

ENGINEERING EXHIBIT

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

Gray Television Licensee, LLC
KJBW-LD Paragould, AR
Facility ID 188810
Ch. 35 10 kW Directional

Gray Television Licensee, LLC (“Gray”) is the licensee of digital Low Power Television station KJBW-LD, Channel 35, Facility ID 188810, Paragould AR. KJBW-LD is licensed to operate at 7 kW effective radiated power (“ERP”) with a directional antenna (file# 0000170679, granted November 24, 2021). *Gray* proposes herein a minor modification Construction Permit to relocate KJBW-LD and to utilize a different directional antenna at increased ERP.

As proposed herein, KJBW-LD will employ an antenna to be side-mounted on the tower structure associated with FCC Antenna Structure Registration number 1047847, located 44.9 km (27.9 miles) from the licensed site. No change to the overall structure height is proposed.

The proposed antenna is a Dielectric model DLP-8F having horizontal polarization. The proposed ERP is 10 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 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

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, 1 km cell size, and 1.0 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.

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 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 25 percent antenna relative field in downward elevations (antenna elevation pattern data shows 25 percent relative field or less for angles 10-90 degrees below the horizontal), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $10.9 \mu\text{W}/\text{cm}^2$, which is 2.7 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. No increase in structure height is proposed.

Engineering Exhibit
Gray Television Licensee, LLC (KJBW-LD)
(page 3 of 3)

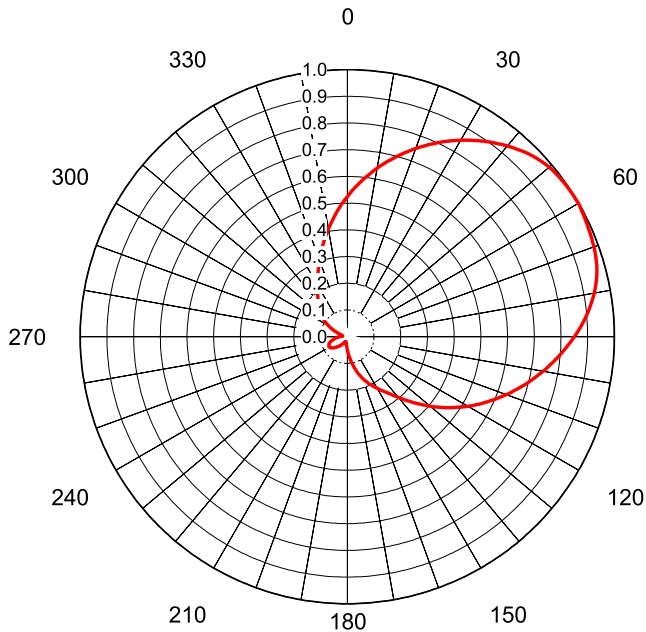


List of Attachments

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.	July 28, 2023	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



AZIMUTH PATTERN Horizontal Polarization

Proposal No. **20230726jmd**
Date **26-Jul-23**
Call Letters **KJBW-LD**
Channel **35**
Frequency **599 MHz**
Antenna Type **DLP-8F**
Gain **3.86 (5.86dB)**
Calculated

Pattern Number **TLP-F-35 Hpol**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.525	36	0.901	72	0.978	108	0.656	144	0.262	180	0.049	216	0.038	252	0.068	288	0.028
1	0.536	37	0.909	73	0.975	109	0.645	145	0.255	181	0.045	217	0.039	253	0.066	289	0.031
2	0.548	38	0.917	74	0.972	110	0.634	146	0.248	182	0.041	218	0.041	254	0.064	290	0.035
3	0.559	39	0.925	75	0.968	111	0.623	147	0.241	183	0.038	219	0.043	255	0.062	291	0.038
4	0.571	40	0.932	76	0.963	112	0.611	148	0.235	184	0.035	220	0.045	256	0.060	292	0.042
5	0.583	41	0.940	77	0.958	113	0.600	149	0.228	185	0.033	221	0.047	257	0.058	293	0.047
6	0.594	42	0.947	78	0.952	114	0.589	150	0.223	186	0.030	222	0.048	258	0.055	294	0.051
7	0.606	43	0.953	79	0.946	115	0.578	151	0.217	187	0.028	223	0.050	259	0.053	295	0.055
8	0.617	44	0.959	80	0.939	116	0.566	152	0.211	188	0.026	224	0.052	260	0.051	296	0.060
9	0.629	45	0.965	81	0.932	117	0.555	153	0.206	189	0.025	225	0.054	261	0.048	297	0.065
10	0.640	46	0.971	82	0.924	118	0.544	154	0.200	190	0.023	226	0.056	262	0.046	298	0.070
11	0.651	47	0.976	83	0.916	119	0.532	155	0.195	191	0.022	227	0.058	263	0.043	299	0.075
12	0.663	48	0.980	84	0.907	120	0.521	156	0.189	192	0.021	228	0.060	264	0.041	300	0.080
13	0.674	49	0.984	85	0.899	121	0.509	157	0.184	193	0.020	229	0.062	265	0.039	301	0.085
14	0.685	50	0.987	86	0.889	122	0.498	158	0.178	194	0.020	230	0.064	266	0.036	302	0.090
15	0.696	51	0.990	87	0.880	123	0.486	159	0.172	195	0.019	231	0.066	267	0.034	303	0.094
16	0.707	52	0.992	88	0.870	124	0.475	160	0.165	196	0.019	232	0.068	268	0.032	304	0.099
17	0.718	53	0.993	89	0.860	125	0.463	161	0.159	197	0.019	233	0.069	269	0.030	305	0.104
18	0.729	54	0.995	90	0.850	126	0.452	162	0.153	198	0.019	234	0.071	270	0.028	306	0.108
19	0.739	55	0.996	91	0.840	127	0.440	163	0.146	199	0.019	235	0.073	271	0.026	307	0.112
20	0.750	56	0.997	92	0.830	128	0.428	164	0.140	200	0.019	236	0.074	272	0.024	308	0.117
21	0.760	57	0.997	93	0.819	129	0.417	165	0.133	201	0.020	237	0.075	273	0.023	309	0.121
22	0.771	58	0.998	94	0.809	130	0.405	166	0.127	202	0.020	238	0.076	274	0.021	310	0.125
23	0.781	59	0.998	95	0.798	131	0.393	167	0.120	203	0.021	239	0.077	275	0.020	311	0.129
24	0.791	60	1.000	96	0.788	132	0.382	168	0.114	204	0.022	240	0.077	276	0.019	312	0.134
25	0.801	61	0.998	97	0.777	133	0.370	169	0.108	205	0.023	241	0.078	277	0.018	313	0.138
26	0.811	62	0.996	98	0.766	134	0.359	170	0.101	206	0.024	242	0.078	278	0.018	314	0.142
27	0.821	63	0.994	99	0.755	135	0.348	171	0.095	207	0.025	243	0.078	279	0.017	315	0.146
28	0.830	64	0.993	100	0.745	136	0.337	172	0.089	208	0.026	244	0.077	280	0.017	316	0.151
29	0.840	65	0.991	101	0.734	137	0.326	173	0.084	209	0.027	245	0.077	281	0.017	317	0.155
30	0.849	66	0.990	102	0.723	138	0.316	174	0.078	210	0.028	246	0.076	282	0.018	318	0.159
31	0.858	67	0.988	103	0.712	139	0.306	175	0.072	211	0.030	247	0.075	283	0.019	319	0.164
32	0.867	68	0.987	104	0.701	140	0.296	176	0.067	212	0.031	248	0.074	284	0.020	320	0.168
33	0.876	69	0.985	105	0.690	141	0.287	177	0.062	213	0.033	249	0.072	285	0.021	321	0.173
34	0.885	70	0.983	106	0.678	142	0.278	178	0.057	214	0.034	250	0.071	286	0.023	322	0.178
35	0.893	71	0.981	107	0.667	143	0.270	179	0.053	215	0.036	251	0.069	287	0.026	323	0.183

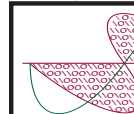
Figure 1
Antenna Azimuthal Pattern
KJBW-LD Paragould, AR
Facility ID 188810
Ch. 35 10 kW Directional

prepared for
Gray Television Licensee, LLC

July, 2023

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Radiofrequency Consulting Engineers
Digital Television and Radio

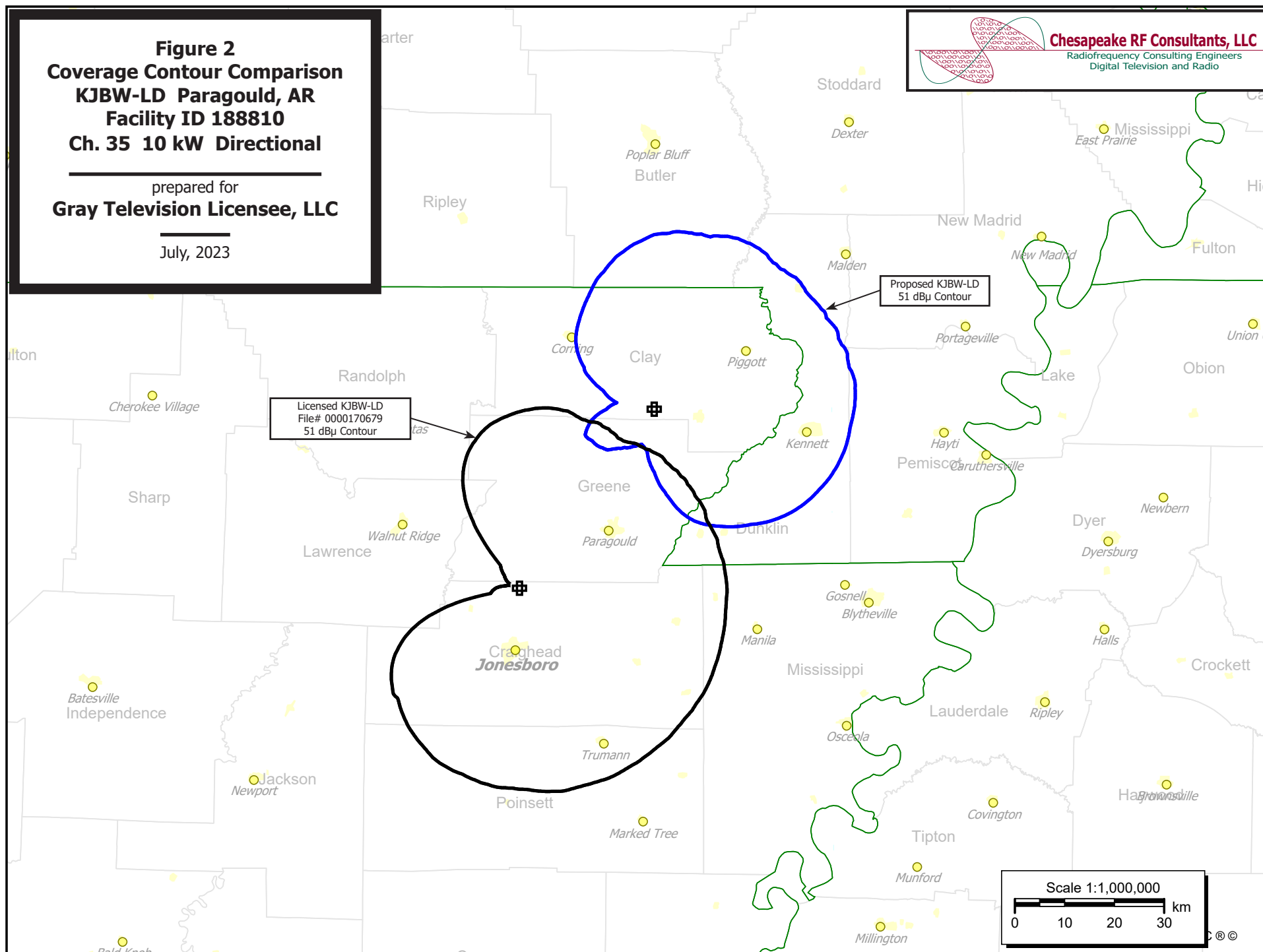


Table 1 KJBW-LD TVStudy Analysis of Proposal (page 1 of 3)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: KJBW-LD 1047847, Model: Longley-Rice
Start: 2023.07.28 10:41:09

Study created: 2023.07.28 10:41:09

Study build station data: LMS TV 2023-07-28

Proposal: KJBW-LD D35 LD APP PARAGOULD, AR
File number: KJBW-LD 1047847
Facility ID: 188810
Station data: User record
Record ID: 43
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	KASN	D34	DT	LIC	PINE BLUFF, AR	BLANK0000073008	258.3 km
No	WSIL-TV	D34	DT	LIC	HARRISBURG, IL	BLCDT20080718AAR	205.1
No	WYJJ-LD	D34	LD	LIC	JACKSON, TN	BLANK0000142036	154.7
No	WFBI-LD	D34	LD	LIC	SOUTH EAST MEMPHIS, TN	BLANK0000156902	124.7
No	WHVD-LD	D35	LD	LIC	HUNTSVILLE, AL	BLANK0000129320	386.8
No	KFLU-LD	D35	LD	LIC	Fayetteville, AR	BLANK0000112149	340.2
No	KRAH-CD	D35	DC	LIC	PARIS, AR	BLANK0000127224	281.0
No	W35DX-D	D35	LD	CP	EVANSVILLE, IN	BLANK0000193281	313.5
No	W35DX-D	D35	LD	LIC	EVANSVILLE, IN	BLANK0000198135	313.5
No	WTWO	D35	DT	LIC	TERRE HAUTE, IN	BLANK0000086897	426.6
No	WCTZ-LD	D35	LD	LIC	BOWLING GREEN, KY	BLANK0000141734	322.7
No	WNKY-LD	D35	LD	LIC	BOWLING GREEN, KY	BLANK0000217721	386.7
No	K35OY-D	D35	LD	LIC	COLUMBIA, MO	BLANK0000177719	330.9
No	KOZJ	D35	DT	LIC	JOPLIN, MO	BLANK0000059543	381.2
No	KSDK	D35	DT	LIC	ST. LOUIS, MO	BLANK0000158259	260.2
No	WTCI	D35	DT	CP	CHATTANOOGA, TN	BLANK0000034751	475.2
No	WTCI	D35	DT	LIC	CHATTANOOGA, TN	BLANK0000144354	475.2
Yes	WBBJ-TV	D35	DT	LIC	JACKSON, TN	BLANK0000116047	166.7
No	KKAP	D36	DT	LIC	LITTLE ROCK, AR	BLEDT20090522AFW	247.7
Yes	KJTB-LD	D36	LD	LIC	PARAGOULD, AR	BLANK0000166715	40.6
Yes	KJTB-LD	D36	LD	CP	PARAGOULD, AR	BLANK0000181647	40.6
No	KBSI	D36	DT	LIC	CAPE GIRARDEAU, MO	BLANK0000115700	150.5
No	K36NN-D	D36	LD	LIC	WEST PLAINS, MO	BLANK0000059299	143.5
No	WMAV-TV	D36	DT	LIC	OXFORD, MS	BLEDT20090612AAK	224.2
No	K27OY-D	N39+	TX	LIC	MEMPHIS, TN	BLTT19930329IE	63.9

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D35
Mask: Full Service
Latitude: 36 13 40.60 N (NAD83)
Longitude: 90 23 44.10 W
Height AMSL: 202.9 m
HAAT: 0.0 m
Peak ERP: 10.0 kW
Antenna: DIE TLP-F 60.0 deg
Elev Pattn: Generic
Elec Tilt: 1.00

50.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	2.76 kW	87.9 m	33.1 km
45.0	9.21	94.0	39.9
90.0	7.22	122.7	41.4
135.0	1.23	125.3	32.6

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



180.0	0.024	121.9	13.3
225.0	0.030	99.8	12.7
270.0	0.008	92.8	8.9
315.0	0.215	104.1	21.6

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 106 m

Distance to Canadian border: 889.5 km

Distance to Mexican border: 1242.7 km

Conditions at FCC monitoring station: Powder Springs GA
Bearing: 115.3 degrees Distance: 579.1 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 293.0 degrees Distance: 1364.1 km

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 BLANK0000116047 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WBBJ-TV	D35	DT	LIC	JACKSON, TN	BLANK0000116047	
Undesireds:	KJBW-LD	D35	LD	APP	PARAGOULD, AR	KJBW-LD 1047847	166.7 km
	WHBH-CD	D34	DC	LIC	BOONEVILLE, MS	BLANK0000001528	109.0
	KSDK	D35	DT	LIC	ST. LOUIS, MO	BLANK0000158259	356.6
	WTCI	D35	DT	CP	CHATTANOOGA, TN	BLANK0000034751	312.7
	WMAV-TV	D36	DT	LIC	OXFORD, MS	BLEDT20090612AAK	175.9
	Service area	Terrain-limited		IX-free, before		IX-free, after	Percent New IX
29051.9	663,009	28751.2	661,123	28719.0	661,033	28473.0 660,283	0.86 0.11
Undesired			Total IX	Unique IX, before		Unique IX, after	
KJBW-LD D35 LD APP	257.1		784			246.0 750	
WHBH-CD D34 DC LIC	5.0		26	5.0 26		5.0 26	
KSDK D35 DT LIC	15.1		49	15.1 49		4.0 15	
WTCI D35 DT CP	10.0		15	10.0 15		10.0 15	
WMAV-TV D36 DT LIC	2.0		0	2.0 0		2.0 0	

Interference to BLANK0000116047 LIC scenario 2

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WBBJ-TV	D35	DT	LIC	JACKSON, TN	BLANK0000116047	
Undesireds:	KJBW-LD	D35	LD	APP	PARAGOULD, AR	KJBW-LD 1047847	166.7 km
	WHBH-CD	D34	DC	LIC	BOONEVILLE, MS	BLANK0000001528	109.0
	KSDK	D35	DT	LIC	ST. LOUIS, MO	BLANK0000158259	356.6
	WTCI	D35	DT	LIC	CHATTANOOGA, TN	BLANK0000144354	312.7
	WMAV-TV	D36	DT	LIC	OXFORD, MS	BLEDT20090612AAK	175.9
	Service area	Terrain-limited		IX-free, before		IX-free, after	Percent New IX
29051.9	663,009	28751.2	661,123	28719.0	661,033	28473.0 660,283	0.86 0.11
Undesired			Total IX	Unique IX, before		Unique IX, after	
KJBW-LD D35 LD APP	257.1		784			246.0 750	
WHBH-CD D34 DC LIC	5.0		26	5.0 26		5.0 26	
KSDK D35 DT LIC	15.1		49	15.1 49		4.0 15	
WTCI D35 DT LIC	10.0		15	10.0 15		10.0 15	
WMAV-TV D36 DT LIC	2.0		0	2.0 0		2.0 0	

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



Interference to BLANK0000166715 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired:	KJTB-LD	D36	LD	LIC	PARAGOULD, AR	BLANK0000166715				
Undesireds:	KJBW-LD	D35	LD	APP	PARAGOULD, AR	KJBW-LD 1047847	40.6 km			
	KBSI	D36	DT	LIC	CAPE GIRARDEAU, MO	BLANK0000115700	190.4			
	WMAV-TV	D36	DT	LIC	OXFORD, MS	BLEDT20090612AAK	205.5			
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX			
4401.7	157,314	4395.6		157,312	4383.6	157,255	4382.5	157,248	0.02	0.00
Undesired				Total IX	Unique IX, before		Unique IX, after			
KJBW-LD	D35	LD	APP	1.0	7		1.0	7		
KBSI	D36	DT	LIC	12.1	57	11.1	57	11.1	57	
WMAV-TV	D36	DT	LIC	1.0	0	0.0	0	0.0	0	

Interference to BLANK0000181647 CP scenario 1

Desired:	Call KJTB-LD	Chan D36	Svc LD	Status CP	City, State PARAGOULD, AR	File Number BLANK0000181647	Distance			
Undesireds:	KJBW-LD	D35	LD	APP	PARAGOULD, AR	KJBW-LD 1047847	40.6 km			
	KBSI	D36	DT	LIC	CAPE GIRARDEAU, MO	BLANK0000115700	190.4			
	WMAV-TV	D36	DT	LIC	OXFORD, MS	BLEDT20090612AAK	205.5			
Service area		Terrain-limited			IX-free, before	IX-free, after	Percent New IX			
7145.9	188,022	7145.9	188,022		7134.8	187,967	7117.7	187,851	0.24	0.06
Undesired				Total IX		Unique IX, before		Unique IX, after		
KJBW-LD	D35	LD	APP	17.1		116		17.1	116	
KBSI	D36	DT	LIC	11.0		55		10.0	39	
WMAV-TV	D36	DT	LIC	1.0		16		0.0	0	

Interference to proposal scenario 1

Desired:	Call KJBW-LD	Chan D35	Svc LD	Status APP	City, State PARAGOULD, AR	File Number KJBW-LD 1047847	Distance
Undesireds:	W35DX-D	D35	LD	CP	EVANSVILLE, IN	BLANK0000193281	313.5 km
	WBBJ-TV	D35	DT	LIC	JACKSON, TN	BLANK0000116047	166.7
	KJTB-LD	D36	LD	LIC	PARAGOULD, AR	BLANK0000166715	40.6
Service area		Terrain-limited			IX-free	Percent IX	
2499.4	35,369	2498.4	35,369		2489.4	35,224	0.36 0.41
Undesired				Total IX		Unique IX	Prcnt Unique IX
WBBJ-TV	D35 DT LIC	9.1	145		9.1	145	0.36 0.41

**Channel and
Facility
Information**

Section	Question	Response
Facility ID	188810	
State	Arkansas	
City	PARAGOULD	
LPD Channel	35	

Antenna Location
Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1047847
Coordinates (NAD83)	Latitude	36° 16' 40.6" N+
	Longitude	090° 23' 44.1" W-
	Structure Type	LTOWER-Lattice Tower
	Overall Structure Height	96.3 meters
	Support Structure Height	91.4 meters
	Ground Elevation (AMSL)	157.2 meters
Antenna Data	Height of Radiation Center Above Ground Level	45.7 meters
	Height of Radiation Center Above Mean Sea Level	202.9 meters
	Effective Radiated Power	10 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-8F
	Rotation	60 degrees
	Electrical Beam Tilt	1.0
	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	1.000	90	0.223	180	0.077	270	0.224
10	0.983	100	0.165	190	0.071	280	0.304
20	0.939	110	0.101	200	0.051	290	0.409
30	0.850	120	0.049	210	0.028	300	0.525
40	0.745	130	0.023	220	0.017	310	0.640
50	0.634	140	0.019	230	0.035	320	0.750
60	0.521	150	0.028	240	0.080	330	0.849
70	0.405	160	0.045	250	0.125	340	0.932
80	0.296	170	0.064	260	0.168	350	0.987

Additional Azimuths

Degree	V _A
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