

## TECHNICAL ATTACHMENT NEW LFPM FOR HONOLULU, HI

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### PARAMETERS

Channel	209
New Location:	21° 16' 57.5" N 157° 47' 52.3" W -- NAD 83
Antenna AGL	18 (structure 8 m + small penthouse 4 m + 6 m pole)
Tower Total	19.5 m
Antenna Ground	53 m
Antenna COR	71
HAAT	2 m - see below
Power	100

### HAAT CALCULATION

Antenna Height Above Average Terrain Calculations -- Results	
Input Data	
Latitude	21° 16' 57.5" North
Longitude	157° 47' 52.3" West (NAD 83)
Height of antenna radiation center above mean sea level: 71 meters AMSL	
Number of Evenly Spaced Radials = 8      0° is referenced to True North	
Results	
Calculated HAAT = 2 meters	
Antenna Height Above Average Terrain calculated using 1 km <a href="#">GLOBE terrain data</a>	
Individual "Radial HAAT" Values, in meters	
0°	-125.9 m
45°	-97.7 m
90°	11.8 m
135°	70.6 m
180°	67.5 m
225°	70.8 m
270°	69.2 m
315°	-52.1 m

### TOWAIR (PASS)

DETERMINATION Results	
Structure does not require registration. There are no airports within 8 kilometers (5 miles) of the coordinates you provided.	
Your Specifications	
NAD83 Coordinates	
Latitude	21-16-57.5 north
Longitude	157-47-52.3 west
Measurements (Meters)	
Overall Structure Height (AGL)	19.5
Support Structure Height (AGL)	12
Site Elevation (AMSL)	53
Structure Type	
BMAST - Building with Mast	

#### CHANNEL SPACING

REFERENCE

21 16 57.50 N.

157 47 52.30 W.

CLASS = L1

Current Spacings to 2nd Adj.

DISPLAY DATES

DATA 10-16-23

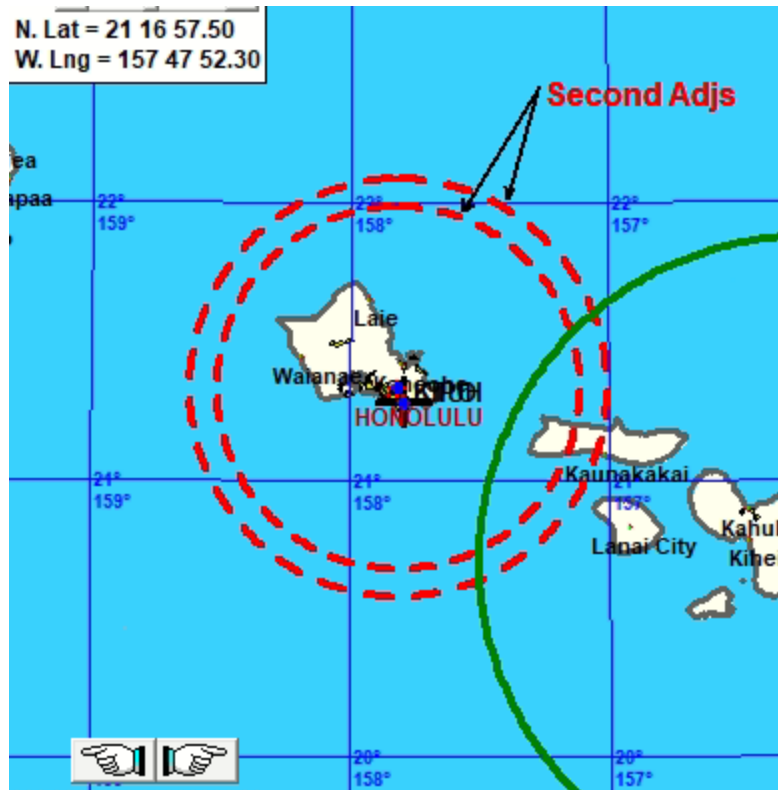
SEARCH 11-14-23

----- Channel 209 - 89.7 MHz -----

Call	Channel	Location	Azi	Dist	FCC	Margin
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KIPO LIC-D	207C0	Honolulu HI	342.8	5.89	83.5	-77.6
KTUH LIC	211C1	Honolulu HI	342.8	5.89	72.5	-66.6
KIPM LIC	209C	Waikapu HI	111.6	172.08	129.5	42.6
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All separation margins include rounding

#### CHANNEL SPACING DIAGRAM

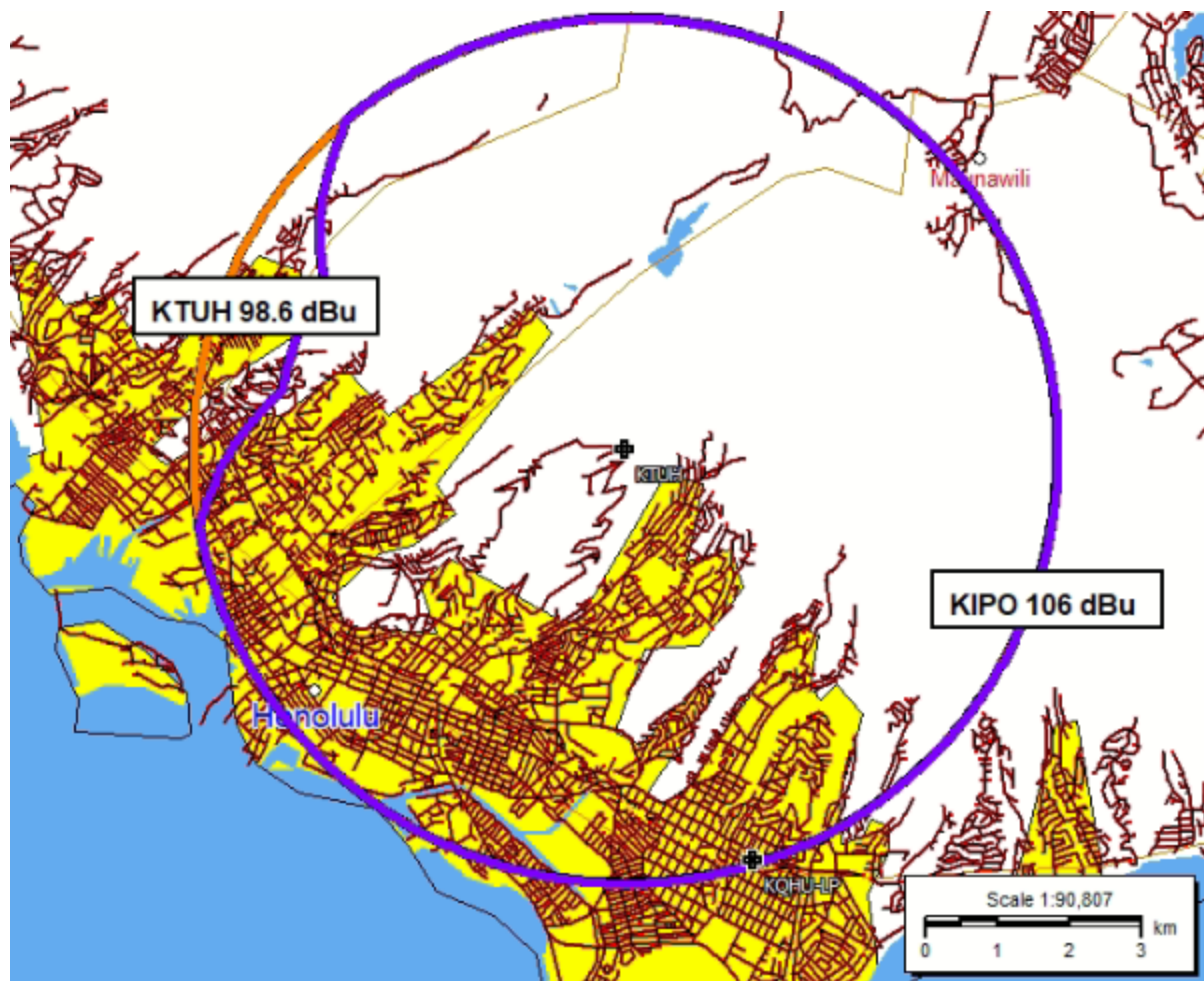


## SECOND ADJACENT WAIVER REQUEST

License respectfully requests a "second adjacent channel waiver" with regards to Section 47 C.F.R. Section 73.807 of the FCC rules based upon the "Living Way" precedent (Living Way Ministries, Inc., Memorandum Opinion and Order, 17 FCC Red 17054, 17056, ¶ 5 (2002), recon. denied 23 FCC Red 15070 (2008)). This will be accomplished by using Free Space methodology of calculation.

KIPO 207C0 and KTUH 211C1 are the second adjacent channels the facility is short spaced to.

At the proposed site, KIPO has a signal strength of 106 dBu (FCC), and KTUH 98.6 dBu



Interference will occur when the smaller of two station's (KTUH) signal strength's interfering signal exceeds the desired signal by 40 dBu. So the area of predicted interference would then be bounded by the 138.6 dBu contour.

The distance to this contour, using free space method:

$$D = (7.01 \cdot P^{1/2}) / E,$$

where P is power (watts), E is field strength (v/m), and D is distance to contour (meters):

$$P = 100 \text{ w}, E = 138.6 \text{ dBu } D = 8.2 \text{ meters}$$

However, the field strength of the proposed LPFM's antenna system falls quickly at depression angles below the horizon. Using elevation pattern data provided by Shively for a ring-stub type antenna setup (2 Bay Shively 6812 ½ wave spaced) the distance to the 138.6 dBu contour at various depression angles is tabulated below. The data shows that the lowest point at which the signal strength rises to 138.6 dBu is 2.5 meters below the center of radiation of the antenna system, or 2.5 meters above the roof. Therefore, this is sufficient clearance of the nearby one-story office park structures, and the interference area encompasses zero population. The table below shows that the lowest elevation point of the 138.6 F(50,10) interfering contour is 2.5 meters above roof.

Due to zero population within this radiation radius, this meets the "Living Way" Criteria to qualify for a Waiver of 47 C.F.R. Section 73.807.

Thus, the applicant requests a second adjacent waiver based upon evidence no interference is proposed.

MAX ERP	DEPRESSION ANGLE	RELATIVE FIELD	dB FROM RELATIVE	ERP	ANGULAR DISTANCE TO 138.6 dBu CONTOUR	VERTICAL DISTANCE (below antenna)	HORIZONTAL DISTANCE TO 138.6 dBu CONTOUR	CLEARANCE OF CONTOUR ABOVE GROUND
100	-90	0.00	-100.000	0.00	0	0	0	5
100	-89	0.00	-100.000	0.00	0	0	0	5
100	-88	0.00	-100.000	0.00	0	0	0	5
100	-87	0.00	-100.000	0.00	0	0	0	5
100	-86	0.001	-60.000	0.00	0	0	0	5
100	-85	0.001	-60.000	0.00	0	0	0	5
100	-84	0.001	-60.000	0.00	0	0	0	5
100	-83	0.002	-53.979	0.00	0	0	0	5
100	-82	0.003	-50.458	0.00	0	0	0	5
100	-81	0.004	-47.959	0.00	0	0	0	5
100	-80	0.005	-46.021	0.00	0	0	0	5
100	-79	0.007	-43.098	0.00	0	0	0	5
100	-78	0.008	-41.938	0.01	0	0	0	5
100	-77	0.011	-39.172	0.01	0	0	0	5
100	-76	0.013	-37.721	0.02	0.1	0	0	5
100	-75	0.016	-35.918	0.03	0.1	0	0	5
100	-74	0.019	-34.425	0.04	0.1	0	0	5
100	-73	0.022	-33.152	0.05	0.1	0	0	5
100	-72	0.026	-31.701	0.07	0.2	0.1	0	4.9
100	-71	0.03	-30.458	0.09	0.2	0.1	0	4.9
100	-70	0.035	-29.119	0.12	0.2	0.1	0	4.9
100	-69	0.04	-27.959	0.16	0.3	0.2	0.1	4.8
100	-68	0.046	-26.745	0.21	0.3	0.2	0.1	4.8
100	-67	0.052	-25.680	0.27	0.4	0.3	0.1	4.7
100	-66	0.059	-24.583	0.35	0.4	0.3	0.1	4.7

100	-65	0.066	-23.609	0.44	0.5	0.4	0.2	4.6
100	-64	0.073	-22.734	0.53	0.6	0.5	0.2	4.5
100	-63	0.082	-21.724	0.67	0.6	0.5	0.2	4.5
100	-62	0.09	-20.915	0.81	0.7	0.6	0.3	4.4
100	-61	0.099	-20.087	0.98	0.8	0.6	0.3	4.4
100	-60	0.109	-19.251	1.19	0.8	0.6	0.4	4.4
100	-59	0.119	-18.489	1.42	0.9	0.7	0.4	4.3
100	-58	0.13	-17.721	1.69	1	0.8	0.5	4.2
100	-57	0.142	-16.954	2.02	1.1	0.9	0.5	4.1
100	-56	0.154	-16.250	2.37	1.2	0.9	0.6	4.1
100	-55	0.166	-15.598	2.76	1.3	1	0.7	4
100	-54	0.179	-14.943	3.20	1.4	1.1	0.8	3.9
100	-53	0.193	-14.289	3.72	1.5	1.1	0.9	3.9
100	-52	0.207	-13.681	4.28	1.7	1.3	1	3.7
100	-51	0.222	-13.073	4.93	1.8	1.3	1.1	3.7
100	-50	0.237	-12.505	5.62	1.9	1.4	1.2	3.6
100	-49	0.253	-11.938	6.40	2	1.5	1.3	3.5
100	-48	0.269	-11.405	7.24	2.2	1.6	1.4	3.4
100	-47	0.286	-10.873	8.18	2.3	1.6	1.5	3.4
100	-46	0.303	-10.371	9.18	2.4	1.7	1.6	3.3
100	-45	0.32	-9.897	10.24	2.6	1.8	1.8	3.2
100	-44	0.338	-9.422	11.42	2.7	1.8	1.9	3.2
100	-43	0.357	-8.947	12.74	2.9	1.9	2.1	3.1
100	-42	0.375	-8.519	14.06	3	2	2.2	3
100	-41	0.394	-8.090	15.52	3.2	2	2.4	3
100	-40	0.414	-7.660	17.14	3.4	2.1	2.6	2.9
100	-39	0.433	-7.270	18.75	3.5	2.2	2.7	2.8
100	-38	0.453	-6.878	20.52	3.7	2.2	2.9	2.8
100	-37	0.473	-6.503	22.37	3.8	2.2	3	2.8
100	-36	0.494	-6.125	24.40	4	2.3	3.2	2.7
100	-35	0.514	-5.781	26.42	4.2	2.4	3.4	2.6
100	-34	0.535	-5.433	28.62	4.4	2.4	3.6	2.6
100	-33	0.555	-5.114	30.80	4.5	2.4	3.7	2.6
100	-32	0.576	-4.792	33.18	4.7	2.4	3.9	2.6
100	-31	0.597	-4.481	35.64	4.9	2.5	4.2	2.5

100	-30	0.617	-4.194	38.07	5	2.4	4.3	2.6
100	-29	0.638	-3.904	40.70	5.2	2.5	4.5	2.5
100	-28	0.658	-3.635	43.30	5.4	2.5	4.7	2.5
100	-27	0.678	-3.375	45.97	5.5	2.4	4.9	2.6
100	-26	0.698	-3.123	48.72	5.7	2.4	5.1	2.6
100	-25	0.718	-2.878	51.55	5.9	2.4	5.3	2.6
100	-24	0.737	-2.651	54.32	6	2.4	5.4	2.6
100	-23	0.756	-2.430	57.15	6.2	2.4	5.7	2.6
100	-22	0.774	-2.225	59.91	6.3	2.3	5.8	2.7
100	-21	0.792	-2.025	62.73	6.5	2.3	6	2.7
100	-20	0.81	-1.830	65.61	6.6	2.2	6.2	2.8
100	-19	0.827	-1.650	68.39	6.8	2.2	6.4	2.8
100	-18	0.843	-1.483	71.06	6.9	2.1	6.5	2.9
100	-17	0.859	-1.320	73.79	7	2	6.6	3
100	-16	0.874	-1.170	76.39	7.1	1.9	6.8	3.1
100	-15	0.889	-1.022	79.03	7.3	1.8	7	3.2
100	-14	0.903	-0.886	81.54	7.4	1.7	7.1	3.3
100	-13	0.915	-0.772	83.72	7.5	1.6	7.3	3.4
100	-12	0.928	-0.649	86.12	7.6	1.5	7.4	3.5
100	-11	0.939	-0.547	88.17	7.7	1.4	7.5	3.6
100	-10	0.949	-0.455	90.06	7.8	1.3	7.6	3.7
100	-9	0.959	-0.364	91.97	7.8	1.2	7.7	3.8
100	-8	0.967	-0.291	93.51	7.9	1	7.8	4
100	-7	0.975	-0.220	95.06	8	0.9	7.9	4.1
100	-6	0.981	-0.167	96.24	8	0.8	7.9	4.2
100	-5	0.987	-0.114	97.42	8.1	0.7	8	4.3
100	-4	0.992	-0.070	98.41	8.1	0.5	8	4.5
100	-3	0.995	-0.044	99.00	8.1	0.4	8	4.6
100	-2	0.998	-0.017	99.60	8.2	0.2	8.1	4.8
100	-1	0.999	-0.009	99.80	8.2	0.1	8.1	4.9
100	0	1	0.000	100.00	8.2	0	8.2	5
100	1	0.999	-0.009	99.80	8.2	0.1	8.1	4.9
100	2	0.998	-0.017	99.60	8.2	0.2	8.1	4.8
100	3	0.995	-0.044	99.00	8.1	0.4	8	4.6
100	4	0.992	-0.070	98.41	8.1	0.5	8	4.5

100	5	0.987	-0.114	97.42	8.1	0.7	8	4.3
100	6	0.981	-0.167	96.24	8	0.8	7.9	4.2
100	7	0.975	-0.220	95.06	8	0.9	7.9	4.1
100	8	0.967	-0.291	93.51	7.9	1	7.8	4
100	9	0.959	-0.364	91.97	7.8	1.2	7.7	3.8
100	10	0.949	-0.455	90.06	7.8	1.3	7.6	3.7
100	11	0.939	-0.547	88.17	7.7	1.4	7.5	3.6
100	12	0.928	-0.649	86.12	7.6	1.5	7.4	3.5
100	13	0.915	-0.772	83.72	7.5	1.6	7.3	3.4
100	14	0.903	-0.886	81.54	7.4	1.7	7.1	3.3
100	15	0.889	-1.022	79.03	7.3	1.8	7	3.2
100	16	0.874	-1.170	76.39	7.1	1.9	6.8	3.1
100	17	0.859	-1.320	73.79	7	2	6.6	3
100	18	0.843	-1.483	71.06	6.9	2.1	6.5	2.9
100	19	0.827	-1.650	68.39	6.8	2.2	6.4	2.8
100	20	0.81	-1.830	65.61	6.6	2.2	6.2	2.8
100	21	0.792	-2.025	62.73	6.5	2.3	6	2.7
100	22	0.774	-2.225	59.91	6.3	2.3	5.8	2.7
100	23	0.756	-2.430	57.15	6.2	2.4	5.7	2.6
100	24	0.737	-2.651	54.32	6	2.4	5.4	2.6
100	25	0.718	-2.878	51.55	5.9	2.4	5.3	2.6
100	26	0.698	-3.123	48.72	5.7	2.4	5.1	2.6
100	27	0.678	-3.375	45.97	5.5	2.4	4.9	2.6
100	28	0.658	-3.635	43.30	5.4	2.5	4.7	2.5
100	29	0.638	-3.904	40.70	5.2	2.5	4.5	2.5
100	30	0.617	-4.194	38.07	5	2.4	4.3	2.6
100	31	0.597	-4.481	35.64	4.9	2.5	4.2	2.5
100	32	0.576	-4.792	33.18	4.7	2.4	3.9	2.6
100	33	0.555	-5.114	30.80	4.5	2.4	3.7	2.6
100	34	0.535	-5.433	28.62	4.4	2.4	3.6	2.6
100	35	0.514	-5.781	26.42	4.2	2.4	3.4	2.6
100	36	0.494	-6.125	24.40	4	2.3	3.2	2.7
100	37	0.473	-6.503	22.37	3.8	2.2	3	2.8
100	38	0.453	-6.878	20.52	3.7	2.2	2.9	2.8
100	39	0.433	-7.270	18.75	3.5	2.2	2.7	2.8



100	40	0.414	-7.660	17.14	3.4	2.1	2.6	2.9
100	41	0.394	-8.090	15.52	3.2	2	2.4	3
100	42	0.375	-8.519	14.06	3	2	2.2	3
100	43	0.357	-8.947	12.74	2.9	1.9	2.1	3.1
100	44	0.338	-9.422	11.42	2.7	1.8	1.9	3.2
100	45	0.32	-9.897	10.24	2.6	1.8	1.8	3.2
100	46	0.303	-10.371	9.18	2.4	1.7	1.6	3.3
100	47	0.286	-10.873	8.18	2.3	1.6	1.5	3.4
100	48	0.269	-11.405	7.24	2.2	1.6	1.4	3.4
100	49	0.253	-11.938	6.40	2	1.5	1.3	3.5
100	50	0.237	-12.505	5.62	1.9	1.4	1.2	3.6
100	51	0.222	-13.073	4.93	1.8	1.3	1.1	3.7
100	52	0.207	-13.681	4.28	1.7	1.3	1	3.7
100	53	0.193	-14.289	3.72	1.5	1.1	0.9	3.9
100	54	0.179	-14.943	3.20	1.4	1.1	0.8	3.9
100	55	0.166	-15.598	2.76	1.3	1	0.7	4
100	56	0.154	-16.250	2.37	1.2	0.9	0.6	4.1
100	57	0.142	-16.954	2.02	1.1	0.9	0.5	4.1
100	58	0.13	-17.721	1.69	1	0.8	0.5	4.2
100	59	0.119	-18.489	1.42	0.9	0.7	0.4	4.3
100	60	0.109	-19.251	1.19	0.8	0.6	0.4	4.4
100	61	0.099	-20.087	0.98	0.8	0.6	0.3	4.4
100	62	0.09	-20.915	0.81	0.7	0.6	0.3	4.4
100	63	0.082	-21.724	0.67	0.6	0.5	0.2	4.5
100	64	0.073	-22.734	0.53	0.6	0.5	0.2	4.5
100	65	0.066	-23.609	0.44	0.5	0.4	0.2	4.6
100	66	0.059	-24.583	0.35	0.4	0.3	0.1	4.7
100	67	0.052	-25.680	0.27	0.4	0.3	0.1	4.7
100	68	0.046	-26.745	0.21	0.3	0.2	0.1	4.8
100	69	0.04	-27.959	0.16	0.3	0.2	0.1	4.8
100	70	0.035	-29.119	0.12	0.2	0.1	0	4.9
100	71	0.03	-30.458	0.09	0.2	0.1	0	4.9
100	72	0.026	-31.701	0.07	0.2	0.1	0	4.9
100	73	0.022	-33.152	0.05	0.1	0	0	5
100	74	0.019	-34.425	0.04	0.1	0	0	5

100	75	0.016	-35.918	0.03	0.1	0	0	5
100	76	0.013	-37.721	0.02	0.1	0	0	5
100	77	0.011	-39.172	0.01	0	0	0	5
100	78	0.008	-41.938	0.01	0	0	0	5
100	79	0.007	-43.098	0.00	0	0	0	5
100	80	0.005	-46.021	0.00	0	0	0	5
100	81	0.004	-47.959	0.00	0	0	0	5
100	82	0.003	-50.458	0.00	0	0	0	5
100	83	0.002	-53.979	0.00	0	0	0	5
100	84	0.001	-60.000	0.00	0	0	0	5
100	85	0.001	-60.000	0.00	0	0	0	5
100	86	0.001	-60.000	0.00	0	0	0	5
100	87	0.00	-100.000	0.00	0	0	0	5
100	88	0.00	-100.000	0.00	0	0	0	5
100	89	0.00	-100.000	0.00	0	0	0	5
100	90	0.00	-100.000	0.00	0	0	0	5

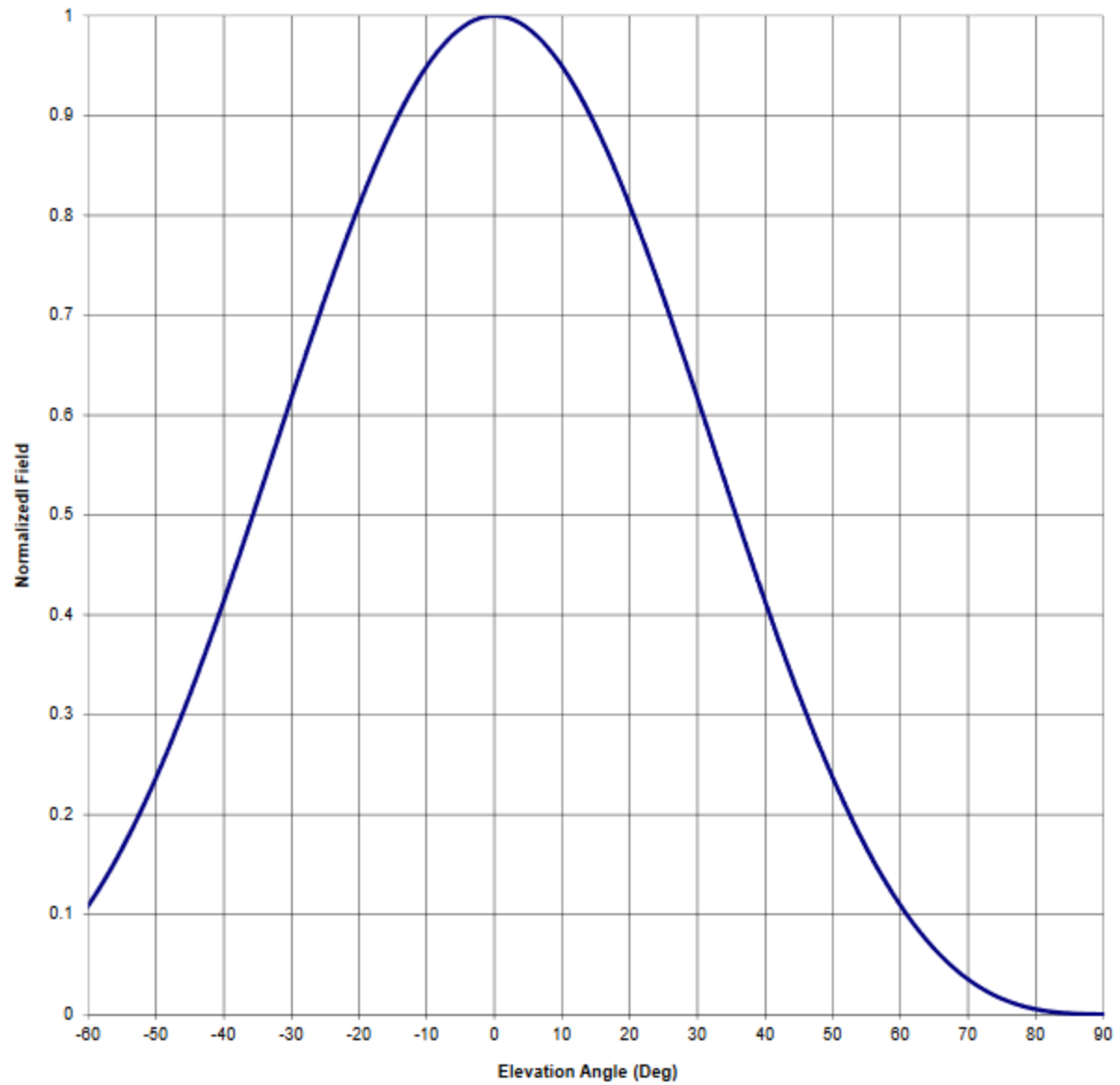
Antenna Mfg.: Shively Labs  
Antenna Type: 6812B-HW-2

Date: 11/3/2020

Station: 0  
Frequency: 98.1  
Channel #: 251

Beam Tilt	0	
Gain (Max)	0.707	-1.507 dB
Gain (Horizon)	0.707	-1.507 dB

Figure: Figure 3



Antenna Mfg.: Shively Labs  
Antenna Type: 6812B-HW-2

Date: 11/3/2020

Station: 0

Beam Tilt 0

Frequency: 98.1

Gain (Max) 0.707

-1.507 dB

Channel #: 251

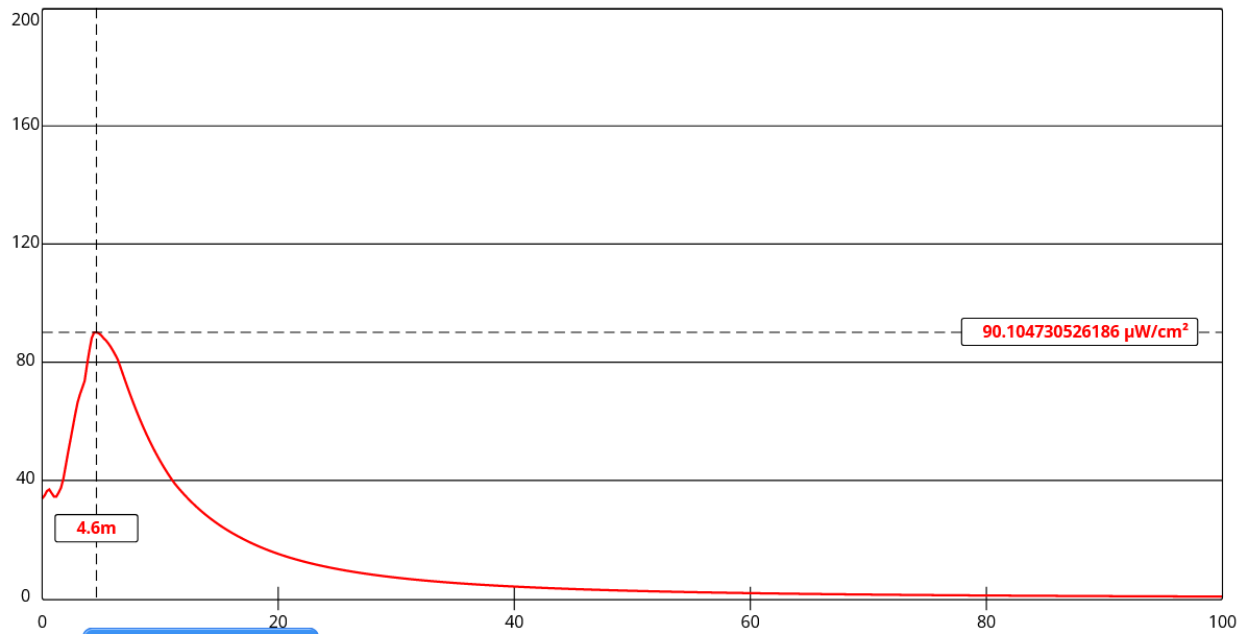
Gain (Horizon) 0.707

-1.507 dB

Figure: Figure 3

Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field
-90	0.000	-44	0.338	0	1.000	46	0.303
-89	0.000	-43	0.357	1	0.999	47	0.286
-88	0.000	-42	0.375	2	0.998	48	0.269
-87	0.000	-41	0.394	3	0.995	49	0.253
-86	0.001	-40	0.414	4	0.992	50	0.237
-85	0.001	-39	0.433	5	0.987	51	0.222
-84	0.001	-38	0.453	6	0.981	52	0.207
-83	0.002	-37	0.473	7	0.975	53	0.193
-82	0.003	-36	0.494	8	0.967	54	0.179
-81	0.004	-35	0.514	9	0.959	55	0.166
-80	0.005	-34	0.535	10	0.949	56	0.154
-79	0.007	-33	0.555	11	0.939	57	0.142
-78	0.008	-32	0.576	12	0.928	58	0.130
-77	0.011	-31	0.597	13	0.915	59	0.119
-76	0.013	-30	0.617	14	0.903	60	0.109
-75	0.016	-29	0.638	15	0.889	61	0.099
-74	0.019	-28	0.658	16	0.874	62	0.090
-73	0.022	-27	0.678	17	0.859	63	0.082
-72	0.026	-26	0.698	18	0.843	64	0.073
-71	0.030	-25	0.718	19	0.827	65	0.066
-70	0.035	-24	0.737	20	0.810	66	0.059
-69	0.040	-23	0.756	21	0.792	67	0.052
-68	0.046	-22	0.774	22	0.774	68	0.046
-67	0.052	-21	0.792	23	0.756	69	0.040
-66	0.059	-20	0.810	24	0.737	70	0.035
-65	0.066	-19	0.827	25	0.718	71	0.030
-64	0.073	-18	0.843	26	0.698	72	0.026
-63	0.082	-17	0.859	27	0.678	73	0.022
-62	0.090	-16	0.874	28	0.658	74	0.019
-61	0.099	-15	0.889	29	0.638	75	0.016
-60	0.109	-14	0.903	30	0.617	76	0.013
-59	0.119	-13	0.915	31	0.597	77	0.011
-58	0.130	-12	0.928	32	0.576	78	0.008
-57	0.142	-11	0.939	33	0.555	79	0.007
-56	0.154	-10	0.949	34	0.535	80	0.005
-55	0.166	-9	0.959	35	0.514	81	0.004
-54	0.179	-8	0.967	36	0.494	82	0.003
-53	0.193	-7	0.975	37	0.473	83	0.002
-52	0.207	-6	0.981	38	0.453	84	0.001
-51	0.222	-5	0.987	39	0.433	85	0.001
-50	0.237	-4	0.992	40	0.414	86	0.001
-49	0.253	-3	0.995	41	0.394	87	0.000
-48	0.269	-2	0.998	42	0.375	88	0.000
-47	0.286	-1	0.999	43	0.357	89	0.000
-46	0.303	0	1.000	44	0.338	90	0.000
-45	0.320			45	0.320		

## NON IONIZING ELECTROMAGNETIC RADIATION



An opposed V dipole was used to gauge the maximum RF for the proposal in OET program FM Model (100 watts, 2-bay, 0.5 wave, H+V-pol). The maximum predicted RF exposure was 90.1  $\mu\text{W}/\text{cm}^2$  at 4.6 m away on the roof of the small penthouse (which has no human access), 45.1% of the FCC Maximum Permissible Exposure (MPR) for 200  $\mu\text{W}/\text{cm}^2$  for uncontrolled environments.

The site will have a sign regarding RF exposure hazards to tower climbers posted. If any work needs to be done around the structure the RF power will be temporarily shut off.