

**Comprehensive Engineering Exhibit**  
**Wilmington, DE**  
**Facility ID No. 139424**

This exhibit is for a new translator, facility ID 139424 which is seeking a change in antenna location, change in antenna height and a change in frequency of 2 channels from the original application. The proposed facility will be a fill-in translator for WRFF (FM), Facility ID# 53969, Philadelphia, PA.

It is proposed to locate the transmit antenna 110 meters above ground on a 370' guyed tower in Wilmington DE as identified by ASR# 1254011. The proposed antenna is a horizontally polarized Scala 3xCL-FM/HRM/HV, (3 sections) with an ERP of 0.175KW.

Below as Figure 1 is a spacing study from which it can be determined that this proposal is within the protected contours of WPEN Burlington NJ and WRDW-FM Philadelphia PA which are each on a second adjacent channel. With respect to all other authorized facilities this proposal will not create any prohibited contour overlap.

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", as recently described in FCC 08-242 in connection with BPFT-19981001TA, allows for the use of U/D Analysis, also known as "signal strength ratio methodology." In this instant case the facilities of WPEN and WRDW-FM and this proposal are second adjacent channels, which are to be afforded protection from signals 40 dB stronger.

Figure 2 is a map showing the predicted signal contours of WPEN and WRDW-FM at the proposed translator location utilizing the FCC F50:50 curve. WPEN is predicted to present a 65.3 dBu signal level, and WRDW-FM is predicted to present a 69.0 dBu signal level at the translator tower location. Using the worst case of WPEN, the 105.3 dBu contour (65.3 dBu + 40 dB) of this proposal is the lowest value predicted to cause interference to either station. Also shown in Figure 2 are the contours of this proposal and that of the original application, along with the primary station.

Figure 3 depicts the predicted signal strength from the translator both at ground level, and at receiving antenna locations up to 30 meters above ground level of the translator. The 30 meter data is identified in the table as the "artificial plane," and as can be determined by the columns colored green, at no location from ground level to 30 meters above ground does the predicted signal of the proposed translator exceed that of 40 dB greater than WPEN or WRDW-FM.

Figure 4 is an aerial photograph of the support tower. It can be determined from the image that no habitable space exists near the tower which exceeds 30 meters, or 98.4 feet above ground level, thus compliance with Section 74.1204(d) has been demonstrated.

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 has been evaluated using "FM Model", as a worst case "Ring Stub" single bay being mounted with its center of radiation 110 meters above ground level, with an effective radiated power of 0.175 kilowatts in the horizontal plane.

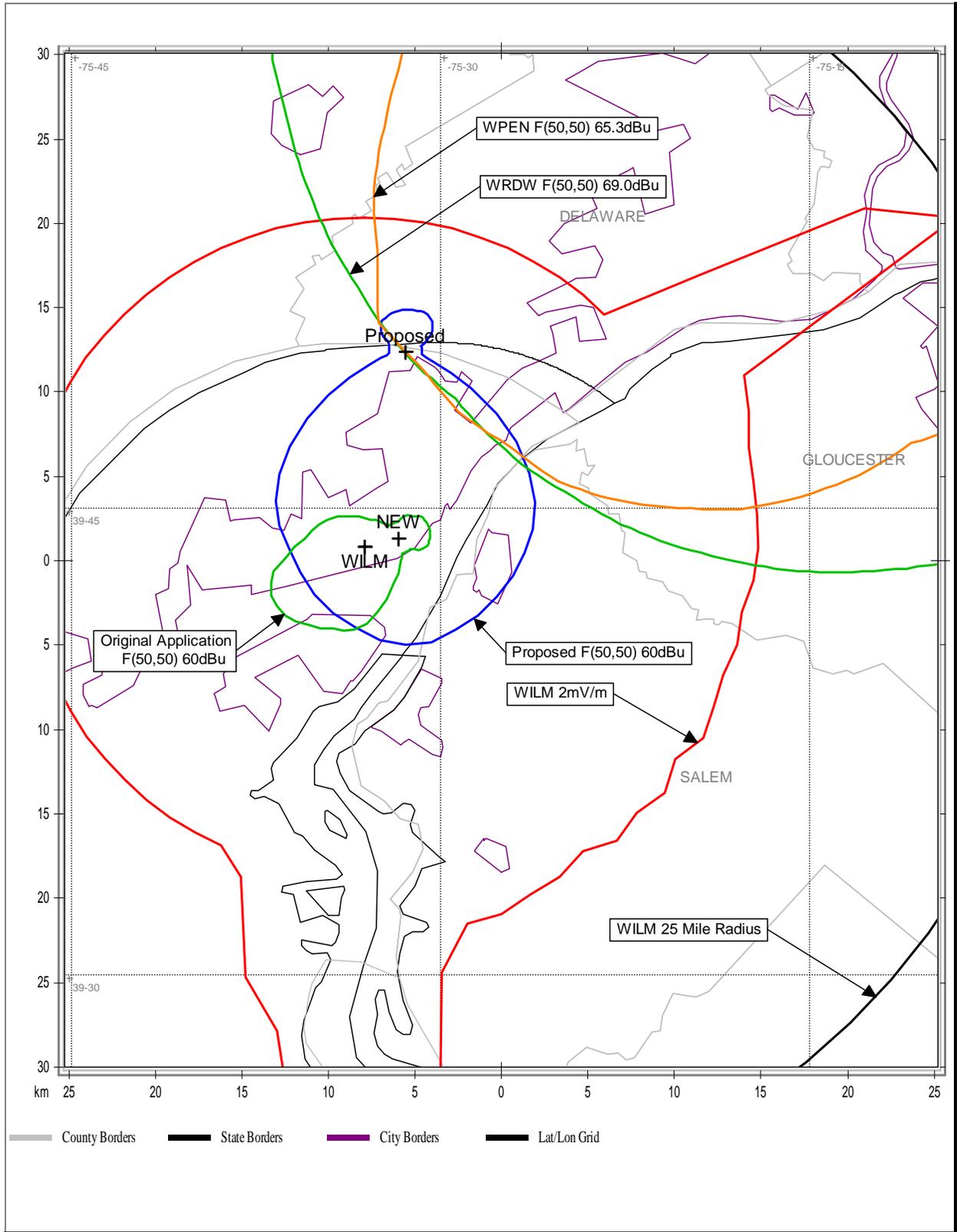
At 2 meters above the surface, at 62.4 meters from the closest point of approach, this proposal will contribute worst case, .139 microwatts per square centimeter, or 0.0139% of the allowable ANSI limit for controlled exposure, and 0.0695% of the allowable limit for uncontrolled exposure. This figure is less than 5% of the applicable FCC exposure limit and thus is categorically excluded from environmental processing for purposes of RF compliance, pursuant to Section 1.1307(b)(3)(ii).

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. Spacing Study**

Comstudy 2.2 Search of Channel 245 (96.9 MHz Class D) at 39-50-02.3 N, 75-31-26.6 W									
Callsign	State	City	Freq	Channel	ERP_w	Class	Status	Distance_km	Clr
NEW	DE	WILMINGTON	97.3	247	175	D	APP	0	-40.57 dB
WRDW-FM	PA	PHILADELPHIA	96.5	243	9600	B	LIC	33.71	-15.11 dB
WPEN	NJ	BURLINGTON	97.5	248	26000	B	LIC	40.23	-11.32 dB
WRDW-FM	PA	PHILADELPHIA	96.5	243	5000	B	LIC	33.43	-5.42 dB
WPEN	NJ	BURLINGTON	97.5	248	850	B	LIC	33.49	-5.16 dB
WLAN-FM	PA	LANCASTER	96.9	245	50000	B	LIC	83.19	0.00 dB
WFPG	NJ	ATLANTIC CITY	96.9	245	50000	B	LIC	105.35	0.40 dB
WFPG	NJ	ATLANTIC CITY	96.9	245	50000	B	LIC	105.35	1.93 dB
W245AG	PA	GLADWYNE	96.9	245	9	D	LIC	33.46	4.10 dB
W246BI	DE	MIDDLETOWN	97.1	246	80	D	LIC	36.89	4.82 dB
WLAN-FM	PA	LANCASTER	96.9	245	20000	B	LIC	83.14	5.34 dB
W245AG	PA	GLENSIDE	96.9	245	10	D	CP	40.22	6.89 dB
WENJ	NJ	MILLVILLE	97.3	247	50000	B	LIC	86.2	9.11 dB
WZZE	PA	GLEN MILLS	97.3	247	18	D	LIC	9.87	12.75 dB
W299BH	DE	MARSHALLTON	107.7	299	250	D	LIC	14.4	14.4
WCEI-FM	MD	EASTON	96.7	244	12500	B1	LIC	109.1	16.93 dB
W246AQ	NJ	COLLINGSWOOD	97.1	246	10	D	LIC	33.71	17.56 dB
WFPG	NJ	ATLANTIC CITY	96.9	245	440	B	LIC	108.54	19.79 dB
W245BH	DE	LEWES	96.9	245	27	D	LIC	128.29	21.11 dB
WRVV	PA	HARRISBURG	97.3	247	15000	B	LIC	128	23.00 dB
NEW	PA	COLLEGEVILLE	97.1	246	80	D	APP	33.57	22.72 dB
WRDW-FM	PA	PHILADELPHIA	96.5	243	0	B	USE	33.49	23.40 dB
NEW	NJ	TRENTON	96.9	245	10	D	APP	87.13	25.92 dB
NEW	NJ	TRENTON	96.9	245	10	D	APP	87.13	25.92 dB
WASH	DC	WASHINGTON	97.1	246	17500	B	LIC	166.09	26.96 dB
W245AC	NJ	HARMONY TOWNSHIP	96.9	245	10	D	LIC	111.19	27.43 dB
WASH	DC	WASHINGTON	97.1	246	15500	B	LIC	161.26	28.53 dB
WRVV	PA	HARRISBURG	97.3	247	4000	B	LIC	128	28.88 dB
WCEI-FM	MD	EASTON	96.7	244	1500	B1	LIC	127.5	29.58 dB
NEW	PA	HARLEYSVILLE	97.1	246	75	D	APP	50.38	30.84 dB
W246AR	PA	BENSALEM	97.1	246	74	D	LIC	59.57	30.39 dB
WQHT	NY	NEW YORK	97.1	246	6700	B	LIC	165.56	31.45 dB
WXNY-FM	NY	NEW YORK	96.3	242	6000	B	LIC	165.56	32.93 dB
WXNY-FM	NY	NEW YORK	96.3	242	12500	B	LIC	166.05	32.72 dB
WHUR-FM	DC	WASHINGTON	96.3	242	16500	B	LIC	166.09	32.13 dB
WFPG	NJ	ATLANTIC CITY	96.9	245	0	B	USE	105.35	33.90 dB
WCEI-FM	MD	EASTON	96.7	244	0	B1	USE	127.52	34.13 dB
WLAN-FM	PA	LANCASTER	96.9	245	0	B	USE	83.19	34.40 dB
WFAJ	VA	NASSAWADOX	96.9	245	13500	B1	LIC	258.04	35.07 dB
WXNY-FM	NY	NEW YORK	96.3	242	4600	B	LIC	165.56	35.02 dB
W245BH	DE	LEWES	96.7	244	38	D	APP	128.29	35.01 dB
WXNY-FM	NY	NEW YORK	96.3	242	26000	B	LIC	151.18	36.87 dB
WQHT	NY	NEW YORK	97.1	246	29500	B	LIC	151.18	36.76 dB
WXNY-FM	NY	NEW YORK	96.3	242	26000	B	APP	151.16	36.82 dB
WENJ	NJ	MILLVILLE	97.3	247	0	B	USE	62.94	37.33 dB
WAVD	MD	OCEAN PINES	97.1	246	3800	A	CP	165.15	37.25 dB
WAVD	MD	OCEAN PINES	97.1	246	4600	A	LIC	164.08	37.37 dB
WENJ	NJ	MILLVILLE	97.3	247	440	B	LIC	108.54	38.75 dB
WPEL-FM	PA	MONTROSE	96.5	243	57000	B	LIC	226.19	38.69 dB
WBYN-FM	PA	BOYERTOWN	107.5	298	5500	B	LIC	54.77	39.8
WBYN-FM	PA	BOYERTOWN	107.5	298	5500	B	LIC	54.77	39.8

**Figure 2. Contour Map**



**Figure 3. Distance to Interference Contour With Antenna Vertical Pattern**

<b>Proposed Antenna:</b>	Scala 3xCL- FM/HRM/HV
<b>Proposed Power:</b>	0.175 kW
<b>Antenna Height AGL:</b>	110 meters
<b>Interference Contour:</b>	105.3 dBu f(50:10)
<b>Artificial Rcv Antenna Height:</b>	30 meters
<b>Distance (Free Space) Equation:</b>	$= (10^{((106.92 - [\text{desired dBu}] + [\text{ERP in dBk}]) / 20)) * 1000}$
<b>Field Strength (dBu) Equation</b>	$= 106.92 - (20 * (\text{LOG}_{10}[\text{DistMeters} / 1000])) + [\text{ERP in dBk}]$

Depression				Distance				
Angle	Antenna			from Ant.	Distance	Field Strength	Distance	Field Strength
Below	Relative	ERP	ERP	to Interf	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	0.175	-7.57	504.10 m	infinite	---	infinite	---
-5°	0.949	0.158	-8.02	478.39 m	917.90 m	99.64 dBu	1262.11 m	96.87 dBu
-10°	0.813	0.116	-9.37	409.84 m	460.70 m	104.28 dBu	633.46 m	101.52 dBu
-15°	0.611	0.065	-11.85	308.01 m	309.10 m	105.27 dBu	425.01 m	102.50 dBu
-20°	0.385	0.026	-15.86	194.08 m	233.90 m	103.68 dBu	321.62 m	100.91 dBu
-25°	0.171	0.005	-22.91	86.20 m	189.30 m	98.47 dBu	260.28 m	95.70 dBu
-30°	0.010	0.000	-47.57	5.04 m	160.00 m	75.27 dBu	220.00 m	72.50 dBu
-35°	0.124	0.003	-25.70	62.51 m	139.48 m	98.33 dBu	191.78 m	95.56 dBu
-40°	0.187	0.006	-22.13	94.27 m	124.46 m	102.89 dBu	171.13 m	100.12 dBu
-45°	0.200	0.007	-21.55	100.82 m	113.14 m	104.30 dBu	155.56 m	101.53 dBu
-50°	0.180	0.006	-22.46	90.74 m	104.43 m	104.08 dBu	143.59 m	101.31 dBu
-55°	0.141	0.003	-24.59	71.08 m	97.66 m	102.54 dBu	134.29 m	99.77 dBu
-60°	0.098	0.002	-27.75	49.40 m	92.38 m	99.86 dBu	127.02 m	97.10 dBu
-65°	0.056	0.001	-32.61	28.23 m	88.27 m	95.40 dBu	121.37 m	92.63 dBu
-70°	0.024	0.000	-39.97	12.10 m	85.13 m	88.35 dBu	117.06 m	85.59 dBu
-75°	0.010	0.000	-47.57	5.04 m	82.82 m	80.99 dBu	113.88 m	78.22 dBu
-80°	0.010	0.000	-47.57	5.04 m	81.23 m	81.16 dBu	111.70 m	78.39 dBu
-85°	0.010	0.000	-47.57	5.04 m	80.31 m	81.26 dBu	110.42 m	78.49 dBu
-90°	0.010	0.000	-47.57	5.04 m	80.00 m	81.29 dBu	110.00 m	78.52 dBu

**Figure 4.**

