



**Your NPR<sup>®</sup> Station**

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HARRISONBURG 90.7 \* CHARLOTTESVILLE 103.5 \* WINCHESTER 94.5 \* LEXINGTON 89.9 \* FARMVILLE 91.3

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## **Exhibit 15 Detailed Interference Study**

The instant application is for a minor relocation of the WMRL transmitter site from one building to a nearby one on the campus of Virginia Military Institute. The actual move is only 170 Meters N59°E. Because of the extremely low HAAT (-81M) the default elevation above average terrain in all directions remains at 30 Meters.

Since the station was first built, several co-channel or 1<sup>st</sup> adjacent stations have appeared whose contour push out as close to WMRL as possible. A detailed interference study on each of these three stations (WNRS-FM, WVLS and WPVA) was performed on the critical contour overlaps. Ordinarily, the 3 second DMA terrain database on-hand would be utilized, however on WNRS, the FCC-standard 30 second Globe terrain database was utilized because of the hair-width separation<sup>1</sup>.

A second adjacent station, WXRT, was also evaluated using the 30 second Globe terrain database. As WMRL was moving away from this station, no problems were anticipated.

Using standard FCC criteria, the proposed operation *will not* involve overlap of signal strength contours, as per section 73.509 of the rules.

William D. Fawcett  
July 9, 2003

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<sup>1</sup> The EXISTING WMRL site is not clear of WNRS using the 3 second DMA terrain database. Our hats off to the WNRS engineers for pushing this to the limit.

WNRS-FM Sweet Briar, VA  
 37-33-50.0, -079-11-34.0 (NAD 27)  
 Channel 210A  
 30 Watts Max DA, 592 meters HAAT

distance (km) 32.97

WMRL Lexington, VA (Proposed)  
 37-47-24.8, -079,26,5.1 (NAD 27)  
 Channel 210A  
 100 Watts, -81 meters HAAT

**Detailed Interference Study**  
**WNRS 40 dBu to WMRL 60 dBu**

WNRS Bearing	HAAT* (Meters)	field	0.0300 max da power (kw)	40 dBu Kilometers F(50:10)	WMRL Bearing	60 dBu Kilometers F(50:50)	CLEAR (Kilometers)
304	519.5	0.257	0.0020	30.09	203.15	5.64	3.40
305	520.4	0.251	0.0019	29.71	200.00	5.64	2.98
306	522.3	0.246	0.0018	29.35	196.63	5.64	2.59
307	523.5	0.240	0.0017	28.95	192.66	5.64	2.26
308	523.8	0.235	0.0016	28.5	188.04	5.64	2.02
309	524.1	0.229	0.0016	28.51	186.12	5.64	1.59
310	524.6	0.224	0.0015	28.05	180.82	5.64	1.45
311	526.4	0.219	0.0014	27.6	175.47	5.64	1.39
312	530.1	0.214	0.0014	27.71	173.15	5.64	0.98
313	534.8	0.209	0.0013	27.32	167.80	5.64	0.99
314	537.8	0.205	0.0013	27.4	164.64	5.64	0.67
315	537.9	0.201	0.0012	26.84	158.61	5.64	0.95
316	536.7	0.196	0.0012	26.81	154.68	5.64	0.80
317	537.8	0.192	0.0011	26.25	149.52	5.64	1.22
318	541.7	0.188	0.0011	25.71	145.14	5.64	1.67
319	547.4	0.184	0.0010	25.87	141.69	5.64	1.47
319.64	550.9		0.0010	25.97	139.36	5.64	1.36
320	552.8	0.180	0.0010	26.02	138.01	5.64	1.31
321	556.1	0.184	0.0010	26.11	134.20	5.64	1.26
322	557.4	0.188	0.0011	26.8	129.26	5.64	0.65
323	558.5	0.192	0.0011	26.84	125.07	5.64	0.73
324	560.0	0.196	0.0012	27.49	118.76	5.64	0.30
325	560.7	0.201	0.0012	27.52	114.59	5.64	0.49
326	559.4	0.205	0.0013	28.05	107.97	5.64	0.33
327	555.0	0.209	0.0013	27.92	105.25	5.64	0.74
328	546.9	0.214	0.0014	28.21	100.33	5.64	0.87
329	536.0	0.219	0.0014	27.88	99.66	5.64	1.46
330	525.4	0.224	0.0015	28.07	96.06	5.64	1.72
331	517.7	0.229	0.0016	28.32	92.38	5.64	1.99
332	512.9	0.234	0.0016	28.18	91.42	5.64	2.48
333	510.2	0.240	0.0017	28.54	87.63	5.64	2.76
334	509.2	0.246	0.0018	28.93	83.93	5.64	3.07
335	509.8	0.251	0.0019	29.37	80.22	5.64	3.42

\*Using Globe 30 sec. terrain database

7 July 2003

WVLS Monterey, VA  
 38-20-39.0, -079-35-47.0 (NAD 27)  
 Channel 209B1  
 360 Watts Max DA, 445 meters HAAT

distance (km) 63.10

WMRL Lexington, VA (Proposed)  
 37-47-24.8, -079,26,5.1 (NAD 27)  
 Channel 210A  
 100 Watts, -81 meters HAAT

**Detailed Interference Study**  
**WVLS 54 dBu to WMRL 60 dBu**

WVLS Bearing	HAAT* (Meters)	field	0.360 max da power (kw)	54 dBu Kilometers F(50:10)	WMRL Bearing	60 dBu Kilometers F(50:50)	CLEAR (Kilometers)
155	642.0	0.950	0.325	55.04	38.01	5.64	9.08
156	643.3	0.942	0.319	54.86	35.54	5.64	8.33
157	641.2	0.937	0.316	54.67	32.71	5.64	7.62
158	635.8	0.930	0.311	54.29	28.86	5.64	7.09
159	632.6	0.934	0.314	54.28	25.94	5.64	6.38
160	626.8	0.915	0.301	53.56	20.29	5.64	6.25
161	620.6	0.905	0.295	53.09	15.31	5.64	6.06
162	615.5	0.895	0.288	52.62	10.24	5.64	5.98
163	609.2	0.885	0.282	52.13	5.14	5.64	6.04
164	601.3	0.874	0.275	51.53	0.04	5.64	6.31
165	595.7	0.863	0.268	50.99	355.34	5.64	6.63
166	595.2	0.852	0.261	50.66	351.06	5.64	6.84
167	593.9	0.841	0.255	50.32	347.00	5.64	7.14
168	593.9	0.830	0.248	49.99	343.19	5.64	7.51
169	595.3	0.817	0.240	49.66	339.67	5.64	7.94
170	594.0	0.805	0.233	49.25	336.51	5.64	8.51
171	586.8	0.794	0.001	48.62	333.92	5.64	9.35
172	584.9	0.784	0.221	48.22	331.41	5.64	10.00
173	589.5	0.773	0.215	48.08	328.80	5.64	10.45
174	596.5	0.762	0.209	48.04	326.21	5.64	10.85
175	599.7	0.752	0.204	47.88	323.98	5.64	11.40
176	594.7	0.742	0.198	47.32	322.66	5.64	12.32
177	589.9	0.732	0.193	46.81	321.45	5.64	13.20
178	581.5	0.722	0.188	46.14	320.69	5.64	14.23
179	568.0	0.711	0.182	45.14	320.65	5.64	15.50

\*Using DMA 3 sec. terrain database

7 July 2003

WPVA Waynesboro, VA  
 38-01-16.0, -078-52-38.0 (NAD 27)  
 Channel 211B1  
 2500 Watts, 293 meters HAAT

distance (km) 55.33

WMRL Lexington, VA (Proposed)  
 37-47-24.8, -079,26,5.1 (NAD 27)  
 Channel 210A  
 100 Watts, -81 meters HAAT

**Detailed Interference Study  
 WPVA 54 dBu to WMRL 60 dBu**

WPVA Bearing	HAAT* (Meters)	field	2.500 max da power (kw)	54 dBu Kilometers F(50:10)	WMRL Bearing	60 dBu Kilometers F(50:50)	CLEAR (Kilometers)
231	177.2	1.000	2.500	45.10	101.12	5.64	8.61
232	179.3	1.000	2.500	45.33	99.69	5.64	7.87
233	177.9	1.000	2.500	45.18	96.85	5.64	7.40
234	176.2	1.000	2.500	44.98	93.64	5.64	7.03
235	169.1	1.000	2.500	44.18	88.69	5.64	7.21
236	158.0	1.000	2.500	42.91	83.06	5.64	7.92
237	153.3	1.000	2.500	42.36	79.26	5.64	8.11
238	157.2	1.000	2.500	42.82	76.97	5.64	7.42
239	164.5	1.000	2.500	43.66	74.83	5.64	6.39
240	171.9	1.000	2.500	44.49	72.12	5.64	5.40
241	180.8	1.000	2.500	45.50	68.84	5.64	4.27
242	183.8	1.000	2.500	45.83	64.33	5.64	3.87
242.4	184.3	1.000	2.500	45.89	62.40	5.64	3.80
243	185.1	1.000	2.500	45.98	59.45	5.64	3.72
244	189.4	1.000	2.500	45.48	55.07	5.64	4.31
245	193.8	1.000	2.500	46.99	48.14	5.64	3.01
246	200.5	1.000	0.001	47.78	40.97	5.64	2.57
247	210.6	1.000	2.500	48.98	31.28	5.64	1.96
248	214.0	1.000	2.500	49.37	24.53	5.64	2.21
249	214.6	1.000	2.500	49.44	19.97	5.64	2.78
250	219.3	1.000	2.500	49.96	13.72	5.64	3.16
251	231.3	1.000	2.500	51.23	3.80	5.64	3.34
252	237.9	1.000	2.500	51.87	358.23	5.64	3.97
253	244.8	1.000	2.500	52.50	353.50	5.64	4.71
254	251.7	1.000	2.500	53.10	349.65	5.64	5.54

\*Using DMA 3 sec. terrain database

8 July 2003

WRXT Roanoke, VA  
 37-23-09.0, -079-40-10.0 (NAD 27)  
 Channel 212C2  
 5500 Watts Max DA, 339 meters HAAT

distance (km) 49.44

WMRL Lexington, VA (Proposed)  
 37-47-24.8, -079,26,5.1 (NAD 27)  
 Channel 210A  
 100 Watts, -81 meters HAAT

**Detailed Interference Study**  
**WRXT 60 dBu to WMRL 100 dBu**

WRXT Bearing	HAAT* (Meters)	field	5.5000 max da power (kw)	60 dBu Kilometers F(50:50)	WMRL Bearing	100 dBu Kilometers F(50:10)	CLEAR (Kilometers)
12	264.1	0.458	1.1537	30.34	223.48	0.70	20.26
13	272.1	0.469	1.2098	31.13	223.33	0.70	19.30
14	275.4	0.480	1.2672	31.67	222.71	0.70	18.56
15	274.7	0.486	1.2991	31.82	221.45	0.70	18.18
16	269.7	0.492	1.3314	31.72	219.79	0.70	18.03
17	264.5	0.501	1.3805	31.68	218.17	0.70	17.86
18	259.2	0.510	1.4306	31.64	216.52	0.70	17.71
19	252.0	0.522	1.4987	31.56	214.80	0.70	17.62
20	239.7	0.534	1.5684	31.14	212.83	0.70	17.89
21	223.7	0.543	1.6187	30.3	210.74	0.70	18.61
22	206.9	0.551	1.6698	29.33	208.84	0.70	19.50
23	192.6	0.565	1.7557	28.66	207.26	0.70	20.11
24	182.7	0.579	1.8438	28.3	205.85	0.70	20.45
24.79	177.7	0.588	1.9016	28.15	204.79	0.70	20.59
25	176.4	0.590	1.9113	28.09	204.51	0.70	20.65
26	170.9	0.600	1.9800	27.92	203.22	0.70	20.83
27	164.0	0.615	2.0802	27.7	201.98	0.70	21.09
28	155.7	0.630	2.1830	27.35	200.83	0.70	21.49
29	146.3	0.645	2.2881	26.88	199.81	0.70	22.02
30	136.5	0.660	2.3958	26.35	198.90	0.70	22.62
31	125.8	0.675	2.5022	25.72	198.14	0.70	23.33
32	113.2	0.689	2.6110	24.86	197.61	0.70	24.27
33	97.8	0.704	2.7220	23.44	197.52	0.70	25.75
34	81.8	0.718	2.8354	21.67	197.74	0.70	27.56
35	68.0	0.732	2.9430	21.68	197.00	0.70	27.66
36	57.2	0.745	3.0526	18.63	198.16	0.70	30.68
37	48.3	0.758	3.1601	17.13	198.47	0.70	32.20
38	40.5	0.771	3.2694	15.58	198.86	0.70	33.76

\*Using Globe 30 sec. terrain database

9 July 2003

Terrain Averages from GLOBE 30-second Database

**Job Title: WMRL 30 SEC**

Center of radiation above mean sea level: 336.0 m (1102.4 ft)

Latitude: N 37° 47' 24.8"  
Longitude: W 79° 26' 05.1"

Bearing (deg. true)	3.0 to 16.0 km average terrain elevation		Height above average terrain	
	(meters)	(feet)	(meters)	(feet)
0.0	422.5	1386.2	-86.5	-283.9
45.0	443.1	1453.7	-107.1	-351.4
90.0	427.9	1404.0	-91.9	-301.6
135.0	405.3	1329.6	-69.3	-227.3
180.0	325.8	1069.0	10.2	33.4
225.0	380.2	1247.4	-44.2	-145.0
270.0	451.2	1480.5	-115.2	-378.1
315.0	477.1	1565.2	-141.1	-462.9
139.4	395.5	1297.5	-59.5	-195.1
Average:	414.3	1359.2	-78.3	-256.9
<b>Average of 8 standard radials:</b>	<b>416.6</b>	<b>1367.0</b>	<b>-80.6</b>	<b>-264.6</b>
Average of 9 radials:	425.0	1394.3	-89.0	-291.9
Average of 12 radials:	418.0	1371.4	-82.0	-269.0
Average of 18 radials:	425.8	1396.8	-89.8	-294.5
Average of 24 radials:	425.4	1395.8	-89.4	-293.4
Average of 36 radials:	425.3	1395.4	-89.3	-293.1
Average of 72 radials:	425.4	1395.7	-89.4	-293.4

>> End of Terrain Averages <<