

ENGINEERING EXHIBIT

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

prepared for

Gray Television Licensee, LLC

K31PR-D Tyler, TX

Facility ID 182595

Ch. 31 6 kW Directional

Gray Television Licensee, LLC (“Gray”) is the licensee of digital Low Power Television station K31PR-D, Channel 31, Facility ID 182595, Tyler TX. K31PR-D is licensed to operate at 15 kW effective radiated power (“ERP”) with a nondirectional antenna (file# 0000153806, granted July 27, 2021). K31PR-D is presently silent (file# 0000212515). *Gray* proposes herein a minor modification Construction Permit to specify relocation of K31PR-D and use of a directional antenna at decreased ERP.

As proposed herein, K31PR-D will employ an antenna to be side-mounted on the tower structure associated with FCC Antenna Structure Registration number 1052615, located 46.1 km (28.6 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 6 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

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 $15.4 \mu\text{W}/\text{cm}^2$, which is 4.0 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 (K31PR-D)
(page 3 of 3)

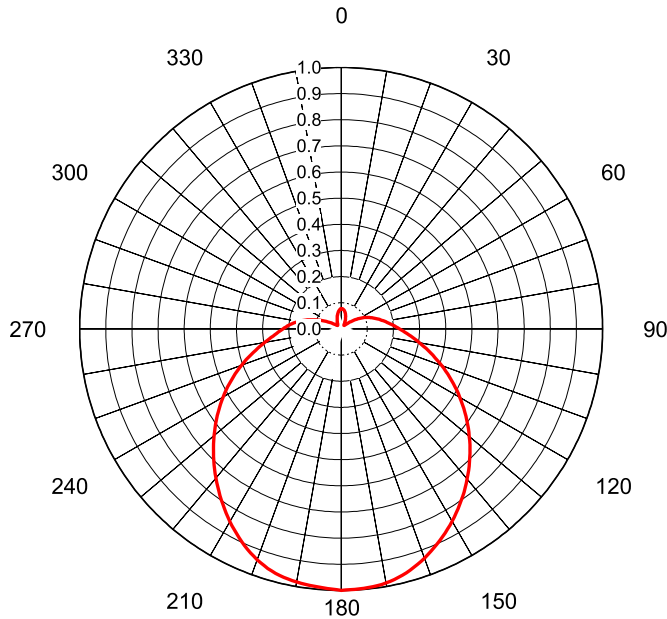


List of Attachments

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.	September 8, 2023	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



AZIMUTH PATTERN Horizontal Polarization

Proposal No. **20230811jmd**
Date **11-Aug-23**
Call Letters **K31PR-D**
Channel **31**
Frequency **575 MHz**
Antenna Type **DLP-8F**
Gain **3.86 (5.86dB)**
Calculated

Pattern Number **TLP-F-31 Hpol**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.077	36	0.019	72	0.134	108	0.387	144	0.791	180	1.000	216	0.788	252	0.382	288	0.114
1	0.078	37	0.018	73	0.138	109	0.398	145	0.801	181	0.998	217	0.777	253	0.370	289	0.108
2	0.078	38	0.018	74	0.142	110	0.409	146	0.811	182	0.996	218	0.766	254	0.359	290	0.101
3	0.078	39	0.017	75	0.146	111	0.420	147	0.821	183	0.994	219	0.755	255	0.348	291	0.095
4	0.077	40	0.017	76	0.151	112	0.432	148	0.830	184	0.993	220	0.745	256	0.337	292	0.089
5	0.077	41	0.017	77	0.155	113	0.443	149	0.840	185	0.991	221	0.734	257	0.326	293	0.084
6	0.076	42	0.018	78	0.159	114	0.455	150	0.849	186	0.990	222	0.723	258	0.316	294	0.078
7	0.075	43	0.019	79	0.164	115	0.466	151	0.858	187	0.988	223	0.712	259	0.306	295	0.072
8	0.074	44	0.020	80	0.168	116	0.478	152	0.867	188	0.987	224	0.701	260	0.296	296	0.067
9	0.072	45	0.021	81	0.173	117	0.489	153	0.876	189	0.985	225	0.690	261	0.287	297	0.062
10	0.071	46	0.023	82	0.178	118	0.501	154	0.885	190	0.983	226	0.678	262	0.278	298	0.057
11	0.069	47	0.026	83	0.183	119	0.513	155	0.893	191	0.981	227	0.667	263	0.270	299	0.053
12	0.068	48	0.028	84	0.188	120	0.525	156	0.901	192	0.978	228	0.656	264	0.262	300	0.049
13	0.066	49	0.031	85	0.194	121	0.536	157	0.909	193	0.975	229	0.645	265	0.255	301	0.045
14	0.064	50	0.035	86	0.199	122	0.548	158	0.917	194	0.972	230	0.634	266	0.248	302	0.041
15	0.062	51	0.038	87	0.205	123	0.559	159	0.925	195	0.968	231	0.623	267	0.241	303	0.038
16	0.060	52	0.042	88	0.211	124	0.571	160	0.932	196	0.963	232	0.611	268	0.235	304	0.035
17	0.058	53	0.047	89	0.217	125	0.583	161	0.940	197	0.958	233	0.600	269	0.228	305	0.033
18	0.055	54	0.051	90	0.224	126	0.594	162	0.947	198	0.952	234	0.589	270	0.223	306	0.030
19	0.053	55	0.055	91	0.230	127	0.606	163	0.953	199	0.946	235	0.578	271	0.217	307	0.028
20	0.051	56	0.060	92	0.237	128	0.617	164	0.959	200	0.939	236	0.566	272	0.211	308	0.026
21	0.048	57	0.065	93	0.245	129	0.629	165	0.965	201	0.932	237	0.555	273	0.206	309	0.025
22	0.046	58	0.070	94	0.252	130	0.640	166	0.971	202	0.924	238	0.544	274	0.200	310	0.023
23	0.043	59	0.075	95	0.260	131	0.651	167	0.976	203	0.916	239	0.532	275	0.195	311	0.022
24	0.041	60	0.080	96	0.268	132	0.663	168	0.980	204	0.907	240	0.521	276	0.189	312	0.021
25	0.039	61	0.085	97	0.277	133	0.674	169	0.984	205	0.899	241	0.509	277	0.184	313	0.020
26	0.036	62	0.090	98	0.286	134	0.685	170	0.987	206	0.889	242	0.498	278	0.178	314	0.020
27	0.034	63	0.094	99	0.295	135	0.696	171	0.990	207	0.880	243	0.486	279	0.172	315	0.019
28	0.032	64	0.099	100	0.304	136	0.707	172	0.992	208	0.870	244	0.475	280	0.165	316	0.019
29	0.030	65	0.104	101	0.314	137	0.718	173	0.993	209	0.860	245	0.463	281	0.159	317	0.019
30	0.028	66	0.108	102	0.324	138	0.729	174	0.995	210	0.850	246	0.452	282	0.153	318	0.019
31	0.026	67	0.112	103	0.334	139	0.739	175	0.996	211	0.840	247	0.440	283	0.146	319	0.019
32	0.024	68	0.117	104	0.344	140	0.750	176	0.997	212	0.830	248	0.428	284	0.140	320	0.019
33	0.023	69	0.121	105	0.354	141	0.760	177	0.997	213	0.819	249	0.417	285	0.133	321	0.020
34	0.021	70	0.125	106	0.365	142	0.771	178	0.998	214	0.809	250	0.405	286	0.127	322	0.020
35	0.020	71	0.129	107	0.376	143	0.781	179	0.998	215	0.798	251	0.393	287	0.120	323	0.021

Figure 1
Antenna Azimuthal Pattern
K31PR-D Tyler, TX
Facility ID 182595
Ch. 31 6 kW Directional

prepared for
Gray Television Licensee, LLC

September, 2023



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

Figure 2
Coverage Contour Comparison
K31PR-D Tyler, TX
Facility ID 182595
Ch. 31 6 kW Directional

prepared for
Gray Television Licensee, LLC

September, 2023

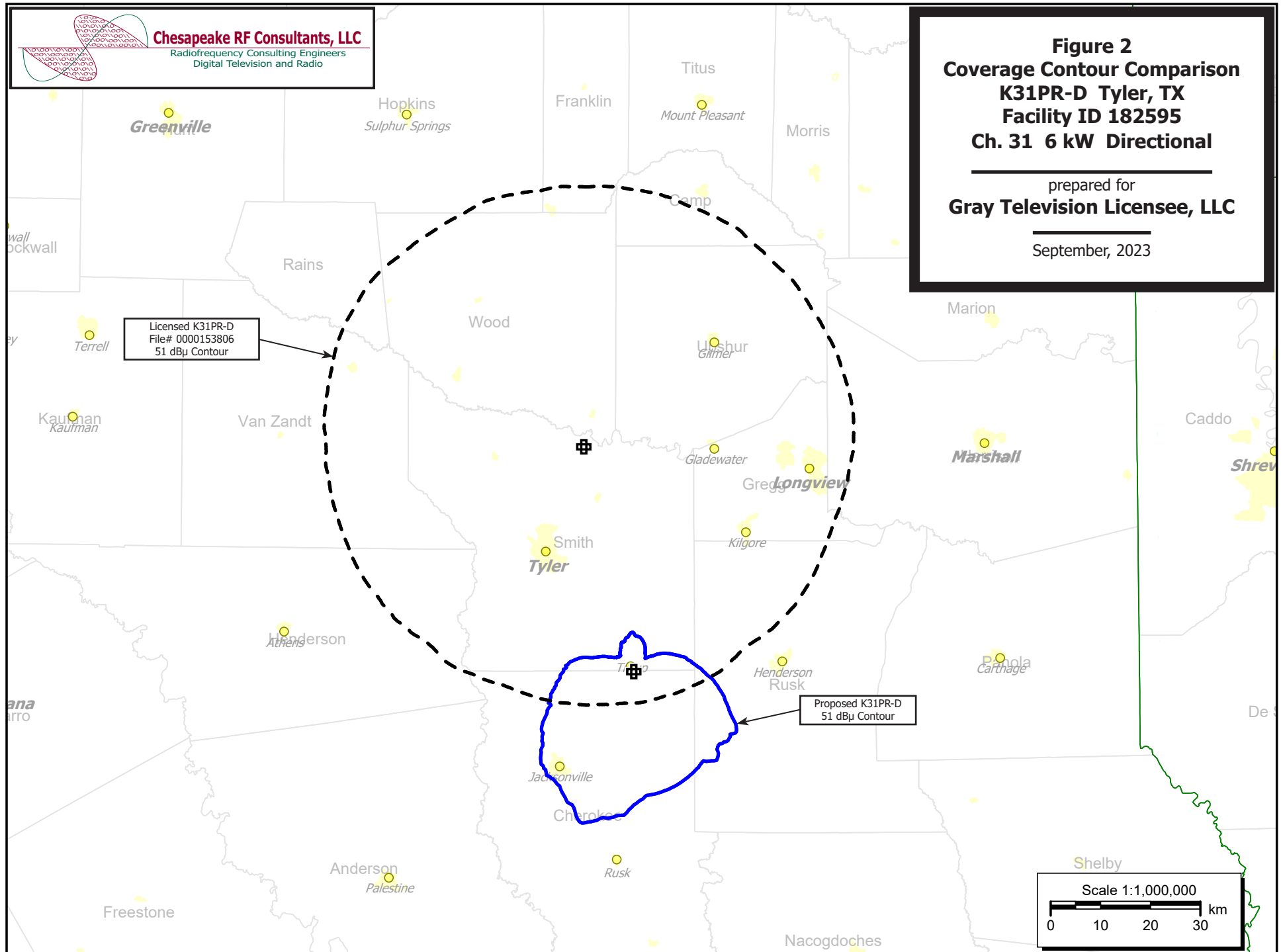


Table 1 K31PR-D TVStudy Analysis of Proposal (page 1 of 2)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: K31PR-D 1052615, Model: Longley-Rice
Start: 2023.09.08 12:14:08

Study created: 2023.09.08 12:14:08

Study build station data: LMS TV 2023-09-08

Proposal: K31PR-D D31 LD APP TYLER, TX
File number: K31PR-D 1052615
Facility ID: 182595
Station data: User record
Record ID: 94
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	KVPO-LD	N30-	TX	LIC	SHREVEPORT, LA	BLTTL19950412IB	173.1 km
No	K30QB-D	D30	LD	LIC	SHREVEPORT, LA	BLANK0000068681	132.8
No	K30QR-D	D30	LD	LIC	BRYAN, TX	BLANK0000218839	204.2
No	KMPX	D30	DT	LIC	DECATUR, TX	BLCDT20060317AGE	181.3
Yes	KKPD-LD	D30	LD	LIC	TYLER, TX	BLANK0000188075	27.6
No	K31PZ-D	D31	LD	LIC	CLARKSVILLE, AR	BLANK0000194163	362.2
No	K31PZ-D	D31	LD	APP	CLARKSVILLE, AR	BLANK0000220385	375.3
No	K31PZ-D	D31	LD	CP	CLARKSVILLE, AR	BLANK0000220320	366.5
No	KTEQ-LP	D31-	LD	CP	FULTON, AR	BLANK0000151968	204.3
No	KTEQ-LP	D31-	LD	LIC	FULTON, AR	BLANK0000179371	204.3
No	KLAX-TV	D31	DT	LIC	ALEXANDRIA, LA	BLCDT20090622AGN	250.2
No	W31EL-D	D31	LD	LIC	BATON ROUGE, LA	BLANK0000157740	429.0
No	KAGN-CD	D31	DC	LIC	CROWLEY, LA	BLANK0000001651	328.9
No	K31HO-D	D31	LD	LIC	SHREVEPORT, LA	BLDTL20120831AAD	125.5
No	KOET	D31	DT	LIC	EUFAULA, OK	BLEDT20060601BJT	339.5
No	K31MK-D	D31	LD	LIC	LAWTON, OK	BLANK0000178492	403.9
No	KOHC-CD	D31	DC	LIC	OKLAHOMA CITY, OK	BLANK0000071619	418.7
No	KBVO-CD	D31	DC	LIC	AUSTIN, TX	BLANK0000121392	324.9
No	KUBE-TV	D31	DT	LIC	BAYTOWN, TX	BLANK0000072353	287.4
No	KHXL-LD	D31-	LD	APP	HUNTSVILLE, TX	BLANK0000005630	204.3
No	KAZD	D31	DT	LIC	LAKE DALLAS, TX	BLANK0000125085	181.1
No	K31MU-D	D31	LD	LIC	LINGLEVILLE-CROWLEY, TX	BLDTL20150120AIJ	224.3
No	KPXJ	D32	DT	LIC	MINDEN, LA	BLANK0000192991	126.6
No	KDAF	D32	DT	CP	DALLAS, TX	BLANK0000127581	179.2
No	KDAF	D32	DT	LIC	DALLAS, TX	BLANK0000204411	179.2
No	KLNM-LD	D32	LD	LIC	LUFKIN, TX	BLANK0000187820	93.3

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D31
Mask: Full Service
Latitude: 32 8 4.80 N (NAD83)
Longitude: 95 6 49.30 W
Height AMSL: 158.5 m
HAAT: 0.0 m
Peak ERP: 6.00 kW
Antenna: DIE TLP-F 180.0 deg
Elev Pattn: Generic
Elec Tilt: 1.00

50.4 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.036 kW	34.2 m	8.0 km
45.0	0.004	11.5	4.5
90.0	0.301	39.4	14.5

Table 1 K31PR-D TVStudy Analysis of Proposal
(page 2 of 2)



135.0	2.90	37.8	24.5
180.0	6.00	35.8	27.3
225.0	2.85	47.4	27.0
270.0	0.298	40.4	14.7
315.0	0.003	36.6	4.4

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 35 m

Distance to Canadian border: 1517.7 km

Distance to Mexican border: 629.7 km

Conditions at FCC monitoring station: Kingsville TX
Bearing: 207.8 degrees Distance: 586.0 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 317.2 degrees Distance: 1267.8 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 BLANK0000188075 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KKPD-LD	D30	LD	LIC	TYLER, TX	BLANK0000188075	
Undesireds:	K31PR-D	D31	LD	APP	TYLER, TX	K31PR-D 1052615	27.6 km
	KMPX	D30	DT	LIC	DECATUR, TX	BLCDT20060317AGE	154.6
	KPLE-CD	D30	DC	LIC	KILLEEN, TX	BLDTL20090416ASY	260.2
	KXLN-DT	D30	DT	LIC	ROSENBERG, TX	BLANK0000166964	300.1
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
5345.5	282,857	5253.9	280,060	4803.2	273,917	4795.2 273,821	0.17 0.04
Undesired				Total IX	Unique IX, before	Unique IX, after	
K31PR-D D31 LD APP				10.1 101	8.1 96		
KMPX D30 DT LIC				450.7 6,143	448.7 6,122	446.7 6,117	
KXLN-DT D30 DT LIC				2.0 21	0.0 0	0.0 0	

Interference to proposal scenario 1
10.23% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	K31PR-D	D31	LD	APP	TYLER, TX	K31PR-D 1052615	
Undesireds:	KTEQ-LP	D31-	LD	CP	FULTON, AR	BLANK0000151968	204.3 km
	KUBE-TV	D31	DT	LIC	BAYTOWN, TX	BLANK0000072353	287.4
	KAZD	D31	DT	LIC	LAKE DALLAS, TX	BLANK0000125085	181.1
Service area		Terrain-limited		IX-free		Percent IX	
1024.8	30,507	1002.6	27,158	968.3	24,380	3.42 10.23	
Undesired				Total IX	Unique IX	Prcnt Unique IX	
KUBE-TV D31 DT LIC				1.0 24	0.0 0	0.00 0.00	
KAZD D31 DT LIC				34.3 2,778	33.3 2,754	3.32 10.14	

**Channel and
Facility
Information**

Section	Question	Response
Facility ID	182595	
State	Texas	
City	TYLER	
LPD Channel	31	

Antenna Location
Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1052615
Coordinates (NAD83)	Latitude	32° 08' 04.8" N+
	Longitude	095° 06' 49.3" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	99.0 meters
	Support Structure Height	91.4 meters
	Ground Elevation (AMSL)	128.0 meters
Antenna Data	Height of Radiation Center Above Ground Level	30.5 meters
	Height of Radiation Center Above Mean Sea Level	158.5 meters
	Effective Radiated Power	6 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	180 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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