

# **ENGINEERING REPORT**

**Supplemental RF Radiation Study for  
Form 302-FM covering  
Construction Permit File No.  
BXPED-20080114ACS**

**WVGR(FM) aux– Grand Rapids, MI  
Channel 281B – 104.1 MHz**

**December, 2010**

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# 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.

December 15, 2010

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## **Radiofrequency Radiation Guidelines Compliance Study**

The new WVGR(FM) facility for Grand Rapids, MI as authorized in Construction Permit File No. BXPED-20080114ACS has been evaluated for human exposure to non-ionizing radiofrequency radiation at this multiple source transmitter site. The guidelines set forth in §1.1310 Table 1 have been used for actual RF measurements taken on site.

The WVGR(FM) auxiliary facility operates on FM Channel 281B, 104.1 MHz, with 19.5 kW ERP (H)&(V), with a center of radiation 117 meters AGL. A two bay Jampro JBCP-H-2 non-directional panel antenna has been employed. Pursuant to Special Condition and/or Restriction(s) 2 & 3 of BXPED-20080114ACS, RF Compliance Measurements have been undertaken and submitted per direction of the Commission.

On December 2, 2010, Edmond R. Trombley, an engineer in the employ of Munn-Reese, Inc., was dispatched to the site to perform the required measurements. Measurements were made with a Narda Model 8718 Electromagnetic Survey Meter Serial Number 1453, connected to a Narda Model 8742 Isotropic Shaped Electric Field Probe. This probe is designed to measure electromagnetic fields within the frequency range of 300 kHz to 2.7 GHz. The frequency response of the probe is based on IEEE/ANSI Standard C95.1-1991, which is also the basis for the current guidelines of human exposure to radio frequency radiation established by the Federal Communications Commission. These guidelines specify Maximum Permissible Exposure (MPE) levels that vary with the frequency of the source of radio frequency energy. Thus, the response of the probe has been shaped to reflect these frequency dependent MPE parameters. This allows the survey meter to read directly in percent of the limit without the necessity to measure individual frequencies independently. Since most telecommunication sites involve multiple transmitters operating on several different frequencies, this also allows an evaluation to be made of the combined exposure from all transmitters with a single measurement.

For calibration purposes, the probe was placed inside the case supplied by the manufacturer. This case is lined with material designed to block the penetration of radio frequency radiation. While the probe was in this shielded environment, the self-calibration routine for the meter was successfully executed.

Calibration was performed on the premises prior to the commencement of the WVGR(FM) auxiliary test operation period. Following calibration, a walking inspection was made of the entire area searching for areas of maximum exposure. No location within restricted access fencing of the tower nor transmitter building exceeded 100% of the controlled limit (1,000  $\mu\text{W}/\text{cm}^2$ ). Areas within the three outer fenced guy-wire footings were noted to exceed 100% of the controlled limit (1,000  $\mu\text{W}/\text{cm}^2$ ). As a result, appropriate RF warning signage has been posted at the three outer guy-wire footing fenced areas<sup>1</sup>. No publically accessible area outside of the fenced areas or up to the fenced areas exceed 100% of the uncontrolled limit (200  $\mu\text{W}/\text{cm}^2$ ), also indentified as 20% of the controlled limit (1,000  $\mu\text{W}/\text{cm}^2$ ).

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<sup>1</sup> Measurement Note: Areas within each of the three outer guy-wire fences measured to be in excess of 1,000  $\mu\text{W}/\text{cm}^2$  were determined to be a result from the grandfathered superpower station contribution of WSRW-FM – Grand Rapids, MI (Facility ID No. 73605), License No. BLH-20071129AJD. Subsequent to this WVGR(FM) auxiliary RF measurement project, the areas in excess of controlled limits where remeasured with both the WVGR(FM) primary and auxiliary RF contribution sources silent and found to be still be in excess of allowable limits. However, in accordance with the provisions of WVGR(FM) auxiliary Construction Permit BXPED-20080114ACS, the appropriate warning signs have been posed and documented here-in.

## Radiofrequency Radiation Guidelines Compliance Study

A diagram of the measured facility and recorded measurements in percentage of the 1000  $\mu\text{W}/\text{cm}^2$  controlled limit has been provided at the end of this report discussion.

Permanent fencing of chain link design and of at least 2.0 meters (6 feet) high is presently existing and installed as of the date of this RF Measurement Compliance Study. The fencing has been build to a distance of no less than 2 meter (6 feet) to the transmitter building at the nearest run and no less than 4 meters (12 feet) to the tower. The height and horizontal distance of the fencing ensures protection to any person or persons in the event a limb is extended over or through the fencing barrier itself.

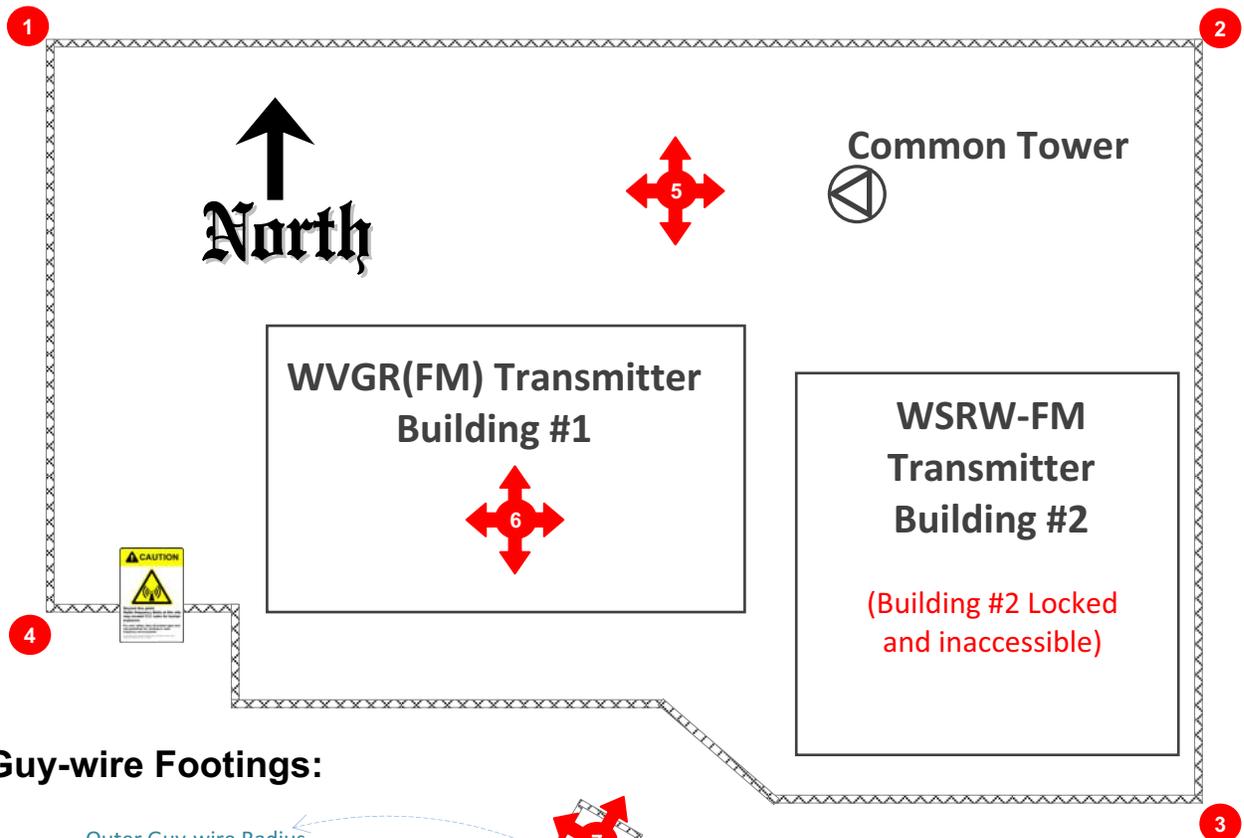
The facility is properly marked with signs, and entry to the facility is restricted by means of a locked gate. In the event work is required in proximity to the antenna such that the person or persons working in the area will be potentially exposed to fields in excess of the current guidelines, the broadcast licensee agrees to reduce power, or cease operation during the critical period to ensure worker protection

A diagram of the plat layout has been attached. The results of the measurement project have been supplied below:

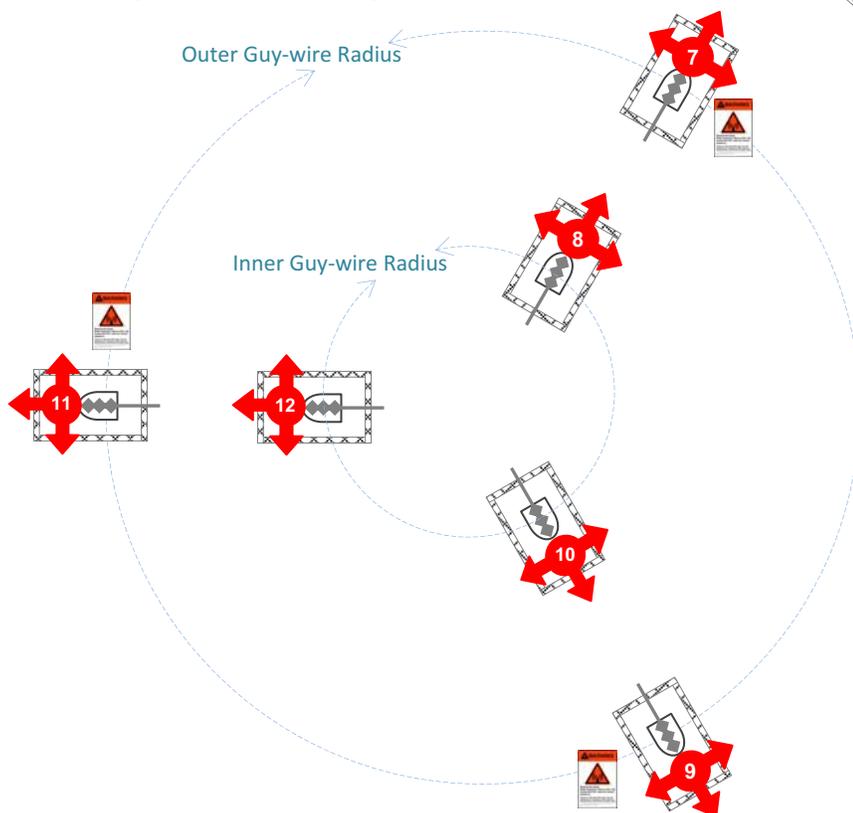
<b>Measurement Location (“•” on supplied plat)</b>	<b>Reading in % of Controlled Limit</b>	<b>Measurement &amp; RF Sign Posting Notes</b>
1 – Northwest Corner of Transmitter Fence (outside)	1.2% (12 $\mu\text{W}/\text{cm}^2$ )	---
2 – Northeast Corner of Transmitter Fence (outside)	6.4% (64 $\mu\text{W}/\text{cm}^2$ )	---
3 – Southeast Corner of Transmitter Fence (outside)	14.2% (142 $\mu\text{W}/\text{cm}^2$ )	---
4 – Southwest Corner of Transmitter Fence (outside)	16.5% (165 $\mu\text{W}/\text{cm}^2$ )	RF Caution Sign Posted
5 – Inside of Transmitter Fence (complete walking tour)	16.5% (165 $\mu\text{W}/\text{cm}^2$ )	RF Caution Sign Posted
6 – Inside of Transmitter Buildings (complete walking tour)	2.4% (24 $\mu\text{W}/\text{cm}^2$ )	---
7 – Northeast Outer Guy-wire Anchor (outside of fence)	14.5% (145 $\mu\text{W}/\text{cm}^2$ )	RF Warning Sign Posted
7a – Northeast Outer Guy-wire Anchor (inside of fence)	+100% (1000 $\mu\text{W}/\text{cm}^2$ )	RF Warning Sign Posted
8 – Northeast Inner Guy-wire Anchor (outside of fence)	2.5% (25.0 $\mu\text{W}/\text{cm}^2$ )	---
8a – Northeast Inner Guy-wire Anchor (inside of fence)	2.5% (25.0 $\mu\text{W}/\text{cm}^2$ )	---
9 – Southeast Outer Guy-wire Anchor (outside of fence)	3.5% (35 $\mu\text{W}/\text{cm}^2$ )	RF Warning Sign Posted
9a – Southeast Outer Guy-wire Anchor (inside of fence)	+100% (1000 $\mu\text{W}/\text{cm}^2$ )	RF Warning Sign Posted
10 – Southeast Inner Guy-wire Anchor (outside of fence)	2.5% (25 $\mu\text{W}/\text{cm}^2$ )	---
10a – Southeast Inner Guy-wire Anchor (inside of fence)	2.5% (25.0 $\mu\text{W}/\text{cm}^2$ )	---
11 – West Outer Guy-wire Anchor (outside of fence)	4.5% (45 $\mu\text{W}/\text{cm}^2$ )	RF Warning Sign Posted
11a – West Outer Guy-wire Anchor (inside of fence)	+100% (1000 $\mu\text{W}/\text{cm}^2$ )	RF Warning Sign Posted
12 – West Inner Guy-wire Anchor (outside of fence)	2.5% (25 $\mu\text{W}/\text{cm}^2$ )	---
12a – West Inner Guy-wire Anchor (inside of fence)	2.5% (25 $\mu\text{W}/\text{cm}^2$ )	---

# Radiofrequency Radiation Guidelines Compliance Study

## Fenced Transmitter Building Complex:



## Fenced Guy-wire Footings:



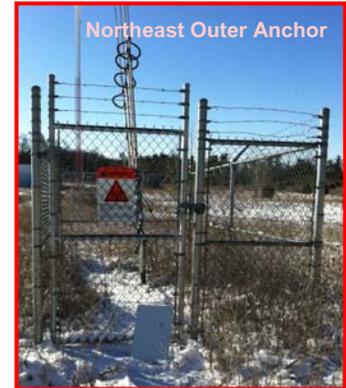
## Typical of Sign Postage



● : Denotes Measurement Locations or Areas



# Radiofrequency Radiation Guidelines Compliance Study



↑  
**Transmitter Building & Locked Fencing**  
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↑  
**Various Sign Postings**  
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