

Evaluation of Compliance
FCC Guidelines for Human Exposure
Radiofrequency Electromagnetic Fields
WIVA-FM CP Main Facility
WORA-TV Site, Maricao, Puerto Rico

Engineering Statement

On January 17, 2019, between the hours of 11:30 AM and 4:30 PM, electromagnetic radiofrequency (RF) field strength measurements were performed at the transmitter site of WORA-TV, located in Monte del Estado, Maricao, Puerto Rico. The licensed parameters of WORA-TV on Channel 29 were operational. The main antenna facility of WIVA-FM, as authorized on the FCC CP File Num. BMPH-20161031AAB, were temporarily operational for several hours to allow for the RF measurements.

The whole area inside and outside the transmitting site of WORA-TV was observed along the road leading to the site and along the unrestricted dirt road surrounding the site, where public can be present. The area inside the fence of the WORA-TV site was separately measured and recorded, as well as the transmitter room of WIVA-FM. There are no significant intermittent emitter (like cellular, paging or two-way radio) operating from this site. In all cases, the guidelines of the FCC Bulletin OET 65 "Evaluating Compliance with Federal Communications Commission Guidelines for Human Exposure to Radiofrequency Electromagnetic Field", Edition 97-01, August 1997, were followed.

The power density levels were recorded using a Narda Electromagnetic Survey Meter, Model NMB-550-S, 2400/101B, (100 kHz – 60 GHz), S/N H-0667, calibrated on 10/15/2018; an FCC Shaped E Field probe, Model EA-5091 (300 kHz – 50 GHz), S/N 01161, calibrated on 10/5/2017; and a linear magnetic probe, Model HF0191 (NMB Series, 27 MHz – 1 GHz), S/N A-0253, calibrated on 11/15/2017; copies of the certificates of calibration are included in Appendix 1.

Procedure

- A) The area outside the transmitter site, as defined by the locked fence surrounding the site where a dirt road exists, was measured for a period of 15 minutes, using the Narda equipment and the FCC shaped (calibrated per the FCC curve for broadcast emissions) electric field probe described below. While slowly and carefully scanning the area, the maximum (peak) and average values of the RF fields were recorded. In no instance did

the RF field peak level (7.4% of the maximum for an uncontrolled environment) or the average level (3.72% of the maximum for an uncontrolled environment), exceeded the maximum values allowed by the FCC standards for an uncontrolled, public exposure environment.

- B) Then, the area inside the transmitter site, as defined by the locked fence surrounding the site, was measured for a period of 15 minutes, using the same Narda RF survey equipment and electric field probe (FCC shaped calibrated for broadcast emissions). While slowly and carefully scanning the whole inside site area, the maximum (peak) and average values of the RF fields were recorded. Again, in no instance did the RF field peak level (17.29% of the maximum for an uncontrolled environment) or the average level (4.31% of the maximum for an uncontrolled environment), exceeded the maximum values allowed by the FCC standards for an uncontrolled, public exposure environment.
- C) Then, the area inside the transmitter building, where the transmitter and associated equipment are housed, was measured for a period of 6 minutes, using the same Narda equipment and the electric field probe (FCC shaped calibrated for broadcast emissions). While slowly and carefully scanning the area, the maximum and average values of the RF fields were recorded. In no instance did the RF field peak level (0.79% of the maximum for an uncontrolled environment) or the average level (0.078% of the maximum for an uncontrolled environment), exceeded the maximum values allowed by the FCC standards for an uncontrolled, public exposure environment.

The same areas described in A), B) and C) above were measured for the same periods of time and locations described above with a linear magnetic probe covering the AM, FM, and TV bands, with the following results:

- D) The area outside the transmitter site, as defined by the locked fence surrounding the site where a dirt road exists, was measured for a period of 15 minutes, using the Narda equipment and the magnetic field probe described below. While slowly and carefully scanning the area, the maximum (peak) and average values of the RF fields were recorded. In no instance did the RF field peak level (49.5 uW/sq.cm out of a maximum of 200 uW/sq.cm for an uncontrolled environment) or the average level (14.0 uW/sq.cm out of a maximum of 200 uW/sq.cm for an uncontrolled environment), exceeded the maximum values allowed by the FCC standards for an uncontrolled, public exposure environment.

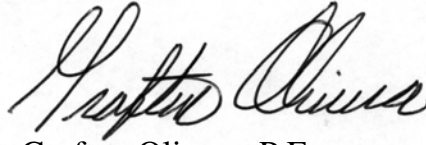
- E) Then, the area inside the transmitter site, as defined by the locked fence surrounding the site, was measured for a period of 15 minutes, using the Narda equipment and the magnetic field probe described below. While carefully scanning the whole area, the maximum (peak) and average values of the RF fields were recorded. In no instance did the RF field, peak level (78.8 uW/sq.cm out of a maximum of 200 uW/sq.cm for an uncontrolled environment) or the average level (18.7 uW/sq.cm out of a maximum of 200 uW/sq.cm for an uncontrolled environment), exceeded the maximum values allowed by the FCC standards for an uncontrolled, public exposure environment.
- F) Then, the area inside the transmitter building, where the transmitter and associated equipment are housed, was measured for a period of 6 minutes, using the Narda equipment and the magnetic field probe. While carefully scanning the whole area, the maximum (peak) and average values of the RF fields were recorded. In no instance did the RF field, peak level (43.5 uW/sq.cm out of a maximum of 200 uW/sq.cm for an uncontrolled environment) or the average level (4.5 uW/sq.cm out of a maximum of 200 uW/sq.cm for an uncontrolled environment), exceeded the maximum values allowed by the FCC standards for an uncontrolled, public exposure environment.

Since the magnetic probe is flat, not FCC shaped, and covers a broad spectrum (27 MHz to 1 GHz), the magnetic field readings, in terms of the percentage of the maximum allowed, tend to read higher than the corresponding electric field measurements. A table of all the measurements recorded, using both the electric and magnetic probes is included in Appendix 2.

Conclusion

The electromagnetic radiation measurements performed at the WORA-TV site with the CP authorized facilities of WIVA-FM main antenna operational, demonstrate that the RF levels inside and around the site at ground levels do not exceed the maximum permissible exposure levels for an uncontrolled environment. The area around the WORA-TV site would generally be considered an uncontrolled environment since access to the premises is not strictly limited to authorized personnel with knowledge and control of the radio frequency radiation present.

RF Study – WIVA-FM Main Facility – Maricao, PR
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A handwritten signature in black ink, appearing to read 'Grafton Olivera', is centered on the page.

Grafton Olivera, P.E.
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January 19, 2019

APPENDIX 1 - CALIBRATION CERTIFICATES

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Certificate of Calibration



Asset ID
22256



Work Order
31828

Certificate Number: 31828

Certificate Date: 1/8/2019

Manufacturer: Narda

Model: NBM-550,2400/101B

Serial Number: H-0667

Description: 100 kHz - 60 GHz Broadband Field Strength M

Date Received: 12/07/2018

Date of Calibration: 10/15/2018

Recommended Due Date: 10/15/2020

Temperature: 22.50 °C

Relative Humidity: 45.6 %RH

Cal Procedure

2401-8700-00A

Customer Name: Advanced Test Equipment Corporation

Customer Address: 10401 Roselle Street, San Diego CA 92121

PO Number:

CRM Order Number: New Item

Comments:

Calibration performed by an Authorized Subcontractor.

This Calibration is traceable to the International System of Units (SI), through National Metrology Institutes, ratio metric techniques, or natural physical constants. This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval by ATEC Corporation Laboratory. The calibration has been completed in accordance with ATEC's Active Use Calibration System.

This calibration conforms to the requirements of ISO/IEC 17025:2005 and ANSI/NCCL Z540-1-1994 (R2002).

In the attached measurement results, deviation may be expressed with units, Measured Value (MV) - Nominal Value (NV) or as a proportion of the nominal value ((MV-NV)/NV), expressed without units with a scalar multiplier such as % (0.01), or as a ratio of the units (mA/A, μ V/V, etc.)

Descriptions such as μ A/A, μ V/V, and others, where used to annotate results or column headings are the preferred replacements for what was historically labeled as "ppm" or parts-per-million and described the results in that column, unless otherwise noted by units symbols.

Where applicable, the expanded uncertainty of measurement at the time of test is given in the following pages. They are calculated in accordance with the method described in the ISO Guide to the Expression of Uncertainty in Measurement (GUM). The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, such that the confidence level approximates 95%.

This Calibration certificate may contain data that is not covered by the A2LA Scope of Accreditation. Unaccredited material, where applicable is indicated by an asterisk (*), or confined to clearly marked sections. Functional (Pass / Fail) tests are not accredited.

No statement of compliance with specifications is made or implied on this certificate. However, measurement results are reviewed, where applicable, to establish where any measurement result exceeded the manufacturer's specifications.

Measured values (MV) greater than the Manufacturer's specification (Spec) are indicated by "X".

Calibration Performed By:		Authorized by:	
Swann, William A	Technician	Javier Estrada	01/08/2019
Name	Title	Metrology Supervisor	Certificate Date

ATEC Corporation calibration documents are electronically signed utilizing MudCats Metrology Software Suite of Applications

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10401 Roselle St.
San Diego, CA 92121

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888-488-2832

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QF21/122713



Certificate of Calibration

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Certificate Number: 27066
Certificate Date: 1/8/2019

Date Received: 09/07/2017
Date of Calibration: 10/5/2017
Recommended Due Date: 10/4/2019
Temperature: 24.40 °C
Relative Humidity: 34.6 %RH

Manufacturer: Narda
Model: EA5091
Serial Number: 01161
Description: 300kHz-50GHz Isotropic Probe, Shaped E-Fie

Cal Procedure
Probe ATE Software, 990313 v3.0.2

Customer Name: Advanced Test Equipment Corporation
Customer Address: 10401 Roselle Street, San Diego CA 92121
PO Number:
CRM Order Number: Stock Calibration

Comments:

Calibration performed by an Authorized Subcontractor.

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Calibration Performed By:		Authorized by:	
Christensen, Rick	Technician	Javier Estrada	01/08/2019
Name	Title	Metrology Supervisor	Certificate Date

ATEC Corporation calibration documents are electronically signed utilizing MudCats Metrology Software Suite of Applications

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Certificate of Calibration

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Certificate Number: 27057

Certificate Date: 1/8/2019

Manufacturer: Narda

Model: HF0191

Serial Number: A-0253

Description: 27MHz-1GHz H Field (Flat) Probe for NBM 8

Date Received: 09/07/2017

Date of Calibration: 11/15/2017

Recommended Due Date: 11/15/2019

Temperature: 22.60 °C

Relative Humidity: 41.5 %RH

Cal Procedure
2402-8706-00A

Customer Name: Advanced Test Equipment Corporation

Customer Address: 10401 Roselle Street, San Diego CA 92121

PO Number:

CRM Order Number: Stock Calibration

Comments:

Calibration performed by an Authorized Subcontractor.

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