

ENGINEERING STATEMENT**In support of a request for****Minor Modification of a Licensed Facility for DTV Application****KVOS-TV CH 14****Bellingham, WA****Facility ID: 35862****PURPOSE**

MARSAND, INC. has been retained by OTA Broadcasting (SEA), LLC, the “applicant”, to prepare this engineering statement in support of a request for a Minor Modification of a Licensed Facility for DTV Application pursuant to the Commission’s directive in *Procedures for the Post-Incentive Auction Broadcast Transition*, DA 17-106, released January 27, 2017 and the *Incentive Auction Closing and Channel Reassignment Public Notice*, DA 17-314, released April 13, 2017. The applicant proposes to replace their existing directional side mount antenna with an elliptically polarized Top mount antenna, reuse an existing transmission line and install a new transmitter on its reassigned channel 14 to be able to meet the construction deadline for its transition phase 7.

The proposed DTV facility will operate on the DTV channel for this station as established in the post-incentive auction channel reassignment public notice. It will operate post-incentive auction facilities that do not expand the noise-limited service contour in any direction beyond that established by the post-incentive auction channel reassignment public notice and that match or reduce by no more than five percent with respect to predicted population from those defined in the post-incentive auction channel reassignment public notice. The antenna structure to be used by this facility has been registered by the Commission and will not require reregistration.

DISCUSSION

The applicant currently is licensed and operating on channel 35 with Digital TV service with 580 kW ERP at 799 m HAAT (BLCDDT-20070628ABX). The station has been reassigned

channel 14 with 362 kW ERP at 799 m HAAT with reference coordinates: 48°-40'-49.38"N, 122°-50'-26.66"W (NAD83). The current tower is leased. It is proposed to remove the existing channel 35 top mount antenna and replace it with a new channel 14 directional elliptically polarized top mount antenna, reuse the existing transmission line and install a new transmitter.

The proposed facility would establish service on the reassigned channel at an ERP of 362 kW ERP and a HAAT of 799 m. The proposed service area will remain within the FCC baseline +1% and still maintain a service area population of more than 95% of baseline. The study results of this proposal utilizing the FCC TVStudy v2.2.2 software are included as **Exhibit 1**.

FCC OET Bulletin No. 65 "Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Edition 97-01, and has been found to comply with the limits set forth in Section 1.1310 of the Rules as shown in **Exhibit 2**. The contribution of the station to exposure as defined by the ANSI standard computations for occupational/controlled area is 0.52 % of the maximum, and exposure as defined by the ANSI standard computations for general population/uncontrolled area is 2.63 % of the maximum.

Proposed coverage contour shown in **Exhibit 3**.

Proposed antenna technical information is shown in **Exhibit 4**.

CONCLUSION


It is respectfully requested that the Commission grant this request for minor modification for these facilities as specified herein.

DECLARATION

David Sanderford, EIT, declares and states that he is a graduate Electrical Engineer with a Bachelor of Science Degree in Electrical Engineering from the Georgia Institute of Technology, and his qualifications are known to the Federal Communications Commission, and that he is Vice-President of MARSAND, INC., a Registered Professional Engineering firm in the State of Texas, and that firm has been retained by OTA Broadcasting (SEA), LLC, to perform the engineering support as contained in this report.

All facts contained herein are true of his own knowledge except where stated to be on information or belief provided by others, and as to those facts, he believes them to be true.

I declare under penalty of perjury that the foregoing is true and correct.



David Sanderford, EIT
Vice-President - MARSAND, INC.

Executed this 7th of July, 2017
State of Texas

EXHIBIT 1

tvstudy v2.2.2
Database: localhost, Study: KVOS_PROPOSED01, Model: Longley-Rice
Start: 2017.07.06 13:20:39

Study created: 2017.07.06 13:20:33

Study build station data: LMS TV 2017-07-01 (9)

Proposal: KVOS-TV D14 DT BL BELLINGHAM, WA
File number: KVOS_PROPOSED01
Facility ID: 35862
Station data: User record
Record ID: 128
Country: U.S.

Stations potentially affected:

Call	Chan	Svc	Status	City, State	File Number	Distance
KRHP-CD	D14	DC	LIC	THE DALLES, OR	BLDTA20090819AFR	360.3 km
KAPP	D14	DT	LIC	YAKIMA, WA	BLCDT20130829AEQ	295.7

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
Latitude: 48 40 49.40 N (NAD83)
Longitude: 122 50 26.40 W
Height AMSL: 834.8 m
HAAT: 799.0 m
Peak ERP: 362 kW
Antenna: TFU-20JTH-R 04SP 0.0 deg

38.7 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	211 kW	833.8 m	120.8 km
45.0	242	834.8	122.1
90.0	199	784.9	118.5
135.0	328	751.7	122.1
180.0	331	798.9	124.0
225.0	223	749.5	118.2
270.0	223	811.8	120.6
315.0	202	828.8	120.2

ERP exceeds maximum

ERP: 362 kW ERP maximum: 199 kW

Proposal service area is within baseline plus 1.0%
Proposal service area population is more than 95.0% of baseline

**Proposal is within coordination distance of Canadian border
Distance to Canadian border: 15.6 km

Distance to Mexican border: 1843.9 km

**Proposal is within coordination distance of FCC monitoring station
**Proposal exceeds field strength limit at FCC monitoring station
Conditions at FCC monitoring station: Ferndale WA
Bearing: 34.2 degrees Distance: 37.1 km
ERP: 246 kW Field strength: 98.0 dBu, 79.4 mV/m

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 117.7 degrees Distance: 1681.2 km

No land mobile station failures found

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

Interference to BLDTA20090819AFR LIC, scenario 1
Proposal causes no interference.

Interference to BLCDT20130829AEQ LIC, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KAPP	D14	DT	LIC	YAKIMA, WA	BLCDT20130829AEQ	
Undesireds:	KVOS-TV	D14	DT	BL	BELLINGHAM, WA	DTVBL35862	295.7 km
	KVOS-TV	D14	DT	BL	BELLINGHAM, WA	KVOS_PROPOSED01	295.7
	KRHP-CD	D14	DC	LIC	THE DALLES, OR	BLDTA20090819AFR	109.3
	KVVK-CD	D15	DC	LIC	KENNEWICK, ETC., WA	BLDTA20100125ACB	112.3

Service area				Terrain-limited		IX-free, before		IX-free, after		Percent	New IX
22240.3	319,797			15486.2	283,944	14576.4	283,574	14576.4	283,574	0.00	0.00
Undesired				Total IX		Unique IX, before		Unique IX, after			
KVOS-TV	D14	DT	BL	44.0	0	44.0	0				
KVOS-TV	D14	DT	BL	44.0	0			44.0	0		
KVVK-CD	D15	DC	LIC	865.9	370	865.9	370	865.9	370		

Interference to proposal, scenario 1

Desired:	Call KVOS-TV	Chan D14	Svc DT	Status BL	City, State BELLINGHAM, WA	File Number KVOS_PROPOSED01	Distance
Undesireds:	KRHP-CD	D14	DC	LIC	THE DALLES, OR	BLDTA20090819AFR	360.3 km
	KAPP	D14	DT	LIC	YAKIMA, WA	BLCDDT20130829AEQ	295.7

Service area		Terrain-limited		IX-free		Percent IX		
24079.9	1,997,552	21696.8	1,946,489	21696.8	1,946,489	0.00	0.00	
21729.9	3,167,639	19094.6	3,128,552	19094.6	3,128,552	0.00	0.00	(in Canada)

EXHIBIT 2

ENVIRONMENTAL STATEMENT

The proposed facility complies in full with the requirements of 47 C.F.R. Section 1.1306 and will have no significant environmental impact. Population is very scattered and sparse near the immediate location of the proposed site. The proposed site does not involve any of the conditions specified in Section 1.1307(a)(1)-(6) of the Rules.

The facility of KVOs-TV has been studied in accordance with the procedures set forth in the FCC OET Bulletin No. 65 "Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Edition 97-01, and has been found to comply with the limits set forth in Section 1.1310 of the Rules. This determination has been based upon calculations with the total radiated power from all TV & FM co-located broadcast emitters. The total exposure as defined by the ANSI standard computations for occupational/controlled area is **0.53 %** of the maximum. The total exposure as defined by the ANSI standard computations for general population/uncontrolled area is **2.63 %** of the maximum. The proposed facility is in compliance with the Commission's guidelines.

Multiple Use FM/TV Tower						
Location:		KVOS-TV - Bellingham, WA				7/7/17
Channel Frequency Type	Call Letters	Service	ERP (W) H+V	Ant Center of Radiation AG (m)	% of ANSI/FCC Limit (6min)	% of ANSI/FCC Limit (30 min)
14	KVOS-TV	TV UHF#1	470,600	142.80	0.49	2.47
12	New(LD)	TV VHF#1	300	30.00	0.04	0.17
Total %					0.53	2.63
IN COMPLIANCE						

The Applicant agrees to maintain full compliance with the safety precautions to workers on the tower (controlled) and the general public (uncontrolled) by reducing or removing radiated power during the time of construction or maintenance on or near the antenna. The Applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from Radiofrequency Electromagnetic exposure in excess of FCC guidelines.

The Applicant is believed to be in full compliance with the Environmental Impact and Commission Rules.

EXHIBIT 3

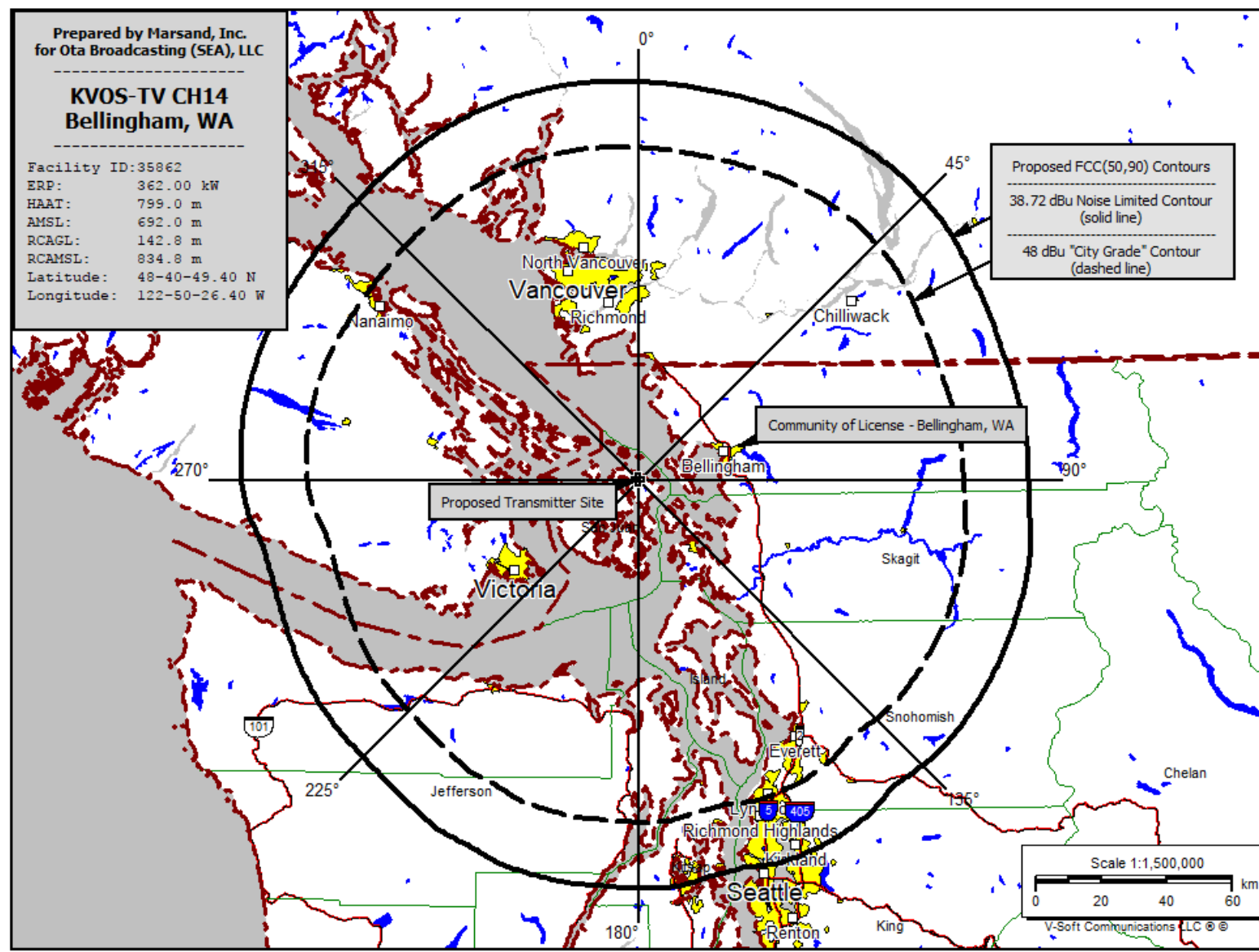
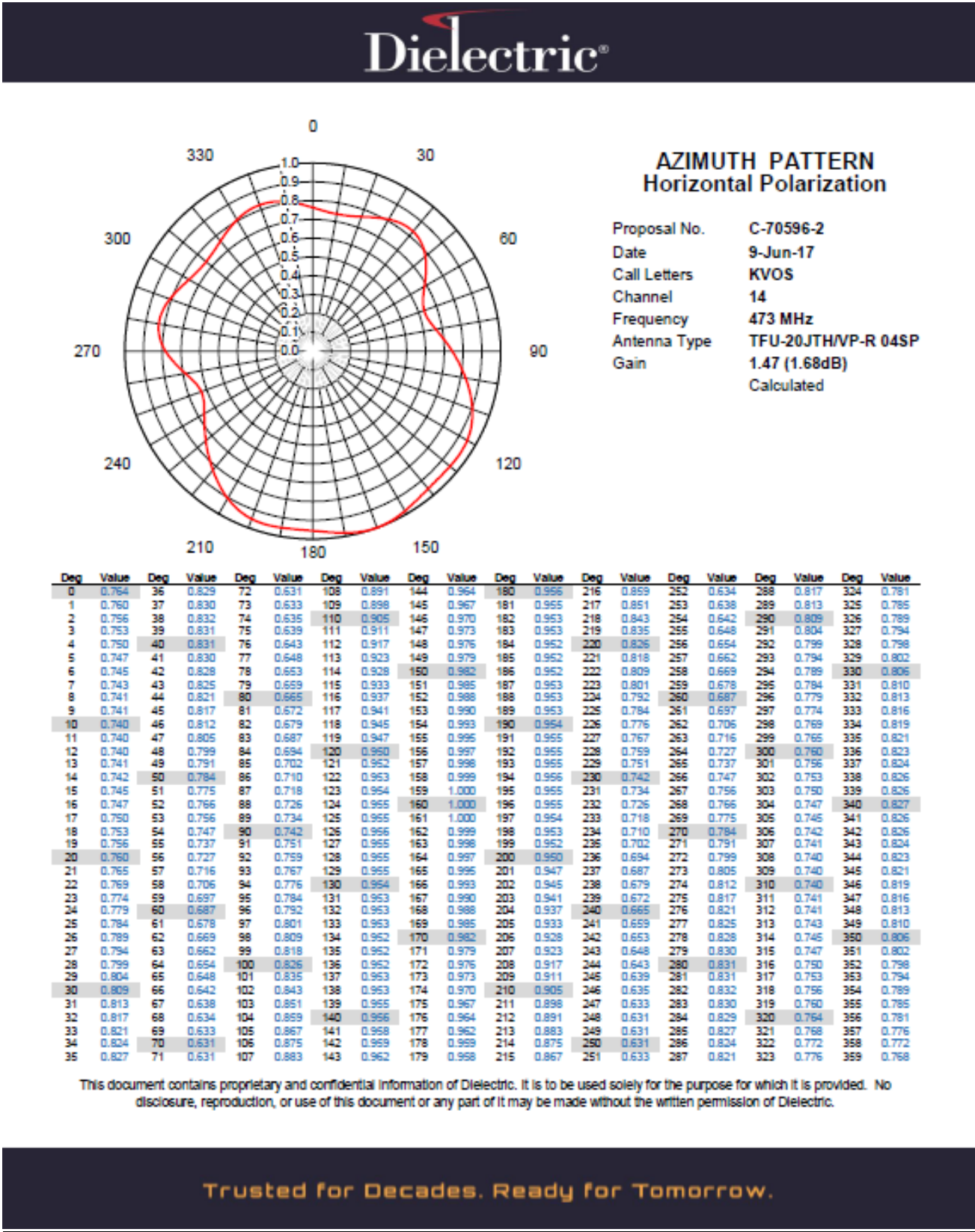
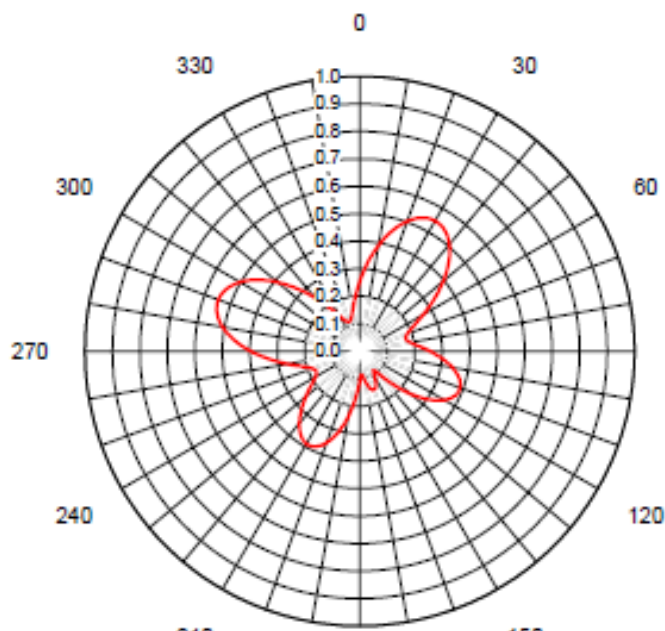


EXHIBIT 4



Dielectric®



AZIMUTH PATTERN Vertical Polarization

Proposal No. C-70596-2
 Date 9-Jun-17
 Call Letters KVOS
 Channel 14
 Frequency 473 MHz
 Antenna Type TFU-20JTH/VP-R 04SP
 Gain 2.83 (4.52dB)
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.254	36	0.533	72	0.177	108	0.385	144	0.085	180	0.108	216	0.369	252	0.194	288	0.546
1	0.267	37	0.528	73	0.175	109	0.387	145	0.085	181	0.119	217	0.363	253	0.201	289	0.548
2	0.280	38	0.522	74	0.174	110	0.389	146	0.088	182	0.131	218	0.356	254	0.208	290	0.548
3	0.294	39	0.515	75	0.174	111	0.389	147	0.092	183	0.144	219	0.350	255	0.216	291	0.547
4	0.308	40	0.507	76	0.175	112	0.389	148	0.097	184	0.157	220	0.342	256	0.225	292	0.545
5	0.322	41	0.499	77	0.176	113	0.388	149	0.103	185	0.171	221	0.334	257	0.235	293	0.543
6	0.336	42	0.489	78	0.179	114	0.386	150	0.110	186	0.185	222	0.326	258	0.245	294	0.540
7	0.349	43	0.480	79	0.182	115	0.383	151	0.116	187	0.200	223	0.318	259	0.256	295	0.535
8	0.363	44	0.469	80	0.186	116	0.379	152	0.122	188	0.214	224	0.309	260	0.267	296	0.530
9	0.377	45	0.458	81	0.190	117	0.374	153	0.128	189	0.228	225	0.300	261	0.279	297	0.525
10	0.390	46	0.447	82	0.196	118	0.369	154	0.134	190	0.242	226	0.291	262	0.292	298	0.518
11	0.403	47	0.435	83	0.202	119	0.362	155	0.138	191	0.256	227	0.282	263	0.304	299	0.511
12	0.416	48	0.422	84	0.208	120	0.355	156	0.142	192	0.269	228	0.273	264	0.317	300	0.503
13	0.429	49	0.410	85	0.215	121	0.347	157	0.146	193	0.282	229	0.264	265	0.330	301	0.494
14	0.441	50	0.397	86	0.222	122	0.338	158	0.148	194	0.295	230	0.255	266	0.344	302	0.484
15	0.453	51	0.384	87	0.230	123	0.328	159	0.149	195	0.307	231	0.247	267	0.357	303	0.474
16	0.464	52	0.370	88	0.238	124	0.318	160	0.150	196	0.318	232	0.238	268	0.370	304	0.464
17	0.474	53	0.357	89	0.247	125	0.307	161	0.149	197	0.328	233	0.230	269	0.384	305	0.453
18	0.484	54	0.344	90	0.255	126	0.295	162	0.148	198	0.338	234	0.222	270	0.397	306	0.441
19	0.494	55	0.330	91	0.264	127	0.282	163	0.146	199	0.347	235	0.215	271	0.410	307	0.429
20	0.503	56	0.317	92	0.273	128	0.269	164	0.142	200	0.355	236	0.208	272	0.422	308	0.416
21	0.511	57	0.304	93	0.282	129	0.256	165	0.138	201	0.362	237	0.202	273	0.435	309	0.403
22	0.518	58	0.292	94	0.291	130	0.242	166	0.134	202	0.369	238	0.196	274	0.447	310	0.390
23	0.525	59	0.279	95	0.300	131	0.228	167	0.128	203	0.374	239	0.190	275	0.458	311	0.377
24	0.530	60	0.267	96	0.309	132	0.214	168	0.122	204	0.379	240	0.186	276	0.469	312	0.363
25	0.535	61	0.256	97	0.318	133	0.200	169	0.116	205	0.383	241	0.182	277	0.480	313	0.349
26	0.540	62	0.245	98	0.326	134	0.185	170	0.110	206	0.386	242	0.179	278	0.489	314	0.336
27	0.543	63	0.235	99	0.334	135	0.171	171	0.103	207	0.388	243	0.176	279	0.499	315	0.322
28	0.545	64	0.225	100	0.342	136	0.157	172	0.097	208	0.389	244	0.175	280	0.507	316	0.308
29	0.547	65	0.216	101	0.350	137	0.144	173	0.092	209	0.389	245	0.174	281	0.515	317	0.294
30	0.548	66	0.208	102	0.356	138	0.131	174	0.088	210	0.389	246	0.174	282	0.522	318	0.280
31	0.548	67	0.201	103	0.363	139	0.119	175	0.085	211	0.387	247	0.175	283	0.528	319	0.267
32	0.546	68	0.194	104	0.369	140	0.108	176	0.085	212	0.385	248	0.177	284	0.533	320	0.254
33	0.545	69	0.188	105	0.374	141	0.099	177	0.087	213	0.382	249	0.180	285	0.538	321	0.241
34	0.542	70	0.184	106	0.378	142	0.092	178	0.092	214	0.378	250	0.184	286	0.542	322	0.229
35	0.538	71	0.180	107	0.382	143	0.087	179	0.099	215	0.374	251	0.188	287	0.545	323	0.217

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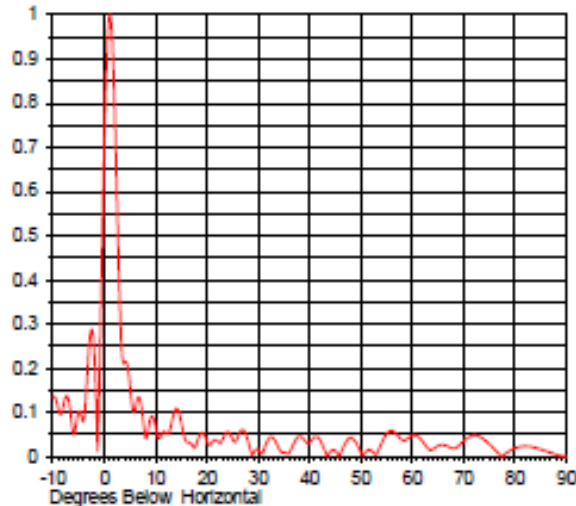
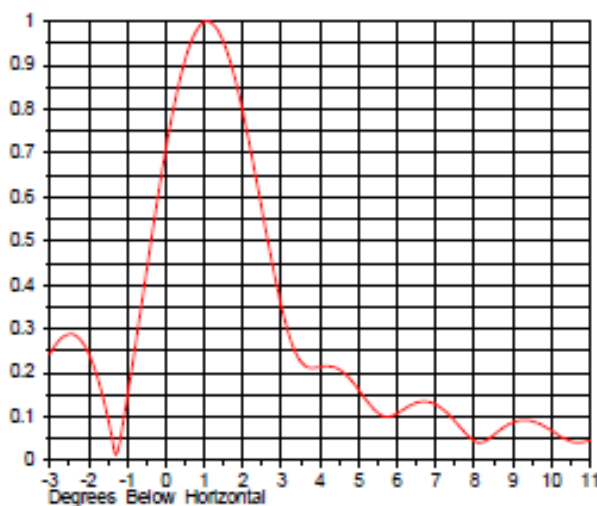


ELEVATION PATTERN

Proposal No. C-70596-2
 Date 9-Jun-17
 Call Letters KVOS
 Channel 14
 Frequency 473 MHz
 Antenna Type TFU-20JTH/VP-R 04SP

RMS Directivity at Main Lobe 24.0 (13.80 dB)
 RMS Directivity at Horizontal 13.7 (11.37 dB)
 Calculated

Beam Tilt 1.00 deg
 Pattern Number 24J240100



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.135	10.0	0.063	30.0	0.015	50.0	0.008	70.0	0.006
-9.0	0.105	11.0	0.049	31.0	0.015	51.0	0.012	71.0	0.045
-8.0	0.120	12.0	0.053	32.0	0.041	52.0	0.014	72.0	0.048
-7.0	0.125	13.0	0.076	33.0	0.040	53.0	0.007	73.0	0.046
-6.0	0.050	14.0	0.109	34.0	0.017	54.0	0.032	74.0	0.038
-5.0	0.103	15.0	0.072	35.0	0.009	55.0	0.053	75.0	0.028
-4.0	0.091	16.0	0.033	36.0	0.010	56.0	0.058	76.0	0.016
-3.0	0.258	17.0	0.026	37.0	0.034	57.0	0.049	77.0	0.005
-2.0	0.224	18.0	0.034	38.0	0.046	58.0	0.038	78.0	0.006
-1.0	0.196	19.0	0.054	39.0	0.036	59.0	0.041	79.0	0.014
0.0	0.755	20.0	0.032	40.0	0.033	60.0	0.048	80.0	0.020
1.0	1.000	21.0	0.034	41.0	0.045	61.0	0.046	81.0	0.023
2.0	0.752	22.0	0.035	42.0	0.037	62.0	0.034	82.0	0.024
3.0	0.317	23.0	0.040	43.0	0.010	63.0	0.018	83.0	0.023
4.0	0.215	24.0	0.056	44.0	0.012	64.0	0.017	84.0	0.020
5.0	0.150	25.0	0.037	45.0	0.012	65.0	0.025	85.0	0.017
6.0	0.113	26.0	0.047	46.0	0.009	66.0	0.027	86.0	0.013
7.0	0.123	27.0	0.060	47.0	0.033	67.0	0.022	87.0	0.009
8.0	0.041	28.0	0.032	48.0	0.043	68.0	0.019	88.0	0.005
9.0	0.090	29.0	0.008	49.0	0.031	69.0	0.025	89.0	0.002
								90.0	0.000

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