

# ***KLEIN BROADCAST ENGINEERING, L.L.C.***

dedicated to improving the science of radio and television communications

OCTOBER 2004

EXHIBIT E-10RHS  
FCC FORM 302-FM APPLICATION  
FOR FM BROADCAST STATION LICENSE TO COVER CONSTRUCTION PERMIT  
FCC FILE # BPH-20020926ABK  
AGM-NEVADA, L.L.C.  
K A R S (FM)  
FM CHANNEL 275 C1 / 102.9 mHz.  
LARAMIE , WYOMING

## RF RADIATION HAZARD COMPLIANCE STATEMENT

The facilities constructed herein by the applicant, permittee or licensee, in this Engineering Exhibit comply with FCC O.S.T. Bulletin #65 and #65A as revised (1997) and the ANSI C-95.1-1982 RF and ANSI C95.1992 and the NCRP exposure guidelines. The interpolation of the figures from the above referenced document, page 18, supplement "A", shows a BEST case requirement of 36.1 meters height above ground level requirement for the radiation center of the installed ten (10) bay 0.926 wave length spaced FM broadcast antenna. A combined vertical and horizontal effective radiated power of 200 kilowatts was used for this study and determination (100 kW Horiz. & 100 kW Vert.) The radiation center of the FM broadcast antenna system is located at 45 meters above ground level (AGL), well within the requirement for the antenna as determined from the above referenced documents. The antenna specified and installed is an Electronics Research, Inc., model SHPX-10AC-SP, EPA Type 3, ten (10) section, 0.926 wave length spaced, circularly polarized antenna. The antenna manufacturer, Electronics Research, Inc., states its antenna meets the BEST case requirements for downward radiation pattern according to the FCC O.S.T. Bulletin #65 Guidelines. The antenna installed uses -1.46 degrees of beam tilt and no null fill.

Occupational compliance is certified by the reduction of operating power or the complete cessation of operation during such time maintenance personnel are on the antenna support structure. A transmitter "LOCK OUT" circuit has been installed to prevent accidental turn on of the transmission equipment during the time maintenance personnel are on the antenna support structure. The applicant, permittee or licensee will cooperate with other site users in order to comply with The FCC Guidelines on Human Exposure to Non-Ionizing RF Radiation.

In addition to the preceding the applicant, permittee or licensee, has by computer program, performed additional calculations to predict RF power density at the base of the antenna support structure. This program predicts a maximum power density of 21.4013 microwatts/cm<sup>2</sup> at a distance of 18 meters from the base of the antenna support structure at a height of 2.0 meters above ground level. This is less than 11% of the allowable RF power density for Uncontrolled areas under the FCC and ANSI/EPA Guidelines, being limited to: 200.0 microwatts/cm<sup>2</sup> for Uncontrolled areas and 1.00mW/cm<sup>2</sup> or (1,000 microwatts/cm<sup>2</sup>) for Controlled areas (areas within fencing). All other power density was calculated to be below this maximum predicted level for a distance of 0 to 1000 meters distance from the base of the antenna support structure at 2.0 meters above ground level. There are no other sources of significant RFR levels at the proposed KARS(FM) site.

The computer program employed for the RFR analysis in this engineering exhibit uses either the Near Field or Far Field method for the calculation of power density and was written by the Commission's O.E.T. staff. In this particular case the Far Field Method was used. The formula used by the computer program was derived from the FCC O.S.T. Bulletin #65, as revised to date.

The formula may be stated in the following manner:

$$E(V/m) = \frac{1.6 * 221.72 * \text{SQRT}(\text{ERP}) * (\text{element pattern factor}) * (\text{array factor})}{\text{DIST}}$$

$$H(A/m) = \frac{1.6 * 0.588 * \text{SQRT}(\text{ERP}) * (\text{element pattern factor}) * (\text{array factor})}{\text{DIST}}$$

Where:

ERP = effective radiated power in kilowatts, relative to a half wave dipole.

DIST = distance in meters from the antenna radiation center to the observation point in meters.

The 1.6 factor found in the ANSI/EPA formula and used above at the beginning of each equation takes into account possible contributions from ground reflections. The element pattern factor in a linearly interpolated relative field value at the appropriate depression angle below the horizon as taken directly from the EPA data. The array factor is computed at the appropriate depression angle using the number of antenna elements, when normalized to 1.0 in the main lobe. This array factor only applies to antenna arrays of point sources where each source has equal power distribution and phase, and are uniformly spaced. The element patterns themselves can be associated with particular antenna designs. As of May 1986 there were six (6) element types identified for FM antennas as listed in the ANSI/EPA data and FCC Bulletin #65.

The "crossed ring" EPA Type 3 element is used on the Electronics Research, Inc., model SHPX-10AC-SP, EPA Type 3 is listed in the EPA data and was used for the calculations contained herein. There were two types listed for television, one for VHF and one for UHF.

The General Public will not have access to the antenna support structure base because it is in a sparsely populated, rural area. The only access to the site is by four wheel drive dirt road. The antenna support structure base will be protected by a locked gate, fence. The locked gate, fence is around the entire perimeter of the communications site and the base of antenna support structure. Only authorized personnel have access to the locked gate. This will prevent General Public access to the actual antenna support structure base.

The applicant, permittee or licensee, will install and post RF Radiation Hazard Warning Signs in and around the site at approximately eye level for additional warning and safety.

A vertical pattern plot of the Electronics Research, Inc., model SHPX-10AC-SP (EPA Type 3) antenna employed at KARS(FM) is included with this exhibit and is marked Figure 1. This plot clearly shows this antenna has greatly reduced downward radiation and meets the BEST case requirements of FCC Bulletin #65, as amended to date. This plot also shows the vertical plane pattern with the specified -1.46 degrees of electrical beam tilt.

The plot Exhibit marked Figure 2. is a plot of the actual calculated power density in microwatts/cm<sup>2</sup> vs. distance. This plot shows the calculated maximum predicted power density of 21.4013 microwatts/cm<sup>2</sup> occurring at 18 meters distant from the base of the antenna support structure. It also shows, graphically, that all other calculated power density RFR levels are below this maximum between 0 meters and 1000 meters distant from the base of the antenna support structure.

The preceding assures compliance with the FCC, ANSI and NCRP requirements. Based on the preceding documents, tables, guidelines and calculations, the proposed operation of the main transmission facility for KARS FM Broadcast Station is in compliance with the FCC O.S.T. Bulletin #65 and the ANSI C-95.1-1992 and the NCRP RF Exposure Guidelines as amended to date. The applicant, permittee or licensee certifies compliance with the ANSI, NCRP and FCC Human Exposure Guidelines to Non-Ionizing RF Radiation.

FIGURE 1. VERTICAL PATTERN PLOT ERI SHPX10-AC-SP

ELECTRONICS RESEARCH, INC  
7777 GARDNER ROAD  
CHANDLER, IN. 47610

-----THEORETICAL-----  
VERTICAL PLANE RELATIVE FIELD

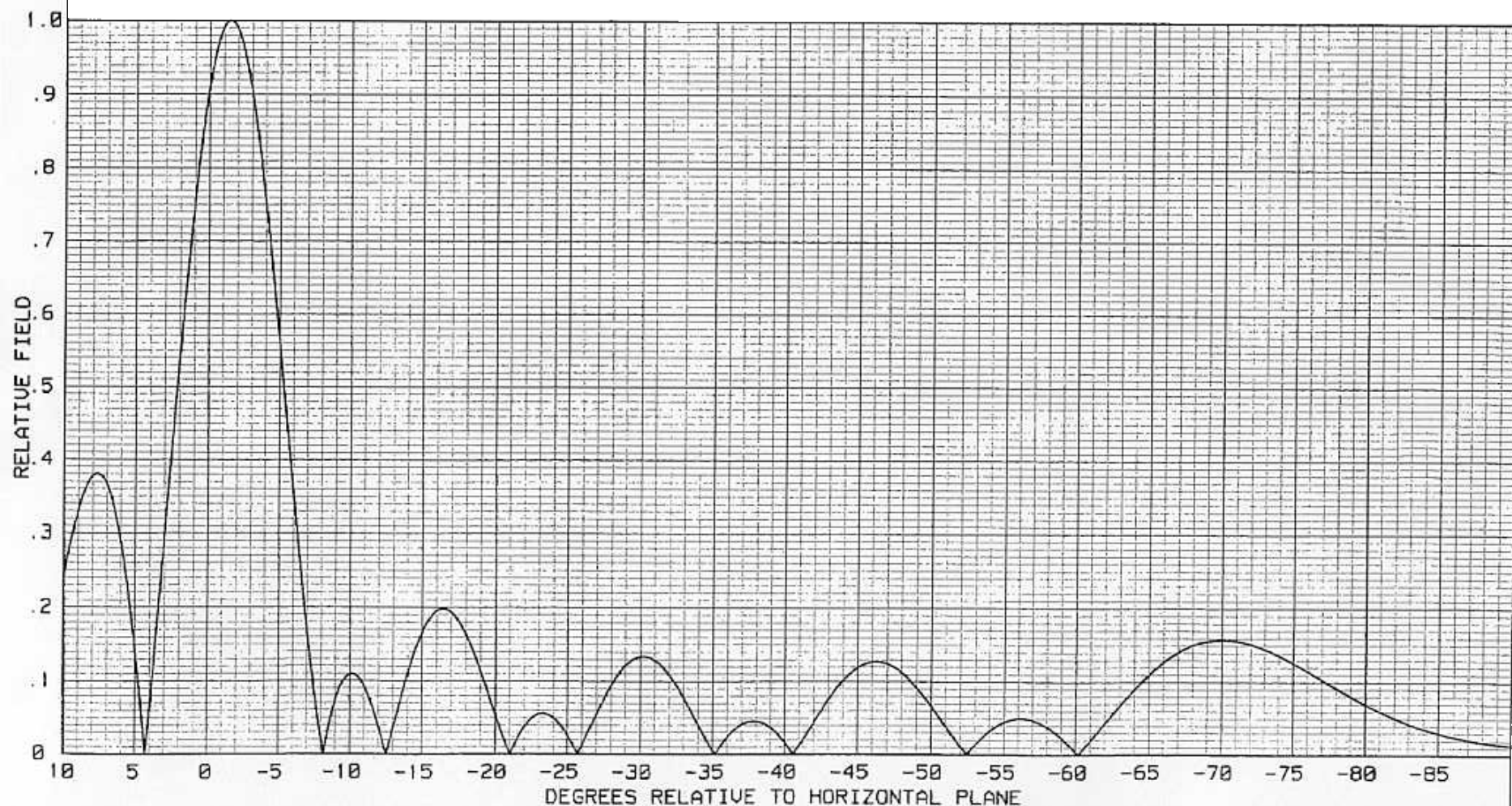
9-19-02

10 ERI TYPE SHP, SHPX, LP, OR LPX ELEMENTS  
-1.46 DEGREE(S) ELECTRICAL BEAM TILT  
0 PERCENT FIRST NULL FILL  
0 PERCENT SECOND NULL FILL

ELEMENT SPACING:  
0.926 WAVELENGTH

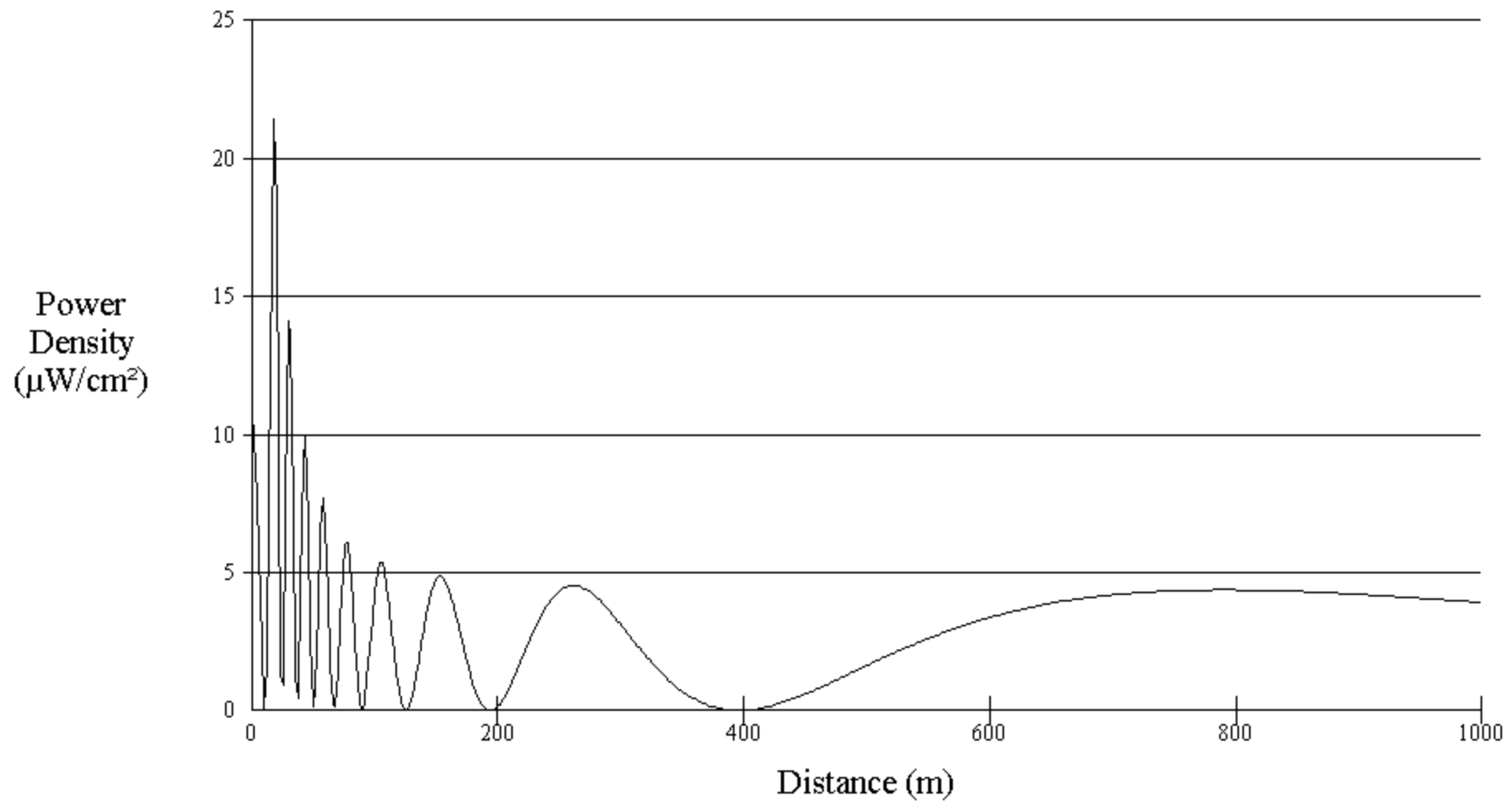
FIGURE 1

POWER GAIN IS 4.276 IN THE HORIZONTAL PLANE(5.167 IN THE MAX.)



## Power Density vs Distance

EXHIBIT E-10 Figure #2.



### Office of Engineering and Technology

Distance (m):  Antenna Type:

Horizontal ERP (W):  Number of Elements:

Vertical ERP (W):  Element Spacing:

Antenna Height (m):

Maximum RFR Power Density = 21.4013uW/cm2 at 18 meters distance from the base of the antenna support structure, 2 meters AGL.

Antenna Manufacturer & Model: Electronics Research, Inc., SHPX-10AC-SP, 10 section, 0.926 wavelength spaced FM Broadcast Antenna.