November 2016
FM Translator K239CL
Spokane, Washington Channel 239D
Allocation Study

Minor Modification
The instant application proposes a change in the installed K239CL antenna model, with no change in location, height, or power.

Allocation Study
The attached spacing study shows the spacing between the proposed translator site and the location of cochannel and adjacent channel stations and proposals. This study was made with the Commission's Class A spacing requirements, and individual situations were examined to determine the lack of prohibited contour overlap per the requirements of §74.1204 of the Rules. The attached allocation study map demonstrates compliance with the Commission's Rules for protection of FM broadcast stations and FM translators as outlined in §74.1204.

The attached spacing study demonstrates compliance with §73.207 of the Commission's Rules regarding spacing restrictions to stations which are 53 or 54 channels removed from the proposed operation.

KPND 237C Deer Park
The proposed translator transmitter site is located within the 60 dBu protected contour of second-adjacent channel station KPND 237C Deer Park. The following calculation, performed using the *Living Way* methodology, demonstrates interference protection to that station.

Protected Station	Distance & Bearing to Proposal	Station ERP and HAAT on that azimuth	Station Field Strength at Proposal	Corresponding Translator Interfering Contour	Distance to Translator Interfering Contour
KPND 237C	59.27 km 206 deg True	56 kW 726 meters	72.9 dBu F(50,50)	112.9 dBu	see following

Given that the transmitting antenna will be installed at a height of 131 meters above ground, and taking into consideration the vertical plane pattern of the Nicom BKG77-1 antenna, the attached Free Space calculations demonstrate that the interference area to KPND will not reach ground level. There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to KPND.

KIIX-FM 241C Opportunity
The proposed translator transmitter site is located within the 60 dBu protected contour of second-adjacent channel station KIIX-FM 241C Opportunity. The following calculation, performed using the *Living Way* methodology, demonstrates interference protection to that station.

Protected Station	Distance & Bearing to Proposal	Station ERP and HAAT on that azimuth	Station Field Strength at Proposal	Corresponding Translator Interfering Contour	Distance to Translator Interfering Contour
KIIX-FM 241C	16.65 km 281 deg True	60 kW 777 meters	96.9 dBu F(50,50)	136.9 dBu	13.1 meters Free Space

The interfering contour will not reach ground level. There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to KIIX-FM.

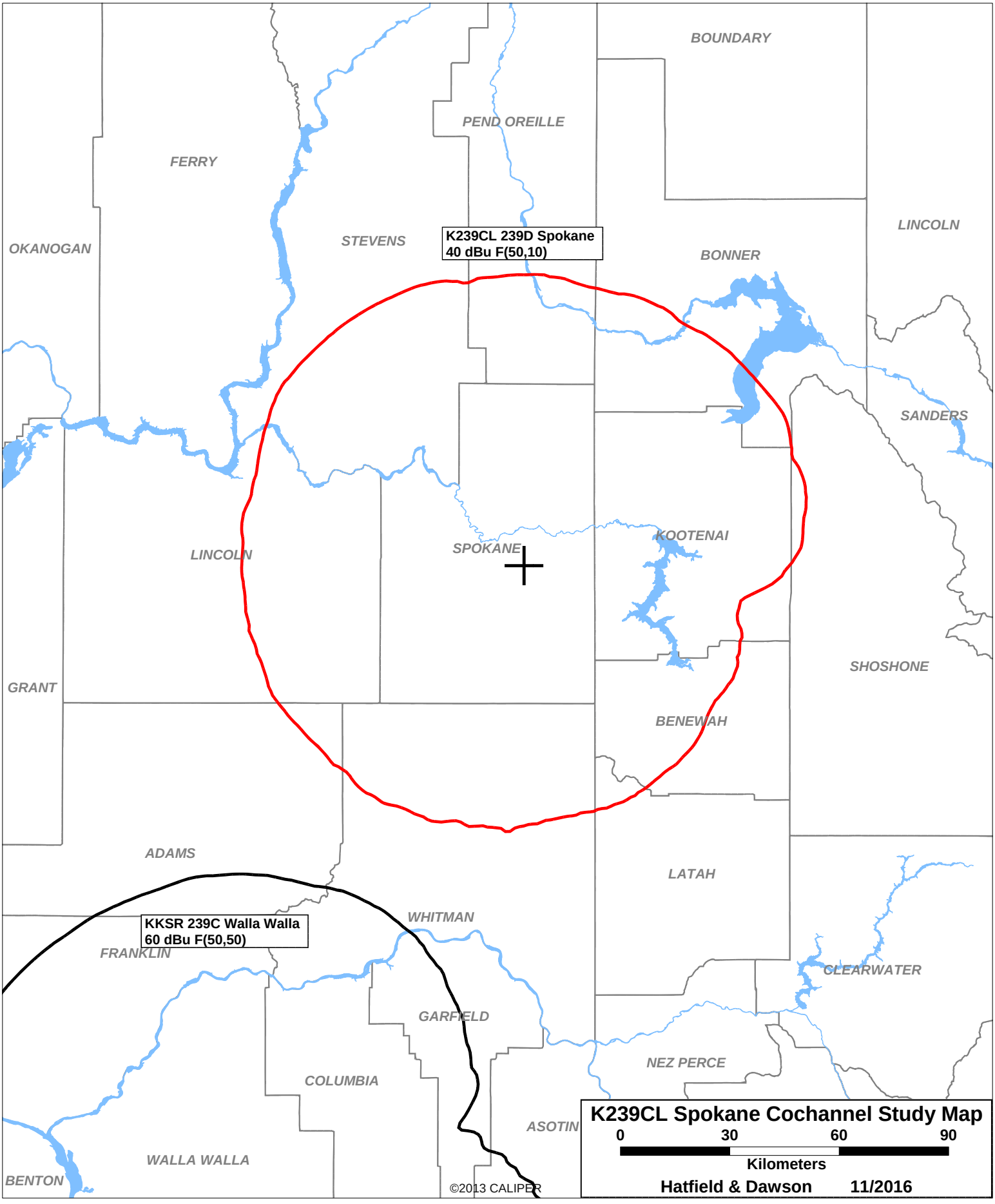
FMSTUDY.EXE Copyright 2016, Hatfield & Dawson, LLC Version 4.01

SEARCH PARAMETERS FM Database Date: 161115

Channel: 239A 95.7 MHz
Latitude: 47 35 58
Longitude: 117 17 57
Safety Zone: 50 km
Job Title: K239CL M OD

Call Status	City St FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KPND	DEER PARK	237C	56.000 DA	48-04-44	25.7	59.27	95
LIC	WA BLH-60718ABU	95.3	763.0	116-57-11		-35.73	SHORT
	TRAIL	239C	0.000	49-05-33	347.1	170.45	247
	BC RM-	95.7	0.0	117-49-12		-76.55	SHORT
K237DS	SPOKANE	239D	0.172	47-35-58	0.0	0.00	0
CP MOD	WA BMPFT-60907AFT	95.7	519.0	117-17-57		0.00	TRANS
NOTE: LICENSE APPLICATION PENDING							
KKSR	WALLA WALLA	239C	100.000	45-59-04	200.6	191.42	226
LIC	WA BLH-811222AI	95.7	427.0	118-10-08		-34.58	SHORT
KIIX-FM	OPPORTUNITY	241C	60.000	47-34-14	101.1	16.65	95
LIC	WA BMLH-41112AIN	96.1	744.0	117-04-55		-78.35	SHORT
KSPO	DISHMAN	293A	2.250	47-41-39	346.0	10.85	10
LIC	WA BLH-01219ABI	106.5	161.0	117-20-03		0.85	CLOSE

==== END OF FM SPACING STUDY FOR CHANNEL 239 ====


BOUNDARY
PEND OREILLE
FERRY
STEVENS
OKANOGAN
K239CL 239D Spokane
40 dBu F(50,10)
BONNER
LINCOLN
SANDERS
KOOTENAI
SPOKANE
LINCOLN
GRANT
SHOSHONE
BENEWAH
ADAMS
LATAH
KKSR 239C Walla Walla
60 dBu F(50,50)
WHITMAN
FRANKLIN
CLEARWATER
GARFIELD
NEZ PERCE
COLUMBIA
ASOTIN
WALLA WALLA
BENTON
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K239CL Spokane Cochannel Study Map
0
30
60
90
Kilometers
Hatfield & Dawson
11/2016

Spokane 239D Free Space Interference Area Calculator
Interference Area to KPND

Antenna Height: 131 meters AGL
Contour Level: 112.9 dBu equals 0.4 V/m
ERP in Watts: 172 Watts

Maximum distance
to interfering contour is: 683.1 feet equals 208.2 meters

Antenna: BKG77-1

Depression Angle (degrees)	Nicom BKG77-1 Relative Field	Adjusted ERP (Watts)	Free Space Distance To 112.9 dBu Contour Along the depression angle	Horizontal Distance (meters)	Contour AGL (meters)
-90	0.105	1.9	21.9 meters	0	109.1
-89	0.104	1.9	21.7	0.4	109.3
-88	0.102	1.8	21.2	0.7	109.8
-87	0.100	1.7	20.8	1.1	110.2
-86	0.102	1.8	21.2	1.5	109.8
-85	0.103	1.8	21.4	1.9	109.6
-84	0.105	1.9	21.9	2.3	109.3
-83	0.110	2.1	22.9	2.8	108.3
-82	0.115	2.3	23.9	3.3	107.3
-81	0.120	2.5	25.0	3.9	106.3
-80	0.129	2.9	26.9	4.7	104.5
-79	0.137	3.2	28.5	5.4	103.0
-78	0.145	3.6	30.2	6.3	101.5
-77	0.155	4.1	32.3	7.3	99.6
-76	0.166	4.7	34.6	8.4	97.5
-75	0.176	5.3	36.6	9.5	95.6
-74	0.188	6.1	39.1	10.8	93.4
-73	0.199	6.8	41.4	12.1	91.4
-72	0.211	7.7	43.9	13.6	89.2
-71	0.225	8.7	46.8	15.3	86.7
-70	0.239	9.8	49.8	17.0	84.2
-69	0.253	11.0	52.7	18.9	81.8
-68	0.268	12.4	55.8	20.9	79.3
-67	0.282	13.7	58.7	22.9	77.0
-66	0.297	15.2	61.8	25.2	74.5
-65	0.313	16.9	65.2	27.5	71.9
-64	0.329	18.6	68.5	30.0	69.4
-63	0.345	20.5	71.8	32.6	67.0
-62	0.361	22.4	75.2	35.3	64.6
-61	0.376	24.3	78.3	38.0	62.5
-60	0.391	26.3	81.4	40.7	60.5
-59	0.406	28.4	84.5	43.5	58.5
-58	0.421	30.5	87.7	46.5	56.7
-57	0.436	32.7	90.8	49.4	54.9
-56	0.450	34.8	93.7	52.4	53.3
-55	0.465	37.2	96.8	55.5	51.7
-54	0.479	39.5	99.7	58.6	50.3
-53	0.494	42.0	102.9	61.9	48.9
-52	0.508	44.4	105.8	65.1	47.7
-51	0.523	47.0	108.9	68.5	46.4
-50	0.539	50.0	112.2	72.1	45.0
-49	0.553	52.6	115.1	75.5	44.1

-48	0.568	55.5	118.3	79.1	43.1
-47	0.584	58.7	121.6	82.9	42.1
-46	0.600	61.9	124.9	86.8	41.1
-45	0.616	65.3	128.3	90.7	40.3
-44	0.631	68.5	131.4	94.5	39.7
-43	0.646	71.8	134.5	98.4	39.3
-42	0.661	75.2	137.6	102.3	38.9
-41	0.676	78.6	140.8	106.2	38.7
-40	0.691	82.1	143.9	110.2	38.5
-39	0.706	85.7	147.0	114.2	38.5
-38	0.719	88.9	149.7	118.0	38.8
-37	0.732	92.2	152.4	121.7	39.3
-36	0.745	95.5	155.1	125.5	39.8
-35	0.758	98.8	157.8	129.3	40.5
-34	0.771	102.2	160.5	133.1	41.2
-33	0.783	105.5	163.0	136.7	42.2
-32	0.795	108.7	165.5	140.4	43.3
-31	0.806	111.7	167.8	143.8	44.6
-30	0.818	115.1	170.3	147.5	45.8
-29	0.829	118.2	172.6	151.0	47.3
-28	0.840	121.4	174.9	154.4	48.9
-27	0.852	124.9	177.4	158.1	50.5
-26	0.862	127.8	179.5	161.3	52.3
-25	0.872	130.8	181.6	164.6	54.3
-24	0.881	133.5	183.4	167.6	56.4
-23	0.891	136.5	185.5	170.8	58.5
-22	0.900	139.3	187.4	173.7	60.8
-21	0.910	142.4	189.5	176.9	63.1
-20	0.918	144.9	191.1	179.6	65.6
-19	0.926	147.5	192.8	182.3	68.2
-18	0.934	150.0	194.5	185.0	70.9
-17	0.941	152.3	195.9	187.4	73.7
-16	0.947	154.3	197.2	189.5	76.7
-15	0.954	156.5	198.6	191.9	79.6
-14	0.960	158.5	199.9	193.9	82.6
-13	0.966	160.5	201.1	196.0	85.8
-12	0.972	162.5	202.4	198.0	88.9
-11	0.977	164.2	203.4	199.7	92.2
-10	0.982	165.9	204.5	201.4	95.5
-9	0.987	167.6	205.5	203.0	98.9
-8	0.991	168.9	206.3	204.3	102.3
-7	0.995	170.3	207.2	205.6	105.8
-6	0.999	171.7	208.0	206.9	109.3
-5	0.999	171.7	208.0	207.2	112.9
-4	0.999	171.7	208.0	207.5	116.5
-3	0.999	171.7	208.0	207.7	120.1
-2	1.000	172.0	208.2	208.1	123.7
-1	1.000	172.0	208.2	208.2	127.4
0	1.000	172.0	208.2	208.2	131.0

November 2016
FM Translator K239CL
Spokane, Washington Channel 239D
RF Exposure Study

Facilities Proposed
The proposed operation will be on Channel 239D (95.7 MHz) with an effective radiated power of 172 watts. Operation is proposed with an antenna to be mounted on an existing tower on Krell Hill, with FCC Antenna Structure Registration Number 1033014.

RF Exposure Calculations
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.

Calculations of the power density produced by the proposed antenna system have been made assuming that the antenna will radiate 100% power straight down to a point 2 meters above ground at the base of the tower (129 meters below the antenna). Under this worst-case assumption, the highest calculated ground level power density from the translator occurs at the base of the antenna support structure. At this point the power density is calculated to be 0.7 μW/cm², which is 0.07%

of 1000 μW/cm^2 (the FCC standard for controlled environments) and 0.35% of 200 μW/cm^2 (the FCC standard for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of the translator 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.

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.