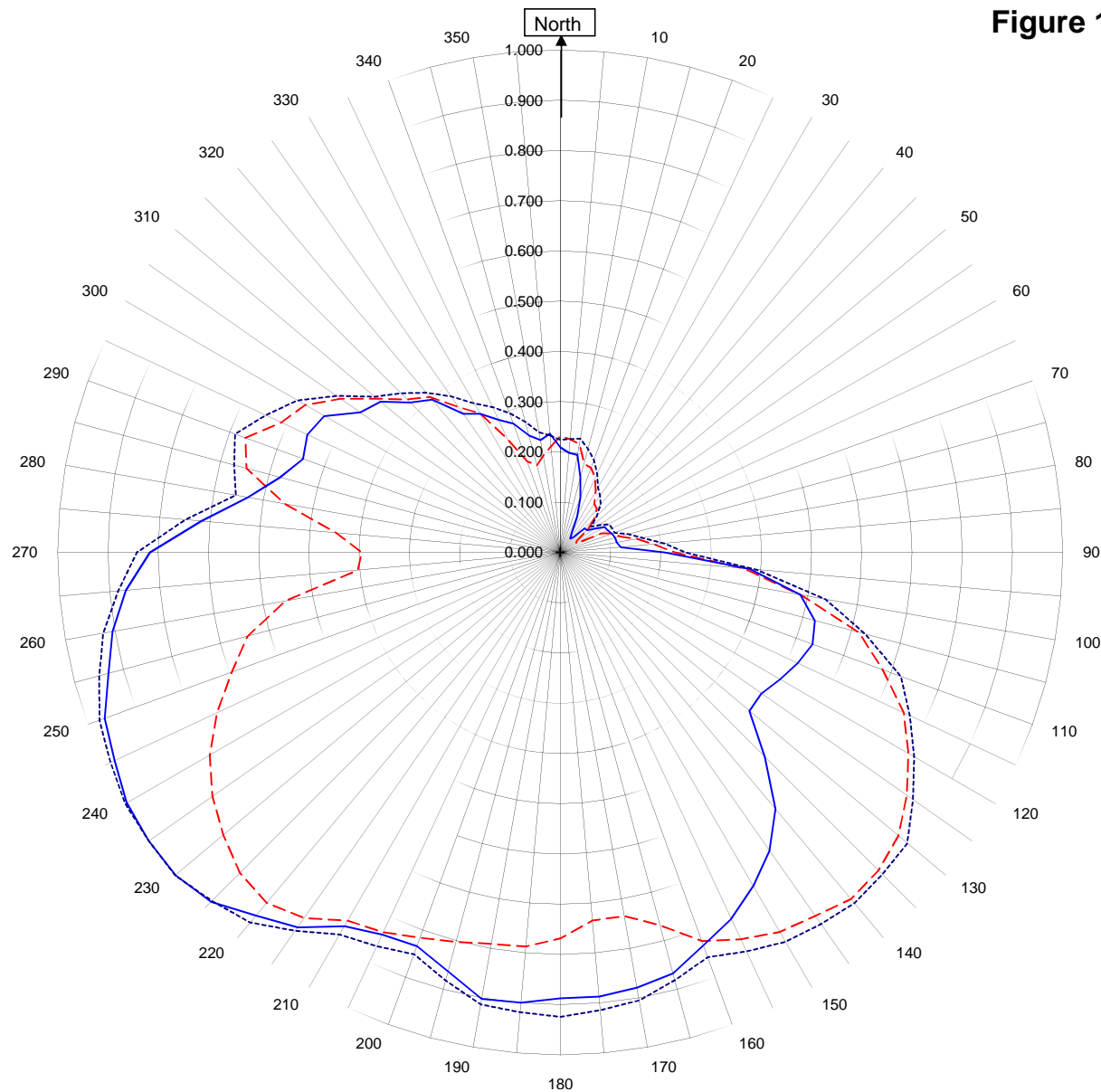


Shively Labs

Shively Labs, a division of Howell Laboratories, Inc. Bridgton, ME (207)647-3327

Figure 1A



W272BV **Portland, ME.**
33571
February 23, 2017

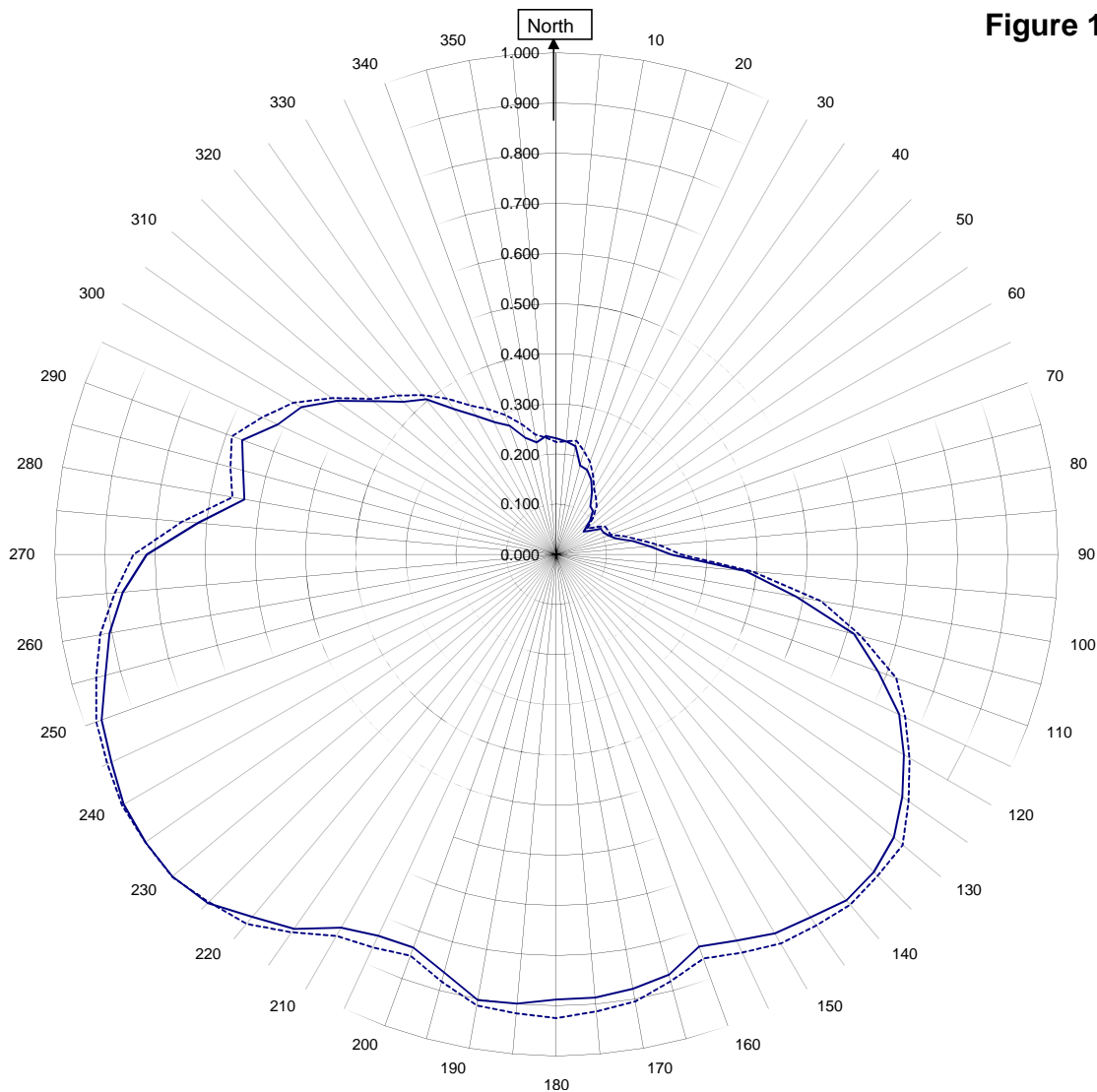
Horizontal RMS	0.615	Frequency	102.5 / 461.25 mHz
Vertical RMS	0.591	Plot	Relative Field
H/V Composite RMS	0.658	Scale	4.5 : 1
FCC Composite RMS	0.673	See Figure 2 for Mechanical Details	

Antenna Model	6810-1R-DA
Pattern Type	Directional Azimuth

Shively Labs

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Figure 1B



W272BV Portland, ME.
33571
February 23, 2017

—————H/V Composite RMS	0.658
.....FCC Composite RMS	0.673

Frequency	102.5 / 461.25 mHz
Plot	Relative Field
Scale	4.5 : 1
See Figure 2 for Mechanical Details	

Antenna Model	6810-1R-DA
Pattern Type	Directional H/V Composite

Figure 1C

Tabulation of Horizontal Azimuth Pattern
W272BV Portland, ME.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.209	180	0.887
10	0.197	190	0.902
20	0.116	200	0.834
30	0.045	210	0.859
40	0.039	220	0.943
45	0.068	225	0.983
50	0.069	230	0.999
60	0.102	240	0.997
70	0.109	250	0.965
80	0.114	260	0.905
90	0.208	270	0.817
100	0.485	280	0.632
110	0.534	290	0.545
120	0.505	300	0.543
130	0.491	310	0.467
135	0.575	315	0.422
140	0.666	320	0.397
150	0.767	330	0.319
160	0.832	340	0.273
170	0.879	350	0.227

Figure 1D

Tabulation of Vertical Azimuth Pattern
W272BV Portland, ME.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.232	180	0.768
10	0.219	190	0.791
20	0.179	200	0.816
30	0.141	210	0.846
40	0.113	220	0.910
45	0.095	225	0.902
50	0.071	230	0.876
60	0.036	240	0.805
70	0.111	250	0.696
80	0.155	260	0.555
90	0.229	270	0.395
100	0.486	280	0.557
110	0.683	290	0.667
120	0.800	300	0.587
130	0.878	310	0.476
135	0.895	315	0.431
140	0.900	320	0.404
150	0.872	330	0.319
160	0.823	340	0.194
170	0.735	350	0.196

Figure 1E

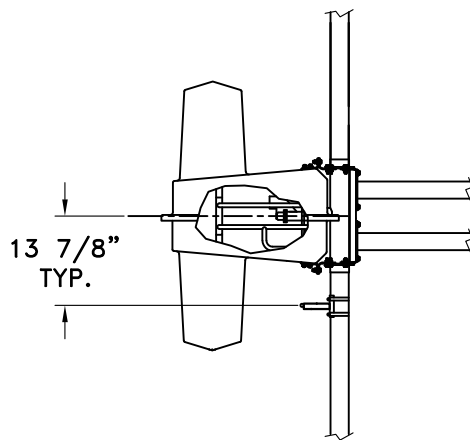
Tabulation of Composite Azimuth Pattern
W272BV Portland, ME.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.232	180	0.887
10	0.219	190	0.902
20	0.179	200	0.834
30	0.141	210	0.859
40	0.113	220	0.943
45	0.095	225	0.983
50	0.071	230	0.999
60	0.102	240	0.997
70	0.111	250	0.965
80	0.155	260	0.905
90	0.229	270	0.817
100	0.486	280	0.632
110	0.683	290	0.667
120	0.800	300	0.587
130	0.878	310	0.476
135	0.895	315	0.431
140	0.900	320	0.404
150	0.872	330	0.319
160	0.832	340	0.273
170	0.879	350	0.227

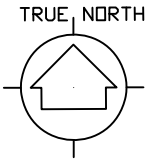
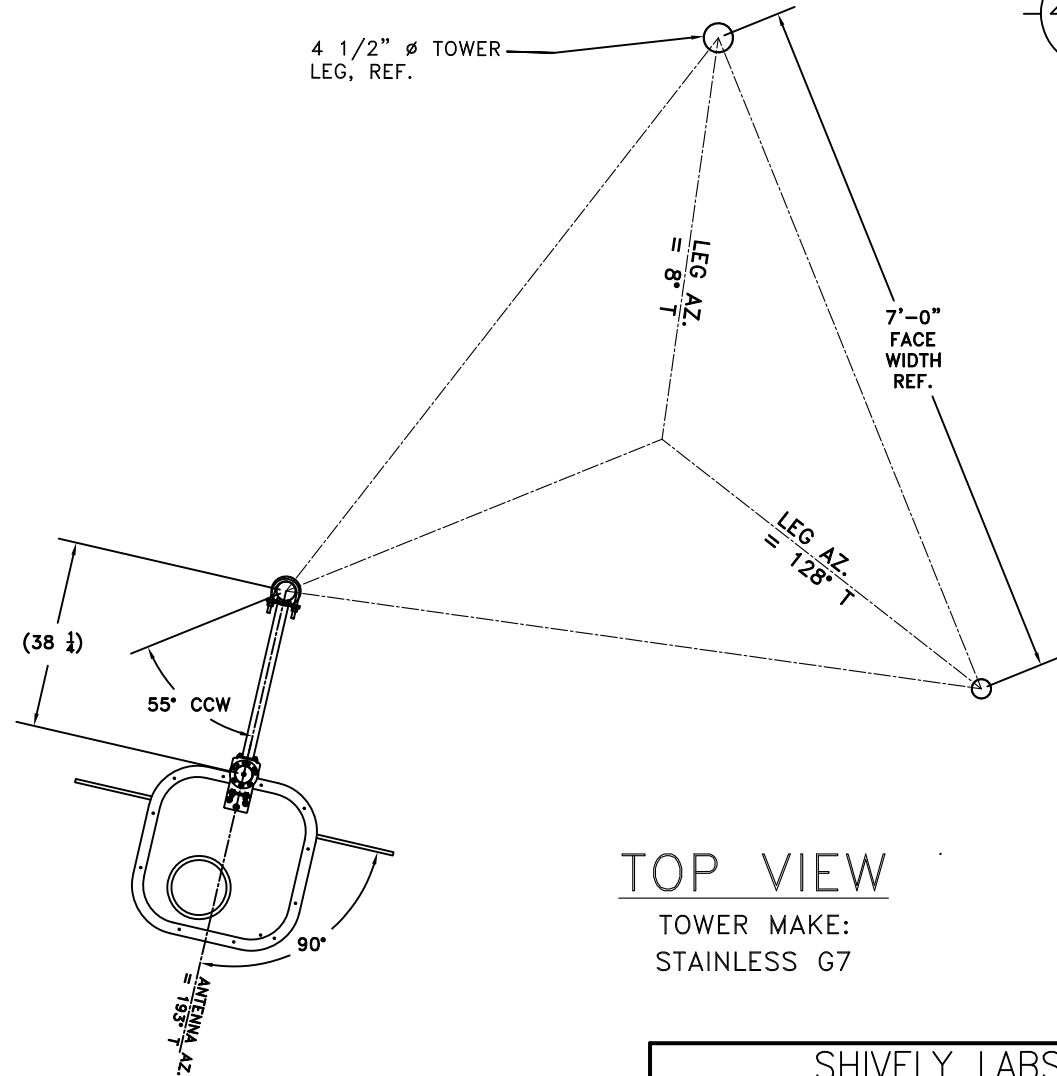
Figure 1F

Tabulation of FCC Directional Composite
W272BV Portland, ME.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.224	180	0.924
10	0.230	190	0.913
20	0.196	200	0.851
30	0.150	210	0.878
40	0.125	220	0.961
50	0.080	230	1.000
60	0.112	240	1.000
70	0.115	250	0.976
80	0.167	260	0.924
90	0.249	270	0.843
100	0.536	280	0.656
110	0.721	290	0.689
120	0.813	300	0.605
130	0.901	310	0.482
140	0.911	320	0.415
150	0.895	330	0.343
160	0.857	340	0.295
170	0.905	350	0.243



SIDE VIEW



TOP VIEW

TOWER MAKE:
STAINLESS G7

ANTENNA HEADING 193° TRUE NORTH

SHIVELY LABS			
A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE			
SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
33571	102.3	N.T.S.	ASP
TITLE:		APPROVED BY:	
MODEL-6810-1R-DIRECTIONAL ANTENNA		DAB	
DATE:			
2-24-17	FIGURE 2		

Antenna Mfg.: Shively Labs
Antenna Type: 6810-1R-DA

Date: 2/27/2017

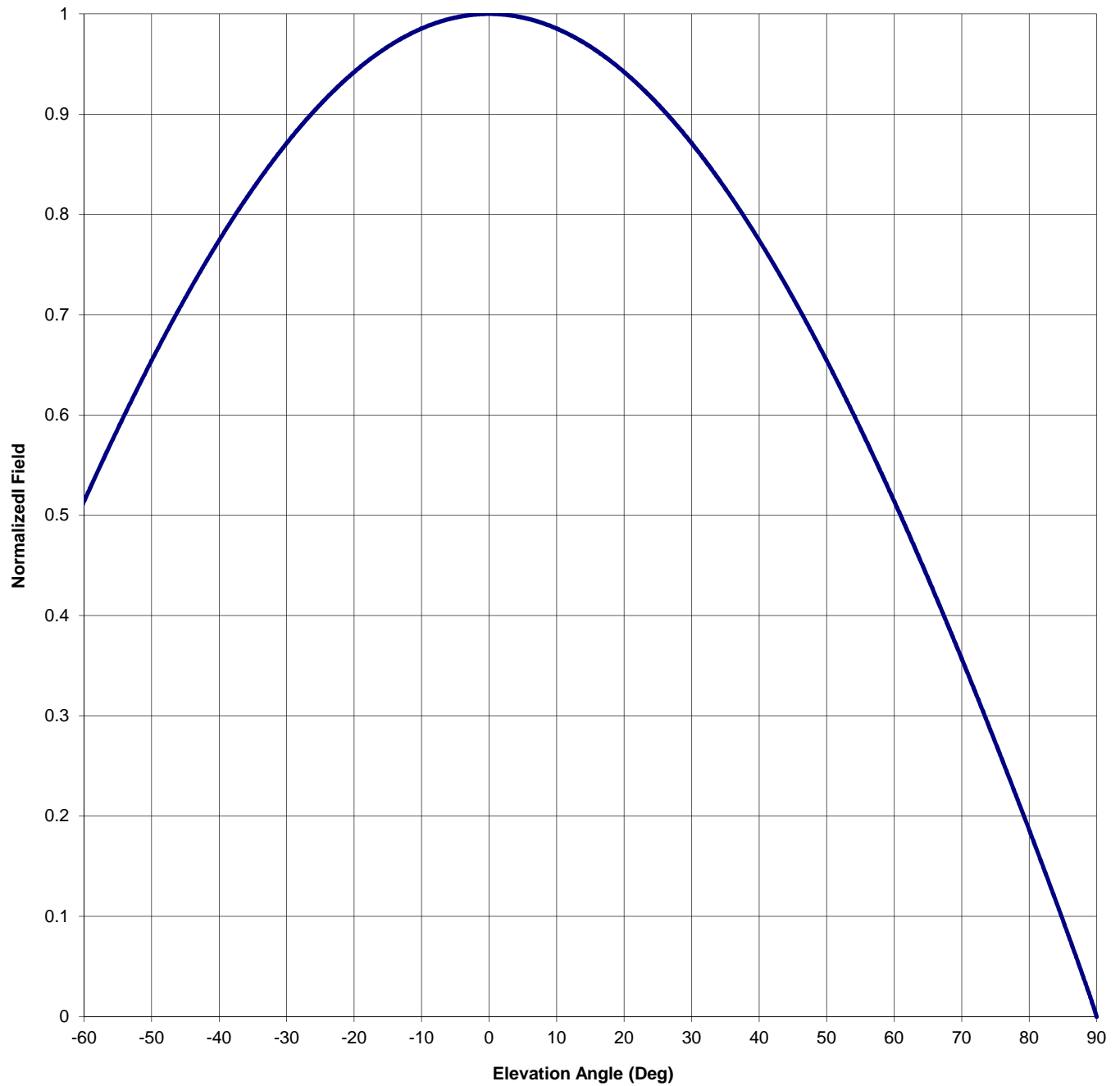
Station: W272BV

Frequency: 102.5

Channel #: 273

Figure: Figure 3

Beam Tilt	0	
Gain (Max)	1.265	1.021 dB
Gain (Horizon)	1.265	1.021 dB



Antenna Mfg.: Shively Labs

Date: 2/27/2017

Antenna Type: 6810-1R-DA

Station: W272BV

Beam Tilt 0

Frequency: 102.5

Gain (Max) 1.265 1.021 dB

Channel #: 273

Gain (Horizon) 1.265 1.021 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	0.729	0	1.000	46	0.705
-89	0.021	-43	0.741	1	1.000	47	0.693
-88	0.040	-42	0.752	2	0.999	48	0.680
-87	0.059	-41	0.763	3	0.999	49	0.667
-86	0.078	-40	0.774	4	0.998	50	0.654
-85	0.096	-39	0.785	5	0.996	51	0.641
-84	0.114	-38	0.796	6	0.995	52	0.628
-83	0.133	-37	0.806	7	0.993	53	0.614
-82	0.151	-36	0.816	8	0.991	54	0.600
-81	0.168	-35	0.826	9	0.988	55	0.586
-80	0.186	-34	0.835	10	0.985	56	0.572
-79	0.204	-33	0.845	11	0.982	57	0.558
-78	0.221	-32	0.854	12	0.979	58	0.544
-77	0.239	-31	0.862	13	0.975	59	0.529
-76	0.256	-30	0.871	14	0.971	60	0.514
-75	0.273	-29	0.879	15	0.967	61	0.499
-74	0.290	-28	0.887	16	0.963	62	0.484
-73	0.307	-27	0.895	17	0.958	63	0.469
-72	0.324	-26	0.903	18	0.953	64	0.453
-71	0.341	-25	0.910	19	0.948	65	0.437
-70	0.357	-24	0.917	20	0.942	66	0.422
-69	0.373	-23	0.924	21	0.936	67	0.406
-68	0.390	-22	0.930	22	0.930	68	0.390
-67	0.406	-21	0.936	23	0.924	69	0.373
-66	0.422	-20	0.942	24	0.917	70	0.357
-65	0.437	-19	0.948	25	0.910	71	0.341
-64	0.453	-18	0.953	26	0.903	72	0.324
-63	0.469	-17	0.958	27	0.895	73	0.307
-62	0.484	-16	0.963	28	0.887	74	0.290
-61	0.499	-15	0.967	29	0.879	75	0.273
-60	0.514	-14	0.971	30	0.871	76	0.256
-59	0.529	-13	0.975	31	0.862	77	0.239
-58	0.544	-12	0.979	32	0.854	78	0.221
-57	0.558	-11	0.982	33	0.845	79	0.204
-56	0.572	-10	0.985	34	0.835	80	0.186
-55	0.586	-9	0.988	35	0.826	81	0.168
-54	0.600	-8	0.991	36	0.816	82	0.151
-53	0.614	-7	0.993	37	0.806	83	0.133
-52	0.628	-6	0.995	38	0.796	84	0.114
-51	0.641	-5	0.996	39	0.785	85	0.096
-50	0.654	-4	0.998	40	0.774	86	0.078
-49	0.667	-3	0.999	41	0.763	87	0.059
-48	0.680	-2	0.999	42	0.752	88	0.040
-47	0.693	-1	1.000	43	0.741	89	0.021
-46	0.705	0	1.000	44	0.729	90	0.000
-45	0.717			45	0.717		

VALIDATION OF TOTAL POWER GAIN CALCULATION

W272BV Portland, ME.

MODEL 6810-1R-DA

Elevation Gain of Antenna

0.46

Horizontal RMS value divided by the Vertical RMS value equals the Horiz. - Vert. Ratio

H RMS

0.614999

V RMS

0.591477

H/V Ratio

1.040

Elevation Gain of Horizontal Component

0.478

Elevation Gain of Vertical Component

0.442

Horizontal Azimuth Gain equals $1/(\text{RMS})^2$.

2.644

Vertical Azimuth Gain equals $1/(\text{RMS}/\text{Max Vert})^2$.

2.377

Max. Vertical

0.912

***Total Horizontal Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Horizontal Power Gain =

1.265

***Total Vertical Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Vertical Power Gain =

1.052

ERP divided by Horizontal Power Gain equals Antenna Input Power

0.21

kW ERP

Divided by H Gain

1.265

equals

0.166

kW H Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

0.166 kW

Times V Gain

1.052

equals

0.175

kW V ERP

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP

 $(0.912)^2$ Times 0.21 Equals 0.175 kW Vertical ERP

NOTE: Calculating the ERP of the Vertical Component by two methods validates the total power gain calculations