

**Comprehensive Engineering Exhibit  
W242BG Winchester, VA  
Facility ID No. 142766**

This exhibit is for a minor modification of Construction Permit BPFT-20120522ACR for translator station W242BG, facility ID 142766 which is seeking a change in antenna location, increase in antenna height and an increase in power. The proposed facility will be a fill-in translator for WKSI-FM Stephens City VA, Facility ID 26998.

It is proposed to locate the transmit antenna 46 meters above ground on a tower identified by registration number 1053229 which is a support structure for WUSQ -FM and WKSI-FM. The proposed antenna is an RFS CPF500-1 with an ERP of 0.045KW.

Below as Figure 1 is a spacing study from which it can be determined that this proposal is within the protected contour of WZRV Front Royal VA which is on the 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 WZRV 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 contour of WZRV at the proposed translator location utilizing the FCC F50:50 curve. WZRV is predicted to present a 64.98 dBu signal at the translator tower location. Thus the 104.98 dBu contour (64.98 dBu + 40 dB) of this proposal is the lowest value predicted to cause interference to WZRV. Also Shown in Figure 2 are the contours of this proposal and that of the currently licensed facility.

Figure 3 depicts the predicted signal strength from the translator both at ground level, and at receiving antenna locations up to 5 meters above ground level of the translator. The 5 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 5 meters above ground does the predicted signal of the proposed translator exceed that of 40 dB greater than WZRV.

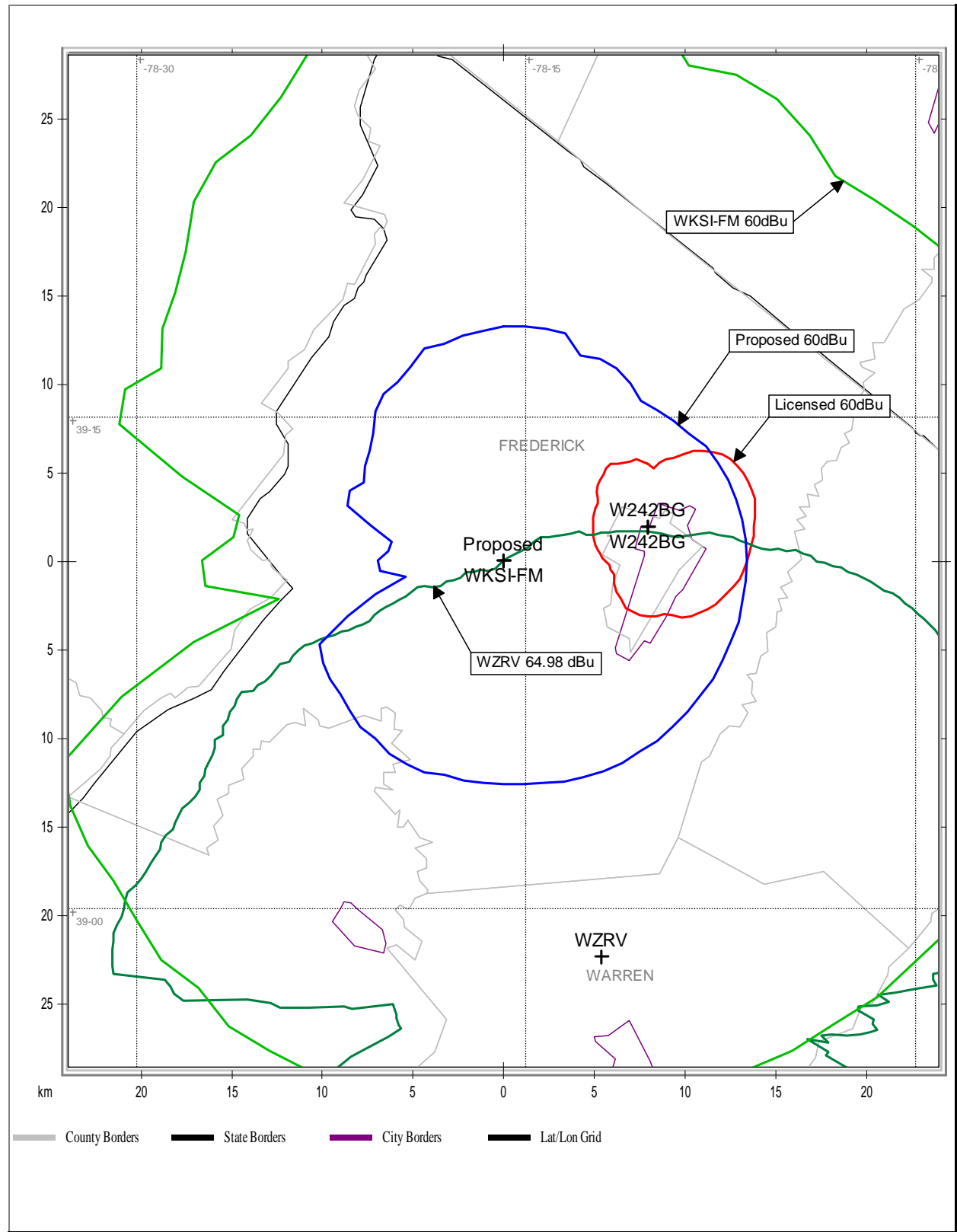
Figure 4 is an aerial photograph of the support tower. It can be determined from the image that no habitable space exists near the tower which exceeds 5 meters, or 16.4 feet above ground level (residential two stories), thus compliance with Section 74.1204(d) has been demonstrated.

The proposed Effective Radiated Power is less than 100 Watts and is therefore categorically excluded from environmental processing with regard to Radio Frequency Exposure.

**Figure 1. Spacing Study**

Comstudy 2.2 Search of Channel 239 (95.7 MHz Class D) at 39-10-38 N, 78-15-53 W									
Callsign	State	City	Freq	Channel	ERP_w	Class	Status	Distance_km	Clr
W242BG	VA	WINCHESTER	95.7	239	5	D	CP	8.26	-47.84 dB
W242BG	VA	WINCHESTER	96.3	242	9	D	LIC	8.26	-9.15 dB
WZRV	VA	FRONT ROYAL	95.3	237	6000	A	LIC	23.07	-5.80 dB
NEW	VA	BERRYVILLE	96.1	241	250	D	APP	26.12	10.78 dB
NEW	VA	BERRYVILLE	96.1	241	250	D	APP	26.12	10.78 dB
WICL	MD	WILLIAMSPORT	95.9	240	3300	A	LIC	63.22	10.34 dB
WPGC-FM	MD	MORNINGSIDE	95.5	238	50000	B	LIC	122.29	10.79 dB
WIKZ	PA	CHAMBERSBURG	95.1	236	50000	B	LIC	96.65	12.12 dB
WFGI-FM	PA	JOHNSTOWN	95.5	238	57000	B	LIC	146.18	12.36 dB
WPGC-FM	MD	MORNINGSIDE	95.5	238	40000	B	LIC	104.95	12.76 dB
WHUR-FM	DC	WASHINGTON	96.3	242	16500	B	LIC	105.61	15.83 dB
WPGC-FM	MD	MORNINGSIDE	95.5	238	14000	B	LIC	122.29	16.67 dB
WJDV	VA	BROADWAY	96.1	241	2600	B1	LIC	90.4	21.12 dB
WFLO-FM	VA	FARMVILLE	95.7	239	50000	B	LIC	205.71	23.22 dB
WZRV	VA	FRONT ROYAL	95.3	237	0	A	USE	23.12	23.42 dB
WICL	MD	WILLIAMSPORT	95.9	240	0	A	USE	63.2	23.53 dB
WRBS-FM	MD	BALTIMORE	95.1	236	50000	B	LIC	137.6	26.09 dB
W240BH	VA	GAINESVILLE	95.9	240	55	D	LIC	85.01	26.37 dB
NEW	PA	GETTYSBURG	95.7	239	19	D	APP	135.23	27.05 dB
WMRF-FM	PA	LEWISTOWN	95.7	239	3900	A	LIC	169.37	27.21 dB
W242AR	MD	HANCOCK	96.3	242	19	D	LIC	59.71	29.42 dB
WGRQ	VA	FAIRVIEW BEACH	95.9	240	2500	A	CP MOD	120.64	31.27 dB
NEW	PA	YORK	95.7	239	80	D	APP	159.19	31.60 dB
WSWW-FM	WV	CRAIGSVILLE	95.7	239	25000	B1	LIC	214.22	32.19 dB
WPGC-FM	MD	MORNINGSIDE	95.5	238	0	B	USE	122.34	32.85 dB
W292CI	VA	WINCHESTER	106.3	292	10	D	LIC	33.83	33.8
W238BN	VA	ORANGE	95.5	238	19	D	LIC	103.26	33.04 dB
WKST-FM	PA	PITTSBURGH	96.1	241	48000	B	LIC	198.69	34.39 dB
WBOP	VA	BUFFALO GAP	95.5	238	6000	A	LIC	138.58	34.04 dB
WSOX	PA	RED LION	96.1	241	13500	B	LIC	165.81	34.15 dB
WMRF-FM	PA	LEWISTOWN	95.7	239	0	A	USE	166.78	34.08 dB
WKST-FM	PA	PITTSBURGH	96.1	241	44000	B	LIC	198.69	34.61 dB
W293AM	WV	MARTINSBURG	106.5	293	102	D	LIC	34.82	34.8
WFLO-FM	VA	FARMVILLE	95.7	239	0	B	USE	207.47	35.32 dB
WBEN-FM	PA	PHILADELPHIA	95.7	239	8900	B	LIC	277.08	35.74 dB
WBEN-FM	PA	PHILADELPHIA	95.7	239	11000	B	LIC	276.93	35.90 dB
WBEN-FM	PA	PHILADELPHIA	95.7	239	11000	B	LIC	276.93	35.90 dB
WKHK	VA	COLONIAL HEIGHTS	95.3	237	50000	B	LIC	206.14	36.95 dB
W240AF	VA	CHARLOTTESVILLE	95.9	240	50	D	LIC	133.7	36.77 dB
WKHK	VA	COLONIAL HEIGHTS	95.3	237	47000	B	LIC	206.14	36.24 dB
WKHK	VA	COLONIAL HEIGHTS	95.3	237	50000	B	LIC	206.12	36.95 dB
WGRQ	VA	FAIRVIEW BEACH	95.9	240	1900	A	LIC	144.64	37.93 dB
WVKF	OH	SHADYSIDE	95.7	239	6800	B1	LIC	235.1	37.23 dB
WQMZ	VA	CHARLOTTESVILLE	95.1	236	6000	A	LIC	126.58	38.39 dB
NEW	PA	SELINGROVE	95.7	239	250	D	APP	216.39	38.70 dB
WVKL	VA	NORFOLK	95.7	239	40000	B	LIC	306.04	38.87 dB
W237CA	VA	CULPEPER	95.3	237	99	D	LIC	80.53	38.94 dB
W242AD	MD	OAKLAND	96.3	242	100	D	LIC	92.26	38.95 dB
WSOX	PA	RED LION	96.1	241	4500	B	LIC	165.81	38.39 dB
WFGI-FM	PA	JOHNSTOWN	95.5	238	0	B	USE	146.18	38.72 dB
WWIN-FM	MD	GLEN BURNIE	95.9	240	3000	A	LIC	146.57	39.35 dB

**Figure 2. Contour Map**



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

<div> <div> Proposed Antenna: RFS CPF500-1  Proposed Power: 0.045 kW  Antenna Height AGL: 46 meters  Interference Contour: 104.98 dBu  Artificial Rcv Antenna Height: 5 meters  Distance (Free Space) Equation: <math display="block">=(10^{((106.92-[desired\ dBu]+[ERP\ in\ dBk])/20)})*1000</math>  Field Strength (dBu) Equation <math display="block">"=106.92-(20*(LOG10[DistMeters]/1000)))+[ERP\ in\ dBk]</math> </div> <div> Fill in "yellow" cells </div> </div>								
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	0.045	-13.47	265.22 m	infinite	---	infinite	---
-5°	0.949	0.041	-13.92	251.67 m	470.42 m	99.55 dBu	527.79 m	98.55 dBu
-10°	0.805	0.029	-15.35	213.45 m	236.11 m	104.10 dBu	264.90 m	103.10 dBu
-15°	0.594	0.016	-18.00	157.49 m	158.41 m	104.93 dBu	177.73 m	103.93 dBu
-20°	0.353	0.006	-22.51	93.65 m	119.88 m	102.84 dBu	134.50 m	101.84 dBu
-25°	0.123	0.001	-31.68	32.57 m	97.01 m	95.50 dBu	108.85 m	94.50 dBu
-30°	0.062	0.000	-37.66	16.36 m	82.00 m	90.98 dBu	92.00 m	89.98 dBu
-35°	0.178	0.001	-28.48	47.08 m	71.48 m	101.35 dBu	80.20 m	100.35 dBu
-40°	0.217	0.002	-26.73	57.61 m	63.78 m	104.09 dBu	71.56 m	103.10 dBu
-45°	0.189	0.002	-27.92	50.23 m	57.98 m	103.73 dBu	65.05 m	102.73 dBu
-50°	0.115	0.001	-32.22	30.61 m	53.52 m	100.13 dBu	60.05 m	99.13 dBu
-55°	0.023	0.000	-46.23	6.10 m	50.05 m	86.70 dBu	56.16 m	85.70 dBu
-60°	0.060	0.000	-37.85	16.02 m	47.34 m	95.57 dBu	53.12 m	94.57 dBu
-65°	0.114	0.001	-32.33	30.24 m	45.24 m	101.48 dBu	50.76 m	100.48 dBu
-70°	0.128	0.001	-31.34	33.90 m	43.63 m	102.79 dBu	48.95 m	101.79 dBu
-75°	0.104	0.000	-33.16	27.48 m	42.45 m	101.20 dBu	47.62 m	100.20 dBu
-80°	0.012	0.000	-51.88	3.18 m	41.63 m	82.65 dBu	46.71 m	81.65 dBu
-85°	0.007	0.000	-56.57	1.86 m	41.16 m	78.07 dBu	46.18 m	77.07 dBu
-90°	0.058	0.000	-38.17	15.44 m	41.00 m	96.49 dBu	46.00 m	95.50 dBu

**Figure 4.**

