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

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

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
Minor Modification of KUMN-LP
Channel 19 at Moses Lake, WA
February 2019

This Engineering Statement has been prepared on behalf of Spokane Television, Inc. ("Spokane"), licensee of digital LPTV station KUMN-LD at Moses Lake, Washington. This material has been prepared in connection with an application for minor modification.

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.

Based on the results of this interference study, it is believed that the proposed facility can operate without risk of interference to other stations.

Study created: 2019.02.07 13:07:21

Study build station data: LMS TV 2019-02-05

```
    Proposal: KUMN-LD D19 LD APP MOSES LAKE, ETC., WA
 File number: KUMN-MONUMENT
 Facility ID: 52273
Station data: User record
   Record ID: 796
     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	KCDT	D18	DT	CP	COEUR D'ALENE, ID	BLANK0000034666	234.9 km
No	K18AD-D	D18	LD	LIC	EAST WENATCHEE, ETC., WA	BLDTT20100831ABA	45.9
Yes	KEPR-TV	D18	DT	APP	PASCO, WA	BLANK0000035749	143.6
Yes	KEPR-TV	D18	DT	LIC	PASCO, WA	BLCDT20140717ABN	143.6
No	KIRO-TV	D18	LD	CP	SEATTLE, WA	BLANK0000054680	164.4
No	K19BY-D	D19	LD	APP	GRANGEVILLE, ETC,, ID	BLANK0000064036	289.8
No	K19BY-D	D19	LD	LIC	GRANGEVILLE, ETC,, ID	BLDTT20120615ADK	289.8
No	K18HQ-D	D19	LD	CP	SANDPOINT, ID	BLANK0000051896	257.7
Yes	K19KP-D	D19	LD	LIC	HERMISTON, OR	BLANK0000055043	153.8
No	K46AK-D	D19	LD	CP	PRINEVILLE, ETC., OR	BLANK0000054538	332.6
No	K50GG-D	D19	LD	CP	SALEM, OR	BLANK0000053826	365.4
No	KBCB	D19	DT	APP	BELLINGHAM, WA	BLANK0000035650	272.0
No	KBCB	D19	DT	LIC	BELLINGHAM, WA	BLCDT20040128AKD	272.0
No	KCKA	D19	DT	APP	CENTRALIA, WA	BLANK0000035737	261.4
No	KCKA	D19	DT	LIC	CENTRALIA, WA	BLEDT20101217ABA	261.4
Yes	K44CK	D19	LD	CP	CHELAN, WA	BLANK0000053161	76.9
No	K19JC-D	D19	LD	LIC	MAZAMA, WA	BLDTT20120614ABX	140.7
Yes	K19AU-D	D19	LD	LIC	OMAK, OKANOGAN, ETC., WA	BLDTT20110727AHT	132.3
Yes	K19KU-D	D19	LD	LIC	WALLA WALLA, WA	BLANK0000059178	203.0
Yes	K19JX-D	D19	LD	LIC	YAKIMA, WA	BLDTL20141016ADC	103.1
No	K20JL-D	D20	LD	LIC	ELLENSBURG, ETC., WA	BLDTT20090506ACI	68.3
No	K20KG-D	D20	LD	LIC	PASCO, WA	BLDTL20140224ABY	126.1
No	K23KI-D	D20	LD	CP	Seattle, WA	BLANK0000052239	180.1
Yes	KREM	D20	DT	LIC	SPOKANE, WA	BLCDT20050623ABG	190.5
Yes	K20LY-D	D20	LD	CP	WENATCHEE, WA	BNPDTL20100624ABA	37.2
No	K20LQ-D	D20	LD	LIC	YAKIMA, WA	BLDTT20141016ADB	103.1

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

```
    Channel: D19
       Mask: Stringent
   Latitude:  47 19 12.70 N (NAD83)
  Longitude: 119 48  4.80 W
Height AMSL: 893.1 m
       HAAT: 0.0 m
   Peak ERP: 2.00 kW
    Antenna: SCA-2X2KBBU 118.0 deg
Elev Pattrn: Generic
```

49.3 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.042 kW	265.9 m	24.7 km
45.0	0.946	211.4	38.2
90.0	1.26	193.9	38.7
135.0	1.14	455.1	49.7
180.0	1.59	479.9	52.5
225.0	0.112	434.9	35.0
270.0	0.021	329.7	23.2
315.0	0.005	283.1	14.9

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 332 m

Proposal 24.25 dBu contour does not cross Canadian border
Distance to Canadian border: 186.7 km

Distance to Mexican border: 1649.2 km

Conditions at FCC monitoring station: Ferndale WA
Bearing: 312.7 degrees Distance: 273.4 km

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Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 119.1 degrees   Distance: 1410.5 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.
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II. 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.

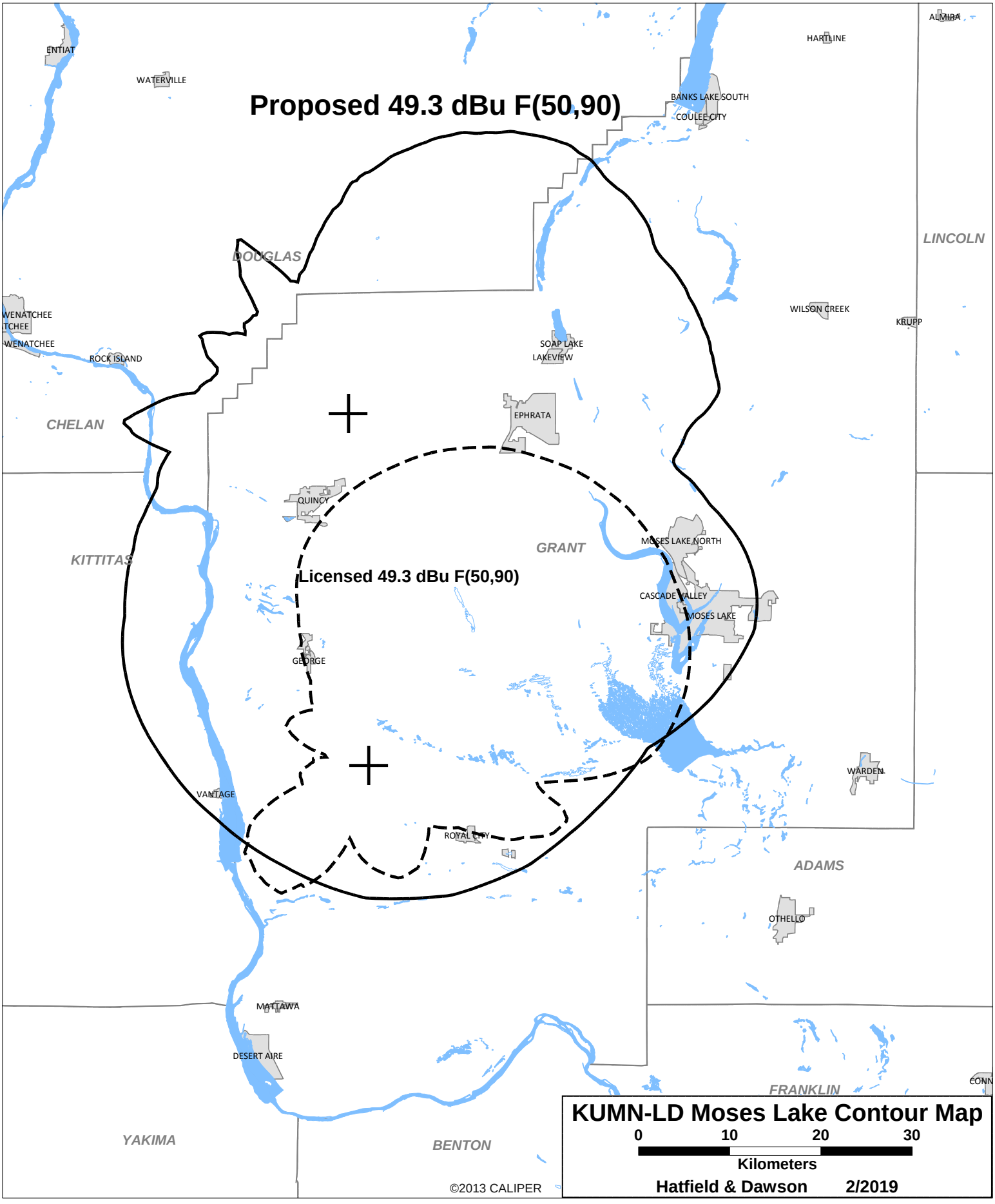
D is the distance in meters from the center of radiation to the calculation point.

Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground (12.1 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 0.125 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized 2X2 Kathrein broadband panel antenna array proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 31.25 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 7.1 μW/cm², which is 2.1% of 333.3 μW/cm² (the FCC maximum for uncontrolled environments at the Channel 19 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 applicants 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.

February 7, 2019
Erik C. Swanson, P.E.


Proposed 49.3 dBu F(50,90)
Licensed 49.3 dBu F(50,90)
ENTIAT
WATERVILLE
BANKS LAKE SOUTH
COULEE CITY
HARTLINE
ALMIRA
LINCOLN
DOUGLAS
WENATCHEE
TCHEE
WENATCHEE
ROCK ISLAND
CHELAN
SOAP LAKE
LAKEVIEW
WILSON CREEK
KRUPP
EPHRATA
QUINCY
KITTITAS
GRANT
MOSES LAKE NORTH
CASCADE VALLEY
MOSES LAKE
GEORGE
VANTAGE
ROYAL CITY
WARDEN
ADAMS
OTHELLO
MATTAWA
DESERT AIRE
FRANKLIN
YAKIMA
BENTON
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KUMN-LD Moses Lake Contour Map
0 10 20 30
Kilometers
Hatfield & Dawson 2/2019