

ENGINEERING STATEMENT
RE BROADCAST ENGINEERING DATA
DISPLACEMENT APPLICATION FOR MODIFICATION
OF DIGITAL TRANSLATOR LICENSE TO CHANGE CHANNEL
K43LY-D, CODY, WYOMING
CHANNEL 14 0.733 KW ND ERP 2009.6 METERS RCAMSL
FACILITY ID: 51609

MAY 2018

COHEN, DIPPELL AND EVERIST, P.C.
CONSULTING ENGINEERS
RADIO AND TELEVISION
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington)
) ss
District of Columbia)

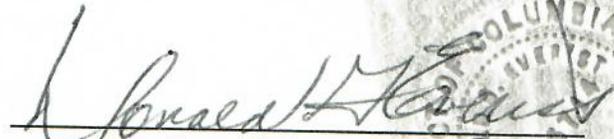
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1420 N Street, N.W., Suite One, Washington, D.C. 20005;

That his qualifications are a matter of record in the Federal Communications Commission;

That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.



Donald G. Everist
District of Columbia
Professional Engineer
Registration No. 5714

Subscribed and sworn to before me this 30th day of May, 2018.



Notary Public

My Commission Expires: 2/28/2023



This engineering statement has been prepared on behalf of KTVQ Communications, LLC. and is in support of a displacement application. The current license bears the call sign K43LY-D. K43LY-D operates with an effective radiated power of 1 kW.

The proposed digital translator will receive KTVQ-DT, Ch. 10, Billings, Montana (Facility ID number 35694) over-the-air and retransmit on Ch. 14.

The existing transmitter site¹ is located on a ridge approximately 18 km north-northwest of Cody, Wyoming. The existing tower has a total overall structure height above ground of 17.1 meters (56.1 feet) and is not registered. The proposed antenna will be side-mounted on this tower at 12.2 meters above ground level. This application updates the transmitter site coordinates.

The geographic coordinates of the licensed and corrected site are as follows:

<u>Licensed</u>	<u>Actual</u>
North Latitude: 44° 36' 25"	North Latitude: 44° 35' 14"
West Longitude: 108° 51' 30"	West Longitude: 108° 51' 08"
NAD-27	NAD-27
North Latitude: 44° 36' 24.8"	North Latitude: 44° 35' 13.8"
West Longitude: 108° 51' 32.4"	West Longitude: 108° 51' 10.5"
NAD-83	NAD-83

¹From Cody, Wyoming, proceed east on Greybull Highway (U.S. Route 114) and continue about 5 miles (approximately 8 km). Turn north onto McCullough Peaks Road and continue approximately 10 miles (approximately 16 km) to the transmitter site.

Equipment Data

Transmitter: Type-approved

Transmitter
At Output Filter: 100 Watts

Antenna: Sira², Model No. UTV-11/4/LP paraslot (or equivalent) antenna with 1.0° electrical beam tilt. Exhibit E-1 provides the technical antenna data.

Transmission Line: Commscope, Type AVA5-50, 7/8" [50 ohm] coaxial heliax, 18.3 meters (60 feet) or equivalent (0.8 dB per 100 feet) 83.2% per 100 ft.

Emission Mask: Simple

Power Data

Transmitter output	0.100 kW	-10 dBk
Combiner loss efficiency/loss	65.0%	-1.87 dB
Transmission line efficiency/loss 18.3 meters (60 feet)	0.895%	-0.48 dB
Input power to the antenna	0.0582 kW	-12.35 dBk
Antenna power gain	12.6	11 dBd
Effective Radiated Power	0.733 kW	-1.349 kW

²Vended by Kathrein-Scala.

Elevation Data

Vertical dimension for Channel 14 diplex antenna	4.9 meters 16.1 feet
Structure Height Above Ground	12.2 meters 40 feet
Overall height above ground of the proposed antenna structure	17.1 meters 56.1 feet
Center of radiation of Channel 14 antenna above ground	14.6 meters 47.9 feet
Elevation of site above mean sea level	1995 meters 6545.3 feet
Center of radiation of Channel 14 antenna above mean sea level	2009.6 meters 6593.2 feet
Overall height above mean sea level of proposed tower and antenna	2012.1 meters 6601.4 feet

Note: Slight height differences may result due to conversion to metric.

Allocation

The proposed digital operation on Channel 14 at Cody, Wyoming, conforms to the requirements of Sections 74.709, 74.793(e), 74.793(f), 74.793(g), 74.793(h), 74.794(b), and 73.1030 of the Commission's Rules based on TVStudy 2.2. The requirements of these sections regarding this proposed Channel 14 operation of K43LY-D have met through demonstration of Longley-Rice prediction methodology. The proposed digital low-power television station will not cause any objectionable interference to any existing or proposed full-service DTV station or LPTV/TV translators.

Interference Analysis

A study of predicted interference caused by the proposed K43LY-D operation on Channel 14 digital operation has been performed using the Longley-Rice program for which the source data has been posted by the Commission on its website at fcc.gov/oet/tvstudy. Comparison of service/interference areas and population indicates this model closely matches the FCC's digital TVStudy 2.2 evaluation program. Best efforts have been made to use data and calculation identical to the FCC's program. The model employs the Longley-Rice propagation methodology and evaluates in grid cells of approximately 1 sq. km. Using one-second terrain data sampled approximately every 1.0 km at one-degree azimuth intervals with 2010 census centroids, all studies are based upon data in the Commission's current Licensing and Management System ("LMS") database update of the FCC's engineering database. Exhibit E-2 provides the allocation study.

Contour Data

Utilizing the formula in Section 73.625(b)(2) for the effective heights along each radial, the depression angle A_h , for each azimuth has been calculated. The maximum radiation value has been used to calculate the ERP where the vertical radiation pattern field value at these angles is greater than 90% of the maximum.

Table I provides the distances calculated by TVStudy 2.2 along each radial spaced every ten degrees in azimuth to the predicted F(50,90) 51 dBu and 48.7 dBu F(50,90) contours, the

effective radiated power and the effective antenna heights. The predicted 51 dBu and 48.7 dBu contours determined from these distances are shown on the attached map (Exhibit E-3).

RFF Analysis

There are no AM stations located within two km of the existing K43LY-D tower site. According to the FCC CDBS database, there are five LPTV stations, including K43LY-D, located on the same tower. With the exception of FM station KUMP, there are no other broadcast stations located within 0.2 km of the site. The tower property as described earlier in this text is located in a very remote area, and although the antennas are relatively close to the ground, when the proposed facilities are constructed, the appropriate warning signage will be posted.

K43LY-D proposes to operate on Channel 14 with a Sira, Model No. UTV-11/4/LP antenna with an effective radiated power of 0.733 kW on UHF Channel 14 with a center of radiation above ground of 12.2 meters (40 feet).

Abstracted from the application bearing FCC File Number 0000053895:

“Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground (12.6 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 Sira UTV-11/4/LP antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 40 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 from the proposed facility is calculated to be $8.4 \mu\text{W}/\text{cm}^2$ ”

For the 733 watts, the power density based on the information abstracted from the application bearing FCC File No. 0000053895 will be less than $8.4 \mu\text{W}/\text{cm}^2$. For Channel 14, the limit for the uncontrolled environment two meters above ground is $315 \mu\text{W}/\text{cm}^2$.

The license indicates the terrain surrounding the site is rugged and difficult to traverse. According to the license, there are no nearby residences, tourist site or camping grounds in the area to attract visitors. There is one access road leading to the site. The road is generally unimproved (4-wheel drive vehicle) and is approximately 10 miles from the nearest highway. The transmitter site is fenced by barbed wire and the access road has a locked gate.

It is anticipated that the total RFF contribution of all LPTV and FM operations at the site may exceed the FCC guidelines for the general population³, authorized personnel and rigging contractors will be alerted to the potential zone of high field levels on the tower, and if necessary, the station will operate with reduced power or terminate the operation of the transmitter as appropriate when it is necessary for authorized personnel or contractors to perform work on the tower. As noted above, the site is extremely remote and not easily accessible.

The proposed operation, based upon the current OET Bulletin No. 65, Edition 97-01, dated August 1997, Supplement A and Appendix B, meets the provisions of the FCC radio

³As noted above, the site is in a remote area approximately 18 km northwest of Cody.

frequency field (“RFF”) guidelines, and thus, it is believed to meet the definition if a remote area site, and therefore, complies with Section 1.1307 of the FCC Rules.

Environmental Statement

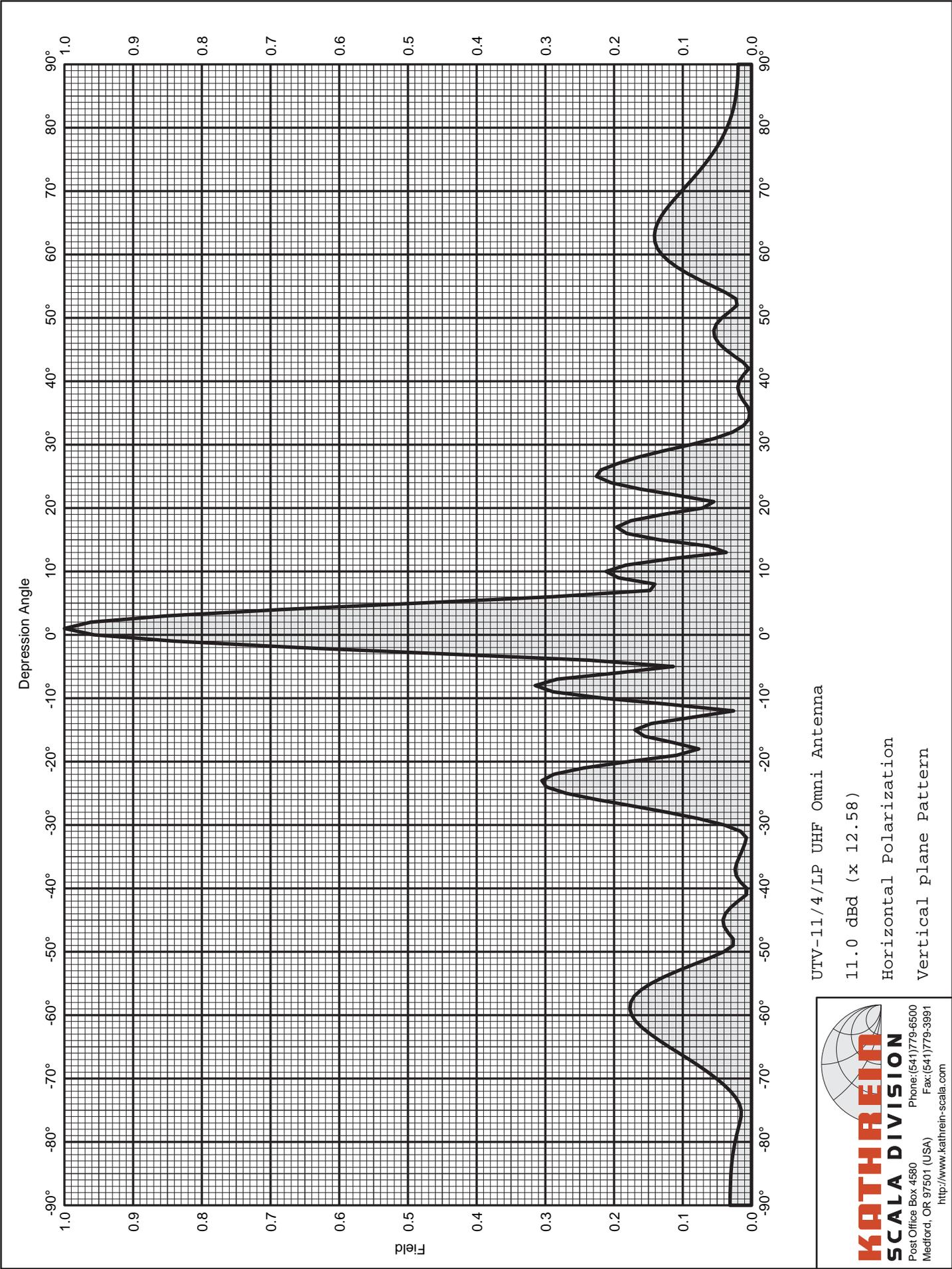
An environmental assessment (“EA”) is categorically excluded under Section 1.1306 of the FCC Rules and Regulations as the tower was constructed prior to the requirements specified in WT Docket No. 03-128 and the licensee indicates:

- (a)(1) The proposed facilities are not located in an officially designated wilderness area.
- (a)(2) The proposed facilities are not located in an officially designated wildlife preserve.
- (a)(3) The proposed facilities will not affect any listed threatened or endangered species or habitats.
- (a)(3)(ii) The proposed facilities will not jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats.
- (a)(4) The proposed facilities located on a tower which was built prior to the adoption of WT Docket No. 03-128 and is grandfathered and has not affected any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
- (a)(5) The existing tower is not located near any known Indian religious sites.
- (a)(6) The existing tower is not located in a flood plain.
- (a)(7) The installation of the DTV facilities on an existing tower at an existing site will not involve a significant change in surface features of the ground in the vicinity of the tower.
- (a)(8) No lighting is required.

- (b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines contained in OET Bulletin 65 (Edition 97-01) and Supplement A. Authorized personnel will be alerted to areas of the antennas where potential radiation levels are in excess of the FCC guidelines. A security fence with a locked gate precludes access to the tower site.

EXHIBIT E-1

ANTENNA MANUFACTURER DATA



UTV-11/4/LP UHF Omni Antenna

11.0 dBd (x 12.58)

Horizontal Polarization

Vertical plane Pattern



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<http://www.kathrein-scala.com>



UTV-11/4/LP UHF Omni Antenna

11.0 dBd (x 12.58)

Horizontal Polarization

Vertical plane Pattern

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
-90	0.031	-30.10	-19.10	0.01	-45	0.041	-27.64	-16.64	0.02
-89	0.031	-30.12	-19.12	0.01	-44	0.038	-28.39	-17.39	0.02
-88	0.031	-30.18	-19.18	0.01	-43	0.030	-30.40	-19.40	0.01
-87	0.031	-30.27	-19.27	0.01	-42	0.019	-34.29	-23.29	0.00
-86	0.030	-30.36	-19.36	0.01	-41	0.010	-40.00	-29.00	0.00
-85	0.030	-30.49	-19.49	0.01	-40	0.010	-40.00	-29.00	0.00
-84	0.029	-30.68	-19.68	0.01	-39	0.016	-35.84	-24.84	0.00
-83	0.028	-30.94	-19.94	0.01	-38	0.022	-33.10	-22.10	0.01
-82	0.027	-31.32	-20.32	0.01	-37	0.024	-32.43	-21.43	0.01
-81	0.026	-31.82	-20.82	0.01	-36	0.021	-33.36	-22.36	0.01
-80	0.024	-32.43	-21.43	0.01	-35	0.018	-35.11	-24.11	0.00
-79	0.022	-33.21	-22.21	0.01	-34	0.014	-37.38	-26.38	0.00
-78	0.019	-34.20	-23.20	0.00	-33	0.010	-40.00	-29.00	0.00
-77	0.017	-35.34	-24.34	0.00	-32	0.010	-40.00	-29.00	0.00
-76	0.015	-36.36	-25.36	0.00	-31	0.016	-36.01	-25.01	0.00
-75	0.015	-36.49	-25.49	0.00	-30	0.040	-28.02	-17.02	0.02
-74	0.017	-35.14	-24.14	0.00	-29	0.077	-22.29	-11.29	0.07
-73	0.023	-32.81	-21.81	0.01	-28	0.123	-18.23	-7.23	0.19
-72	0.031	-30.30	-19.30	0.01	-27	0.173	-15.24	-4.24	0.38
-71	0.040	-27.95	-16.95	0.02	-26	0.225	-12.96	-1.96	0.64
-70	0.051	-25.84	-14.84	0.03	-25	0.270	-11.38	-0.38	0.92
-69	0.063	-23.97	-12.97	0.05	-24	0.299	-10.50	0.50	1.12
-68	0.077	-22.32	-11.32	0.07	-23	0.305	-10.31	0.69	1.17
-67	0.091	-20.86	-9.86	0.10	-22	0.288	-10.82	0.18	1.04
-66	0.105	-19.55	-8.55	0.14	-21	0.244	-12.25	-1.25	0.75
-65	0.120	-18.41	-7.41	0.18	-20	0.179	-14.94	-3.94	0.40
-64	0.134	-17.45	-6.45	0.23	-19	0.109	-19.26	-8.26	0.15
-63	0.147	-16.65	-5.65	0.27	-18	0.077	-22.31	-11.31	0.07
-62	0.159	-15.98	-4.98	0.32	-17	0.114	-18.87	-7.87	0.16
-61	0.168	-15.48	-4.48	0.36	-16	0.156	-16.15	-5.15	0.31
-60	0.174	-15.17	-4.17	0.38	-15	0.170	-15.41	-4.41	0.36
-59	0.177	-15.04	-4.04	0.39	-14	0.146	-16.71	-5.71	0.27
-58	0.176	-15.10	-4.10	0.39	-13	0.086	-21.35	-10.35	0.09
-57	0.171	-15.36	-4.36	0.37	-12	0.026	-31.72	-20.72	0.01
-56	0.161	-15.89	-4.89	0.32	-11	0.117	-18.64	-7.64	0.17
-55	0.146	-16.70	-5.70	0.27	-10	0.216	-13.33	-2.33	0.58
-54	0.128	-17.85	-6.85	0.21	-9	0.288	-10.80	0.20	1.05
-53	0.107	-19.41	-8.41	0.14	-8	0.315	-10.04	0.96	1.25
-52	0.084	-21.49	-10.49	0.09	-7	0.283	-10.97	0.03	1.01
-51	0.061	-24.27	-13.27	0.05	-6	0.195	-14.20	-3.20	0.48
-50	0.040	-27.90	-16.90	0.02	-5	0.114	-18.89	-7.89	0.16
-49	0.027	-31.47	-20.47	0.01	-4	0.237	-12.51	-1.51	0.71
-48	0.027	-31.51	-20.51	0.01	-3	0.448	-6.97	4.03	2.53
-47	0.034	-29.38	-18.38	0.01	-2	0.661	-3.60	7.40	5.50
-46	0.040	-27.97	-16.97	0.02	-1	0.839	-1.52	9.48	8.87
					0	0.957	-0.38	10.62	11.53



UTV-11/4/LP UHF Omni Antenna

11.0 dBd (x 12.58)

Horizontal Polarization

Vertical plane Pattern

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	0.957	-0.38	10.62	11.53	45	0.038	-28.46	-17.46	0.02
1	1.000	0.00	11.00	12.59	46	0.048	-26.44	-15.44	0.03
2	0.962	-0.34	10.66	11.64	47	0.054	-25.42	-14.42	0.04
3	0.850	-1.41	9.59	9.10	48	0.055	-25.21	-14.21	0.04
4	0.682	-3.32	7.68	5.86	49	0.051	-25.80	-14.80	0.03
5	0.485	-6.28	4.72	2.96	50	0.043	-27.31	-16.31	0.02
6	0.291	-10.73	0.27	1.06	51	0.032	-29.99	-18.99	0.01
7	0.148	-16.62	-5.62	0.27	52	0.021	-33.59	-22.59	0.01
8	0.141	-17.04	-6.04	0.25	53	0.023	-32.95	-21.95	0.01
9	0.194	-14.25	-3.25	0.47	54	0.038	-28.49	-17.49	0.02
10	0.212	-13.49	-2.49	0.56	55	0.056	-24.96	-13.96	0.04
11	0.183	-14.76	-3.76	0.42	56	0.076	-22.44	-11.44	0.07
12	0.118	-18.58	-7.58	0.17	57	0.093	-20.61	-9.61	0.11
13	0.037	-28.70	-17.70	0.02	58	0.108	-19.30	-8.30	0.15
14	0.063	-24.03	-13.03	0.05	59	0.121	-18.35	-7.35	0.18
15	0.134	-17.43	-6.43	0.23	60	0.131	-17.68	-6.68	0.21
16	0.182	-14.81	-3.81	0.42	61	0.137	-17.25	-6.25	0.24
17	0.196	-14.14	-3.14	0.49	62	0.141	-17.04	-6.04	0.25
18	0.176	-15.11	-4.11	0.39	63	0.141	-17.00	-6.00	0.25
19	0.129	-17.82	-6.82	0.21	64	0.140	-17.08	-6.08	0.25
20	0.071	-22.95	-11.95	0.06	65	0.137	-17.29	-6.29	0.23
21	0.055	-25.22	-14.22	0.04	66	0.132	-17.61	-6.61	0.22
22	0.108	-19.36	-8.36	0.15	67	0.125	-18.04	-7.04	0.20
23	0.162	-15.79	-4.79	0.33	68	0.118	-18.57	-7.57	0.17
24	0.205	-13.78	-2.78	0.53	69	0.110	-19.18	-8.18	0.15
25	0.226	-12.93	-1.93	0.64	70	0.102	-19.85	-8.85	0.13
26	0.219	-13.18	-2.18	0.61	71	0.093	-20.59	-9.59	0.11
27	0.195	-14.19	-3.19	0.48	72	0.085	-21.39	-10.39	0.09
28	0.166	-15.60	-4.60	0.35	73	0.077	-22.24	-11.24	0.08
29	0.129	-17.78	-6.78	0.21	74	0.070	-23.13	-12.13	0.06
30	0.089	-21.06	-10.06	0.10	75	0.063	-24.06	-13.06	0.05
31	0.053	-25.48	-14.48	0.04	76	0.056	-25.02	-14.02	0.04
32	0.027	-31.34	-20.34	0.01	77	0.050	-26.01	-15.01	0.03
33	0.012	-38.62	-27.62	0.00	78	0.045	-27.00	-16.00	0.03
34	0.010	-40.00	-29.00	0.00	79	0.040	-27.98	-16.98	0.02
35	0.010	-40.00	-29.00	0.00	80	0.036	-28.95	-17.95	0.02
36	0.010	-40.00	-29.00	0.00	81	0.032	-29.89	-18.89	0.01
37	0.012	-38.12	-27.12	0.00	82	0.029	-30.78	-19.78	0.01
38	0.018	-35.03	-24.03	0.00	83	0.026	-31.59	-20.59	0.01
39	0.020	-34.03	-23.03	0.00	84	0.024	-32.29	-21.29	0.01
40	0.018	-34.91	-23.91	0.00	85	0.023	-32.87	-21.87	0.01
41	0.012	-38.63	-27.63	0.00	86	0.021	-33.36	-22.36	0.01
42	0.010	-40.00	-29.00	0.00	87	0.021	-33.73	-22.73	0.01
43	0.012	-38.23	-27.23	0.00	88	0.020	-34.00	-23.00	0.01
44	0.025	-31.90	-20.90	0.01	89	0.020	-34.16	-23.16	0.00
					90	0.019	-34.21	-23.21	0.00

EXHIBIT E-2
ALLOCATION STUDY

tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: K43LY-Ch14Final, Model: Longley-Rice
Start: 2018.05.30 15:02:09

Study created: 2018.05.30 15:02:08

Study build station data: LMS TV 2018-05-30

Proposal: K43LY-D D14 LD LIC CODY, WY
File number: Ch14Final
Facility ID: 51609
Station data: User record
Record ID: 256
Country: U.S.

Build options:
Protect pre-transition records not on baseline channel

Search options:
Non-U.S. records included
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K14MC-D	D14	LD	LIC	LAVA HOT SPRINGS, ID	BLDTT20110526AID	335.2 km
No	K14IJ-D	D14	LD	LIC	LEADORE, ID	BLDTT20121109ABB	353.8
No	K14NT-D	D14	LD	LIC	MONTPELIER, ID	BLDTT20111115AGT	318.4
No	K14OA-D	D14	LD	LIC	PRESTON, ID	BLDTT20111005AJC	361.5
Yes	KINV-LD	D14	LD	LIC	BILLINGS, MT	BLDRTL20091015ACG	134.6
No	K14OS-D	D14	LD	CP	DEER LODGE, MT	BNPDTL20100505AGB	363.3
No	K14PM-D	D14	LD	CP	DELL, MT	BNPDTL20100609AIC	293.6
No	K41LS-D	D14	LD	APP	FORSYTH, MT	BLANK0000054013	256.2
No	K14QI-D	D14	LD	CP	GREAT FALLS, MT	BNPDTL20101014ABJ	378.0
No	K14OQ-D	D14	LD	CP	HYSHAM, MT	BNPDTL20100510ABN	214.4
No	K42HT-D	D14	LD	APP	LAKETOWN, ETC., UT	BLANK0000052890	358.7
No	KGWC-TV	D14	DT	LIC	CASPER, WY	BLCDT20090225AAL	286.9
No	K14OT-D	D14	LD	CP	GILLETTE, WY	BNPDTL20100505AHZ	236.7
No	K14IL	N14	TX	LIC	PINEDALE, ETC., WY	BLTT19921228IG	207.6
No	K15JL-D	D15	LD	CP	BILLINGS, MT	BNPDTL20100208ACF	134.5
No	K39HD-D	D15	LD	APP	RED LODGE, MT	BLANK0000054239	67.9
No	K15HK-D	D15	LD	CP	SHERIDAN, WY	BLANK0000036662	137.3

No K15HK-D D15 LD LIC SHERIDAN, WY BLDTT20090625AAM 152.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D14
Mask: Simple
Latitude: 44 35 13.80 N (NAD83)
Longitude: 108 51 10.50 W
Height AMSL: 2009.6 m
HAAT: 0.0 m
Peak ERP: 0.733 kW
Antenna: Omnidirectional
Elev Pattn: Generic
Elec Tilt: 1.00

48.7 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.733 kW	606.8 m	51.6 km
45.0	0.733	558.2	50.7
90.0	0.733	574.6	51.0
135.0	0.733	355.5	44.6
180.0	0.733	387.0	45.8
225.0	0.733	426.7	46.9
270.0	0.733	477.6	48.5
315.0	0.733	498.6	49.3

Database HAAT does not agree with computed HAAT

Database HAAT: 0 m Computed HAAT: 486 m

Distance to Canadian border: 490.4 km

Distance to Mexican border: 1413.1 km

Conditions at FCC monitoring station: Grand Island NE

Bearing: 112.0 degrees Distance: 942.3 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
 Bearing: 147.8 degrees Distance: 574.6 km

No land mobile station failures found

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%

 Interference to BLDLTL20091015ACG LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	KINV-LD	D14	LD	LIC	BILLINGS, MT	BLDRTL20091015ACG	
Undesireds:	K43LY-D	D14	LD	LIC	CODY, WY	Ch14Final	134.6 km
	K14AG	N14	TX	LIC	CIRCLE, ETC., MT	BLTTL19830420IH	286.2
	K14OQ-D	D14	LD	CP	HYSHAM, MT	BNPDTL20100510ABN	99.1
	K15JL-D	D15	LD	CP	BILLINGS, MT	BNPDTL20100208ACF	0.2
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	5372.6	149,889	4786.1	149,589	4663.5	149,239	4646.4 149,165 0.37 0.05
Undesired			Total IX		Unique IX, before	Unique IX, after	
K43LY-D	D14	LD	LIC	18.1	77	17.1	74
K14OQ-D	D14	LD	CP	111.4	350	110.4	347
K15JL-D	D15	LD	CP	11.2	0	11.2	0

 Interference to proposal scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	K43LY-D	D14	LD	LIC	CODY, WY	Ch14Final	
Undesireds:	KINV-LD	D14	LD	LIC	BILLINGS, MT	BLDRTL20091015ACG	134.6 km
	K15HK-D	D15	LD	CP	SHERIDAN, WY	BLANK0000036662	137.3
	Service area		Terrain-limited		IX-free	Percent IX	

7359.2	32,783	6405.2	31,975	6404.2	31,975	0.02	0.00
Undesired			Total IX		Unique IX	Prcnt Unique IX	
KINV-LD D14 LD LIC		1.0	0	1.0	0	0.02	0.00

TABLE I
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
K43LY-D, CODY, WYOMING
CHANNEL 14 0.733 KW ERP ND 2009.6 METERS RC/AMSL
MAY 2018

Radial Bearing (N ° E, T)	Average*	Effective Height	Depression Angle	Effective Radiated Power	Distance to Contour F(50/90)	
	Elevation 3.2 to 16.1 km meters				51 dBu Noise-Limited	48.72 dBu Noise-Limited
0	1406.4	603.2	0.680	0.733	48.3	51.6
10	1392.0	617.6	0.688	0.733	48.5	51.9
20	1410.4	599.2	0.678	0.733	48.2	51.5
30	1425.1	584.5	0.670	0.733	48.0	51.3
40	1422.9	586.7	0.671	0.733	48.0	51.3
50	1449.1	560.5	0.656	0.733	47.6	50.8
60	1456.7	552.9	0.651	0.733	47.5	50.7
70	1446.2	563.4	0.658	0.733	47.7	50.9
80	1435.0	574.6	0.664	0.733	47.8	51.1
90	1438.6	571.0	0.662	0.733	47.8	51.0
100	1522.3	487.3	0.611	0.733	45.8	49.0
110	1560.9	448.7	0.587	0.733	44.4	47.6
120	1699.2	310.4	0.488	0.733	39.6	42.5
130	1674.5	335.1	0.507	0.733	40.7	43.7
140	1646.1	363.5	0.528	0.733	41.9	45.1
150	1635.9	373.7	0.535	0.733	42.3	45.5
160	1647.8	361.8	0.527	0.733	41.8	45.0
170	1644.0	365.6	0.530	0.733	42.0	45.2
180	1626.2	383.4	0.542	0.733	42.6	45.8
190	1626.5	383.1	0.542	0.733	42.6	45.8
200	1617.5	392.1	0.548	0.733	42.9	46.1
210	1636.1	373.5	0.535	0.733	42.3	45.5
220	1594.6	415.0	0.564	0.733	43.5	46.7
230	1582.3	427.3	0.573	0.733	43.8	47.0
240	1569.4	440.2	0.581	0.733	44.2	47.4
250	1516.0	493.6	0.615	0.733	46.0	49.2
260	1520.7	488.9	0.612	0.733	45.8	49.0
270	1535.6	474.0	0.603	0.733	45.3	48.5
280	1571.8	437.8	0.580	0.733	44.1	47.3

TABLE I
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
K43LY-D, CODY, WYOMING
CHANNEL 14 0.733 KW ERP ND 2009.6 METERS RC/AMSL
MAY 2018

<u>Radial</u> <u>Bearing</u> (N ° E, T)	<u>Average*</u> <u>Elevation</u> <u>3.2 to 16.1 km</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Depression</u> <u>Angle</u> degrees	<u>Effective</u> <u>Radiated</u> <u>Power</u> kW	<u>Distance to Contour F(50/90)</u>	
					<u>51 dBu</u> <u>Noise-Limited</u> km	<u>48.72 dBu</u> <u>Noise-Limited</u> km
290	1561.2	448.4	0.587	0.733	44.4	47.6
300	1585.9	423.7	0.570	0.733	43.8	46.9
310	1532.5	477.1	0.605	0.733	45.4	48.6
320	1510.9	498.7	0.619	0.733	46.2	49.4
330	1474.1	535.5	0.641	0.733	47.2	50.4
340	1465.3	544.4	0.646	0.733	47.3	50.5
350	1434.9	574.7	0.664	0.733	47.8	51.1

*Based on data from FCC one-second data base.

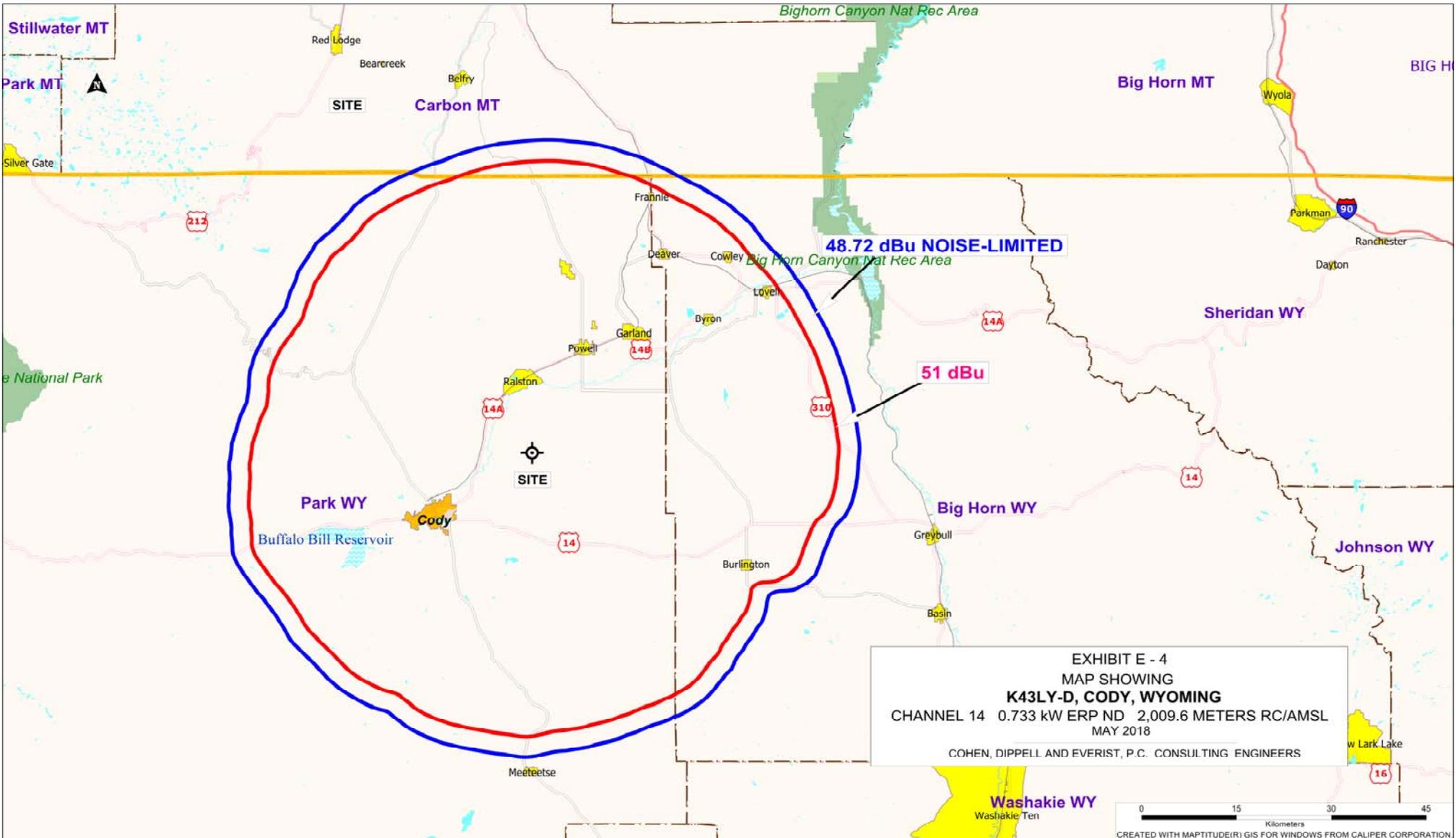


EXHIBIT E - 4
 MAP SHOWING
K43LY-D, CODY, WYOMING
 CHANNEL 14 0.733 kW ERP ND 2,009.6 METERS RC/AMSL
 MAY 2018
 COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS

0 15 30 45
 Kilometers
 CREATED WITH MAPTITUDE(R) GIS FOR WINDOWS FROM CALIPER CORPORATION