

## Comprehensive Engineering Exhibit Minor Modification of BPFT-20130403ABD W236CA, Facility ID No. 87686

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This exhibit is in support of a minor modification to correct the permitted geographic location and tower elevations to match an updated antenna structure registration, and to specify a new antenna and operating power for W236CA.

The facility antenna is to be mounted on ASR 1005705, at the corrected elevation of 108 meters above ground level. Below as **Figure 1** is an overlap and spacing study from which it can be determined that this proposal is within the permitted protected contour of **second** adjacent channel stations WQDR-FM. The proposed directional antenna pattern used in calculating the overlap and spacing requirements is giving in **Figure 2**.

Concerning WQDR-FM, Section 74.1204(d) states that *“The provisions of this section concerning prohibited overlap will not apply where the area of such overlap lies entirely over water. In addition, an application otherwise precluded by this section will be accepted if it can be demonstrated that no actual interference will occur due to intervening terrain, lack of population or such other factors as may be applicable.”*

We will demonstrate that a lack of population and/or other factors allow this proposal to be compliant with 74.1204. The process commonly called “Living Way”<sup>1</sup>, which allows for the use of U/D Analysis, also known as “signal strength ratio methodology” is to be utilized. In this instant case the facilities to be protected are **second** adjacent and are to be afforded protection from signals 40 dB stronger than they present in the location of the proposed antenna location.

WQDR-FM is predicted to have 77.3 dBu of signal at 500 meters beyond the proposed site, as shown in **Figure 3**. Thus only a signal exceeding 117.3 dBu (77.3 + 40) in a habitable area is predicted to cause interference to WQDR-FM from this instant proposal. Utilizing the line of sight equation and the vertical elevation pattern of the antenna it has been determined, as shown in **Figure 4**, that a 117.3 dBu signal developed by 240 watts, does not reach any habitable space as shown in **Figure 5**. Thus the provisions of the rules section concerning prohibited overlap will not apply as it has been demonstrated that no actual interference will occur due to a lack of population and other factors as applied in this instant proposal.

This application qualifies as a minor modification and as fill-in, as is demonstrated in **Figure 3** by the contour overlap of the proposed and licensed 60 dBu contours, and that the primary stations service contour fully encompasses that of the proposed translator.

### **RF Radiation Statement**

The proposed facilities were evaluated in terms of potential radio frequency radiation exposure at ground level in accordance with OET Bulletin No. 65, “Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radio frequency Radiation.”

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<sup>1</sup> As recently described in FCC 08-242 in connection with BPFT-19981001TA

The proposed antenna system is an array of 2, Scala CL-FM/VRM antenna mounted 108 meters above ground. As this element type is not modeled in any current computer program, for purposes of this analysis the FM Model program has been set to calculate values for a "worst case" type of antenna element array of "Ring Stub" type elements, with an effective radiated vertical power of 0.240 Kilowatts, and horizontal of 0.0 Kilowatts. At 2 meters above the surface, at 25 meters from the base of the tower, this proposal will contribute worst case, 0.7 microwatts per square centimeter, or 0.07 percent of the allowable ANSI limit for controlled exposure, and 0.35 percent of the allowable limit for uncontrolled exposure. It is therefore believed that this proposal is in compliance with OET Bulletin Number 65 as required by the Federal Communications Commission.

Further, the applicant will see that signs are posted in the vicinity of the tower, warning of potential radio frequency hazards at the site. The site itself is restricted from public access. The applicant will cooperate with other users of the tower to reduce power of the facility, or discontinue operation, as necessary to limit human exposure to levels less than specified by the Federal Communications Commission should anyone be required to climb the tower for maintenance or inspection.

**Figure 1. Overlap and Spacing Study**

W236CA, 240w ASR and Elev Corrected  
Radio Training Network, Inc.

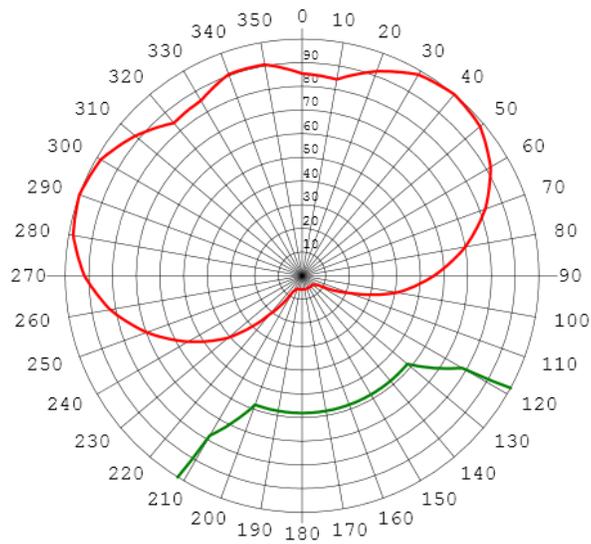
REFERENCE: 35 59 54.5 N, 78 51 22.0 W. CH# 236D - 95.1 MHz, Pwr= 0.24 kW DA, HAAT= 112.3 M, COR= 217 M  
Average Protected F(50-50)= 13.48 km  
Standard Directional

DISPLAY DATES  
DATA 10-15-14  
SEARCH 10-15-14

CH CITY	CALL	TYPE ANT STATE	AZI <--	DIST FILE #	LAT LNG	PWR(Kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
236D	W236CA	CP_DL_ NC	90.0 270.0	0.02 BPFT20130403ABD	35 59 54.5 78 51 21.0	0.180 137	41.2 241	12.1 Radio Training Network, In	-51.8*	-48.1*
234C	WQDR-FM	LIC_C_ NC	141.0 321.2	45.98 BLH19910411KB	35 40 35.0 78 32 09.0	100.000 512	12.8 603	88.2 Carolina Media Group, Inc.	30.2	-42.3*<
236C	WRNS-FM	LIC_C_ NC	125.4 306.3	169.78 BLH20000531AED	35 06 15.0 77 20 12.0	100.000 459	187.5 472	84.0 Nm License, Llc	-21.0*<	75.2
236D	W236CA	LIC_DV_ NC	95.8 275.9	22.05 BLFT20130220ABM	35 58 41.9 78 36 46.2	0.175 82	30.0 185	9.0 Radio Training Network, In	-17.6*	-19.6
236D	W236B0	LIC_DC_ NC	281.2 100.8	57.84 BLFT20130731ANF	36 05 51.0 79 29 11.0	0.250	50.5 344	15.3 Eastern Airwaves, Llc	-4.4*<	2.1
237D	W237BZ	LIC_DC_ NC	173.8 353.8	31.75 BLFT20121017AAU	35 42 50.4 78 49 04.0	0.250 511	32.6 618	21.5 Radio Training Network, In	-3.9*<	5.7
289D	W289BD	LIC_C_ NC	145.5 325.6	28.18 BLFT20130107AAL	35 47 21.0 78 40 45.0	0.115 120	50.5 222	15.3 Truth Broadcasting Corpora	10.0R	18.2M
289D	W289BD	CP_C_ NC	145.5 325.6	28.18 BPFT20130228AAR	35 47 21.0 78 40 45.0	0.250 120	50.5 222	15.3 Truth Broadcasting Corpora	10.0R	18.2M
236C	WNKS	LIC_CX_ NC	251.9 70.5	219.78 BMLH20140821ABZ	35 21 44.0 81 09 19.0	100.000 470	189.4 707	85.6 Cbs Radio Stations Inc.	18.6	94.0
237A	WHLF	LIC_ZCX VA	355.6 175.5	78.82 BLH20060313ADI	36 42 24.0 78 55 28.0	6.000 75	39.2 206	25.5 Lakes Media Holding Compan	26.7	33.9
235C	WSLC-FM	LIC_C_ VA	319.4 138.6	176.52 BLH20121126ARA	37 11 50.0 80 09 11.0	100.000 598	134.3 1181	90.0 Mel Wheeler, Inc.	31.3	70.8
238C1	WHPE-FM	LIC_CX_ NC	265.6 84.9	106.23 BMLE20140602AZZ	35 55 11.0 80 01 47.0	100.000 159	7.4 399	59.9 Bible Broadcasting Network	86.5	45.4
233C1	WPTI	LIC_DE_ NC	292.6 112.0	102.24 BMLH20010514AAN	36 20 48.0 79 54 30.0	100.000 299	5.9 522	54.3 Clear Channel Broadcasting	84.0	46.8
233C1	WPTI	CP_DEX NC	292.5 111.9	102.04 BPH201311258BP	36 20 42.0 79 54 24.0	100.000 299	5.9 519	54.1 Clear Channel Broadcasting	83.8	46.9
289D	W289BX	CP_C_ NC	47.0 227.2	57.47 BNPFT20130308AEZ	36 21 01.0 78 23 14.0	0.250 147	50.5 267	15.3 Edgewater Broadcasting, In	10.0R	47.5M
236D	W236AL	LIC_C_ NC	285.0 104.4	97.82 BLFT20050124AIH	36 13 18.0 79 54 26.0	0.013 125	23.8 369	7.1 Calvary Chapel Of Twin Fal	62.1	49.9
239C0	WKML	LIC_DCX NC	187.3 7.2	136.24 BMLH20120425ADL	34 46 49.0 79 02 45.0	100.000 318	10.0 368	72.0 Wkml License Limited Partn	123.0	64.2
236D	W236AD	LIC_V_ VA	46.6 227.2	123.25 BLFT20051012AAW	36 45 21.0 77 51 05.0	0.250 3	23.8 82	7.1 Positive Alternative Radio	85.3	68.2
238C3	WPWZ	LIC_NCN NC	92.8 273.5	108.01 BLH19961231KKB	35 56 45.0 77 39 37.0	12.500 140	3.9 163	38.3 First Media Radio, Llc	94.0	69.1

Terrain database is NGDC 30 SEC, R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM  
Contour distances are on direct line to and from reference station. Reference zone= , Co to 3rd adjacent.  
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, \_= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)  
"\*"affixed to 'IN' or 'OUT' values = site inside protected contour.  
< = Contour Overlap

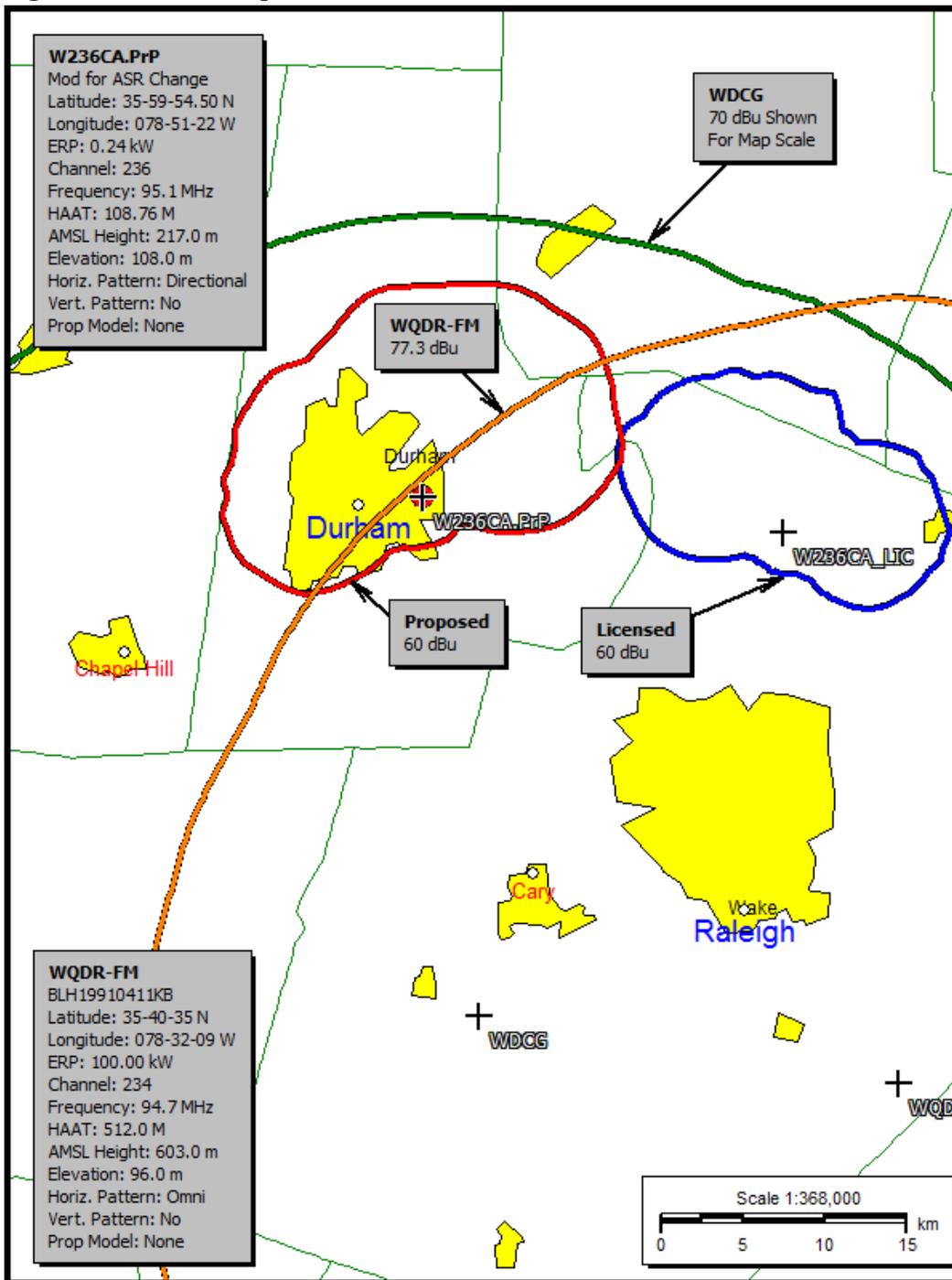
**Figure 2. Antenna Pattern**



Azi	Rel	dBk	kW	dB	Azi	Rel	dBk	kW	dB
0	0.854	-7.57	0.175	-1.37	180	0.058	-30.93	0.001	-24.73
10	0.842	-7.69	0.170	-1.49	190	0.058	-30.93	0.001	-24.73
20	0.919	-6.93	0.203	-0.73	200	0.058	-30.93	0.001	-24.73
30	0.981	-6.36	0.231	-0.17	210	0.078	-28.36	0.001	-22.16
40	1.000	-6.20	0.240	0.00	220	0.214	-19.59	0.011	-13.39
50	0.981	-6.36	0.231	-0.17	230	0.408	-13.98	0.040	-7.79
60	0.919	-6.93	0.203	-0.73	240	0.557	-11.28	0.074	-5.08
70	0.823	-7.89	0.163	-1.69	250	0.699	-9.31	0.117	-3.11
80	0.699	-9.31	0.117	-3.11	260	0.823	-7.89	0.163	-1.69
90	0.557	-11.28	0.074	-5.08	270	0.919	-6.93	0.203	-0.73
100	0.408	-13.98	0.040	-7.79	280	0.981	-6.36	0.231	-0.17
110	0.214	-19.59	0.011	-13.39	290	1.000	-6.20	0.240	0.00
120	0.078	-28.36	0.001	-22.16	300	0.981	-6.36	0.231	-0.17
130	0.058	-30.93	0.001	-24.73	310	0.919	-6.93	0.203	-0.73
140	0.058	-30.93	0.001	-24.73	320	0.842	-7.69	0.170	-1.49
150	0.058	-30.93	0.001	-24.73	330	0.854	-7.57	0.175	-1.37
160	0.058	-30.93	0.001	-24.73	340	0.906	-7.06	0.197	-0.86
170	0.058	-30.93	0.001	-24.73	350	0.906	-7.06	0.197	-0.86

Rotation Angle = 0

**Figure 3. Contour Map**



**Figure 4. Signal Strength at Elevation/Distance**

**Proposed Antenna:** Scala CL-FMV 2 Stack full wave  
**Proposed Power:** 0.24 kW  
**Antenna Height AGL:** 108 meters  
**Interference Contour:** 117.3 dBu f(50:10)  
**Artificial Rcv Antenna Height:** 2 meters  
**Distance (Free Space) Equation:**  $= (10^{(106.92 - [\text{desired dBu}] + [\text{ERP in dBk}] / 20)}) * 1000$   
**Field Strength (dBu) Equation:**  $= 106.92 - (20 * (\text{LOG}_{10}[\text{DistMeters} / 1000])) + [\text{ERP in dBk}]$

Depression				Distance				
Angle	Antenna			from Ant.	Distance	Field Streng	Distance	Field Strength
Below	Relative	ERP	ERP	to Interf	from Ant. to	in dBu @	from Ant.	in dBu @
Horizon	Field	in kW	in dBk	Contour	Artificial Plane	Artificial Plane	to Ground Level	Ground Level
0°	1.000	0.240	-6.20	148.29 m	infinite	---	infinite	---
-5°	0.948	0.216	-6.66	140.58 m	1216.21 m	98.56 dBu	1239.16 m	98.40 dBu
-10°	0.828	0.165	-7.84	122.78 m	610.43 m	103.37 dBu	621.95 m	103.21 dBu
-15°	0.646	0.100	-9.99	95.79 m	409.55 m	104.68 dBu	417.28 m	104.52 dBu
-20°	0.436	0.046	-13.41	64.65 m	309.92 m	103.69 dBu	315.77 m	103.52 dBu
-25°	0.233	0.013	-18.85	34.55 m	250.82 m	100.08 dBu	255.55 m	99.92 dBu
-30°	0.061	0.001	-30.49	9.05 m	212.00 m	89.90 dBu	216.00 m	89.74 dBu
-35°	0.069	0.001	-29.42	10.23 m	184.81 m	92.16 dBu	188.29 m	92.00 dBu
-40°	0.151	0.005	-22.62	22.39 m	164.91 m	99.96 dBu	168.02 m	99.79 dBu
-45°	0.178	0.008	-21.19	26.40 m	149.91 m	102.21 dBu	152.74 m	102.05 dBu
-50°	0.159	0.006	-22.17	23.58 m	138.37 m	101.93 dBu	140.98 m	101.77 dBu
-55°	0.116	0.003	-24.91	17.20 m	129.40 m	99.77 dBu	131.84 m	99.61 dBu
-60°	0.071	0.001	-29.17	10.53 m	122.40 m	95.99 dBu	124.71 m	95.83 dBu
-65°	0.040	0.000	-34.16	5.93 m	116.96 m	91.40 dBu	119.16 m	91.24 dBu
-70°	0.019	0.000	-40.62	2.82 m	112.80 m	85.25 dBu	114.93 m	85.09 dBu
-75°	0.010	0.000	-46.20	1.48 m	109.74 m	79.91 dBu	111.81 m	79.75 dBu
-80°	0.010	0.000	-46.20	1.48 m	107.64 m	80.08 dBu	109.67 m	79.92 dBu
-85°	0.010	0.000	-46.20	1.48 m	106.40 m	80.18 dBu	108.41 m	80.02 dBu
-90°	0.010	0.000	-46.20	1.48 m	106.00 m	80.22 dBu	108.00 m	80.05 dBu

**Figure 5. Transmitter Locaiton**

