# FCC 47 CFR PART 15 SUBPART C

# TEST REPORT

**For**

## Smart Home Gateway

**Model: NA301-ZWxxxxxxxx; G150xxxxxxxx; Edgexxxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "-" , for marking purpose)**

**Trade Name: Sercomm; MiOS Limited; Vera Control, Ltd.**

*Issued to*

**Sercomm Corporation**
**8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**
**No.81-1, Lane 210, Bade 2nd Rd., LujhuTownship,**
**TaoyuanCounty 33841, Taiwan, R.O.C.**
**TEL: 886-3-324-0332**
**FAX: 886-3-324-5235**
**http://www.ccsrf.com**
**service@ccsrf.com**

Testing Laboratory
0363

## Revision History

| Rev. | | Issue Date | | Revisions | Effect Page | Revised By |
|---|---|---|---|---|---|---|
| 00 | | August 18, 2014 | | Initial Issue | ALL | Landy Huang |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# TABLE OF CONTENTS

# 1. TEST RESULT CERTIFICATION

| | |
|---|---|
| **Applicant:** | **Sercomm Corporation**<br>8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C. |
| **Manufacturer:** | **Sercomm Corporation**<br>8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C. |
| **Equipment Under Test:** | Smart Home Gateway |
| **Trade Name:** | Sercomm; MiOS Limited; Vera Control, Ltd. |
| **Model:** | NA301-ZWxxxxxxxx; G150xxxxxxxx; Edgexxxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "-" , for marking purpose) |
| **Date of Test:** | July 24 ~ August 11, 2014 |

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

## We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

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

Approved ***by:***

Bill Cheng
Section Manager

***Reviewed by:***

Angel Hu
Section Manager

# 2. EUT DESCRIPTION

| | | | |
|---|---|---|---|
| **Product** | Smart Home Gateway | | |
| **Trade Name** | Sercomm; MiOS Limited; Vera Control, Ltd. | | |
| **Model Number** | NA301-ZWxxxxxxxx; G150xxxxxxxx; Edgexxxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "-" , for marking purpose) | | |
| **Model Discrepancy** | 1. All the model numbers (list on this report) are identical, just formarketing purpose only except Brand.<br>**Model Number** / **Brand**<br>NA301-ZWxxxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "-" , for marking purpose) / Sercomm<br>G150xxxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "-" , for marking purpose) / MiOS Limited<br>Edgexxxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "-" , for marking purpose) / Vera Control, Ltd.<br>2. The means of "x" (The "x" in model name can be 0 to 9, A to Z, blank or "-" , for marking purpose) on model number are identical, just for marketing purpose only.<br>3. Client consigns only one model sample (Model number: NA301-ZW-US) to test. Therefore testing Lab. just guarantees the units, which have been tested. | | |
| **EUT Power Rating** | 12VDC, 1.0A | | |
| **Power Adapter** | Asia power Device Inc. | **Model** | WA-12M12FU |
| | Sunny | **Model** | SYS-1381-1212-W2 |
| **Power Adapter Rating** | I/P: 100-240VAC, 50/60HZ, 0.5A<br>O/P: 12VDC, 1.0A | | |
| **RF Module Manufacturer** | MEDIATEK | **Model** | MT7620A |
| **Operating Frequency Range** | IEEE 802.11 b/g/HT20 mode: 2412 ~ 2462 MHz<br>IEEE 802.11 HT40 mode: 2422 ~ 2452 MHz | | |
| **Transmit Power** | IEEE 802.11b mode: 20.49dBm (0.01119W)<br>IEEE 802.11g mode: 22.73dBm (0.1875W)<br>IEEE 802.11n HT20 mode: 24.97dBm(0.3137W)<br>IEEE 802.11n HT40 mode: 25.00dBm (0.3164W) | | |
| **Modulation Technique** | IEEE 802.11b mode: DSSS (11, 5.5, 2, 1 Mbps)<br>IEEE 802.11g mode: OFDM (54, 48, 36, 24, 18, 12, 11, 9, 6 Mbps)<br>IEEE 802.11n HT20 mode: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65, 78, 104, 117, 130 Mbps)<br>IEEE 802.11n HT40 mode: OFDM (13.5, 27, 40.5, 54, 81, 108, 121.5, 135, 162, 216, 243, 270 Mbps) | | |
| **Antenna Specification** | Chain 0: Monopole Antenna / Gain: 3.62dBi ( For IEEE 802.11b/g)<br>Chain 1: PCB Antenna / Gain: 4.99dBi( For IEEE 802.11b/g)<br>MIMO: $10\log[(10^{3.62/20}+10^{4.99/20})^2/2]=7.34$) ( For IEEE 802.11n) | | |

***Remark:***

*1. The sample selected for test was production product and was provided by manufacturer.*

*2. This submittal(s) (test report) is intended for FCC ID: **P27NA301ZW** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

# 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 Part 2, Part 15.207, 15.209 and 15.247.

## 3.1 EUT CONFIGURATION

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

## 3.2 EUT EXERCISE

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

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

## 3.3 GENERAL TEST PROCEDURES

**Conducted Emissions**

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

**Radiated Emissions**

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

## 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

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

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

[2] Above 38.6

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

## 3.5 DESCRIPTION OF TEST MODES

The EUT is a 2Tx2R MIMO transmitter.

The EUT (model: NA301-ZW-US) had been tested under operating condition and had been reported as worst case on this test report.

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

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode.

WA-12M12FU & SYS-1381-1212-W2 have been pre-scanned during the test, and the model WA-12M12FU was selected as the worst case for final test.

**IEEE 802.11b:**

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate was chosen for full testing.

**IEEE 802.11g:**

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate was chosen for full testing.

**IEEE 802.11n HT20:**

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

**IEEE 802.11n HT40:**

Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

# 4. INSTRUMENT CALIBRATION

## 4.1 MEASURING INSTRUMENT CALIBRATION

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

## 4.2 MEASUREMENT EQUIPMENT USED

**Equipment Used for Emissions Measurement**

| Conducted Emissions Test Site | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| Spectrum Analyzer | Agilent | E4446A | MY48250064 | 01/01/2015 |
| Spectrum Analyzer | Agilent | N9010A | MY52220817 | 03/20/2015 |
| Spectrum Analyzer | R&S | FSL | 100837 | 11/11/2014 |
| Power meter | Anritsu | ML2495A | 1033009 | 09/29/2014 |
| Power Sensor | Anritsu | MA2411B | 0917221 | 09/29/2014 |

| 3MSemi Anechoic Chamber | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| Spectrum Analyzer | Agilent | E4446A | MY48250064 | 01/01/2015 |
| Spectrum Analyzer | R&S | FSL | 100837 | 11/11/2014 |
| Pre-Amplifier | HP | 8447D | 2944A06530 | 05/02/2015 |
| Pre-Amplifier | EMEC | EM01M26G | 060570 | 07/28/2015 |
| Pre-Amplifier | MITEQ | AMF-6F-260400-40-8P | 985646 | 06/12/2015 |
| Pre-Amplifier | Agilent | 8449B | 3008A01738 | 08/11/2015 |
| EMI Test Receiver | SCHAFFNER | SCR 3501 | 430 | 03/30/2015 |
| Loop Antenna | EMCO | 6502 | 8905-2356 | 08/20/2014 |
| Bilog Antenna | TESEQ | CBL 6112D | 35378 | 09/11/2014 |
| Horn Antenna | EMCO | 3115 | 00022250 | 08/05/2015 |
| Horn Antenna | EMCO | 3116 | 00026370 | 12/29/2014 |
| Antenna Tower | CCS | CC-A-1F | N/A | N.C.R |
| Turn Table | CCS | CC-T-1F | N/A | N.C.R |
| Test S/W | EZ-EMC | | | |

***NOTE:*** *1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
*2. N.C.R = No Calibration Request.*

| Powerline Conducted Emissions Test Site#3 | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| EMI Test Receiver | R&S | ESCI | 101300 | 09/06/2014 |
| LISN | R&S | ENV216 | 100069 | 06/09/2015 |
| LISN | FCC | FCC-LISN-50/250-16-2-07 | 06013 | 11/20/2014 |
| ISN | TESEQ | ISN-T8 | 30842 | 07/30/2015 |
| Current Probe | FCC | F-35 | 506 | 07/13/2015 |
| ISN | FCC | FCC-TLISN-T2-02 | 20587 | 07/28/2015 |
| Test S/W | EZ-EMC | | | |

***NOTE:*** *1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
*2. N.C.R = No Calibration Request.*

## 4.3 MEASUREMENT UNCERTAINTY

| Parameter | Uncertainty |
|---|---|
| Powerline Conducted Emission #3 | ±2.1876 |
| 3M Semi Anechoic Chamber / 30MHz ~ 200MHz | ±3.5921 |
| 3M Semi Anechoic Chamber / 200MHz ~ 1GHz | ±3.5657 |
| 3M Semi Anechoic Chamber / 1 ~ 8GHz | ±2.5873 |
| 3M Semi Anechoic Chamber / 8 ~ 18GHz | ±2.6646 |
| 3M Semi Anechoic Chamber / 18 ~ 26GHz | ±2.9617 |
| 3M Semi Anechoic Chamber / 26 ~ 40GHz | ±3.4250 |

***Remark:*** *This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence levelusing a coverage factor of k=2.*

# 5. FACILITIES AND ACCREDITATIONS

## 5.1 FACILTIES

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

☐No. 163-1, Jhongsheng Rd., Sindien District, Taipei City23151, Taiwan

☐No 11, Wugong 6th Rd, Wugu District, New Taipei City 24891, Taiwan (R.O.C)

Tel: 886-2-2299-9720 / Fax:886-2-2298-4045

☒No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,Taoyuan County 33841,Taiwan, R.O.C.

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

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

## 5.2 EQUIPMENT

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

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

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

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

## 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

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

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

# 6. SETUP OF EQUIPMENT UNDER TEST

## 6.1 SETUP CONFIGURATION OF EUT

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

## 6.2 SUPPORT EQUIPMENT

| For Radiated Emission (Below 1GHz) and Power line conducted emission measurement: | | | | | | | |
|---|---|---|---|---|---|---|---|
| **No.** | **Device Type** | **Model** | **Series No.** | **FCC ID** | **Brand** | **Data Cable** | **Power Cord** |
| 1. | Traveling Disk | LuxMini 720 | N/A | FCC DoC | SILICON POWER | Shielded,1.8m | N/A |
| 2. | Notebook PC (Remote) | 1706-A78 | LV-L1870 06/09 | FCC DOC | IBM | LAN Cable: Unshielded,10m | AC I/P: Unshielded,1.8m DC O/P: Shielded,1.8m |
| 3. | Notebook PC (Remote) | ThinkPad T430u | PB-VZLGG 12/09 | FCC DOC | LENOVO | N/A | AC I/P: Unshielded,1.8m DC O/P: Unshielded,1.8m with a core |

| For Radiated Emission (Above 1GHz) measurement: | | | | | | | |
|---|---|---|---|---|---|---|---|
| **No.** | **Device Type** | **Model** | **Series No.** | **FCC ID** | **Brand** | **Data Cable** | **Power Cord** |
| | N/A | | | | | | |

| For Conducted emission measurement: | | | | | | | |
|---|---|---|---|---|---|---|---|
| **No.** | **Device Type** | **Model** | **Series No.** | **FCC ID** | **Brand** | **Data Cable** | **Power Cord** |
| 1. | Notebook PC | D400 | 0932RY | E2K24GBRL | DELL | LAN Cable: Unshielded,10m | AC I/P: Unshielded,1.8m DC O/P: Unshielded,1.8m with a core |

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

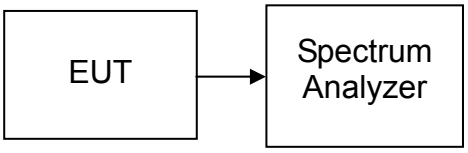
# 7. FCC PART 15.247 REQUIREMENTS

## 7.1 6dB BANDWIDTH

### LIMIT

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST CONFIGURATION




### TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Span = 30MHz or 50MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

### TEST RESULTS

*No non-compliance noted*

# TEST DATA

**Test mode: IEEE 802.11b mode**

| Channel | Frequency (MHz) | Bandwidth(MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 10.17 | >500 | PASS |
| Mid | 2437 | 10.17 | | PASS |
| High | 2462 | 10.17 | | PASS |

**Test mode: IEEE 802.11g mode**

| Channel | Frequency (MHz) | Bandwidth(MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 16.65 | >500 | PASS |
| Mid | 2437 | 16.62 | | PASS |
| High | 2462 | 16.65 | | PASS |

**Test mode: IEEE 802.11n HT20 mode**

| Channel | Frequency (MHz) | Bandwidth(MHz) | | Limit (kHz) | Result |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| Low | 2412 | 17.82 | 17.82 | >500 | PASS |
| Mid | 2437 | 17.82 | 17.76 | | PASS |
| High | 2462 | 17.85 | 17.79 | | PASS |

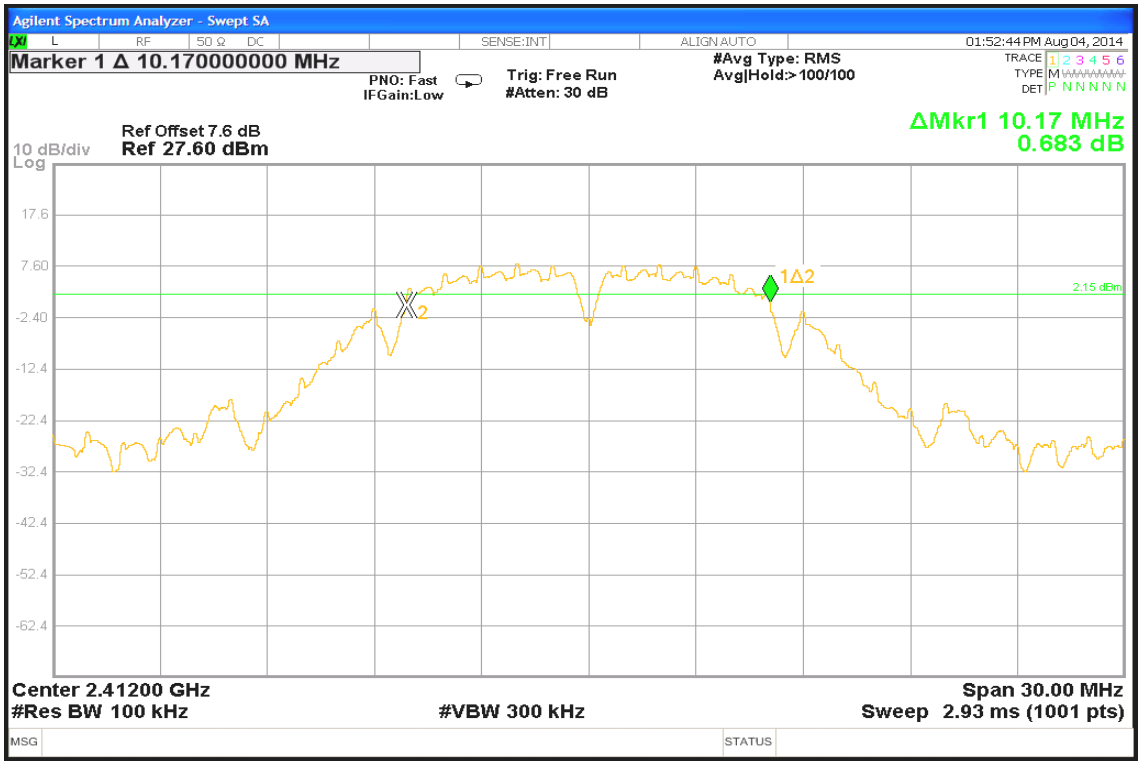
**Test mode: IEEE 802.11n HT40 mode**

| Channel | Frequency (MHz) | Bandwidth(MHz) | | Limit (kHz) | Result |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| Low | 2422 | 36.60 | 36.60 | >500 | PASS |
| Mid | 2437 | 36.60 | 36.55 | | PASS |
| High | 2452 | 36.60 | 36.60 | | PASS |

## Test Plot

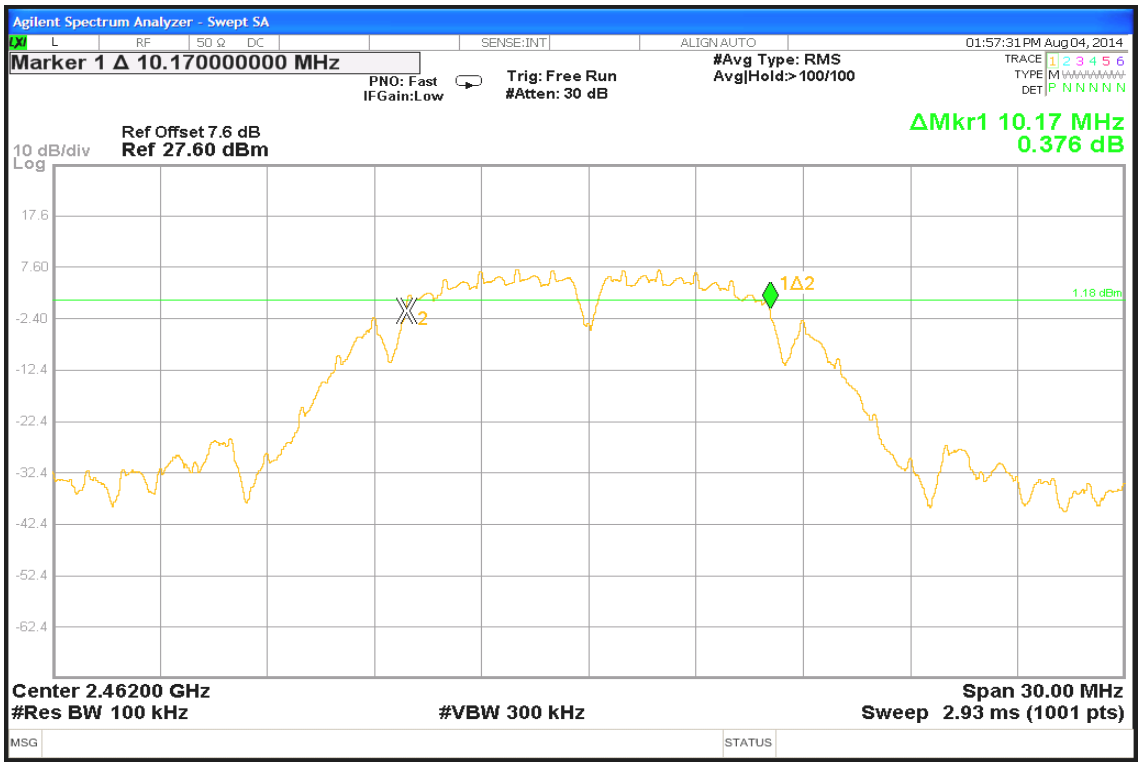
## IEEE 802.11b mode

### 6dB Bandwidth (CH Low)



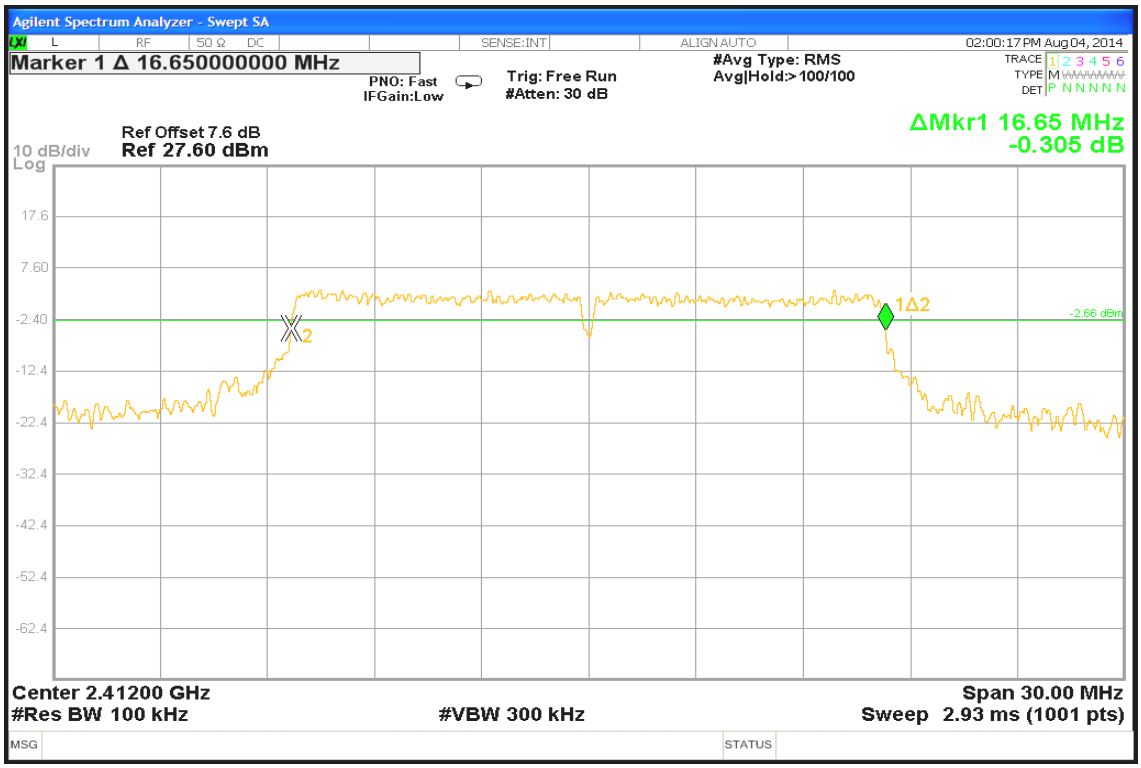

### 6dB Bandwidth (CH Mid)

## 6dB Bandwidth (CH High)

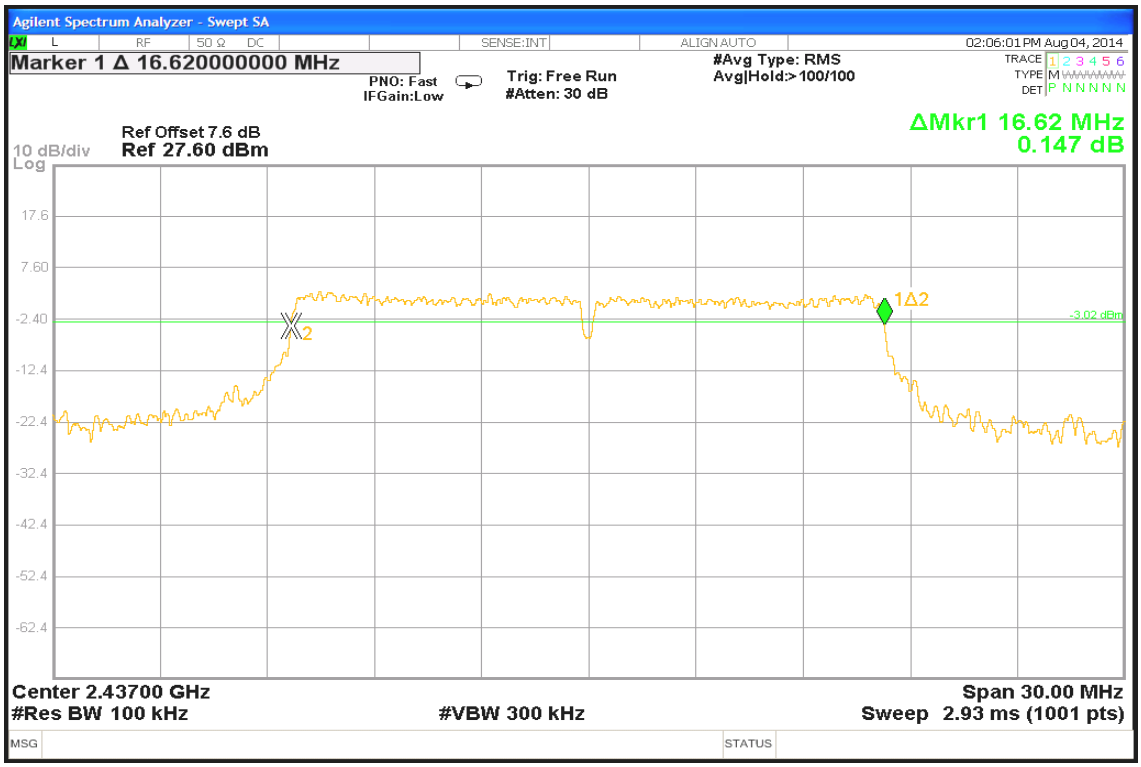



## IEEE 802.11g mode

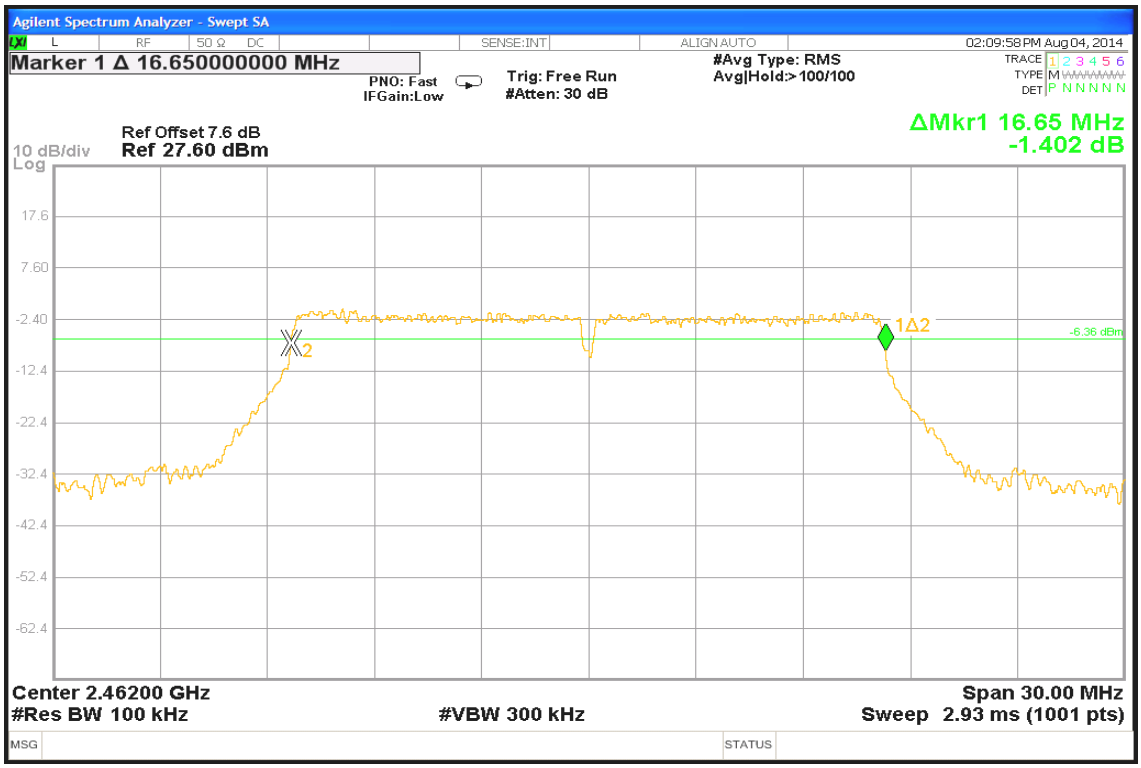
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)

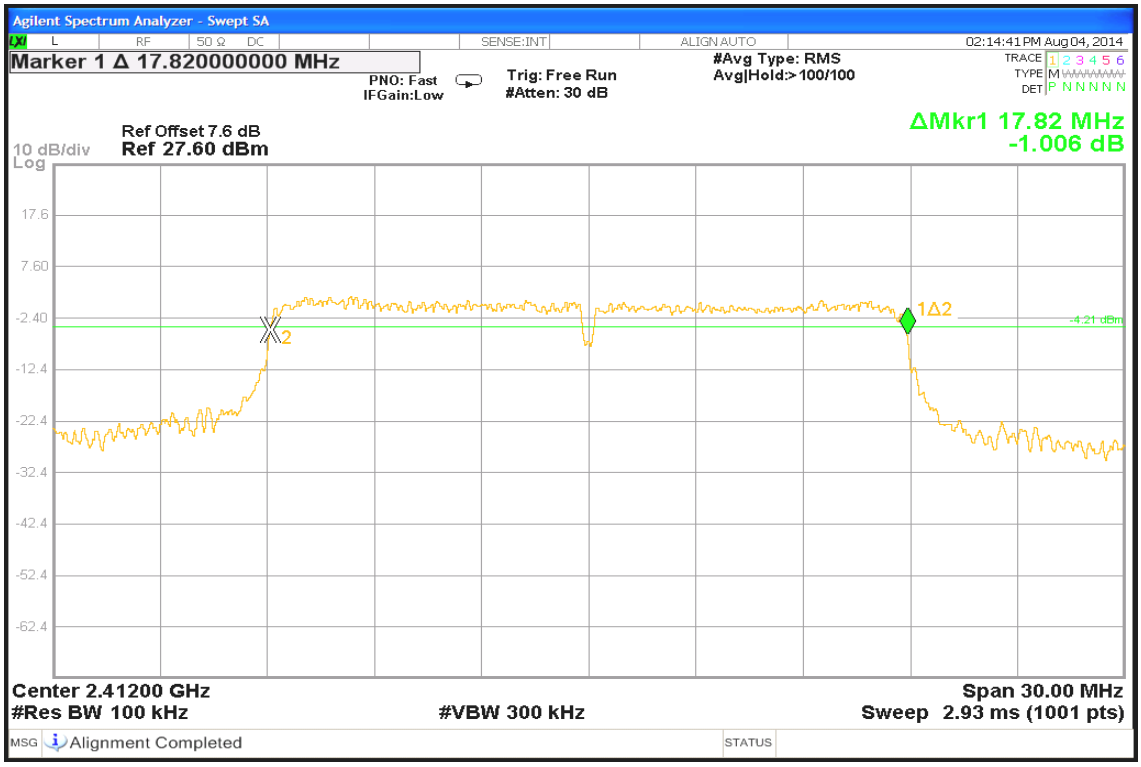



## 6dB Bandwidth (CH High)

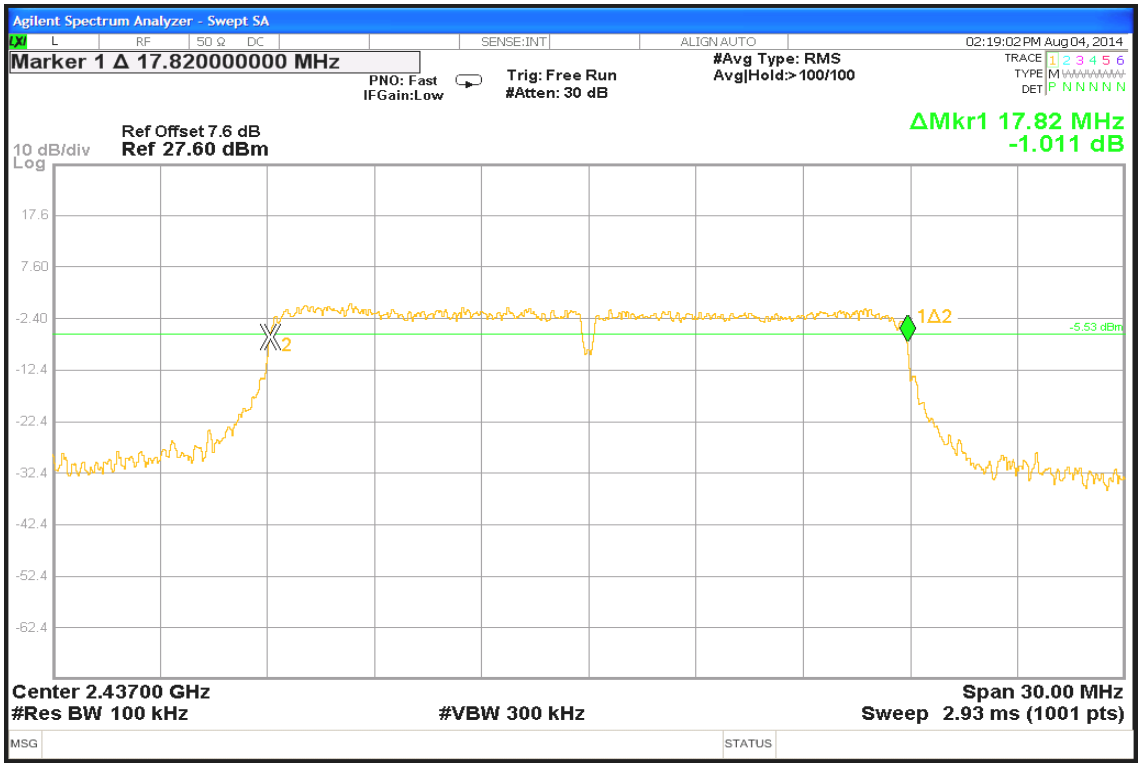


## IEEE 802.11n HT20 mode / Chain 0

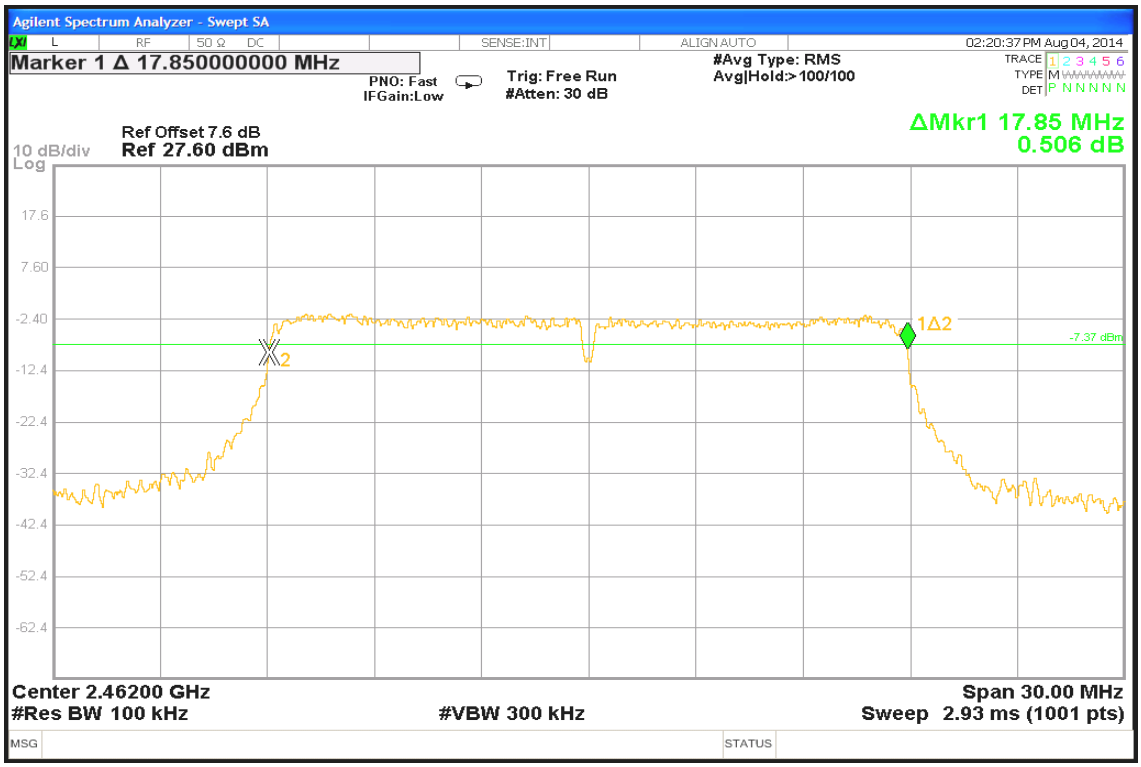
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

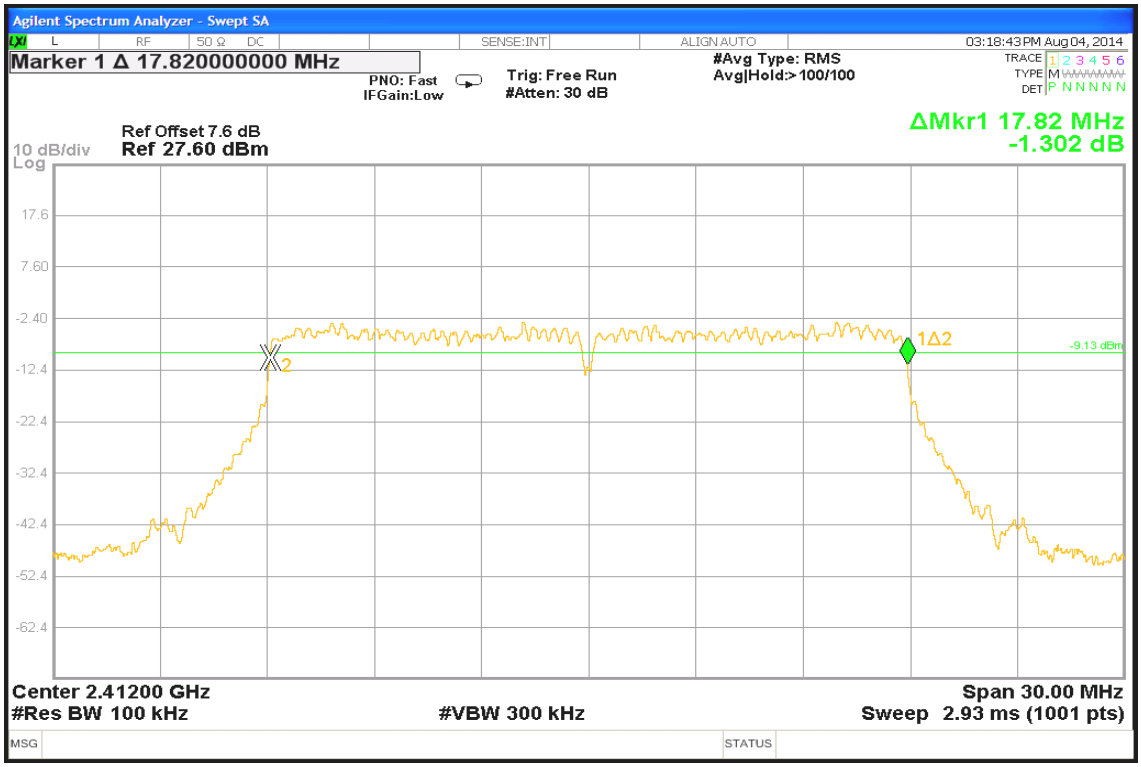


## 6dB Bandwidth (CH High)

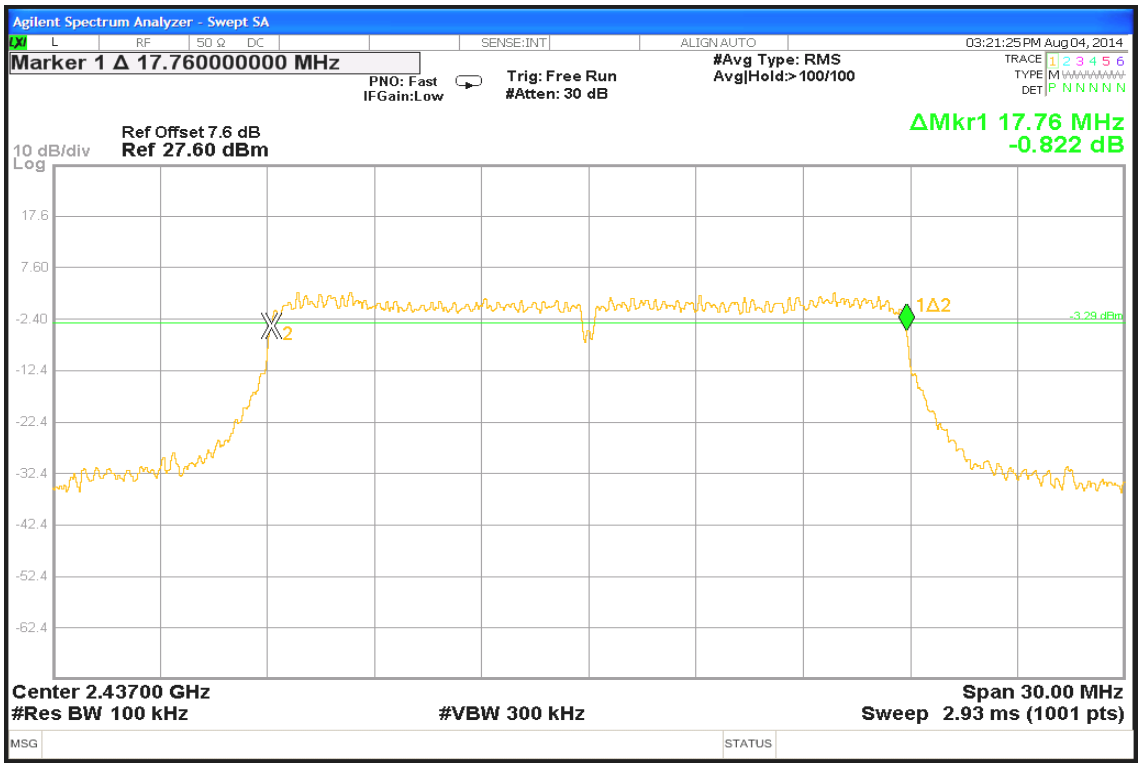



## IEEE 802.11n HT20 mode / Chain 1

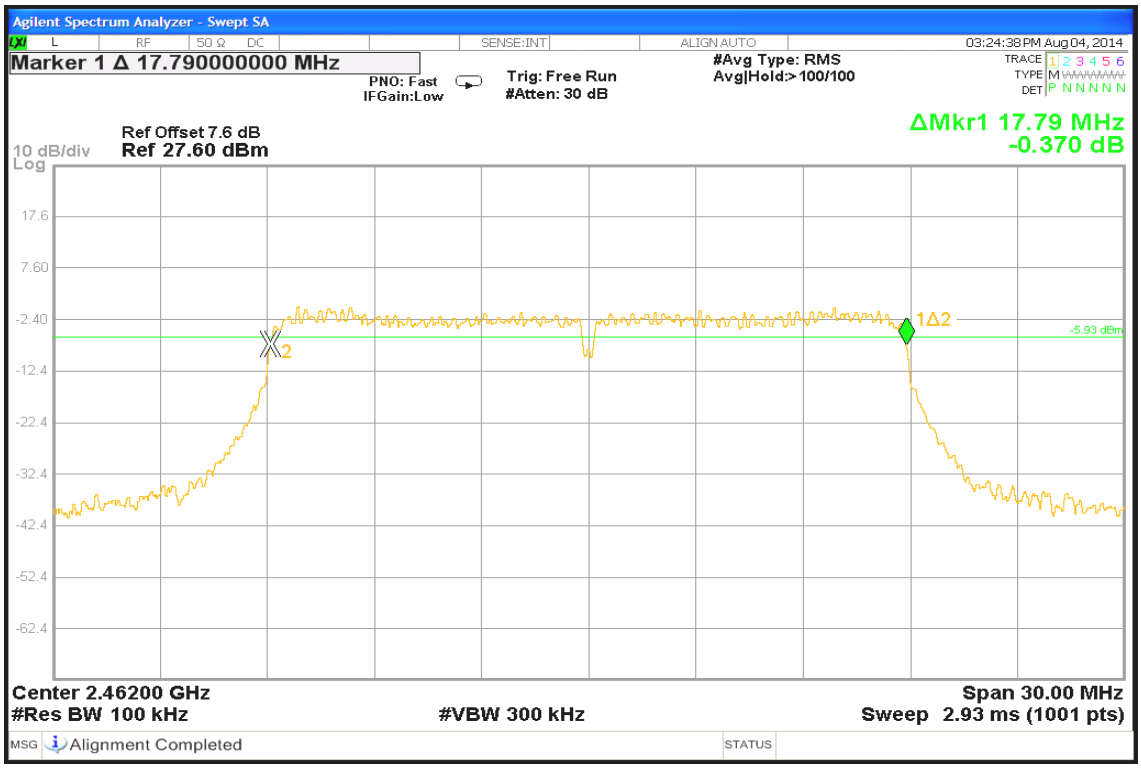
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)

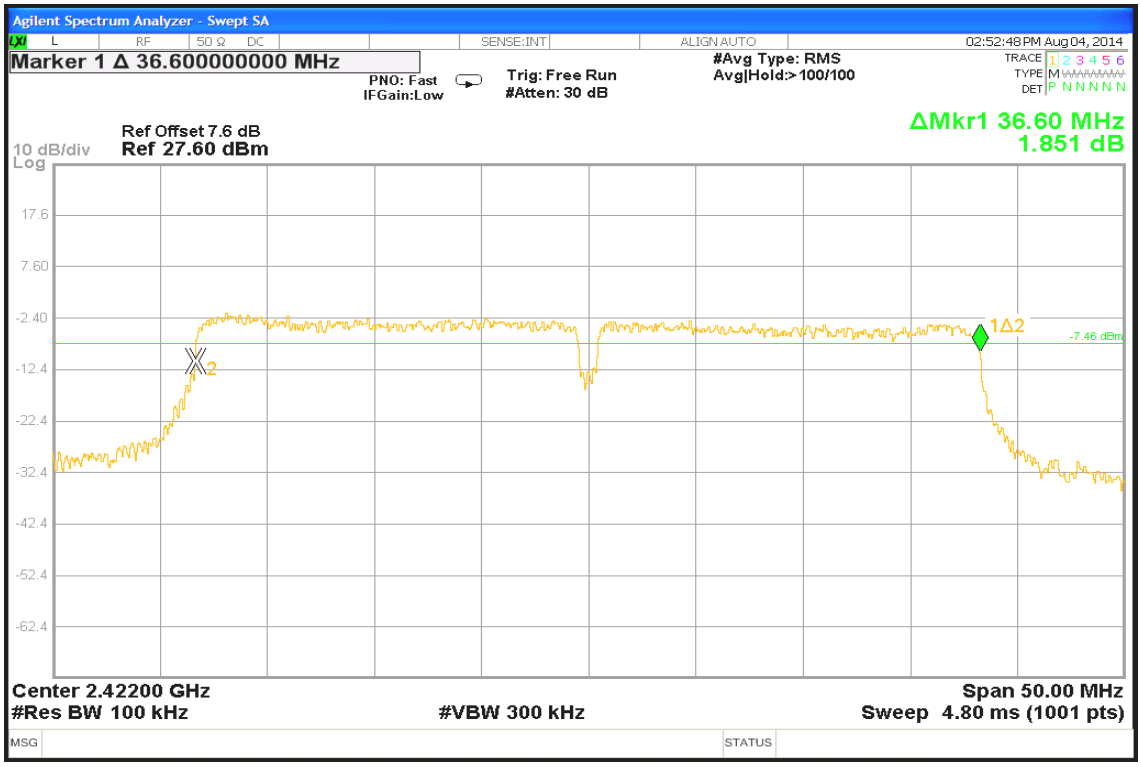



## 6dB Bandwidth (CH High)

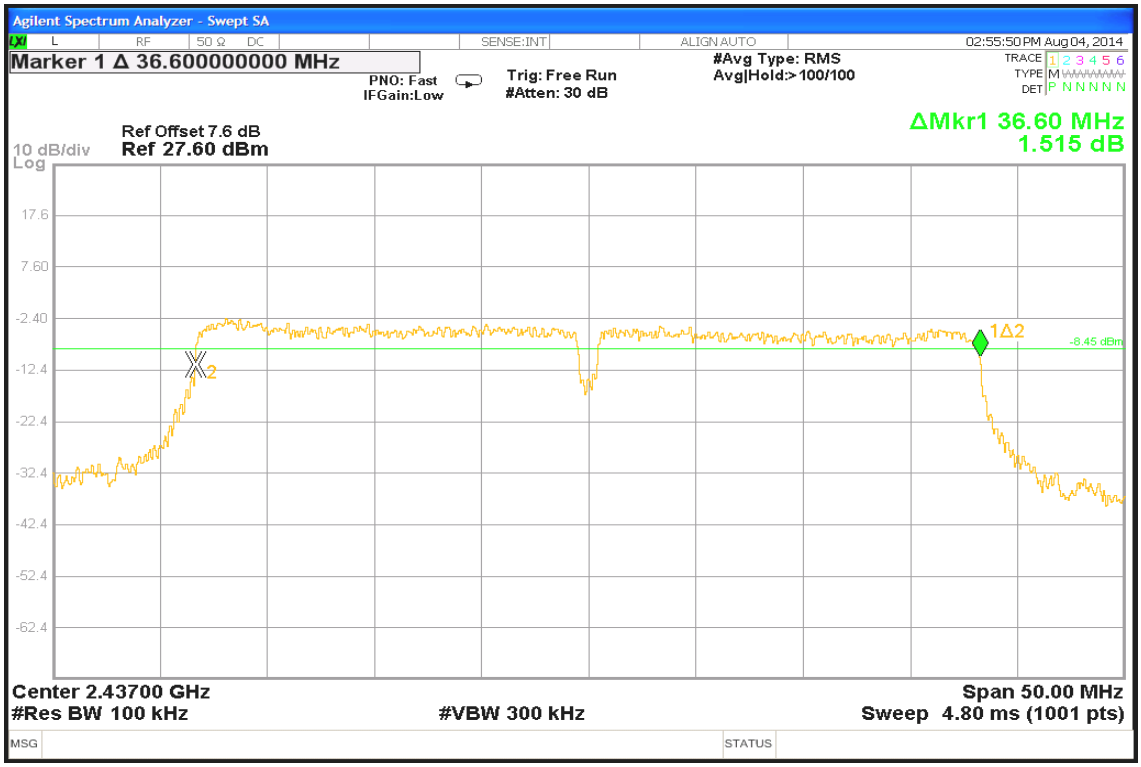


## IEEE 802.11n HT40 mode / Chain 0

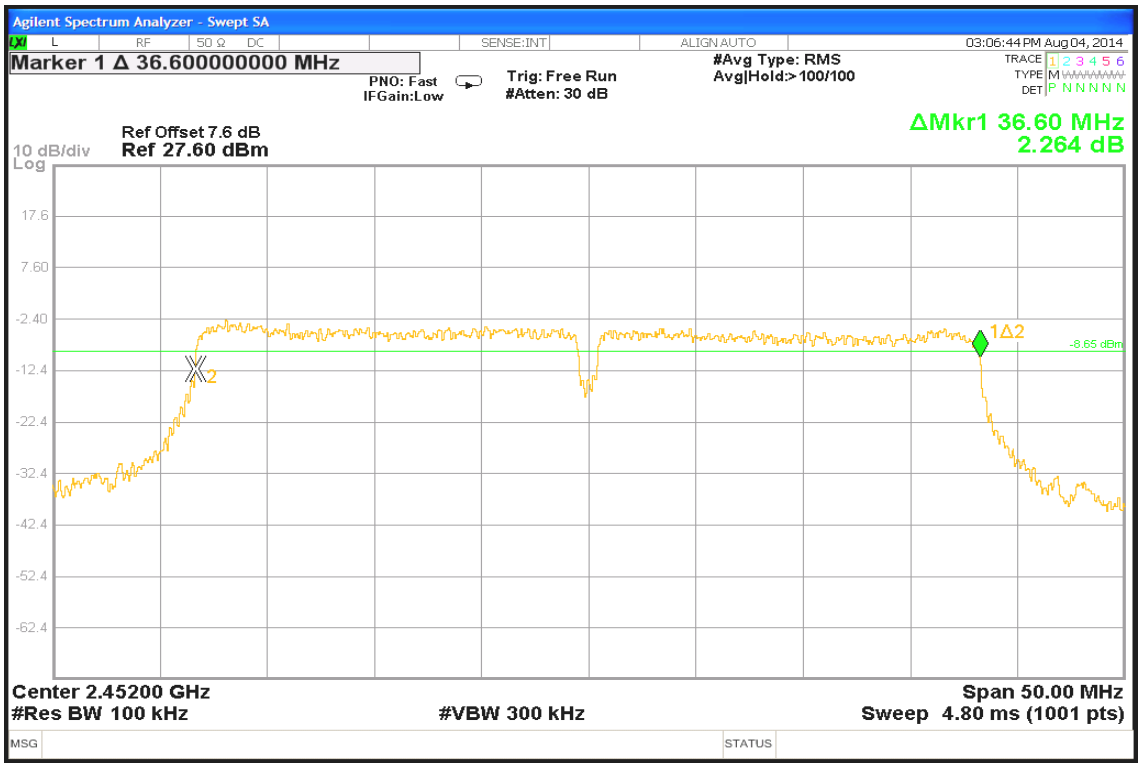
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

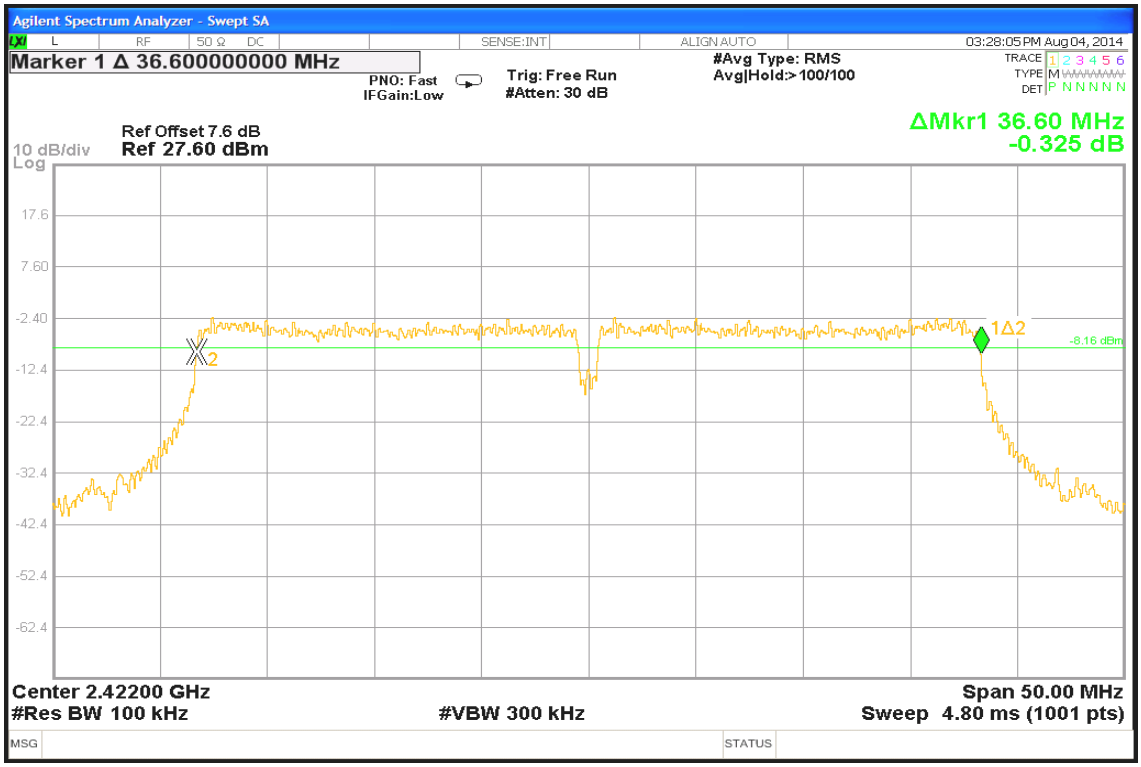


## 6dB Bandwidth (CH High)

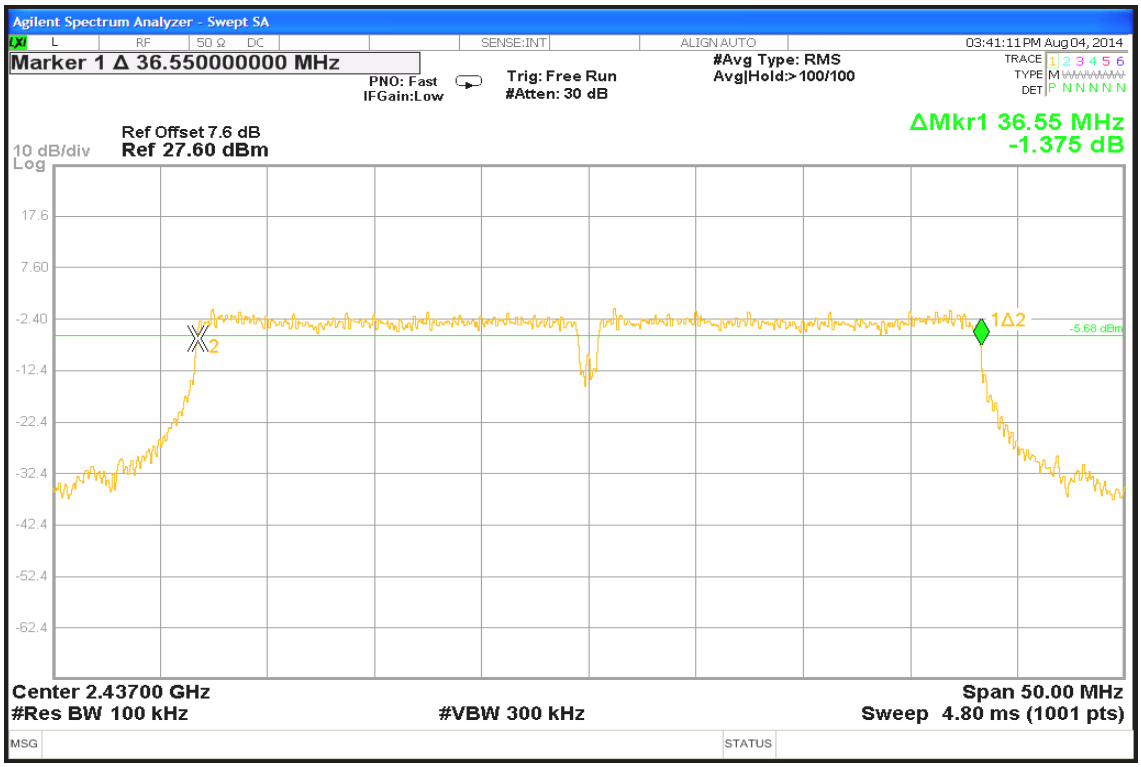



## IEEE 802.11n HT40 mode / Chain 1

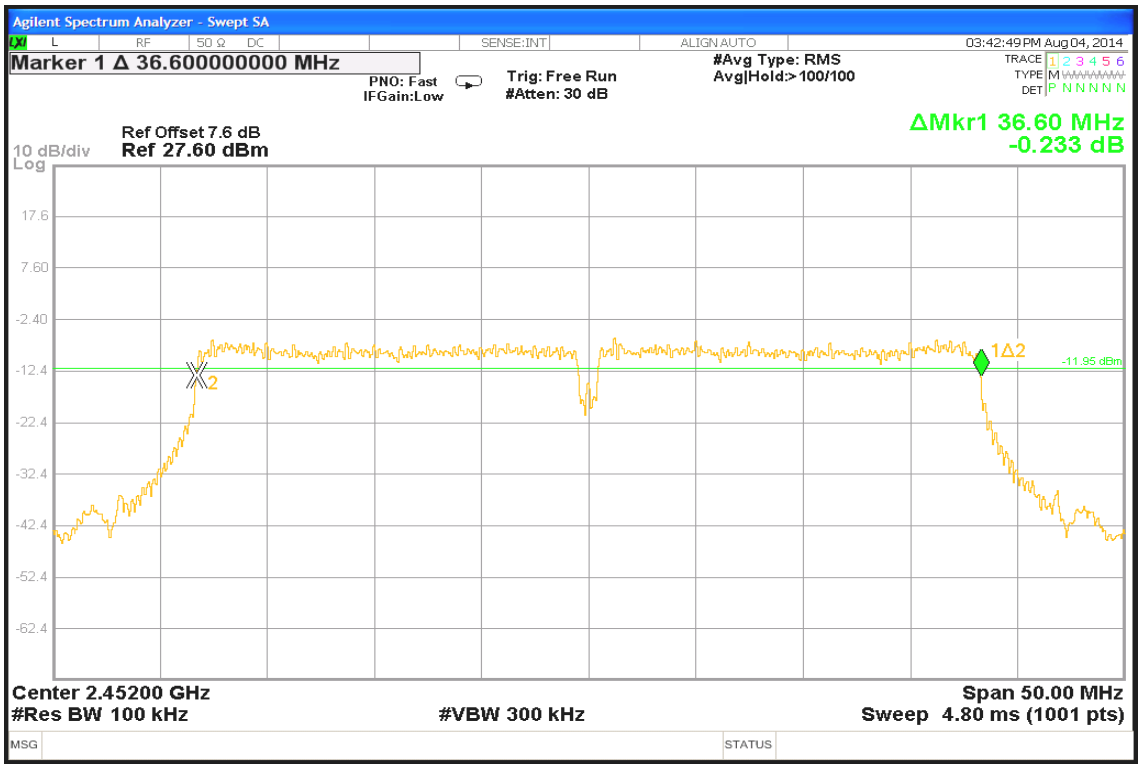
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)




## 6dB Bandwidth (CH High)



## 7.2 PEAK POWER

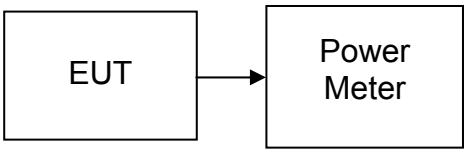
### LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.

2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### TEST CONFIGURATION




### TEST PROCEDURE

**Per KDB 558074v03r01**

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

### TEST RESULTS

*No non-compliance noted*

# TEST DATA

**Test mode: IEEE 802.11b mode**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Test Result |
|---|---|---|---|---|---|
| Low | 2412 | 20.49 | 0.1119 | 1 | PASS |
| Mid | 2437 | 20.28 | 0.1067 | | PASS |
| High | 2462 | 20.32 | 0.1076 | | PASS |

**Test mode: IEEE 802.11g mode**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Test Result |
|---|---|---|---|---|---|
| Low | 2412 | 22.48 | 0.1770 | 1 | PASS |
| Mid | 2437 | 22.73 | 0.1875 | | PASS |
| High | 2462 | 19.58 | 0.0908 | | PASS |

**Test mode: IEEE 802.11n HT20 mode**

| Channel | Frequency (MHz) | Output Power (dBm) | | | Output Power (W) | | | Limit (W) | Result |
|---|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Total | Chain 0 | Chain 1 | Total | | |
| Low | 2412 | 21.59 | 20.26 | 23.99 | 0.1442 | 0.1062 | 0.2504 | 0.7345 | PASS |
| Mid | 2437 | 21.04 | 22.71 | 24.97 | 0.1271 | 0.1866 | 0.3137 | | PASS |
| High | 2462 | 20.58 | 20.32 | 23.46 | 0.1143 | 0.1076 | 0.2219 | | PASS |

Test mode: IEEE 802.11n HT40 mode

| Channel | Frequency (MHz) | Output Power (dBm) | | | Output Power (W) | | | Limit (W) | Result |
|---|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Total | Chain 0 | Chain 1 | Total | | |
| Low | 2422 | 21.07 | 20.85 | 23.97 | 0.1279 | 0.1216 | 0.2496 | 0.7345 | PASS |
| Mid | 2437 | 21.43 | 22.49 | 25.00 | 0.1390 | 0.1774 | 0.3164 | | PASS |
| High | 2452 | 20.09 | 17.02 | 21.83 | 0.1021 | 0.0504 | 0.1524 | | PASS |

**Remark:**

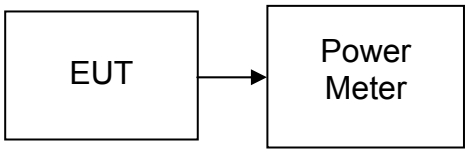
1. Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000))
2. The maximum antenna gain is 7.34dBi; therefore the reduction due to antenna gain is 1.34dBi, so the limit is 28.66dBm(0.7345W).

## 7.3 AVERAGE POWER

### LIMIT

None; for reporting purposes only.

### TEST CONFIGURATION




### TEST PROCEDURE

**Per KDB 558074 v03r01**

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

### TEST RESULTS

*No non-compliance noted*

# TEST DATA

**Test mode: IEEE 802.11b mode**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) |
|---|---|---|---|
| Low | 2412 | 17.99 | 0.0630 |
| Mid | 2437 | 17.49 | 0.0561 |
| High | 2462 | 17.14 | 0.0518 |

**Test mode: IEEE 802.11g mode**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) |
|---|---|---|---|
| Low | 2412 | 16.64 | 0.0461 |
| Mid | 2437 | 16.28 | 0.0425 |
| High | 2462 | 12.35 | 0.0172 |

**Test mode: IEEE 802.11n HT20 mode**

| Channel | Frequency (MHz) | Output Power (dBm) | | | Output Power (W) | | |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Total | Chain 0 | Chain 1 | Total |
| Low | 2412 | 13.89 | 13.08 | 16.51 | 0.0245 | 0.0203 | 0.0448 |
| Mid | 2437 | 13.49 | 14.91 | 17.27 | 0.0223 | 0.0310 | 0.0533 |
| High | 2462 | 12.28 | 12.89 | 15.61 | 0.0169 | 0.0195 | 0.0364 |

**Test mode: IEEE 802.11n HT40 mode**

| Channel | Frequency (MHz) | Output Power (dBm) | | | Output Power (W) | | |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Total | Chain 0 | Chain 1 | Total |
| Low | 2412 | 14.36 | 13.61 | 17.01 | 0.0273 | 0.0230 | 0.0503 |
| Mid | 2437 | 11.79 | 14.25 | 16.20 | 0.0151 | 0.0266 | 0.0417 |
| High | 2462 | 11.69 | 9.56 | 13.76 | 0.0148 | 0.0090 | 0.0238 |

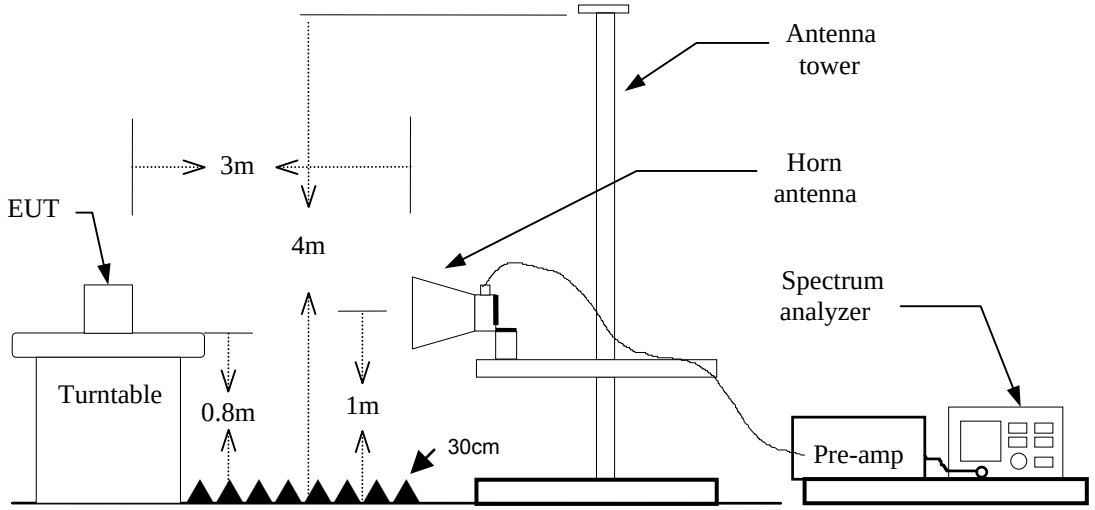
**Remark:** Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000))

## 7.4 BAND EDGES MEASUREMENT

### LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiatedmeasurement, provided the transmitter demonstrates compliance with the peak conducted power limits. 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 in15.209(a)(see Section15.205(c)).

### TEST CONFIGURATION




### TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=100ms
   (b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

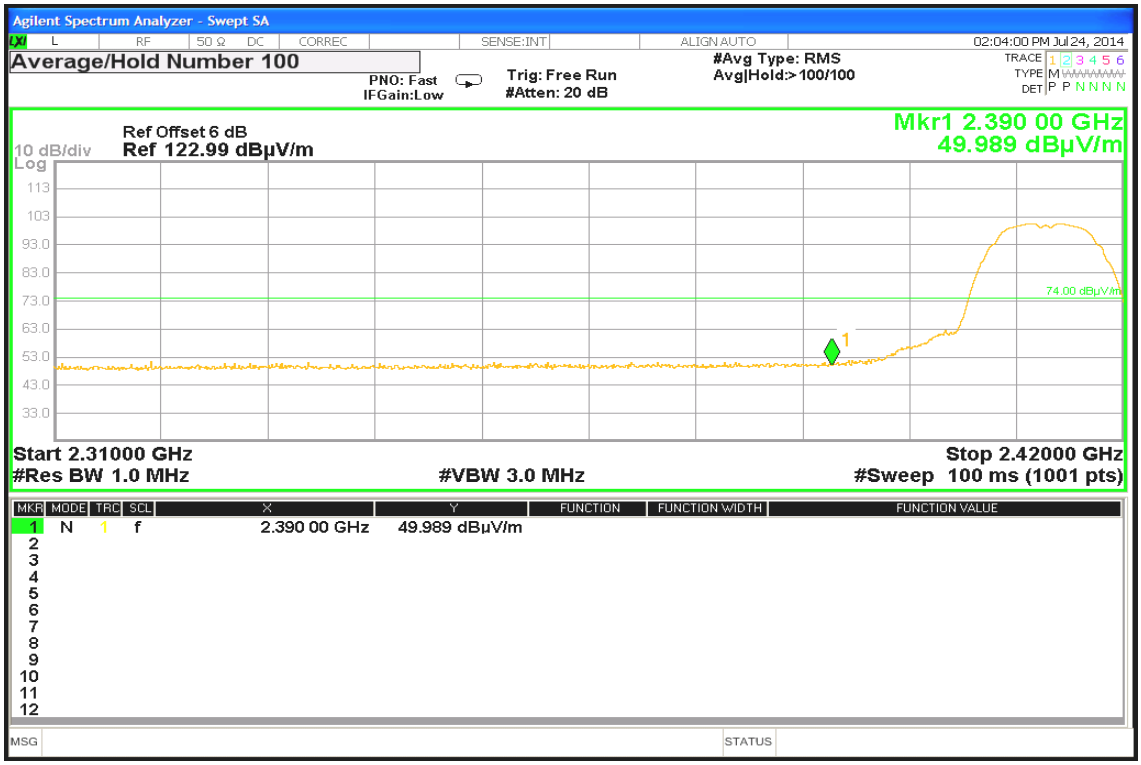
### TEST RESULTS

Refer to attach spectrum analyzer data chart.

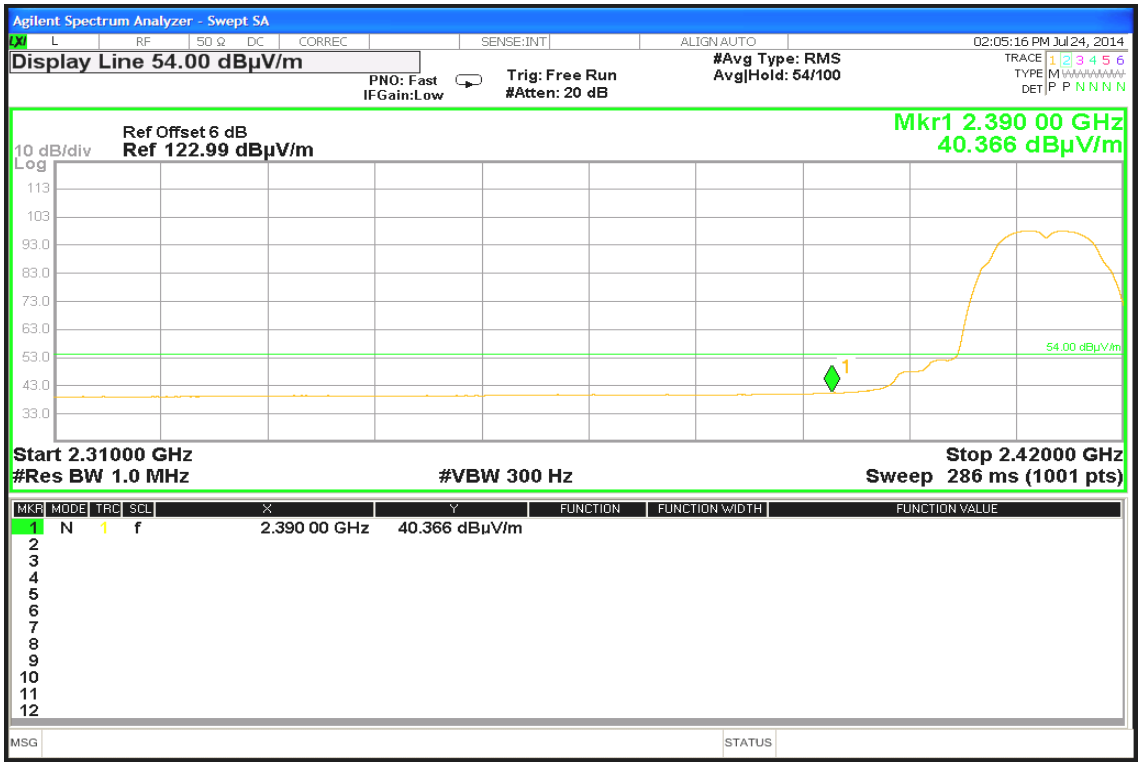
## Test Plot

### Band Edges (IEEE 802.11b mode/ CH Low)

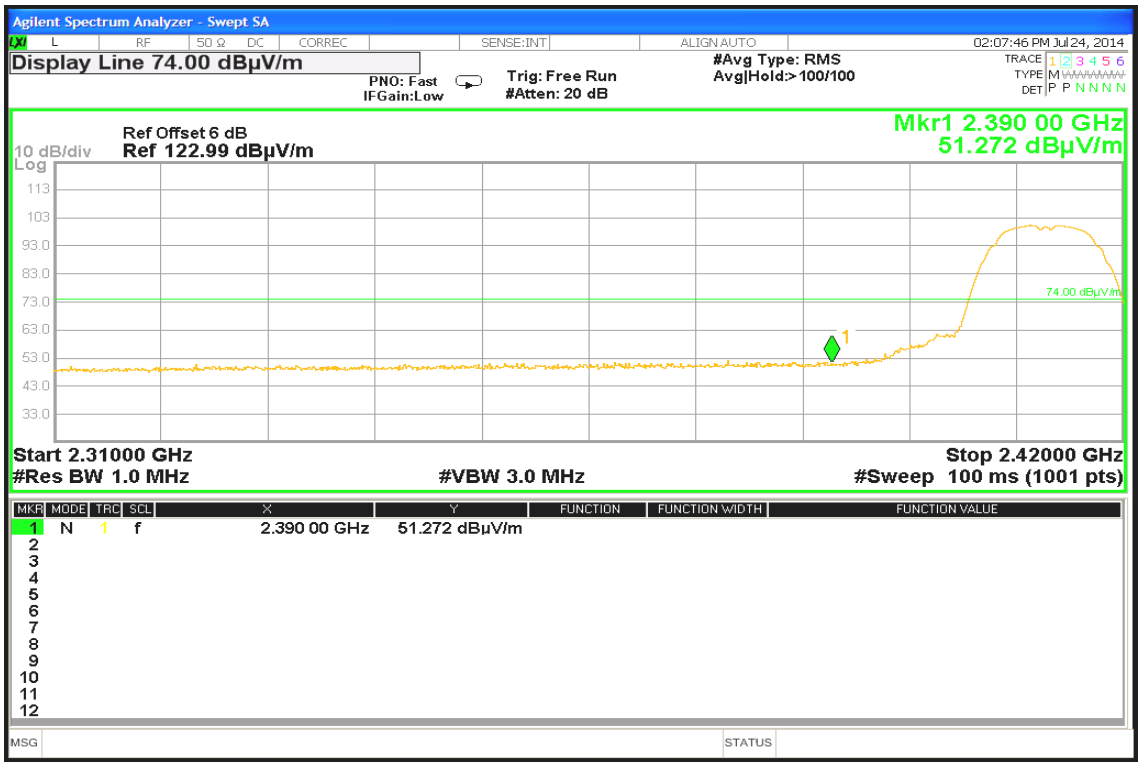
### Detector mode: Peak Polarity: Vertical



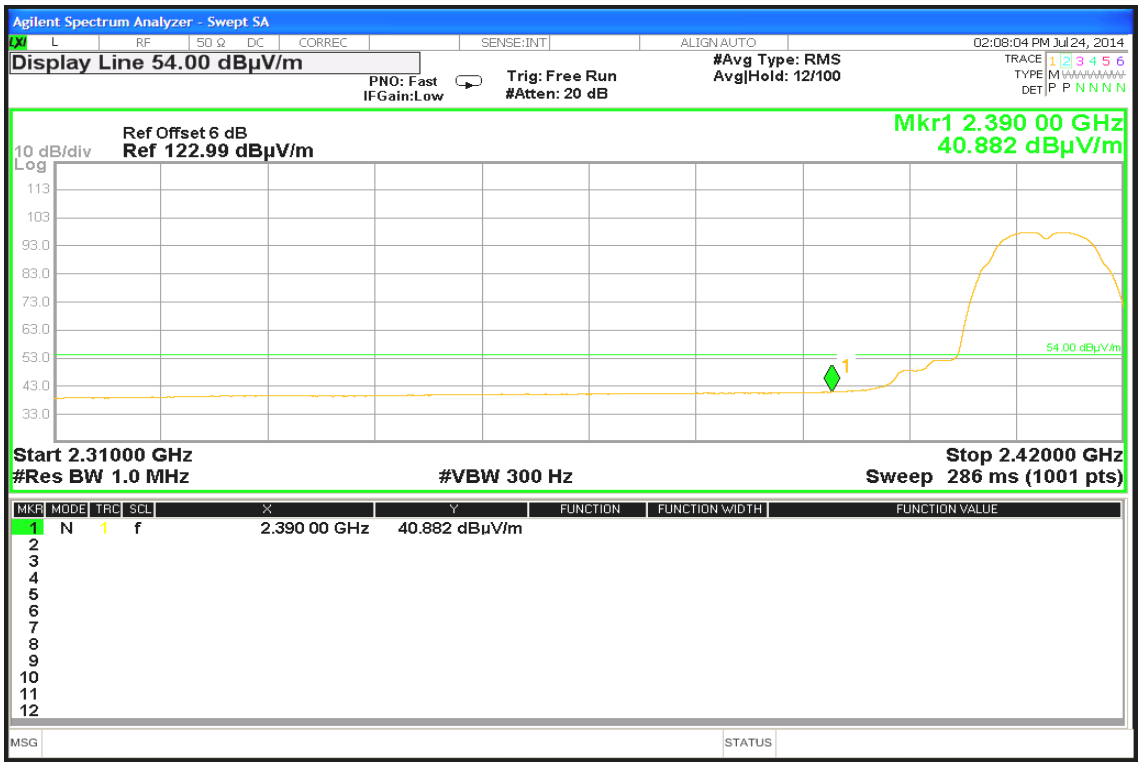

### Detector mode: Average Polarity: Vertical



## Detector mode: Peak Polarity: Horizontal



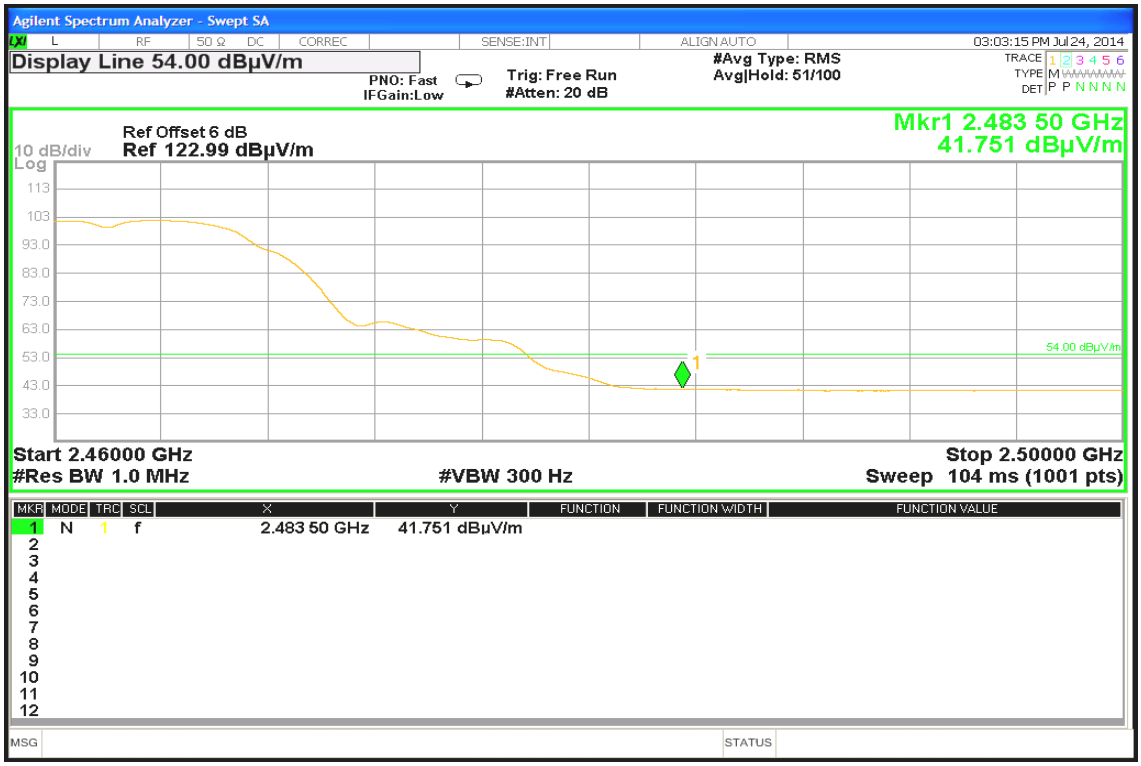

## Detector mode: Average Polarity: Horizontal



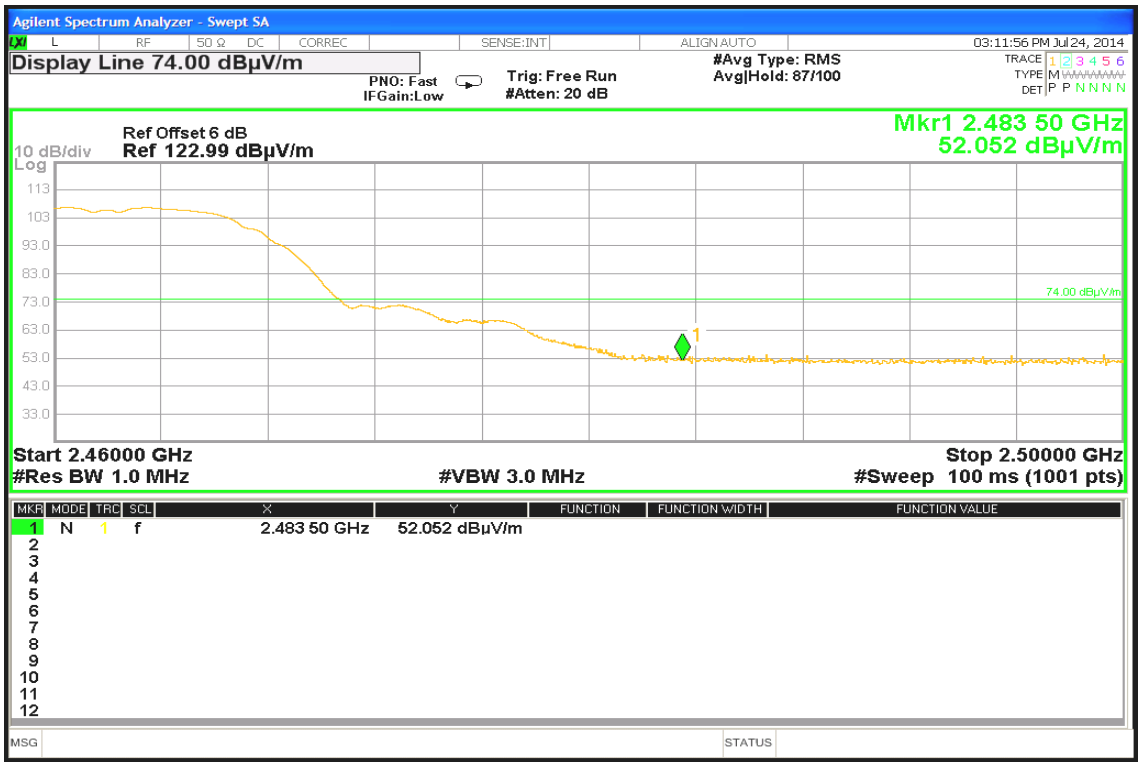
## Band Edges (IEEE 802.11b mode / CH High)

### Detector mode: Peak Polarity: Vertical


### Detector mode: Average Polarity: Vertical



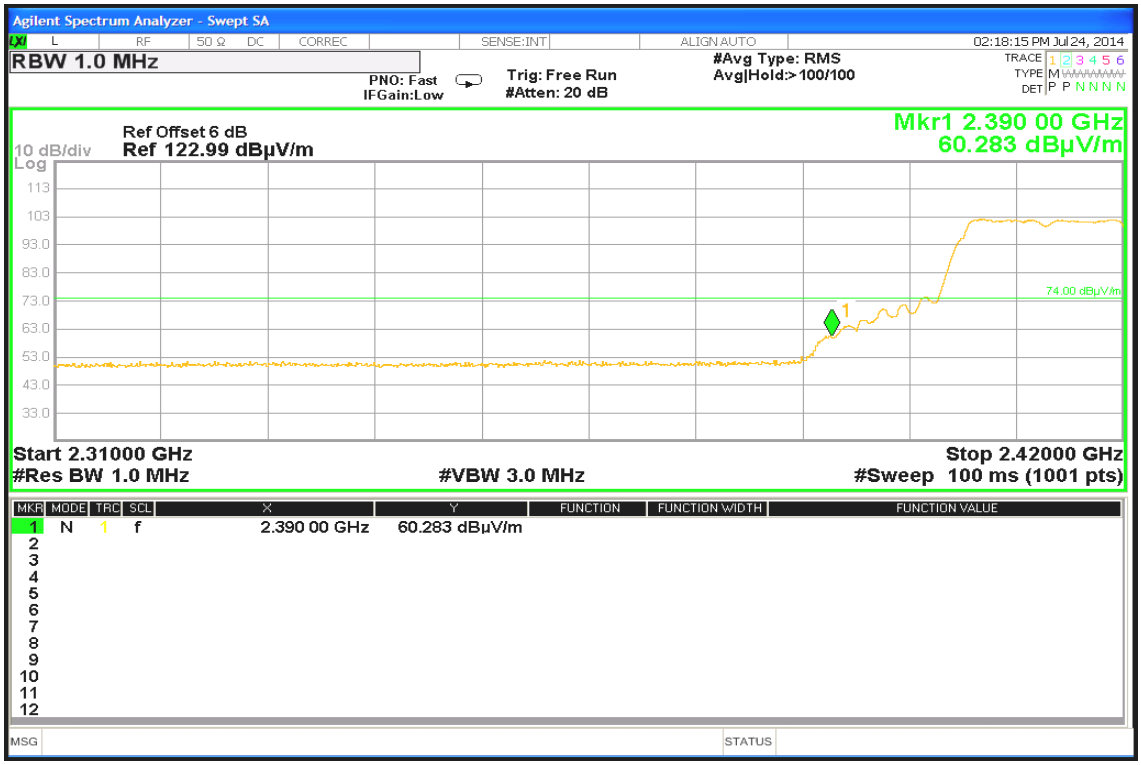
## Detector mode: Peak Polarity: Horizontal



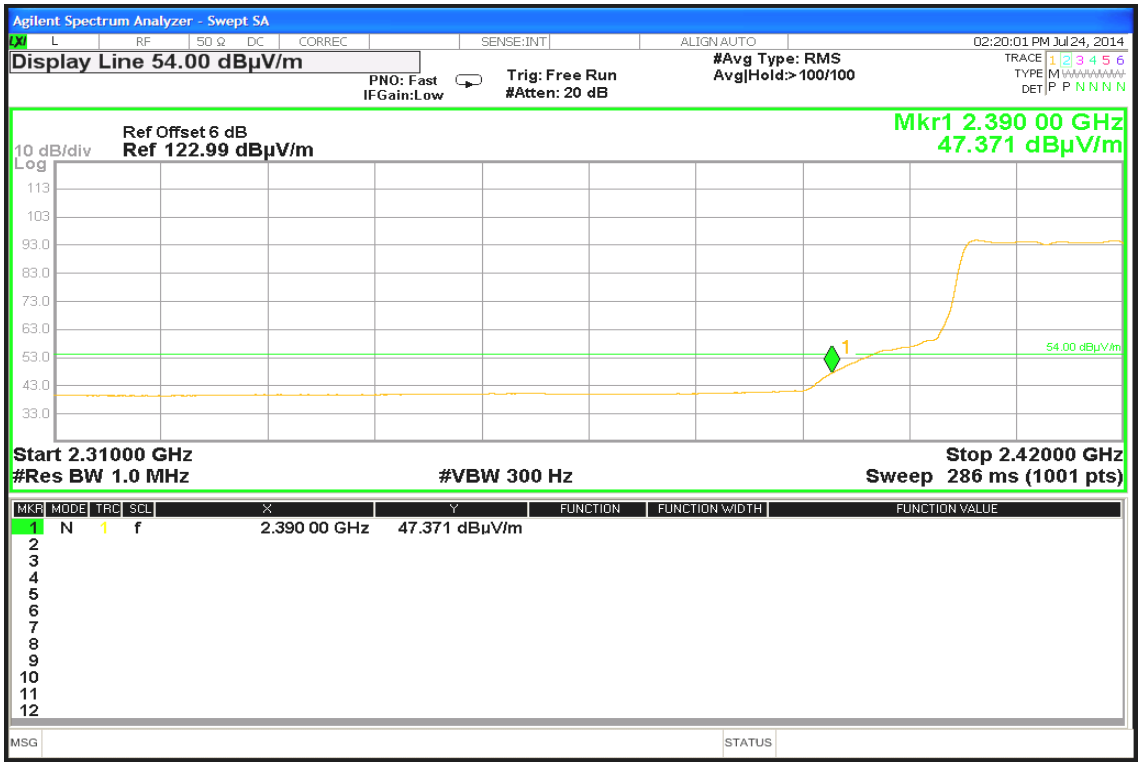

## Detector mode: Average Polarity: Horizontal

## Band Edges (IEEE 802.11g mode / CH Low)

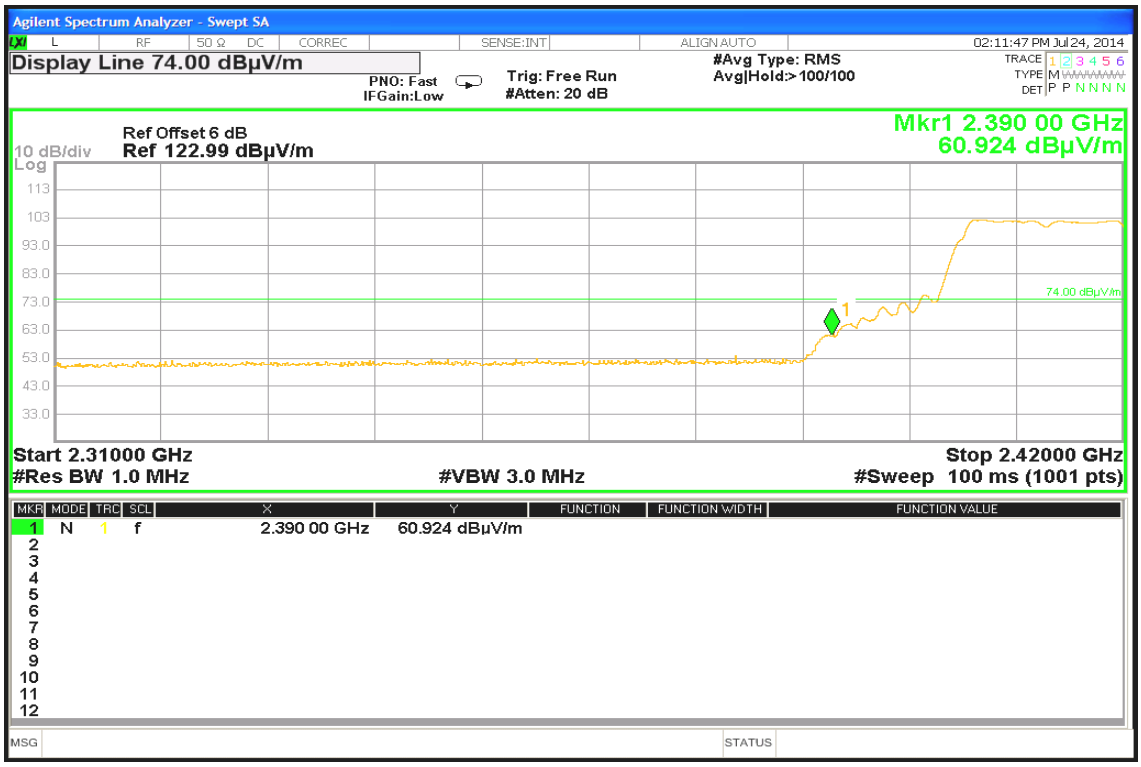
### Detector mode: Peak Polarity: Vertical



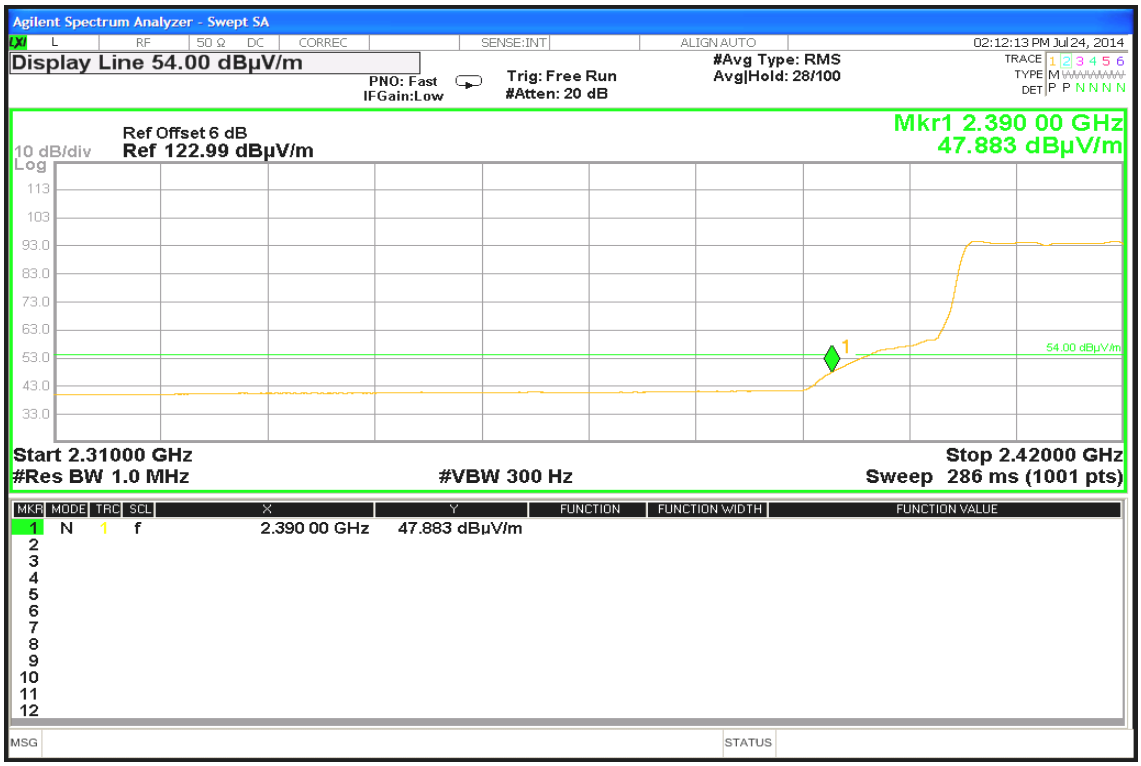

### Detector mode: Average Polarity: Vertical



## Detector mode: Peak Polarity: Horizontal

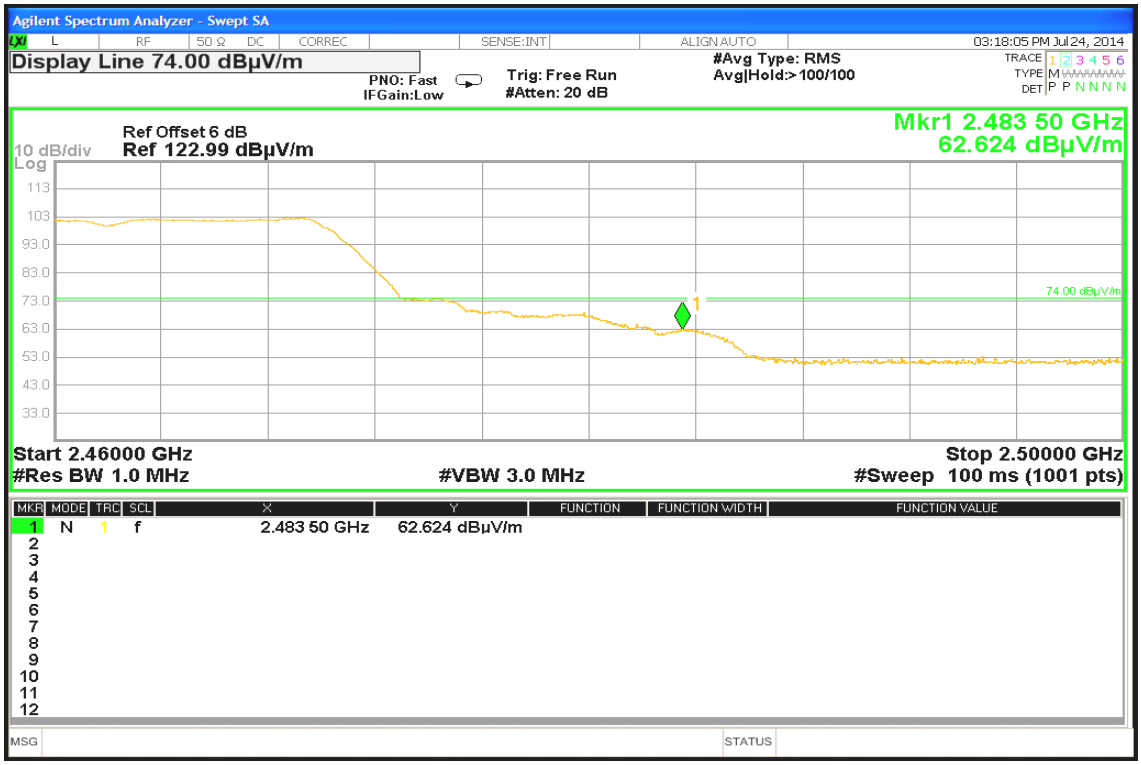



## Detector mode: Average Polarity: Horizontal

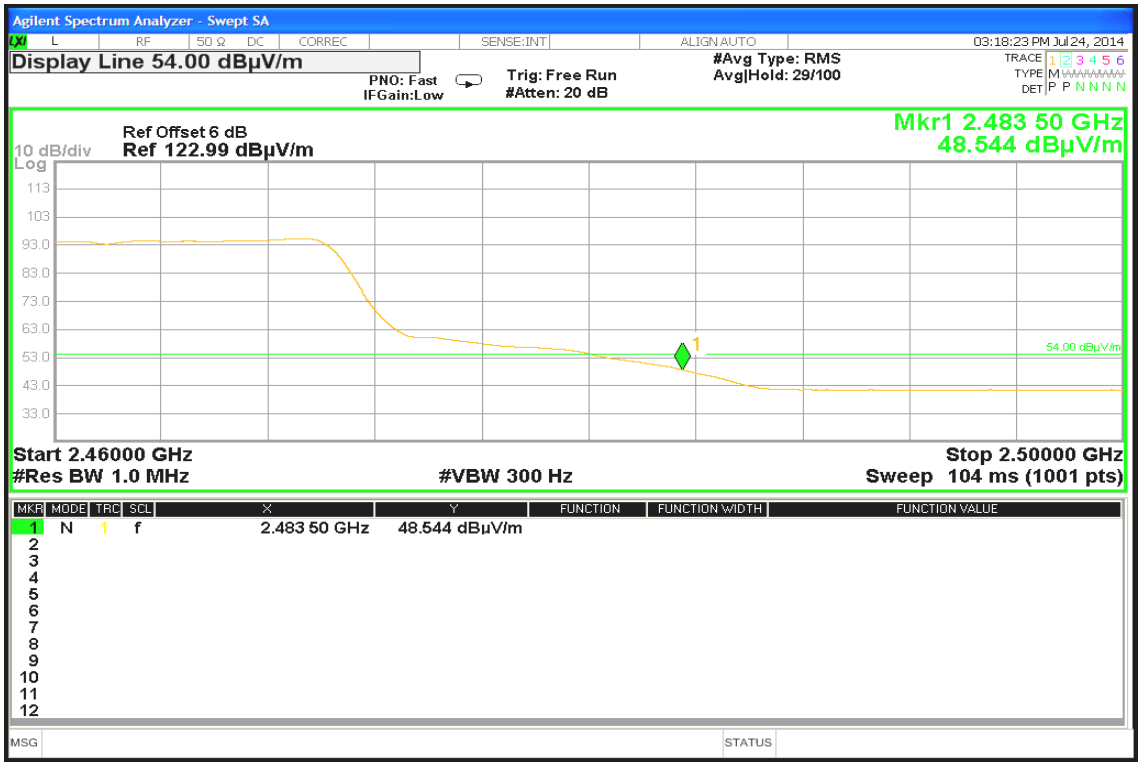


## Band Edges (IEEE 802.11g mode / CH High)

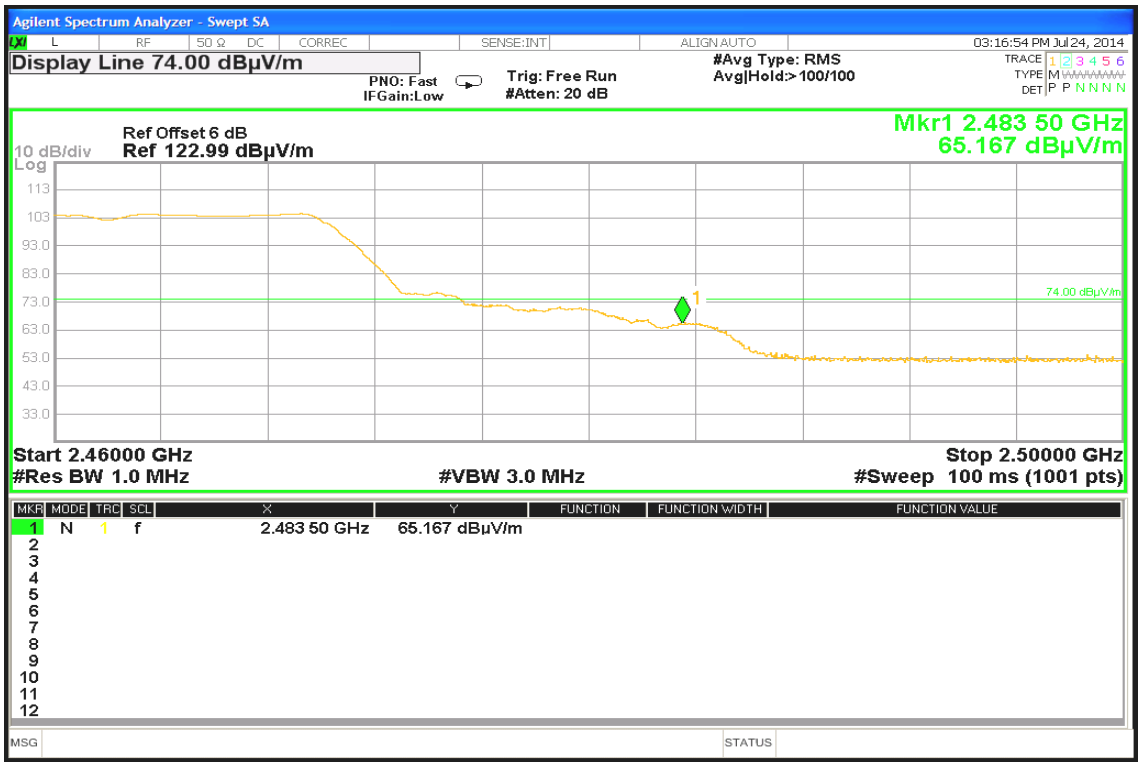
### Detector mode: Peak Polarity: Vertical



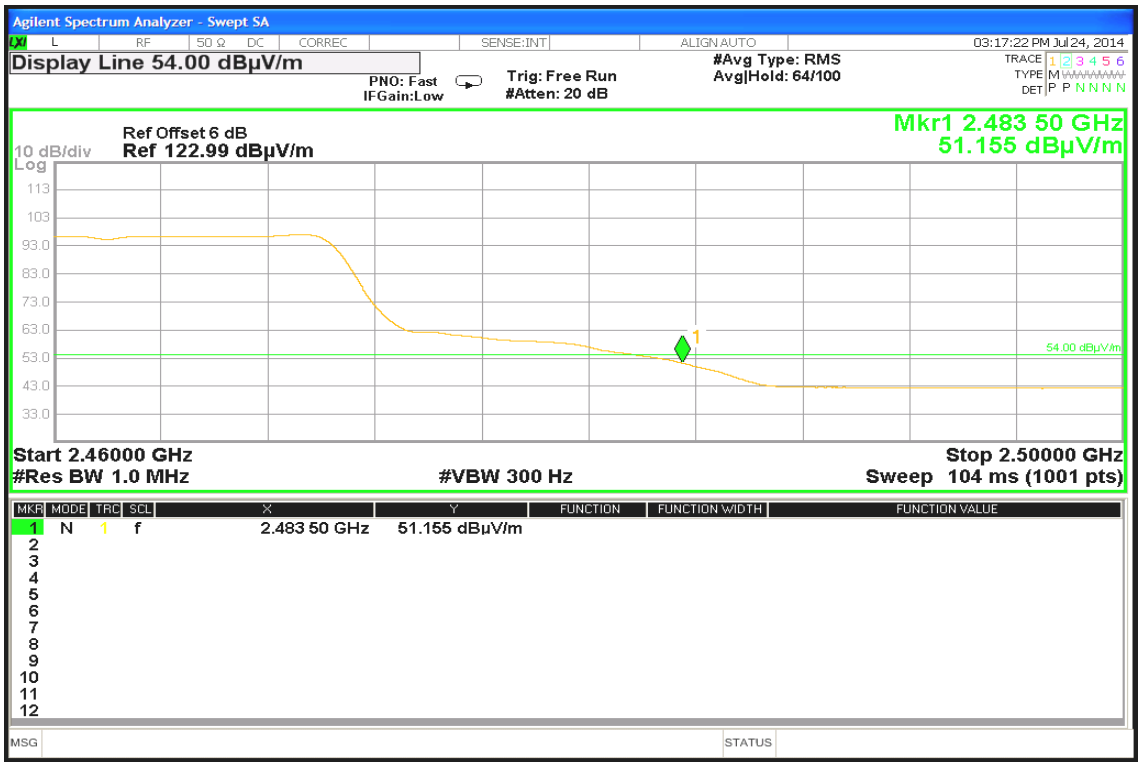

### Detector mode: Average Polarity: Vertical



## Detector mode: Peak Polarity: Horizontal

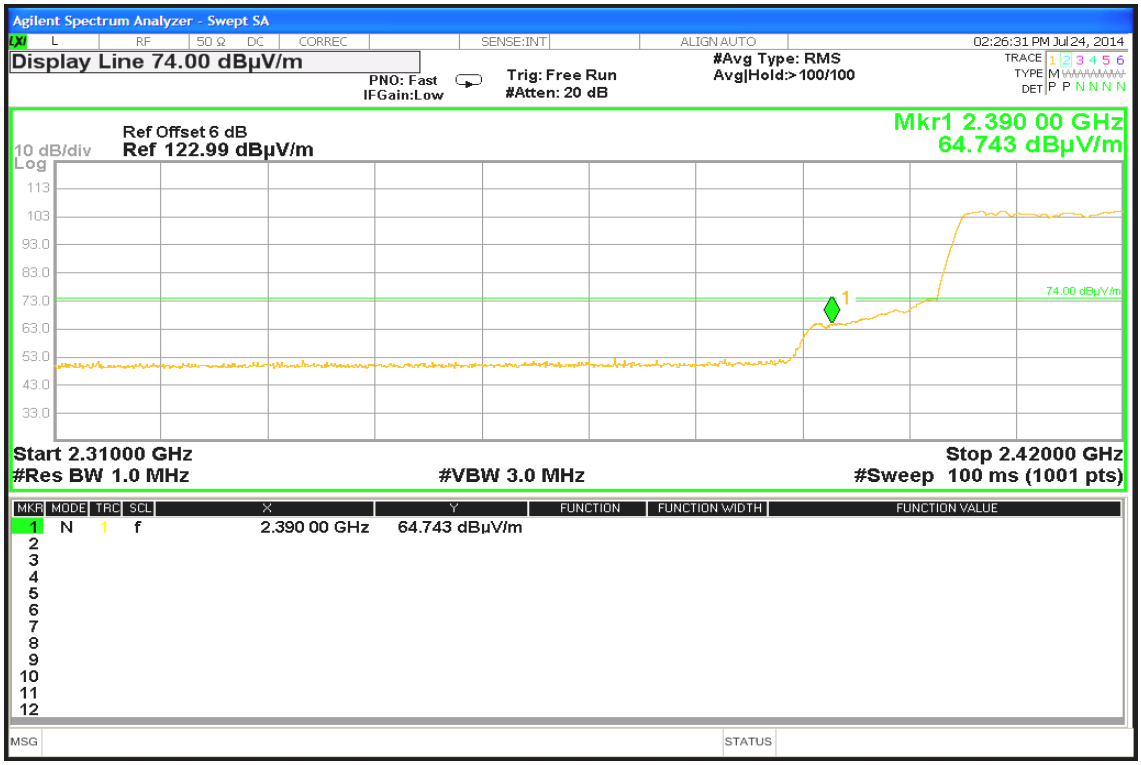



## Detector mode: Average Polarity: Horizontal

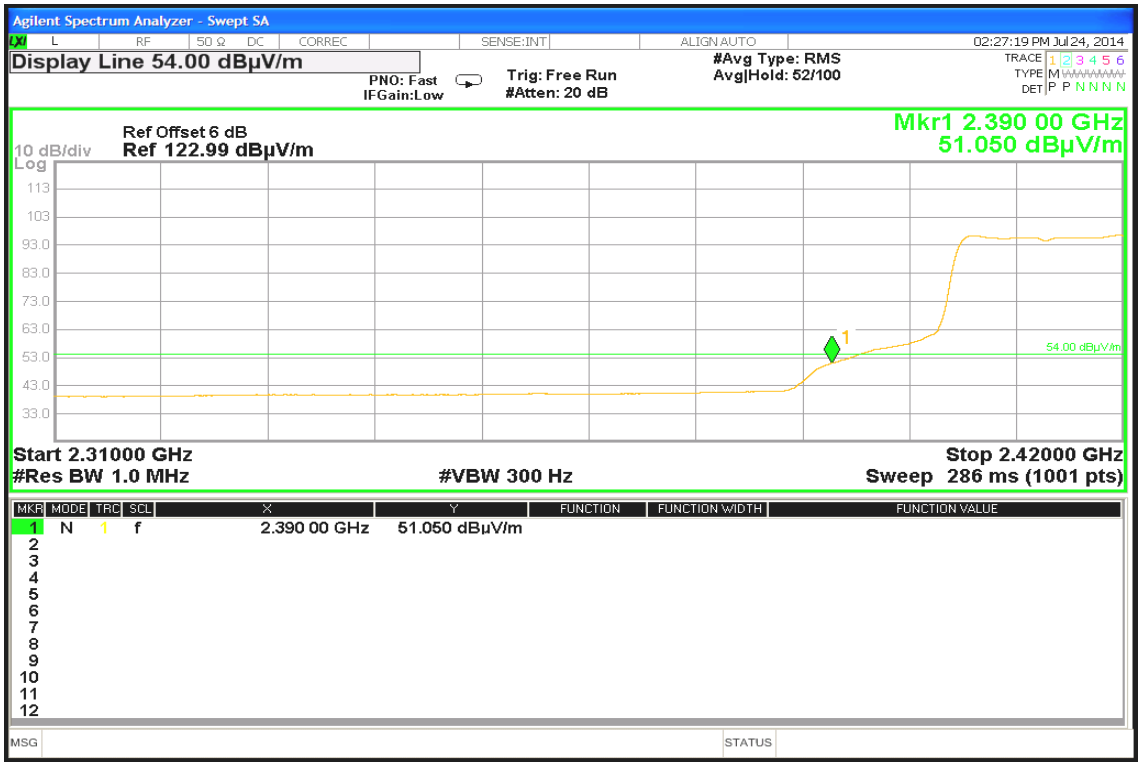


## Band Edges (IEEE 802.11n HT20 mode / CH Low)

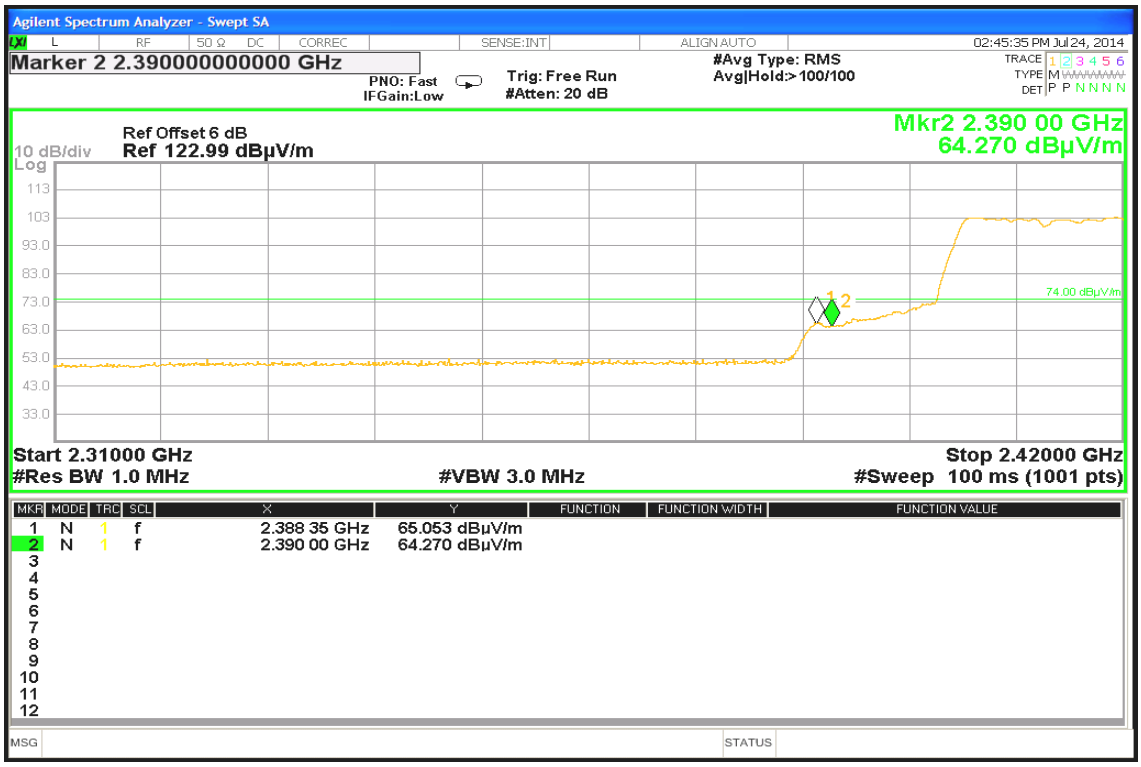
### Detector mode: Peak Polarity: Vertical



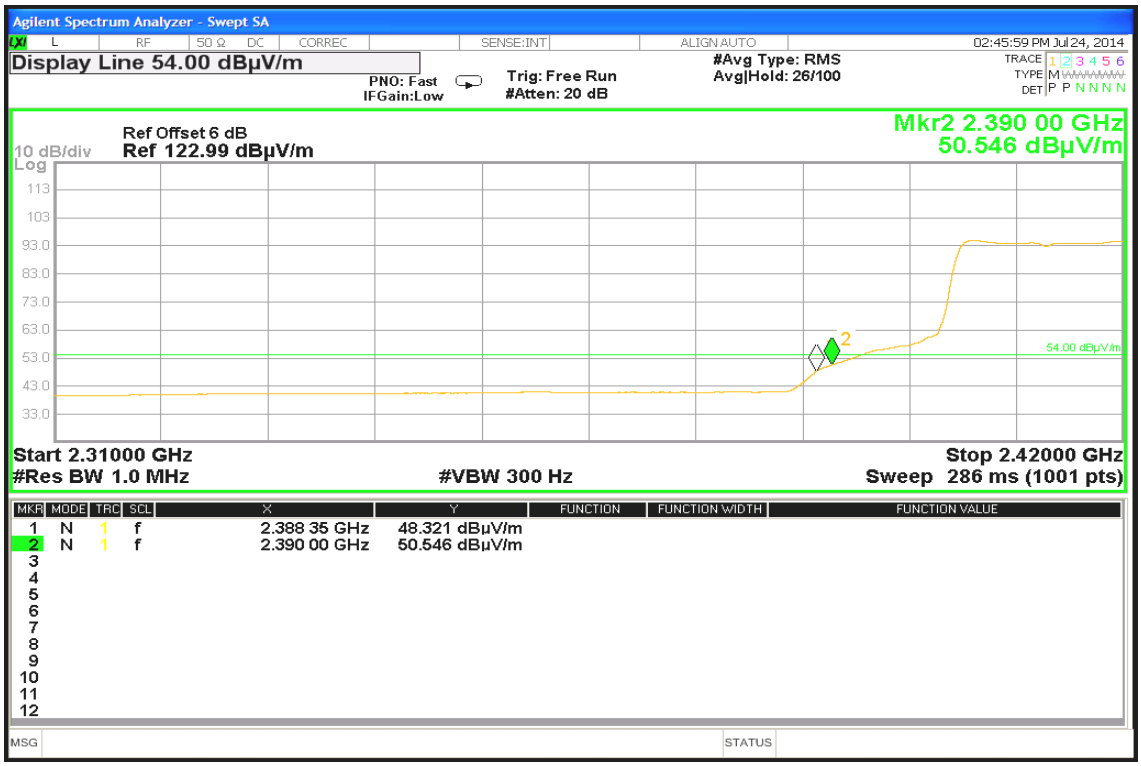

### Detector mode: Average Polarity: Vertical



## Detector mode: Peak Polarity: Horizontal



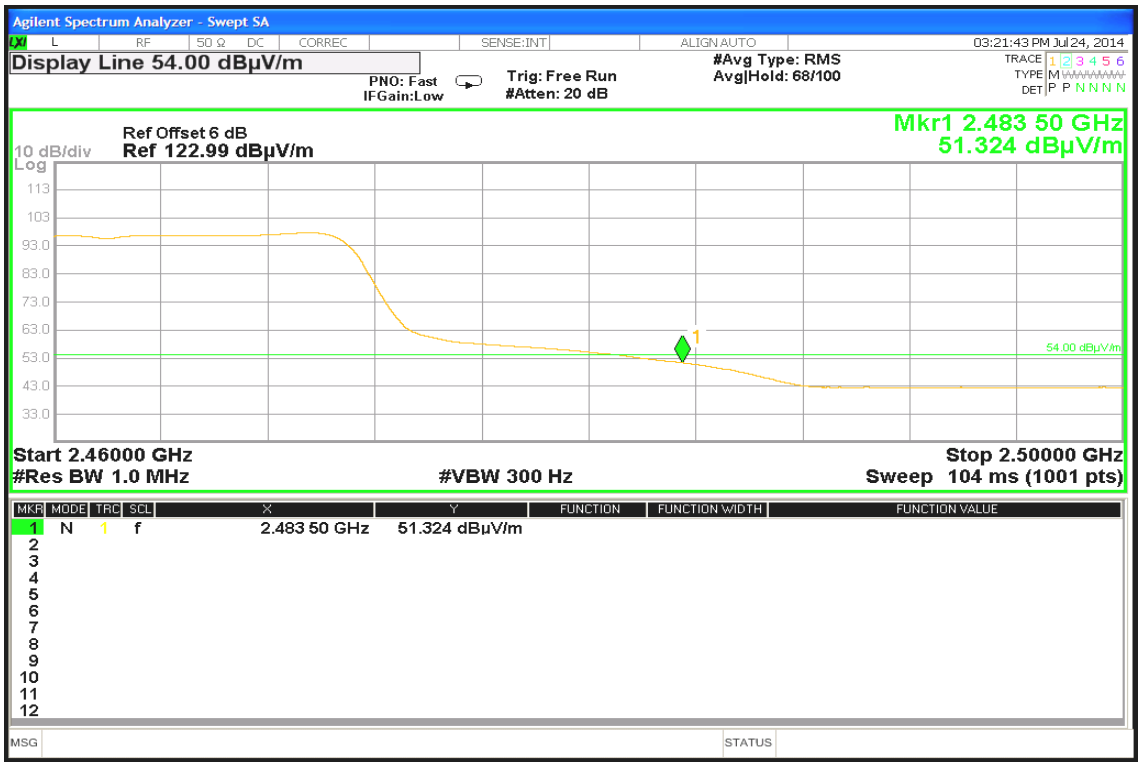

## Detector mode: Average Polarity: Horizontal



## Band Edges (IEEE 802.11n HT20 mode / CH High)

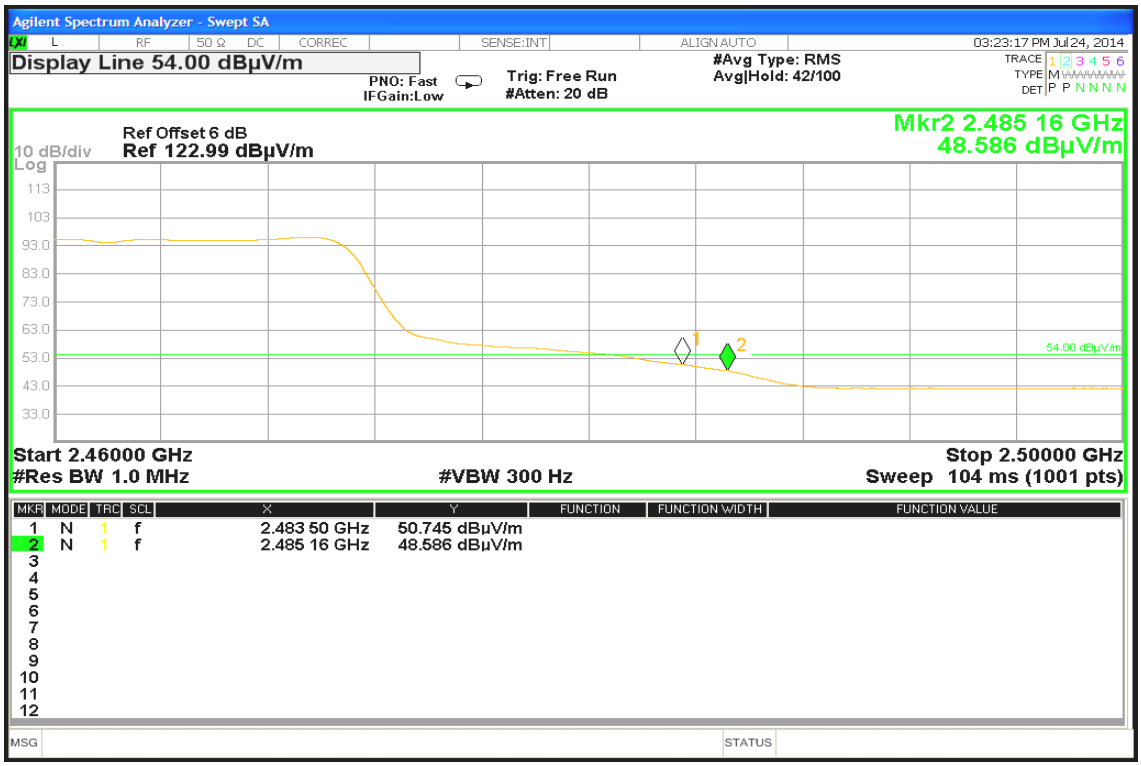
### Detector mode: Peak Polarity: Vertical


### Detector mode: Average Polarity: Vertical



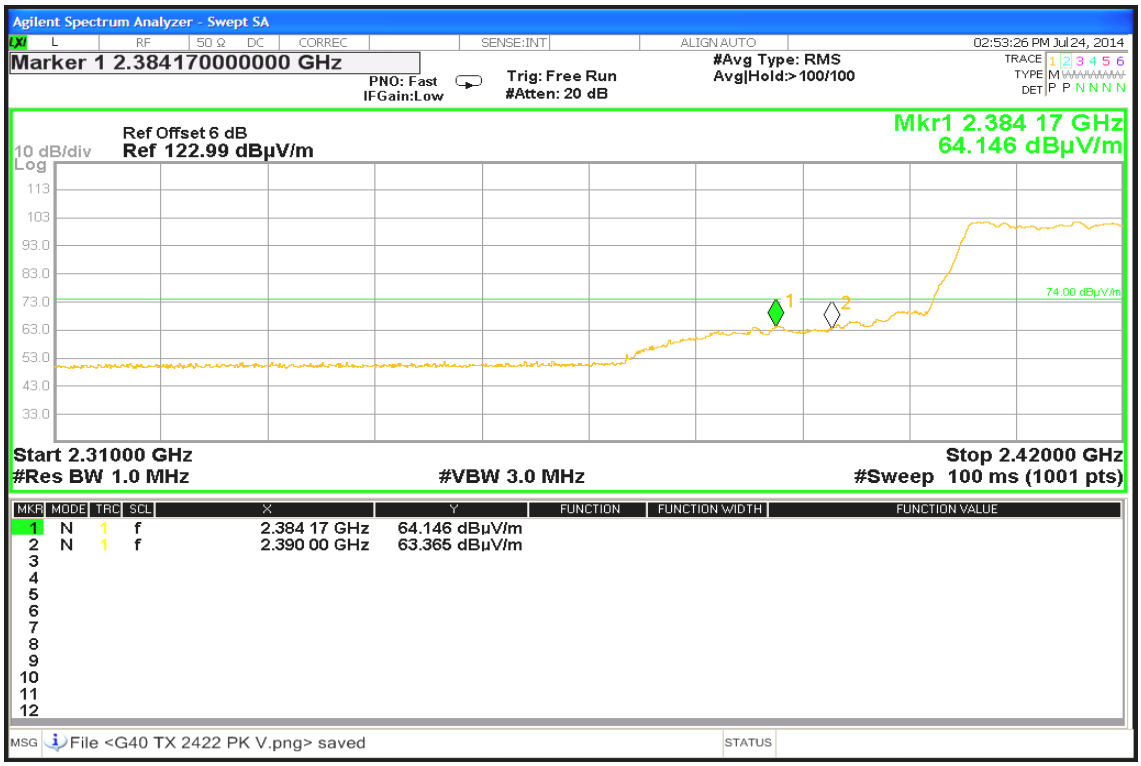
## Detector mode: Peak Polarity: Horizontal


## Detector mode: Average Polarity: Horizontal

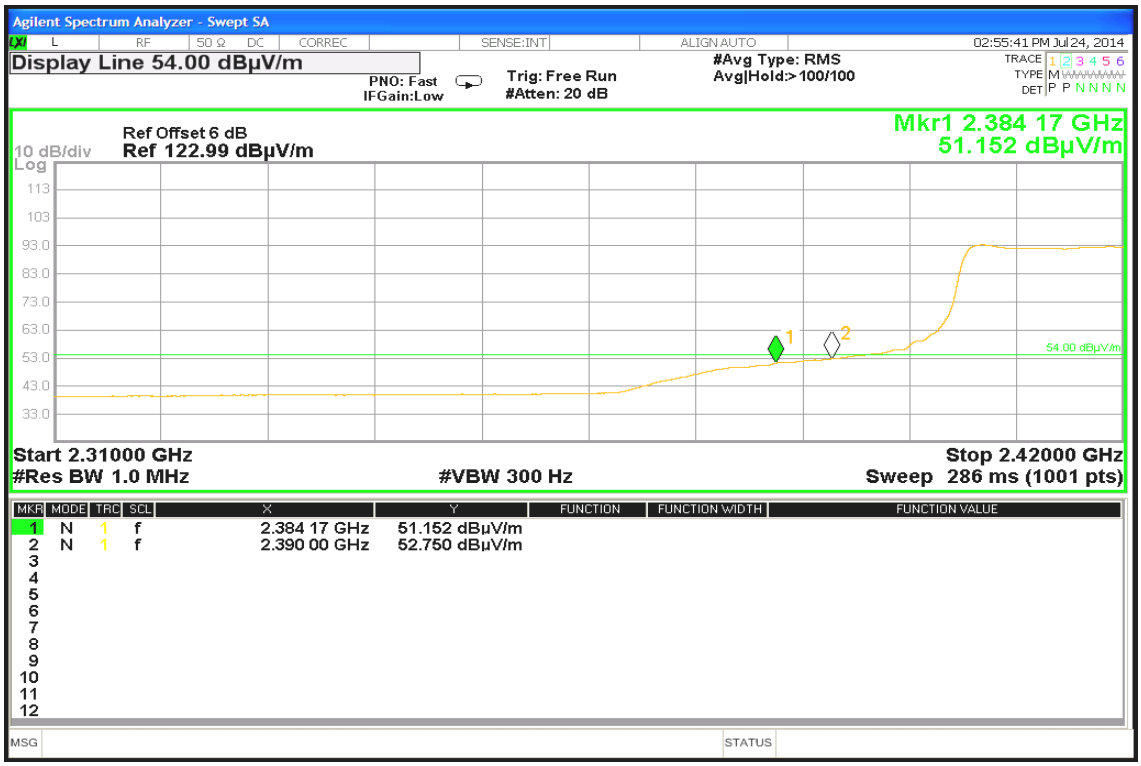


## Band Edges (IEEE 802.11n HT40 mode / CH Low)

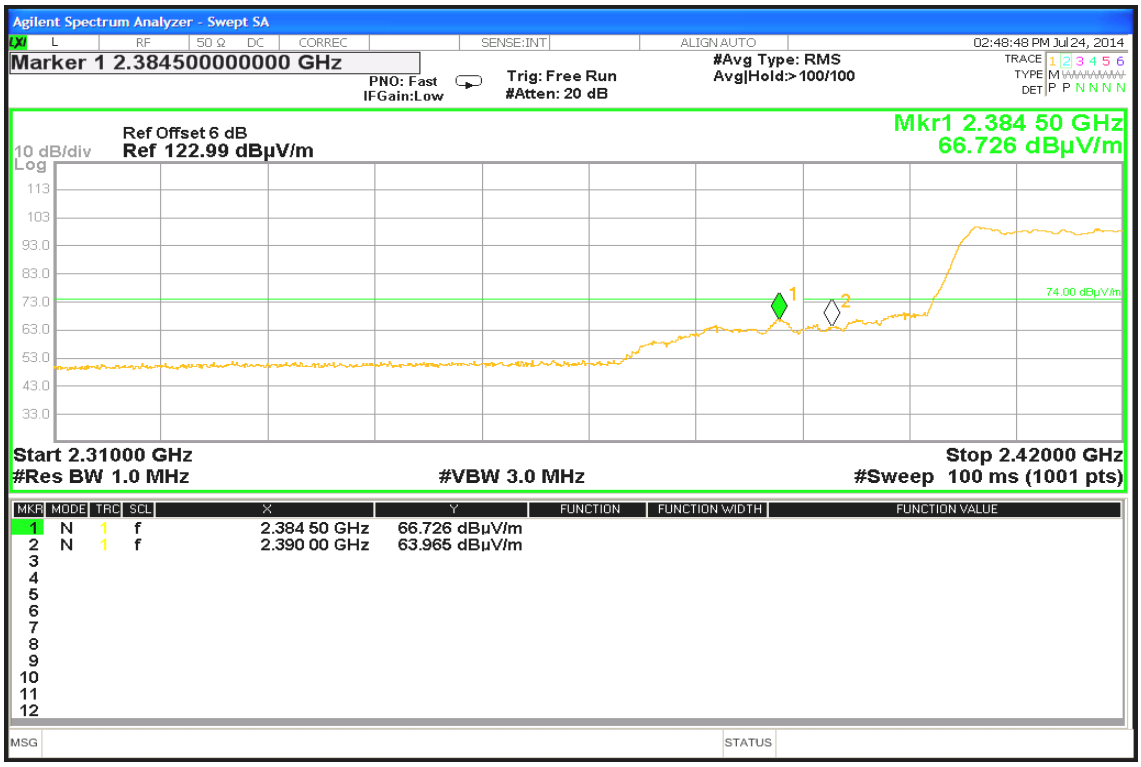
## Detector mode: Peak Polarity: Vertical



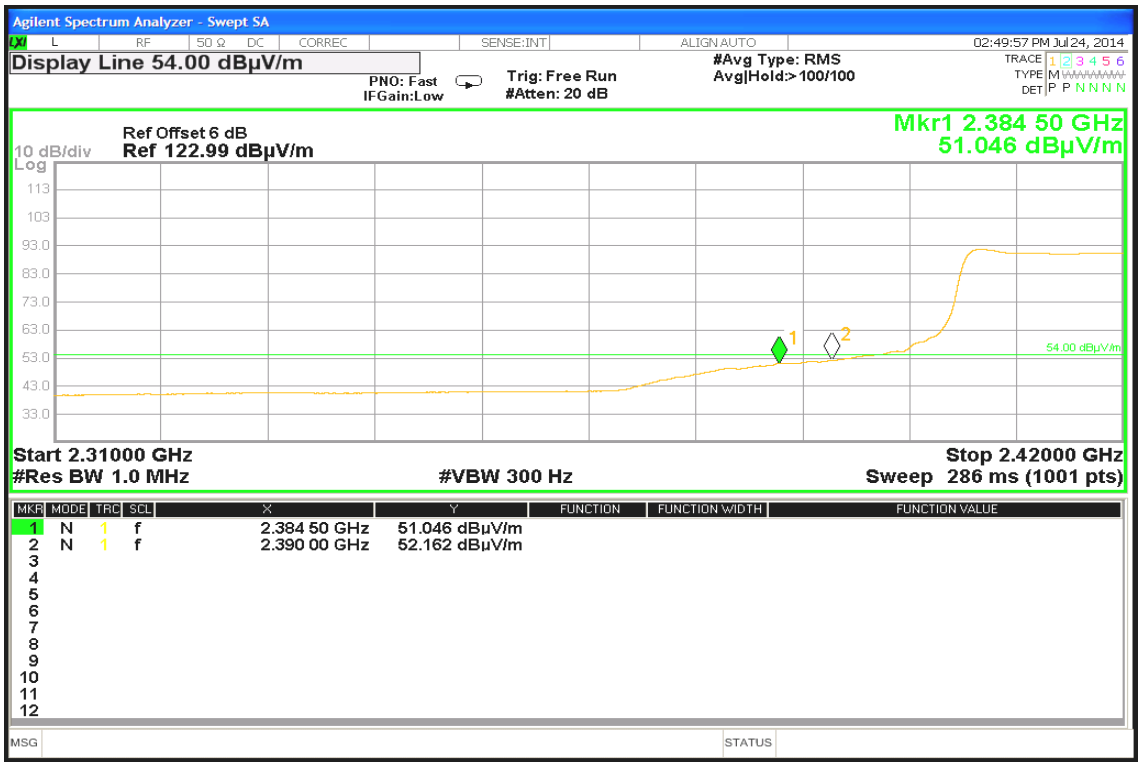

## Detector mode: Average Polarity: Vertical



## Detector mode: Peak Polarity: Horizontal

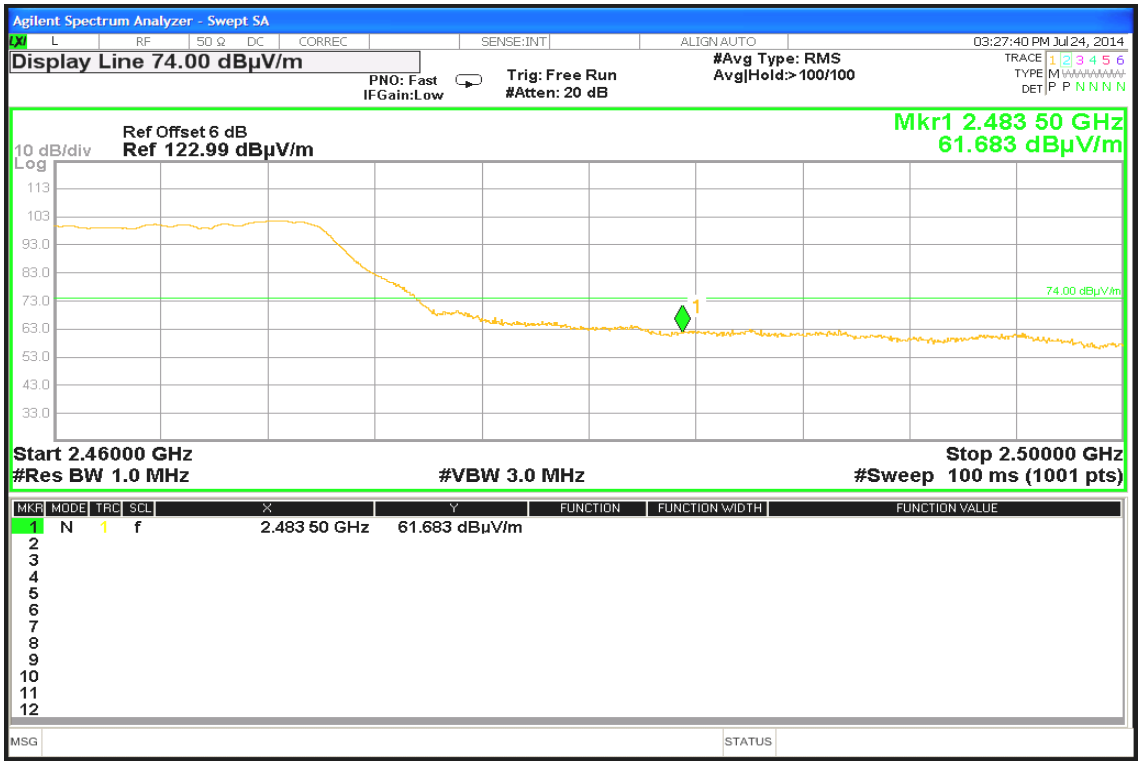



## Detector mode: Average Polarity: Horizontal

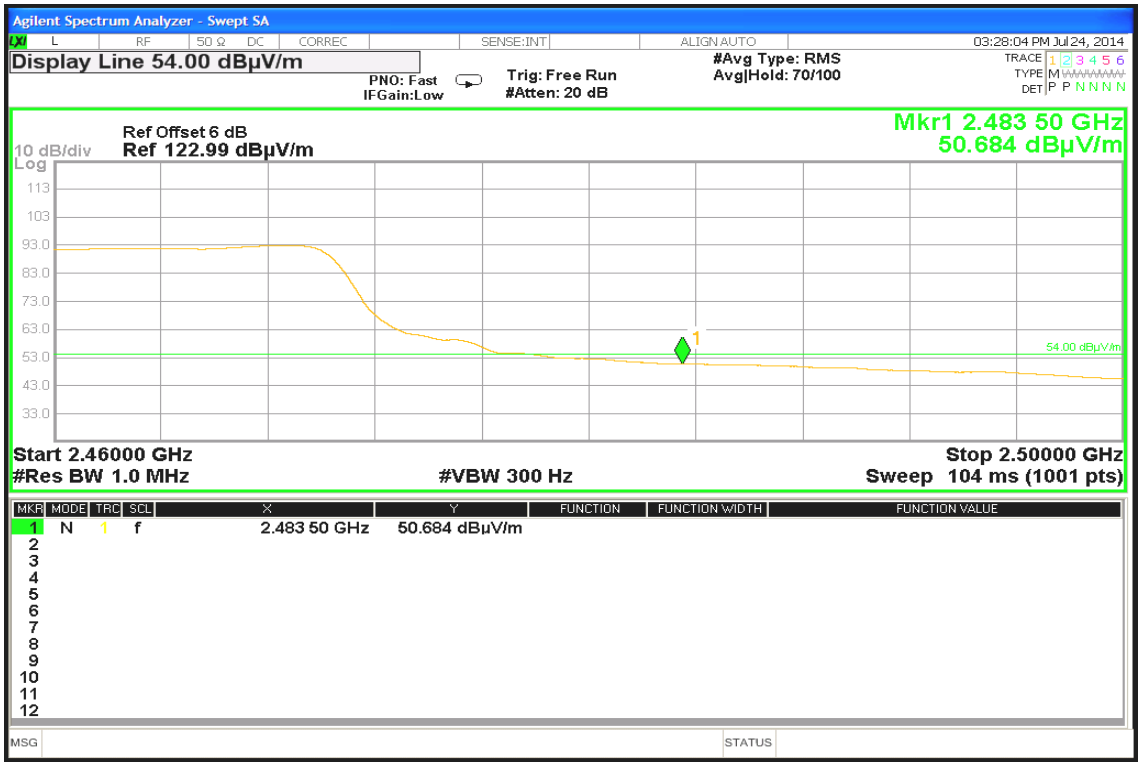


## Band Edges (IEEE 802.11n HT40 mode / CH High)

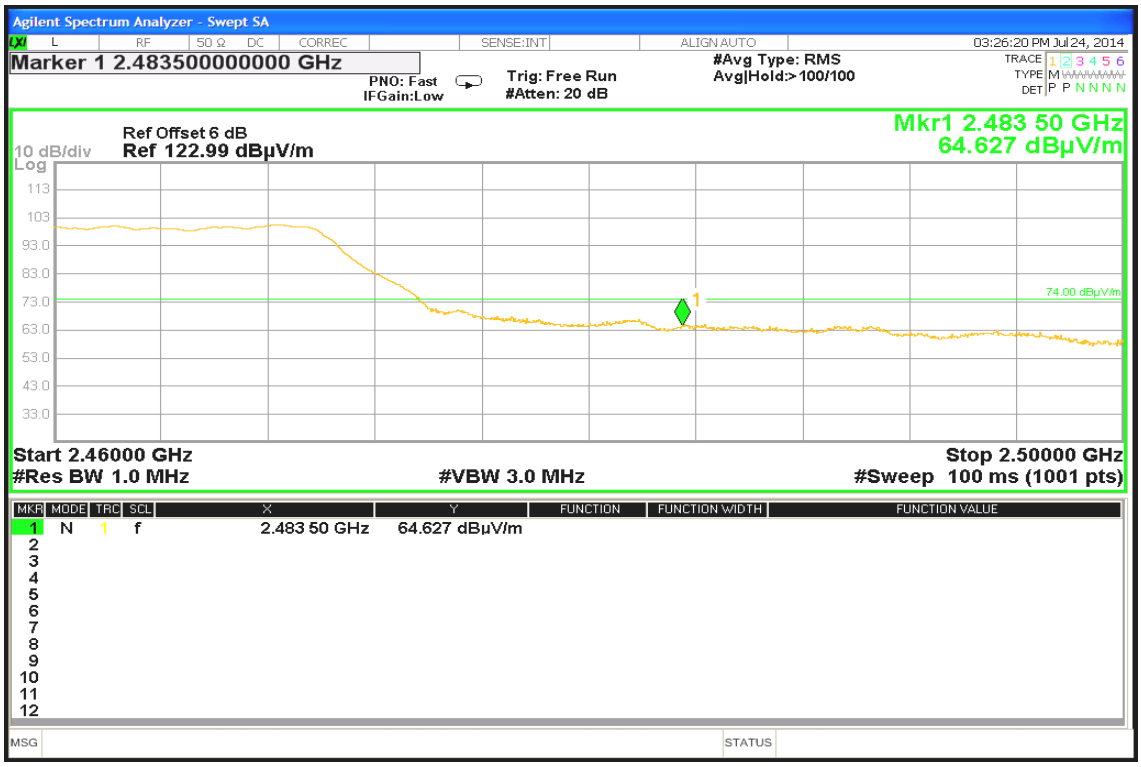
### Detector mode: Peak Polarity: Vertical



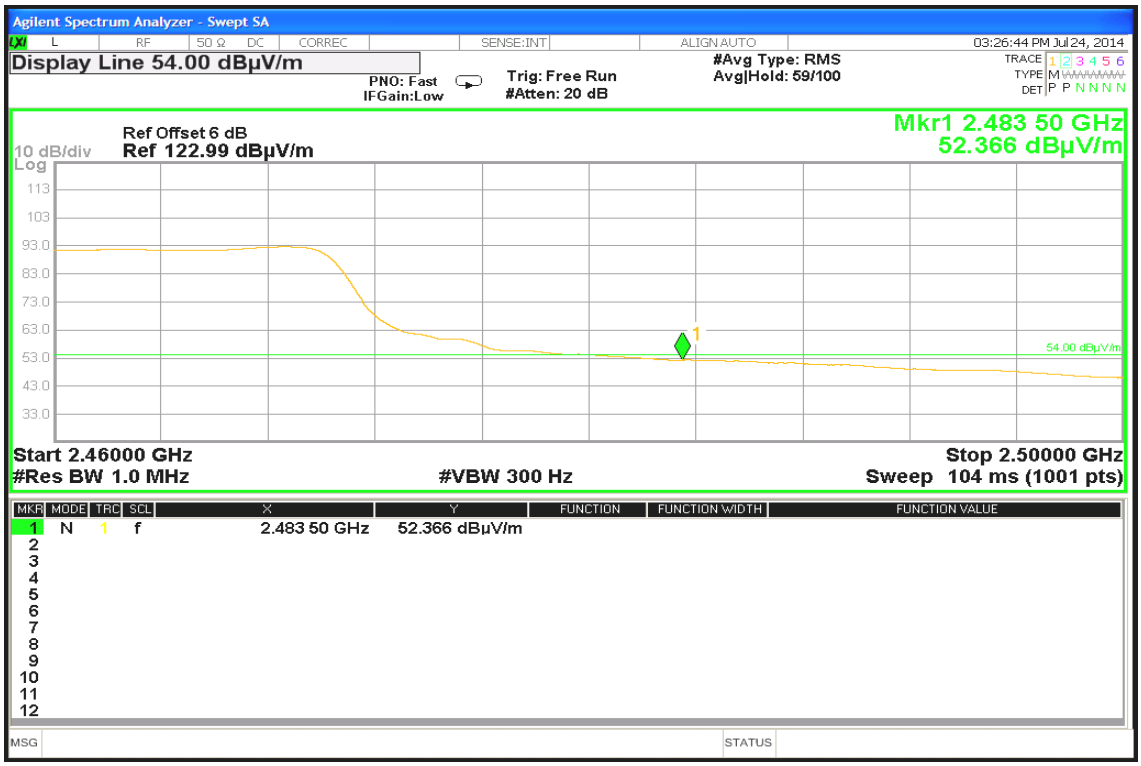

### Detector mode: Average Polarity: Vertical



## Detector mode: Peak Polarity: Horizontal




## Detector mode: Average Polarity: Horizontal

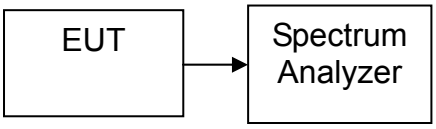


## 7.5 PEAK POWER SPECTRAL DENSITY

### LIMIT

1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentionalradiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval ofcontinuous transmission.
2. According to §15.247(f), the digital modulation operation of thehybrid system, with the frequency hopping turned off, shall comply with the power density requirementsof paragraph (d) of this section.

### TEST CONFIGURATION




### TEST PROCEDURE

**Per KDB 558074 v03r01**

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

### TEST RESULTS

*No non-compliance noted*

# TEST DATA

### Test mode: IEEE 802.11b mode

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -0.54 | 8.00 | PASS |
| Mid | 2437 | -1.95 | | |
| High | 2462 | -8.60 | | |

### Test mode: IEEE 802.11g mode

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -11.30 | 8.00 | PASS |
| Mid | 2437 | -11.82 | | |
| High | 2462 | -12.87 | | |

### Test mode: IEEE 802.11n HT20 mode

| Channel | Frequency (MHz) | PPSD(dBm) | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Total | | |
| Low | 2412 | -12.83 | -13.10 | -9.95 | 6.66 | PASS |
| Mid | 2437 | -13.72 | -12.66 | -10.15 | | PASS |
| High | 2462 | -13.52 | -12.92 | -10.20 | | PASS |

### Test mode: IEEE 802.11n HT40 mode

| Channel | Frequency (MHz) | PPSD(dBm) | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Total | | |
| Low | 2422 | -18.37 | -17.55 | -14.93 | 6.66 | PASS |
| Mid | 2437 | -18.36 | -18.00 | -15.17 | | PASS |
| High | 2452 | -18.75 | -16.86 | -14.69 | | PASS |

***Remark:***

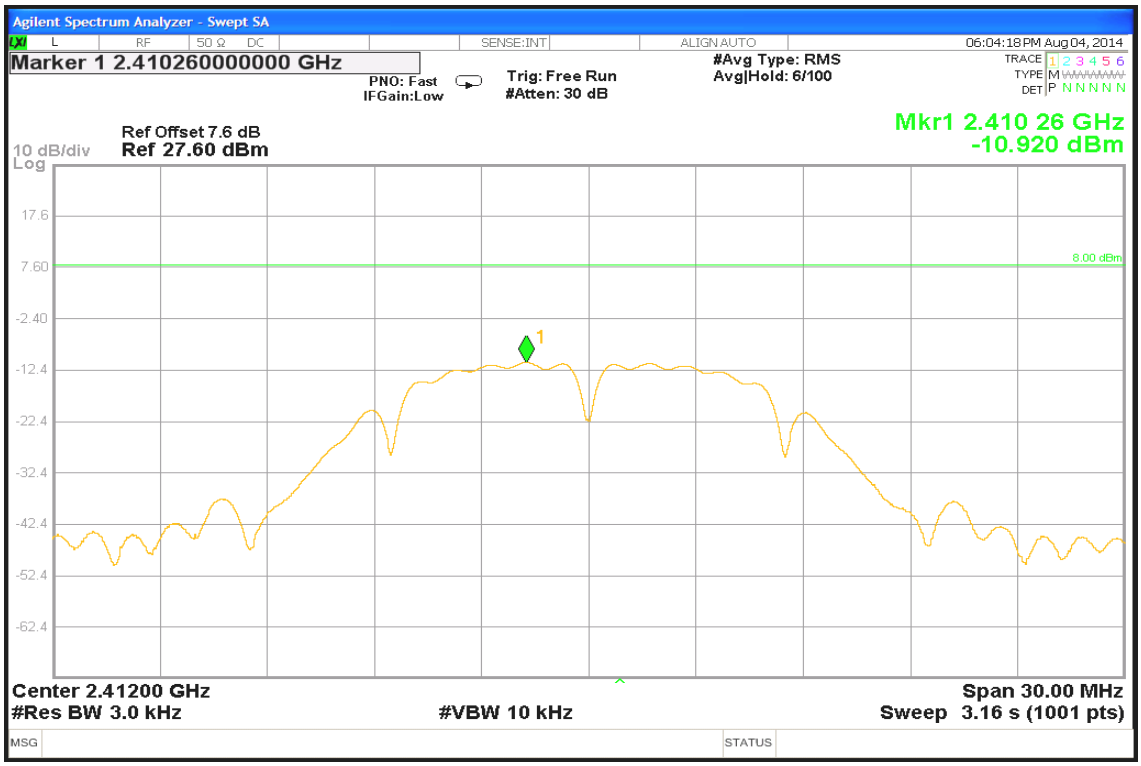
*1.Total PPSD (dBm) = 10*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 1 PPSD /10))*

*2. The maximum antenna gain is 7.34dBi; therefore the reduction due to antenna gain is 1.34dBi, so the limit is 6.66dBm*

## Test Plot

## IEEE 802.11b mode

### PPSD (CH Low)

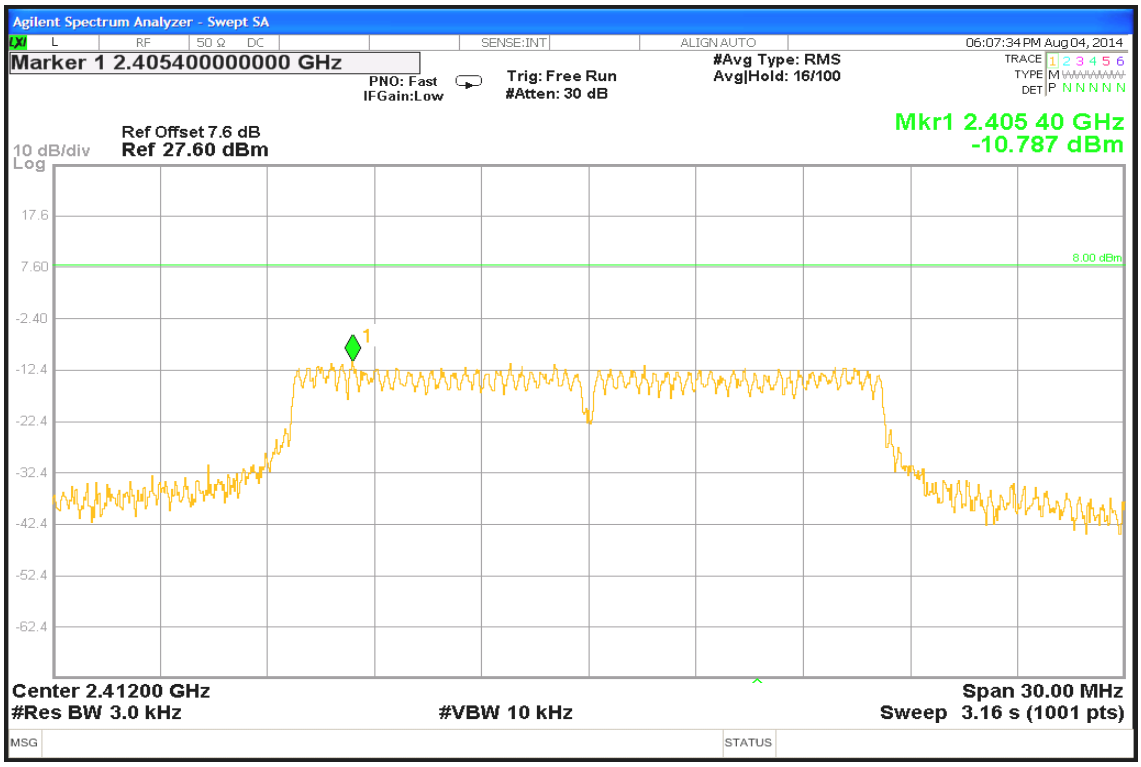



### PPSD (CH Mid)

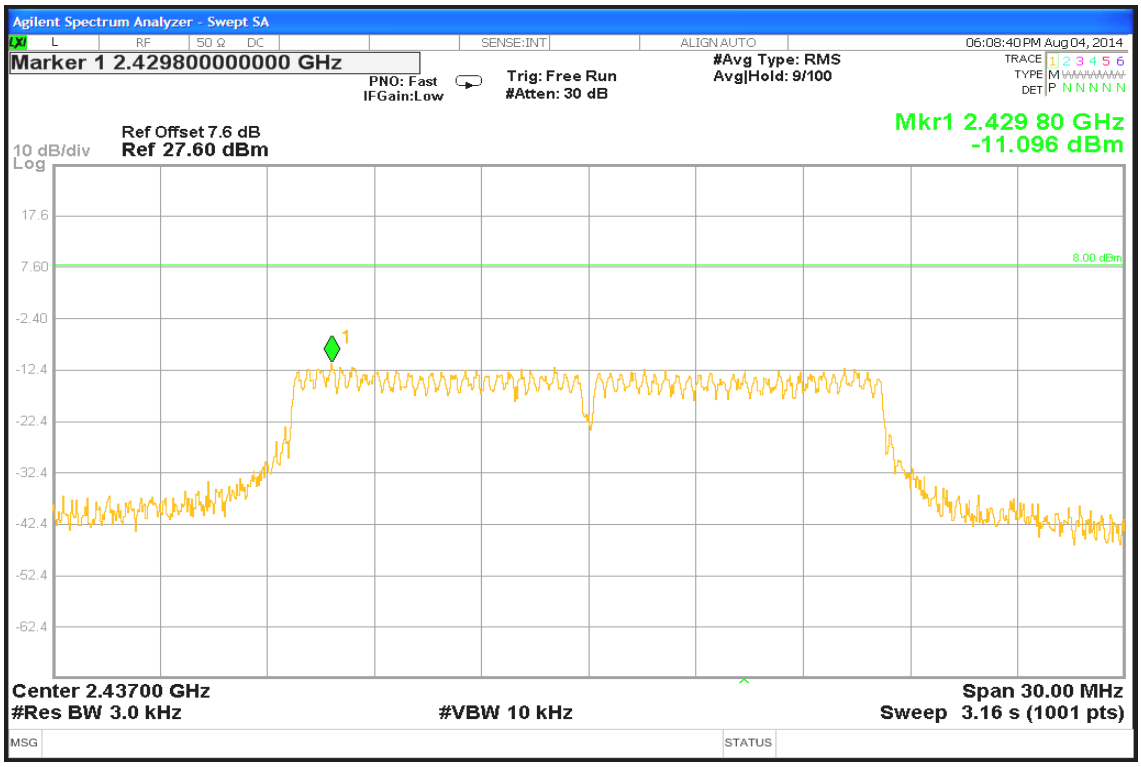
## PPSD (CH High)


## IEEE 802.11g mode

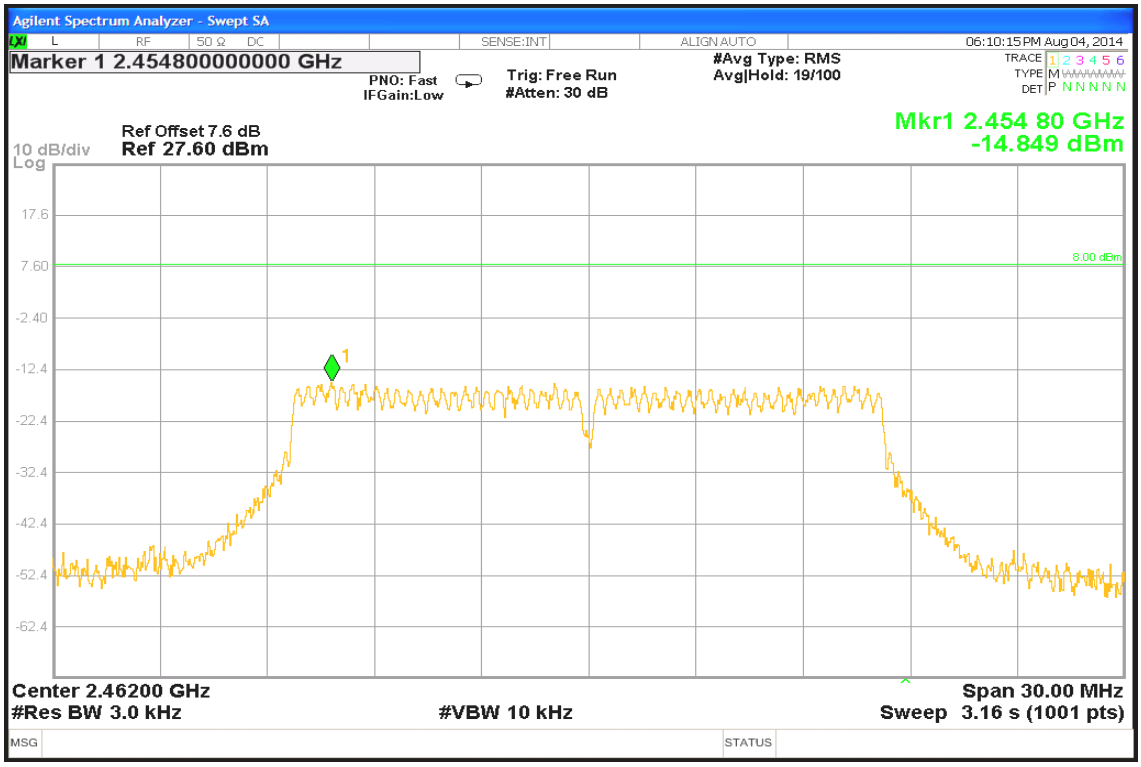
## PPSD (CH Low)



## PPSD (CH Mid)

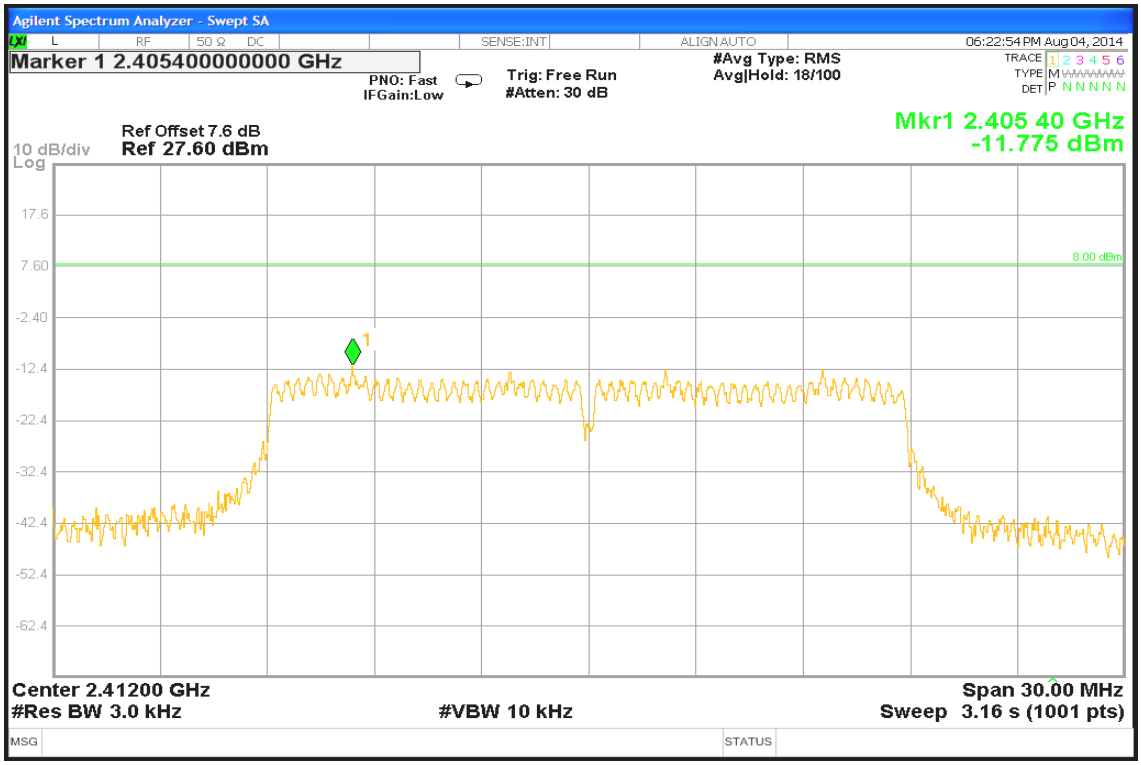



## PPSD (CH High)

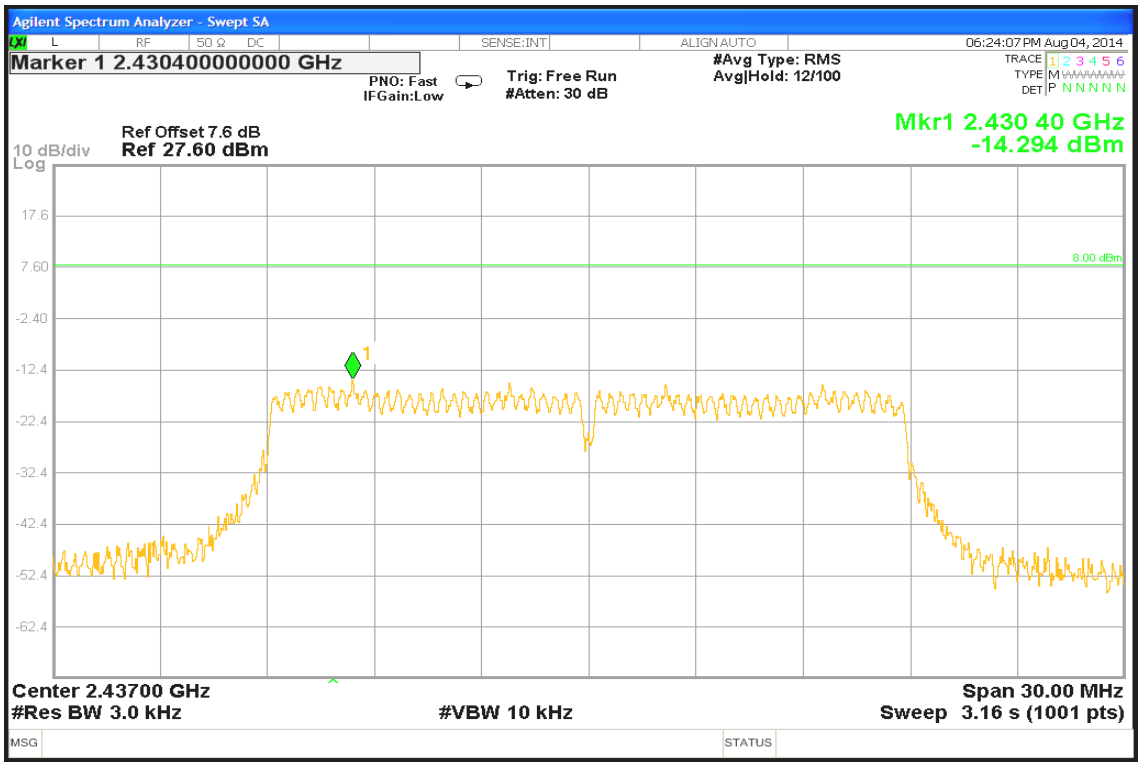


## IEEE 802.11n HT20 mode / Chain 0

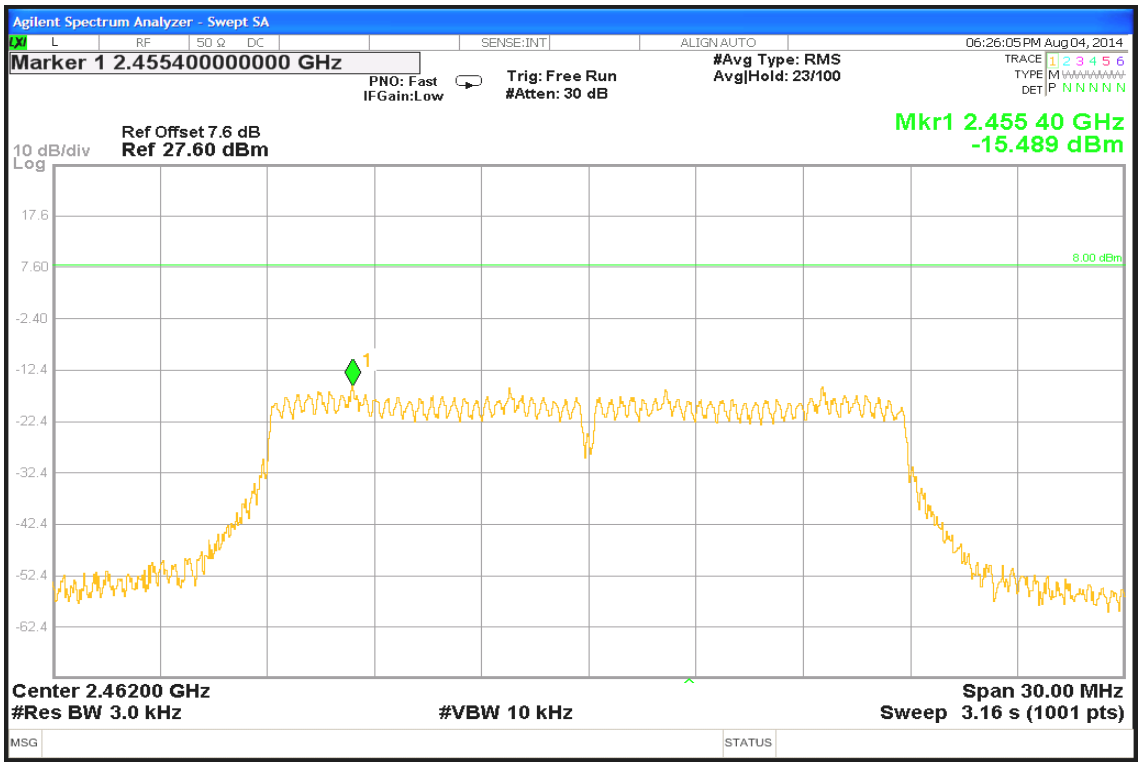
### PPSD (CH Low)




### PPSD (CH Mid)

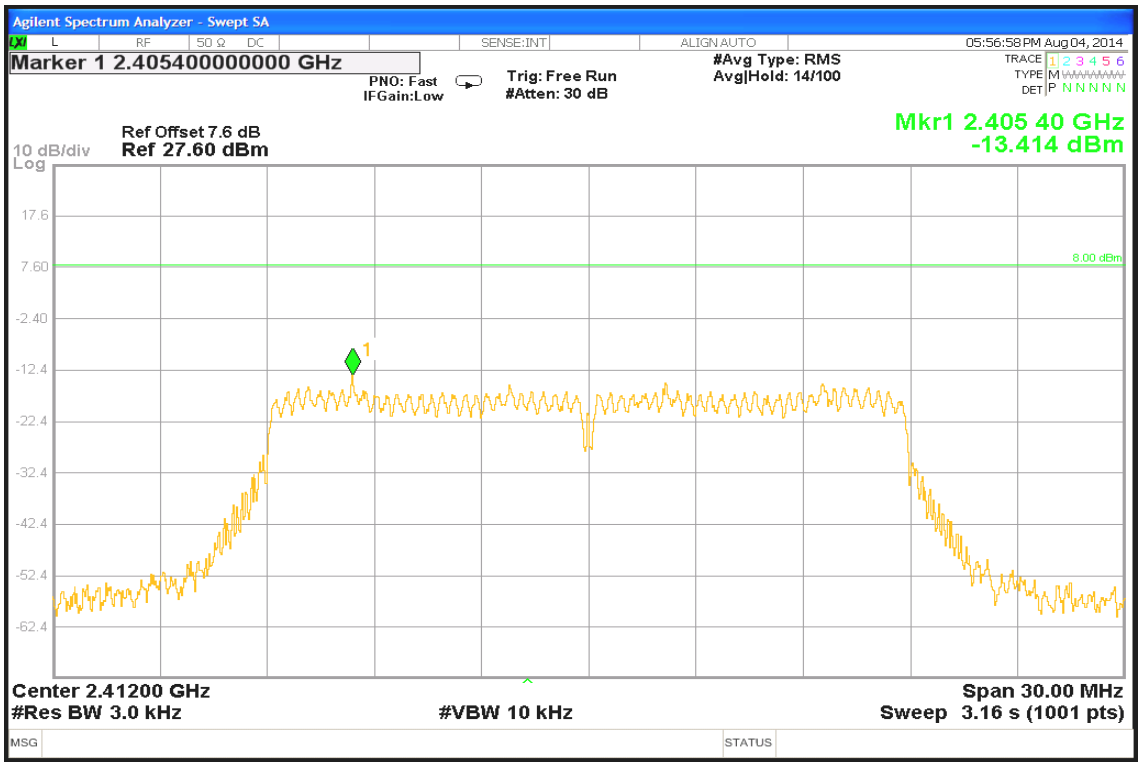


## PPSD (CH High)

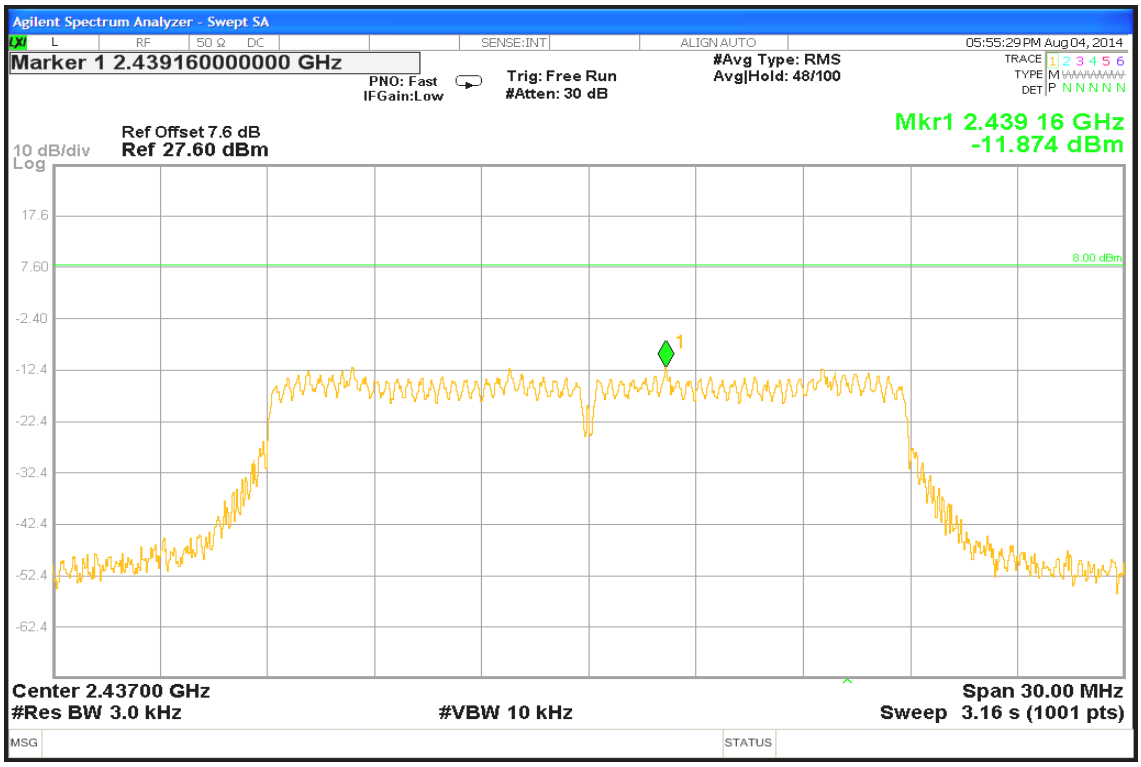



## IEEE 802.11n HT20 mode / Chain 1

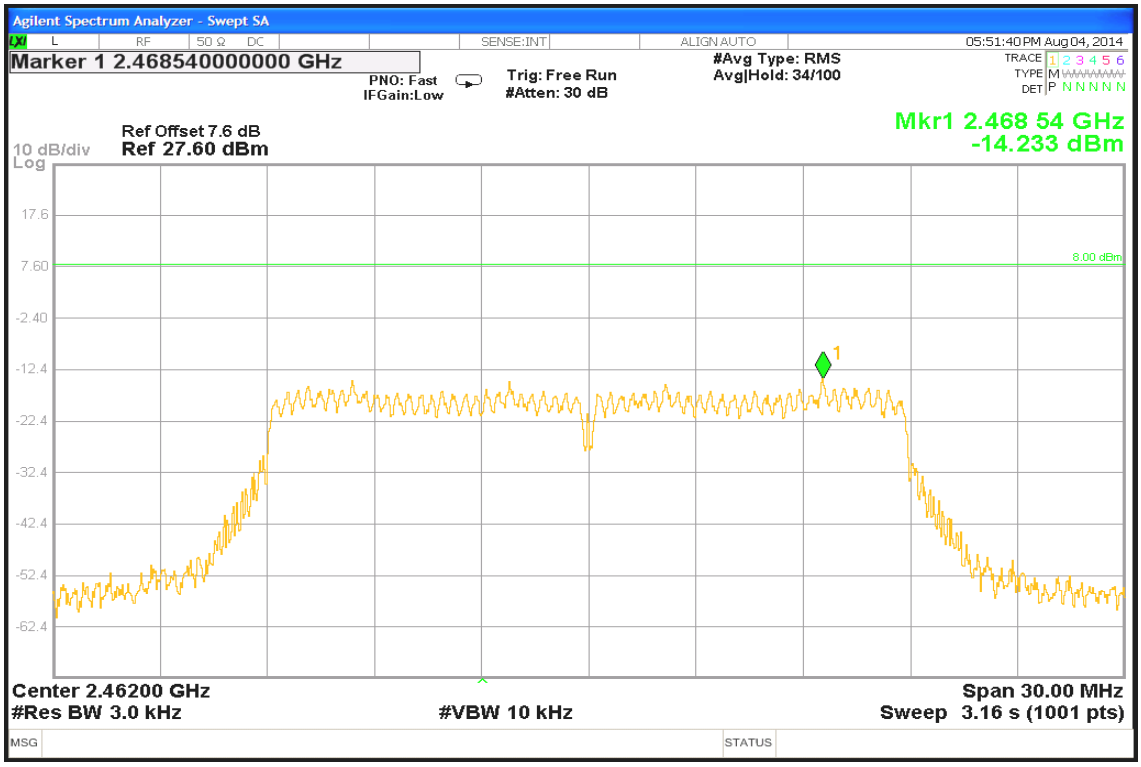
## PPSD (CH Low)



## PPSD (CH Mid)

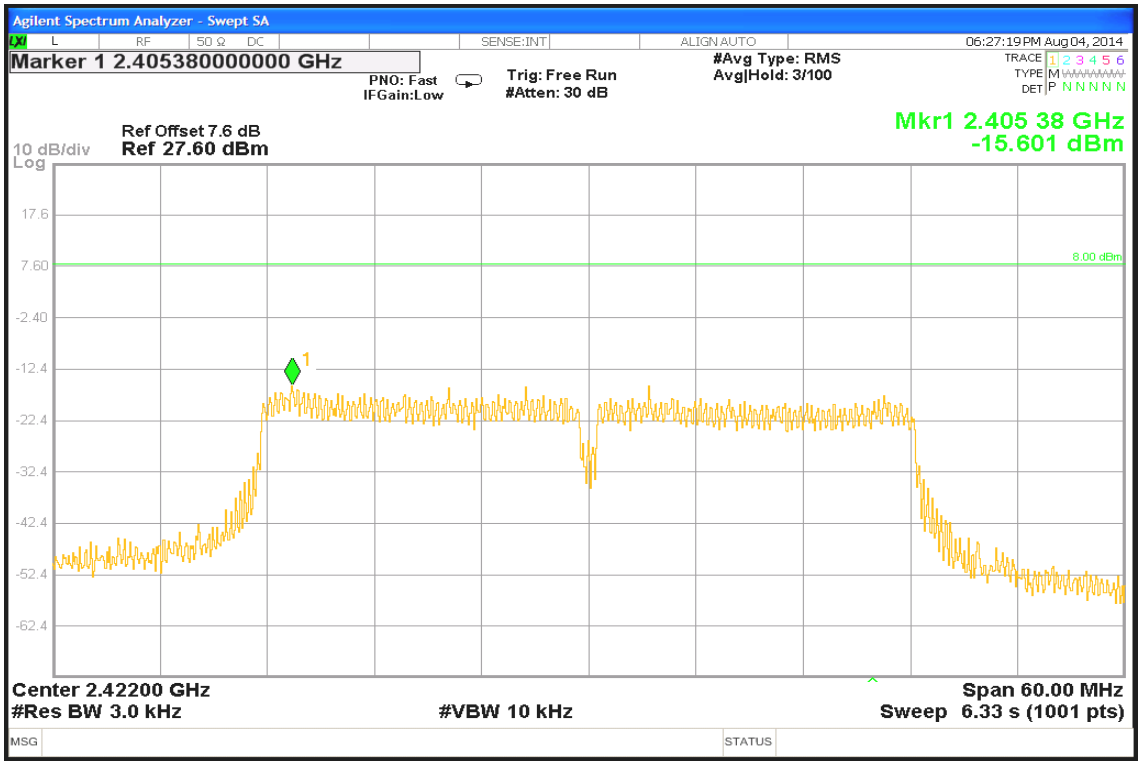



## PPSD (CH High)

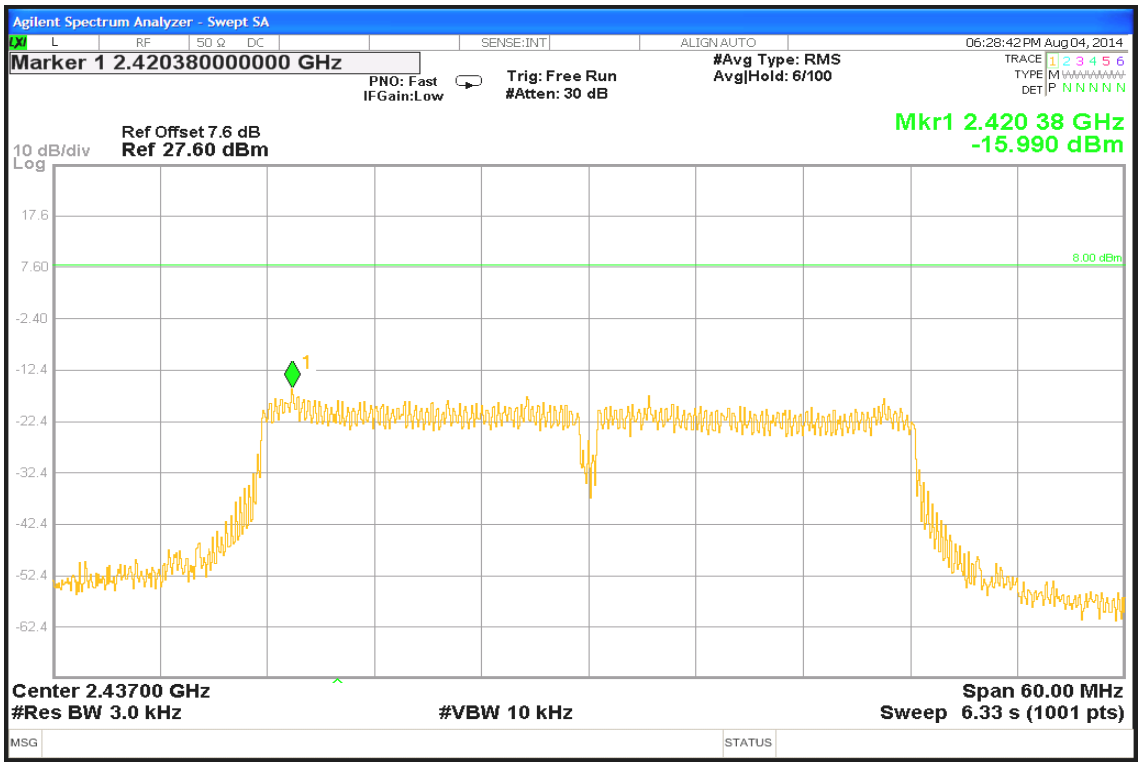


## IEEE 802.11n HT40 mode / Chain 0

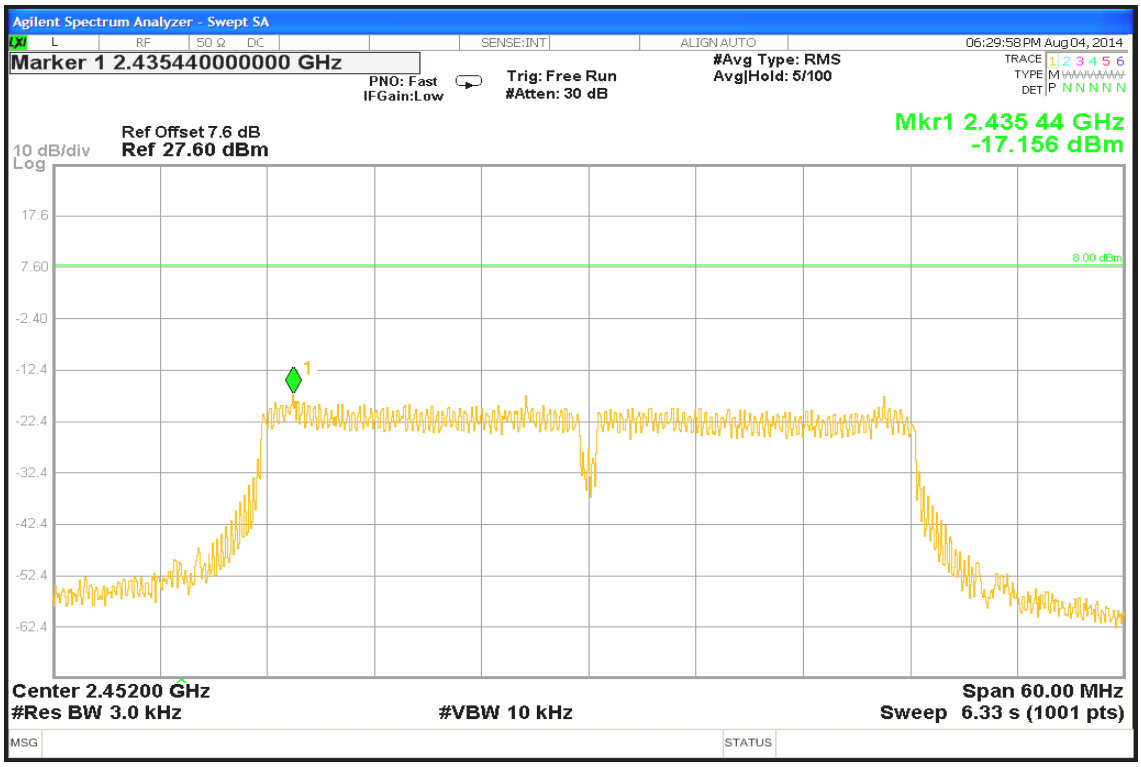
### PPSD (CH Low)




### PPSD (CH Mid)

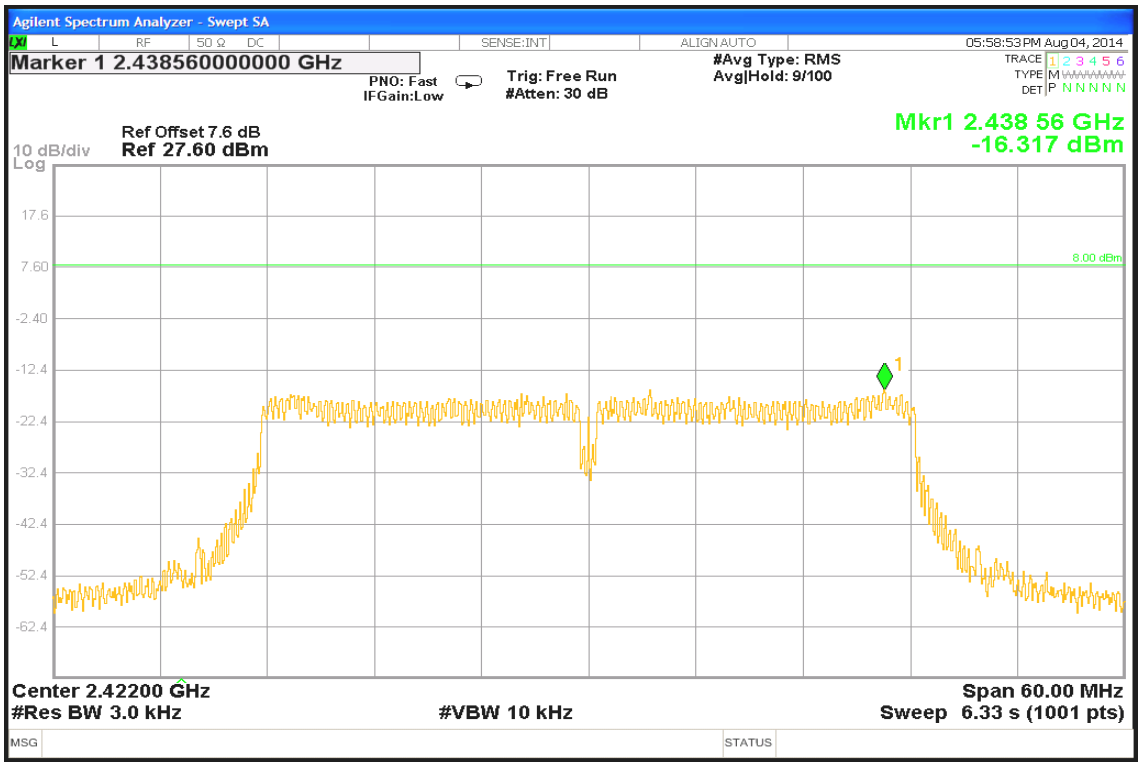


## PPSD (CH High)

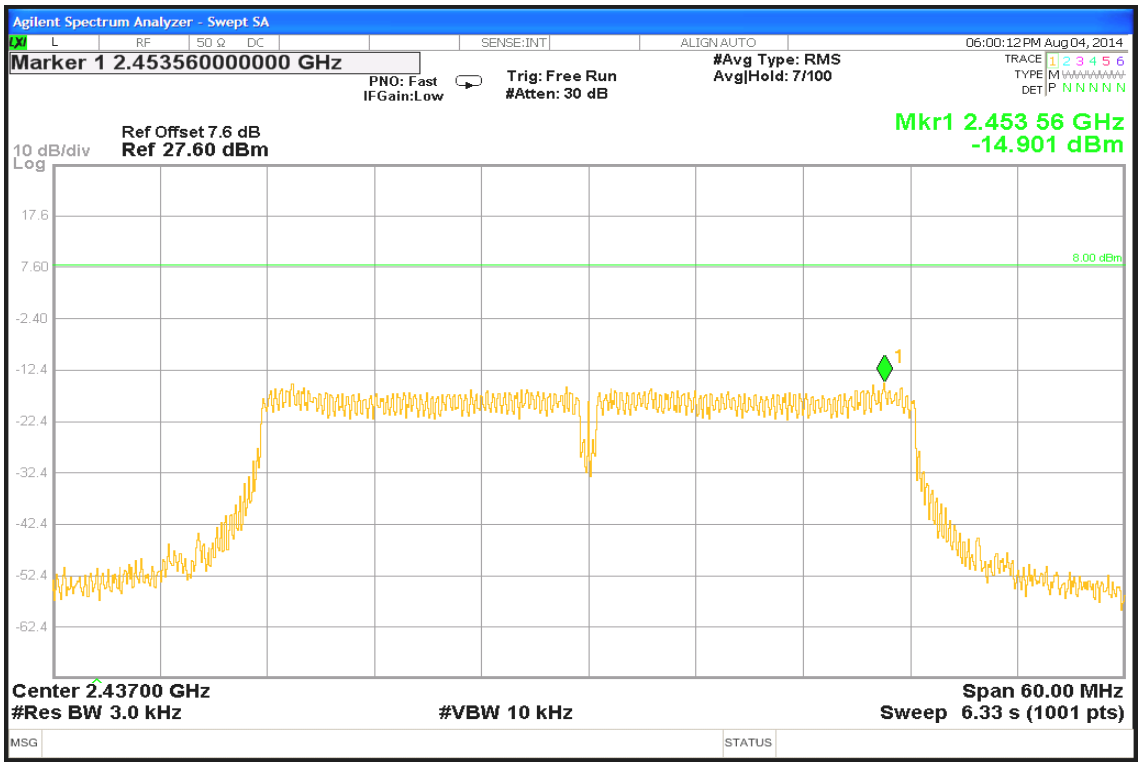



## IEEE 802.11n HT40 mode / Chain 1

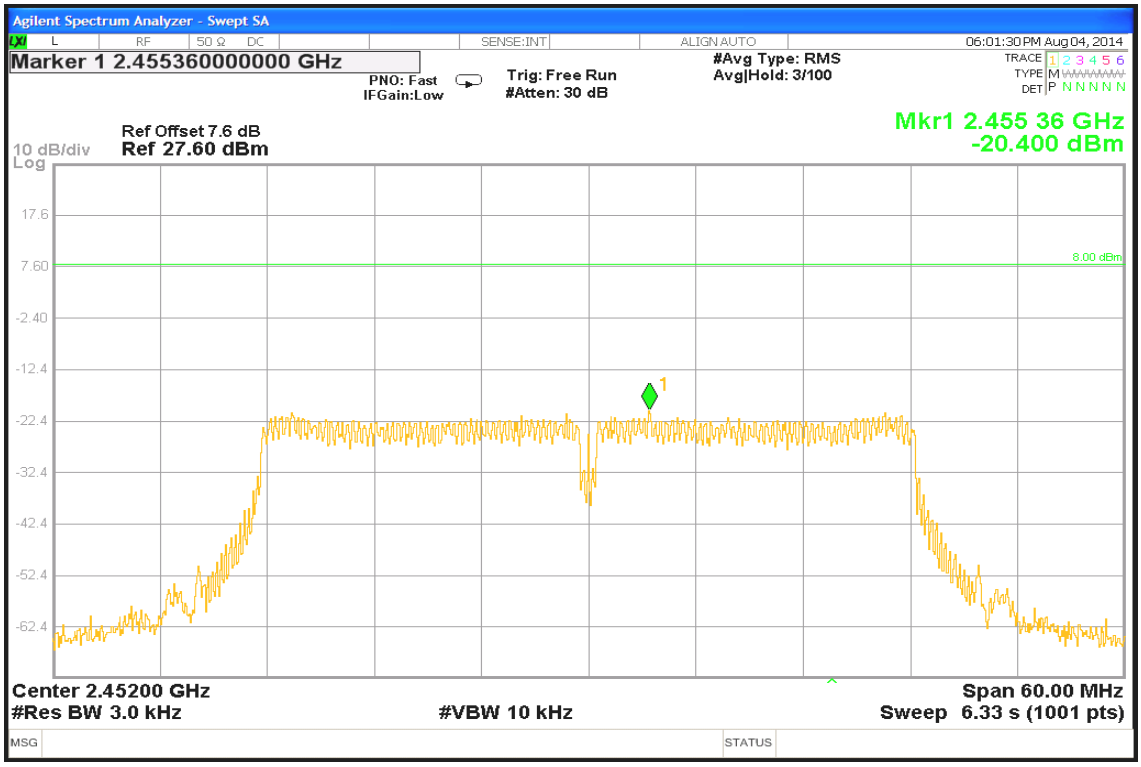
## PPSD (CH Low)



## PPSD (CH Mid)




## PPSD (CH High)



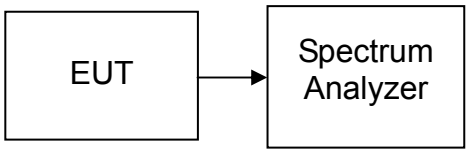
# 7.6 SPURIOUS EMISSIONS

## 7.6.1 CONDUCTED MEASUREMENT

## LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiatedmeasurement, provided the transmitter demonstrates compliance with the peak conducted power limits. 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 in15.209(a)(see Section15.205(c)).

## TEST CONFIGURATION




## TEST PROCEDURE

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

The transmitter output is connected to the spectrum analyzer. Set the spectrum analyzer in the following setting as:

**Below 1GHz:** RBW=100kHz / VBW=100kHz

**Above 1GHz:** RBW=1MHz / VBW=1MHz

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

## TEST RESULTS

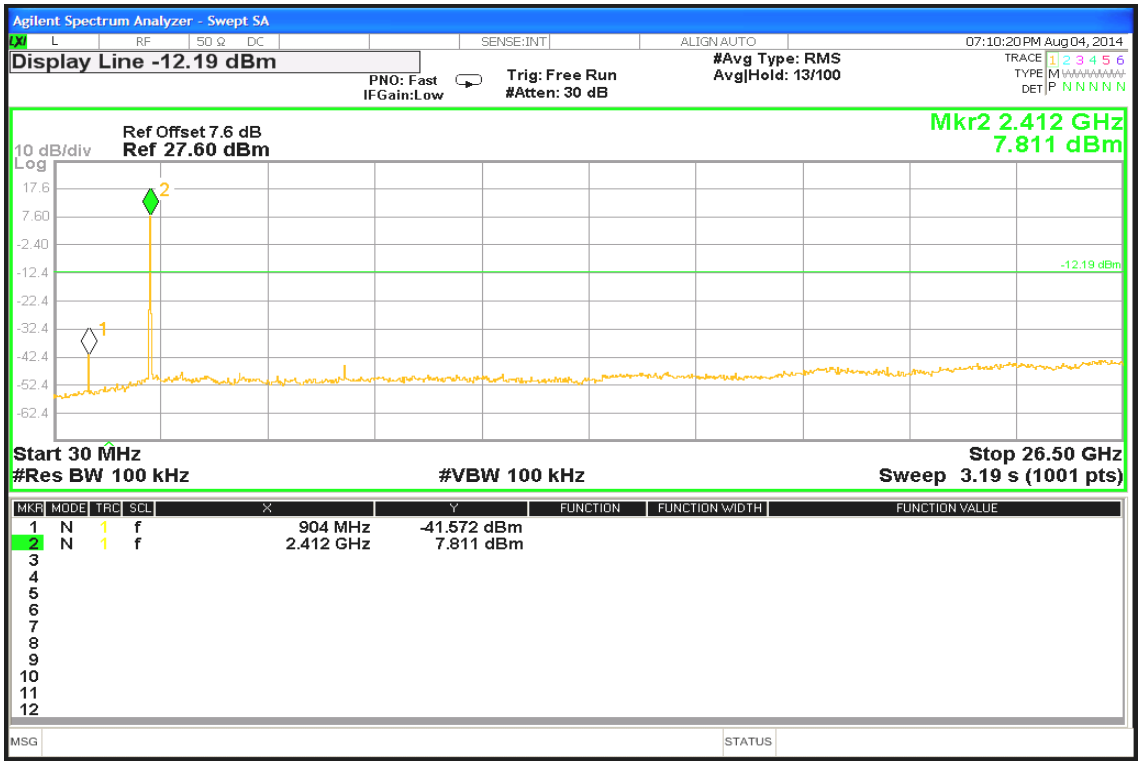
*No non-compliance noted.*

## Test Plot

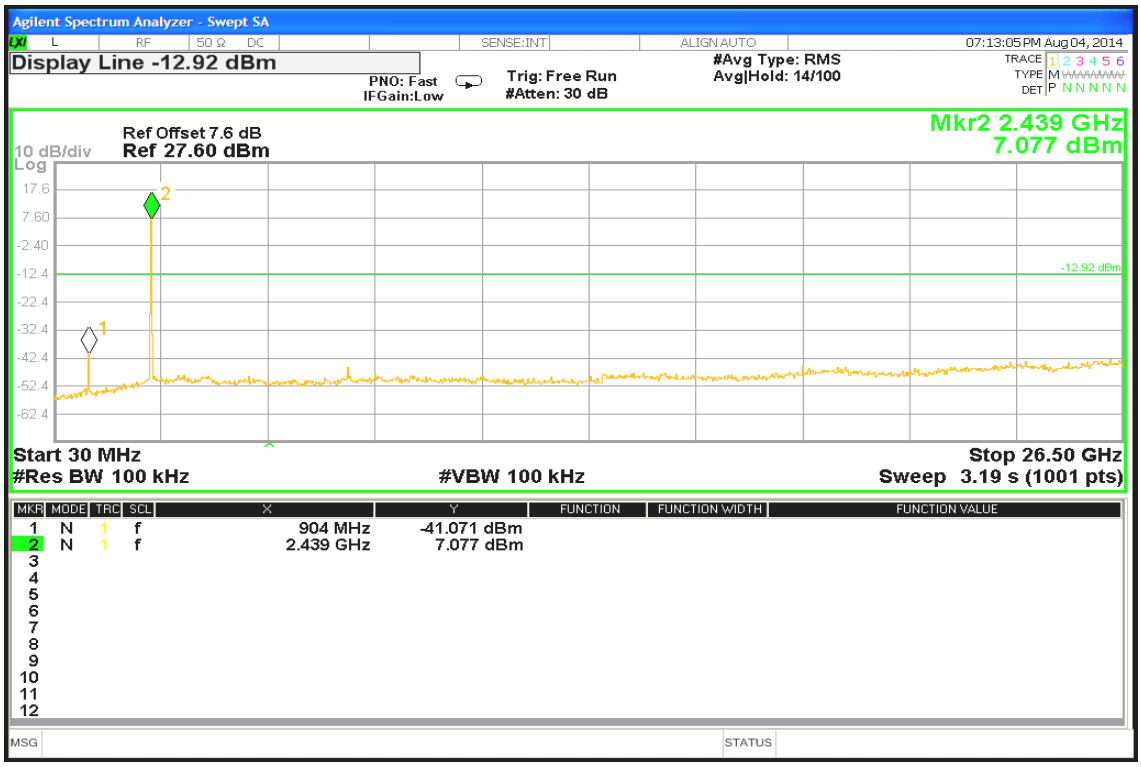
## Spurious Emissions

## IEEE 802.11b mode

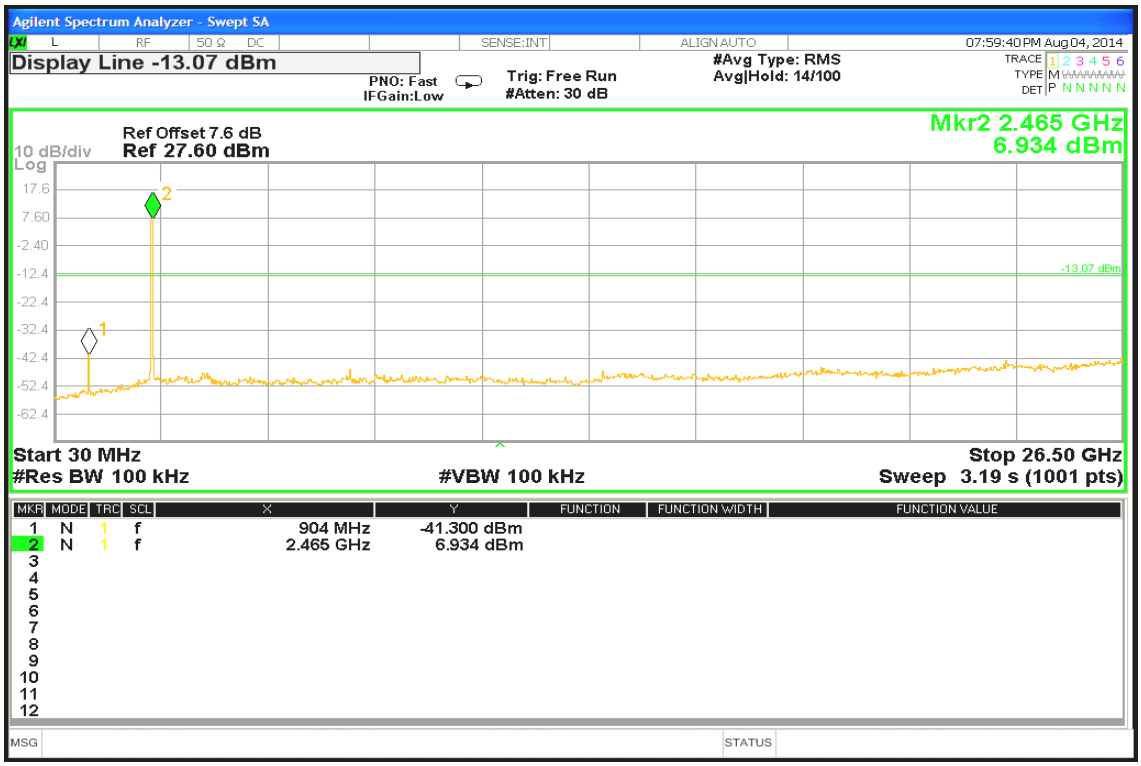
### CH Low




### CH Mid

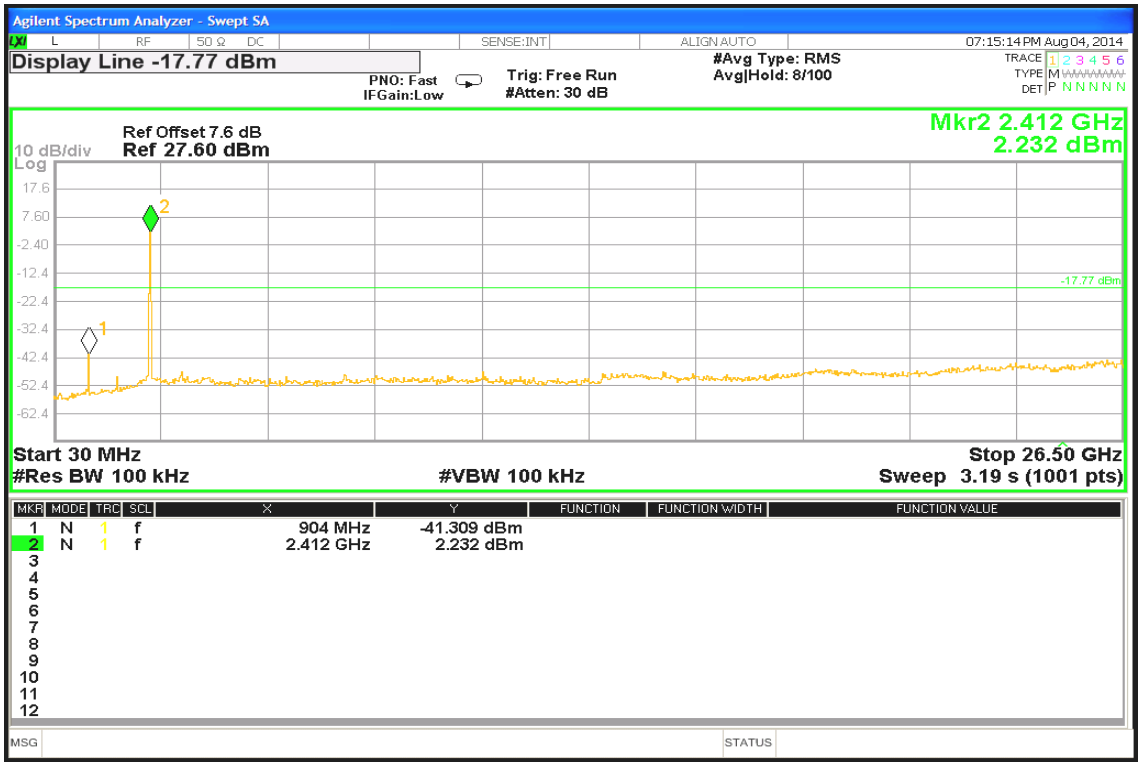


## CH High

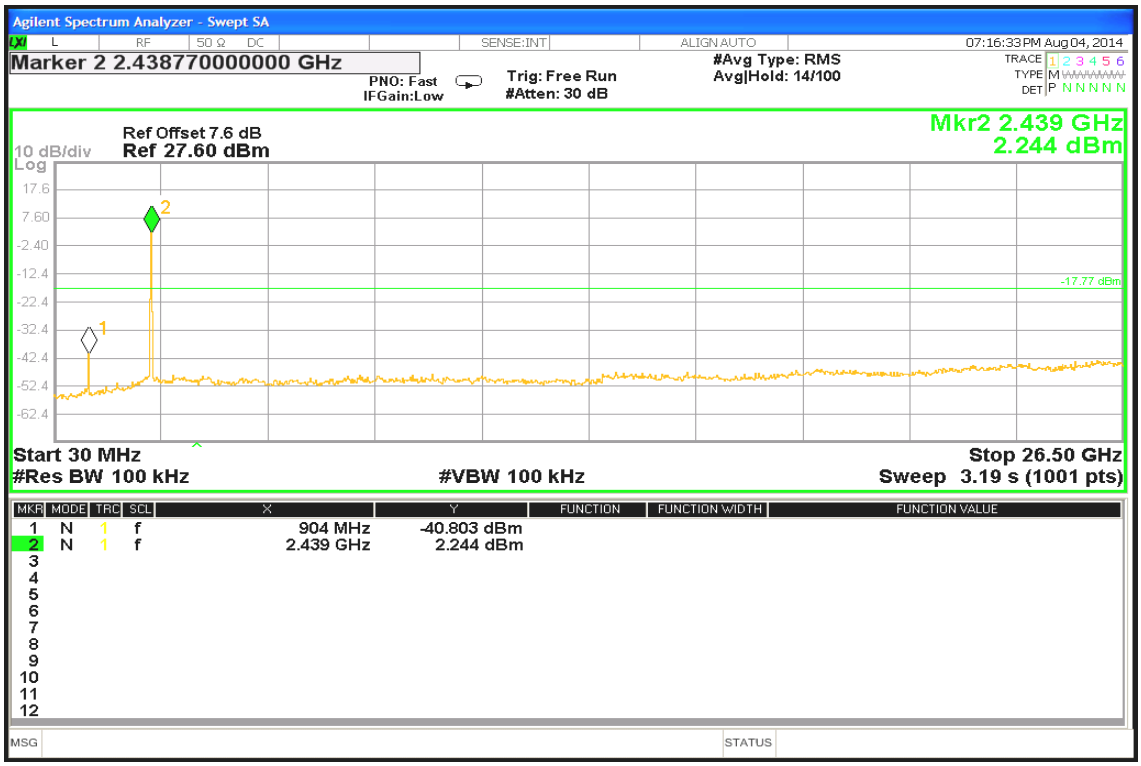



## IEEE 802.11g mode

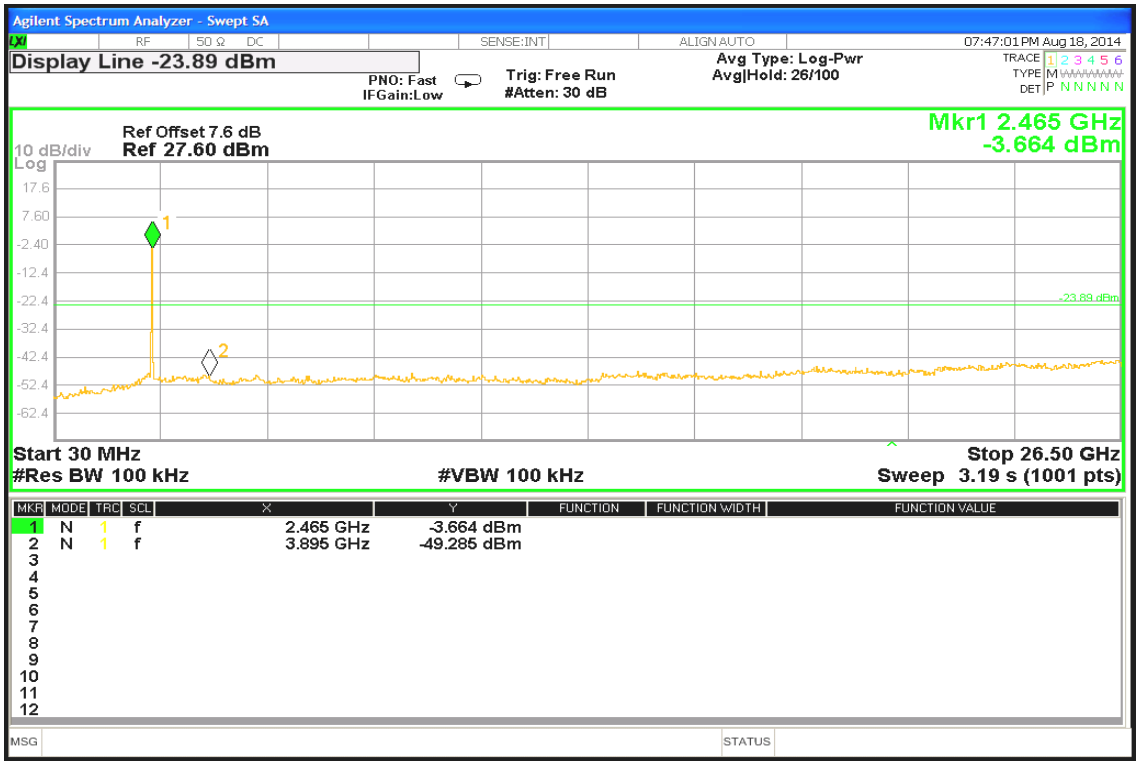
## CH Low



## CH Mid

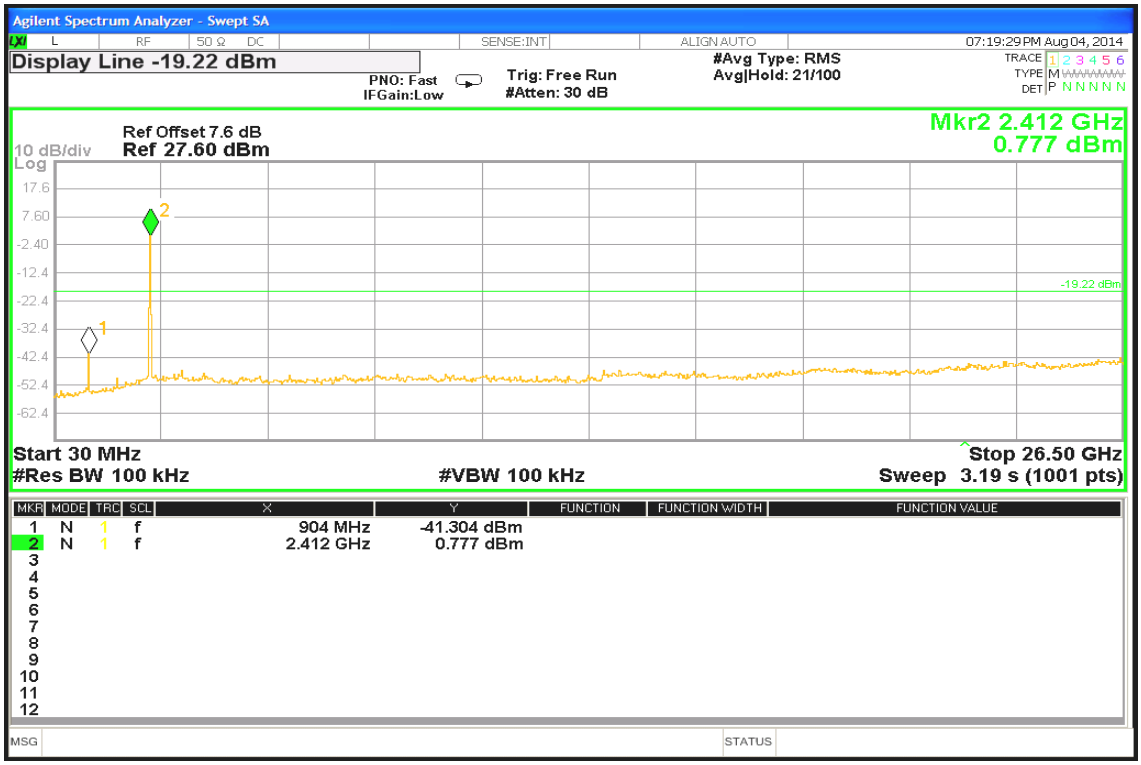



## CH High

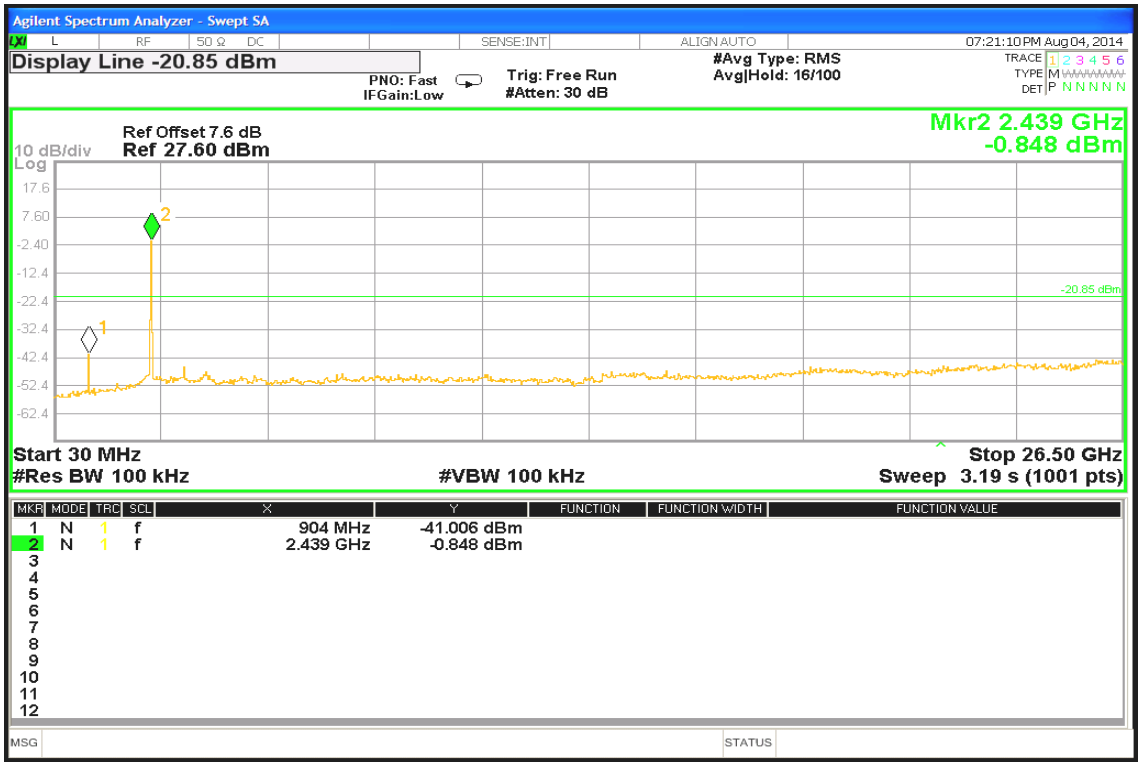


## IEEE 802.11n HT20 mode / Chain 0

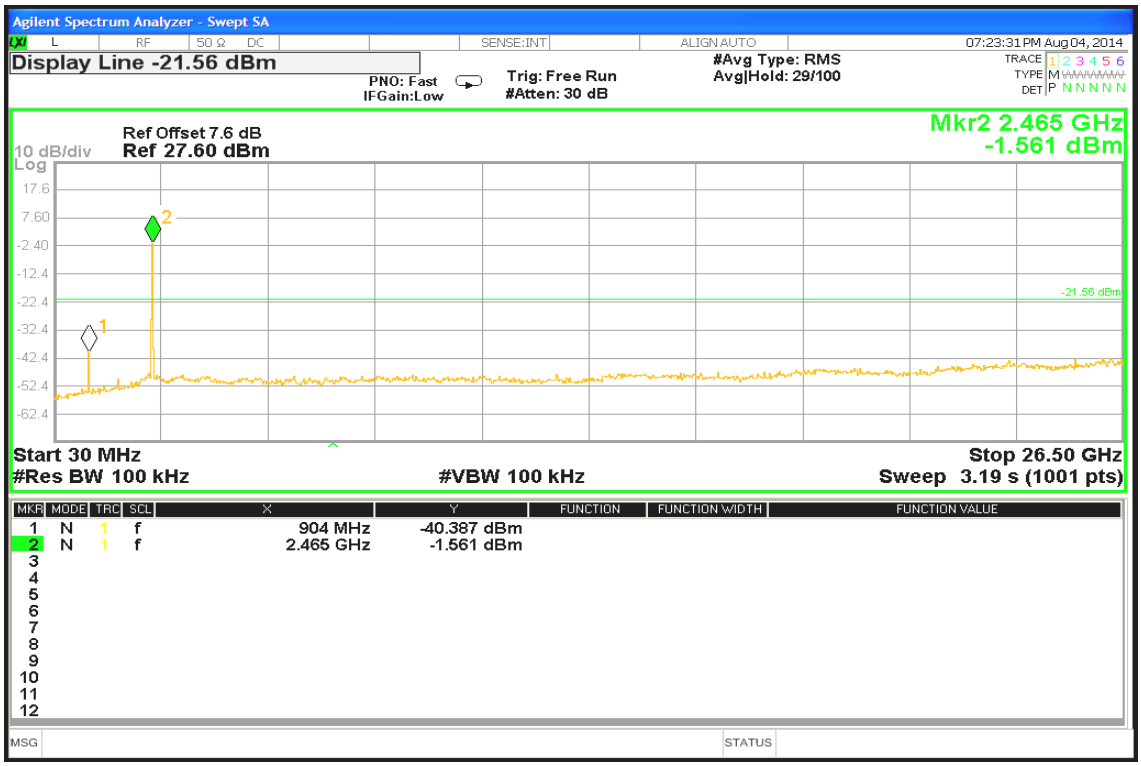
### CH Low




### CH Mid

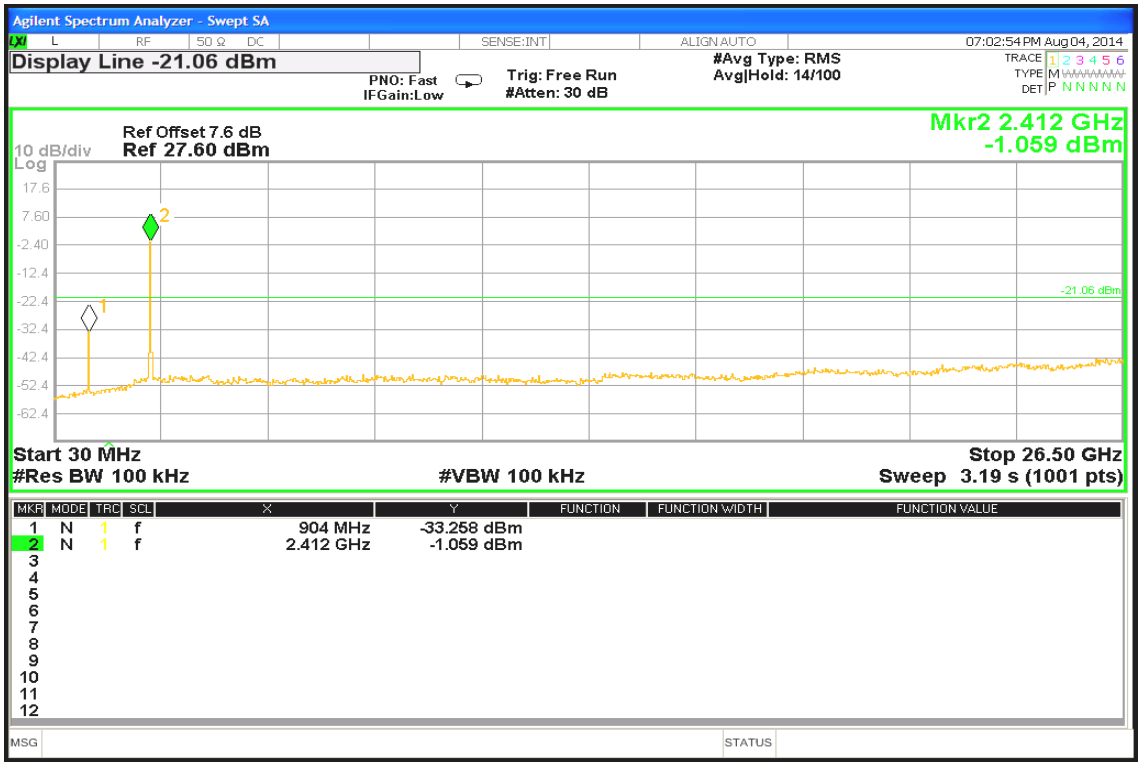


## CH High

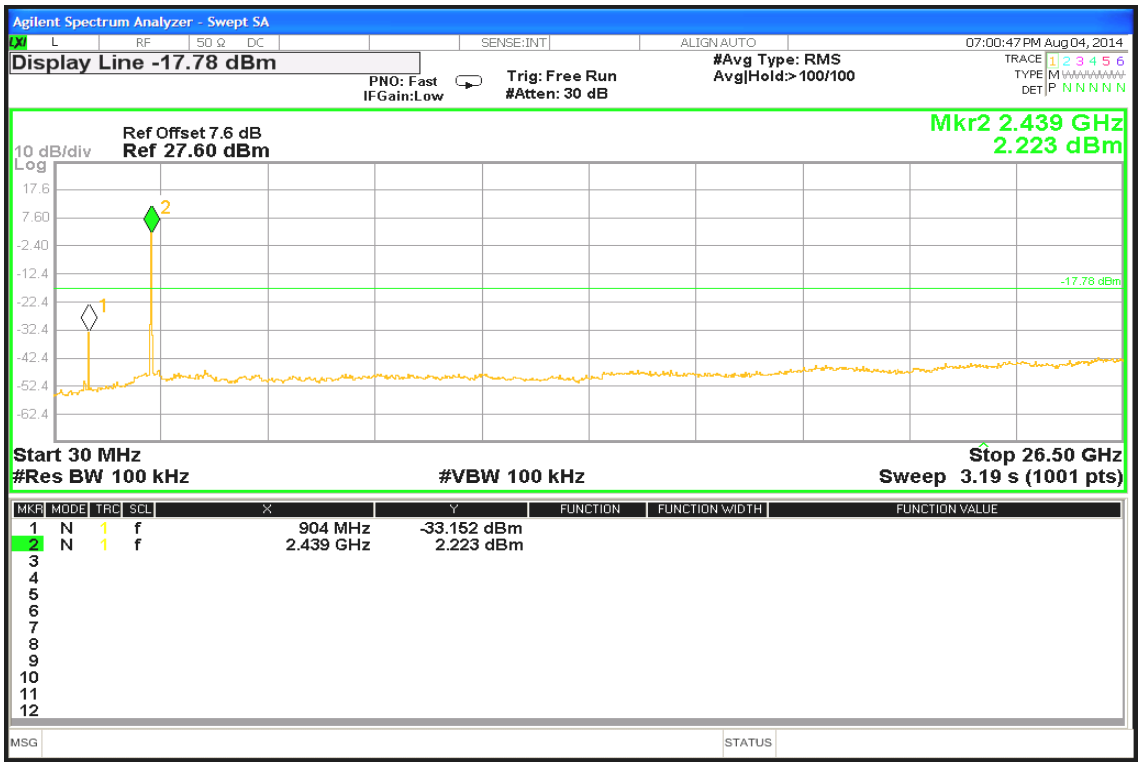



## IEEE 802.11n HT20 mode / Chain 1

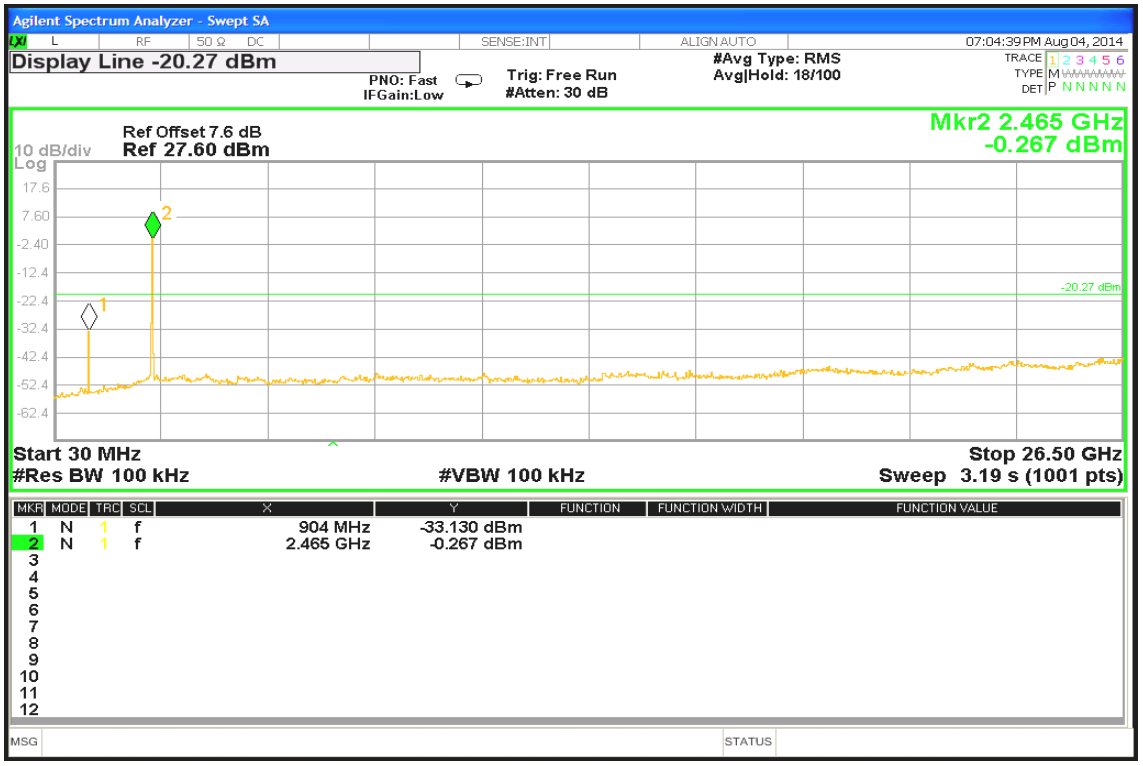
## CH Low



## CH Mid

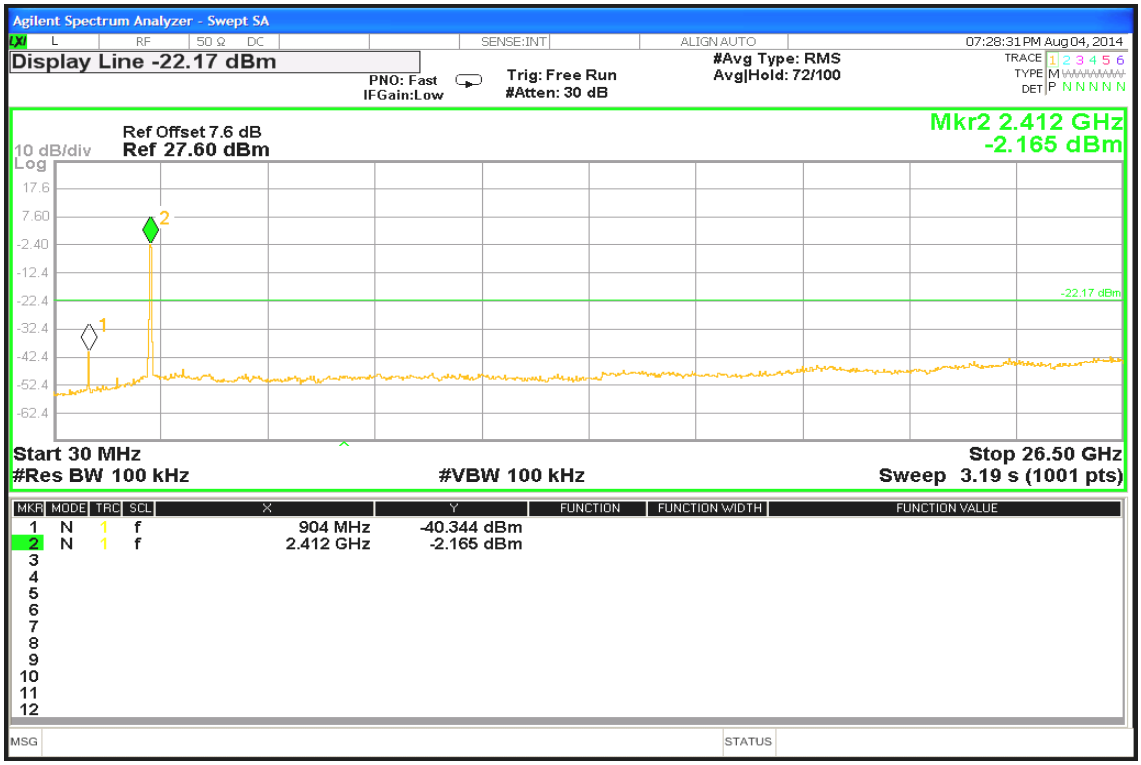



## CH High

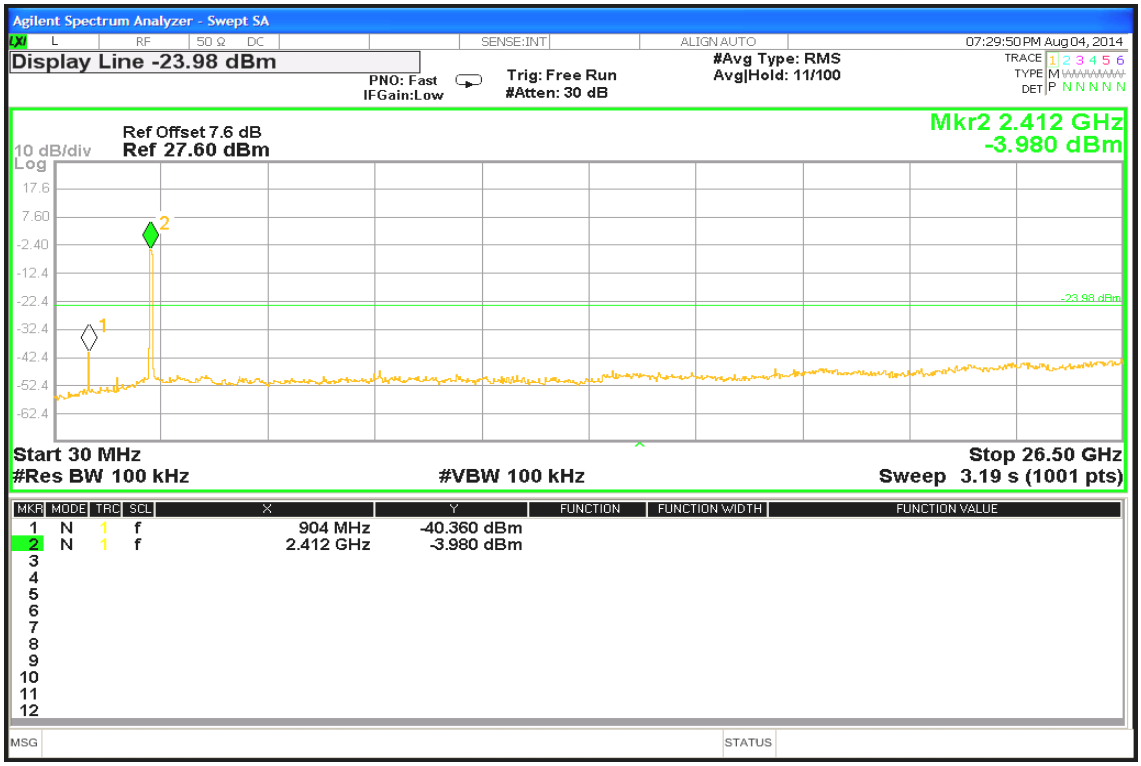


## IEEE 802.11n HT40 mode / Chain 0

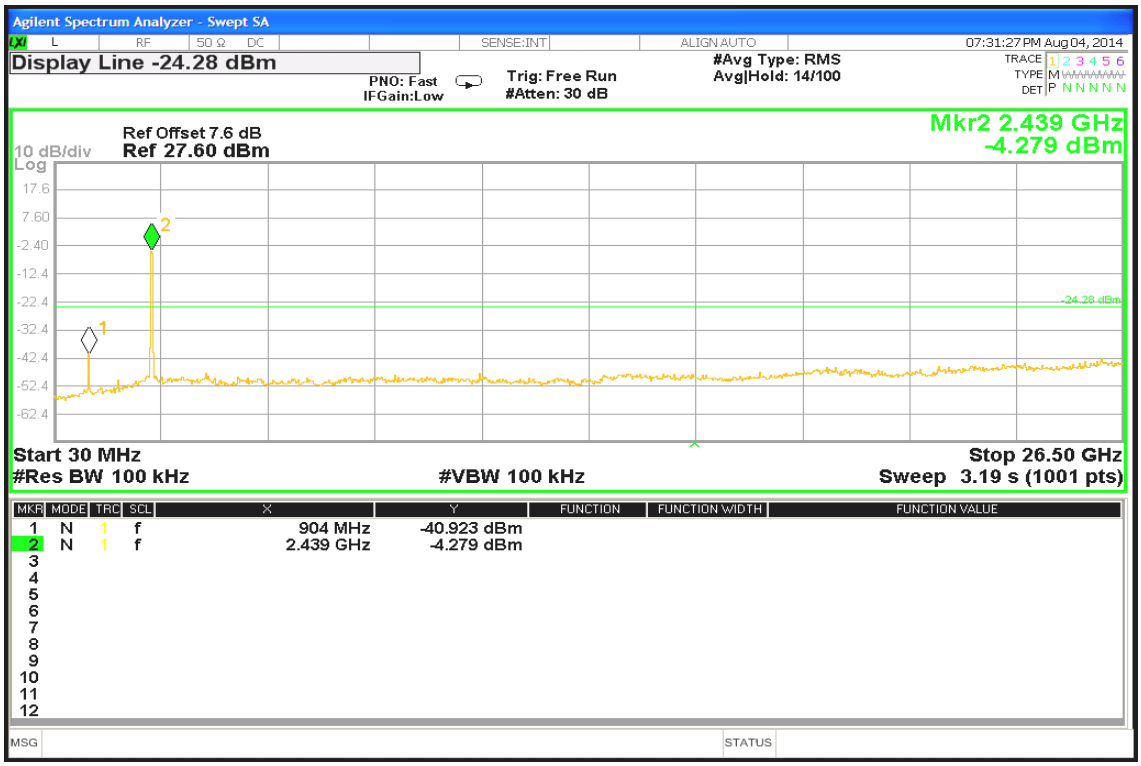
### CH Low




### CH Mid

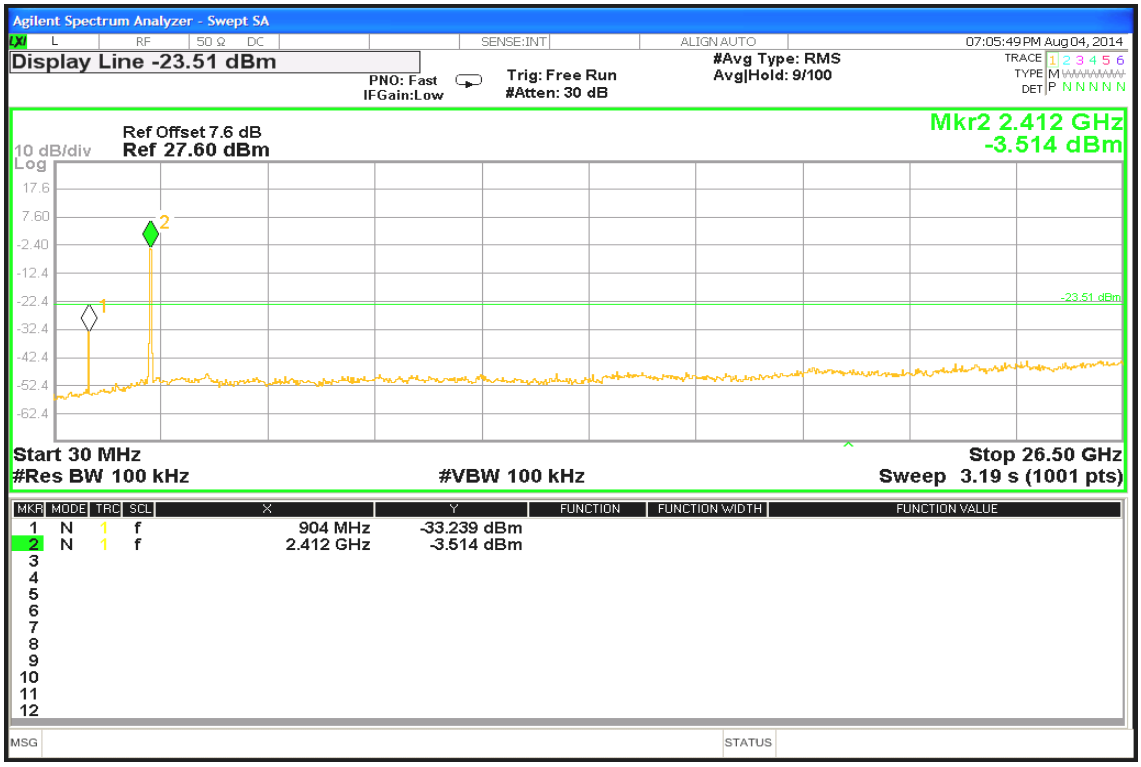


## CH High

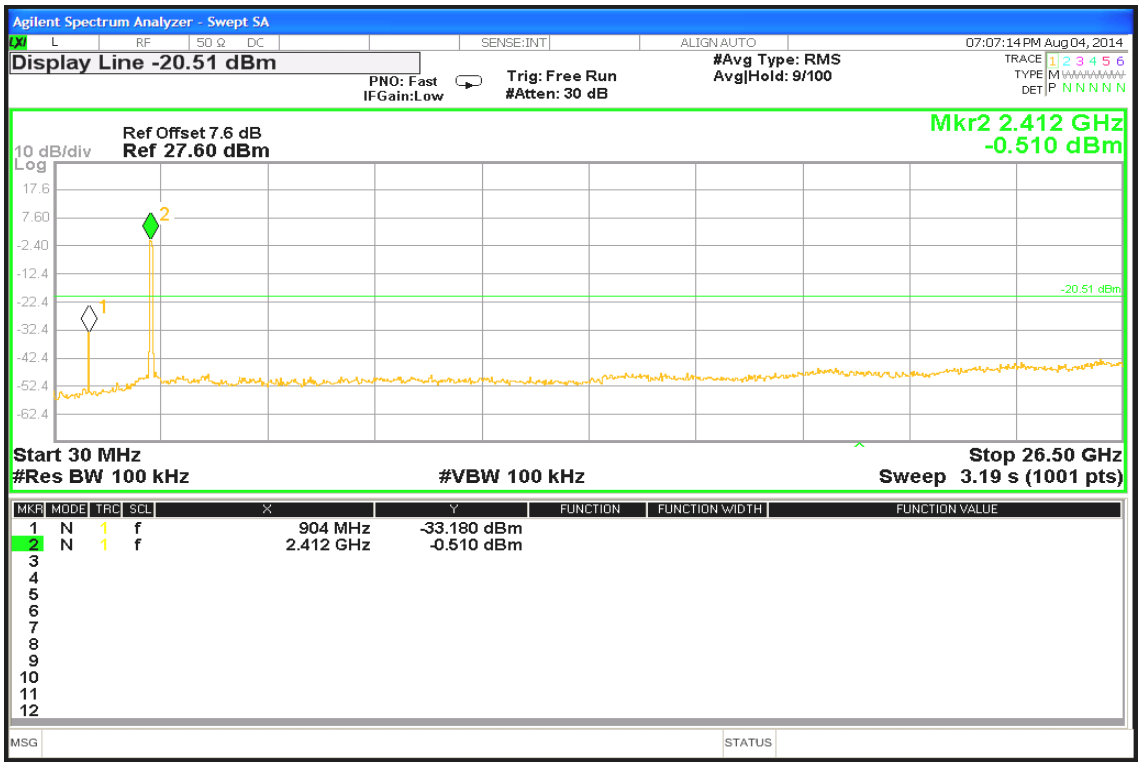



## IEEE 802.11n HT40 mode / Chain 1

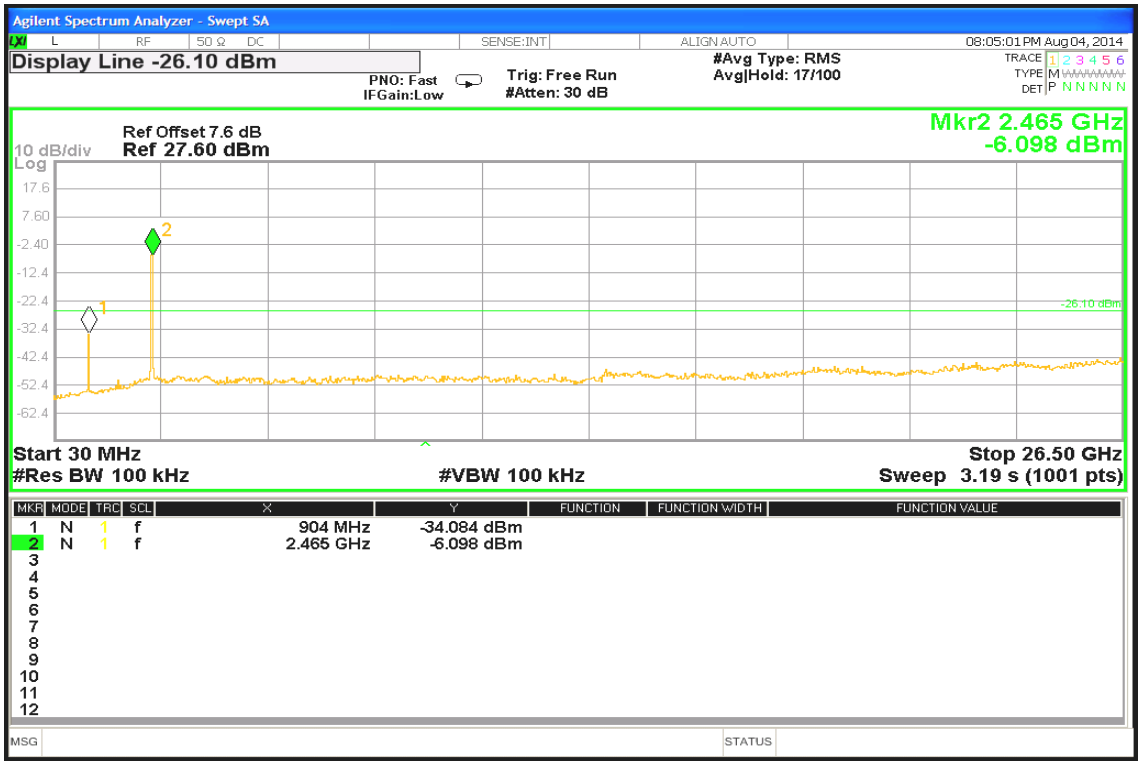
## CH Low



## CH Mid




## CH High



## Conducted band-edge

## IEEE 802.11b mode

## CH Low


## CH High

## IEEE 802.11g mode

## CH Low


## CH High

## IEEE 802.11n HT20 mode / Chain 0

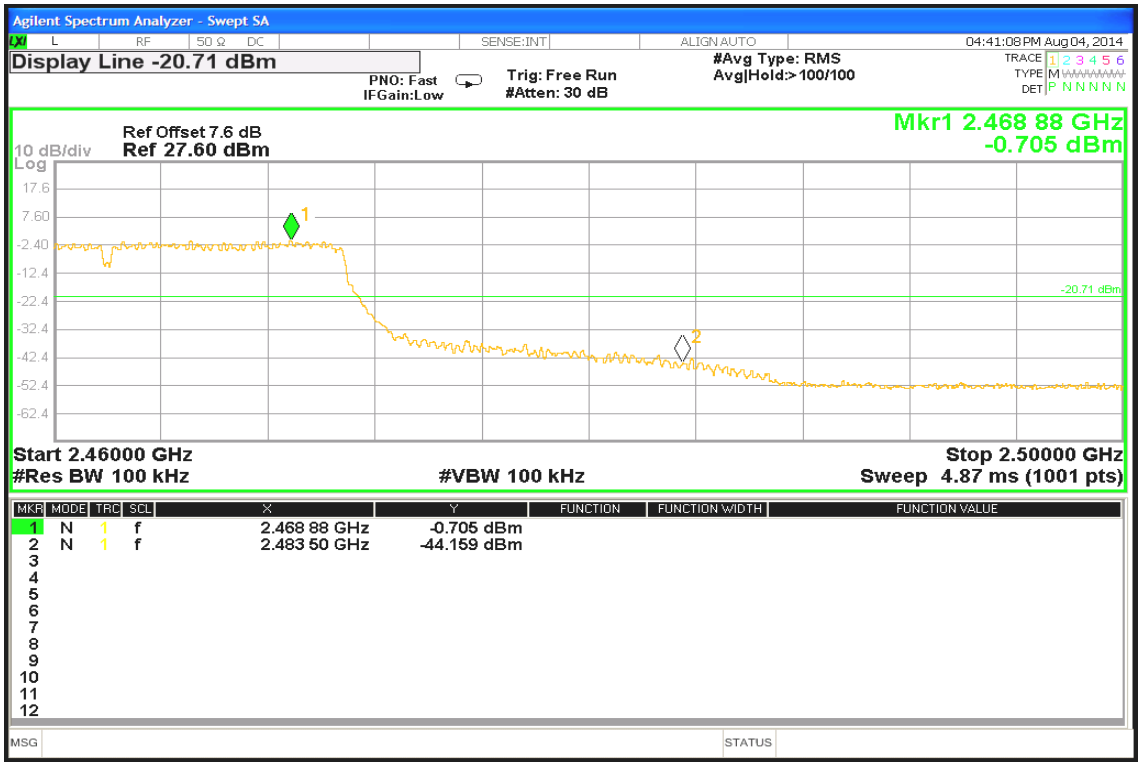
### CH Low


### CH High

## IEEE 802.11n HT20 mode / Chain 1

### CH Low


### CH High



## IEEE 802.11n HT40 mode / Chain 0

### CH Low


### CH High

## IEEE 802.11n HT40 mode / Chain 1

### CH Low


### CH High

## 7.6.2 RADIATED EMISSIONS

## LIMIT

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

| Frequency (MHz) | Field Strength (μV/m) | Measurement Distance (m) |
|---|---|---|
| 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 |

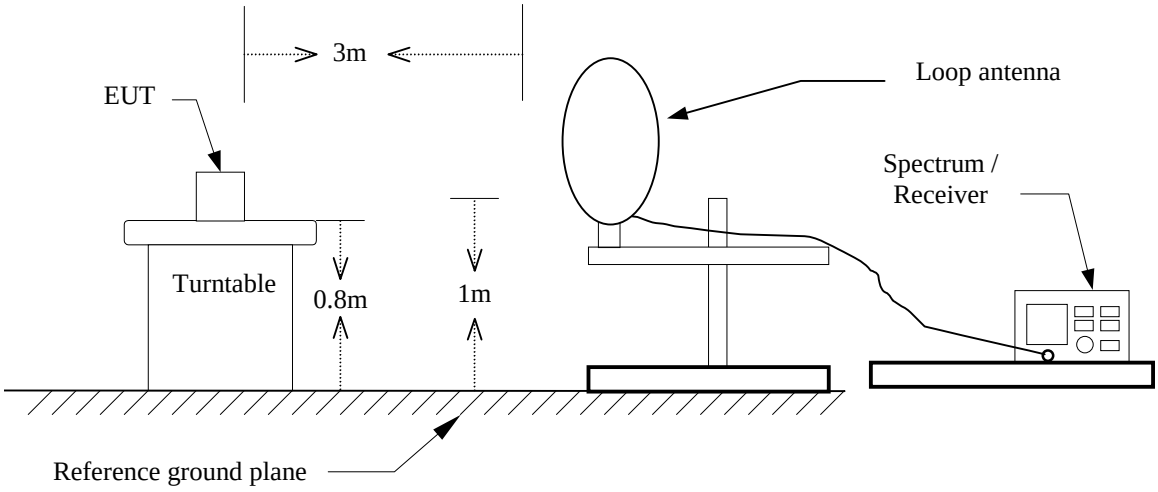
***Remark:*** *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections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

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

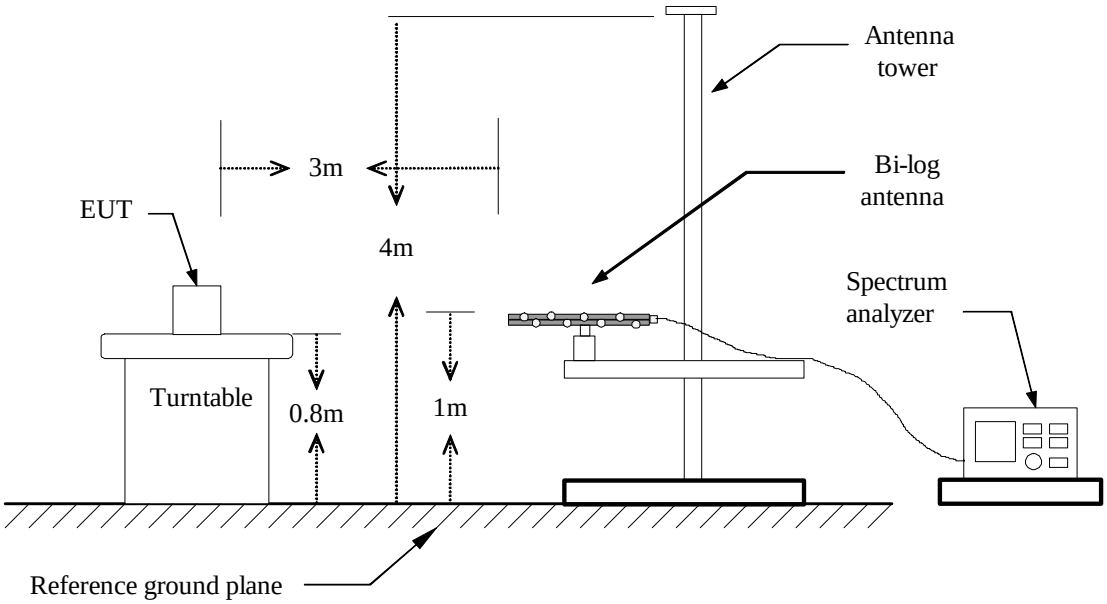
| Frequency (MHz) | Field Strength (μV/m at 3-meter) | Field Strength (dBμV/m at 3-meter) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) +80 | 20LOG((2400/F(kHz))+80) |
| 0.490 - 1.705 | 24000/F(kHz) +40 | 20LOG((24000/F(kHz))+40) |
| 1.705 – 30.0 | 30 | 69.54 |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

# TEST CONFIGURATION

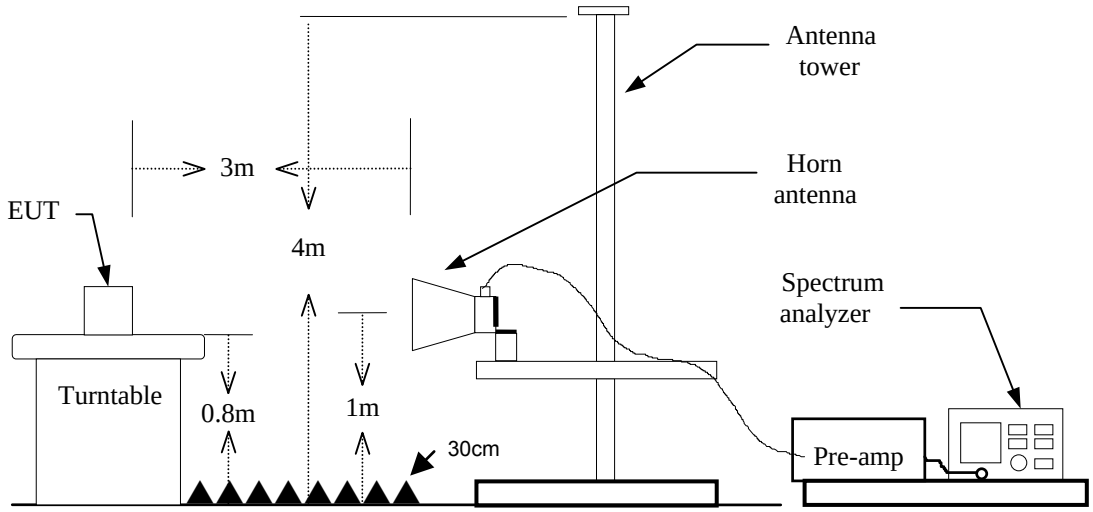
### 9kHz ~ 30MHz




### 30MHz ~ 1GHz



**Above 1 GHz**




## TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   **Below 30MHz**

   RBW=10kHz / VBW=30kHz / Sweep=AUTO

   **30 ~ 1000MHz:**

   RBW=100kHz / VBW=300KHz / Sweep=AUTO

   **Above 1GHz:**

   a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

   b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO

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

## TEST RESULTS

*No non-compliance noted.*

# TEST DATA

## Below 1GHz

| | | | |
|---|---|---|---|
| **Operation Mode:** | Normal Link | **Test Date:** | 2014/8/5 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 56% RH | **Polarity:** | Ver. / Hor. |

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol. (H/V) | Remark |
|---|---|---|---|---|---|---|---|
| 58.1300 | 55.04 | -20.97 | 34.07 | 40.00 | -5.93 | V | QP |
| 200.7199 | 40.91 | -16.55 | 24.36 | 43.50 | -19.14 | V | QP |
| 579.9900 | 37.98 | -8.06 | 29.92 | 46.00 | -16.08 | V | QP |
| 749.7400 | 31.29 | -6.02 | 25.27 | 46.00 | -20.73 | V | QP |
| 813.7599 | 30.96 | -5.40 | 25.56 | 46.00 | -20.44 | V | QP |
| 897.1799 | 29.75 | -3.98 | 25.77 | 46.00 | -20.23 | V | QP |
| 60.0700 | 40.86 | -21.33 | 19.53 | 40.00 | -20.47 | H | QP |
| 200.7200 | 39.09 | -16.55 | 22.54 | 43.50 | -20.96 | H | QP |
| 593.5700 | 35.67 | -7.96 | 27.71 | 46.00 | -18.29 | H | QP |
| 749.7400 | 33.18 | -6.02 | 27.16 | 46.00 | -18.84 | H | QP |
| 814.7300 | 33.87 | -5.38 | 28.49 | 46.00 | -17.51 | H | QP |
| 897.1800 | 31.06 | -3.98 | 27.08 | 46.00 | -18.92 | H | QP |

***Remark:***

1. *No emission found between lowest internal used / generated frequency to 30 MHz. (9kHz ~ 30MHz)*
2. *Measuring frequencies from 9 kHz to the 1GHz.*
3. *Radiated emissions measured in the measured frequency range were made with an instrument using peak detector or quasi-peak detector mode.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

## Above 1 GHz

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11b / CH Low | **Test Date:** | 2014/7/24 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 56 % RH | **Polarity:** | Ver. / Hor. |

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1576.000 | 53.80 | -4.90 | 48.90 | 74.00 | -25.10 | V | peak |
| 1998.000 | 53.41 | -1.33 | 52.08 | 74.00 | -21.92 | V | peak |
| 1998.000 | 40.24 | -1.33 | 38.91 | 54.00 | -15.09 | V | AVG |
| 2274.000 | 54.72 | -1.49 | 53.23 | 74.00 | -20.77 | V | peak |
| 2274.000 | 40.46 | -1.49 | 38.97 | 54.00 | -15.03 | V | AVG |
| 2636.000 | 54.59 | -1.92 | 52.67 | 74.00 | -21.33 | V | peak |
| 2636.000 | 40.53 | -1.92 | 38.61 | 54.00 | -15.39 | V | AVG |
| 3740.000 | 40.57 | 2.96 | 43.53 | 74.00 | -30.47 | V | peak |
| 4825.000 | 42.54 | 2.68 | 45.22 | 74.00 | -28.78 | V | peak |
| 7595.000 | 39.80 | 11.89 | 51.69 | 74.00 | -22.31 | V | peak |
| 1394.000 | 53.83 | -7.05 | 46.78 | 74.00 | -27.22 | H | peak |
| 2206.000 | 53.91 | -3.73 | 50.18 | 74.00 | -23.82 | H | peak |
| 2632.000 | 55.18 | -3.36 | 51.82 | 74.00 | -22.18 | H | peak |
| 4315.000 | 40.00 | 7.55 | 47.55 | 74.00 | -26.45 | H | peak |
| 5145.000 | 40.62 | 6.63 | 47.25 | 74.00 | -26.75 | H | peak |
| 7270.000 | 39.17 | 11.42 | 50.59 | 74.00 | -23.41 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** TX / IEEE 802.11b / CH Mid **Test Date:** 2014/7/24

**Temperature:** 26°C **Tested by:** Francis Lee

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

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1522.000 | 54.85 | -5.16 | 49.69 | 74.00 | -24.31 | V | peak |
| 1982.000 | 53.98 | -1.58 | 52.40 | 74.00 | -21.60 | V | peak |
| 1982.000 | 40.18 | -1.58 | 38.60 | 54.00 | -15.40 | V | AVG |
| 2276.000 | 55.07 | -1.50 | 53.57 | 74.00 | -20.43 | V | peak |
| 2276.000 | 41.36 | -1.50 | 39.86 | 54.00 | -14.14 | V | AVG |
| 2802.000 | 55.10 | -2.07 | 53.03 | 74.00 | -20.97 | V | peak |
| 2802.000 | 40.41 | -2.07 | 38.34 | 54.00 | -15.66 | V | AVG |
| 3800.000 | 40.87 | 3.69 | 44.56 | 74.00 | -29.44 | V | peak |
| 4875.000 | 43.64 | 3.81 | 47.45 | 74.00 | -26.55 | V | peak |
| 7450.000 | 38.71 | 11.42 | 50.13 | 74.00 | -23.87 | V | peak |
| 1378.000 | 54.47 | -7.47 | 47.00 | 74.00 | -27.00 | H | peak |
| 2198.000 | 54.13 | -3.56 | 50.57 | 74.00 | -23.43 | H | peak |
| 2546.000 | 56.06 | -3.60 | 52.46 | 74.00 | -21.54 | H | peak |
| 2546.000 | 40.17 | -3.60 | 36.57 | 54.00 | -17.43 | H | AVG |
| 2886.000 | 53.93 | -1.83 | 52.10 | 74.00 | -21.90 | H | peak |
| 2886.000 | 41.63 | -1.83 | 39.80 | 54.00 | -14.20 | H | AVG |
| 3800.000 | 40.87 | 3.69 | 44.56 | 74.00 | -29.44 | H | peak |
| 4875.000 | 45.64 | 3.81 | 49.45 | 74.00 | -24.55 | H | peak |
| 7450.000 | 38.71 | 11.42 | 50.13 | 74.00 | -23.87 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** TX / IEEE 802.11b / CH High **Test Date:** 2014/7/24

**Temperature:** 26°C **Tested by:** Francis Lee

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

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1518.000 | 53.53 | -5.18 | 48.35 | 74.00 | -25.65 | V | peak |
| 1972.000 | 54.28 | -1.74 | 52.54 | 74.00 | -21.46 | V | peak |
| 1972.000 | 40.22 | -1.74 | 38.48 | 54.00 | -15.52 | V | AVG |
| 2270.000 | 54.41 | -1.48 | 52.93 | 74.00 | -21.07 | V | peak |
| 2270.000 | 41.06 | -1.48 | 39.58 | 54.00 | -14.42 | V | AVG |
| 2882.000 | 55.01 | -0.92 | 54.09 | 74.00 | -19.91 | V | peak |
| 2882.000 | 40.36 | -0.92 | 39.44 | 54.00 | -14.56 | V | AVG |
| 3800.000 | 40.43 | 3.69 | 44.12 | 74.00 | -29.88 | V | peak |
| 4925.000 | 42.44 | 4.61 | 47.05 | 74.00 | -26.95 | V | peak |
| 7590.000 | 39.65 | 11.87 | 51.52 | 74.00 | -22.48 | V | peak |
| 1400.000 | 53.38 | -6.90 | 46.48 | 74.00 | -27.52 | H | peak |
| 2168.000 | 53.85 | -3.63 | 50.22 | 74.00 | -23.78 | H | peak |
| 2758.000 | 54.00 | -2.85 | 51.15 | 74.00 | -22.85 | H | peak |
| 3635.000 | 41.59 | 4.02 | 45.61 | 74.00 | -28.39 | H | peak |
| 4925.000 | 39.64 | 7.26 | 46.90 | 74.00 | -27.10 | H | peak |
| 7235.000 | 40.11 | 10.96 | 51.07 | 74.00 | -22.93 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** TX / IEEE 802.11g / CH Low **Test Date:** 2014/7/24

**Temperature:** 26°C **Tested by:** Francis Lee

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

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1608.000 | 51.95 | -4.86 | 47.09 | 74.00 | -26.91 | V | peak |
| 1998.000 | 51.59 | -1.33 | 50.26 | 74.00 | -23.74 | V | peak |
| 2200.000 | 53.42 | -1.33 | 52.09 | 74.00 | -21.91 | V | peak |
| 2200.000 | 40.91 | -1.33 | 39.58 | 54.00 | -14.42 | V | AVG |
| 2872.000 | 51.96 | -1.06 | 50.90 | 74.00 | -23.10 | V | peak |
| 3610.000 | 41.17 | 2.88 | 44.05 | 74.00 | -29.95 | V | peak |
| 5850.000 | 40.28 | 5.70 | 45.98 | 74.00 | -28.02 | V | peak |
| 7510.000 | 38.54 | 11.58 | 50.12 | 74.00 | -23.88 | V | peak |
| 1420.000 | 52.21 | -7.32 | 44.89 | 74.00 | -29.11 | H | peak |
| 2208.000 | 52.84 | -3.78 | 49.06 | 74.00 | -24.94 | H | peak |
| 2904.000 | 52.03 | -1.69 | 50.34 | 74.00 | -23.66 | H | peak |
| 3215.000 | 44.31 | 1.11 | 45.42 | 74.00 | -28.58 | H | peak |
| 6075.000 | 39.20 | 8.72 | 47.92 | 74.00 | -26.08 | H | peak |
| 7240.000 | 40.43 | 11.02 | 51.45 | 74.00 | -22.55 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** TX / IEEE 802.11g / CH Mid **Test Date:** 2014/7/24

**Temperature:** 26°C **Tested by:** Francis Lee

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

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1546.000 | 51.91 | -5.04 | 46.87 | 74.00 | -27.13 | V | peak |
| 1996.000 | 52.25 | -1.36 | 50.89 | 74.00 | -23.11 | V | peak |
| 2338.000 | 55.02 | -1.60 | 53.42 | 74.00 | -20.58 | V | peak |
| 2338.000 | 42.97 | -1.60 | 41.37 | 54.00 | -12.63 | V | AVG |
| 2694.000 | 53.04 | -1.51 | 51.53 | 74.00 | -22.47 | V | peak |
| 3760.000 | 40.79 | 3.20 | 43.99 | 74.00 | -30.01 | V | peak |
| 5500.000 | 39.11 | 6.23 | 45.34 | 74.00 | -28.66 | V | peak |
| 7310.000 | 40.70 | 10.56 | 51.26 | 74.00 | -22.74 | V | peak |
| 1390.000 | 52.16 | -7.16 | 45.00 | 74.00 | -29.00 | H | peak |
| 2196.000 | 53.01 | -3.57 | 49.44 | 74.00 | -24.56 | H | peak |
| 2630.000 | 53.98 | -3.36 | 50.62 | 74.00 | -23.38 | H | peak |
| 3250.000 | 42.95 | 1.18 | 44.13 | 74.00 | -29.87 | H | peak |
| 5590.000 | 39.41 | 9.17 | 48.58 | 74.00 | -25.42 | H | peak |
| 7300.000 | 39.49 | 11.82 | 51.31 | 74.00 | -22.69 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** TX / IEEE 802.11g / CH High **Test Date:** 2014/7/24

**Temperature:** 26°C **Tested by:** Francis Lee

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

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1540.000 | 51.92 | -5.07 | 46.85 | 74.00 | -27.15 | V | peak |
| 1984.000 | 51.56 | -1.55 | 50.01 | 74.00 | -23.99 | V | peak |
| 2312.000 | 55.35 | -1.56 | 53.79 | 74.00 | -20.21 | V | peak |
| 2312.000 | 42.54 | -1.56 | 40.98 | 54.00 | -13.02 | V | AVG |
| 2702.000 | 52.26 | -1.48 | 50.78 | 74.00 | -23.22 | V | peak |
| 3775.000 | 40.29 | 3.38 | 43.67 | 74.00 | -30.33 | V | peak |
| 5400.000 | 39.50 | 6.39 | 45.89 | 74.00 | -28.11 | V | peak |
| 7600.000 | 38.97 | 11.91 | 50.88 | 74.00 | -23.12 | V | peak |
| 1408.000 | 52.54 | -7.07 | 45.47 | 74.00 | -28.53 | H | peak |
| 2202.000 | 52.87 | -3.62 | 49.25 | 74.00 | -24.75 | H | peak |
| 2838.000 | 53.65 | -2.19 | 51.46 | 74.00 | -22.54 | H | peak |
| 3790.000 | 40.55 | 4.97 | 45.52 | 74.00 | -28.48 | H | peak |
| 5975.000 | 39.86 | 8.93 | 48.79 | 74.00 | -25.21 | H | peak |
| 7305.000 | 39.28 | 11.79 | 51.07 | 74.00 | -22.93 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT20 mode / CH Low | **Test Date:** | 2014/7/24 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 55 % RH | **Polarity:** | Ver. / Hor. |

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1478.000 | 51.84 | -5.56 | 46.28 | 74.00 | -27.72 | V | peak |
| 2006.000 | 51.64 | -1.44 | 50.20 | 74.00 | -23.80 | V | peak |
| 2228.000 | 55.00 | -1.39 | 53.61 | 74.00 | -20.39 | V | peak |
| 2228.000 | 41.19 | -1.39 | 39.80 | 54.00 | -14.20 | V | AVG |
| 2506.000 | 55.30 | -1.00 | 54.30 | 74.00 | -19.70 | V | peak |
| 2506.000 | 41.53 | -1.00 | 40.53 | 54.00 | -13.47 | V | AVG |
| 2888.000 | 52.46 | -0.83 | 51.63 | 74.00 | -22.37 | V | peak |
| 3655.000 | 40.88 | 2.68 | 43.56 | 74.00 | -30.44 | V | peak |
| 5370.000 | 39.28 | 6.04 | 45.32 | 74.00 | -28.68 | V | peak |
| 7550.000 | 38.61 | 11.72 | 50.33 | 74.00 | -23.67 | V | peak |
| 1420.000 | 51.82 | -7.32 | 44.50 | 74.00 | -29.50 | H | peak |
| 2174.000 | 52.95 | -3.62 | 49.33 | 74.00 | -24.67 | H | peak |
| 2704.000 | 53.11 | -3.33 | 49.78 | 74.00 | -24.22 | H | peak |
| 3215.000 | 43.96 | 1.11 | 45.07 | 74.00 | -28.93 | H | peak |
| 5630.000 | 39.15 | 8.87 | 48.02 | 74.00 | -25.98 | H | peak |
| 7415.000 | 39.07 | 11.25 | 50.32 | 74.00 | -23.68 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT20 mode / CH Mid | **Test Date:** | 2014/7/24 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 56 % RH | **Polarity:** | Ver. / Hor. |

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1500.000 | 53.14 | -5.26 | 47.88 | 74.00 | -26.12 | V | peak |
| 1996.000 | 52.78 | -1.36 | 51.42 | 74.00 | -22.58 | V | peak |
| 2206.000 | 57.41 | -1.34 | 56.07 | 74.00 | -17.93 | V | peak |
| 2206.000 | 43.12 | -1.34 | 41.78 | 54.00 | -12.22 | V | AVG |
| 2542.000 | 57.35 | -1.45 | 55.90 | 74.00 | -18.10 | V | peak |
| 2542.000 | 43.13 | -1.45 | 41.68 | 54.00 | -12.32 | V | AVG |
| 3250.000 | 43.35 | -0.01 | 43.34 | 74.00 | -30.66 | V | peak |
| 4875.000 | 42.05 | 3.81 | 45.86 | 74.00 | -28.14 | V | peak |
| 7315.000 | 39.74 | 10.60 | 50.34 | 74.00 | -23.66 | V | peak |
| 1400.000 | 51.57 | -6.90 | 44.67 | 74.00 | -29.33 | H | peak |
| 2216.000 | 55.89 | -4.01 | 51.88 | 74.00 | -22.12 | H | peak |
| 2572.000 | 54.41 | -3.49 | 50.92 | 74.00 | -23.08 | H | peak |
| 2964.000 | 52.51 | -1.05 | 51.46 | 74.00 | -22.54 | H | peak |
| 3775.000 | 41.37 | 4.77 | 46.14 | 74.00 | -27.86 | H | peak |
| 4875.000 | 47.19 | 6.73 | 53.92 | 74.00 | -20.08 | H | peak |
| 4875.000 | 34.40 | 6.73 | 41.13 | 54.00 | -12.87 | H | AVG |
| 7320.000 | 39.43 | 11.72 | 51.15 | 74.00 | -22.85 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT20 mode / CH High | **Test Date:** | 2014/7/24 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 56 % RH | **Polarity:** | Ver. / Hor. |

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1582.000 | 51.79 | -4.87 | 46.92 | 74.00 | -27.08 | V | peak |
| 1990.000 | 52.05 | -1.46 | 50.59 | 74.00 | -23.41 | V | peak |
| 2302.000 | 54.82 | -1.55 | 53.27 | 74.00 | -20.73 | V | peak |
| 2302.000 | 41.80 | -1.55 | 40.25 | 54.00 | -13.75 | V | AVG |
| 2688.000 | 53.06 | -1.55 | 51.51 | 74.00 | -22.49 | V | peak |
| 3575.000 | 41.09 | 2.75 | 43.84 | 74.00 | -30.16 | V | peak |
| 4930.000 | 40.91 | 4.66 | 45.57 | 74.00 | -28.43 | V | peak |
| 7495.000 | 38.94 | 11.53 | 50.47 | 74.00 | -23.53 | V | peak |
| 1418.000 | 52.29 | -7.28 | 45.01 | 74.00 | -28.99 | H | peak |
| 2150.000 | 53.57 | -3.67 | 49.90 | 74.00 | -24.10 | H | peak |
| 2764.000 | 53.15 | -2.80 | 50.35 | 74.00 | -23.65 | H | peak |
| 3605.000 | 42.17 | 4.14 | 46.31 | 74.00 | -27.69 | H | peak |
| 4930.000 | 41.84 | 7.28 | 49.12 | 74.00 | -24.88 | H | peak |
| 7390.000 | 39.74 | 11.36 | 51.10 | 74.00 | -22.90 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT40 mode / CH Low | **Test Date:** | 2014/7/24 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 56 % RH | **Polarity:** | Ver. / Hor. |

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1538.000 | 52.72 | -5.08 | 47.64 | 74.00 | -26.36 | V | peak |
| 1992.000 | 52.00 | -1.43 | 50.57 | 74.00 | -23.43 | V | peak |
| 2202.000 | 54.09 | -1.33 | 52.76 | 74.00 | -21.24 | V | peak |
| 2202.000 | 43.37 | -1.33 | 42.04 | 54.00 | -11.96 | V | AVG |
| 2676.000 | 53.35 | -1.64 | 51.71 | 74.00 | -22.29 | V | peak |
| 3605.000 | 40.59 | 2.91 | 43.50 | 74.00 | -30.50 | V | peak |
| 5925.000 | 40.21 | 6.00 | 46.21 | 74.00 | -27.79 | V | peak |
| 7450.000 | 40.51 | 11.42 | 51.93 | 74.00 | -22.07 | V | peak |
| 1414.000 | 52.24 | -7.19 | 45.05 | 74.00 | -28.95 | H | peak |
| 2198.000 | 53.28 | -3.56 | 49.72 | 74.00 | -24.28 | H | peak |
| 2844.000 | 52.40 | -2.15 | 50.25 | 74.00 | -23.75 | H | peak |
| 4340.000 | 40.07 | 7.36 | 47.43 | 74.00 | -26.57 | H | peak |
| 5655.000 | 37.81 | 8.59 | 46.40 | 74.00 | -27.60 | H | peak |
| 7360.000 | 40.09 | 11.51 | 51.60 | 74.00 | -22.40 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT40 mode / CH Mid | **Test Date:** | 2014/7/24 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 56 % RH | **Polarity:** | Ver. / Hor. |

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1536.000 | 52.71 | -5.09 | 47.62 | 74.00 | -26.38 | V | peak |
| 2012.000 | 52.62 | -1.57 | 51.05 | 74.00 | -22.95 | V | peak |
| 2216.000 | 56.52 | -1.37 | 55.15 | 74.00 | -18.85 | V | peak |
| 2216.000 | 46.72 | -1.37 | 45.35 | 54.00 | -8.65 | V | AVG |
| 2842.000 | 52.95 | -1.50 | 51.45 | 74.00 | -22.55 | V | peak |
| 4000.000 | 40.16 | 3.49 | 43.65 | 74.00 | -30.35 | V | peak |
| 5840.000 | 39.17 | 5.58 | 44.75 | 74.00 | -29.25 | V | peak |
| 7325.000 | 39.88 | 10.69 | 50.57 | 74.00 | -23.43 | V | peak |
| 1420.000 | 52.11 | -7.32 | 44.79 | 74.00 | -29.21 | H | peak |
| 2202.000 | 54.55 | -3.62 | 50.93 | 74.00 | -23.07 | H | peak |
| 2650.000 | 53.54 | -3.36 | 50.18 | 74.00 | -23.82 | H | peak |
| 4885.000 | 41.30 | 6.90 | 48.20 | 74.00 | -25.80 | H | peak |
| 5910.000 | 38.98 | 9.18 | 48.16 | 74.00 | -25.84 | H | peak |
| 7295.000 | 39.39 | 11.75 | 51.14 | 74.00 | -22.86 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT40 mode / CH High | **Test Date:** | 2014/7/24 |
| **Temperature:** | 26°C | **Tested by:** | Francis Lee |
| **Humidity:** | 56 % RH | **Polarity:** | Ver. / Hor. |

| Freq. (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant. Pol H/V | Remark |
|---|---|---|---|---|---|---|---|
| 1970.000 | 52.99 | -1.77 | 51.22 | 74.00 | -22.78 | V | peak |
| 2222.000 | 54.45 | -1.38 | 53.07 | 74.00 | -20.93 | V | peak |
| 2222.000 | 41.53 | -1.38 | 40.15 | 54.00 | -13.85 | V | AVG |
| 2868.000 | 52.04 | -1.12 | 50.92 | 74.00 | -23.08 | V | peak |
| 3810.000 | 39.73 | 3.47 | 43.20 | 74.00 | -30.80 | V | peak |
| 5155.000 | 40.24 | 5.01 | 45.25 | 74.00 | -28.75 | V | peak |
| 7425.000 | 38.86 | 11.36 | 50.22 | 74.00 | -23.78 | V | peak |
| 1406.000 | 51.80 | -7.03 | 44.77 | 74.00 | -29.23 | H | peak |
| 2192.000 | 52.42 | -3.58 | 48.84 | 74.00 | -25.16 | H | peak |
| 2880.000 | 52.44 | -1.88 | 50.56 | 74.00 | -23.44 | H | peak |
| 4310.000 | 38.70 | 7.59 | 46.29 | 74.00 | -27.71 | H | peak |
| 5655.000 | 39.82 | 8.59 | 48.41 | 74.00 | -25.59 | H | peak |
| 7280.000 | 39.34 | 11.55 | 50.89 | 74.00 | -23.11 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limitor as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

## 7.7 POWERLINE CONDUCTED EMISSIONS

### LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that isconducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms lineimpedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be basedon the measurement of the radio frequency voltage between each power line and ground at the powerterminal. The lower limit applies at the boundary between the frequency ranges.

| FrequencyRange (MHz) | Limits (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56* | 56 to 46* |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

***** *Decreases with the logarithm of the frequency.*

### TEST CONFIGURATION

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

### TEST PROCEDURE

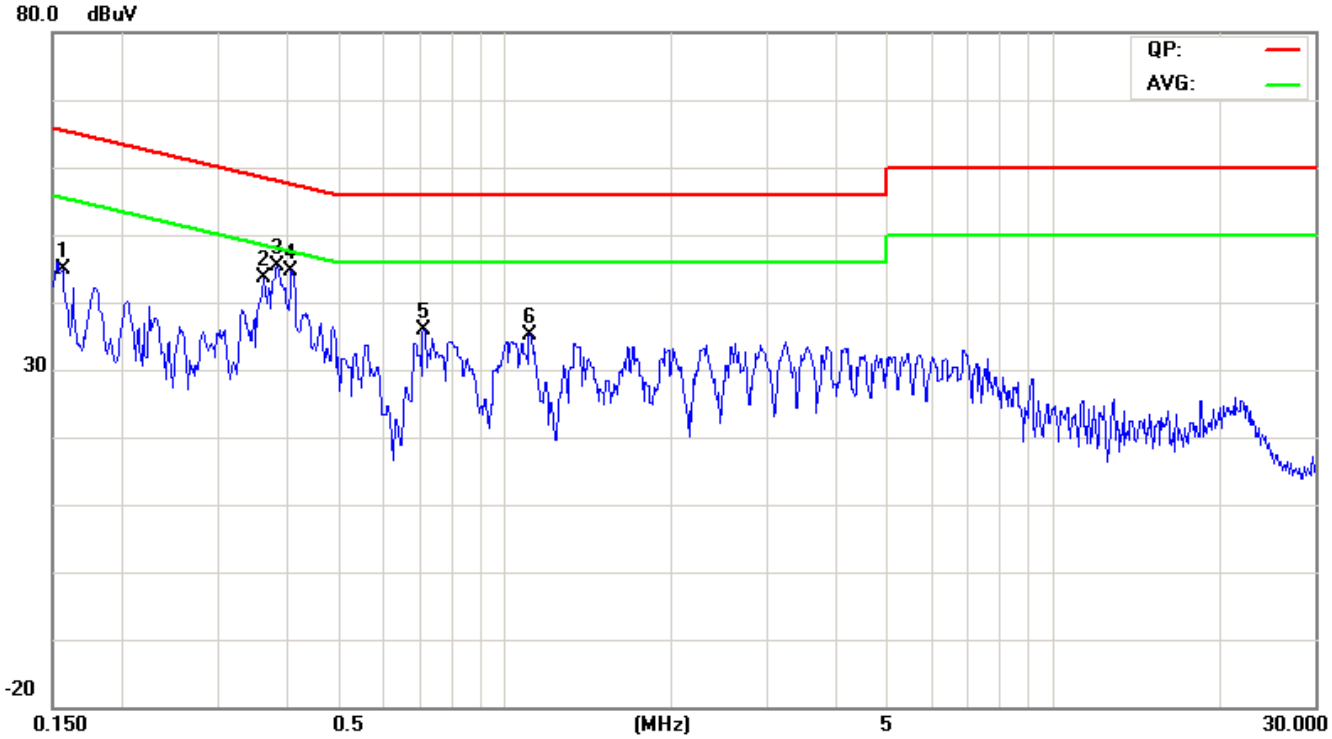
1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### TEST RESULTS

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

# TEST DATA

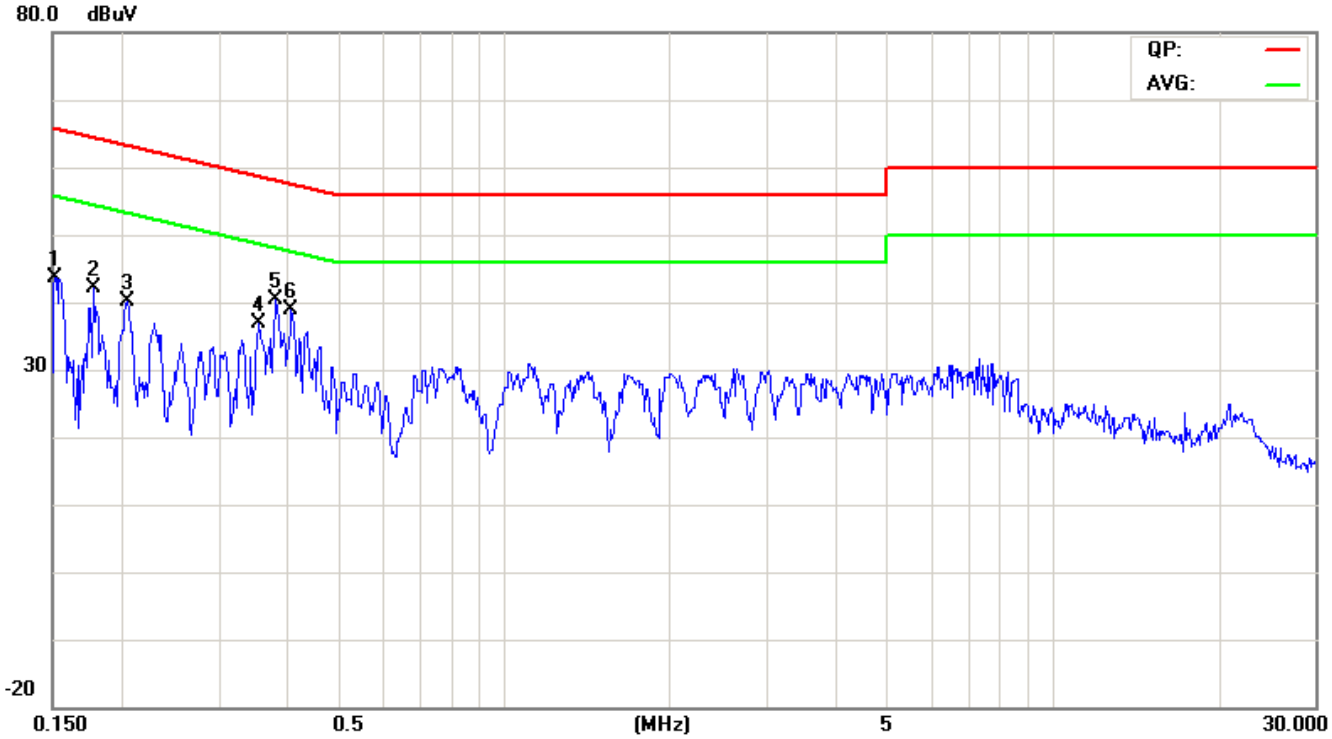
| | | | |
|---|---|---|---|
| **Test Mode** | Normal Link | **6dBBandwidth** | 9 kHz |
| **Environmental Conditions** | 25°C, 57% RH | **Test Date:** | 2014/8/11 |
| **Tested By** | Johnny Chen | **Line** | L1 |




| NO. | Frequency | QuasiPeak reading | Average reading | Correction factor | QuasiPeak result | Average result | QuasiPeak limit | Average limit | QuasiPeak margin | Average margin | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dBuV) | (dBuV) | (dB) | (dB) | (Pass/Fail) |
| 1 | 0.1549 | 31.91 | 23.05 | 9.79 | 41.70 | 32.84 | 65.73 | 55.73 | -24.03 | -22.89 | Pass |
| 2 | 0.3664 | 25.67 | 16.03 | 9.74 | 35.41 | 25.77 | 58.58 | 48.58 | -23.17 | -22.81 | Pass |
| 3* | 0.3848 | 32.08 | 29.48 | 9.75 | 41.83 | 39.23 | 58.18 | 48.18 | -16.35 | -8.95 | Pass |
| 4 | 0.4075 | 31.58 | 28.74 | 9.75 | 41.33 | 38.49 | 57.70 | 47.70 | -16.37 | -9.21 | Pass |
| 5 | 0.7140 | 24.71 | 21.16 | 9.74 | 34.45 | 30.90 | 56.00 | 46.00 | -21.55 | -15.10 | Pass |
| 6 | 1.1115 | 24.00 | 19.05 | 9.73 | 33.73 | 28.78 | 56.00 | 46.00 | -22.27 | -17.22 | Pass |

**REMARKS:**L1 = Line One (Live Line)

| | | | |
|---|---|---|---|
| **Test Mode** | Normal Link | **6dBBandwidth** | 9 kHz |
| **Environmental Conditions** | 25°C, 57% RH | **Test Date:** | 2014/8/11 |
| **Tested By** | Johnny Chen | **Line** | L2 |

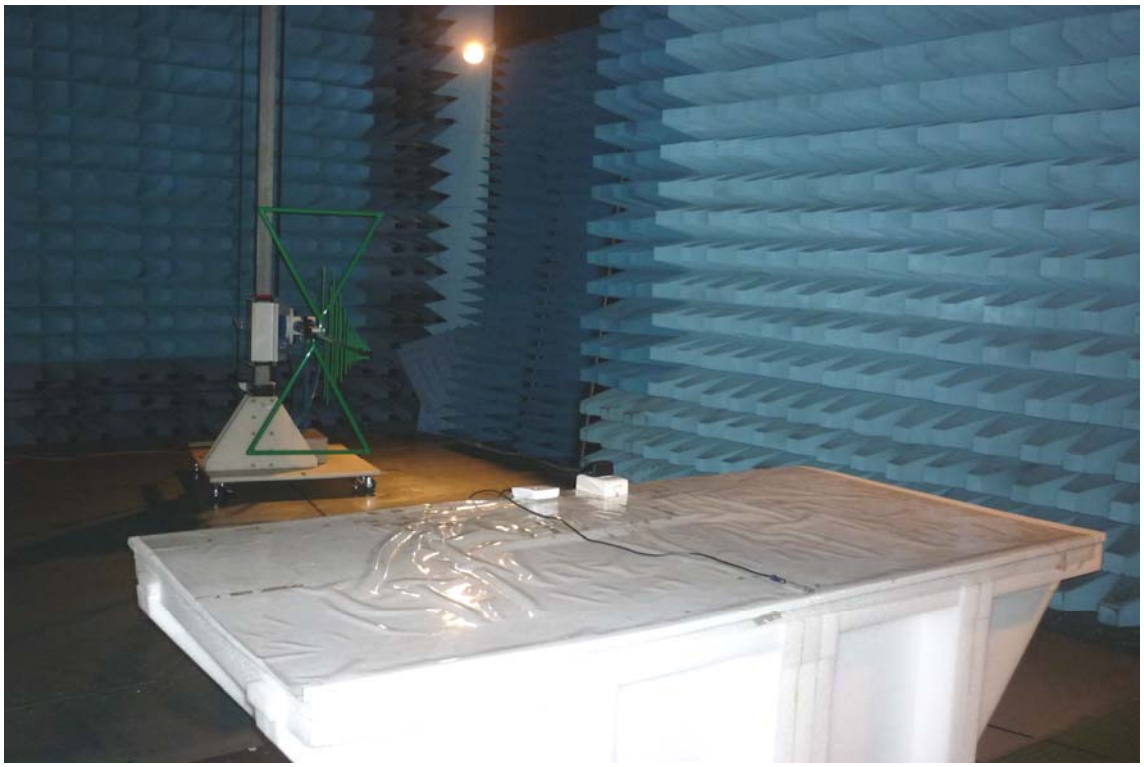


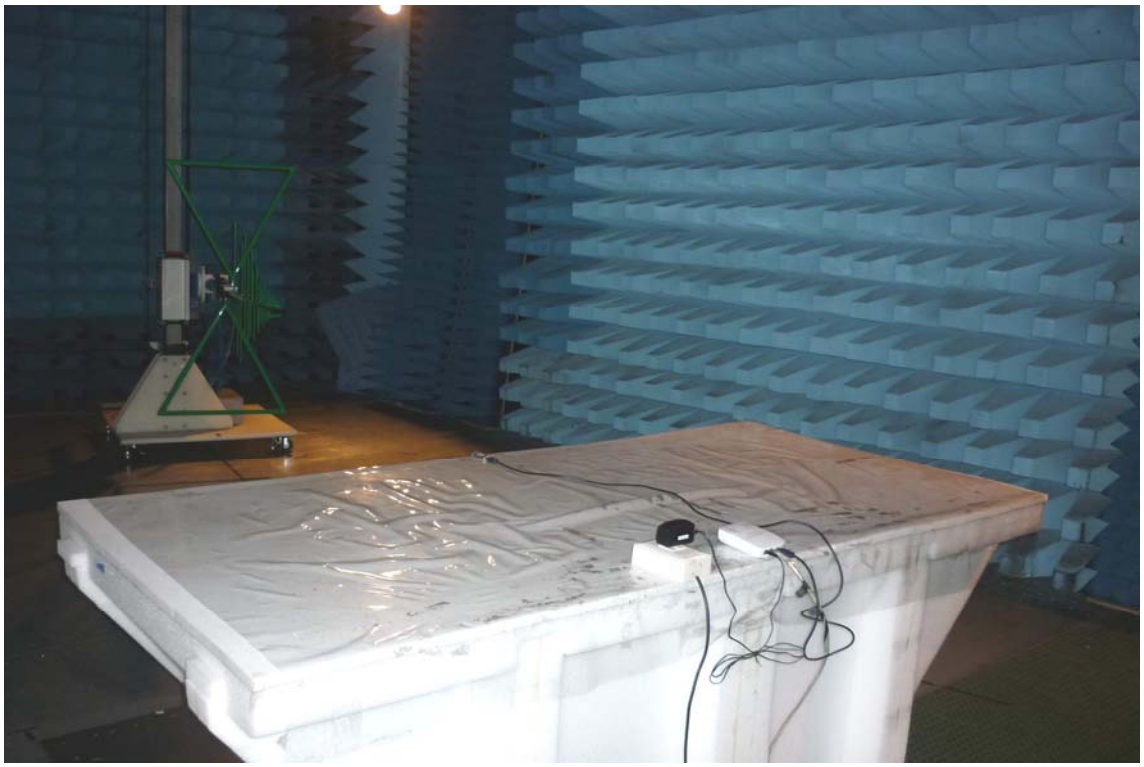

| NO. | Frequency | QuasiPeak reading | Average reading | Correction factor | QuasiPeak result | Average result | QuasiPeak limit | Average limit | QuasiPeak margin | Average margin | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dBuV) | (dBuV) | (dB) | (dB) | (Pass/Fail) |
| 1 | 0.1517 | 31.88 | 20.14 | 9.77 | 41.65 | 29.91 | 65.91 | 55.91 | -24.26 | -26.00 | Pass |
| 2 | 0.1780 | 30.88 | 21.08 | 9.74 | 40.62 | 30.82 | 64.58 | 54.58 | -23.96 | -23.76 | Pass |
| 3 | 0.2041 | 29.07 | 21.31 | 9.72 | 38.79 | 31.03 | 63.44 | 53.44 | -24.65 | -22.41 | Pass |
| 4 | 0.3569 | 27.27 | 22.49 | 9.72 | 36.99 | 32.21 | 58.80 | 48.80 | -21.81 | -16.59 | Pass |
| 5* | 0.3814 | 28.55 | 24.94 | 9.73 | 38.28 | 34.67 | 58.25 | 48.25 | -19.97 | -13.58 | Pass |
| 6 | 0.4077 | 27.35 | 23.83 | 9.73 | 37.08 | 33.56 | 57.70 | 47.70 | -20.62 | -14.14 | Pass |

**REMARKS:**L2 = Line Two (Neutral Line)

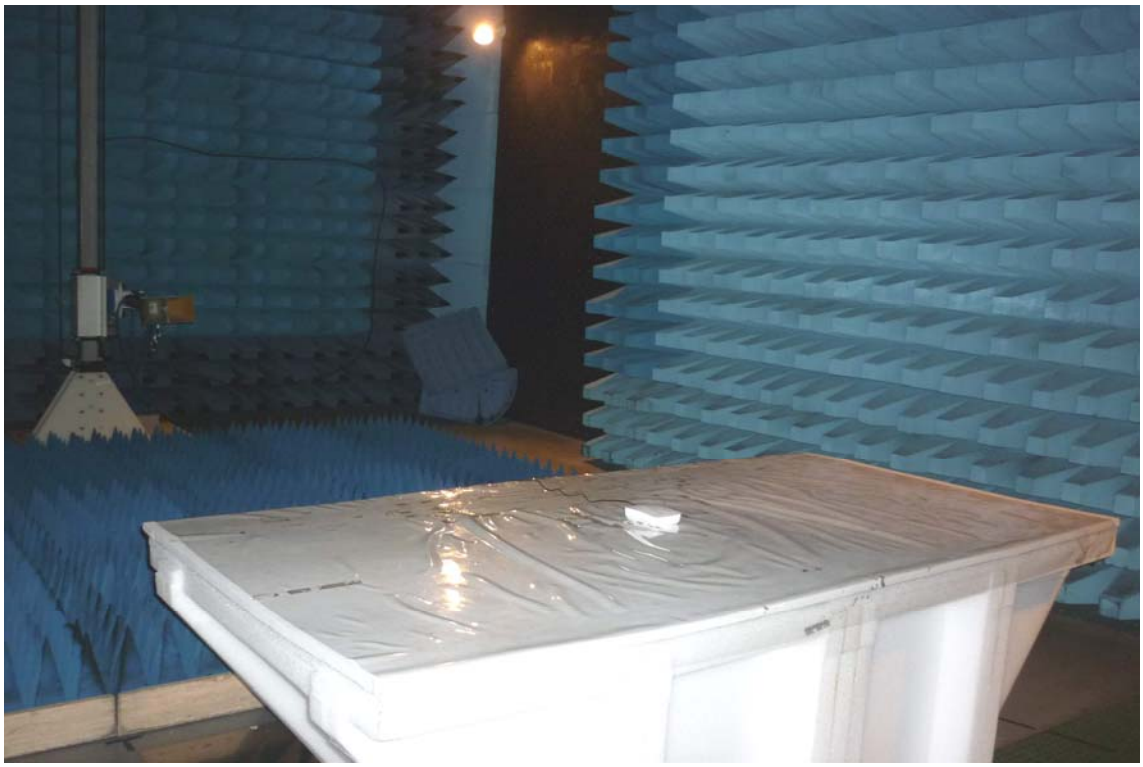
# 8. APPENDIX IPHOTOGRAPHS OF TEST SETUP

## Radiated Emission Set up Photos
## Below 1GHz

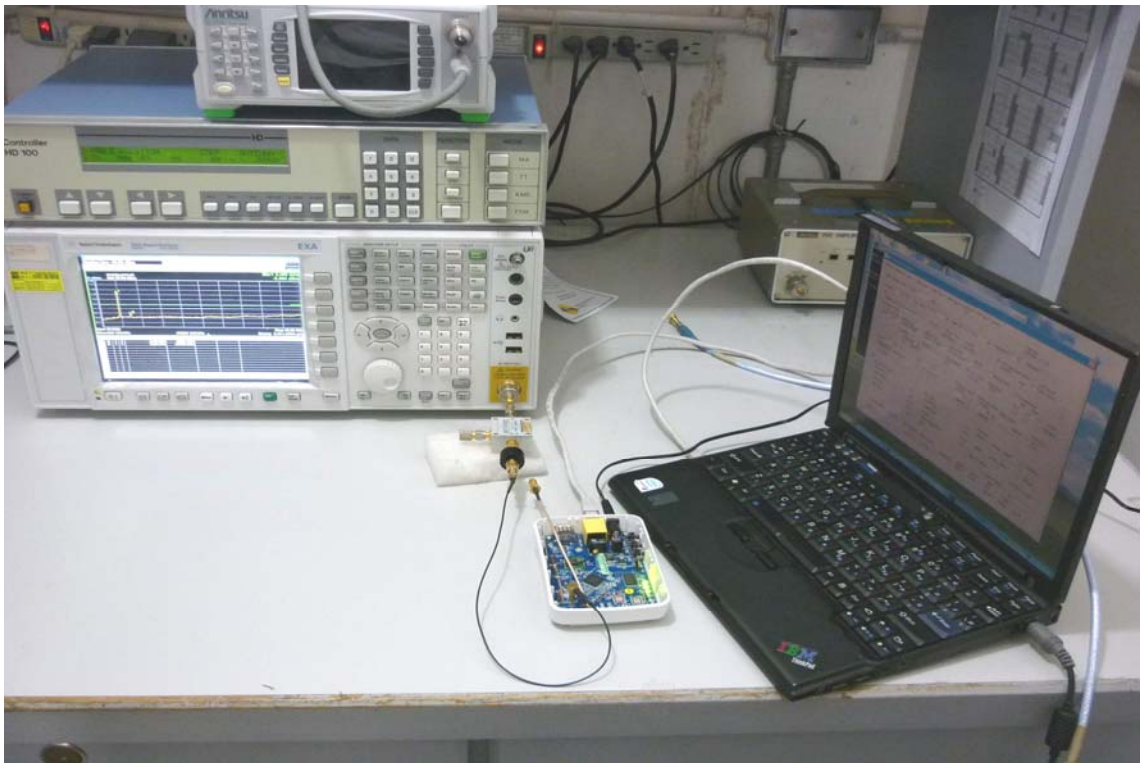




## Above 1GHz



## Conducted Emission Setup Photos



## Powerline Conducted EmissionsSetup Photos

# APPENDIX 1: PHOTOGRAPHS OF EUT

## Refer toT140708D15 Photographs.