



## ENGINEERING EXHIBIT

### I incentive Auction Channel Reassignment

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

prepared for

#### Ohio/Oklahoma Hearst Television Inc.

WLWT(DT) Cincinnati, OH

Facility ID 46979

Ch. 20 810 kW 249 m

*Ohio/Oklahoma Hearst Television Inc. (“Hearst”) is the licensee of digital television station WLWT(DT), Facility ID 46979, Cincinnati OH. Reassignment of WLWT from Channel 35 to Channel 20 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (DA 17-317, released April 13, 2017). The WLWT reassignment facility was recently constructed, and WLWT is now licensed (file# 0000087261) to operate on Channel 20 at 880 kW effective radiated power (“ERP”) with a nondirectional antenna at 309 meters height above average terrain (“HAAT”). Hearst herein seeks authorization for an auxiliary antenna for WLWT on its post-auction Channel 20.*

The proposed auxiliary antenna is side-mounted on the same tower structure as the authorized main antenna, and will operate on Channel 20 at 810 kW ERP (directional) and an antenna HAAT of 249 meters. The subject antenna was previously authorized for use as an interim facility on WLWT’s pre-auction Channel 35 (see STA file# 0000050307).

The WLWT tower structure is associated with FCC Antenna Structure Registration number 1038226. No change to the overall structure height will result from this proposal.

The proposed antenna is a horizontally polarized directional Dielectric model TFU-16WB C160. The directional antenna’s azimuthal and elevation patterns are depicted in Figures 1 and 2, respectively.

Figure 3 shows that the 41 dB $\mu$  noise limited service contour of the proposed auxiliary facility does not extend beyond that of the authorized main facility. Thus, the proposal complies with §73.1675(a).

### **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 10 percent antenna relative field in downward elevations (pattern data shows less than 10 percent relative field at angles 25 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 6.6  $\mu$ W/cm<sup>2</sup>, which is 1.9 percent of the general population/uncontrolled maximum permitted exposure limit. This is 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.

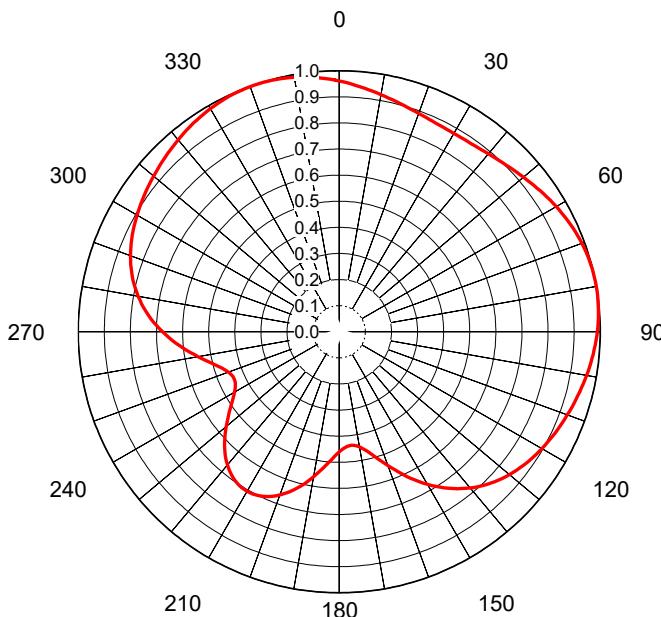
The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power 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.

#### *List of Attachments*

- |             |                             |
|-------------|-----------------------------|
| Figure 1,1A | Antenna Azimuthal Pattern   |
| Figure 2    | Antenna Elevation Pattern   |
| Figure 3    | Proposed Auxiliary Contours |

#### **Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.      January 13, 2020  
207 Old Dominion Road      Yorktown, VA 23692      703-650-9600



### AZIMUTH PATTERN Horizontal Polarization

Proposal No. Q053 JMD  
 Date 8-Jan-20  
 Call Letters WLWT  
 Channel 20  
 Frequency 509 MHz  
 Antenna Type TFU-16WB-R C160  
 Gain 1.5 (1.76dB)  
 Calculated

Pattern Number WB-C160-20 Hpol

Deg	Value																		
0	0.961	36	0.882	72	0.993	108	0.937	144	0.743	180	0.480	216	0.691	252	0.465	288	0.840	324	0.972
1	0.957	37	0.883	73	0.995	109	0.934	145	0.732	181	0.468	217	0.686	253	0.473	289	0.846	325	0.975
2	0.953	38	0.885	74	0.996	110	0.930	146	0.722	182	0.477	218	0.680	254	0.482	290	0.851	326	0.978
3	0.950	39	0.887	75	0.998	111	0.927	147	0.710	183	0.486	219	0.674	255	0.491	291	0.856	327	0.980
4	0.946	40	0.890	76	0.999	112	0.924	148	0.699	184	0.496	220	0.666	256	0.502	292	0.861	328	0.983
5	0.942	41	0.892	77	0.999	113	0.920	149	0.687	185	0.506	221	0.658	257	0.513	293	0.866	329	0.985
6	0.938	42	0.895	78	1.000	114	0.917	150	0.675	186	0.517	222	0.650	258	0.525	294	0.871	330	0.987
7	0.934	43	0.897	79	1.000	115	0.914	151	0.663	187	0.529	223	0.641	259	0.537	295	0.875	331	0.989
8	0.930	44	0.900	80	1.000	116	0.910	152	0.650	188	0.540	224	0.631	260	0.549	296	0.879	332	0.991
9	0.926	45	0.904	81	1.000	117	0.907	153	0.637	189	0.552	225	0.621	261	0.562	297	0.883	333	0.993
10	0.922	46	0.907	82	0.999	118	0.903	154	0.624	190	0.564	226	0.610	262	0.575	298	0.887	334	0.994
11	0.919	47	0.910	83	0.999	119	0.900	155	0.611	191	0.575	227	0.600	263	0.588	299	0.891	335	0.996
12	0.915	48	0.914	84	0.998	120	0.896	156	0.598	192	0.587	228	0.588	264	0.601	300	0.895	336	0.997
13	0.911	49	0.917	85	0.997	121	0.892	157	0.585	193	0.598	229	0.577	265	0.614	301	0.898	337	0.998
14	0.908	50	0.921	86	0.996	122	0.888	158	0.572	194	0.609	230	0.566	266	0.627	302	0.902	338	0.999
15	0.905	51	0.925	87	0.994	123	0.884	159	0.559	195	0.620	231	0.554	267	0.640	303	0.905	339	0.999
16	0.901	52	0.929	88	0.992	124	0.880	160	0.546	196	0.630	232	0.542	268	0.652	304	0.908	340	0.999
17	0.898	53	0.933	89	0.991	125	0.876	161	0.533	197	0.640	233	0.531	269	0.665	305	0.912	341	0.999
18	0.896	54	0.937	90	0.989	126	0.871	162	0.521	198	0.649	234	0.520	270	0.677	306	0.915	342	0.999
19	0.893	55	0.941	91	0.987	127	0.867	163	0.509	199	0.657	235	0.509	271	0.689	307	0.918	343	0.999
20	0.890	56	0.944	92	0.984	128	0.862	164	0.498	200	0.665	236	0.499	272	0.701	308	0.922	344	0.998
21	0.888	57	0.948	93	0.982	129	0.857	165	0.488	201	0.673	237	0.489	273	0.712	309	0.925	345	0.998
22	0.886	58	0.952	94	0.979	130	0.851	166	0.478	202	0.680	238	0.479	274	0.723	310	0.928	346	0.996
23	0.884	59	0.956	95	0.977	131	0.846	167	0.469	203	0.686	239	0.471	275	0.734	311	0.931	347	0.995
24	0.882	60	0.960	96	0.974	132	0.840	168	0.461	204	0.691	240	0.463	276	0.745	312	0.935	348	0.994
25	0.881	61	0.963	97	0.971	133	0.834	169	0.454	205	0.695	241	0.457	277	0.754	313	0.938	349	0.992
26	0.880	62	0.967	98	0.968	134	0.827	170	0.448	206	0.699	242	0.451	278	0.764	314	0.941	350	0.990
27	0.879	63	0.970	99	0.965	135	0.820	171	0.444	207	0.702	243	0.447	279	0.773	315	0.944	351	0.988
28	0.878	64	0.973	100	0.962	136	0.813	172	0.440	208	0.704	244	0.444	280	0.782	316	0.948	352	0.985
29	0.878	65	0.977	101	0.959	137	0.806	173	0.438	209	0.705	245	0.442	281	0.791	317	0.951	353	0.983
30	0.878	66	0.980	102	0.956	138	0.798	174	0.438	210	0.706	246	0.441	282	0.799	318	0.954	354	0.980
31	0.878	67	0.982	103	0.953	139	0.790	175	0.438	211	0.706	247	0.442	283	0.806	319	0.957	355	0.977
32	0.878	68	0.985	104	0.950	140	0.781	176	0.440	212	0.704	248	0.444	284	0.814	320	0.960	356	0.974
33	0.879	69	0.987	105	0.947	141	0.772	177	0.443	213	0.702	249	0.447	285	0.821	321	0.963	357	0.971
34	0.879	70	0.990	106	0.943	142	0.763	178	0.448	214	0.699	250	0.452	286	0.828	322	0.966	358	0.968
35	0.881	71	0.992	107	0.940	143	0.753	179	0.454	215	0.696	251	0.458	287	0.834	323	0.969	359	0.964

**Figure 1**  
**Auxiliary Antenna Azimuthal Pattern**  
**WLWT(DT) Cincinnati, OH**  
**Facility ID 46979**  
**Ch. 20 810 kW 249 m**

prepared for  
**Ohio/Oklahoma**  
**Hearst Television Inc.**

January, 2020



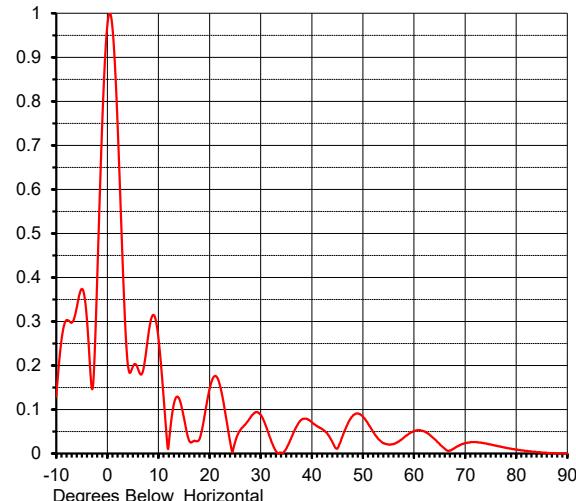
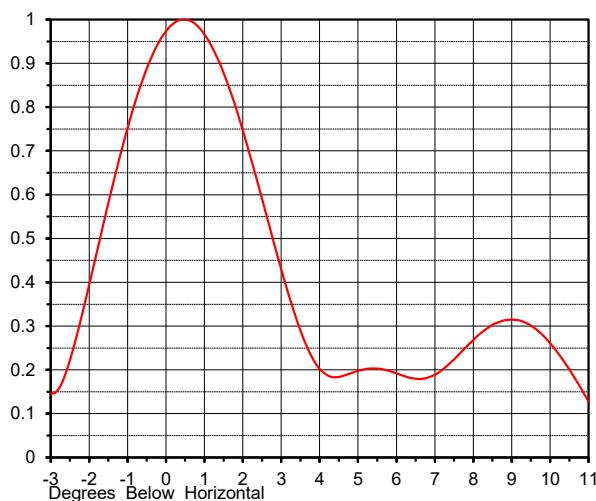
## ELEVATION PATTERN

Proposal No. Q053 JMD  
 Date 8-Jan-20  
 Call Letters WLWT  
 Channel 20  
 Frequency 509 MHz  
 Antenna Type TFU-16WB-R C160

RMS Directivity at Main Lobe 14.2 ( 11.52 dB )  
 RMS Directivity at Horizontal 13.4 ( 11.27 dB )

Calculated

Beam Tilt 0.55 deg  
 Pattern Number 16W142055-20



Angle	Field								
-10.0	0.129	10.0	0.261	30.0	0.088	50.0	0.084	70.0	0.023
-9.0	0.256	11.0	0.128	31.0	0.063	51.0	0.068	71.0	0.025
-8.0	0.303	12.0	0.020	32.0	0.031	52.0	0.049	72.0	0.026
-7.0	0.297	13.0	0.112	33.0	0.005	53.0	0.033	73.0	0.025
-6.0	0.331	14.0	0.126	34.0	0.002	54.0	0.024	74.0	0.023
-5.0	0.374	15.0	0.080	35.0	0.011	55.0	0.021	75.0	0.020
-4.0	0.304	16.0	0.029	36.0	0.036	56.0	0.022	76.0	0.018
-3.0	0.146	17.0	0.029	37.0	0.061	57.0	0.027	77.0	0.015
-2.0	0.394	18.0	0.032	38.0	0.077	58.0	0.036	78.0	0.013
-1.0	0.752	19.0	0.085	39.0	0.079	59.0	0.045	79.0	0.011
0.0	0.973	20.0	0.147	40.0	0.071	60.0	0.051	80.0	0.009
1.0	0.966	21.0	0.176	41.0	0.062	61.0	0.053	81.0	0.007
2.0	0.747	22.0	0.156	42.0	0.056	62.0	0.050	82.0	0.006
3.0	0.430	23.0	0.097	43.0	0.046	63.0	0.043	83.0	0.004
4.0	0.202	24.0	0.028	44.0	0.027	64.0	0.033	84.0	0.003
5.0	0.198	25.0	0.026	45.0	0.011	65.0	0.022	85.0	0.002
6.0	0.192	26.0	0.053	46.0	0.039	66.0	0.011	86.0	0.001
7.0	0.189	27.0	0.066	47.0	0.067	67.0	0.007	87.0	0.001
8.0	0.268	28.0	0.082	48.0	0.085	68.0	0.013	88.0	0.000
9.0	0.315	29.0	0.094	49.0	0.091	69.0	0.019	89.0	0.000
									90.0 0.000

**Figure 2**  
**Auxiliary Antenna Elevation Pattern**  
**WLWT(DT) Cincinnati, OH**  
**Facility ID 46979**  
**Ch. 20 810 kW 249 m**

prepared for  
**Ohio/Oklahoma**  
**Hearst Television Inc.**

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