

THOMAS M. ECKELS, PE
STEPHEN S. LOCKWOOD, PE
DAVID J. PINION, PE
ERIK C. SWANSON, PE

THOMAS S. GORTON, PE

JAMES B. HATFIELD, PE
BENJAMIN F. DAWSON III, PE
CONSULTANTS

HATFIELD & DAWSON
CONSULTING ELECTRICAL ENGINEERS
9500 GREENWOOD AVE. N.
SEATTLE, WASHINGTON 98103

TELEPHONE (206) 783-9151
FACSIMILE (206) 789-9834
E-MAIL hatdaw@hatdaw.com

MAURY L. HATFIELD, PE
(1942-2009)
PAUL W. LEONARD, PE
(1925-2011)

**Engineering Statement
Modification of K15HK-D
Channel 15 at Sheridan, WY
May 2020**

This Engineering Statement has been prepared on behalf of Central Wyoming College ("CWC"), licensee of digital TV translator station K15HK-D at Sheridan, Wyoming. This material has been prepared in connection with an application for minor modification of construction permit 0000036662.

I. 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 facilities with which contour overlap exists. This study was performed using the Commission's TVStudy software.

The results of this study indicate that the proposed facility is predicted to cause zero additional interference to any of the listed 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: 2020.05.06 11:02:03

Study build station data: LMS TV 2020-04-15

Proposal: K15HK-D D15 LD APP SHERIDAN, WY
File number: K15HK-MOD
Facility ID: 167612
Station data: User record
Record ID: 961
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	K14RX-D	D14	LD	LIC	ASHLAND, MT	BLANK0000067769	142.9 km
No	K1INV-LD	D14	LD	LIC	BILLINGS, MT	BLDTL20091015ACG	164.7
No	K14OQ-D	D14	LD	CP	HYSHAM, MT	BNPDTL20100510ABN	175.2
No	KGWC-TV	D14	DT	LIC	CASPER, WY	BLCDT20090225AAL	218.0
No	K14RF-D	D14	LD	LIC	CODY, WY	BLANK0000060228	137.3
Yes	K14OT-D	D14	LD	CP	GILLETTE, WY	BNPDTL20100505AHZ	105.6
No	KPIF	D15	DT	LIC	POCATELLO, ID	BLANK0000001051	475.7
No	KPIF	D15	DT	CP	POCATELLO, ID	BLANK0000035740	475.7
Yes	K15JL-D	D15	LD	CP	BILLINGS, MT	BLANK0000068779	164.5
No	K15JA-D	D15	LD	LIC	HARLOWTON, ETC, MT	BLDTT20120611ACG	304.0
No	K15LD-D	D15	LD	LIC	LEWISTOWN, MT	BLANK0000063001	339.9
No	K15LB-D	D15	LD	LIC	RED LODGE, MT	BLANK0000060222	178.3
No	K15JT-D	D15	LD	CP	TERRY, MT	BNPDTL20100506AED	270.6
No	K15IZ-D	D15	LD	LIC	EDGEMONT, SD	BLDTT20110923ABF	304.3
No	K31KU-D	D15	LD	CP	RAPID CITY, SD	BLANK0000053755	341.0
No	K15JX-D	D15	LD	CP	CASPER, WY	BDCCDTT20130322AIM	218.0
No	K15II-D	D15	LD	LIC	NEWCASTLE, WY	BLDTT20110812ADI	248.1
No	K15MP-D	D15	LD	LIC	Rawlins, WY	BLANK0000109332	327.2
Yes	K15KM-D	D15	LD	LIC	SUNDANCE, WY	BLANK0000064167	218.9
No	K16MY-D	D16	LD	LIC	ASHLAND, MT	BLANK0000067770	142.9
No	KBGS-TV	D16	DT	APP	BILLINGS, MT	BLANK0000035770	164.8
No	KBGS-TV	D16	DT	LIC	BILLINGS, MT	BLEDT20090619ACP	164.8
No	K16DZ-D	D16	LD	LIC	HARDIN, MT	BLANK0000013267	128.8
No	K16DH	D16	LD	CP	MILES CITY, MT	BLANK0000054417	224.3
No	K16JI-D	D16	LD	LIC	CASPER, WY	BLANK0000008309	206.3
No	K16AE-D	D16	LD	LIC	GILLETTE, WY	BLDTL20090806AAM	138.8
No	KWC-DT	D16	LD	LIC	LANDER, WY	BLEDT20090819ADV	140.9
No	K22AD	N22	TX	LIC	GILLETTE, WY	BLTTL19940224JS	135.4

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D15
Mask: Simple
Latitude: 44 37 25.70 N (NAD83)
Longitude: 107 7 5.10 W
Height AMSL: 2355.6 m
HAAT: 0.0 m
Peak ERP: 3.70 kW
Antenna: KAT-75010402_CH15 30.0 deg
Elev Pattern: Generic
Elec Tilt: 2.00

48.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	2.88 kW	953.8 m	66.5 km
45.0	3.66	1005.0	69.1
90.0	2.72	873.3	64.8
135.0	0.831	209.2	37.9
180.0	0.266	-262.4	13.6
225.0	0.309	-153.2	14.1
270.0	0.213	-71.2	12.8
315.0	1.27	265.3	43.1

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 352 m

Distance to Canadian border: 486.4 km

Distance to Mexican border: 1427.2 km

Conditions at FCC monitoring station: Grand Island NE
Bearing: 117.1 degrees Distance: 819.0 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 162.2 degrees Distance: 520.0 km

No land mobile station failures found

Proposal is not within the Offshore Radio Service protected area

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.

II. Facilities Proposed

The proposed K15HK-D facility will operate from a tower site on Bosin Rock, with a horizontally-polarized Kathrein 75010402 panel antenna. The tower structure does not require FCC Antenna Structure Registration.

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.

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

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.

Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground (5.6 meters below the antenna radiation center). The worst case power density levels occur at depression angles between 45 and 90 degrees below the horizontal. The calculations in this report assume a worst-case relative field value of 0.073 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Kathrein 75010402 antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 19.7 watts at depression angles between 45 and 90 degrees below the horizontal. Assuming this power and the shortest distance between the antenna radiation center and 2 meters above ground level (i.e. straight down), the highest calculated power density from the proposed antenna alone occurs at the base of the antenna support structure. At this point the power density is calculated to be 21.0 $\mu W/cm^2$, which is 6.6% of 317.3 $\mu W/cm^2$ (the FCC maximum for uncontrolled environments at the Channel 15 frequency).

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.

May 6, 2020

Erik C. Swanson, P.E.