



**Kessler and Gehman Associates**  
Consultants • Broadcast • Wireless

**MINOR MODIFICATION TO A  
CONSTRUCTION PERMITTED  
NON-COMMERCIAL FM  
BROADCAST STATION**

**CALL SIGN: KUHF(FM)**  
**FACILITY ID: 69150**  
**FCC FILE NO.: BPED-20181105AAF**  
**LOCATION: HOUSTON, TX**

**Prepared For:**

University of Houston System  
The Center of Public Broadcasting  
4343 Elgin Street  
Houston, Tx 77004

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March 8, 2021

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## **1.0 INTRODUCTION AND SCOPE OF WORK**

University of Houston System is the licensee of an FM broadcast station having call sign KUHF(FM), and facility ID 69150. KUHF(FM) is permitted<sup>1</sup> to operate at Antenna Structure Registration Number (ASRN) 1064696. It is herein proposed to modify the antenna pattern and rotate it 10 degrees counterclockwise. No other changes are proposed.

## **2.0 ANTENNA AND ANTENNA HEIGHT REQUIREMENTS**

Pursuant to 47 C.F.R. Section 73.211(b) entitled “Maximum limits”, Class C FM stations will be authorized to operate with maximum facilities of 100kW ERP at 600 meters HAAT. An FM station with a HAAT that exceeds 600 meters will not be permitted to operate with an ERP greater than that which would result in a 60 dB $\mu$  contour of 92 km. Appendix B is a calculation using Section 73.313(d) methods with USGS 3 arc second data which establishes an HAAT of 598m. Since the reference HAAT is below the respective threshold, the resulting 60 dB $\mu$  F(50,50) average contour distance will be 91.7km which is below the 92 km threshold and thus the proposed facility is compliant with regard to power height requirements.

## **3.0 ALLOCATION ANALYSIS**

Appendix E is a long form allocation study using 3 arc second USGS terrain data which demonstrates the contour protection requirements specified in of 47 C.F.R. Section 73.509 has been met to all applicable broadcast stations except KFTG and KSBJ.

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<sup>1</sup> FCC File No.: BPED-20181105AAF

Appendix F and G show the licensed and proposed KUHF(FM) contour overlap respectively to/from the licensed KSBJ(FM) facility. As illustrated, the modification of KUHF(FM) does not change the existing 100 dB $\mu$ V/m interfering contour caused by KSBJ(FM) to the KUHF(FM) 60 dB $\mu$ V/m protected contour; however, the KUHF(FM) 100 dB $\mu$ V/m interfering contour overlap to the KSBJ(FM) 60 dB $\mu$ V/m protected contour will be reduced by 32,227 people<sup>2</sup>.

Appendix H and I show the licensed and proposed KUHF(FM) contour overlap respectively to/from the licensed KFTG(FM) facility. As illustrated, there is no change to the contour overlap area or population to/from KFTG(FM).

#### **4.0 FM TRANSMITTER LOCATION AND COVERAGE REQUIREMENTS**

Appendix D demonstrates that the transmitter location has been chosen so that, based on the effective radiated power and antenna height above average terrain employed, a minimum field strength of 60 dB $\mu$ , or 1 mV/m, will be provided over the 100% of the principal community of Houston, TX. The proposed facility is thus compliant with 47 CFR Section 73.515 which requires at least 50 percent coverage of the population or area of the community of licensed boundary.

#### **5.0 AM STATION PROXIMITY**

No AM stations are located within 3.2 km of the proposed facility. Pursuant to 47 C.F.R. Section 1.30002(e), the construction or extension of an antenna-supporting structure shall be considered subject to the moment method analysis and prior notification requirement; however, the instant application does not propose to extend the existing structure or build a new structure. Thus, the proposed facility is exempt from further AM analysis consideration.

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<sup>2</sup> According to 2010 Census Datum

## **6.0 INTERNATIONAL COORDINATION**

The proposed facility is located 1765 km from the Canadian border and 423km from the Mexican border. Since the site is not within 320km of any international borders, it is not subject to international coordination.

## **7.0 RADIO FREQUENCY RADIATION COMPLIANCE**

A theoretical analysis has been conducted of the human exposure to radio frequency radiation (“RFR”) using the calculation methodology described in OET Bulletin 65, Edition 97-01. The RFR analysis is conducted pursuant to the following methodology:

Terrain<sup>3</sup> extraction is compiled from the proposed tower site to radial lengths of 0.25 miles in 0.001 mile increments for 360 radials. The power density is calculated for each terrain point at 6 feet above ground level using the elevation and azimuth pattern of the proposed broadcast antenna. The power density calculations are conducted using the lower edge of the proposed channel frequency. To account for ground reflections, a coefficient of 1.6 was included in the calculation.

The resulting cylindrical polar analysis is then summarized into a coordinate plane graph using the following methodology:

Starting from the origin the maximum calculated RFR value is determined among the 360 degree radials for each 0.001 mile increment, the value is then converted into a percentage of the maximum allowable general

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<sup>3</sup> Terrain extraction is based upon a 3 arc second point spacing terrain database.

population or uncontrolled exposure and plotted as a function of perpendicular distance from the tower.

The resulting RFR study in Appendix L demonstrates that the peak exposure is 0.76% of the most restrictive permissible exposure threshold. Pursuant to OET Bulletin 65 concerning multiple-user transmitter sites only those licensees whose transmitters produce power density levels greater than 5.0% of the exposure limit are considered significant contributors to RFR. Since the proposed operation is within 5% of the most permissible exposure at any location 2 meters above the ground, it is not considered a significant contributor to RFR exposure. Thus, contributions to exposure from other RF sources in the vicinity of the proposed facility were not taken into account. The instant application is compliant with the FCC limits for human exposure to RF radiation and is excluded from further environmental processing since no changes are proposed to the tower structure in order to accommodate the proposed antenna.

A chain link fence encloses the support structure and the applicant will cooperate with any other users of the tower by reducing the power to the antenna or if necessary, completely cutting it off to protect maintenance workers on the tower.

## **8.0 CERTIFICATION**

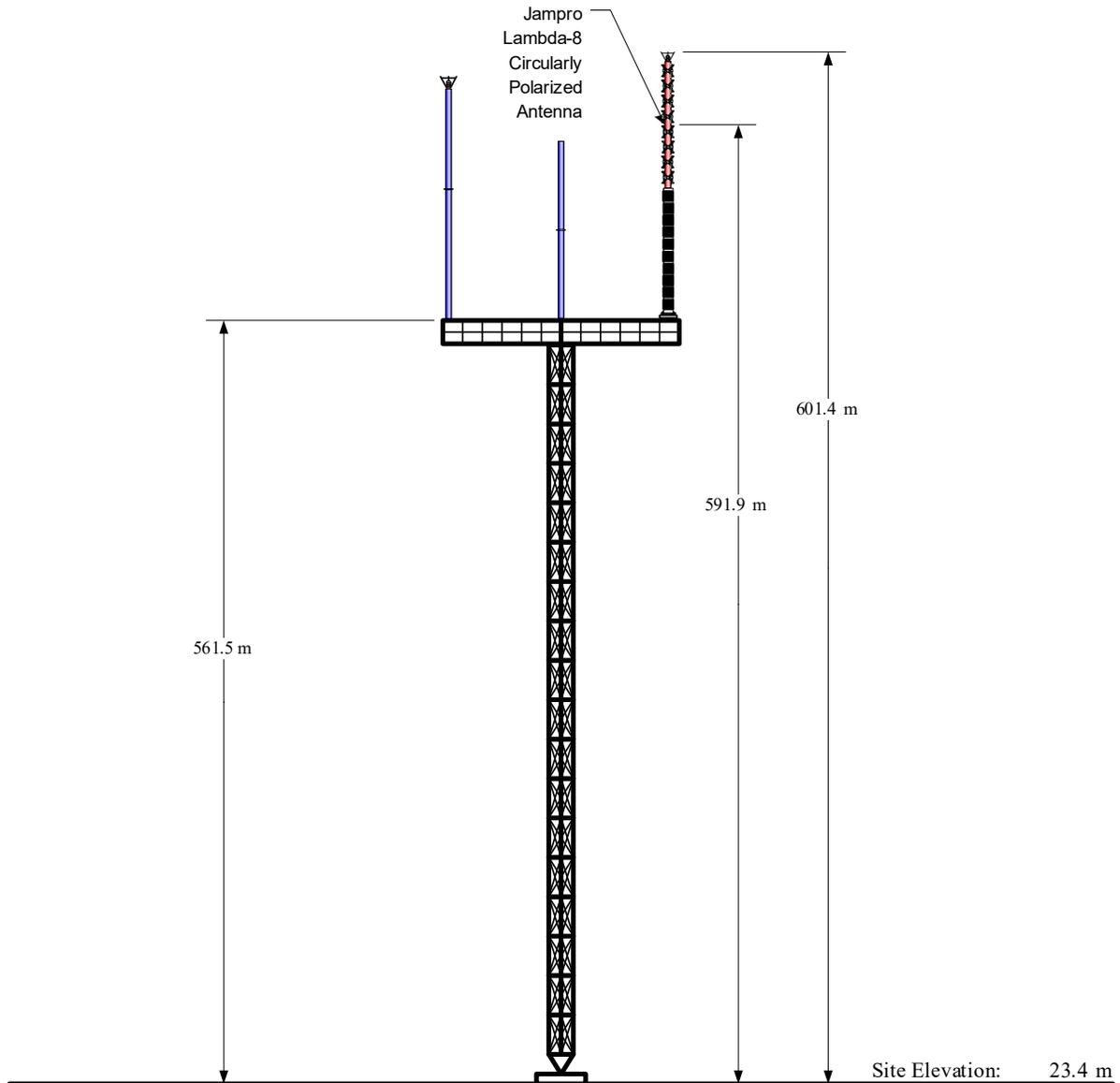
The foregoing statement and the report regarding the aforementioned engineering work are true and correct to the best of my knowledge. Executed on March 8, 2021

KESSLER AND GEHMAN ASSOCIATES, INC.



Ryan Wilhour  
Consulting Engineer

**APPENDIX A – Tower Elevation Profile**



Overall Height AGL:	601.4 m	NAD 83 Coordinates:
Overall Height AMSL:	624.8 m	N. Latitude: 29° 34' 16.0"
Radiation Center AGL:	591.9 m	W. Longitude: 95° 30' 38.0"
Radiation Center AMSL:	615.3 m	
Radiation Center HAAT*:	598 m	ASR No.: 1064696
* Based upon 3 arc second USGS terrain		FAA Study No.: 1998-ASW-4226-OE

NOTE: NOT TO SCALE

**APPENDIX B – Height Above Average Terrain Calculation**

**Antenna Height Above Average Terrain Calculations -- Results**

**Input Data**

Latitude 29° 34' 16" North  
Longitude 95° 30' 38" West (NAD 83)

These coordinates convert to NAD 27 coordinates of  
29° 34' 15.15", North, 95° 30' 37.20" West (NAD 27).

Height of antenna radiation center above mean sea level: **615.3 meters AMSL**

Number of Evenly Spaced Radials = **8** 0° is referenced to True North

**Results**

**Calculated HAAT = 598 meters**

Antenna Height Above Average Terrain calculated  
using FCC 30 second terrain database (continental USA only)

**Individual "Radial HAAT" Values, in meters**

0°	595.3 m
45°	600.3 m
90°	599.2 m
135°	598.7 m
180°	602.2 m
225°	599.8 m
270°	596.8 m
315°	595.3 m

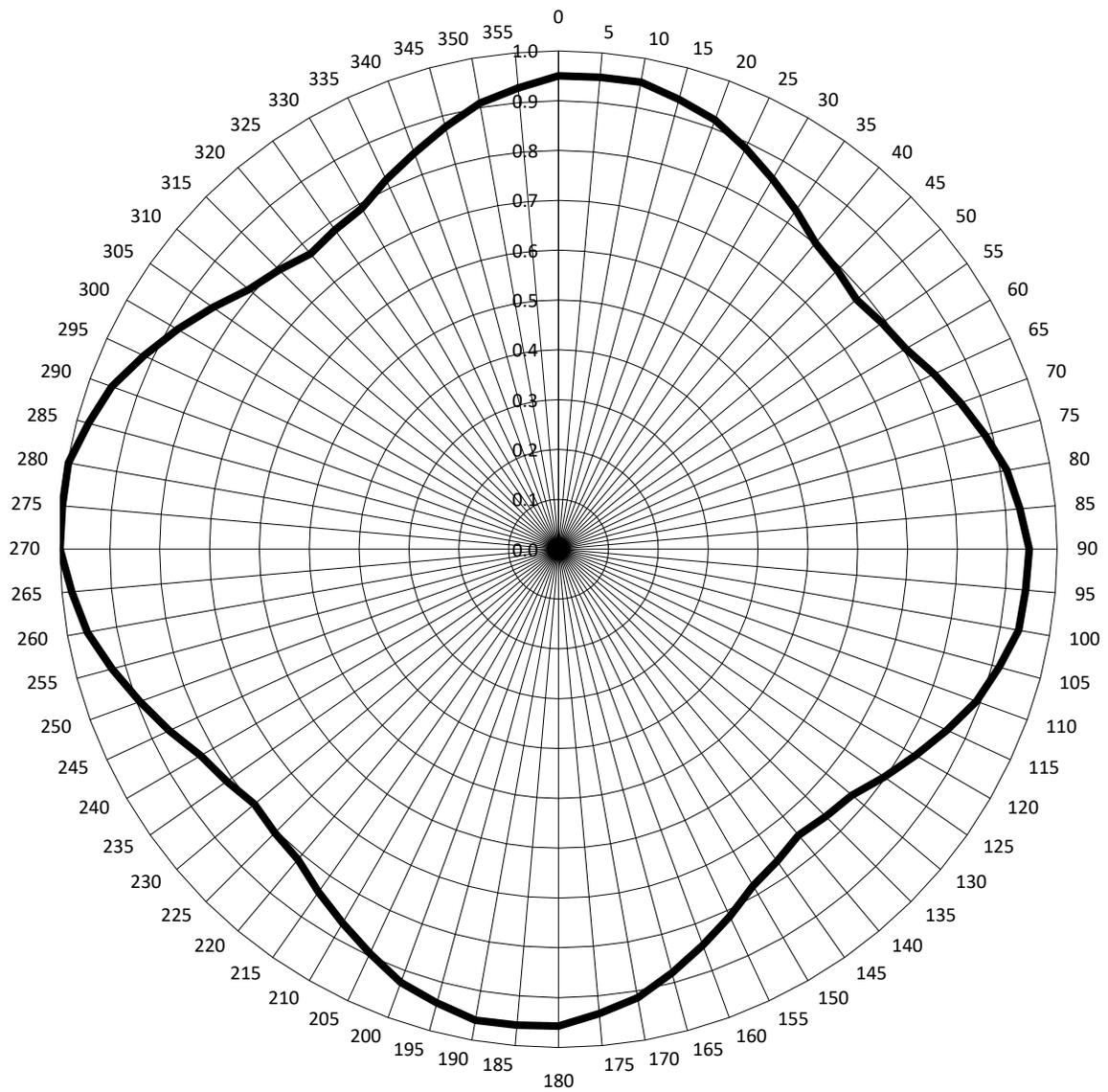
As per the FCC's HAAT Calculator: <https://www.fcc.gov/media/radio/haat-calculator>

**APPENDIX C – Antenna Azimuth Tabulation and Pattern**

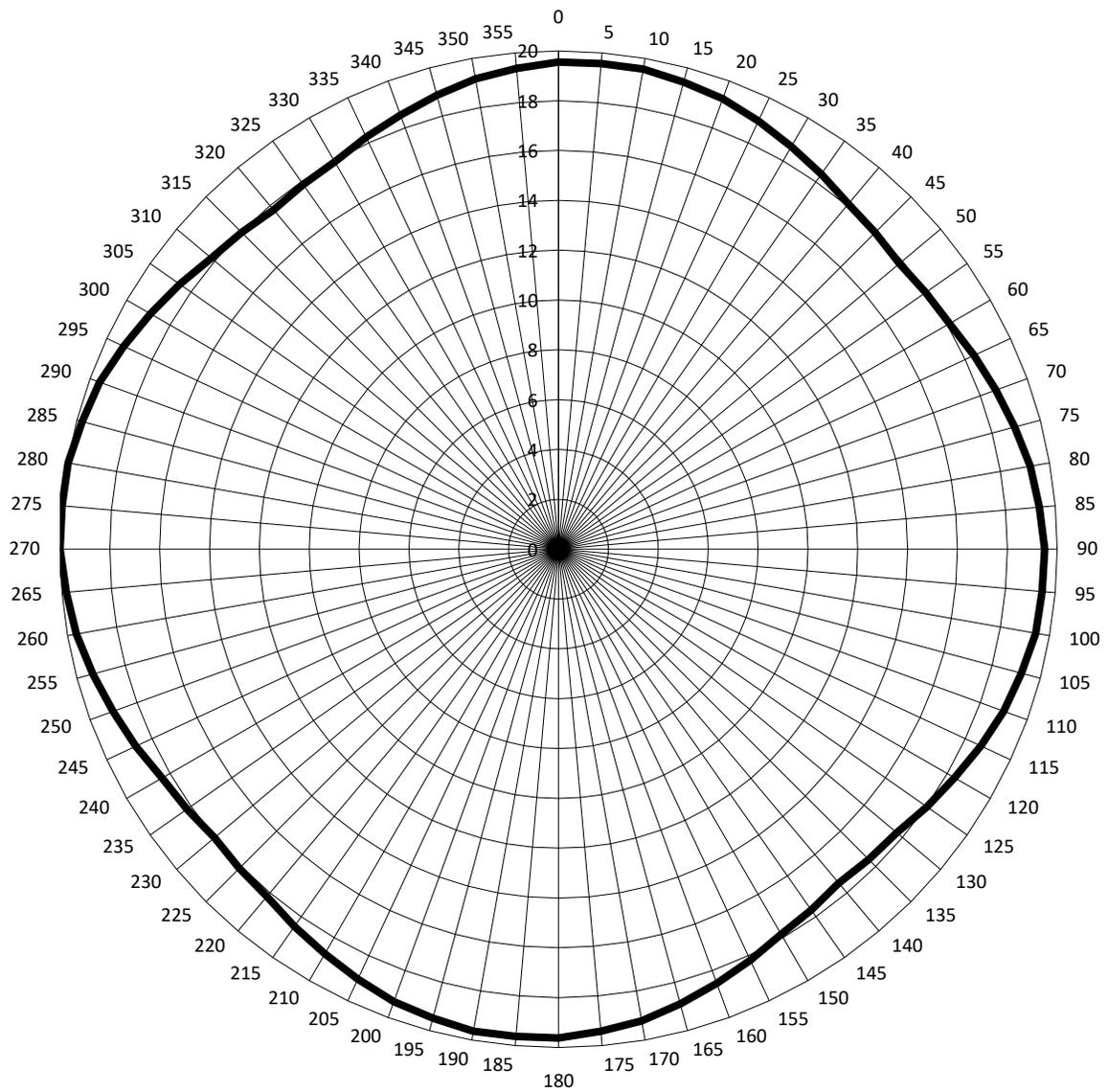
<b>Azimuth</b>	<b>Relative Field</b>
0	0.950
10	0.952
14	0.917
20	0.858
30	0.802
40	0.780
50	0.804
60	0.858
70	0.913
80	0.944
90	0.937
100	0.892
104	0.827
110	0.768
120	0.749
130	0.780
140	0.846
150	0.914
160	0.950
170	0.952

<b>Azimuth</b>	<b>Relative Field</b>
180	0.957
190	0.960
194	0.925
200	0.866
210	0.813
220	0.796
230	0.829
240	0.894
250	0.960
260	1.000
270	0.998
280	0.954
284	0.882
290	0.811
300	0.774
310	0.790
320	0.846
330	0.909
340	0.957
350	0.960

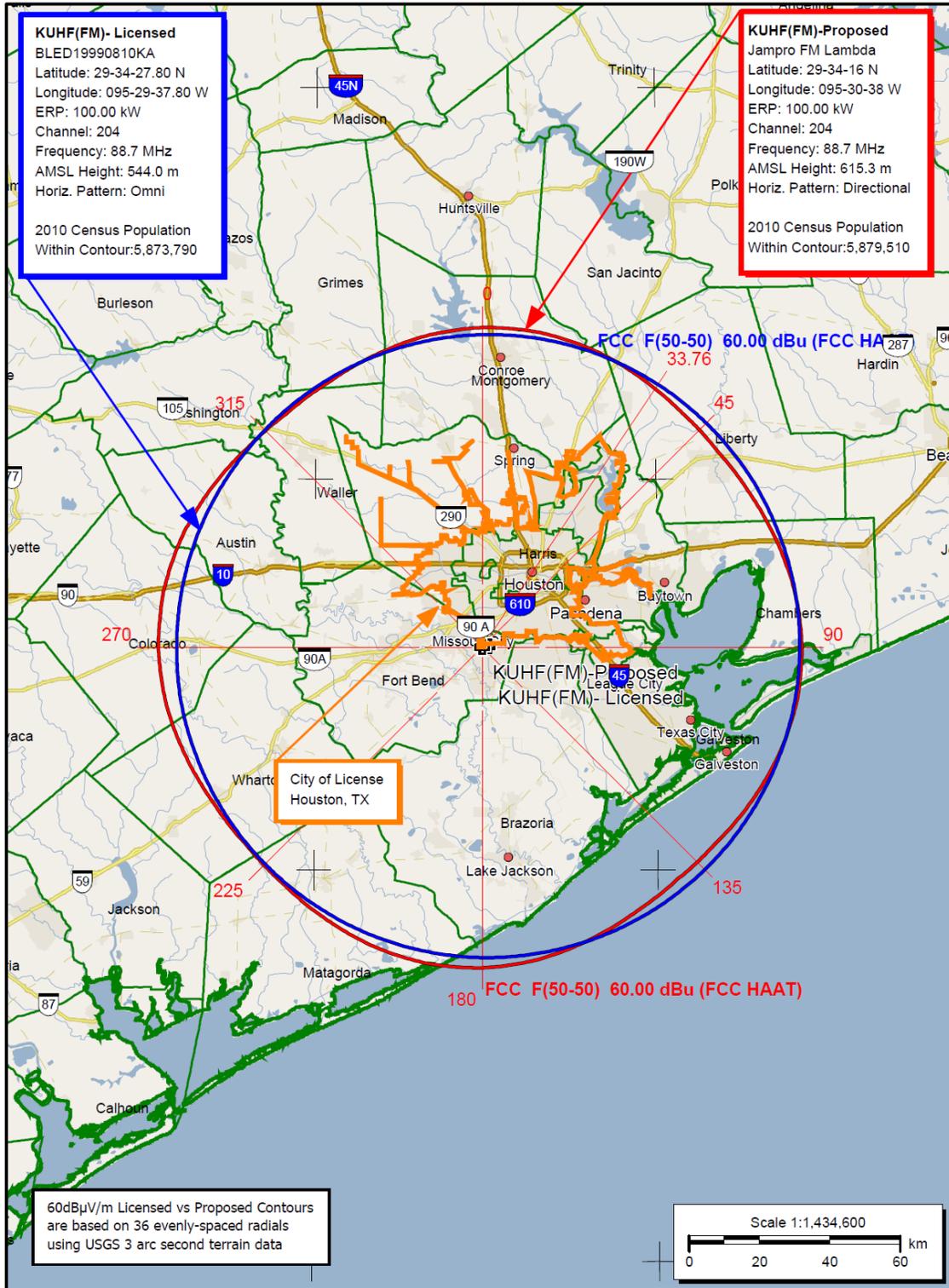
**RELATIVE FIELD AZIMUTH PATTERN**



**ERP - dBkW**



APPENDIX D – Predicted Coverage Contour and Site Map



# KUHF(FM) – Application for Minor Construction Permit Modification

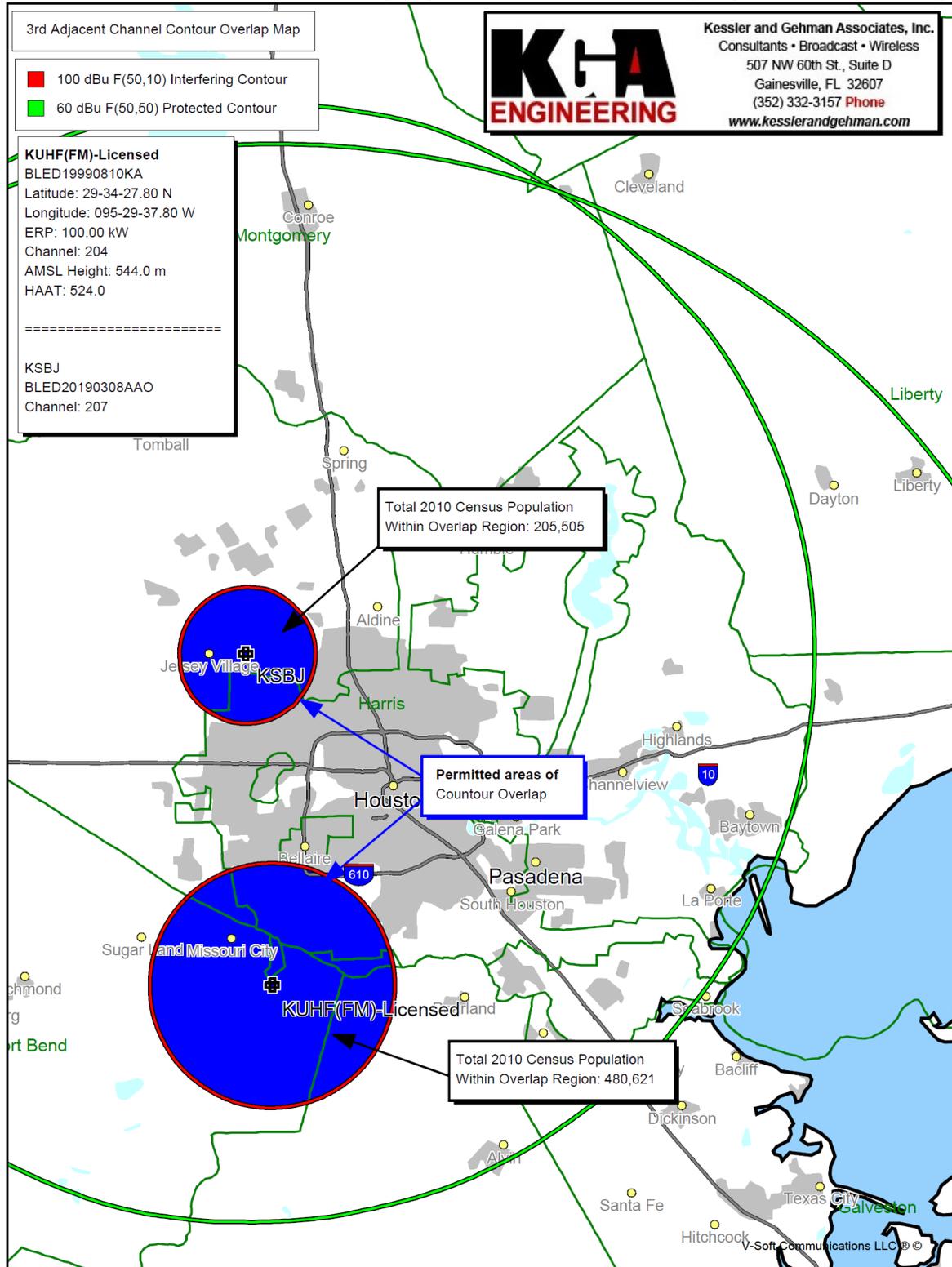
Houston, TX

## APPENDIX E – Allocation Studies and Map

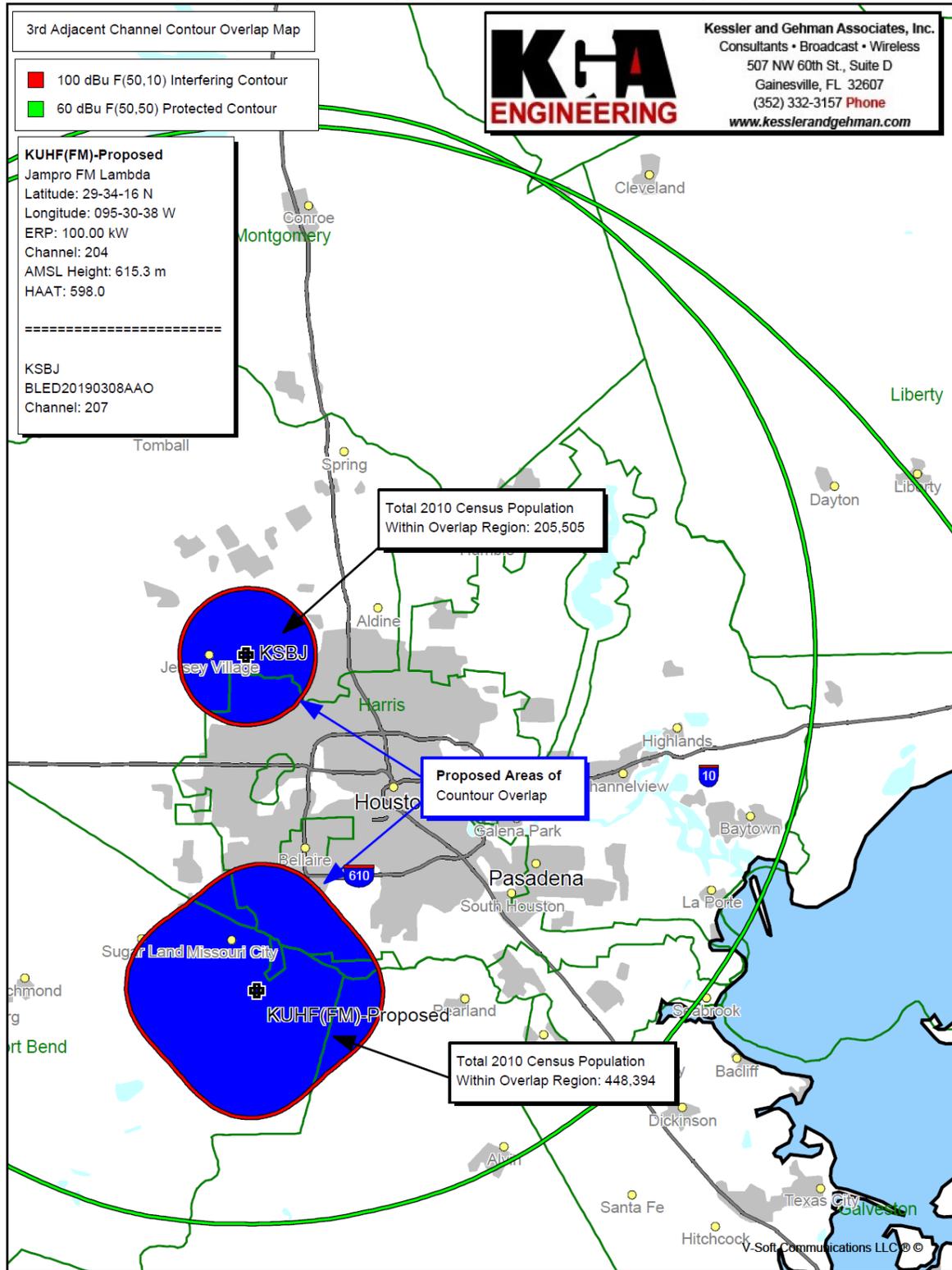
University of Houston System											
REFERENCE		CH# 204C - 88.7 MHz, Pwr= 100 kW DA, HAAT= 598 M,					COR= 615.3 M		DISPLAY DATES		
29 34 16.0 N.		Average Protected F(50-50)= 91.7 km							DATA 03-08-21		
95 30 38.0 W.		Standard Directional							SEARCH 03-08-21		
CH	CALL	TYPE	ANT	AZI.	DIST	LAT.	Pwr (kW)	INT (km)	PRO (km)	*IN*	*OUT*
CITY	STATE			<--	FILE #	LANG.	HAAT (M)	COR (M)	LICENSEE	(Overlap in km)	
207C1	KSBJ	LIC	CN	358.0	35.12	29 53 16.1	87.000	7.2	59.0	-62.5*<	-37.0*<
Humble	TX			178.0	BLED20190308AAO	95 31 23.3	160	190	Hope Media Group		
201A	KFTG	LIC	DEN	66.3	32.58	29 41 18.8	0.700	1.4	10.9	-57.0*<	9.5
Pasadena	TX			246.4	BLED20070621AQP	95 12 07.7	57	66	Aleluya Broadcasting Netwo		
203C2	KAYK	LIC	VN	239.8	173.40	28 46 44.0	50.000	66.1	41.4	19.4	1.7
Victoria	TX			59.1	BLED20040322AFS	97 02 52.0	86	109	American Family Associatio		
202C1	KAFR	LIC	VN	0.3	99.04	30 27 52.7	100.000	6.7	56.4	1.7	29.5
Willis	TX			180.3	BLED20171107ACF	95 30 20.8	135	216	American Family Associatio		
203C3	KGHY	LIC	VN	62.1	169.04	30 16 23.8	13.500	53.8	34.9	27.7	4.3
Beaumont	TX			242.9	BLED20090601AUP	93 57 23.6	105	112	Ccs Radio, Inc.		
201C2	KQUE-FM	LIC	DCN	215.0	104.23	28 48 03.9	3.600	3.7	48.3	12.3	43.7
Bay City	TX			34.7	BMLED20131113BFB	96 07 32.9	437	441	Aleluya Broadcasting Netwo		
204A	KAZI	LIC	CN	290.0	236.91	30 16 37.7	1.700	80.3	27.7	66.0	14.0
Austin	TX			108.8	BLED20180522AAR	97 49 35.0	107	328	Austin Community Radio		
203A	KEDC	LIC	CN	323.6	166.00	30 46 13.2	2.500	28.5	19.5	51.0	18.5
Hearne	TX			143.1	BLED20100726AJY	96 32 33.8	56	151	Red-C Apostolate: Religiou		
205C1	KLDN	LIC	DCN	19.1	215.84	31 24 28.6	50.000	82.8	56.0	43.1	26.2
LuFkin	TX			199.5	BLED19910418KA	94 45 53.7	198	282	Bd Supervisors, Louisiana		
203A	KHIB	LIC	DCN	294.9	173.05	30 12 57.7	4.000	17.4	11.9	65.8	27.7
Bastrop	TX			114.1	BLED19980508KB	97 08 31.9	94	242	Houston Christian Broadcas		
201C2	KLBT	LIC	DEN	71.8	124.50	29 54 52.8	30.000	2.3	25.8	33.4	86.3
Beaumont	TX			252.4	BLED20160511ABH	94 17 06.7	145	148	The King's Musician Educat		
206C3	KTIM	LIC	DCN	284.9	136.76	29 52 43.8	19.500	3.8	37.2	41.8	86.2
Ellinger	TX			104.2	BLED20171026ABX	96 52 45.9	84	182	Texas Independent Media, I		
204C0	KRVS	LIC	DEN	73.8	313.68	30 19 20.7	100.000	176.3	76.1	48.3	46.0
Lafayette	LA			255.3	BLED20040105AAF	92 22 40.5	379	388	The University Of Louisian		
204C2	KPLV	APP	CN	225.9	286.96	27 45 32.9	13.500	124.7	51.6	75.0	48.0
Corpus Christi	TX			44.9	0000110388	97 36 27.3	280	293	Educational Media Foundati		
201A	KXBT	LIC	DCN	311.6	137.73	30 23 21.9	2.400	1.9	21.1	48.8	104.8
Somerville	TX			131.1	BLED20110606AAN	96 35 04.6	96	181	The University Of Texas At		
204C2	KPLV	LIC	CN	225.6	287.99	27 44 30.1	14.000	123.6	50.8	77.0	49.7
Corpus Christi	TX			44.6	BLED20131115ALD	97 36 10.0	264	277	Educational Media Foundati		

Terrain database is USGS 03 SEC, R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM  
 Contour distances are on direct line to and from reference station. Reference Zone= , Co to 3rd adjacent.  
 All separation margins (if shown) include rounding.  
 Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, \_= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)  
 "\*"affixed to 'IN' or 'OUT' values = site inside restricted contour.  
 < = Station meets FCC minimum distance spacing for its class.  
 < = Contour Overlap

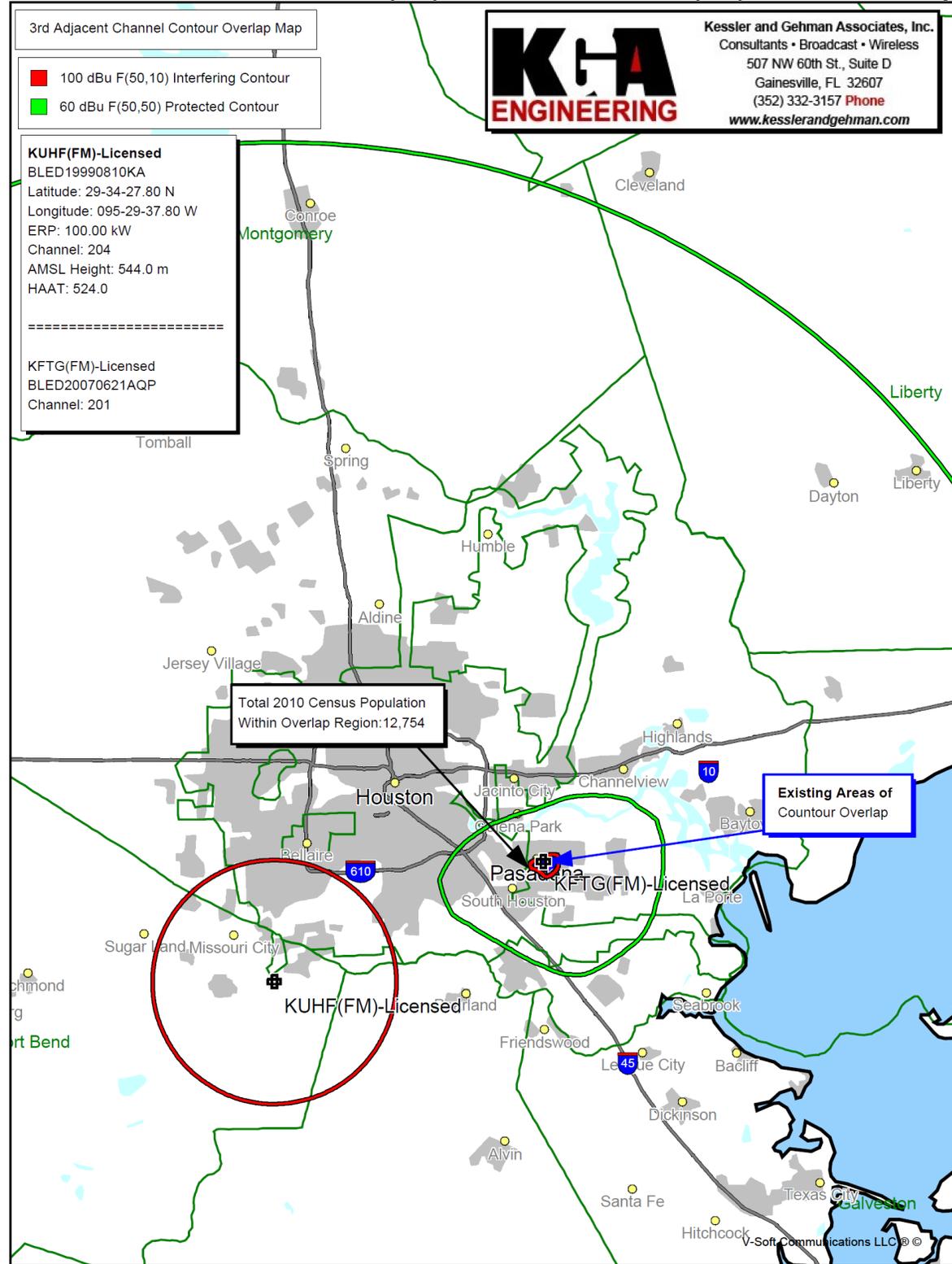
**APPENDIX F – Licensed KUHF(FM) and Licensed KSBJ(FM) Contour Overlap**



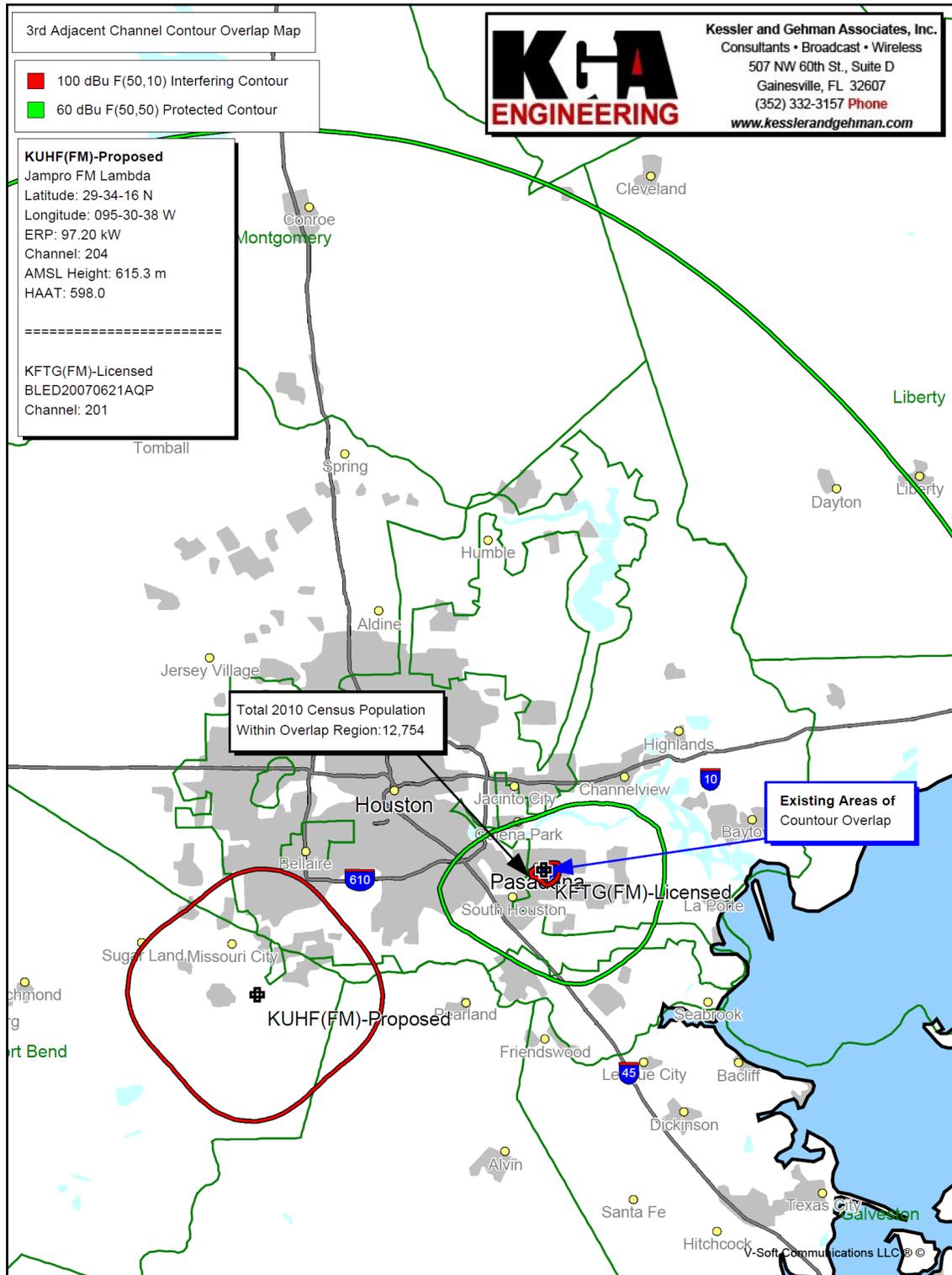
**APPENDIX G – Proposed KUHF(FM) and Licensed KSBJ(FM) Contour Overlap**



**APPENDIX H – Licensed KUHF(FM) and Licensed KFTG(FM) Contour Overlap**



**APPENDIX I – Proposed KUHF(FM) and Licensed KFTG(FM) Contour Overlap**



APPENDIX J – Far Field Exposure to RF Emissions

