

ENGINEERING EXHIBIT
IN SUPPORT OF AN
APPLICATION FOR CONSTRUCTION PERMIT
FOR A MODIFIED STANDARD PATTERN
WWRC - WASHINGTON, DISTRICT OF COLUMBIA
1260 kHz - 35.0 kW DAY/5.0 kW NIGHT - DA-2
Facility ID: 8681

Applicant: Salem Media of Virginia, Inc.

July, 2013



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STATEMENT OF CYNTHIA M. JACOBSON, P.E.
IN SUPPORT OF AN
APPLICATION FOR CONSTRUCTION PERMIT
FOR A MODIFIED STANDARD PATTERN
WWRC - WASHINGTON, DISTRICT OF COLUMBIA
1260 kHz - 35.0 kW DAY/5.0 kW NIGHT - DA-2
Facility ID: 8681

Applicant: Salem Media of Virginia, Inc.

I am a Consulting Engineer, an employee in the firm of Carl T. Jones Corporation, with offices located in Springfield, Virginia.

My education and experience are a matter of record with the Federal Communications Commission. I am a Registered Professional Engineer in the Commonwealth of Virginia, Registration No. 027914.

This office has been authorized by Salem Media of Virginia, Inc. ("Salem") to prepare this engineering statement, Section III-A of FCC Form 301, and the associated figures in support of an Application for a Modification of a Construction Permit. Salem proposes a minor modification to the daytime directional antenna standard pattern by adding augmentations over two spans. Data provided in the simultaneously filed Application for License supports the proposed directional antenna pattern modifications. No other changes are proposed. No actual construction is proposed in the instant application.



WWRC is authorized¹ to operate on 1260 kHz with a power of 35.0 kW daytime and 5.0 kW nighttime. The daytime employs a two-tower directional array while the nighttime employs a three-tower directional antenna array (DA-2).

DIRECTIONAL ANTENNA PATTERN AUGMENTATION

During the antenna adjustment process, it was determined that the radiation on the 100 and 145 degree radial bearings could not be reduced below the standard modified pattern values authorized in the construction permit (FCC File No. BP-20120824AAY). The fact that the radiation could not be further reduced in these two non-monitored radials, without further distortion of the antenna pattern, is believed to be directly attributable to localized re-radiation. As a result, it is necessary to augment the daytime directional antenna pattern in the following manner:

<u>Central Azimuth (deg. T.)</u>	<u>Span (deg. T.)</u>	<u>Authorized Radiation (mV/m)</u>	<u>Proposed Radiation (mV/m)</u>
100	10	2214.0	2583.0
145	10	2538.8	3210.9

The horizontal plane modified standard pattern radiation had been calculated in accordance with the equations set forth in Section 73.150 and Section 73.152 of the FCC's Rules. A polar plot of the proposed daytime horizontal plane modified standard radiation

¹FCC File No. BP-20120824AAY.

pattern is contained in Figure 1. The daytime horizontal plane theoretical, standard and proposed modified standard pattern values are tabulated on Figure 2.

COMMUNITY COVERAGE

The proposed pattern augmentation will have no effect on the daytime service to the community of license as currently authorized.

DAYTIME ALLOCATION COVERAGE

The results of the daytime study are shown in the Figure 3, Sheets 1 & 2. Eight stations were considered in detail regarding the daytime allocation. These stations are:

WKDL	1250 kHz	Warrenton, Virginia;
WYYC	1250 kHz	York, Pennsylvania;
WFJS	1260 kHz	Trenton, New Jersey;
WCHV	1260 kHz	Charlottesville, Virginia;
WZBO	1260 kHz	Edenton, North Carolina;
WPHB	1260 kHz	Philipsburg, Pennsylvania;
WTJZ	1270 kHz	Newport News, Virginia; and
WCBC	1270 kHz	Cumberland, Maryland.

The distances to all groundwave contours were calibrated using the equivalent distance method. Contours were calculated at 5 degree intervals using ground conductivity values shown in the M-3 soil map with the exception of WWRC, WCHV, WPHB, WFJS,

and WKDL, where measurement data was employed. A tabulation of the measured ground conductivities employed are contained in Appendix A.

Tabulations of distances to groundwave contours and conductivity profiles are not included herein, but can be provided upon request.

Figure 3 depicts the daytime allocation study. Sheet 1 depicts the co-channel allocation picture while Sheet 2 depicts the first adjacent channel relationship. Second and third adjacent stations were located sufficiently far away and therefore not considered.

Co-channel Protection

As depicted in Figure 3, Sheet 1, no overlap of the 0.025 mV/m and the 0.5 mV/m contours will occur between proposed WWRC and the stations of WFJS, WCHV, WZBO, and WPHB.

First-adjacent Channel Protection

Figure 3, Sheet 2, shows that the proposed operation of WWRC will not have prohibited overlap with WYYC, WCBC, WTJZ, and WKDL.

In no case does the proposed augmentations result in prohibited overlap over land areas.

ENVIRONMENTAL CONSIDERATIONS

There are no physical modifications proposed to the authorized facility; therefore, the proposal is categorically excluded from environmental processing per Section 47 CFR 1.1306 of the Rules.

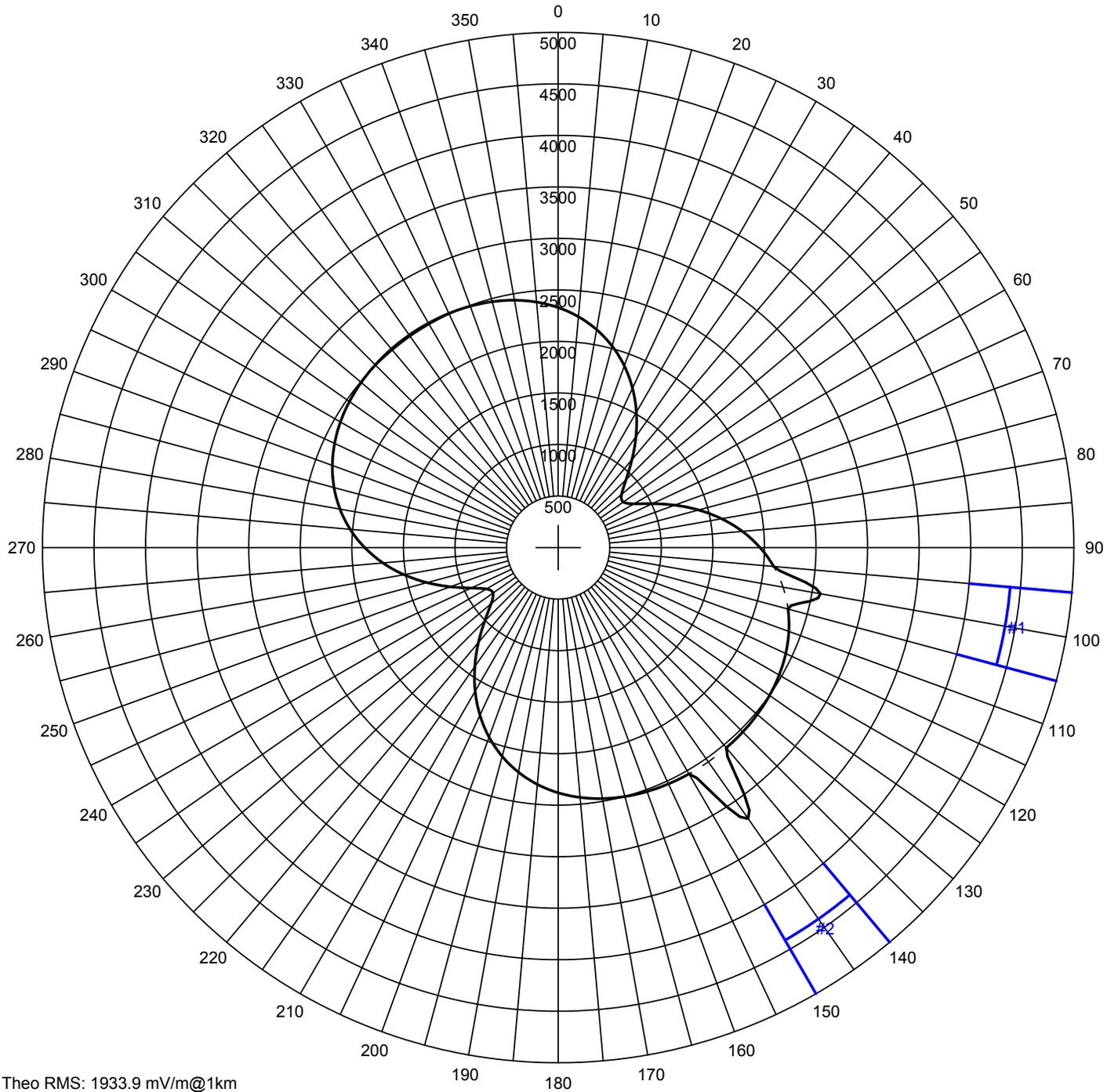
SUMMARY

It is submitted that this statement, FCC Form 301, Section III-A, and the attached figures comply with the Rules and Regulations of the Federal Communications Commission, that they were prepared by me or under my direct supervision and are believed to be true and correct.

DATED: July 18, 2013



Figure 1



Theo RMS: 1933.9 mV/m@1km
 Std RMS: 2031.6 mV/m@1km
 Aug RMS: 2050.7 mV/m@1km
 Q: 59.16 mV/m@1km

Modified Standard Horizontal Plane Pattern

— Aug Pattern (mV/m@1km)
 - - - Std Pattern (mV/m@1km)

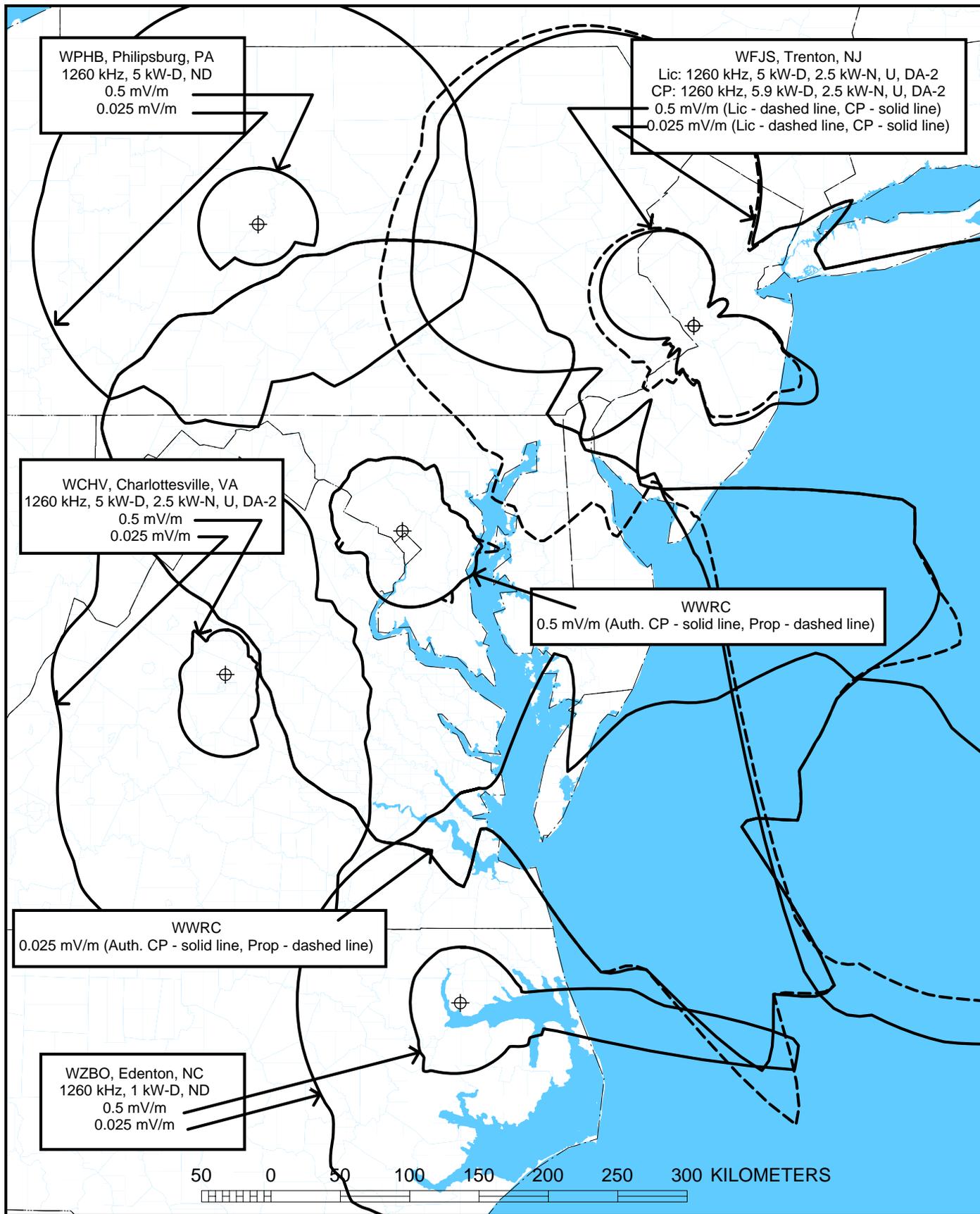
#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	#	Azimuth (deg)	Radiation (mV/m@1km)	Span (deg)	Site Coordinates:
1	1.000	0.0	0.0	0.0	90.0	0	1	100.00	2583.00	10.0	Lat: 38-59-59 N
2	0.540	-177.0	160.0	145.0	90.0	0	2	145.00	3210.90	10.0	Lng: 077-03-27 W

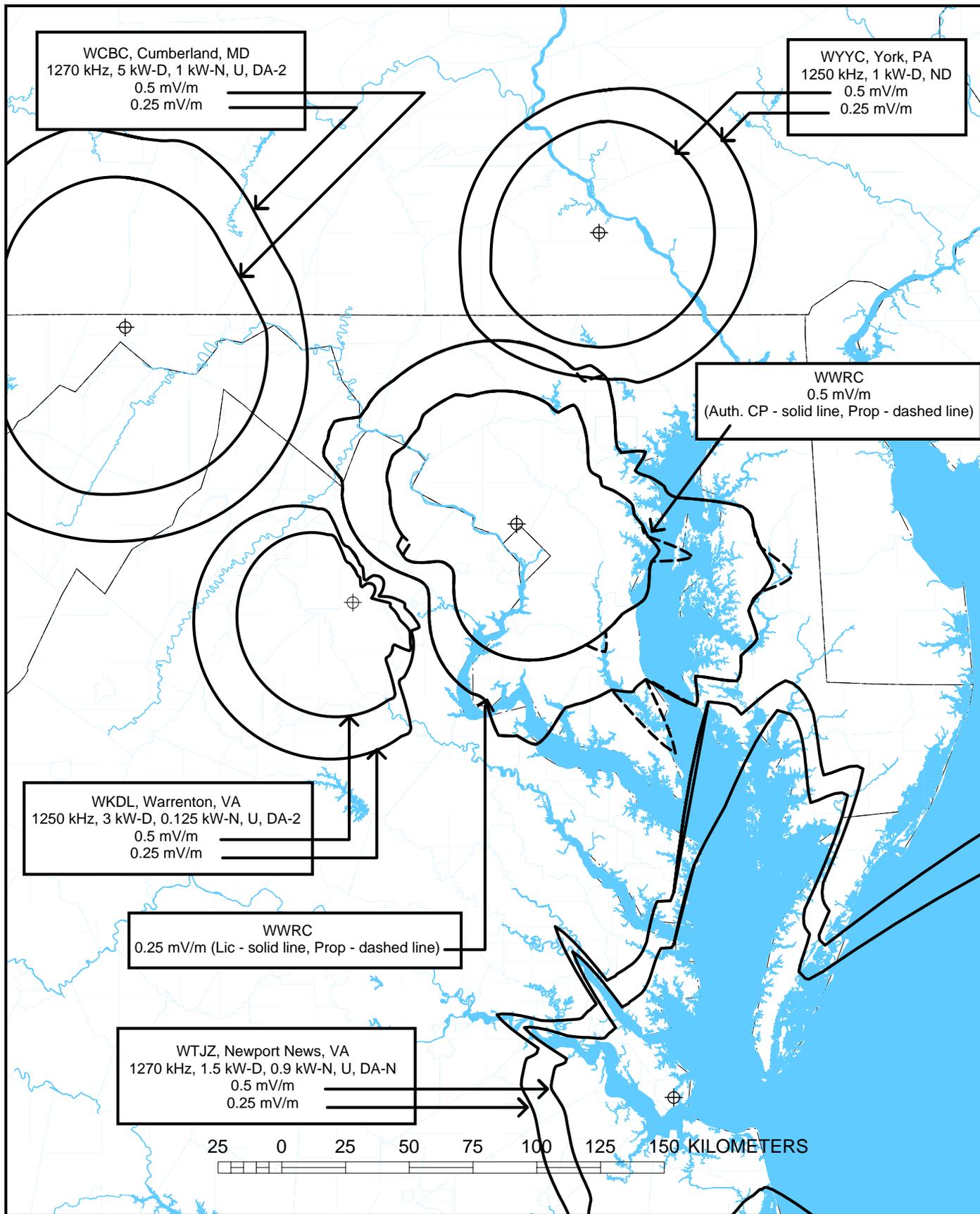
PROPOSED DAYTIME HORIZONTAL PLANE MODIFIED STANDARD RADIATION PATTERN
STATION WWRC - WASHINGTON, DC
1260 kHz - 35 kW-D, 5 kW-N, U, DA-2
JULY, 2013

**TABULATION OF PROPOSED DAYTIME HORIZONTAL
PLANE MODIFIED STANDARD RADIATION PATTERN
STATION WWRC - WASHINGTON, DC
1260 kHz - 35 kW-D, 5 kW-N, U, DA-2**

<u>Azimuth (deg)</u>	<u>Theoretical (mV/m)</u>	<u>Standard (mV/m)</u>	<u>Modified (mV/m)</u>	<u>Azimuth (deg)</u>	<u>Theoretical (mV/m)</u>	<u>Standard (mV/m)</u>	<u>Modified (mV/m)</u>
0	2218.2	2329.9		180.0	2266.0	2380.1	
5	2141.6	2249.5		185.0	2196.8	2307.4	
10	2044.8	2148.0		190.0	2107.7	2214.0	
15	1926.4	2023.6		195.0	1997.0	2097.8	
20	1785.6	1875.9		200.0	1863.5	1957.6	
25	1623.6	1705.9		205.0	1707.6	1794.0	
30	1443.3	1516.7		210.0	1531.6	1609.4	
35	1251.0	1315.0		215.0	1340.5	1408.9	
40	1058.0	1112.7		220.0	1143.4	1202.2	
45	884.3	930.6		225.0	956.2	1006.0	
50	762.4	802.9		230.0	806.1	848.7	
55	731.9	771.0		235.0	731.9	771.0	
60	806.1	848.7		240.0	762.4	802.9	
65	956.2	1006.0		245.0	884.3	930.6	
70	1143.4	1202.2		250.0	1058.0	1112.7	
75	1340.5	1408.9		255.0	1251.0	1315.0	
80	1531.6	1609.4		260.0	1443.3	1516.7	
85	1707.6	1794.0		265.0	1623.6	1705.9	
90	1863.5	1957.6		270.0	1785.6	1875.9	
95	1997.0	2097.8		275.0	1926.4	2023.6	
100	2107.7	2214.0	2583.0	280.0	2044.8	2148.0	
105	2196.8	2307.4		285.0	2141.6	2249.5	
110	2266.0	2380.1		290.0	2218.2	2329.9	
115	2318.0	2434.7		295.0	2277.1	2391.7	
120	2355.7	2474.2		300.0	2320.8	2437.7	
125	2381.8	2501.7		305.0	2352.1	2470.5	
130	2399.1	2519.8		310.0	2373.5	2493.0	
135	2409.7	2531.0		315.0	2387.1	2507.3	
140	2415.4	2536.9		320.0	2394.6	2515.1	
145	2417.2	2538.8	3210.9	325.0	2397.0	2517.6	
150	2415.4	2536.9		330.0	2394.6	2515.1	
155	2409.7	2531.0		335.0	2387.1	2507.3	
160	2399.1	2519.8		340.0	2373.5	2493.0	
165	2381.8	2501.7		345.0	2352.1	2470.5	
170	2355.7	2474.2		350.0	2320.8	2437.7	
175	2318.0	2434.7		355.0	2277.1	2391.7	

Fields in mV/m @ 1 kilometer





DAYTIME ALLOCATION STUDY - 1ST ADJ CHANNEL STATIONS
STATION WWRC, WASHINGTON, DC
1260 kHz, 35 kW-D, 5 kW-N, U, DA-2
JULY, 2013

APPENDIX A

Summary of Measurement Data

**TABULATION OF MEASURED CONDUCTIVITY DATA
WWRC - WASHINGTON, DISTRICT OF COLUMBIA
1260 kHz - 35.0 kW D/5.0 kW N - DA-2**

<u>Source</u>	<u>Azimuth (deg. T.)</u>	<u>σ (mS/m)</u>	<u>Distance From Transmitter to End of Conductivity (km)</u>
WWRC BP-20110223ACB	10.0	1.0	16.00
		0.1	81.29
WWRC BP-20110223ACB	30.0	1.0	15.00
		0.5	26.00
		1.0	67.00
		0.1	80.31
WWRC BP-20120824AAY	42.0	2.0	5.28
		1.5	17.30
		1.0	86.26
WWRC BP-201208AAY	52.0	0.1	14.24
		1.0	50.00
		1.5	59.82
		0.1	98.88
WWRC BP-20120824AAY	72.0	1.0	14.16
		1.5	35.37
		0.5	64.67
		2.0	117.00
		0.5	130.34
WWRC BP-20120824AAY	90.0	1.5	5.25
		1.0	17.87
		0.1	46.35
WWRC BP-20110223ACB	115.0	1.5	2.90
		0.5	10.50
		1.0	15.50
		0.5	24.00
		0.1	49.50

TABULATION OF MEASURED CONDUCTIVITY DATA
WWRC - WASHINGTON, DISTRICT OF COLUMBIA
1260 kHz - 35.0 kW D/5.0 kW N - DA-2
(continued)

<u>Source</u>	<u>Azimuth (deg. T.)</u>	<u>σ (mS/m)</u>	<u>Distance From Transmitter to End of Conductivity (km)</u>
WWRC BP-20110223ACB	135.0	0.1	65.48
WWRC BP-20110223ACB	155.0	0.1	96.66
WWRC BP-20110223ACB	175.0	2.0	3.20
		1.0	5.00
		0.1	13.90
		1.5	33.70
		0.1	60.51
WWRC BP-20110223ACB	195.0	0.1	83.04
WWRC BP-20110223ACB & BP-20120824AAY	215.0	0.5	14.00
		1.0	36.60
		0.1	124.64
WWRC BP-20120824AAY	225.0	1.0	21.67
		0.1	91.27
WWRC BP-20110223ACB & BP-20120824AAY	235.0	1.5	2.70
		1.0	7.20
		0.1	72.84
WWRC BP-20110223ACB & BP-20120824AAY	255.0	0.1	23.60
		0.5	31.30
		1.0	46.00
		0.1	105.38

TABULATION OF MEASURED CONDUCTIVITY DATA
WWRC - WASHINGTON, DISTRICT OF COLUMBIA
1260 kHz - 35.0 kW D/5.0 kW N - DA-2
 (continued)

<u>Source</u>	<u>Azimuth (deg. T.)</u>	<u>σ (mS/m)</u>	<u>Distance From Transmitter to End of Conductivity (km)</u>
WWRC BP-20110223ACB & BP-20120824AAY	275.0	0.1	68.40
WWRC BP-20110223ACB	295.0	1.5	1.00
		0.5	2.30
		0.1	45.38
WWRC BP-20120824AAY	305.0	0.1	69.64
WWRC BP-20110223ACB & BP-20120824AAY	325.0	0.5	3.20
		0.1	13.00
		1.0	24.84
		0.1	50.00
		0.5	70.38
		0.1	124.48
WWRC BP-20110223ACB	345.0	0.1	91.28
WWRC BP-20110223ACB & BP-20120824AAY	350.0	1.0	0.95
		0.1	80.29

TABULATION OF MEASURED CONDUCTIVITY DATA
WFJS - TRENTON, NEW JERSEY
LIC: 1260 kHz - 5.0 kW D/2.5 kW N - DA-2
CP: 1260 kHz - 5.9 kW D/2.5 kW N - DA-2

<u>Source</u>	<u>Azimuth (deg. T.)</u>	<u>σ (mS/m)</u>	<u>Distance From Transmitter to End of Conductivity (km)</u>
WWRC BP-20120824AAY	185.0	3.0	4.32
		7.0	5.87
		2.0	22.15
		1.5	41.55
		1.0	108.60
WWRC BP-20120824AAY	205.0	4.0	11.02
		3.0	56.53
		1.5	64.21
WWRC BP-20120824AAY	220.0	4.0	23.09
		5.0	34.77
		8.0	65.74
		5.0	78.70
WWRC BP-20120824AAY	229.5	4.0	5.38
		3.0	6.95
		1.5	12.92
		2.0	25.91
		4.0	44.28
		3.0	64.61

**TABULATION OF MEASURED CONDUCTIVITY DATA
WCHV - CHARLOTTESVILLE, VIRGINIA
1260 kHz - 5.0 kW D/2.5 kW N - DA-2**

<u>Source</u>	<u>Azimuth (deg. T.)</u>	<u>σ (mS/m)</u>	<u>Distance From Transmitter to End of Conductivity (km)</u>
WWRC BP-20120824AAY	340.0	0.1	59.93
WWRC BP-20120824AAY	0.0	0.1	59.82
WWRC BP-20120824AAY	20.0	0.1	68.19
WWRC BP-20120824AAY	40.0	1.0 0.5 0.1	19.15 34.05 77.41
WWRC BP-20120824AAY	60.0	1.0 1.5 1.0	24.19 41.00 79.71
WWRC BP-20120824AAY	80.0	1.5 0.5 0.1 0.5	4.58 23.58 40.52 75.83
WWRC BP-20120824AAY	100.0	1.0 0.5	19.40 50.36
WWRC BP-20120824AAY	120.0	0.1	59.29
WWRC BP-20120824AAY	140.0	0.1	49.76

**TABULATION OF MEASURED CONDUCTIVITY DATA
WPHB - PHILIPSBURG, PENNSYLVANIA
1260 kHz - 5.0 kW D/0.034 kW N - ND-1**

<u>Source</u>	<u>Azimuth (deg. T.)</u>	<u>σ (mS/m)</u>	<u>Distance From Transmitter to End of Conductivity (km)</u>
WWRC BP-20110223ACB	125.0	0.1	52.51
WWRC BP-20110223ACB	145.0	1.0	3.10
		0.1	97.90
		1.0	122.10
		0.1	131.00
WWRC BP-20110223ACB	165.0	0.1	113.78
WWRC BP-20110223ACB	185.0	0.5	7.57
		0.1	50.65
WWRC BP-20110223ACB	205.0	1.0	11.80
		0.1	38.24

**TABULATION OF MEASURED CONDUCTIVITY DATA
WKDL - WARRENTON, VIRGINIA
1250 kHz - 3.0 kW D/0.125 kW N - DA-2**

<u>Source</u>	<u>Azimuth (deg. T.)</u>	<u>σ (mS/m)</u>	<u>Distance From Transmitter to End of Conductivity (km)</u>
WWRC	0.0	0.5	52.70
BP-20110223ACB		0.1	59.06
WWRC	20.0	1.0	2.90
BP-20110223ACB		1.5	7.90
		1.0	15.40
		0.1	41.40
		1.0	83.20
WWRC	40.0	1.5	29.00
BP-20110223ACB		2.0	79.90
		1.0	94.15
WWRC	60.0	1.5	40.20
BP-20110223ACB		1.0	60.67
WWRC	80.0	0.5	5.00
BP-20110223ACB		1.0	11.10
		1.5	32.10
		0.1	70.97
WWRC	100.0	1.0	27.20
BP-20110223ACB		0.1	104.45
WWRC	120.0	1.5	29.50
BP-20110223ACB		0.1	84.33
WWRC	140.0	1.0	3.30
BP-20110223ACB		0.5	11.50
		1.5	27.40
		0.1	80.15