

ENGINEERING EXHIBIT

Incentive Auction Channel Reassignment

Application for Modification of Digital Television Station Construction Permit

prepared for

KZJL License LLC
KZJL(DT) Houston, TX
Facility ID 69531
Ch. 21 880 kW 595 m

KZJL License LLC (“*KLL*”) is the licensee of digital television station KZJL, Channel 44, Facility ID 69531, Houston, TX. Reassignment of KZJL from Channel 44 to Channel 21 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (“*CCRPN*”, DA 17-317, released April 13, 2017). *KLL* herein proposes modification of the KZJL post-auction Channel 21 Construction Permit (“CP” file# 0000028638). This application is intended to be filed during the second filing window.¹ The CP authorizes operation at 660 kW effective radiated power (“ERP”) with a directional antenna at 460 meters height above average terrain (“HAAT”). *KLL* proposes herein to increase the ERP and HAAT to 880 kW at 595 meters and change the directional antenna pattern.

The proposed Channel 21 operation will employ a new broadband antenna system to be top-mounted on the KZJL candelabra tower. The proposed antenna will be shared with several other post-auction facilities. The tower structure corresponds to FCC Antenna Structure Registration number 1059622. No change to the overall structure height will result.

The proposed antenna is an elliptically polarized directional RFS model PEPL42C (25 percent vertical polarization). The maximum horizontally polarized ERP is 880 kW and the maximum vertically polarized ERP is 220 kW. The vertically polarized component will not exceed the horizontally polarized component at any azimuth. The directional antenna’s

¹Public Notice “*Incentive Auction Task Force and Media Bureau Announce the Opening of the Second Filing Window for Eligible Full Power and Class A Television Station—October 3 Through November 2, 2017*” DA 17-911, released September 20, 2017.

azimuthal patterns are depicted in Figures 1 and 1A for horizontal and vertical polarization, respectively. The antenna's elevation pattern is depicted in Figures 2 and 2A.

Figure 3 supplies a map that demonstrates compliance with §73.625(a)(1) regarding coverage of the entire principal community. The proposed facility's predicted population exceeds 95 percent of the *CCRPN* baseline facility's population.

Interference study per FCC OET Bulletin 69² shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby post-auction full service and Class A television stations as required by §73.616. **FCC processing of this proposal is requested using a 2 km cell size and 0.1 km terrain profile increment.** The interference study output report is provided as Table 1.

The proposed 880 kW ERP exceeds the maximum permitted by §73.622(f)(8)(i) for the proposed antenna HAAT of 595 meters. Section 73.622(f)(5) permits the maximum ERP to be exceeded in order to provide the same geographic coverage area as the largest station within the same market. As demonstrated in Figure 4, the total area within the proposed KZJL NLSC is 35,349 square kilometers, which does not exceed the NLSC area of KTRK-TV (47,349 sq. km, Ch. 13, Houston TX, BLCDT-20090612AAS). Thus, the 880 kW ERP specified herein is in compliance with §73.622(f)(5) of the FCC's Rules.

The nearest FCC monitoring station is 331 km distant at Kingsville, TX. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with "quiet" zones specified in §73.1030(a) and (b). The site location is beyond the border areas requiring international coordination. There are no authorized AM stations within 3 kilometers of the site.

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, 2 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.

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 10 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 $1.1 \mu\text{W}/\text{cm}^2$, which is 0.3 percent of the general population/uncontrolled maximum permitted 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.

List of Attachments

Figure 1, 1A	Antenna Azimuthal Pattern
Figure 2, 2A	Antenna Elevation Pattern
Figure 3	Proposed Coverage Contours
Figure 4	Maximum ERP per §73.622(f)
Table 1	OET Bulletin 69 Interference Study
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	October 27, 2017	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

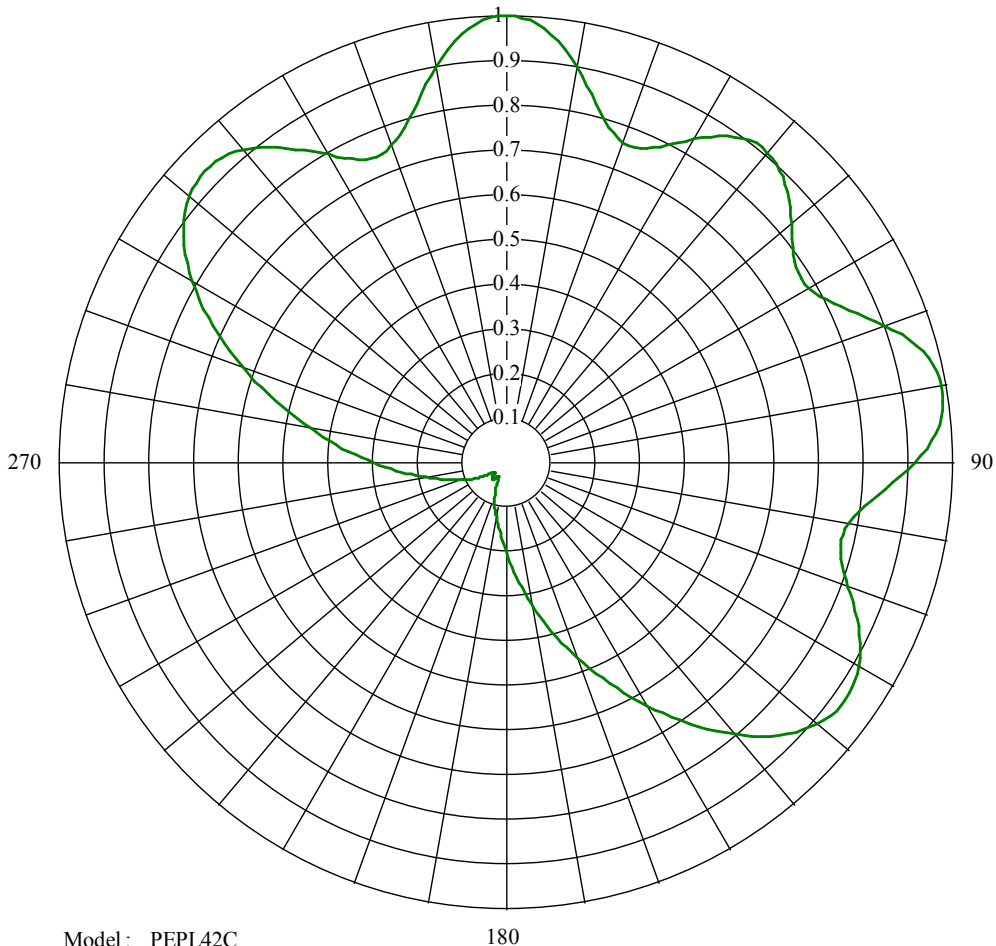


Horizontal Radiation Pattern

E / E_{max}

Station : Houston

Date : 10/27/2017



Model : PEPL42C

180

Face	XOffset	YOffset	Tilt	Power	Phase
A	0.00	0.00	0.0	1.0	0.0

Polarisation : Horizontal

Frequency (MHz) : 515.00

Directivity (dB) : 3.20

Loaded Measured Unit Pattern

File = dallas pep4-ch21h.pat

Pattern Tolerance +/- 5% of E_{max}

Figure 1
Antenna Azimuthal Pattern
Horizontal Polarization
KZJL(DT) Houston, TX
Facility ID 69531
Ch. 21 880 kW 595 m

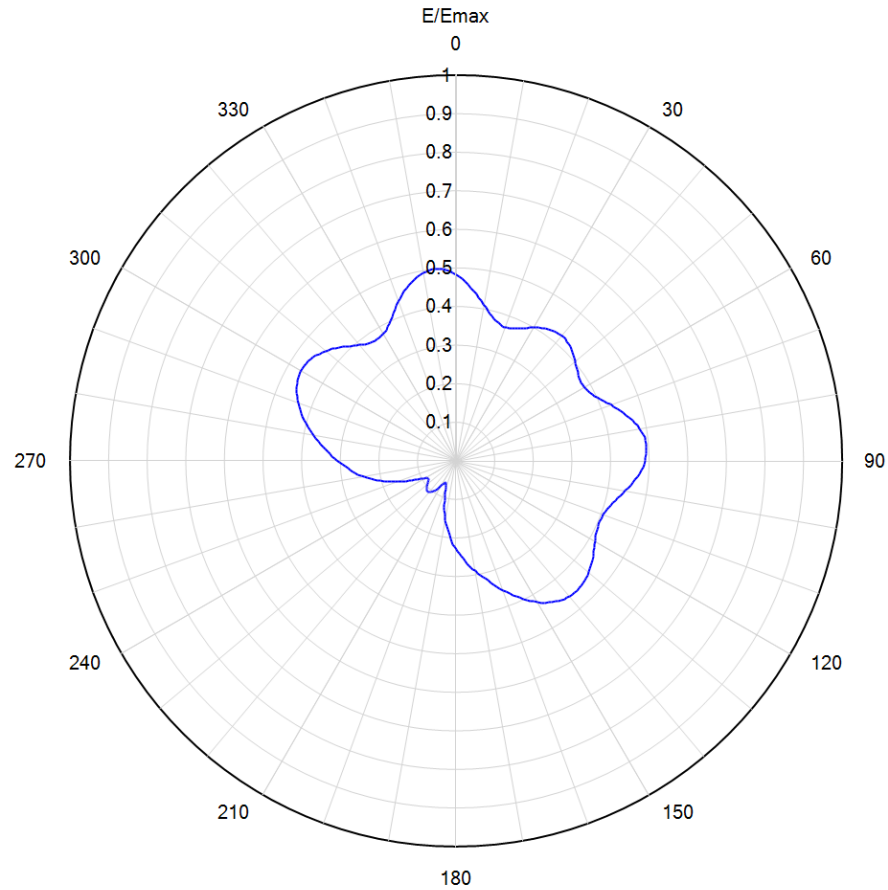
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October, 2017





Azimuth Pattern



Model: PEPL42C
Location: Houston Missouri City
Customer: American Tower
Date: June 9, 2017
Rotation Angle: 40 degrees

Polarisation: Vertical
Frequency: 515.00 MHz
Directivity: 1.8 (2.60 dB)
Elevation Angle: 0.75 degrees
Horizontal Unit Pattern:
File = Dallas PEP4-CH21V.pat

Note: Pattern Tolerance +/-5% of Emax

Figure 1A
Antenna Azimuthal Pattern
Vertical Polarization
KZJL(DT) Houston, TX
Facility ID 69531
Ch. 21 880 kW 595 m

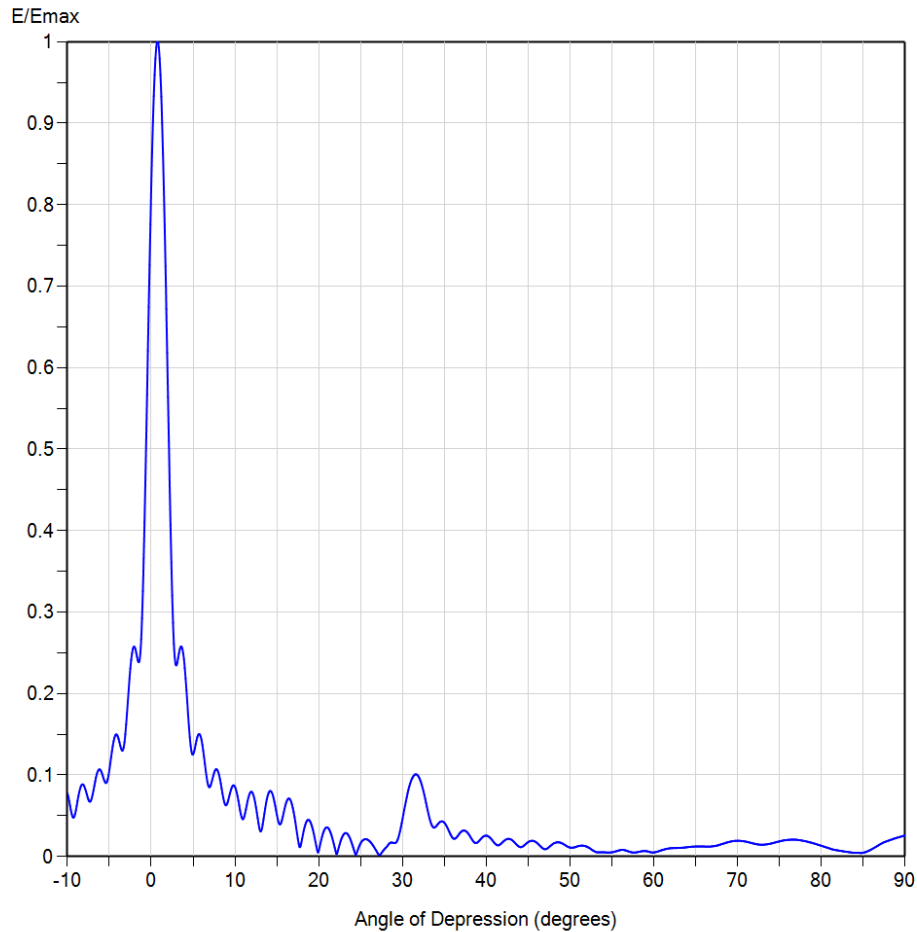
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Elevation Pattern



Model:	PEPL42C	Frequency:	515.00 MHz
Polarisation:	<u>Horizontal</u>	Directivity (Main Lobe):	28.0 (14.48 dBd)
Location:	Houston Missouri City	Directivity (At Horizon):	18.9 (12.77 dBd)
Customer:	American Tower	Beam Tilt:	0.75 degrees
Date:	June 9, 2017	Azimuth Angle:	360 degrees

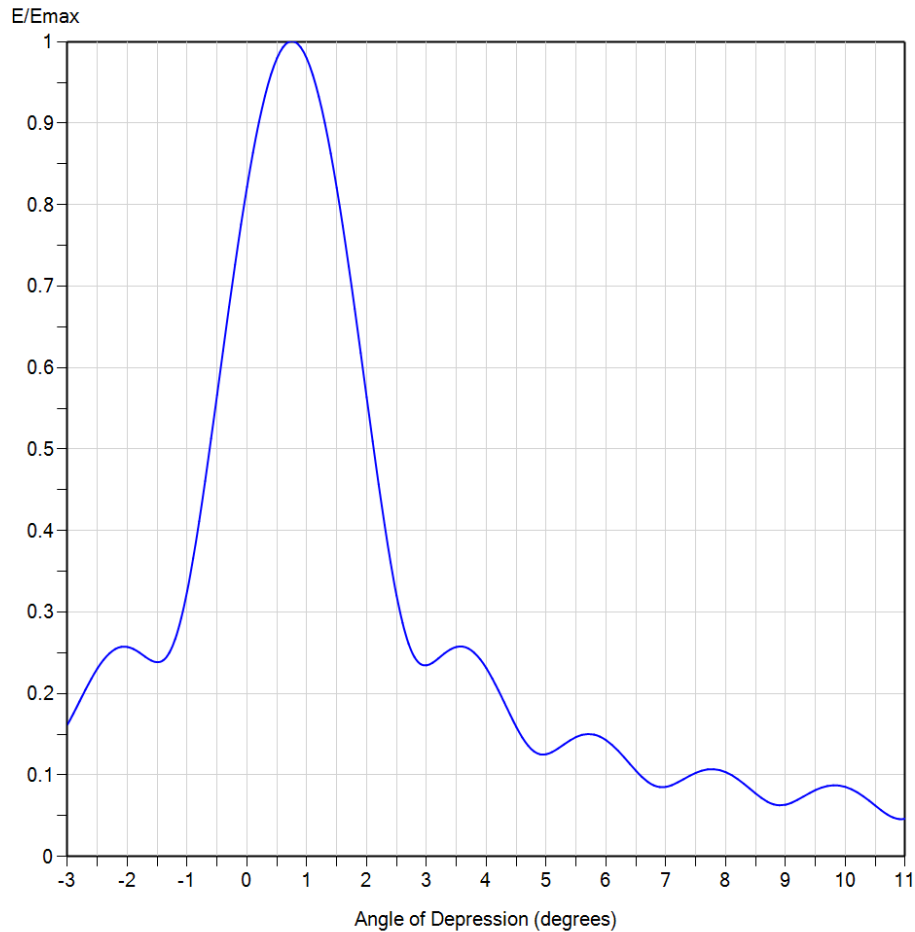
Figure 2
Antenna Elevation Pattern
KZJL(DT) Houston, TX
Facility ID 69531
Ch. 21 880 kW 595 m

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Elevation Pattern



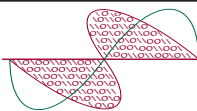
Model:	PEPL42C	Frequency:	515.00 MHz
Polarisation:	<u>Horizontal</u>	Directivity (Main Lobe):	28.0 (14.48 dBd)
Location:	Houston Missouri City	Directivity (At Horizon):	18.9 (12.77 dBd)
Customer:	American Tower	Beam Tilt:	0.75 degrees
Date:	June 9, 2017	Azimuth Angle:	360 degrees

**Figure 2A - Detail
Antenna Elevation Pattern
KZJL(DT) Houston, TX
Facility ID 69531
Ch. 21 880 kW 595 m**



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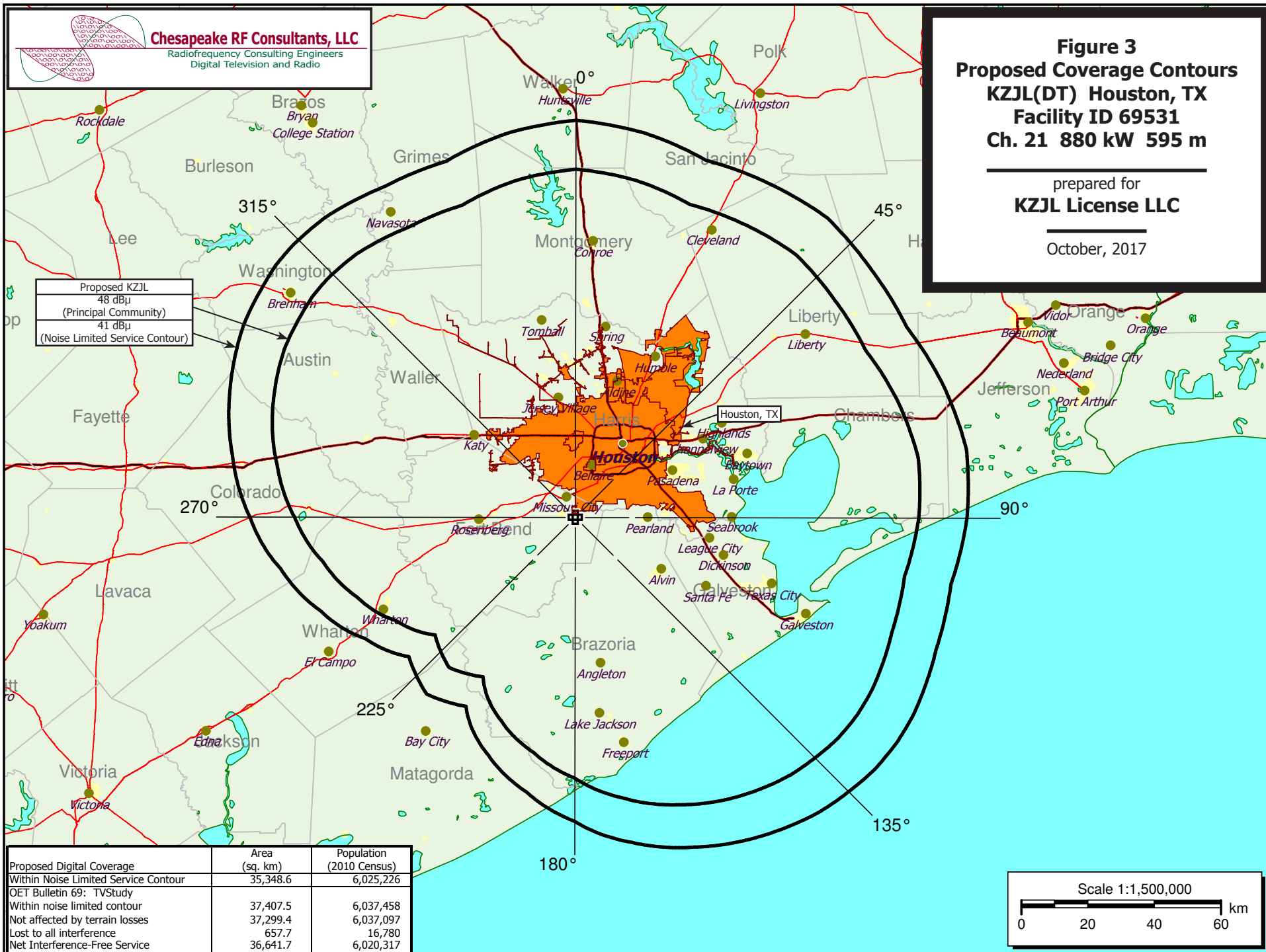
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Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 3
Proposed Coverage Contours
KZJL(DT) Houston, TX
Facility ID 69531
Ch. 21 880 kW 595 m

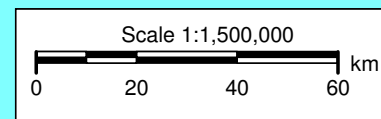
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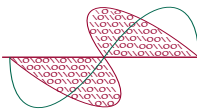
October, 2017

Proposed KZJL
48 dBμ
(Principal Community)
41 dBμ
(Noise Limited Service Contour)



Proposed Digital Coverage	Area (sq. km)	Population (2010 Census)
Within Noise Limited Service Contour	35,348.6	6,025,226
OET Bulletin 69: TVStudy		
Within noise limited contour	37,407.5	6,037,458
Not affected by terrain losses	37,299.4	6,037,097
Lost to all interference	657.7	16,780
Net Interference-Free Service	36,641.7	6,020,317





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Digital Television and Radio

Figure 4
Maximum ERP per §73.622(f)
KZJL(DT) Houston, TX
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Ch. 21 880 kW 595 m

prepared for
KZJL License LLC

October, 2017

KTRK-TV Ch. 13 Houston, TX
BLCDT-20090612AAS
36 dBμ Contour (NLSC)
Area: 47,349 sq. km

Proposed KZJL
41 dBμ Contour (NLSC)
Area: 35,349 sq. km

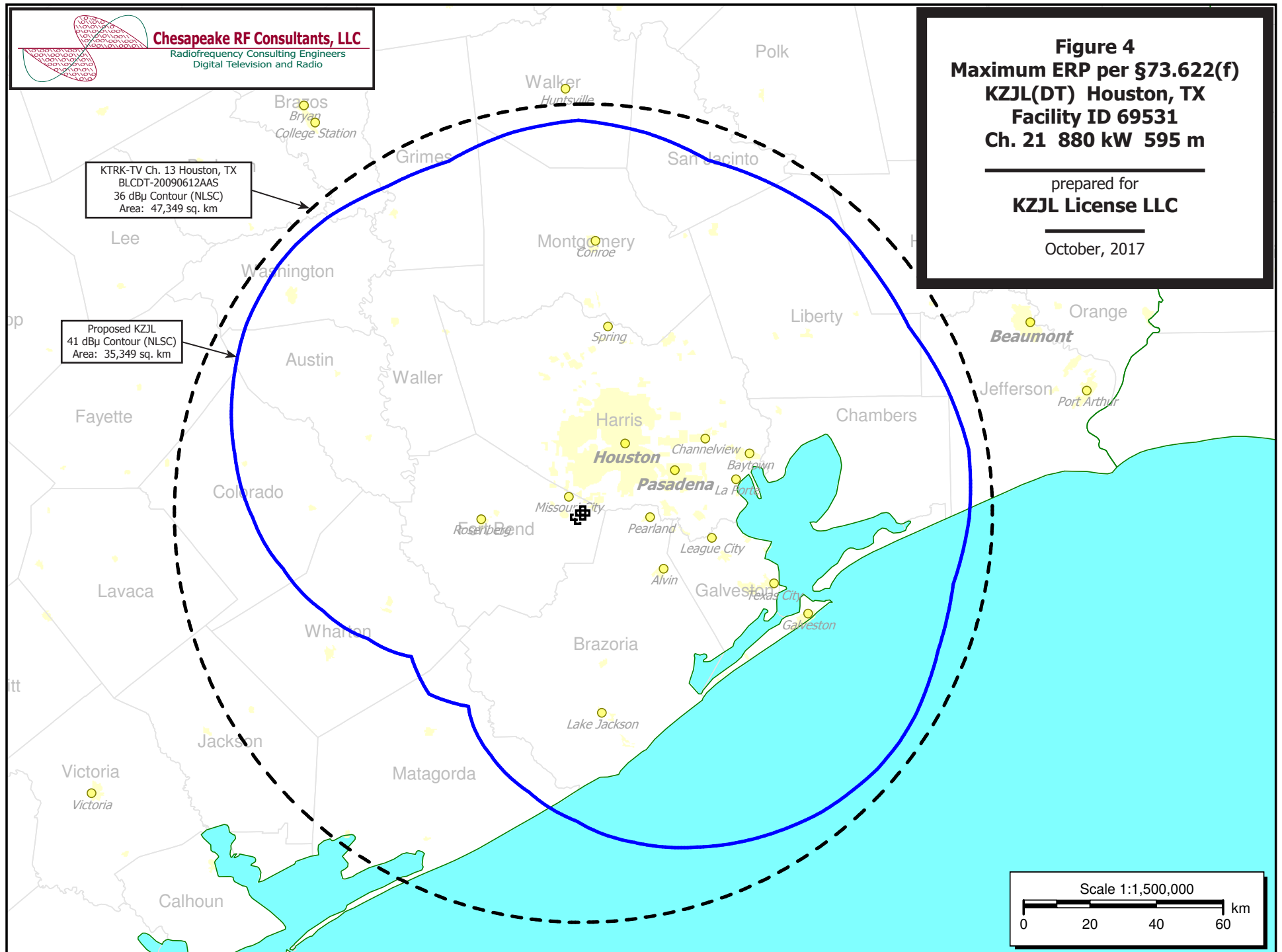
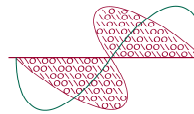


Table 1 KZJL(DT) OET Bulletin 69 Interference Study
(page 1 of 3)



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Radiofrequency Consulting Engineers
Digital Television and Radio

tvstudy v2.2.3 (6K70F1)
Database: localhost, Study: KZJL RFS-top 880kW Prop, Model: Longley-Rice
Start: 2017.10.27 16:53:26

Study created: 2017.10.27 16:52:40

Study build station data: LMS TV 2017-10-01 LMSTV

Proposal: KZJL D21 DT APP HOUSTON, TX
File number: KZJL RFS-top 880kW
Facility ID: 69531
Station data: User record
Record ID: 1430
Country: U.S.
Zone: III

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	KLTL-TV	D20	DT	LIC	LAKE CHARLES, LA	BLEDT20100216ABR	258.7 km
Yes	KUVM-CD	D20	DC	CP	MISSOURI CITY, TX	BLANK0000024453	0.0
No	KAVU-TV	D20	DT	CP	VICTORIA, TX	BLANK0000028099	175.9
No	WBRL-CD	D21	DC	LIC	BATON ROUGE, LA	BLDTA20100908AAP	416.4
Yes	KXAN-TV	D21	DT	LIC	AUSTIN, TX	BLCDT20050630AAG	236.3
No	KDTX-TV	D21	DT	CP	DALLAS, TX	BLANK0000027714	358.9
No	KLUJ-TV	D21	DT	CP	HARLINGEN, TX	BLANK0000028192	433.6
No	KLRU	D22	DT	LIC	AUSTIN, TX	BLEDT20040305ACK	236.5
Yes	KTMD	D22	DT	CP	GALVESTON, TX	BLANK0000026839	1.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D21
Latitude: 29 33 45.20 N (NAD83)
Longitude: 95 30 35.90 W
Height AMSL: 614.5 m
HAAT: 595.0 m
Peak ERP: 880 kW
Antenna: PEPL42C Ch21 20171027 0.0 deg
Elev Pattern: Generic
Elec Tilt: 0.75

39.5 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	880 kW	594.6 m	122.5 km
45.0	665	596.9	119.9
90.0	730	595.9	120.8
135.0	637	595.6	119.4
180.0	35.6	596.7	94.2
225.0	1.52	595.6	69.7
270.0	77.6	594.4	100.7
315.0	769	590.3	121.0

ERP exceeds maximum

ERP: 880 kW ERP maximum: 333 kW

**Proposal service area extends beyond baseline plus 1.0%
Proposal service area population is more than 95.0% of baseline

Distance to Canadian border: 1765.2 km

Distance to Mexican border: 422.3 km

Conditions at FCC monitoring station: Kingsville TX
Bearing: 225.1 degrees Distance: 330.6 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 325.6 degrees Distance: 1468.3 km

Table 1 KZJL(DT) OET Bulletin 69 Interference Study
(page 2 of 3)



No land mobile station failures found

Study cell size: 2.00 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 BLANK0000024453 CP, scenario 1

Desired:	Call KUVM-CD	Chan D20	Svc DC	Status CP	City, State MISSOURI CITY, TX	File Number BLANK0000024453	Distance		
Undesireds:	KZJL	D21	DT	BL	HOUSTON, TX	DTVBL69531	0.0 km		
	KZJL	D21	DT	APP	HOUSTON, TX	KZJL RFS-top 880kW	0.0		
	KTXH	D19	DT	LIC	HOUSTON, TX	BLCDT20090804ABC	0.0		
	Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
	5420.2	4,522,649	5420.2	4,522,649	4540.7	4,329,366	4420.9	4,312,026	2.64 0.40
Undesired				Total IX	Unique IX, before		Unique IX, after		
KZJL	D21	DT	BL	859.4	182,851	243.9	46,823		
KZJL	D21	DT	APP	927.3	184,551			363.7	64,163
KTXH	D19	DT	LIC	635.6	146,460	20.1	10,432	71.9	26,072

Interference to BLCDT20050630AAG LIC, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance				
Desired:	KXAN-TV	D21	DT	LIC	AUSTIN, TX	BLCDT20050630AAG					
Undesireds:	KZJL	D21	DT	BL	HOUSTON, TX	DTVBL69531	236.3 km				
	KZJL	D21	DT	APP	HOUSTON, TX	KZJL RFS-top 880kW	236.3				
	KAVU-TV	D20	DT	CP	VICTORIA, TX	BLANK0000028099	177.0				
	KDTX-TV	D21	DT	CP	DALLAS, TX	BLANK0000027714	259.0				
Service area		Terrain-limited			IX-free, before		IX-free, after		Percent New IX		
34843.9	2,678,666	34072.5	2,603,884		33379.5	2,590,555		33123.1	2,587,082	0.77	0.13
Undesired				Total IX		Unique IX, before		Unique IX, after			
KZJL	D21	DT	BL	625.1	12,394	601.2	6,030				
KZJL	D21	DT	APP	881.6	15,867			857.7	9,503		
KAVU-TV	D20	DT	CP	12.0	30	8.0	21	8.0	21		
KDTX-TV	D21	DT	CP	79.7	7,269	59.8	914	59.8	914		

Interference to BLANK0000026839 CP, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired:	KTMD	D22	DT	CP	GALVESTON, TX	BLANK0000026839			
Undesireds:	KZJL	D21	DT	BL	HOUSTON, TX	DTVBL69531	1.0 km		
	KZJL	D21	DT	APP	HOUSTON, TX	KZJL RFS-top 880kW	1.0		
	KLRU	D22	DT	LIC	AUSTIN, TX	BLEDT20040305ACK	236.1		
	KETK-TV	D22	DT	LIC	JACKSONVILLE, TX	BMLCDT20120516ABW	277.4		
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
39912.3	6,074,265	39812.1	6,073,943	39022.5	6,057,303	39018.5	6,057,014	0.01	0.00
Undesired				Total IX	Unique IX, before		Unique IX, after		
KZJL	D21	DT	BL	0.0	0	0.0	0		
KZJL	D21	DT	APP	4.0	289			4.0	289
KLRU	D22	DT	LIC	557.4	13,702	401.1	12,411	401.1	12,411
KETK-TV	D22	DT	LIC	388.5	4,229	232.3	2,938	232.3	2,938

Interference to proposal, scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance
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Table 1 KZJL(DT) OET Bulletin 69 Interference Study
(page 3 of 3)



Desired:	KZJL	D21	DT	APP	HOUSTON, TX	KZJL RFS-top 880kW	
Undesireds:	KXAN-TV	D21	DT	LIC	AUSTIN, TX	BLCDT20050630AAG	236.3 km
	KDTX-TV	D21	DT	CP	DALLAS, TX	BLANK0000027714	358.9
	KTMD	D22	DT	CP	GALVESTON, TX	BLANK0000026839	1.0
Service area		Terrain-limited		IX-free		Percent IX	
37407.5	6,037,458	37299.4	6,037,097	36641.7	6,020,317	1.76	0.28
Undesired		Total IX		Unique IX		Prcnt Unique IX	
KXAN-TV	D21 DT LIC	653.7	16,762	649.7	16,762	1.74	0.28
KDTX-TV	D21 DT CP	4.0	0	0.0	0	0.00	0.00
KTMD	D22 DT CP	4.0	18	4.0	18	0.01	0.00

**Channel and
Facility
Information**

Section	Question	Response
Proposed Community of License	Facility ID	69531
	State	Texas
	City	HOUSTON
	DTV Channel	21
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	3

**Antenna Location
Data**

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1059622
Coordinates (NAD83)	Latitude	29° 33' 45.2" N+
	Longitude	095° 30' 35.9" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	601.7 meters
	Support Structure Height	562.1 meters
	Ground Elevation (AMSL)	22.6 meters
Antenna Data	Height of Radiation Center Above Ground Level	591.9 meters
	Height of Radiation Center Above Average Terrain	595.0 meters
	Height of Radiation Center Above Mean Sea Level	614.5 meters
	Effective Radiated Power	880 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:	RFS
	Model	PEPL42C
	Rotation	0 degrees
	Electrical Beam Tilt	0.75
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Elliptical
DTV and DTS: Elevation 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	

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	V _A (Authorized Value)	Degree	V _A (Authorized Value)	Degree	V _A (Authorized Value)	Degree	V _A (Authorized Value)
0	1.000	90	0.911	180	0.201	270	0.297
10	0.901	100	0.777	190	0.127	280	0.446
20	0.762	110	0.812	200	0.077	290	0.628
30	0.836	120	0.909	210	0.036	300	0.811
40	0.907	130	0.908	220	0.048	310	0.927
50	0.831	140	0.793	230	0.035	320	0.915
60	0.781	150	0.628	240	0.062	330	0.796
70	0.899	160	0.464	250	0.112	340	0.754
80	0.988	170	0.320	260	0.185	350	0.901

Additional Azimuths

Degree	V _A
314	0.939
125	0.924

**Construction
Permit
Certifications**

Section	Question	Response
Post-Incentive Auction Expedited Processing	It will operate on the DTV channel for this station as established in the post-incentive auction channel reassignment public notice.	Yes
	It will operate post-incentive auction facilities that do not expand the noise-limited service contour in any direction beyond that established by the post-incentive auction channel reassignment public notice.	No
	It will operate post-incentive auction facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the post-incentive auction channel reassignment public notice.	Yes
	The antenna structure to be used by this facility has been registered by the Commission and will not require re-registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely affect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7.	Yes
Environmental Effect	Would a Commission grant of Authorization for this location be an action which may have a significant environmental effect? (See Section 1.1306 of 47 C.F.R.)	No
Broadcast Facility	The proposed facility complies with the applicable engineering standards and assignment requirements of 47 C. F.R. Sections 73.616, 73.622(i), 73.623(e), 73.625, 73.1030, and 73.1125.	Yes