

BENJAMIN F. DAWSON III, PE  
THOMAS M. ECKELS, PE  
STEPHEN S. LOCKWOOD, PE  
DAVID J. PINION, PE  
ERIK C. SWANSON, PE

THOMAS S. GORTON, PE  
MICHAEL H. MEHIGAN, EIT

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](mailto:hatdaw@hatdaw.com)

JAMES B. HATFIELD, PE  
CONSULTANT

MAURY L. HATFIELD, PE  
(1942-2009)

PAUL W. LEONARD, PE  
(1925-2011)

**Engineering Statement  
Application for Modification of Construction Permit  
KRUM-LD at Renton, WA  
November 2011**

This Engineering Statement has been prepared on behalf of Centro Familiar Cristiano, in connection with an application for modification of the construction permit for digital TV translator station KRUM-LD at Renton, Washington.

**I. Allocation 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 SunDTV program from V-Soft Communications and a 1 km grid spacing. The SunDTV program identically duplicates the FCC's OET-69 processing program.

The results of this study indicate that the proposed facility is predicted to cause zero additional interference to any of the listed stations.

Summary Study

Percent allowed new interference: 0.500  
Percent allowed new interference to non Class A LPTV: 2.000  
Census data selected 2000  
Data Base Selected  
./data\_files/pt\_tvdb.sff

WARNING WARNING WARNING

The following list of station records has been excluded from the analysis due to the fact that they have the same state, city and channel as the proposed station - This could cause the program to not find a potential fail situation

You can force the program to include these records by setting the state of the proposed record to ZZ and re-running the analysis

KRUM-LD 24 RENTON WA BDISDTL 20091001AKW

TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 11-10-2011 Time: 12:58:49

Record Selected for Analysis

KRUM-LD USERRECORD-02 RENTON WA US  
Channel 24 ERP 4.25 kW HAAT 258. m RCAMSL 00294 m STRINGENT MASK  
Latitude 047-36-55 Longitude 0122-18-33  
Status APP Zone 2 Border Site number: 01  
Dir Antenna Make usr Model USRPAT02 Beam tilt N Ref Azimuth 180.  
Last update Cutoff date Docket  
Comments  
Applicant

Cell Size for Service Analysis 1.0 km/side

Distance Increments for Longley-Rice Analysis 1.00 km

Not full service station

Service Class = LD

Maximum height/power limits not checked

Site number	1		
Azimuth	ERP	HAAT	51.0 dBu F(50,90)
(Deg)	(kW)	(m)	(km)
0.0	0.002	217.4	9.0
45.0	0.002	271.3	9.9
90.0	2.142	250.8	42.5
135.0	3.747	253.1	45.6
180.0	4.250	224.4	44.7
225.0	3.917	276.1	47.0
270.0	2.173	291.3	44.6
315.0	0.002	281.5	10.1

Contour Overlap to Proposed Station

Contour Overlap Evaluation to Proposed Station Complete

NO LANDMOBILE SPACING VIOLATIONS FOUND

Checks to Site Number 01

Proposed facility OK to FCC Monitoring Stations

Proposed facility OK toward West Virginia quiet zone

Proposed facility OK toward Table Mountain

Proposed facility is within the Canadian coordination distance  
Distance to border = 101.6km

Proposed facility is beyond the Mexican coordination distance

Proposed station is OK toward AM broadcast stations

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Start of Interference Analysis

Channel	Proposed Station Call	City/State	ARN
24	KRUM-LD	RENTON WA	USERRECORD02

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
22	K22HH	BELLINGHAM WA	132.3	APP	BNPPT	-20000830BHD
23	K23GK-D	ASTORIA OR	190.5	LIC	BLDTP	-20100723AFZ
23	K07BC	BRIDGEPORT WA	199.8	APP	BDISDTP	-20110617ABZ
23	K07BC	BRIDGEPORT WA	199.8	APP	BSTA	-20110705ABL
23	K23KI-D	ELLENBURG WA	169.5	CP	BNPDTL	-20090825AKO
23	NEW	YAKIMA WA	181.6	APP	BNPDTL	-20090825ANG
24	K04PH	ASTORIA OR	142.6	APP	BDISDTP	-20080819ACU
24	KDLN-LP	EUGENE OR	383.6	CP MOD	BMPDTL	-20080819ACW
24	KPWC-LD	FOREST GROVE OR	257.1	CP	BPDTL	-20090203ABG
24	K24JI-D	HERMISTON OR	292.6	CP	BNPDTL	-20090825AFZ
24	K58BK	MADRAS OR	349.0	CP	BDISDTP	-20110328ABV
24	K24DX	PENDLETON, ETC OR	353.0	LIC	BLTTL	-19960301JB
24	KKEI-CA	PORTLAND OR	235.0	APP	BDISTTA	-20090102ACF
24	KPWC-LD	TILLAMOOK OR	288.9	LIC	BLDTP	-20090107ADZ
24	NEW	WARM SPRINGS OR	314.3	APP	BMJADTP	-20100524AGR
24	K24IC-D	BELLINGHAM WA	124.7	LIC	BLDTP	-20100830ABY
24	K11AS	BRIDGE WA	199.8	APP	BDISDTP	-20110617ACF
24	K11AS	BRIDGEPORT WA	199.8	APP	BSTA	-20110705ABO
24	KQUP	PULLMAN WA	394.3	CP	BPCDT	-20090813ADL
24	K24IT-D	SEATTLE WA	144.2	CP	BNPDTL	-20090825AKR
24	K24EX	WENATCHEE WA	154.0	LIC	BLTTL	-20020304AGX
24	NEW	YAKIMA WA	179.7	APP	BNPDTL	-20090825AMM
25	K25CG-D	ABERDEEN WA	132.0	LIC	BLDTP	-20110812ACG
25	K13DL	BRIDGEPORT WA	199.8	APP	BDISDTP	-20110617ACK
25	K13DL	BRIDGEPORT WA	199.8	APP	BSTA	-20110705ACN
25	K25FP	ELLENSBURG WA	162.6	LIC	BLTTL	-19971103IP
25	K25FP	ELLENSBURG WA	162.6	CP	BDFCDTP	-20090806AAF
25	K25CH-D	NORTH BEND WA	130.8	LIC	BLDTP	-20110815ABG
25	KZJO	SEATTLE WA	0.2	LIC	BLCDT	-20090917AAN
25	KZJO	SEATTLE WA	0.2	APP	BPCDT	-19991022ABF

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Study of this proposal found the following interference problem(s):

NONE.

## II. RF Exposure Study

OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (Edition 97-01) states in part that:

When performing an evaluation for compliance with the FCC's RF guidelines all significant contributors to the ambient RF environment should be considered. . . For purposes of such consideration, significance can be taken to mean any transmitter producing more than 5% of the applicable exposure limit (in terms of power density or the square of the electric or magnetic field strength) at accessible locations.

As will be demonstrated below, the proposed operation will produce less than 5% of the applicable exposure limit for both controlled and uncontrolled environments. Thus, the proposed facility is categorically excluded from the requirement of further study. Therefore, pursuant to §1.1307(b)(3) of the Commission's Rules no calculations are required for the other FM and TV facilities in the vicinity, and precise calculations are made only with regard to the levels from this proposal.

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.

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

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 (166 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 0.215 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Scala 4DR-8-2HW antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 196.5 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  $0.2 \mu\text{W}/\text{cm}^2$ , which is  $<0.1\%$  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 alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 1000 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 radiofrequency 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 radiation in excess of FCC guidelines.

November 10, 2011

Erik C. Swanson, P.E.