



## TFU-15ETT/VP-R 6S140

**Proposal Number:** C-70308-7  
**Date:** 25-Oct-17  
**Customer:** WLS-ABC  
**Location:** Chicago, IL

### Electrical Specifications

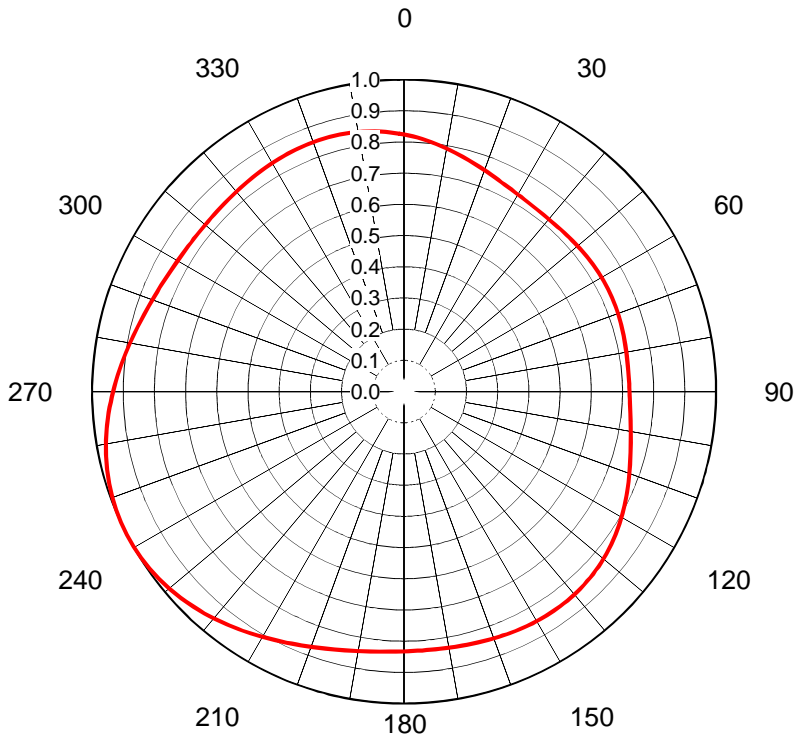
<b>Polarization</b>	Elliptical				
<b>Azimuth Pattern</b>	Directional				
<b>Antenna Input</b>	8-3/16"	75 Ohm	EIA/DCA		
<b>VSWR</b>	Channel	1.08 : 1		Band	0.00 : 1
<b>Bandwidth</b>	6 MHz				
<b>Rated Input Power</b>	80 kW	(19.03 dBk)	Maximum Average Power		

### Mechanical Specifications

<b>Mounting</b>	Top Mounted			
<b>Environmental Protection</b>	Full Radome			
<b>Height</b>	33.4 ft (10.2m)	less Lightning Protector	37.4 ft (11.4m)	with Lightning Protector
<b>Weight</b>	4650 lb (2.1t)			
<b>Effective Projected Area</b>	38.8 ft² (3.6m²)	TIA-222-G	<b>Basic Wind Speed</b>	90 m/h (144.8 km/h)

### Channel Specifications

Call	CH	Freq	Hpol ERP	Vpol ERP	TPO	Peak Main Lobe Hpol Gain	Peak Main Lobe Vpol Gain	Peak at Horizontal Hpol Gain	Peak at Horizontal Vpol Gain
WLS	22	521 MHz	1000.0 kW (30.00 dBk)	450.0 kW (26.53 dBk)	83.0 kW (19.19 dBk)	13.16 (11.19dB)	5.92 (7.72dB)	9.64 (9.84dB)	4.34 (6.37dB)



## AZIMUTH PATTERN Horizontal Polarization

Proposal No. **C-70308-7**  
Date **25-Oct-17**  
Call Letters **WLS 22**  
Frequency **521 MHz**  
Antenna Type **TFU-15ETT/VP-R 6S140**

Gain **1.42 (1.53dB)**  
**Calculated**

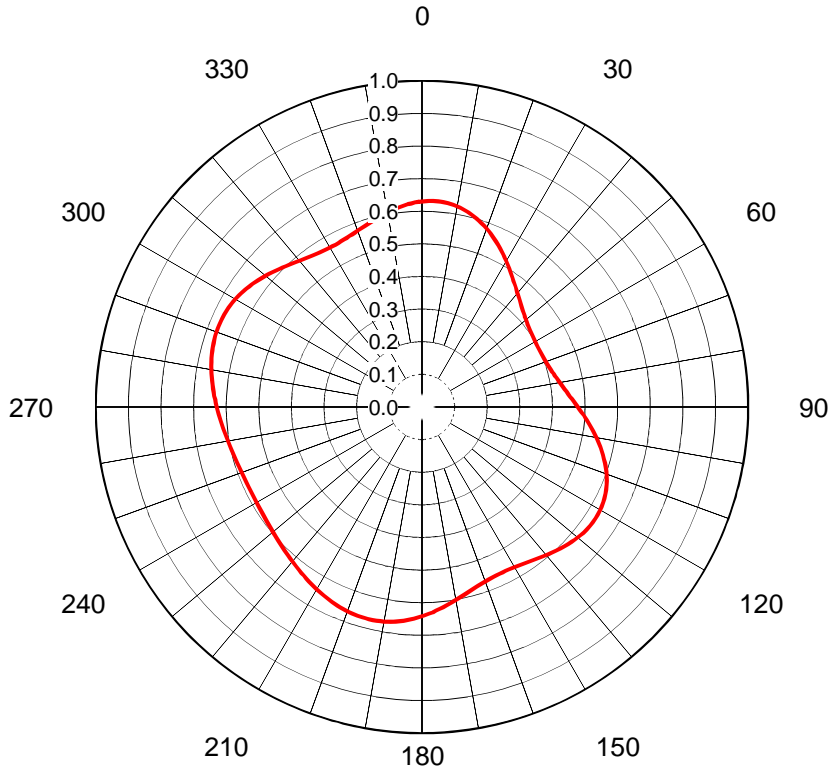
Directional  
Drawing # **WLS\_D22-H**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.824	36	0.723	72	0.729	108	0.762	144	0.851	180	0.833	216	0.933	252	0.991	288	0.864
1	0.821	37	0.722	73	0.728	109	0.765	145	0.851	181	0.833	217	0.937	253	0.989	289	0.861
2	0.818	38	0.722	74	0.728	110	0.769	146	0.851	182	0.834	218	0.941	254	0.987	290	0.859
3	0.815	39	0.722	75	0.727	111	0.772	147	0.851	183	0.835	219	0.945	255	0.985	291	0.856
4	0.812	40	0.722	76	0.726	112	0.776	148	0.851	184	0.836	220	0.949	256	0.982	292	0.853
5	0.808	41	0.722	77	0.726	113	0.780	149	0.850	185	0.837	221	0.953	257	0.979	293	0.851
6	0.805	42	0.722	78	0.725	114	0.783	150	0.850	186	0.838	222	0.956	258	0.977	294	0.849
7	0.802	43	0.722	79	0.724	115	0.787	151	0.849	187	0.840	223	0.960	259	0.974	295	0.847
8	0.798	44	0.723	80	0.724	116	0.791	152	0.849	188	0.841	224	0.964	260	0.970	296	0.845
9	0.794	45	0.723	81	0.723	117	0.794	153	0.848	189	0.843	225	0.967	261	0.967	297	0.843
10	0.791	46	0.724	82	0.723	118	0.798	154	0.847	190	0.845	226	0.970	262	0.964	298	0.841
11	0.787	47	0.724	83	0.722	119	0.802	155	0.846	191	0.847	227	0.974	263	0.960	299	0.840
12	0.783	48	0.725	84	0.722	120	0.805	156	0.846	192	0.849	228	0.977	264	0.956	300	0.838
13	0.780	49	0.726	85	0.722	121	0.808	157	0.845	193	0.851	229	0.979	265	0.953	301	0.837
14	0.776	50	0.726	86	0.722	122	0.812	158	0.844	194	0.853	230	0.982	266	0.949	302	0.836
15	0.772	51	0.727	87	0.722	123	0.815	159	0.843	195	0.856	231	0.985	267	0.945	303	0.835
16	0.769	52	0.728	88	0.722	124	0.818	160	0.842	196	0.859	232	0.987	268	0.941	304	0.834
17	0.765	53	0.728	89	0.722	125	0.821	161	0.841	197	0.861	233	0.989	269	0.937	305	0.833
18	0.762	54	0.729	90	0.723	126	0.824	162	0.840	198	0.864	234	0.991	270	0.933	306	0.833
19	0.758	55	0.729	91	0.724	127	0.827	163	0.839	199	0.868	235	0.993	271	0.929	307	0.832
20	0.755	56	0.730	92	0.724	128	0.829	164	0.838	200	0.871	236	0.995	272	0.924	308	0.832
21	0.752	57	0.730	93	0.725	129	0.832	165	0.837	201	0.874	237	0.996	273	0.920	309	0.832
22	0.749	58	0.731	94	0.727	130	0.834	166	0.836	202	0.877	238	0.997	274	0.916	310	0.832
23	0.746	59	0.731	95	0.728	131	0.836	167	0.836	203	0.881	239	0.998	275	0.912	311	0.832
24	0.743	60	0.731	96	0.730	132	0.838	168	0.835	204	0.885	240	0.999	276	0.908	312	0.832
25	0.740	61	0.732	97	0.731	133	0.840	169	0.834	205	0.888	241	1.000	277	0.904	313	0.832
26	0.738	62	0.732	98	0.733	134	0.842	170	0.834	206	0.892	242	1.000	278	0.900	314	0.833
27	0.735	63	0.732	99	0.735	135	0.844	171	0.833	207	0.896	243	1.000	279	0.896	315	0.833
28	0.733	64	0.732	100	0.738	136	0.845	172	0.833	208	0.900	244	1.000	280	0.892	316	0.834
29	0.731	65	0.732	101	0.740	137	0.846	173	0.832	209	0.904	245	1.000	281	0.888	317	0.834
30	0.730	66	0.731	102	0.743	138	0.847	174	0.832	210	0.908	246	0.999	282	0.885	318	0.835
31	0.728	67	0.731	103	0.746	139	0.848	175	0.832	211	0.912	247	0.998	283	0.881	319	0.836
32	0.727	68	0.731	104	0.749	140	0.849	176	0.832	212	0.916	248	0.997	284	0.877	320	0.836
33	0.725	69	0.730	105	0.752	141	0.850	177	0.832	213	0.920	249	0.996	285	0.874	321	0.837
34	0.724	70	0.730	106	0.755	142	0.850	178	0.832	214	0.924	250	0.995	286	0.871	322	0.838
35	0.724	71	0.729	107	0.758	143	0.851	179	0.832	215	0.929	251	0.993	287	0.868	323	0.839

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## AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-70308-7**  
 Date **25-Oct-17**  
 Call Letters **WLS 22**  
 Frequency **521 MHz**  
 Antenna Type **TFU-15ETT/VP-R 6S140**  
 Gain **1.32 (1.2dB)**  
 Directional  
 Drawing # **WLS\_D22-V**



Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.630	36	0.478	72	0.408	108	0.592	144	0.580	180	0.642	216	0.629	252	0.590	288	0.669	324	0.573
1	0.631	37	0.472	73	0.409	109	0.597	145	0.578	181	0.646	217	0.626	253	0.592	289	0.670	325	0.571
2	0.632	38	0.466	74	0.412	110	0.602	146	0.575	182	0.649	218	0.623	254	0.593	290	0.671	326	0.569
3	0.632	39	0.461	75	0.414	111	0.607	147	0.573	183	0.652	219	0.621	255	0.595	291	0.671	327	0.567
4	0.632	40	0.456	76	0.416	112	0.611	148	0.571	184	0.655	220	0.618	256	0.596	292	0.671	328	0.566
5	0.632	41	0.451	77	0.419	113	0.615	149	0.569	185	0.658	221	0.616	257	0.598	293	0.671	329	0.565
6	0.631	42	0.446	78	0.422	114	0.618	150	0.567	186	0.661	222	0.613	258	0.600	294	0.670	330	0.564
7	0.630	43	0.441	79	0.426	115	0.621	151	0.566	187	0.663	223	0.611	259	0.602	295	0.669	331	0.564
8	0.629	44	0.437	80	0.429	116	0.624	152	0.565	188	0.665	224	0.608	260	0.604	296	0.668	332	0.564
9	0.627	45	0.433	81	0.433	117	0.627	153	0.564	189	0.667	225	0.606	261	0.606	297	0.667	333	0.564
10	0.624	46	0.429	82	0.437	118	0.629	154	0.564	190	0.668	226	0.604	262	0.608	298	0.665	334	0.565
11	0.621	47	0.426	83	0.441	119	0.630	155	0.564	191	0.669	227	0.602	263	0.611	299	0.663	335	0.566
12	0.618	48	0.422	84	0.446	120	0.631	156	0.564	192	0.670	228	0.600	264	0.613	300	0.661	336	0.567
13	0.615	49	0.419	85	0.451	121	0.632	157	0.565	193	0.671	229	0.598	265	0.616	301	0.658	337	0.569
14	0.611	50	0.416	86	0.456	122	0.632	158	0.566	194	0.671	230	0.596	266	0.618	302	0.655	338	0.571
15	0.607	51	0.414	87	0.461	123	0.632	159	0.567	195	0.671	231	0.595	267	0.621	303	0.652	339	0.573
16	0.602	52	0.412	88	0.466	124	0.632	160	0.569	196	0.671	232	0.593	268	0.623	304	0.649	340	0.575
17	0.597	53	0.409	89	0.472	125	0.631	161	0.571	197	0.670	233	0.592	269	0.626	305	0.646	341	0.578
18	0.592	54	0.408	90	0.478	126	0.630	162	0.573	198	0.669	234	0.590	270	0.629	306	0.642	342	0.580
19	0.587	55	0.406	91	0.484	127	0.629	163	0.576	199	0.668	235	0.589	271	0.632	307	0.638	343	0.583
20	0.581	56	0.405	92	0.490	128	0.627	164	0.579	200	0.667	236	0.588	272	0.634	308	0.634	344	0.586
21	0.575	57	0.403	93	0.497	129	0.625	165	0.582	201	0.665	237	0.587	273	0.637	309	0.630	345	0.589
22	0.569	58	0.402	94	0.503	130	0.623	166	0.585	202	0.664	238	0.587	274	0.640	310	0.626	346	0.593
23	0.563	59	0.401	95	0.510	131	0.621	167	0.589	203	0.662	239	0.586	275	0.643	311	0.622	347	0.596
24	0.557	60	0.401	96	0.517	132	0.618	168	0.592	204	0.660	240	0.585	276	0.645	312	0.617	348	0.599
25	0.550	61	0.400	97	0.523	133	0.615	169	0.596	205	0.658	241	0.585	277	0.648	313	0.613	349	0.603
26	0.543	62	0.400	98	0.530	134	0.612	170	0.600	206	0.656	242	0.585	278	0.651	314	0.609	350	0.606
27	0.537	63	0.400	99	0.537	135	0.609	171	0.605	207	0.653	243	0.585	279	0.653	315	0.605	351	0.609
28	0.530	64	0.400	100	0.543	136	0.606	172	0.609	208	0.651	244	0.585	280	0.656	316	0.600	352	0.612
29	0.523	65	0.400	101	0.550	137	0.603	173	0.613	209	0.648	245	0.585	281	0.658	317	0.596	353	0.615
30	0.517	66	0.401	102	0.557	138	0.599	174	0.617	210	0.645	246	0.585	282	0.660	318	0.592	354	0.618
31	0.510	67	0.401	103	0.563	139	0.596	175	0.622	211	0.643	247	0.586	283	0.662	319	0.589	355	0.621
32	0.503	68	0.402	104	0.569	140	0.593	176	0.626	212	0.640	248	0.587	284	0.664	320	0.585	356	0.623
33	0.497	69	0.403	105	0.575	141	0.589	177	0.631	213	0.637	249	0.587	285	0.665	321	0.582	357	0.625
34	0.490	70	0.405	106	0.581	142	0.586	178	0.634	214	0.634	250	0.588	286	0.667	322	0.579	358	0.627
35	0.484	71	0.406	107	0.587	143	0.583	179	0.638	215	0.632	251	0.589	287	0.668	323	0.576	359	0.629

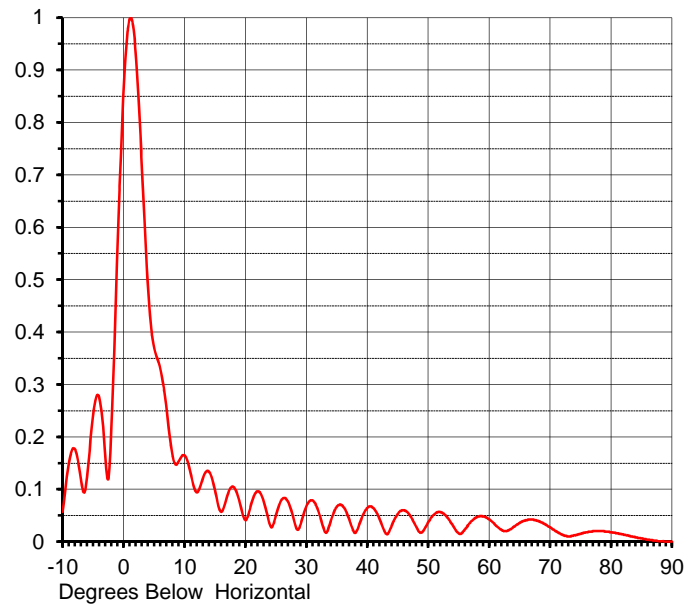
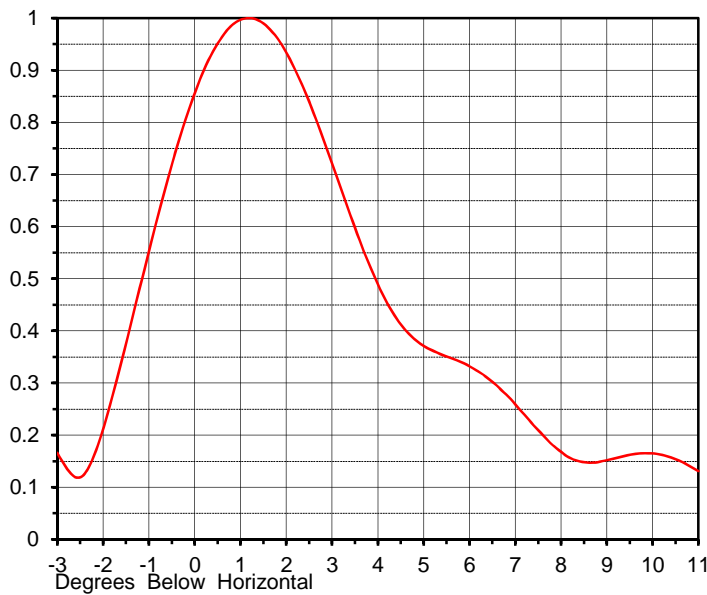
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## ELEVATION PATTERN

Proposal No. **C-70308-7**  
 Date **25-Oct-17**  
 Call Letters **WLS 22**  
 Frequency **521 MHz**  
 Antenna Type **TFU-15ETT/VP-R 6S140**

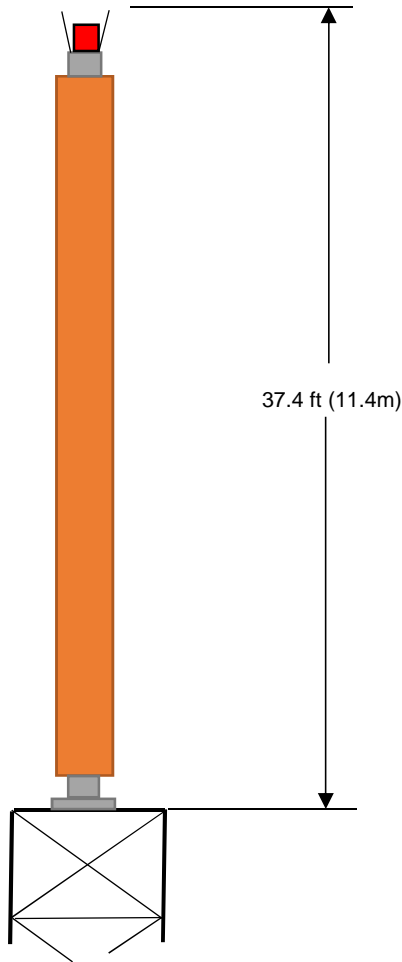
RMS Directivity at Main Lobe **13.75 ( 11.38 dB )**  
 RMS Directivity at Horizontal **10.10 ( 10.04 dB )**  
**Calculated**

Beam Tilt **1.20 deg**  
 Drawing Number **15E1375120**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.057	10.0	0.165	30.0	0.067	50.0	0.037	70.0	0.027
-9.0	0.147	11.0	0.131	31.0	0.079	51.0	0.052	71.0	0.020
-8.0	0.177	12.0	0.094	32.0	0.058	52.0	0.056	72.0	0.013
-7.0	0.120	13.0	0.120	33.0	0.020	53.0	0.048	73.0	0.010
-6.0	0.121	14.0	0.134	34.0	0.039	54.0	0.032	74.0	0.012
-5.0	0.240	15.0	0.099	35.0	0.066	55.0	0.016	75.0	0.015
-4.0	0.276	16.0	0.057	36.0	0.068	56.0	0.023	76.0	0.018
-3.0	0.166	17.0	0.086	37.0	0.044	57.0	0.038	77.0	0.020
-2.0	0.211	18.0	0.105	38.0	0.017	58.0	0.047	78.0	0.020
-1.0	0.552	19.0	0.078	39.0	0.042	59.0	0.048	79.0	0.019
0.0	0.856	20.0	0.041	40.0	0.064	60.0	0.043	80.0	0.018
1.0	0.997	21.0	0.073	41.0	0.064	61.0	0.032	81.0	0.016
2.0	0.934	22.0	0.096	42.0	0.044	62.0	0.023	82.0	0.014
3.0	0.721	23.0	0.077	43.0	0.016	63.0	0.021	83.0	0.011
4.0	0.489	24.0	0.033	44.0	0.030	64.0	0.028	84.0	0.008
5.0	0.371	25.0	0.049	45.0	0.053	65.0	0.036	85.0	0.006
6.0	0.332	26.0	0.081	46.0	0.060	66.0	0.041	86.0	0.004
7.0	0.259	27.0	0.076	47.0	0.050	67.0	0.042	87.0	0.002
8.0	0.168	28.0	0.040	48.0	0.029	68.0	0.040	88.0	0.001
9.0	0.152	29.0	0.031	49.0	0.018	69.0	0.034	89.0	0.000
						90.0	0.000	90.0	0.000

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## MECHANICALS

Proposal No. **C-70308-7**  
 Date **25-Oct-17**  
 Call Letters **WLS** **22**  
 Frequency **521 MHz**  
 Antenna Type **TFU-15ETT/VP-R 6S140**

### Preliminary Specifications

#### Top Mounted

##### Mechanical Specification without ice TIA-222-G

Height AGL(z) 1750 ft (533.4 m)  
 Basic Wind Speed 90 m/h (144.8 km/h)

Structure Class II  
 Exposure Category C  
 Topography Category 1

#### Mechanical Specifications

Height with Lightning Protector	H4	37.4 ft (11.4m)
Height less Lightning Protector	H2	33.4 ft (10.2m)
Height of Center of Radiation	H3	16.7 ft (5.1m)
Effective Projected Area	(EPA) <sub>S</sub>	38.8 ft <sup>2</sup> (3.6m <sup>2</sup> )
Moment Arm	D1	18.3 ft (5.6m)

Weight	W	4650 lb (2.1t)
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Antenna designed in accordance with AISC specifications for design of structural steel as prescribed by TIA-222-G

Prepared by: DLS  
 Rev. No.7 by: jls

Date: 25-Oct-17  
 Date: 25-Oct-17

ME: EE:

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## Summary

Proposal No.	<b>C-70308-7</b>	
Date	<b>25-Oct-17</b>	
Call Letters	<b>WLS</b>	<b>22 DTV</b>
Frequency	<b>521 MHz</b>	
Antenna Type	<b>TFU-15ETT/VP-R</b>	<b>6S140</b>

## Antenna

	Hpol	Vpol
ERP:	<b>1000.0 kW ( 30.00 dBk )</b>	<b>450.0 kW ( 26.53 dBk )</b>
Peak Gain*	13.16 ( 11.19 dB )	5.92 ( 7.72 dB )

<b>Antenna Input Power</b>	<b>76.0 kW ( 18.81 dBk )</b>
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## Transmission Line

Type	Rigid	Attenuation	( 0.38 dB )
Size	Size 8-3/16"	Efficiency	91.6%
Impedance	75 Ohm		
Length	460 ft	140.2 m	

## Transmitter Output

**83.0 kW ( 19.19 dBk )**

Transmitter filter losses not included

\* Directivity and Gain are with respect to half wave dipole.

\*\*Antenna Gain includes feed system losses

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