

Comprehensive Engineering Exhibit

Minor Modification of BMPFT-20141021ABB

W236CA, Facility ID No. 87686

This exhibit is in support of a minor modification to change the transmitter location, and to specify a new antenna and operating power for W236CA.

The facility antenna is to be mounted on ASR 1008249, at 139 meters above ground level and operate at 200 watts effective power. 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"¹, 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 79.5 dBu of signal at 500 meters beyond the proposed site, as shown in **Figure 3**. Thus only a signal exceeding 119.5 dBu (79.5 + 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 119.5 dBu signal developed by 200 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 station, WDCG FacID 53597 Durham, NC, 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."

The proposed antenna system is an array of 2, Scala CL-FM/VRM antenna mounted 139 meters above ground. As this element type is not modeled in any current computer program, for purposes of

¹ As recently described in FCC 08-242 in connection with BPFT-19981001TA

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 0.200 Kilowatts, and horizontal of 0.0 Kilowatts. At 2 meters above the surface, at 31.4 meters from the base of the tower, this proposal will contribute worst case, 0.3 microwatts per square centimeter, or 0.03 percent of the allowable ANSI limit for controlled exposure, and 0.15 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.

[illegible]

Figure 2. Antenna Pattern

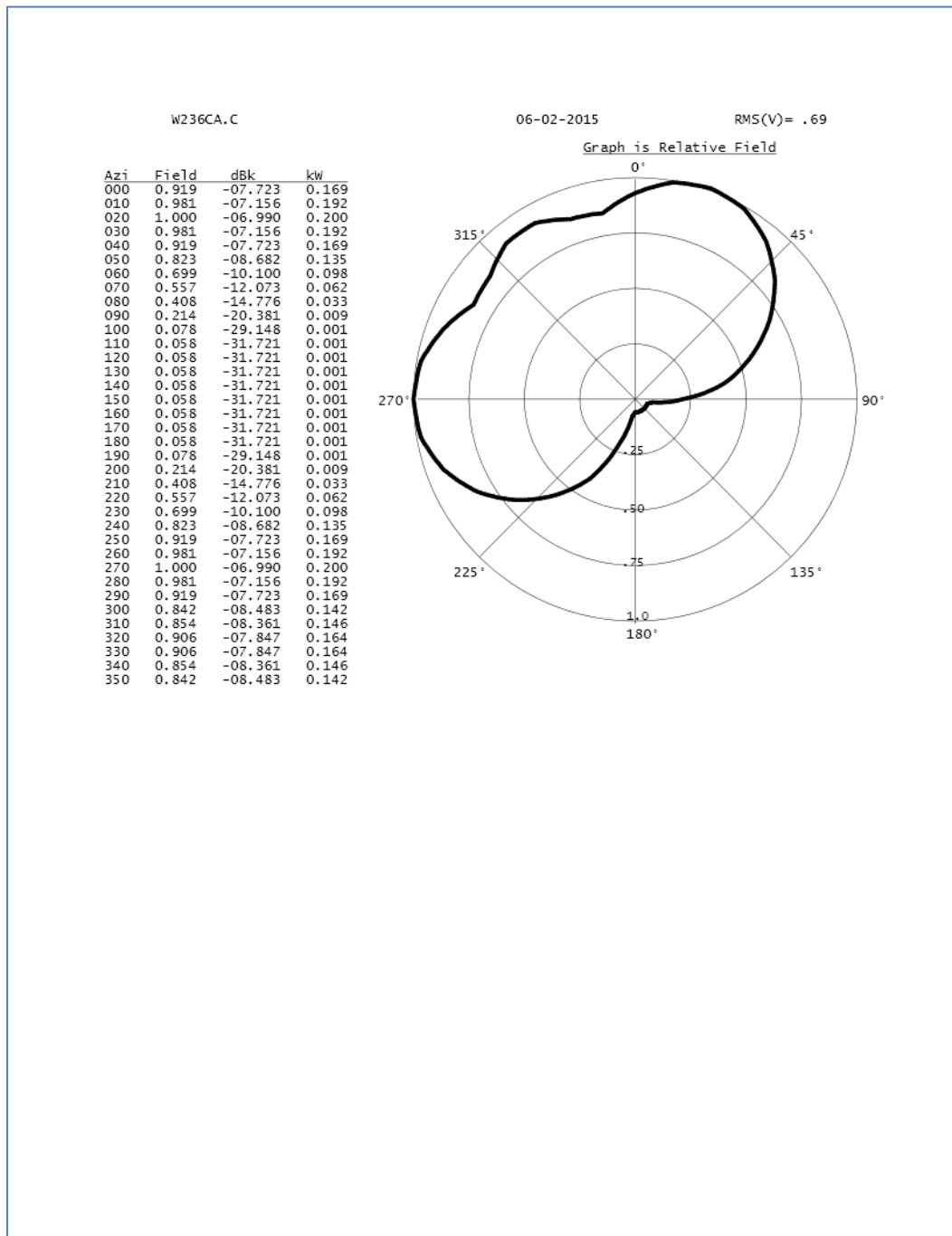


Figure 3. Contour Map

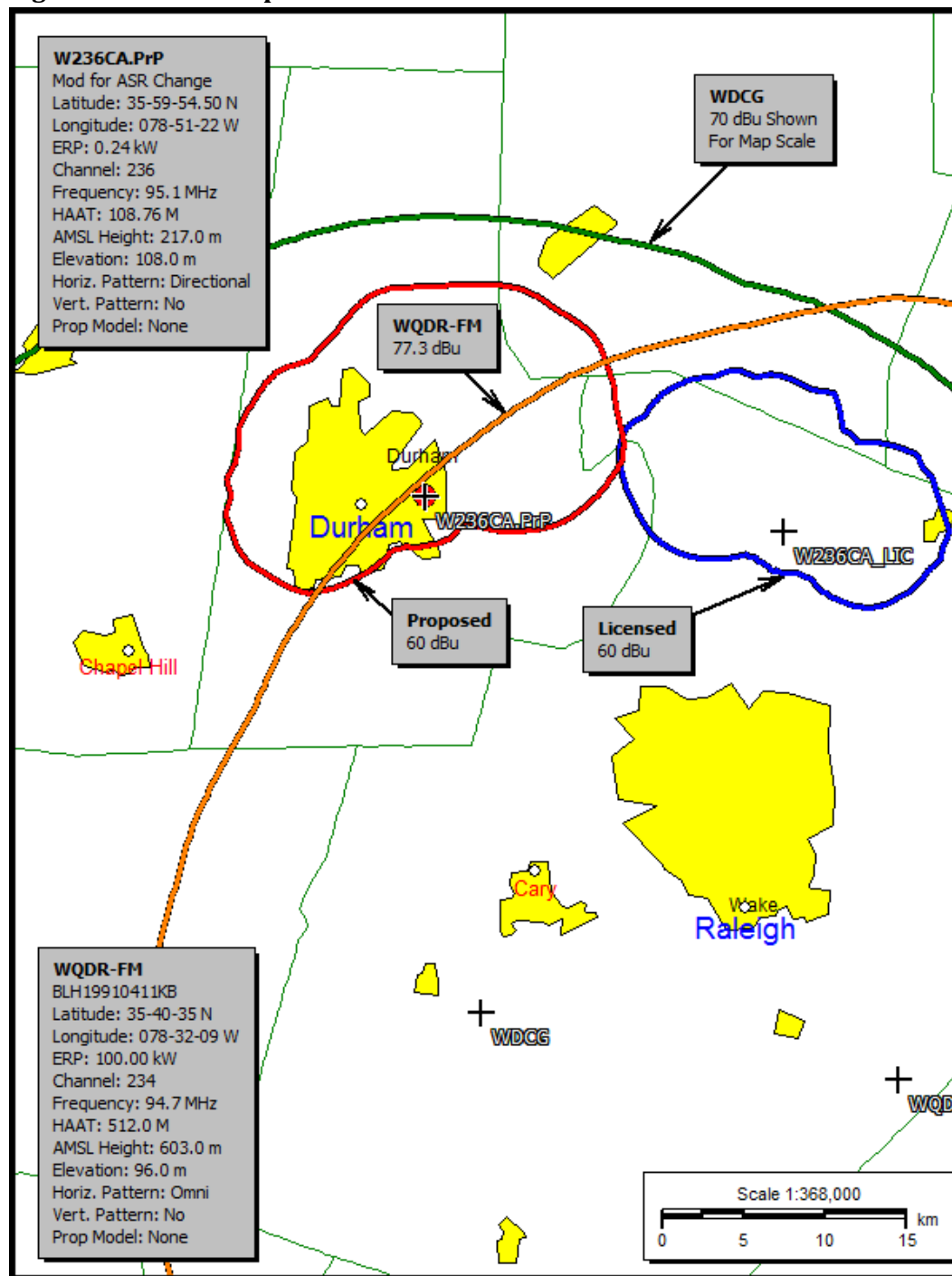


Figure 4. Signal Strength at Elevation/Distance

Proposed Antenna: Scala CL-FM V Pol Proposed Power: 0.2 kW Antenna Height AGL: 139 meters Interference Contour: 119.5 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: $= 106.92 - (20 * (\text{LOG10}[\text{DistMeters} / 1000])) + [\text{ERP in dBk}]$								
Depression				Distance				
Angle	Antenna			from Ant.	Distance	Field Strength	Distance	Field Strength
Below	Relative	ERP	ERP	to Interf	rom 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	0.200	-6.99	105.08 m	infinite	---	infinite	---
-5°	0.980	0.192	-7.17	102.98 m	1571.90 m	95.83 dBu	1594.85 m	95.70 dBu
-10°	0.950	0.181	-7.44	99.82 m	788.95 m	101.54 dBu	800.47 m	101.42 dBu
-15°	0.895	0.160	-7.95	94.05 m	529.33 m	104.49 dBu	537.05 m	104.37 dBu
-20°	0.820	0.134	-8.71	86.16 m	400.56 m	106.15 dBu	406.41 m	106.03 dBu
-25°	0.735	0.108	-9.66	77.23 m	324.17 m	107.04 dBu	328.90 m	106.91 dBu
-30°	0.645	0.083	-10.80	67.78 m	274.00 m	107.37 dBu	278.00 m	107.24 dBu
-35°	0.562	0.063	-11.99	59.05 m	238.85 m	107.36 dBu	242.34 m	107.24 dBu
-40°	0.470	0.044	-13.55	49.39 m	213.13 m	106.80 dBu	216.25 m	106.67 dBu
-45°	0.360	0.026	-15.86	37.83 m	193.75 m	105.31 dBu	196.58 m	105.19 dBu
-50°	0.250	0.013	-19.03	26.27 m	178.84 m	102.84 dBu	181.45 m	102.71 dBu
-55°	0.155	0.005	-23.18	16.29 m	167.25 m	99.27 dBu	169.69 m	99.14 dBu
-60°	0.085	0.001	-28.40	8.93 m	158.19 m	94.53 dBu	160.50 m	94.41 dBu
-65°	0.045	0.000	-33.93	4.73 m	151.16 m	89.41 dBu	153.37 m	89.28 dBu
-70°	0.020	0.000	-40.97	2.10 m	145.79 m	82.68 dBu	147.92 m	82.55 dBu
-75°	0.010	0.000	-46.99	1.05 m	141.83 m	76.89 dBu	143.90 m	76.77 dBu
-80°	0.010	0.000	-46.99	1.05 m	139.11 m	77.06 dBu	141.14 m	76.94 dBu
-85°	0.010	0.000	-46.99	1.05 m	137.52 m	77.16 dBu	139.53 m	77.04 dBu
-90°	0.010	0.000	-46.99	1.05 m	137.00 m	77.20 dBu	139.00 m	77.07 dBu

Figure 5. Transmitter Location

