

TECHNICAL ATTACHMENT
NEW LPFM FOR COLLEGE STATION, TX

State: TX
City: COLLEGE STATION
Channel: 238 - 95.5 MHz

Antenna Structure Registration: N/A
Do you have an FCC Antenna Structure Registration Number?: N
Yes/No/Filed with the FAA No

Latitude: 30 36 44.2 N.
Longitude: 96 20 28.6 W.
Structure Type: BUILDING WITH MAST
Overall Structure Height: 19.1
Support Structure: 13
Ground Elevation: 106

Antenna Data

	HORIZONTAL	VERTICAL
Height of Radiation Center		
Above Ground Level	18.3	18.3
Height of Radiation Center AMSL	(FORM CALCULATES)	
MIn Radiated Power	(FORM CALCULATES)	
Max Radiated Power	(FORM CALCULATES)	

Antenna Type

Directional
Non-Directional X

Directional Antenna

Technical Certification

Environmental Effect

*Would a Commission grant of Authorization for this location be an action which may have a significant environmental effect? See 47 C.F.R. Section 1.1306?

NO

Interference

*Does the applicant certify that the proposed facility complies with engineering requirements...?

NO

SPACING

REFERENCE 30 36 44.20 N. CLASS = L1 DISPLAY DATES 10-16-23
96 20 28.60 W. Current Spacings to 2nd Adj. SEARCH
12-07-23

----- Channel 238 - 95.5 MHz -----

Call	Channel	Location	Azi	Dist	FCC	Margin
KNDE	LIC	236C2 College Station TX	316.1	11.64	52.5	-40.9
KKHH	LIC	239C Houston TX	145.0	140.01	119.5	20.5
KKMJ-FM	LIC	238C1 Austin TX	257.4	143.67	110.5	33.2
KJJB	LIC-N	237C3 Eagle Lake TX	187.3	113.92	66.5	47.4
KBGO	LIC-N	239C2 Waco TX	321.2	129.03	79.5	49.5
K237FS	LIC-D	237D Conroe TX	108.2	82.23	20.5	61.7
AU9813222VAC		237C3 Teague TX	5.2	128.85	66.5	62.4
KAFX-FM	LIC	238C1 Diboll TX	59.1	174.47	110.5	64.0
NEW	APP	237C3 Teague TX	3.0	132.40	66.5	65.9
AL6225	RSV-A	237C3 Teague TX	3.0	132.42	66.5	65.9
K240FC	LIC-D	240D Conroe TX	95.4	83.83	13.5	70.3

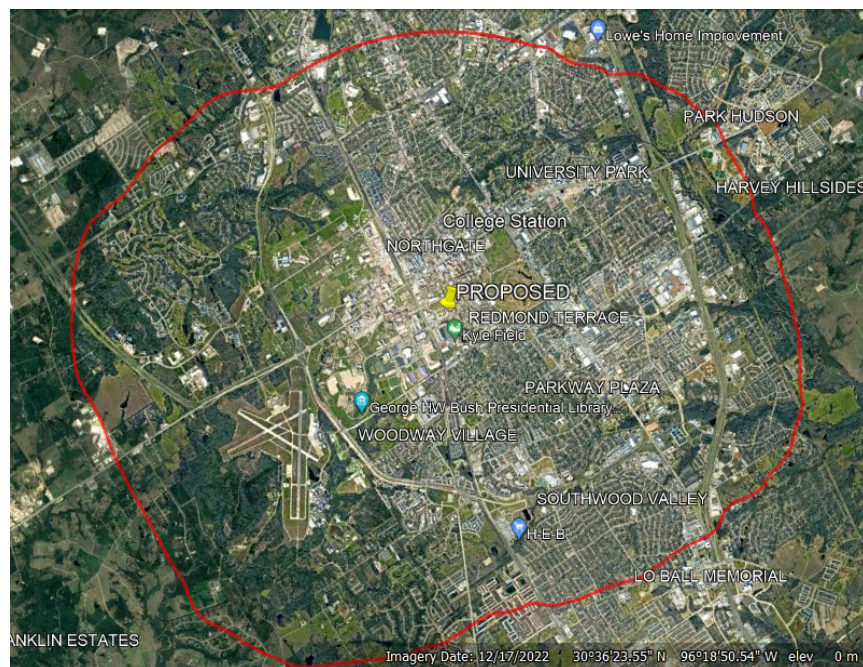
RSV-R = reserved - needs protection, RSV-A = allocation.

All separation margins include rounding

SEE: SECOND ADJ WAIVER REQUEST



FCC 60 dBu F(50,50)



TOWAIR (PASS)

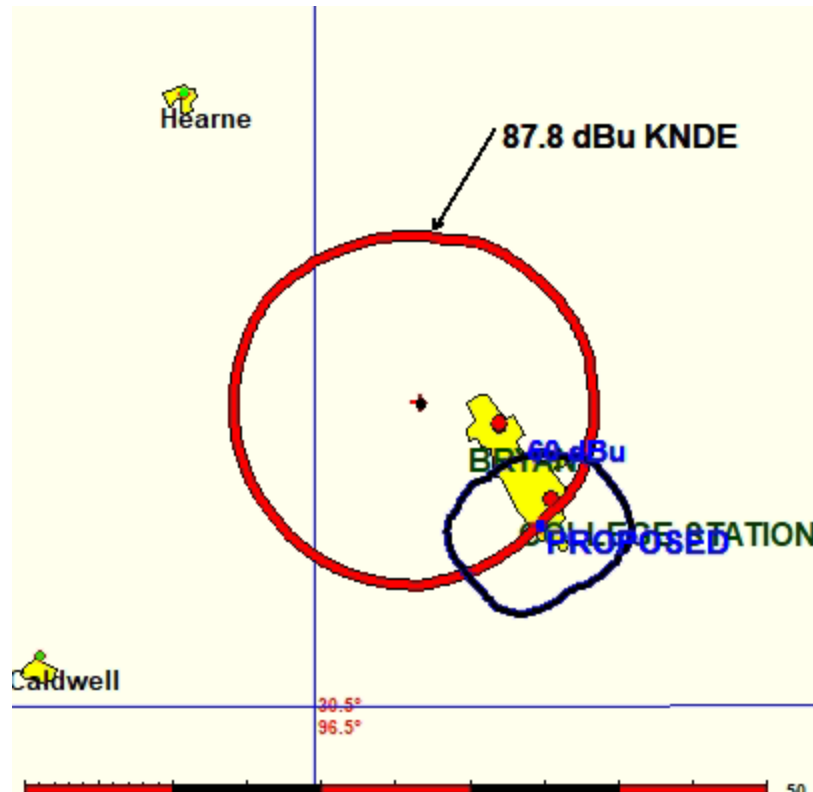
DETERMINATION Results	
Structure does not require registration. The structure meets the 6.10-meter (20-foot) Rule criteria.	
Your Specifications	
NAD83 Coordinates	
Latitude	30-36-44.2 north
Longitude	096-20-28.6 west
Measurements (Meters)	
Overall Structure Height (AGL)	19.1
Support Structure Height (AGL)	13
Site Elevation (AMSL)	106
Structure Type	
BMAST - Building with Mast	

SECOND ADJACENT WAIVER REQUEST

Applicant 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.

The second adjacent channel is (with signal strength at the proposed site):

KNDE LIC-N 263C2 87.8 dBu



Using U/D methodology, interference will occur when KNDE's signal strength's interfering signal exceeds the desired signal by 40 dBu. So the area of predicted interference would then be bounded by the 127.8 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):

$$P = 50 \text{ w}, E = 127.8 \text{ dBu } D = 20.2 \text{ meters}$$

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 6812 antenna setup (2 bay 0.5 wave spaced) the distance to the 127.8 dBu contour at various depression angles is tabulated below. The data shows that the lowest point at which the signal strength rises to 127.8 dBu is 6.1 meters below the center of radiation of the antenna system, or right at roof level (-0.1 m is below the roof level, but there is a false building

ceiling within that area of clearance). Therefore, this is sufficient clearance from the population in the building and the interference area encompasses zero population. The table below shows that the lowest elevation point of the 127.8 F(50,10) interfering contour is above the building ceiling.

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 127.8 dBu CONTOUR	VERTICAL DISTANCE (below antenna)	HORIZONTAL DISTANCE TO 127.8 dBu CONTOUR	CLEARANCE CONTOUR ABOVE GROUND
50	-90	0.00	-100.000	0.00	0	0	0	6.1
50	-89	0.00	-100.000	0.00	0	0	0	6.1
50	-88	0.00	-100.000	0.00	0	0	0	6.1
50	-87	0.00	-100.000	0.00	0	0	0	6.1
50	-86	0.001	-60.000	0.00	0	0	0	6.1
50	-85	0.001	-60.000	0.00	0	0	0	6.1
50	-84	0.001	-60.000	0.00	0	0	0	6.1
50	-83	0.002	-53.979	0.00	0	0	0	6.1
50	-82	0.003	-50.458	0.00	0	0	0	6.1
50	-81	0.004	-47.959	0.00	0	0	0	6.1
50	-80	0.005	-46.021	0.00	0.1	0	0	6.1
50	-79	0.007	-43.098	0.00	0.1	0	0	6.1
50	-78	0.008	-41.938	0.00	0.1	0	0	6.1
50	-77	0.011	-39.172	0.01	0.2	0.1	0	6
50	-76	0.013	-37.721	0.01	0.2	0.1	0	6
50	-75	0.016	-35.918	0.01	0.3	0.2	0	5.9
50	-74	0.019	-34.425	0.02	0.3	0.2	0	5.9
50	-73	0.022	-33.152	0.02	0.4	0.3	0.1	5.8
50	-72	0.026	-31.701	0.03	0.5	0.4	0.1	5.7

50	-71	0.03	-30.458	0.05	0.6	0.5	0.1	5.6
50	-70	0.035	-29.119	0.06	0.7	0.6	0.2	5.5
50	-69	0.04	-27.959	0.08	0.8	0.7	0.2	5.4
50	-68	0.046	-26.745	0.11	0.9	0.8	0.3	5.3
50	-67	0.052	-25.680	0.14	1	0.9	0.3	5.2
50	-66	0.059	-24.583	0.17	1.1	1	0.4	5.1
50	-65	0.066	-23.609	0.22	1.3	1.1	0.5	5
50	-64	0.073	-22.734	0.27	1.4	1.2	0.6	4.9
50	-63	0.082	-21.724	0.34	1.6	1.4	0.7	4.7
50	-62	0.09	-20.915	0.41	1.8	1.5	0.8	4.6
50	-61	0.099	-20.087	0.49	1.9	1.6	0.9	4.5
50	-60	0.109	-19.251	0.59	2.2	1.9	1.1	4.2
50	-59	0.119	-18.489	0.71	2.4	2	1.2	4.1
50	-58	0.13	-17.721	0.85	2.6	2.2	1.3	3.9
50	-57	0.142	-16.954	1.01	2.8	2.3	1.5	3.8
50	-56	0.154	-16.250	1.19	3.1	2.5	1.7	3.6
50	-55	0.166	-15.598	1.38	3.3	2.7	1.8	3.4
50	-54	0.179	-14.943	1.60	3.6	2.9	2.1	3.2
50	-53	0.193	-14.289	1.86	3.8	3	2.2	3.1
50	-52	0.207	-13.681	2.14	4.1	3.2	2.5	2.9
50	-51	0.222	-13.073	2.46	4.4	3.4	2.7	2.7
50	-50	0.237	-12.505	2.81	4.7	3.5	3	2.6
50	-49	0.253	-11.938	3.20	5.1	3.8	3.3	2.3
50	-48	0.269	-11.405	3.62	5.4	4	3.6	2.1
50	-47	0.286	-10.873	4.09	5.7	4.1	3.8	2
50	-46	0.303	-10.371	4.59	6.1	4.3	4.2	1.8
50	-45	0.32	-9.897	5.12	6.4	4.5	4.5	1.6
50	-44	0.338	-9.422	5.71	6.8	4.7	4.8	1.4
50	-43	0.357	-8.947	6.37	7.2	4.9	5.2	1.2
50	-42	0.375	-8.519	7.03	7.5	5	5.5	1.1
50	-41	0.394	-8.090	7.76	7.9	5.1	5.9	1
50	-40	0.414	-7.660	8.57	8.3	5.3	6.3	0.8
50	-39	0.433	-7.270	9.37	8.7	5.4	6.7	0.7
50	-38	0.453	-6.878	10.26	9.1	5.6	7.1	0.5
50	-37	0.473	-6.503	11.19	9.5	5.7	7.5	0.4

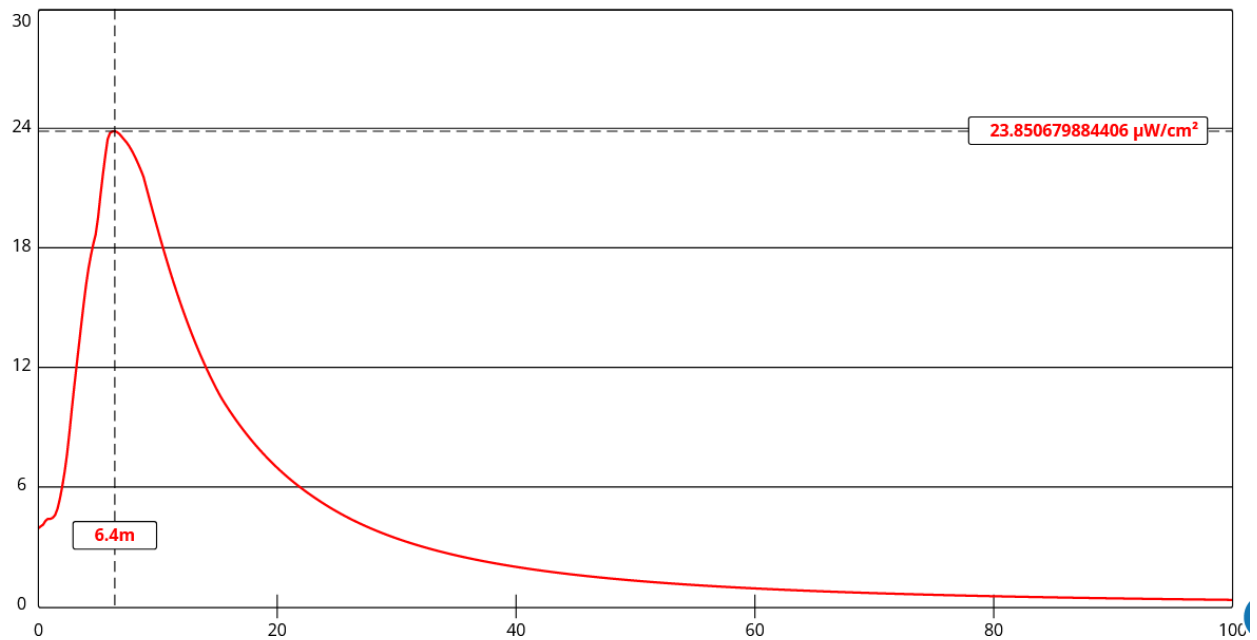
50	-36	0.494	-6.125	12.20	9.9	5.8	8	0.3
50	-35	0.514	-5.781	13.21	10.3	5.9	8.4	0.2
50	-34	0.535	-5.433	14.31	10.8	6	8.9	0.1
50	-33	0.555	-5.114	15.40	11.2	6	9.3	0.1
50	-32	0.576	-4.792	16.59	11.6	6.1	9.8	0
50	-31	0.597	-4.481	17.82	12	6.1	10.2	0
50	-30	0.617	-4.194	19.03	12.4	6.1	10.7	0
50	-29	0.638	-3.904	20.35	12.8	6.2	11.1	-0.1
50	-28	0.658	-3.635	21.65	13.2	6.1	11.6	0
50	-27	0.678	-3.375	22.98	13.6	6.1	12.1	0
50	-26	0.698	-3.123	24.36	14	6.1	12.5	0
50	-25	0.718	-2.878	25.78	14.4	6	13	0.1
50	-24	0.737	-2.651	27.16	14.8	6	13.5	0.1
50	-23	0.756	-2.430	28.58	15.2	5.9	13.9	0.2
50	-22	0.774	-2.225	29.95	15.6	5.8	14.4	0.3
50	-21	0.792	-2.025	31.36	15.9	5.6	14.8	0.5
50	-20	0.81	-1.830	32.81	16.3	5.5	15.3	0.6
50	-19	0.827	-1.650	34.20	16.6	5.4	15.6	0.7
50	-18	0.843	-1.483	35.53	17	5.2	16.1	0.9
50	-17	0.859	-1.320	36.89	17.3	5	16.5	1.1
50	-16	0.874	-1.170	38.19	17.6	4.8	16.9	1.3
50	-15	0.889	-1.022	39.52	17.9	4.6	17.2	1.5
50	-14	0.903	-0.886	40.77	18.2	4.4	17.6	1.7
50	-13	0.915	-0.772	41.86	18.4	4.1	17.9	2
50	-12	0.928	-0.649	43.06	18.7	3.8	18.2	2.3
50	-11	0.939	-0.547	44.09	18.9	3.6	18.5	2.5
50	-10	0.949	-0.455	45.03	19.1	3.3	18.8	2.8
50	-9	0.959	-0.364	45.98	19.3	3	19	3.1
50	-8	0.967	-0.291	46.75	19.5	2.7	19.3	3.4
50	-7	0.975	-0.220	47.53	19.6	2.3	19.4	3.8
50	-6	0.981	-0.167	48.12	19.8	2	19.6	4.1
50	-5	0.987	-0.114	48.71	19.9	1.7	19.8	4.4
50	-4	0.992	-0.070	49.20	20	1.3	19.9	4.8
50	-3	0.995	-0.044	49.50	20	1	19.9	5.1
50	-2	0.998	-0.017	49.80	20.1	0.7	20	5.4

50	-1	0.999	-0.009	49.90	20.1	0.3	20	5.8
50	0	1	0.000	50.00	20.1	0	20.1	6.1
50	1	0.999	-0.009	49.90	20.1	0.3	20	5.8
50	2	0.998	-0.017	49.80	20.1	0.7	20	5.4
50	3	0.995	-0.044	49.50	20	1	19.9	5.1
50	4	0.992	-0.070	49.20	20	1.3	19.9	4.8
50	5	0.987	-0.114	48.71	19.9	1.7	19.8	4.4
50	6	0.981	-0.167	48.12	19.8	2	19.6	4.1
50	7	0.975	-0.220	47.53	19.6	2.3	19.4	3.8
50	8	0.967	-0.291	46.75	19.5	2.7	19.3	3.4
50	9	0.959	-0.364	45.98	19.3	3	19	3.1
50	10	0.949	-0.455	45.03	19.1	3.3	18.8	2.8
50	11	0.939	-0.547	44.09	18.9	3.6	18.5	2.5
50	12	0.928	-0.649	43.06	18.7	3.8	18.2	2.3
50	13	0.915	-0.772	41.86	18.4	4.1	17.9	2
50	14	0.903	-0.886	40.77	18.2	4.4	17.6	1.7
50	15	0.889	-1.022	39.52	17.9	4.6	17.2	1.5
50	16	0.874	-1.170	38.19	17.6	4.8	16.9	1.3
50	17	0.859	-1.320	36.89	17.3	5	16.5	1.1
50	18	0.843	-1.483	35.53	17	5.2	16.1	0.9
50	19	0.827	-1.650	34.20	16.6	5.4	15.6	0.7
50	20	0.81	-1.830	32.81	16.3	5.5	15.3	0.6
50	21	0.792	-2.025	31.36	15.9	5.6	14.8	0.5
50	22	0.774	-2.225	29.95	15.6	5.8	14.4	0.3
50	23	0.756	-2.430	28.58	15.2	5.9	13.9	0.2
50	24	0.737	-2.651	27.16	14.8	6	13.5	0.1
50	25	0.718	-2.878	25.78	14.4	6	13	0.1
50	26	0.698	-3.123	24.36	14	6.1	12.5	0
50	27	0.678	-3.375	22.98	13.6	6.1	12.1	0
50	28	0.658	-3.635	21.65	13.2	6.1	11.6	0
50	29	0.638	-3.904	20.35	12.8	6.2	11.1	-0.1
50	30	0.617	-4.194	19.03	12.4	6.1	10.7	0
50	31	0.597	-4.481	17.82	12	6.1	10.2	0
50	32	0.576	-4.792	16.59	11.6	6.1	9.8	0
50	33	0.555	-5.114	15.40	11.2	6	9.3	0.1

50	34	0.535	-5.433	14.31	10.8	6	8.9	0.1
50	35	0.514	-5.781	13.21	10.3	5.9	8.4	0.2
50	36	0.494	-6.125	12.20	9.9	5.8	8	0.3
50	37	0.473	-6.503	11.19	9.5	5.7	7.5	0.4
50	38	0.453	-6.878	10.26	9.1	5.6	7.1	0.5
50	39	0.433	-7.270	9.37	8.7	5.4	6.7	0.7
50	40	0.414	-7.660	8.57	8.3	5.3	6.3	0.8
50	41	0.394	-8.090	7.76	7.9	5.1	5.9	1
50	42	0.375	-8.519	7.03	7.5	5	5.5	1.1
50	43	0.357	-8.947	6.37	7.2	4.9	5.2	1.2
50	44	0.338	-9.422	5.71	6.8	4.7	4.8	1.4
50	45	0.32	-9.897	5.12	6.4	4.5	4.5	1.6
50	46	0.303	-10.371	4.59	6.1	4.3	4.2	1.8
50	47	0.286	-10.873	4.09	5.7	4.1	3.8	2
50	48	0.269	-11.405	3.62	5.4	4	3.6	2.1
50	49	0.253	-11.938	3.20	5.1	3.8	3.3	2.3
50	50	0.237	-12.505	2.81	4.7	3.5	3	2.6
50	51	0.222	-13.073	2.46	4.4	3.4	2.7	2.7
50	52	0.207	-13.681	2.14	4.1	3.2	2.5	2.9
50	53	0.193	-14.289	1.86	3.8	3	2.2	3.1
50	54	0.179	-14.943	1.60	3.6	2.9	2.1	3.2
50	55	0.166	-15.598	1.38	3.3	2.7	1.8	3.4
50	56	0.154	-16.250	1.19	3.1	2.5	1.7	3.6
50	57	0.142	-16.954	1.01	2.8	2.3	1.5	3.8
50	58	0.13	-17.721	0.85	2.6	2.2	1.3	3.9
50	59	0.119	-18.489	0.71	2.4	2	1.2	4.1
50	60	0.109	-19.251	0.59	2.2	1.9	1.1	4.2
50	61	0.099	-20.087	0.49	1.9	1.6	0.9	4.5
50	62	0.09	-20.915	0.41	1.8	1.5	0.8	4.6
50	63	0.082	-21.724	0.34	1.6	1.4	0.7	4.7
50	64	0.073	-22.734	0.27	1.4	1.2	0.6	4.9
50	65	0.066	-23.609	0.22	1.3	1.1	0.5	5
50	66	0.059	-24.583	0.17	1.1	1	0.4	5.1
50	67	0.052	-25.680	0.14	1	0.9	0.3	5.2
50	68	0.046	-26.745	0.11	0.9	0.8	0.3	5.3

50	69	0.04	-27.959	0.08	0.8	0.7	0.2	5.4
50	70	0.035	-29.119	0.06	0.7	0.6	0.2	5.5
50	71	0.03	-30.458	0.05	0.6	0.5	0.1	5.6
50	72	0.026	-31.701	0.03	0.5	0.4	0.1	5.7
50	73	0.022	-33.152	0.02	0.4	0.3	0.1	5.8
50	74	0.019	-34.425	0.02	0.3	0.2	0	5.9
50	75	0.016	-35.918	0.01	0.3	0.2	0	5.9
50	76	0.013	-37.721	0.01	0.2	0.1	0	6
50	77	0.011	-39.172	0.01	0.2	0.1	0	6
50	78	0.008	-41.938	0.00	0.1	0	0	6.1
50	79	0.007	-43.098	0.00	0.1	0	0	6.1
50	80	0.005	-46.021	0.00	0.1	0	0	6.1
50	81	0.004	-47.959	0.00	0	0	0	6.1
50	82	0.003	-50.458	0.00	0	0	0	6.1
50	83	0.002	-53.979	0.00	0	0	0	6.1
50	84	0.001	-60.000	0.00	0	0	0	6.1
50	85	0.001	-60.000	0.00	0	0	0	6.1
50	86	0.001	-60.000	0.00	0	0	0	6.1
50	87	0.00	-100.000	0.00	0	0	0	6.1
50	88	0.00	-100.000	0.00	0	0	0	6.1
50	89	0.00	-100.000	0.00	0	0	0	6.1
50	90	0.00	-100.000	0.00	0	0	0	6.1

NON IONIZING ELECTROMAGNETIC RADIATION



Antenna: Inverted V
Horizontal ERP (W): 50
Vertical ERP (W): 50
Antenna Height (M): 6.1 m
Elements: 2
Spacing: 0.5

Using these settings, the maximum predicted RF exposure for a human standing on the ground would be 23.9 $\mu\text{W}/\text{cm}^2$ at 6.4 m at roof level. This represents less than 12% of the FCC Maximum Permissible Exposure (MPE) of 200 $\mu\text{W}/\text{cm}^2$ for uncontrolled environments. Roof level is off limits, and a warning sign will be posted on the mast. If roof work needs to be done the station will be powered down.

Elevation Data for Antenna

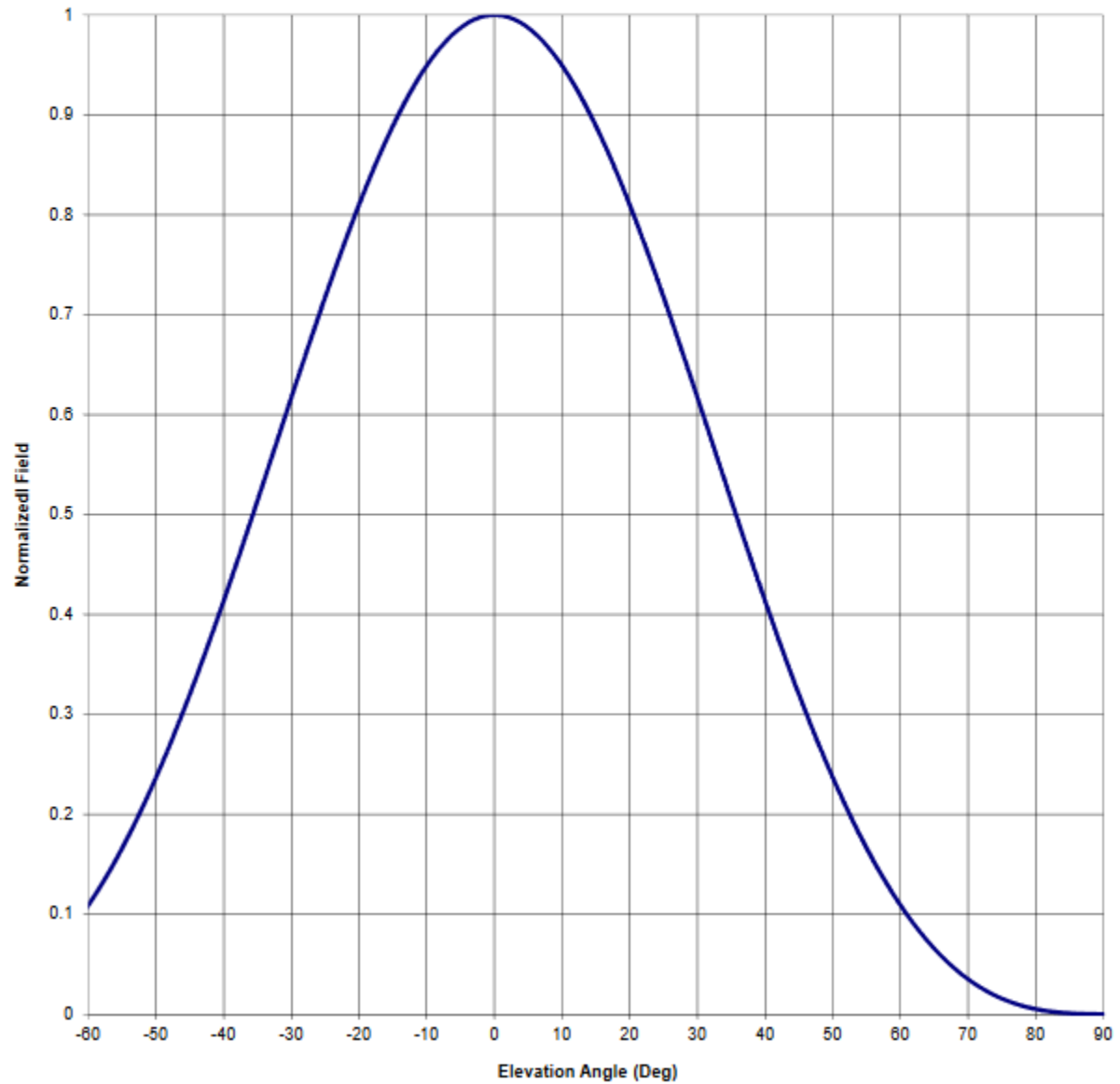
Antenna Mfg.: Shively Labs
Antenna Type: 6812B-HW-2

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

Date: 11/3/2020

Antenna Type: 6812B-HW-2

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		