December 2004
New FM – Channel 289C2 – Manhattan, MT
NIER Analysis

Facilities Proposed

The proposed operation will be on Channel 289C2 (105.7 MHz) with an effective radiated power of 20 kilowatts. Operation is proposed with a 4-element circularly-polarized omni-directional antenna. The antenna will be side-mounted on an existing tower located at the High Flat Electronics Site.

The antenna support structure will not exceed 60.96 meters (200 feet) above ground and does not require notification to the Federal Aviation Administration. Therefore, this structure does not require an Antenna Structure Registration Number.

NIER Calculations

Several other broadcast facilities operate from this transmitter site, as detailed below. FM translators operating with less than 100 Watts ERP have been excluded from this analysis.

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W/cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

D is the distance in meters from the center of radiation to the calculation point.

Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 1000 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed antenna system assume a Type 6 element pattern, which is the element pattern for the 0.9 wavelength spaced Shively antenna proposed for use. The highest calculated ground level power density occurs at a distance of 11 meters from the base of the antenna support structure. At this point the power density is calculated to be 21.5 $\mu W/cm^2$, which is 2.2% of 1000 $\mu W/cm^2$ (the FCC standard for controlled environments) and 10.8% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

Calculations of the power density produced by the KBMC(FM) antenna system assume a Type 6 element pattern, which is the element pattern for the Shively antenna used by that station. The highest calculated ground level power density occurs at a distance of 20 meters from the base of the antenna support structure. At this point the power density is calculated to be 31.5 $\mu W/cm^2$, which is 3.2% of 1000 $\mu W/cm^2$ (the FCC standard for controlled environments) and 15.8% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

Calculations of the power density produced by the TV translator and LPTV antenna systems at this site assume operation with 10% aural power, and the appropriate

manufacturer's vertical plane radiation pattern. The worst case power density levels occur at depression angles between 45 and 90 degrees below the horizontal. Worst-case calculations have been made assuming the highest relative field value occurring below 45 degrees and the shortest distance between the antenna radiation center and 2 meters above ground level (i.e. straight down). The results are summarized in the following table:

Station	**Antenna**	**Height Peak ERP**	**Maximum**	**Percentage of Gen Pub Std**
K20DY Ch. 20	Andrew ALP12L2-HSW	30 m AGL 17.1 kW	18.4 μW/cm²	5.4% of 338 μW/cm²
K26DE Ch. 26	Andrew ALP16L2-HSW	9 m AGL 23.1 kW	158.8 μW/cm²	43.9% of 362 μW/cm²
KBTX-LP Ch. 32	Andrew AL8	37 m AGL 11.8 kW	14.0 μW/cm²	3.6% of 386 μW/cm²
K45EB Ch. 45	Data not available*	18 m AGL 10.3 kW	60.5 μW/cm²	13.8% of 438 μW/cm²

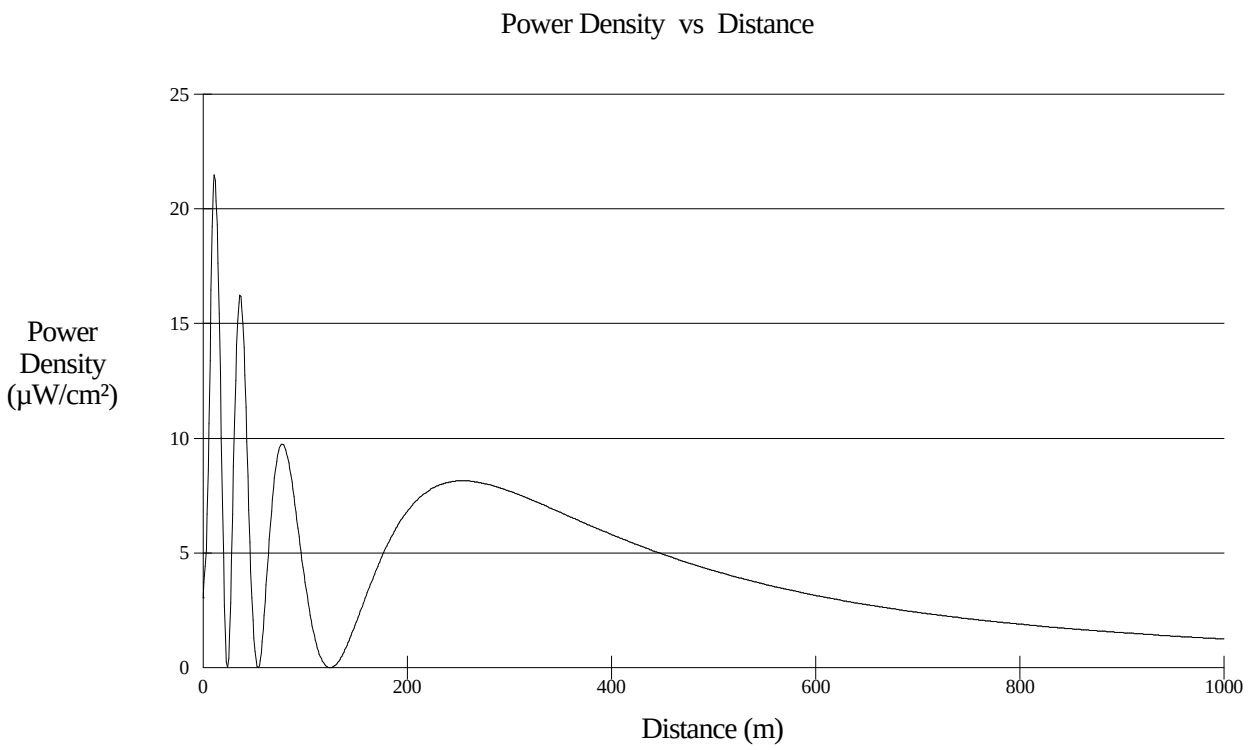
*The K45EB antenna type was not available at the time the instant application was prepared. A relative field value of 0.3 has been assumed, as a typical worst-case maximum value below 45 degrees for UHF low power antennas.

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of Manhattan 289C2 and the present operations of the other stations at this site is 93.3% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

Public access to the site is restricted and the antenna tower is posted with warning signs. Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower,

including reduction in power or discontinuance of operation before any maintenance work is undertaken.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.



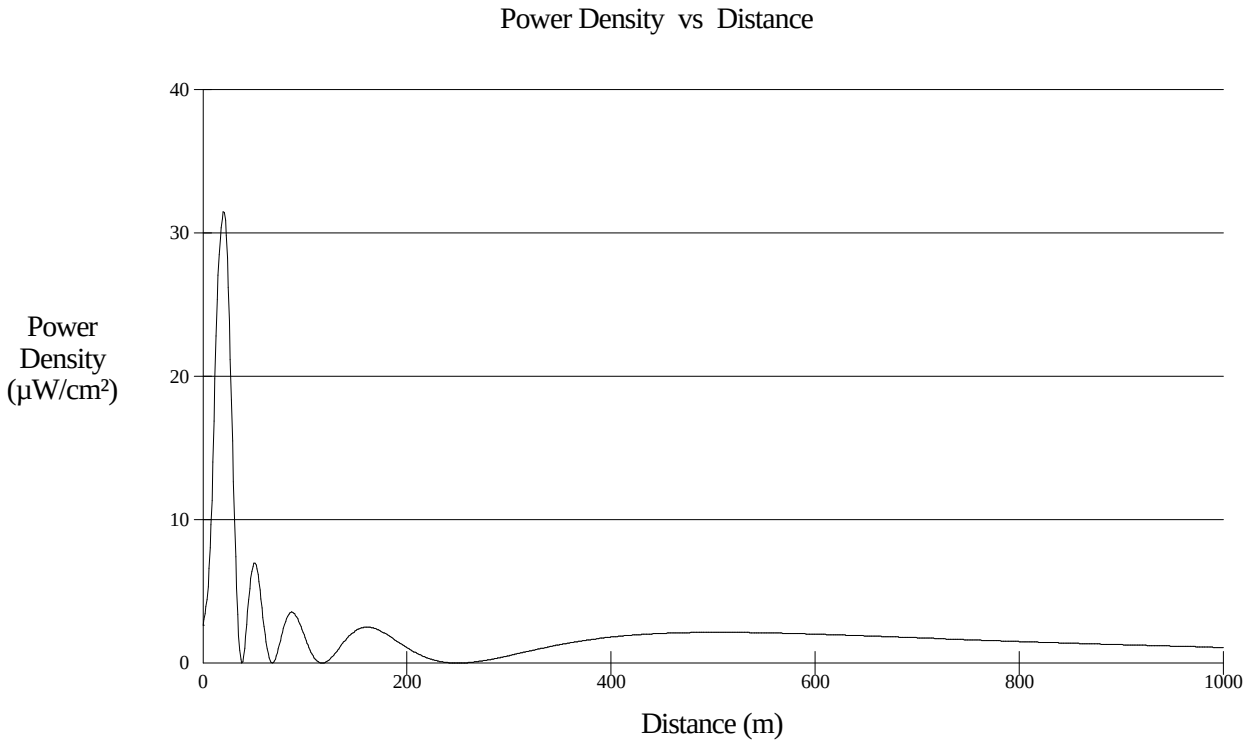
Ground-Level NIER Analysis OET FMModel

Manhattan 289C2
Antenna Type: Shively (Type 6)
Number of Elements: 4
Element Spacing: 0.9 wavelength

Distance: 1000 meters
Horizontal ERP: 20 kW
Vertical ERP: 20 kW

Antenna Height: 38 meters AGL

Maximum Power Density is 21.5 µW/cm2 at 11 meters from the antenna structure.



Ground-Level NIER Analysis OET FMModel

KBMC(FM) Bozeman
Antenna Type: Shively (Type 6)
Number of Elements: 5
Element Spacing: 1.0 wavelength

Distance: 1000 meters
Horizontal ERP: 20.5 kW
Vertical ERP: 20.5 kW

Antenna Height: 53 meters AGL

Maximum Power Density is 31.5 µW/cm2 at 20 meters from the antenna structure.