

# ENGINEERING REPORT

## 2012 Auxiliary Application Radio Frequency (RF) Protection Study

WWRZ(FM) – Fort Meade, FL (Primary Analog & HD/IBOC)  
WWRZ(FM) – Fort Meade, FL (Auxiliary Analog)

**September, 2012**

### **CERTIFICATION OF ENGINEERS**

The firm of Munn-Reese, Inc., Broadcast Engineering Consultants, with offices at 385 Airport Drive, Coldwater, Michigan, has been retained for the purpose of preparing the technical data forming this report.

The data utilized in this report was taken from the FCC Secondary Database and data on file. While this information is believed accurate, errors or omissions in the database and file data are possible. This firm may not be held liable for damages as a result of such data errors or omissions.

The report has been prepared by properly trained electronics specialists under the direction of the undersigned whose qualifications are a matter of record before the Federal Communications Commission.

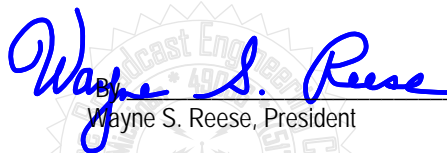
I declare under penalty of the laws of perjury that the contents of this report are true and accurate to the best of my knowledge and belief.

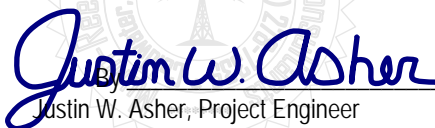
September 28, 2012

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Wayne S. Reese, President

  
Justin W. Asher, Project Engineer

# Engineering Report

## Compliance with Radiofrequency Radiation Guidelines

This firm was retained to study the potential for human exposure to non-ionizing radiofrequency radiation at the common site of existing station WWRZ(FM) licensed to Fort Meade, FL. There are no other licensed facilities located within 315 meters of the common site. ***The applicant would like to note that this proposed WWRZ(FM) analog auxiliary facility will only operate during periods of time when the co-located WWRZ(FM) analog primary facility is rendered silent. However for purposes of this RF Compliance Study, and out of an overabundance of caution, all co-located facilities, including the WWRZ(FM) primary and analog facilities have been included at full operational power.***

The WWRZ(FM) – Fort Meade, FL primary analog facility (BLH-20080613ABL) operates on CH252C2, 98.3 MHz with a maximum effective radiated power (ERP) of 27.0 kW (H) and 27.0 kW (V) of circular polarization. The radiator is licensed as a 4-bay ERI Lynx DI-4A antenna mounted 206 meters above ground level (AGL). The spacing for the elements is  $0.75 \lambda$  (wavelength). The antenna employs EPA type 3 elements as defined by FCC program FM Model Version 2 issued March 22, 1995.

The WWRZ(FM) – Fort Meade, FL HD/IBOC facility (BDNH-20110613ADI) operates on CH252C2, 98.3 MHz with -14 dBc power or 1.08 kW ERP circular polarization (H&V) ( $\text{Log}[0.04 \text{ or } 1\%] \times 10 = -14 \text{ dBc}$ ). The HD/IBOC facility broadcasts a diplexed signal from the WWRZ(FM) main antenna mounted 206 meters above ground level (AGL). The common antenna is licensed as a 4-Bay,  $0.75 \lambda$  (wavelength) spaced, ERI Lynx DI-4A antenna employing EPA Type 3 elements as defined by FM Model Version 2.10 Beta issued March 22, 1995.

For purposes of this RF Compliance Study, the sum WWRZ(FM) analog and WWRZ(FM) HD/IBOC powers of 28.08 kW ERP circular polarization have been assumed as one single WWRZ(FM) contribution into the antenna.

The proposed WWRZ(FM) auxiliary analog facility will operate on CH252C2, 98.3 MHz with a maximum effective radiated power (ERP) of 43.0 kW (H) and 43.0 kW (V) of circular polarization. The radiator will be a 4-bay Harris (ERI) FMH-4-AC “roto-tiller” antenna mounted 153 meters above ground level (AGL). The spacing for the elements will be  $1.0 \lambda$  (wavelengths). The antenna will employ EPA type 3 element as defined by FCC program FM Model Version 2 issued March 22, 1995. This WWRZ(FM) auxiliary antenna will not operate with HD-IBOC facilities at this time.

Software packages were used to determine the individual contribution of each station. FM radiofrequency radiation levels were predicted using both the array pattern, the calculations of which are based on the number of bays in the antenna and wavelength spacing between the bays, and the element pattern. The element pattern is determined by using measured element data prepared by the EPA. and published in “An Engineering Assessment of the Potential Impact of Federal Radiation Protection Guidance on the AM, FM and TV Services,” by Paul C. Gailey and Richard Tell - April 1985, U.S. Environmental Protection Agency, Las Vegas, NV. Both FM and TV programs use formulas were originally published in OST Bulletin No. 65, 1985.

To evaluate the total exposure to non-ionizing radio-frequency radiation it is necessary to sum the individual contributions as a decimal fraction of the maximum permissible limit. If the resulting sum is less than or equal to 100%, the exposure is concluded to be within the guidelines of OET Bulletin No. 65 (Edition 97-01). To simplify the calculations and produce a “worst case” study, the maximum exposure level produced by each station has been selected without regard to the location of that exposure. The following table is based on the uncontrolled limits set forth in OET Bulletin No. 65 (Edition 97-01).

## Engineering Report (continued)

### Compliance with Radiofrequency Radiation Guidelines

<u>Contributing Station</u>	<u>Maximum Contribution</u>	<u>Uncontrolled Limit</u>	<u>% of Limit</u>
WWRZ(FM) Primary (analog & HD/IBOC)	0.6374 $\mu\text{W}/\text{cm}^2$	200.00 $\mu\text{W}/\text{cm}^2$	0.319%
WWRZ(FM) Auxiliary (analog)	10.930 $\mu\text{W}/\text{cm}^2$	200.00 $\mu\text{W}/\text{cm}^2$	<u>5.465%</u>
		<b>Total % of Limit</b>	<b>5.784%</b>

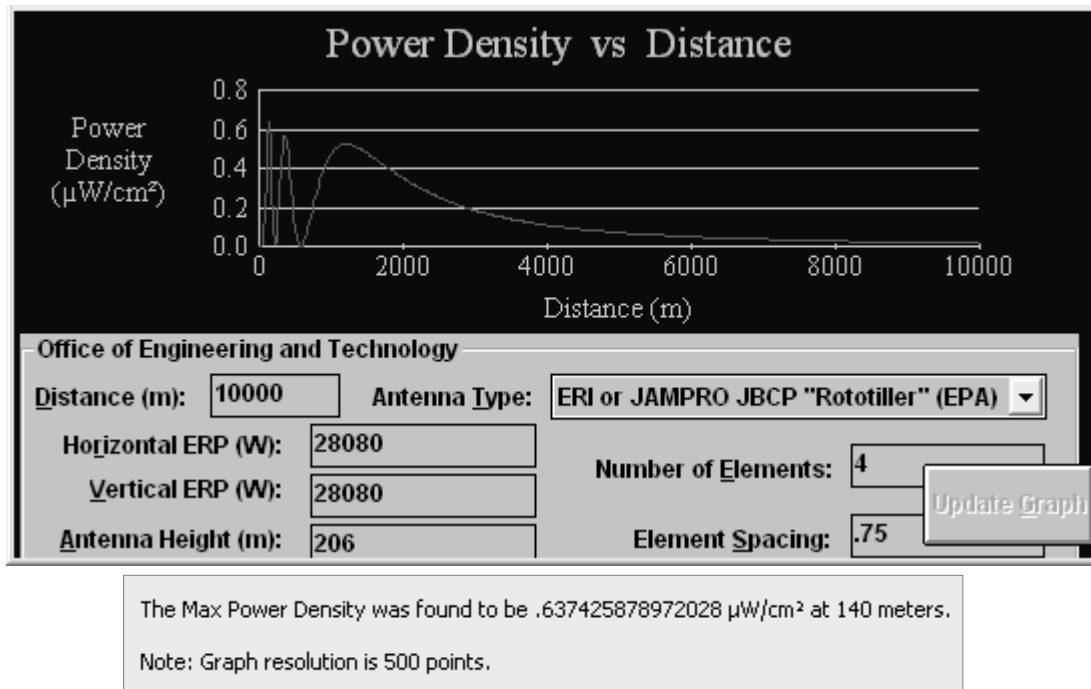
With the implementation of OET Bulletin No. 65 (Edition 97-01) and the accompanying Supplement A (Edition 97-01), the Commission set forth new guidelines for human exposure to radiofrequency radiation that employ a two-tiered system. The more lenient set of guidelines are for the “controlled environments”, which are defined as “locations where there is exposure that may be incurred by persons who are aware of the potential for exposure as a concomitant of employment, by other cognizant persons, or as the incidental result of transient passage through areas where analysis shows the exposure levels may be above...” the more restrictive guidelines but below the more lenient guidelines. The second, more restrictive, set of guidelines is to be applied to “uncontrolled environments” which are defined as “locations where there is the exposure of individuals who have no knowledge or control of their exposure.” The table above sets forth an evaluation of the transmitter site based on the standards for “uncontrolled environments.”

Since the Total % of the Limit is less than 100% of the more stringent uncontrolled environment guidelines, the proposed installation will comply with the current FCC guidelines.

In addition to the protection afforded by the proposed antenna heights above ground, the facility is properly marked with signs, and entry to the facility is restricted by means of fencing with locked doors and/or gates. Any other means that may be required to protect employees and the general public will be employed.

In the event work is required in proximity to the antenna(s) such that the person or persons working in the area will be potentially exposed to fields in excess of the current guidelines, an agreement signed by all broadcast parties at the site will be in effect for the offending transmitter(s) to reduce power, or cease operation during the critical period.

**PLOT AND TAB OF TOTAL POWER DENSITY**  
**WWRZ(FM) (Analog & HD/IBOC Primary) - Channel 252C2 – Fort Meade, FL**



**PLOT AND TAB OF TOTAL POWER DENSITY**  
**WWRZ(FM) (Analog Auxiliary) - Channel 252C2 – Fort Meade, FL**

