



**Antenna Model:**

**TLS-V4/VP-R**

Proposal Number: **C-71199-5**  
Date: **16-Jul-19**  
Customer: **WISC-TV**  
Location: **Madison, WI**

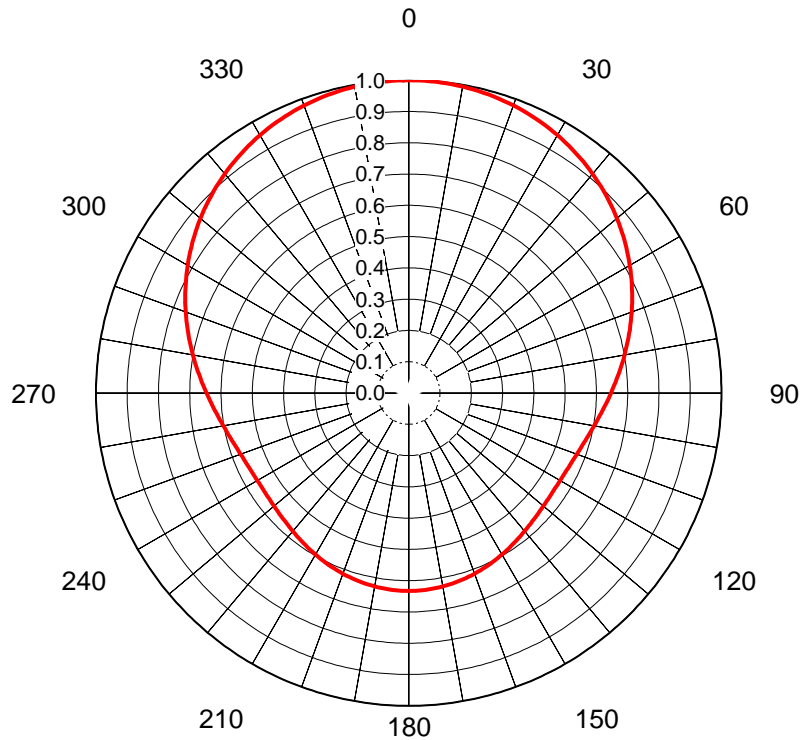
### **Electrical Specifications**

Polarization:	<b>Elliptical</b>		
Azimuth Pattern:	<b>Directional</b>		
Antenna Input:	<b>1-5/8"</b>	<b>50 Ohm</b>	<b>EIA/DCA</b>
VSWR:	<b>Channel</b>	<b>1.15 : 1</b>	
Bandwidth:	<b>6 MHz</b>		
Rated Input Power:	<b>7.5 kW</b>	<b>(8.75 dBk)</b>	<b>Maximum Average Power</b>

### **Mechanical Specifications**

Mounting:	<b>Side Mounted</b>		
Environmental Protection:	<b>Full Radome</b>		
Height:	<b>20.7 ft (6.3m)</b>		
Weight:	<b>500 lb (0.2t)</b>	<b>Excludes Mounts</b>	
Effective Projected Area:	<b>17.9 ft² (1.7m²)</b>	<b>TIA-222-G</b>	<b>Basic Wind Speed: 90 m/h (144.8 km/h)</b>

### **Channel Specifications**



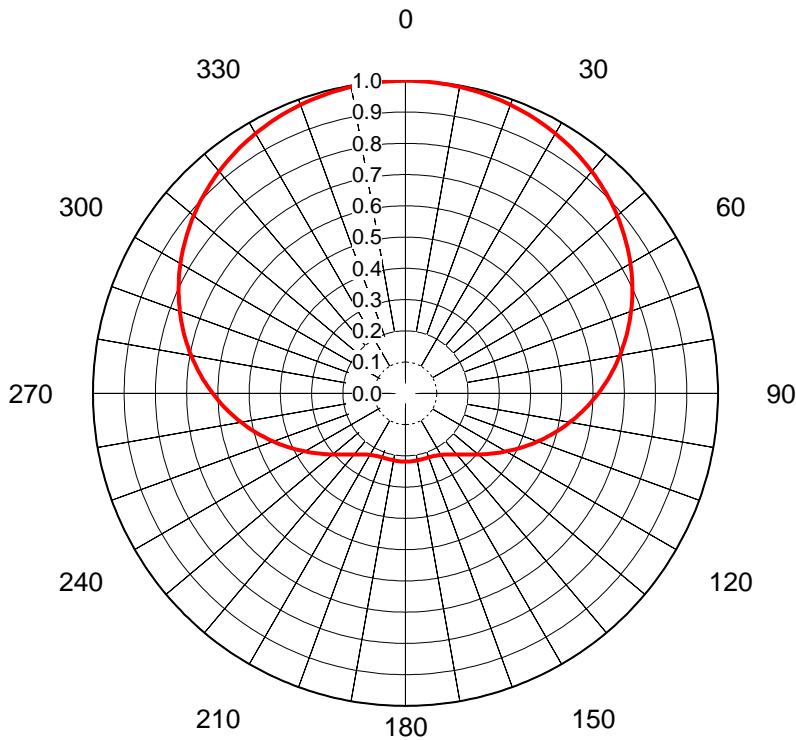
## AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71199-5**  
 Date **16-Jul-19**  
 Call Letters **WISC-TV**  
 Channel **11**  
 Frequency **201 MHz**  
 Antenna Type **TLS-V4/VP-R**  
 Gain **1.79 (2.52dB)**  
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	1.000	36	0.931	72	0.747	108	0.577	144	0.584	180	0.633	216	0.584	252	0.577	288	0.747
1	1.000	37	0.927	73	0.741	109	0.574	145	0.586	181	0.633	217	0.582	253	0.579	289	0.753
2	1.000	38	0.923	74	0.735	110	0.572	146	0.588	182	0.633	218	0.580	254	0.582	290	0.759
3	0.999	39	0.919	75	0.729	111	0.570	147	0.590	183	0.632	219	0.578	255	0.585	291	0.765
4	0.999	40	0.915	76	0.724	112	0.568	148	0.592	184	0.632	220	0.577	256	0.588	292	0.770
5	0.999	41	0.910	77	0.718	113	0.566	149	0.594	185	0.632	221	0.575	257	0.591	293	0.776
6	0.998	42	0.906	78	0.712	114	0.565	150	0.596	186	0.631	222	0.573	258	0.595	294	0.782
7	0.997	43	0.902	79	0.706	115	0.563	151	0.598	187	0.630	223	0.571	259	0.598	295	0.788
8	0.997	44	0.897	80	0.701	116	0.562	152	0.600	188	0.630	224	0.570	260	0.602	296	0.794
9	0.996	45	0.893	81	0.695	117	0.561	153	0.602	189	0.629	225	0.568	261	0.606	297	0.799
10	0.995	46	0.888	82	0.689	118	0.560	154	0.604	190	0.628	226	0.567	262	0.610	298	0.805
11	0.993	47	0.884	83	0.684	119	0.560	155	0.606	191	0.627	227	0.566	263	0.614	299	0.811
12	0.992	48	0.879	84	0.678	120	0.559	156	0.608	192	0.626	228	0.564	264	0.618	300	0.816
13	0.991	49	0.874	85	0.673	121	0.559	157	0.610	193	0.625	229	0.563	265	0.623	301	0.822
14	0.989	50	0.869	86	0.667	122	0.558	158	0.612	194	0.624	230	0.562	266	0.627	302	0.827
15	0.988	51	0.864	87	0.662	123	0.558	159	0.613	195	0.622	231	0.561	267	0.632	303	0.833
16	0.986	52	0.859	88	0.657	124	0.558	160	0.615	196	0.621	232	0.560	268	0.637	304	0.838
17	0.984	53	0.854	89	0.652	125	0.559	161	0.617	197	0.620	233	0.560	269	0.642	305	0.843
18	0.982	54	0.849	90	0.647	126	0.559	162	0.618	198	0.618	234	0.559	270	0.647	306	0.849
19	0.980	55	0.843	91	0.642	127	0.560	163	0.620	199	0.617	235	0.559	271	0.652	307	0.854
20	0.978	56	0.838	92	0.637	128	0.560	164	0.621	200	0.615	236	0.558	272	0.657	308	0.859
21	0.976	57	0.833	93	0.632	129	0.561	165	0.622	201	0.613	237	0.558	273	0.662	309	0.864
22	0.974	58	0.827	94	0.627	130	0.562	166	0.624	202	0.612	238	0.558	274	0.667	310	0.869
23	0.971	59	0.822	95	0.623	131	0.563	167	0.625	203	0.610	239	0.559	275	0.673	311	0.874
24	0.969	60	0.816	96	0.618	132	0.564	168	0.626	204	0.608	240	0.559	276	0.678	312	0.879
25	0.966	61	0.811	97	0.614	133	0.566	169	0.627	205	0.606	241	0.560	277	0.684	313	0.884
26	0.963	62	0.805	98	0.610	134	0.567	170	0.628	206	0.604	242	0.560	278	0.689	314	0.888
27	0.961	63	0.799	99	0.606	135	0.568	171	0.629	207	0.602	243	0.561	279	0.695	315	0.893
28	0.958	64	0.794	100	0.602	136	0.570	172	0.630	208	0.600	244	0.562	280	0.701	316	0.897
29	0.955	65	0.788	101	0.598	137	0.571	173	0.630	209	0.598	245	0.563	281	0.706	317	0.902
30	0.952	66	0.782	102	0.595	138	0.573	174	0.631	210	0.596	246	0.565	282	0.712	318	0.906
31	0.948	67	0.776	103	0.591	139	0.575	175	0.632	211	0.594	247	0.566	283	0.718	319	0.910
32	0.945	68	0.770	104	0.588	140	0.577	176	0.632	212	0.592	248	0.568	284	0.724	320	0.915
33	0.941	69	0.765	105	0.585	141	0.578	177	0.632	213	0.590	249	0.570	285	0.729	321	0.919
34	0.938	70	0.759	106	0.582	142	0.580	178	0.633	214	0.588	250	0.572	286	0.735	322	0.923
35	0.934	71	0.753	107	0.579	143	0.582	179	0.633	215	0.586	251	0.574	287	0.741	323	0.927

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## AZIMUTH PATTERN Vertical Polarization

In Free Space

Proposal No. **C-71199-5**  
Date **16-Jul-19**  
Call Letters **WISC-TV**  
Channel **11**  
Frequency **201 MHz**  
Antenna Type **TLS-V4/VP-R**  
Gain **2.22 (3.46dB)**  
Calculated

Normalized

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	1.000	36	0.941	72	0.754	108	0.467	144	0.241	180	0.218	216	0.241	252	0.467	288	0.754	324	0.941
1	1.000	37	0.938	73	0.747	109	0.458	145	0.238	181	0.218	217	0.244	253	0.475	289	0.761	325	0.945
2	1.000	38	0.934	74	0.740	110	0.450	146	0.236	182	0.218	218	0.248	254	0.483	290	0.768	326	0.948
3	1.000	39	0.931	75	0.733	111	0.442	147	0.233	183	0.218	219	0.251	255	0.492	291	0.775	327	0.951
4	0.999	40	0.927	76	0.726	112	0.434	148	0.231	184	0.218	220	0.255	256	0.500	292	0.782	328	0.954
5	0.999	41	0.923	77	0.719	113	0.426	149	0.229	185	0.218	221	0.259	257	0.508	293	0.788	329	0.957
6	0.998	42	0.919	78	0.711	114	0.418	150	0.227	186	0.218	222	0.263	258	0.517	294	0.795	330	0.960
7	0.998	43	0.915	79	0.704	115	0.410	151	0.226	187	0.218	223	0.268	259	0.525	295	0.801	331	0.962
8	0.997	44	0.911	80	0.696	116	0.402	152	0.224	188	0.218	224	0.272	260	0.534	296	0.807	332	0.965
9	0.996	45	0.907	81	0.688	117	0.394	153	0.223	189	0.218	225	0.277	261	0.542	297	0.813	333	0.967
10	0.996	46	0.903	82	0.681	118	0.387	154	0.222	190	0.218	226	0.282	262	0.550	298	0.819	334	0.970
11	0.995	47	0.898	83	0.673	119	0.379	155	0.221	191	0.217	227	0.287	263	0.559	299	0.825	335	0.972
12	0.994	48	0.894	84	0.665	120	0.372	156	0.220	192	0.217	228	0.293	264	0.567	300	0.831	336	0.974
13	0.993	49	0.889	85	0.657	121	0.364	157	0.219	193	0.217	229	0.298	265	0.576	301	0.837	337	0.977
14	0.991	50	0.884	86	0.649	122	0.357	158	0.219	194	0.217	230	0.304	266	0.584	302	0.843	338	0.979
15	0.990	51	0.880	87	0.641	123	0.350	159	0.218	195	0.217	231	0.310	267	0.592	303	0.848	339	0.980
16	0.989	52	0.875	88	0.633	124	0.343	160	0.218	196	0.217	232	0.317	268	0.601	304	0.854	340	0.982
17	0.987	53	0.870	89	0.625	125	0.336	161	0.217	197	0.217	233	0.323	269	0.609	305	0.859	341	0.984
18	0.986	54	0.864	90	0.617	126	0.329	162	0.217	198	0.217	234	0.329	270	0.617	306	0.864	342	0.986
19	0.984	55	0.859	91	0.609	127	0.323	163	0.217	199	0.217	235	0.336	271	0.625	307	0.870	343	0.987
20	0.982	56	0.854	92	0.601	128	0.317	164	0.217	200	0.218	236	0.343	272	0.633	308	0.875	344	0.989
21	0.980	57	0.848	93	0.592	129	0.310	165	0.217	201	0.218	237	0.350	273	0.641	309	0.880	345	0.990
22	0.979	58	0.843	94	0.584	130	0.304	166	0.217	202	0.219	238	0.357	274	0.649	310	0.884	346	0.991
23	0.977	59	0.837	95	0.576	131	0.298	167	0.217	203	0.219	239	0.364	275	0.657	311	0.889	347	0.993
24	0.974	60	0.831	96	0.567	132	0.293	168	0.217	204	0.220	240	0.372	276	0.665	312	0.894	348	0.994
25	0.972	61	0.825	97	0.559	133	0.287	169	0.217	205	0.221	241	0.379	277	0.673	313	0.898	349	0.995
26	0.970	62	0.819	98	0.550	134	0.282	170	0.218	206	0.222	242	0.387	278	0.681	314	0.903	350	0.996
27	0.967	63	0.813	99	0.542	135	0.277	171	0.218	207	0.223	243	0.394	279	0.688	315	0.907	351	0.996
28	0.965	64	0.807	100	0.534	136	0.272	172	0.218	208	0.224	244	0.402	280	0.696	316	0.911	352	0.997
29	0.962	65	0.801	101	0.525	137	0.268	173	0.218	209	0.226	245	0.410	281	0.704	317	0.915	353	0.998
30	0.960	66	0.795	102	0.517	138	0.263	174	0.218	210	0.227	246	0.418	282	0.711	318	0.919	354	0.998
31	0.957	67	0.788	103	0.508	139	0.259	175	0.218	211	0.229	247	0.426	283	0.719	319	0.923	355	0.999
32	0.954	68	0.782	104	0.500	140	0.255	176	0.218	212	0.231	248	0.434	284	0.726	320	0.927	356	0.999
33	0.951	69	0.775	105	0.492	141	0.251	177	0.218	213	0.233	249	0.442	285	0.733	321	0.931	357	1.000
34	0.948	70	0.768	106	0.483	142	0.248	178	0.218	214	0.236	250	0.450	286	0.740	322	0.934	358	1.000
35	0.945	71	0.761	107	0.475	143	0.244	179	0.218	215	0.238	251	0.458	287	0.747	323	0.938	359	1.000

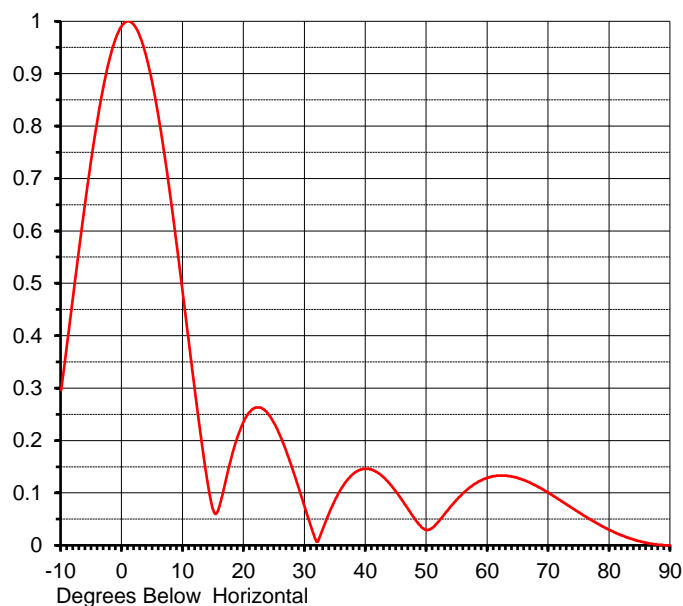
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## ELEVATION PATTERN

Proposal No. **C-71199-5**  
 Date **16-Jul-19**  
 Call Letters **WISC-TV**  
 Channel **11**  
 Frequency **201 MHz**  
 Antenna Type **TLS-V4/VP-R**

RMS Directivity at Main Lobe **4.4 ( 6.43 dB )**  
 RMS Directivity at Horizontal **4.3 ( 6.33 dB )**  
**Calculated**

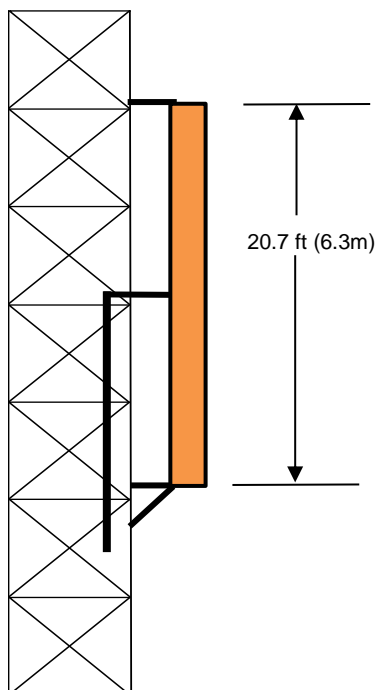
Beam Tilt **1.00 deg**  
 Pattern Number **04T044100**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.296	10.0	0.477	30.0	0.072	50.0	0.029	70.0	0.100
-9.0	0.387	11.0	0.383	31.0	0.036	51.0	0.034	71.0	0.093
-8.0	0.479	12.0	0.290	32.0	0.007	52.0	0.046	72.0	0.085
-7.0	0.571	13.0	0.202	33.0	0.033	53.0	0.061	73.0	0.078
-6.0	0.659	14.0	0.122	34.0	0.062	54.0	0.075	74.0	0.070
-5.0	0.741	15.0	0.066	35.0	0.088	55.0	0.088	75.0	0.063
-4.0	0.815	16.0	0.075	36.0	0.109	56.0	0.100	76.0	0.055
-3.0	0.879	17.0	0.123	37.0	0.125	57.0	0.110	77.0	0.048
-2.0	0.931	18.0	0.170	38.0	0.137	58.0	0.118	78.0	0.042
-1.0	0.969	19.0	0.209	39.0	0.144	59.0	0.124	79.0	0.035
0.0	0.992	20.0	0.237	40.0	0.146	60.0	0.129	80.0	0.029
1.0	1.000	21.0	0.255	41.0	0.144	61.0	0.132	81.0	0.024
2.0	0.992	22.0	0.263	42.0	0.138	62.0	0.133	82.0	0.019
3.0	0.969	23.0	0.261	43.0	0.129	63.0	0.133	83.0	0.015
4.0	0.931	24.0	0.250	44.0	0.116	64.0	0.131	84.0	0.011
5.0	0.880	25.0	0.232	45.0	0.102	65.0	0.128	85.0	0.008
6.0	0.816	26.0	0.207	46.0	0.085	66.0	0.124	86.0	0.005
7.0	0.742	27.0	0.178	47.0	0.068	67.0	0.119	87.0	0.003
8.0	0.659	28.0	0.144	48.0	0.051	68.0	0.113	88.0	0.001
9.0	0.570	29.0	0.109	49.0	0.037	69.0	0.107	89.0	0.000
								90.0	0.000

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## MECHANICAL SPECIFICATIONS



Proposal No. **C-71199-5**  
 Date **16-Jul-19**  
 Call Letters **WISC-TV**  
 Channel **11**  
 Frequency **201 MHz**  
 Antenna Type **TLS-V4/VP-R**

### Preliminary Specifications

#### Side Mounted

#### With ice TIA-222-G

Height AGL(z) 999 ft (304.5 m)  
 Basic Wind Speed 90 m/h (144.8 km/h)

Structure Class II  
 Exposure Category C  
 Topography Category 1

Design Ice 0.75 in  $t_{iz} = 2.10$  in  
 Wind Speed w/Ice 40 m/h (64.4 km/h)

#### Mechanical Specifications

		without ice	with ice	
Height	H2	20.7 ft (6.3m)		
Height of Center of Radiation	H3	10.4 ft (3.2m)		
Effective Projected Area	(EPA) <sub>A</sub>	17.9 ft² (1.7m²)	34.5 ft² (3.2m²)	Mounts Excluded
Weight	W	500 lb (0.2t)	1500 lb (0.7t)	Mounts Excluded

Antenna designed in accordance with AISC specifications for design of structural steel as prescribed by TIA-222-G

Prepared by: JBC  
 Rev. No.5 by: CAB

Date: 31-Jan-19  
 Date: 16-Jul-19

ME: EE:

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