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**ENGINEERING EXHIBIT EE-1:**

**HOUSTON CHRISTIAN BROADCASTERS, INC.  
FM TRANSLATOR STATION**

**NEW  
FM CHANNEL 228D  
KERRVILLE, TEXAS**

**APPLICATION FOR AUTHORITY TO  
CONSTRUCT OR MAKE CHANGES IN AN  
FM TRANSLATOR OR FM BOOSTER STATION**

**AUGUST 2013  
FCC FACILITY NUMBER  
142497**

**ENGINEERING EXHIBIT  
IN SUPPORT OF**

**APPLICATION FOR AUTHORITY TO  
CONSTRUCT OR MAKE CHANGES IN AN  
FM TRANSLATOR OR FM BOOSTER STATION**

**CH 228D  
KERRVILLE, TEXAS**

**HOUSTON CHRISTIAN BROADCASTERS, INC.**  
**FM TRANSLATOR STATION**  
**NEW**  
**FM CHANNEL 228D**  
**KERRVILLE, TEXAS**

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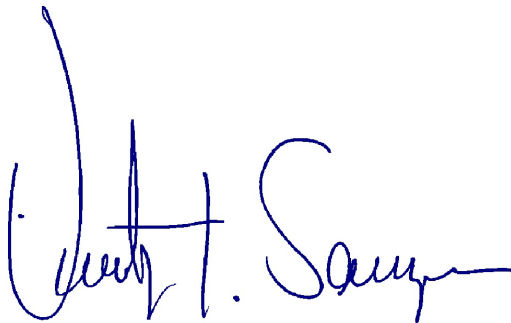
1. F.C.C. Form 349, Section III (Certification)
2. F.C.C. Form 349, Section IIIa (Engineering)
3. Declaration of Engineer
4. Narrative Statement
5. Figure 1, FCC/FAA Tower Registration
6. Figure 2, Vertical Sketch of Supporting Structure
7. Figure 3, Proposed Translator Service and Primary Station Contours, FM Translator Interference/Spacing Study, and LPFM Preclusion Study (if required).

## **DECLARATION**

I, Timothy Z. Sawyer, declare and that I have provided engineering services in the area of telecommunications since 1969. My qualifications are a matter of record with the Federal Communications Commission. I am a senior engineer with the firm of Mullaney Engineering, Inc., consulting radio telecommunications engineers with offices in Gaithersburg, Maryland.

The firm of Mullaney Engineering, Inc., has been retained to prepare the instant engineering exhibit in support of **an application for Authority to Construct or Make Changes in a FM Translator of FM Booster Station, FCC Facility ID Number 142497.**

All facts contained herein are true of my own knowledge except those stated to be on information and belief, and as to those facts, I believe them to be true. I declare under the penalty of perjury that the foregoing is true and correct.



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Timothy Z. Sawyer

Executed on the 27<sup>th</sup> day of August 2013

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**NARRATIVE STATEMENT:**

**I. GENERAL:**

The engineering exhibit, of which this narrative is part, was prepared in support of an application for a construction permit for a NEW FM Translator Station at Kerrville, Texas.

The station will provide FM "translator" service for co-owned noncommercial educational (NCE) FM Station KHKV, Kerrville, Texas, FCC Facility ID: 83433.

**No changes are proposed from the previously provided short form application**

The proposed FM Translator station will operate on channel 228D (93.5 MHZ) with an effective radiated power (ERP) of 0.050 kilowatts (50 watts) and an antenna height above mean sea level of 709 meters (AMSL) and above ground level of 98 meters (AGL). The applicant proposes to use a standard, non-directional, 1-bay FM antenna utilizing circular polarization (H & V).

**TRANSMITTER LOCATION - FIGURE 1:**

The transmitting facility will consist of a 1-bay FM antenna side-mounted on an existing permanent structure. No changes are proposed from the previously provided short form application. A copy of the FCC ASR registration for the structure is provided in Figure 1.

**VERTICAL SKETCH OF SUPPORTING STRUCTURE - FIGURE 2:**

A vertical tower sketch showing the proposed antenna and the existing supporting structure is included as Figure 2. No change in the overall height of the existing structure is proposed. The FAA has not been notified of this proposal.

**COVERAGE CONTOURS - FIGURE 3:**

The predicted coverage contours were calculated in accordance with the provisions of 47 CFR 73.313. In accordance with current FCC practice, no consideration was given to terrain roughness correction factors.

The average terrain elevations from 3 to 16 kilometers from the proposed translator site were obtained from the NGDC 30-second computer database. The standard twelve radials evenly spaced at 30-degree intervals were used for determining the average terrain elevations and the distance to the 60 dBu translator coverage contour.

The antenna radiation center heights above average terrain in the individual radial directions and the effective radiated power were used in conjunction with the F(50,50) curves of 47 CFR 73.333(Figure 1) to determine distances to the 60 dBu contour from the proposed translator and the FM primary station.

Figure 3 contains a map on which the predicted coverage contours of the translator and the primary station to be rebroadcast, KHKV, Channel 216A Kerrville, Texas are drawn.

**CHANNEL 228D ALLOCATION STUDY - FIGURE 3:**

The proposed site fully protects all other stations of concern as detailed in Figure 3. No prohibitive overlap with any other facility of concern is predicted to occur.

**LPFM PRECLUSION STUDY:**

An LPFM preclusion study, has been provided in the previously filed short-form amendment.

As this application *DOES NOT* modify any technical parameters from that previously filed with the Commission, the LPFM preclusion study is incorporated herein by reference.

No preclusion of any LPFM facilities will occur as a result of a grant of this proposal within any designated LPFM market grid, nor is the proposed facility located within any Top-50 market grid or buffer zone.

**OTHER CONSIDERATIONS:**

The "blanketing" contour of a 0.050 kilowatt FM station extends 90 meters. The applicant recognizes its responsibility to remedy complaints of blanketing interference as required by 47 CFR 73.318, and to protect existing or proposed facilities in accordance with the Commission's applicable rules. An intermodulation study has been conducted and no adverse impact on existing facilities or pending applications is anticipated. However, the applicant clearly recognizes its responsibility to remedy interference complaints to existing stations resulting from its proposed operation.

**ENVIRONMENTAL CONSIDERATIONS:**

The applicant believes its proposal will not significantly affect the environment for the following reasons.

The proposal does not meet any of the criteria specified in Section 1.1307 of the FCC Rules. More specifically, the proposed facilities are not known to fall within any of the categories enumerated in Sections 1.1307(a)(1)-(7) and will not involve the use of high intensity white lights.

The site and this proposal are exempt from NHPA Section 106 review as no construction will occur that would trigger a review under NHPA Section 106.

Furthermore, operation of the proposed facility will not involve the exposure of workers or the general public to levels of radio frequency electromagnetic fields exceeding guidelines adopted by the Federal Communications Commission. (The current FCC guidelines are based upon criteria contained in the National Council of Radiation Protection and Measurements (NCRP) Report No.86 (1986) and ANSI/IEEE C95.1-1992.)

Based upon a worst case downward field value of 1.0 for all angles below the horizon, and a power of 0.050-kilowatts, and an antenna height of 98 meters above ground. The power density level 2-meters above ground is predicted to be 0.0004 mW/cm<sup>2</sup> or less. The computed power density is 0.04% of the Commission's guidelines for a controlled area and 0.2% for an uncontrolled area. This level is well below the Commission's guidelines for maximum exposure levels to electromagnetic fields and no further study is required. The minimum safe distance for a controlled area is 1.8 meters (5.91feet), the antenna is located at 98 meters (322 feet) above ground, therefore no exposure in excess of the guidelines can occur at ground level.

The applicant will fully-cooperate and coordinate with all site users as required by the Commission's rules.

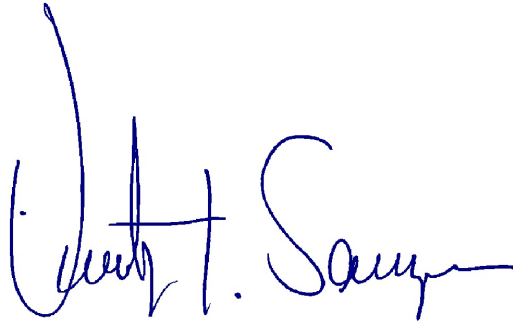
**II SUMMARY:**

The proposed FM translator will operate as a FM translator for co-owned, noncommercial educational FM Broadcast Station KHKV Kerrville, Texas with a maximum ERP 0.050-kilowatts, utilizing a NON-DIRECTIONAL / OMNI circularly polarized antenna system.

Operation as proposed herein would not cause/increase any normally prohibited contour overlap, and would not have any significant impact on the environment.

The proposed operation is fully in compliance with all other areas of the Commission's rules and applicable international agreements.

27 August 2013



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Timothy Z. Sawyer

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TEL.: (301) 921-0115, ext 3.



# FCC TOWER REGISTRATION

## 1247051

### Registration Detail

Reg Number	1247051	Status	Granted
File Number	A0428121	Constructed	
EMI	No	Dismantled	
NEPA	No		

### Antenna Structure

Structure Type	TOWER - Free standing or Guyed Structure used for Commu		
Location (in NAD83 Coordinates)			
Lat/Long	30-03-31.0 N 099-03-51.1 W	Address	2935 Cypress Creek Road (5 mi E of Kerville)
City, State	Kerville , TX		
Zip	78028	County	KERR
Center of AM Array		Position of Tower in Array	

### Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
611.1	128.0
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
739.1	127.1

### Painting and Lighting Specifications

FAA Chapters 4, 8, 12  
Paint and Light in Accordance with FAA Circular Number 70/7460-1K

### FAA Notification

FAA Study	2004-ASW-4478-OE	FAA Issue Date	10/22/2004
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## FAA NOTIFICATION AND/OR FCC TOWER REGISTRATION

CH 228D (FMX)  
KERRVILLE, TEXAS

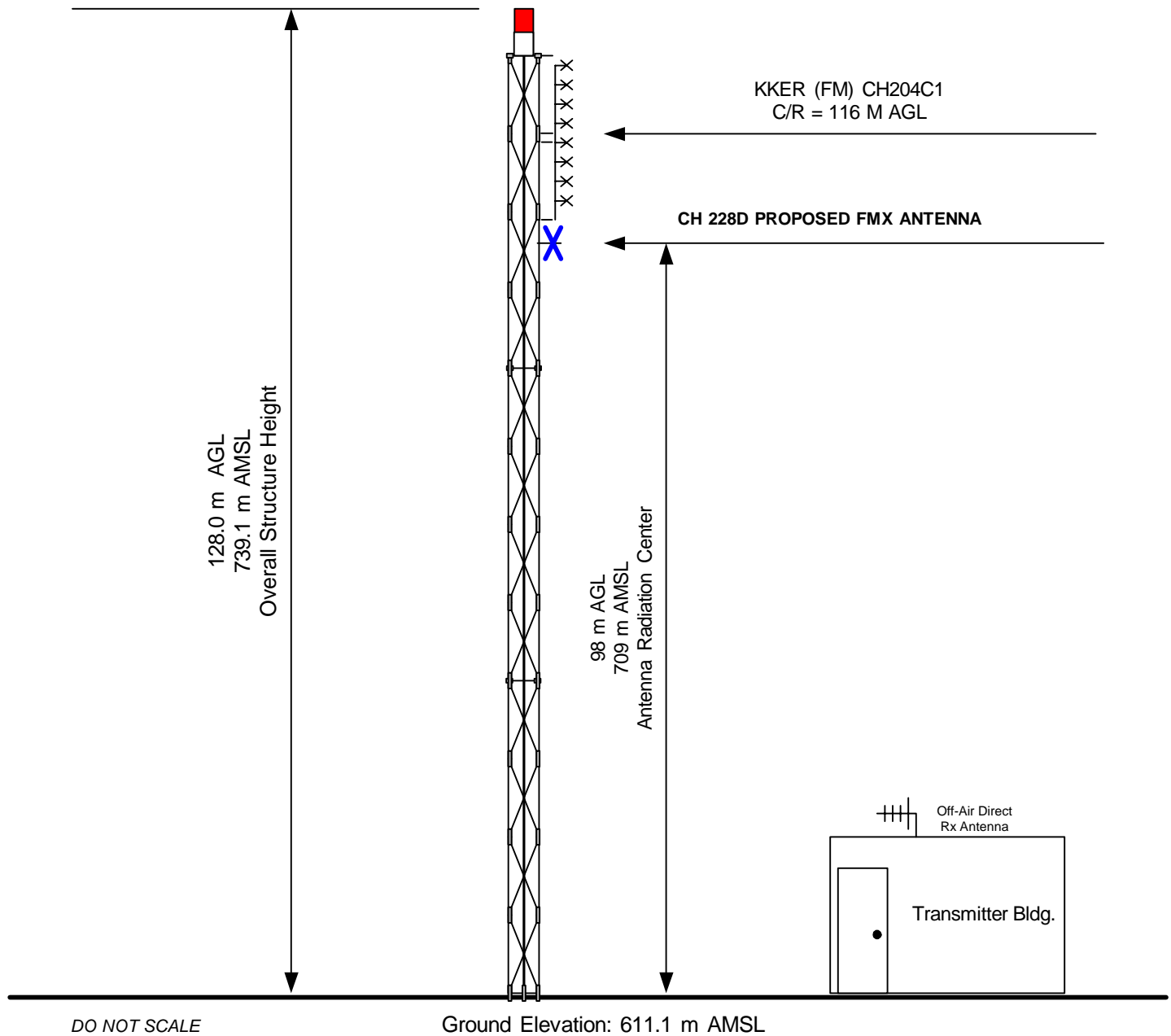
**FIGURE  
1**

GAITHERSBURG, MARYLAND U.S.A

SIZE A	FSCM NO N/A	DWG NO 20130827KERRVILLECH228D	REV NONE
SCALE N/A	AUGUST 2013		SHEET

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This is an existing structure - no new construction is required  
 Proposal is exempt from Section 106 NHPA processing  
 No increase in existing structure height - FAA notification not required  
 FCC ASR # 1247051



DO NOT SCALE

Ground Elevation: 611.1 m AMSL



## VERTICAL SKETCH OF SUPPORTING STRUCTURE

CH228D (FMX)  
KERRVILLE, TEXAS

**FIGURE  
2**

GAITHERSBURG, MARYLAND U.S.A

SIZE  
A

FSCM NO  
N/A

DWG NO

20130827CH228KERRVILLE

REV

(c) 2013, ALL RIGHTS RESERVED

SCALE

NO SCALE

AUGUST 2013

SHEET

**NEW-T**

THIS APPLICATION

Latitude: 30-03-30.20 N

Longitude: 099-03-50 W

ERP: 0.05 kW

Channel: 228 Frequency: 93.5 MHz

Antenna HAAT Height: 0.0 m

Antenna AMSL Height: 709.0 m

Antenna AGL Height: 98.0 m

Ground Elevation: 611.0 m

Horiz. Pattern: Omni

**KHKV**

BLED19980416KA

Latitude: 30-02-37 N

Longitude: 099-07-17 W

ERP: 0.30 kW

Channel: 216 Frequency: 91.1 MHz

Antenna HAAT Height: 63.0 m

Antenna AMSL Height: 615.0 m

Antenna AGL Height: 42.0 m

Ground Elevation: 573.0 m

Horiz. Pattern: Omni

**PROPOSED FM TRANSLATOR SERVICE CONTOUR  
WITH PRIMARY STATION SERVICE CONTOUR**

NEW-T

CHANNEL 228D

KERRVILLE, TEXAS

FIGURE 3

**FCC 60 DBU F(50,50) SERVICE CONTOURS****CONTOURS DISPLAYED**RED CONTOUR IS PROPOSED FM TRANSLATOR  
BLACK CONTOUR IS PRIMARY STATION

Scale 1:250,000

0 6 12 18 km

**AUGUST 2013**

## NEW FM TRANSLATOR CH 228D KERRVILLE TX

FIGURE 3

Houston Christian Broadcasters, Inc.

REFERENCE CH# 228D - 93.5 MHz, Pwr= 0.05 kW, HAAT= 0.0 M, COR= 709 M  
 30 03 30.2 N. Average Protected F(50-50)= 4.71 km  
 99 03 50.0 W. Omni-directional

DISPLAY DATES  
 DATA 08-27-13

CH CITY	CALL	TYPE STATE	ANT TX	AZI <--	DIST FILE #	LAT LNG	PWR (kW) HAAT (M)	INT (km) COR (M)	PRO (km) LICENSEE	*IN* (Overlap in km)	*OUT*
228C2	KOOK Junction	LIC	CN TX	297.6 117.1	105.00 BLH19990609KA	30 29 31.0 100 02 03.0	50.000 150	138.4 794	52.8 Foster Charitable Foundati	-44.1*<	16.1
228D	1563543 Kerrville	APP	C TX	0.0 0.0	0.00 BNPFT20030317CNX	30 03 30.2 99 03 50.0	0.050	30.3 709	9.0 Houston Christian Broadcas	-39.3*	-39.3*
229C	R15062 Austin OSC to reclassify as class C0.	DEL	TX	76.8 257.4	125.58	30 18 36.0 97 47 33.0	100.000 600	134.8 814	90.4 Katherine Pyeatt	-19.2*<	21.2
229C	R14709 Austin OSC to class C0.	DEL	TX	76.8 257.4	125.58	30 18 36.0 97 47 33.0	100.000 600	134.8 814	90.4 Katherine Pyeatt	-19.2*<	21.2
227C	KGSR Cedar Park	LIC	CX TX	54.0 234.5	127.02 BLH20020404AAD	30 43 34.0 97 59 23.0	100.000 587	134.4 928	90.1 Emmis Austin Radio Broadca	-16.8*<	23.7
229C0	R14709 Austin OSC from class C to accommodate a dropin channel 232C3 @ Moulton, TX.	ADD	TX	76.8 257.4	125.58	30 18 36.0 97 47 33.0	100.000 450	120.2 664	81.0 Katherine Pyeatt	-4.5<	30.7
229C0	R15062 Austin OSC to reclassify as class C0.	ADD	TX	76.8 257.4	125.58	30 18 36.0 97 47 33.0	100.000 450	120.2 664	81.0 Katherine Pyeatt	-4.5<	30.7
229C	KLBJ-FM Austin	LIC	CX TX	76.8 257.4	125.58 BMLH20070405ABS	30 18 36.0 97 47 33.0	97.000 320	103.8 539	71.4 Emmis Austin Radio Broadca	11.9	40.3
230D	K230AL Boerne	LIC	V TX	136.5 316.6	33.35 BLFT20070315ABR	29 50 26.0 98 49 32.0	0.115 103	0.8 596	10.1 Wildcatter Wireless, Inc.	20.5	22.8
225C1	KROM San Antonio From Channel 225C	LIC	NCN TX	138.2 318.6	116.34 BLH19970530KA	29 16 29.0 98 15 52.0	45.000 412	9.3 570	72.0 Tichenor License Corporati	95.0	43.8
226A	KXQK Leakey One Step Application	RSV-A	TX	240.9 60.5	83.16	29 41 34.0 99 48 56.0	6.000 100	3.1 679	32.6 Radio Dalhart, Inc.	68.5	50.0
226A	KXQK Leakey One Step Application	APP	NCX TX	240.9 60.5	83.16 BPH20130221AAO	29 41 34.0 99 48 56.0	1.900 181	2.5 760	31.1 Radio Dalhart, Inc.	69.1	51.6
229D	K229BJ Hollywood Park	LIC	DC TX	126.6 306.9	73.71 BLFT20070919ACU	29 39 43.0 98 27 05.0	0.062 138	2.1 455	1.6 Elizabeth Gonzalez	59.0	53.4
227D	K227BH San Antonio	LIC	C TX	141.6 321.9	90.45 BLFT20130410AAB	29 25 06.5 98 29 01.0	0.250	22.3 384	14.8 Mary H. Lopez	56.1	57.9
231C2	KTFM Floresville	LIC	CN TX	151.2 331.4	110.59 BLH19980421KD	29 11 03.0 98 30 49.0	40.000 167	6.0 344	52.8 Bmp San Antonio License Co	92.2	57.3
230C3	KBNU Uvalde	LIC	EX TX	215.2 34.9	106.10 BLH20011102AAH	29 16 34.0 99 41 44.0	25.000 89	3.4 389	33.5 Mbm Radio Uvalde Llc	90.3	72.1

Terrain database is NGDC 30 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= West 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 protected contour.

----- NO PROHIBITIVE OVERLAP - NO PROBLEMS FOUND -----

WITH REGARDS TO MEXICO:

Station must coordinate with Mexico. Distance to border = 187.4 km.

Translator stations located between 125 kilometers and 320 kilometers from the Mexican border

may operate with an ERP in excess of 50 watts, up to the maximum permitted ERP of 250 watts per §74.1235(b)(2).

However, in no event shall the location of the 60 dBu contour lie within 116.3 km of the Mexican border.

This proposal complies with the spacing/contour distances to Mexico.