

Matthews, North Carolina
Application for Minor Modification of
FM Translator W282BP
On Channel 282
by
WHVN, Inc.

Interference Analysis

May 2020

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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 Interference Analysis for WHVN, 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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7 May 2020

Narrative

This Exhibit supports a minor modification application for FM translator W282BP, on Channel 282 in Matthews, 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, and the licensed coverage area. Figure 1 shows fill-in status confirmation.

The changes are a change of primary station, a change of site, a reduction in height, and a new directional antenna pattern.

Allocations

This application proposes service to Matthews, North Carolina, on channel 282. 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 GLOBE 30 terrain database which is described below. Where the outgoing protection is provided by interference contours with a separation of less than 3.2 kilometers (2 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.

Table and Figure	Call Sign	Location	Channel, class and relationship
3	W281BE	Fort Mill, South Carolina	281D, first adjacent

Table 1: Allocations

Allocation Study											
WHVN, Inc.											
REFERENCE		CH# 282D - 104.3 MHz, Pwr= 0.25 kW DA, HAAT= 99.5 M, COR= 306 M								DISPLAY DATES	
35 05 46.8 N.		Average Protected F(50-50)= 12.8 km								DATA 05-07-20	
80 40 47.4 W.		Standard Directional								SEARCH 05-07-20	
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)	
279C0	WSOC-FM	LIC		358.0	17.29	35 15 06.50	100.000	11.3	78.1	-5.3	-61.8*
Charlotte		NC		178.0	BMLH20140821ABX	80 41 11.20	411	613	Beasley Media Group	Licensee	
Protected by Undesired to Desired Signal Ratio Studies, see text and figures.											
282D	W282BP!	LIC		314.1	16.60	35 12 00.50	0.250		---	Reference---	
Charlotte		NC		134.0	BLFT20110128ACF	80 48 40.30	111	315	Whvn, Inc.		
284C0	WKQC	LIC D		358.0	17.29	35 15 06.50	100.000	5.4	53.8	1.1	-37.5*
Charlotte		NC		178.0	BLH19920416KB	80 41 11.20	369	570	Beasley Media Group	Licensee	
Protected by Undesired to Desired Signal Ratio Studies, see text and figures.											
282C3	WJSG	LIC N		109.8	92.44	34 48 39.60	6.000	93.6	33.9	-12.7*	25.2
Hamlet		NC		290.3	BLH20061109ADN	79 43 37.20	149	223	Jackson Broadcasting Company		
281D	W281BE	LIC		222.9	33.49	34 52 31.50	0.250	22.3	14.2	-1.1	0.5
Fort Mill		SC		42.8	BLFT20140813AAA	80 55 47.30		307	our Three Sons Broadcasting		
281C	WTQR	LIC N		11.1	145.11	36 22 36.90	100.000	133.7	89.5	0.8	42.3
Winston-Salem		NC		191.2	BLH20110809ABB	80 22 07.80	528	850	Clear Channel Broadcasting		
228C3	WYFQ-FM	LIC N		98.7	34.10	35 02 57.50	8.700	45.9	12.2	11.5R	22.6M
Wadesboro		NC		278.9	BLED19951010KE	80 18 37.20	169	310	Bible Broadcasting Network		
281D	W281BY	CP		295.4	49.66	35 17 12.40	0.100	10.6	7.4	26.2	23.0
Kings Mountain		NC		115.1	BNPFT20171201AOC	81 10 27.20		268	Iglesia Nueva Vida Of High		
282C0	WBBQ-FM	LIC N		210.1	214.49	33 25 17.10	80.000	177.0	76.8	24.3	93.2
Augusta		GA		29.4	BLH20120403ACE	81 50 18.00	436	517	Capstar Tx, LLC		
282C0	WBBQ-FM	LIC N		210.1	214.49	33 25 17.10	80.000	177.0	76.8	24.3	93.2
Augusta		GA		29.4	BLH20120403ACE	81 50 18.00	436	517	Capstar Tx, LLC		
282D	W282AX	LIC		269.7	87.73	35 05 18.40	0.250	28.7	8.5	45.7	31.5
Gaffney		SC		89.2	BLFT20090811ACO	81 38 39.30	36	254	Fowler Broadcast Communica		
283D	W283CY	CP		227.2	64.99	34 41 53.50	0.250	20.1	13.4	32.2	32.8
Chester		SC		46.9	BMPFT20181204ABC	81 12 06.30		279	wisdom, LLC		
283D	W283CY	LIC		227.2	64.99	34 41 53.60	0.250	19.8	13.2	32.5	33.0
Chester		SC		46.9	0000111086	81 12 06.30		276	wisdom, LLC		
284C1	WNOK	LIC D		191.4	107.19	34 09 03.50	90.000	3.4	41.6	90.3	63.4
Columbia		SC		11.3	BLH20031030AAR	80 54 35.30	315	419	Capstar Tx, LLC		
283D	W283CE	CP D		321.1	116.15	35 54 25.40	0.250	29.4	19.8	74.4	76.3
Lenoir		NC		140.7	BPFT20170519ABB	81 29 21.30		687	Eastern Airwaves, LLC		

Terrain database is GLOBE 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.
 « = Station meets FCC minimum distance spacing for its class.

Table 2: Facilities Protected by U/D Method

Facility	WSOC-FM Charlotte, North Carolina	WKQC Charlotte, North Carolina
Relationship	279C0, third adjacent	284C0, second adjacent
Distance (km)	17.3	17.3
Bearing (degrees)	358.0	358.0
ERP (kW, on azimuth)	100.0	11.7
HAAT (m, on azimuth)	377.2	334.2
Ratio	40	40
Signal Strength (dBu)	92.61	82.29
Translator Signal Strength	132.61	122.29
Translator distance (km)	.026	.085

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 a single level ERI LPX-1 directional antenna. The elevation pattern is shown in Figure 4.

The WSOC-FM field strength calculated at the site is 92.61 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 132.61 dBu field strength distance is .026 kilometers (26 meters) in the horizontal plane. The proposed antenna location is 82 meters above ground. The lowest point of the interference contour is 68 meters (223 feet) above ground.

The WKQC field strength calculated at the site is 82.29 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 122.29 dBu field strength distance is .085 kilometers (85 meters) in the horizontal plane. The proposed antenna location is 82 meters above ground. The lowest point of the interference contour is 37 meters (121 feet) above ground.

Figure 5 is the vertical elevation of the 132.61 dBu and 122.29 dBu interference contours. Figure 6 is a topographic map of the site. Figure 7 is an aerial photograph of the site with the interference contours plotted. There are no tall buildings in the area.

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 (converted to NAD 83) or LMS. 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 GLOBE 30 arcsecond terrain database, formatted by V-Soft Communications to work with its allocation and mapping programs.

Table 3: FMOver Protection of W281BE

05-07-2020 Terrain Data: GLOBE 30 Sec FMOver Analysis

W281BE BLFT20140813AAA

W282BP

Channel = 281D
 Max ERP = 0.25 kw
 RCAMSL = 307 m
 N. Lat. 34 52 31.50
 W. Lng. 80 55 47.30
 Protected
 60 dBu

Channel = 282D
 Max ERP = 0.25 kw
 RCAMSL = 306 m
 N. Lat. 35 05 46.80
 W. Lng. 80 40 47.40
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kw)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kw)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
343.0	000.2500	0121.0	014.1	247.7	000.2500	0094.3	029.1	46.40	
344.0	000.2500	0121.9	014.2	247.8	000.2500	0094.4	028.8	46.56	
345.0	000.2500	0123.8	014.3	247.9	000.2500	0094.7	028.6	46.75	
346.0	000.2500	0125.5	014.4	248.1	000.2500	0095.0	028.3	46.93	
347.0	000.2500	0126.4	014.4	248.1	000.2500	0095.1	028.0	47.09	
348.0	000.2500	0126.3	014.4	248.0	000.2500	0094.9	027.8	47.23	
349.0	000.2500	0125.8	014.4	247.8	000.2500	0094.5	027.5	47.35	
350.0	000.2500	0125.2	014.4	247.7	000.2500	0094.2	027.3	47.46	
351.0	000.2500	0124.8	014.3	247.5	000.2500	0093.9	027.1	47.59	
352.0	000.2500	0123.1	014.2	247.2	000.2500	0093.3	026.9	47.67	
353.0	000.2500	0121.3	014.1	246.8	000.2500	0092.9	026.6	47.76	
354.0	000.2500	0120.0	014.1	246.5	000.2500	0092.5	026.4	47.86	
355.0	000.2500	0119.5	014.0	246.3	000.2500	0092.2	026.2	47.99	
356.0	000.2500	0119.1	014.0	246.1	000.2500	0092.0	026.0	48.12	
357.0	000.2500	0119.0	014.0	245.8	000.2500	0091.9	025.8	48.26	
358.0	000.2500	0118.8	014.0	245.6	000.2500	0091.8	025.5	48.40	
359.0	000.2500	0118.9	014.0	245.4	000.2500	0091.7	025.3	48.55	
000.0	000.2500	0118.9	014.0	245.2	000.2500	0091.7	025.1	48.71	
001.0	000.2500	0118.9	014.0	244.9	000.2500	0091.7	024.9	48.86	
002.0	000.2500	0118.9	014.0	244.7	000.2500	0091.7	024.6	49.02	
003.0	000.2500	0118.9	014.0	244.4	000.2500	0091.8	024.4	49.18	
004.0	000.2500	0119.2	014.0	244.2	000.2500	0091.8	024.2	49.34	
005.0	000.2500	0120.3	014.1	244.0	000.2500	0091.9	024.0	49.53	
006.0	000.2500	0121.3	014.1	243.8	000.2500	0091.9	023.7	49.70	
007.0	000.2500	0122.5	014.2	243.6	000.2500	0092.0	023.5	49.89	
008.0	000.2500	0124.2	014.3	243.5	000.2500	0092.0	023.2	50.08	
009.0	000.2500	0126.1	014.4	243.3	000.2500	0092.0	023.0	50.29	
010.0	000.2500	0127.3	014.5	243.1	000.2500	0092.1	022.7	50.48	
011.0	000.2500	0127.6	014.5	242.7	000.2500	0092.2	022.5	50.65	
012.0	000.2500	0127.8	014.5	242.4	000.2500	0092.3	022.3	50.81	
013.0	000.2500	0127.9	014.5	241.9	000.2500	0092.3	022.1	50.97	
014.0	000.2500	0128.1	014.5	241.5	000.2500	0092.4	021.9	51.13	
015.0	000.2500	0128.6	014.6	241.1	000.2500	0092.6	021.7	51.30	
016.0	000.2500	0129.1	014.6	240.7	000.2500	0092.7	021.5	51.47	
017.0	000.2500	0129.7	014.6	240.3	000.2500	0093.0	021.3	51.66	
018.0	000.2500	0129.8	014.6	239.8	000.2500	0093.3	021.1	51.83	
019.0	000.2500	0129.6	014.6	239.2	000.2500	0093.7	021.0	51.99	
020.0	000.2500	0129.5	014.6	238.7	000.2500	0094.1	020.8	52.15	
021.0	000.2500	0129.6	014.6	238.1	000.2500	0094.4	020.6	52.31	
022.0	000.2500	0129.6	014.6	237.6	000.2500	0094.7	020.5	52.46	
023.0	000.2500	0129.1	014.6	236.9	000.2500	0095.0	020.4	52.58	
024.0	000.2500	0128.0	014.5	236.2	000.2500	0095.5	020.3	52.69	
025.0	000.2500	0126.1	014.4	235.4	000.2500	0096.1	020.2	52.79	
026.0	000.2500	0124.5	014.3	234.7	000.2500	0096.9	020.2	52.89	
027.0	000.2500	0124.0	014.3	234.0	000.2500	0097.5	020.1	53.03	
028.0	000.2500	0124.5	014.3	233.4	000.2500	0097.9	020.0	53.17	
029.0	000.2500	0125.4	014.4	232.8	000.2500	0098.2	019.8	53.32	
030.0	000.2500	0125.8	014.4	232.2	000.2500	0098.4	019.7	53.44	
031.0	000.2500	0125.7	014.4	231.5	000.2500	0098.5	019.6	53.52	
032.0	000.2500	0125.2	014.4	230.8	000.2500	0098.5	019.6	53.56	
033.0	000.2500	0124.0	014.3	230.0	000.2500	0098.3	019.6	53.55	
034.0	000.2500	0122.4	014.2	229.2	000.2500	0097.7	019.6	53.48	
035.0	000.2500	0120.8	014.1	228.5	000.2500	0096.6	019.6	53.36	
036.0	000.2500	0119.9	014.1	227.8	000.2500	0095.3	019.6	53.24	
037.0	000.2500	0120.0	014.1	227.0	000.2500	0094.0	019.5	53.14	
038.0	000.2500	0120.6	014.1	226.3	000.2500	0092.6	019.5	53.07	
039.0	000.2500	0121.0	014.1	225.6	000.2500	0091.4	019.4	52.99	
040.0	000.2500	0121.1	014.1	224.9	000.2500	0090.4	019.4	52.91	

041.0	000.2500	0121.2	014.1	224.2	000.2500	0089.6	019.4	52.85
042.0	000.2500	0121.7	014.2	223.5	000.2500	0089.1	019.3	52.83
043.0	000.2500	0122.3	014.2	222.7	000.2500	0088.7	019.3	52.82
044.0	000.2500	0123.0	014.2	222.0	000.2500	0088.4	019.3	52.81
045.0	000.2500	0123.8	014.3	221.2	000.2500	0088.0	019.2	52.80
046.0	000.2500	0124.4	014.3	220.5	000.2500	0087.6	019.2	52.78
047.0	000.2500	0125.2	014.4	219.7	000.2500	0087.5	019.2	52.77
048.0	000.2500	0126.1	014.4	219.0	000.2500	0087.7	019.2	52.80
049.0	000.2500	0127.2	014.5	218.2	000.2500	0088.3	019.2	52.88
050.0	000.2500	0128.5	014.6	217.4	000.2500	0089.0	019.1	52.98
051.0	000.2500	0130.0	014.6	216.6	000.2500	0089.7	019.1	53.07
052.0	000.2500	0131.3	014.7	215.8	000.2500	0090.3	019.1	53.13
053.0	000.2500	0132.3	014.8	215.0	000.2500	0090.9	019.1	53.18
054.0	000.2500	0133.1	014.8	214.2	000.2500	0091.6	019.2	53.22
055.0	000.2500	0133.7	014.9	213.5	000.2500	0092.5	019.2	53.26
056.0	000.2500	0134.2	014.9	212.7	000.2500	0093.5	019.3	53.30
057.0	000.2500	0134.8	014.9	212.0	000.2500	0094.7	019.4	53.35
058.0	000.2500	0135.4	015.0	211.2	000.2500	0096.0	019.5	53.41
059.0	000.2500	0136.1	015.0	210.5	000.2500	0097.3	019.5	53.46
060.0	000.2500	0136.7	015.0	209.8	000.2500	0098.5	019.6	53.50
061.0	000.2500	0137.2	015.1	209.1	000.2500	0099.5	019.7	53.51
062.0	000.2500	0137.7	015.1	208.4	000.2500	0100.5	019.9	53.51
063.0	000.2500	0138.4	015.2	207.7	000.2500	0101.7	020.0	53.53
064.0	000.2500	0139.1	015.2	207.0	000.2500	0102.9	020.1	53.54
065.0	000.2500	0139.5	015.2	206.4	000.2500	0104.1	020.2	53.53
066.0	000.2500	0139.4	015.2	205.8	000.2500	0104.9	020.4	53.46
067.0	000.2500	0139.0	015.2	205.3	000.2500	0105.4	020.6	53.36
068.0	000.2500	0138.6	015.2	204.8	000.2500	0105.9	020.8	53.24
069.0	000.2500	0138.4	015.2	204.3	000.2500	0106.2	021.0	53.12
070.0	000.2500	0138.7	015.2	203.8	000.2500	0106.5	021.2	53.00
071.0	000.2500	0139.0	015.2	203.2	000.2500	0106.6	021.4	52.87
072.0	000.2500	0139.2	015.2	202.7	000.2500	0106.7	021.5	52.74
073.0	000.2500	0139.0	015.2	202.3	000.2500	0106.8	021.8	52.58
074.0	000.2500	0137.8	015.1	202.0	000.2500	0106.8	022.0	52.38
075.0	000.2500	0136.7	015.0	201.8	000.2500	0106.7	022.3	52.19
076.0	000.2500	0135.4	015.0	201.5	000.2500	0106.7	022.5	51.99
077.0	000.2500	0134.0	014.9	201.3	000.2500	0106.7	022.8	51.79
078.0	000.2500	0132.0	014.8	201.2	000.2500	0106.7	023.1	51.58
079.0	000.2500	0129.6	014.6	201.2	000.2500	0106.7	023.4	51.36
080.0	000.2500	0127.1	014.5	201.2	000.2500	0106.7	023.7	51.14
081.0	000.2500	0124.8	014.3	201.1	000.2500	0106.7	023.9	50.94
082.0	000.2500	0122.8	014.2	201.1	000.2500	0106.7	024.2	50.74
083.0	000.2500	0121.1	014.1	201.0	000.2500	0106.7	024.5	50.55
084.0	000.2500	0119.7	014.1	200.9	000.2500	0106.7	024.7	50.37
085.0	000.2500	0119.0	014.0	200.7	000.2500	0106.7	025.0	50.21
086.0	000.2500	0118.9	014.0	200.5	000.2500	0106.8	025.2	50.06
087.0	000.2500	0119.0	014.0	200.3	000.2500	0106.8	025.4	49.91
088.0	000.2500	0119.6	014.0	200.0	000.2500	0107.0	025.6	49.77
089.0	000.2500	0122.3	014.2	199.5	000.2500	0107.3	025.8	49.68
090.0	000.2500	0125.3	014.4	198.9	000.2500	0107.8	026.0	49.60
091.0	000.2500	0128.4	014.5	198.4	000.2500	0108.2	026.2	49.51
092.0	000.2500	0131.3	014.7	197.9	000.2500	0108.5	026.4	49.40
093.0	000.2500	0133.1	014.8	197.5	000.2500	0108.7	026.6	49.27
094.0	000.2500	0133.6	014.9	197.3	000.2500	0108.8	026.8	49.12
095.0	000.2500	0133.9	014.9	197.2	000.2500	0108.8	027.1	48.96
096.0	000.2500	0134.3	014.9	197.0	000.2500	0108.9	027.3	48.80
097.0	000.2500	0134.7	014.9	196.9	000.2500	0108.9	027.6	48.64
098.0	000.2500	0134.8	014.9	196.7	000.2500	0108.9	027.8	48.48
099.0	000.2500	0134.9	014.9	196.7	000.2500	0109.0	028.1	48.33
100.0	000.2500	0135.5	015.0	196.5	000.2500	0109.0	028.3	48.17
101.0	000.2500	0136.2	015.0	196.4	000.2500	0109.0	028.6	48.02
102.0	000.2500	0136.8	015.1	196.3	000.2500	0109.1	028.9	47.86

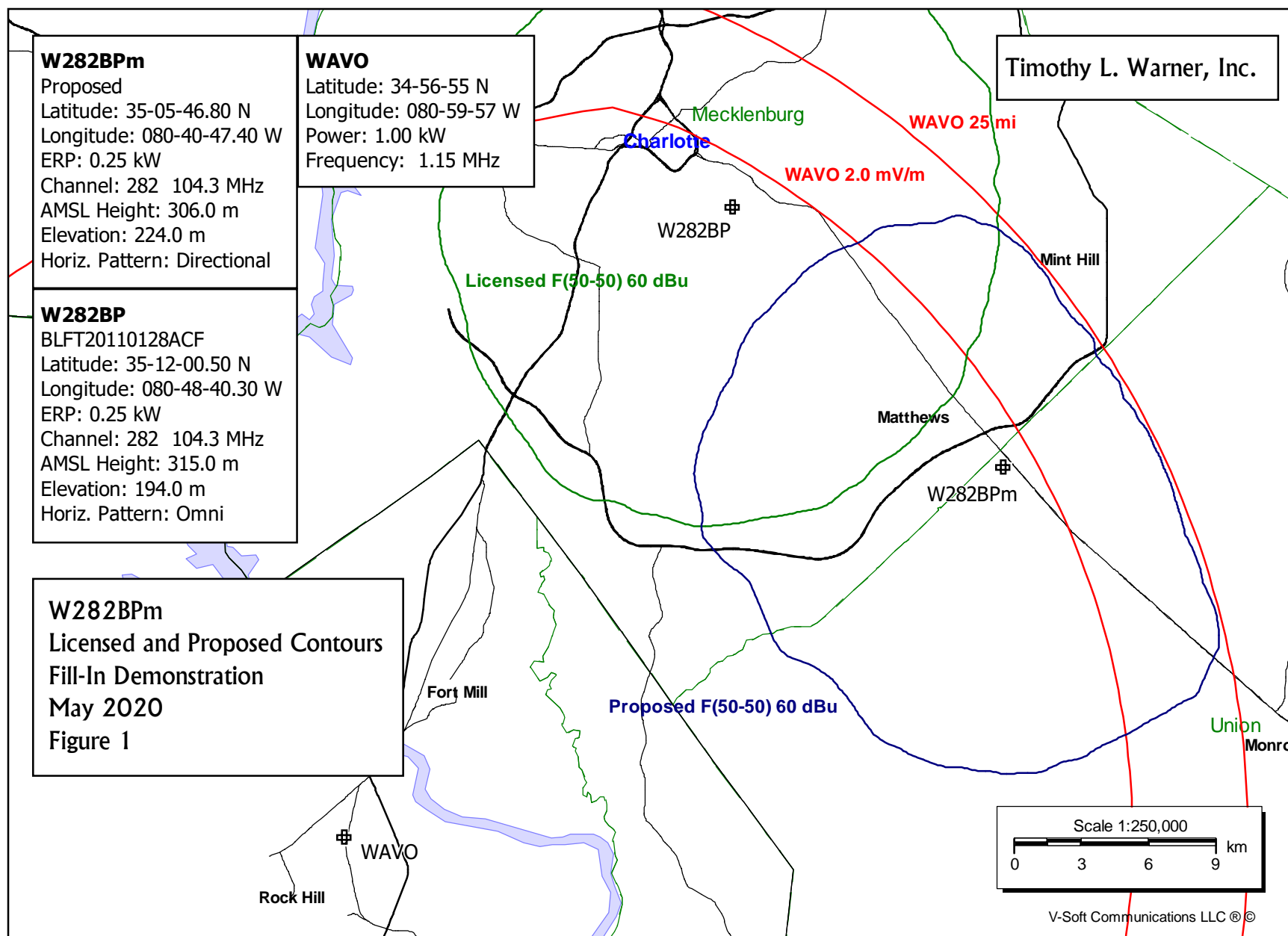


Figure 2: Directional Pattern
Pre-Rotation Antenna Pattern....

Azimuth (deg)	Relative Field
0.0	0.9
10.0	0.68
20.0	0.49
30.0	0.38
40.0	0.28
50.0	0.22
60.0	0.195
70.0	0.195
80.0	0.22
90.0	0.26
100.0	0.315
110.0	0.39
120.0	0.55
130.0	0.85
140.0	1.0
150.0	1.0
160.0	1.0
170.0	1.0
180.0	1.0
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

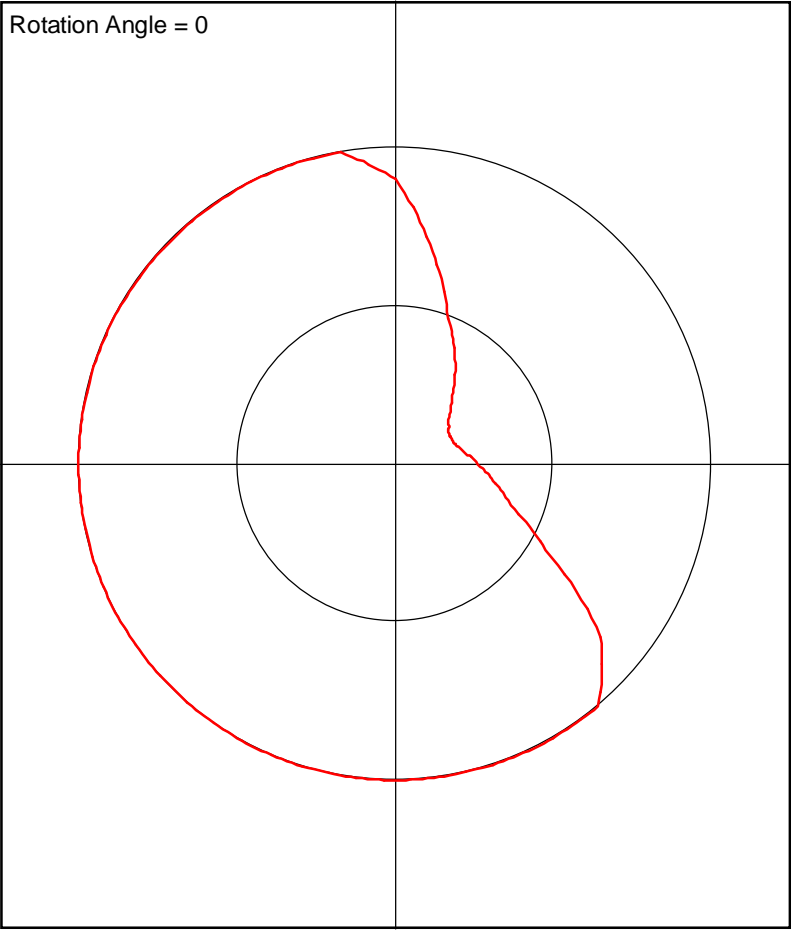
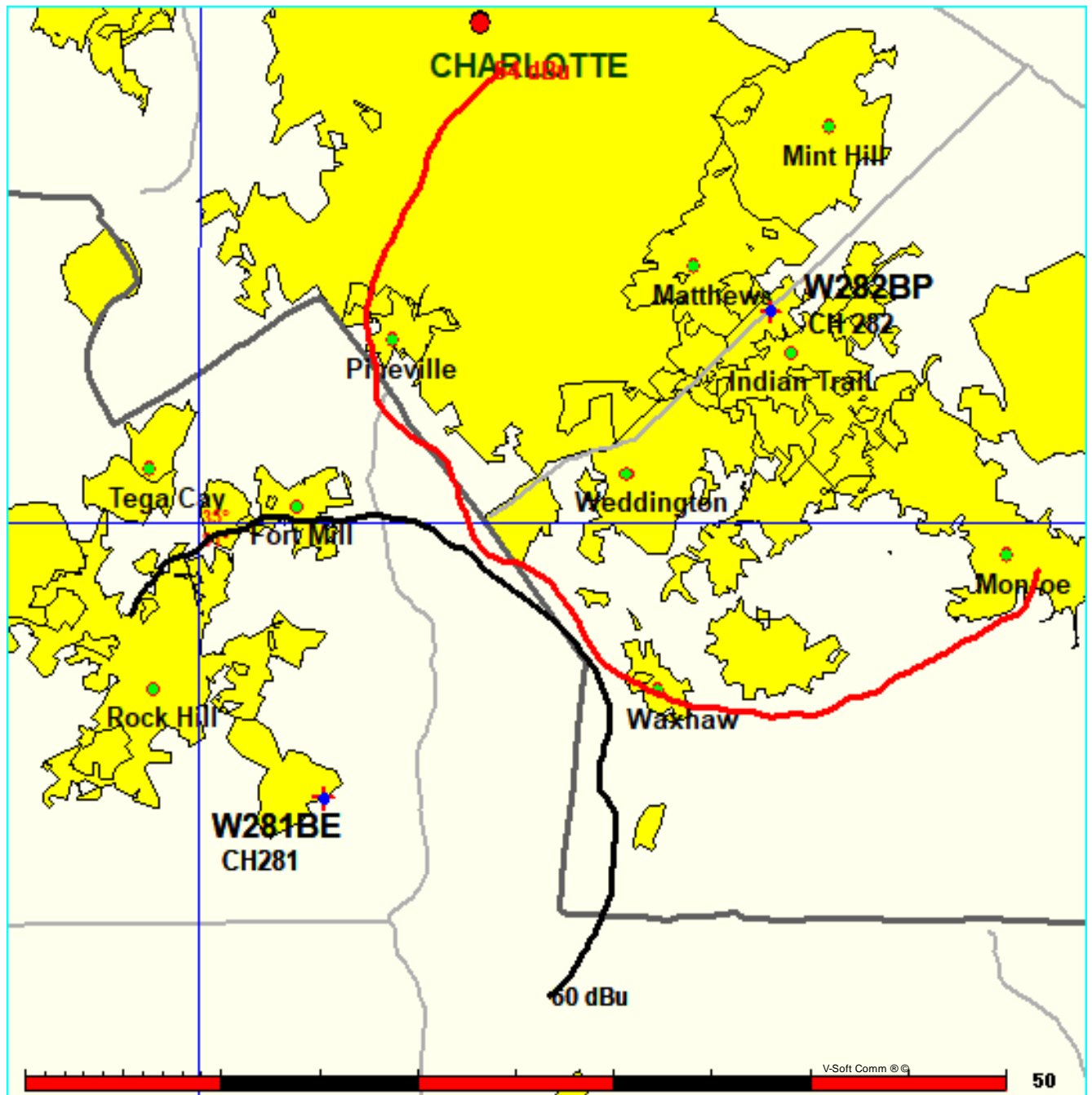


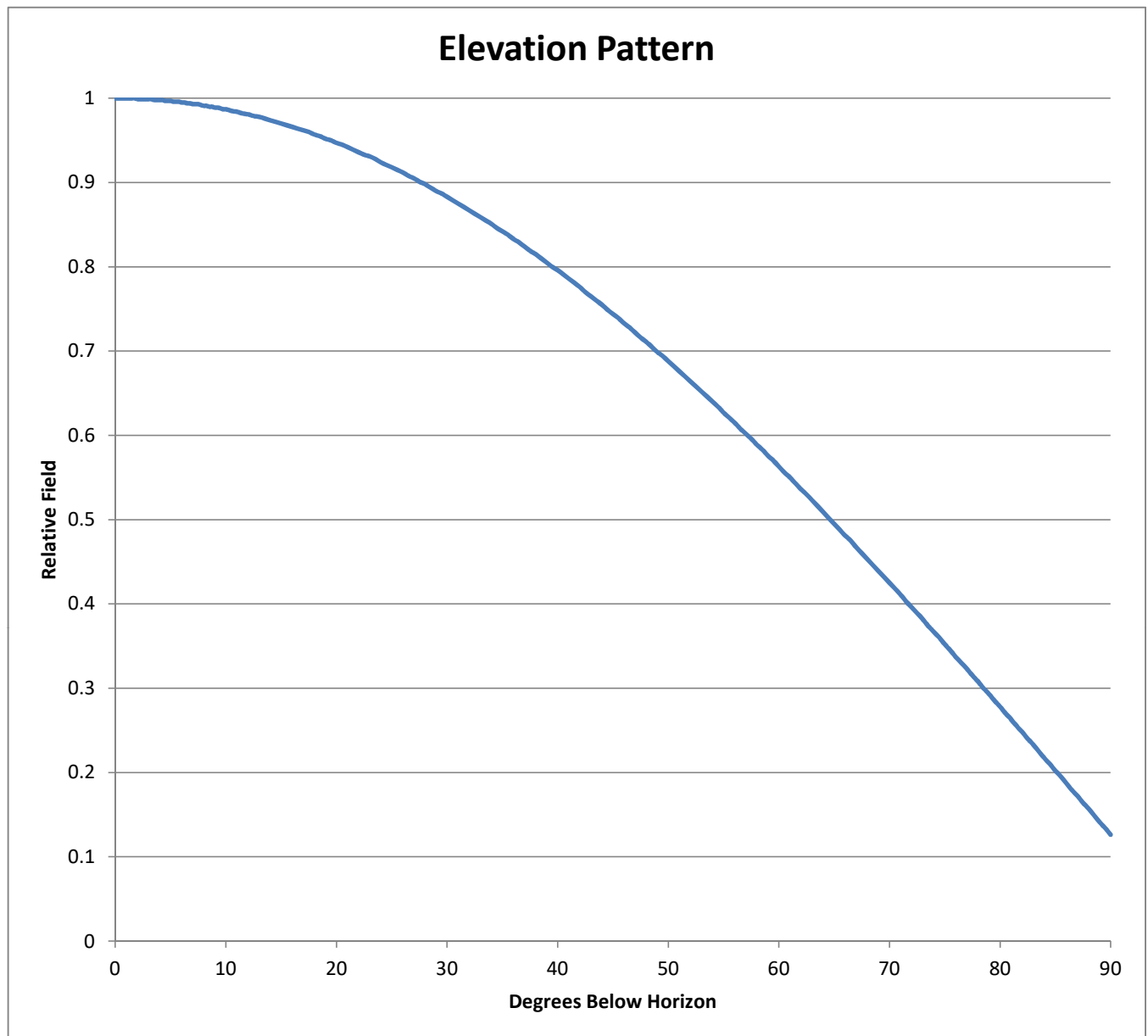
Figure 3: Allocation Study: W28BE
WHVN, Inc.

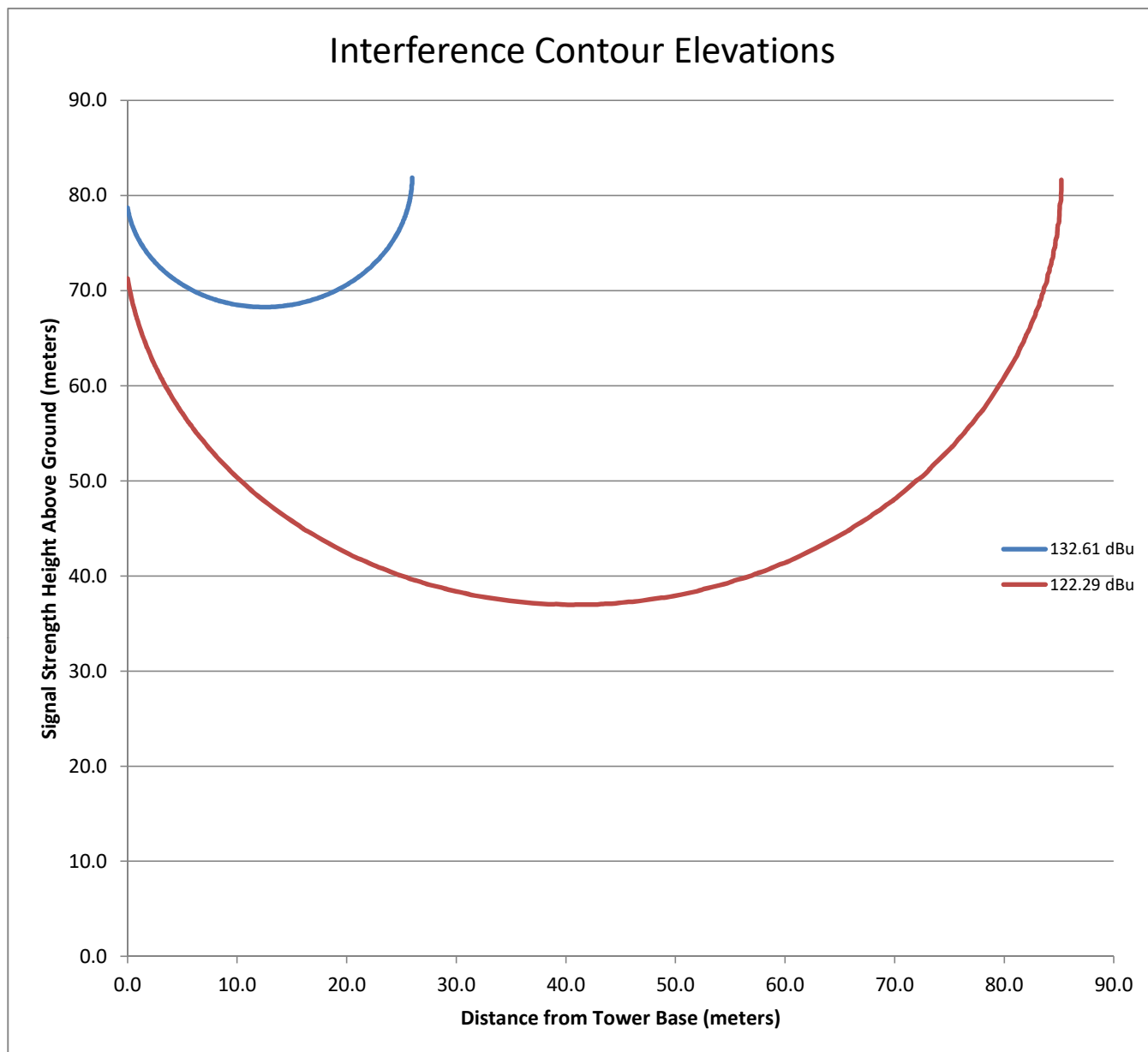
FMCommander Single Allocation Study - 05-07-2020 - GLOBE 30 Sec
W282BP's Overlaps (In= -1.06 km, Out= 0.54 km)

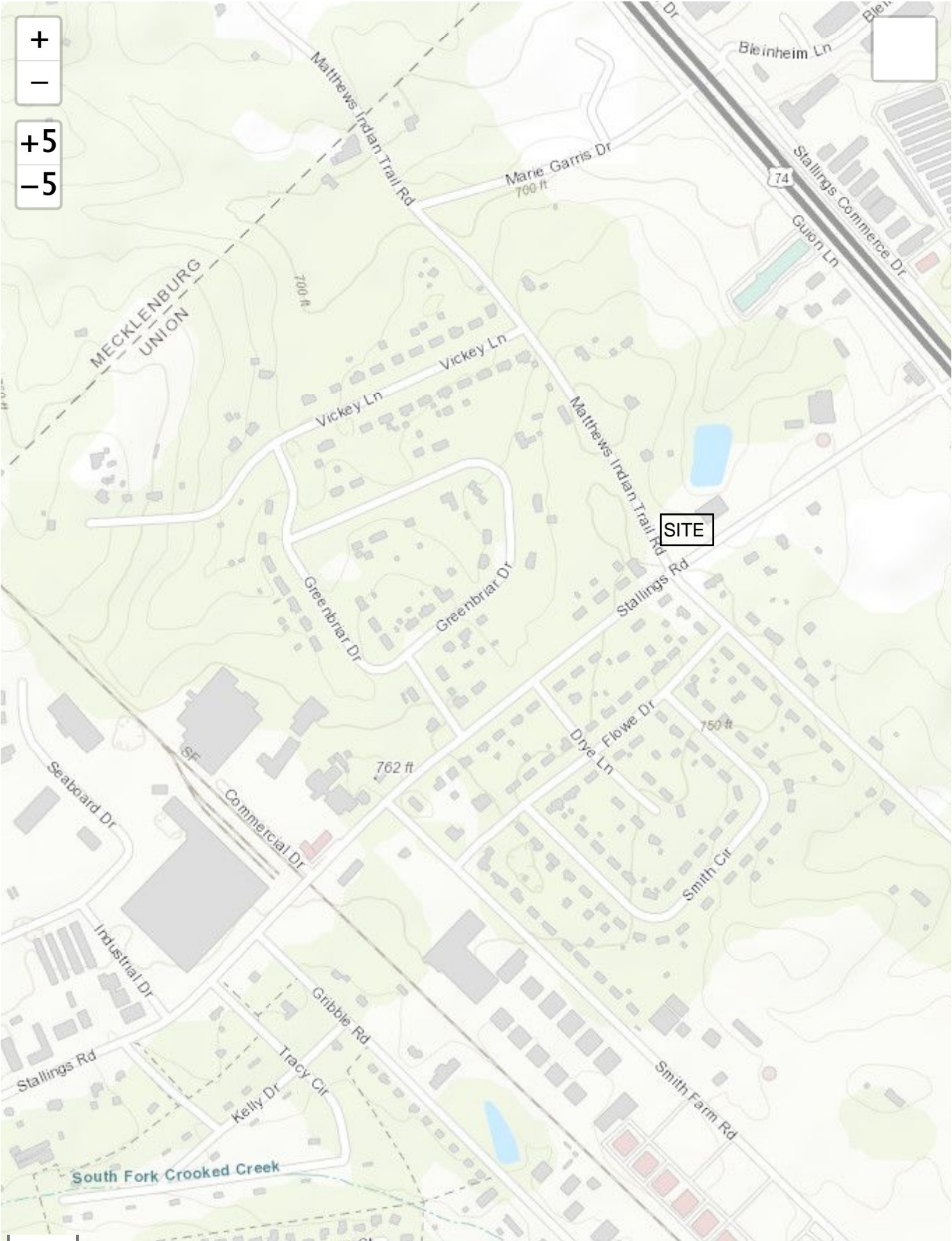
W282BP CH 282 D DA
Lat= 35 05 46.80, Lng= 80 40 47.40
0.25 kW 99.5 m HAAT, 306 m COR
Prot.= 60 dBu, Intef.= 54 dBu

W281BE CH 281 D BLFT20140813AAA
Lat= 34 52 31.50, Lng= 80 55 47.30
0.25 kW 0 m HAAT, 307 m COR
Prot.= 60 dBu, Intef.= 54 dBu












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W282BP

Aerial Photograph
With Interference Contours
May 2020
Figure 7

Legend

-  W282BPm (282)
-  W282BPm (282) - 50 10 Field Strength: 132.61 dBu FCC [GLOBE 30]
-  W282BPm (282) - 50-10 Field Strength: 122.29 dBu FCC [GLOBE 30]

