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S.O. 26621

Report of Test 6513-2-DA

for

REAL COMMUNITY RADIO NETWORK, INC.

KZGM 88.1 MHz Cabool, MO

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6513-2-DA to meet the needs of KZGM and to comply with the requirements of the FCC construction permit, file number BNPED-20071018ANM.

RESULTS:

The measured azimuth pattern for the 6513-2-DA is shown in Figure 1. Figure 1A shows the Tabulation of the Vertical Polarization. Figure 1B shows the Tabulation of the FCC Composite Pattern. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BNPED-20071018ANM indicates that the Vertical radiation component shall not exceed 12.5 kW at any azimuth and is restricted to the following values at the azimuths specified:

270 Degrees T: 0.400 kW

From Figure 1, the maximum radiation of the Vertical component occurs at 054 Degrees T to 137 Degrees T. At the restricted azimuth of 270 Degrees T the Vertical component is 16.48 dB down from the maximum of 12.5 kW, or 0.281 kW.

The R.M.S. of the Vertical component is 0.736. The total Vertical power gain is 3.655. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.787. The R.M.S. of the measured composite pattern is 0.736. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.669. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6513-2-DA was mounted on a tower of precise scale to the Rohn 45G tower at the KZGM site. The spacing of the antenna to the tower was varied to achieve the vertical pattern shown in Figure 1. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BNPED-20071018ANM, a single level of the 6513-2-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 9th and 10th Editions 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 396.45 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 unpadded 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 26621
May 29, 2008

Shively Labs

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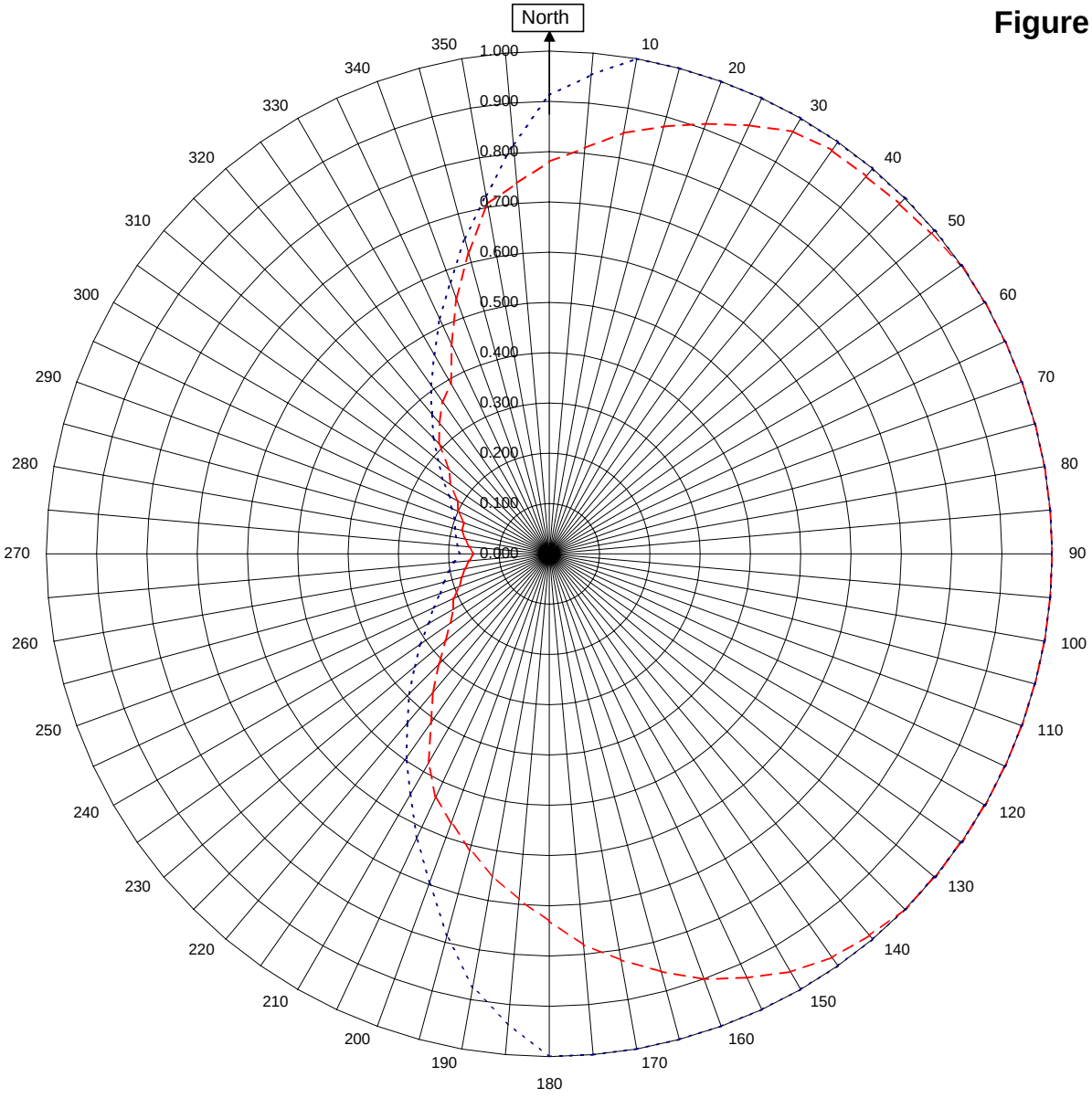
Figure 1



KZGM Cabool, MO

26621

May 29, 2008

Horizontal RMS	0.000
Vertical RMS	0.736
H/V Composite RMS	0.736
FCC Composite RMS	0.787

Frequency	88.1 / 396.45 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6513-2-DA Pattern 10
Pattern Type	Directional Azimuth

Figure 1a

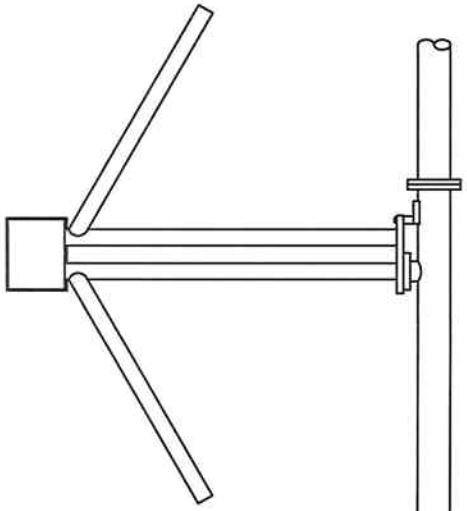
Tabulation of Vertical Azimuth Pattern
KZGM Cabool, MO

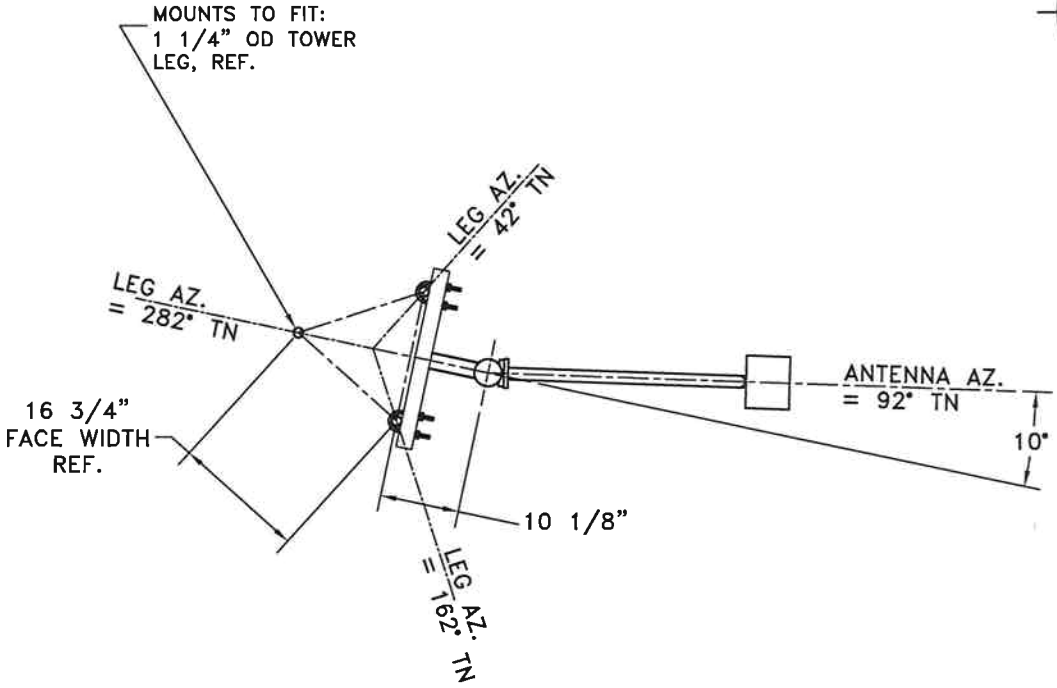
Azimuth	Rel Field	Azimuth	Rel Field
0	0.780	180	0.730
10	0.850	190	0.650
20	0.910	200	0.570
30	0.970	210	0.480
40	0.980	220	0.360
45	0.985	225	0.310
50	0.990	230	0.270
60	1.000	240	0.220
70	1.000	250	0.190
80	1.000	260	0.170
90	1.000	270	0.150
100	1.000	280	0.170
110	1.000	290	0.180
120	1.000	300	0.210
130	1.000	310	0.260
135	1.000	315	0.310
140	0.990	320	0.340
150	0.960	330	0.390
160	0.900	340	0.540
170	0.820	350	0.707

Figure 1b

Tabulation of FCC Directional Composite
KZGM Cabool, MO

Azimuth	Rel Field	Azimuth	Rel Field
0	0.912	180	1.000
10	1.000	190	0.876
20	1.000	200	0.696
30	1.000	210	0.552
40	1.000	220	0.439
50	1.000	230	0.349
60	1.000	240	0.277
70	1.000	250	0.231
80	1.000	260	0.203
90	1.000	270	0.178
100	1.000	280	0.188
110	1.000	290	0.200
120	1.000	300	0.229
130	1.000	310	0.288
140	1.000	320	0.363
150	1.000	330	0.457
160	1.000	340	0.575
170	1.000	350	0.724





TOP VIEW
TOWER: ROHN 45

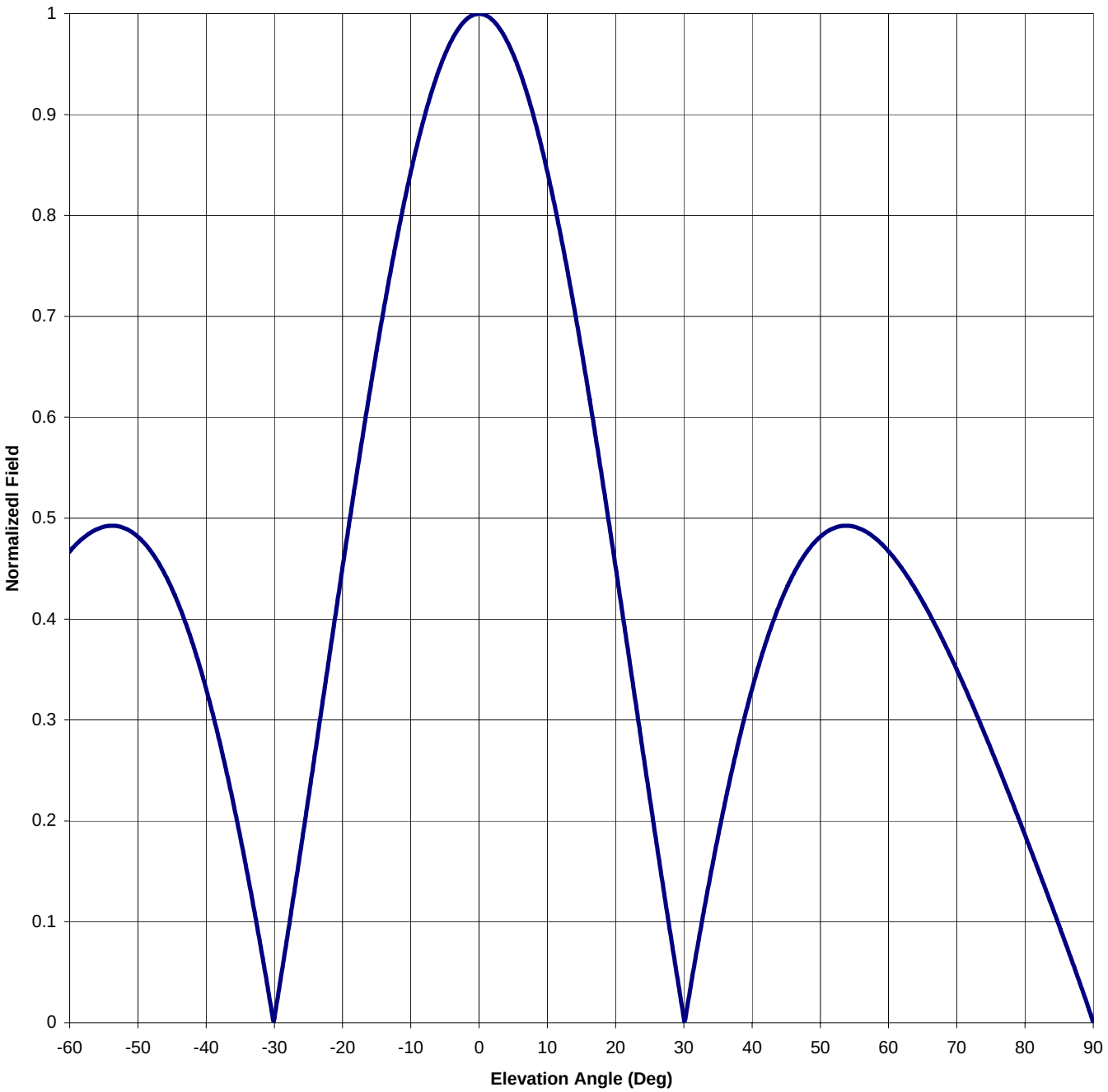
ANTENNA FEEDLINE (REF.)

SIDE VIEW

ANTENNA HEADING = 92° TRUE NORTH

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 26621	FREQUENCY: 88.1 MHz.	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY: DAB
TITLE: MODEL-6513-2-DIRECTIONAL ANTENNA			
DATE: 5/20/08	FIGURE 2		

Antenna Mfg.:	**Shively Labs**			**Date: 5/29/2008**
Antenna Type:	**6513-2-DA**			
Station:	**KZGM**	**Beam Tilt**	**0**	
Frequency:	**88.1**	**Gain (Max)**	**3.655**	**5.629 dB**
Channel #:	**201**	**Gain (Horizon)**	**3.655**	**5.629 dB**
Figure:	**3**			



Antenna Mfg.: Shively Labs **Date:** 5/29/2008

Antenna Type: 6513-2-DA

Station: KZGM **Beam Tilt** 0

Frequency: 88.1 **Gain (Max)** 3.655 5.629 dB

Channel #: 201 **Gain (Horizon)** 3.655 5.629 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	0.414	0	1.000	46	0.444
-89	0.021	-43	0.396	1	0.998	47	0.456
-88	0.040	-42	0.376	2	0.993	48	0.466
-87	0.059	-41	0.355	3	0.985	49	0.475
-86	0.078	-40	0.331	4	0.974	50	0.482
-85	0.096	-39	0.305	5	0.959	51	0.487
-84	0.114	-38	0.278	6	0.942	52	0.490
-83	0.132	-37	0.248	7	0.921	53	0.492
-82	0.150	-36	0.217	8	0.898	54	0.492
-81	0.168	-35	0.184	9	0.872	55	0.491
-80	0.186	-34	0.149	10	0.843	56	0.489
-79	0.203	-33	0.113	11	0.812	57	0.485
-78	0.221	-32	0.075	12	0.779	58	0.480
-77	0.238	-31	0.036	13	0.743	59	0.474
-76	0.255	-30	0.005	14	0.706	60	0.467
-75	0.271	-29	0.047	15	0.667	61	0.459
-74	0.288	-28	0.090	16	0.626	62	0.450
-73	0.304	-27	0.133	17	0.584	63	0.440
-72	0.320	-26	0.178	18	0.541	64	0.429
-71	0.335	-25	0.223	19	0.497	65	0.417
-70	0.350	-24	0.269	20	0.452	66	0.405
-69	0.364	-23	0.315	21	0.406	67	0.392
-68	0.379	-22	0.361	22	0.361	68	0.379
-67	0.392	-21	0.406	23	0.315	69	0.364
-66	0.405	-20	0.452	24	0.269	70	0.350
-65	0.417	-19	0.497	25	0.223	71	0.335
-64	0.429	-18	0.541	26	0.178	72	0.320
-63	0.440	-17	0.584	27	0.133	73	0.304
-62	0.450	-16	0.626	28	0.090	74	0.288
-61	0.459	-15	0.667	29	0.047	75	0.271
-60	0.467	-14	0.706	30	0.005	76	0.255
-59	0.474	-13	0.743	31	0.036	77	0.238
-58	0.480	-12	0.779	32	0.075	78	0.221
-57	0.485	-11	0.812	33	0.113	79	0.203
-56	0.489	-10	0.843	34	0.149	80	0.186
-55	0.491	-9	0.872	35	0.184	81	0.168
-54	0.492	-8	0.898	36	0.217	82	0.150
-53	0.492	-7	0.921	37	0.248	83	0.132
-52	0.490	-6	0.942	38	0.278	84	0.114
-51	0.487	-5	0.959	39	0.305	85	0.096
-50	0.482	-4	0.974	40	0.331	86	0.078
-49	0.475	-3	0.985	41	0.355	87	0.059
-48	0.466	-2	0.993	42	0.376	88	0.040
-47	0.456	-1	0.998	43	0.396	89	0.021
-46	0.444	0	1.000	44	0.414	90	0.000
-45	0.430			45	0.430		

S.O. 26621 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

KZGM 88.1 MHz Cabool, MO

MODEL 6513-2-DA

Elevation Gain of Antenna 1.98

V RMS 0.736

Vertical Azimuth Gain equals $1/(RMS)^2$ 1.846

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

Total Vertical Power Gain **3.655**

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ERP divided by Vertical Power Gain equals Antenna Input Power

12.5 kW ERP Divided by V Gain 3.655 Equals **3.420** kW Antenna Input Power