



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Foldable Bluetooth Keyboard

Model: BT523

Trade Name: ZIPPY

Issued to

ZIPPY TECHNOLOGY CORP.

10F, No.50, Min Chyuan Rd., Shin-Tien Dist, New Taipei City Taiwan 231

Issued by

**Compliance Certification Services Inc.
No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,
Taoyuan County 33841,Taiwan, R.O.C.**

TEL: 886-3-324-0332

FAX: 886-3-324-5235

<http://www.ccsrf.com>

service@ccsrf.com



Testing Laboratory
0363

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Compliance Certification Services Inc.

Report No: T120702D02-RP1

FCC ID: P4PBT523

Date of Issue: July 23, 2012

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1 TEST RESULT CERTIFICATION

ZIPPY TECHNOLOGY CORP.

Applicant: 10F, No.50, Min Chyuan Rd., Shin-Tien Dist,
New Taipei City Taiwan 231

ZIPPY TECHNOLOGY CORP.

Manufacturer: 10F, No.50, Min Chyuan Rd., Shin-Tien Dist,
New Taipei City Taiwan 231

Equipment Under Test: Foldable Bluetooth Keyboard

Trade Name: ZIPPY

Model: BT523

Date of Test: July 2 ~ 22, 2012

APPLICABLE STANDARDS

| STANDARD | TEST RESULT |
|------------------------------|-------------------------|
| FCC 47 CFR Part 15 Subpart C | No non-compliance noted |

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. 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 the requirements of FCC Rules Part 15.207, 15.209, 15.247.

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

Approved by:

Stan Lin
Section Manager

Reviewed by:

Jill Shiau
Section Manager



2 EUT DESCRIPTION

| | |
|----------------------------------|-----------------------------|
| Product | Foldable Bluetooth Keyboard |
| Trade Name | ZIPPY |
| Model Number | BT523 |
| Model Name Discrepancy | N/A |
| EUT Power Rating | 3.7VDC from Battery |
| Operating Frequency Range | 2402 ~ 2480 MHz |
| Transmit Power | -1.90dBm (0.00065W) |
| Modulation Technique | GFSK |
| Transmit Data Rate | 1Mbps |
| Number of Channels | 79 Channels |
| Antenna Specification | PCB Antenna / Gain: 0.78dBi |

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **P4PBT523** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 (2009) and FCC CFR 47 15.207, 15.209 and 15.247.

3.1. EUT CONFIGURATION

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

3.2. EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3. GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 (2009) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4 (2009).

**3.4. FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS**

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

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

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

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



3.5. DESCRIPTION OF TEST MODES

The EUT (model: BT523) had been tested under operating condition and had been reported as worst case on this test report.

Test program used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

Channel Low (2402MHz), Mid (2441MHz) and High (2480MHz) with 1Mbps data rate was chosen for full testing.



4 INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.1. MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

| 3M Semi Anechoic Chamber | | | | |
|--------------------------|--|---------------------|---------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Spectrum Analyzer | Agilent | E4446A | MY48250064 | 12/25/2012 |
| Spectrum Analyzer | R&S | FSEB | 825829/011 | 12/18/2012 |
| Pre-Amplifier | Anritsu | MH648A | M89145 | 07/03/2013 |
| Pre-Amplifier | Agilent | 8449B | 3008A01738 | 04/17/2013 |
| Pre-Amplifier | MITEQ | AMF-6F-260400-40-8P | 985646 | 05/20/2013 |
| Bilog Antenna | FRANKONIA | BTA-M | 030003M | 10/03/2012 |
| Horn Antenna | EMCO | 3115 | 9602-4659 | 06/14/2013 |
| Horn Antenna | EMCO | 3116 | 00026370 | 10/04/2012 |
| Turn Table | HD | DT-K312 | N/A | N.C.R |
| Antenna Tower | HD | AS620E | N/A | N.C.R |
| Controller | HD | HD100 | N/A | N.C.R |
| Test S/W | LabVIEW 6.1 (Wugu Chamber EMI Test V1_4.5.3) | | | |

| Conducted Emission Test site | | | | |
|------------------------------|--------------|---------|---------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Spectrum Analyzer | Agilent | E4446A | MY48250064 | 12/25/2012 |
| Spectrum Analyzer | R&S | FSEB | 825829/011 | 12/18/2012 |
| Power meter | Anritsu | ML2495A | 1033009 | 08/18/2012 |
| Power Sensor | Anritsu | MA2411B | 0917221 | 08/18/2012 |



| Powerline Conducted Emissions Test Site | | | | |
|---|--------------|-----------|---------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| TEST RECEIVER | R&S | ESCI | 101201 | 09/05/2012 |
| LISN (EUT) | SCHWARZBECK | NSLK 8127 | 8127527 | 12/13/2012 |
| LISN | SCHWARZBECK | NSLK 8127 | 8127526 | 12/13/2012 |
| BNC CABLE | EMCI | 5Dr | BNC A6 | 12/07/2012 |
| Pulse Limiter | R&S | ESH3-Z2 | C3010026-2 | 09/07/2012 |
| TEST RECEIVER | R&S | ESCI | 101201 | 09/05/2012 |
| Test S/W | EZ-EMC | | | |

4.2. MEASUREMENT UNCERTAINTY

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor (coverage factor) $k = 1,96$ or $k = 2$ (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 6 is based on such expansion factors.

Table 6: Maximum measurement uncertainty

| Parameter | Uncertainty |
|-------------------------------|-----------------------|
| RF frequency | $\pm 1 \cdot 10^{-5}$ |
| Total RF power conducted | $\pm 1,5$ dB |
| RF power density, conducted | ± 3 dB |
| Spurious emissions, conducted | ± 3 dB |
| All emissions, radiated | ± 6 dB |
| Humidity | ± 5 % |
| Temperature | ± 1 °C |
| DC and low frequency voltages | ± 3 % |
| Powerline Conducted Emission | ± 2.0518 |



5 FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

All measurement facilities used to collect the measurement data are located at

- No. 163-1, Jhongsheng Rd., Sindien District, Taipei City 23151, Taiwan
(For Powerline measurement)
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029
- No 11, Wugong 6th Rd, Wugu District, New Taipei City 24891, Taiwan (R.O.C)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045
- No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841,Taiwan, R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

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

5.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



5.3. TABLE OF ACCREDITATIONS AND LISTINGS

| Country | Agency | Scope of Accreditation | Logo |
|---------|-----------------|---|--|
| USA | A2LA | CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3 |  TESTING CERT #0824.01 |
| USA | FCC MRA | 3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements |  TW1026 |
| Japan | VCCI | 3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements | VCCI R-2882/2541/2798/725/1868 C-402/747/912 T-1930/1646 |
| Taiwan | TAF | EN 55014-1, CISPR 14, CNS 13781-1, EN 55013, CISPR 13, CNS 13439, EN 55011, CISPR 11, CNS 13803, PLMN09, IS2045-0, LP0002 FCC Part 27/90, Part 15B/C/D/E, RSS-192/193/210/310 ETSI EN 300 328/ 300 220-1/ 300 220-2/ 301 893/ 301 489-01/ 301 489-03/ 301 489-07 / 301 489-17/ 300 440-1/ 300 440-2 AS/NZS 4268, AS/NZS 4771 CISPR 22, EN 55022, CNS 13438, AS/NZS CISPR 22, VCCI, IEC/EN 61000-4-2/3/4/5/6/8/11, CNS 14676-2/3/4/5/6/8, CNS 14934-2/3, CNS 13783-1, CNS 13439, CNS 13803 |  Testing Laboratory 0363 |
| Taiwan | BSMI | CNS 13438, CNS 13783-1, CNS 13439, CNS 14115 | SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014 |
| Canada | Industry Canada | RSS-Gen Issue 3 |  IC 2324C-5 |

Note: No part of this report may be used to claim or imply product endorsement by A2LA, TAF or other government agency.



6 SETUP OF EQUIPMENT UNDER TEST

6.1. SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2. SUPPORT EQUIPMENT

For Conducted & Radiated Emission measurement (Above 1GHz):

| No. | Device Type | Brand | Model | Series No. | FCC ID | Data Cable | Power Cord |
|-----|-------------|-------|-------|------------|-----------|------------------|---|
| 1. | Notebook PC | DELL | D400 | 0932RY | E2K24GBRL | Unshielded, 1.8m | AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core |
| 2. | Test Jig | N/A | N/A | N/A | N/A | N/A | N/A |

For Radiated Emission measurement (Below 1GHz)

| No. | Device Type | Brand | Model | Series No. | FCC ID | Data Cable | Power Cord |
|-----|-------------|-------|-------|------------|--------|------------|------------|
| | N/A | | | | | | |

For Powerline Conducted Emissions Measurement:

| No. | Device Type | Brand | Model | Series No. | FCC ID | Data Cable | Power Cord |
|-----|-----------------------|--------|---------|---------------------|--------|-------------------------------|------------------|
| 1. | USB 2.0 HDD | A-Tec | HD-234 | N/A | N/A | Shielded, 1.8m with a core | N/A |
| 2. | Earphone & Microphone | Atayal | SEP912 | N/A | N/A | Unshielded, 1.8m | N/A |
| 3. | USB Mouse | HP | M-UAE96 | F93A90A5BU90 L20 | DoC | Shielded, 1.8m | N/A |
| 4. | Notebook | HP | 2210B | CNV7472KG5 | DoC | Shielded, 1.0m | Unshielded, 1.8m |

Remark: Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



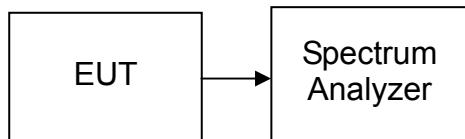
7 FCC PART 15.247 REQUIREMENTS

7.1. 20DB BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=30 kHz, VBW = 100 kHz, Span = 3 MHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

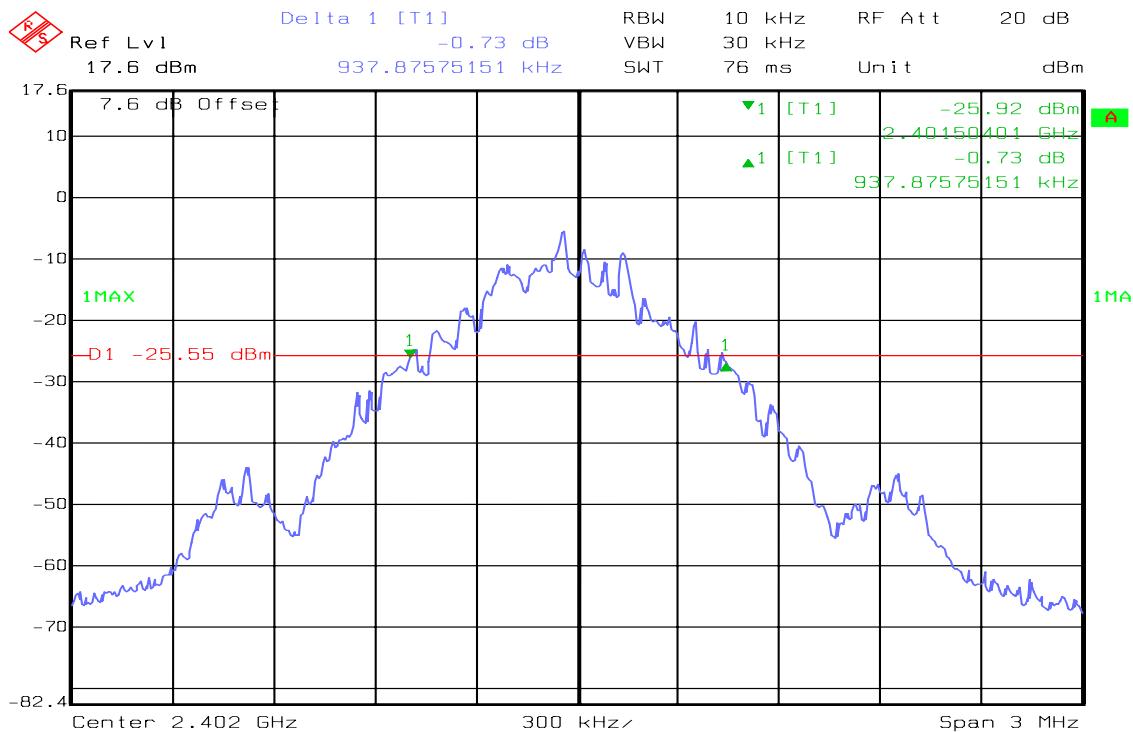
TEST RESULTS

No non-compliance noted



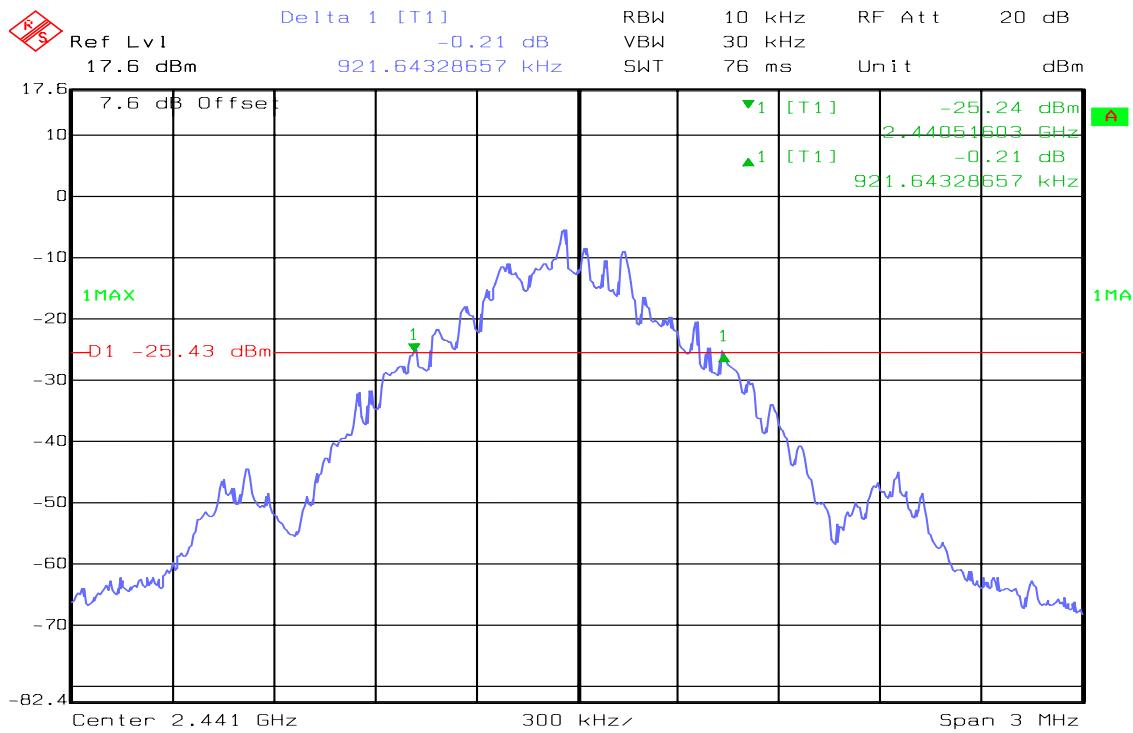
Test Plot

20dB Bandwidth (CH Low)



Date: 20.JUL.2012 13:25:10

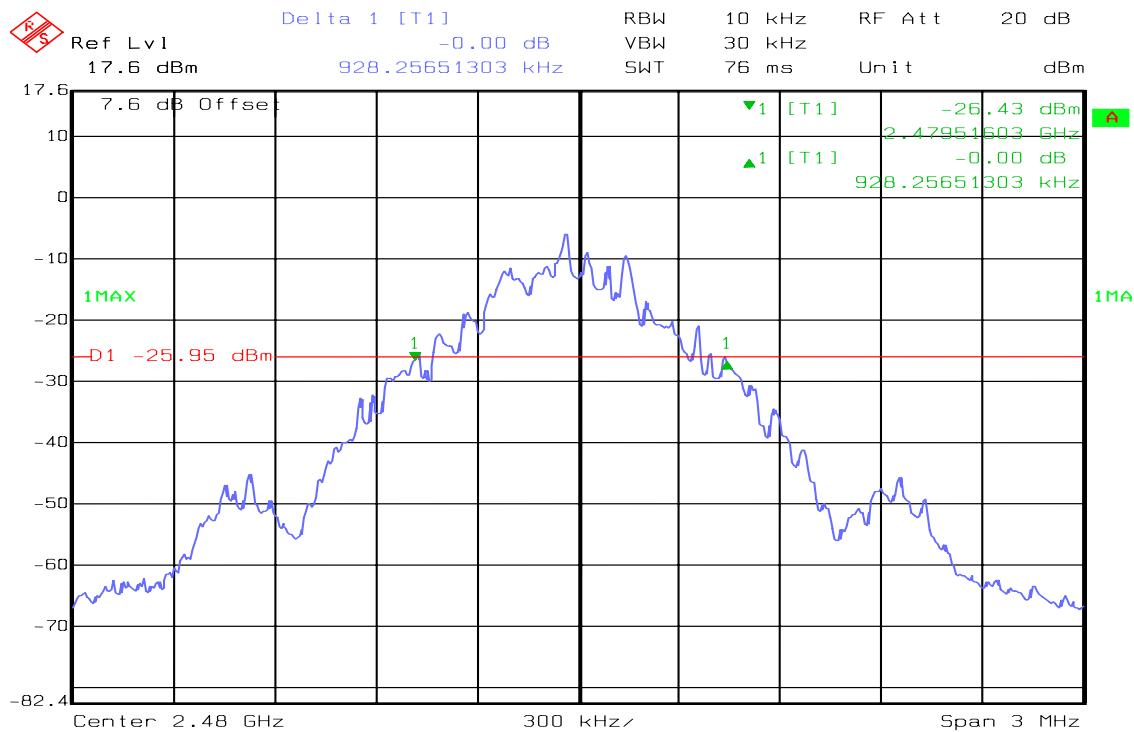
20dB Bandwidth (CH Mid)



Date: 20.JUL.2012 13:26:38



20dB Bandwidth (CH High)



Date: 20.JUL.2012 13:34:51



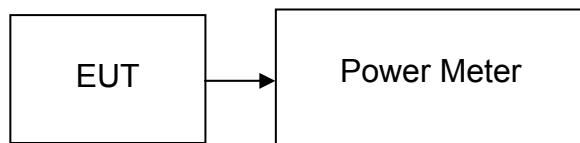
7.2. PEAK POWER

LIMIT

According to §15.247, the maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
2. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt.
3. According to §15.247(b) (4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted

TEST DATA

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Test Result |
|---------|-----------------|--------------------|------------------|-----------|-------------|
| Low | 2402 | -1.90 | 0.00065 | 0.125 | PASS |
| Mid | 2441 | -1.98 | 0.00063 | | PASS |
| High | 2480 | -2.57 | 0.00055 | | PASS |

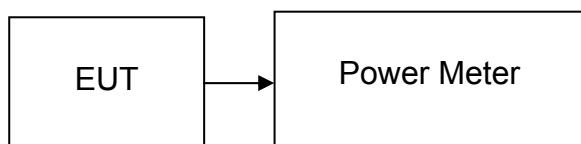


7.3. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the average power detection.

TEST RESULTS

No non-compliance noted

TEST DATA

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) |
|---------|-----------------|--------------------|------------------|
| Low | 2402 | -3.45 | 0.00045 |
| Mid | 2441 | -3.55 | 0.00044 |
| High | 2480 | -4.19 | 0.00038 |

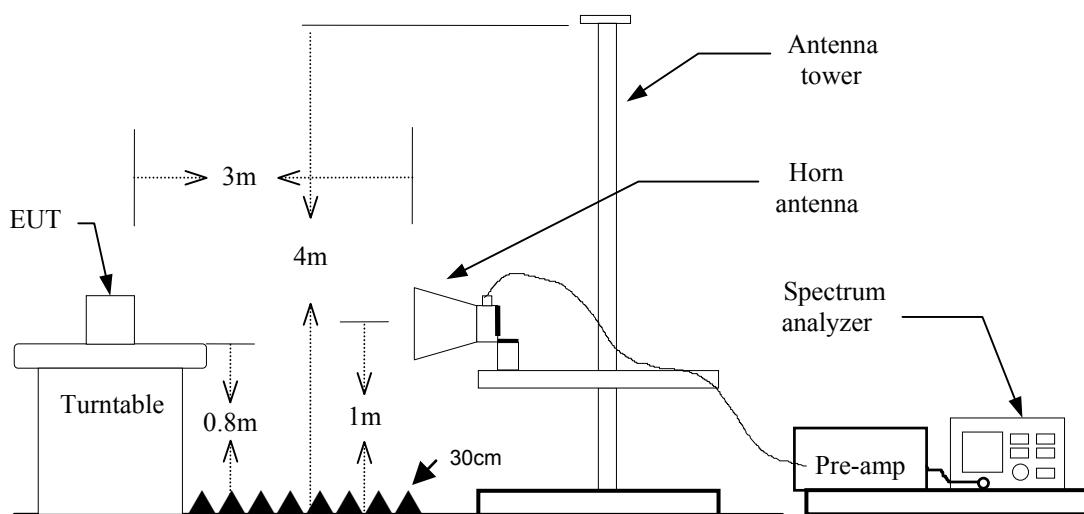


7.4. BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of thsnder this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=VBW=1MHz / Sweep=100ms
 - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

No non-compliance noted

TEST DATA

Refer to attach spectrum analyzer data chart.



Band Edges (CH Low)

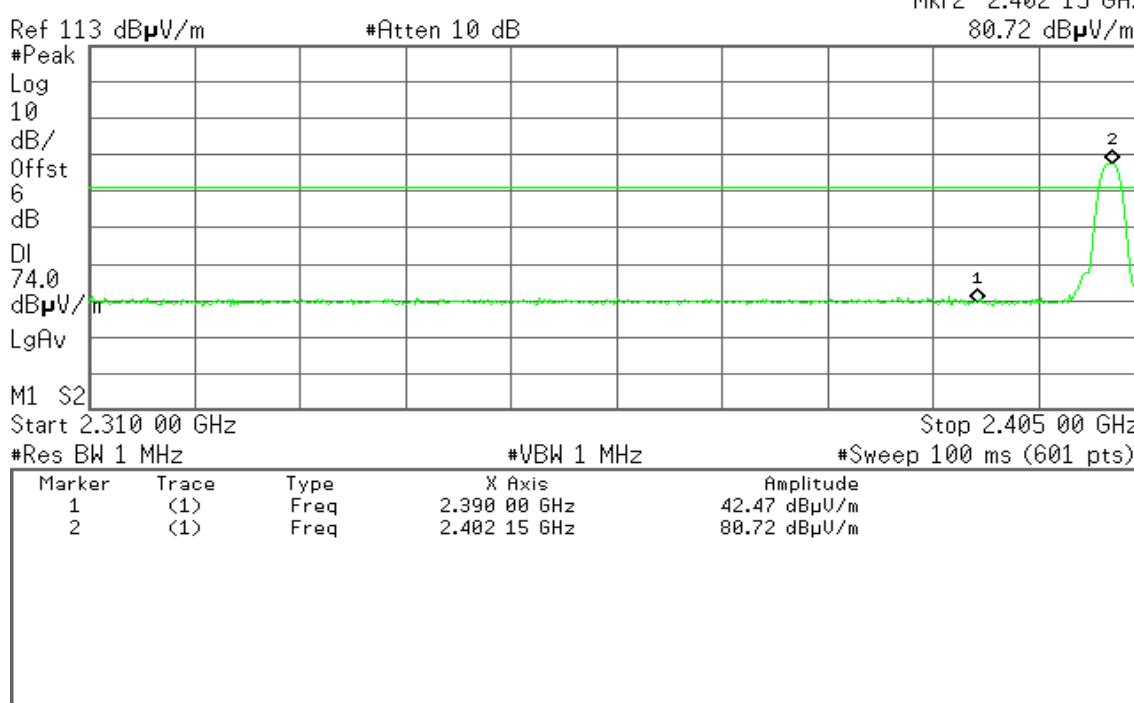
Detector mode: Peak

Polarity: Vertical

* Agilent 12:44:32 Jul 19, 2012

R L

Mkr2 2.402 15 GHz
80.72 dB μ V/m



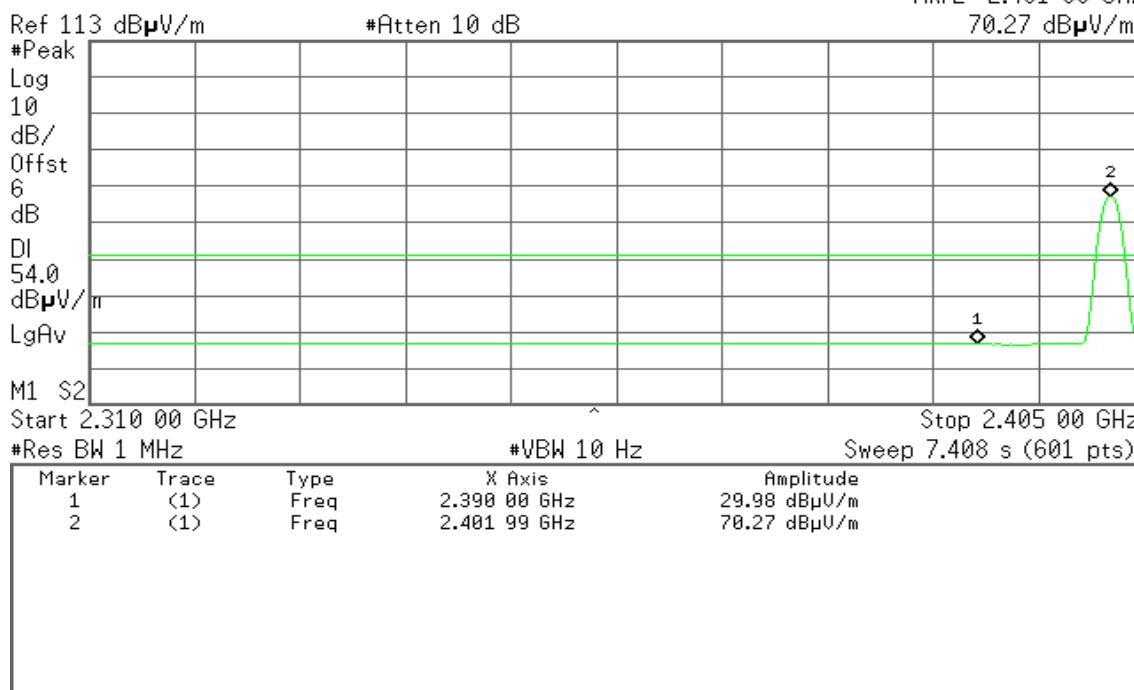
Detector mode: Average

Polarity: Vertical

* Agilent 12:45:55 Jul 19, 2012

R L

Mkr2 2.401 99 GHz
70.27 dB μ V/m

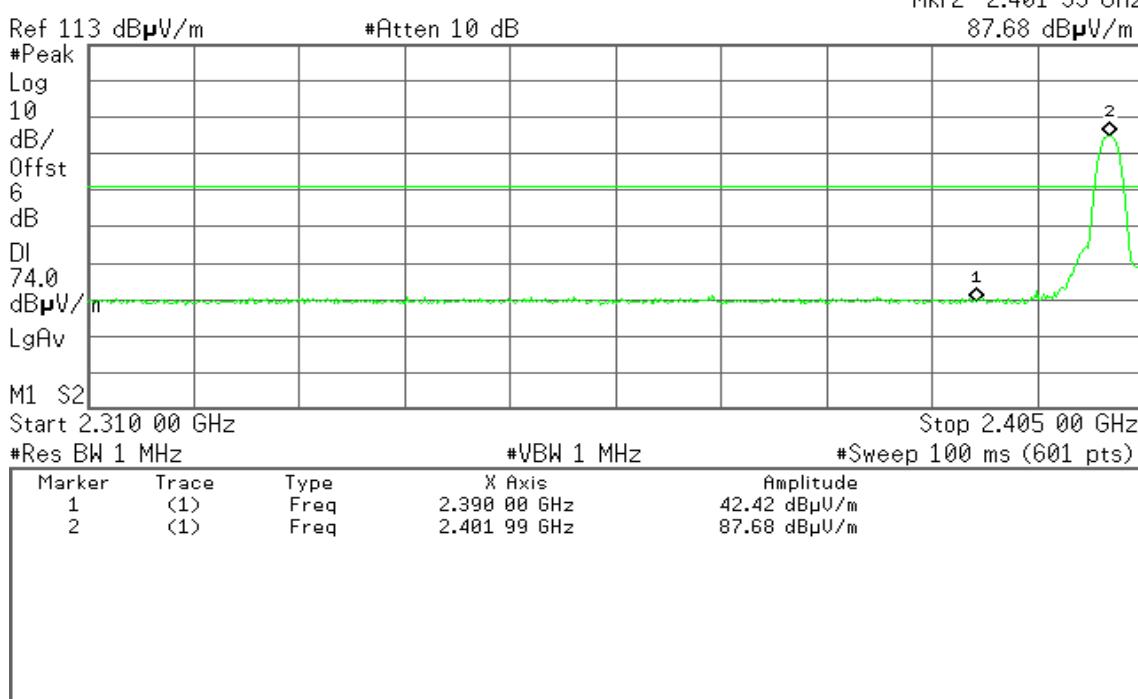


**Detector mode: Peak****Polarity: Horizontal**

* Agilent 12:48:57 Jul 19, 2012

R L

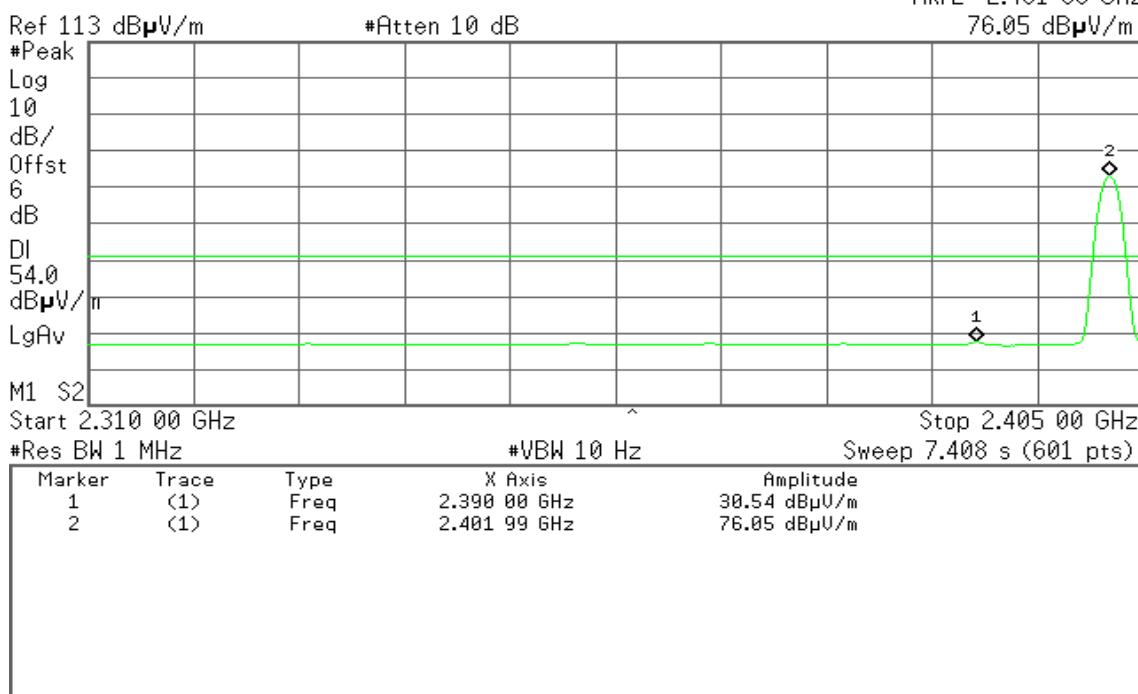
Mkr2 2.401 99 GHz
87.68 dB μ V/m

**Detector mode: Average****Polarity: Horizontal**

* Agilent 12:50:20 Jul 19, 2012

R L

Mkr2 2.401 99 GHz
76.05 dB μ V/m

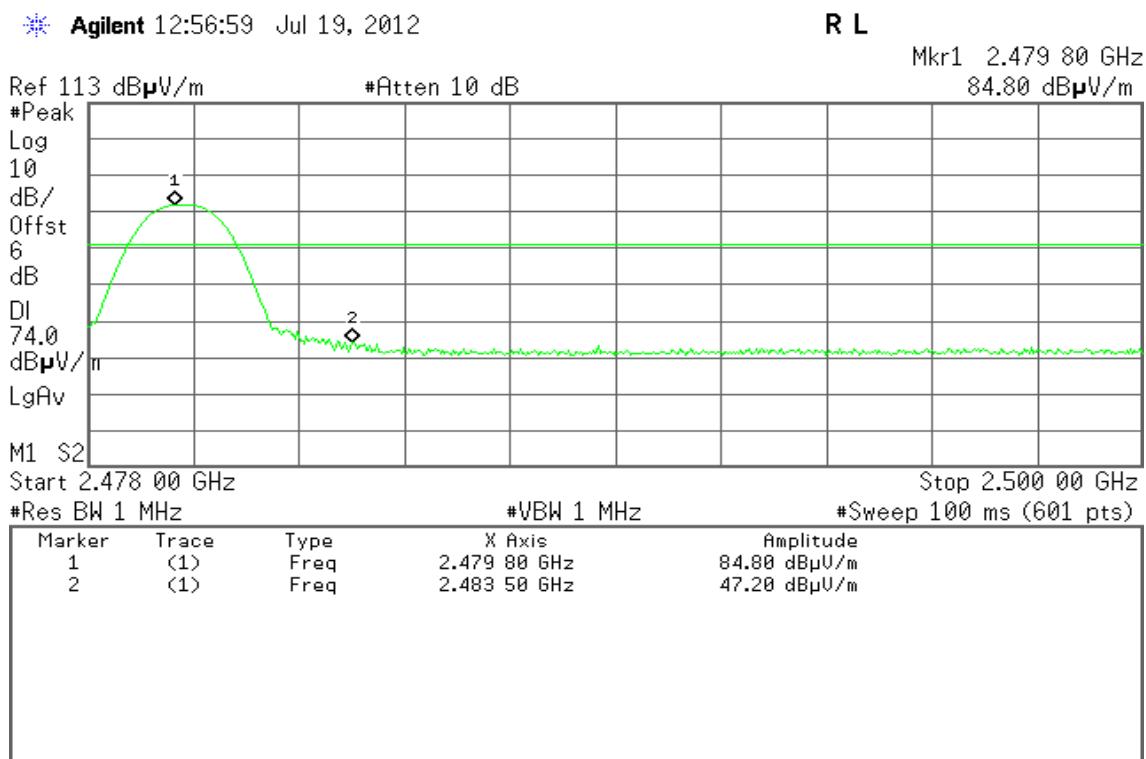




Band Edges (Bluetooth CH High)

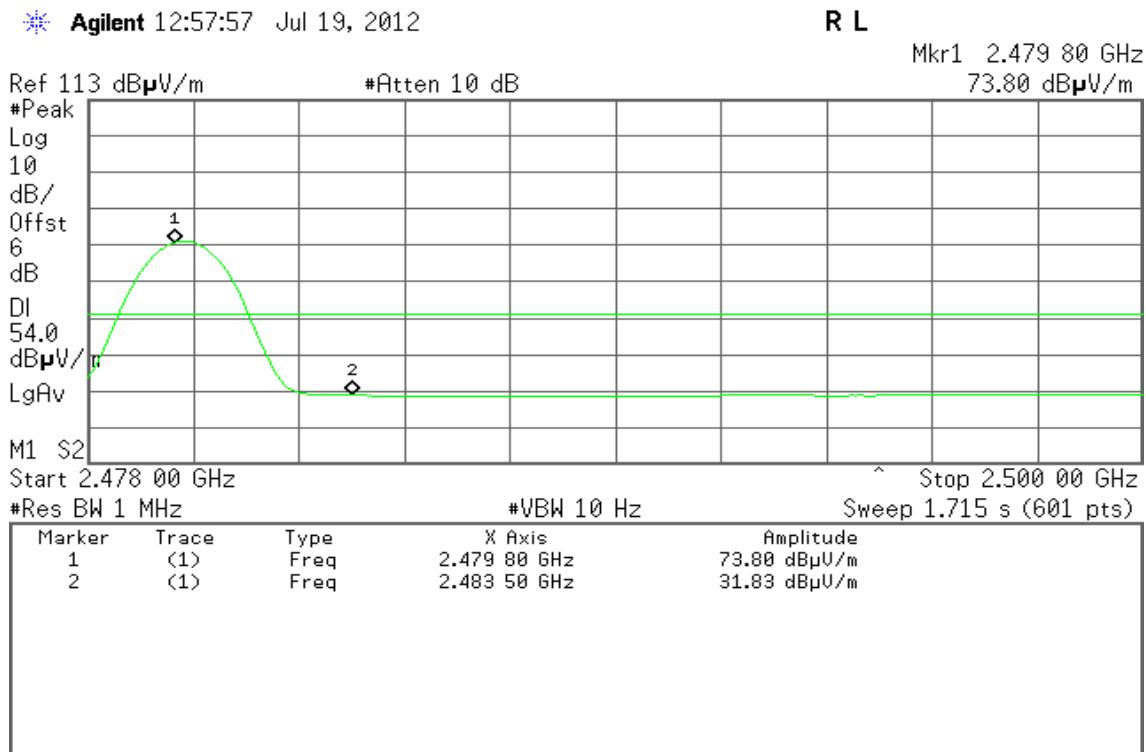
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

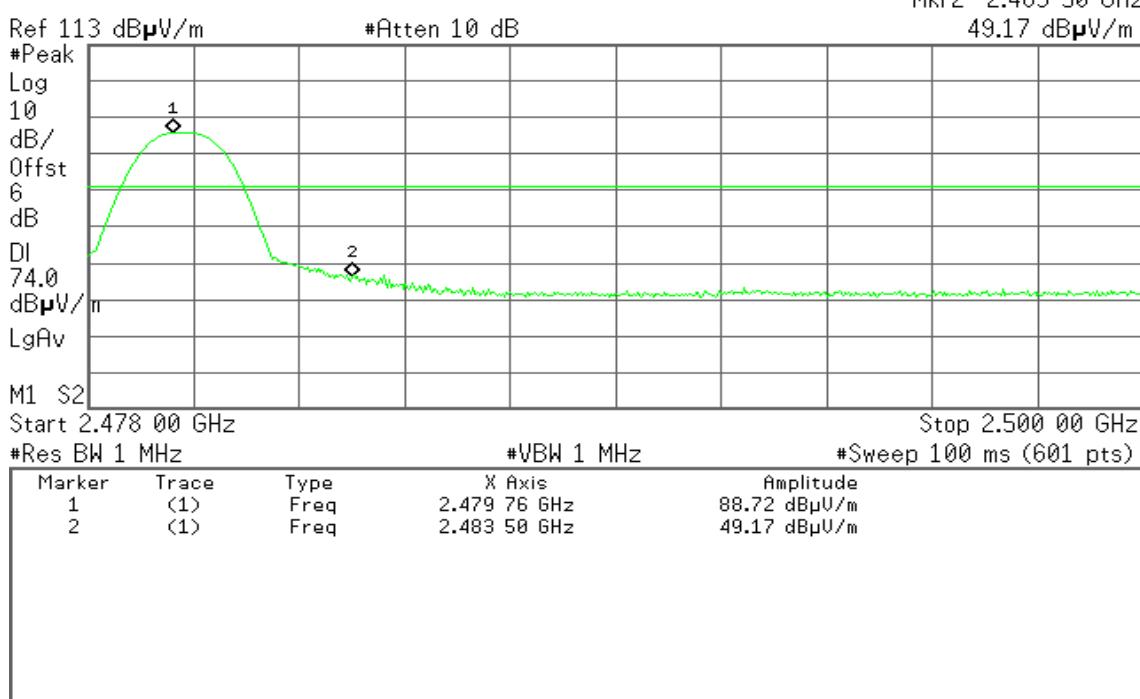


**Detector mode: Peak****Polarity: Horizontal**

* Agilent 12:53:18 Jul 19, 2012

R T

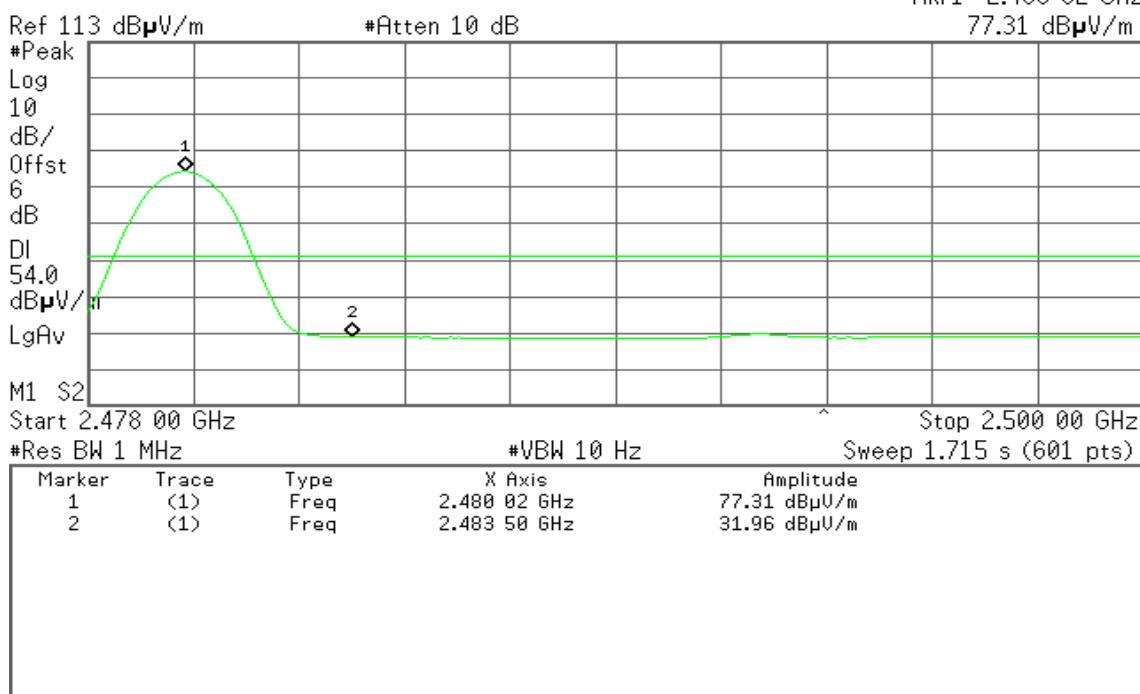
Mkr2 2.483 50 GHz
49.17 dB μ V/m

**Detector mode: Average****Polarity: Horizontal**

* Agilent 12:54:17 Jul 19, 2012

R L

Mkr1 2.480 02 GHz
77.31 dB μ V/m



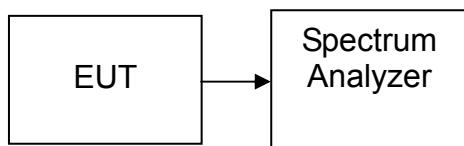


7.5. FREQUENCY SEPARATION

LIMIT

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW = 30kHz, VBW = 100kHz, Span = 3MHz, Sweep = auto.
5. Max hold, mark 3 peaks of hopping channel and record the 3 peaks frequency.

TEST RESULTS

No non-compliance noted

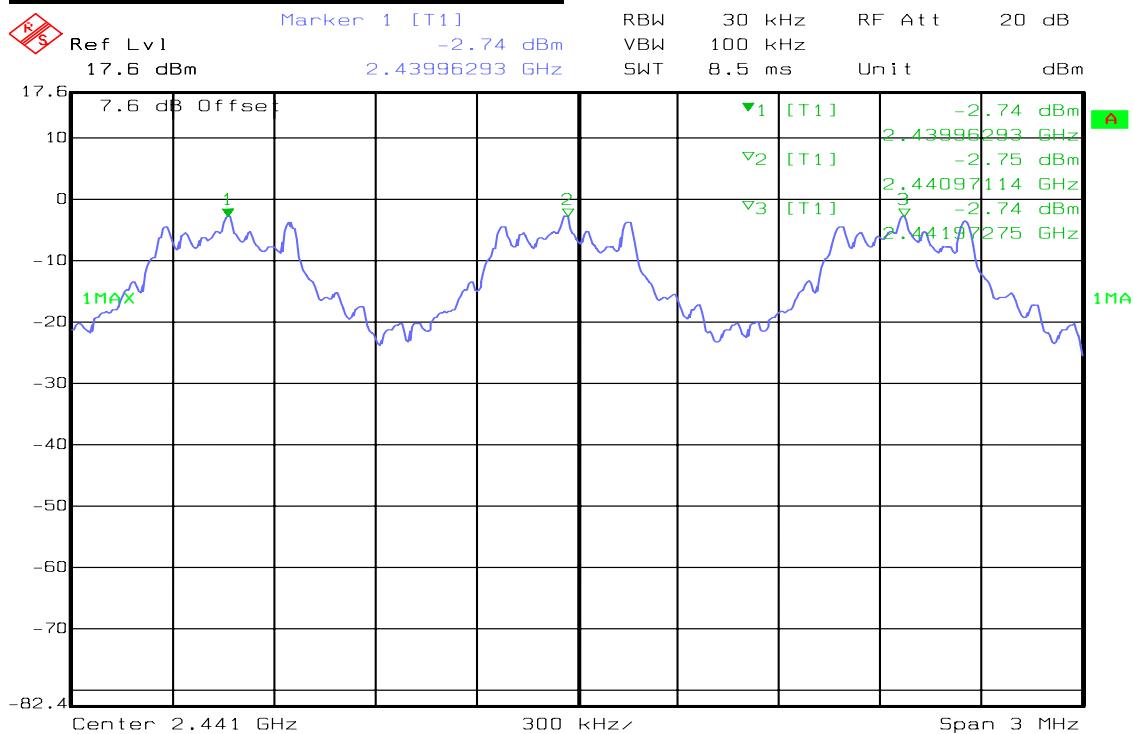
TEST DATA

| Channel Separation (MHz) | 20dB Bandwidth (kHz) | Channel Separation Limit | Result |
|--------------------------|----------------------|--------------------------|--------|
| 1.00 | 937 | > 20dB Bandwidth | Pass |



Test Plot

Measurement of Channel Separation



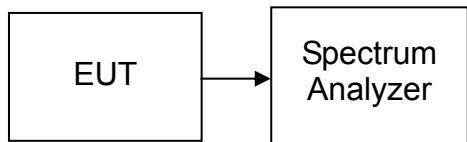


7.6. NUMBER OF HOPPING FREQUENCY

LIMIT

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2441.5MHz, Sweep = auto and Start=2441.5MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW, VBW=510kHz.
5. Max hold, view and count how many channel in the band.

TEST RESULTS

No non-compliance noted

TEST DATA

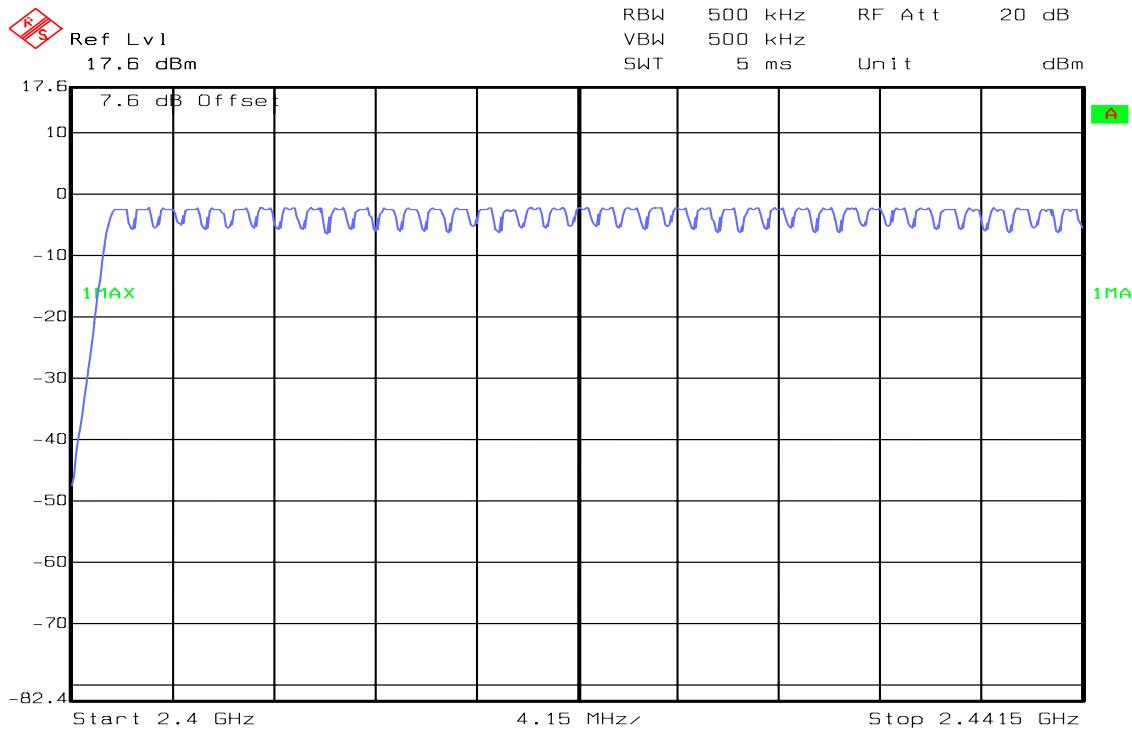
| Result (No. of CH) | Limit (No. of CH) | Result |
|--------------------|-------------------|--------|
| 79 | 75 | PASS |



Test Plot

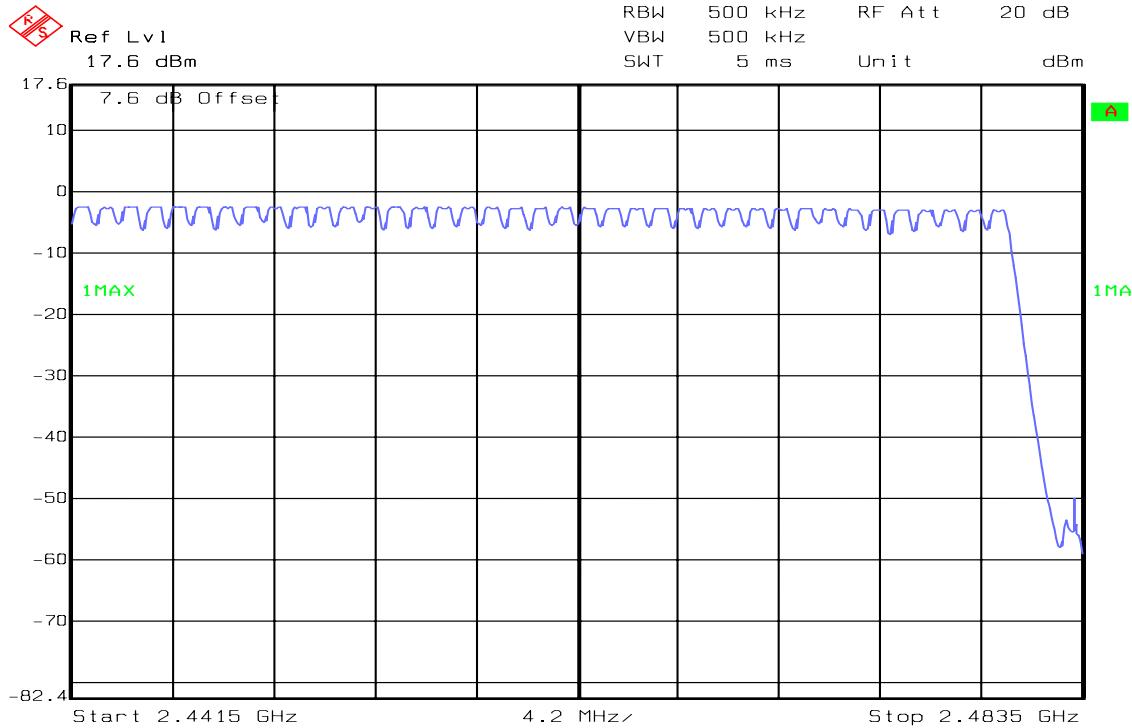
Channel Number

2.4 GHz – 2.4415 GHz



Date: 20.JUL.2012 15:07:03

2.4415 GHz – 2.4835 GHz



Date: 20.JUL.2012 15:06:10

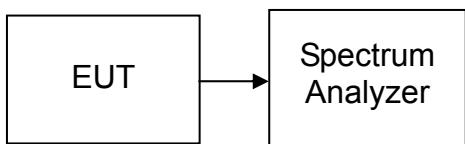


7.7. TIME OF OCCUPANCY (DWELL TIME)

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = 10ms.
5. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

No non-compliance noted



TEST DATA

DH 1

CH Low: $0.433 * (1600/2)/79 * 31.60 = 138.56$ (ms)

CH Mid: $0.433 * (1600/2)/79 * 31.60 = 138.56$ (ms)

CH High: $0.433 * (1600/2)/79 * 31.60 = 138.56$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|------|-----------------|---------------------|-----------------|------------|--------|
| Low | 0.433 | 138.56 | 31.60 | 400.00 | PASS |
| Mid | 0.433 | 138.56 | 31.60 | | PASS |
| High | 0.433 | 138.56 | 31.60 | | PASS |

DH 3

CH Low: $1.695 * (1600/4)/79 * 31.60 = 271.20$ (ms)

CH Mid: $1.695 * (1600/4)/79 * 31.60 = 271.20$ (ms)

CH High: $1.695 * (1600/4)/79 * 31.60 = 271.20$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|------|-----------------|---------------------|-----------------|------------|--------|
| Low | 1.695 | 271.20 | 31.60 | 400.00 | PASS |
| Mid | 1.695 | 271.20 | 31.60 | | PASS |
| High | 1.695 | 271.20 | 31.60 | | PASS |

DH 5

CH Low: $2.960 * (1600/6)/79 * 31.60 = 315.73$ (ms)

CH Mid: $2.940 * (1600/6)/79 * 31.60 = 313.60$ (ms)

CH High: $2.960 * (1600/6)/79 * 31.60 = 315.73$ (ms)

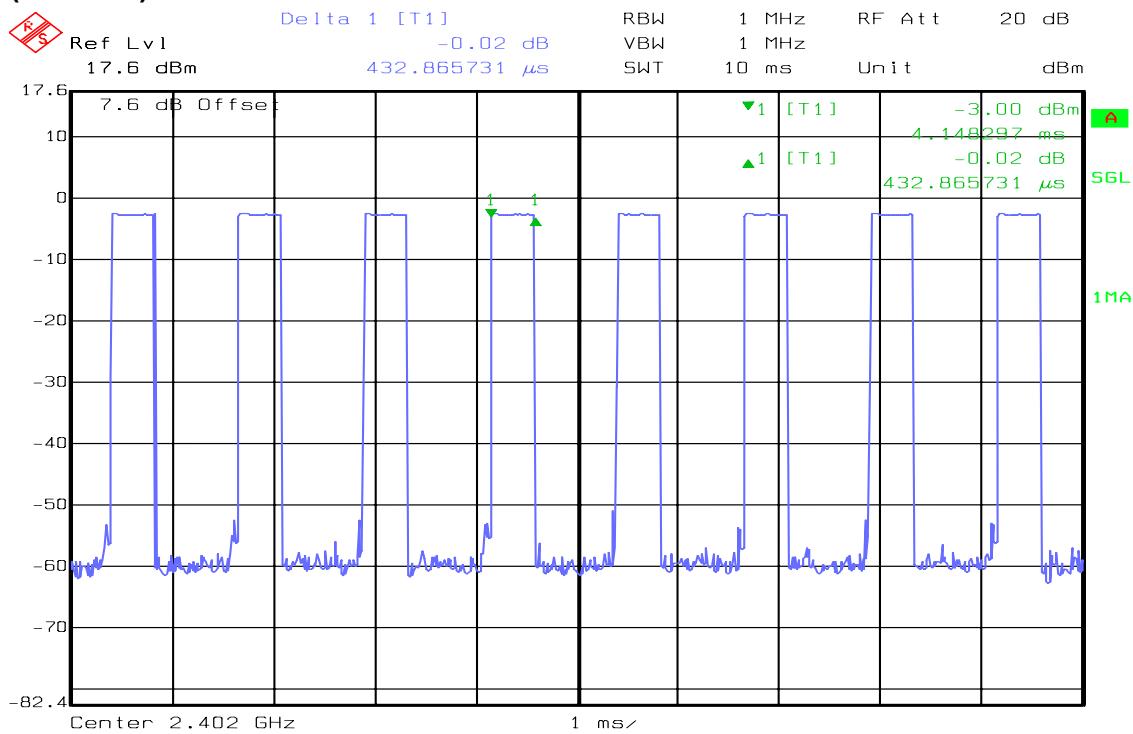
| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|------|-----------------|---------------------|-----------------|------------|--------|
| Low | 2.960 | 315.73 | 31.60 | 400.00 | PASS |
| Mid | 2.940 | 313.60 | 31.60 | | PASS |
| High | 2.960 | 315.73 | 31.60 | | PASS |



Test Plot

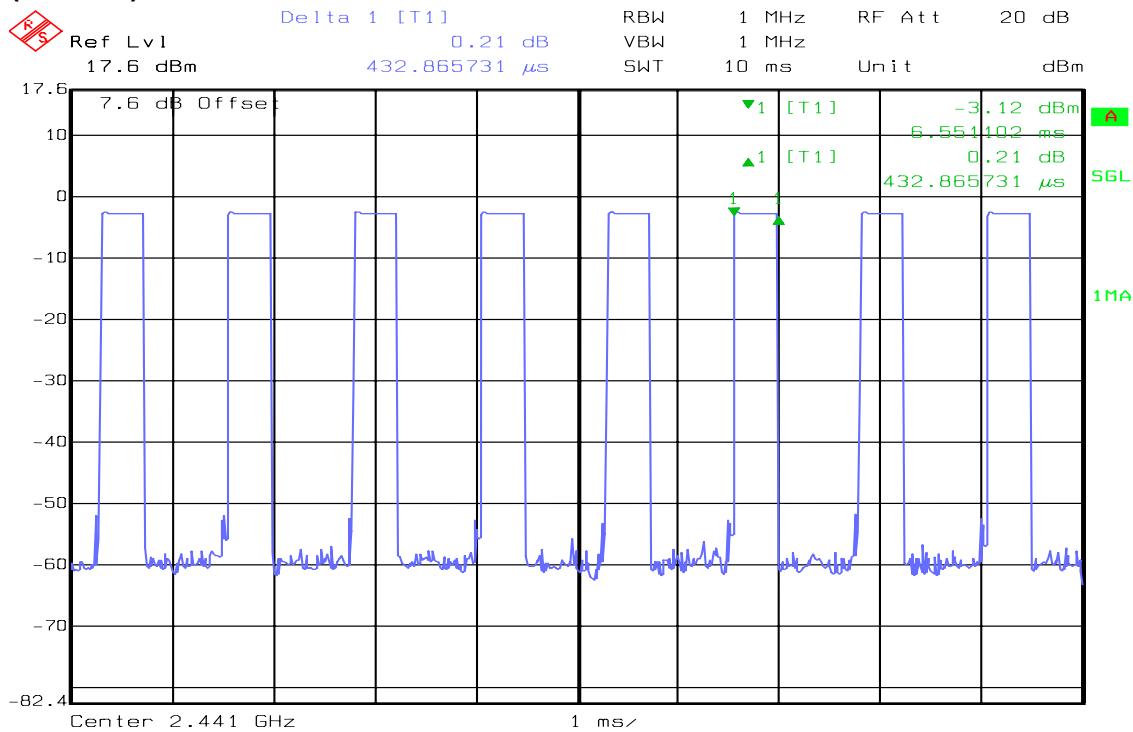
DH 1

(CH Low)



Date: 20.JUL.2012 15:44:18

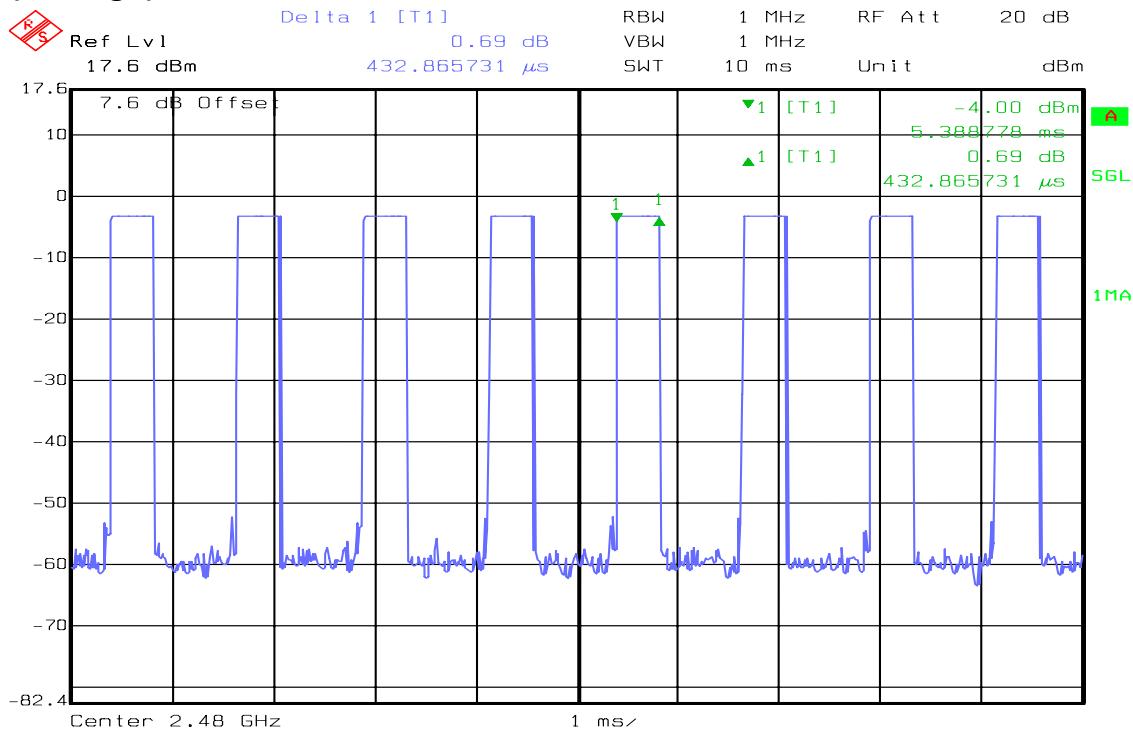
(CH Mid)



Date: 20.JUL.2012 15:45:55



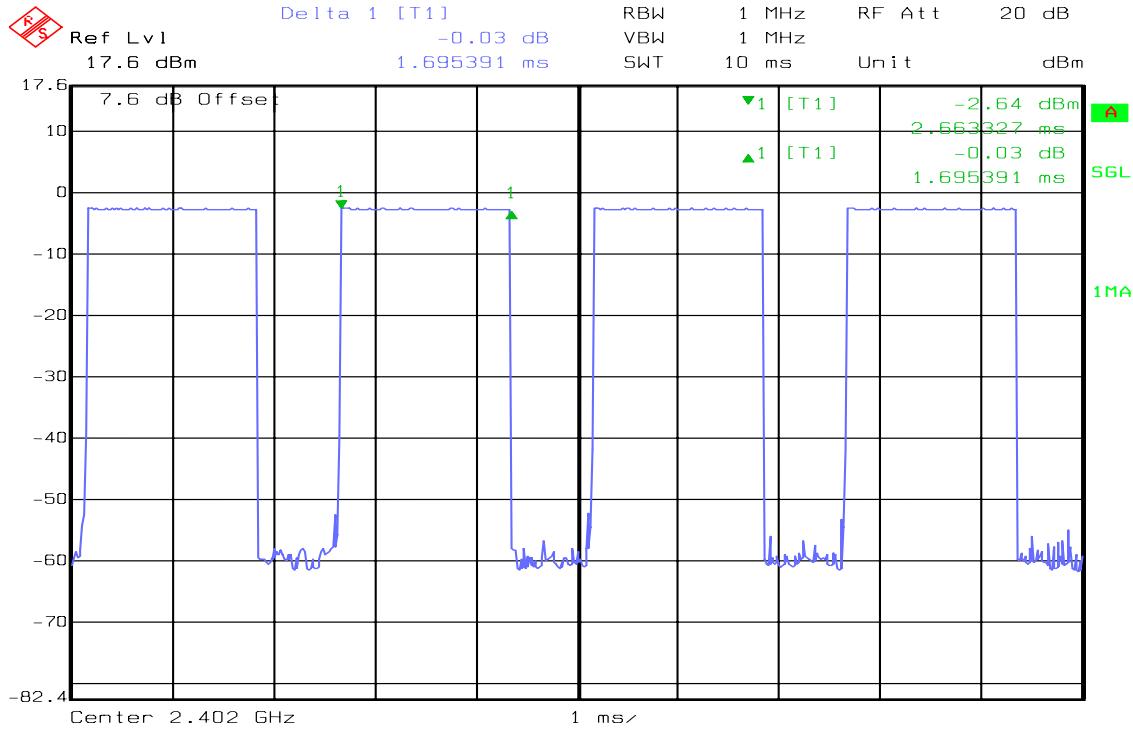
(CH High)



Date: 20.JUL.2012 15:47:26

DH 3

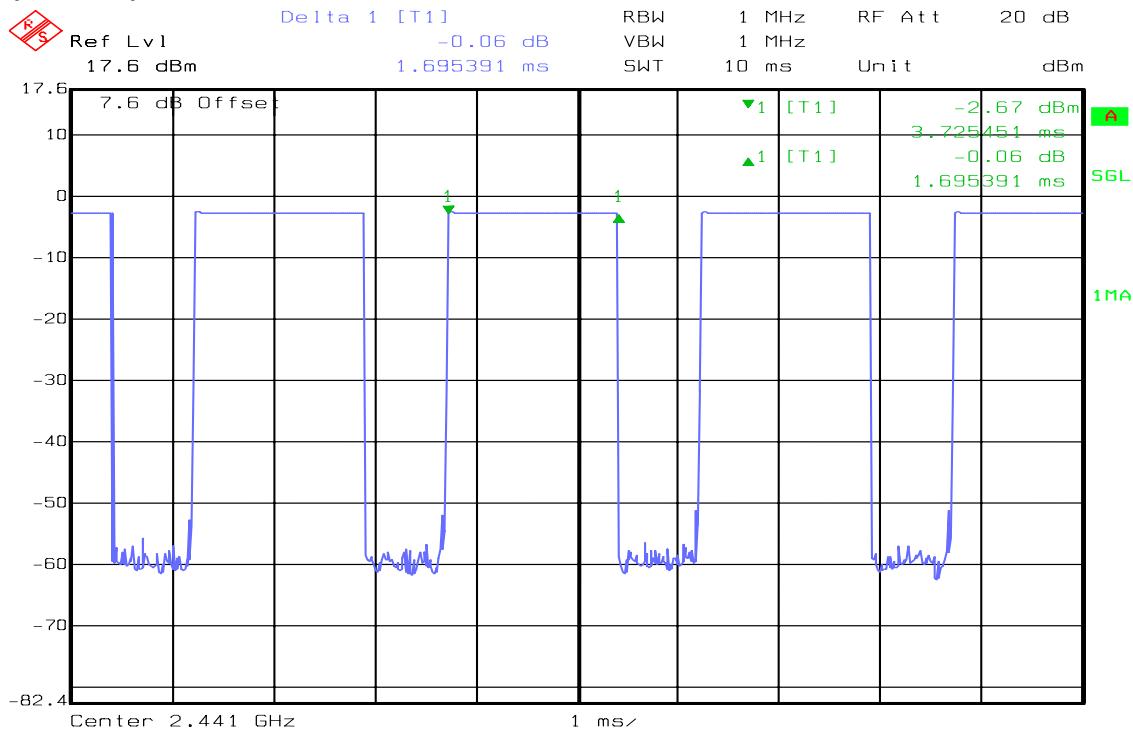
(CH Low)



Date: 20.JUL.2012 15:51:21

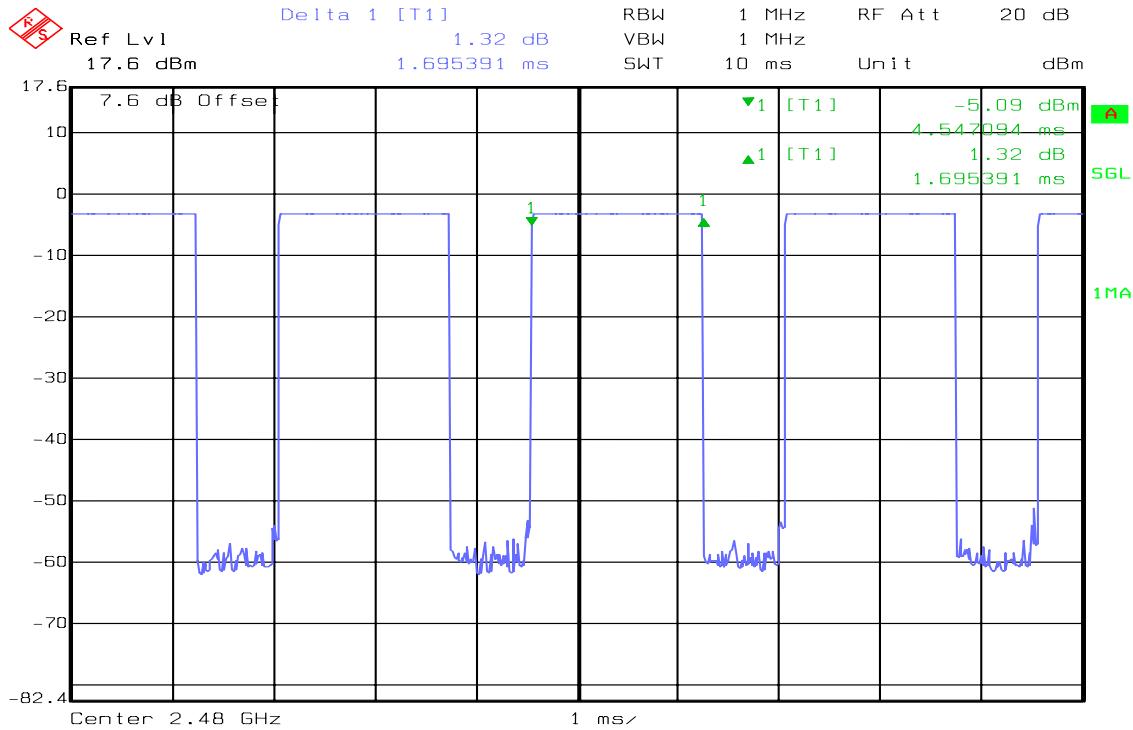


(CH Mid)



Date: 20.JUL.2012 15:50:17

(CH High)

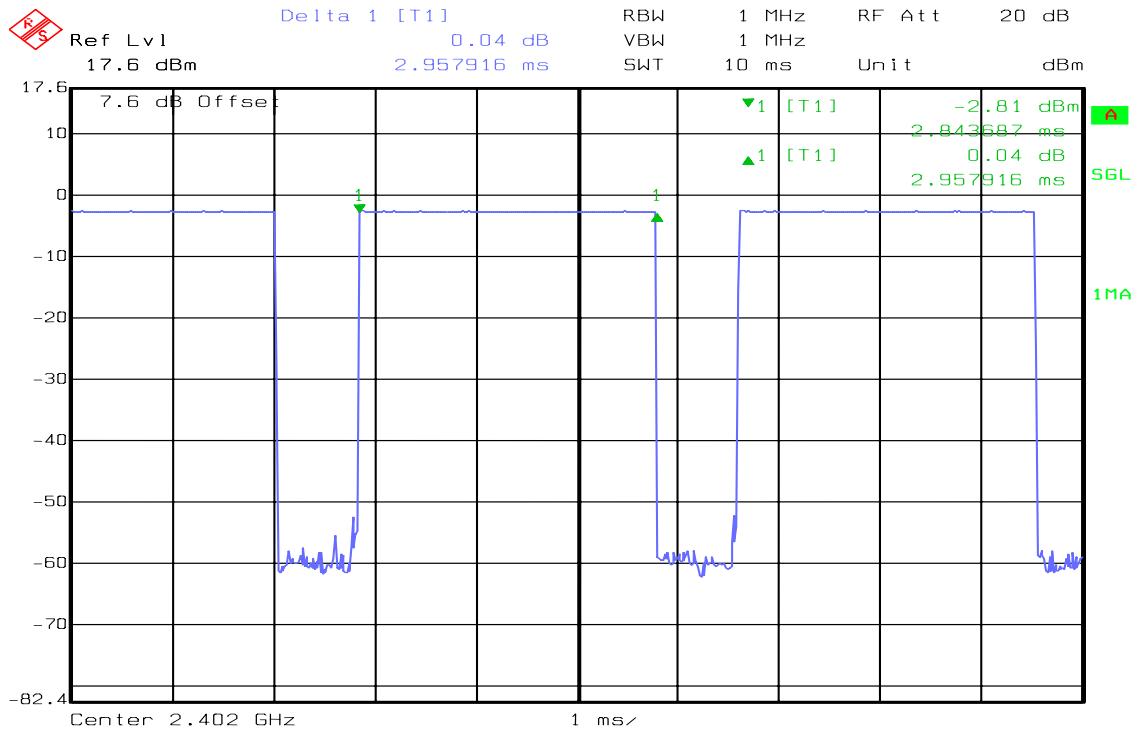


Date: 20.JUL.2012 15:48:37



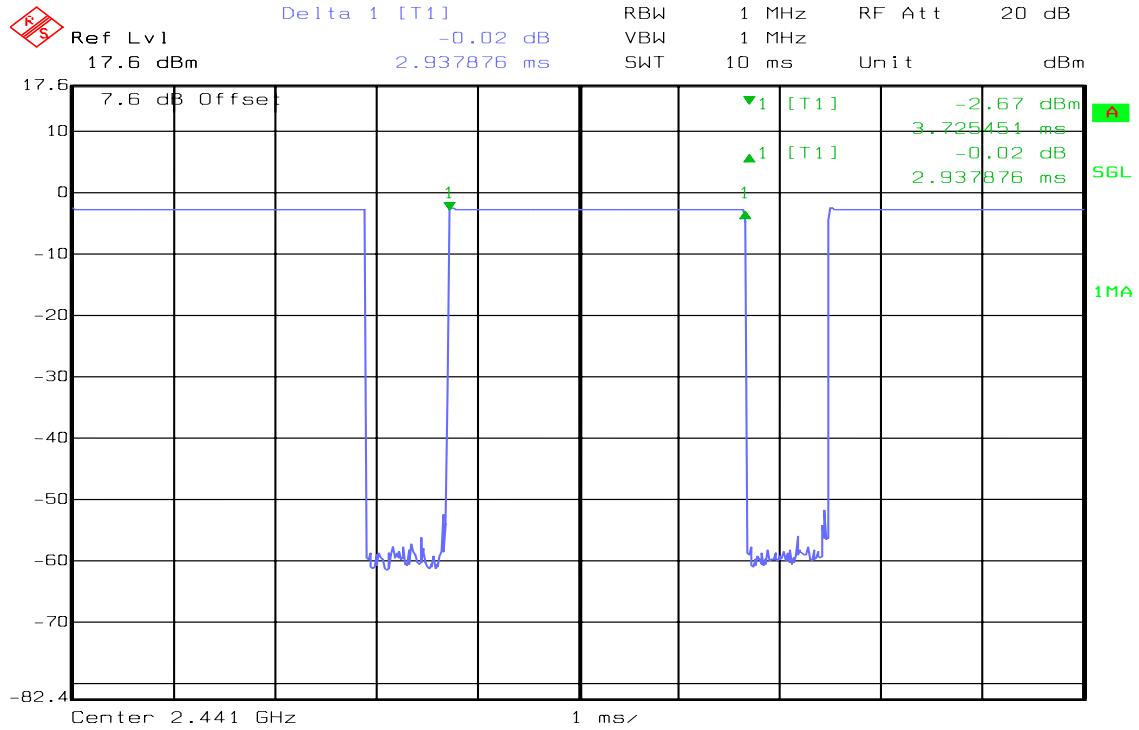
DH 5

(CH Low)



Date: 20.JUL.2012 15:52:46

(CH Mid)



Date: 20.JUL.2012 15:58:30



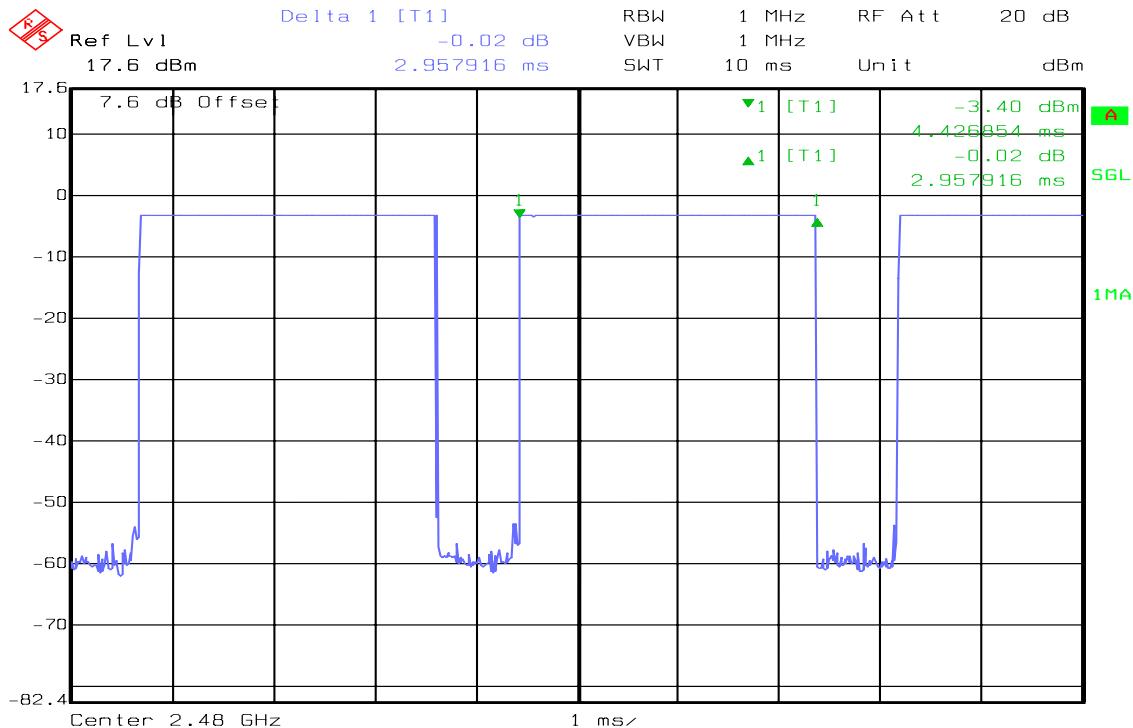
Compliance Certification Services Inc.

Report No: T120702D02-RP1

FCC ID: P4PBT523

Date of Issue: July 23, 2012

(CH High)



Date: 20.JUL.2012 16:00:16



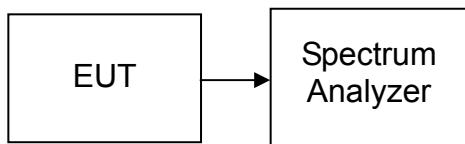
7.8. SPURIOUS EMISSIONS

7.8.1 Conducted Measurement

LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted

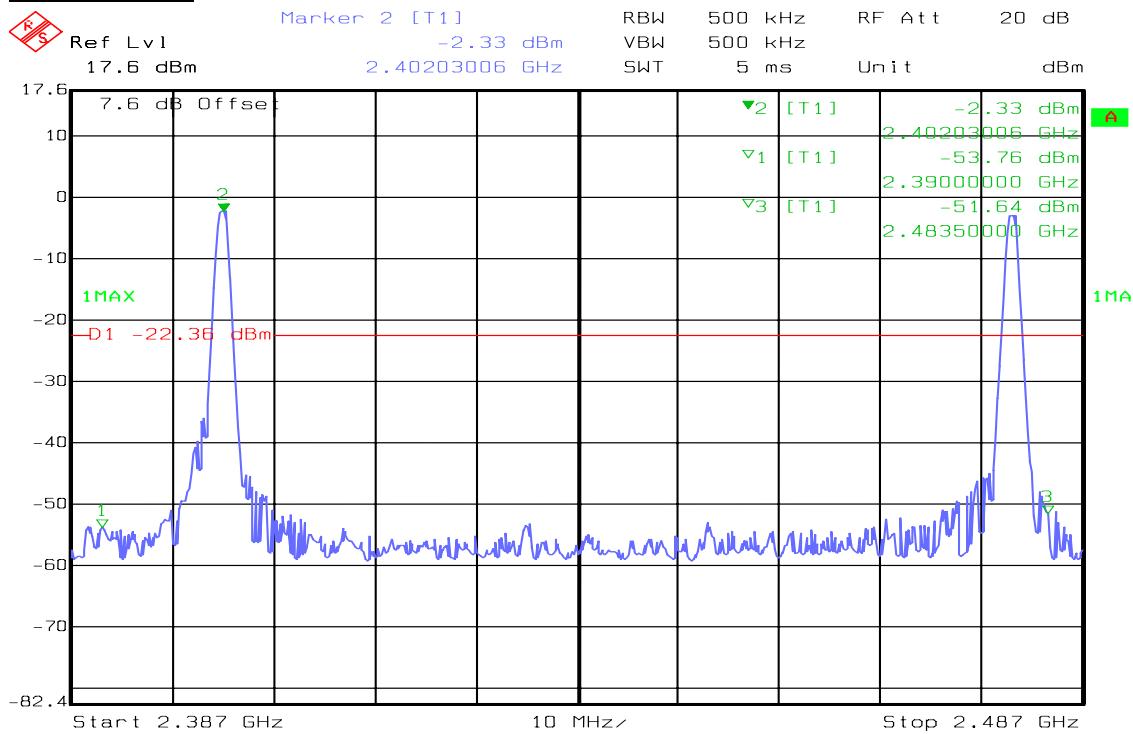
TEST DATA

Refer to attach spectrum analyzer data chart.



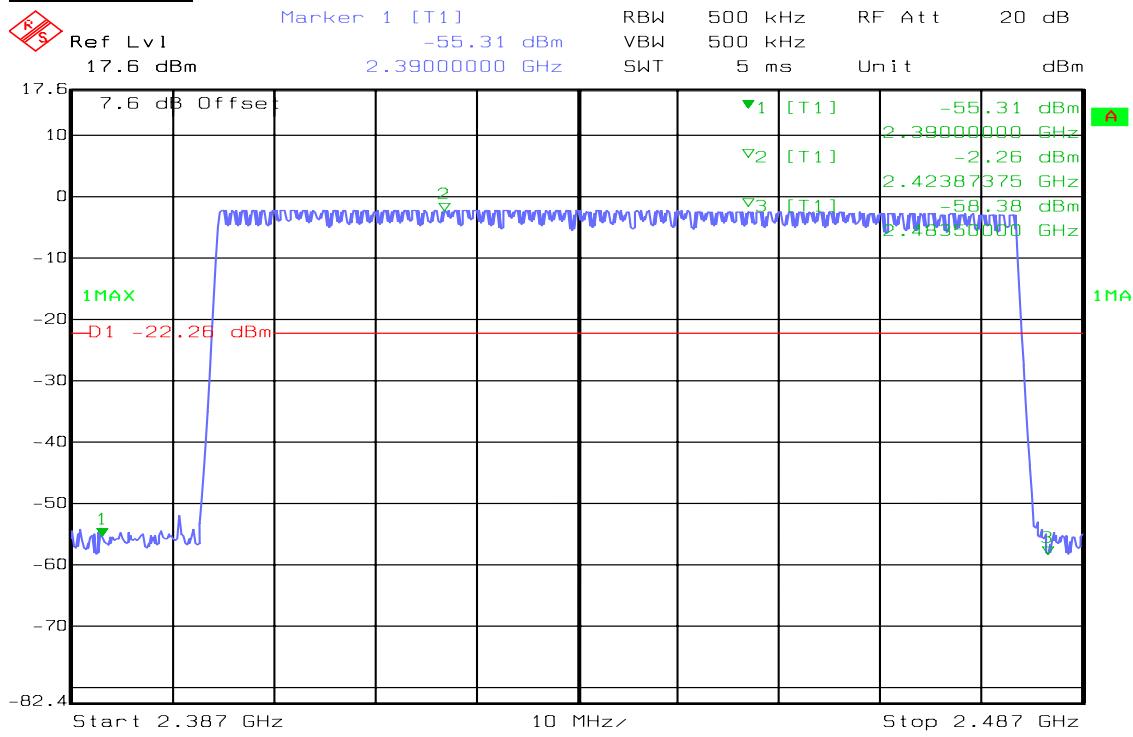
Test Plot

Hopping Off



Date: 20.JUL.2012 15:01:50

Hopping On

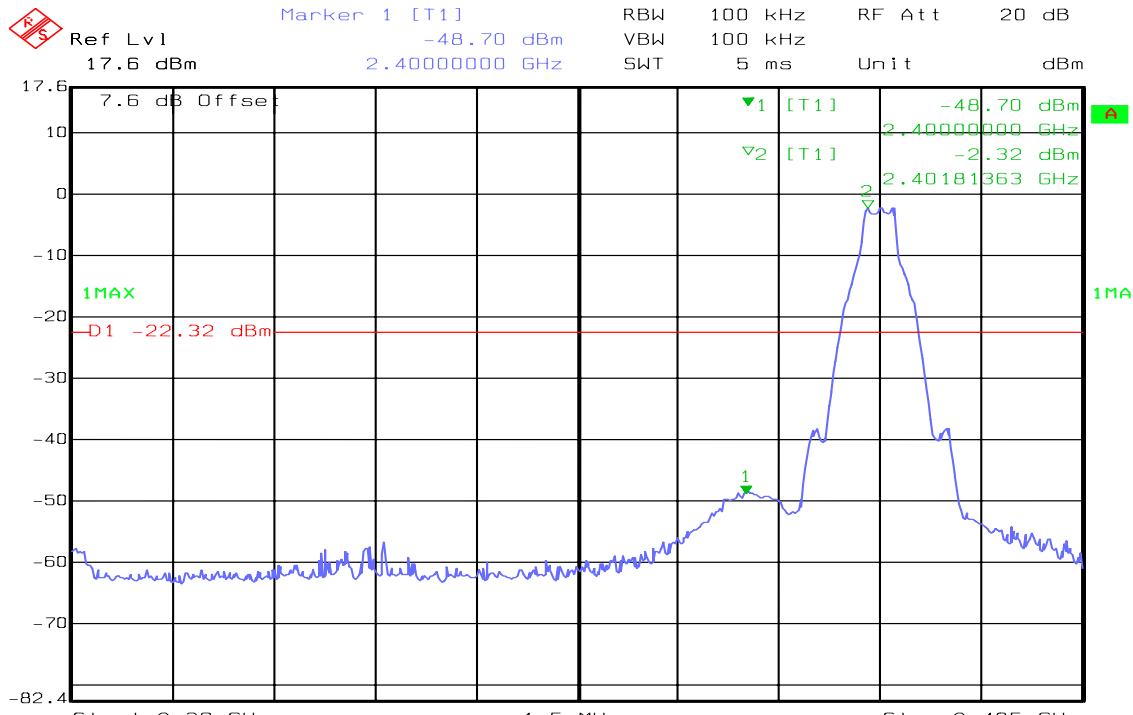


Date: 20.JUL.2012 15:00:18

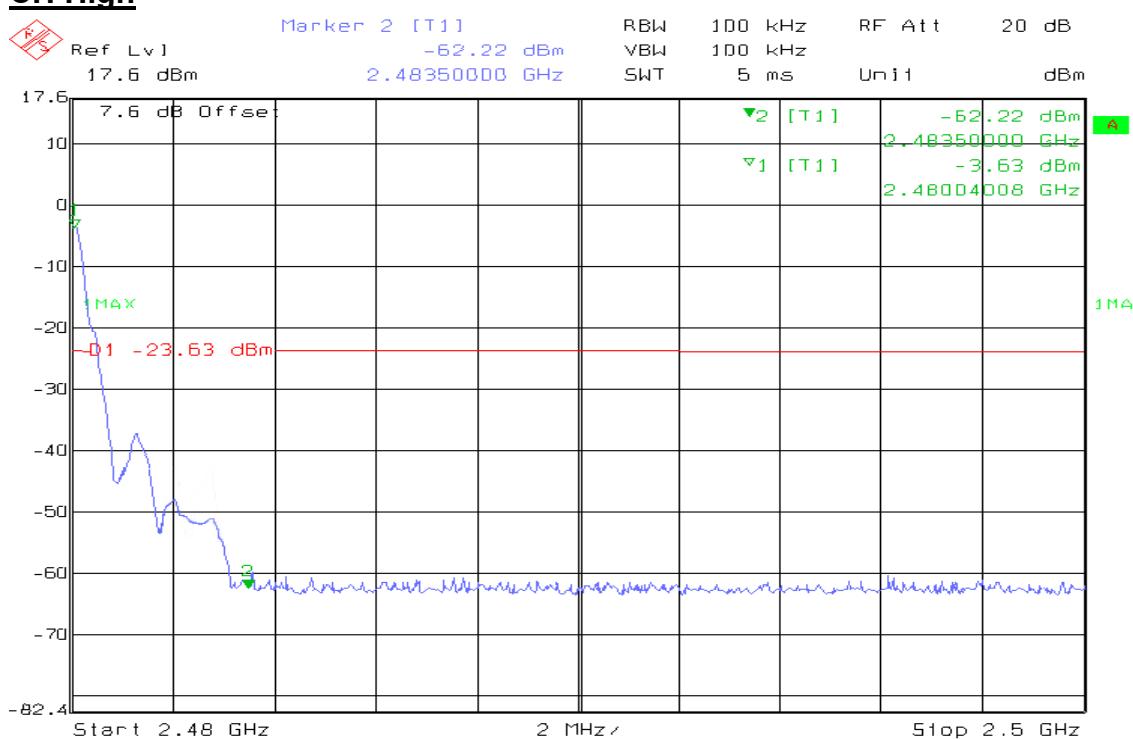


Conducted Band-edge

CH Low



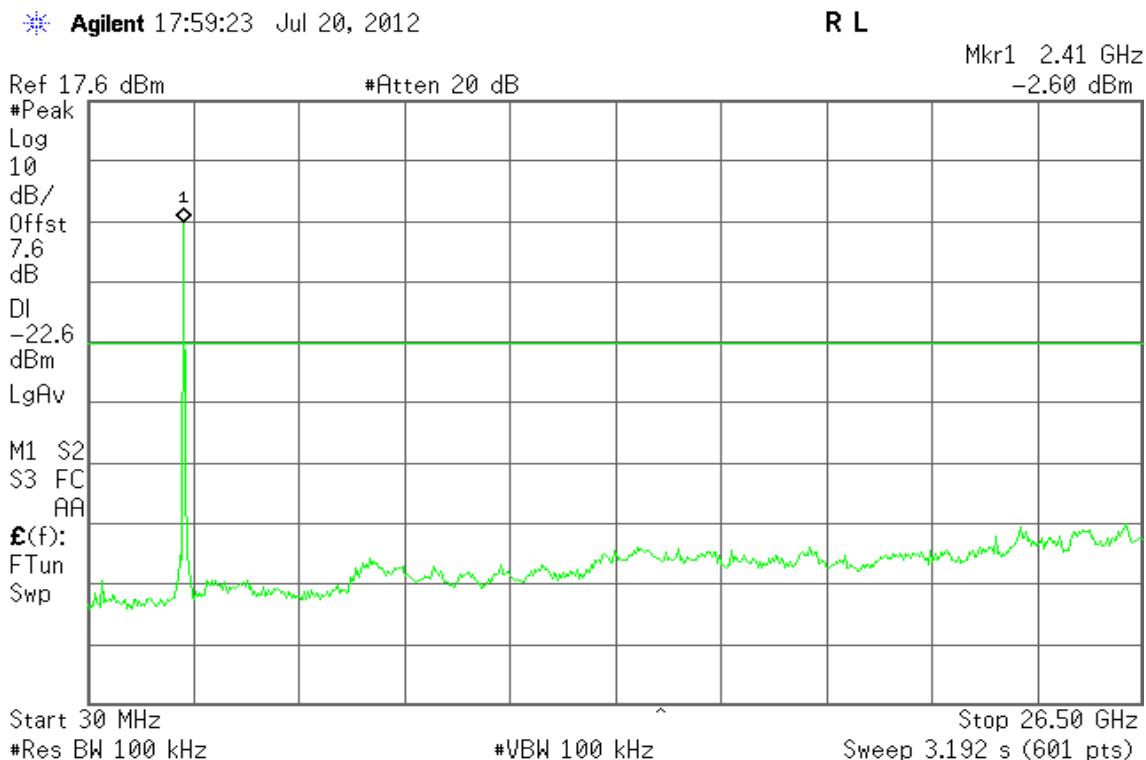
CH High



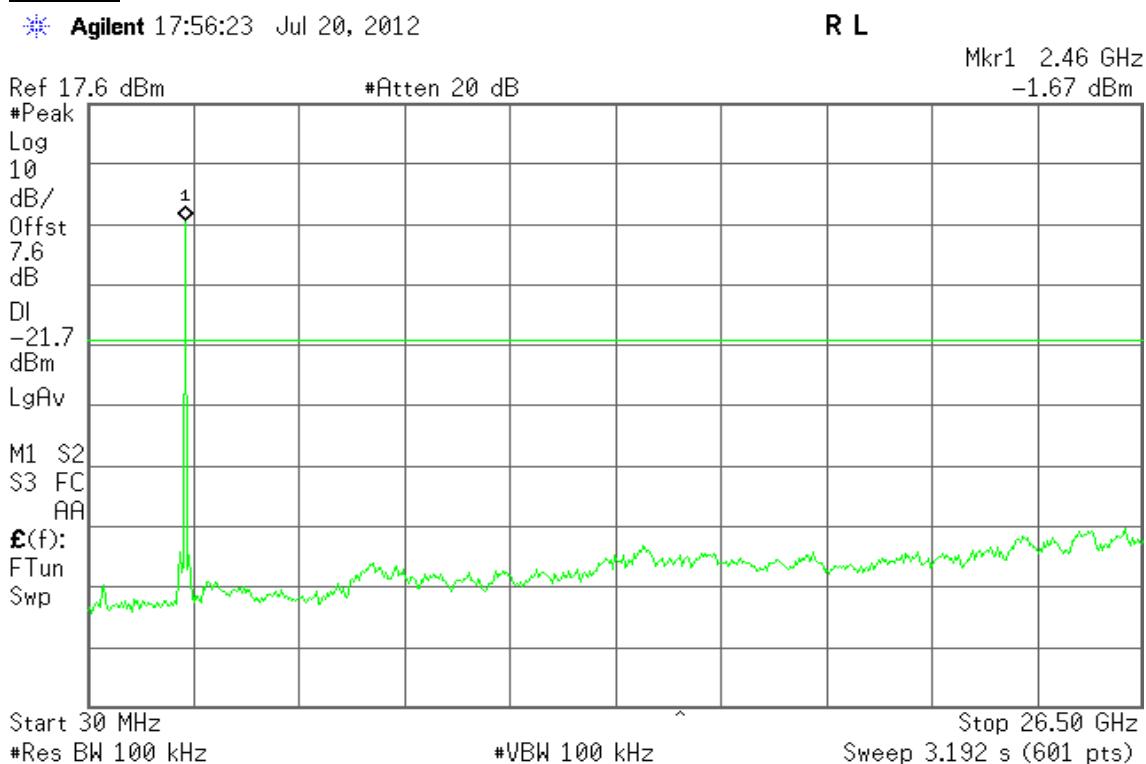


SPURIOUS EMISSIONS

CH Low



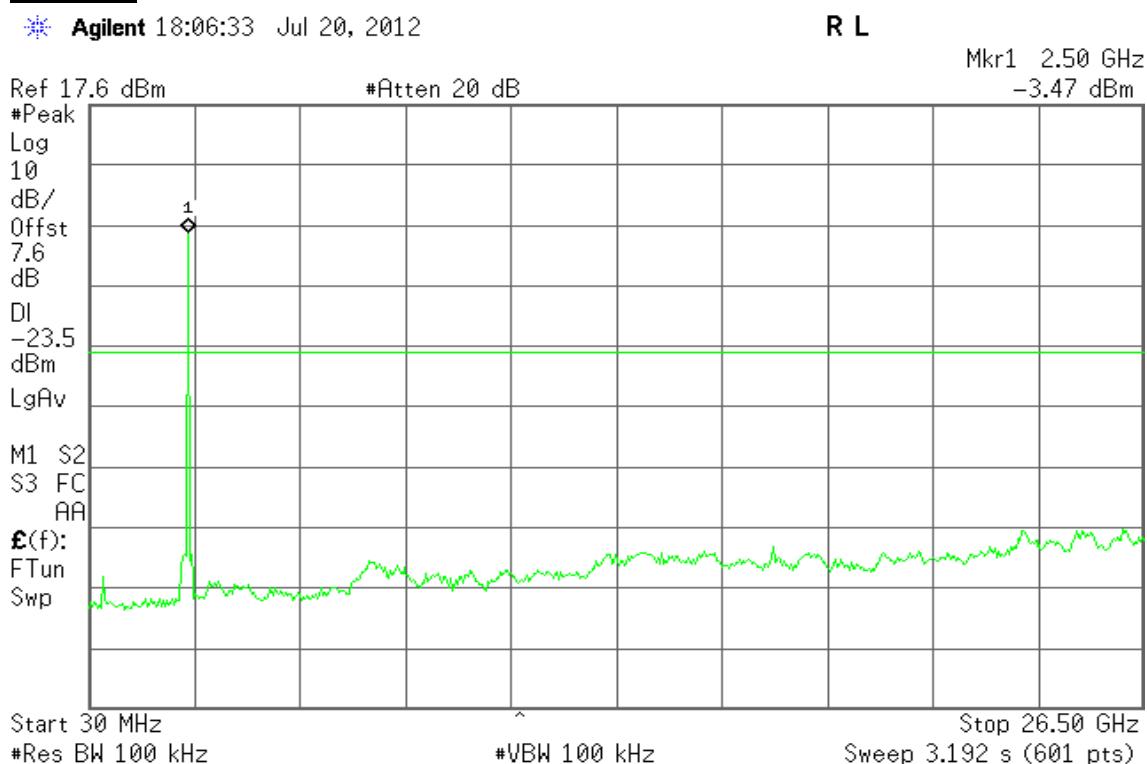
CH Mid





CH High

* Agilent 18:06:33 Jul 20, 2012





7.8.2 RADIATED EMISSIONS

LIMIT

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

| Frequency (MHz) | Field Strength (μ V/m) | Measurement Distance (m) |
|-----------------|-----------------------------|--------------------------|
| 30-88 | 100* | 3 |
| 88-216 | 150* | 3 |
| 216-960 | 200* | 3 |
| Above 960 | 500 | 3 |

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

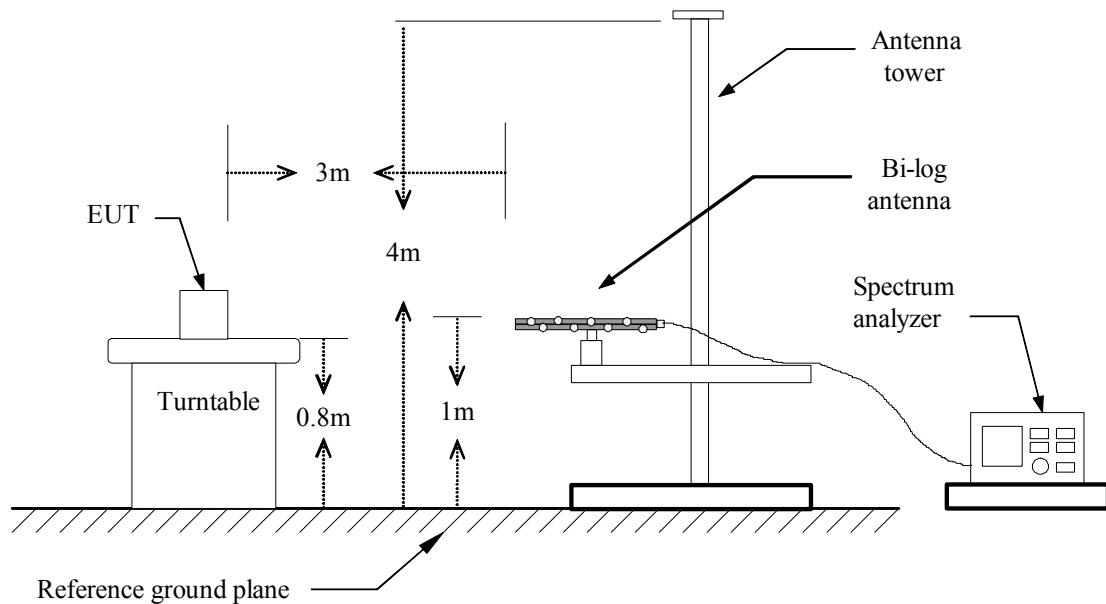
- In the emission table above, the tighter limit applies at the band edges.

| Frequency (Hz) | Field Strength (μ V/m at 3-meter) | Field Strength (dB μ V/m at 3-meter) |
|----------------|--|--|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

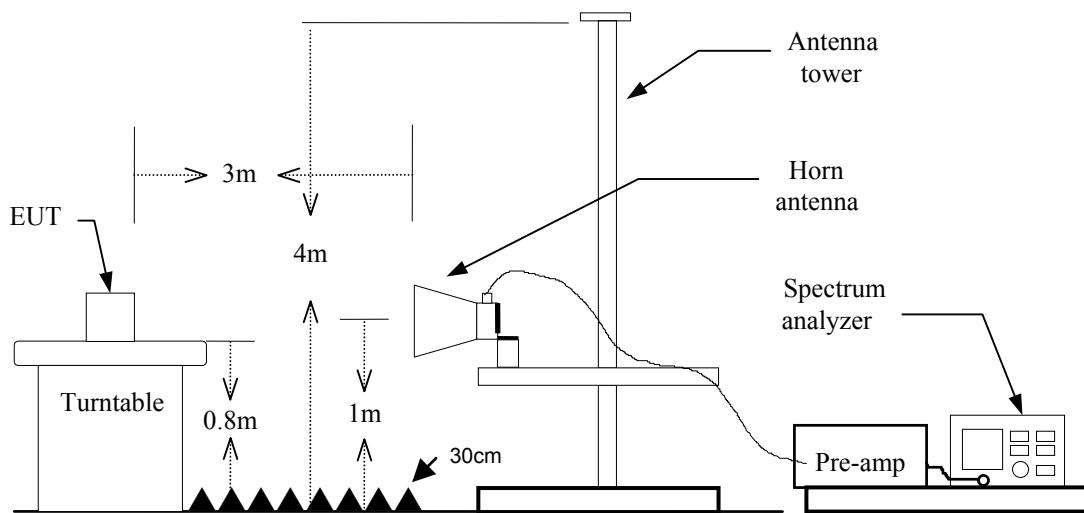


TEST CONFIGURATION

Below 1 GHz



Above 1 GHz





TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
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. Set the spectrum analyzer in the following setting as:

Below 30MHz

RBW=9kHz / VBW=300kHz / Sweep=AUTO

30 ~ 1000MHz:

RBW=120kHz / VBW=3MHz / Sweep=AUTO

Above 1GHz:

(a)PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b)AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

No non-compliance noted



TEST DATA

Below 1 GHz

Operation Mode: Transmitting **Test Date:** July 22, 2012

Temperature: 26°C **Tested by:** Clark Su

Humidity: 56 % RH **Polarity:** Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol. (H/V) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|-----------------|--------|
| 35.8200 | 47.18 | -13.79 | 33.39 | 40.00 | -6.61 | V | QP |
| 299.6600 | 37.89 | -8.88 | 29.01 | 46.00 | -16.99 | V | QP |
| 459.7100 | 37.48 | -7.17 | 30.31 | 46.00 | -15.69 | V | QP |
| 540.2200 | 36.03 | -6.07 | 29.96 | 46.00 | -16.04 | V | QP |
| 760.4100 | 35.91 | -1.96 | 33.95 | 46.00 | -12.05 | V | QP |
| 942.7700 | 33.88 | 0.69 | 34.57 | 46.00 | -11.43 | V | QP |
| 35.8200 | 46.61 | -13.79 | 32.82 | 40.00 | -7.18 | H | QP |
| 299.6600 | 38.15 | -8.88 | 29.27 | 46.00 | -16.73 | H | QP |
| 320.0300 | 35.98 | -9.47 | 26.51 | 46.00 | -19.49 | H | QP |
| 459.7100 | 36.92 | -7.17 | 29.75 | 46.00 | -16.25 | H | QP |
| 760.4100 | 35.52 | -1.96 | 33.56 | 46.00 | -12.44 | H | QP |
| 942.7700 | 34.11 | 0.69 | 34.80 | 46.00 | -11.20 | H | QP |

Remark:

1. No emission found between lowest internal used / generated frequency to 30 MHz. (9kHz ~ 30MHz)
2. Measuring frequencies from 30 MHz to the 1GHz.
3. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
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. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Compliance Certification Services Inc.

Report No: T120702D02-RP1

FCC ID: P4PBT523

Date of Issue: July 23, 2012

Above 1 GHz

Operation Mode: TX / CH Low

Test Date: July 19, 2012

Temperature: 26°C

Tested by: Clark Su

Humidity: 56% RH

Polarity: Ver. / Hor.

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|----------------|-------------------|-----------------------------|--------------------|-------------------|----------------|-----------------|--------|
| 1520.000 | 51.30 | -5.17 | 46.13 | 74.00 | -27.87 | V | Peak |
| 1984.000 | 48.80 | -1.55 | 47.25 | 74.00 | -26.75 | V | Peak |
| 2702.000 | 48.20 | -1.48 | 46.72 | 74.00 | -27.28 | V | Peak |
| 4805.000 | 41.76 | 2.23 | 43.99 | 74.00 | -30.01 | V | Peak |
| 7205.000 | 42.87 | 10.08 | 52.95 | 74.00 | -21.05 | V | Peak |
| 7205.000 | 32.10 | 10.08 | 42.18 | 54.00 | -11.82 | V | AVG |
| N/A | | | | | | | |
| | | | | | | | |
| 1422.000 | 50.65 | -7.36 | 43.29 | 74.00 | -30.71 | H | Peak |
| 2186.000 | 49.42 | -3.59 | 45.83 | 74.00 | -28.17 | H | Peak |
| 2840.000 | 47.98 | -2.18 | 45.80 | 74.00 | -28.20 | H | Peak |
| N/A | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
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. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Compliance Certification Services Inc.

Report No: T120702D02-RP1

FCC ID: P4PBT523

Date of Issue: July 23, 2012

Operation Mode: TX / CH Mid

Test Date: July 19, 2012

Temperature: 26°C

Tested by: Clark Su

Humidity: 56% RH

Polarity: Ver. / Hor.

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|----------------|-------------------|-----------------------------|--------------------|-------------------|----------------|-----------------|--------|
| 1600.000 | 49.92 | -4.79 | 45.13 | 74.00 | -28.87 | V | Peak |
| 2002.000 | 48.68 | -1.35 | 47.33 | 74.00 | -26.67 | V | Peak |
| 2908.000 | 47.76 | -0.71 | 47.05 | 74.00 | -26.95 | V | Peak |
| N/A | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 1852.000 | 50.31 | -6.26 | 44.05 | 74.00 | -29.95 | H | Peak |
| 2780.000 | 48.99 | -2.66 | 46.33 | 74.00 | -27.67 | H | Peak |
| 4880.000 | 42.49 | 6.81 | 49.30 | 74.00 | -24.70 | H | Peak |
| 7325.000 | 42.81 | 11.69 | 54.50 | 74.00 | -19.50 | H | Peak |
| 7325.000 | 34.80 | 11.69 | 46.49 | 54.00 | -7.51 | H | AVG |
| N/A | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
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. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Compliance Certification Services Inc.

Report No: T120702D02-RP1

FCC ID: P4PBT523

Date of Issue: July 23, 2012

Operation Mode: TX / CH High

Test Date: July 19, 2012

Temperature: 26°C

Tested by: Clark Su

Humidity: 56% RH

Polarity: Ver. / Hor.

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|----------------|-------------------|-----------------------------|--------------------|-------------------|----------------|-----------------|--------|
| 2010.000 | 49.14 | -1.53 | 47.61 | 74.00 | -26.39 | V | Peak |
| 2280.000 | 50.18 | -1.51 | 48.67 | 74.00 | -25.33 | V | Peak |
| 2670.000 | 48.99 | -1.68 | 47.31 | 74.00 | -26.69 | V | Peak |
| N/A | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 1360.000 | 51.84 | -7.93 | 43.91 | 74.00 | -30.09 | H | Peak |
| 2154.000 | 49.50 | -3.66 | 45.84 | 74.00 | -28.16 | H | Peak |
| 2874.000 | 50.16 | -1.93 | 48.23 | 74.00 | -25.77 | H | Peak |
| 4960.000 | 41.32 | 7.41 | 48.73 | 74.00 | -25.27 | H | Peak |
| 7440.000 | 42.77 | 11.14 | 53.91 | 74.00 | -20.09 | H | Peak |
| 7440.000 | 31.30 | 11.14 | 42.44 | 54.00 | -11.56 | H | AVG |
| N/A | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
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. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



7.9. POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

| Frequency Range (MHz) | Limits (dB μ V) | |
|-----------------------|---------------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

TEST CONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

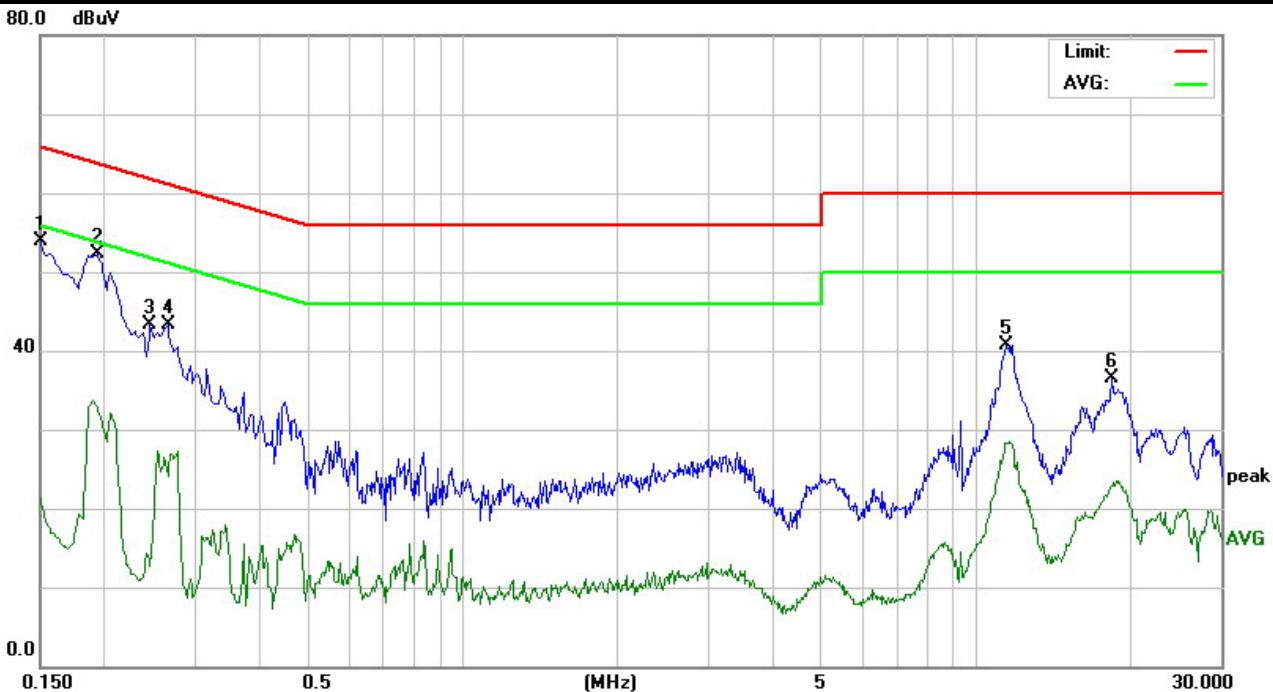
TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.



TEST DATA

| | | | |
|---------------------------------|--------------|----------------------|--------------|
| Test Mode | Charging | 6dB Bandwidth | 9 kHz |
| Environmental Conditions | 22°C, 55% RH | Test Date: | July 2, 2012 |
| Tested By | Frank Liao | Line | L1 |



| No. | Frequency | Reading | Factor | Result | Limit | Margin | Detector | Remark |
|-----|-----------|---------|--------|--------|--------|--------|----------|--------|
| | (MHz) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dB) | | |
| 1 | 0.1500 | 43.80 | 10.07 | 53.87 | 65.99 | -12.12 | peak | |
| 2 | 0.1940 | 42.28 | 10.02 | 52.30 | 63.86 | -11.56 | peak | |
| 3 | 0.2460 | 33.26 | 10.01 | 43.27 | 61.89 | -18.62 | peak | |
| 4 | 0.2660 | 33.28 | 10.02 | 43.30 | 61.24 | -17.94 | peak | |
| 5 | 11.4740 | 30.10 | 10.57 | 40.67 | 60.00 | -19.33 | peak | |
| 6 | 18.4100 | 25.64 | 10.79 | 36.43 | 60.00 | -23.57 | peak | |

REMARKS: L1 = Line One (Live Line)



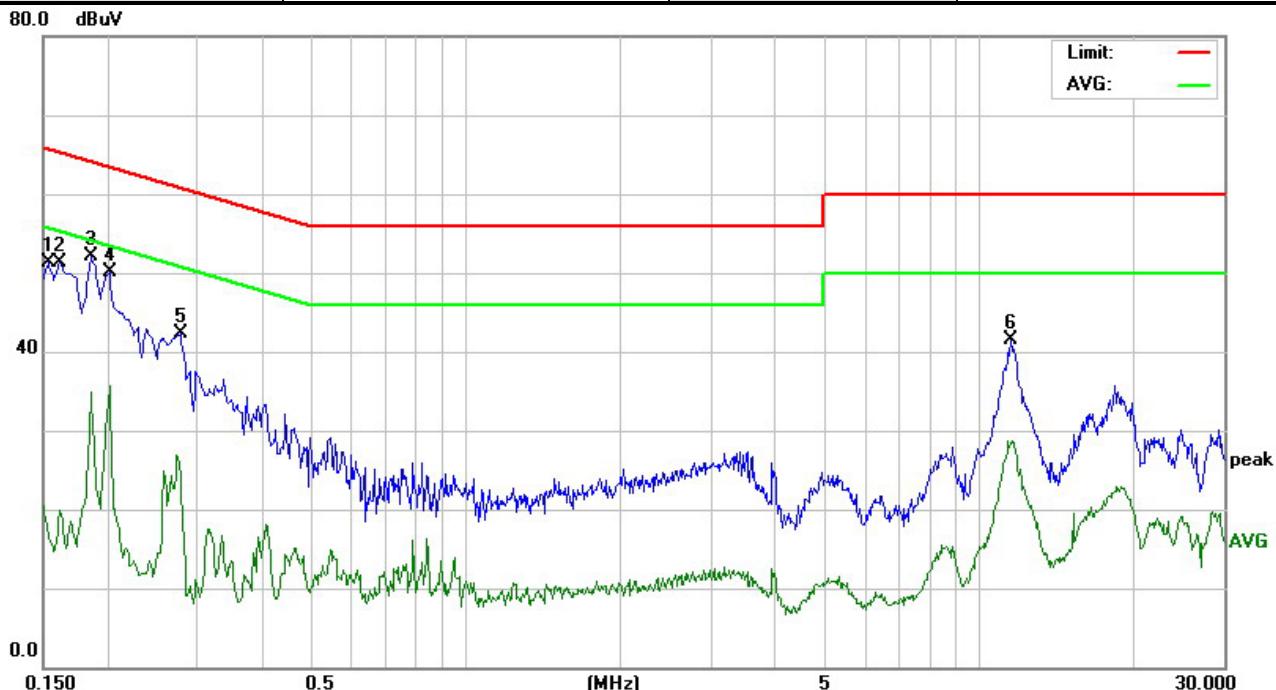
Compliance Certification Services Inc.

Report No: T120702D02-RP1

FCC ID: P4PBT523

Date of Issue: July 23, 2012

| | | | |
|---------------------------------|--------------|----------------------|--------------|
| Test Mode | Charging | 6dB Bandwidth | 9 kHz |
| Environmental Conditions | 22°C, 55% RH | Test Date: | July 2, 2012 |
| Tested By | Frank Liao | Line | L2 |



| No. | Frequency | Reading | Factor | Result | Limit | Margin | Detector | Remark |
|-----|-----------|---------|--------|--------|--------|--------|----------|--------|
| | (MHz) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dB) | | |
| 1 | 0.1539 | 41.24 | 10.07 | 51.31 | 65.78 | -14.47 | peak | |
| 2 | 0.1620 | 41.31 | 10.06 | 51.37 | 65.36 | -13.99 | peak | |
| 3 | 0.1860 | 42.04 | 10.03 | 52.07 | 64.21 | -12.14 | peak | |
| 4 | 0.2020 | 40.02 | 10.01 | 50.03 | 63.52 | -13.49 | peak | |
| 5 | 0.2779 | 32.27 | 10.02 | 42.29 | 60.88 | -18.59 | peak | |
| 6 | 11.5500 | 30.90 | 10.55 | 41.45 | 60.00 | -18.55 | peak | |

REMARKS: L2 = Line Two (Neutral Line)