

May 2013
FM Translator K221BI
Wenatchee, Washington Channel 221D
Allocation Study

The attached spacing study shows the spacing between the proposed translator site and the location of cochannel and adjacent channel stations and proposals. This study was made with the Commission's Class A spacing requirements, and individual situations were examined to determine the lack of prohibited contour overlap per the requirements of §74.1204 of the Rules. The attached allocation study maps demonstrate compliance with the Commission's Rules for protection of FM broadcast stations and FM translators as outlined in §74.1204.

Since the proposed facility will operate with an ERP of less than 100 watts, there are no spacing restrictions to stations which are 53 or 54 channels removed from the proposed operation.

K223BK 223D Cashmere

The proposed translator transmitter site is located within the 60 dBu protected contour of second-adjacent channel station K223BK 223D Cashmere. The proposed site is 11.97 km from the K223BK transmitter site at a bearing of 130 degrees True. Given the K223BK antenna's 225 meter HAAT and 250 watt ERP along this radial, K223BK places a 68.4 dBu contour at the translator transmitter site. The corresponding interfering contour from the translator is $68.4 + 40 = 108.4$ dBu. The attached map of the proposed transmitter site depicts the 108.4 dBu contour from the proposed facility, which extends 265 meters from the antenna per a Free Space calculation. There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to K223BK.

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SEARCH PARAMETERS                      FM Database Date: 130515
Channel: 221A      92.1 MHz                      Page 1
Latitude:  47 27 44
Longitude: 120 21 28
Safety Zone:  50 km
Job Title: K221BI AT KKRT SITE

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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
K218DF LIC	CLE ELUM WA BLFT-10715ABR	218D 91.5	0.022 326.0	47-09-46 120-47-36	224.8	46.83 0.00	0 TRANS	
KLWS LIC	MOSES LAKE WA BLED-970609KD	218C2 91.5	7.200 209.0	47-18-50 119-34-55	105.5	60.86 5.86	55 CLOSE	
K219BM LIC	CHELAN WA BLFT-890911TA	219D 91.7	0.026 883.0	47-48-25 120-01-58	32.3	45.45 0.00	0 TRANS	
KPBW LIC	BREWSTER WA BLED-20521AAL	220C2 91.9	1.000 755.2	48-02-14 119-59-07	23.4	69.77 -36.23	106 SHORT	
K220CQ LIC	BREWSTER, ETC, WA BLFT-920225TC	220D 91.9	0.046 1256.0	48-02-14 119-59-07	23.4	69.77 0.00	0 TRANS	
K220HD LIC	FALL CITY WA BMLFT-81014AAR	220D 91.9	0.004 778.0	47-30-34 121-58-56	273.1	122.54 0.00	0 TRANS	
K220DV LIC	GRAND COULEE WA BLFT-940215TA	220D 91.9	0.046 171.0	47-57-16 119-00-09	61.1	115.50 0.00	0 TRANS	
K220CS LIC	TWISP, ETC. WA BLFT-920225TE	220D 91.9	0.046 832.0	48-19-03 120-06-53	10.7	96.82 0.00	0 TRANS	
KDNA LIC	YAKIMA WA BMLD-60906ABQ	220C1 91.9	18.500 280.0	46-31-42 120-31-03	186.7	104.53 -28.47	133 SHORT	
KDNAaux LIC	YAKIMA WA BXLED-60906ABP	220C1 91.9	0.185 270.0	46-31-42 120-31-03	186.7	104.53 0.00	0 AUX	
	VICTORIA BC RM-	221C 92.1	0.000 0.0	48-30-20 123-28-23	297.7	259.89 12.89	247 CLEAR	
CJRQFM	VICTORIA BC -	221C 92.1	0.000 0.0	48-25-00 123-22-00	296.4	248.60 1.60	247 CLOSE	
CJRQFM	VICTORIA BC -	221C 92.1	87.000 636.0	48-45-13 123-29-25	302.9	273.93 26.93	247 CLEAR	
K221BI LIC	EAST WENATCHEE WA BLFT-21105AAE	221D 92.1	0.016 396.0	47-22-52 120-17-16	149.7	10.45 0.00	0 TRANS	

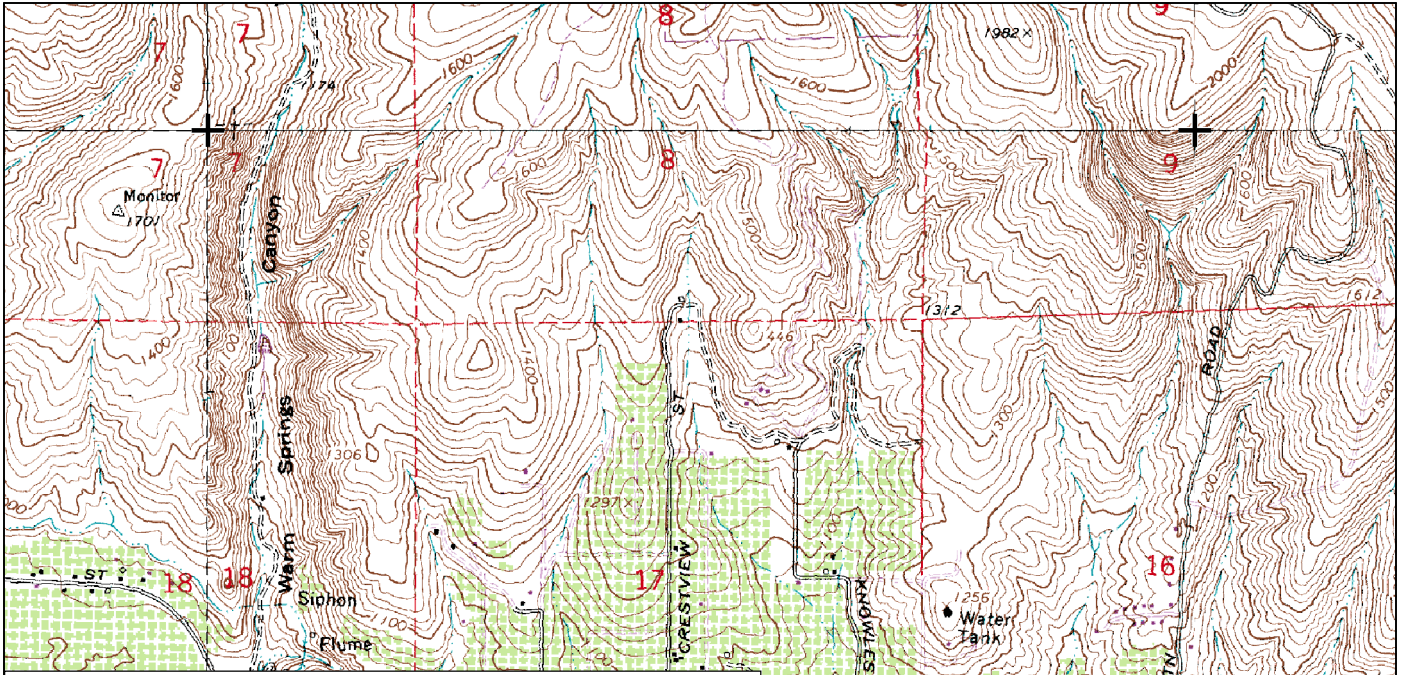
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SEARCH PARAMETERS                      FM Database Date: 130515
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Safety Zone:  50 km
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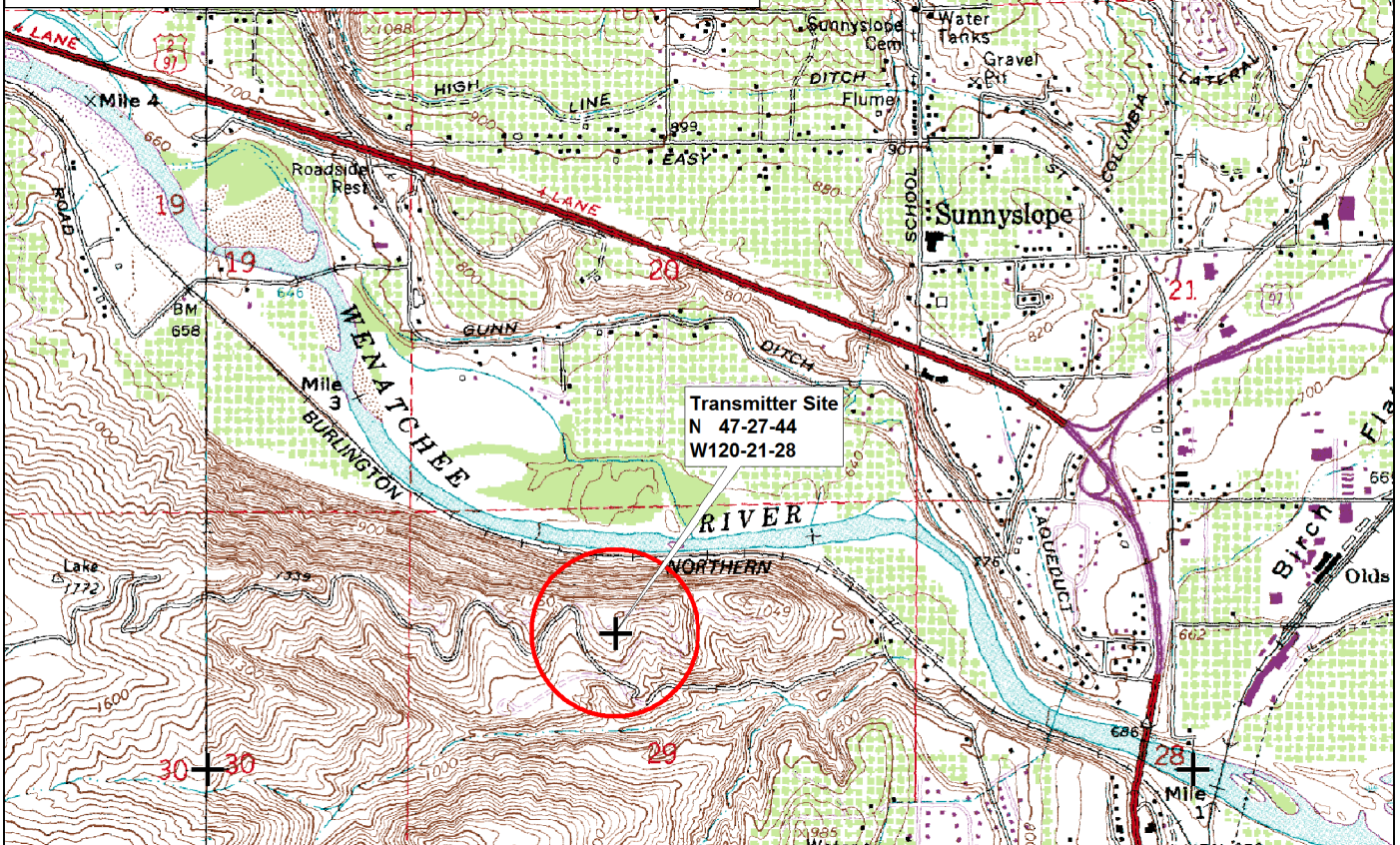
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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
K221BT LIC	OTHELLO, ETC. WA	BLFT-870423TC	221D 92.1	0.046 DA 276.0	46-56-43 119-23-12	127.7	93.36 0.00	0 TRANS
K221FJ LIC	TACOMA WA	BLFT-00202ABK	221D 92.1	0.150 DA 179.0	47-14-32 122-27-57	262.0	161.15 0.00	0 TRANS
K221FR LIC	WEST SEATTLE, ETC. WA	BLFT-20620AAK	221D 92.1	0.250 DA 245.0	47-28-50 122-31-58	271.5	163.98 0.00	0 TRANS
KULE-FM LIC	EPHRATA WA	BLH-990108KA	222C2 92.3	26.000 205.0	47-18-18 119-35-53	106.7 SS	59.97 -46.03	106 SHORT
KQMVaux LIC	BELLEVUE WA	BXMLH-21107AFM	223C 92.5	1.700 374.0	47-32-41 122-06-28	274.6	132.17 0.00	0 AUX
KQMVaux LIC	BELLEVUE WA	BLH-990803KJ	223C 92.5	8.400 374.0	47-32-41 122-06-28	274.6	132.17 0.00	0 AUX
KQMV LIC	BELLEVUE WA	BLH-60824AEA	223C 92.5	60.000 698.0	47-30-17 121-58-03	272.8 SS	121.42 26.42	95 CLEAR
K223BK LIC	CASHMERE WA	BLFT-80307ACJ	223D 92.5	0.250 230.0	47-31-50 120-28-50	309.5	11.97 0.00	0 TRANS
K223AZ LIC	CHELAN WA	BLFT-70719ACW	223D 92.5	0.013 DA 246.0	47-51-15 120-09-58	18.2	45.89 0.00	0 TRANS
NEW-T APP	CASHMERE WA	BNPFT-30317BQH	274D 102.7	0.038 378.0	47-30-21 120-24-33	321.5	6.21 0.00	0 TRANS
NEW-T APP	ENTIAT WA	BNPFT-30317JRZ	275D 102.9	0.050 DA 330.0	47-39-48 120-11-47	28.4	25.45 0.00	0 TRANS
NEW-T APP	SOUTH CHELAN WA	BNPFT-30317AAZ	275D 102.9	0.003 DA 863.0	47-48-24 120-02-05	32.2	45.34 0.00	0 TRANS
NEW-T APP	WENATCHEE WA	BNPFT-30317JOD	275D 102.9	0.007 523.0	47-29-37 120-19-14	38.7	4.48 0.00	0 TRANS

===== END OF FM SPACING STUDY FOR CHANNEL 221 =====



Red circle indicates the extent of the 108.4 dBu interfering contour, having a radius of 265 meters per a Free Space calculation. This area is unpopulated.



Transmitter Site Map
FM Translator K221BI
Wenatchee, WA 3/2013

Wenatchee, WA Quadrangle
7.5 Minute Series
Contour Interval 20 Feet

May 2013
FM Translator K221BI
Wenatchee, Washington Channel 221D
RF Exposure Study

Facilities Proposed

The proposed operation will be on Channel 221D (92.1 MHz) with an effective radiated power of 99 watts. Diplexed operation with K232ED is proposed, with an antenna to be mounted on an existing tower used by KKRT(AM) having FCC Antenna Structure Registration Number 1031821.

RF Exposure Calculations

OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (Edition 97-01) states in part that:

When performing an evaluation for compliance with the FCC's RF guidelines all significant contributors to the ambient RF environment should be considered. . . For purposes of such consideration, significance can be taken to mean any transmitter producing more than 5% of the applicable exposure limit (in terms of power density or the square of the electric or magnetic field strength) at accessible locations.

As will be demonstrated below, the proposed operation of K221BI will produce less than 5% of the applicable exposure limit for both controlled and uncontrolled environments. Thus, the proposed facility is categorically excluded from the requirement of further study. Therefore, pursuant to §1.1307(b)(3) of the Commission's Rules no calculations are required for the other FM and TV facilities in the vicinity, and precise calculations are made only with regard to the levels from this proposal.

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

D is the distance in meters from the center of radiation to the calculation point.

Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 1000 meters. Values past this point are increasingly negligible.

Since the Commission's FMModel software does not include an element model for the Shively

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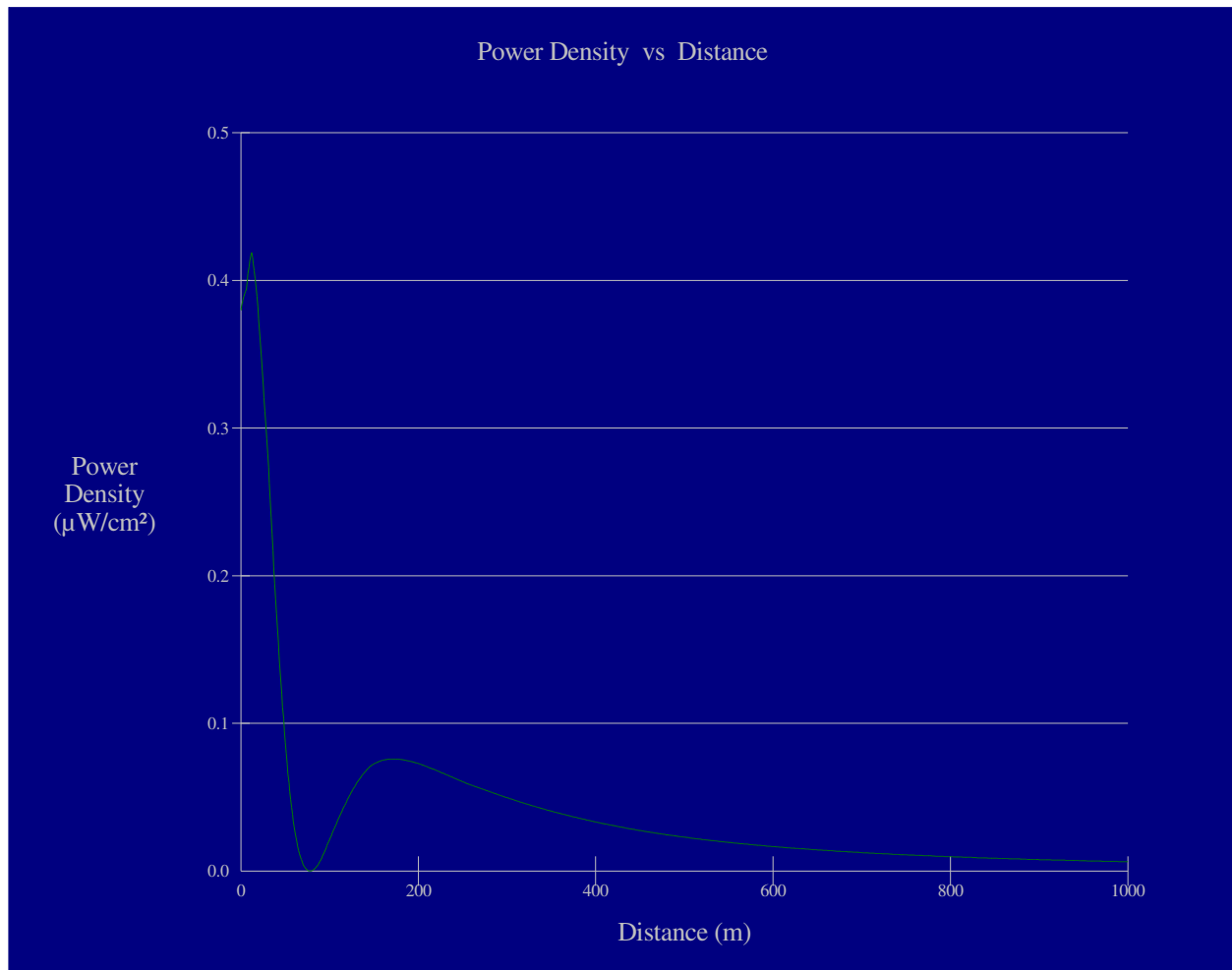
6832-2 antenna to be used, calculations of the power density produced by the K221BI antenna system have been made assuming the “ring stub” element model. Under this worst-case assumption, the highest calculated ground level power density from K221BI occurs 12 meters from the base of the antenna support structure. At this point the power density is calculated to be $0.4 \mu\text{W}/\text{cm}^2$, which is 0.2% of $200 \mu\text{W}/\text{cm}^2$ (the FCC standard for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of K221BI alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 1000 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.

KKRT 900 kHz Wenatchee

The translator antenna will be installed on the tower used by AM station KKRT 900 kHz Wenatchee. KKRT operates with 1000 watts nondirectional daytime, 72 watts nondirectional nighttime. The tower is 78.9 electrical degrees tall, or 21.9% of the station wavelength. Using Tables 1-4 in OET Bulletin No. 65, the worst-case fencing distance requirement for this station is 3 meters from the tower base. The tower is fenced to at least this distance.



Ground-Level RF Exposure

OET FMModel

K221BI Wenatchee

Antenna Type: Shively 6832-2 (ring stub assumed)

No. of Elements: 2

Element Spacing: 0.76 wavelength

Distance: 1000 meters

Horizontal ERP: 99 W

Vertical ERP: 99 W

Antenna Height: 70 meters AGL

Maximum Calculated Power Density is $0.4 \mu\text{W}/\text{cm}^2$ at 12 meters from the antenna structure.

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