# FCC COMPLIANCE TEST REPORT

*Technical Statement of Conformity*

**in accordance with 47 CFR Part 15 Subpart C**

## The product

| | |
|---|---|
| **Equipment Under Test** | : *Bluetooth Headset* |
| **Model Number** | : *BTH-300* |
| **Product Series** | : *N/A* |
| **Report Number** | : *HA150540-RA* |
| **Issue Date** | : *11-Aug-2015* |
| **Test Result** | : *Compliance* |

*is produced by*

*Mobility Sound Technology Ltd.*

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**FCC Designation No.:** *TW1071*
**TAF Accreditation No.:** *1163*
**VCCI Registration No.:** *R-2156, C-2329, T-219*

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# Test Result Certification

| | | |
|---|---|---|
| **Applicant** | : | *Mobility Sound Technology Ltd.* |
| **Address of Applicant** | : | *5F, No. 100, Jian 1st Road, ZhongHe Dist., New Taipei City #235, Taiwan* |
| **Manufacturer** | : | *Mobility Sound Technology Ltd.* |
| **Address of Manufacturer** | : | *5F, No. 100, Jian 1st Road, ZhongHe Dist., New Taipei City #235, Taiwan* |
| **Trade Name** | : | *MobilitySound* |
| **Equipment Under Test** | : | *Bluetooth Headset* |
| **Model Number** | : | *BTH-300* |
| **Product Series** | : | *N/A* |
| **FCC ID** | : | *XTS-BTH-300* |
| **Filing Type** | : | *Certification* |
| **Sample Received Date** | : | *11-Aug-2015* |
| **Test Standard** | : | |

☒ *FCC Part 15 Subpart C §15.247*

**Deviations from standard test methods & any other specifications : NONE**

**Remark:**

1. *This report details the results of the test carried out on one sample.*
2. *The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in both ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.203, 15.207, 15.209, 15.247.*
3. *This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd.*

**Documented by:** *2015-08-11*

**Kay Wang/ ADM. Dept Staff**

**Tested by:** *2015-08-04*

**Eason Hsieh / ENG. Dept. Staff**

**Approved by:** **Date:** *2015-08-12*

**Peter Chin / Section Manager**

# Summary of Test Result

| | Test Item | Applicable Standard | Test Result |
|---|---|---|---|
| 1 | Antenna Requirement | FCC part 15 subpart C §203 | Compliance |
| 2 | Conducted limits | FCC part 15 subpart C §207 | Compliance |
| 3 | Radiated emission limits | FCC part 15 subpart C §209 | Compliance |
| 4 | 20 dB Bandwidth | FCC part 15 subpart C §247(a)(1) | Compliance |
| 5 | Hopping Frequency Separation | FCC part 15 subpart C §247(a)(1) | Compliance |
| 6 | Number of Hopping Channels | FCC part 15 subpart C §247(a)(1) | Compliance |
| 7 | Average Time of Occupancy | FCC part 15 subpart C §247(a)(1)(iii) | Compliance |
| 8 | Peak Output Power | FCC part 15 subpart C §247(b) | Compliance |
| 9 | 100kHz Bandwidth of Band Edges | FCC part 15 subpart C §247(d) | Compliance |
| 10 | Spurious RF Conducted Emissions | FCC part 15 subpart C §247(d) | Compliance |

# 1 General Description

## 1.1 Description of EUT

| | | |
|---|---|---|
| **Equipment Under Test** | : | *Bluetooth Headset* |
| **Model Number of EUT** | : | *BTH-300* |
| **Product Series** | : | *N/A* |
| **Power Supply** | : | *DC 5 V (through USB)* |
| **Frequency Range** | : | *2402~2480 MHz* |
| **Transmit Power** | : | *-7.79 dBm* |
| **Number of Channels** | : | *79 Channels* |
| **Carrier Frequency of Each Channel** | : | *00 2402 20 2422 40 2442 60 2462*<br>*01 2403 21 2423 41 2443 61 2463*<br>*02 2404 22 2424 42 2444 62 2464*<br>*03 2405 23 2425 43 2445 63 2465*<br>*04 2406 24 2426 44 2446 64 2466*<br>*05 2407 25 2427 45 2447 65 2467*<br>*06 2408 26 2428 46 2448 66 2468*<br>*07 2409 27 2429 47 2449 67 2469*<br>*08 2410 28 2430 48 2450 68 2470*<br>*09 2411 29 2431 49 2451 69 2471*<br>*10 2412 30 2432 50 2452 70 2472*<br>*11 2413 31 2433 51 2453 71 2473*<br>*12 2414 32 2434 52 2454 72 2474*<br>*13 2415 33 2435 53 2455 73 2475*<br>*14 2416 34 2436 54 2456 74 2476*<br>*15 2417 35 2437 55 2457 75 2477*<br>*16 2418 36 2438 56 2458 76 2478*<br>*17 2419 37 2439 57 2459 77 2479*<br>*18 2420 38 2440 58 2460 78 2480*<br>*19 2421 39 2441 59 2461 - -* |
| **Antenna Specification** | : | *Chip Antenna/ Gain: 2.5 dBi* |
| **Modulation Technique** | : | *Bluetooth 3.0*<br>*FHSS*<br>*Bluetooth : GFSK,*<br>*Bluetooth EDR : π/4-DQPSK, 8-DPSK* |
| **Transmit Data Rate** | : | *Bluetooth : 1Mbps*<br>*Bluetooth EDR : 2/3 Mbps* |

| | | |
|---|---|---|
| **Specification** | **:** | **Dimensions**：*65 mm (L) X 31 mm (W) X 12 mm (H)*<br>**Weight**：*25g*<br>**Function**：*The EUT is a Bluetooth Headset.*<br>**※For more detail specification, please refer to the User Manual.** |

## 1.2 Test Instruments

*HA1*

| Instrument Name | Manufacture Mode | Model Number | Serial Number | Last Cal. Date | Next Cal. Date |
|---|---|---|---|---|---|
| *RF Amplifier* | *AR* | *15S1G3* | *306578* | *11-AUG-2014* | *11-AUG-2015* |
| *EMI Receiver* | *R&S* | *ESCI* | *100615* | *03-MAR-2015* | *03-MAR-2016* |
| *Spectrum Analyzer* | *R&S* | *FSL6* | *100323* | *11-JUN-2015* | *11-JUN-2016* |
| *Spectrum Analyzer* | *Advantest* | *R3172* | *101202158* | *24-JUN-2015* | *24-JUN-2016* |
| *Preamplifier* | *WIRELESS* | *FPA-6592G* | *060009* | *09-JUL-2015* | *09-JUL-2016* |
| *Preamplifier* | *HD* | *HD17187* | *004* | *14-FEB-2015* | *14-FEB-2016* |
| *Bilog Antenna* | *TESEQ* | *CBL6111D* | *25769* | *03-MAR-2015* | *03-MAR-2016* |
| *Bilog Antenna* | *Schaffner* | *CBL6112B* | *2860* | *12-AUG-2014* | *12-AUG-2015* |
| *Double-Ridged Waveguide Horn* | *EMCO* | *3115* | *9912-5992* | *04-MAY-2015* | *04-MAY-2016* |
| *Temp. & Humidity Chamber* | *Giant Force* | *GTH-150-20-SP-AR* | *MMA0907-012* | *22-JUL-2015* | *22-JUL-2016* |
| *Horn Antenna (18-40GHz)* | *Com-Power* | *AH-840* | *101042* | *03-Jul-2015* | *03-Jul-2016* |
| *Microwave Preamplifier* | *Com-Power* | *PAM-840* | *461269* | *02-Jul-2015* | *02-Jul-2016* |
| *L.I.S.N.* | *Mess Tec* | *NNB-2/16Z* | *03/1006* | *24-Jan-2015* | *24-Jan-2016* |
| *L.I.S.N.* | *EMCIS* | *LN2-16* | *LN04023* | *01-Aug-2015* | *01-Aug-2016* |
| *WIDEBAND RADIO COMMUNICATION TESTER* | *ROHDE&SCHWARZ* | *CMW-500* | *141958* | *05-NOV-2014* | *05-NOV-2015* |

※ *The test equipments used are calibrated and can be traced to National ITRI and International Standards.*

## 1.3 Auxiliary Equipments

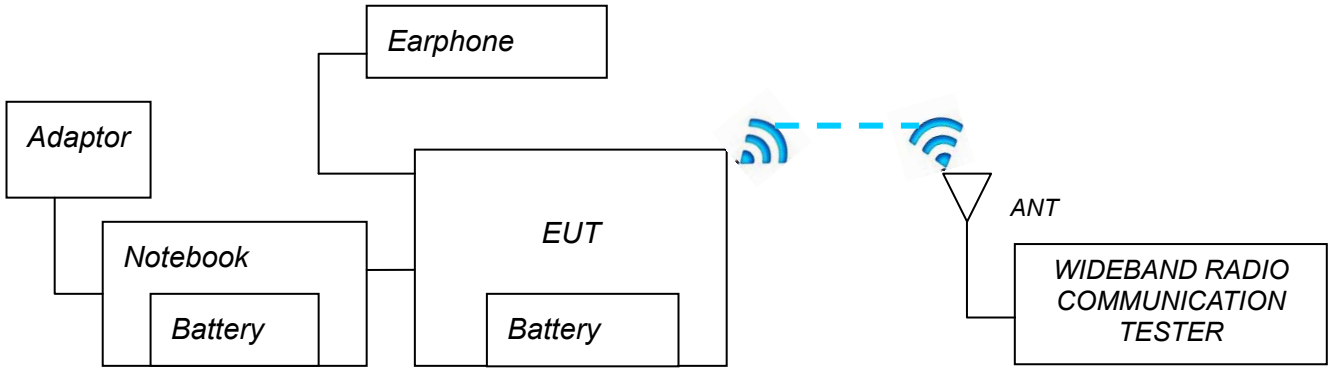
### 1.3.1. Provided by HongAn Technology Co., Ltd. for RF Test.

| No. | Equipment | Model No. | Serial No. | EMC Approved | Brand | Description | |
|---|---|---|---|---|---|---|---|
| | | | | | | Data Cable | Power Cable |
| 1 | Notebook | N61J | N61JV-021A520M | FCC DoC. | ASUS | Adapter to Notebook Unshielded*1.8 m | AC to Adapter Unshielded*1.8 m |

### 1.3.2. Provided by the Manufacturer

| No. | Equipment | Model No. | Serial No. | EMC Approved | Brand | Description | |
|---|---|---|---|---|---|---|---|
| | | | | | | Data Cable | Power Cable |
| | | | | | | | |

## 1.4 EUT SETUP




Note: Main Test Sample: BTH-300

## 1.5 Identifying the Final Test Mode

1. Mode 1: TX BT mode (1Mbps) CH 00.
2. Mode 2: TX BT mode (1Mbps) CH 39.
3. Mode 3: TX BT mode (1Mbps) CH 78.
4. Mode 4: TX BT mode (2Mbps) CH 00.
5. Mode 5: TX BT mode (2Mbps) CH 39.
6. Mode 6: TX BT mode (2Mbps) CH 78.Note
7. Mode 7: TX BT mode (3Mbps) CH 00.
8. Mode 8: TX BT mode (3Mbps) CH 39.
9. Mode 9: TX BT mode (3Mbps) CH 78.
10. Mode 10 : RX mode.

Note :

1. After pre-test, we identified that the TX (Packet type DH5 and X axis) was most likely to cause maximum disturbance. Therefore, the Final Assessment was performed for the worst case.
2. The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

3. *Channel Low (2402 MHz), Mid (2441 MHz) and High (2480 MHz) were chosen for full testing.*
4. *According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.*
5. *new dry batteries were used during all hereafter testing.*

## 1.6 Final Test Mode

*Conducted Emission: Mode 3.*
*Field Strength: All Mode.*
*Radiated Emission (30~1000 MHz): Mode 3.*
*Radiated Emission (1~26.5GHz): All Mode.*

## 1.7 Condition of Power Supply

*The EUT was connected to the Laptop through a Micro USB cable. The Laptop was powered by an adaptor, and the adaptor was connected to the public network.*

## 1.8 EUT Configuration

1. *Setup the EUT as shown in Sec.1.4 Block Diagram.*
2. *Turn on the power of all equipments.*
3. *Activate the selected Final Test Mode.*

## 1.9 Test Methodology

*The tests documented in this report were performed in accordance with ANSI C63.10 (2013) and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.203, 15.207, 15.209 and 15.247.*

## 1.10 General Test Procedures

**Conducted Emissions**

*The EUT is set according to the requirements in Section 6.2 of ANSI C63.10 (2013).*

**Radiated Emissions**

*The EUT is set according to the requirements in Section 6.3 of ANSI C63.10 (2013).*

## 1.11 Modification

*N/A*

## 1.12 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 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37635-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | ([2]) |
| 13.36-13.41 | | | |

[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.*

## 1.13 Qualification of Test Facility

| | | |
|---|---|---|
| **BSMI Certificate No.** | : | *SL2-IS-E-0023, SL2-IN-E-0023, SL2-R1-E-0023, SL2-R2-E-0023, SL2-A1-E-0023, SL2-L1-E-0023.* |
| **FCC Designation No.** | : | *TW1071* |
| **TAF Accreditation No.** | : | *1163* |
| **VCCI Certificate No.** | : | *R-2156, C-2329, T-219* |

# 2 Power line Conducted Emission Measurement

## 2.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 2.2 Test Arrangement and 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.*

## 2.3 Limit (§ 15.207)

*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 (MHz)* | *Limits (dBuV)* | |
|---|---|---|
| | *Q.P. (Quasi-Peak)* | *A.V. (Average)* |
| *0.15 to 0.50* | *66 to 56* | *56 to 46* |
| *0.50 to 5.0* | *56* | *46* |
| *5.0 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.*

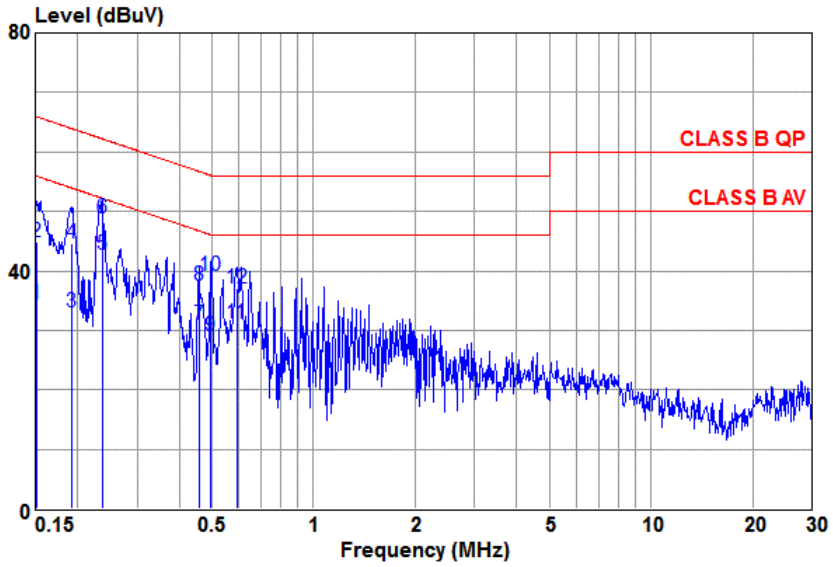
## 2.4 Test Result

**Compliance**

*The final test data are shown on the following page(s).*

## Power Line Conducted Emission Test Data

| | | | | | |
|---|---|---|---|---|---|
| *Test Date* | : | *2015-08-04* | *Power Line* | : | *Line* |
| *Temperature* | : | *25.9℃* | *Humidity* | : | *32%* |




| | | Freq | Reading | C.F | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | |
| 1 | | 0.151 | 34.46 | 0.12 | 34.58 | 55.96 | -21.38 | Average |
| 2 | | 0.151 | 44.78 | 0.12 | 44.90 | 65.96 | -21.06 | QP |
| 3 | | 0.191 | 32.94 | 0.10 | 33.04 | 53.98 | -20.94 | Average |
| 4 | | 0.191 | 44.53 | 0.10 | 44.63 | 63.98 | -19.35 | QP |
| 5 | * | 0.237 | 42.70 | 0.11 | 42.81 | 52.22 | -9.41 | Average |
| 6 | @ | 0.237 | 48.85 | 0.11 | 48.96 | 62.22 | -13.26 | QP |
| 7 | | 0.459 | 30.79 | 0.11 | 30.90 | 46.71 | -15.81 | Average |
| 8 | | 0.459 | 37.40 | 0.11 | 37.51 | 56.71 | -19.20 | QP |
| 9 | | 0.497 | 28.90 | 0.11 | 29.01 | 46.05 | -17.04 | Average |
| 10 | | 0.497 | 39.08 | 0.11 | 39.19 | 56.05 | -16.86 | QP |
| 11 | | 0.592 | 30.99 | 0.11 | 31.10 | 46.00 | -14.90 | Average |
| 12 | | 0.592 | 36.92 | 0.11 | 37.03 | 56.00 | -18.97 | QP |

Result = Reading + C.F ; C.F = LISN Factor + Cable Loss

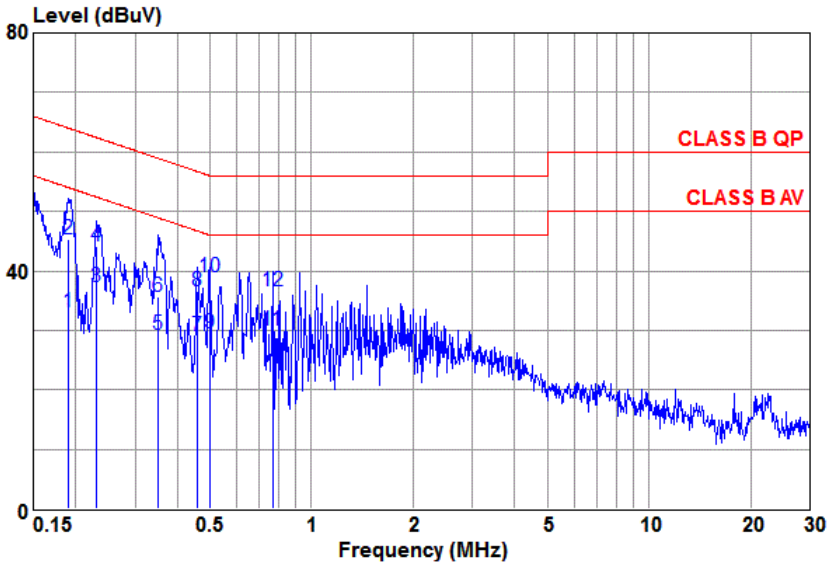
@ :Maximum QP * :Maximum AVG x :Over Limit

*Remark*：

1. *Measuring frequencies from 0.15 MHz to 30 MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30 MHz were made with an instrument using quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15 MHz to 30 MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15 MHz to 30 MHz was 9kHz.*

## Power Line Conducted Emission Test Data

| | | | | | |
|---|---|---|---|---|---|
| *Test Date* | : | *2015-08-04* | *Power Line* | : | *Neutral* |
| *Temperature* | : | *25.9℃* | *Humidity* | : | *32%* |




| | | Freq | Reading | C.F | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | |
| 1 | | 0.190 | 32.87 | 0.11 | 32.98 | 54.02 | -21.04 | Average |
| 2 | | 0.190 | 45.11 | 0.11 | 45.22 | 64.02 | -18.80 | QP |
| 3 | * | 0.232 | 37.28 | 0.12 | 37.40 | 52.39 | -14.99 | Average |
| 4 | | 0.232 | 44.07 | 0.12 | 44.19 | 62.39 | -18.20 | QP |
| 5 | | 0.350 | 29.18 | 0.11 | 29.29 | 48.96 | -19.67 | Average |
| 6 | | 0.350 | 35.62 | 0.11 | 35.73 | 58.96 | -23.23 | QP |
| 7 | | 0.459 | 29.00 | 0.11 | 29.11 | 46.71 | -17.60 | Average |
| 8 | | 0.459 | 36.53 | 0.11 | 36.64 | 56.71 | -20.07 | QP |
| 9 | | 0.499 | 29.48 | 0.12 | 29.60 | 46.01 | -16.41 | Average |
| 10 | @ | 0.499 | 38.77 | 0.12 | 38.89 | 56.01 | -17.12 | QP |
| 11 | | 0.767 | 29.82 | 0.14 | 29.96 | 46.00 | -16.04 | Average |
| 12 | | 0.767 | 36.49 | 0.14 | 36.63 | 56.00 | -19.37 | QP |

Result = Reading + C.F ; C.F = LISN Factor + Cable Loss

@ :Maximum QP * :Maximum AVG x :Over Limit

*Remark*：

1. *Measuring frequencies from 0.15 MHz to 30 MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30 MHz were made with an instrument using quasi-peak detector and average detector.*

*The IF bandwidth of SPA between 0.15 MHz to 30 MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15 MHz to 30 MHz was 9kHz.*

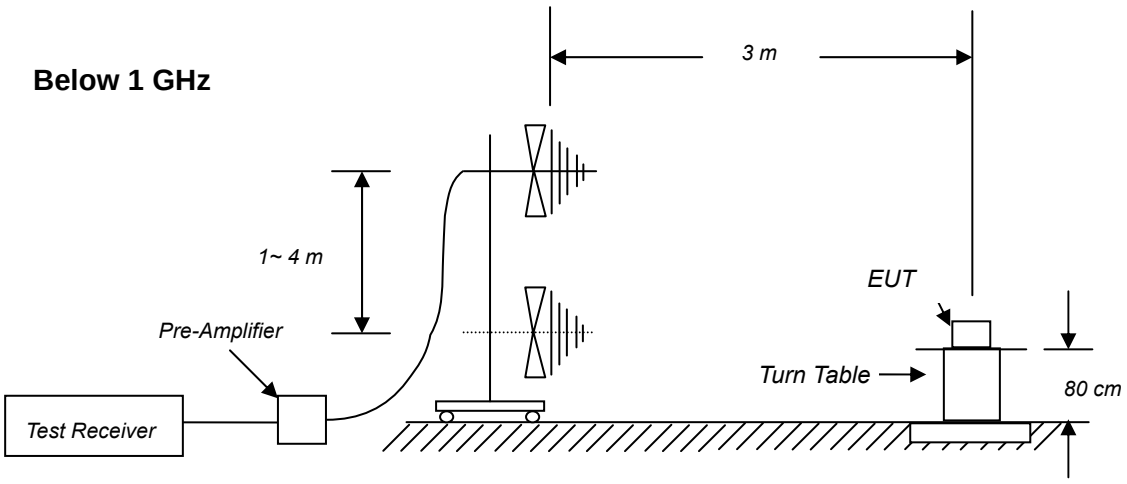
# 3 Radiated Emission Test

## 3.1 Test Instruments

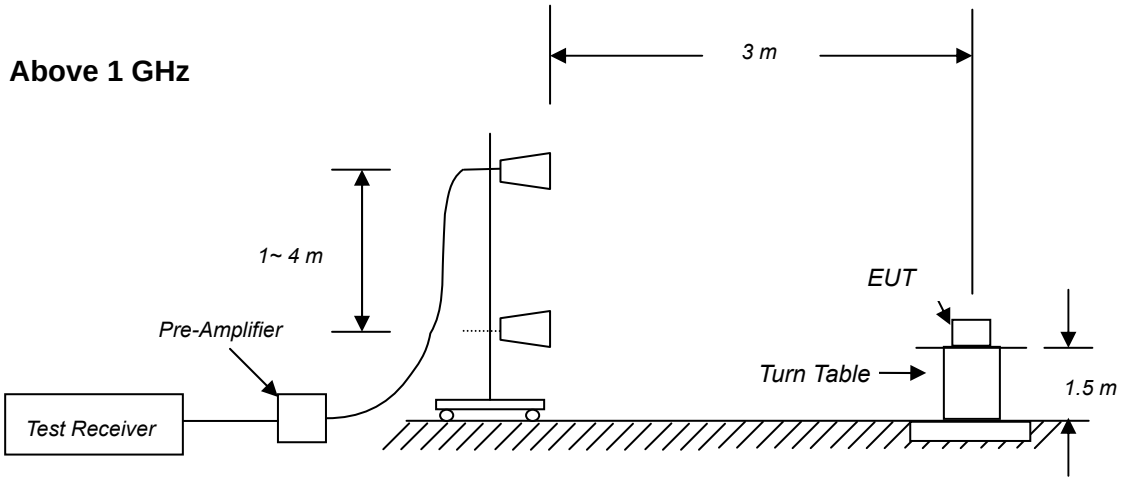
*Refer to Sec. 1.2 Test Instruments.*

## 3.2 Test Arrangement and Procedure

**Below 1 GHz**




**Above 1 GHz**




1. *The EUT is placed on a turntable, which is 0.8 m (below 1GHz) and 1.5m (above 1GHz) above ground plane.*
2. *The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.*
3. *EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.*
4. *Maxium 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:*
   *(a) Below 1 GHz: RBW =100 kHz/ VBW = 1 MHz/ Sweep = AUTO.*

(b) Above 1 GHz: Peak: RBW = VBW = 1MHz/ Sweep = AUTO; Average: RBW = 1MHz/ VBW = 10Hz/ Sweep = AUTO.

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

## 3.3 Limit (§ 15.205 & § 15.209)

*1.2.1. Limit of Restricted Band of Operation (§ 15.205)*

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

| Frequency Band | | | |
|---|---|---|---|
| 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 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | |
| 13.36-13.41 | | | |

*1.2.2. Limit of Spurious Emission (§ 15.209)*

*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 § 15.209, whichever is lesser attenuation.*

| *Frequency (MHz)* | *Field strength (microvolts/ meter)* | *Measurement distance (meters)* |
|---|---|---|
| *0.009-0.490* | *2400/F(kHz)* | *300* |
| *0.490-1.705* | *24000/F(kHz)* | *30* |
| *1.705-30.0* | *30* | *30* |
| *30-88* | *100*** | *3* |
| *88-216* | *150*** | *3* |
| *216-960* | *200*** | *3* |
| *Above 960* | *500* | *3* |

*** 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.§§ 15.231 and 15.241.*

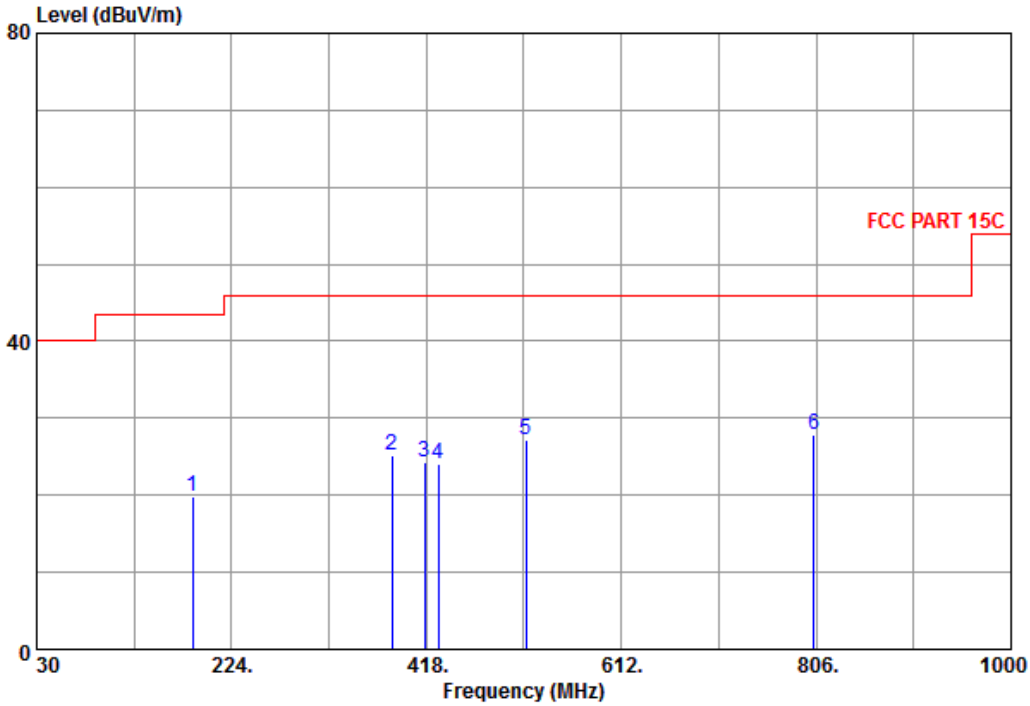
## 3.4 Test Result

**Compliance**

*The final test data are shown on the following page(s).*

## Radiated Emission Test Data (Below 1 GHz)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH78 (2480MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | 185.200 | 38.92 | -19.01 | 19.91 | 43.50 | -23.59 | --- | --- | |
| 2 | 384.050 | 40.79 | -15.57 | 25.22 | 46.00 | -20.78 | --- | --- | |
| 3 | 416.060 | 41.64 | -17.30 | 24.34 | 46.00 | -21.66 | --- | --- | |
| 4 | 429.640 | 41.75 | -17.63 | 24.12 | 46.00 | -21.88 | --- | --- | |
| 5 | 516.940 | 39.63 | -12.44 | 27.19 | 46.00 | -18.81 | --- | --- | |
| 6 | @ 804.060 | 34.22 | -6.44 | 27.78 | 46.00 | -18.22 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

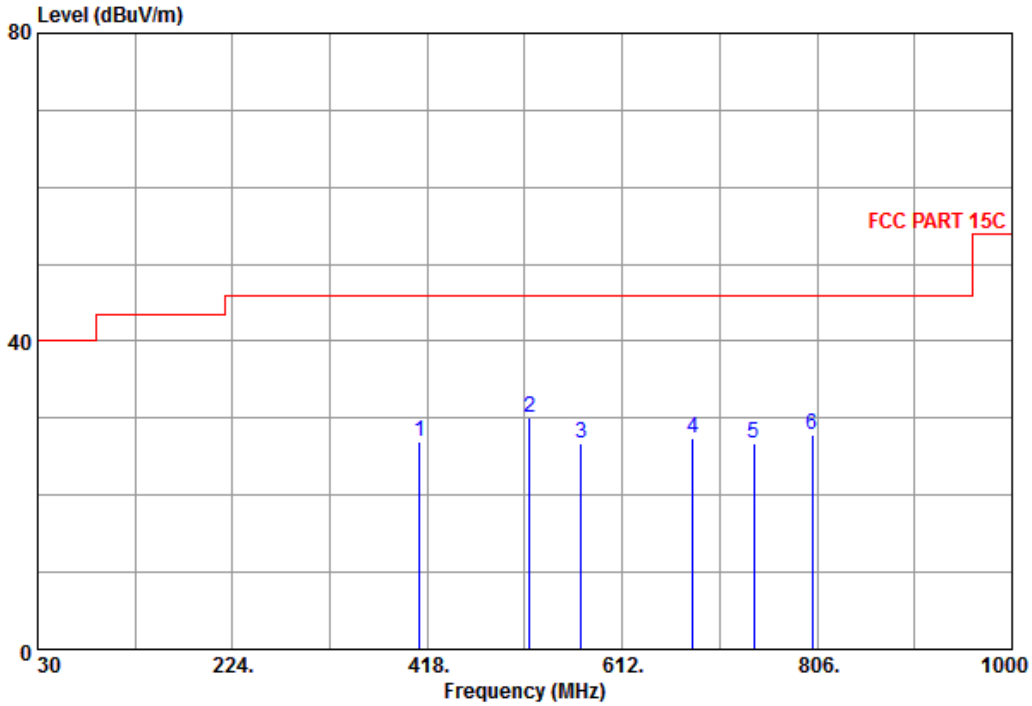
@ :Maximum Data x :Over Limit

*Remark*：

1. *Measuring frequencies from 30 MHz to 1 GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.*
3. *Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.*
4. *All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.*
5. *The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.*

## Radiated Emission Test Data (Below 1 GHz)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH78 (2480MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | 410.240 | 43.51 | -16.63 | 26.88 | 46.00 | -19.12 | --- | --- | |
| 2 @ | 519.850 | 42.54 | -12.40 | 30.14 | 46.00 | -15.86 | --- | --- | |
| 3 | 571.260 | 38.77 | -11.99 | 26.78 | 46.00 | -19.22 | --- | --- | |
| 4 | 681.840 | 36.37 | -8.88 | 27.49 | 46.00 | -18.51 | --- | --- | |
| 5 | 742.950 | 34.25 | -7.49 | 26.76 | 46.00 | -19.24 | --- | --- | |
| 6 | 801.150 | 34.40 | -6.53 | 27.87 | 46.00 | -18.13 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

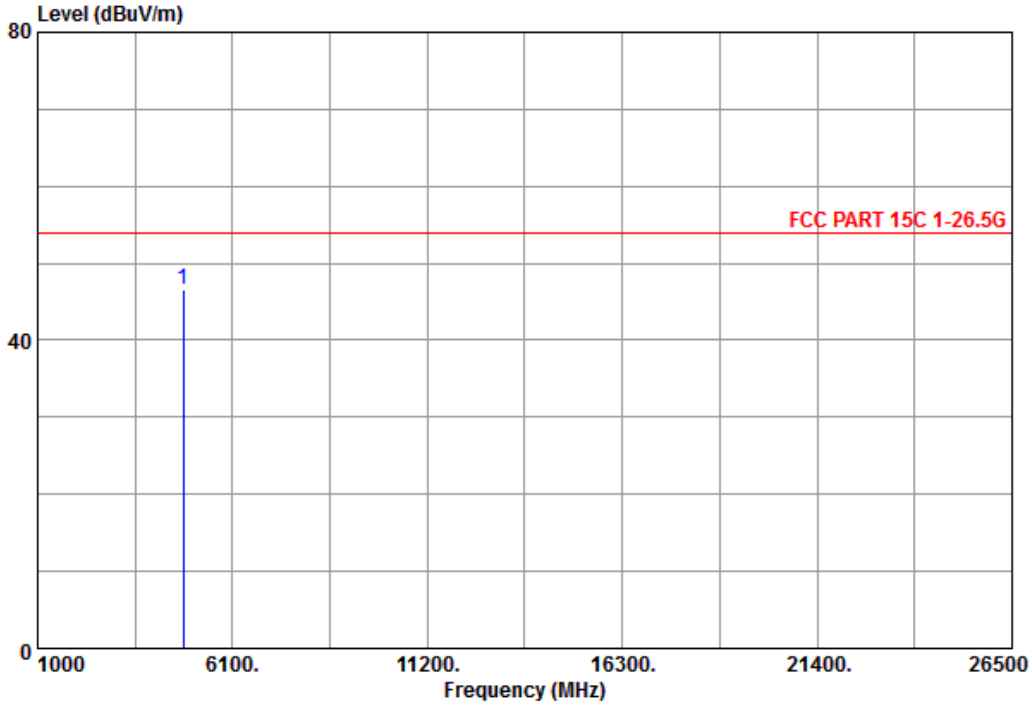
@ :Maximum Data x :Over Limit

*Remark*：

1. *Measuring frequencies from 30 MHz to 1 GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.*
3. *Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.*
4. *All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.*
5. *The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH00 (2402MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 @4804.000 | 46.08 | 0.49 | 46.57 | 54.00 | -7.43 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

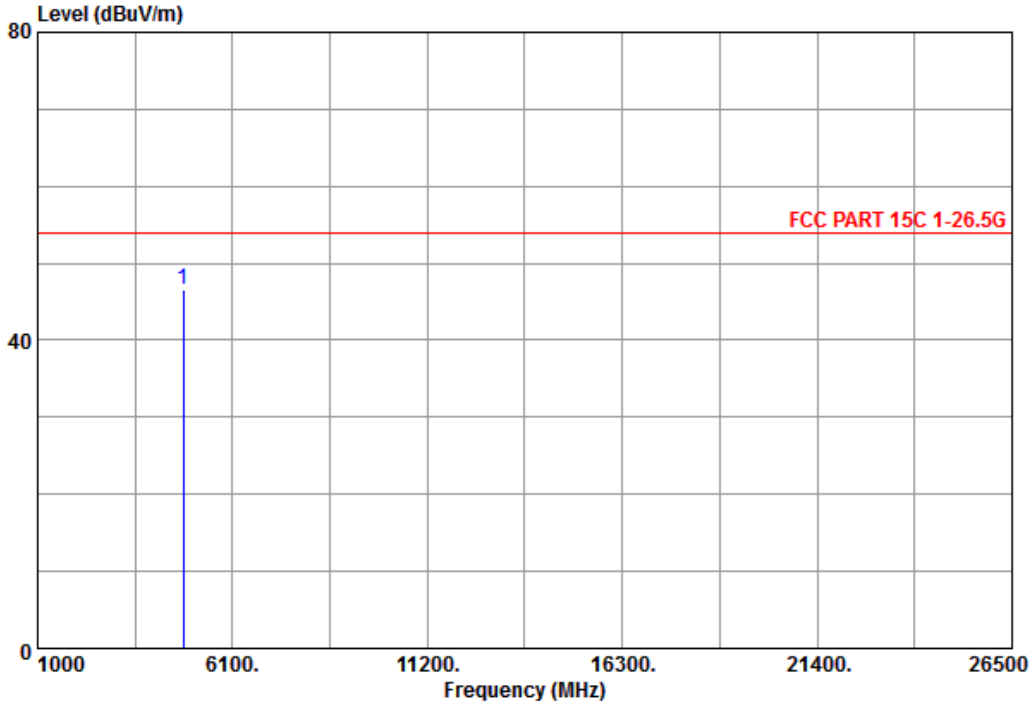
@ :Maximum Data x :Over Limit

*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH00 (2402MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4804.000 | 46.16 | 0.49 | 46.65 | 54.00 | -7.35 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

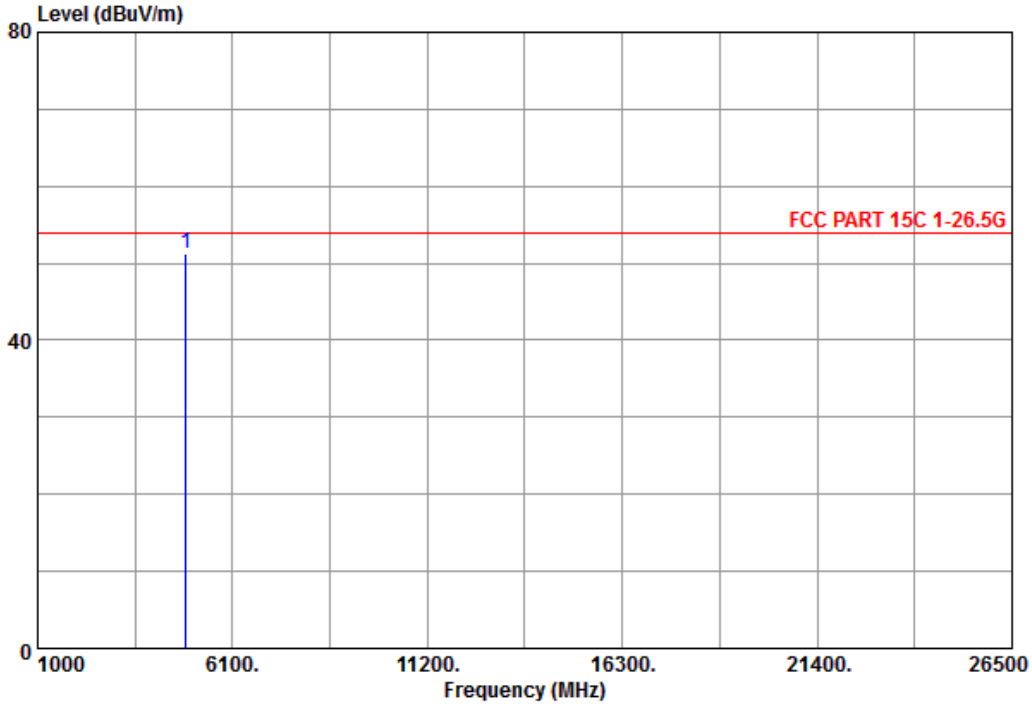
@ :Maximum Data x :Over Limit

*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH39 (2441MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4882.000 | 50.37 | 0.80 | 51.17 | 54.00 | -2.83 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

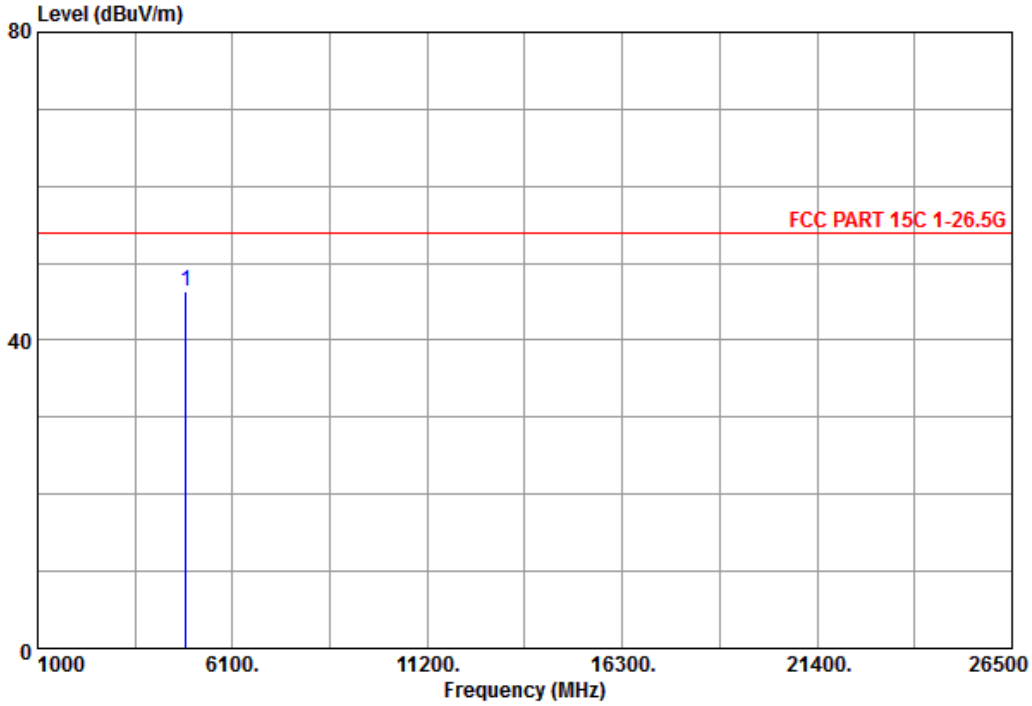
@ :Maximum Data x :Over Limit

*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH39 (2441MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4882.000 | 45.65 | 0.80 | 46.45 | 54.00 | -7.55 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

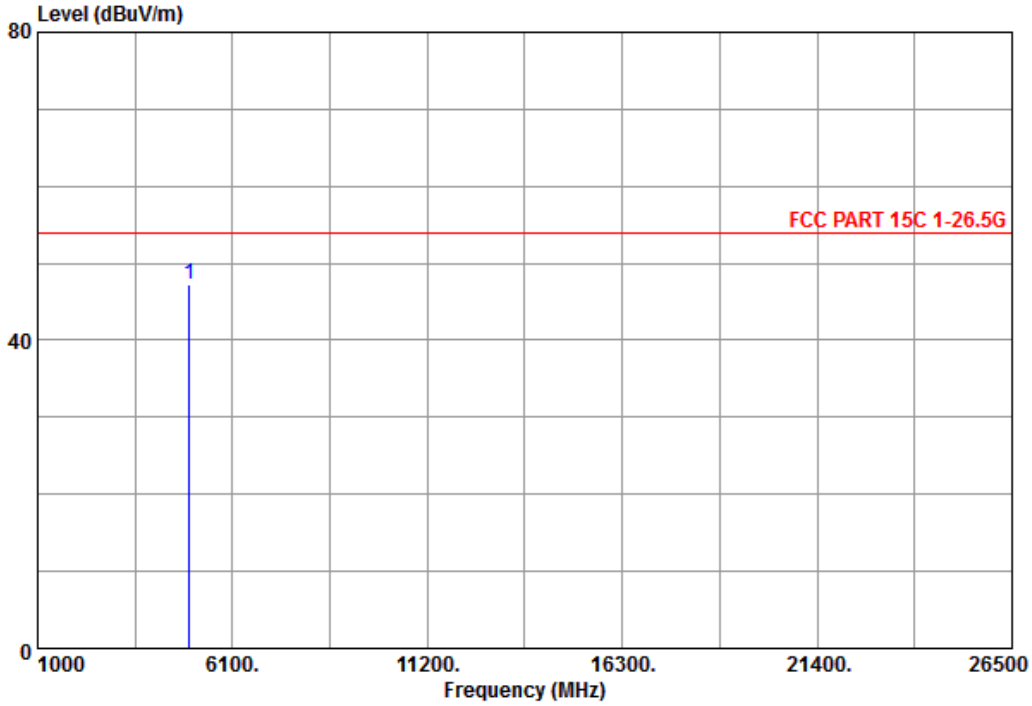
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH78 (2480MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4960.000 | 46.20 | 1.15 | 47.35 | 54.00 | -6.65 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

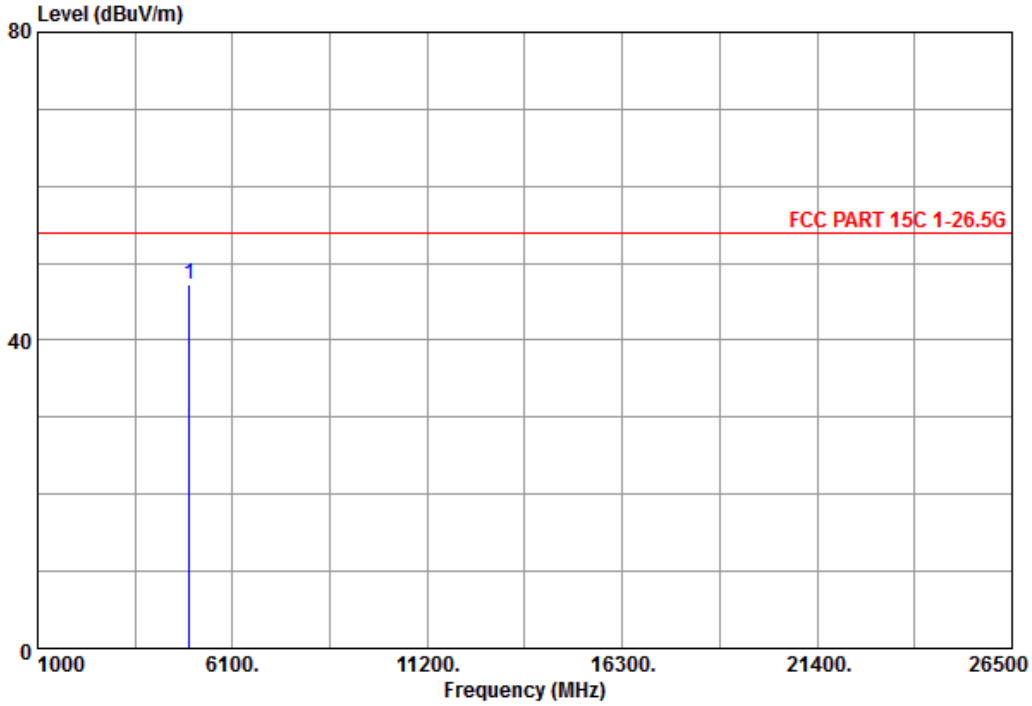
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH78 (2480MHz) (1Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4960.000 | 46.11 | 1.15 | 47.26 | 54.00 | -6.74 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

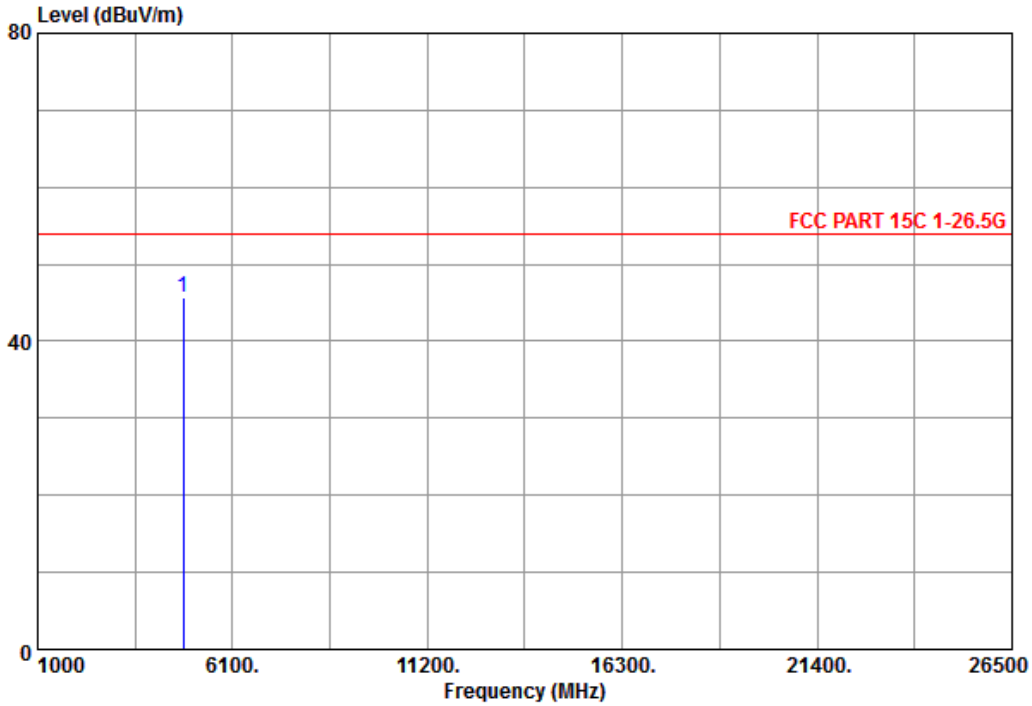
@ :Maximum Data x :Over Limit

*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH00 (2402MHz) (2Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4804.000 | 45.19 | 0.49 | 45.68 | 54.00 | -8.32 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

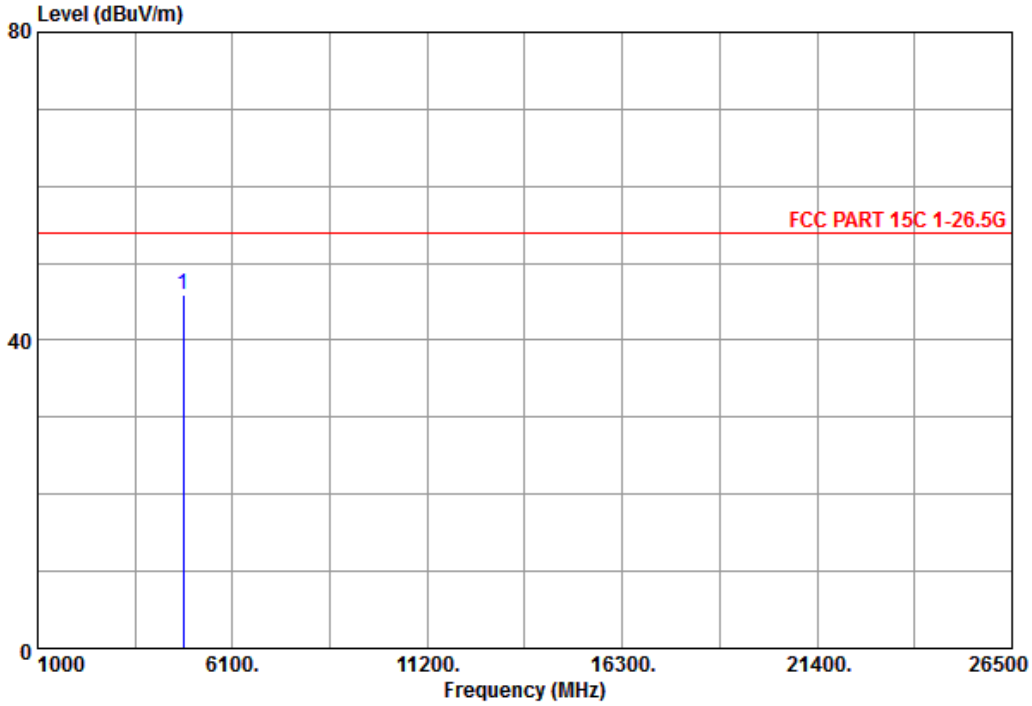
@ :Maximum Data x :Over Limit

*Remark*：

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH00 (2402MHz) (2Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4804.000 | 45.36 | 0.49 | 45.85 | 54.00 | -8.15 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

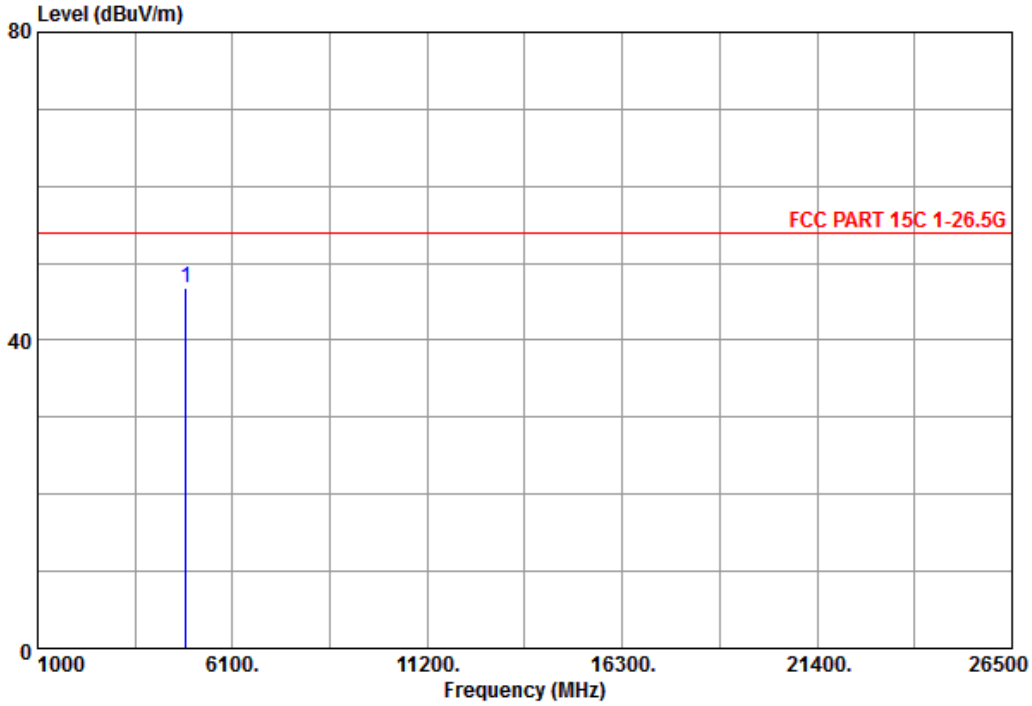
@ :Maximum Data x :Over Limit

*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| *Temperature* | : | *25.9℃* | *Humidity* | : | *32%* |
| *Test Date* | : | *04-Aug-2015* | *Tested by* | : | *Eason Hsieh* |
| *Polarization* | : | *Vertical* | *Channel* | : | *CH39 (2441MHz) (2Mbps)* |
| *EUT Position* | : | *Vertical* | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4882.000 | 46.08 | 0.80 | 46.88 | 54.00 | -7.12 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

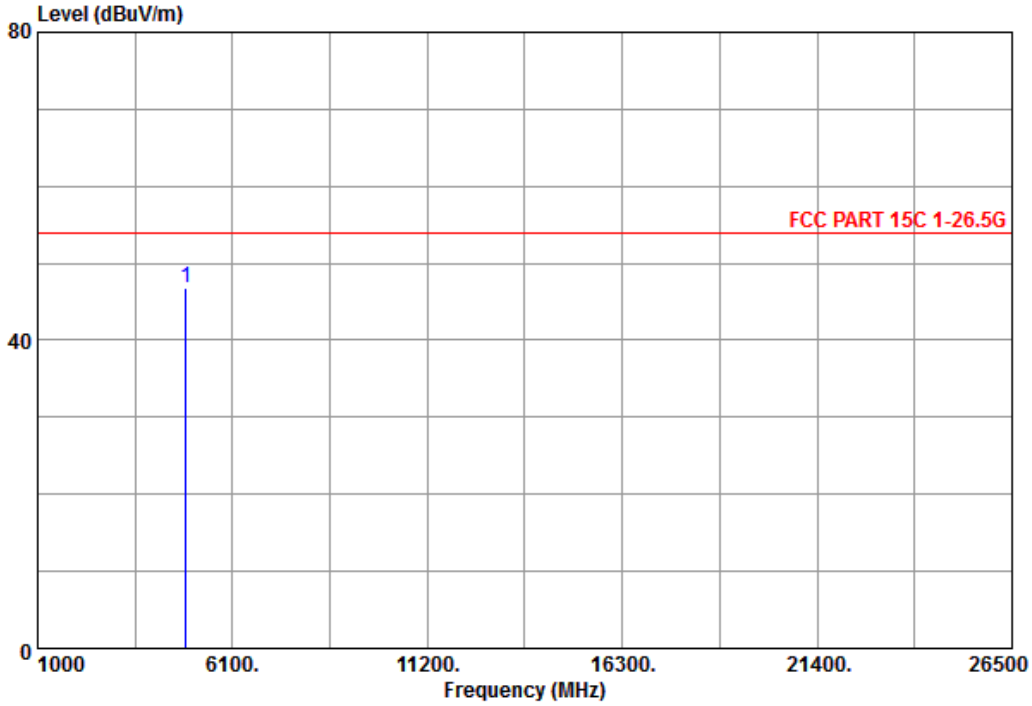
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH39 (2441MHz) (2Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4882.000 | 46.00 | 0.80 | 46.80 | 54.00 | -7.20 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

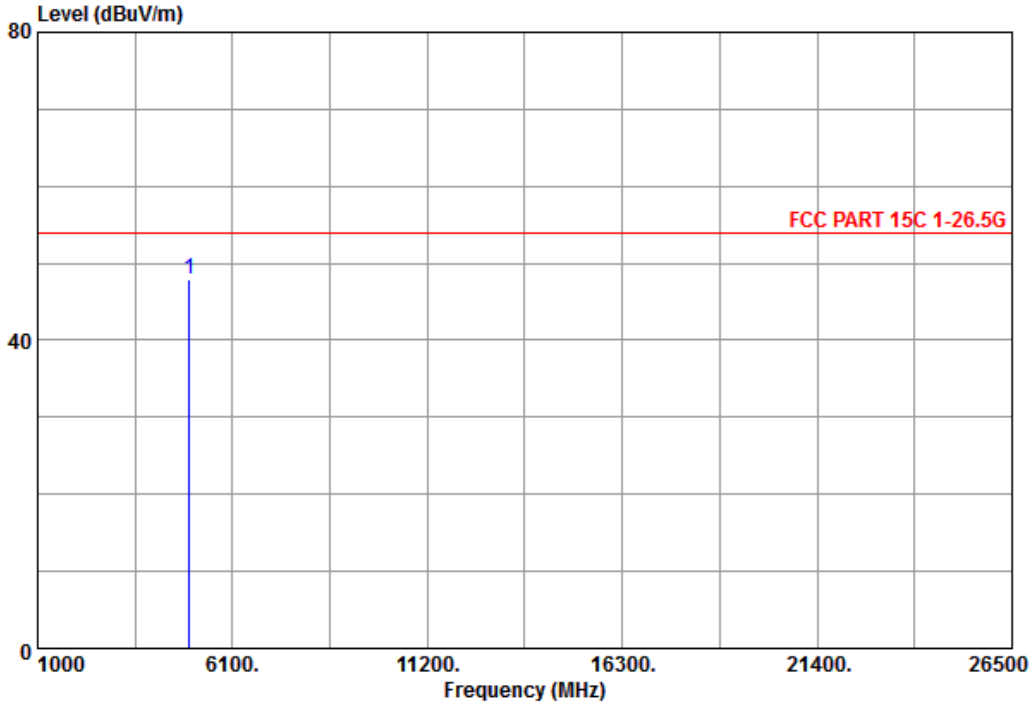
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH78 (2480MHz) (2Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4960.000 | 46.81 | 1.15 | 47.96 | 54.00 | -6.04 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

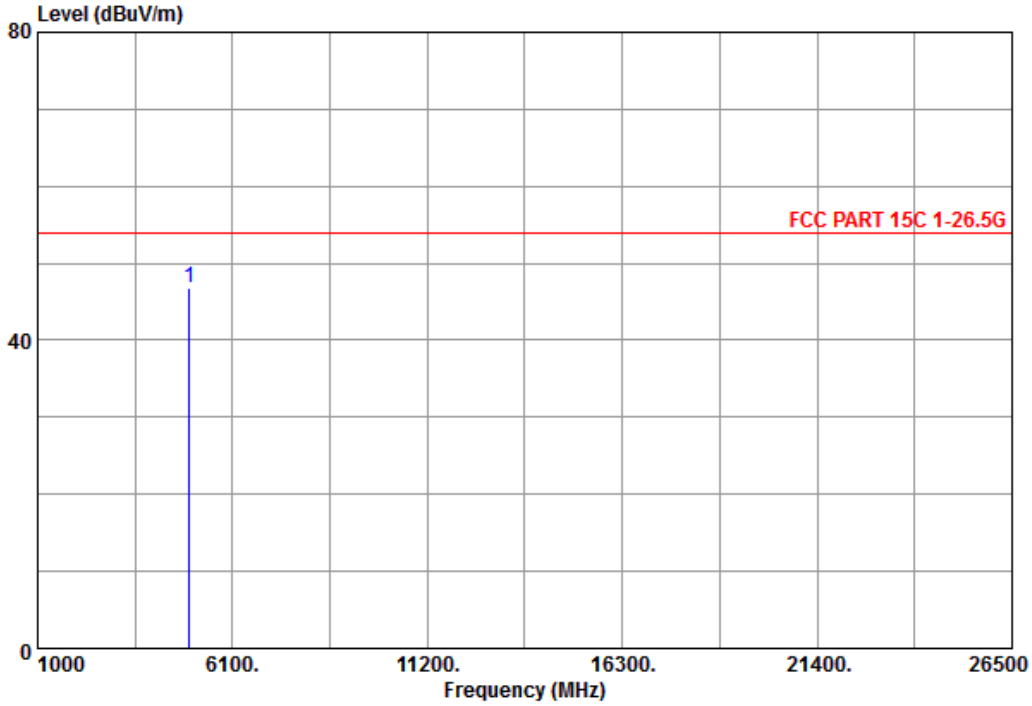
@ :Maximum Data x :Over Limit

*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH78 (2480MHz) (2Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4960.000 | 45.56 | 1.15 | 46.71 | 54.00 | -7.29 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

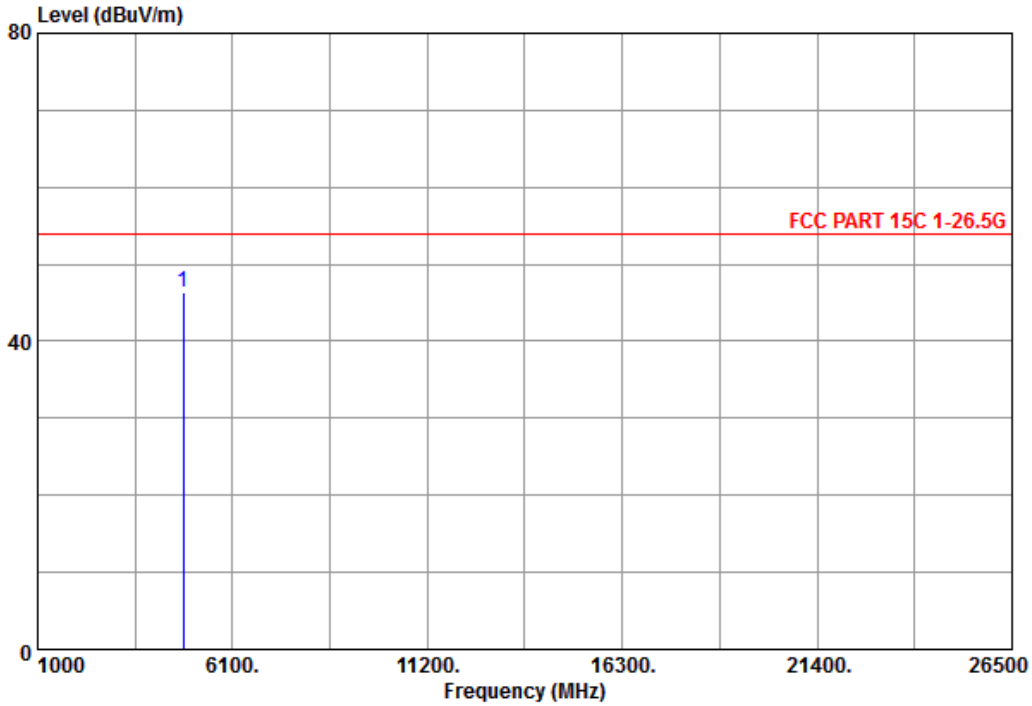
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH00 (2402MHz) (3Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4804.000 | 45.79 | 0.49 | 46.28 | 54.00 | -7.72 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

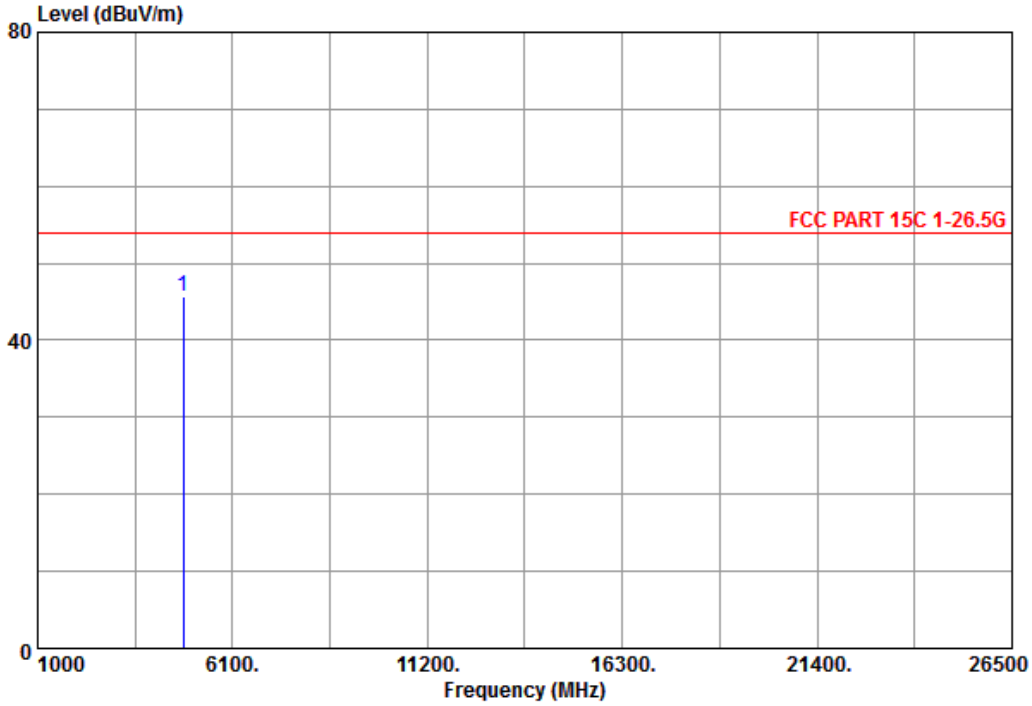
*Remark*：

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH00 (2402MHz) (3Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4804.000 | 45.14 | 0.49 | 45.63 | 54.00 | -8.37 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

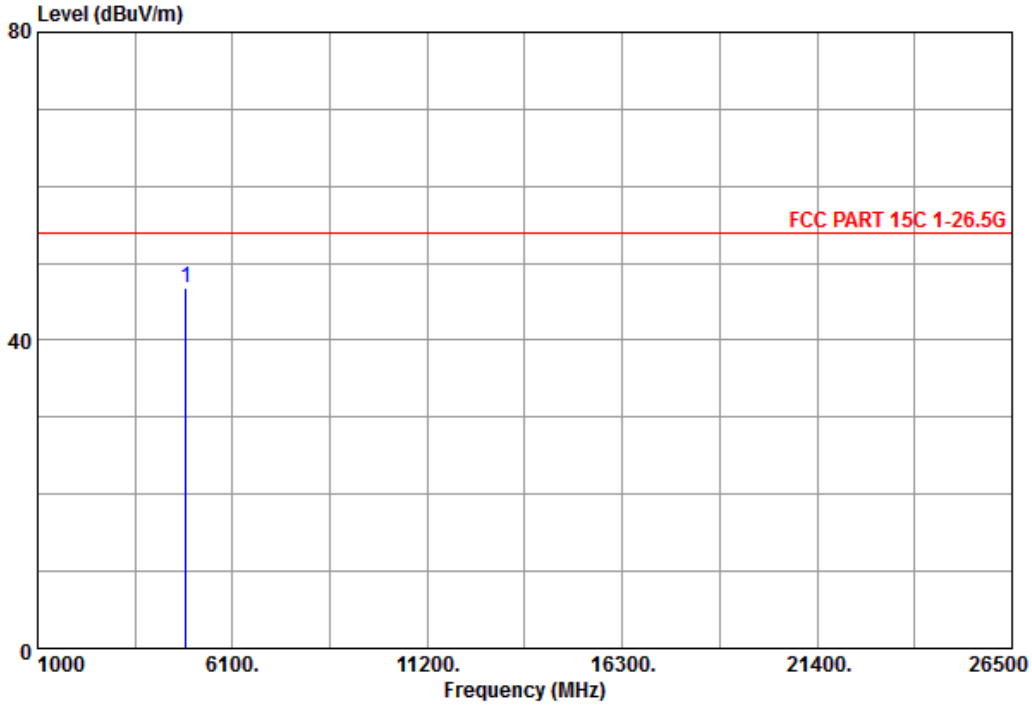
@ :Maximum Data x :Over Limit

*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*
   (a) *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH39 (2441MHz) (3Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4882.000 | 45.89 | 0.80 | 46.69 | 54.00 | -7.31 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

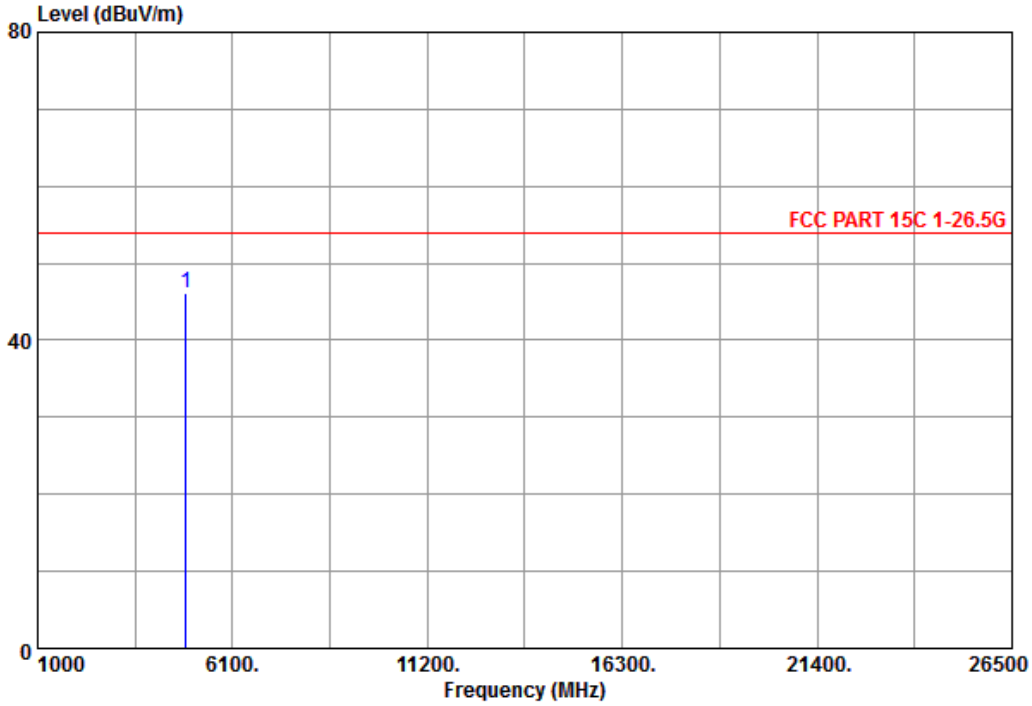
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH39 (2441MHz) (3Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4882.000 | 45.41 | 0.80 | 46.21 | 54.00 | -7.79 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

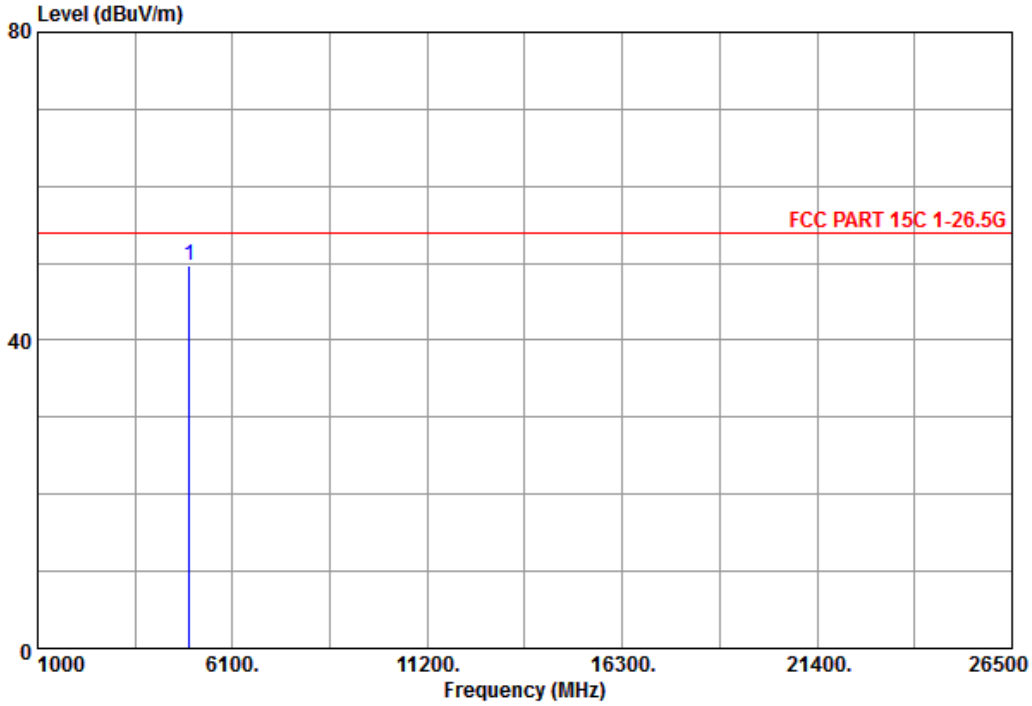
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Vertical | Channel | : | CH78 (2480MHz) (3Mbps) |
| EUT Position | : | Vertical | | | |




| | Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 | @4960.000 | 48.55 | 1.15 | 49.70 | 54.00 | -4.30 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

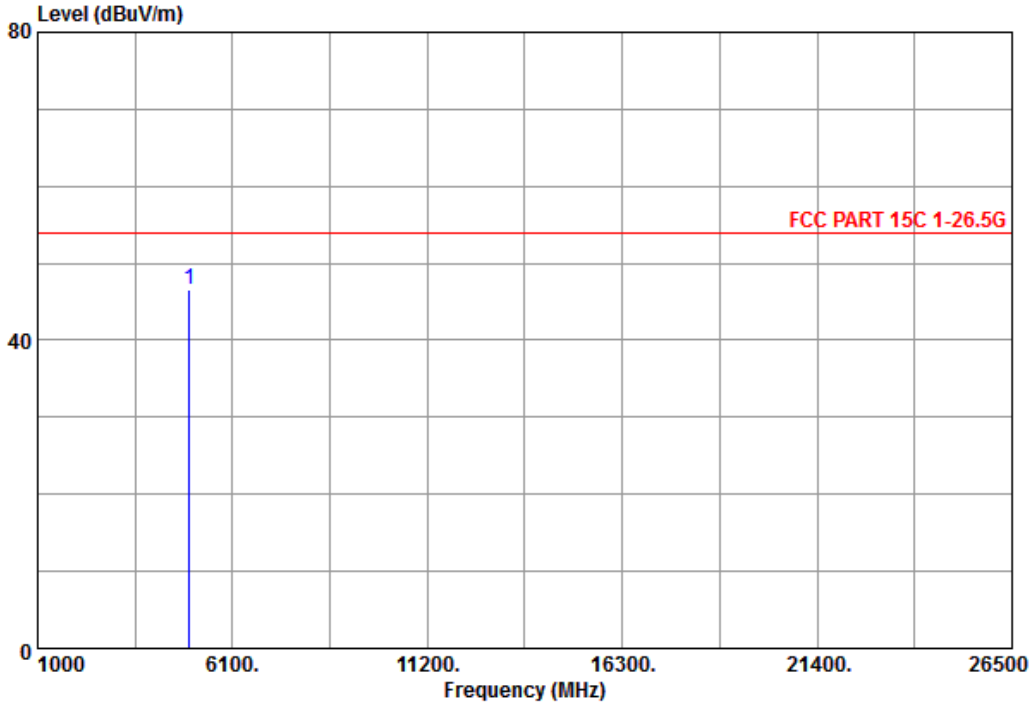
*Remark* :

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

## Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Polarization | : | Horizontal | Channel | : | CH78 (2480MHz) (3Mbps) |
| EUT Position | : | Vertical | | | |




| Freq | Reading | C.F | Result | Limit | Margin | A/pos | T/pos | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | | |
| 1 @4960.000 | 45.41 | 1.15 | 46.56 | 54.00 | -7.44 | --- | --- | |

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

*Remark*：

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.*
3. *Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.*
4. *All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.*
5. *Spectrum setting:*

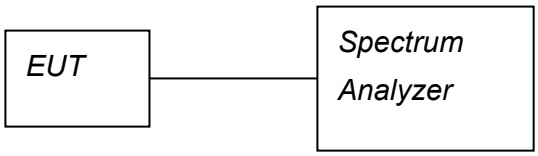
   *(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.*

# 4 20 dB Bandwidth

## 4.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 4.2 Test Arrangement and Procedure




1. *The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).*
2. *The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. Measured the -20 dB bandwidth and plotted the graph.*

## 4.3 Limit

*None; For report purpose only.*

## 4.4 Test Result

**No non-compliance noted.**

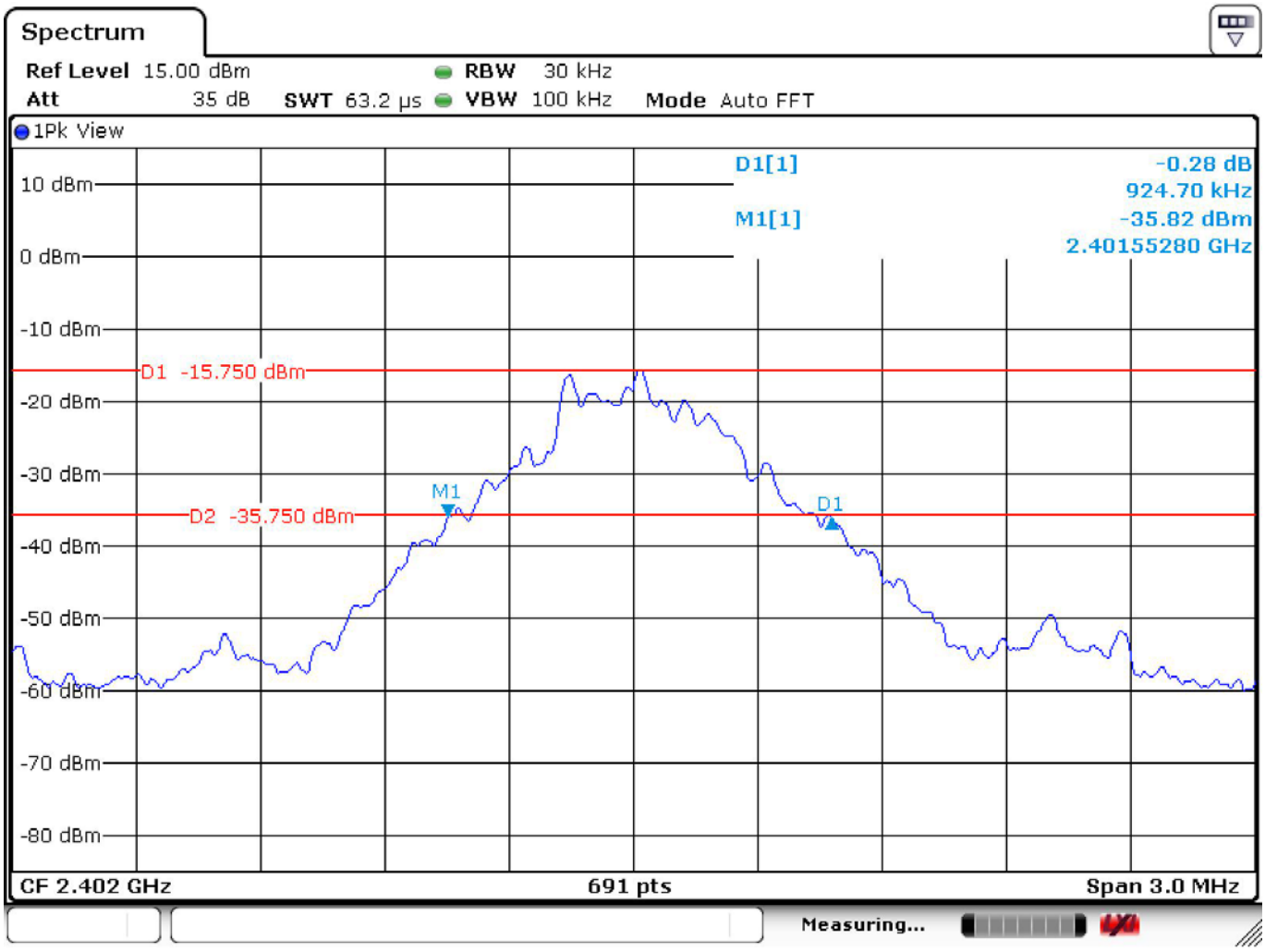
*The final test data are shown on the following page(s).*

| **Bluetooth 1 Mbps (DH5)** | | |
|---|---|---|
| **Channel** | **Frequency (MHz)** | **20dB Bandwidth (MHz)** |
| *Low* | *2402* | *0.9247* |
| *Middle* | *2441* | *0.9522* |
| *High* | *2480* | *0.9522* |

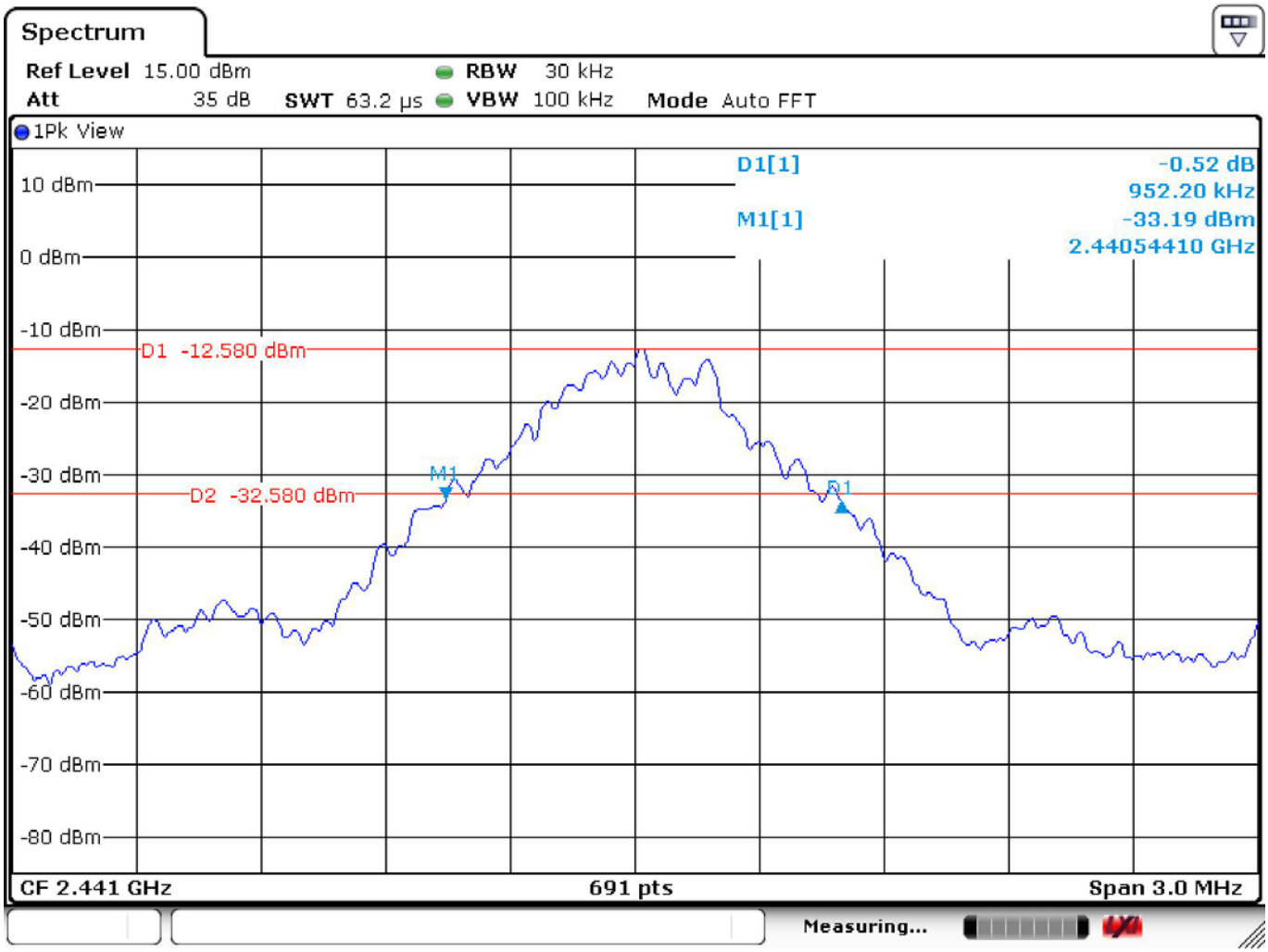
| **Bluetooth 2 Mbps (DH5)** | | |
|---|---|---|
| **Channel** | **Frequency (MHz)** | **20dB Bandwidth (MHz)** |
| *Low* | *2402* | *1.2822* |
| *Middle* | *2441* | *1.2880* |
| *High* | *2480* | *1.3315* |

| **Bluetooth 3 Mbps (DH5)** | | |
|---|---|---|
| **Channel** | **Frequency (MHz)** | **20dB Bandwidth (MHz)** |
| *Low* | *2402* | *1.2967* |
| *Middle* | *2441* | *1.2884* |
| *High* | *2480* | *1.3087* |

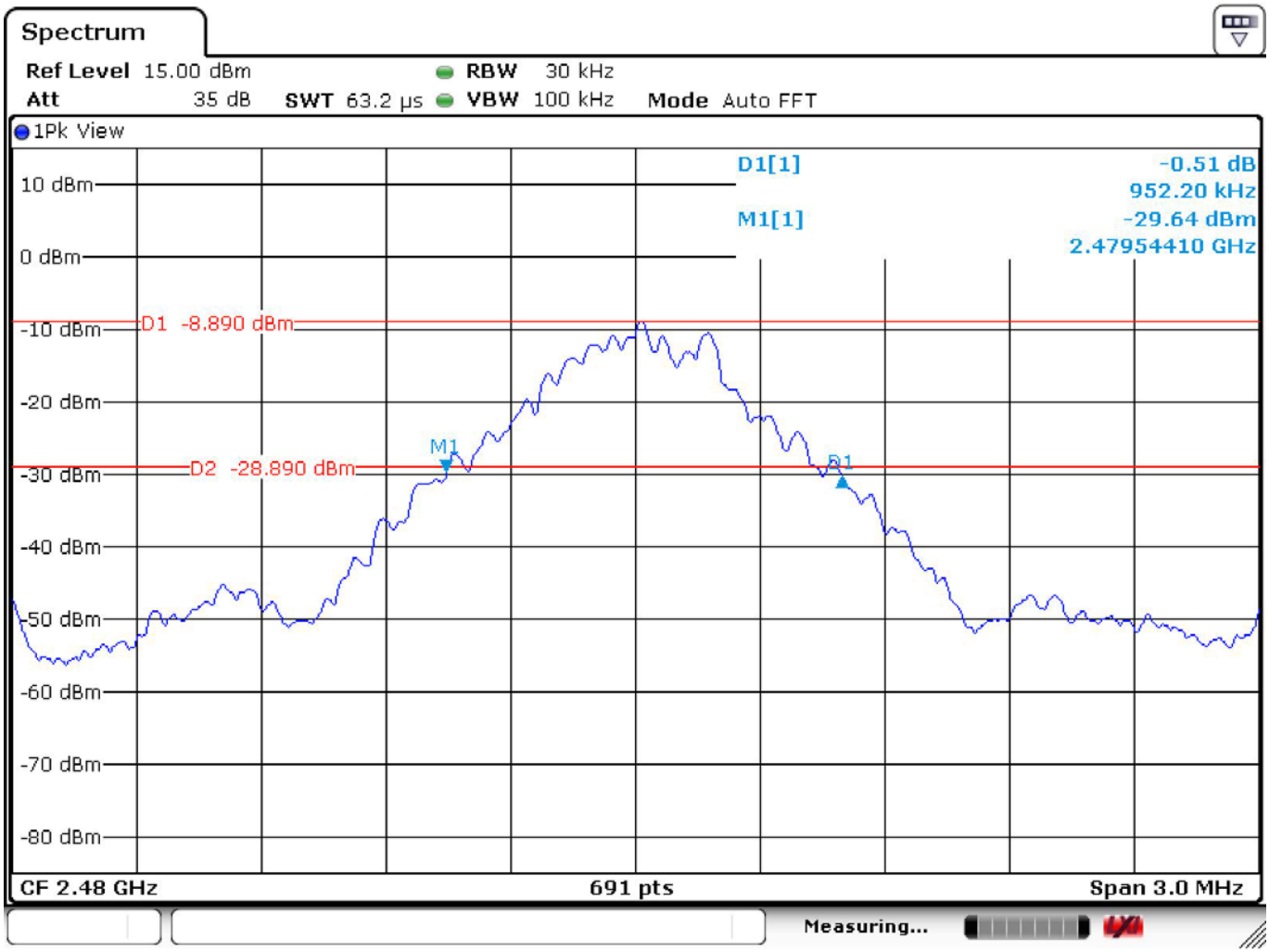
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (1 Mbps) DH5 | Channel | : | 00 |



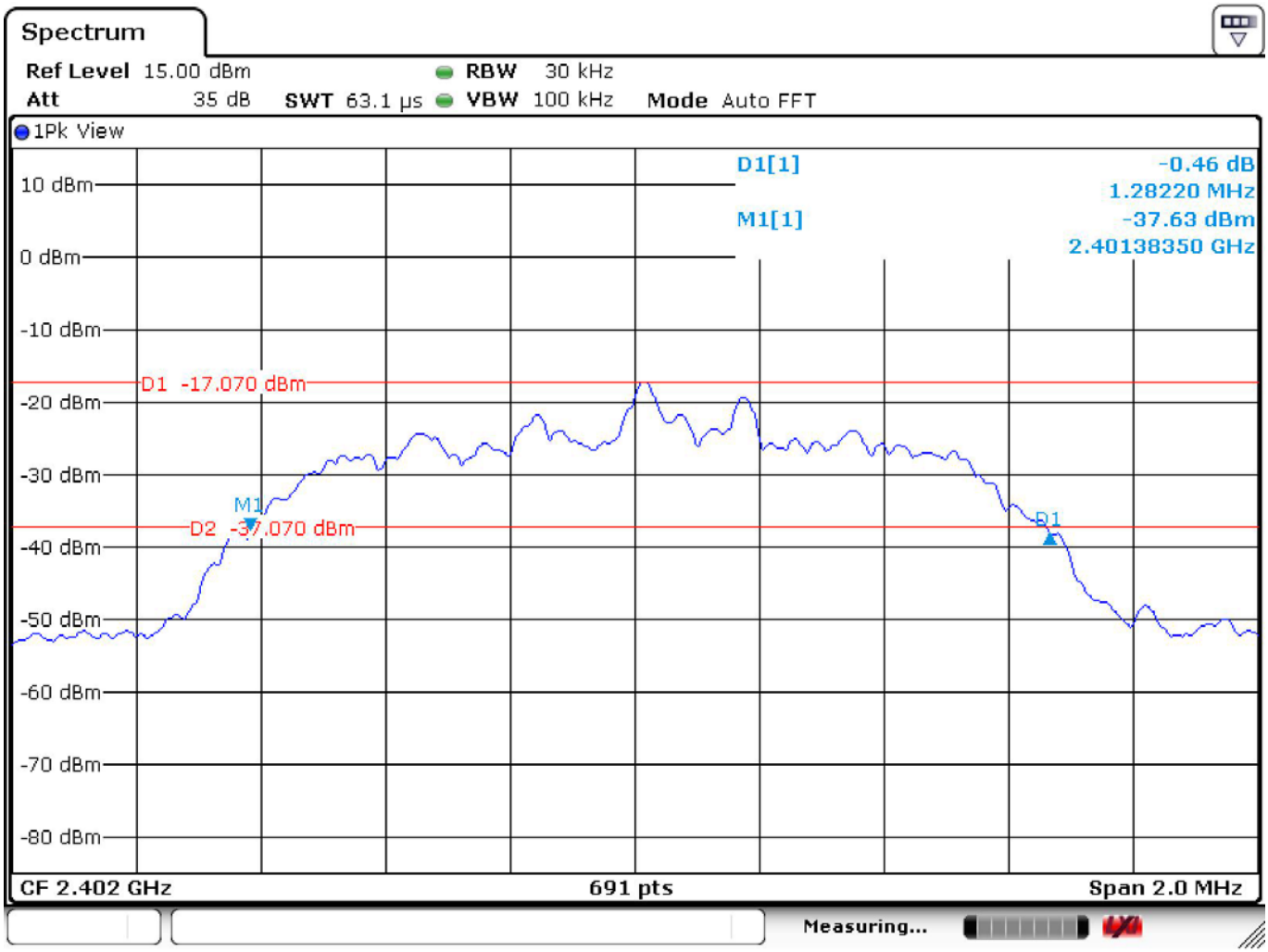

| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (1 Mbps) DH5 | Channel | : | 39 |


Spectrum
Ref Level 15.00 dBm
RBW 30 kHz
Att 35 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk View
D1[1]
-0.52 dB
952.20 kHz
M1[1]
-33.19 dBm
2.44054410 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -12.580 dBm
D2 -32.580 dBm
M1
D1
CF 2.441 GHz
691 pts
Span 3.0 MHz
Measuring...

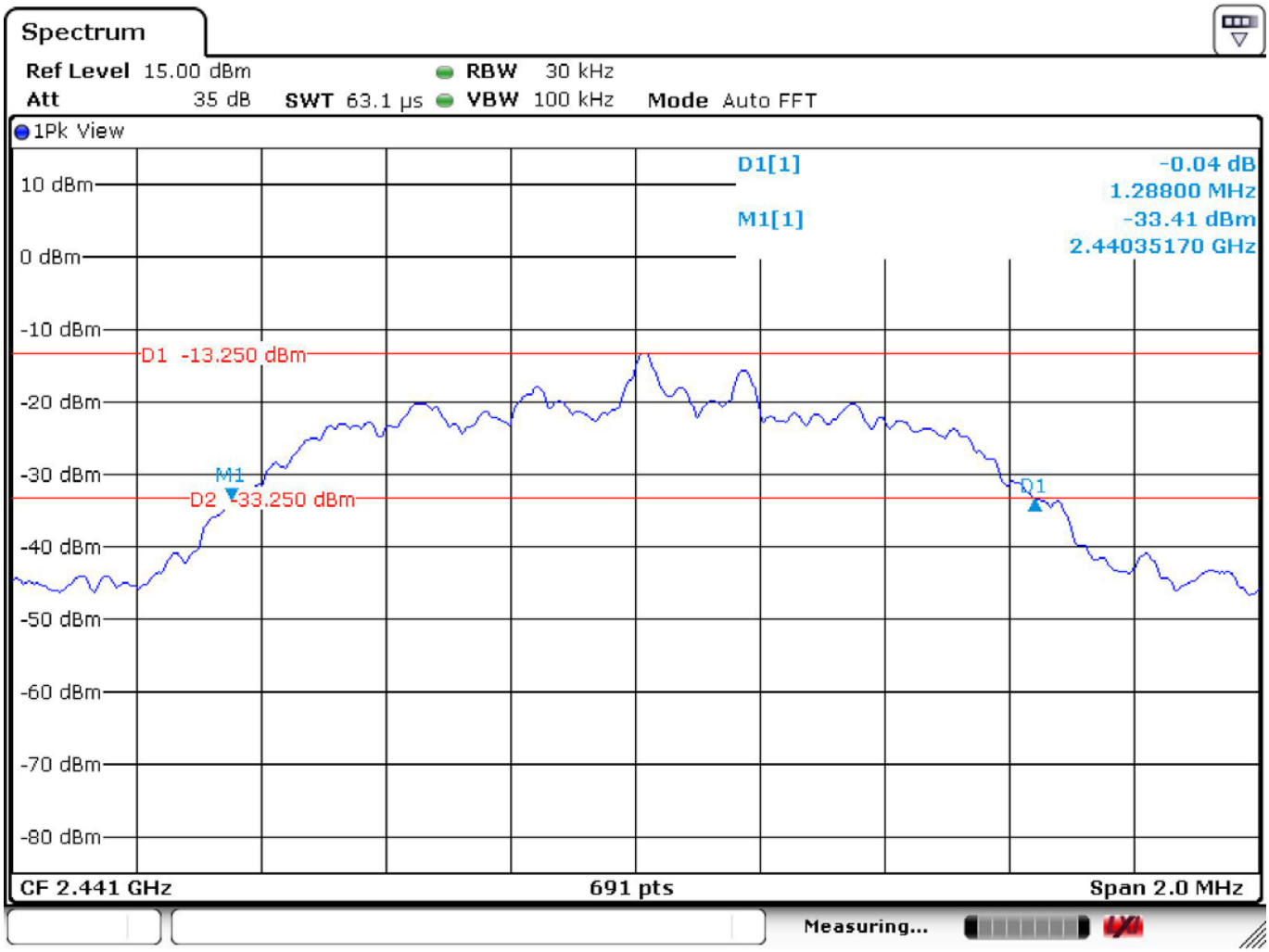
*Test Mode : BT (1 Mbps) DH5 Channel : 78*



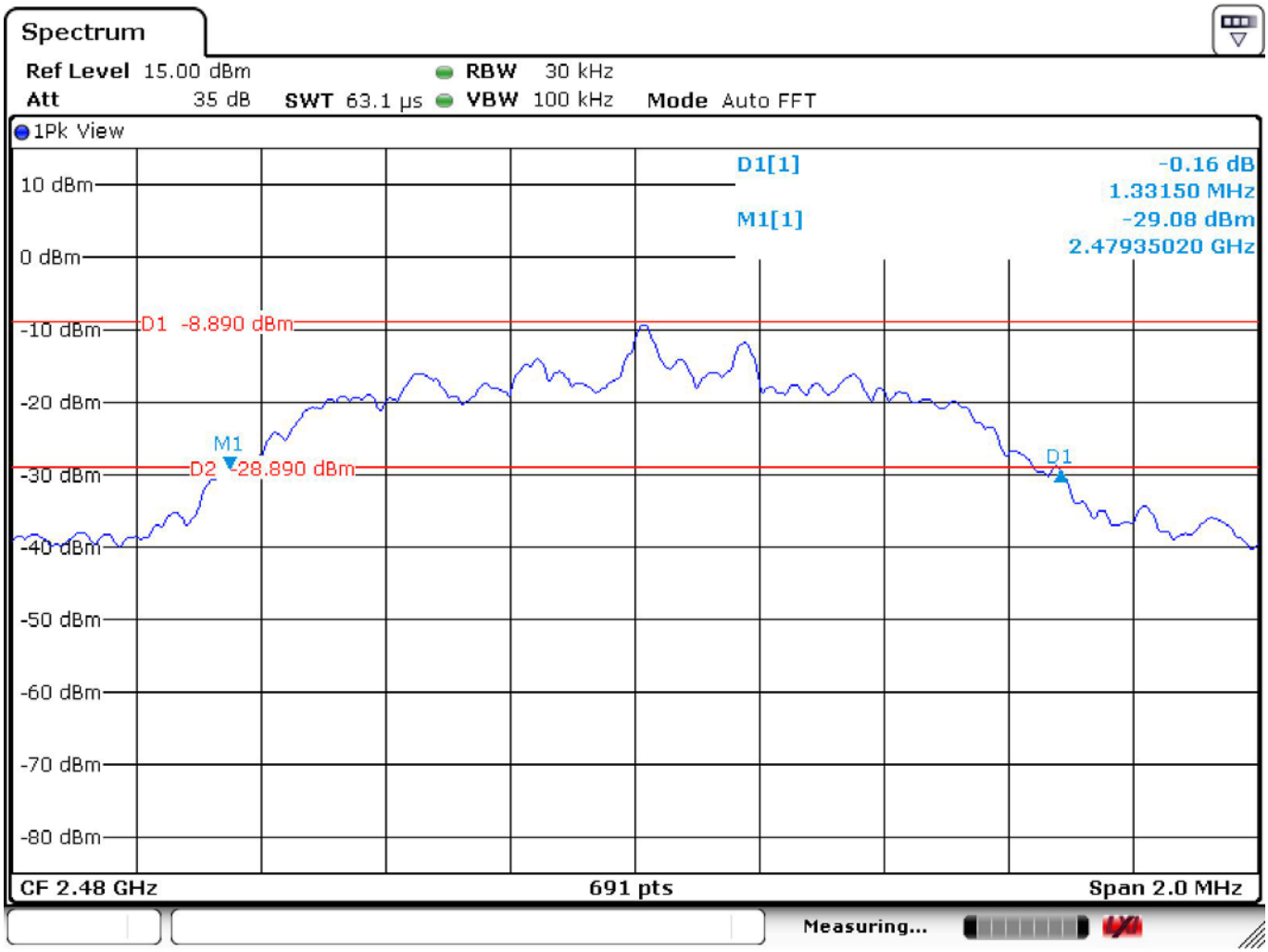

*Test Mode : BT (2 Mbps) DH5 Channel : 00*


Spectrum
Ref Level 15.00 dBm
RBW 30 kHz
Att 35 dB
SWT 63.1 µs
VBW 100 kHz
Mode Auto FFT
1Pk View
D1[1]
-0.46 dB
1.28220 MHz
M1[1]
-37.63 dBm
2.40138350 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -17.070 dBm
M1
D2 -37.070 dBm
D1
CF 2.402 GHz
691 pts
Span 2.0 MHz
Measuring...

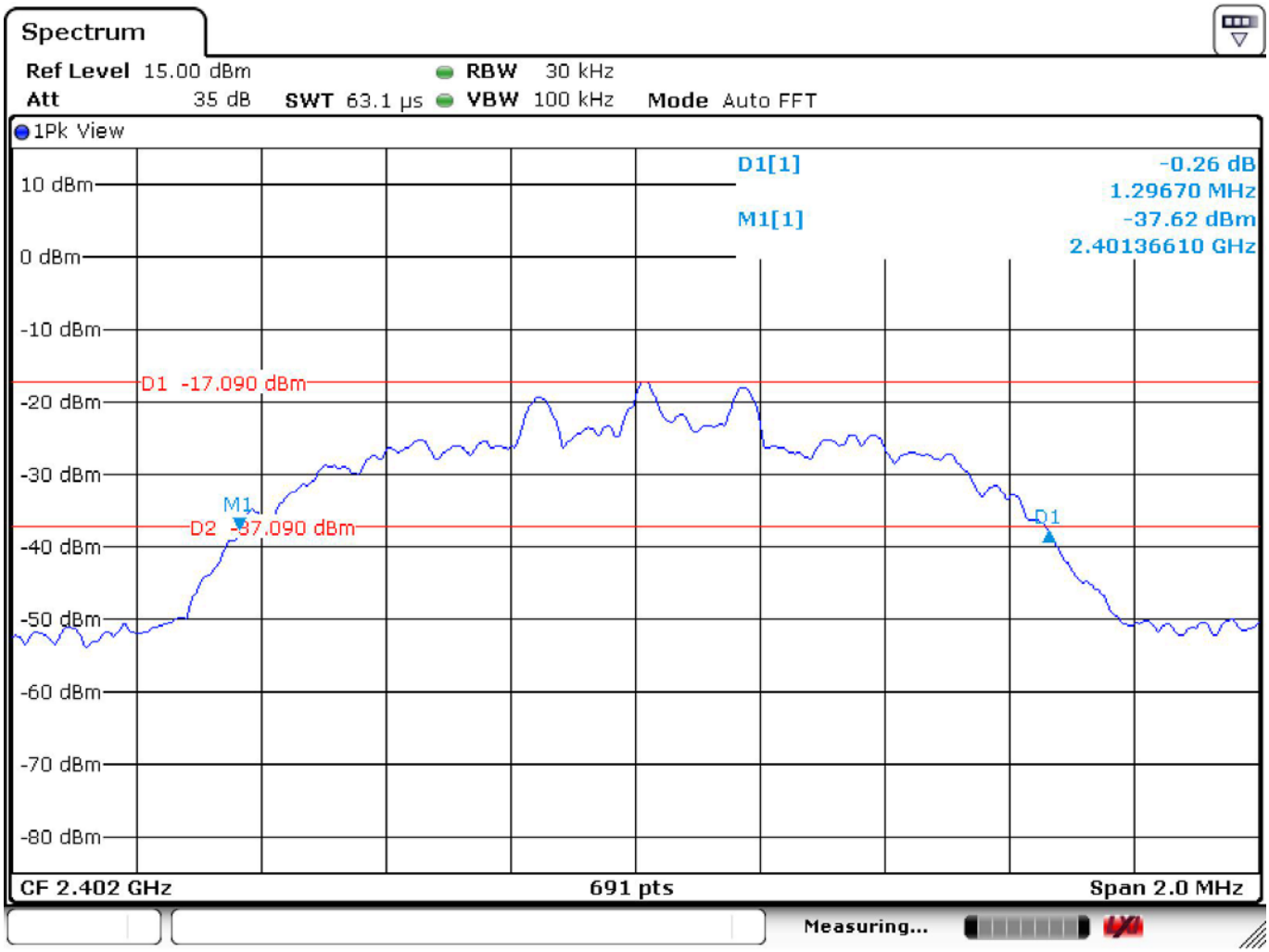
*Test Mode : BT (2 Mbps) DH5 Channel : 39*



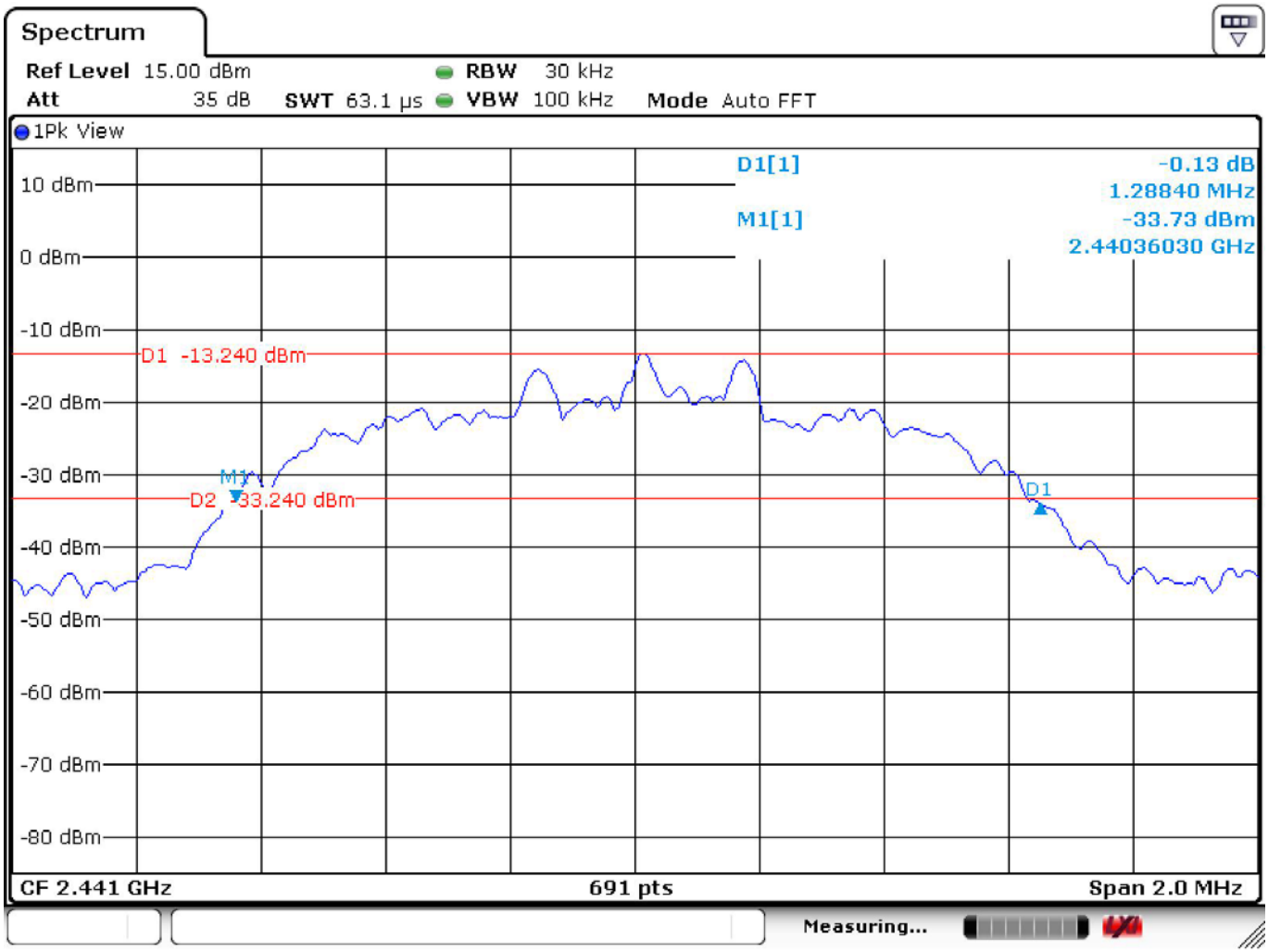

*Test Mode : BT (2 Mbps) DH5 Channel : 78*


Spectrum
Ref Level 15.00 dBm
RBW 30 kHz
Att 35 dB
SWT 63.1 µs
VBW 100 kHz
Mode Auto FFT
1Pk View
D1[1]
-0.16 dB
1.33150 MHz
M1[1]
-29.08 dBm
2.47935020 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -8.890 dBm
M1
D2 -28.890 dBm
D1
CF 2.48 GHz
691 pts
Span 2.0 MHz
Measuring...

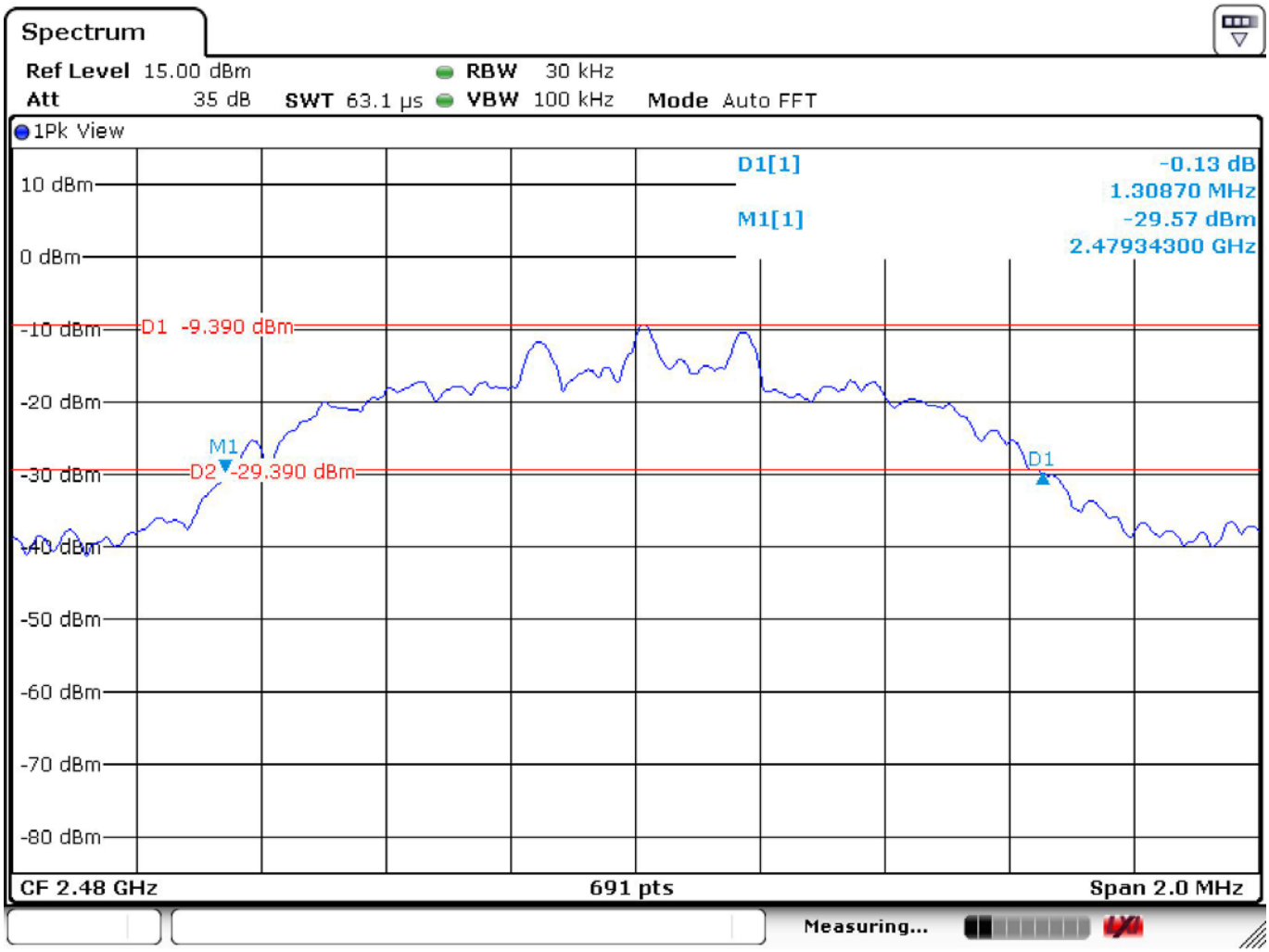
*Test Mode : BT (3 Mbps) DH5 Channel : 00*




*Test Mode : BT (3 Mbps) DH5 Channel : 39*


Spectrum
Ref Level 15.00 dBm
RBW 30 kHz
Att 35 dB
SWT 63.1 µs
VBW 100 kHz
Mode Auto FFT
1Pk View
D1[1]
-0.13 dB
1.28840 MHz
M1[1]
-33.73 dBm
2.44036030 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -13.240 dBm
M1
D2 -33.240 dBm
D1
CF 2.441 GHz
691 pts
Span 2.0 MHz
Measuring...

Test Mode : BT (3 Mbps) DH5 Channel : 78

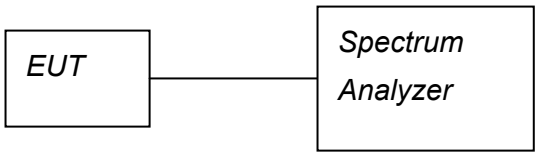


# 5 Hopping Frequency Separation

## 5.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 5.2 Test Arrangement and Procedure




1. *The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).*
2. *The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW.*
3. *Mark the peak outputs of two adjacent channels. And, measured the separation between the marked peak outputs of two adjacent channels.*

## 5.3 Limit (§ 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.*

## 5.4 Test Result

**Compliance.**

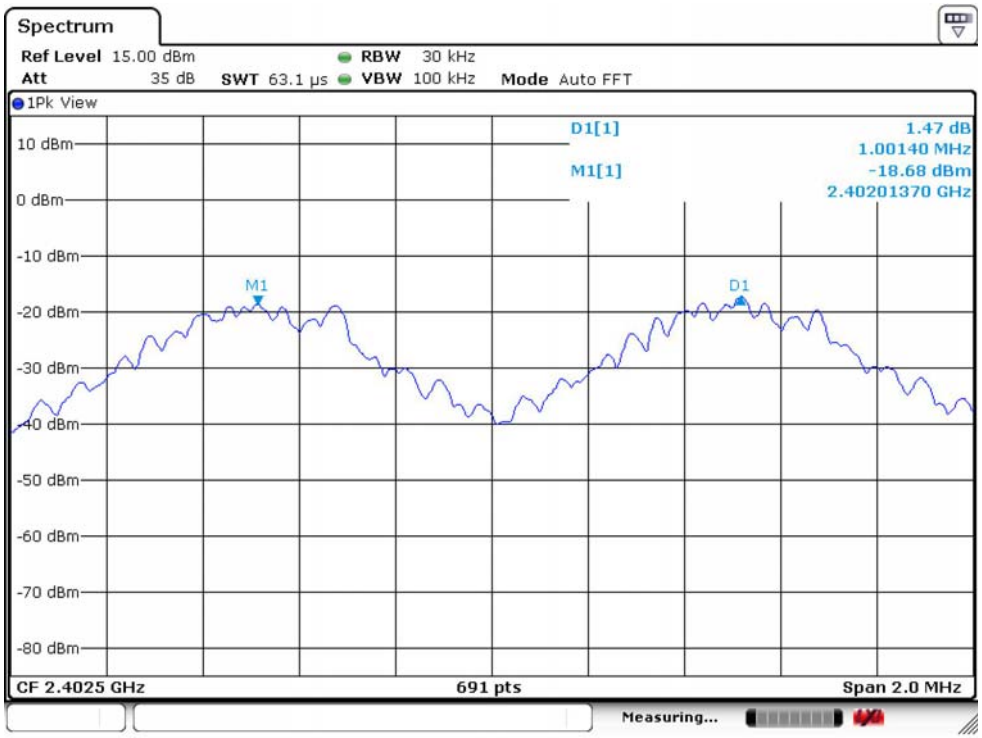
*The final test data are shown on the following page(s).*

| Bluetooth 1 Mbps DH5 | | | | | |
|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **20 dB bandwidth (MHz)** | **Limit (2/3 of 20dB bandwidth) (MHz)** | **Result** | **Verdict** |
| *Low* | *2402* | *0.9247* | *0.6165* | *1.0014* | *Pass* |
| *Middle* | *2441* | *0.9522* | *0.6348* | *0.9986* | *Pass* |
| *High* | *2480* | *0.9522* | *0.6348* | *1.0478* | *Pass* |

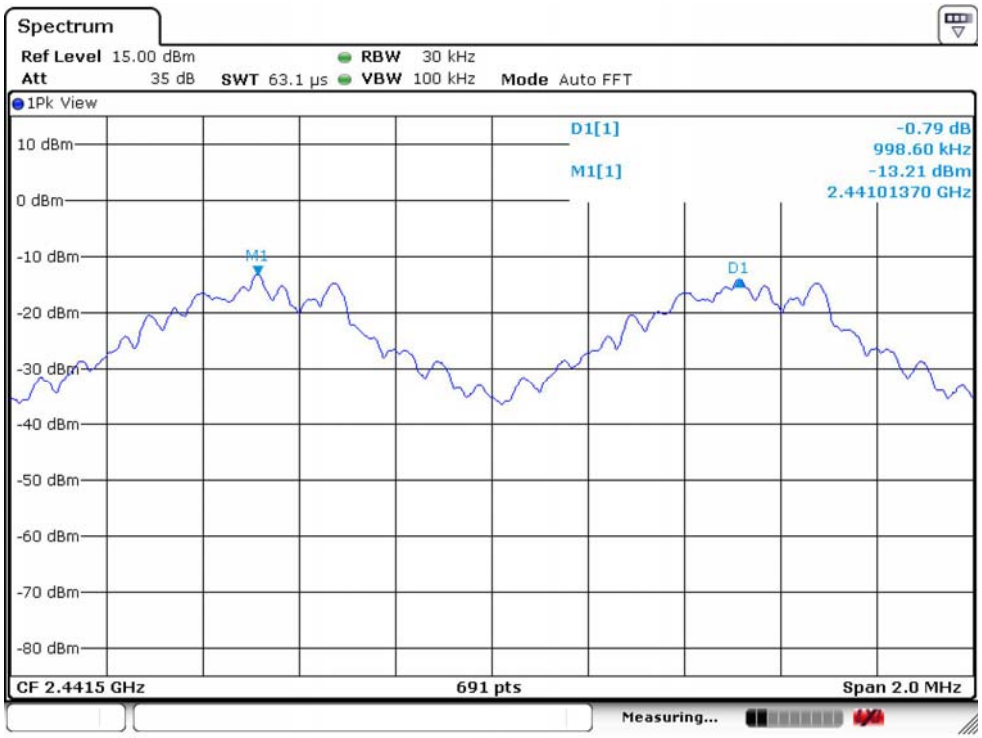
| Bluetooth 2 Mbps DH5 | | | | | |
|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **20 dB bandwidth (MHz)** | **Limit (2/3 of 20dB bandwidth) (MHz)** | **Result** | **Verdict** |
| *Low* | *2402* | *1.2822* | *0.8548* | *1.0043* | *Pass* |
| *Middle* | *2441* | *1.2880* | *0.8587* | *1.0014* | *Pass* |
| *High* | *2480* | *1.3315* | *0.8877* | *0.9986* | *Pass* |

| Bluetooth 3 Mbps DH5 | | | | | |
|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **20 dB bandwidth (MHz)** | **Limit (2/3 of 20dB bandwidth) (MHz)** | **Result** | **Verdict** |
| *Low* | *2402* | *1.2967* | *0.8645* | *1.0014* | *Pass* |
| *Middle* | *2441* | *1.2884* | *0.8589* | *0.9986* | *Pass* |
| *High* | *2480* | *1.3087* | *0.8725* | *0.9986* | *Pass* |

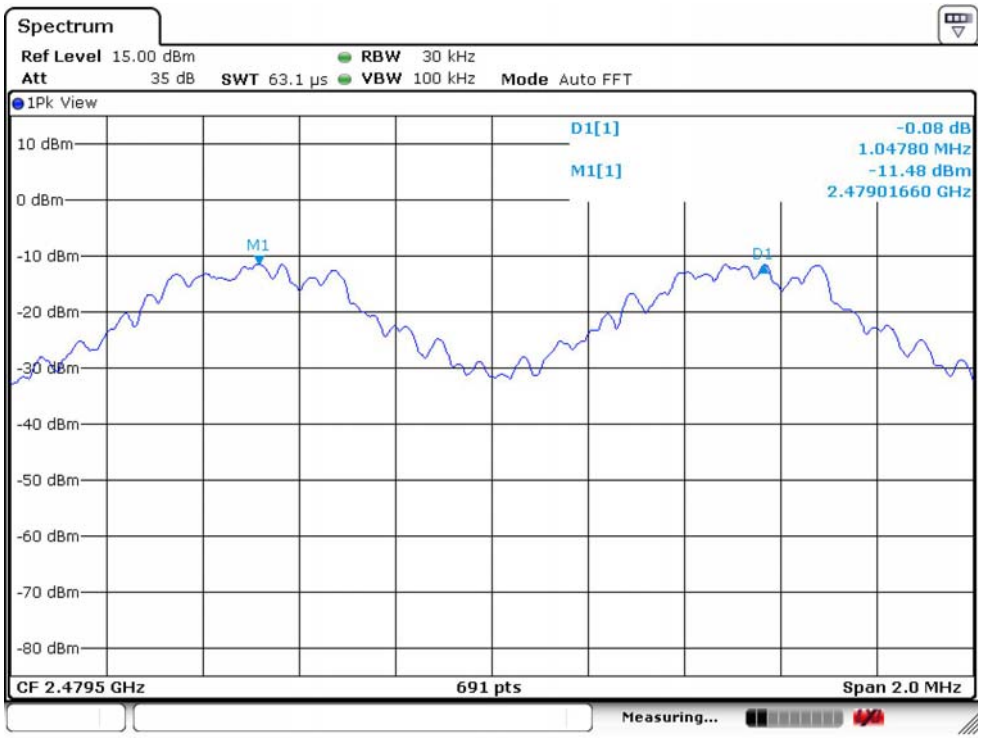
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (1 Mbps) DH5 | Channel | : | Low |



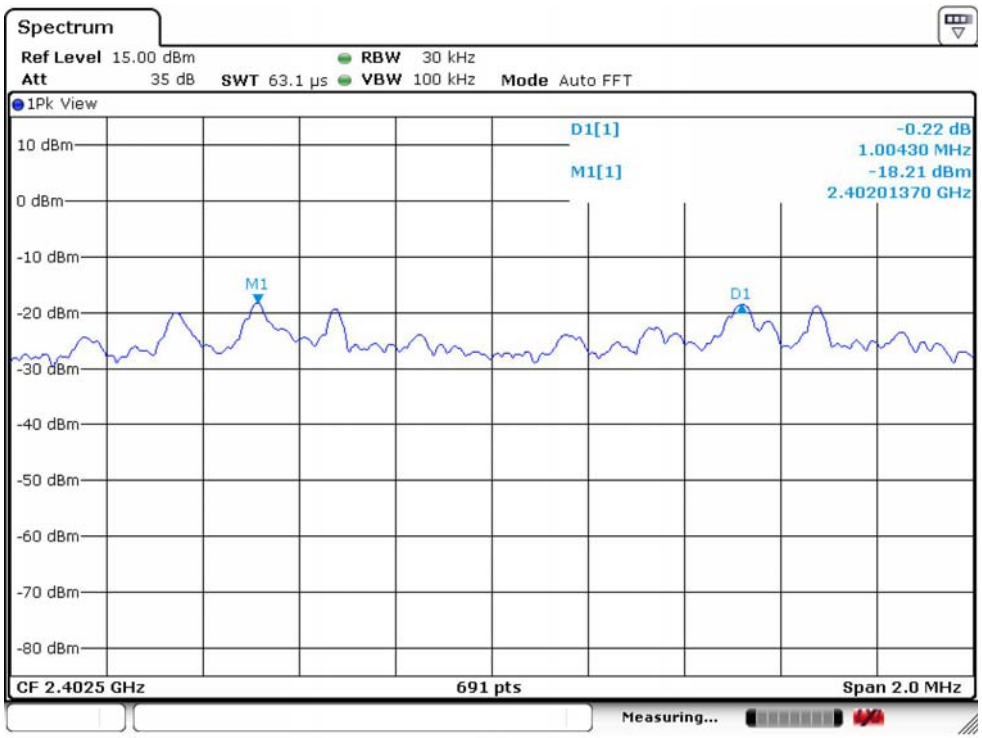

| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (1 Mbps) DH5 | Channel | : | Middle |



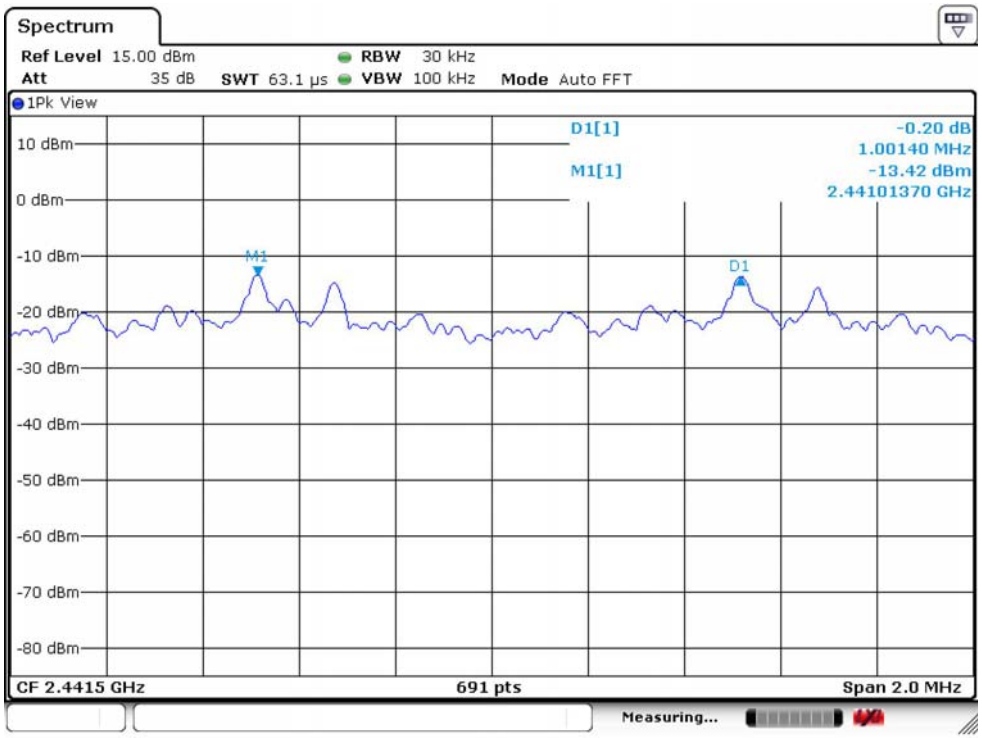
Test Mode : BT (1 Mbps) DH5 Channel : High



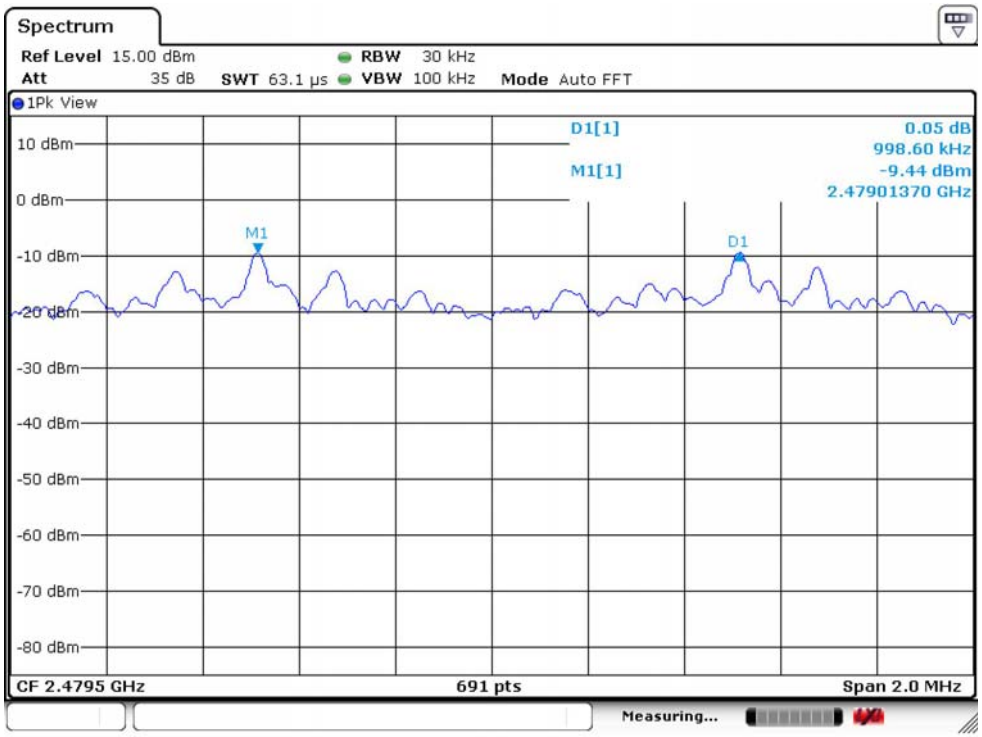

Test Mode : BT (2 Mbps) DH5 Channel : Low



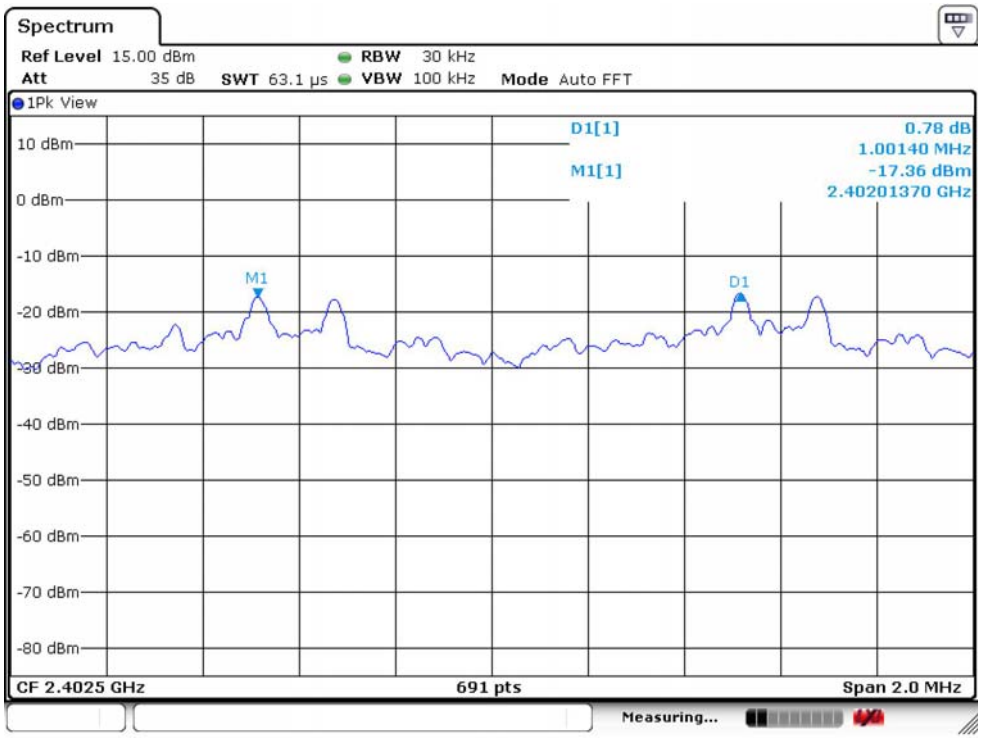
Test Mode : BT (2 Mbps) DH5 Channel : Middle



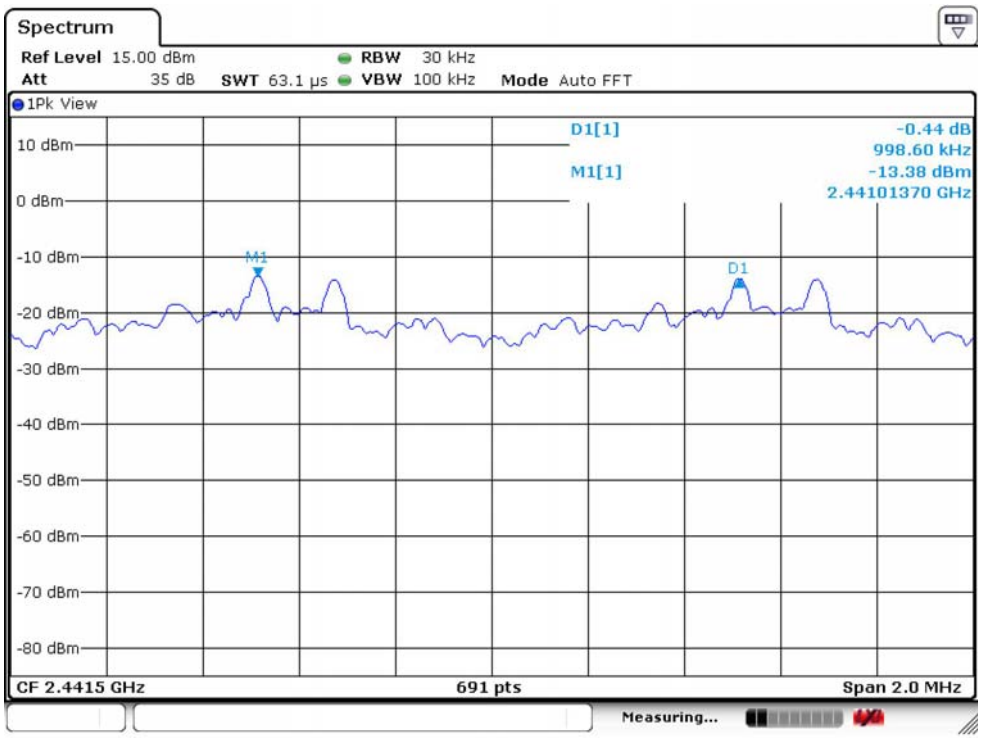

Test Mode : BT (2 Mbps) DH5 Channel : High



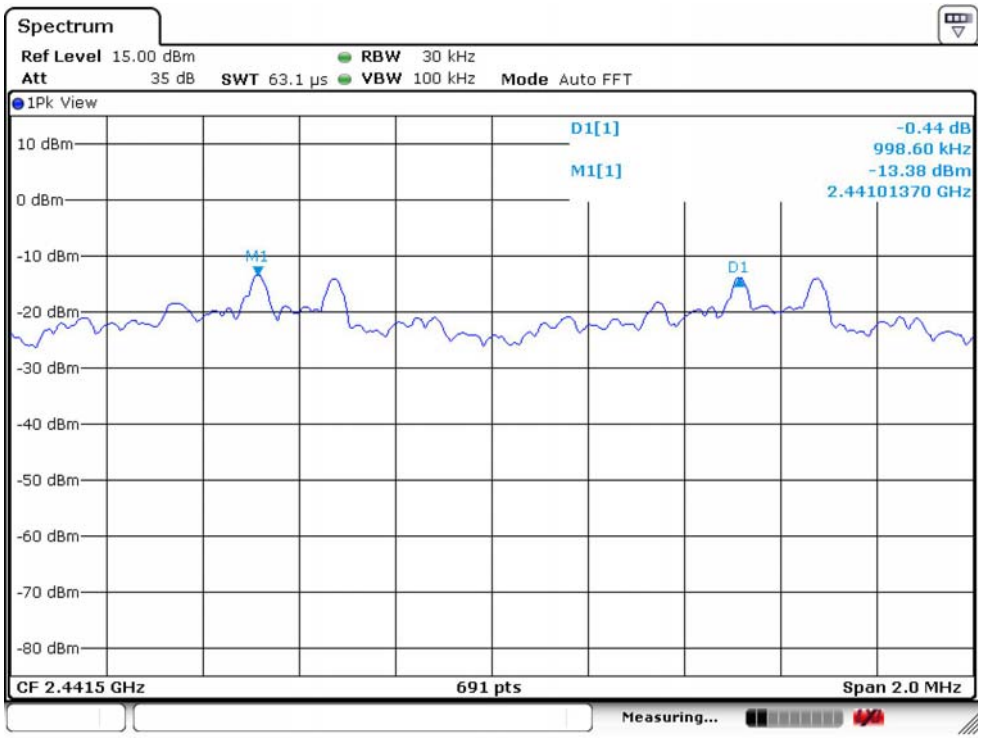
Test Mode : BT (3 Mbps) DH5 Channel : Low




Test Mode : BT (3 Mbps) DH5 Channel : Middle



Test Mode : BT (3 Mbps) DH5 Channel : High

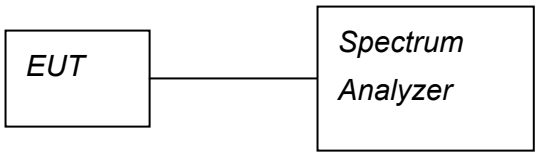


# 6 Number of Hopping Channels

## 6.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 6.2 Test Arrangement and Procedure




1. *The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).*
2. *The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps.*
3. *The RBW is set to 1 MHz and VBW is set to 1 MHz .*
4. *Max Hold.*

## 6.3 Limit (§ 15.247(a)(1)(iii))

*Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.*

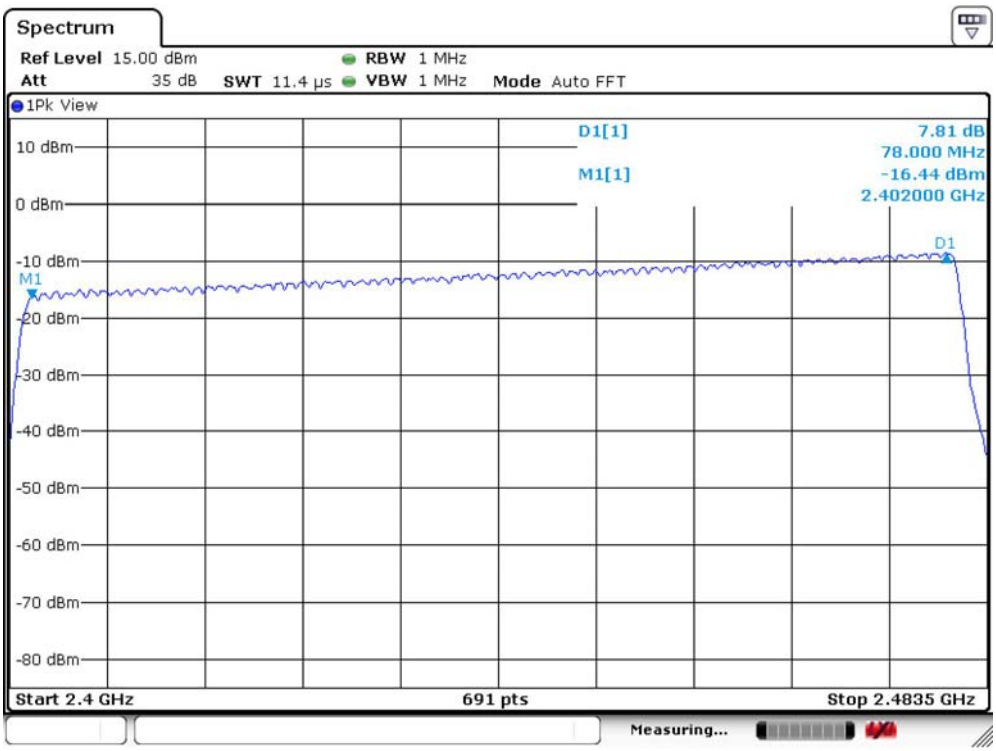
## 6.4 Test Result

**79 Channels have been used.**

**Compliance.**

*The final test data are shown on the following page(s).*

*Test Mode : BT (3 Mbps) DH5*



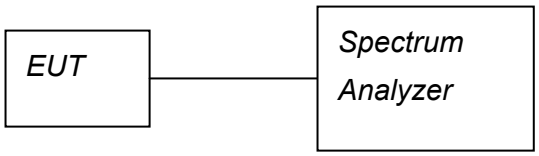

*Note : After pre-test, we found that each and every operation mode has using all 79 channels. All test data are similar to the above one. Therefore, we choice the very plot to represent them all.*

# 7 Average Time of Occupancy

## 7.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 7.2 Test Arrangement and Procedure




1. *The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).*
2. *First, measure the number of pulses per 5 second, the RBW is set to 100 kHz and VBW is set to 100 kHz. Sweep is set to 5 sec. Span 0 Hz.*
3. *Second, measure the Pulse width, the RBW is set to 1MHz and VBW is set to 1MHz. Sweep is adjusted to appropriate time to show a complete pulse. Span 0 Hz.*

## 7.3 Limit (§ 15.247(a)(1)(iii))

*The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.*

## 7.4 Test Result

**Compliance.**

*The final test data are shown on the following page(s).*

| Bluetooth (3 Mbps) Channel 00 | | | | | |
|---|---|---|---|---|---|
| DH Packet | Number of Hopping channels | Number of Pulses per 5 sec | Pulse Width (sec) | AV time of Occupancy (sec) | Limit (sec) |
| DH1 | 79 | 50 | 0.00044058 | 0.139223 | 0.4 |
| DH3 | 79 | 26 | 0.00169710 | 0.278867 | 0.4 |
| DH5 | 79 | 17 | 0.00295072 | 0.317025 | 0.4 |

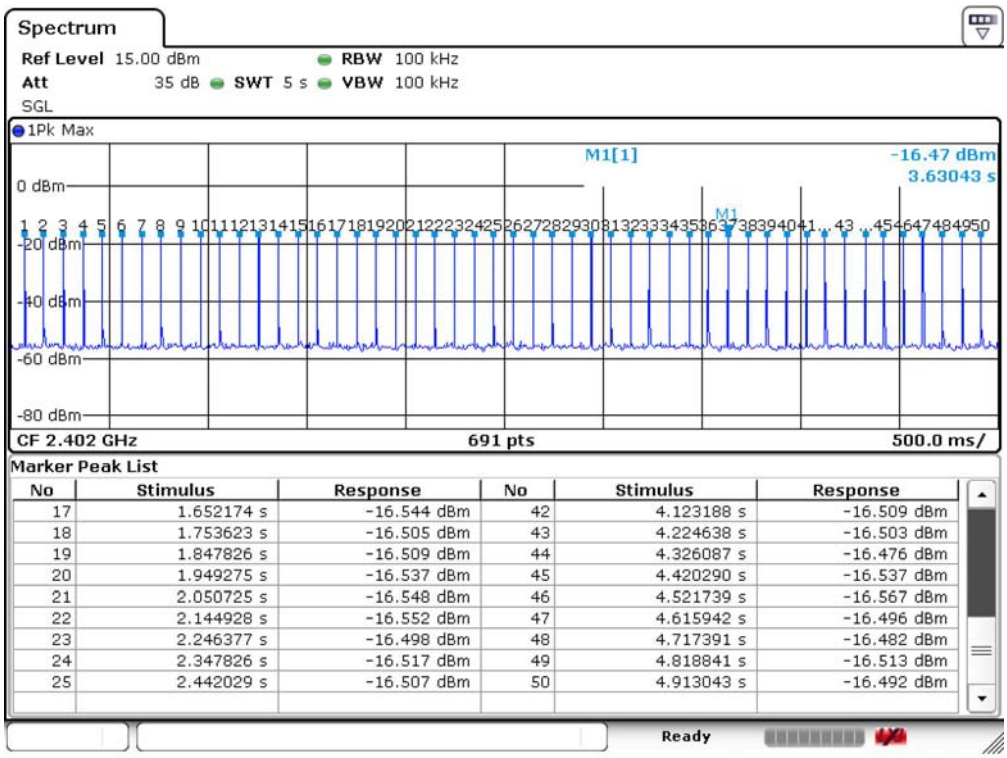
| Bluetooth (3 Mbps) Channel 39 | | | | | |
|---|---|---|---|---|---|
| DH Packet | Number of Hopping channels | Number of Pulses per 5 sec | Pulse Width (sec) | AV time of Occupancy (sec) | Limit (sec) |
| DH1 | 79 | 51 | 0.00044348 | 0.142942 | 0.4 |
| DH3 | 79 | 25 | 0.00171159 | 0.270431 | 0.4 |
| DH5 | 79 | 17 | 0.00294348 | 0.316247 | 0.4 |

| Bluetooth (3 Mbps) Channel 78 (Worst Case) | | | | | |
|---|---|---|---|---|---|
| DH Packet | Number of Hopping channels | Number of Pulses per 5 sec | Pulse Width (sec) | AV time of Occupancy (sec) | Limit (sec) |
| DH1 | 79 | 51 | 0.00044348 | 0.142942 | 0.4 |
| DH3 | 79 | 25 | 0.00169710 | 0.268142 | 0.4 |
| DH5 | 79 | 17 | 0.00297246 | 0.319361 | 0.4 |
| Remark:<br>AV time of Occupancy (sec) = 79 (number of hopping channels) * 0.4 (sec) * Number of Pulses per 5 sec/ 5 * Pulse Width (sec) | | | | | |

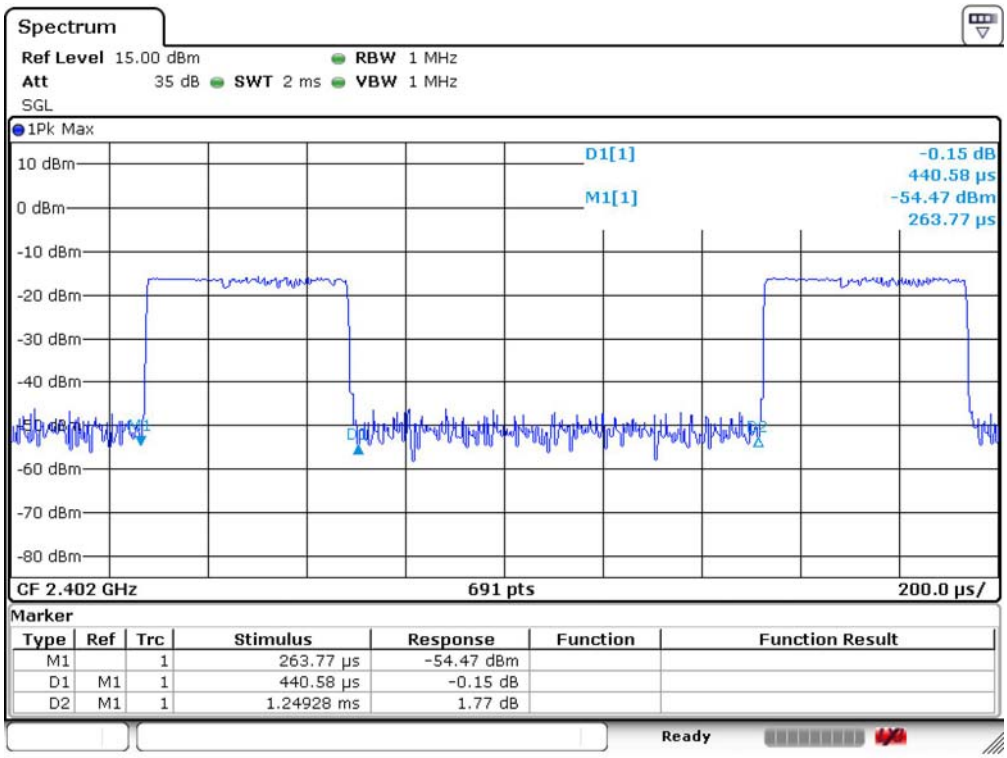
Note : 1. The EUT does not support AFH mode.

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (3Mbps) DH1 | Channel | : | 00 |

Number of Pulses Per 5 sec

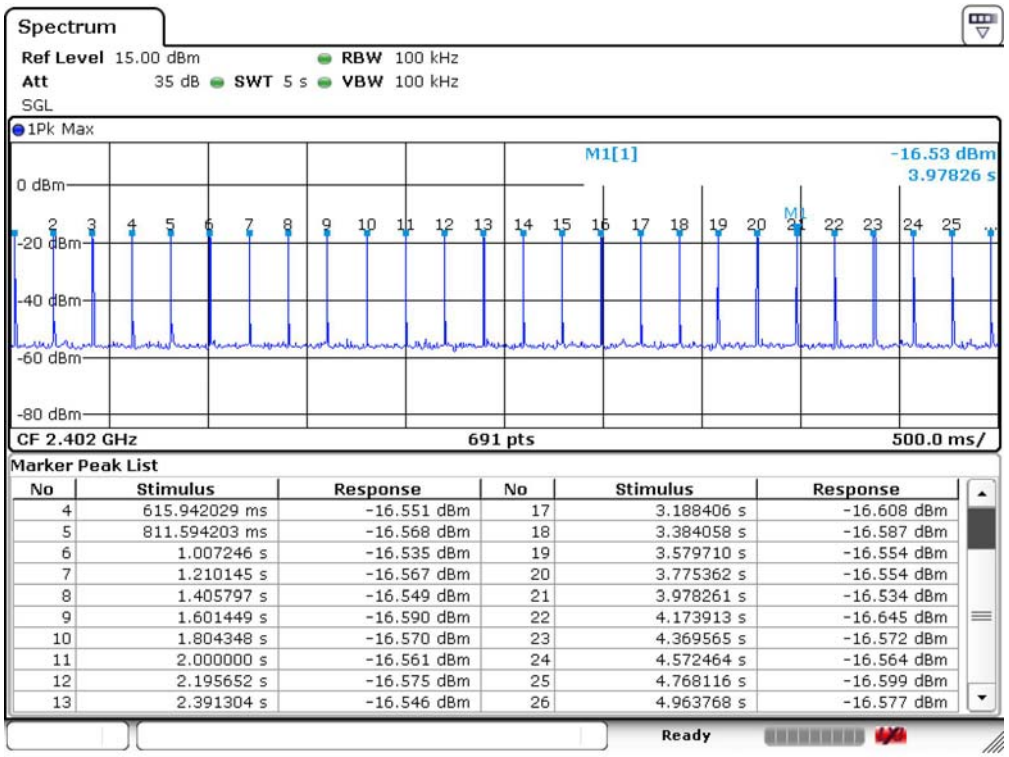



Pulse Width (sec)



*Test Mode : BT (3 Mbps) DH3 Channel : 00*

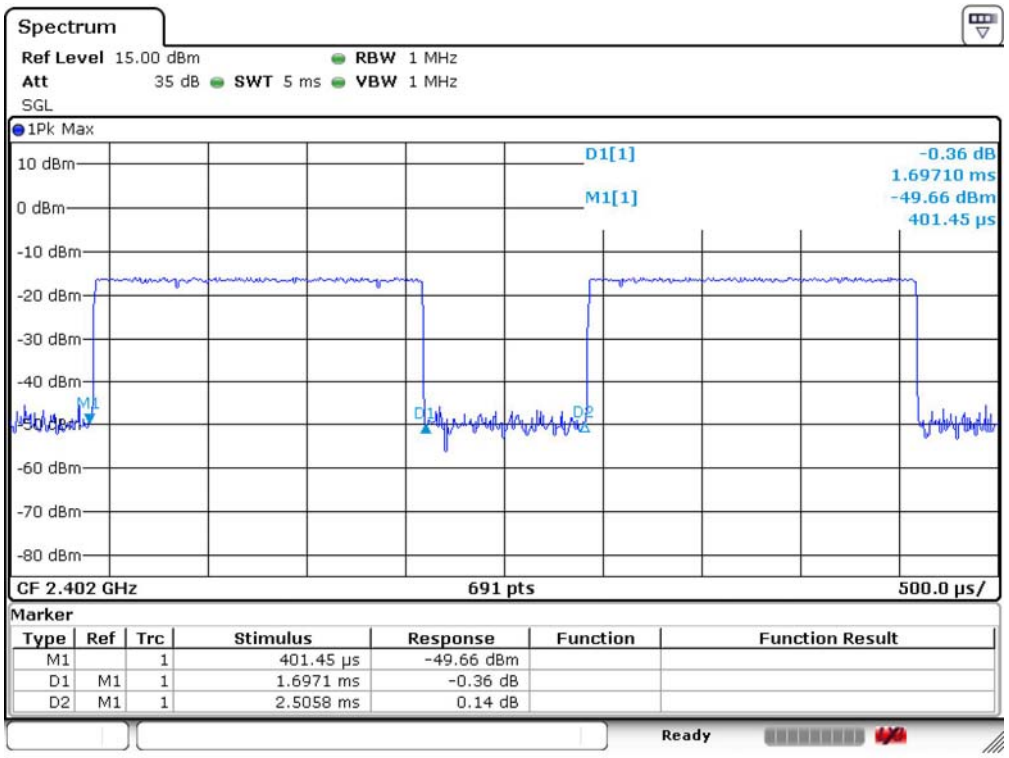
*Number of Pulses Per 5 sec*




| No | Stimulus | Response | No | Stimulus | Response |
|---|---|---|---|---|---|
| 4 | 615.942029 ms | -16.551 dBm | 17 | 3.188406 s | -16.608 dBm |
| 5 | 811.594203 ms | -16.568 dBm | 18 | 3.384058 s | -16.587 dBm |
| 6 | 1.007246 s | -16.535 dBm | 19 | 3.579710 s | -16.554 dBm |
| 7 | 1.210145 s | -16.567 dBm | 20 | 3.775362 s | -16.554 dBm |
| 8 | 1.405797 s | -16.549 dBm | 21 | 3.978261 s | -16.534 dBm |
| 9 | 1.601449 s | -16.590 dBm | 22 | 4.173913 s | -16.645 dBm |
| 10 | 1.804348 s | -16.570 dBm | 23 | 4.369565 s | -16.572 dBm |
| 11 | 2.000000 s | -16.561 dBm | 24 | 4.572464 s | -16.564 dBm |
| 12 | 2.195652 s | -16.575 dBm | 25 | 4.768116 s | -16.599 dBm |
| 13 | 2.391304 s | -16.546 dBm | 26 | 4.963768 s | -16.577 dBm |



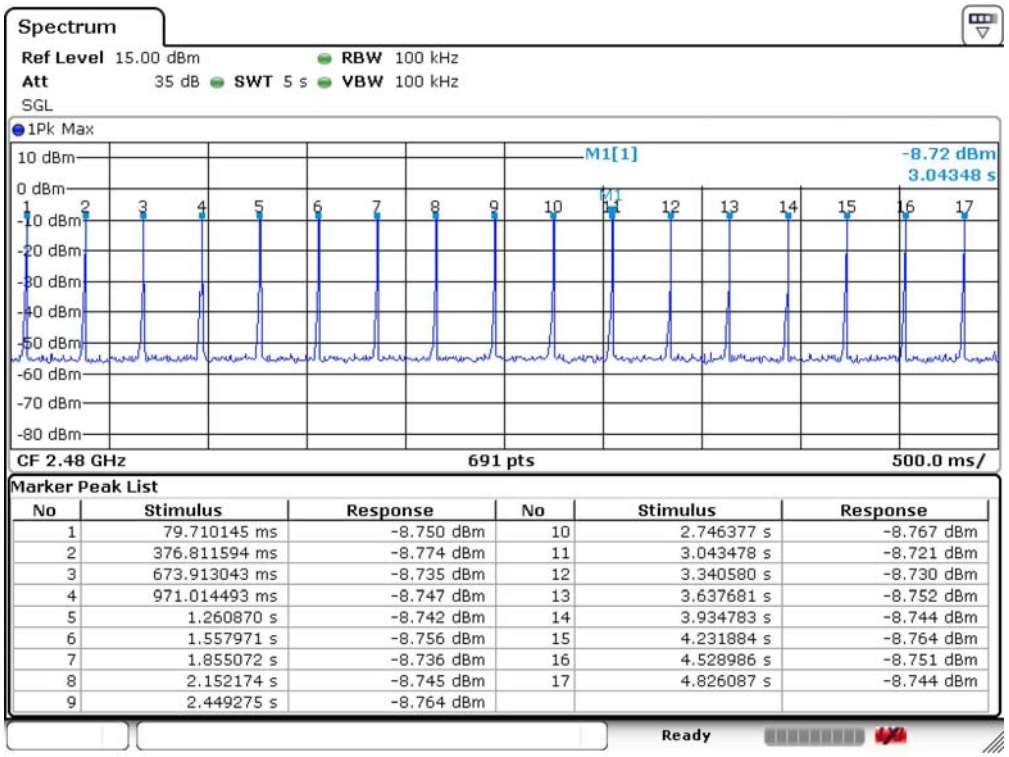
*Pulse Width (sec)*




| Type | Ref | Trc | Stimulus | Response | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 401.45 µs | -49.66 dBm | | |
| D1 | M1 | 1 | 1.6971 ms | -0.36 dB | | |
| D2 | M1 | 1 | 2.5058 ms | 0.14 dB | | |

*Test Mode : BT (3 Mbps) DH5 Channel : 00*

*Number of Pulses Per 5 sec*

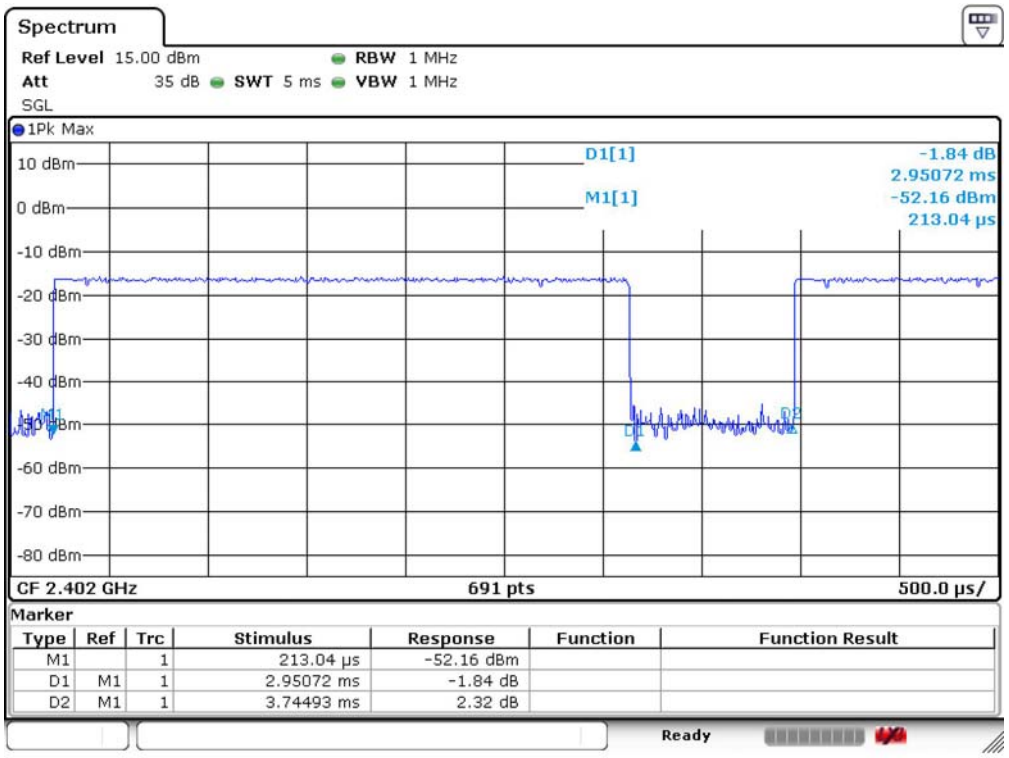



Marker Peak List

| No | Stimulus | Response | No | Stimulus | Response |
|---|---|---|---|---|---|
| 1 | 79.710145 ms | -8.750 dBm | 10 | 2.746377 s | -8.767 dBm |
| 2 | 376.811594 ms | -8.774 dBm | 11 | 3.043478 s | -8.721 dBm |
| 3 | 673.913043 ms | -8.735 dBm | 12 | 3.340580 s | -8.730 dBm |
| 4 | 971.014493 ms | -8.747 dBm | 13 | 3.637681 s | -8.752 dBm |
| 5 | 1.260870 s | -8.742 dBm | 14 | 3.934783 s | -8.744 dBm |
| 6 | 1.557971 s | -8.756 dBm | 15 | 4.231884 s | -8.764 dBm |
| 7 | 1.855072 s | -8.736 dBm | 16 | 4.528986 s | -8.751 dBm |
| 8 | 2.152174 s | -8.745 dBm | 17 | 4.826087 s | -8.744 dBm |
| 9 | 2.449275 s | -8.764 dBm | | | |



*Pulse Width (sec)*

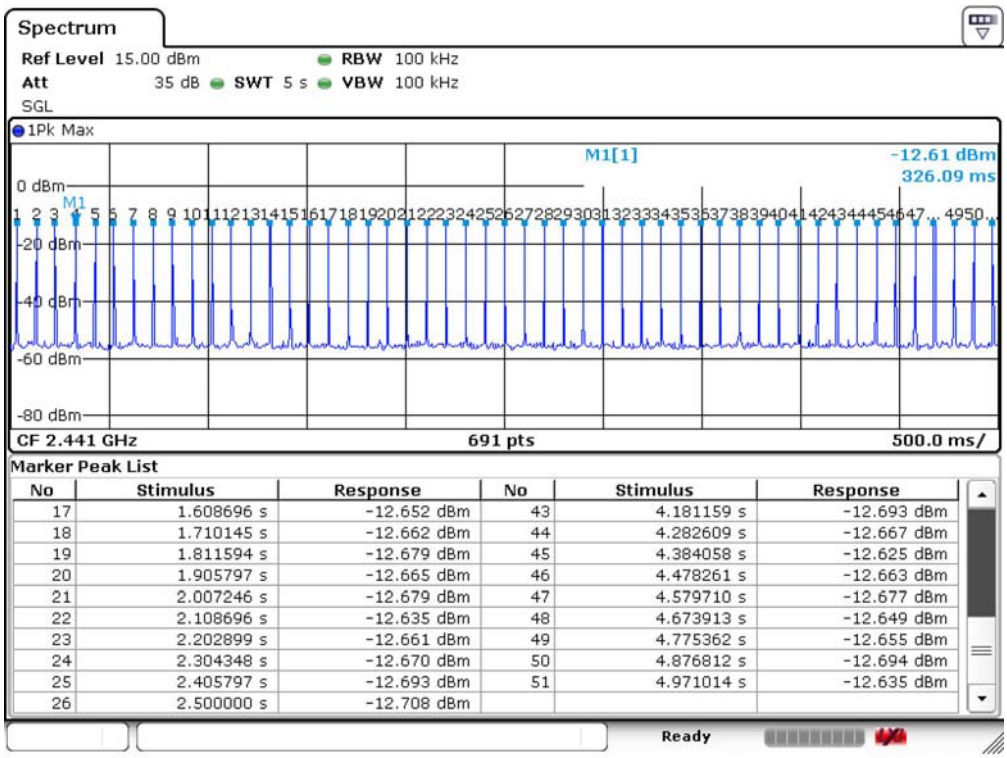



Marker

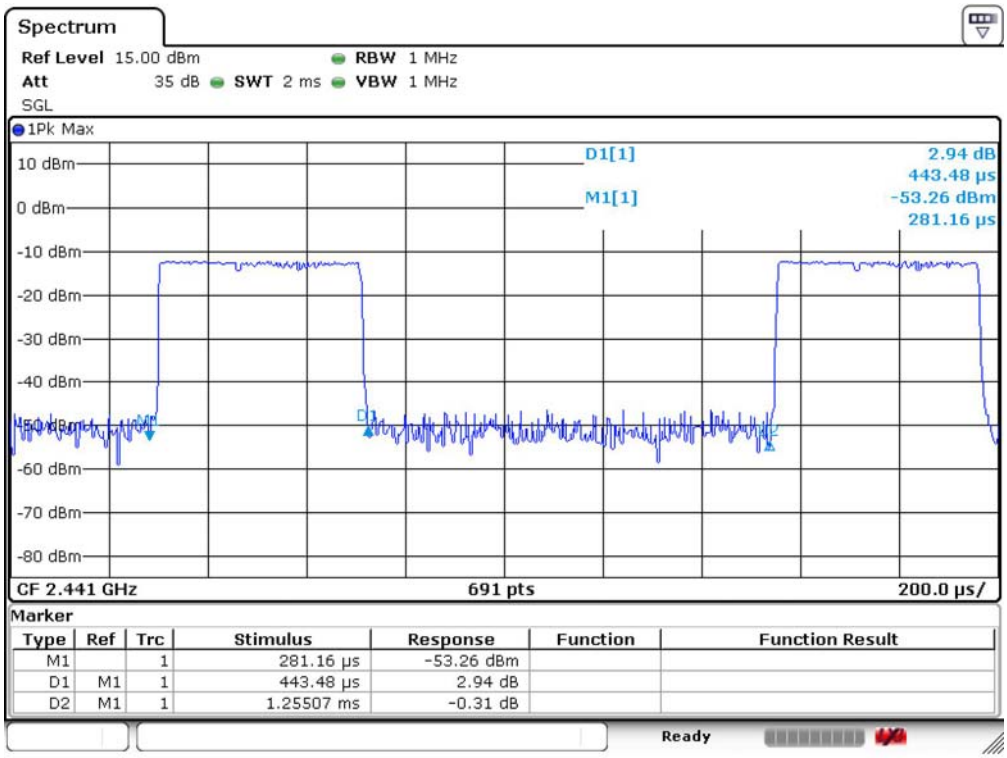
| Type | Ref | Trc | Stimulus | Response | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 213.04 µs | -52.16 dBm | | |
| D1 | M1 | 1 | 2.95072 ms | -1.84 dB | | |
| D2 | M1 | 1 | 3.74493 ms | 2.32 dB | | |

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (3 Mbps) DH1 | Channel | : | 39 |

Number of Pulses Per 5 sec

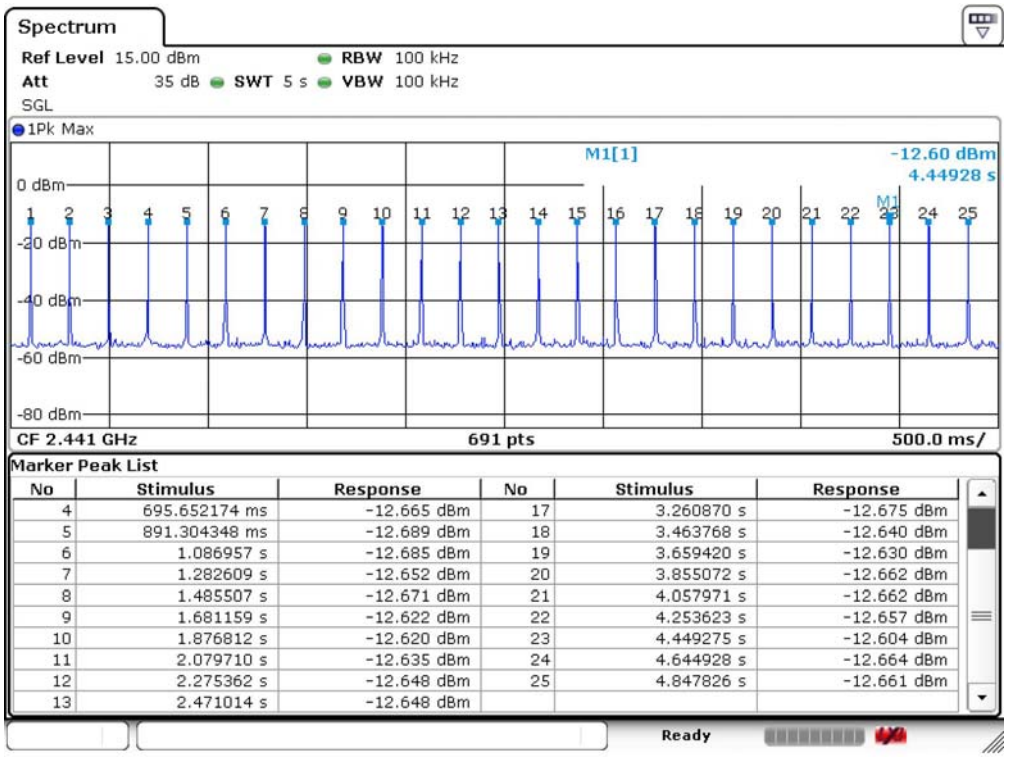



Pulse Width (sec)

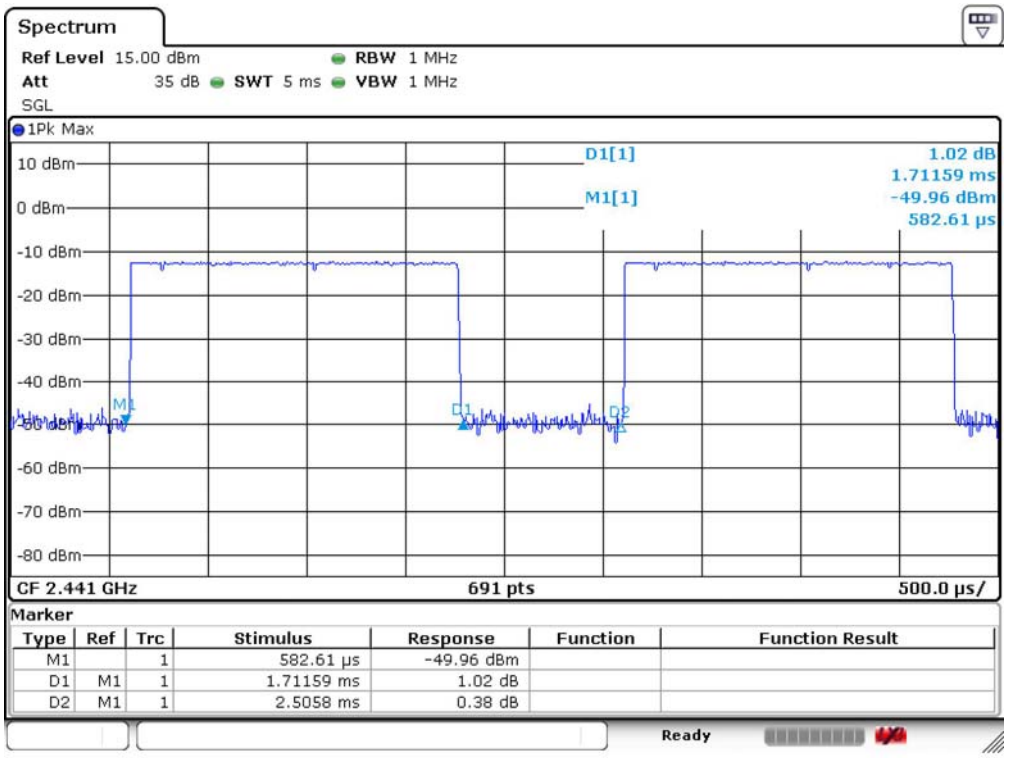


*Test Mode : BT (3 Mbps) DH3 Channel : 39*

*Number of Pulses Per 5 sec*

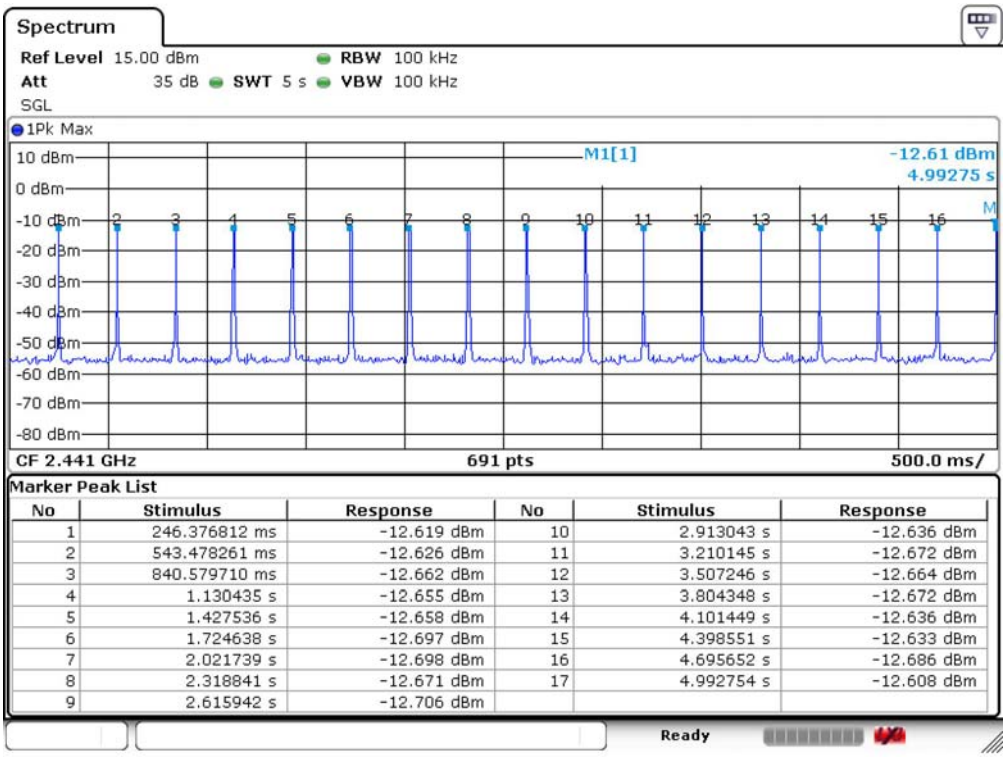



*Pulse Width (sec)*



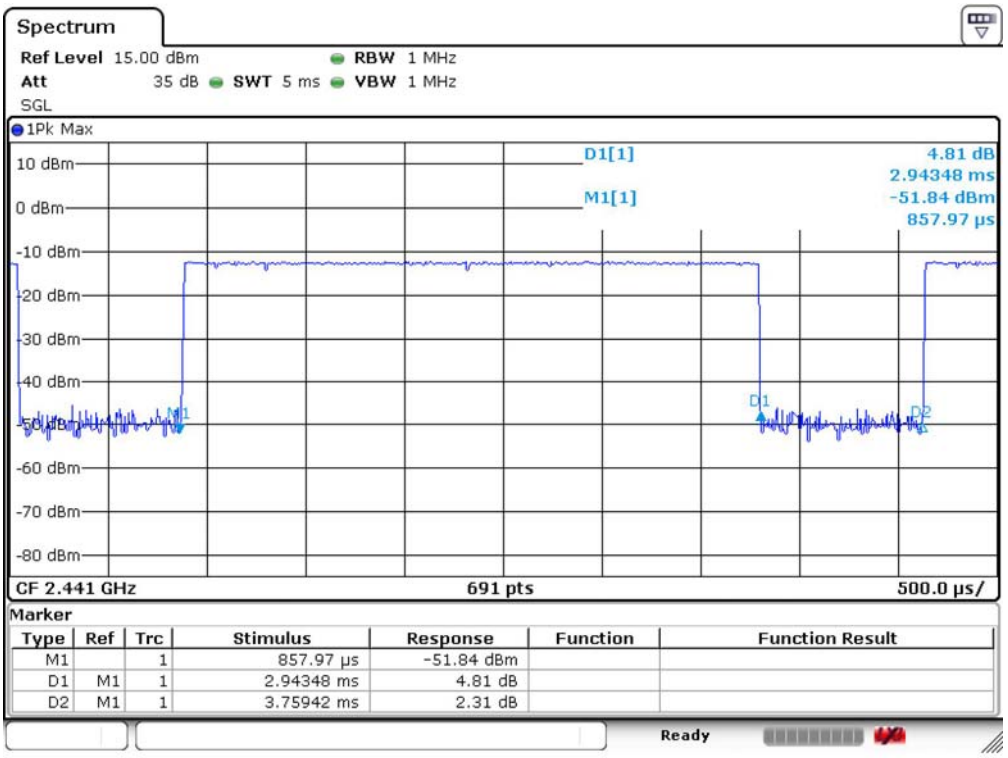
*Test Mode : BT (3 Mbps) DH5 Channel : 39*

*Number of Pulses Per 5 sec*




| No | Stimulus | Response | No | Stimulus | Response |
|---|---|---|---|---|---|
| 1 | 246.376812 ms | -12.619 dBm | 10 | 2.913043 s | -12.636 dBm |
| 2 | 543.478261 ms | -12.626 dBm | 11 | 3.210145 s | -12.672 dBm |
| 3 | 840.579710 ms | -12.662 dBm | 12 | 3.507246 s | -12.664 dBm |
| 4 | 1.130435 s | -12.655 dBm | 13 | 3.804348 s | -12.672 dBm |
| 5 | 1.427536 s | -12.658 dBm | 14 | 4.101449 s | -12.636 dBm |
| 6 | 1.724638 s | -12.697 dBm | 15 | 4.398551 s | -12.633 dBm |
| 7 | 2.021739 s | -12.698 dBm | 16 | 4.695652 s | -12.686 dBm |
| 8 | 2.318841 s | -12.671 dBm | 17 | 4.992754 s | -12.608 dBm |
| 9 | 2.615942 s | -12.706 dBm | | | |

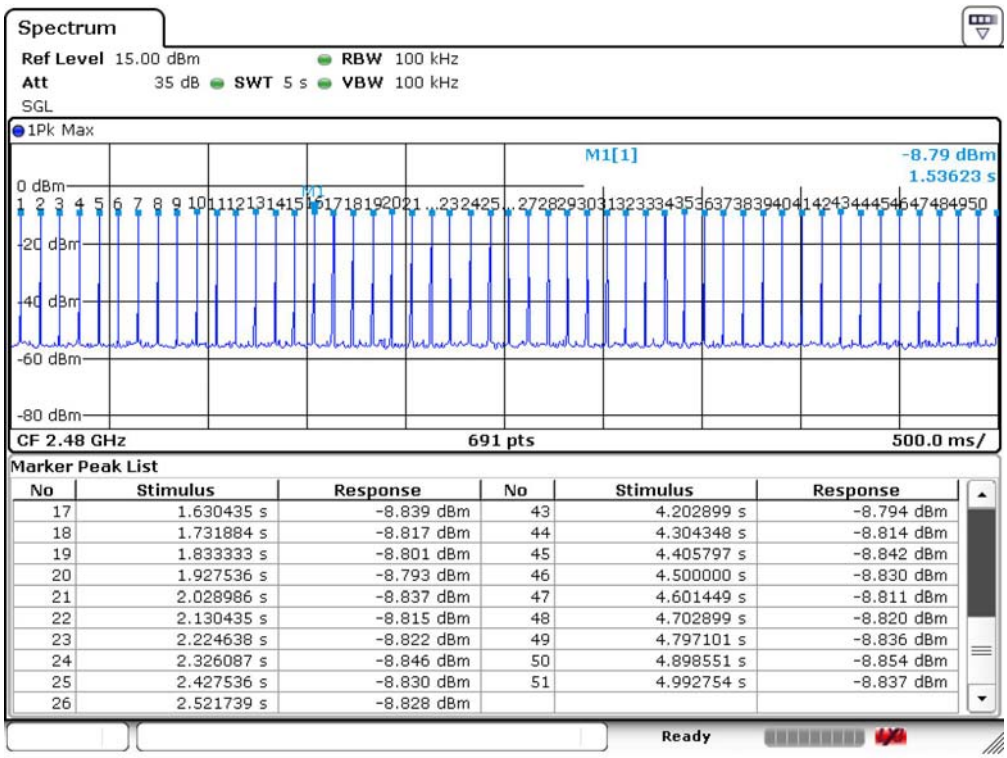
*Pulse Width (sec)*



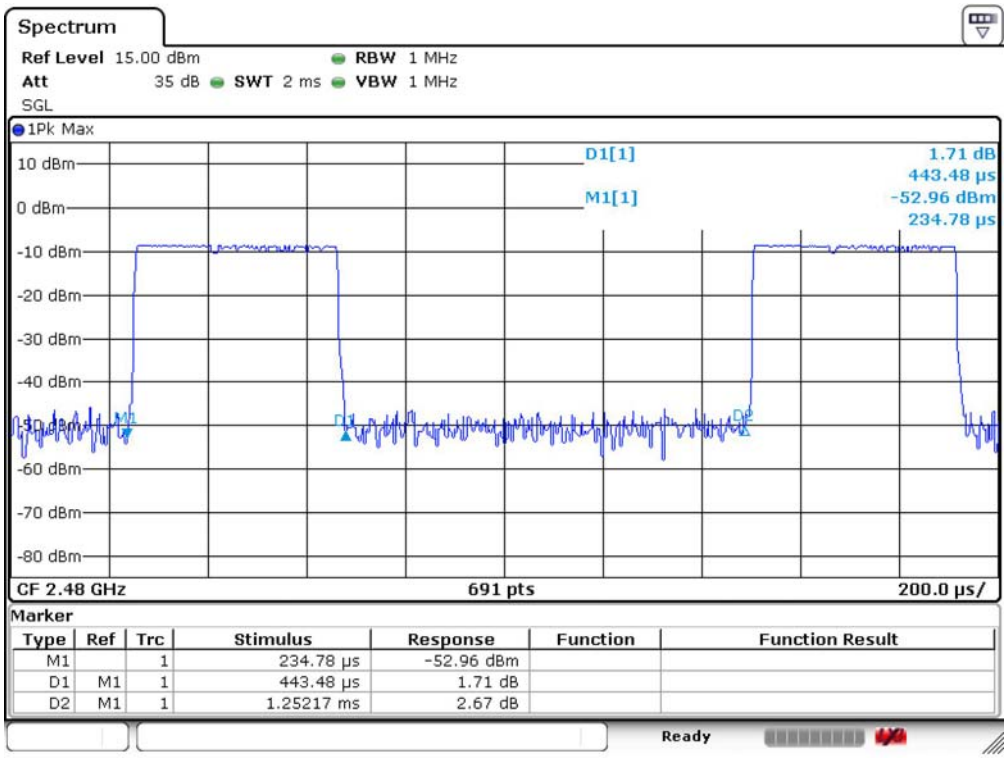

| Type | Ref | Trc | Stimulus | Response | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 857.97 µs | -51.84 dBm | | |
| D1 | M1 | 1 | 2.94348 ms | 4.81 dB | | |
| D2 | M1 | 1 | 3.75942 ms | 2.31 dB | | |

| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (3 Mbps) DH1 | Channel | : | 78 |

Number of Pulses Per 5 sec

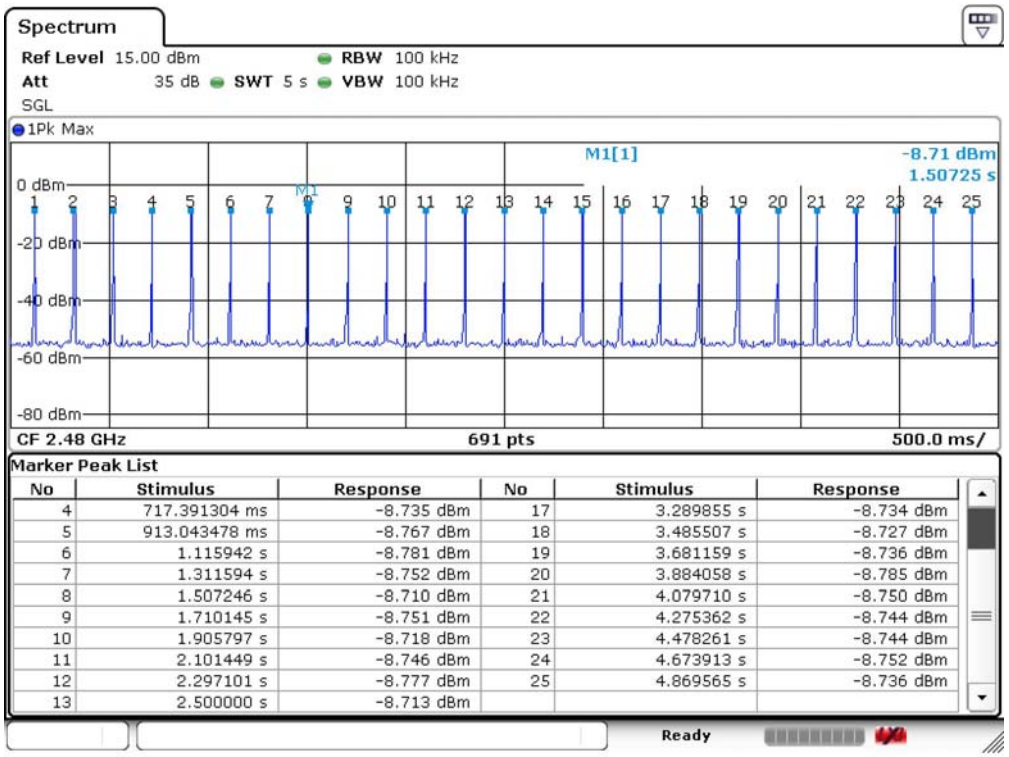



Pulse Width (sec)

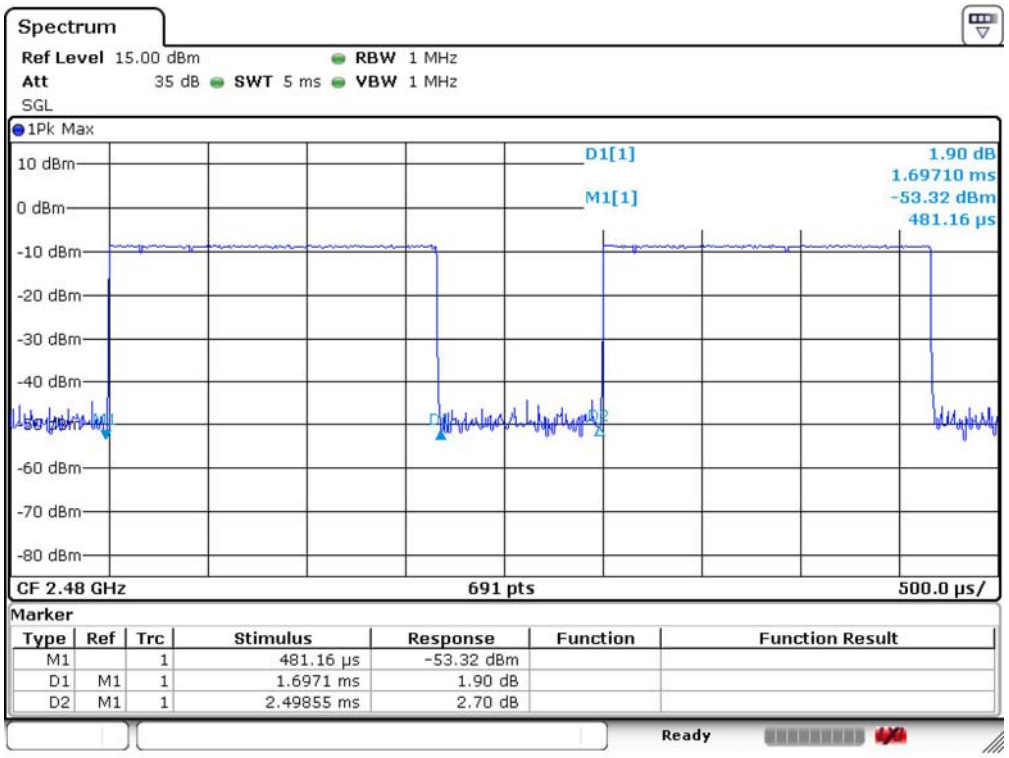


*Test Mode : BT (3 Mbps) DH3 Channel : 78*

*Number of Pulses Per 5 sec*

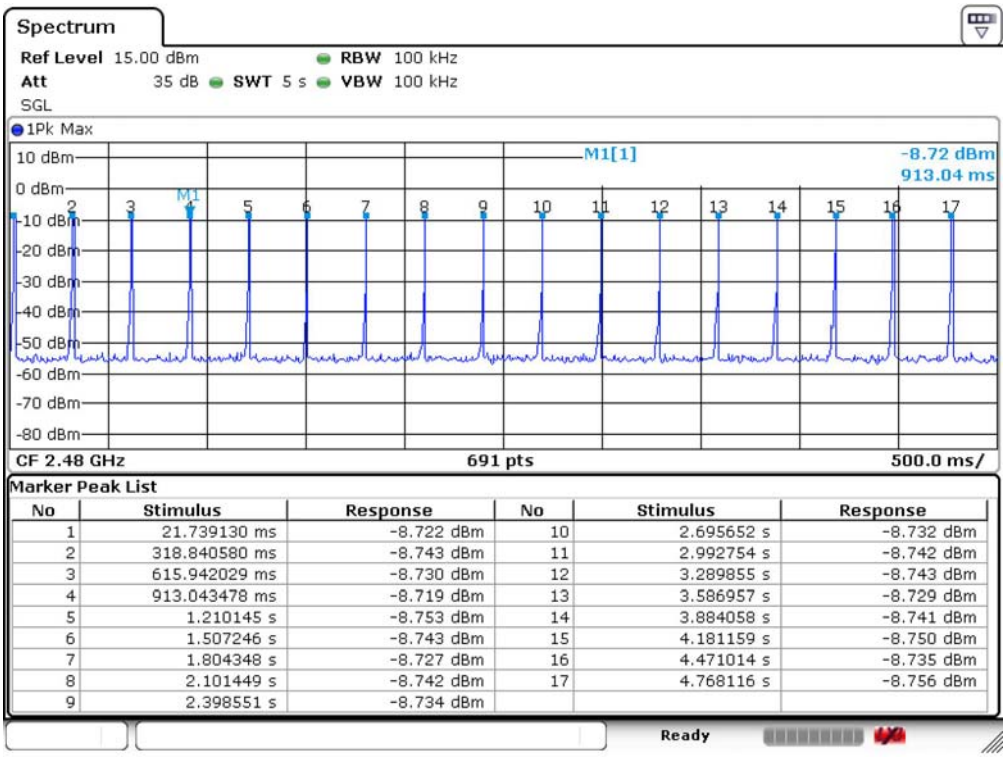



*Pulse Width (sec)*

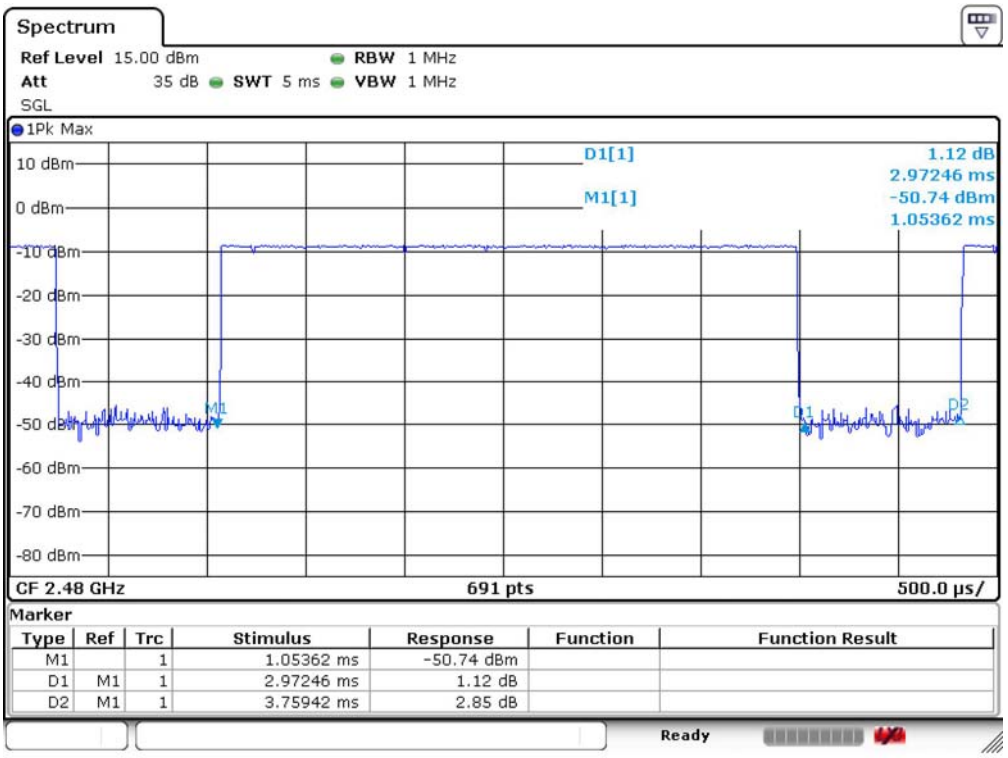


*Test Mode : BT (3 Mbps) DH5 Channel : 78*

*Number of Pulses Per 5 sec*




*Pulse Width (sec)*

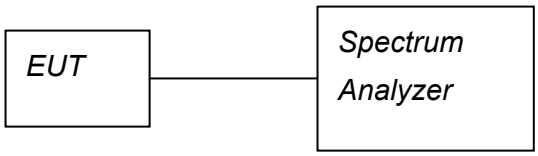


# 8 Peak Output Power

## 8.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 8.2 Test Arrangement and Procedure




1. *The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).*
2. *The RBW is set to 3MHz and VBW is set to 3MHz. Span set to 5MHz.*
3. *Max Hold..*

## 8.3 Limit (§ 15.247(b))

*15.247(b) - The maximum peak conducted output power of the intentional radiator shall not exceed the following:*

*15.247(b)(1) - For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.*

*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.*

*The maximum antenna gain is 3 dBi, therefore, the limit is 30 dBm.*

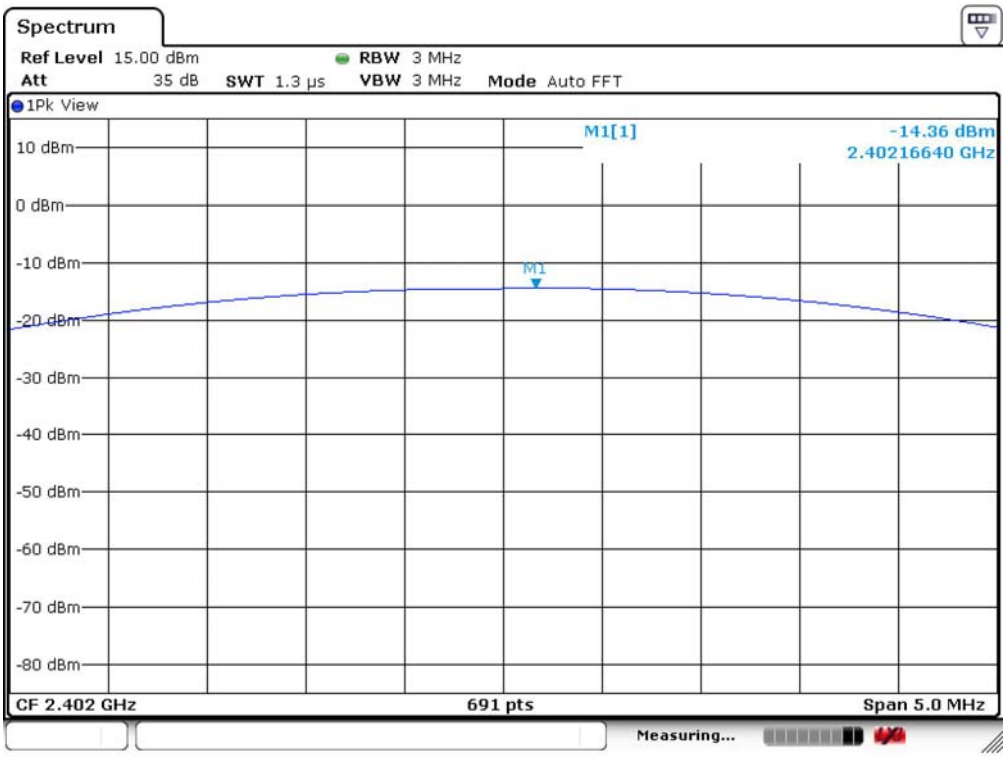
## 8.4 Test Result

**Compliance.**

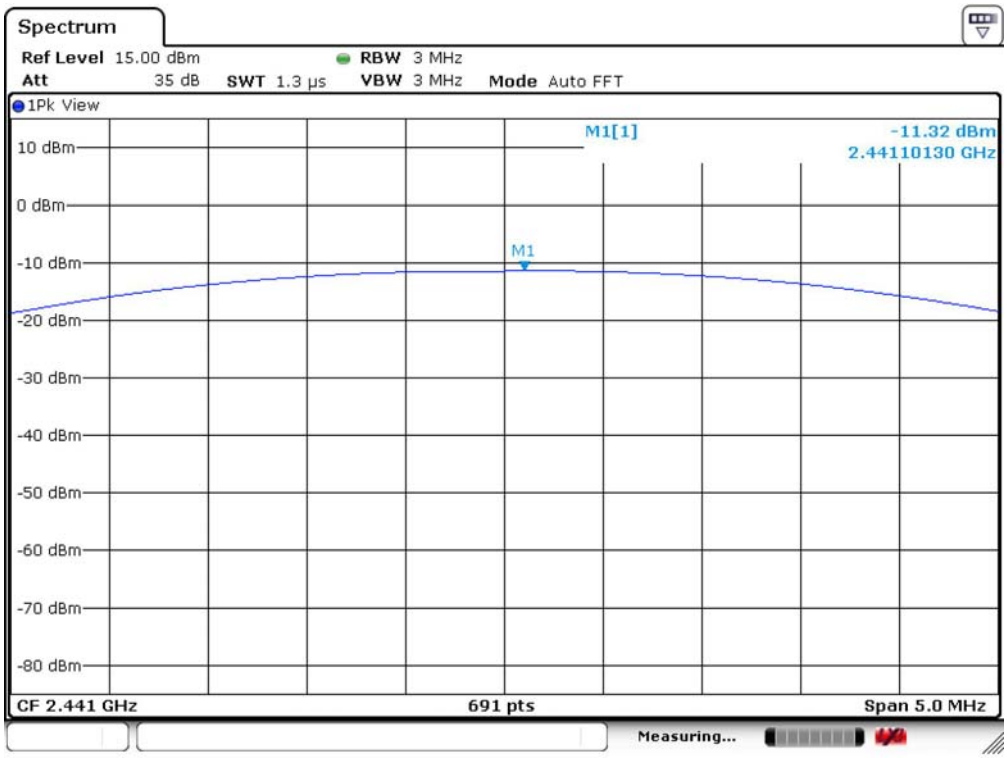
*The final test data are shown on the following page(s).*

| Bluetooth 1 Mbps (DH5) (Worst Case) | | | |
|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Result (dBm)** | **Limit (dBm)** |
| *00* | *2402* | *-14.36* | *30* |
| *39* | *2441* | *-11.32* | *30* |
| *78* | *2480* | *-7.79* | *30* |

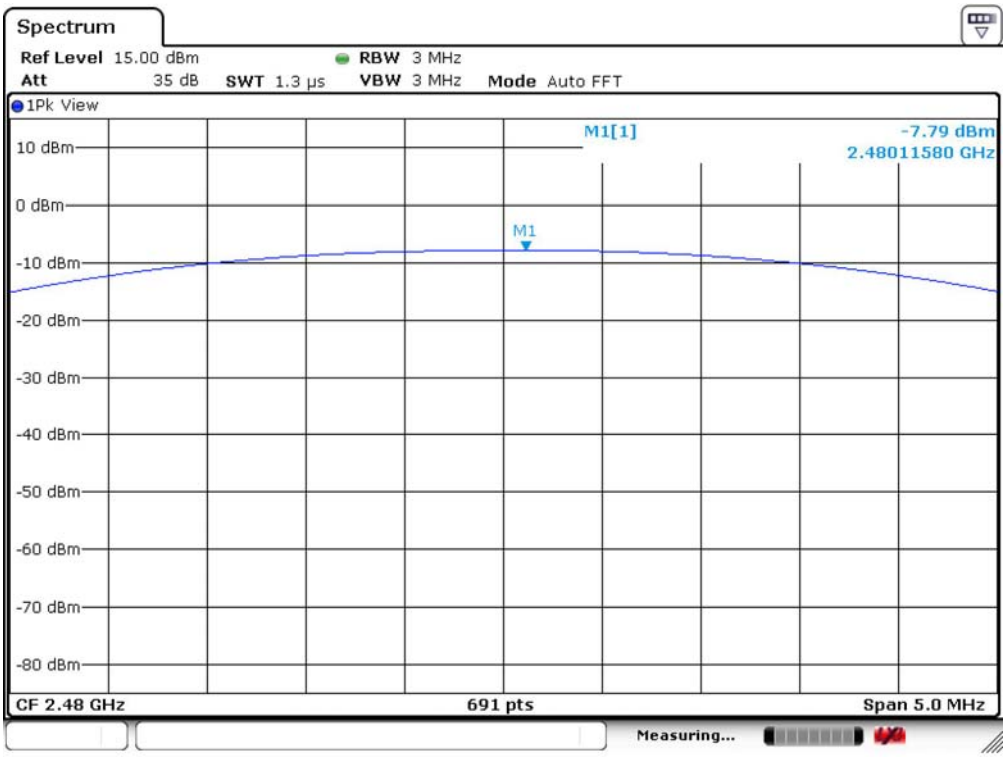
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (1 Mbps) DH5 | Channel | : | 00 |




| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (1 Mbps) DH5 | Channel | : | 39 |



*Test Mode : BT (1 Mbps) DH5 Channel : 78*

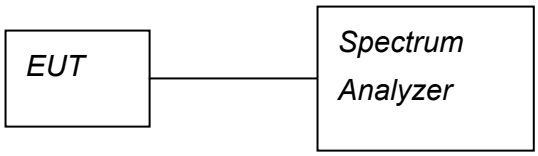


# 9 100kHz Bandwidth of Band Edges

## 9.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 9.2 Test Arrangement and Procedure




1. *Remove the antenna from the transmitter and connected it to a spectrum analyzer through a low loss RF cable (connect an attenuator, if it's necessary).*
2. *The RBW is set to 100 kHz and VBW is set to 300 kHz. Sweep set to Auto. Span set to 100MHz.*
3. *Max Hold. Mark Peak and record max level.*
4. *Keep the same instrument setting, perform the hopping function.*
5. *Max Hold. Mark Peak and record max level.*

## 9.3 Limit (§ 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 the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, 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) (see § 15.205(c)).*

## 9.4 Test Result

**Compliance.**

*The final test data are shown on the following page(s).*

*Since the fix channel mode is the worst case, data of the hopping mode were not recorded in this report.*

| Bluetooth (1Mbps) Channel: 00 | | | | | | |
|---|---|---|---|---|---|---|
| Measured Result | | | | | Result (dB) | Limit (dB) |
| Mode | Lower Channel (MHz) | Max Peak Power (dBm) | Highest Freq. at Lower Band edge (MHz) | Max Peak Power at Lower Band edge (dBm) | | |
| non-Hopping | 2402.16 | -15.22 | 2400 | -58.61 | 43.39 | 20 |
| Hopping | 2405.05 | -14.82 | 2387.41 | -58.76 | 43.94 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.*

| Bluetooth (2Mbps) Channel: 00 | | | | | | |
|---|---|---|---|---|---|---|
| Measured Result | | | | | Result (dB) | Limit (dB) |
| Mode | Lower Channel (MHz) | Max Peak Power (dBm) | Highest Freq. at Lower Band edge (MHz) | Max Peak Power at Lower Band edge (dBm) | | |
| non-Hopping | 2401.96 | -16.90 | 2327.87 | -57.33 | 40.43 | 20 |
| Hopping | 2405.05 | -15.84 | 2394.31 | -58.17 | 42.33 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.*

| Bluetooth (3Mbps) Channel: 00 | | | | | | |
|---|---|---|---|---|---|---|
| Measured Result | | | | | Result (dB) | Limit (dB) |
| Mode | Lower Channel (MHz) | Max Peak Power (dBm) | Highest Freq. at Lower Band edge (MHz) | Max Peak Power at Lower Band edge (dBm) | | |
| non-Hopping | 2402.06 | -16.64 | 2393.51 | -57.78 | 41.14 | 20 |
| Hopping | 2408.15 | -15.57 | 2398.6 | -58.79 | 43.22 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.*

| Bluetooth (1Mbps) Channel: 78 | | | | | | |
|---|---|---|---|---|---|---|
| Measured Result | | | | | Result (dB) | Limit (dB) |
| Mode | Upper Channel (MHz) | Max Peak Power (dBm) | Highest Freq. at Lower Band edge (MHz) | Max Peak Power at Lower Band edge (dBm) | | |
| non-Hopping | 2480 | -8.7 | 2538.66 | -48.53 | 39.83 | 20 |
| Hopping | 2479.121 | -10.08 | 2577.14 | -46.96 | 36.88 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.*

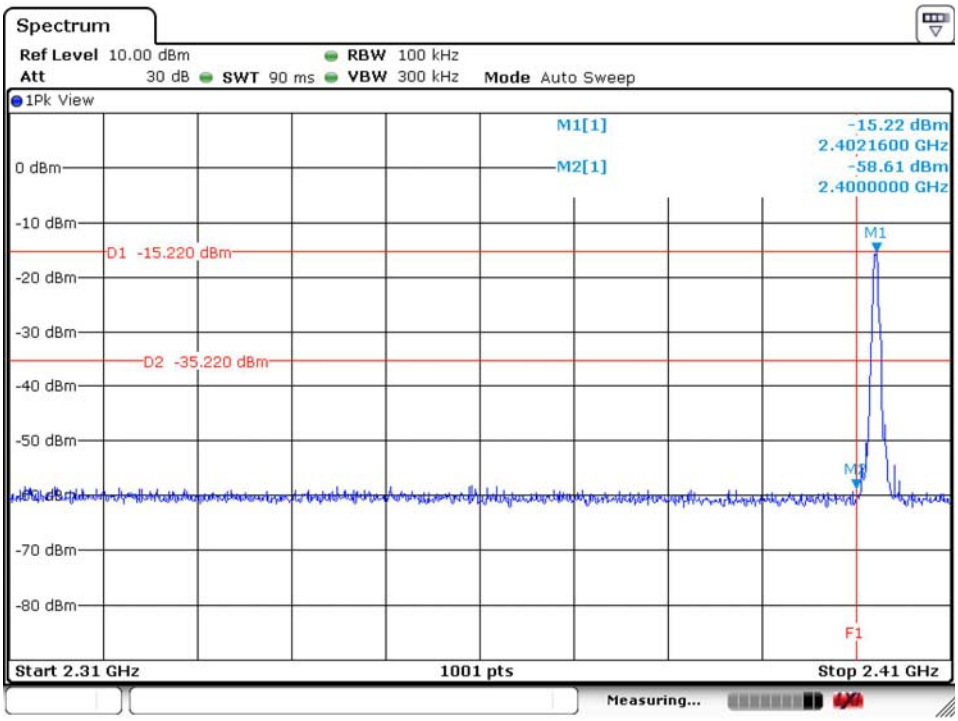
| Bluetooth (2Mbps) Channel: 78 | | | | | | |
|---|---|---|---|---|---|---|
| Measured Result | | | | | Result (dB) | Limit (dB) |
| Mode | Upper Channel (MHz) | Max Peak Power (dBm) | Highest Freq. at Lower Band edge (MHz) | Max Peak Power at Lower Band edge (dBm) | | |
| non-Hopping | 2480 | -9.2 | 2487.68 | -48.54 | 39.34 | 20 |
| Hopping | 2474.07 | -11.17 | 2508.55 | -47.71 | 36.54 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.*

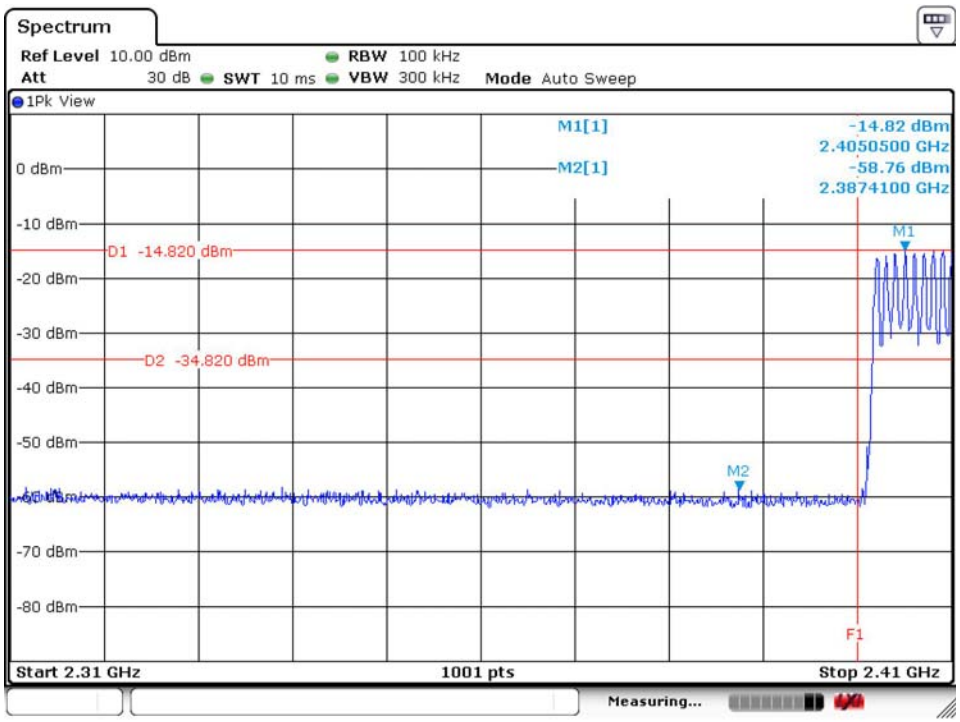
| Bluetooth (3Mbps) Channel: 78 | | | | | | |
|---|---|---|---|---|---|---|
| Measured Result | | | | | Result (dB) | Limit (dB) |
| Mode | Upper Channel (MHz) | Max Peak Power (dBm) | Highest Freq. at Lower Band edge (MHz) | Max Peak Power at Lower Band edge (dBm) | | |
| non-Hopping | 2480 | -9.09 | 2509.65 | -47.44 | 38.35 | 20 |
| Hopping | 2476.04 | -10.67 | 2507.24 | -48.51 | 37.84 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.*

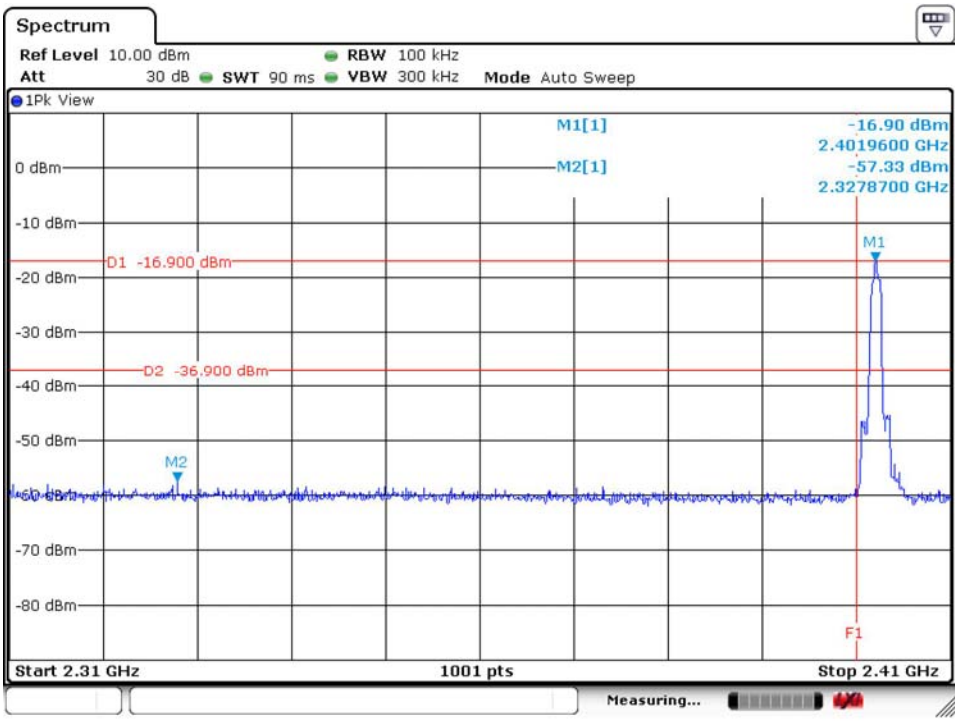
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (1Mbps) non-hopping mode | Channel | : | 2402 |



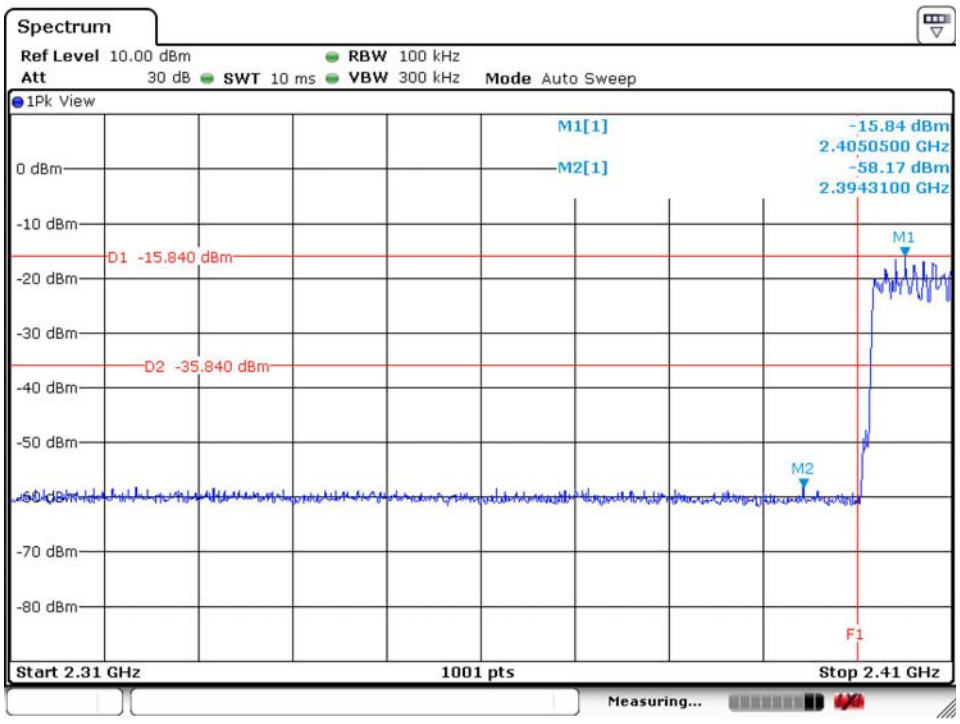

| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (1Mbps) hopping mode | Channel | : | 2402 |



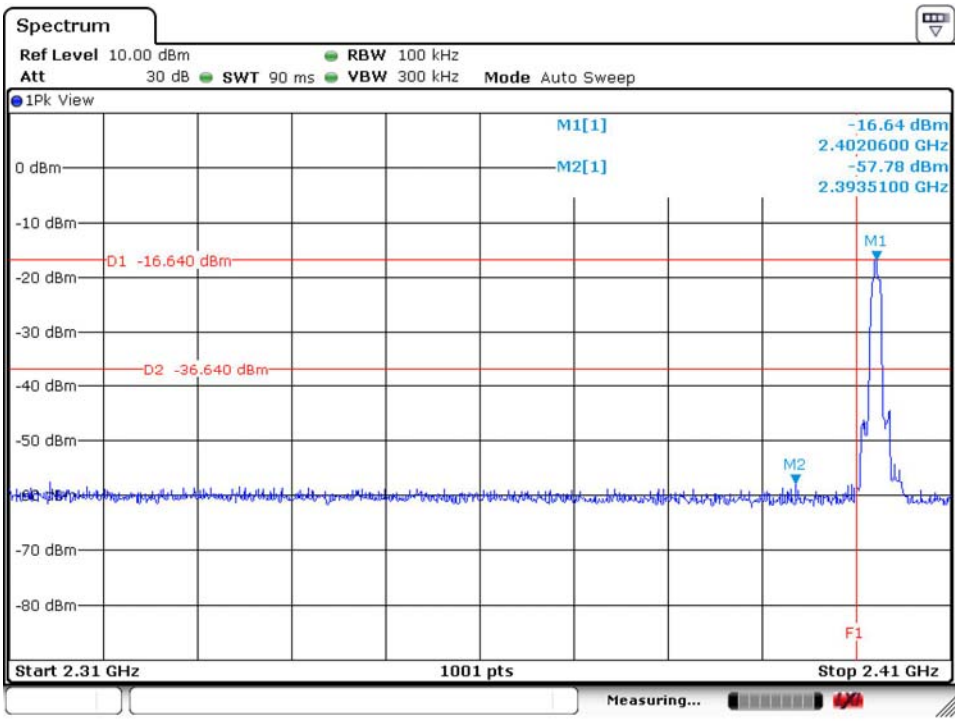
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (2Mbps) non-hopping mode | Channel | : | 2402 |



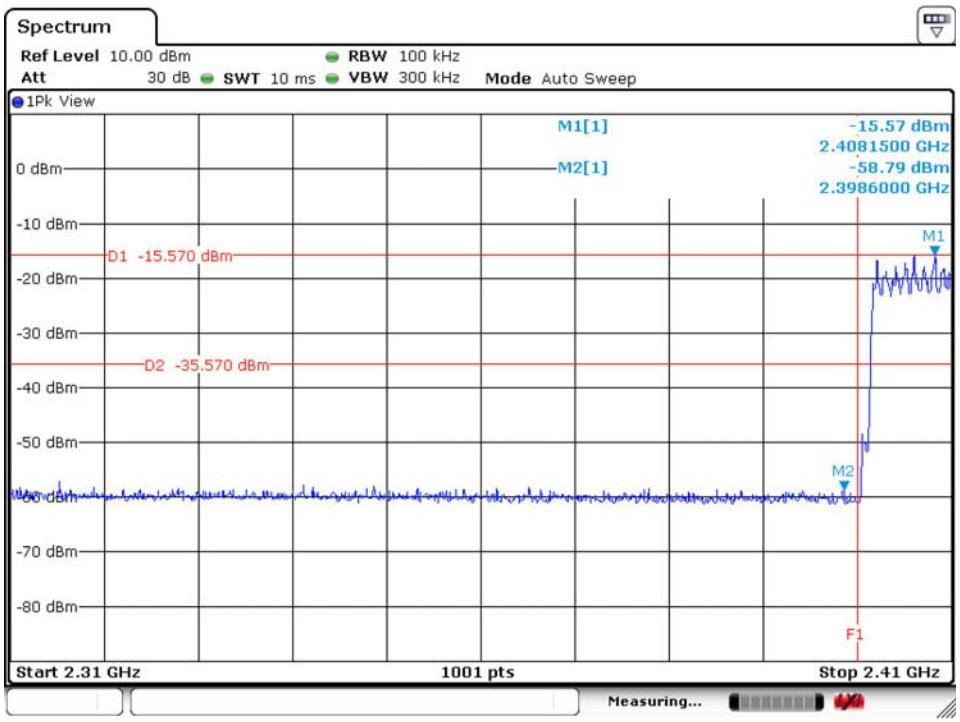

| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (2Mbps) hopping mode | Channel | : | 2402 |



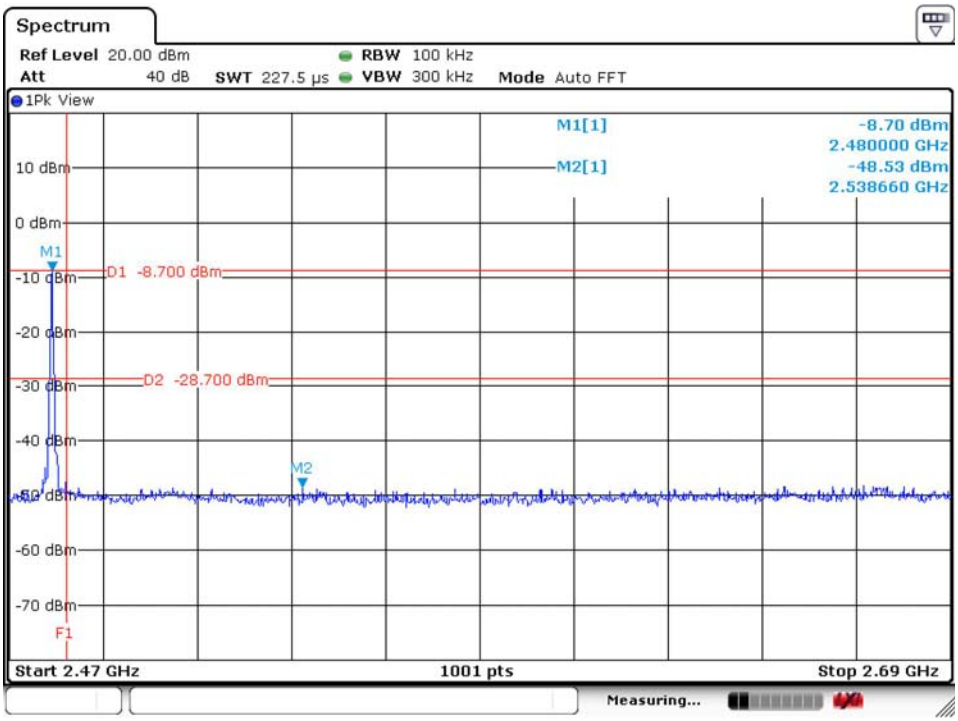
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (3Mbps) non-hopping mode | Channel | : | 2402 |



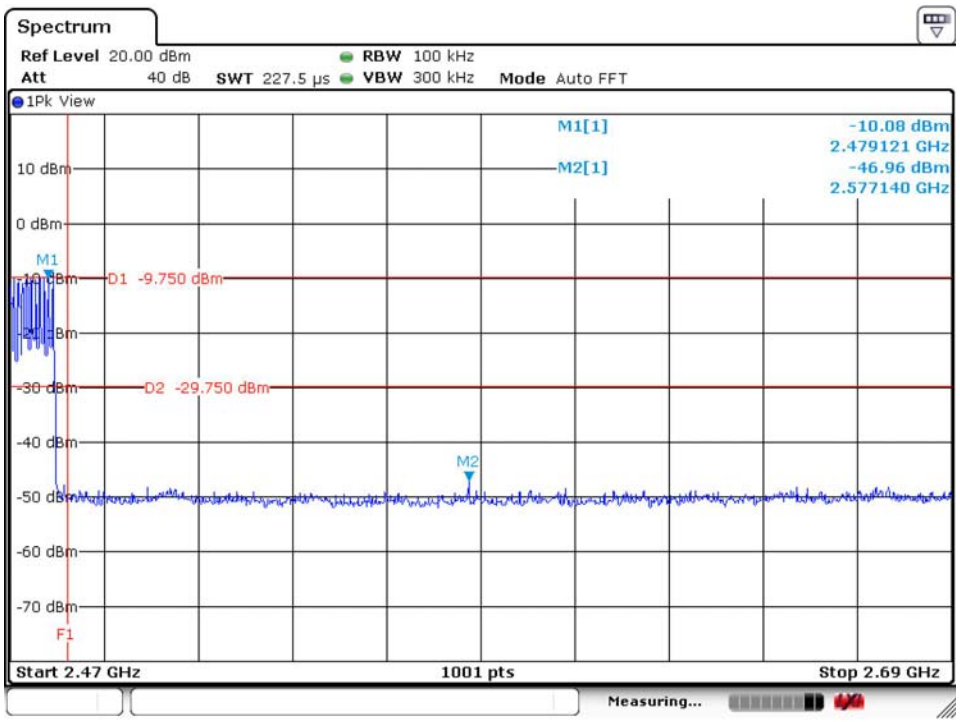

| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (3Mbps) hopping mode | Channel | : | 2402 |



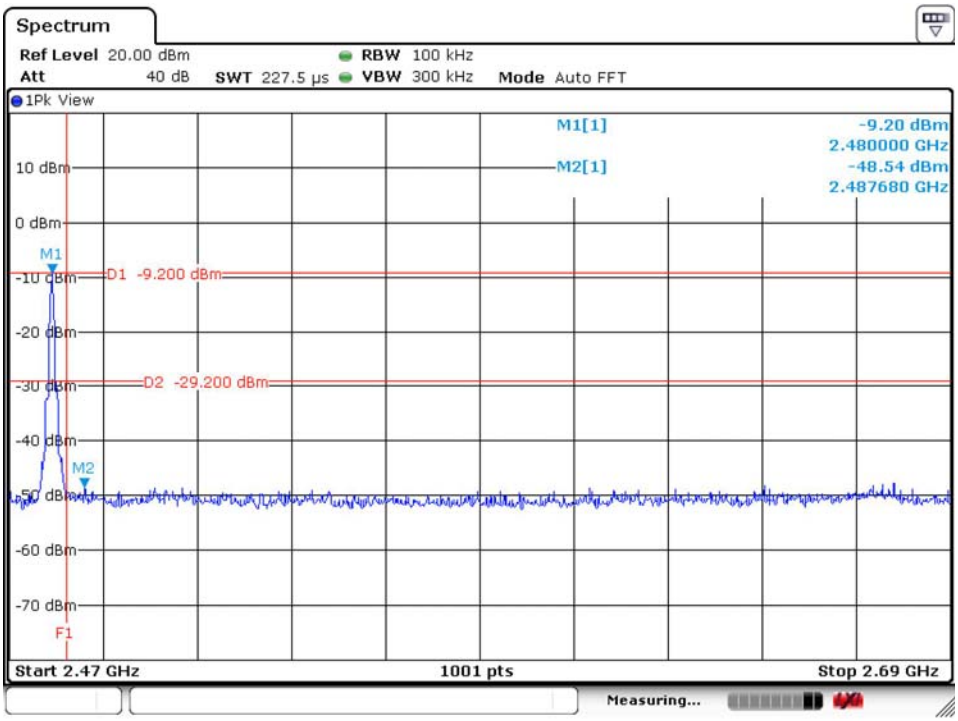
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (1Mbps) non-hopping mode | Channel | : | 2480 |



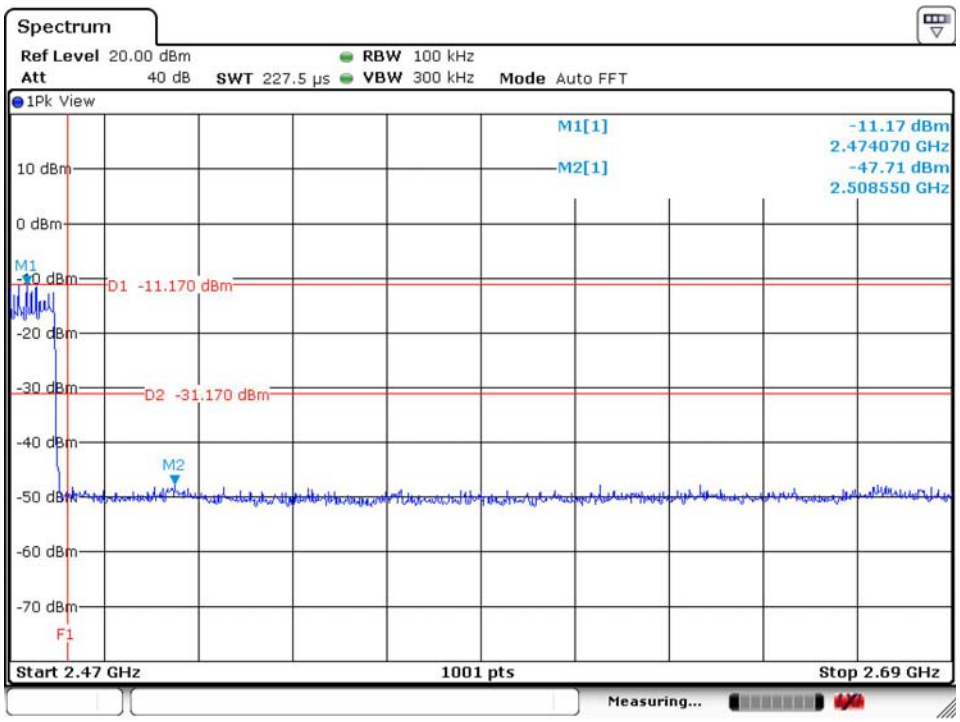

| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (1Mbps) hopping mode | Channel | : | 2480 |



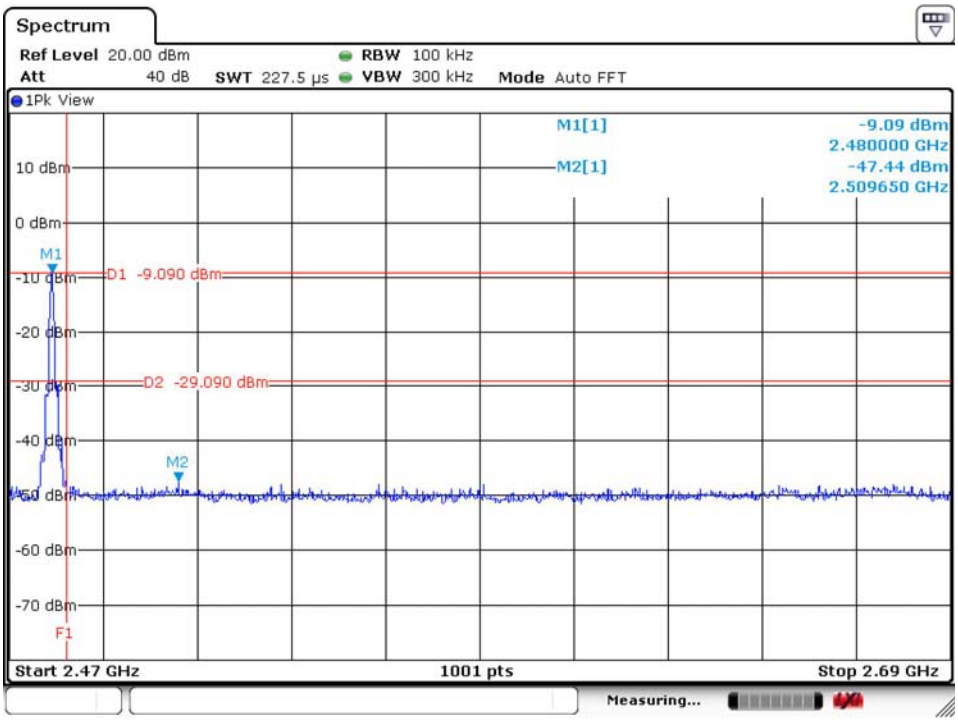
| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (2Mbps) non-hopping mode | Channel | : | 2480 |



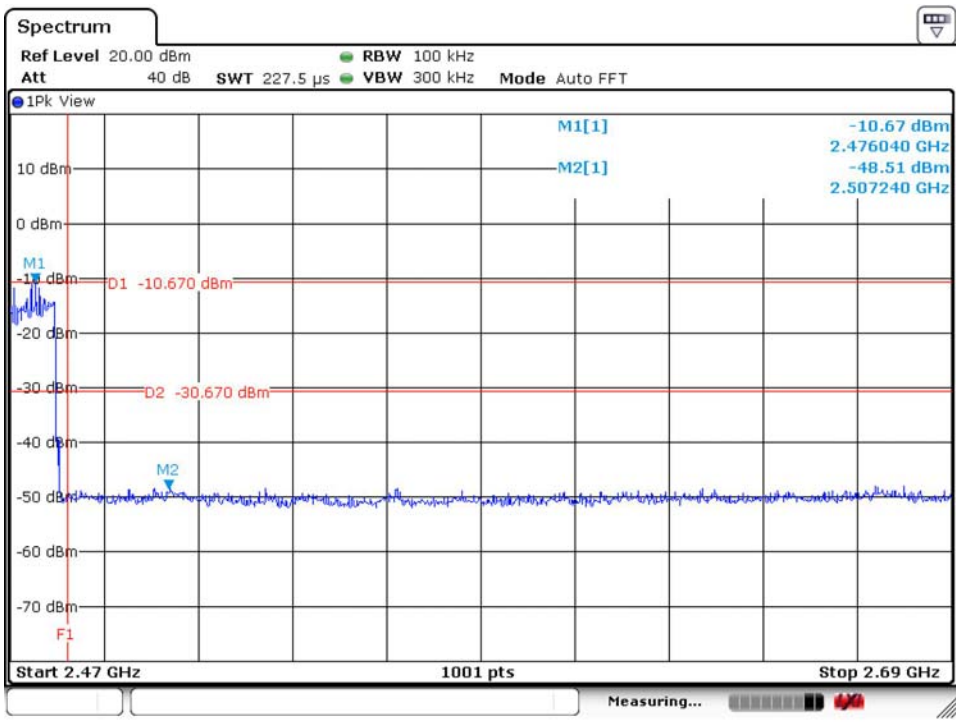

| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (2Mbps) hopping mode | Channel | : | 2480 |



| | | | | | |
|---|---|---|---|---|---|
| Temperature | : | 25.9℃ | Humidity | : | 32% |
| Test Date | : | 04-Aug-2015 | Tested by | : | Eason Hsieh |
| Test Mode | : | BT (3Mbps) non-hopping mode | Channel | : | 2480 |




| | | | | | |
|---|---|---|---|---|---|
| Test Mode | : | BT (3Mbps) hopping mode | Channel | : | 2480 |

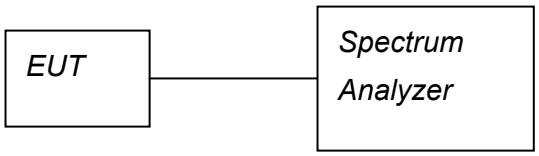


# 10 Spurious RF Conducted Emissions

## 10.1 Test Instruments

*Refer to Sec. 1.2 Test Instruments.*

## 10.2 Test Arrangement and Procedure




*1. Remove the antenna from the transmitter and connected it to a spectrum analyzer through a low loss RF cable (connect an attenuator, if it's necessary).*
*2. Use the following spectrum analyzer settings:*
*Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.*
*3. Typically, several plots are required to cover this entire span.*
*4. RBW = 100 kHz ; VBW ≧ RBW ; Sweep = auto*
*5. Detector function = peak ; Trace = max hold ; Allow the trace to stabilize.*
*6. Set the marker on the peak of any spurious emission recorded.*
*7. The level displayed must comply with the limit specified in this Section.*
*8. Submit these plots.*

## 10.3 Limit (§ 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 the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, 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) (see § 15.205(c)).*

## 10.4 Test Result

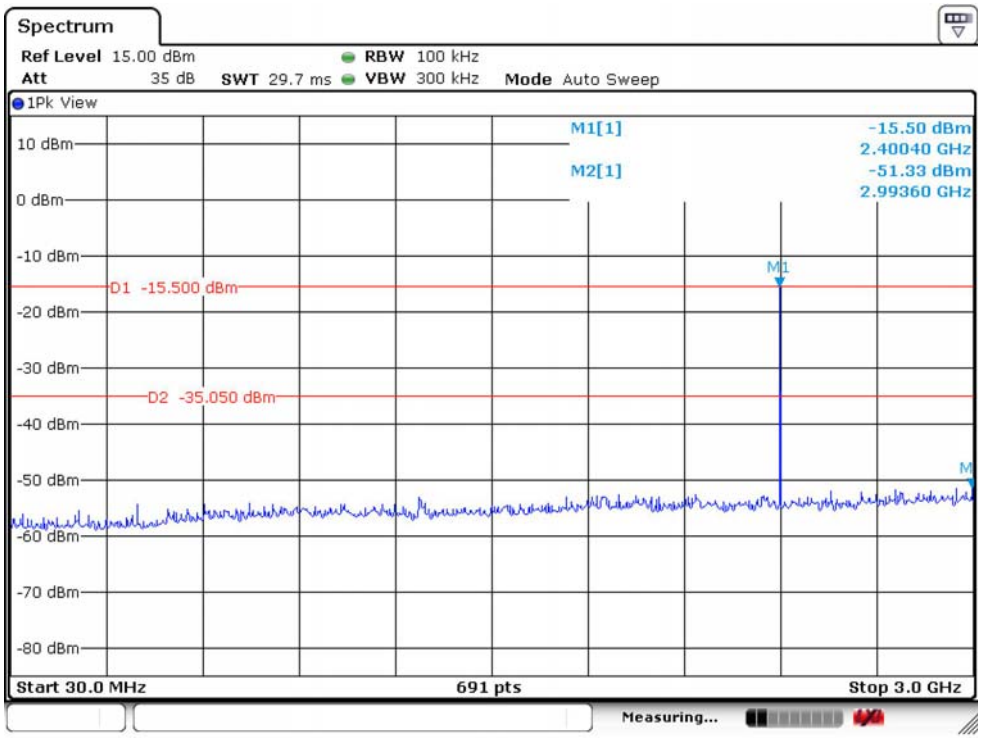
**Compliance.**

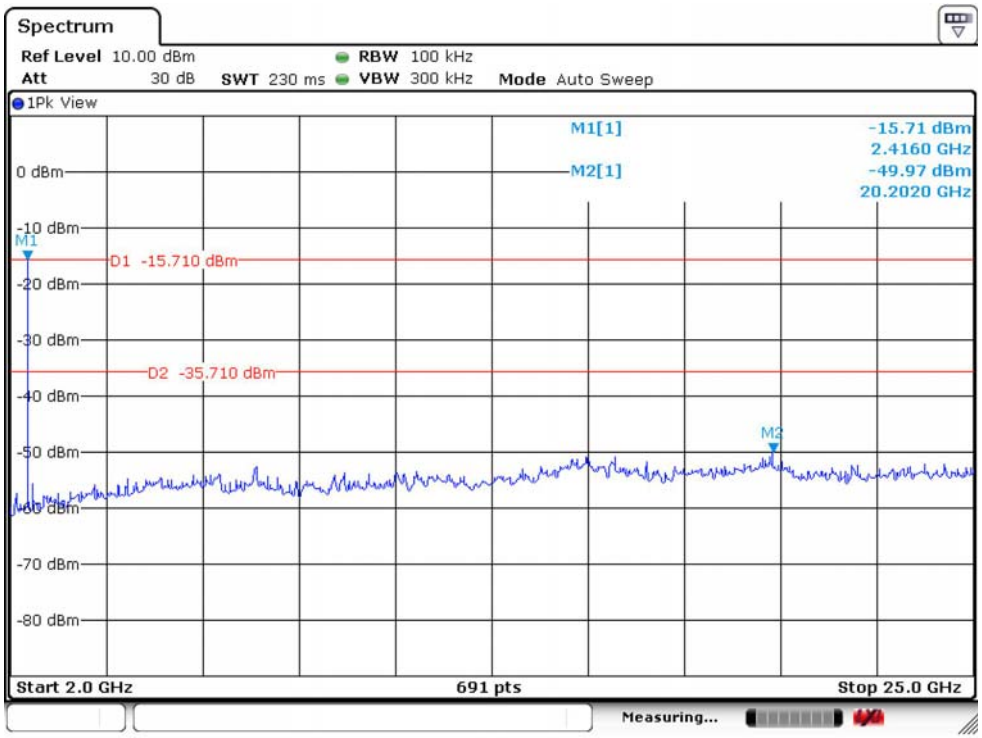
*The final test data are shown on the following page(s).*
*Since the fix channel mode is the worst case, data of the hopping mode were not recorded in this report.*

| Bluetooth (1Mbps) Channel: 00 | | | | | |
|---|---|---|---|---|---|
| Measured Result | | | | Result (dB) | Limit (dB) |
| (GHz) | Max Peak Power (dBm) | Highest Freq. at spurious emissions (GHz) | Max Peak Power at spurious emissions (dBm) | | |
| 2.40040 | -15.50 | 2.99360 | -51.33 | 35.83 | 20 |
| 2.4160 | -15.71 | 20.2020 | -49.97 | 34.26 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at spurious emissions.*

*When Result > Limit, it's a pass.*

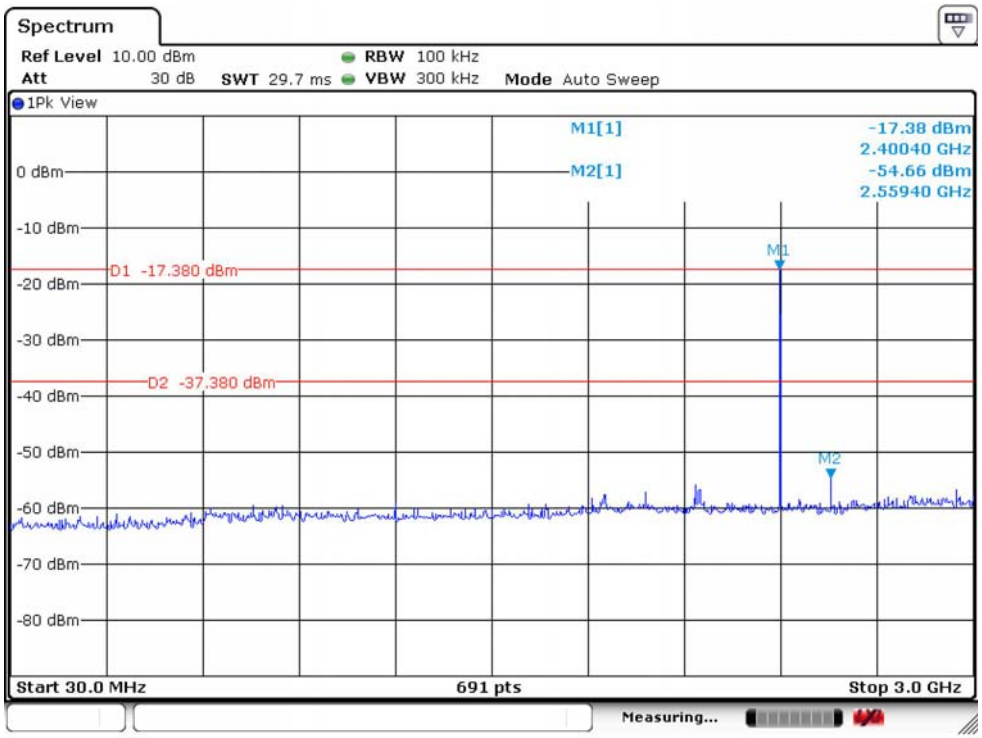


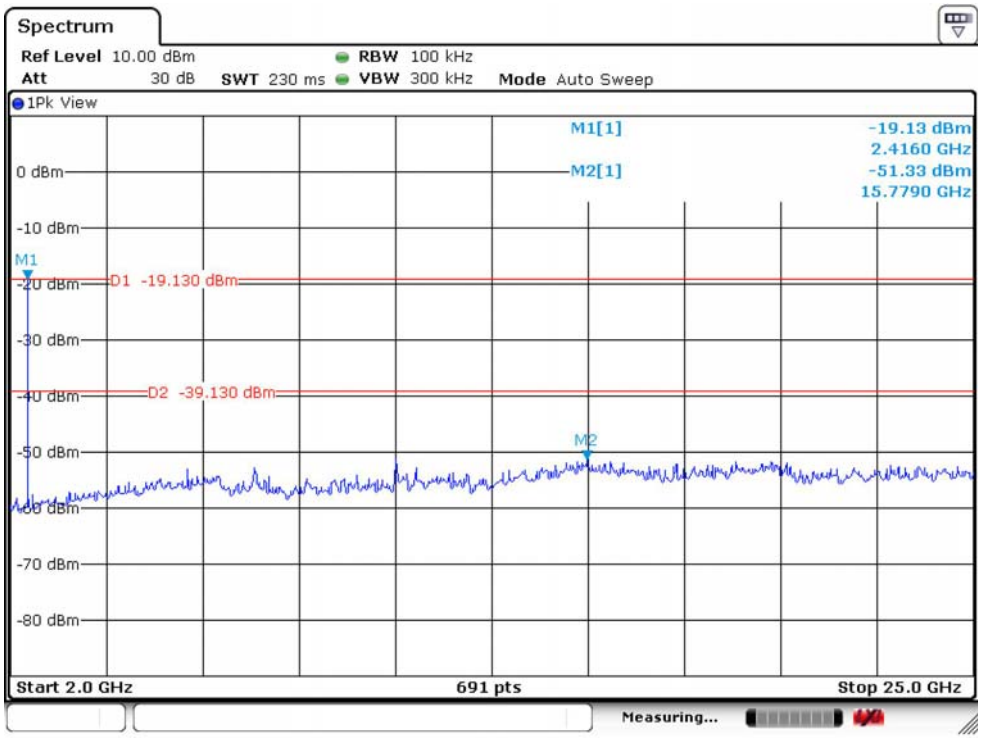



| Bluetooth (1Mbps) Channel: 39 (Worst Case) | | | | | |
|---|---|---|---|---|---|
| Measured Result | | | | Result (dB) | Limit (dB) |
| (GHz) | Max Peak Power (dBm) | Highest Freq. at spurious emissions (GHz) | Max Peak Power at spurious emissions (dBm) | | |
| 2.44040 | -17.38 | 2.55940 | -54.66 | 37.28 | 20 |
| 2.4160 | -19.13 | 15.7790 | -51.33 | 32.2 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at spurious emissions.*

*When Result > Limit, it's a pass.*

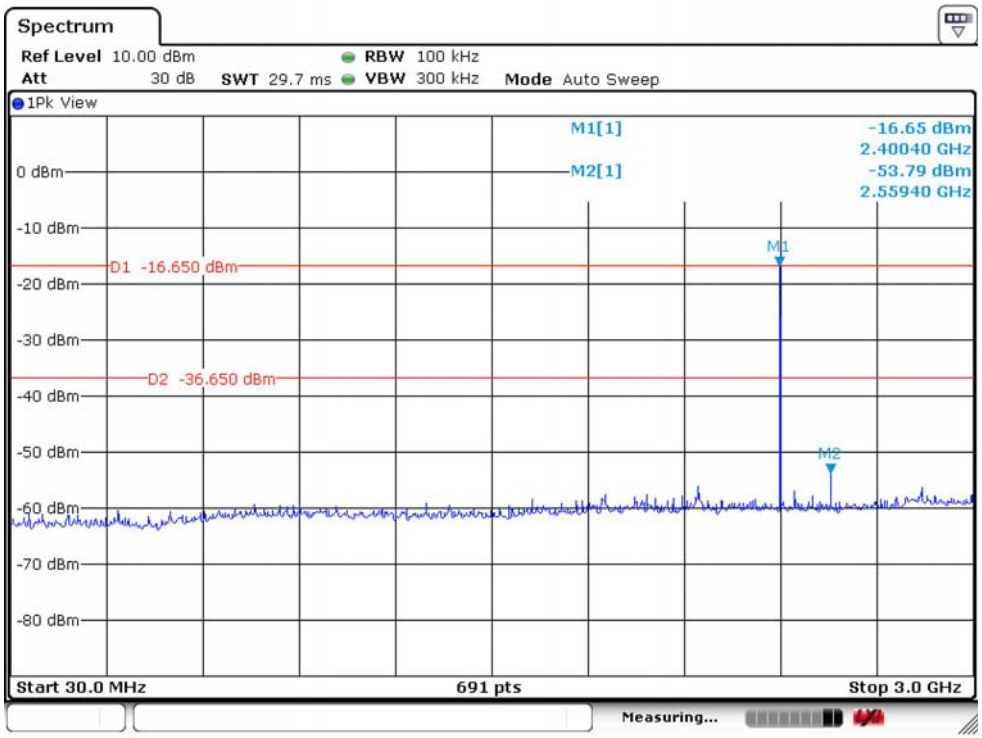


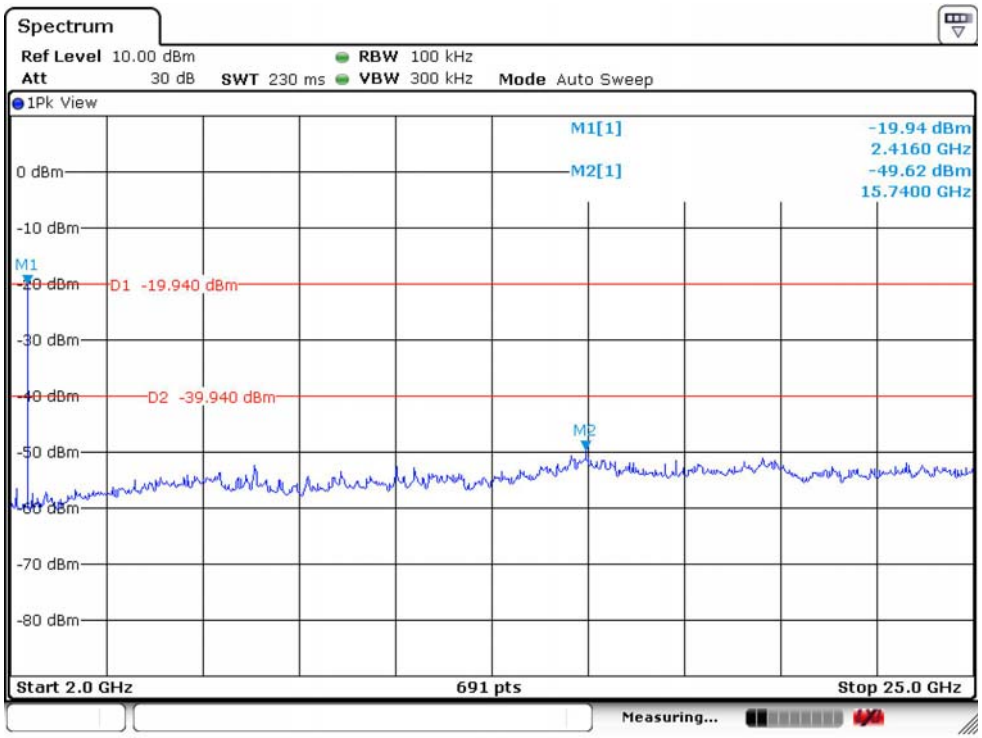



| Bluetooth (1Mbps) Channel: 78 | | | | | |
|---|---|---|---|---|---|
| Measured Result | | | | Result (dB) | Limit (dB) |
| (GHz) | Max Peak Power (dBm) | Highest Freq. at spurious emissions (GHz) | Max Peak Power at spurious emissions (dBm) | | |
| 2.40040 | -16.65 | 2.55940 | -53.79 | 37.14 | 20 |
| 2.4160 | -19.94 | 15.7400 | -49.62 | 29.68 | 20 |

*Remark: Result (dB) = Max Peak Power – Max Peak power at spurious emissions.*

*When Result > Limit, it's a pass.*



# 11 Antenna requirement

## 11.1 Limit (§ 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. The use of a permanently attached antenna or of an antenna that uses a uniue 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.*

## 11.2 Test Result

**Compliance.**

*The EUT applies a Chip antenna.*

# 12 Information about the FHSS characteristics

## 12.1 Pseudorandom Frequency Hopping Sequence

*The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels.*

*The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master; the phase in the hopping sequence is determined by the Bluetooth clock of the master.*

*The channel is divided into time slots where each slot corresponds to an RF hop frequency. Consecutive hops correspond to different RF hop frequencies. The nominal hop rate is 1600 hops/s.*

## 12.2 Example of a 79 hopping sequence in data mode:

*02, 05, 31 , 24, 20, 10,43, 36, 30, 23, 40, 06, 21, 50, 44, 09, 71 , 78, 01, 13, 73, 07, 70, 72, 35, 62, 42, 11, 41, 08, 16, 29, 60, 15, 34, 61, 58, 04, 67, 12, 22, 53, 57, 18, 27, 76, 39, 32, 17, 77, 52, 33, 56, 46, 37, 47, 64, 49, 45, 38, 69, 14, 51, 26, 79, 19, 28, 65, 75, 54, 48, 03, 25, 66, 05, 16, 68, 74, 59, 63, 55*

## 12.3 Equal Hopping Frequency Use

*Due to each the GFSK, π/4-DQPSK and 8-DPSK modulation of hopping frequency will be transmitted in accordance to the frequency tables described above, there is no any frequency will be able to hop more times than other. Therefore each frequency will be used equally.*

— *End of Test Report* —