

TECHNICAL  
SPECIALIST  
INSTITUTE



Report No:  
File reference No:

FCC 1607058  
2016-08-10

Applicant: Samzuk Technology & Development Co., Ltd

Product: 16 Channel Walkie Talkie

Model No: FPBN10A, FPBAN20A, FPBAN30A, FPBAN40A  
FPBAN50A, FPBAN60A, FPBAN70A, FPBAN80A

Trademark: **SAMCOM**

Test Standards: FCC Part 90

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10 and FCC Part 90, regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: August 10, 2016

**Results appearing herein relate only to the sample tested  
The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

**SHENZHEN TIMEWAY TESTING LABORATORIES**

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



## **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

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

### **CNAL-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

### **FCC-Registration No.: 899988**

The 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 No.: 899988.

### **IC- Registration No.: IC5205A-02**

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-02.

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## Test Report Conclusion

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## 1.0 General Details

### 1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.  
Address: Room 512-519,5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong China  
Telephone: (755) 83448688  
Fax: (755) 83442996  
Site on File with the Federal Communications Commission – United States  
Registration Number: 899988  
For 3m & 10 m OATS  
Site Listed with Industry Canada of Ottawa, Canada  
Registration Number: IC: 5205A-02  
For 3m & 10 m OATS

### 1.2 Applicant Details

Applicant: Samzuk Technology & Development Co., Ltd  
Address: High-Tech Zone Xinggong Avenue East Heyuan City (2/F of Minghuang Electrical Engineering Company Building)  
Telephone: --  
Fax: --

### 1.3 Description of EUT

|                      |   |
|----------------------|---|
| Product:             | 16 Channel Walkie Talkie  |
| Manufacturer:        | Guangdong Samzuk Technology Development Co., Ltd                                  |
| Brand Name:          | <b>SAMCOM</b>   |
| Model Number:        | FPBN10A, FPBAN20A, FPBAN30A, FPBAN40A<br>FPBAN50A, FPBAN60A, FPBAN70A, FPBAN80A   |
| Power Source Adapter | Model: NLA050090W1C1 Input: 100-240V~0.2A max 60/50Hz<br>Output: 9V, 500mA        |
| Type of Modulation   | FM  |
| Frequency range      | UHF: 406.1MHz-470MHz  |
| Channel Bandwidth    | 12.5 kHz and 6.25kHz  |
| Frequency Selection  | By operation  |
| Antenna:             | Whip antenna with gain 1.0dBi   |
| Emission Designer    | 5K41F3E for 12.5kHz channel Bandwidth;<br>2K51F3E for 6.25 kHz channels Bandwidth |

### 1.4 Submitted Sample: 3Sample

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1.5 Test Duration

2016-07-06-2016-08-08

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

*Terry Tang*

The sample tested by \_\_\_\_\_

Print Name: Terry Tang

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| 2.0 Test Equipments |              |            |                   |              |            |
|---------------------|--------------|------------|-------------------|--------------|------------|
| Instrument Type     | Manufacturer | Model      | Serial No.        | Date of Cal. | Due Date   |
| ESPI Test Receiver  | R&S          | ESPI 3     | 100379            | 2015-08-22   | 2016-08-21 |
| TWO Line-V-NETW     | R&S          | EZH3-Z5    | 100294            | 2015-08-22   | 2016-08-21 |
| TWO Line-V-NETW     | R&S          | EZH3-Z5    | 100253            | 2015-08-22   | 2016-08-21 |
| Ultra Broadband ANT | R&S          | HL562      | 100157            | 2015-08-23   | 2016-08-22 |
| ESDV Test Receiver  | R&S          | ESDV       | 100008            | 2015-08-22   | 2016-08-21 |
| Impuls-Begrenzer    | R&S          | ESH3-Z2    | 100281            | 2015-08-22   | 2016-08-21 |
| System Controller   | CT           | SC100      | -                 | --           | --         |
| Printer             | EPSON        | PHOTO EX3  | CFNH234850        | --           | --         |
| Computer            | IBM          | 8434       | 1S8434KCE99BLXLO* | -            | -          |
| Loop Antenna        | EMCO         | 6502       | 00042960          | 2015-08-23   | 2016-08-22 |
| ESPI Test Receiver  | R&S          | ESI26      | 838786/013        | 2015-08-22   | 2016-08-21 |
| 3m OATS             | --           | --         | N/A               | 2015-08-24   | 2016-08-23 |
| Horn Antenna        | R&S          | BBHA 9170  | BBHA9170265       | 2015-08-24   | 2016-08-23 |
| Horn Antenna        | R&S          | BBHA 9120D | 9120D-631         | 2015-08-24   | 2016-08-23 |
| Power meter         | Anritsu      | ML2487A    | 6K00003613        | 2015-08-22   | 2016-08-21 |
| Power sensor        | Anritsu      | MA2491A    | 32263             | 2015-08-22   | 2016-08-21 |
| Bilog Antenna       | Schwarebeck  | VULB9163   | 9163/340          | 2015-08-23   | 2016-08-21 |
| LISN                | AFJ          | LS16C      | 10010947251       | 2015-08-22   | 2016-08-21 |
| LISN (Three Phase)  | Schwarebeck  | NSLK 8126  | 8126453           | 2015-08-23   | 2016-08-22 |
| 9*6*6 Anechoic      | --           | --         | N/A               | 2015-08-24   | 2016-08-23 |
| EMI Test Receiver   | RS           | ESCS30     | 100139            | 2015-08-22   | 2016-08-21 |
| Modulation Analyzer | HP           | 8901B      | 3104A03367        | 2016-06-11   | 2017-06-10 |

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### 3.0 Technical Details

#### 3.1 Summary of test results

**The EUT has been tested according to the following specifications:**

|  | <b>Standard</b> | <b>Test Type</b>              | <b>Result</b> |
|--|-----------------|-------------------------------|---------------|
|  | FCC Part 15.207 | Conducted Emission            | Compliant     |
|  | FCC Part 90.205 | Maximum Transmitter Power     | Compliant     |
|  | FCC Part 90.207 | Modulation Characteristic     | Compliant     |
|  | FCC Part 90.209 | Occupied Bandwidth            | Compliant     |
|  | FCC Part 90.210 | Emission Mask                 | Compliant     |
|  | FCC Part 90.213 | Frequency Tolerance           | Compliant     |
|  | FCC Part 90.214 | Transient Frequency Behaviour | Compliant     |
|  | FCC Part 90.221 | Adjacent channel power        | Compliant     |

#### 3.2 The tests were performed according to following standards:

**FCC Part 90**

**TIA-603-D-2010**

**ANSI C63.10-2013**

### 4.0 EUT Modification

**No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.**

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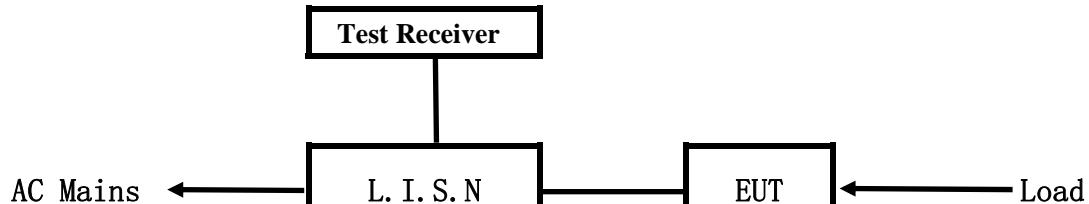
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## 5. Power Line Conducted Emission Test

### 5.1 Schematics of the test



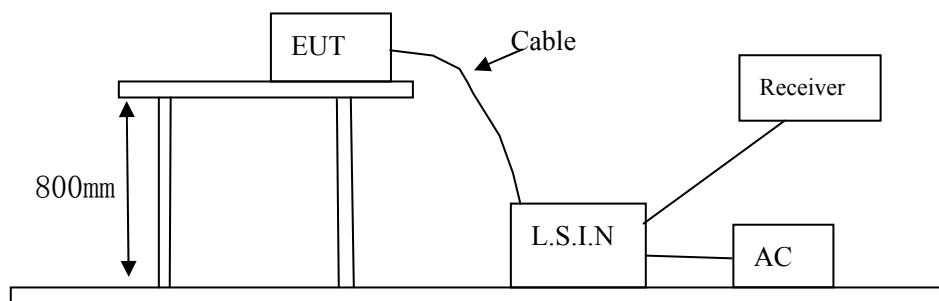
EUT: Equipment Under Test

### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4-2014.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



### 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

#### A. EUT

| Device                   | Manufacturer                                     | Model   | FCC ID        |
|--------------------------|--|---|---------------|
| 16 Channel Walkie Talkie | Guangdong Samzuk Technology Development Co., Ltd | FPBN10A, FPBN20A<br>FPBN30A FPBN40A<br>FPBN50A FPBN60A<br>FPBN70A FPBN80A | 2AIOQ-FPBN10A |

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B. Internal Device

| Device | Manufacturer | Model | FCC ID/DOC |
|--------|--------------|-------|------------|
| N/A    |              |       |            |

C. Peripherals

| Device | Manufacturer | Model | FCC ID/DOC | Cable |
|--------|--------------|-------|------------|-------|
| N/A    |              |       |            |       |

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4-2014

A Setup the EUT and simulators as shown on follow  
B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.107

| Frequency(MHz) | Class A Limits (dB $\mu$ V) |               | Class B Limits (dB $\mu$ V) |               |
|----------------|-----------------------------|---------------|-----------------------------|---------------|
|                | Quasi-peak Level            | Average Level | Quasi-peak Level            | Average Level |
| 0.15 ~ 0.50    | 79.0                        | 66.0          | 66.0~56.0*                  | 56.0~46.0*    |
| 0.50 ~ 5.00    | 73.0                        | 60.0          | 56.0                        | 46.0          |
| 5.00 ~ 30.00   | 73.0                        | 60.0          | 60.0                        | 50.0          |

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

Remark: 1. scanning with PK detector and final measurement with QP and AV detector.

2. \* means the worse case

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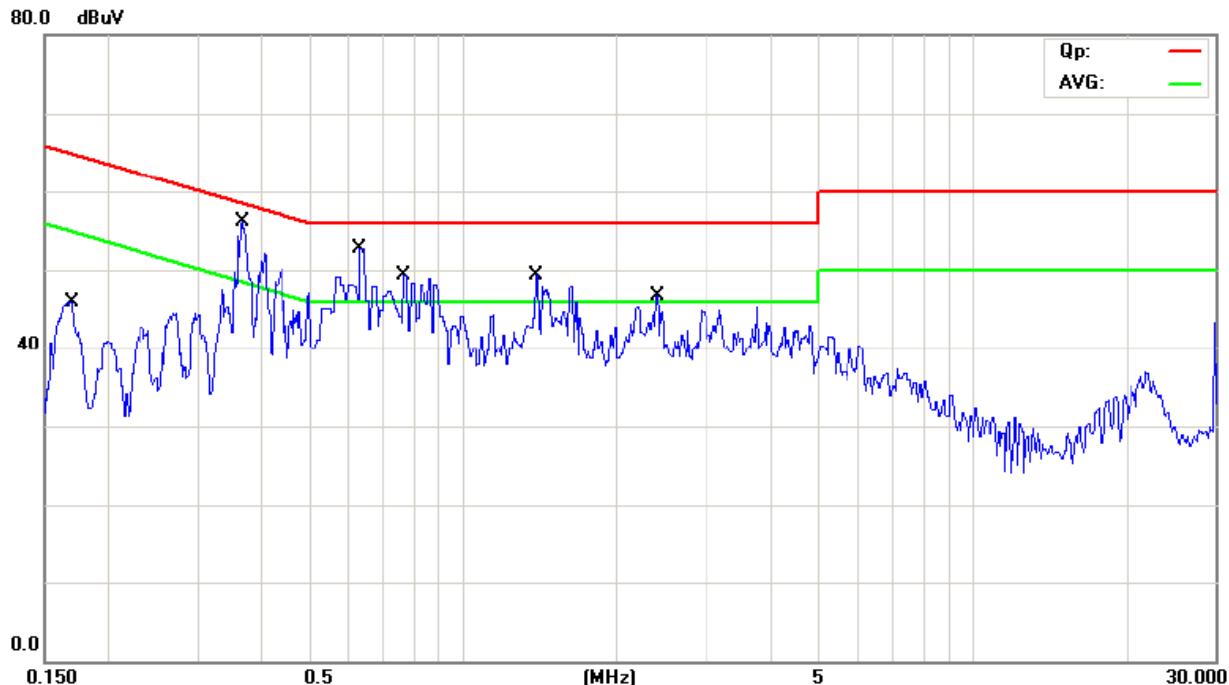


### A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT set Condition: Charging Mode

**Results:** **Pass**

Please refer to following diagram for individual



| No. | Mk. | Freq.  | Reading | Correct | Measure- | Limit | Over   | Detector | Comment |
|-----|-----|--------|---------|---------|----------|-------|--------|----------|---------|
|     |     |        | Level   | Factor  | ment     |       |        |          |         |
|     |     | MHz    | dBuV    | dB      | dBuV     | dBuV  | dB     |          |         |
| 1   |     | 0.1693 | 29.90   | 11.02   | 40.92    | 64.99 | -24.07 | QP       |         |
| 2   |     | 0.1693 | 22.70   | 11.02   | 33.72    | 54.99 | -21.27 | AVG      |         |
| 3   |     | 0.3647 | 39.30   | 11.23   | 50.53    | 58.62 | -8.09  | QP       |         |
| 4   | *   | 0.3647 | 29.60   | 11.23   | 40.83    | 48.62 | -7.79  | AVG      |         |
| 5   |     | 0.6320 | 35.10   | 11.51   | 46.61    | 56.00 | -9.39  | QP       |         |
| 6   |     | 0.6320 | 23.80   | 11.51   | 35.31    | 46.00 | -10.69 | AVG      |         |
| 7   |     | 0.7677 | 31.50   | 11.65   | 43.15    | 56.00 | -12.85 | QP       |         |
| 8   |     | 0.7677 | 19.00   | 11.65   | 30.65    | 46.00 | -15.35 | AVG      |         |
| 9   |     | 1.3870 | 30.10   | 12.05   | 42.15    | 56.00 | -13.85 | QP       |         |
| 10  |     | 1.3870 | 16.00   | 12.05   | 28.05    | 46.00 | -17.95 | AVG      |         |
| 11  |     | 2.3817 | 26.20   | 12.45   | 38.65    | 56.00 | -17.35 | QP       |         |
| 12  |     | 2.3817 | 13.80   | 12.45   | 26.25    | 46.00 | -19.75 | AVG      |         |

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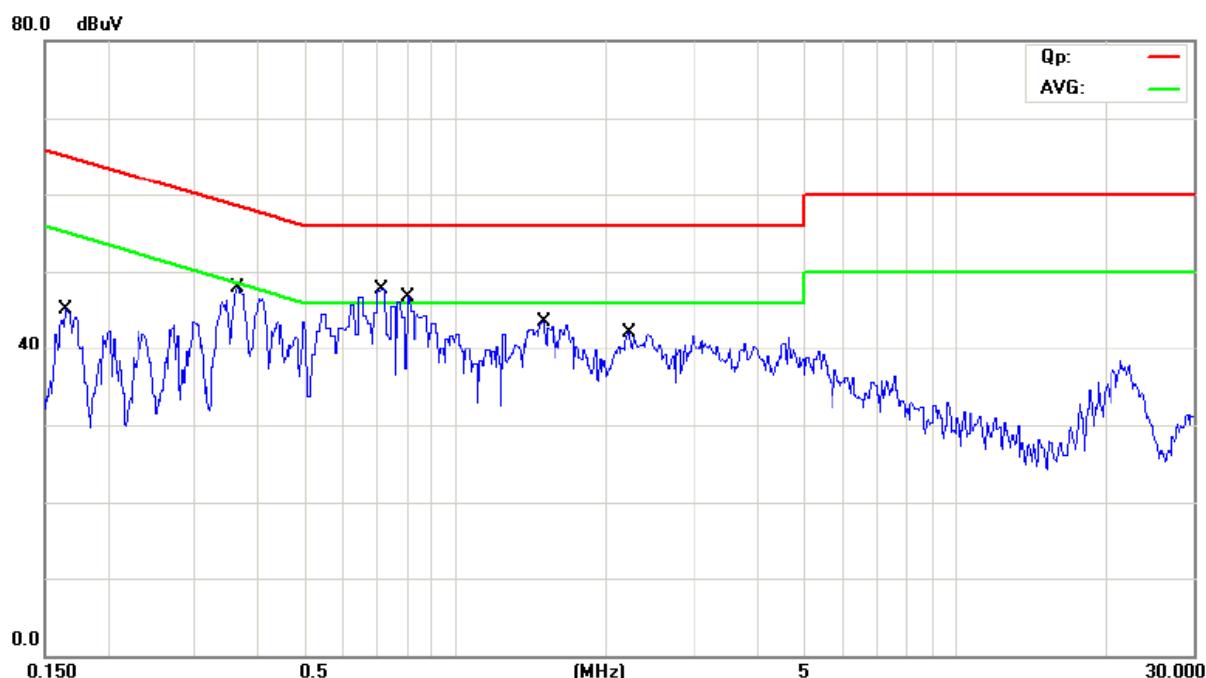


## B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT set Condition: Charging Mode

**Results:** Pass

Please refer to following diagram for individual



| No. | Mk. | Freq.  | Reading | Correct | Measure- | Limit | Over   | Detector | Comment |
|-----|-----|--------|---------|---------|----------|-------|--------|----------|---------|
|     |     |        | Level   | Factor  | ment     |       |        |          |         |
| 1   |     | 0.1651 | 30.30   | 11.02   | 41.32    | 65.20 | -23.88 | QP       |         |
| 2   |     | 0.1651 | 19.00   | 11.02   | 30.02    | 55.20 | -25.18 | AVG      |         |
| 3   | *   | 0.3615 | 34.60   | 11.22   | 45.82    | 58.69 | -12.87 | QP       |         |
| 4   |     | 0.3615 | 17.80   | 11.22   | 29.02    | 48.69 | -19.67 | AVG      |         |
| 5   |     | 0.7108 | 27.50   | 11.59   | 39.09    | 56.00 | -16.91 | QP       |         |
| 6   |     | 0.7108 | 7.80    | 11.59   | 19.39    | 46.00 | -26.61 | AVG      |         |
| 7   |     | 0.7987 | 30.60   | 11.69   | 42.29    | 56.00 | -13.71 | QP       |         |
| 8   |     | 0.7987 | 16.60   | 11.69   | 28.29    | 46.00 | -17.71 | AVG      |         |
| 9   |     | 1.4847 | 25.70   | 12.09   | 37.79    | 56.00 | -18.21 | QP       |         |
| 10  |     | 1.4847 | 12.90   | 12.09   | 24.99    | 46.00 | -21.01 | AVG      |         |
| 11  |     | 2.2100 | 25.50   | 12.38   | 37.88    | 56.00 | -18.12 | QP       |         |
| 12  |     | 2.2100 | 13.20   | 12.38   | 25.58    | 46.00 | -20.42 | AVG      |         |

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## 6. Frequency Tolerance

### 6.1 Applicable standard

According to FCC Part 90 Section 90.213,

In the 150-174 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth or designed to operate on a frequency specifically designated for itinerant use or designed for low-power operation of two watts or less, must have a frequency stability of 5.0 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 2.0 ppm.

In the 421-512 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

### 6.2 Measurement Procedure

#### 6.2.1 Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measurement inside an environment chamber, Install new battery in the EUT.
2. Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1kHz and Video Resolution Bandwidth to 1kHz and Frequency Span to 50kHz. Record this frequency as reference frequency.
3. Set the temperature of chamber to 50°C. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10°C decreased per stage until the lowest temperature -30°C is measured, record all measured frequencies on each temperature step.

#### 6.2.2 Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at temperature if it is within 15°C to 25°C. Otherwise, an environment chamber set for a temperature of 20°C shall be used. The EUT shall be powered by DC 7.4-8.4 V
2. Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 KHz and Video Resolution Bandwidth to 1KHz. Record this frequency as reference frequency.
3. Supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.

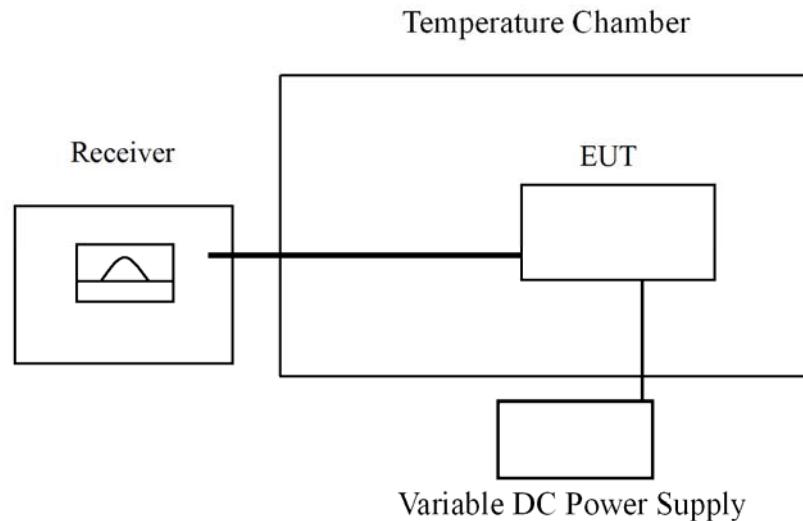
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### 6.3 TEST SETUP BLOCK DIAGRAM



**Figure 1**

### 6.5 TEST RESULT

(1) Frequency stability versus input voltage (battery operation end point voltage is 6.3V)

UHF Band: **(12.5 kHz Channel Bandwidth)**

| Channel        | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Deviation (ppm) | Nominal Frequency | Limit(ppm) |
|----------------|----------------------|--------------------------|---------------------------|-------------------|------------|
| Top channel    | 6.3V                 | 469.97546                | 0.98                      | 469.975MHz        | 2.5        |
| Middle channel | 6.3V                 | 439.97535                | 0.80                      | 439.975MHz        | 2.5        |
| Bottom channel | 6.3V                 | 406.12552                | 1.11                      | 406.125MHz        | 2.5        |

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(2)Frequency stability versus ambient temperature

### Test Results

#### UHF Band: (12.5 kHz Channel Bandwidth)

##### Top channel

| Environment Temperature(°C) | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Deviation (ppm) | Nominal Frequency | Limit(ppm) |
|-----------------------------|----------------------|--------------------------|---------------------------|-------------------|------------|
| 50                          | 7.4                  | 469.97565                | 1.35                      | 469.975MHz        | 2.5        |
| 40                          | 7.4                  | 469.97531                | 0.66                      | 469.975MHz        | 2.5        |
| 30                          | 7.4                  | 469.97549                | 1.04                      | 469.975MHz        | 2.5        |
| 20                          | 7.4                  | 469.97533                | 0.70                      | 469.975MHz        | 2.5        |
| 10                          | 7.4                  | 469.97557                | 1.21                      | 469.975MHz        | 2.5        |
| 0                           | 7.4                  | 469.97552                | 1.11                      | 469.975MHz        | 2.5        |
| -10                         | 7.4                  | 469.97560                | 1.28                      | 469.975MHz        | 2.5        |
| -20                         | 7.4                  | 469.97532                | 0.68                      | 469.975MHz        | 2.5        |
| -30                         | 7.4                  | 469.97535                | 0.74                      | 469.975MHz        | 2.5        |

##### Middle channel

| Environment Temperature(°C) | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Error (ppm) | Nominal Frequency | Limit(ppm) |
|-----------------------------|----------------------|--------------------------|-----------------------|-------------------|------------|
| 50                          | 7.4                  | 439.97555                | 1.25                  | 439.975MHz        | 2.5        |
| 40                          | 7.4                  | 439.97534                | 0.77                  | 439.975MHz        | 2.5        |
| 30                          | 7.4                  | 439.97535                | 0.80                  | 439.975MHz        | 2.5        |
| 20                          | 7.4                  | 439.97557                | 1.30                  | 439.975MHz        | 2.5        |
| 10                          | 7.4                  | 439.97566                | 1.50                  | 439.975MHz        | 2.5        |
| 0                           | 7.4                  | 439.97529                | 0.66                  | 439.975MHz        | 2.5        |
| -10                         | 7.4                  | 439.97531                | 0.70                  | 439.975MHz        | 2.5        |
| -20                         | 7.4                  | 439.97533                | 0.75                  | 439.975MHz        | 2.5        |
| -30                         | 7.4                  | 439.97543                | 0.98                  | 439.975MHz        | 2.5        |

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**Bottom channel**

| Environment Temperature(°C) | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Error (ppm) | Nominal Frequency | Limit(ppm) |
|-----------------------------|----------------------|--------------------------|-----------------------|-------------------|------------|
| 50                          | 7.4                  | 406.12539                | 0.96                  | 406.125MHz        | 2.5        |
| 40                          | 7.4                  | 406.12532                | 0.79                  | 406.125MHz        | 2.5        |
| 30                          | 7.4                  | 406.12544                | 1.08                  | 406.125MHz        | 2.5        |
| 20                          | 7.4                  | 406.12551                | 1.26                  | 406.125MHz        | 2.5        |
| 10                          | 7.4                  | 406.12537                | 0.91                  | 406.125MHz        | 2.5        |
| 0                           | 7.4                  | 406.12546                | 1.13                  | 406.125MHz        | 2.5        |
| -10                         | 7.4                  | 406.12540                | 0.98                  | 406.125MHz        | 2.5        |
| -20                         | 7.4                  | 406.12553                | 1.31                  | 406.125MHz        | 2.5        |
| -30                         | 7.4                  | 406.12538                | 0.94                  | 406.125MHz        | 2.5        |

(1) Frequency stability versus input voltage (battery operation end point voltage is 6.3V)

**UHF Band: (6.25 kHz Channel Bandwidth)**

| Channel        | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Deviation (ppm) | Nominal Frequency | Limit(ppm) |
|----------------|----------------------|--------------------------|---------------------------|-------------------|------------|
| Top channel    | 6.3V                 | 469.97531                | 0.66                      | 469.975MHz        | 1.0        |
| Middle channel | 6.3V                 | 439.97527                | 0.61                      | 439.975MHz        | 1.0        |
| Bottom channel | 6.3V                 | 406.12528                | 0.69                      | 406.125MHz        | 1.0        |

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(2)Frequency stability versus ambient temperature

### Test Results

#### UHF Band: (6.25 kHz Channel Bandwidth)

##### Top channel

| Environment Temperature(°C) | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Deviation (ppm) | Nominal Frequency | Limit(ppm) |
|-----------------------------|----------------------|--------------------------|---------------------------|-------------------|------------|
| 50                          | 7.4                  | 469.97525                | 0.53                      | 469.975MHz        | 1.0        |
| 40                          | 7.4                  | 469.97534                | 0.72                      | 469.975MHz        | 1.0        |
| 30                          | 7.4                  | 469.97527                | 0.57                      | 469.975MHz        | 1.0        |
| 20                          | 7.4                  | 469.97529                | 0.62                      | 469.975MHz        | 1.0        |
| 10                          | 7.4                  | 469.97523                | 0.49                      | 469.975MHz        | 1.0        |
| 0                           | 7.4                  | 469.97534                | 0.72                      | 469.975MHz        | 1.0        |
| -10                         | 7.4                  | 469.97531                | 0.66                      | 469.975MHz        | 1.0        |
| -20                         | 7.4                  | 469.97535                | 0.74                      | 469.975MHz        | 1.0        |
| -30                         | 7.4                  | 469.97528                | 0.60                      | 469.975MHz        | 1.0        |

##### Middle channel

| Environment Temperature(°C) | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Error (ppm) | Nominal Frequency | Limit(ppm) |
|-----------------------------|----------------------|--------------------------|-----------------------|-------------------|------------|
| 50                          | 7.4                  | 439.97526                | 0.59                  | 439.975MHz        | 1.0        |
| 40                          | 7.4                  | 439.97529                | 0.66                  | 439.975MHz        | 1.0        |
| 30                          | 7.4                  | 439.97525                | 0.57                  | 439.975MHz        | 1.0        |
| 20                          | 7.4                  | 439.97533                | 0.75                  | 439.975MHz        | 1.0        |
| 10                          | 7.4                  | 439.97534                | 0.77                  | 439.975MHz        | 1.0        |
| 0                           | 7.4                  | 439.97526                | 0.59                  | 439.975MHz        | 1.0        |
| -10                         | 7.4                  | 439.97527                | 0.61                  | 439.975MHz        | 1.0        |
| -20                         | 7.4                  | 439.97525                | 0.57                  | 439.975MHz        | 1.0        |
| -30                         | 7.4                  | 439.97530                | 0.68                  | 439.975MHz        | 1.0        |

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**Bottom channel**

| Environment Temperature(°C) | Power Supplied (Vdc) | Frequency Measured (MHz) | Frequency Error (ppm) | Nominal Frequency | Limit(ppm) |
|-----------------------------|----------------------|--------------------------|-----------------------|-------------------|------------|
| 50                          | 7.4                  | 406.12523                | 0.57                  | 406.125MHz        | 1.0        |
| 40                          | 7.4                  | 406.12526                | 0.64                  | 406.125MHz        | 1.0        |
| 30                          | 7.4                  | 406.12528                | 0.69                  | 406.125MHz        | 1.0        |
| 20                          | 7.4                  | 406.12525                | 0.62                  | 406.125MHz        | 1.0        |
| 10                          | 7.4                  | 406.12519                | 0.47                  | 406.125MHz        | 1.0        |
| 0                           | 7.4                  | 406.12524                | 0.59                  | 406.125MHz        | 1.0        |
| -10                         | 7.4                  | 406.12528                | 0.69                  | 406.125MHz        | 1.0        |
| -20                         | 7.4                  | 406.12529                | 0.71                  | 406.125MHz        | 1.0        |
| -30                         | 7.4                  | 406.12522                | 0.54                  | 406.125MHz        | 1.0        |

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## 7. EMISSION BANDWIDTH and Mask

### 7.1 PROVISIONS APPLICABLE

**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  $f_0$  to 5.625 kHz removed from  $f_0$ : 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  $7.27(fd - 2.88)$  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.
- (4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two to three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emissions mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (m) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, then an alternate procedure may be used provided prior Commission approval is obtained.

#### **Emission Mask-E:**

6.25 kHz or less channel bandwidth equipment. For transmitters designed to operate with a 6.25 kHz or less 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  $f_0$  to 3.0 kHz removed from  $f_0$ : Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $fd$  in kHz) of more than 3.0 kHz but no more than 4.6 kHz: At least  $30 + 16.67(fd - 3)$  dB or  $55 + 10 \log (P)$  or 65 dB, whichever is the lesser attenuation.
- (3) On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: At least  $55 + 10 \log (P)$  or 65 dB, whichever is the lesser attenuation.
- (4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth.

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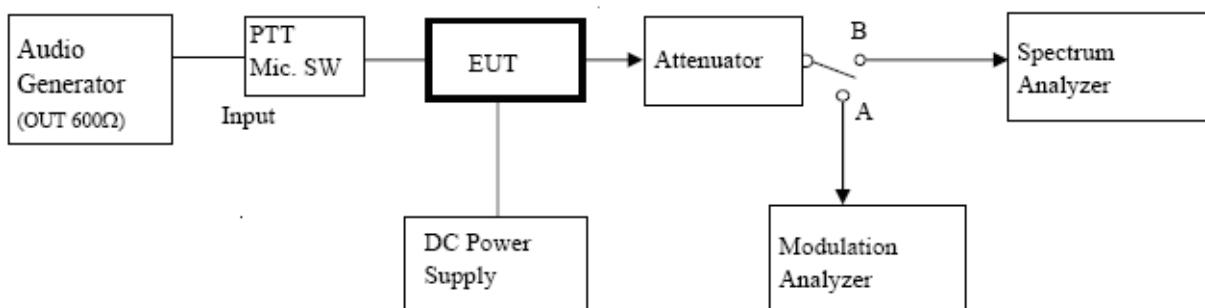


resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

## 7.2 MEASUREMENT PROCEDURE

- 1). 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
- 2). Set SPA Center Frequency = fundamental frequency, RBW=100Hz, VBW= 300 Hz, Span =50 kHz
- 3). Set SPA Max hold. Mark peak, -26 dB.

## 7.3 Test Setup Block Diagram



## 7.4 Measurement Result:

### For 12.5 kHz Channel Bandwidth

| Bandwidth           |                |               |           |        |
|---------------------|----------------|---------------|-----------|--------|
| Operating Frequency | 26dB Bandwidth | 99% Bandwidth | Limits    | Result |
| 439.975MHz (Middle) | 5.81kHz        | 5.41kHz       | 11.25 kHz | Pass   |

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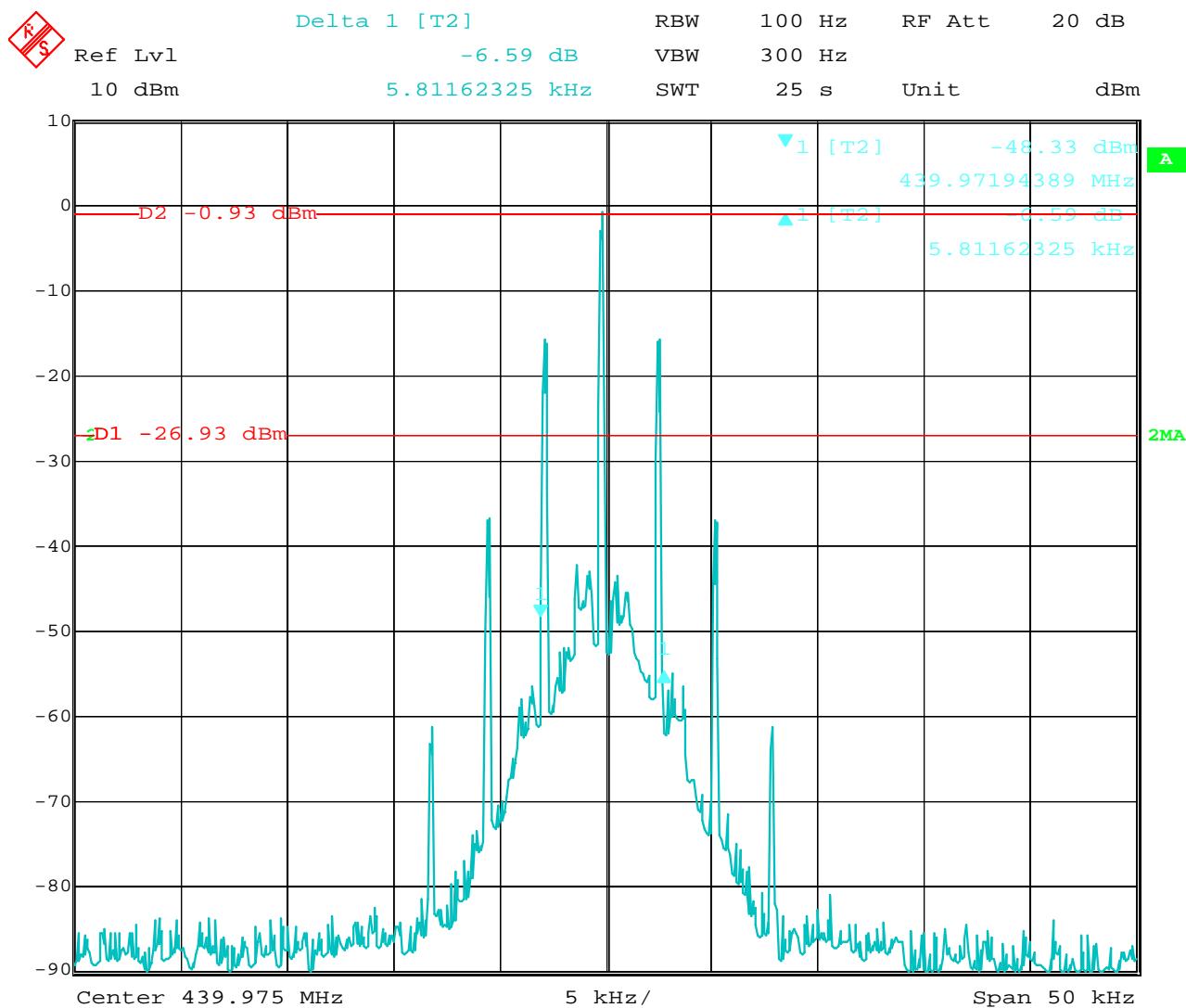
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## 7.5 Test Plots:

UHF Band-Middle Channel

26dB Bandwidth



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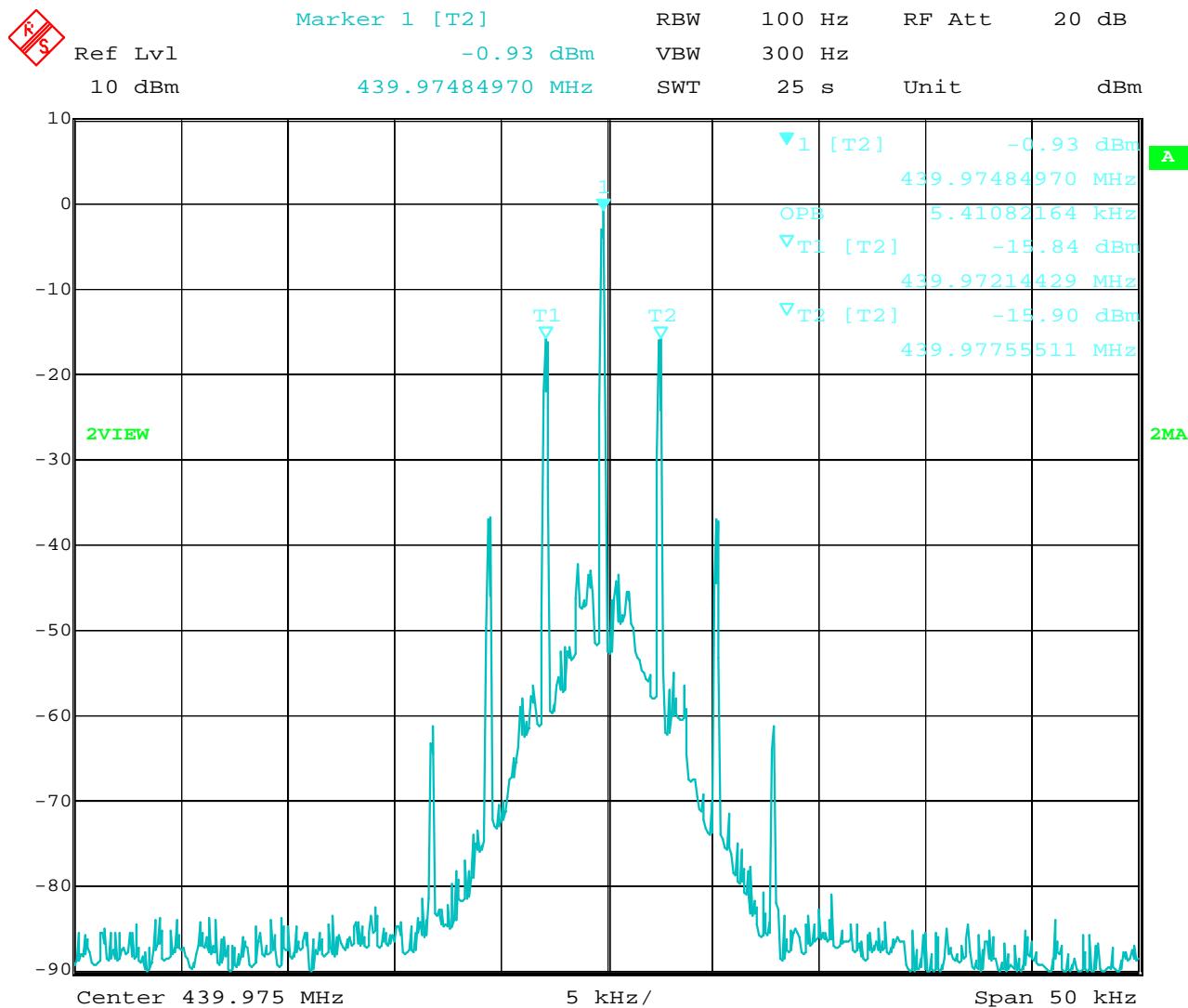
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UHF Band-Middle Channel

99% Bandwidth



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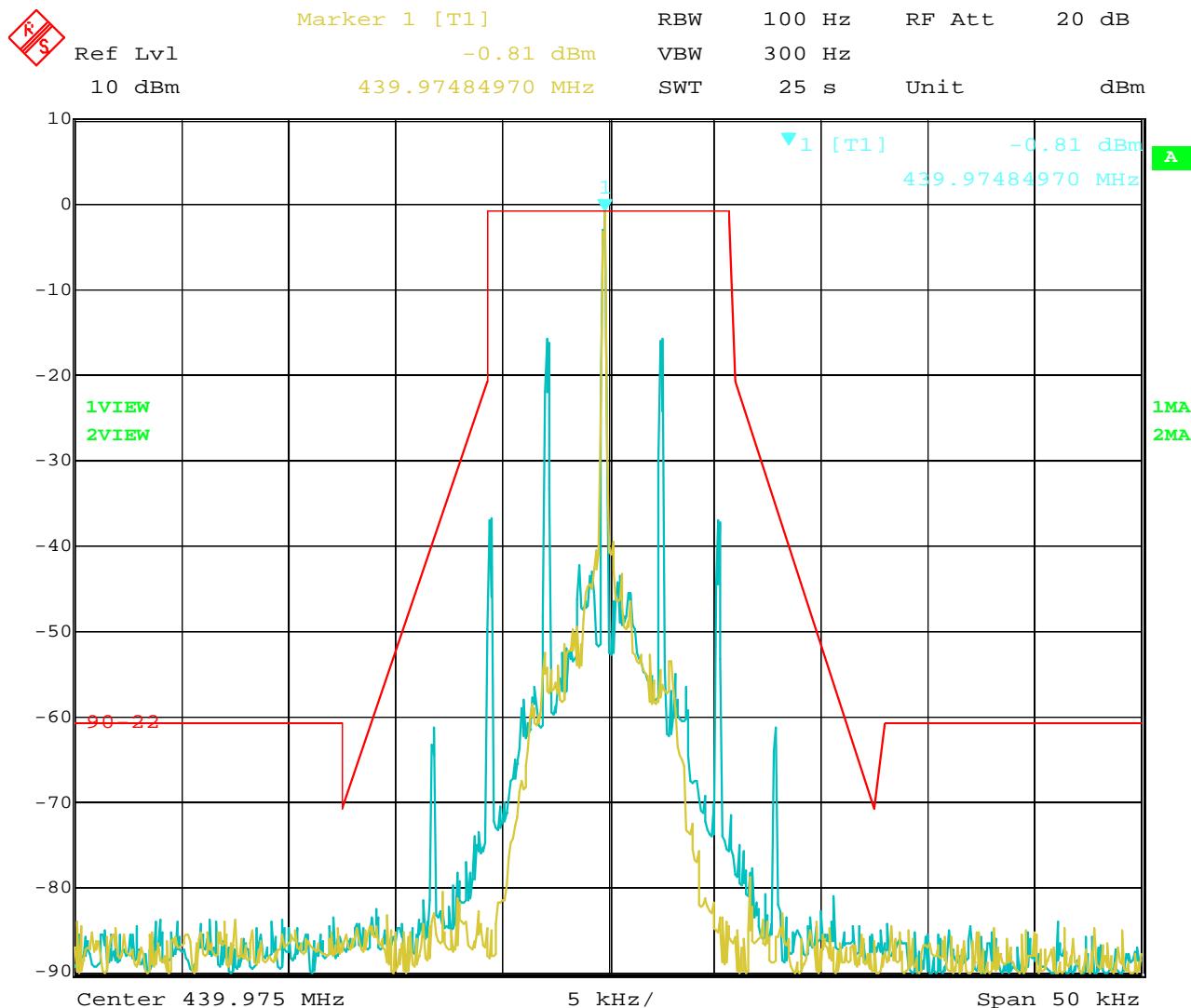
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UHF Band-Middle Channel

Emission Mask D



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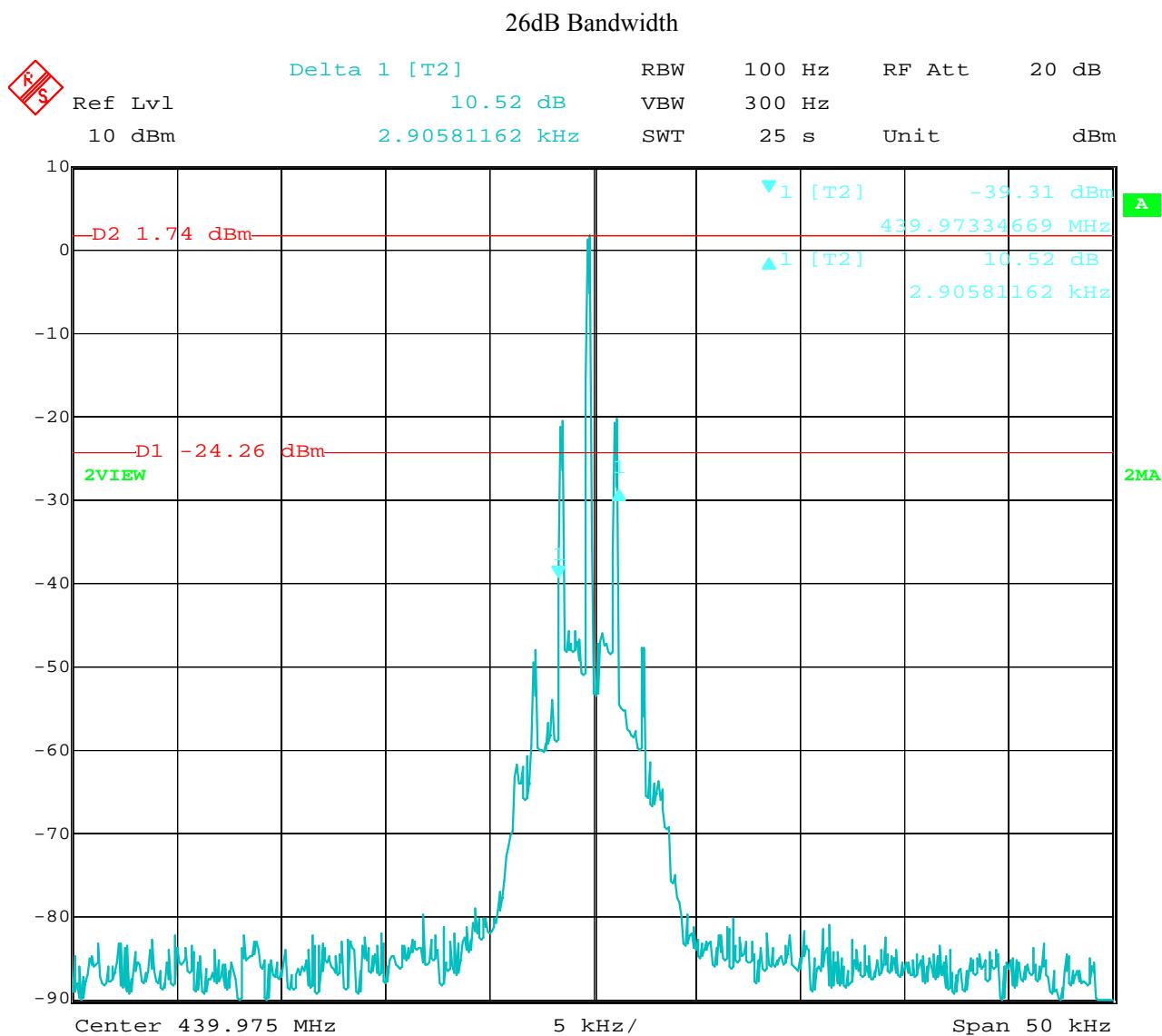
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For 6.25 kHz Channel Bandwidth

| Bandwidth           |                |               |        |        |
|---------------------|----------------|---------------|--------|--------|
| Operating Frequency | 26dB Bandwidth | 99% Bandwidth | Limits | Result |
| 439.975MHz (Middle) | 2.91kHz        | 2.51kHz       | 6 kHz  | Pass   |

UHF Band-Middle Channel



The report refers only to the sample tested and does not apply to the bulk.

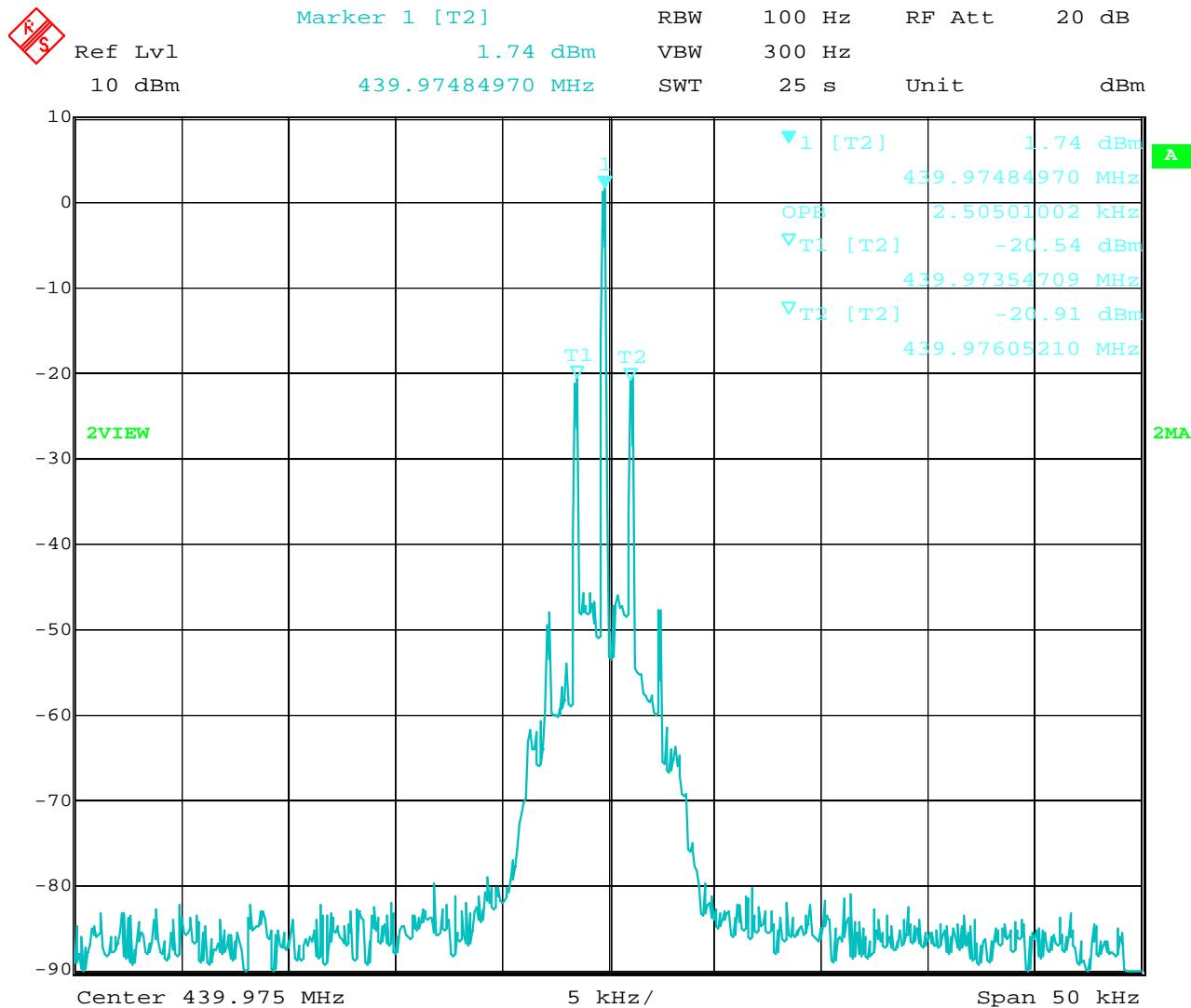
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UHF Band-Middle Channel

99% Bandwidth



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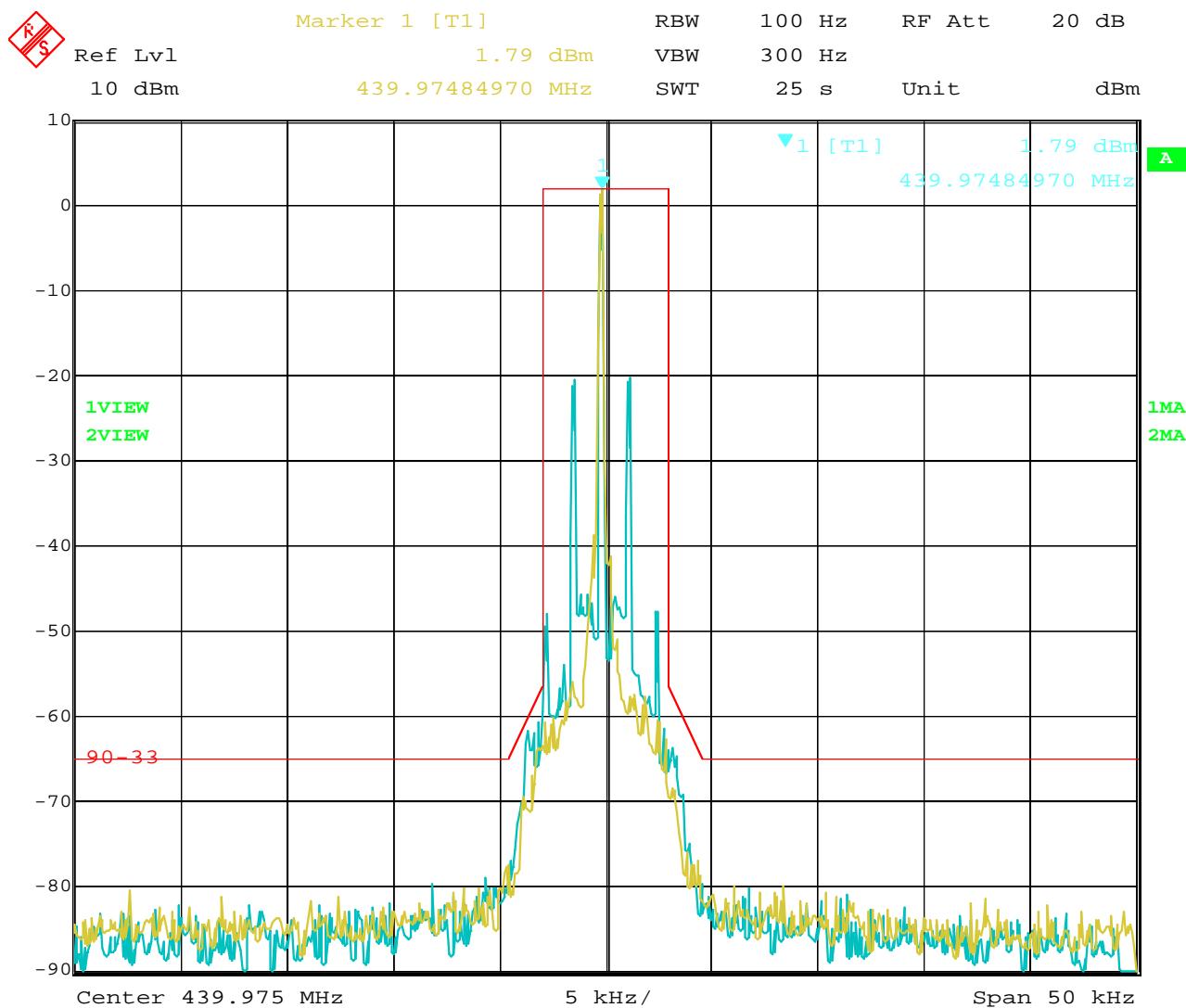
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UHF Band-Middle Channel

Emission Mask E



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## 8. UNWANTED RADIATION

### 8.1 PROVISIONS APPLICABLE

8.1.1 **Emission Mask D**-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 from the centre of the authorized bandwidth  $f_0$  to 5.625 KHz removed from  $f_0$ : Zero dB
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.625 KHz but no more than 12.5 KHz: At least  $7.27(f_d - 2.88 \text{ KHz})$  dB
- (3) 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  $50 + 10 \log(P)$  dB or 70 dB, whichever is the lesser attenuation.

#### **Emission Mask-E:**

6.25 kHz or less channel bandwidth equipment. For transmitters designed to operate with a 6.25 kHz or less 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  $f_0$  to 3.0 kHz removed from  $f_0$ : Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 3.0 kHz but no more than 4.6 kHz: At least  $30 + 16.67(f_d - 3 \text{ kHz})$  or  $55 + 10 \log(P)$  or 65 dB, whichever is the lesser attenuation.
- (3) On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: At least  $55 + 10 \log(P)$  or 65 dB, whichever is the lesser attenuation.
- (4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

### 8.2 MEASUREMENT PROCEDURE (Radiated Emissions)

- (1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
- (2). The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3). The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak

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detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

(4). The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

(5). The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.

(6). The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

(7). The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.

(8). The maximum signal level detected by the measuring receiver shall be noted.

(9). The measurement shall be repeated with the test antenna set to horizontal polarization.

(10). Replace the antenna with a proper Antenna (substitution antenna).

(11). The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.

(12). The substitution antenna shall be connected to a calibrated signal generator.

(13). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

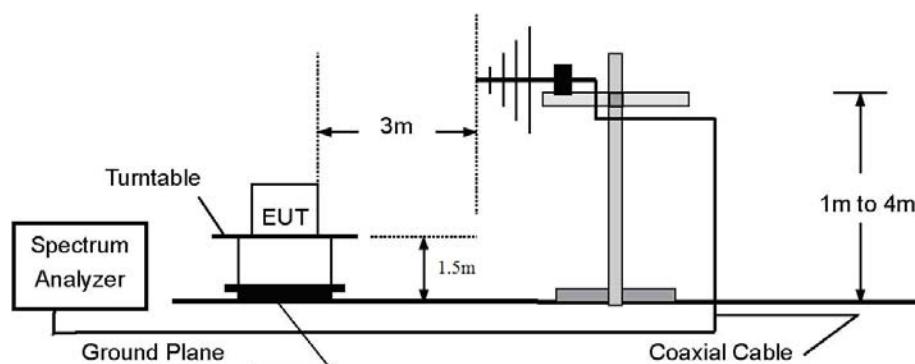
(14). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

(15). The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver and Gain of Substitution antenna.

(16). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver and Gain of Substitution antenna. So the EIRP is obtained.

(17). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

### 8.3 Test setup Block Diagram



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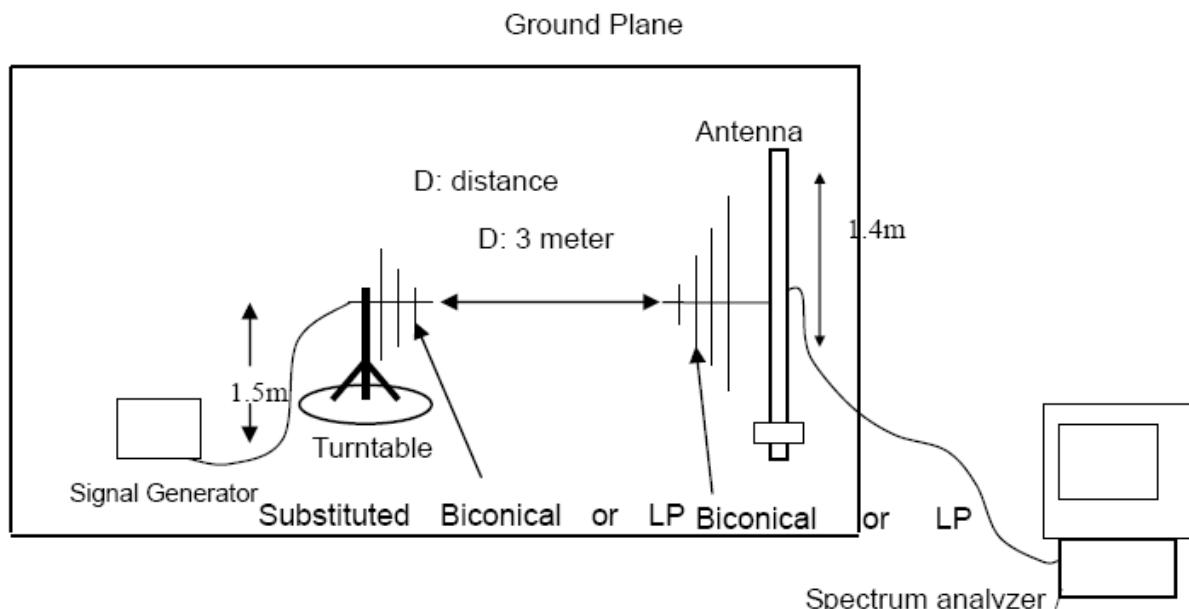
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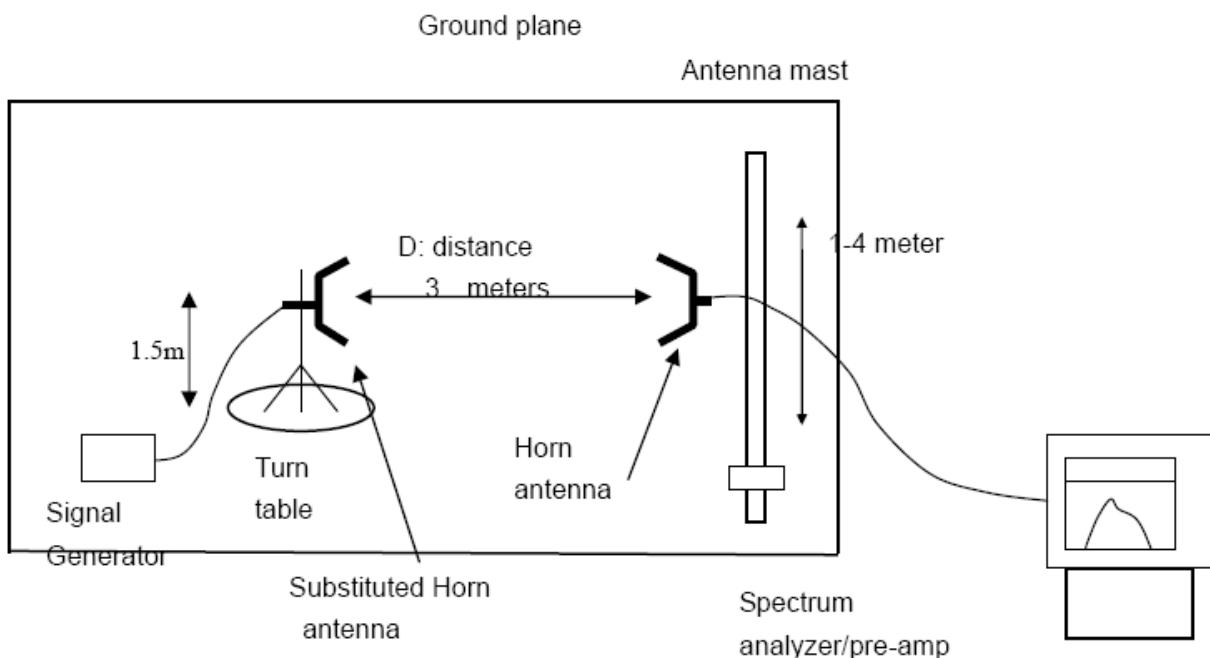


#### 8.4 Substitution Method: (Radiated Emissions)

##### Radiated Below 1GHz



##### Radiated Above 1 GHz



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## 8.5 MEASUREMENT RESULTS:

Limit:  $43 + 10 \log (P)$  dB, (-13 dBm)

**Note: The results were peak values and worse case was recorded**

UHF Band

Bottom channel

| Frequency (MHz) | Substituted Level (dBm) | Cable Loss (dBm) | Antennal Polarity | Antenna Gain (dB) | Emission (dBm) | Limit (dBm) |
|-----------------|-------------------------|------------------|-------------------|-------------------|----------------|-------------|
| 812.25          | -36.2                   | 2.1              | Vertical          | 6.2               | -32.1          | -13         |
| 1218.38         | -41.1                   | 3.3              | Vertical          | 7.3               | -37.1          | -13         |
| 1624.5          | -35.4                   | 3.9              | Vertical          | 8.7               | -40.2          | -13         |
| 2030.63         | -49.3                   | 4.5              | Vertical          | 10.2              | -43.6          | -13         |
| 812.25          | -40.2                   | 2.1              | Horizontal        | 6.2               | -36.1          | -13         |
| 1218.38         | -47.6                   | 3.3              | Horizontal        | 7.3               | -43.6          | -13         |
| 1624.5          | -52.7                   | 3.9              | Horizontal        | 8.7               | -47.9          | -13         |

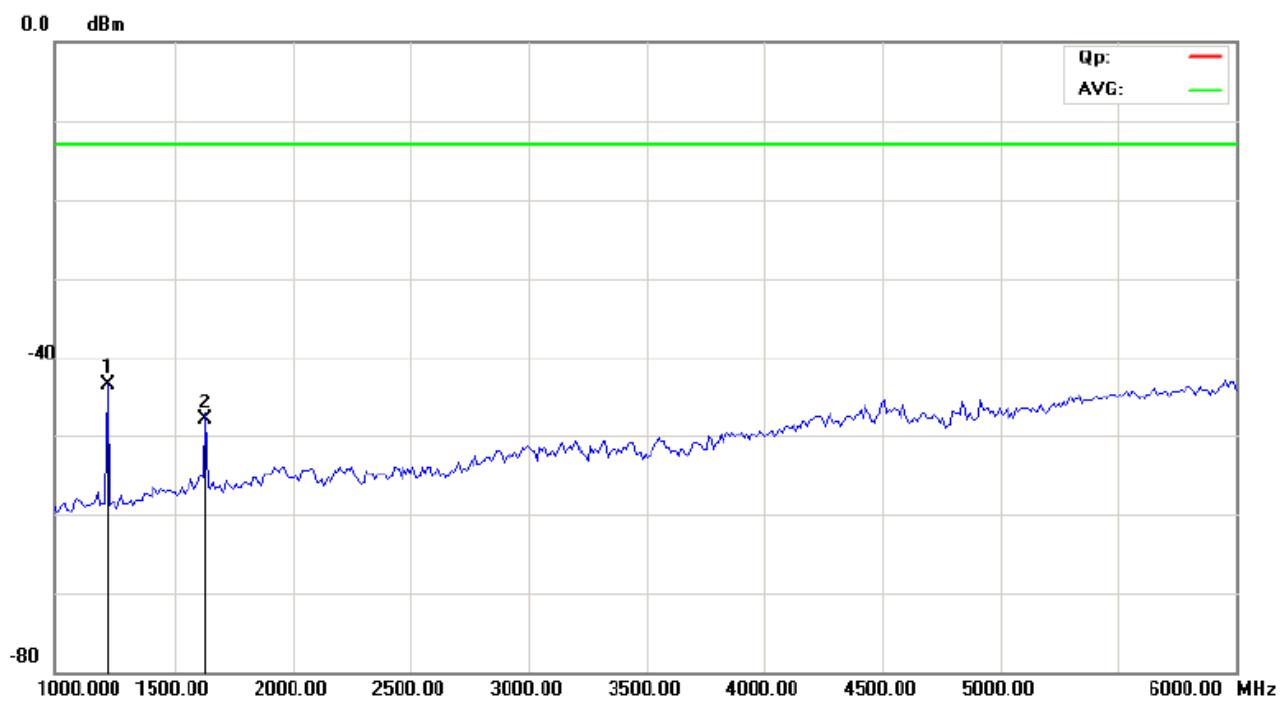
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Horizontal-Bottom Channel



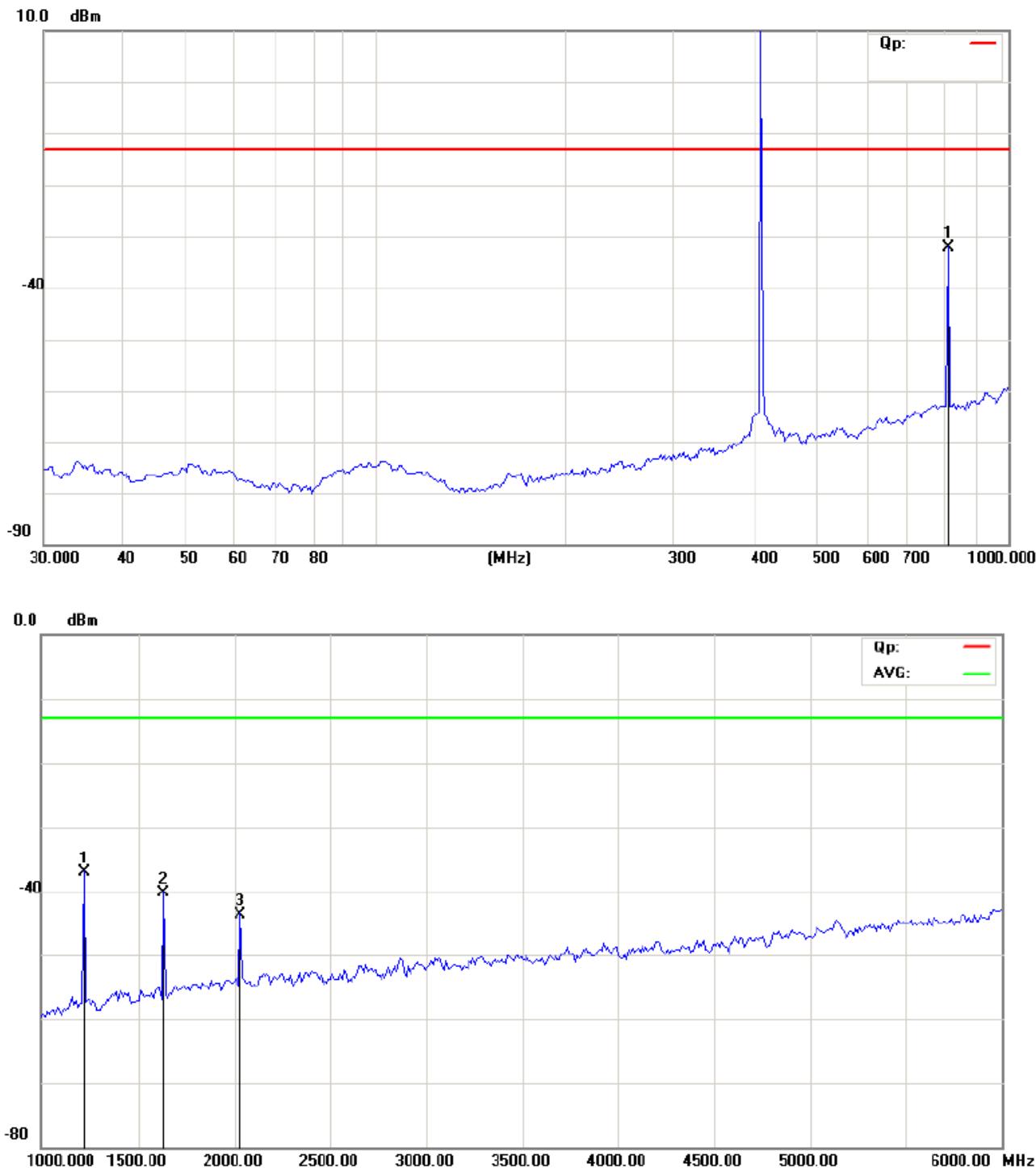
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Vertical-Bottom Channel



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Middle channel

| Frequency (MHz) | Substituted Level (dBm) | Cable Loss (dBm) | Antennal Polarity | Antenna Gain (dB) | Emission (dBm) | Limit (dBm) |
|-----------------|-------------------------|------------------|-------------------|-------------------|----------------|-------------|
| 879.95          | -34.1                   | 2.3              | Vertical          | 6.3               | -30.1          | -13         |
| 1319.93         | -40.9                   | 3.6              | Vertical          | 7.3               | -37.2          | -13         |
| 1759.90         | -46.6                   | 4.4              | Vertical          | 8.9               | -42.1          | -13         |
| 2199.88         | -52.7                   | 5.1              | Vertical          | 10.4              | -46.4          | -13         |
| 879.95          | -39.6                   | 2.3              | Horizontal        | 6.3               | -35.6          | -13         |
| 1319.93         | -46.9                   | 3.6              | Horizontal        | 7.3               | -43.2          | -13         |
| 1759.90         | -51.4                   | 4.4              | Vertical          | 8.9               | -46.9          | -13         |

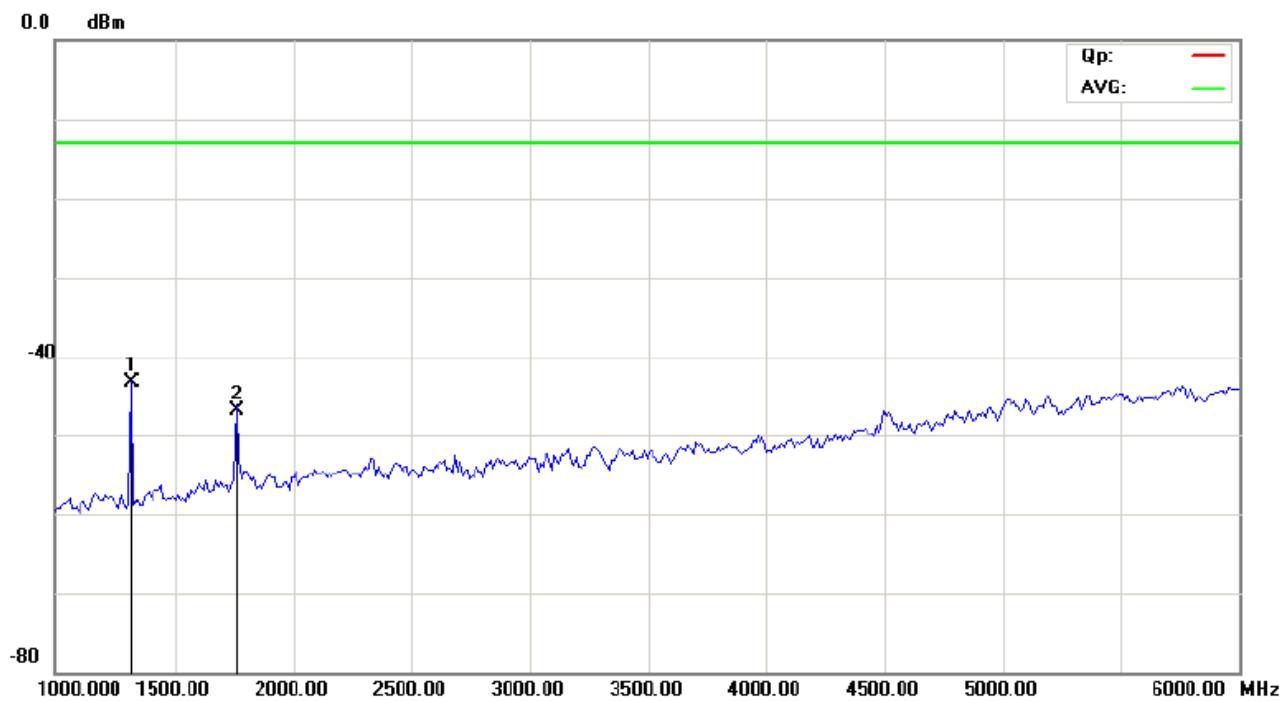
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Horizontal-Bottom Channel



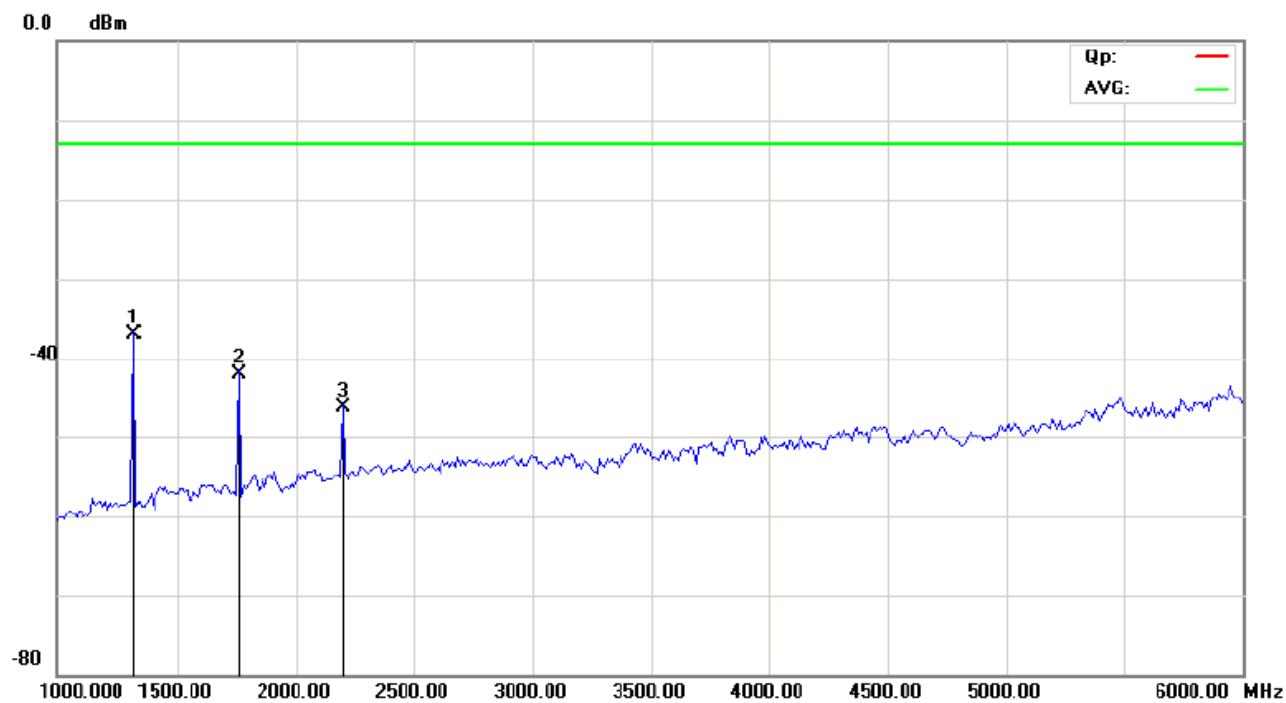
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Vertical-Bottom Channel



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Top channel

| Frequency (MHz) | Substituted Level (dBm) | Cable Loss (dBm) | Antennal Polarity | Antenna Gain (dB) | Emission (dBm) | Limit (dBm) |
|-----------------|-------------------------|------------------|-------------------|-------------------|----------------|-------------|
| 939.95          | -37.2                   | 2.7              | Vertical          | 6.6               | -33.3          | -13         |
| 1409.93         | -44.6                   | 3.8              | Vertical          | 7.8               | -40.6          | -13         |
| 1979.90         | -48.6                   | 4.9              | Vertical          | 9.1               | -44.4          | -13         |
| 939.95          | -42.2                   | 2.7              | Horizontal        | 6.6               | -38.3          | -13         |
| 1409.93         | -47.7                   | 3.8              | Horizontal        | 7.8               | -43.7          | -13         |

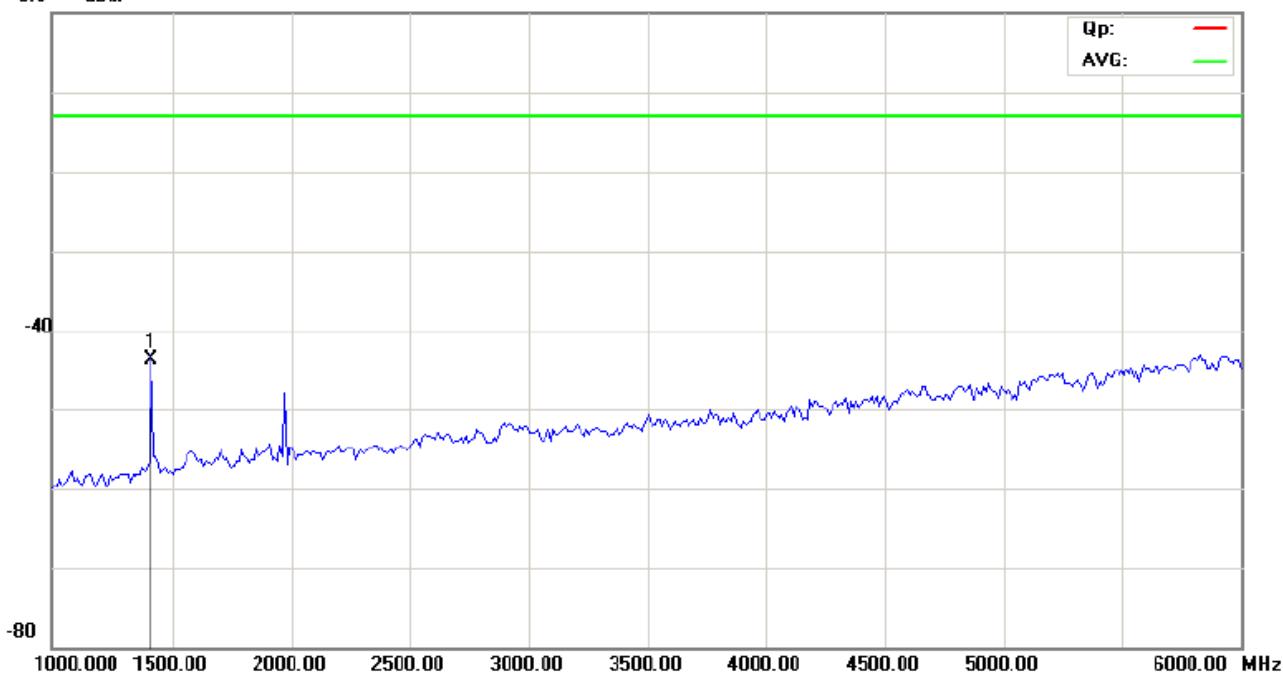
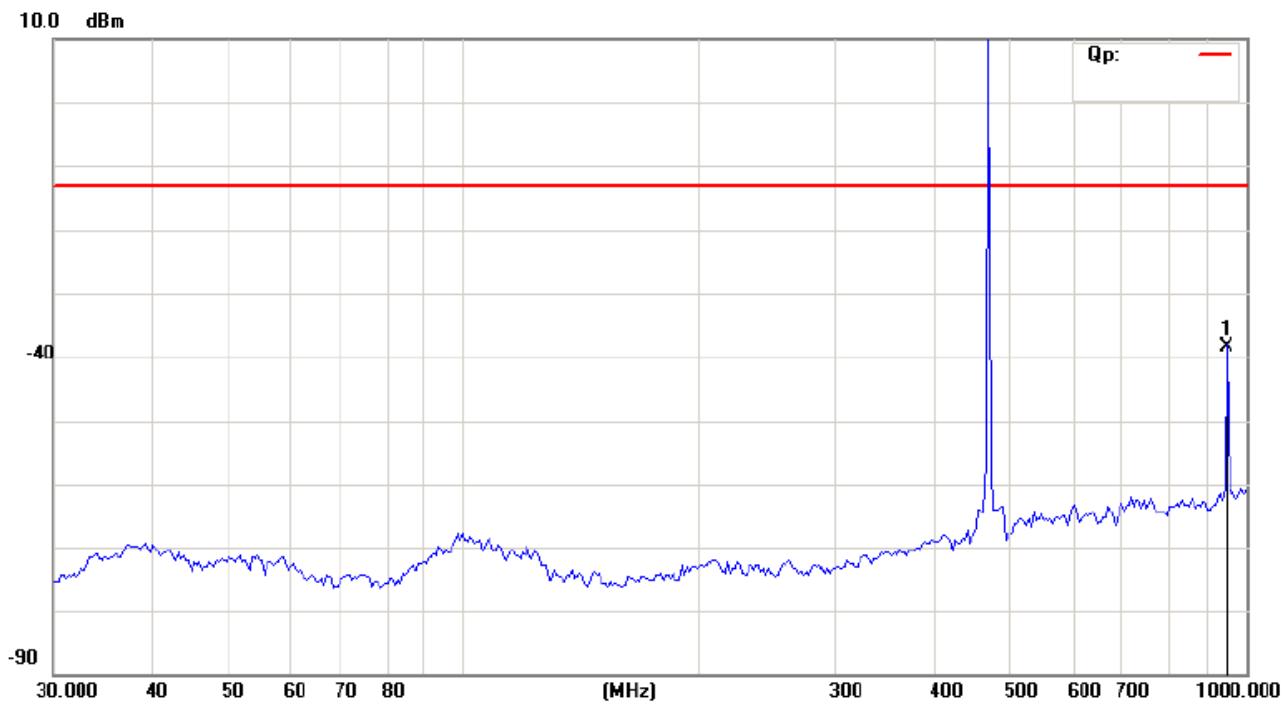
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Horizontal-Bottom Channel



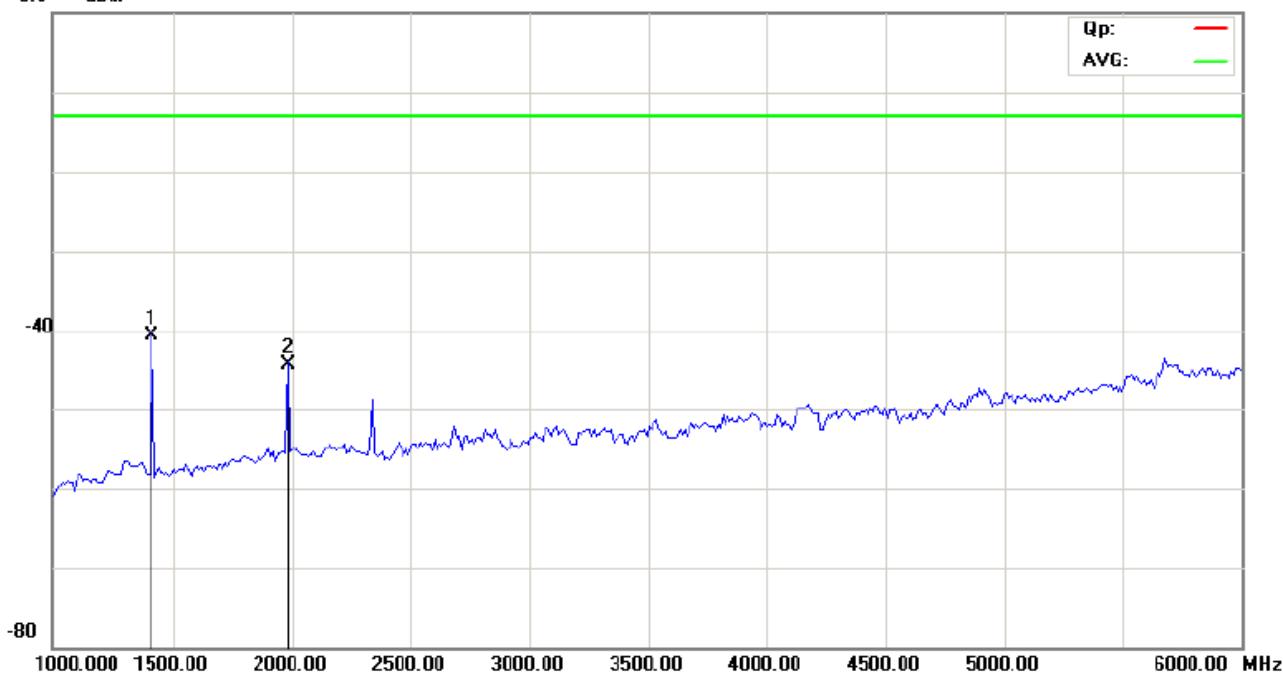
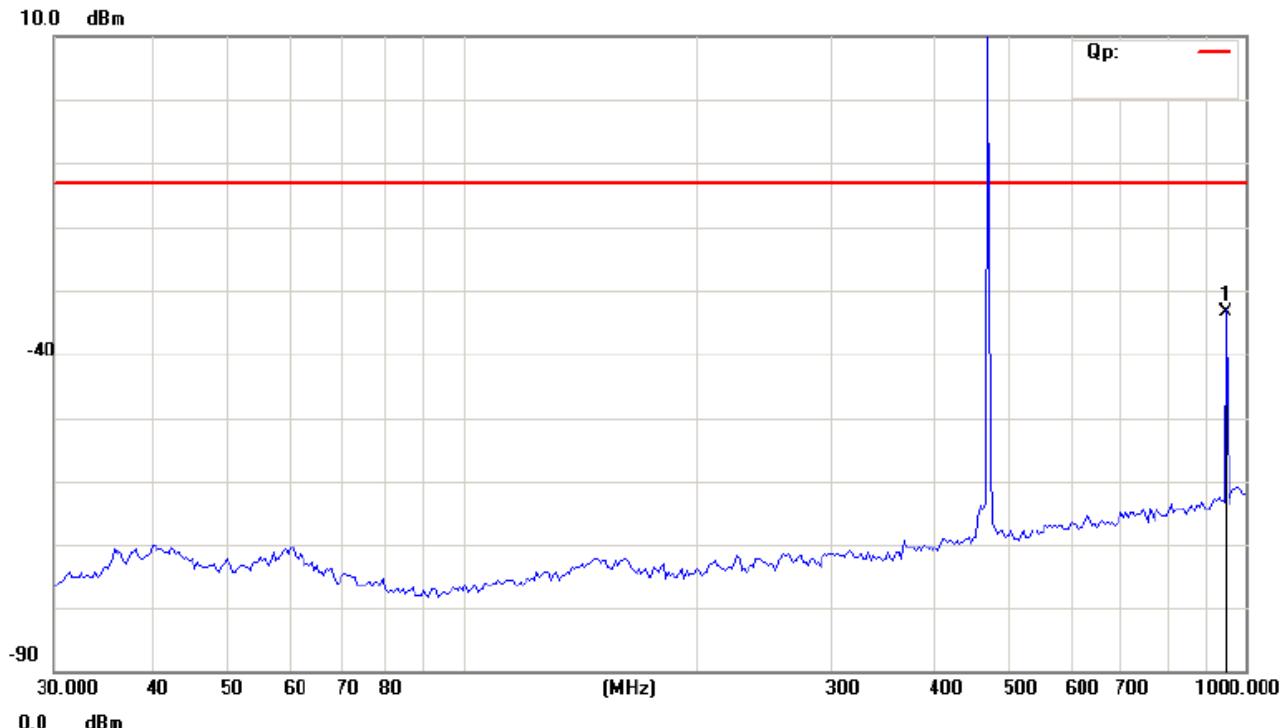
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## 8.6 Conducted Emissions

### 8.6.1. Measurement Procedure

- 1). The eut antenna port connect to the spectrum analyzer through a attenuator.
- 2). Let the eut working in transmitter and used the spectrum to measure the conducted emission. 3). The output of the antenna shall be connected to the spectrum.

The setup of test receiver: Detector: Peak RBW: 120 kHz for 30-1000MHz, 1MHz for above1GHz

VBW: 300 kHz for 30-1000MHz 3MHz for above1GHz

### 8.6.2. Test Setup Block Diagram (block diagram of configuration)



### 8.6.3 Test Result

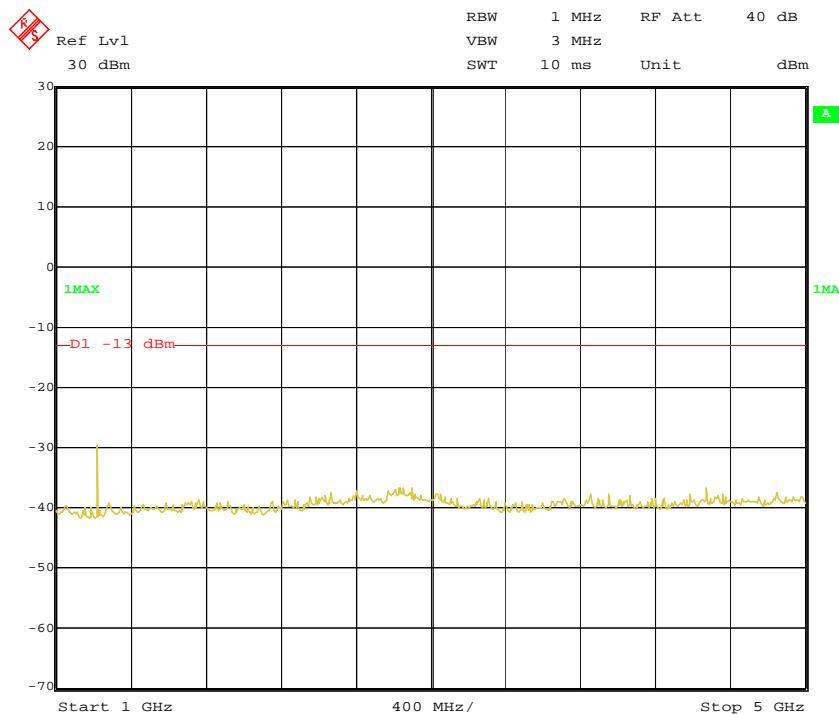
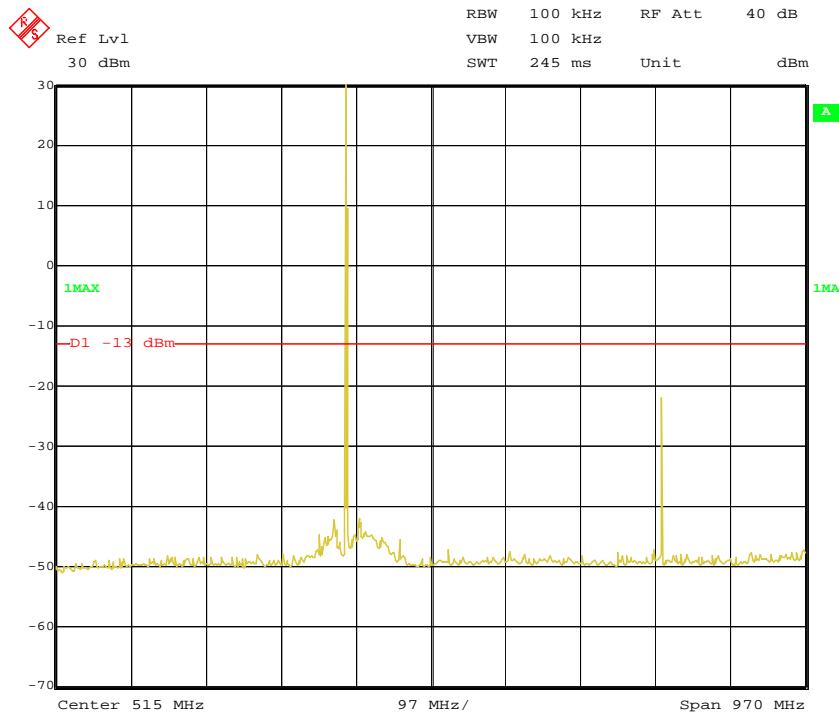
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### Bottom Channel



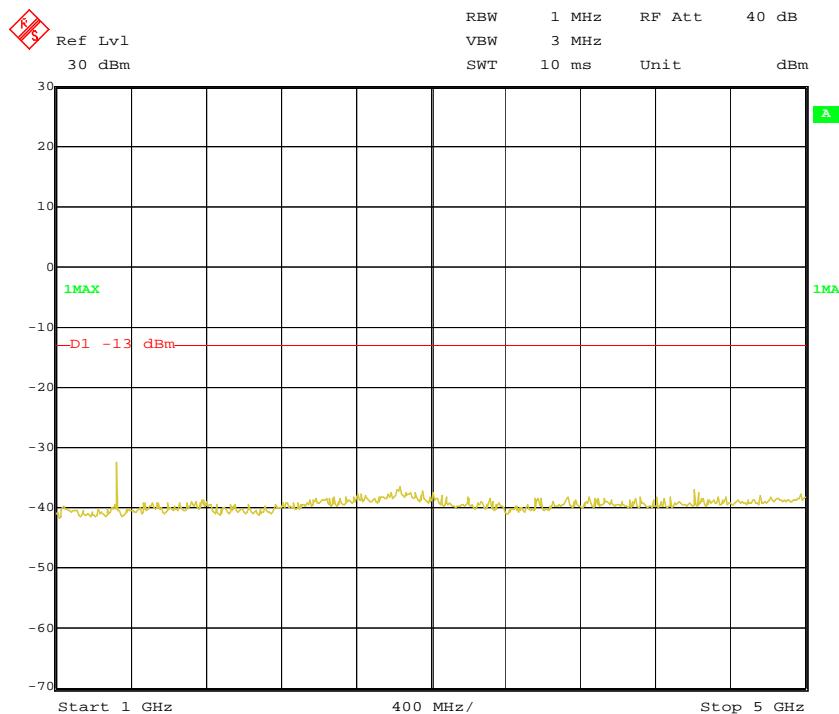
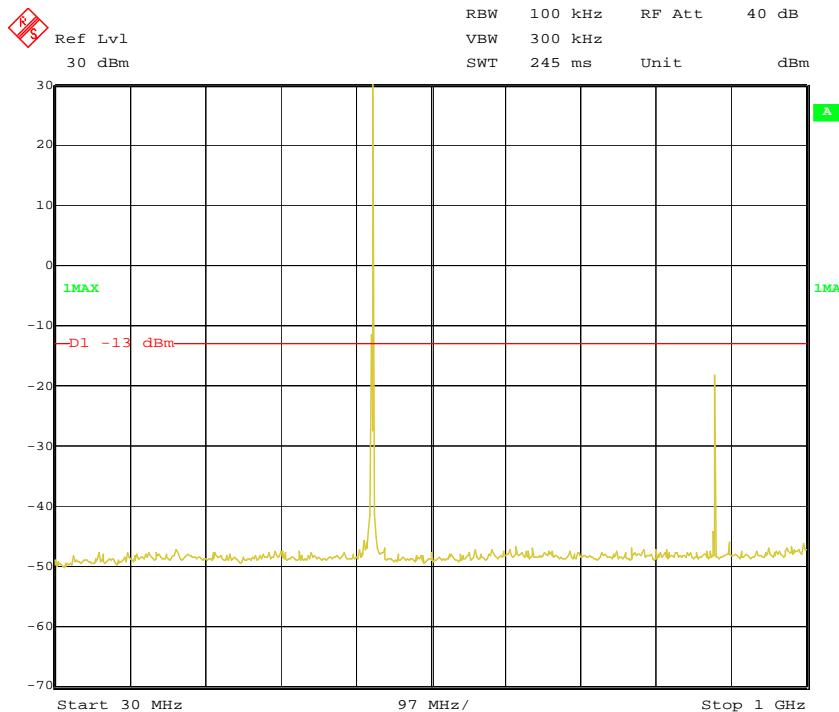
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### Middle Channel



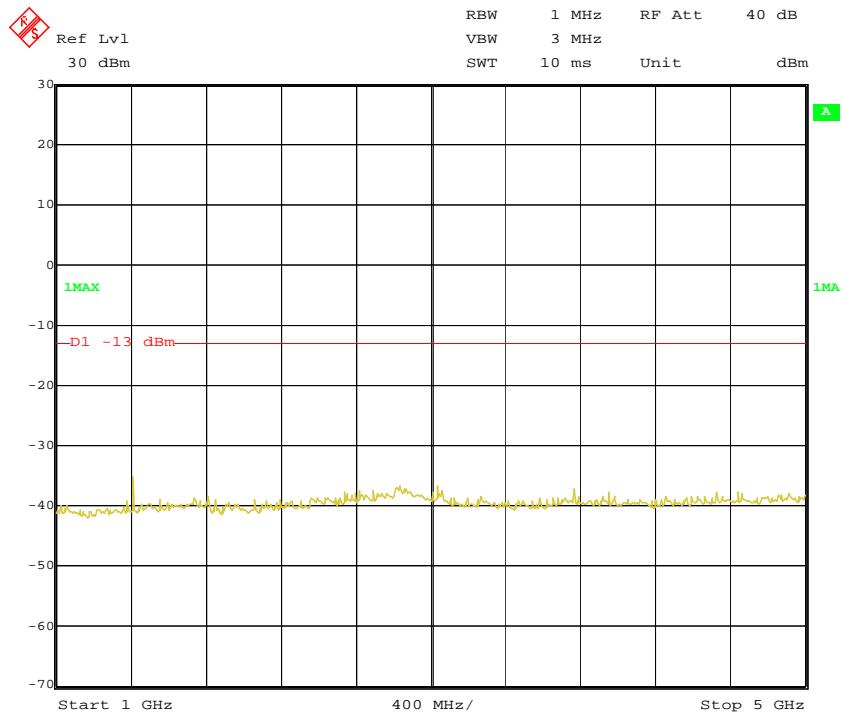
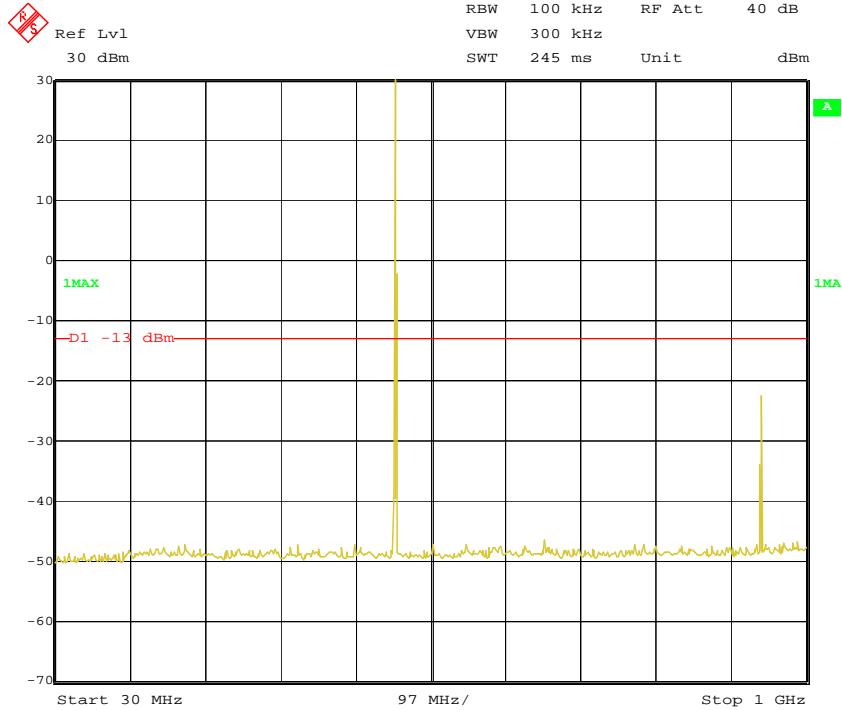
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Top Channel



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## 9. Modulation Characteristics

### 9.1 PROVISIONS APPLICABLE

According to CFR 47 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.

### 9.2 MEASUREMENT METHOD

#### 9.2.1 Modulation Limit

- (1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1kHz 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, 1000, 1500 and 3000Hz in sequence.

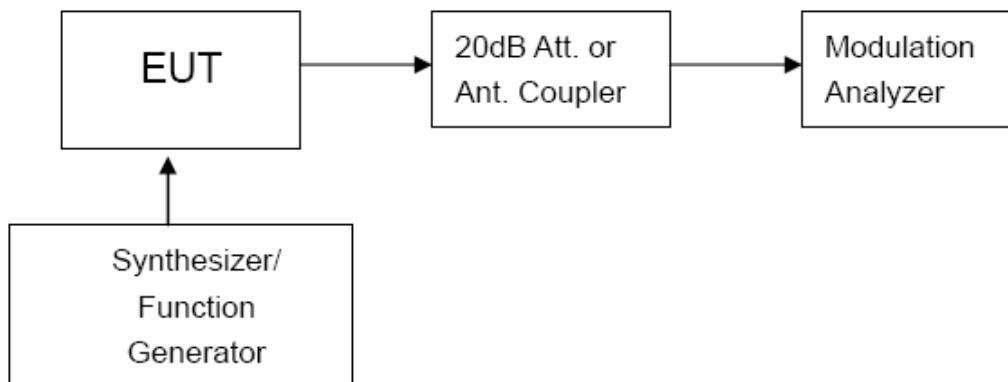
#### 9.2.2 Audio Frequency Response

- (1). The EUT and test equipment were set up as shown in figure 2.
- (2). Adjust the Modulation Analyzer for the following setting:
  - a) High-pass filter : off
  - b) Low-pass filter : 15 kHz
  - c) Detector : positive peak
  - d) Function : FM
- (3). The audio signal input was adjusted to obtain 20 % modulation at 1 kHz, and this point was taken as the 0 dB reference level.
- (4). With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 300 Hz to 5 kHz.
- (5). The response in dB relative to 1 kHz was then measured, using the Modulation Analyzer.

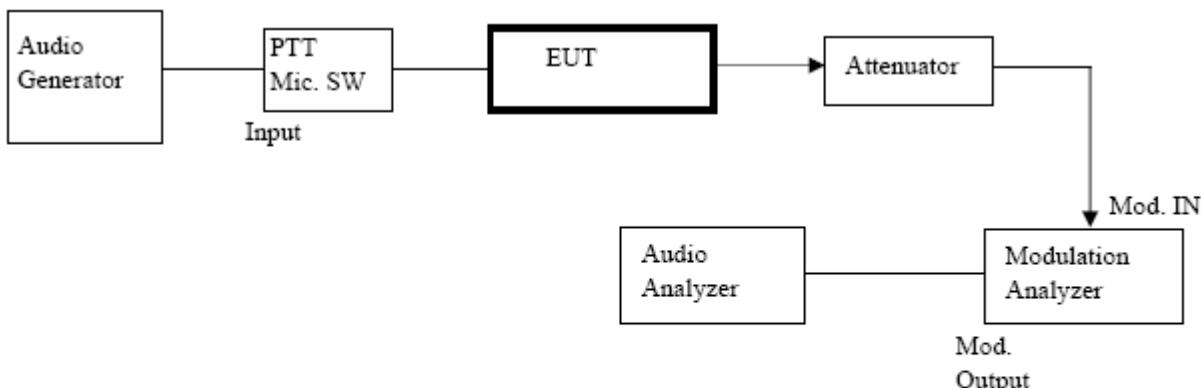
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**Figure 1: Modulation characteristic measurement configuration**



**Figure 2: Audio Frequency Response Measurement Configure**

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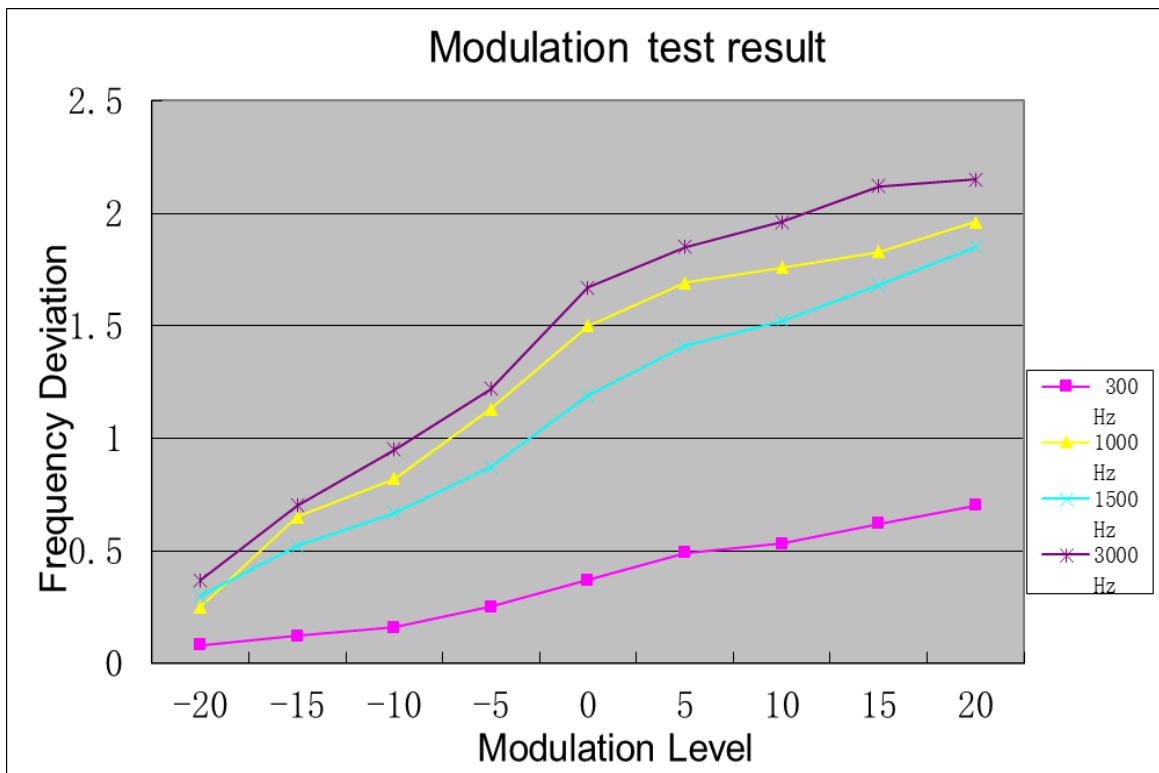


## 9.4 MEASUREMENT RESULT

### (a). Modulation Limit:

Middle channel (For UHF Band, 12.5 kHz Channel Bandwidth)

| Modulation Level (dB) | Peak Freq. Deviation At 300 Hz | Peak Freq. Deviation At 1000 Hz | Peak Freq. Deviation At 1500 Hz | Peak Freq. Deviation At 3000 Hz |
|-----------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|
| -20                   | 0.08                           | 0.25                            | 0.3                             | 0.37                            |
| -15                   | 0.12                           | 0.65                            | 0.52                            | 0.7                             |
| -10                   | 0.16                           | 0.82                            | 0.67                            | 0.95                            |
| -5                    | 0.25                           | 1.13                            | 0.87                            | 1.22                            |
| 0                     | 0.37                           | 1.5                             | 1.19                            | 1.67                            |
| 5                     | 0.49                           | 1.69                            | 1.41                            | 1.85                            |
| 10                    | 0.53                           | 1.76                            | 1.52                            | 1.96                            |
| 15                    | 0.62                           | 1.83                            | 1.68                            | 2.12                            |
| 20                    | 0.7                            | 1.96                            | 1.85                            | 2.15                            |



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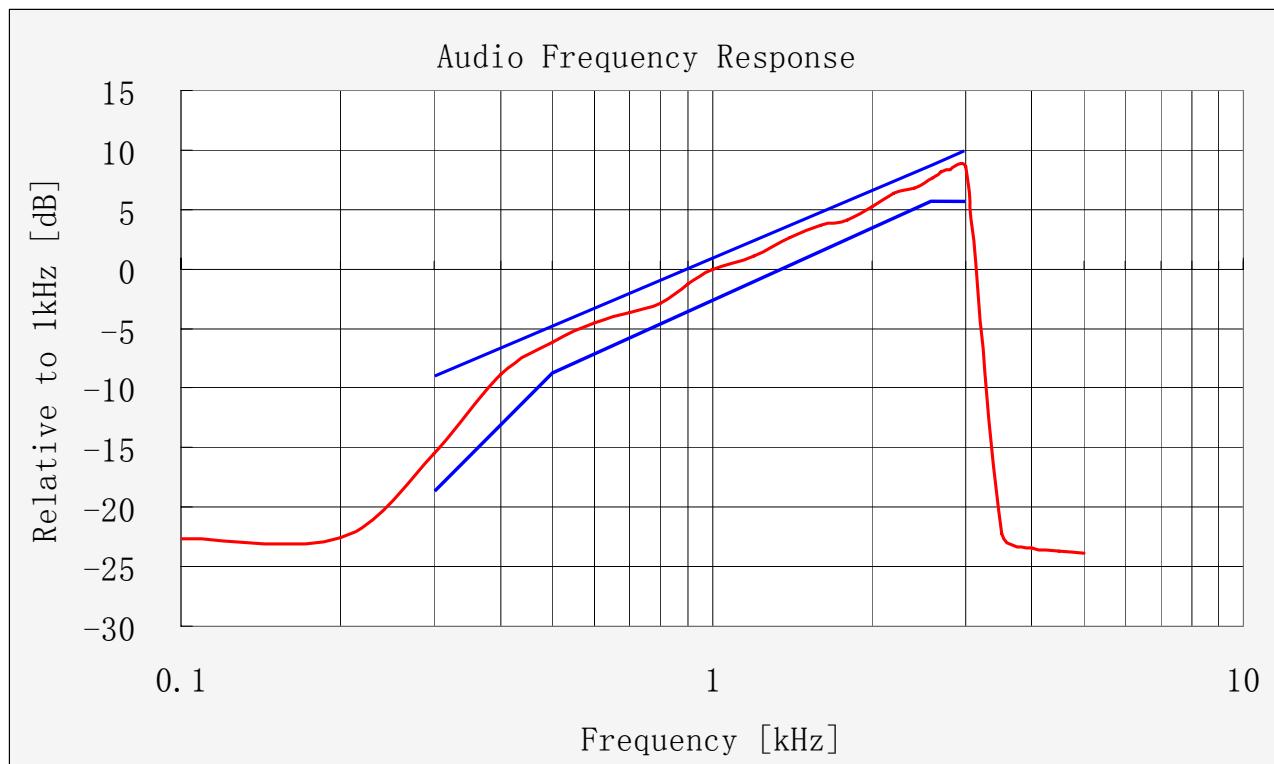
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**(b). Audio Frequency Response:**

**For UHF Band, 12.5 kHz Channel Bandwidth**



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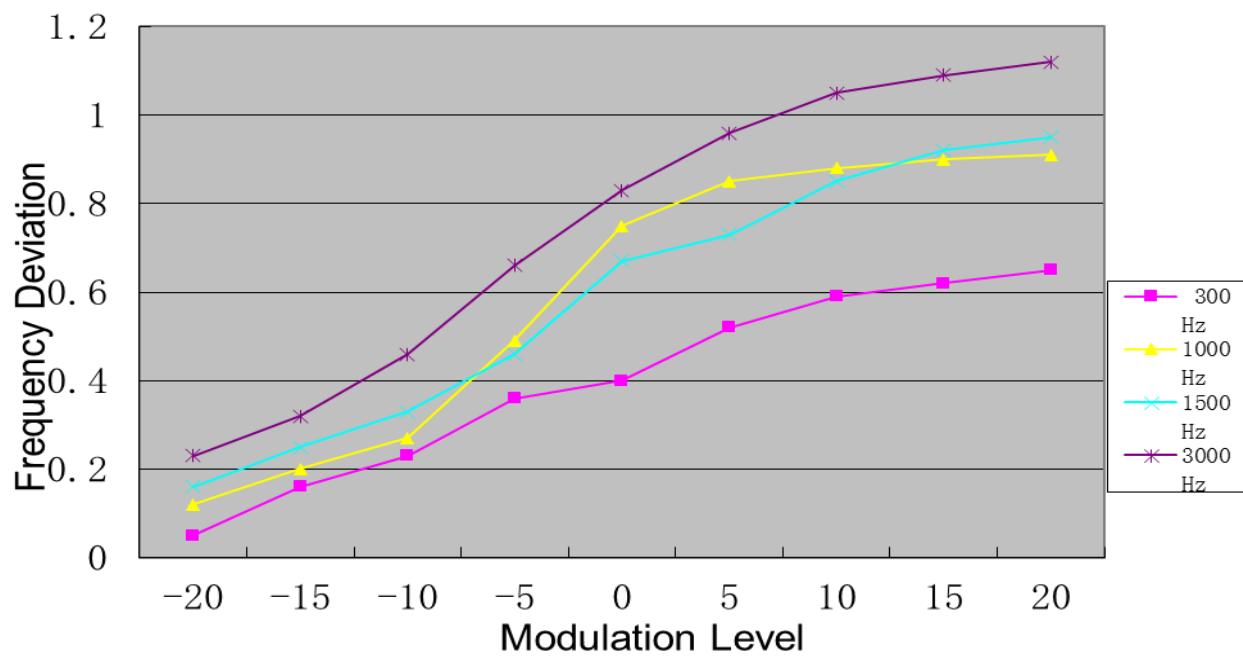


**(a). Modulation Limit:**

**Middle channel (For UHF Band, 6.25 kHz Channel Bandwidth)**

| Modulation Level (dB) | Peak Freq. Deviation At 300 Hz | Peak Freq. Deviation At 1000 Hz | Peak Freq. Deviation At 1500 Hz | Peak Freq. Deviation At 3000 Hz |
|-----------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|
| -20                   | 0.05                           | 0.12                            | 0.16                            | 0.23                            |
| -15                   | 0.16                           | 0.2                             | 0.25                            | 0.32                            |
| -10                   | 0.23                           | 0.27                            | 0.33                            | 0.46                            |
| -5                    | 0.36                           | 0.49                            | 0.46                            | 0.66                            |
| 0                     | 0.4                            | 0.75                            | 0.67                            | 0.83                            |
| 5                     | 0.52                           | 0.85                            | 0.73                            | 0.96                            |
| 10                    | 0.59                           | 0.88                            | 0.85                            | 1.05                            |
| 15                    | 0.62                           | 0.9                             | 0.92                            | 1.09                            |
| 20                    | 0.65                           | 0.91                            | 0.95                            | 1.12                            |

**Modulation test result**



The report refers only to the sample tested and does not apply to the bulk.

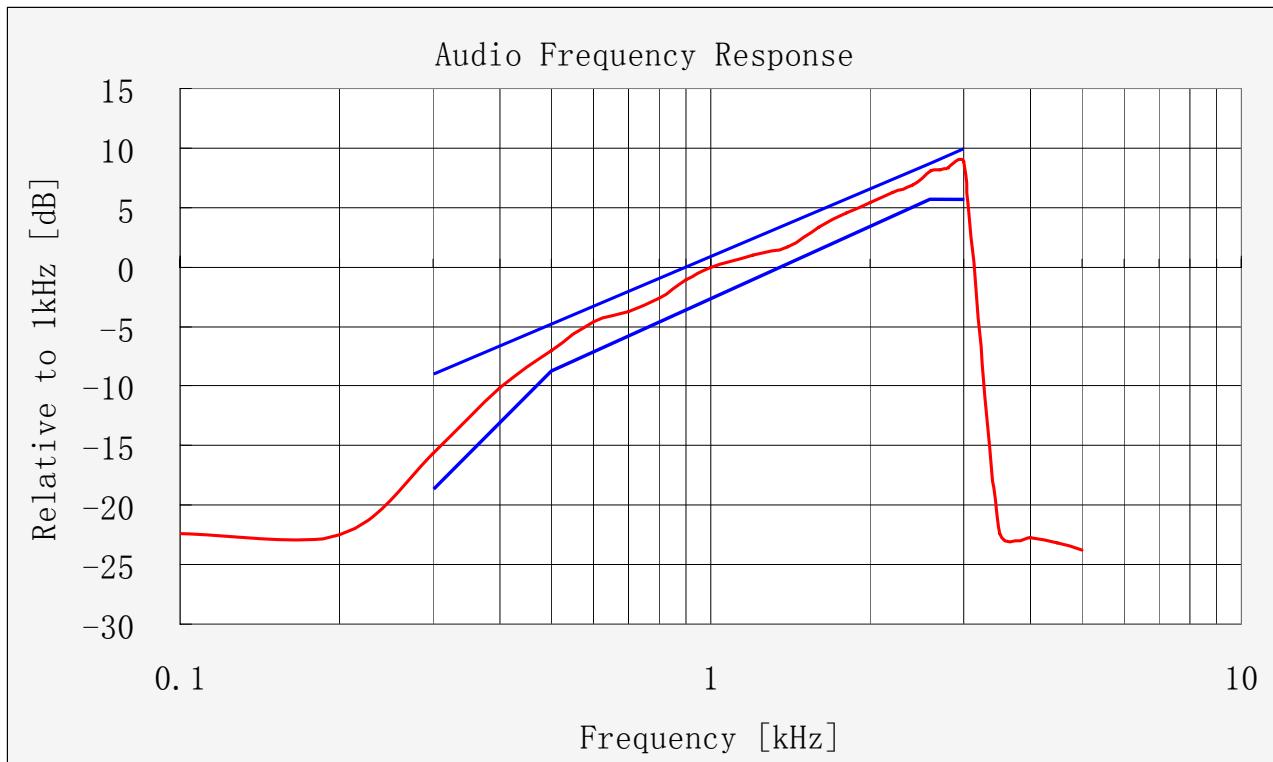
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**(b). Audio Frequency Response:**

**For UHF Band, 6.25 kHz Channel Bandwidth**



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## 10. MAXIMUM TRANSMITTER POWER (CONDUCTED OUTPUT POWER)

### 10.1 PROVISIONS APPLICABLE

Per FCC §2.1046 and §90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

### 10.2 TEST PROCEDURE

The RF output of Two-way Radio was conducted to a spectrum analyzer through an appropriate attenuator.

Spectrum analyzer setting: RBW=10 kHz, VBW=30 kHz, PK detector

### 10.3 TEST RESULT

Calculation Formula:  $CP = R + A + L$

\* Note:

CP: The final Conducted Power

R : The reading value from spectrum analyzer

A : The attenuation value of the used attenuator

L : The loss of all connection cables

#### For 12.5 kHz Channel Bandwidth

| Conducted Power Measurement Results |                |                          |
|-------------------------------------|----------------|--------------------------|
| Channel Separation                  | Channel        | Measurement Result (dBm) |
| UHF Band                            | Bottom channel | 35.87                    |
|                                     | Middle Channel | 36.08                    |
|                                     | Top channel    | 35.50                    |

Maximum ERP=34.82dBm

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**For 6.25 kHz Channel Spacing**

| Conducted Power Measurement Results |                |                          |
|-------------------------------------|----------------|--------------------------|
| Channel Separation                  | Channel        | Measurement Result (dBm) |
| UHF Band                            | Bottom channel | 35.73                    |
|                                     | Middle Channel | 35.99                    |
|                                     | Top channel    | 35.41                    |

Maximum ERP=34.70dBm

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## 11. TRANSMITTER FREQUENCY BEHAVIOR

### 11.1 PROVISIONS APPLICABLE

Transmitters designed to operate in the 150–174 MHz and 421–512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

$t_3$  is the time period from the instant when the transmitter is turned off until  $t_{\text{off}}$ .

$t_{\text{off}}$  is the instant when the 1 kHz test signal starts to rise.

<sup>2</sup> 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.

| Time intervals <sup>1,2</sup> | Maximum frequency difference <sup>3</sup> | All equipment  |                |
|-------------------------------|---|----------------|----------------|
|                               |   | 150 to 174 MHz | 421 to 512 MHz |

#### Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels

|                          |           |         |         |
|--------------------------|-----------|---------|---------|
| $t_1$ <sup>4</sup> ..... | ±25.0 kHz | 5.0 ms  | 10.0 ms |
| $t_2$ .....              | ±12.5 kHz | 20.0 ms | 25.0 ms |
| $t_3$ <sup>4</sup> ..... | ±25.0 kHz | 5.0 ms  | 10.0 ms |

#### Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels

|                          |           |         |         |
|--------------------------|-----------|---------|---------|
| $t_1$ <sup>4</sup> ..... | ±12.5 kHz | 5.0 ms  | 10.0 ms |
| $t_2$ .....              | ±6.25 kHz | 20.0 ms | 25.0 ms |
| $t_3$ <sup>4</sup> ..... | ±12.5 kHz | 5.0 ms  | 10.0 ms |

#### Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels

|                          |            |         |         |
|--------------------------|------------|---------|---------|
| $t_1$ <sup>4</sup> ..... | ±6.25 kHz  | 5.0 ms  | 10.0 ms |
| $t_2$ .....              | ±3.125 kHz | 20.0 ms | 25.0 ms |
| $t_3$ <sup>4</sup> ..... | ±6.25 kHz  | 5.0 ms  | 10.0 ms |

<sup>1</sup><sub>on</sub> 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  $t_{\text{on}}$ .

$t_2$  is the time period immediately following  $t_1$ .

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$t_3$  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.

<sup>2</sup> 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.

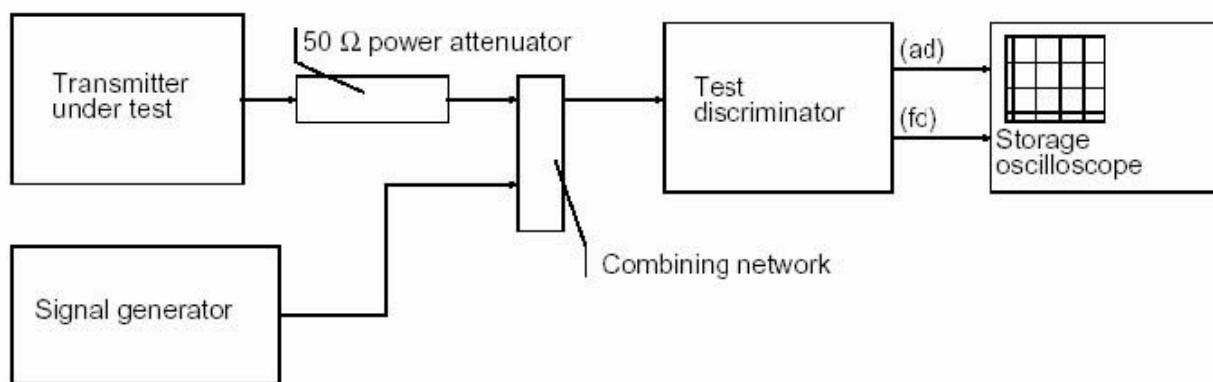
<sup>3</sup> Difference between the actual transmitter frequency and the assigned transmitter frequency.

<sup>4</sup> 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.

## 11.2 Test Method

TIA-603-D-2010

### 11.3 Test setup Block Diagram



### 11.4 MEASURE RESULT

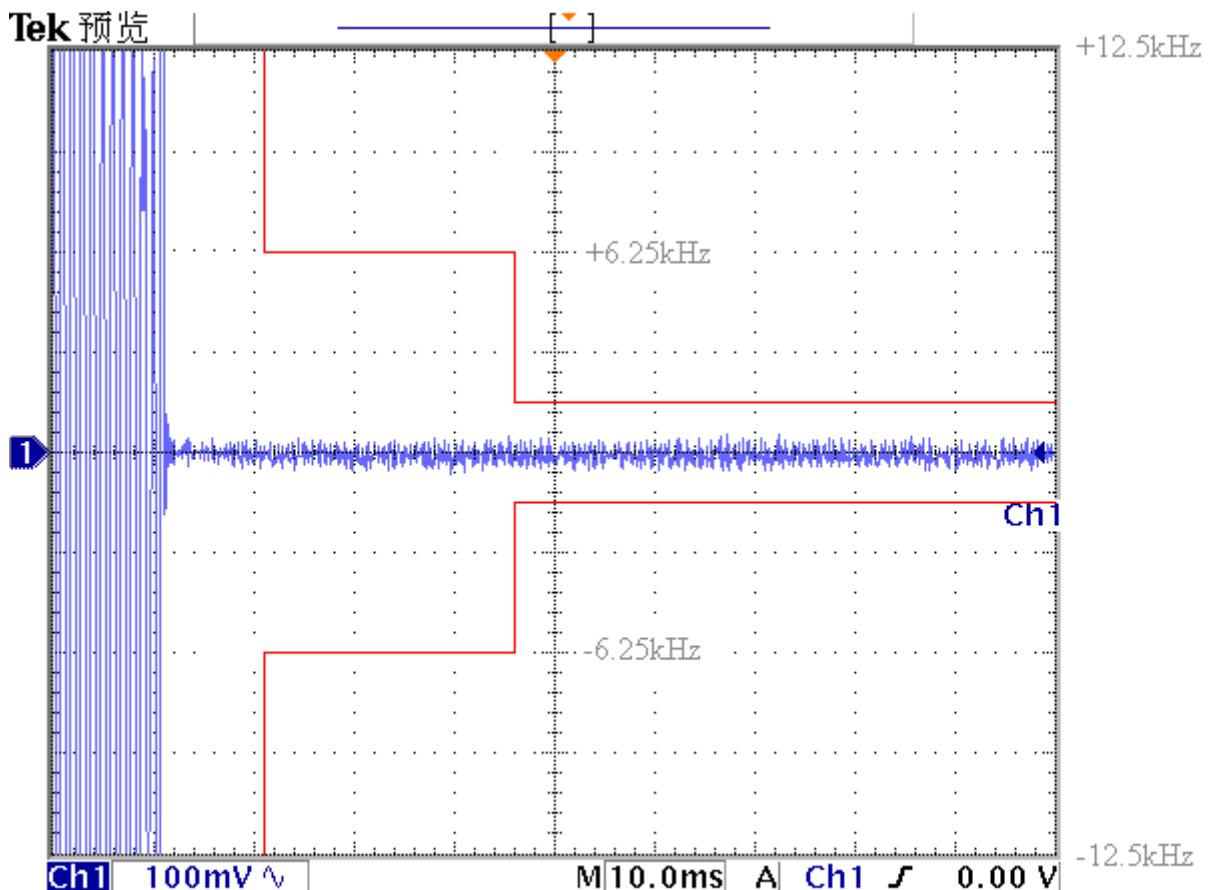
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Transmitter Frequency Behaviour @ 12.5 kHz Channel Bandwidth--Off to On at UHF Band



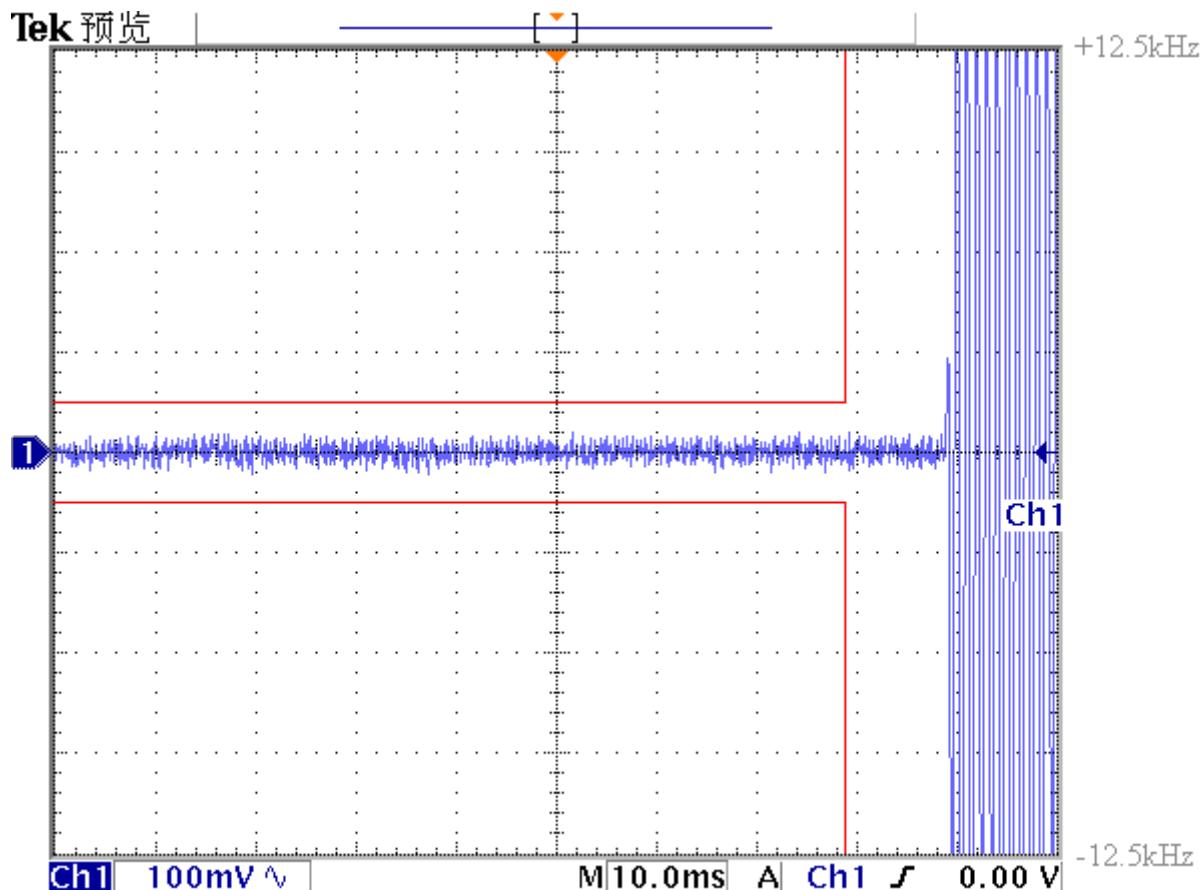
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Transmitter Frequency Behaviour @ 12.5 kHz Channel Bandwidth—On to Off at UHF Band



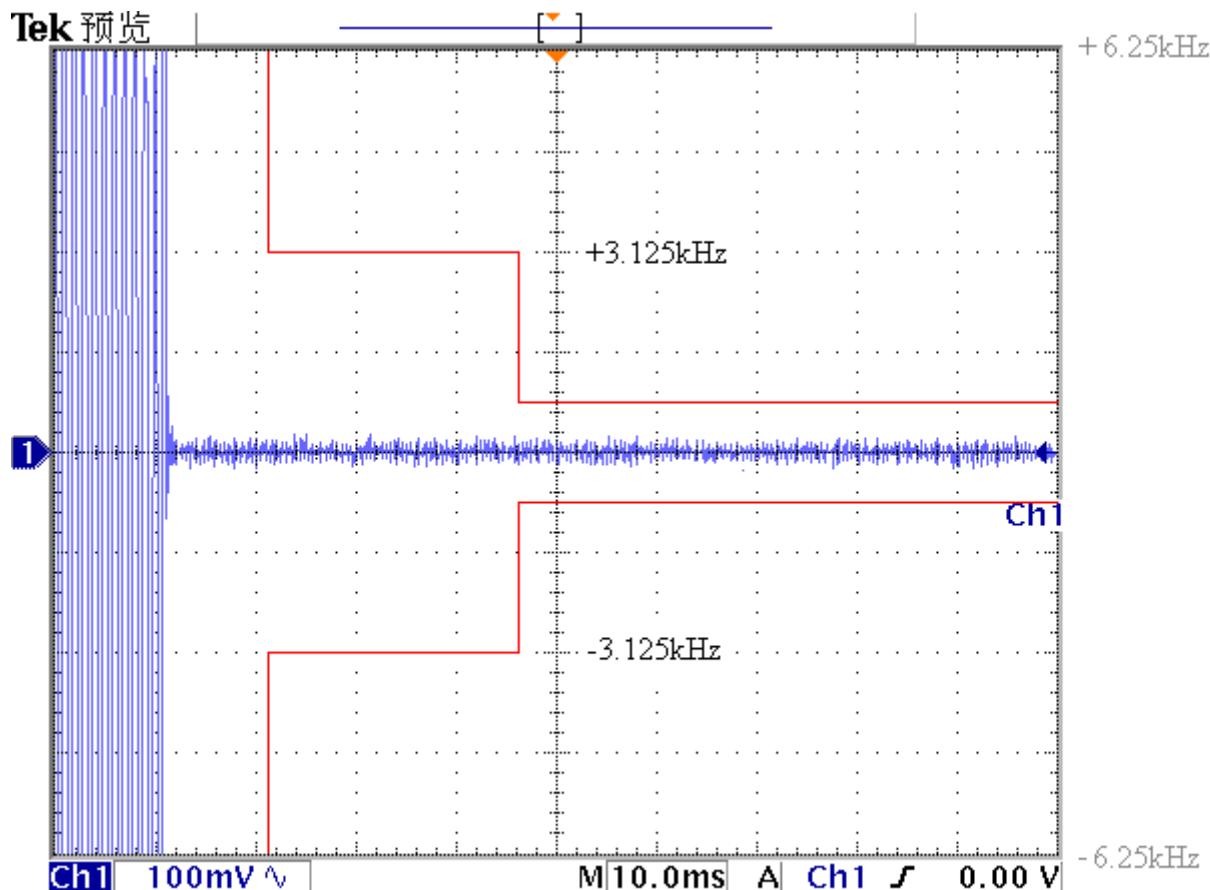
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Transmitter Frequency Behaviour @ 6.25 kHz Channel Bandwidth --Off to On at UHF Band



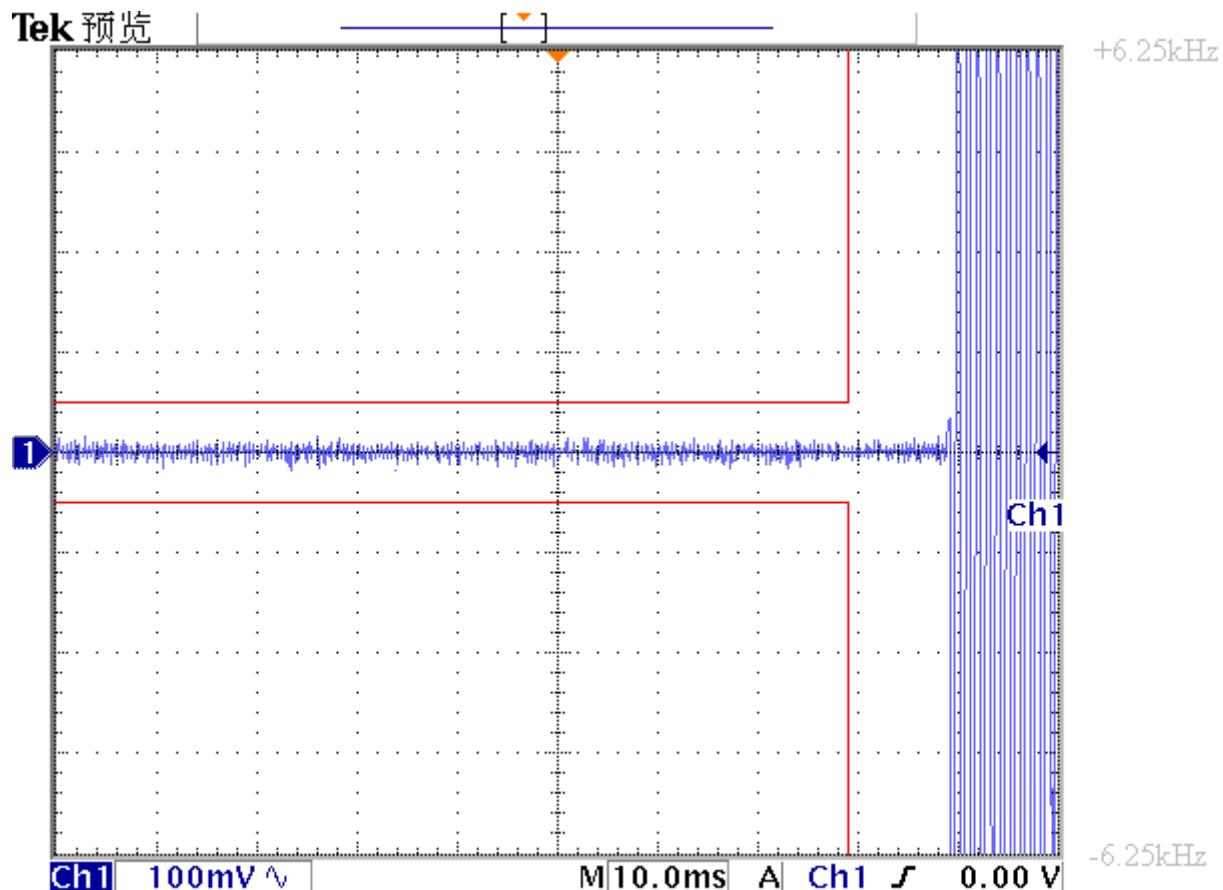
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Transmitter Frequency Behaviour @ 6.25 kHz Channel Bandwidth—On to Off at UHF Band



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## 12.0 Adjacent channel power

### 12.1 Provisions Applicable

(b)(1) Maximum adjacent power levels for frequencies in the 450-470 MHz band:

| Frequency offset | Maximum ACP (dBc) for devices 1 watt and less | Maximum ACP (dBc) for devices above 1 watt |
|------------------|---|--|
| 25 kHz           | -55 dBc                                       | -60 dBc                                    |
| 50 kHz           | -70 dBc                                       | -70 dBc                                    |
| 75 kHz           | -70 dBc                                       | -70 dBc                                    |

(2) In any case, no requirement in excess of -36 dBm shall apply.

(d) On any frequency removed from the assigned frequency by more than 75 kHz, the attenuation of any emission must be at least  $43 + 10 \log (P_{\text{watts}})$  dB.

### 12.1 Test Result

#### For 12.5 kHz Channel Bandwidth

| Test Condition   |              | Measurement Offset  | Adjacent Channel Power (dBc) |  |
|------------------|--------------|---------------------|------------------------------|--|
| Temperature (°C) | Voltage(V)   |                     |                              |  |
| T Nor (25°C)     | V Nor (7.4V) | +25kHz              | -68.55                       |  |
|                  |              | -25kHz              | -68.71                       |  |
| Applicable Limit |              | 60dB down or -36dBm |                              |  |
| Result           |              | Pass                |                              |  |

| Test Condition   |              | Measurement Offset  | Adjacent Channel Power (dBc) |  |
|------------------|--------------|---------------------|------------------------------|--|
| Temperature (°C) | Voltage(V)   |                     |                              |  |
| T Nor (25°C)     | V Nor (7.4V) | +50kHz              | -76.28                       |  |
|                  |              | -50kHz              | -76.39                       |  |
| Applicable Limit |              | 60dB down or -36dBm |                              |  |
| Result           |              | Pass                |                              |  |

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| Test Condition   |              | Measurement Offset  | Adjacent Channel Power (dBc) |  |
|------------------|--------------|---------------------|------------------------------|--|
| Temperature (°C) | Voltage(V)   |                     |                              |  |
| T Nor (25°C)     | V Nor (7.4V) | +50kHz              | -77.22                       |  |
|                  |              | -50kHz              | -77.35                       |  |
| Applicable Limit |              | 60dB down or -36dBm |                              |  |
| Result           |              | Pass                |                              |  |

**For 6.25 kHz Channel Bandwidth**

| Test Condition   |              | Measurement Offset  | Adjacent Channel Power (dBc) |  |
|------------------|--------------|---------------------|------------------------------|--|
| Temperature (°C) | Voltage(V)   |                     |                              |  |
| T Nor (25°C)     | V Nor (7.4V) | +25kHz              | -73.58                       |  |
|                  |              | -25kHz              | -73.65                       |  |
| Applicable Limit |              | 60dB down or -36dBm |                              |  |
| Result           |              | Pass                |                              |  |

| Test Condition   |              | Measurement Offset  | Adjacent Channel Power (dBc) |  |
|------------------|--------------|---------------------|------------------------------|--|
| Temperature (°C) | Voltage(V)   |                     |                              |  |
| T Nor (25°C)     | V Nor (7.4V) | +50kHz              | -77.83                       |  |
|                  |              | -50kHz              | -78.02                       |  |
| Applicable Limit |              | 60dB down or -36dBm |                              |  |
| Result           |              | Pass                |                              |  |

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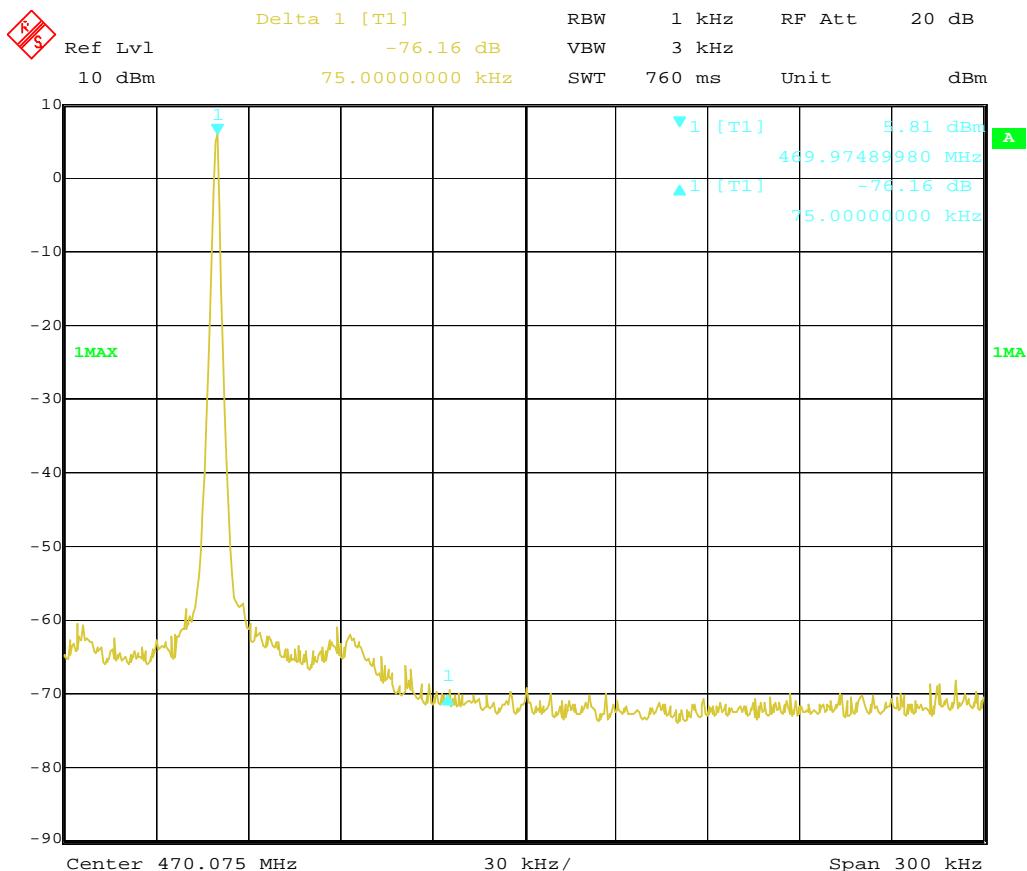
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| Test Condition   |              | Measurement Offset  | Adjacent Channel Power (dBc) |        |  |
|------------------|--------------|---------------------|------------------------------|--------|--|
| Temperature (°C) | Voltage(V)   |                     | +50kHz                       | -50kHz |  |
| T Nor (25°C)     | V Nor (7.4V) | +50kHz              | -78.35                       |        |  |
|                  |              | -50kHz              |                              | -78.39 |  |
| Applicable Limit |              | 60dB down or -36dBm |                              |        |  |
| Result           |              | Pass                |                              |        |  |

### For 12.5 kHz Channel Bandwidth



Note: From the above plot, the attenuation is at least  $43 + 10 \log (P_{\text{watts}})$  dB

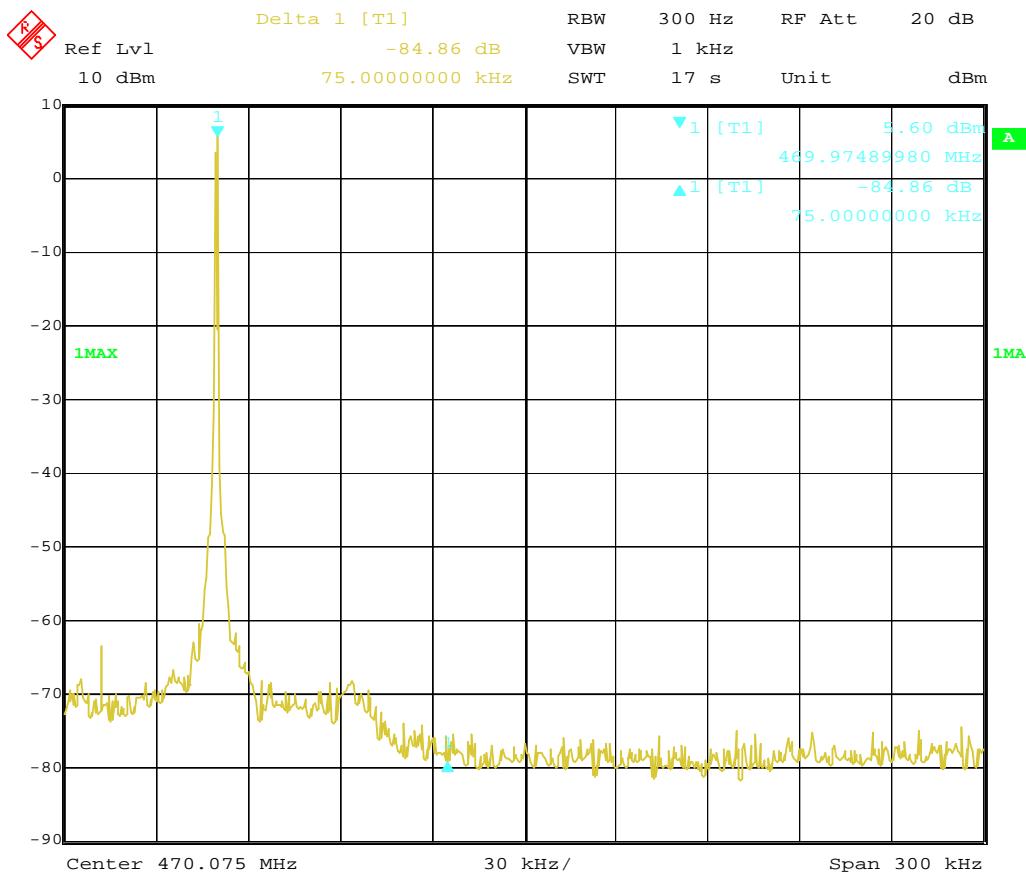
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For 6.25 kHz Channel Bandwidth



Note: From the above plot, the attenuation is at least  $43 + 10 \log (P_{\text{watts}}) \text{ dB}$

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## 13. Radiated Emission on Receiving Mode

### 13.1 Provisions Applicable

FCC Part 15 Subpart B Section 15.109

### 13.2 TEST METHOD

ANSI C 63.4: 2014

### 13.4 MEASURE RESULT (MEASURED AT 3M USING FCC PART15 B LIMITS)

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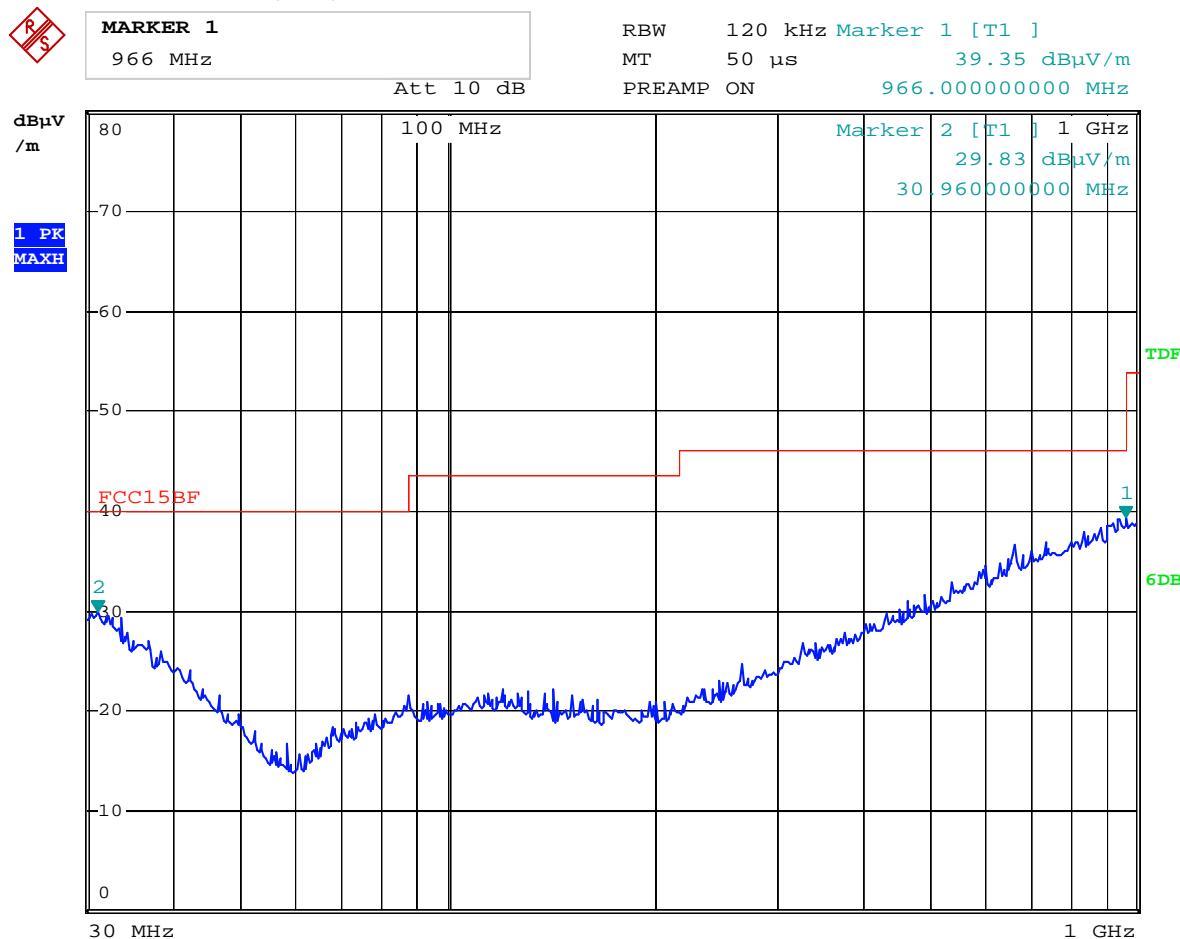


## Radiated Emission In Horizontal (30MHz----1000MHz)

## EUT set Condition: Charging and Receiving

## Results: Pass

Please refer to following diagram for individual



| Frequency (MHz) | Level@3m (dB $\mu$ V/m) | Antenna Polarity | Limit@3m (dB $\mu$ V/m) |
|-----------------|-------------------------|------------------|-------------------------|
| 966.000         | 39.35                   | H                | 54.00                   |
| 30.960          | 29.83                   | H                | 40.00                   |

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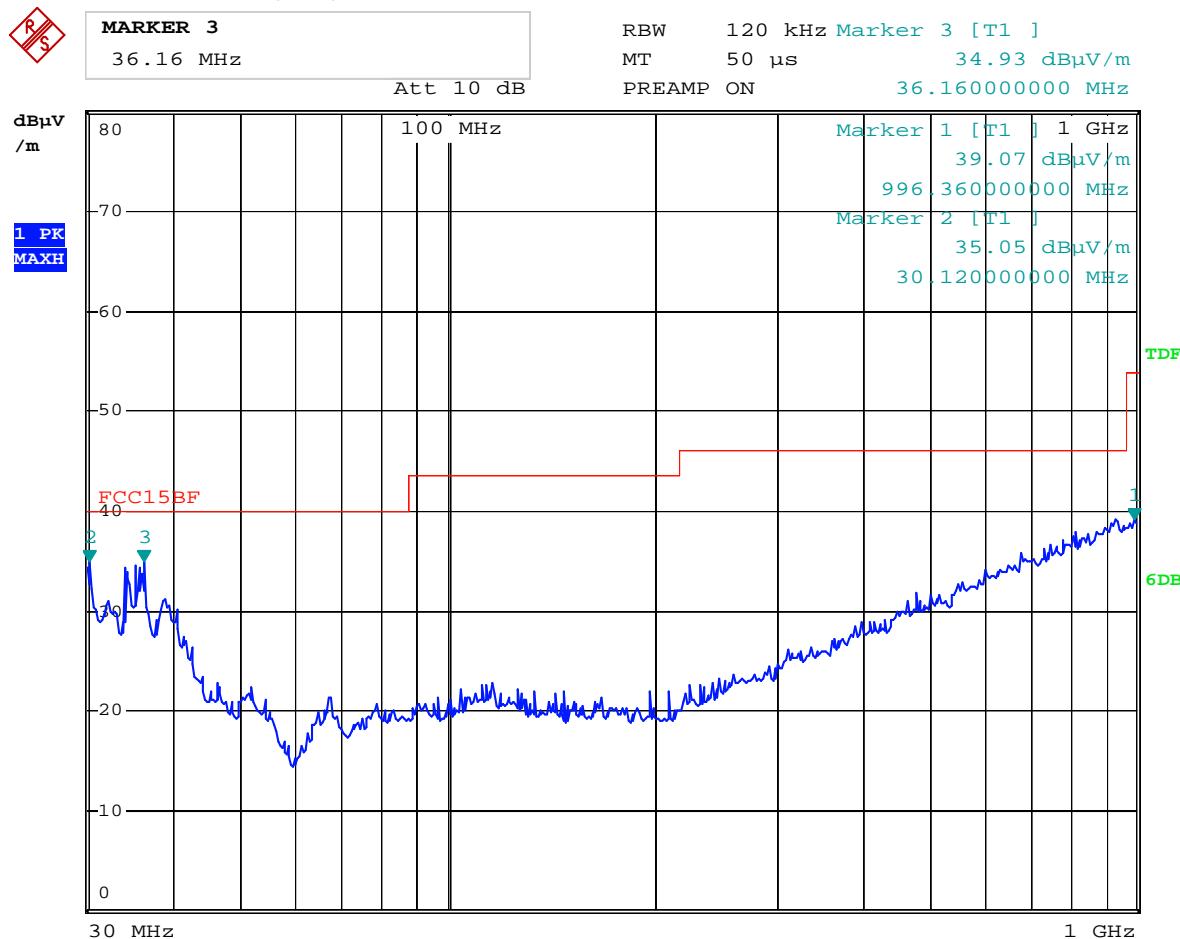


### Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Charging and Receiving

**Results:** **Pass**

Please refer to following diagram for individual



| Frequency (MHz) | Level@3m (dB μ V/m) | Antenna Polarity | Limit@3m (dB μ V/m) |
|-----------------|---------------------|------------------|---------------------|
| 36.160          | 34.93               | V                | 40.00               |
| 996.360         | 39.07               | V                | 54.00               |
| 30.120          | 35.05               | V                | 40.00               |

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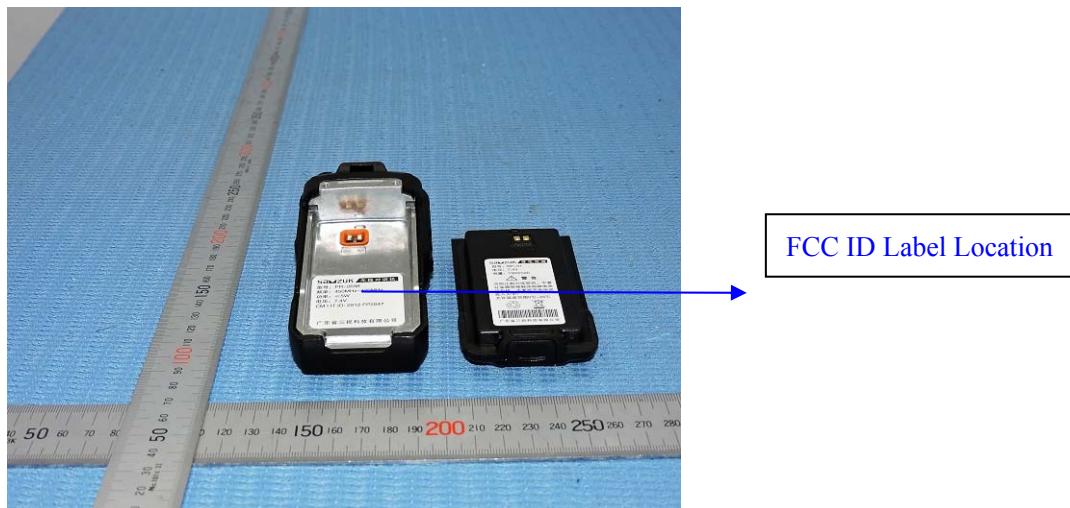


#### 14.0 FCC ID Label

**FCC ID: 2AIOQ-FPBN10A**

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

**Mark Location:**



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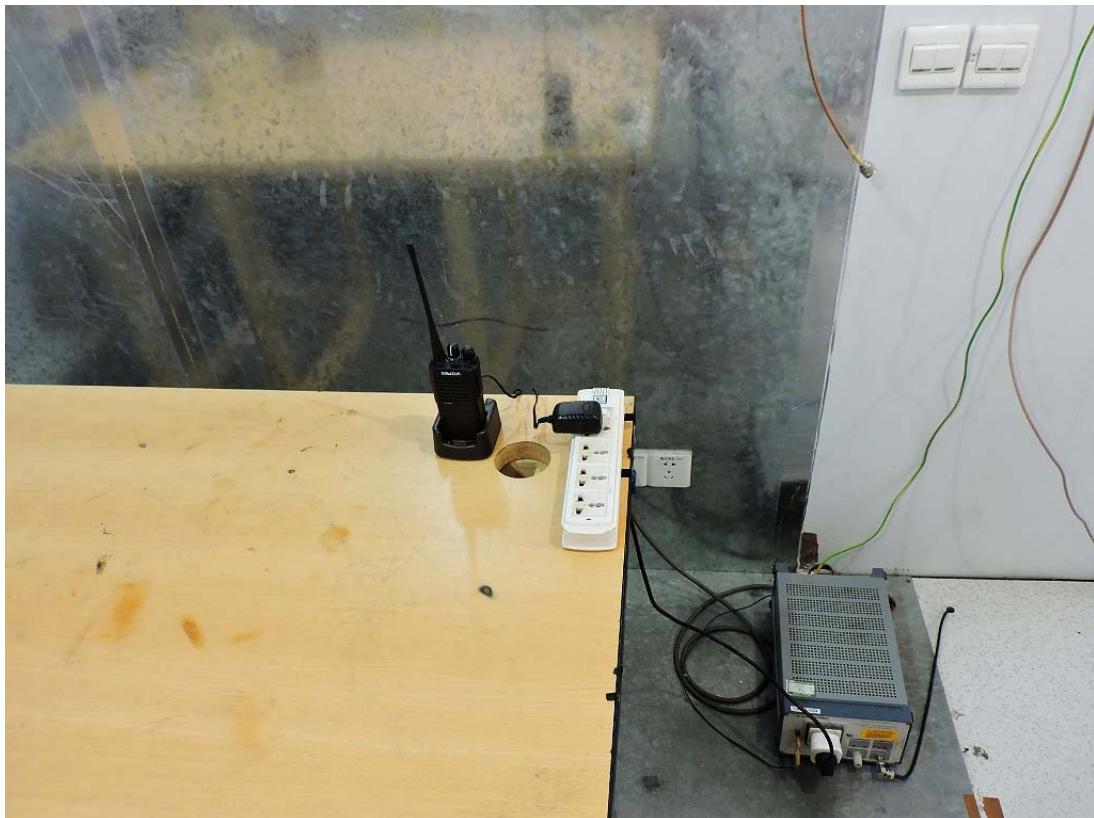
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## 15.0 Photo of testing

### 15.1 Conducted test View--



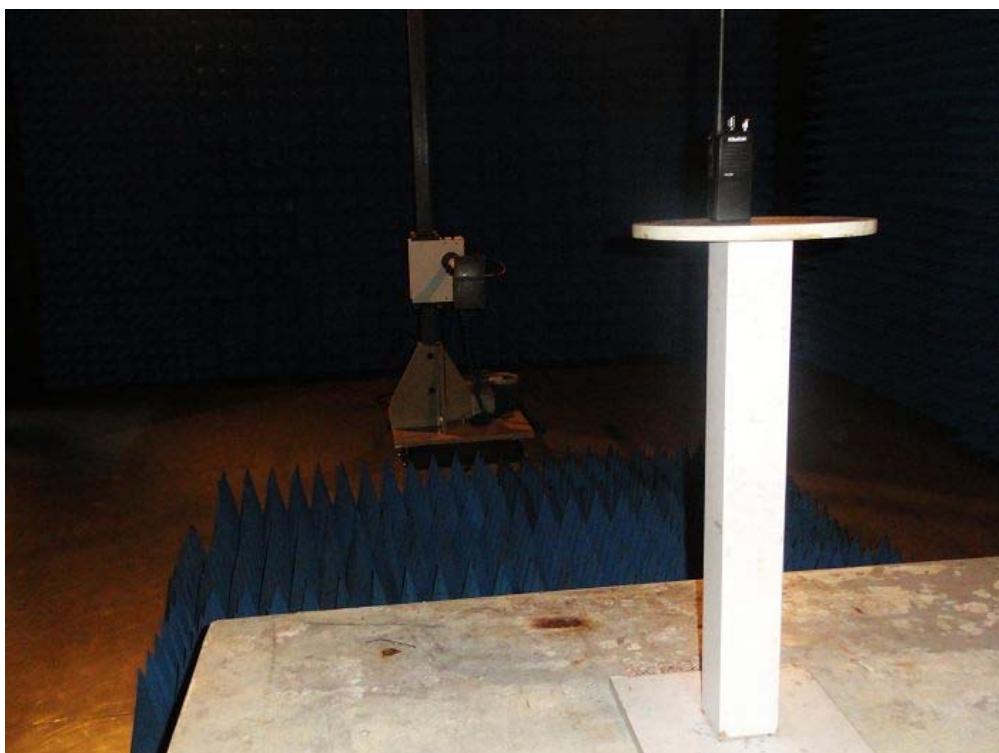
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15.2 Spurious Radiated emission test view



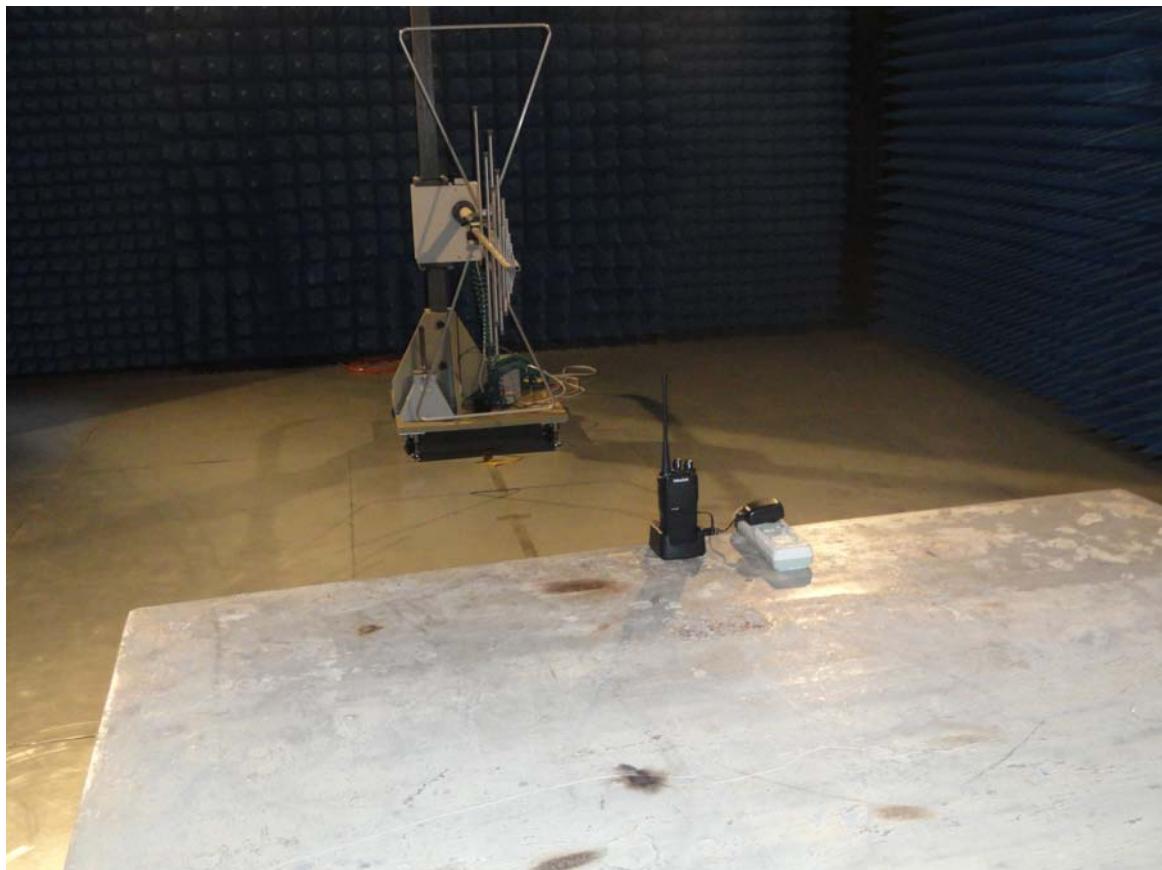
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15.2 Radiated emission test view



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Outside View



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Outside View



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Outside View



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Outside View



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Power Supply



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Interior View



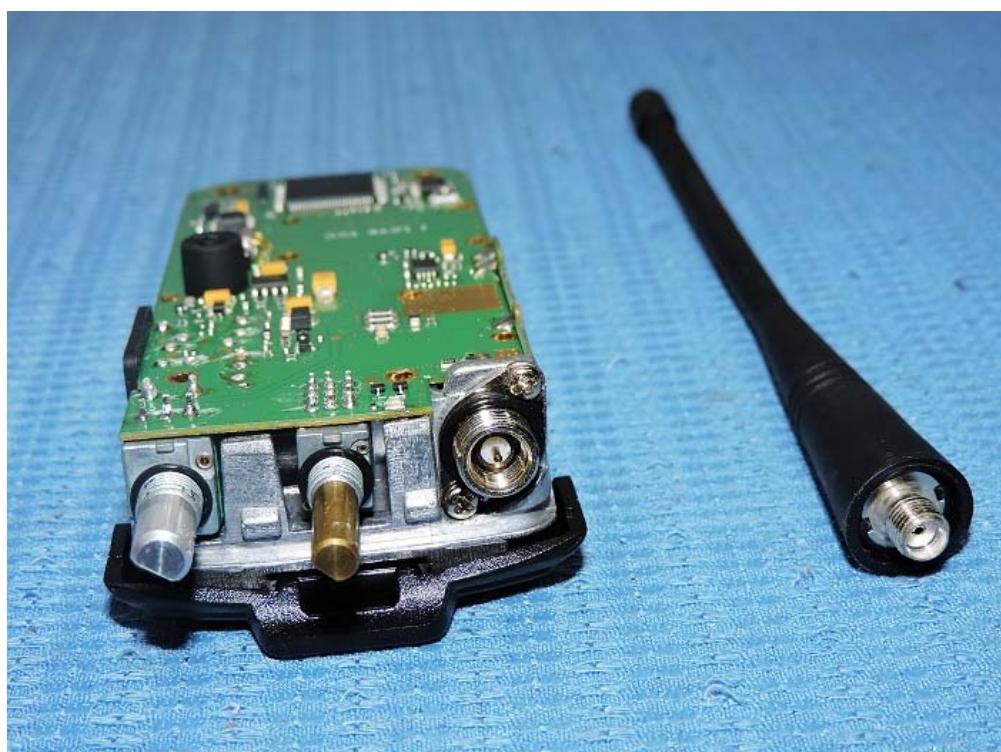
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Interior View



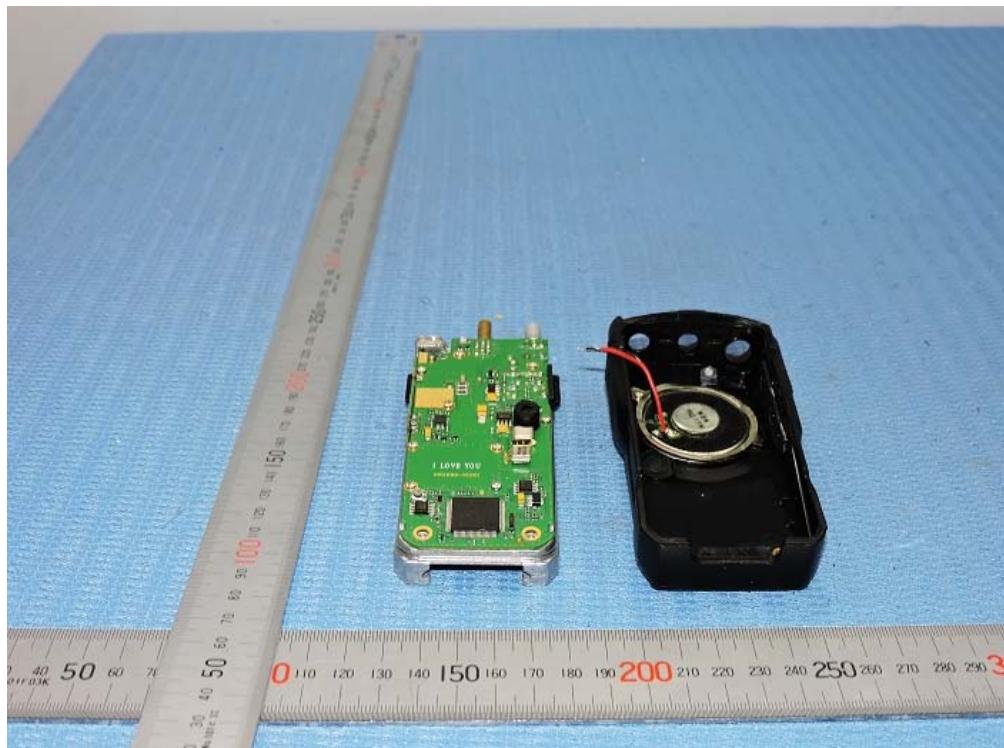
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Interior View



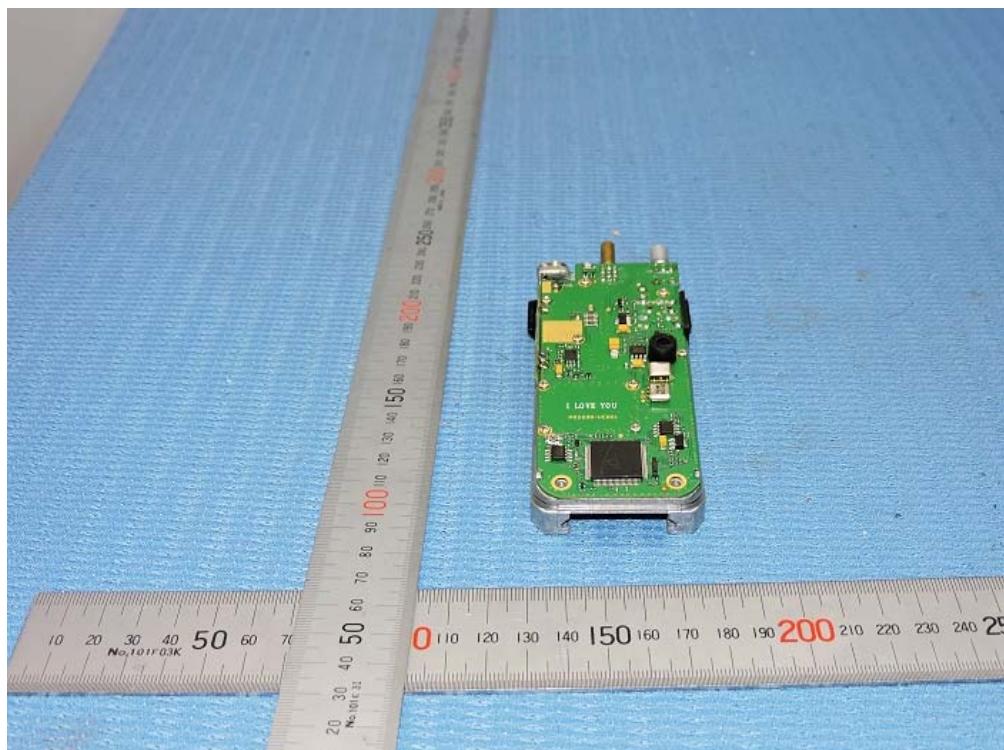
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Interior View



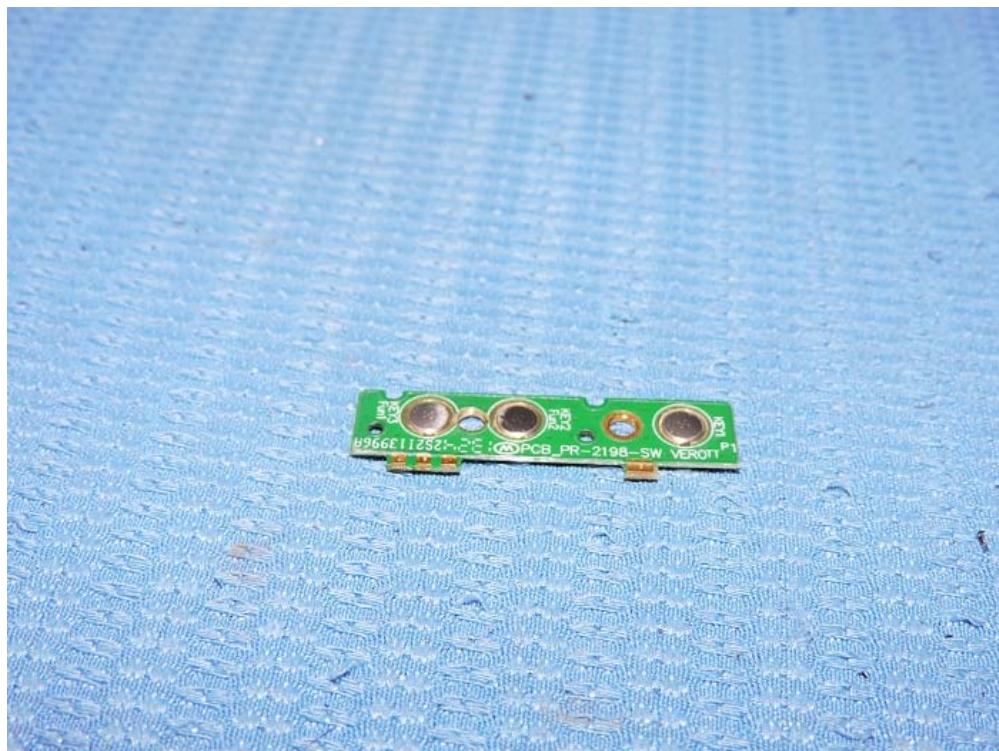
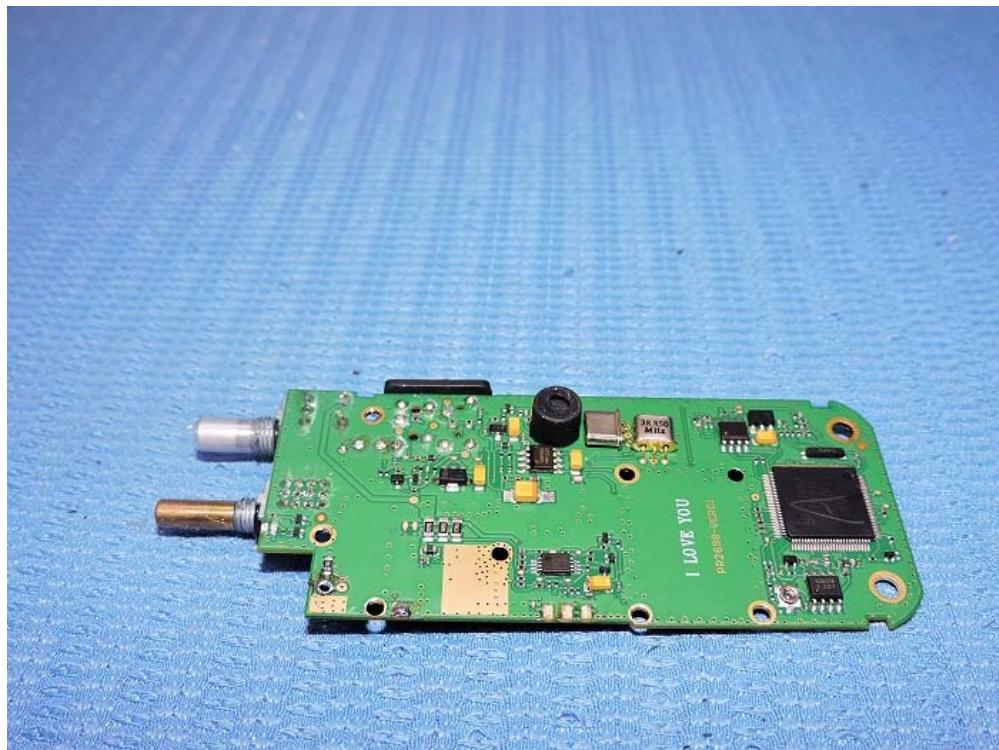
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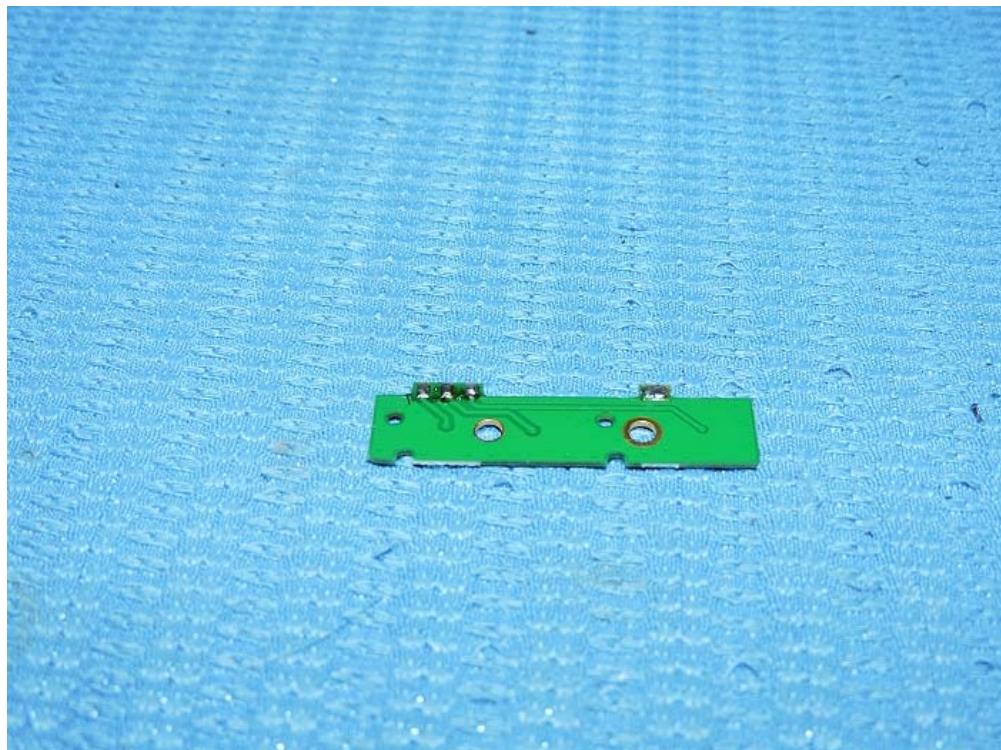
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Interior View



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