Antenna Model: **TFU-16WB/VP-R C160**

Reference Number:	**WVTV-Interim**
Date:	**14-Oct-19**
Customer:	**WVTV-SBG**
Location:	**Milwaukee, WI**

Electrical Specifications

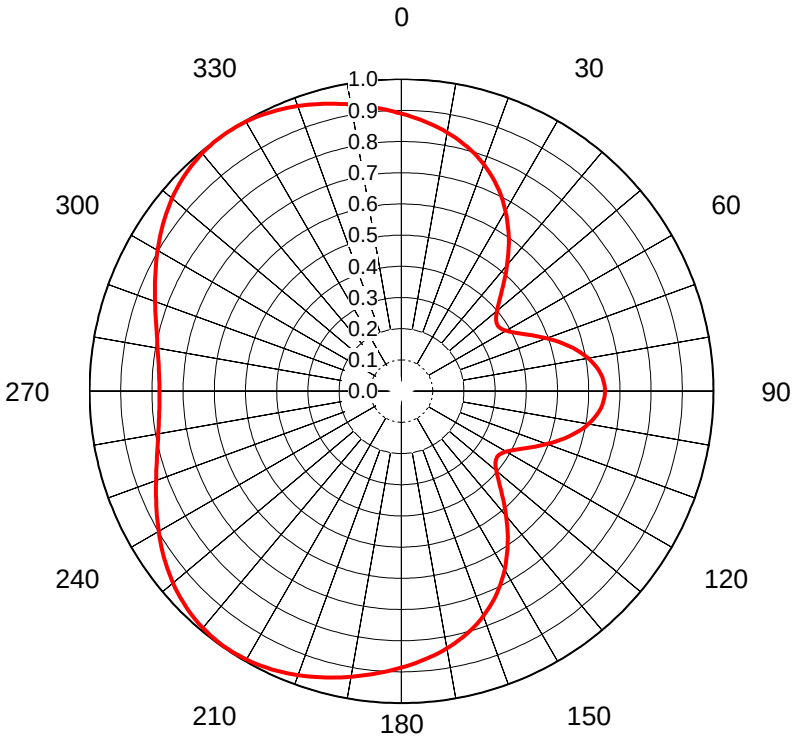
Polarization:	**Elliptical**		
Azimuth Pattern:	**C160**		
Antenna Input:	**6-1/8 in 50 Ohm EIA/DCA**		
VSWR:	Channel	**1.15:1**	Band **1.15:1**
Bandwidth:	**470-698 MHz**		
Rated Input Power:	**40 kW**	**(16.02 dBk)**	**Maximum Average Power**

Mechanical Specifications

Mounting:	**Side Mounted**	
Environmental Protection:	**Full Radome**	
Height:		
Weight:		mounts excluded
Effective Projected Area:		

Channel Specifications

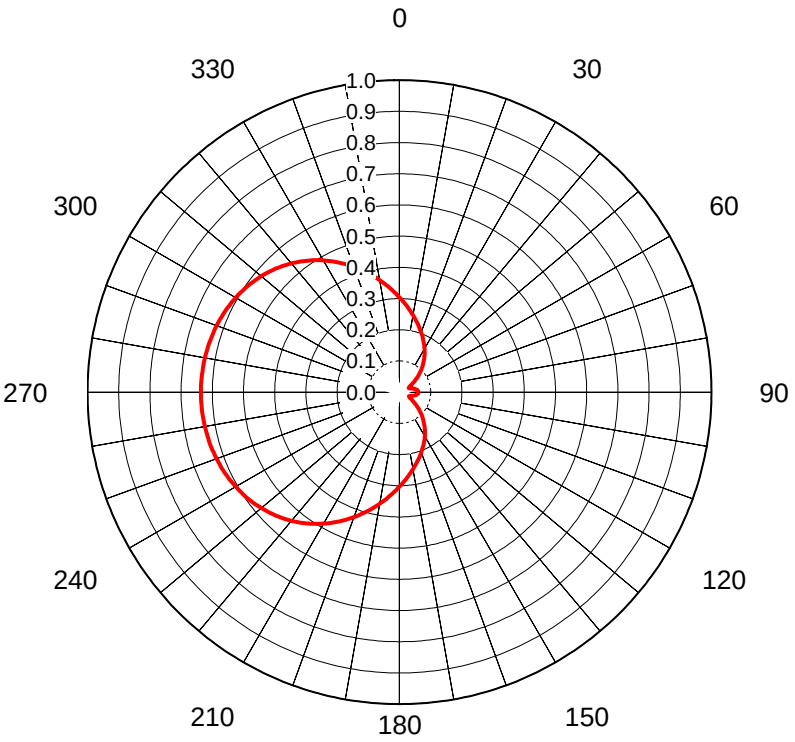
Call	Ch	Freq	Hpol ERP	Vpol ERP	TPO	Peak Gain Main Lobe Hpol	Peak Gain Main Lobe Vpol	Peak Gain at Horizontal Hpol	Peak Gain at Horizontal Vpol
WVTV	27	551	92.6 kW (19.67 dBk)	37.5 kW (15.74 dBk)	6.43 kW (8.08 dBk)	18.78 (12.74dB)	7.61 (8.81dB)	17.63 (12.46dB)	7.14 (8.54dB)



AZIMUTH PATTERN
Horizontal Polarization

Proposal No.	**WVTV-Interim**
Date	**14-Oct-19**
Call Letters	**WVTV**
Channel	**27**
Frequency	**551 MHz**
Antenna Type	**TFU-16WB/VP-R C160**
Gain	**1.62 (2.11dB)**
	Calculated
Pattern Number	**WB-C160-27 Hpol**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.890	36	0.585	72	0.520	108	0.521	144	0.579	180	0.886	216	0.996	252	0.826	288	0.829	324	1.000
1	0.885	37	0.570	73	0.533	109	0.509	145	0.594	181	0.891	217	0.995	253	0.821	289	0.835	325	1.000
2	0.881	38	0.556	74	0.545	110	0.496	146	0.608	182	0.895	218	0.994	254	0.816	290	0.841	326	1.000
3	0.876	39	0.541	75	0.557	111	0.483	147	0.621	183	0.899	219	0.993	255	0.811	291	0.846	327	1.000
4	0.872	40	0.526	76	0.568	112	0.470	148	0.635	184	0.904	220	0.991	256	0.807	292	0.852	328	0.999
5	0.867	41	0.512	77	0.579	113	0.458	149	0.648	185	0.908	221	0.989	257	0.803	293	0.858	329	0.998
6	0.862	42	0.497	78	0.589	114	0.446	150	0.661	186	0.912	222	0.986	258	0.799	294	0.865	330	0.997
7	0.857	43	0.483	79	0.599	115	0.434	151	0.673	187	0.917	223	0.984	259	0.795	295	0.871	331	0.996
8	0.852	44	0.469	80	0.608	116	0.423	152	0.685	188	0.921	224	0.981	260	0.792	296	0.877	332	0.994
9	0.847	45	0.455	81	0.616	117	0.413	153	0.697	189	0.925	225	0.977	261	0.789	297	0.884	333	0.992
10	0.842	46	0.442	82	0.623	118	0.403	154	0.708	190	0.930	226	0.974	262	0.786	298	0.890	334	0.990
11	0.836	47	0.430	83	0.630	119	0.395	155	0.719	191	0.934	227	0.970	263	0.784	299	0.896	335	0.987
12	0.830	48	0.419	84	0.636	120	0.387	156	0.730	192	0.938	228	0.965	264	0.781	300	0.903	336	0.985
13	0.824	49	0.408	85	0.641	121	0.381	157	0.740	193	0.942	229	0.961	265	0.780	301	0.909	337	0.982
14	0.818	50	0.399	86	0.645	122	0.377	158	0.749	194	0.946	230	0.956	266	0.778	302	0.915	338	0.979
15	0.811	51	0.391	87	0.648	123	0.374	159	0.758	195	0.950	231	0.951	267	0.777	303	0.921	339	0.976
16	0.804	52	0.384	88	0.650	124	0.372	160	0.767	196	0.954	232	0.946	268	0.776	304	0.927	340	0.972
17	0.797	53	0.379	89	0.652	125	0.372	161	0.776	197	0.958	233	0.941	269	0.776	305	0.933	341	0.969
18	0.789	54	0.375	90	0.652	126	0.374	162	0.784	198	0.962	234	0.935	270	0.776	306	0.939	342	0.965
19	0.781	55	0.373	91	0.652	127	0.378	163	0.791	199	0.965	235	0.929	271	0.776	307	0.945	343	0.961
20	0.773	56	0.373	92	0.650	128	0.383	164	0.799	200	0.969	236	0.923	272	0.777	308	0.950	344	0.957
21	0.764	57	0.374	93	0.648	129	0.389	165	0.806	201	0.972	237	0.917	273	0.778	309	0.955	345	0.953
22	0.755	58	0.377	94	0.645	130	0.397	166	0.813	202	0.976	238	0.911	274	0.779	310	0.960	346	0.949
23	0.745	59	0.381	95	0.641	131	0.406	167	0.819	203	0.979	239	0.905	275	0.781	311	0.965	347	0.945
24	0.735	60	0.387	96	0.636	132	0.416	168	0.825	204	0.981	240	0.899	276	0.783	312	0.969	348	0.941
25	0.725	61	0.394	97	0.630	133	0.427	169	0.831	205	0.984	241	0.892	277	0.785	313	0.974	349	0.937
26	0.714	62	0.402	98	0.624	134	0.439	170	0.837	206	0.986	242	0.886	278	0.788	314	0.978	350	0.933
27	0.703	63	0.412	99	0.616	135	0.452	171	0.843	207	0.989	243	0.880	279	0.791	315	0.981	351	0.928
28	0.691	64	0.422	100	0.608	136	0.465	172	0.848	208	0.991	244	0.873	280	0.794	316	0.984	352	0.924
29	0.679	65	0.433	101	0.599	137	0.478	173	0.853	209	0.992	245	0.867	281	0.797	317	0.987	353	0.920
30	0.667	66	0.445	102	0.590	138	0.493	174	0.858	210	0.994	246	0.861	282	0.801	318	0.990	354	0.916
31	0.654	67	0.457	103	0.579	139	0.507	175	0.863	211	0.995	247	0.855	283	0.805	319	0.993	355	0.911
32	0.641	68	0.469	104	0.569	140	0.521	176	0.868	212	0.996	248	0.849	284	0.810	320	0.995	356	0.907
33	0.627	69	0.482	105	0.557	141	0.536	177	0.873	213	0.996	249	0.843	285	0.814	321	0.996	357	0.903
34	0.613	70	0.495	106	0.546	142	0.550	178	0.877	214	0.996	250	0.837	286	0.819	322	0.998	358	0.898
35	0.599	71	0.508	107	0.534	143	0.565	179	0.882	215	0.996	251	0.832	287	0.824	323	0.999	359	0.894



AZIMUTH PATTERN
Verttical Polarization

Proposal No.	**WVTV-Interim**
Date	**14-Oct-19**
Call Letters	**WVTV**
Channel	**27**
Frequency	**551 MHz**
Antenna Type	**TFU-16WB/VP-R C160**
Gain	**2.62 (4.18dB)**
	Calculated
Pattern Number	**WB-C160-27 Vpol**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.304	36	0.135	72	0.039	108	0.039	144	0.137	180	0.303	216	0.519	252	0.627	288	0.626	324	0.520
1	0.298	37	0.131	73	0.041	109	0.038	145	0.141	181	0.308	217	0.524	253	0.628	289	0.625	325	0.515
2	0.293	38	0.126	74	0.043	110	0.036	146	0.145	182	0.314	218	0.529	254	0.629	290	0.624	326	0.509
3	0.287	39	0.122	75	0.045	111	0.035	147	0.149	183	0.320	219	0.534	255	0.630	291	0.622	327	0.504
4	0.282	40	0.118	76	0.047	112	0.034	148	0.154	184	0.326	220	0.538	256	0.631	292	0.621	328	0.499
5	0.276	41	0.114	77	0.048	113	0.033	149	0.158	185	0.332	221	0.543	257	0.631	293	0.619	329	0.493
6	0.271	42	0.109	78	0.050	114	0.033	150	0.162	186	0.338	222	0.547	258	0.632	294	0.618	330	0.488
7	0.266	43	0.105	79	0.052	115	0.033	151	0.166	187	0.344	223	0.552	259	0.633	295	0.616	331	0.482
8	0.260	44	0.101	80	0.053	116	0.034	152	0.171	188	0.350	224	0.556	260	0.634	296	0.614	332	0.476
9	0.255	45	0.096	81	0.055	117	0.035	153	0.175	189	0.357	225	0.560	261	0.634	297	0.612	333	0.470
10	0.250	46	0.092	82	0.056	118	0.036	154	0.179	190	0.363	226	0.564	262	0.635	298	0.610	334	0.464
11	0.245	47	0.088	83	0.057	119	0.038	155	0.183	191	0.369	227	0.568	263	0.635	299	0.608	335	0.458
12	0.240	48	0.083	84	0.058	120	0.040	156	0.187	192	0.375	228	0.571	264	0.635	300	0.606	336	0.452
13	0.236	49	0.079	85	0.059	121	0.043	157	0.192	193	0.382	229	0.575	265	0.636	301	0.604	337	0.446
14	0.231	50	0.075	86	0.060	122	0.046	158	0.196	194	0.388	230	0.578	266	0.636	302	0.601	338	0.440
15	0.226	51	0.071	87	0.060	123	0.049	159	0.200	195	0.394	231	0.582	267	0.636	303	0.599	339	0.434
16	0.221	52	0.067	88	0.061	124	0.053	160	0.205	196	0.401	232	0.585	268	0.636	304	0.596	340	0.428
17	0.217	53	0.063	89	0.061	125	0.056	161	0.209	197	0.407	233	0.588	269	0.636	305	0.594	341	0.421
18	0.212	54	0.059	90	0.061	126	0.060	162	0.213	198	0.414	234	0.591	270	0.636	306	0.591	342	0.415
19	0.208	55	0.055	91	0.061	127	0.064	163	0.218	199	0.420	235	0.594	271	0.636	307	0.588	343	0.409
20	0.203	56	0.052	92	0.061	128	0.068	164	0.222	200	0.426	236	0.596	272	0.636	308	0.585	344	0.402
21	0.199	57	0.048	93	0.060	129	0.072	165	0.227	201	0.432	237	0.599	273	0.636	309	0.582	345	0.396
22	0.195	58	0.045	94	0.060	130	0.076	166	0.231	202	0.439	238	0.602	274	0.636	310	0.578	346	0.390
23	0.190	59	0.042	95	0.059	131	0.080	167	0.236	203	0.445	239	0.604	275	0.636	311	0.575	347	0.383
24	0.186	60	0.039	96	0.058	132	0.085	168	0.241	204	0.451	240	0.606	276	0.635	312	0.571	348	0.377
25	0.182	61	0.037	97	0.057	133	0.089	169	0.245	205	0.457	241	0.608	277	0.635	313	0.568	349	0.371
26	0.177	62	0.035	98	0.056	134	0.093	170	0.250	206	0.463	242	0.611	278	0.634	314	0.564	350	0.364
27	0.173	63	0.034	99	0.055	135	0.098	171	0.255	207	0.469	243	0.613	279	0.634	315	0.560	351	0.358
28	0.169	64	0.033	100	0.053	136	0.102	172	0.260	208	0.475	244	0.614	280	0.633	316	0.556	352	0.352
29	0.165	65	0.032	101	0.052	137	0.106	173	0.265	209	0.481	245	0.616	281	0.633	317	0.552	353	0.346
30	0.161	66	0.032	102	0.050	138	0.111	174	0.270	210	0.487	246	0.618	282	0.632	318	0.548	354	0.340
31	0.156	67	0.033	103	0.048	139	0.115	175	0.275	211	0.492	247	0.620	283	0.631	319	0.543	355	0.334
32	0.152	68	0.033	104	0.047	140	0.119	176	0.281	212	0.498	248	0.621	284	0.630	320	0.539	356	0.328
33	0.148	69	0.034	105	0.045	141	0.124	177	0.286	213	0.503	249	0.623	285	0.629	321	0.534	357	0.322
34	0.144	70	0.036	106	0.043	142	0.128	178	0.292	214	0.509	250	0.624	286	0.628	322	0.530	358	0.316
35	0.139	71	0.037	107	0.041	143	0.132	179	0.297	215	0.514	251	0.625	287	0.627	323	0.525	359	0.310

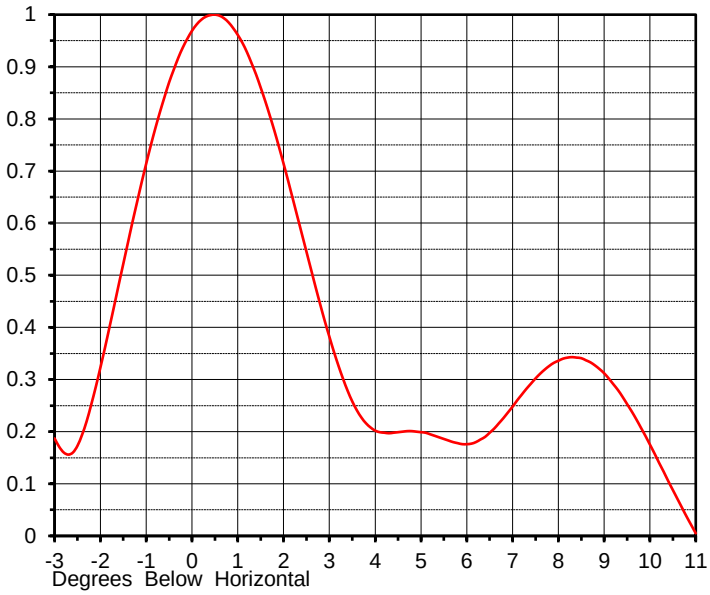
Dielectric®

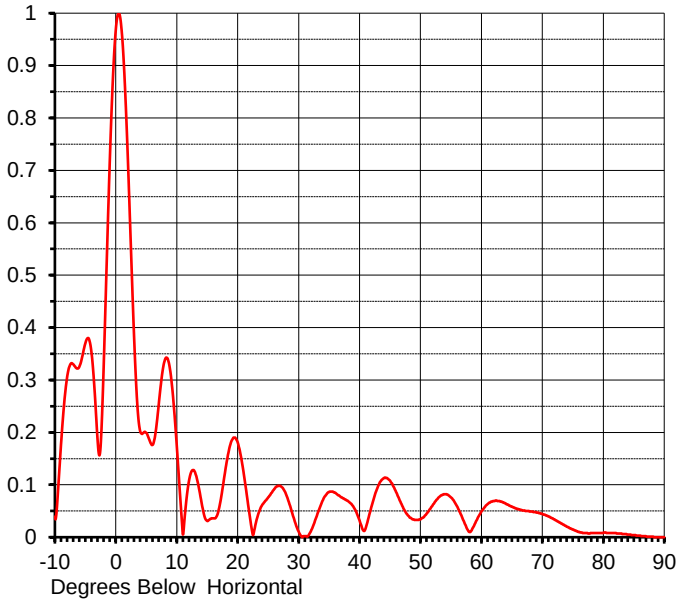
ELEVATION PATTERN

Proposal No.	**WVTV-Interim**
Date	**14-Oct-19**
Call Letters	**WVTV**
Channel	**27**
Frequency	**551 MHz**
Antenna Type	**TFU-16WB/VP-R C160**

RMS Directivity at Main Lobe	**14.5 (11.60 dB)**	Beam Tilt	**0.55 deg**
RMS Directivity at Horizontal	**13.6 (11.34 dB)**	Pattern Number	**16W145055-27**

Calculated





Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.039	10.0	0.175	30.0	0.011	50.0	0.034	70.0	0.044
-9.0	0.176	11.0	0.005	31.0	0.002	51.0	0.045	71.0	0.040
-8.0	0.305	12.0	0.107	32.0	0.011	52.0	0.061	72.0	0.034
-7.0	0.330	13.0	0.124	33.0	0.041	53.0	0.076	73.0	0.027
-6.0	0.325	14.0	0.071	34.0	0.071	54.0	0.082	74.0	0.020
-5.0	0.370	15.0	0.031	35.0	0.086	55.0	0.076	75.0	0.015
-4.0	0.353	16.0	0.036	36.0	0.085	56.0	0.059	76.0	0.010
-3.0	0.187	17.0	0.058	37.0	0.076	57.0	0.033	77.0	0.008
-2.0	0.323	18.0	0.130	38.0	0.070	58.0	0.010	78.0	0.008
-1.0	0.714	19.0	0.184	39.0	0.058	59.0	0.027	79.0	0.008
0.0	0.969	20.0	0.181	40.0	0.032	60.0	0.049	80.0	0.008
1.0	0.961	21.0	0.121	41.0	0.017	61.0	0.063	81.0	0.008
2.0	0.714	22.0	0.039	42.0	0.060	62.0	0.069	82.0	0.008
3.0	0.382	23.0	0.028	43.0	0.096	63.0	0.069	83.0	0.007
4.0	0.202	24.0	0.061	44.0	0.113	64.0	0.064	84.0	0.005
5.0	0.199	25.0	0.076	45.0	0.108	65.0	0.058	85.0	0.004
6.0	0.176	26.0	0.092	46.0	0.086	66.0	0.054	86.0	0.003
7.0	0.248	27.0	0.098	47.0	0.060	67.0	0.051	87.0	0.002
8.0	0.336	28.0	0.080	48.0	0.041	68.0	0.049	88.0	0.001
9.0	0.312	29.0	0.044	49.0	0.033	69.0	0.047	89.0	0.000
								90.0	0.000

Summary

Proposal No.	**WVTV-Interim**
Date	**14-Oct-19**
Call Letters	**WVTV**
Channel	**27**
Frequency	**551 MHz**
Antenna Type	**TFU-16WB/VP-R C160**

Antenna

	Hpol		Vpol	
ERP:	**92.6 kW**	**(19.67 dBk)**	**37.5 kW**	**(15.74 dBk)**
Peak Gain	18.78	(12.74 dBd)	7.61	(8.81 dBd)

Antenna Input Power

4.93 kW **(6.93 dBk)**

Transmission Line

Type:	**Rigid**	Attenuation:		**(1.15 dB)**
Size:	**6-1/8"**	Efficiency:	**76.7%**	
Impedance:	**75 Ohm**			
Length:	**1010 ft**	**307.8 m**		

Transmitter Output

6.43 kW **(8.08 dBk)**

Transmitter filter losses not included