

ENGINEERING EXHIBIT

Application for Minor Modification of Digital Low Power Television Station Construction Permit

prepared for

WBOC, Inc.

WRUE-LD Salisbury, MD
Facility ID 187720
Ch. 19 15 kW Directional

WBOC, Inc. (“*WBOC*”) is the permittee of unbuilt digital Low Power Television station WRUE-LD, Channel 19, Salisbury MD, Facility ID 187720. WRUE-LD is authorized to operate pursuant to a Construction Permit (“CP”, file# 0000141151) with 15 kW effective radiated power (“ERP”), directional. *WBOC* herein seeks a modification of the CP to specify an adjacent tower structure. No change in antenna or ERP is proposed.

The authorized WRUE-LD site associated with FCC Antenna Structure Registration (“ASR”) number 1035996. *WBOC* is in the process replacing that tower structure, which is also utilized by *WBOC*’s radio station WBOC-FM (Fac ID 39894, Princess Anne MD). A replacement tower has recently been constructed immediately adjacent to the existing tower, and ASR number 1318928 has been obtained for the replacement tower. Accordingly, the proposed modification specifies the replacement tower’s ASR number 1318928. The site is located more than 75 miles (121 km) from the reference coordinates of the markets listed in Appendix A of DA 09-1487¹.

The presently authorized WRUE-LD tower’s ASR number 1035996 geographic coordinates are 0.3 second latitude and 0.3 second longitude different from the replacement tower ASR 1318928 coordinates, corresponding to a change in location of 0.01 km. The ground elevation above mean sea level is reduced by 0.1 meter at the replacement tower, while there is no change in the proposed antenna height above ground level.

¹“Commencement of Rural, First-come, First-served digital licensing for Low Power Television and TV Translators Beginning August 25, 2009 and Commencement of Nationwide, First-come, First-served Digital Licensing for Low Power Television and TV Translator Services Beginning January 25, 2010,” Public Notice, DA 09-1487, Released June 29, 2009.

As with the current authorization, the proposed antenna is a Dielectric model DLP-12B having horizontal polarization. The ERP is 15 kW using a “full service” out of channel emission mask. A plot of the directional antenna’s azimuthal pattern is supplied in Figure 1. Figure 2 depicts the coverage contour of the proposed facility (indistinguishable from the existing WRUE-LD authorization) as well as that of the original CP facility (file# BNPDTL-20100709AIT), demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69² shows that the proposal complies with the FCC’s interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. The results, summarized in Table 1, show that any new interference does not exceed the FCC’s interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility.

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 10 percent antenna relative field in downward elevations (pattern data shows 10 percent or less relative field at angles 10 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 $0.3 \mu\text{W}/\text{cm}^2$, which is 0.1 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

²FCC 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, 1 km cell size, and 1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC’s implementation of TVStudy show excellent correlation.

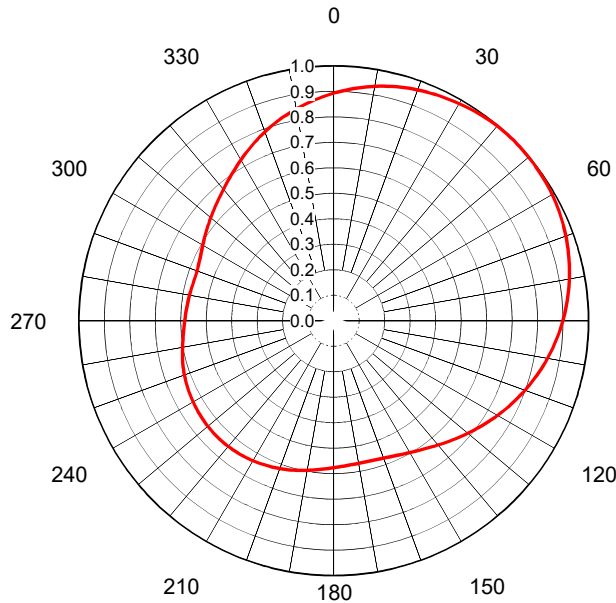
will reduce power or cease operation as necessary to protect persons having access to the site, tower, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. This exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2	Coverage Contour Comparison
Table 1	TVStudy Analysis of Proposal
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	January 3, 2022	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



AZIMUTH PATTERN Horizontal Polarization

In Free Space

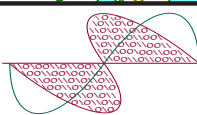
Proposal No. **0**
Date **14-Apr-20**
Call Letters **WRUE-LD**
Channel **19**
Frequency **503 MHz**
Antenna Type **ANT DLP12B**
Gain **1.76 (2.45dB)**
Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.893	36	0.994	72	0.964	108	0.810	144	0.619	180	0.577	216	0.641	252	0.619	288	0.570
1	0.897	37	0.995	73	0.961	109	0.804	145	0.615	181	0.578	217	0.642	253	0.618	289	0.570
2	0.902	38	0.996	74	0.958	110	0.799	146	0.612	182	0.580	218	0.643	254	0.616	290	0.571
3	0.906	39	0.997	75	0.955	111	0.793	147	0.608	183	0.582	219	0.643	255	0.613	291	0.572
4	0.910	40	0.998	76	0.952	112	0.787	148	0.604	184	0.584	220	0.644	256	0.611	292	0.573
5	0.914	41	0.999	77	0.949	113	0.782	149	0.601	185	0.586	221	0.644	257	0.609	293	0.575
6	0.919	42	0.999	78	0.946	114	0.776	150	0.597	186	0.588	222	0.645	258	0.607	294	0.577
7	0.923	43	0.999	79	0.942	115	0.771	151	0.594	187	0.590	223	0.645	259	0.605	295	0.579
8	0.927	44	1.000	80	0.939	116	0.765	152	0.591	188	0.592	224	0.645	260	0.602	296	0.581
9	0.930	45	1.000	81	0.935	117	0.759	153	0.589	189	0.594	225	0.645	261	0.600	297	0.584
10	0.934	46	1.000	82	0.932	118	0.754	154	0.586	190	0.596	226	0.645	262	0.598	298	0.587
11	0.938	47	0.999	83	0.928	119	0.748	155	0.583	191	0.598	227	0.645	263	0.596	299	0.590
12	0.941	48	0.999	84	0.924	120	0.742	156	0.581	192	0.600	228	0.645	264	0.594	300	0.593
13	0.944	49	0.999	85	0.920	121	0.737	157	0.579	193	0.603	229	0.645	265	0.592	301	0.596
14	0.948	50	0.998	86	0.916	122	0.731	158	0.577	194	0.605	230	0.644	266	0.590	302	0.600
15	0.951	51	0.998	87	0.912	123	0.726	159	0.575	195	0.607	231	0.644	267	0.589	303	0.603
16	0.954	52	0.998	88	0.908	124	0.720	160	0.574	196	0.609	232	0.643	268	0.587	304	0.607
17	0.956	53	0.997	89	0.904	125	0.714	161	0.573	197	0.611	233	0.643	269	0.586	305	0.610
18	0.959	54	0.996	90	0.899	126	0.709	162	0.571	198	0.614	234	0.642	270	0.584	306	0.614
19	0.962	55	0.996	91	0.895	127	0.703	163	0.570	199	0.616	235	0.641	271	0.583	307	0.618
20	0.964	56	0.995	92	0.890	128	0.698	164	0.569	200	0.618	236	0.640	272	0.582	308	0.622
21	0.966	57	0.994	93	0.886	129	0.692	165	0.569	201	0.619	237	0.640	273	0.581	309	0.625
22	0.968	58	0.993	94	0.881	130	0.687	166	0.568	202	0.621	238	0.639	274	0.580	310	0.629
23	0.971	59	0.992	95	0.876	131	0.682	167	0.568	203	0.623	239	0.638	275	0.579	311	0.633
24	0.973	60	0.990	96	0.872	132	0.676	168	0.568	204	0.625	240	0.637	276	0.578	312	0.637
25	0.975	61	0.989	97	0.867	133	0.671	169	0.568	205	0.627	241	0.636	277	0.577	313	0.641
26	0.977	62	0.987	98	0.862	134	0.666	170	0.568	206	0.628	242	0.634	278	0.576	314	0.646
27	0.979	63	0.985	99	0.857	135	0.661	171	0.568	207	0.630	243	0.633	279	0.575	315	0.650
28	0.980	64	0.983	100	0.852	136	0.656	172	0.569	208	0.632	244	0.632	280	0.574	316	0.654
29	0.982	65	0.981	101	0.847	137	0.651	173	0.569	209	0.633	245	0.631	281	0.573	317	0.659
30	0.984	66	0.979	102	0.842	138	0.646	174	0.570	210	0.634	246	0.629	282	0.572	318	0.663
31	0.986	67	0.977	103	0.836	139	0.641	175	0.571	211	0.636	247	0.628	283	0.572	319	0.668
32	0.988	68	0.975	104	0.831	140	0.637	176	0.572	212	0.637	248	0.626	284	0.571	320	0.673
33	0.990	69	0.972	105	0.826	141	0.632	177	0.573	213	0.638	249	0.625	285	0.570	321	0.678
34	0.991	70	0.970	106	0.820	142	0.628	178	0.574	214	0.639	250	0.623	286	0.570	322	0.683
35	0.993	71	0.967	107	0.815	143	0.624	179	0.575	215	0.640	251	0.621	287	0.570	323	0.688

Figure 1
Antenna Azimuthal Pattern
WRUE-LD Salisbury, MD
Facility ID 187720
Ch. 19 15 kW Directional

prepared for
WBOC, Inc.

January, 2022



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

Figure 2
Coverage Contour Comparison
WRUE-LD Salisbury, MD
Facility ID 187720
Ch. 19 15 kW Directional

prepared for
WBOC, Inc.

January, 2022

Original CP
BNPDTL-20100709AIT
51 dBμ Contour

Proposed WRUE-LD
Indistinguishable from
Existing CP
File# 0000141151
51 dBμ Contour

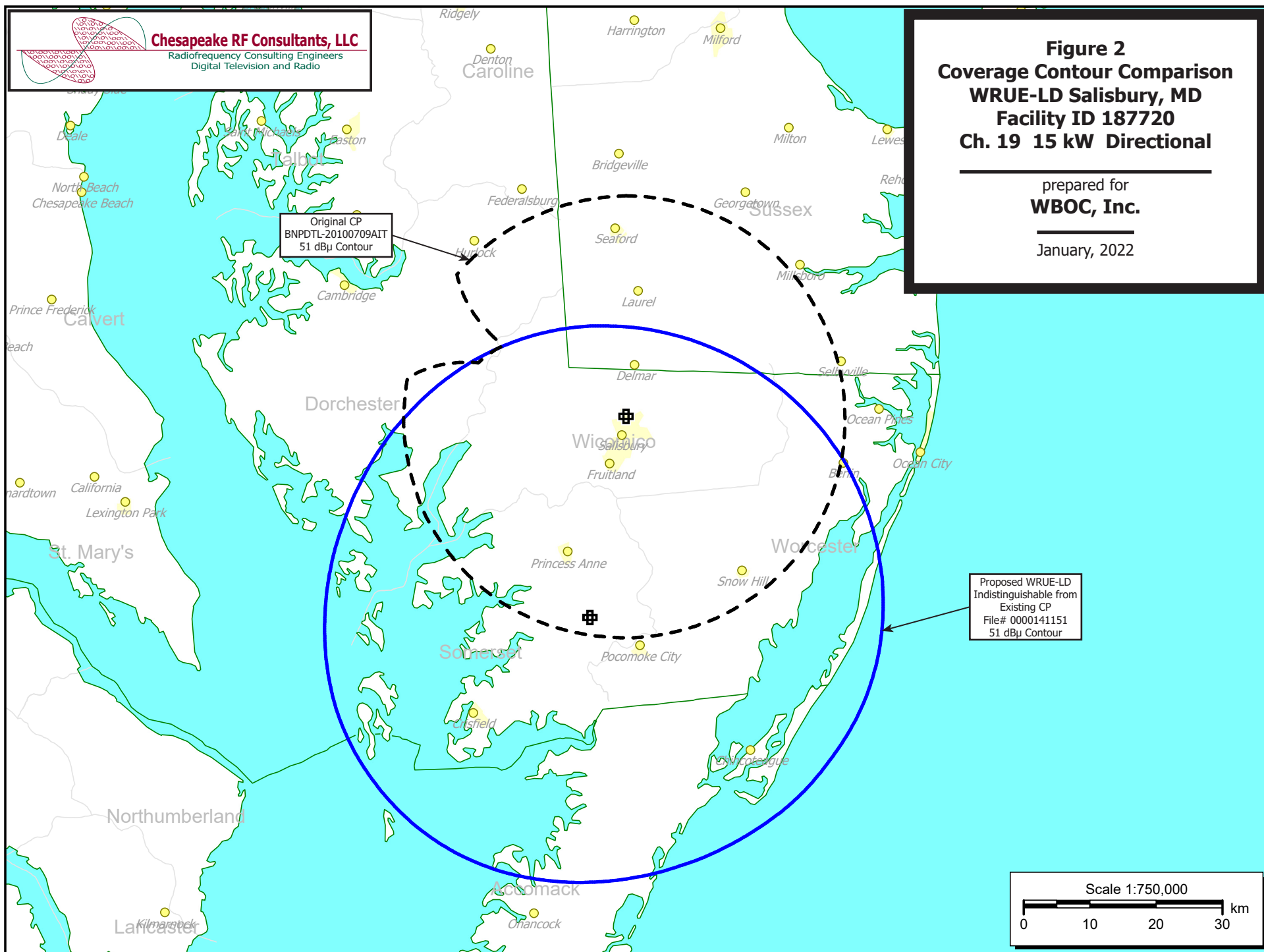
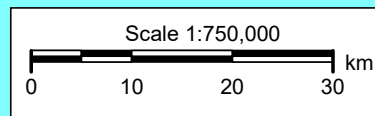


Table 1 WRUE-LD TVStudy Analysis of Proposal (page 1 of 3)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: WRUE-LD final, Model: Longley-Rice
Start: 2022.01.02 11:27:58

Study created: 2022.01.02 11:27:58

Study build station data: LMS TV 2022-01-02

Proposal: WRUE-LD D19 LD APP SALISBURY, MD
File number: WRUE-LD final
Facility ID: 187720
Station data: User record
Record ID: 4100
Country: U.S.

Build options:
Protect pre-transition records not on baseline channel

Search options:
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	W18BB-D	D18	LD	LIC	ELIZABETH CITY, NC	BLDTL20110720ACI	209.4 km
No	DW18BS	N18z	TX	APP	HAMPTON, VA	BLTTL19961118JG	132.9
Yes	W18EG-D	D18	LD	LIC	ONANCOCK, VA	BLDTT20120614AAG	30.9
No	DWVBN-LP	D18+	LD	APP	VIRGINIA BEACH, VA	BLANK0000054622	155.9
No	W19DY-D	D19	LD	CP	CRESAPTOWN, MD	BMPDTL20121012AAA	321.4
No	WUNC-TV	D19	LD	LIC	CHAPEL HILL, NC	BLANK0000115730	372.4
No	WYDO	D19	DT	LIC	GREENVILLE, NC	BLANK0000129688	366.5
No	WGSR-LD	D19	LD	LIC	REIDSVILLE, NC	BLANK0000072219	404.8
No	WSPZ-LD	D19	LD	LIC	DUBOIS, PA	BLANK0000146397	369.9
No	WZBJ-CD	D19	DC	LIC	LYNCHBURG, VA	BLANK0000086464	319.2
Yes	WAVY-TV	D19	DT	LIC	PORTSMOUTH, VA	BLANK0000125371	162.3
No	WQAW-LD	D20	LD	LIC	LAKE SHORE, MD	BLANK0000122659	129.7
Yes	W20EO-D	D20	LD	CP	SALISBURY, MD	BLANK0000072872	32.8
No	WGNT	D20	DT	LIC	PORTSMOUTH, VA	BLANK0000118341	163.2
No	WAZT-CD	D20	DC	LIC	WOODSTOCK, VA	BLANK0000150120	197.8
No	WAZT-CD	D20	DC	CP	WOODSTOCK, VA	BLANK0000151019	154.4

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D19
Mask: Full Service
Latitude: 38 6 47.00 N (NAD83)
Longitude: 75 39 15.00 W
Height AMSL: 130.4 m
HAAT: 0.0 m
Peak ERP: 15.0 kW
Antenna: Die DLP12B 0.0 deg
Elev Pattn: Generic
Elec Tilt: 1.50

49.3 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	12.0 kW	124.2 m	45.8 km
45.0	15.0	122.3	46.8
90.0	12.1	126.1	46.0
135.0	6.57	126.0	42.9
180.0	4.99	128.6	41.7
225.0	6.22	128.0	42.8
270.0	5.12	128.5	41.8
315.0	6.36	127.4	42.9

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 126 m

Distance to Canadian border: 592.9 km

Table 1 WRUE-LD TVStudy Analysis of Proposal
(page 2 of 3)



Distance to Mexican border: 2406.3 km

Conditions at FCC monitoring station: Laurel MD
Bearing: 319.5 degrees Distance: 154.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 284.4 degrees Distance: 2547.8 km

No land mobile station failures found

Study cell size: 1.00 km
Profile point spacing: 1.00 km

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

Interference to BLDTT20120614AAG LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	W18EG-D	D18	LD	LIC	ONANCOCK, VA	BLDTT20120614AAG	
Undesireds:	WRUE-LD	D19	LD	APP	SALISBURY, MD	WRUE-LD final	30.9 km
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	4330.5 49,878		4330.5 49,878		4330.5 49,878	4297.3 49,614	0.77 0.53
Undesired			Total IX		Unique IX, before	Unique IX, after	
WRUE-LD D19 LD APP		33.2	264		33.2	264	

Interference to BLANK0000125371 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WAVY-TV	D19	DT	LIC	PORTSMOUTH, VA	BLANK0000125371	
Undesireds:	WRUE-LD	D19	LD	APP	SALISBURY, MD	WRUE-LD final	162.3 km
	WYDO	D19	DT	LIC	GREENVILLE, NC	BLANK0000129688	204.7
	WZBJ-CD	D19	DC	LIC	LYNCHBURG, VA	BLANK0000086464	242.2
	WGNT	D20	DT	LIC	PORTSMOUTH, VA	BLANK0000118341	1.5
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	30232.2 2,081,427		30227.2 2,081,427		28610.5 2,054,478	28512.1 2,054,121	0.34 0.02
Undesired			Total IX		Unique IX, before	Unique IX, after	
WRUE-LD D19 LD APP		99.5	358		98.5	357	
WYDO D19 DT LIC		1541.9	24,578		1529.8 23,415	1529.8 23,415	
WZBJ-CD D19 DC LIC		2.0	1,114		0.0 0	0.0 0	
WGNT D20 DT LIC		84.8	2,420		74.7 2,371	74.7 2,371	

Interference to BLANK0000072872 CP scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	W20EO-D	D20	LD	CP	SALISBURY, MD	BLANK0000072872	
Undesireds:	WRUE-LD	D19	LD	APP	SALISBURY, MD	WRUE-LD final	32.8 km
	WAZT-CD	D20	DC	LIC	WOODSTOCK, VA	BLANK0000150120	186.9
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	4145.4 181,362		4145.4 181,362		4145.4 181,362	4075.8 180,638	1.68 0.40
Undesired			Total IX		Unique IX, before	Unique IX, after	
WRUE-LD D19 LD APP		69.6	724		69.6	724	

Table 1 WRUE-LD TVStudy Analysis of Proposal
(page 3 of 3)



Interference to proposal scenario 1
2.91% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WRUE-LD	D19	LD	APP	SALISBURY, MD	WRUE-LD final	
Undesireds:	W18EG-D	D18	LD	LIC	ONANCOCK, VA	BLDTT20120614AAG	30.9 km
	WAVY-TV	D19	DT	LIC	PORTSMOUTH, VA	BLANK0000125371	162.3
	Service area	Terrain-limited		IX-free		Percent IX	
6049.2	173,839	6049.2	173,839	5886.2	168,787	2.69	2.91
Undesired				Total IX	Unique IX	Prct Unique IX	
W18EG-D D18 LD LIC	162.0			5,028	162.0	5,028	2.68 2.89
WAVY-TV D19 DT LIC	1.0			24	1.0	24	0.02 0.01

**Channel and
Facility
Information**

Section	Question	Response
Facility ID	187720	
State	Maryland	
City	SALISBURY	
LPD Channel	19	

Primary station proposed to be rebroadcast:

Facility Id	Call Sign	City	State
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**Antenna Location
Data**

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1318928
Coordinates (NAD83)	Latitude	38° 06' 47.0" N+
	Longitude	075° 39' 15.0" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	152.0 meters
	Support Structure Height	149.4 meters
	Ground Elevation (AMSL)	6.0 meters
Antenna Data	Height of Radiation Center Above Ground Level	124.4 meters
	Height of Radiation Center Above Mean Sea Level	130.4 meters
	Effective Radiated Power	15 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	DLP-12B
	Rotation	0.0 degrees
	Electrical Beam Tilt	1.5
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
Elevation Radiation 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	
	Out-of-Channel Emission Mask:	Full Service

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	Value	Degree	Value	Degree	Value	Degree	Value
0	0.893	90	0.899	180	0.577	270	0.584
10	0.934	100	0.852	190	0.596	280	0.574
20	0.964	110	0.799	200	0.618	290	0.571
30	0.984	120	0.742	210	0.634	300	0.593
40	0.998	130	0.687	220	0.644	310	0.629
50	0.998	140	0.637	230	0.644	320	0.673
60	0.990	150	0.597	240	0.637	330	0.728
70	0.970	160	0.574	250	0.623	340	0.789
80	0.939	170	0.568	260	0.602	350	0.844

Additional Azimuths

Degree	V _A
45	1.000