

EXHIBIT 13

Interference Contour Calculations – PSI FMT (-3) 2-bay at 140 degrees on 105.5 Kemp Rd. Site, Beavercreek. 39-45-46, 84-05-11

Take ERP at a given HAAT, looking at 105.5 MHz to ensure that the translator's interference contour will not overlap the protected contour of other stations. If the distance of the protected contour plus the distance of the worst-case interference contour is less than the distance between stations, there is no possible overlap using contour protection techniques..

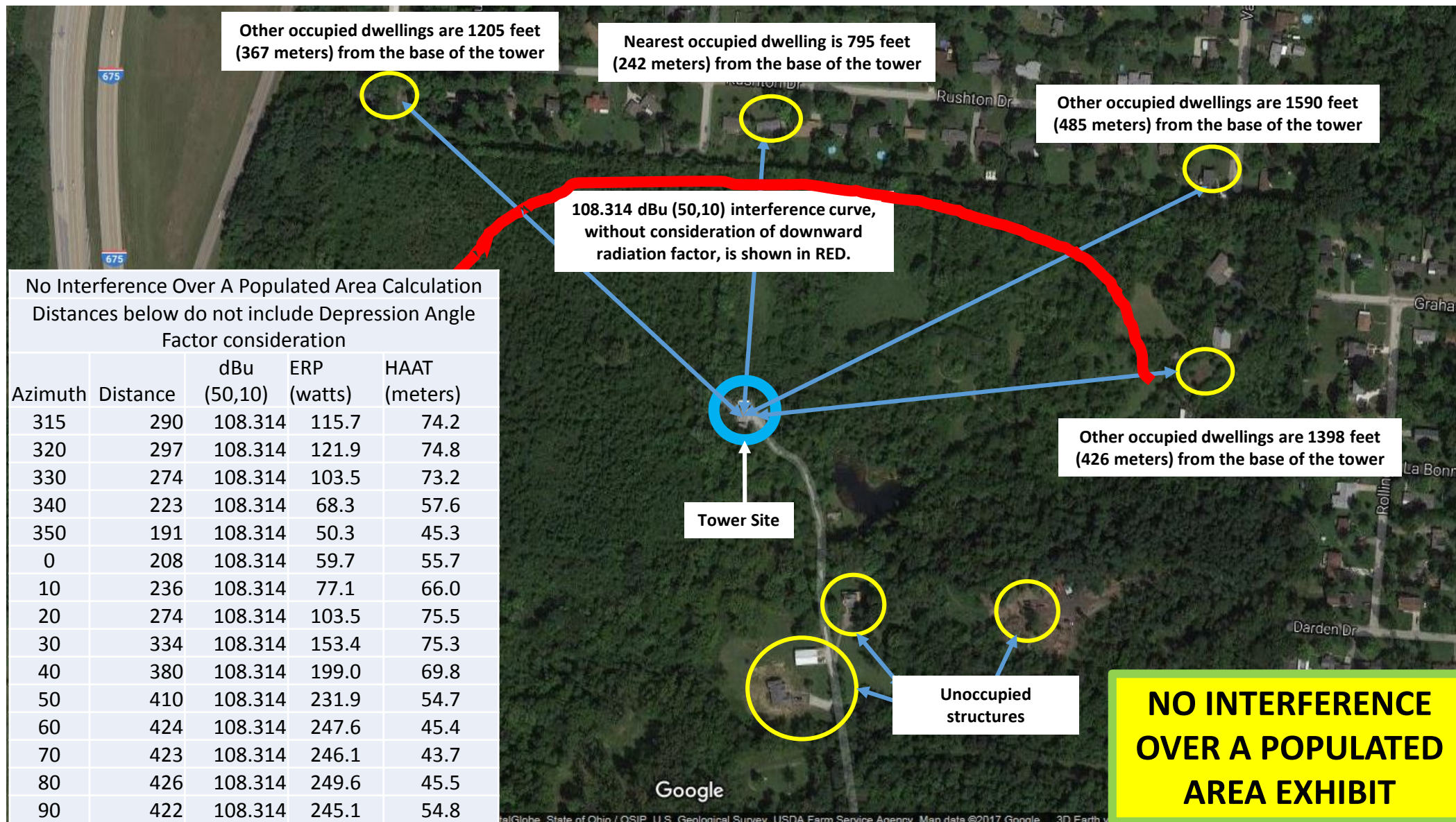
Station and Call Sign	Facility ID #	Station		Azimuth Degrees	Dist. km	Other Station's (50,50) Protected Contour toward 105.5				105.5 Interference (50,10) Contour at 42.3m AGL				Clearance km
		Class	Freq.			W	HAAT m	dBu	km	W	HAAT	dBu	km	
WEGE, Lima, OH	1061	A	104.9	0.13	106.63	3000	56	60	18.34	60	56	100	0.84	87.45
WCVO, Gahanna, OH	11138	A	104.9	71.63	110.15	6000	127	60	31.47	247	44	100	1.10	77.58
WUBE, Cincinnati, OH	10140	B	105.1	206.67	79.21	14500	308	54	67.43	238	42	94	1.08	10.70
WUBE, Cincinnati, OH	10140	B	105.1	206.67	79.21	14500	308	54	67.43	238	42	94	1.08	10.70
WCYC-LP, London, OH	131831	L1	105.1	75.66	56.42	30	22	60	4.13	248	45	100	1.11	51.18
WCHO, Washington Ct. Hs., OH	57354	A	105.5	126.12	68.12	6000	86	60	26.35	219	67	40	34.82	6.95
W288DJ, Eaton	153190	D	105.5	268.00	42.67	250	81	60	11.64	78	80	40	28.75	2.28
WMVR, Sidney, OH	15998	A	105.5	350.40	60.64	6000	53	60	21.20	50	46	40	19.45	19.99
WCXX-LP, Cincinnati, OH	192000	D	105.5	202.54	70.08	6	66	60	4.15	238	40	40	26.90	39.03
WXZX, Hilliard, OH	64716	A	105.7	75.70	95.51	2400	142	60	26.81	248	45	54	12.26	56.44
WNKN, Middletown, OH	54833	B	105.9	219.65	35.63	34000	179	54	64.69	234	47	94	1.18	SEE NOTE

Translator's 60 dBu (50.50) contour at 221 degrees extends 8.607 km. Translator site is 28.171 km from WULM-AM site.

Translator's 60dBu (50,50) coverage is contained in 40.0 km circle from WULM-AM transmitter.

Note: See next page for a “No Interference Over A Populated Area Interference Analysis”.

WNKN (50,50) at Kemp Road Site is 68.314 dBu. The 108.314 dBu (50,10) at 80m HAAT is 0.426 km with no downward radiation factor. A directional antenna is being used to reduce the interfering contour in the direction of nearby residences – thereby not causing interference over a populated area.



Search Parameters:

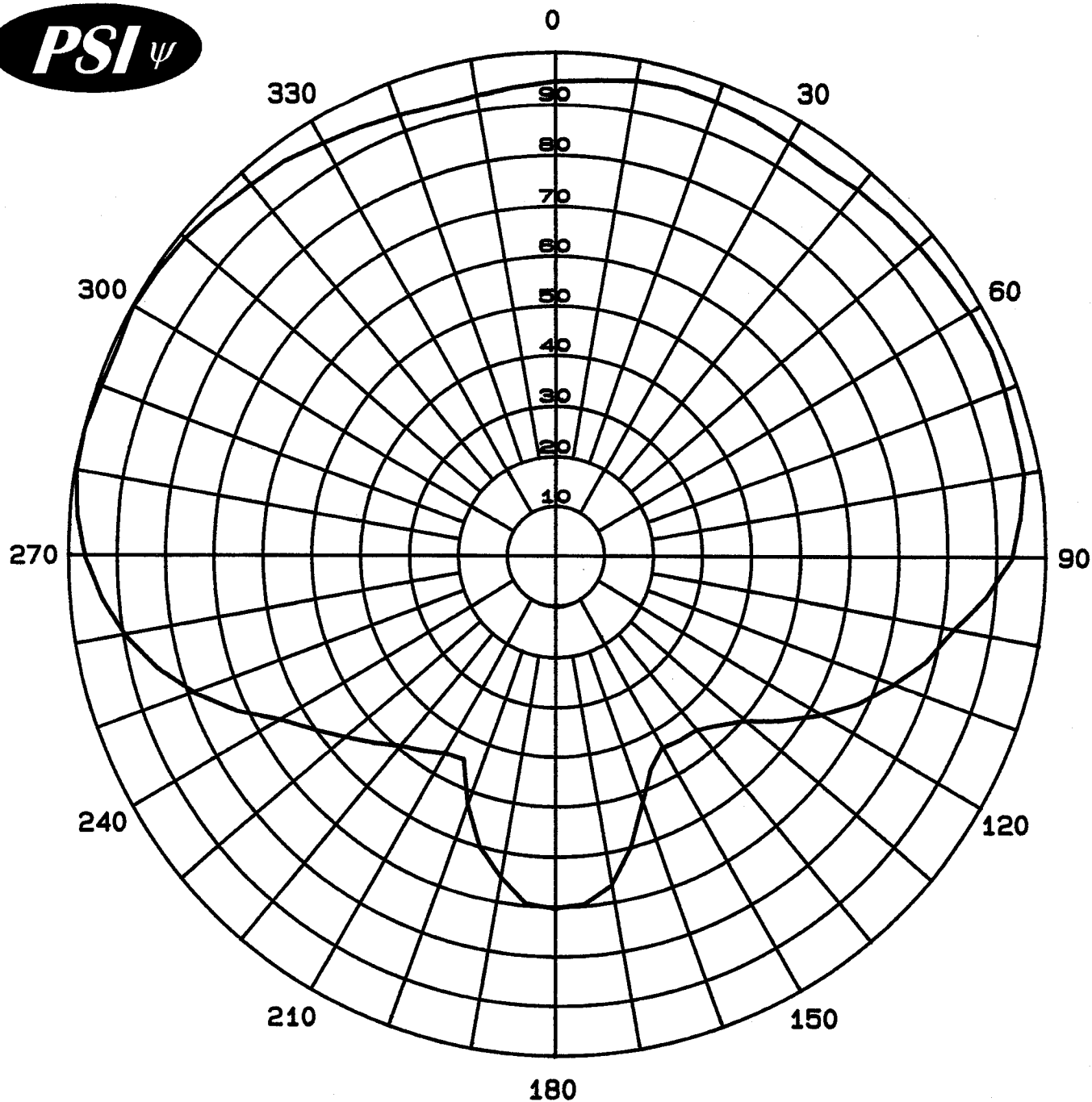
Search radius:	120.00 km
Center lat / lon:	N 39 45 46.00 W 84 5 11.00
Lower Channel	285
Upper Channel	291

FM Query Results

Thu Mar 23 12:58:27 2017 Eastern time

(Landscape printing preferred)

Call	Channel	Class	Service	Frequency	Status	City	State	FacilityID	ERP	DA?	HAAT	RCAMSL	RCAGL	Latitude	Longitude	Dist(km)	Azimuth
WCVO	285	A	FM	104.9	MHz LIC	GAHANNA	OH	11138	6. kW		95.5 m	381.2 m	86.5 m	N 40 4 4.00	W 82 51 38.00	110.15 km	71.63°
WEQE	285	A	FM	104.9	MHz LIC	LIMA	OH	1061	3. kW		67. m	340. m	69. m	N 40 43 23.00	W 84 5 1.00	106.63 km	0.13°
WUBE-FM	286	B	FM	105.1	MHz LIC	CINCINNATI	OH	10140	14.5 kW		279. m	490. m	234. m	N 39 7 30.00	W 84 29 56.00	79.21 km	206.67°
WUBE-FM	286	B	FM	105.1	MHz CP	CINCINNATI	OH	10140	14.5 kW		280. m	491. m	234. m	N 39 7 30.00	W 84 29 56.00	79.21 km	206.67°
WCYC-LP	286	L1	FL	105.1	MHz LIC	LONDON	OH	131831	0.03 kW		53.5 m	369. m	25. m	N 39 53 11.00	W 83 26 50.00	56.42 km	75.66°
WCHO-FM	288	A	FM	105.5	MHz LIC	WASHINGTON COURT HOU	OH	57354	6. kW		100. m	397. m	98. m	N 39 24 1.00	W 83 26 48.00	68.12 km	126.12°
WMVR-FM	288	A	FM	105.5	MHz LIC	SIDNEY	OH	15998	6. kW		47. m	356. m	51. m	N 40 18 4.00	W 84 12 21.00	60.64 km	350.40°
WCXX-LP	288	L1	FL	105.5	MHz LIC	CINCINNATI	OH	192000	0.006 kW		118. m	326. m	85. m	N 39 10 47.00	W 84 23 54.00	70.08 km	202.54°
W288DJ	288	D	FX	105.5	MHz LIC	EATON	OH	153190	0.25 kW		0. m	370. m	67. m	N 39 44 54.00	W 84 35 2.00	42.67 km	268.00°
WXZX	289	A	FM	105.7	MHz LIC	HILLIARD	OH	64716	2.4 kW		159. m	402. m	173. m	N 39 58 10.00	W 83 0 10.00	95.51 km	75.70°
WNKN	290	B	FM	105.9	MHz LIC	MIDDLETOWN	OH	54833	34. kW		181. m	419. m	156. m	N 39 30 57.00	W 84 21 5.00	35.63 km	219.65°
WNKN	290	B	FM	105.9	MHz CP	MIDDLETOWN	OH	54833	34. kW		181. m	419. m	156. m	N 39 30 57.00	W 84 21 5.00	35.63 km	219.65°



Azimuth Plane Pattern
Composite Relative Field
Antenna Model: PSIFMT-2A-3DB
Type: Directional Translator
Polarization: Circular
Number of Bays: Two
Gain: 1.55 (1.90 dB)
Date: 11-1-2011

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931



Composite Azimuth Pattern Tabulation

Antenna Model: PSIFMT-2A-3DB

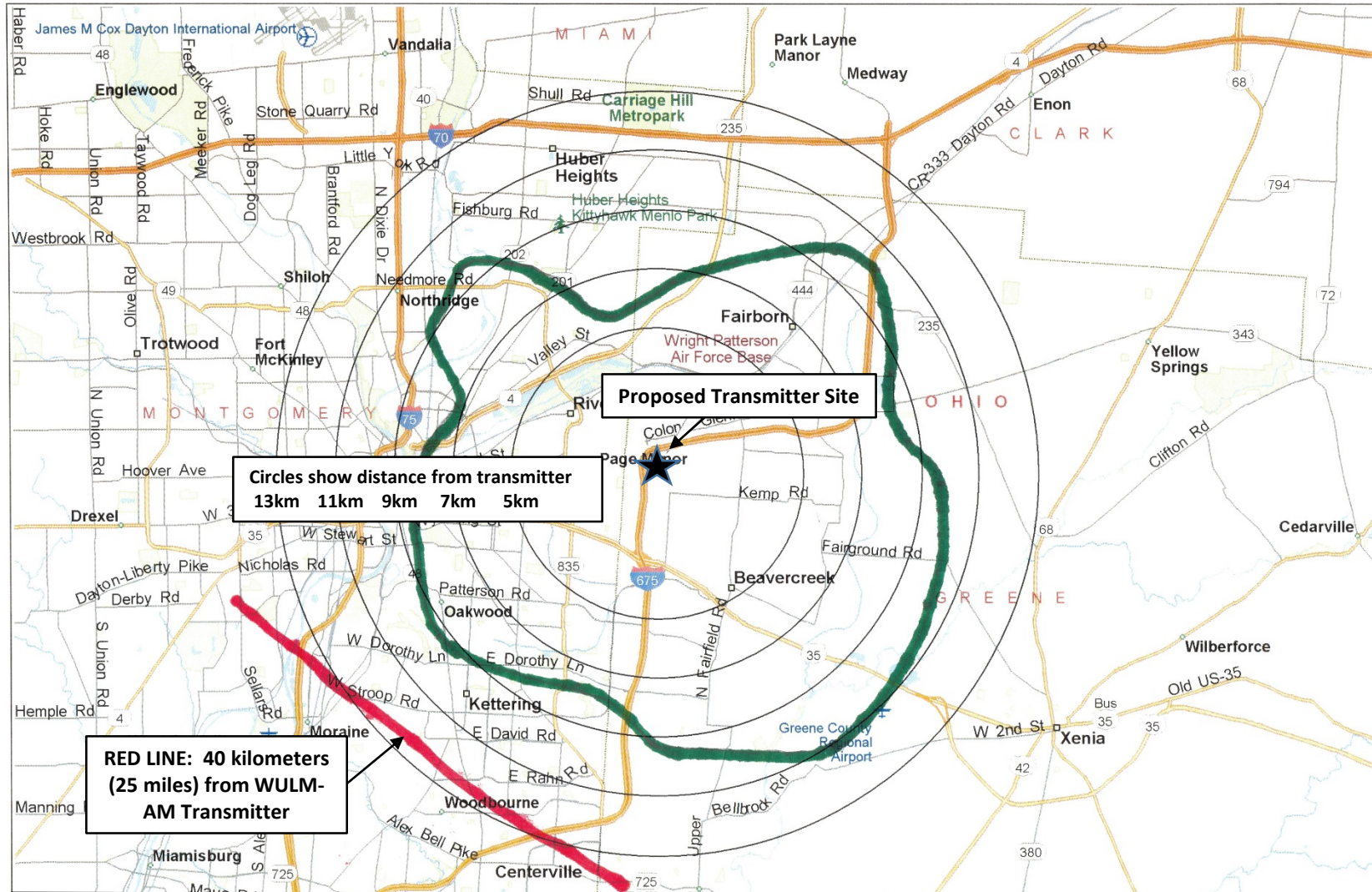
Gain: 1.55 (1.90 dB)

Angle	Relative Field	Power Gain	Gain (dBd)
0	0.949	1.40	1.45
10	0.965	1.44	1.59
20	0.968	1.45	1.62
30	0.957	1.42	1.52
40	0.962	1.43	1.57
50	0.967	1.45	1.61
60	0.977	1.48	1.70
70	0.975	1.47	1.68
80	0.969	1.46	1.63
90	0.932	1.35	1.29
100	0.822	1.05	0.20
110	0.730	0.83	-0.83
120	0.620	0.60	-2.25
130	0.501	0.39	-4.10
140	0.446	0.31	-5.11
150	0.436	0.29	-5.31
160	0.521	0.42	-3.76
170	0.662	0.68	-1.68
180	0.699	0.76	-1.21
190	0.644	0.64	-1.92
200	0.523	0.42	-3.73
210	0.449	0.31	-5.05
220	0.489	0.37	-4.31
230	0.556	0.48	-3.20
240	0.644	0.64	-1.92
250	0.784	0.95	-0.21
260	0.893	1.24	0.92
270	0.964	1.44	1.58
280	0.996	1.54	1.87
290	0.993	1.53	1.84
300	1.000	1.55	1.90
310	0.991	1.52	1.82
320	0.973	1.47	1.67
330	0.954	1.41	1.49
340	0.938	1.36	1.35
350	0.935	1.36	1.32

PSI FMT-2 (-3)

-----PSI FMT (-3 dB) 5/8 Wavelength Spacing, 140 degree offset. Two-Bay: 1.55 efficiency-----							
Reference Degrees	Relative Field	Power Gain	ERP with 161W at antenna	Azimuth with 140 degree offset	Ground HAAT (m)	Rad.Ctr. 42.3m AGL	60dBu Cvg. (km)
0	0.949	0.901	224.7	140	25.4	67.7	10.457
10	0.965	0.931	232.4	150	32.9	75.2	11.055
20	0.968	0.937	233.8	160	25.9	68.2	10.593
30	0.957	0.916	228.6	170	15.0	57.3	9.738
40	0.962	0.925	230.9	180	8.0	50.3	9.109
50	0.967	0.935	233.4	190	0.3	42.6	8.304
60	0.977	0.955	238.2	200	-3.9	38.4	7.876
70	0.975	0.951	237.2	210	1.1	43.4	8.431
80	0.969	0.939	234.3	220	4.8	47.1	8.810
90	0.932	0.869	216.8	230	16.0	58.3	9.689
100	0.822	0.676	168.6	240	21.4	63.7	9.467
110	0.730	0.533	133.0	250	28.1	70.4	9.340
120	0.620	0.384	95.9	260	33.7	76.0	8.911
130	0.501	0.251	62.6	270	38.7	81.0	8.222
140	0.446	0.199	49.6	280	34.0	76.3	7.486
150	0.436	0.190	47.4	290	29.6	71.9	7.191
160	0.521	0.271	67.7	300	46.0	88.3	8.797
170	0.662	0.438	109.4	310	33.2	75.5	9.192
175	0.681	0.464	115.7	315	31.9	74.2	9.246
180	0.699	0.489	121.9	320	32.5	74.8	9.407
190	0.644	0.415	103.5	330	30.9	73.2	8.919
200	0.523	0.274	68.3	340	15.3	57.6	7.081
210	0.449	0.202	50.3	350	3.0	45.3	5.818
220	0.489	0.239	59.7	0	13.4	55.7	6.737
230	0.556	0.309	77.1	10	23.7	66.0	7.804
240	0.644	0.415	103.5	20	33.2	75.5	9.060
250	0.784	0.615	153.4	30	33.0	75.3	9.998
260	0.893	0.797	199.0	40	27.5	69.8	10.293
270	0.964	0.929	231.9	50	12.4	54.7	9.544
280	0.996	0.992	247.6	60	3.1	45.4	8.754
290	0.993	0.986	246.1	70	1.4	43.7	8.550
300	1.000	1.000	249.6	80	3.2	45.5	8.784
310	0.991	0.982	245.1	90	12.5	54.8	9.689
320	0.973	0.947	236.3	100	13.7	56.0	9.707
330	0.954	0.910	227.1	110	20.2	62.5	10.118
340	0.938	0.880	219.6	120	23.7	66.0	10.281
350	0.935	0.874	218.2	130	25.6	67.9	10.396

1055 Kemp



HAAT ON GROUND

ATC Site #81464 at ground

Latitude **39° 45' 46"** North

Longitude **84° 5' 11"** West (NAD 83)

These coordinates convert to NAD 27 coordinates of
39° 45' 45.79", North, 84° 05' 11.23" West (NAD 27).

Height of antenna radiation center above mean sea level: **287** meters AMSL

Number of Evenly Spaced Radials = **360** 0° is referenced to True North

Results

Calculated HAAT = **20 meters**

Antenna Height Above Average Terrain calculated
using FCC 30 second terrain database (continental USA only)

Individual "Radial HAAT" Values, in meters

0°	13.4 m	120°	23.7 m	240°	21.4 m
1°	15.2 m	121°	24.2 m	241°	22.1 m
2°	17.4 m	122°	24.7 m	242°	23.1 m
3°	19.2 m	123°	25.0 m	243°	24.2 m
4°	20.5 m	124°	25.2 m	244°	25.2 m
5°	21.5 m	125°	25.1 m	245°	25.8 m
6°	22.4 m	126°	25.3 m	246°	26.0 m
7°	22.9 m	127°	25.7 m	247°	26.2 m
8°	23.0 m	128°	26.0 m	248°	26.7 m
9°	23.3 m	129°	26.0 m	249°	27.4 m
10°	23.7 m	130°	25.6 m	250°	28.1 m
11°	24.1 m	131°	25.0 m	251°	29.1 m

12°	24.8 m	132°	24.5 m	252°	30.1 m
13°	25.9 m	133°	24.2 m	253°	31.0 m
14°	27.3 m	134°	24.0 m	254°	31.5 m
15°	28.5 m	135°	23.8 m	255°	31.8 m
16°	29.7 m	136°	23.9 m	256°	32.0 m
17°	30.9 m	137°	24.0 m	257°	32.4 m
18°	32.0 m	138°	24.4 m	258°	32.9 m
19°	32.9 m	139°	24.9 m	259°	33.4 m
20°	33.2 m	140°	25.4 m	260°	33.7 m
21°	33.1 m	141°	25.8 m	261°	34.0 m
22°	33.1 m	142°	25.8 m	262°	34.4 m
23°	33.4 m	143°	25.4 m	263°	34.9 m
24°	34.1 m	144°	24.5 m	264°	35.4 m
25°	34.8 m	145°	23.1 m	265°	35.9 m
26°	34.9 m	146°	21.8 m	266°	36.5 m
27°	34.5 m	147°	22.7 m	267°	37.0 m
28°	34.0 m	148°	28.0 m	268°	37.6 m
29°	33.6 m	149°	33.7 m	269°	38.1 m
30°	33.0 m	150°	32.9 m	270°	38.7 m
31°	32.5 m	151°	25.6 m	271°	39.3 m
32°	32.1 m	152°	19.6 m	272°	39.9 m
33°	31.6 m	153°	18.3 m	273°	39.5 m
34°	31.0 m	154°	19.1 m	274°	39.0 m
35°	30.3 m	155°	20.0 m	275°	38.4 m
36°	29.7 m	156°	21.0 m	276°	37.4 m
37°	29.1 m	157°	22.3 m	277°	36.5 m
38°	28.6 m	158°	23.7 m	278°	36.0 m
39°	28.0 m	159°	25.1 m	279°	35.1 m
40°	27.5 m	160°	25.9 m	280°	34.0 m
41°	27.0 m	161°	25.6 m	281°	32.8 m
42°	26.4 m	162°	23.8 m	282°	31.6 m
43°	25.5 m	163°	21.3 m	283°	30.9 m
44°	24.5 m	164°	19.2 m	284°	30.3 m
45°	23.3 m	165°	17.9 m	285°	29.9 m
46°	22.0 m	166°	17.7 m	286°	29.6 m
47°	20.2 m	167°	17.3 m	287°	29.4 m
48°	17.7 m	168°	16.8 m	288°	29.4 m
49°	15.0 m	169°	15.8 m	289°	29.4 m
50°	12.4 m	170°	15.0 m	290°	29.6 m
51°	10.6 m	171°	13.7 m	291°	30.2 m
52°	9.5 m	172°	12.4 m	292°	31.3 m

53°	9.0 m	173°	11.1 m	293°	32.9 m
54°	8.6 m	174°	9.9 m	294°	35.1 m
55°	7.9 m	175°	8.3 m	295°	37.6 m
56°	7.0 m	176°	7.3 m	296°	40.0 m
57°	5.9 m	177°	7.2 m	297°	42.1 m
58°	4.9 m	178°	7.5 m	298°	43.7 m
59°	3.9 m	179°	8.3 m	299°	45.1 m
60°	3.1 m	180°	8.0 m	300°	46.0 m
61°	2.6 m	181°	7.8 m	301°	46.6 m
62°	2.3 m	182°	7.5 m	302°	46.6 m
63°	2.1 m	183°	6.9 m	303°	46.1 m
64°	2.1 m	184°	6.0 m	304°	44.6 m
65°	2.0 m	185°	5.4 m	305°	42.4 m
66°	2.0 m	186°	4.9 m	306°	39.8 m
67°	2.0 m	187°	3.9 m	307°	37.3 m
68°	1.8 m	188°	2.7 m	308°	35.3 m
69°	1.6 m	189°	1.4 m	309°	34.0 m
70°	1.4 m	190°	0.3 m	310°	33.2 m
71°	1.2 m	191°	-0.6 m	311°	32.7 m
72°	1.0 m	192°	-1.2 m	312°	32.5 m
73°	0.9 m	193°	-1.6 m	313°	32.2 m
74°	0.9 m	194°	-1.8 m	314°	32.1 m
75°	0.8 m	195°	-2.1 m	315°	31.9 m
76°	0.6 m	196°	-2.7 m	316°	31.8 m
77°	0.5 m	197°	-3.4 m	317°	31.8 m
78°	1.0 m	198°	-3.8 m	318°	31.8 m
79°	2.1 m	199°	-4.0 m	319°	31.9 m
80°	3.2 m	200°	-3.9 m	320°	32.5 m
81°	4.6 m	201°	-3.8 m	321°	33.7 m
82°	6.0 m	202°	-3.6 m	322°	35.0 m
83°	7.5 m	203°	-3.4 m	323°	35.8 m
84°	9.0 m	204°	-3.0 m	324°	35.9 m
85°	10.4 m	205°	-2.3 m	325°	35.8 m
86°	11.2 m	206°	-1.2 m	326°	35.4 m
87°	11.9 m	207°	-0.1 m	327°	34.7 m
88°	12.4 m	208°	0.6 m	328°	33.6 m
89°	12.4 m	209°	0.9 m	329°	32.2 m
90°	12.5 m	210°	1.1 m	330°	30.9 m
91°	12.5 m	211°	1.4 m	331°	29.8 m
92°	12.5 m	212°	1.6 m	332°	28.8 m
93°	12.5 m	213°	1.8 m	333°	27.7 m

94°	12.5 m	214°	1.8 m	334°	26.4 m
95°	12.6 m	215°	1.7 m	335°	25.4 m
96°	12.6 m	216°	1.7 m	336°	24.5 m
97°	12.9 m	217°	2.0 m	337°	23.2 m
98°	13.3 m	218°	2.6 m	338°	20.9 m
99°	13.5 m	219°	3.7 m	339°	18.1 m
100°	13.7 m	220°	4.8 m	340°	15.3 m
101°	13.8 m	221°	5.3 m	341°	12.1 m
102°	14.1 m	222°	5.5 m	342°	9.0 m
103°	14.8 m	223°	5.6 m	343°	6.4 m
104°	15.6 m	224°	6.2 m	344°	4.5 m
105°	16.5 m	225°	7.7 m	345°	3.2 m
106°	17.4 m	226°	9.8 m	346°	2.6 m
107°	18.1 m	227°	11.8 m	347°	2.4 m
108°	18.8 m	228°	13.3 m	348°	2.4 m
109°	19.5 m	229°	14.7 m	349°	2.6 m
110°	20.2 m	230°	16.0 m	350°	3.0 m
111°	20.9 m	231°	17.3 m	351°	3.5 m
112°	21.5 m	232°	18.2 m	352°	4.4 m
113°	21.9 m	233°	18.8 m	353°	5.3 m
114°	22.1 m	234°	19.1 m	354°	6.2 m
115°	22.3 m	235°	19.4 m	355°	6.8 m
116°	22.4 m	236°	19.6 m	356°	7.7 m
117°	22.6 m	237°	19.9 m	357°	8.8 m
118°	22.9 m	238°	20.2 m	358°	10.0 m
119°	23.2 m	239°	20.8 m	359°	11.7 m