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Engineering Statement
Digital Flash Cut Application for K04MG
Channel 4 at Wedderburn, OR
July 2009

This Engineering Statement has been prepared on behalf of Oregon Public Broadcasting, licensee of TV translator station K04MG at Wedderburn, Oregon. This material has been prepared in connection with an application for digital flash-cut.

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

Census data selected: 2000

Post DTV Transition Database Selected

                    TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 07-06-2009   Time: 13:45:28

Record Selected for Analysis

K04MG   USERRECORD-01   WEDDERBURN, ETC.   OR US
Channel 04 ERP 0.25   kW   HAAT 451. m RCAMSL 00716 m STRINGENT MASK
Latitude 042-23-51 Longitude 0124-21-51
Status APP   Zone 2   Border
Dir Antenna Make usr Model USRPAT01   Beam tilt N Ref Azimuth 345.
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

Facility meets maximum power limit

     Azimuth   ERP   HAAT   43.0 dBu F(50,90)
      (Deg)   (kW)   (m)   (km)
       0.0   0.192   607.6   59.7
      45.0   0.002   232.4   16.2
      90.0   0.000   33.0   2.8
     135.0   0.004   222.0   17.3
     180.0   0.006   450.1   26.8
     225.0   0.000   680.9   11.3
     270.0   0.000   698.5   11.4
     315.0   0.103   687.0   57.2

        Contour Overlap to Proposed Station

        Contour Overlap Evaluation to Proposed Station Complete

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

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                    Start of Interference Analysis

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                Proposed Station
Channel     Call         City/State              ARN
   04      K04MG      WEDDERBURN, ETC. OR        USERRECORD01

     Stations Potentially Affected by  Proposed Station

Chan    Call        City/State       Dist(km) Status   Application Ref. No.
 03    K03HX-D   ETNA CA                157.5  LIC    BLDTV    -20081001ACJ
 03    KIEM-TV   EUREKA CA              188.4  CP     BPCDT    -20080617ADN
 03    K03CT     LEWISTON, ETC. CA      228.5  LIC    BLTTV    -4961
 03    K03CQ     MAPLETON OR            188.4  LIC    BLTTV    -1798
 03    K03BZ     ROGUE RIVER OR          96.6  LIC    BLTTV    -4263
 03    K03EI     TOLO, ETC. OR          124.7  LIC    BLTTV    -20070503AAQ
 04    K04EZ     BIG BEND, ETC. CA      252.5  LIC    BLTTV    -1168
 04    K04EQ     FORT JONES, ETC. CA    157.5  LIC    BLTTV    -3876
 04    DK04PQ    JONES VALLEY PARK CA   256.7  LIC    BLTVL    -20040618AAK
 04    K04FL     LAKESHORE, ETC. CA     229.3  LIC    BLTTV    -4744
 04    K04QC     OROVILLE CA            401.3  CP     BDFCDTT  -20060329ADM
 04    K04QC     PALERMO CA             401.3  LIC    BLTVL    -20050114ADZ
 04    KVFR-LP   REDDING CA             258.2  LIC    BLTVL    -20071228ABV
 04    K04NU     SEIAD VALLEY CA        111.5  LIC    BLTTV    -19891211IC
 04    K04DD-D   WEAVERVILLE CA         219.2  LIC    BLDTV    -20090608AAF
 04    DK04CM    WEED CA                195.5  LIC    BLTTV    -3071
 04    K04HE     YREKA, ETC. CA         155.1  LIC    BLTTV    -19950612IG
 04    K04ER     APPLEGATE VALLEY OR    111.2  LIC    BLTTV    -1797
 04    K04EO     ASHLAND, ETC. OR       133.1  LIC    BLTTV    -4907
 04    K04HK     BLACK BUTTE RANCH OR   306.3  LIC    BLTTV    -19800404IA
 04    K04JQ     BUTTE FALLS OR         148.3  LIC    BLTTV    -19800702IC
 04    K04CX     CASCADIA OR            269.0  LIC    BLTTV    -1253
 04    K04GR     DORENA, ETC. OR        192.4  LIC    BLTTV    -3627
 04    K04DR     EUGENE OR              212.5  LIC    BLTVL    -20021106AAI
 04    K04JZ     GOLD HILL OR           111.9  LIC    BLTTV    -19810526ID
 04    K04EY     GRANTS PASS, ETC. OR    88.9  LIC    BLTTV    -19790222IC
 04    K04ES     KLAMATH FALLS OR       212.2  LIC    BLTTV    -1139
 04    K04BJ     LA PINE OR             276.4  LIC    BLTTV    -19800821IE
 04    K04BJ     LA PINE OR             276.4  APP    BDFCDTV  -20090630AEO
 04    K04BJ     LA PINE OR             276.1  CP     BPTTV    -20060323AER
 04    K04KI     MERRILL, ETC. OR       227.2  LIC    BLTTV    -19830516IY
 04    KDLN-LP   NEWPORT OR             263.4  LIC    BLTVL    -20050307ABU
 04    K04PK     PAISLEY OR             328.0  LIC    BLTTV    -20060106ABT
 04    K04CB     PLUSH OR               368.8  LIC    BLTTV    -19790924IE
 04    K04OS     REEDSPORT OR           148.9  APP    BDFCDTV  -20090604ACQ
 04    K04OS     REEDSPORT OR           148.9  LIC    BLTTV    -19970407JC
 04    K21GX     SALEM OR               303.2  APP    BDISDVL  -20090130ARC
 04    K04JP     WILLIAMS OR             91.3  LIC    BLTTV    -19800702IB
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Study of this proposal found the following interference problem(s):

    NONE.

II. NIER 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.

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

> 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 (17 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 0.244 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Scala SL8 antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 72.6 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 8.4 μW/cm², which is 2.5% of 335 μW/cm² (the FCC maximum for uncontrolled environments at the Channel 19 frequency).

Calculations of the power density produced by K04MG-D and the other broadcast stations at this transmitter site are summarized in the following table:

Call	Avg or Peak ERP Antenna Model	Relative Field	Height AGL	Calculated Exposure	Gen Pub FCC Limit	% of Limit
K04MG-D	0.250 kW avg SCA HDCA-5-4	Manf pattern	8 m	37.7 μW/cm²	200 μW/cm²	18.9%

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K02IQ	0.08 kW peak SCA HDCA-5-2	Manf pattern	8 m	6.0 μW/cm²	200 μW/cm²	3.0%
K07KZ	0.049 kW peak model unknown SCA HDCA-5-7 assumed	Manf pattern	8 m	3.7 μW/cm²	200 μW/cm²	1.9%
K20BI	1.56 kW peak SCA 4DR-8S	Manf pattern	10 m	10.3 μW/cm²	339 μW/cm²	3.0%
K288EF	0.077 kW avg ring stub assumed	FMModel	9 m	63.2 μW/cm²	200 μW/cm²	31.6%
KGBR 224A	0.265 kW avg ring stub assumed	FMModel	14 m	73.9 μW/cm²	200 μW/cm²	37.0%

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of K04MG-D and the present operations of the other stations at this site (were their maxima to coincide, which they do not) is 95% of the FCC standard for uncontrolled environments.

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.

July 6, 2009
Erik C. Swanson, P.E.

Hatfield & Dawson Consulting Engineers

K04MG-D Wedderburn: Scala HDCA-5-4

ERP	250	Watts H (avg)	
	0	Watts V (avg)	
AGL	8	less 2m is	6 meters
Maximum is	37.72	uW/cm² at	8 meters

Power Density vs Distance