



## RF TEST REPORT

|                   |                    |
|-------------------|--------------------|
| <b>Applicant</b>  | ID TECH            |
| <b>FCC ID</b>     | WQJ-IDCL-51        |
| <b>Brand</b>      | ID TECH            |
| <b>Product</b>    | AC100              |
| <b>Model</b>      | IDCL-51/IDCL-51-TC |
| <b>Report No.</b> | RXA1702-0042RF01R1 |
| <b>Issue Date</b> | September 27, 2017 |

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15E (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

*Performed by: Xianqing Li*

*Approved by: Kai Xu*

### TA Technology (Shanghai) Co., Ltd.

*No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China*

*TEL: +86-021-50791141/2/3*

*FAX: +86-021-50791141/2/3-8000*

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## Summary of measurement results

| Number                                                                         | Summary of measurements of results  | Clause in FCC rules | Verdict |
|--------------------------------------------------------------------------------|-------------------------------------|---------------------|---------|
| 1                                                                              | Maximum peak conducted output power | 15.407(a)           | PASS    |
| 2                                                                              | Occupied bandwidth                  | 15.407(e)           | PASS    |
| 3                                                                              | Frequency stability                 | 15.407(g)           | PASS    |
| 4                                                                              | Maximum power spectral density      | 15.407(a)           | PASS    |
| 5                                                                              | Unwanted Emissions                  | 15.407(b)           | PASS    |
| 6                                                                              | Conducted Emissions                 | 15.207              | PASS    |
| Date of Testing: April 22, 2016~ May 4, 2016 and June 28, 2017 ~ July 13, 2017 |                                     |                     |         |

## 1. Test Laboratory

### 1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of TA technology (shanghai) co., Ltd).The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

### 1.2. Test facility

#### **CNAS (accreditation number:L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

#### **FCC (recognition number is 428261)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### **IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

#### **VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

#### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



### 1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
Country: P. R. China  
Contact: Xu Kai  
Telephone: +86-021-50791141/2/3  
Fax: +86-021-50791141/2/3-8000  
Website: <http://www.ta-shanghai.com>  
E-mail: [xukai@ta-shanghai.com](mailto:xukai@ta-shanghai.com)

## 2. General Description of Equipment under Test

### Client Information

|                             |                                         |
|-----------------------------|-----------------------------------------|
| <b>Applicant</b>            | ID TECH                                 |
| <b>Applicant address</b>    | 10721 Walker Street, Cypress, CA, 90630 |
| <b>Manufacturer</b>         | ID TECH                                 |
| <b>Manufacturer address</b> | 10721 Walker Street, Cypress, CA, 90630 |

### General information

| EUT Description                                                                                                                     |                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Model:                                                                                                                              | IDCL-51/IDCL-51-TC                                                                               |
| Designation Number                                                                                                                  | CN1179                                                                                           |
| SN:                                                                                                                                 | 617T000007                                                                                       |
| Hardware Version:                                                                                                                   | 80144301                                                                                         |
| Software Version:                                                                                                                   | ID TECH AC100 V1.00                                                                              |
| Power Supply:                                                                                                                       | AC Power Supply                                                                                  |
| Antenna Type:                                                                                                                       | Internal Antenna                                                                                 |
| Antenna Gain:                                                                                                                       | 3.3dBi                                                                                           |
| Test Mode:                                                                                                                          | U-NII-1(5150MHz-5250MHz)<br>U-NII-3(5725MHz-5850MHz)                                             |
| Modulation Type:                                                                                                                    | 802.11a: OFDM                                                                                    |
| Max. Conducted Power                                                                                                                | 802.11a: 3.48 dBm                                                                                |
| Operating Frequency Range(s)                                                                                                        | U-NII-1: 5150-5250MHz<br>U-NII-3: 5725MHz-5850MHz                                                |
| EUT Accessory                                                                                                                       |                                                                                                  |
| Adapter                                                                                                                             | Manufacture:BSY<br>Model : BSYH050200UU<br>Input: 100-240Vac 50/60Hz 0.4A<br>Output: 5.0Vdc 2.0A |
| Note: The information of the EUT is declared by the manufacturer.<br>Please refer to the specifications or user manual for details. |                                                                                                  |



### 3. Test Information

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC CFR47 Part 15E (2017)** Unlicensed National Information Infrastructure Devices

**ANSI C63.10 (2013)**

**KDB789033 D02 General UNII Test Procedures New Rules v01r04**

**KDB 662911 D01 Multiple Transmitter Output v02r01**

## 4. Test Configuration

IDCL-51/IDCL-51-TC (RXA1702-0042RF01R1) is a variant model of IDCL-51 (RXA1604-0066RF03). Test items tested see the table below. The detailed product change description please refers to the ANNEX B.

| Test items                   | Modes/Modulation               |                                 |
|------------------------------|--------------------------------|---------------------------------|
|                              | Original<br>(RXA1604-0066RF03) | Variant<br>(RXA1702-0042RF01R1) |
| Peak Power Output –Conducted | pass                           | Refer to the Original           |
| Occupied bandwidth           | pass                           | pass                            |
| Frequency stability          | pass                           | pass                            |
| Power spectral density       | pass                           | pass                            |
| Unwanted Emissions           | pass                           | pass                            |
| Conducted Emissions          | pass                           | pass                            |

The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on the all configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

| Band    |         | Data Rate |
|---------|---------|-----------|
| 802.11a | U-NII-1 | 6 Mbps    |
|         | U-NII-3 | 54 Mbps   |

## 5. Test Case Results

### 5.1. Peak Power Output –Conducted

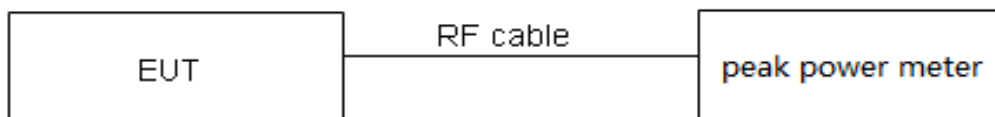
#### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

#### Methods of Measurement

During the process of the testing, The EUT was connected to the peak power meter through an external attenuator and a known loss cable. The EUT is max power transmission with proper modulation. We use Maximum Peak Conducted Output Power Level Method in KDB789033 for this test

#### Test Setup



#### Limits

Rule FCC Part 15.407(a)

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.44$  dB.

## Test Results

| Network Standards  | Channel/<br>Frequency (MHz) | Peak Output Power (dBm) |       | Limit(dBm) | Conclusion |
|--------------------|-----------------------------|-------------------------|-------|------------|------------|
|                    |                             | 6M                      | 54M   |            |            |
| U-NII-1<br>802.11a | 36/5180                     | 11.63                   | 11.01 | 30.00      | PASS       |
|                    | 40/5200                     | 11.51                   | 10.87 | 30.00      | PASS       |
|                    | 48/5240                     | 11.19                   | 10.58 | 30.00      | PASS       |
| U-NII-3<br>802.11a | 149/5745                    | 12.13                   | 11.39 | 30.00      | PASS       |
|                    | 157/5785                    | 12.35                   | 11.92 | 30.00      | PASS       |
|                    | 161/5805                    | 12.11                   | 12.73 | 30.00      | PASS       |

## 5.2. Occupied Bandwidth

### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

### Method of Measurement

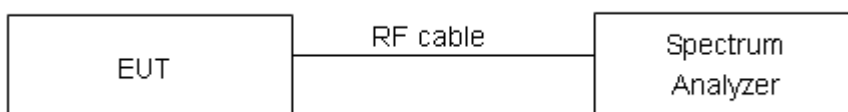
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW  $\approx 1\%$  OCB kHz, VBW  $\geq 3 \times$  RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

Use the 99 % power bandwidth function of the instrument

### Test Setup



### Limits

Rule FCC Part 15.407(e)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 936$  Hz.



## Test Results:

| Network Standards  | Carrier frequency (MHz) | 99% bandwidth (MHz) | Minimum 26 dB bandwidth (MHz) | Limit (kHz) | Conclusion  |
|--------------------|-------------------------|---------------------|-------------------------------|-------------|-------------|
| U-NII-1<br>802.11a | 5180                    | 16.410              | 18.57                         | 500         | PASS        |
|                    | 5220                    | 16.415              | 19.10                         | 500         | PASS        |
|                    | 5240                    | 16.455              | 18.56                         | 500         | PASS        |
| Network Standards  | Carrier frequency (MHz) | 99% bandwidth (MHz) | Minimum 6 dB bandwidth (MHz)  | Limit (kHz) | Limit (kHz) |
| U-NII-3<br>802.11a | 5745                    | 16.444              | 15.66                         | 500         | PASS        |
|                    | 5785                    | 16.414              | 15.70                         | 500         | PASS        |
|                    | 5825                    | 16.448              | 15.40                         | 500         | PASS        |

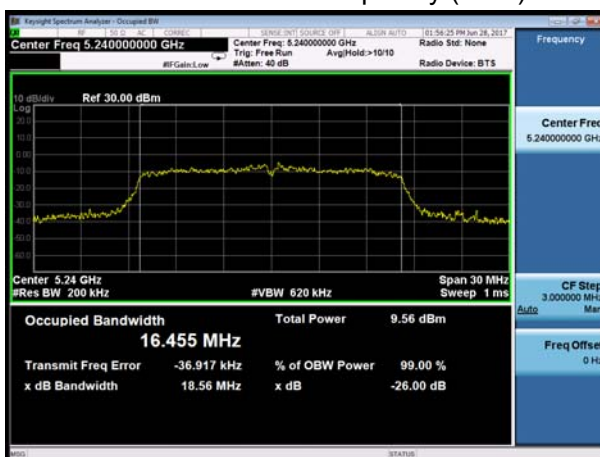
U-NII-1 802.11a Carrier frequency (MHz): 5180



U-NII-1 802.11a Carrier frequency (MHz): 5200



U-NII-1 802.11a Carrier frequency (MHz): 5240



### U-NII-3 802.11a Carrier frequency (MHz): 5745 99% bandwidth



### U-NII-3 802.11a Carrier frequency (MHz): 5745 Minimum 6 dB bandwidth



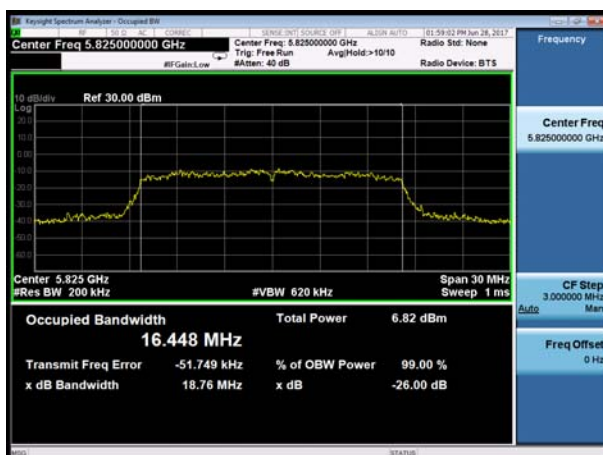
### U-NII-3 802.11a Carrier frequency (MHz): 5785 99% bandwidth



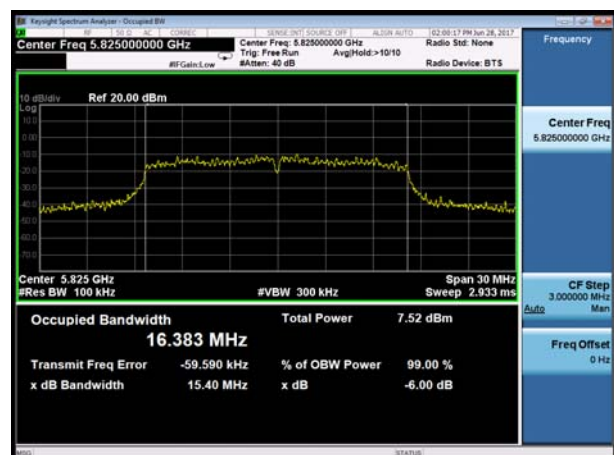
### U-NII-3 802.11a Carrier frequency (MHz): 5785 Minimum 6 dB bandwidth



### U-NII-3 802.11a Carrier frequency (MHz): 5825 99% bandwidth



### U-NII-3 802.11a Carrier frequency (MHz): 5825 Minimum 6 dB bandwidth



### 5.3. Frequency Stability

#### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

#### Method of Measurement

##### 1. Frequency stability with respect to ambient temperature

- a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.
- b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.
- c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
- d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.
- e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.
- f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.
- g) Measure the frequency at each of frequencies specified in 5.6.
- h) Switch OFF the EUT but do not switch OFF the oscillator heater.
- i) Lower the chamber temperature by not more than 10 C, and allow the temperature inside the chamber to stabilize.
- j) Repeat step f) through step i) down to the lowest specified temperature.

##### 2. Frequency stability when varying supply voltage

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 °C to +25 °C). An antenna shall be connected to the antenna output terminals of the EUT if possible. If the EUT is equipped with or uses an adjustable-length antenna, then it shall be fully extended.

- a) Supply the EUT with nominal voltage or install a new or fully charged battery in the EUT. Turn ON the EUT and couple its output to a frequency counter or other frequency-measuring instrument.

- b) Tune the EUT to one of the number of frequencies required in 5.6. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
- c) Measure the frequency at each of the frequencies specified in 5.6.
- d) Repeat the above procedure at 85% and 115% of the nominal supply voltage.

**Limit**

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 936\text{Hz}$

**Test Results**

| Voltage<br>(V) | Temperature<br>(°C) | U-NII-1 Test Results |             |             |             |
|----------------|---------------------|----------------------|-------------|-------------|-------------|
|                |                     | 5200MHz              |             |             |             |
|                |                     | 1min                 | 2min        | 5min        | 10min       |
| 5.00           | -20                 | 5200.008475          | 5200.005233 | 5199.995989 | 5199.990172 |
| 5.00           | -10                 | 5199.999006          | 5199.999454 | 5199.992742 | 5199.988990 |
| 5.00           | 0                   | 5199.992669          | 5199.998175 | 5199.986501 | 5199.982401 |
| 5.00           | 10                  | 5199.987854          | 5199.997695 | 5199.981082 | 5199.974908 |
| 5.00           | 20                  | 5199.982084          | 5199.996217 | 5199.972971 | 5199.969696 |
| 5.00           | 30                  | 5199.976813          | 5199.989726 | 5199.965807 | 5199.967640 |
| 5.00           | 40                  | 5199.967816          | 5199.986548 | 5199.956797 | 5199.966369 |
| 5.00           | 50                  | 5199.958450          | 5199.986226 | 5199.948069 | 5199.958552 |
| 4.50           | 20                  | 5199.950703          | 5199.984671 | 5199.943661 | 5199.956959 |
| 5.50           | 20                  | 5199.943080          | 5199.975807 | 5199.940973 | 5199.954709 |
| MHz            |                     | -0.056920            | -0.024193   | -0.059027   | -0.045291   |
| PPM            |                     | -10.946073           | -4.652543   | -11.351258  | -8.709718   |

| Voltage<br>(V) | Temperature<br>(°C) | U-NII-3 Test Results |             |             |             |
|----------------|---------------------|----------------------|-------------|-------------|-------------|
|                |                     | 5785MHz              |             |             |             |
|                |                     | 1min                 | 2min        | 5min        | 10min       |
| 5.00           | -20                 | 5784.996448          | 5784.990517 | 5784.989668 | 5784.979999 |
| 5.00           | -10                 | 5784.989377          | 5784.982963 | 5784.989431 | 5784.971029 |
| 5.00           | 0                   | 5784.982127          | 5784.975618 | 5784.989024 | 5784.970071 |
| 5.00           | 10                  | 5784.977441          | 5784.971193 | 5784.979725 | 5784.963500 |
| 5.00           | 20                  | 5784.970325          | 5784.962388 | 5784.971259 | 5784.963467 |
| 5.00           | 30                  | 5784.967589          | 5784.958291 | 5784.969795 | 5784.958155 |
| 5.00           | 40                  | 5784.957652          | 5784.954838 | 5784.967120 | 5784.952818 |
| 5.00           | 50                  | 5784.951514          | 5784.951034 | 5784.962441 | 5784.943570 |
| 4.50           | 20                  | 5784.949307          | 5784.944131 | 5784.957051 | 5784.937358 |
| 5.50           | 20                  | 5784.943585          | 5784.943482 | 5784.954088 | 5784.936925 |
| MHz            |                     | -0.056415            | -0.056518   | -0.045912   | -0.063075   |
| PPM            |                     | -9.751965            | -9.769693   | -7.936355   | -10.903129  |

## 5.4. Power Spectral Density

### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

### Method of Measurement

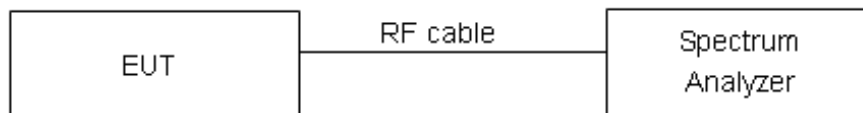
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW = 1 MHz, VBW =3MHz on spectrum analyzer for U-NII-1

Set RBW = 510 MHz, VBW =1.5MHz on spectrum analyzer for U-NII-3

The conducted PSD is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

### Test setup



### Limits

Rule FCC Part 15.407(a)(3)/ Part 15.407(a)(1)

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum powerspectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

| Frequency Bands/MHz | Limits       |
|---------------------|--------------|
| U-NII-1             | 17dBm/MHz    |
| U-NII-3             | 30dBm/500kHz |

### Measurement Uncertainty

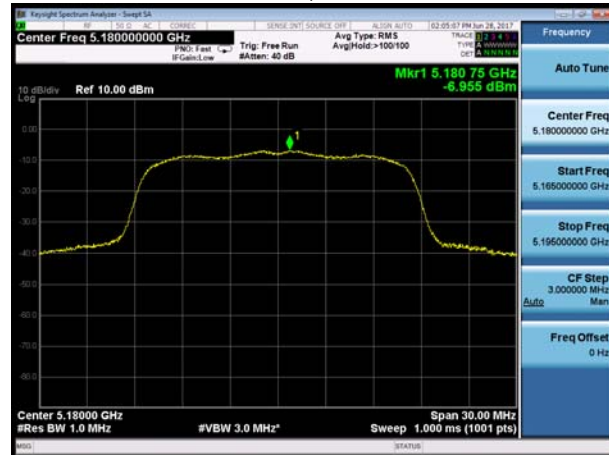
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.75\text{dB}$ .

**Test Results:**

| Network Standards  | Channel Number | Power Spectral Density (dBm / MHz)  | Limit (dBm / MHz)  | Conclusion |
|--------------------|----------------|-------------------------------------|--------------------|------------|
| U-NII-1<br>802.11a | 36             | -6.955                              | 17                 | PASS       |
|                    | 44             | -6.818                              | 17                 | PASS       |
|                    | 48             | -7.226                              | 17                 | PASS       |
| Network Standards  | Channel Number | Power Spectral Density (dBm/500kHz) | Limit (dBm/500kHz) | Conclusion |
| U-NII-3<br>802.11a | 149            | -15.131                             | 30                 | PASS       |
|                    | 157            | -13.078                             | 30                 | PASS       |
|                    | 165            | -12.681                             | 30                 | PASS       |



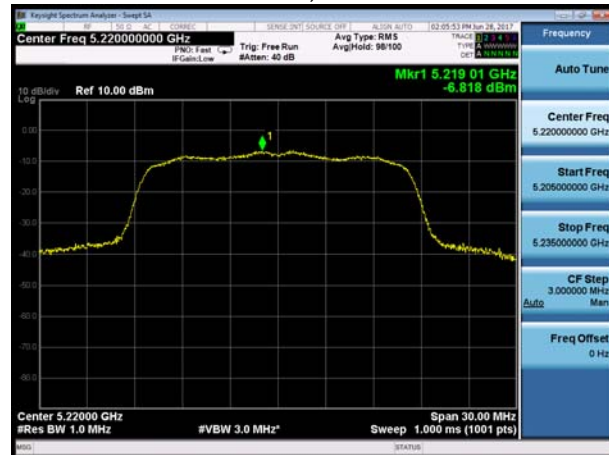
U-NII-1 802.11a, Channel No: 36



U-NII-3 802.11a, Channel No: 149



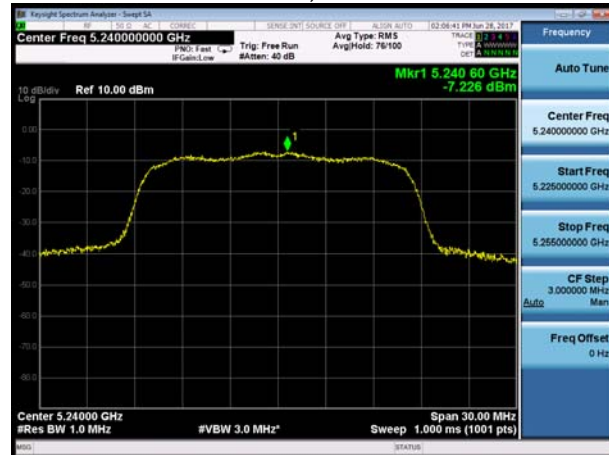
U-NII-1 802.11a, Channel No: 40



U-NII-3 802.11a, Channel No: 157



U-NII-1 802.11a, Channel No: 48



U-NII-3 802.11a, Channel No: 165



## 5.5. Unwanted Emission

### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

### Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10-2013. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration. Sweep the whole frequency band range from 9kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

Below 1GHz (detector: Peak and Quasi-Peak)

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

Above 1GHz (detector: Peak):

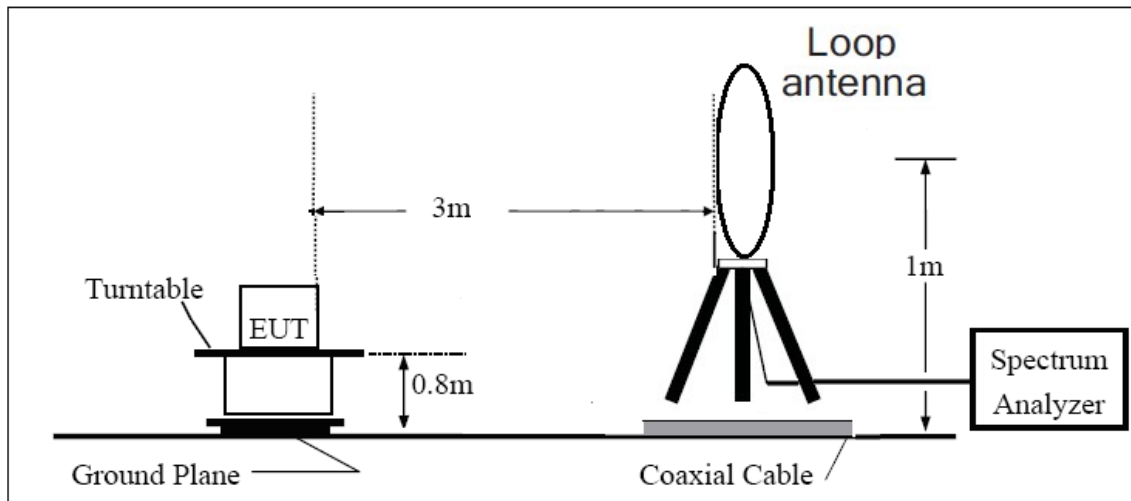
(a) PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

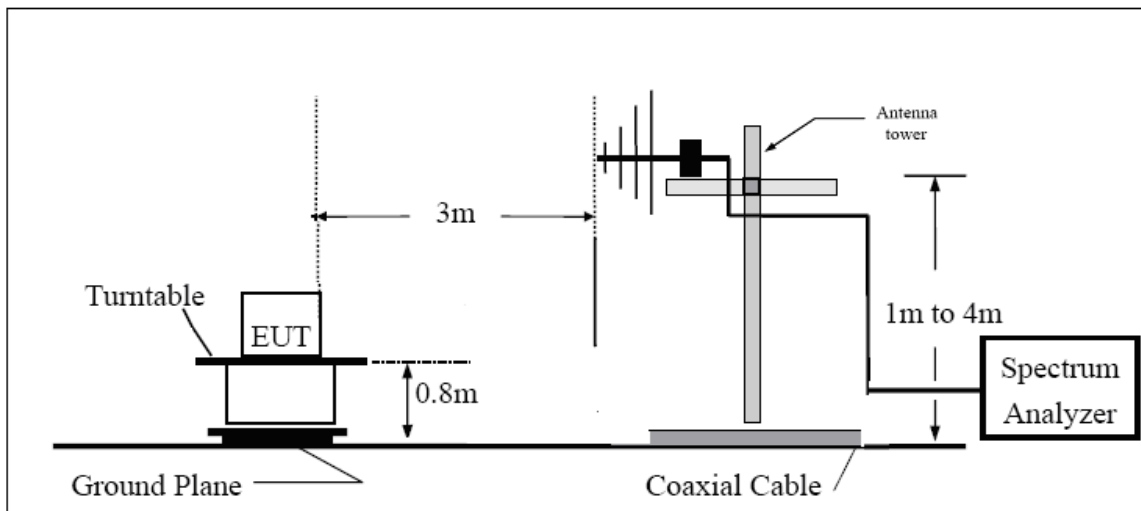
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

The test is in transmitting mode.

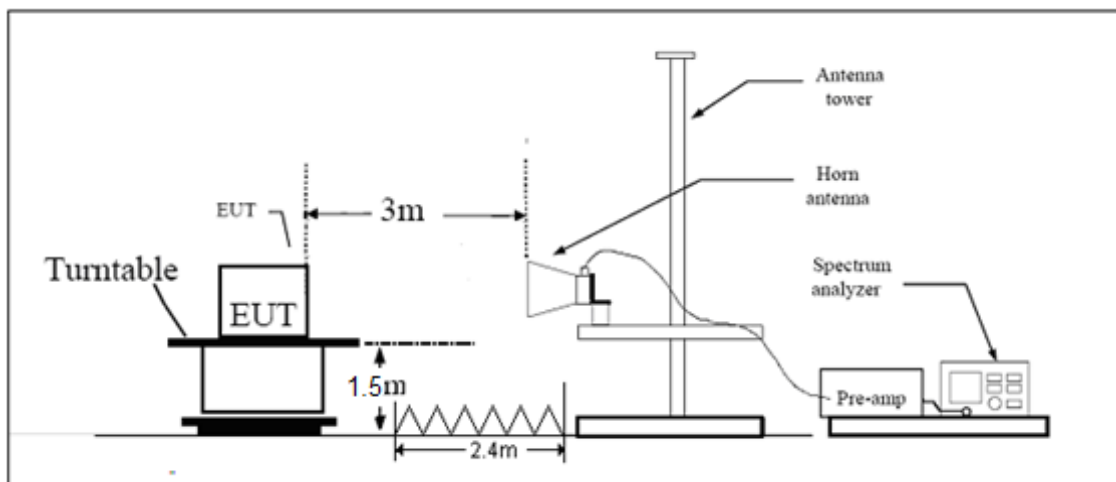
**9KHz~~~30MHz**



**30MHz~~~ 1GHz**



**Above 1GHz**



Note: Area side:2.4mX3.6m

## Limits

- (1) For transmitters operating in the 5725-5850 MHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17dBm/MHz (78.3dBμV/m); for frequencies 10MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz(68.3dBμV/m).

**Note:** The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$

| EIRP (dBm) | Field Strength at 3m (dBμV/m) |
|------------|-------------------------------|
| -17        | 78.3                          |
| -27        | 68.3                          |

- (2) For transmitters operating in the 5.15-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz(68.3dBμV/m).
- (3) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table.

| Frequency of emission (MHz) | Field strength(uV/m) | Field strength(dBuV/m) |
|-----------------------------|----------------------|------------------------|
| 0.009–0.490                 | 2400/F(kHz)          | /                      |
| 0.490–1.705                 | 24000/F(kHz)         | /                      |
| 1.705–30.0                  | 30                   | /                      |
| 30-88                       | 100                  | 40                     |
| 88-216                      | 150                  | 43.5                   |
| 216-960                     | 200                  | 46                     |
| Above960                    | 500                  | 54                     |

- (4) Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              |                       |                 |                  |

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

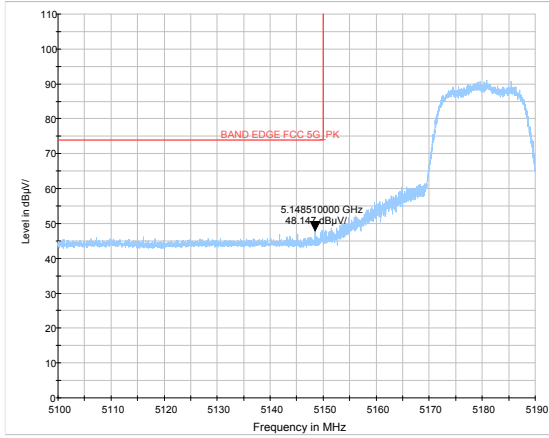
| Frequency    | Uncertainty |
|--------------|-------------|
| 9KHz-30MHz   | 3.55 dB     |
| 30MHz-200MHz | 4.19 dB     |
| 200MHz-1GHz  | 3.63 dB     |
| 1GHz-26.5G   | 3.68 dB     |
| 26.5G-40GHz  | 4.76dB      |

**Test Results:**

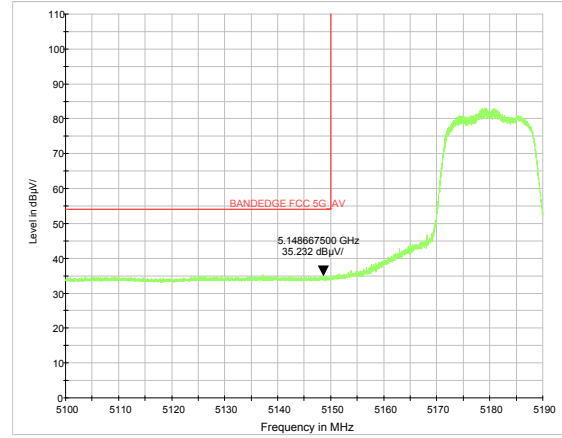
**PASS**

The signal beyond the limit is carrier.

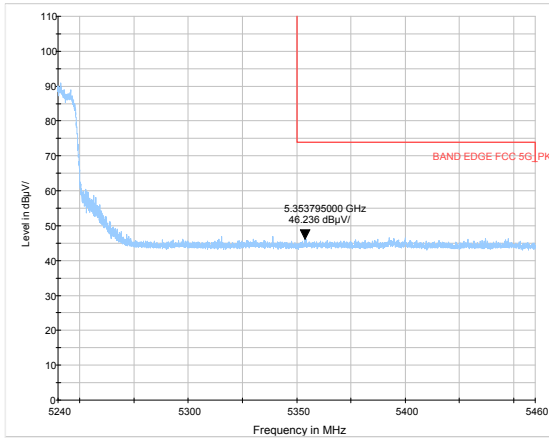
**802.11a-Channel 36: Peak**



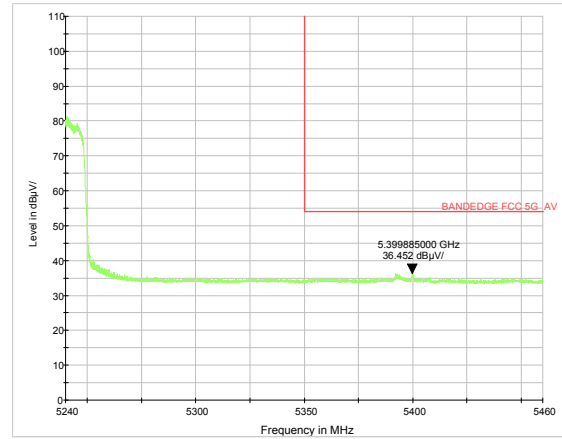
**802.11a-Channel 36: Average**



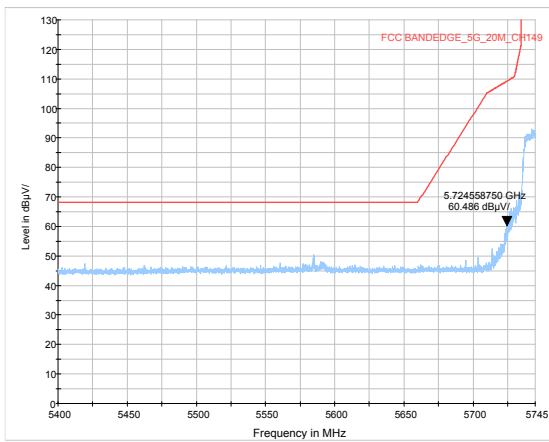
**802.11a-Channel 48: Peak**



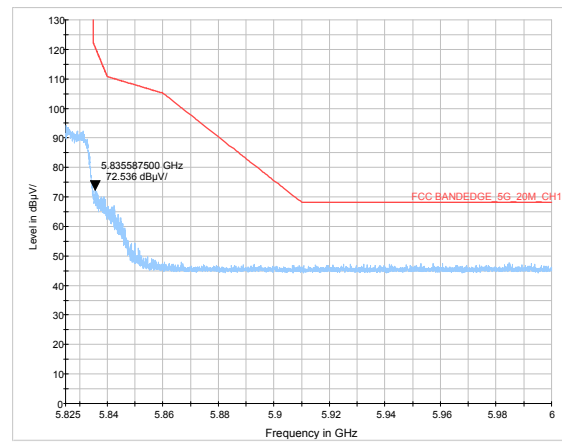
**802.11a-Channel 48: Average**



**802.11a-Channel 149: Peak**



**802.11a-Channel 165: Peak**



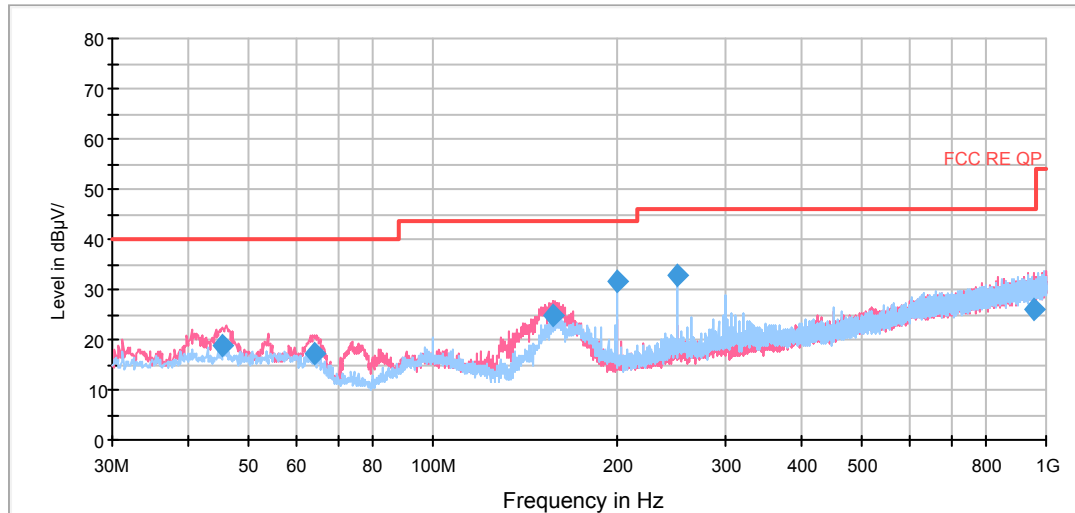
## Result of RE

### Test result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, and 9KHz-30MHz, the emissions more than 20 dB below the permissible value are not reported.

### Continuous TX mode:

FCC RE 0.03-1GHz QP Class B



Radiates Emission from 30MHz to 1GHz



## 802.11a CH36

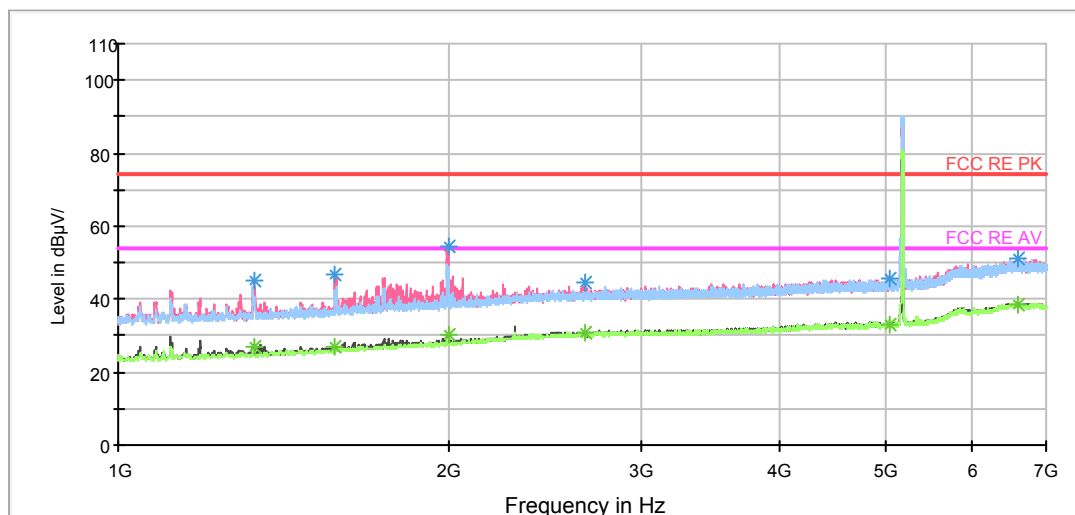
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1328.500000     | 44.9          | 100.0       | V            | 188.0         | 52.4                   | -7.5                | 29.1        | 74             |
| 1576.750000     | 46.9          | 100.0       | V            | 149.0         | 52.9                   | -6.0                | 27.1        | 74             |
| 1997.500000     | 54.7          | 100.0       | V            | 300.0         | 58.3                   | -3.6                | 19.3        | 74             |
| 2659.000000     | 44.7          | 100.0       | V            | 188.0         | 45.5                   | -0.8                | 29.3        | 74             |
| 5046.250000     | 45.7          | 100.0       | V            | 149.0         | 43.9                   | 1.8                 | 28.3        | 74             |
| 6591.250000     | 51.3          | 100.0       | V            | 0.0           | 43.9                   | 7.4                 | 22.7        | 74             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1328.500000     | 27.1             | 100.0       | V            | 188.0         | 34.6                   | -7.5                | 26.9        | 54             |
| 1576.750000     | 26.9             | 100.0       | V            | 149.0         | 32.9                   | -6.0                | 27.1        | 54             |
| 1997.500000     | 30.2             | 100.0       | V            | 300.0         | 33.8                   | -3.6                | 23.8        | 54             |
| 2659.000000     | 30.7             | 100.0       | V            | 188.0         | 31.5                   | -0.8                | 23.3        | 54             |
| 5047.000000     | 32.8             | 100.0       | V            | 0.0           | 31.0                   | 1.8                 | 21.2        | 54             |
| 6589.750000     | 38.6             | 100.0       | V            | 0.0           | 31.1                   | 7.5                 | 15.4        | 54             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

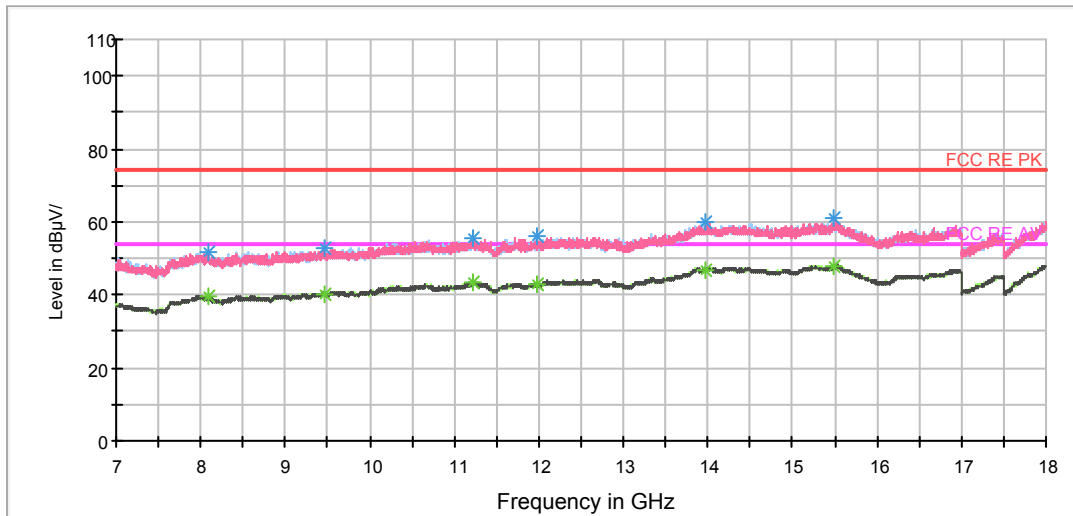
FCC RE 1G-18GHz PK+AV Class B



Note: The signal beyond the limit is carrier.

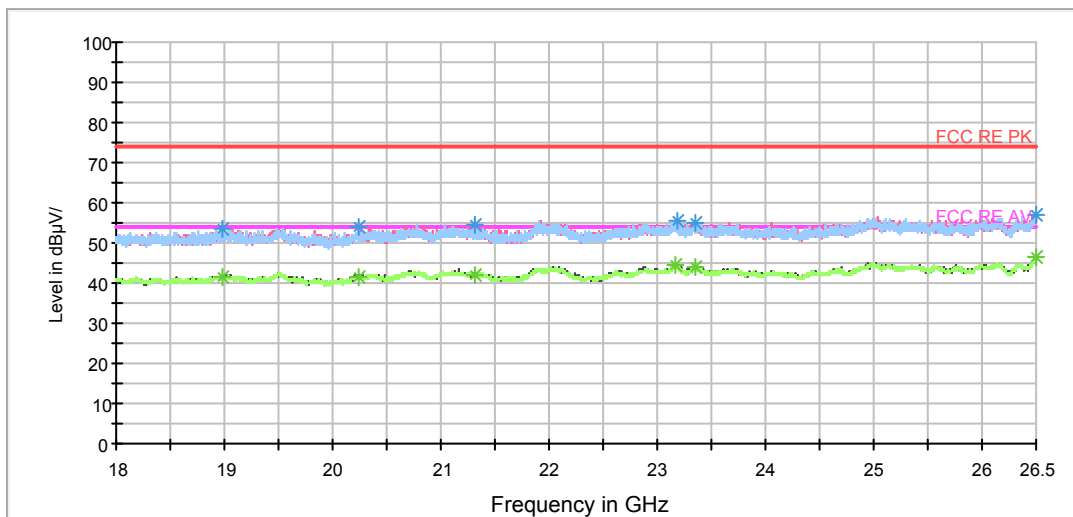
Radiates Emission from 1GHz to 7GHz

FCC RE 1G-18GHz PK+AV Class B



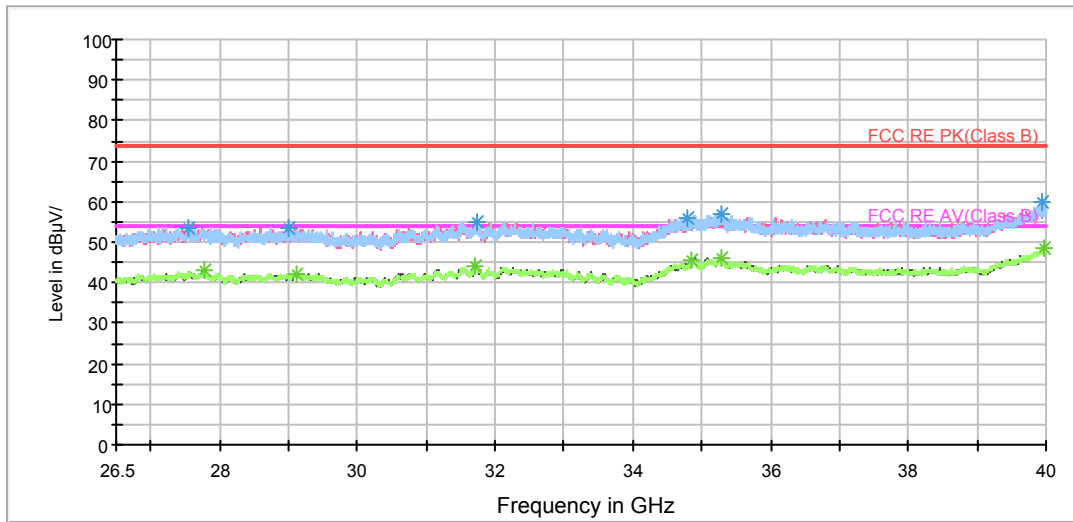
Radiates Emission from 7GHz to 18GHz

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

### 802.11a CH40

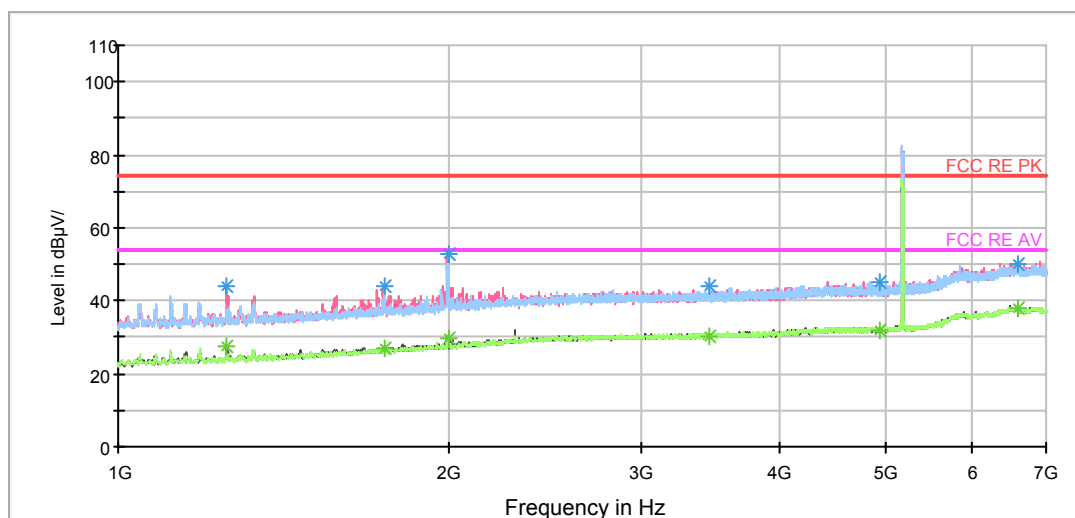
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1255.750000     | 44.1          | 100.0       | V            | 232.0         | 51.9                   | -7.8                | 29.9        | 74             |
| 1746.250000     | 44.1          | 100.0       | V            | 354.0         | 49.1                   | -5.0                | 29.9        | 74             |
| 1999.000000     | 52.9          | 100.0       | V            | 350.0         | 56.5                   | -3.6                | 21.1        | 74             |
| 3456.250000     | 44.0          | 100.0       | H            | 194.0         | 44.0                   | 0.0                 | 30.0        | 74             |
| 4930.750000     | 45.2          | 100.0       | H            | 5.0           | 43.6                   | 1.6                 | 28.8        | 74             |
| 6592.750000     | 49.9          | 100.0       | H            | 154.0         | 42.5                   | 7.4                 | 24.1        | 74             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1255.750000     | 27.6             | 100.0       | V            | 232.0         | 35.4                   | -7.8                | 26.4        | 54             |
| 1746.250000     | 26.7             | 100.0       | V            | 354.0         | 31.7                   | -5.0                | 27.3        | 54             |
| 1999.000000     | 29.7             | 100.0       | V            | 350.0         | 33.3                   | -3.6                | 24.3        | 54             |
| 3456.250000     | 30.4             | 100.0       | V            | 356.0         | 30.4                   | 0.0                 | 23.6        | 54             |
| 4930.750000     | 32.1             | 100.0       | H            | 5.0           | 30.5                   | 1.6                 | 21.9        | 54             |
| 6592.750000     | 38.0             | 100.0       | V            | 335.0         | 30.6                   | 7.4                 | 16.0        | 54             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

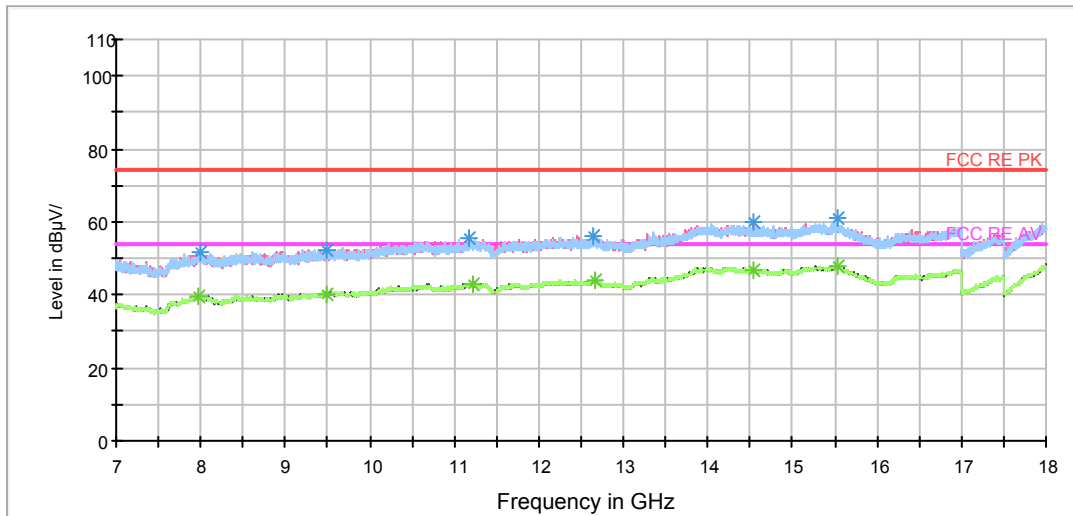
FCC RE 1G-18GHz PK+AV Class B



Note: The signal beyond the limit is carrier.

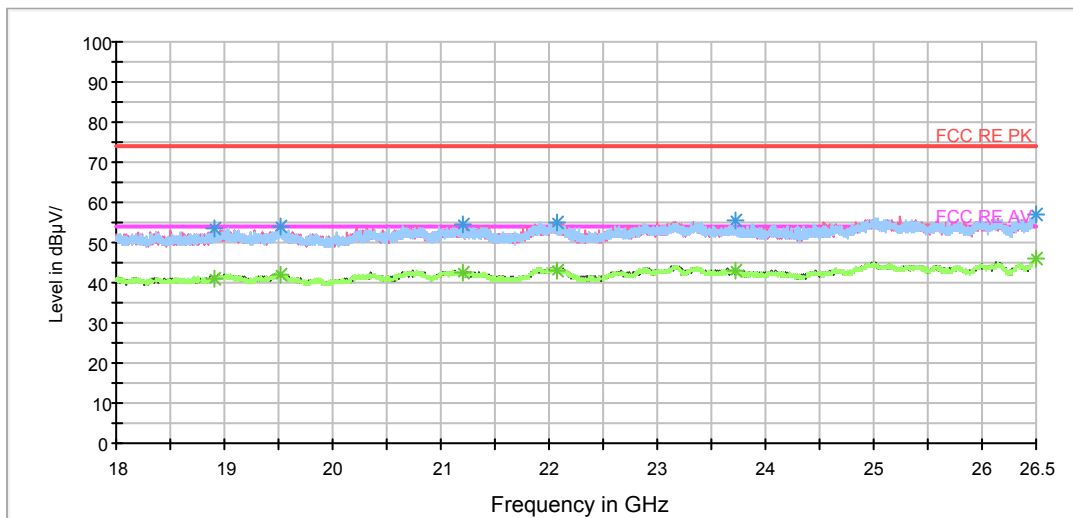
Radiates Emission from 1GHz to 7GHz

FCC RE 1G-18GHz PK+AV Class B



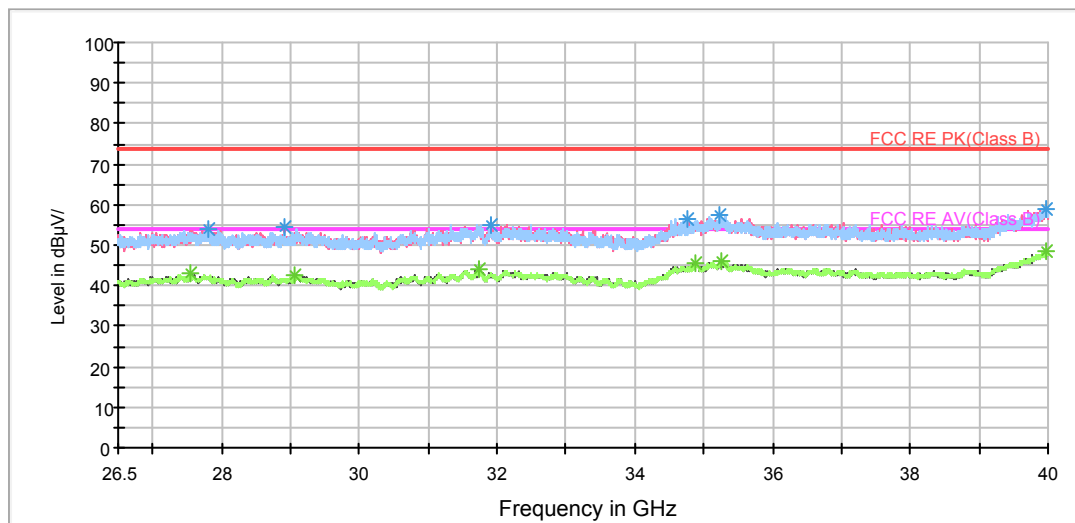
Radiates Emission from 7GHz to 18GHz

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

### 802.11a CH48

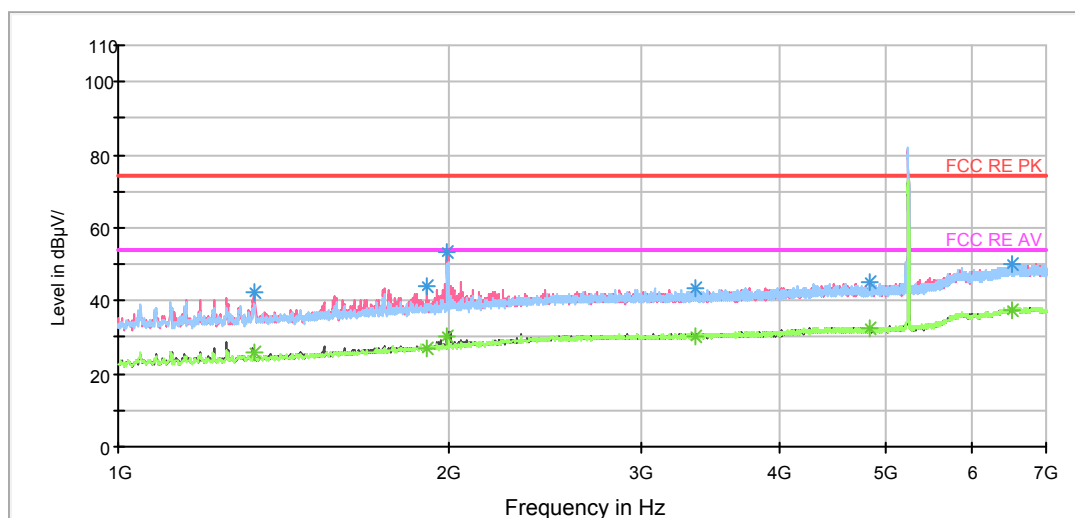
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1328.500000     | 42.1          | 100.0       | V            | 151.0         | 49.6                   | -7.5                | 31.9        | 74             |
| 1912.000000     | 44.0          | 100.0       | V            | 151.0         | 47.9                   | -3.9                | 30.0        | 74             |
| 1995.250000     | 53.1          | 100.0       | V            | 350.0         | 56.7                   | -3.6                | 20.9        | 74             |
| 3361.000000     | 43.2          | 100.0       | H            | 0.0           | 43.3                   | -0.1                | 30.8        | 74             |
| 4839.250000     | 44.9          | 100.0       | V            | 297.0         | 43.1                   | 1.8                 | 29.1        | 74             |
| 6504.250000     | 50.0          | 100.0       | V            | 124.0         | 42.7                   | 7.3                 | 24.0        | 74             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1328.500000     | 25.9             | 100.0       | H            | 1.0           | 33.4                   | -7.5                | 28.1        | 54             |
| 1912.000000     | 27.0             | 100.0       | V            | 151.0         | 30.9                   | -3.9                | 27.0        | 54             |
| 1995.250000     | 30.0             | 100.0       | V            | 350.0         | 33.6                   | -3.6                | 24.0        | 54             |
| 3361.000000     | 30.4             | 100.0       | H            | 0.0           | 30.5                   | -0.1                | 23.6        | 54             |
| 4839.250000     | 32.4             | 100.0       | H            | 10.0          | 30.6                   | 1.8                 | 21.6        | 54             |
| 6504.250000     | 37.6             | 100.0       | H            | 16.0          | 30.3                   | 7.3                 | 16.4        | 54             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

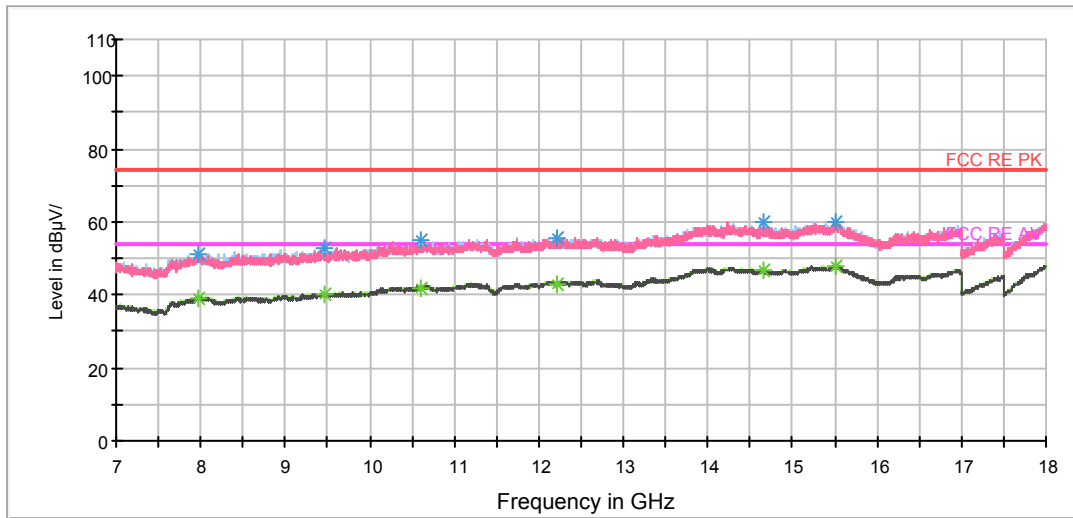
FCC RE 1G-18GHz PK+AV Class B



Note: The signal beyond the limit is carrier.

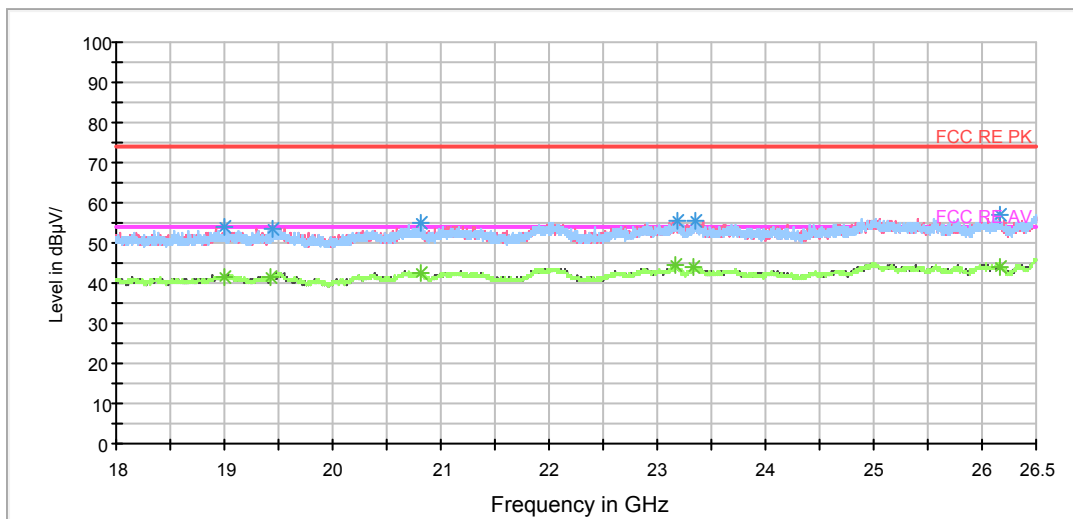
Radiates Emission from 1GHz to 7GHz

FCC RE 1G-18GHz PK+AV Class B



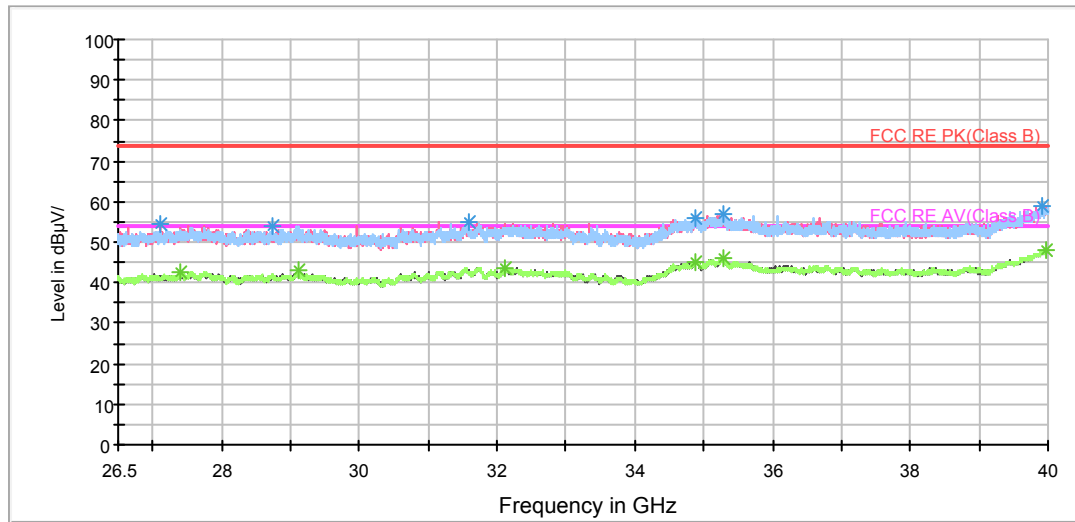
Radiates Emission from 7GHz to 18GHz

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

### 802.11a CH149

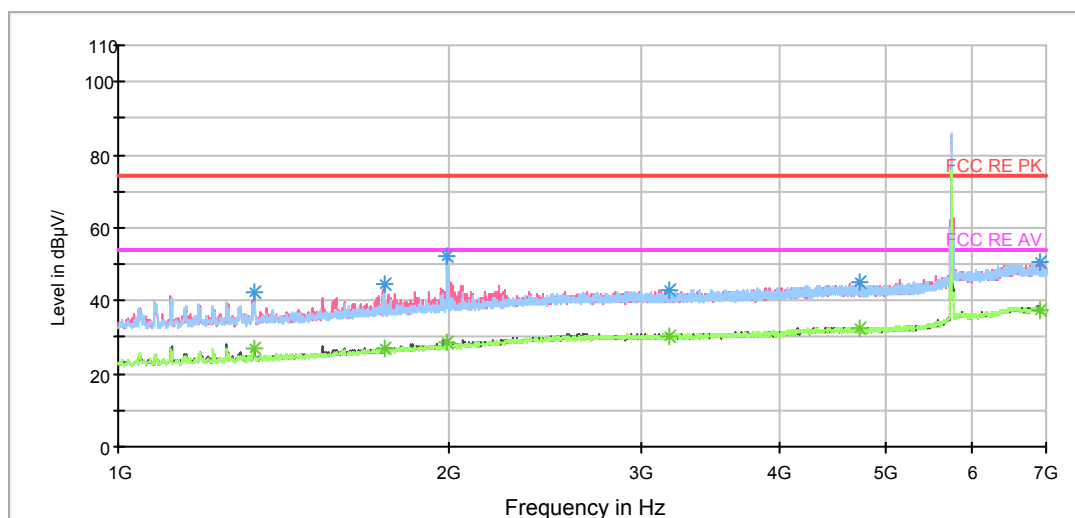
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1331.500000     | 42.1          | 100.0       | V            | 180.0         | 49.6                   | -7.5                | 31.9        | 74             |
| 1745.500000     | 44.6          | 100.0       | V            | 0.0           | 49.6                   | -5.0                | 29.4        | 74             |
| 1993.750000     | 52.2          | 100.0       | V            | 352.0         | 55.8                   | -3.6                | 21.8        | 74             |
| 3175.750000     | 43.0          | 100.0       | H            | 112.0         | 43.2                   | -0.2                | 31.0        | 74             |
| 4732.000000     | 45.1          | 100.0       | V            | 0.0           | 43.5                   | 1.6                 | 28.9        | 74             |
| 6901.000000     | 50.4          | 100.0       | V            | 180.0         | 43.1                   | 7.3                 | 23.6        | 74             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1331.500000     | 27.0             | 100.0       | V            | 180.0         | 34.5                   | -7.5                | 27.0        | 54             |
| 1745.500000     | 26.8             | 100.0       | V            | 0.0           | 31.8                   | -5.0                | 27.2        | 54             |
| 1993.750000     | 28.8             | 100.0       | V            | 352.0         | 32.4                   | -3.6                | 25.2        | 54             |
| 3175.750000     | 30.3             | 100.0       | V            | 0.0           | 30.5                   | -0.2                | 23.7        | 54             |
| 4732.000000     | 32.2             | 100.0       | V            | 0.0           | 30.6                   | 1.6                 | 21.8        | 54             |
| 6901.000000     | 37.6             | 100.0       | V            | 180.0         | 30.3                   | 7.3                 | 16.4        | 54             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

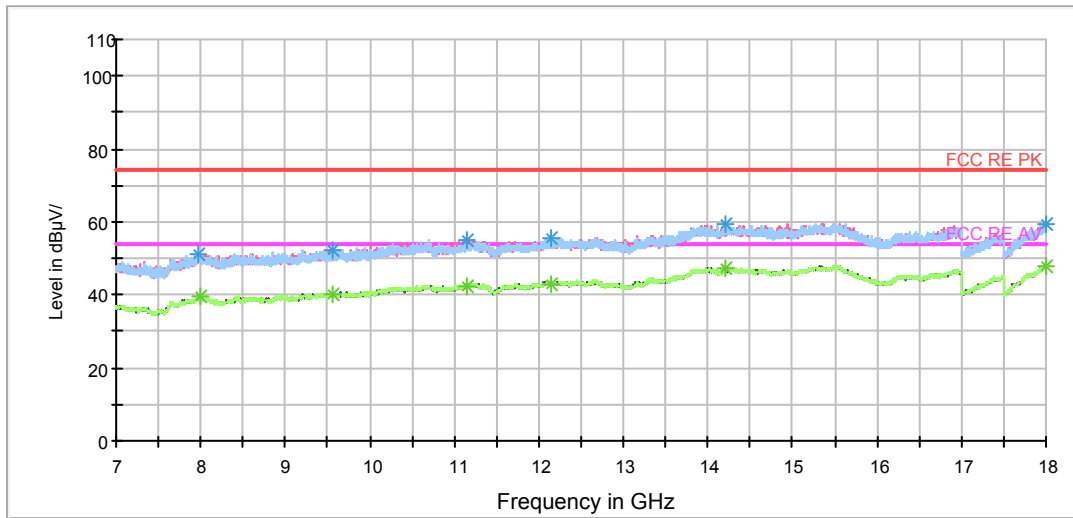
FCC RE 1G-18GHz PK+AV Class B



Note: The signal beyond the limit is carrier.

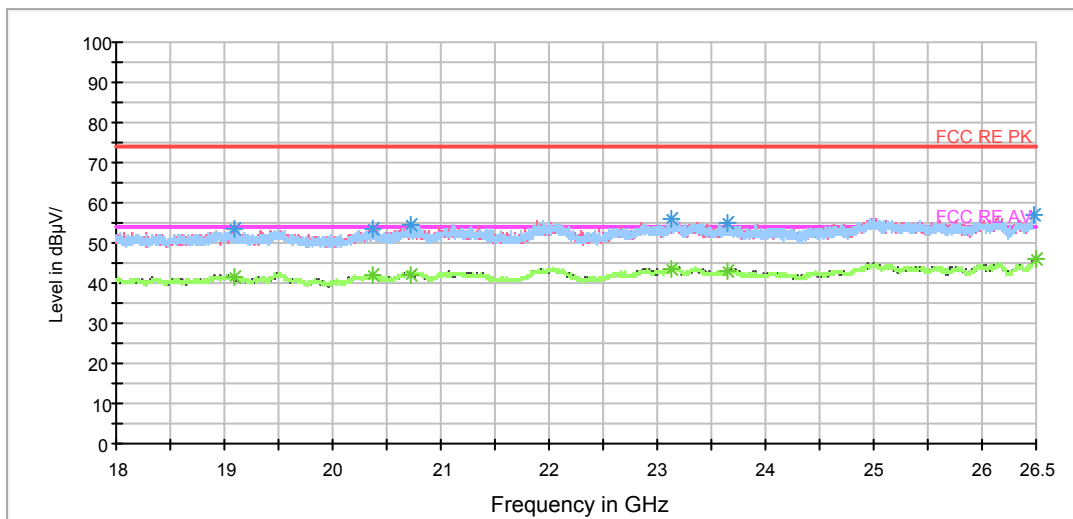
Radiates Emission from 1GHz to 7GHz

FCC RE 1G-18GHz PK+AV Class B



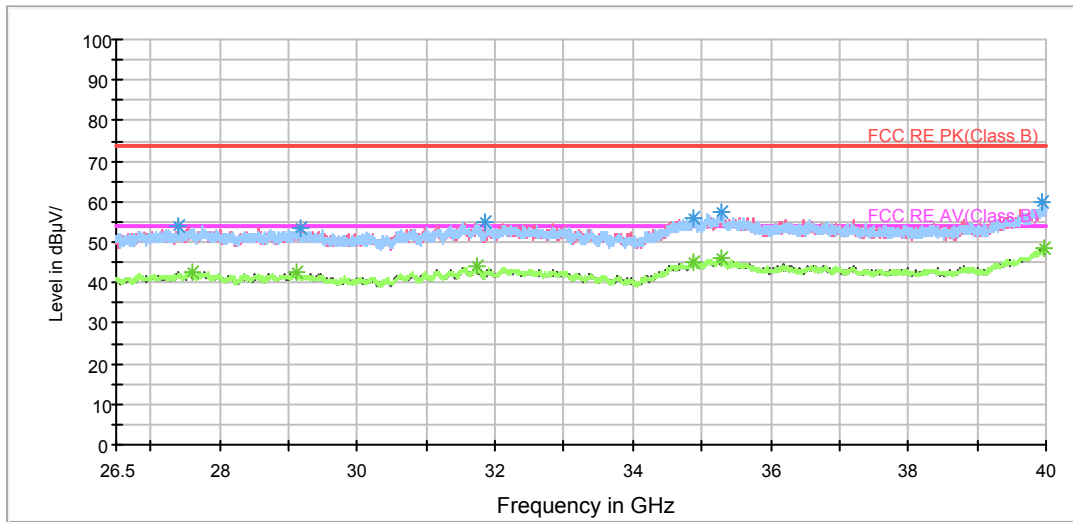
Radiates Emission from 7GHz to 18GHz

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

### 802.11a CH157

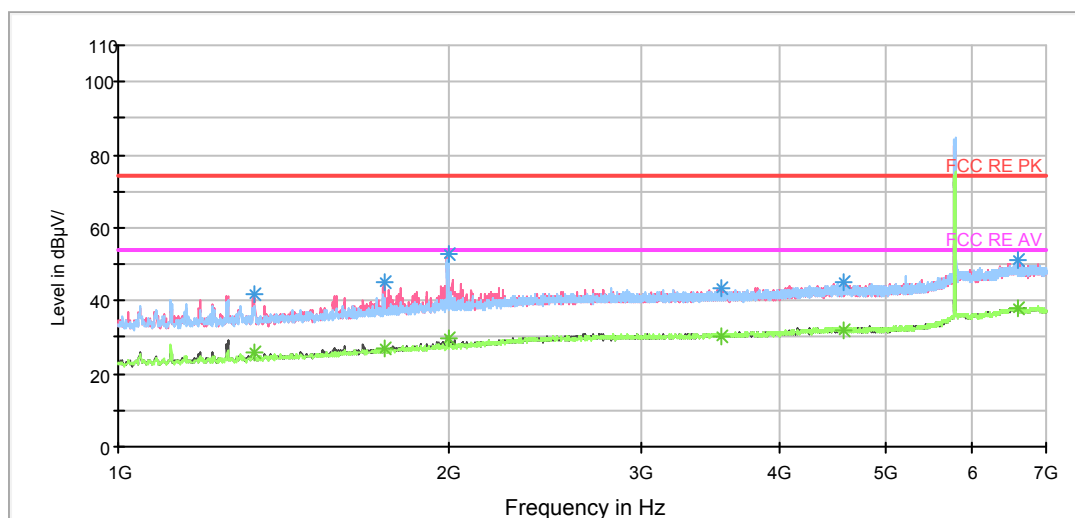
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1328.500000     | 41.6          | 100.0       | V            | 165.0         | 49.1                   | -7.5                | 32.4        | 74             |
| 1745.500000     | 45.0          | 100.0       | V            | 340.0         | 50.0                   | -5.0                | 29.0        | 74             |
| 1998.250000     | 53.0          | 100.0       | V            | 348.0         | 56.6                   | -3.6                | 21.0        | 74             |
| 3541.750000     | 43.3          | 100.0       | V            | 0.0           | 43.2                   | 0.1                 | 30.7        | 74             |
| 4583.500000     | 44.9          | 100.0       | H            | 0.0           | 43.2                   | 1.7                 | 29.1        | 74             |
| 6597.250000     | 51.0          | 100.0       | H            | 207.0         | 43.6                   | 7.4                 | 23.0        | 74             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1328.500000     | 25.7             | 100.0       | V            | 165.0         | 33.2                   | -7.5                | 28.3        | 54             |
| 1745.500000     | 26.7             | 100.0       | V            | 340.0         | 31.7                   | -5.0                | 27.3        | 54             |
| 1998.250000     | 29.6             | 100.0       | V            | 348.0         | 33.2                   | -3.6                | 24.4        | 54             |
| 3541.750000     | 30.3             | 100.0       | H            | 28.0          | 30.2                   | 0.1                 | 23.7        | 54             |
| 4583.500000     | 32.1             | 100.0       | H            | 0.0           | 30.4                   | 1.7                 | 21.9        | 54             |
| 6597.250000     | 37.8             | 100.0       | V            | 359.0         | 30.4                   | 7.4                 | 16.2        | 54             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

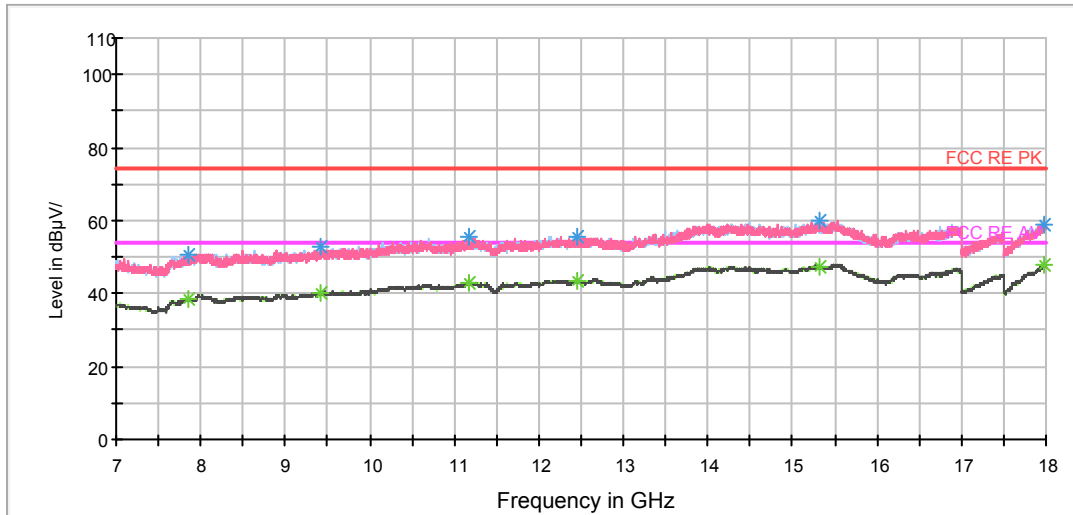
FCC RE 1G-18GHz PK+AV Class B



Note: The signal beyond the limit is carrier.

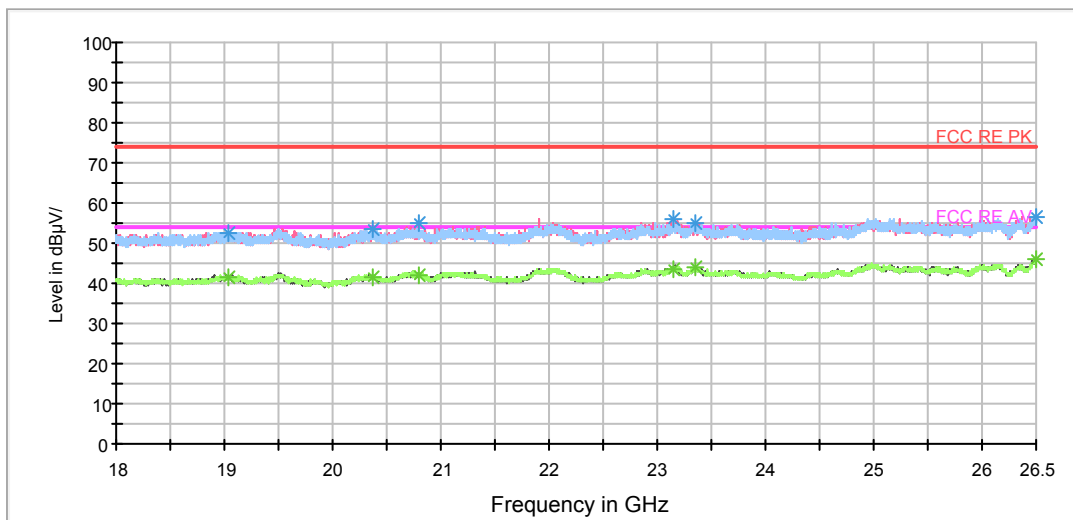
Radiates Emission from 1GHz to 7GHz

FCC RE 1G-18GHz PK+AV Class B



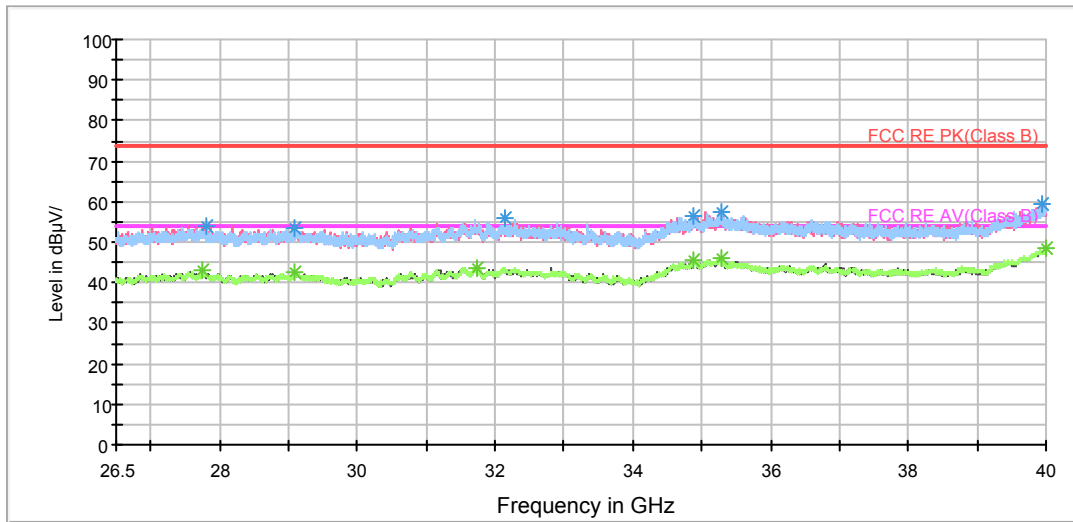
Radiates Emission from 7GHz to 18GHz

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

### 802.11a CH165

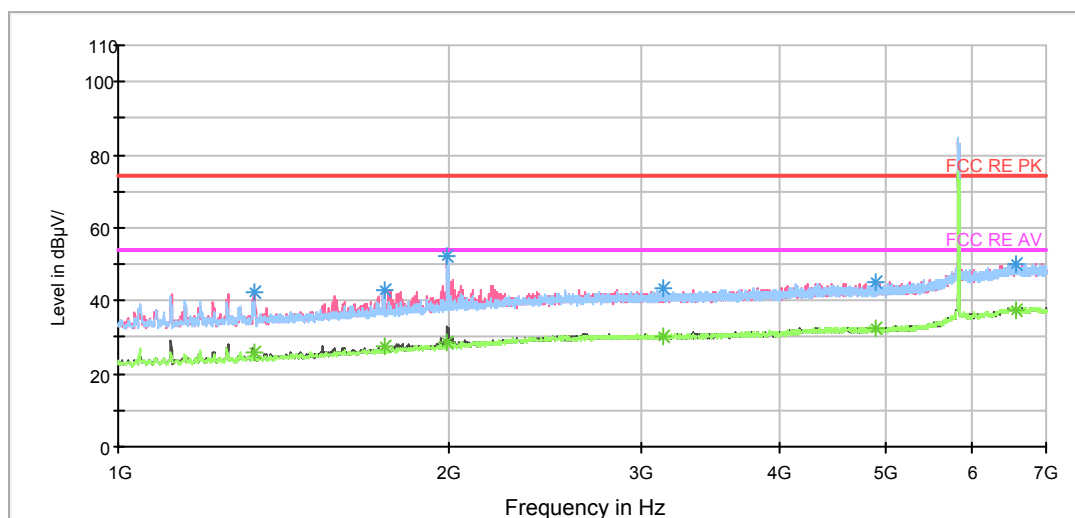
| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1330.750000     | 42.1          | 100.0       | V            | 166.0         | 49.6                   | -7.5                | 31.9        | 74             |
| 1748.500000     | 43.0          | 100.0       | V            | 358.0         | 48.0                   | -5.0                | 31.0        | 74             |
| 1990.750000     | 52.5          | 100.0       | V            | 350.0         | 56.1                   | -3.6                | 21.5        | 74             |
| 3138.250000     | 43.5          | 100.0       | H            | 36.0          | 43.8                   | -0.3                | 30.5        | 74             |
| 4895.500000     | 44.9          | 100.0       | V            | 335.0         | 43.1                   | 1.8                 | 29.1        | 74             |
| 6579.250000     | 50.2          | 100.0       | V            | 111.0         | 42.8                   | 7.4                 | 23.8        | 74             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1330.750000     | 25.9             | 100.0       | V            | 166.0         | 33.4                   | -7.5                | 28.1        | 54             |
| 1748.500000     | 27.4             | 100.0       | V            | 358.0         | 32.4                   | -5.0                | 26.6        | 54             |
| 1990.750000     | 28.4             | 100.0       | V            | 350.0         | 32.0                   | -3.6                | 25.6        | 54             |
| 3138.250000     | 30.4             | 100.0       | H            | 36.0          | 30.7                   | -0.3                | 23.6        | 54             |
| 4895.500000     | 32.4             | 100.0       | H            | 0.0           | 30.6                   | 1.8                 | 21.6        | 54             |
| 6579.250000     | 37.6             | 100.0       | V            | 111.0         | 30.2                   | 7.4                 | 16.4        | 54             |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

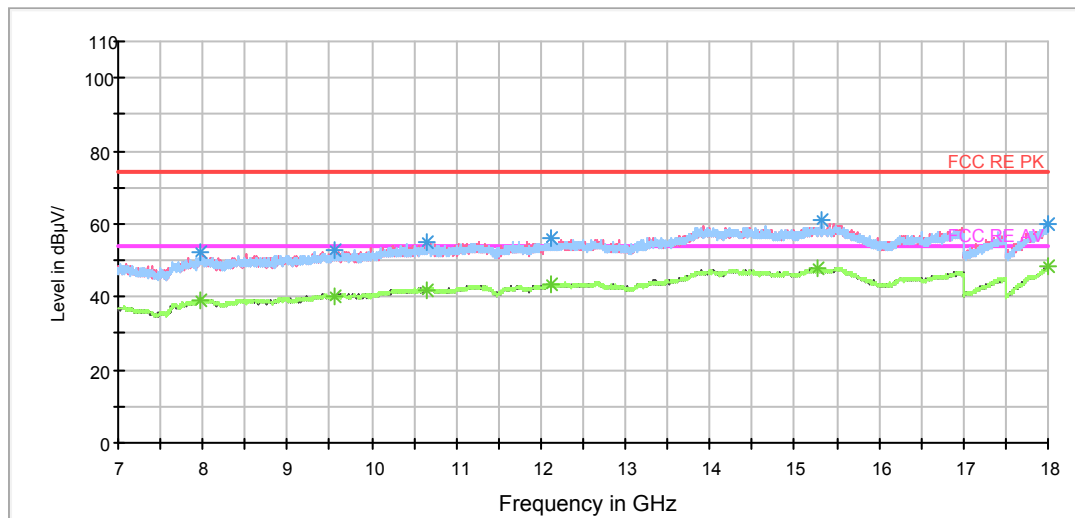
FCC RE 1G-18GHz PK+AV Class B



Note: The signal beyond the limit is carrier.

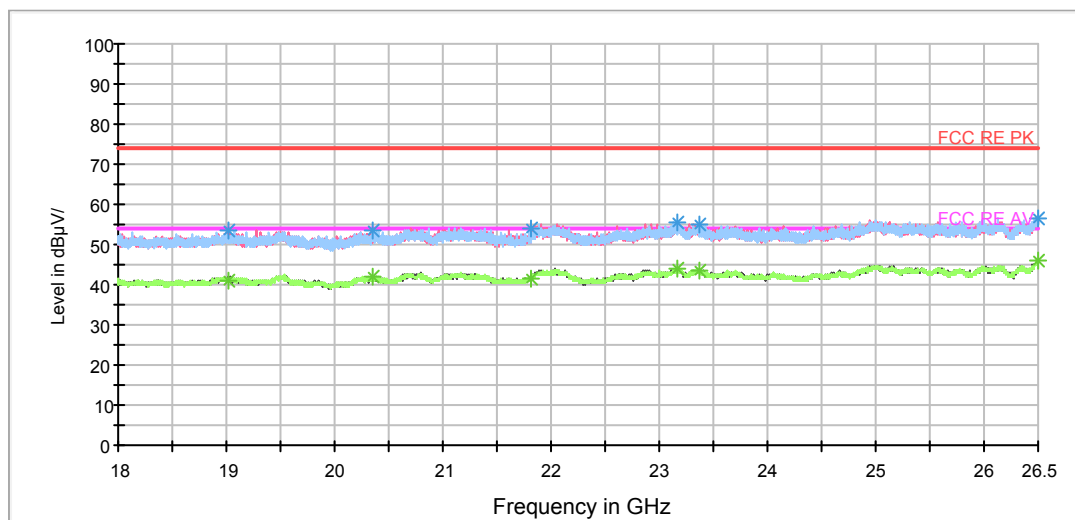
Radiates Emission from 1GHz to 7GHz

FCC RE 1G-18GHz PK+AV Class B



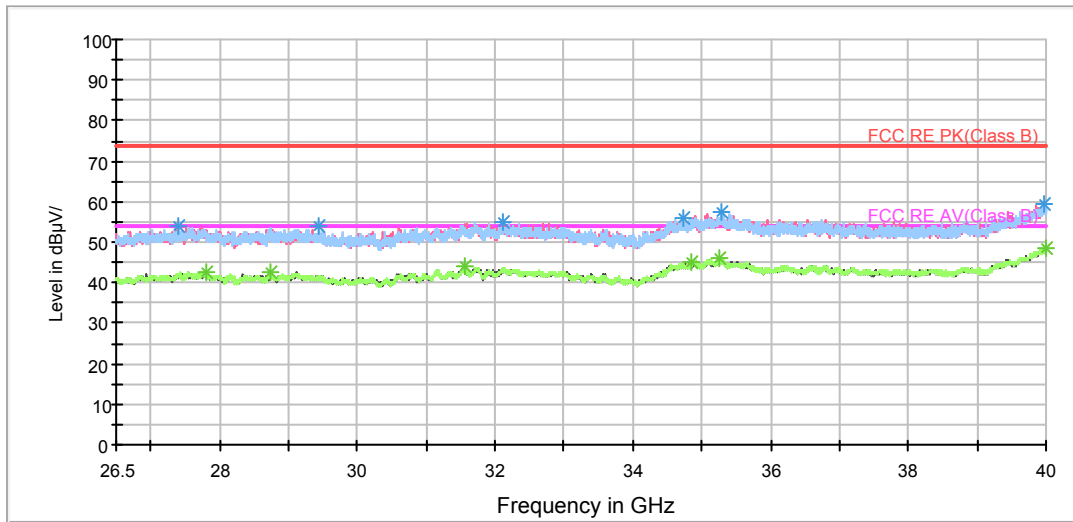
Radiates Emission from 7GHz to 18GHz

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

## 5.6. Conducted Emission

### Ambient condition

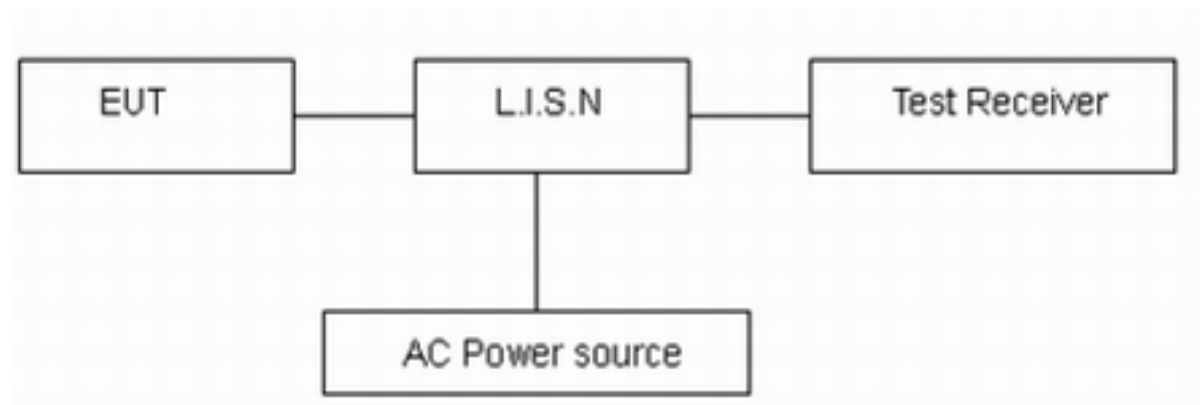
| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

### Methods of Measurement

The EUT IS placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10-2013. Connect the AC power line of the EUT to the LISN Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9kHz, VBW is set to 30kHz The measurement result should include both L line and N line.

The test is in transmitting mode.

### Test Setup



Note: AC Power source is used to change the voltage 110V/60Hz.

### Limits

| Frequency<br>(MHz) | Conducted Limits(dBμV) |            |
|--------------------|------------------------|------------|
|                    | Quasi-peak             | Average    |
| 0.15 - 0.5         | 66 to 56 *             | 56 to 46 * |
| 0.5 - 5            | 56                     | 46         |
| 5 - 30             | 60                     | 50         |

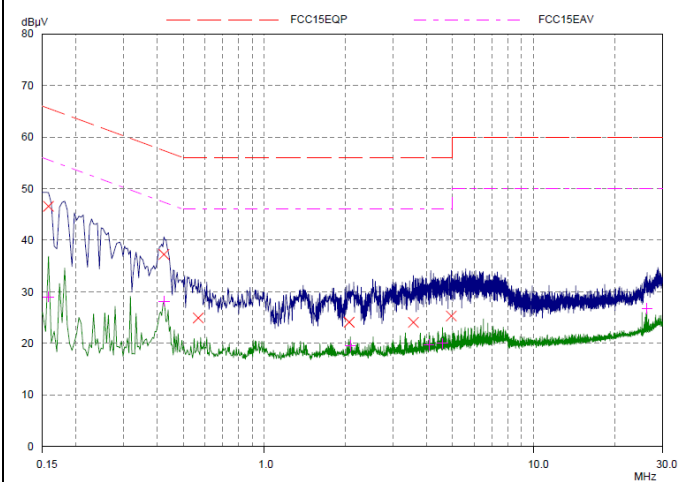
\*: Decreases with the logarithm of the frequency.

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 2.69$  dB.

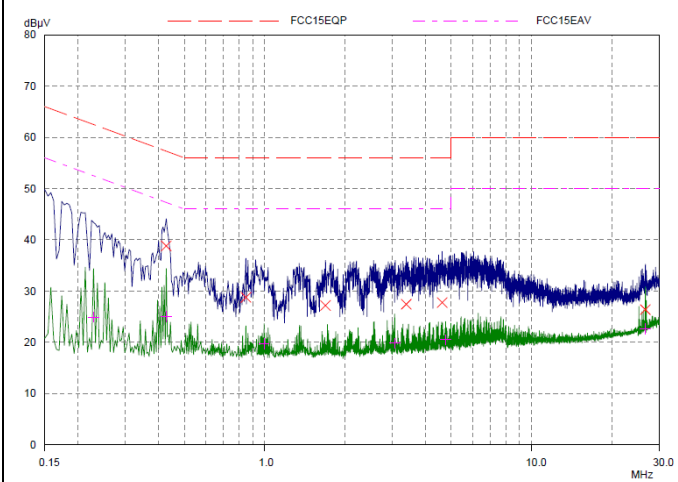
**Test Results:**

Following plots, Blue trace uses the peak detection, Green trace uses the average detection.

**U-NII-1, 802.11a, Channel No: 36, L Line****Final Measurement Results**

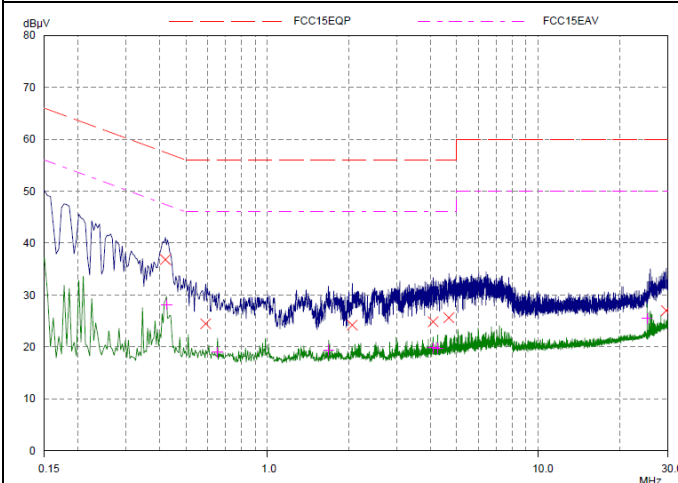
| Frequency MHz | QP Level dBμV | QP Limit dBμV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15781       | 46.59         | 65.58         | 18.99       | L1      | gnd  |
| 0.42343       | 37.26         | 57.38         | 20.12       | L1      | gnd  |
| 0.56796       | 24.93         | 56.00         | 31.07       | L1      | gnd  |
| 2.06406       | 24.11         | 56.00         | 31.89       | L1      | gnd  |
| 3.57187       | 24.06         | 56.00         | 31.94       | L1      | gnd  |
| 4.94296       | 25.30         | 56.00         | 30.70       | L1      | gnd  |

| Frequency MHz | AV Level dBμV | AV Limit dBμV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15781       | 29.02         | 55.58         | 26.56       | L1      | gnd  |
| 0.42343       | 28.19         | 47.38         | 19.19       | L1      | gnd  |
| 2.08359       | 19.53         | 46.00         | 26.47       | L1      | gnd  |
| 4.08359       | 19.77         | 46.00         | 26.23       | L1      | gnd  |
| 4.57968       | 19.99         | 46.00         | 26.01       | L1      | gnd  |
| 26.31015      | 26.72         | 50.00         | 23.28       | L1      | gnd  |

**U-NII-1, 802.11a, Channel No: 36, N Line****Final Measurement Results**

| Frequency MHz | QP Level dBμV | QP Limit dBμV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.42734       | 38.82         | 57.30         | 18.48       | N       | gnd  |
| 0.84921       | 28.78         | 56.00         | 27.22       | N       | gnd  |
| 1.68906       | 27.19         | 56.00         | 28.81       | N       | gnd  |
| 3.38828       | 27.43         | 56.00         | 28.57       | N       | gnd  |
| 4.61875       | 27.77         | 56.00         | 28.23       | N       | gnd  |
| 26.68515      | 26.38         | 60.00         | 33.62       | N       | gnd  |

| Frequency MHz | AV Level dBμV | AV Limit dBμV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.22812       | 24.93         | 52.52         | 27.59       | N       | gnd  |
| 0.42734       | 25.02         | 47.30         | 22.28       | N       | gnd  |
| 0.99375       | 19.72         | 46.00         | 26.28       | N       | gnd  |
| 3.06796       | 19.83         | 46.00         | 26.17       | N       | gnd  |
| 4.75937       | 20.51         | 46.00         | 25.49       | N       | gnd  |
| 26.68515      | 22.64         | 50.00         | 27.36       | N       | gnd  |

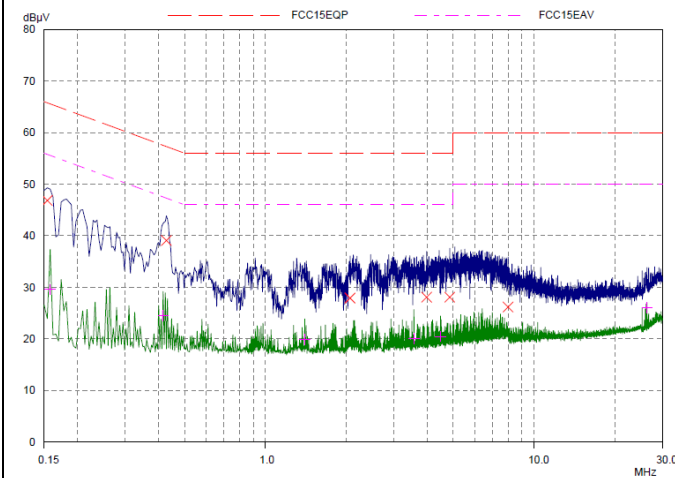
**U-NII-1, 802.11a, Channel No: 40, L Line****Final Measurement Results**

| Frequency MHz | QP Level dBμV | QP Limit dBμV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.41953       | 36.83         | 57.46         | 20.63       | L1      | gnd  |
| 0.5914        | 24.47         | 56.00         | 31.53       | L1      | gnd  |
| 2.05625       | 24.21         | 56.00         | 31.79       | L1      | gnd  |
| 4.0875        | 24.86         | 56.00         | 31.14       | L1      | gnd  |
| 4.67734       | 25.65         | 56.00         | 30.35       | L1      | gnd  |
| 29.69687      | 27.01         | 60.00         | 32.99       | L1      | gnd  |

| Frequency MHz | AV Level dBμV | AV Limit dBμV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.42343       | 28.19         | 47.38         | 19.19       | L1      | gnd  |
| 0.6539        | 19.00         | 46.00         | 27.00       | L1      | gnd  |
| 1.68125       | 19.34         | 46.00         | 26.66       | L1      | gnd  |
| 4.0875        | 19.84         | 46.00         | 26.16       | L1      | gnd  |
| 4.24765       | 19.80         | 46.00         | 26.20       | L1      | gnd  |
| 25.22812      | 25.50         | 50.00         | 24.50       | L1      | gnd  |



## U-NII-1, 802.11a, Channel No: 40, N Line

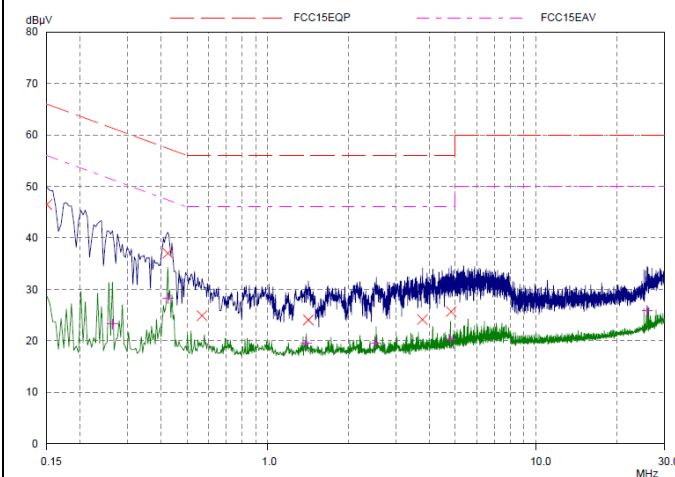


## Final Measurement Results

| Frequency MHz | QP Level dBuV | QP Limit dBuV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.1539        | 46.84         | 65.79         | 18.95       | N       | gnd  |
| 0.42734       | 39.08         | 57.30         | 18.22       | N       | gnd  |
| 2.06406       | 27.91         | 56.00         | 28.09       | N       | gnd  |
| 3.97812       | 28.09         | 56.00         | 27.91       | N       | gnd  |
| 4.84921       | 28.07         | 56.00         | 27.93       | N       | gnd  |
| 8.00156       | 26.20         | 60.00         | 33.80       | N       | gnd  |

| Frequency MHz | AV Level dBuV | AV Limit dBuV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15781       | 29.59         | 55.58         | 25.99       | N       | gnd  |
| 0.41562       | 24.48         | 47.54         | 23.06       | N       | gnd  |
| 1.4           | 19.93         | 46.00         | 26.07       | N       | gnd  |
| 3.56796       | 20.06         | 46.00         | 25.94       | N       | gnd  |
| 4.47812       | 20.47         | 46.00         | 25.53       | N       | gnd  |
| 26.30625      | 26.04         | 50.00         | 23.96       | N       | gnd  |

## U-NII-1, 802.11a, Channel No: 48, L Line

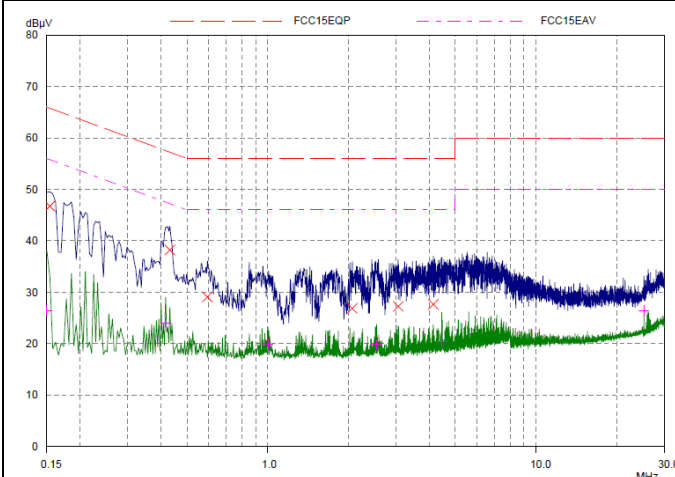


## Final Measurement Results

| Frequency MHz | QP Level dBuV | QP Limit dBuV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15          | 46.47         | 66.00         | 19.53       | L1      | gnd  |
| 0.42343       | 37.02         | 57.38         | 20.36       | L1      | gnd  |
| 0.56796       | 24.87         | 56.00         | 31.13       | L1      | gnd  |
| 1.41562       | 24.04         | 56.00         | 31.96       | L1      | gnd  |
| 3.77109       | 24.13         | 56.00         | 31.87       | L1      | gnd  |
| 4.82578       | 25.68         | 56.00         | 30.32       | L1      | gnd  |

| Frequency MHz | AV Level dBuV | AV Limit dBuV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.26328       | 23.26         | 51.33         | 28.07       | L1      | gnd  |
| 0.42343       | 28.25         | 47.38         | 19.13       | L1      | gnd  |
| 1.39218       | 19.57         | 46.00         | 26.43       | L1      | gnd  |
| 2.53281       | 19.60         | 46.00         | 26.40       | L1      | gnd  |
| 4.79453       | 20.19         | 46.00         | 25.81       | L1      | gnd  |
| 25.92734      | 25.83         | 50.00         | 24.17       | L1      | gnd  |

## U-NII-1, 802.11a, Channel No: 48, N Line



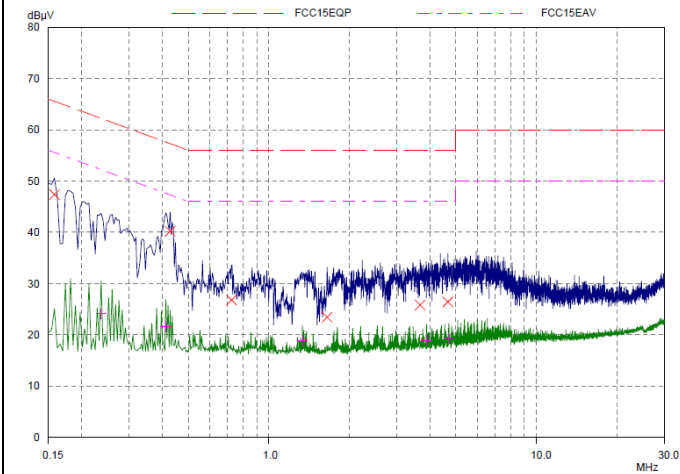
## Final Measurement Results

| Frequency MHz | QP Level dBuV | QP Limit dBuV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.1539        | 46.74         | 65.79         | 19.05       | N       | gnd  |
| 0.43125       | 38.21         | 57.23         | 19.02       | N       | gnd  |
| 0.59531       | 29.07         | 56.00         | 26.93       | N       | gnd  |
| 2.06406       | 26.87         | 56.00         | 29.13       | N       | gnd  |
| 3.06015       | 27.25         | 56.00         | 28.75       | N       | gnd  |
| 4.13828       | 27.66         | 56.00         | 28.34       | N       | gnd  |

| Frequency MHz | AV Level dBuV | AV Limit dBuV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15          | 26.47         | 56.00         | 29.53       | N       | gnd  |
| 0.41562       | 24.06         | 47.54         | 23.48       | N       | gnd  |
| 1.00156       | 19.92         | 46.00         | 26.08       | N       | gnd  |
| 2.54453       | 19.82         | 46.00         | 26.18       | N       | gnd  |
| 4.45078       | 20.33         | 46.00         | 25.67       | N       | gnd  |
| 25.22812      | 26.37         | 50.00         | 23.63       | N       | gnd  |



## U-NII-3, 802.11a, Channel No: 149, L Line

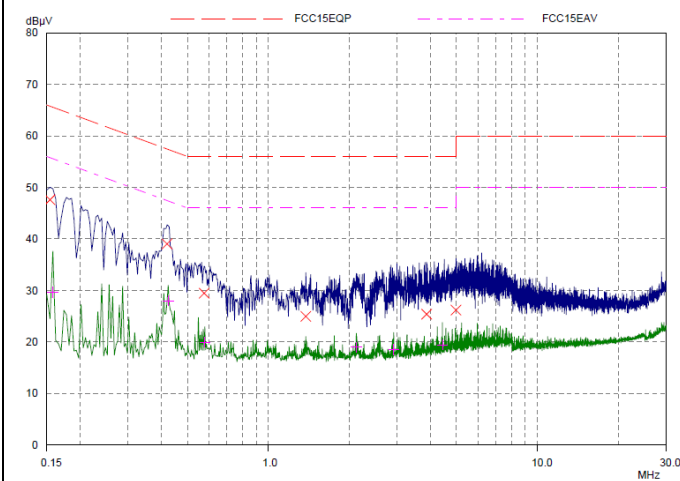


## Final Measurement Results

| Frequency MHz | QP Level dBμV | QP Limit dBμV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15781       | 47.36         | 65.58         | 18.22       | L1      | gnd  |
| 0.42734       | 40.19         | 57.30         | 17.11       | L1      | gnd  |
| 0.72421       | 26.80         | 56.00         | 29.20       | L1      | gnd  |
| 1.65          | 23.45         | 56.00         | 32.55       | L1      | gnd  |
| 3.67343       | 25.83         | 56.00         | 30.17       | L1      | gnd  |
| 4.66171       | 26.42         | 56.00         | 29.58       | L1      | gnd  |

| Frequency MHz | AV Level dBμV | AV Limit dBμV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.23593       | 24.09         | 52.24         | 28.15       | L1      | gnd  |
| 0.41171       | 21.58         | 47.61         | 26.03       | L1      | gnd  |
| 1.33359       | 18.87         | 46.00         | 27.13       | L1      | gnd  |
| 3.88046       | 18.95         | 46.00         | 27.05       | L1      | gnd  |
| 4.69687       | 19.33         | 46.00         | 26.67       | L1      | gnd  |

## U-NII-3, 802.11a, Channel No: 149, N Line

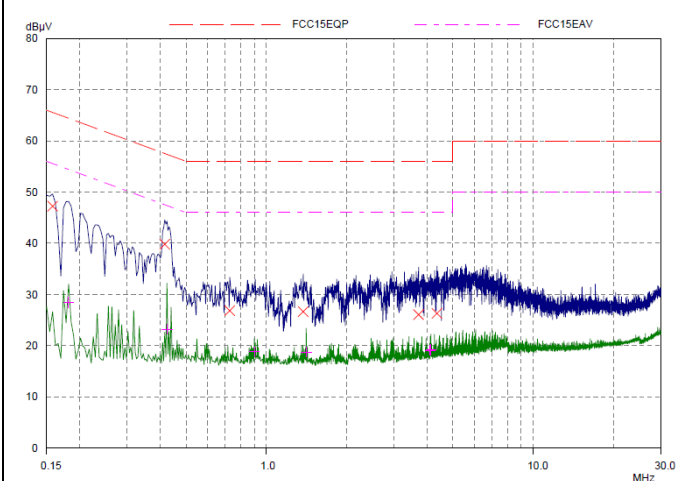


## Final Measurement Results

| Frequency MHz | QP Level dBμV | QP Limit dBμV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.1539        | 47.60         | 65.79         | 18.19       | N       | gnd  |
| 0.41953       | 39.03         | 57.46         | 18.43       | N       | gnd  |
| 0.57578       | 29.47         | 56.00         | 26.53       | N       | gnd  |
| 1.37656       | 24.97         | 56.00         | 31.03       | N       | gnd  |
| 3.86875       | 25.38         | 56.00         | 30.62       | N       | gnd  |
| 4.97812       | 26.19         | 56.00         | 29.81       | N       | gnd  |

| Frequency MHz | AV Level dBμV | AV Limit dBμV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15781       | 29.62         | 55.58         | 25.96       | N       | gnd  |
| 0.42343       | 27.99         | 47.38         | 19.39       | N       | gnd  |
| 0.57968       | 19.96         | 46.00         | 26.04       | N       | gnd  |
| 2.11875       | 18.98         | 46.00         | 27.02       | N       | gnd  |
| 2.91953       | 18.52         | 46.00         | 27.48       | N       | gnd  |
| 4.43125       | 19.45         | 46.00         | 26.55       | N       | gnd  |

## U-NII-3, 802.11a, Channel No: 157, L Line



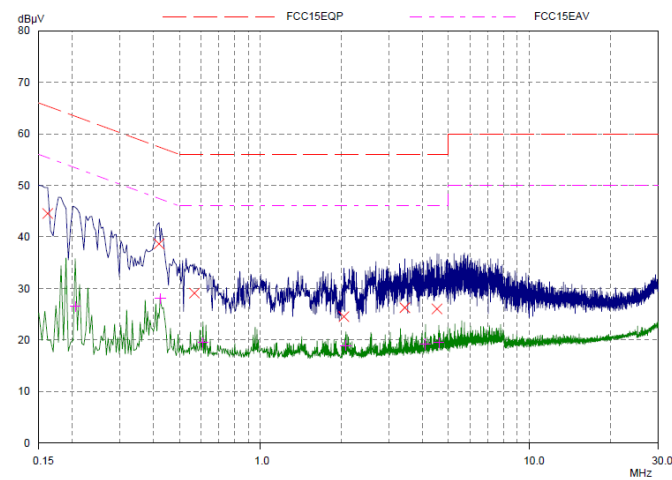
## Final Measurement Results

| Frequency MHz | QP Level dBμV | QP Limit dBμV | QP Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.15781       | 47.25         | 65.58         | 18.33       | L1      | gnd  |
| 0.41562       | 39.80         | 57.54         | 17.74       | L1      | gnd  |
| 0.72812       | 26.84         | 56.00         | 29.16       | L1      | gnd  |
| 1.37265       | 26.64         | 56.00         | 29.36       | L1      | gnd  |
| 3.7125        | 26.06         | 56.00         | 29.94       | L1      | gnd  |
| 4.35312       | 26.31         | 56.00         | 29.69       | L1      | gnd  |

| Frequency MHz | AV Level dBμV | AV Limit dBμV | AV Delta dB | Phase - | PE - |
|---------------|---------------|---------------|-------------|---------|------|
| 0.18125       | 28.48         | 54.43         | 25.95       | L1      | gnd  |
| 0.42343       | 23.20         | 47.38         | 24.18       | L1      | gnd  |
| 0.9           | 18.82         | 46.00         | 27.18       | L1      | gnd  |
| 1.40781       | 18.73         | 46.00         | 27.27       | L1      | gnd  |
| 4.10703       | 19.09         | 46.00         | 26.91       | L1      | gnd  |
| 4.13046       | 19.17         | 46.00         | 26.83       | L1      | gnd  |



## U-NII-3, 802.11a, Channel No: 157, N Line

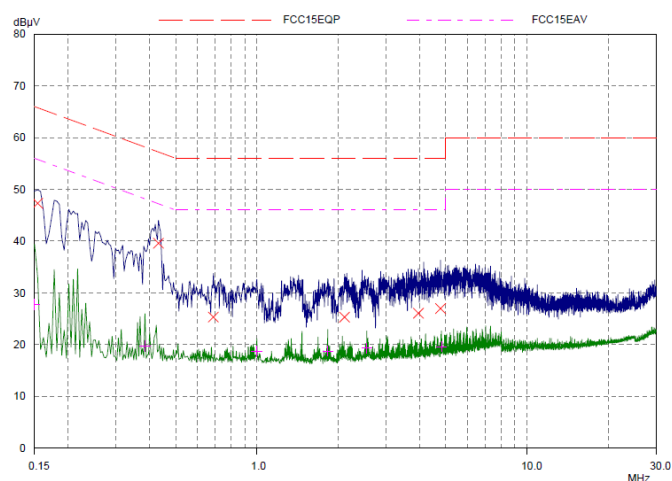


## Final Measurement Results

| Frequency<br>MHz | QP Level<br>dBμV | QP Limit<br>dBμV | QP Delta<br>dB | Phase<br>- | PE<br>- |
|------------------|------------------|------------------|----------------|------------|---------|
| 0.16171          | 44.53            | 65.38            | 20.85          | N          | gnd     |
| 0.41953          | 38.67            | 57.46            | 18.79          | N          | gnd     |
| 0.56796          | 29.08            | 56.00            | 26.92          | N          | gnd     |
| 2.04062          | 24.52            | 56.00            | 31.48          | N          | gnd     |
| 3.43906          | 26.26            | 56.00            | 29.74          | N          | gnd     |
| 4.5289           | 26.02            | 56.00            | 29.98          | N          | gnd     |

| Frequency<br>MHz | AV Level<br>dBμV | AV Limit<br>dBμV | AV Delta<br>dB | Phase<br>- | PE<br>- |
|------------------|------------------|------------------|----------------|------------|---------|
| 0.20468          | 26.50            | 53.42            | 26.92          | N          | gnd     |
| 0.42343          | 28.05            | 47.38            | 19.33          | N          | gnd     |
| 0.61093          | 19.46            | 46.00            | 26.54          | N          | gnd     |
| 2.07578          | 18.91            | 46.00            | 27.09          | N          | gnd     |
| 4.10703          | 19.23            | 46.00            | 26.77          | N          | gnd     |
| 4.60312          | 19.47            | 46.00            | 26.53          | N          | gnd     |

## U-NII-3, 802.11a, Channel No: 161, L Line

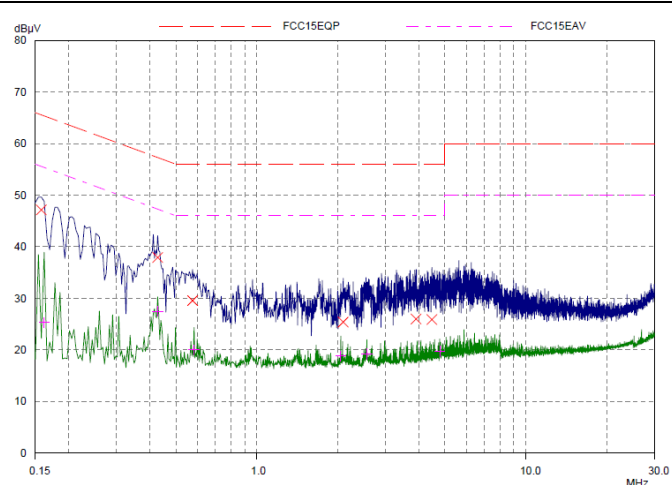


## Final Measurement Results

| Frequency<br>MHz | QP Level<br>dBμV | QP Limit<br>dBμV | QP Delta<br>dB | Phase<br>- | PE<br>- |
|------------------|------------------|------------------|----------------|------------|---------|
| 0.1539           | 47.32            | 65.79            | 18.47          | L1         | gnd     |
| 0.43125          | 39.61            | 57.23            | 17.62          | L1         | gnd     |
| 0.68906          | 25.33            | 56.00            | 30.67          | L1         | gnd     |
| 2.10703          | 25.31            | 56.00            | 30.69          | L1         | gnd     |
| 3.95859          | 26.07            | 56.00            | 29.93          | L1         | gnd     |
| 4.7789           | 26.97            | 56.00            | 29.03          | L1         | gnd     |

| Frequency<br>MHz | AV Level<br>dBμV | AV Limit<br>dBμV | AV Delta<br>dB | Phase<br>- | PE<br>- |
|------------------|------------------|------------------|----------------|------------|---------|
| 0.15             | 27.78            | 56.00            | 28.22          | L1         | gnd     |
| 0.38437          | 19.76            | 48.18            | 28.42          | L1         | gnd     |
| 0.99765          | 18.65            | 46.00            | 27.35          | L1         | gnd     |
| 1.82578          | 18.73            | 46.00            | 27.27          | L1         | gnd     |
| 2.54843          | 19.29            | 46.00            | 26.71          | L1         | gnd     |
| 4.81406          | 19.61            | 46.00            | 26.39          | L1         | gnd     |

## U-NII-3, 802.11a, Channel No: 161, N Line



## Final Measurement Results

| Frequency<br>MHz | QP Level<br>dBμV | QP Limit<br>dBμV | QP Delta<br>dB | Phase<br>- | PE<br>- |
|------------------|------------------|------------------|----------------|------------|---------|
| 0.15781          | 47.15            | 65.58            | 18.43          | N          | gnd     |
| 0.42734          | 37.92            | 57.30            | 19.38          | N          | gnd     |
| 0.57578          | 29.57            | 56.00            | 26.43          | N          | gnd     |
| 2.0914           | 25.40            | 56.00            | 30.60          | N          | gnd     |
| 3.9              | 25.99            | 56.00            | 30.01          | N          | gnd     |
| 4.4664           | 25.90            | 56.00            | 30.10          | N          | gnd     |

| Frequency<br>MHz | AV Level<br>dBμV | AV Limit<br>dBμV | AV Delta<br>dB | Phase<br>- | PE<br>- |
|------------------|------------------|------------------|----------------|------------|---------|
| 0.16171          | 25.32            | 55.38            | 30.06          | N          | gnd     |
| 0.42734          | 27.49            | 47.30            | 19.81          | N          | gnd     |
| 0.58359          | 20.02            | 46.00            | 25.98          | N          | gnd     |
| 2.04843          | 18.82            | 46.00            | 27.18          | N          | gnd     |
| 2.56015          | 19.20            | 46.00            | 26.80          | N          | gnd     |
| 4.7789           | 19.74            | 46.00            | 26.26          | N          | gnd     |

## 6. Main Test Instruments

| Name                                 | Type      | Manufacturer | Serial Number | Calibration Date | Expiration Time |
|--------------------------------------|-----------|--------------|---------------|------------------|-----------------|
| EMI Test Receiver                    | ESCI      | R&S          | 100948        | 2015-05-22       | 2016-05-21      |
| EMI Test Receiver                    | ESCI      | R&S          | 100948        | 2017-05-20       | 2018-05-19      |
| Loop Antenna                         | FMZB1519  | SCHWARZBECK  | 1519-047      | 2014-02-29       | 2017-02-28      |
| Loop Antenna                         | FMZB1519  | SCHWARZBECK  | 1519-047      | 2017-02-18       | 2020-02-17      |
| TRILOG Broadband Antenna             | VULB 9163 | Schwarzbeck  | 9163-201      | 2014-12-06       | 2017-12-05      |
| Double Ridged Waveguide Horn Antenna | HF907     | R&S          | 100126        | 2014-12-06       | 2017-12-05      |
| Standard Gain Horn                   | 3160-09   | ETS-Lindgren | 00102644      | 2015-01-30       | 2018-01-29      |
| EMI Test Receiver                    | ESCS30    | R&S          | 100138        | 2015-12-17       | 2016-12-16      |
| EMI Test Receiver                    | ESCS30    | R&S          | 100138        | 2016-12-16       | 2017-12-15      |
| LISN                                 | ENV216    | R&S          | 101171        | 2013-12-18       | 2016-12-17      |
| LISN                                 | ENV216    | R&S          | 101171        | 2016-12-16       | 2017-12-15      |
| Spectrum Analyzer                    | N9010A    | Agilent      | MY47191109    | 2015-05-22       | 2016-05-21      |
| Spectrum Analyzer                    | N9010A    | Agilent      | MY47191109    | 2017-05-20       | 2018-05-19      |
| Spectrum Analyzer                    | FSV30     | R&S          | 100815        | 2015-12-17       | 2016-12-16      |
| Spectrum Analyzer                    | FSV30     | R&S          | 100815        | 2016-12-16       | 2017-12-15      |
| RF Cable                             | SMA 15cm  | Agilent      | 0001          | 2016-03-07       | 2016-06-06      |
| RF Cable                             | SMA 15cm  | Agilent      | 0001          | 2017-04-03       | 2017-07-02      |
| Broadband Horn Antenna               | BBHA9170  | Schwarzbeck  | MRTSUE06024   | 2016-01-05       | 2017-01-04      |
| Broadband Horn Antenna               | BBHA9170  | Schwarzbeck  | MRTSUE06024   | 2016-11-24       | 2019-11-23      |

\*\*\*\*\*END OF REPORT \*\*\*\*\*

## ANNEX A: EUT Appearance and Test Setup

### A.1 EUT Appearance



Front Side



Back Side

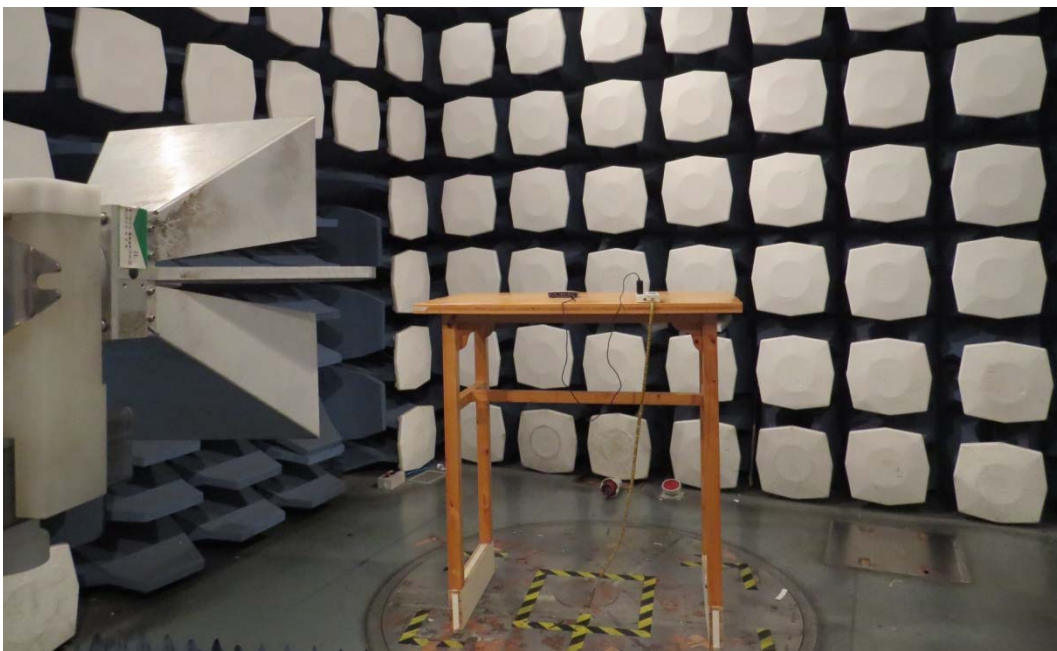
a: EUT

Picture 1 EUT

## A.2 Test Setup



30MHz-1GHz



Above 1GHz

**Picture 2 Radiated Emission Test Setup**



### Picture 3 Conducted Emission Test Setup



## ANNEX B: Product Change Description

### ID TECH

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Date: August 22, 2017  
Federal Communications Commission  
Authorization and Evaluation Division  
7435 Oakland Mills Road  
Columbia, MD 21046

Attn: OET Dept.

Ref: FCC Class II Permissive change for FCC ID: WQJ-IDCL-51  
Original Grant Date: 06/15/2016  
Applicant: ID TECH

Dear Examiner,

This is to request a Class II permissive change for FCC ID: WQJ-IDCL-51, originally granted on 06/15/2016.

There are no hardware or RF parameters changes. Except below:

1. Battery changes

Because the market purpose, the coin battery changeds.

The battery change only by manufacture.

2. RTC changes

Because the market purpose, the RTC changes to internal MCU.

The RTC change only by manufacture.

Sincerely,

Print name: Lewis Lin

Company: ID TECH