

ENGINEERING STATEMENT RE  
APPLICATION IN SUPPORT OF MODIFICATION OF  
CONSTRUCTION PERMIT (FCC FILE NO. 0000027905)  
FOR REPACKED FACILITIES PURSUANT TO DA 17-314  
**WVIR-TV, CHARLOTTESVILLE, VIRGINIA**  
CHANNEL 2 10 KW ERP MAX 367.9 METERS HAAT

SEPTEMBER 2017

COHEN, DIPPELL AND EVERIST, P.C.  
CONSULTING ENGINEERS  
RADIO AND TELEVISION  
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington            )  
                                          ) ss  
District of Columbia         )

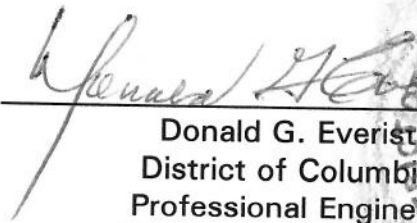
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1420 N Street, N.W., Suite One, Washington, D.C. 20005;

That his qualifications are a matter of record in the Federal Communications Commission;

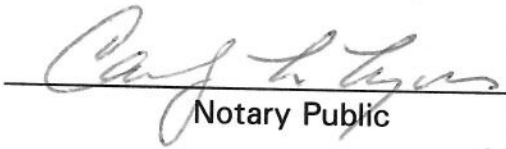
That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

  
\_\_\_\_\_  
Donald G. Everist  
District of Columbia  
Professional Engineer  
Registration No. 5714

Subscribed and sworn to before me this 15<sup>th</sup> day of September, 2017.



  
\_\_\_\_\_  
Notary Public

My Commission Expires: 2/28/2018

This engineering statement has been prepared on behalf of Virginia Broadcasting Corporation, licensee of TV Station WVIR-TV, Charlottesville, Virginia, in support of its application for modification of construction permit (FCC File No. 0000027905) to operate on Channel 2 as authorized by the Incentive Auction for repacked facilities pursuant to DA 17-314 and the First Priority Window.

Station WVIR-TV is currently licensed to operate on Channel 32 (578-584 MHz) for its digital TV operation with 1000 kW maximum effective radiated power ("ERP") at 367.9 meters height above average terrain ("HAAT").

#### Antenna Site

It is proposed to top-mount the Channel 2 DTV antenna on the existing WVIR-DT self-supporting tower (see Exhibit E-1). The tower registration is 1243302.

The WVIR-TV antenna site is located on the Carters Mountain Orchard, east of Route 20, approximately 5.6 km (3.5 miles) south of Charlottesville, Virginia.

The geographic coordinates of the existing tower are as follows:

North Latitude: 37° 59' 02"

West Longitude: 78° 28' 53"

NAD-27

North Latitude: 37° 59' 03"

West Longitude: 78° 28' 52"

NAD-83

Equipment Data

Antenna: Dielectric, Model No. TDM-3A2 or equivalent with 1.0 degree electrical beam tilt. The vertical plane pattern and other exhibits required by Section 73.625(c) are herein included as Exhibits E-2

Transmission Line: 91.4 meters (300 ft) of Dielectric, Type EIA/DCA, 6-1/8" 75 ohm or equivalent with total loss of 0.10 dB

Elevation Data

Elevation of the site above mean sea level	448.4 meters (1471 feet)
Elevation of the top of structure including antenna above ground	95.7 meters (314 feet)
Elevation of the top of supporting structure above mean sea level	544 meters (1784.8 feet)
Height of DTV antenna radiation center above ground	87.3 meters (286.5 feet)
Height of DTV antenna radiation center above mean sea level	535.7 meters (1757.5 feet)
Height of DTV antenna radiation center above average terrain	367.9 meters (1207 feet)

Topographic Data

The average HAAT from the eight cardinal radials from 3.2 to 16.1 kilometers have been previously determined.

### Contour Data

Utilizing the formula in Section 73.625(b)(2) for the effective heights along each radial, the depression angle  $A_h$ , for each azimuth has been calculated. The maximum radiation value has been used to calculate the ERP where the vertical radiation pattern field value at these angles is greater than 90% of the maximum.

Table I provides the distances calculated by TVStudy 2.2 along each radial spaced every ten degrees in azimuth to the predicted F(50,90) 35 dBu and 28 dBu F(50,90) contours, the effective radiated power and the effective antenna heights. The predicted 35 dBu and 28 dBu contours determined from these distances are shown on the attached map (Exhibit E-3).

Exhibit E-4 reflects the proposed coverage contour.

The distances along each radial to the limits of F(50,90) 35 dBu and 28 dBu F(50,90) contours were determined from reference to the appropriate propagation data for Channels 2-6, as published by the Commission in Section 73.699 of its rules.

### Environmental Statement

The proposed WVIR-TV antenna will replace the current Channel 32 antenna and will be top-mounted on the existing self-supporting tower.

An evaluation has been made to determine compliance with the Commission's specified standards for human exposure to RF fields as set forth in the OET Bulletin No. 65 dated August 1997. For a maximum effective radiated power of 10 kW and a radiation center of 87.3 meters above ground level, the proposed DTV operation would have a maximum of 4.42 microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ) radio frequency field levels ("RFF") at 2 meters above the base of the

tower, based on an antenna field factor of 0.150 in the downward direction 50 to 90 degrees (see Exhibit E-2). The Commission's guidelines for Channel 2 TV operation are  $1000 \mu\text{W}/\text{cm}^2$  for the occupational/controlled and  $200 \mu\text{W}/\text{cm}^2$  for the general population/ uncontrolled environment.

There are multiple emitters utilizing the Carter's Mountain antenna farm. However, those television operations within 100 meters will be changing their facilities due to the repack therefore, the RFF study will not consider those stations and addresses only WVIR-TV.

The RFF contribution by WVIR-TV will be calculated using the following formula:

$$S = \frac{33.4(F^2) \text{ Total ERP}}{R^2}$$

where:

S = power density in  $\mu\text{W}/\text{cm}^2$

F = relative field factor

Total ERP = ERP Horizontal Polarization + ERP Vertical Polarization

R = RCAGL - 2 meters

ERP = RMS ERP in watts for DTV Stations

**WVIR-TV DTV Facility** (based on the numbers in this application)

Channel 2	Freq:	56 + 62 MHz Range
	ERP =	20 kW (H&V)
	Polarization =	Circular
	RCAGL -2 meters =	85.95 meters

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$$

Total ERP = 10940 watts (Circular)  
R = 85.3 meters  
F = 0.150 (from elevation data)

$$S = < 4.42 \mu\text{W}/\text{cm}^2 \text{ (2 meters above ground)}$$

Therefore, WVIR-TV contributes less than  $4.42 \mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for an uncontrolled environment (general population) for this frequency is 200  $\mu\text{W}/\text{cm}^2$ .

WVIR-TV contributes less than three percent RFF level for an uncontrolled environment (general population) two meters above the ground.

Therefore, the RFF percentage will be less than three percent of the limit for an uncontrolled environment at two meters above ground. Based on this analysis, RFF levels will not exceed current FCC guidelines.

Therefore, members of the public and personnel working around the proposed WVIR-DT, Channel 2 DTV facility would not be exposed to RFF exceeding the Commission's guidelines. With respect to work performed on the tower, Station WVIR-TV will establish procedure to ensure that workers are not exposed to RFF levels above the Commission's guidelines, by reducing or turning off the power, as appropriate.

FCC Rule, Section 1.1307

An environmental assessment ("EA") is categorically excluded under Section 1.1306 of the FCC Rules and Regulations because the tower structure is existing and will not be modified so as to invoke the need for environmental analysis. The existing tower is registered with the FCC, and approved by the FAA, and neither the ASR nor FAA approval will require modification. It was not constructed during 2001-2005 and thus is not a "twilight tower."

While some structural reinforcement of the tower will be required to support additional weight, there will be no material change in visual appearance, since one antenna is being substituted

for another with no increase in overall structure height, including the height of the top-mounted antenna.

Compliance with OET Bulletin No. 65 (non-ionizing radiation) is discussed in the previous section of this exhibit.



ABOVE MEAN SEA LEVEL

ABOVE GROUND

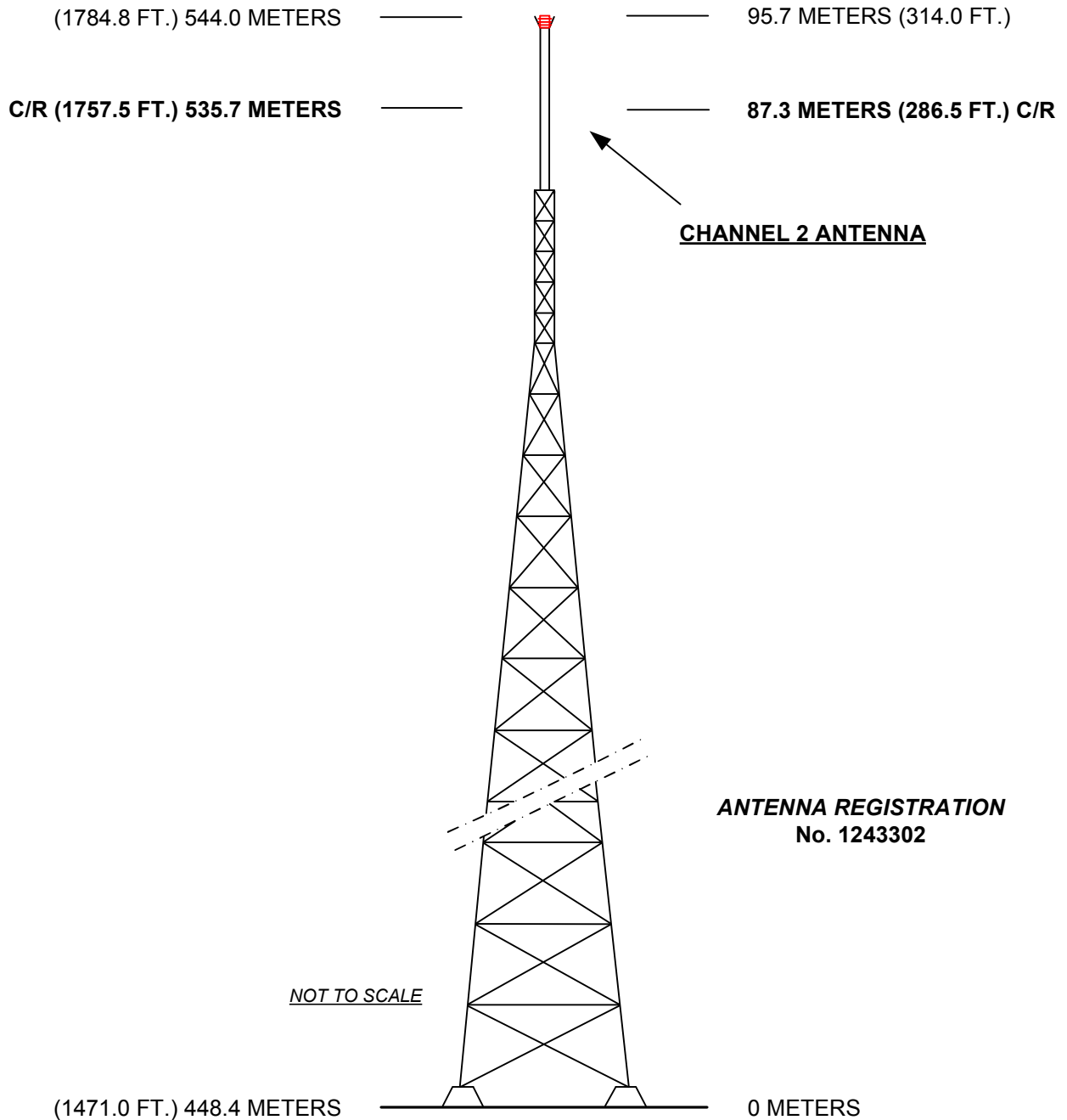


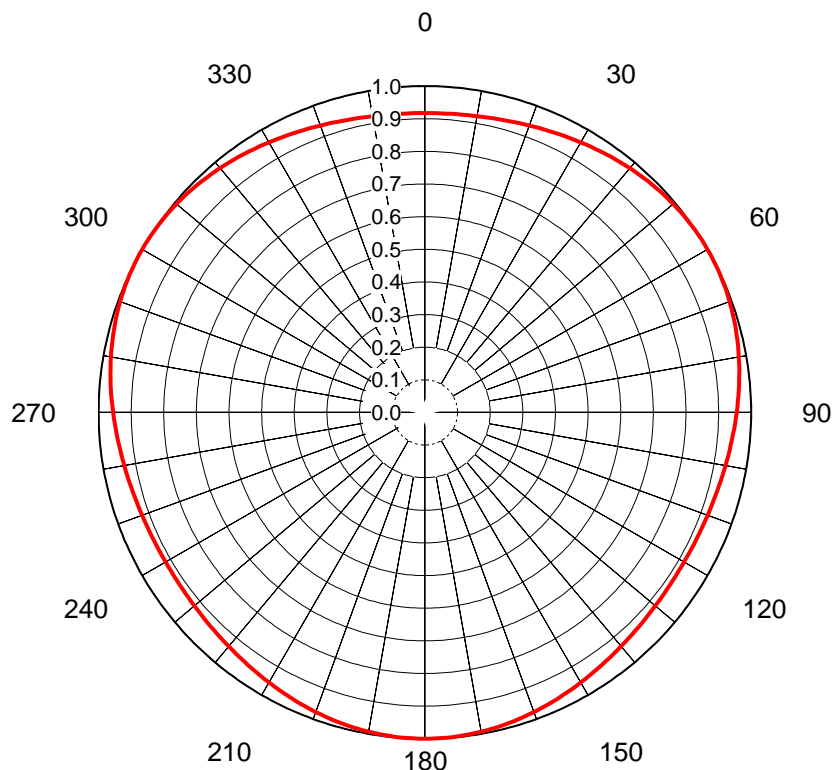
EXHIBIT E-1  
VERTICAL SKETCH  
FOR THE PROPOSED OPERATION OF  
**WVIR-TV, CHARLOTTESVILLE, VIRGINIA**  
CHANNEL 2 10 kW 367.9 METERS HAAT  
SEPTEMBER 2017

EXHIBIT E-2

ANTENNA MANUFACTURER DATA

## AZIMUTH PATTERN Horizontal Polarization

Proposal No. **C-70741**  
 Date **24-May-17**  
 Call Letters **WVIR**  
 Channel **2**  
 Frequency **57 MHz**  
 Antenna Type **TDM-3A2**  
 Gain **1.09 (0.38dB)**  
 Calculated  
 Circularity **+/- 1.0 dB**

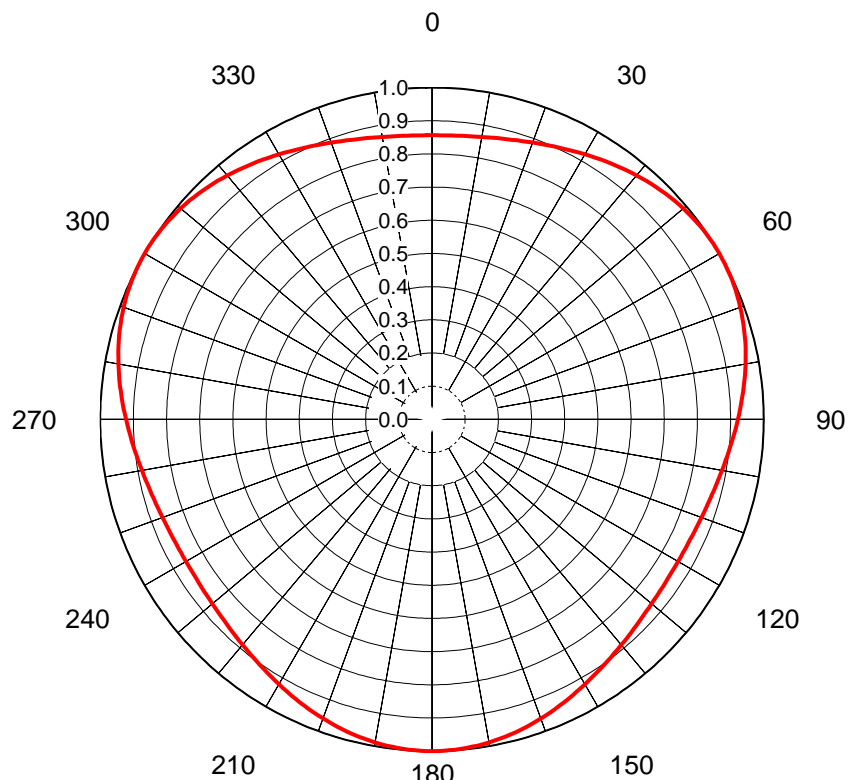


Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.917	36	0.969	72	0.991	108	0.924	144	0.943	180	1.000	216	0.943	252	0.924	288	0.991	324	0.969
1	0.917	37	0.971	73	0.990	109	0.923	145	0.945	181	1.000	217	0.941	253	0.925	289	0.992	325	0.967
2	0.918	38	0.973	74	0.988	110	0.922	146	0.947	182	1.000	218	0.939	254	0.927	290	0.994	326	0.964
3	0.918	39	0.975	75	0.986	111	0.921	147	0.949	183	0.999	219	0.937	255	0.928	291	0.995	327	0.962
4	0.918	40	0.977	76	0.985	112	0.920	148	0.951	184	0.999	220	0.936	256	0.929	292	0.996	328	0.960
5	0.919	41	0.979	77	0.983	113	0.920	149	0.953	185	0.998	221	0.934	257	0.931	293	0.997	329	0.958
6	0.919	42	0.981	78	0.981	114	0.919	150	0.956	186	0.998	222	0.932	258	0.932	294	0.998	330	0.956
7	0.920	43	0.983	79	0.979	115	0.919	151	0.958	187	0.997	223	0.931	259	0.934	295	0.998	331	0.953
8	0.920	44	0.985	80	0.977	116	0.918	152	0.960	188	0.996	224	0.929	260	0.936	296	0.999	332	0.951
9	0.921	45	0.986	81	0.975	117	0.918	153	0.962	189	0.995	225	0.928	261	0.937	297	0.999	333	0.949
10	0.922	46	0.988	82	0.973	118	0.918	154	0.964	190	0.994	226	0.927	262	0.939	298	1.000	334	0.947
11	0.923	47	0.990	83	0.971	119	0.917	155	0.967	191	0.992	227	0.925	263	0.941	299	1.000	335	0.945
12	0.924	48	0.991	84	0.969	120	0.917	156	0.969	192	0.991	228	0.924	264	0.943	300	1.000	336	0.943
13	0.925	49	0.992	85	0.967	121	0.917	157	0.971	193	0.990	229	0.923	265	0.945	301	1.000	337	0.941
14	0.927	50	0.994	86	0.964	122	0.918	158	0.973	194	0.988	230	0.922	266	0.947	302	1.000	338	0.939
15	0.928	51	0.995	87	0.962	123	0.918	159	0.975	195	0.986	231	0.921	267	0.949	303	0.999	339	0.937
16	0.929	52	0.996	88	0.960	124	0.918	160	0.977	196	0.985	232	0.920	268	0.951	304	0.999	340	0.936
17	0.931	53	0.997	89	0.958	125	0.919	161	0.979	197	0.983	233	0.920	269	0.953	305	0.998	341	0.934
18	0.932	54	0.998	90	0.956	126	0.919	162	0.981	198	0.981	234	0.919	270	0.956	306	0.998	342	0.932
19	0.934	55	0.998	91	0.953	127	0.920	163	0.983	199	0.979	235	0.919	271	0.958	307	0.997	343	0.931
20	0.936	56	0.999	92	0.951	128	0.920	164	0.985	200	0.977	236	0.918	272	0.960	308	0.996	344	0.929
21	0.937	57	0.999	93	0.949	129	0.921	165	0.986	201	0.975	237	0.918	273	0.962	309	0.995	345	0.928
22	0.939	58	1.000	94	0.947	130	0.922	166	0.988	202	0.973	238	0.918	274	0.964	310	0.994	346	0.927
23	0.941	59	1.000	95	0.945	131	0.923	167	0.990	203	0.971	239	0.917	275	0.967	311	0.992	347	0.925
24	0.943	60	1.000	96	0.943	132	0.924	168	0.991	204	0.969	240	0.917	276	0.969	312	0.991	348	0.924
25	0.945	61	1.000	97	0.941	133	0.925	169	0.992	205	0.967	241	0.917	277	0.971	313	0.990	349	0.923
26	0.947	62	1.000	98	0.939	134	0.927	170	0.994	206	0.964	242	0.918	278	0.973	314	0.988	350	0.922
27	0.949	63	0.999	99	0.937	135	0.928	171	0.995	207	0.962	243	0.918	279	0.975	315	0.986	351	0.921
28	0.951	64	0.999	100	0.936	136	0.929	172	0.996	208	0.960	244	0.918	280	0.977	316	0.985	352	0.920
29	0.953	65	0.998	101	0.934	137	0.931	173	0.997	209	0.958	245	0.919	281	0.979	317	0.983	353	0.920
30	0.956	66	0.998	102	0.932	138	0.932	174	0.998	210	0.956	246	0.919	282	0.981	318	0.981	354	0.919
31	0.958	67	0.997	103	0.931	139	0.934	175	0.998	211	0.953	247	0.920	283	0.983	319	0.979	355	0.919
32	0.960	68	0.996	104	0.929	140	0.936	176	0.999	212	0.951	248	0.920	284	0.985	320	0.977	356	0.918
33	0.962	69	0.995	105	0.928	141	0.937	177	0.999	213	0.949	249	0.921	285	0.986	321	0.975	357	0.918
34	0.964	70	0.994	106	0.927	142	0.939	178	1.000	214	0.947	250	0.922	286	0.988	322	0.973	358	0.918
35	0.967	71	0.992	107	0.925	143	0.941	179	1.000	215	0.945	251	0.923	287	0.990	323	0.971	359	0.917

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## AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-70741**  
 Date **24-May-17**  
 Call Letters **WVIR**  
 Channel **2**  
 Frequency **57 MHz**  
 Antenna Type **TDM-3A2**  
 Gain **1.16 (0.66dB)**  
 Circularity **+/- 1.0 dB**



Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.856	36	0.945	72	0.984	108	0.868	144	0.900	180	1.000	216	0.900	252	0.868	288	0.984
1	0.857	37	0.949	73	0.982	109	0.866	145	0.904	181	1.000	217	0.897	253	0.870	289	0.987
2	0.857	38	0.953	74	0.979	110	0.864	146	0.907	182	0.999	218	0.894	254	0.872	290	0.989
3	0.857	39	0.956	75	0.976	111	0.863	147	0.911	183	0.999	219	0.891	255	0.874	291	0.991
4	0.858	40	0.960	76	0.973	112	0.862	148	0.915	184	0.998	220	0.888	256	0.877	292	0.993
5	0.858	41	0.963	77	0.970	113	0.860	149	0.918	185	0.997	221	0.885	257	0.879	293	0.994
6	0.859	42	0.967	78	0.967	114	0.859	150	0.922	186	0.996	222	0.882	258	0.882	294	0.996
7	0.860	43	0.970	79	0.963	115	0.858	151	0.926	187	0.994	223	0.879	259	0.885	295	0.997
8	0.862	44	0.973	80	0.960	116	0.858	152	0.930	188	0.993	224	0.877	260	0.888	296	0.998
9	0.863	45	0.976	81	0.956	117	0.857	153	0.934	189	0.991	225	0.874	261	0.891	297	0.999
10	0.864	46	0.979	82	0.953	118	0.857	154	0.937	190	0.989	226	0.872	262	0.894	298	0.999
11	0.866	47	0.982	83	0.949	119	0.857	155	0.941	191	0.987	227	0.870	263	0.897	299	1.000
12	0.868	48	0.984	84	0.945	120	0.856	156	0.945	192	0.984	228	0.868	264	0.900	300	1.000
13	0.870	49	0.987	85	0.941	121	0.857	157	0.949	193	0.982	229	0.866	265	0.904	301	1.000
14	0.872	50	0.989	86	0.937	122	0.857	158	0.953	194	0.979	230	0.864	266	0.907	302	0.999
15	0.874	51	0.991	87	0.934	123	0.857	159	0.956	195	0.976	231	0.863	267	0.911	303	0.999
16	0.877	52	0.993	88	0.930	124	0.858	160	0.960	196	0.973	232	0.862	268	0.915	304	0.998
17	0.879	53	0.994	89	0.926	125	0.858	161	0.963	197	0.970	233	0.860	269	0.918	305	0.997
18	0.882	54	0.996	90	0.922	126	0.859	162	0.967	198	0.967	234	0.859	270	0.922	306	0.996
19	0.885	55	0.997	91	0.918	127	0.860	163	0.970	199	0.963	235	0.858	271	0.926	307	0.994
20	0.888	56	0.998	92	0.915	128	0.862	164	0.973	200	0.960	236	0.858	272	0.930	308	0.993
21	0.891	57	0.999	93	0.911	129	0.863	165	0.976	201	0.956	237	0.857	273	0.934	309	0.991
22	0.894	58	0.999	94	0.907	130	0.864	166	0.979	202	0.953	238	0.857	274	0.937	310	0.989
23	0.897	59	1.000	95	0.904	131	0.866	167	0.982	203	0.949	239	0.857	275	0.941	311	0.987
24	0.900	60	1.000	96	0.900	132	0.868	168	0.984	204	0.945	240	0.856	276	0.945	312	0.984
25	0.904	61	1.000	97	0.897	133	0.870	169	0.987	205	0.941	241	0.857	277	0.949	313	0.982
26	0.907	62	0.999	98	0.894	134	0.872	170	0.989	206	0.937	242	0.857	278	0.953	314	0.979
27	0.911	63	0.999	99	0.891	135	0.874	171	0.991	207	0.934	243	0.857	279	0.956	315	0.976
28	0.915	64	0.998	100	0.888	136	0.877	172	0.993	208	0.930	244	0.858	280	0.960	316	0.973
29	0.918	65	0.997	101	0.885	137	0.879	173	0.994	209	0.926	245	0.858	281	0.963	317	0.970
30	0.922	66	0.996	102	0.882	138	0.882	174	0.996	210	0.922	246	0.859	282	0.967	318	0.967
31	0.926	67	0.994	103	0.879	139	0.885	175	0.997	211	0.918	247	0.860	283	0.970	319	0.963
32	0.930	68	0.993	104	0.877	140	0.888	176	0.998	212	0.915	248	0.862	284	0.973	320	0.960
33	0.934	69	0.991	105	0.874	141	0.891	177	0.999	213	0.911	249	0.863	285	0.976	321	0.956
34	0.937	70	0.989	106	0.872	142	0.894	178	0.999	214	0.907	250	0.864	286	0.979	322	0.953
35	0.941	71	0.987	107	0.870	143	0.897	179	1.000	215	0.904	251	0.866	287	0.982	323	0.949

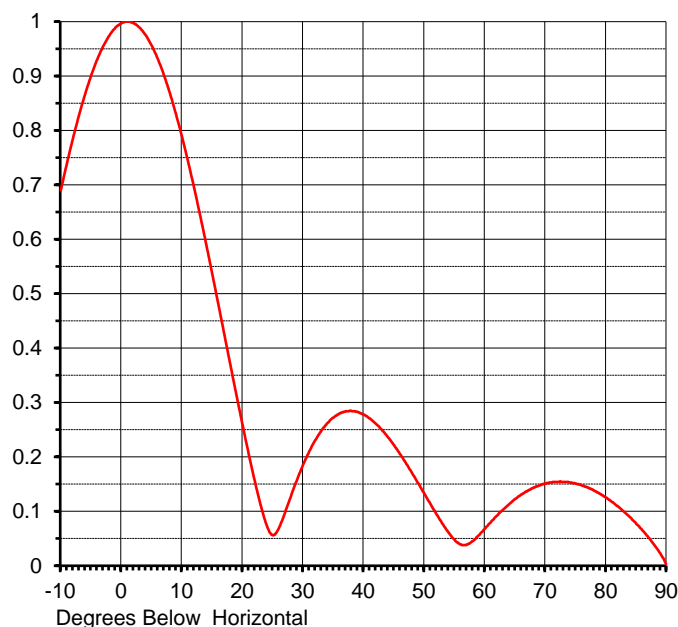
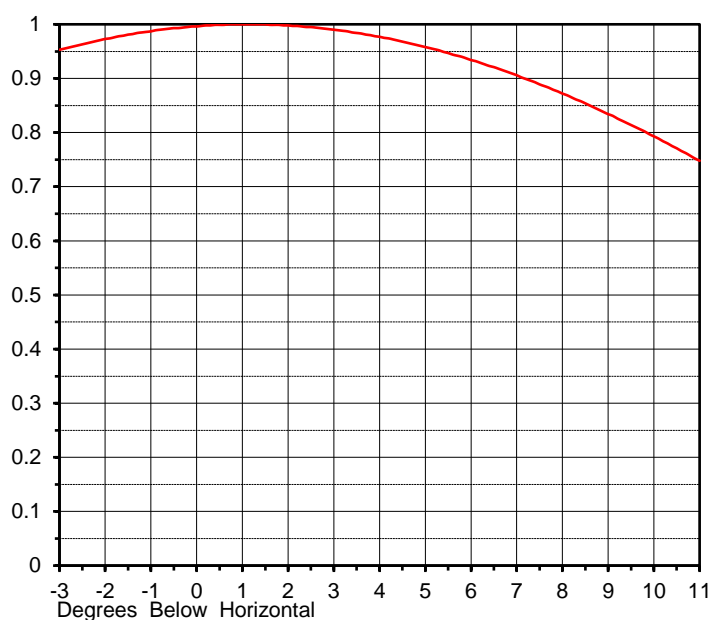
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## ELEVATION PATTERN

Proposal No. **C-70741**  
 Date **24-May-17**  
 Call Letters **WVIR**  
 Channel **2**  
 Frequency **57 MHz**  
 Antenna Type **TDM-3A2**

RMS Directivity at Main Lobe **2.9 ( 4.62 dB )**  
 RMS Directivity at Horizontal **2.9 ( 4.62 dB )**  
**Calculated**

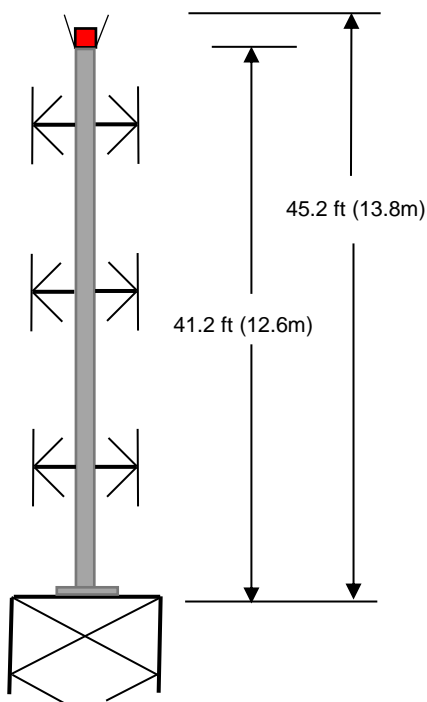
Beam Tilt **1.00 deg**  
 Pattern Number **03D028100**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.690	10.0	0.789	30.0	0.186	50.0	0.133	70.0	0.151
-9.0	0.739	11.0	0.743	31.0	0.210	51.0	0.114	71.0	0.153
-8.0	0.785	12.0	0.695	32.0	0.231	52.0	0.095	72.0	0.154
-7.0	0.828	13.0	0.644	33.0	0.248	53.0	0.077	73.0	0.154
-6.0	0.866	14.0	0.591	34.0	0.262	54.0	0.061	74.0	0.153
-5.0	0.901	15.0	0.536	35.0	0.272	55.0	0.048	75.0	0.151
-4.0	0.930	16.0	0.481	36.0	0.280	56.0	0.039	76.0	0.148
-3.0	0.955	17.0	0.425	37.0	0.284	57.0	0.039	77.0	0.144
-2.0	0.974	18.0	0.369	38.0	0.284	58.0	0.045	78.0	0.138
-1.0	0.989	19.0	0.313	39.0	0.283	59.0	0.056	79.0	0.132
0.0	0.997	20.0	0.259	40.0	0.278	60.0	0.068	80.0	0.125
1.0	1.000	21.0	0.206	41.0	0.271	61.0	0.080	81.0	0.117
2.0	0.997	22.0	0.157	42.0	0.261	62.0	0.092	82.0	0.109
3.0	0.989	23.0	0.111	43.0	0.250	63.0	0.103	83.0	0.099
4.0	0.975	24.0	0.074	44.0	0.236	64.0	0.113	84.0	0.089
5.0	0.956	25.0	0.056	45.0	0.222	65.0	0.123	85.0	0.077
6.0	0.932	26.0	0.069	46.0	0.205	66.0	0.131	86.0	0.065
7.0	0.902	27.0	0.097	47.0	0.188	67.0	0.137	87.0	0.052
8.0	0.869	28.0	0.128	48.0	0.170	68.0	0.143	88.0	0.038
9.0	0.831	29.0	0.158	49.0	0.152	69.0	0.148	89.0	0.022
								90.0	0.000

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## MECHANICAL SPECIFICATIONS



Proposal No. **C-70741**  
 Date **24-May-17**  
 Call Letters **WVIR**  
 Channel **2**  
 Frequency **57 MHz**  
 Antenna Type **TDM-3A2**

### Preliminary Specifications

#### Top Mounted

#### With ice TIA/EIA-222-F

Height AGL 250 ft (76.2 m)  
 Basic Wind Speed 70 m/h (112.7 km/h)

Design Ice 0.75 in (1.9 cm)  
 Wind Speed w/Ice 30 m/h ( km/hr)

#### Mechanical Specifications

		without ice	with ice
Height with Lightning Protector	H4	45.2 ft (13.8m)	
Height less Lightning Protector	H2	41.2 ft (12.6m)	
Height of Center of Radiation	H3	21.2 ft (6.5m)	
Force Coeff. x Projected Area	CaAc	ft <sup>2</sup> ( m <sup>2</sup> )	ft <sup>2</sup> ( m <sup>2</sup> )
Moment Arm	D1	ft ( m)	ft ( m)

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

Prepared by: JBC

Date: 24-May-17

ME:

EE:

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