**Shenzhen Huatongwei International Inspection Co., Ltd.**
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
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# TEST REPORT

| | | |
|---|---|---|
| **Report Reference No. ..... :** | **TRE1411001801** | **R/C……: 43921** |
| **FCC ID ..... :** | **YAMMD65XU2** | |
| **Applicant's name ..... :** | **Hytera Communications Co.,Ltd** | |
| Address.....: | HYT Tower, Hi-Tech Industrial Park North, Nanshan District, Shenzhen China | |
| **Manufacturer.....:** | **Hytera Communications Co.,Ltd** | |
| Address.....: | HYT Tower,Hi-Tech Industrial Park North, Nanshan District, Shenzhen China | |
| **Test item description ..... :** | **Digital Mobile Radio** | |
| Trade Mark .....: | Hytera | |
| Model/Type reference.....: | MD650 U(2) | |
| Listed Model(s) .....: | MD652 U(2), MD655 U(2), MD656 U(2), MD658 U(2) | |
| **Standard ..... :** | **FCC Part 90/FCC Part 2/ FCC Part 15B** | |
| Date of receipt of test sample……..: | Nov 13, 2014 | |
| Date of testing……: | Nov 13, 2014- Nov 27, 2014 | |
| Date of issue……...: | Nov 27, 2014 | |
| **Result..... ……..:** | **PASS** | |

| | | |
|---|---|---|
| Compiled by ( position+printed name+signature)..: | File administrators Yingchun Shan | Yingchun Shan |
| Supervised by ( position+printed name+signature)..: | Project Engineer Cary Luo | Cary Luo |
| Approved by ( position+printed name+signature)..: | RF Manager Hans Hu | Hans Hu |

| | |
|---|---|
| **Testing Laboratory Name ..... :** | **Shenzhen Huatongwei International Inspection Co., Ltd** |
| Address.....: | Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China |

# Contents

# 1. TEST STANDARDS AND TEST DESCRIPTION

## 1.1. Test Standards

The tests were performed according to following standards:
FCC Rules Part 90 :2014 Private land mobile radio services.
TIA/EIA 603 D:June 2010 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
FCC Part 15 Subpart B:2014 Unintentional Radiators
FCC Part 2: 2014 Frequency allocations and radio treaty matters, general rules and regulations.
KDB579009 D01 v03r01: Questions and Answers on Re-farming Part 90 frequencies
KDB 579009 D02 v01r02 :Transition Summary Table

## 1.2. Test Description

| Test specification clause | Test case | Verdict |
|---|---|---|
| FCC Part 15.207 | Conducted Emission | PASS |
| FCC Part 90.205 | Maximum Transmitter Power | PASS |
| FCC Part 90.207 | Modulation Characteristic | PASS |
| FCC Part 90.209 | Occupied Bandwidth | PASS |
| FCC Part 90.210 | Emission Mask | PASS |
| FCC Part 90.213 | Frequency Stability | PASS |
| FCC Part 90.214 | Transmitter Frequency Behavior | PASS |
| FCC Part 90.210 | Transmitter Radiated Spurious Emssion | PASS |
| FCC Part 90.210 | Spurious Emssion On Antenna Port | PASS |
| FCC Part 15.109 | Receiver Radiated Spurious Emssion | PASS |

Remark: 1.The measurement uncertainty is not included in the test result.

# 2. SUMMARY

## 2.1. Client Information

| | |
|---|---|
| Applicant: | Hytera Communications Co.,Ltd |
| Address: | HYT Tower, Hi-tech Industrial Park North,Nanshan District, Shenzhen China |
| Manufacturer: | Hytera Communications Co.,Ltd |
| Address: | HYT Tower, Hi-tech Industrial Park North,Nanshan District, Shenzhen China |

## 2.2. Product Description

| | | |
|---|---|---|
| Name of EUT | Digital Mobile Radio | |
| Trade Mark: | Hytera | |
| Model/Type reference: | MD650 U(2) | |
| Listed Model(s): | MD652 U(2), MD655 U(2), MD656 U(2), MD658 U(2) | |
| Power supply: | DC 13.6V | |
| Charger information: | / | |
| Adapter information: | / | |
| Operation Frequency: | From 450MHz to 527MHz | |
| Rated Output Power: | 25 Watts(43.98dBm)/1 Watts(30.00dBm) | |
| Support data rate: | 9.6kbps | |
| Modilation Type: | FM for Analog Voice | |
| | 4FSK for Digital Voice / Digital Data | |
| Channel Separation: | Analog Voice | 12.5KHz,25KHz |
| | Digital Voice/Data | 12.5KHz |
| | Digital Data | 12.5KHz |
| Antenna Type: | External | |

Note: The product has the same digital working characters when operating in both two digitized voice/data mode. So only one set of test results for digital modulation modes are provided in this test report.

Test frequency list

| Modulation Type | Channel Separation | Test Frequency (MHz) |
|---|---|---|
| Analog/FM | 12.5KHz | 450.5 |
| | | 488.5 |
| | | 526.5 |
| | 25KHz | 450.5 |
| | | 488.5 |
| | | 526.5 |
| Digital/4FSK | 12.5KHz | 450.5 |
| | | 488.5 |
| | | 526.5 |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above listed frequency for testing.

## 2.3. EUT operation mode

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

| EUT operation mode no. | Description of operation mode | Additional information |
|---|---|---|
| Op 1 | FM+BW12.5KHz+TX | The equipment is set with FM modulation and 12.5KHz bandwidth at maximum rated power for transmitter,powered by DC 13.60V |
| Op 2 | FM+BW12.5KHz+TX | The equipment is set with FM modulation and 12.5KHz bandwidth at minimum rated power for transmitter,powered by DC 13.60V |
| Op 3 | FM+BW25KHz+TX | The equipment is set with FM modulation and 25KHz bandwidth at maximum rated power for transmitter,powered by DC 13.60V |
| Op 4 | FM+BW25KHz+TX | The equipment is set with FM modulation and 25KHz bandwidth at minimum rated power for transmitter,powered by DC 13.60V |
| Op 5 | 4FSK+BW12.5KHz+TX | The equipment is set with 4FSK modulation and 12.5KHz bandwidth at maximum rated power for transmitter,powered by DC 13.60V |
| Op 6 | 4FSK+BW12.5KHz+TX | The equipment is set with 4FSK modulation and 12.5KHz bandwidth at minimum rated power for transmitter,powered by DC 13.60V |
| Op 7 | FM+BW12.5KHz+RX | The equipment is set with FM modulation and 12.5KHz bandwidth at receiver or standby,powered by DC 13.60V |
| Op 8 | FM+BW25KHz+RX | The equipment is set with FM modulation and 25KHz bandwidth at receiver or standby,powered by DC 13.60V |
| Op 9 | 4FSK+BW12.5KHz+RX | The equipment is set with 4FSK modulation and 12.5KHz bandwidth receiver or standby,powered by DC 13.60V |
| Op 10 | GPS | Gps Receiver Mode |

## 2.4. EUT configuration

**The following peripheral devices and interface cables were connected during the measurement:**

● - supplied by the manufacturer

○ - supplied by the lab

| | | | |
|---|---|---|---|
| ● | Power Cable | Length (m) : | 3.00 |
| | | Shield : | Unshielded |
| | | Detachable : | Undetachable |
| ○ | Multimeter | Manufacturer : | / |
| | | Model No. : | / |

## 2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID:YAMMD65XU2 filing to comply with FCC Part 90 rules.

## 2.6. Modifications

No modifications were implemented to meet testing criteria.

# 3. TEST ENVIRONMENT

## 3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

## 3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 01, 2012. Valid time is until Feb. 28, 2015.

### A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2015.

### FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date June. 01, 2012, valid time is until Jun. 01, 2015.

### IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 30, 2013, valid time is until Dec. 21, 2016.

### ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

### VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 23, 2013. Valid time is until Dec. 22, 2016.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 06, 2013. Valid time is until May 05, 2016.

### DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

## 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|---|---|
| Temperature: | 15~35°C |
| lative Humidity: | 30~60 % |
| Air Pressure: | 950~1050mba |

## 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

| Test Items | Measurement Uncertainty | Notes |
|---|---|---|
| Frequency stability | 25 Hz | (1) |
| Transmitter power conducted | 0.57 dB | (1) |
| Transmitter power Radiated | 2.20 dB | (1) |
| Conducted spurious emission 9KHz-40 GHz | 1.60 dB | (1) |
| Conducted Emission 9KHz-30MHz | 3.39 dB | (1) |
| Radiated Emission 30~1000MHz | 4.65 dB | (1) |
| Radiated Emissio 1~18GHz | 5.16 dB | (1) |
| Radiated Emissio 18-40GHz | 5.54 dB | (1) |
| Occupied Bandwidth | --------- | (1) |
| Emission Mask | --------- | (1) |
| Modulation Characteristic | --------- | (1) |
| Transmitter Frequency Behavior | --------- | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 3.5. Equipments Used during the Test

| AC Power Conducted Emission | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Last Cal.** |
| Artificial Mains | Rohde&Schwarz | ESH2-Z5 | 100028 | 2014/11/1 |
| EMI Test Receiver | Rohde&Schwarz | ESCS 30 | 100038 | 2014/11/1 |
| Pulse Limiter | Rohde&Schwarz | ESHSZ2 | 100044 | 2014/11/1 |
| EMI Test Software | Rohde&Schwarz | ES-K1 V1.71 | N/A | N/A |
| RF COMMUNICATION TEST SET | HP | 8920A | 3813A10206 | 2014/11/1 |

| DC Power Conducted Emission | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Last Cal.** |
| Artificial Mains | Rohde&Schwarz | ESH2-Z6 | 100210 | 2014/11/1 |
| Artificial Mains | Rohde&Schwarz | ESH2-Z6 | 100211 | 2014/11/1 |
| EMI Test Receiver | Rohde&Schwarz | ESCS 30 | 100038 | 2014/11/1 |
| Pulse Limiter | Rohde&Schwarz | ESHSZ2 | 100044 | 2014/11/1 |
| EMI Test Software | Rohde&Schwarz | ES-K1 V1.71 | N/A | N/A |
| RF COMMUNICATION TEST SET | HP | 8920A | 3813A10206 | 2014/11/1 |

| Modulation Characteristic | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Last Cal.** |
| RF COMMUNICATION TEST SET | HP | 8920A | 3813A10206 | 2014/11/1 |

| Frequency Stability | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Last Cal.** |
| RF COMMUNICATION TEST SET | HP | 8920A | 3813A10206 | 2014/11/1 |
| Signal Generator | Rohde&Schwarz | SMT03 | 100059 | 2014/11/1 |
| Climate Chamber | ESPEC | EL-10KA | 05107008 | 2014/11/1 |

| Transmitter Radiated Spurious Emssion | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Last Cal.** |
| Ultra-Broadband Antenna | Rohde&Schwarz | HL562 | 100015 | 2014/11/1 |
| EMI Test Receiver | Rohde&Schwarz | ESI 26 | 100009 | 2014/11/1 |
| RF Test Panel | Rohde&Schwarz | TS / RSP | 335015/ 0017 | N/A |
| HORN ANTENNA | Rohde&Schwarz | HF906 | 100039 | 2014/11/1 |
| Turntable | ETS | 2088 | 2149 | N/A |
| Antenna Mast | ETS | 2075 | 2346 | N/A |
| EMI Test Software | Rohde&Schwarz | ES-K1 V1.71 | N/A | N/A |
| RF COMMUNICATION TEST SET | HP | 8920A | 3813A10206 | 2014/11/1 |
| Ultra-Broadband Antenna | ShwarzBeck | VULB9163 | 538 | 2014/11/1 |
| Ultra-Broadband Antenna | ShwarzBeck | VULB9163 | 539 | 2014/11/1 |
| HORN ANTENNA | ShwarzBeck | 9120D | 1012 | 2014/11/1 |
| HORN ANTENNA | ShwarzBeck | 9120D | 1011 | 2014/11/1 |
| TURNTABLE | MATURO | TT2.0 | ---- | N/A |
| ANTENNA MAST | MATURO | TAM-4.0-P | ---- | N/A |

| **Maximum Transmitter Power & Spurious Emssion On Antenna Port & Occupied Bandwidth & Emission Mask** | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Last Cal.** |
| Receiver | Rohde&Schwarz | ESI 26 | 100009 | 2014/11/1 |
| Attenuator | R&S | ESH3-22 | 100449 | 2014/11/1 |
| RF COMMUNICATION TEST SET | HP | 8920A | 3813A10206 | 2014/11/1 |
| High-Pass Filter | Anritsu | MP526B | 6220875256 | 2014/11/1 |
| High-Pass Filter | Anritsu | MP526D | 6220878392 | 2014/11/1 |
| Spectrum Analzyer | Aglient | E4407B | MY44210775 | 2014/11/1 |
| Spectrum Analzyer | Rohde&Schwarz | FSP40 | 1164.4391.40 | 2014/11/1 |

| **Transient Frequency Behavior** | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Last Cal.** |
| Signal Generator | Rohde&Schwarz | SMT03 | 100059 | 2014/11/1 |
| Storage Oscilloscope | Tektronix | TDS3054B | B033027 | 2014/11/1 |
| RF COMMUNICATION TEST SET | HP | 8920A | 3813A10206 | 2014/11/1 |

The calibration interval was one year.

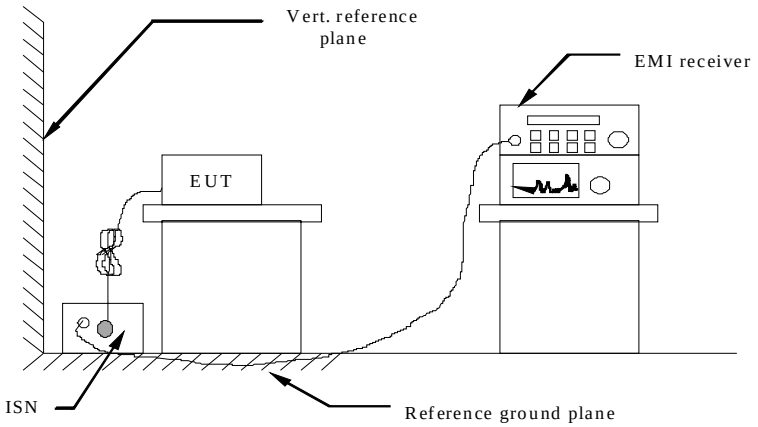
# 4. TEST CONDITIONS AND RESULTS

## 4.1. Conducted Emissions Test

### TEST APPLICABLE

The EUT was tested according to ANSI C63.4 - 2009. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 u Henry as specified by section 5.1 of ANSI C63.4 - 2009. Cables and peripherals were moved to find the maximum emission levels for each frequency.

### TEST CONFIGURATION




### TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2009.
2 Support equipment, if needed, was placed as per ANSI C63.4-2009.
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009.
4 If a EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 If a EUT received DC 13.60V power through a Impedance Stabilization Network (ISN) which supplied power source and was grounded to the ground plane.
6 All support equipments received AC power from a second LISN, if any.
7 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
8 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
9 During the above scans, the emissions were maximized by cable manipulation.

### Conducted Power Line Emission Limit

For intentional device, according to § 15.207(a) for Conducted Emission Limits is as following:

| Frequency of Emission (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreasing linearly with the logarithm of the frequency

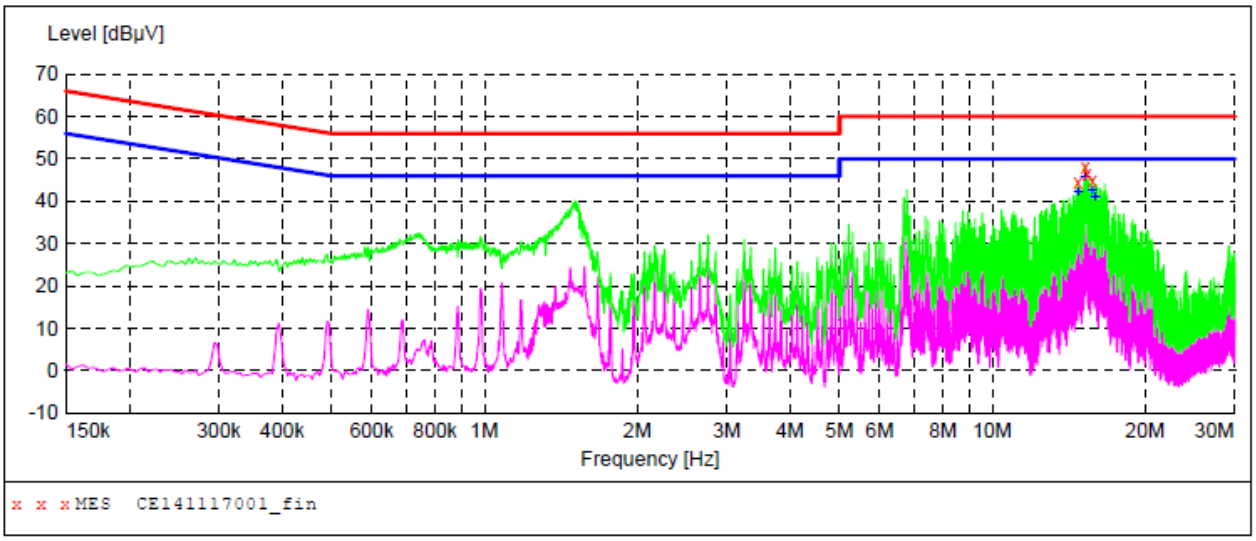
**TEST RESULTS**

Remark: we tested all Op 1 to Op 10, recorded worst case at Op 1,Op 3,Op 5, and Op 10.

| Test mode: | Op 1 | Polarization | + |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M) FIN"***

Short Description: 150K-30M Voltage




***MEASUREMENT RESULT: "CE141117001_fin"***

11/17/2014 10:35AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 44.40 | 10.4 | 60 | 15.6 | QP | + | GND |
| 15.246000 | 48.20 | 10.4 | 60 | 11.8 | QP | + | GND |
| 15.346000 | 46.60 | 10.4 | 60 | 13.4 | QP | + | GND |
| 15.738000 | 45.00 | 10.4 | 60 | 15.0 | QP | + | GND |

***MEASUREMENT RESULT: "CE141117001_fin2"***

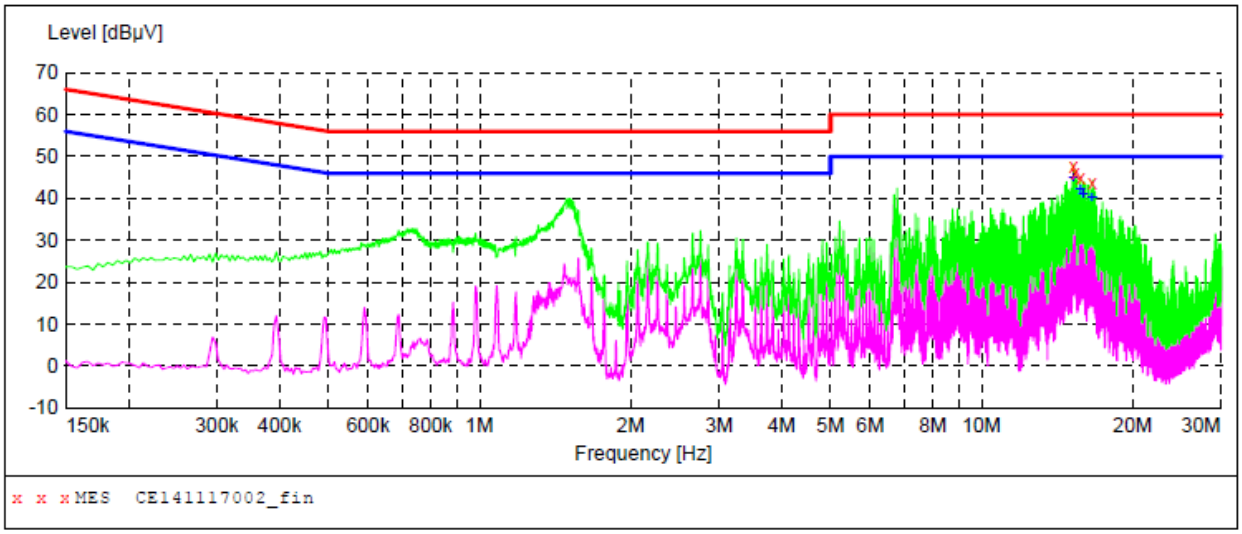
11/17/2014 10:35AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 42.20 | 10.4 | 50 | 7.8 | AV | + | GND |
| 15.246000 | 45.60 | 10.4 | 50 | 4.4 | AV | + | GND |
| 15.738000 | 42.50 | 10.4 | 50 | 7.5 | AV | + | GND |
| 15.934000 | 41.00 | 10.4 | 50 | 9.0 | AV | + | GND |

| Test mode: | Op 1 | Polarization | - |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M) FIN"***

Short Description: 150K-30M Voltage




***MEASUREMENT RESULT: "CE141117002_fin"***

11/17/2014 10:50AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 15.246000 | 47.70 | 10.4 | 60 | 12.3 | QP | - | GND |
| 15.346000 | 46.10 | 10.4 | 60 | 13.9 | QP | - | GND |
| 15.738000 | 44.70 | 10.4 | 60 | 15.3 | QP | - | GND |
| 16.622000 | 43.70 | 10.4 | 60 | 16.3 | QP | - | GND |

***MEASUREMENT RESULT: "CE141117002_fin2"***

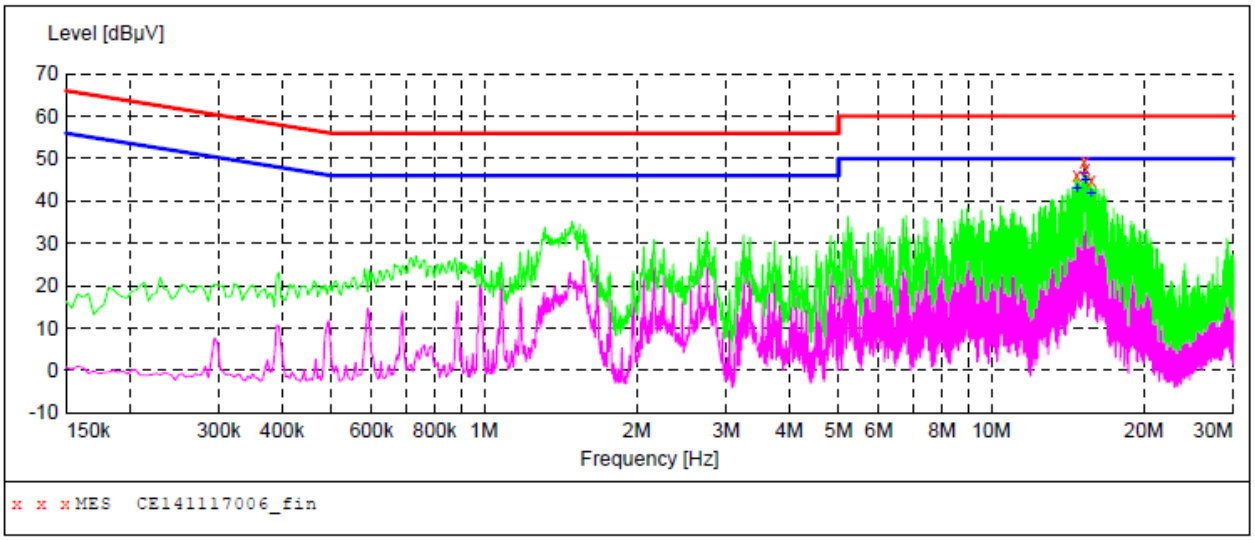
11/17/2014 10:50AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 15.246000 | 45.00 | 10.4 | 50 | 5.0 | AV | - | GND |
| 15.738000 | 42.10 | 10.4 | 50 | 7.9 | AV | - | GND |
| 15.934000 | 40.80 | 10.4 | 50 | 9.2 | AV | - | GND |
| 16.622000 | 40.20 | 10.4 | 50 | 9.8 | AV | - | GND |

| Test mode: | Op 3 | Polarization | + |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M) FIN"***

Short Description: 150K-30M Voltage




***MEASUREMENT RESULT: "CE141117006_fin"***

11/17/2014 11:06AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 46.00 | 10.4 | 60 | 14.0 | QP | + | GND |
| 15.246000 | 49.40 | 10.4 | 60 | 10.6 | QP | + | GND |
| 15.346000 | 47.50 | 10.4 | 60 | 12.5 | QP | + | GND |
| 15.738000 | 45.10 | 10.4 | 60 | 14.9 | QP | + | GND |

***MEASUREMENT RESULT: "CE141117006_fin2"***

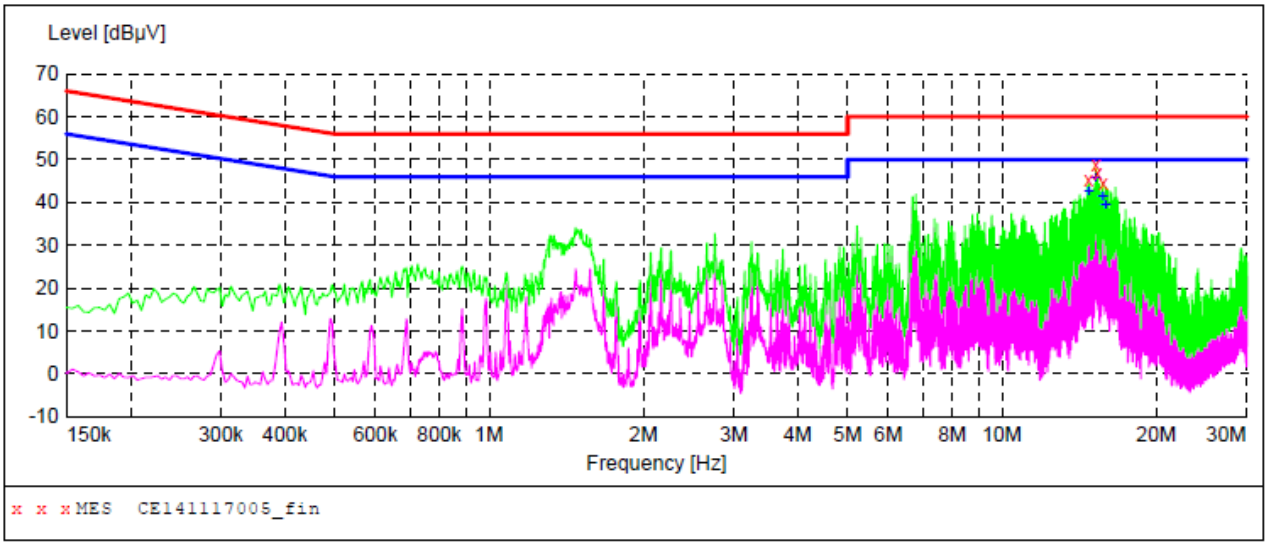
11/17/2014 11:06AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 43.00 | 10.4 | 50 | 7.0 | AV | + | GND |
| 15.246000 | 46.30 | 10.4 | 50 | 3.7 | AV | + | GND |
| 15.346000 | 44.70 | 10.4 | 50 | 5.3 | AV | + | GND |
| 15.738000 | 41.80 | 10.4 | 50 | 8.2 | AV | + | GND |

| Test mode: | Op 3 | Polarization | - |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M) FIN"***

Short Description: 150K-30M Voltage




***MEASUREMENT RESULT: "CE141117005_fin"***

11/17/2014 11:03AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 45.50 | 10.4 | 60 | 14.5 | QP | - | GND |
| 15.246000 | 48.80 | 10.4 | 60 | 11.2 | QP | - | GND |
| 15.346000 | 47.00 | 10.4 | 60 | 13.0 | QP | - | GND |
| 15.738000 | 44.60 | 10.4 | 60 | 15.4 | QP | - | GND |

***MEASUREMENT RESULT: "CE141117005_fin2"***

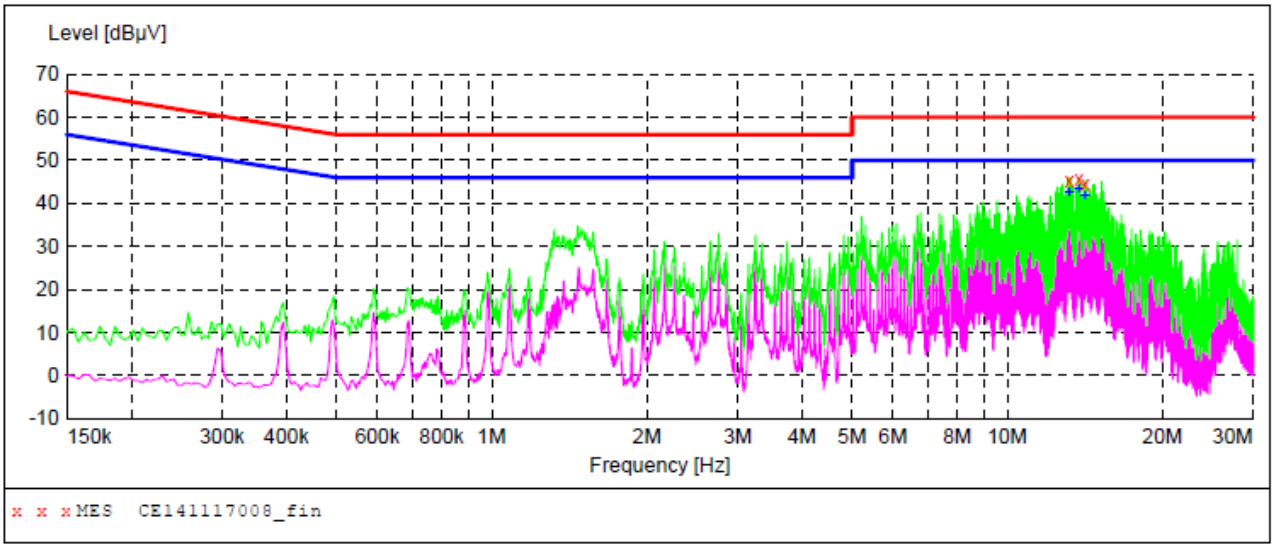
11/17/2014 11:03AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 42.40 | 10.4 | 50 | 7.6 | AV | - | GND |
| 15.246000 | 45.80 | 10.4 | 50 | 4.2 | AV | - | GND |
| 15.738000 | 41.30 | 10.4 | 50 | 8.7 | AV | - | GND |
| 15.934000 | 39.50 | 10.4 | 50 | 10.5 | AV | - | GND |

| Test mode: | Op 5 | Polarization | + |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M)FIN"***

Short Description: 150K-30M Voltage




x x x MES CE141117008_fin

***MEASUREMENT RESULT: "CE141117008_fin"***

11/17/2014 11:15AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 13.182000 | 45.50 | 10.4 | 60 | 14.5 | QP | + | GND |
| 13.770000 | 45.80 | 10.4 | 60 | 14.2 | QP | + | GND |
| 14.162000 | 44.50 | 10.4 | 60 | 15.5 | QP | + | GND |

***MEASUREMENT RESULT: "CE141117008_fin2"***

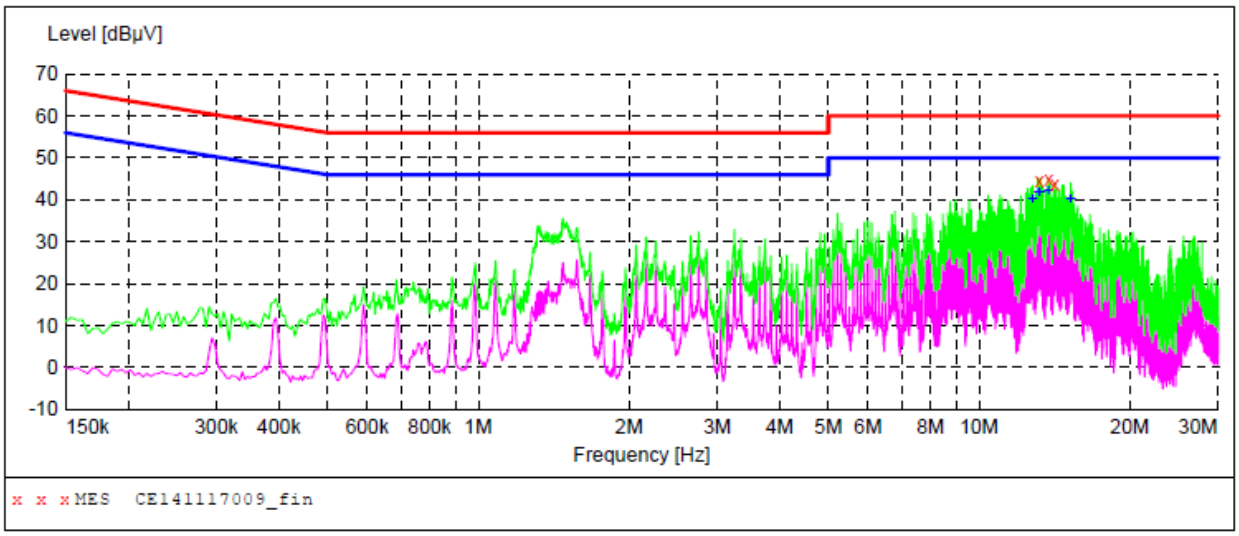
11/17/2014 11:15AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 13.182000 | 42.70 | 10.4 | 50 | 7.3 | AV | + | GND |
| 13.770000 | 43.20 | 10.4 | 50 | 6.8 | AV | + | GND |
| 14.162000 | 41.60 | 10.4 | 50 | 8.4 | AV | + | GND |

| Test mode: | Op 5 | Polarization | - |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M)FIN"***

Short Description: 150K-30M Voltage




***MEASUREMENT RESULT: "CE141117009_fin"***

11/17/2014 11:19AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 13.182000 | 44.60 | 10.4 | 60 | 15.4 | QP | - | GND |
| 13.770000 | 44.90 | 10.4 | 60 | 15.1 | QP | - | GND |
| 14.162000 | 43.60 | 10.4 | 60 | 16.4 | QP | - | GND |

***MEASUREMENT RESULT: "CE141117009_fin2"***

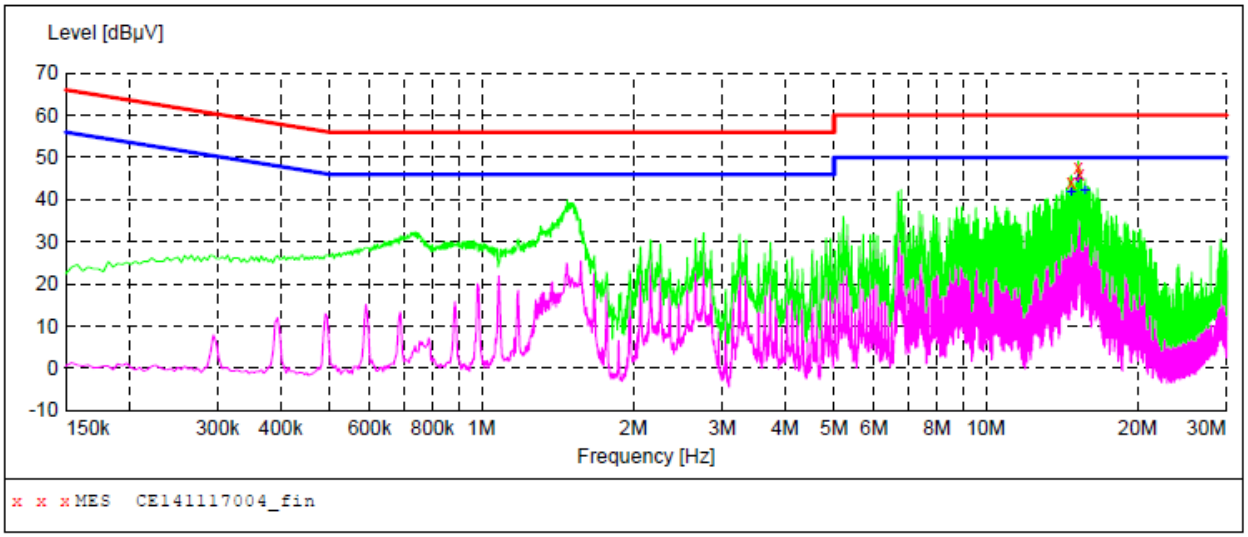
11/17/2014 11:19AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 12.786000 | 40.00 | 10.4 | 50 | 10.0 | AV | - | GND |
| 13.178000 | 41.90 | 10.4 | 50 | 8.1 | AV | - | GND |
| 13.182000 | 41.90 | 10.4 | 50 | 8.1 | AV | - | GND |
| 13.770000 | 42.30 | 10.4 | 50 | 7.7 | AV | - | GND |
| 15.246000 | 40.30 | 10.4 | 50 | 9.7 | AV | - | GND |

| Test mode: | Op 10 | Polarization | + |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M) FIN"***

Short Description: 150K-30M Voltage




***MEASUREMENT RESULT: "CE141117004_fin"***

11/17/2014 10:58AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 44.00 | 10.4 | 60 | 16.0 | QP | + | GND |
| 15.246000 | 47.80 | 10.4 | 60 | 12.2 | QP | + | GND |
| 15.346000 | 46.10 | 10.4 | 60 | 13.9 | QP | + | GND |

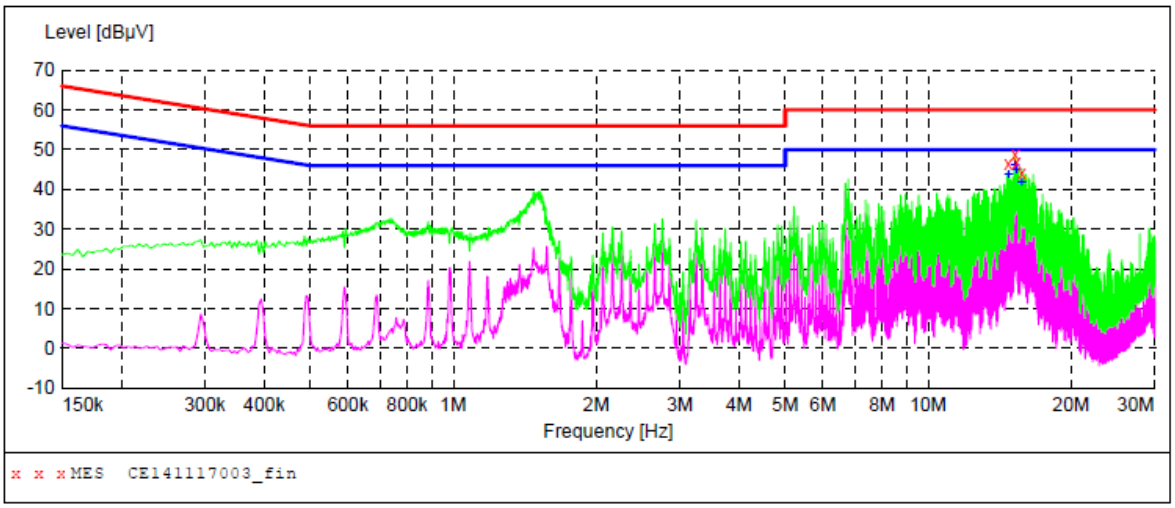
***MEASUREMENT RESULT: "CE141117004_fin2"***

11/17/2014 10:58AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 41.70 | 10.4 | 50 | 8.3 | AV | + | GND |
| 15.246000 | 45.10 | 10.4 | 50 | 4.9 | AV | + | GND |
| 15.738000 | 42.00 | 10.4 | 50 | 8.0 | AV | + | GND |

| Test mode: | Op 10 | Polarization | - |
|---|---|---|---|

***SCAN TABLE: "Voltage (9K-30M)FIN"***
Short Description: 150K-30M Voltage




***MEASUREMENT RESULT: "CE141117003_fin"***

11/17/2014 10:55AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 46.40 | 10.4 | 60 | 13.6 | QP | - | GND |
| 15.246000 | 48.90 | 10.4 | 60 | 11.1 | QP | - | GND |
| 15.346000 | 46.90 | 10.4 | 60 | 13.1 | QP | - | GND |
| 15.738000 | 44.30 | 10.4 | 60 | 15.7 | QP | - | GND |

***MEASUREMENT RESULT: "CE141117003_fin2"***

11/17/2014 10:55AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 14.754000 | 43.70 | 10.4 | 50 | 6.3 | AV | - | GND |
| 15.246000 | 46.20 | 10.4 | 50 | 3.8 | AV | - | GND |
| 15.346000 | 44.70 | 10.4 | 50 | 5.3 | AV | - | GND |
| 15.738000 | 41.70 | 10.4 | 50 | 8.3 | AV | - | GND |

## 4.2. Maximum Transmitter Power

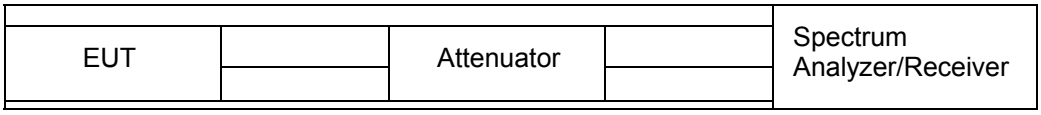
**TEST APPLICABLE**

Per FCC Part 2.1046 and Part 90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.
Per RSS-119 Section 5.4 and 5.4.1: The output power shall be within ±1.0 dB of the manufacturer's rated power. Typical transmitter output powers are 110 watts for base and/or fixed stations (paging transmitters excepted), and 30 watts for mobile stations. Higher powers may be certified, but it should be noted that mobile stations are normally only licensed up to 30 watts. See the SRSP relevant to the operating frequency for equipment power limits.

**TEST PROCEDURE**

Measurements shall be made to establish the radio frequency power delivered by the transmitter the standard output termination. The power output shall be monitored and recorded and no adjustment shall be made to the transmitter after the test has begun, except as noted bellow:
If the power output is adjustable, measurements shall be made for the highest and lowest power levels.
The EUT connect to the Receiver through 20 dB attenuator.
Measurement with Spectrum Analyzer FSP40 conducted, external power supply with 13.60 V stabilized supply voltage.

**TEST CONFIGURATION**



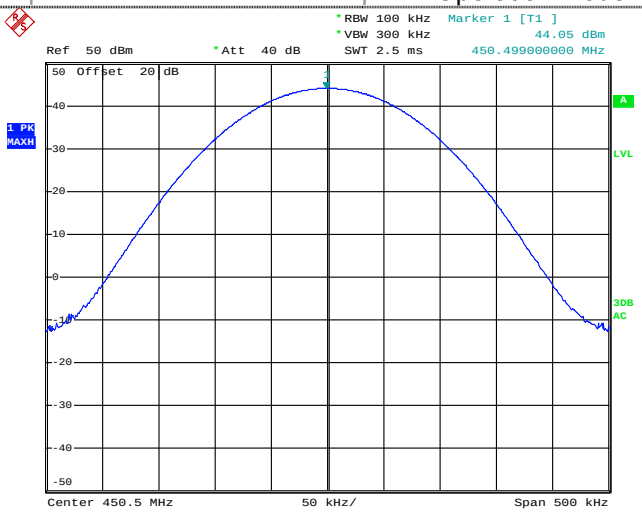

The EUT was directly connected to a RF Communication
Test set by a 20 dB attenuator

**TEST RESULTS**

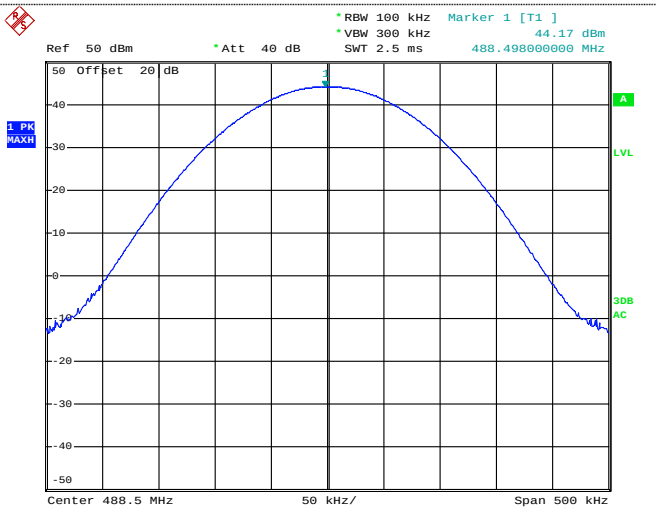
| Operation Mode | Test Frequency (MHz) | Measured power (dBm) | Difference ( dB ) | Limit (dB) | Result |
|---|---|---|---|---|---|
| Op 1 | 450.5 | 44.05 | 0.07 | -1 ~ +1 | Pass |
| | 488.5 | 44.17 | 0.19 | | |
| | 526.5 | 44.10 | 0.12 | | |
| Op 2 | 450.5 | 29.80 | -0.20 | -1 ~ +1 | Pass |
| | 488.5 | 30.48 | 0.48 | | |
| | 526.5 | 30.77 | 0.77 | | |
| Op 3 | 450.5 | 44.00 | 0.02 | -1 ~ +1 | Pass |
| | 488.5 | 43.96 | -0.02 | | |
| | 526.5 | 44.10 | 0.12 | | |
| Op 4 | 450.5 | 29.78 | -0.22 | -1 ~ +1 | Pass |
| | 488.5 | 30.48 | 0.48 | | |
| | 526.5 | 30.27 | 0.27 | | |
| Op 5 | 450.5 | 43.88 | -0.10 | -1 ~ +1 | Pass |
| | 488.5 | 43.46 | -0.52 | | |
| | 526.5 | 43.67 | -0.31 | | |
| Op 6 | 450.5 | 29.65 | -0.35 | -1 ~ +1 | Pass |
| | 488.5 | 29.95 | -0.05 | | |
| | 526.5 | 30.14 | 0.14 | | |

Test plot as follows:

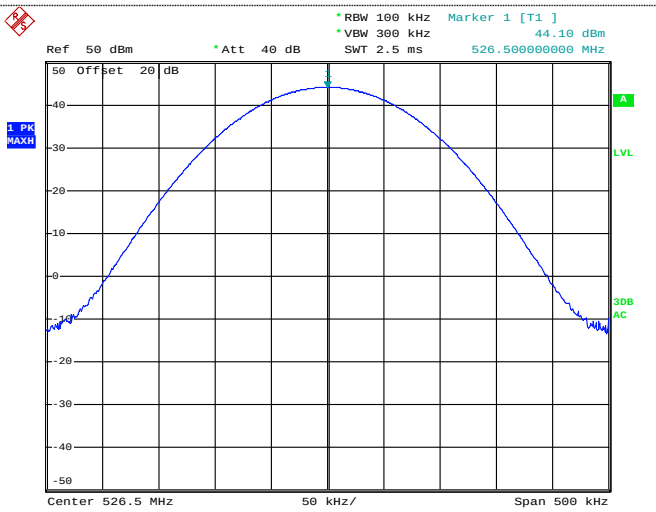
| Modulation Type | FM | Operation Mode | Op 1 |
|---|---|---|---|




Date: 18.NOV.2014 14:04:59

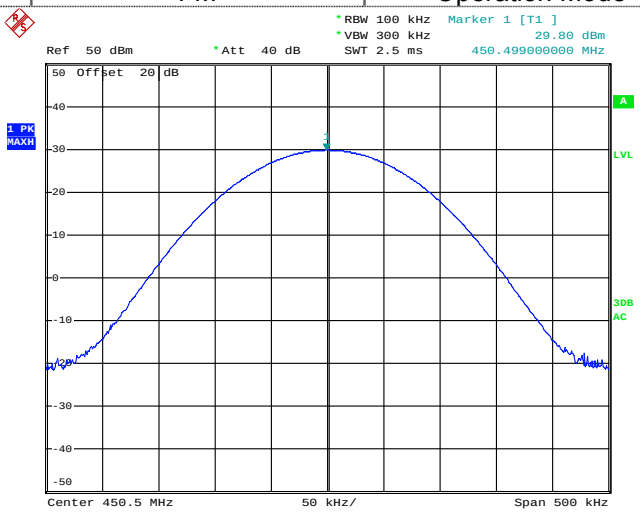



Date: 18.NOV.2014 14:08:49

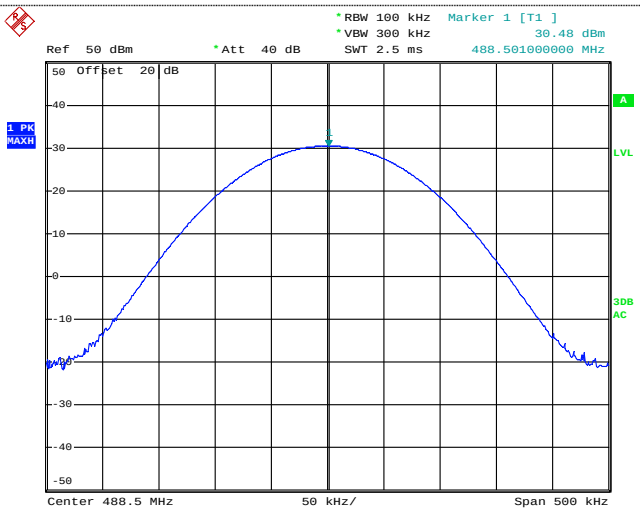



Date: 18.NOV.2014 14:11:43

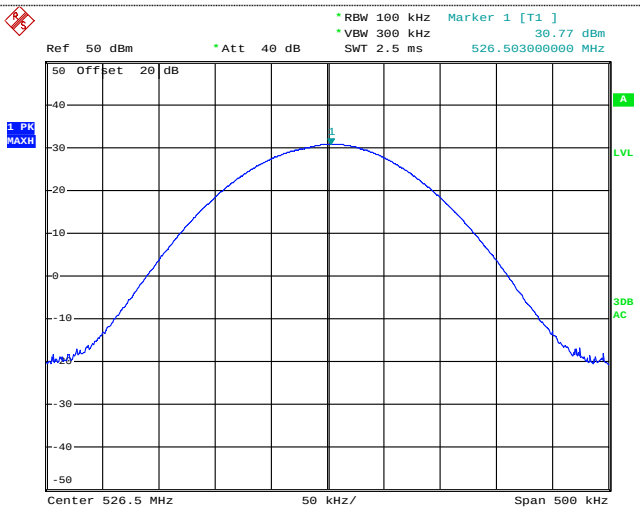
| Modulation Type | FM | Operation Mode | Op 2 |
|---|---|---|---|




Date: 18.NOV.2014 14:18:11

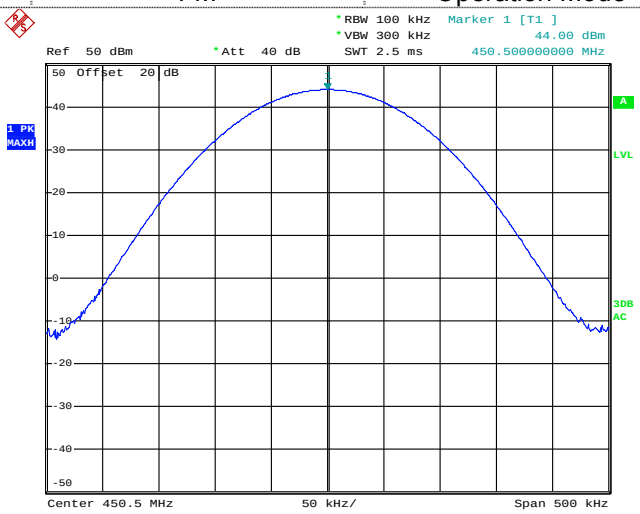



Date: 18.NOV.2014 14:15:43

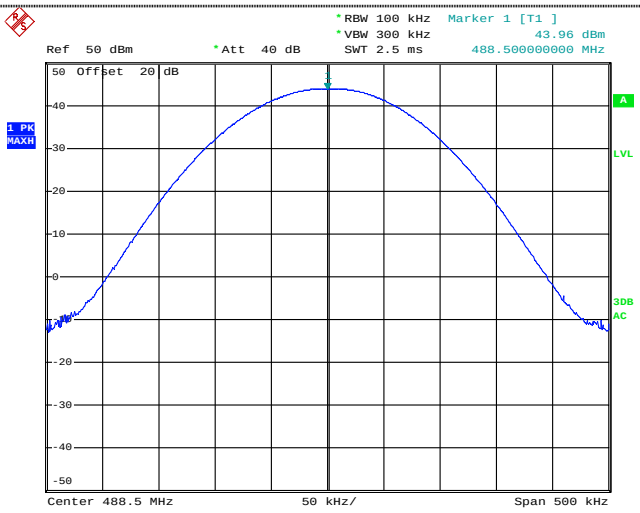



Date: 18.NOV.2014 14:13:22

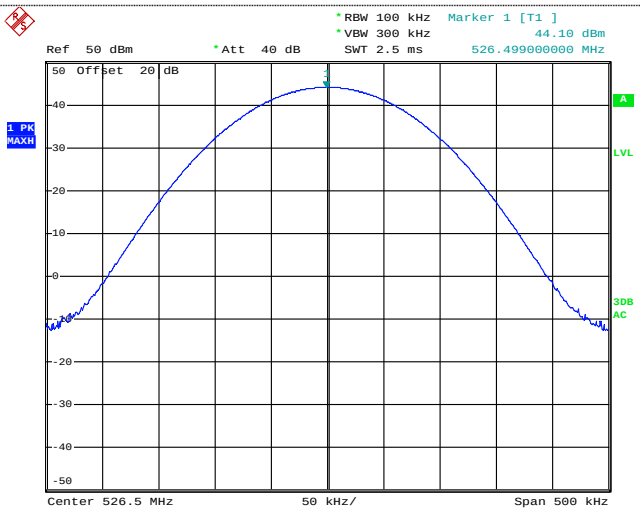
| Modulation Type | FM | Operation Mode | Op 3 |
|---|---|---|---|




Date: 18.NOV.2014 14:03:55

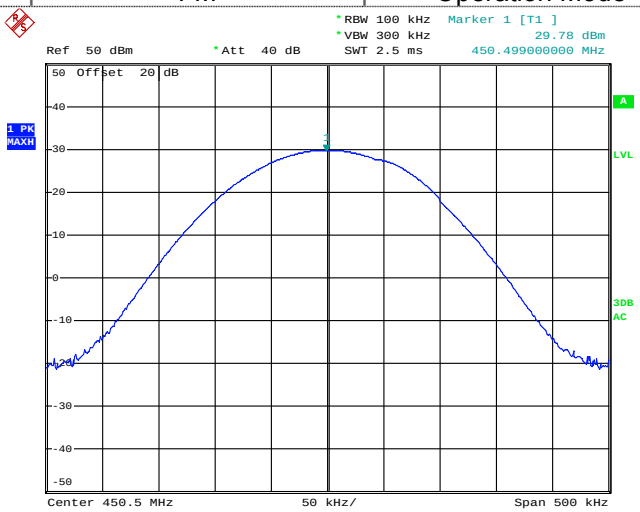



Date: 18.NOV.2014 14:08:01

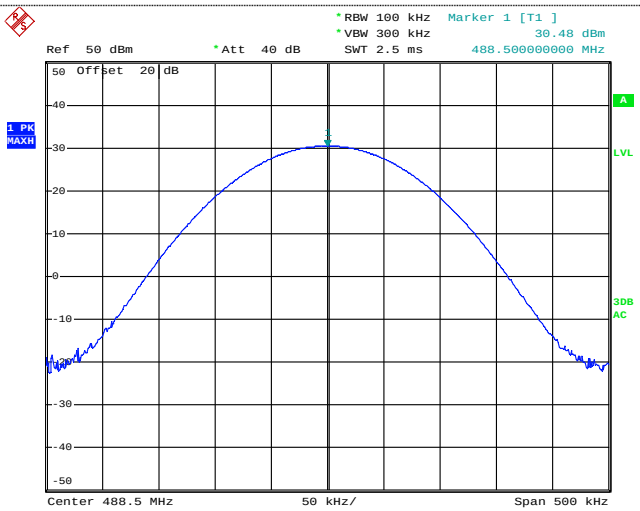



Date: 18.NOV.2014 14:11:11

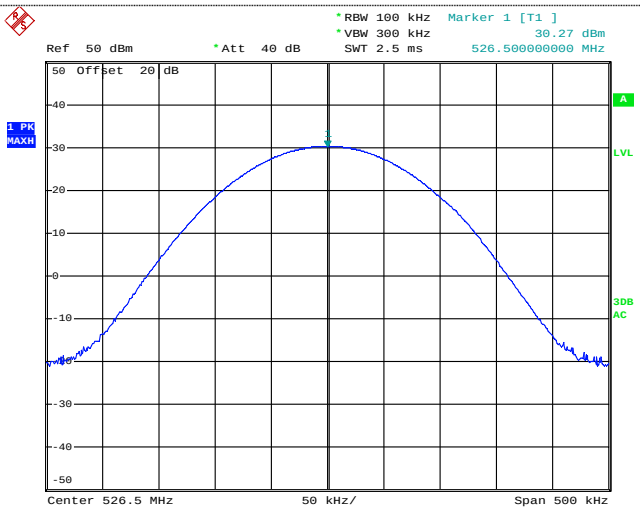
| Modulation Type | FM | Operation Mode | Op 4 |
|---|---|---|---|




Date: 18.NOV.2014 14:24:18

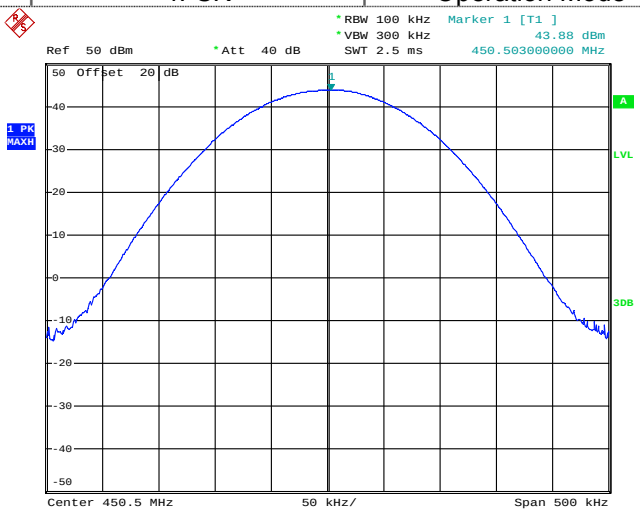



Date: 18.NOV.2014 14:16:17

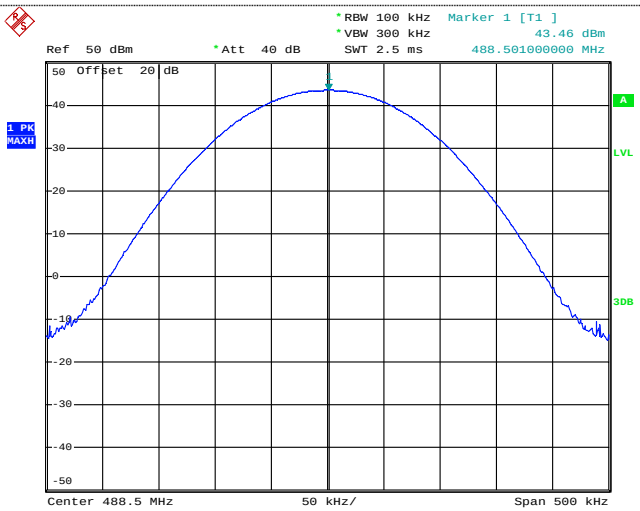



Date: 18.NOV.2014 14:13:58

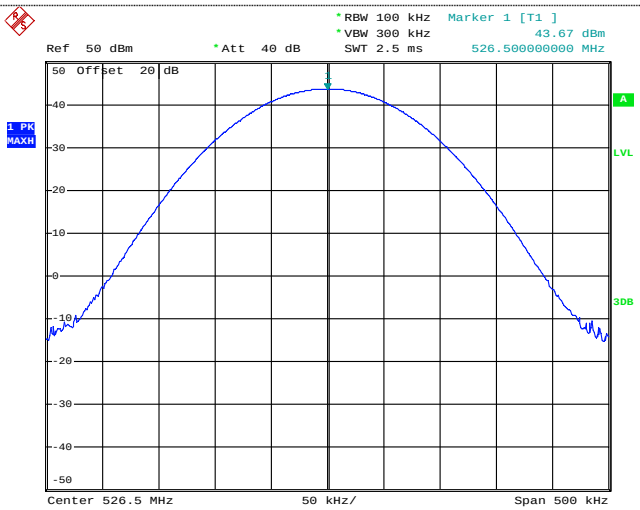
| Modulation Type | 4FSK | Operation Mode | Op 5 |
|---|---|---|---|




Date: 19.NOV.2014 17:45:52

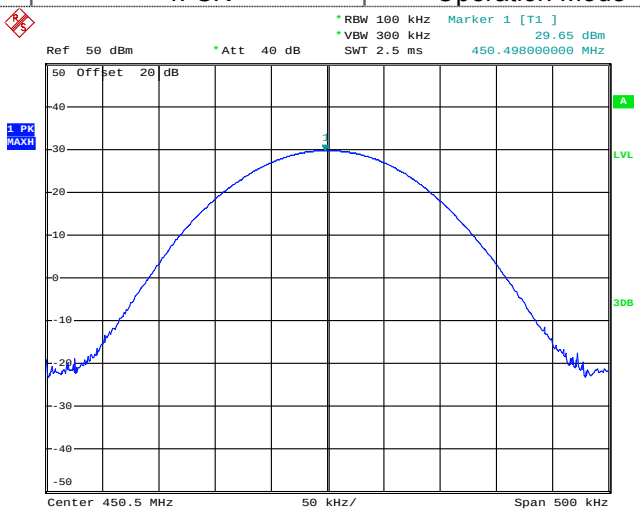



Date: 19.NOV.2014 17:48:04

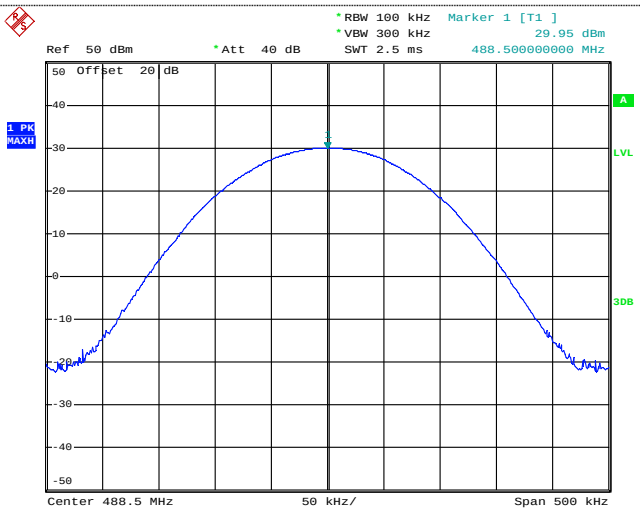



Date: 19.NOV.2014 17:49:55

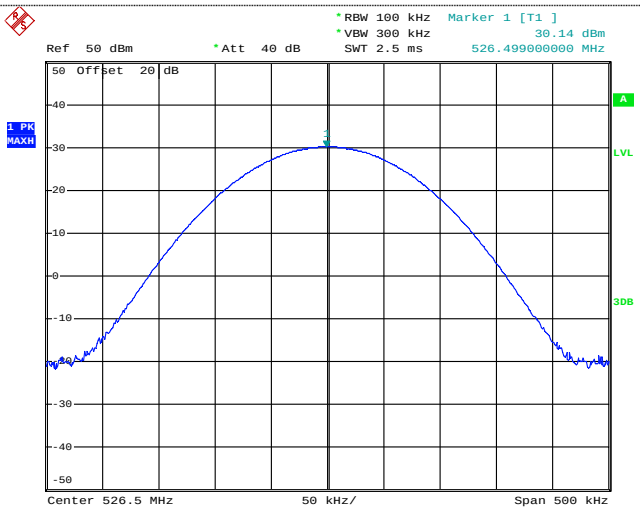
| Modulation Type | 4FSK | Operation Mode | Op 6 |
|---|---|---|---|




Date: 19.NOV.2014 17:46:15




Date: 19.NOV.2014 17:48:18




Date: 19.NOV.2014 17:49:44

## 4.3. Occupied Bandwidth and Emission Mask Test

**TEST APPLICABLE**

(a). Occupied Bandwidth: The EUT was connected to the audio signal generator and the spectrum analyzer via the main RF connector, and through an appropriate attenuator. The EUT was controlled to transmit its maximum power. Then the bandwidth of 99% power can be measured by the spectrum analyzer.

(b). Emission Mask B: For transmitters that are equipped with an audio low-pass filter pursuant to §90.210(a), the power of any emission must be below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

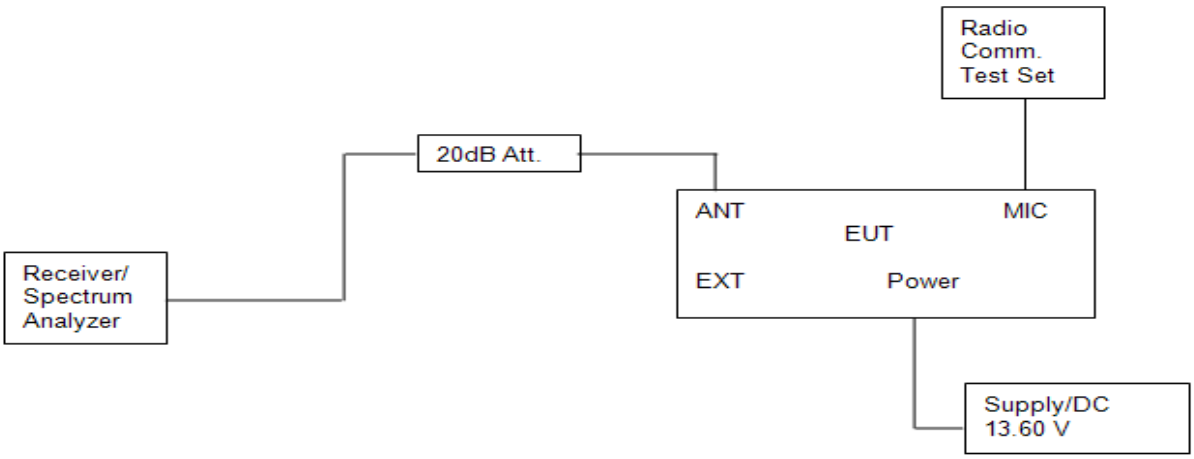
(c). Emission Mask D, 12.5 kHz channel bandwidth equipment: For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd -2.88 kHz) dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

**TEST CONFIGURATION**




**TEST PROCEDURE**

1 The EUT was placed on a turn table which is 0.8m above ground plane.

2 The EUT was modulated by 2.5 KHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing) and 5 kHz (25 kHz channel spacing).

3 Set EUT as normal operation.
1)Set SPA Center Frequency = fundamental frequency, RBW=100Hz, VBW=300Hz,span=50KHz for 12.5KHz channel spacing.
2)Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW=1 KHz,span=50KHz for 25KHz channel spacing.

4 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

5 Set SPA Center Frequency=fundamental frequency, set =100Hz, VBW=300Hz, span=50 KHz for 12.5KHz channel spacing.
Set SPA Center Frequency=fundamental frequency, set =300Hz,VBW=1KHz,span=50KHz for 25 KHz channel spacing.

**TEST RESULTS**

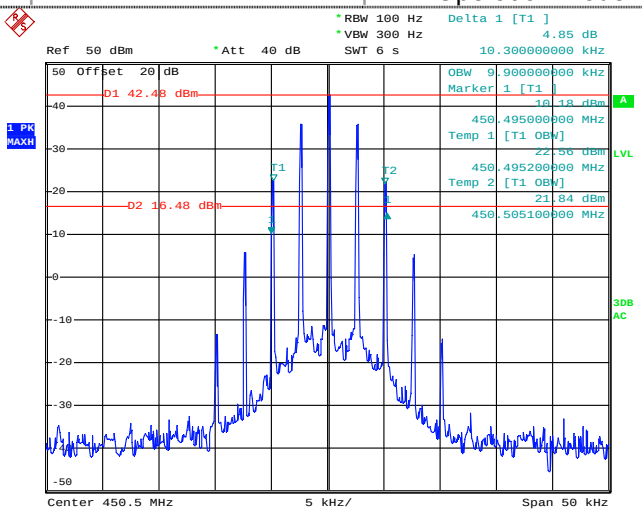
Remark:We tested Op 1 to Op 6,reocrded worst case at Op 1,Op 3, Op 5.

### 4.2.1 Occupied Bandwidth

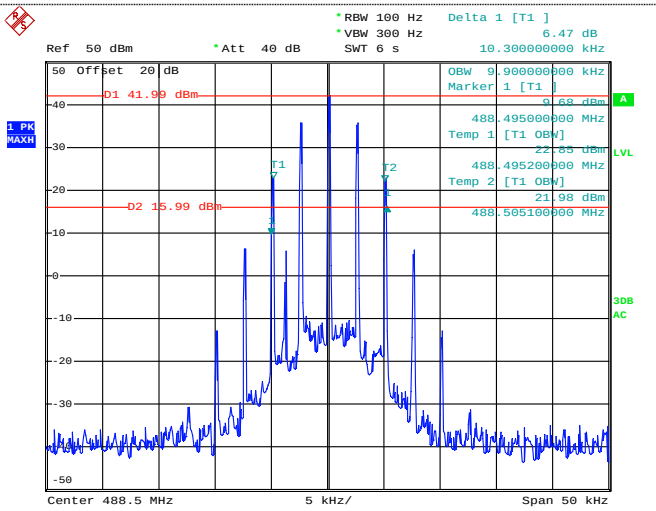
| Operation Mode | Test Frequency (MHz) | Occupied Bandwidth (KHz) | | Limit (KHz) | Result |
|---|---|---|---|---|---|
| | | 99% | 26dB | | |
| Op 1 | 450.5 | 9.90 | 10.30 | ≤11.25 | Pass |
| | 488.5 | 9.90 | 10.30 | | |
| | 526.5 | 9.90 | 10.30 | | |
| Op 3 | 450.5 | 14.90 | 15.70 | ≤20.0 | Pass |
| | 488.5 | 15.00 | 15.70 | | |
| | 526.5 | 14.90 | 15.70 | | |
| Op 5 | 450.5 | 7.40 | 9.60 | ≤11.25 | Pass |
| | 488.5 | 7.20 | 9.60 | | |
| | 526.5 | 6.90 | 9.30 | | |

Test plot as follows:

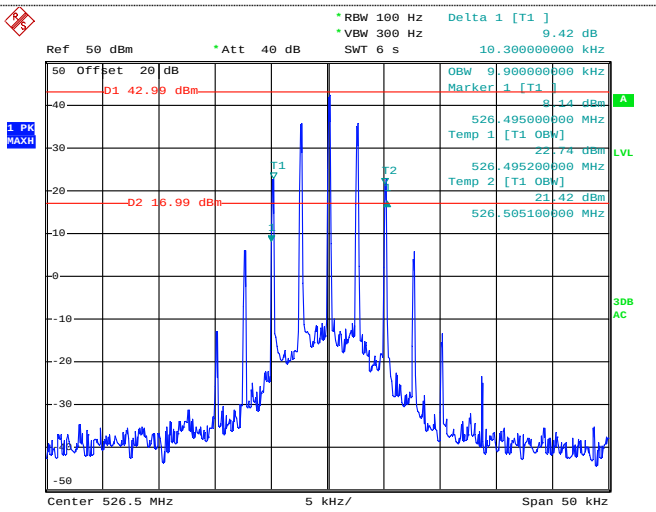
| Modulation Type | FM | Operation Mode | Op 1 |
|---|---|---|---|




Date: 20.NOV.2014 18:17:43

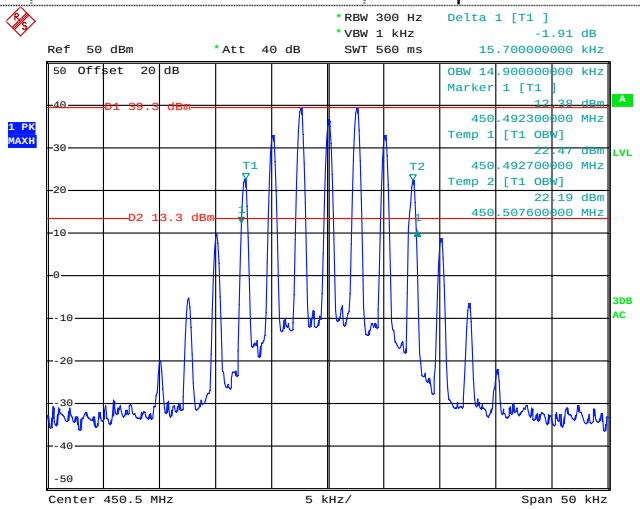



Date: 20.NOV.2014 19:03:04

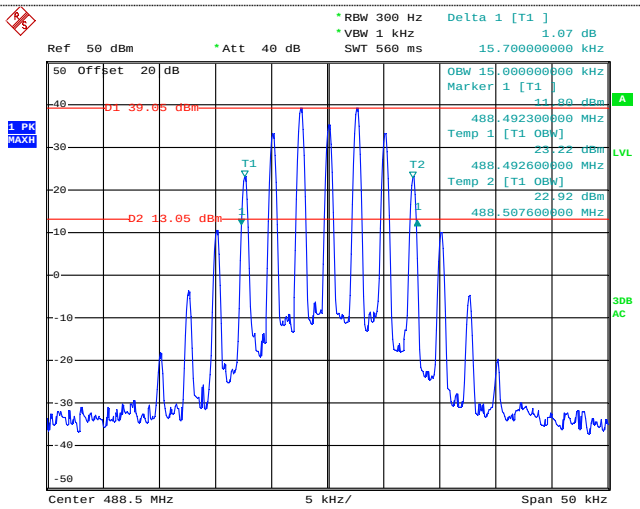



Date: 20.NOV.2014 19:04:37

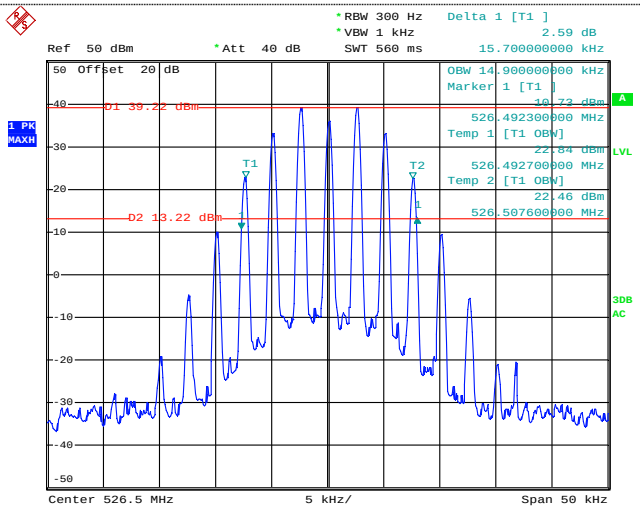
| Modulation Type | FM | Operation Mode | Op 3 |
|---|---|---|---|




Date: 20.NOV.2014 19:10:07

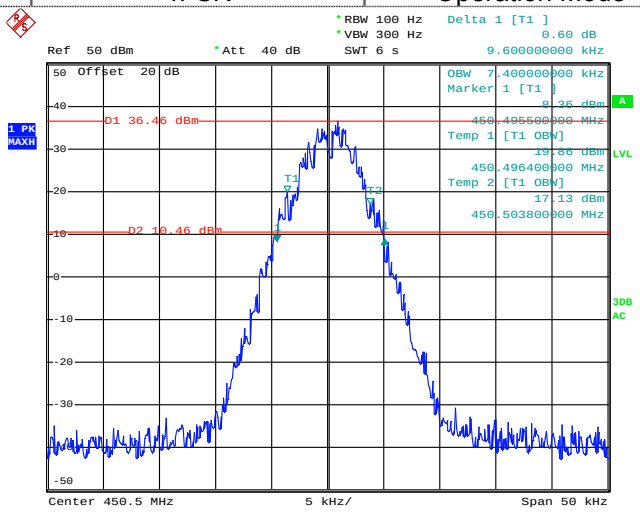



Date: 20.NOV.2014 19:09:10

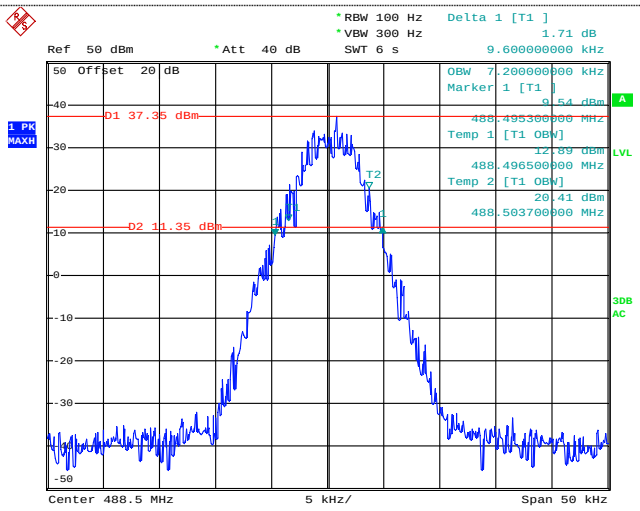



Date: 20.NOV.2014 19:08:03

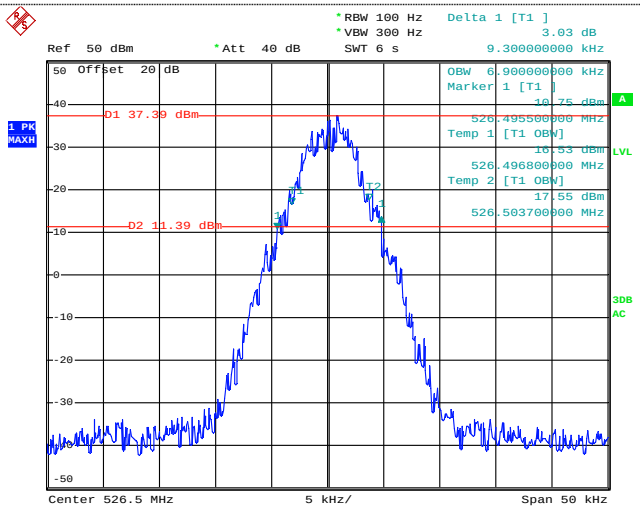
| Modulation Type | 4FSK | Operation Mode | Op 5 |
|---|---|---|---|




Date: 20.NOV.2014 09:22:04




Date: 20.NOV.2014 09:25:02



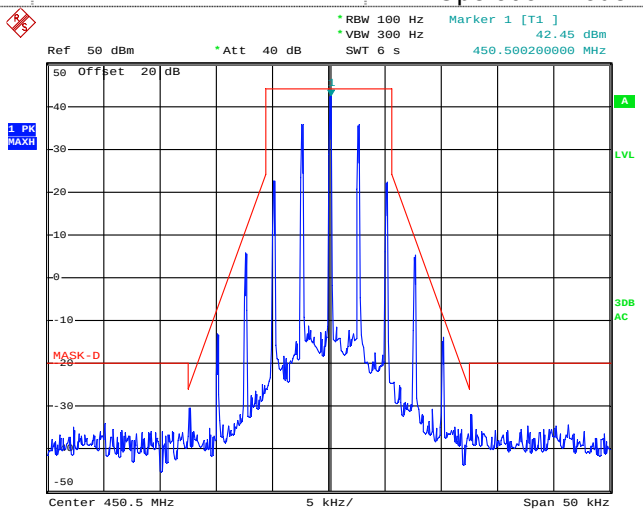

Date: 20.NOV.2014 09:28:36

### 4.2.2 Emission Mask

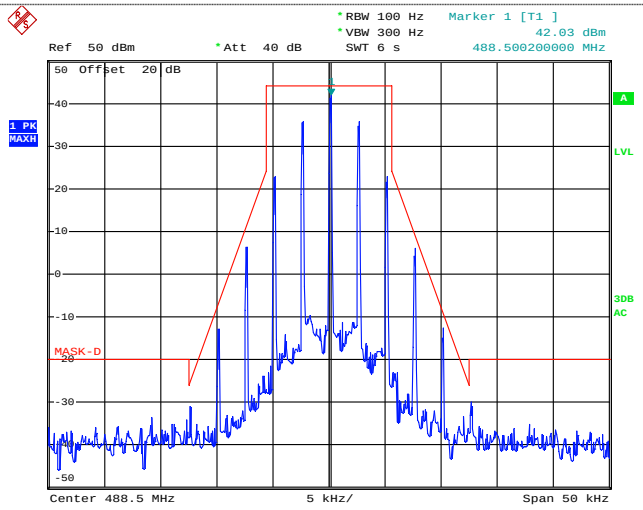
| Operation Mode | Test Frequency (MHz) | RBW (Hz) | Applicable Mask | Result |
|---|---|---|---|---|
| Op 1 | 450.5 | 100 | D | Pass |
| | 488.5 | | | |
| | 526.5 | | | |
| Op 3 | 450.5 | 300 | B | Pass |
| | 488.5 | | | |
| | 526.5 | | | |
| Op 5 | 450.5 | 100 | D | Pass |
| | 488.5 | | | |
| | 526.5 | | | |

Test plot as follows:

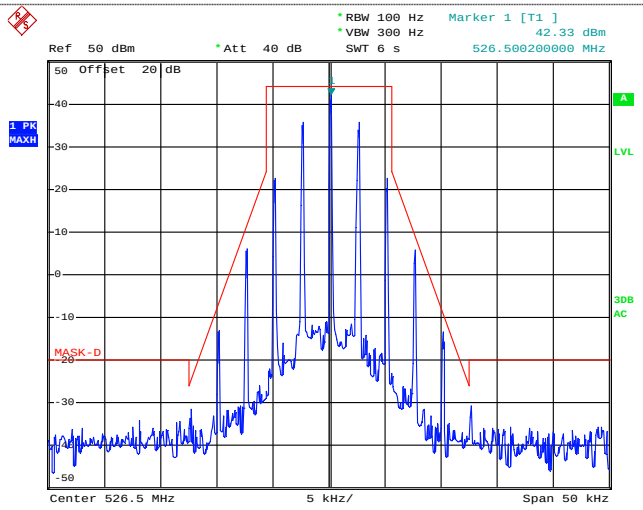
| Modulation Type | FM | Operation Mode | Op 1 |
|---|---|---|---|




Date: 20.NOV.2014 18:46:58

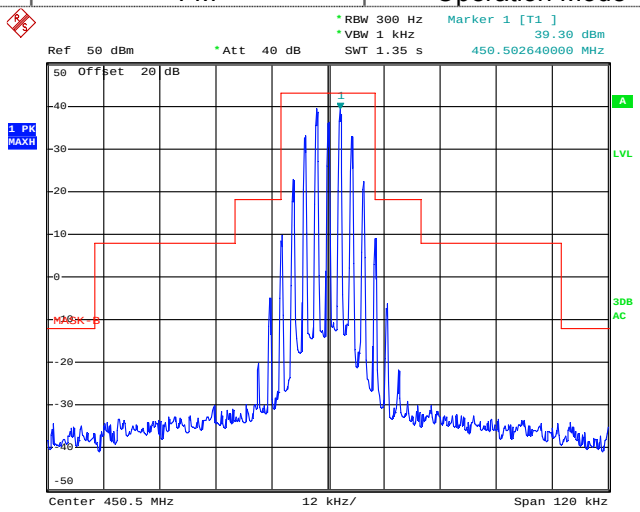



Date: 20.NOV.2014 18:48:07

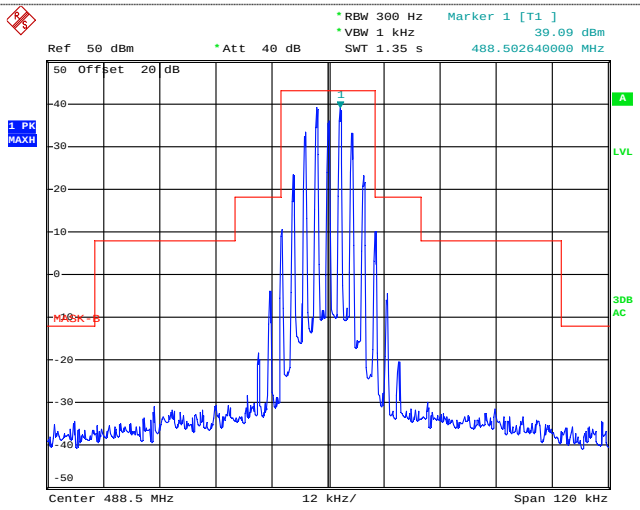



Date: 20.NOV.2014 18:48:52

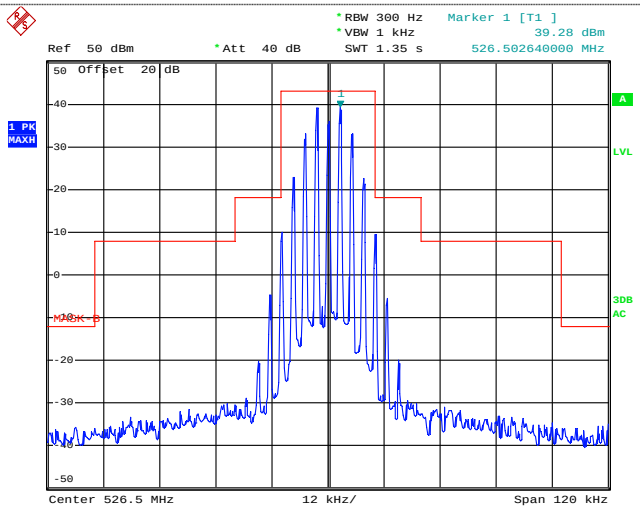
| Modulation Type | FM | Operation Mode | Op 3 |
|---|---|---|---|




Date: 20.NOV.2014 18:44:58

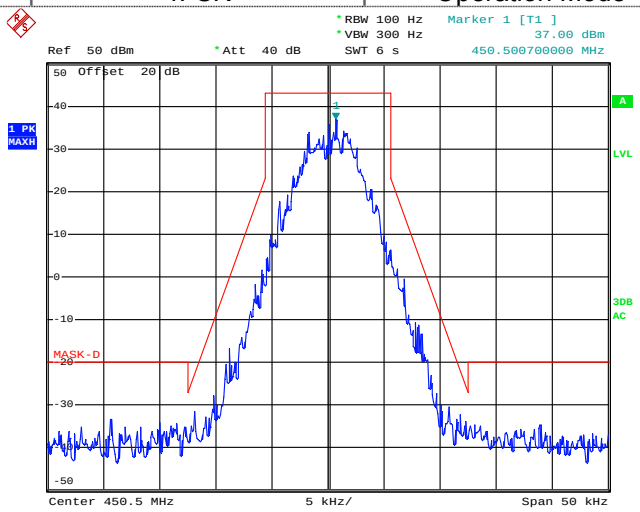



Date: 20.NOV.2014 18:44:28

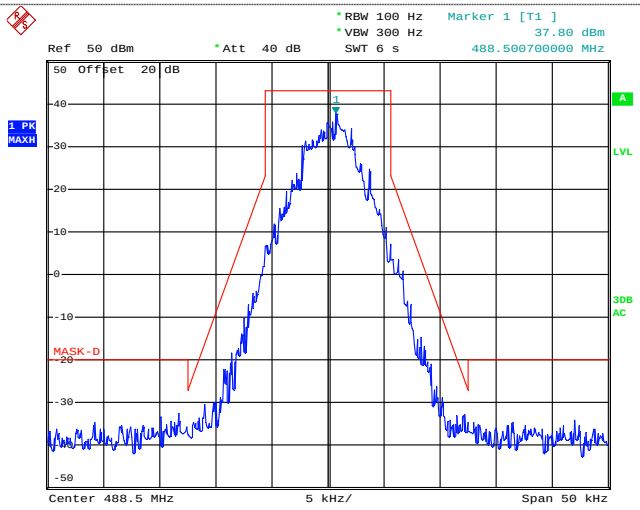



Date: 20.NOV.2014 18:43:36

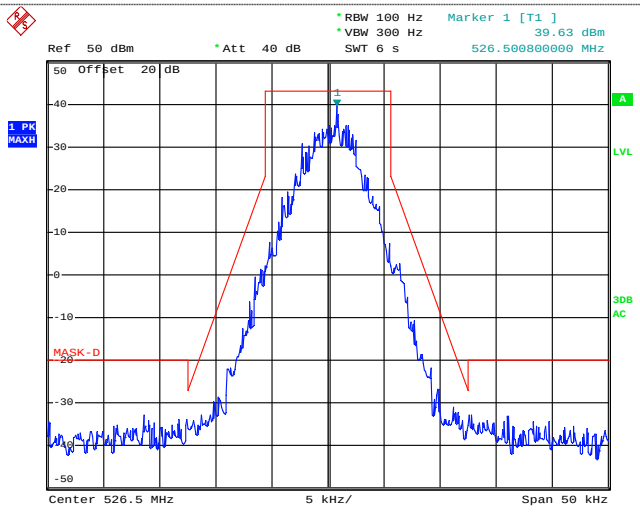
| Modulation Type | 4FSK | Operation Mode | Op 5 |
|---|---|---|---|




Date: 20.NOV.2014 18:52:45




Date: 20.NOV.2014 18:56:04




Date: 20.NOV.2014 18:57:37

## 4.4. Modulation Charcateristics

**TEST APPLICABLE**

According to CFR47 section 2.1047(a), for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

**TEST PROCEDURE**

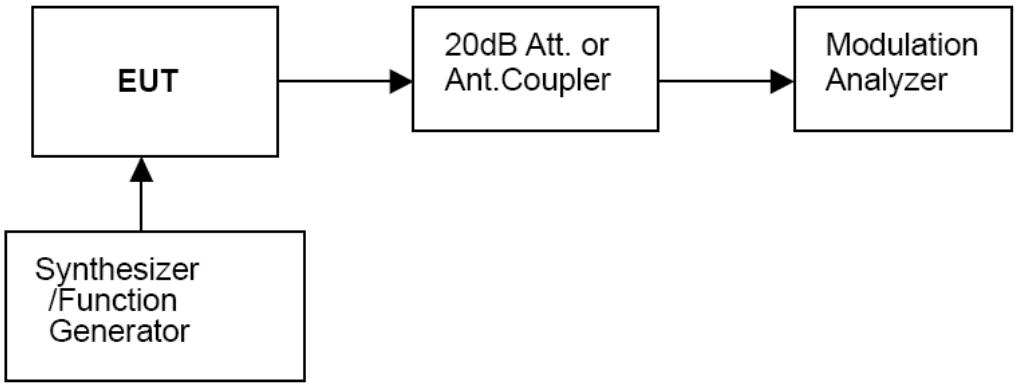
**Modulation Limit**

1 Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1 KHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.
2 Repeat step 1 with input frequency changing to 300, 1004, 1500 and 2500Hz in sequence.

**Audio Frequency Response**

1 Configure the EUT as shown in figure 1.
2 Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0dB).
3 Vary the Audio frequency from 100 Hz to 3 KHz and record the frequency deviation.
4 Audio Frequency Response =20log10 (Deviation of test frequency/Deviation of 1 KHz reference).

**TEST CONFIGURATION**



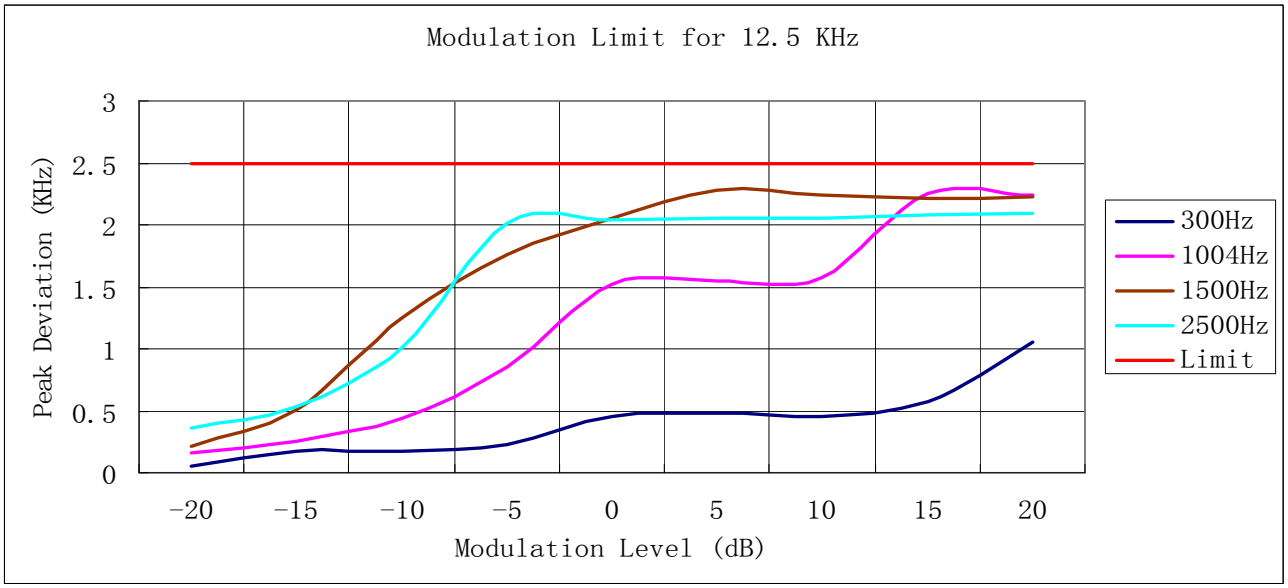

**TEST RESULTS**

Remark:We tested Op 1 to Op 4.recorded worst case at Op 1 for 488.5MHz and Op 3 for 488.5MHz.

**a).Modulation Limit:**

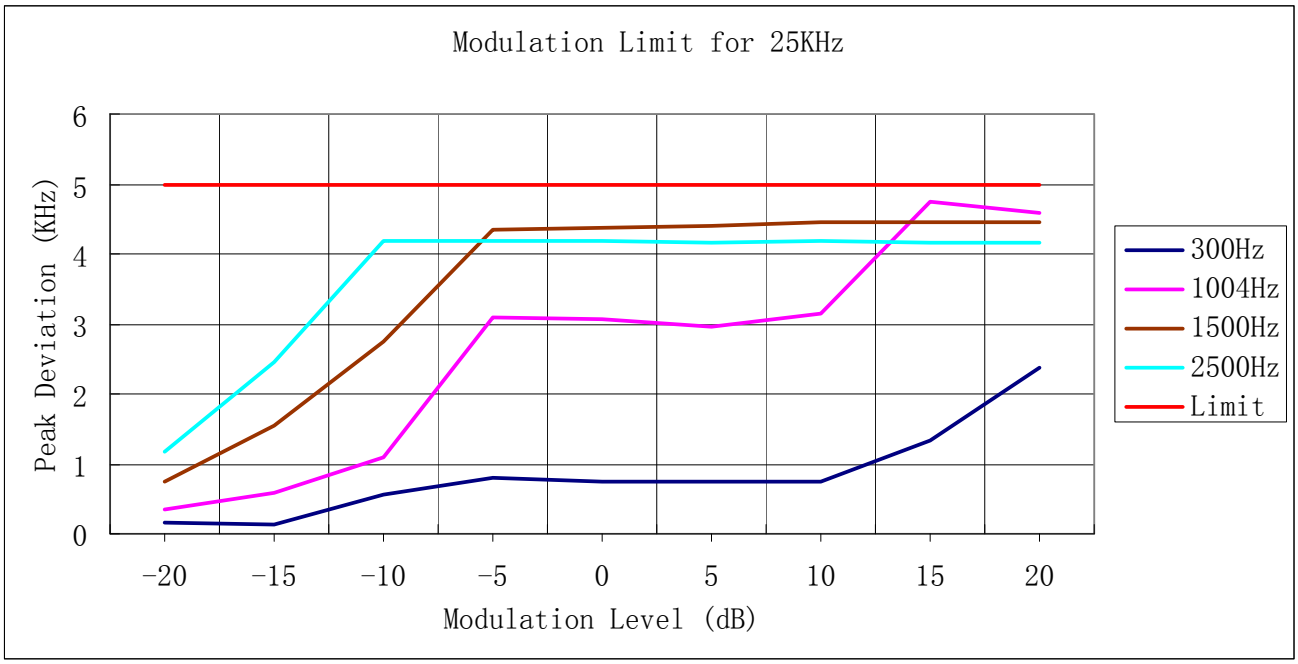
| Op 1: 488.5MHz | | | | | | |
|---|---|---|---|---|---|---|
| Modulation Level (dB) | Peak Freq. Deviation At 300Hz (KHz) | Peak Freq. Deviation At 1004Hz (KHz) | Peak Freq. Deviation At 1500Hz (KHz) | Peak Freq. Deviation At 2500 Hz (KHz) | Limit (KHz) | Result |
| -20 | 0.04 | 0.15 | 0.23 | 0.34 | 2.5 | Pass |
| -15 | 0.19 | 0.23 | 0.52 | 0.51 | | |
| -10 | 0.17 | 0.45 | 1.23 | 1.01 | | |
| -5 | 0.22 | 0.84 | 1.75 | 2.03 | | |
| 0 | 0.44 | 1.53 | 2.07 | 2.03 | | |
| 5 | 0.48 | 1.55 | 2.28 | 2.05 | | |
| 10 | 0.47 | 1.55 | 2.22 | 2.04 | | |
| 15 | 0.54 | 2.23 | 2.23 | 2.07 | | |
| 20 | 1.04 | 2.23 | 2.21 | 2.07 | | |

Test plot as follows:



| Op 3: 488.5MHz | | | | | | |
|---|---|---|---|---|---|---|
| Modulation Level (dB) | Peak Freq. Deviation At 300Hz (KHz) | Peak Freq. Deviation At 1004Hz (KHz) | Peak Freq. Deviation At 1500Hz (KHz) | Peak Freq. Deviation At 2500 Hz (KHz) | Limit (KHz) | Result |
| -20 | 0.14 | 0.34 | 0.74 | 1.16 | 5.0 | Pass |
| -15 | 0.12 | 0.56 | 1.55 | 2.44 | | |
| -10 | 0.53 | 1.07 | 2.74 | 4.17 | | |
| -5 | 0.77 | 3.08 | 4.33 | 4.15 | | |
| 0 | 0.75 | 3.06 | 4.32 | 4.14 | | |
| 5 | 0.73 | 2.94 | 4.38 | 4.13 | | |
| 10 | 0.72 | 3.13 | 4.44 | 4.19 | | |
| 15 | 1.35 | 4.72 | 4.43 | 4.16 | | |
| 20 | 2.37 | 4.57 | 4.42 | 4.14 | | |

Test plot as follows:



**b). Audio Frequency Response:**

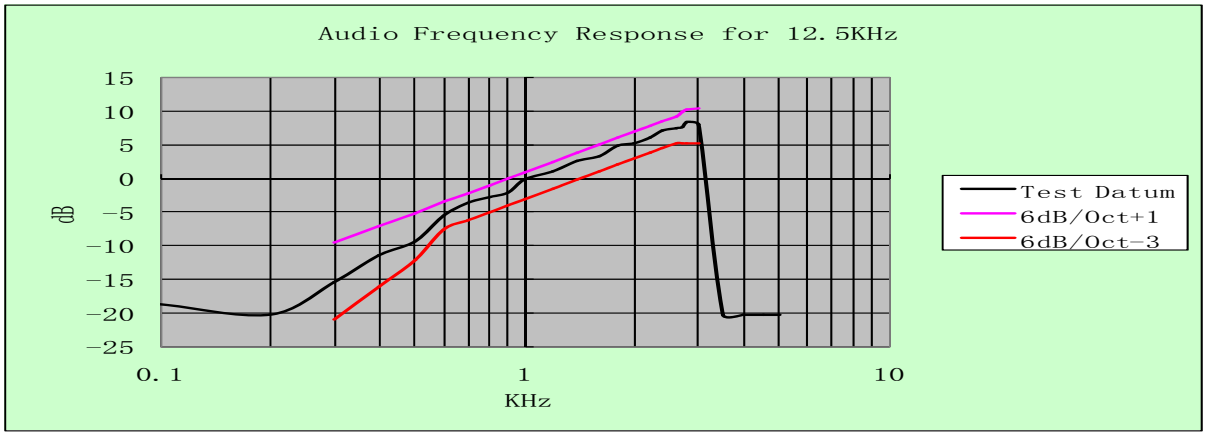
**Method of Measurement:**
The audio frequency response was measured in accordance with TIA/EIA Specification 603 with no exception. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 300-3000Hz shall be submitted and Audio Post Limiter Low Pass Filter Response from 3.0 KHz to 50KHz.However, the audio frequency response should test from 100Hz to 5.0 KHz according to FCC Part 2.1047(a).

**Note:**

1. The Audio Frequency Response is identical for 12.5 KHz and 25KHz channel separation

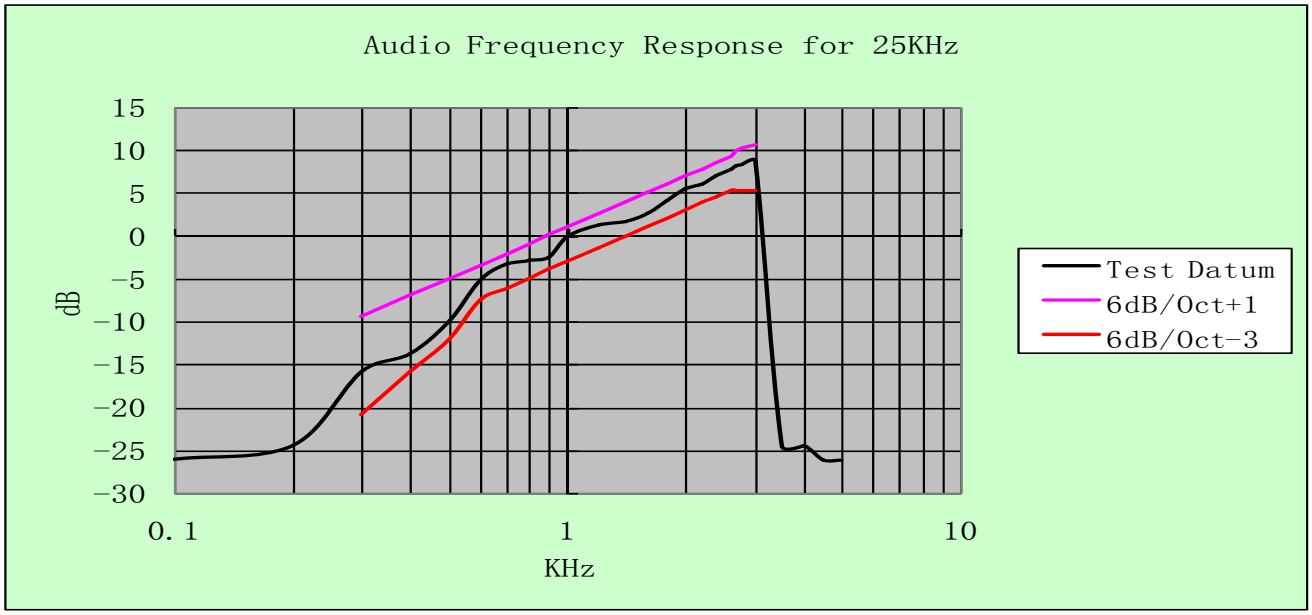
| Op 1:488.5MHz | | | |
|---|---|---|---|
| Frequency (KHz ) | Frequency Deviation (KHz) | 1KHz Refenerce Deviation (KHz) | Audio Frequency Response (dB) |
| 0.1 | 0.05 | 0.48 | -19.65 |
| 0.2 | 0.04 | 0.48 | -21.58 |
| 0.3 | 0.08 | 0.48 | -15.56 |
| 0.4 | 0.13 | 0.48 | -11.35 |
| 0.5 | 0.19 | 0.48 | -8.05 |
| 0.6 | 0.26 | 0.48 | -5.33 |
| 0.7 | 0.35 | 0.48 | -2.74 |
| 0.8 | 0.38 | 0.48 | -2.03 |
| 0.9 | 0.42 | 0.48 | -1.16 |
| 1 | 0.48 | 0.48 | 0.00 |
| 1.2 | 0.58 | 0.48 | 1.64 |
| 1.4 | 0.7 | 0.48 | 3.28 |
| 1.6 | 0.75 | 0.48 | 3.88 |
| 1.8 | 0.92 | 0.48 | 5.65 |
| 2 | 0.94 | 0.48 | 5.84 |
| 2.2 | 1.02 | 0.48 | 6.55 |
| 2.4 | 1.17 | 0.48 | 7.74 |
| 2.6 | 1.22 | 0.48 | 8.10 |
| 2.7 | 1.24 | 0.48 | 8.24 |
| 2.8 | 1.37 | 0.48 | 9.11 |
| 3 | 1.28 | 0.48 | 8.52 |
| 3.5 | 0.06 | 0.48 | -18.06 |
| 4 | 0.04 | 0.48 | -21.58 |
| 4.5 | 0.04 | 0.48 | -21.58 |
| 5 | 0.04 | 0.48 | -21.58 |

Test plot as follows:



| Op 3: 488.5MHz | | | |
|---|---|---|---|
| Frequency (KHz ) | Frequency Deviation (KHz) | 1KHz Reference Deviation (KHz) | Audio Frequency Response (dB) |
| 0.1 | 0.04 | 1.03 | -28.22 |
| 0.2 | 0.05 | 1.03 | -26.28 |
| 0.3 | 0.16 | 1.03 | -16.17 |
| 0.4 | 0.21 | 1.03 | -13.81 |
| 0.5 | 0.31 | 1.03 | -10.43 |
| 0.6 | 0.57 | 1.03 | -5.14 |
| 0.7 | 0.69 | 1.03 | -3.48 |
| 0.8 | 0.73 | 1.03 | -2.99 |
| 0.9 | 0.75 | 1.03 | -2.76 |
| 1 | 1.03 | 1.03 | 0.00 |
| 1.2 | 1.15 | 1.03 | 0.96 |
| 1.4 | 1.22 | 1.03 | 1.47 |
| 1.6 | 1.36 | 1.03 | 2.41 |
| 1.8 | 1.63 | 1.03 | 3.99 |
| 2 | 1.89 | 1.03 | 5.27 |
| 2.2 | 2.03 | 1.03 | 5.89 |
| 2.4 | 2.25 | 1.03 | 6.79 |
| 2.6 | 2.46 | 1.03 | 7.56 |
| 2.7 | 2.58 | 1.03 | 7.98 |
| 2.8 | 2.62 | 1.03 | 8.11 |
| 3 | 2.77 | 1.03 | 8.59 |
| 3.5 | 0.04 | 1.03 | -28.22 |
| 4 | 0.04 | 1.03 | -28.22 |
| 4.5 | 0.04 | 1.03 | -28.22 |
| 5 | 0.04 | 1.03 | -28.22 |

Test plot as follows:



## 4.5. Frequency Stability Test

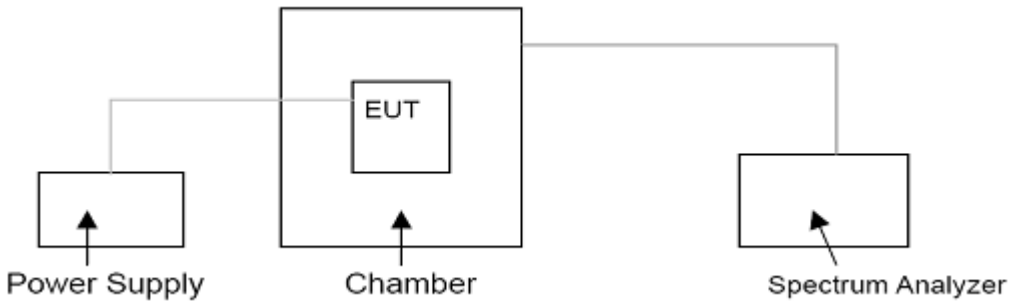
**TEST APPLICABLE**

1 According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃ to +50℃ centigrade.
2 According to FCC Part 2 Section 2.1055 (d) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3 Vary primary supply voltage from 85 to 115 percent of the nominal value.
4 According to §90.213, the frequency stability limit is 2.5 ppm for 12.5KHz channel separation

**TEST PROCEDURE**

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer ESI 26. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

**TEST CONFIGURATION**




**TEST LIMITS**

According to 90.213, Transmitters used must have minimum frequency stability as specified in the following table.

| Frequency Range (MHz) | Channel Bandwidth (KHz) | Frequency Tolerance (ppm) | | |
|---|---|---|---|---|
| | | Fixed and Base Stations | Mobile Stations | |
| | | | > 2 W | ≤ 2 W |
| 150-174 MHz | 6.25 | 1.0 | 2.0 | 2.0 |
| | 12.5 | 2.5 | 5.0 | 5.0 |
| | 25 | 5.0 | 5.0 | 50.0* |
| 421-512 MHz | 6.25 | 0.5 | 1.0 | 1.0 |
| | 12.5 | 1.5 | 2.5 | 2.5 |
| | 25 | 2.5 | 5.0 | 5.0 |

- Stations operating in the 154.45 to 154.49 MHz or the 173.2 to 173.4 MHz bands must have a frequency stability of 5 ppm.
- Paging transmitters operating on paging-only frequencies must operate with frequency stability of 5 ppm in the 150-174 MHz band and 2.5 ppm in the 421-512 MHz band.

**TEST RESULTS**

Remark:We tested Op 1 to Op 6,recorded worst case at Op 1,Op 3, Op 5.

| Op 1 | | | | | | |
|---|---|---|---|---|---|---|
| Test conditions | | Frequency error (ppm) | | | Limit (ppm) | Result |
| Voltage(V) | Temp(℃) | 450.5MHz | 488.5MHz | 526.5MHz | | |
| 13.6 | -30 | 0.38 | 0.85 | 0.59 | 2.5 | Pass |
| | -20 | 0.42 | 0.74 | 0.76 | | |
| | -10 | 0.57 | 0.67 | 0.77 | | |
| | 0 | 0.26 | 0.59 | 0.74 | | |
| | 10 | 0.75 | 0.55 | 0.71 | | |
| | 20 | 0.52 | 0.47 | 0.63 | | |
| | 30 | 0.47 | 0.68 | 0.57 | | |
| | 40 | 0.66 | 0.55 | 0.44 | | |
| | 50 | 0.58 | 0.79 | 0.66 | | |
| 11.56 (85% Rated) | 20 | 0.39 | 0.59 | 0.54 | | |
| 15.64(115% Rated) | 20 | 0.71 | 0.68 | 0.28 | | |

| Op 3 | | | | | | |
|---|---|---|---|---|---|---|
| Test conditions | | Frequency error (ppm) | | | Limit (ppm) | Result |
| Voltage(V) | Temp(℃) | 450.5MHz | 488.5MHz | 526.5MHz | | |
| 13.6 | -30 | 0.53 | 0.63 | 1.03 | 5.0 | Pass |
| | -20 | 0.47 | 0.44 | 0.89 | | |
| | -10 | 0.66 | 0.56 | 0.91 | | |
| | 0 | 0.59 | 0.86 | 0.52 | | |
| | 10 | 0.74 | 0.46 | 0.68 | | |
| | 20 | 0.62 | 1.03 | 0.47 | | |
| | 30 | 0.59 | 0.85 | 0.74 | | |
| | 40 | 0.48 | 0.71 | 0.62 | | |
| | 50 | 0.67 | 0.62 | 0.66 | | |
| 11.56 (85% Rated) | 20 | 0.51 | 0.68 | 0.74 | | |
| 15.64(115% Rated) | 20 | 0.78 | 0.69 | 0.78 | | |

| Op 5 | | | | | | |
|---|---|---|---|---|---|---|
| Test conditions | | Frequency error (ppm) | | | Limit (ppm) | Result |
| Voltage(V) | Temp(℃) | 450.5MHz | 488.5MHz | 526.5MHz | | |
| 13.6 | -30 | 0.61 | 0.68 | 0.95 | 2.5 | Pass |
| | -20 | 0.55 | 0.55 | 0.57 | | |
| | -10 | 0.59 | 0.54 | 0.54 | | |
| | 0 | 0.63 | 0.63 | 0.52 | | |
| | 10 | 0.52 | 0.57 | 0.36 | | |
| | 20 | 0.57 | 0.55 | 0.21 | | |
| | 30 | 0.83 | 0.63 | 0.84 | | |
| | 40 | 0.74 | 0.51 | 0.46 | | |
| | 50 | 0.68 | 0.74 | 0.28 | | |
| 11.56 (85% Rated) | 20 | 0.92 | 0.69 | 0.87 | | |
| 15.64(115% Rated) | 20 | 0.57 | 0.75 | 0.62 | | |

## 4.6. Transmitter Frequency Behavior

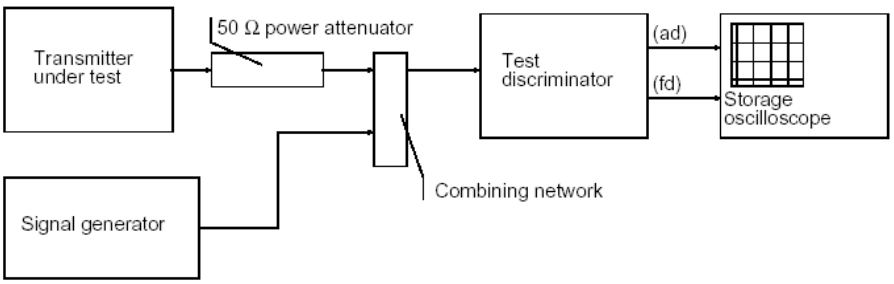
**TEST APPLICABLE**

Section 90.214
Transient frequencies must be within the maximum frequency difference limits during the time intervals indicated:

| Time intervals [1, 2] | Maximum frequency difference [3] | All equipment | |
|---|---|---|---|
| | | 150 to 174 MHz | 421 to 512MHz |
| Transient Frequency Behavior for Equipment Designed to Operate on 25 KHz Channels | | | |
| $t_1$ [4] ..... | ± 25.0 KHz | 5.0 ms | 10.0 ms |
| $t_2$ ..... | ± 12.5 KHz | 20.0 ms | 25.0 ms |
| $t_3$ [4] ..... | ± 25.0 KHz | 5.0 ms | 10.0 ms |
| Transient Frequency Behavior for Equipment Designed to Operate on 12.5 KHz Channels | | | |
| $t_1$ [4] ..... | ± 12.5 KHz | 5.0 ms | 10.0 ms |
| $t_2$ ..... | ± 6.25 KHz | 20.0 ms | 25.0 ms |
| $t_3$ [4] ..... | ± 12.5 KHz | 5.0 ms | 10.0 ms |
| Transient Frequency Behavior for Equipment Designed to Operate on 6.25 KHz Channels | | | |
| $t_1$ [4] ..... | ±6.25 KHz | 5.0 ms | 10.0 ms |
| $t_2$ ..... | ±3.125 KHz | 20.0 ms | 25.0 ms |
| $t_3$ [4] ..... | ±6.25 KHz | 5.0 ms | 10.0 ms |

1. $t_{on}$ is the instant when a 1 KHz test signal is completely suppressed, including any capture time due to phasing.
   $t_1$ is the time period immediately following $t_{on}$.
   $t_2$ is the time period immediately following $t_1$.
   $t_3$ is the time period from the instant when the transmitter is turned off until $t_{off}$.
   $t_{off}$ is the instant when the 1 KHz test signal starts to rise.
2. During the time from the end of $t_2$ to the beginning of $t_3$, the frequency difference must not exceed the limits specified in § 90.213.
3. Difference between the actual transmitter frequency and the assigned transmitter frequency.
4. If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

**TEST CONFIGURATION**




**TEST PROCEDURE**

According to TIA/EIA-603 2.2.19 requirement.As for the product different from PTT,we use test steps as follows:

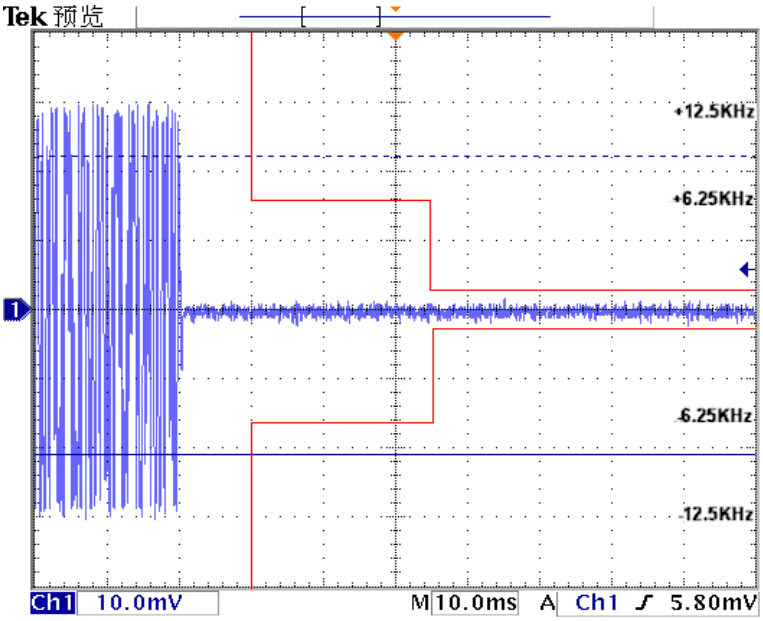
1. Connect DUT into Test discriminator and Storage Oscilloscope and keep DUT stats ON;
2. Inut 1KHz signal into DUT;
3. Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signals;
4. Keep DUT in OFF state and Key the PTT;
5. Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be maintained within the allowable limits during the periods $t_1$ and $t_2$,and shall also remain within limits following $t_2$;
6. Adjust the modulation domain anzlyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transmitter of the transmitter signal.
7. Keep the digital portable radio in ON state and Unkey the PTT;
8. Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be maintained within the allowable limits during the period $t_3$.

**TEST RESULTS**

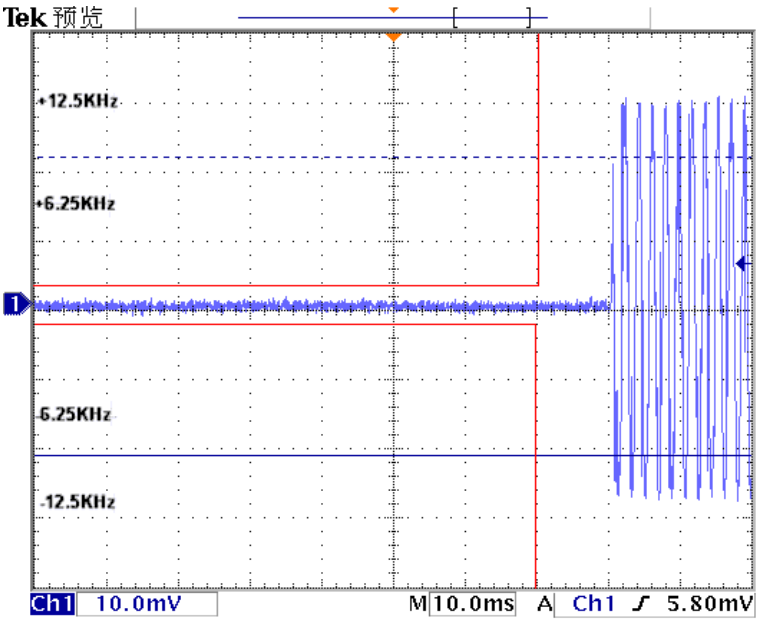
Remark:We tested Op 1 to Op 6,recorded worst case at Op 1,Op 3, Op 5 for 488.5MHz.

Please refer to the following plots.
Modulation Type: FM

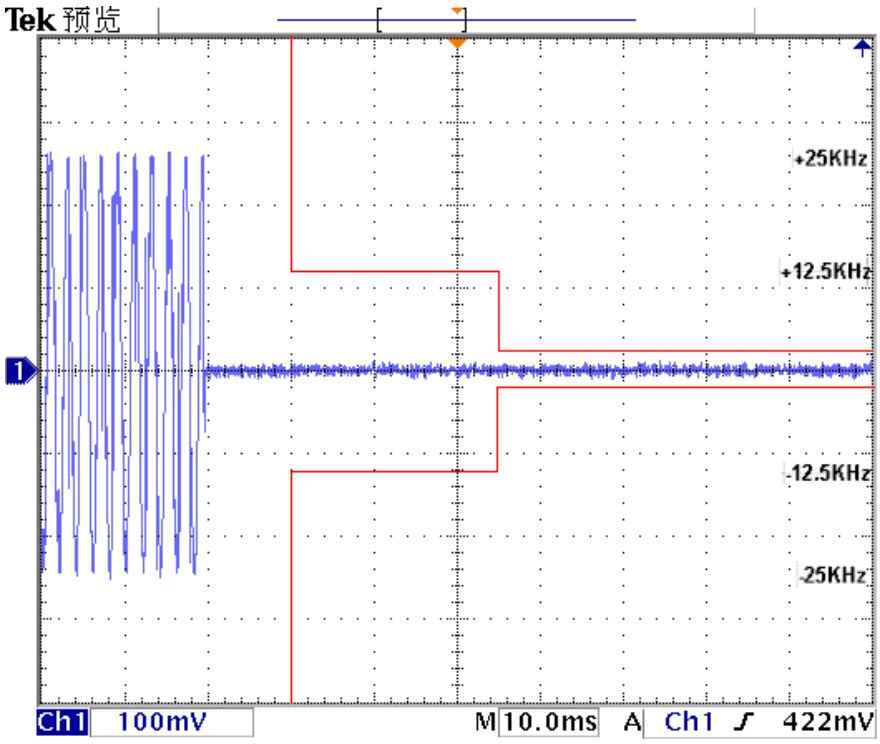
Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation------Off – On



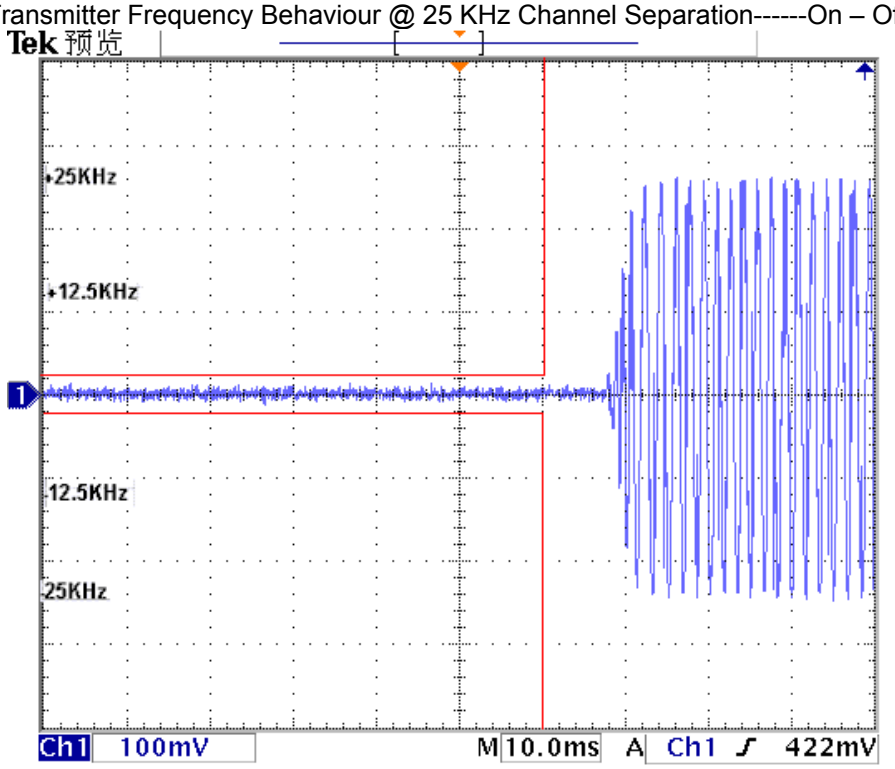

Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation------On – Off



Transmitter Frequency Behaviour @ 25 KHz Channel Separation------Off – On

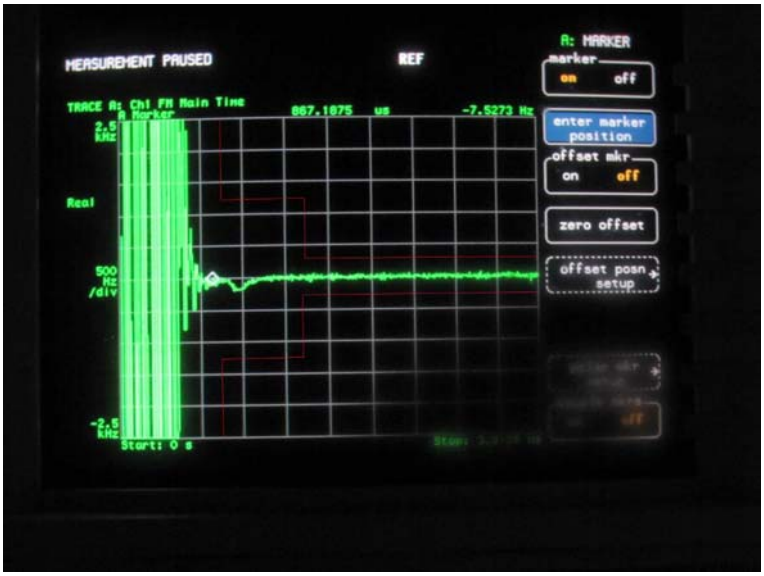



Transmitter Frequency Behaviour @ 25 KHz Channel Separation------On – Off

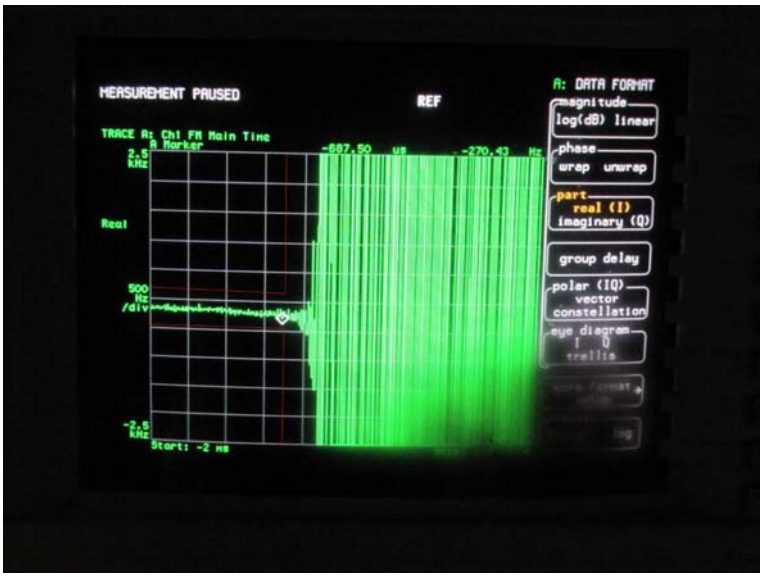


Modulation Type: 4FSK

Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation------Off – On




Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation------On – Off



## 4.7. Spurious Emssion on Antenna Port

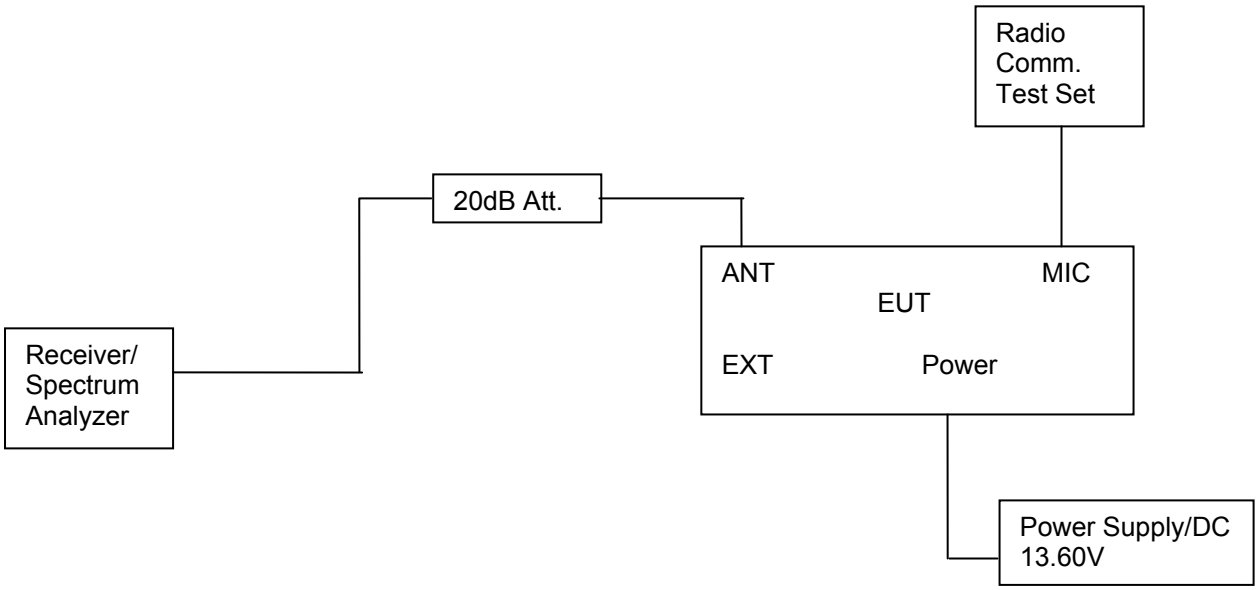
**TEST APPLICABLE**

The same as Section 4.3

**TEST PROCEDURE**

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set to 100 kHz. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range. Set RBW 100 kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz,while set RBW=1MHz.VBW=3MHz from the 1GHz to $10^{th}$ Harmonic.
The audio input was set to 0 to get the unmodulated carrier, the resulting picture is print out for each channel separation.

**TEST CONFIGURATION**




**LIMIT**

**Modulation Type: FM**

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz bandwidth only):
On any frequency removed from the center of the authorized bandwidth by a displacement frequency ($f_d$ in kHz) of more than 12.5 kHz at least:
Low: 50 + 10 log (Pwatts) = 50 + 10 log (26.12) =64.17 dB
High: 50 + 10 log (Pwatts) = 50 + 10 log (25.14) =64.05 dB
Note: In general, the worse case attenuation requirement shown above was applied.
Calculation: Limit (dBm) =EL-50-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 43.98 dBm.
Limit (dBm) =43.98-50-10log10 (26.12) = -20 dBm

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (25 kHz bandwidth only):
On any frequency removed from the center of the assigned channel by more than 250 percent at least:
Low: 43 + 10 log (Pwatts) = 43 + 10 log (25.70) =64.10 dB
High: 43 + 10 log (Pwatts) = 43 + 10 log (24.89) =63.96 dB
Calculation: Limit (dBm) =EL-43-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 43.98 dBm.
Limit (dBm) =43.98-43-10log10 (25.70) = -13 dBm

***Modulation Type: 4FSK***

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz Bandwidth only): On any frequency removed from the center of the authorized bandwidth by a displacement frequency ($f_d$ in kHz) of more than 12.5 kHz at least:
Low: 50 + 10 log (Pwatts) = 50 + 10 log (24.43) =63.88 dB
High: 50 + 10 log (Pwatts) = 50 + 10 log (22.18) =63.46 dB

Note: In general, the worse case attenuation requirement shown above was applied.
Calculation: Limit (dBm) =EL-50-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 43.98 dBm.
Limit (dBm) =43.98-50-10log10 (24.43) = -20 dBm

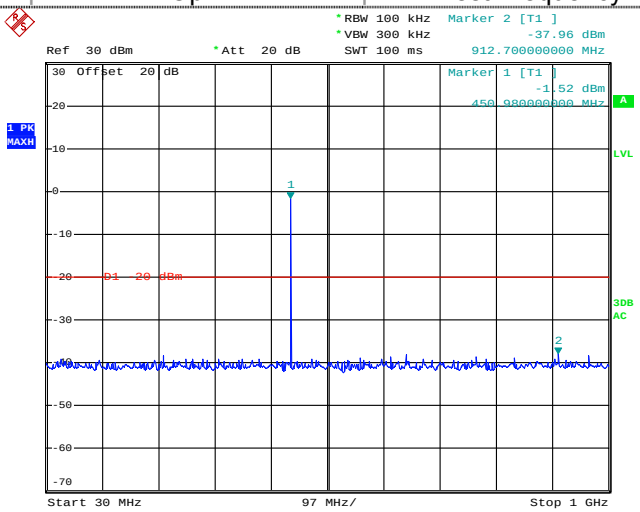
**TEST RESULTS**

Remark:We tested Op 1 to Op 6,recorded worst case at Op 1,Op 3, Op 5.

Note:
1. In general, the worse case attenuation requirement shown above was applied.
2. The measurement frequency range from 30 MHz to 6GHz.

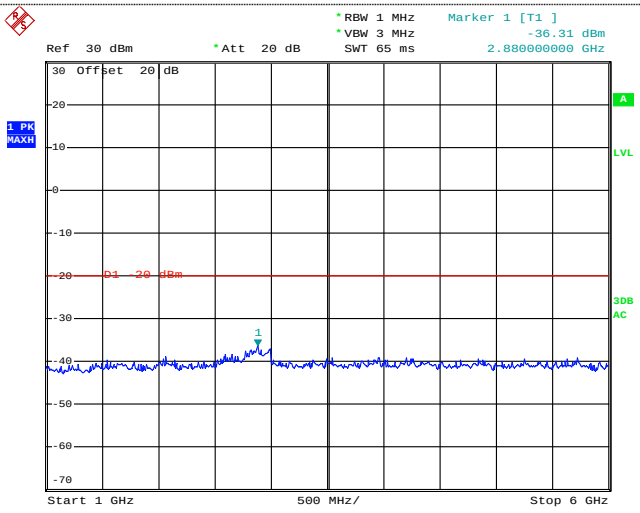
Test plot as follows:

| Operation Mode | Op 1 | Test Frequency | 450.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:31:49

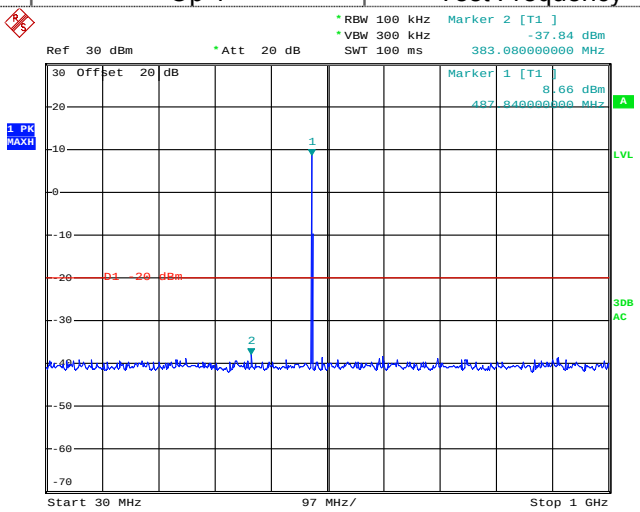
30MHz-1GHz




Date: 19.NOV.2014 07:32:58

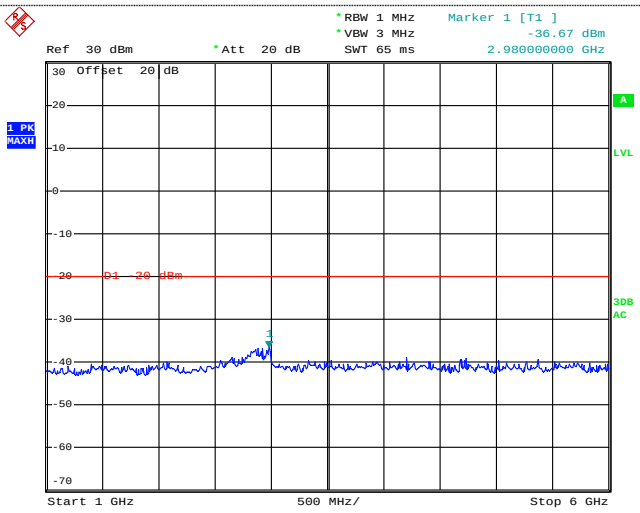
1GHz-6GHz

| Operation Mode | Op 1 | Test Frequency | 488.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:39:05

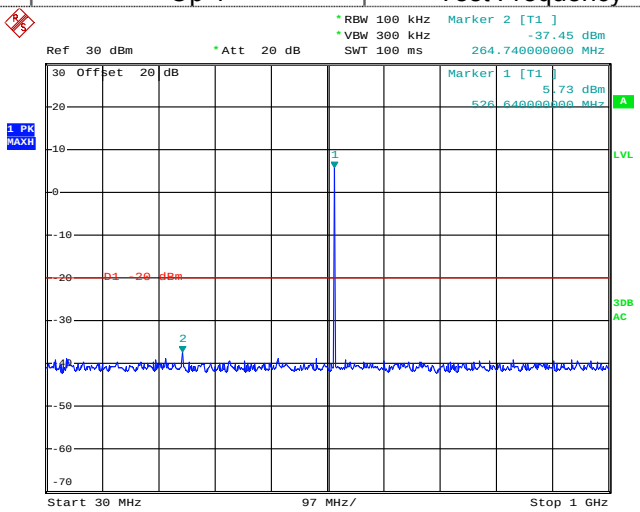
30MHz-1GHz




Date: 19.NOV.2014 07:40:08

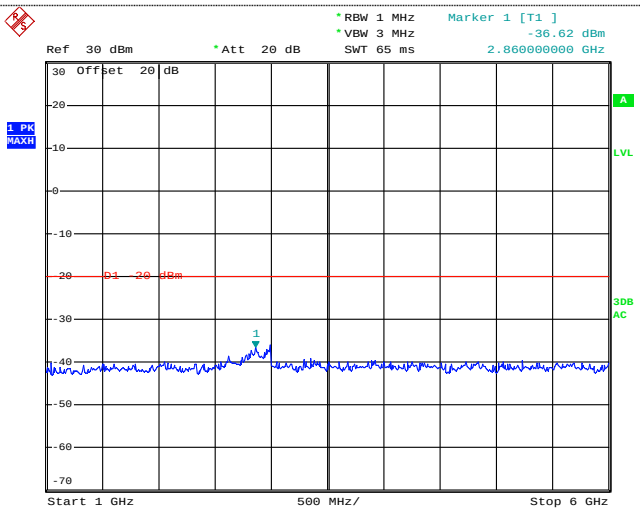
1GHz-6GHz

| Operation Mode | Op 1 | Test Frequency | 526.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:48:14

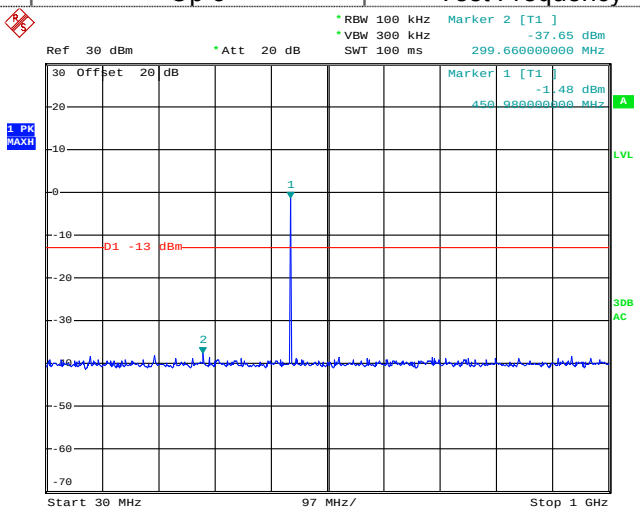
30MHz-1GHz




Date: 19.NOV.2014 07:49:11

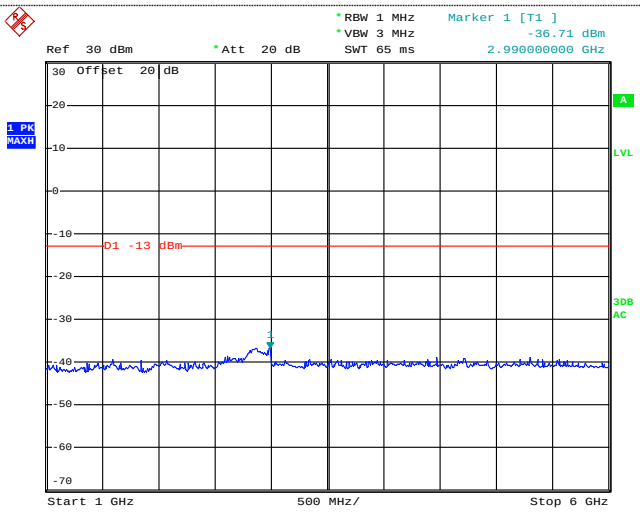
1GHz-6GHz

| Operation Mode | Op 3 | Test Frequency | 450.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:34:51

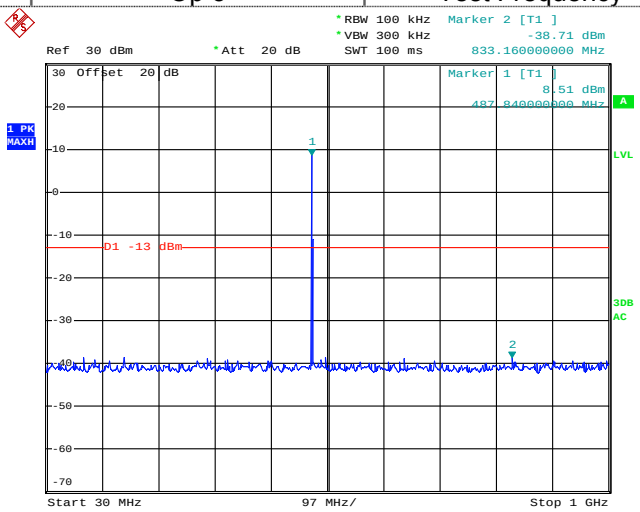
30MHz-1GHz




Date: 19.NOV.2014 07:35:44

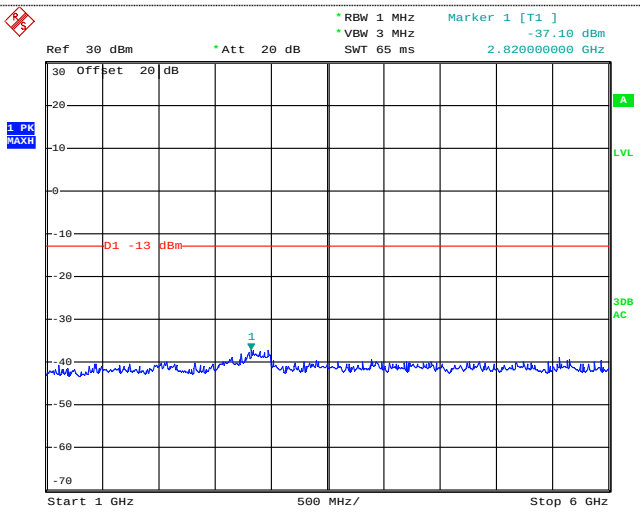
1GHz-6GHz

| Operation Mode | Op 3 | Test Frequency | 488.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:41:05

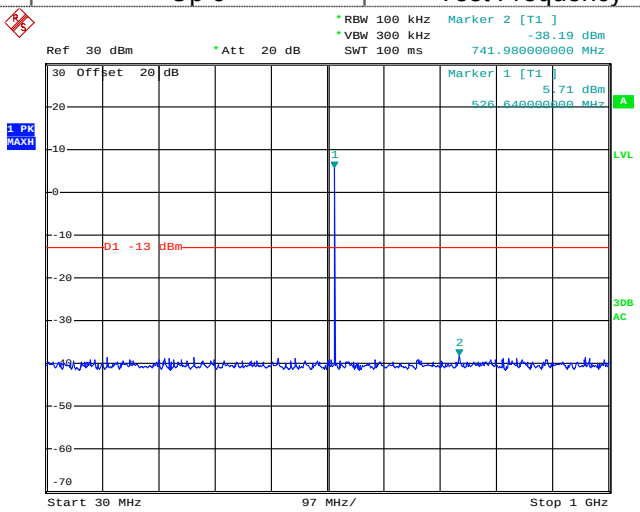
30MHz-1GHz




Date: 19.NOV.2014 07:41:35

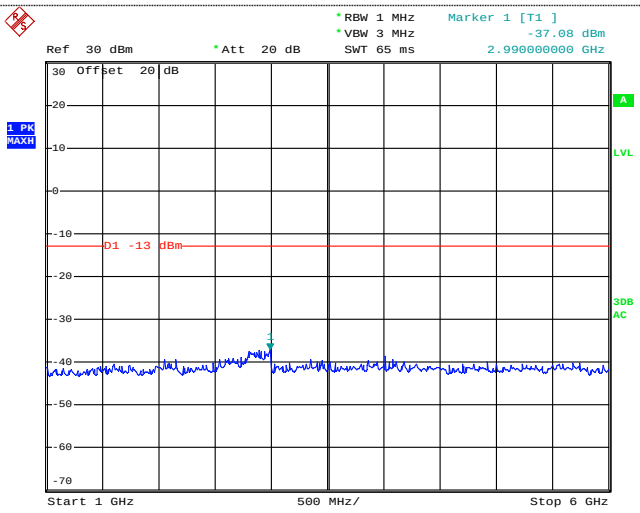
1GHz-6GHz

| Operation Mode | Op 3 | Test Frequency | 526.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:49:57

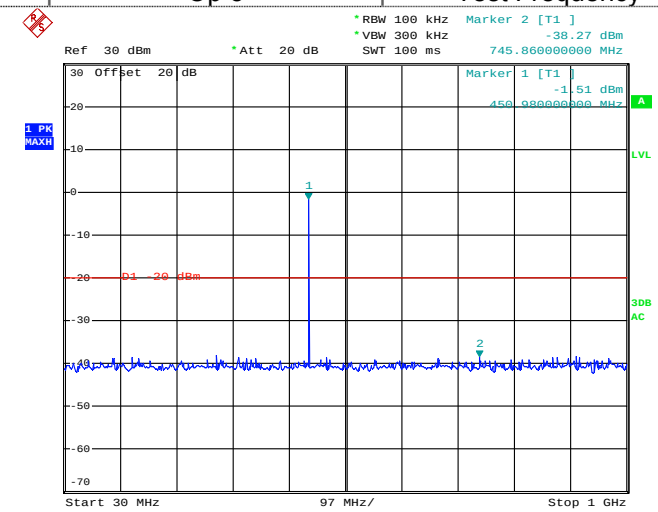
30MHz-1GHz




Date: 19.NOV.2014 07:50:16

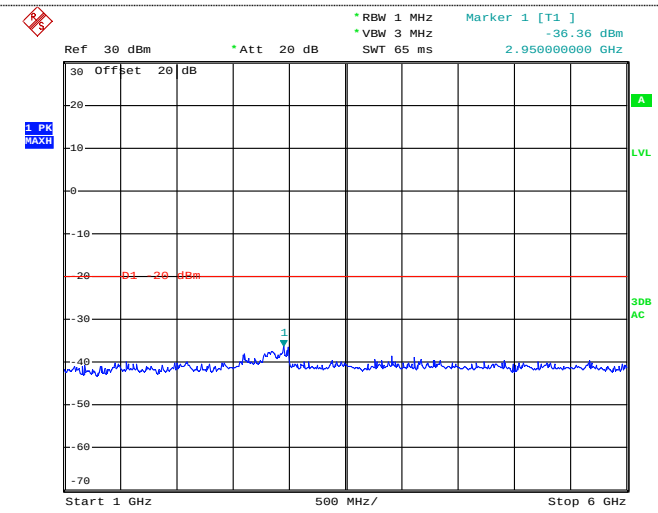
1GHz-6GHz

| Operation Mode | Op 5 | Test Frequency | 450.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:31:19

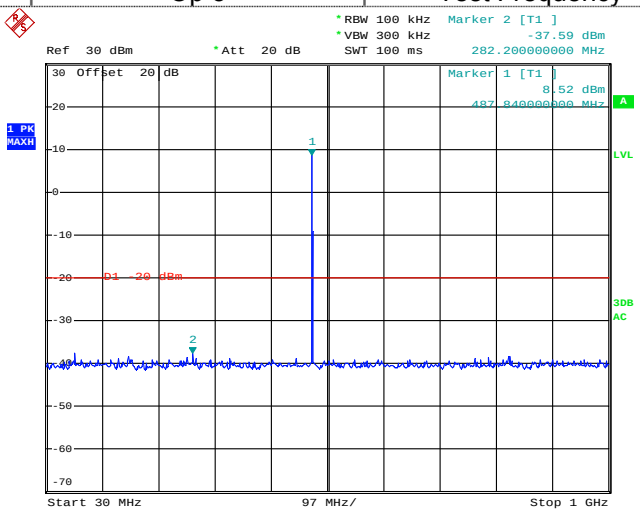
30MHz-1GHz




Date: 19.NOV.2014 07:32:33

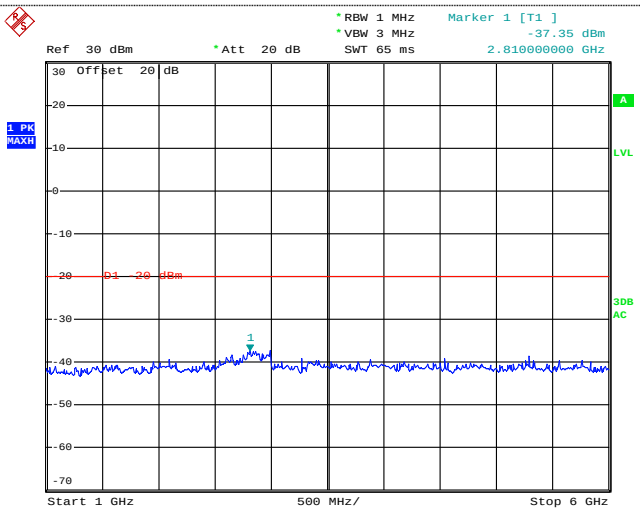
1GHz-6GHz

| Operation Mode | Op 5 | Test Frequency | 488.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:38:34

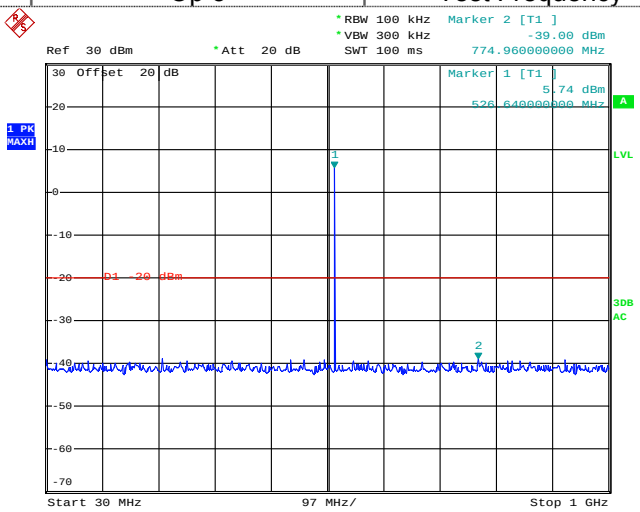
30MHz-1GHz




Date: 19.NOV.2014 07:39:55

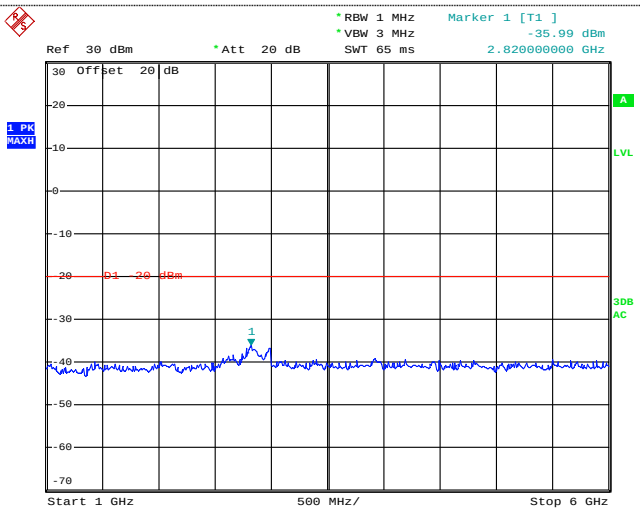
1GHz-6GHz

| Operation Mode | Op 5 | Test Frequency | 526.5MHz |
|---|---|---|---|




Date: 19.NOV.2014 07:47:54

30MHz-1GHz




Date: 19.NOV.2014 07:48:50

1GHz-6GHz

## 4.8. Transmitter Radiated Spurious Emssion

**TEST APPLICABLE**

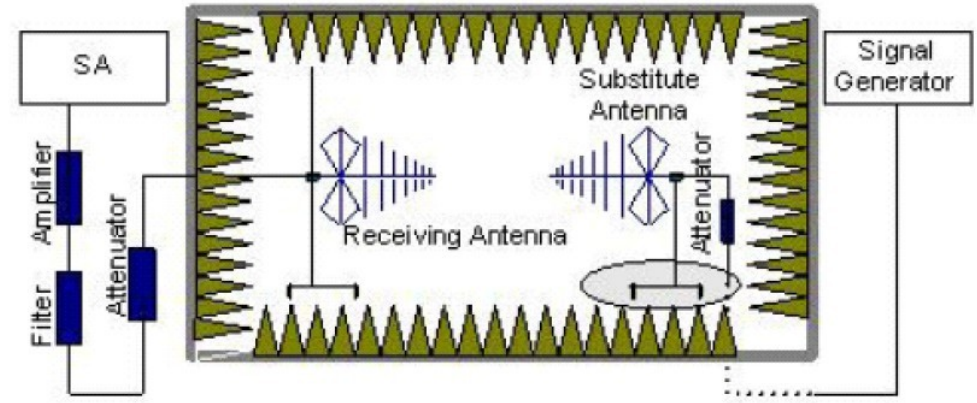
According to the TIA/EIA 603 test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

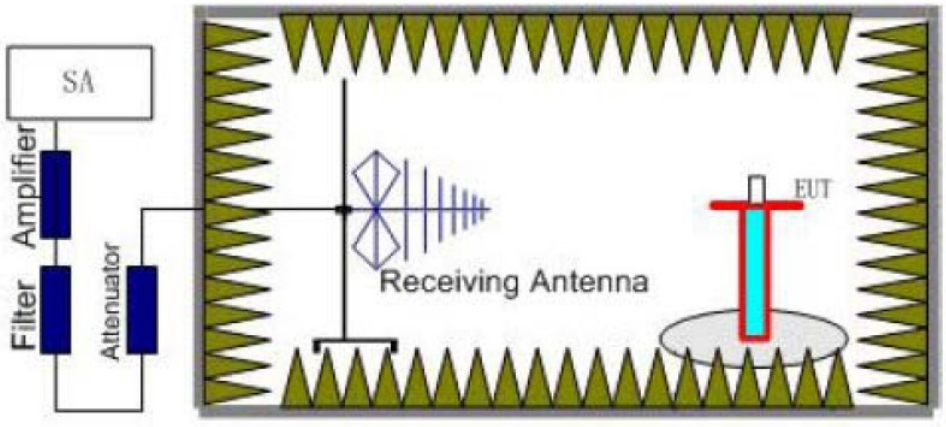
1 On any frequency removed from the center of the authorized bandwidth fo to 5.625 KHz removed from fo: Zero dB
2 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) fo of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27dB
3 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) fo of more than 12.5 KHz: At least 50+10 log (P) dB or 70 dB, which ever is lesser attenuation.

For transmitters designed to transmit with 25 KHz channel separation and equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as following:

1 On any frequency removed from the assigned frequency by more than 50 percent, but no more than 100 percent of the authorized bandwidth: At least 25 dB.
2 On any frequency removed from the assigned frequency by more than 100 percent, but no more than 250 percent of the authorized bandwidth: At least 35 dB.
3 On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43+10Log (P) dB.

**TEST CONFIGURATION**




**TEST PROCEDURE**

1. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in six channels were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same

power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100KHz,VBW=300KHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as ($P_r$).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ($P_{Mea}$) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss ($P_{cl}$) ,the Substitution Antenna Gain ($G_a$) and the Amplifier Gain ($P_{Ag}$) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=$P_{Mea}$- $P_{Ag}$ - $P_{cl}$ - $G_a$
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=$P_{Mea}$- $P_{cl}$ - $G_a$
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

**LIMIT**

***Modulation Type: FM***

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz bandwidth only):
On any frequency removed from the center of the authorized bandwidth by a displacement frequency ($f_d$ in kHz) of more than 12.5 kHz at least:
Low: 50 + 10 log (Pwatts) = 50 + 10 log (26.12) =64.17 dB
High: 50 + 10 log (Pwatts) = 50 + 10 log (25.14) =64.05 dB
Note: In general, the worse case attenuation requirement shown above was applied.
Calculation: Limit (dBm) =EL-50-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 43.98 dBm.
Limit (dBm) =43.98-50-10log10 (26.12) = -20 dBm

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (25 kHz bandwidth only):
On any frequency removed from the center of the assigned channel by more than 250 percent at least:
Low: 43 + 10 log (Pwatts) = 43 + 10 log (25.70) =64.10 dB
High: 43 + 10 log (Pwatts) = 43 + 10 log (24.89) =63.96 dB
Calculation: Limit (dBm) =EL-43-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 43.98 dBm.
Limit (dBm) =43.98-43-10log10 (25.70) = -13 dBm

***Modulation Type: 4FSK***

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz Bandwidth only):
On any frequency removed from the center of the authorized bandwidth by a displacement frequency ($f_d$ in kHz) of more than 12.5 kHz at least:
Low: 50 + 10 log (Pwatts) = 50 + 10 log (24.43) =63.88 dB
High: 50 + 10 log (Pwatts) = 50 + 10 log (22.18) =63.46 dB

Note: In general, the worse case attenuation requirement shown above was applied.
Calculation: Limit (dBm) =EL-50-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 43.98 dBm.
Limit (dBm) =43.98-50-10log10 (24.43) = -20 dBm

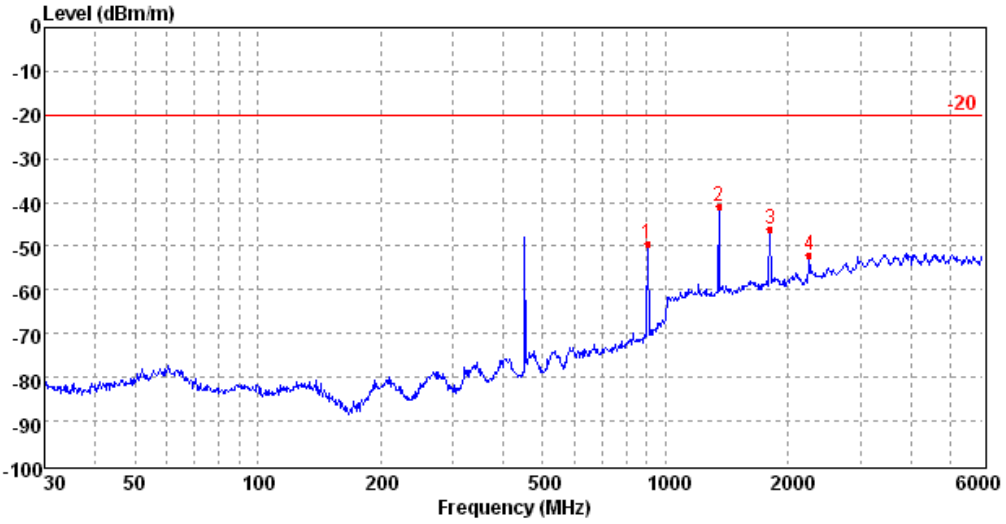
**TEST RESULTS**

Remark:We tested Op 1 to Op 6.recorded worst case at Op 1, Op 3 and Op 5 .

Note: 1. In general, the worse case attenuation requirement shown above was applied.
2. The measurement frequency range from 30 MHz to 6 GHz.

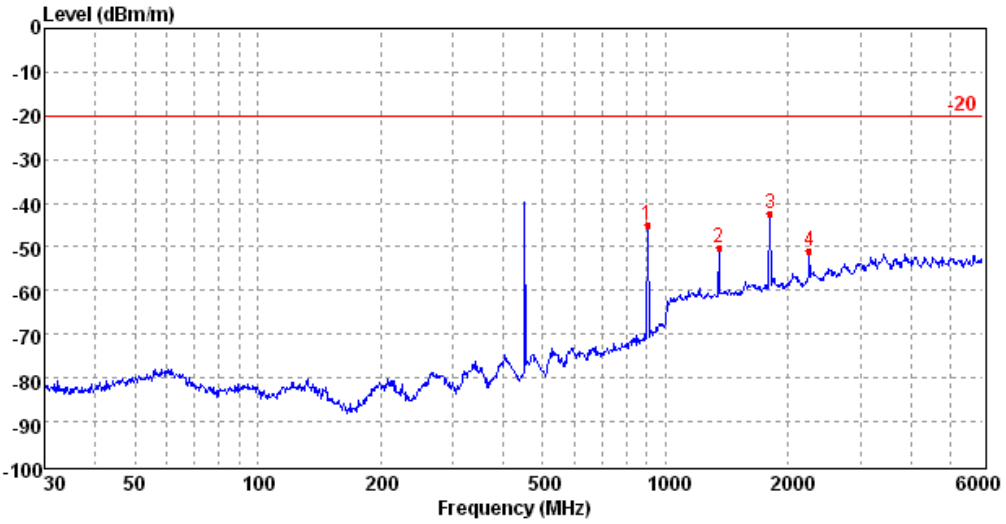
Test plot as follows:

| Op 1 | | | |
|---|---|---|---|
| Test Frequency: | 450.50 MHz | Polarity: | Horizontal |



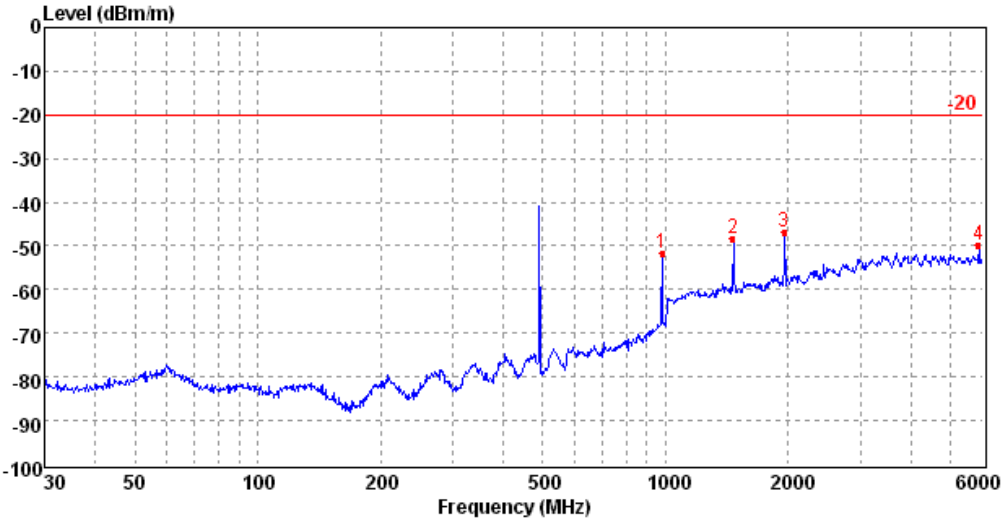

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 902.51 | -59.91 | 35.32 | 3.62 | 28.41 | -49.38 | -20.00 | -29.38 | Peak |
| 2 | 1351.23 | -48.59 | 39.59 | 4.88 | 36.68 | -40.80 | -20.00 | -20.80 | Peak |
| 3 | 1803.07 | -55.29 | 40.68 | 5.80 | 37.10 | -45.91 | -20.00 | -25.91 | Peak |
| 4 | 2251.66 | -63.04 | 41.75 | 6.59 | 37.47 | -52.17 | -20.00 | -32.17 | Peak |

| Test Frequency: | 450.50MHz | Polarity: | Vertical |
|---|---|---|---|



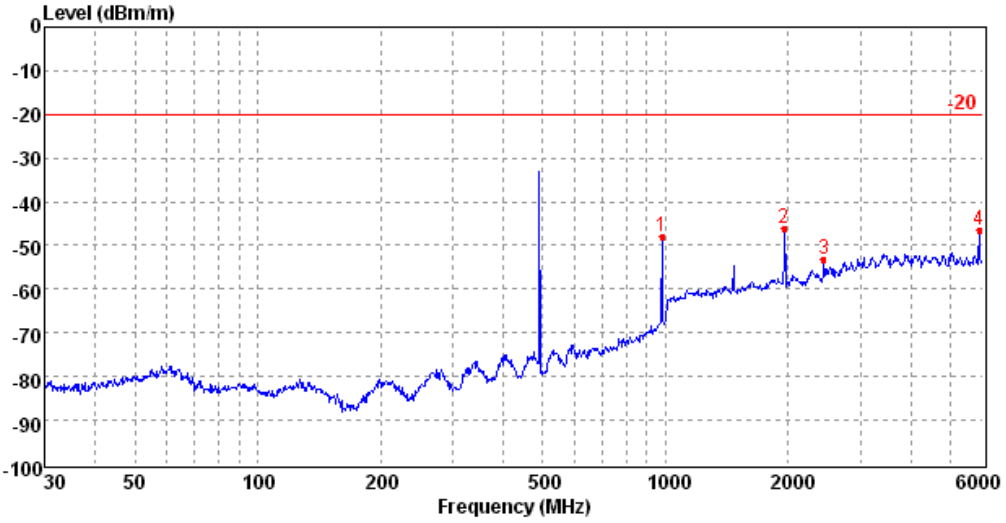

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 902.51 | -55.58 | 35.32 | 3.62 | 28.41 | -45.05 | -20.00 | -25.05 | Peak |
| 2 | 1351.23 | -57.80 | 39.59 | 4.88 | 36.68 | -50.01 | -20.00 | -30.01 | Peak |
| 3 | 1803.07 | -51.66 | 40.68 | 5.80 | 37.10 | -42.28 | -20.00 | -22.28 | Peak |
| 4 | 2251.66 | -61.67 | 41.75 | 6.59 | 37.47 | -50.80 | -20.00 | -30.80 | Peak |

| Op 1 | | | |
|---|---|---|---|
| Test Frequency: | 488.5 MHz | Polarity: | *Horizontal* |



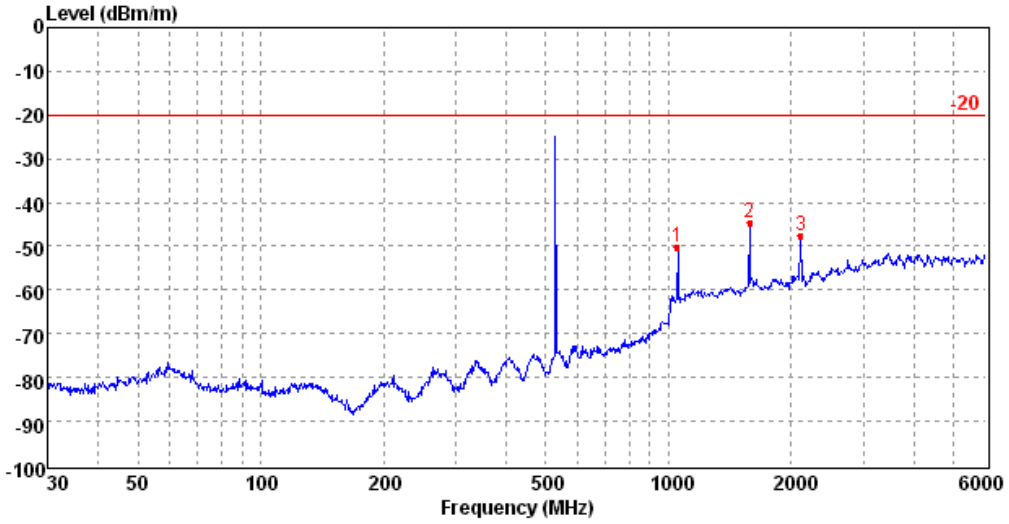

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 978.54 | -64.65 | 37.58 | 3.65 | 28.34 | -51.76 | -20.00 | -31.76 | Peak |
| 2 | 1464.69 | -56.42 | 39.96 | 5.11 | 36.80 | -48.15 | -20.00 | -28.15 | Peak |
| 3 | 1954.47 | -56.56 | 40.98 | 6.07 | 37.22 | -46.73 | -20.00 | -26.73 | Peak |
| 4 | 5861.86 | -68.01 | 46.58 | 9.72 | 38.00 | -49.71 | -20.00 | -29.71 | Peak |

| Test Frequency: | 488.5MHz | Polarity: | Vertical |
|---|---|---|---|



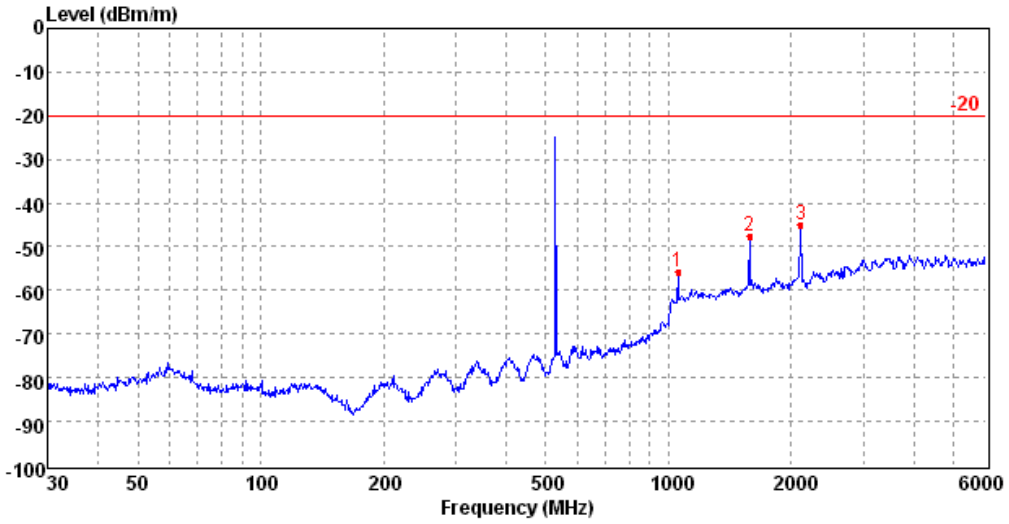

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 978.54 | -60.85 | 37.58 | 3.65 | 28.34 | -47.96 | -20.00 | -27.96 | Peak |
| 2 | 1954.47 | -55.77 | 40.98 | 6.07 | 37.22 | -45.94 | -20.00 | -25.94 | Peak |
| 3 | 2440.73 | -64.59 | 42.21 | 6.89 | 37.61 | -53.10 | -20.00 | -33.10 | Peak |
| 4 | 5872.37 | -64.84 | 46.58 | 9.73 | 38.00 | -46.53 | -20.00 | -26.53 | Peak |

| Op 1 | | | |
|---|---|---|---|
| Test Frequency: | 526.5 MHz | Polarity: | *Horizontal* |



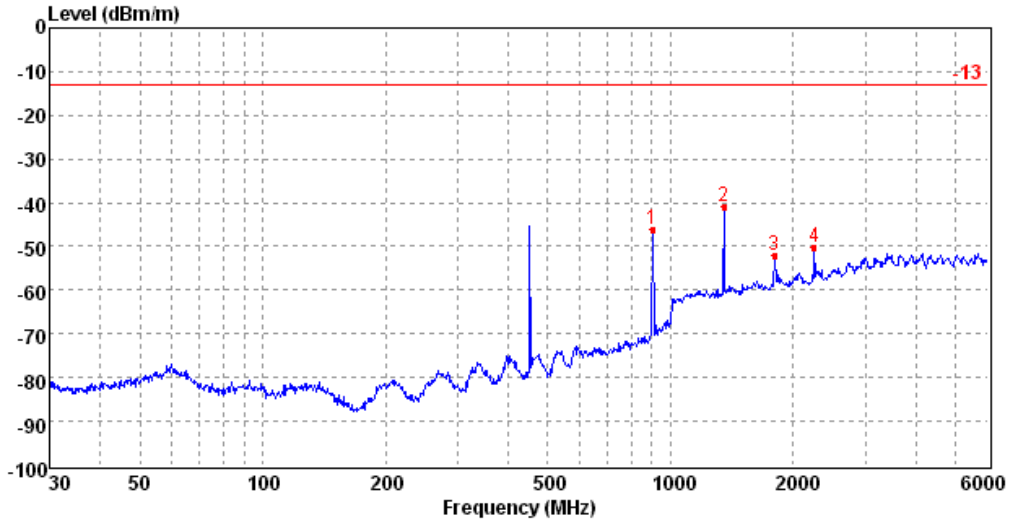

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1051.45 | -56.62 | 38.54 | 4.15 | 36.32 | -50.25 | -20.00 | -30.25 | Peak |
| 2 | 1579.17 | -53.13 | 40.22 | 5.35 | 36.91 | -44.47 | -20.00 | -24.47 | Peak |
| 3 | 2107.23 | -58.00 | 41.36 | 6.35 | 37.35 | -47.64 | -20.00 | -27.64 | Peak |

| Test Frequency: | 526.5MHz | Polarity: | Vertical |
|---|---|---|---|



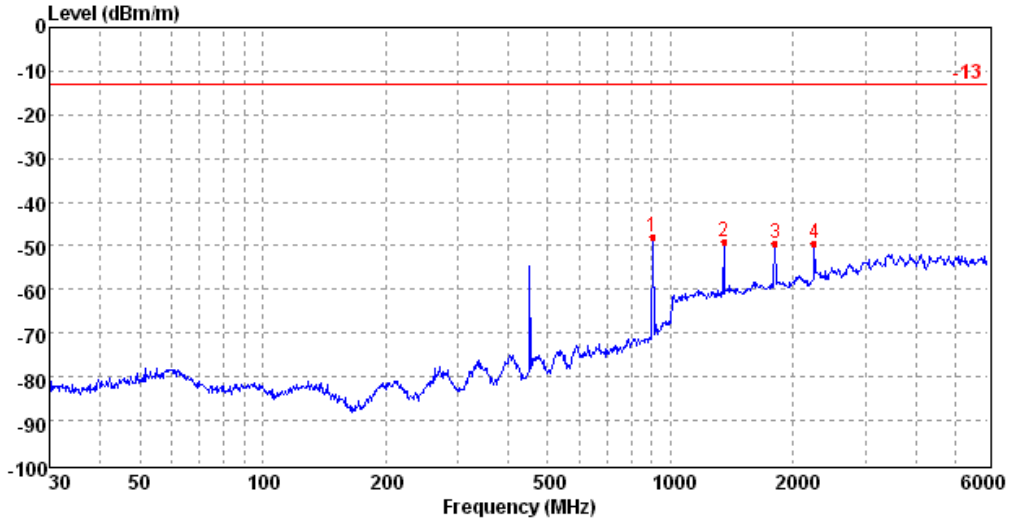

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1053.34 | -62.14 | 38.56 | 4.15 | 36.33 | -55.76 | -20.00 | -35.76 | Peak |
| 2 | 1579.17 | -56.26 | 40.22 | 5.35 | 36.91 | -47.60 | -20.00 | -27.60 | Peak |
| 3 | 2107.23 | -55.20 | 41.36 | 6.35 | 37.35 | -44.84 | -20.00 | -24.84 | Peak |

| Op 3 | | | |
|---|---|---|---|
| Test Frequency: | 450.50 MHz | Polarity: | Horizontal |



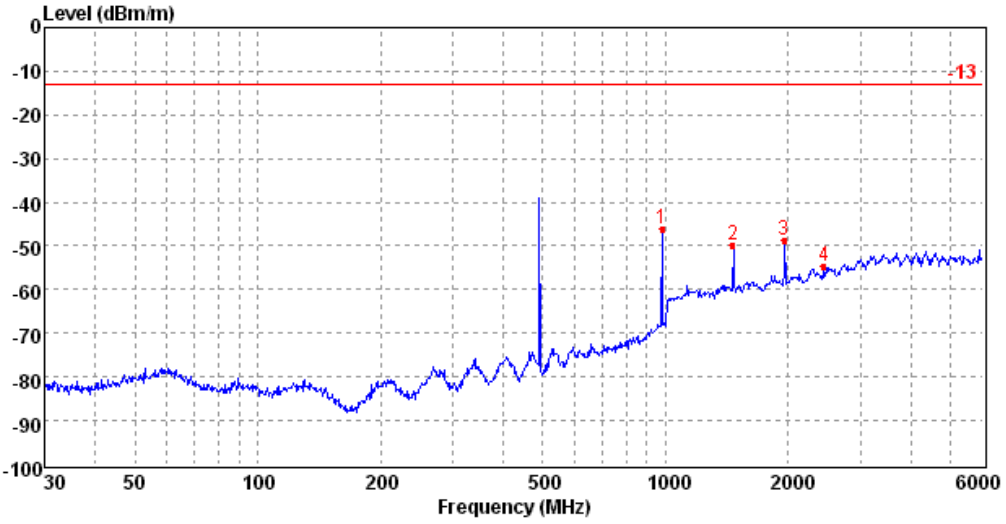

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 902.51 | -56.58 | 35.32 | 3.62 | 28.41 | -46.05 | -13.00 | -33.05 | Peak |
| 2 | 1351.23 | -48.71 | 39.59 | 4.88 | 36.68 | -40.92 | -13.00 | -27.92 | Peak |
| 3 | 1799.84 | -61.31 | 40.68 | 5.80 | 37.10 | -51.93 | -13.00 | -38.93 | Peak |
| 4 | 2251.66 | -61.24 | 41.75 | 6.59 | 37.47 | -50.37 | -13.00 | -37.37 | Peak |

| Test Frequency: | 450.50MHz | Polarity: | Vertical |
|---|---|---|---|



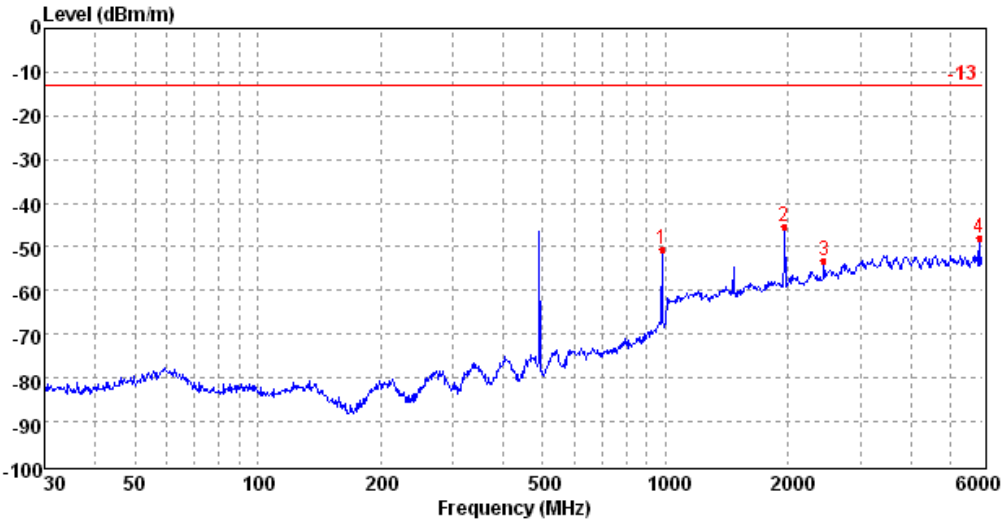

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 902.51 | -58.56 | 35.32 | 3.62 | 28.41 | -48.03 | -13.00 | -35.03 | Peak |
| 2 | 1351.23 | -56.91 | 39.59 | 4.88 | 36.68 | -49.12 | -13.00 | -36.12 | Peak |
| 3 | 1803.07 | -58.67 | 40.68 | 5.80 | 37.10 | -49.29 | -13.00 | -36.29 | Peak |
| 4 | 2251.66 | -60.44 | 41.75 | 6.59 | 37.47 | -49.57 | -13.00 | -36.57 | Peak |

| Op 3 | | | |
|---|---|---|---|
| Test Frequency: | 488.5 MHz | Polarity: | *Horizontal* |



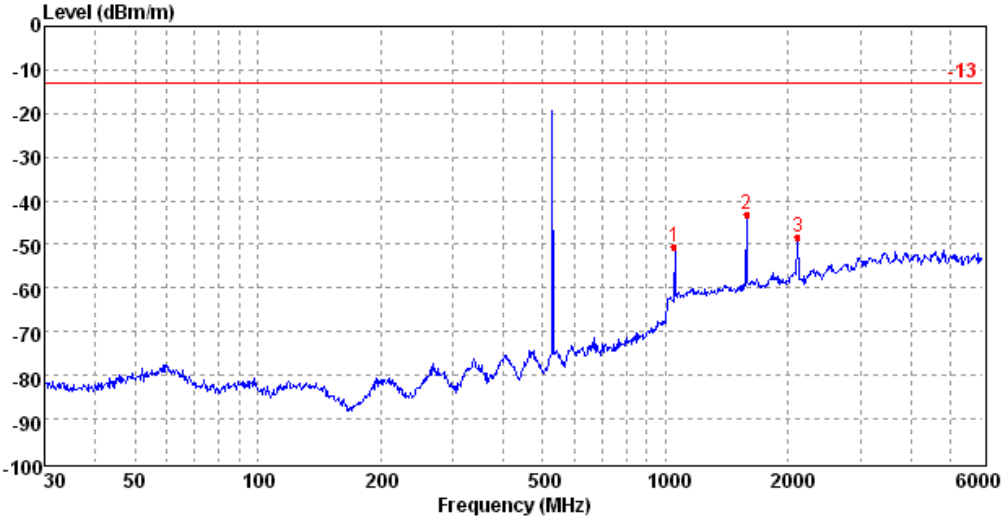

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 978.54 | -59.08 | 37.58 | 3.65 | 28.34 | -46.19 | -13.00 | -33.19 | Peak |
| 2 | 1464.69 | -57.94 | 39.96 | 5.11 | 36.80 | -49.67 | -13.00 | -36.67 | Peak |
| 3 | 1954.47 | -58.39 | 40.98 | 6.07 | 37.22 | -48.56 | -13.00 | -35.56 | Peak |
| 4 | 2445.11 | -66.08 | 42.25 | 6.90 | 37.61 | -54.54 | -13.00 | -41.54 | Peak |

| Test Frequency: | 488.5MHz | Polarity: | Vertical |
|---|---|---|---|



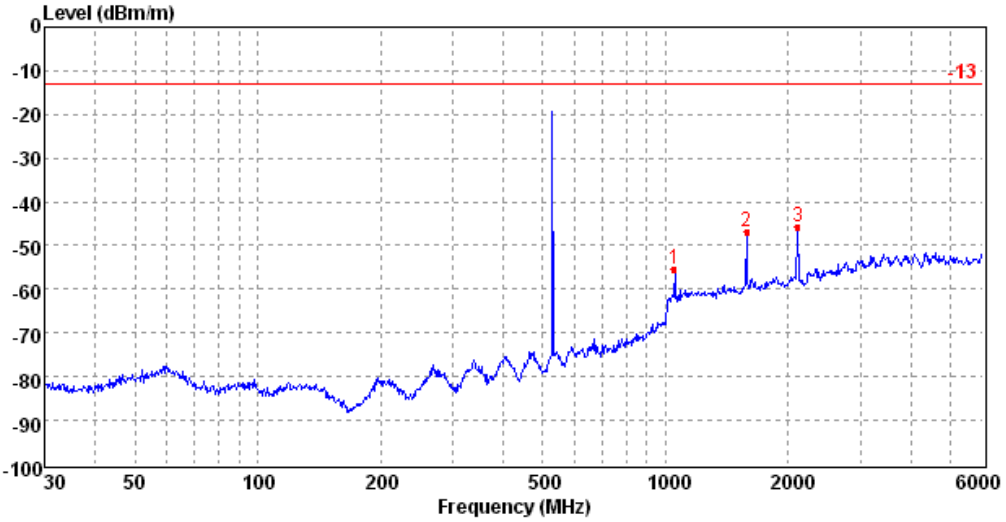

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 978.54 | -63.42 | 37.58 | 3.65 | 28.34 | -50.53 | -13.00 | -37.53 | Peak |
| 2 | 1954.47 | -55.06 | 40.98 | 6.07 | 37.22 | -45.23 | -13.00 | -32.23 | Peak |
| 3 | 2440.73 | -64.71 | 42.21 | 6.89 | 37.61 | -53.22 | -13.00 | -40.22 | Peak |
| 4 | 5872.37 | -66.20 | 46.58 | 9.73 | 38.00 | -47.89 | -13.00 | -34.89 | Peak |

| Op 3 | | | |
|---|---|---|---|
| Test Frequency: | 526.5 MHz | Polarity: | *Horizontal* |



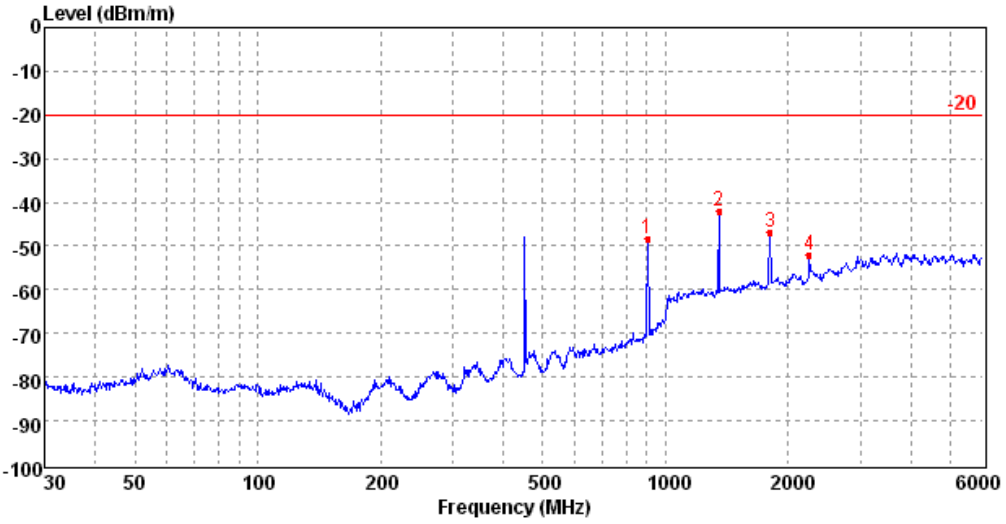

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1051.45 | -57.10 | 38.54 | 4.15 | 36.32 | -50.73 | -13.00 | -37.73 | Peak |
| 2 | 1579.17 | -51.71 | 40.22 | 5.35 | 36.91 | -43.05 | -13.00 | -30.05 | Peak |
| 3 | 2107.23 | -58.75 | 41.36 | 6.35 | 37.35 | -48.39 | -13.00 | -35.39 | Peak |

| Test Frequency: | 526.5MHz | Polarity: | Vertical |
|---|---|---|---|



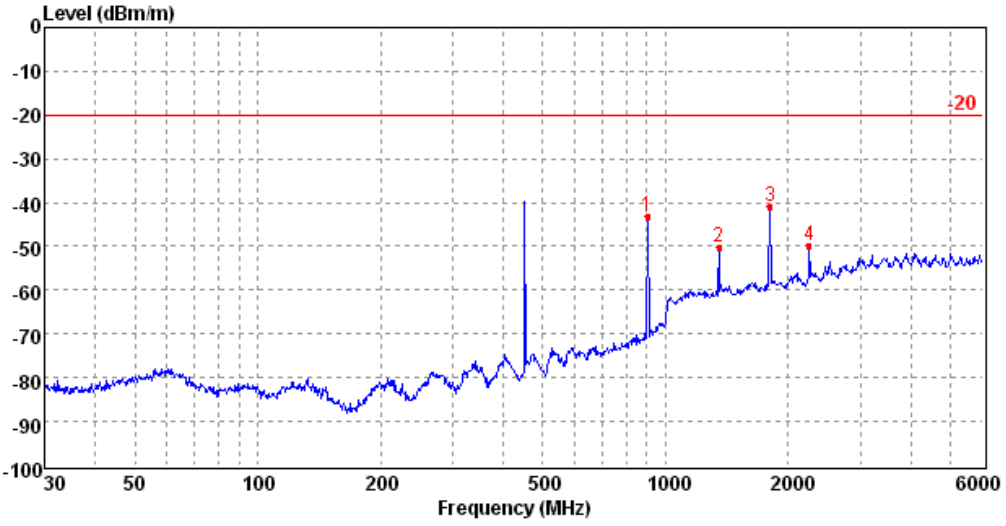

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1051.45 | -61.75 | 38.54 | 4.15 | 36.32 | -55.38 | -13.00 | -42.38 | Peak |
| 2 | 1579.17 | -55.32 | 40.22 | 5.35 | 36.91 | -46.66 | -13.00 | -33.66 | Peak |
| 3 | 2107.23 | -56.00 | 41.36 | 6.35 | 37.35 | -45.64 | -13.00 | -32.64 | Peak |

| Op 5 | | | |
|---|---|---|---|
| Test Frequency: | 450.50 MHz | Polarity: | Horizontal |



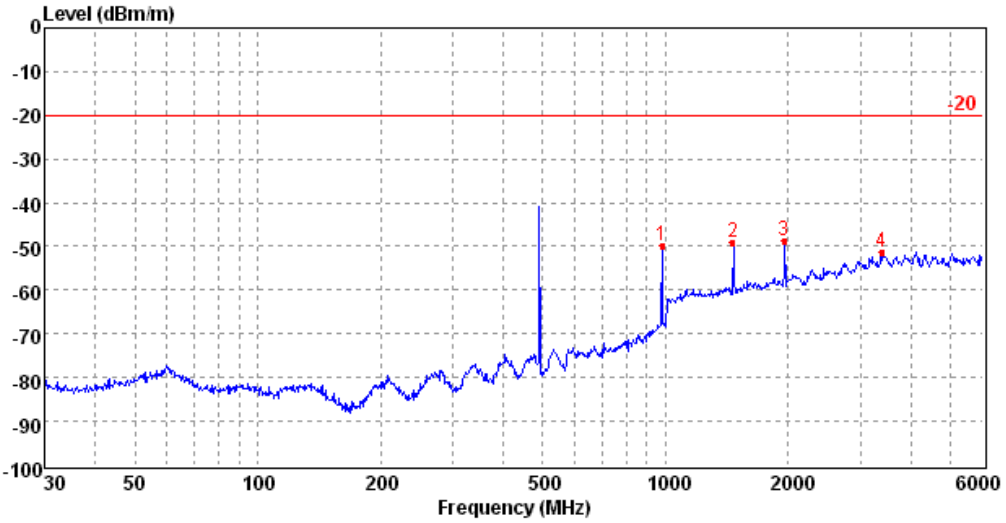

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 902.51 | -58.91 | 35.32 | 3.62 | 28.41 | -48.38 | -20.00 | -28.38 | Peak |
| 2 | 1351.23 | -49.81 | 39.59 | 4.88 | 36.68 | -42.02 | -20.00 | -22.02 | Peak |
| 3 | 1803.07 | -56.36 | 40.68 | 5.80 | 37.10 | -46.98 | -20.00 | -26.98 | Peak |
| 4 | 2251.66 | -63.00 | 41.75 | 6.59 | 37.47 | -52.13 | -20.00 | -32.13 | Peak |

| Test Frequency: | 450.50MHz | Polarity: | Vertical |
|---|---|---|---|



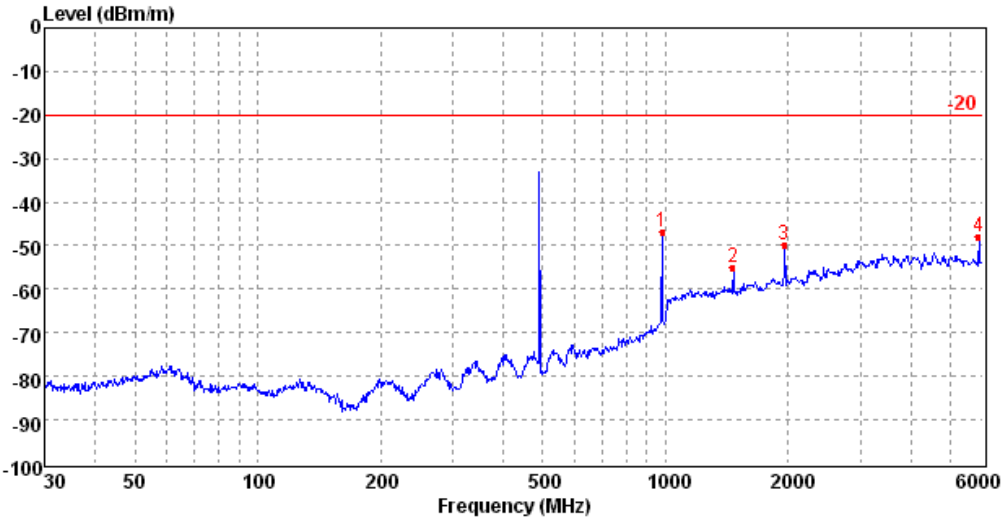

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 902.51 | -53.58 | 35.32 | 3.62 | 28.41 | -43.05 | -20.00 | -23.05 | Peak |
| 2 | 1351.23 | -58.11 | 39.59 | 4.88 | 36.68 | -50.32 | -20.00 | -30.32 | Peak |
| 3 | 1803.07 | -50.17 | 40.68 | 5.80 | 37.10 | -40.79 | -20.00 | -20.79 | Peak |
| 4 | 2251.66 | -60.79 | 41.75 | 6.59 | 37.47 | -49.92 | -20.00 | -29.92 | Peak |

| Op 5 | | | |
|---|---|---|---|
| Test Frequency: | 488.5 MHz | Polarity: | *Horizontal* |



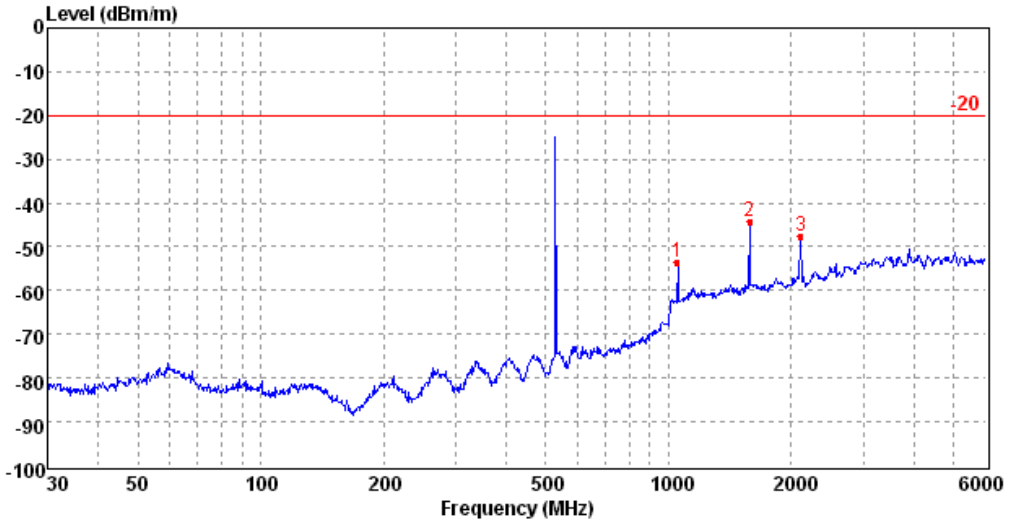

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 978.54 | -62.65 | 37.58 | 3.65 | 28.34 | -49.76 | -20.00 | -29.76 | Peak |
| 2 | 1464.69 | -57.18 | 39.96 | 5.11 | 36.80 | -48.91 | -20.00 | -28.91 | Peak |
| 3 | 1954.47 | -58.42 | 40.98 | 6.07 | 37.22 | -48.59 | -20.00 | -28.59 | Peak |
| 4 | 3387.83 | -65.68 | 43.67 | 8.67 | 37.99 | -51.33 | -20.00 | -31.33 | Peak |

| Test Frequency: | 488.5MHz | Polarity: | Vertical |
|---|---|---|---|



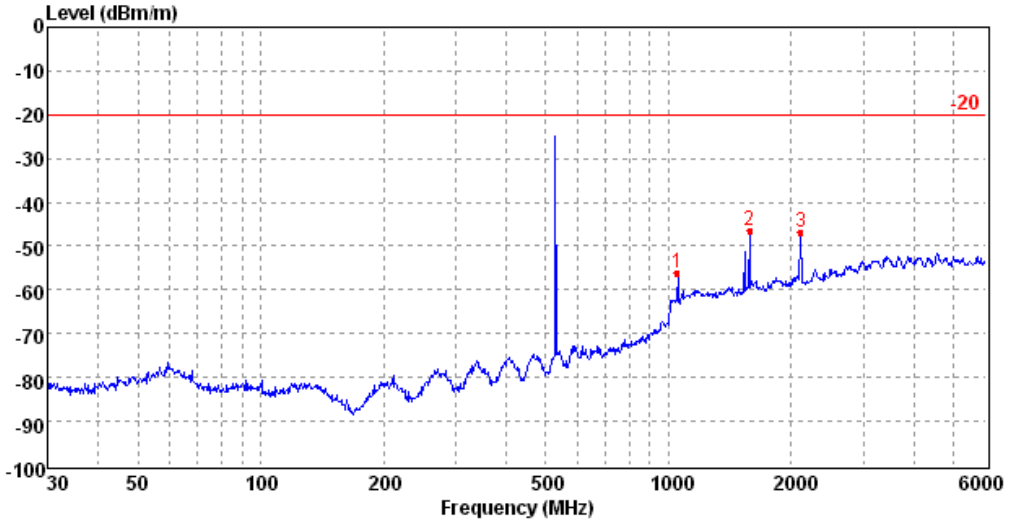

| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 978.54 | -59.85 | 37.58 | 3.65 | 28.34 | -46.96 | -20.00 | -26.96 | Peak |
| 2 | 1464.69 | -63.30 | 39.96 | 5.11 | 36.80 | -55.03 | -20.00 | -35.03 | Peak |
| 3 | 1954.47 | -59.62 | 40.98 | 6.07 | 37.22 | -49.79 | -20.00 | -29.79 | Peak |
| 4 | 5861.86 | -66.35 | 46.58 | 9.72 | 38.00 | -48.05 | -20.00 | -28.05 | Peak |

| Op 5 | | | |
|---|---|---|---|
| Test Frequency: | 526.5 MHz | Polarity: | *Horizontal* |




| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1051.45 | -60.07 | 38.54 | 4.15 | 36.32 | -53.70 | -20.00 | -33.70 | Peak |
| 2 | 1579.17 | -52.73 | 40.22 | 5.35 | 36.91 | -44.07 | -20.00 | -24.07 | Peak |
| 3 | 2107.23 | -58.03 | 41.36 | 6.35 | 37.35 | -47.67 | -20.00 | -27.67 | Peak |

| Test Frequency: | 526.5MHz | Polarity: | Vertical |
|---|---|---|---|




| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1051.45 | -62.60 | 38.54 | 4.15 | 36.32 | -56.23 | -20.00 | -36.23 | Peak |
| 2 | 1579.17 | -55.22 | 40.22 | 5.35 | 36.91 | -46.56 | -20.00 | -26.56 | Peak |
| 3 | 2107.23 | -57.16 | 41.36 | 6.35 | 37.35 | -46.80 | -20.00 | -26.80 | Peak |

## 4.9. Receiver Radiated Spurious Emssion

**TEST APPLICABLE**

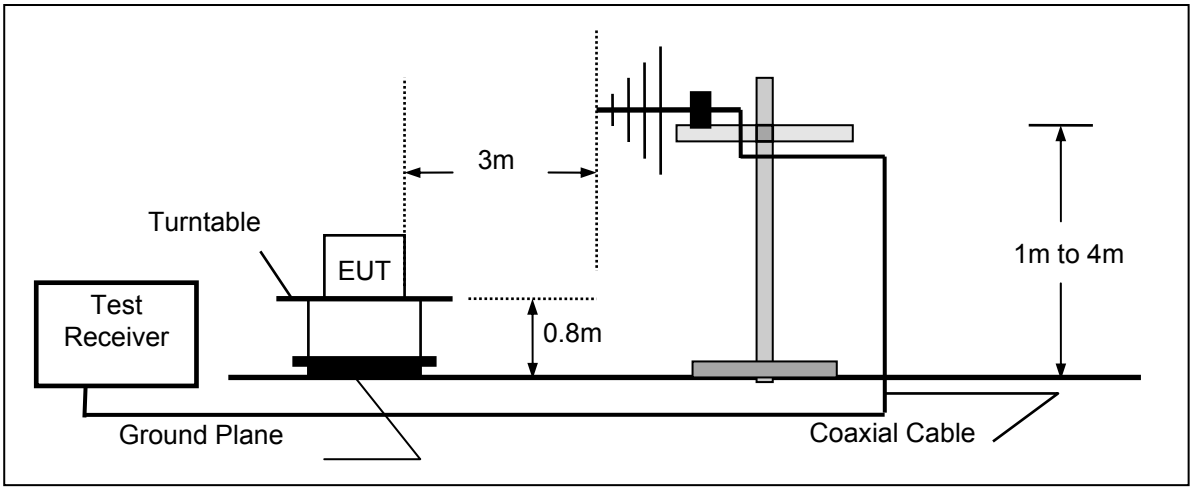
The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

**FS = RA + AF + CL – AG**

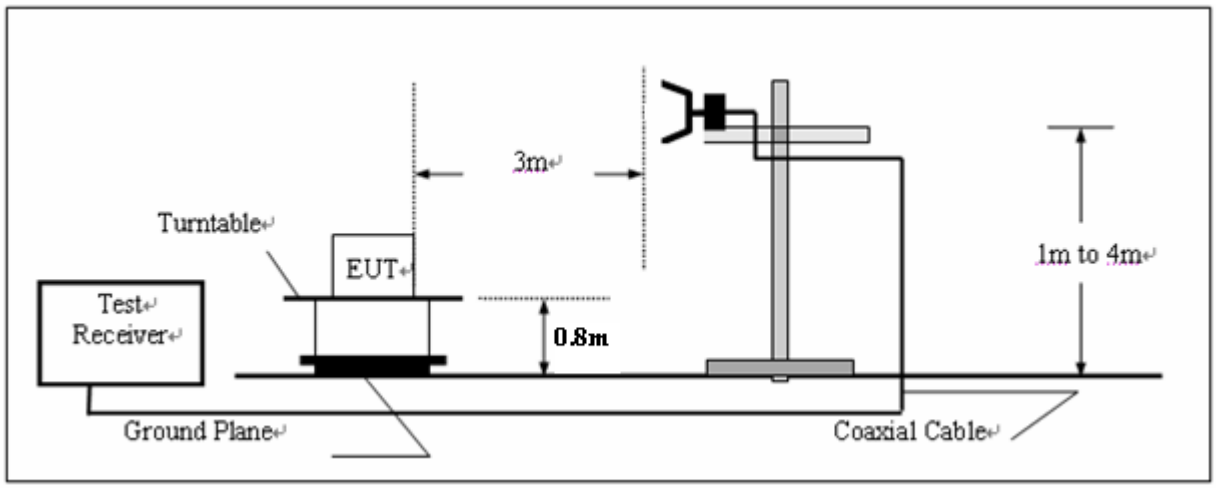
| | |
|---|---|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude | AG = Amplifier Gain |
| AF = Antenna Factor | |

**TEST CONFIGURATION**

(A) Radiated Emission Test Set-Up, Frequency below 1000MHz




(B) Radiated Emission Test Set-Up, Frequency above 1000MHz




**TEST PROCEDURE**

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4 Repeat above procedures until all frequency measurements have been completed.

**RECEIVER RADIATED SPOUIOUS LIMIT**

For unintentional device, according to § 15.109(a) and RSS-Gen, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/m) | Radiated (μV/m) |
|---|---|---|---|
| 30-88 | 3 | 40.0 | 100 |
| 88-216 | 3 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

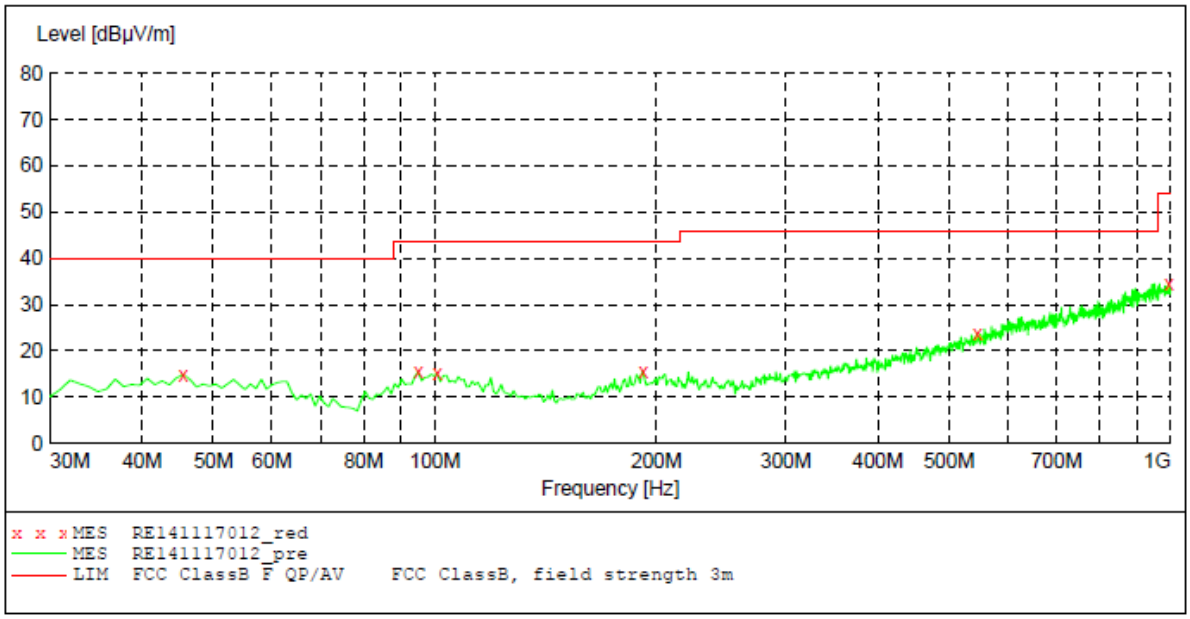
**TEST RESULTS**

Remak:

1.The Radiated Measurement (Standby mode /Receiver mode) are performed to the three channels (the high channel, the middle channel and the low channel), the datum recorded below is the worst case for each channel separation;and the EUT shall be scanned from 30 MHz to the 5th harmonic of the highest oscillator frequency in the digital devices or 1 GHz whichever is higher.

2.Test performed at Op 7 , Op 8,Op 9 and Op 10 operation mode respectively.And the datum append below is the worst case at 488.5MHz(*Test* Frequency) of each operation mode.

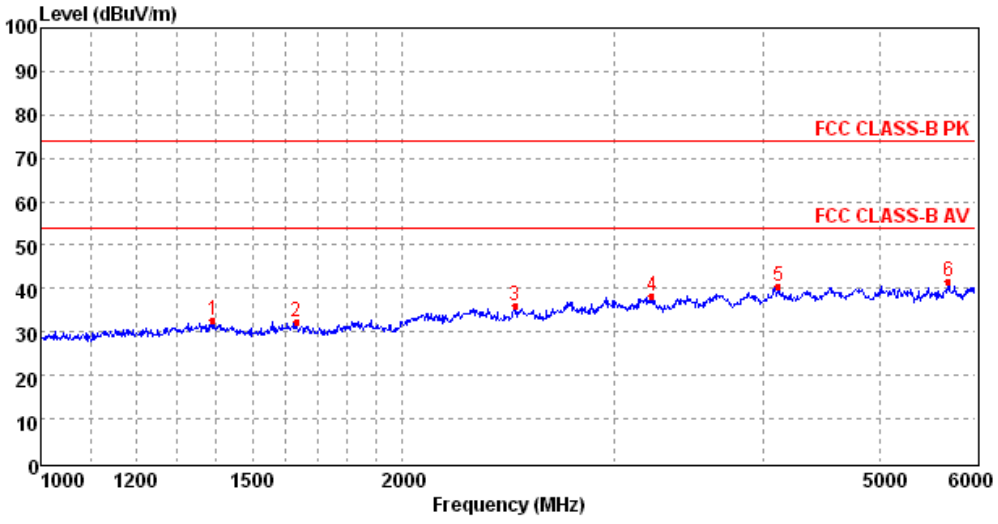
| Op 7 | | | |
|---|---|---|---|
| Test Frequency: | 488.5MHz | Polarity: | *Horizontal* |




***MEASUREMENT RESULT: "RE141117012_fin"***

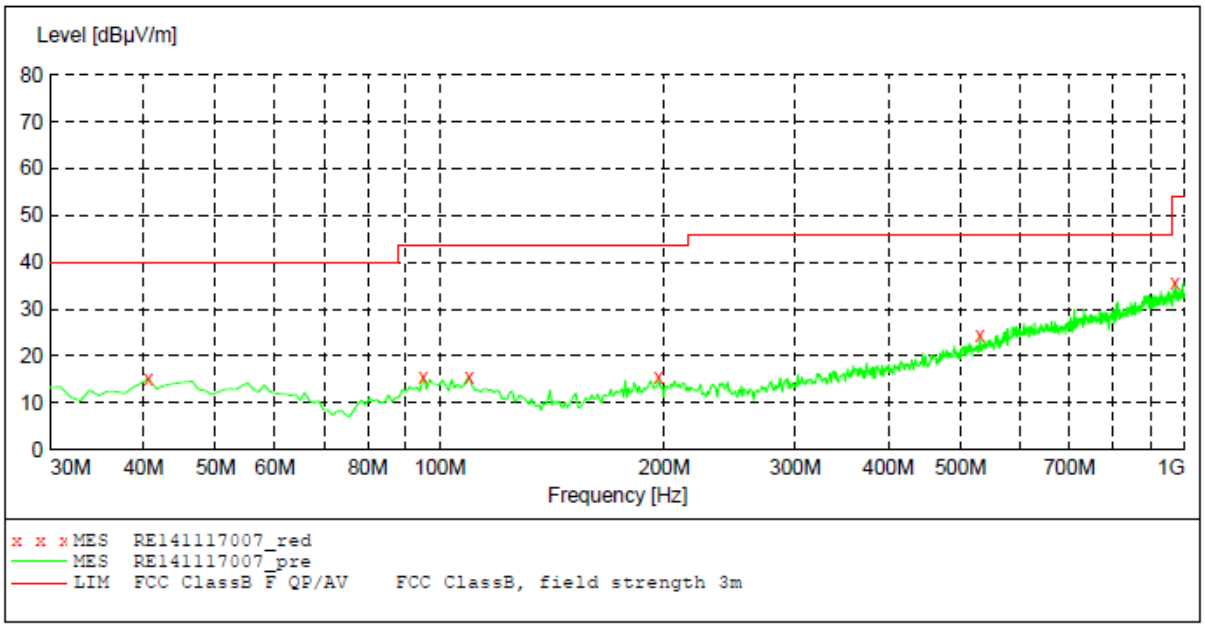
11/17/2014 5:36PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 45.520000 | 14.90 | -15.0 | 40.0 | 25.1 | PK | 100.0 | 126.00 | HORIZONTAL |
| 94.990000 | 15.40 | -14.3 | 40.0 | 24.6 | PK | 100.0 | 0.00 | HORIZONTAL |
| 100.810000 | 15.10 | -13.7 | 40.0 | 24.9 | PK | 100.0 | 126.00 | HORIZONTAL |
| 191.990000 | 15.60 | -14.7 | 40.0 | 24.4 | PK | 100.0 | 228.00 | HORIZONTAL |
| 547.010000 | 23.80 | -5.5 | 47.0 | 23.2 | PK | 100.0 | 348.00 | HORIZONTAL |
| 996.120000 | 34.50 | 4.5 | 47.0 | 12.5 | PK | 100.0 | 187.00 | HORIZONTAL |




| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1390.53 | 32.58 | -8.08 | 40.66 | 74.00 | 41.42 | HORIZONTAL | Peak |
| 2 | 1630.93 | 32.51 | -8.38 | 40.89 | 74.00 | 41.49 | HORIZONTAL | Peak |
| 3 | 2480.41 | 36.03 | -5.22 | 41.25 | 74.00 | 37.97 | HORIZONTAL | Peak |
| 4 | 3227.83 | 38.45 | -2.84 | 41.29 | 74.00 | 35.55 | HORIZONTAL | Peak |
| 5 | 4111.13 | 40.46 | 0.03 | 40.43 | 74.00 | 33.54 | HORIZONTAL | Peak |
| 6 | 5696.20 | 41.66 | 3.62 | 38.04 | 74.00 | 32.34 | HORIZONTAL | Peak |

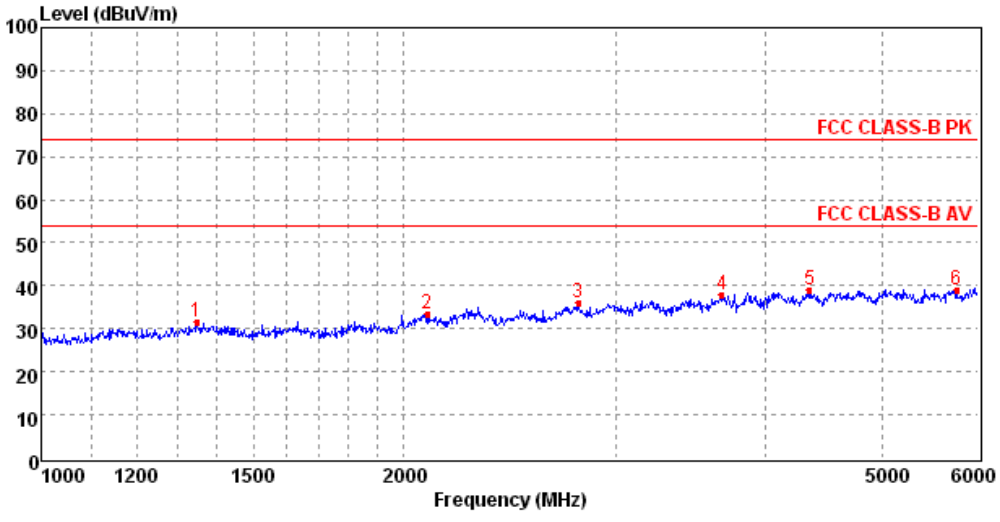
| Op 7 | | | |
|---|---|---|---|
| Test Frequency: | 488.5MHz | Polarity: | Vertical |




***MEASUREMENT RESULT: "RE141117007_fin"***

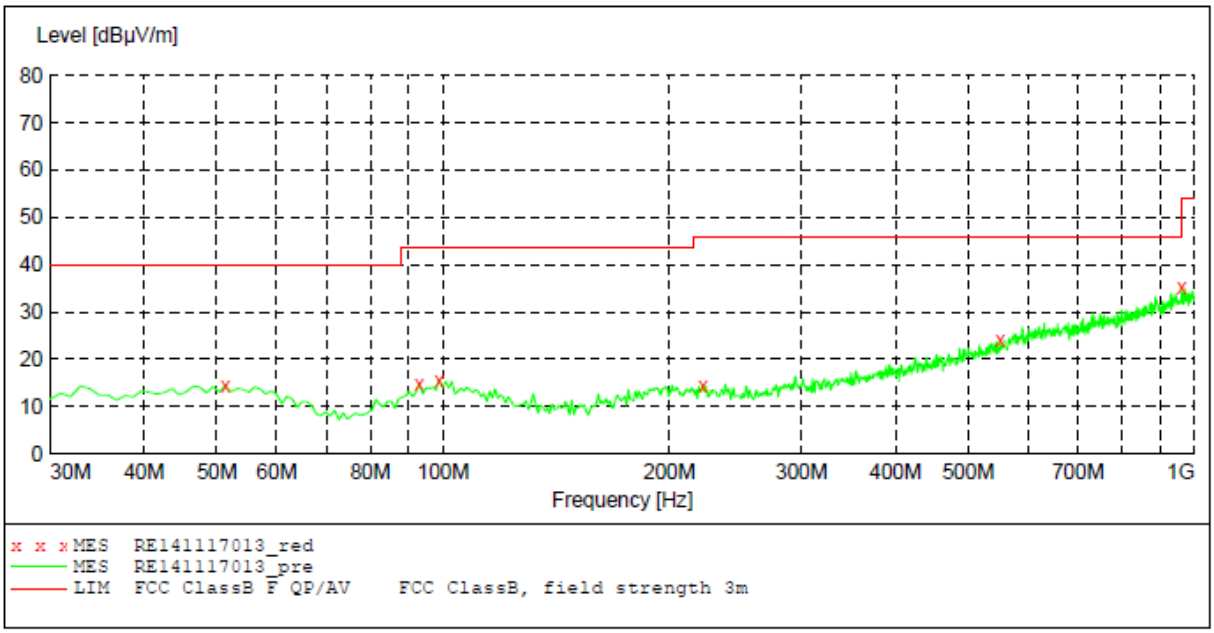
11/17/2014 5:24PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 40.670000 | 15.30 | -15.0 | 40.0 | 24.7 | PK | 100.0 | 180.00 | VERTICAL |
| 94.990000 | 15.50 | -14.3 | 40.0 | 24.5 | PK | 100.0 | 44.00 | VERTICAL |
| 109.540000 | 15.40 | -14.6 | 40.0 | 24.6 | PK | 100.0 | 349.00 | VERTICAL |
| 196.840000 | 15.40 | -14.6 | 40.0 | 24.6 | PK | 100.0 | 349.00 | VERTICAL |
| 531.490000 | 24.40 | -6.0 | 47.0 | 22.6 | PK | 100.0 | 273.00 | VERTICAL |
| 970.900000 | 35.60 | 3.9 | 47.0 | 11.4 | PK | 100.0 | 0.00 | VERTICAL |




| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1346.40 | 31.51 | -8.02 | 39.53 | 74.00 | 42.49 | VERTICAL | Peak |
| 2 | 2092.18 | 33.49 | -5.99 | 39.48 | 74.00 | 40.51 | VERTICAL | Peak |
| 3 | 2791.78 | 36.24 | -3.85 | 40.09 | 74.00 | 37.76 | VERTICAL | Peak |
| 4 | 3678.88 | 38.02 | -1.50 | 39.52 | 74.00 | 35.98 | VERTICAL | Peak |
| 5 | 4345.94 | 39.04 | 0.73 | 38.31 | 74.00 | 34.96 | VERTICAL | Peak |
| 6 | 5757.76 | 39.14 | 3.90 | 35.24 | 74.00 | 34.86 | VERTICAL | Peak |

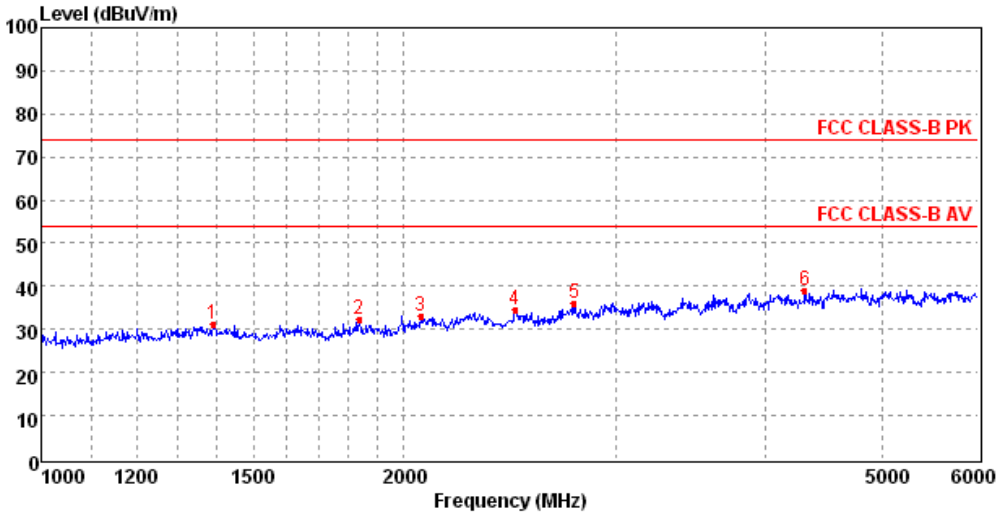
| Op 8 | | | |
|---|---|---|---|
| Test Frequency: | 488.5MHz | Polarity: | *Horizontal* |




***MEASUREMENT RESULT: "RE141117013_fin"***

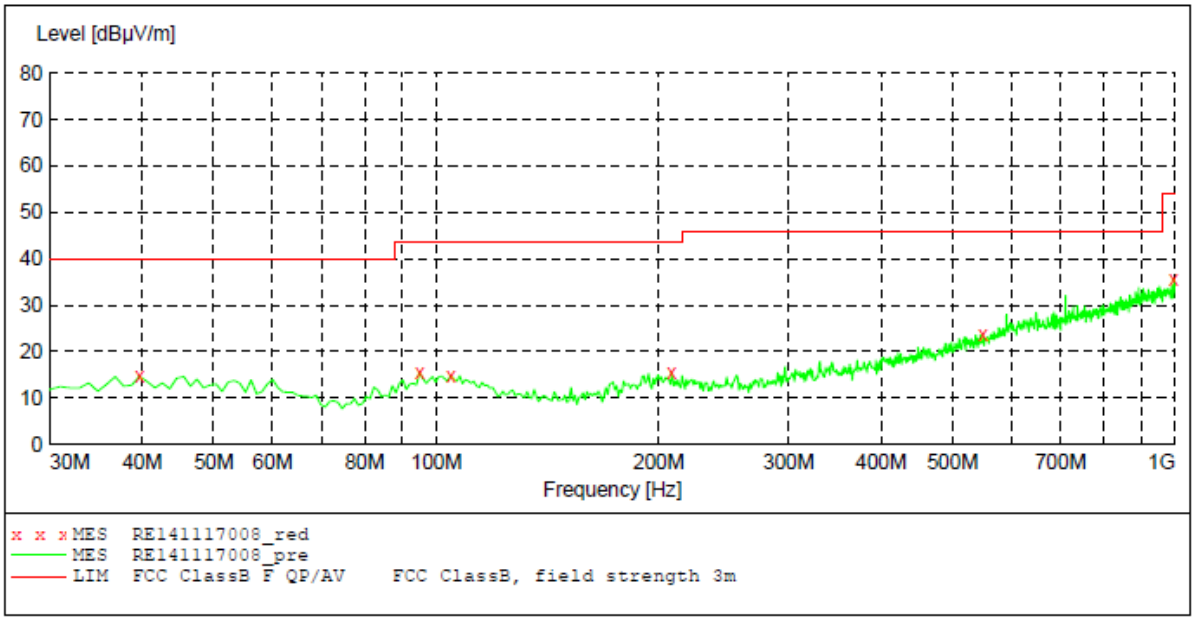
11/17/2014 5:38PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 51.340000 | 14.50 | -15.2 | 40.0 | 25.5 | PK | 100.0 | 171.00 | HORIZONTAL |
| 93.050000 | 14.80 | -14.8 | 40.0 | 25.2 | PK | 100.0 | 111.00 | HORIZONTAL |
| 98.870000 | 15.60 | -13.8 | 40.0 | 24.4 | PK | 100.0 | 29.00 | HORIZONTAL |
| 222.060000 | 14.50 | -15.1 | 40.0 | 25.5 | PK | 100.0 | 211.00 | HORIZONTAL |
| 551.860000 | 24.10 | -5.4 | 47.0 | 22.9 | PK | 100.0 | 0.00 | HORIZONTAL |
| 963.140000 | 35.40 | 3.6 | 47.0 | 11.6 | PK | 100.0 | 29.00 | HORIZONTAL |




| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1388.04 | 31.27 | -8.07 | 39.34 | 74.00 | 42.73 | HORIZONTAL | Peak |
| 2 | 1835.66 | 32.39 | -8.11 | 40.50 | 74.00 | 41.61 | HORIZONTAL | Peak |
| 3 | 2066.10 | 33.18 | -6.30 | 39.48 | 74.00 | 40.82 | HORIZONTAL | Peak |
| 4 | 2475.97 | 34.66 | -5.23 | 39.89 | 74.00 | 39.34 | HORIZONTAL | Peak |
| 5 | 2771.84 | 36.24 | -3.95 | 40.19 | 74.00 | 37.76 | HORIZONTAL | Peak |
| 6 | 4307.18 | 39.02 | 0.60 | 38.42 | 74.00 | 34.98 | HORIZONTAL | Peak |

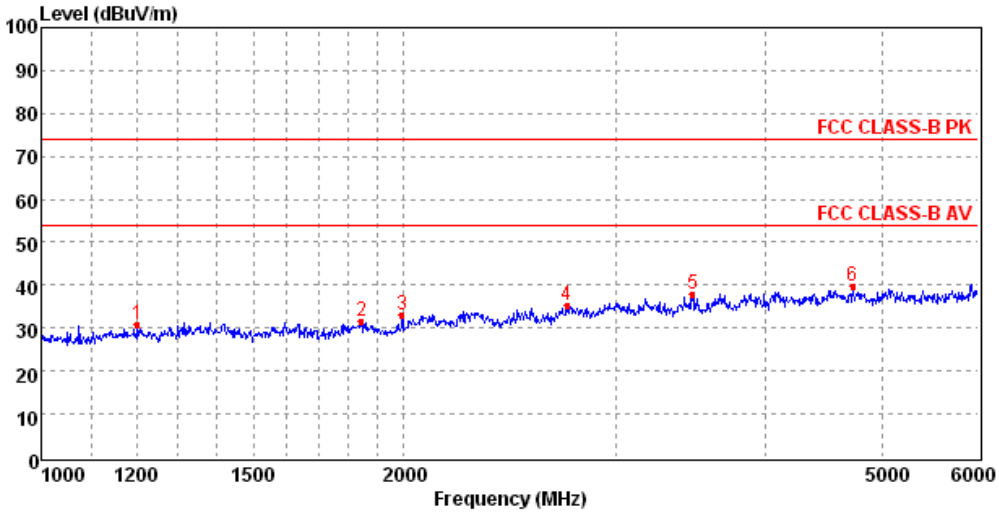
| Op 8 | | | |
|---|---|---|---|
| Test Frequency: | 488.5MHz | Polarity: | Vertical |




***MEASUREMENT RESULT: "RE141117008_fin"***

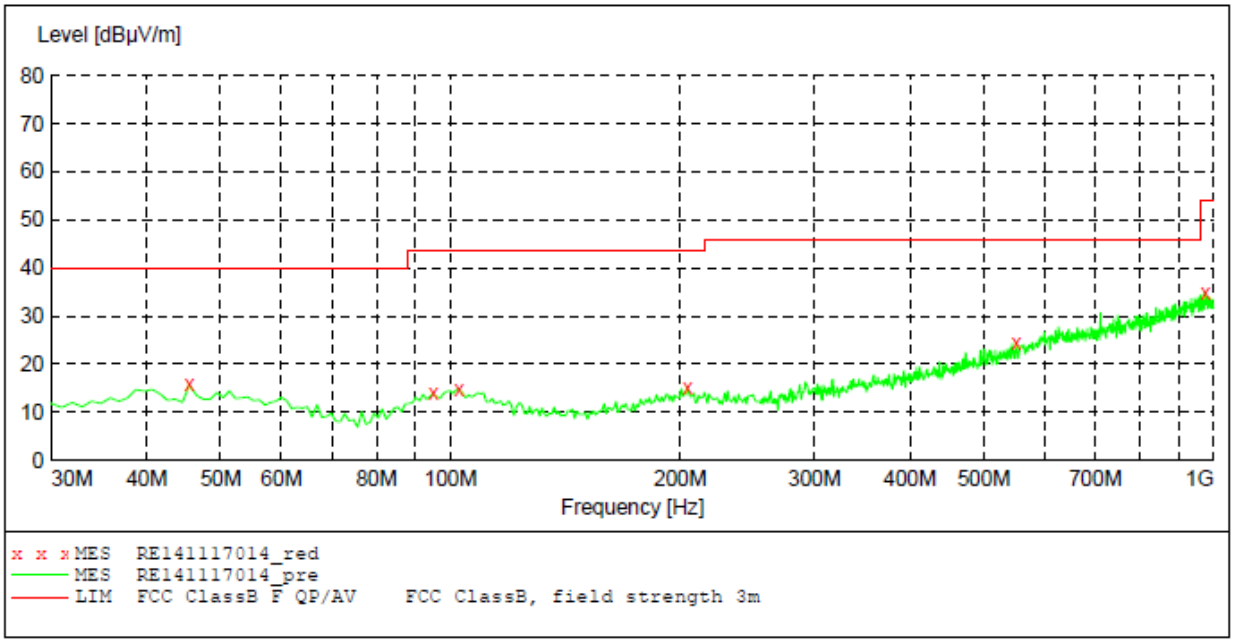
11/17/2014 5:26PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 39.700000 | 14.70 | -15.1 | 40.0 | 25.3 | PK | 100.0 | 6.00 | VERTICAL |
| 94.990000 | 15.60 | -14.3 | 40.0 | 24.4 | PK | 100.0 | 221.00 | VERTICAL |
| 104.690000 | 14.90 | -14.1 | 40.0 | 25.1 | PK | 100.0 | 321.00 | VERTICAL |
| 208.480000 | 15.50 | -14.9 | 40.0 | 24.5 | PK | 100.0 | 66.00 | VERTICAL |
| 549.920000 | 23.60 | -5.4 | 47.0 | 23.4 | PK | 100.0 | 6.00 | VERTICAL |
| 995.150000 | 35.70 | 4.4 | 47.0 | 11.3 | PK | 100.0 | 66.00 | VERTICAL |




| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1202.68 | 30.99 | -8.86 | 39.85 | 74.00 | 43.01 | VERTICAL | Peak |
| 2 | 1845.56 | 31.61 | -8.06 | 39.67 | 74.00 | 42.39 | VERTICAL | Peak |
| 3 | 1993.37 | 32.98 | -7.15 | 40.13 | 74.00 | 41.02 | VERTICAL | Peak |
| 4 | 2732.39 | 35.33 | -4.15 | 39.48 | 74.00 | 38.67 | VERTICAL | Peak |
| 5 | 3473.88 | 37.77 | -2.40 | 40.17 | 74.00 | 36.23 | VERTICAL | Peak |
| 6 | 4719.32 | 39.60 | 2.00 | 37.60 | 74.00 | 34.40 | VERTICAL | Peak |

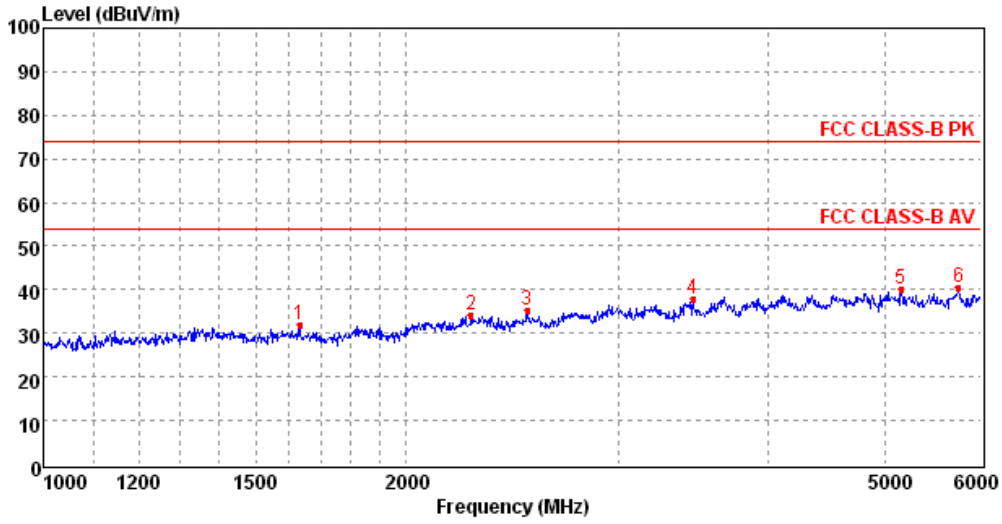
| Op 9 | | | |
|---|---|---|---|
| Test Frequency: | 488.5MHz | Polarity: | *Horizontal* |




***MEASUREMENT RESULT: "RE141117014_fin"***

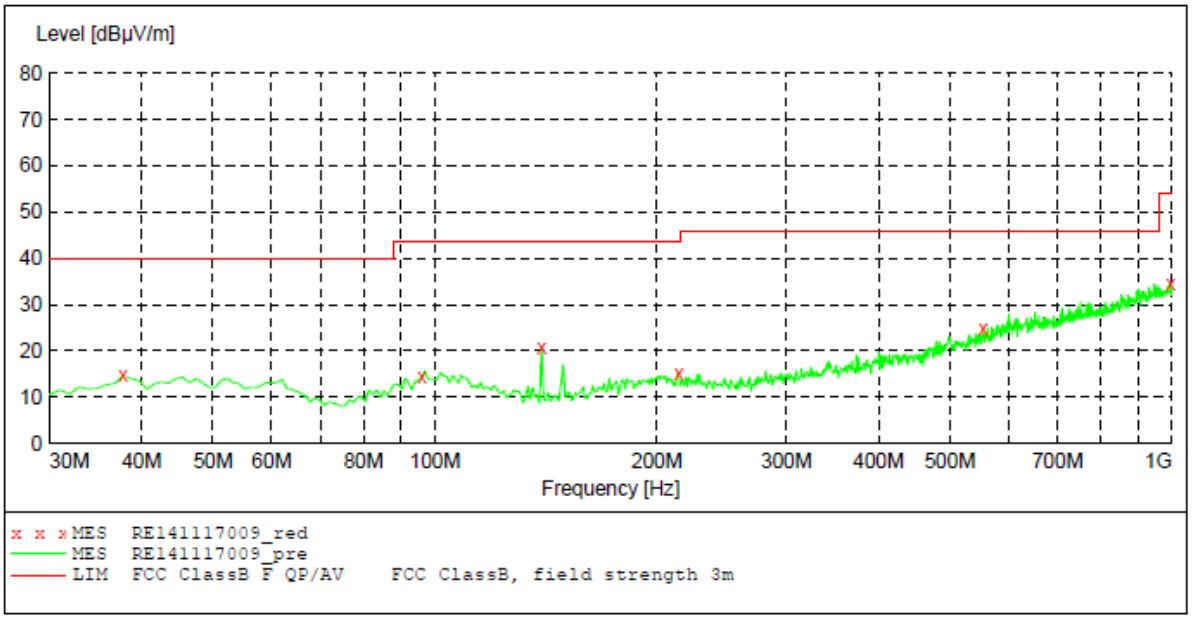
11/17/2014 5:40PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 45.520000 | 15.70 | -15.0 | 40.0 | 24.3 | PK | 100.0 | 200.00 | HORIZONTAL |
| 94.990000 | 13.90 | -14.3 | 40.0 | 26.1 | PK | 100.0 | 139.00 | HORIZONTAL |
| 102.750000 | 14.80 | -13.9 | 40.0 | 25.2 | PK | 100.0 | 263.00 | HORIZONTAL |
| 204.600000 | 15.20 | -14.7 | 40.0 | 24.8 | PK | 100.0 | 200.00 | HORIZONTAL |
| 551.860000 | 24.50 | -5.4 | 47.0 | 22.5 | PK | 100.0 | 181.00 | HORIZONTAL |
| 975.750000 | 34.90 | 4.0 | 47.0 | 12.1 | PK | 100.0 | 57.00 | HORIZONTAL |




| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1630.93 | 31.88 | -8.38 | 40.26 | 74.00 | 42.12 | HORIZONTAL | Peak |
| 2 | 2263.79 | 34.14 | -4.97 | 39.11 | 74.00 | 39.86 | HORIZONTAL | Peak |
| 3 | 2520.73 | 35.28 | -5.15 | 40.43 | 74.00 | 38.72 | HORIZONTAL | Peak |
| 4 | 3461.46 | 37.89 | -2.49 | 40.38 | 74.00 | 36.11 | HORIZONTAL | Peak |
| 5 | 5152.39 | 40.26 | 2.87 | 37.39 | 74.00 | 33.74 | HORIZONTAL | Peak |
| 6 | 5747.46 | 40.49 | 3.85 | 36.64 | 74.00 | 33.51 | HORIZONTAL | Peak |

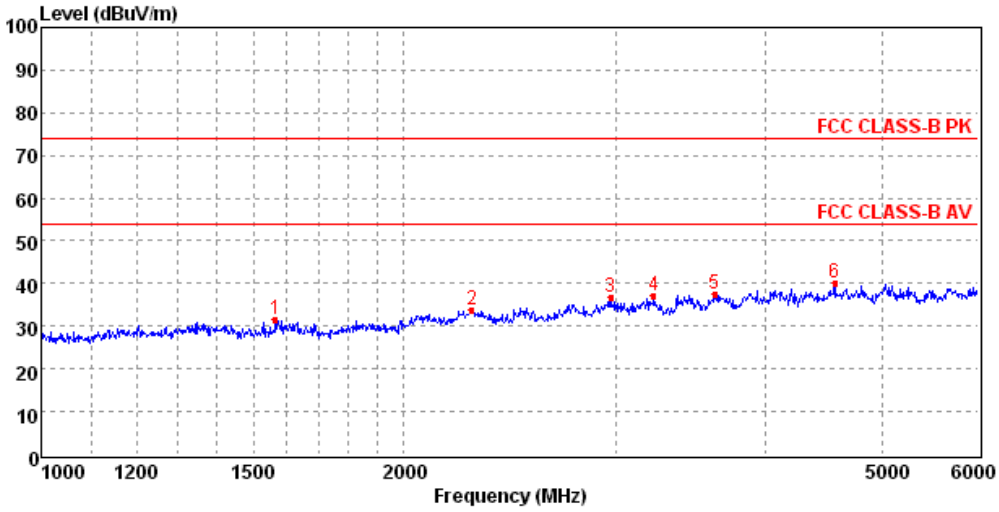
| Op 9 | | | |
|---|---|---|---|
| Test Frequency: | 488.5MHz | Polarity: | Vertical |




***MEASUREMENT RESULT: "RE141117009_fin"***

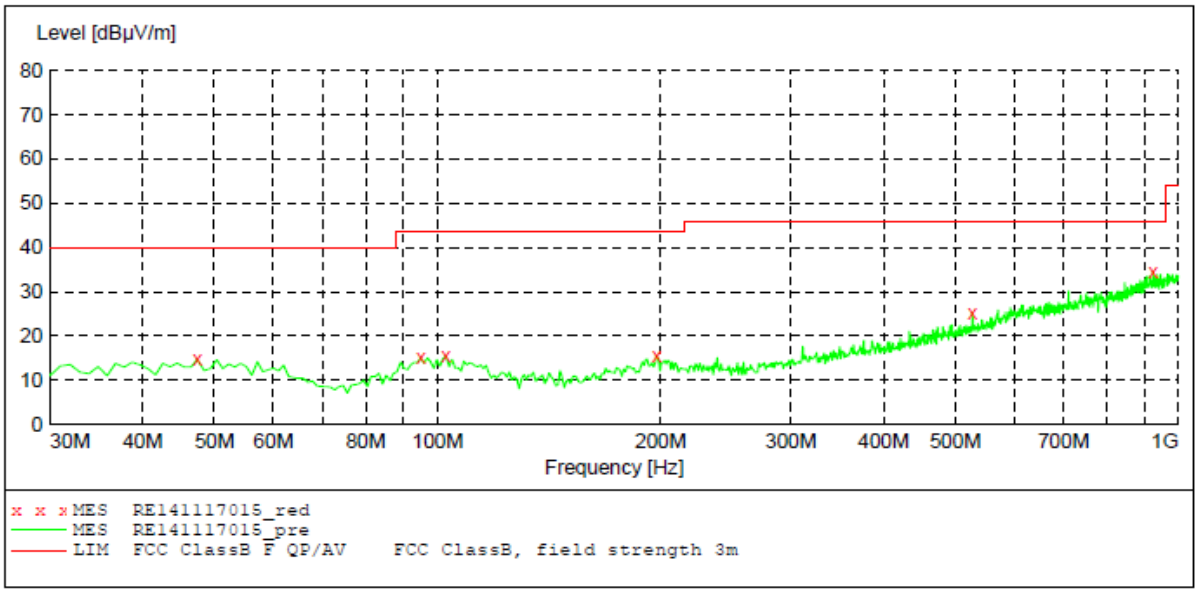
11/17/2014 5:29PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 37.760000 | 14.60 | -15.6 | 40.0 | 25.4 | PK | 100.0 | 348.00 | VERTICAL |
| 95.960000 | 14.30 | -14.2 | 40.0 | 25.7 | PK | 100.0 | 0.00 | VERTICAL |
| 139.610000 | 20.60 | -18.5 | 40.0 | 19.4 | PK | 100.0 | 107.00 | VERTICAL |
| 214.300000 | 15.30 | -15.0 | 40.0 | 24.7 | PK | 100.0 | 107.00 | VERTICAL |
| 554.770000 | 24.70 | -5.3 | 47.0 | 22.3 | PK | 100.0 | 348.00 | VERTICAL |
| 997.090000 | 34.50 | 4.5 | 47.0 | 12.5 | PK | 100.0 | 348.00 | VERTICAL |




| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1565.09 | 31.63 | -8.37 | 40.00 | 74.00 | 42.37 | VERTICAL | Peak |
| 2 | 2280.08 | 34.01 | -4.98 | 38.99 | 74.00 | 39.99 | VERTICAL | Peak |
| 3 | 2972.46 | 36.72 | -3.34 | 40.06 | 74.00 | 37.28 | VERTICAL | Peak |
| 4 | 3227.83 | 37.06 | -2.84 | 39.90 | 74.00 | 36.94 | VERTICAL | Peak |
| 5 | 3626.53 | 37.41 | -1.67 | 39.08 | 74.00 | 36.59 | VERTICAL | Peak |
| 6 | 4561.36 | 40.25 | 1.28 | 38.97 | 74.00 | 33.75 | VERTICAL | Peak |

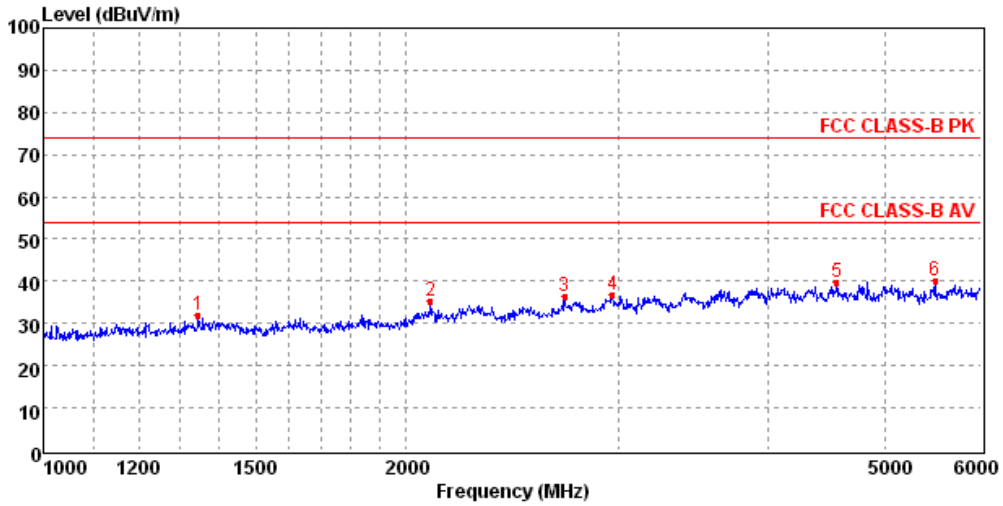
| Op10 | | | |
|---|---|---|---|
| Test Frequency: | 1575.42MHz | Polarity: | *Horizontal* |




***MEASUREMENT RESULT: "RE141117015_fin"***

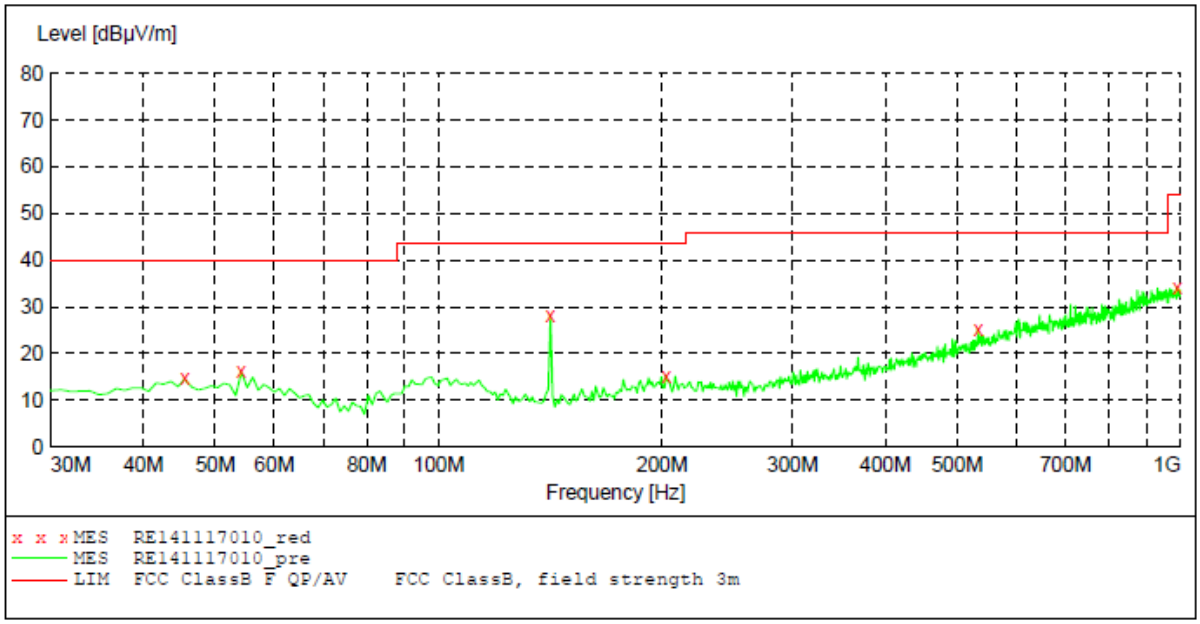
11/17/2014 5:43PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 47.460000 | 14.70 | -15.1 | 40.0 | 25.3 | PK | 100.0 | 31.00 | HORIZONTAL |
| 94.990000 | 15.10 | -14.3 | 40.0 | 24.9 | PK | 100.0 | 31.00 | HORIZONTAL |
| 102.750000 | 15.40 | -13.9 | 40.0 | 24.6 | PK | 100.0 | 220.00 | HORIZONTAL |
| 197.810000 | 15.50 | -14.5 | 40.0 | 24.5 | PK | 100.0 | 10.00 | HORIZONTAL |
| 527.610000 | 25.20 | -6.1 | 47.0 | 21.8 | PK | 100.0 | 10.00 | HORIZONTAL |
| 925.310000 | 34.50 | 3.1 | 47.0 | 12.5 | PK | 100.0 | 345.00 | HORIZONTAL |




| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1343.99 | 31.91 | -8.01 | 39.92 | 74.00 | 42.09 | HORIZONTAL | Peak |
| 2 | 2095.93 | 35.33 | -5.95 | 41.28 | 74.00 | 38.67 | HORIZONTAL | Peak |
| 3 | 2708.02 | 36.29 | -4.28 | 40.57 | 74.00 | 37.71 | HORIZONTAL | Peak |
| 4 | 2967.14 | 36.86 | -3.34 | 40.20 | 74.00 | 37.14 | HORIZONTAL | Peak |
| 5 | 4553.19 | 39.74 | 1.26 | 38.48 | 74.00 | 34.26 | HORIZONTAL | Peak |
| 6 | 5495.69 | 40.18 | 3.46 | 36.72 | 74.00 | 33.82 | HORIZONTAL | Peak |

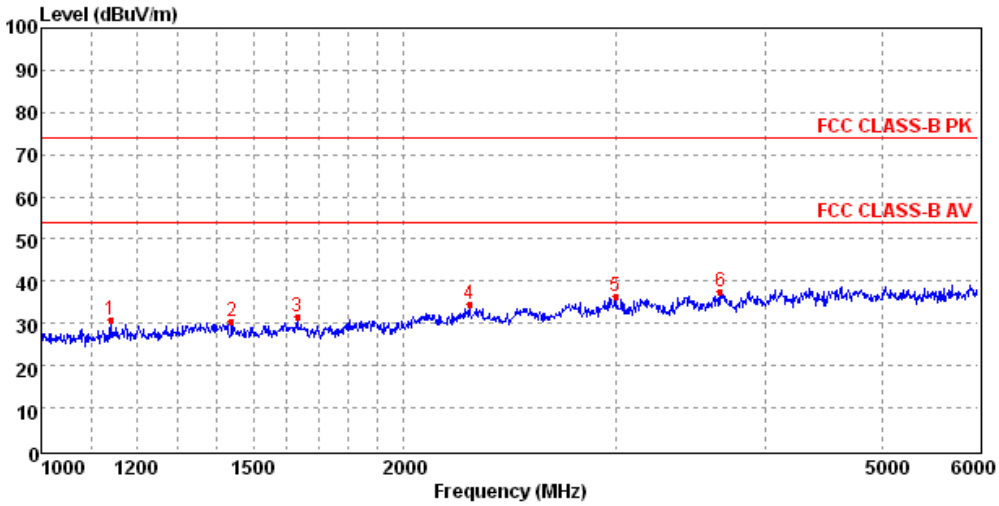
| Op 10 | | | |
|---|---|---|---|
| Test Frequency: | 1575.42MHz | Polarity: | Vertical |




***MEASUREMENT RESULT: "RE141117010_fin"***

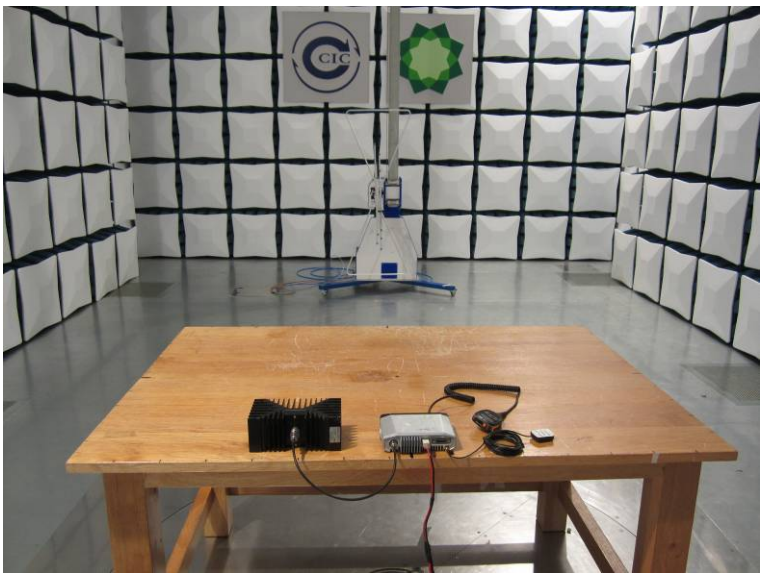
11/17/2014 5:31PM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 45.520000 | 14.60 | -15.0 | 40.0 | 25.4 | PK | 100.0 | 7.00 | VERTICAL |
| 54.250000 | 16.10 | -15.4 | 40.0 | 23.9 | PK | 100.0 | 207.00 | VERTICAL |
| 141.550000 | 28.30 | -18.5 | 40.0 | 11.7 | PK | 100.0 | 309.00 | VERTICAL |
| 202.660000 | 15.30 | -14.6 | 40.0 | 24.7 | PK | 100.0 | 207.00 | VERTICAL |
| 533.430000 | 25.30 | -5.9 | 47.0 | 21.7 | PK | 100.0 | 269.00 | VERTICAL |
| 990.300000 | 34.20 | 4.3 | 47.0 | 12.8 | PK | 100.0 | 349.00 | VERTICAL |



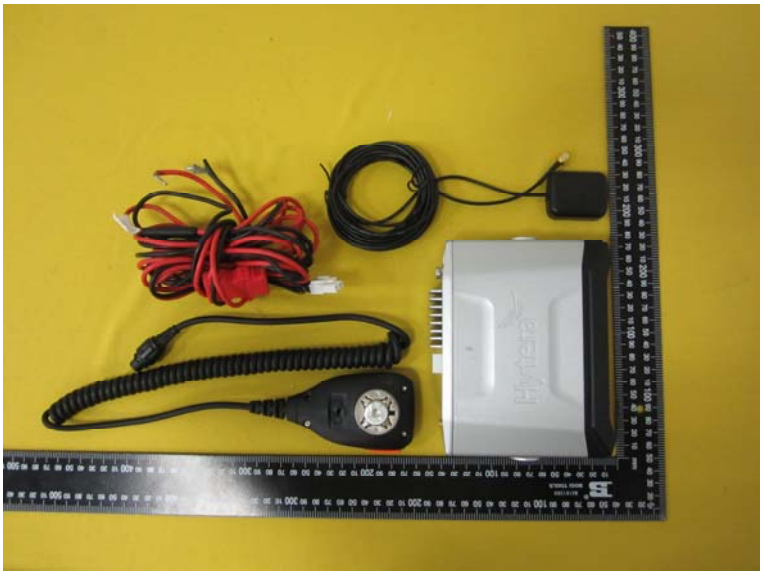

| Mark | Frequency MHz | Level dBuv/m | Factor dB | Reading dBuv/m | Limit dBuv/m | Margin dB | Polarization | Det. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1141.78 | 30.77 | -9.43 | 40.20 | 74.00 | 43.23 | VERTICAL | Peak |
| 2 | 1438.68 | 30.54 | -8.19 | 38.73 | 74.00 | 43.46 | VERTICAL | Peak |
| 3 | 1630.93 | 31.44 | -8.38 | 39.82 | 74.00 | 42.56 | VERTICAL | Peak |
| 4 | 2267.85 | 34.58 | -4.97 | 39.55 | 74.00 | 39.42 | VERTICAL | Peak |
| 5 | 2999.21 | 36.50 | -3.34 | 39.84 | 74.00 | 37.50 | VERTICAL | Peak |
| 6 | 3665.72 | 37.42 | -1.54 | 38.96 | 74.00 | 36.58 | VERTICAL | Peak |

# 5. Test Setup Photos of the EUT

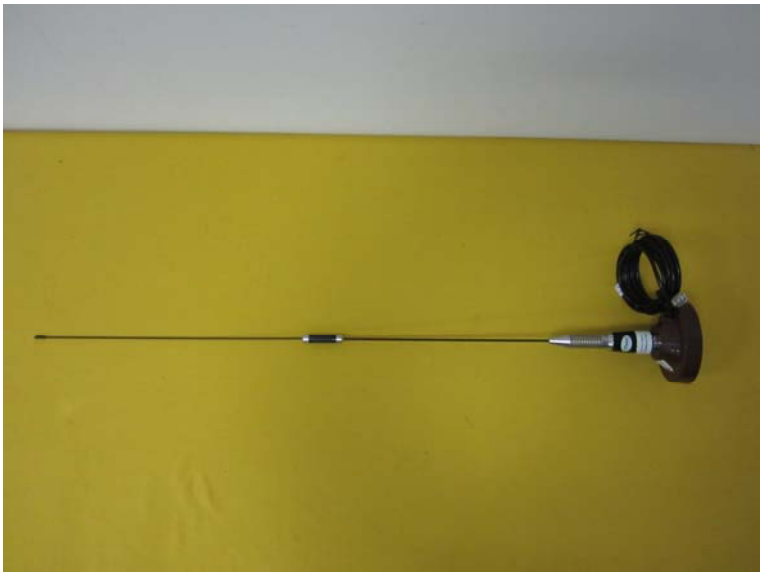


# 6. External and Internal Photos of the EUT

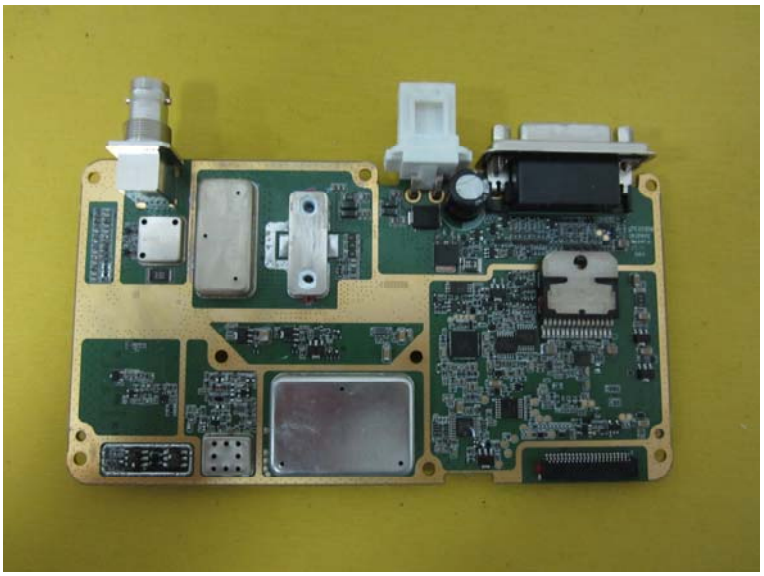
## External photos of the EUT

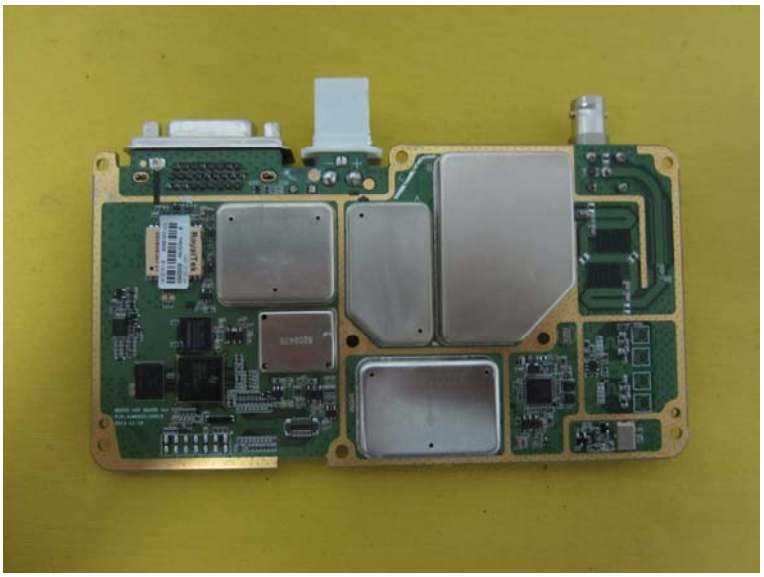


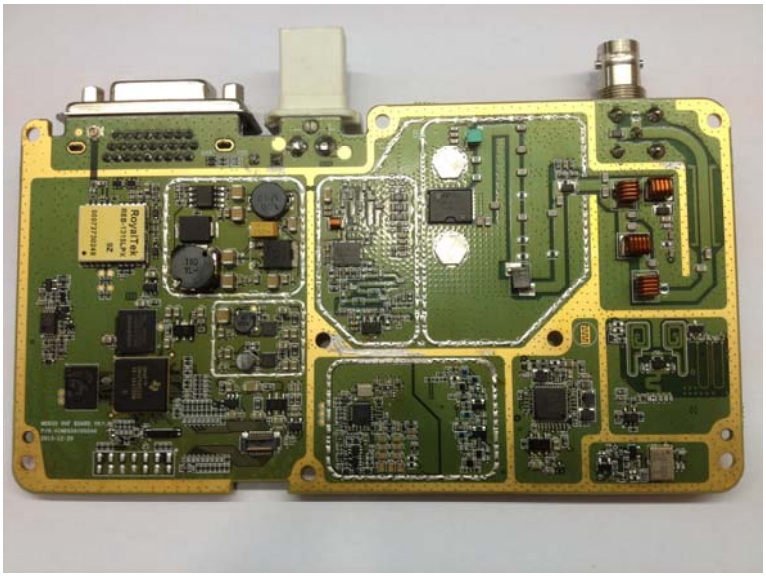

Hytera
P1
P2

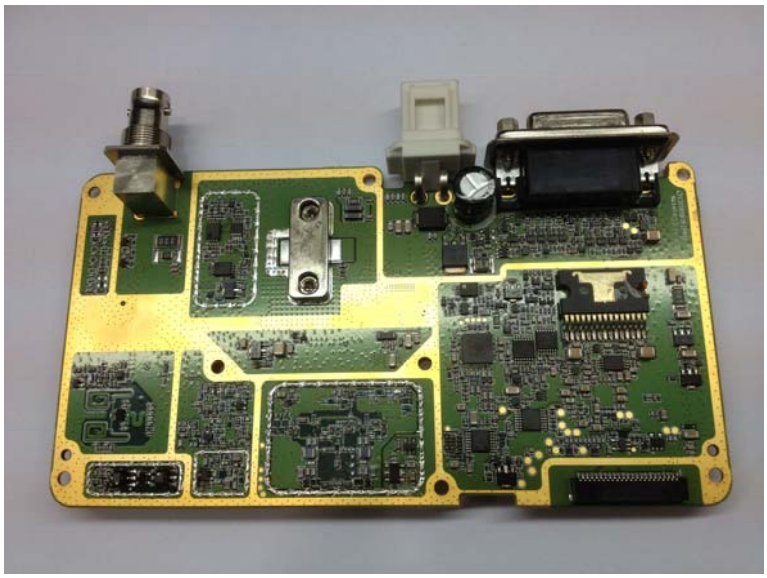


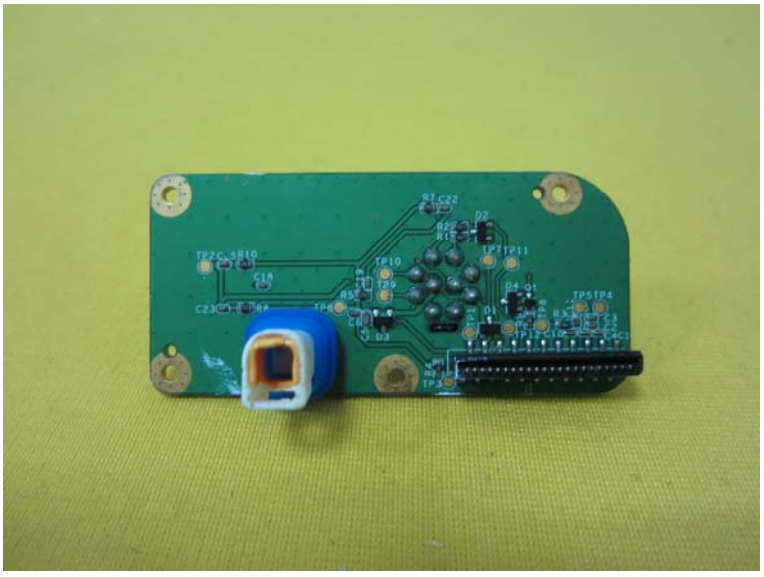
# Internal photos of the EUT











**.....End of Report.....**