



Antenna Model: **THV-10A13/VP-R C150**

Proposal Number: **C-71966-1**

Date: **27-Oct-22**

Customer: **Blue Ridge Public TV**

Location: **Roanoke, VA**

Electrical Specifications

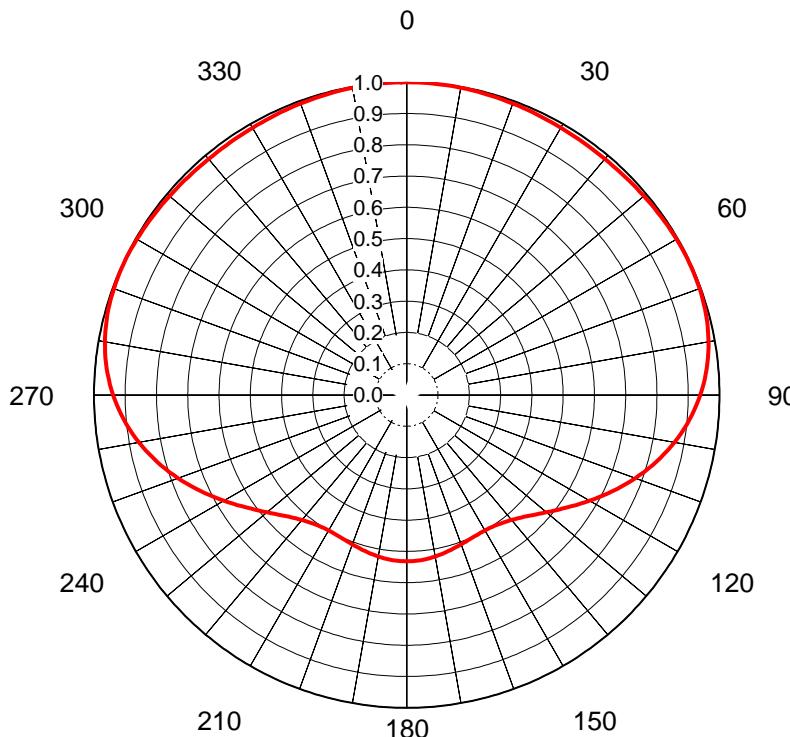
Polarization:	Elliptical		
Azimuth Pattern:	Directional		
Antenna Input:	3-1/8"	50 Ohm	EIA/DCA
VSWR:	Channel	1.10 : 1	
Bandwidth:		MHz	
Rated Input Power:	20 kW	(13.01 dBk)	Maximum Average Power

Mechanical Specifications

Mounting:	Top Mounted		
Environmental Protection:	Full Radome		
Height:	51.8 ft (15.8m)	less Lightning Protector	55.8 ft (17m) with Lightning Protector
Weight:	10000 lb (4.5t)		
Effective Projected Area:	72.2 ft² (6.7m²)	TIA-222-G	Basic Wind Speed: 90 m/h (144.8 km/h)

Channel Specifications

Call	CH	Freq	Hpol ERP	Vpol ERP	TPO	Peak	Peak	Peak	Peak
						Main Lobe Hpol Gain	Main Lobe Vpol Gain	at Horizontal Hpol Gain	at Horizontal Vpol Gain
WBRA	13	213 MHz	66.0 kW (18.20 dBk)	62.7 kW (17.97 dBk)	9.22 kW (9.65 dBk)	7.78 (8.91dB)	7.39 (8.69dB)	7.01 (8.46dB)	6.66 (8.23dB)

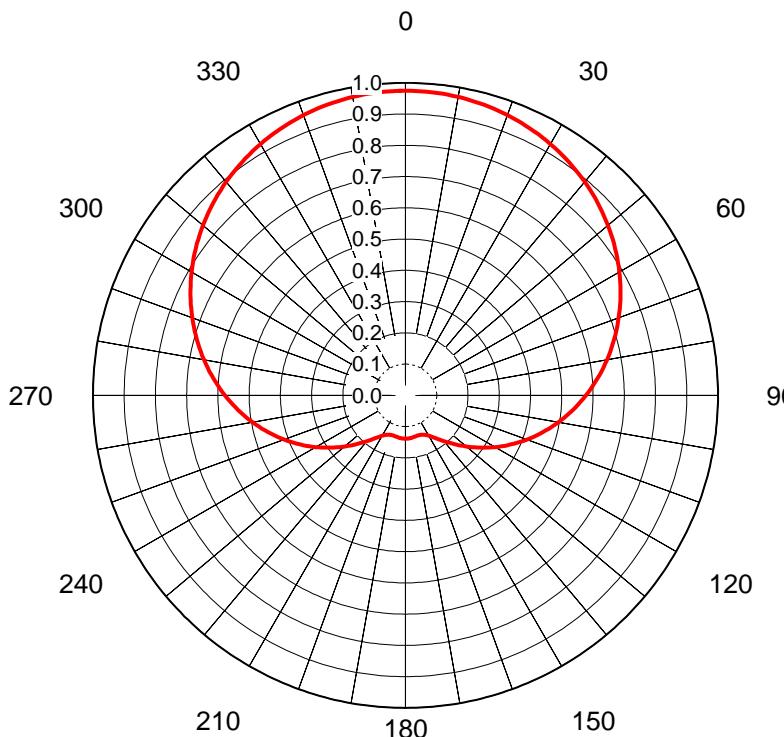


AZIMUTH PATTERN Horizontal Polarization

Proposal No. C-71966-1
 Date 27-Oct-22
 Call Letters WBRA
 Channel 13
 Frequency 213 MHz
 Antenna Type THV-10A13/VP-R C150
 Gain 1.43 (1.56dB)
 Calculated

Deg	Value																		
0	1.000	36	0.985	72	0.995	108	0.797	144	0.508	180	0.532	216	0.508	252	0.797	288	0.995	324	0.985
1	1.000	37	0.985	73	0.993	109	0.788	145	0.506	181	0.532	217	0.511	253	0.807	289	0.995	325	0.985
2	1.000	38	0.985	74	0.992	110	0.778	146	0.504	182	0.531	218	0.514	254	0.817	290	0.996	326	0.985
3	1.000	39	0.985	75	0.991	111	0.768	147	0.503	183	0.531	219	0.518	255	0.826	291	0.997	327	0.985
4	1.000	40	0.985	76	0.989	112	0.757	148	0.501	184	0.530	220	0.521	256	0.835	292	0.997	328	0.986
5	0.999	41	0.985	77	0.987	113	0.747	149	0.501	185	0.530	221	0.526	257	0.844	293	0.997	329	0.986
6	0.999	42	0.986	78	0.985	114	0.737	150	0.500	186	0.529	222	0.530	258	0.853	294	0.998	330	0.986
7	0.999	43	0.986	79	0.982	115	0.727	151	0.500	187	0.528	223	0.536	259	0.861	295	0.997	331	0.987
8	0.998	44	0.986	80	0.980	116	0.716	152	0.500	188	0.527	224	0.541	260	0.870	296	0.997	332	0.987
9	0.998	45	0.987	81	0.977	117	0.706	153	0.500	189	0.526	225	0.547	261	0.878	297	0.997	333	0.988
10	0.998	46	0.987	82	0.974	118	0.696	154	0.501	190	0.524	226	0.554	262	0.886	298	0.997	334	0.988
11	0.997	47	0.988	83	0.970	119	0.686	155	0.502	191	0.523	227	0.561	263	0.893	299	0.996	335	0.989
12	0.997	48	0.988	84	0.967	120	0.675	156	0.503	192	0.521	228	0.568	264	0.901	300	0.996	336	0.989
13	0.996	49	0.989	85	0.963	121	0.665	157	0.504	193	0.520	229	0.575	265	0.907	301	0.995	337	0.990
14	0.995	50	0.990	86	0.959	122	0.655	158	0.505	194	0.518	230	0.583	266	0.914	302	0.995	338	0.991
15	0.995	51	0.990	87	0.954	123	0.646	159	0.507	195	0.517	231	0.591	267	0.921	303	0.994	339	0.991
16	0.994	52	0.991	88	0.949	124	0.636	160	0.508	196	0.515	232	0.600	268	0.927	304	0.994	340	0.992
17	0.994	53	0.992	89	0.944	125	0.627	161	0.510	197	0.513	233	0.608	269	0.933	305	0.993	341	0.992
18	0.993	54	0.992	90	0.939	126	0.617	162	0.511	198	0.511	234	0.617	270	0.939	306	0.992	342	0.993
19	0.992	55	0.993	91	0.933	127	0.608	163	0.513	199	0.510	235	0.627	271	0.944	307	0.992	343	0.994
20	0.992	56	0.994	92	0.927	128	0.600	164	0.515	200	0.508	236	0.636	272	0.949	308	0.991	344	0.994
21	0.991	57	0.994	93	0.921	129	0.591	165	0.517	201	0.507	237	0.646	273	0.954	309	0.990	345	0.995
22	0.991	58	0.995	94	0.914	130	0.583	166	0.518	202	0.505	238	0.655	274	0.959	310	0.990	346	0.995
23	0.990	59	0.995	95	0.907	131	0.575	167	0.520	203	0.504	239	0.665	275	0.963	311	0.989	347	0.996
24	0.989	60	0.996	96	0.901	132	0.568	168	0.521	204	0.503	240	0.675	276	0.967	312	0.988	348	0.997
25	0.989	61	0.996	97	0.893	133	0.561	169	0.523	205	0.502	241	0.686	277	0.970	313	0.988	349	0.997
26	0.988	62	0.997	98	0.886	134	0.554	170	0.524	206	0.501	242	0.696	278	0.974	314	0.987	350	0.998
27	0.988	63	0.997	99	0.878	135	0.547	171	0.526	207	0.500	243	0.706	279	0.977	315	0.987	351	0.998
28	0.987	64	0.997	100	0.870	136	0.541	172	0.527	208	0.500	244	0.716	280	0.980	316	0.986	352	0.998
29	0.987	65	0.997	101	0.861	137	0.536	173	0.528	209	0.500	245	0.727	281	0.982	317	0.986	353	0.999
30	0.986	66	0.998	102	0.853	138	0.530	174	0.529	210	0.500	246	0.737	282	0.985	318	0.986	354	0.999
31	0.986	67	0.997	103	0.844	139	0.526	175	0.530	211	0.501	247	0.747	283	0.987	319	0.985	355	0.999
32	0.986	68	0.997	104	0.835	140	0.521	176	0.530	212	0.501	248	0.757	284	0.989	320	0.985	356	1.000
33	0.985	69	0.997	105	0.826	141	0.518	177	0.531	213	0.503	249	0.768	285	0.991	321	0.985	357	1.000
34	0.985	70	0.996	106	0.817	142	0.514	178	0.531	214	0.504	250	0.778	286	0.992	322	0.985	358	1.000
35	0.985	71	0.995	107	0.807	143	0.511	179	0.532	215	0.506	251	0.788	287	0.993	323	0.985	359	1.000

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AZIMUTH PATTERN Vertical Polarization

Proposal No. C-71966-1
 Date 27-Oct-22
 Call Letters WBRA
 Channel 13
 Frequency 213 MHz
 Antenna Type THV-10A13/VP-R C150
 Gain 2.34 (3.69dB)
 Calculated

Deg	Value																						
0	0.975	36	0.908	72	0.712	108	0.430	144	0.171	180	0.139	216	0.171	252	0.430	288	0.712	324	0.908				
1	0.975	37	0.904	73	0.705	109	0.422	145	0.167	181	0.139	217	0.176	253	0.438	289	0.719	325	0.911				
2	0.974	38	0.900	74	0.698	110	0.413	146	0.163	182	0.139	218	0.180	254	0.447	290	0.726	326	0.915				
3	0.974	39	0.896	75	0.691	111	0.405	147	0.159	183	0.139	219	0.185	255	0.455	291	0.733	327	0.918				
4	0.974	40	0.892	76	0.684	112	0.397	148	0.155	184	0.138	220	0.191	256	0.463	292	0.739	328	0.922				
5	0.973	41	0.888	77	0.677	113	0.389	149	0.152	185	0.138	221	0.196	257	0.472	293	0.746	329	0.925				
6	0.973	42	0.884	78	0.669	114	0.380	150	0.149	186	0.138	222	0.202	258	0.480	294	0.753	330	0.928				
7	0.972	43	0.879	79	0.662	115	0.372	151	0.147	187	0.138	223	0.208	259	0.488	295	0.759	331	0.931				
8	0.971	44	0.875	80	0.655	116	0.364	152	0.144	188	0.137	224	0.214	260	0.497	296	0.765	332	0.934				
9	0.971	45	0.870	81	0.647	117	0.356	153	0.142	189	0.137	225	0.220	261	0.505	297	0.772	333	0.937				
10	0.970	46	0.865	82	0.640	118	0.347	154	0.141	190	0.136	226	0.227	262	0.513	298	0.778	334	0.940				
11	0.968	47	0.861	83	0.632	119	0.339	155	0.139	191	0.136	227	0.234	263	0.521	299	0.784	335	0.942				
12	0.967	48	0.856	84	0.624	120	0.331	156	0.138	192	0.136	228	0.240	264	0.529	300	0.790	336	0.945				
13	0.966	49	0.851	85	0.617	121	0.323	157	0.137	193	0.135	229	0.247	265	0.537	301	0.796	337	0.947				
14	0.965	50	0.846	86	0.609	122	0.315	158	0.136	194	0.135	230	0.255	266	0.545	302	0.802	338	0.950				
15	0.963	51	0.841	87	0.601	123	0.307	159	0.135	195	0.135	231	0.262	267	0.554	303	0.808	339	0.952				
16	0.961	52	0.835	88	0.593	124	0.300	160	0.135	196	0.134	232	0.269	268	0.562	304	0.813	340	0.954				
17	0.960	53	0.830	89	0.585	125	0.292	161	0.134	197	0.134	233	0.277	269	0.570	305	0.819	341	0.956				
18	0.958	54	0.825	90	0.578	126	0.284	162	0.134	198	0.134	234	0.284	270	0.577	306	0.825	342	0.958				
19	0.956	55	0.819	91	0.570	127	0.277	163	0.134	199	0.134	235	0.292	271	0.585	307	0.830	343	0.960				
20	0.954	56	0.813	92	0.562	128	0.269	164	0.134	200	0.135	236	0.300	272	0.593	308	0.835	344	0.961				
21	0.952	57	0.808	93	0.554	129	0.262	165	0.135	201	0.135	237	0.307	273	0.601	309	0.841	345	0.963				
22	0.950	58	0.802	94	0.545	130	0.255	166	0.135	202	0.136	238	0.315	274	0.609	310	0.846	346	0.965				
23	0.947	59	0.796	95	0.537	131	0.247	167	0.135	203	0.137	239	0.323	275	0.617	311	0.851	347	0.966				
24	0.945	60	0.790	96	0.529	132	0.240	168	0.136	204	0.138	240	0.331	276	0.624	312	0.856	348	0.967				
25	0.942	61	0.784	97	0.521	133	0.234	169	0.136	205	0.139	241	0.339	277	0.632	313	0.861	349	0.968				
26	0.940	62	0.778	98	0.513	134	0.227	170	0.136	206	0.141	242	0.347	278	0.640	314	0.865	350	0.970				
27	0.937	63	0.772	99	0.505	135	0.220	171	0.137	207	0.142	243	0.356	279	0.647	315	0.870	351	0.970				
28	0.934	64	0.765	100	0.497	136	0.214	172	0.137	208	0.144	244	0.364	280	0.655	316	0.875	352	0.971				
29	0.931	65	0.759	101	0.488	137	0.208	173	0.138	209	0.147	245	0.372	281	0.662	317	0.879	353	0.972				
30	0.928	66	0.753	102	0.480	138	0.202	174	0.138	210	0.149	246	0.380	282	0.669	318	0.884	354	0.973				
31	0.925	67	0.746	103	0.472	139	0.196	175	0.138	211	0.152	247	0.389	283	0.677	319	0.888	355	0.973				
32	0.922	68	0.739	104	0.463	140	0.191	176	0.138	212	0.155	248	0.397	284	0.684	320	0.892	356	0.974				
33	0.918	69	0.733	105	0.455	141	0.185	177	0.139	213	0.159	249	0.405	285	0.691	321	0.896	357	0.974				
34	0.915	70	0.726	106	0.447	142	0.180	178	0.139	214	0.163	250	0.413	286	0.698	322	0.900	358	0.974				
35	0.911	71	0.719	107	0.438	143	0.176	179	0.139	215	0.167	251	0.422	287	0.705	323	0.904	359	0.975				

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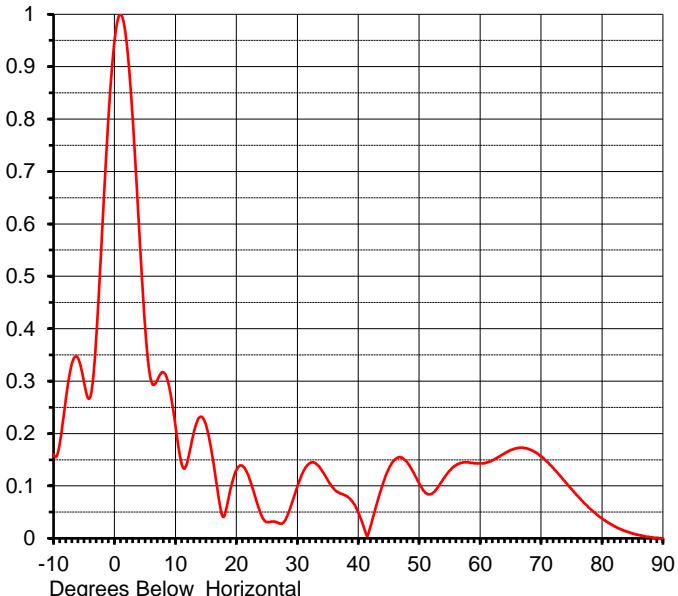
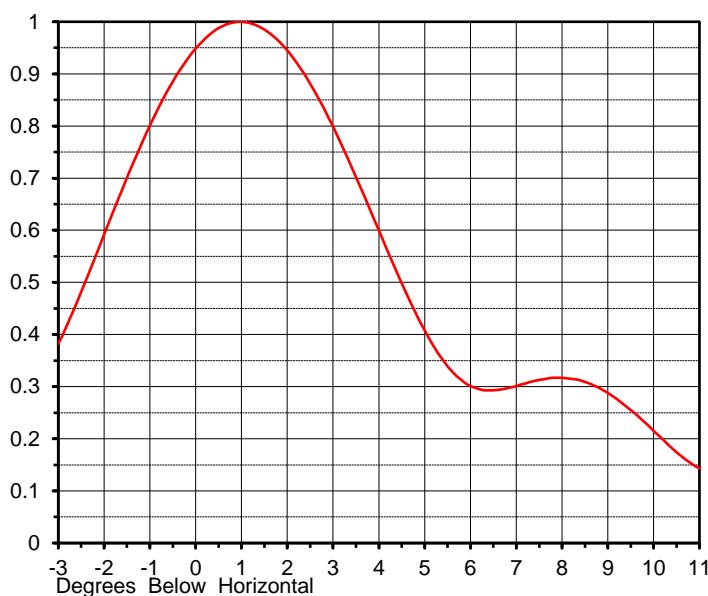
ELEVATION PATTERN

Proposal No. C-71966-1
 Date 27-Oct-22
 Call Letters WBRA
 Channel 13
 Frequency 213 MHz
 Antenna Type THV-10A13/VP-R C150

RMS Directivity at Main Lobe
 RMS Directivity at Horizontal

8.6 (9.34 dB)
7.7 (8.86 dB)
 Calculated

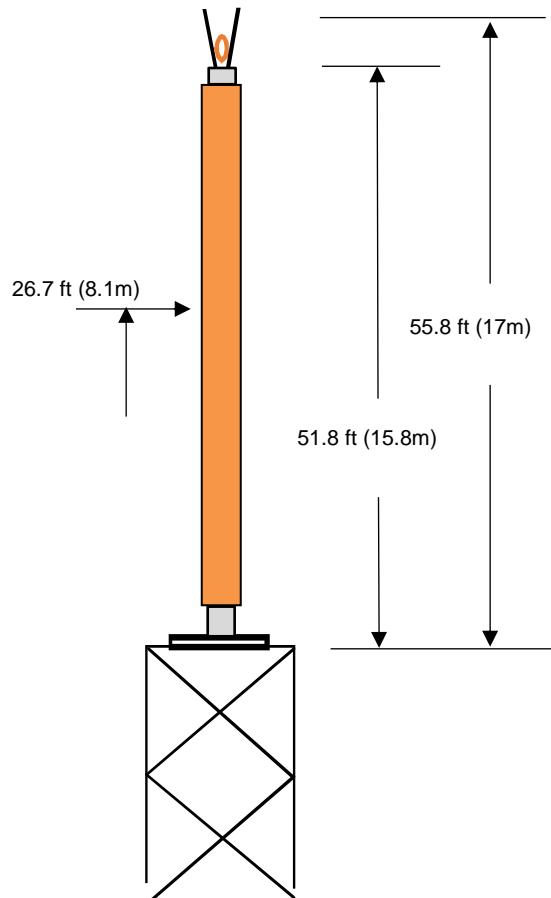
Beam Tilt 1.00 deg
 Pattern Number 10V086100



Angle	Field								
-10.0	0.160	10.0	0.215	30.0	0.098	50.0	0.105	70.0	0.157
-9.0	0.179	11.0	0.143	31.0	0.128	51.0	0.087	71.0	0.146
-8.0	0.264	12.0	0.148	32.0	0.143	52.0	0.085	72.0	0.134
-7.0	0.333	13.0	0.201	33.0	0.143	53.0	0.096	73.0	0.121
-6.0	0.344	14.0	0.231	34.0	0.130	54.0	0.114	74.0	0.107
-5.0	0.298	15.0	0.217	35.0	0.111	55.0	0.129	75.0	0.094
-4.0	0.269	16.0	0.161	36.0	0.095	56.0	0.139	76.0	0.081
-3.0	0.382	17.0	0.085	37.0	0.086	57.0	0.144	77.0	0.068
-2.0	0.592	18.0	0.042	38.0	0.081	58.0	0.145	78.0	0.057
-1.0	0.801	19.0	0.092	39.0	0.071	59.0	0.143	79.0	0.047
0.0	0.949	20.0	0.130	40.0	0.050	60.0	0.143	80.0	0.038
1.0	1.000	21.0	0.138	41.0	0.018	61.0	0.144	81.0	0.030
2.0	0.945	22.0	0.119	42.0	0.022	62.0	0.149	82.0	0.023
3.0	0.799	23.0	0.083	43.0	0.064	63.0	0.155	83.0	0.018
4.0	0.600	24.0	0.047	44.0	0.102	64.0	0.162	84.0	0.013
5.0	0.408	25.0	0.031	45.0	0.132	65.0	0.168	85.0	0.009
6.0	0.301	26.0	0.032	46.0	0.150	66.0	0.172	86.0	0.006
7.0	0.301	27.0	0.029	47.0	0.154	67.0	0.173	87.0	0.004
8.0	0.317	28.0	0.034	48.0	0.146	68.0	0.170	88.0	0.002
9.0	0.288	29.0	0.063	49.0	0.127	69.0	0.165	89.0	0.001

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MECHANICAL SPECIFICATIONS



Proposal No. **C-71966-1**
 Date **27-Oct-22**
 Call Letters **WBRA**
 Channel **13**
 Frequency **213 MHz**
 Antenna Type **THV-10A13/VP-R C150**

Preliminary Specifications

Top Mounted

With ice TIA-222-G

Height AGL(z)	235 ft (71.6 m)
Basic Wind Speed	90 m/h (144.8 km/h)

Structure Class	II
Exposure Category	B
Topography Category	5 Kzt=1.895

Design Ice	0.75 in	$t_{iz} = 2.52$ in
Wind Speed w/Ice	30 m/h	(48.3 km/h)

Mechanical Specifications

	without ice	with ice
Height with Lightning Protector	H4	55.8 ft (17m)
Height less Lightning Protector	H2	51.8 ft (15.8m)
Height of Center of Radiation	H3	25.9 ft (7.9m)
Effective Projected Area	(EPA) _S	72.2 ft ² (6.7m ²)
Moment Arm	D1	26.7 ft (8.1m)
		27.5 ft (8.4m)

Weight	W	10000 lb (4.5t)	15100 lb (6.8t)
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Antenna designed in accordance with AISC specifications for design of structural steel as prescribed by TIA-222-G

Prepared by: CAB
Rev. No.1 by: CAB

Date: 27-Oct-22
Date: 27-Oct-22

ME:

EE:

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Summary

Proposal No.	C-71966-1
Date	27-Oct-22
Call Letters	WBRA
Channel	13
Frequency	213 MHz
Antenna Type	THV-10A13/VP-R C150

Antenna

	Hpol	Vpol
ERP:	66.0 kW (18.20 dBk)	62.7 kW (17.97 dBk)
Peak Gain*	7.78 (8.91 dB)	7.39 (8.69 dB)

Antenna Input Power **8.48 kW (9.28 dBk)**

Transmission Line

Type:	Rigid	Attenuation:	(0.36 dB)
Size:	3-1/8"	Efficiency:	92.0%
Impedance:	50 Ohm		
Length:	250 ft	76.2 m	

Transmitter Output

9.22 kW (9.65 dBk)

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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