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**Engineering Statement
Application for Digital Companion Channel for TV Translator Station
KBND-LP at Bend, Oregon
August 2014**

This Engineering Statement has been prepared on behalf of Combined Communications, Inc., in connection with an application for a digital companion channel for LPTV station KBND-LP at Bend, Oregon.¹

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

¹ At the time this material is being prepared, KBND-LP holds a construction permit for digital flash cut on Channel 41 (see BMPDTL-20090521AEQ). It is our understanding that Combined Communications will be requesting cancellation of that permit.

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
TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 06-30-2014 Time: 12:10:26

Record Selected for Analysis

KBND-LP USERRECORD-01 BEND OR US
Channel 14 ERP 2.3 kW HAAT 199. m RCAMSL 01336 m STRINGENT MASK
Latitude 044-04-39 Longitude 0121-19-57
Status APP Zone 2 Border Site number: 01
Dir Antenna Make usr Model USRPAT01 Beam tilt N Ref Azimuth 120.
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 (Deg)	ERP (kW)	HAAT (m)	51.0 dBu F(50,90) (km)	
0.0	0.039	346.2	24.6	
45.0	1.741	318.7	44.7	
90.0	1.414	279.7	41.7	
135.0	1.812	190.2	38.3	
180.0	2.186	121.1	34.9	
225.0	0.564	57.0	20.3	
270.0	0.001	33.0	3.1	
315.0	0.001	248.9	8.2	

Contour Overlap to Proposed Station

Station
KABH-LP 15 BEND OR BLTTA20030131AJE

Station inside contour of Digital LPTV station
KBND-LP 14 BEND OR USERRECORD01

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 beyond the Canadian coordination distance

Proposed facility is beyond the Mexican coordination distance

Proposed station is OK toward AM broadcast stations

Start of Interference Analysis

Channel	Proposed Station Call	City/State	ARN
14	KBND-LP	BEND OR	USERRECORD01

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
14	K14HX-D	LAKEHEAD CA	363.2	LIC	BLDTT	-20080826AAP
14	NEW	BOISE ID	366.9	APP	BNPDTL	-20090825BBL
14	NEW	NAMPA ID	386.6	APP	BNPDTL	-20090825BEV
14	K14MQ-D	COOS BAY OR	237.2	LIC	BLDTL	-20101122ADP
14	K14GW-D	CORVALLIS OR	166.5	LIC	BLDTL	-20100611AFN
14	K14LP-D	COTTAGE GROVE OR	140.9	LIC	BLDTT	-20090706AGJ
14	K14PJ-D	EUGENE OR	142.5	CP	BNPDTL	-20100716ADA
14	KMCW-LP	MEDFORD OR	228.7	LIC	BLTTL	-20060417AFT
14	K14GT	PORT ORFORD OR	296.3	LIC	BLTT	-19880527IH
14	KODT-LP	SALT CREEK OR	188.6	LIC	BLTTL	-20050309ACO
14	KRHP-LD	THE DALLES OR	175.6	LIC	BLDTA	-20090819AFR
14	KTBW-TV	TACOMA WA	401.9	LIC	BLCDT	-20060615AAY
14	DK14HN	VANCOUVER, CAMAS WA	196.9	CP	BDFCDTL	-20090810ABX
14	K14HT	WALLA WALLA, ETC. WA	309.5	LIC	BLTT	-19910213IG
14	K14BF-D	WENATCHEE WA	386.5	LIC	BLDTL	-20110815ABQ
14	K14BF-D	WENATCHEE WA	370.8	CP	BPDTL	-20120214AAJ
14	KAPP	YAKIMA WA	280.3	LIC	BLCDT	-20130829AEQ
15	KABH-LP	BEND OR	0.4	LIC	BLTTA	-20030131AJE
15	KORY-LD	EUGENE OR	142.5	CP	BDCCDTL	-20061025ADN
15	K15JI-D	EUGENE OR	142.5	CP	BNPDTL	-20100716ADB
15	K15IL-D	JOHN DAY OR	193.2	LIC	BLDTL	-20120531ABD
15	K15JG-D	SCOTTSBURG OR	205.3	LIC	BLDTT	-20120511ABH

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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.

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

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 (51 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 0.112 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Scala 4DR-16-2HW antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 28.9 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 $0.4 \mu\text{W}/\text{cm}^2$, which is 0.1% of $313 \mu\text{W}/\text{cm}^2$ (the FCC maximum for uncontrolled environments at the Channel 14 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 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 radiation in excess of FCC guidelines.

August 29, 2014

Erik C. Swanson, P.E.