

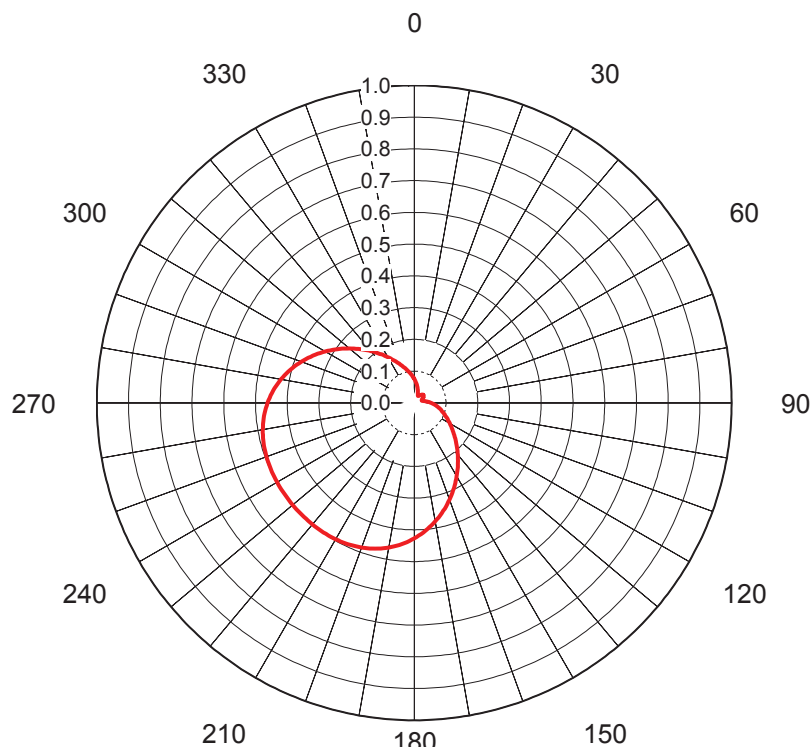
## AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-70044-4**  
 Date **29-Dec-17**  
 Call Letters **WACH**  
 Channel **22**  
 Frequency **521 MHz**  
 Antenna Type **TFU-24JSC/VP-R C188**  
 Gain **1.88 (2.73dB)**  
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.392	36	0.207	72	0.179	108	0.481	144	0.816	180	0.998	216	0.907	252	0.925	288	0.990
1	0.381	37	0.211	73	0.178	109	0.491	145	0.826	181	0.997	217	0.905	253	0.926	289	0.988
2	0.370	38	0.216	74	0.178	110	0.502	146	0.835	182	0.996	218	0.904	254	0.928	290	0.985
3	0.358	39	0.221	75	0.178	111	0.512	147	0.845	183	0.994	219	0.903	255	0.930	291	0.982
4	0.347	40	0.226	76	0.180	112	0.522	148	0.854	184	0.992	220	0.901	256	0.932	292	0.979
5	0.335	41	0.231	77	0.182	113	0.532	149	0.863	185	0.990	221	0.900	257	0.935	293	0.975
6	0.324	42	0.235	78	0.185	114	0.542	150	0.873	186	0.987	222	0.899	258	0.937	294	0.971
7	0.313	43	0.240	79	0.189	115	0.552	151	0.882	187	0.985	223	0.899	259	0.940	295	0.967
8	0.302	44	0.244	80	0.194	116	0.561	152	0.890	188	0.982	224	0.898	260	0.942	296	0.962
9	0.291	45	0.247	81	0.200	117	0.571	153	0.899	189	0.979	225	0.897	261	0.945	297	0.957
10	0.280	46	0.250	82	0.206	118	0.580	154	0.907	190	0.976	226	0.897	262	0.948	298	0.952
11	0.270	47	0.253	83	0.214	119	0.590	155	0.916	191	0.973	227	0.896	263	0.951	299	0.946
12	0.260	48	0.255	84	0.221	120	0.599	156	0.923	192	0.970	228	0.896	264	0.954	300	0.940
13	0.250	49	0.256	85	0.229	121	0.608	157	0.931	193	0.967	229	0.896	265	0.958	301	0.934
14	0.241	50	0.257	86	0.238	122	0.617	158	0.938	194	0.964	230	0.895	266	0.961	302	0.927
15	0.232	51	0.256	87	0.248	123	0.626	159	0.945	195	0.960	231	0.897	267	0.964	303	0.920
16	0.224	52	0.255	88	0.257	124	0.635	160	0.951	196	0.957	232	0.898	268	0.967	304	0.913
17	0.216	53	0.253	89	0.267	125	0.644	161	0.957	197	0.954	233	0.900	269	0.971	305	0.906
18	0.209	54	0.251	90	0.278	126	0.653	162	0.963	198	0.951	234	0.901	270	0.974	306	0.898
19	0.203	55	0.248	91	0.289	127	0.662	163	0.968	199	0.947	235	0.902	271	0.977	307	0.890
20	0.197	56	0.245	92	0.300	128	0.671	164	0.972	200	0.944	236	0.904	272	0.980	308	0.882
21	0.192	57	0.241	93	0.311	129	0.680	165	0.977	201	0.941	237	0.905	273	0.983	309	0.874
22	0.188	58	0.236	94	0.322	130	0.688	166	0.981	202	0.938	238	0.906	274	0.985	310	0.865
23	0.184	59	0.232	95	0.334	131	0.697	167	0.984	203	0.935	239	0.907	275	0.988	311	0.857
24	0.182	60	0.227	96	0.346	132	0.706	168	0.987	204	0.933	240	0.908	276	0.990	312	0.848
25	0.180	61	0.222	97	0.357	133	0.715	169	0.990	205	0.930	241	0.910	277	0.992	313	0.839
26	0.179	62	0.217	98	0.369	134	0.724	170	0.993	206	0.927	242	0.911	278	0.993	314	0.830
27	0.179	63	0.212	99	0.381	135	0.733	171	0.995	207	0.925	243	0.912	279	0.994	315	0.821
28	0.180	64	0.207	100	0.393	136	0.742	172	0.996	208	0.922	244	0.913	280	0.995	316	0.812
29	0.182	65	0.202	101	0.404	137	0.751	173	0.998	209	0.920	245	0.914	281	0.996	317	0.803
30	0.184	66	0.198	102	0.415	138	0.760	174	0.999	210	0.918	246	0.916	282	0.996	318	0.794
31	0.187	67	0.194	103	0.427	139	0.769	175	1.000	211	0.916	247	0.917	283	0.996	319	0.784
32	0.190	68	0.190	104	0.438	140	0.778	176	1.000	212	0.914	248	0.918	284	0.996	320	0.775
33	0.194	69	0.186	105	0.449	141	0.788	177	1.000	213	0.912	249	0.920	285	0.995	321	0.766
34	0.198	70	0.183	106	0.460	142	0.797	178	1.000	214	0.910	250	0.921	286	0.993	322	0.757
35	0.202	71	0.181	107	0.470	143	0.807	179	0.999	215	0.908	251	0.923	287	0.992	323	0.748

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## AZIMUTH PATTERN Vertical Polarization

In Free Space

Proposal No. **C-70044-4**  
 Date **29-Dec-17**  
 Call Letters **WACH**  
 Channel **22**  
 Frequency **521 MHz**  
 Antenna Type **TFU-24JSC/VP-R C188**  
 Gain **2.67 (4.27dB)**  
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.076	36	0.029	72	0.025	108	0.095	144	0.234	180	0.427	216	0.499	252	0.494	288	0.389
1	0.073	37	0.030	73	0.025	109	0.097	145	0.240	181	0.431	217	0.499	253	0.493	289	0.384
2	0.071	38	0.031	74	0.025	110	0.100	146	0.245	182	0.435	218	0.499	254	0.492	290	0.379
3	0.069	39	0.032	75	0.026	111	0.103	147	0.251	183	0.439	219	0.499	255	0.491	291	0.374
4	0.067	40	0.033	76	0.027	112	0.105	148	0.256	184	0.443	220	0.499	256	0.490	292	0.368
5	0.064	41	0.034	77	0.028	113	0.108	149	0.262	185	0.446	221	0.500	257	0.489	293	0.363
6	0.062	42	0.035	78	0.030	114	0.111	150	0.267	186	0.450	222	0.500	258	0.487	294	0.357
7	0.060	43	0.035	79	0.031	115	0.114	151	0.273	187	0.453	223	0.500	259	0.486	295	0.352
8	0.058	44	0.036	80	0.033	116	0.117	152	0.279	188	0.457	224	0.500	260	0.484	296	0.346
9	0.055	45	0.037	81	0.034	117	0.120	153	0.284	189	0.460	225	0.500	261	0.483	297	0.341
10	0.053	46	0.037	82	0.036	118	0.123	154	0.290	190	0.463	226	0.500	262	0.481	298	0.335
11	0.051	47	0.037	83	0.038	119	0.126	155	0.296	191	0.465	227	0.500	263	0.479	299	0.329
12	0.049	48	0.038	84	0.040	120	0.129	156	0.301	192	0.468	228	0.500	264	0.477	300	0.324
13	0.047	49	0.038	85	0.042	121	0.132	157	0.307	193	0.471	229	0.500	265	0.475	301	0.318
14	0.044	50	0.038	86	0.045	122	0.136	158	0.313	194	0.473	230	0.500	266	0.473	302	0.312
15	0.042	51	0.038	87	0.047	123	0.139	159	0.319	195	0.475	231	0.500	267	0.470	303	0.307
16	0.040	52	0.038	88	0.049	124	0.143	160	0.324	196	0.478	232	0.500	268	0.468	304	0.301
17	0.038	53	0.037	89	0.051	125	0.147	161	0.330	197	0.480	233	0.500	269	0.465	305	0.295
18	0.036	54	0.037	90	0.053	126	0.151	162	0.336	198	0.481	234	0.500	270	0.462	306	0.289
19	0.034	55	0.037	91	0.056	127	0.154	163	0.341	199	0.483	235	0.500	271	0.459	307	0.284
20	0.033	56	0.036	92	0.058	128	0.158	164	0.347	200	0.485	236	0.500	272	0.456	308	0.278
21	0.031	57	0.035	93	0.060	129	0.162	165	0.353	201	0.486	237	0.500	273	0.453	309	0.272
22	0.029	58	0.035	94	0.062	130	0.167	166	0.358	202	0.488	238	0.500	274	0.449	310	0.267
23	0.028	59	0.034	95	0.065	131	0.171	167	0.363	203	0.489	239	0.499	275	0.446	311	0.261
24	0.027	60	0.033	96	0.067	132	0.175	168	0.369	204	0.490	240	0.499	276	0.442	312	0.256
25	0.026	61	0.032	97	0.069	133	0.180	169	0.374	205	0.492	241	0.499	277	0.438	313	0.250
26	0.025	62	0.031	98	0.071	134	0.184	170	0.379	206	0.493	242	0.499	278	0.435	314	0.245
27	0.025	63	0.030	99	0.074	135	0.189	171	0.385	207	0.493	243	0.499	279	0.430	315	0.239
28	0.025	64	0.029	100	0.076	136	0.194	172	0.390	208	0.494	244	0.498	280	0.426	316	0.234
29	0.025	65	0.028	101	0.078	137	0.199	173	0.395	209	0.495	245	0.498	281	0.422	317	0.229
30	0.025	66	0.027	102	0.080	138	0.203	174	0.400	210	0.496	246	0.498	282	0.418	318	0.223
31	0.025	67	0.027	103	0.083	139	0.208	175	0.404	211	0.496	247	0.497	283	0.413	319	0.218
32	0.026	68	0.026	104	0.085	140	0.213	176	0.409	212	0.497	248	0.497	284	0.409	320	0.213
33	0.026	69	0.025	105	0.088	141	0.219	177	0.414	213	0.497	249	0.496	285	0.404	321	0.208
34	0.027	70	0.025	106	0.090	142	0.224	178	0.418	214	0.498	250	0.495	286	0.399	322	0.203
35	0.028	71	0.025	107	0.092	143	0.229	179	0.423	215	0.498	251	0.495	287	0.394	323	0.198

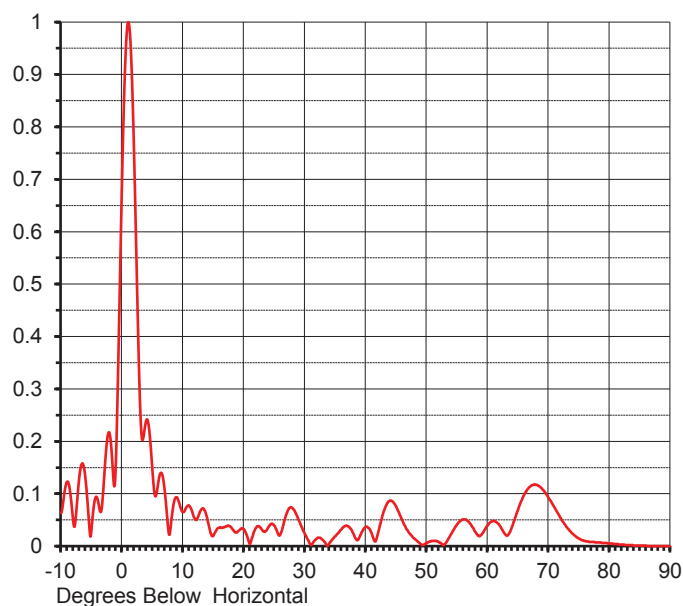
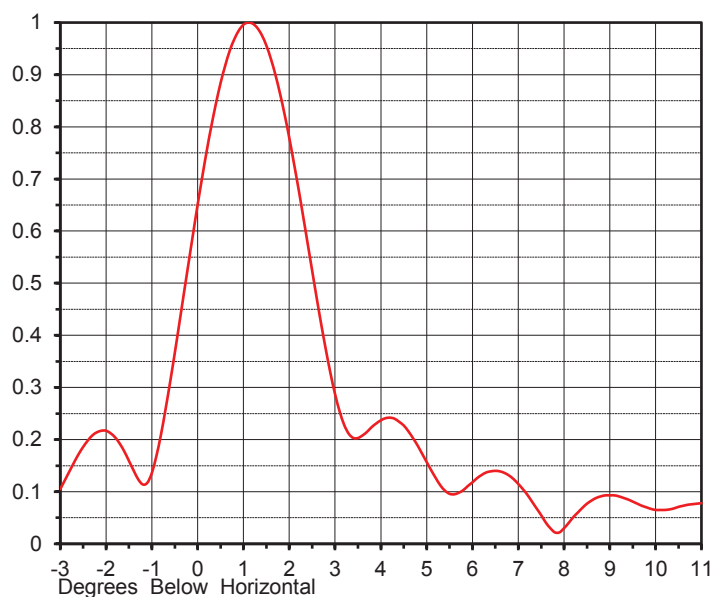
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## ELEVATION PATTERN

Proposal No. **C-70044-4**  
 Date **29-Dec-17**  
 Call Letters **WACH**  
 Channel **22**  
 Frequency **521 MHz**  
 Antenna Type **TFU-24JSC/VP-R C188**

RMS Directivity at Main Lobe **24.0 ( 13.80 dB )**  
 RMS Directivity at Horizontal **11.9 ( 10.76 dB )**  
**Calculated**

Beam Tilt **1.00 deg**  
 Pattern Number **24B240100**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.063	10.0	0.065	30.0	0.023	50.0	0.006	70.0	0.092
-9.0	0.123	11.0	0.077	31.0	0.002	51.0	0.010	71.0	0.073
-8.0	0.045	12.0	0.051	32.0	0.015	52.0	0.008	72.0	0.053
-7.0	0.134	13.0	0.070	33.0	0.011	53.0	0.004	73.0	0.036
-6.0	0.127	14.0	0.051	34.0	0.005	54.0	0.023	74.0	0.023
-5.0	0.035	15.0	0.020	35.0	0.019	55.0	0.042	75.0	0.014
-4.0	0.088	16.0	0.035	36.0	0.032	56.0	0.051	76.0	0.010
-3.0	0.122	17.0	0.037	37.0	0.038	57.0	0.045	77.0	0.008
-2.0	0.212	18.0	0.034	38.0	0.023	58.0	0.027	78.0	0.007
-1.0	0.169	19.0	0.028	39.0	0.018	59.0	0.022	79.0	0.006
0.0	0.704	20.0	0.032	40.0	0.037	60.0	0.040	80.0	0.005
1.0	1.000	21.0	0.004	41.0	0.023	61.0	0.048	81.0	0.004
2.0	0.731	22.0	0.035	42.0	0.025	62.0	0.039	82.0	0.003
3.0	0.254	23.0	0.031	43.0	0.068	63.0	0.021	83.0	0.002
4.0	0.241	24.0	0.036	44.0	0.087	64.0	0.037	84.0	0.001
5.0	0.141	25.0	0.039	45.0	0.075	65.0	0.070	85.0	0.001
6.0	0.126	26.0	0.023	46.0	0.049	66.0	0.098	86.0	0.001
7.0	0.105	27.0	0.062	47.0	0.027	67.0	0.114	87.0	0.000
8.0	0.040	28.0	0.072	48.0	0.014	68.0	0.117	88.0	0.000
9.0	0.093	29.0	0.049	49.0	0.004	69.0	0.108	89.0	0.000
								90.0	0.000

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