# FCC CFR47 PART 15 SUBPART C
# CERTIFICATION
# TEST REPORT

**FOR**

**FM TRANSMITTER**

**MODEL NUMBER: F-FM96MCU**

**FCC ID: UY6-FFM96MCU**

**REPORT NUMBER: 07J10798-1, REVISION B**

**ISSUE DATE: FEBRUARY 23, 2007**

*Prepared for*

**TOHNICHI MFG. CO., LTD**
**2-12 OMORI-KITA 2-CHOME, OTA-KU**
**TOKYO 143-0016, JAPAN**

*Prepared by*

**COMPLIANCE CERTIFICATION SERVICES**
**47173 BENICIA STREET**
**FREMONT, CA 94538, U.S.A.**
**TEL: (510) 771-1000**
**FAX: (510) 661-0888**

NVLAP LAB CODE 200065-0

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| -- | 02/09/07 | Initial Issue | T.C. |
| B | 02/23/07 | Revised Section 5.1 and 5.2 per reviewer's comments. | T.C. |

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** TOHNICHI MFG. CO., LTD
2-12, OMORI-KITA 2-CHOME
OTA-KU, TOKYO, 143-0016, JAPAN

**EUT DESCRIPTION:** FM TRANSMITTER

**MODEL:** F-FM96MCU

**SERIAL NUMBER:** CCS01841

**DATE TESTED:** JANUARY 25 & FEBRUARY 08, 2007

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| FCC PART 15 SUBPART C | NO NON-COMPLIANCE NOTED |

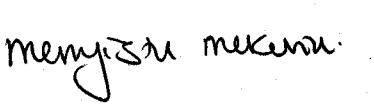
Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note**: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



MENGISTU MEKURIA
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Radiated Emission, 30 to 200 MHz | +/- 3.3 dB |
| Radiated Emission, 200 to 1000 MHz | +4.5 / -2.9 dB |
| Radiated Emission, 1000 to 2000 MHz | +4.5 / -2.9 dB |
| Power Line Conducted Emission | +/- 2.9 dB |

Uncertainty figures are valid to a confidence level of 95%.

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is an F-FM96MCU FM Transmitter which is utilized in TOHNICHI torque wrenches. The transmitter sends the tightening completion signal to the Receiver from the wrench using FM wave. The operating frequency is determined by a crystal; available frequencies are 41.025, 41.050, 41.075, 41.100, 41.125, 41.150, 41.175, 41.200, 41.225,41.250, 41.275, 41.300MHz. The sample tested was fitted with a 41.148 MHz crystal.

## 5.2. GENERAL INFORMATION

| | |
|---|---|
| CHASSIS MATERIAL | METAL |
| ENCLOSURE MATERIAL | METAL |
| POWER REQUIREMENTS | 1.5 VDC |
| POWERLINE FILTER MANUFACTURER AND MODEL | N/A |
| LIST OF ALL OSCILLATOR FREQUENCIES<br>GREATER THAN OR EQUAL TO 9 kHz | 480kHz , 13MHz, 41.148MHz*<br>* Applied to tested sample, see section 5.1 above |

## 5.3. PRELIMINARY TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

| EUT Configuration | Description |
|---|---|
| STAND ALONE | EUT CONTINUIOUSLY TRANSMIT MODE at X and Y antenna positions |

The worst-case configuration was determined to be EUT at Y position.

## 5.4. MODE(S) OF OPERATION

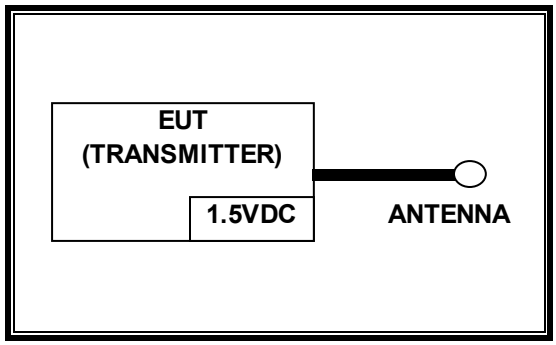
| Mode | Description |
|---|---|
| NORMAL | CONTINUIOUSLY TRANSMIT MODE |

## 5.5. MODIFICATIONS

No modifications were made during testing.

## 5.6. DETAILS OF TESTED SYSTEM

**TEST SETUP DIAGRAM**



# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **Cal Due** |
| Quasi-Peak Adaptor | Agilent / HP | 85650A | 2521A01038 | 01/11/08 |
| SA Display Section 2 | Agilent / HP | 85662A | 2816A16696 | 04/07/08 |
| SA RF Section, 1.5 GHz | Agilent / HP | 85680B | 2814A04227 | 01/07/08 |
| Preamp 30-1000MHz | Sonoma Instrument | 310N | 185623 | 01/20/08 |
| EMI Receiver, 9 kHz ~ 2.9 GHz | Agilent / HP | 8542E | 3942A00286 | 02/04/07 |
| RF Filter Section | Agilent / HP | 85420E | 3705A00256 | 02/04/07 |
| Antenna, Bilog 30 MHz ~ 2 Ghz | Sunol Sciences | JB1 | A121003 | 08/13/07 |

# 7. APPLICABLE LIMITS AND TEST RESULTS

## 7.1. RADIATED EMISSIONS

**TEST PROCEDURE**

ANSI C63.4

The highest clock frequency generated or used in the EUT is 41.148 MHz, therefore the frequency range was investigated from 30 MHz to 1000 MHz.

**LIMITS**

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | | | |

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 30 - 88 | 100 ** | 3 |
| 88 - 216 | 150 ** | 3 |
| 216 - 960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

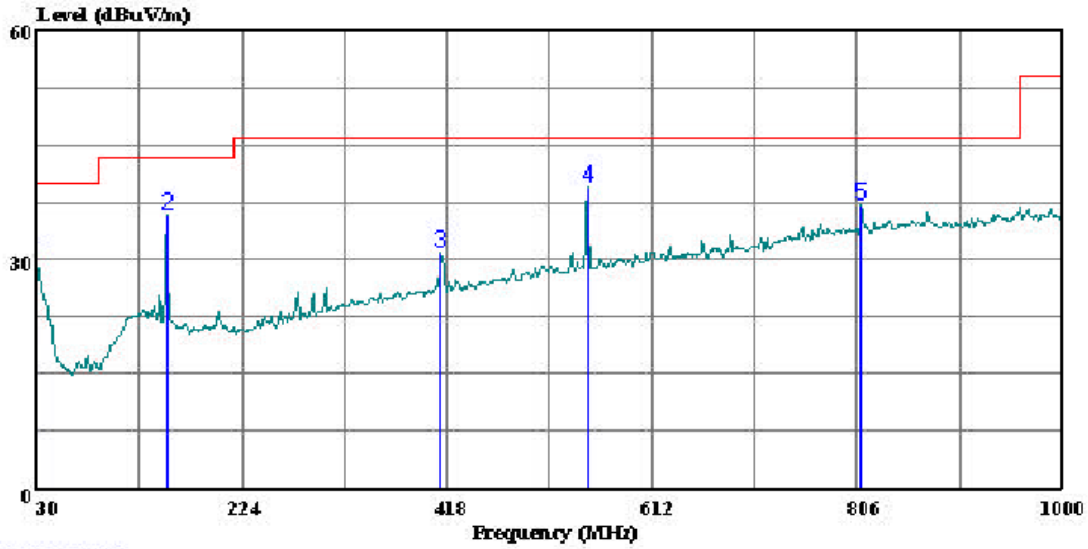
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

**SPURIOUS EMISSIONS 30 TO 1000 MHz (EUT Antenna @ X POSITION, HORIZONTAL)**

COMPLIANCE Engineering Services, Inc.
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1052
Fax: (510) 661-0888

Data#: 6 File#: 07J10799.EMI Date: 01-25-2007 Time: 19:33:14




Trace: 5 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : Mengistu Mekuria
Company: : Tohnichi Mfg. Co., Ltd.
Project #: : 07J10798
Configuration: : EUT Alone
Mode of Operation:: Tx
Target: : FCC Class B

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| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 30.970 | 6.73 | 22.65 | 29.38 | 40.00 | -10.62 | Peak |
| 2 | 153.190 | 21.55 | 14.19 | 35.74 | 43.50 | -7.76 | Peak |
| 3 | 412.180 | 12.32 | 18.48 | 30.80 | 46.00 | -15.20 | Peak |
| 4 | 550.890 | 18.38 | 21.23 | 39.61 | 46.00 | -6.39 | Peak |
| 5 | 809.880 | 12.29 | 24.96 | 37.25 | 46.00 | -8.75 | Peak |

**SPURIOUS EMISSIONS 30 TO 1000 MHz (EUT Antenna @ X POSITION, VERTICAL)**

COMPLIANCE Engineering Services, Inc.
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1052
Fax: (510) 661-0888

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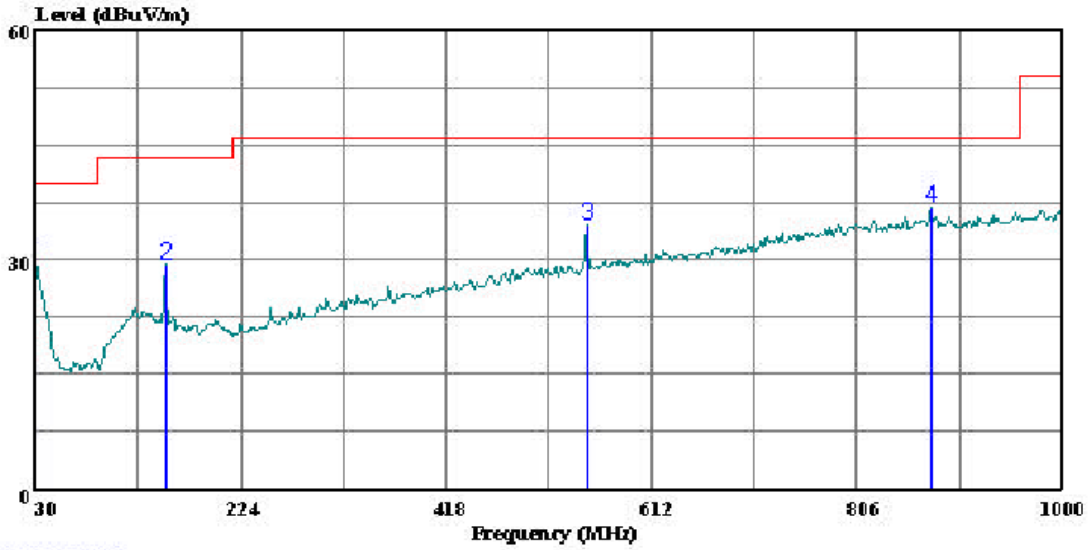


Trace: 7 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Mengistu Mekuria
Company: : Tohnichi Mfg. Co., Ltd.
Project #: : 07J10798
Configuration: : EUT Alone
Mode of Operation:: Tx
Target: : FCC Class B

Page: 1

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 30.970 | 6.73 | 22.65 | 29.38 | 40.00 | -10.62 | Peak |
| 2 | 153.190 | 15.17 | 14.19 | 29.36 | 43.50 | -14.14 | Peak |
| 3 | 550.890 | 13.19 | 21.23 | 34.42 | 46.00 | -11.58 | Peak |
| 4 | 875.840 | 10.95 | 25.85 | 36.80 | 46.00 | -9.20 | Peak |

**SPURIOUS EMISSIONS 30 TO 1000 MHz (EUT Antenna @ Y POSITION, HORIZONTAL)**

Compliance Certification Services
47173 BENICIA STREET
FREMONTl, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

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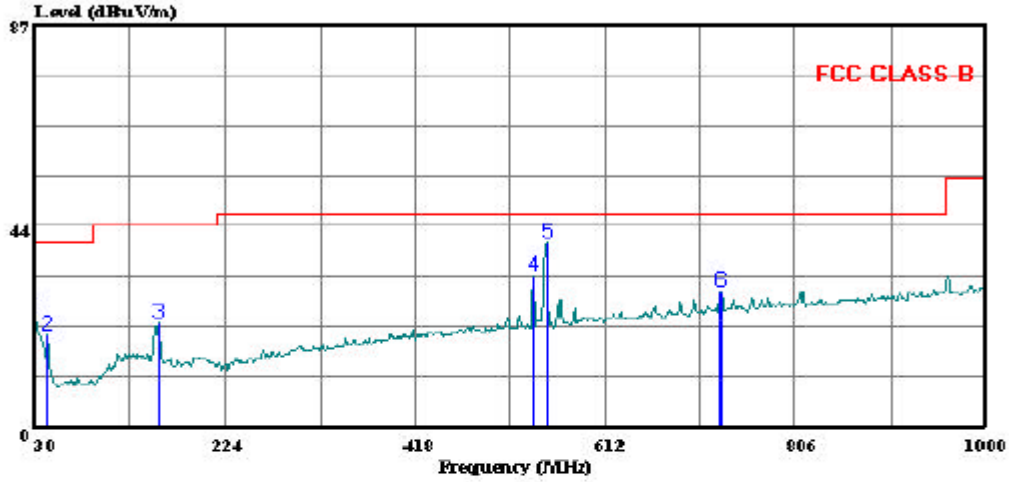


Trace: 3 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator : Mengistu Mekuria
Project # : 07U10798
Company : Tohchini
EUT : FM Transmitter
Configuration : EUT with antenna at Y position
Mode of operation: Tx Mode
Standard : FCC Class B

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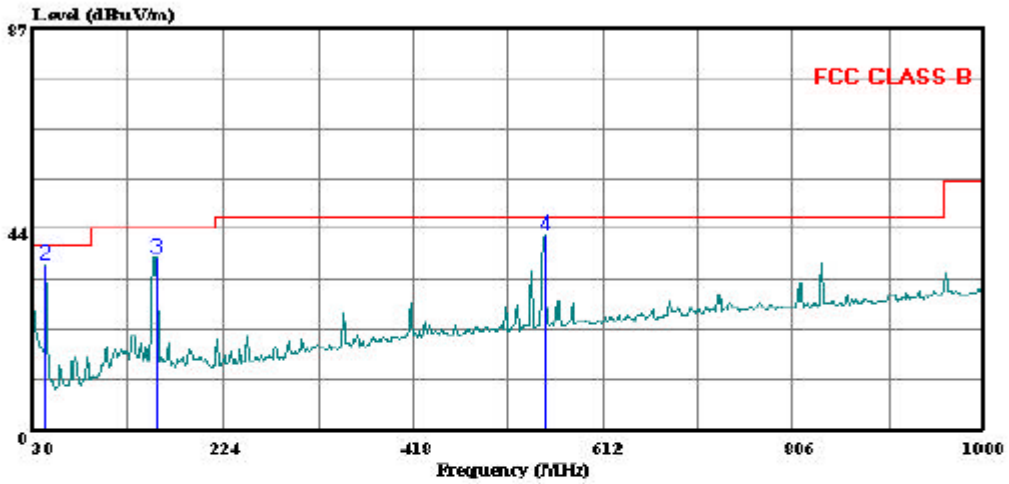
| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 30.000 | 32.91 | -9.13 | 23.78 | 40.00 | -16.22 | Peak |
| 2 | 43.580 | 38.07 | -18.14 | 19.93 | 40.00 | -20.07 | Peak |
| 3 | 155.130 | 40.39 | -17.63 | 22.77 | 43.50 | -20.74 | Peak |
| 4 | 538.280 | 43.31 | -10.71 | 32.60 | 46.00 | -13.40 | Peak |
| 5 | 552.830 | 50.37 | -10.53 | 39.84 | 46.00 | -6.16 | Peak |
| 6 | 730.340 | 37.08 | -7.72 | 29.36 | 46.00 | -16.64 | Peak |

**SPURIOUS EMISSIONS 30 TO 1000 MHz (EUT Antenna @ Y POSITION, VERTICAL)**

Compliance Certification Services
47173 BENICIA STREET
FREMONT, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 8 File#: Tohnichi.EMI 02-08-2007 Time: 19:26:50




Trace: 7 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator : Mengistu Mekuria
Project # : 07U10798
Company : Tohnichi
EUT : FM Transmitter
Configuration : EUT with antenna at vertical position
Mode of operation: Tx Mode
Standard : FCC Class B

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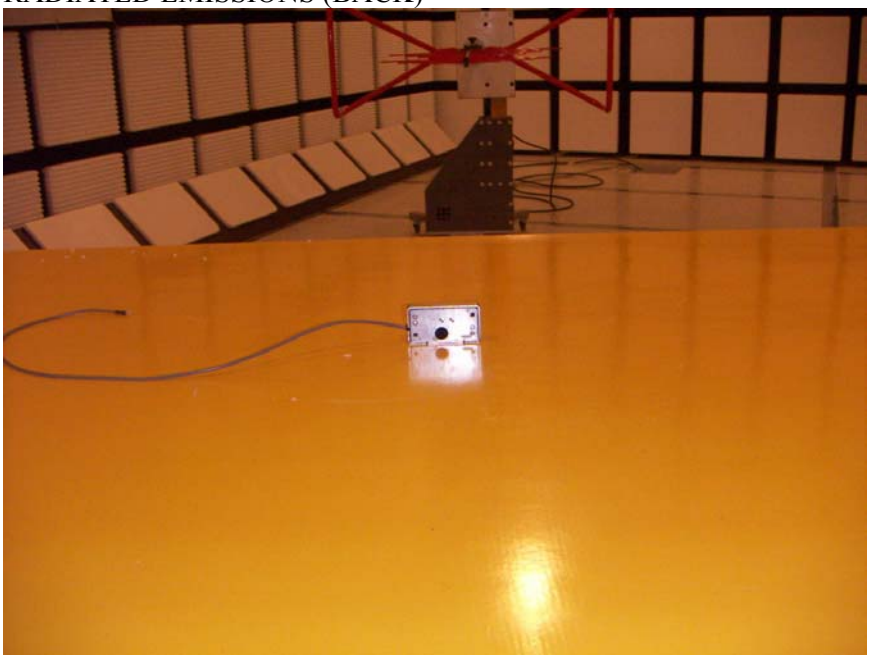
| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 30.000 | 43.27 | -9.13 | 34.14 | 40.00 | -5.86 | Peak |
| 2 | 43.580 | 53.98 | -18.14 | 35.84 | 40.00 | -4.16 | Peak |
| 3 | 155.130 | 55.00 | -17.63 | 37.38 | 43.50 | -6.13 | Peak |
| 4 | 552.830 | 52.81 | -10.53 | 42.28 | 46.00 | -3.72 | Peak |

# 8. SETUP PHOTOS

**RADIATED EMISSION (X POSITION)**

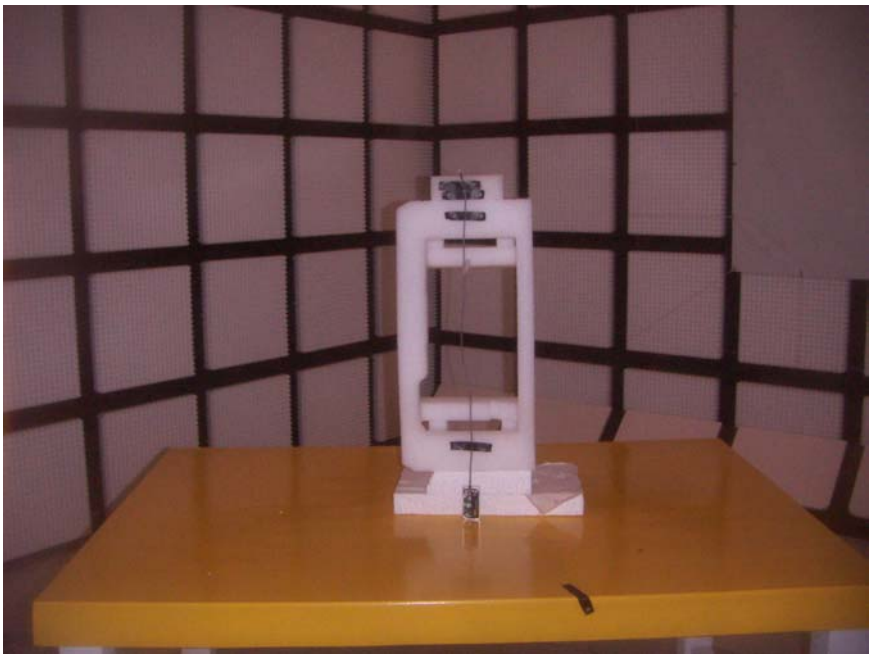
RADIATED EMISSIONS (FRONT)

RADIATED EMISSIONS (BACK)

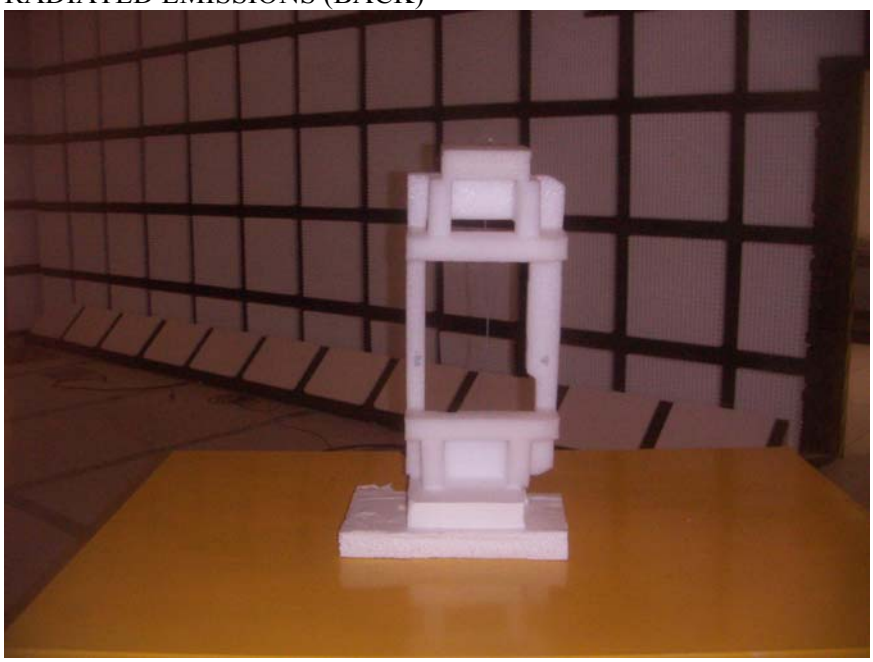


**RADIATED EMISSION (Y POSITION)**

RADIATED EMISSIONS (FRONT)



RADIATED EMISSIONS (BACK)



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