50-50) 60.00 dBu

Henderson



W276CTmod
W276CT

Hendersonville

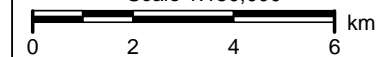
WCQS F(50-50) 60.00 dBu

East Flat Rock

W276CT

Fill-In Demonstration Detail
May 2017
Figure 1A

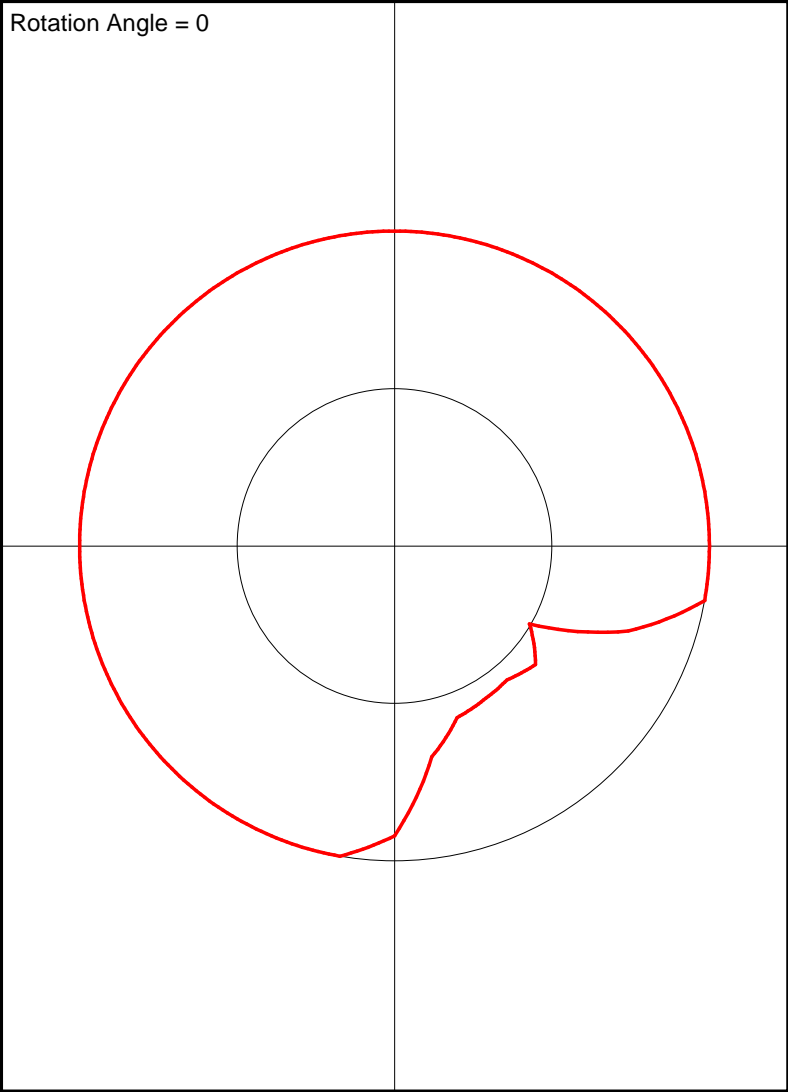
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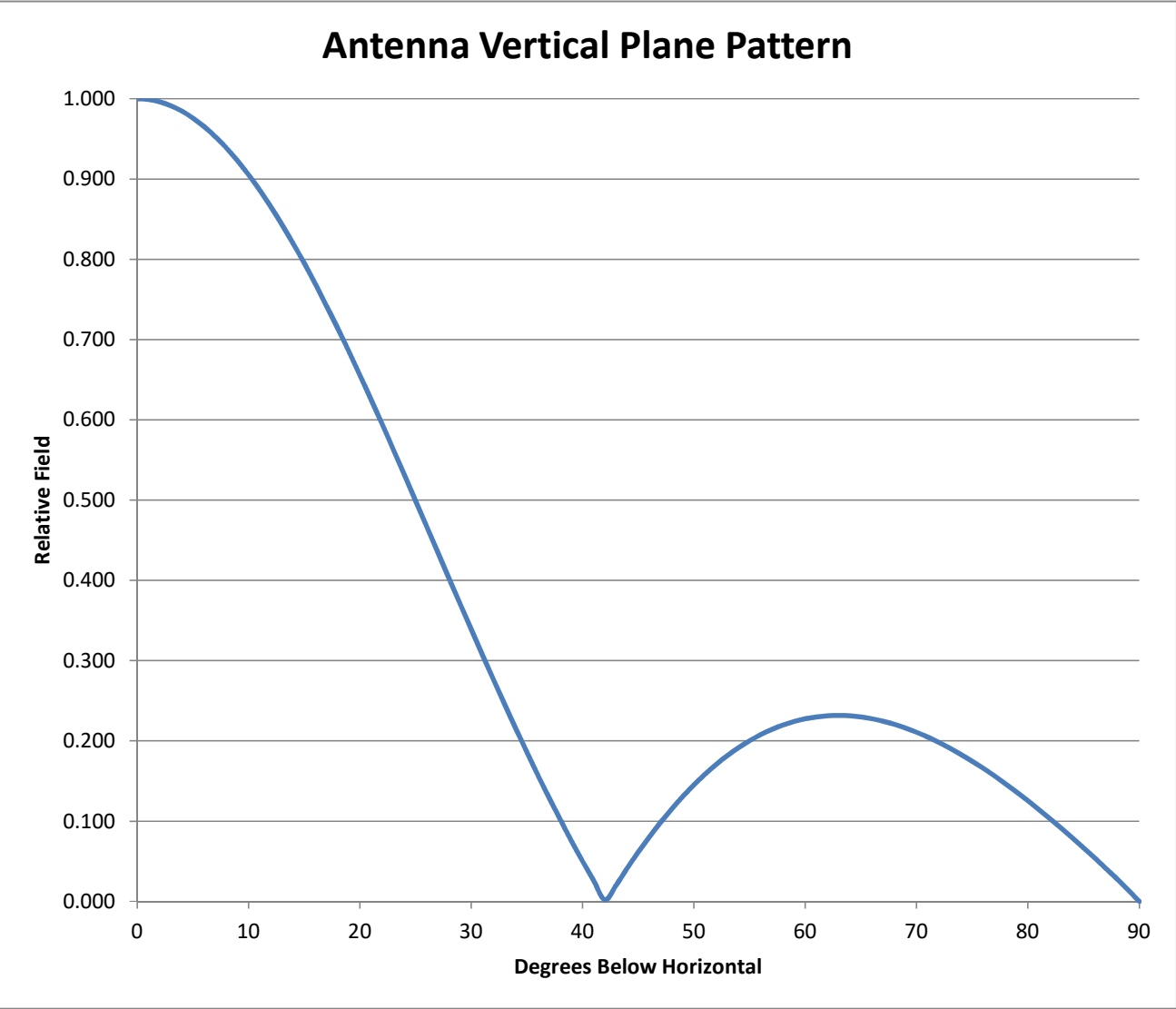


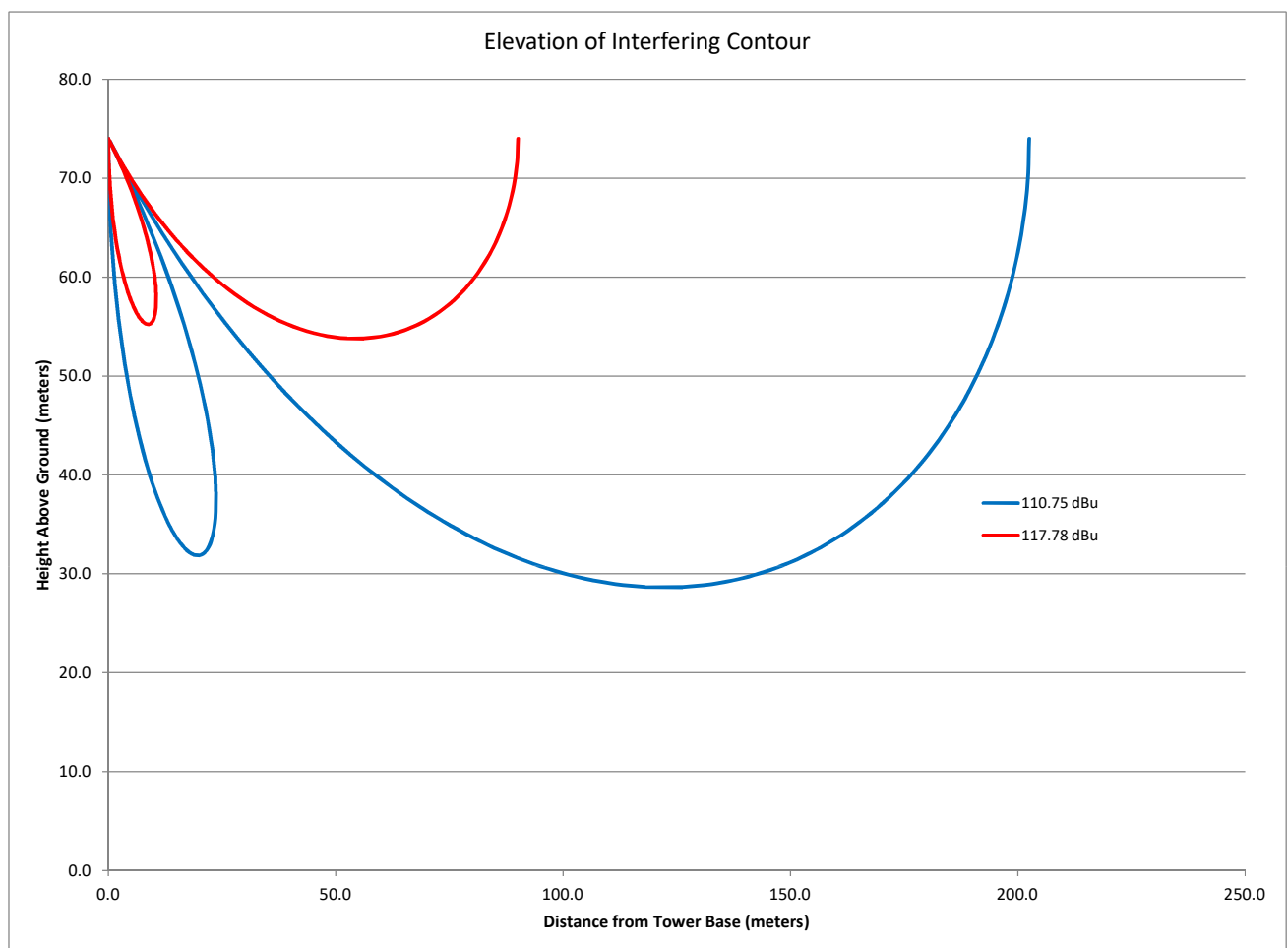
V-Soft Communications LLC ©

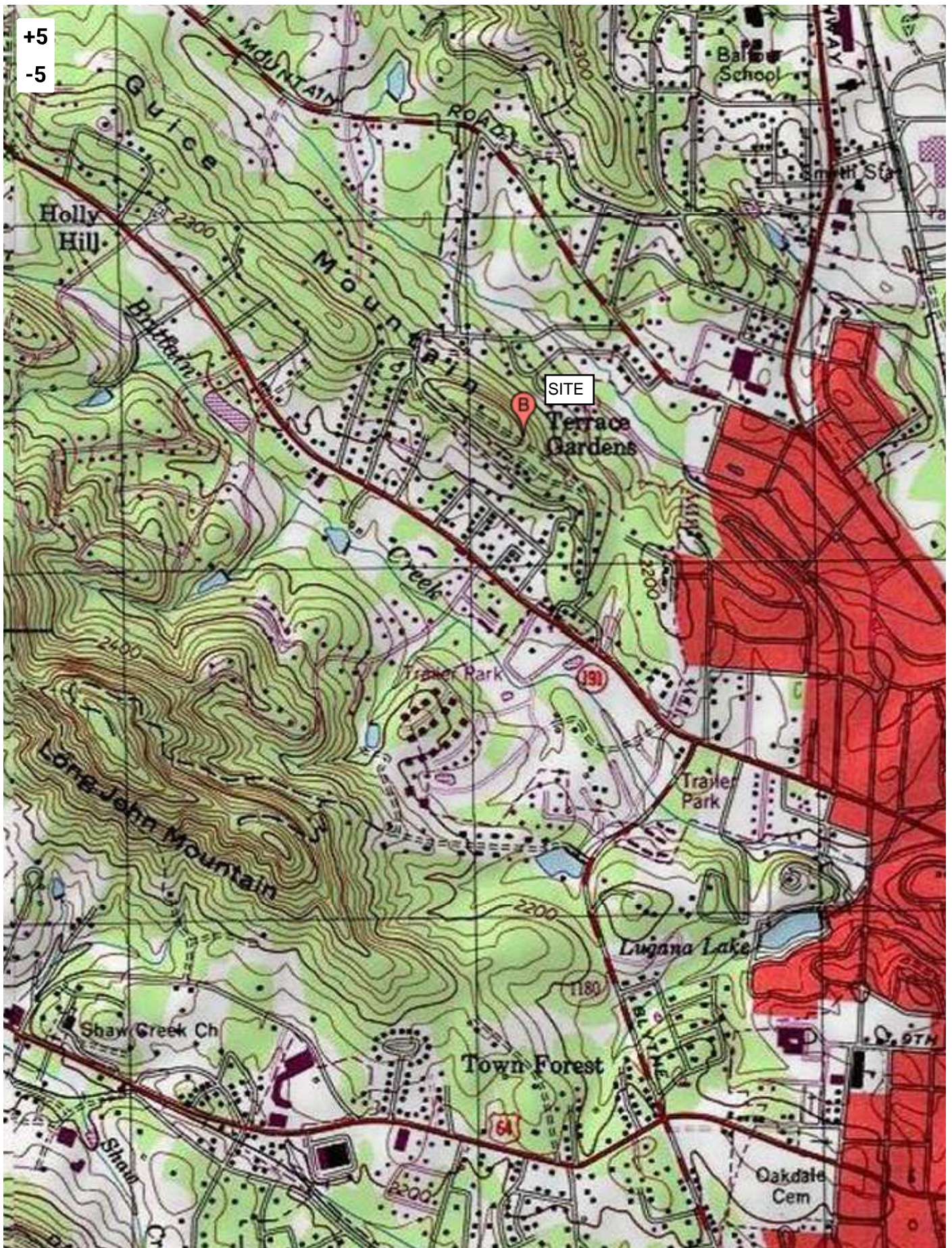
Figure 2: Proposed Directional Antenna Pattern
Pre-Rotation Antenna Pattern....

Azimuth (deg)	Relative Field
0.0	1.0
10.0	1.0
20.0	1.0
30.0	1.0
40.0	1.0
50.0	1.0
60.0	1.0
70.0	1.0
80.0	1.0
90.0	1.0
100.0	1.0
110.0	0.79
120.0	0.495
130.0	0.585
140.0	0.555
150.0	0.565
160.0	0.58
170.0	0.68
180.0	0.92
190.0	1.0
200.0	1.0
210.0	1.0
220.0	1.0
230.0	1.0
240.0	1.0
250.0	1.0
260.0	1.0
270.0	1.0
280.0	1.0
290.0	1.0
300.0	1.0
310.0	1.0
320.0	1.0
330.0	1.0
340.0	1.0
350.0	1.0












Topographic Map
Figure 5

W276CT

Aerial Photograph with Interference Contours
May 2017
Figure 6

Legend

-  W276CTmod (276)
-  W276CTmod (276) - 50 10 Field Strength: 110.75 dBu FCC [NED 03 US]
-  W276CTmod (276) - 50 10 Field Strength: 117.78 dBu FCC [NED 03 US]

