

**Comprehensive Engineering Exhibit**  
**Minor Modification of BMPFT-20130708ABQ**  
**Facility ID No. 150854, W258AY**  
**October 2014**

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This exhibit is for a further Minor Modification of translator W258AY, permit BMPFT-20130708ABQ. The modification is seeking to modify the translator antenna horizontal plane emissivity pattern only, and update the antenna name and model number what is currently used by the manufacturer.

**Antenna Location**

The proposed antenna is to be mounted on ASR 1035830 at 159 meters above ground, to serve as a fill-in translator for standard band station WNTM.

Below as **Figure 1** is an overlap and spacing study, that takes into account the proposed directional antenna pattern shown in Figure 1a, from which it can be determined that this proposal is within the protected contour of **second** adjacent channel stations WMXC and WKNN-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>, allows for the use of U/D Analysis, also known as "signal strength ratio methodology" to be utilized. In this instant case the facilities of to be protected are second adjacent and are to be afforded protection from signals 40 dB stronger<sup>2</sup> than they present in the location of the proposed antenna location.

**Figure 2** is a map showing the predicted signal contour of WKNN-FM at the proposed translator antenna location utilizing the FCC F50:50 curves. WKNN-FM is located a support tower 63.3 km distant from this proposed facility, and will present a signal of 61.25 dBu at ground level. Thus a signal produced by this proposal exceeding 101.25 dBu is the only area predicted to cause interference.

Utilizing the line of sight equation<sup>3</sup> it has been determined that a 101.25 dBu signal is developed by 250 watts, as proposed, emitted by the proposed antenna mounted 159 meters above ground, will not reach within 8 meters above ground level, as demonstrated in **Figure 3** and with examination of the image in **Figures 4** it can be determined that no habitable space extends above this height, within the confines of this contour. Station WMXC is located 31 km from this proposal and presents an even stronger signal than WKNN. Thus the provisions of the rules section concerning prohibited overlap will

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

<sup>2</sup> See 74.1204(a)(3)

<sup>3</sup>  $\text{ReachDistMeters} = 106.92 - (20 * (\text{LOG10}[\text{DistMeters}/1000])) + [\text{ERP in dBk}]$

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.

#### **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."

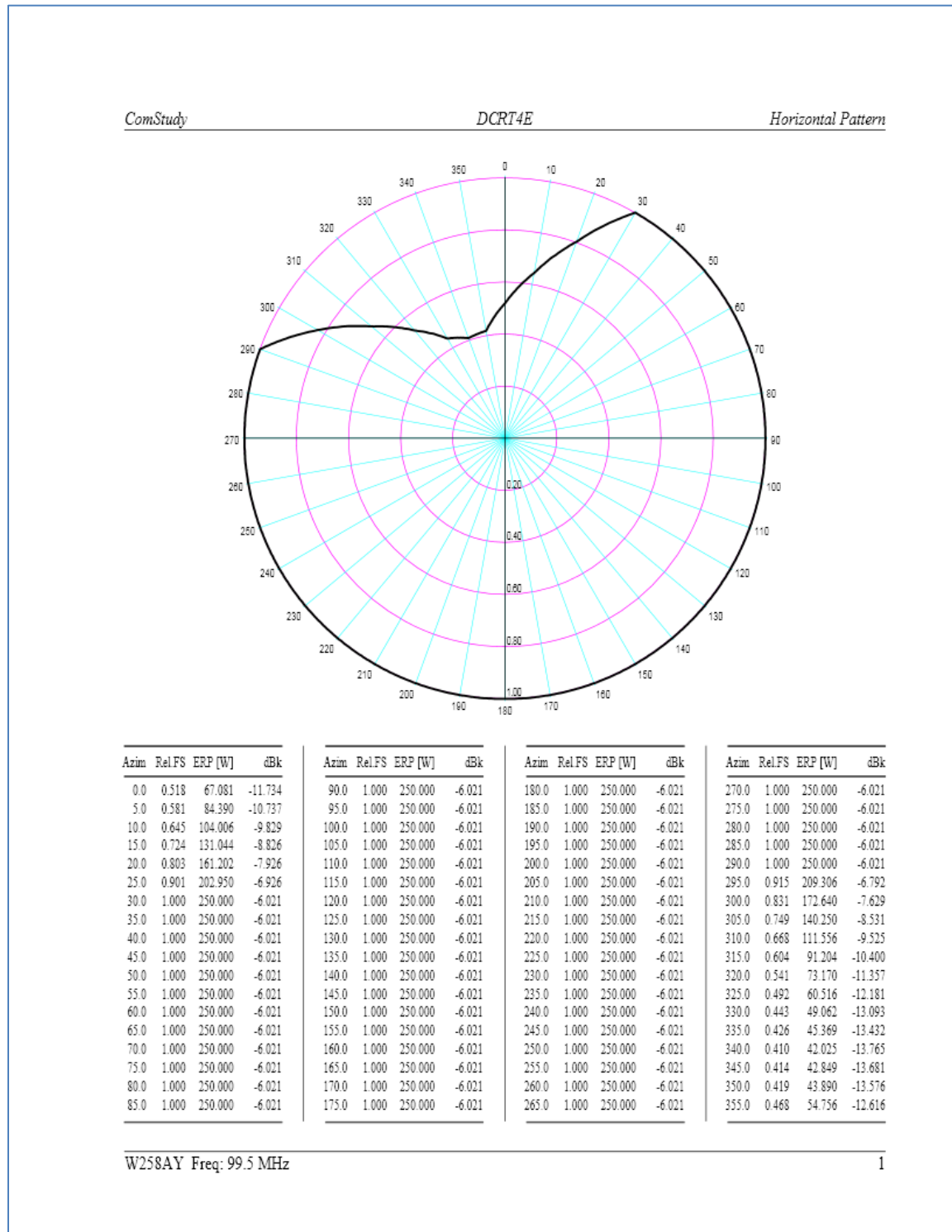
The proposed antenna system is a **Dielectric DCRT4E** 4- element antenna mounted 159 meters above ground. As this element type is not modeled in any current computer program, for purposes of this analysis the FM Model program has been set to calculate values for a "worst case" type of antenna element array of "Ring Stub", operated with an effective radiated power of 0.25 Kilowatts in vertical and horizontal. At 2 meters above the surface, at 28.8 meters from the base of the tower, this proposal will contribute worst case, 0.4 microwatts per square centimeter, or 0.04 percent of the allowable ANSI limit for controlled exposure, and 0.20 percent of the allowable limit for uncontrolled exposure. This figure is less than 5% of the applicable FCC exposure limit at all locations extending out from the base of the tower. Section 1.1307(b)(3) excludes applications when the calculated level is predicted to be less than 5% of the applicable exposure limit. 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.

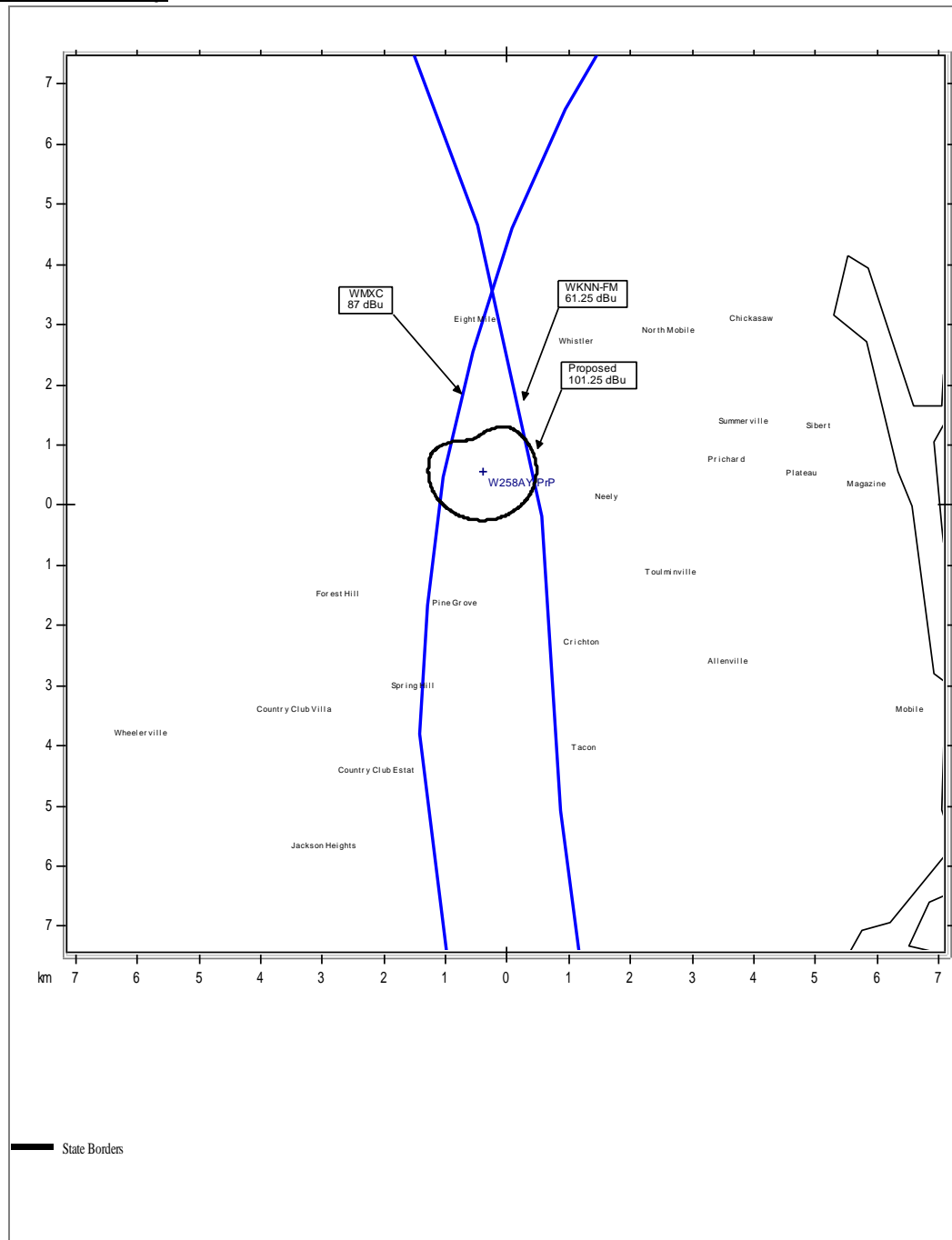
**Figure 1. Overlap and Spacing Study**

Callsign	Freq	Chanl	ERP_w	Class	Status	Dist_km	Sep	Clr
W258AY	99.5	258	8	D	LIC	3.42	0	-72.73 dB
WMXC	99.9	260	94000	C	LIC	28.33	0	-28.15 dB
WKNN-FM	99.1	256	99000	C1	LIC	63.27	0	-2.18 dB
W258AQ	99.5	258	13	D	LIC	42.22	0	0.22 dB
WKNN-FM	99.1	256	51000	C1	CP	63.27	0	3.08 dB
WKSM	99.5	258	50000	C2	LIC	147.61	0	13.96 dB
WRNO-FM	99.5	258	100000	C0	LIC	194.83	0	20.80 dB
WMFC	99.3	257	30000	C2	LIC	116.68	0	23.03 dB
WKSM	99.5	258	0	C2	USE	147.62	0	24.23 dB
WMXC	99.9	260	0	C	USE	28.33	0	26.98 dB
WRNO-FM	99.5	258	12300	C0	CP	206.71	0	27.71 dB
WRNO-FM	99.5	258	9900	C0	LIC	207.36	0	28.85 dB
WLAU	99.3	257	50000	C2	LIC	165.29	0	32.01 dB
WMFC	99.3	257	0	C2	USE	116.68	0	32.33 dB
WRNO-FM	99.5	258	0	C0	USE	194.83	0	33.86 dB
W259BH	99.7	259	250	D	LIC	132.94	0	34.34 dB
WMSO	98.9	255	25000	C3	LIC	158.13	0	38.29 dB

**Figure 1a. Antenna Pattern**



**Figure 2. Contour Map**



**Figure 3. Distance to Signal**

<p><b>Proposed Antenna:</b> DCR-T4E</p> <p><b>Proposed Power:</b> 0.25 kW</p> <p><b>Antenna Height AGL:</b> 159 meters</p> <p><b>Interference Contour:</b> 101.25 dBu</p> <p><b>Artificial Rcv Antenna Height:</b> 8 meters</p> <p><b>Distance (Free Space) Equation:</b> <math>= (10^{((106.92 - [\text{desired dBu}] + [\text{ERP in dBk}]) / 20)}) * 1000</math></p> <p><b>Field Strength (dBu) Equation:</b> <math>= 106.92 - (20 * (\text{LOG10}[\text{DistMeters}] / 1000)) + [\text{ERP in dBk}]</math></p>								
<b>Depression</b>				<b>Distance</b>				
<b>Angle</b>	<b>Antenna</b>			<b>from Ant.</b>	<b>Distance</b>	<b>Field Streng</b>	<b>Distance</b>	<b>field Strength</b>
<b>Below</b>	<b>Relative</b>	<b>ERP</b>	<b>ERP</b>	<b>to Interf</b>	<b>from Ant. to</b>	<b>in dBu @</b>	<b>from Ant.</b>	<b>in dBu @</b>
<b>Horizon</b>	<b>Field</b>	<b>in kW</b>	<b>in dBk</b>	<b>Contour</b>	<b>Artificial Plane</b>	<b>Artificial Plane</b>	<b>to Ground Level</b>	<b>Ground Level</b>
0°	1.000	0.250	-6.02	960.44 m	infinite	---	infinite	---
-5°	0.950	0.226	-6.47	912.42 m	1732.53 m	95.68 dBu	1824.32 m	95.23 dBu
-10°	0.809	0.164	-7.86	777.00 m	869.57 m	100.27 dBu	915.64 m	99.82 dBu
-15°	0.607	0.092	-10.36	582.99 m	583.42 m	101.24 dBu	614.33 m	100.80 dBu
-20°	0.381	0.036	-14.40	365.93 m	441.49 m	99.62 dBu	464.88 m	99.17 dBu
-25°	0.170	0.007	-21.41	163.27 m	357.30 m	94.45 dBu	376.23 m	94.00 dBu
-30°	0.001	0.000	-66.02	0.96 m	302.00 m	51.30 dBu	318.00 m	50.85 dBu
-35°	0.122	0.004	-24.29	117.17 m	263.26 m	94.22 dBu	277.21 m	93.77 dBu
-40°	0.171	0.007	-21.36	164.24 m	234.91 m	98.14 dBu	247.36 m	97.69 dBu
-45°	0.183	0.008	-20.77	175.76 m	213.55 m	99.56 dBu	224.86 m	99.11 dBu
-50°	0.164	0.007	-21.72	157.51 m	197.12 m	99.30 dBu	207.56 m	98.85 dBu
-55°	0.129	0.004	-23.81	123.90 m	184.34 m	97.80 dBu	194.10 m	97.35 dBu
-60°	0.091	0.002	-26.84	87.40 m	174.36 m	95.25 dBu	183.60 m	94.80 dBu
-65°	0.057	0.001	-30.90	54.75 m	166.61 m	91.58 dBu	175.44 m	91.13 dBu
-70°	0.031	0.000	-36.19	29.77 m	160.69 m	86.61 dBu	169.20 m	86.16 dBu
-75°	0.014	0.000	-43.10	13.45 m	156.33 m	79.94 dBu	164.61 m	79.49 dBu
-80°	0.005	0.000	-52.04	4.80 m	153.33 m	71.17 dBu	161.45 m	70.72 dBu
-85°	0.001	0.000	-66.02	0.96 m	151.58 m	57.29 dBu	159.61 m	56.84 dBu
-90°	0.001	0.000	-66.02	0.96 m	151.00 m	57.32 dBu	159.00 m	56.87 dBu



**Figure 4. Aerial View of Antenna Location.**

