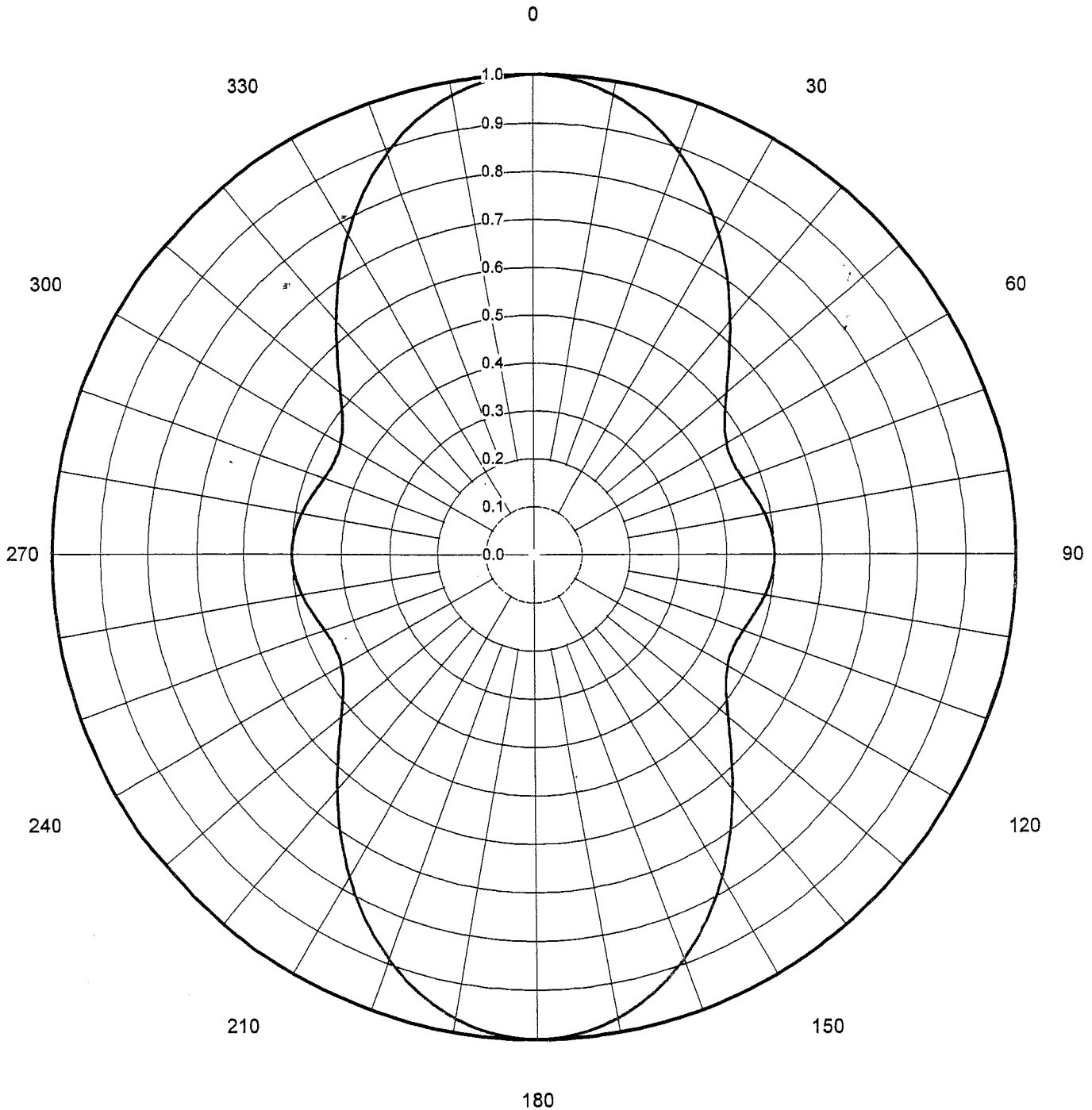


Proposal Number	<b>DCA-10190</b>	Revision:	<b>1</b>
Date	<b>7-Mar-03</b>		
Call Letters	<b>WGVU-DT</b>	Channel	<b>11</b>
Location	<b>Grand Rapids, MI</b>		
Customer	<b>Grand Valley St. Univ</b>		
Antenna Type	<b>TF-8HS-H P200</b>		

## AZIMUTH PATTERN

Gain	<b>2.10</b>	<b>( 3.22 dB)</b>
Calculated / Measured	<b>Calculated</b>	

Frequency	<b>201.00 MHz</b>
Drawing #	<b>TF-P4-2010</b>





Proposal Number **DCA-10190** Revision: **1**  
 Date **7-Mar-03**  
 Call Letters **WGVU-DT** Channel **11**  
 Location **Grand Rapids, MI**  
 Customer **Grand Valley St. Univ**  
 Antenna Type **TF-8HS-H P200**

## TABULATION OF AZIMUTH PATTERN

Azimuth Pattern Drawing #: **TF-P4-2010**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	1.000	45	0.575	90	0.500	135	0.575	180	1.000	225	0.575	270	0.500	315	0.575
1	1.000	46	0.563	91	0.500	136	0.586	181	1.000	226	0.563	271	0.500	316	0.586
2	0.999	47	0.552	92	0.499	137	0.599	182	0.999	227	0.552	272	0.499	317	0.599
3	0.997	48	0.542	93	0.499	138	0.611	183	0.997	228	0.542	273	0.499	318	0.611
4	0.995	49	0.532	94	0.498	139	0.624	184	0.995	229	0.532	274	0.498	319	0.624
5	0.993	50	0.523	95	0.496	140	0.637	185	0.993	230	0.523	275	0.496	320	0.637
6	0.990	51	0.514	96	0.495	141	0.650	186	0.990	231	0.514	276	0.495	321	0.650
7	0.986	52	0.505	97	0.493	142	0.663	187	0.986	232	0.505	277	0.493	322	0.663
8	0.981	53	0.498	98	0.491	143	0.676	188	0.981	233	0.498	278	0.491	323	0.676
9	0.977	54	0.491	99	0.489	144	0.690	189	0.977	234	0.491	279	0.489	324	0.690
10	0.971	55	0.484	100	0.487	145	0.703	190	0.971	235	0.484	280	0.487	325	0.703
11	0.965	56	0.479	101	0.484	146	0.717	191	0.965	236	0.479	281	0.484	326	0.717
12	0.959	57	0.473	102	0.482	147	0.730	192	0.959	237	0.473	282	0.482	327	0.730
13	0.952	58	0.469	103	0.479	148	0.744	193	0.952	238	0.469	283	0.479	328	0.744
14	0.944	59	0.465	104	0.476	149	0.757	194	0.944	239	0.465	284	0.476	329	0.757
15	0.936	60	0.462	105	0.474	150	0.770	195	0.936	240	0.462	285	0.474	330	0.770
16	0.928	61	0.460	106	0.471	151	0.783	196	0.928	241	0.460	286	0.471	331	0.783
17	0.919	62	0.458	107	0.468	152	0.796	197	0.919	242	0.458	287	0.468	332	0.796
18	0.910	63	0.457	108	0.466	153	0.809	198	0.910	243	0.457	288	0.466	333	0.809
19	0.900	64	0.456	109	0.464	154	0.821	199	0.900	244	0.456	289	0.464	334	0.821
20	0.890	65	0.456	110	0.462	155	0.833	200	0.890	245	0.456	290	0.462	335	0.833
21	0.879	66	0.456	111	0.460	156	0.845	201	0.879	246	0.456	291	0.460	336	0.845
22	0.868	67	0.457	112	0.458	157	0.857	202	0.868	247	0.457	292	0.458	337	0.857
23	0.857	68	0.458	113	0.457	158	0.868	203	0.857	248	0.458	293	0.457	338	0.868
24	0.845	69	0.460	114	0.456	159	0.879	204	0.845	249	0.460	294	0.456	339	0.879
25	0.833	70	0.462	115	0.456	160	0.890	205	0.833	250	0.462	295	0.456	340	0.890
26	0.821	71	0.464	116	0.456	161	0.900	206	0.821	251	0.464	296	0.456	341	0.900
27	0.809	72	0.466	117	0.457	162	0.910	207	0.809	252	0.466	297	0.457	342	0.910
28	0.796	73	0.468	118	0.458	163	0.919	208	0.796	253	0.468	298	0.458	343	0.919
29	0.783	74	0.471	119	0.460	164	0.928	209	0.783	254	0.471	299	0.460	344	0.928
30	0.770	75	0.474	120	0.462	165	0.936	210	0.770	255	0.474	300	0.462	345	0.936
31	0.757	76	0.476	121	0.465	166	0.944	211	0.757	256	0.476	301	0.465	346	0.944
32	0.744	77	0.479	122	0.469	167	0.952	212	0.744	257	0.479	302	0.469	347	0.952
33	0.730	78	0.482	123	0.473	168	0.959	213	0.730	258	0.482	303	0.473	348	0.959
34	0.717	79	0.484	124	0.479	169	0.965	214	0.717	259	0.484	304	0.479	349	0.965
35	0.703	80	0.487	125	0.484	170	0.971	215	0.703	260	0.487	305	0.484	350	0.971
36	0.690	81	0.489	126	0.491	171	0.977	216	0.690	261	0.489	306	0.491	351	0.977
37	0.676	82	0.491	127	0.498	172	0.981	217	0.676	262	0.491	307	0.498	352	0.981
38	0.663	83	0.493	128	0.505	173	0.986	218	0.663	263	0.493	308	0.505	353	0.986
39	0.650	84	0.495	129	0.514	174	0.990	219	0.650	264	0.495	309	0.514	354	0.990
40	0.637	85	0.496	130	0.523	175	0.993	220	0.637	265	0.496	310	0.523	355	0.993
41	0.624	86	0.498	131	0.532	176	0.995	221	0.624	266	0.498	311	0.532	356	0.995
42	0.611	87	0.499	132	0.542	177	0.997	222	0.611	267	0.499	312	0.542	357	0.997
43	0.599	88	0.499	133	0.552	178	0.999	223	0.599	268	0.499	313	0.552	358	0.999
44	0.586	89	0.500	134	0.563	179	1.000	224	0.586	269	0.500	314	0.563	359	1.000

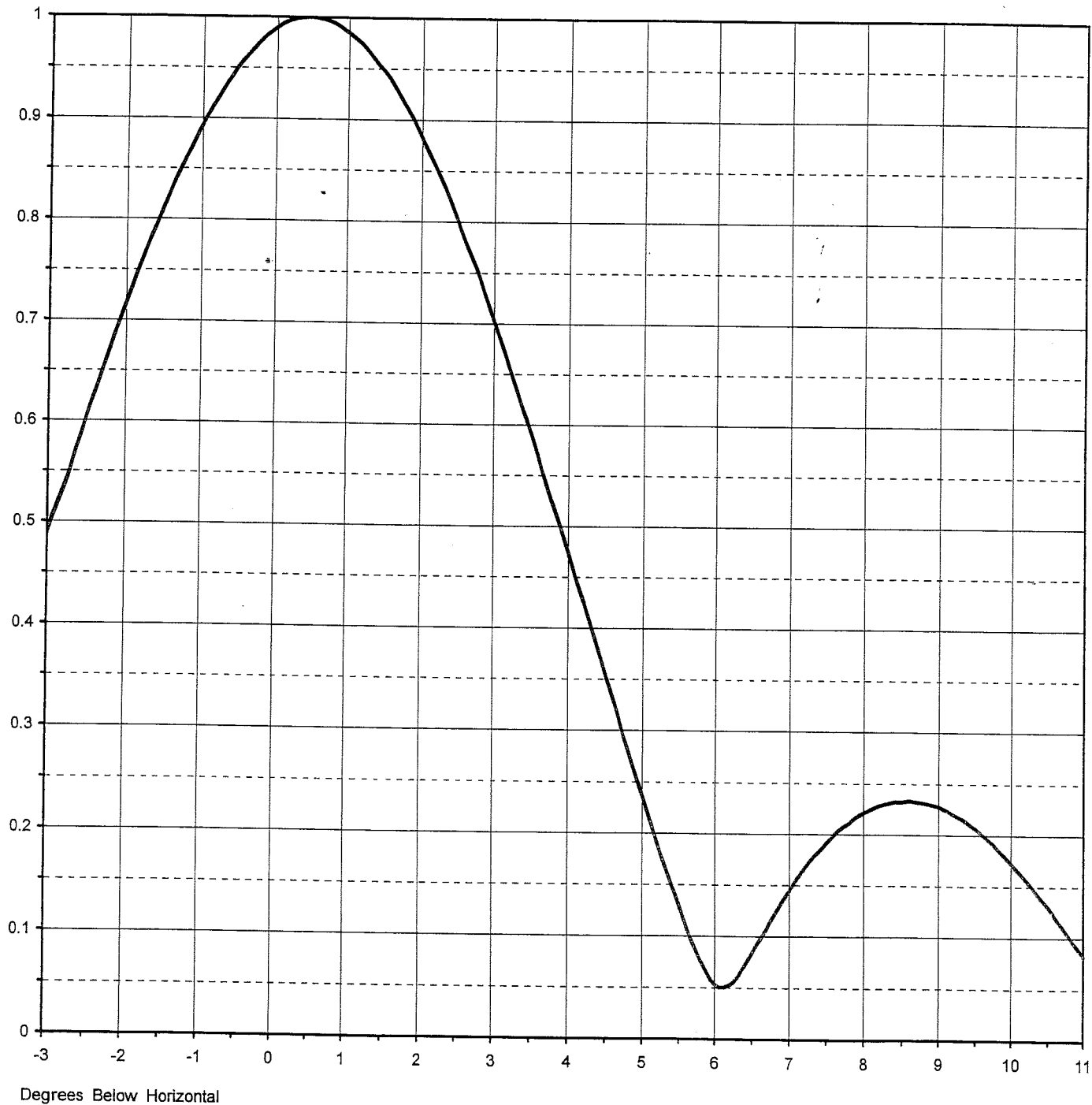


Proposal Number	<b>DCA-10190</b>	Revision:	<b>1</b>
Date	<b>7-Mar-03</b>		
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Location	<b>Grand Rapids, MI</b>		
Customer	<b>Grand Valley St. Univ</b>		
Antenna Type	<b>TF-8HS-H P200</b>		

### ELEVATION PATTERN

RMS Gain at Main Lobe	<b>8.30</b>	<b>( 9.19 dB )</b>
RMS Gain at Horizontal	<b>8.10</b>	<b>( 9.08 dB )</b>
Calculated / Measured	<b>Calculated</b>	

Beam Tilt	<b>0.50 deg</b>
Frequency	<b>201.00 MHz</b>
Drawing #	<b>08S083050</b>





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 Antenna Type **TF-8HS-H P200**

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **08S083050-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.086	2.4	0.819	10.6	0.130	30.5	0.012	51.0	0.297	71.5	0.040
-9.5	0.134	2.6	0.782	10.8	0.111	31.0	0.023	51.5	0.302	72.0	0.039
-9.0	0.176	2.8	0.744	11.0	0.091	31.5	0.034	52.0	0.304	72.5	0.037
-8.5	0.209	3.0	0.702	11.5	0.041	32.0	0.044	52.5	0.303	73.0	0.035
-8.0	0.229	3.2	0.659	12.0	0.014	32.5	0.052	53.0	0.299	73.5	0.032
-7.5	0.233	3.4	0.615	12.5	0.057	33.0	0.057	53.5	0.292	74.0	0.030
-7.0	0.220	3.6	0.569	13.0	0.096	33.5	0.060	54.0	0.282	74.5	0.028
-6.5	0.188	3.8	0.522	13.5	0.127	34.0	0.059	54.5	0.270	75.0	0.025
-6.0	0.139	4.0	0.474	14.0	0.148	34.5	0.055	55.0	0.257	75.5	0.023
-5.5	0.077	4.2	0.426	14.5	0.158	35.0	0.047	55.5	0.242	76.0	0.021
-5.0	0.058	4.4	0.378	15.0	0.157	35.5	0.037	56.0	0.225	76.5	0.018
-4.5	0.141	4.6	0.330	15.5	0.144	36.0	0.024	56.5	0.208	77.0	0.016
-4.0	0.250	4.8	0.283	16.0	0.122	36.5	0.011	57.0	0.189	77.5	0.014
-3.5	0.367	5.0	0.237	16.5	0.092	37.0	0.011	57.5	0.171	78.0	0.012
-3.0	0.488	5.2	0.192	17.0	0.057	37.5	0.025	58.0	0.152	78.5	0.010
-2.8	0.535	5.4	0.150	17.5	0.018	38.0	0.040	58.5	0.134	79.0	0.008
-2.6	0.582	5.6	0.110	18.0	0.022	38.5	0.055	59.0	0.116	79.5	0.007
-2.4	0.628	5.8	0.076	18.5	0.061	39.0	0.068	59.5	0.098	80.0	0.005
-2.2	0.672	6.0	0.053	19.0	0.097	39.5	0.078	60.0	0.082	80.5	0.004
-2.0	0.715	6.2	0.053	19.5	0.128	40.0	0.085	60.5	0.066	81.0	0.002
-1.8	0.756	6.4	0.071	20.0	0.153	40.5	0.089	61.0	0.052	81.5	0.001
-1.6	0.794	6.6	0.096	20.5	0.171	41.0	0.090	61.5	0.039	82.0	0.001
-1.4	0.830	6.8	0.121	21.0	0.181	41.5	0.086	62.0	0.027	82.5	0.002
-1.2	0.863	7.0	0.144	21.5	0.184	42.0	0.078	62.5	0.017	83.0	0.003
-1.0	0.893	7.2	0.165	22.0	0.179	42.5	0.067	63.0	0.010	83.5	0.004
-0.8	0.919	7.4	0.183	22.5	0.168	43.0	0.053	63.5	0.012	84.0	0.004
-0.6	0.942	7.6	0.199	23.0	0.152	43.5	0.036	64.0	0.017	84.5	0.005
-0.4	0.962	7.8	0.211	23.5	0.131	44.0	0.023	64.5	0.025	85.0	0.006
-0.2	0.978	8.0	0.221	24.0	0.109	44.5	0.028	65.0	0.030	85.5	0.006
0.0	0.990	8.2	0.228	24.5	0.085	45.0	0.049	65.5	0.035	86.0	0.007
0.2	0.997	8.4	0.232	25.0	0.061	45.5	0.074	66.0	0.039	86.5	0.007
0.4	1.000	8.6	0.233	25.5	0.040	46.0	0.101	66.5	0.042	87.0	0.007
0.6	0.999	8.8	0.231	26.0	0.024	46.5	0.129	67.0	0.044	87.5	0.008
0.8	0.994	9.0	0.227	26.5	0.017	47.0	0.156	67.5	0.046	88.0	0.008
1.0	0.985	9.2	0.220	27.0	0.021	47.5	0.182	68.0	0.046	88.5	0.008
1.2	0.972	9.4	0.211	27.5	0.026	48.0	0.206	68.5	0.047	89.0	0.008
1.4	0.955	9.6	0.200	28.0	0.029	48.5	0.228	69.0	0.046	89.5	0.008
1.6	0.935	9.8	0.194	28.5	0.027	49.0	0.247	69.5	0.046	90.0	0.008
1.8	0.911	10.0	0.180	29.0	0.023	49.5	0.264	70.0	0.044		
2.0	0.883	10.2	0.164	29.5	0.016	50.0	0.277	70.5	0.043		
2.2	0.853	10.4	0.148	30.0	0.009	50.5	0.289	71.0	0.042		