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

PAUL W. LEONARD, 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

> JAMES B. HATFIELD, PE CONSULTANT

Maury L. Hatfield, PE Consultant Oakhurst, NSW Australia

Engineering Statement Digital Flash Cut Application for K18FR Channel 18 at Newport, OR January 2009

This Engineering Statement has been prepared on behalf of Oregon Public Broadcasting, licensee of TV translator station K18FR at Newport, 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.

1990 Census data selected TV INTERFERENCE and SPACING ANALYSIS PROGRAM Date: 01-27-2009 Time: 17:59:11 Record Selected for Analysis USERRECORD-01 NEWPORT K18FR OR US kW HAAT 316. m RCAMSL 00364 m STRINGENT MASK Channel 18 ERP 5.4 Latitude 044-45-23 Longitude 0124-02-55 Status APP Zone 2 Border Beam tilt N Ref Azimuth 0. Dir Antenna Make usr Model USRPAT01 Cutoff date Last update 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 51.0 dBu F(50,90) Azimuth ERP HAAT (Deg) (kW) (m) (km) 4.946 325.5 50.8 0.0 45.0 2.823 259.8 44.4 26.1 90.0 0.086 263.6 135.0 2.130 267.8 43.3 180.0 5.325 316.1 50.7 225.0 0.937 43.3 364.0 270.0 0.061 364.0 27.3 315.0 0.635 364.0 41.0 Contour Overlap to Proposed Station Station K18EL 18 NEWBERG/TIGARD OR BSTA20060608ACM causes Contour overlap to Digital LPTV station 18 NEWPORT K18FR OR USERRECORD01 Required D/U ratio: 2.0 Contour Overlap Evaluation to Proposed Station Complete LANDMOBILE SPACING VIOLATIONS FOUND NONE Proposed facility OK to FCC Monitoring Stations Proposed facility OK toward West Virginia quite zone Proposed facility OK toward Table Mountian Proposed facility is within the Canadian coordination distance Distance to border = 387.3km Proposed facility is beyond the Mexican coordination distance

Summary Study

Proposed station is OK toward AM broadcast stations

Start of Interference Analysis

	Prop	osed Station	
Channel	Call	City/State	ARN
18	K18FR	NEWPORT OR	USERRECORD01

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Applicatio	on Ref. No.
14	K14GW	CORVALLIS OR	62.6	LIC	BLTTL	-19890412IE
14	K14LP	COTTAGE GROVE OR	135.1	LIC	BLTT	-20030807AGJ
14	KSLM-LP	SALT CREEK OR	60.4	LIC	BLTTL	-20050309ACO
15	K15DS	NEWPORT, ETC. OR	0.1	LIC	BLTTL	-19961220JB
16	KMTR	EUGENE OR	109.6	LIC	BLCT	-19821013KF
16	KMTR	EUGENE OR	109.6	APP	BSTA	-20071113AJC
16	KORS-CA	SALEM OR	133.0	CP	BPTTA	-20040902AAJ
16	K16HT-D	SALT CREEK OR	60.5	CP	BNPTTL	-20000831BPI
17	K17HA	ASTORIA OR	170.5	LIC	BLTT	-20050616AAQ
17	k17aa	COOS BAY, ETC. OR	161.3	LIC	BLTT	-19840702IA
17	KWVT-LP	EOLA OR	75.6	APP	BSTA	-20070626ARA
17	KMTR	EUGENE OR	109.6	LIC	BLCDT	-20030618AAY
17	K17GV	RAINIER OR	182.1	LIC	BLTT	-20070209ABT
17	KWVT-LP	SALEM OR	75.6	LIC	BLTTL	-20080512AFV
18	K18IF-D	SEIAD VALLEY CA	330.8	CP	BDCCDTT	-20061030AIU
18	K18EP	BROOKINGS, ETC. OR	293.4	LIC	BLTT	-19960829JA
18	K18EA	COTTAGE GROVE OR	135.1	LIC	BLTT	-19940919IE
18	K18AN	GRANTS PASS OR	259.0	CP	BPTT	-20080125ADF
18	K18AN	GRANTS PASS OR	267.9	LIC	BLTT	-19850621IA
18	K18GB	MEDFORD OR	292.9	LIC	BLTTL	-20040916ABD
18	K18EL	NEWBERG/TIGARD OR	106.6	LIC	BLTTL	-19940506IN
18	K18EL	NEWBERG/TIGARD OR	106.6	CP	BDFCDTL	-20060331BBL
18	K18EL	NEWBERG/TIGARD OR	106.6	APP	BSTA	-20060608ACM
18	K18TE-D	PROSPECT OR	253.5	CP MOD	BMPDTL	-20080528ACS
18	KTVC	ROSEBURG OR	178 8	CP	BPCDT	-20061013ADM
18	KTVC	ROSEBURG OR	178.7	LTC	BLCDT	-20060721AAR
18	к18нн	THE DALLES OR	252 9	LTC	BLTT	-20070622ABB
18	K18AD	EAST WENATCHEE, ETC. W	A 396.7	LTC	BLTT	-19841203TD
18	K18AD	EAST WENATCHEE, ETC. W	A 396.7	CP	BDFCDTT	-20060329AKH
18	KCPO	TACOMA WA	324 7	LTC	BLCDT	-20010212ABV
19	K19GH	EUGENE, ETC. OR	109.6	CP	BDISTTL	-20060331BGE
19	K19EC	MAPLETON OR	83 6	LTC	BLTT	-20011009ACD
19	K19ET	PACIFIC C/CLOVERDALE OF	₹ 55.8	LIC	BLTT	-20020311AAN
19	KPIC	ROSEBURG OR	178 8	CP	BPCDT	-20080618ATT
19	KPIC	ROSENBURG OR	178.8	LTC	BLCDT	-20060707ADF
19	K67GU	SALEM OR	73 8	APP	BDCD1 BPTTI	-20020521AAX
20	K2000	ALBANY ETC OR	90 6	LTC	BI TTL BI TTT.	-19940114.TN
20	K52CV	COTTAGE GROVE OR	135 1	CP	BDISTT	-20051122AGT
20	кодет	ROCKAWAY OR	110 1	LTC	BLTT	-20030609AGE
20	KOXT-CA	CAMAS WA	133 0	LIC	BLTTA	-20070831ACV
21	KONI CA	EUGENE OR	104 7	LIC	BLTT	-20011005ABD
21	K21CX	SALEM OR	75 6	LIC	BI.TTI.	-20070103AAN
22	K69AV	COTTAGE GROVE OR	135 1	CP	BDISTT	-20051122AER
22	KDXG	SALEM OR	110 1		BLCT	-19811130KF
26	K26AV	CORVALLIS FTC OP	90 6	LIC	BITT	-20040909770
26	K26CJ	PORTLAND OR	140 0	TIC	BI.TTI.	-200404193AAB
20	K2090	TITIVNOOR OD	140.9 70 0	TIC		_20070625AAA
20	ILZOUD	JUDINIALIUN AVOINALLIT	13.4			-20070023AD0

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

NONE.

II. NIER Study

OET Bulletin 65 <u>Evaluating Compliance with FCC Guidelines for Human Exposure to</u> <u>Radiofrequency Electromagnetic Fields</u> (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.

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

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 (46 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

Hatfield & Dawson Consulting Engineers

this report assume a worst-case relative field value of 0.075 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized 4X2 Kathrein K723417 panel antenna array proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 30.4 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 0.5 μ W/cm², which is 0.15% of 331 μ W/cm² (the FCC maximum for uncontrolled environments at the Channel 18 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 <u>et seq</u> and no further analysis of non-ionizing radiation 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

Hatfield & Dawson Consulting Engineers

operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.

January 28, 2009

Erik C. Swanson, P.E.



simulation with typical exactness of +/- 8% of max signal

Azimuth Radiation Pattern in % and dB at downtilt: 1.0

f = 495.250 MHz

azim	uth	¥	dB	azim	uth 😽	dB
0	95	. 7		180	99.3	
5	98.	4		185	96.9	
10	100.	0		190	93 1	
15	98.	8		195	87 5	
20	95.	6		200	79 5	
25	91.	9		205	70.8	
30	87.	2		210	61.6	
35	83.	5		215	52.9	
40	78.	8		220	46.6	
45	72.	7		225	41.1	
50	65.	8		230	36.7	
55	58.	6		235	31.6	
60	50.	4		240	25.8	
65	40.	0		245	19.3	
70	28.	7		250	12.4	
75	18.	4		255	5.7	
80	12.	1		260	1.9	
85	11.	7		265	6.8	
90	12.	6		270	10.6	
95	12.	7		275	11.4	
100	12.	1		280	8.5	
105	11.	5		285	3.8	
110	15.	1		290	3.2	
115	24.	3		295	9.7	
120	35.	5		300	16.6	
125	46.0	5		305	23.3	
130	55.9	5		310	29.4	
135	62.8	3		315	35.0	
140	70.2	L		320	39.2	
145	76.6	5		325	44.4	
150	81.8	3		330	50.2	
155	85.5	5	-1.4	335	58.0	-4.7
160	90.0)	9	340	67.1	~3.5
165	94.2	?	5	345	75.9	-2.4
170	97.6	5	2	350	84.5	-1.5
175	99.9)	. 0	355	91.3	8
180	99.3		1	360	95.7	4

maximum	fieldstrength	was	found	at:	
azimuth	176.				
downtilt	1.				

Newport Oregon

SCALA Medford Oregon	4 x 2 K723147 Panel Array	Typ Nr.
MB 18.3. 8 16:17	Channel – 18 (fill 1st & 2nd null)	B1 ·



Newport Oregon

SCALA Medford Oregon	4 x 2 K723147 Panel Array	Typ Nr.
MB 18.3. 8 16:16	Channel – 18 (fill 1st & 2nd null)	B1.:



Dimensions and Feeding of Antenn System antenna type: K72314. dipole panel 470-860 MHZ

oper	ating	fi	n MHz	49	95.250	. 00	00	.000	. 0	00	.000					
oper	ating	cha	nnels		18		0	0		0	0					
data	base	fi	n MHz	:	500											
max.	azimu	t a	ngle	180		max	decl	inatio	9	0	cable	design f	requen	cy:	495.250) MHz
comp	ensati	on	in 🕏	:	17.65	. (00	.00	. •	00	.00					
ba	heigh	-	r-feed	power	cab-ph	fix-ph	panel	azipos	azidir	radius	tanoff	radoff	tilt	power	cab-ph	fix-ph
4	345	1		6.0	56	0	1	12.0	12.0	165.0	.0	. 0	. 0	1.0	0	0
							2	175.0	175.0	165.0	.0	.0]	. 0	1.0	, oļ	0
bay	heigh	-	r-feed	power	cab-ph	fix-ph	panel	azipos	azidir	radius	tanoff	radoff	tilt	power	cab-ph	fix-ph
3	230)		5.0	21	0	1	12.0	12.0	165.0	.0	. 0	. 0	1.0	0	0
							2	175.0	175.0	165.0	.0	. 0	. 0	1.0	0	0
bay	height	1	r-feed	power	cab-ph	fix-ph	panel	azipos	azidir	radius	tanoff	radoff	tilt	power	cab-ph	fix-ph
2	1150)		4.0	14	0	1	12.0	12.0	165.0	.0	. 0 !	. 0	1.0	o	0
							2	175.0	175.0	165.0	. 0	.0	.0]	1.0	0	0
bay	height	100	-feed	power	cab-ph	fix-ph	panel	azipos	azidir	radius	tanoff	radoff	tilt	power	cab-ph	fix-ph
1	0)		3.0	15	Ō	1	12.0	12.0	165.0	.0	. 0	.0	1.0	0	0
							2	175.0	175.0	165.0	.0	.0	. 0	1.0	, O	0

Directivity from HRP and zoome VRP

operating f in MHz :	495.250	.000	.00	.000	.000
operating channel :	18	0	0	0	0
HRP max/mean in dB :	4.29	.00	. 0	.00	.00
VRP omnidir in dB	9.38	.00	.0	.00	.00
directivity in dB	13.67	.00	.0	.00	.00
harness losses	.00	.00	1.0	. 00	.00
gain in dB	13.67	.00	.0	.00	. 00
allow +-0.5 dB toles	cance for p	attern varia	tion		
harness parameters a	at cable de	sian frequen	CV		
bay feeder :	m (áAAα@L (a	00 di	F	
antenna cable: .0	m a	AAα@L@ (a	00 di		

Newpor Orego

SCALA Medford Oregon	4 x 2 K723147 Panel Array	Typ Nr.
MB 18.3. 8 16:17	Channel – 18 (fill 1st & 2nd null)	B1.: