

## **ENGINEERING EXHIBIT**

### **Application for Digital Television Station Auxiliary Antenna Construction Permit**

prepared for

#### **Gray Television Licensee, LLC**

KFDA-TV Amarillo, TX

Facility ID 51466

Ch. 10 2.5 kW 327 m

*Gray Television Licensee, LLC* (“Gray”) is the licensee of digital television station KFDA-TV, Facility ID 51466, Channel 10, Amarillo TX (file# BLCDT-20111114BLB). *Gray* herein seeks authorization for an auxiliary antenna for KFDA-TV.

KFDA-TV’s main facility operates with a top-mounted nondirectional antenna at 62 kW effective radiated power (“ERP”) and 466 meters height above average terrain (“HAAT”). The proposed auxiliary antenna will be side-mounted on the same tower structure as the licensed main antenna, and will operate at 2.5 kW ERP (directional) and an antenna HAAT of 327 meters.

The KFDA-TV tower structure is associated with FCC Antenna Structure Registration number 1052115. No change to the overall structure height will result from this proposal.

The proposed auxiliary antenna is a horizontally polarized directional Dielectric model TLS-V2-B. The directional antenna’s azimuthal and elevation patterns are supplied in Figures 1 and 2, respectively.

Figure 3 shows that the 36 dB $\mu$  noise limited service contour (“NLSC”) of the proposed auxiliary facility does not extend beyond that of the main facility. Thus, the proposal complies with §73.1675(a).

#### **Human Exposure to Radiofrequency Electromagnetic Field (Environmental)**

The proposed facility was evaluated for human exposure to RF energy using the procedures outlined in the FCC’s OET Bulletin Number 65. Based on OET-65 equation (10) and 30 percent

antenna relative field in downward elevations (pattern data shows 30 percent or less relative field at angles 30 to 90 degrees below the antenna), the calculated power density attributable to the proposed facility at locations near the transmitter site at a height of two meters above ground level is  $0.1 \mu\text{W}/\text{cm}^2$ , which is 0.05 percent of the general population / uncontrolled maximum permissible exposure limit. This is well below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

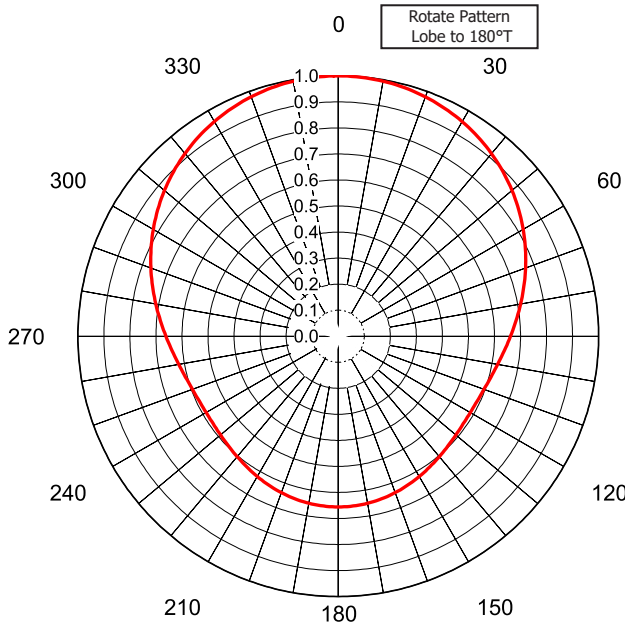
The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. This exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

*List of Attachments*

Figure 1	Antenna Azimuthal Pattern
Figure 2	Antenna Elevation Pattern
Figure 3	Proposed Auxiliary Contours
Form 2100	Saved Version of Engineering Sections of FCC Form at Time of Upload

**Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.	July 31, 2023	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



## AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71913**  
Date **21-Jun-22**  
Call Letters **KFDA**  
Channel **10**  
Frequency **195 MHz**  
Antenna Type **TLS-V2-B**  
Gain **1.73 (2.39dB)**  
Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	1.000	36	0.931	72	0.755	108	0.600	144	0.611	180	0.656	216	0.611	252	0.600	288	0.755
1	1.000	37	0.928	73	0.749	109	0.598	145	0.613	181	0.656	217	0.609	253	0.602	289	0.760
2	1.000	38	0.924	74	0.744	110	0.596	146	0.615	182	0.656	218	0.607	254	0.605	290	0.766
3	0.999	39	0.920	75	0.738	111	0.594	147	0.616	183	0.655	219	0.606	255	0.607	291	0.771
4	0.999	40	0.916	76	0.733	112	0.593	148	0.618	184	0.655	220	0.604	256	0.610	292	0.777
5	0.999	41	0.912	77	0.727	113	0.591	149	0.620	185	0.655	221	0.602	257	0.613	293	0.782
6	0.998	42	0.908	78	0.722	114	0.590	150	0.622	186	0.654	222	0.600	258	0.616	294	0.788
7	0.997	43	0.903	79	0.717	115	0.589	151	0.624	187	0.654	223	0.599	259	0.619	295	0.793
8	0.997	44	0.899	80	0.711	116	0.588	152	0.626	188	0.653	224	0.597	260	0.622	296	0.799
9	0.996	45	0.894	81	0.706	117	0.587	153	0.628	189	0.652	225	0.596	261	0.625	297	0.804
10	0.995	46	0.890	82	0.701	118	0.587	154	0.629	190	0.651	226	0.594	262	0.629	298	0.810
11	0.993	47	0.885	83	0.696	119	0.586	155	0.631	191	0.650	227	0.593	263	0.633	299	0.815
12	0.992	48	0.881	84	0.691	120	0.586	156	0.633	192	0.650	228	0.592	264	0.636	300	0.820
13	0.991	49	0.876	85	0.686	121	0.586	157	0.635	193	0.648	229	0.591	265	0.640	301	0.826
14	0.989	50	0.871	86	0.681	122	0.586	158	0.636	194	0.647	230	0.590	266	0.644	302	0.831
15	0.988	51	0.866	87	0.676	123	0.586	159	0.638	195	0.646	231	0.589	267	0.649	303	0.836
16	0.986	52	0.862	88	0.671	124	0.586	160	0.639	196	0.645	232	0.588	268	0.653	304	0.841
17	0.984	53	0.857	89	0.666	125	0.586	161	0.641	197	0.644	233	0.587	269	0.657	305	0.846
18	0.983	54	0.852	90	0.662	126	0.587	162	0.642	198	0.642	234	0.587	270	0.662	306	0.852
19	0.980	55	0.846	91	0.657	127	0.587	163	0.644	199	0.641	235	0.586	271	0.666	307	0.857
20	0.978	56	0.841	92	0.653	128	0.588	164	0.645	200	0.639	236	0.586	272	0.671	308	0.862
21	0.976	57	0.836	93	0.649	129	0.589	165	0.646	201	0.638	237	0.586	273	0.676	309	0.866
22	0.974	58	0.831	94	0.644	130	0.590	166	0.647	202	0.636	238	0.586	274	0.681	310	0.871
23	0.971	59	0.826	95	0.640	131	0.591	167	0.648	203	0.635	239	0.586	275	0.686	311	0.876
24	0.969	60	0.820	96	0.636	132	0.592	168	0.650	204	0.633	240	0.586	276	0.691	312	0.881
25	0.966	61	0.815	97	0.633	133	0.593	169	0.650	205	0.631	241	0.586	277	0.696	313	0.885
26	0.964	62	0.810	98	0.629	134	0.594	170	0.651	206	0.629	242	0.587	278	0.701	314	0.890
27	0.961	63	0.804	99	0.625	135	0.596	171	0.652	207	0.628	243	0.587	279	0.706	315	0.894
28	0.958	64	0.799	100	0.622	136	0.597	172	0.653	208	0.626	244	0.588	280	0.711	316	0.899
29	0.955	65	0.793	101	0.619	137	0.599	173	0.654	209	0.624	245	0.589	281	0.717	317	0.903
30	0.952	66	0.788	102	0.616	138	0.600	174	0.654	210	0.622	246	0.590	282	0.722	318	0.908
31	0.949	67	0.782	103	0.613	139	0.602	175	0.655	211	0.620	247	0.591	283	0.727	319	0.912
32	0.945	68	0.777	104	0.610	140	0.604	176	0.655	212	0.618	248	0.593	284	0.733	320	0.916
33	0.942	69	0.771	105	0.607	141	0.606	177	0.655	213	0.616	249	0.594	285	0.738	321	0.920
34	0.939	70	0.766	106	0.605	142	0.607	178	0.656	214	0.615	250	0.596	286	0.744	322	0.924
35	0.935	71	0.760	107	0.602	143	0.609	179	0.656	215	0.613	251	0.598	287	0.749	323	0.928



**Figure 1**  
**Auxiliary Antenna Azimuthal Pattern**  
**KFDA-TV Amarillo, TX**  
**Facility ID 51466**  
**Ch. 10 2.5 kW 327 m**

prepared for  
**Gray Television Licensee, LLC**

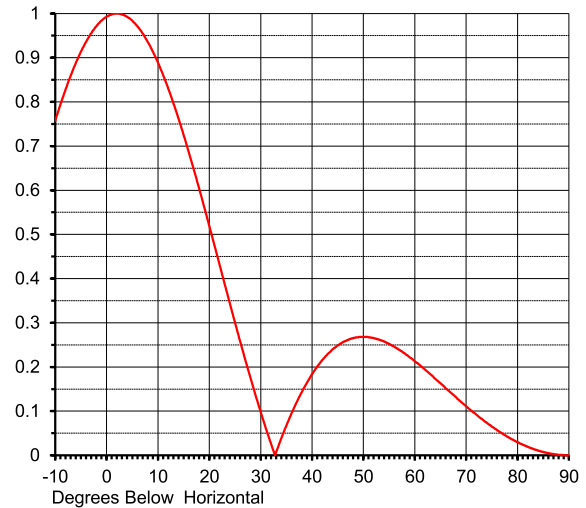
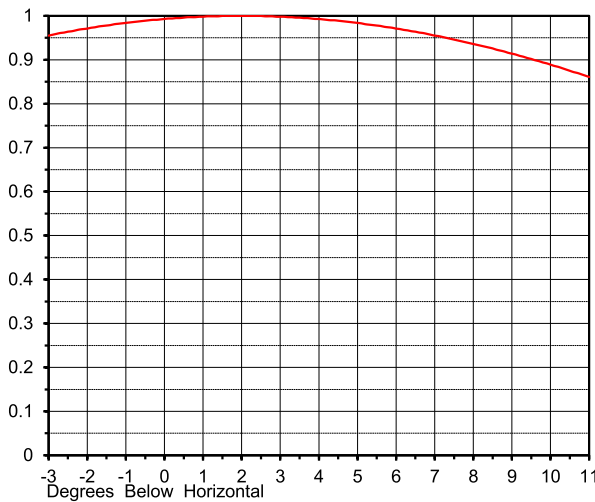
July, 2023

## ELEVATION PATTERN

Proposal No. **C-71913**  
 Date **21-Jun-22**  
 Call Letters **KFDA**  
 Channel **10**  
 Frequency **195 MHz**  
 Antenna Type **TLS-V2-B**

RMS Directivity at Main Lobe **2.2 ( 3.42 dB )**  
 RMS Directivity at Horizontal **2.2 ( 3.42 dB )**  
**Calculated**

Beam Tilt **2.00 deg**  
 Pattern Number **02T022200**



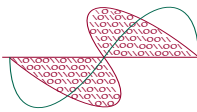
Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.757	10.0	0.889	30.0	0.098	50.0	0.268	70.0	0.111
-9.0	0.794	11.0	0.861	31.0	0.061	51.0	0.267	71.0	0.101
-8.0	0.828	12.0	0.830	32.0	0.027	52.0	0.265	72.0	0.092
-7.0	0.859	13.0	0.797	33.0	0.007	53.0	0.262	73.0	0.083
-6.0	0.888	14.0	0.762	34.0	0.038	54.0	0.258	74.0	0.074
-5.0	0.914	15.0	0.725	35.0	0.067	55.0	0.252	75.0	0.065
-4.0	0.936	16.0	0.686	36.0	0.095	56.0	0.246	76.0	0.057
-3.0	0.955	17.0	0.646	37.0	0.120	57.0	0.239	77.0	0.050
-2.0	0.971	18.0	0.605	38.0	0.143	58.0	0.231	78.0	0.042
-1.0	0.984	19.0	0.562	39.0	0.164	59.0	0.222	79.0	0.036
0.0	0.993	20.0	0.519	40.0	0.184	60.0	0.213	80.0	0.030
1.0	0.998	21.0	0.475	41.0	0.201	61.0	0.204	81.0	0.024
2.0	1.000	22.0	0.431	42.0	0.216	62.0	0.194	82.0	0.019
3.0	0.998	23.0	0.387	43.0	0.229	63.0	0.184	83.0	0.015
4.0	0.993	24.0	0.344	44.0	0.240	64.0	0.173	84.0	0.011
5.0	0.984	25.0	0.301	45.0	0.249	65.0	0.163	85.0	0.008
6.0	0.971	26.0	0.258	46.0	0.256	66.0	0.152	86.0	0.005
7.0	0.955	27.0	0.216	47.0	0.261	67.0	0.142	87.0	0.003
8.0	0.936	28.0	0.176	48.0	0.265	68.0	0.132	88.0	0.001
9.0	0.914	29.0	0.136	49.0	0.267	69.0	0.121	89.0	0.000
						70.0	0.111	90.0	0.000



**Figure 2**  
**Auxiliary Antenna Elevation Pattern**  
**KFDA-TV Amarillo, TX**  
**Facility ID 51466**  
**Ch. 10 2.5 kW 327 m**

prepared for  
**Gray Television Licensee, LLC**

July, 2023



**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

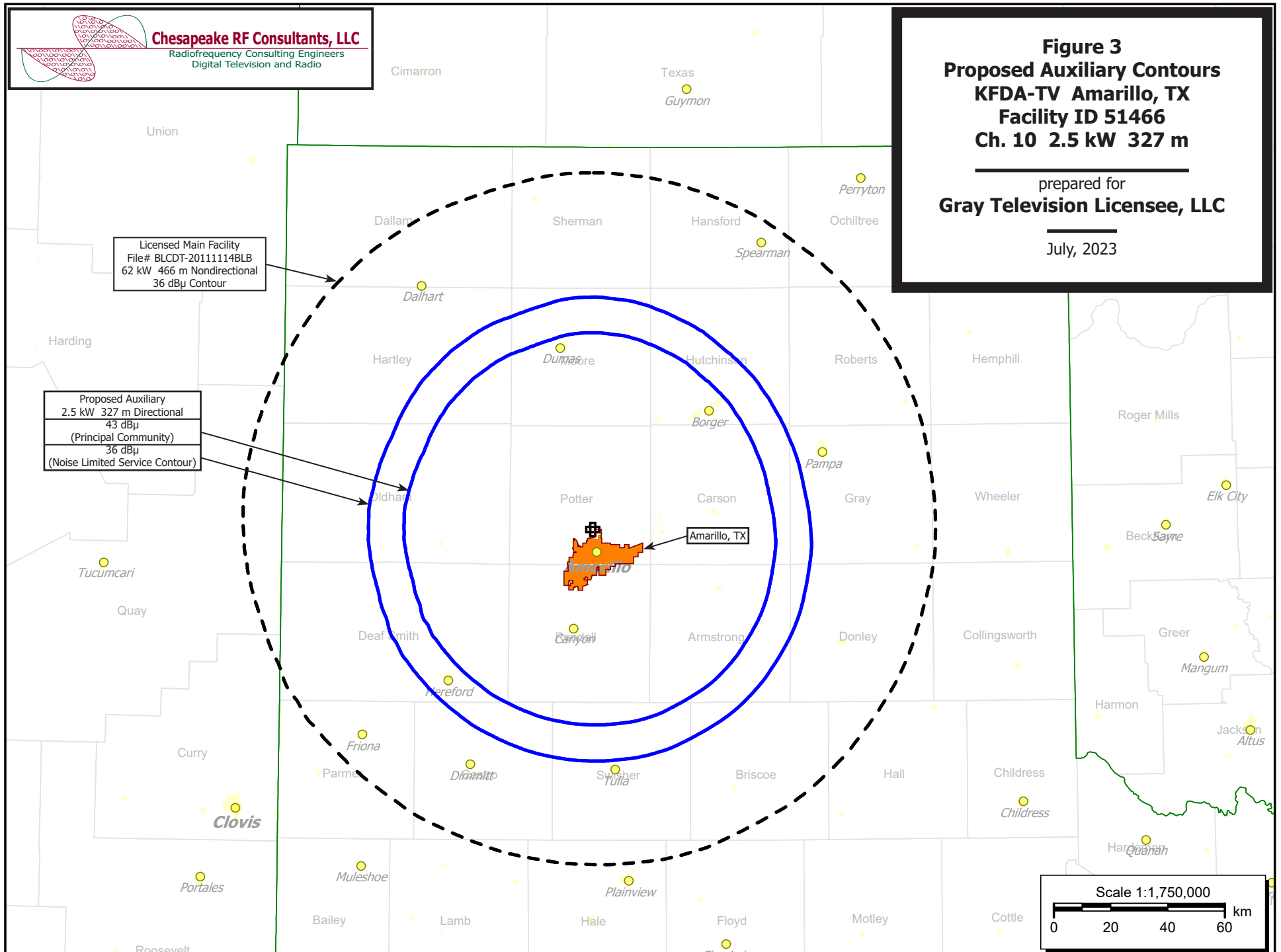
**Figure 3**  
**Proposed Auxiliary Contours**  
**KFDA-TV Amarillo, TX**  
**Facility ID 51466**  
**Ch. 10 2.5 kW 327 m**

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July, 2023

Licensed Main Facility  
File# BLCDT-2011114BLB  
62 kW 466 m Nondirectional  
36 dBu Contour

Proposed Auxiliary  
2.5 kW 327 m Directional  
43 dBu  
(Principal Community)  
36 dBu  
(Noise Limited Service Contour)



**Channel and  
Facility  
Information**

Section	Question	Response
Proposed Community of License	Facility ID	51466
	State	Texas
	City	AMARILLO
	DTX Channel	10
	Designated Market Area	Amarillo
Facility Type	Facility Type	Commercial
	Station Type	Auxiliary
Zone	Zone	2

Antenna Location  
Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1052115
Coordinates (NAD83)	Latitude	35° 17' 34.2" N+
	Longitude	101° 50' 43.4" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	456.0 meters
	Support Structure Height	427.0 meters
	Ground Elevation (AMSL)	1082.3 meters
Antenna Data	Height of Radiation Center Above Ground Level	304.8 meters
	Height of Radiation Center Above Average Terrain	327.3 meters
	Height of Radiation Center Above Mean Sea Level	1387.1 meters
	Effective Radiated Power	2.5 kW

Antenna  
Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	No
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	Dielectric
	Model	TLS-V2-B
	Rotation	180 degrees
	Electrical Beam Tilt	2.0
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
DTV and DTS: Elevation Pattern	Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt?	No
	Uploaded file for elevation antenna (or radiation) pattern data	

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	Value	Degree	Value	Degree	Value	Degree	Value
0	1.000	90	0.662	180	0.656	270	0.662
10	0.995	100	0.622	190	0.651	280	0.711
20	0.978	110	0.596	200	0.639	290	0.766
30	0.952	120	0.586	210	0.622	300	0.820
40	0.916	130	0.590	220	0.604	310	0.871
50	0.871	140	0.604	230	0.590	320	0.916
60	0.820	150	0.622	240	0.586	330	0.952
70	0.766	160	0.639	250	0.596	340	0.978
80	0.711	170	0.651	260	0.622	350	0.995

Additional Azimuths

Degree	V <sub>A</sub>
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