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Lawrence Behr Associates, Inc.

# **AM Protection Report: WFAI and Salem NJ Site 67 Salem, New Jersey**

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*American Tower Corporation  
Salem, New Jersey*



*22 April 2012*

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# AM Protection Report: WFAI at Salem NJ Site 67 Salem, New Jersey

*American Tower Corporation  
Salem, New Jersey*

## Introduction

This report summarizes the methodology used and the results obtained in a study of the American Tower Corporation Salem NJ Site 67 at the WFAI frequency, 1510 kHz. These procedures were undertaken to determine whether the reradiated field from the installation on the tower has any adverse effect on the WFAI directional antenna radiation pattern that would make the pattern exceed the licensed limits.

## Site and Facility Considerations

The American Tower Corporation site is located on South Broadway, 0.05 miles north of Freas Road in Salem, New Jersey. The site coordinates are given as North Latitude 39° 35' 30.62", West Longitude 75° 29' 28.91", using NAD 83 datum. The support structure is a guyed lattice tower having a height of 48 meters above ground level. The addition of the Chesapeake Catholic Radio, Inc. antennas and lines did not increase the height of the structure.

In order to comply with FCC requirements, all nondirectional AM stations were determined within one kilometer and all directional AM stations within three kilometers of this site. The only station so identified is WFAI at 1510 kHz. WFAI operates daytime with a power of 2.5 kilowatts using a directional antenna array. Appendix 1.0 shows the location of station WFAI with regard to the American Tower Corporation host tower.

## Methodology

LBA evaluated the impact of the Chesapeake Catholic Radio, Inc. installation on the existing tower. It was our expectation that the installation would not create a significant change in the amount of reradiation and, therefore, would not have an adverse effect on the WFAI radiation pattern. Field measurements on the station's directional pattern monitor points and close-in measurements on the American Tower Corporation host tower were taken to document actual conditions and confirm the theoretical study. LBA notified WFAI regarding the AM protection project. There was no response or cooperation on the part of WFAI.

Pattern measurements were made on the WFAI directional antenna system monitor point after the installation of the Chesapeake Catholic Radio, Inc. antennas and lines on the tower.

The monitor point was identified using the description from the WFAI license. LBA Director of Site Services Michael W. Hayden, who has extensive experience in making field strength measurements, made these measurements utilizing a recently calibrated Potomac Instruments FIM-4100 field strength meter, serial number 223.

## **Results of Field Measurements**

Appendix 2.0 contains the fields at the WFAI monitoring point as measured after installation of the Chesapeake Catholic Radio, Inc. equipment at the site. The FCC licensed maximum limit for the point as specified in the WFAI license is also shown on the table. It is observed that the measured monitoring point field falls below the maximum.

## **Reradiation Measurements**

In order to ascertain that any differences in the WFAI measured signal are independent of the Chesapeake Catholic Radio, Inc. installation on the existing tower, close-in measurements on the American Tower Corporation host tower were made to determine the reradiated field. Using appropriate procedures, such measurements can accurately gauge the reradiation from the tower relative to the ambient field intensity of the station being protected.

Mr. Hayden performed the close-in measurements. The measurement points required to implement this approach were laid out along a precise line beginning at the center of the host tower and proceeding outward at a bearing 90° off the bearing from the tower to the array center coordinates of station WFAI. Marks were then made, at intervals along the line, beginning with a distance of 10 feet and ending with a distance of 100 feet from the host tower's center. Appendix 3.0 is a diagram of the measurement radial and points associated with it.

The field intensity meter was mounted on a tripod, which was placed exactly over each mark. The meter was aligned directly on the host tower and a reading of the reradiated signal was taken. The meter was then turned 90° and a reading of the incident field from station WFAI was taken. Further corrections for near field effects were applied to the measured data after the manner of George Brown (G.H. Brown, Directional Antennas, Proceedings of the IRE, January 1937).

Appendix 4.0 is a tabulation and Appendix 5.0 is a graph of reradiated field intensity measured by the above technique from the host tower with WFAI operating with its directional antenna.

For the site's tower with installed antennas and lines, the measured reradiated field of 0.47 mV/m at one kilometer was obtained with WFAI operating with its daytime directional pattern. This reradiation was evaluated against the lowest standard field of 127.0 mV/m at one kilometer. This minimal reradiation should have no adverse effect on the WFAI directional antenna pattern.

## Conclusion

The objective of this measurement program was to assess the impact of the reradiated field of the Chesapeake Catholic Radio, Inc. antenna installation on WFAI. The monitor point measurement and supplemental near field measurements on the American Tower Corporation host tower demonstrate that this installation has no measurable effects on the WFAI directional antenna pattern which would make the pattern exceed its licensed limits.

It is our opinion that the Chesapeake Catholic Radio, Inc. installation on the existing tower is not a significant factor in the ability of WFAI to properly adjust and maintain its directional antenna system.

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22 April 2012

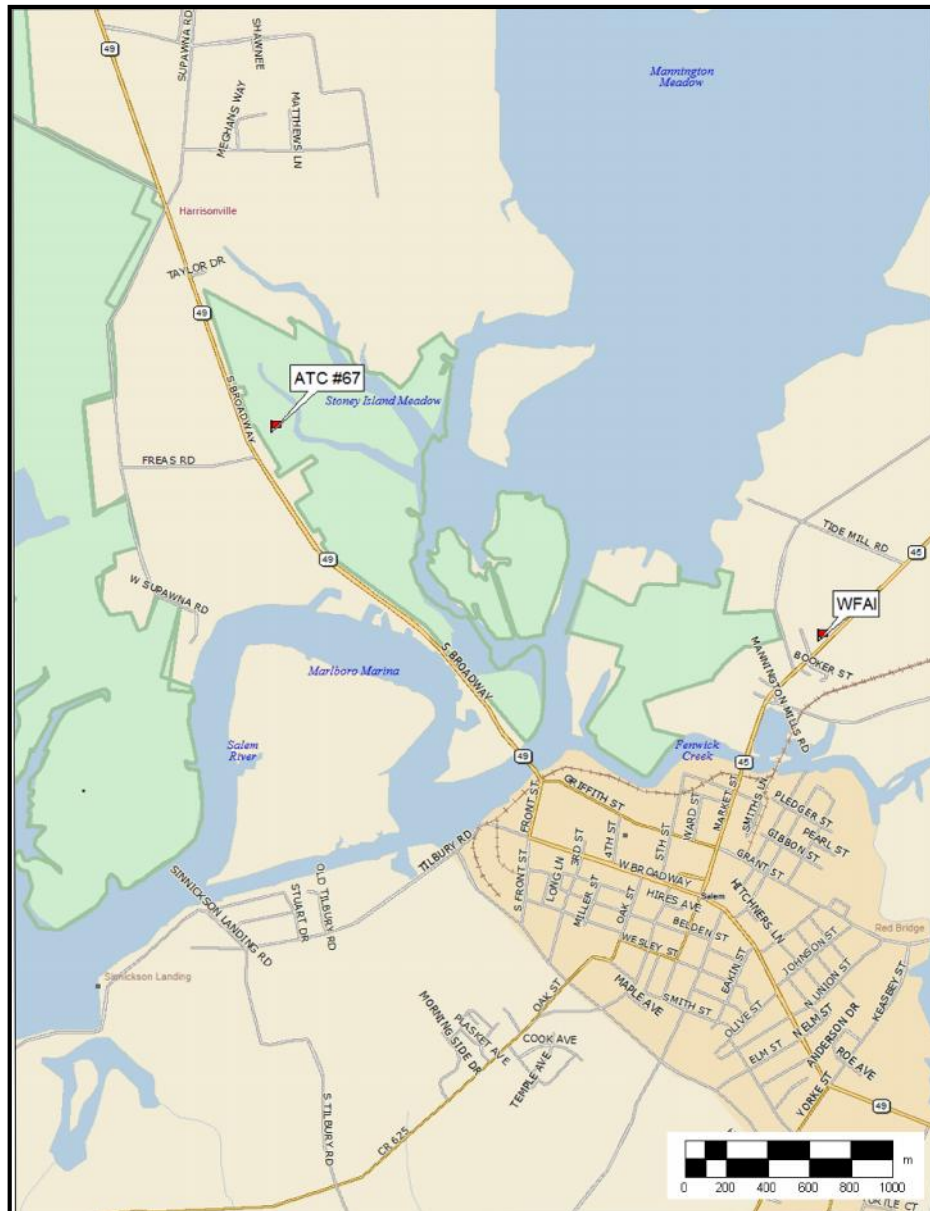


Michael W. Hayden NCE CPBE CBNT AMD

Director of Site Services

# Appendix 1.0 Site Area Map

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# Appendix 2.0

## WFAI Monitor Point Analysis

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DAYTIME MONITORING POINT DATA				
Azimuth	Post-Construction			Licensed Maximum
	Date	Time	Field (mV/m)	
344.2°	21-Apr-12	1403	4.67	18.60

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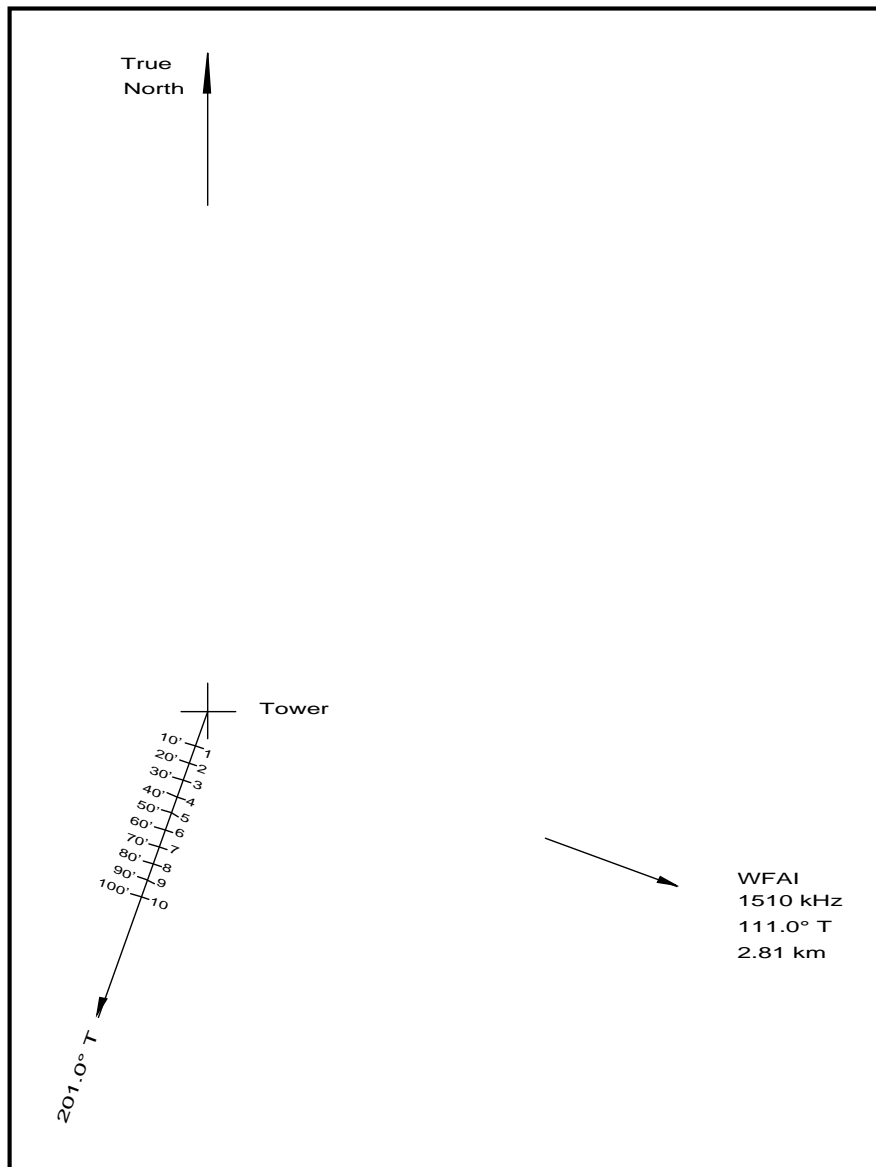
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# Appendix 3.0

## WFAI Measurement

### Location Points

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# Appendix 4.0

## WFAI Near Field

## Measurement Results

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Point No.	Distance		Field (mV/m)
	Feet	Kilometers	Untuned
1	10	0.003	101.54
2	20	0.006	81.76
3	30	0.009	60.83
4	40	0.012	55.23
5	50	0.015	40.82
6	60	0.018	29.24
7	70	0.021	21.50
8	80	0.024	16.65
9	90	0.027	13.74
10	100	0.030	11.80

**Notes:**

Reradiated Field (mV/m/km): 0.47

WFAI ambient directional daytime field.

Field data has been proximity corrected.

Date: 21-Apr-12

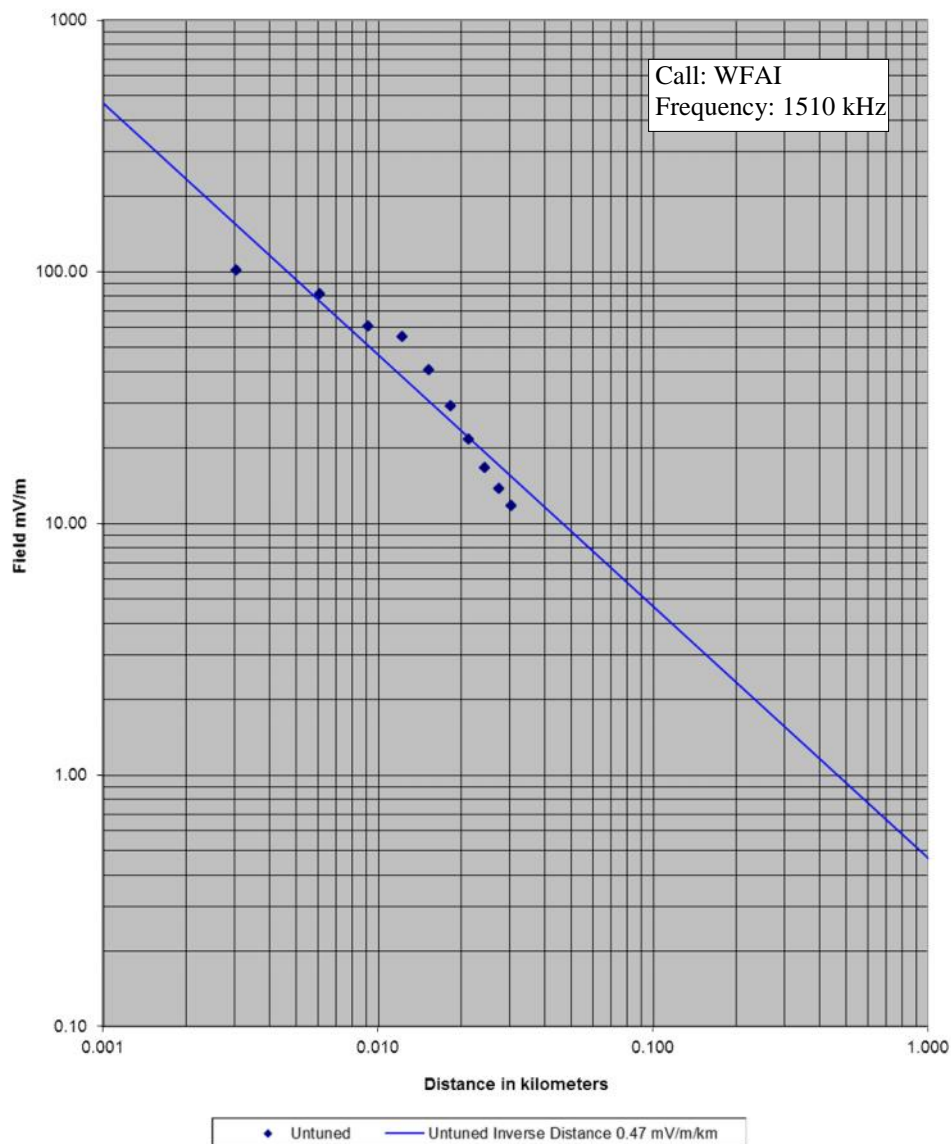


# Appendix 5.0

## WFAI Reradiation Analysis

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### Reradiation Analysis



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