

**Antenna Model:****THV-9A11/CP-R O4**

Proposal Number: **C-70563**  
Date: **29-Mar-17**  
Customer: **WISC**  
Location: **Madison, WI**

**Electrical Specifications**

Polarization: **Elliptical**  
Azimuth Pattern: **Omni**  
Antenna Input: **3-1/8"** **50 Ohm** **EIA/DCA**  
VSWR: **1.08 : 1**  
Bandwidth: **6 MHz**  
Rated Input Power: **30 kW** **(14.77 dBk)** **Maximum Average Power**

**Mechanical Specifications**

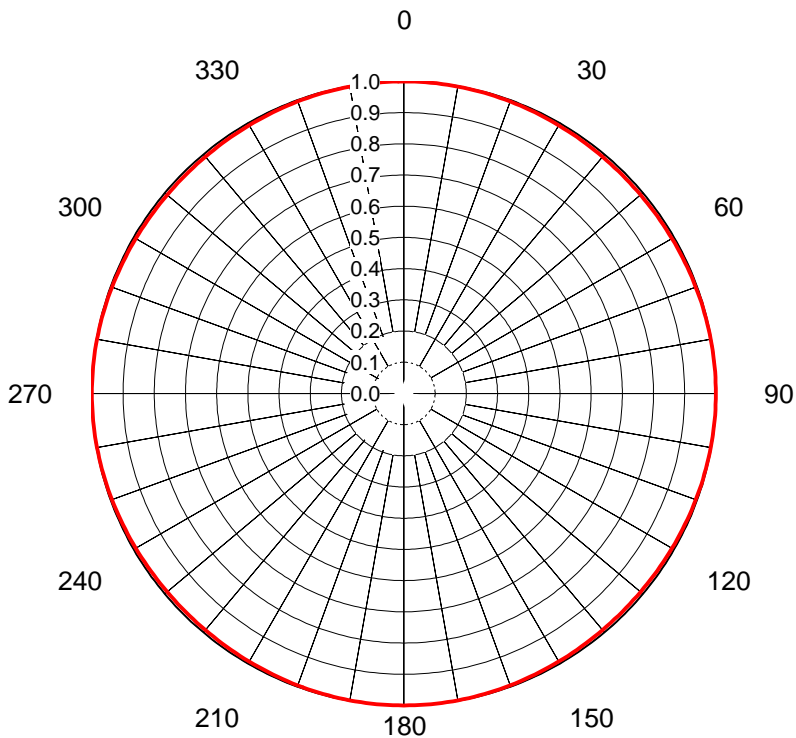
Mounting: **Top of Stack**  
Environmental Protection: **Full Radome**  
Height: **48.3 ft (14.7m)** less Lightning Protector **51.3 ft (15.6m)** with Lightning Protector  
Weight: **6650 lb (3t)**  
Effective Projected Area: **63.5 ft² (5.9m²)** **TIA-222-G** Basic Wind Speed: **90 m/h (144.8 km/h)**

**Channel Specifications**

Call	CH	Freq	Hpol ERP	Vpol ERP	TPO	RMS	RMS	RMS	RMS
						Main Lobe Hpol Gain	Main Lobe Vpol Gain	at Horizontal Hpol Gain	at Horizontal Vpol Gain
WISC	11	201 MHz	10.2 kW (10.09 dBk)	10.2 kW (10.09 dBk)	3.6 kW (5.59 dBk)	4.50 (6.53dB)	4.50 (6.53dB)	4.17 (6.20dB)	4.17 (6.20dB)

## AZIMUTH PATTERN Horizontal Polarization

Proposal No. **C-70563**  
 Date **29-Mar-17**  
 Call Letters **WISC**  
 Channel **11**  
 Frequency **201 MHz**  
 Antenna Type **THV-9A11/CP-R O4**  
 Gain **1.01 (0.04dB)**  
 Calculated  
 Circularity **+/- 1.0 dB**

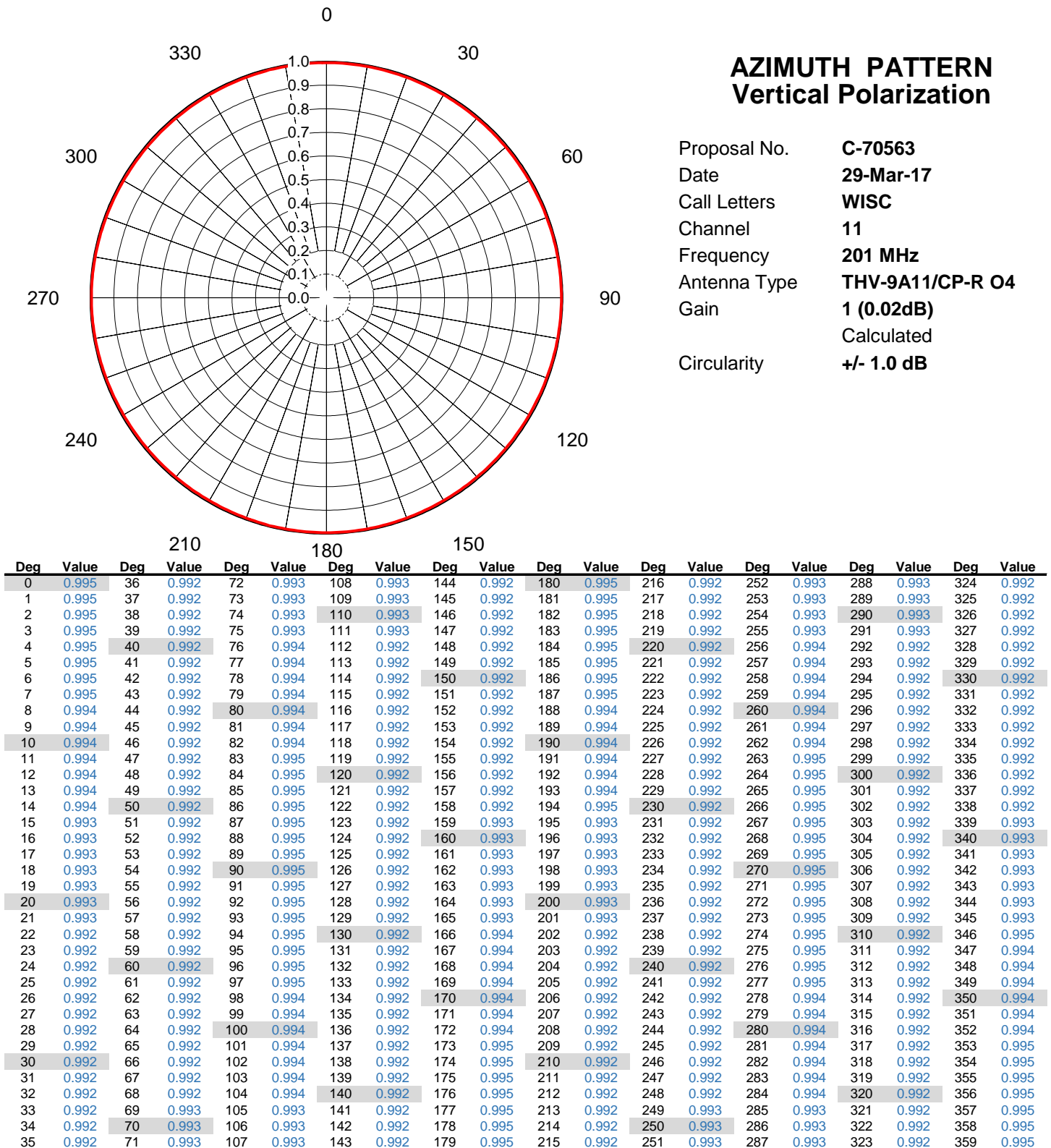


Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	1.000	36	0.991	72	0.996	108	0.996	144	0.991	180	1.000	216	0.991	252	0.996	288	0.996	324	0.991
1	1.000	37	0.991	73	0.997	109	0.996	145	0.991	181	1.000	217	0.991	253	0.997	289	0.996	325	0.991
2	1.000	38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

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## AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-70563**  
 Date **29-Mar-17**  
 Call Letters **WISC**  
 Channel **11**  
 Frequency **201 MHz**  
 Antenna Type **THV-9A11/CP-R O4**  
 Gain **1 (0.02dB)**  
 Calculated  
 Circularity **+/- 1.0 dB**



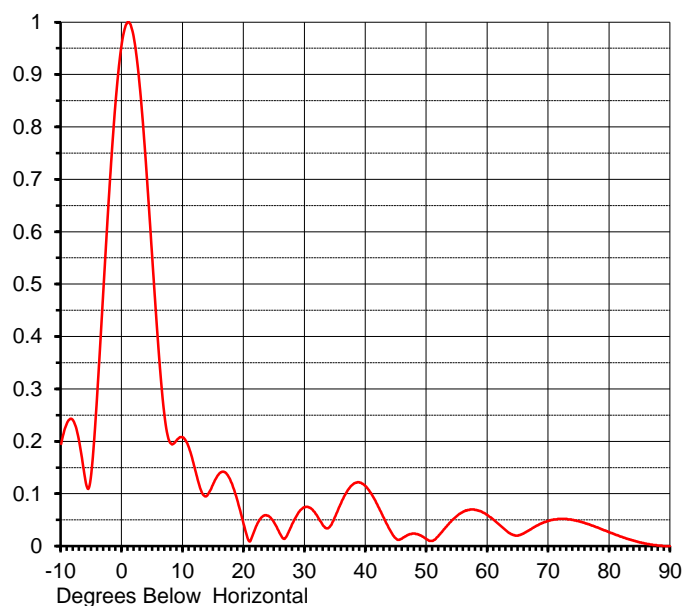
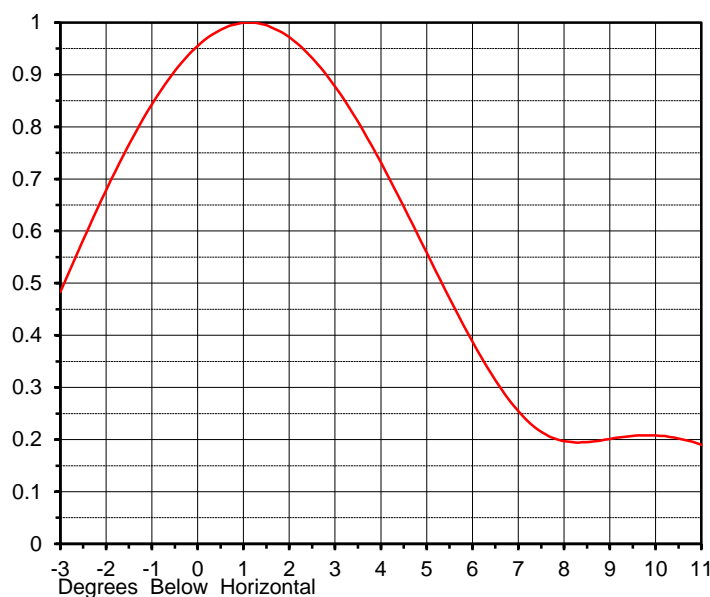
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## ELEVATION PATTERN

Proposal No. **C-70563**  
 Date **29-Mar-17**  
 Call Letters **WISC**  
 Channel **11**  
 Frequency **201 MHz**  
 Antenna Type **THV-9A11/CP-R O4**

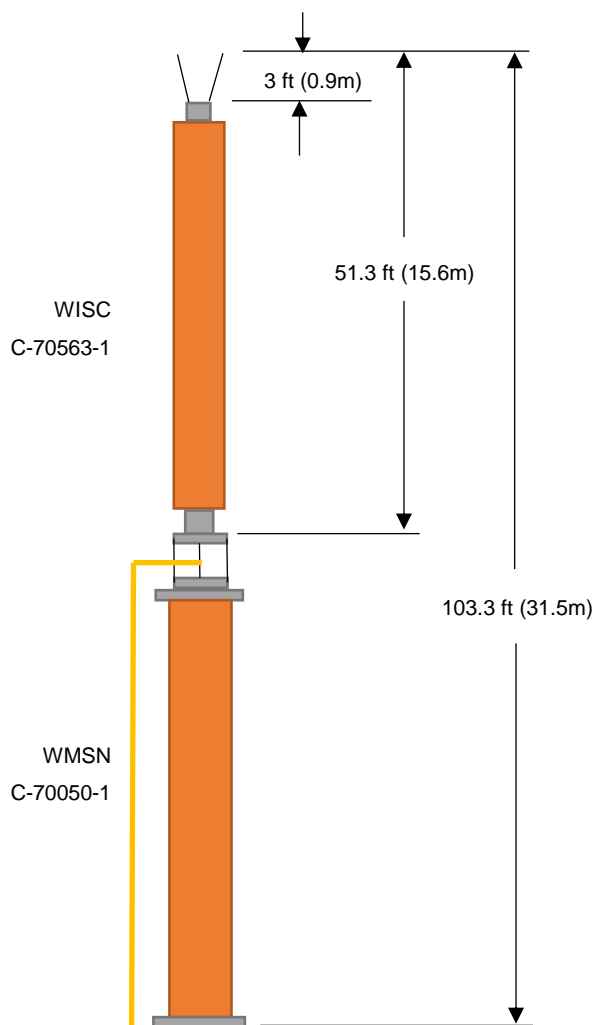
RMS Directivity at Main Lobe **9.0 ( 9.54 dB )**  
 RMS Directivity at Horizontal **8.3 ( 9.19 dB )**  
**Calculated**

Beam Tilt **1.00 deg**  
 Pattern Number **09V090100**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.195	10.0	0.207	30.0	0.074	50.0	0.013	70.0	0.048
-9.0	0.236	11.0	0.187	31.0	0.072	51.0	0.010	71.0	0.051
-8.0	0.239	12.0	0.145	32.0	0.058	52.0	0.021	72.0	0.052
-7.0	0.197	13.0	0.105	33.0	0.039	53.0	0.034	73.0	0.052
-6.0	0.124	14.0	0.097	34.0	0.036	54.0	0.047	74.0	0.050
-5.0	0.145	15.0	0.120	35.0	0.057	55.0	0.058	75.0	0.047
-4.0	0.306	16.0	0.139	36.0	0.084	56.0	0.066	76.0	0.044
-3.0	0.503	17.0	0.140	37.0	0.106	57.0	0.069	77.0	0.040
-2.0	0.697	18.0	0.120	38.0	0.119	58.0	0.069	78.0	0.036
-1.0	0.857	19.0	0.084	39.0	0.121	59.0	0.066	79.0	0.031
0.0	0.963	20.0	0.040	40.0	0.114	60.0	0.059	80.0	0.026
1.0	1.000	21.0	0.009	41.0	0.098	61.0	0.050	81.0	0.022
2.0	0.965	22.0	0.038	42.0	0.076	62.0	0.040	82.0	0.018
3.0	0.865	23.0	0.056	43.0	0.053	63.0	0.030	83.0	0.014
4.0	0.715	24.0	0.058	44.0	0.030	64.0	0.022	84.0	0.010
5.0	0.541	25.0	0.044	45.0	0.014	65.0	0.020	85.0	0.007
6.0	0.372	26.0	0.022	46.0	0.015	66.0	0.025	86.0	0.005
7.0	0.245	27.0	0.019	47.0	0.022	67.0	0.032	87.0	0.003
8.0	0.196	28.0	0.044	48.0	0.024	68.0	0.039	88.0	0.001
9.0	0.203	29.0	0.065	49.0	0.020	69.0	0.044	89.0	0.000
								90.0	0.000

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## MECHANICAL SPECIFICATIONS

Proposal No. **C-70563**  
 Date **29-Mar-17**  
 Call Letters **WISC**  
 Channel **11**  
 Frequency **201 MHz**  
 Antenna Type **THV-9A11/CP-R 04**

### Preliminary Specifications

#### Top of Stack

##### With ice TIA-222-G

Height AGL(z) 1335.3 ft (407 m)  
 Basic Wind Speed 90 m/h (144.8 km/h)

Structure Class II  
 Exposure Category C  
 Topography Category 1

#### See C-70050-1 for Full Stack Loads

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 with Lightning Protector	H4	51.3 ft (15.6m)	
Height less Lightning Protector	H2	48.3 ft (14.7m)	
Height of Center of Radiation	H3	24.15 ft (7.4m)	
Effective Projected Area	(EPA) <sub>S</sub>	63.5 ft <sup>2</sup> (5.9m <sup>2</sup> )	154.8 ft <sup>2</sup> (14.4m <sup>2</sup> )
Moment Arm	D1	25.5 ft (7.8m)	26.5 ft (8.1m)

Weight W 6650 lb (3t) 10800 lb (4.9t)

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

Prepared by:

Date: 29-Mar-17

ME:

*RS*

EE:

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## Summary

Proposal No.	<b>C-70563</b>
Date	<b>29-Mar-17</b>
Call Letters	<b>WISC</b>
Channel	<b>11</b>
Frequency	<b>201 MHz</b>
Antenna Type	<b>THV-9A11/CP-R O4</b>

## Antenna

	Hpol	Vpol
ERP:	<b>10.2 kW ( 10.09 dBk )</b>	<b>10.2 kW ( 10.09 dBk )</b>
RMS Gain*	4.50 ( 6.53 dB )	4.50 ( 6.53 dB )

<b>Antenna Input Power</b>	<b>2.3 kW ( 3.56 dBk )</b>
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## Transmission Line

Type:	<b>Rigid</b>	Attenuation:	<b>( 2.03 dB )</b>
Size:	<b>3-1/8"</b>	Efficiency:	<b>62.6%</b>
Impedance:	<b>50 Ohm</b>		
Length:	<b>1450 ft</b>	<b>442.0 m</b>	

## Transmitter Output

<b>3.6 kW ( 5.59 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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