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**Engineering Statement
Minor Modification of K23FR-D
Channel 23 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 K23FR-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 13:59:17

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

Proposal: K23FR-D D23 LD APP WINNEMUCCA, NV
File number: WINN23-WIDE-110W
Facility ID: 22799
Station data: User record
Record ID: 755
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	K20HX	N20	TX	LIC	BEOWAWE, NV	BLTTL20051006ADR	100.6 km
No	K22GM-D	D22	LD	LIC	BATTLE MOUNTAIN, NV	BLDTT20120514ADF	100.6
No	K48LM	D22	LD	CP	CARLIN, NV	BLANK0000054862	130.1
No	K51BW	D22	LD	CP	GOLCONDA, NV	BLANK0000054081	29.6
No	K22LH-D	D22	LD	CP	IMLAY, NV	BNPDTL20100512AHF	50.8
No	KRDT-CD	D23	DC	CP	REDDING, CA	BLANK0000036140	413.3
No	KRDT-CD	D23	DC	LIC	REDDING, CA	BLDTA20110620AEA	401.7
No	KQCA	D23	DT	CP	STOCKTON, CA	BLANK0000034562	441.2
No	K23DT-D	D23	LD	LIC	TAHOE CITY, CA	BLDTT20140116ABS	260.9
No	NEW	D23	LD	APP	BOISE, ID	BNPDTL20090825BBG	325.8
No	K23NB-D	D23	LD	CP	BOISE, ID	BNPDTL20090825AXP	334.4
No	NEW	D23	LD	APP	BOISE, ID	BNPDTL20090825BNQ	334.4
No	NEW	D23	LD	APP	MOUNTAIN HOME, ID	BNPDTL20090825BLB	291.8
No	K23KV-D	D23	LD	LIC	AUSTIN, NV	BLDTT20130603AHR	179.0
Yes	K23FC-D	D23	LD	LIC	ELKO, NV	BLDTT20111219ABF	160.5
No	K23LF-D	D23	LD	LIC	EUREKA, NV	BLDTT20111230AAH	226.2
No	K45HS-D	D23	LD	CP	LUND & PRESTON, NV	BLANK0000054601	305.9
Yes	KRXI-TV	D23	DT	CP	RENO, NV	BLANK0000034621	241.8
No	K42DS-D	D23	LD	CP	WALKER LAKE, NV	BLANK0000052559	277.1
No	K23MN-D	D23	LD	CP	WENDOVER, NV	BNPDTL20100512AIB	309.7
No	K24JL-D	D24	LD	LIC	BEOWAWE, NV	BLDTT20111230AAP	100.6
No	K38LX-D	D24	LD	CP	GOLCONDA, NV	BLANK0000054080	29.6
No	K24FF-D	D24	LD	LIC	LOVELOCK, NV	BLDTT20091030ADJ	128.1
No	K30HF	N30	TX	LIC	BEOWAWE, NV	BLTT20051006ADT	100.6
No	K30CD	N30	TX	LIC	CARLIN, NV	BLTTL19891211IY	143.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D23
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

49.7 dBu contour:
Azimuth ERP HAAT Distance
0.0 deg 0.000 kW 536.6 m 12.4 km
45.0 0.011 760.2 27.3
90.0 0.103 740.5 40.2
135.0 0.079 510.2 34.5
180.0 0.086 774.3 39.7
225.0 0.036 761.0 34.2
270.0 0.001 632.8 14.9
315.0 0.000 753.8 8.2

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

Distance to Canadian border: 888.1 km

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

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

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

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 $\mu W/cm^2$, which is <0.1% of 349.3 $\mu W/cm^2$ (the FCC maximum for uncontrolled environments at the Channel 23 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.