

CETEC ANTENNAS
6939 POWER INN ROAD
SACRAMENTO, CA 95828
(916) 383-1177

DATE:

CIRCULARLY POLARIZED DIRECTIONAL
FM CP ANTENNA FOR:

ANTENNA	H	V
Gain in db:	6.25	6.18

STATION: WXGA-FM

LOCATION: Waycross, GA.

MODEL NUMBER: JSCP-4 (DA)

FREQUENCY AND ERP: 90.1 MHz 79kw

INPUT POWER FOR ERP: 18.72kw

ANTENNA BOOM HEADING: 4° True

HPOL

VPOL

CERTIFICATION

RMS OF PATTERN:

.71

.65

THIS STATEMENT ALONG WITH THE ACCOMPANYING TECHNICAL SPECIFICATION SHEET, ANTENNA MOUNTING SKETCH, AND AZIMUTH AND ELEVATION PATTERNS CERTIFY THE CONSTRUCTION AND MEASUREMENT OF THE CETEC FM CP ANTENNA TO THE STATION'S REQUIREMENTS, AS MEASURED AT THE CETEC ANTENNAS SITE IN SACRAMENTO, CA. THE FOLLOWING IS AN OUTLINE OF CONSTRUCTION METHODS FOLLOWED, PATTERN MEASUREMENTS, INSTALLATION REQUIREMENTS, RECOMMENDED MAINTENANCE AND EQUIPMENT USED.

CONSTRUCTION

A STANDARD CP FM ANTENNA MODEL WAS USED, AND PARASITIC REFLECTORS WERE ADDED TO EACH BAY TO CREATE THE REQUIRED DIRECTIONAL PATTERN. FROM EXPERIENCE AND BY FURTHER MEASUREMENTS THESE ELEMENTS WERE ADJUSTED AS TO POSITION AND LENGTH UNTIL THE FINAL CONFIGURATION WAS DETERMINED AND THE PATTERN REQUIREMENTS WERE MET. THESE ADDITIONAL ELEMENTS ARE STEEL, HOT DIPPED GALVANIZED, AND EITHER BOLTED OR WELDED IN PLACE. MEASUREMENTS TO ESTABLISH THEIR LOCATION EXACTLY ARE SHOWN IN THE ANTENNA MOUNTING SKETCH.

MEASUREMENT

A SINGLE BAY OF THE FULL SCALE SIZE ANTENNA WAS MOUNTED ON AN EXACT DUPLICATE OF ITS FINAL SUPPORT AT THE STATION. WE WERE CAREFUL TO DUPLICATE CONDUITS, CABLES AND ANYTHING PECULIAR TO THIS MOUNTING.

THIS WAS THEN PLACED ON A ROTATABLE TURNTABLE AT THE CETEC ANTENNA RANGE. THIS DIRECTIONAL ANTENNA WAS USED FOR RECEIVING THE RADIATION FROM A CORNER REFLECTOR ANTENNA LOCATED AT THE SAME HEIGHT ABOUT 20 WAVELENGTHS AWAY FROM IT, AND CAPABLE OF BEING ROTATED TO EITHER HORIZONTAL OR VERTICAL POLARIZATION. THE SIGNAL GENERATOR FREQUENCY WAS ACCURATELY SET TO STATION FREQUENCY BY USE OF A FREQUENCY COUNTER. A FIELD INTENSITY METER WAS USED TO CONTINUOUSLY MEASURE FIELD STRENGTH AS THE DIRECTIONAL ANTENNA WAS ROTATED. FIELD STRENGTH WAS PLOTTED WITH REFERENCE TO AZIMUTH AT EACH TEN DEGREES, OR WHEREVER ANY ABNORMALITY OCCURED.

INSTALLATION

THE ANTENNA MUST BE INSTALLED IN EXACTLY THE MANNER IN WHICH IT WAS MEASURED AT THE FACTORY. THIS IS SHOWN IN DETAIL ON THE ANTENNA MOUNTING SKETCH, INCLUDING THE AZIMUTH BEARING OF THE MAIN BOOM OF THE ELEMENTS. THIS BOOM HEADING MUST BE VERIFIED BY A SURVEYOR AT THE SITE WHEN INSTALLATION IS BEING COMPLETED. GOOD ENGINEERING PRACTICE SHOULD BE FOLLOWED IN ANY DETAILS NOT COVERED BY SPECIFIC INSTRUCTIONS.

MAINTENANCE

ANNUAL OR REGULAR INSPECTION SHOULD BE MADE OF AN ANTENNA SYSTEM. AT THIS TIME TIGHTNESS OF U-BOLTS OR OTHER FASTENINGS SHOULD BE ROUTINELY CHECKED. ANY DETERIORATION OF THE ANTENNA DUE TO LIGHTNING OR OTHER CAUSES SHOULD BE PROMPTLY REPAIRED. OTHER THAN THESE INSTRUCTIONS, AND MAINTAINING THE ORIGINAL AZIMUTH HEADING, NOTHING SHOULD BE NECESSARY TO MAINTAIN THE PATTERN INITIALLY ACHIEVED.

EQUIPMENT

MODEL: 3000 Wavetec Signal Generator, Serial #66479, Calibrated 5/84
8555B H.P. Spectrum Analyzer, Serial #1829A04558, Calibrated 3/84
Tuned Cavity Dipole
Scientific Atlanta Plotter 15S1-4-7-9, Serial #471229, Calibrated 4/83

CONCLUSION

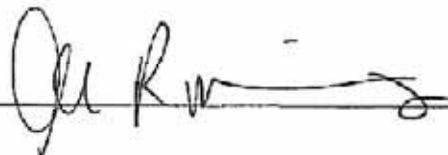
IN THE DEVELOPMENT OF THIS PATTERN CETEC ANTENNAS OBSERVED KNOWN REQUIREMENTS OF THE FCC AS STATED ON THE STATION CONSTRUCTION PERMIT. SUCH REQUIREMENTS AS THE MAXIMUM TO MINIMUM RATIO NOT EXCEEDING 15 DB, AND THE RATE OF CHANGE OF RADIATION NOT EXCEEDING 0.2 DB PER DEGREE OF AZIMUTH WERE OBSERVED. IN ADDITION, THE RMS OF THE VERTICALLY POLARIZED PATTERN DOES NOT EXCEED THE RMS OF THE HORIZONTALLY POLARIZED PATTERN, AND IF APPLICABLE TO THIS PERMIT, NOWHERE DOES THE VERTICALLY POLARIZED FIELD EXCEED THE HORIZONTALLY POLARIZED FIELD WITHIN THE ACCURACY OF THE CALIBRATED RANGE.

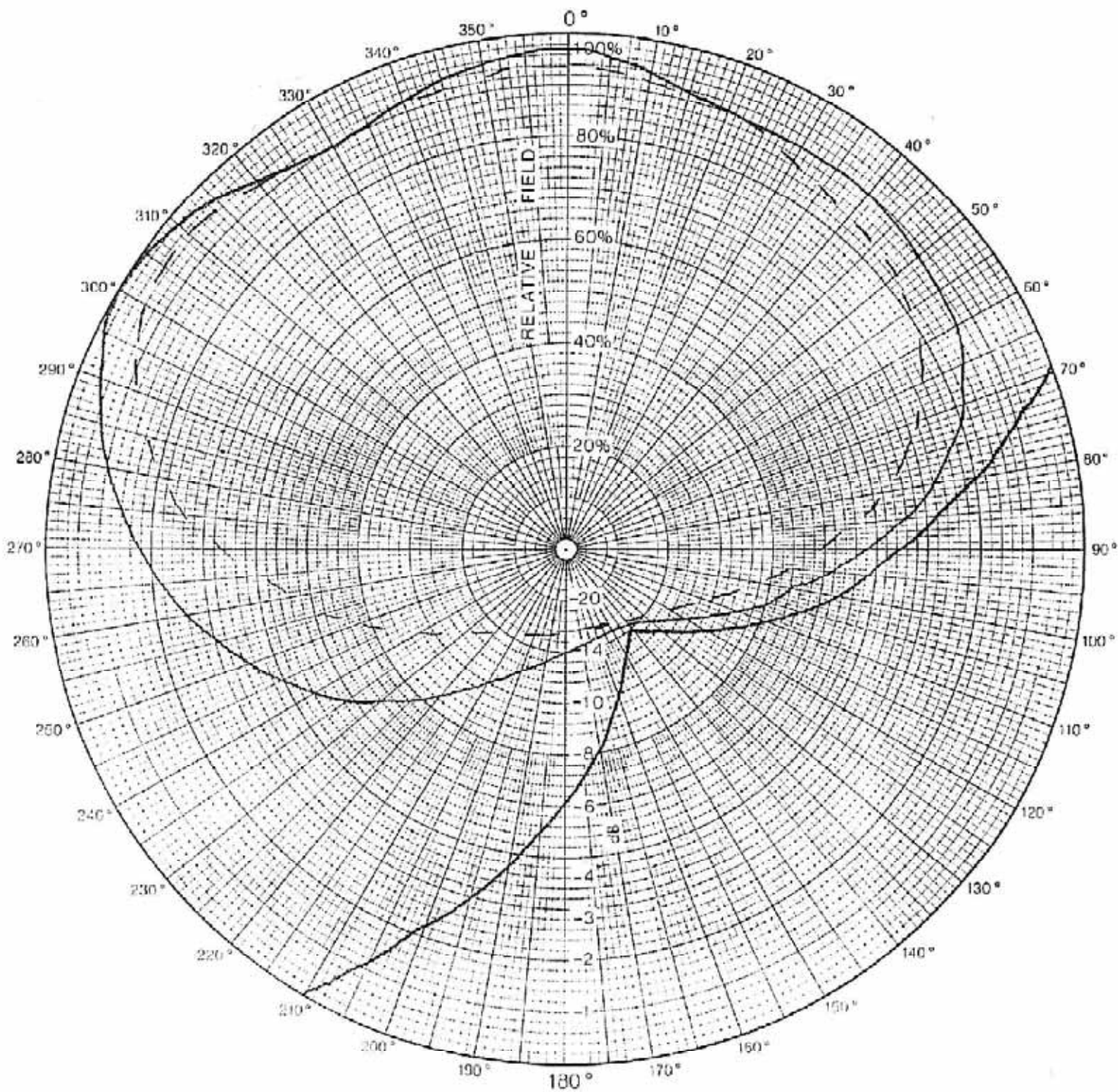
GAIN FIGURES AND REQUIRED INPUT POWER TO ACHIEVE STATION ERP, AS WELL AS OTHER DETAILS, ARE TO BE FOUND ON THE ACCOMPANYING PAGES.

THESE ADJUSTMENTS AND TESTS WERE PERFORMED BY OR UNDER THE SUPERVISION OF ALI REZA MAHNAD, DIRECTOR OF ENGINEERING, CETEC ANTENNAS.

EXECUTED THIS _____ DAY OF _____, 19____

BY

A handwritten signature in dark ink, appearing to read 'Ali Reza Mahnad', is written over a horizontal line.



Azimuth pattern

Customer: WXGA-FM

Type Number JSCP-4 (DA)

Date 2-11-86

Frequency 90.1

Major Lobe Gain 4.22

RMS Gain 2.1

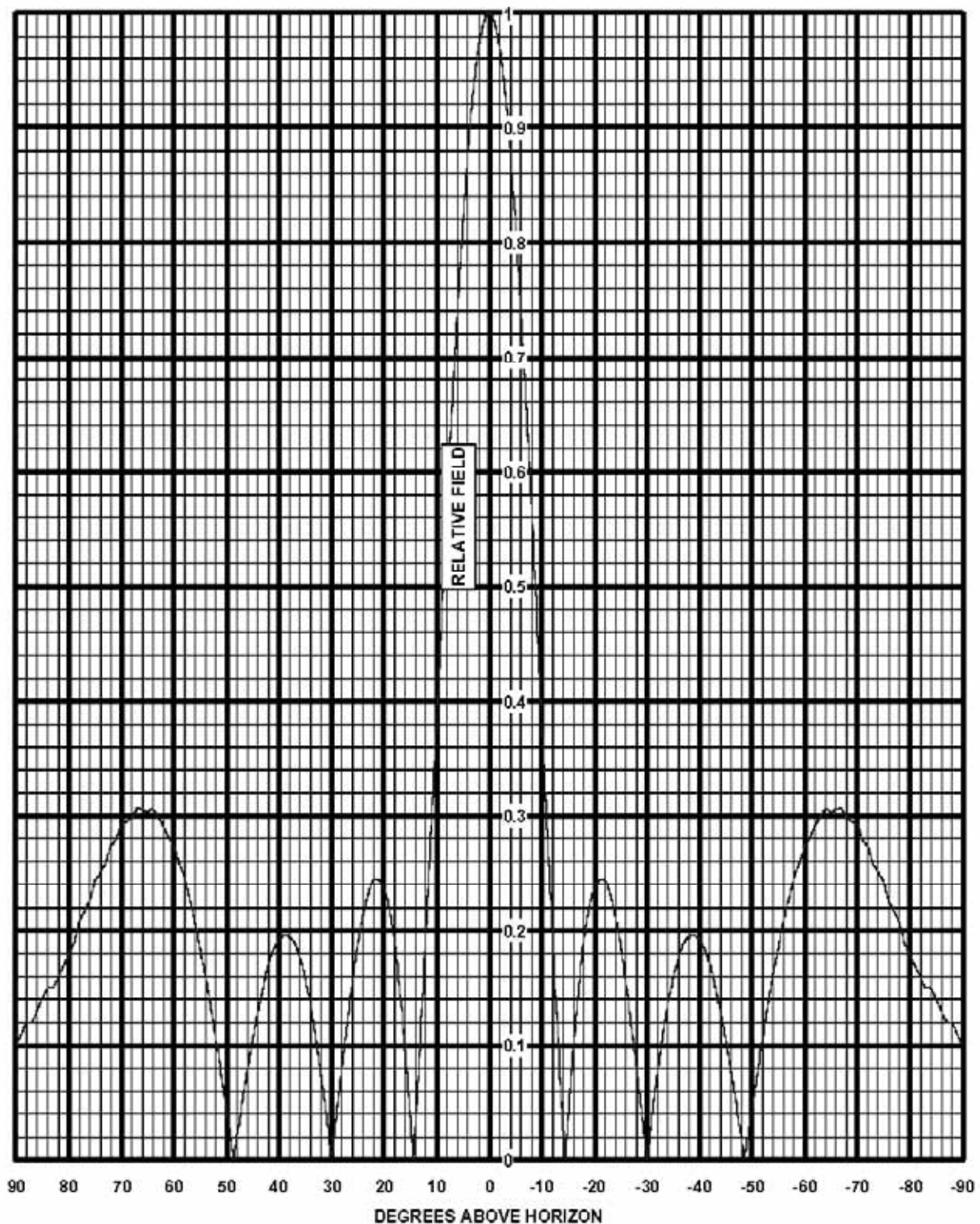
Notes: Final measured pattern.



6340 Sky Creek Drive
Sacramento, California 95828 USA

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Fax (916) 383-1182

COMPUTED ELEVATION PATTERN



Customer: Georgia Public Broadcasting
Frequency: 90.1 MHz
Calls: WXGA

Model: JSCP-4 DA
Description: FM Sidemount Antenna
-0° Beam Tilt, 0% Null Fill

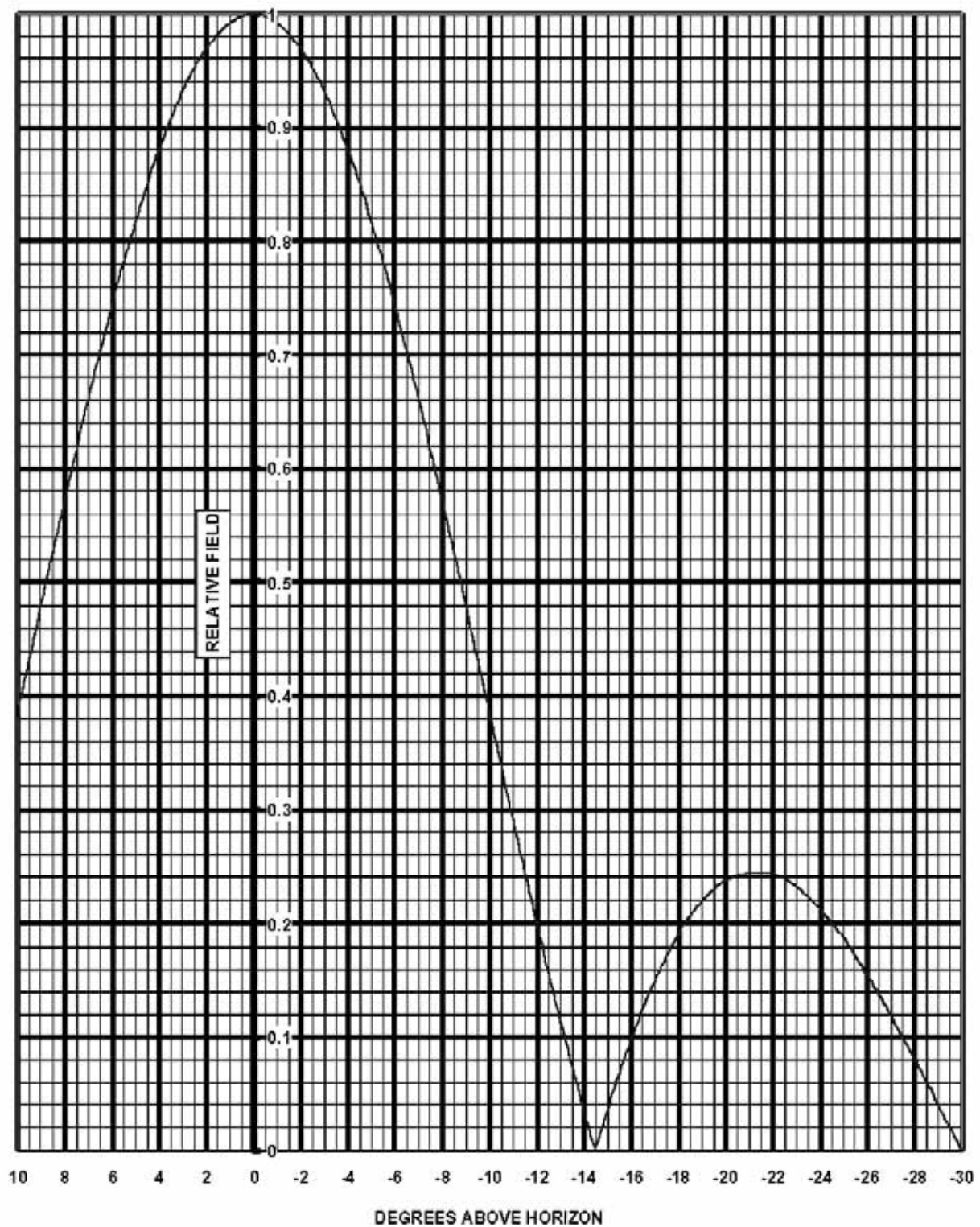
EXHIBIT 3



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Elevation Pattern Tabulation

ELEVATION PATTERN TABULATION

RELATIVE FIELD VS ELEVATION ANGLE

<u>ELEVATION ANGLE</u>	<u>RELATIVE FIELD</u>	<u>ELEVATION ANGLE</u>	<u>RELATIVE FIELD</u>	<u>ELEVATION ANGLE</u>	<u>RELATIVE FIELD</u>
10	0.385	-26	0.155	-61	0.280
9	0.479	-27	0.119	-62	0.291
8	0.572	-28	0.081	-63	0.299
7	0.661	-29	0.040	-64	0.306
6	0.743	-30	0.000	-65	0.302
5	0.817	-31	0.039	-66	0.305
4	0.880	-32	0.075	-67	0.306
3	0.932	-33	0.107	-68	0.297
2	0.969	-34	0.136	-69	0.295
1	0.992	-35	0.158	-70	0.292
0	1.000	-36	0.176	-71	0.278
-1	0.992	-37	0.189	-72	0.273
-2	0.969	-38	0.194	-73	0.257
-3	0.932	-39	0.196	-74	0.250
-4	0.880	-40	0.192	-75	0.243
-5	0.817	-41	0.183	-76	0.225
-6	0.743	-42	0.170	-77	0.216
-7	0.661	-43	0.150	-78	0.208
-8	0.572	-44	0.129	-79	0.188
-9	0.479	-45	0.105	-80	0.179
-10	0.385	-46	0.078	-81	0.169
-11	0.291	-47	0.049	-82	0.160
-12	0.199	-48	0.018	-83	0.150
-13	0.114	-49	0.013	-84	0.150
-14	0.035	-50	0.045	-85	0.140
-15	0.036	-51	0.075	-86	0.130
-16	0.098	-52	0.106	-87	0.120
-17	0.149	-53	0.133	-88	0.120
-18	0.190	-54	0.162	-89	0.110
-19	0.219	-55	0.185	-90	0.100
-20	0.237	-56	0.209		
-21	0.244	-57	0.227		
-22	0.244	-58	0.246		
-23	0.232	-59	0.258		
-24	0.212	-60	0.274		
-25	0.187				

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