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Engineering Statement
Modification of Construction Permit
Digital Replacement Translator Application for KOPB-TV
Channel 32 at Newberg, Oregon
July 2013

This Engineering Statement has been prepared on behalf of Oregon Public Broadcasting, licensee of non-commercial television station KOPB-TV at Portland, Oregon. This material has been prepared in connection with an application for modification of construction permit for an authorized digital replacement translator to ensure that KOPB-TV digital service is provided to viewers in the vicinity of Newberg, Oregon.

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.

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

KOPB-TV 32 NEWBERG OR BMPEDT 20120615AAL

TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 07-02-2013 Time: 12:30:32

Record Selected for Analysis

KOPB-TV USERRECORD-01 NEWBERG OR US
Channel 32 ERP 0.23 kW HAAT 346. m RCAMSL 00455 m STRINGENT MASK
Latitude 045-21-16 Longitude 0122-59-17
Status APP Zone 2 Border Site number: 01
Dir Antenna Make usr Model USRPAT01 Beam tilt N Ref Azimuth 210.
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	0.003	384.1	13.6
45.0	0.000	357.3	4.4
90.0	0.004	321.0	13.3
135.0	0.098	326.4	28.9
180.0	0.152	420.5	34.1
225.0	0.140	346.5	31.4
270.0	0.199	348.6	33.5
315.0	0.015	262.6	17.4

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 = 321.4km

Proposed facility is beyond the Mexican coordination distance

Proposed station is OK toward AM broadcast stations

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Start of Interference Analysis

Proposed Station			
Channel	Call	City/State	ARN
32	KOPB-TV	NEWBERG OR	USERRECORD01

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
17	K17GV	RAINIER OR	90.5	LIC	BLTT	-20070209ABT
24	KKEI-CA	PORTLAND OR	26.6	APP	BDISTTA	-20090102ACF
28	K28FP	ASTORIA OR	125.2	LIC	BLTTL	-19990727JG
31	KLSR-TV	EUGENE OR	150.7	LIC	BLCDT	-20070104ADQ
31	K31CR-D	PRINEVILLE, ETC. OR	204.3	LIC	BLDTT	-20081016AEI
31	K31HK	RAINIER OR	90.5	LIC	BLTT	-20070502ABR
31	K31HK	RAINIER OR	90.5	CP	BDFCDTT	-20090821ACO
31	K31HZ-D	THE DALLES, ETC. OR	151.1	LIC	BLDTT	-20091125AAT
31	K31HZ-D	THE DALLES, ETC. OR	151.1	CP	BPDTT	-20120314AAR
31	K31IR-D	GRAYS RIVER WA	130.4	LIC	BLDTT	-20100222AAX
32	K32JY-D	: EUGENE OR	145.6	CP	BNPDTL	-20090825BHV
32	K32KP-D	BLACK BUTTE RANCH OR	151.3	LIC	BLDTT	-20120606AAB
32	K32HF-D	FLORENCE OR	177.4	LIC	BLDTT	-20100119ADV
32	K32JR-D	GRANTS PASS OR	308.3	CP	BNPDTL	-20090825BGO
32	K32DY-CD	MEDFORD OR	340.2	LIC	BLDTA	-20110926AHK
32	K32CC	MONTGOMERY RANCH,ETC OR	202.2	LIC	BLTT	-19881013IC
32	K32CC	MONTGOMERY RANCH,ETC OR	202.2	CP	BDFCDTL	-20100326ACI
32	K32DE-D	PENDLETON OR	289.2	LIC	BLDTT	-20120614AAE
32	K32JL-D	POWERS OR	284.6	LIC	BLDTT	-20121203AHO
32	K32FI-D	YONCALLA OR	192.6	LIC	BLDTL	-20110228AFN
32	K32IG-D	ELLENSBURG, ETC. WA	259.8	LIC	BLDTT	-20090506ACO
32	K32KY-D	PASCO WA	318.3	CP	BNPDTL	-20101001AAF
32	K32JE-D	QUINCY WA	318.9	CP	BNPDTL	-20090825ADN
32	K32FN	WENATCHEE WA	291.3	LIC	BLTT	-20030605AEC
33	K33AG	BEND OR	193.1	LIC	BLTTL	-19871223ID
33	K33KD-D	LONDON SPRINGS OR	191.1	LIC	BLDTT	-20091109AAX
33	KRCW-TV	SALEM OR	26.8	CP	BPCDT	-20080619AKY
33	KRCW-TV	SALEM OR	26.8	LIC	BMLCDT	-20070123ABS
33	K33MF-D	TOKELAND WA	173.6	CP	BNPDTL	-20100324ABC
35	KORK-CA	PORTLAND OR	26.6	LIC	BLTTA	-20070831ACZ
40	K40EG	TILLAMOOK OR	61.8	LIC	BLTT	-19960130JA

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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 (13 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/Scala 1X2KBBU broadband antenna array proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 9.2 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 1.8 $\mu W/cm^2$, which is <1% of 385 $\mu W/cm^2$ (the FCC maximum for uncontrolled environments at the Channel 32 frequency).

These calculations show that the worst-case 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 exposure in excess of FCC guidelines.

July 2, 2013
Erik C. Swanson, P.E.