

## **EXHIBIT #9**

### **SPECIAL OPERATING CONDITIONS**

University of Wyoming  
KUWT  
Thermopolis, Wyoming  
License to Cover  
BPED-20050721ADC

CH 217C2

2.0 kW H & V

The facility was constructed in compliance with all special operating conditions, terms, and obligations described in the construction permit.

The following operating condition has been and will continue to be met:

1. Protection of workers

The applicant will protect workers on or near the tower by either reducing ERP or terminating transmission.

2. Antenna proof of performance:

Attachment A is the antenna proof of performance, submitted by Bob Surette of Shively Labs.

3. Surveyor affidavit:

Attachment B is an affidavit by professional engineer, Larry Dean, certifying to the orientation of the directional antenna.

4. Installation certification:

Attachment C is a letter from Larry Dean, certifying to the installation of the directional antenna.

5. Directional antenna certification:

Attachment D is a statement by the technical consultant, Kate Michler, attesting to the validity of the as-built directional antenna. The theoretical pattern has been modified along azimuths 80° – 170°, but all relative field values of the as-built pattern continue to be within the corresponding values of the new theoretical pattern along all pertinent azimuths.

6. RF emissions compliance:

Attachment E is an RF emissions compliance statement, prepared by Kate Michler.

7. RF Warning signs:

Signs warning people of the hazard of radiofrequency electromagnetic field have been posted at the site.

8. Main Studio Waiver

KUWT will operate at a satellite facility of KUWR(FM), Laramie, Wyoming.

S.O. 24050

Report of Test 6810-1R-DA

for

UNIVERSITY OF WYOMING

KUWT 91.3 MHz THERMOPOLIS, WY

## **OBJECTIVE:**

The objective of this test was to demonstrate the directional characteristics of a 6810-1R-DA to meet the needs of KUWT and to comply with the requirements of the FCC construction permit, file number BPED-20050721ADC.

## **RESULTS:**

The measured azimuth pattern for the 6810-1R-DA is shown in Figure 1. Figure 1A shows the Tabulation of the Horizontal Polarization. Figure 1B shows the Tabulation of the Vertical Polarization. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BPED-20050721ADC indicates that the Horizontal radiation component shall not exceed 2.0 kW at any azimuth and is restricted to the following values at the azimuths specified:

120 Degrees T: 0.49 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 325 Degrees T to 330 Degrees T. At the restricted azimuth of 120 Degrees T the Horizontal component is 10.9 dB down from the maximum of 2.0 kW, or 0.16 kW.

The R.M.S. of the Horizontal component is 0.719. The total Horizontal power gain is 1.027. The R.M.S. of the Vertical component is 0.623. The total Vertical power gain is 1.006. See Figure 4 for calculations.

**AMENDED FCC COMPOSITE PATTERN:**

The R.M.S. of the measured composite pattern is 0.738. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.8082. Therefore the measured pattern does not comply with the FCC requirement of 73.316(c)(ix)(A). In accordance with 73.1690(c)(2)(ii) an amended composite pattern with an R.M.S. value of 0.859 is attached as Figure 5. Figure 5A shows the tabulations of the amended composite pattern. This new composite pattern allows the above measured pattern to comply with the FCC requirement of 73.316(c)(ix)(A).

**METHOD OF DIRECTIONALIZATION:**

The 6810-1R-DA was mounted on a tower of exact scale to a Rohn 45 tower at the KUWT site. The spacing of the antenna to the tower was varied to achieve the vertical pattern shown in Figure 1. A horizontal parasitic element was placed directly under the bay. The position of this horizontal parasitic element was changed until the horizontal pattern shown in Figure 1 was achieved. See Figure 2 for mechanical details.

**METHOD OF MEASUREMENT:**

As allowed by the construction permit, file number BPED-20050721ADC, a single level of the 6810-1R-DA was set up on the Howell Laboratories scale model antenna pattern measuring range. A scale of 4.5:1 was used.

**SUPERVISION:**

Mr. Surette was graduated from Lowell Technological Institute, Lowell, Massachusetts in 1973 with the degree of Bachelor of Science in Electrical Engineering. He has been directly involved with design and development of broadcast antennas, filter systems and RF transmission components since 1974, as an RF Engineer for six years with the original Shively Labs in Raymond, ME and for a short period of time with Dielectric Communications. He is currently an Associate Member of the AFCCE and a Senior Member of IEEE. He has authored a chapter on filters and combining systems for the latest edition of the CRC Electronics Handbook and for the 9<sup>th</sup> Edition of the NAB Handbook.

**EQUIPMENT:**

The scale model pattern range consists of a wooden rotating pedestal equipped with a position indicator. The scale model bay is placed on the top of this pedestal and is used in the transmission mode at approximately 20 feet above ground level. The receiving corner reflector is spaced 50 feet away from the rotating pedestal at the same level above ground as the transmitting model. The transmitting and receiving signals are carried to a control building by means of RG-9/U double shielded coax cable.

The control building is equipped with:

Hewlett Packard Model 8753 Network Analyzer

PC Based Controller

Hewlett Packard 7550A Graphics Plotter

The test equipment is calibrated to ANSI/NCSL Z540-1-1994.

**TEST PROCEDURES:**

The corner reflector is mounted so that the horizontal and vertical azimuth patterns are measured independently by rotating the corner reflector by 90 degrees. The network analyzer was set to 410.85 MHz. Calibrated pads are used to check the linearity of the measuring system. For example, 6 dB padding yields a scale reading of 50 from an unpadding reading of 100 in voltage. From the recorded patterns, the R.M.S. values are calculated and recorded as shown in Figure 1.

Respectfully submitted by:

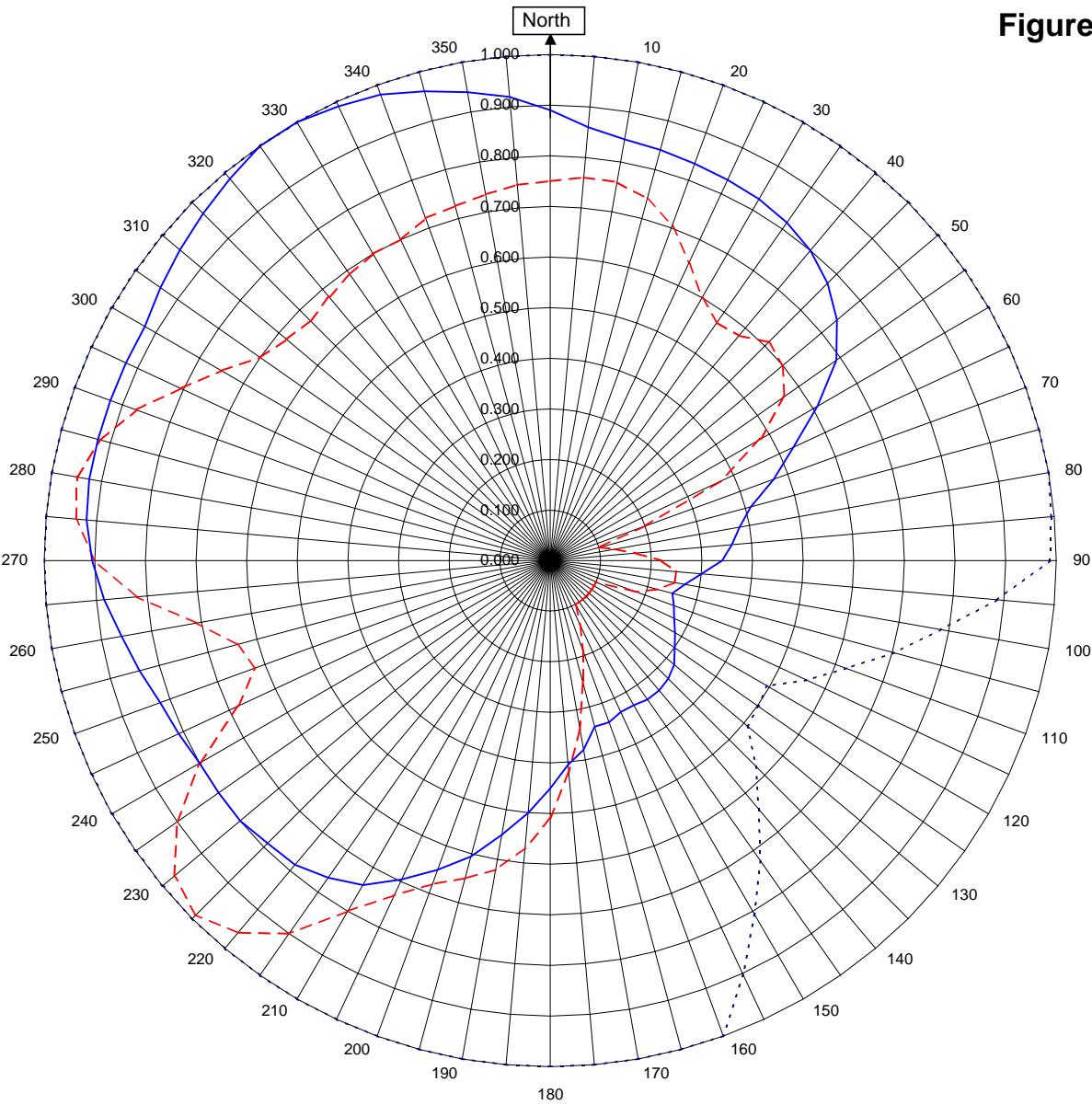


Robert A. Surette  
Director of Sales Engineering  
S/O 24050  
April 3, 2006

# Shively Labs

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

Figure 1



## KUWT Thermopolis, WY

24050  
April 3, 2006

Horizontal RMS	0.719
Vertical RMS	0.623
H/V Composite RMS	0.738
FCC Composite RMS	0.951

Frequency	91.3 / 410.85 MHz
Plot	Relative Field
Scale	4.5 : 1
See Figure 2 for Mechanical Details	

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

Figure 1a

Tabulation of Horizontal Azimuth Pattern  
KUWT Thermopolis, WY

Azimuth	Rel Field	Azimuth	Rel Field
0	0.890	180	0.450
10	0.845	190	0.550
20	0.835	200	0.650
30	0.825	210	0.740
40	0.800	220	0.785
45	0.775	225	0.790
50	0.740	230	0.800
60	0.610	240	0.800
70	0.470	250	0.820
80	0.380	260	0.860
90	0.340	270	0.905
100	0.270	280	0.925
110	0.260	290	0.925
120	0.285	300	0.925
130	0.320	310	0.955
135	0.330	315	0.970
140	0.335	320	0.985
150	0.330	330	1.000
160	0.340	340	0.980
170	0.380	350	0.940

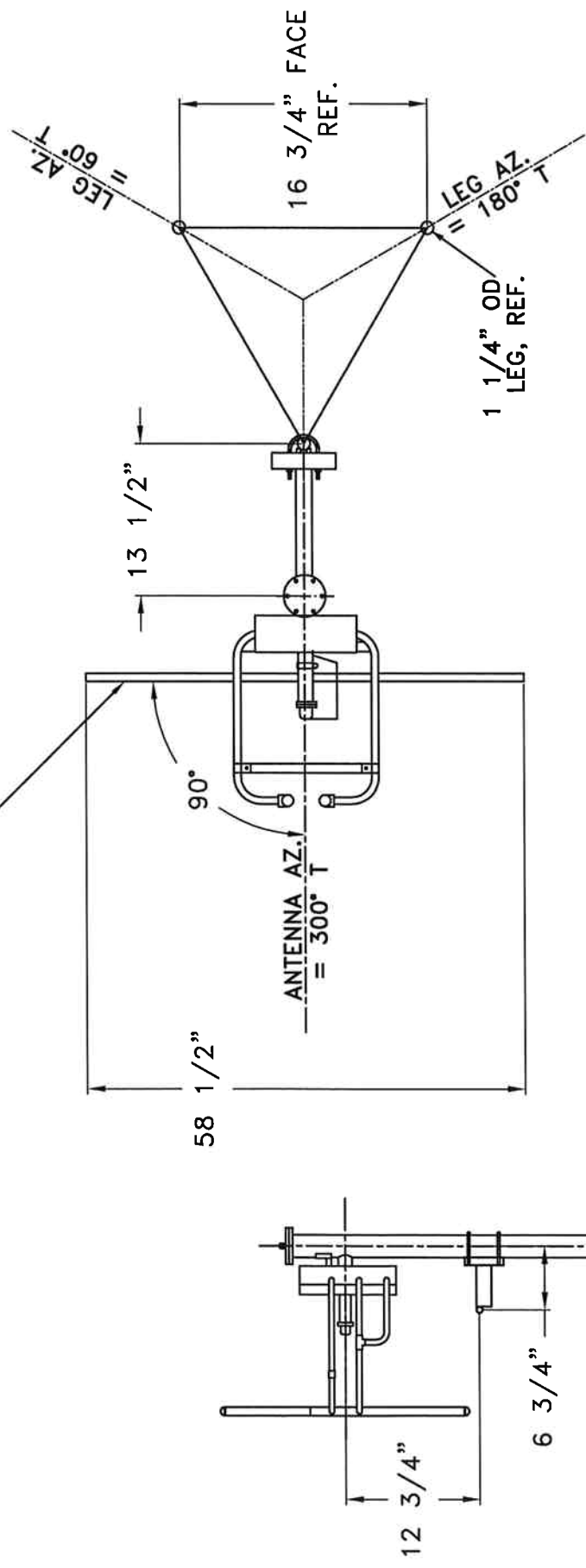
Figure 1b

Tabulation of Vertical Azimuth Pattern  
KUWT Thermopolis, WY

Azimuth	Rel Field	Azimuth	Rel Field
0	0.750	180	0.510
10	0.760	190	0.620
20	0.705	200	0.680
30	0.600	210	0.800
40	0.580	220	0.960
45	0.610	225	0.990
50	0.600	230	0.970
60	0.480	240	0.800
70	0.200	250	0.620
80	0.130	260	0.710
90	0.220	270	0.900
100	0.250	280	0.950
110	0.180	290	0.870
120	0.100	300	0.750
130	0.100	310	0.680
135	0.100	315	0.670
140	0.100	320	0.680
150	0.100	330	0.700
160	0.190	340	0.720
170	0.340	350	0.735



HORIZONTAL PARASITIC ASSEMBLY



**TOP VIEW**  
TOWER: ROHN-45

**SIDE VIEW**

SHIVELY LABS			
A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE			
SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
24050	91.3 MHZ.	N.T.S.	AMG
TITLE:		APPROVED BY:	
MODEL-6810-1R-DIRECTIONAL ANTENNA			
DATE:	FIGURE 2		
6/24/05			

**FIGURE 2**



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

Date: 4/3/2006

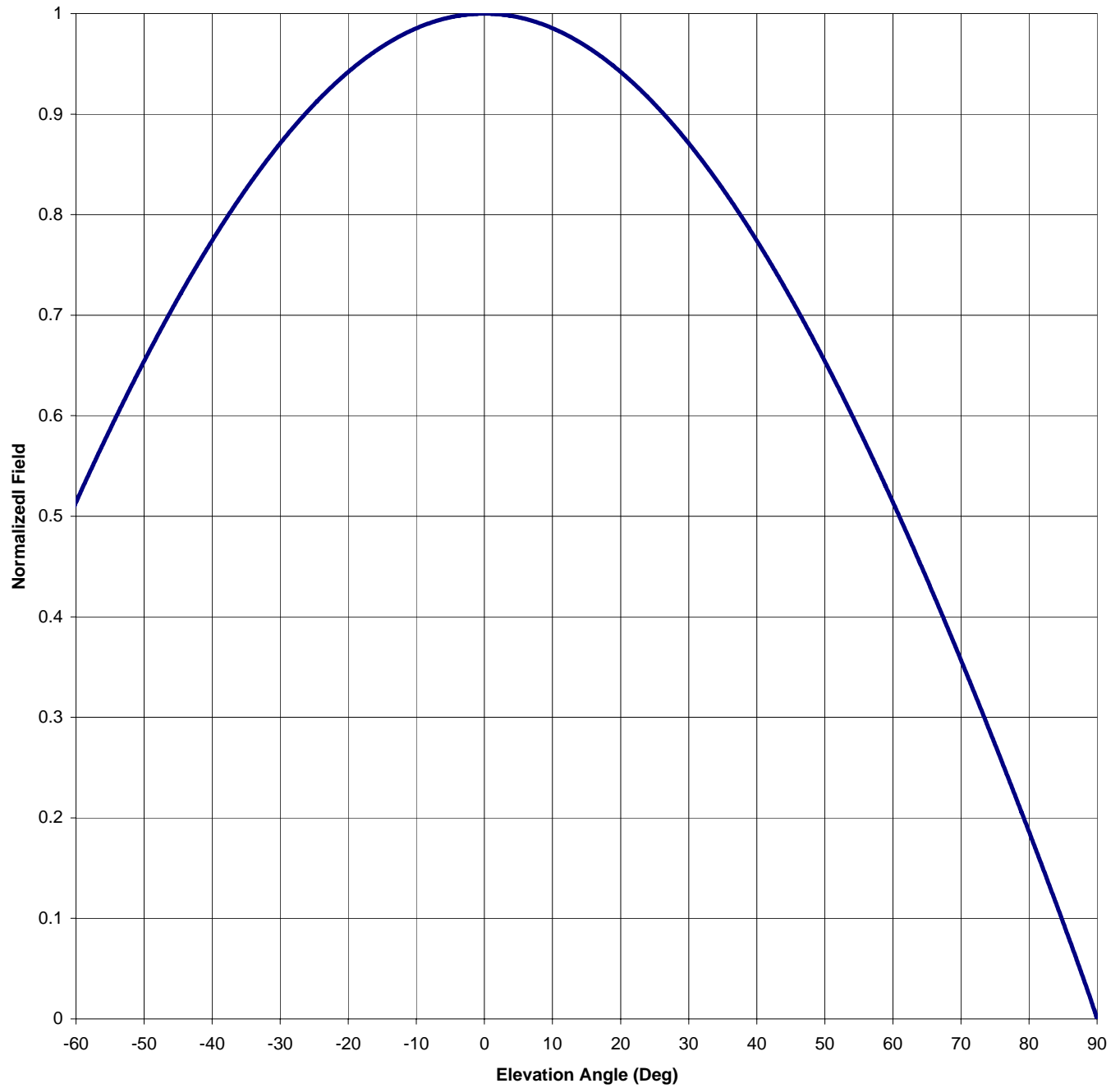
Station: KUWT

Frequency: 91.3

Channel #: 217

Figure: 3

Beam Tilt	1	
Gain (Max)	1.027	0.115 dB
Gain (Horizon)	1.027	0.115 dB



Antenna Mfg.: Shively Labs

Date: 4/3/2006

Antenna Type: 6810-1R-DA

Station: KUWT

Beam Tilt 1

Frequency: 91.3

Gain (Max) 1.027

0.115 dB

Channel #: 217

Gain (Horizon) 1.027

0.115 dB

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

KUWT

6810-1R-DA

Elevation Gain of Antenna 0.46

**The RMS values are calculated utilizing the data of a planimeter**

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

H RMS 0.719 V RMS 0.623 H/V Ratio 1.154

Elevation Gain of Horizontal Component 0.531

Elevation Gain of Vertical Component 0.399

Horizontal Azimuth Gain equals 1/(RMS)SQ. 1.934

Vertical Azimuth Gain equals 1/(RMS/Max Vert)SQ. 2.525

Max. Vertical 0.99

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

Total Horizontal Power Gain = 1.027

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

Total Vertical Power Gain = 1.006

=====

ERP divided by Horizontal Power Gain equals Antenna Input Power

2 KW ERP Equals 1.948 KW Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

1.948 KW Times 1.006 KW Equals 1.960 KW ERP

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

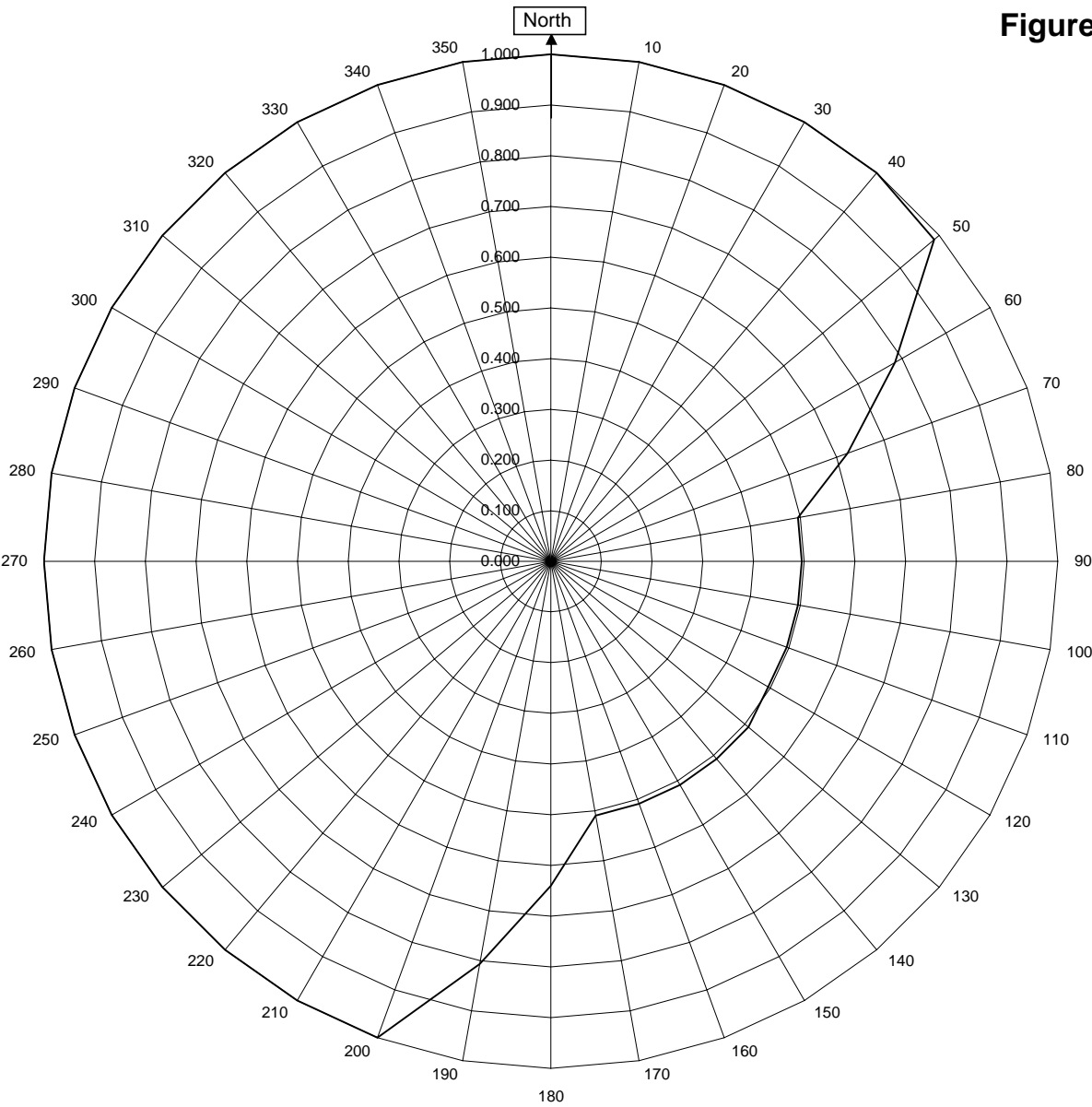
0.99 Equals 1.960 KW Vertical ERP

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

# Shively Labs

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

Figure 5



## KUWT Thermopolis, WY

24050  
April 3, 2006

Amended Composite RMS	0.859
85% Amended Composite RMS	0.730

Frequency	91.3 / 410.85 mHz
Plot	Relative Field

Antenna Model	6810-1R-DA
Pattern Type	Amended FCC Composite

Figure 5a

Tabulation of Amended Composite Pattern  
KUWT Thermopolis, WY

Azimuth	Rel Field	Azimuth	Rel Field
0	1.000	180	0.640
10	1.000	190	0.806
20	1.000	200	1.000
30	1.000	210	1.000
40	1.000	220	1.000
45	1.000	225	1.000
50	0.987	230	1.000
60	0.784	240	1.000
70	0.623	250	1.000
80	0.495	260	1.000
90	0.495	270	1.000
100	0.495	280	1.000
110	0.495	290	1.000
120	0.495	300	1.000
130	0.509	310	1.000
135	0.509	315	1.000
140	0.509	320	1.000
150	0.509	330	1.000
160	0.509	340	1.000
170	0.509	350	1.000

Azimuths to be modified

Certification for the FCC and concerned parties.

As stipulated in the application and construction permit grant BPED-20050721ADC for modification of station KUWT, Thermopolis WY, a survey was taken to confirm the directional alignment of the Shively model 6810 antenna. In accordance with the manufacture's plans specific for this site, antenna orientation on tower 1 places the radiation minima at 120 degrees true. This alignment was established using accurate GPS measurement in the setting of an aiming point 100 meters removed from the base of tower 1.

NAD 27 tower base coordinates as previously reported were also confirmed. Work was performed by me personally on September 12, 2006, and witnessed by Jay Ingalls, Senior Technician, University of Wyoming. Instrument was Garmin GPS72, in 3D digital resolution mode. A waypoint was set at the base of tower 1 directly under the antenna, and measurement of the bearing angle from true north from the aiming point to the waypoint was calculated internally and reported by the GPS to 1 degree precision.

Larry O. Dean  
Registered Professional Engineer  
PE 15734 Colorado

and

Coordinator of Radio Engineering  
Wyoming Public Radio  
University of Wyoming

/signed/ Larry O. Dean, September 18, 2006

Certification for the FCC and concerned parties.

In accordance with the application and construction permit grant BPED-20050721ADC for modification of station KUWT, Thermopolis WY, a Shively model 6810 antenna designed and tested by the manufacturer specific for the radiation requirement of this site was installed. Installation was performed by Harris Corporation, Microwave Communications Division the first week of March, 2006 under my direct supervision. VSWR of the completed installation as measured at the transmitter is 1:1.05.

Larry O. Dean  
Coordinator of Radio Engineering  
Wyoming Public Radio  
University of Wyoming

/signed/ Larry O. Dean, September 18, 2006

## **ATTACHMENT D**

### **DIRECTIONAL ANTENNA CERTIFICATION**

University of Wyoming  
KUWT  
Thermopolis, Wyoming  
License to Cover  
BPED-20050721ADC

CH 217C2

2.0 kW H & V

I have reviewed the antenna proof of performance submitted by Shively Labs and have reached the following conclusions:

1. The relative field strength values along all azimuths of the circularly polarized radiation component of the measured pattern do not exceed the values indicated on the composite pattern authorized by the underlying construction permit. See Page 2 (Amended Theoretical Relative Field Values) and Page 3 (As-Built Relative Field Values).
2. The relative field strength of 1.0 on the composite pattern does correspond to 2.0 kW ERP.
3. The principal minima of the as built pattern and the associated field strength (See Page 4):  
  
110° - 0.135 kW  
120° - 0.162
4. The as-built RMS is 85.9% of the theoretical pattern RMS.

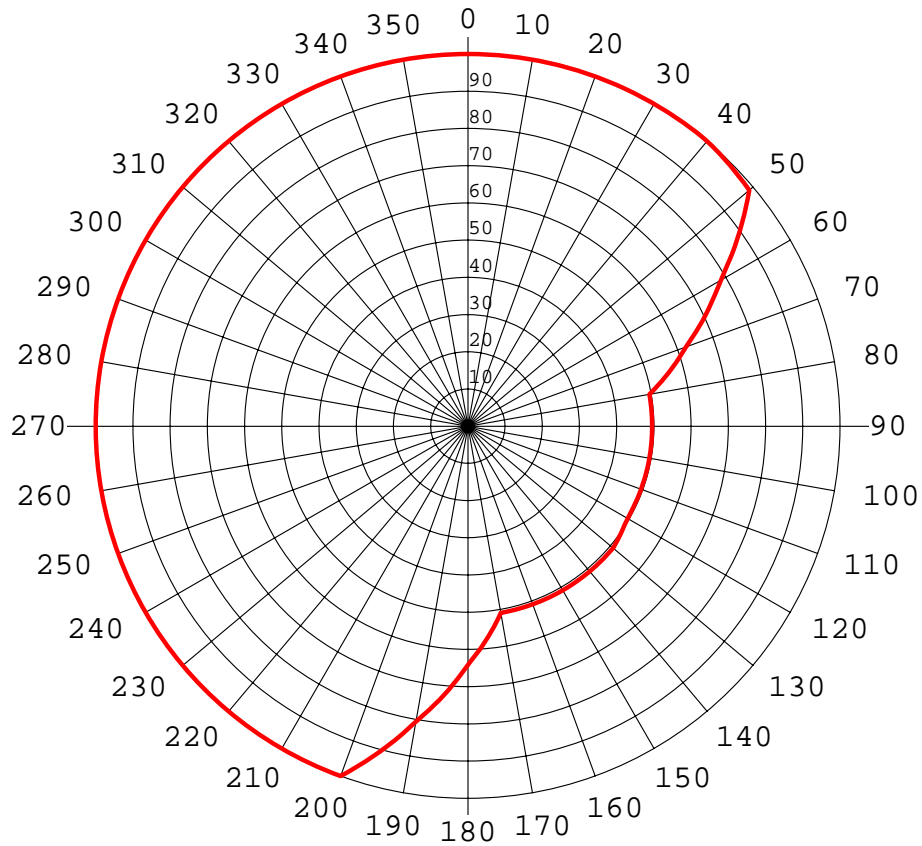
Amended Theoretical RMS = 0.859

As-Built RMS = 0.738

Kate Michler,  
Technical Consultant

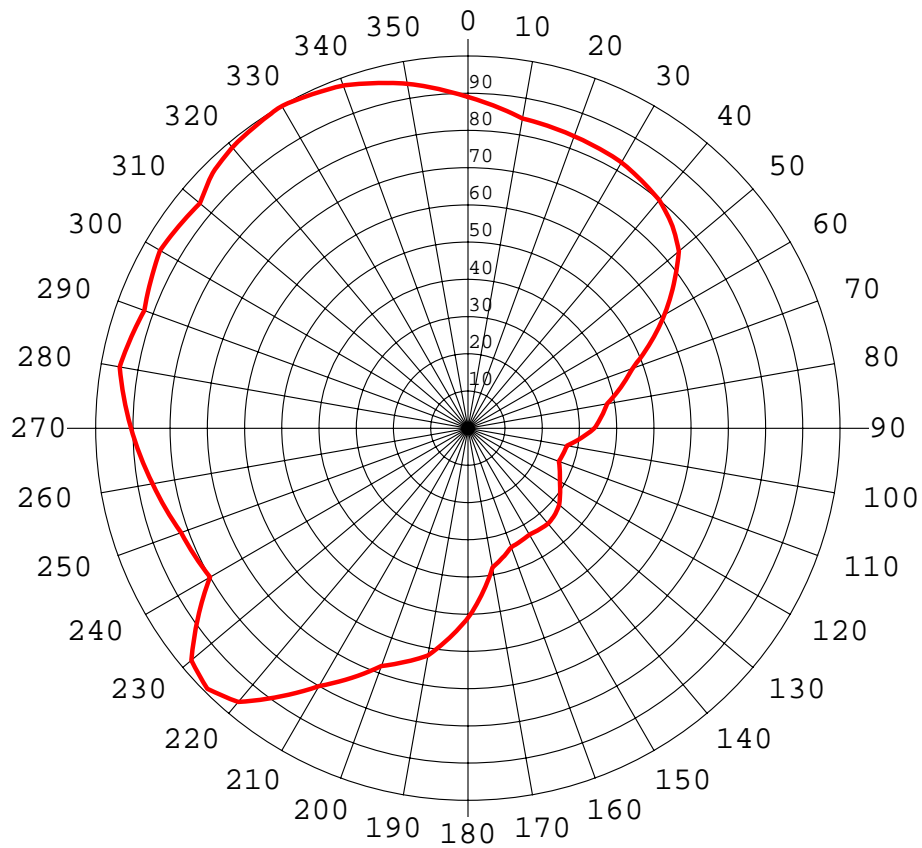


# Amended Theoretical Relative Field Values



Azi	Rel	dBk	kW	dB	Azi	Rel	dBk	kW	dB
0	1.000	3.01	2.00	0.00	180	0.640	-0.86	0.82	-3.87
10	1.000	3.01	2.00	0.00	190	0.806	1.14	1.30	-1.87
20	1.000	3.01	2.00	0.00	200	1.000	3.01	2.00	0.00
30	1.000	3.01	2.00	0.00	210	1.000	3.01	2.00	0.00
40	1.000	3.01	2.00	0.00	220	1.000	3.01	2.00	0.00
50	0.987	2.90	1.95	-0.11	230	1.000	3.01	2.00	0.00
60	0.784	0.90	1.23	-2.11	240	1.000	3.01	2.00	0.00
70	0.623	-1.10	0.78	-4.11	250	1.000	3.01	2.00	0.00
80	0.495	-3.10	0.49	-6.11	260	1.000	3.01	2.00	0.00
90	0.495	-3.10	0.49	-6.11	270	1.000	3.01	2.00	0.00
100	0.495	-3.10	0.49	-6.11	280	1.000	3.01	2.00	0.00
110	0.495	-3.10	0.49	-6.11	290	1.000	3.01	2.00	0.00
120	0.495	-3.10	0.49	-6.11	300	1.000	3.01	2.00	0.00
130	0.509	-2.86	0.52	-5.87	310	1.000	3.01	2.00	0.00
140	0.509	-2.86	0.52	-5.87	320	1.000	3.01	2.00	0.00
150	0.509	-2.86	0.52	-5.87	330	1.000	3.01	2.00	0.00
160	0.509	-2.86	0.52	-5.87	340	1.000	3.01	2.00	0.00
170	0.509	-2.86	0.52	-5.87	350	1.000	3.01	2.00	0.00

# As-Built Relative Field Values Composite



Azi	Rel	dBk	kW	dB	Azi	Rel	dBk	kW	dB
0	0.890	2.00	1.584	-1.01	180	0.510	-2.84	0.520	-5.85
10	0.845	1.55	1.428	-1.46	190	0.620	-1.14	0.769	-4.15
20	0.835	1.44	1.394	-1.57	200	0.680	-0.34	0.925	-3.35
30	0.825	1.34	1.361	-1.67	210	0.800	1.07	1.280	-1.94
40	0.800	1.07	1.280	-1.94	220	0.960	2.66	1.843	-0.35
50	0.740	0.39	1.095	-2.62	230	0.970	2.75	1.882	-0.26
60	0.610	-1.28	0.744	-4.29	240	0.800	1.07	1.280	-1.94
70	0.470	-3.55	0.442	-6.56	250	0.820	1.29	1.345	-1.72
80	0.380	-5.39	0.289	-8.40	260	0.860	1.70	1.479	-1.31
90	0.340	-6.36	0.231	-9.37	270	0.905	2.14	1.638	-0.87
100	0.270	-8.36	0.146	-11.37	280	0.950	2.56	1.805	-0.45
110	0.260	-8.69	0.135	-11.70	290	0.925	2.33	1.711	-0.68
120	0.285	-7.89	0.162	-10.90	300	0.955	2.61	1.824	-0.40
130	0.320	-6.89	0.205	-9.90	310	0.940	2.47	1.767	-0.54
140	0.335	-6.49	0.224	-9.50	320	0.985	2.88	1.940	-0.13
150	0.330	-6.62	0.218	-9.63	330	1.000	3.01	2.000	0.00
160	0.340	-6.36	0.231	-9.37	340	0.980	2.83	1.921	-0.18
170	0.380	-5.39	0.289	-8.40	350	0.940	2.47	1.767	-0.54

Rotation Angle = 0

Additional Points

Azi	Rel	dBk	kW	dB
45	0.775	0.80	1.201	-2.21
135	0.330	-6.62	0.218	-9.63

Azi	Rel	dBk	kW	dB
225	0.990	2.92	1.960	-0.09
315	0.970	2.75	1.882	-0.26

## Attachment E

### R.F. EMISSION COMPLIANCE STATEMENT

The University of Wyoming  
Minor Change to KUWT  
BLED-20010920AAB  
Channel 217 – 2 kW H & V DA  
Thermopolis, Wyoming

September 2006

The as-built one-bay, circularly polarized antenna will be energized such that it produces 2 kW effective radiated power from a center of radiation of 10.7 meters above ground. Using the formulas expressed in the OET Bulletin, No. 65, August 1997, "Evaluating Compliance with F.C.C. Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", published by the Federal Communication Commission's Office of Science and Engineering, and then by applying a combination of the element and array pattern as defined in E.P.A. study PB85-245868 ("**Engineering Assessment of the Potential Impact of the Federal Radiation Protection Guidance on the AM, FM and TV Broadcast Services**") the predicted level of RF non-ionization emissions at a position of 2 meters above ground (head-height) at the base of the tower for the proposed 1-bay Shively 6810 (Type #6) antenna is 13.0 microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ), which is 1.3 percent of the maximum for this controlled area. The peak level, located at a distance of 9 meters from the tower base, is predicted to be  $379.54 \mu\text{W}/\text{cm}^2$ , which is 37.95 percent of the maximum for the controlled area. The applicant has constructed a locked and gated fence 15 meters from the tower base on all sides.

There are no other sources of RF emissions on the tower.

The applicant will protect workers on the tower by either reducing ERP or terminating transmission.

Consequently, it appears that the as-built FM station will be in full compliance with the Commission's human exposure to radiofrequency electromagnetic field rules and regulations.