

## Compliance with Special Operating Conditions or Restrictions

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The instant application includes a request for program test authority and contains the documentation required by this Special Condition.

The applicant commits to complying with any special operating conditions or restrictions listed on the construction permit which require no action or specific response at licensing and, in coordination with other users of the site, shall reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines. Required responses to listed special conditions or restrictions are contained below.

- The Applicant has discontinued use of the auxiliary facility authorized by BLH-19840409CA. The auxiliary license was turned in and canceled on August 30, 2022.
- *RFR Condition:* The outstanding WPAT-FM Construction Permit authorizes the permanent operation from the ERI main master antenna atop the Empire State Building (ESB) with an Effective Radiated Power (ERP) of 4.8 kW. Radio station WPAT-FM has been operating from this antenna pursuant to Special Temporary Authority (STA) since its main facility was destroyed in the terrorist attacks on September 11, 2001, and with an ERP of 4.0 kW since April, 2004.

Over the years, there have been multiple RFR surveys performed at ESB and multiple certifications of the site's continued compliance with all applicable FCC Guidelines. In fact, in the last few months, license renewal applications were granted for seven stations which operate from the ERI main master antenna (WNYC-FM, WSKQ-FM, WEPN-FM, WFAN-FM, WKTU, WAXQ and WQXR-FM) which contained fresh certifications for the site's compliance with all applicable RFR guidelines.

As demonstrated herein, RFR measurements demonstrate that the power increase authorized in the outstanding WPAT-FM Construction Permit will have an insignificant impact on the RFR environment on ESB and the site will remain compliant with all applicable FCC Guideline values. Attached is a Table which shows, based on measurements, that the WPAT-FM (4.8 kW) CP facility will contribute less than 5% to the maximum permissible exposure guideline value in uncontrolled (public) RFR environments (MPE). Further, the WPAT-FM (4.8 kW) CP facility will increase the percentage of the MPE by only 0.77% compared to the WPAT-FM (4.0 kW) STA facility which has been on-the-air for over 16 years.

Finally, with respect to controlled (occupational) RFR environments, the ESB users have a comprehensive plan in place to ensure the safety to personnel which must access work areas where the measured RF field may be in excess of the Commission's MPE for these areas. RF measurements have also been made throughout these areas and, where necessary, areas are marked, chained off and/or inaccessible without specific permission from building management.<sup>1</sup>

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<sup>1</sup> See WNYC-FM Application for License, FCC File No. BLH-20110815AAD, granted August 29, 2011.

- *Spurious Emission Condition:* As stated above, WPAT-FM has been operating from the antenna specified herein for over 20 years. Yearly maintenance inspections and equipment verifications have been conducted over that time and the very complex transmission system remains compliant and is operating without issues. A copy of the spurious emission report as submitted in the previously referenced WNYC-FM license application is attached for reference and demonstrates compliance with the instant special condition.

Empire State Building Main Master Antenna  
RFR Measurement Survey Summary  
September, 2022

Antenna:	ERI 1084-2CP		
Date of RFR Measurements:	16-Oct-10	<i>See WNYC-FM Application for License BLH-20110815ADD</i>	
Operating Power WNYC-FM (93.9 MHz)	5.2	kW (H&V)	ERP
Operating Power WPAT-FM (93.1 MHz)	4.0	kW (H&V)	ERP

All other remaining stations in the master antenna are operating today as they were on Oct. 16, 2010 with the exception of WFAN-FM which filed for a minor technical facility correction in 2017 (See BMLH-20170328AAC).

<u>Station and Operating Power</u>	<u>Maximum Measured Power Density as Percentage of Maximum Permissible Exposure Level in Uncontrolled (public) Areas</u>
WNYC-FM (5.2 kW ERP)*	5.00%
WPAT-FM (4.0 kW ERP)**	3.85%
WPAT-FM (4.8kW ERP)**	4.62%

\* Worst-case. The measured WNYC-FM power density was reported as "less than 5% of applicable MPE".  
The applicable MPE in this case was the uncontrolled (public) guideline value.

\*\* Extrapolated

# **Report of Intermodulation Product Findings**

**Project No. 2787**

*AT EMPIRE STATE BUILDING MASTER AND MINI MASTER FM BROADCAST FACILITIES  
NEW YORK, NEW YORK*

**WNYC 93.9 MHz. New York, NY  
Power Increase & IM Checkout**

*JULY 23, 2011*

**Measurements conducted by:**

**Robert Rose  
Nicholas Paulin  
Craig Day**

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7777 Gardner Road  
Chandler, Indiana 47610  
Phone (812) 925-6000 Fax (812) 925-4030**

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## **Empire State Building Master FM Antenna WNYC Power Increase & IM Checkout**

WYNC has retained the services of Electronics Research Inc. to examine the implications of a transmitter power increase to its FM station operating from a Master Antenna system. WYNC is being considered for a 1.74 kilowatt power increase and would now operate at a new transmitter power output (TPO) of 7.61 kilowatts if the FCC grants the power increase. ERI performed the work under Project No. 28538 on July 23<sup>rd</sup>, 2011

WNYC is only one FM station among 16 that is multiplexed into the Empire State Building common antenna broadcasting from the building top. A second independent Master Antenna is collocated on the building tower and services three additional stations. The two “systems” have, on at least two occasions, been inspected by ERI to insure compliance with section the FCC Rules and Regulations as required by the Code of Federal Regulations (CFR) Title 47 section 73.317 paragraph (b) through (d). One of the two previously compiled reports by Electronics Research Inc. (ERI) are included in the addendum and are referenced frequently.

The Antenna system and measurement technique used to assess inter-modulation emission levels is described in detail in the earlier report titled “***Report of Findings, Empire State Building Mini Master FM Broadcast Facility, New York, New York***” and will not be dwelled on here. In both previous reports, the measurements indicate that WNYC clearly meets the FCC emission levels on inter-modulation (IM) products while operating at the lower power level. The following discussion pertains to the power increase

We have included in this report a work sheet titled ***WNYC Power Increase-Third Order Product Investigation*** to show in a relatively simple manner that WNYC (93.9 MHz) while operating at the aforementioned power increase remains in compliance with FCC Rules and Regulations (i.e. is not generating unacceptable levels of IM products). Although it was unlikely that a change in power level would bring about an unacceptable IM product, it is understandable that all frequencies that pose a would-be mix to WNYC and from WNYC operation should be reexamined. Therefore, we have singled out these frequencies found in the earlier reports (see appendix) into Column-1 of the new work sheet. Thirty six specific product frequencies become the focus of our investigation along with the 19 station carrier reference levels.

Using a measurement technique nearly identical with the one disclosed in the earlier report, each listed IM product along with carrier reference levels were measured. A calibrated Directional Coupler located at the output of the multiplexing system was selected to sample forward energy. For traceability, a photo of this Directional Coupler showing its location and surroundings is included as a supplement to this report. Due to the Directional Coupler’s high (48 dB nominal) coupling level, each stations carrier level and all the product frequencies inspected were isolated using a Band-Pass Filter\*.

Before making use of the calibrated Spectrum Analyzer to record signal levels, a 6 dB Pad was inserted in the feed cable before the Band-Pass Filter and Directional Coupler. The Pad along with the Filter serve as a buffer to the Spectrum Analyzer, which insures a good instrument match and level protection requirements are met. The total losses (Pad + Filter) are summed in Column-6 and are used to justify the *Adjusted Level*, found in the Work Sheet, Column-8.

Using the appropriate *Adjusted Carrier-Reference* and *Adjusted Product-Levels* from Column-8 and by properly associating them with the *Interfering Frequency* information in Column-3, all IM product levels are determined and placed in Column-9. It is these values (disclosed in Column-9) that are offered as confirmation that while WNYC operated at the new increased power level no IM emissions beyond the FCC 80 dB limit were encountered. Furthermore, even as the Empire State Building broadcast facility operated normally, with simultaneous operation of both the FM Master Antenna systems and Mini Master System, no problems were encountered. This claim is not based entirely on the IM work sheet; once all Antennas operated at their customary power levels from the building a broad Spectral sweep was made using the forward port of the Master FM Antenna's Directional Coupler. The Spectrum Analyzer showed no emission levels above or below the FM Band worth investigating.

**Conclusion :** Based upon my observations and measurements taken July 23<sup>th</sup>, 2011 as summarized in this document, I, Robert Rose, find the subject multiplexed system- specifically the transmitters and combiner system for the operation of the Empire State Building, FM Master Antenna to be in proper working order. Furthermore, based on the measured data, it is my opinion that there are no inter-modulation products in excess of 80 dB below carrier levels generated from or within the stations operating on the installed system. Also, based on this recorded data I conclude that WNYC is in compliance with the requirements of Section 73.317 paragraph (b) through (d) of the FCC Rules and Regulations.

- (1) The Band-Pass filter was tuned using a Network Analyzer and its loss recorded in Column-5 of the work sheet.
- (2) Electrically isolating carrier reference levels using the Band-Pass filter, prior to recording its level is the only exception to the measurement technique covered in earlier reports.
- (3) The Antenna configuration and multiplexer footprints are given in the appendix.

Respectfully submitted,  
Electronics Research, Inc.

By:

Robert Rose

State of Indiana)  
County of Warrick) SS:

**AFFIDAVIT**

I, Robert Rose, hereby declare that the following statements are true and correct to the best of my knowledge and belief:

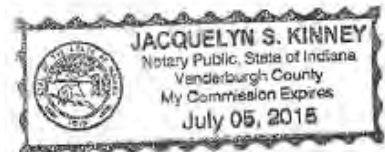
- 1.) I am VP of Engineering at Electronics Research, Inc ("ERI") and have been employed by ERI for 40 years. I am familiar with and have assisted in the design, manufacturing and installation of FM Antennas and FM Multiplexers in my long tenure with ERI.
- 2.) I have either prepared and/or directly supervised the preparation of all technical information contained in this Report Of Findings and to my knowledge to be accurate and true.
- 3.) ERI has been requested by NY Public Radio, Inc. on behalf of radio Station WNYC in New York City, NY to prepare this Report of Findings.



Robert Rose; ERI-VP of Engineering

*Subscribed and sworn to before me on this 5th, day of August 2011.*

Jacquelyn Kinney; Notary Public  
My commission expires July 5, 2015





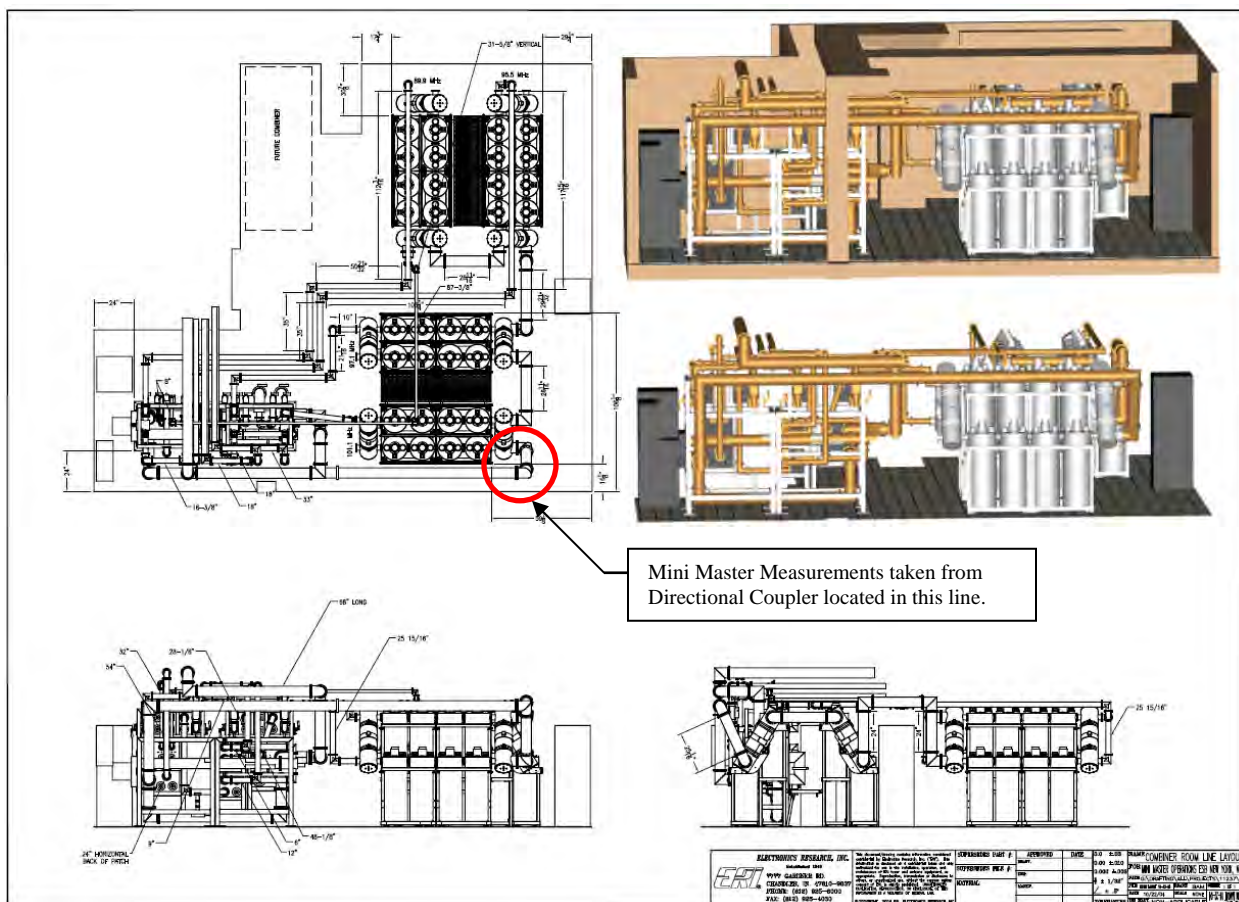
**WNYC POWER INCREASE - THIRD ORDER PRODUCT INVESTIGATION**

1	2	3	4	5	6	7	8	9	10
Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Spectrum Analyzer Level (dBm)	Adjusted Level (dBm)	Level Referenced to Carrier (dB)	Notes
MASTER ROOM CARRIERS									
---	92.3		6	8.84	14.84	5.75	20.59		
---	93.1		6	8.75	14.75	3.14	17.89		
---	93.9		6	9.90	15.90	6.20	22.10		
---	96.3		6	8.66	14.66	5.45	20.11		
---	97.9		6	8.48	14.48	4.17	18.65		
---	98.7		6	8.52	14.52	6.84	21.36		
---	99.5		6	8.42	14.42	5.28	19.70		
---	100.3		6	8.33	14.33	6.56	20.89		
---	101.9		6	8.20	14.20	6.84	21.04		
---	102.7		6	8.35	14.35	7.56	21.91		
---	103.5		6	8.40	14.40	6.61	21.01		
---	104.3		6	9.09	15.09	5.65	20.74		
---	105.1		6	9.23	15.23	5.48	20.71		
---	105.9		6	8.08	14.08	-3.27	10.81		
---	106.7		6	9.03	15.03	3.87	18.90		
---	107.5		6	8.96	14.96	5.06	20.02		
MINI MASTER ROOM CARRIERS									
---	97.1		6	8.90	14.90	-3.00	11.90		
---	101.1		6	8.84	14.84	-6.41	8.43		
---	95.5		6	9.00	15.00	-3.08	11.92		
PRODUCTS MEASURED FROM THE MASTER ROOM									
80.3	93.9	107.5	6	9.65	15.65	-98.59	-82.94	105.04	
81.1	93.9	106.7	6	9.61	15.61	-98.21	-82.60	104.70	
81.9	93.9	105.9	6	9.44	15.44	-98.72	-83.28	105.38	
82.7	93.9	105.1	6	9.46	15.46	-97.97	-82.51	104.61	
83.5	93.9	104.3	6	9.33	15.33	-98.82	-83.49	105.59	

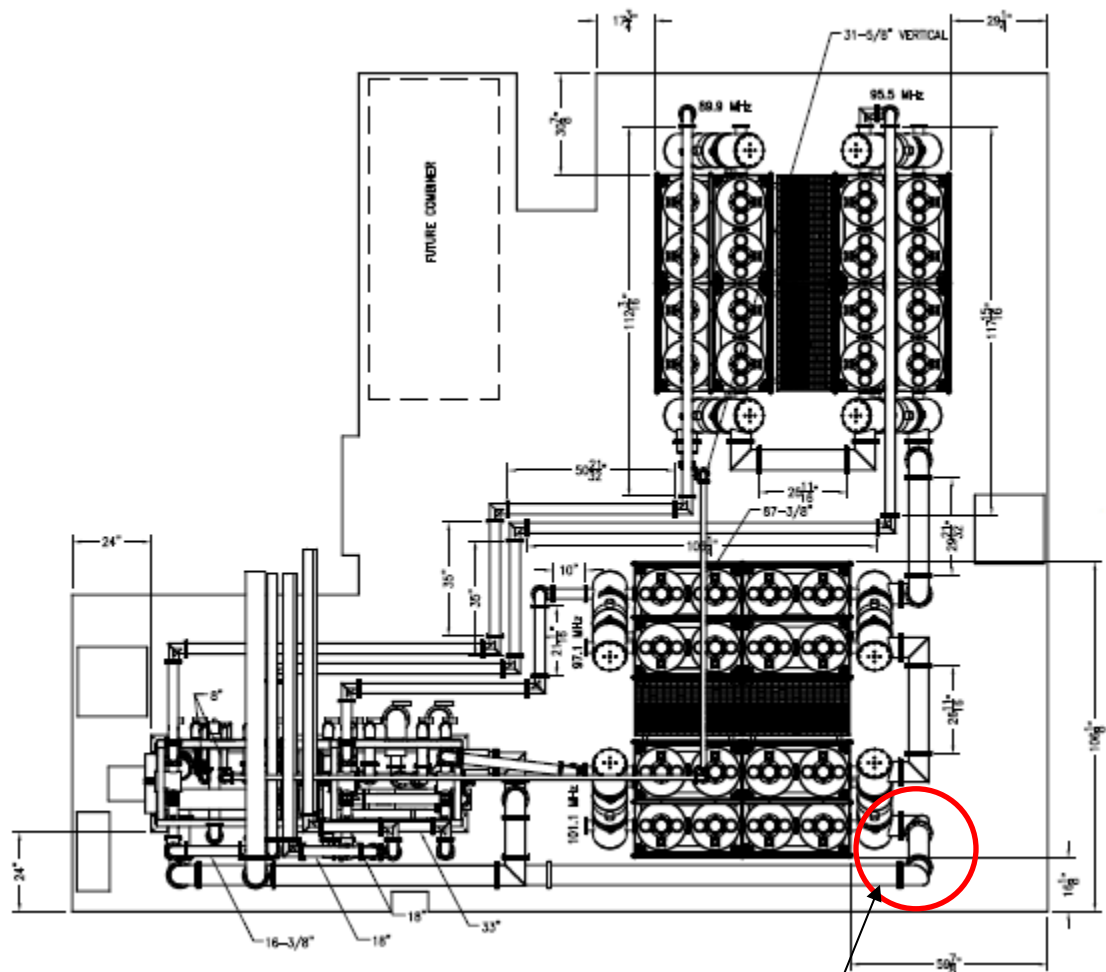
7777 Gardner Road, Chandler, Indiana 47610, (812) 925—6000, Fax (812) 925-4030

84.3	93.9	103.5	6	9.26	15.26	-98.16	-82.90	105.00	
85.1	93.9	102.7	6	9.22	15.22	-97.44	-82.22	104.32	
85.9	93.9	101.9	6	9.10	15.10	-96.69	-81.59	103.69	
86.7	93.9	101.1	6	9.12	15.12	-97.13	-82.01	104.11	
87.5	93.9	100.3	6	9.08	15.08	-96.50	-81.42	103.52	
88.3	93.9	99.5	6	9.00	15.00	-96.25	-81.25	103.35	
89.1	93.9	98.7	6	9.05	15.05	-94.44	-79.39	101.49	
89.9	93.9	97.9	6	8.90	14.90	-93.94	-79.04	101.14	
90.7	93.9	97.1	6	8.89	14.89	-95.18	-80.29	102.39	
91.5	93.9	96.3	6	8.82	14.82	-93.58	-78.76	100.86	
92.3	93.9	95.5	6	8.90	14.90	-97.41	-82.51	104.61	
94.7	93.9	93.1	6	8.70	14.70	-91.94	-77.24	99.34	
95.5	93.9	92.3	6	8.87	14.87	-97.63	-82.76	104.86	
90.7	93.9	97.1	6	8.89	14.89	-95.18	-80.29	102.39	
92.3	93.9	95.5	6	8.90	14.90	-97.41	-82.51	104.61	WXRK carrier dropped *
98.7	96.3	93.9	6	8.35	14.35	-95.00	-80.65	99.30	WRKS carrier dropped *
101.9	97.9	93.9	6	8.35	14.35	-92.58	-78.23	96.88	WQCD carrier dropped *
103.5	98.7	93.9	6	8.25	14.25	-82.10	-67.85	89.21	WKTU carrier dropped *
105.1	99.5	93.9	6	8.24	14.24	-78.16	-63.92	83.62	WWPR carrier dropped *
106.7	100.3	93.9	6	8.16	14.16	-94.75	-80.59	101.48	WLTW carrier dropped *
109.9	101.9	93.9	6	8.00	14.00	-93.50	-79.50	100.54	
111.5	102.7	93.9	6	7.87	13.87	-94.37	-80.50	102.41	
113.1	103.5	93.9	6	7.87	13.87	-94.88	-81.01	102.02	
114.7	104.3	93.9	6	7.73	13.73	-95.75	-82.02	102.76	
116.3	105.1	93.9	6	7.73	13.73	-95.70	-81.97	102.68	
117.9	105.9	93.9	6	7.67	13.67	-94.70	-81.03	91.84	
119.5	106.7	93.9	6	7.67	13.67	-98.22	-84.55	103.45	
121.1	107.5	93.9	6	7.55	13.55	-98.69	-85.14	105.16	
PRODUCTS MEASURED FROM THE MINI MASTER ROOM									
100.3	97.1	93.9	6	8.70	14.70	-100.20	-85.50	97.40	
108.3	101.1	93.9	6	8.36	14.36	-99.02	-84.66	93.09	
97.1	95.5	93.9	6	8.81	14.81	-97.60	-82.79	94.71	WQHT carrier dropped*

\* - The indicated Call station was dropped to make appropriate measurement



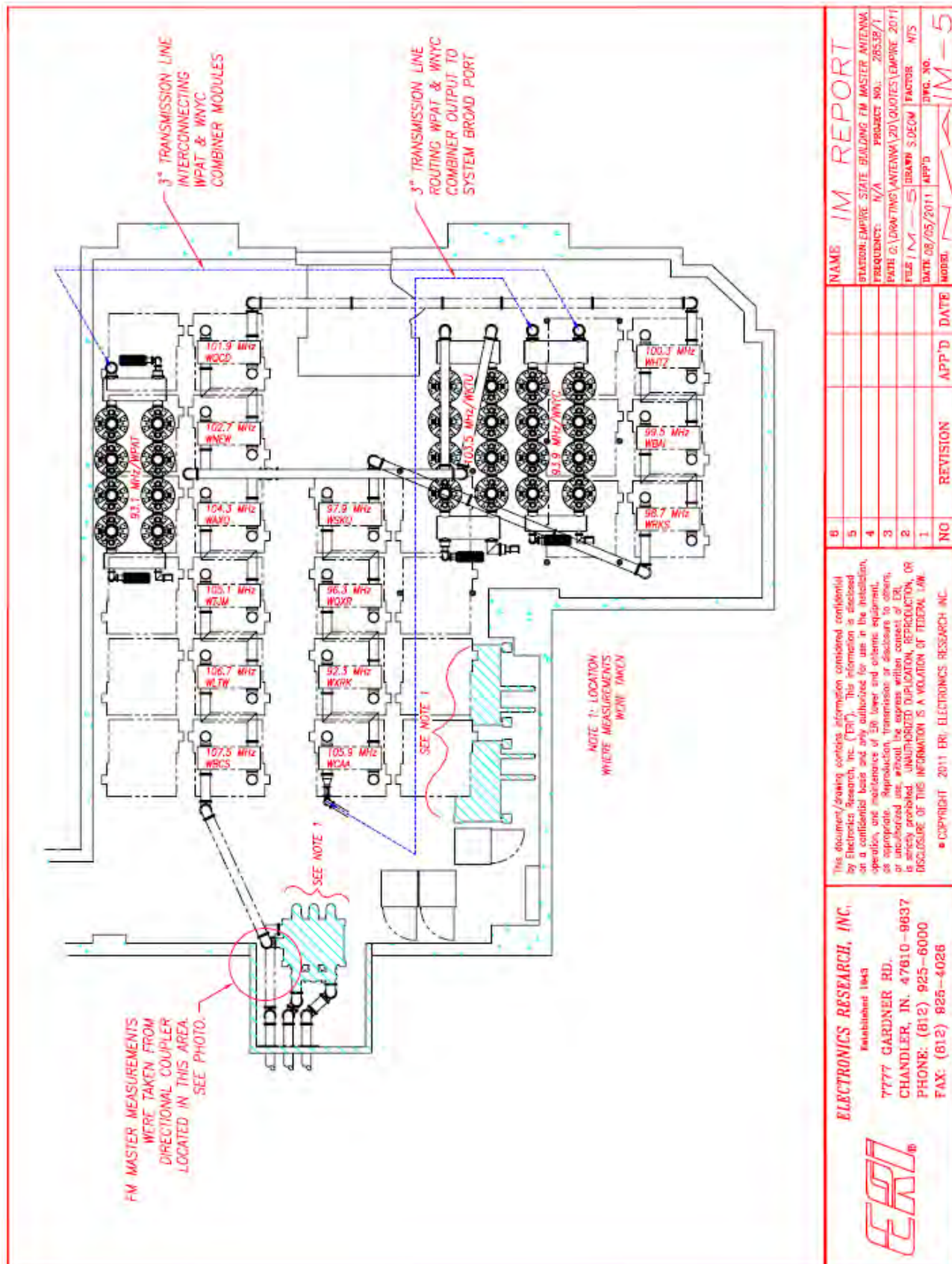
### Figure 1



**Top View of Mini Master Combiner**

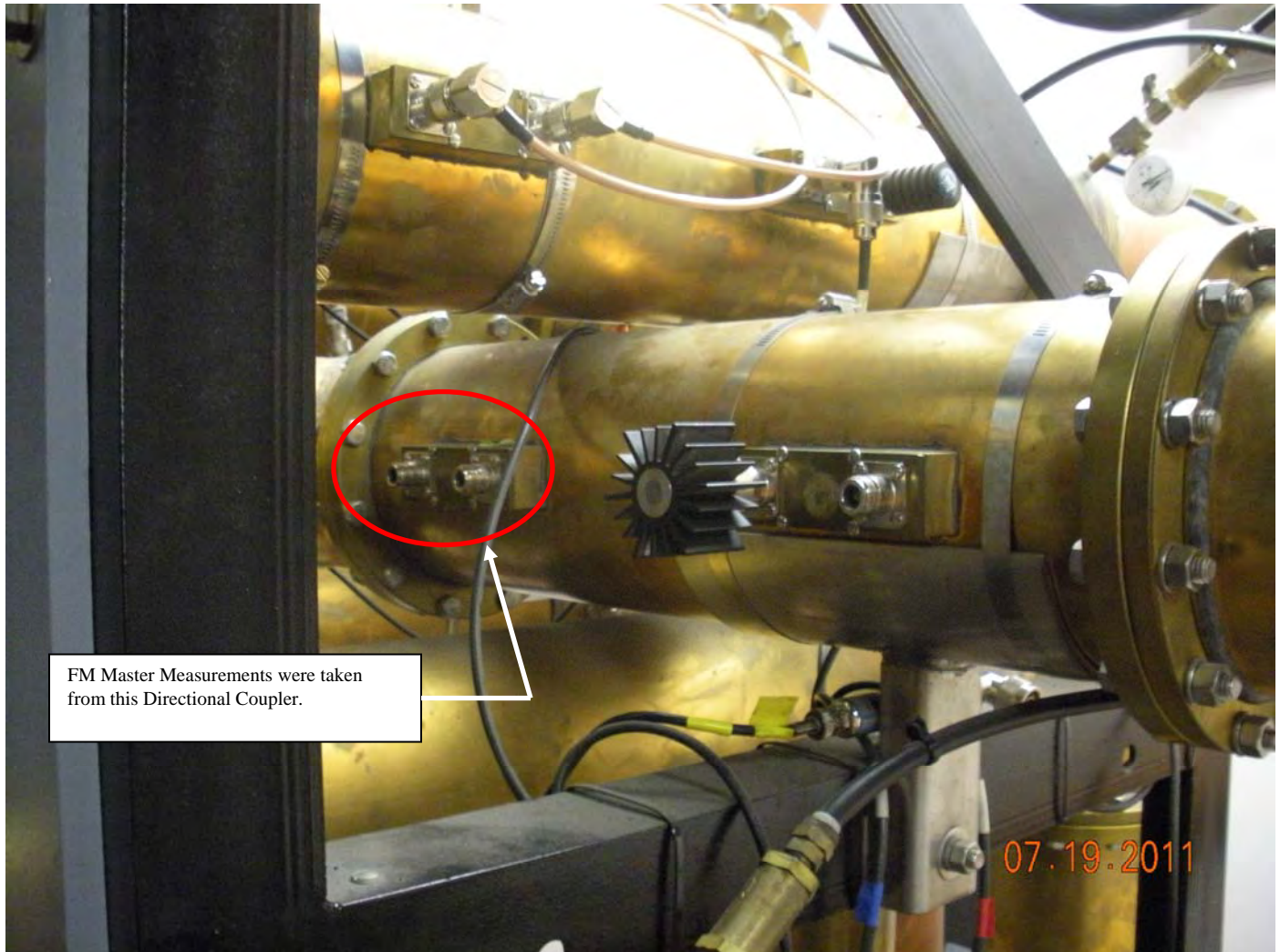
**Figure 2**

Mini Master Measurements were taken from Directional Coupler located in this line.



### Figure 3





**Figure 4**

# *Appendix A*

*Original*  
*2005*

**Report Of Findings Empire State  
Building Mini Master**

**FM Broadcast Facility**

**New York, New York**

**REPORT OF FINDINGS  
EMPIRE STATE BUILDING MINI MASTER  
FM BROADCAST FACILITY  
NEW YORK, NEW YORK**

**Introduction :** This report of findings is based on data collected at the Empire State Building ERI Master FM broadcast facility located in New York, NY. The report includes measurements offered as proof that the combined operations of WPLJ (95.5 MHz), WQHT (97.1 MHz) and WCBS (101.1 MHz) into the (1) one bay ERI Mini Master Antenna are in compliance with the FCC Rules and Regulations as required by the Code of Federal Regulations (CFR) Title 47 section 73.317 paragraph (b) through (d). In brief, the collection of measurements presented in this report shows that all possible third order inter-modulation (IM) products generated by this multiplex system are less than the maximum allowable level as required by section 73.317 paragraph (b) through (d). WXRK (92.3 MHz), WPAT (93.1 MHz), WNYC (93.9 MHz), WQXR (96.3 MHz), WSKQ (97.9 MHz), WRKS (98.7 MHz), WBAI (99.5 MHz), WHITZ (100.3 MHz), WQCD (101.9 MHz), WNEW (102.7 MHz), WKTU (103.5 MHz), WAXQ (104.3 MHz), WWPR (105.1 MHz), WCAA (105.9 MHz), WLTW (106.7 MHz) and WBLS (107.5 MHz) operate into separate Master antenna located on top of the Empire State Building. Their effects on the stations operating from the multiplexed system has been considered in this report. Mark Steapleton of Electronics Research, Inc. located in Chandler, Indiana performed the measurements summarized herein on February 4, 2005.

**The following exhibits are provided:**

**Exhibit A:**

- A-1 Drawing Depicting Antenna.
- A-2 Drawing Depicting Multiplexing Scheme.

**Exhibit B:**

- B-1 Equipment Employed In Intermodulation Product Measurement.
- B-2 Broadcasting Scheme of the Multiplexed Systems.

Table 1. Mini Master Antenna Carrier Reference Levels.

Table 2. Calculated Third Order Products from the Mini Master Antenna Transmitters.

Table 3. Mini Master Intermodulation Analysis Measurements.

Table 4. Master Antenna Carrier Reference Levels.

Table 5. Calculated Third Order Products from the Master Antenna Transmitters.

Table 6. Master Antenna Intermodulation Analysis Measurements

**Exhibits Accompanying Report:** Exhibit A, provides comprehensive information on both antenna and filters used by these radio stations. Exhibit B, illustrates the broadcasting scheme of each station, the layout of the equipment used to isolate and measure potential intermodulation products and forward carrier reference levels. Found within Table 1 and Table 4 are the narrow band carrier frequency measurements that provide relative output signal levels for the IM analysis. Table 2 and Table 5 lists the calculated third order products that can be generated from FM transmitters broadcasting from both multiplexed systems. The IM Analysis Measurements, in Table 3 and Table 6, provides detailed information obtained from the product frequency investigation.



**The Nature Of Intermodulation Products (IM) :** Intermodulation products result from inadequate transmitter-to-transmitter isolation. Intermodulation products are commonly generated from radio stations operating into multiplexed facilities and congested antenna broadcast sites. The mechanics associated with the phenomenon have been well documented. When two or more transmitters are coupled to each other, new spectral components are produced by the mixing of the station frequencies in the active circuits of each transmitter. The common term used to describe this phenomenon is third order product denoted by the mathematical expression  $[2(F_1)-(F_2)]$ , where  $F_1$  signifies the frequency of the transmitter that is generating the intermodulation product, and  $F_2$  signifies the frequency causing the interference.

**The Mini Master Multiplexed Systems :** At the time of my measurements three (3) stations were operating from the Mini Master combined antenna system. The Mini Master FM multiplexed system is fundamentally comprised of antenna, feed line and multiplexer unit. The COG 1084-1 CP antenna and 970 Constant Impedance Modules are products of Electronics Research, Inc, whereas the feed line is manufactured by Myat. There were sixteen (16) stations operating into the Master Antenna system during all the IM Analysis measurements, Refer to Exhibit B-1, for an illustration of the Broadcasting Schemes of these stations.

To accomplish the aggregation of three (3) transmitter signals into a common antenna feed and provide transmitter-to-transmitter isolation, a multiplexing scheme consisting of Combiner modules is used. Specifically, three ERI 970-8 combiner modules with non-adjacent coupling and Group Delay Compensation are used. The combiner is illustrated in the attached Exhibit A-2. Performance measurements, such as match, insertion loss, group-delay, etc, revealed that the multiplexer unit was in proper working condition.

**The IM Investigation :** ERI Directional Couplers were used to monitor and maintain the multiplexers performance. All couplers furnished with the both systems are factory calibrated and capable of delivering accurate and repeatable RF measurements. To facilitate the taking of the measurements, the couplers located at the antenna output of the multiplexed systems was used. Care was taken in the selection of the measurement location to insure that the measurements would be made far removed from transmitters and any filtering used to reduce broadcast emissions. The coupler selected would normally be used for antenna reflection measurements and thus would provide greater than 33 dB directivity and a forward signal sample of -47 dB.

The forward port of the couplers was used for sampling the outgoing carrier levels and IM products. The IM sampled signal was fed by shielded cable into a Band Pass Filter where all extraneous energy was steeply attenuated. Various attenuation pads were used, when needed, on the band pass filter and/or the FIM71 to ensure an adequate signal level for measurements without overloading the measurement equipment. A Potomac Instruments FIM-71 Field Strength Receiver was employed to record the level of all signals investigated. To facilitate the selective tuning of the Receiver and Band Pass Filter a Wavetek Model 3000 signal generator was used. An IFR Model 2399 Spectrum Analyzer was used to measure the close in spectral attenuation of each carrier and wide band search for any anomalies that may need further investigation. See attached Exhibit B-2 for an illustration of the measurement equipment.

Prior to recording measurements, all pertinent broadcasting equipment including Transmitters, Multiplexer, Feed Line and Antenna were adjusted to optimal performance. Also, it was confirmed before taking any measurements that all stations of concern were operating at their full licensed power level. From the equipment setup described above, the relative output signal level of each stations forward carrier was made. The resulting signal levels of these measurements are listed in Table 1 and Table 4, column labeled "Adjusted Level". This level will be used as the reference level for possible IM products of each carrier and was necessary to confirm that no significant levels of spurious energy, referenced to each carrier, were present from any transmitter operating from the multiplexed system.

**Table 1 - Mini Master Carrier Reference Levels**

Carrier Frequency (MHz)	Pad One (dB)	Bandpass Filter Loss (dB)	Full Scale Range (dBu)	Scale Reading (dB)	Adjusted Level (dBu)	Notes
WPLJ (95.5)	6	—	140	-13.2	132.8	
WQHT (97.1)	6	—	140	-13.1	132.9	
WCBS-FM(101.1)	6	—	140	-12.9	133.1	

Predictable third-order products due to system harmonics mixed with all on-site interfering frequencies that could be generated from the multiplexed systems are calculated and listed in Table 2. The frequencies listed across the top are the primary transmitters operating into Master FM antenna. The frequencies listed on the left indicate the secondary mixing frequencies that would cause the predictable third order product listed inside the table.

**Table 2 - Mini Master Third Order Products.**

Interfering Frequency (MHz)	Carrier Frequency (MHz)		
	WPLJ 95.5	WQHT 97.1	WCBS-FM 101.1
WXRK (92.3)	98.7	101.9	109.9
WPAT (93.1)	97.9	101.1	109.1
WNYC (93.9)	97.1	100.3	108.3
WPLJ (95.5)	---	98.7	106.7
WQXR (96.3)	94.7	97.9	105.9
WQHT (97.1)	93.9	---	105.1
WSKQ (97.9)	93.1	96.3	104.3
WRKS (98.7)	92.3	95.5	103.5
WBAI (99.5)	91.5	94.7	102.7
WHTZ (100.3)	90.7	93.9	101.9
WCBS-FM (101.1)	89.9	93.1	---
WQCD (101.9)	89.1	92.3	100.3
WNEW (102.7)	88.3	91.5	99.5
WKTU (103.5)	87.5	90.7	98.7
WAXQ (104.3)	86.7	89.9	97.9
WWPR (105.1)	85.9	89.1	97.1
WCAA (105.9)	85.1	88.3	96.3
WLTW (106.7)	84.3	87.5	95.5
WBLS (107.5)	83.5	86.7	94.7

Using the equipment previously described the IM product measurements were recorded and are listed in Table 3. The signal levels referenced to the carriers are calculated and listed in the column labeled "Level Referenced to Carrier". Refer to Exhibit B for a layout of the measurement equipment.



**Table 3 Mini Master Intermodulation Measurements**

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
83.5	95.5	107.5	6	9.9	15.9	20	20	15.9	132.8	-116.9	
84.3	95.5	108.7	6	9.9	15.9	20	20	15.9	132.8	-116.9	
85.1	95.5	105.9	6	9.8	15.8	20	20	15.8	132.8	-117	
85.9	95.5	105.1	6	9.8	15.8	20	19.1	16.7	132.8	-116.1	
86.7	97.1	107.5	6	9.8	15.8	20	20	15.8	132.9	-117.1	
86.7	95.5	104.3	6	9.8	15.8	20	19.1	16.7	132.8	-116.1	
87.5	97.1	108.7	6	9.8	15.8	20	20	15.8	132.9	-117.3	
87.5	95.5	103.5	6	9.8	15.8	20	20	15.8	132.8	-117.2	
88.3	97.1	105.9	6	9.7	15.7	20	5.2	30.5	132.9	-102.4	
88.3	95.5	102.7	6	9.7	15.7	20	5.2	30.5	132.8	-102.3	
89.1	95.5	101.9	6	9.5	15.5	20	5.5	30	132.8	-102.8	
89.1	97.1	105.1	6	9.5	15.5	20	5.5	30	132.9	-102.9	
89.9	97.1	104.3	6	9.5	15.5	40	14.2	41.3	132.9	-91.6	
89.9	95.5	101.1	6	9.5	15.5	20	14.2	21.3	132.8	-111.5	
90.7	97.1	103.5	6	9.2	15.2	20	4.2	31	132.9	-101.9	
90.7	95.5	100.3	6	9.2	15.2	20	4.2	31	132.8	-101.8	
91.5	97.1	102.7	16	9.3	25.3	20	8.5	36.8	132.9	-96.1	
91.5	95.5	99.5	16	9.3	25.3	20	8.5	36.8	132.8	-96	
92.3	97.1	101.9	6	9.1	15.1	20	19.5	15.6	132.9	-117.3	1
92.3	95.5	98.7	6	9.1	15.1	20	19.5	15.6	132.8	-117.2	1
93.1	95.5	97.9	6	9.2	15.2	20	0.5	34.7	132.8	-98.1	1
93.1	97.1	101.1	6	9.2	15.2	20	0.5	34.7	132.9	-98.2	1
93.9	97.1	100.3	16	9.2	25.2	20	20	25.2	132.9	-107.7	1
93.9	95.5	97.1	16	9.2	25.2	20	20	25.2	132.8	-107.6	1
94.7	97.1	99.5	6	9.1	15.1	20	5.1	30	132.9	-102.9	
94.7	101.1	107.5	6	9.1	15.1	20	5.1	30	133.1	-103.1	
94.7	95.5	96.3	6	9.1	15.1	20	5.1	30	132.8	-102.8	
95.5	97.1	98.7	9	8.9	17.9	20	2.1	35.8	132.9	-97.1	2
95.5	101.1	108.7	9	8.9	17.9	20	2.1	35.8	133.1	-97.3	2
96.3	97.1	97.9	9	9.1	18.1	20	10.9	27.2	132.9	-105.7	1
96.3	101.1	105.9	9	9.1	18.1	20	10.9	27.2	133.1	-105.9	1
97.1	95.5	93.9	9	8.7	17.7	20	20	17.7	132.8	-115.1	2
97.1	101.1	105.1	9	8.7	17.7	20	2	35.7	133.1	-97.4	2
97.9	97.1	96.3	9	8.9	17.9	20	9.9	28	132.9	-104.9	1

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
97.9	101.1	104.3	9	8.9	17.9	20	9.9	28	133.1	-105.1	1
97.9	95.5	93.1	9	8.9	17.9	20	9.9	28	132.8	-104.8	1
98.7	97.1	95.5	9	8.7	17.7	20	6.5	31.2	132.9	-101.7	1
98.7	101.1	103.5	9	8.7	17.7	20	6.5	31.2	133.1	-101.9	1
98.7	95.5	92.3	9	8.7	17.7	20	6.5	31.2	132.8	-101.6	1
99.5	101.1	102.7	9	8.5	17.5	20	5.5	32	133.1	-101.1	1
100.3	97.1	93.9	9	8.5	17.5	20	7.9	29.6	132.9	-103.3	1
100.3	101.1	101.9	9	8.5	17.5	20	7.9	29.6	133.1	-103.5	1
101.1	97.1	93.1	9	8.5	17.5	20	20	17.5	132.9	-115.4	2
101.9	97.1	92.3	9	8.5	17.5	20	9.9	27.6	132.9	-105.3	1
101.9	101.1	100.3	9	8.5	17.5	20	9.9	27.6	133.1	-105.5	1
102.7	101.1	98.5	9	8.5	17.5	20	10.6	26.9	133.1	-106.2	1
103.5	101.1	98.7	9	8.1	17.1	20	20	17.1	133.1	-116	1
104.3	101.1	97.9	9	8.2	17.2	20	20	17.2	133.1	-115.9	1
105.1	101.1	97.1	9	8.2	17.2	20	14.8	22.4	133.1	-110.7	1
105.9	101.1	96.3	9	8.1	17.1	20	18.1	19	133.1	-114.1	1
106.7	101.1	95.5	9	8.1	17.1	20	16.8	20.3	133.1	-112.8	1
108.3	101.1	93.9	9	8.2	17.2	20	20	17.2	133.1	-115.9	1
109.1	101.1	93.1	9	8.1	17.1	20	20	17.1	133.1	-116	1
109.9	101.1	92.3	9	8.1	17.1	20	20	17.1	133.1	-116	1

**NOTES:**

- 1) Local transmitter was turned off for this measurement.
- 2) System transmitter was turned off for this measurement.

**Table 4 - Master Carrier Reference Levels**

Carrier Frequency (MHz)	Pad One (dB)	Bandpass Filter Loss (dB)	Full Scale Range (dBu)	Scale Reading (dB)	Adjusted Level (dBu)	Notes
WXRK (92.3)	3	—	140	16.1	126.9	
WPAT (93.1)	3	—	140	19.7	123.3	
WNYC (93.9)	3	—	140	18.1	124.9	
WQXR (96.3)	3	—	140	16.8	126.2	
WSKQ (97.9)	3	—	140	17.5	125.5	
WRKS (98.7)	3	—	140	16.5	126.5	
WBAI (99.5)	3	—	140	18.2	124.8	
WHTZ (100.3)	3	—	140	17.2	125.8	
WQCD (101.9)	3	—	140	17.1	125.9	
WNEW (102.7)	3	—	140	17.8	125.2	
WKTU (103.5)	3	—	140	17.9	125.1	
WAXQ (104.3)	3	—	140	17.6	125.4	
WWPR (105.1)	3	—	140	17.1	125.9	
WCAA (105.9)	3	—	120	7.5	115.5	
WLTW (106.7)	3	—	140	15.9	127.1	
WBLS (107.5)	3	—	140	17.8	125.2	

Predictable third-order products due to system harmonics mixed with all on-site interfering frequencies that could be generated from the multiplexed systems are calculated and listed in Table 5. The frequencies listed across the top are the primary transmitters operating into Master FM antenna. The frequencies listed on the left indicate the secondary mixing frequencies that would cause the predictable third order product listed inside the table.

**Table 5. - Mini Master Third Order Products.**

Mix Freq- uency MHz.	Carrier Frequency (MHz)															
	92.3	93.1	93.9	96.3	97.9	98.7	99.5	100.3	101.9	102.7	103.5	104.3	105.1	105.9	106.7	107.5
92.3	---	93.9	95.5	100.3	103.5	105.1	106.7	108.3	111.5	113.1	114.7	116.3	117.9	119.5	121.1	122.7
93.1	91.5	---	94.7	99.5	102.7	104.3	105.9	107.5	110.7	112.3	113.9	115.5	117.1	118.7	120.3	121.9
93.9	90.7	92.3	---	98.7	101.9	103.5	105.1	106.7	109.9	111.5	113.1	114.7	116.3	117.9	119.5	121.1
95.5	89.1	90.7	92.3	97.1	100.3	101.9	103.5	105.1	108.3	109.9	111.5	113.1	114.7	116.3	117.9	119.5
96.3	88.3	89.9	91.5	---	99.5	101.1	102.7	104.3	107.5	109.1	110.7	112.3	113.9	115.5	117.1	118.7
97.1	87.5	89.1	90.7	95.5	98.7	100.3	101.9	103.5	106.7	108.3	109.9	111.5	113.1	114.7	116.3	117.9
97.9	86.7	88.3	89.9	94.7	---	99.5	101.1	102.7	105.9	107.5	109.1	110.7	112.3	113.9	115.5	117.1
98.7	85.9	87.5	89.1	93.9	97.1	---	100.3	101.9	105.1	106.7	108.3	109.9	111.5	113.1	114.7	116.3
99.5	85.1	86.7	88.3	93.1	96.3	97.9	---	101.1	104.3	105.9	107.5	109.1	110.7	112.3	113.9	115.5
100.3	84.3	85.9	87.5	92.3	95.5	97.1	98.7	---	103.5	105.1	106.7	108.3	109.9	111.5	113.1	114.7
101.1	83.5	85.1	86.7	91.5	94.7	96.3	97.9	99.5	102.7	104.3	105.9	107.5	109.1	110.7	112.3	113.9
101.9	82.7	84.3	85.9	90.7	93.9	95.5	97.1	98.7	---	103.5	105.1	106.7	108.3	109.9	111.5	113.1
102.7	81.9	83.5	85.1	89.9	93.1	94.7	96.3	97.9	101.1	---	104.3	105.9	107.5	109.1	110.7	112.3
103.5	81.1	82.7	84.3	89.1	92.3	93.9	95.5	97.1	100.3	101.9	---	105.1	106.7	108.3	109.9	111.5
104.3	80.3	81.9	83.5	88.3	91.5	93.1	94.7	96.3	99.5	101.1	102.7	---	105.9	107.5	109.1	110.7
105.1	79.5	81.1	82.7	87.5	90.7	92.3	93.9	95.5	98.7	100.3	101.9	103.5	---	106.7	108.3	109.9
105.9	78.7	80.3	81.9	86.7	89.9	91.5	93.1	94.7	97.9	99.5	101.1	102.7	104.3	---	107.5	109.1
106.7	77.9	79.5	81.1	85.9	89.1	90.7	92.3	93.9	97.1	98.7	100.3	101.9	103.5	105.1	---	108.3
107.5	77.1	78.7	80.3	85.1	88.3	89.9	91.5	93.1	96.3	97.9	99.5	101.1	102.7	104.3	105.9	---



Using the equipment previously described the IM product measurements were recorded and are listed in Table 6. The signal levels referenced to the carriers are calculated and listed in the column labeled "Level Referenced to Carrier". Refer to Exhibit B for a layout of the measurement equipment.

**Table 6. Mini Master Intermodulation Measurements**

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
77.1	92.3	107.5	6	10.1	16.1	40	14.4	41.7	126.9	-78.5	1
77.9	92.3	106.7	6	10.3	16.3	20	10.8	25.5	126.9	-92.7	
78.7	92.3	105.9	6	10.2	16.2	20	15.7	20.5	126.9	-97.7	
78.7	93.1	107.5	6	10.2	16.2	20	15.7	20.5	123.3	-102.8	
79.5	93.1	106.7	6	10.2	16.2	20	17.3	18.9	123.3	-96.3	
79.5	92.3	105.1	6	10.2	16.2	20	17.3	18.9	126.9	-108	
80.3	93.1	105.9	6	10.2	16.2	20	17.8	18.4	123.3	-104.9	
80.3	92.3	104.3	6	10.2	16.2	20	17.8	18.4	126.9	-108.5	
80.3	93.9	107.5	6	10.2	16.2	20	17.8	18.4	124.9	-106.5	
81.1	92.3	103.5	6	10.1	16.1	20	14.8	21.3	126.9	-105.6	
81.1	93.1	105.1	6	10.1	16.1	20	14.8	21.3	123.3	-102	
81.1	93.9	106.7	6	10.1	16.1	20	14.8	21.3	124.9	-103.6	
81.9	92.3	102.7	6	10.1	16.1	40	14	42.1	126.9	-84.8	
81.9	93.1	104.3	6	10.1	16.1	40	14	42.1	123.3	-81.2	
81.9	93.9	105.9	6	10.1	16.1	40	14	42.1	124.9	-82.8	
82.7	92.3	101.9	6	10	16	20	14.2	21.8	126.9	-105.1	
82.7	93.1	103.5	6	10	16	20	14.2	21.8	123.3	-101.5	
82.7	93.9	105.1	6	10	16	20	14.2	21.8	124.9	-103.1	
83.5	93.1	102.7	6	9.9	15.9	20	11.5	24.4	123.3	-98.9	
83.5	92.3	101.1	6	9.9	15.9	20	11.5	24.4	126.9	-102.5	
83.5	93.9	104.3	6	9.9	15.9	20	11.5	24.4	124.9	-100.5	
84.3	93.1	101.9	6	9.9	15.9	20	11.1	24.8	123.3	-98.5	
84.3	92.3	100.3	6	9.9	15.9	20	11.1	24.8	126.9	-102.1	
84.3	93.9	103.5	6	9.9	15.9	20	11.1	24.8	124.9	-100.1	



Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
85.1	92.3	99.5	8	9.5	15.5	20	9.6	25.9	126.9	-101	
85.1	93.1	101.1	8	9.5	15.5	20	9.6	25.9	123.3	-97.4	
85.1	96.3	107.5	8	9.5	15.5	20	9.6	25.9	126.2	-100.3	
85.1	93.9	102.7	8	9.5	15.5	20	9.6	25.9	124.9	-99	
85.9	92.3	98.7	6	9.7	15.7	20	8.8	26.9	126.9	-100	
85.9	93.1	100.3	6	9.7	15.7	20	8.8	26.9	123.3	-96.4	
85.9	96.3	106.7	6	9.7	15.7	20	8.8	26.9	126.2	-99.3	
85.9	93.9	101.9	6	9.7	15.7	20	8.8	26.9	124.9	-98	
86.7	92.3	97.9	8	9.4	15.4	20	8.2	27.2	126.9	-99.7	
86.7	93.1	99.5	8	9.4	15.4	20	8.2	27.2	123.3	-96.1	
86.7	96.3	105.9	8	9.4	15.4	20	8.2	27.2	126.2	-99	
86.7	93.9	101.1	8	9.4	15.4	20	8.2	27.2	124.9	-97.7	
87.5	93.1	98.7	6	9.5	15.5	20	6.3	29.2	123.3	-94.1	
87.5	92.3	97.1	6	9.5	15.5	20	6.3	29.2	126.9	-97.7	
87.5	96.3	105.1	6	9.5	15.5	20	6.3	29.2	126.2	-97	
87.5	93.9	100.3	6	9.5	15.5	20	6.3	29.2	124.9	-95.7	
88.3	93.1	97.9	9	9.5	18.5	20	4.3	34.2	123.3	-89.1	
88.3	92.3	96.3	9	9.5	18.5	20	4.3	34.2	126.9	-92.7	
88.3	96.3	104.3	9	9.5	18.5	20	4.3	34.2	126.2	-92	
88.3	93.9	99.5	9	9.5	18.5	20	4.3	34.2	124.9	-90.7	
88.3	97.9	107.5	9	9.5	18.5	20	4.3	34.2	125.5	-91.3	
89.1	92.3	95.5	9	9.3	18.3	20	7.1	31.2	126.9	-95.7	
89.1	93.1	97.1	9	9.3	18.3	20	7.1	31.2	123.3	-92.1	
89.1	96.3	103.5	9	9.3	18.3	20	7.1	31.2	126.2	-95	
89.1	93.9	98.7	9	9.3	18.3	20	7.1	31.2	124.9	-93.7	
89.1	97.9	106.7	9	9.3	18.3	20	7.1	31.2	125.5	-94.3	
89.9	93.1	96.3	8	9.8	15.8	40	12.5	43.3	123.3	-80	2
89.9	96.3	102.7	8	9.8	15.8	40	12.5	43.3	126.2	-82.9	2
89.9	93.9	97.9	8	9.8	15.8	40	12.5	43.3	124.9	-81.6	2
89.9	97.9	105.9	8	9.8	15.8	40	12.5	43.3	125.5	-82.2	2
89.9	98.7	107.5	8	9.8	15.8	40	12.5	43.3	126.5	-83.2	2
90.7	92.3	93.9	6	9.6	15.6	20	1	34.6	126.9	-92.3	
90.7	93.1	95.5	6	9.6	15.6	20	1	34.6	123.3	-88.7	
90.7	96.3	101.9	6	9.6	15.6	20	1	34.6	126.2	-91.6	

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
90.7	98.7	106.7	6	9.6	15.6	20	1	34.6	126.5	-91.9	
90.7	93.9	97.1	6	9.6	15.6	20	1	34.6	124.9	-90.3	
90.7	97.9	105.1	6	9.6	15.6	20	1	34.6	125.5	-90.9	
91.5	92.3	93.1	9	9.5	18.5	20	0.8	37.7	126.9	-89.2	
91.5	96.3	101.1	9	9.5	18.5	20	0.8	37.7	126.2	-88.5	
91.5	98.7	105.9	9	9.5	18.5	20	0.8	37.7	126.5	-88.8	
91.5	99.5	107.5	9	9.5	18.5	20	0.8	37.7	124.8	-87.1	
91.5	93.9	96.3	9	9.5	18.5	20	0.8	37.7	124.9	-87.2	
91.5	97.9	104.3	9	9.5	18.5	20	0.8	37.7	125.5	-87.8	
92.3	93.1	93.9	6	9.7	15.7	20	0.5	35.2	123.3	-88.1	3
92.3	96.3	100.3	6	9.7	15.7	20	0.5	35.2	126.2	-91	3
92.3	99.5	106.7	6	9.7	15.7	20	0.5	35.2	124.8	-89.6	3
92.3	93.9	95.5	6	9.7	15.7	20	0.5	35.2	124.9	-89.7	3
92.3	97.9	103.5	6	9.7	15.7	20	0.5	35.2	125.5	-90.3	3
92.3	98.7	105.1	6	9.7	15.7	20	0.5	35.2	126.5	-91.3	3
93.1	96.3	99.5	9	9.5	18.5	20	13.2	25.3	126.2	-100.9	3
93.1	99.5	105.9	9	9.5	18.5	20	13.2	25.3	124.8	-99.5	3
93.1	100.3	107.5	9	9.5	18.5	20	13.2	25.3	126.8	-101.5	3
93.1	97.9	102.7	9	9.5	18.5	20	13.2	25.3	125.5	-100.2	3
93.1	98.7	104.3	9	9.5	18.5	20	13.2	25.3	126.5	-101.2	3
93.9	93.1	92.3	9	9.4	18.4	20	4.1	34.3	123.3	-89	3
93.9	96.3	98.7	9	9.4	18.4	20	4.1	34.3	126.2	-91.9	3
93.9	100.3	106.7	9	9.4	18.4	20	4.1	34.3	126.8	-92.5	3
93.9	97.9	101.9	9	9.4	18.4	20	4.1	34.3	125.5	-91.2	3
93.9	98.7	103.5	9	9.4	18.4	20	4.1	34.3	126.5	-92.2	3
93.9	99.5	105.1	9	9.4	18.4	20	4.1	34.3	124.8	-90.5	3
94.7	96.3	97.9	9	9.4	18.4	20	0.2	38.2	126.2	-88	3
94.7	100.3	105.9	9	9.4	18.4	20	0.2	38.2	126.8	-88.6	3
94.7	98.7	102.7	9	9.4	18.4	20	0.2	38.2	126.5	-88.3	3
94.7	99.5	104.3	9	9.4	18.4	20	0.2	38.2	124.8	-86.6	3
94.7	93.9	93.1	9	9.4	18.4	20	0.2	38.2	124.9	-86.7	3
94.7	97.9	101.1	9	9.4	18.4	20	0.2	38.2	125.5	-87.3	3
95.5	96.3	97.1	13	9.1	22.1	20	10.8	31.3	126.2	-94.9	4
95.5	98.7	101.9	13	9.1	22.1	20	10.8	31.3	126.5	-95.2	4

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
95.5	99.5	103.5	13	9.1	22.1	20	10.8	31.3	124.8	-93.5	4
95.5	100.3	105.1	13	9.1	22.1	20	10.8	31.3	126.8	-95.5	4
95.5	93.9	92.3	13	9.1	22.1	20	10.8	31.3	124.9	-93.6	4
95.5	97.9	100.3	13	9.1	22.1	20	10.8	31.3	125.5	-94.2	4
96.3	99.5	102.7	9	9.3	18.3	20	15.6	22.7	124.8	-102.1	3
96.3	100.3	104.3	9	9.3	18.3	20	15.6	22.7	126.8	-104.1	3
96.3	97.9	99.5	9	9.3	18.3	20	15.6	22.7	125.5	-102.8	3
96.3	98.7	101.1	9	9.3	18.3	20	15.6	22.7	126.5	-103.8	3
96.3	101.9	107.5	9	9.3	18.3	20	15.6	22.7	126.9	-104.2	3
97.1	96.3	95.5	13	9.2	22.2	20	0.5	41.7	126.2	-84.5	4
97.1	99.5	101.9	13	9.2	22.2	20	0.5	41.7	124.8	-83.1	4
97.1	100.3	103.5	13	9.2	22.2	20	0.5	41.7	126.8	-85.1	4
97.1	97.9	98.7	13	9.2	22.2	20	0.5	41.7	125.5	-83.8	4
97.1	98.7	100.3	13	9.2	22.2	20	0.5	41.7	126.5	-84.8	4
97.1	101.9	106.7	13	9.2	22.2	20	0.5	41.7	126.9	-85.2	4
97.9	100.3	102.7	13	9.1	22.1	20	6.5	35.6	126.8	-91.2	3
97.9	98.7	99.5	13	9.1	22.1	20	6.5	35.6	126.5	-90.9	3
97.9	99.5	101.1	13	9.1	22.1	20	6.5	35.6	124.8	-89.2	3
97.9	101.9	105.9	13	9.1	22.1	20	6.5	35.6	126.9	-91.3	3
97.9	102.7	107.5	13	9.1	22.1	20	6.5	35.6	126.2	-90.6	3
98.7	96.3	93.9	13	9.1	22.1	20	2.5	39.6	126.2	-86.6	3
98.7	100.3	101.9	13	9.1	22.1	20	2.5	39.6	126.8	-87.2	3
98.7	99.5	100.3	13	9.1	22.1	20	2.5	39.6	124.8	-85.2	3
98.7	102.7	106.7	13	9.1	22.1	20	2.5	39.6	126.2	-86.6	3
98.7	97.9	97.1	13	9.1	22.1	20	2.5	39.6	125.5	-85.9	3
98.7	101.9	105.1	13	9.1	22.1	20	2.5	39.6	126.9	-87.3	3
99.5	96.3	93.1	9	9	18	20	1.1	36.9	126.2	-89.3	3
99.5	98.7	97.9	9	9	18	20	1.1	36.9	126.5	-89.6	3
99.5	100.3	101.1	9	9	18	20	1.1	36.9	126.8	-89.9	3
99.5	102.7	105.9	9	9	18	20	1.1	36.9	126.2	-89.3	3
99.5	103.5	107.5	9	9	18	20	1.1	36.9	126.1	-89.2	3
99.5	97.9	96.3	9	9	18	20	1.1	36.9	125.5	-88.6	3
99.5	101.9	104.3	9	9	18	20	1.1	36.9	126.9	-90	3
100.3	96.3	92.3	13	8.9	21.9	20	5.7	36.2	126.2	-90	3



Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
100.3	99.5	98.7	13	8.9	21.9	20	5.7	36.2	124.8	-88.6	3
100.3	103.5	106.7	13	8.9	21.9	20	5.7	36.2	126.1	-89.9	3
100.3	97.9	95.5	13	8.9	21.9	20	5.7	36.2	125.5	-89.3	3
100.3	98.7	97.1	13	8.9	21.9	20	5.7	36.2	126.5	-90.3	3
100.3	101.9	103.5	13	8.9	21.9	20	5.7	36.2	126.9	-90.7	3
100.3	102.7	105.1	13	8.9	21.9	20	5.7	36.2	126.2	-90	3
101.1	99.5	97.9	13	8.9	21.9	20	0.5	41.4	124.8	-83.4	4
101.1	100.3	99.5	13	8.9	21.9	20	0.5	41.4	126.8	-85.4	4
101.1	103.5	105.9	13	8.9	21.9	20	0.5	41.4	126.1	-84.7	4
101.1	104.3	107.5	13	8.9	21.9	20	0.5	41.4	126.4	-85	4
101.1	98.7	96.3	13	8.9	21.9	20	0.5	41.4	126.5	-85.1	4
101.1	101.9	102.7	13	8.9	21.9	20	0.5	41.4	126.9	-85.5	4
101.1	102.7	104.3	13	8.9	21.9	20	0.5	41.4	126.2	-84.8	4
101.9	100.3	98.7	13	8.9	21.9	20	1.5	40.4	126.8	-86.4	3
101.9	104.3	106.7	13	8.9	21.9	20	1.5	40.4	126.4	-86	3
101.9	97.9	93.9	13	8.9	21.9	20	1.5	40.4	125.5	-85.1	3
101.9	98.7	95.5	13	8.9	21.9	20	1.5	40.4	126.5	-86.1	3
101.9	99.5	97.1	13	8.9	21.9	20	1.5	40.4	124.8	-84.4	3
101.9	102.7	103.5	13	8.9	21.9	20	1.5	40.4	126.2	-85.8	3
101.9	103.5	105.1	13	8.9	21.9	20	1.5	40.4	126.1	-85.7	3
102.7	100.3	97.9	9	8.8	17.8	20	0.5	37.3	126.8	-89.5	3
102.7	104.3	105.9	9	8.8	17.8	20	0.5	37.3	126.4	-89.1	3
102.7	105.1	107.5	9	8.8	17.8	20	0.5	37.3	126.9	-89.6	3
102.7	99.5	96.3	9	8.8	17.8	20	0.5	37.3	124.8	-87.5	3
102.7	103.5	104.3	9	8.8	17.8	20	0.5	37.3	126.1	-88.8	3
102.7	97.9	93.1	9	8.8	17.8	20	0.5	37.3	125.5	-88.2	3
102.7	101.9	101.1	9	8.8	17.8	20	0.5	37.3	126.9	-89.6	3
103.5	105.1	106.7	13	8.9	21.9	20	0.2	41.7	126.9	-85.2	3
103.5	98.7	93.9	13	8.9	21.9	20	0.2	41.7	126.5	-84.8	3
103.5	99.5	95.5	13	8.9	21.9	20	0.2	41.7	124.8	-83.1	3
103.5	100.3	97.1	13	8.9	21.9	20	0.2	41.7	126.8	-85.1	3
103.5	102.7	101.9	13	8.9	21.9	20	0.2	41.7	126.2	-84.5	3
103.5	104.3	105.1	13	8.9	21.9	20	0.2	41.7	126.4	-84.7	3
103.5	97.9	92.3	13	8.9	21.9	20	0.2	41.7	125.5	-83.8	3

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
103.5	101.9	100.3	13	8.9	21.9	20	0.2	41.7	126.9	-85.2	3
104.3	105.1	105.9	9	8.6	17.6	40	17.1	40.5	126.9	-86.4	3
104.3	100.3	96.3	9	8.6	17.6	20	17.1	20.5	126.8	-106.3	3
104.3	103.5	102.7	9	8.6	17.6	20	17.1	20.5	126.1	-105.6	3
104.3	99.7	93.1	9	8.6	17.6	20	17.1	20.5	126.5	-106	3
104.3	101.9	99.5	9	8.6	17.6	20	17.1	20.5	126.9	-106.4	3
104.3	102.7	101.1	9	8.6	17.6	20	17.1	20.5	126.2	-105.7	3
104.3	105.9	107.5	9	8.6	17.6	20	17.1	20.5	115.5	-95	3
105.1	99.5	93.9	9	8.7	17.7	20	0.5	37.2	124.8	-87.6	3
105.1	100.3	95.5	9	8.7	17.7	20	0.5	37.2	126.8	-89.6	3
105.1	103.5	101.9	9	8.7	17.7	20	0.5	37.2	126.1	-88.9	3
105.1	104.3	103.5	9	8.7	17.7	20	0.5	37.2	126.4	-89.2	3
105.1	98.7	92.3	9	8.7	17.7	20	0.5	37.2	126.5	-89.3	3
105.1	101.9	98.7	9	8.7	17.7	20	0.5	37.2	126.9	-89.7	3
105.1	102.7	100.3	9	8.7	17.7	20	0.5	37.2	126.2	-89	3
105.1	105.9	106.7	9	8.7	17.7	20	0.5	37.2	115.5	-78.3	5
105.9	104.3	102.7	9	8.5	17.5	40	16.5	41	126.4	-85.4	3
105.9	105.1	104.3	9	8.5	17.5	20	16.5	21	126.9	-105.9	3
105.9	99.5	93.1	9	8.5	17.5	20	16.5	21	124.8	-103.8	3
105.9	101.9	97.9	9	8.5	17.5	20	16.5	21	126.9	-105.9	3
105.9	102.7	99.5	9	8.5	17.5	20	16.5	21	126.2	-105.2	3
105.9	103.5	101.1	9	8.5	17.5	20	16.5	21	126.1	-105.1	3
105.9	106.7	107.5	9	8.5	17.5	20	16.5	21	127.1	-106.1	3
106.7	100.3	93.9	13	8.4	21.4	20	3.2	38.2	126.8	-88.6	3
106.7	104.3	101.9	13	8.4	21.4	20	3.2	38.2	126.4	-88.2	3
106.7	105.1	103.5	13	8.4	21.4	20	3.2	38.2	126.9	-88.7	3
106.7	99.5	92.3	13	8.4	21.4	20	3.2	38.2	124.8	-86.6	3
106.7	102.7	98.7	13	8.4	21.4	20	3.2	38.2	126.2	-88	3
106.7	103.5	100.3	13	8.4	21.4	20	3.2	38.2	126.1	-87.9	3
106.7	101.9	97.1	13	8.4	21.4	20	3.2	38.2	126.9	-88.7	3
106.7	105.9	105.1	13	8.4	21.4	20	3.2	38.2	115.5	-77.3	3
107.5	105.1	102.7	13	8.1	21.1	20	8.1	33	126.9	-93.9	3
107.5	100.3	93.1	13	8.1	21.1	20	8.1	33	126.8	-93.8	3
107.5	102.7	97.9	13	8.1	21.1	20	8.1	33	126.2	-93.2	3
107.5	103.5	99.5	13	8.1	21.1	20	8.1	33	126.1	-93.1	3

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
107.5	104.3	101.1	13	8.1	21.1	20	8.1	33	126.4	-93.4	3
107.5	106.7	105.9	13	8.1	21.1	20	8.1	33	127.1	-94.1	3
107.5	101.9	96.3	13	8.1	21.1	20	8.1	33	126.9	-93.9	3
107.5	105.9	104.3	13	8.1	21.1	20	8.1	33	115.5	-82.5	3
108.3	105.1	101.9	6	8.1	14.1	20	15.3	18.8	126.9	-108.1	
108.3	100.3	92.3	6	8.1	14.1	20	15.3	18.8	126.8	-108	
108.3	103.5	98.7	6	8.1	14.1	20	15.3	18.8	126.1	-107.3	
108.3	104.3	100.3	6	8.1	14.1	20	15.3	18.8	126.4	-107.6	
108.3	107.5	106.7	6	8.1	14.1	20	15.3	18.8	125.2	-106.4	
108.3	101.9	95.5	6	8.1	14.1	20	15.3	18.8	126.9	-108.1	
108.3	102.7	97.1	6	8.1	14.1	20	15.3	18.8	126.2	-107.4	
108.3	105.9	103.5	6	8.1	14.1	20	15.3	18.8	115.5	-96.7	
108.3	106.7	105.1	6	8.1	14.1	20	15.3	18.8	127.1	-108.3	
109.1	103.5	97.9	9	8.1	17.1	20	11.2	25.9	126.1	-100.2	
109.1	104.3	99.5	9	8.1	17.1	20	11.2	25.9	126.4	-100.5	
109.1	105.1	101.1	9	8.1	17.1	20	11.2	25.9	126.9	-101	
109.1	107.5	105.9	9	8.1	17.1	20	11.2	25.9	125.2	-99.3	
109.1	102.7	96.3	9	8.1	17.1	20	11.2	25.9	126.2	-100.3	
109.1	105.9	102.7	9	8.1	17.1	20	11.2	25.9	115.5	-89.6	
109.1	106.7	104.3	9	8.1	17.1	20	11.2	25.9	127.1	-101.2	
109.9	104.3	98.7	9	8	17	20	19.3	17.7	126.4	-108.7	
109.9	105.1	100.3	9	8	17	20	19.3	17.7	126.9	-109.2	
109.9	101.9	93.9	9	8	17	20	19.3	17.7	126.9	-109.2	
109.9	102.7	95.5	9	8	17	20	19.3	17.7	126.2	-108.5	
109.9	103.5	97.1	9	8	17	20	19.3	17.7	126.1	-108.4	
109.9	105.9	101.9	9	8	17	20	19.3	17.7	115.5	-97.8	
109.9	106.7	103.5	9	8	17	20	19.3	17.7	127.1	-109.4	
109.9	107.5	105.1	9	8	17	20	19.3	17.7	125.2	-107.5	
110.7	104.3	97.9	9	8	17	20	19.4	17.6	126.4	-108.8	
110.7	105.1	99.5	9	8	17	20	19.4	17.6	126.9	-109.3	
110.7	103.5	96.3	9	8	17	20	19.4	17.6	126.1	-108.5	
110.7	106.7	102.7	9	8	17	20	19.4	17.6	127.1	-109.5	
110.7	107.5	104.3	9	8	17	20	19.4	17.6	125.2	-107.6	
110.7	101.9	93.1	9	8	17	20	19.4	17.6	126.9	-109.3	



Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
110.7	105.9	101.1	9	8	17	20	19.4	17.6	115.5	-97.9	
111.5	105.1	98.7	9	8	17	20	20	17	126.9	-109.9	
111.5	102.7	93.9	9	8	17	20	20	17	126.2	-109.2	
111.5	103.5	95.5	9	8	17	20	20	17	126.1	-109.1	
111.5	104.3	97.1	9	8	17	20	20	17	126.4	-109.4	
111.5	106.7	101.9	9	8	17	20	20	17	127.1	-110.1	
111.5	107.5	103.5	9	8	17	20	20	17	125.2	-108.2	
111.5	101.9	92.3	9	8	17	20	20	17	126.9	-109.9	
111.5	105.9	100.3	9	8	17	20	20	17	115.5	-98.5	
112.3	105.1	97.9	9	8	17	20	20	17	126.9	-109.9	
112.3	104.3	96.3	9	8	17	20	20	17	126.4	-109.4	
112.3	107.5	102.7	9	8	17	20	20	17	125.2	-108.2	
112.3	102.7	93.1	9	8	17	20	20	17	128.2	-109.2	
112.3	105.9	98.5	9	8	17	20	20	17	115.5	-98.5	
112.3	106.7	101.1	9	8	17	20	20	17	127.1	-110.1	
113.1	103.5	93.9	9	8	17	20	20	17	126.1	-109.1	
113.1	104.3	95.5	9	8	17	20	20	17	126.4	-109.4	
113.1	105.1	97.1	9	8	17	20	20	17	126.9	-109.9	
113.1	107.5	101.9	9	8	17	20	20	17	125.2	-108.2	
113.1	102.7	92.3	9	8	17	20	20	17	126.2	-109.2	
113.1	105.9	98.7	9	8	17	20	20	17	115.5	-98.5	
113.1	106.7	100.3	9	8	17	20	20	17	127.1	-110.1	
113.9	105.1	96.3	3	7.6	10.6	20	17.2	13.4	126.9	-113.5	
113.9	103.5	93.1	3	7.6	10.6	20	17.2	13.4	126.1	-112.7	
113.9	105.9	97.9	3	7.6	10.6	20	17.2	13.4	115.5	-102.1	
113.9	106.7	99.5	3	7.6	10.6	20	17.2	13.4	127.1	-113.7	
113.9	107.5	101.1	3	7.6	10.6	20	17.2	13.4	125.2	-111.8	
114.7	104.3	93.9	3	7.5	10.5	20	20	10.5	126.4	-115.9	
114.7	105.1	95.5	3	7.5	10.5	20	20	10.5	126.9	-116.4	
114.7	103.5	92.3	3	7.5	10.5	20	20	10.5	126.1	-115.6	
114.7	106.7	98.7	3	7.5	10.5	20	20	10.5	127.1	-116.6	
114.7	107.5	100.3	3	7.5	10.5	20	20	10.5	125.2	-114.7	
114.7	105.9	97.1	3	7.5	10.5	20	20	10.5	115.5	-105	
115.5	104.3	93.1	3	7.5	10.5	20	20	10.5	126.4	-115.9	

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Full Scale Range (dBμ)	Scale Reading (dBμ)	Adjusted Level (dBμ)	Carrier Reference Level (dBμ)	Level Referenced to Carrier (dB)	Notes*
115.5	106.7	97.9	3	7.5	10.5	20	20	10.5	127.1	-116.8	
115.5	107.5	99.5	3	7.5	10.5	20	20	10.5	125.2	-114.7	
115.5	105.9	96.3	3	7.5	10.5	20	20	10.5	115.5	-105	
116.3	105.1	93.9	3	7.5	10.5	20	20	10.5	126.9	-116.4	
116.3	104.3	92.3	3	7.5	10.5	20	20	10.5	126.4	-115.9	
116.3	107.5	98.7	3	7.5	10.5	20	20	10.5	125.2	-114.7	
116.3	105.9	95.5	3	7.5	10.5	20	20	10.5	115.5	-105	
116.3	106.7	97.1	3	7.5	10.5	20	20	10.5	127.1	-116.6	
117.1	105.1	93.1	3	7.6	10.6	20	20	10.6	126.9	-116.3	
117.1	107.5	97.9	3	7.6	10.6	20	20	10.6	125.2	-114.6	
117.1	106.7	96.3	3	7.6	10.6	20	20	10.6	127.1	-116.5	
117.9	105.1	92.3	3	7.7	10.7	20	20	10.7	126.9	-116.2	
117.9	105.9	93.9	3	7.7	10.7	20	20	10.7	115.5	-104.8	
117.9	106.7	95.5	3	7.7	10.7	20	20	10.7	127.1	-116.4	
117.9	107.5	97.1	3	7.7	10.7	20	20	10.7	125.2	-114.5	
118.7	107.5	96.3	3	7.9	10.9	20	20	10.9	125.2	-114.3	
118.7	105.9	93.1	3	7.9	10.9	20	20	10.9	115.5	-104.6	
119.5	106.7	93.9	3	7.9	10.9	20	20	10.9	127.1	-116.2	
119.5	107.5	95.5	3	7.9	10.9	20	20	10.9	125.2	-114.3	
119.5	105.9	92.3	3	7.9	10.9	20	20	10.9	115.5	-104.6	
120.3	106.7	93.1	3	8	11	20	20	11	127.1	-116.1	
121.1	107.5	93.9	3	8	11	20	20	11	125.2	-114.2	
121.1	106.7	92.3	3	8	11	20	20	11	127.1	-116.1	
121.9	107.5	93.1	3	8	11	20	20	11	125.2	-114.2	
122.7	107.5	92.3	3	8	11	20	20	11	125.2	-114.2	

1. Measured Signal is a local TV carrier WNYW Transmitting at Channel 5: No discernable signal was measured.
2. Measured signal is local carrier WSIA Transmitting on 88.9 MHz: No discernable signal was measured.
3. System carrier assigned to this frequency was turned off for this measurement.
4. Local carrier assigned to this frequency was turned off for this measurement.
5. Allowable spurious level is -72.5 dB for a TPO of 890 watts.



The Spectrum Analyzer was used to check the close in spectral attenuation of each carrier on both systems to confirm the operation of these transmitters are in compliance with Sections (b) and (c) of the FCC Rules and Regulations.

As a final proof of the systems IM Product performance, a wide band search was undertaken using the Spectrum Analyzer. The purpose for this measurement was to look for suspicious anomalies that may warrant further investigation. My search ranged the complete frequency span of the receiver and resulted in no additional investigations

**Conclusion :** Based upon my observations and measurements taken May 2003 as summarized in this document, I, Mark Steapleton, find the subject multiplexed system- specifically the transmitters and combiner system for the operation of the WPLJ, WQHT and WCBS-FM into the COG 1084-1 CP antenna- to be in proper working order. Furthermore, based on the measured data, it is my opinion that there are no inter-modulation products in excess of 80 dB (or greater than  $43 + 10 \log_{10}(\text{Power in watts})$  dB below carrier levels generated from or within the stations operating on both the Mini Master and Master installed system. Also, based on this recorded data. I conclude that WPLJ, WQHT and WCBS-FM are in compliance with the requirements of Section 73.317 paragraph (b) through (d) of the FCC Rules and Regulations.

Respectfully submitted,  
Electronics Research, Inc.

By \_\_\_\_\_  
Mark Steapleton Field Technician

WARRICK COUNTY )  
 ) SS:  
STATE OF INDIANA )

**AFFIDAVIT**

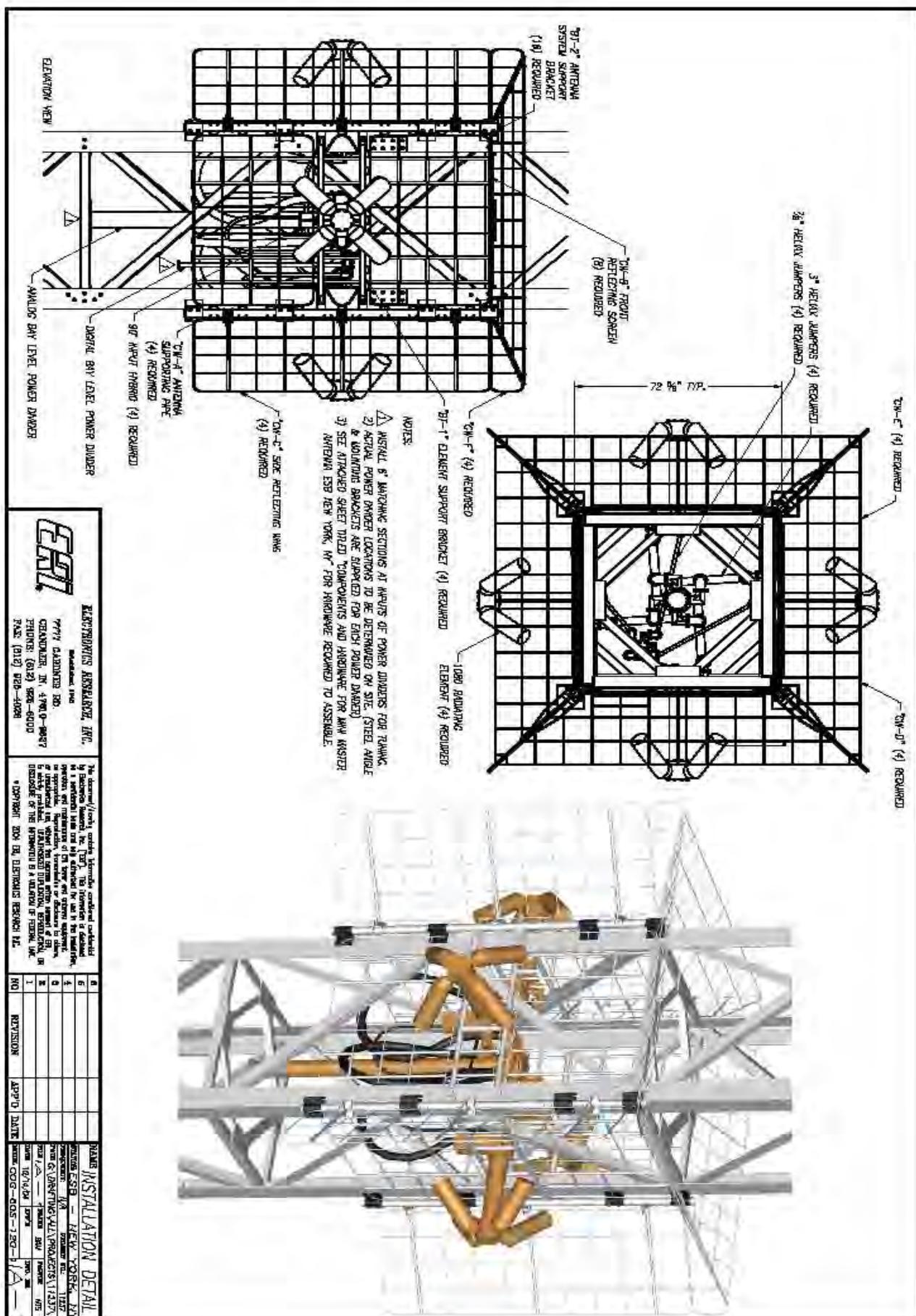
I, Mark Steapleton, hereby declare that the following statements are true and correct to the best of my knowledge and belief :

- 1.) I am a Field Technician for Electronics Research, Inc ("ERI ") and have been employed by ERI for 24 years. I am familiar with and have assisted in the design, manufacturing and installation of FM Antennas and FM Multiplexers in my long tenure with ERI.
- 2.) I have either prepared and/or directly supervised the preparation of all technical information contained in this Report Of Findings and to my knowledge to be accurate and true.
- 3.) ERI has been requested by Mini Master Operations Group, on behalf of radio Stations WPLJ, WQHT and WCBS-FM to prepare this Report Of Findings.

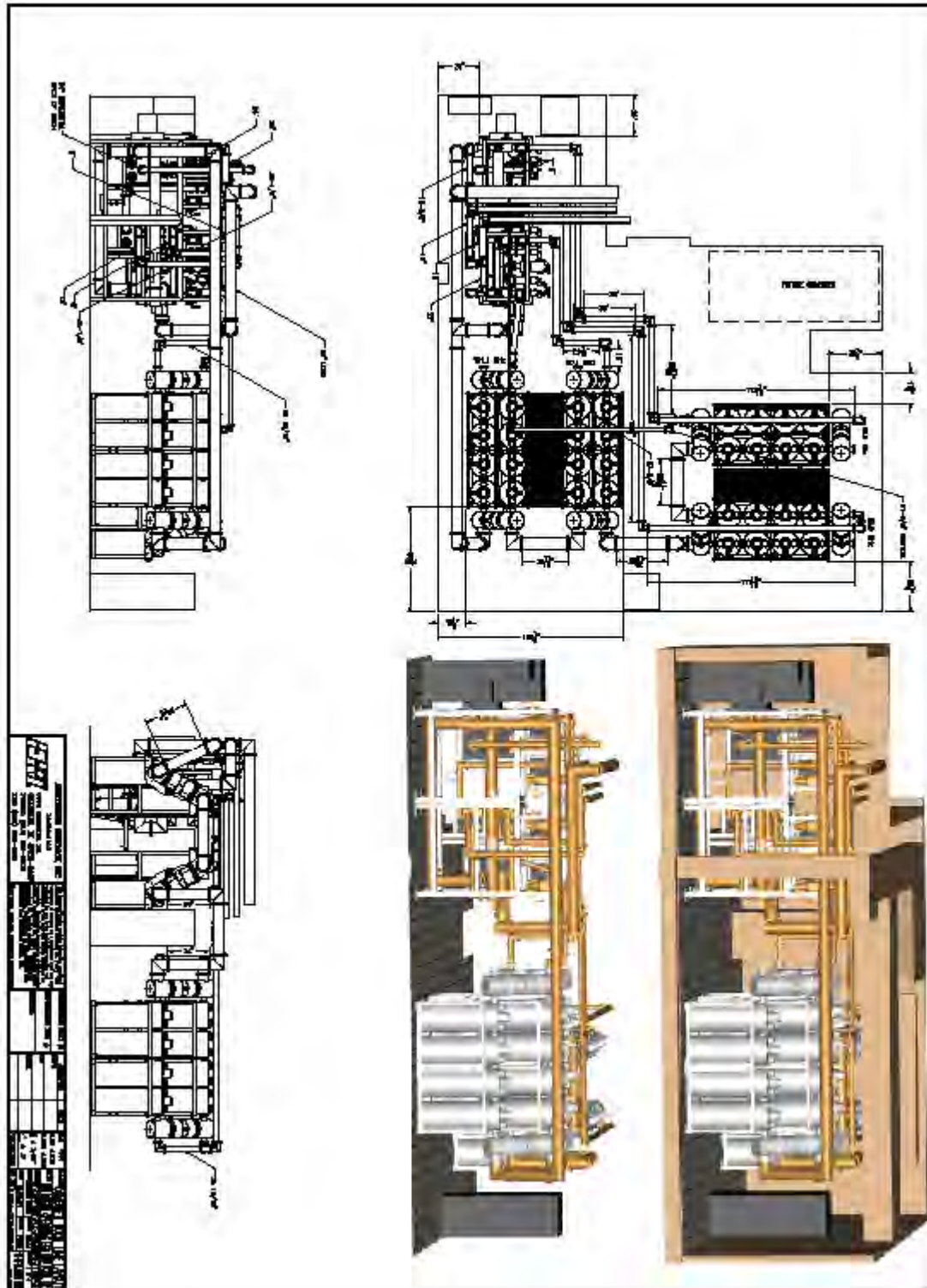
**Mark Steapleton; Field Technician**

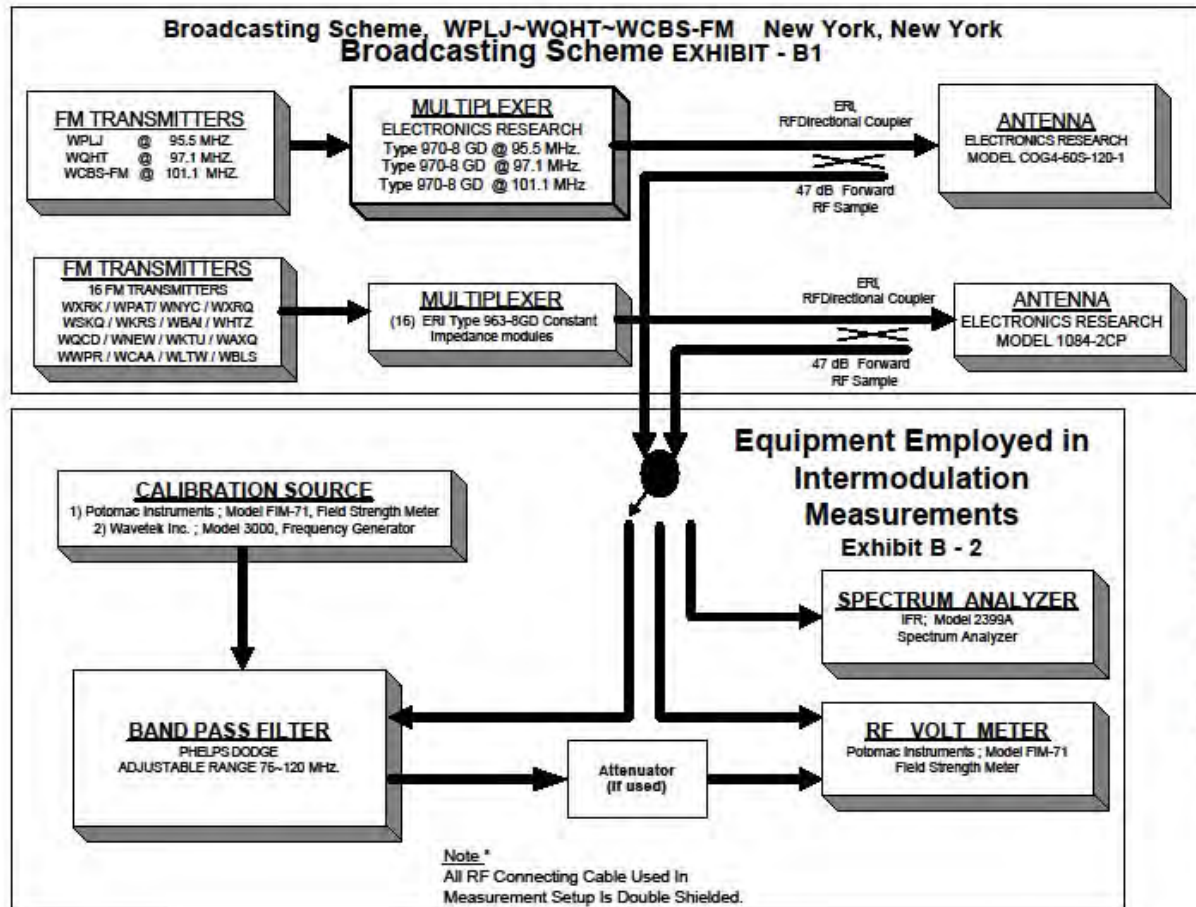
*Subscribed and sworn to before me on this 11th. day of February 2005.*

Jacquelyn Kinney, Notary Public  
My commission expires July 5, 2007









Broadcasting Scheme and Equipment Employed in Intermodulation Measurements