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# Report On

Application for Grant of Equipment Authorization of the  
Hughes Network Systems  
9211 Land Portable Satellite Terminal

FCC Part 15 Subpart C §15.247

Report No. SC1405829A\_Rev1.0

September 2014



**REPORT ON** Radio Testing of the  
Hughes Network Systems  
Land Portable Satellite Terminal

**TEST REPORT NUMBER** SC1405829A\_Rev1.0

**PREPARED FOR** Hughes Network Systems  
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Title: EMC/Senior Wireless Engineer

**DATED** September 09, 2014



## Revision History

| SC1405829A_Rev1.0<br>Hughes Network Systems<br>9211 Land Portable Satellite Terminal |                 |              |                     |                   |                    |
|--------------------------------------------------------------------------------------|-----------------|--------------|---------------------|-------------------|--------------------|
| DATE                                                                                 | OLD REVISION    | NEW REVISION | REASON              | PAGES<br>AFFECTED | APPROVED BY        |
| 08/13/2014                                                                           | Initial Release |              |                     |                   | Ferdinand Custodio |
| 09/09/14                                                                             | Initial Release | 1.0          | Remove EUT Pictures | 8                 | Juan M. Gonzalez   |
|                                                                                      |                 |              |                     |                   |                    |
|                                                                                      |                 |              |                     |                   |                    |
|                                                                                      |                 |              |                     |                   |                    |



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## **SECTION 1**

### **REPORT SUMMARY**

Radio Testing of the  
Hughes Network Systems  
9211 Land Portable Satellite Terminal



## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Hughes Network Systems 9211 Land Portable Satellite Terminal to the requirements of FCC Part 15 Subpart C §15.247.

|                               |                                                                                                                                                                                                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective                     | To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.                                                                                                                          |
| Manufacturer                  | Hughes Network Systems                                                                                                                                                                                                                                                         |
| Model Number(s)               | 9211                                                                                                                                                                                                                                                                           |
| FCC ID Number                 | K3YHNS9211                                                                                                                                                                                                                                                                     |
| IC Number                     | N/A                                                                                                                                                                                                                                                                            |
| Serial Number(s)              | EUT#3-EMC                                                                                                                                                                                                                                                                      |
| Number of Samples Tested      | 1                                                                                                                                                                                                                                                                              |
| Test Specification/Issue/Date | <ul style="list-style-type: none"><li>• FCC Part 15 Subpart C §15.247 (October 1, 2013).</li><li>• 558074 D01 DTS Meas Guidance v03r02 June 05, 2014 (Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247)</li></ul> |
| Start of Test                 | May 14, 2014                                                                                                                                                                                                                                                                   |
| Finish of Test                | July 25, 2014                                                                                                                                                                                                                                                                  |
| Name of Engineer(s)           | Alex Chang<br>Ferdinand S. Custodio<br>Kathy Mackenzie                                                                                                                                                                                                                         |
| Related Document(s)           | None. Supporting documents for EUT certification are separate exhibits.                                                                                                                                                                                                        |



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart C §15.247 is shown below.

| Section | §15.247 Spec Clause | Test Description                                      | Result    | Comments/<br>Base Standard |
|---------|---------------------|-------------------------------------------------------|-----------|----------------------------|
| 2.1     | §15.247(b)(3)       | Peak Output Power                                     | Compliant |                            |
| 2.2     | §15.207(a)          | Conducted Emissions                                   | Compliant |                            |
| 2.3     | §15.247(a)(2)       | Minimum 6 dB RF Bandwidth                             | Compliant |                            |
| 2.4     | §15.247(d)          | Out-of-Band Emissions - Conducted                     | Compliant |                            |
| 2.5     | §15.247(d)          | Band-edge Compliance of RF Conducted Emissions        | Compliant |                            |
| 2.6     | §15.247(d)          | Spurious Radiated Emissions                           | Compliant |                            |
| 2.7     | §15.247(d)          | Radiated Band Edge Measurements                       | Compliant |                            |
| 2.8     | §15.247(e)          | Power Spectral Density for Digitally Modulated Device | Compliant |                            |

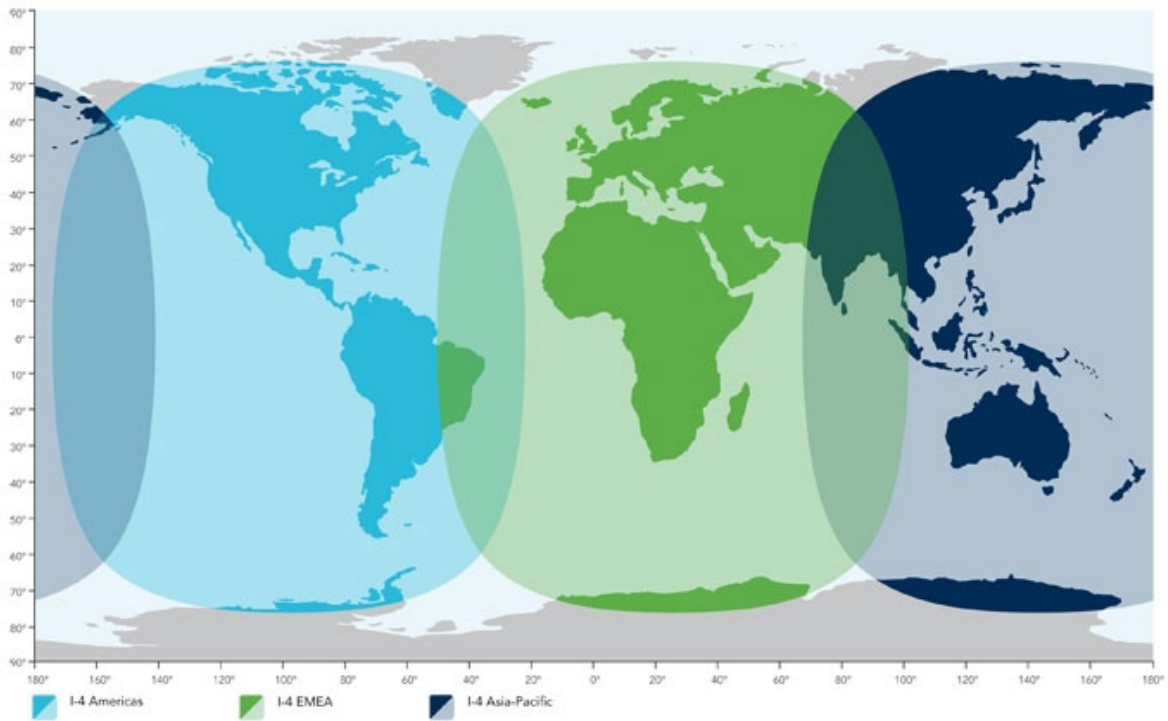


### **1.3 PRODUCT INFORMATION**

#### **1.3.1 Technical Description**

The Equipment Under Test (EUT) was an Hughes Network Systems 9211 Land Portable Satellite Terminal as shown in the photograph below. The EUT provides satellite connectivity over the Inmarsat BGAN satellite network. The EUT can send and receive IP packets via Ethernet and WLAN interface and also supports circuit switched voice and fax call via standard POTS interface. The external satellite antenna connector of the EUT was not verified. All verifications were performed on the main antenna connector which is considered worst case configuration between the two.

### 1.3.2 Inmarsat BGAN Coverage Map





### 1.3.3 EUT General Description

|                    |                                                                                                                                                                  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Description    | Land Portable Satellite Terminal                                                                                                                                 |
| Model Number(s)    | 9211                                                                                                                                                             |
| Rated Voltage      | 7.5VDC Li-Ion battery<br>19VDC from compatible AC/DC adapter                                                                                                     |
| Mode Verified      | 802.11 b/g/n (20MHz/40MHz for 802.11n)                                                                                                                           |
| Capability         | 802.11 b/g/n WLAN (DTS) 2.4GHz band (20MHz/40MHz for 802.11n) and 1.6GHz Mobile Satellite Service                                                                |
| Primary Unit (EUT) | <input type="checkbox"/> Production<br><input checked="" type="checkbox"/> Pre-Production<br><input type="checkbox"/> Engineering                                |
| Antenna Type       | Integral Antenna                                                                                                                                                 |
| Antenna Gain       | 0.9 dBi                                                                                                                                                          |
| Antenna Details    | Please refer to the manufacturer documentation titled "Specification Control Document – Antenna, L-Band Transportable" Cage Code 3LOW2 No. 3500648 (05/02/2014). |

### 1.3.4 Maximum Conducted Output Power

| Mode           | Frequency Range (MHz) | Output Power (dBm) | Output Power (mW) |
|----------------|-----------------------|--------------------|-------------------|
| 802.11b        | 2412-2462             | 12.55              | 17.99             |
| 802.11g        | 2412-2462             | 12.20              | 16.59             |
| 802.11n (HT20) | 2412-2462             | 12.25              | 16.79             |
| 802.11n (HT40) | 2412-2462             | 12.19              | 16.56             |



#### 1.4 EUT TEST CONFIGURATION

##### 1.4.1 Test Configuration Description

| Test Configuration | Description                                                                                                                               |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| A                  | Conducted measurement configuration. The antenna radome was removed to gain access to the main antenna connector.                         |
| B                  | Radiated / Conducted emission configuration. The EUT was set to transmit via integral antenna and connected to supplied AC power adaptor. |

##### 1.4.2 EUT Exercise Software

“Perl Command” software provided by the client was used to exercise the EUT. A file containing commands to change channels and modulation was also provided. Specific channel/modulation combination is copied from this file and transferred to the test software, once executed the EUT will transmit at max power (default setting if TX) at that channel.

##### 1.4.3 Support Equipment and I/O cables

| Manufacturer | Equipment/Cable                   | Description                             |
|--------------|-----------------------------------|-----------------------------------------|
| Hughes       | AC Adapter for EUT                | Model: ATS065-A190 S/N N/A              |
| Toshiba      | Laptop                            | Model Satellite Pro 4600 S/N 91225670PU |
| Toshiba      | Laptop External PSU               | Model PA3049U-1ACA S/N 0008A0184957G    |
| HP           | Mouse for Laptop                  | Model M-UD43 S/N LZA03401471            |
| GFM          | Analog Telephone                  | Model: KT-887 S/N 7-19263-81663-4       |
| -            | Telco cable (analog phone to EUT) | 2.1m unshielded RJ11 connector          |
| -            | CAT6 (Laptop to EUT)              | 2.1m unshielded RJ45 connector          |

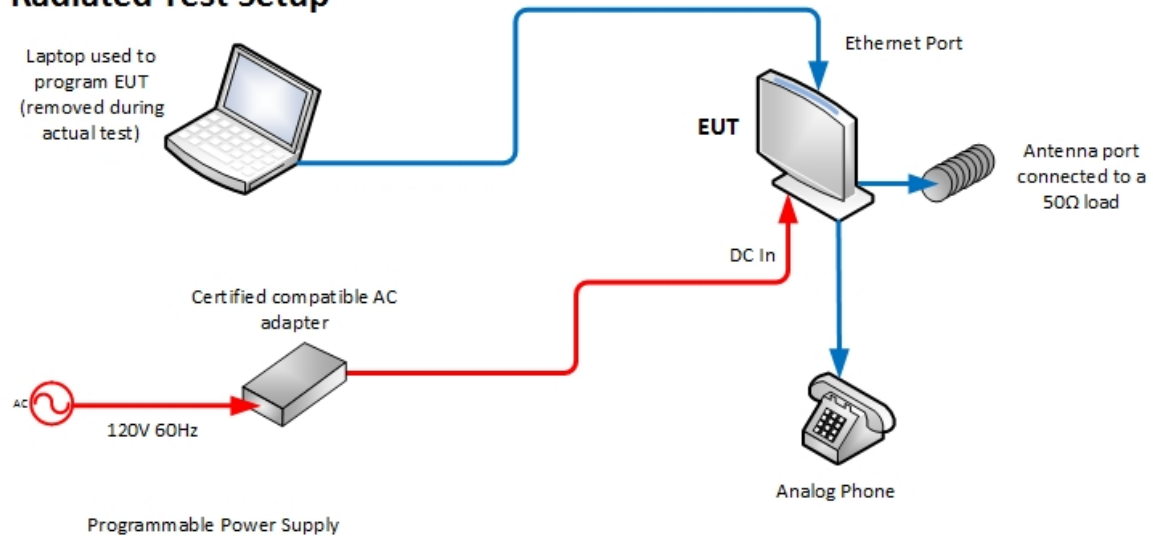
##### 1.4.4 Worst Case Configuration

Worst-case configuration used in this test report as per maximum conducted output power measurements:

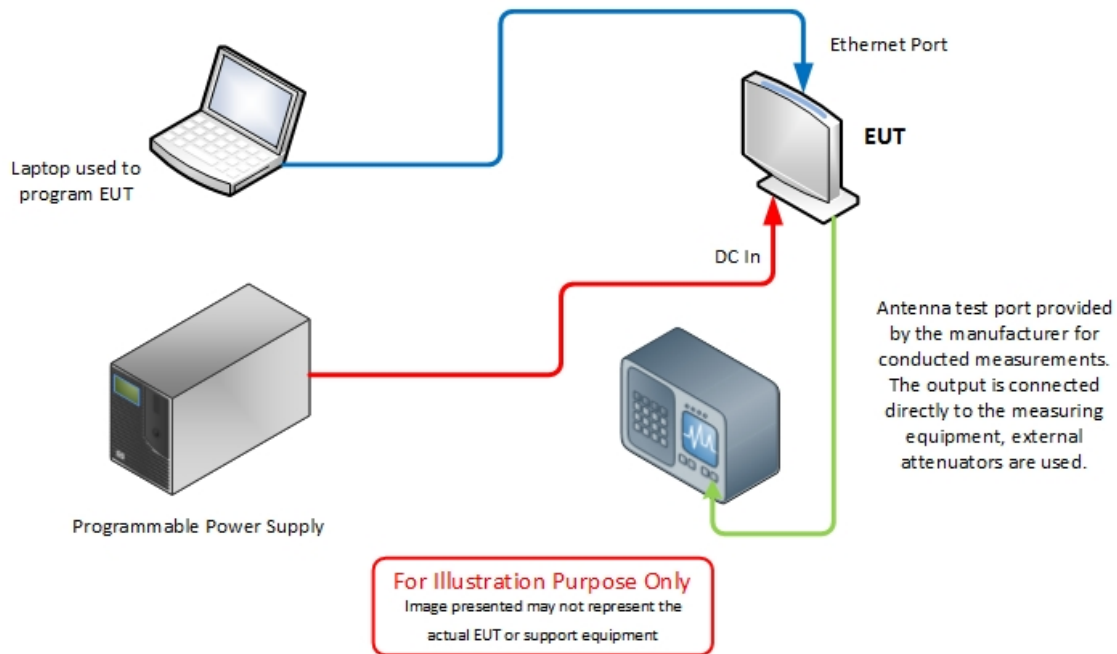
| Mode           | Channel         | Data Rate          |
|----------------|-----------------|--------------------|
| 802.11b        | 1 (Low Channel) | 5.5 Mbps           |
| 802.11g        | 6 (Mid Channel) | 18 Mbps            |
| 802.11n (HT20) | 6 (Mid Channel) | Mcs 0 (72.0 Mbps)  |
| 802.11n (HT40) | 6 (Mid Channel) | Mcs 7 (150.0 Mbps) |

#### 1.4.5 Simplified Test Configuration Diagram

##### Radiated Test Setup



##### Conducted Port Measurement Test Setup





## 1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

## 1.6 MODIFICATION RECORD

| Description of Modification | Modification Fitted By | Date Modification Fitted |
|-----------------------------|------------------------|--------------------------|
| Serial Number EUT#3-EMC     |                        |                          |
| N/A                         | —                      | —                        |

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

## 1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

## 1.8 TEST FACILITY LOCATION

### 1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 FAX: 858-546 0364

### 1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

Sony Electronics Inc., Building #8 16530 Via Esprillo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 FAX: 858-546 0364

## 1.9 TEST FACILITY REGISTRATION

### 1.9.1 FCC – Registration No.: US1146

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.



**1.9.2 Industry Canada (IC) Registration No.: 3067A**

The 10m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego) has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.



## **SECTION 2**

### **TEST DETAILS**

Radio Testing of the  
Hughes Network Systems  
9211 Land Portable Satellite Terminal



## **2.1 PEAK OUTPUT POWER**

### **2.1.1 Specification Reference**

Part 15 Subpart C §15.247(b)(3)

### **2.1.2 Standard Applicable**

(3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

### **2.1.3 Equipment Under Test and Modification State**

Serial No: EUT#3-EMC / Test Configuration A

### **2.1.4 Date of Test/Initial of test personnel who performed the test**

June 17, 2014 / KAM

### **2.1.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.1.6 Environmental Conditions**

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.7°C   |
| Relative Humidity   | 39.4%    |
| ATM Pressure        | 98.9 kPa |

### **2.1.7 Additional Observations**

- This is a conducted test (Maximum conducted [average] output power) using direct connection to a power meter.
- An offset of 21.1dB was added to compensate for the external attenuator and cable used from the antenna port to the power sensor.
- This is a conducted test using Method A: Peak Power Meter Method per Section 9.2.3 under KDB 558074 D01 DTS Measurement Guidance v03r02 (Compliance Measurement Guidance for 15.247 Digital Transmission Systems, June 05, 2014).
- Both Peak and Average measurements were recorded.
- All available modes and data rates were verified. The worst case data rate for each mode (marked bold and italic) will be verified for each test throughout this test report.



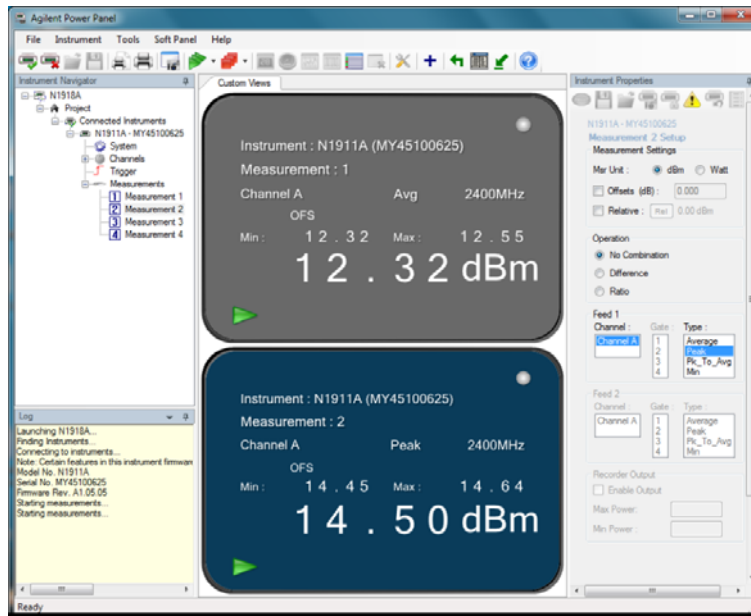
## 2.1.8 Test Results

| WLAN Mode | Channel       | Data Rates (Mbps) | Measured Average Power (dBm) | Measured Peak Power (dBm) |
|-----------|---------------|-------------------|------------------------------|---------------------------|
| 802.11b   | 1 (2412 MHz)  | 1                 | 12.22                        | 15.04                     |
|           |               | 2                 | 12.52                        | 15.27                     |
|           |               | <b>5.5</b>        | <b>12.55</b>                 | <b>14.64</b>              |
|           |               | 11                | 12.49                        | 15.28                     |
|           | 6 (2437 MHz)  | <b>1</b>          | <b>12.37</b>                 | <b>15.12</b>              |
|           |               | 2                 | 12.22                        | 15.00                     |
|           |               | 5.5               | 12.29                        | 14.41                     |
|           |               | 11                | 12.27                        | 15.04                     |
|           | 11 (2462 MHz) | 1                 | 11.74                        | 14.58                     |
|           |               | <b>2</b>          | <b>11.87</b>                 | <b>14.61</b>              |
|           |               | 5.5               | 11.82                        | 13.90                     |
|           |               | 11                | 11.84                        | 14.64                     |
| 802.11g   | 1 (2412 MHz)  | <b>6</b>          | <b>11.98</b>                 | <b>21.51</b>              |
|           |               | 9                 | 11.86                        | 21.20                     |
|           |               | 12                | 11.88                        | 21.34                     |
|           |               | 18                | 11.93                        | 21.29                     |
|           |               | 24                | 11.85                        | 21.83                     |
|           |               | 36                | 11.86                        | 21.35                     |
|           |               | 48                | 11.79                        | 21.38                     |
|           |               | 54                | 11.71                        | 21.62                     |
|           | 6 (2437 MHz)  | 6                 | 12.10                        | 21.64                     |
|           |               | 9                 | 12.11                        | 21.40                     |
|           |               | 12                | 12.14                        | 21.48                     |
|           |               | <b>18</b>         | <b>12.20</b>                 | <b>21.49</b>              |
|           |               | 24                | 12.08                        | 22.07                     |
|           |               | 36                | 12.00                        | 21.50                     |
|           |               | 48                | 12.09                        | 21.54                     |

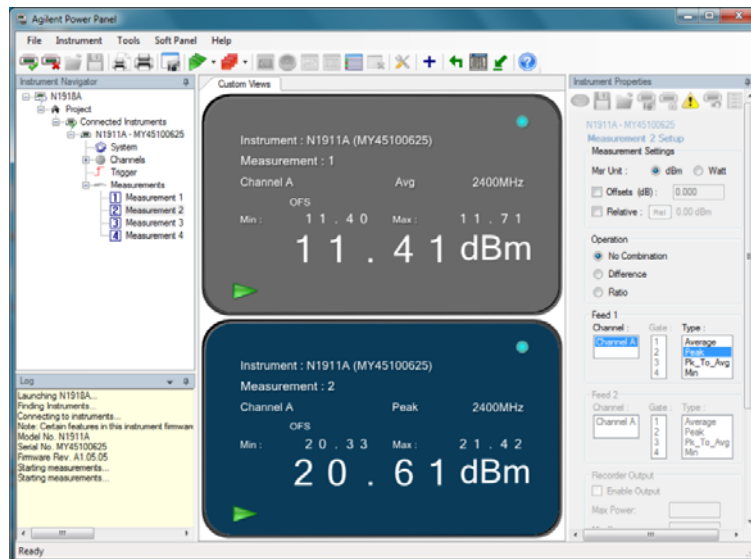


| WLAN Mode              | Channel       | Data Rates (Mbps)         | Measured Average Power (dBm) | Measured Peak Power (dBm) |
|------------------------|---------------|---------------------------|------------------------------|---------------------------|
| 802.11g                | 6 (2437 MHz)  | 54                        | 12.06                        | 21.85                     |
|                        | 11 (2462 MHz) | 6                         | 11.71                        | 21.42                     |
|                        |               | 9                         | 11.63                        | 21.14                     |
|                        |               | 12                        | 11.65                        | 21.22                     |
|                        |               | 18                        | 11.70                        | 21.11                     |
|                        |               | 24                        | 11.63                        | 21.74                     |
|                        |               | 36                        | 11.53                        | 21.24                     |
|                        |               | 48                        | 11.59                        | 21.26                     |
|                        |               | 54                        | 11.53                        | 21.58                     |
| 802.11n<br>(20 MHz BW) | 1 (2412 MHz)  | mcs 0 (72.0 Mbps)         | 12.07                        | 21.11                     |
|                        | 6 (2437 MHz)  | <b>mcs 0 (72.0 Mbps)</b>  | <b>12.25</b>                 | <b>21.29</b>              |
|                        | 11 (2462 MHz) | mcs 0 (72.0 Mbps)         | 11.69                        | 20.78                     |
| 802.11n<br>(40 MHz BW) | 3 (2422 MHz)  | mcs 7 (150.0 Mbps)        | 11.99                        | 21.46                     |
|                        | 6 (2437 MHz)  | <b>mcs 7 (150.0 Mbps)</b> | <b>12.19</b>                 | <b>21.55</b>              |
|                        | 9 (2452 MHz)  | mcs 7 (150.0 Mbps)        | 11.99                        | 21.35                     |

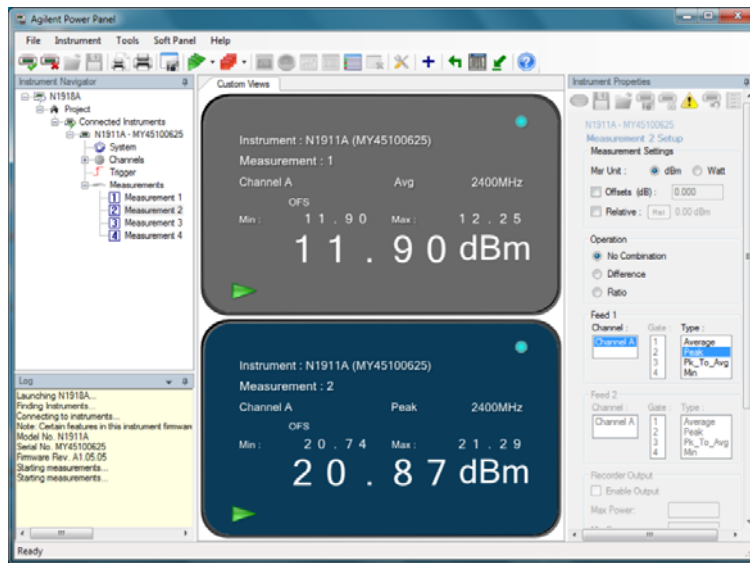
## 2.1.9 Sample Test Display



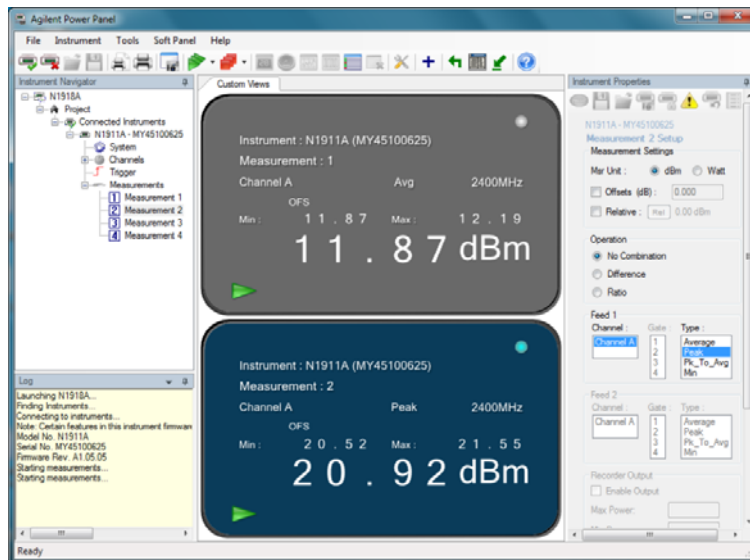
802.11 "b" mode. Low Channel 5.5Mbps



802.11 "g" mode. High Channel 6Mbps



802.11 "n" mode HT20. Mid Channel 72Mbps



802.11 "n" mode HT40. Mid Channel 150Mbps



## 2.2 CONDUCTED EMISSIONS

### 2.2.1 Specification Reference

Part 15 Subpart C §15.207(a)

### 2.2.2 Standard Applicable

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

| Frequency of emission (MHz) | Conducted limit (dB $\mu$ V) |           |
|-----------------------------|------------------------------|-----------|
|                             | Quasi-peak                   | Average   |
| 0.15–0.5                    | 66 to 56*                    | 56 to 46* |
| 0.5–5                       | 56                           | 46        |
| 5–30                        | 60                           | 50        |

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

### 2.2.3 Equipment Under Test and Modification State

Serial No: EUT#3-EMC / Test Configuration B

### 2.2.4 Date of Test/Initial of test personnel who performed the test

June 20, 2014 / KAM

### 2.2.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.2.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.2 °C  |
| Relative Humidity   | 47.0. %  |
| ATM Pressure        | 98.9 kPa |

### 2.2.7 Additional Observations

- Verification performed while the EUT is in charging mode.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.2.8 for sample computation.



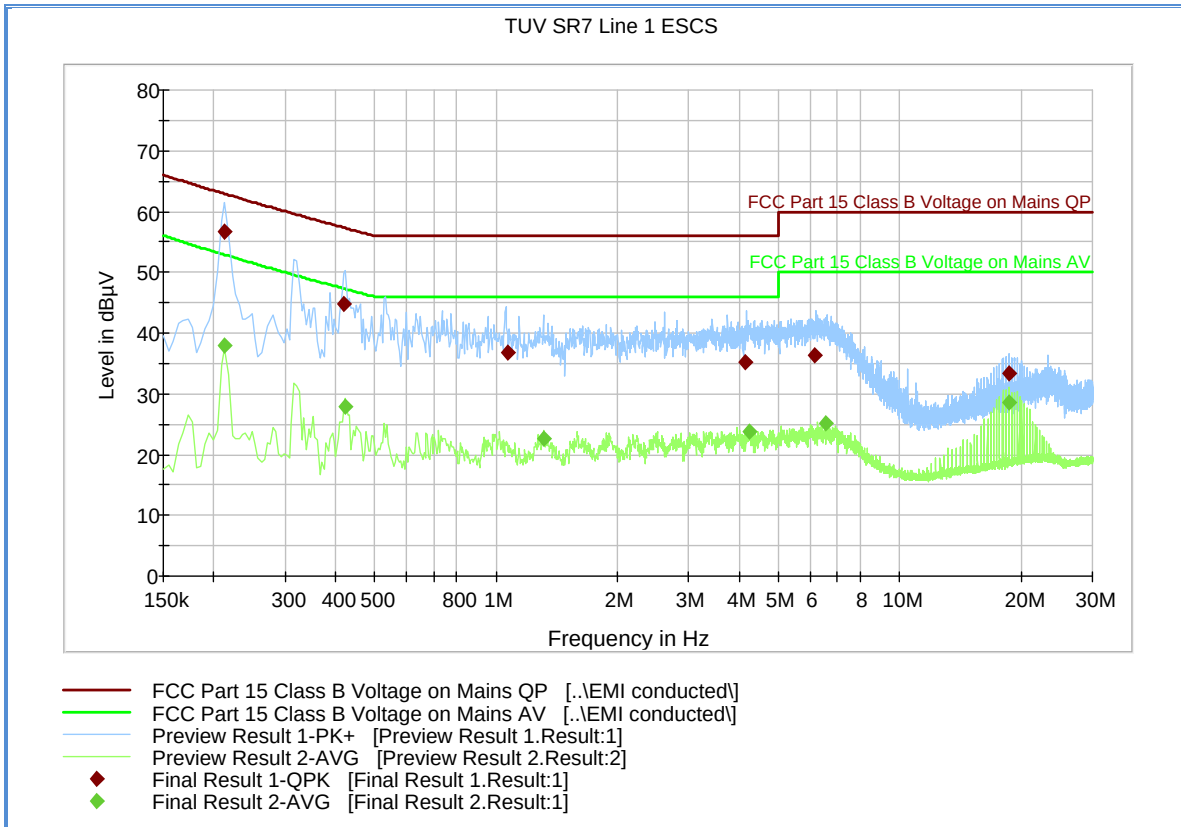
## 2.2.8 Sample Computation (Conducted Emission – Quasi Peak)

|                                                            |                                |      |      |
|------------------------------------------------------------|--------------------------------|------|------|
| Measuring equipment raw measurement (db $\mu$ V) @ 150kHz  |                                |      | 5.5  |
| Correction Factor (dB)                                     | Asset# 8607 (20 dB attenuator) | 19.9 | 20.7 |
|                                                            | Asset# 1177 (cable)            | 0.15 |      |
|                                                            | Asset# 1176 (cable)            | 0.35 |      |
|                                                            | Asset# 7567 (LISN)             | 0.30 |      |
| Reported QuasiPeak Final Measurement (db $\mu$ V) @ 150kHz |                                |      | 26.2 |

## 2.2.9 Test Results

Compliant. See attached plots and tables.

## 2.2.10 FCC Conducted Emissions Line 1



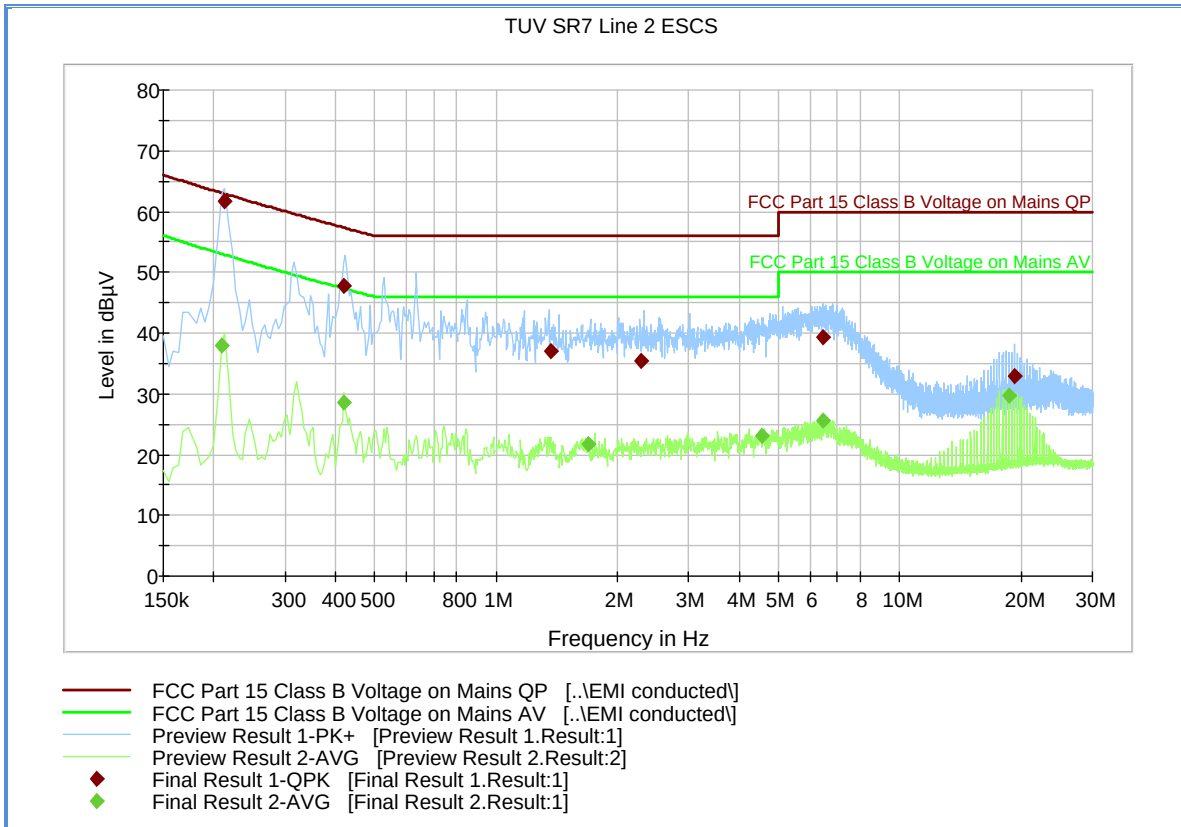
### Quasi Peak

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.213000        | 56.7             | 1000.0          | 9.000           | Off    | L1   | 20.1       | 6.2               | 62.9               |
| 0.420000        | 44.9             | 1000.0          | 9.000           | Off    | L1   | 20.0       | 12.5              | 57.3               |
| 1.072500        | 36.8             | 1000.0          | 9.000           | Off    | L1   | 20.1       | 19.2              | 56.0               |
| 4.132500        | 35.3             | 1000.0          | 9.000           | Off    | L1   | 20.5       | 20.7              | 56.0               |
| 6.157500        | 36.5             | 1000.0          | 9.000           | Off    | L1   | 20.6       | 23.5              | 60.0               |
| 18.604500       | 33.3             | 1000.0          | 9.000           | Off    | L1   | 21.0       | 26.7              | 60.0               |

### Average

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBμV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.213000        | 38.0           | 1000.0          | 9.000           | Off    | L1   | 20.1       | 14.9              | 52.9               |
| 0.424500        | 27.8           | 1000.0          | 9.000           | Off    | L1   | 20.0       | 19.4              | 47.2               |
| 1.315500        | 22.7           | 1000.0          | 9.000           | Off    | L1   | 20.2       | 23.3              | 46.0               |
| 4.227000        | 23.7           | 1000.0          | 9.000           | Off    | L1   | 20.5       | 22.3              | 46.0               |
| 6.571500        | 25.1           | 1000.0          | 9.000           | Off    | L1   | 20.5       | 24.9              | 50.0               |
| 18.600000       | 28.7           | 1000.0          | 9.000           | Off    | L1   | 21.0       | 21.3              | 50.0               |

## 2.2.11 FCC Conducted Emissions Line 2



### Quasi Peak

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.213000        | 61.7             | 1000.0          | 9.000           | Off    | N    | 20.0       | 1.2               | 62.9               |
| 0.420000        | 47.8             | 1000.0          | 9.000           | Off    | N    | 20.0       | 9.6               | 57.3               |
| 1.369500        | 36.9             | 1000.0          | 9.000           | Off    | N    | 20.0       | 19.1              | 56.0               |
| 2.292000        | 35.5             | 1000.0          | 9.000           | Off    | N    | 20.3       | 20.5              | 56.0               |
| 6.441000        | 39.3             | 1000.0          | 9.000           | Off    | N    | 20.5       | 20.7              | 60.0               |
| 19.203000       | 32.9             | 1000.0          | 9.000           | Off    | N    | 20.8       | 27.1              | 60.0               |

### Average

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBμV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.208500        | 38.0           | 1000.0          | 9.000           | Off    | N    | 20.0       | 15.1              | 53.1               |
| 0.420000        | 28.5           | 1000.0          | 9.000           | Off    | N    | 20.0       | 18.9              | 47.3               |
| 1.689000        | 21.8           | 1000.0          | 9.000           | Off    | N    | 20.1       | 24.2              | 46.0               |
| 4.546500        | 23.2           | 1000.0          | 9.000           | Off    | N    | 20.4       | 22.8              | 46.0               |
| 6.445500        | 25.7           | 1000.0          | 9.000           | Off    | N    | 20.5       | 24.3              | 50.0               |
| 18.600000       | 29.7           | 1000.0          | 9.000           | Off    | N    | 20.8       | 20.3              | 50.0               |



## **2.3 MINIMUM 6 dB RF BANDWIDTH**

### **2.3.1 Specification Reference**

Part 15 Subpart C §15.247(a)(2)

### **2.3.2 Standard Applicable**

(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.

### **2.3.3 Equipment Under Test and Modification State**

Serial No: EUT#3-EMC / Test Configuration A

### **2.3.4 Date of Test/Initial of test personnel who performed the test**

June 18, 2014 / KAM

### **2.3.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.3.6 Environmental Conditions/ Test Location**

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.1 °C  |
| Relative Humidity   | 44.1 %   |
| ATM Pressure        | 98.9 kPa |

### **2.3.7 Additional Observations**

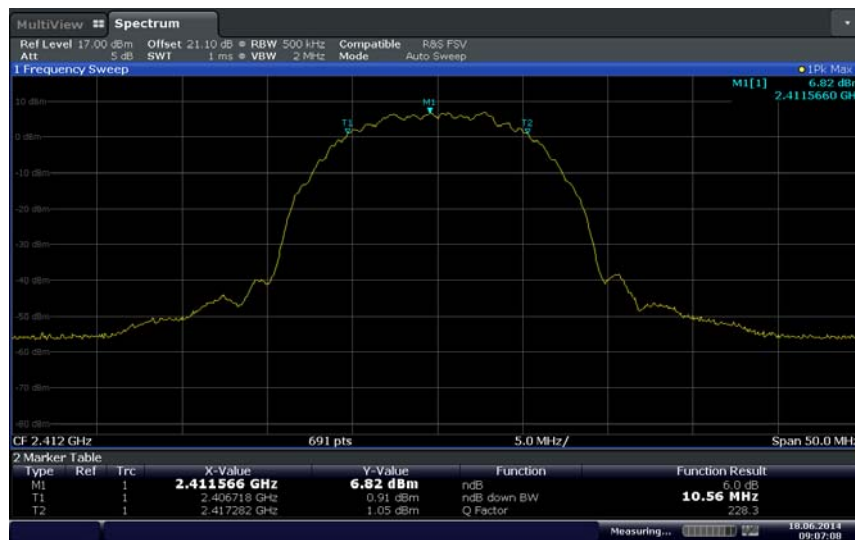
- This is a conducted test.
- An offset of 21.1dB was added to compensate for the external attenuator and cable used from the antenna port to the power sensor.
- Span is wide enough to capture the channel transmission.
- RBW is set to 1% of the span.
- VBW is  $\geq 3X$  RBW.
- Sweep is auto.
- Detector is peak.
- The “n” dB down marker function of the spectrum analyzer was used for this test.



### 2.3.8 Test Results

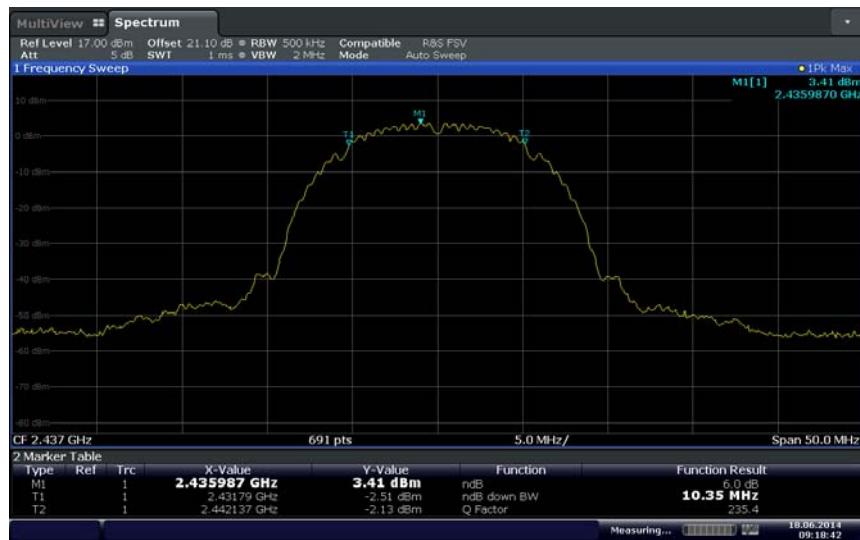
| Mode         | Channel       | Measured Bandwidth (MHz) | Minimum Bandwidth (MHz) | Compliance |
|--------------|---------------|--------------------------|-------------------------|------------|
| 802.11b      | 1 (2412 MHz)  | 10.56                    | 0.500                   | Complies   |
|              | 6 (2437 MHz)  | 10.35                    | 0.500                   | Complies   |
|              | 11 (2462 MHz) | 10.20                    | 0.500                   | Complies   |
| 802.11g      | 1 (2412 MHz)  | 16.71                    | 0.500                   | Complies   |
|              | 6 (2437 MHz)  | 16.79                    | 0.500                   | Complies   |
|              | 11 (2462 MHz) | 16.71                    | 0.500                   | Complies   |
| 802.11n HT20 | 1 (2412 MHz)  | 17.87                    | 0.500                   | Complies   |
|              | 6 (2437 MHz)  | 17.95                    | 0.500                   | Complies   |
|              | 11 (2462 MHz) | 17.95                    | 0.500                   | Complies   |
| 802.11n HT40 | 3 (2422 MHz)  | 36.90                    | 0.500                   | Complies   |
|              | 6 (2437 MHz)  | 36.90                    | 0.500                   | Complies   |
|              | 9 (2452 MHz)  | 36.90                    | 0.500                   | Complies   |

### 2.3.9 Test Results Plots



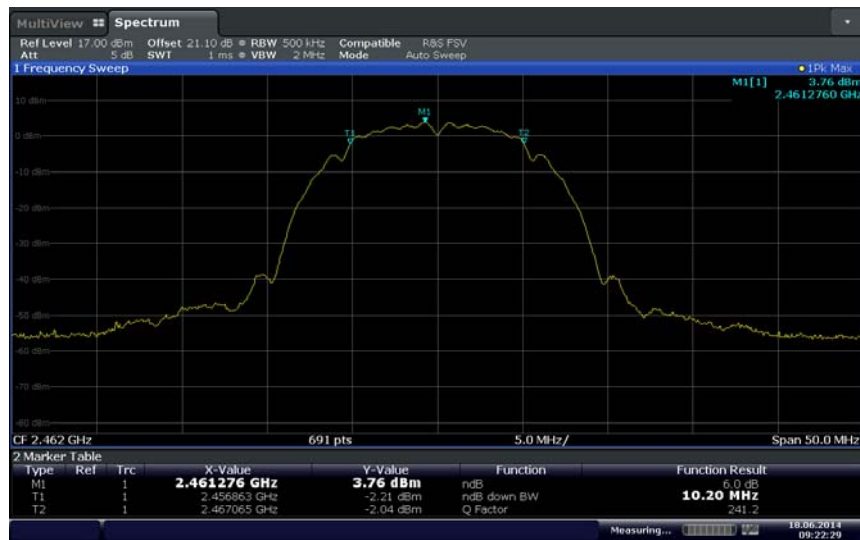
Date: 18 JUN 2014 09:07:08

802.11b Low Channel



Date: 18 JUN 2014 09:18:42

### 802.11b Mid Channel



Date: 18 JUN 2014 09:22:29

### 802.11b High Channel



Date: 18 JUN 2014 09:28:45

### 802.11g Low Channel



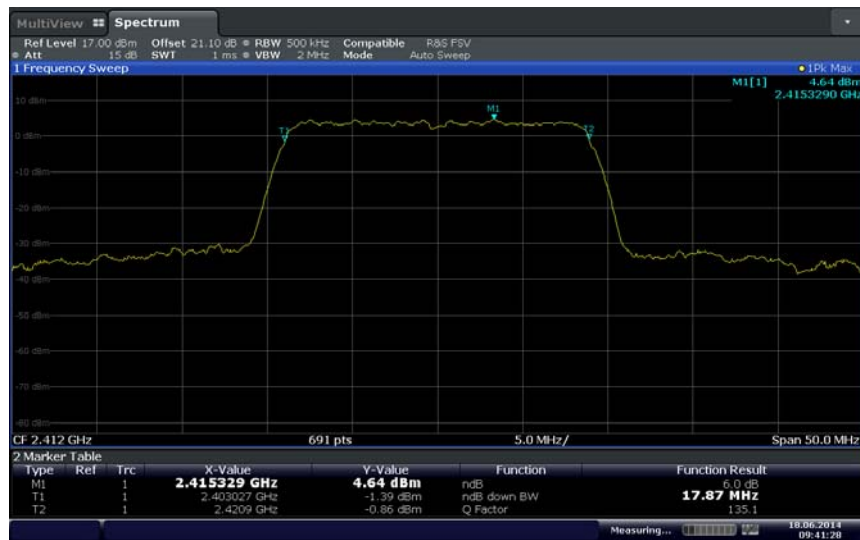
Date: 18 JUN 2014 09:34:07

### 802.11g Mid Channel



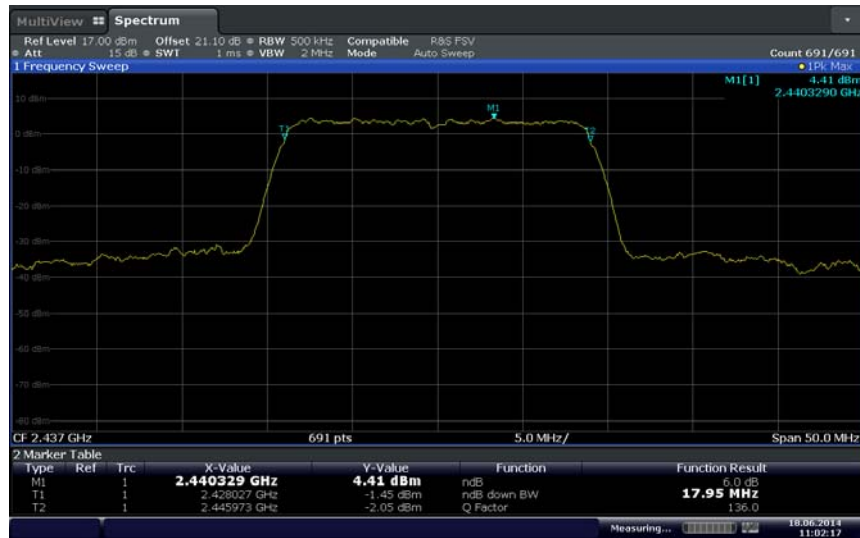
Date: 18 JUN 2014 09:37:16

### 802.11g High Channel



Date: 18 JUN 2014 09:41:28

### 802.11n HT20 Low Channel



Date: 18 JUN 2014 11:02:17

### 802.11n HT20 Mid Channel



Date: 19 JUN 2014 11:50:14

### 802.11n HT20 High Channel



Date: 19 JUN 2014 13:55:43

### 802.11n HT40 Low Channel



Date: 19 JUN 2014 13:56:36

### 802.11n HT40 Mid Channel



Date: 18 JUN 2014 09:51:47

### 802.11n HT40 High Channel



## **2.4 OUT-OF-BAND EMISSIONS - CONDUCTED**

### **2.4.1 Specification Reference**

Part 15 Subpart C §15.247(d)

### **2.4.2 Standard Applicable**

(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)).

### **2.4.3 Equipment Under Test and Modification State**

Serial No: EUT#3-EMC / Test Configuration A

### **2.4.4 Date of Test/Initial of test personnel who performed the test**

June 18, 2014 / KAM

### **2.4.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.4.6 Environmental Conditions/ Test Location**

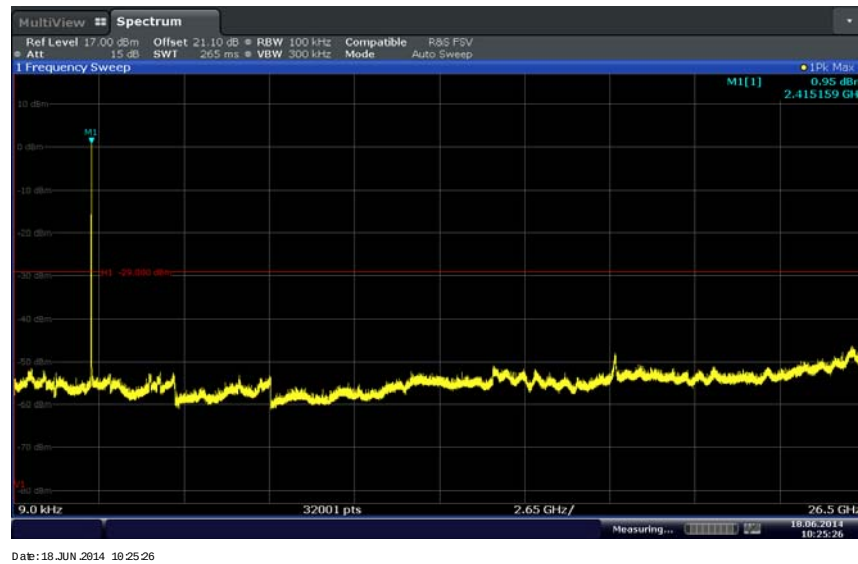
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.1 °C  |
| Relative Humidity   | 44.1. %  |
| ATM Pressure        | 98.9 kPa |

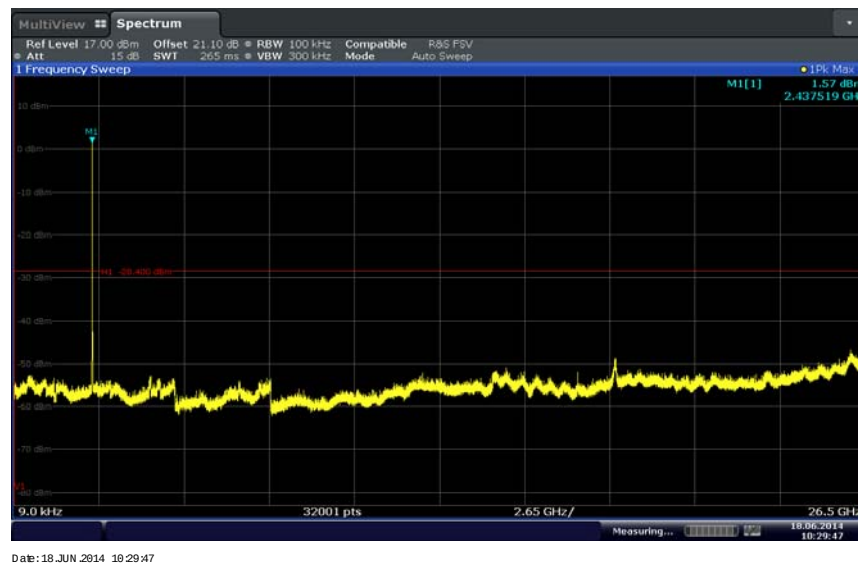
### **2.4.7 Additional Observations**

- This is a conducted test.
- An offset of 21.1dB was added to compensate for the external attenuator and cable used from the antenna port to the power sensor.
- RBW is 100kHz.VBW is 3X RBW.
- Sweep is auto. Detector is peak. Trace is max hold.
- Initial scan was performed to determine the highest level of the desired power within the band. Limit (display line) was drawn 30dB below this level.
- Spectrum was searched from 9 kHz up to 26.5GHz.

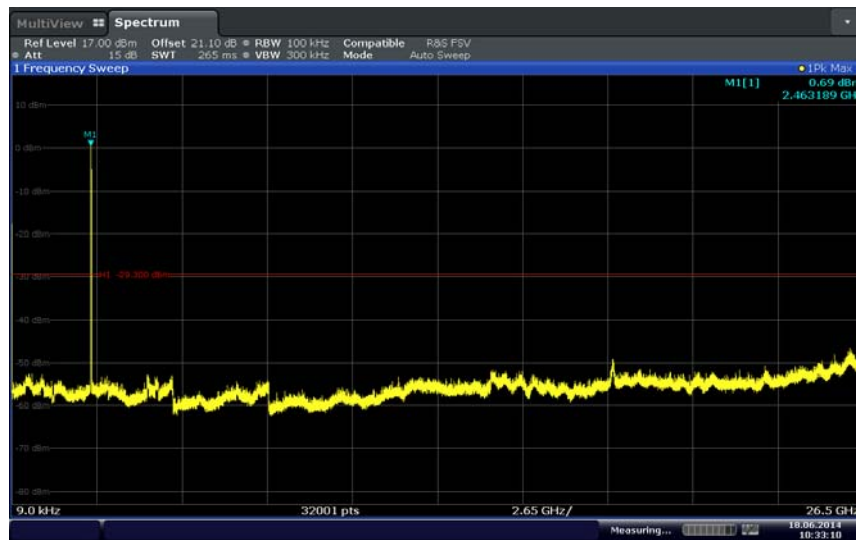
## 2.4.8 Test Results Plots



802.11b Low Channel

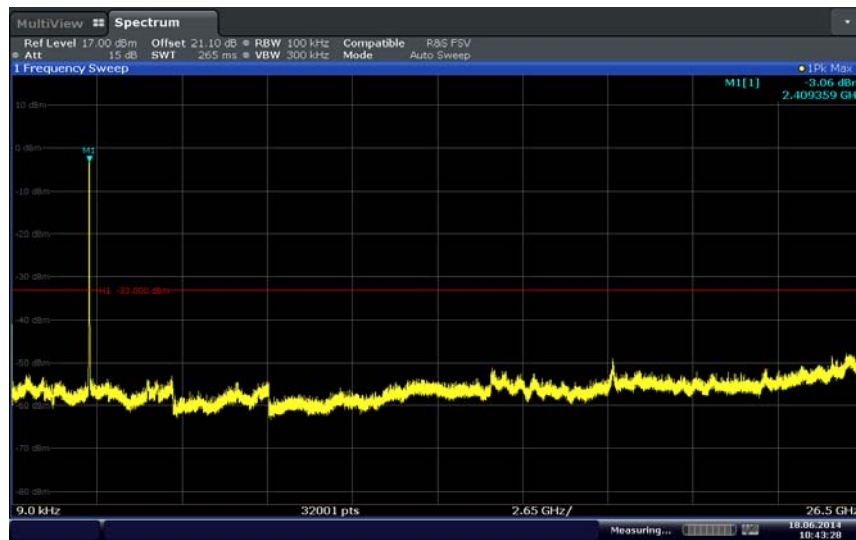


802.11b Mid Channel



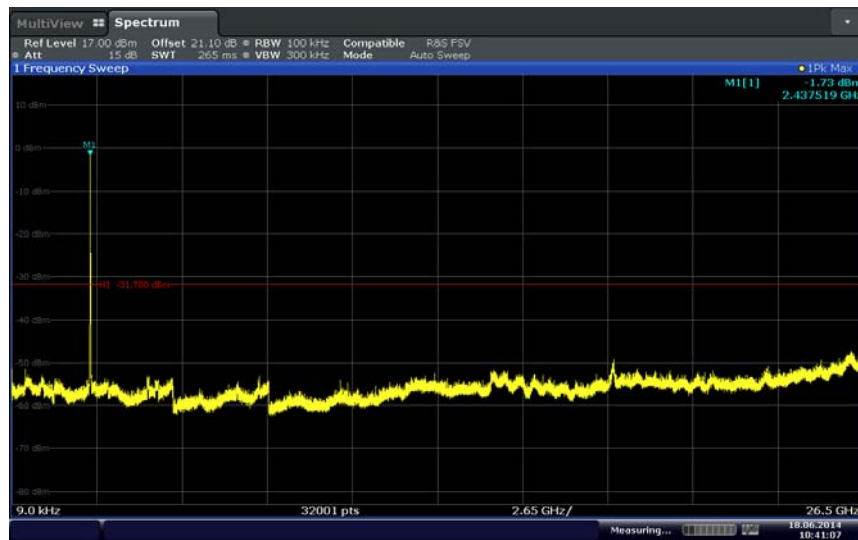
Date: 18 JUN 2014 10:33:09

### 802.11b High Channel

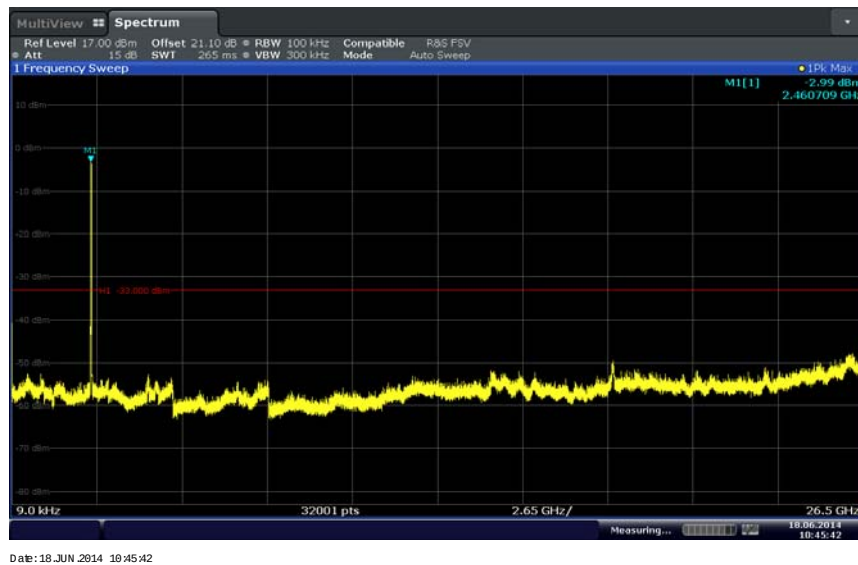


Date: 18 JUN 2014 10:43:28

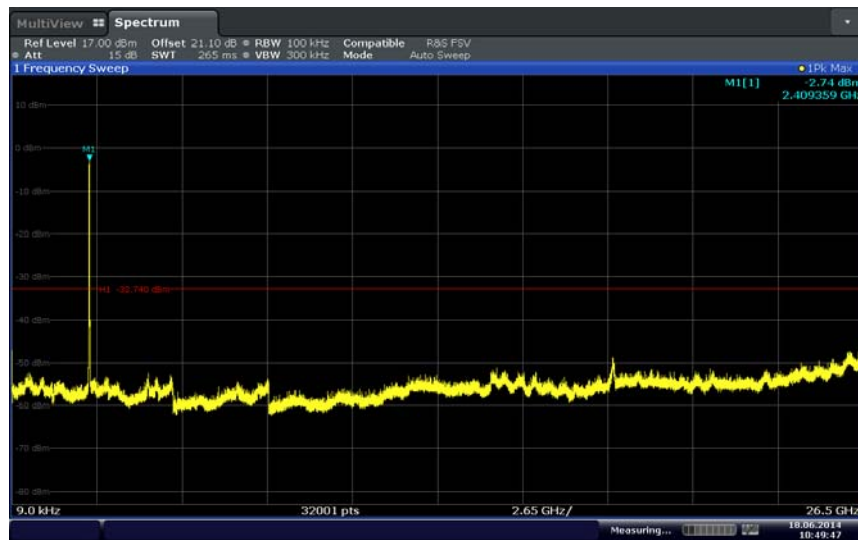
### 802.11g Low Channel



802.11g Mid Channel

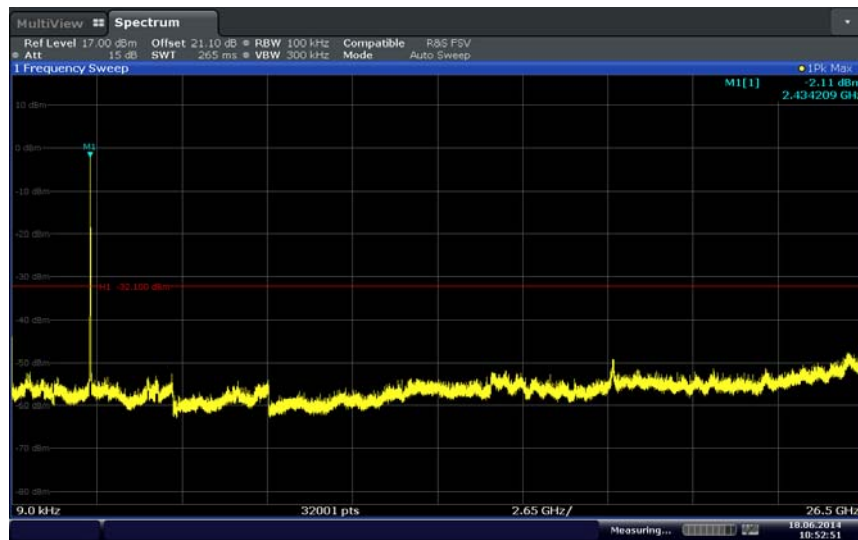


802.11g High Channel



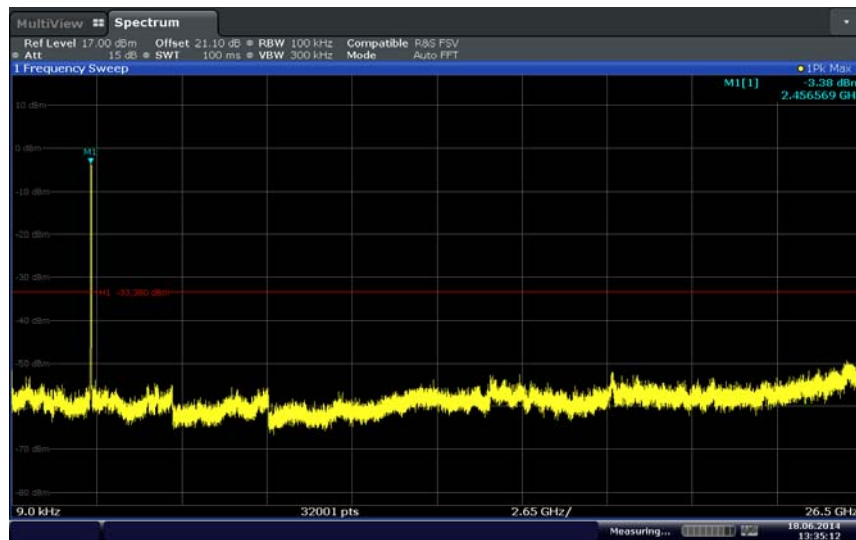
Date: 18 JUN 2014 18:49:48

802.11n HT20 Low Channel



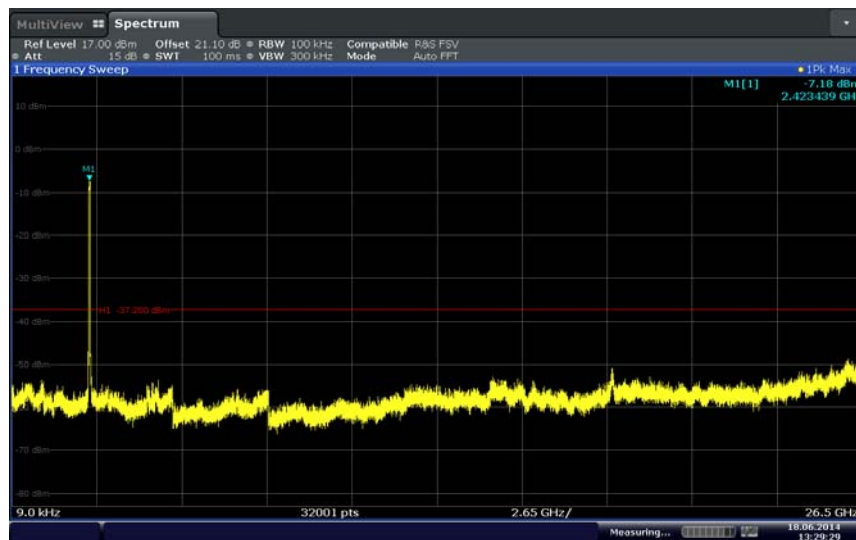
Date: 18 JUN 2014 18:52:51

802.11n HT20 Mid Channel



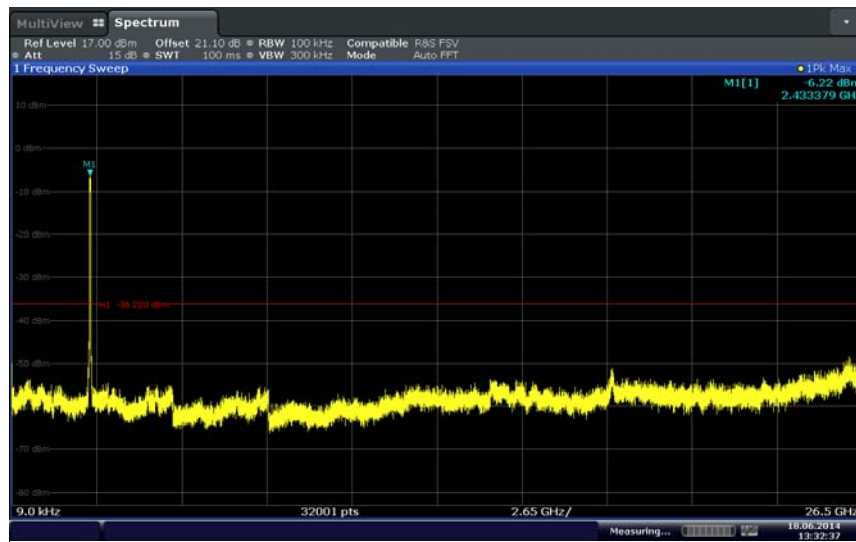
Date: 18 JUN 2014 13:35:13

802.11n HT20 High Channel



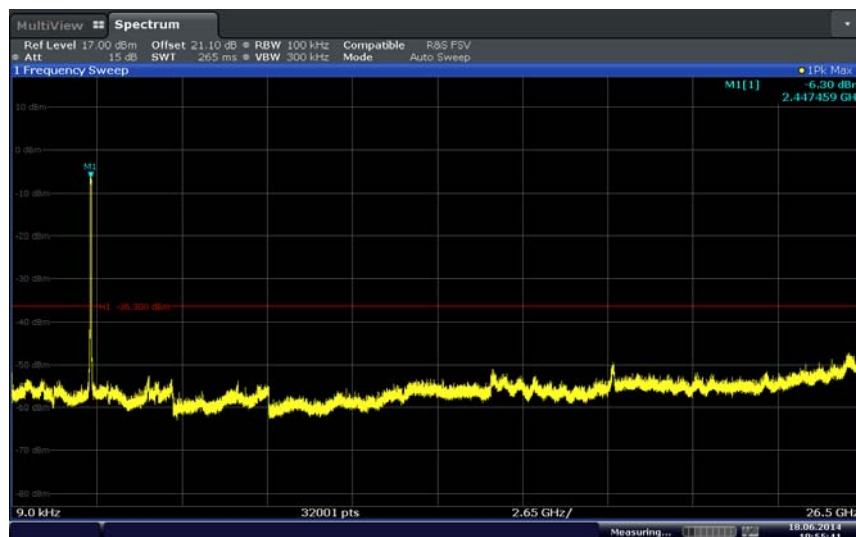
Date: 18 JUN 2014 13:29:28

802.11n HT40 Low Channel



Date: 18 JUN 2014 13:32:38

802.11n HT40 Mid Channel



Date: 18 JUN 2014 18:55:41

802.11n HT40 High Channel



## **2.5 BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS**

### **2.5.1 Specification Reference**

Part 15 Subpart C §15.247(d)

### **2.5.2 Standard Applicable**

See previous test.

### **2.5.3 Equipment Under Test and Modification State**

Serial No: EUT#3-EMC / Test Configuration A

### **2.5.4 Date of Test/Initial of test personnel who performed the test**

June 18, 2014 / KAM

### **2.5.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.5.6 Environmental Conditions/ Test Location**

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

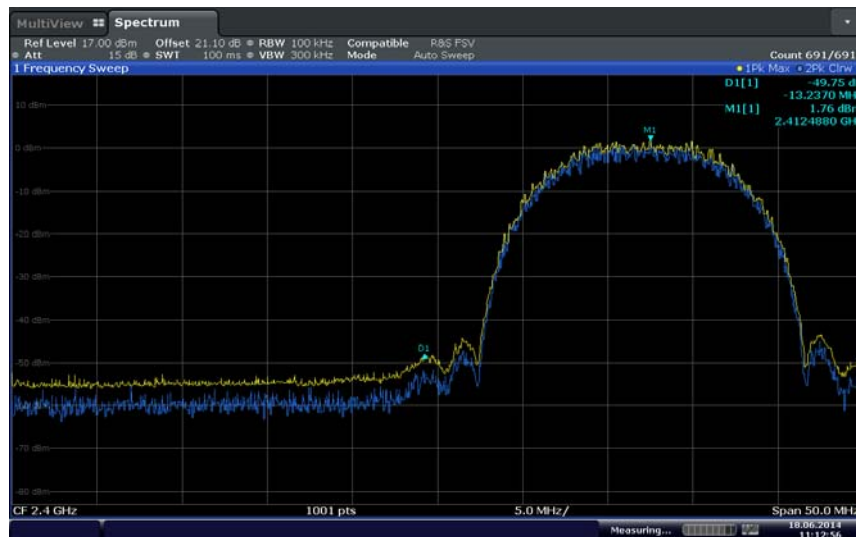
|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.1 °C  |
| Relative Humidity   | 44.1 %   |
| ATM Pressure        | 98.9 kPa |

### **2.5.7 Additional Observations**

- This is a conducted test.
- An offset of 21.1dB was added to compensate for the external attenuator and cable used from the antenna port to the power sensor.
- RBW is 100kHz.VBW is 3X RBW.
- Sweep is auto. Detector is peak. Trace is max hold.
- Trace was centred on the band-edge frequency.
- Span was set to encompass the band-edge frequency and the peak of the emission.
- Using Marker function, peak of the emission was determined and the delta to the band-edge frequency measured.

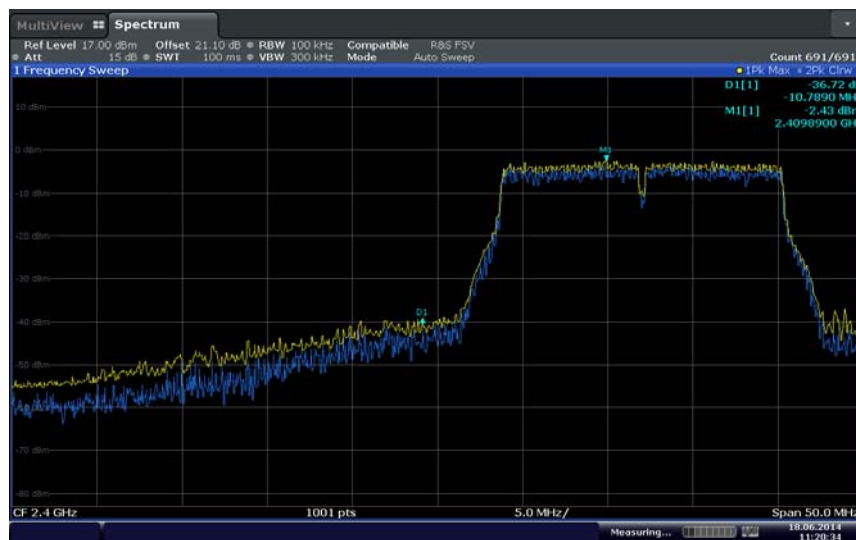
### **2.5.8 Test Results**

Complies. See attached plots.



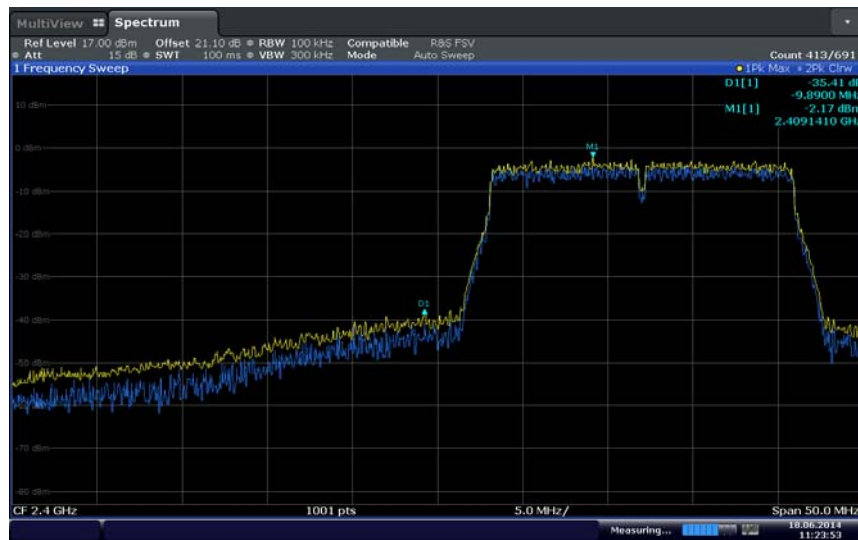
Date: 18 JUN 2014 11:12:57

802.11b Low Channel (2412 MHz)



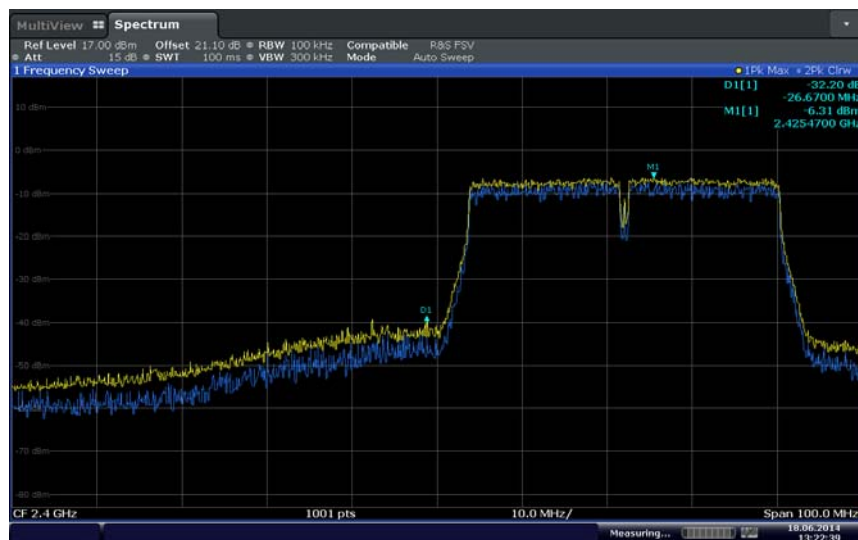
Date: 18 JUN 2014 11:28:34

802.11g Low Channel (2412 MHz)



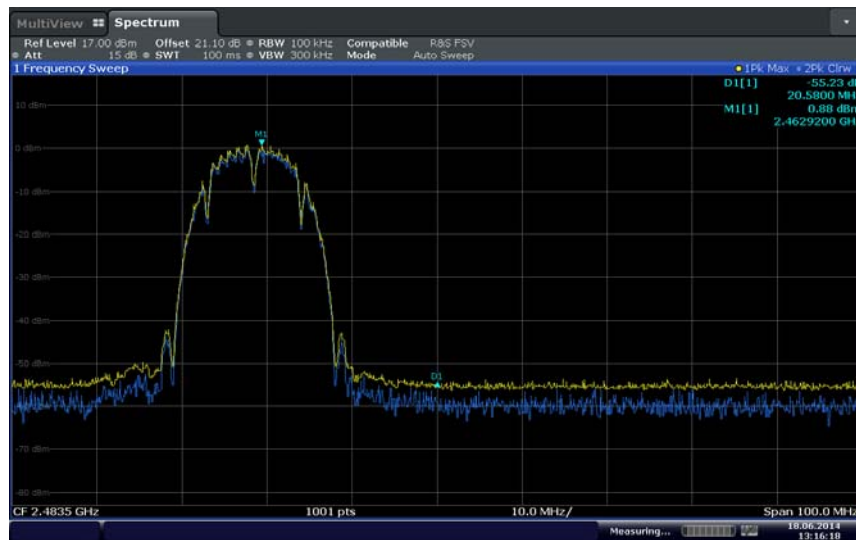
Date: 18 JUN 2014 11:23:53

802.11n HT20 Low Channel (2412 MHz)



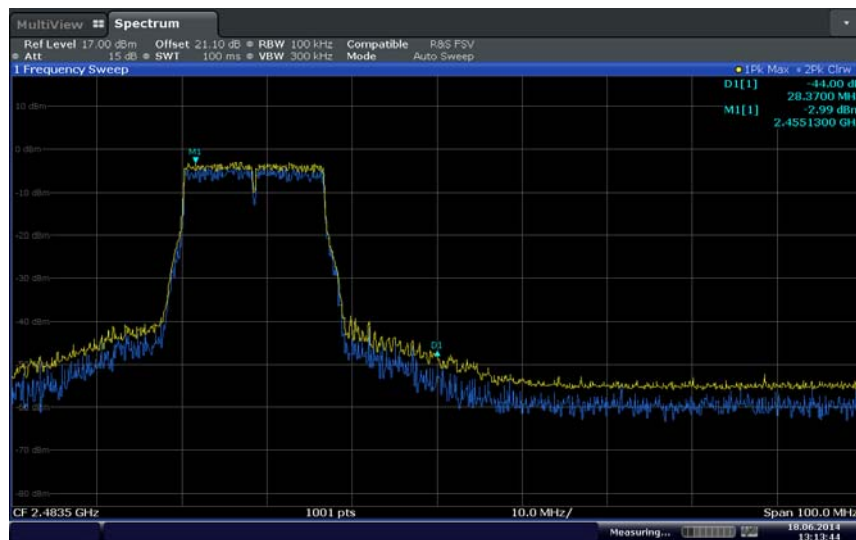
Date: 18 JUN 2014 13:22:39

802.11n HT40 Low Channel (2412 MHz)



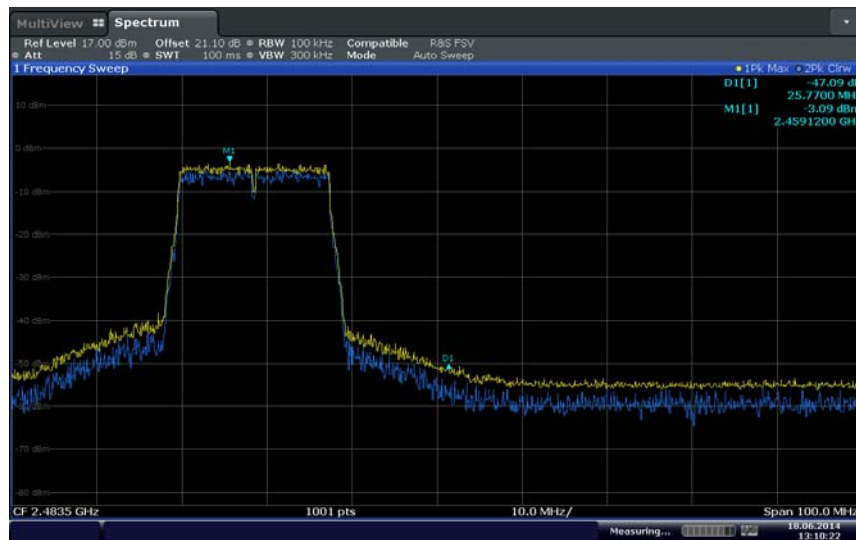
Date: 18 JUN 2014 13:16:18

802.11b High Channel (2462 MHz)



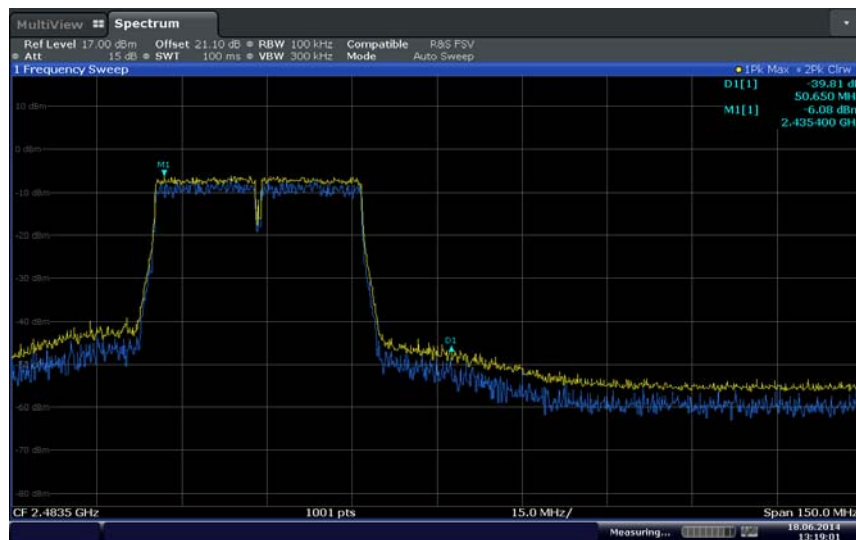
Date: 18 JUN 2014 13:16:44

802.11g High Channel (2462 MHz)



Date: 18 JUN 2014 13:10:22

802.11n HT20 High Channel (2462 MHz)



Date: 18 JUN 2014 13:10:01

802.11n HT40 High Channel (2452 MHz)



## **2.6 SPURIOUS RADIATED EMISSIONS**

### **2.6.1 Specification Reference**

Part 15 Subpart C §15.247(d)

### **2.6.2 Standard Applicable**

(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)).

### **2.6.3 Equipment Under Test and Modification State**

Serial No: EUT#3-EMC / Test Configuration B

### **2.6.4 Date of Test/Initial of test personnel who performed the test**

July 24, 2014 / AC and FC

### **2.6.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.6.6 Environmental Conditions**

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.2°C   |
| Relative Humidity   | 53.5%    |
| ATM Pressure        | 98.6 kPa |

### **2.6.7 Additional Observations**

- This is a radiated test. The spectrum was searched from 30MHz to the 10<sup>th</sup> harmonic.
- There are no emissions found that do not comply to the restricted bands defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).
- Only the considered worst case WLAN configuration (802.11b, Low Channel, 5.5Mbps) presented for radiated emissions below 1GHz. There are no significant differences in emissions between all modes below 1GHz.



- Only noise floor measurements observed above 18GHz.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.7.8 for sample computation.

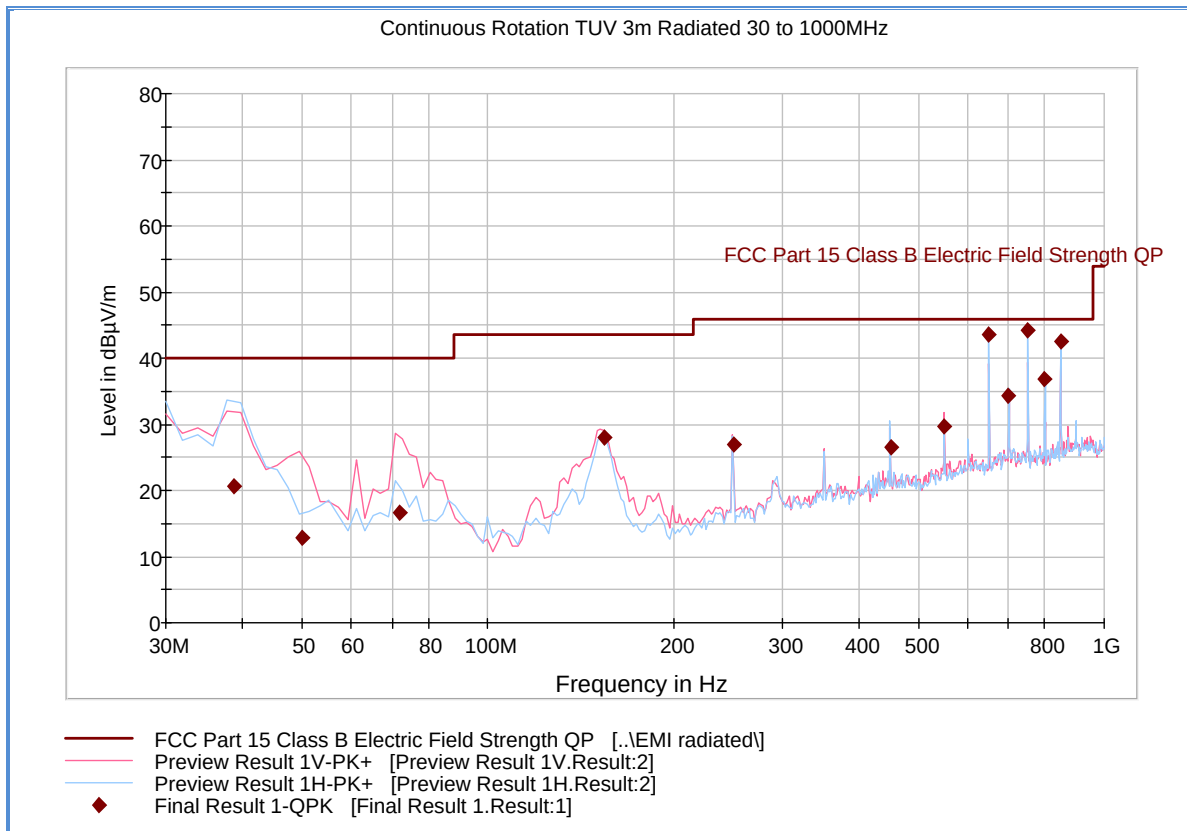
#### 2.6.8 Sample Computation (Radiated Emission)

|                                                       |                            |       |       |
|-------------------------------------------------------|----------------------------|-------|-------|
| Measuring equipment raw measurement (dbμV) @ 30 MHz   |                            |       | 24.4  |
| Correction Factor (dB)                                | Asset# 1066 (cable)        | 0.3   | -12.6 |
|                                                       | Asset# 1172 (cable)        | 0.3   |       |
|                                                       | Asset# 1016 (preamplifier) | -30.7 |       |
|                                                       | Asset# 1175(cable)         | 0.3   |       |
|                                                       | Asset# 1002 (antenna)      | 17.2  |       |
| Reported QuasiPeak Final Measurement (dbμV/m) @ 30MHz |                            |       | 11.8  |

#### 2.6.9 Test Results

See attached plots.

## 2.6.10 Test Results Below 1GHz (WLAN worst Case Configuration)

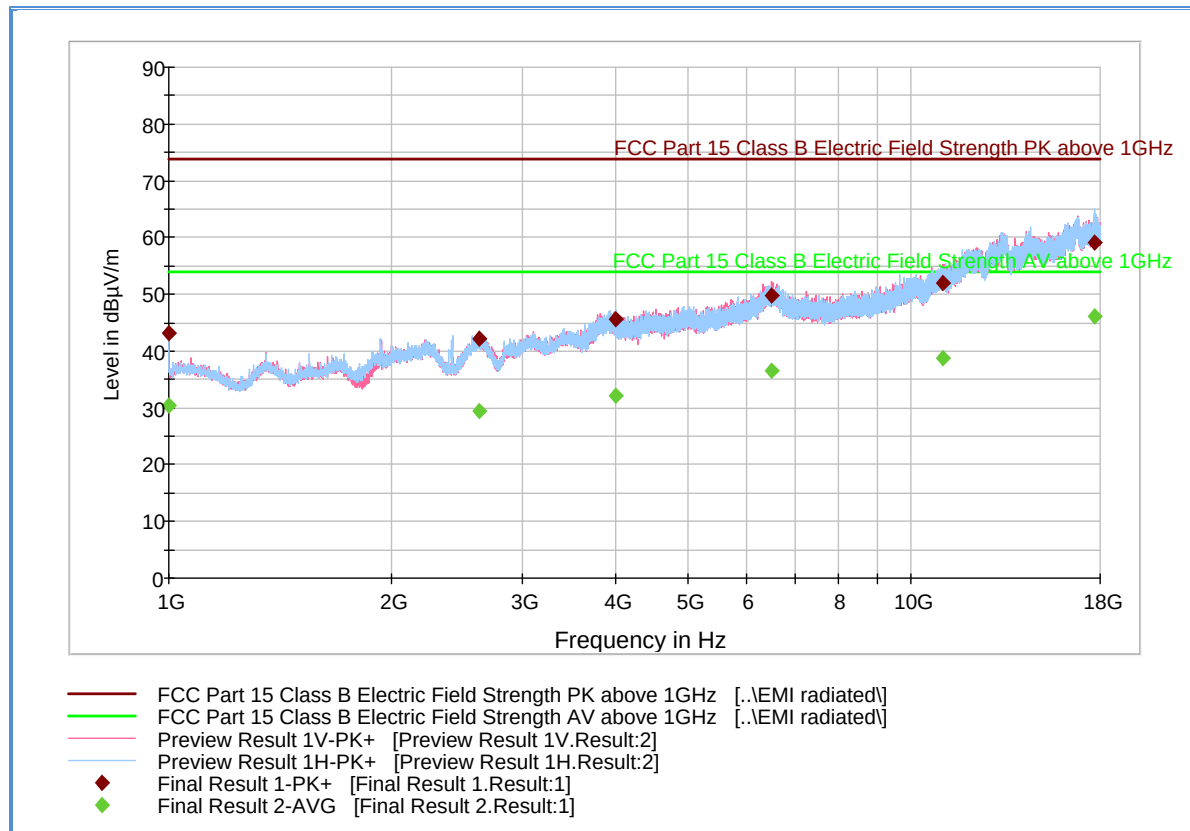


### Quasi Peak Data

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 38.735551       | 20.6               | 1000.0          | 120.000         | 250.0       | H            | 15.0          | -15.1      | 19.4        | 40.0           |
| 50.038878       | 12.9               | 1000.0          | 120.000         | 100.0       | V            | 292.0         | -18.8      | 27.1        | 40.0           |
| 71.781643       | 16.6               | 1000.0          | 120.000         | 200.0       | V            | 102.0         | -21.4      | 23.4        | 40.0           |
| 154.544930      | 28.0               | 1000.0          | 120.000         | 100.0       | V            | 74.0          | -17.4      | 15.5        | 43.5           |
| 250.019319      | 27.0               | 1000.0          | 120.000         | 100.0       | V            | 175.0         | -13.3      | 19.0        | 46.0           |
| 450.039760      | 26.6               | 1000.0          | 120.000         | 164.0       | H            | 224.0         | -7.0       | 19.4        | 46.0           |
| 550.041924      | 29.7               | 1000.0          | 120.000         | 100.0       | V            | 222.0         | -4.3       | 16.3        | 46.0           |
| 650.020200      | 43.6               | 1000.0          | 120.000         | 100.0       | H            | 290.0         | -2.7       | 2.4         | 46.0           |
| 700.041283      | 34.2               | 1000.0          | 120.000         | 203.0       | V            | 30.0          | -0.6       | 11.8        | 46.0           |
| 750.022365      | 44.3               | 1000.0          | 120.000         | 100.0       | H            | 151.0         | -0.8       | 1.7         | 46.0           |
| 800.043447      | 36.8               | 1000.0          | 120.000         | 100.0       | H            | 159.0         | -0.5       | 9.2         | 46.0           |
| 850.040641      | 42.5               | 1000.0          | 120.000         | 105.0       | V            | 164.0         | 0.7        | 3.5         | 46.0           |

**Test Notes:** Only worst case channel presented for spurious emissions below 1GHz.

## 2.6.11 Test Results Above 1GHz (802.11b Low Channel)



### Peak Data

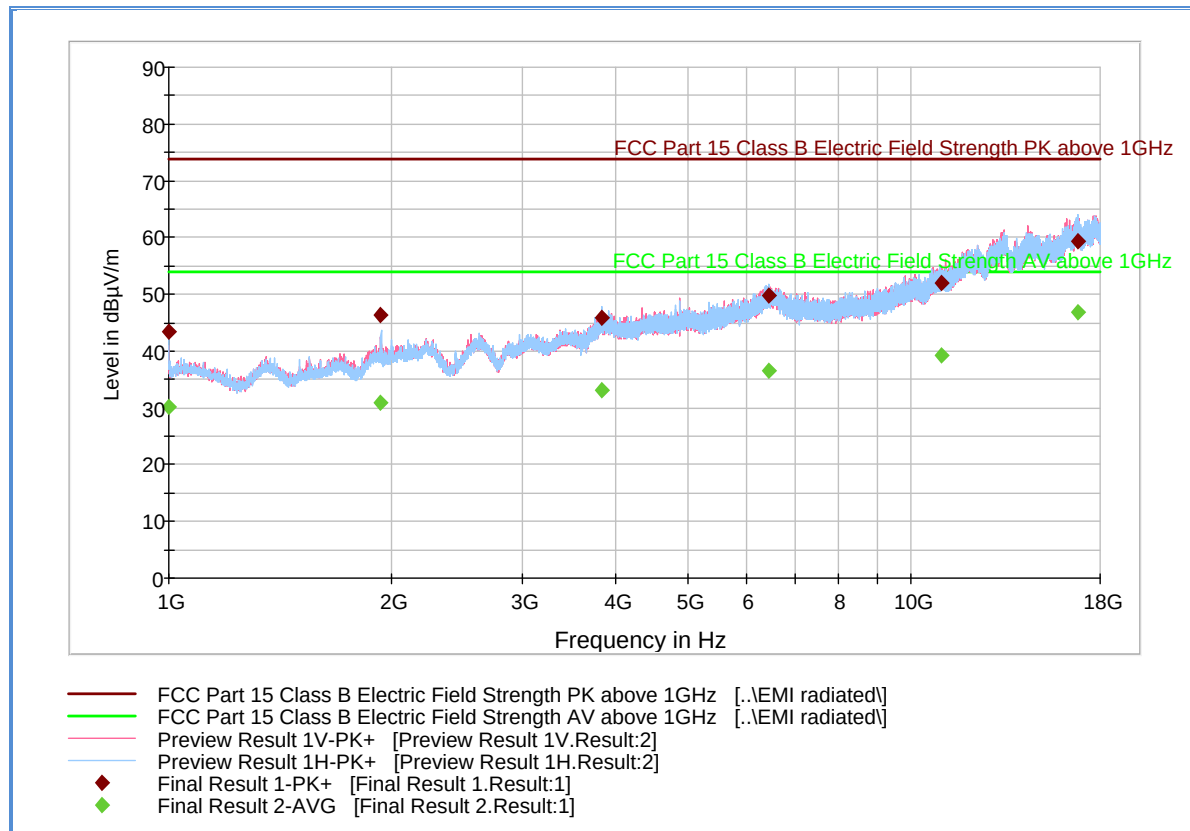
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 43.2             | 1000.0          | 1000.000        | 258.3       | H            | 324.0         | -7.0       | 30.7        | 73.9           |
| 2615.566667     | 42.3             | 1000.0          | 1000.000        | 200.5       | H            | 256.0         | -0.4       | 31.6        | 73.9           |
| 4008.833333     | 45.5             | 1000.0          | 1000.000        | 277.3       | H            | 95.0          | 5.9        | 28.4        | 73.9           |
| 6491.133333     | 49.8             | 1000.0          | 1000.000        | 168.6       | V            | 282.0         | 12.7       | 24.1        | 73.9           |
| 11053.600000    | 52.1             | 1000.0          | 1000.000        | 350.6       | V            | 272.0         | 16.8       | 21.8        | 73.9           |
| 17711.233333    | 59.1             | 1000.0          | 1000.000        | 99.7        | H            | 14.0          | 25.6       | 14.8        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 30.3             | 1000.0          | 1000.000        | 258.3       | H            | 324.0         | -7.0       | 23.6        | 53.9           |
| 2615.566667     | 29.4             | 1000.0          | 1000.000        | 200.5       | H            | 256.0         | -0.4       | 24.5        | 53.9           |
| 4008.833333     | 32.1             | 1000.0          | 1000.000        | 277.3       | H            | 95.0          | 5.9        | 21.8        | 53.9           |
| 6491.133333     | 36.5             | 1000.0          | 1000.000        | 168.6       | V            | 282.0         | 12.7       | 17.4        | 53.9           |
| 11053.600000    | 38.7             | 1000.0          | 1000.000        | 350.6       | V            | 272.0         | 16.8       | 15.2        | 53.9           |
| 17711.233333    | 46.0             | 1000.0          | 1000.000        | 99.7        | H            | 14.0          | 25.6       | 7.9         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.12 Test Results Above 1GHz (802.11b Mid Channel)



### Peak Data

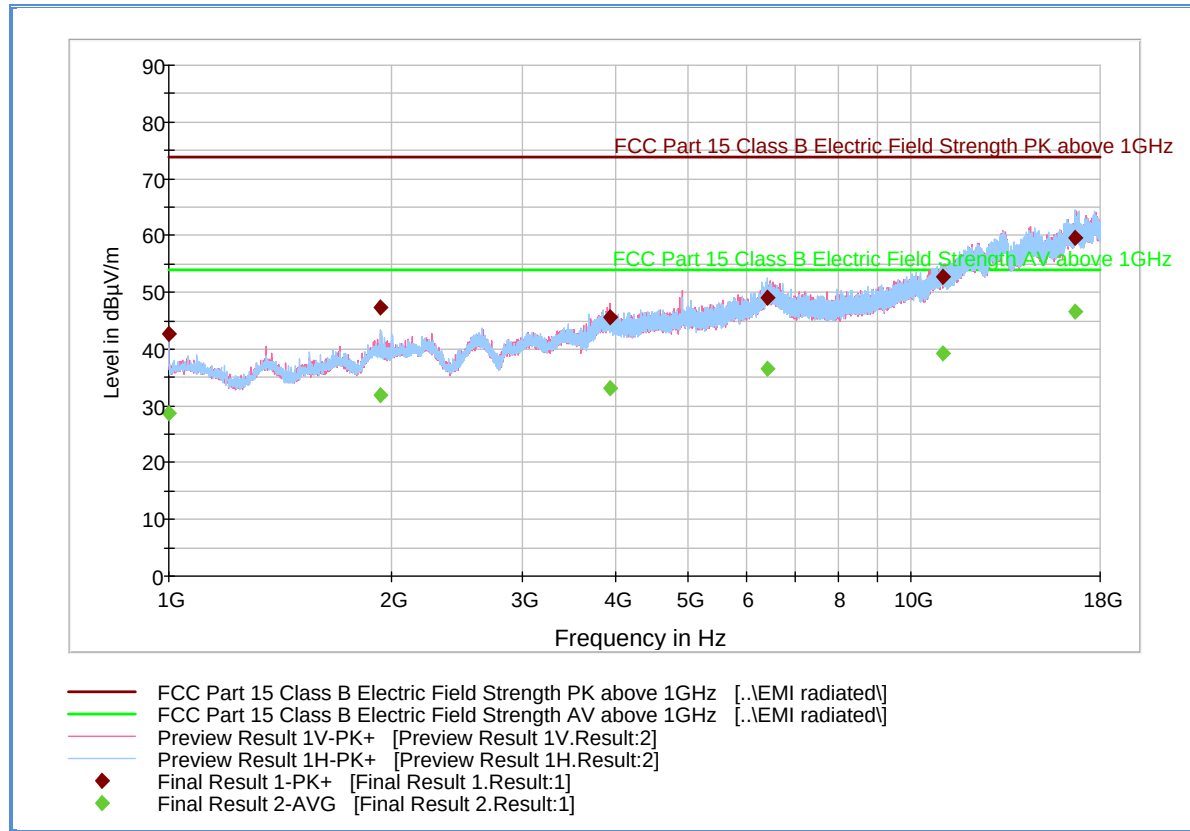
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 43.3             | 1000.0          | 1000.000        | 261.3       | H            | 276.0         | -7.0       | 30.6        | 73.9           |
| 1932.533333     | 46.4             | 1000.0          | 1000.000        | 103.7       | H            | 151.0         | -1.4       | 27.5        | 73.9           |
| 3834.700000     | 45.9             | 1000.0          | 1000.000        | 344.1       | H            | -10.0         | 6.1        | 28.0        | 73.9           |
| 6429.666667     | 49.7             | 1000.0          | 1000.000        | 405.5       | H            | 111.0         | 12.6       | 24.2        | 73.9           |
| 11018.500000    | 52.1             | 1000.0          | 1000.000        | 174.6       | V            | 224.0         | 17.0       | 21.8        | 73.9           |
| 16796.633333    | 59.3             | 1000.0          | 1000.000        | 350.6       | H            | 194.0         | 25.9       | 14.6        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 30.2             | 1000.0          | 1000.000        | 261.3       | H            | 276.0         | -7.0       | 23.7        | 53.9           |
| 1932.533333     | 30.8             | 1000.0          | 1000.000        | 103.7       | H            | 151.0         | -1.4       | 23.1        | 53.9           |
| 3834.700000     | 33.1             | 1000.0          | 1000.000        | 344.1       | H            | -10.0         | 6.1        | 20.8        | 53.9           |
| 6429.666667     | 36.6             | 1000.0          | 1000.000        | 405.5       | H            | 111.0         | 12.6       | 17.3        | 53.9           |
| 11018.500000    | 39.3             | 1000.0          | 1000.000        | 174.6       | V            | 224.0         | 17.0       | 14.6        | 53.9           |
| 16796.633333    | 46.9             | 1000.0          | 1000.000        | 350.6       | H            | 194.0         | 25.9       | 7.0         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.13 Test Results Above 1GHz (802.11b High Channel)



### Peak Data

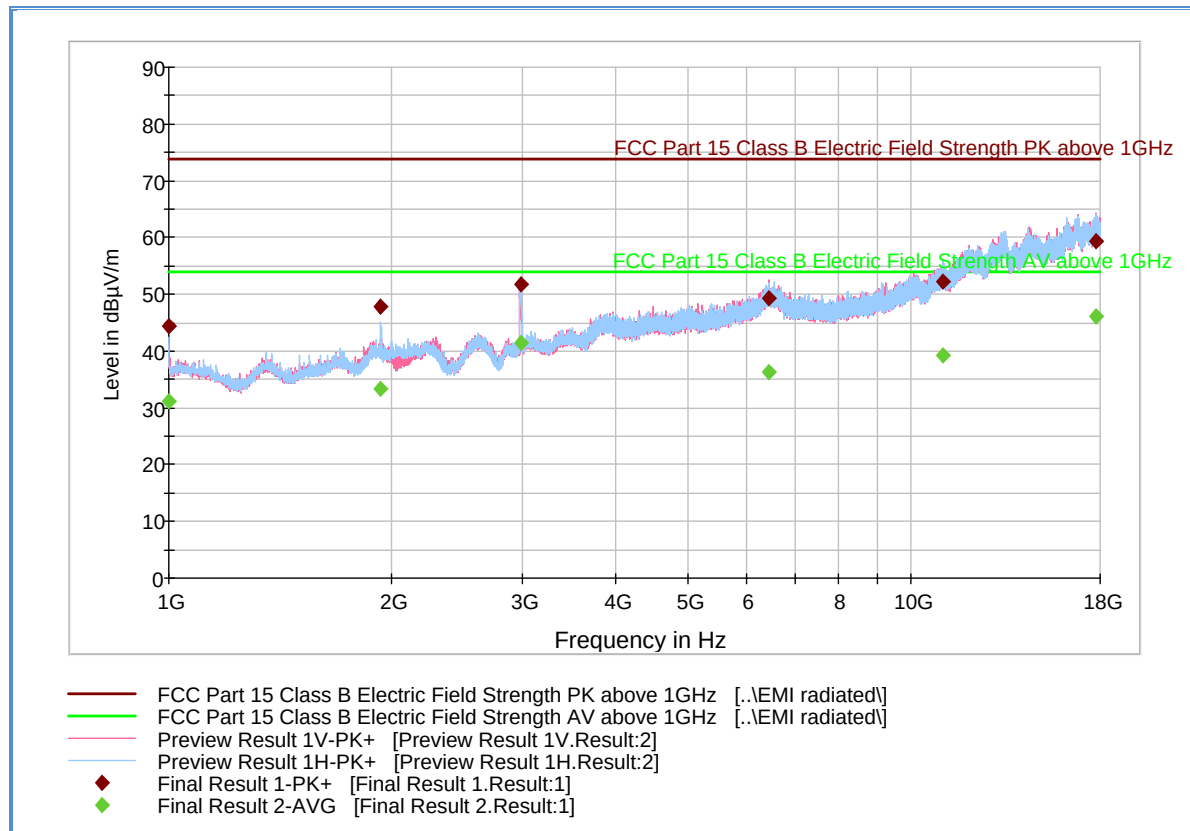
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.500000     | 42.8             | 1000.0          | 1000.000        | 250.3       | H            | -9.0          | -7.0       | 31.1        | 73.9           |
| 1932.366667     | 47.3             | 1000.0          | 1000.000        | 103.7       | H            | 316.0         | -1.4       | 26.6        | 73.9           |
| 3926.700000     | 45.7             | 1000.0          | 1000.000        | 378.1       | V            | 60.0          | 6.0        | 28.2        | 73.9           |
| 6409.833333     | 49.0             | 1000.0          | 1000.000        | 323.2       | H            | 321.0         | 12.7       | 24.9        | 73.9           |
| 11023.233333    | 52.7             | 1000.0          | 1000.000        | 405.4       | H            | 222.0         | 16.9       | 21.2        | 73.9           |
| 16675.500000    | 59.6             | 1000.0          | 1000.000        | 113.7       | H            | 29.0          | 25.5       | 14.3        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.500000     | 28.6             | 1000.0          | 1000.000        | 250.3       | H            | -9.0          | -7.0       | 25.3        | 53.9           |
| 1932.366667     | 31.9             | 1000.0          | 1000.000        | 103.7       | H            | 316.0         | -1.4       | 22.0        | 53.9           |
| 3926.700000     | 33.2             | 1000.0          | 1000.000        | 378.1       | V            | 60.0          | 6.0        | 20.7        | 53.9           |
| 6409.833333     | 36.5             | 1000.0          | 1000.000        | 323.2       | H            | 321.0         | 12.7       | 17.4        | 53.9           |
| 11023.233333    | 39.2             | 1000.0          | 1000.000        | 405.4       | H            | 222.0         | 16.9       | 14.7        | 53.9           |
| 16675.500000    | 46.6             | 1000.0          | 1000.000        | 113.7       | H            | 29.0          | 25.5       | 7.3         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.14 Test Results Above 1GHz (802.11g Low Channel)



### Peak Data

| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 44.3             | 1000.0          | 1000.000        | 250.3       | H            | 20.0          | -7.0       | 29.6        | 73.9           |
| 1932.366667     | 47.9             | 1000.0          | 1000.000        | 103.7       | H            | 242.0         | -1.4       | 26.0        | 73.9           |
| 2983.533333     | 51.8             | 1000.0          | 1000.000        | 183.5       | V            | 3.0           | 1.4        | 22.1        | 73.9           |
| 6441.933333     | 49.4             | 1000.0          | 1000.000        | 334.1       | V            | 190.0         | 12.7       | 24.5        | 73.9           |
| 11030.766667    | 52.2             | 1000.0          | 1000.000        | 405.4       | H            | 303.0         | 16.9       | 21.7        | 73.9           |
| 17793.933333    | 59.3             | 1000.0          | 1000.000        | 346.1       | V            | 344.0         | 25.8       | 14.6        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 31.1             | 1000.0          | 1000.000        | 250.3       | H            | 20.0          | -7.0       | 22.8        | 53.9           |
| 1932.366667     | 33.4             | 1000.0          | 1000.000        | 103.7       | H            | 242.0         | -1.4       | 20.5        | 53.9           |
| 2983.533333     | 41.4             | 1000.0          | 1000.000        | 183.5       | V            | 3.0           | 1.4        | 12.5        | 53.9           |
| 6441.933333     | 36.2             | 1000.0          | 1000.000        | 334.1       | V            | 190.0         | 12.7       | 17.7        | 53.9           |
| 11030.766667    | 39.1             | 1000.0          | 1000.000        | 405.4       | H            | 303.0         | 16.9       | 14.8        | 53.9           |
| 17793.933333    | 46.2             | 1000.0          | 1000.000        | 346.1       | V            | 344.0         | 25.8       | 7.7         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.15 Test Results Above 1GHz (802.11g Mid Channel)



### Peak Data

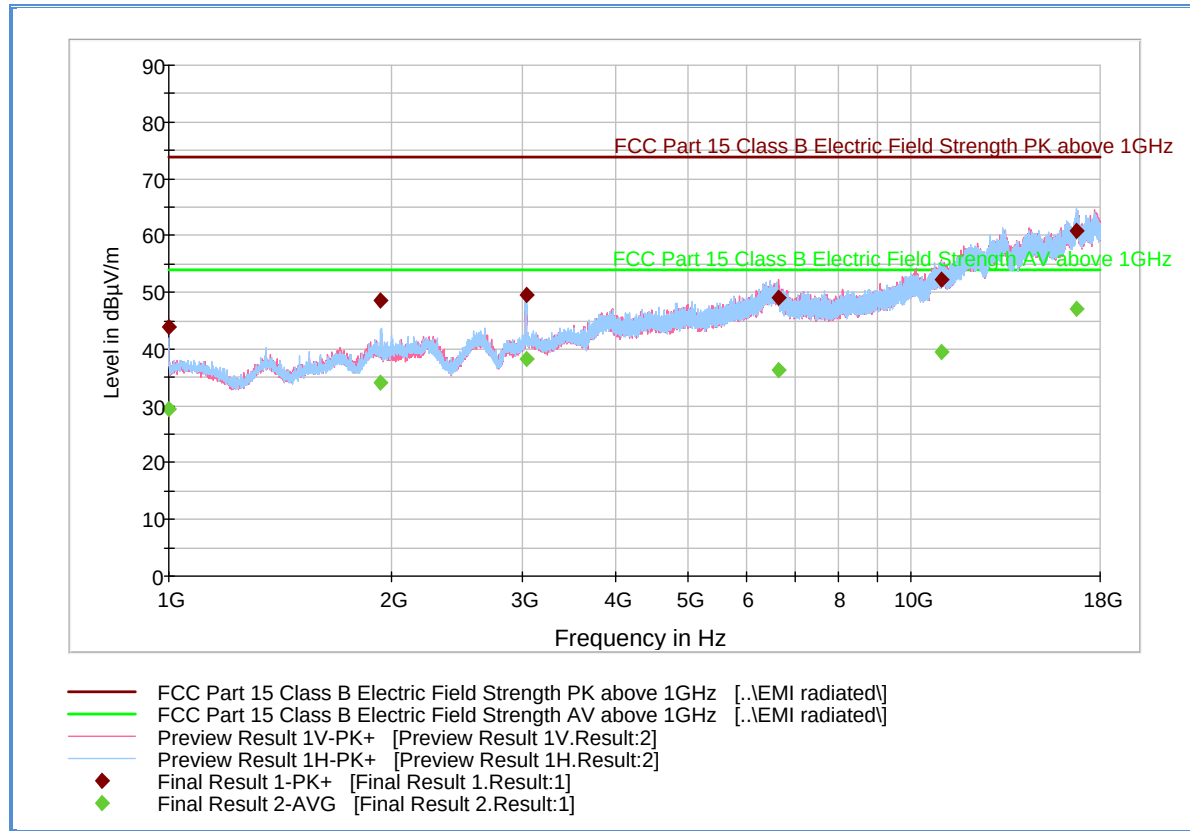
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 44.1             | 1000.0          | 1000.000        | 250.3       | H            | 30.0          | -7.0       | 29.8        | 73.9           |
| 1932.733333     | 41.7             | 1000.0          | 1000.000        | 249.3       | V            | 305.0         | -1.4       | 32.2        | 73.9           |
| 3000.000000     | 54.0             | 1000.0          | 1000.000        | 187.5       | H            | 85.0          | 1.5        | 19.9        | 73.9           |
| 6463.600000     | 48.4             | 1000.0          | 1000.000        | 230.4       | V            | 186.0         | 12.7       | 25.5        | 73.9           |
| 10945.000000    | 52.1             | 1000.0          | 1000.000        | 345.1       | V            | 233.0         | 16.9       | 21.8        | 73.9           |
| 16768.466667    | 59.9             | 1000.0          | 1000.000        | 405.4       | V            | 255.0         | 25.9       | 14.0        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 31.3             | 1000.0          | 1000.000        | 250.3       | H            | 30.0          | -7.0       | 22.6        | 53.9           |
| 1932.733333     | 28.1             | 1000.0          | 1000.000        | 249.3       | V            | 305.0         | -1.4       | 25.8        | 53.9           |
| 3000.000000     | 43.0             | 1000.0          | 1000.000        | 187.5       | H            | 85.0          | 1.5        | 10.9        | 53.9           |
| 6463.600000     | 35.9             | 1000.0          | 1000.000        | 230.4       | V            | 186.0         | 12.7       | 18.0        | 53.9           |
| 10945.000000    | 38.9             | 1000.0          | 1000.000        | 345.1       | V            | 233.0         | 16.9       | 15.0        | 53.9           |
| 16768.466667    | 47.0             | 1000.0          | 1000.000        | 405.4       | V            | 255.0         | 25.9       | 6.9         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.16 Test Results Above 1GHz (802.11g High Channel)



### Peak Data

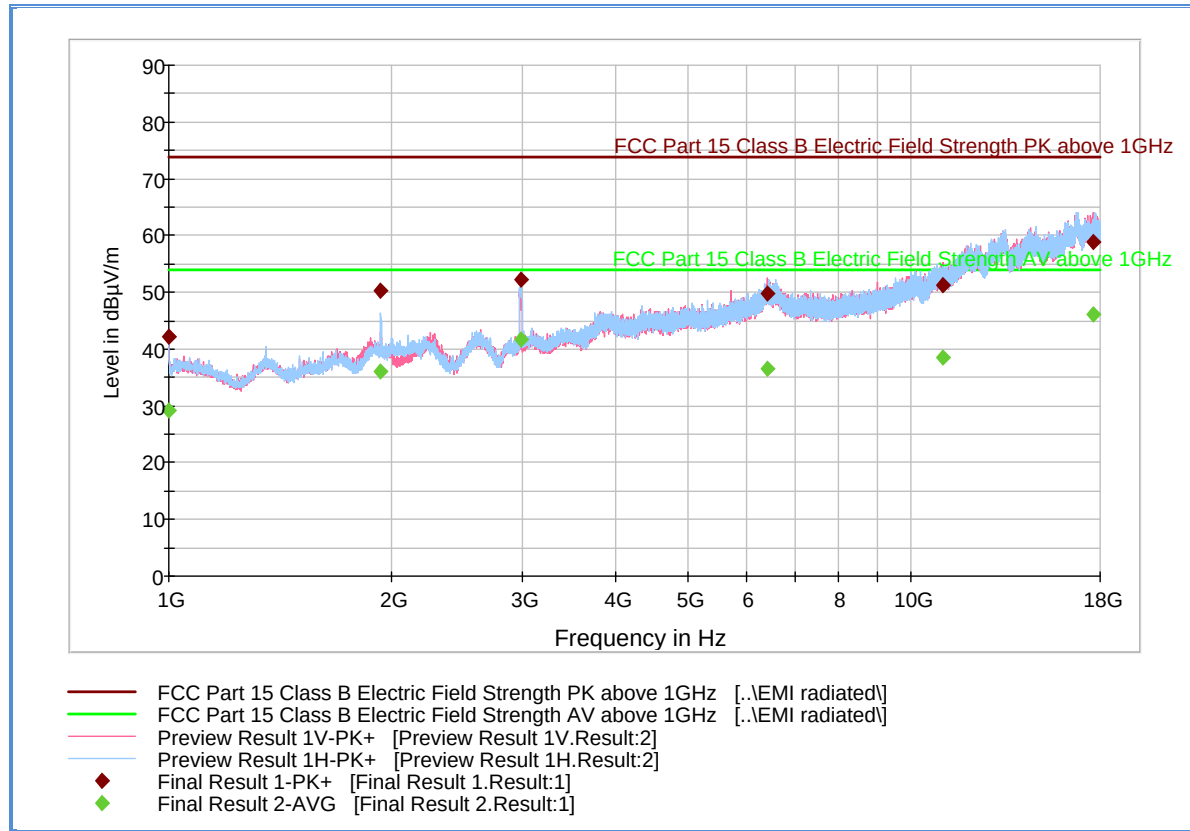
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.400000     | 43.8             | 1000.0          | 1000.000        | 260.3       | H            | 250.0         | -7.0       | 30.1        | 73.9           |
| 1932.533333     | 48.7             | 1000.0          | 1000.000        | 102.7       | H            | 23.0          | -1.4       | 25.2        | 73.9           |
| 3030.566667     | 49.6             | 1000.0          | 1000.000        | 230.4       | H            | 87.0          | 1.6        | 24.3        | 73.9           |
| 6647.266667     | 49.1             | 1000.0          | 1000.000        | 251.3       | V            | 321.0         | 12.5       | 24.8        | 73.9           |
| 10982.800000    | 52.2             | 1000.0          | 1000.000        | 302.2       | V            | 138.0         | 17.0       | 21.7        | 73.9           |
| 16747.066667    | 60.9             | 1000.0          | 1000.000        | 240.4       | H            | 304.0         | 25.9       | 13.0        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.400000     | 29.4             | 1000.0          | 1000.000        | 260.3       | H            | 250.0         | -7.0       | 24.5        | 53.9           |
| 1932.533333     | 34.1             | 1000.0          | 1000.000        | 102.7       | H            | 23.0          | -1.4       | 19.8        | 53.9           |
| 3030.566667     | 38.4             | 1000.0          | 1000.000        | 230.4       | H            | 87.0          | 1.6        | 15.5        | 53.9           |
| 6647.266667     | 36.4             | 1000.0          | 1000.000        | 251.3       | V            | 321.0         | 12.5       | 17.5        | 53.9           |
| 10982.800000    | 39.4             | 1000.0          | 1000.000        | 302.2       | V            | 138.0         | 17.0       | 14.5        | 53.9           |
| 16747.066667    | 47.0             | 1000.0          | 1000.000        | 240.4       | H            | 304.0         | 25.9       | 6.9         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.17 Test Results Above 1GHz (802.11n HT20 Low Channel)



### Peak Data

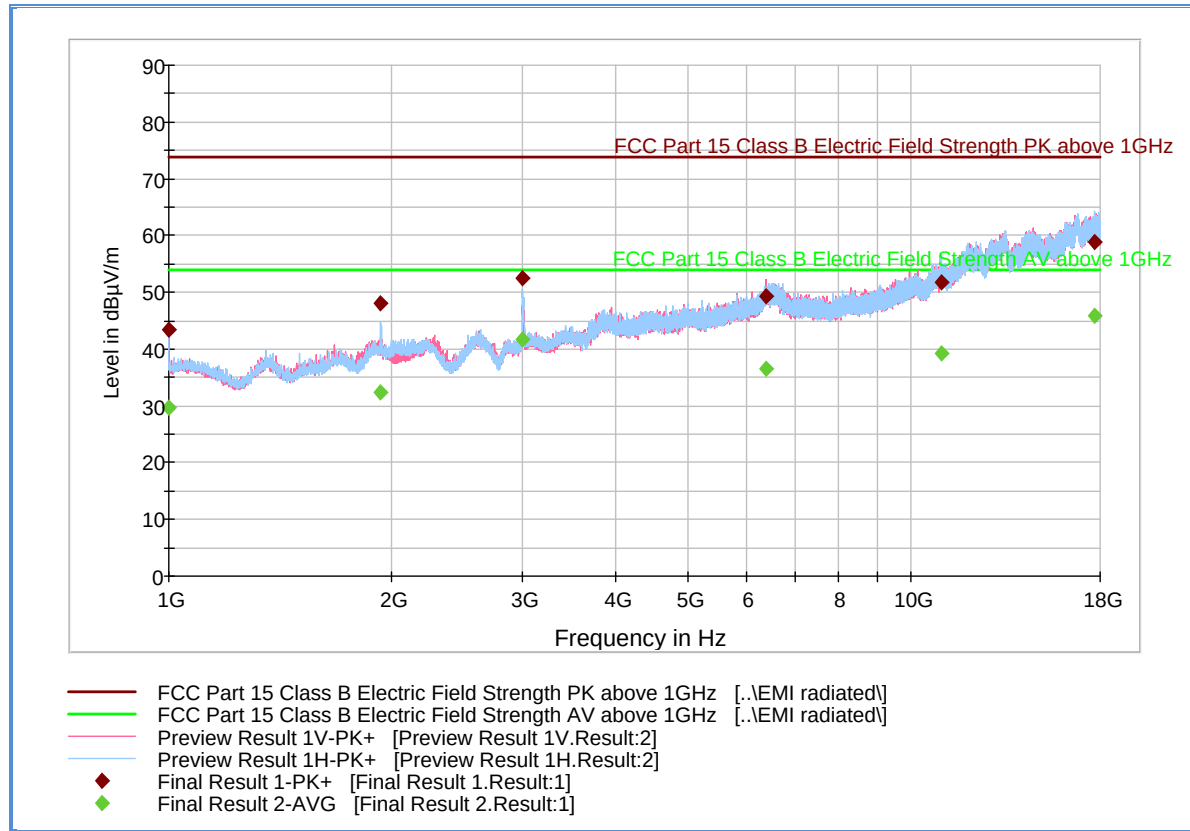
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 42.2             | 1000.0          | 1000.000        | 99.7        | H            | 288.0         | -7.0       | 31.7        | 73.9           |
| 1932.566667     | 50.4             | 1000.0          | 1000.000        | 102.7       | H            | 23.0          | -1.4       | 23.5        | 73.9           |
| 2985.166667     | 52.2             | 1000.0          | 1000.000        | 356.1       | H            | 66.0          | 1.4        | 21.7        | 73.9           |
| 6409.633333     | 49.7             | 1000.0          | 1000.000        | 312.2       | V            | 332.0         | 12.7       | 24.2        | 73.9           |
| 11064.566667    | 51.3             | 1000.0          | 1000.000        | 114.7       | V            | 112.0         | 16.7       | 22.6        | 73.9           |
| 17650.166667    | 58.8             | 1000.0          | 1000.000        | 196.5       | V            | 200.0         | 25.2       | 15.1        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 29.3             | 1000.0          | 1000.000        | 99.7        | H            | 288.0         | -7.0       | 24.6        | 53.9           |
| 1932.566667     | 36.1             | 1000.0          | 1000.000        | 102.7       | H            | 23.0          | -1.4       | 17.8        | 53.9           |
| 2985.166667     | 41.8             | 1000.0          | 1000.000        | 356.1       | H            | 66.0          | 1.4        | 12.1        | 53.9           |
| 6409.633333     | 36.5             | 1000.0          | 1000.000        | 312.2       | V            | 332.0         | 12.7       | 17.4        | 53.9           |
| 11064.566667    | 38.4             | 1000.0          | 1000.000        | 114.7       | V            | 112.0         | 16.7       | 15.5        | 53.9           |
| 17650.166667    | 46.0             | 1000.0          | 1000.000        | 196.5       | V            | 200.0         | 25.2       | 7.9         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.18 Test Results Above 1GHz (802.11n HT20 Mid Channel)



### Peak Data

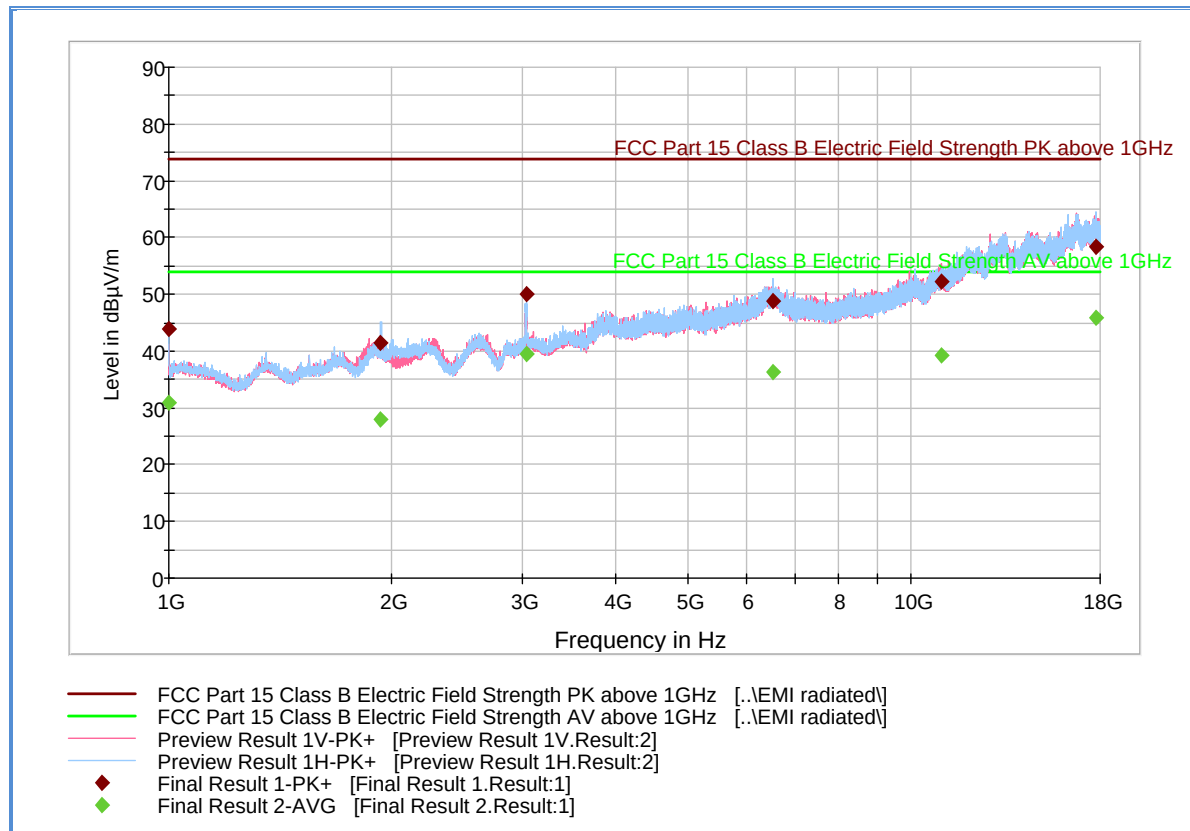
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.400000     | 43.4             | 1000.0          | 1000.000        | 260.3       | H            | 88.0          | -7.0       | 30.5        | 73.9           |
| 1932.366667     | 48.0             | 1000.0          | 1000.000        | 103.7       | H            | 148.0         | -1.4       | 25.9        | 73.9           |
| 3002.233333     | 52.4             | 1000.0          | 1000.000        | 187.5       | H            | 84.0          | 1.5        | 21.5        | 73.9           |
| 6389.400000     | 49.3             | 1000.0          | 1000.000        | 260.3       | V            | 350.0         | 12.7       | 24.6        | 73.9           |
| 11018.866667    | 51.9             | 1000.0          | 1000.000        | 112.7       | H            | 242.0         | 17.0       | 22.0        | 73.9           |
| 17681.200000    | 58.8             | 1000.0          | 1000.000        | 201.5       | H            | 254.0         | 25.4       | 15.1        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.400000     | 29.6             | 1000.0          | 1000.000        | 260.3       | H            | 88.0          | -7.0       | 24.3        | 53.9           |
| 1932.366667     | 32.3             | 1000.0          | 1000.000        | 103.7       | H            | 148.0         | -1.4       | 21.6        | 53.9           |
| 3002.233333     | 41.8             | 1000.0          | 1000.000        | 187.5       | H            | 84.0          | 1.5        | 12.1        | 53.9           |
| 6389.400000     | 36.5             | 1000.0          | 1000.000        | 260.3       | V            | 350.0         | 12.7       | 17.4        | 53.9           |
| 11018.866667    | 39.3             | 1000.0          | 1000.000        | 112.7       | H            | 242.0         | 17.0       | 14.6        | 53.9           |
| 17681.200000    | 45.9             | 1000.0          | 1000.000        | 201.5       | H            | 254.0         | 25.4       | 8.0         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.19 Test Results Above 1GHz (802.11n HT20 High Channel)



### Peak Data

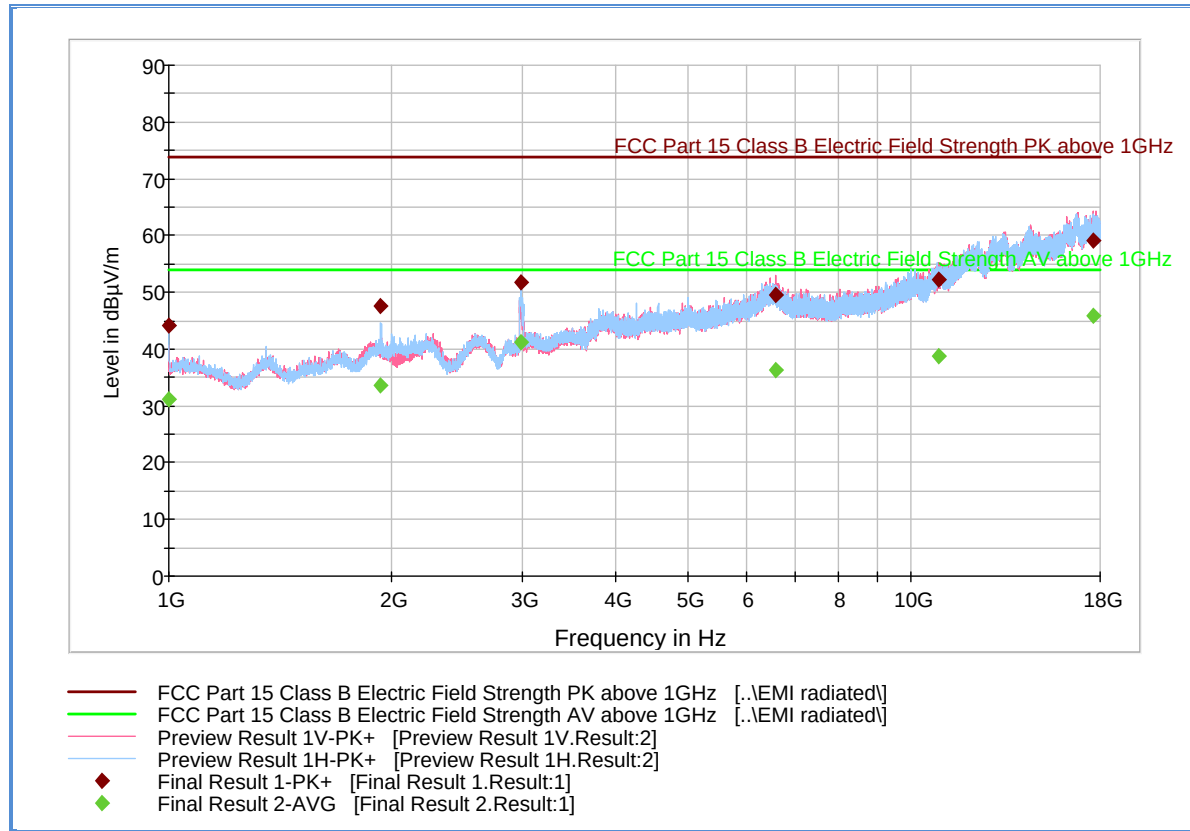
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 43.9             | 1000.0          | 1000.000        | 260.3       | H            | 311.0         | -7.0       | 30.0        | 73.9           |
| 1932.366667     | 41.4             | 1000.0          | 1000.000        | 122.7       | H            | 93.0          | -1.4       | 32.5        | 73.9           |
| 3035.100000     | 50.0             | 1000.0          | 1000.000        | 99.7        | H            | 42.0          | 1.6        | 23.9        | 73.9           |
| 6524.633333     | 48.8             | 1000.0          | 1000.000        | 153.7       | H            | 308.0         | 12.8       | 25.1        | 73.9           |
| 10985.633333    | 52.2             | 1000.0          | 1000.000        | 367.1       | V            | 27.0          | 17.0       | 21.8        | 73.9           |
| 17786.600000    | 58.5             | 1000.0          | 1000.000        | 250.3       | H            | 22.0          | 25.8       | 15.4        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 31.0             | 1000.0          | 1000.000        | 260.3       | H            | 311.0         | -7.0       | 22.9        | 53.9           |
| 1932.366667     | 28.0             | 1000.0          | 1000.000        | 122.7       | H            | 93.0          | -1.4       | 25.9        | 53.9           |
| 3035.100000     | 39.4             | 1000.0          | 1000.000        | 99.7        | H            | 42.0          | 1.6        | 14.5        | 53.9           |
| 6524.633333     | 36.3             | 1000.0          | 1000.000        | 153.7       | H            | 308.0         | 12.8       | 17.6        | 53.9           |
| 10985.633333    | 39.3             | 1000.0          | 1000.000        | 367.1       | V            | 27.0          | 17.0       | 14.6        | 53.9           |
| 17786.600000    | 45.8             | 1000.0          | 1000.000        | 250.3       | H            | 22.0          | 25.8       | 8.1         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.20 Test Results Above 1GHz (802.11n HT40 Low Channel)



### Peak Data

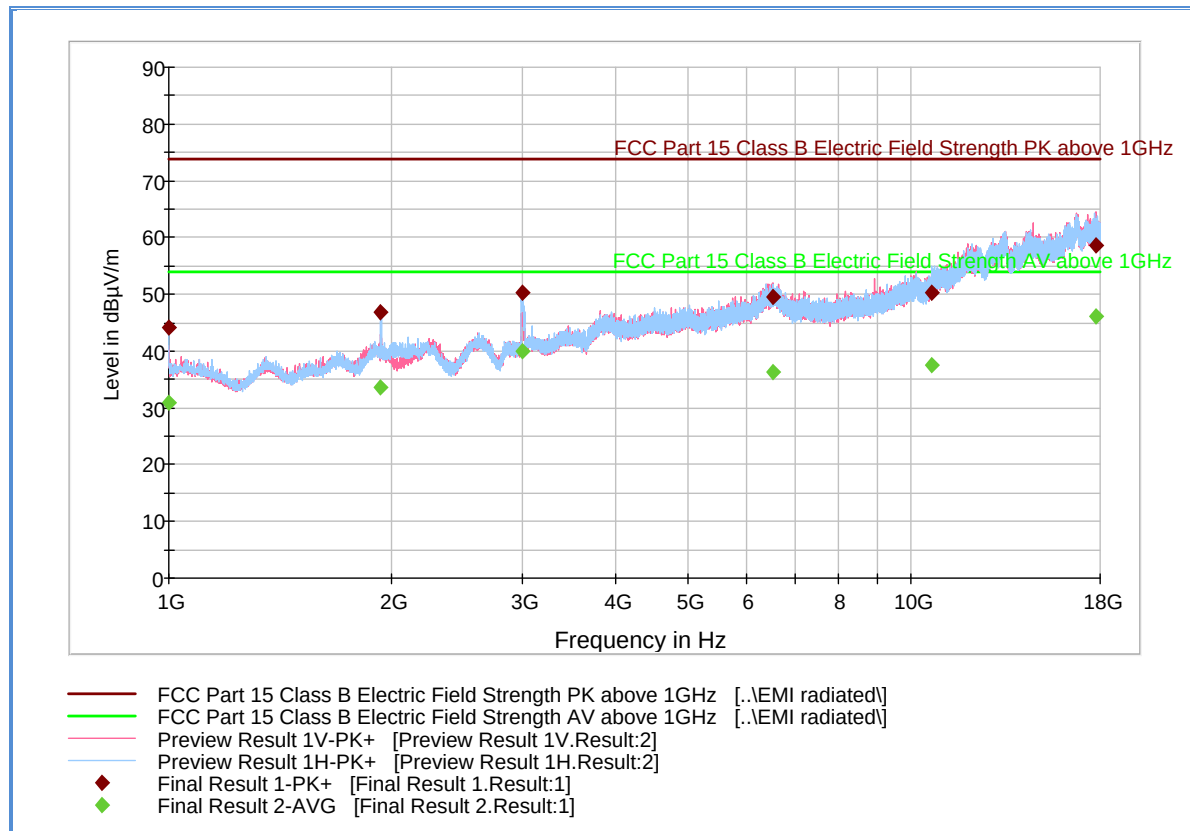
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 44.1             | 1000.0          | 1000.000        | 250.3       | H            | 91.0          | -7.0       | 29.8        | 73.9           |
| 1932.366667     | 47.5             | 1000.0          | 1000.000        | 120.7       | H            | 316.0         | -1.4       | 26.4        | 73.9           |
| 2984.100000     | 51.7             | 1000.0          | 1000.000        | 99.7        | H            | 81.0          | 1.4        | 22.2        | 73.9           |
| 6579.633333     | 49.6             | 1000.0          | 1000.000        | 240.3       | V            | 10.0          | 12.8       | 24.4        | 73.9           |
| 10899.066667    | 52.3             | 1000.0          | 1000.000        | 99.7        | V            | 266.0         | 16.8       | 21.6        | 73.9           |
| 17633.900000    | 59.0             | 1000.0          | 1000.000        | 251.3       | V            | 104.0         | 25.1       | 14.9        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 31.2             | 1000.0          | 1000.000        | 250.3       | H            | 91.0          | -7.0       | 22.7        | 53.9           |
| 1932.366667     | 33.7             | 1000.0          | 1000.000        | 120.7       | H            | 316.0         | -1.4       | 20.2        | 53.9           |
| 2984.100000     | 41.1             | 1000.0          | 1000.000        | 99.7        | H            | 81.0          | 1.4        | 12.8        | 53.9           |
| 6579.633333     | 36.3             | 1000.0          | 1000.000        | 240.3       | V            | 10.0          | 12.8       | 17.6        | 53.9           |
| 10899.066667    | 38.8             | 1000.0          | 1000.000        | 99.7        | V            | 266.0         | 16.8       | 15.1        | 53.9           |
| 17633.900000    | 45.9             | 1000.0          | 1000.000        | 251.3       | V            | 104.0         | 25.1       | 8.0         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.21 Test Results Above 1GHz (802.11n HT40 Mid Channel)



### Peak Data

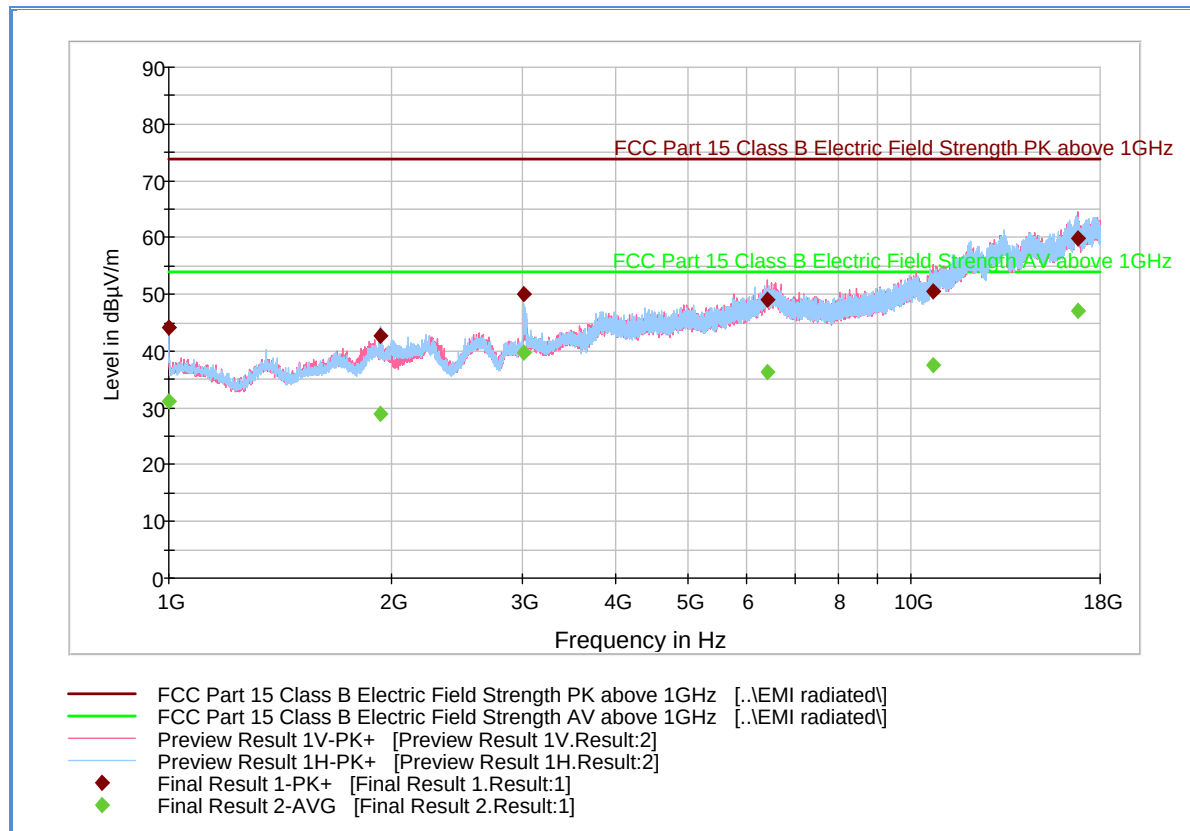
| Frequency (MHz) | MaxPeak (dB $\mu$ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1000.000000     | 44.0                   | 1000.0          | 1000.000        | 261.3       | H            | 283.0         | -7.0       | 29.9        | 73.9                 |
| 1932.533333     | 46.9                   | 1000.0          | 1000.000        | 103.7       | H            | 238.0         | -1.4       | 27.0        | 73.9                 |
| 2991.633333     | 50.3                   | 1000.0          | 1000.000        | 229.4       | H            | 93.0          | 1.4        | 23.6        | 73.9                 |
| 6514.233333     | 49.6                   | 1000.0          | 1000.000        | 356.1       | V            | 65.0          | 12.8       | 24.3        | 73.9                 |
| 10691.833333    | 50.2                   | 1000.0          | 1000.000        | 405.5       | H            | 221.0         | 15.9       | 23.7        | 73.9                 |
| 17796.200000    | 58.7                   | 1000.0          | 1000.000        | 251.3       | V            | 100.0         | 25.8       | 15.2        | 73.9                 |

### Average Data

| Frequency (MHz) | Average (dB $\mu$ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1000.000000     | 30.8                   | 1000.0          | 1000.000        | 261.3       | H            | 283.0         | -7.0       | 23.1        | 53.9                 |
| 1932.533333     | 33.5                   | 1000.0          | 1000.000        | 103.7       | H            | 238.0         | -1.4       | 20.4        | 53.9                 |
| 2991.633333     | 40.0                   | 1000.0          | 1000.000        | 229.4       | H            | 93.0          | 1.4        | 13.9        | 53.9                 |
| 6514.233333     | 36.4                   | 1000.0          | 1000.000        | 356.1       | V            | 65.0          | 12.8       | 17.5        | 53.9                 |
| 10691.833333    | 37.6                   | 1000.0          | 1000.000        | 405.5       | H            | 221.0         | 15.9       | 16.3        | 53.9                 |
| 17796.200000    | 46.0                   | 1000.0          | 1000.000        | 251.3       | V            | 100.0         | 25.8       | 7.9         | 53.9                 |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.

## 2.6.22 Test Results Above 1GHz (802.11n HT40 High Channel)



### Peak Data

| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 44.0             | 1000.0          | 1000.000        | 250.3       | H            | 344.0         | -7.0       | 29.9        | 73.9           |
| 1932.566667     | 42.8             | 1000.0          | 1000.000        | 113.7       | H            | 108.0         | -1.4       | 31.1        | 73.9           |
| 3006.366667     | 50.0             | 1000.0          | 1000.000        | 99.7        | H            | 41.0          | 1.5        | 23.9        | 73.9           |
| 6403.166667     | 48.9             | 1000.0          | 1000.000        | 151.6       | V            | 285.0         | 12.7       | 25.0        | 73.9           |
| 10705.133333    | 50.5             | 1000.0          | 1000.000        | 99.7        | V            | 304.0         | 16.0       | 23.4        | 73.9           |
| 16768.600000    | 59.8             | 1000.0          | 1000.000        | 202.3       | V            | 138.0         | 25.9       | 14.1        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 31.1             | 1000.0          | 1000.000        | 250.3       | H            | 344.0         | -7.0       | 22.8        | 53.9           |
| 1932.566667     | 28.9             | 1000.0          | 1000.000        | 113.7       | H            | 108.0         | -1.4       | 25.0        | 53.9           |
| 3006.366667     | 39.7             | 1000.0          | 1000.000        | 99.7        | H            | 41.0          | 1.5        | 14.2        | 53.9           |
| 6403.166667     | 36.4             | 1000.0          | 1000.000        | 151.6       | V            | 285.0         | 12.7       | 17.5        | 53.9           |
| 10705.133333    | 37.6             | 1000.0          | 1000.000        | 99.7        | V            | 304.0         | 16.0       | 16.3        | 53.9           |
| 16768.600000    | 47.1             | 1000.0          | 1000.000        | 202.3       | V            | 138.0         | 25.9       | 6.8         | 53.9           |

**Test Notes:** No Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 6GHz. Measurements above 6GHz are noise floor figures.



## **2.7 RADIATED BAND EDGE MEASUREMENTS AND IMMEDIATE RESTRICTED BANDS**

### **2.7.1 Specification Reference**

Part 15 Subpart C §15.247(d)

### **2.7.2 Standard Applicable**

(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)).

### **2.7.3 Equipment Under Test and Modification State**

Serial No: EUT#3-EMC / Test Configuration B

### **2.7.4 Date of Test/Initial of test personnel who performed the test**

July 24, 2014 / AC and FC

### **2.7.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.7.6 Environmental Conditions/ Test Location**

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.2 °C  |
| Relative Humidity   | 53.5. %  |
| ATM Pressure        | 98.6 kPa |

### **2.7.7 Additional Observations**

- This is a radiated test. The spectrum was searched from 2310MHz to 2390MHz for lower immediate restricted band and 2483.5MHz to 2500MHz for the upper immediate restricted band.
- There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205.



- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.8.8 for sample computation.

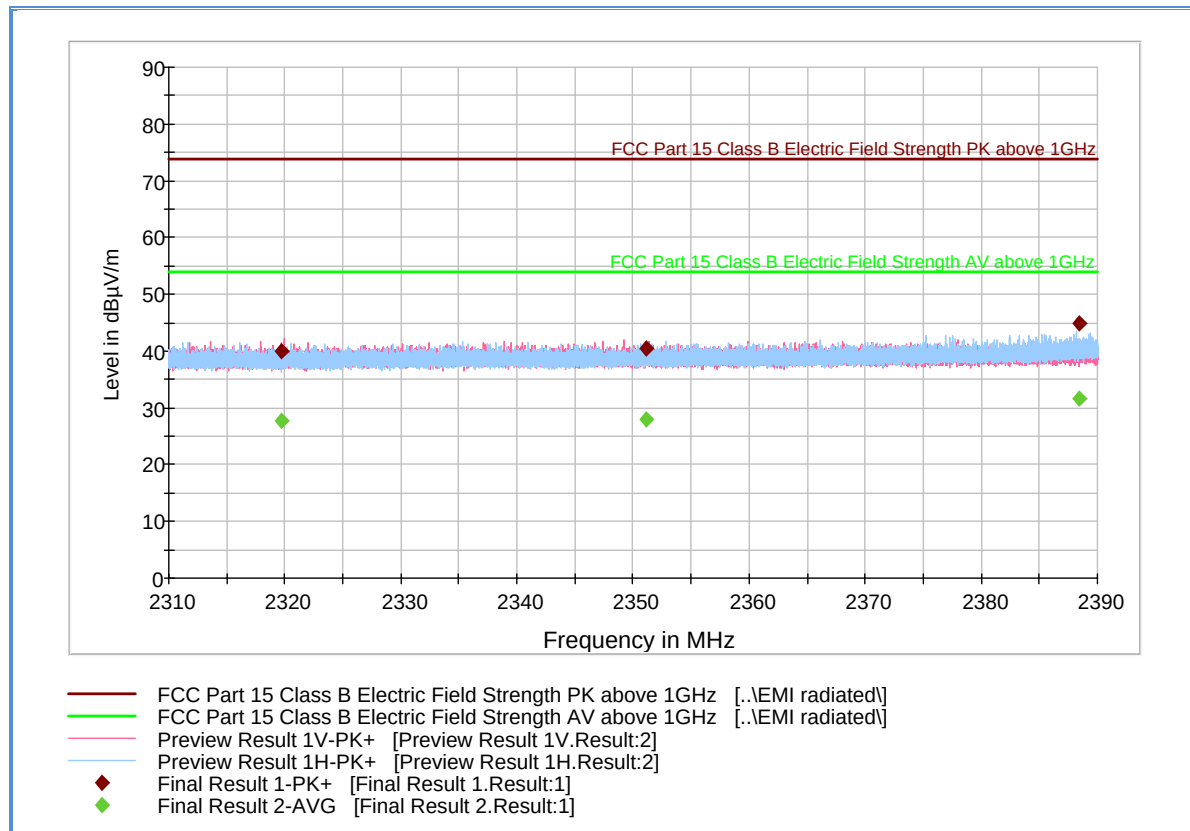
#### 2.7.8 Sample Computation (Radiated Emission)

|                                                               |                           |       |      |
|---------------------------------------------------------------|---------------------------|-------|------|
| Measuring equipment raw measurement (db $\mu$ V) @ 2400 MHz   |                           |       | 53.9 |
| Correction Factor (dB)                                        | Asset# 1153 (cable)       | 3.4   | -0.4 |
|                                                               | Asset# 8628(preamplifier) | -36.5 |      |
|                                                               | Asset#7575 (antenna)      | 32.7  |      |
| Reported Max Peak Final Measurement (db $\mu$ V/m) @ 2400 MHz |                           |       | 53.5 |

#### 2.7.9 Test Results

See attached plots.

## 2.7.10 Test Results Restricted Band 2310MHz to 2390MHz (802.11b Low Channel)



### Peak Data

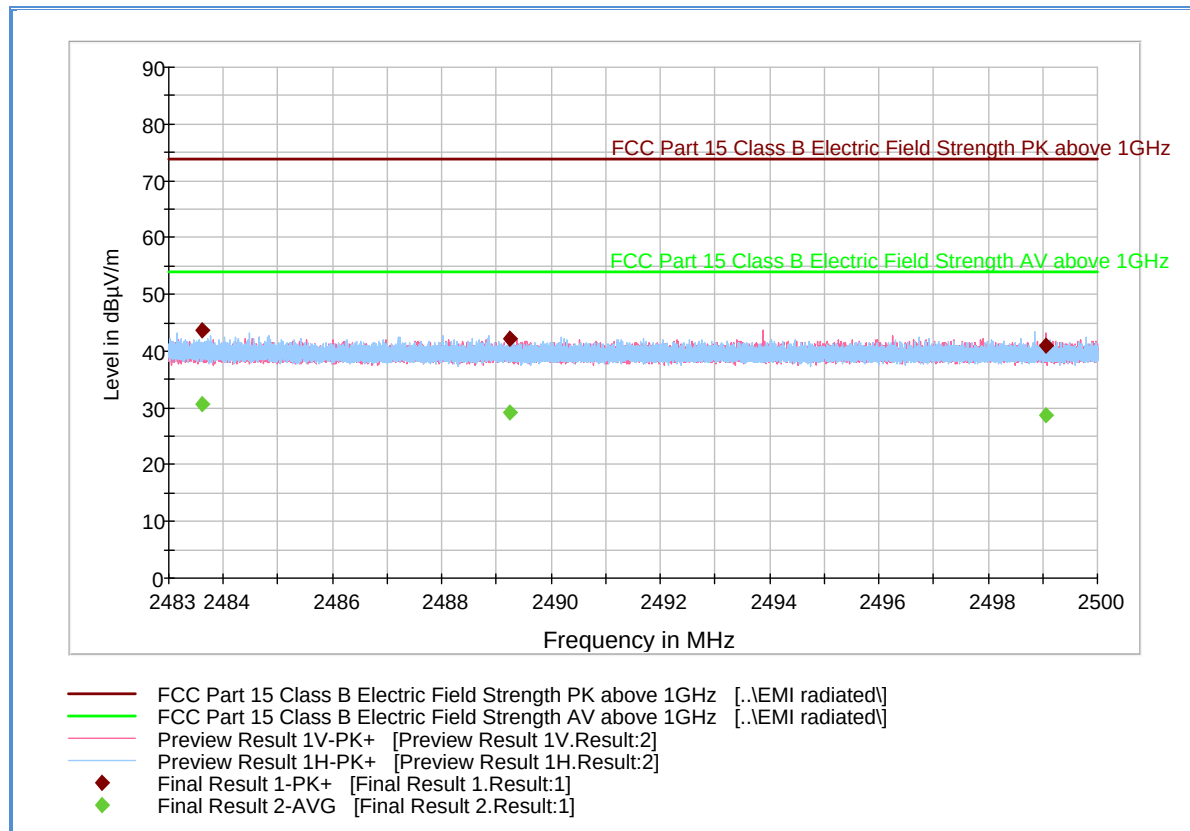
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2319.712000     | 39.9             | 1000.0          | 1000.000        | 287.3       | V            | 77.0          | -0.5       | 34.0        | 73.9           |
| 2351.181333     | 40.4             | 1000.0          | 1000.000        | 177.6       | V            | 134.0         | -0.4       | 33.5        | 73.9           |
| 2388.434667     | 44.8             | 1000.0          | 1000.000        | 101.7       | H            | 83.0          | -0.2       | 29.1        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2319.712000     | 27.6             | 1000.0          | 1000.000        | 287.3       | V            | 77.0          | -0.5       | 26.3        | 53.9           |
| 2351.181333     | 28.1             | 1000.0          | 1000.000        | 177.6       | V            | 134.0         | -0.4       | 25.8        | 53.9           |
| 2388.434667     | 31.6             | 1000.0          | 1000.000        | 101.7       | H            | 83.0          | -0.2       | 22.3        | 53.9           |

Test Notes: 2.4GHz notch filter removed for this test.

## 2.7.11 Test Results Restricted Band 2483.5MHz to 2500MHz (802.11b high Channel)



### Peak Data

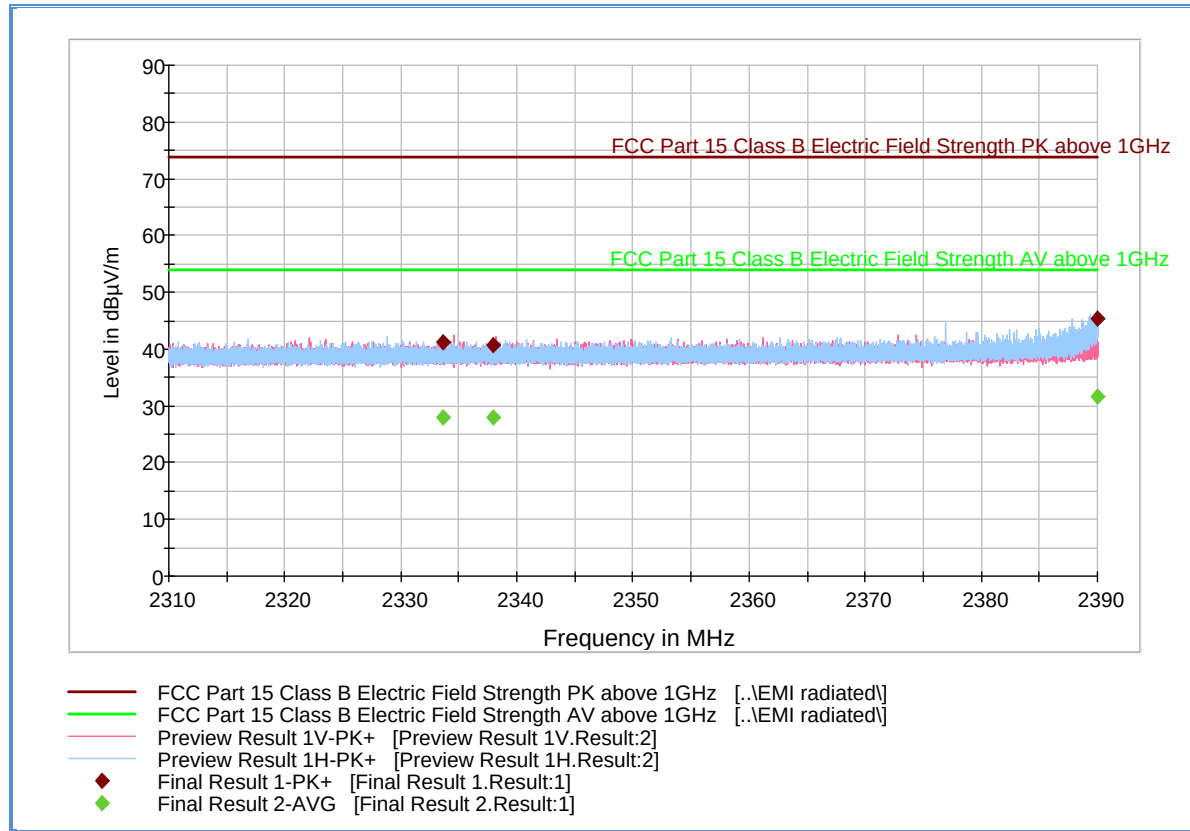
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2483.600000     | 43.6             | 1000.0          | 1000.000        | 103.7       | H            | 16.0          | 0.1        | 30.3        | 73.9           |
| 2489.253100     | 42.3             | 1000.0          | 1000.000        | 99.7        | H            | 15.0          | 0.2        | 31.6        | 73.9           |
| 2499.052500     | 40.9             | 1000.0          | 1000.000        | 115.7       | H            | 127.0         | 0.2        | 33.0        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2483.600000     | 30.7             | 1000.0          | 1000.000        | 103.7       | H            | 16.0          | 0.1        | 23.2        | 53.9           |
| 2489.253100     | 29.3             | 1000.0          | 1000.000        | 99.7        | H            | 15.0          | 0.2        | 24.6        | 53.9           |
| 2499.052500     | 28.6             | 1000.0          | 1000.000        | 115.7       | H            | 127.0         | 0.2        | 25.3        | 53.9           |

Test Notes: 2.4GHz notch filter removed for this test.

## 2.7.12 Test Results Restricted Band 2310MHz to 2390MHz (802.11g Low Channel)



### Peak Data

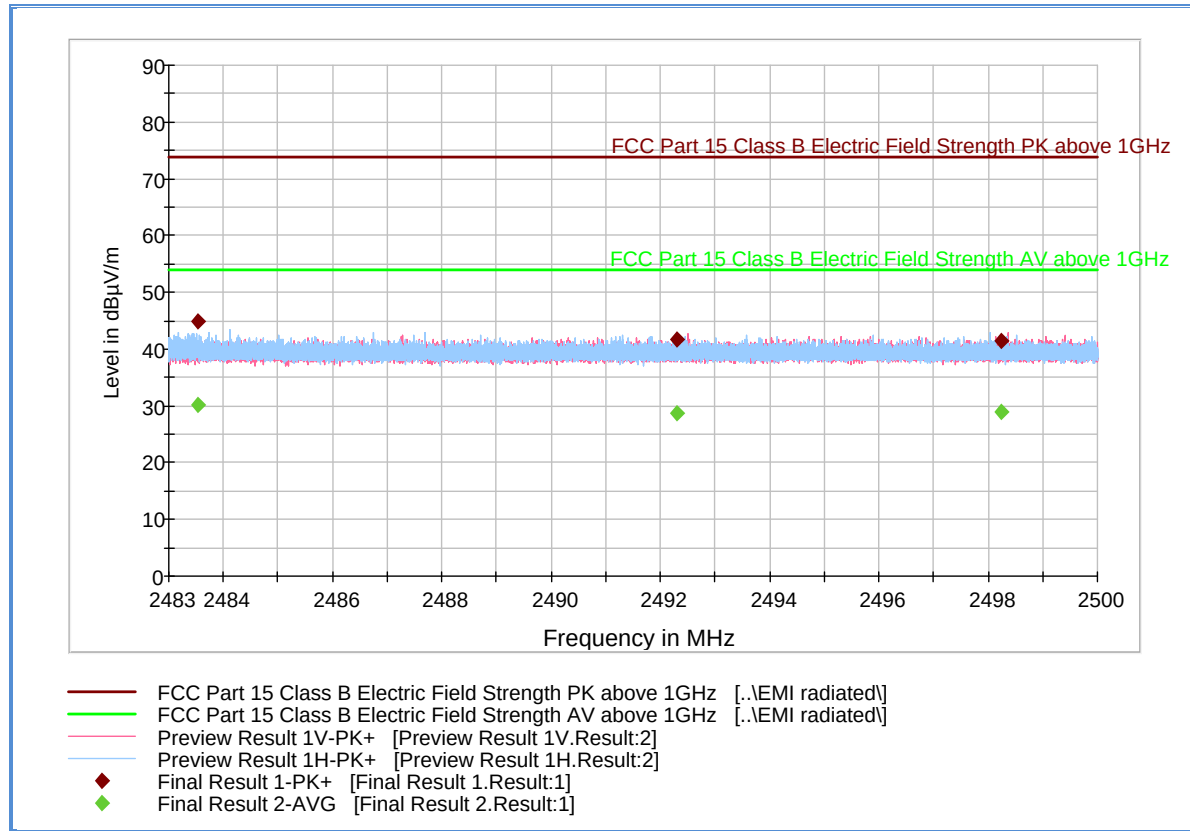
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2333.584000     | 41.2             | 1000.0          | 1000.000        | 300.6       | V            | 38.0          | -0.4       | 32.7        | 73.9           |
| 2337.976000     | 40.8             | 1000.0          | 1000.000        | 202.5       | V            | 74.0          | -0.4       | 33.1        | 73.9           |
| 2390.000000     | 45.4             | 1000.0          | 1000.000        | 113.7       | H            | -3.0          | -0.2       | 28.5        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2333.584000     | 28.0             | 1000.0          | 1000.000        | 300.6       | V            | 38.0          | -0.4       | 25.9        | 53.9           |
| 2337.976000     | 28.0             | 1000.0          | 1000.000        | 202.5       | V            | 74.0          | -0.4       | 25.9        | 53.9           |
| 2390.000000     | 31.7             | 1000.0          | 1000.000        | 113.7       | H            | -3.0          | -0.2       | 22.2        | 53.9           |

Test Notes: 2.4GHz notch filter removed for this test.

## 2.7.13 Test Results Restricted Band 2483.5MHz to 2500MHz (802.11g high Channel)



### Peak Data

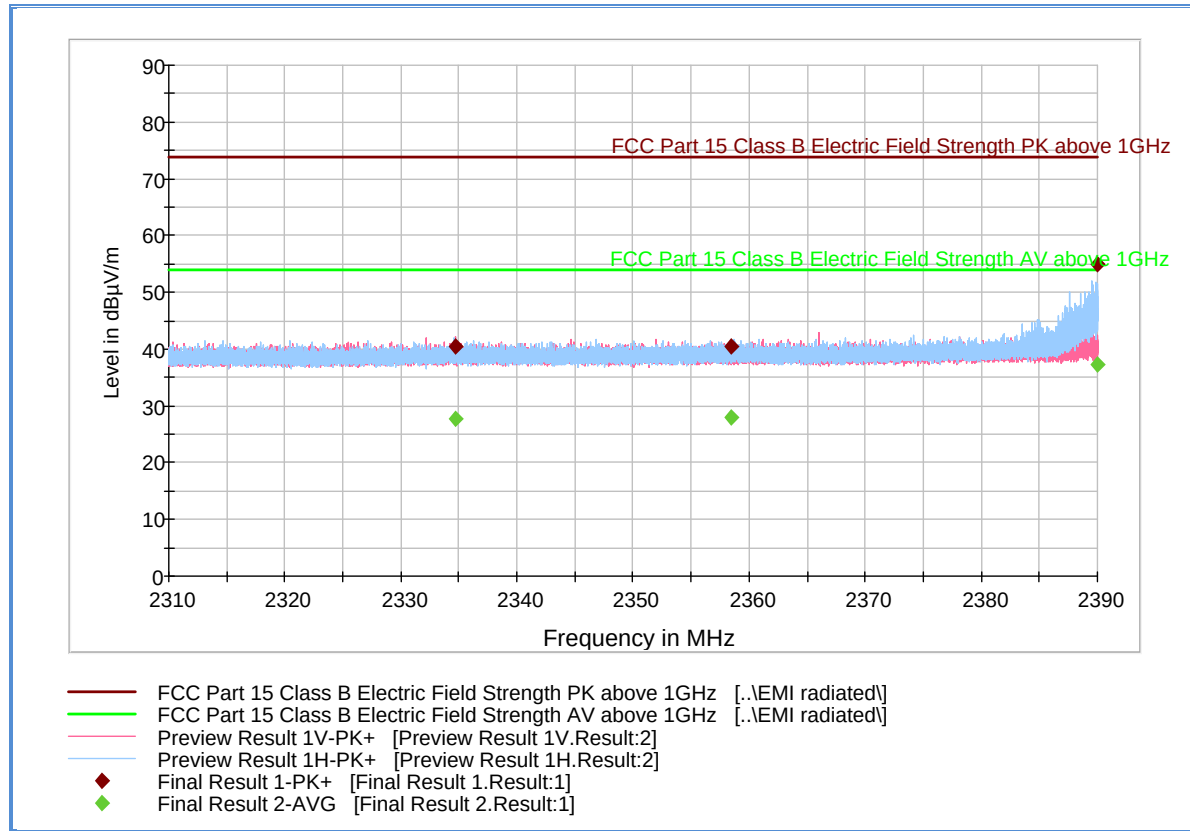
| Frequency (MHz) | MaxPeak (dB $\mu$ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 2483.523700     | 44.8                   | 1000.0          | 1000.000        | 99.7        | H            | 93.0          | 0.1        | 29.1        | 73.9                 |
| 2492.299033     | 41.7                   | 1000.0          | 1000.000        | 405.4       | V            | 52.0          | 0.2        | 32.2        | 73.9                 |
| 2498.229700     | 41.6                   | 1000.0          | 1000.000        | 102.7       | H            | 10.0          | 0.2        | 32.3        | 73.9                 |

### Average Data

| Frequency (MHz) | Average (dB $\mu$ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 2483.523700     | 30.3                   | 1000.0          | 1000.000        | 99.7        | H            | 93.0          | 0.1        | 23.6        | 53.9                 |
| 2492.299033     | 28.6                   | 1000.0          | 1000.000        | 405.4       | V            | 52.0          | 0.2        | 25.3        | 53.9                 |
| 2498.229700     | 28.8                   | 1000.0          | 1000.000        | 102.7       | H            | 10.0          | 0.2        | 25.1        | 53.9                 |

Test Notes: 2.4GHz notch filter removed for this test.

## 2.7.14 Test Results Restricted Band 2310MHz to 2390MHz (802.11n HT20 Low Channel)



### Peak Data

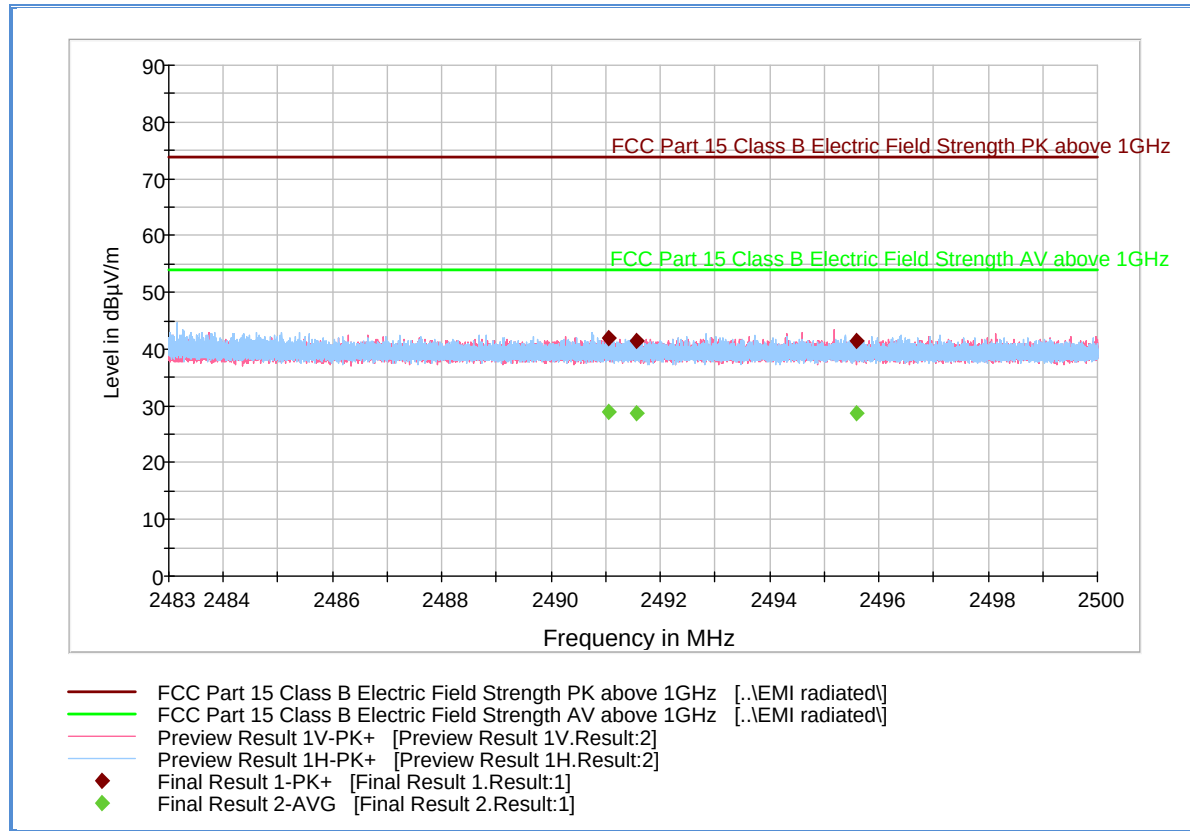
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2334.720000     | 40.6             | 1000.0          | 1000.000        | 99.7        | V            | 124.0         | -0.4       | 33.3        | 73.9           |
| 2358.469333     | 40.5             | 1000.0          | 1000.000        | 227.4       | H            | 10.0          | -0.4       | 33.4        | 73.9           |
| 2390.000000     | 54.8             | 1000.0          | 1000.000        | 128.7       | H            | 86.0          | -0.2       | 19.1        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2334.720000     | 27.7             | 1000.0          | 1000.000        | 99.7        | V            | 124.0         | -0.4       | 26.2        | 53.9           |
| 2358.469333     | 28.0             | 1000.0          | 1000.000        | 227.4       | H            | 10.0          | -0.4       | 25.9        | 53.9           |
| 2390.000000     | 37.3             | 1000.0          | 1000.000        | 128.7       | H            | 86.0          | -0.2       | 16.6        | 53.9           |

Test Notes: 2.4GHz notch filter removed for this test.

## 2.7.15 Test Results Restricted Band 2483.5MHz to 2500MHz (802.11n HT20 High Channel)



### Peak Data

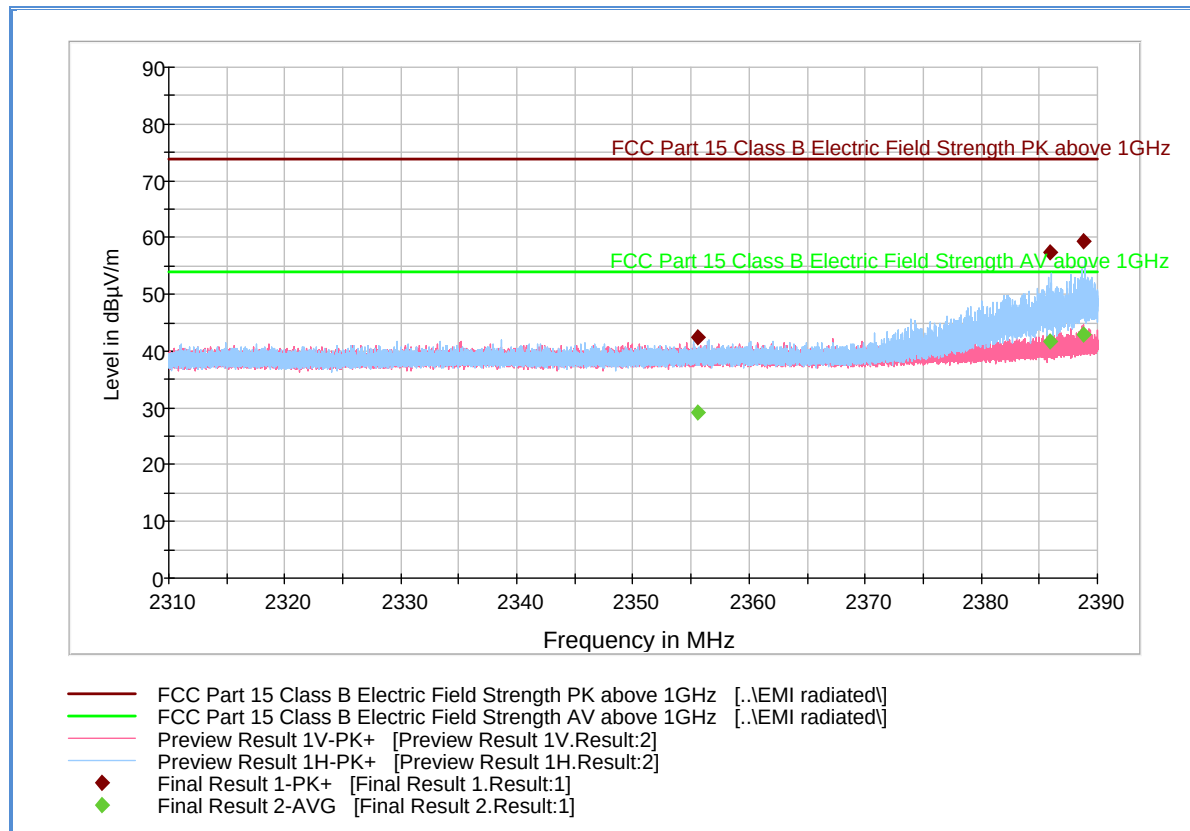
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2491.052567     | 41.9             | 1000.0          | 1000.000        | 101.7       | H            | -10.0         | 0.2        | 32.0        | 73.9           |
| 2491.552567     | 41.4             | 1000.0          | 1000.000        | 99.7        | H            | 128.0         | 0.2        | 32.5        | 73.9           |
| 2495.590133     | 41.4             | 1000.0          | 1000.000        | 201.3       | V            | 88.0          | 0.2        | 32.5        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2491.052567     | 29.0             | 1000.0          | 1000.000        | 101.7       | H            | -10.0         | 0.2        | 24.9        | 53.9           |
| 2491.552567     | 28.6             | 1000.0          | 1000.000        | 99.7        | H            | 128.0         | 0.2        | 25.3        | 53.9           |
| 2495.590133     | 28.7             | 1000.0          | 1000.000        | 201.3       | V            | 88.0          | 0.2        | 25.2        | 53.9           |

Test Notes: 2.4GHz notch filter removed for this test.

## 2.7.16 Test Results Restricted Band 2310MHz to 2390MHz (802.11n HT40 Low Channel)



### Peak Data

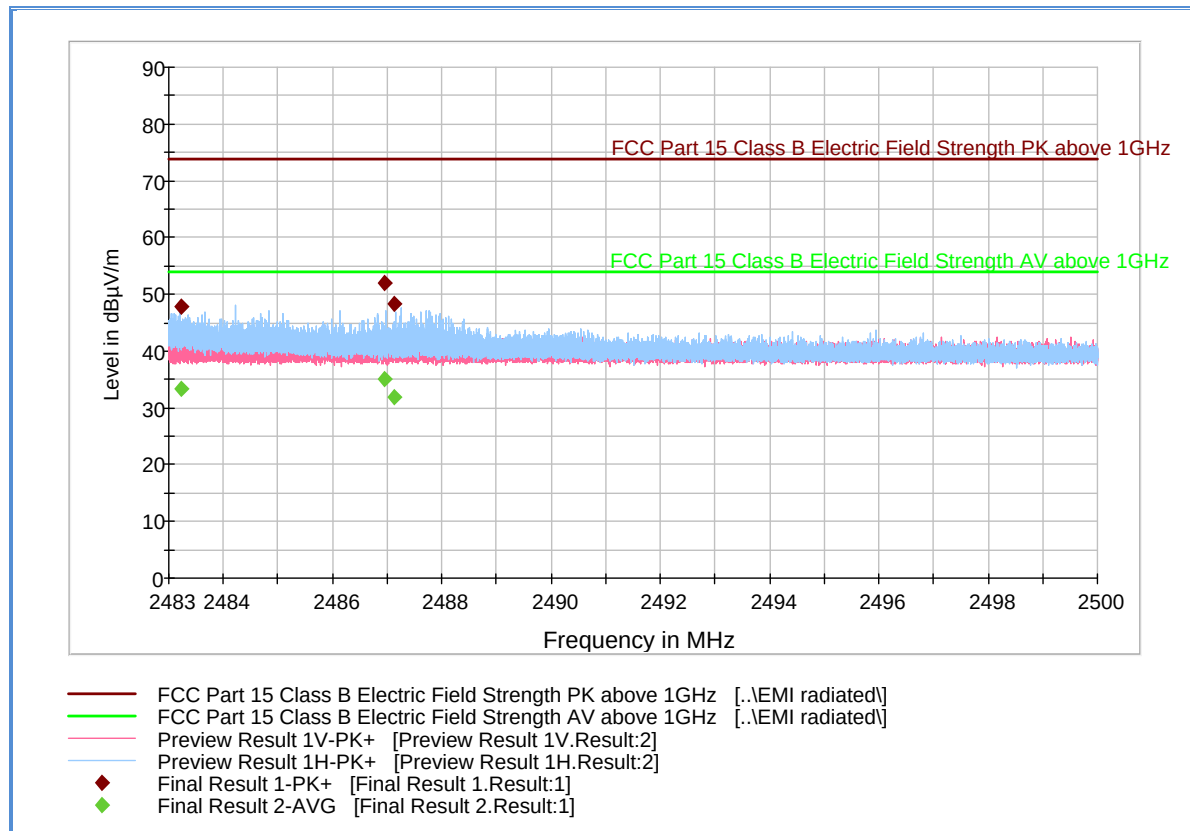
| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2355.522667     | 42.5             | 1000.0          | 1000.000        | 131.7       | H            | 95.0          | -0.4       | 31.4        | 73.9           |
| 2385.885333     | 57.5             | 1000.0          | 1000.000        | 128.7       | H            | 79.0          | -0.2       | 16.4        | 73.9           |
| 2388.749333     | 59.4             | 1000.0          | 1000.000        | 129.7       | H            | 80.0          | -0.2       | 14.5        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2355.522667     | 29.1             | 1000.0          | 1000.000        | 131.7       | H            | 95.0          | -0.4       | 24.8        | 53.9           |
| 2385.885333     | 41.6             | 1000.0          | 1000.000        | 128.7       | H            | 79.0          | -0.2       | 12.3        | 53.9           |
| 2388.749333     | 43.0             | 1000.0          | 1000.000        | 129.7       | H            | 80.0          | -0.2       | 10.9        | 53.9           |

Test Notes: 2.4GHz notch filter removed for this test.

## 2.7.17 Test Results Restricted Band 2483.5MHz to 2500MHz (802.11n HT40 high Channel)



### Peak Data

| Frequency (MHz) | MaxPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2483.217200     | 47.9             | 1000.0          | 1000.000        | 129.7       | H            | 357.0         | 0.1        | 26.0        | 73.9           |
| 2486.938200     | 51.9             | 1000.0          | 1000.000        | 122.7       | H            | 83.0          | 0.2        | 22.0        | 73.9           |
| 2487.123800     | 48.4             | 1000.0          | 1000.000        | 128.7       | H            | 84.0          | 0.2        | 25.5        | 73.9           |

### Average Data

| Frequency (MHz) | Average (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 2483.217200     | 33.2             | 1000.0          | 1000.000        | 129.7       | H            | 357.0         | 0.1        | 20.7        | 53.9           |
| 2486.938200     | 35.0             | 1000.0          | 1000.000        | 122.7       | H            | 83.0          | 0.2        | 18.9        | 53.9           |
| 2487.123800     | 31.8             | 1000.0          | 1000.000        | 128.7       | H            | 84.0          | 0.2        | 22.1        | 53.9           |

Test Notes: 2.4GHz notch filter removed for this test.



## **2.8 POWER SPECTRAL DENSITY**

### **2.8.1 Specification Reference**

Part 15 Subpart C §15.247(e)

### **2.8.2 Standard Applicable**

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### **2.8.3 Equipment Under Test and Modification State**

Serial No: EUT#3-EMC / Test Configuration A

### **2.8.4 Date of Test/Initial of test personnel who performed the test**

June 18, 2014/KAM

### **2.8.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.8.6 Environmental Conditions/ Test Location**

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

|                     |          |
|---------------------|----------|
| Ambient Temperature | 25.1 °C  |
| Relative Humidity   | 44.1. %  |
| ATM Pressure        | 98.9 kPa |

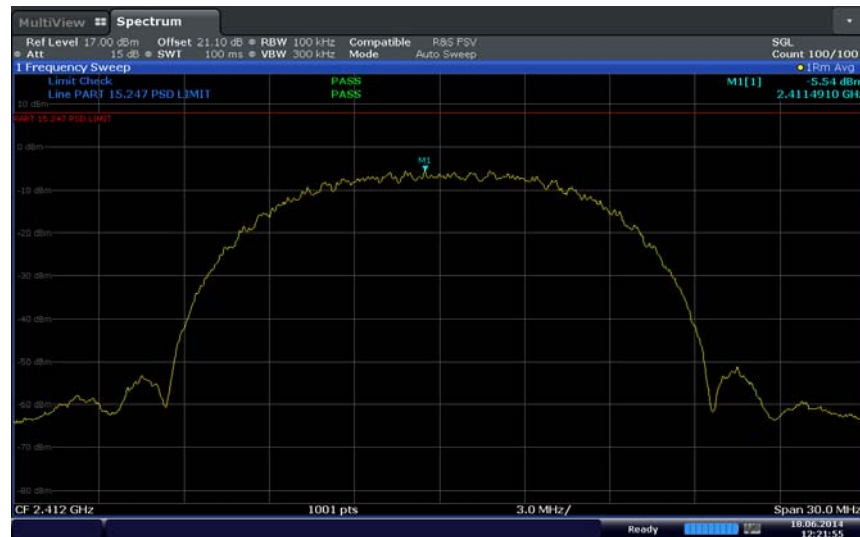
### **2.8.7 Additional Observations**

- This is a conducted test procedure is per Section 10.3 under KDB 558074 D01 DTS Measurement Guidance v03r02 (Compliance Measurement Guidance for 15.247 Digital Transmission Systems, June 05, 2014).
- An offset of 21.1dB was added to compensate for the external attenuator and cable used from the antenna port to the power sensor.
- Detector is RMS power averaging.
- Trace averaging mode over 100 traces.
- Sweep time is Auto Couple.
- EUT complies with 100 kHz RBW.

## 2.8.8 Test Results Summary

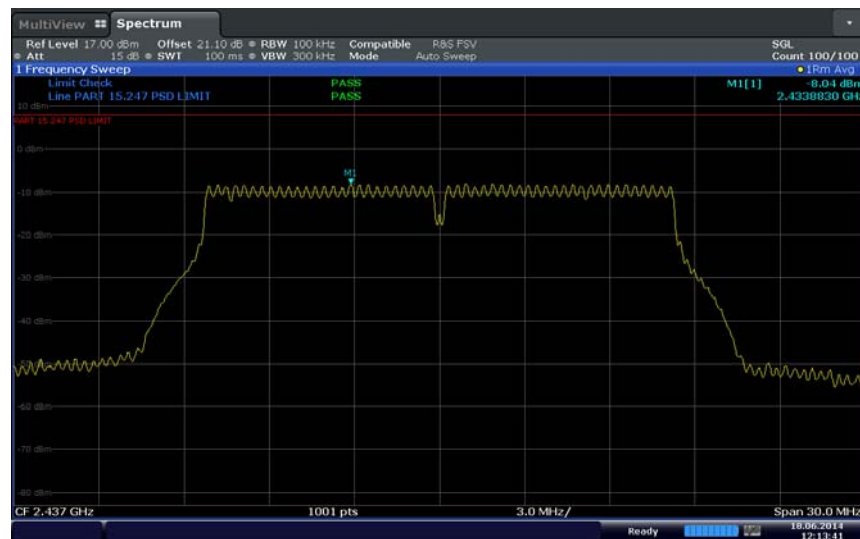
| Mode            | Channel       | Marker Reading<br>using 100 kHz<br>RBW<br>(dBm) | PSD<br>Limit<br>(dBm) | Margin<br>(dB) | Compliance |
|-----------------|---------------|-------------------------------------------------|-----------------------|----------------|------------|
| 802.11b         | 1 (2412 MHz)  | -5.54                                           | 8                     | 13.54          | Complies   |
|                 | 6 (2437 MHz)  | -6.39                                           | 8                     | 14.39          | Complies   |
|                 | 11 (2462 MHz) | -5.83                                           | 8                     | 13.83          | Complies   |
| 802.11g         | 1 (2412 MHz)  | -8.40                                           | 8                     | 16.40          | Complies   |
|                 | 6 (2437 MHz)  | -8.04                                           | 8                     | 16.04          | Complies   |
|                 | 11 (2462 MHz) | -8.84                                           | 8                     | 16.84          | Complies   |
| 802.11n<br>HT20 | 1 (2412 MHz)  | -8.65                                           | 8                     | 16.65          | Complies   |
|                 | 6 (2437 MHz)  | -8.63                                           | 8                     | 16.63          | Complies   |
|                 | 11 (2462 MHz) | -9.54                                           | 8                     | 17.54          | Complies   |
| 802.11n<br>HT40 | 3 (2422 MHz)  | -11.86                                          | 8                     | 19.86          | Complies   |
|                 | 6 (2437 MHz)  | -12.28                                          | 8                     | 20.28          | Complies   |
|                 | 9 (2452 MHz)  | -11.78                                          | 8                     | 19.78          | Complies   |

## 2.8.9 Test Results Plots



Date: 18 JUN 2014 12:21:55

802.11b Worst Case Channel



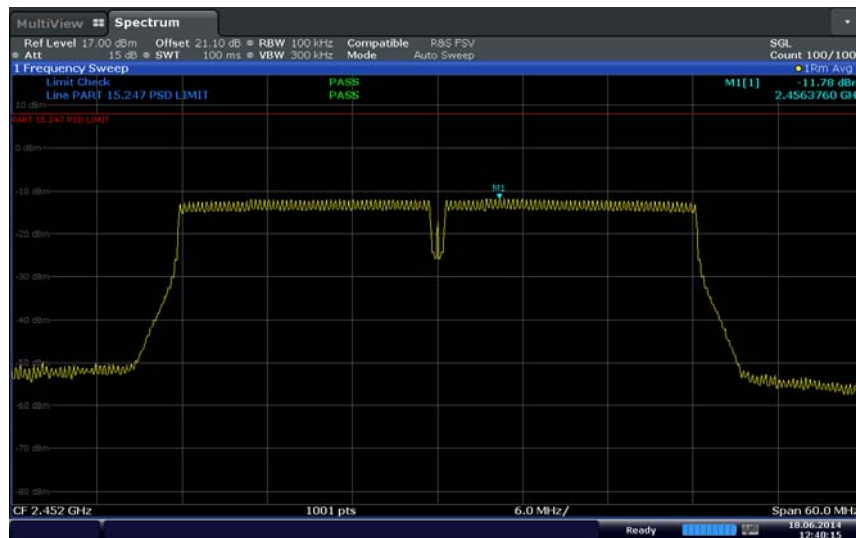
Date: 18 JUN 2014 12:13:41

802.11g Worst Case Channel



Date: 18 JUN 2014 12:25:23

802.11n HT20 Worst Case Channel



Date: 18 JUN 2014 12:40:15

802.11n HT40 Worst Case Channel



### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

| ID Number<br>(SDGE/SDRB)     | Test Equipment                             | Type                | Serial Number | Manufacturer               | Cal Date                  | Cal Due Date |
|------------------------------|--------------------------------------------|---------------------|---------------|----------------------------|---------------------------|--------------|
| Antenna Conducted Port Setup |                                            |                     |               |                            |                           |              |
| 7569                         | Series Power Meter                         | N1911A P-           | MY45100625    | Agilent                    | 04/22/14                  | 04/22/15     |
| 7570                         | 50MHz-18GHz Wideband Power Sensor          | N1921A              | MY45240588    | Agilent                    | 04/09/14                  | 04/09/15     |
| 7582                         | Signal/Spectrum Analyzer                   | FSW26               | 101614        | Rhode & Schwarz            | 11/19/13                  | 11/19/14     |
| Radiated Test Setup          |                                            |                     |               |                            |                           |              |
| 1002                         | Bilog Antenna                              | 3142C               | 00058717      | ETS-Lindgren               | 01/30/14                  | 01/30/16     |
| 7575                         | Double-ridged waveguide horn antenna       | 3117                | 00155511      | EMCO                       | 04/08/14                  | 04/08/15     |
| 8628                         | Pre-amplifier                              | QLI 01182835-JO     | 8986002       | QuinStar Technologies Inc. | 04/03/14                  | 04/03/15     |
| 1151                         | Pre-amplifier                              | TS-PR26             | 100026        | Rhode & Schwarz            | 05/02/13                  | 05/02/15     |
| 1003                         | Signal Generator                           | SMR-40              | 1104.0002.40  | Rhode & Schwarz            | 01/20/14                  | 01/20/15     |
| 8543                         | High-frequency cable                       | Micropore 19057793  | N/A           | United Microwave Products  | 09/03/13                  | 09/03/14     |
| 1040                         | EMI Test Receiver                          | ESIB40              | 100292        | Rhode & Schwarz            | 07/31/13                  | 07/31/14     |
| 1049                         | EMI Test Receiver                          | ESU                 | 100133        | Rhode & Schwarz            | 03/17/14                  | 03/17/15     |
| 8816                         | 2.4GHz Band Notch Filter                   | BRM50702            | 133           | Micro-Tronics              | Verified by 1189 and 7582 |              |
| 1016                         | Pre-amplifier                              | PAM-0202            | 187           | PAM                        | 10/08/13                  | 10/08/14     |
| Conducted Emissions          |                                            |                     |               |                            |                           |              |
| 1024                         | EMI Test Receiver                          | ESCS 30             | 847793/001    | Rhode & Schwarz            | 04/05/14                  | 04/05/15     |
| 7567                         | LISN                                       | FCC-LISN-50-25-2-10 | 120304        | Fischer Custom Comm.       | 07/01/14                  | 07/01/15     |
| 8822                         | 20dB Attenuator                            | 34-20-34            | N/A           | MCE / Weinschel            | 01/30/14                  | 01/30/15     |
| 8824                         | 20dB Attenuator                            | 34-20-34            | N/A           | MCE / Weinschel            | 01/30/14                  | 01/30/15     |
| 6837                         | LISN                                       | FCC-LISN-50-25-2    | 05025         | Fischer Custom Comm.       | 02/22/14                  | 02/22/15     |
| Miscellaneous                |                                            |                     |               |                            |                           |              |
| 7560                         | Barometer/Temperature/Humidity Transmitter | iBTHX-W             | 1240476       | Omega                      | 01/30/14                  | 01/30/15     |
|                              | Test Software                              | EMC32               | V8.53         | Rhode & Schwarz            | N/A                       |              |

### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

#### 3.2.1 Radiated Emission Measurements (Below 1GHz)

| Contribution                    |                            | Probability Distribution Type | Probability Distribution $x_i$ | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1                               | Receiver/Spectrum Analyzer | Rectangular                   | 0.45                           | 0.26                          | 0.07         |
| 2                               | Cables                     | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 3                               | Preamp                     | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 4                               | Antenna                    | Rectangular                   | 0.75                           | 0.43                          | 0.19         |
| 5                               | Site                       | Rectangular                   | 3.89                           | 2.25                          | 5.04         |
| 6                               | EUT Setup                  | Rectangular                   | 1.00                           | 0.58                          | 0.33         |
| Combined Uncertainty ( $u_c$ ): |                            |                               |                                |                               | 2.41         |
| Coverage Factor (k):            |                            |                               |                                |                               | 2            |
| Expanded Uncertainty:           |                            |                               |                                |                               | 4.82         |

#### 3.2.2 Radiated Emission Measurements (Above 1GHz)

| Contribution                    |                            | Probability Distribution Type | Probability Distribution $x_i$ | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1                               | Receiver/Spectrum Analyzer | Rectangular                   | 0.57                           | 0.33                          | 0.11         |
| 2                               | Cables                     | Rectangular                   | 0.70                           | 0.40                          | 0.16         |
| 3                               | Preamp                     | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 4                               | Antenna                    | Rectangular                   | 0.37                           | 0.21                          | 0.05         |
| 5                               | Site                       | Rectangular                   | 3.89                           | 2.25                          | 5.04         |
| 6                               | EUT Setup                  | Rectangular                   | 1.00                           | 0.58                          | 0.33         |
| Combined Uncertainty ( $u_c$ ): |                            |                               |                                |                               | 2.40         |
| Coverage Factor (k):            |                            |                               |                                |                               | 2            |
| Expanded Uncertainty:           |                            |                               |                                |                               | 4.81         |

#### 3.2.3 Conducted Antenna Port Measurement

| Contribution                    |                            | Probability Distribution Type | Probability Distribution $x_i$ | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1                               | Receiver/Spectrum Analyzer | Rectangular                   | 0.57                           | 0.33                          | 0.11         |
| 2                               | Cables                     | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 3                               | EUT Setup                  | Rectangular                   | 1.00                           | 0.58                          | 0.33         |
| Combined Uncertainty ( $u_c$ ): |                            |                               |                                |                               | 0.72         |
| Coverage Factor (k):            |                            |                               |                                |                               | 2            |
| Expanded Uncertainty:           |                            |                               |                                |                               | 1.45         |

### 3.2.1 AC Conducted Measurements

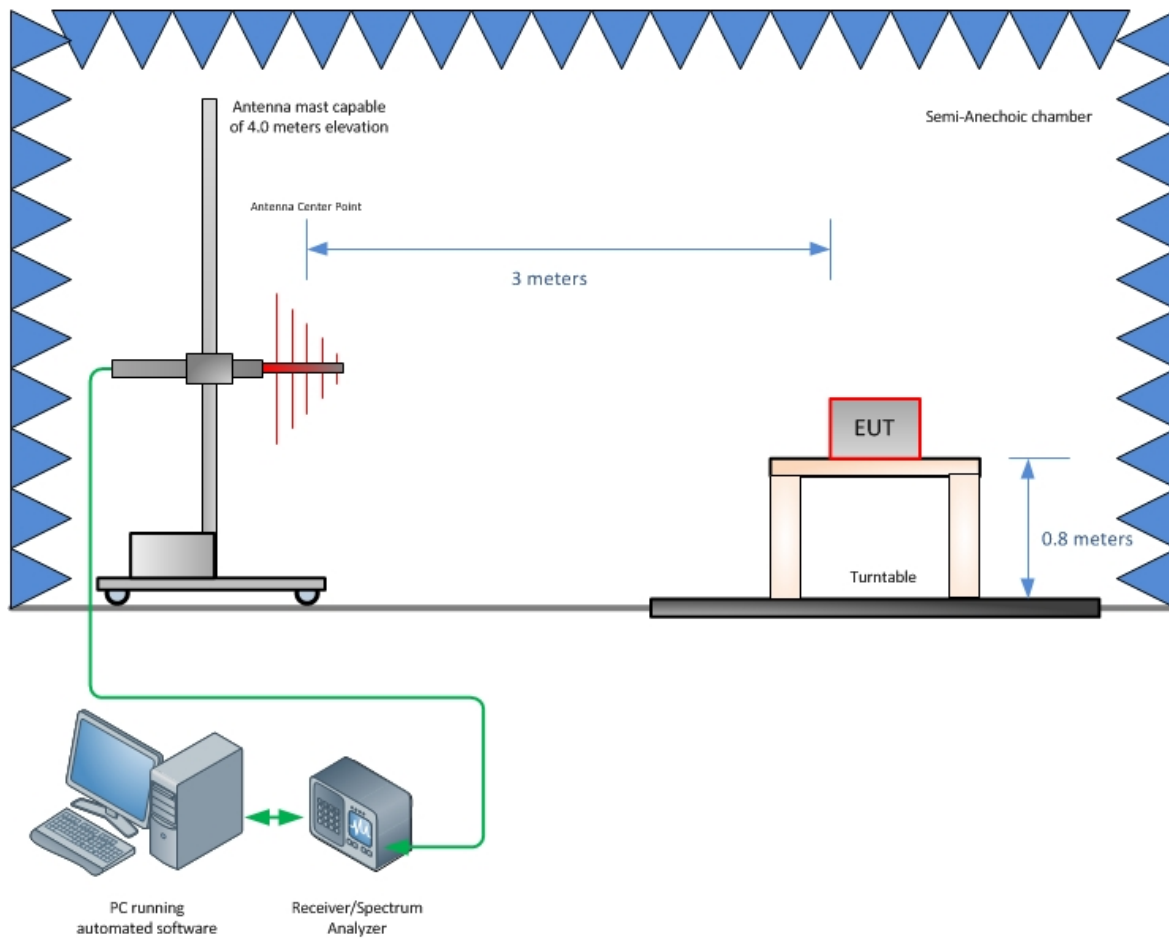
| Contribution                    |                            | Probability Distribution Type | Probability Distribution $x_i$ | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1                               | Receiver/Spectrum Analyzer | Rectangular                   | 0.36                           | 0.21                          | 0.04         |
| 2                               | Cables                     | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 3                               | LISN                       | Rectangular                   | 0.66                           | 0.38                          | 0.15         |
| 4                               | Attenuator                 | Rectangular                   | 0.30                           | 0.17                          | 0.03         |
| 5                               | EUT Setup                  | Rectangular                   | 1.00                           | 0.58                          | 0.33         |
| Combined Uncertainty ( $u_c$ ): |                            |                               |                                |                               | 0.80         |
| Coverage Factor (k):            |                            |                               |                                |                               | 2            |
| Expanded Uncertainty:           |                            |                               |                                |                               | 1.59         |



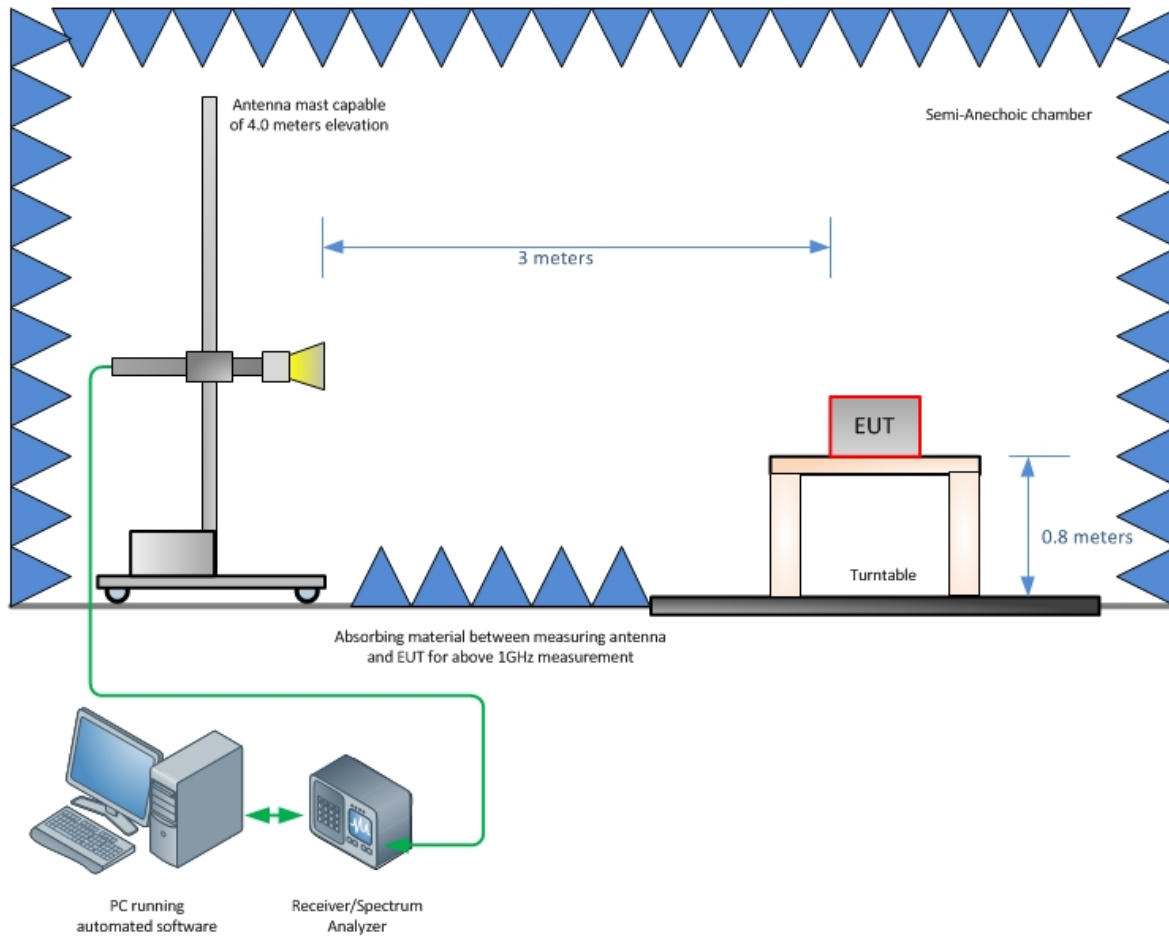
## **SECTION 4**

### **DIAGRAM OF TEST SETUP**

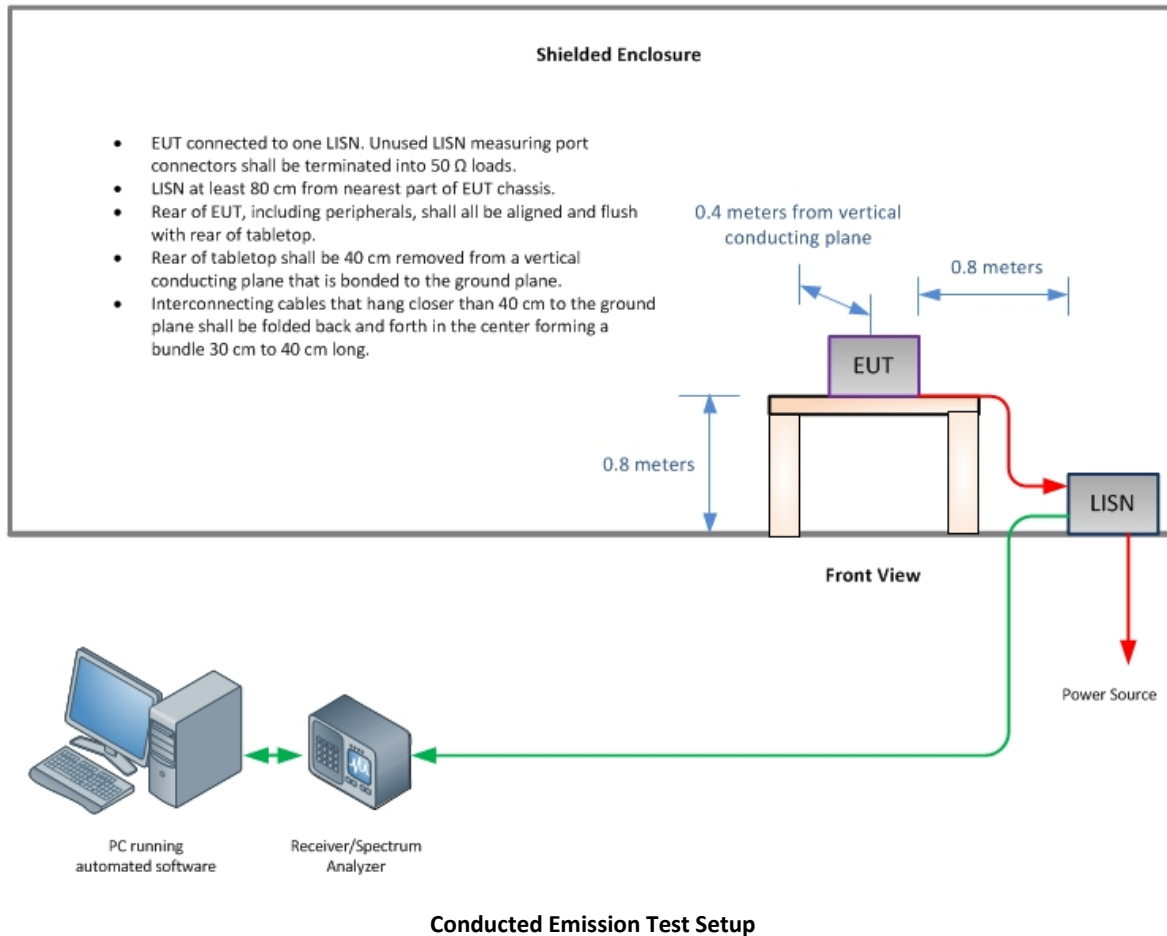
#### 4.1 TEST SETUP DIAGRAM



**Radiated Emission Test Setup (Below 1GHz)**



**Radiated Emission Test Setup (Above 1GHz)**





## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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