

**ENGINEERING EXHIBIT  
IN SUPPORT OF  
APPLICATION FOR LICENSE**

**Radio Frequency Radiation  
(ANSI) Measurements**

**Common Antenna Site  
IDS Building, Minneapolis Minnesota**

<b>KQRS-FM - 92.5 MHz.</b>	<b>KXXR-FM - 93.7 MHz.</b>
<b>KTCZ-FM - 97.1 MHz.</b>	<b>KTIS-FM - 98.5 MHz.</b>
<b>KSJN-FM - 99.5 MHz.</b>	<b>KTLK-FM - 100.3 MHz.</b>
<b>KDWB-FM - 101.3 MHz.</b>	<b>KEEY-FM - 102.1 MHz.</b>
<b>KZJK-FM - 104.1 MHz.</b>	

**September 10, 2008**

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The filing of this engineering statement with the FCC constitutes acceptance of these terms and conditions by

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gwerl@commsulting.com

# AFFIDAVIT

HENNEPIN COUNTY

STATE OF MINNESOTA

SS:

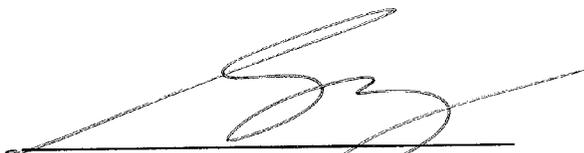
GEORGE H. WERL, JR., being duly sworn upon oath deposes and says:

That his qualifications are a matter of record with the Federal Communications Commission;

That he is President of Commsulting, Incorporated, a Minnesota corporation;

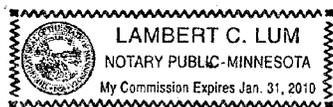
That Commsulting, Incorporated has been retained to prepare this declaration and engineering statement;

That he has either prepared or directly supervised the preparation of all technical information contained in this engineering statement and that the facts stated in this engineering statement are true of his knowledge, except as to such statements as are herein stated to be on information and belief, and to such statements he believes them to be true.



George H. Werl, Jr.

Subscribed and sworn to before me on Sept. 10, 2008



Notary Public

My Commission expires Jan. 31, 2010

# ENGINEERING EXHIBIT IN SUPPORT OF APPLICATION FOR LICENSE

## Radio Frequency Radiation (ANSI) Measurements

Common Antenna Site  
IDS Building, Minneapolis Minnesota

KQRS-FM - 92.5 MHz.	KXXR-FM - 93.7 MHz.
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KDWB-FM - 101.3 MHz.	KEEY-FM - 102.1 MHz.
KZJK-FM - 104.1 MHz.	

**NARRATIVE STATEMENT:** This engineering statement and exhibits have been prepared by George H. Werl, Jr., President of Commsulting, Inc., on behalf of KQRS-FM, KXXR-FM, KTCZ-FM, KTIS-FM, KSJN-FM, KTLK-FM, KDWB-FM, KEEY-FM and KZJK-FM (herein referred to as "the IDS Stations"), in accordance with the Rules and Regulations of the Federal Communications Commission following the replacement of a master antenna located at the IDS Building in Minneapolis, Minnesota. These facilities constitute a common auxiliary transmission site for the stations specified, the main site for all of these stations being located at Shoreview, Minnesota.

**ANTENNA SYSTEM SITE DESCRIPTION:** Nine FM stations utilize the master antenna located at the IDS Building in Minneapolis, Minnesota as an auxiliary site. The new antenna installed at this site, an Electronics Research (ERI) 12 bay AXIOM, replaces a 14 level Shively Labs Lindenblad design installed some 10 years ago. Only the antenna and the short feedline section above the roof level was replaced, the combiner system originally installed with the previous Shively antenna and all feedlines internal to the building remain unchanged. There was no change in the antenna center of radiation. As the number of bays was reduced, the overall gain of the AXIOM antenna is somewhat lower than the previous Shively Lindenblad resulting in somewhat lower Effective Radiated Power for

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the antenna array than previous as the stations are essentially maintaining their previously licensed transmitter power output (TPO). However, at the slightly reduced power level the facility remains fully compliant with FCC Rules as an auxiliary transmission site.

In addition to the master FM antenna, the IDS Building rooftop provides leased space for numerous facilities in the land mobile, public service, two-way and microwave services as well as a class A FM station (WGVZ-FM), a number of LPTV facilities (WTMS-7, WUMN-13, K14KH, K19ER, K25IA, K43HB, WDMI-62) and a MediaFLO (mobile television) system on channel 55. Access to the roof is tightly restricted through the use of identification checkpoints, specially issued keys and ID card readers. The building rooftop leasing agent is Broadcast Services, Inc. (BSI) based in Indianapolis, Indiana. BSI has established the Electromagnetic Energy (EME) Compliance Plan for all of the RF emitters at the IDS Building and is responsible for authoring and distributing training materials to all persons having access to the roof, including the documents "EME Compliance Plan for IDS Center, Minneapolis, Minnesota" and "EME Training Manual for Rooftop Personnel". The IDS Building rooftop therefore qualifies as an Occupational/Controlled Environment as defined by FCC OET Bulletin 65 standards.

**MEASUREMENT METHODOLOGY:** As part of the design process, ERI modeled the 12 BAY AXIOM antenna array in the proposed location on the IDS roof to determine the AXIOM's predicted theoretical power density anticipated over the entire rooftop (at height of 6.6 feet above roof level). This was calculated as a "worst case" scenario using maximum TPO's for each FM station (assuming zero combiner and feedline loss). Using this "worst case" analysis, the maximum anticipated power density contribution was 5 decibels below the Occupational/Controlled Environment standard MPE limit for continuous exposure ( $1 \text{ mW/cm}^2$ ) at any point on the roof. A plot is included herein as Exhibit C.

On the morning of August 24, 2008, on-site RFR measurements were made on the IDS rooftop. All RF emitters were operating normally, the nine FM stations described herein were operating as described above and in the accompanying Form 302 license applications. The on-site measurements were performed by George Werl (President, Commsulting, Inc.), James Stanley (FM Chief Engineer, CBS Radio Minneapolis) and David Szaflarski (Chief Engineer, Citadel Broadcasting Minneapolis).

Measurements were made in accordance with procedures outlined in FCC OET Bulletin 65 (Edition 97-01) "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", in particular, with Section 3 of that document.

Two separate measurement systems were employed. A Narda model 8718B Electromagnetic Radiation Survey Meter was used with a Narda model A8742D Isotropic Shaped Electric Field probe. This probe has a correction factor of 1.06 at 100 MHz. The meter and probe configuration have a measurement range from 300 kHz to 3 GHz. The meter was initialized for the FCC 1997 Occupational/Controlled standard and zeroed according to the manufacturer's instructions to read in percent of maximum permissible exposure (MPE). The "peak hold" feature was used to indicate the maximum RF fields encountered. This meter was provided by Clear Channel Broadcasting, last calibrated in May/June, 2004.

A Narda model SRM-3000 Selective Radiation Meter was used with its supplied 3-axis E-field antenna. The meter and probe configuration have a measurement range from 50 MHz to 3 GHz. The SRM system automatically applies probe correction factors from an EPROM built into the probe. This meter was also initialized for the FCC 1997 Occupational/Controlled standard and similarly zeroed. The meter's Safety Evaluation Mode was used along with 16 sweep averaging while walking the rooftop. At several points the Spectrum Analysis feature of the instrument was employed to analyze individual contributors to the overall percentage of MPE. This meter was provided by CBS/Infinity Broadcasting, last calibrated in 2007.

The entire perimeter of the IDS Building (along the window washer track) was "walked" as well as all accessible areas around the rooftop equipment and antenna mounts. Readings were periodically entered for both meters on a rooftop sketch showing the locations. This data is included herein as Exhibit D. At each measurement location the lower entry is the SRM-3000, the upper entry is the 8718B. Note that in preparing Exhibit D the specified 1.06 probe correction factor at 100 MHz. has been applied to the 8718B raw data.

With installation of the previous Shively antenna, "work rules" were established under the BSI EME Compliance Plan that no climbing on any roof structure would be permitted while the FM master antenna was operating. There are signs posted at the roof entry points prohibiting such activity. As these "work rules" will continue to be in force with the AXIOM antenna, no areas above the roof surface were surveyed. It has been (and will continue to be) the practice of the FM facilities to "lock out" the FM transmitters by turning off each of the individual FM transmitter mains power while any person is working on any roof structure above the roof deck level.

**CONCLUSIONS:** The two Narda meters were found to "track" remarkably well at all locations. The maximum reading on the roof was found at a location northeast of the support

designated as "FM 1" between the antenna supports labelled "P" and "K". This measurement was highly variable and difficult to reestablish, at one point reading 95.4% of MPE on "peak hold" on the 8718B. It is also noted that the largest difference between the two meters occurred at this point, the SRM-3000 reading 74% of MPE (well below the 8718B peak reading).

No areas on the roof were found that exceeded the FCC 1997 Occupational/Controlled Environment MPE standard for continuous exposure.

**PREPARER'S CERTIFICATION:** George H. Werl, Jr. holds a Bachelor of Science from The Pennsylvania State University as well as a Bachelor of Electrical Engineering from the University of Minnesota. He has had numerous matters before the Federal Communications Commission, his qualifications are a matter of record;

He supervised the construction and equipment installation of this combined antenna system at the IDS Building and has been associated with this site since FM facilities began broadcasting from this site in 1977. Over the years he has performed these types measurements demonstrating FCC compliance many times.

He is President of Commsulting, Incorporated, a Minnesota corporation; and he has either prepared or directly supervised the preparation of all technical information contained in this engineering statement. The facts stated in this engineering statement are true of his knowledge, except as to such statements as are herein stated to be on information and belief, and as to such statements he believes them to be true.

A handwritten signature in black ink, appearing to be 'G. Werl, Jr.', written over a solid horizontal line.

George H. Werl, Jr.  
President, Commsulting, Inc.

# ENGINEERING EXHIBIT A

IDS Building Master Antenna, Minneapolis, Minnesota

*Antenna System Data:*

*The following FM facilities operate from the IDS master antenna.*

KQRS -FM	92.5 MHz.
KXXR-FM	93.7 MHz.
KTCZ-FM	97.1 MHz.
KTIS-FM	98.5 MHz.
KSJN-FM	99.5 MHz.
KTLK-FM	100.3 MHz.
KDWB-FM	101.3 MHz.
KEEY-FM	102.1 MHz.
KZJK-FM	104.1 MHz.

# ENGINEERING EXHIBIT B

## IDS Building Master Antenna, Minneapolis, Minnesota

### *Measurement Equipment Details:*

#### Equipment Data:

Narda Model 8718B Electromagnetic Radiation Survey Meter

S/N 1101, Last Calibrated May 2004

Narda Model A8742D Isotropic, Shaped Frequency Response Electric Field Probe

S/N 11007, Last Calibrated June 2004

Narda Model SRM-3001/01 Selective Radiation Meter

S/N L-0018, Last Calibrated 2007

Narda Model 3501/02 Electric Field Three Axis Antenna

S/N H-0123, Last Calibrated 2007

#### Notes:

- 1) Narda model 8718B meter and probe supplied by Clear Channel Broadcasting.
- 2) Narda model SRM-3000 meter and probe supplied by CBS/Infinity Broadcasting.

# ENGINEERING EXHIBIT C

## IDS Building Master Antenna, Minneapolis, Minnesota

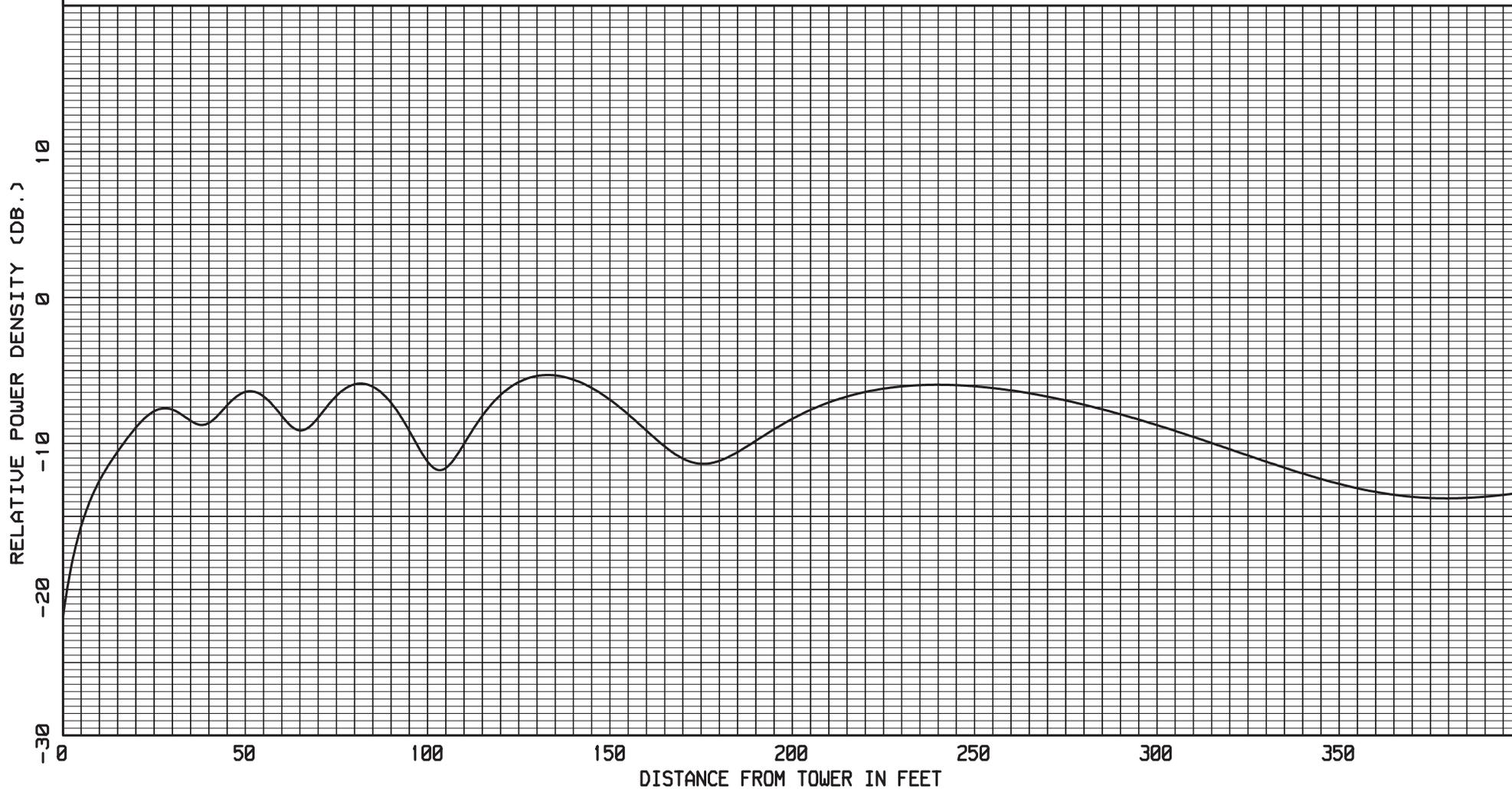
ELECTRONICS RESEARCH, INC.  
7777 GARDNER ROAD  
CHANDLER, IN., 47610

THEORETICAL POWER DENSITY  
RELATIVE TO 1 MW/CM<sup>2</sup>

SEPTEMBER 26, 2007

FIGURE 11

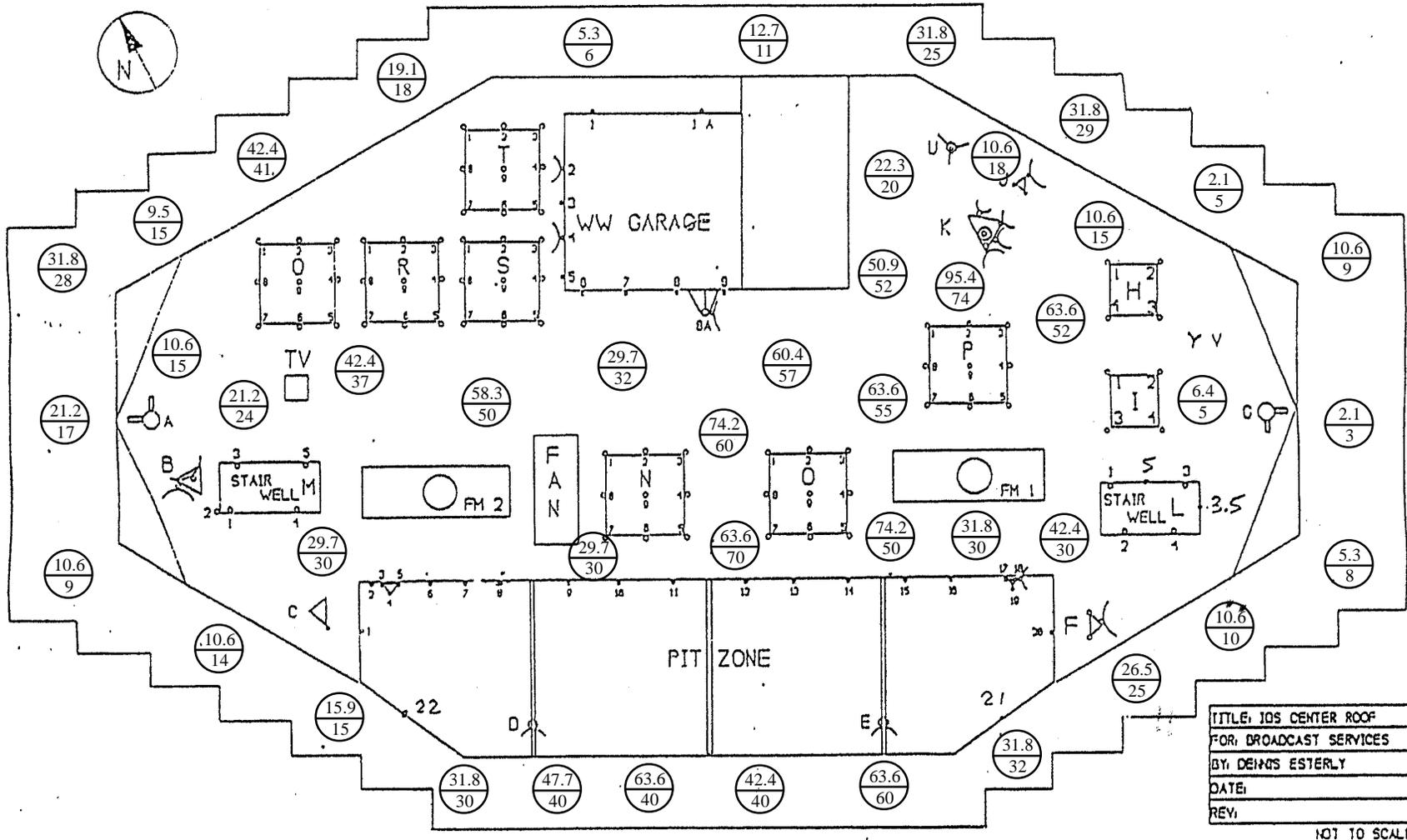
12 BAYS AT 9 FREQUENCIES  
TOTAL HORIZONTAL PLANE ERP= 675.46 KW. (H+V)  
ELEMENT-TO-ELEMENT SPACING= 5 FT.  
BOTTOM BAY 40 FEET ABOVE ROOF LEVEL  
CALCULATED AT 6.6 FEET ABOVE ROOF LEVEL



# ENGINEERING EXHIBIT D

## IDS Building Master Antenna, Minneapolis, Minnesota

### Measurement Data Plotted on IDS Rooftop Sketch:



$\frac{28}{30}$  <- "Peak" reading, Narda model 8718B (see Narrative) - 1.06 correction factor @100 MHz. applied  
 $\frac{30}{30}$  <- "16 x Average" reading, Narda model SRM-3000 (see Narrative)  
 All readings in percent of FCC 1997 Occupational/Controlled MPE for continuous exposure.

ROOF PLAN  
 BSI DWG. NO. 9803-100