



WVBO

Winneconne, Wisconsin

Antenna Directional Pattern Certification



PATTERN CERTIFICATION

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PATTERN CERTIFICATION

Method of Measurement

The azimuth pattern for "WVBO", Dielectric Document Sketch # 07, was measured in the following manner.

A single 4.4 to 1 scale model "DCRC" 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 # 07. 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 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

Paul S. Jones Jr. is a Senior Electrical Engineer here at Dielectric. He received a BS in Electrical Engineering from the University of New Hampshire in 1990. He has over 12 years of experience in RF antenna engineering and has been employed by Dielectric Communications since 1995.

Signed By: _____

Paul S. Jones Jr.

Date: _____

6/27/03



MSO NO: 75476

DATE: June 27, 2003

PATTERN NO: WVBO - 07

FM AZIMUTH PATTERN APPROVAL

The azimuth pattern of the horizontal polarization and vertical polarization as supplied by Dielectric in the document labeled “ WVBO - 07 ”, is acknowledged as acceptable. We understand that Dielectric does not guarantee or predict signal strength in any particular location.

(Customer's name)

By:_____
(Name typed or printed)

Title:_____

(Signature)

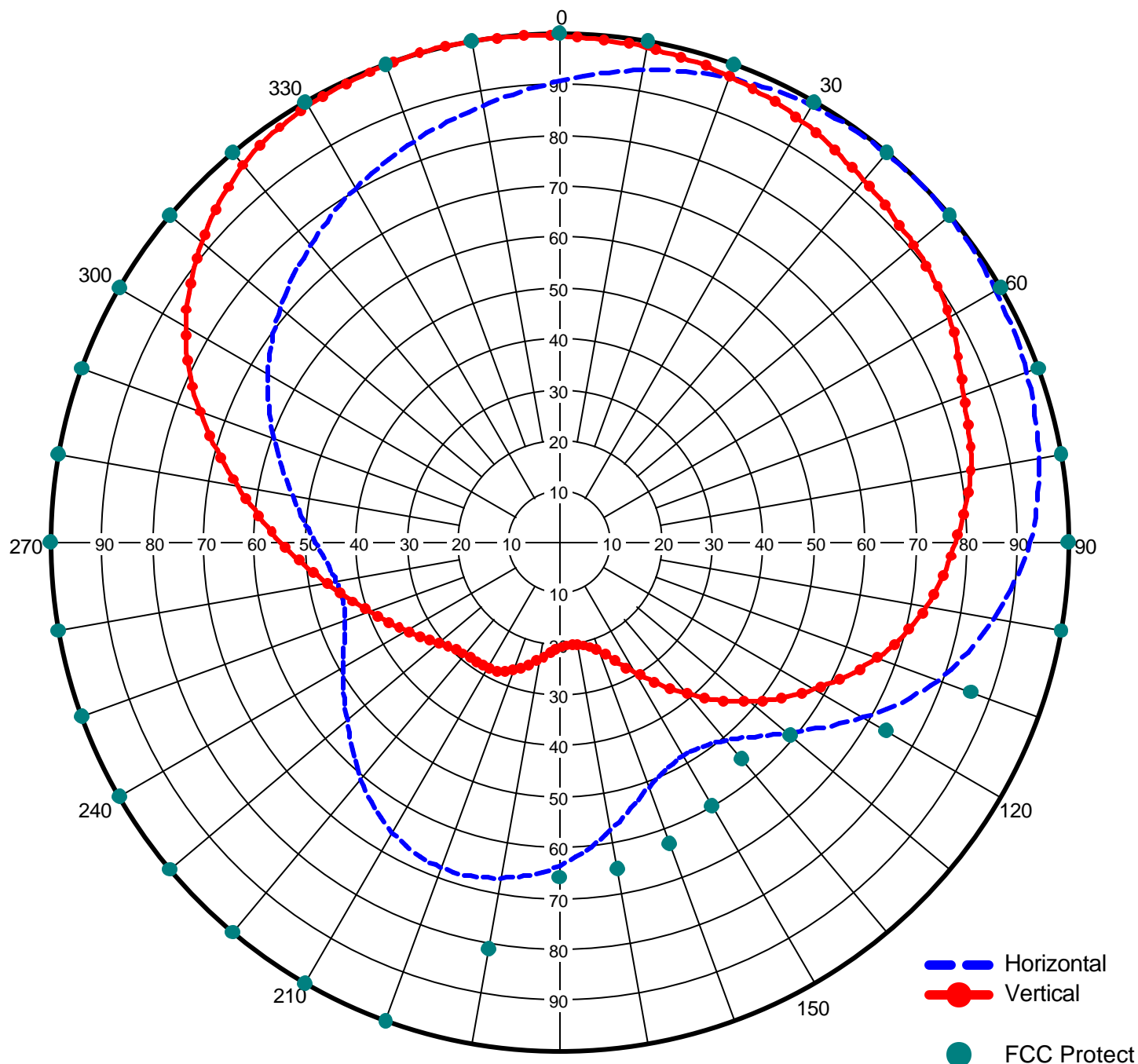


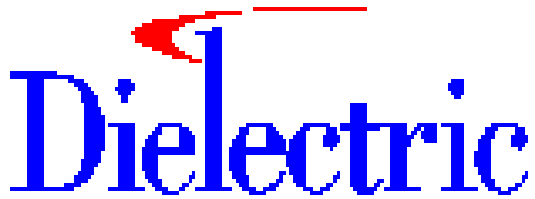
Proposal Number **75476**
Date **Jun 27, 2003**
Call Letters **WVBO**
Location **Winneconne, WI**
Customer **Gary Kline**
Antenna Type **DCRC6C5RDT5**

AZIMUTH PATTERN

85.3% Ccov - 51.5% Hrms - 48.5% Vrms

Calculated / Measured **Measured** Frequency **103.9**
Drawing # **07**



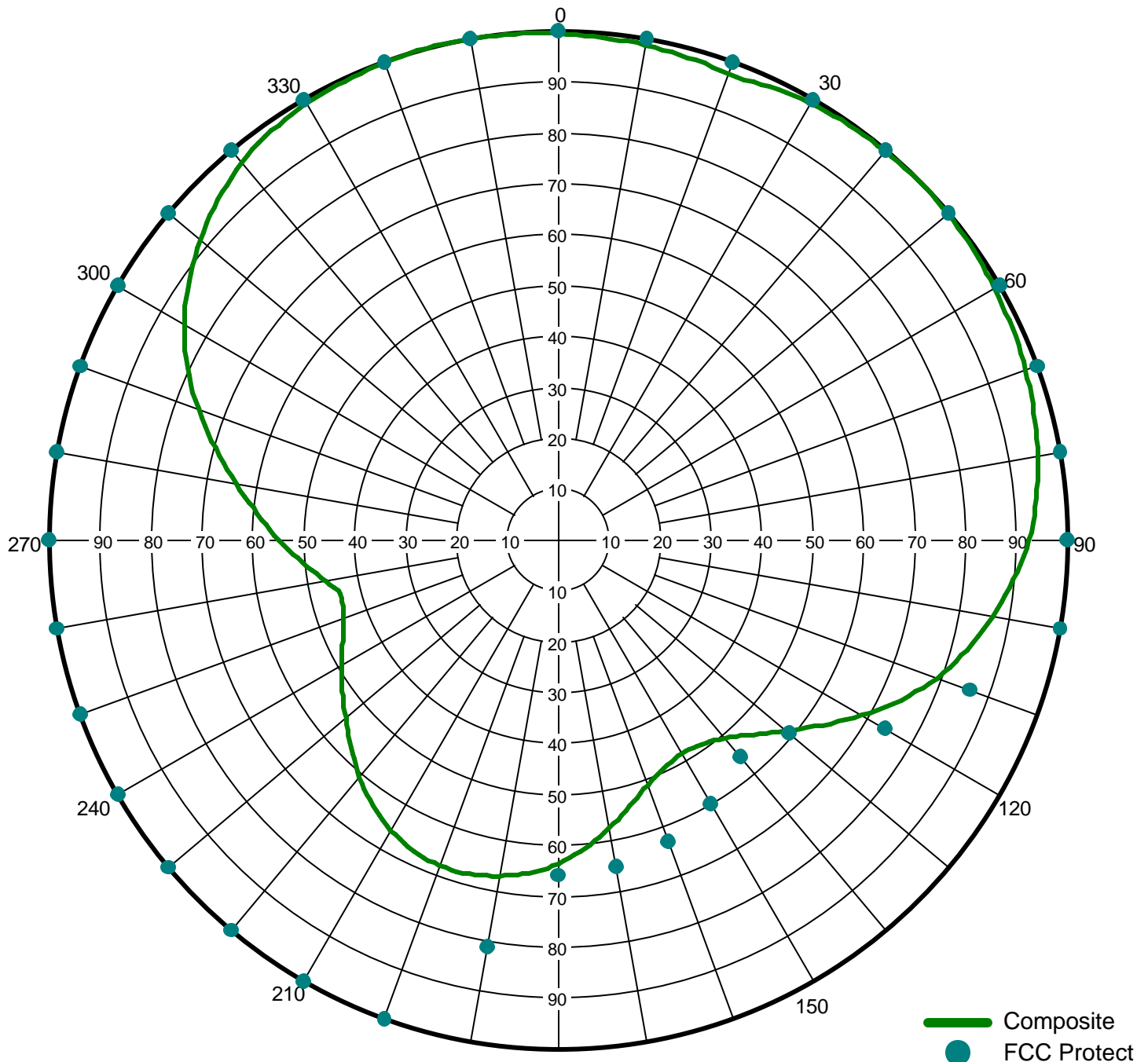


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 Frequency **103.90 MHz**
 Drawing #: **7**

TABULATION OF HORIZONTAL AZIMUTH PATTERN

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	0.908	45	1.000	90	0.925	135	0.540	180	0.636	225	0.576	270	0.480	315	0.740
1	0.911	46	1.000	91	0.919	136	0.533	181	0.640	226	0.569	271	0.484	316	0.744
2	0.914	47	1.000	92	0.915	137	0.526	182	0.645	227	0.564	272	0.489	317	0.748
3	0.917	48	0.999	93	0.910	138	0.520	183	0.649	228	0.557	273	0.494	318	0.752
4	0.921	49	0.999	94	0.904	139	0.514	184	0.653	229	0.551	274	0.499	319	0.757
5	0.925	50	0.999	95	0.897	140	0.509	185	0.656	230	0.545	275	0.505	320	0.761
6	0.928	51	0.998	96	0.892	141	0.503	186	0.659	231	0.539	276	0.510	321	0.766
7	0.931	52	0.998	97	0.885	142	0.499	187	0.662	232	0.534	277	0.516	322	0.770
8	0.935	53	0.996	98	0.879	143	0.495	188	0.665	233	0.528	278	0.522	323	0.774
9	0.939	54	0.995	99	0.873	144	0.493	189	0.667	234	0.523	279	0.528	324	0.778
10	0.942	55	0.994	100	0.866	145	0.490	190	0.670	235	0.518	280	0.533	325	0.782
11	0.945	56	0.994	101	0.859	146	0.487	191	0.672	236	0.513	281	0.539	326	0.787
12	0.948	57	0.993	102	0.852	147	0.486	192	0.674	237	0.508	282	0.546	327	0.791
13	0.952	58	0.992	103	0.846	148	0.485	193	0.676	238	0.502	283	0.552	328	0.795
14	0.955	59	0.991	104	0.838	149	0.485	194	0.678	239	0.498	284	0.558	329	0.799
15	0.957	60	0.990	105	0.832	150	0.485	195	0.678	240	0.493	285	0.565	330	0.803
16	0.960	61	0.988	106	0.824	151	0.485	196	0.680	241	0.487	286	0.571	331	0.806
17	0.964	62	0.987	107	0.816	152	0.486	197	0.681	242	0.482	287	0.578	332	0.810
18	0.966	63	0.986	108	0.808	153	0.488	198	0.681	243	0.477	288	0.585	333	0.814
19	0.969	64	0.985	109	0.800	154	0.490	199	0.681	244	0.472	289	0.591	334	0.817
20	0.972	65	0.984	110	0.791	155	0.493	200	0.681	245	0.467	290	0.598	335	0.821
21	0.974	66	0.983	111	0.782	156	0.496	201	0.680	246	0.463	291	0.605	336	0.825
22	0.976	67	0.982	112	0.773	157	0.499	202	0.679	247	0.459	292	0.611	337	0.829
23	0.978	68	0.980	113	0.763	158	0.503	203	0.678	248	0.455	293	0.617	338	0.832
24	0.980	69	0.978	114	0.753	159	0.508	204	0.675	249	0.451	294	0.624	339	0.835
25	0.983	70	0.977	115	0.743	160	0.513	205	0.674	250	0.449	295	0.631	340	0.838
26	0.985	71	0.975	116	0.732	161	0.518	206	0.671	251	0.446	296	0.637	341	0.842
27	0.986	72	0.974	117	0.721	162	0.524	207	0.668	252	0.445	297	0.643	342	0.845
28	0.988	73	0.972	118	0.710	163	0.529	208	0.665	253	0.443	298	0.649	343	0.848
29	0.990	74	0.969	119	0.700	164	0.535	209	0.662	254	0.442	299	0.656	344	0.851
30	0.991	75	0.967	120	0.689	165	0.541	210	0.658	255	0.442	300	0.662	345	0.855
31	0.992	76	0.965	121	0.678	166	0.548	211	0.655	256	0.442	301	0.667	346	0.858
32	0.993	77	0.963	122	0.667	167	0.555	212	0.650	257	0.442	302	0.674	347	0.861
33	0.994	78	0.960	123	0.655	168	0.562	213	0.646	258	0.443	303	0.679	348	0.864
34	0.995	79	0.958	124	0.645	169	0.568	214	0.641	259	0.444	304	0.685	349	0.868
35	0.995	80	0.956	125	0.634	170	0.575	215	0.636	260	0.446	305	0.690	350	0.871
36	0.996	81	0.953	126	0.623	171	0.582	216	0.631	261	0.448	306	0.696	351	0.875
37	0.996	82	0.950	127	0.613	172	0.589	217	0.626	262	0.450	307	0.701	352	0.878
38	0.998	83	0.948	128	0.602	173	0.595	218	0.620	263	0.453	308	0.706	353	0.882
39	0.998	84	0.945	129	0.593	174	0.602	219	0.614	264	0.456	309	0.711	354	0.885
40	0.999	85	0.943	130	0.583	175	0.608	220	0.608	265	0.459	310	0.716	355	0.889
41	0.999	86	0.940	131	0.574	176	0.614	221	0.602	266	0.463	311	0.721	356	0.892
42	0.999	87	0.936	132	0.565	177	0.620	222	0.596	267	0.467	312	0.725	357	0.896
43	0.999	88	0.933	133	0.556	178	0.626	223	0.589	268	0.471	313	0.730	358	0.899
44	1.000	89	0.929	134	0.548	179	0.631	224	0.583	269	0.475	314	0.735	359	0.904



Proposal Number **75476**
Date **June 27, 2003**
Call Letters **WVBO**
Location **Winneconne, WI**
Customer **Gary Kline**
Antenna Type **DCRC6C5RDT5**
Frequency **103.90 MHz**
Drawing #: **7**

TABULATION OF VERTICAL AZIMUTH PATTERN

Angle	Field	dBk	Power kW
0	0.995	13.936	24.751
10	0.987	13.866	24.354
20	0.974	13.751	23.717
30	0.955	13.579	22.801
40	0.929	13.340	21.576
50	0.909	13.151	20.657
60	0.884	12.908	19.536
70	0.845	12.517	17.851
80	0.820	12.256	16.810
90	0.778	11.799	15.132
100	0.732	11.270	13.396
110	0.664	10.423	11.022
120	0.577	9.203	8.323
130	0.487	7.730	5.929
140	0.389	5.778	3.783
150	0.296	3.405	2.190
160	0.228	1.138	1.300
170	0.205	0.214	1.051
180	0.207	0.299	1.071
190	0.234	1.364	1.369
200	0.268	2.542	1.796
210	0.285	3.076	2.031
220	0.288	3.167	2.074
230	0.310	3.807	2.403
240	0.349	4.836	3.045
250	0.398	5.977	3.960
260	0.464	7.310	5.382
270	0.548	8.755	7.508
280	0.643	10.144	10.336
290	0.752	11.504	14.138
300	0.848	12.547	17.978
310	0.917	13.227	21.022
320	0.968	13.697	23.426
330	0.990	13.892	24.503
340	0.998	13.962	24.900
350	1.000	13.979	25.000



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CUSTOMER GAIN SUMMARY

Azimuth Pattern Gain of Horizontal Polarization	1.78
Elevation Pattern Gain Per Polarization	1.80
Peak Gain at Horizontal Polarization	3.20

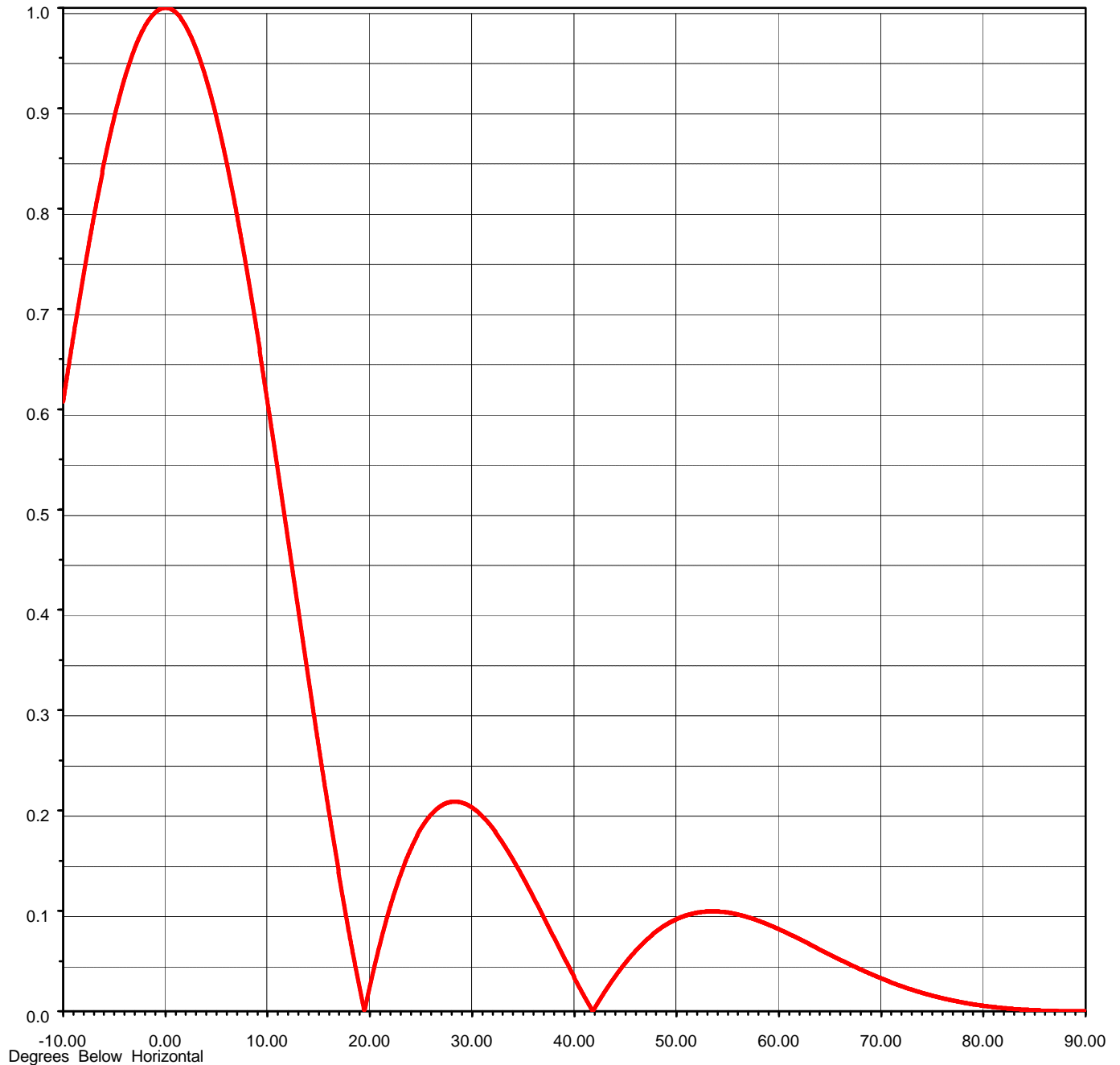


Proposal Number	75476
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Location	Winneconne, WI
Customer	Gary Kline
Antenna Type	DCRC6C5RDT5

MEASURED ELEVATION PATTERN

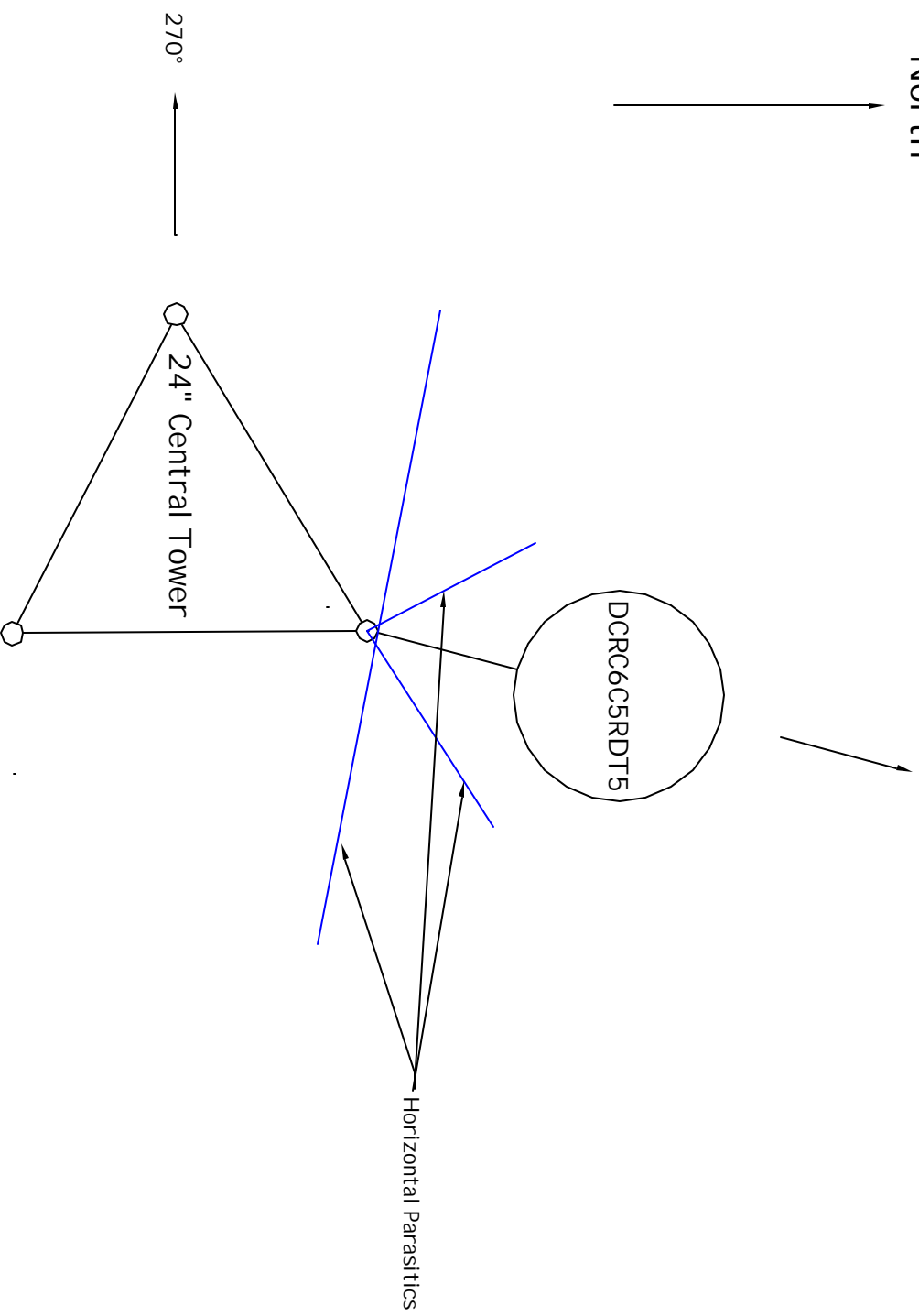
RMS Gain at Main Lobe **1.80 (2.55 dB)**
Per Polarization

Beam Tilt **0.50 deg**
Frequency **103.90 MHz**
Plane **Typical**



North

150



WBVO - 103.9

Document Sketch # 07

Dielectric

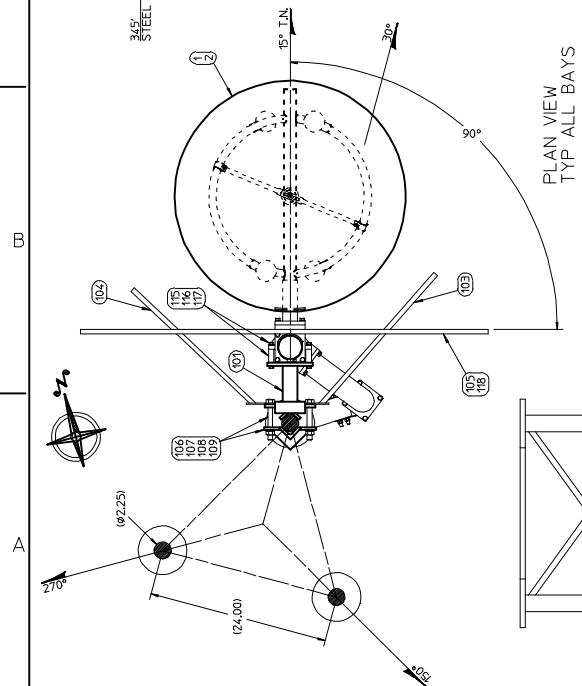
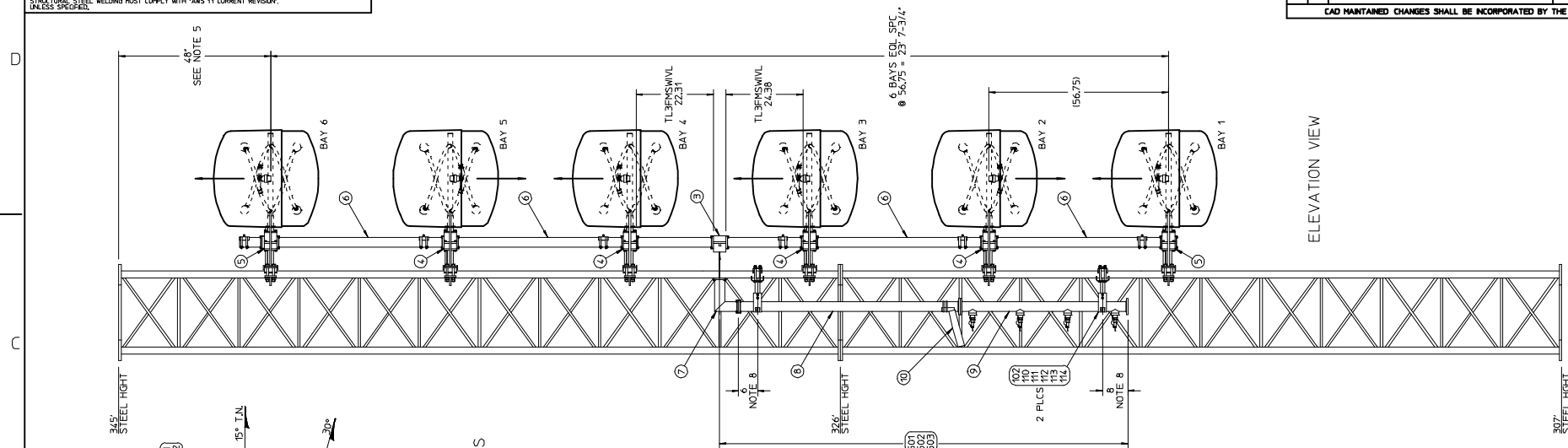
SPX CORPORATION. THE INFORMATION CONTAINED HEREIN IS CONFIDENTIAL. IT IS THE PROPERTY OF SPX CORPORATION. IT IS TO BE USED SOLELY FOR THE PURPOSE PROVIDED, AND IT IS NOT TO BE DISCLOSED TO OTHERS WITHOUT THE PRIOR WRITTEN CONSENT OF SPX CORPORATION.

MANUFACTURING TOLERANCES AND PROCEDURES MUST BE IN ACCORDANCE WITH D78691 UNLESS OTHERWISE SPECIFIED.

ALL WELDINGS MUST COMPLY WITH A-62790, SECT. XIV 'PRODUCTION WELDING PROCEDURES'.

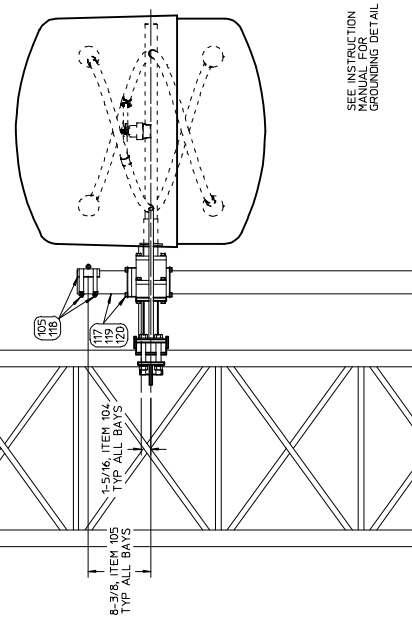
STRUCTURAL STEEL WELDING MUST COMPLY WITH 'AWS 11 CURRENT REVISION, UNLESS SPECIFIED.

REVISIONS						
REV	VER	DESCRIPTION	CHG BY	DATE	CHG APPR	DES APPR
CAD MAINTAINED CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY						



PLAN VIEW
TYP ALL BAYS

NOTE- BAY 6 JUNCTION BLOCK:
REMOVE 3/8" END CAP BOLTS.
DO NOT REMOVE END CAP.
MOUNT ITEM 119 ON TOP OF
END CAP. AS SHOWN. REPLACE
BOLTS W/ 3/8" X 1-3/4" LNG BOLTS
(ITEM 120 PROVIDED).



SEE INSTRUCTION
MANUAL FOR
GROUNDING DETAIL

NOTES:

- 1- TO ACHIEVE ANY GIVEN PATTERN STUDY, THE ANTENNA MUST BE INSTALLED AND ORIENTED AS DEPICTED IN THIS DRAWING.
- 2- IF ANY SUCH PATTERN WAS NOT PROVIDED, THE BUYER SHALL BE RESPONSIBLE FOR THE ANTENNA WAS SOLD.
- 3- THE ANTENNA WAS SOLD AT THE DISCRETION OF THE BUYER TO WHICH THE INSTALLATION PROCESS. CONTACT ELECTRIC COMMUNICATIONS AT 800-374-9674, TO ASSIST THE BUYER IN THE INSTALLATION PROCESS. PROVIDE THE PART NUMBER SHOWN BELOW.
- 4- COMPONENTS ARE MATCH MARKED FOR EASE IN ASSEMBLY.
- 5- ITEM NUMBERS IDENTIFIED ON THIS DRAWING, MUST BE IDENTIFIED ON THE PARTS LIST AND ENCLOSED BILL OF MATERIAL.
- 6- APPLY THIN LAYER OF DC4 DOW CORNING COMPOUND TO ALL "O" RING SEALS PRIOR TO ASSEMBLY.
- 7- UNLESS OTHERWISE SPECIFIED, THE TOP BAY MUST NOT BE LOCATED ANY CLOSER THAN 5 ft. BELOW THE TOWER TOP.
- 8- BAY TAP POINT DIRECTION INDICATED BY ARROWS @ BAY IN ELEVATION VIEW.
- 9- WATCHING TRANSFORMER (ITEM 9) IS SHIPPED WITH ANTENNAS. IT IS DESIGNED TO COSEEN LOCKWITS AND PULL ALL PROBES TO COSEN OUTWARD POSITION. BE IN FULL OUTWARD POSITION BEFORE POWERING UP ANTENNA. REFER TO INSTRUCTION MANUAL FOR TUNING INSTRUCTIONS.
- 10- SUGGESTED LOCATION FOR TERMINATION MOUNT.
- 11- LOCATION MAY VARY PER TOWER DESIGN.
- 12- FOR HEATED ANTENNAS ONLY: HEATER HARNESS MUST BE USED. HEATERS ARE REQUIRED TO TOWER PER INSTRUCTIONS. HEATERS ARE REQUIRED TO TOWER PER LOOSE OR DANGLING WIRE IN RF FIELD WILL SHORT & RESULT IN ANTENNA FAILURE.
- 13- REFER TO DRAWING A88212 FOR ALL HARDWARE TORQUE SPECIFICATIONS.
- 14- IT IS IMPORTANT TO MAINTAIN DOCUMENT FOR HISTORICAL PURPOSES.
- 15- THE LOCATION OF INFORMATION TO BE MAINTAINED IS THE PART NUMBER AS SHOWN ON THE TEST DATA.
- 16- AFTER ANTENNA HAS BEEN INSTALLED & TUNED ON THE TOWER IT IS REQUESTED THAT A COPY OF THE TEST DATA BE FORWARDED TO:
ELECTRIC COMMUNICATIONS
227 TOWER RD.
RAYMOND, ME. 04071

P/N 95226,	ANTENNA ASSEMBLY BILL OF MATERIAL
P/N 95227,	MOUNTING KIT BILL OF MATERIAL.
MSO NO.,	75476

[illegible]