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ENGINEERING EXHIBIT EE:

**RADIO STATION KKER(FM)
HOUSTON CHRISTIAN BROADCASTERS, INC
KERRVILLE, TEXAS**

Ch. 204C1 55 KW-DA 174 M HAAT

NOVEMBER 8, 2004

**ENGINEERING STATEMENT IN SUPPORT OF
AN APPLICATION FOR A
MODIFICATION OF A LICENSED FACILITY**

File No. BLED-20001220AAK - Facility ID: 84182

ATTACHED TO EXHIBIT 14 OF FCC FORM 340

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TABLE OF CONTENTS:

1. F.C.C. Form 340.
2. Declaration of Engineer
3. Narrative Statement
4. Figure 1, Topographic Map Showing Proposed Site. (not required)
5. Figure 2, Existing vs: Proposed Coverage Map.
6. Figure 3, Vertical Tower Sketch.
7. Figure 4, Channel Allocation - Worst Case.
8. Figure 5, Contour Protection Map.
9. Figure 6, Horizontal Radiation Pattern - Relative Field.
10. Figure 7, RF Exposure Plot.
11. Figure 7-A, Antenna Elevation Plot.
12. Figure 8, TV Channel 6 Protection.

Declaration

I, John J. Mullaney, declare and state that I am a graduate electrical engineer with a B.E.E. and my qualifications are known to the Federal Communications Commission, and that I am a principal engineer in the firm of Mullaney Engineering, Inc., and that I have provided engineering services in the area of telecommunications since 1977. My qualifications as an expert in radio engineering are a matter of record with the Federal Communications Commission.

The firm of Mullaney Engineering, Inc., has been requested by Houston Christian Broadcasters, Inc., to prepare the instant engineering exhibit in support of an application for Construction Permit to modify the existing facility of KKER at Kerrville, TX.

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

/s/ John J. Mullaney

John J. Mullaney, Consulting Engineer

Executed on the 8th day of November 2004.

ENGINEERING EXHIBIT EE:

**RADIO STATION KKER(FM)
KERRVILLE, TEXAS**

Ch. 204C1 55 KW-DA 174 M HAAT

NARRATIVE STATEMENT:

I. General:

This engineering statement has been prepared on behalf of Houston Christian Broadcasters, Inc.. The purpose of this statement is to request a Construction Permit to modify the existing facility of KKER at Kerrville, TX. This application is for a new CP for C1 facilities Channel 204C1 which will operate with an ERP of 55 KW-DA and an HAAT of 174 Meters.

This application is essentially a replacement CP for an outstanding authorization to upgrade from C3 to C1 facilities. Mexican concurrence has already be obtained from a nearby site.

The application is not a major environmental action, as defined by Section 1.1307 of the Commission's Rules. The proposed facility is in full compliance with both the "controlled" & "un-controlled" FCC Radiation Guidelines.

Answers to questions contained in F.C.C. Form 340, are incorporated in the following paragraphs and figures.

II. Engineering Discussion:

A. Proposed Location:

KKER(FM) proposes to locate the tower approximately 8 kilometers east of Kerville, Texas. The NAD-27 geographic coordinates are:

Latitude: 30° 03' 30.3"

Longitude: 99° 03' 50.0"

The Regional Office of the **FAA has already approved the structure**. Once the decision is final it will be registered with the ASR system (December 2004).

B. Antenna System and Tower:

A dual polarized 8-bay FM antenna will be side mounted near the top of a new tower. **Figure 3** is a sketch of the proposed tower.

Figure 6 is a polar plot & tabulation of the relative horizontal field pattern. The antenna will be mounted in accordance with recommendations from the directional antenna manufacturer. In addition, no top mounted platforms or other antennas will exist in close proximity of the FM antenna unless approved by the antenna manufacturer.

C. Effective Radiated Power:

Giving consideration for the maximum antenna gain, transmitter power and line loss, the maximum Effective Radiated Power is 55 KW-DA for the Horizontal and 55 KW-DA for the Vertical Component.

D. Channel Allocation:

Figure 4 is a channel allocation study from the proposed site. The study is worst case since it assumes a non-directional ERP of 100 kW whereas the proposal is for 55 kW using a directional pattern. **Figure 5** is a contour protection map which shows the protected and interfering contour for each of the potentially affected stations. This map clearly demonstrates the lack of prohibited overlap.

E. TV Channel 6 Protection:

The only TV 6 station close enough to require evaluation is KCEN which is 222 km away. An FM operating on Ch. 204 is permitted to exceed the protected contour of the TV (U/D) by 9 dB. **Figure 8** is a map which illustrates the 47 dBu contour of the TV and the interfering 56 dBu contour of the FM (F(50,10)). No prohibited overlap results.

F. Terrain Profile Data & Coverage:

Terrain profile data was extracted from the NGDC 30 Second Digitized Terrain Data Base provided out of Boulder, Colorado. At least twenty-four bearings (every 15 degrees) were used to obtain the proposed coverage data. The standard eight bearings (every 45 degrees) were used to obtain the proposed HAAT.

The predicted service contours, as shown in the attached report, were computed using a mathematical model adapted for computer use of data shown in Figure 1 of Section 73.333. This is the Commission's computer program TV FM FS REPORT RS-76-01, dated January 1976.

G. Terrain Profile to City of License:

The N-265-E radial is the direct path to the City of License. From the proposed site the 3.16 mV/M or 70 dBu City Grade Contour will completely encompass the City of License without major terrain obstruction.

H. FM Blanketing Contour:

KKER(FM) recognizes its obligation to resolve related interference complaints for a one year period within its 115 dBu "FM Blanketing Contour" as required by Section 73.318 of the FCC Rules.

The radius around the base of the tower in which Blanketing interference is possible is fairly small (2.3 km) and is in a sparsely populated area. Given the height of the proposed antenna, no problems are anticipated.

I. Other Services in Area:

There are no known AM Broadcast Stations within 3.2 kilometers of the proposed site.

There are no known transmission facilities within 60 meters (197 feet) of the proposed antenna.

There are other known FM or TV transmitters within 10 kilometers (6.2 miles) of the proposed site, however, based upon the type of transmitter proposed, and the frequency & power involved no intermodulation interference problems with existing transmitting facilities is expected. In the unlikely event some problems

would occur, KKER(FM) will investigate and correct such cases in accordance with the Commission's Rules.

J. Environmental Assessment Statement:

KKER(FM) believes its proposal will not significantly affect the environment since it does not meet any of the criteria specified in Section 1.1307 of the rules. Specifically the proposed facility:

- 1) Will NOT be located in an officially designated wilderness area.
- 2) Will NOT be located in an officially designated wildlife preserve.
- 3) Will NOT affect districts, sites, buildings, structures or objects, significant in American history, architecture, archeology or culture, that are listed in the National Register of Historic places or are eligible for such listing.
- 4) Will NOT be located in a floodplain.
- 5) Will NOT result in construction that will involve a significant change in the surface features (eg. wetland fill, deforestation or water diversion).
- 6) Will NOT involve the use of high intensity white lights on a structure located in a residential neighborhood, as defined by the applicable zoning laws.
- 7) Will NOT involve the exposure of workers or the general public to levels of Radio Frequency radiation in excess of the guidelines recommended by the FCC - OET Bulletin 65 (August 25, 1997).

The following is a more detailed discussion of this protection standard:

A. National Environmental Policy Act of 1969:

In 1969, Congress enacted the National Environmental Policy Act (NEPA), which requires the FCC to evaluate the potential environmental significance of the facilities it regulates and authorizes. Human exposure to Radio Frequency (RF) radiation had been identified as an issue that the FCC must consider.

Beginning with the filing of applications after January 1, 1986, broadcast stations were required to “certify compliance” with FCC prescribed guidelines on human exposure to RF radiation. The FCC standard was based upon the American National Standards Institute’s (ANSI) RF radiation protection guides (ANSI C95.1-1982). These exposure limits are expressed in terms of milli-watts per square centimeter.

In October 1997, the FCC implemented a two tier evaluation criteria utilizing recommendations of the National Council on Radiation Protection and Measurement (NCRP). The “controlled” tier involves areas which have restricted access while the “un-controlled” tier involves areas which have unrestricted access. The Maximum Permissible Exposure (MPE) limits for “controlled” areas are the same as adopted in 1985, while the “un-controlled” limits for FM and TV frequencies are one-fifth or 20% of the limits for “controlled” areas.

These exposure limits are time-averaged over any six minute period and vary depending upon the frequency involved. The following are the Maximum Permissible Exposure (MPE) limits for “controlled” areas:

Frequency Range (MHz)	Power Density (mW/sq.cm)
*****	*****
0.3 to 3	100 AM
3 to 30	900/(Freq ²)
30 to 300	1.0 VHF TV & FM
300 to 1,500	Freq/300 UHF TV
1500 to 100,000	5.0

KKER(FM) recognizes that compliance with the above criteria at sites involving multiple AM, FM and/or TV facilities is based upon the contributions of all such facilities. At the site discussed in this application, **the only significant facility** that will exist is the proposed FM facility.

FM Broadcast Stations

For FM Broadcast Stations the following formula is used:

$$D = \frac{\text{SQRT}(F^2 * [HERP + VERP])}{1.667 * \text{SQRT}(PD) * 3.2808}$$

Where:

- D = the closest distance in meters that a human should come to an operating antenna (To obtain feet multiply by 3.2808)
- F = typical relative field factor in downward direction (F=1 is worst case main lobe)
- HERP = Horizontal ERP in watts (above a dipole)
- VERP = Vertical ERP in watts (above a dipole)
- PD = highest Power Density in milli-watts/cm²
- SQRT = Square Root
- Freq = Frequency in mega-cycles/sec. (MHz)

The vertical radiation pattern of the FM antenna specified in this application is narrow and, therefore, the power density as seen by an observer on the ground

near the base of the tower will be less than 20 percent of the total ERP.

The application of the above equation (assuming maximum ERP), in our case, for a frequency of 88.7 MHz and an “un-controlled” Power Density of 0.2 milliwatts results in a minimum distance of 135.6 meters (445 feet) from the antenna. Inasmuch as the lowest element on the proposed antenna will be approximately 100.6 meters (330 feet) above the ground level, additional analysis is required before one can conclude that no hazard will exist.

Figure 7-A is a vertical elevation plot for an ERI 8 bay full-wave spaced FM antenna (LPX-8AC).

Figure 7 is a plot of the predicted RF Exposure at 7 feet above ground level. The “solid” line assumes a vertical form factor of $F=1.0$ while the “dashed” line uses the vertical form factor from Figure 7-A. As can be seen, the use of the 8 bay antenna reduced the exposure at ground level below 20 uW/sq.cm or 2 percent of the standard for a “controlled” area. For FM, the “un-controlled” standard is 20% and therefore, this proposal is in full compliance.

The tower will be surrounded by a locked fence to limit access.

Workers employed to climb the tower or work in a potential overexposure location will not be permitted to enter the work area until cleared by the station manager or other responsible person. Appropriate warning signs will be posted to ensure safety. In addition, KKER(FM) will establish and enforce work rules and safety procedures applicable in a potential over-exposure area. The rules will establish how close a worker can get to the antenna when it is operating at

normal power and specify the power reduction required in order to make other locations safe. It is recognized that maintenance or installation work on or near the antenna may require the station to completely shutdown or switch temporarily to an auxiliary antenna or an auxiliary transmitter site. All employees, contract and other persons having access to areas of potential exposure will be required to sign a site management guide indicating they are aware of and will comply with all safety rules.

III. SUMMARY:

Houston Christian Broadcasters, Inc., licensee of KKER at Kerrville, Texas, requests a new CP to upgrade from C3 to C1 facilities. This engineering proposal is in full compliance with the Commission's Rules.

/s/ John J. Mullaney

John J. Mullaney, Consulting Engineer

November 8, 2004.