EXHIBIT E

ENGINEERING STATEMENT
RE APPLICATION IN SUPPORT OF CONSTRUCTION PERMIT
FOR REPACKED FACILITIES
PURSUANT TO DA 17-314
ON BEHALF OF
KQDS ACQUISITION CORPORATION.
KQDS-TV, DULUTH, MINNESOTA
CHANNEL 18 1000 KW H 428.3 KW V ERP 297 METERS

JUNE 2017

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 June, 2017.

Notary Public

My Commission Expires: 2/28/2018

CAROLYN L. LYONS NOTARY PUBLIC DISTRICT OF COLUMBIA 02-28-2018

Introduction

This engineering statement has been prepared on behalf of KQDS Acquisition Corporation ("KQDS Acquisition"), licensee of KQDS-TV. The purpose of this engineering statement is to accompany it's request for an authorization to construct repacked facilities pursuant to DA 17-314.

KQDS Acquisition, is authorized to operate Station KQDS-TV on DTV Channel 17 with a maximum effective radiated power ("ERP") of 1000 kW (horizontal polarization) and an antenna height above average terrain ("HAAT") of 299 meters. KQDS-TV has been assigned DTV Channel 18 with facilities of 1000 kW and an HAAT of 299 meters in the Incentive Auction. The licensee proposes to construct DTV facilities of 1000 kW (elliptical polarization) at a HAAT of 297 meters. The current tower top has the old analog antenna with the current digital antenna stacked on top. These antennas will be removed and a pedestal of appropriate length be installed with the repacked antenna.

The slight change in HAAT is due to the changes in channel and antenna.

KQDS-TV Tower

The new DTV Channel 18 antenna will be top-mounted and the overall structure height above ground will remain unchanged, 240.5 meters (789 feet). The tower registration number is 1203847.

The geographic coordinates of the tower as determined by survey are:

North Latitude: 46° 47' 37"

West Longitude: 92° 07' 03"

(NAD 27)

North Latitude: 46° 47' 37"

West Longitude: 92° 07' 04"

(NAD 83)

A tower sketch is provided as Exhibit E-1.

Equipment Data

A Dielectric, Type TFU-28GTH O4A (or equivalent) DTV antenna, with one degree electrical beam tilt is proposed. The manufacturer's electrical performance specifications for this antenna are included as Exhibit E-2. Further, the vertical plane pattern and other exhibits required by Section 73.625(c) are attached in Exhibit E-2.

Power Data

Effective Radiated Power	Horizontal	1000 kW	30.0 dBk
	Vertical	428.3 kW	26.32 dBk
Antenna Type		Dielectric, Type TFU-28GTH O4A or equivalent	
Antenna Gain RMS	Horizontal	16.8	12.25 dB
	Vertical	7.2	8.57 dB
Antenna Input		59.5 kW	17.75 dBk
Transmission Line		Dielectric EIA 7-3/16" 75-ohm rigid line	
Length of Line		783 ft.	
Total Line Efficiency Loss		84.62	0.7 dB
Transmitter Output Power		70.3 kW	18.47 dBk

Elevation Data
(Existing Tower)

Vertical dimension of Channel 18	17.8 meters (58.4 feet)
Elevation of site above mean sea level	377.0 meters (1237.0 feet)
Overall height above ground of the existing tower (including beacon)	240.5 meters (789 feet)
Overall height above mean sea level of existing tower (including beacon)	617.5 meters (2026.0 feet)
Center of radiation of Channel 18 antenna above ground	230.4 meters (756 feet)
Center of radiation of Channel 18 antenna above mean sea level	607.4 meters (1993 feet)
Antenna height above average terrain	297 meters

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

Coverage

The average elevation data for 3 to 16 km along each radial has been previously determined.

The F(50,90) DTV coverage contour has been computed from reference to the propagation data for Channels 14-69, as published by the FCC in Figure 10b and Figure 10c, Section 73.699 of the FCC Rules and Regulations.

Utilizing the formula in Section 73.625(b)(2) of the Rules for the effective heights, it is found that the depression angle, A_h, varies from 0.372 to 0.572 degrees. Since the relative

vertical field is greater than 90% of the maximum at these depression angles, the maximum power was used in determining the distance to the DTV contour.

The map in Exhibit E-3 shows the proposed KQDS-TV coverage contours, 48 dBu and 39.15 dBu F(50,90). The legal boundaries of Duluth, Minnesota are highlighted on the map. Table I provides the average elevation 3 to 16 km, the antenna height above average terrain, the effective radiated power and the predicted distance to the 48 dBu and 39.15 dBu F(50,90) coverage contours.

Other Licensed and Broadcast Facilities

There is no AM station located within 3.2 km of the existing KQDS-TV site.

KQDS(FM), 94.9 MHz, Duluth, MN is located on the tower.

No other FM or full-service TV stations are located within100 meters.

No adverse technical effect is anticipated by the proposed DTV operation to any other FCC licensed facility. If required, the licensee will install filters or take other measurements as necessary to resolve the problem.

RF Radiation at Tower Site

The RF radiation by the slight channel change is not expected to change significantly. Therefore, only the RF radiation two meters above the ground at the tower site as a result of KQDS-TV change will be calculated.

KQDS-TV DTV Facility

Channel 18	Freq:	494-500 MHz Range
	ERP =	1,000,000 watts horizontal + 428,300 watts vertical
	RCAGL =	230.4 meters

KQDS-TV proposes to utilize a Dielectric TFU-28GTH O4A antenna. The manufacturers vertical plane plot is included as Exhibit E-2. The vertical plane plot indicates that the relative RF radiation is less then 0.105 for any angle more then 10 to 90 degrees below the horizon. A value of 0.1 will be assumed.

$S = \frac{33.4 (F^2) ERP}{R^2}$

ERP = 1,428,300 watts
R = 228.4 meters (antenna height above ground - 2 meters)
F = 0.105 (field factor)

$S = 10.1 \text{ uW/cm}^2$

Therefore KQDS-TV contributes 10.1 $\mu W/cm^2$ at 2 meters above the ground. The limit for an uncontrolled environment is f/1500 for the 300-1500 MHz range:

(497 MHz)/1500 = 0.331 mW/cm^2 or 331$\mu W/cm^2$ is the RF limit for KQDS-TV

Therefore:

KQDS-TV proposed DTV facility contributes three percent RF for an uncontrolled environment two meters above the ground at the tower site.

Finally, provisions will be made to reduce power or to terminate the transmitter emissions as appropriate when it is necessary for authorized personnel to climb the tower. All facilities operating at the tower site will coordinate to ensure that workers will not be subjected to RFR levels in excess of the current FCC guidelines.

FCC Rule, Section 1.1307

An environmental assessment ("EA") is categorically excluded under Section 1.1307 of the FCC Rules and Regulations since the licensee indicates:

(a)(1)	The proposed facilities will not be located in an officially designated wilderness area.
(a)(2)	The proposed facilities will not be 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 will not affect any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
(a)(5)	The proposed facilities will not be located near any known Indian religious sites.
(a)(6)	The proposed facilities will not be located in a flood plain.
(a)(7)	The installation of a new DTV transmitting antenna on an existing guyed tower will not involve a significant change in surface features of the ground in the vicinity of the tower.
(a)(8)	It is not proposed to equip the tower with high intensity white lights unless required by the FAA.
(b)	Workers and the general public will not be subjected to RFR levels in excess of the current FCC guidelines. Authorized personnel climbing the tower will not be exposed to RFR levels in excess of the FCC guidelines listed OET Bulletin No. 65, dated August 1997.

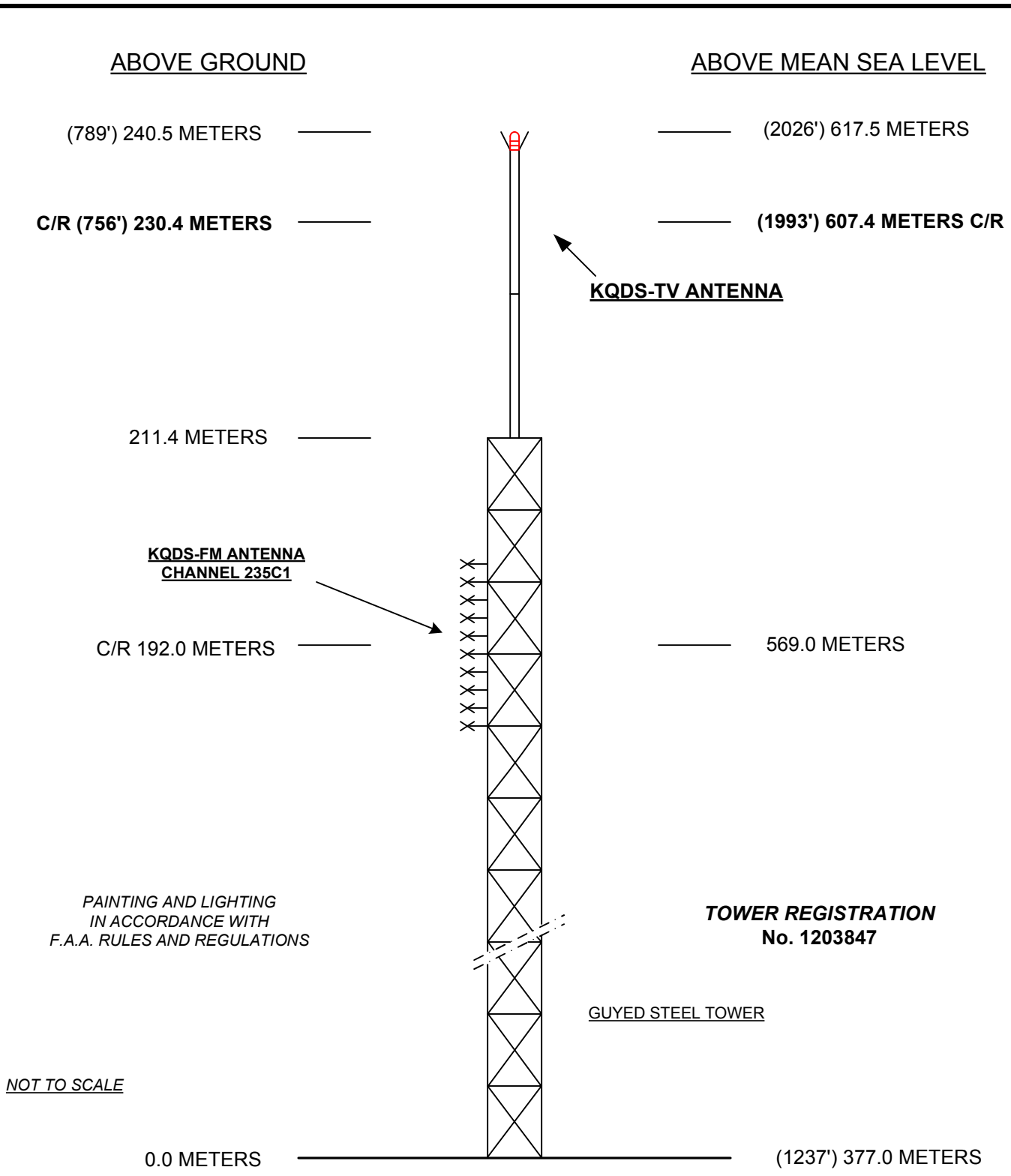
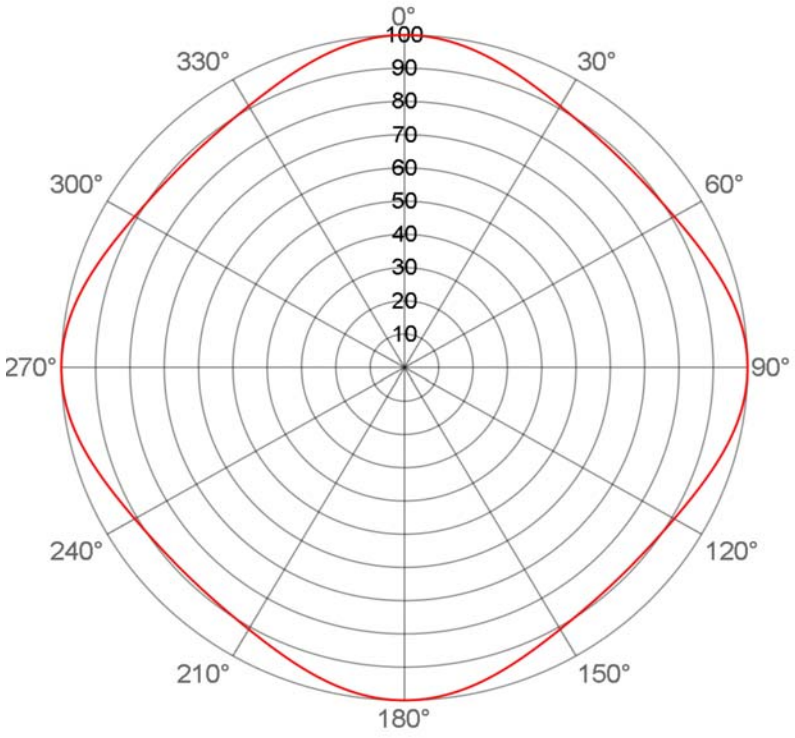


EXHIBIT E - 1
VERTICAL SKETCH
FOR THE REPACKING OPERATION OF
KQDS-TV, DULUTH, MINNESOTA
CHANNEL 18 1000 kW ERP 297 METERS HAAT
JUNE 2017

COHEN, DIPPELL AND EVERIST, P.C. Consulting Engineers Washington, D.C.

EXHIBIT E-2

ANTENNA MANUFACTURER DATA



Horizontal Polarization
AZIMUTH PATTERN

Exhibit No.	**AZ-1**
Date	**23 Feb 2017**
Call Letters	**KQDS**
Channel	**18**
Antenna Type	**TFU-28GTH O4A**
Location	**Duluth, MN**
Customer	
Gain	**1.1 (0.41 dB)**
	Calculated
Drawing #	**TFU-O4**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	1.000	36	0.895	72	0.951	108	0.951	144	0.895	180	1.000	216	0.895	252	0.951	288	0.951	324	0.895
1	1.000	37	0.894	73	0.956	109	0.947	145	0.897	181	1.000	217	0.894	253	0.956	289	0.947	325	0.897
2	0.999	38	0.893	74	0.960	110	0.943	146	0.899	182	0.999	218	0.893	254	0.960	290	0.943	326	0.899
3	0.998	39	0.892	75	0.964	111	0.939	147	0.901	183	0.998	219	0.892	255	0.964	291	0.939	327	0.901
4	0.997	40	0.891	76	0.968	112	0.935	148	0.903	184	0.997	220	0.891	256	0.968	292	0.935	328	0.903
5	0.995	41	0.890	77	0.972	113	0.931	149	0.905	185	0.995	221	0.890	257	0.972	293	0.931	329	0.905
6	0.993	42	0.889	78	0.976	114	0.927	150	0.908	186	0.993	222	0.889	258	0.976	294	0.927	330	0.908
7	0.991	43	0.889	79	0.979	115	0.924	151	0.911	187	0.991	223	0.889	259	0.979	295	0.924	331	0.911
8	0.989	44	0.889	80	0.983	116	0.920	152	0.914	188	0.989	224	0.889	260	0.983	296	0.920	332	0.914
9	0.986	45	0.889	81	0.986	117	0.917	153	0.917	189	0.986	225	0.889	261	0.986	297	0.917	333	0.917
10	0.983	46	0.889	82	0.989	118	0.914	154	0.920	190	0.983	226	0.889	262	0.989	298	0.914	334	0.920
11	0.979	47	0.889	83	0.991	119	0.911	155	0.924	191	0.979	227	0.889	263	0.991	299	0.911	335	0.924
12	0.976	48	0.889	84	0.993	120	0.908	156	0.927	192	0.976	228	0.889	264	0.993	300	0.908	336	0.927
13	0.972	49	0.890	85	0.995	121	0.905	157	0.931	193	0.972	229	0.890	265	0.995	301	0.905	337	0.931
14	0.968	50	0.891	86	0.997	122	0.903	158	0.935	194	0.968	230	0.891	266	0.997	302	0.903	338	0.935
15	0.964	51	0.892	87	0.998	123	0.901	159	0.939	195	0.964	231	0.892	267	0.998	303	0.901	339	0.939
16	0.960	52	0.893	88	0.999	124	0.899	160	0.943	196	0.960	232	0.893	268	0.999	304	0.899	340	0.943
17	0.956	53	0.894	89	1.000	125	0.897	161	0.947	197	0.956	233	0.894	269	1.000	305	0.897	341	0.947
18	0.951	54	0.895	90	1.000	126	0.895	162	0.951	198	0.951	234	0.895	270	1.000	306	0.895	342	0.951
19	0.947	55	0.897	91	1.000	127	0.894	163	0.956	199	0.947	235	0.897	271	1.000	307	0.894	343	0.956
20	0.943	56	0.899	92	0.999	128	0.893	164	0.960	200	0.943	236	0.899	272	0.999	308	0.893	344	0.960
21	0.939	57	0.901	93	0.998	129	0.892	165	0.964	201	0.939	237	0.901	273	0.998	309	0.892	345	0.964
22	0.935	58	0.903	94	0.997	130	0.891	166	0.968	202	0.935	238	0.903	274	0.997	310	0.891	346	0.968
23	0.931	59	0.905	95	0.995	131	0.890	167	0.972	203	0.931	239	0.905	275	0.995	311	0.890	347	0.972
24	0.927	60	0.908	96	0.993	132	0.889	168	0.976	204	0.927	240	0.908	276	0.993	312	0.889	348	0.976
25	0.924	61	0.911	97	0.991	133	0.889	169	0.979	205	0.924	241	0.911	277	0.991	313	0.889	349	0.979
26	0.920	62	0.914	98	0.989	134	0.889	170	0.983	206	0.920	242	0.914	278	0.989	314	0.889	350	0.983
27	0.917	63	0.917	99	0.986	135	0.889	171	0.986	207	0.917	243	0.917	279	0.986	315	0.889	351	0.986
28	0.914	64	0.920	100	0.983	136	0.889	172	0.989	208	0.914	244	0.920	280	0.983	316	0.889	352	0.989
29	0.911	65	0.924	101	0.979	137	0.889	173	0.991	209	0.911	245	0.924	281	0.979	317	0.889	353	0.991
30	0.908	66	0.927	102	0.976	138	0.889	174	0.993	210	0.908	246	0.927	282	0.976	318	0.889	354	0.993
31	0.905	67	0.931	103	0.972	139	0.890	175	0.995	211	0.905	247	0.931	283	0.972	319	0.890	355	0.995
32	0.903	68	0.935	104	0.968	140	0.891	176	0.997	212	0.903	248	0.935	284	0.968	320	0.891	356	0.997
33	0.901	69	0.939	105	0.964	141	0.892	177	0.998	213	0.901	249	0.939	285	0.964	321	0.892	357	0.998
34	0.899	70	0.943	106	0.960	142	0.893	178	0.999	214	0.899	250	0.943	286	0.960	322	0.893	358	0.999
35	0.897	71	0.947	107	0.956	143	0.894	179	1.000	215	0.897	251	0.947	287	0.956	323	0.894	359	1.000

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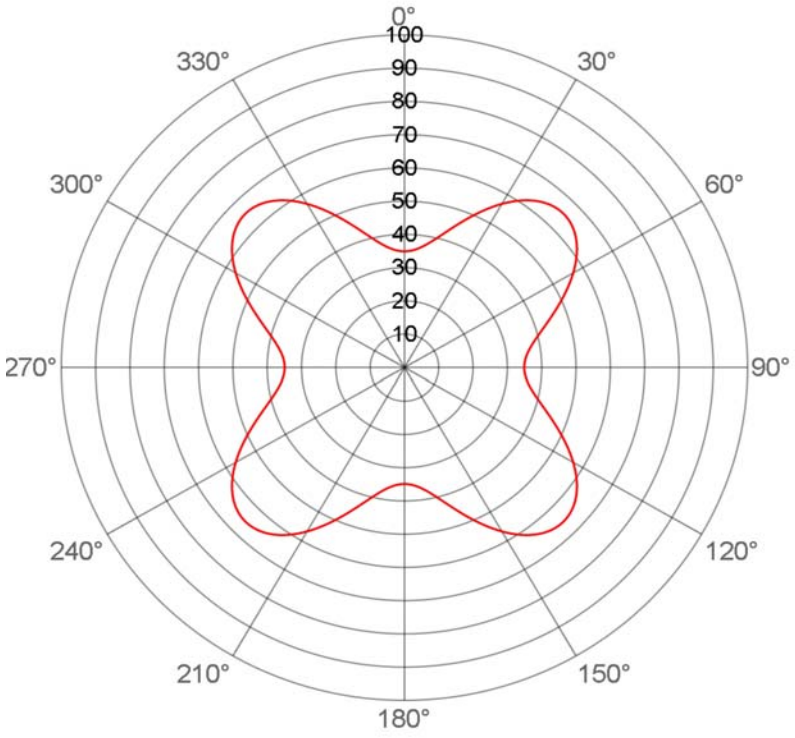

Vertical Polarization
AZIMUTH PATTERN

Exhibit No.	**AZ-1**
Date	**23 Feb 2017**
Call Letters	**KQDS**
Channel	**18**
Antenna Type	**TFU-28GTH O4A**
Location	**Duluth, MN**
Customer	
Gain	**1.1 (0.41 dB)**
	Calculated
Drawing #	**TFU-O4**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.349	36	0.621	72	0.438	108	0.438	144	0.621	180	0.349	216	0.621	252	0.438	288	0.438	324	0.621
1	0.349	37	0.628	73	0.429	109	0.448	145	0.614	181	0.349	217	0.628	253	0.429	289	0.448	325	0.614
2	0.350	38	0.634	74	0.420	110	0.459	146	0.606	182	0.350	218	0.634	254	0.420	290	0.459	326	0.606
3	0.351	39	0.639	75	0.411	111	0.469	147	0.597	183	0.351	219	0.639	255	0.411	291	0.469	327	0.597
4	0.353	40	0.644	76	0.403	112	0.480	148	0.588	184	0.353	220	0.644	256	0.403	292	0.480	328	0.588
5	0.356	41	0.648	77	0.395	113	0.491	149	0.578	185	0.356	221	0.648	257	0.395	293	0.491	329	0.578
6	0.359	42	0.651	78	0.388	114	0.502	150	0.568	186	0.359	222	0.651	258	0.388	294	0.502	330	0.568
7	0.362	43	0.653	79	0.382	115	0.514	151	0.557	187	0.362	223	0.653	259	0.382	295	0.514	331	0.557
8	0.366	44	0.654	80	0.376	116	0.525	152	0.547	188	0.366	224	0.654	260	0.376	296	0.525	332	0.547
9	0.371	45	0.655	81	0.371	117	0.536	153	0.536	189	0.371	225	0.655	261	0.371	297	0.536	333	0.536
10	0.376	46	0.654	82	0.366	118	0.547	154	0.525	190	0.376	226	0.654	262	0.366	298	0.547	334	0.525
11	0.382	47	0.653	83	0.362	119	0.557	155	0.514	191	0.382	227	0.653	263	0.362	299	0.557	335	0.514
12	0.388	48	0.651	84	0.359	120	0.568	156	0.502	192	0.388	228	0.651	264	0.359	300	0.568	336	0.502
13	0.395	49	0.648	85	0.356	121	0.578	157	0.491	193	0.395	229	0.648	265	0.356	301	0.578	337	0.491
14	0.403	50	0.644	86	0.353	122	0.588	158	0.480	194	0.403	230	0.644	266	0.353	302	0.588	338	0.480
15	0.411	51	0.639	87	0.351	123	0.597	159	0.469	195	0.411	231	0.639	267	0.351	303	0.597	339	0.469
16	0.420	52	0.634	88	0.350	124	0.606	160	0.459	196	0.420	232	0.634	268	0.350	304	0.606	340	0.459
17	0.429	53	0.628	89	0.349	125	0.614	161	0.448	197	0.429	233	0.628	269	0.349	305	0.614	341	0.448
18	0.438	54	0.621	90	0.349	126	0.621	162	0.438	198	0.438	234	0.621	270	0.349	306	0.621	342	0.438
19	0.448	55	0.614	91	0.349	127	0.628	163	0.429	199	0.448	235	0.614	271	0.349	307	0.628	343	0.429
20	0.459	56	0.606	92	0.350	128	0.634	164	0.420	200	0.459	236	0.606	272	0.350	308	0.634	344	0.420
21	0.469	57	0.597	93	0.351	129	0.639	165	0.411	201	0.469	237	0.597	273	0.351	309	0.639	345	0.411
22	0.480	58	0.588	94	0.353	130	0.644	166	0.403	202	0.480	238	0.588	274	0.353	310	0.644	346	0.403
23	0.491	59	0.578	95	0.356	131	0.648	167	0.395	203	0.491	239	0.578	275	0.356	311	0.648	347	0.395
24	0.502	60	0.568	96	0.359	132	0.651	168	0.388	204	0.502	240	0.568	276	0.359	312	0.651	348	0.388
25	0.514	61	0.557	97	0.362	133	0.653	169	0.382	205	0.514	241	0.557	277	0.362	313	0.653	349	0.382
26	0.525	62	0.547	98	0.366	134	0.654	170	0.376	206	0.525	242	0.547	278	0.366	314	0.654	350	0.376
27	0.536	63	0.536	99	0.371	135	0.655	171	0.371	207	0.536	243	0.536	279	0.371	315	0.655	351	0.371
28	0.547	64	0.525	100	0.376	136	0.654	172	0.366	208	0.547	244	0.525	280	0.376	316	0.654	352	0.366
29	0.557	65	0.514	101	0.382	137	0.653	173	0.362	209	0.557	245	0.514	281	0.382	317	0.653	353	0.362
30	0.568	66	0.502	102	0.388	138	0.651	174	0.359	210	0.568	246	0.502	282	0.388	318	0.651	354	0.359
31	0.578	67	0.491	103	0.395	139	0.648	175	0.356	211	0.578	247	0.491	283	0.395	319	0.648	355	0.356
32	0.588	68	0.480	104	0.403	140	0.644	176	0.353	212	0.588	248	0.480	284	0.403	320	0.644	356	0.353
33	0.597	69	0.469	105	0.411	141	0.639	177	0.351	213	0.597	249	0.469	285	0.411	321	0.639	357	0.351
34	0.606	70	0.459	106	0.420	142	0.634	178	0.350	214	0.606	250	0.459	286	0.420	322	0.634	358	0.350
35	0.614	71	0.448	107	0.429	143	0.628	179	0.349	215	0.614	251	0.448	287	0.429	323	0.628	359	0.349

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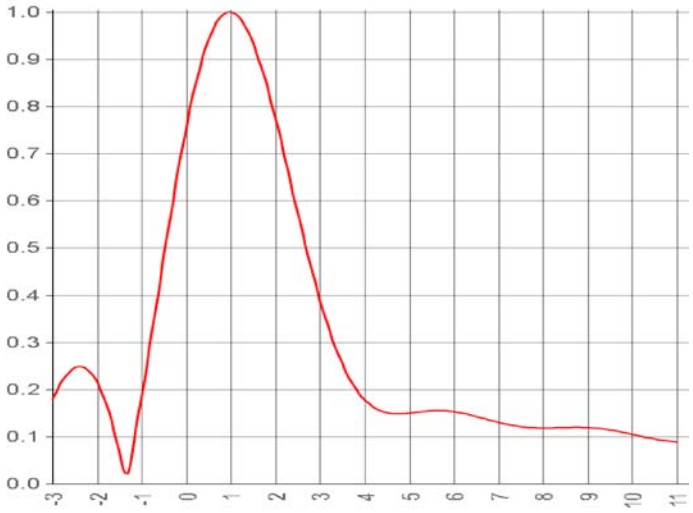
ELEVATION PATTERN

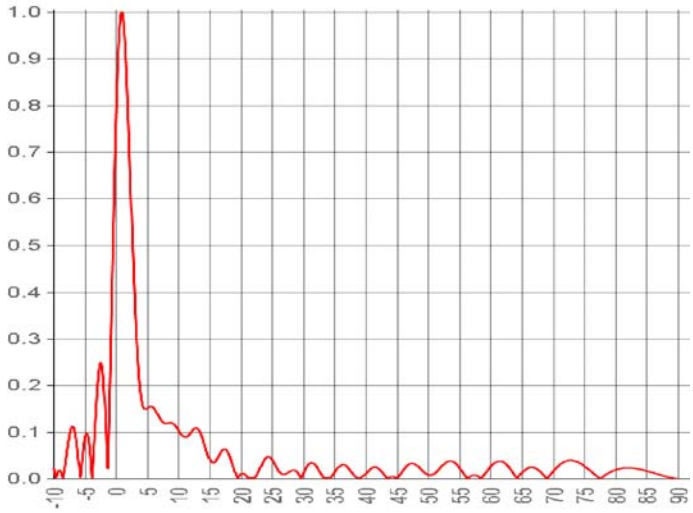
Exhibit No.	**EL-1**
Date	**23 Feb 2017**
Call Letters	**KQDS**
Channel	**18**
Antenna Type	**TFU-28GTH O4A**
Location	**Duluth, MN**
Customer	

Future fill is available!

RMS Gain at Main Lobe	**24.0 (13.80 dB)**	Beam Tilt	**1 Degrees**
RMS Gain at Horizontal	**13.6 (11.34 dB)**	Drawing #	**28G240100**
	Calculated		



Degrees below horizontal



Degrees below horizontal

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10	0.024	10	0.105	30	0.009	50	0.008	70	0.015
-9	0.018	11	0.089	31	0.032	51	0.010	71	0.029
-8	0.040	12	0.099	32	0.028	52	0.023	72	0.037
-7	0.112	13	0.108	33	0.007	53	0.036	73	0.039
-6	0.046	14	0.082	34	0.002	54	0.036	74	0.035
-5	0.084	15	0.042	35	0.012	55	0.024	75	0.027
-4	0.039	16	0.038	36	0.028	56	0.006	76	0.017
-3	0.179	17	0.060	37	0.026	57	0.006	77	0.006
-2	0.216	18	0.056	38	0.009	58	0.005	78	0.004
-1	0.181	19	0.018	39	0.001	59	0.008	79	0.013
0	0.753	20	0.010	40	0.010	60	0.025	80	0.019
1	1.000	21	0.005	41	0.023	61	0.036	81	0.022
2	0.774	22	0.001	42	0.022	62	0.036	82	0.023
3	0.391	23	0.019	43	0.008	63	0.024	83	0.022
4	0.178	24	0.044	44	0.003	64	0.005	84	0.020
5	0.150	25	0.041	45	0.001	65	0.012	85	0.016
6	0.153	26	0.018	46	0.017	66	0.023	86	0.013
7	0.130	27	0.009	47	0.031	67	0.023	87	0.009
8	0.118	28	0.016	48	0.030	68	0.015	88	0.005
9	0.119	29	0.014	49	0.018	69	0.001	89	0.002

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System Summary

Exhibit No.	
Date	**23 Feb 2017**
Call Letters	**KQDS**
Channel	**18**
Antenna Type	**TFU-28GTH O4A**
Location	**Duluth, MN**
Customer	

Antenna

	Hpol	Vpol
ERP:	1000.0 kW (30.00 dBk)	428.3 kW (26.32 dBk)
RMS Gain*:	16.8 (12.25 dB)	7.2 (8.57 dB)

Antenna Input Power:

59.5 kW

Transmission Line

Type:	Transmission Line		
Size:	7-3/16" 75 ohm		
Impedance:	75 ohm		
Length:	783 ft (238.7 m)	Attenuation:	0.7 dB
		Efficiency:	84.62 %

Transmitter Output

70.3 kW (18.47 dBk)

* Gain is with respect to half wave dipole.

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Mechanicals

Exhibit No.	
Date	**23 Feb 2017**
Call Letters	**KQDS**
Channel	**18**
Antenna Type	**TFU-28GTH O4A**
Location	**Duluth, MN**
Customer	

Preliminary Specifications

Top Mounted

Mechanical Specification without ice TIA-222-G

Basic Wind Speed	90 mph
Structure Class	II
Exposure Category	C
Topography Category	1

Mechanical Specifications

Height less Lightning Protector	(H2)	58.4 ft (17.8 m)
Height with Lightning Protector	(H4)	62.4 ft (19.0 m)
Center of Radiation	(H3)	29.2 ft (8.9 m)

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TABLE I
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
KQDS-TV, DULUTH, MINNESOTA
CHANNEL 18 1000 KW H 428.3 KW V ERP 297 METERS HAAT
JUNE 2017

Radial Bearing (N ° E, T)	Average* Elevation 3.2 to 16.1 km meters	Effective Height meters	Depression Angle degrees	Effective Radiated Power kW	Distance to Contour F(50/90) 48 dBu City Grade km	39.15 dBu Noise-Limited km
0	424.0	185.7	0.377	1000	73.1	85.4
10	403.2	206.5	0.398	1000	74.6	87.8
20	382.3	227.4	0.418	1000	76.2	90.6
30	361.4	248.3	0.436	1000	77.7	93.8
40	340.5	269.2	0.454	1000	79.5	96.8
50	313.8	295.9	0.477	1000	82.4	100.2
60	281.1	328.6	0.502	1000	86.2	103.6
70	248.4	361.3	0.527	1000	89.5	106.8
80	215.7	394.0	0.550	1000	91.9	110.0
90	183.0	426.7	0.572	1000	93.8	113.1
100	183.0	426.7	0.572	1000	93.8	113.1
110	183.0	426.7	0.572	1000	93.8	113.1
120	183.0	426.7	0.572	1000	93.8	113.1
130	183.0	426.7	0.572	1000	93.8	113.1
140	184.4	425.3	0.571	1000	93.7	113.0
150	187.1	422.6	0.569	1000	93.6	112.7
160	189.8	419.9	0.568	1000	93.4	112.5
170	192.5	417.2	0.566	1000	93.3	112.2
180	195.3	414.4	0.564	1000	93.1	112.0
190	230.8	378.9	0.539	1000	90.9	108.5
200	266.3	343.4	0.513	1000	87.8	105.1
210	301.9	307.8	0.486	1000	83.8	101.6
220	337.4	272.3	0.457	1000	79.8	97.3
230	360.5	249.2	0.437	1000	77.8	94.0
240	371.3	238.4	0.428	1000	77.0	92.3
250	382.1	227.6	0.418	1000	76.2	90.7
260	392.9	216.8	0.408	1000	75.4	89.1
270	403.7	206.0	0.398	1000	74.6	87.8

TABLE I
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
KQDS-TV, DULUTH, MINNESOTA
CHANNEL 18 1000 KW H 428.3 KW V ERP 297 METERS HAAT
JUNE 2017

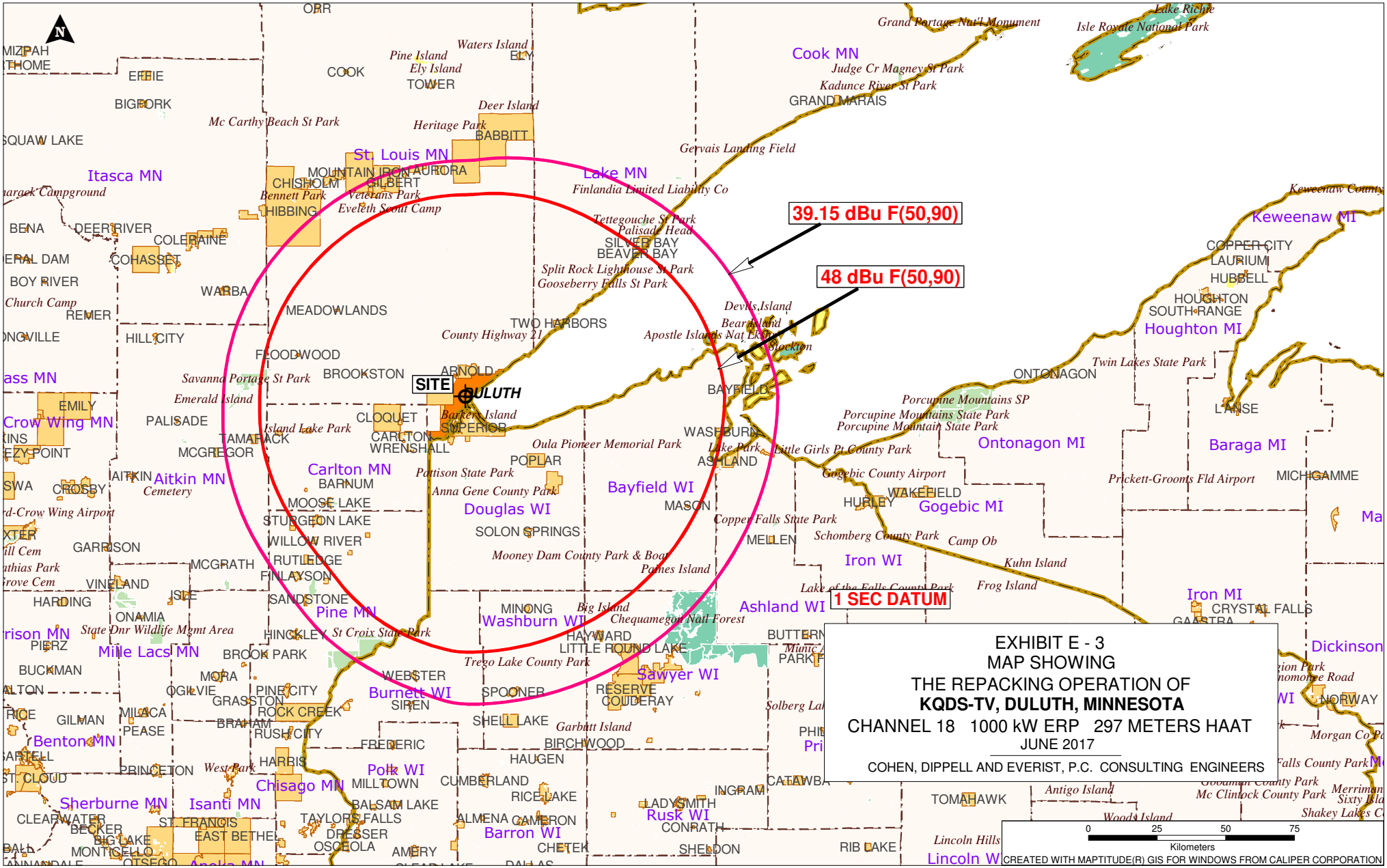
Radial Bearing (N ° E, T)	Average* Elevation 3.2 to 16.1 km meters	Effective Height meters	Depression Angle degrees	Effective Radiated Power kW	Distance to Contour F(50/90) 48 dBu City Grade km	39.15 dBu Noise-Limited km
280	409.5	200.2	0.392	1000	74.1	87.1
290	415.3	194.4	0.386	1000	73.7	86.4
300	421.0	188.7	0.380	1000	73.3	85.8
310	426.8	182.9	0.375	1000	72.9	85.1
320	429.1	180.6	0.372	1000	72.7	84.9
330	427.8	181.9	0.374	1000	72.8	85.0
340	426.6	183.1	0.375	1000	72.9	85.2
350	425.3	184.4	0.376	1000	73.0	85.3

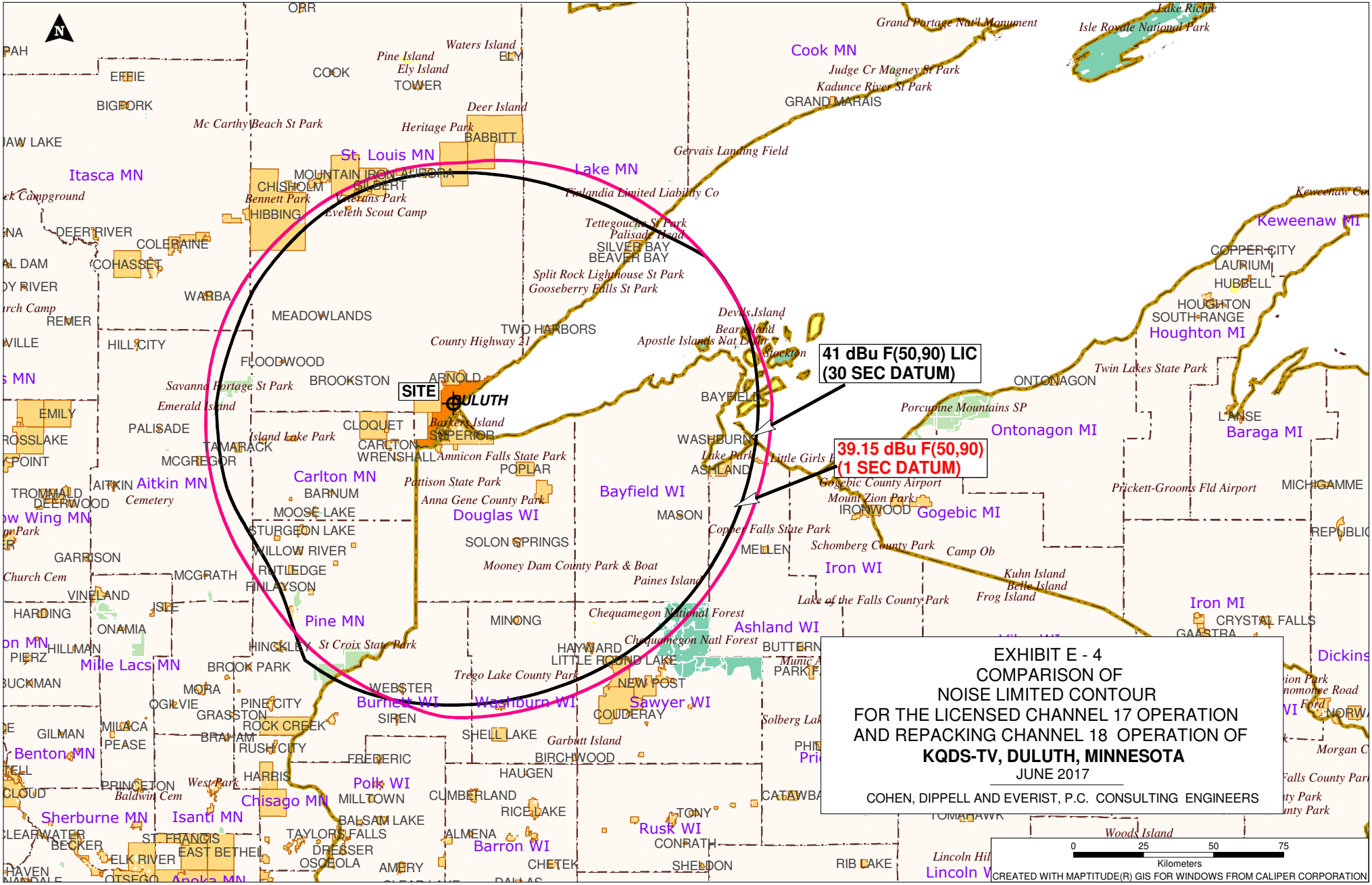
*Based on data from FCC one-second data base.

DTV Channel 18 (494-500 MHz)
Average Elevation 3.2 to 16.1 km 312.9 meters AMSL
Center of Radiation 609.7 meters AMSL
Antenna Height Above Average Terrain 299 meters
Effective Radiated Power 1000 kW (30 dBk) Horizontal

North Latitude: 46˚ 47' 37"
West Longitude: 92˚ 07' 03"

(NAD-27)


39.15 dBu F(50,90)
48 dBu F(50,90)
SITE
DULUTH
1 SEC DATUM
EXHIBIT E - 3
MAP SHOWING
THE REPACKING OPERATION OF
KQDS-TV, DULUTH, MINNESOTA
CHANNEL 18 1000 kW ERP 297 METERS HAAT
JUNE 2017
COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS
0 25 50 75
Kilometers
CREATED WITH MAPTITUDE(R) GIS FOR WINDOWS FROM CALIPER CORPORATION


41 dBu F(50,90) LIC
(30 SEC DATUM)
39.15 dBu F(50,90)
(1 SEC DATUM)
SITE
DULUTH
EXHIBIT E - 4
COMPARISON OF
NOISE LIMITED CONTOUR
FOR THE LICENSED CHANNEL 17 OPERATION
AND REPACKING CHANNEL 18 OPERATION OF
KQDS-TV, DULUTH, MINNESOTA
JUNE 2017
COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS
0 25 50 75
Kilometers
CREATED WITH MAPTITUDE(R) GIS FOR WINDOWS FROM CALIPER CORPORATION