



Antenna Model:

**TFU-24WB-R C160**

Proposal Number: **C-71184**  
Date: **6-Jul-18**  
Customer: **Tegna**  
Location: **New Orleans, LA**

### Electrical Specifications

Polarization: **Horizontal**  
Azimuth Pattern: **Directional**  
Antenna Input: **6-1/8"** **75 Ohm** **EIA/DCA**  
VSWR: **Channel** **1.10 : 1** **Band** **1.10 : 1**  
Bandwidth: **470 - 698 MHz**  
Rated Input Power: **60 kW** **(17.78 dBk)** **Maximum combined average power**

### Mechanical Specifications

Mounting: **Side Mounted**  
Environmental Protection: **Full Radome**  
Height: **43.5 ft (13.3m)**  
Weight: **1900 lb (0.9t)** **Excludes Mounts**  
Effective Projected Area: **52.2 ft² (4.8m²)** **TIA-222-G** **Basic Wind Speed: 140 m/h (225.3 km/h)**

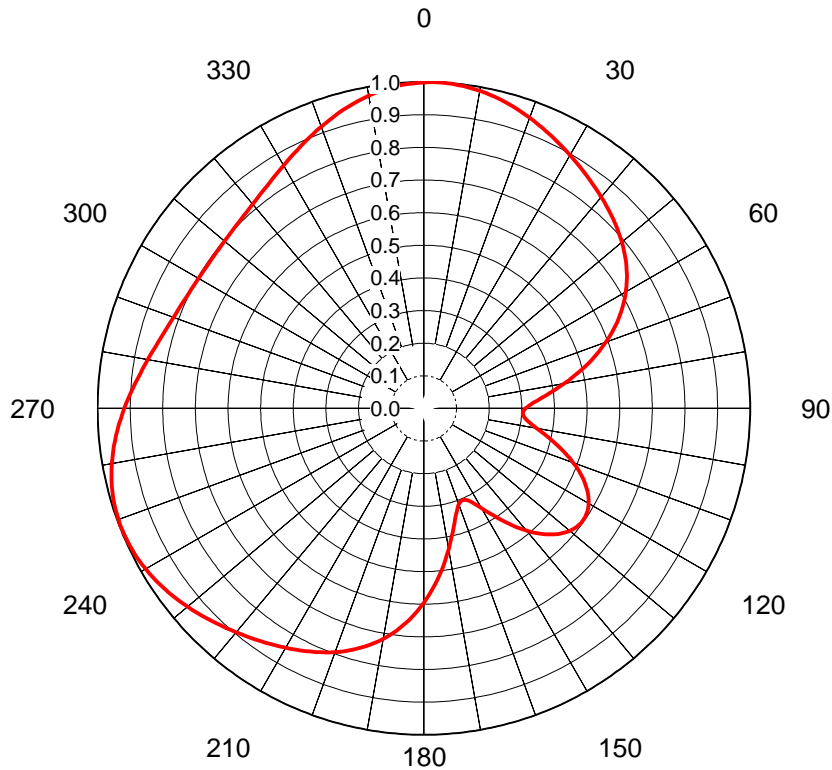
### Channel Specifications

	Call	CH	Freq	Hpol ERP	TPO	Peak Main Lobe Hpol Gain	Peak at Horizontal Hpol Gain
1	WWL	36	605 MHz	1,000 kW (30.00 dBk)	37.5 kW (15.74 dBk)	35.55 (15.51dB)	28.73 (14.58dB)
2	WWL	27	551 MHz	1,000 kW (30.00 dBk)	37.5 kW (15.74 dBk)	35.03 (15.44dB)	29.39 (14.68dB)
3	WUPL	24	533 MHz	1,000 kW (30.00 dBk)	38.9 kW (15.89 dBk)	33.66 (15.27dB)	28.61 (14.57dB)
4	WUPL	17	491 MHz	1,000 kW (30.00 dBk)	41.0 kW (16.12 dBk)	31.56 (14.99dB)	27.53 (14.40dB)

## AZIMUTH PATTERN Horizontal Polarization

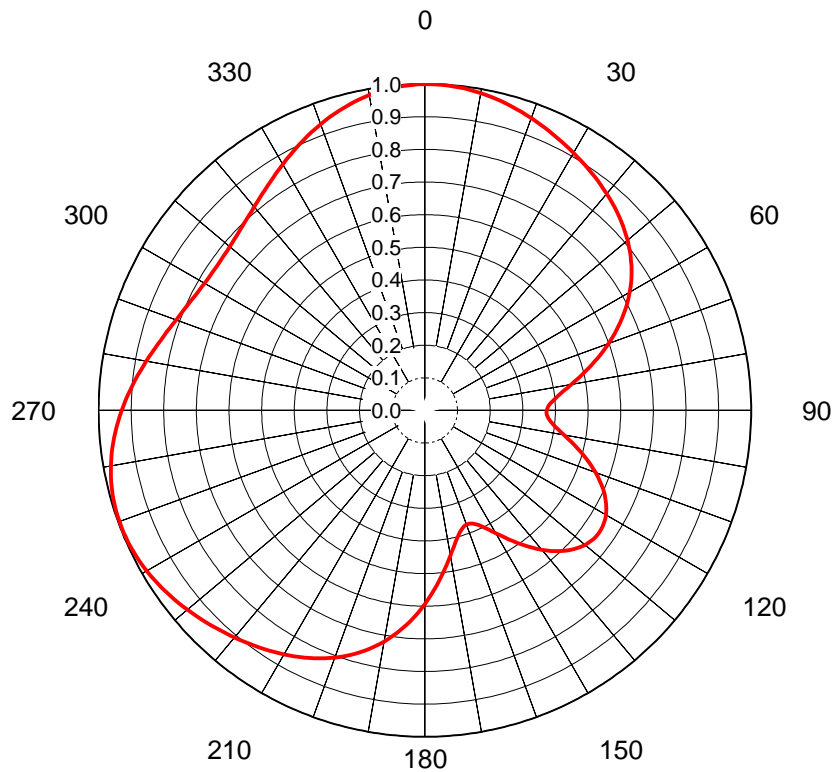
In Free Space

Proposal No. **C-71184**  
Date **6-Jul-18**  
Call Letters **WWL**  
Channel **36**  
Frequency **605 MHz**  
Antenna Type **TFU-24WB-R C160**  
Gain **1.68 (2.26dB)**  
Calculated



Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.999	36	0.865	72	0.564	108	0.461	144	0.434	180	0.596	216	0.876	252	0.994	288	0.823	324	0.831
1	1.000	37	0.861	73	0.549	109	0.474	145	0.420	181	0.610	217	0.881	253	0.992	289	0.820	325	0.835
2	1.000	38	0.856	74	0.533	110	0.488	146	0.406	182	0.624	218	0.886	254	0.990	290	0.817	326	0.840
3	1.000	39	0.851	75	0.517	111	0.501	147	0.392	183	0.637	219	0.890	255	0.988	291	0.814	327	0.844
4	0.999	40	0.846	76	0.501	112	0.513	148	0.378	184	0.650	220	0.895	256	0.985	292	0.811	328	0.849
5	0.998	41	0.841	77	0.485	113	0.524	149	0.365	185	0.662	221	0.900	257	0.982	293	0.809	329	0.854
6	0.997	42	0.836	78	0.469	114	0.535	150	0.353	186	0.674	222	0.905	258	0.979	294	0.806	330	0.860
7	0.995	43	0.831	79	0.452	115	0.545	151	0.341	187	0.686	223	0.911	259	0.975	295	0.804	331	0.865
8	0.993	44	0.826	80	0.436	116	0.555	152	0.331	188	0.697	224	0.916	260	0.971	296	0.802	332	0.871
9	0.991	45	0.820	81	0.420	117	0.563	153	0.322	189	0.707	225	0.921	261	0.967	297	0.801	333	0.877
10	0.988	46	0.815	82	0.404	118	0.571	154	0.315	190	0.717	226	0.926	262	0.962	298	0.800	334	0.882
11	0.985	47	0.810	83	0.389	119	0.577	155	0.310	191	0.727	227	0.931	263	0.957	299	0.798	335	0.888
12	0.982	48	0.804	84	0.375	120	0.583	156	0.306	192	0.736	228	0.936	264	0.952	300	0.797	336	0.895
13	0.978	49	0.798	85	0.361	121	0.588	157	0.305	193	0.744	229	0.940	265	0.947	301	0.797	337	0.901
14	0.975	50	0.792	86	0.349	122	0.591	158	0.306	194	0.753	230	0.945	266	0.941	302	0.796	338	0.907
15	0.971	51	0.786	87	0.337	123	0.594	159	0.308	195	0.760	231	0.950	267	0.936	303	0.796	339	0.913
16	0.966	52	0.780	88	0.327	124	0.596	160	0.313	196	0.768	232	0.955	268	0.930	304	0.795	340	0.919
17	0.962	53	0.773	89	0.319	125	0.596	161	0.320	197	0.775	233	0.959	269	0.924	305	0.795	341	0.925
18	0.957	54	0.766	90	0.312	126	0.596	162	0.328	198	0.782	234	0.963	270	0.918	306	0.795	342	0.931
19	0.953	55	0.758	91	0.307	127	0.594	163	0.338	199	0.788	235	0.967	271	0.912	307	0.796	343	0.937
20	0.948	56	0.750	92	0.304	128	0.592	164	0.350	200	0.795	236	0.971	272	0.906	308	0.796	344	0.943
21	0.943	57	0.742	93	0.304	129	0.588	165	0.363	201	0.801	237	0.975	273	0.900	309	0.797	345	0.948
22	0.938	58	0.733	94	0.305	130	0.584	166	0.376	202	0.806	238	0.978	274	0.894	310	0.797	346	0.954
23	0.933	59	0.724	95	0.309	131	0.578	167	0.391	203	0.812	239	0.982	275	0.888	311	0.798	347	0.959
24	0.927	60	0.715	96	0.314	132	0.571	168	0.406	204	0.817	240	0.985	276	0.882	312	0.800	348	0.964
25	0.922	61	0.705	97	0.321	133	0.564	169	0.422	205	0.822	241	0.987	277	0.876	313	0.801	349	0.969
26	0.917	62	0.694	98	0.330	134	0.555	170	0.438	206	0.827	242	0.990	278	0.870	314	0.803	350	0.973
27	0.912	63	0.683	99	0.340	135	0.546	171	0.454	207	0.832	243	0.992	279	0.865	315	0.804	351	0.977
28	0.906	64	0.672	100	0.352	136	0.536	172	0.470	208	0.837	244	0.993	280	0.859	316	0.806	352	0.981
29	0.901	65	0.660	101	0.364	137	0.525	173	0.487	209	0.842	245	0.995	281	0.854	317	0.809	353	0.985
30	0.896	66	0.648	102	0.377	138	0.514	174	0.503	210	0.847	246	0.996	282	0.849	318	0.811	354	0.988
31	0.891	67	0.635	103	0.390	139	0.502	175	0.519	211	0.852	247	0.996	283	0.844	319	0.814	355	0.991
32	0.886	68	0.622	104	0.404	140	0.489	176	0.535	212	0.857	248	0.997	284	0.839	320	0.817	356	0.993
33	0.881	69	0.608	105	0.418	141	0.476	177	0.551	213	0.861	249	0.996	285	0.835	321	0.820	357	0.995
34	0.875	70	0.594	106	0.433	142	0.462	178	0.566	214	0.866	250	0.996	286	0.831	322	0.824	358	0.997
35	0.870	71	0.579	107	0.447	143	0.448	179	0.581	215	0.871	251	0.995	287	0.827	323	0.827	359	0.998

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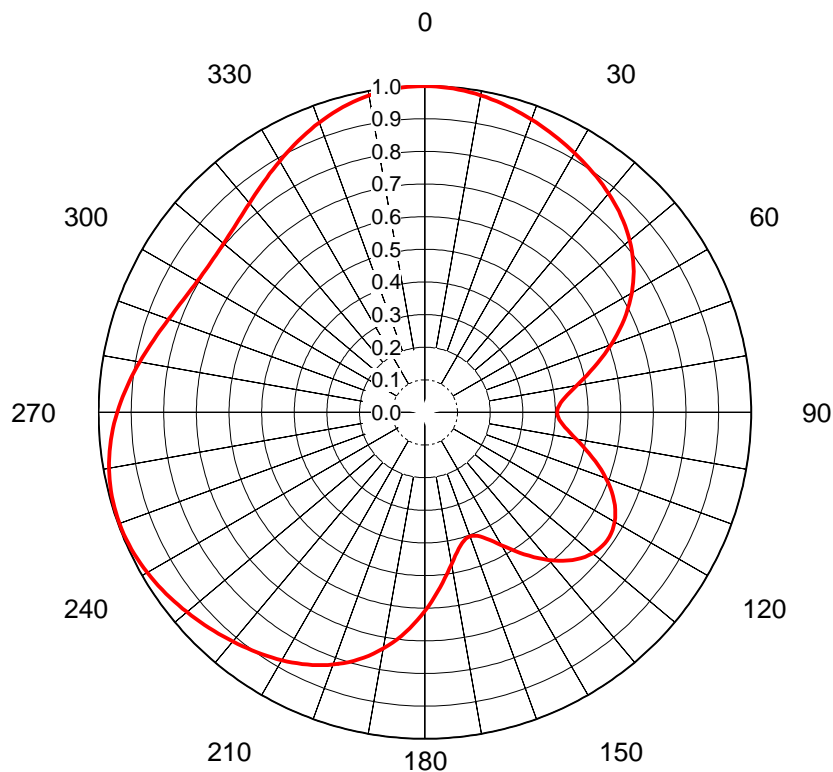
## AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71184**  
Date **6-Jul-18**  
Call Letters **WWL**  
Channel **27**  
Frequency **551 MHz**  
Antenna Type **TFU-24WB-R C160**  
Gain **1.62 (2.11dB)**  
Calculated

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

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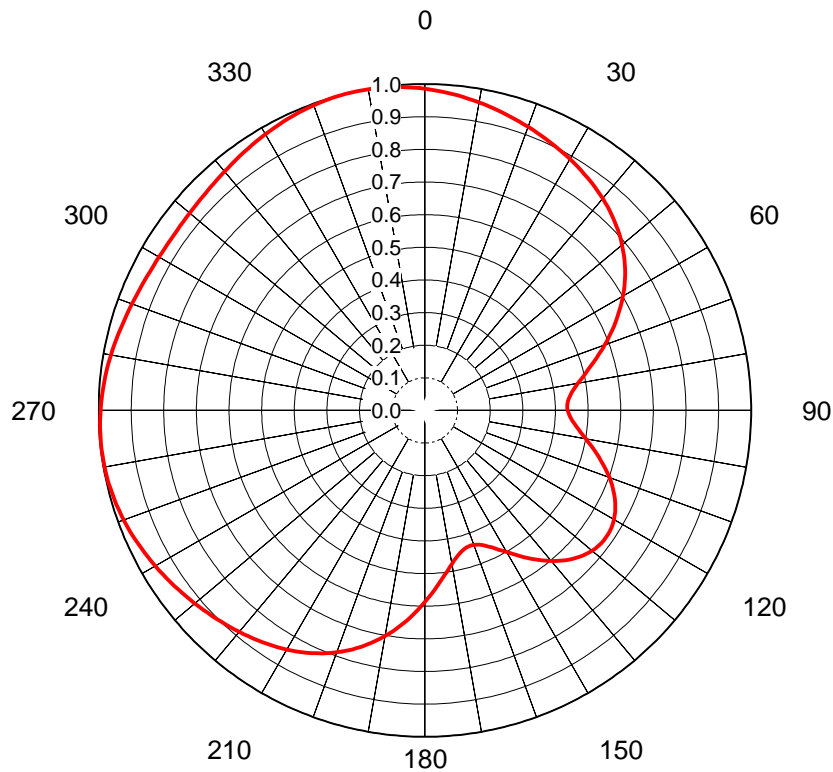
## AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71184**  
 Date **6-Jul-18**  
 Call Letters **WUPL**  
 Channel **24**  
 Frequency **533 MHz**  
 Antenna Type **TFU-24WB-R C160**  
 Gain **1.57 (1.96dB)**  
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	1.000	36	0.894	72	0.579	108	0.568	144	0.543	180	0.609	216	0.901	252	0.996	288	0.845	324	0.856
1	1.000	37	0.889	73	0.565	109	0.580	145	0.531	181	0.623	217	0.905	253	0.995	289	0.840	325	0.862
2	0.999	38	0.885	74	0.551	110	0.591	146	0.518	182	0.636	218	0.909	254	0.994	290	0.836	326	0.867
3	0.999	39	0.881	75	0.537	111	0.602	147	0.506	183	0.650	219	0.912	255	0.993	291	0.831	327	0.873
4	0.998	40	0.876	76	0.524	112	0.612	148	0.494	184	0.663	220	0.916	256	0.991	292	0.827	328	0.878
5	0.996	41	0.871	77	0.510	113	0.622	149	0.482	185	0.676	221	0.920	257	0.990	293	0.824	329	0.884
6	0.995	42	0.866	78	0.497	114	0.631	150	0.470	186	0.688	222	0.923	258	0.988	294	0.820	330	0.890
7	0.993	43	0.861	79	0.484	115	0.640	151	0.459	187	0.701	223	0.927	259	0.985	295	0.817	331	0.895
8	0.991	44	0.856	80	0.472	116	0.648	152	0.449	188	0.712	224	0.931	260	0.983	296	0.814	332	0.901
9	0.989	45	0.851	81	0.460	117	0.655	153	0.439	189	0.724	225	0.934	261	0.980	297	0.811	333	0.907
10	0.987	46	0.845	82	0.450	118	0.661	154	0.430	190	0.735	226	0.938	262	0.977	298	0.809	334	0.913
11	0.984	47	0.839	83	0.440	119	0.667	155	0.423	191	0.745	227	0.941	263	0.973	299	0.807	335	0.918
12	0.981	48	0.833	84	0.431	120	0.672	156	0.416	192	0.755	228	0.945	264	0.970	300	0.805	336	0.924
13	0.979	49	0.827	85	0.423	121	0.675	157	0.411	193	0.765	229	0.948	265	0.966	301	0.803	337	0.930
14	0.976	50	0.820	86	0.417	122	0.679	158	0.407	194	0.775	230	0.952	266	0.962	302	0.802	338	0.935
15	0.972	51	0.813	87	0.412	123	0.681	159	0.405	195	0.783	231	0.955	267	0.957	303	0.801	339	0.940
16	0.969	52	0.805	88	0.408	124	0.682	160	0.404	196	0.792	232	0.959	268	0.953	304	0.801	340	0.946
17	0.966	53	0.797	89	0.406	125	0.682	161	0.405	197	0.800	233	0.962	269	0.948	305	0.801	341	0.951
18	0.962	54	0.789	90	0.406	126	0.682	162	0.407	198	0.808	234	0.965	270	0.943	306	0.801	342	0.955
19	0.959	55	0.781	91	0.406	127	0.681	163	0.411	199	0.815	235	0.968	271	0.938	307	0.802	343	0.960
20	0.955	56	0.772	92	0.409	128	0.678	164	0.416	200	0.822	236	0.971	272	0.933	308	0.802	344	0.964
21	0.952	57	0.762	93	0.413	129	0.675	165	0.422	201	0.829	237	0.974	273	0.927	309	0.804	345	0.969
22	0.948	58	0.753	94	0.418	130	0.671	166	0.430	202	0.835	238	0.977	274	0.922	310	0.805	346	0.973
23	0.944	59	0.743	95	0.424	131	0.667	167	0.439	203	0.841	239	0.980	275	0.916	311	0.807	347	0.976
24	0.941	60	0.732	96	0.432	132	0.661	168	0.449	204	0.847	240	0.982	276	0.910	312	0.809	348	0.980
25	0.937	61	0.721	97	0.440	133	0.655	169	0.460	205	0.853	241	0.985	277	0.905	313	0.812	349	0.983
26	0.933	62	0.710	98	0.450	134	0.647	170	0.471	206	0.858	242	0.987	278	0.899	314	0.815	350	0.986
27	0.929	63	0.698	99	0.460	135	0.640	171	0.484	207	0.863	243	0.989	279	0.893	315	0.818	351	0.989
28	0.925	64	0.686	100	0.471	136	0.631	172	0.497	208	0.868	244	0.990	280	0.888	316	0.821	352	0.991
29	0.922	65	0.674	101	0.483	137	0.622	173	0.510	209	0.872	245	0.992	281	0.882	317	0.825	353	0.993
30	0.918	66	0.661	102	0.494	138	0.612	174	0.524	210	0.877	246	0.993	282	0.876	318	0.828	354	0.995
31	0.914	67	0.648	103	0.507	139	0.601	175	0.538	211	0.881	247	0.994	283	0.871	319	0.833	355	0.997
32	0.910	68	0.635	104	0.519	140	0.590	176	0.552	212	0.885	248	0.995	284	0.865	320	0.837	356	0.998
33	0.906	69	0.621	105	0.531	141	0.579	177	0.566	213	0.890	249	0.996	285	0.860	321	0.842	357	0.999
34	0.902	70	0.607	106	0.544	142	0.567	178	0.580	214	0.894	250	0.996	286	0.855	322	0.846	358	1.000
35	0.898	71	0.593	107	0.556	143	0.555	179	0.595	215	0.897	251	0.996	287	0.850	323	0.851	359	1.000

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## AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71184**  
 Date **6-Jul-18**  
 Call Letters **WUPL**  
 Channel **17**  
 Frequency **491 MHz**  
 Antenna Type **TFU-24WB-R C160**  
 Gain **1.51 (1.79dB)**  
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.986	36	0.866	72	0.562	108	0.583	144	0.563	180	0.587	216	0.871	252	0.986	288	0.959	324	0.964
1	0.984	37	0.862	73	0.550	109	0.592	145	0.552	181	0.599	217	0.875	253	0.988	289	0.957	325	0.966
2	0.981	38	0.857	74	0.538	110	0.602	146	0.542	182	0.611	218	0.879	254	0.990	290	0.955	326	0.969
3	0.979	39	0.853	75	0.527	111	0.611	147	0.532	183	0.623	219	0.882	255	0.992	291	0.953	327	0.971
4	0.976	40	0.848	76	0.516	112	0.619	148	0.521	184	0.635	220	0.886	256	0.993	292	0.951	328	0.973
5	0.973	41	0.843	77	0.505	113	0.628	149	0.511	185	0.647	221	0.889	257	0.994	293	0.950	329	0.975
6	0.971	42	0.838	78	0.495	114	0.635	150	0.502	186	0.658	222	0.893	258	0.995	294	0.948	330	0.978
7	0.968	43	0.833	79	0.485	115	0.642	151	0.492	187	0.670	223	0.896	259	0.996	295	0.946	331	0.980
8	0.965	44	0.827	80	0.476	116	0.649	152	0.483	188	0.681	224	0.900	260	0.997	296	0.945	332	0.982
9	0.962	45	0.822	81	0.468	117	0.655	153	0.475	189	0.691	225	0.903	261	0.997	297	0.944	333	0.984
10	0.958	46	0.816	82	0.460	118	0.660	154	0.467	190	0.702	226	0.906	262	0.998	298	0.943	334	0.986
11	0.955	47	0.809	83	0.454	119	0.665	155	0.460	191	0.712	227	0.910	263	0.998	299	0.941	335	0.988
12	0.952	48	0.803	84	0.448	120	0.669	156	0.454	192	0.722	228	0.913	264	0.998	300	0.941	336	0.990
13	0.949	49	0.796	85	0.444	121	0.672	157	0.448	193	0.731	229	0.917	265	0.998	301	0.940	337	0.991
14	0.945	50	0.789	86	0.440	122	0.675	158	0.444	194	0.740	230	0.920	266	0.997	302	0.939	338	0.993
15	0.942	51	0.782	87	0.438	123	0.677	159	0.441	195	0.749	231	0.924	267	0.997	303	0.939	339	0.994
16	0.939	52	0.774	88	0.437	124	0.678	160	0.439	196	0.758	232	0.927	268	0.996	304	0.939	340	0.995
17	0.935	53	0.766	89	0.437	125	0.678	161	0.438	197	0.766	233	0.930	269	0.995	305	0.939	341	0.997
18	0.932	54	0.758	90	0.438	126	0.678	162	0.438	198	0.774	234	0.934	270	0.994	306	0.939	342	0.998
19	0.928	55	0.749	91	0.440	127	0.677	163	0.439	199	0.782	235	0.937	271	0.993	307	0.939	343	0.998
20	0.925	56	0.740	92	0.443	128	0.675	164	0.441	200	0.789	236	0.941	272	0.991	308	0.939	344	0.999
21	0.921	57	0.731	93	0.448	129	0.672	165	0.445	201	0.796	237	0.944	273	0.990	309	0.940	345	1.000
22	0.918	58	0.721	94	0.453	130	0.669	166	0.449	202	0.802	238	0.947	274	0.988	310	0.941	346	1.000
23	0.914	59	0.711	95	0.459	131	0.665	167	0.455	203	0.809	239	0.951	275	0.987	311	0.942	347	1.000
24	0.911	60	0.701	96	0.466	132	0.660	168	0.462	204	0.815	240	0.954	276	0.985	312	0.943	348	1.000
25	0.907	61	0.690	97	0.474	133	0.655	169	0.469	205	0.821	241	0.957	277	0.983	313	0.944	349	1.000
26	0.904	62	0.680	98	0.483	134	0.649	170	0.477	206	0.826	242	0.960	278	0.981	314	0.945	350	0.999
27	0.900	63	0.669	99	0.492	135	0.643	171	0.487	207	0.831	243	0.963	279	0.979	315	0.947	351	0.999
28	0.897	64	0.657	100	0.501	136	0.635	172	0.496	208	0.837	244	0.966	280	0.977	316	0.948	352	0.998
29	0.893	65	0.646	101	0.511	137	0.628	173	0.506	209	0.841	245	0.969	281	0.975	317	0.950	353	0.997
30	0.889	66	0.634	102	0.521	138	0.620	174	0.517	210	0.846	246	0.972	282	0.973	318	0.952	354	0.996
31	0.886	67	0.622	103	0.531	139	0.611	175	0.528	211	0.851	247	0.975	283	0.970	319	0.954	355	0.995
32	0.882	68	0.610	104	0.542	140	0.602	176	0.540	212	0.855	248	0.977	284	0.968	320	0.956	356	0.993
33	0.878	69	0.598	105	0.552	141	0.593	177	0.551	213	0.859	249	0.980	285	0.966	321	0.958	357	0.992
34	0.874	70	0.586	106	0.562	142	0.583	178	0.563	214	0.863	250	0.982	286	0.964	322	0.960	358	0.990
35	0.870	71	0.574	107	0.573	143	0.573	179	0.575	215	0.867	251	0.984	287	0.961	323	0.962	359	0.988

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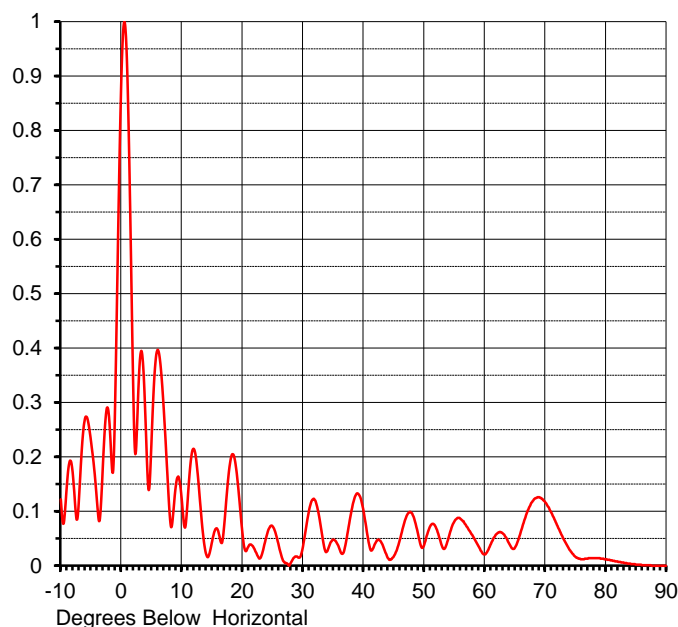
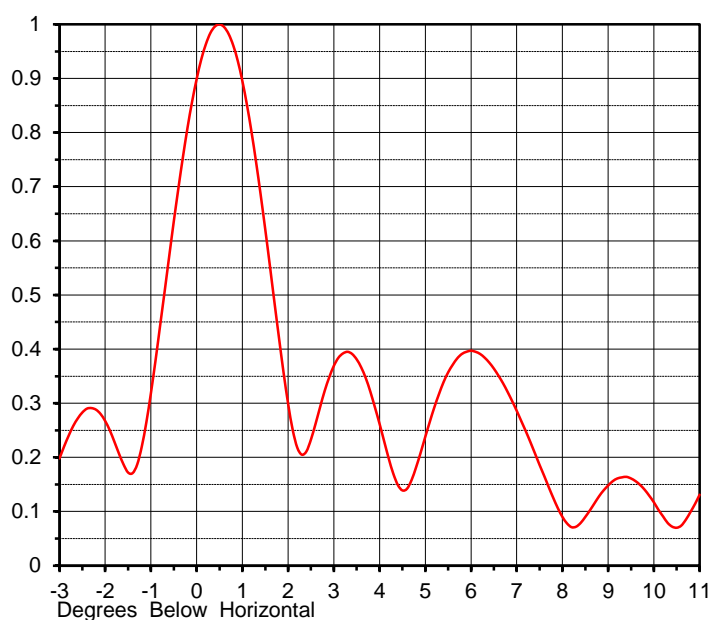


## ELEVATION PATTERN

Proposal No. **C-71184**  
 Date **6-Jul-18**  
 Call Letters **WWL**  
 Channel **36**  
 Frequency **605 MHz**  
 Antenna Type **TFU-24WB-R C160**

RMS Directivity at Main Lobe **21.1 ( 13.25 dB )**  
 RMS Directivity at Horizontal **17.1 ( 12.33 dB )**  
**Calculated**

Beam Tilt **0.50 deg**  
 Pattern Number **24W211050**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.122	10.0	0.117	30.0	0.037	50.0	0.039	70.0	0.116
-9.0	0.148	11.0	0.131	31.0	0.103	51.0	0.073	71.0	0.097
-8.0	0.166	12.0	0.214	32.0	0.120	52.0	0.068	72.0	0.073
-7.0	0.124	13.0	0.116	33.0	0.066	53.0	0.034	73.0	0.049
-6.0	0.271	14.0	0.021	34.0	0.027	54.0	0.051	74.0	0.029
-5.0	0.227	15.0	0.046	35.0	0.048	55.0	0.082	75.0	0.016
-4.0	0.114	16.0	0.063	36.0	0.031	56.0	0.086	76.0	0.012
-3.0	0.198	17.0	0.078	37.0	0.039	57.0	0.072	77.0	0.013
-2.0	0.267	18.0	0.193	38.0	0.102	58.0	0.055	78.0	0.014
-1.0	0.319	19.0	0.174	39.0	0.133	59.0	0.035	79.0	0.014
0.0	0.899	20.0	0.058	40.0	0.099	60.0	0.021	80.0	0.012
1.0	0.895	21.0	0.036	41.0	0.034	61.0	0.040	81.0	0.010
2.0	0.299	22.0	0.030	42.0	0.043	62.0	0.059	82.0	0.007
3.0	0.369	23.0	0.015	43.0	0.041	63.0	0.059	83.0	0.005
4.0	0.262	24.0	0.056	44.0	0.014	64.0	0.041	84.0	0.004
5.0	0.238	25.0	0.072	45.0	0.018	65.0	0.034	85.0	0.002
6.0	0.397	26.0	0.036	46.0	0.049	66.0	0.065	86.0	0.001
7.0	0.286	27.0	0.006	47.0	0.089	67.0	0.099	87.0	0.001
8.0	0.090	28.0	0.006	48.0	0.096	68.0	0.120	88.0	0.000
9.0	0.148	29.0	0.017	49.0	0.057	69.0	0.126	89.0	0.000
								90.0	0.000

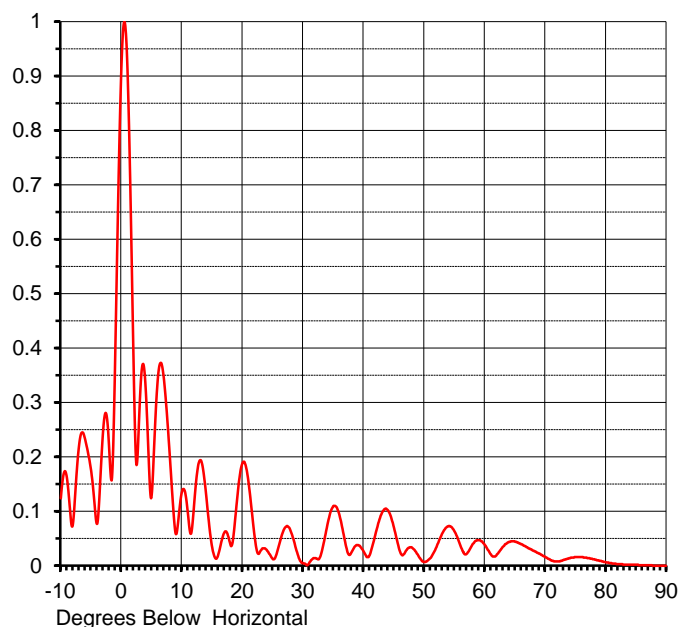
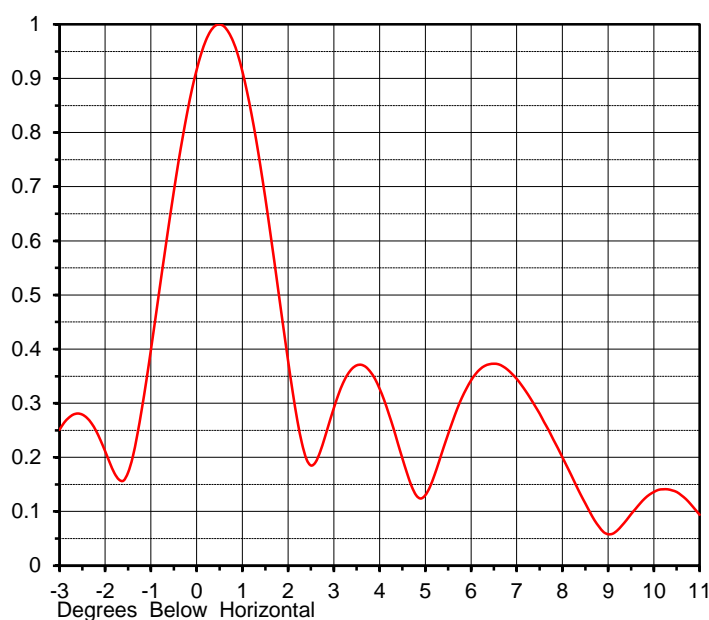
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## ELEVATION PATTERN

Proposal No. **C-71184**  
 Date **6-Jul-18**  
 Call Letters **WWL**  
 Channel **27**  
 Frequency **551 MHz**  
 Antenna Type **TFU-24WB-R C160**

RMS Directivity at Main Lobe **21.6 ( 13.34 dB )**  
 RMS Directivity at Horizontal **18.1 ( 12.58 dB )**  
**Calculated**

Beam Tilt **0.50 deg**  
 Pattern Number **24W216050**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.124	10.0	0.136	30.0	0.005	50.0	0.007	70.0	0.016
-9.0	0.162	11.0	0.094	31.0	0.005	51.0	0.014	71.0	0.010
-8.0	0.077	12.0	0.112	32.0	0.014	52.0	0.034	72.0	0.008
-7.0	0.220	13.0	0.194	33.0	0.023	53.0	0.060	73.0	0.011
-6.0	0.233	14.0	0.129	34.0	0.075	54.0	0.073	74.0	0.014
-5.0	0.175	15.0	0.033	35.0	0.110	55.0	0.063	75.0	0.016
-4.0	0.077	16.0	0.021	36.0	0.093	56.0	0.036	76.0	0.016
-3.0	0.251	17.0	0.061	37.0	0.040	57.0	0.022	77.0	0.014
-2.0	0.211	18.0	0.039	38.0	0.025	58.0	0.040	78.0	0.012
-1.0	0.399	19.0	0.111	39.0	0.038	59.0	0.047	79.0	0.009
0.0	0.916	20.0	0.189	40.0	0.026	60.0	0.038	80.0	0.006
1.0	0.913	21.0	0.152	41.0	0.020	61.0	0.021	81.0	0.004
2.0	0.378	22.0	0.053	42.0	0.061	62.0	0.021	82.0	0.003
3.0	0.291	23.0	0.028	43.0	0.097	63.0	0.035	83.0	0.002
4.0	0.327	24.0	0.029	44.0	0.102	64.0	0.044	84.0	0.002
5.0	0.130	25.0	0.012	45.0	0.070	65.0	0.044	85.0	0.002
6.0	0.342	26.0	0.037	46.0	0.026	66.0	0.040	86.0	0.001
7.0	0.345	27.0	0.070	47.0	0.028	67.0	0.034	87.0	0.001
8.0	0.200	28.0	0.062	48.0	0.033	68.0	0.028	88.0	0.000
9.0	0.058	29.0	0.025	49.0	0.019	69.0	0.022	89.0	0.000
								90.0	0.000

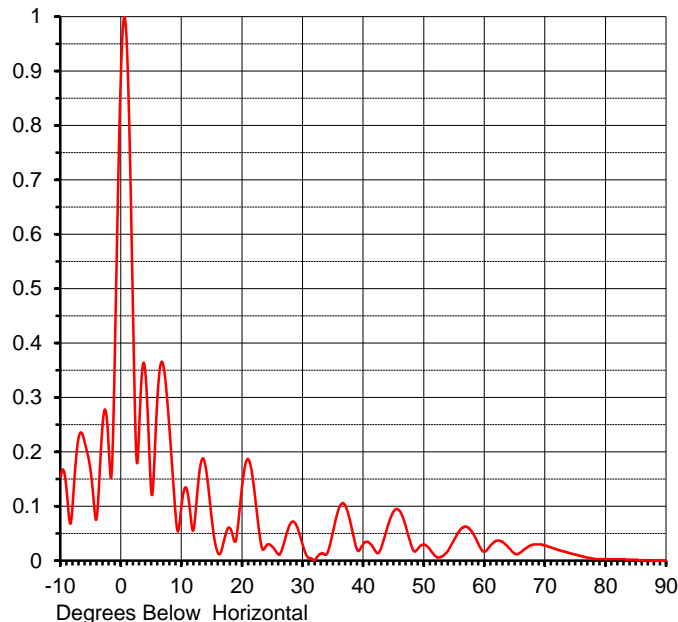
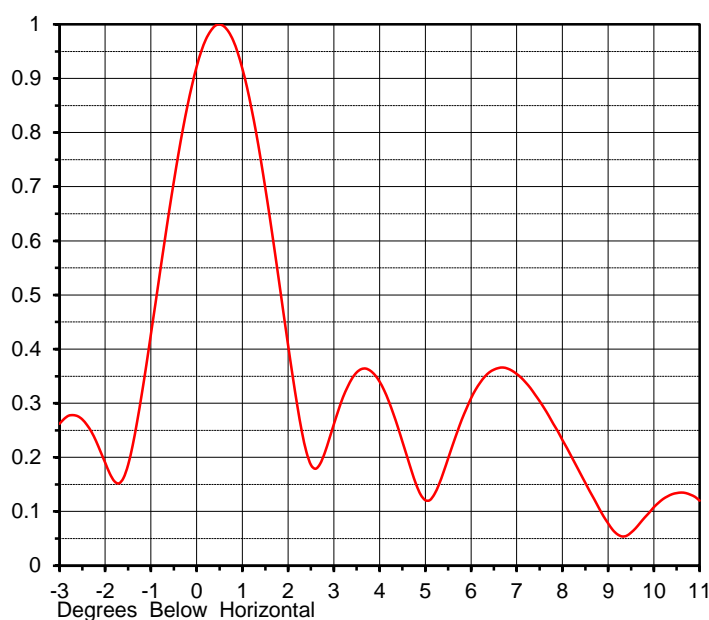
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## ELEVATION PATTERN

Proposal No. **C-71184**  
 Date **6-Jul-18**  
 Call Letters **WUPL**  
 Channel **24**  
 Frequency **533 MHz**  
 Antenna Type **TFU-24WB-R C160**

RMS Directivity at Main Lobe **21.5 ( 13.31 dB )**  
 RMS Directivity at Horizontal **18.2 ( 12.60 dB )**  
**Calculated**

Beam Tilt **0.50 deg**  
 Pattern Number **24W215050**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.155	10.0	0.108	30.0	0.027	50.0	0.030	70.0	0.028
-9.0	0.124	11.0	0.120	31.0	0.005	51.0	0.020	71.0	0.024
-8.0	0.111	12.0	0.062	32.0	0.002	52.0	0.007	72.0	0.020
-7.0	0.229	13.0	0.172	33.0	0.013	53.0	0.008	73.0	0.017
-6.0	0.215	14.0	0.166	34.0	0.014	54.0	0.020	74.0	0.014
-5.0	0.158	15.0	0.069	35.0	0.057	55.0	0.040	75.0	0.011
-4.0	0.086	16.0	0.013	36.0	0.099	56.0	0.058	76.0	0.008
-3.0	0.262	17.0	0.040	37.0	0.101	57.0	0.062	77.0	0.006
-2.0	0.190	18.0	0.059	38.0	0.061	58.0	0.051	78.0	0.004
-1.0	0.428	19.0	0.043	39.0	0.019	59.0	0.029	79.0	0.003
0.0	0.922	20.0	0.144	40.0	0.032	60.0	0.017	80.0	0.003
1.0	0.918	21.0	0.186	41.0	0.032	61.0	0.029	81.0	0.003
2.0	0.407	22.0	0.124	42.0	0.017	62.0	0.037	82.0	0.003
3.0	0.261	23.0	0.034	43.0	0.028	63.0	0.034	83.0	0.003
4.0	0.340	24.0	0.029	44.0	0.065	64.0	0.023	84.0	0.002
5.0	0.121	25.0	0.025	45.0	0.091	65.0	0.013	85.0	0.002
6.0	0.309	26.0	0.011	46.0	0.091	66.0	0.016	86.0	0.001
7.0	0.354	27.0	0.039	47.0	0.061	67.0	0.025	87.0	0.001
8.0	0.232	28.0	0.070	48.0	0.024	68.0	0.030	88.0	0.000
9.0	0.078	29.0	0.062	49.0	0.023	69.0	0.030	89.0	0.000
								90.0	0.000

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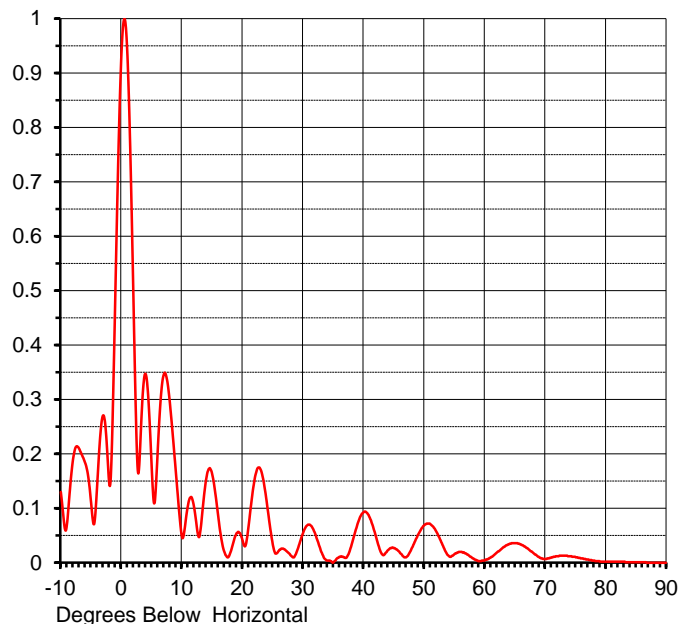
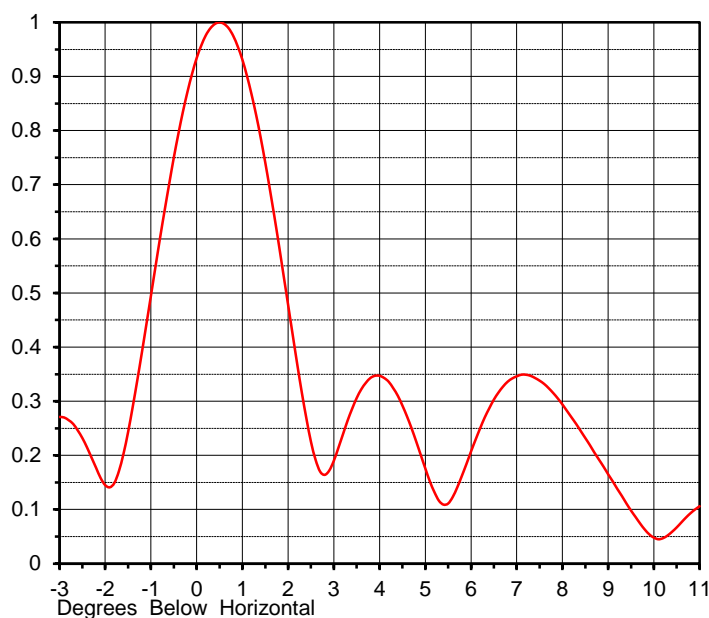


## ELEVATION PATTERN

Proposal No. **C-71184**  
 Date **6-Jul-18**  
 Call Letters **WUPL**  
 Channel **17**  
 Frequency **491 MHz**  
 Antenna Type **TFU-24WB-R C160**

RMS Directivity at Main Lobe **20.9 ( 13.20 dB )**  
 RMS Directivity at Horizontal **18.2 ( 12.60 dB )**  
**Calculated**

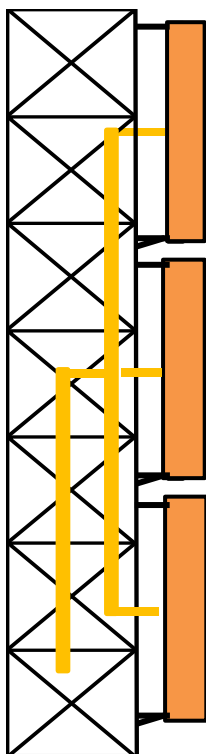
Beam Tilt **0.50 deg**  
 Pattern Number **24W209050**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.130	10.0	0.048	30.0	0.055	50.0	0.069	70.0	0.007
-9.0	0.070	11.0	0.106	31.0	0.070	51.0	0.071	71.0	0.010
-8.0	0.189	12.0	0.102	32.0	0.053	52.0	0.057	72.0	0.012
-7.0	0.210	13.0	0.056	33.0	0.020	53.0	0.033	73.0	0.013
-6.0	0.184	14.0	0.154	34.0	0.004	54.0	0.013	74.0	0.012
-5.0	0.110	15.0	0.162	35.0	0.001	55.0	0.016	75.0	0.010
-4.0	0.143	16.0	0.084	36.0	0.011	56.0	0.020	76.0	0.008
-3.0	0.271	17.0	0.020	37.0	0.009	57.0	0.016	77.0	0.006
-2.0	0.145	18.0	0.019	38.0	0.033	58.0	0.008	78.0	0.004
-1.0	0.495	19.0	0.054	39.0	0.072	59.0	0.003	79.0	0.002
0.0	0.934	20.0	0.041	40.0	0.093	60.0	0.005	80.0	0.002
1.0	0.931	21.0	0.068	41.0	0.083	61.0	0.010	81.0	0.002
2.0	0.478	22.0	0.154	42.0	0.049	62.0	0.019	82.0	0.002
3.0	0.190	23.0	0.171	43.0	0.016	63.0	0.028	83.0	0.002
4.0	0.347	24.0	0.111	44.0	0.023	64.0	0.034	84.0	0.001
5.0	0.176	25.0	0.033	45.0	0.027	65.0	0.036	85.0	0.001
6.0	0.207	26.0	0.022	46.0	0.018	66.0	0.033	86.0	0.001
7.0	0.346	27.0	0.024	47.0	0.010	67.0	0.027	87.0	0.000
8.0	0.294	28.0	0.013	48.0	0.028	68.0	0.018	88.0	0.000
9.0	0.165	29.0	0.022	49.0	0.052	69.0	0.010	89.0	0.000
								90.0	0.000

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## MECHANICAL SPECIFICATIONS



43.5 ft (13.3m)

Proposal No. **C-71184**  
 Date **6-Jul-18**  
 Call Letters **WWL**  
 Channel **36**  
 Frequency **605 MHz**  
 Antenna Type **TFU-24WB-R C160**

### Preliminary Specifications

#### Side Mounted

#### Without ice TIA-222-G

Height AGL(z) 950 ft (289.6 m)  
 Basic Wind Speed 140 m/h (225.3 km/h)

Structure Class II  
 Exposure Category B  
 Topography Category 1

#### Mechanical Specifications

Height	H2	43.5 ft (13.3m)	
Height of Center of Radiation	H3	21.8 ft (6.6m)	
Effective Projected Area	(EPA) <sub>A</sub>	52.2 ft <sup>2</sup> (4.8m <sup>2</sup> )	Mounts Excluded
Weight	W	1900 lb (0.9t)	Mounts Excluded

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

Prepared by: JBC

Date: 6-Jul-18

ME:

EE:

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## Summary

Proposal No.	<b>C-71184</b>
Date	<b>6-Jul-18</b>
Call Letters	<b>WWL</b>
Channel	<b>36</b>
Frequency	<b>605 MHz</b>
Antenna Type	<b>TFU-24WB-R C160</b>

## Antenna

	Hpol
ERP:	<b>1,000 kW ( 30.00 dBk )</b>
Peak Gain*	<b>35.55 ( 15.51 dB )</b>

<b>Antenna Input Power</b>	<b>28.1 kW ( 14.49 dBk )</b>
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## Transmission Line

Type:	<b>Rigid</b>	Attenuation:	<b>( 1.25 dB )</b>
Size:	<b>6-1/8"</b>	Efficiency:	<b>75.0%</b>
Impedance:	<b>75 Ohm</b>		
Length:	<b>1040 ft</b>	<b>317.0 m</b>	

## Transmitter Output

<b>37.5 kW ( 15.74 dBk )</b>
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Transmitter filter losses not included

\* Directivity and Gain are with respect to half wave dipole. The gain includes feed system losses

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## Summary

Proposal No.	<b>C-71184</b>
Date	<b>6-Jul-18</b>
Call Letters	<b>WWL</b>
Channel	<b>27</b>
Frequency	<b>551 MHz</b>
Antenna Type	<b>TFU-24WB-R C160</b>

## Antenna

		Hpol
ERP:	<b>1,000 kW</b>	<b>( 30.00 dBk )</b>
Peak Gain*	35.03	( 15.44 dB )

<b>Antenna Input Power</b>	<b>28.5 kW</b>	<b>( 14.56 dBk )</b>
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## Transmission Line

Type:	<b>Rigid</b>	Attenuation:	<b>( 1.19 dB )</b>
Size:	<b>6-1/8"</b>	Efficiency:	<b>76.1%</b>
Impedance:	<b>75 Ohm</b>		
Length:	<b>1040 ft</b>	<b>317.0 m</b>	

## Transmitter Output

<b>37.5 kW</b>	<b>( 15.74 dBk )</b>
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Transmitter filter losses not included

\* Directivity and Gain are with respect to half wave dipole. The gain includes feed system losses

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## Summary

Proposal No.	<b>C-71184</b>
Date	<b>6-Jul-18</b>
Call Letters	<b>WUPL</b>
Channel	<b>24</b>
Frequency	<b>533 MHz</b>
Antenna Type	<b>TFU-24WB-R C160</b>

## Antenna

	Hpol
ERP:	<b>1,000 kW ( 30.00 dBk )</b>
Peak Gain*	<b>33.66 ( 15.27 dB )</b>

<b>Antenna Input Power</b>	<b>29.7 kW ( 14.73 dBk )</b>
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## Transmission Line

Type:	<b>Rigid</b>	Attenuation:	<b>( 1.17 dB )</b>
Size:	<b>6-1/8"</b>	Efficiency:	<b>76.5%</b>
Impedance:	<b>75 Ohm</b>		
Length:	<b>1040 ft</b>	<b>317.0 m</b>	

## Transmitter Output

<b>38.9 kW ( 15.89 dBk )</b>
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Transmitter filter losses not included

\* Directivity and Gain are with respect to half wave dipole. The gain includes feed system losses

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## Summary

Proposal No.	<b>C-71184</b>
Date	<b>6-Jul-18</b>
Call Letters	<b>WUPL</b>
Channel	<b>17</b>
Frequency	<b>491 MHz</b>
Antenna Type	<b>TFU-24WB-R C160</b>

## Antenna

	Hpol
ERP:	<b>1,000 kW ( 30.00 dBk )</b>
Peak Gain*	<b>31.56 ( 14.99 dB )</b>

<b>Antenna Input Power</b>	<b>31.7 kW ( 15.01 dBk )</b>
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## Transmission Line

Type:	<b>Rigid</b>	Attenuation:	<b>( 1.11 dB )</b>
Size:	<b>6-1/8"</b>	Efficiency:	<b>77.4%</b>
Impedance:	<b>75 Ohm</b>		
Length:	<b>1040 ft</b>	<b>317.0 m</b>	

## Transmitter Output

<b>41.0 kW ( 16.12 dBk )</b>
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Transmitter filter losses not included

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