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**Engineering Statement  
Minor Modification of K24FH-D  
Channel 24 at Glide & Sutherlin, OR  
March 2023**

**I. Background**

This Engineering Statement has been prepared on behalf of Oregon Public Broadcasting, licensee of low-power station K24FH-D. This material has been prepared in connection with an application for minor modification of the licensed K24FH-D facility.

**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: 2023.03.10 11:07:41

Study build station data: LMS TV 2023-03-09

Proposal: K24FH-D D24 LD APP GLIDE, ETC., OR  
File number: K24FH-MOD  
Facility ID: 50585  
Station data: User record  
Record ID: 1470  
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	K23NI-D	D23	LD	LIC	CRESCENT CITY, CA	BLANK0000055353	180.8 km
No	K23ME-D	D23	LD	LIC	CAMAS VALLEY, OR	BLDTT20120510ABB	70.9
No	K23KD-D	D23	LD	LIC	COOS BAY, ETC., OR	BLDTT20110524AGT	86.4
No	KEVU-CD	D23	DC	LIC	EUGENE, OR	BLANK0000129446	70.1
Yes	KEZI	D23	LD	LIC	EUGENE, OR	BLCDT20120620AAA	47.0
No	K23PA-D	D23	LD	CP	KLAMATH FALLS, OR	BLANK0000170865	171.5
No	K23PA-D	D23	LD	LIC	KLAMATH FALLS, OR	BLANK0000165599	171.5
No	K23PN-D	D23	LD	LIC	LA PINE, OR	BLANK0000152593	135.3
No	K38CZ-D	D23	LD	LIC	LINCOLN CITY/NEWPORT, OR	BLANK0000078959	172.9
No	K23OS-D	D23	LD	LIC	LONDON SPRINGS, OR	BLANK0000116973	29.6
No	K23EX-D	D23	DC	LIC	MEDFORD, OR	BLDTA20131125BZO	113.0
No	K24KX-D	D24	LD	LIC	CEDARVILLE, CA	BLDTT20120730AKG	310.6
No	KKTF-LD	D24	LD	LIC	CHICO, CA	BLANK0000203345	395.2
No	KEET	D24	LD	LIC	EUREKA, CA	BLANK0000074563	339.7
No	K24MI-D	D24	LD	LIC	REDDING, CA	BLANK0000198032	311.9
Yes	K44JP-D	D24	LD	LIC	COTTAGE GROVE, OR	BLANK0000066928	45.2
Yes	K24MF-D	D24	LD	LIC	FLORENCE, OR	BLANK0000055171	104.1
No	K24KG-D	D24	LD	LIC	MADRAS, OR	BLDTT20120430ACW	203.4
Yes	KDSO-LD	D24-	LD	LIC	MEDFORD, OR	BLANK0000201191	122.0
No	DDK24DX	N24z	TX	APP	PENDLETON, ETC., OR	BLTTL19960301JB	363.0
Yes	KATU	D24	DT	LIC	PORTLAND, OR	BLANK0000158168	239.8
No	K24MH-D	D24	LD	LIC	POWERS, OR	BLANK0000058817	96.6
No	K24JE-D	D24	LD	LIC	SUNRIVER, OR	BLANK0000004689	137.4
No	K24JE-D	D24	LD	CP	SUNRIVER, OR	BLANK0000189946	137.4
No	KUNS-TV	D24	DT	LIC	BELLEVUE, WA	BLANK0000126240	476.8
No	K24IT-D	D24	LD	LIC	HOQUIAM, WA	BLANK0000001697	313.4
No	KCKW-LD	D25	LD	LIC	EUGENE, OR	BLANK0000166016	70.2
No	KEZI	D25	LD	LIC	EUGENE, OR	BLCDT20120626ACP	65.3
No	K25EN-D	D25	LD	LIC	GOLD BEACH, OR	BLDTT20100204ABD	151.1
No	K25JW-D	D25	LD	LIC	HUGO, ETC., OR	BLDTT20091118ACD	99.9
No	K25NI-D	D25	LD	LIC	MAPLETON, OR	BLDTT20120608AAW	98.2
No	K25IM-D	D25	LD	LIC	MEDFORD, OR	BLDTL20110125ACR	152.9
No	KOIN	D25	DT	LIC	PORTLAND, OR	BLANK0000107804	239.8
Yes	K25OK-D	D25	LD	LIC	YONCALLA, OR	BLANK0000058776	36.5
No	K31GP-D	N31-	TX	LIC	BROOKINGS, ETC., OR	BLTT20051214ACA	177.1

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D24  
Mask: Stringent  
Latitude: 43 22 15.90 N (NAD83)  
Longitude: 123 3 51.20 W  
Height AMSL: 1310.7 m  
HAAT: 0.0 m  
Peak ERP: 1.10 kW  
Antenna: KAT-4X2 PANEL ARRAY 0.0 deg  
Elev Pattn: Generic

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Elec Tilt: 2.20

49.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.000 kW	856.5 m	14.7 km
45.0	0.010	386.1	20.5
90.0	0.006	650.9	22.0
135.0	0.135	774.0	42.3
180.0	0.911	890.8	56.4
225.0	0.775	1025.9	57.4
270.0	0.978	933.5	57.6
315.0	0.394	1011.7	52.9

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m    Computed HAAT: 816 m

Distance to Canadian border: 540.7 km

Distance to Mexican border: 1294.1 km

Conditions at FCC monitoring station: Ferndale WA  
Bearing: 3.4 degrees    Distance: 622.0 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 97.5 degrees    Distance: 1516.2 km

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 K24FH-D facility were calculated for an elevation of 2 meters above ground using the manufacturer's vertical plane pattern for the horizontally-

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polarized Kathrein 4X2 panel antenna array proposed in this application. The highest calculated power density from the proposed antenna alone occurs at a point 4 meters from the base of the antenna support structure. At this point the power density from the proposed facility is calculated to be  $0.8 \mu\text{W}/\text{cm}^2$ , which is 0.2% of  $353 \mu\text{W}/\text{cm}^2$  (the FCC maximum for uncontrolled environments at the Channel 24 frequency).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of K24FH-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.

March 10, 2023

Erik C. Swanson, P.E.

# K24FH-D Glide & Sutherlin

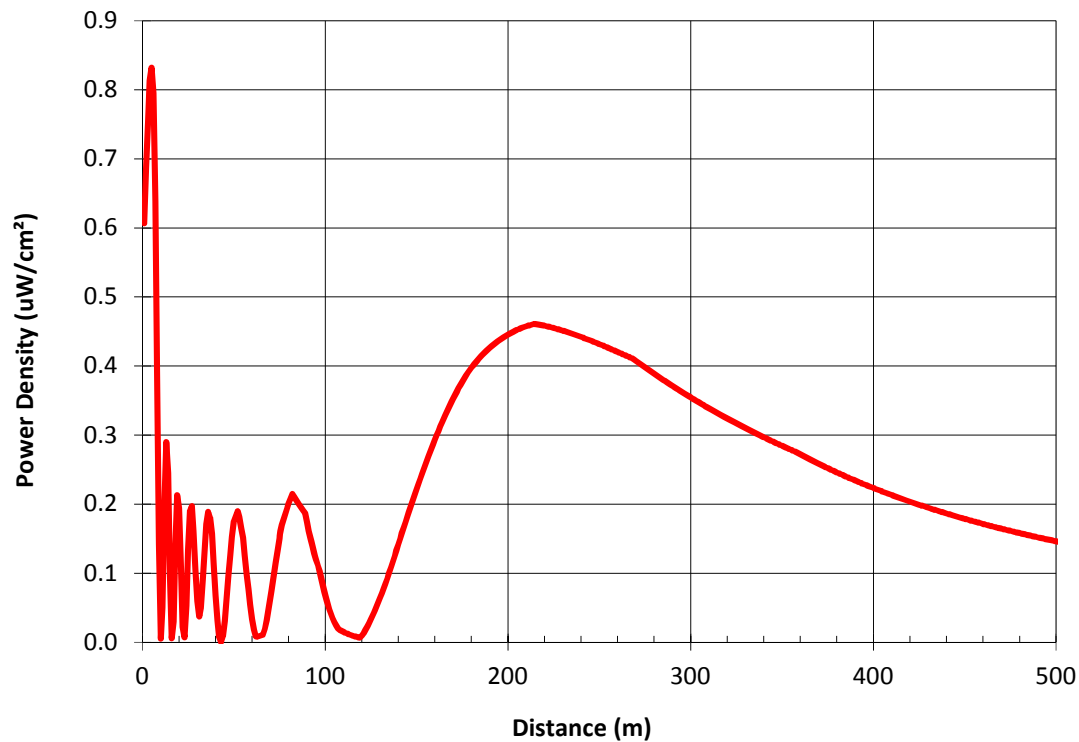
## Ground-Level Power Density Calculations

Using Manufacturer's Vertical Plane Pattern

Antenna	Kathrein 4x2 Panel Custom	
ERP	1,100 Watts H (avg)	
	- Watts V (avg)	
Antenna AGL	20.7 meters less 2m is	18.7 meters above the reference plane
MBT	0 degrees	

Calculated  
Maximum is 0.8  $\mu\text{W}/\text{cm}^2$  at 4 meters from the tower

### Power Density vs Distance



**K24FH-D Glide & Sutherlin**  
**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 <sup>2</sup>
0	18.70	90.00	0.076	6.4	0.61
1	18.73	86.94	0.081	7.2	0.69
2	18.81	83.90	0.085	8.0	0.75
3	18.94	80.89	0.089	8.7	0.81
4	19.12	77.93	0.091	9.1	0.83
5	19.36	75.03	0.090	8.9	0.80
6	19.64	72.21	0.082	7.4	0.64
7	19.97	69.48	0.066	4.8	0.40
8	20.34	66.84	0.040	1.8	0.14
9	20.75	64.30	0.008	0.1	0.01
10	21.21	61.86	0.025	0.7	0.05
11	21.70	59.53	0.050	2.8	0.20
12	22.22	57.31	0.062	4.3	0.29
13	22.77	55.19	0.059	3.8	0.24
14	23.36	53.18	0.039	1.7	0.10
15	23.97	51.27	0.010	0.1	0.01
16	24.61	49.45	0.022	0.6	0.03
17	25.27	47.73	0.048	2.6	0.13
18	25.96	46.09	0.062	4.3	0.21
19	26.66	44.54	0.061	4.1	0.19
20	27.38	43.08	0.047	2.4	0.11
21	28.12	41.68	0.022	0.5	0.02
22	28.87	40.36	0.013	0.2	0.01
23	29.64	39.11	0.036	1.4	0.05
24	30.43	37.92	0.058	3.7	0.13
25	31.22	36.80	0.071	5.5	0.19
26	32.03	35.72	0.074	6.1	0.20
27	32.84	34.71	0.069	5.2	0.16
28	33.67	33.74	0.057	3.6	0.11
29	34.51	32.82	0.044	2.1	0.06
30	35.35	31.94	0.036	1.4	0.04
31	36.20	31.10	0.042	2.0	0.05
32	37.06	30.30	0.058	3.7	0.09
33	37.93	29.54	0.072	5.8	0.13
34	38.80	28.81	0.084	7.7	0.17
35	39.68	28.11	0.090	8.9	0.19
36	40.57	27.45	0.090	8.9	0.18
37	41.46	26.81	0.086	8.1	0.16
38	42.35	26.20	0.075	6.1	0.11
39	43.25	25.62	0.059	3.8	0.07
40	44.16	25.06	0.041	1.8	0.03
41	45.06	24.52	0.021	0.5	0.01
42	45.97	24.00	0.001	0.0	0.00
43	46.89	23.50	0.023	0.6	0.01
44	47.81	23.03	0.044	2.1	0.03

45	48.73	22.57	0.062	4.3	0.06
46	49.66	22.12	0.080	7.1	0.10
47	50.58	21.70	0.094	9.6	0.13
48	51.51	21.29	0.105	12.1	0.15
49	52.45	20.89	0.114	14.4	0.17
50	53.38	20.51	0.119	15.6	0.18
51	54.32	20.14	0.123	16.7	0.19
52	55.26	19.78	0.123	16.6	0.18
53	56.20	19.43	0.119	15.7	0.17
54	57.15	19.10	0.116	14.8	0.15
55	58.09	18.78	0.107	12.7	0.13
56	59.04	18.47	0.097	10.3	0.10
57	59.99	18.16	0.087	8.2	0.08
58	60.94	17.87	0.074	6.0	0.05
59	61.89	17.59	0.059	3.8	0.03
60	62.85	17.31	0.044	2.2	0.02
61	63.80	17.04	0.030	1.0	0.01
62	64.76	16.78	0.030	1.0	0.01
63	65.72	16.53	0.032	1.1	0.01
64	66.68	16.29	0.034	1.3	0.01
65	67.64	16.05	0.037	1.5	0.01
66	68.60	15.82	0.049	2.7	0.02
67	69.56	15.59	0.065	4.6	0.03
68	70.52	15.38	0.080	7.0	0.05
69	71.49	15.16	0.095	9.9	0.06
70	72.45	14.96	0.109	13.0	0.08
71	73.42	14.76	0.120	16.0	0.10
72	74.39	14.56	0.132	19.2	0.12
73	75.36	14.37	0.143	22.6	0.13
74	76.33	14.18	0.154	26.2	0.15
75	77.30	14.00	0.165	29.9	0.17
76	78.27	13.82	0.171	32.3	0.18
77	79.24	13.65	0.178	34.7	0.18
78	80.21	13.48	0.184	37.1	0.19
79	81.18	13.32	0.190	39.5	0.20
80	82.16	13.16	0.195	42.0	0.21
81	83.13	13.00	0.201	44.4	0.21
82	84.11	12.85	0.201	44.6	0.21
83	85.08	12.70	0.202	44.7	0.21
84	86.06	12.55	0.202	44.8	0.20
85	87.03	12.41	0.202	45.0	0.20
86	88.01	12.27	0.202	45.1	0.19
87	88.99	12.13	0.203	45.2	0.19
88	89.96	12.00	0.203	45.3	0.19
89	90.94	11.87	0.198	43.0	0.17
90	91.92	11.74	0.193	40.8	0.16
91	92.90	11.61	0.187	38.7	0.15
92	93.88	11.49	0.183	36.7	0.14
93	94.86	11.37	0.178	34.8	0.13
94	95.84	11.25	0.173	32.9	0.12
95	96.82	11.14	0.168	31.2	0.11
96	97.80	11.02	0.164	29.6	0.10

4x2 750-10210-w/  
290mm radius and  
85mm tangetial

Deg.	offset
0	0.028
10	0.04
20	0.019
30	0.092
40	0.125
50	0.07
60	0.034
70	0.102
80	0.103
90	0.071
100	0.073
110	0.094
120	0.154
130	0.271
140	0.429
150	0.58
160	0.71
170	0.812
180	0.91
190	0.965
200	0.907
210	0.779
220	0.776
230	0.903
240	0.942
250	0.88
260	0.863
270	0.943
280	1
290	0.959
300	0.836
310	0.681
320	0.516
330	0.365
340	0.23
350	0.105

