ENGINEERING EXHIBIT

Digital Television Station
Application for Minor Modification of Construction Permit

prepared for

Gray Television Licensee, LLC
WOIO Shaker Heights, OH
Facility ID 39746
Ch. 10 30 kW 333 m

Gray Television Licensee, LLC ("Gray") is the licensee of digital television station WOIO(DT), Channel 10, Facility ID 39746, Shaker Heights, OH. WOIO is licensed (file# 0000040178) to operate with 9.5 kW effective radiated power ("ERP") with a directional antenna at 304 meters height above average terrain ("HAAT"). A Construction Permit ("CP" file# 0000035655) authorizes WOIO to relocate 2.3 km to a different transmitting location and increase ERP and antenna HAAT to 20 kW directional at 333 meters. *Gray* proposes herein a minor modification of the CP to increase the ERP to 30 kW and to make changes to the directional antenna pattern.

As with the current CP, the proposed WOIO facility will employ a new antenna system to be top-mounted on tower structure corresponding to FCC Antenna Structure Registration number 1012090. The new antenna will replace an existing top-mounted antenna formerly utilized by WUAB(DT) (Facility ID 8532, Lorain OH). WUAB's spectrum was relinquished in the incentive auction, and WUAB is now a channel sharing guest station for WOIO. *Gray* is also the licensee of WUAB and owns the subject tower structure. No increase of overall structure height will result from this proposal.

The proposed antenna is an elliptically polarized directional Dielectric model THV-5A10/VP-R (80 percent vertical polarization). *Gray* proposes to operate WOIO with an ERP of 30 kW at 333 meters antenna HAAT. The maximum horizontally polarized ERP is 30 kW and the maximum vertically polarized ERP is 24 kW. The vertically polarized component will not exceed the horizontally polarized component at any azimuth. The directional antenna's azimuthal

patterns are depicted in Figures 1 and 1A for horizontal and vertical polarization, respectively. The antenna's elevation pattern is depicted in Figure 2.

Figure 3 supplies a map that demonstrates compliance with §73.625(a)(1) regarding coverage of the entire principal community. The proposed facility's predicted population exceeds 95 percent of the Incentive Auction[1] baseline facility population. The 43 dBμ principal community contour also encompasses Lorain OH, the principal community for channel sharing guest station WUAB(DT) (Facility ID 8532).

Interference study per FCC OET Bulletin 69[2] shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby full service and Class A television stations except with respect to WILX-TV which does not present a conflict for the proposal. FCC processing of this proposal is requested using a 2 km cell size and 0.1 km terrain profile increment. The interference study output report is provided as Table 1.

WILX-TV (Ch. 10, Facility ID 6863, Onondaga MI, file# BLCDT-20120404ACG) would receive 6.42 percent additional interference, which exceeds the 0.5 percent limit towards full-service television stations. *Gray* is also the licensee of WILX-TV and consents to interference exceeding 0.5 percent from the proposed WOIO facility.

According to FCC TVStudy analysis and as depicted on Figure 4, the 6.42 percent additional interference would occur at locations that are near the edge of the WILX-TV noise limited service contour ("NLSC") and beyond WILX-TV's DMA (Lansing MI). Additionally, Figure 4A provides an overview of the WILX-TV NLSC, the locations of added interference from the proposed WOIO, and overlapping NLSCs from relevant full power television stations in the

[1] *Incentive Auction Closing and Channel Reassignment Public Notice*, DA 17-317, released April 13, 2017.

[2] FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 2 km cell size, and 0.1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCCs implementation of TVStudy show excellent correlation.

region. As shown thereon, all locations of predicted additional interference from WOIO are within the NLSC of another same-network station (NBC) and also within the NLSC of 5 or more alternative TV services. The stations providing the alternative services are listed in Table 2.

Accordingly, the proposal complies with §73.616 regarding interference protection to U.S. full power television and Class A television facilities.

The site location is within the Canadian coordination zone (65.4 km to the Canada border). The only known Canadian station that would receive interference from the proposed WOIO facility is CFPL-DT (Ch. 10, London ON, 178.6 km distant). Table 3 supplies an interference analysis summary regarding CFPL-DT using the method employed by the Department of Innovation, Science and Economic Development (ISED) of Canada. The summary in Table 3 shows that the proposed WOIO facility's interference caused to CFPL-DT does not exceed that of the currently authorized WOIO facility (CP, file# 0000035655) which has previously been coordinated with Canada.

The proposed 30 kW ERP exceeds the maximum permitted by §73.622(f)(7) for the proposed antenna HAAT of 333 meters. Section 73.622(f)(5) permits the maximum ERP to be exceeded in order to provide the same geographic coverage area as the largest station within the same market. As demonstrated in Figure 5, the total area within the proposed WOIO NLSC is 29,824 square kilometers, which does not exceed the NLSC area of WGGN-TV (34,978 sq. km, Ch. 3, Sandusky OH). WOIO and WGGN-TV are both in the Cleveland-Akron (Canton) Nielsen DMA. Thus, the 30 kW ERP specified herein complies with §73.622(f)(5).

As depicted in Figure 5, the proposed WOIO facility represents an NLSC expansion beyond that of the licensed facility. No areas of NLSC loss will be created. The U.S. population (2010 Census) within the proposed WOIO NLSC is 4,203,811 persons, which is an increase of 408,553 persons beyond the licensed facility's NLSC population of 3,795,258. The increase corresponds to 10.8 percent of the total population within the licensed WOIO NLSC.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposed operation 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 considering 20 percent antenna relative field in downward elevations (pattern data shows less than 20 percent relative field at angles 20 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is 1.0 $\mu W/cm^2$, which is 0.5 percent of the general population/uncontrolled maximum permitted 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, 1A	Antenna Azimuthal Pattern
Figure 2	Antenna Elevation Pattern
Figure 3	Proposed Coverage Contours
Figure 4	Predicted Coverage and Interference Affecting WILX-TV
Figure 4A	Alternate Services to WILX-TV At Locations of Added Interference
Figure 5	Coverage Contour Comparison - Maximum ERP per §73.622(f)
Table 1	TVStudy Analysis of Proposal
Table 2	Authorized Alternate Television Services Within WILX-TV NLSC
Table 3	WOIO Canada DTV Interference Analysis
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

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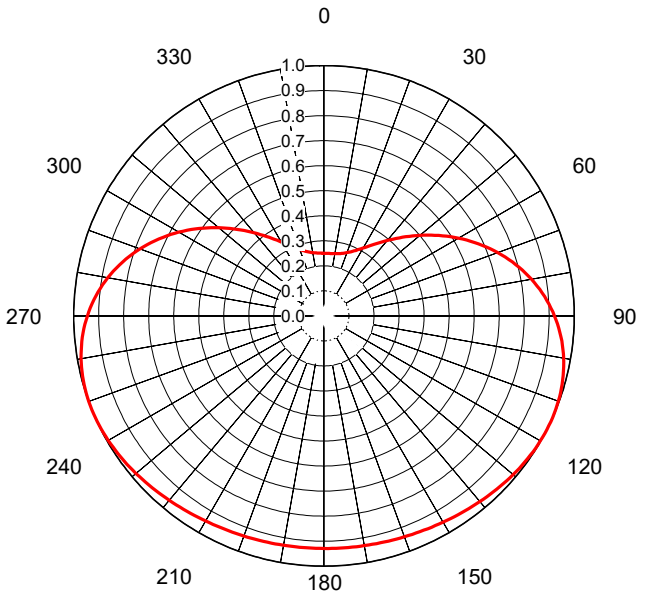

AZIMUTH PATTERN
Horizontal Polarization

Proposal No.	**C-70982-3**
Date	**31-Aug-22**
Call Letters	**WOIO**
Channel	**10**
Frequency	**195 MHz**
Antenna Type	**THV-5A10/VP-R C160**
Gain	**1.6 (2.04dB)**
	Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.250	36	0.357	72	0.761	108	0.994	144	0.962	180	0.929	216	0.955	252	0.999	288	0.803	324	0.393
1	0.250	37	0.366	73	0.772	109	0.995	145	0.960	181	0.929	217	0.956	253	0.998	289	0.793	325	0.384
2	0.250	38	0.374	74	0.783	110	0.997	146	0.958	182	0.929	218	0.958	254	0.997	290	0.783	326	0.374
3	0.250	39	0.384	75	0.793	111	0.998	147	0.956	183	0.929	219	0.960	255	0.995	291	0.772	327	0.366
4	0.250	40	0.393	76	0.803	112	0.999	148	0.955	184	0.929	220	0.962	256	0.994	292	0.761	328	0.357
5	0.250	41	0.403	77	0.813	113	0.999	149	0.953	185	0.929	221	0.963	257	0.992	293	0.750	329	0.349
6	0.251	42	0.413	78	0.823	114	1.000	150	0.952	186	0.929	222	0.965	258	0.990	294	0.739	330	0.341
7	0.251	43	0.423	79	0.833	115	1.000	151	0.950	187	0.930	223	0.967	259	0.988	295	0.728	331	0.333
8	0.251	44	0.433	80	0.842	116	1.000	152	0.949	188	0.930	224	0.969	260	0.985	296	0.716	332	0.326
9	0.252	45	0.444	81	0.851	117	1.000	153	0.947	189	0.930	225	0.971	261	0.982	297	0.705	333	0.320
10	0.253	46	0.455	82	0.860	118	1.000	154	0.946	190	0.930	226	0.972	262	0.979	298	0.693	334	0.313
11	0.253	47	0.466	83	0.869	119	0.999	155	0.945	191	0.931	227	0.974	263	0.976	299	0.681	335	0.307
12	0.254	48	0.477	84	0.877	120	0.999	156	0.944	192	0.931	228	0.976	264	0.972	300	0.669	336	0.301
13	0.255	49	0.489	85	0.885	121	0.998	157	0.942	193	0.932	229	0.978	265	0.969	301	0.657	337	0.296
14	0.257	50	0.501	86	0.893	122	0.997	158	0.941	194	0.932	230	0.980	266	0.964	302	0.645	338	0.291
15	0.258	51	0.512	87	0.900	123	0.996	159	0.940	195	0.932	231	0.982	267	0.960	303	0.633	339	0.287
16	0.260	52	0.524	88	0.908	124	0.995	160	0.939	196	0.933	232	0.983	268	0.955	304	0.621	340	0.282
17	0.262	53	0.536	89	0.915	125	0.994	161	0.938	197	0.934	233	0.985	269	0.950	305	0.609	341	0.278
18	0.264	54	0.548	90	0.921	126	0.993	162	0.937	198	0.934	234	0.987	270	0.945	306	0.597	342	0.275
19	0.266	55	0.560	91	0.928	127	0.991	163	0.937	199	0.935	235	0.988	271	0.940	307	0.584	343	0.272
20	0.269	56	0.572	92	0.934	128	0.990	164	0.936	200	0.936	236	0.990	272	0.934	308	0.572	344	0.269
21	0.272	57	0.584	93	0.940	129	0.988	165	0.935	201	0.937	237	0.991	273	0.928	309	0.560	345	0.266
22	0.275	58	0.597	94	0.945	130	0.987	166	0.934	202	0.937	238	0.993	274	0.921	310	0.548	346	0.264
23	0.278	59	0.609	95	0.950	131	0.985	167	0.934	203	0.938	239	0.994	275	0.915	311	0.536	347	0.262
24	0.282	60	0.621	96	0.955	132	0.983	168	0.933	204	0.939	240	0.995	276	0.908	312	0.524	348	0.260
25	0.287	61	0.633	97	0.960	133	0.982	169	0.932	205	0.940	241	0.996	277	0.900	313	0.512	349	0.258
26	0.291	62	0.645	98	0.964	134	0.980	170	0.932	206	0.941	242	0.997	278	0.893	314	0.501	350	0.257
27	0.296	63	0.657	99	0.969	135	0.978	171	0.932	207	0.942	243	0.998	279	0.885	315	0.489	351	0.255
28	0.301	64	0.669	100	0.972	136	0.976	172	0.931	208	0.944	244	0.999	280	0.877	316	0.477	352	0.254
29	0.307	65	0.681	101	0.976	137	0.974	173	0.931	209	0.945	245	0.999	281	0.869	317	0.466	353	0.253
30	0.313	66	0.693	102	0.979	138	0.972	174	0.930	210	0.946	246	1.000	282	0.860	318	0.455	354	0.253
31	0.320	67	0.705	103	0.982	139	0.971	175	0.930	211	0.947	247	1.000	283	0.851	319	0.444	355	0.252
32	0.326	68	0.716	104	0.985	140	0.969	176	0.930	212	0.949	248	1.000	284	0.842	320	0.433	356	0.251
33	0.333	69	0.728	105	0.988	141	0.967	177	0.930	213	0.950	249	1.000	285	0.833	321	0.423	357	0.251
34	0.341	70	0.739	106	0.990	142	0.965	178	0.929	214	0.952	250	1.000	286	0.823	322	0.413	358	0.251
35	0.349	71	0.750	107	0.992	143	0.963	179	0.929	215	0.953	251	0.999	287	0.813	323	0.403	359	0.250

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

Figure 1
Antenna Azimuthal Pattern
Horizontal Polarization
WOIO Shaker Heights, OH
Facility ID 39746
Ch. 10 30 kW 333 m

prepared for
Gray Television Licensee, LLC

September, 2022

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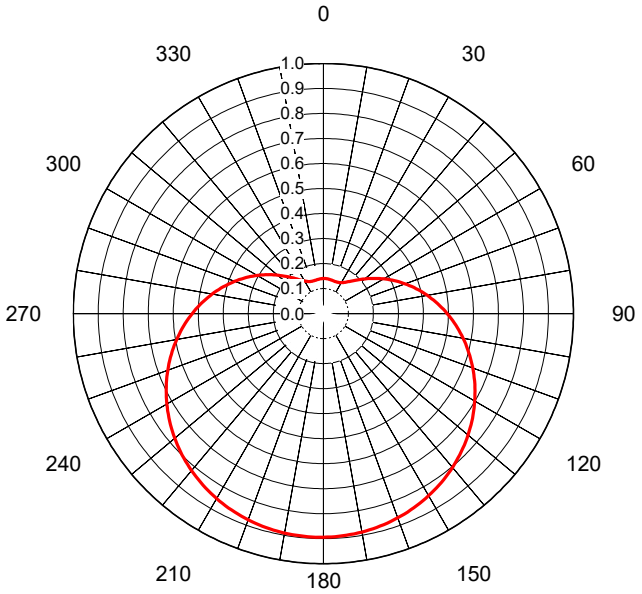


AZIMUTH PATTERN
Vertical Polarization

Proposal No.	**C-70982-3**
Date	**31-Aug-22**
Call Letters	**WOIO**
Channel	**10**
Frequency	**195 MHz**
Antenna Type	**THV-5A10/VP-R C160**
Gain	**2.4 (3.8dB)**
	Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.140	36	0.156	72	0.362	108	0.622	144	0.819	180	0.894	216	0.834	252	0.649	288	0.392	324	0.169
1	0.140	37	0.159	73	0.370	109	0.629	145	0.823	181	0.894	217	0.831	253	0.642	289	0.384	325	0.165
2	0.140	38	0.162	74	0.377	110	0.636	146	0.827	182	0.894	218	0.827	254	0.636	290	0.377	326	0.162
3	0.140	39	0.165	75	0.384	111	0.642	147	0.831	183	0.894	219	0.823	255	0.629	291	0.370	327	0.159
4	0.140	40	0.169	76	0.392	112	0.649	148	0.834	184	0.894	220	0.819	256	0.622	292	0.362	328	0.156
5	0.140	41	0.173	77	0.399	113	0.655	149	0.838	185	0.894	221	0.816	257	0.616	293	0.355	329	0.153
6	0.140	42	0.177	78	0.407	114	0.662	150	0.841	186	0.894	222	0.811	258	0.609	294	0.348	330	0.151
7	0.140	43	0.181	79	0.414	115	0.668	151	0.845	187	0.893	223	0.807	259	0.602	295	0.341	331	0.148
8	0.140	44	0.185	80	0.421	116	0.674	152	0.848	188	0.893	224	0.803	260	0.595	296	0.333	332	0.146
9	0.139	45	0.190	81	0.429	117	0.681	153	0.851	189	0.892	225	0.799	261	0.588	297	0.326	333	0.144
10	0.139	46	0.195	82	0.436	118	0.687	154	0.854	190	0.891	226	0.794	262	0.581	298	0.319	334	0.143
11	0.139	47	0.200	83	0.444	119	0.693	155	0.857	191	0.890	227	0.790	263	0.574	299	0.312	335	0.142
12	0.138	48	0.205	84	0.451	120	0.699	156	0.859	192	0.889	228	0.785	264	0.567	300	0.305	336	0.140
13	0.138	49	0.210	85	0.458	121	0.705	157	0.862	193	0.888	229	0.780	265	0.560	301	0.298	337	0.139
14	0.138	50	0.216	86	0.466	122	0.711	158	0.865	194	0.887	230	0.775	266	0.553	302	0.291	338	0.139
15	0.138	51	0.221	87	0.473	123	0.717	159	0.867	195	0.886	231	0.771	267	0.546	303	0.284	339	0.138
16	0.137	52	0.227	88	0.481	124	0.722	160	0.869	196	0.884	232	0.766	268	0.539	304	0.278	340	0.137
17	0.137	53	0.233	89	0.488	125	0.728	161	0.872	197	0.883	233	0.760	269	0.532	305	0.271	341	0.137
18	0.137	54	0.239	90	0.495	126	0.734	162	0.874	198	0.881	234	0.755	270	0.524	306	0.265	342	0.137
19	0.137	55	0.245	91	0.503	127	0.739	163	0.876	199	0.879	235	0.750	271	0.517	307	0.258	343	0.137
20	0.137	56	0.252	92	0.510	128	0.745	164	0.878	200	0.878	236	0.745	272	0.510	308	0.252	344	0.137
21	0.137	57	0.258	93	0.517	129	0.750	165	0.879	201	0.876	237	0.739	273	0.503	309	0.245	345	0.137
22	0.137	58	0.265	94	0.524	130	0.755	166	0.881	202	0.874	238	0.734	274	0.495	310	0.239	346	0.137
23	0.137	59	0.271	95	0.532	131	0.760	167	0.883	203	0.872	239	0.728	275	0.488	311	0.233	347	0.137
24	0.137	60	0.278	96	0.539	132	0.766	168	0.884	204	0.869	240	0.722	276	0.481	312	0.227	348	0.137
25	0.138	61	0.284	97	0.546	133	0.771	169	0.886	205	0.867	241	0.717	277	0.473	313	0.221	349	0.138
26	0.139	62	0.291	98	0.553	134	0.775	170	0.887	206	0.865	242	0.711	278	0.466	314	0.216	350	0.138
27	0.139	63	0.298	99	0.560	135	0.780	171	0.888	207	0.862	243	0.705	279	0.458	315	0.210	351	0.138
28	0.140	64	0.305	100	0.567	136	0.785	172	0.889	208	0.859	244	0.699	280	0.451	316	0.205	352	0.138
29	0.142	65	0.312	101	0.574	137	0.790	173	0.890	209	0.857	245	0.693	281	0.444	317	0.200	353	0.139
30	0.143	66	0.319	102	0.581	138	0.794	174	0.891	210	0.854	246	0.687	282	0.436	318	0.195	354	0.139
31	0.144	67	0.326	103	0.588	139	0.799	175	0.892	211	0.851	247	0.681	283	0.429	319	0.190	355	0.139
32	0.146	68	0.333	104	0.595	140	0.803	176	0.893	212	0.848	248	0.674	284	0.421	320	0.185	356	0.140
33	0.148	69	0.341	105	0.602	141	0.807	177	0.893	213	0.845	249	0.668	285	0.414	321	0.181	357	0.140
34	0.151	70	0.348	106	0.609	142	0.811	178	0.894	214	0.841	250	0.662	286	0.407	322	0.177	358	0.140
35	0.153	71	0.355	107	0.616	143	0.816	179	0.894	215	0.838	251	0.655	287	0.399	323	0.173	359	0.140

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

Figure 1A
Antenna Azimuthal Pattern
Vertical Polarization
WOIO Shaker Heights, OH
Facility ID 39746
Ch. 10 30 kW 333 m

prepared for
Gray Television Licensee, LLC

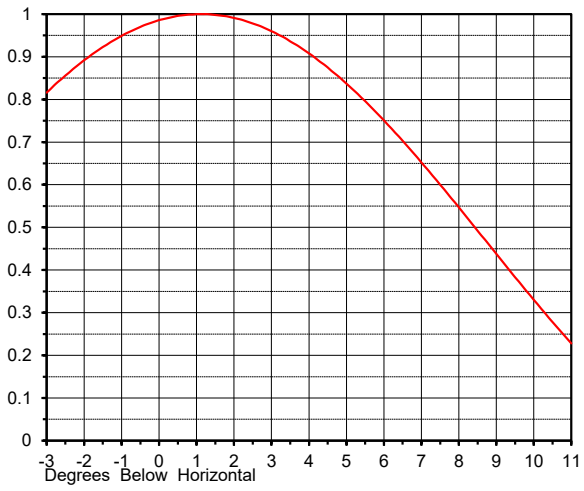
September, 2022

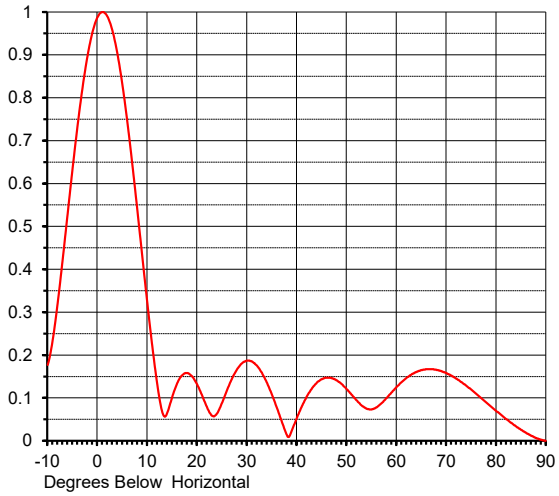
Dielectric®

ELEVATION PATTERN

Proposal No.	**C-70982-3**
Date	**31-Aug-22**
Call Letters	**WOIO**
Channel	**10**
Frequency	**195 MHz**
Antenna Type	**THV-5A10/VP-R C160**

RMS Directivity at Main Lobe	**5.0 (6.99 dB)**	Beam Tilt	**1.00 deg**
RMS Directivity at Horizontal	**4.9 (6.90 dB)**	Pattern Number	**05V050100**
	Calculated		





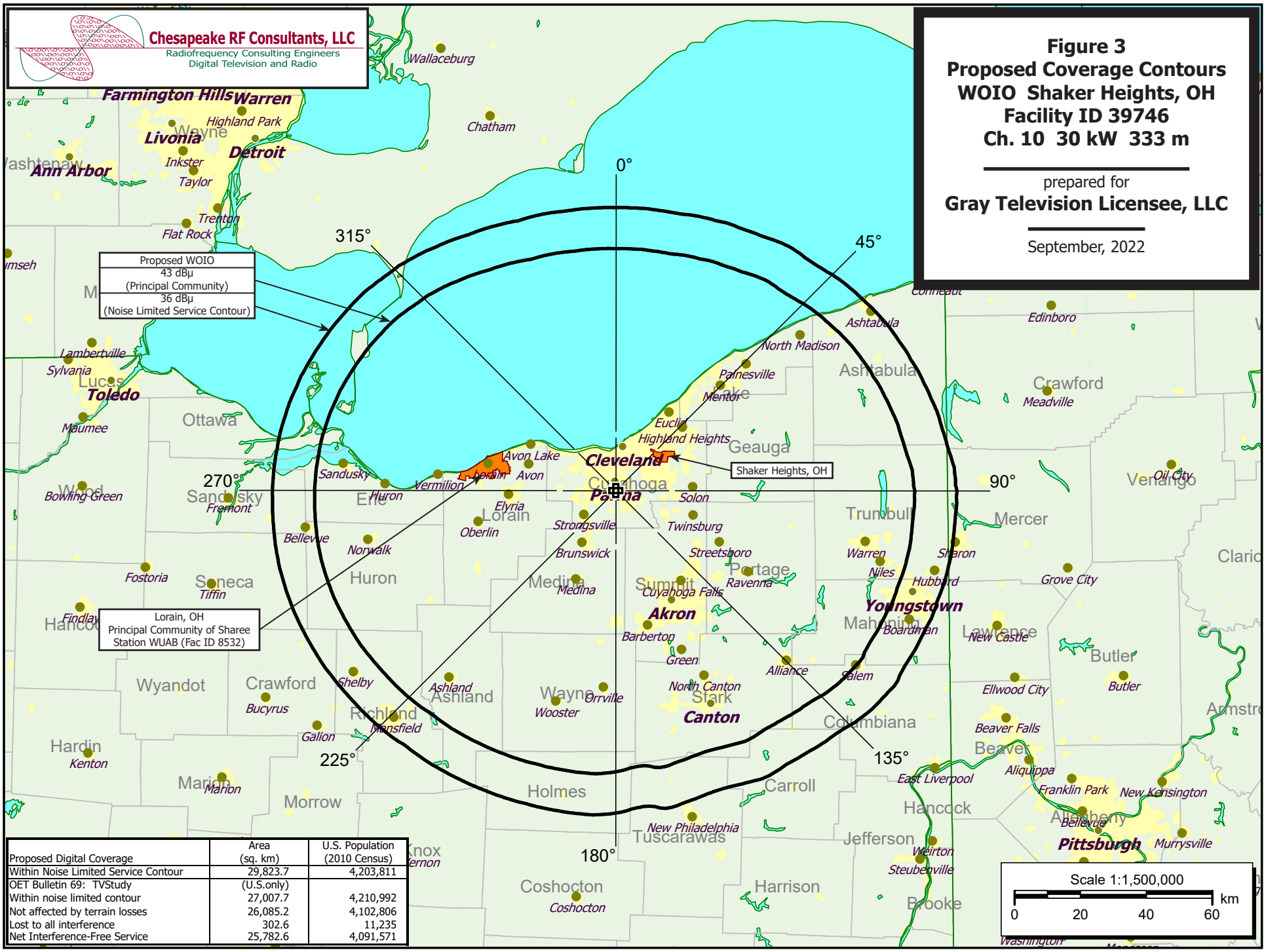
Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.177	10.0	0.320	30.0	0.187	50.0	0.120	70.0	0.158
-9.0	0.235	11.0	0.219	31.0	0.185	51.0	0.107	71.0	0.152
-8.0	0.321	12.0	0.130	32.0	0.175	52.0	0.094	72.0	0.145
-7.0	0.422	13.0	0.066	33.0	0.158	53.0	0.082	73.0	0.137
-6.0	0.529	14.0	0.066	34.0	0.135	54.0	0.075	74.0	0.128
-5.0	0.636	15.0	0.103	35.0	0.107	55.0	0.073	75.0	0.119
-4.0	0.736	16.0	0.135	36.0	0.076	56.0	0.078	76.0	0.109
-3.0	0.824	17.0	0.153	37.0	0.043	57.0	0.088	77.0	0.099
-2.0	0.898	18.0	0.158	38.0	0.013	58.0	0.100	78.0	0.089
-1.0	0.954	19.0	0.150	39.0	0.025	59.0	0.113	79.0	0.079
0.0	0.988	20.0	0.131	40.0	0.054	60.0	0.126	80.0	0.069
1.0	1.000	21.0	0.105	41.0	0.081	61.0	0.137	81.0	0.060
2.0	0.989	22.0	0.077	42.0	0.104	62.0	0.147	82.0	0.050
3.0	0.956	23.0	0.058	43.0	0.122	63.0	0.155	83.0	0.042
4.0	0.902	24.0	0.064	44.0	0.136	64.0	0.161	84.0	0.033
5.0	0.829	25.0	0.089	45.0	0.144	65.0	0.165	85.0	0.025
6.0	0.741	26.0	0.119	46.0	0.147	66.0	0.167	86.0	0.018
7.0	0.642	27.0	0.146	47.0	0.146	67.0	0.167	87.0	0.012
8.0	0.536	28.0	0.167	48.0	0.141	68.0	0.165	88.0	0.006
9.0	0.427	29.0	0.181	49.0	0.132	69.0	0.162	89.0	0.002
								90.0	0.000

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

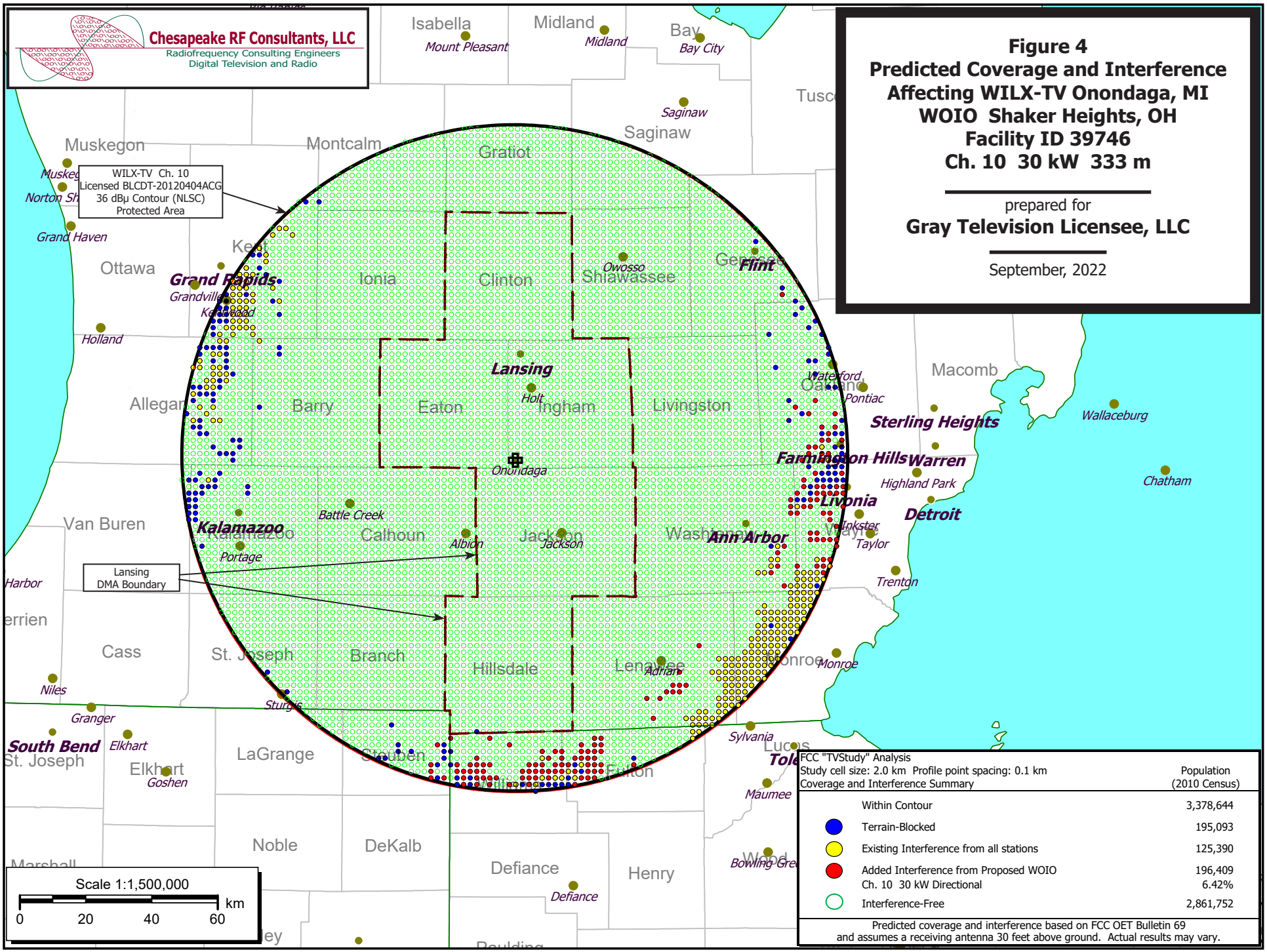
Figure 2
Antenna Elevation Pattern
WOIO Shaker Heights, OH
Facility ID 39746
Ch. 10 30 kW 333 m

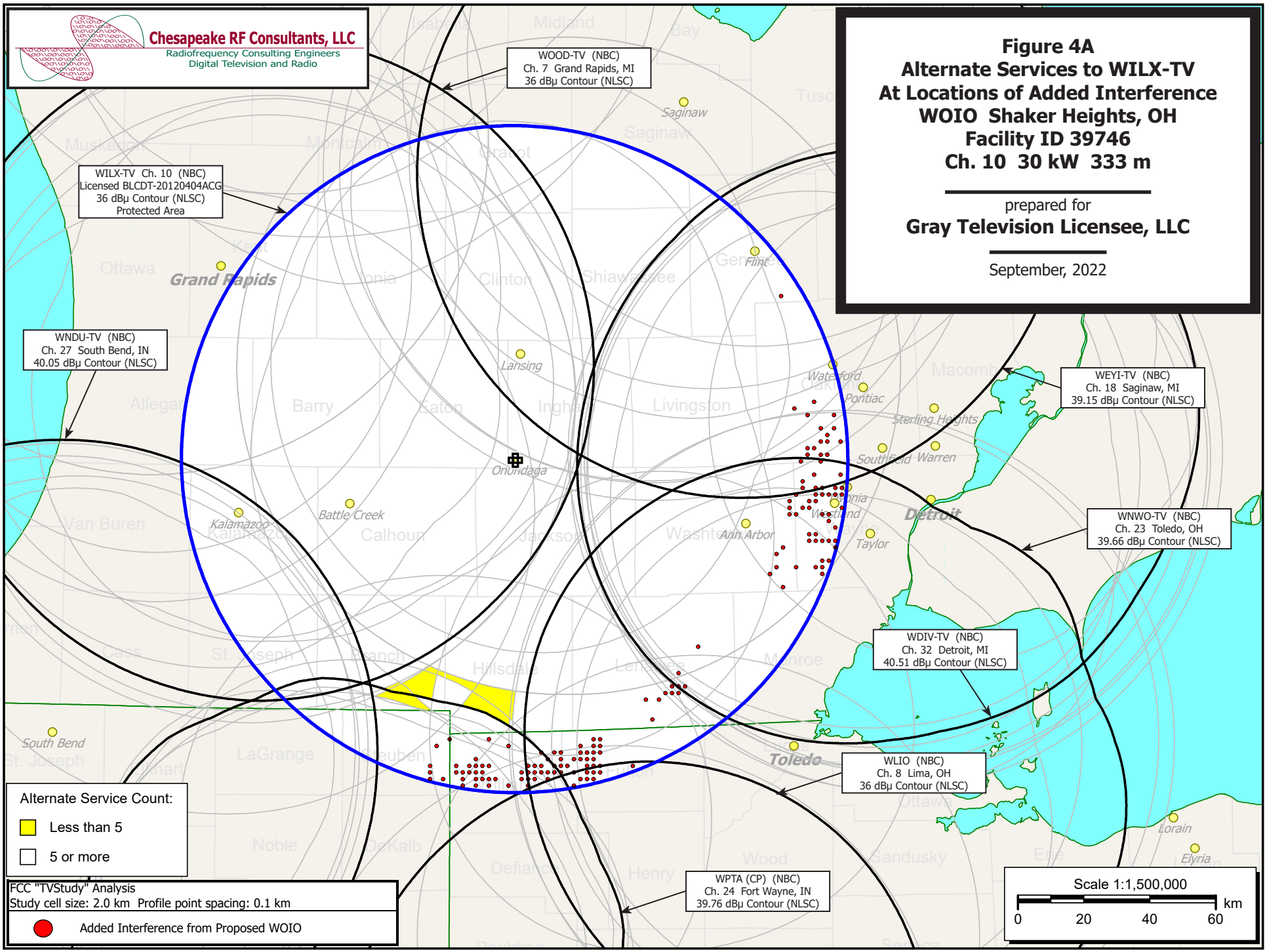
prepared for
Gray Television Licensee, LLC

September, 2022



Proposed Digital Coverage	Area (sq. km)	U.S. Population (2010 Census)
Within Noise Limited Service Contour	29,823.7	4,203,811
OET Bulletin 69: TVStudy	(U.S.only)	
Within noise limited contour	27,007.7	4,210,992
Not affected by terrain losses	26,085.2	4,102,806
Lost to all interference	302.6	11,235
Net Interference-Free Service	25,782.6	4,091,571


Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 4
Predicted Coverage and Interference
Affecting WILX-TV Onondaga, MI
WOIO Shaker Heights, OH
Facility ID 39746
Ch. 10 30 kW 333 m
prepared for
Gray Television Licensee, LLC
September, 2022
WILX-TV Ch. 10
Licensed BLCDT-20120404ACG
36 dBμ Contour (NLSC)
Protected Area
Lansing
DMA Boundary
Onondaga
Scale 1:1,500,000
0 20 40 60 km
FCC "TVStudy" Analysis
Study cell size: 2.0 km Profile point spacing: 0.1 km
Coverage and Interference Summary
Population (2010 Census)
Within Contour 3,378,644
Terrain-Blocked 195,093
Existing Interference from all stations 125,390
Added Interference from Proposed WOIO 196,409
Ch. 10 30 kW Directional 6.42%
Interference-Free 2,861,752
Predicted coverage and interference based on FCC OET Bulletin 69
and assumes a receiving antenna 30 feet above ground. Actual results may vary.


Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 4A
Alternate Services to WILX-TV
At Locations of Added Interference
WOIO Shaker Heights, OH
Facility ID 39746
Ch. 10 30 kW 333 m
prepared for
Gray Television Licensee, LLC
September, 2022
WOOD-TV (NBC)
Ch. 7 Grand Rapids, MI
36 dBµ Contour (NLSC)
WILX-TV Ch. 10 (NBC)
Licensed BLCDT-20120404ACG
36 dBµ Contour (NLSC)
Protected Area
WNDU-TV (NBC)
Ch. 27 South Bend, IN
40.05 dBµ Contour (NLSC)
WEYI-TV (NBC)
Ch. 18 Saginaw, MI
39.15 dBµ Contour (NLSC)
WNWO-TV (NBC)
Ch. 23 Toledo, OH
39.66 dBµ Contour (NLSC)
WDIV-TV (NBC)
Ch. 32 Detroit, MI
40.51 dBµ Contour (NLSC)
WLIO (NBC)
Ch. 8 Lima, OH
36 dBµ Contour (NLSC)
WPTA (CP) (NBC)
Ch. 24 Fort Wayne, IN
39.76 dBµ Contour (NLSC)
Grand Rapids
Saginaw
Flint
Lansing
Pontiac
Waterford
Sterling Heights
Southfield
Warren
Detroit
Westland
Ann Arbor
Taylor
Kalamazoo
Battle Creek
South Bend
Toledo
Lorain
Elyria
Onondaga
Alternate Service Count:
Less than 5
5 or more
FCC "TVStudy" Analysis
Study cell size: 2.0 km Profile point spacing: 0.1 km
Added Interference from Proposed WOIO
Scale 1:1,500,000
0 20 40 60 km

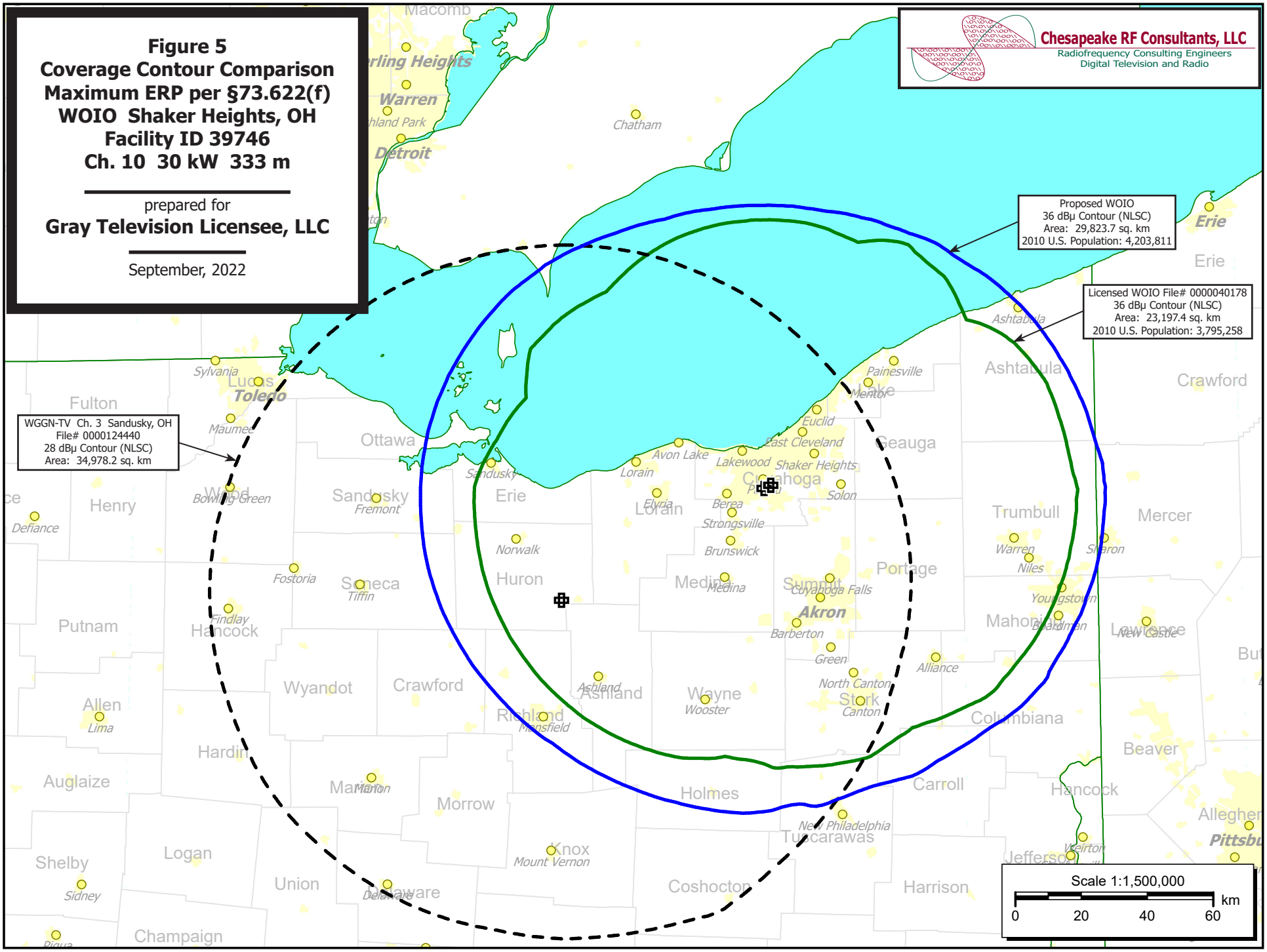


Figure 5
Coverage Contour Comparison
Maximum ERP per §73.622(f)
WOIO Shaker Heights, OH
Facility ID 39746
Ch. 10 30 kW 333 m
prepared for
Gray Television Licensee, LLC
September, 2022
Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Proposed WOIO
36 dBμ Contour (NLSC)
Area: 29,823.7 sq. km
2010 U.S. Population: 4,203,811
Licensed WOIO File# 0000040178
36 dBμ Contour (NLSC)
Area: 23,197.4 sq. km
2010 U.S. Population: 3,795,258
WGGN-TV Ch. 3 Sandusky, OH
File# 0000124440
28 dBμ Contour (NLSC)
Area: 34,978.2 sq. km
Scale 1:1,500,000
km
0
20
40
60

Table 1 WOIO TVStudy Analysis of Proposal


```
tvstudy v2.2.5 (4uoc83)
Database: localhost,  Study: WOIO 1012090 C-70982-3 prop,  Model: Longley-Rice
Start: 2022.09.22 09:09:17

Study created: 2022.09.22 09:09:17

Study build station data: LMS TV 2022-09-21

    Proposal: WOIO D10 DT APP SHAKER HEIGHTS, OH
 File number: WOIO 1012090 C-70982-3
 Facility ID: 39746
Station data: User record
   Record ID: 4669
     Country: U.S.
        Zone: I

Search options:
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX   Call      Chan       Svc Status  City, State              File Number             Distance
Yes  WTOV-TV   D9         DT  LIC     STEUBENVILLE, OH         BLCDT20111206ACB        147.7 km
Yes  WILX-TV   D10        DT  LIC     ONONDAGA, MI             BLCDT20120404ACG        263.9
No   WHEC-TV   D10        DT  LIC     ROCHESTER, NY            BMLCDT20111228ABJ       392.2
No   WHTM-TV   D10        DT  LIC     HARRISBURG, PA           BLANK0000176940         418.0
Yes  WOWK-TV   D10        DT  LIC     HUNTINGTON, WV           BLANK0000168156         322.1
Yes  WTOL      D11        DT  LIC     TOLEDO, OH               BLANK0000164536         141.9
No   WPCW      D11        DT  LIC     JEANNETTE, PA            BLCDT20090626AAT        173.4

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

    Channel: D10
   Latitude:  41 22 45.00 N (NAD83)
  Longitude:  81 43 11.00 W
Height AMSL: 596.4 m
       HAAT: 333.2 m
   Peak ERP: 30.0 kW
    Antenna: 20220831 C-70982-3 0.0 deg
Elev Pattrn: Generic
  Elec Tilt: 1.00

36.0 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg   1.87 kW   387.5 m   85.8 km
 45.0       5.99      356.4      92.6
 90.0       25.4      346.3     103.3
135.0       28.7      296.0     100.4
180.0       25.9      252.1      97.7
225.0       28.3      309.8     101.2
270.0       26.8      350.4     104.0
315.0       7.22      367.3      94.9

ERP exceeds maximum
ERP: 30.0 kW   ERP maximum: 22.4 kW

**Proposal is within coordination distance of Canadian border
Distance to Canadian border: 65.4 km

Distance to Mexican border: 2185.1 km

Conditions at FCC monitoring station: Allegan MI
Bearing: 292.7 degrees   Distance: 375.5 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 273.9 degrees   Distance: 1977.4 km
```

Study cell size: 2.00 km
Profile point spacing: 0.10 km

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

Interference to BLCDT20111206ACB LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WTOV-TV	D9	DT	LIC	STEUBENVILLE, OH	BLCDT20111206ACB	
Undesireds:	WOIO	D10	DT	BL	SHAKER HEIGHTS, OH	DTVBL39746	147.1 km
	WOIO	D10	DT	APP	SHAKER HEIGHTS, OH	WOIO 1012090 C-70982-3	147.7
	WJW	D8	DT	LIC	CLEVELAND, OH	BLCDT20090612AJC	146.1
	WWCP-TV	D8	DT	LIC	JOHNSTOWN, PA	BLANK0000001637	125.9
	WVPB-TV	D9	DT	LIC	HUNTINGTON, WV	BLANK0000141956	246.1

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX
31394.3	3,892,886	29858.5	3,620,094	29802.7	3,609,981	29778.9	3,601,111	0.08 0.25

Undesired		Total IX		Unique IX, before		Unique IX, after	
WOIO D10 DT BL		0.0	0	0.0	0		
WOIO D10 DT APP		27.8	9,624			23.9	8,870
WJW D8 DT LIC		7.9	1,255	7.9	1,255	4.0	501
WWCP-TV D8 DT LIC		8.0	296	8.0	296	8.0	296
WVPB-TV D9 DT LIC		39.8	8,562	39.8	8,562	39.8	8,562

Interference to BLCDT20120404ACG LIC scenario 1
**IX: 6.42% interference caused

See text: WILX-TV is accepting 6.42% interference

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WILX-TV	D10	DT	LIC	ONONDAGA, MI	BLCDT20120404ACG	
Undesireds:	WOIO	D10	DT	BL	SHAKER HEIGHTS, OH	DTVBL39746	265.3 km
	WOIO	D10	DT	APP	SHAKER HEIGHTS, OH	WOIO 1012090 C-70982-3	263.9
	WWTV	D9	DT	LIC	CADILLAC, MI	BLCDT20091217ACZ	198.3
	WAOE	D10	DD	CP	OSWEGO, IL	BLANK0000189533	357.5
	WGVU-TV	D11	DT	LIC	GRAND RAPIDS, MI	BLEDT20100827ABE	122.4
	WTOL	D11	DT	LIC	TOLEDO, OH	BLANK0000164536	130.4

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX
31897.2	3,378,644	31247.8	3,183,551	30317.8	3,058,161	29711.3	2,861,752	2.00 6.42

Undesired		Total IX		Unique IX, before		Unique IX, after	
WOIO D10 DT BL		68.3	8,141	52.3	7,030		
WOIO D10 DT APP		911.5	218,382			658.9	203,439
WAOE D10 DD CP		8.0	517	4.0	7	4.0	7
WGVU-TV D11 DT LIC		272.1	87,416	268.1	86,906	268.1	86,906
WTOL D11 DT LIC		601.7	30,937	585.7	29,826	349.1	15,994

Interference to BLCDT20120404ACG LIC scenario 2
**IX: 6.42% interference caused

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WILX-TV	D10	DT	LIC	ONONDAGA, MI	BLCDT20120404ACG	
Undesireds:	WOIO	D10	DT	BL	SHAKER HEIGHTS, OH	DTVBL39746	265.3 km
	WOIO	D10	DT	APP	SHAKER HEIGHTS, OH	WOIO 1012090 C-70982-3	263.9
	WWTV	D9	DT	LIC	CADILLAC, MI	BLCDT20091217ACZ	198.3
	WAOE	D10	DD	APP	OSWEGO, IL	BLANK0000200042	357.5
	WGVU-TV	D11	DT	LIC	GRAND RAPIDS, MI	BLEDT20100827ABE	122.4
	WTOL	D11	DT	LIC	TOLEDO, OH	BLANK0000164536	130.4

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX
31897.2	3,378,644	31247.8	3,183,551	30317.8	3,058,161	29711.3	2,861,752	2.00 6.42

Undesired	Total IX	Unique IX, before	Unique IX, after

WOIO D10 DT BL	68.3	8,141	52.3	7,030				
WOIO D10 DT APP	911.5	218,382			658.9	203,439		
WAOE D10 DD APP	8.0	517	4.0	7	4.0	7		
WGVU-TV D11 DT LIC	272.1	87,416	268.1	86,906	268.1	86,906		
WTOL D11 DT LIC	601.7	30,937	585.7	29,826	349.1	15,994		

Interference to BLANK0000168156 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WOWK-TV	D10	DT	LIC	HUNTINGTON, WV	BLANK0000168156	
Undesireds:	WOIO	D10	DT	BL	SHAKER HEIGHTS, OH	DTVBL39746	323.3 km
	WOIO	D10	DT	APP	SHAKER HEIGHTS, OH	WOIO 1012090 C-70982-3	322.1
	WBIR-TV	D10	DT	LIC	KNOXVILLE, TN	BLCDT20090619ADG	317.3

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
39052.5	1,342,969	37785.4	1,252,528	37773.4	1,252,468	37753.6	1,252,195	0.05	0.02

Undesired	Total IX		Unique IX, before		Unique IX, after	
WOIO D10 DT BL	7.9	60	7.9	60		
WOIO D10 DT APP	27.8	333			27.8	333
WBIR-TV D10 DT LIC	4.0	0	4.0	0	4.0	0

Interference to BLANK0000164536 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WTOL	D11	DT	LIC	TOLEDO, OH	BLANK0000164536	
Undesireds:	WOIO	D10	DT	BL	SHAKER HEIGHTS, OH	DTVBL39746	143.7 km
	WOIO	D10	DT	APP	SHAKER HEIGHTS, OH	WOIO 1012090 C-70982-3	141.9
	WILX-TV	D10	DT	LIC	ONONDAGA, MI	BLCDT20120404ACG	130.4
	WLFI-TV	D11	DT	LIC	LAFAYETTE, IN	BLCDT20040520AIX	306.3
	WGVU-TV	D11	DT	LIC	GRAND RAPIDS, MI	BLEDT20100827ABE	251.4
	WPCW	D11	DT	LIC	JEANNETTE, PA	BLCDT20090626AAT	310.5
	WINM	D12	DT	APP	ANGOLA, IN	BLANK0000199518	163.8
	WMFD-TV	D12	DT	LIC	MANSFIELD, OH	BLCDT20081112ALJ	119.4

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
26816.1	4,487,440	26663.8	4,472,142	26132.7	4,446,563	26104.4	4,446,308	0.11	0.01
4684.6	391,578	4684.6	391,578	4684.6	391,578	4684.6	391,578	0.00	0.00
(in Canada)									

Undesired	Total IX		Unique IX, before		Unique IX, after	
WOIO D10 DT BL	0.0	0	0.0	0		
WOIO D10 DT APP	40.4	257			28.3	255
WILX-TV D10 DT LIC	291.6	16,875	243.6	12,440	243.6	12,440
WLFI-TV D11 DT LIC	8.0	158	0.0	0	0.0	0
WGVU-TV D11 DT LIC	108.1	10,889	56.2	6,438	56.2	6,438
WPCW D11 DT LIC	12.1	2	12.1	2	0.0	0
WMFD-TV D12 DT LIC	167.2	2,248	167.2	2,248	167.2	2,248

Interference to BLANK0000164536 LIC scenario 2

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WTOL	D11	DT	LIC	TOLEDO, OH	BLANK0000164536	
Undesireds:	WOIO	D10	DT	BL	SHAKER HEIGHTS, OH	DTVBL39746	143.7 km
	WOIO	D10	DT	APP	SHAKER HEIGHTS, OH	WOIO 1012090 C-70982-3	141.9
	WILX-TV	D10	DT	LIC	ONONDAGA, MI	BLCDT20120404ACG	130.4
	WLFI-TV	D11	DT	LIC	LAFAYETTE, IN	BLCDT20040520AIX	306.3
	WGVU-TV	D11	DT	LIC	GRAND RAPIDS, MI	BLEDT20100827ABE	251.4
	WPCW	D11	DT	LIC	JEANNETTE, PA	BLCDT20090626AAT	310.5
	WINM	D12	DT	LIC	ANGOLA, IN	BLCDT20130711ABN	120.8
	WMFD-TV	D12	DT	LIC	MANSFIELD, OH	BLCDT20081112ALJ	119.4

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
26816.1	4,487,440	26663.8	4,472,142	26108.4	4,442,869	26080.2	4,442,614	0.11	0.01
4684.6	391,578	4684.6	391,578	4684.6	391,578	4684.6	391,578	0.00	0.00
(in Canada)									

Table 1 WOIO TVStudy Analysis of Proposal

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

Undesired		Total IX		Unique IX, before		Unique IX, after	
WOIO D10 DT BL	0.0	0		0.0	0		
WOIO D10 DT APP	40.4	257				28.3	255
WILX-TV D10 DT LIC	291.6	16,875		243.6	12,440	243.6	12,440
WLFI-TV D11 DT LIC	8.0	158		0.0	0	0.0	0
WGVU-TV D11 DT LIC	108.1	10,889		52.1	6,406	52.1	6,406
WPCW D11 DT LIC	12.1	2		12.1	2	0.0	0
WINM D12 DT LIC	32.3	3,742		24.2	3,694	24.2	3,694
WMFD-TV D12 DT LIC	167.2	2,248		167.2	2,248	167.2	2,248

Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WOIO	D10	DT	APP	SHAKER HEIGHTS, OH	WOIO 1012090 C-70982-3	
Undesireds:	WILX-TV	D10	DT	LIC	ONONDAGA, MI	BLCDT20120404ACG	263.9 km
	WOWK-TV	D10	DT	LIC	HUNTINGTON, WV	BLANK0000168156	322.1
	WTOL	D11	DT	LIC	TOLEDO, OH	BLANK0000164536	141.9

Service area		Terrain-limited		IX-free		Percent IX		
27007.7	4,210,992	26085.2	4,102,806	25782.6	4,091,571	1.16	0.27	
2880.2	171	2880.2	171	2880.2	171	0.00	0.00	(in Canada)

Undesired	Total IX		Unique IX		Prcnt Unique IX	
WILX-TV D10 DT LIC	137.5	2,998	16.1	428	0.06	0.01
WOWK-TV D10 DT LIC	52.0	2,030	48.0	1,992	0.18	0.05
WTOL D11 DT LIC	234.6	8,777	117.1	6,245	0.45	0.15

Table 2

Authorized Alternate Television Services Within WILX-TV NLSC

prepared for

Gray Television Licensee, LLC

WOIO Shaker Heights, OH

Call Sign	Ch.	Facility ID	Status	File Number	Community
WTLW	4	1222	Lic	0000078570	Lima, OH
WGVK	5	24783	Lic	BLEDT-20060703ABQ	Kalamazoo, MI
WJBK	7	73123	Lic	0000126157	Detroit, MI
WOOD-TV	7	36838	Lic	0000141784	Grand Rapids, MI
WLIO	8	37503	Lic	0000079203	Lima, OH
WWMT	8	74195	Lic	0000159066	Kalamazoo, MI
WWTV	9	26994	CP	0000035807	Cadillac, MI
WILX-TV	10	6863	Lic	BLCDT-20120404ACG	Onondaga, MI
WGVU-TV	11	24784	Lic	BLEDT-20100827ABE	Grand Rapids, MI
WTOL	11	13992	Lic	0000164536	Toledo, OH
WINM	12	67787	Lic	BLCDT-20130711ABN	Angola, IN
WJRT-TV	12	21735	Lic	0000185925	Flint, MI
WTVG	13	74150	Lic	0000143483	Toledo, OH
WZZM	13	49713	Lic	BLCDT-20100726AKV	Grand Rapids, MI
WZZM-D	13	49713	Lic	BLCDT-20100726AKV	Grand Rapids, MI
WLAJ	14	36533	Lic	0000100497	Lansing, MI
WLNS-TV	14	74420	Lic	0000103503	Lansing, MI
WDCQ-TV	15	16530	Lic	BLEDT-20030922ABG	Bad Axe, MI
WSMH	16	21737	Lic	0000185127	Flint, MI
WOTV	17	10212	Lic	0000141782	Battle Creek, MI
WEYI-TV	18	72052	Lic	0000185142	Saginaw, MI
WFWA	18	22108	Lic	0000063130	Fort Wayne, IN
WXMI	19	68433	Lic	0000143294	Grand Rapids, MI
WFFT-TV	20	25040	Lic	0000086952	Fort Wayne, IN
WTVS	20	16817	Lic	0000117036	Detroit, MI
WWJ-TV	21	72123	Lic	0000125983	Detroit, MI
WZPX-TV	21	71871	Lic	0000087609	Battle Creek, MI
WBGU-TV	22	6568	Lic	0000063785	Bowling Green, OH
WLLA	22	11033	Lic	0000122579	Kalamazoo, MI
WBSF	23	82627	Lic	0000185118	Bay City, MI
WNWO-TV	23	73354	Lic	0000123861	Toledo, OH
WPTA	24	73905	CP	0000127490	Fort Wayne, IN
WPXD-TV	24	5800	Lic	0000108759	Ann Arbor, MI
WTLJ	24	67781	Lic	0000001674	Muskegon, MI
WXYZ-TV	25	10267	Lic	0000126705	Detroit, MI
WCMU-TV	26	9908	Lic	BLEDT-20130710ABN	Mount Pleasant, MI
WUPW	26	19190	Lic	0000108708	Toledo, OH
WADL	27	455	Lic	0000111708	Mount Clemens, MI
WNDU-TV	27	41674	Lic	0000116736	South Bend, IN
WSYM-TV	28	74094	CP	0000181141	Lansing, MI
WGTE-TV	29	66285	Lic	BLEDT-20031110AKO	Toledo, OH
WSBT-TV	29	73983	Lic	0000087455	South Bend, IN
WNEM-TV	30	41221	Lic	0000185174	Bay City, MI
WSJV	30	74007	Lic	0000124380	Elkhart, IN
WMYD	31	74211	Lic	0000125639	Detroit, MI
WNIT	31	41671	Lic	0000087078	South Bend, IN
WANE-TV	32	39270	Lic	0000121250	Fort Wayne, IN
WDIV-TV	32	53114	Lic	0000126974	Detroit, MI
WFQX-TV	32	25396	CP	0000035809	Cadillac, MI
WKAR-TV	33	6104	Lic	0000054990	East Lansing, MI
WISE-TV	34	13960	Lic	0000064330	Fort Wayne, IN
WKBD-TV	34	51570	Lic	0000074932	Detroit, MI
WLMB	35	17076	CP	0000185769	Toledo, OH
WAQP	36	67792	Lic	0000096188	Saginaw, MI
WHME-TV	36	36117	Lic	0000087036	South Bend, IN

Table 3 WOIO Canada DTV Interference Analysis

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

Population Database: 2011 Canada Census

CFPL-DT (10) London, ON - CANADA184
Broadcast Type: Digital Service: T
Lat: 42-56-59.14 N Lng: 081-15-51.47 W [NAD83]
ERP: 45.00 kW AMSL: 561.8 m
TV Incoming Interference Study
Interference Considered Within: Noise Limited FCC Contour
Signal Resolution: 2.0 km
LR Profile Spacing Increment: 1.0 km
Consider NTSC Taboo: Yes
KWX error points are considered as
possible interference points.
# of radials computed for protected contour: 360
Protected contour calculated using 36 radial HAAT. (HAAT values snapped to 30 m before interpolating)
Threshold for reception: 36.0 dBu
Pop Centroid DB: 2011 Canada Census

Study Date: 8/22/2022
TV Database Date: 8/22/2022

Primary Terrain: FCC 30 Meter Terrain
Secondary Terrain: V-Soft 3 Second US Terrain

Population Database: 2011 Canada Census

Percentages calculated using a baseline population of 1,523,774.

Stations which cause interference:

Call Letters	H Units	Population	%	Area (sq. km)
WOIO-D CP 0000035655 (10)	5,848	12,275	0.806	1211.10
WOIO-D Proposed (10)	5,472	11,348	0.745	1096.17

Masking Summary:

Call Letters	Total Interference Population	%	Unique Interference Population	%
WOIO-D CP 0000035655 (10)	12,275	0.806	927	0.061
WOIO-D Proposed (10)	11,348	0.745	0	0.000

Call Letters	City	State	Dist	Azi
WOIO-D CP 0000035655 (10)	Shaker Heights	OH	178.6	192.3
WOIO-D Proposed (10)	Shaker Heights	OH	178.6	192.3

Totals for CFPL-DT (10)

	Population	Area
Calculation Area Population:	1,624,300	[29463.8 sq. km]
Not Affected by Terrain Loss:	1,523,774	[28978.0 sq. km]
Total NTSC Interference:	0	[0.0 sq. km]
DTV Only Interference:	12,275	[1211.1 sq. km]
Total DTV Interference:	12,275	[1211.1 sq. km]
Interfered Population:	12,275	[1211.1 sq. km]
Interference Free:	1,511,499	[27766.9 sq. km]
Percent Interference:	0.81 %	
Terrain Blocked Population:	100,526	[485.8 sq. km]
Contour Area Population:	1,628,362	

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	39746
	State	Ohio
	City	SHAKER HEIGHTS
	DTV Channel	10
	Designated Market Area	Cleveland-Akron (Canton)
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	1

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1012090
Coordinates (NAD83)	Latitude	41° 22' 45.0" N+
	Longitude	081° 43' 11.0" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	288.6 meters
	Support Structure Height	270.7 meters
	Ground Elevation (AMSL)	320.6 meters
Antenna Data	Height of Radiation Center Above Ground Level	275.8 meters
	Height of Radiation Center Above Average Terrain	333.2 meters
	Height of Radiation Center Above Mean Sea Level	596.4 meters
	Effective Radiated Power	30 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	THV-5A10/VP-R C160
	Rotation	0 degrees
	Electrical Beam Tilt	1.0
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Elliptical
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	0.250	**90**	0.921	**180**	0.929	**270**	0.945
10	0.253	**100**	0.972	**190**	0.930	**280**	0.877
20	0.269	**110**	0.997	**200**	0.936	**290**	0.783
30	0.313	**120**	0.999	**210**	0.946	**300**	0.669
40	0.393	**130**	0.987	**220**	0.962	**310**	0.548
50	0.501	**140**	0.969	**230**	0.980	**320**	0.433
60	0.621	**150**	0.952	**240**	0.995	**330**	0.341
70	0.739	**160**	0.939	**250**	1.000	**340**	0.282
80	0.842	**170**	0.932	**260**	0.985	**350**	0.257

Additional Azimuths

Degree	V_A
248	1.000
116	1.000