

# **Engineering Exhibit**

## **RF Radiation Compliance**

**Capstar TX Limited Partnership  
WMJJ(FM), Birmingham, AL (FID#2111)  
WDXB(FM), Jasper, AL (FID#2114)  
WQEN(FM), Trussville, AL (FID#22997)**

### **Reference:**

**WQEN(FM) Construction Permit  
BPH-20030113ACO**

**WMJJ(FM) Auxiliary Antenna Construction Permit  
BMXPH-20040810ABU**

**WDXB(FM) Auxiliary Antenna Construction Permit  
BXPB-20040810ABO**

## **RF Radiation Compliance**

This report is to demonstrate that both the licensed and proposed transmission facilities of WMJJ(FM) and WDXB(FM) and the proposed transmission facilities of WQEN(FM) comply with the FCC established guidelines regarding exposure to RF electromagnetic fields as described in OET Bulletin 65 Edition 97-01.

### **Facilities:**

WMJJ(FM) and WDXB(FM) utilize a common 6-bay ERI “Rototiller” antenna mounted on a 214 meter, guyed tower with a Center of Radiation of 206 meters above ground level. WMJJ(FM) is licensed for an ERP (H & V) of 100 kW and WDXB(FM) is licensed for an ERP (H & V) of 90 kW. WQEN(FM) was granted a Construction Permit (BPH-20030113ACO) to install transmitting facilities on the same tower with an ERP (H & V) of 100 kW utilizing an antenna with a Center of Radiation of 178 meters above ground level. The antenna installed for WQEN(FM) is an 8-bay full-wave spaced ERI “Rototiller”, model SHPX-8AC. WMJJ(FM) was granted a Construction Permit (BMXPH-2004081ABU) to install an auxiliary antenna on the same tower with an ERP (H & V) of 32 kW utilizing an antenna with a Center of Radiation of 131 meters above ground level. The auxiliary antenna installed for WMJJ(FM) is a 2-bay full-wave spaced ERI “Rototiller”, model SHPX-2AE. WDXB(FM) was granted a Construction Permit (BXPB-20040810ABO) to install an auxiliary antenna on the same tower with an ERP (H & V) of 32 kW utilizing an antenna with a Center of Radiation of 114 meters above ground level. The auxiliary antenna installed for WDXB(FM) is a 2-bay full-wave spaced ERI “Rototiller”, model SHPX-2AE. The transmitting facility of WDJC-FM is located on a separate tower at a distance of 100 meters from the WMJJ(FM), WDXB(FM) and proposed WQEN(FM) tower. WDJC-FM utilizes an 8-bay full-wave spaced “Rototiller” antenna with a maximum ERP (H & V) of 100 kW. There are no other contributing AM, FM or TV stations located within 315 meters.

### **Prediction Method:**

The FCC’s version of the FM computer model (version 2.1) as referenced in “Supplement A Edition 97-01 to OET Bulletin 65 Edition 97-01” was used to determine the RF power density at various distances from the common tower. A total of 500 data points were used over a total distance of 500 meters from the tower. This distance was deemed sufficient since the power density from the stations decays to extremely small levels beyond this distance. The power densities for each station that were predicted using the FM computer model were then exported to a spreadsheet program where they were added to produce a total predicted power density for each possible mode of operation. The total power density was evaluated for four possible operating modes as follows:

1 – WMJJ(FM) and WDXB(FM) operating from the common main antenna with WQEN(FM) operating from the proposed main antenna.

2 – WMJJ(FM) operating from the main antenna with WDXB(FM) operating from the proposed Auxiliary antenna and WQEN(FM) operating from the proposed main antenna.

3 – WDXB(FM) operating from the main antenna with WMJJ(FM) operating from the proposed Auxiliary antenna and WQEN(FM) operating from the proposed main antenna.

4 – WMJJ(FM) and WDXB(FM) operating from there respective Auxiliary antennas and WQEN(FM) operating from the proposed main antenna.

Figure 1 shows the predicted total power density and the individual power densities for WMJJ(FM), WDXB(FM) and WQEN(FM) utilizing Operating Mode 1 listed above. The maximum RF exposure level of  $30.2 \mu\text{W}/\text{cm}^2$  was calculated to occur at 55 meters from the common tower. Figure 5 shows the predicted power density attributable to the operation of WDJC-FM. The maximum predicted RF exposure level attributable to WDJC-FM is  $9.8 \mu\text{W}/\text{cm}^2$  is predicted to occur at 54 meters from the base of the WDJC-FM tower. It is, therefore, reasonable to assume that a maximum RF exposure level of  $40.0 \mu\text{W}/\text{cm}^2$  will occur at a location that is 55 meters from the base of the common tower and 54 meters from the base of the WDJC-FM tower. This value is 4.0 % of the Occupational/Controlled Exposure limit of  $1.0 \text{ mW}/\text{cm}^2$  and 20.0 % of the General Population/Uncontrolled Exposure limit of  $200 \mu\text{W}/\text{cm}^2$ .

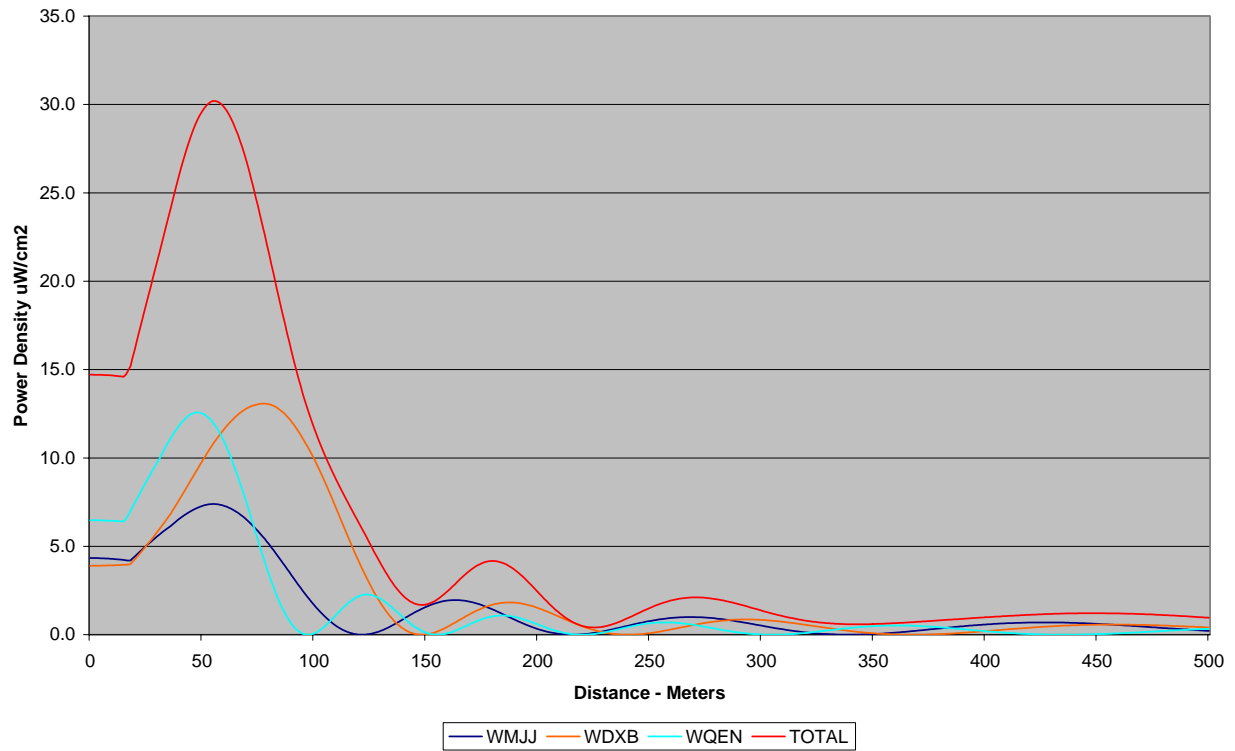
Figure 2 shows the predicted total power density and the individual power densities for WMJJ(FM), WDXB(FM) and WQEN(FM) utilizing Operating Mode 2 listed above. The maximum RF exposure level of  $40.9 \mu\text{W}/\text{cm}^2$  was calculated to occur at 58 meters from the common tower. It is, therefore, reasonable to assume that a maximum RF exposure level of  $50.7 \mu\text{W}/\text{cm}^2$  will occur at a location that is 58 meters from the base of the common tower and 54 meters from the base of the WDJC-FM tower. This value is 5.07 % of the Occupational/Controlled Exposure limit of  $1.0 \text{ mW}/\text{cm}^2$  and 25.35 % of the General Population/Uncontrolled Exposure limit of  $200 \mu\text{W}/\text{cm}^2$ .

Figure 3 shows the predicted total power density and the individual power densities for WMJJ(FM), WDXB(FM) and WQEN(FM) utilizing Operating Mode 3 listed above. The maximum RF exposure level of  $38.1 \mu\text{W}/\text{cm}^2$  was calculated to occur at 63 meters from the common tower. It is, therefore, reasonable to assume that a maximum RF exposure level of  $47.9 \mu\text{W}/\text{cm}^2$  will occur at a location that is 63 meters from the base of the common tower and 54 meters from the base of the WDJC-FM tower. This value is 4.79 % of the Occupational/Controlled Exposure limit of  $1.0 \text{ mW}/\text{cm}^2$  and 23.95 % of the General Population/Uncontrolled Exposure limit of  $200 \mu\text{W}/\text{cm}^2$ .

Figure 4 shows the predicted total power density and the individual power densities for WMJJ(FM), WDXB(FM) and WQEN(FM) utilizing Operating Mode 4 listed above. The maximum RF exposure level of  $49.2 \mu\text{W}/\text{cm}^2$  was calculated to occur at 64 meters from the common tower. It is, therefore, reasonable to assume that a maximum RF exposure level of  $59.0 \mu\text{W}/\text{cm}^2$  will occur at a location that is 64 meters from the base of the common tower and 54 meters from the base of the WDJC-FM tower. This value is 5.90 % of the Occupational/Controlled Exposure limit of  $1.0 \text{ mW}/\text{cm}^2$  and 29.50 % of the General Population/Uncontrolled Exposure limit of  $200 \mu\text{W}/\text{cm}^2$ .

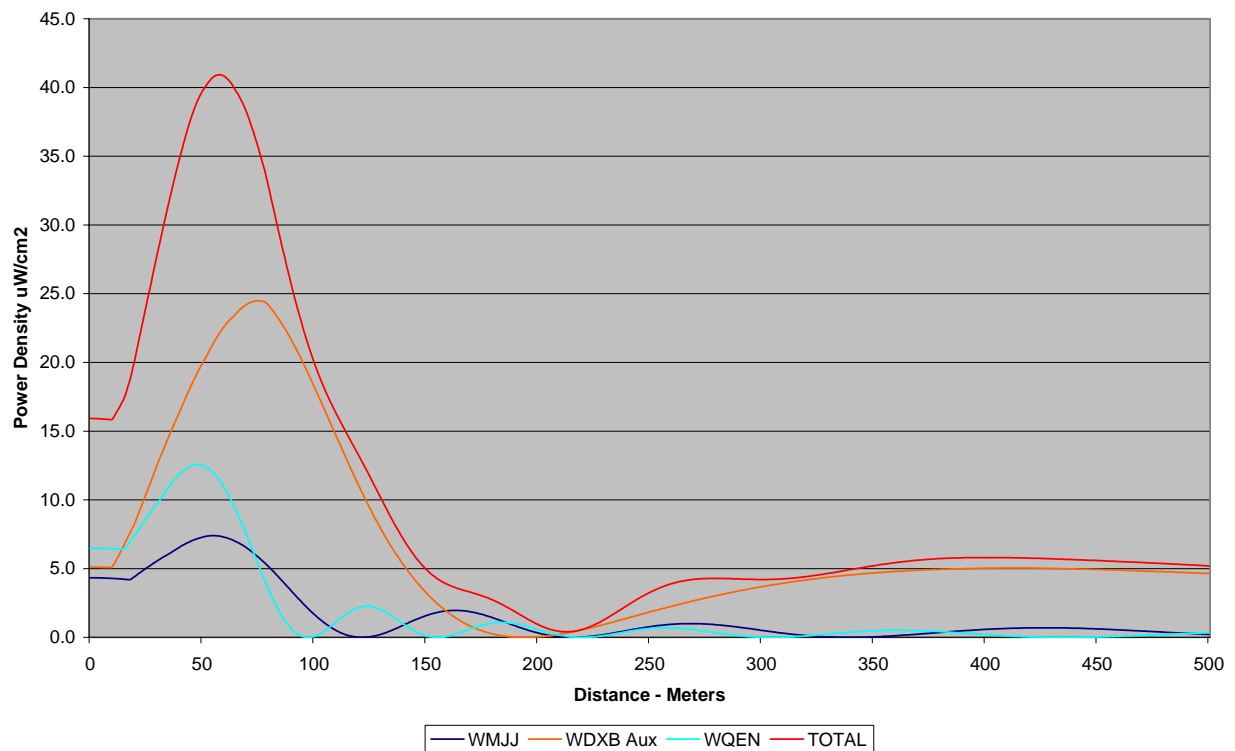
**Figure 1**

**TOTAL POWER DENSITY**



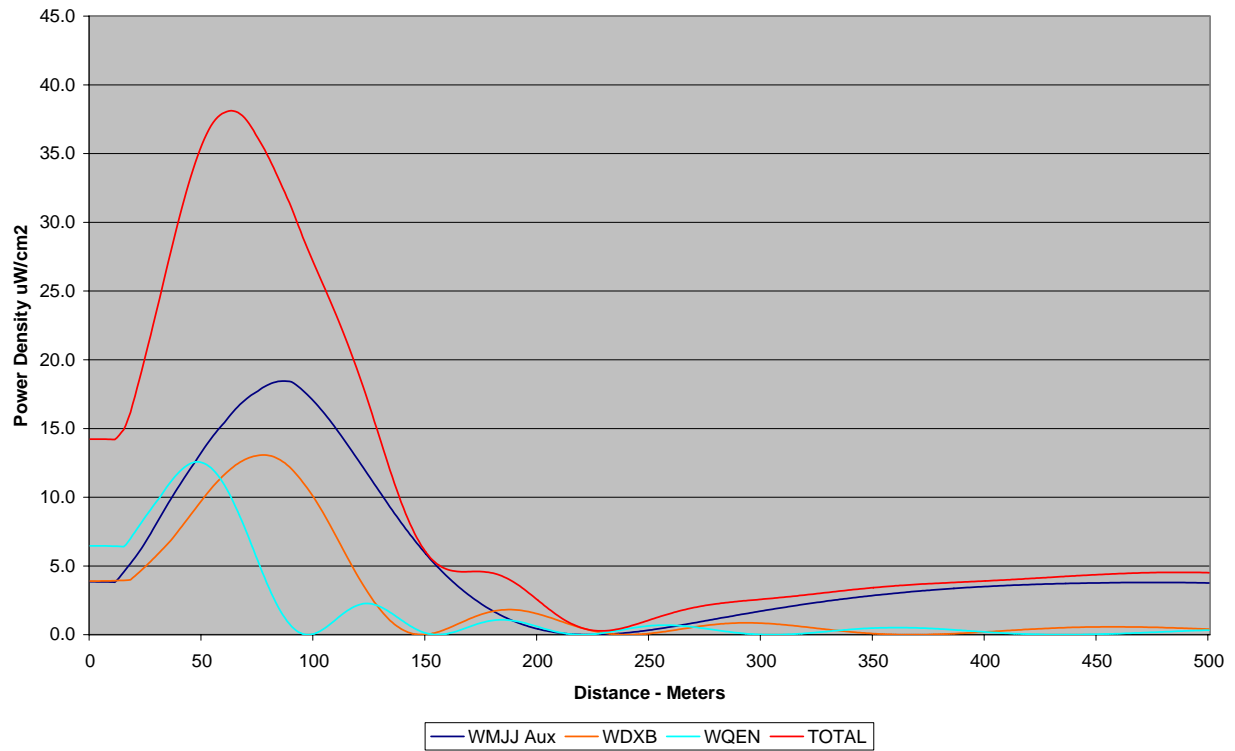
**Figure 2**

**TOTAL POWER DENSITY**



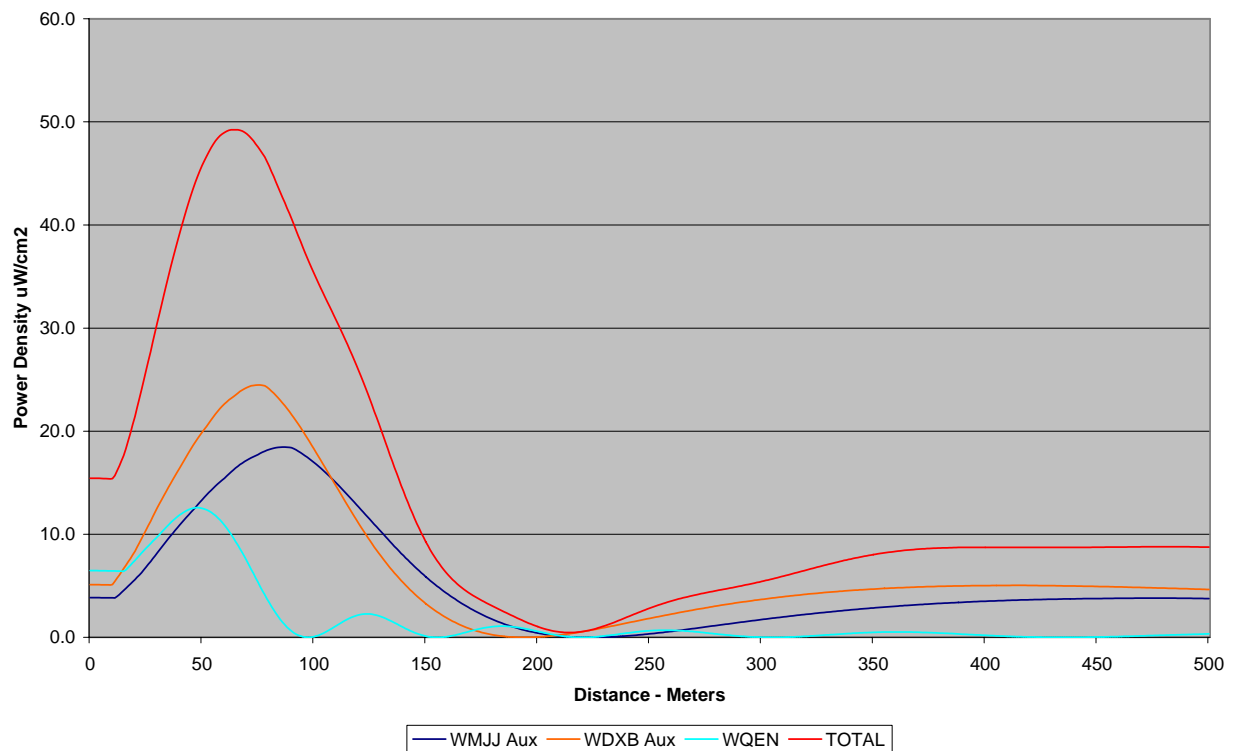
**Figure 3**

**TOTAL POWER DENSITY**



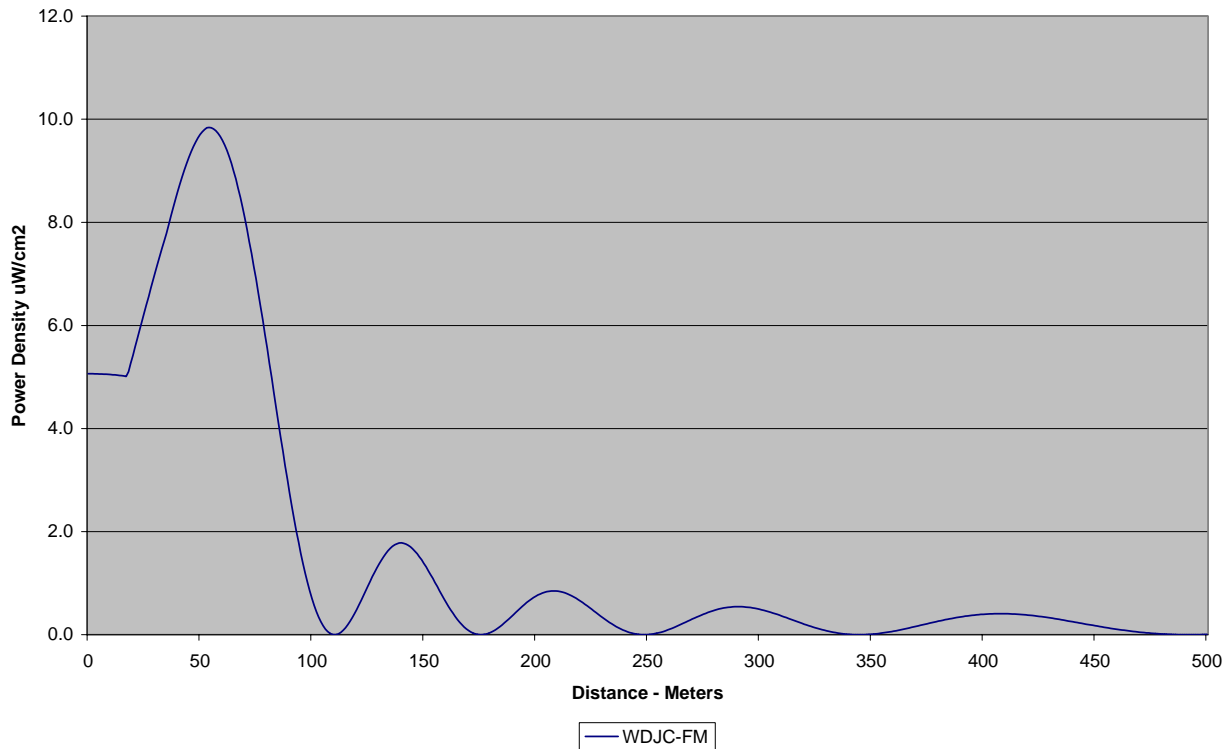
**Figure 4**

**TOTAL POWER DENSITY**



**Figure 5**

**TOTAL POWER DENSITY**



A 3-meter high security fence surrounds the common tower, the gate to which is securely locked and signs warning of the potential RF hazard are conspicuously posted on the gate and at appropriate intervals along the tower fence. WMJJ(FM), WDXB(FM) and WQEN(FM) in coordination with other users of the site, reduce power or cease operations as necessary to protect persons having access to the site, tower or antenna from RF Exposure in excess of FCC guidelines. Based upon the predictions contained herein, both the licensed and proposed facilities of WMJJ(FM) and WDXB(FM) and the proposed facilities of WQEN(FM) comply with OET Bulletin 65 Edition 97-01 with regard to both General Population/Uncontrolled and Occupational/Controlled Exposure to RF Radiation.

Randall L. Mullinax  
Regional Engineer  
Capstar TX Limited Partnership