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NVLAP LAB CODE: 200413-0

**July 8, 2004**

# Test Record

## Product Verification
## According to FCC Part 15 Subparts C

**for**

# MONSTER, LLC
# MODEL: 168008-00

# TABLE OF CONTENTS

# Revision History

| Revision | Date | Description of Changes | Author |
|---|---|---|---|
| 0.1 | 8 Jul. 2004 | Initial document | L.Kogan |
| | | : | |

## Introduction – Test Plan

This report describes the results of all measurements made on portable FM transmitter which falls under the class of intentional radiator by the FCC Part 15 Subpart C Rules and Regulations.

This EUT is designated: **Universal FM Stereo Modulator, vehicular use.**

Model : **168008-00**

| Description of tests | Reference FCC prt.15 | Comments |
|---|---|---|
| Radiated Emissions | 15.209 | Test and limit specified in FCC prt.15, Clause 15.209 |
| Field Strength of Fundamental and Emissions within permitted band | 15.239 | Limit specified in FCC prt.15, Clause 15.239 Limit:0.25 mV/m @ 3m ;w/average detector |
| Emission bandwidth; Occupied channel bandwidth | 15.239 | Limit specified in FCC prt.15, Clause 15.239 Limit:200 kHz |

## 1.0 CERTIFICATION OF TEST DATA

### Verification statement.

The data, data evaluation and equipment configuration represented herein are a true and accurate representation of the test sample (EUT), and characteristics and measurements obtained as of the dates and the times of the test under the conditions specified and to the methods of FCC Part 15, Subpart C "Intentional Radiators" and Part 2 "Frequency Allocations and radio Treaty Matters; General Rules and regulations"

The test results provided with this report, indicate that the equipment tested:
**Universal FM Stereo Modulator for vehicular use**. MODEL : **168008-00** is compliant with the following Rules and Regulations

A. 47 Code of Federal Regulations, Part 15 Subpart C
B. 47 Code of Federal Regulations, Part 2
C. ANSI C63.4: 2000

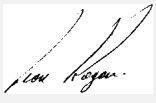
Tests performed by:

_____
Sandra Sohn
EMC Test Engineer

Report prepared by:

_____
Sandra Sohn
EMC Test Engineer

Report approved by:



Leon Kogan
Technical Director,

JMR Compliance Engineering, 20400 Plummer Street, Chatsworth CA 91311.
**E-mail:emc@jmr.com**

# 2.0 GENERAL INFORMATION

## 2.1 Client Information

| | |
|---|---|
| Company Name: | Monster, LLC |
| Contact: | Irene Baran |
| Company Address: | 7251 West Lake Mead Blvd. Suite 342<br>Las Vegas, NV 89128 |
| Phone: | (877) 800-8989 |

## 2.2 Administrative Data

| | |
|---|---|
| Device tested: | Universal FM Stereo Modulator for vehicular use |
| Model: | 168008-00 |
| Equipment category: | Intentional Radiators |
| Accessories: | N/A |
| Expository Statement: | This device is intended for personal use. |
| Purpose of test: | Compliance to FCC Rules and Regulations, Part 15, Subpart C |
| Date of test: | 06/30/2004 – 07/02/2004 |
| Place of the test: | JMR Electronics, Inc.<br>Compliance Engineering Laboratory<br>20400 Plummer Street<br>Chatsworth, CA 91311<br>Phone: (818) 993-4801 |

## 3.0 Description of Equipment Under Test (EUT)

### 3.1 Brief Description of the EUT

The EUT is a portable FM Transmitter which is designed to connect to a personal MP3 player and allow reception of the transmitted signal using a standard FM radio. There are six (6) available channels. Sliding switch will increment the frequency to the next channel.
There is no ON/OFF switch for this product. Circuit goes ON when product is plugged to automobile cigarette lighter outlet.
Power consumption of FM transmitter IC is 20ma typical at 5v.
Wires connecting to MP3 player are used as the antenna. Alteration of antenna by user is not possible.

The EUT was configured on a table top. device and was tested with standard MP3 player connected. The modulation frequency was provided by external Test Oscillator HP 651B.

**Operating frequencies :** 88.1, 88.3, 88.5, 107.5, 107.7, 107.9 MHz.
**Clock frequencies :** 7.6 MHz
**Power Supply** : External 12VDC battery.

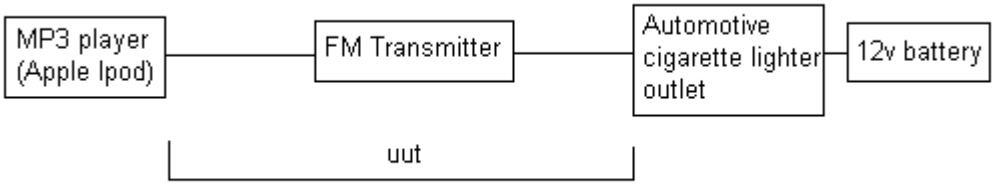
### 3.2 Test Run

1) The EUT was connected through Monster Stubby cigarette lighter connector to the 12VDC battery
   Apple Ipod, as a standard MP3 player, was connected to the appropriate input/output of the EUT;
2) Test Oscillator HP 651B had been connected to the Aux In input of the docking connector when it was necessary.

For test purposes the following three channels were selected for measurements :
88.1 MHz 107.5 MHz 107.9 MHz

Each channel had generated its frequency continuously for the duration of the testing. The above mentioned set-up allowed the article to perform sufficiently for the test purposes and required time.

## 3.3 Block Diagram of the Test Setup




## 3.4 Support Equipment List:

| No | Equipment | Model | S/N (last 6) | Notes |
|---|---|---|---|---|
| 1 | **HP Test Oscillator** | 651B | 1230A08435 | |
| 2 | **MP3 player** | M8976LL/A | | Apple Ipod |
| 3 | **Standard 12VDC battery** | N/A | N/A | |
| 4 | **Comm. Receiver** | ICOM_IC-R5 | 101410 | |
| 5 | **DC Power Supply** | DCS8-13E | 6B1012 | |

## 3.5 Cabling Configuration

**Power Cords:**

| | |
|---|---|
| Unit | HP 651B Test Oscillator |
| MFG | Standard |
| Shielded | No |
| Length | 2 m |

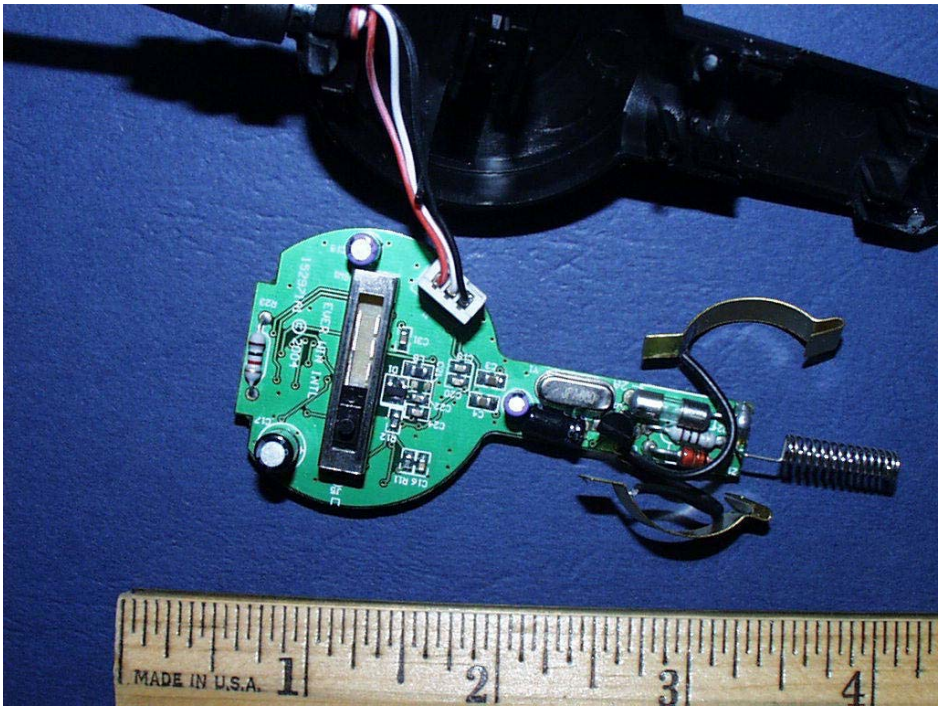
**I / O Cables External:**

| | |
|---|---|
| Connection | AUX In of the EUT to Out, 50 Ohm of the HP 651B |
| Cable | Generic 50 Ohm RF cable |
| Shielded? | Yes |
| Connector | BNC, Jack |
| Length | 0.3 m |

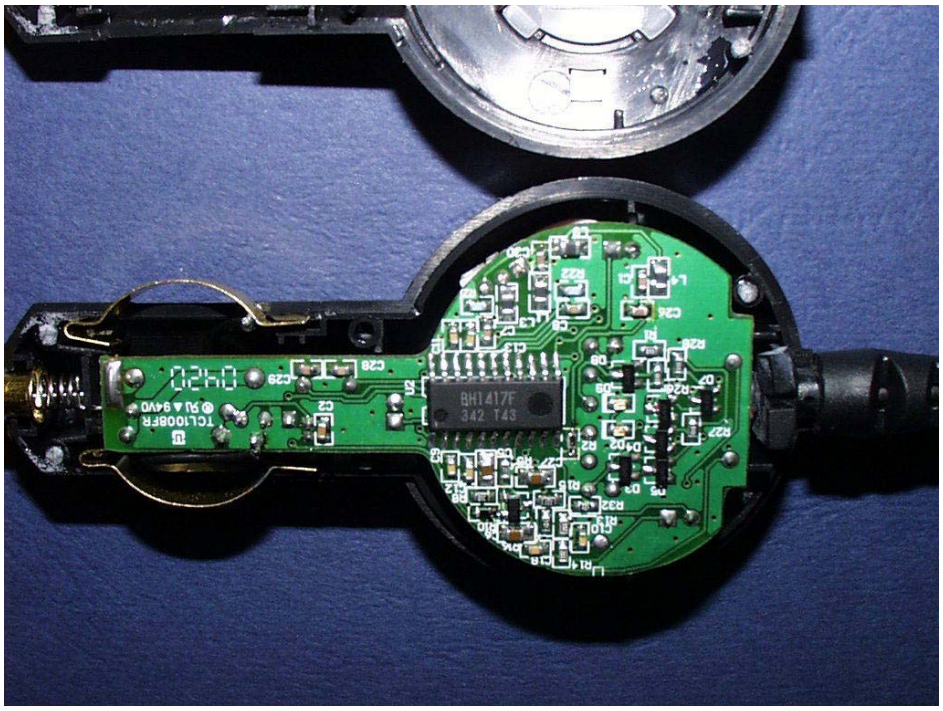
## Photos of the EUT

**EUT: Universal FM Stereo Modulator for vehicular use.**
**MODEL : 168008-00**


**EUT: Universal FM Stereo Modulator for vehicular use.**
**MODEL : 168008-00**




**EUT: Universal FM Stereo Modulator for vehicular use.**
**MODEL : 168008-00**
**PCB components side**



**EUT: Universal FM Stereo Modulator for vehicular use.**
**MODEL : 168008-00**
**PCB solder side**

## 3.7 EUT Modifications

**N/A**

## 3.8 Photographs of EUT Modifications

**N/A**

## 4.0 Test equipment used

| Device | Model No. | Serial No. | Last Cal. | Next Cal |
|---|---|---|---|---|
| Cable 1 | 8214 | CBL-006 | 02/19/04 | 02/19/05 |
| Analyzer | HP85462A | 3325A00120 | 04/11/04 | 04/11/05 |
| Cable 2 | 8268 | CBL-002 | 02/19/04 | 02/19/05 |
| Preselector | HP85460A | 3330A00117 | 04/11/04 | 04/11/05 |
| Qpeak Adapter | HP85462 Internal | Internal | 04/11/04 | 04/11/05 |
| Pre-Amplifier | None | | | |
| Tower 1 | EMCO 1050 | 9310-1786 | N/A | N/A |
| Turntable 1 | EMCO 1060 | 9409-1753 | N/A | N/A |
| Bilog Antenna | CBL6112B | 2604 | 09/03/03 | 09/03/04 |
| Shielded Semi-Anechoic Chamber | RANTEC | N/A | 03/16/04 | 03/16/05 |
| Temperature and Humidity Recorder | Dickson TH8-24C | 5097755 | 09/16/03 | 09/186/05 |
| | | | | |
| Analyzer | HP8590A | 2618A01059 | 11/05/03 | 11/05/04 |
| Amplifier | HP 8447F | 3113A05772 | 3/11/04 | 3/11/05 |
| Temp. chamber | Industrial oven & equipment IndoCo | 5966B | N/A | N/A |
| Thermocouple Monitor | SR600 | 34202 | 12/16/03 | 12/16/04 |
| Voltmeter | Fluke 83 | 65530501 | 01/13/04 | 01/13/05 |
| Bilog Antenna | CBL6111B | 1167 | 03/08/04 | 03/08/05 |
| Signal Generator | HP8648C | | 09/04/03 | 09/04/04 |
| | | | | |

## 5.0 Field Strength of Fundamental and Emissions within permitted band.

**Test Requirements:** **FCC Part 15 : Subclause 15.239**
**Test Method:** **ANSI C63.4: 2000**

**Limit :** The maximum Field Strength authorized within 200 kHz is 250 uV/m @ 3m
**Mode of operation:** with and without modulation**.**

The test facility consists of a shielded semi-anechoic chamber with attached shielded control room. The semi-anechoic chamber is approximately 18 feet wide by 28 feet long by 19 feet high. A hybrid absorber combines high performance anechoic polyurethane foam with a ferrite tile base to achieve high levels of absorption and power dissipation capability.

The EUT had been placed at the 0.8 m height on the non-conducting table. Transmitter had been turned ON without modulation and worked at the frequencies of the selected 1, 61 and 80 channels.
All data was obtained via a HP 85876A EMI measurement software package using an HP 85462A Receiver which is compliant to CISPR 16. The EUT was configured in various geometric patterns to find the geometric configuration and EUT attitude that produced the largest RF power.
After determination of the maximum emissions configuration the distance of the EUT to the scanning antenna was set to 3 meters.

**At each of three selected channels 88.1 MHz, 107.5 MHz, and 107.9 MHz Field Strength of Emissions had been measured.**

**The field strength is calculated by adding the Antenna Factor and Cable losses, and subtracting the Amplifier Gain:**

**FS=SA+AF+CL-AG**

**Where:** **FS= field strength in dB (uV/m)**
**SA= receiver amplitude in dB (uV)**
**CL= cable attenuation in (dB)**
**AF= antenna factor in (dB)**
**AG= amplifier gain**

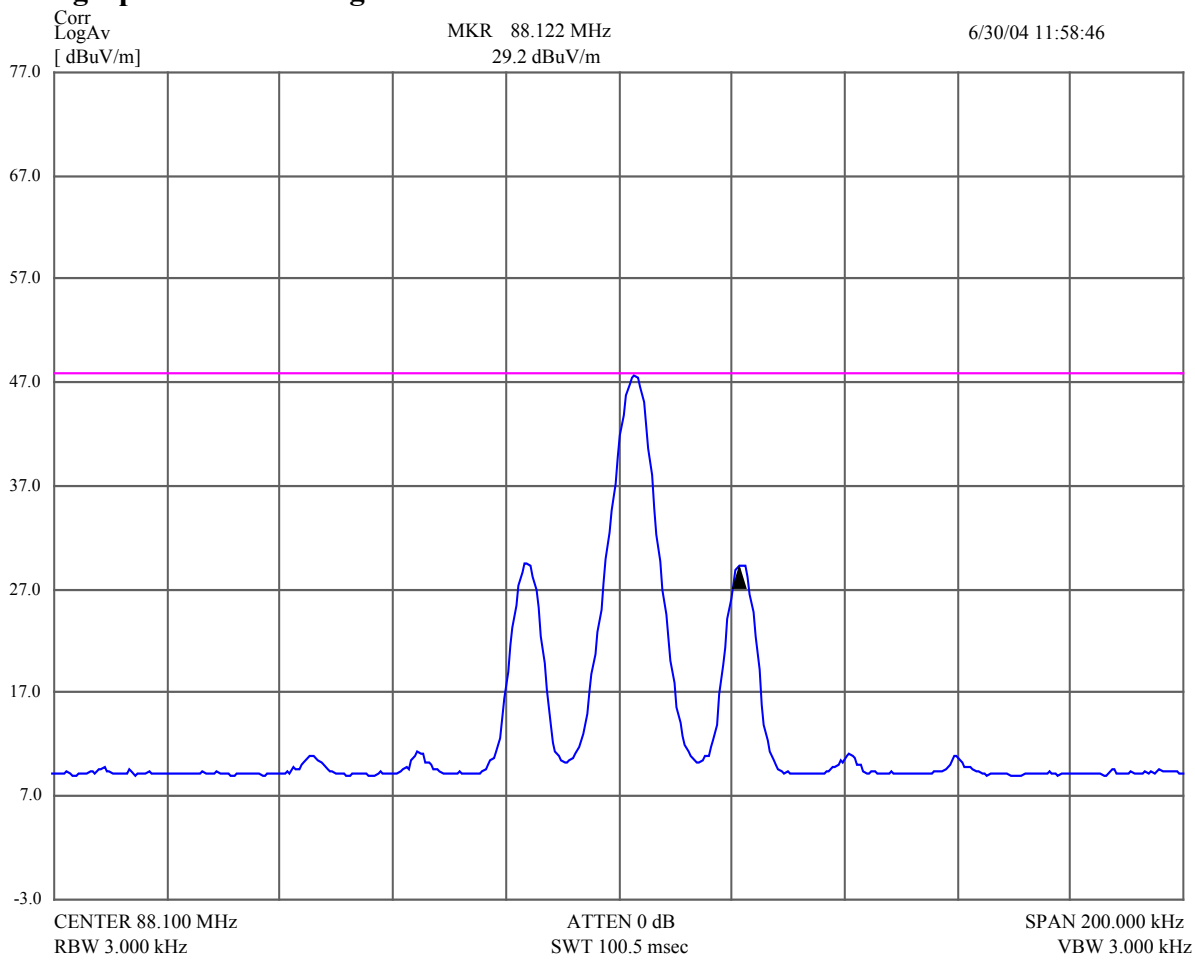
## 5.1. Channel 88.1 MHz

### 5.1.1 no modulation

### Average value data

| Frequency MHz | Avg dBuV/m | Avg Lmt dBuV/m | DelLim-Avg dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 88.084000 | 29.37 | 48.00 | -18.63 | Horz | 217 | 8 | PASS |
| 88.103000 | 47.51 | 48.00 | -0.49 | Horz | 217 | 8 | PASS |
| 88.121504 | 29.22 | 48.00 | -18.78 | Horz | 217 | 8 | PASS |

### Receiver graph of Field Strength of Emissions at 3 m

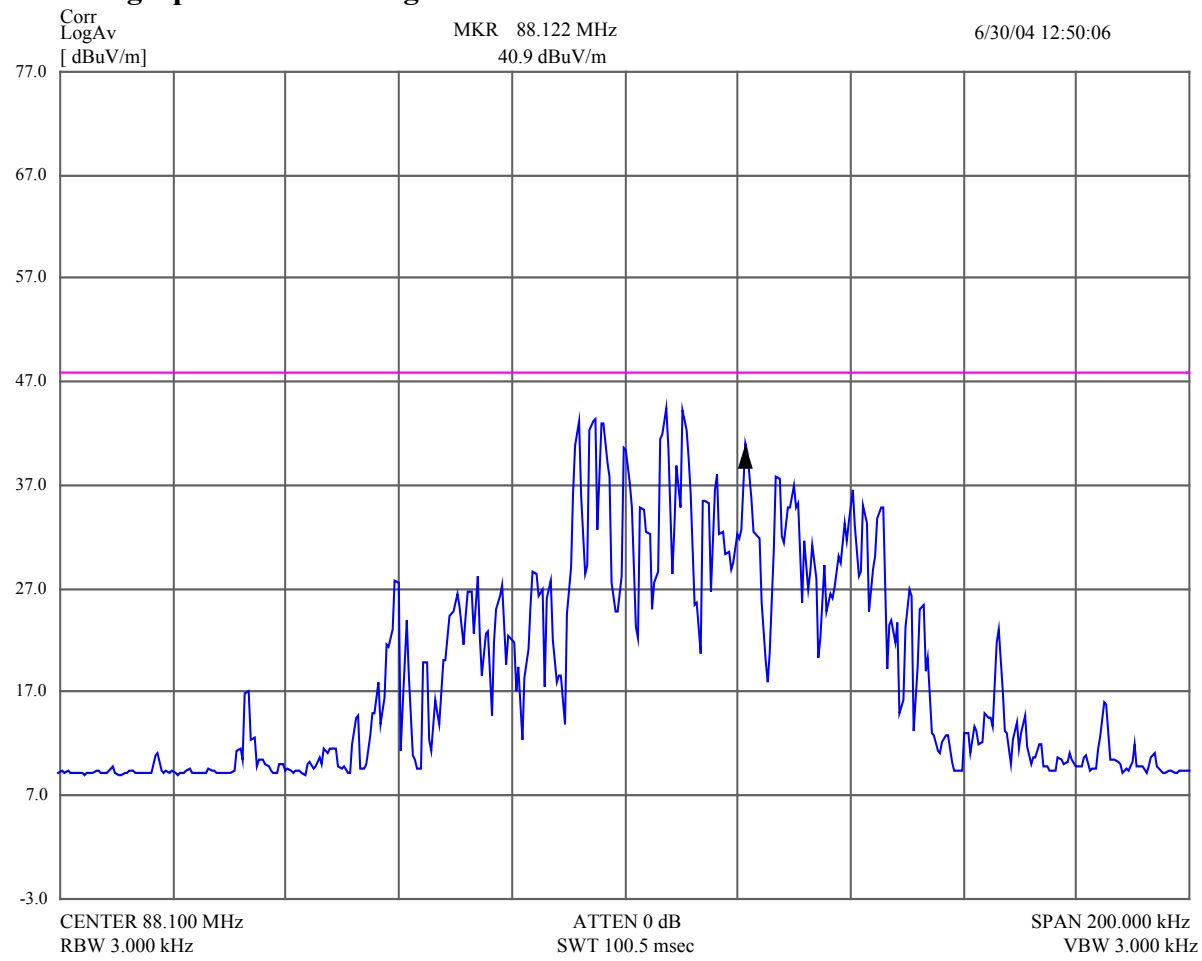


### 5.1.2 with modulation

## Average value data

| Frequency MHz | Avg dBuV/m | Avg Lmt dBuV/m | DelLim-Avg dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 88.092000 | 43.00 | 48.00 | -5.00 | Horz | 191 | 8 | PASS |
| 88.096000 | 42.83 | 48.00 | -5.17 | Horz | 191 | 8 | PASS |
| 88.107504 | 44.37 | 48.00 | -3.63 | Horz | 191 | 8 | PASS |
| 88.121504 | 40.94 | 48.00 | -7.06 | Horz | 191 | 8 | PASS |

## Receiver graph of Field Strength of Emissions at 3 m



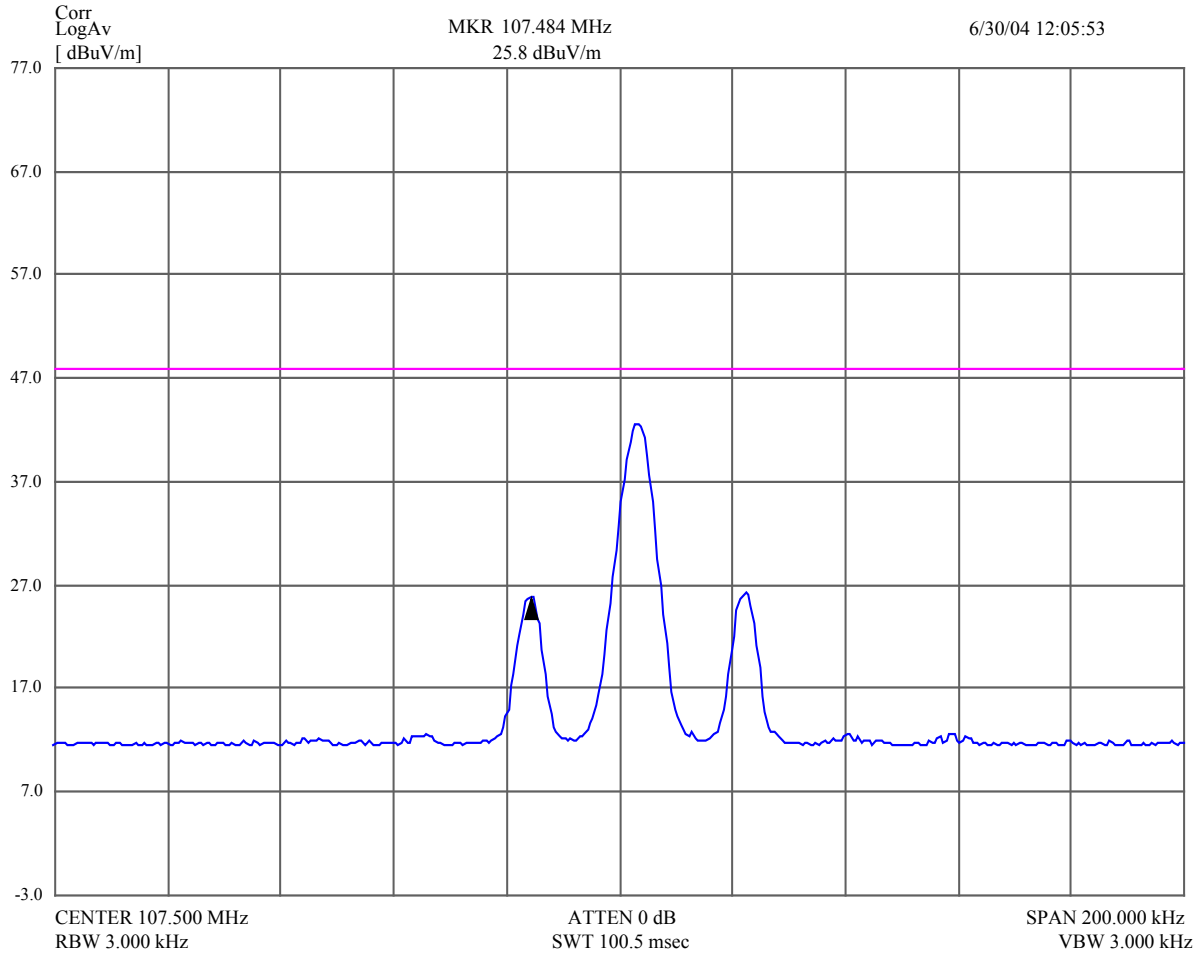
## 5.2. Channel 107.5 MHz

### 5.2.1 no modulation

### Average value data

| Frequency MHz | Avg dBuV/m | Avg Lmt dBuV/m | DelLim-Avg dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 107.484496 | 25.82 | 48.00 | -22.18 | Horz | 291 | 8 | PASS |
| 107.503504 | 42.49 | 48.00 | -5.51 | Horz | 291 | 8 | PASS |
| 107.522496 | 26.11 | 48.00 | -21.89 | Horz | 291 | 8 | PASS |

### Receiver graph of Field Strength of Emission at 3 m

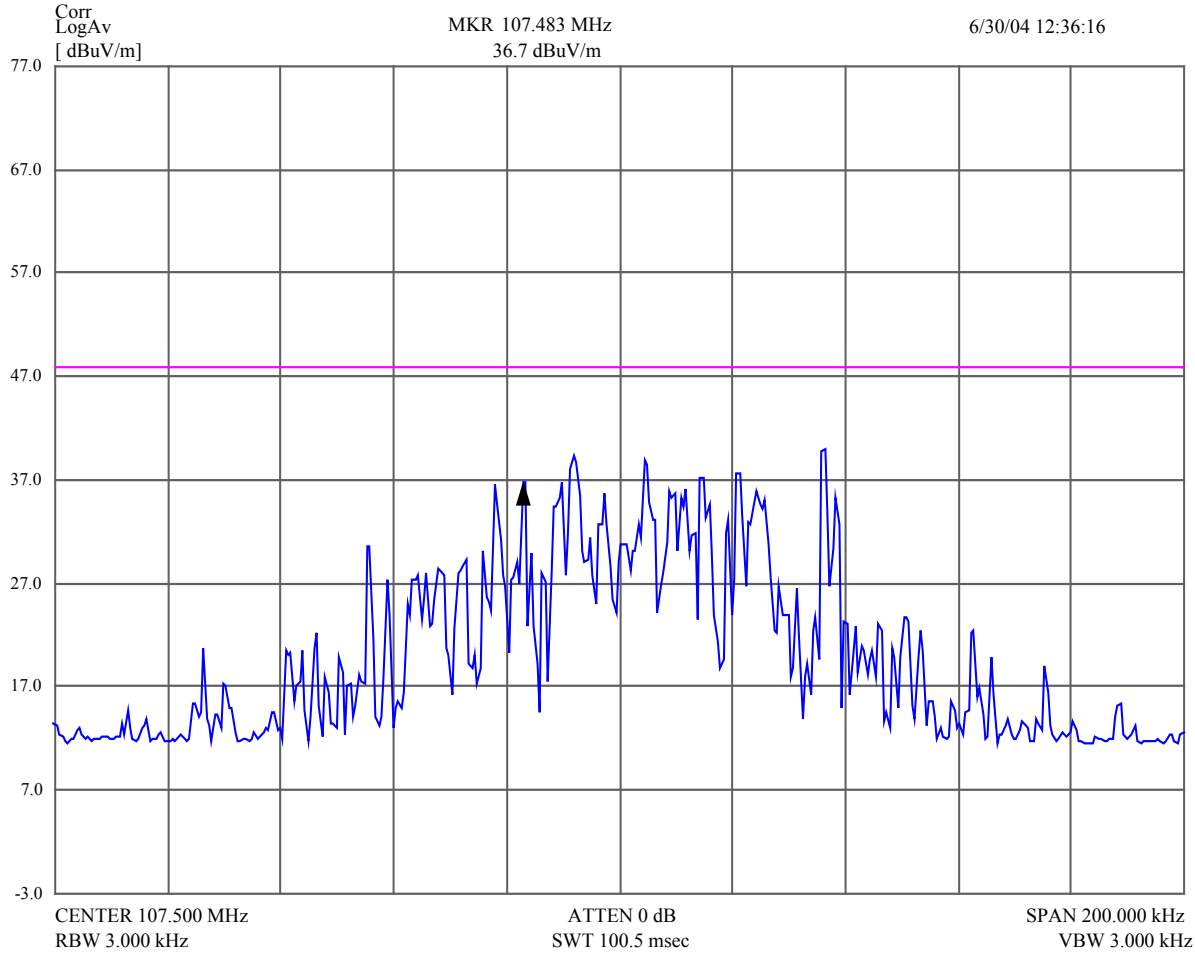


### 5.2.2 with modulation

### Average value data

| Frequency MHz | Avg dBuV/m | Avg Lmt dBuV/m | DelLim-Avg dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 107.483000 | 36.74 | 48.00 | -11.26 | Horz | 287 | 8 | PASS |
| 107.492000 | 39.15 | 48.00 | -8.85 | Horz | 287 | 8 | PASS |
| 107.504496 | 38.79 | 48.00 | -9.21 | Horz | 287 | 8 | PASS |
| 107.514496 | 37.08 | 48.00 | -10.92 | Horz | 287 | 8 | PASS |
| 107.521504 | 37.59 | 48.00 | -10.41 | Horz | 287 | 8 | PASS |
| 107.536496 | 39.79 | 48.00 | -8.21 | Horz | 287 | 8 | PASS |

### Receiver graph of Field Strength of Emissions at 3 m



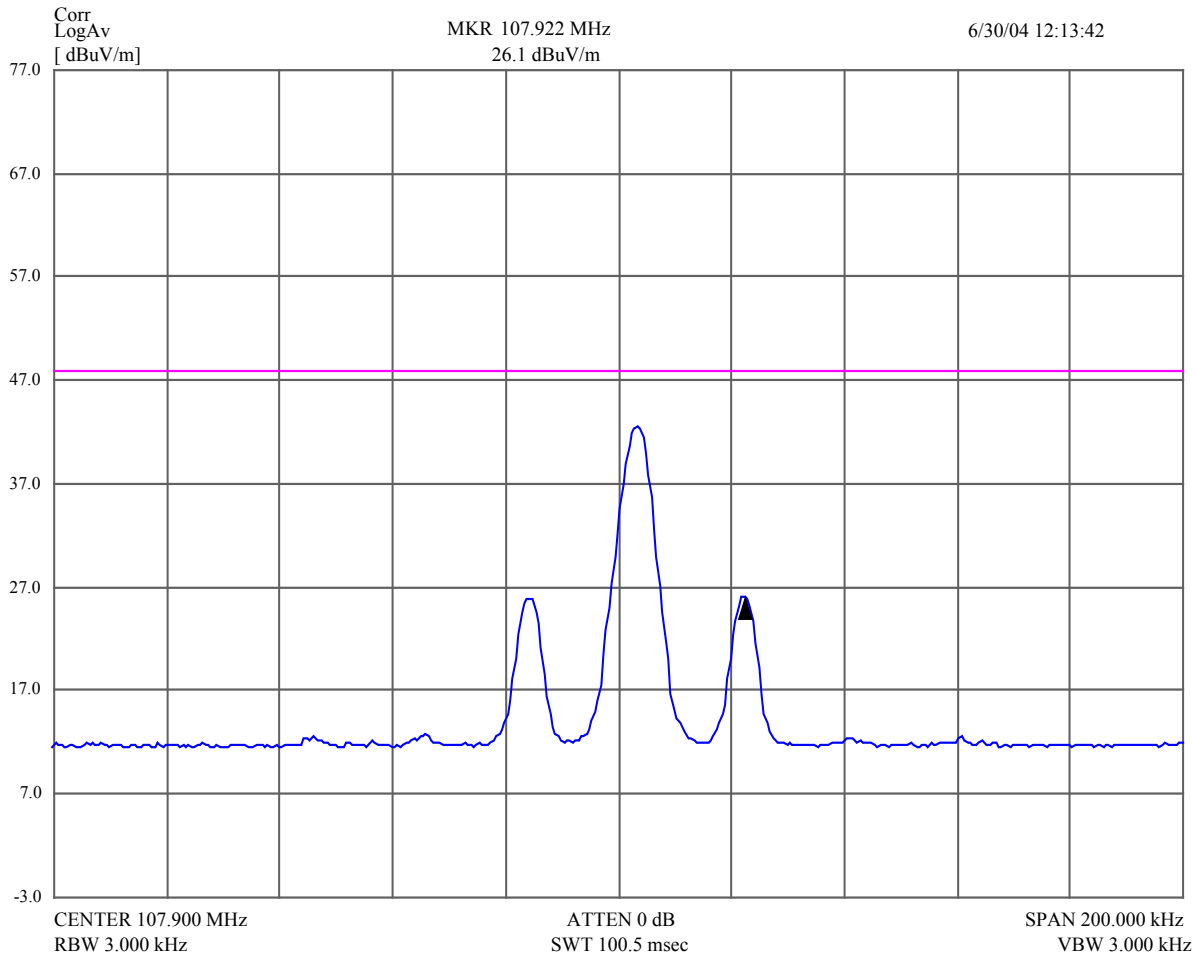
## 5.3. Channel 107.9 MHz

### 5.3.1 no modulation

### Average value data

| Frequency MHz | Avg dBuV/m | Avg Lmt dBuV/m | DelLim-Avg dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 107.884496 | 25.87 | 48.00 | -22.13 | Horz | 287 | 8 | PASS |
| 107.903504 | 42.43 | 48.00 | -5.57 | Horz | 287 | 8 | PASS |
| 107.922496 | 26.07 | 48.00 | -21.93 | Horz | 287 | 8 | PASS |

### Receiver graph of Field Strength of Emissions at 3 m

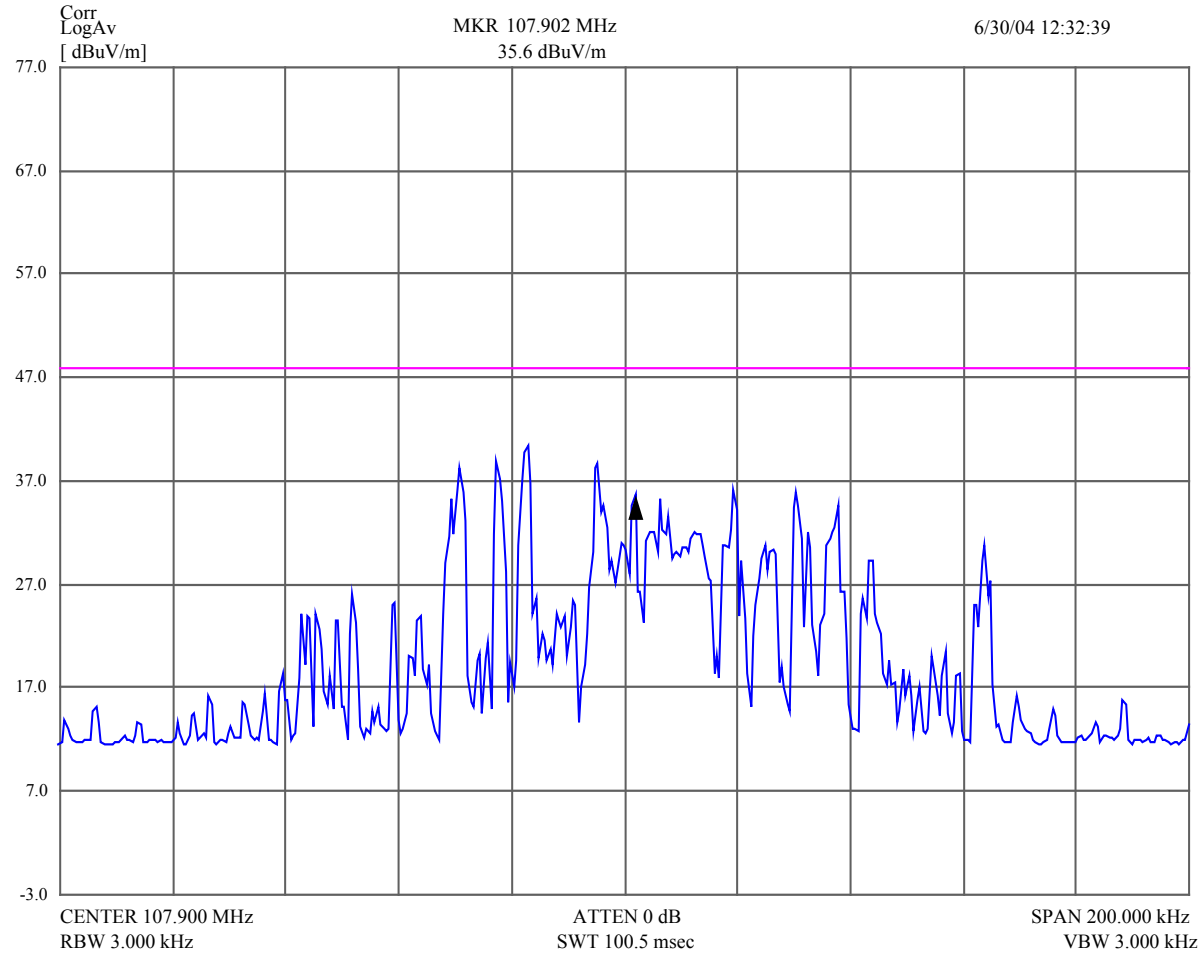


### 5.3.2 with modulation

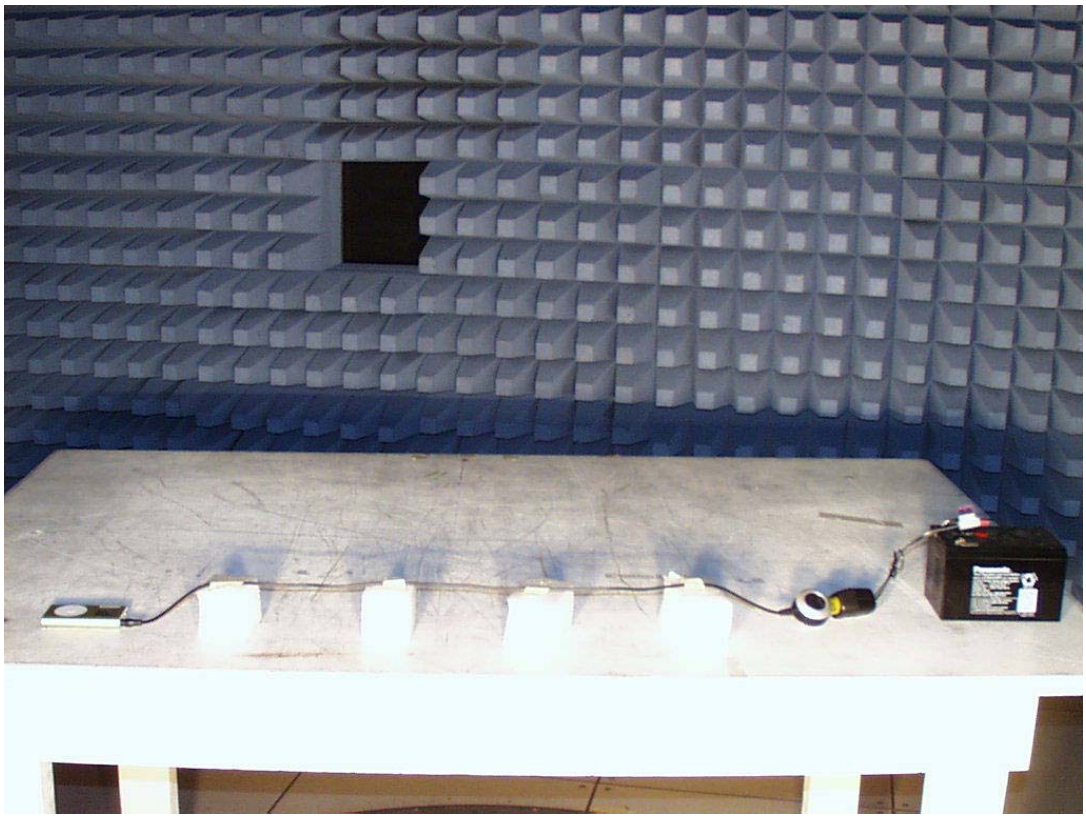
### Average value data

| Frequency MHz | Avg dBuV/m | Avg Lmt dBuV/m | DelLim-Avg dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 107.871000 | 38.20 | 48.00 | -9.80 | Horz | 287 | 8 | PASS |
| 107.877504 | 38.84 | 48.00 | -9.16 | Horz | 287 | 8 | PASS |
| 107.883000 | 40.31 | 48.00 | -7.69 | Horz | 287 | 8 | PASS |
| 107.895504 | 38.71 | 48.00 | -9.29 | Horz | 287 | 8 | PASS |
| 107.902000 | 35.60 | 48.00 | -12.40 | Horz | 287 | 8 | PASS |

### Receiver graph of Field Strength of Emissions at 3 m



## 5.4 Photographs of Test Set-Up



## 6.0 Radiated Emissions.

| | |
|---|---|
| **Test Requirements:** | **FCC Part 15 : Subclause 15.209** |
| **Test Method:** | **ANSI C63.4: 2000** |
| **Limit :** | FCC Part 15 : Subclause 15.209 |
| **Mode of operation:** | normal |
| **Room Ambient Temperature**: | 20°C±1°C |
| **Relative Humidity**: | 38%±5% |

The test facility consists of a shielded semi-anechoic chamber with attached shielded control room. The semi-anechoic chamber is approximately 18 feet wide by 28 feet long by 19 feet high. A hybrid absorber combines high performance anechoic polyurethane foam with a ferrite tile base to achieve high levels of absorption and power dissipation capability.

The EUT had been placed at the 0.8 m height on the non-conducting table. Transmitter had been turned ON with modulation and worked at the frequencies of the selected channels.
All data was obtained via a HP 85876A EMI measurement software package using an HP 85462A Receiver which is compliant to CISPR 16. The EUT was configured in various geometric patterns to find the geometric configuration and EUT attitude that produced the largest RF power.
After determination of the maximum emissions configuration the distance of the EUT to the scanning antenna was set to 3 meters.

**At each of three selected channels 88.1 MHz, 107.5 MHz, and 107.9 MHz Radiated Emissions had been measured.**

**The field strength is calculated by adding the Antenna Factor and Cable losses, and subtracting the Amplifier Gain:**

**FS=SA+AF+CL-AG**

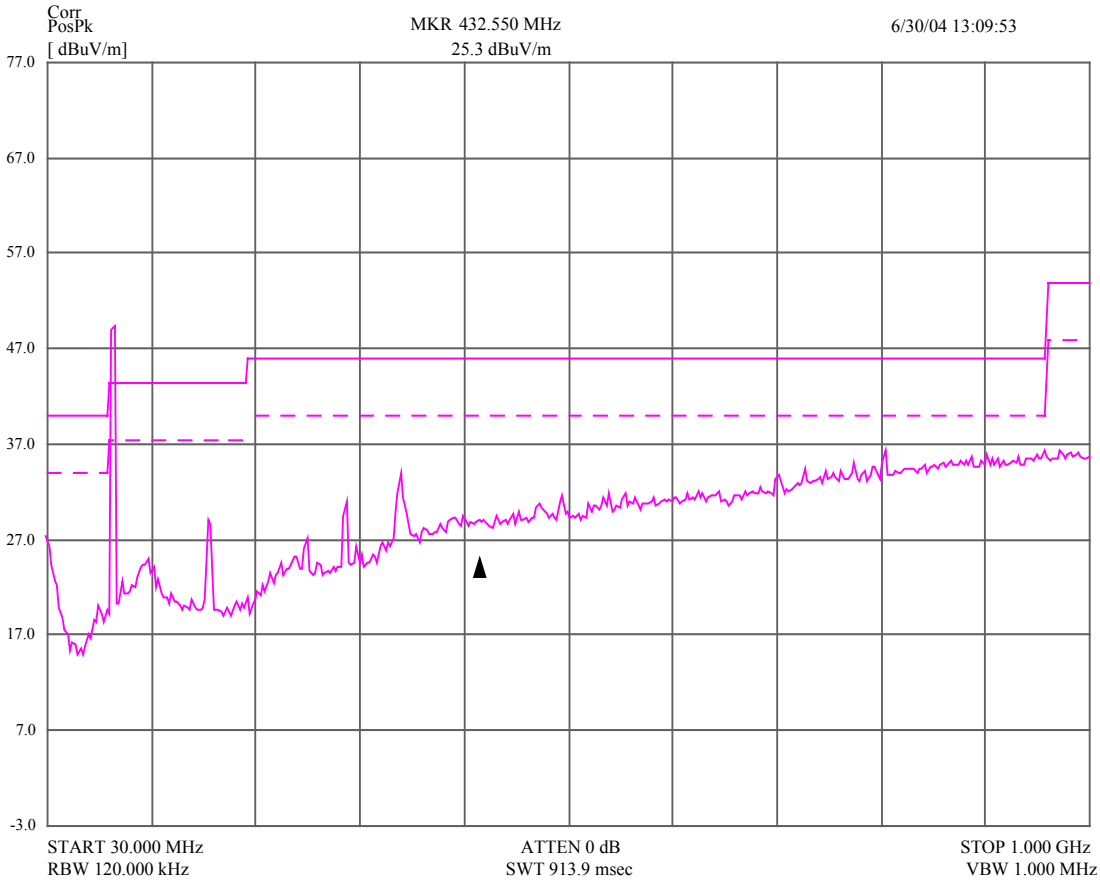
**Where: FS= field strength in dB (uV/m)**
**SA= receiver amplitude in dB (uV)**
**CL= cable attenuation in (dB)**
**AF= antenna factor in (dB)**
**AG= amplifier gain**

Measurements expanded uncertainty equals 3.26 dB with 95% confidence level.

## 6.1. Channel 88.1 MHz

| Frequency MHz | QP dBuV/m | QP Lmt dBuV/m | DelLim-QP dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 176.227504 | 27.42 | 43.50 | -16.08 | Horz | 232 | 43 | PASS |
| 300.693760 | 22.69 | 46.00 | -23.31 | Horz | 97 | 342 | PASS |
| 352.672000 | 29.57 | 46.00 | -16.43 | Horz | 97 | 245 | PASS |
| 801.861760 | 29.40 | 46.00 | -16.60 | Horz | 244 | 129 | PASS |

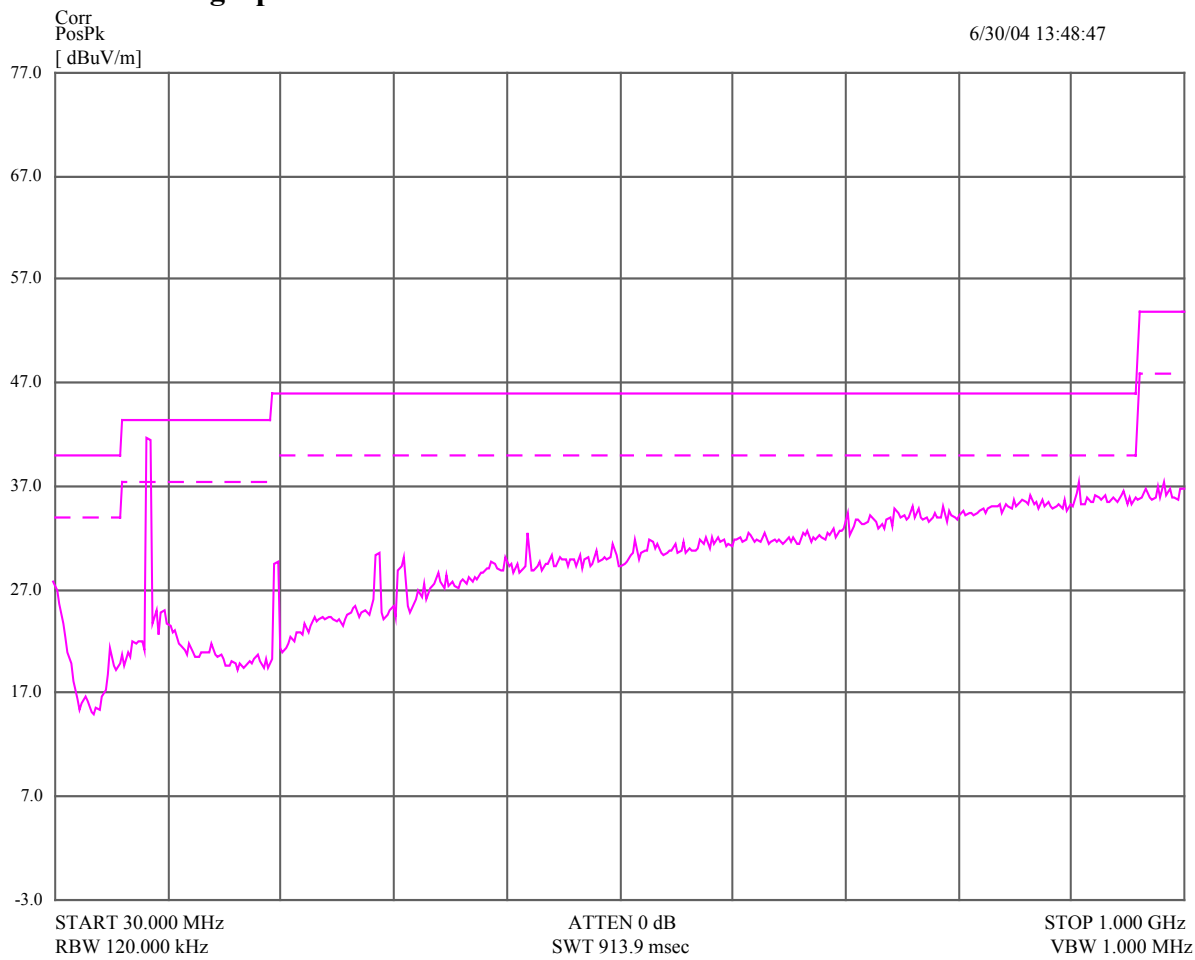
### Receiver graph of Radiated Emissions at 3 m



## 6.2. Channel 107.5 MHz

| Frequency MHz | QP dBuV/m | QP Lmt dBuV/m | DelLim-QP dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 214.840256 | 27.99 | 43.50 | -15.51 | Horz | 154 | 38 | PASS |
| 300.690496 | 25.63 | 46.00 | -20.37 | Horz | 281 | 70 | PASS |
| 322.733760 | 25.63 | 46.00 | -20.37 | Horz | 97 | 238 | PASS |
| 430.028736 | 27.62 | 46.00 | -18.38 | Horz | 97 | 258 | PASS |

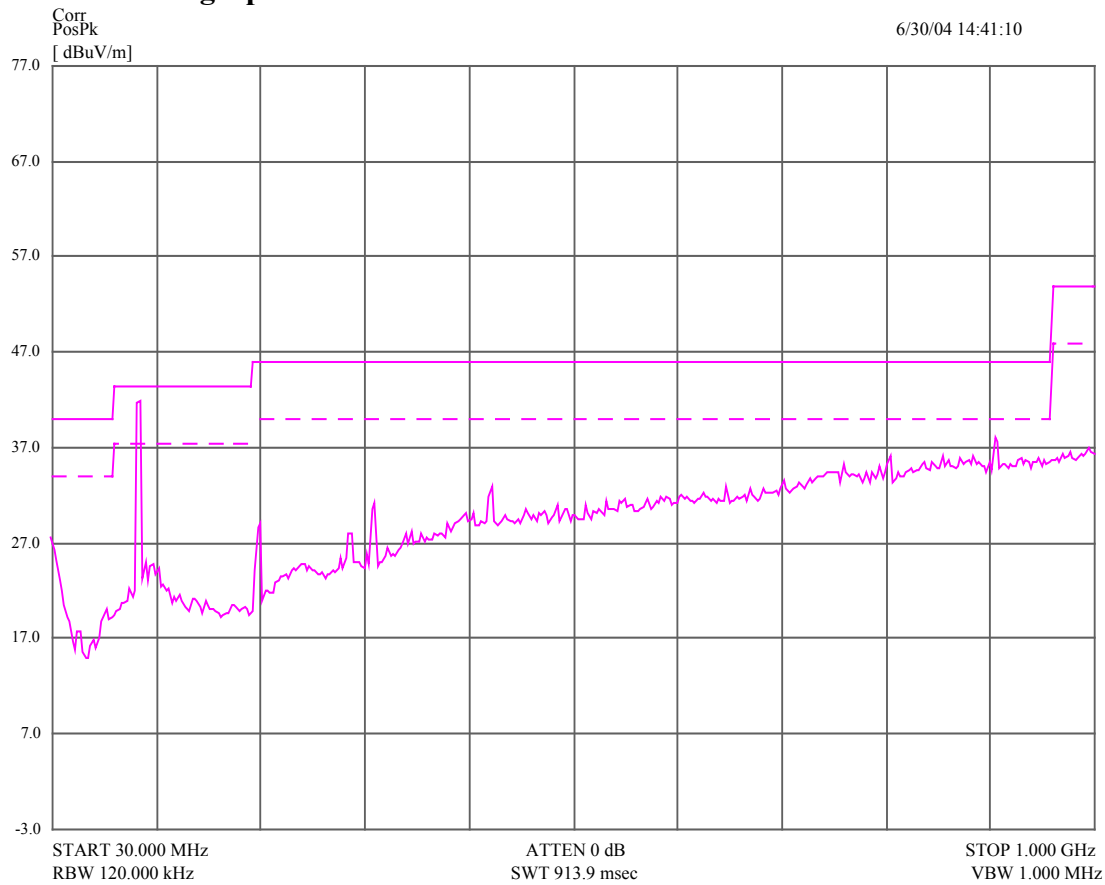
**Receiver graph of Radiated Emissions at 3 m**



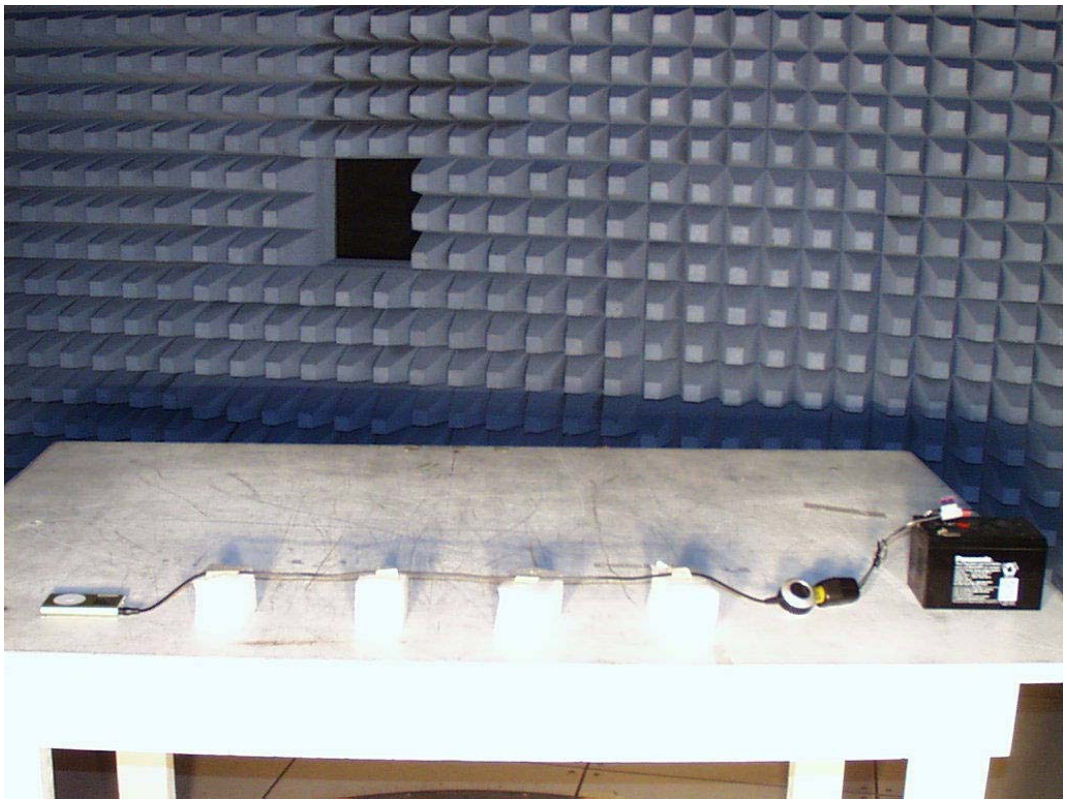
## 6.3. Channel 107.9 MHz

| Frequency MHz | QP dBuV/m | QP Lmt dBuV/m | DelLim-QP dB | Pol | Hgt cm | Angle deg | Status |
|---|---|---|---|---|---|---|---|
| 215.806256 | 28.43 | 43.50 | -15.07 | Horz | 155 | 43 | PASS |
| 300.684992 | 24.36 | 46.00 | -21.64 | Horz | 251 | 178 | PASS |
| 323.708736 | 28.31 | 46.00 | -17.69 | Horz | 97 | 325 | PASS |
| 431.612512 | 28.51 | 46.00 | -17.49 | Horz | 97 | 136 | PASS |
| 902.040000 | 27.59 | 46.00 | -18.41 | Horz | 282 | 40 | PASS |

**Receiver graph of Radiated Emissions at 3 m**



## 6.4 Photographs of Test Set-Up



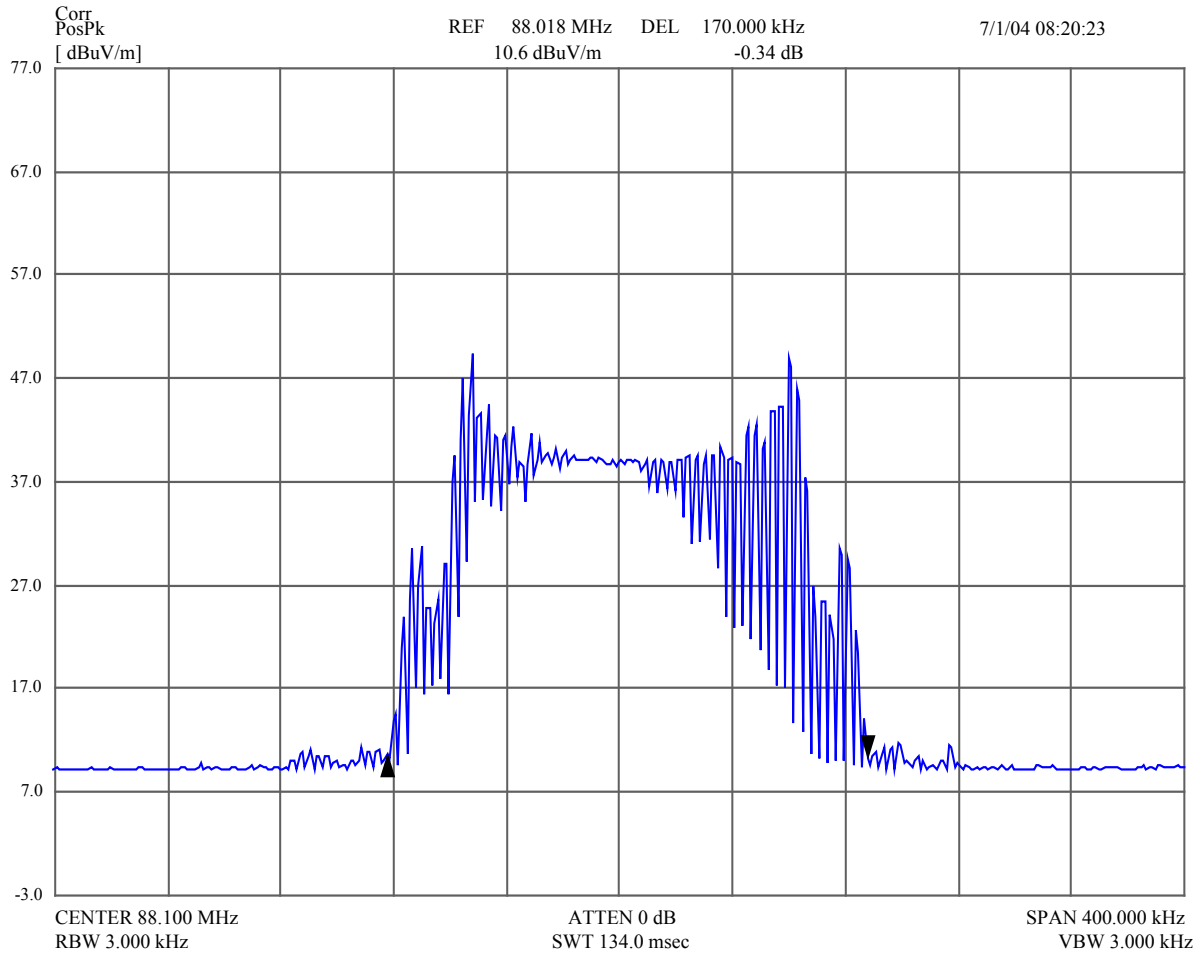
## 7.0 Occupied channel bandwidth

| | |
|---|---|
| **Test Requirements:** | **FCC Part 15 : Subclause 15.239** |
| **Test Method:** | **ANSI C63.4: 2000** |
| | **FCC Part 2 : Subclause 2.1049 © (1)** |
| **Limit :** | **200 kHz** |

The channel Bandwidth (BW) is defined as the minimum declared bandwidth within which the transmitter's necessary bandwidth can be contained.

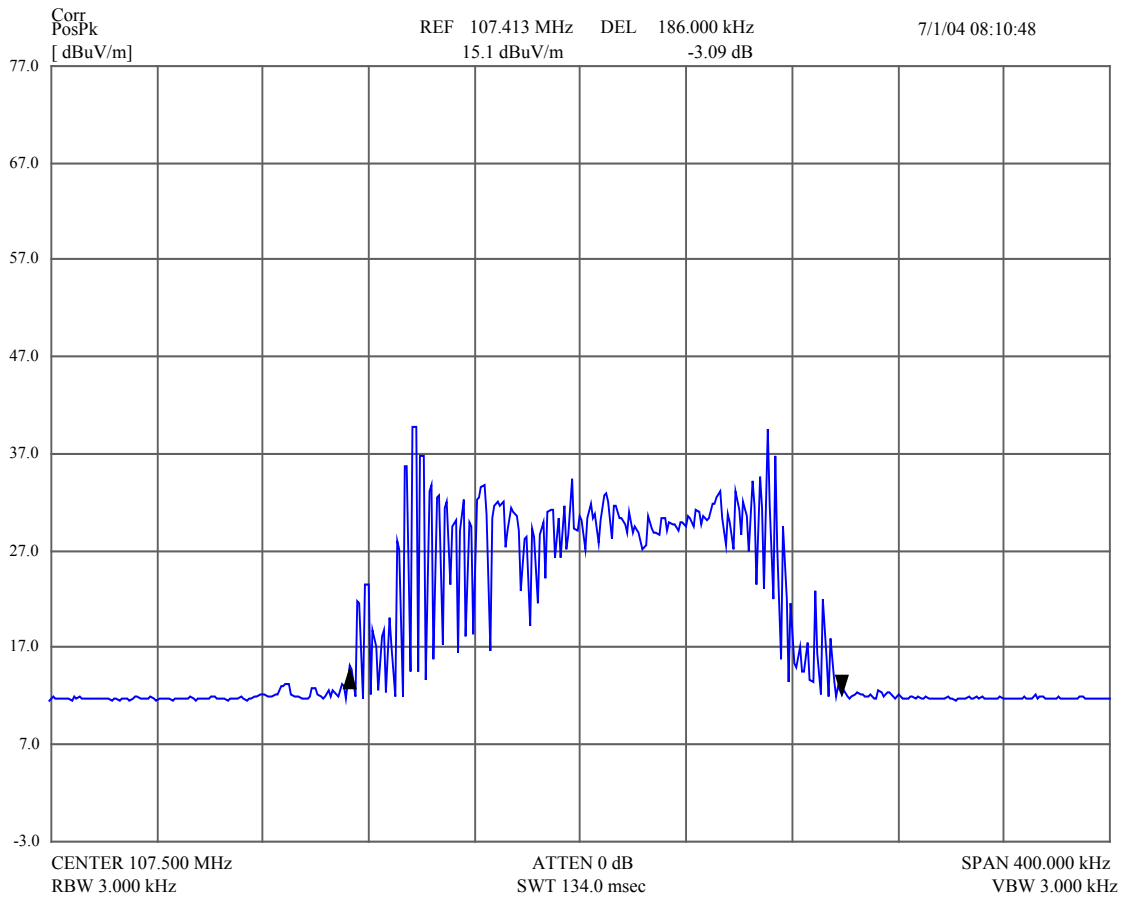
1. The Transmitter was adjusted to work at the selected channels –88.1 MHz, 107.5 MHz and 107.9 MHz. All measurements were conducted by the HP 85462A Spectrum Analyzer;
2. The test Signal generator HP651B was connected to the audio input of the EUT. The fundamental frequency is modulated by 1 kHz sinewave with input level equals to the limiting threshold
3. The Channel BW was measured at an amplitude level reduced from the reference level by the 26 dB. :

## 7.1. Channel 88.1 MHz



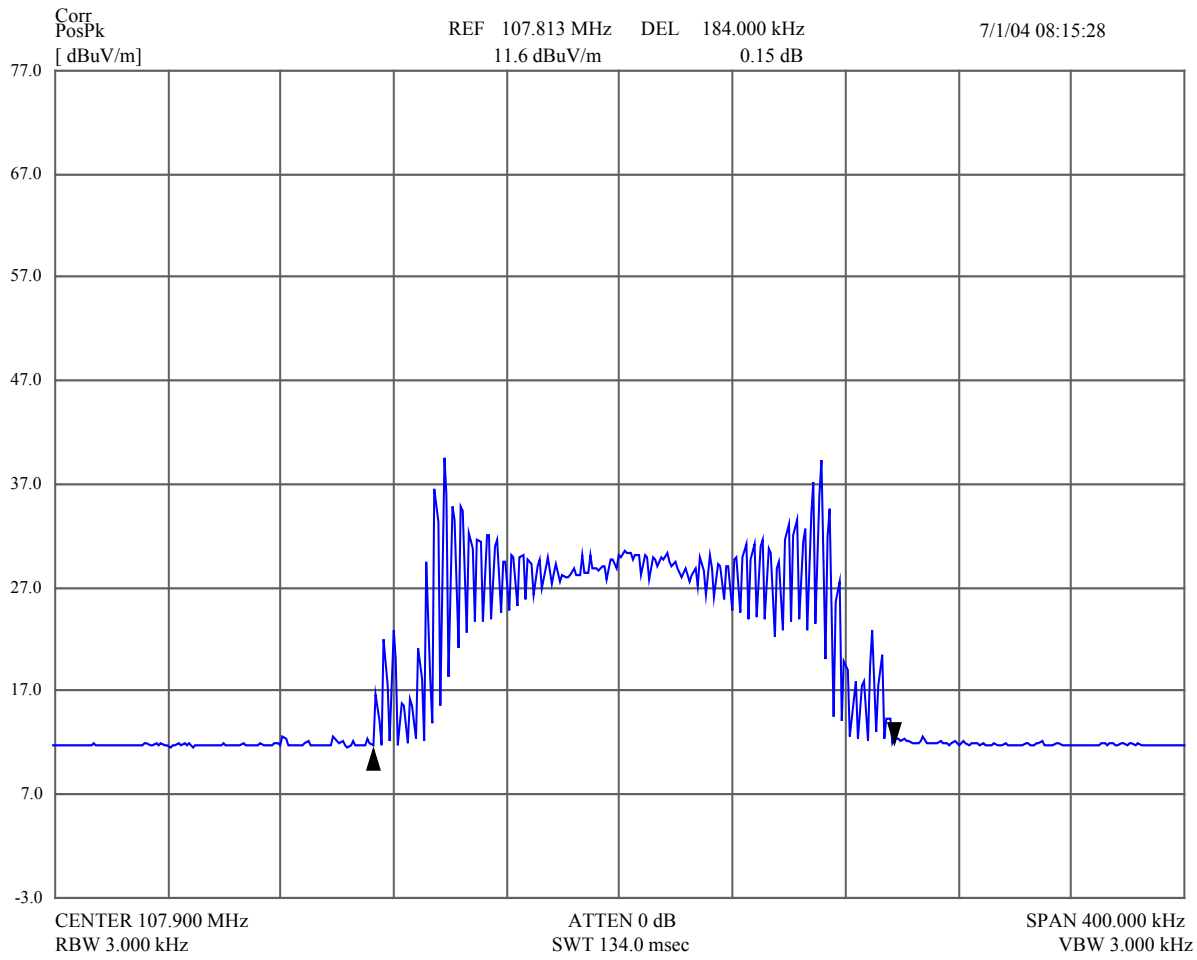

**The plot shows the 26 dB bandwidth equals 170 kHz**

## 7.2. Channel 107.5 MHz




**The plot shows the 26 dB bandwidth equals 186 kHz**

## 7.3. Channel 107.9 MHz




**The plot shows the 26 dB bandwidth equals 184 kHz**

## 7.4 Photographs of Test Set-Up