

W284CO
Hendersonville, North Carolina
Application for Minor Modification of FM Translator
On Channel 284
by
JBN, Inc.

Exhibit 13
Interference Analysis

March 2017

© 2017 JBN, Inc.

Timothy L. Warner, Inc.
Post Office Box 8045
Asheville, North Carolina 28814-8045
(828) 258-1238
twarner@tlwinc.net

Table of Contents

Description	Page
Declaration	2
Narrative	3
Allocations	3
Table 1: Allocations	5
Table 2: Facilities Protected by U/D Method	6
Undesired to Desired Method under §74.1204(d)	6
Source of Data	7
Licensed and Proposed Contours	Figure 1
Antenna Elevation Pattern	Figure 2
Interference Contour Vertical Elevation Plot	Figure 3
Transmitter Site Topographic Map	Figure 4
Transmitter Site Aerial Photograph with Interference Contour	Figure 5

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 JBN, 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.



Timothy L. Warner, P.E.
Post Office Box 8045
Asheville, North Carolina 28801
(828) 258-1238
twarner@tlwinc.net
30 March 2017

Narrative

This Exhibit supports a minor modification application for FM translator W284CO, on Channel 284 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 licensed 60 dBu F(50,50) coverage area and the proposed 60 dBu F(50,50) coverage area. Figure 1 shows that the proposed site meets the requirements of 47 C.F.R. §73.860 for translators having common ownership with low power FM stations. Specifically, the site is within 16.1 kilometers¹ of the co-owned LPFM station WFHC-LP; there is contour overlap between the proposed W284CO facilities and WFHC-LP. As shown on Figure 1, the proposed modification is a minor modification of the authorized facilities.

The changes are a change of site, change of antenna, increase in elevation, decrease in power.

Allocations

This application proposes service to Hendersonville, North Carolina, on channel 284. 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

¹ The distance limitation in 47 C.F.R. §73.860 is 16.1 km for top 50 urban markets, and 32.1 km outside the top 50 markets. Only the more restrictive limit is shown.

§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 NGDC 30 sec terrain database which is described below.

Table 1: Allocations

Allocation Study JBN, Inc.												
REFERENCE		CH# 284D - 104.7 MHz, Pwr= 0.01 kw, HAAT= 320.2 M, COR= 1058 M								DISPLAY DATES		
35 31 39.0 N.		Average Protected F(50-50)= 10.4 km								DATA 03-30-17		
82 29 44.0 W.		Omni-directional								SEARCH 03-30-17		
CH CITY	CALL	TYPE	ANT STATE	AZI. <--	DIST FILE #	LAT. LNG.	Pwr(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap	*OUT* in km)	
284D Hendersonville	W284CO!	LIC	C NC	178.5 358.5	14.52 BLFT20160708AAB	35 23 48.0 82 29 29.0	0.030	24.8 733	4.1 JBN, Inc.	-20.4	-29.9	Facility being modified.
282A Fletcher	WQNO	LIC	CX NC	270.0 90.0	0.12 BLH20050323AAV	35 31 39.0 82 29 49.0	0.470 349	1.5 1075	26.2 Clear Channel Broadcasting	-12.8*	-26.3*	Protected by U/D contours, see text and figures.
284C0 Charlotte	WKQC	LIC	DCY NC	100.1 281.1	167.17 BLH19920416KB	35 15 06.0 80 41 12.0	100.000 369	175.3 570	74.8 wkis License Limited Partn	-18.0*	60.5	
286A Woodfin	WQNS	LIC	ZCX NC	308.0 127.9	12.64 BLH20150807AAE	35 35 50.4 82 36 20.6	6.000 62	2.1 766	20.5 Clear Channel Broadcasting	-1.5	-8.0*	Protected by U/D contours, see text and figures.
284A White Pine	WLNQ	LIC	NCX TN	320.8 140.4	99.11 BLH20120330AOX	36 13 00.0 83 11 38.0	2.800 150	87.7 518	31.4 Bristol Broadcasting Compa	-0.5	26.1	
285C3 Mauldin	WROO	LIC	NCX SC	172.7 352.8	67.81 BLH20150828ABF	34 55 16.0 82 24 05.0	2.300 288	53.0 590	35.4 Clear Channel Broadcasting	3.6	16.1	
285D Franklin	W285FD	LIC	DC NC	253.9 73.5	79.47 BLFT20160311AAF	35 19 38.0 83 20 09.0	0.113	45.7 1535	29.3 Sutton Radiocasting Corpor	22.5	33.9	
283A Highlands	WHLC	CP	CX NC	230.5 50.1	81.28 BPH20150123AHK	35 03 40.0 83 11 05.0	0.540 330	36.9 1338	24.3 Charisma Radio Corp.	33.5	40.5	
283A Highlands	WHLC	LIC	C NC	230.5 50.1	81.28 BLH19990302KF	35 03 40.0 83 11 05.0	0.460 353	34.8 1330	23.1 Charisma Radio Corp.	35.5	41.7	
283D Inman	W283CG	LIC	DC SC	142.6 322.9	76.31 BLFT20160504ABR	34 58 51.6 81 59 10.6	0.250	20.6 381	13.7 Ted A Mccall	45.0	48.6	
281A Franklin	WNCC	LIC	C NC	253.9 73.5	79.47 BLH20160412AAK	35 19 38.0 83 20 09.0	0.115 681	0.8 1538	30.7 Sutton Radiocasting Corpor	67.5	48.0	
284C1 Athens	WFSH-FM	LIC	CX GA	213.8 33.1	221.01 BMLH20060726APQ	33 52 02.0 83 49 44.0	24.000 505	161.5 772	71.6 South Texas Broadcasting,	48.0	109.9	
287C1 Gaffney	WOSF	LIC	CX SC	98.3 279.1	120.18 BLH20100429ADK	35 21 51.0 81 11 13.0	51.000 395	9.4 644	71.5 Gaffney Broadcasting, Llc	100.9	48.3	
285D Boone	W285DG	LIC	DCN NC	41.9 222.3	106.10 BLFT19960910TO	36 14 08.0 81 42 21.0	0.250 425	41.4 1464	26.4 Radio License Holding Cbc,	55.1	65.3	Translator for WQUT, Johnson City, TN.
283D Lenoir	W283CE	LIC	DC NC	64.8 245.4	100.30 BLFT20150120AIK	35 54 25.0 81 29 22.0	0.250	35.9 687	23.8 Eastern Airwaves, Llc	55.3	69.2	
285A Kingsport	WKOS	LIC	DCN TN	2.0 182.1	113.95 BLH19940401KA	36 33 14.0 82 27 00.0	2.750 150	45.1 617	29.6 Radio License Holding Cbc,	58.6	70.2	

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	WQNQ Fletcher, North Carolina	WQNS Woodfin, North Carolina
Relationship	282A, second adjacent	286A, second adjacent
Distance (km)	0.13	12.64
Bearing (degrees)	270.0	308.0
ERP (kW, on azimuth)	0.47	4.59
HAAT (m, on azimuth)	301.1	56.3
Ratio	40	40
Signal Strength (dBu)	121.6	68.2
Translator Signal Strength	161.6	108.2
Translator distance (km)	0.0002	0.087

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 Nicom BKG88 two bay antenna with a standard spacing of 0.85 wavelength. The elevation pattern is shown in Figure 2.

The WQNQ field strength calculated at ground level at the proposed W284CO site is 121.6 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 161.6 dBu field strength distance is 0.0002 kilometers (0.2 meters) in the horizontal plane. The proposed antenna location is 11 meters above ground. The predicted interference level signal can not reach ground or any other structure.

The WQNS field strength calculated at ground level at the proposed W284CO site is 68.2 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 108.2 dBu field strength distance is 0.087 kilometers (87 meters) in the horizontal plane. The proposed antenna location is 11

meters above ground. Figure 3 is a vertical plot of the 108.2 dBu predicted interference contour.

As Figure 3 shows, the 108.2 dBu signal level goes below ground level. A portion of the terrain along the 102° radial, passing through the middle of the only occupied structure within that distance, is shown on Figure 3. The single story house is modeled with a height above ground level of 4.6 meters (15 feet). The interference contour remains at least 3.5 meters above the floor level of the single story structure.

Figure 4 is a topographic map of the transmitter site, showing that the site is on a mountain ridge. The closest residence, to the Southeast, is not shown on the topographic map. Figure 5 is a Google Earth aerial photograph with a 108.2 dBu field strength line plotted. As shown, most of the area within the contour is forest. The site is a developed electronic site with other transmitter buildings. There is no population within the predicted interference area and therefore this facility is permitted under §74.1204(d).

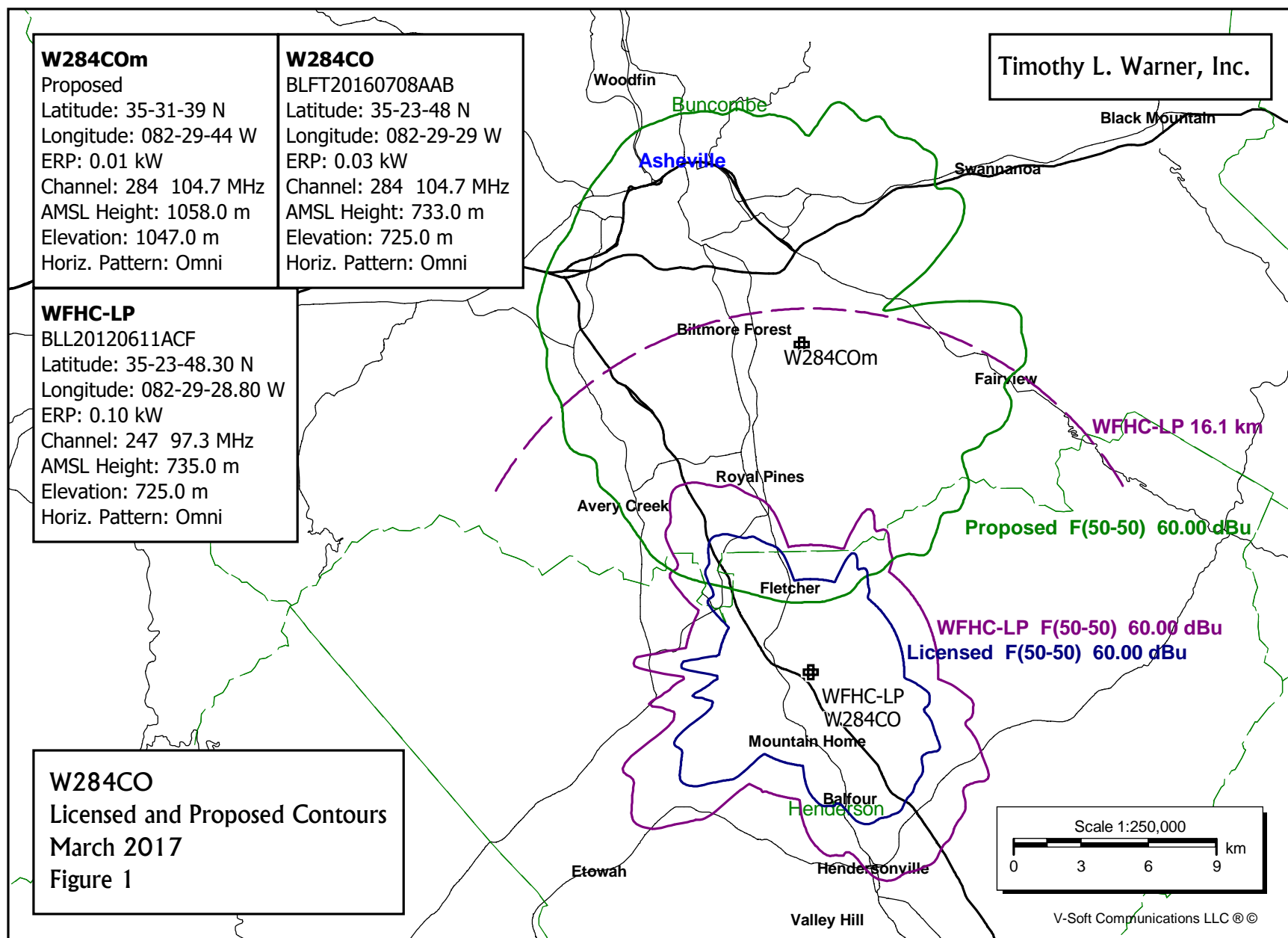
The applicant recognizes that the U/D method is only a tool for predicting likely interference. Should any actual interference be experienced, the applicant will cooperate fully in correcting the interference. Corrective steps may require changes in the transmitting antenna or other steps which would 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.

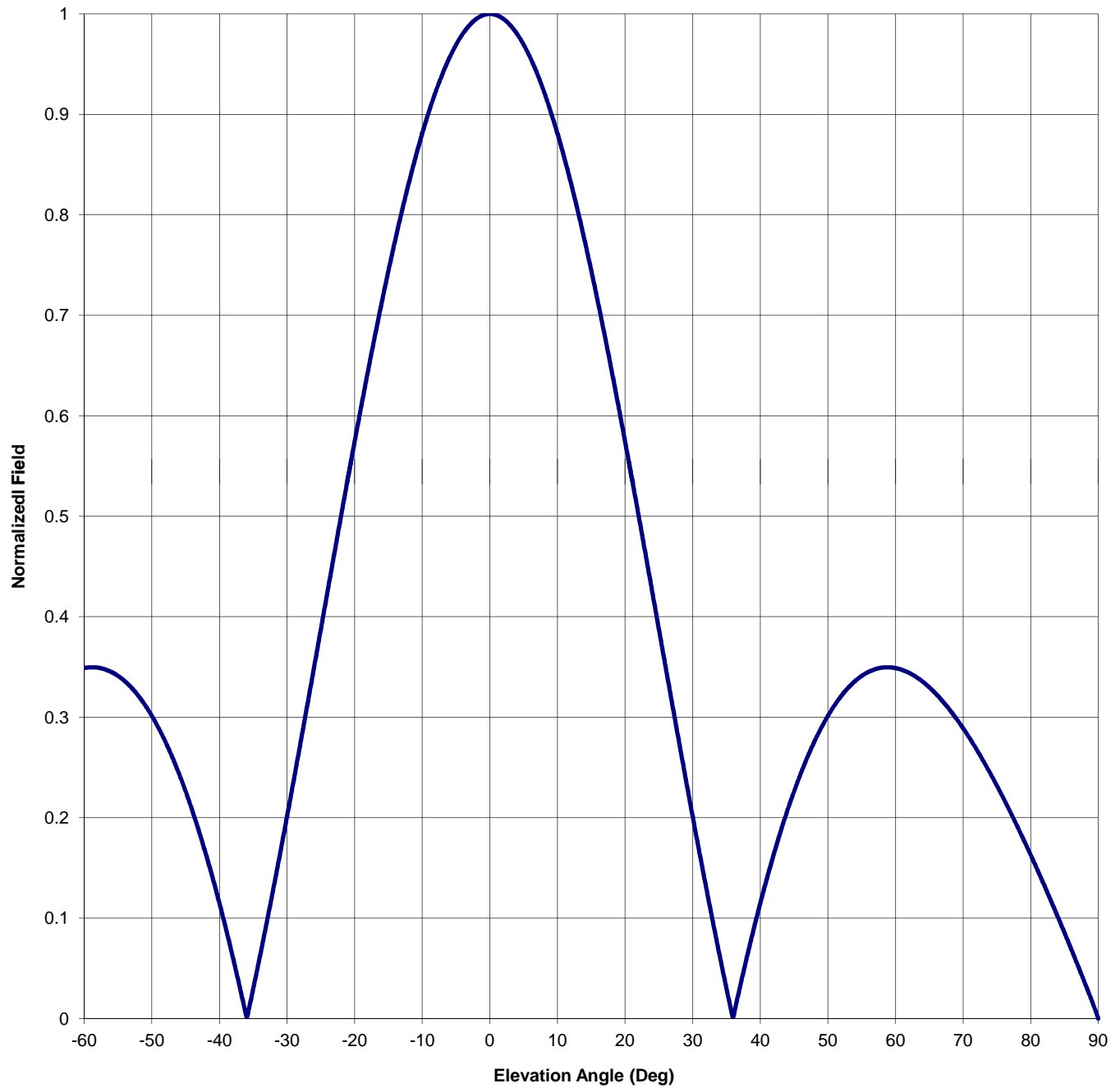
The contours were evaluated using terrain extracted from the National Geophysical Data Center's (NGDC) 30 arcsecond terrain database, formatted by V-Soft Communications and edited to match the database in use at the Federal Communications Commission.

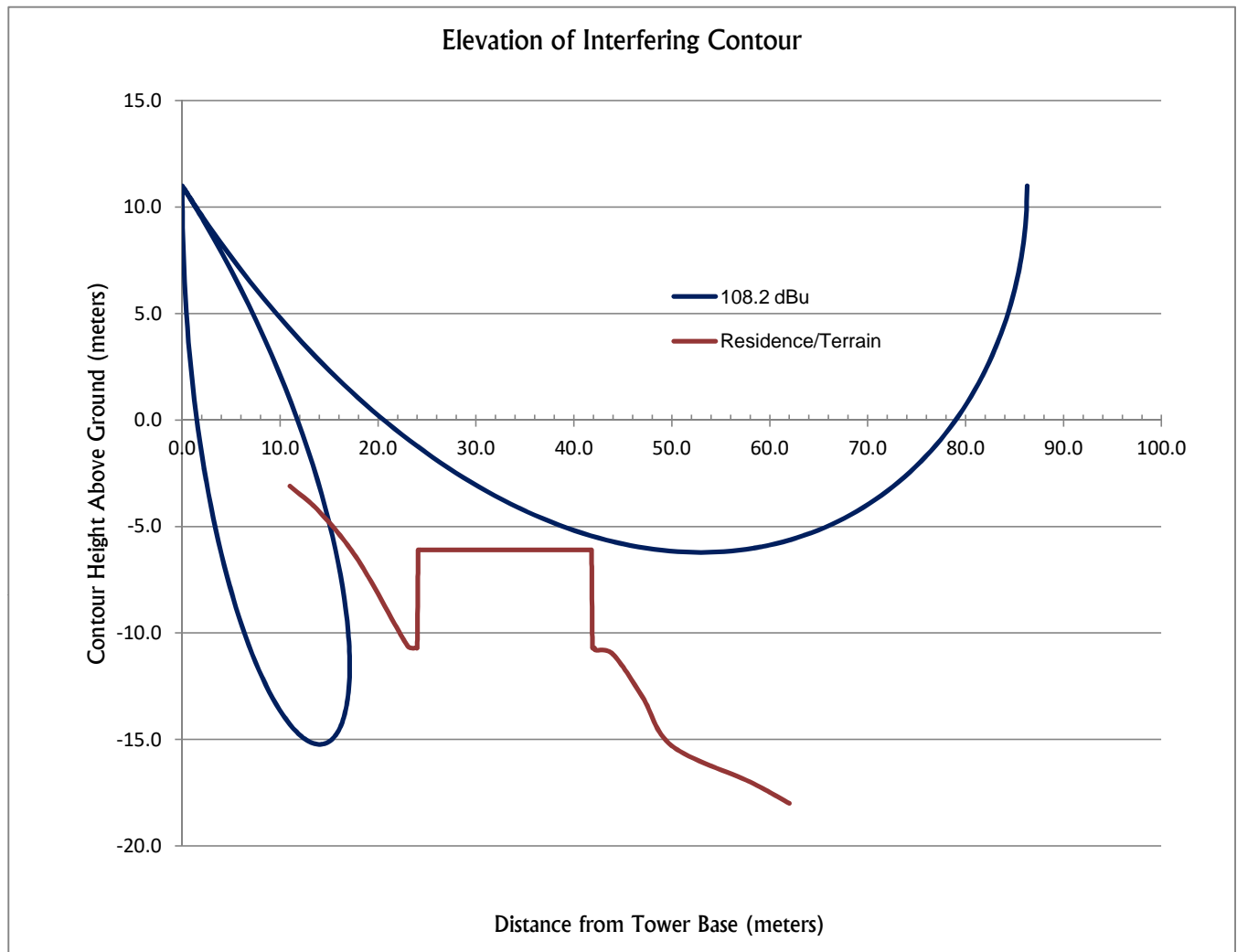


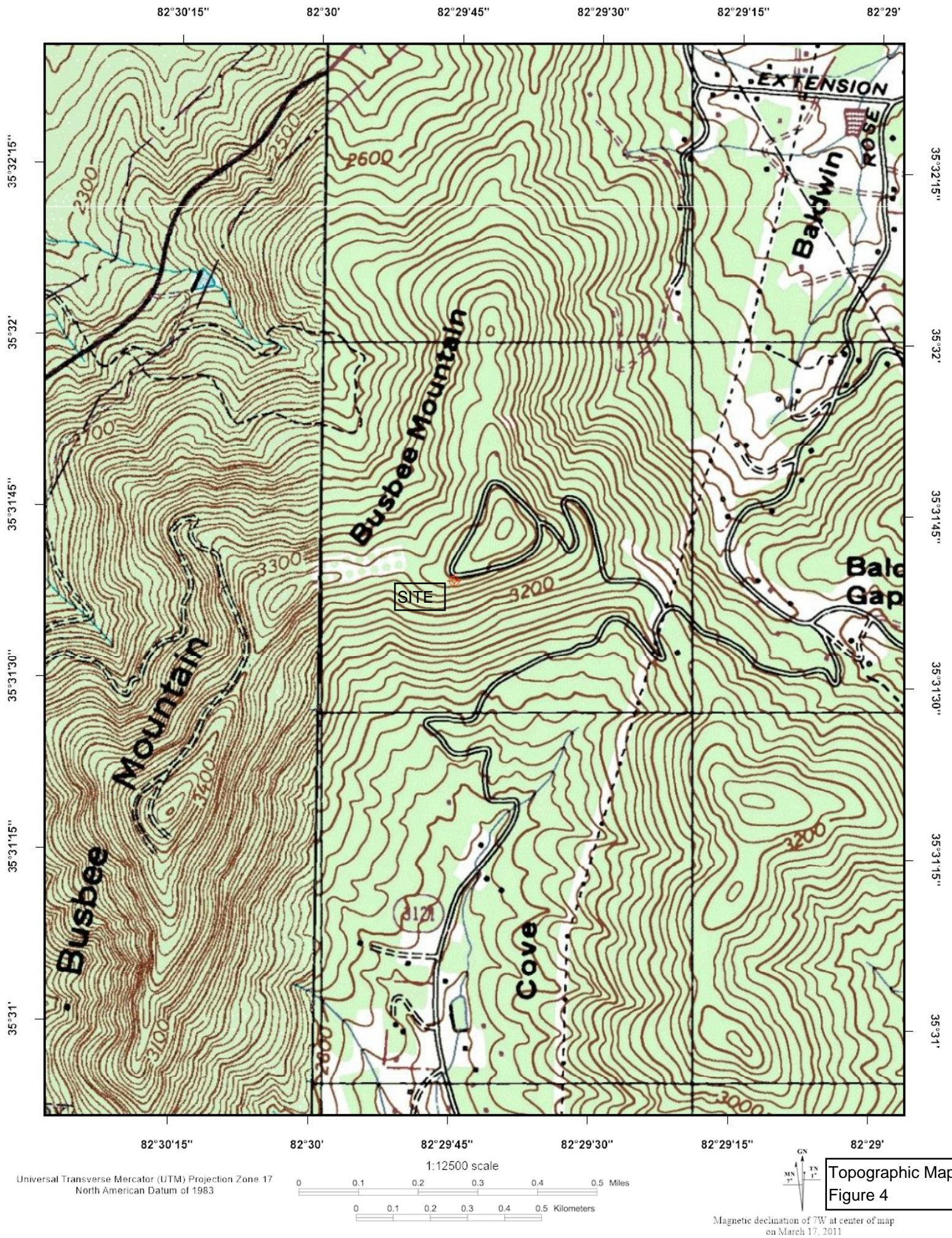
Antenna Mfg.: Nicom
Antenna Type: BKG88-2
Station: W284CO
Frequency: 104.7
Channel #: 284
Figure: 2

Date: 3/30/2017

Beam Tilt	0	
Gain (Max)	1.005	0.023 dB
Gain (Horizon)	1.005	0.023 dB









W284CO

Aerial Photograph with Interference Contour
March 2017
Figure 5

Legend

-  W284COm (284)
-  W284COm (284) - 50 50 Field Strength: 108.2 dBu FCC [FCC 30 US]

