

ENGINEERING EXHIBIT

Digital Low Power Television Station Application for Minor Modification of Licensed Facility prepared for

Gray Television Licensee, LLC
WSHM-LD Springfield, MA
Facility ID 67980
Ch. 20 4.9 kW Directional

Gray Television Licensee, LLC (“Gray”) is the licensee of digital Low Power Television station WSHM-LD, Channel 20, Facility ID 67980, Springfield MA. WSHM-LD is licensed to operate at 6 kW effective radiated power (“ERP”) with a directional antenna (file# 0000080531). *Gray* herein seeks a minor modification Construction Permit to relocate WSHM-LD and to utilize a different directional antenna pattern at increased antenna height and reduced ERP.

The proposed facility will employ an existing broadband antenna that is side-mounted on the tower structure associated with FCC Antenna Structure Registration number 1018460, located 23.9 km (14.8 miles) from the licensed site. No change to the overall structure height is proposed. The antenna supporting structure is utilized by *Gray’s* full-service television station WGGB-TV (Facility ID 25682, Springfield MA). The broadband antenna was previously utilized by WGGB-TV as an interim antenna in 2019 during WGGB-TV’s transition to its reassignment channel (file# 0000078098).

The broadband antenna is a Dielectric model TFU-8WB-1-R C160 having horizontal polarization. The proposed ERP is 4.9 kW using a “full service” out of channel emission mask. A plot of the directional antenna’s azimuthal pattern on Channel 14 is supplied in Figure 1. Figure 2 depicts the coverage contour of the proposed facility as well as that of the licensed facility, demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69¹ shows that the proposal complies with the FCC's interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. FCC processing of this proposal is requested using a 0.5 km cell size and 0.1 km terrain profile increment. 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 25 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 $1.4 \mu\text{W}/\text{cm}^2$, which is 0.4 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.

¹FCC 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, 0.5 km cell size, and 0.1 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.

Engineering Exhibit
Gray Television Licensee, LLC (WSHM-LD)
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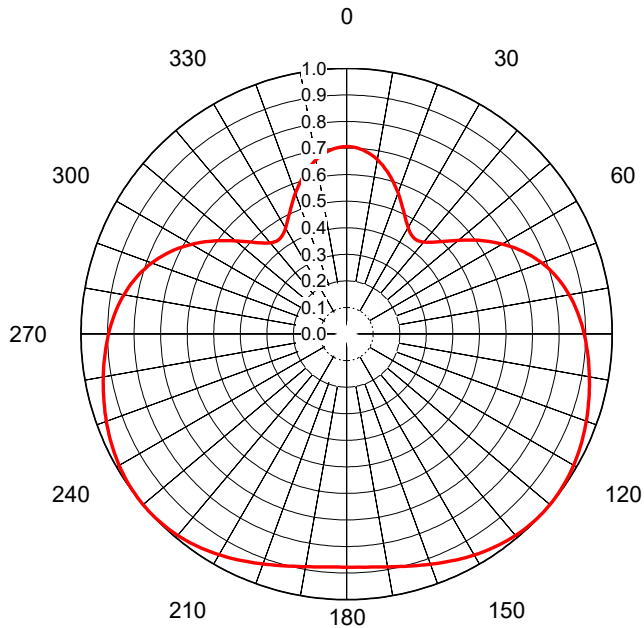


List of Attachments

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

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	April 28, 2022	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



AZIMUTH PATTERN Horizontal Polarization

Proposal No. **20220428jmd**
Date **28-Apr-22**
Call Letters **WSHM-LD**
Channel **20**
Frequency **509 MHz**
Antenna Type **TFU-8WB-R C160**
Gain **1.5 (1.76dB)**
Calculated

Pattern Number **WB-C160-20 Hpol**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.706	36	0.441	72	0.799	108	0.954	144	0.980	180	0.878	216	0.980	252	0.956	288	0.798	324	0.438
1	0.706	37	0.442	73	0.806	109	0.957	145	0.977	181	0.878	217	0.982	253	0.953	289	0.790	325	0.438
2	0.704	38	0.444	74	0.814	110	0.960	146	0.974	182	0.878	218	0.985	254	0.950	290	0.781	326	0.440
3	0.702	39	0.447	75	0.821	111	0.963	147	0.971	183	0.879	219	0.987	255	0.947	291	0.772	327	0.443
4	0.699	40	0.452	76	0.828	112	0.966	148	0.968	184	0.879	220	0.990	256	0.943	292	0.763	328	0.448
5	0.696	41	0.458	77	0.834	113	0.969	149	0.964	185	0.881	221	0.992	257	0.940	293	0.753	329	0.454
6	0.691	42	0.465	78	0.840	114	0.972	150	0.961	186	0.882	222	0.993	258	0.937	294	0.743	330	0.460
7	0.686	43	0.473	79	0.846	115	0.975	151	0.957	187	0.883	223	0.995	259	0.934	295	0.732	331	0.468
8	0.680	44	0.482	80	0.851	116	0.978	152	0.953	188	0.885	224	0.996	260	0.930	296	0.722	332	0.477
9	0.674	45	0.491	81	0.856	117	0.980	153	0.950	189	0.887	225	0.998	261	0.927	297	0.710	333	0.486
10	0.666	46	0.502	82	0.861	118	0.983	154	0.946	190	0.890	226	0.999	262	0.924	298	0.699	334	0.496
11	0.658	47	0.513	83	0.866	119	0.985	155	0.942	191	0.892	227	0.999	263	0.920	299	0.687	335	0.506
12	0.650	48	0.525	84	0.871	120	0.987	156	0.938	192	0.895	228	1.000	264	0.917	300	0.675	336	0.517
13	0.641	49	0.537	85	0.875	121	0.989	157	0.934	193	0.897	229	1.000	265	0.914	301	0.663	337	0.529
14	0.631	50	0.549	86	0.879	122	0.991	158	0.930	194	0.900	230	1.000	266	0.910	302	0.650	338	0.540
15	0.621	51	0.562	87	0.883	123	0.993	159	0.926	195	0.904	231	1.000	267	0.907	303	0.637	339	0.552
16	0.610	52	0.575	88	0.887	124	0.994	160	0.922	196	0.907	232	0.999	268	0.903	304	0.624	340	0.564
17	0.600	53	0.588	89	0.891	125	0.996	161	0.919	197	0.910	233	0.999	269	0.900	305	0.611	341	0.575
18	0.588	54	0.601	90	0.895	126	0.997	162	0.915	198	0.914	234	0.998	270	0.896	306	0.598	342	0.587
19	0.577	55	0.614	91	0.898	127	0.998	163	0.911	199	0.917	235	0.997	271	0.892	307	0.585	343	0.598
20	0.566	56	0.627	92	0.902	128	0.999	164	0.908	200	0.921	236	0.996	272	0.888	308	0.572	344	0.609
21	0.554	57	0.640	93	0.905	129	0.999	165	0.905	201	0.925	237	0.994	273	0.884	309	0.559	345	0.620
22	0.542	58	0.652	94	0.908	130	0.999	166	0.901	202	0.929	238	0.992	274	0.880	310	0.546	346	0.630
23	0.531	59	0.665	95	0.912	131	0.999	167	0.898	203	0.933	239	0.991	275	0.876	311	0.533	347	0.640
24	0.520	60	0.677	96	0.915	132	0.999	168	0.896	204	0.937	240	0.989	276	0.871	312	0.521	348	0.649
25	0.509	61	0.689	97	0.918	133	0.999	169	0.893	205	0.941	241	0.987	277	0.867	313	0.509	349	0.657
26	0.499	62	0.701	98	0.922	134	0.998	170	0.890	206	0.944	242	0.984	278	0.862	314	0.498	350	0.665
27	0.489	63	0.712	99	0.925	135	0.998	171	0.888	207	0.948	243	0.982	279	0.857	315	0.488	351	0.673
28	0.479	64	0.723	100	0.928	136	0.996	172	0.886	208	0.952	244	0.979	280	0.851	316	0.478	352	0.680
29	0.471	65	0.734	101	0.931	137	0.995	173	0.884	209	0.956	245	0.977	281	0.846	317	0.469	353	0.686
30	0.463	66	0.745	102	0.935	138	0.994	174	0.882	210	0.960	246	0.974	282	0.840	318	0.461	354	0.691
31	0.457	67	0.754	103	0.938	139	0.992	175	0.881	211	0.963	247	0.971	283	0.834	319	0.454	355	0.695
32	0.451	68	0.764	104	0.941	140	0.990	176	0.880	212	0.967	248	0.968	284	0.827	320	0.448	356	0.699
33	0.447	69	0.773	105	0.944	141	0.988	177	0.879	213	0.970	249	0.965	285	0.820	321	0.444	357	0.702
34	0.444	70	0.782	106	0.948	142	0.985	178	0.878	214	0.973	250	0.962	286	0.813	322	0.440	358	0.704
35	0.442	71	0.791	107	0.951	143	0.983	179	0.878	215	0.977	251	0.959	287	0.806	323	0.438	359	0.705

Figure 1
Antenna Azimuthal Pattern
WSHM-LD Springfield, MA
Facility ID 67980
Ch. 20 4.9 kW Directional

prepared for
Gray Television Licensee, LLC

April, 2022



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

Figure 2
Coverage Contour Comparison
WSHM-LD Springfield, MA
Facility ID 67980
Ch. 20 4.9 kW Directional

prepared for
Gray Television Licensee, LLC

April, 2022

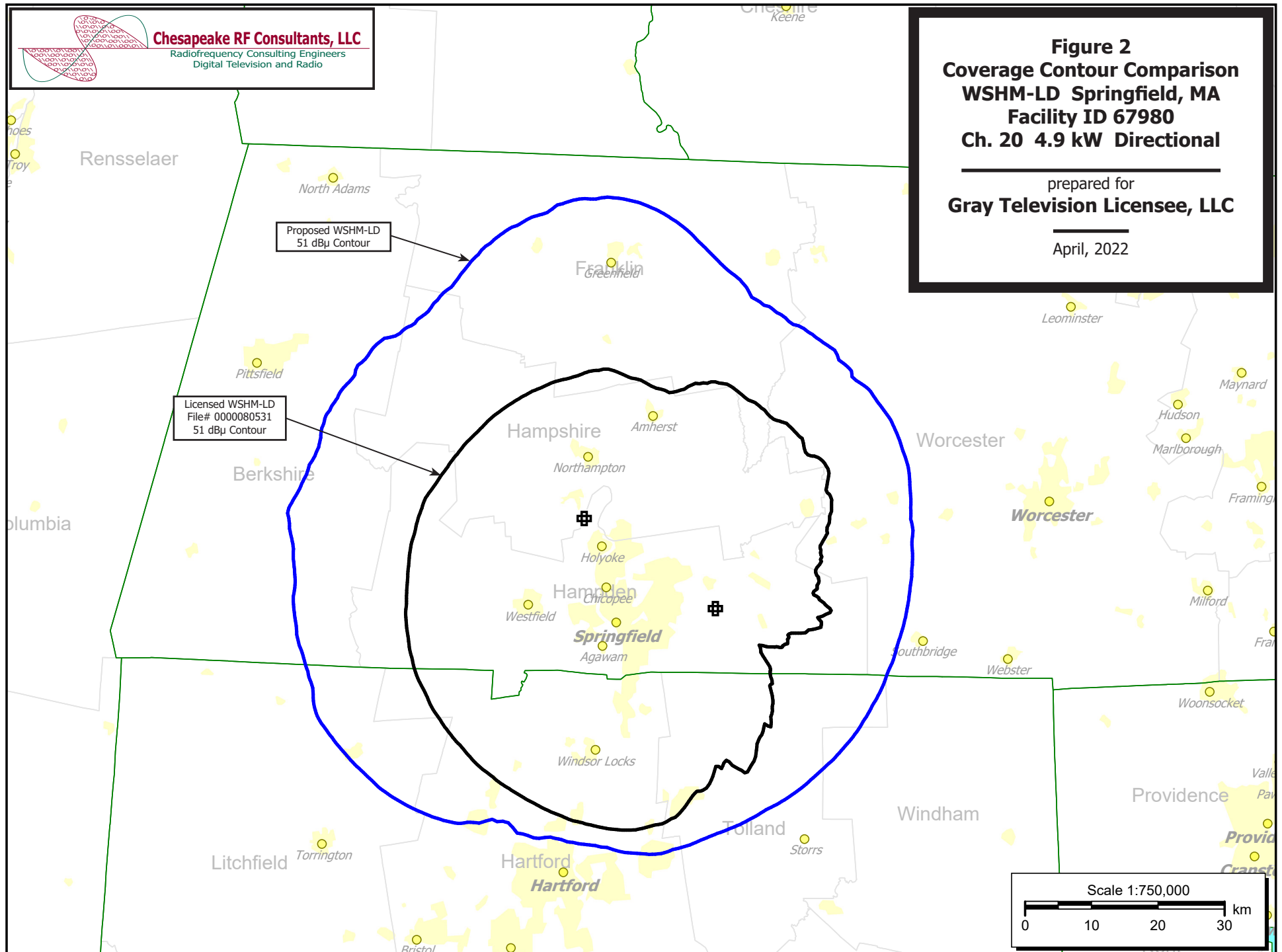


Table 1 WSHM-LD TVStudy Analysis of Proposal (page 1 of 6)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: WSHM-LD TFU-8WB 4.9kW_0.5-0.1, Model: Longley-Rice
Start: 2022.04.28 14:52:26

Study created: 2022.04.28 14:52:26

Study build station data: LMS TV 2022-04-28

Proposal: WSHM-LD D20 LD APP SPRINGFIELD, MA
File number: WSHM-LD TFU-8WB 4.9kW
Facility ID: 67980
Station data: User record
Record ID: 4234
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
Yes	WUTF-TV	D19	DT	LIC	WORCESTER, MA	BLANK0000120256	116.4 km
Yes	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167	119.3
Yes	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666	116.4
Yes	WBZ-TV	D20	DT	CP	BOSTON, MA	BLANK0000127484	116.4
No	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	301.5
No	W20ER-D	D20	LD	APP	BANGOR, ME	BLANK0000163150	425.5
No	W20ER-D	D20	LD	CP	BANGOR, ME	BNPDTL20100728AFK	425.5
No	WBGH-CD	D20z	DC	LIC	BINGHAMTON, NY	BLANK0000004524	272.2
No	W20CQ-D	D20	LD	LIC	HEMPSTEAD, NY	BLDTL20130912ABS	174.4
No	W20EF-D	D20	LD	LIC	NEW YORK, NY	BLANK0000053224	198.6
No	WNGJ-LD	D20	LD	LIC	OGDENSBURG, NY	BLANK0000152606	350.6
No	WNGJ-LD	N20-	TX	LIC	OGDENSBURG, NY	BLTTL20110318AEZ	350.6
No	WCNY-TV	D20	DT	LIC	SYRACUSE, NY	BLANK0000105277	294.5
No	W20CP-D	D20	LD	LIC	MANSFIELD, PA	BLANK0000091020	357.2
No	W20EI-D	D20	LD	LIC	TOWANDA, PA	BLANK0000120366	322.9
No	W20AD-D	D20	LD	LIC	WILLIAMSPORT, PA	BLDTT20090810AAD	379.9
Yes	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	254.2
Yes	W20EH-D	D20	LD	LIC	POWNA, ETC., VT	BLANK0000078513	84.1
No	WEDW	D21	DD	CP	STAMFORD, CT	BLANK0000177225	152.4
Yes	WSBK-TV	D21	DT	LIC	BOSTON, MA	BLANK0000117438	116.4
Yes	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	1.1
Yes	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	119.6
No	WZPJ-LD	N21+	TX	LIC	ALBANY, NY	BLTTL20061201AAG	112.3
No	W21CP-D	D21	LD	LIC	GLOVERSVILLE, NY	BLDTT20090601AQC	166.2
No	W24EZ-D	N28z	TX	LIC	ALLINGTON, CT	BLTTL20010608AAO	108.9

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D20
Mask: Full Service
Latitude: 42 14 30.00 N (NAD83)
Longitude: 72 38 55.00 W
Height AMSL: 402.4 m
HAAT: 0.0 m
Peak ERP: 4.90 kW
Antenna: DIE TFU-WB-C160 Ch-20 180.0 deg
Elev Pattn: Generic
Elec Tilt: 1.05

49.4 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	2.44 kW	346.0 m	50.1 km
45.0	1.23	315.0	44.7
90.0	3.93	314.3	51.0
135.0	4.85	347.4	53.9

Table 1 WSHM-LD TV Study Analysis of Proposal
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180.0	3.78	316.2	50.9
225.0	4.85	317.9	52.3
270.0	3.93	225.3	46.3
315.0	1.21	244.3	41.1

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 303 m

Distance to Canadian border: 307.6 km

Distance to Mexican border: 2855.9 km

Conditions at FCC monitoring station: Belfast ME
Bearing: 48.4 degrees Distance: 378.2 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 276.2 degrees Distance: 2717.8 km

No land mobile station failures found

Study cell size: 0.50 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 BLANK0000120256 LIC scenario 1

Desired:	Call WUTF-TV	Chan D19	Svc DT	Status LIC	City, State WORCESTER, MA	File Number BLANK0000120256	Distance		
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	116.4 km		
	WEKW-TV	D18	DT	LIC	KEENE, NH	BLANK0000111230	122.5		
	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167	229.5		
	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666	0.0		
Service area		Terrain-limited			IX-free, before	IX-free, after	Percent New IX		
36218.5	7,921,525	34619.8	7,725,852	34374.4	7,698,909	34372.5	7,698,867	0.01	0.00
Undesired				Total IX	Unique IX, before	Unique IX, after			
WSHM-LD	D20	LD	APP	13.7	2,524	2.0	42		
WEKW-TV	D18	DT	LIC	21.7	261	12.1	59	12.1	59
WYPX-TV	D19	DT	LIC	227.1	26,867	217.5	26,665	205.8	24,183
WBZ-TV	D20	DT	LIC	6.1	17	6.1	17	6.1	17

Interference to BLANK0000120256 LIC scenario 2

Desired:	Call WUTF-TV	Chan D19	Svc DT	Status LIC	City, State WORCESTER, MA	File Number BLANK0000120256	Distance
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	116.4 km
	WEKW-TV	D18	DT	LIC	KEENE, NH	BLANK0000111230	122.5
	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167	229.5
	WBZ-TV	D20	DT	CP	BOSTON, MA	BLANK0000127484	0.0
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
36218.5	7,921,525	34619.8	7,725,852	34374.2	7,698,909	34372.2 7,698,867	0.01 0.00
Undesired				Total IX	Unique IX, before		Unique IX, after
WSHM-LD	D20	LD	APP	13.7	2,524	2.0	42
WEKW-TV	D18	DT	LIC	21.7	261	12.1	59
WYPX-TV	D19	DT	LIC	227.1	26,867	217.5	26,665
WBZ-TV	D20	DT	CP	6.4	17	6.4	17
						205.8	24,183

Interference to BLANK0000080167 LIC scenario 1

Table 1 WSHM-LD TV Study Analysis of Proposal
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	Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired:	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167			
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	119.3 km		
	WEKW-TV	D18	DT	LIC	KEENE, NH	BLANK0000111230	140.2		
	WUTF-TV	D19	DT	LIC	WORCESTER, MA	BLANK0000120256	229.5		
	WSTM-TV	D19	DT	LIC	SYRACUSE, NY	BLANK0000136480	176.1		
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
25800.6	1,528,693	23234.4	1,431,172	22622.7	1,415,491	22622.7	1,415,491	0.00	0.00
Undesired				Total IX		Unique IX, before		Unique IX, after	
WSHM-LD	D20	LD	APP	12.9	394	0.0	0		
WEKW-TV	D18	DT	LIC	28.9	324	3.9	15		
WUTF-TV	D19	DT	LIC	445.8	12,640	353.8	11,257	349.6	11,139
WSTM-TV	D19	DT	LIC	243.8	4,352	157.0	2,967	155.2	2,967

Interference to BLANK0000117666 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired:	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666			
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	116.4 km		
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	227.8		
	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	277.3		
	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	116.0		
Service area		Terrain-limited			IX-free, before	IX-free, after	Percent New IX		
36700.1	7,965,215	35017.1	7,751,087	34044.2	7,679,524	33735.1	7,647,945	0.91	0.41
Undesired				Total IX	Unique IX, before	Unique IX, after			
WSHM-LD	D20	LD	APP	372.3	40,771	309.1	31,579		
WCBB	D20	DT	APP	822.2	60,629	725.7	46,728		
WCAX-TV	D20	DT	LIC	228.6	18,134	112.3	8,343		
WFXQ-CD	D21	DC	LIC	13.9	2,025	0.7	0		

Interference to BLANK0000127484 CP scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired:	WBZ-TV	D20	DT	CP	BOSTON, MA	BLANK0000127484			
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	116.4 km		
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	227.8		
	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	277.3		
	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	116.0		
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX		
37287.5	8,011,641	35530.3	7,781,924	34513.5	7,710,330	34194.9	7,676,294	0.92	0.44
Undesired				Total IX	Unique IX, before		Unique IX, after		
WSHM-LD	D20	LD	APP	378.9	41,923	318.6	34,036		
WCBB	D20	DT	APP	870.8	61,124	781.8	51,392	770.3	46,693
WCAX-TV	D20	DT	LIC	227.5	19,916	137.6	9,758	108.6	8,251
WFXQ-CD	D21	DC	LIC	13.2	1,283	5.7	286	0.7	0

Interference to BLANK0000090403 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	254.2 km
	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666	277.3
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	226.8
	WCNY-TV	D20	DT	LIC	SYRACUSE, NY	BLANK0000105277	318.1
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
38451.4		784,851		33587.5		675,211	0.00
11857.4		2,366,631		33387.5		673,066	0.00
(in Canada)				11266.4		2,247,671	0.00
				11212.1		2,246,474	0.00

Table 1 WSHM-LD TV Study Analysis of Proposal
(page 4 of 6)

Undesired		Total IX	Unique IX, before	Unique IX, after	
WSHM-LD D20 LD APP	0.2	0		0.0	0
WBZ-TV D20 DT LIC	91.0	1,088	75.7	1,020	75.7
WCBB D20 DT APP	107.0	836	91.9	768	91.9
WCBB D20 DT APP	54.3	1,197	54.3	1,197	54.3
WCNY-TV D20 DT LIC	17.2	289	17.0	289	17.0

(in Canada)

Interference to BLANK0000090403 LIC scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	254.2 km
	WBZ-TV	D20	DT	CP	BOSTON, MA	BLANK0000127484	277.3
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	226.8
	WCNY-TV	D20	DT	LIC	SYRACUSE, NY	BLANK0000105277	318.1
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
38451.4	784,851	33587.5	675,211	33383.1	673,010	33383.1	673,010
11857.4	2,366,631	11266.4	2,247,671	11212.1	2,246,474	11212.1	2,246,474

Undesired		Total IX	Unique IX, before	Unique IX, after	
WSHM-LD D20 LD APP	0.2	0		0.0	0
WBZ-TV D20 DT CP	96.2	1,144	80.1	1,076	80.1
WCBB D20 DT APP	107.0	836	91.2	768	91.2
WCBB D20 DT APP	54.3	1,197	54.3	1,197	54.3
WCNY-TV D20 DT LIC	17.2	289	17.0	289	17.0

(in Canada)

Interference to BLANK0000078513 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	W20EH-D	D20	LD	LIC	POWNA, ETC., VT	BLANK0000078513	
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	84.1 km
	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167	67.6
	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666	174.5
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	296.7
	WNGJ-LD	D20	LD	LIC	OGDENSBURG, NY	BLANK0000152606	267.0
	WCNY-TV	D20	DT	LIC	SYRACUSE, NY	BLANK0000105277	235.1
	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	187.7
	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	68.8
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
6706.7	518,279	4937.7	345,924	4622.7	301,132	4619.5	301,132

Undesired		Total IX	Unique IX, before	Unique IX, after	
WSHM-LD D20 LD APP	6.2	0		3.2	0
WYPX-TV D19 DT LIC	168.8	37,422	1.5	0	1.5
WBZ-TV D20 DT LIC	39.3	3,203	3.9	22	2.2
WCBB D20 DT APP	0.5	0	0.0	0	0.0
WCNY-TV D20 DT LIC	0.5	134	0.5	134	0.5
WCAX-TV D20 DT LIC	163.3	12,519	63.8	3,330	63.5
WNYT D21 DT CP	236.9	41,208	41.5	2,683	41.5

Interference to BLANK0000078513 LIC scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	W20EH-D	D20	LD	LIC	POWNA, ETC., VT	BLANK0000078513	
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	84.1 km
	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167	67.6
	WBZ-TV	D20	DT	CP	BOSTON, MA	BLANK0000127484	174.5
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	296.7
	WNGJ-LD	D20	LD	LIC	OGDENSBURG, NY	BLANK0000152606	267.0
	WCNY-TV	D20	DT	LIC	SYRACUSE, NY	BLANK0000105277	235.1
	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	187.7
	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	68.8
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX

Table 1 WSHM-LD TVStudy Analysis of Proposal
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6706.7	518,279	4937.7	345,924	4622.5	301,132	4619.3	301,132	0.07	0.00
Undesired			Total IX	Unique IX, before		Unique IX, after			
WSHM-LD D20 LD APP	6.2		0			3.2	0		
WYPX-TV D19 DT LIC	168.8		37,422	1.5	0	1.5	0		
WBZ-TV D20 DT CP	42.9		3,305	4.2	22	2.5	22		
WCBB D20 DT APP	0.5		0	0.0	0	0.0	0		
WCNY-TV D20 DT LIC	0.5		134	0.5	134	0.5	134		
WCAX-TV D20 DT LIC	163.3		12,519	63.0	3,323	62.8	3,323		
WNYT D21 DT CP	236.9		41,208	41.5	2,683	41.5	2,683		

Interference to BLANK0000117438 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WSBK-TV	D21	DT	LIC	BOSTON, MA	BLANK0000117438	
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	116.4 km
	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666	0.0
	WEDW	D21	DD	CP	STAMFORD, CT	BLANK0000177225	238.4
	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	116.0
	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	230.1
	WBPX-TV	D22	DT	LIC	BOSTON, MA	BLANK0000075858	22.6
	WVMA-CD	D22	DC	LIC	WINCHENDON, MA	BLANK0000157576	89.9
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
26988.1	7,293,538	26198.8	7,236,447	25626.1	7,170,940	25626.1 7,170,940	0.00 0.00

Undesired			Total IX	Unique IX, before		Unique IX, after	
WSHM-LD D20 LD APP	3.5		168			0.0	0
WEDW D21 DD CP	223.8		16,481	93.8	6,045	93.5	6,045
WFXQ-CD D21 DC LIC	281.1		16,411	171.6	11,095	171.6	11,095
WNYT D21 DT CP	192.6		16,438	57.0	5,572	57.0	5,572
WBPX-TV D22 DT LIC	66.4		29,872	65.4	29,872	65.4	29,872
WVMA-CD D22 DC LIC	32.3		1,196	17.3	643	17.3	643

Interference to BLANK0000125116 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	1.1 km
	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666	116.0
	WEDW	D21	DD	CP	STAMFORD, CT	BLANK0000177225	153.5
	WSBK-TV	D21	DT	LIC	BOSTON, MA	BLANK0000117438	116.0
	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	119.5
	WNEP-TV	D21	DT	LIC	SCRANTON, PA	BLANK0000117109	292.9
	WCWN	D22	DT	LIC	SCHENECTADY, NY	BLANK0000185804	119.5
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
6188.5	792,735	5591.3	763,966	5241.8	751,701	5237.1 750,733	0.09 0.13

Undesired			Total IX	Unique IX, before		Unique IX, after	
WSHM-LD D20 LD APP	7.5		1,094			4.7	968
WEDW D21 DD CP	149.6		5,059	84.9	3,105	84.6	3,105
WSBK-TV D21 DT LIC	167.8		4,140	89.6	1,929	89.6	1,929
WNYT D21 DT CP	148.5		6,685	76.0	4,330	75.0	4,272
WNEP-TV D21 DT LIC	1.0		9	0.0	0	0.0	0
WCWN D22 DT LIC	0.2		0	0.0	0	0.0	0

Interference to BLANK0000156619 CP scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	
Undesireds:	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	119.6 km
	WEDW	D21	DD	CP	STAMFORD, CT	BLANK0000177225	178.7
	WSBK-TV	D21	DT	LIC	BOSTON, MA	BLANK0000117438	230.1
	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	119.5
	WROC-TV	D21	DT	LIC	ROCHESTER, NY	BLANK0000079899	296.5
	WNEP-TV	D21	DT	LIC	SCRANTON, PA	BLANK0000117109	222.3

Table 1 WSHM-LD TV Study Analysis of Proposal
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WUTH-CD		D22	DC	LIC	HARTFORD, CT		BLANK0000080135		162.4	
WCWN		D22	DT	LIC	SCHENECTADY, NY		BLANK0000185804		0.0	
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX		
37726.4	1,966,009	33187.4	1,700,055	32129.5	1,668,875	32129.5	1,668,875	0.00	0.00	
Undesired				Total IX	Unique IX, before		Unique IX, after			
WSHM-LD	D20	LD	APP	10.9	395		0.0	0		
WEDW	D21	DD	CP	613.2	21,201	343.8	14,411	343.5	14,411	
WSBK-TV	D21	DT	LIC	201.0	5,649	24.4	207	24.4	207	
WFXQ-CD	D21	DC	LIC	322.6	6,643	99.1	1,039	98.6	1,039	
WROC-TV	D21	DT	LIC	107.7	1,499	40.7	676	40.7	676	
WNEP-TV	D21	DT	LIC	352.6	11,071	162.3	5,239	162.3	5,239	
WUTH-CD	D22	DC	LIC	14.2	1,775	0.0	0	0.0	0	
WCWN	D22	DT	LIC	1.5	2	1.5	2	1.5	2	

Interference to proposal scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	
Undesireds:	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167	119.3 km
	WBZ-TV	D20	DT	LIC	BOSTON, MA	BLANK0000117666	116.4
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	301.5
	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	254.2
	W20EH-D	D20	LD	LIC	POWNA, ETC., VT	BLANK0000078513	84.1
	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	1.1
	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	119.6

Service area		Terrain-limited		IX-free		Percent IX	
7525.4	1,122,902	6817.4	1,078,862	6449.3	1,061,985	5.40	1.56
Undesired			Total IX	Unique IX		Prcnt Unique IX	
WYPX-TV	D19	DT	LIC	0.2	0	0.00	0.00
WBZ-TV	D20	DT	LIC	353.2	14,173	4.97	1.19
WCBB	D20	DT	APP	4.9	47	0.01	0.00
WCAX-TV	D20	DT	LIC	17.9	1,741	0.11	0.04
W20EH-D	D20	LD	LIC	1.2	0	0.01	0.00
WFXQ-CD	D21	DC	LIC	6.4	2,298	0.08	0.21
WNYT	D21	DT	CP	0.5	0	0.00	0.00

Interference to proposal scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WSHM-LD	D20	LD	APP	SPRINGFIELD, MA	WSHM-LD TFU-8WB 4.9kW	
Undesireds:	WYPX-TV	D19	DT	LIC	AMSTERDAM, NY	BLANK0000080167	119.3 km
	WBZ-TV	D20	DT	CP	BOSTON, MA	BLANK0000127484	116.4
	WCBB	D20	DT	APP	AUGUSTA, ME	BLANK0000188079	301.5
	WCAX-TV	D20	DT	LIC	BURLINGTON, VT	BLANK0000090403	254.2
	W20EH-D	D20	LD	LIC	POWNA, ETC., VT	BLANK0000078513	84.1
	WFXQ-CD	D21	DC	LIC	SPRINGFIELD, MA	BLANK0000125116	1.1
	WNYT	D21	DT	CP	ALBANY, NY	BLANK0000156619	119.6

Service area		Terrain-limited		IX-free		Percent IX	
7525.4	1,122,902	6817.4	1,078,862	6440.6	1,061,611	5.53	1.60
Undesired			Total IX	Unique IX		Prcnt Unique IX	
WYPX-TV	D19	DT	LIC	0.2	0	0.00	0.00
WBZ-TV	D20	DT	CP	361.9	14,547	5.10	1.22
WCBB	D20	DT	APP	4.9	47	0.01	0.00
WCAX-TV	D20	DT	LIC	17.9	1,741	0.11	0.04
W20EH-D	D20	LD	LIC	1.2	0	0.01	0.00
WFXQ-CD	D21	DC	LIC	6.4	2,298	0.08	0.21
WNYT	D21	DT	CP	0.5	0	0.00	0.00

**Channel and
Facility
Information**

Section	Question	Response
Facility ID	67980	
State	Massachusetts	
City	SPRINGFIELD	
LPD Channel	20	

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	1018460
Coordinates (NAD83)	Latitude	42° 14' 30.0" N+
	Longitude	072° 38' 55.0" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	59.6 meters
	Support Structure Height	45.7 meters
	Ground Elevation (AMSL)	365.8 meters
Antenna Data	Height of Radiation Center Above Ground Level	36.6 meters
	Height of Radiation Center Above Mean Sea Level	402.4 meters
	Effective Radiated Power	4.9 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	TFU-8WB-1-R C160
	Rotation	180 degrees
	Electrical Beam Tilt	1.05
	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	0.878	90	0.896	180	0.706	270	0.895
10	0.890	100	0.851	190	0.666	280	0.928
20	0.921	110	0.781	200	0.566	290	0.960
30	0.960	120	0.675	210	0.463	300	0.987
40	0.990	130	0.546	220	0.452	310	0.999
50	1.000	140	0.448	230	0.549	320	0.990
60	0.989	150	0.460	240	0.677	330	0.961
70	0.962	160	0.564	250	0.782	340	0.922
80	0.930	170	0.666	260	0.851	350	0.890

Additional Azimuths

Degree	V _A
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