

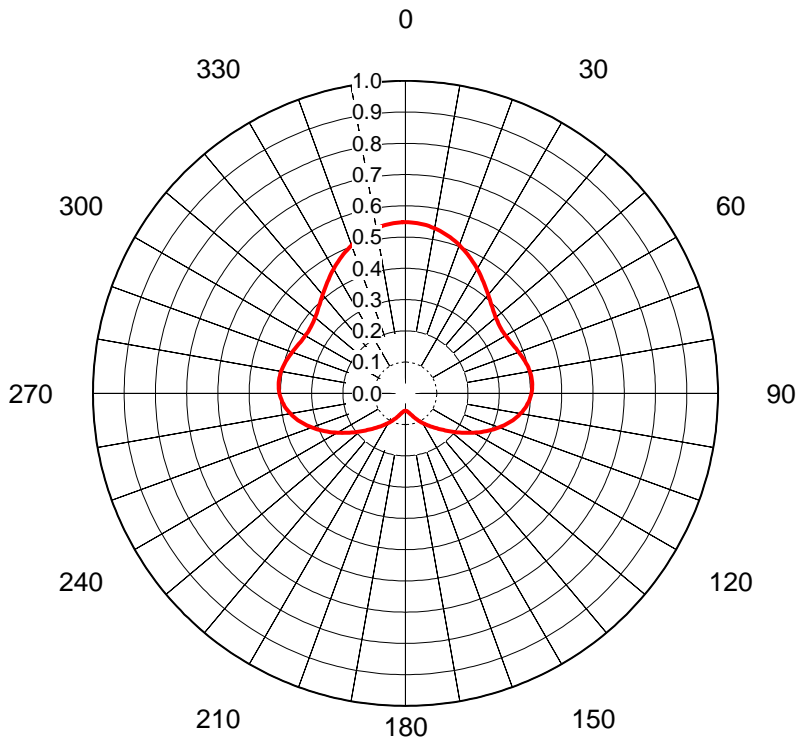
## AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71941**  
Date **1-Sep-22**  
Call Letters **WHNO**  
Channel **21**  
Frequency **515 MHz**  
Antenna Type **TFU-18DSC/VP-R S180**  
Gain **1.81 (2.57dB)**  
Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	1.000	36	0.957	72	0.871	108	0.614	144	0.320	180	0.475	216	0.320	252	0.614	288	0.871
1	1.000	37	0.955	73	0.868	109	0.603	145	0.323	181	0.475	217	0.319	253	0.625	289	0.875
2	1.000	38	0.953	74	0.864	110	0.591	146	0.326	182	0.474	218	0.318	254	0.636	290	0.878
3	1.000	39	0.951	75	0.860	111	0.580	147	0.329	183	0.473	219	0.318	255	0.647	291	0.881
4	0.999	40	0.949	76	0.856	112	0.568	148	0.333	184	0.472	220	0.319	256	0.657	292	0.884
5	0.999	41	0.947	77	0.852	113	0.556	149	0.338	185	0.470	221	0.320	257	0.667	293	0.887
6	0.999	42	0.945	78	0.848	114	0.545	150	0.343	186	0.468	222	0.323	258	0.677	294	0.889
7	0.998	43	0.943	79	0.843	115	0.533	151	0.348	187	0.465	223	0.326	259	0.687	295	0.893
8	0.997	44	0.941	80	0.839	116	0.521	152	0.354	188	0.462	224	0.330	260	0.697	296	0.896
9	0.997	45	0.939	81	0.834	117	0.509	153	0.359	189	0.459	225	0.335	261	0.706	297	0.898
10	0.996	46	0.937	82	0.829	118	0.497	154	0.366	190	0.455	226	0.340	262	0.715	298	0.901
11	0.995	47	0.934	83	0.823	119	0.485	155	0.372	191	0.451	227	0.346	263	0.724	299	0.903
12	0.994	48	0.932	84	0.818	120	0.474	156	0.378	192	0.447	228	0.353	264	0.733	300	0.906
13	0.993	49	0.930	85	0.812	121	0.462	157	0.384	193	0.442	229	0.361	265	0.741	301	0.908
14	0.992	50	0.928	86	0.806	122	0.450	158	0.391	194	0.438	230	0.369	266	0.750	302	0.910
15	0.991	51	0.926	87	0.800	123	0.439	159	0.397	195	0.432	231	0.378	267	0.758	303	0.913
16	0.990	52	0.924	88	0.793	124	0.428	160	0.403	196	0.427	232	0.387	268	0.765	304	0.915
17	0.989	53	0.922	89	0.787	125	0.417	161	0.410	197	0.421	233	0.397	269	0.773	305	0.917
18	0.988	54	0.920	90	0.780	126	0.407	162	0.416	198	0.416	234	0.407	270	0.780	306	0.920
19	0.986	55	0.917	91	0.773	127	0.397	163	0.421	199	0.410	235	0.417	271	0.787	307	0.922
20	0.985	56	0.915	92	0.765	128	0.387	164	0.427	200	0.403	236	0.428	272	0.793	308	0.924
21	0.983	57	0.913	93	0.758	129	0.378	165	0.432	201	0.397	237	0.439	273	0.800	309	0.926
22	0.982	58	0.910	94	0.750	130	0.369	166	0.438	202	0.391	238	0.450	274	0.806	310	0.928
23	0.980	59	0.908	95	0.741	131	0.361	167	0.442	203	0.384	239	0.462	275	0.812	311	0.930
24	0.979	60	0.906	96	0.733	132	0.353	168	0.447	204	0.378	240	0.474	276	0.818	312	0.932
25	0.977	61	0.903	97	0.724	133	0.346	169	0.451	205	0.372	241	0.485	277	0.823	313	0.934
26	0.976	62	0.901	98	0.715	134	0.340	170	0.455	206	0.366	242	0.497	278	0.829	314	0.937
27	0.974	63	0.898	99	0.706	135	0.335	171	0.459	207	0.359	243	0.509	279	0.834	315	0.939
28	0.972	64	0.896	100	0.697	136	0.330	172	0.462	208	0.354	244	0.521	280	0.839	316	0.941
29	0.970	65	0.893	101	0.687	137	0.326	173	0.465	209	0.348	245	0.533	281	0.843	317	0.943
30	0.968	66	0.890	102	0.677	138	0.323	174	0.468	210	0.343	246	0.545	282	0.848	318	0.945
31	0.967	67	0.887	103	0.667	139	0.320	175	0.470	211	0.338	247	0.556	283	0.852	319	0.947
32	0.965	68	0.884	104	0.657	140	0.319	176	0.472	212	0.333	248	0.568	284	0.856	320	0.949
33	0.963	69	0.881	105	0.647	141	0.318	177	0.473	213	0.329	249	0.580	285	0.860	321	0.951
34	0.961	70	0.878	106	0.636	142	0.318	178	0.474	214	0.326	250	0.591	286	0.864	322	0.953
35	0.959	71	0.875	107	0.625	143	0.319	179	0.475	215	0.323	251	0.603	287	0.868	323	0.955

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## AZIMUTH PATTERN Vertical Polarization

In Free Space

Proposal No. **C-71941**  
 Date **1-Sep-22**  
 Call Letters **WHNO**  
 Channel **21**  
 Frequency **515 MHz**  
 Antenna Type **TFU-18DSC/VP-R S180**  
 Gain **2.44 (3.88dB)**  
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.548	36	0.430	72	0.390	108	0.331	144	0.128	180	0.056	216	0.128	252	0.331	288	0.390	324	0.430
1	0.548	37	0.426	73	0.392	109	0.325	145	0.125	181	0.056	217	0.132	253	0.337	289	0.388	325	0.435
2	0.547	38	0.421	74	0.394	110	0.319	146	0.121	182	0.056	218	0.135	254	0.343	290	0.386	326	0.440
3	0.547	39	0.416	75	0.396	111	0.312	147	0.118	183	0.056	219	0.139	255	0.349	291	0.384	327	0.445
4	0.546	40	0.412	76	0.398	112	0.306	148	0.115	184	0.057	220	0.143	256	0.354	292	0.382	328	0.450
5	0.545	41	0.408	77	0.400	113	0.299	149	0.112	185	0.058	221	0.147	257	0.359	293	0.380	329	0.455
6	0.544	42	0.403	78	0.401	114	0.293	150	0.109	186	0.058	222	0.151	258	0.364	294	0.378	330	0.459
7	0.542	43	0.399	79	0.403	115	0.286	151	0.106	187	0.059	223	0.155	259	0.369	295	0.376	331	0.464
8	0.540	44	0.396	80	0.404	116	0.279	152	0.103	188	0.060	224	0.160	260	0.374	296	0.374	332	0.469
9	0.538	45	0.392	81	0.405	117	0.272	153	0.100	189	0.061	225	0.164	261	0.378	297	0.373	333	0.474
10	0.536	46	0.389	82	0.406	118	0.265	154	0.098	190	0.063	226	0.169	262	0.382	298	0.372	334	0.478
11	0.534	47	0.385	83	0.406	119	0.259	155	0.095	191	0.064	227	0.174	263	0.385	299	0.371	335	0.483
12	0.531	48	0.382	84	0.407	120	0.252	156	0.092	192	0.066	228	0.179	264	0.389	300	0.370	336	0.487
13	0.529	49	0.380	85	0.407	121	0.245	157	0.090	193	0.067	229	0.184	265	0.392	301	0.369	337	0.492
14	0.526	50	0.377	86	0.407	122	0.239	158	0.087	194	0.069	230	0.190	266	0.395	302	0.369	338	0.496
15	0.522	51	0.375	87	0.406	123	0.232	159	0.084	195	0.071	231	0.195	267	0.397	303	0.369	339	0.500
16	0.519	52	0.373	88	0.405	124	0.226	160	0.082	196	0.073	232	0.201	268	0.400	304	0.369	340	0.504
17	0.516	53	0.372	89	0.404	125	0.219	161	0.080	197	0.075	233	0.207	269	0.401	305	0.370	341	0.508
18	0.512	54	0.371	90	0.403	126	0.213	162	0.077	198	0.077	234	0.213	270	0.403	306	0.371	342	0.512
19	0.508	55	0.370	91	0.401	127	0.207	163	0.075	199	0.080	235	0.219	271	0.404	307	0.372	343	0.516
20	0.504	56	0.369	92	0.400	128	0.201	164	0.073	200	0.082	236	0.226	272	0.405	308	0.373	344	0.519
21	0.500	57	0.369	93	0.397	129	0.195	165	0.071	201	0.084	237	0.232	273	0.406	309	0.375	345	0.522
22	0.496	58	0.369	94	0.395	130	0.190	166	0.069	202	0.087	238	0.239	274	0.407	310	0.377	346	0.526
23	0.492	59	0.369	95	0.392	131	0.184	167	0.067	203	0.090	239	0.245	275	0.407	311	0.380	347	0.529
24	0.487	60	0.370	96	0.389	132	0.179	168	0.066	204	0.092	240	0.252	276	0.407	312	0.382	348	0.531
25	0.483	61	0.371	97	0.385	133	0.174	169	0.064	205	0.095	241	0.259	277	0.406	313	0.385	349	0.534
26	0.478	62	0.372	98	0.382	134	0.169	170	0.063	206	0.098	242	0.266	278	0.406	314	0.389	350	0.536
27	0.474	63	0.373	99	0.378	135	0.164	171	0.061	207	0.100	243	0.272	279	0.405	315	0.392	351	0.538
28	0.469	64	0.374	100	0.374	136	0.159	172	0.060	208	0.103	244	0.279	280	0.404	316	0.396	352	0.540
29	0.464	65	0.376	101	0.369	137	0.155	173	0.059	209	0.106	245	0.286	281	0.403	317	0.399	353	0.542
30	0.459	66	0.378	102	0.364	138	0.151	174	0.058	210	0.109	246	0.293	282	0.401	318	0.403	354	0.544
31	0.455	67	0.380	103	0.359	139	0.147	175	0.058	211	0.112	247	0.299	283	0.400	319	0.408	355	0.545
32	0.450	68	0.382	104	0.354	140	0.143	176	0.057	212	0.115	248	0.306	284	0.398	320	0.412	356	0.546
33	0.445	69	0.384	105	0.349	141	0.139	177	0.056	213	0.118	249	0.312	285	0.396	321	0.416	357	0.547
34	0.440	70	0.386	106	0.343	142	0.135	178	0.056	214	0.122	250	0.319	286	0.394	322	0.421	358	0.547
35	0.435	71	0.388	107	0.337	143	0.132	179	0.056	215	0.125	251	0.325	287	0.392	323	0.426	359	0.548

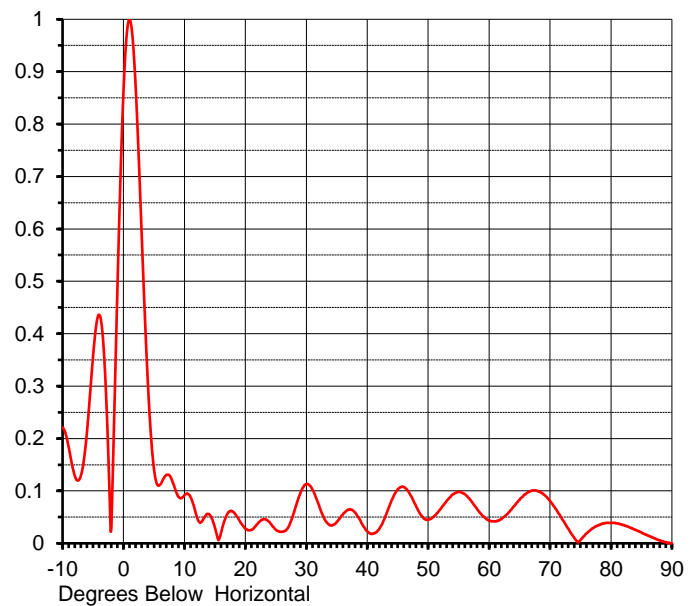
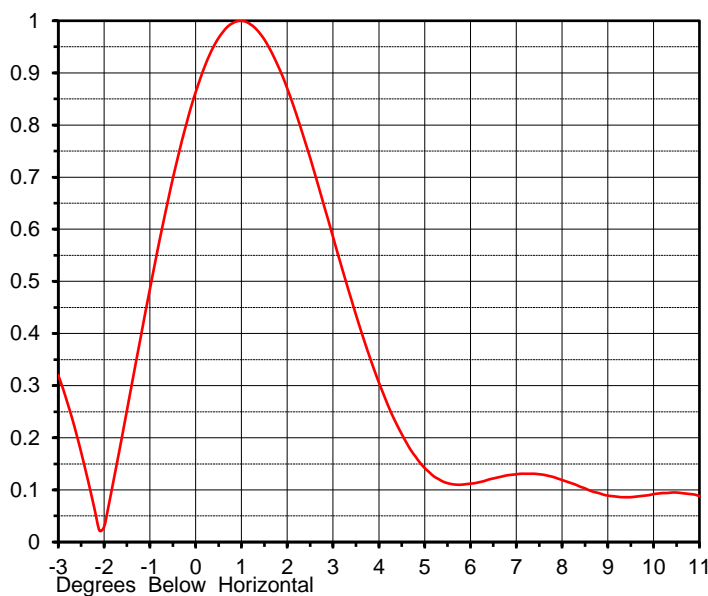
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## ELEVATION PATTERN

Proposal No. **C-71941**  
 Date **1-Sep-22**  
 Call Letters **WHNO**  
 Channel **21**  
 Frequency **515 MHz**  
 Antenna Type **TFU-18DSC/VP-R S180**

RMS Directivity at Main Lobe **15.0 ( 11.76 dB )**  
 RMS Directivity at Horizontal **11.2 ( 10.49 dB )**  
**Calculated**

Beam Tilt **1.00 deg**  
 Pattern Number **18Q150100**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.221	10.0	0.092	30.0	0.113	50.0	0.045	70.0	0.081
-9.0	0.184	11.0	0.088	31.0	0.103	51.0	0.052	71.0	0.065
-8.0	0.129	12.0	0.052	32.0	0.075	52.0	0.065	72.0	0.046
-7.0	0.129	13.0	0.044	33.0	0.046	53.0	0.080	73.0	0.028
-6.0	0.212	14.0	0.056	34.0	0.034	54.0	0.093	74.0	0.010
-5.0	0.356	15.0	0.030	35.0	0.041	55.0	0.098	75.0	0.006
-4.0	0.436	16.0	0.020	36.0	0.055	56.0	0.094	76.0	0.019
-3.0	0.320	17.0	0.055	37.0	0.064	57.0	0.082	77.0	0.029
-2.0	0.029	18.0	0.060	38.0	0.059	58.0	0.066	78.0	0.035
-1.0	0.485	19.0	0.044	39.0	0.040	59.0	0.052	79.0	0.038
0.0	0.863	20.0	0.028	40.0	0.023	60.0	0.043	80.0	0.039
1.0	1.000	21.0	0.026	41.0	0.019	61.0	0.042	81.0	0.038
2.0	0.870	22.0	0.037	42.0	0.028	62.0	0.046	82.0	0.035
3.0	0.585	23.0	0.046	43.0	0.052	63.0	0.056	83.0	0.031
4.0	0.306	24.0	0.040	44.0	0.082	64.0	0.070	84.0	0.026
5.0	0.142	25.0	0.026	45.0	0.103	65.0	0.083	85.0	0.021
6.0	0.112	26.0	0.022	46.0	0.107	66.0	0.094	86.0	0.015
7.0	0.130	27.0	0.030	47.0	0.094	67.0	0.100	87.0	0.010
8.0	0.119	28.0	0.060	48.0	0.071	68.0	0.100	88.0	0.006
9.0	0.089	29.0	0.095	49.0	0.051	69.0	0.093	89.0	0.002
								90.0	0.000

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