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**Engineering Statement
Minor Modification of K21LB-D
Channel 21 at Lincoln City, OR
Aug 2023**

I. Background

This Engineering Statement has been prepared on behalf of Bridge News, LLC, licensee of low-power station K21LB-D Lincoln City. This material has been prepared in connection with an application for minor modification of construction permit 0000185134.

II. Interference Study

Study has been made of all cochannel and adjacent-channel facilities in the vicinity of the proposed operation, including a detailed Longley-Rice interference study to demonstrate that the proposed operation will not cause interference to any authorized or pending proposed facilities. This study was performed using the Commission's TVStudy software.

This study was conducted using a study cell size of 1.0 km and a terrain extraction increment of 1.0 km.

The results of this study indicate that the proposed facility is predicted to cause zero additional interference to any of the listed stations, beyond the allowed values of 0.5% to full-power and Class A stations, and 2.0% to low-power stations. Based on the foregoing interference study, it is believed that the proposed facility can operate without risk of interference to other stations.

Study created: 2023.08.23 15:46:48

Study build station data: LMS TV 2023-08-20

Proposal: K21LB-D D21 LD APP LINCOLN CITY, OR
File number: K21LB-MOD
Facility ID: 185411
Station data: User record
Record ID: 1525
Country: U.S.

Build options:

Protect pre-transition records not on baseline channel

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K20DD-D	D20	LD	LIC	ALBANY, ETC., OR	BLDTL20120524AIN	96.1 km
No	K20IR-D	D20	LD	LIC	COTTAGE GROVE, OR	BLDTT20090303ACH	150.6
No	KOXI-CD	D20	DC	LIC	PORTLAND, OR	BLANK0000131008	117.6
No	K20LL-D	D20	LD	LIC	REEDSPORT, OR	BLDTT20120613AAT	136.1
No	K20HT-D	D20	LD	LIC	ROCKAWAY BEACH, OR	BLDTT20120514ABZ	88.9
No	K20NL-D	D20	LD	LIC	GRAYS RIVER, LEBAM, WA	BLANK0000064254	172.1
No	K21LW-D	D21	LD	LIC	GAZELLE, CA	BLDTT20130912ADD	371.1
No	KTVZ	D21	DT	LIC	BEND, OR	BLCDT20100122ABM	232.9
No	K21KB-D	D21	LD	LIC	BROOKINGS, OR	BLDTL20120612AAW	314.6
No	K21KE-D	D21	LD	LIC	CANYONVILLE, OR	BLDTL20120606AAJ	234.4
No	K21JI-D	D21	LD	LIC	CAVE JUNCTION, ETC., OR	BLDTT20091118ACE	299.9
No	K21FS-D	D21	LD	LIC	EUGENE, OR	BLDTT20101029ACP	115.9
No	K21BG-D	D21	LD	LIC	JACKSONVILLE, OR	BLDTT20090521AFG	311.1
No	K21LY-D	D21	LD	LIC	MAPLETON, OR	BLDTT20120615ADJ	100.3
Yes	KPTV	D21	DT	CP	PORTLAND, OR	BLANK0000185110	117.4
No	KPXG-LD	D21	LD	LIC	PORTLAND, OR	BLANK0000125999	117.6
No	K21MB-D	D21	LD	LIC	SCOTTSBURG, OR	BLDTT20120607ADE	145.0
No	K21DE-D	D21	LD	LIC	SEASIDE-ASTORIA, OR	BLDTL20130415ACG	149.3
No	K21OT-D	D21+	LD	LIC	PASCO-KENNEWICK, WA	BLANK0000179350	400.8
No	KTBW-TV	D21	DT	LIC	TACOMA, WA	BLANK0000087359	303.8
No	KYVE	D21	DT	LIC	YAKIMA, WA	BLEDT20030910ACL	323.5
No	KMCB	D22	DT	CP	COOS BAY, OR	BLANK0000215821	173.1
No	KMCB	D22	DT	LIC	COOS BAY, OR	BLCDT20030717ACA	172.7
No	K22HO-D	D22	LD	LIC	COTTAGE GROVE, OR	BLDTT20090330AAP	150.6
Yes	KPXG-TV	D22	DT	LIC	SALEM, OR	BLCDT20110715ACN	117.6
No	KHPN-LD	D22	LD	CP	WARRENTON, OR	BLANK0000171560	149.3
No	KHPN-LD	D22	LD	LIC	WARRENTON, OR	BLANK0000152189	149.3

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D21
Mask: Simple
Latitude: 44 56 42.90 N (NAD83)
Longitude: 124 0 24.40 W
Height AMSL: 165.7 m
HAAT: 0.0 m
Peak ERP: 1.00 kW
Antenna: KAT-1X2 PANELS 0.0 deg
Elev Pattn: Generic

49.5 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.951 kW	94.0 m	29.9 km
45.0	0.099	-7.1	10.3
90.0	0.007	-133.1	5.5
135.0	0.075	-34.9	9.6

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180.0	0.869	85.7	28.4
225.0	0.482	165.7	31.9
270.0	0.054	165.7	20.9
315.0	0.385	165.7	30.7

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 63 m

Distance to Canadian border: 366.2 km

Distance to Mexican border: 1484.5 km

Conditions at FCC monitoring station: Ferndale WA
Bearing: 13.4 degrees Distance: 459.1 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 102.6 degrees Distance: 1620.9 km

No land mobile station failures found

Study cell size: 1.00 km
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%
Maximum new IX to LPTV: 2.00%

No IX check failures found.

III. RF Exposure Study

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.

Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground, based on the manufacturer's vertical plane pattern for the elliptically-polarized Kathrein model 1X2 broadband UHF panel antenna array proposed in this application. This

antenna has a 70/30 split of horizontal and vertical power (or 1 kW horizontal and 0.43 kW vertical.) The highest calculated power density from the proposed antenna alone occurs at a point 31 meters from the base of the antenna support structure. At this point the power density is calculated to be $0.8 \mu\text{W}/\text{cm}^2$, which is 0.2% of $341 \mu\text{W}/\text{cm}^2$ (the FCC maximum for uncontrolled environments at the Channel 21 frequency).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of K21LB-D 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.

Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken. 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.

August 23, 2023

Erik C. Swanson, P.E.

K21LB-D Lincoln City

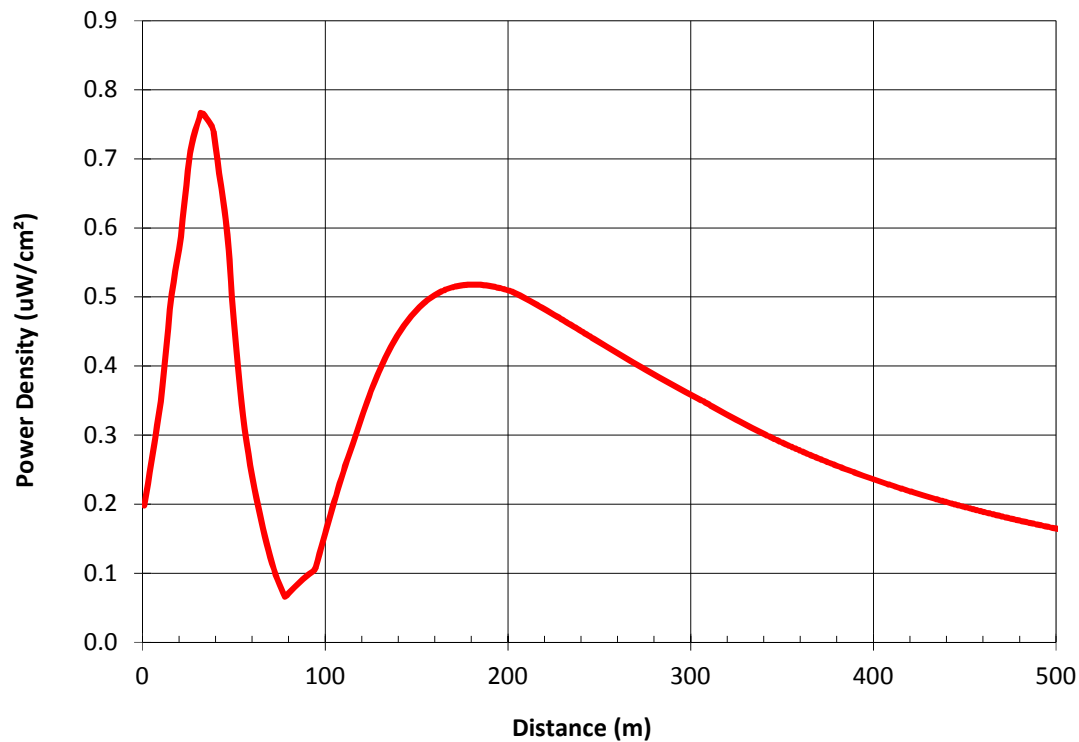
Ground-Level Power Density Calculations

Using Manufacturer's Vertical Plane Pattern

Antenna	K723147		
ERP	1,000	Watts H (avg)	
	430	Watts V (avg)	
Antenna AGL	56	meters less 2m is	54 meters above the reference plane
MBT	0	degrees	

Calculated
Maximum is 0.8 $\mu\text{W}/\text{cm}^2$ at 31 meters from the tower

Power Density vs Distance



K21LB-D Lincoln City
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	54.00	90.00	0.110	17.3	0.20
1	54.01	88.94	0.114	18.7	0.21
2	54.04	87.88	0.118	20.1	0.23
3	54.08	86.82	0.123	21.5	0.25
4	54.15	85.76	0.127	23.0	0.26
5	54.23	84.71	0.131	24.6	0.28
6	54.33	83.66	0.135	26.2	0.30
7	54.45	82.61	0.140	27.8	0.31
8	54.59	81.57	0.144	29.5	0.33
9	54.74	80.54	0.148	31.3	0.35
10	54.92	79.51	0.153	33.5	0.37
11	55.11	78.49	0.159	36.2	0.40
12	55.32	77.47	0.165	39.0	0.43
13	55.54	76.46	0.171	41.9	0.45
14	55.79	75.47	0.177	44.9	0.48
15	56.04	74.48	0.182	47.4	0.50
16	56.32	73.50	0.186	49.5	0.52
17	56.61	72.53	0.190	51.6	0.54
18	56.92	71.57	0.194	53.7	0.55
19	57.25	70.62	0.198	55.8	0.57
20	57.58	69.68	0.202	58.3	0.59
21	57.94	68.75	0.208	61.6	0.61
22	58.31	67.83	0.213	64.9	0.64
23	58.69	66.93	0.218	68.2	0.66
24	59.09	66.04	0.224	71.6	0.69
25	59.51	65.16	0.229	75.0	0.71
26	59.93	64.29	0.233	77.5	0.72
27	60.37	63.43	0.236	79.8	0.73
28	60.83	62.59	0.240	82.1	0.74
29	61.29	61.76	0.243	84.4	0.75
30	61.77	60.95	0.246	86.7	0.76
31	62.27	60.14	0.249	89.0	0.77
32	62.77	59.35	0.251	90.3	0.77
33	63.29	58.57	0.253	91.4	0.76
34	63.81	57.80	0.254	92.5	0.76
35	64.35	57.05	0.256	93.6	0.76
36	64.90	56.31	0.257	94.7	0.75
37	65.46	55.58	0.259	95.8	0.75
38	66.03	54.87	0.260	96.5	0.74
39	66.61	54.16	0.258	95.4	0.72
40	67.20	53.47	0.257	94.4	0.70
41	67.80	52.79	0.256	93.4	0.68
42	68.41	52.13	0.254	92.4	0.66
43	69.03	51.47	0.253	91.5	0.64
44	69.66	50.83	0.252	90.6	0.62

45	70.29	50.19	0.250	89.7	0.61
46	70.94	49.57	0.246	86.4	0.57
47	71.59	48.96	0.240	82.1	0.54
48	72.25	48.37	0.234	78.1	0.50
49	72.92	47.78	0.228	74.2	0.47
50	73.59	47.20	0.222	70.5	0.43
51	74.28	46.64	0.216	66.9	0.41
52	74.97	46.08	0.211	63.5	0.38
53	75.66	45.54	0.205	60.3	0.35
54	76.37	45.00	0.200	57.2	0.33
55	77.08	44.47	0.196	54.8	0.31
56	77.79	43.96	0.192	52.5	0.29
57	78.52	43.45	0.188	50.3	0.27
58	79.25	42.95	0.184	48.2	0.26
59	79.98	42.47	0.180	46.2	0.24
60	80.72	41.99	0.176	44.2	0.23
61	81.47	41.52	0.172	42.4	0.21
62	82.22	41.05	0.168	40.6	0.20
63	82.98	40.60	0.165	38.8	0.19
64	83.74	40.16	0.161	37.2	0.18
65	84.50	39.72	0.157	35.3	0.17
66	85.28	39.29	0.153	33.4	0.15
67	86.05	38.87	0.149	31.6	0.14
68	86.83	38.45	0.145	29.9	0.13
69	87.62	38.05	0.140	28.2	0.12
70	88.41	37.65	0.136	26.6	0.11
71	89.20	37.26	0.133	25.1	0.11
72	90.00	36.87	0.129	23.7	0.10
73	90.80	36.49	0.125	22.3	0.09
74	91.61	36.12	0.121	21.0	0.08
75	92.42	35.75	0.118	19.8	0.08
76	93.23	35.39	0.114	18.6	0.07
77	94.05	35.04	0.110	17.4	0.07
78	94.87	34.70	0.113	18.3	0.07
79	95.69	34.35	0.116	19.4	0.07
80	96.52	34.02	0.120	20.5	0.07
81	97.35	33.69	0.123	21.7	0.08
82	98.18	33.37	0.126	22.8	0.08
83	99.02	33.05	0.130	24.0	0.08
84	99.86	32.74	0.133	25.2	0.08
85	100.70	32.43	0.136	26.3	0.09
86	101.55	32.12	0.139	27.5	0.09
87	102.40	31.83	0.142	28.7	0.09
88	103.25	31.53	0.145	29.9	0.09
89	104.10	31.25	0.148	31.1	0.10
90	104.96	30.96	0.150	32.3	0.10
91	105.82	30.69	0.153	33.5	0.10
92	106.68	30.41	0.156	34.8	0.10
93	107.54	30.14	0.159	36.0	0.10
94	108.41	29.88	0.164	38.4	0.11
95	109.27	29.61	0.172	42.5	0.12
96	110.15	29.36	0.181	46.6	0.13

97	111.02	29.10	0.189	50.9	0.14
98	111.89	28.86	0.197	55.3	0.15
99	112.77	28.61	0.204	59.8	0.16
100	113.65	28.37	0.212	64.4	0.17
101	114.53	28.13	0.220	69.1	0.18
102	115.41	27.90	0.227	73.9	0.19
103	116.30	27.67	0.235	78.7	0.19
104	117.18	27.44	0.242	83.7	0.20
105	118.07	27.22	0.249	88.7	0.21
106	118.96	27.00	0.256	93.8	0.22
107	119.85	26.78	0.263	99.0	0.23
108	120.75	26.57	0.270	104.2	0.24
109	121.64	26.35	0.277	109.5	0.25
110	122.54	26.15	0.283	114.8	0.26
111	123.44	25.94	0.290	120.1	0.26
112	124.34	25.74	0.296	125.5	0.27
113	125.24	25.54	0.303	131.0	0.28
114	126.14	25.35	0.309	136.5	0.29
115	127.05	25.15	0.315	142.0	0.29
116	127.95	24.96	0.321	147.7	0.30
117	128.86	24.78	0.328	153.9	0.31
118	129.77	24.59	0.335	160.2	0.32
119	130.68	24.41	0.341	166.6	0.33
120	131.59	24.23	0.348	173.0	0.33
121	132.50	24.05	0.354	179.4	0.34
122	133.42	23.88	0.360	185.8	0.35
123	134.33	23.70	0.367	192.3	0.36
124	135.25	23.53	0.373	198.8	0.36
125	136.17	23.36	0.379	205.3	0.37
126	137.08	23.20	0.385	211.8	0.38
127	138.00	23.04	0.391	218.3	0.38
128	138.92	22.87	0.397	224.9	0.39
129	139.85	22.71	0.402	231.4	0.40
130	140.77	22.56	0.408	238.0	0.40
131	141.69	22.40	0.414	244.5	0.41
132	142.62	22.25	0.419	251.1	0.41
133	143.54	22.10	0.424	257.7	0.42
134	144.47	21.95	0.430	264.2	0.42
135	145.40	21.80	0.435	270.8	0.43
136	146.33	21.66	0.440	277.3	0.43
137	147.26	21.51	0.446	283.9	0.44
138	148.19	21.37	0.451	290.4	0.44
139	149.12	21.23	0.456	297.0	0.45
140	150.05	21.09	0.461	303.5	0.45
141	150.99	20.96	0.466	310.0	0.45
142	151.92	20.82	0.470	316.5	0.46
143	152.86	20.69	0.475	323.0	0.46
144	153.79	20.56	0.480	329.4	0.47
145	154.73	20.43	0.485	335.9	0.47
146	155.67	20.30	0.489	342.3	0.47
147	156.60	20.17	0.494	348.8	0.48
148	157.54	20.05	0.498	355.2	0.48