



PATTERN CERTIFICATION

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PATTERN CERTIFICATION

Method of Measurement

The azimuth pattern for "WFAE", Dielectric Document Sketch # 57, was measured in the following manner.

A single 4.4 to 1 scale model "DCBR" bay radiator was mounted on a similarly scaled model of the tower according to information provided to Dielectric by the customer; refer to Dielectric Document Sketch # 57. The antenna under test, all parasitics, all known tower appurtenances, and the tower section were rotated through 360 degrees while receiving a signal at the appropriate frequency from a linear cavity-backed source antenna. Both the horizontal and vertical polarization azimuth patterns were measured in an anechoic test range.

The transmit and scale model antennas are mounted at identical elevations and at opposite ends of the chamber. A Hewlett Packard model 8752C network analyzer was used to supply the RF signal to the source antenna at 4.4 times the fundamental FM frequency and to receive the signal intercepted by the antenna under test. The received signal was converted to a relative level, referenced to the source. This level was stored on a computer acting as the master controller. The computer controls the measurement system via IEEE-488 control bus through a GPIB card.

Statement of Qualifications

Keith L. Pelletier is a Senior Electrical Engineer here at Dielectric. He received a BS in Electrical Engineering Technology from the University of Maine in 1998. He has over 6 years experience in RF antenna engineering and has been employed by Dielectric Communications since 1997.

Signed By: Keith L. Pelletier

Date: 8/17/04

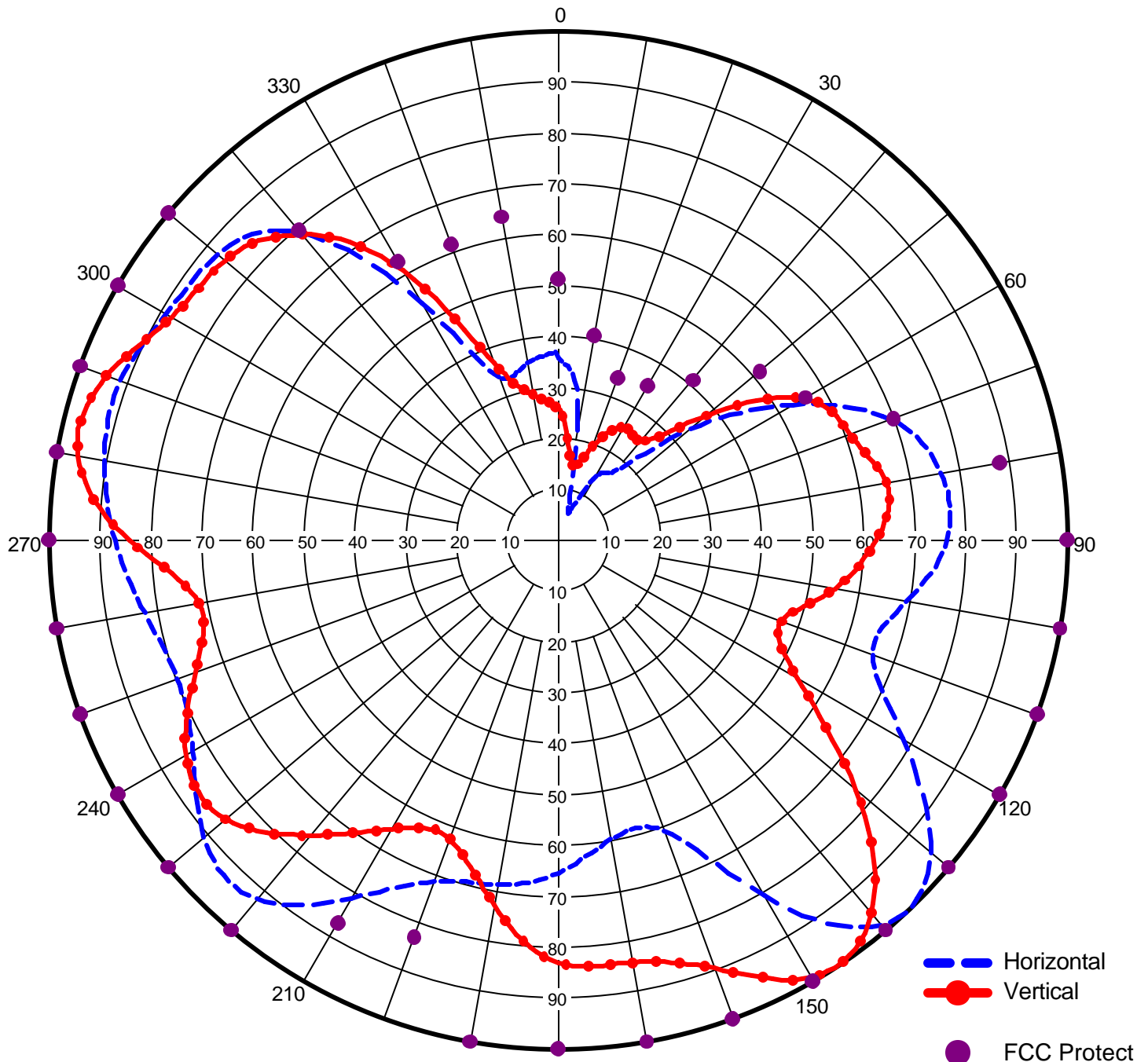


Proposal Number **79420**
Date **Aug 5, 2004**
Call Letters **WFAE**
Location **Charlotte, NC**
Customer **University Radio**
Antenna Type **DCBR-C3SP-5FM/13H-1-N**

AZIMUTH PATTERN

85.7% Ccov - 50.6% Hrms - 49.4% Vrms

Gain	2.01 (3.03) HPOL 2.11 (3.24) VPOL	Frequency	90.7
Calculated / Measured	Measured	Drawing #	57





Proposal Number **79420**
Date **5-Aug-04**
Call Letters **WFAE**
Location **Charlotte, NC**
Customer **University Radio**
Antenna Type **DCBR-C3SP-5FM/13H-1-N**
Frequency **90.70 MHz**
Drawing #: **57**

TABULATION OF HORIZONTAL AZIMUTH PATTERN

Angle	Field	dBk	ERP kW
0	0.359	11.102	12.888
10	0.218	6.769	4.752
20	0.057	-4.883	0.325
30	0.138	2.798	1.904
40	0.180	5.105	3.240
50	0.338	10.578	11.424
60	0.531	14.502	28.196
70	0.693	16.815	48.025
80	0.763	17.650	58.217
90	0.764	17.662	58.370
100	0.695	16.840	48.303
110	0.657	16.351	43.165
120	0.781	17.853	60.996
130	0.955	19.600	91.203
140	0.986	19.878	97.220
150	0.808	18.148	65.286
160	0.608	15.678	36.966
170	0.598	15.534	35.760
180	0.654	16.312	42.772
190	0.688	16.752	47.334
200	0.713	17.062	50.837
210	0.812	18.191	65.934
220	0.921	19.285	84.824
230	0.909	19.171	82.628
240	0.830	18.382	68.890
250	0.796	18.018	63.362
260	0.825	18.329	68.063
270	0.871	18.800	75.864
280	0.905	19.133	81.903
290	0.915	19.228	83.723
300	0.889	18.978	79.032
310	0.873	18.820	76.213
320	0.788	17.931	62.094
330	0.539	14.632	29.052
340	0.342	10.681	11.696
350	0.352	10.931	12.390



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 Antenna Type **DCBR-C3SP-5FM/13H-1-N**
 Frequency **90.70 MHz**
 Drawing #: **57**

TABULATION OF HORIZONTAL AZIMUTH PATTERN

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	0.359	45	0.241	90	0.764	135	0.997	180	0.654	225	0.931	270	0.871	315	0.850
1	0.351	46	0.258	91	0.759	136	1.000	181	0.659	226	0.929	271	0.875	316	0.841
2	0.346	47	0.277	92	0.754	137	1.000	182	0.664	227	0.925	272	0.879	317	0.831
3	0.341	48	0.297	93	0.748	138	0.997	183	0.667	228	0.920	273	0.883	318	0.818
4	0.336	49	0.318	94	0.742	139	0.994	184	0.672	229	0.915	274	0.886	319	0.804
5	0.327	50	0.338	95	0.735	140	0.986	185	0.675	230	0.909	275	0.890	320	0.788
6	0.315	51	0.358	96	0.728	141	0.977	186	0.678	231	0.901	276	0.893	321	0.769
7	0.298	52	0.378	97	0.720	142	0.966	187	0.681	232	0.894	277	0.896	322	0.749
8	0.276	53	0.398	98	0.712	143	0.952	188	0.684	233	0.886	278	0.899	323	0.727
9	0.249	54	0.418	99	0.704	144	0.936	189	0.686	234	0.877	279	0.902	324	0.704
10	0.218	55	0.437	100	0.695	145	0.919	190	0.688	235	0.869	280	0.905	325	0.678
11	0.186	56	0.456	101	0.687	146	0.899	191	0.689	236	0.860	281	0.908	326	0.652
12	0.156	57	0.475	102	0.679	147	0.879	192	0.691	237	0.852	282	0.911	327	0.625
13	0.130	58	0.494	103	0.671	148	0.857	193	0.692	238	0.844	283	0.913	328	0.597
14	0.109	59	0.513	104	0.665	149	0.832	194	0.693	239	0.836	284	0.914	329	0.568
15	0.091	60	0.531	105	0.660	150	0.808	195	0.696	240	0.830	285	0.916	330	0.539
16	0.078	61	0.550	106	0.655	151	0.782	196	0.697	241	0.823	286	0.917	331	0.510
17	0.068	62	0.568	107	0.653	152	0.757	197	0.700	242	0.817	287	0.917	332	0.482
18	0.061	63	0.586	108	0.652	153	0.733	198	0.704	243	0.813	288	0.917	333	0.456
19	0.058	64	0.604	109	0.653	154	0.709	199	0.709	244	0.808	289	0.916	334	0.432
20	0.057	65	0.621	110	0.657	155	0.688	200	0.713	245	0.804	290	0.915	335	0.410
21	0.058	66	0.637	111	0.662	156	0.667	201	0.720	246	0.801	291	0.914	336	0.390
22	0.061	67	0.653	112	0.670	157	0.648	202	0.727	247	0.799	292	0.911	337	0.374
23	0.066	68	0.667	113	0.678	158	0.632	203	0.735	248	0.797	293	0.909	338	0.360
24	0.073	69	0.681	114	0.689	159	0.619	204	0.744	249	0.796	294	0.905	339	0.349
25	0.082	70	0.693	115	0.702	160	0.608	205	0.754	250	0.796	295	0.902	340	0.342
26	0.093	71	0.704	116	0.716	161	0.600	206	0.764	251	0.797	296	0.899	341	0.337
27	0.104	72	0.715	117	0.731	162	0.593	207	0.775	252	0.798	297	0.897	342	0.334
28	0.117	73	0.724	118	0.747	163	0.589	208	0.787	253	0.800	298	0.894	343	0.333
29	0.128	74	0.732	119	0.764	164	0.587	209	0.799	254	0.802	299	0.891	344	0.334
30	0.138	75	0.739	120	0.781	165	0.586	210	0.812	255	0.805	300	0.889	345	0.336
31	0.146	76	0.745	121	0.800	166	0.586	211	0.824	256	0.809	301	0.888	346	0.339
32	0.152	77	0.751	122	0.818	167	0.587	212	0.837	257	0.813	302	0.886	347	0.342
33	0.157	78	0.756	123	0.836	168	0.590	213	0.850	258	0.816	303	0.884	348	0.345
34	0.160	79	0.759	124	0.855	169	0.593	214	0.863	259	0.821	304	0.883	349	0.349
35	0.162	80	0.763	125	0.874	170	0.598	215	0.875	260	0.825	305	0.882	350	0.352
36	0.164	81	0.766	126	0.892	171	0.602	216	0.887	261	0.830	306	0.880	351	0.355
37	0.166	82	0.769	127	0.909	172	0.607	217	0.897	262	0.834	307	0.879	352	0.357
38	0.169	83	0.771	128	0.925	173	0.612	218	0.906	263	0.838	308	0.877	353	0.359
39	0.174	84	0.772	129	0.940	174	0.619	219	0.915	264	0.843	309	0.875	354	0.361
40	0.180	85	0.772	130	0.955	175	0.624	220	0.921	265	0.848	310	0.873	355	0.363
41	0.189	86	0.772	131	0.967	176	0.630	221	0.925	266	0.853	311	0.870	356	0.365
42	0.199	87	0.772	132	0.977	177	0.637	222	0.930	267	0.858	312	0.867	357	0.366
43	0.211	88	0.770	133	0.986	178	0.642	223	0.931	268	0.862	313	0.862	358	0.368
44	0.225	89	0.767	134	0.993	179	0.648	224	0.932	269	0.867	314	0.857	359	0.371



Proposal Number **79420**
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Call Letters **WFAE**
Location **Charlotte, NC**
Customer **University Radio**
Antenna Type **DCBR-C3SP-5FM/13H-1-N**
Frequency **90.70 MHz**
Drawing #: **57**

TABULATION OF VERTICAL AZIMUTH PATTERN

Angle	Field	dBk	ERP kW
0	0.259	8.266	6.708
10	0.154	3.750	2.372
20	0.195	5.801	3.803
30	0.255	8.131	6.503
40	0.254	8.097	6.452
50	0.381	11.618	14.516
60	0.556	14.901	30.914
70	0.609	15.692	37.088
80	0.654	16.312	42.772
90	0.624	15.904	38.938
100	0.551	14.823	30.360
110	0.466	13.368	21.716
120	0.543	14.696	29.485
130	0.764	17.662	58.370
140	0.957	19.618	91.585
150	0.992	19.930	98.406
160	0.895	19.036	80.103
170	0.842	18.506	70.896
180	0.830	18.382	68.890
190	0.729	17.255	53.144
200	0.624	15.904	38.938
210	0.656	16.338	43.034
220	0.757	17.582	57.305
230	0.853	18.619	72.761
240	0.844	18.527	71.234
250	0.759	17.605	57.608
260	0.716	17.098	51.266
270	0.843	18.517	71.065
280	0.958	19.627	91.776
290	0.944	19.499	89.114
300	0.877	18.860	76.913
310	0.855	18.639	73.103
320	0.783	17.875	61.309
330	0.611	15.721	37.332
340	0.370	11.364	13.690
350	0.290	9.248	8.410

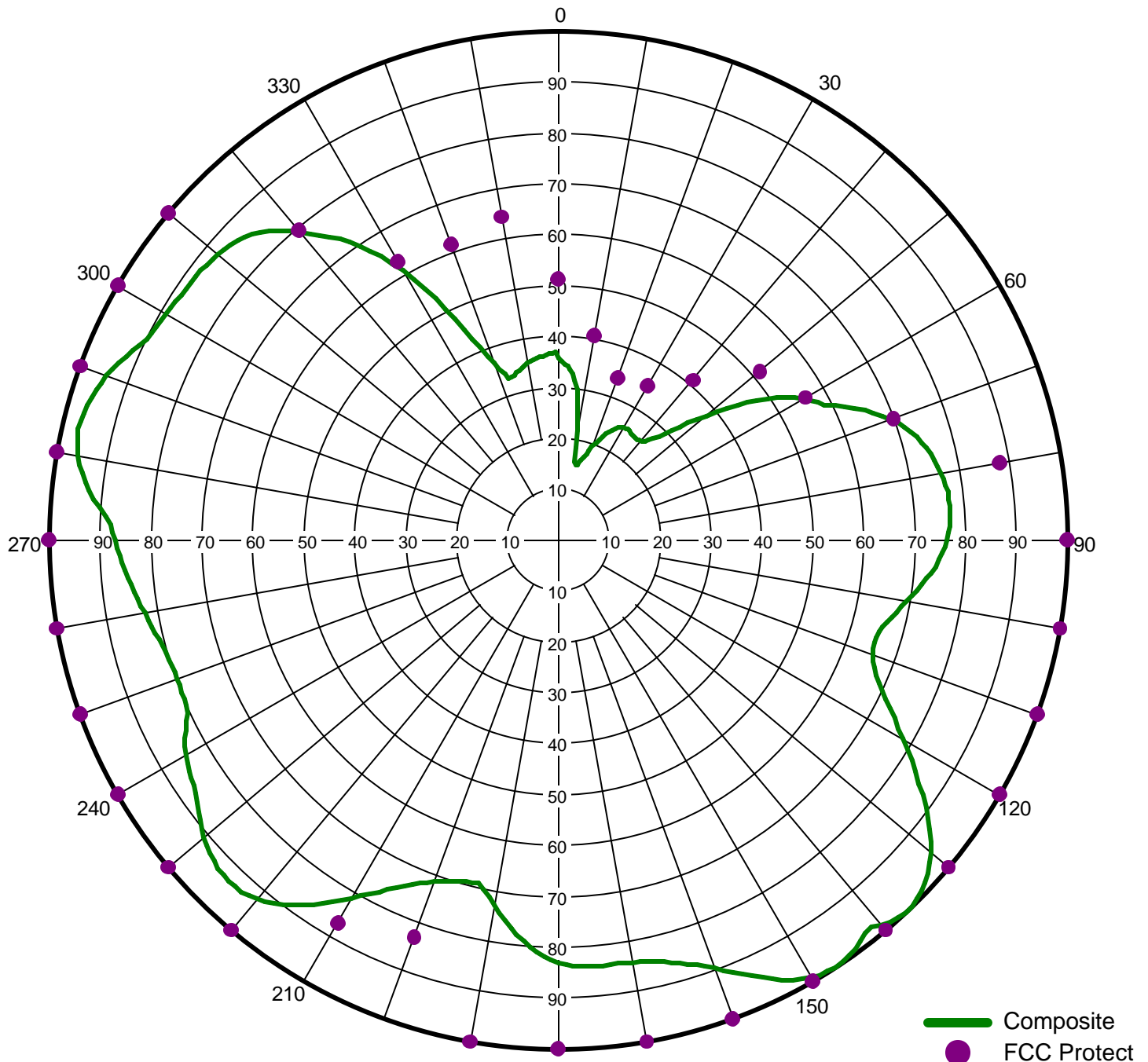


Proposal Number **79420**
Date **Aug 5, 2004**
Call Letters **WFAE**
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Antenna Type **DCBR-C3SP-5FM/13H-1-N**

AZIMUTH PATTERN

85.7% Ccov - 50.6% Hrms - 49.4% Vrms

Gain	2.01 (3.03) HPOL 2.11 (3.24) VPOL	Frequency	90.7
Calculated / Measured	Measured	Drawing #	57





Proposal Number	79420
Date	5-Aug-04
Call Letters	WFAE
Location	Charlotte, NC
Customer	University Radio
Antenna Type	DCBR-C3SP-5FM/13H-1-N
Frequency	90.70 MHz
Drawing #:	57

TABULATION OF COMPOSITE AZIMUTH PATTERN

Angle	Field	dBk	Power kW	Input Power
0	0.359	11.102	12.888	100.000
10	0.218	6.769	4.752	100.000
20	0.195	5.801	3.803	100.000
30	0.255	8.131	6.503	100.000
40	0.254	8.097	6.452	100.000
50	0.381	11.618	14.516	100.000
60	0.556	14.901	30.914	100.000
70	0.693	16.815	48.025	100.000
80	0.763	17.650	58.217	100.000
90	0.764	17.662	58.370	100.000
100	0.695	16.840	48.303	100.000
110	0.657	16.351	43.165	100.000
120	0.781	17.853	60.996	100.000
130	0.955	19.600	91.203	100.000
140	0.986	19.878	97.220	100.000
150	0.992	19.930	98.406	100.000
160	0.895	19.036	80.103	100.000
170	0.842	18.506	70.896	100.000
180	0.830	18.382	68.890	100.000
190	0.729	17.255	53.144	100.000
200	0.713	17.062	50.837	100.000
210	0.812	18.191	65.934	100.000
220	0.921	19.285	84.824	100.000
230	0.909	19.171	82.628	100.000
240	0.844	18.527	71.234	100.000
250	0.796	18.018	63.362	100.000
260	0.825	18.329	68.063	100.000
270	0.871	18.800	75.864	100.000
280	0.958	19.627	91.776	100.000
290	0.944	19.499	89.114	100.000
300	0.889	18.978	79.032	100.000
310	0.873	18.820	76.213	100.000
320	0.788	17.931	62.094	100.000
330	0.611	15.721	37.332	100.000
340	0.370	11.364	13.690	100.000
350	0.352	10.931	12.390	100.000



Proposal Number	79420
Date	Aug 05, 2004
Call Letters	WFAE
Location	Charlotte, NC
Customer	University Radio
Antenna Type	DCBR-C3SP-5FM/13H-1-N
Frequency	90.70 MHz
Drawing #	57

CUSTOMER GAIN SUMMARY

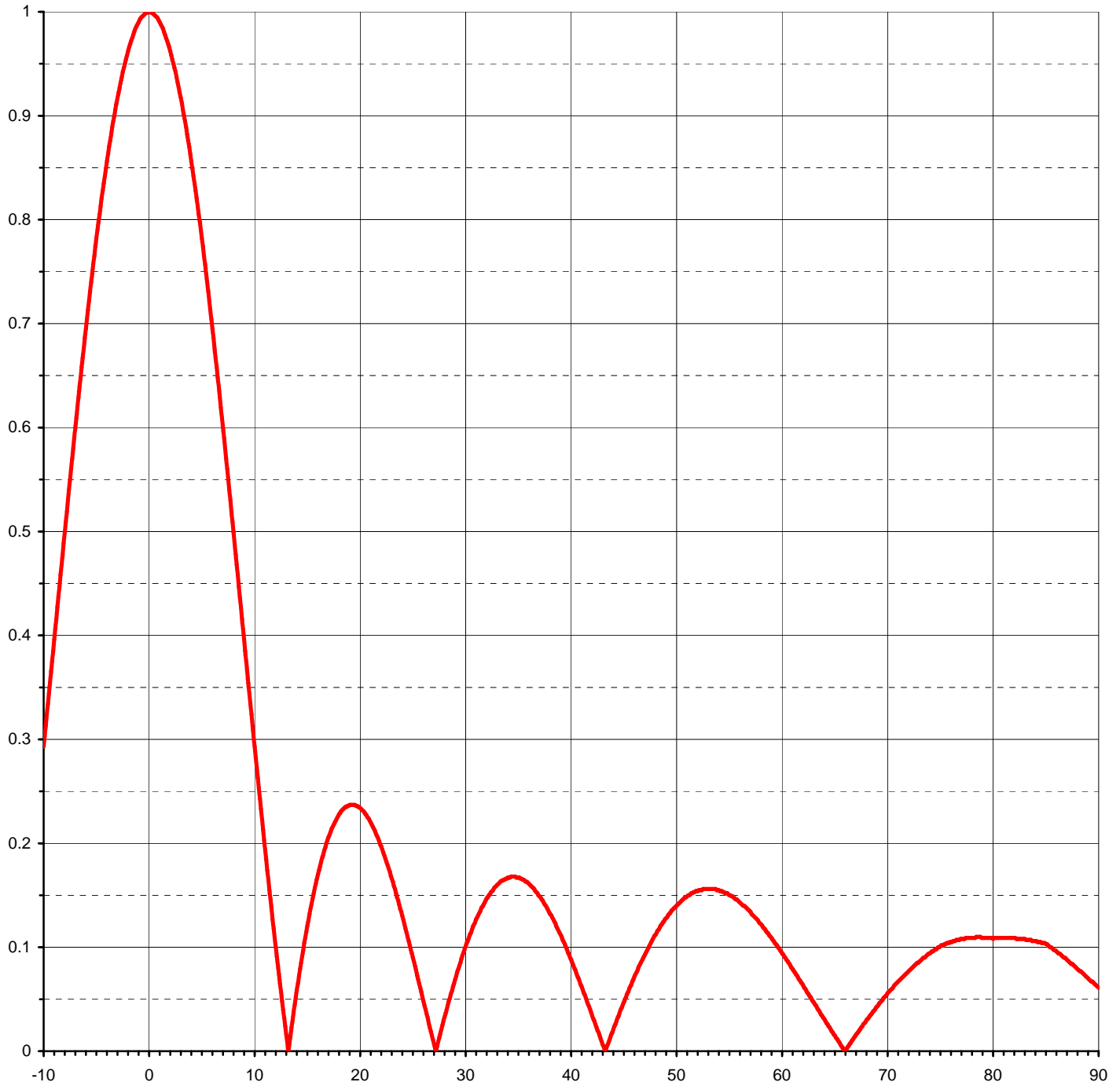
Azimuth Pattern Gain of Horizontal Polarization	2.00	(3.01 dB)
Elevation Pattern Gain Per Polarization	2.20	(3.42 dB)
Peak Gain at Horizontal Polarization	4.40	(6.43 dB)

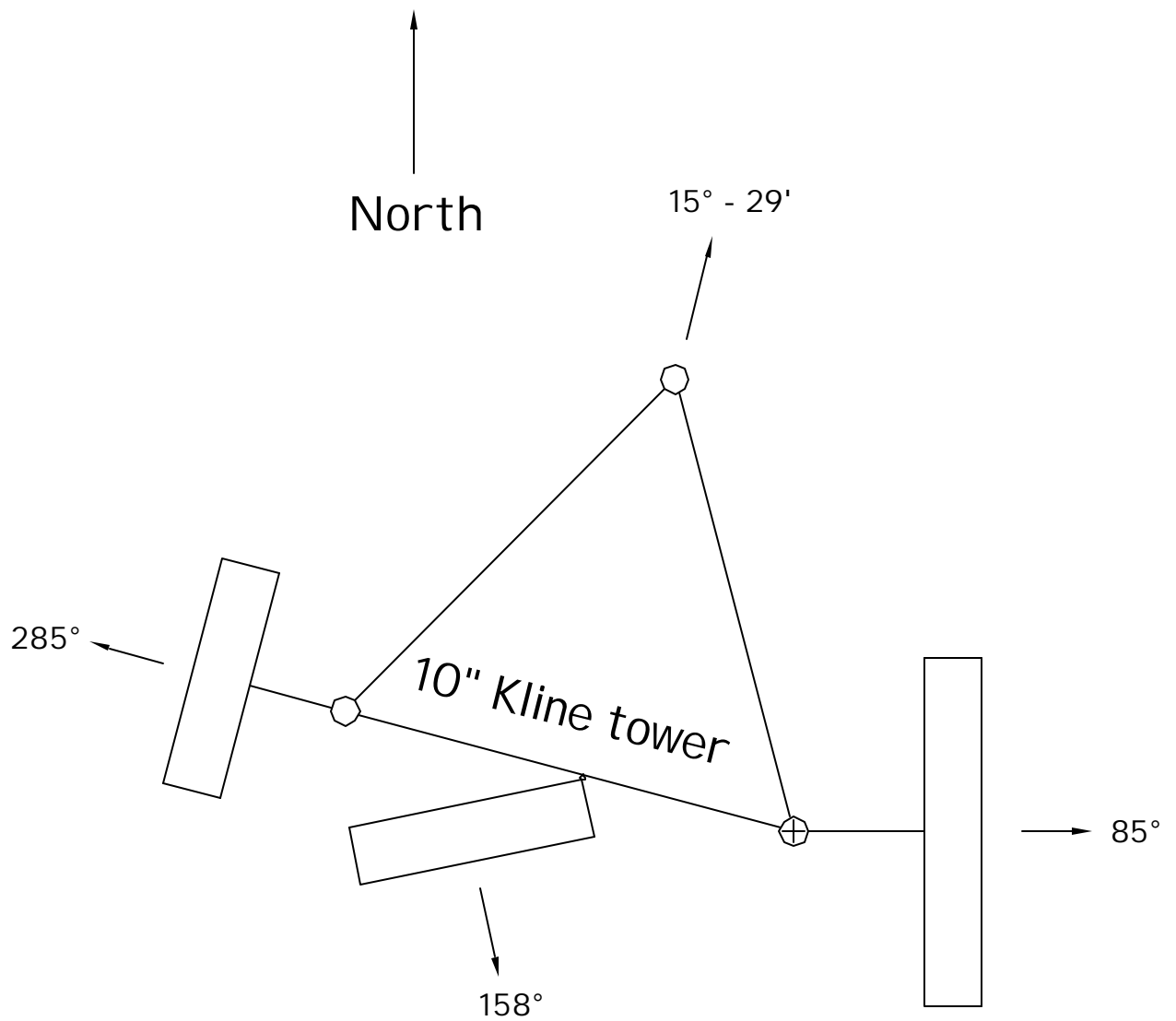


Proposal Number	79420
Date	05-Aug-04
Call Letters	WFAE
Location	Charlotte, NC
Customer	University Radio Foundation
Antenna Type	DCBR-C3SP-5FM/13H-1-N

ELEVATION PATTERN

RMS Gain at Main Lobe	2.2 (3.32 dB)	Beam Tilt	0.00 deg
RMS Gain at Horizontal	2.2 (3.32 dB)	Frequency	90.70 MHz
Calculated / Measured	Calculated	Drawing #	57





WFAE - 90.7
DCBR-C3SP-5FM/13H-1-N
Document Sketch # 57


Dielectric