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**Engineering Statement
Minor Modification of K16AE-D
Channel 16 at Gillette, WY
September 2021**

I. Background

This Engineering Statement has been prepared on behalf of BHTV License, LLC ("BHTV"), licensee of low-power digital station K16AE-D. This material has been prepared in connection with an application for minor modification.

II. Interference 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 authorized or pending proposed facilities. This study was performed using the Commission's TVStudy software.

The results of this study indicate that the proposed facility is predicted to cause zero additional interference to any of the listed stations, beyond the allowed values of 0.5% to full-power and Class A stations, and 2.0% to low-power stations. Based on the foregoing interference study, it is believed that the proposed facility can operate without risk of interference to other stations.

Hatfield & Dawson Consulting Engineers

Study created: 2021.09.21 16:35:41

Study build station data: LMS TV 2021-09-21

Proposal: K16AE-D D16 LD APP GILLETTE, WY
File number: K16AE-MOD
Facility ID: 63175
Station data: User record
Record ID: 1310
Country: U.S.

Build options:

Protect pre-transition records not on baseline channel

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K15MY-D	D15	LD	CP	CAPUTA, SD	BLANK0000157646	186.4 km
No	K15IZ-D	D15	LD	LIC	EDGEMONT, SD	BLD TT20110923ABF	179.8
No	DDK31KU-D	D15	LD	APP	RAPID CITY, SD	BLANK0000053755	214.0
No	K15II-D	D15	LD	LIC	NEWCASTLE, WY	BLD TT20110812ADI	120.5
No	K15HK-D	D15	LD	LIC	SHERIDAN, WY	BLANK0000116458	128.2
No	K15KM-D	D15	LD	LIC	SUNDANCE, WY	BLANK0000064167	94.9
No	KPXH-LD	D16	LD	APP	FORT COLLINS, CO	BLANK0000154860	418.8
No	K50LT-D	D16	LD	LIC	ASHLAND, MT	BLANK0000067770	147.1
No	KBGS-TV	D16	DT	CP	BILLINGS, MT	BLANK0000035770	279.3
No	KBGS-TV	D16	DT	LIC	BILLINGS, MT	BLED T20090619ACP	279.3
No	K16GP-D	D16	LD	LIC	CIRCLE, MT	BLANK0000139784	329.6
No	K16GP-D	N16	TX	LIC	CIRCLE, MT	BL TT20041110ABU	329.6
No	K16NX-D	D16	LD	CP	COLUMBUS, MT	BLANK0000154266	329.1
No	K16NE-D	D16	LD	LIC	FORSYTH, MT	BLANK0000124956	241.6
No	K16DZ-D	D16	LD	LIC	HARDIN, MT	BLANK0000013267	222.7
No	K16DH-D	D16	LD	LIC	MILES CITY, MT	BLANK0000152874	237.9
No	K16DH-D	N16	TX	LIC	MILES CITY, MT	BL TT20040930APV	237.9
No	KCLO-TV	D16	DT	LIC	RAPID CITY, SD	BLCD T20060207ABK	186.3
No	K16JI-D	D16	LD	LIC	CASPER, WY	BLANK0000008309	174.0
No	KKTQ-LD	D16	LD	LIC	CHEYENNE, WY	BLD TL20110602ACH	354.3
No	K16IO-D	D16	LD	LIC	CHUGWATER, WY	BLD TT20101104AAK	288.3
No	K47LK-D	D16	LD	LIC	DUBOIS, ETC., WY	BLANK0000064169	342.1
No	KCWC-DT	D16	LD	LIC	LANDER, WY	BLED T20090819ADV	226.8
No	KCWC-DT	D16	LD	LIC	LANDER, WY	BLED T20090819ADZ	296.7
No	KTWO-TV	D17	DT	LIC	CASPER, WY	BLCD T20110315ABB	185.3

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D16
Mask: Simple
Latitude: 44 18 17.00 N (NAD83)
Longitude: 105 33 55.00 W
Height AMSL: 1506.3 m
HAAT: 0.0 m
Peak ERP: 0.770 kW
Antenna: SCA-4DR-4S 110.0 deg
Elev Pattn: Generic

48.9 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.001 kW	176.0 m	8.6 km
45.0	0.060	176.1	22.7
90.0	0.645	126.4	31.5
135.0	0.576	94.3	28.0
180.0	0.015	51.9	8.8
225.0	0.000	51.3	3.3
270.0	0.004	79.8	7.7
315.0	0.002	119.5	7.7

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 109 m

Distance to Canadian border: 521.8 km

Distance to Mexican border: 1394.2 km

Conditions at FCC monitoring station: Grand Island NE
Bearing: 120.3 degrees Distance: 693.9 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 176.7 degrees Distance: 462.2 km

No land mobile station failures found

Proposal is not within the Offshore Radio Service protected area

Study cell size: 1.00 km
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%
Maximum new IX to LPTV: 2.00%

No IX check failures found.

III. RF Exposure 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.

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

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 using the manufacturer's vertical plane pattern for the horizontally-polarized Scala 4DR-4S antenna proposed in this application. The highest calculated power density from the proposed antenna alone occurs 9 meters from the base of the antenna support structure. At this point the power density is calculated

to be $6.1 \mu\text{W}/\text{cm}^2$, which is 1.9% of $321.3 \mu\text{W}/\text{cm}^2$ (the FCC maximum for uncontrolled environments at the Channel 16 frequency).

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.

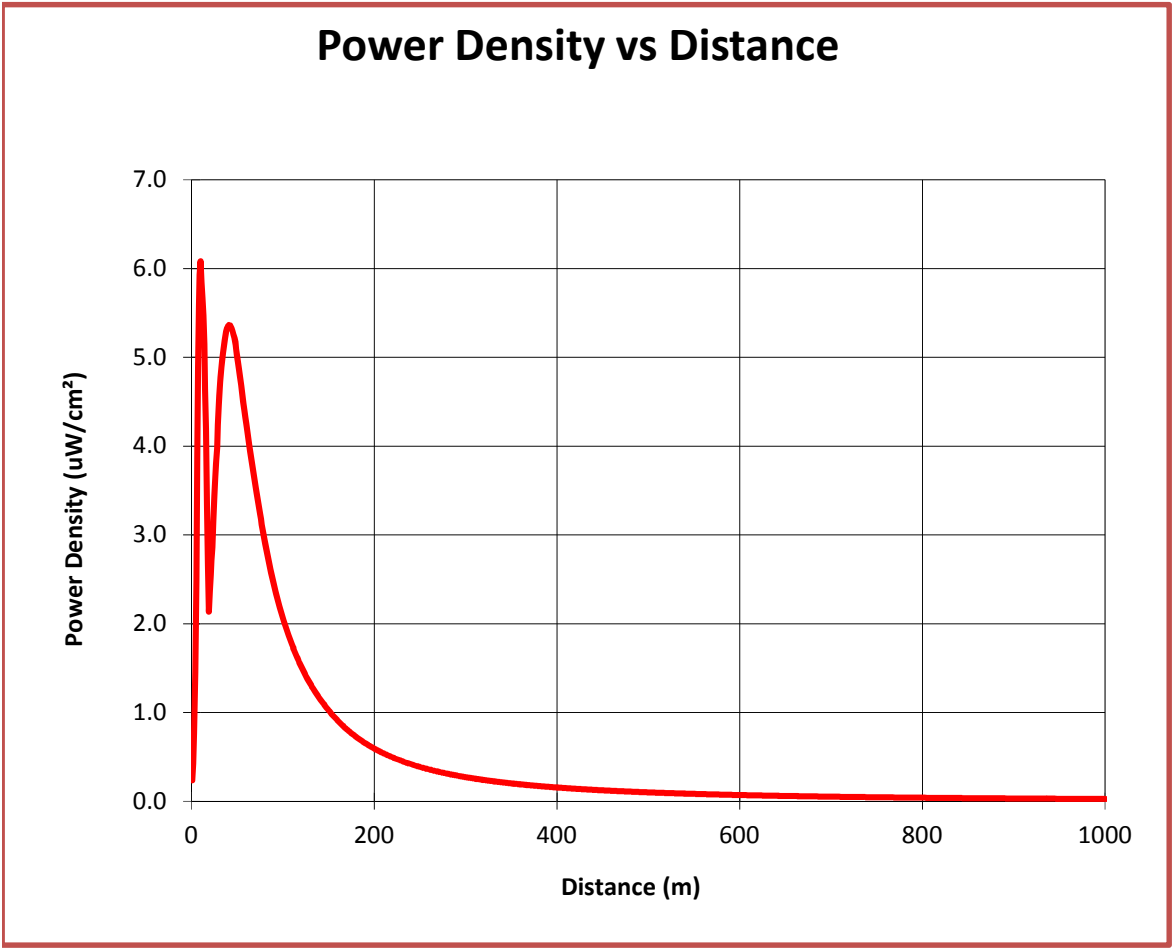
September 21, 2021

Erik C. Swanson, P.E.

K16AE-D Gillette
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern

Antenna	4DR4		
ERP	770	Watts H (avg)	
	-	Watts V (avg)	
Antenna AGL	14.6	meters less 2m is	12.6 meters above the reference plane
MBT	0	degrees	

Calculated
Maximum is 6.1 uW/cm² at 9 meters from the tower



K16AE-D Gillette
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern

Distance From Tower (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm ²
0	12.60	90.00	0.038	1.1	0.23
1	12.64	85.46	0.051	2.0	0.42
2	12.76	80.98	0.068	3.6	0.73
3	12.95	76.61	0.094	6.9	1.37
4	13.22	72.39	0.123	11.7	2.24
5	13.56	68.36	0.155	18.5	3.35
6	13.96	64.54	0.188	27.3	4.68
7	14.41	60.95	0.211	34.4	5.53
8	14.93	57.59	0.227	39.6	5.93
9	15.48	54.46	0.238	43.6	6.08
10	16.09	51.56	0.242	45.3	5.84
11	16.73	48.88	0.248	47.5	5.67
12	17.40	46.40	0.254	49.6	5.47
13	18.10	44.10	0.256	50.5	5.15
14	18.84	41.99	0.253	49.3	4.64
15	19.59	40.03	0.250	48.1	4.19
16	20.37	38.22	0.232	41.5	3.34
17	21.16	36.54	0.215	35.7	2.67
18	21.97	34.99	0.200	30.8	2.13
19	22.80	33.55	0.218	36.7	2.36
20	23.64	32.21	0.235	42.6	2.55
21	24.49	30.96	0.251	48.7	2.71
22	25.35	29.80	0.267	55.0	2.86
23	26.23	28.72	0.291	65.2	3.17
24	27.11	27.70	0.313	75.2	3.42
25	28.00	26.75	0.334	85.7	3.65
26	28.89	25.86	0.353	96.0	3.84
27	29.80	25.02	0.371	105.8	3.98
28	30.70	24.23	0.394	119.6	4.24
29	31.62	23.48	0.416	133.6	4.46
30	32.54	22.78	0.438	147.4	4.65
31	33.46	22.12	0.457	161.1	4.81
32	34.39	21.49	0.476	174.3	4.92
33	35.32	20.90	0.493	187.2	5.01
34	36.26	20.33	0.510	200.3	5.09
35	37.20	19.80	0.527	213.7	5.16
36	38.14	19.29	0.544	228.0	5.24
37	39.09	18.81	0.561	242.0	5.29
38	40.03	18.34	0.576	255.7	5.33
39	40.98	17.90	0.591	269.2	5.35
40	41.94	17.48	0.606	282.3	5.36
41	42.89	17.08	0.619	295.2	5.36
42	43.85	16.70	0.632	307.8	5.35
43	44.81	16.33	0.645	320.1	5.33
44	45.77	15.98	0.657	332.1	5.30

45	46.73	15.64	0.668	343.8	5.26
46	47.69	15.32	0.679	355.2	5.22
47	48.66	15.01	0.690	366.3	5.17
48	49.63	14.71	0.698	375.6	5.10
49	50.59	14.42	0.707	384.7	5.02
50	51.56	14.14	0.715	393.4	4.94
51	52.53	13.88	0.723	402.0	4.87
52	53.50	13.62	0.730	410.3	4.79
53	54.48	13.37	0.737	418.4	4.71
54	55.45	13.13	0.744	426.4	4.63
55	56.42	12.90	0.751	434.1	4.55
56	57.40	12.68	0.757	441.6	4.48
57	58.38	12.46	0.764	448.9	4.40
58	59.35	12.26	0.770	456.0	4.32
59	60.33	12.05	0.775	463.0	4.25
60	61.31	11.86	0.781	469.7	4.18
61	62.29	11.67	0.787	476.4	4.10
62	63.27	11.49	0.792	482.8	4.03
63	64.25	11.31	0.797	489.1	3.96
64	65.23	11.14	0.802	495.3	3.89
65	66.21	10.97	0.807	501.3	3.82
66	67.19	10.81	0.812	507.1	3.75
67	68.17	10.65	0.816	512.9	3.69
68	69.16	10.50	0.821	518.5	3.62
69	70.14	10.35	0.825	523.9	3.56
70	71.12	10.20	0.829	529.3	3.50
71	72.11	10.06	0.833	534.5	3.43
72	73.09	9.93	0.837	539.0	3.37
73	74.08	9.79	0.840	542.7	3.30
74	75.07	9.66	0.842	546.4	3.24
75	76.05	9.54	0.845	550.1	3.18
76	77.04	9.41	0.848	553.6	3.12
77	78.02	9.29	0.851	557.0	3.06
78	79.01	9.18	0.853	560.4	3.00
79	80.00	9.06	0.856	563.7	2.94
80	80.99	8.95	0.858	566.9	2.89
81	81.97	8.84	0.860	569.9	2.83
82	82.96	8.74	0.863	572.9	2.78
83	83.95	8.63	0.865	575.8	2.73
84	84.94	8.53	0.867	578.6	2.68
85	85.93	8.43	0.869	581.4	2.63
86	86.92	8.34	0.871	584.1	2.58
87	87.91	8.24	0.873	586.8	2.54
88	88.90	8.15	0.875	589.4	2.49
89	89.89	8.06	0.877	591.9	2.45
90	90.88	7.97	0.879	594.5	2.40
91	91.87	7.88	0.881	597.1	2.36
92	92.86	7.80	0.882	599.6	2.32
93	93.85	7.72	0.884	602.1	2.28
94	94.84	7.63	0.886	604.5	2.25
95	95.83	7.56	0.888	606.9	2.21
96	96.82	7.48	0.889	609.2	2.17