SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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ee.shanghai@sgs.com



# TEST REPORT

| | |
|---|---|
| **Application No. :** | SHEM120700101301 |
| **Applicant:** | Philips Electronics (Suzhou) Co.,Ltd. |
| | 209 ZhuYuan Road , Building B-3rd ,19~21 floor, SuZhou new district,Suzhou |
| **FCC ID:** | ZQ8RC297A |
| **IC:** | 135AD-RC297A |
| **Fundamental Frequency :** | 2425MHz-2475MHz |
| **Equipment Under Test (EUT):** | |
| **EUT Name:** | Remote Control |
| **Brand Name:** | Cogeco |
| **Model No:** | RC2972501 |
| **Standards:** | FCC PART 15 SUBPART C, Section 15.249 |
| | RSS-210 Issue 8 (December 2010) |
| | RSS-Gen Issue 3 (December 2010) |
| **Date of Receipt:** | July 25, 2012 |
| **Date of Test:** | July 26, 2012 to Aug 08, 2012 |
| **Date of Issue:** | Aug 08, 2012 |
| **Test Result :** | **PASS *** |

* In the configuration tested, the EUT complied with the standards specified above.

Jim Xu
E&E Section Head
SGS-CSTC(Shanghai) Co., Ltd.

Neil Zhang
E&E Project Engineer
SGS-CSTC(Shanghai) Co., Ltd.

# 2 Test Summary

| TEST ITEM | FCC REFERANCE | IC REFERANCE | RESULT |
|---|---|---|---|
| Radiated emission | 15.249 & 15.205 | RSS-210 Issue 8 Annex A2.9 & Clause 2.2 | Pass |
| Assigned bandwidth (20dB bandwidth) | 15.215(c) | - | Complete |
| Occupied bandwidth | - | RSS-Gen Issue 3 Clause 4.6.1 | Complete |
| Antenna Requirement | 15.203 | - | Pass |
| Power line conducted emission | 15.207 | RSS-Gen Issue 3 Clause 7.2.4 | N/A |

Noted 1: "-"means not require in the rules.

Noted 2: NA =Not Applicable

# 3 Contents

# 4 General Information

## 4.1 Client Information

| | |
|---|---|
| Applicant: | Philips Electronics (Suzhou) Co.,Ltd. |
| Address of Applicant: | 209 ZhuYuan Road , Building B-3rd ,19~21 floor, SuZhou new district,Suzhou |
| Manufacturer: | Philips Electronics (Suzhou) Co.,Ltd. |
| Address of Manufacturer: | 209 ZhuYuan Road , Building B-3rd ,19~21 floor, SuZhou new district,Suzhou |

## 4.2 General Description of E.U.T.

| | |
|---|---|
| EUT Name: | Remote Control |
| Brand Name: | Cogeco |
| Model No: | RC2972501 |

## 4.3 Details of E.U.T.

| | |
|---|---|
| EUT Power Supply: | Battery 2*1.5V |
| Operation Frequency Range: | The EUT application supports only 3 RF-channels; these channels are the following:<br>CH15 2425 MHz<br>CH20 2450 MHz<br>CH25 2475 MHz |
| Hardware Version: | Not supplied by client |
| Software Version: | Not supplied by client |

## 4.4 Description of Support Units

| Name | Model No. | Remark |
|---|---|---|
| NA | NA | NA |

## 4.5 Standards Applicable for Testing

47CFR Part 15 (2009)
ANSI C63.10: 2009

## 4.6 Test Location

All tests were performed at SGS E&E EMC lab

SGS-CSTC EMC Laboratory, No.588 West Jindu Road,Songjiang District,Shanghai,China

Tel:+86 21 6191 5666 Fax:+86 21 6191 5655

## 4.7 Mode of operation during the test / Test peripherals used

While testing the transmitter mode of the EUT, the internal modulation was used.
For the EUT is handheld device, so it was set up and tested in three axes (X and Y and Z).
The three axes were tested one by one while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded.

## 4.8 Deviation from Standards

None.

## 4.9 Other Information Requested by the Customer

None.

## 4.10 Test Confident level

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

## 4.11 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868 and C-4336 respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.

## 4.12 Test Instruments

**Radiated Emission**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal.Due date |
|---|---|---|---|---|---|---|
| 1 | EMI test receiver | Rohde & Schwarz | ESU40 | 100109 | 2012-06-03 | 2013-06-01 |
| 2 | Antenna | SCHWARZBECK | VULB9168 | 9168-313 | 2011-10-28 | 2012-10-26 |
| 3 | CONTROLLER | INNCO | CO200 | 474 | / | / |
| 4 | Antenna | SCHWARZBECK | BBHA9120D | 9120D-679 | 2011-10-28 | 2012-10-26 |
| 5 | Antenna | SCHWARZBECK | BBHA9170 | 9170-373 | 2011-10-28 | 2012-10-26 |

**Conducted Emission**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal.Due date |
|---|---|---|---|---|---|---|
| 1 | EMI test receiver | Rohde & Schwarz | ESCS30 | 100086 | 2012-06-03 | 2013-06-01 |
| 2 | Line impedance stabilization network | SCHWARZBECK | NSLK8127 | 8127-490 | 2012-05-07 | 2013-05-05 |

**General Equipment**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal.Due date |
|---|---|---|---|---|---|---|
| 1 | Digital pressure meter | YONGZHI | DYM3-01 | 101012 | 2011-11-18 | 2012-11-17 |
| 2 | Digital Multimeter | FLUKE | 17B | 10560713 | 2011-08-24 | 2012-08-22 |
| 3 | Temperature& humidity recorder | ShangHai weather meter work | ZJ 1-2B | 0805126 | 2011-07-25 | 2012-07-23 |

## 4.13 E.U.T. Operation

| | |
|---|---|
| Input voltage: | Battery 2*1.5V |
| Operating Environment: | |
| Temperature: | 24.0 °C |
| Humidity: | 50 % RH |
| Atmospheric Pressure: | 1010 mbar |
| EUT Operation: | While testing the transmitter mode of the EUT, the internal modulation was used.For the EUT is handheld round-shaped device, it was set up and tested in three axes (X,Y&Z).<br>The three axes were tested one by one while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded.And worst case is be found at “Y” position.<br>The EUT has been tested under operating condition.Test program was used to control the EUT for staying in continuous Transmitting mode is programmed.<br>Channel low (2425MHz) mid(2450MHz) high(2475MHz) |

# 5 Test Procedure & Measurement Data

## 5.1 Spurious Emission Test

**Test Requirement:** FCC part 15.249 & 15.205

**Test date:** Aug. 2,2012 to Aug. 4,2012

**Limit:** 15.249(a): Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental Frequency | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|---|---|---|
| 902 - 928 MHz | 50 | 500 |
| 2400 - 2483.5 MHz | 50 | 500 |
| 5725 - 5875 MHz | 50 | 500 |
| 24.0 - 24.25 GHz | 250 | 2500 |

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

| Frequency (MHz) | Field Strength (dBuV/m) | Measurement Distance (m) |
|---|---|---|
| 30 - 88 | 40.0 | 3 |
| 88 - 216 | 43.5 | 3 |
| 216 - 960 | 46.0 | 3 |
| Above 960 | 54.0 | 3 |

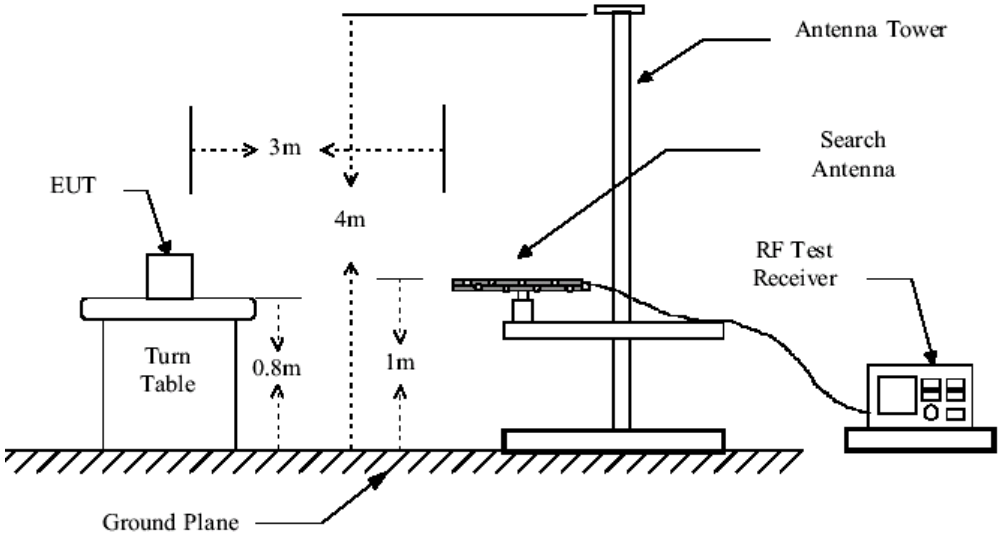
**15.249** (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

**Measurement Procedure:**
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz). 1MHz resolution bandwidth and Peak detector apply (1000 MHz – 25GHz ) Above 1GHz
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.
7. The field strength of spurious emission was measured in the following position:EUT satnd-up position (Z axis),lie-down position（X，Y axis）.The worst emission was found in lie-down

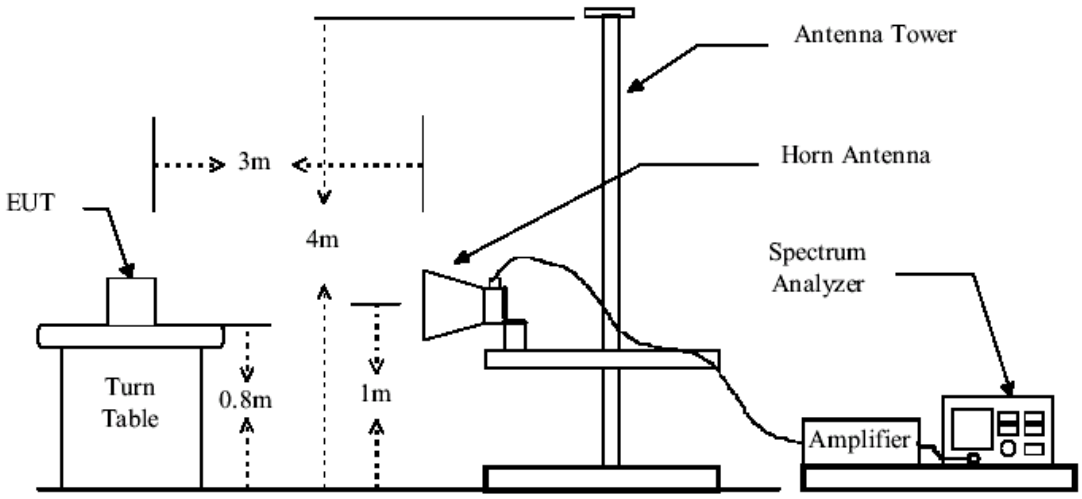
postion(X axis) and the wrost case was recored.

**Radiated Test Set-up:**

**Radiated Emission Test Set-up,Frequency Below 1000MHz**

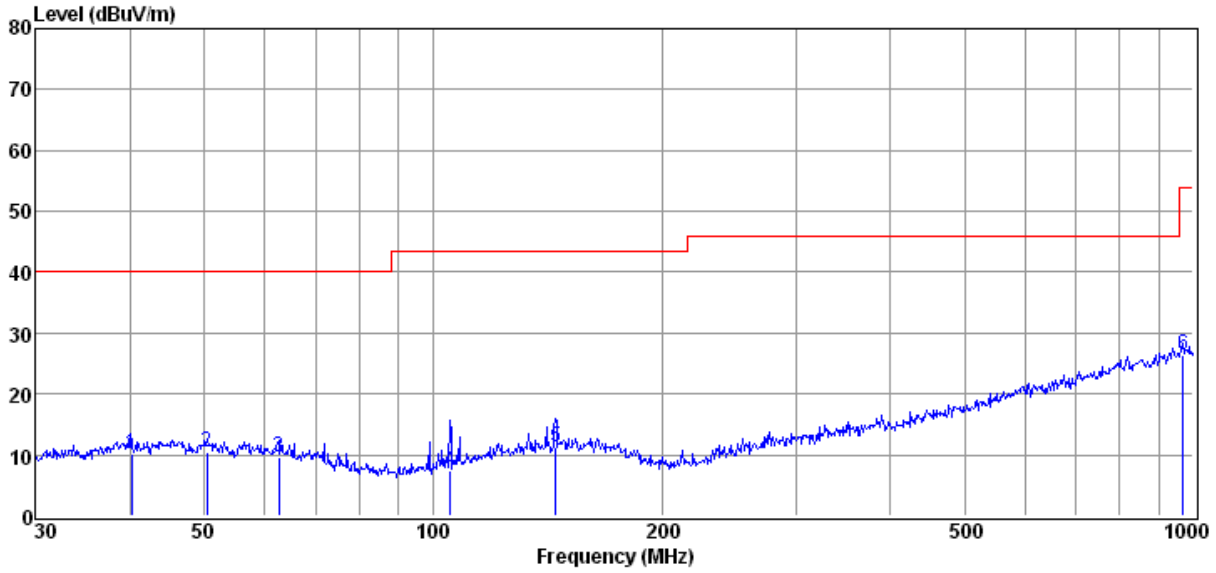



**Radiated Emission Test Set-up Frequency Over 1GHz**




Low nosie amplifier was used below 1GHz,High pass Filter was used above 1GHz.

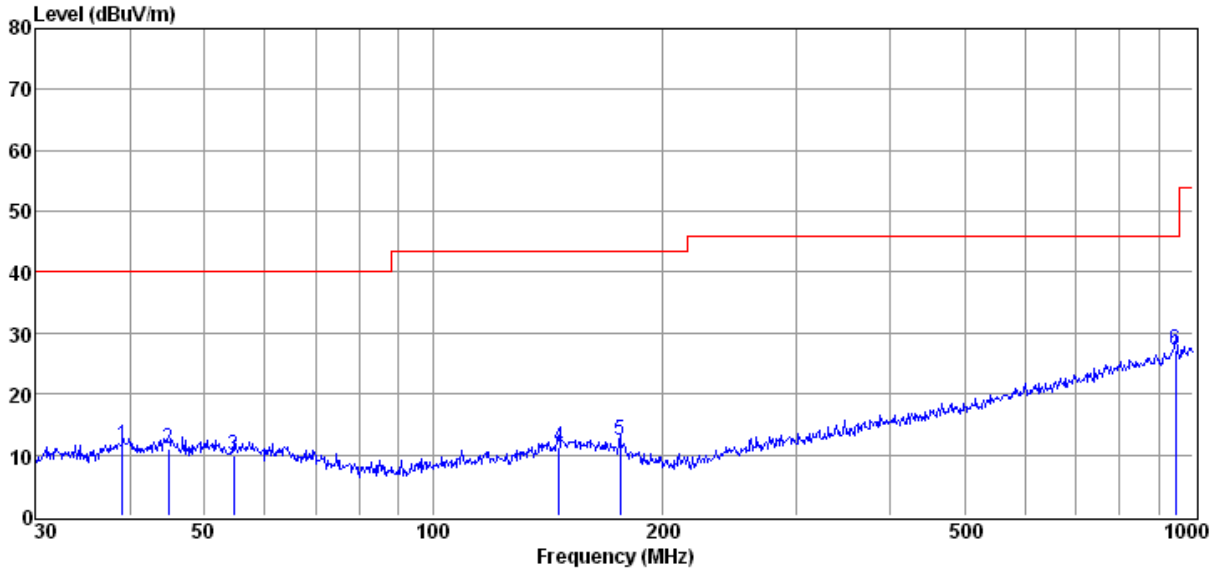
Antenna Horizontal:




| Item (Mark) | Freq (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor (dB) | Cable Loss (dB) | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 40.14 | 21.00 | 13.29 | 24.70 | 0.56 | 10.15 | 40.00 | -29.85 | QP | HORIZONTAL |
| 2 | 50.41 | 21.59 | 12.78 | 24.70 | 0.65 | 10.32 | 40.00 | -29.68 | QP | HORIZONTAL |
| 3 | 62.65 | 21.87 | 11.83 | 24.70 | 0.75 | 9.75 | 40.00 | -30.25 | QP | HORIZONTAL |
| 4 | 105.27 | 21.38 | 9.67 | 24.70 | 1.07 | 7.42 | 43.50 | -36.08 | QP | HORIZONTAL |
| 5 | 144.84 | 22.31 | 12.39 | 24.70 | 1.25 | 11.25 | 43.50 | -32.25 | QP | HORIZONTAL |
| 6 | 968.93 | 22.33 | 24.05 | 23.72 | 3.84 | 26.50 | 54.00 | -27.50 | QP | HORIZONTAL |

Note: Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

Antenna Vertical:




| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor (dB) | Cable Loss (dB) | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 39.02 | 22.47 | 13.12 | 24.70 | 0.55 | 11.44 | 40.00 | -28.56 | QP | VERTICAL |
| 2 | 44.90 | 21.92 | 13.10 | 24.70 | 0.60 | 10.92 | 40.00 | -29.08 | QP | VERTICAL |
| 3 | 54.64 | 21.30 | 12.52 | 24.70 | 0.69 | 9.81 | 40.00 | -30.19 | QP | VERTICAL |
| 4 | 146.37 | 22.33 | 12.48 | 24.70 | 1.26 | 11.37 | 43.50 | -32.13 | QP | VERTICAL |
| 5 | 176.27 | 23.94 | 11.55 | 24.60 | 1.39 | 12.28 | 43.50 | -31.22 | QP | VERTICAL |
| 6 | 948.76 | 23.27 | 23.88 | 23.80 | 3.80 | 27.15 | 46.00 | -18.85 | QP | VERTICAL |

Note: Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

Operation Mode: TX
Low CH 2425MHz
Fundamental frequency emission：

| Radiated Emissions | | | Ant | Correction Factors | Total | FCC Limit | |
|---|---|---|---|---|---|---|---|
| Frequency (GHz) | Receiver Peak Reading (dBuV) | Detect Mode | Pol. | Ant.(dB/m) | Peak Result (dBuV/m) | Peak Limit 3m (dBuV/m) | Margin (dB) |
| 2.425 | 43.87 | PK | H | 32.4 | 76.27 | 114 | -37.73 |
| 2.425 | 57.54 | PK | V | 32.4 | 89.94 | 114 | -24.06 |

Remark：
1. For fundamental emission test, no amplifier is employed.
2.Peak Result=Peak Reading+Correction Factors
3.Margin =Corrected Reading – Limit

Spurious emission above 1GHz：

| Radiated Emissions | | | Ant | Correction Factors | Total | FCC Limit | |
|---|---|---|---|---|---|---|---|
| Frequency (GHz) | Reading (dBuV) | Detect Mode | Pol. | Ant.(dB/m) | Actual (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 4.849 | 48.85 | PK | H | -2.3 | 46.55 | 54 | -7.45 |
| 7.274 | 39.72 | PK | H | 3.0 | 42.72 | 54 | -11.28 |
| 4.510 | 51.75 | PK | V | -2.3 | 49.45 | 54 | -4.55 |
| 7.274 | 40.17 | PK | V | 3.0 | 43.17 | 54 | -10.83 |

Remark:
1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin =Corrected Reading – Limit
4. This limit applies for using average detector, if the test result on peak is lower than average limit, then average mea
performed.

Operation Mode: TX
Mid CH 2450MHz
Fundamental frequency emission：

| Radiated Emissions | | | Ant | Correction Factors | Total | FCC Limit | |
|---|---|---|---|---|---|---|---|
| Frequency (GHz) | Receiver Peak Reading (dBuV) | Detect Mode | Pol. | Ant.(dB/m) | Peak Result (dBuV/m) | Peak Limit 3m (dBuV/m) | Margin (dB) |
| 2.450 | 39.22 | PK | H | 32.4 | 71.62 | 114 | -42.38 |
| 2.450 | 58.15 | PK | V | 32.4 | 90.55 | 114 | -23.45 |

Remark：
1. For fundamental emission test, no amplifier is employed.
2.Peak Result=Peak Reading+Correction Factors
3.Margin =Corrected Reading – Limit

Spurious emission above 1GHz：

| Radiated Emissions | | | Ant | Correction Factors | Total | FCC Limit | |
|---|---|---|---|---|---|---|---|
| Frequency (GHz) | Reading (dBuV) | Detect Mode | Pol. | Ant.(dB/m) | Actual (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 4.900 | 48.89 | PK | H | -2.1 | 46.79 | 54 | -7.21 |
| 7.350 | 38.97 | PK | H | 3.2 | 42.17 | 54 | -11.83 |
| 4.899 | 50.15 | PK | V | -2.1 | 48.05 | 54 | -5.95 |
| 7.351 | 39.97 | PK | V | 3.2 | 43.17 | 54 | -10.83 |

Remark:
1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin =Corrected Reading – Limit
4. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Operation Mode: TX
High CH 2475MHz
Fundamental frequency emission：

| Radiated Emissions | | | Ant | Correction Factors | Total | FCC Limit | |
|---|---|---|---|---|---|---|---|
| Frequency (GHz) | Receiver Peak Reading (dBuV) | Detect Mode | Pol. | Ant.(dB/m) | Peak Result (dBuV/m) | Peak Limit 3m (dBuV/m) | Margin (dB) |
| 2.475 | 40.14 | PK | H | 32.4 | 72.54 | 114 | -41.46 |
| 2.475 | 58.17 | PK | V | 32.4 | 90.57 | 114 | -23.43 |

Remark：
1. For fundamental emission test, no amplifier is employed.
2.Peak Result=Peak Reading+Correction Factors
3.Margin =Corrected Reading – Limit

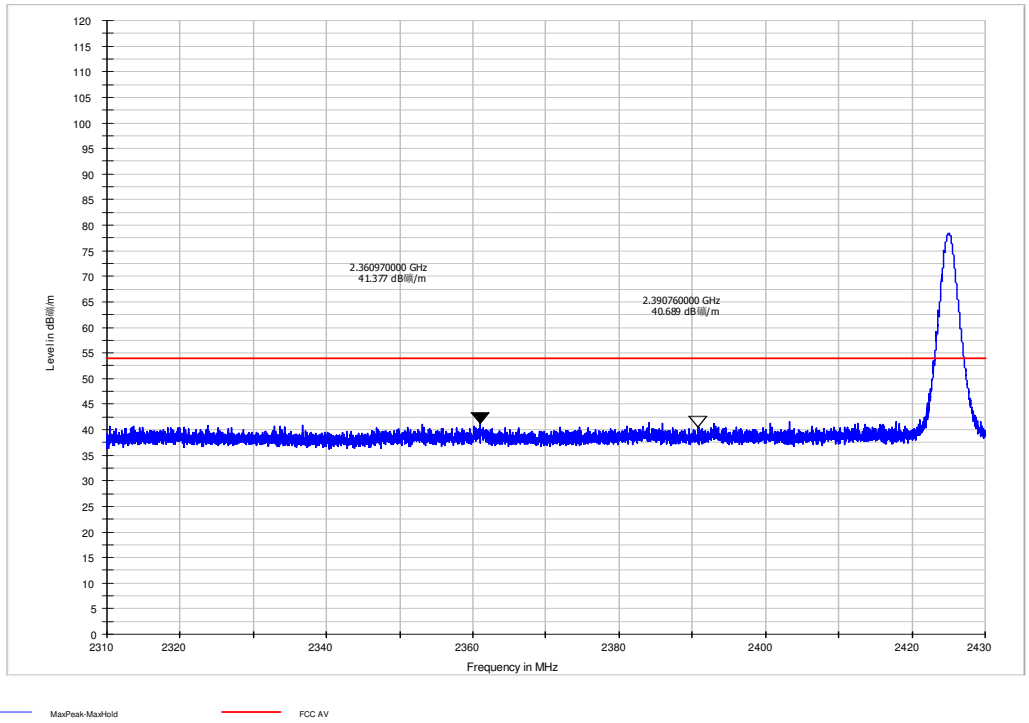
Spurious emission above 1GHz：

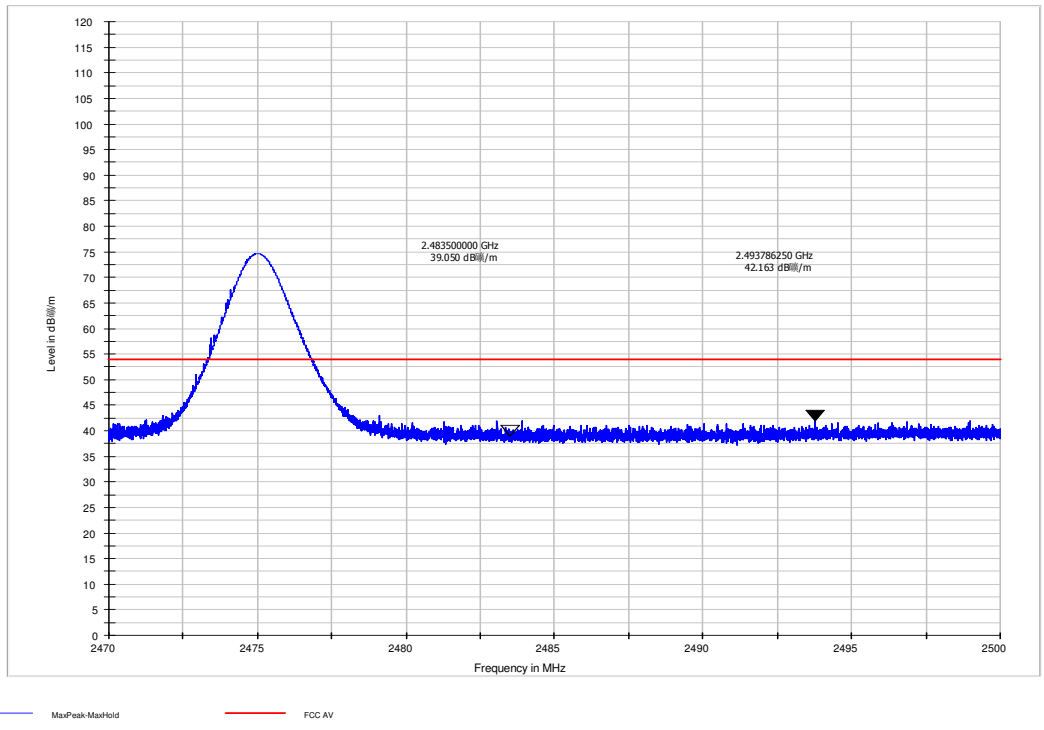
| Radiated Emissions | | | Ant | Correction Factors | Total | FCC Limit | |
|---|---|---|---|---|---|---|---|
| Frequency (GHz) | Reading (dBuV) | Detect Mode | Pol. | Ant.(dB/m) | Actual (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 4.950 | 49.37 | PK | H | -2.0 | 47.37 | 54 | -6.63 |
| 7.425 | 39.93 | PK | H | 3.0 | 42.93 | 54 | -11.07 |
| 4.950 | 50.30 | PK | V | -2.0 | 48.30 | 54 | -5.70 |
| 7.425 | 40.17 | PK | V | 3.0 | 43.17 | 54 | -10.83 |

Remark:
1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin =Corrected Reading – Limit
4. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

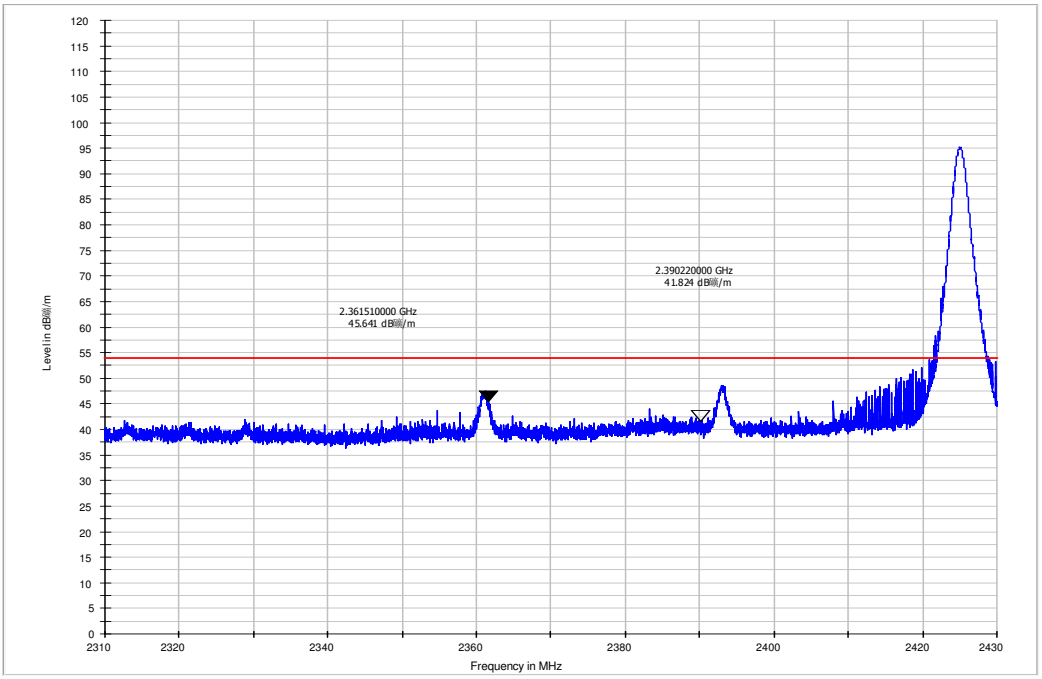
**Bandedge Test Plot:**

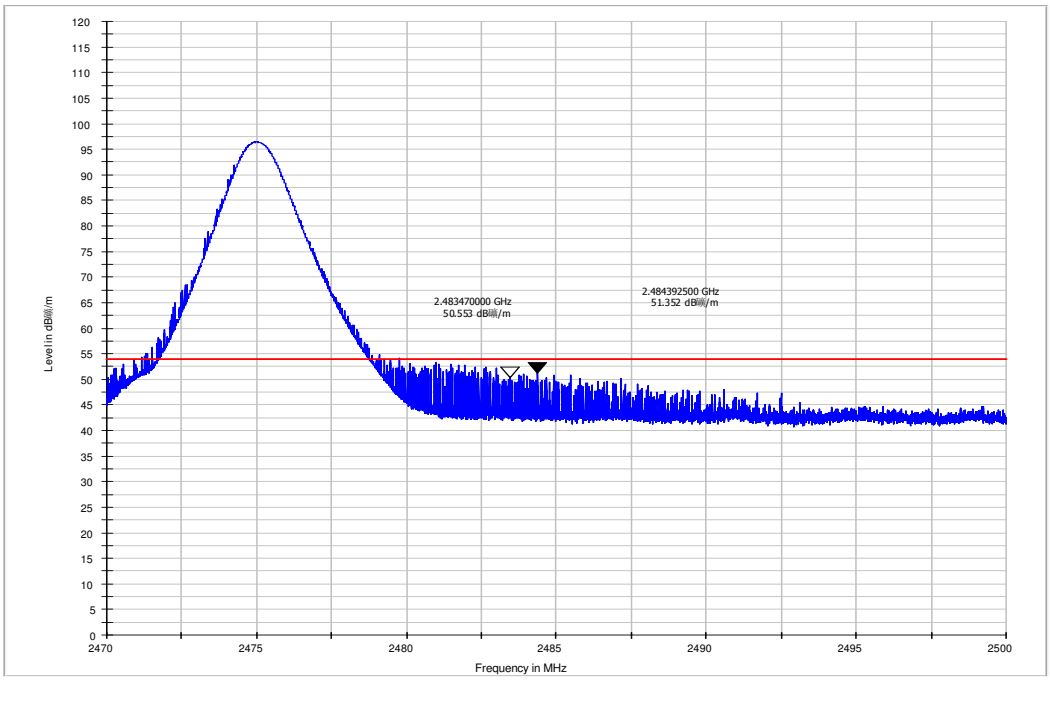
Horizontal, Peak Detector:



**Vertical, Peak Detector:**




Note：If the test result on peak is lower than average limit, then average measurement needn't be performed.

## 5.2 20dB Bandwidth

**Test Requirement:** FCC Part15 215(c)

**Test date:** Aug. 5.2012

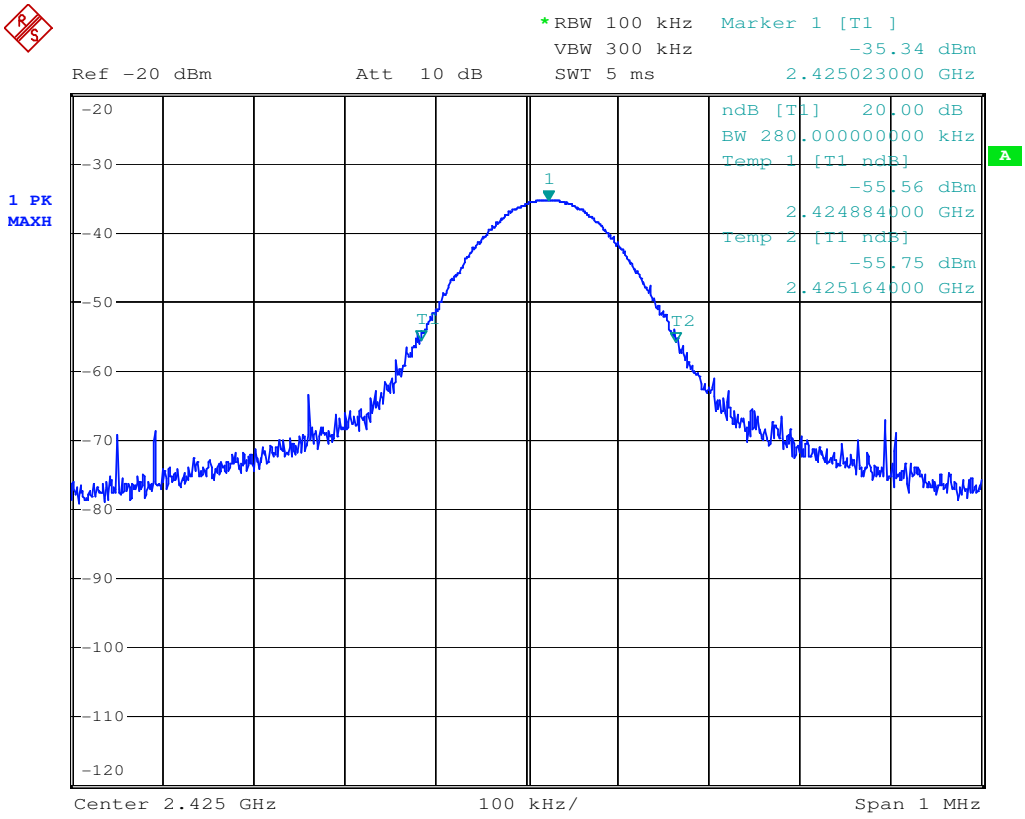
**Standard Applicable:** Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the allocated frequency band as clause 3.1 shows. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

**Measurement Procedure:** The 20dB Bandwidth per FCC § 15.215(c) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW.

**Measurement Result:**

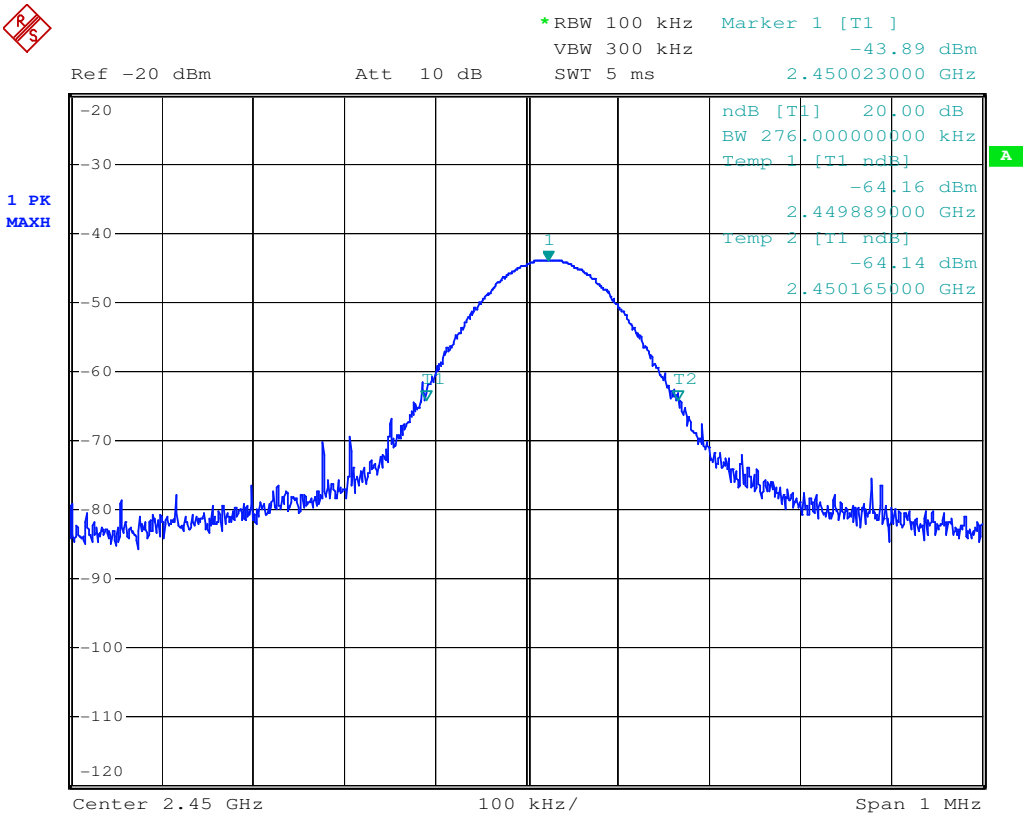
| CH | Frequency (MHz) | 20dB bandwidth (MHz) |
|---|---|---|
| 15 | 2425 | 0.28 |

20dB Band Width Test Data CH15 2425MHz:



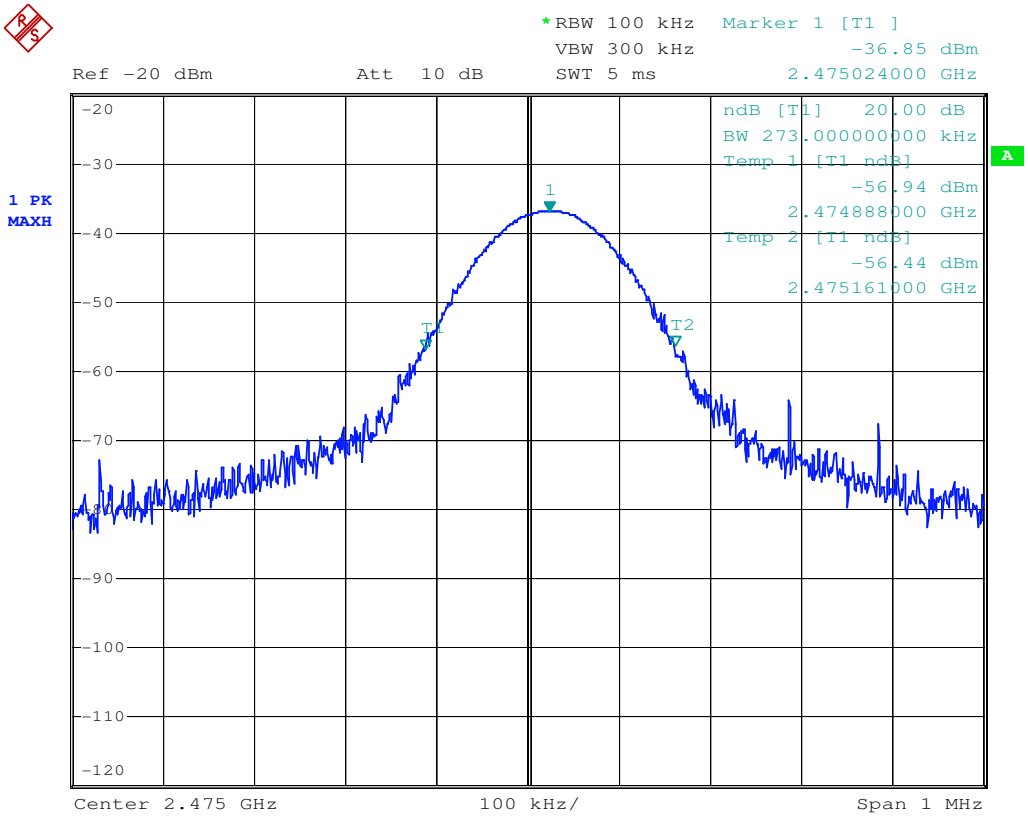
| CH | Frequency (MHz) | 20dB bandwidth (MHz) |
|---|---|---|
| 20 | 2450 | 0.276 |

20dB Band Width Test Data CH20 2450MHz:



| CH | Frequency (MHz) | 20dB bandwidth (MHz) |
|---|---|---|
| 25 | 2475 | 0.273 |

20dB Band Width Test Data CH25 2475MHz:



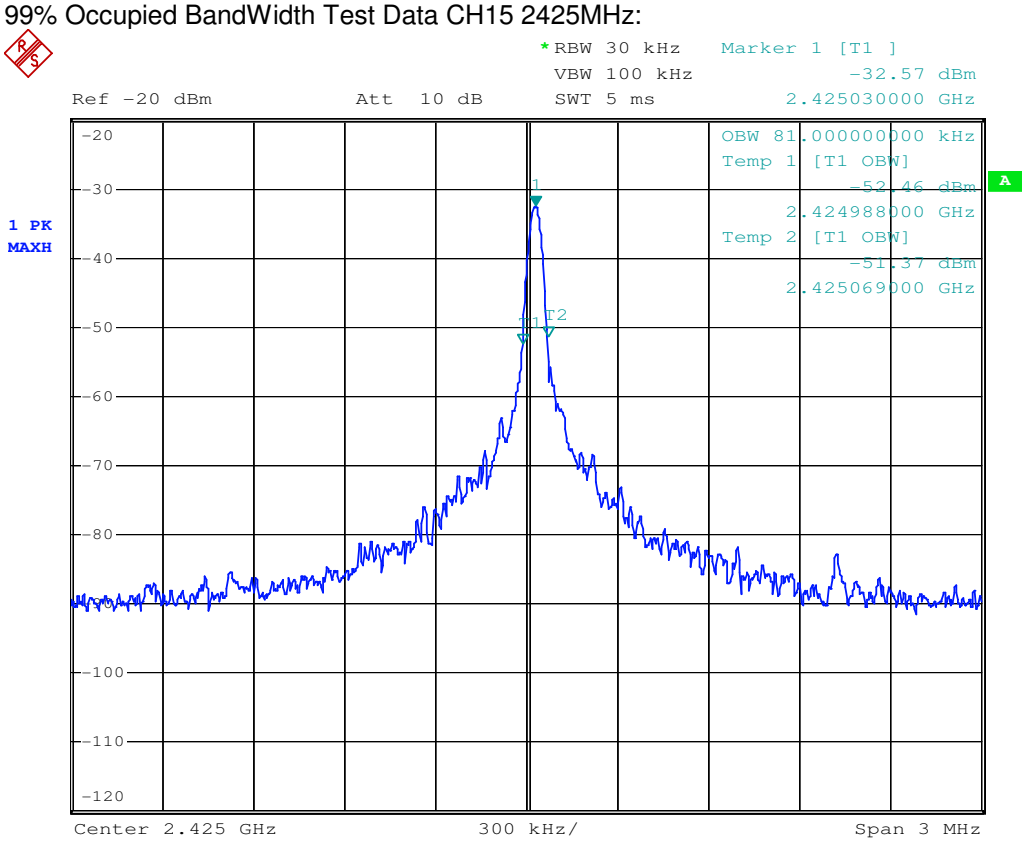
## 5.3 99% Occupied Bandwidth Test

| | |
|---|---|
| **Test Requirement:** | RSS-Gen Issue 3 Clause 4.6.1 |
| **Test date:** | Aug. 5, 2012 |
| **Standard Applicable** | According to the section RSS-Gen Issue 3 Clause 4.6.1 |
| **EUT Setup** | The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer with the resolutions set at 30kHz,the video bandwidth set at 100kHz. |

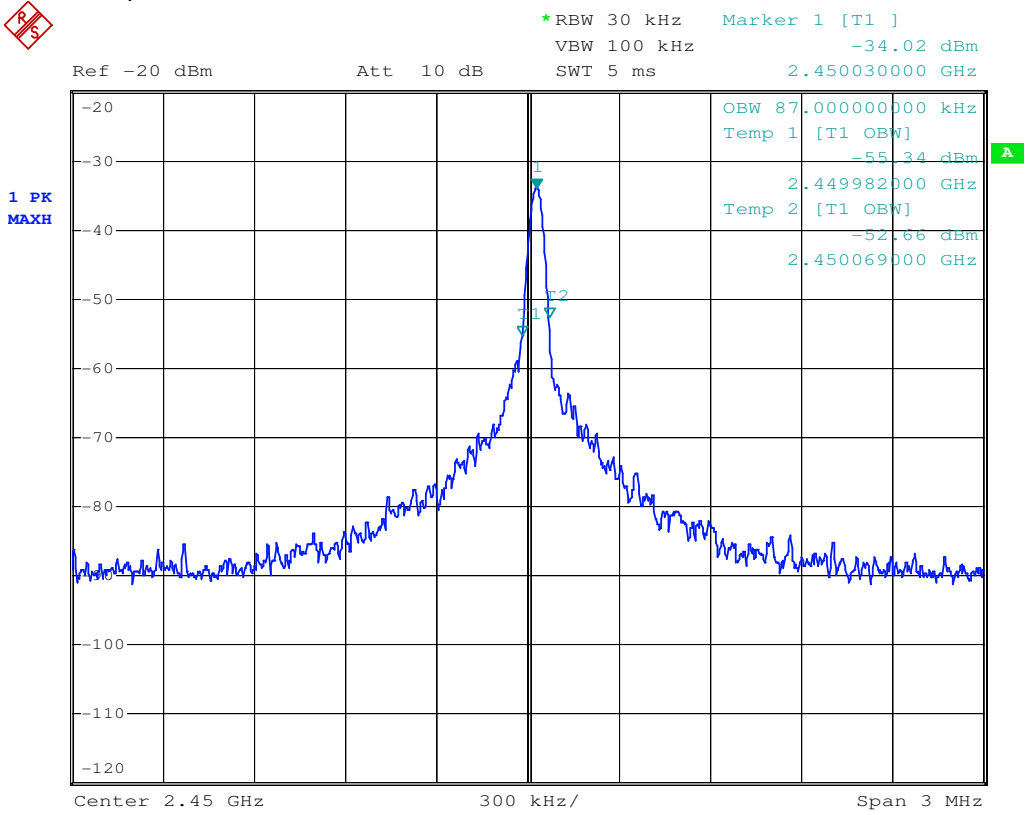
**Measurement Result:**

| CH | Frequency (MHz) | Occupied Bandwidth (MHz) |
|---|---|---|
| 15 | 2425 | 0.081 |
| 20 | 2450 | 0.087 |
| 25 | 2475 | 0.105 |

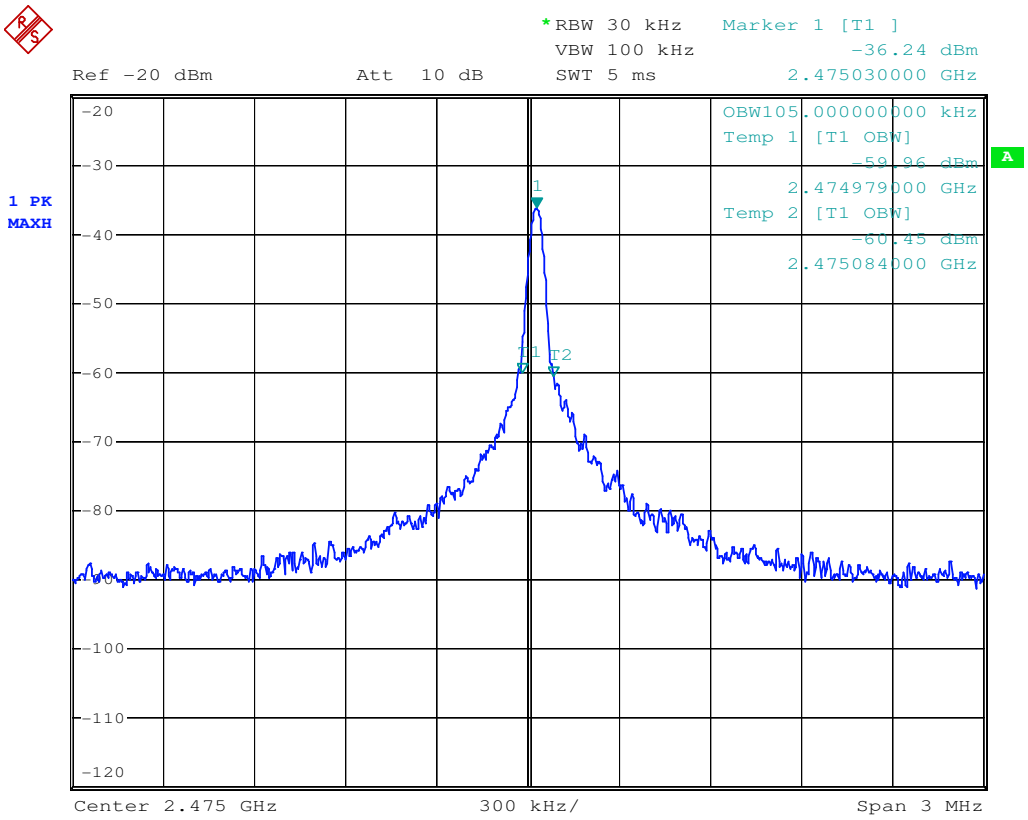
99% Occupied BandWidth Test Data CH15 2425MHz:



99% Occupied BandWidth Test Data CH20 2450MHz:



99% Occupied BandWidth Test Data CH25 2475MHz:



## 5.4 Antenna Requirement

**Test Requirement:** FCC Part15 15.203

### 5.4.1 Standard Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### 5.4.2 Antenna Connected Construction

The antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

### 5.4.3 Result

The EUT antenna is internal Antenna. It comply with the standard requirement.

***End of the Report***