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**Engineering Statement
Minor Modification of K15AL-D
Channel 15 at Winnemucca, NV
September 2018**

I. Background

This Engineering Statement has been prepared on behalf of Humboldt County ("HC"), licensee of digital TV translator station K15AL-D at Winnemucca, NV. This material has been prepared in connection with an application for minor modification.

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.

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.

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Study created: 2018.09.24 13:52:49

Study build station data: LMS TV 2018-09-23 (151)

Proposal: K15AL-D D15 LD APP WINNEMUCCA, NV
File number: WINN15-WIDE-110W
Facility ID: 28080
Station data: User record
Record ID: 751
Country: U.S.

Build options:

Protect pre-transition records not on baseline channel

User records included:

615 K16JZ-D D16 LD APP MCDERMITT, NV HIGH16

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K14NU-D	D14	LD	LIC	BEOWAWE, NV	BLD TT20100323AAE	100.6 km
No	K44AM	D14	LD	CP	CARLIN, NV	BLANK0000054858	130.1
No	K14KQ-D	D14	LD	LIC	LOVELOCK, NV	BLD TL20120530A00	110.0
No	K42KW-D	D14	LD	APP	MCDERMITT, NV	BLANK0000054087	126.6
No	K15HV-D	D15	LD	LIC	CHICO, CA	BLD TL20080805AAT	353.5
No	K36LY-D	D15	LD	APP	DURHAM, CA	BLANK0000054788	398.6
No	K15CX	D15	LD	CP	OROVILLE, CA	BDFC DTT20110613ACB	366.4
No	K15CX	N15z	TX	LIC	OROVILLE, CA	BLT TL20020613AAH	366.4
No	KKJB	D15	DT	CP	BOISE, ID	BLANK0000028176	331.5
No	KIWG-LD	D15	LD	CP	BOISE, ID	BNP DTL20091026ABP	307.9
No	KSAW-LD	D15	LD	LIC	TWIN FALLS, ID	BLD TL20140325AEJ	336.8
No	K15GS	N15	TX	LIC	DUCKWATER, ETC., NV	BLT T20040929AQF	229.4
No	K15EE-D	D15	LD	LIC	ELKO, NV	BLD TT20090716AAC	174.8
No	K15EE-D	D15	LD	CP	ELKO, NV	BP DTT20120514AEU	175.1
No	K38LR-D	D15	LD	CP	EUREKA, NV	BLANK0000054896	227.6
No	K50AI-D	D15	LD	CP	HAWTHORNE, NV	BLANK0000052560	296.3
No	KNPB	D15	LD	APP	RENO, NV	BD RTEDT20090825BIO	263.3
No	KNPB	D15	LD	LIC	RENO, NV	BLED T20101109ACK	263.3
No	KNPB	D15	DT	LIC	RENO, NV	BLED T20031023AAU	234.1
No	K43IL-D	D15	LD	CP	RUTH, NV	BLANK0000054595	304.5
No	K15KE-D	D15	LD	LIC	KLAMATH FALLS, ETC, OR	BLANK0000011186	359.2
No	K15HU-D	D15	LD	LIC	LAKEVIEW, OR	BLD TT20091118ACG	275.6
No	K15DY-D	D15	LD	LIC	ONTARIO, ETC., OR	BLD TT20100219ABD	346.5
No	K15GZ-D	D15	LD	LIC	WENDOVER, UT	BLD TT20110928ADG	314.9
No	K16FD-D	D16	LD	LIC	BATTLE MOUNTAIN, NV	BLD TT20110902ACE	100.6
No	K16KT-D	D16	LD	CP	IMLAY, NV	BNP DTL20100512AHG	50.8
No	K16JZ-D	D16	LD	LIC	MCDERMITT, NV	BLD TL20120524AGS	126.7
No	K16JZ-D	D16	LD	APP	MCDERMITT, NV	HIGH16	126.6
No	K18GW	N18	TX	LIC	BEOWAWE, NV	BLT TL20051006ADO	100.6

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: Stringent
Latitude: 41 0 38.50 N (NAD83)
Longitude: 117 46 4.20 W
Height AMSL: 2095.8 m
HAAT: 0.0 m
Peak ERP: 0.110 kW
Antenna: KAT-1X2KBBU 145.0 deg
Elev Pattnr: Generic

48.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.000 kW	536.6 m	13.2 km
45.0	0.011	760.2	28.4
90.0	0.103	740.5	41.4
135.0	0.079	510.2	35.7
180.0	0.086	774.3	40.9
225.0	0.036	761.0	35.3
270.0	0.001	632.8	15.6
315.0	0.000	753.8	8.9

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 684 m

Distance to Canadian border: 888.1 km

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Distance to Mexican border: 936.4 km

Conditions at FCC monitoring station: Livermore CA
Bearing: 224.4 degrees Distance: 500.6 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 91.1 degrees Distance: 1059.8 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.

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 (33.8 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 0.200 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Kathrein broadband panel antenna array proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 4.4 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 from the proposed facility is calculated to be $0.1 \mu\text{W}/\text{cm}^2$, which is $<0.1\%$ of $317.3 \mu\text{W}/\text{cm}^2$ (the FCC maximum for uncontrolled environments at the Channel 15 frequency).

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

September 24, 2018

Erik C. Swanson, P.E.