

## **KTWI Engineering Narrative**

**November 11, 2010**

This application seeks relocation of KTWI to 190 meters above ground on a tower identified by registration number 1242828, to operate with 6,100 watts.

As this location and height results in a Height Above Average Terrain 102 meters greater than the reference 100 meters for a class C3 facility, the FCC "FM Power" tool was utilized to determine equivalent ERP.

This location does not meet the spacing requirement of Section 73.207 with respect to station KKOT. Utilization of Section 73.215 is requested, a directional antenna is proposed to prevent prohibited contour overlap. A spacing study and contour study are presented below.

The proposed facilities were evaluated in terms of potential radio frequency radiation exposure at ground level in accordance with OET Bulletin No. 65, "Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radio frequency Radiation."

The proposed antenna system is unknown at this time. As a "worst case" study, a single bay, antenna mounted 190 meters above ground has been analyzed using the program "FM Model" set to calculate values for a "Ring Stub" antenna element operated with an effective radiated power of 6.1 Kilowatts in both the horizontal and vertical planes. At 2 meters above the surface, at 51 meters from the base of the tower, this proposal will contribute worst case, 6.94 microwatts per square centimeter, or 0.69 percent of the allowable ANSI limit for controlled exposure, and 3.45 percent of the allowable limit for uncontrolled exposure. This figure is less than 5% of the applicable FCC exposure limit at all locations extending out from the base of the tower. Section 1.1307(b)(3) excludes applications when the calculated level is predicted to be less than 5% of the applicable exposure limit. It is therefore believed that this proposal is in compliance with OET Bulletin Number 65 as required by the Federal Communications Commission.

Further, the applicant will see that signs are posted in the vicinity of the tower, warning of potential radio frequency hazards at the site. The site itself is restricted from public access. The applicant will cooperate with other users of the tower to reduce power of the facility, or discontinue operation, as necessary to limit human exposure to levels less than specified by the Federal Communications Commission should anyone be required to climb the tower for maintenance or inspection.

## FM Power Results

http://www.fcc.gov/fcc-bin/fmpower - Windows Internet Explorer

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### FMpower Results

**Class C3 facilities for Equivalency Determination:**

Reference ERP = 25.000 kW  
Reference HAAT = 100.0 meters  
F(50,50) 60 dBu protected contour at 39.1 km distance

**Equivalent ERP (rounded per 47 CFR 73.212) = 6.100 kW**

at **202.0 meters HAAT**

Unrounded ERP = 6.086 kW for 202.0 meters HAAT

Class C3 stations are authorized in AK.

**Enter New Data in FMpower?**

Related items: [FM and TV Propagation Curves](#).  
[This document may be accessed at http://www.fcc.gov/mb/audio/bickel/fmpower.html](http://www.fcc.gov/mb/audio/bickel/fmpower.html)

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Internet 100%

## Calculation of Antenna Height Above Average Terrain Calculations

Antenna Height Above Average Terrain (HAAT) Calculations (HAAT) Results Audio Division - Windows Internet Explorer

http://www.fcc.gov/fcc-bin/haat\_calculator?dlat=41.8&lat=188&lat=32.0&ns=1&lon=96&lon=01&lon=33.1&ew=1&nad=27&rcansl=543.8

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**FCC** Federal Communications Commission

**Audio Division** Antenna Height Above Average Terrain (HAAT) : Contour Calculations

(202)-418-2700 [FCC > MB > Audio Division > HAAT/Contour Calculations](#) [FCC site map](#)

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

Latitude **41 18 32.0 North**  
Longitude **96 1 33.1 West** (NAD 27)

Height of antenna radiation center above mean sea level [RCAMSL] = **543.8** meters

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

**Results:**

**Calculated HAAT = 202. meters**

(Antenna Height Above Average Terrain)  
using the 30 second FCC/NGDC terrain data)

**Antenna Radiation Center Heights Above Individual Radials:**

|        |              |
|--------|--------------|
| 0.0°   | 172.4 meters |
| 45.0°  | 230.2 meters |
| 90.0°  | 223.5 meters |
| 135.0° | 208.2 meters |
| 180.0° | 215.4 meters |
| 225.0° | 200.9 meters |
| 270.0° | 187.6 meters |
| 315.0° | 174.6 meters |

**New Antenna Height Above Average Terrain (HAAT) calculation?**

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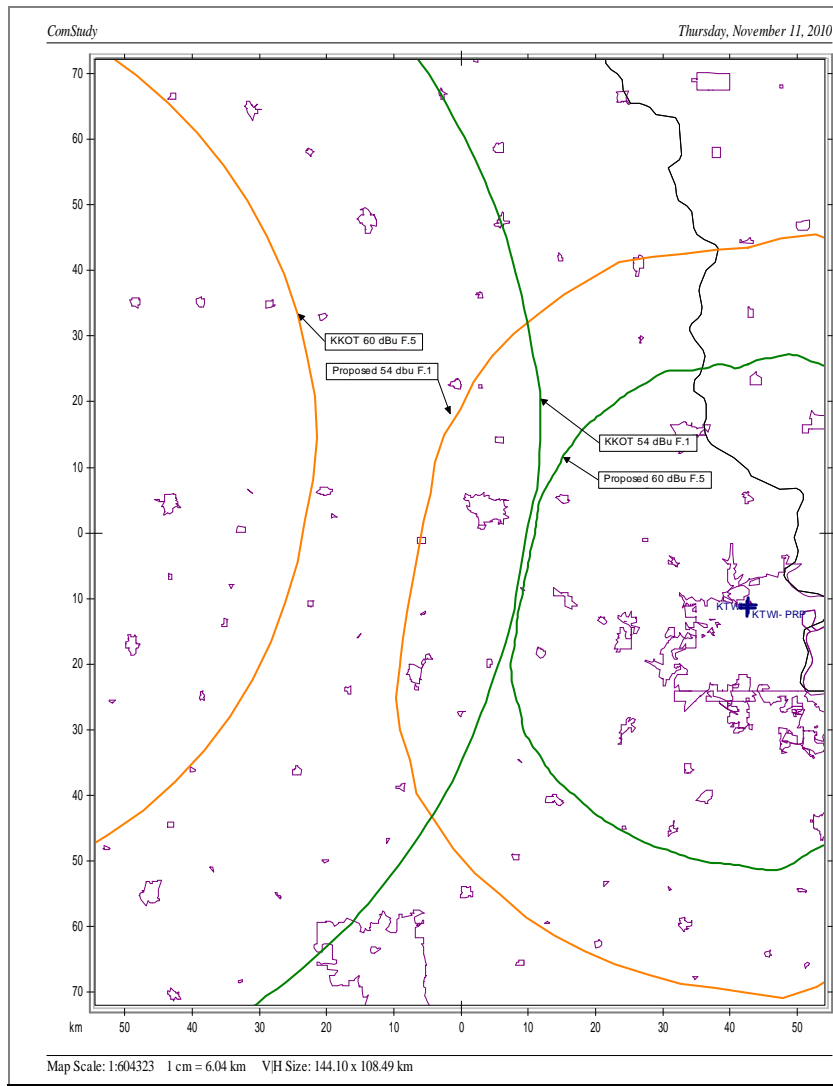
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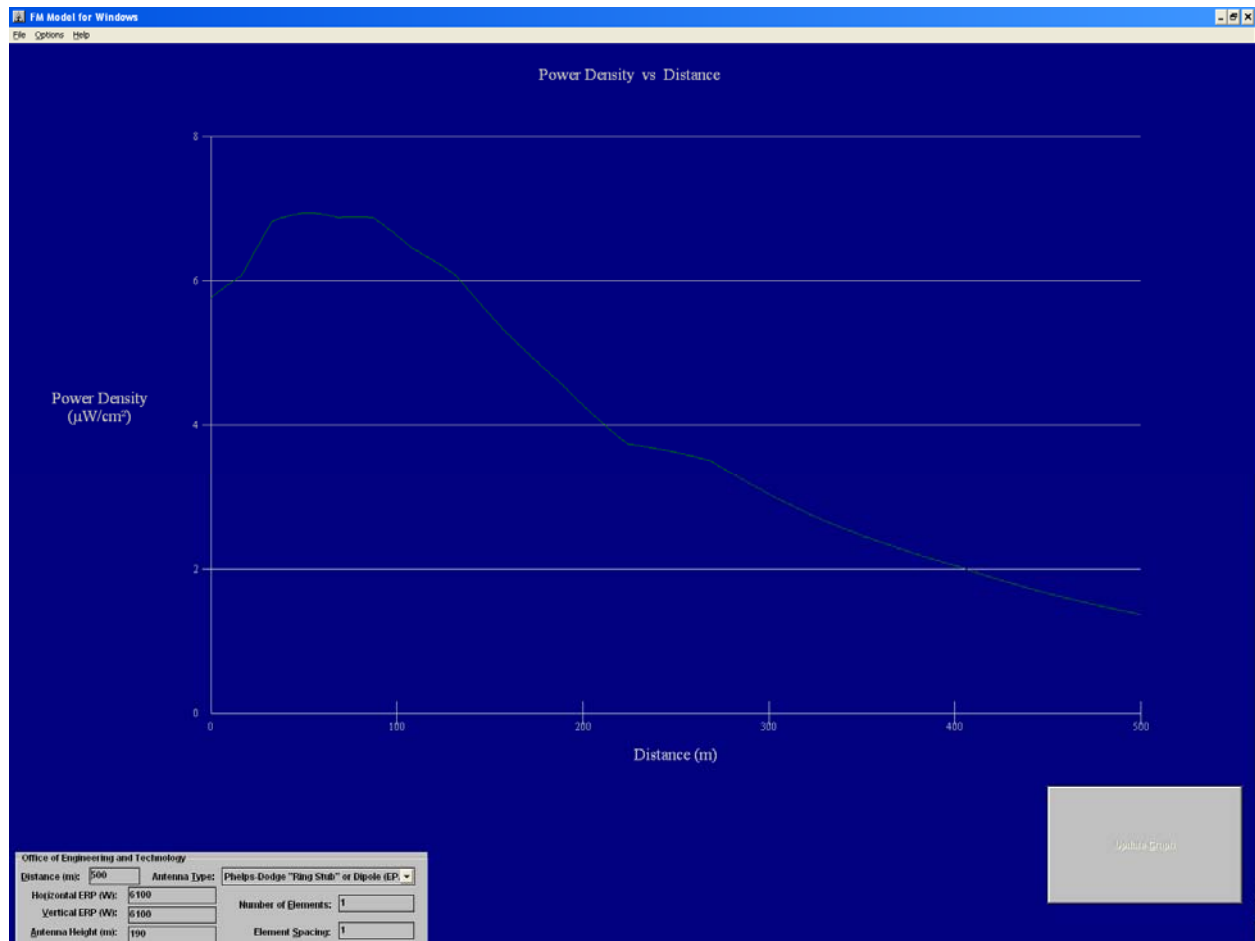
## Spacing Study

| Callsign | State | City       | Freq | Chanl | ERP_w  | Class | Status | Dist_km | Sep | Clr    |
|----------|-------|------------|------|-------|--------|-------|--------|---------|-----|--------|
| KTWI     | NE    | BENNINGTON | 93.3 | 227   | 9600   | C3    | LIC    | 0.53    | 153 | -152.5 |
| KKOT     | NE    | COLUMBUS   | 93.5 | 228   | 100000 | C1    | LIC    | 140.59  | 144 | -3.4   |
| KIOA     | IA    | DES MOINES | 93.3 | 227   | 82000  | C1    | LIC    | 217.55  | 211 | 6.6    |
| KRSS     | MO    | TARKIO     | 93.5 | 228   | 11000  | C3    | LIC    | 112.73  | 99  | 13.7   |

## Contour Map



## FM Model Results



### Maximum Value of Graph.

The Max Power Density was found to be 6.94019815271036 μW/cm² at 51 meters.

Note: Graph resolution is 500 points.

OK