

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART B &C REQUIREMENT**

OF

Electronic Shelf Label

MODEL No.: T817

FCC ID: N6K-ESL-T817

REPORT NO: KAN120504005E

ISSUE DATE: May 30, 2012

Prepared for
HANGZHOU CENTURY CO., LTD
1418-25# Moganshan Road Hangzhou, Zhejiang, P.R.China

Prepared by
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VERIFICATION OF COMPLIANCE

| | |
|----------------------|--|
| Applicant: | HANGZHOU CENTURY CO., LTD 1418-25# Moganshan Road Hangzhou, Zhejiang, P.R.China |
| Product Description: | Electronic Shelf Label |
| Model Number: | T817 |
| File Number: | KAN120504005E |
| Date of Test: | May 21, 2012 to May 29, 2012 |

We hereby certify that:

The above equipment was tested by NINGBO EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249.

The test results of this report relate only to the tested sample identified in this report.

Approved By



Andy.wang/Manager
NINGBO EMTEK CO., LTD.

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1. GENERAL INFORMATION

1.1. Product Description

The EUT is a short range, lower power, Details of technical specification, refers to the description in follows:

- a. Operation Frequency: 2404.210MHz
- b. Number of Channel: 1
- c. Antenna Designation: Internal
- d. Rated RF Output Power: 0dBm (Max)
- e. Power Supply: DC 3.0V

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: N6K-ESL-T817 filing to comply with Section 15.249 of the FCC Part 15 Subpart C Rules.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 -2009. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4. Special Accessories

Not available for this EUT intended for grant.

1.5. Equipment Modifications

Not available for this EUT intended for grant.

1.6. Test Facility

| | |
|------------------|---|
| Site Description | |
| EMC Lab. | : Accredited by FCC, June 14, 2011 The Certificate Registration Number is 463622. |
| | Accredited by Industry Canada, May 2, 2011 The Certificate Registration Number is 46405-9469.. |
| Name of Firm | : NINGBO EMTEK CO., LTD. |
| Site Location | : 1F Building 4, 1177#, Lingyun Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang, China |

30MHz~26GHz Radiated emission item Subcontracted in Shenzhen Emtek:

| | |
|---------------|--|
| EMC Lab. | The Certificate Registration Number is 406365. |
| Name of Firm | : SHENZHEN EMTEK CO., LTD. |
| Site Location | : Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China |

1.7. Measurement Uncertainty

| | |
|---|--|
| Radiated Emission Uncertainty (3m Chamber) | : 3.7dB (30M~26GHz Polarize: H) 3.6dB (30M~26GHz Polarize: V) |
|---|--|

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Electronic Shelf Label) has been tested under Normal Operating and standby condition. No software used to control the EUT for staying in continuous transmitting and receiving mode for testing.

2.3. Requirement for Compliance

2.3.1. Conducted Emissions (Not apply in the report)

According to §15.207, For intentional radiator device is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

| Frequency(MHz) | Quasi-peak | Average |
|----------------|------------|---------|
| 0.15-0.5 | 66-56 | 56-46 |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

Note: 1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

2.3.2.Radiated Emissions

(a) FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

| Frequency (MHz) | Field strength μ V/m | Distance(m) | Field strength at 3m $\text{dB}\mu\text{V/m}$ |
|-----------------|--------------------------|-------------|---|
| 30-88 | 100 | 3 | 40 |
| 88-216 | 150 | 3 | 43.5 |
| 216-960 | 200 | 3 | 46 |
| Above 960 | 500 | 3 | 54 |

Remark:

1. Emission level in $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

(b) FCC Part 15, Section 15.35(b) limit of radiated emission for frequency above 1000MHz

| Frequency(MHz) | $\text{dB}\mu\text{V/m}(at\ 3m)$ | |
|----------------|----------------------------------|---------|
| | PEAK | AVERAGE |
| Above 1000 | 74.0 | 54.0 |

(c) FCC Part 15, Subpart C Section 15.249(a). The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Frequency(MHz) | Filed Strength of Fundamental(at 3m) | | Filed Strength of Harmonics (at 3m) | |
|----------------|--------------------------------------|---------|-------------------------------------|---------|
| | PEAK | AVERAGE | PEAK | AVERAGE |
| 902-928 | 114 | 94 | 74.0 | 54.0 |
| 2400-2483.5 | 114 | 94 | 74.0 | 54.0 |
| 5725-5875 | 114 | 94 | 74.0 | 54.0 |
| 24000-24250 | 128 | 108 | 88.0 | 68.0 |

(d) Band edge

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

| Frequency Range(MHz) | Limit($\text{dB}\mu\text{V/m}$) | |
|----------------------|-----------------------------------|----|
| | Peak | AV |
| 902-928 | | |
| 2400-2483.5 | | |
| 5725-5850 | 74 | 54 |
| 24000-24250 | | |

2.3.3.Antenna Requirement

For intentional device, according to §15.203, 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.

2.4.Configuration of Tested System



2.5.Description of support units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | FCC ID | Series No. | Note |
|------|------------------------|-----------|----------------|--------------|------------|------|
| 1. | Electronic Shelf Label | CENTURY | T817 | N6K-ESL-T817 | N/A | EUT |

Note: Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.

3. SUMMARY OF TEST RESULTS

| FCC Rules | Description Of Test | Result |
|---|---------------------|-----------|
| § 15.249(a), § 15.249(d) § 15.249(e), § 15.209 | Radiated Emission | Compliant |
| §15.249 | Band Edge | Compliant |
| § 15.203 | Antenna Requirement | Compliant |

4. DESCRIPTION OF TEST MODES

| Test Mode | Frequency(MHz) |
|-----------|----------------|
| TX | 2404.210 |

5. RADIATED EMISSION TEST

5.1. Measurement Procedure

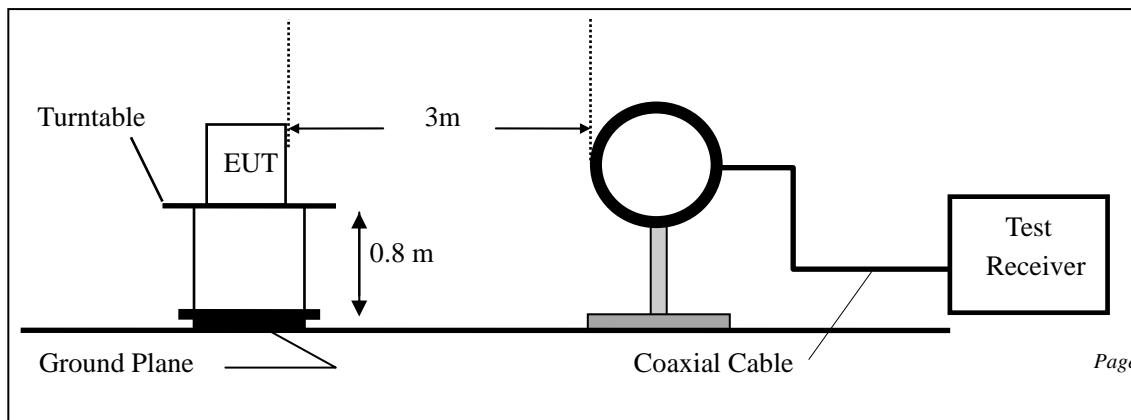
- a. All measurements were made at 3 meters.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.2. Measurement Equipment Used:

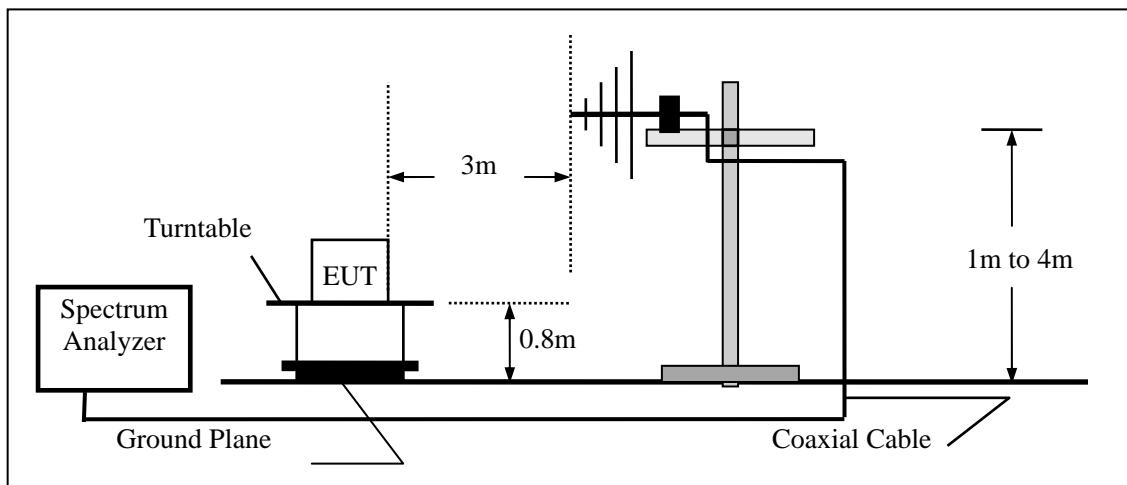
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
|-------------------|-----------------|--------------|-----------------|------------|------------|
| Spectrum Analyzer | Rohde & Schwarz | ESU | 1302.6005.26 | 05/29/2012 | 05/28/2013 |
| EMI Test Receiver | Rohde & Schwarz | ESU | 1302.6005.26 | 05/29/2012 | 05/28/2013 |
| Pre-Amplifier | HP | 8447D | 2944A07999 | 05/29/2012 | 05/28/2013 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 142 | 05/29/2012 | 05/28/2013 |
| Loop Antenna | ARA | PLA-1030/B | 1029 | 05/29/2012 | 05/28/2013 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA91703 99 | 05/29/2012 | 05/28/2013 |
| Horn Antenna | Schwarzbeck | BBHA 9120 | D143 | 05/29/2012 | 05/28/2013 |

5.3. Test SET-UP

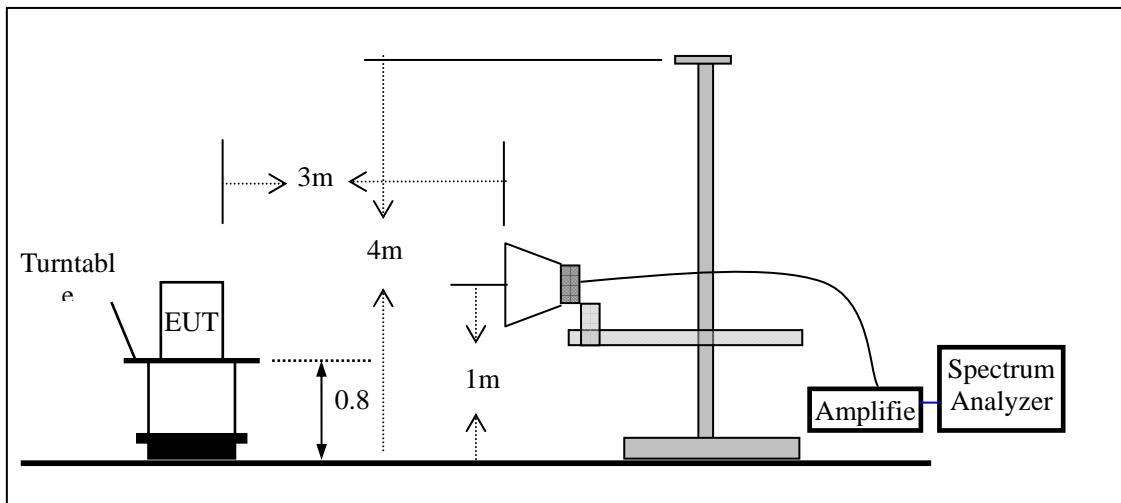
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency Above 1000MHz



5.4.Radiated Measurement Result

| | | | |
|--------------------|------------|---------------|--------------|
| Operation Mode: | TX | Test Date : | May 26, 2012 |
| Frequency Range: | 30~1000MHz | Temperature : | 22 °C |
| Test Result: | PASS | Humidity : | 55 % |
| Measured Distance: | 3m | Test By: | King |

| Freq. (MHz) | Ant.Pol. H/V | Emission Level (dBuV) | Limit 3m (dBuV/m) | Margin (dB) | Note |
|----------------|-----------------|-----------------------------|----------------------|----------------|------|
| 31. 9545 | V | 19. 90 | 40. 00 | -20. 10 | PK |
| 44. 1202 | V | 18. 30 | 40. 00 | -21. 70 | PK |
| 58. 8185 | V | 19. 40 | 40. 00 | -20. 60 | PK |
| 86. 2000 | V | 17. 60 | 40. 00 | -22. 40 | PK |
| 616. 3716 | V | 26. 70 | 46. 00 | -19. 30 | PK |
| 912. 8620 | V | 31. 40 | 46. 00 | -14. 60 | PK |
| 39. 4791 | H | 21. 70 | 40.00 | -18. 30 | PK |
| 43. 9685 | H | 18. 30 | 40.00 | -21. 70 | PK |
| 52. 2078 | H | 17. 60 | 40.00 | -22. 40 | PK |
| 95. 4270 | H | 17. 20 | 43.50 | -26. 30 | PK |
| 273. 2340 | H | 22. 20 | 46.00 | -23. 80 | PK |
| 938. 8326 | H | 31. 70 | 46.00 | -14. 30 | PK |

Note: (1) All Readings are Peak Value.

(2) Emission Level= Reading Level+Probe Factor +Cable Loss

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: TX Test Date : May 26, 2012
Frequency Range: 1-25GHz Temperature : 22 °C
Test Result: PASS Humidity : 55 %
Measured Distance: 3m Test By: King

| Freq. (MHz) | Ant.Pol . | Emission Level (dBuV) | | Limit 3m (dBuV/m) | | Margin(dB) | |
|----------------|--------------|--------------------------|-------|----------------------|----|------------|--------|
| | | H/V | PK | AV | PK | AV | PK |
| 2404.210 | V | 88.90 | 87.67 | 114 | 94 | -25.1 | -6.33 |
| 4808.420 | V | 46.94 | 40.86 | 74 | 54 | -27.06 | -13.14 |
| 7212.630 | V | 48.27 | 41.33 | 74 | 54 | -25.73 | -12.67 |
| -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- |
| 2404.210 | H | 84.45 | 83.33 | 114 | 94 | -29.55 | -10.67 |
| 4808.420 | H | 44.06 | 39.14 | 74 | 54 | -29.94 | -14.86 |
| 7212.630 | H | 45.23 | 40.76 | 74 | 54 | -28.77 | -13.24 |
| -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- |

Note: (1) All Readings are Peak Value and AV.

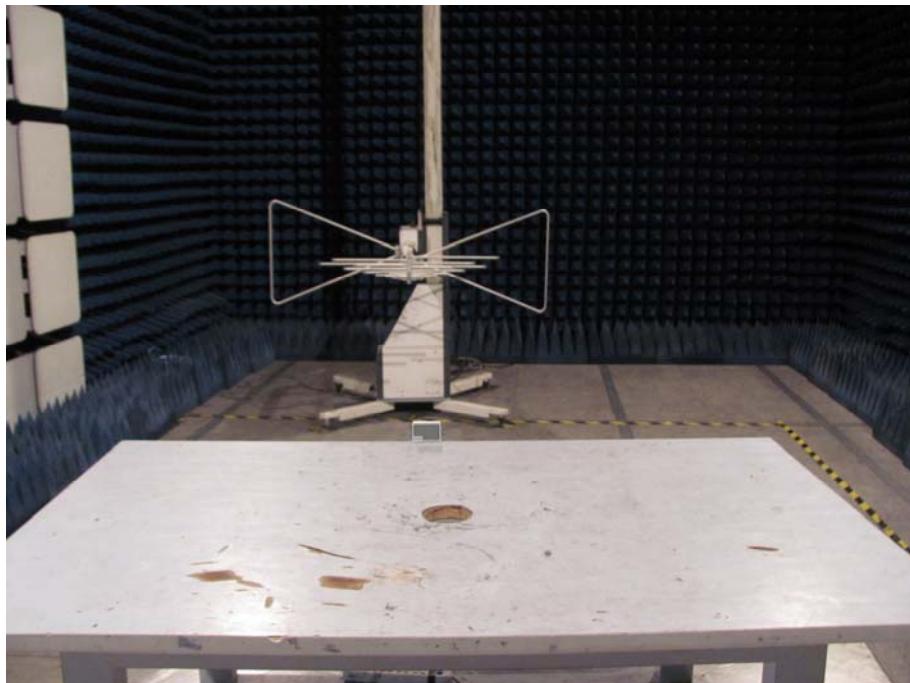
(2) Emission Level= Reading Level+Probe Factor +Cable Loss

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

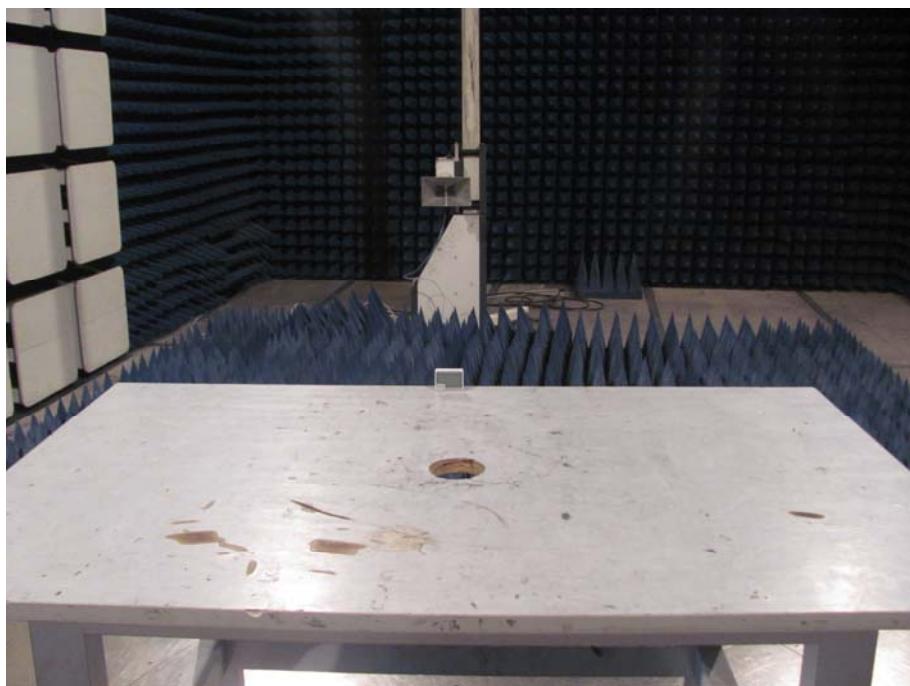
(4) Data of measurement within this frequency range shown “--” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured

5.5.Radiated Measurement Photos:

30M~1000MHz:



Above 1000MHz:



6. BAND EDGES MEASUREMENT

6.1. Standard Applicable

According to 15.249(d), out band emission except for harmonics shall be comply with §15.209 or at least attenuated by 50 dB below the level of the fundamental.

6.2. Measurement Procedure

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = AUTO.

6.3. Measurement Equipment

| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
|-------------------|-----------------|--------------|-----------------|------------|------------|
| Spectrum Analyzer | Rohde & Schwarz | ESU | 1302.6005.26 | 05/29/2012 | 05/28/2013 |
| EMI Test Receiver | Rohde & Schwarz | ESU | 1302.6005.26 | 05/29/2012 | 05/28/2013 |
| Pre-Amplifier | HP | 8447D | 2944A07999 | 05/29/2012 | 05/28/2013 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 142 | 05/29/2012 | 05/28/2013 |
| Loop Antenna | ARA | PLA-1030/B | 1029 | 05/29/2012 | 05/28/2013 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA91703 99 | 05/29/2012 | 05/28/2013 |
| Horn Antenna | Schwarzbeck | BBHA 9120 | D143 | 05/29/2012 | 05/28/2013 |

6.4. Test Setup

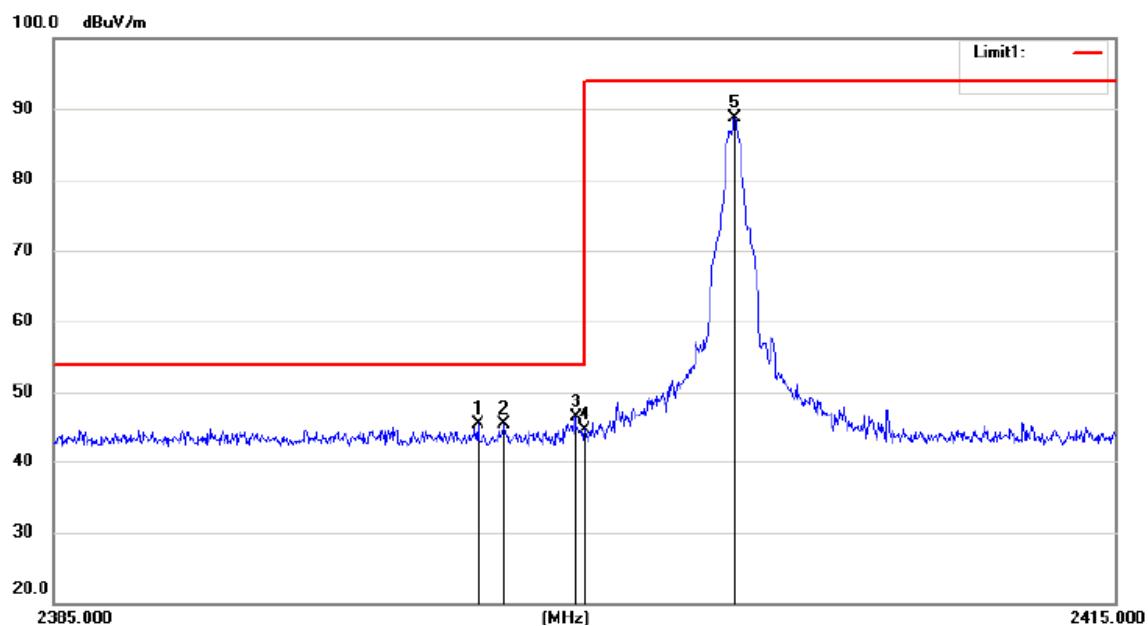
Same as 5.3 Radiated Emission Measurement.

6.5. Test Results

Pass

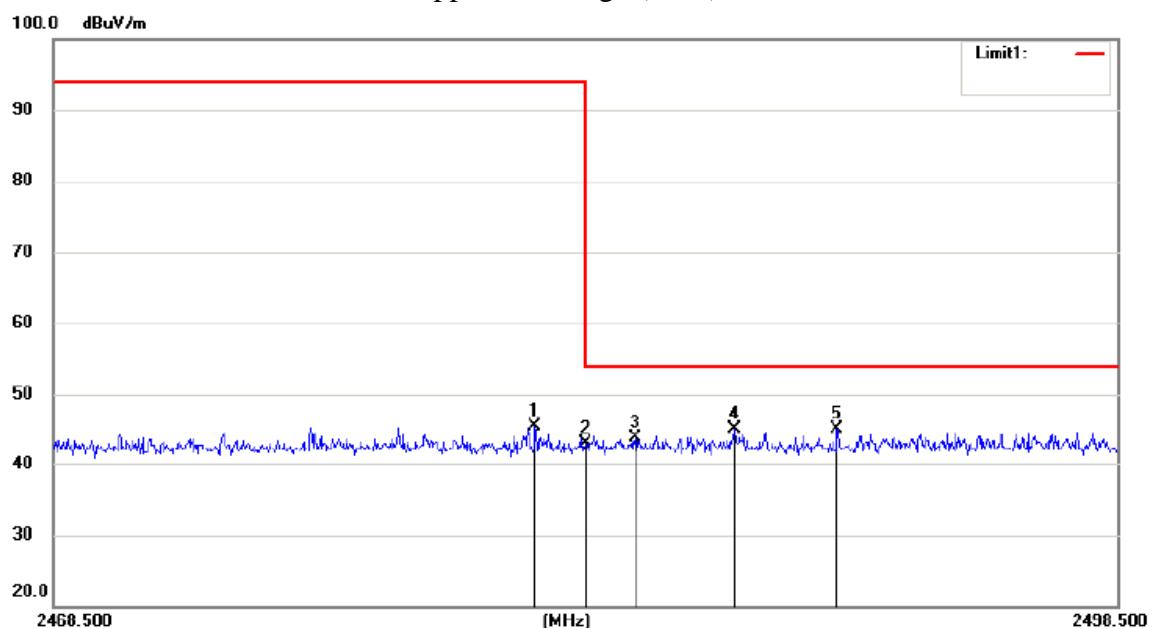
The test plots as following:

Lower band edge (Peak)



| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | Degree |
|-----|-----|----------|---------|---------|----------|--------|-------|----------|-------|--------|
| | | | Level | Factor | ment | | | | | |
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree |
| 1 | | 2396.970 | 34.20 | 11.29 | 45.49 | 53.90 | -8.41 | peak | | |
| 2 | | 2397.720 | 34.20 | 11.31 | 45.51 | 53.90 | -8.39 | peak | | |
| 3 | | 2399.730 | 35.20 | 11.33 | 46.53 | 53.90 | -7.37 | peak | | |
| 4 | | 2400.000 | 33.30 | 11.33 | 44.63 | 53.90 | -9.27 | peak | | |
| 5 | * | 2404.210 | 77.30 | 11.38 | 88.68 | 93.90 | -5.22 | peak | | |

Upper band edge (Peak)



| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Antenna | Table | Degree | |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|-------|--------|---------|
| | | | Level | Factor | ment | | | | | | |
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2482.060 | 33.30 | 12.11 | 45.41 | 93.90 | -48.49 | peak | | | |
| 2 | | 2483.500 | 31.00 | 12.13 | 43.13 | 53.90 | -10.77 | peak | | | |
| 3 | | 2484.880 | 31.70 | 12.15 | 43.85 | 53.90 | -10.05 | peak | | | |
| 4 | | 2487.700 | 32.90 | 12.17 | 45.07 | 53.90 | -8.83 | peak | | | |
| 5 | * | 2490.580 | 32.90 | 12.20 | 45.10 | 53.90 | -8.80 | peak | | | |

7. ANTENNA APPLICATION

7.1. Standard Applicable

According to §15.203, 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.

7.2. Antenna Construction

The EUT'S antenna (Internal antenna) is permanently integrated on the main EUT, no consideration of replacement.