

**June 2023
FM Translator K221BA
Grangeville, Idaho Channel 227D
Allocation Study**

Background and Non-Adjacent Channel Change

This application is being filed as a minor modification of the licensed facility of FM translator K221BA, proposing operation on Channel 227D. K221BA presently operates on Channel 221D, which is on a first-adjacent channel to the construction permit for a new NCE FM station on Channel 220A at Grangeville (see FCC File No. 167207) at this same transmitter site. Once the new FM station is activated, there would be significant interference created between the two first-adjacent channel stations, which will necessitate K221BA moving to an alternate channel. The interference with Grangeville 220A will be completely eliminated by modifying K221BA to non-adjacent Channel 227D.

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 map demonstrates compliance with the Commission's Rules for protection of FM broadcast stations and FM translators as outlined in §74.1204.

KORT-FM 224C2 Grangeville

The proposed translator transmitter site is located within the 60 dBu protected contour of third-adjacent channel station KORT-FM 224C2 Grangeville. The following calculation, performed using the *Living Way* methodology, demonstrates interference protection to that station.

Protected Station	Distance & Bearing to Proposal	Station ERP and HAAT on that azimuth	Station Field Strength at Proposal	Corresponding Translator Interfering Contour	Distance to Translator Interfering Contour
KORT-FM 224C2	0.06 km 93 deg True	1.0 kW 701 meters	131.4 dBu Free Space	171.4 dBu	0.3 meters Free Space

The 171.4 dBu contour extends just 0.3 meters from the translator antenna per a Free Space calculation and does not reach ground level. There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to KORT-FM, which in any case is the station to be rebroadcast.

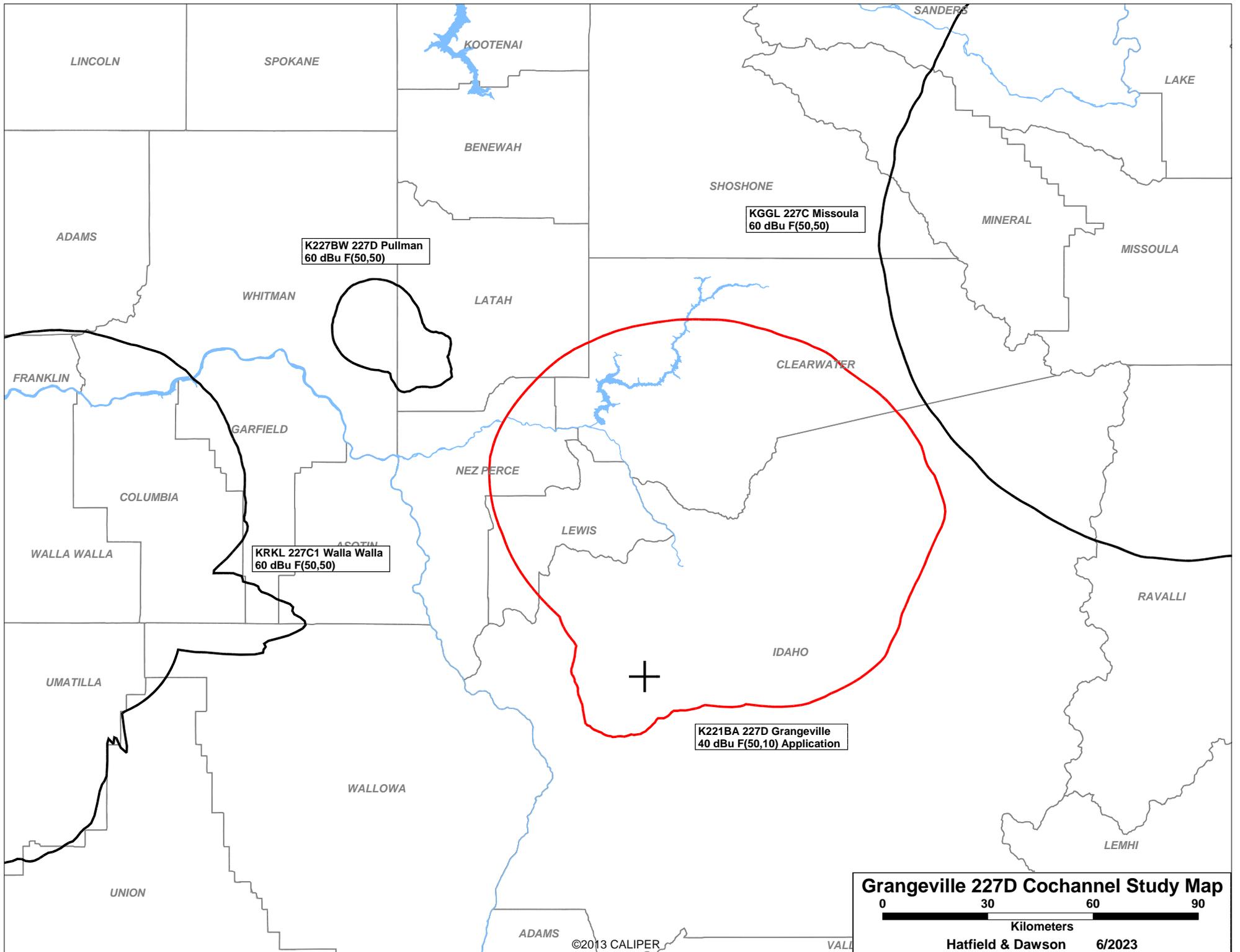
The attached spacing study demonstrates compliance with §73.207 of the Commission's Rules regarding spacing restrictions to stations which are 53 or 54 channels removed from the proposed operation.

```

=====
SEARCH PARAMETERS                               FM Database Date: 20230612
Channel: 227A      93.3 MHz                      Page 1
Latitude: 45 51 47.5 (NAD83)
Longitude: 116 7 24.6
Safety Zone: 50 km
Job Title: GRANGEVILLE 227
    
```

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KORT-FM LIC	GRANGEVILLE ID	BMLH-20190731AAT	224C2 92.7	1.000 717.0	45 51 47.6 116 7 27.5	272.8	0.06	55
							-54.94	SHORT
K226CT LIC	LEWISTON ID	BLFT-20181025AAQ	226D 93.1	0.250 0.0	DA 46 27 32.6 117 2 21.6	313.5	96.91	0
							0.00	TRANS
KRKL LIC	WALLA WALLA WA	BMLD-20020130AB	227C1 93.3	42.000 420.0	45 59 18.5 118 10 31.8	275.8	159.78	200
							-40.22	SHORT
K227BW LIC	PULLMAN WA	BLFT-20130617ABX	227D 93.3	0.500 0.0	DA 46 40 53.6 116 58 16.6	324.7	112.01	0
							0.00	TRANS
KGGL LIC	MISSOULA MT	BLH-19950426KA	227C 93.3	43.000 777.0	47 1 56.7 113 59 34.3	50.7	209.03	226
							-16.97	SHORT
K228DU LIC	CLARKSTON WA	BLFT-20061023ACZ	228D 93.5	0.014 0.0	46 27 41.5 117 0 32.5	314.6	95.40	0
							0.00	TRANS
K228CZ LIC	NEW MEADOWS ETC. ID	BLFT-19900312TD	228D 93.5	0.190 0.0	DA 44 45 53.6 116 11 44.4	182.7	122.19	0
							0.00	TRANS

==== END OF FM SPACING STUDY FOR CHANNEL 227 =====



K227BW 227D Pullman
60 dBu F(50,50)

KGGL 227C Missoula
60 dBu F(50,50)

KRKL 227C1 Walla Walla
60 dBu F(50,50)

K221BA 227D Grangeville
40 dBu F(50,10) Application

Grangeville 227D Cochannel Study Map

0 30 60 90

Kilometers

Hatfield & Dawson 6/2023

June 2023
FM Translator K221BA
Grangeville, Idaho Channel 227D
RF Exposure Study

Facilities Proposed

The proposed operation will be on Channel 227D (93.3 MHz) with a maximum lobe effective radiated power of 250 watts. Operation is proposed with the existing broadband log periodic antenna which is mounted on an existing wooden pole at the High Camp electronics site.

The proposed antenna support structure will not exceed 60.96 meters (200 feet) above ground and does not require notification to the Federal Aviation Administration. Therefore, this structure does not require an Antenna Structure Registration Number.

RF Exposure Calculations

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.

$$S(\mu W / cm^2) = \frac{33.4 \times AdjERP(Watts)}{D^2}$$

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.

The instant application proposes only a change in the output channel of the existing K221BA facility, using the existing broadband log periodic antenna, which was most recently licensed in September 2020 (see FCC File No. 0000121391). The channel change is necessitated by the grant of a construction permit for a new FM station on Channel 220A at this same transmitter site, on the first-adjacent channel. Thus the modification of K221BA

will in no way change the existing RF environment at the transmitter site, which was previously found to be in compliance with the FCC Guidelines.

Calculations of the power density produced by the proposed K221BA antenna system have been made using the manufacturer's elevation pattern for the Scala CL-FM(V) antenna to be used. The translator will operate with a single CL-FM(V) element and so the manufacturer's elevation pattern is considered to be a valid source for data concerning the power to be radiated towards ground level.

The highest calculated ground level power density from K221BA occurs at a point 24 meters from the base of the antenna support structure. At this point the power density is calculated to be $3.9 \mu\text{W}/\text{cm}^2$, which is 1.95% of $200 \mu\text{W}/\text{cm}^2$ (the FCC MPE for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of K221BA alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 500 meters from the base of the antenna support structure. Section 1.1307 of the Commission's Rules exempts applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicant's 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 exposure in excess of FCC guidelines.

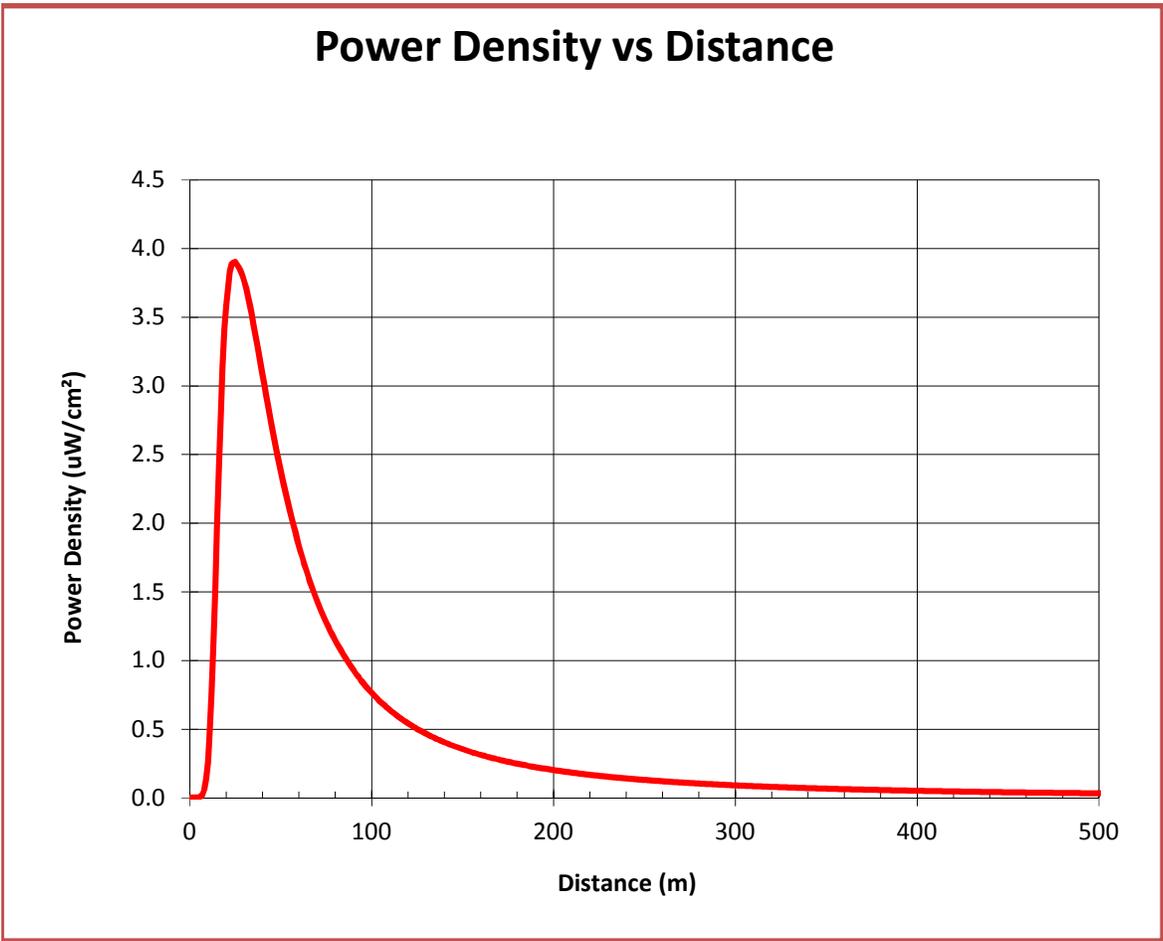
K221BA 227D Grangeville

Ground-Level Power Density Calculations

Using Manufacturer's Vertical Plane Pattern

Antenna	CLFMV		
ERP	-	Watts H (avg)	
	250	Watts V (avg)	
Antenna AGL	17	meters less 2m is	15 meters above the reference plane
MBT	0	degrees	

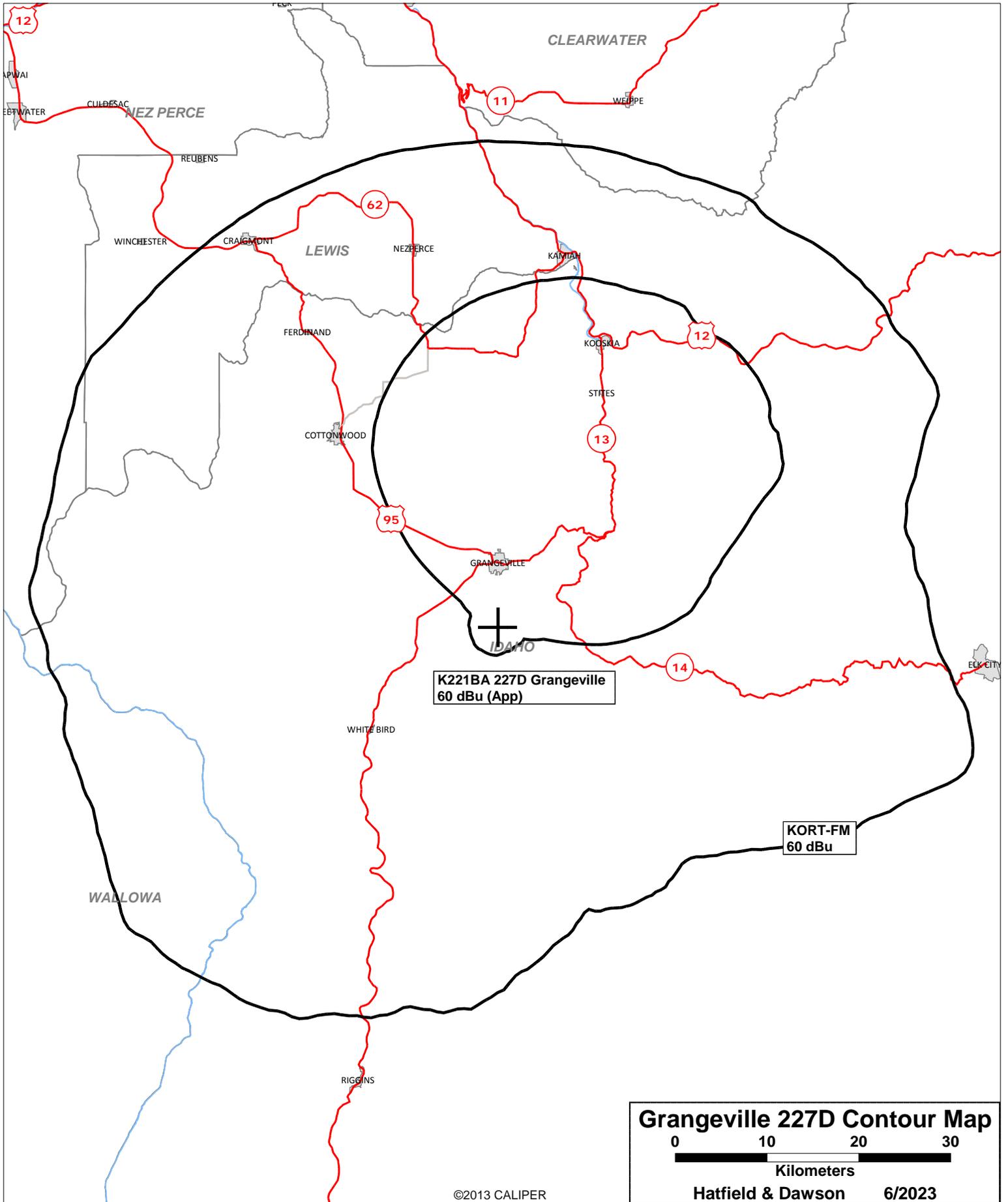
Calculated Maximum is 3.9 $\mu\text{W}/\text{cm}^2$ at 24 meters from the tower



**K221BA 227D Grangeville
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern**

Distance From Tower (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm ²
0	15.00	90.00	0.010	0.0	0.00
1	15.03	86.19	0.010	0.0	0.00
2	15.13	82.41	0.010	0.0	0.00
3	15.30	78.69	0.010	0.0	0.00
4	15.52	75.07	0.010	0.0	0.00
5	15.81	71.57	0.017	0.1	0.01
6	16.16	68.20	0.029	0.2	0.03
7	16.55	64.98	0.045	0.5	0.06
8	17.00	61.93	0.070	1.2	0.14
9	17.49	59.04	0.098	2.4	0.26
10	18.03	56.31	0.137	4.7	0.48
11	18.60	53.75	0.179	8.0	0.77
12	19.21	51.34	0.225	12.6	1.14
13	19.85	49.09	0.270	18.2	1.55
14	20.52	46.97	0.317	25.1	1.99
15	21.21	45.00	0.360	32.4	2.41
16	21.93	43.15	0.401	40.1	2.79
17	22.67	41.42	0.439	48.1	3.13
18	23.43	39.81	0.473	56.1	3.41
19	24.21	38.29	0.501	62.9	3.58
20	25.00	36.87	0.527	69.6	3.72
21	25.81	35.54	0.553	76.4	3.83
22	26.63	34.29	0.574	82.5	3.89
23	27.46	33.11	0.593	88.0	3.90
24	28.30	32.01	0.612	93.6	3.90
25	29.15	30.96	0.629	98.8	3.88
26	30.02	29.98	0.645	104.1	3.86
27	30.89	29.05	0.662	109.6	3.84
28	31.76	28.18	0.678	114.8	3.80
29	32.65	27.35	0.693	120.0	3.76
30	33.54	26.57	0.707	124.9	3.71
31	34.44	25.82	0.720	129.7	3.65
32	35.34	25.11	0.733	134.3	3.59
33	36.25	24.44	0.744	138.6	3.52
34	37.16	23.81	0.755	142.6	3.45
35	38.08	23.20	0.766	146.5	3.38
36	39.00	22.62	0.775	150.3	3.30
37	39.92	22.07	0.785	154.0	3.23
38	40.85	21.54	0.794	157.5	3.15
39	41.79	21.04	0.802	160.9	3.08
40	42.72	20.56	0.811	164.2	3.01
41	43.66	20.10	0.818	167.4	2.93
42	44.60	19.65	0.825	170.2	2.86
43	45.54	19.23	0.832	172.9	2.78
44	46.49	18.82	0.838	175.4	2.71

45	47.43	18.43	0.843	177.9	2.64
46	48.38	18.06	0.849	180.2	2.57
47	49.34	17.70	0.854	182.5	2.51
48	50.29	17.35	0.860	184.8	2.44
49	51.24	17.02	0.865	186.9	2.38
50	52.20	16.70	0.870	189.0	2.32
51	53.16	16.39	0.874	191.0	2.26
52	54.12	16.09	0.879	193.0	2.20
53	55.08	15.80	0.883	194.9	2.15
54	56.04	15.52	0.887	196.8	2.09
55	57.01	15.26	0.891	198.5	2.04
56	57.97	15.00	0.895	200.3	1.99
57	58.94	14.74	0.898	201.5	1.94
58	59.91	14.50	0.900	202.7	1.89
59	60.88	14.26	0.903	203.9	1.84
60	61.85	14.04	0.906	205.0	1.79
61	62.82	13.82	0.908	206.1	1.75
62	63.79	13.60	0.910	207.2	1.70
63	64.76	13.39	0.913	208.2	1.66
64	65.73	13.19	0.915	209.3	1.62
65	66.71	12.99	0.917	210.2	1.58
66	67.68	12.80	0.919	211.2	1.54
67	68.66	12.62	0.921	212.1	1.50
68	69.63	12.44	0.923	213.1	1.47
69	70.61	12.26	0.925	213.9	1.43
70	71.59	12.09	0.927	214.8	1.40
71	72.57	11.93	0.929	215.7	1.37
72	73.55	11.77	0.931	216.5	1.34
73	74.53	11.61	0.932	217.3	1.31
74	75.50	11.46	0.934	218.1	1.28
75	76.49	11.31	0.936	218.8	1.25
76	77.47	11.16	0.937	219.6	1.22
77	78.45	11.02	0.939	220.3	1.20
78	79.43	10.89	0.940	221.0	1.17
79	80.41	10.75	0.942	221.7	1.15
80	81.39	10.62	0.943	222.4	1.12
81	82.38	10.49	0.945	223.1	1.10
82	83.36	10.37	0.946	223.7	1.08
83	84.34	10.24	0.947	224.4	1.05
84	85.33	10.12	0.949	225.0	1.03
85	86.31	10.01	0.950	225.6	1.01
86	87.30	9.89	0.951	225.9	0.99
87	88.28	9.78	0.951	226.2	0.97
88	89.27	9.67	0.952	226.6	0.95
89	90.26	9.57	0.953	226.9	0.93
90	91.24	9.46	0.953	227.2	0.91
91	92.23	9.36	0.954	227.5	0.89
92	93.21	9.26	0.954	227.7	0.88
93	94.20	9.16	0.955	228.0	0.86
94	95.19	9.07	0.956	228.3	0.84
95	96.18	8.97	0.956	228.6	0.83
96	97.16	8.88	0.957	228.8	0.81



K221BA 227D Grangeville
60 dBu (App)

KORT-FM
60 dBu

Grangeville 227D Contour Map

0 10 20 30

Kilometers

Hatfield & Dawson

6/2023