



RF TEST REPORT

Applicant Gosuncn Technology Group Co.,Ltd.
FCC ID 2APNR-GW631Q
Product LTE CPE
Model WF831, WF831+, WF831A, GW631
Report No. R1805A0254-R3V1
Issue Date June 6, 2018

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

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Summary of measurement results

| Number | Summary of measurements of results | Clause in FCC rules | Verdict |
|---|--|-------------------------|---------|
| 1 | Maximum Average conducted output power | 15.247(b)(3) | PASS |
| 2 | 6 dB bandwidth | 15.247(a)(2) | PASS |
| 3 | Power spectral density | 15.247(e) | PASS |
| 4 | Band Edge | 15.247(d) | PASS |
| 5 | Spurious RF Conducted Emissions | 15.247(d) | PASS |
| 6 | Radiated Emissions in restricted frequency bands | 15.247(d),15.205,15.209 | PASS |
| 7 | Radiated Emissions | 15.247(d),15.205,15.209 | PASS |
| 8 | Conducted Emissions | 15.207 | PASS |
| Date of Testing: November 17, 2017~ November 24, 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 (Designation number: CN1179, Test Firm Registration Number: 446626)

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
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E-mail: xukai@ta-shanghai.com

2. General Description of Equipment under Test

Client Information

| | |
|-----------------------------|--|
| Applicant | Gosuncn Technology Group Co.,Ltd. |
| Applicant address | 6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China |
| Manufacturer | Gosuncn Technology Group Co.,Ltd. |
| Manufacturer address | 6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China |

General information

| EUT Description | |
|---|--|
| Model | WF831, WF831+, WF831A, GW631 |
| IMEI | 8942017450400020 |
| Hardware Version | V1.0 |
| Software Version | ENTEL_PER_WF831_V1.0.0B02 |
| Power Supply | AC adapter |
| Antenna Type | Embeded Antenna |
| Antenna Connector | A permanently attached antenna (meet with the standard FCC Part 15.203 requirement) |
| Antenna Gain | Antenna 1: 1.5dBi Antenna 2: 1.5dBi |
| additional beamforming gain | 0 dB |
| Test Mode | 802.11b 802.11g, 802.11n(HT20/HT40); |
| Modulation Type | 802.11b: DSSS; 802.11g/n(HT20/HT40): OFDM |
| Max. Conducted Power | Wi-Fi 2.4G: 22.51dBm |
| Operating Frequency Range(s) | 802.11b/g/n(HT20): 2412 ~ 2462 MHz 802.11n(HT40): 2422 ~ 2452 MHz |
| EUT Accessory | |
| Adapter | Manufacturer: AQUILSTAR PRECISION INDUSTRIAL (SHENZHEN)CO., LTD Model: ASSA65A-120100 |
| Network cable | Manufacturer: SHANGHAI JINGTU ELECTRONICS LTD. Model: UTP CAT5E |
| Note: The information of the EUT is declared by the manufacturer. | |



| Item | WF831 | WF831+ | WF831A | GW631 |
|-------------------------|----------|----------|----------|----------|
| Protocol Stack | The same | The same | The same | The same |
| MMS/STK | The same | The same | The same | The same |
| JAVA | The same | The same | The same | The same |
| Web User Interface page | The same | changes | changes | changes |
| HARDWARE | The same | The same | The same | The same |
| MECHANICAL | The same | The same | The same | The same |
| ACCESSORY | The same | The same | The same | The same |

Note: Customer declaration, four models are the same, except for the logo and default parameters in the Web User Interface page, which will not affect the RF characteristic according to Part 2.1043 requirement. This report tested WF831.

3. Applied Standards

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

Test standards

- **FCC CFR47 Part 15C (2017) Radio Frequency Devices**
- **ANSI C63.10 (2013)**
- **KDB 558074 D01 DTS Meas Guidance v04**
- **KDB 662911 D01 Multiple Transmitter Output v02r01**

4. Test Configuration

Test Mode

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 all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

The test software is used securecrt

Worst-case data rates are shown as following table.

| Band | Data Rate | | |
|--------------|-----------|-----------|------|
| | Antenna 1 | Antenna 2 | MIMO |
| 802.11b | 11 Mbps | 11 Mbps | / |
| 802.11g | 54Mbps | 54 Mbps | / |
| 802.11n HT20 | / | / | MCS7 |
| 802.11n HT40 | / | / | MCS7 |

The worst case Antenna mode for each of the following tests for Wi-Fi:

| Test Cases | Antenna 1 | Antenna 2 | MIMO |
|--|-----------|-----------|------------------------------|
| Average Power Output –Conducted | 802.11b/g | 802.11b/g | 802.11n HT20 802.11n HT40 |
| 6dB Bandwidth | -- | O | -- |
| Band Edge | -- | O | -- |
| Power Spectral Density | 802.11b/g | 802.11b/g | 802.11n HT20 802.11n HT40 |
| Spurious RF Conducted Emissions | O | O | 802.11n HT20 802.11n HT40 |
| Radiates Emission in the Restricted Band | -- | O | -- |
| Radiates Emission | -- | 802.11b/g | 802.11n HT20 802.11n HT40 |
| Conducted Emission | -- | 802.11b/g | 802.11n HT20 802.11n HT40 |

5. Test Case Results

5.1. Average Power Output –Conducted

Ambient condition

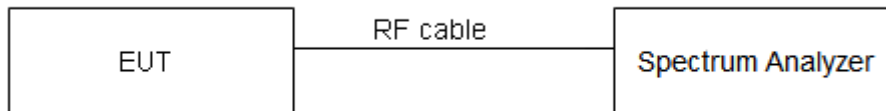
| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C | 45%~50% | 101.5kPa |

Methods of Measurement

During the process of the testing, The EUT was connected to Spectrum Analyzer with a known loss. The EUT is max power transmission with proper modulation. The Average detector is used. We use Maximum Average Conducted Output Power Level Method in KDB 558074 D01/KDB662911 D01 for this test.

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

Test Setup



Limits

Rule Part 15.247 (b) (3) specifies that " For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz: 1 Watt."

| | |
|----------------------|--------------|
| Average Output Power | ≤ 1W (30dBm) |
|----------------------|--------------|

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

| Single Antenna Power Index | | | | | | |
|----------------------------|-----------|-----|------|-----------|-----|------|
| Packet Type | Antenna 1 | | | Antenna 2 | | |
| | CH1 | CH6 | CH11 | CH1 | CH6 | CH11 |
| 802.11b | 40 | 41 | 44 | 46 | 46 | 46 |
| 802.11g | 53 | 53 | 57 | 58 | 57 | 58 |
| MIMO Antenna Power Index | | | | | | |
| Packet Type | Antenna 1 | | | Antenna 2 | | |
| | CH1 | CH6 | CH11 | CH1 | CH6 | CH11 |
| 802.11n HT20 | 51 | 51 | 55 | 57 | 60 | 58 |
| Packet Type | CH3 | CH6 | CH9 | CH3 | CH6 | CH9 |
| 802.11n HT40 | 56 | 57 | 60 | 60 | 62 | 62 |

| Band | T _{on} (ms) | T _(on+off) (ms) | Duty cycle | Duty cycle correction Factor(dB) |
|--|----------------------|----------------------------|------------|----------------------------------|
| 802.11b | 12.44 | 12.58 | 0.99 | NA |
| 802.11g | 0.25 | 0.34 | 0.74 | 1.32 |
| 802.11n HT20 | 0.23 | 0.36 | 0.63 | 2.01 |
| 802.11n HT40 | 0.13 | 0.24 | 0.52 | 2.83 |
| Note: when Duty cycle>0.98, Duty cycle correction Factor not required. | | | | |

SISO Antenna 1

| Network Standards | Carrier frequency (MHz) | Read Value (dBm) | Average Output Power(dBm) | Limit (dBm) | Conclusion |
|---|-------------------------|------------------|---------------------------|-------------|------------|
| 802.11b | 2412 | 16.02 | 16.02 | 30 | PASS |
| | 2437 | 16.47 | 16.47 | 30 | PASS |
| | 2462 | 16.13 | 16.13 | 30 | PASS |
| 802.11g | 2412 | 16.21 | 17.53 | 30 | PASS |
| | 2437 | 16.41 | 17.73 | 30 | PASS |
| | 2462 | 16.79 | 18.11 | 30 | PASS |
| Note:Output Power=Read Value+Duty cycle correction factor | | | | | |

**SISO Antenna 2**

| Network Standards | Carrier frequency (MHz) | Read Value (dBm) | Average Output Power(dBm) | Limit (dBm) | Conclusion |
|-------------------|-------------------------|------------------|---------------------------|-------------|------------|
| 802.11b | 2412 | 16.30 | 16.30 | 30 | PASS |
| | 2437 | 16.34 | 16.34 | 30 | PASS |
| | 2462 | 16.20 | 16.20 | 30 | PASS |
| 802.11g | 2412 | 16.23 | 17.55 | 30 | PASS |
| | 2437 | 16.11 | 17.43 | 30 | PASS |
| | 2462 | 16.09 | 17.41 | 30 | PASS |

Note:Output Power=Read Value+Duty cycle correction factor

MIMO

| Network Standards | Carrier frequency (MHz) | Antenna 1 | | | Antenna 2 | | | Total Power | | Limit (dBm) | Conclusion |
|-------------------|-------------------------|------------------|----------------------|-------|------------------|----------------------|-------|----------------------|-------|-------------|------------|
| | | Read Value (dBm) | Average Output Power | | Read Value (dBm) | Average Output Power | | Average Output Power | | | |
| | | | (dBm) | (mW) | | (dBm) | (dBm) | (mW) | (mW) | | |
| 802.11n HT20 | 2412 | 16.47 | 18.48 | 70.47 | 16.35 | 18.36 | 68.55 | 139.02 | 21.43 | 30 | PASS |
| | 2437 | 16.41 | 18.42 | 69.50 | 16.63 | 18.64 | 73.11 | 142.62 | 21.54 | 30 | PASS |
| | 2462 | 16.15 | 18.16 | 65.46 | 16.81 | 18.82 | 76.21 | 141.67 | 21.51 | 30 | PASS |
| 802.11n HT40 | 2422 | 16.05 | 18.88 | 77.27 | 16.08 | 18.91 | 77.80 | 155.07 | 21.91 | 30 | PASS |
| | 2437 | 16.16 | 18.99 | 79.25 | 16.34 | 19.17 | 82.60 | 161.85 | 22.10 | 30 | PASS |
| | 2452 | 16.87 | 19.7 | 93.33 | 16.46 | 19.29 | 84.92 | 178.24 | 22.51 | 30 | PASS |

Note: 1. Output Power=Read Value+Duty cycle correction factor

2. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power = $10\log(10^{(\text{Power antenna1 in dBm}/10)} + 10^{(\text{Power antenna2 in dBm}/10)})$.

3. The manufacturer declared the transmitter output signals is CDD mode. And $N_{ss}=1$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain,
Directional gain = $G_{ANT} + \text{Array Gain}$,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

So directional gain = $G_{ANT} + \text{Array Gain} = 1.5 + 0 = 1.5 \text{ dBi} < 6 \text{ dBi}$. So the power limit is 30dBm



SISO Antenna 1

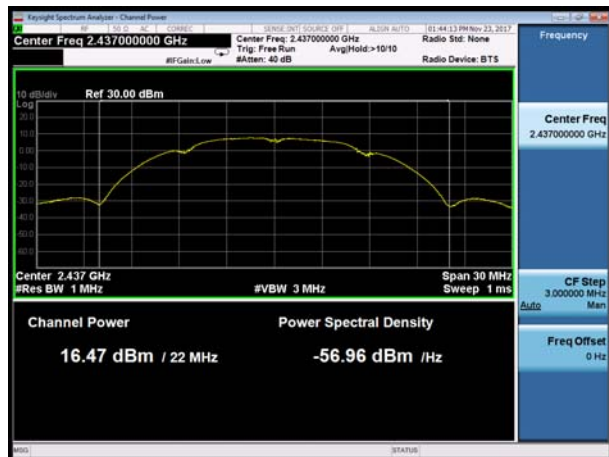
802.11b, Channel No.: 1



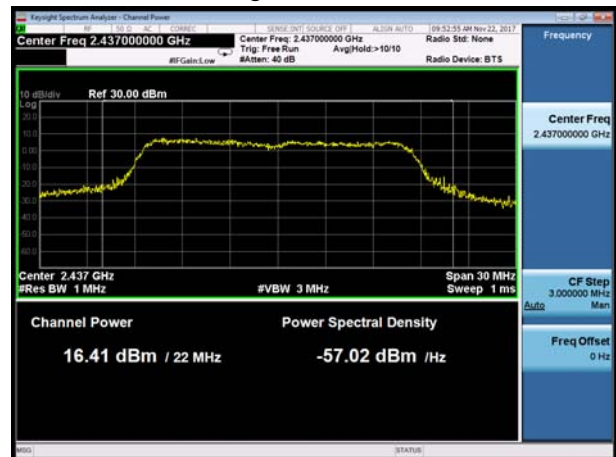
802.11g, Channel No.: 1



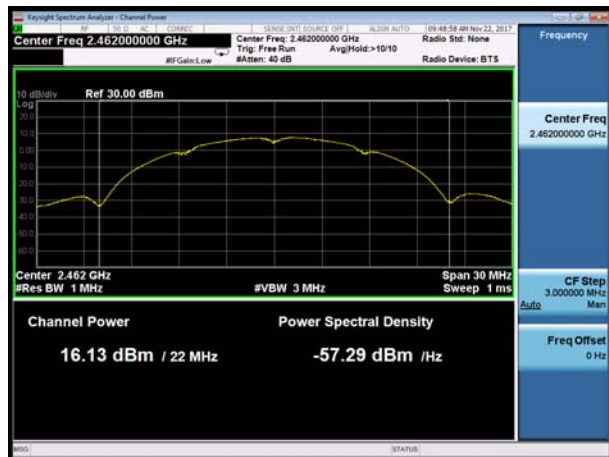
802.11b, Channel No.: 6



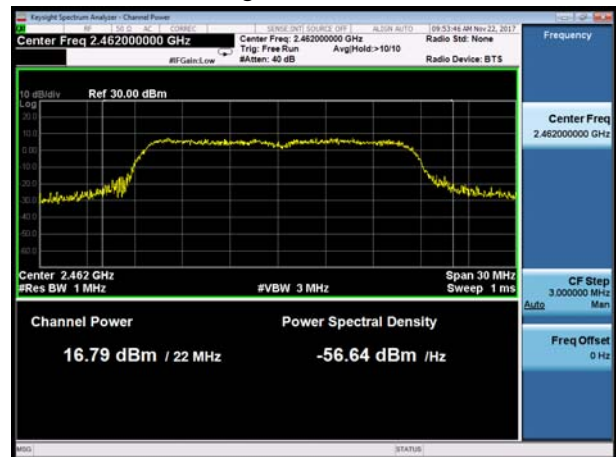
802.11g, Channel No.: 6



802.11b, Channel No.: 11



802.11g, Channel No.: 11



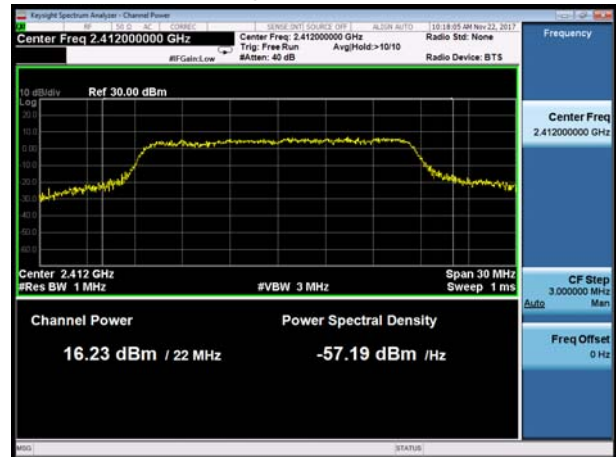


SISO Antenna 2

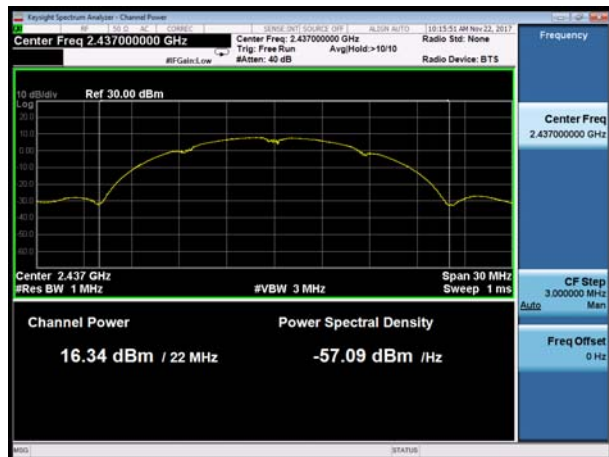
802.11b, Channel No.: 1



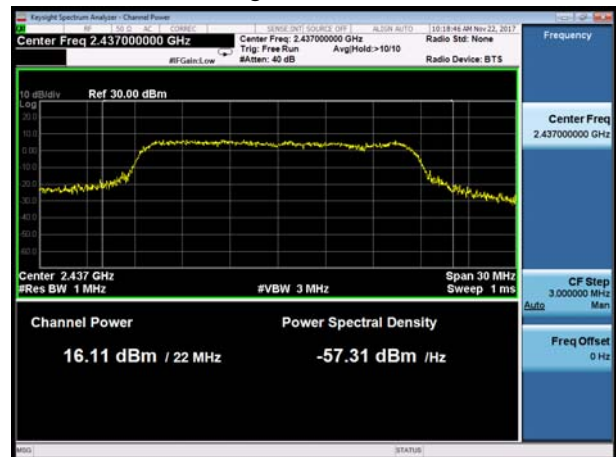
802.11g, Channel No.: 1



802.11b, Channel No.: 6



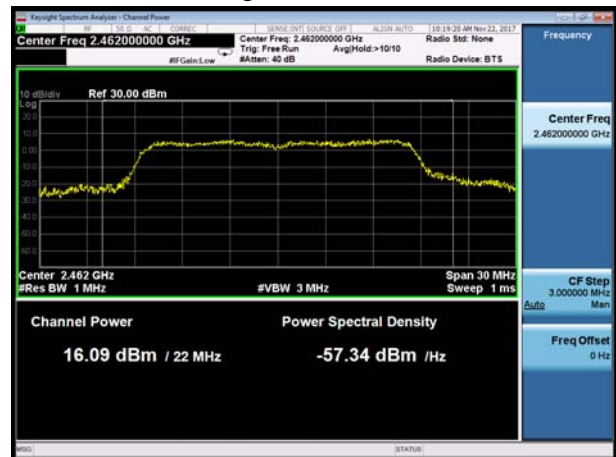
802.11g, Channel No.: 6



802.11b, Channel No.: 11



802.11g, Channel No.: 11



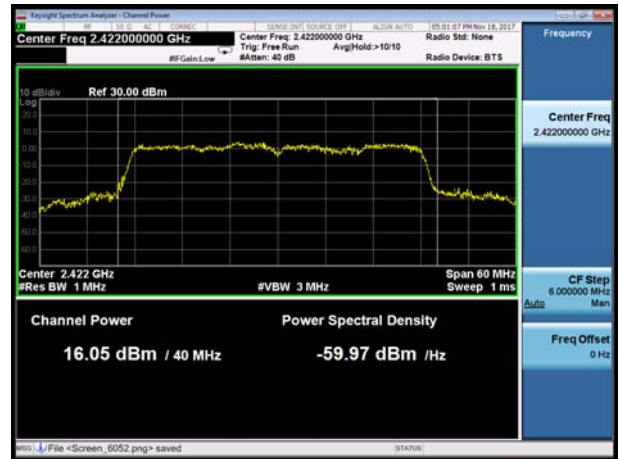


MIMO Antenna 1

802.11n(HT20), Channel No. 1



802.11n(HT40), Channel No. 3



802.11n(HT20), Channel No. 6



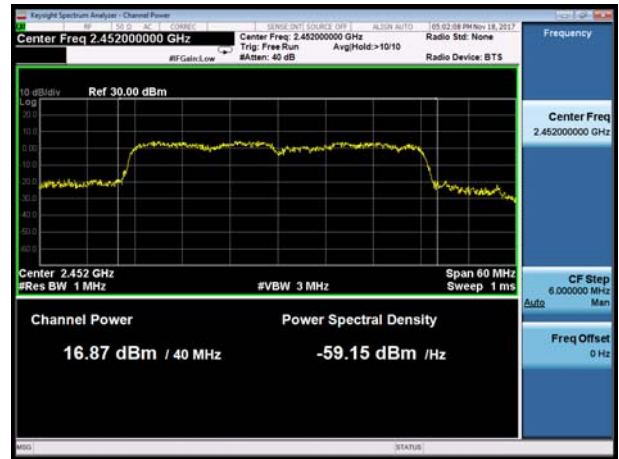
802.11n(HT40), Channel No. 6



802.11n(HT20), Channel No. 11



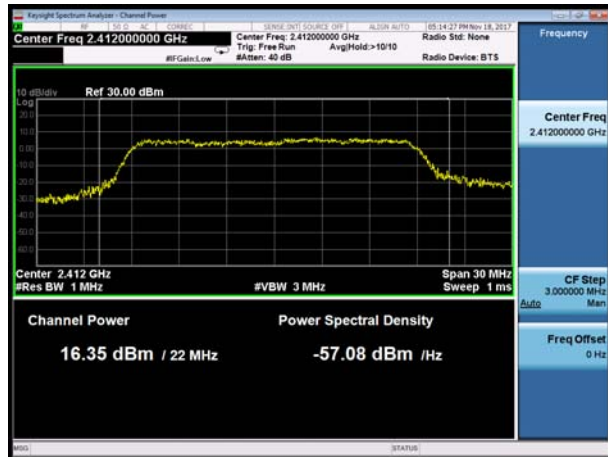
802.11n(HT40), Channel No. 9





MIMO Antenna 2

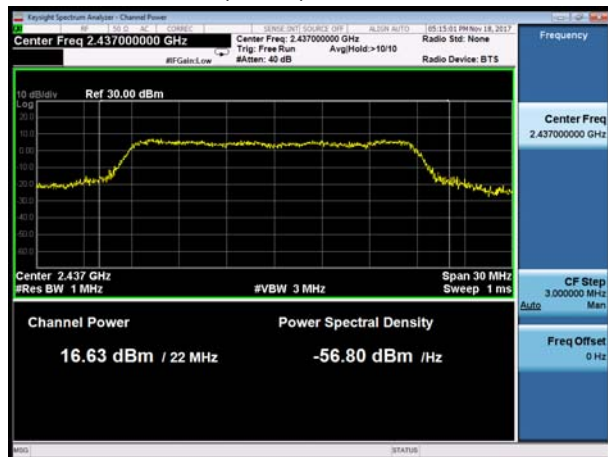
802.11n(HT20), Channel No. 1



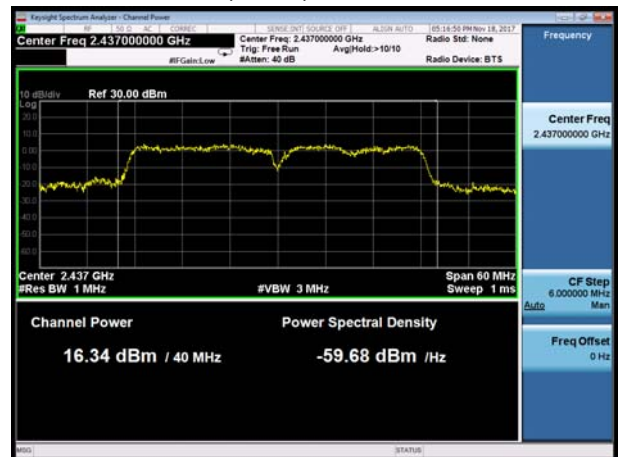
802.11n(HT40), Channel No. 3



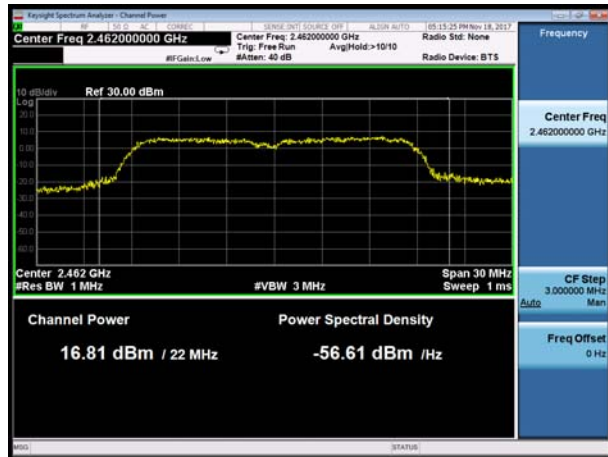
802.11n(HT20), Channel No. 6



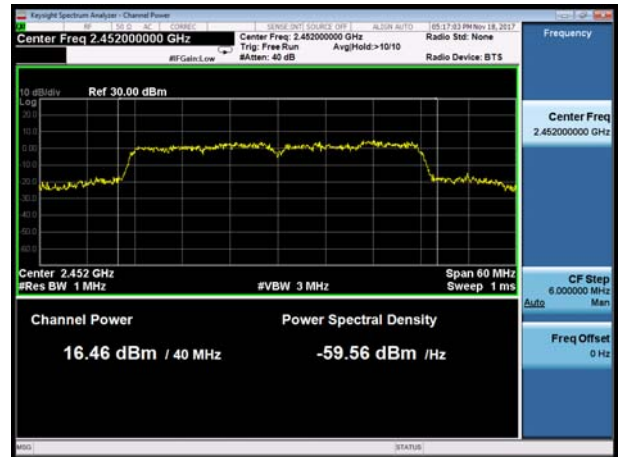
802.11n(HT40), Channel No. 6



802.11n(HT20), Channel No. 11



802.11n(HT40), Channel No. 9



5.2. 6dB Bandwidth

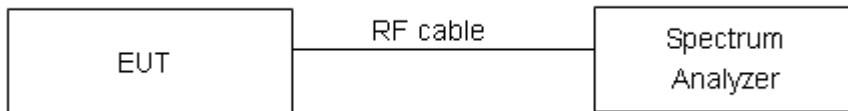
Ambient condition

| 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. RBW is set to 100 kHz; VBW is set to 300 kHz on spectrum analyzer.

Test Setup



Limits

Rule Part 15.247 (a) (2) specifies that “Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.”

| | |
|------------------------|-----------|
| minimum 6 dB bandwidth | ≥ 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.

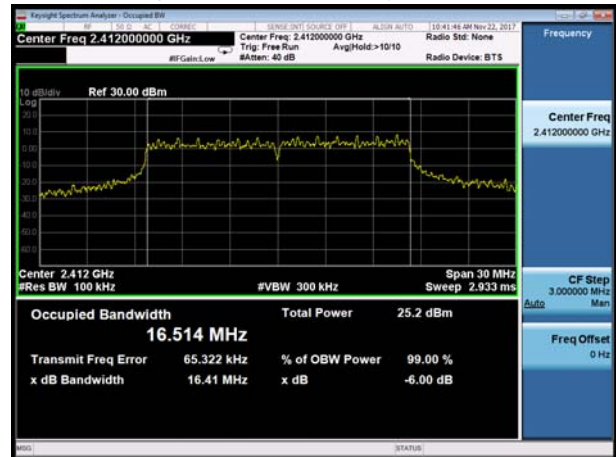
**Test Results:**

| Network Standards | Carrier frequency (MHz) | 99% bandwidth (MHz) | Minimum 6 dB bandwidth (MHz) | Limit (kHz) | Conclusion |
|-------------------|-------------------------|---------------------|------------------------------|-------------|------------|
| 802.11b | 2412 | 15.313 | 9.597 | 500 | PASS |
| | 2437 | 15.193 | 9.593 | 500 | PASS |
| | 2462 | 15.252 | 9.598 | 500 | PASS |
| 802.11g | 2412 | 16.514 | 16.410 | 500 | PASS |
| | 2437 | 16.486 | 16.460 | 500 | PASS |
| | 2462 | 16.561 | 16.430 | 500 | PASS |
| 802.11n HT20 | 2412 | 17.748 | 17.050 | 500 | PASS |
| | 2437 | 17.742 | 17.710 | 500 | PASS |
| | 2462 | 17.820 | 17.580 | 500 | PASS |
| 802.11n HT40 | 2422 | 36.157 | 35.13 | 500 | PASS |
| | 2437 | 36.334 | 36.02 | 500 | PASS |
| | 2452 | 36.423 | 36.05 | 500 | PASS |

802.11b, Carrier frequency (MHz): 2412



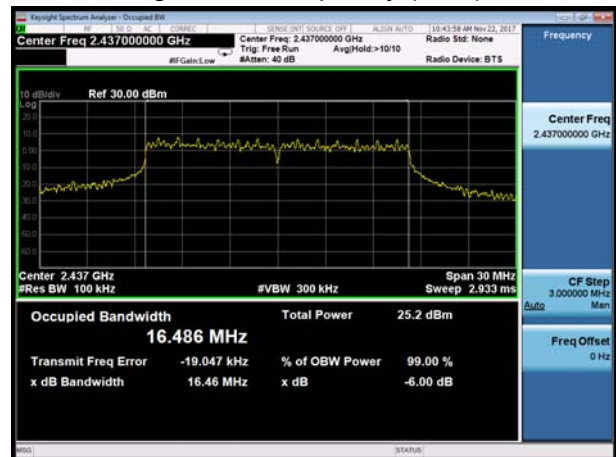
802.11g, Carrier frequency (MHz): 2412



802.11b, Carrier frequency (MHz): 2437



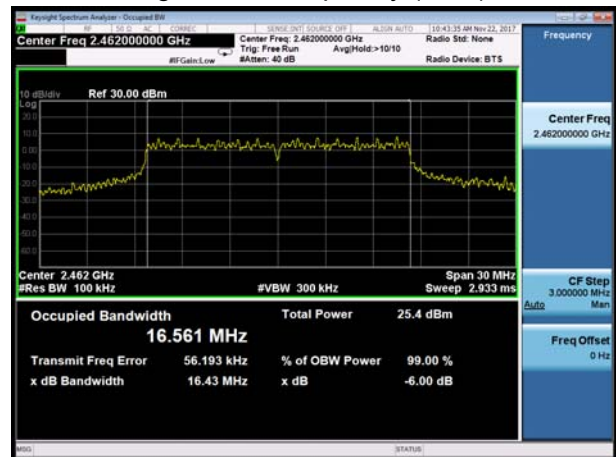
802.11g, Carrier frequency (MHz): 2437



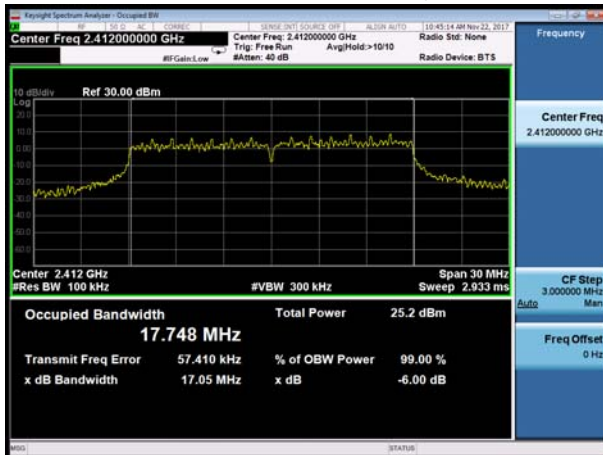
802.11b, Carrier frequency (MHz): 2462



802.11g, Carrier frequency (MHz): 2462



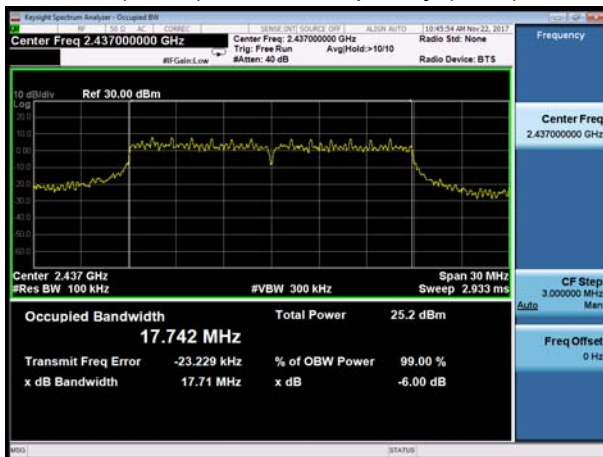
802.11n(HT20), Carrier frequency (MHz): 2412



802.11n(HT40), Carrier frequency (MHz): 2422



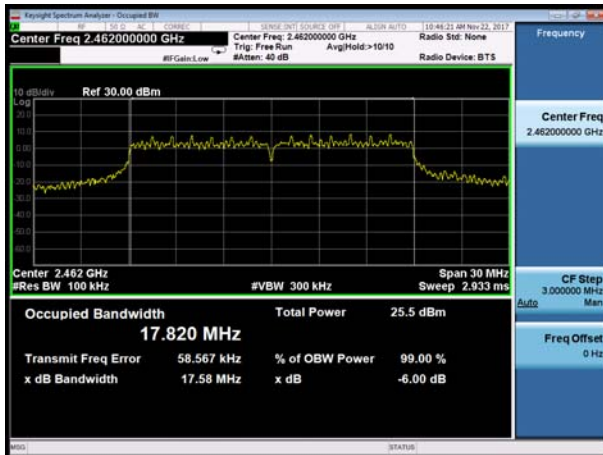
802.11n(HT20), Carrier frequency (MHz): 2437



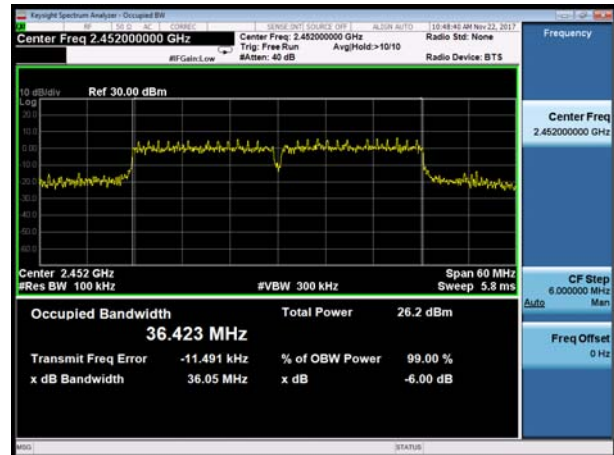
802.11n(HT40), Carrier frequency (MHz): 2437



802.11n(HT20), Carrier frequency (MHz):2462



802.11n(HT40), Carrier frequency (MHz):2452



5.3. Band Edge

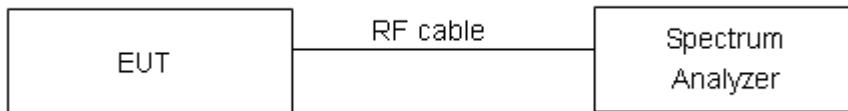
Ambient condition

| 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 the band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 15.247(d) specifies that “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.”

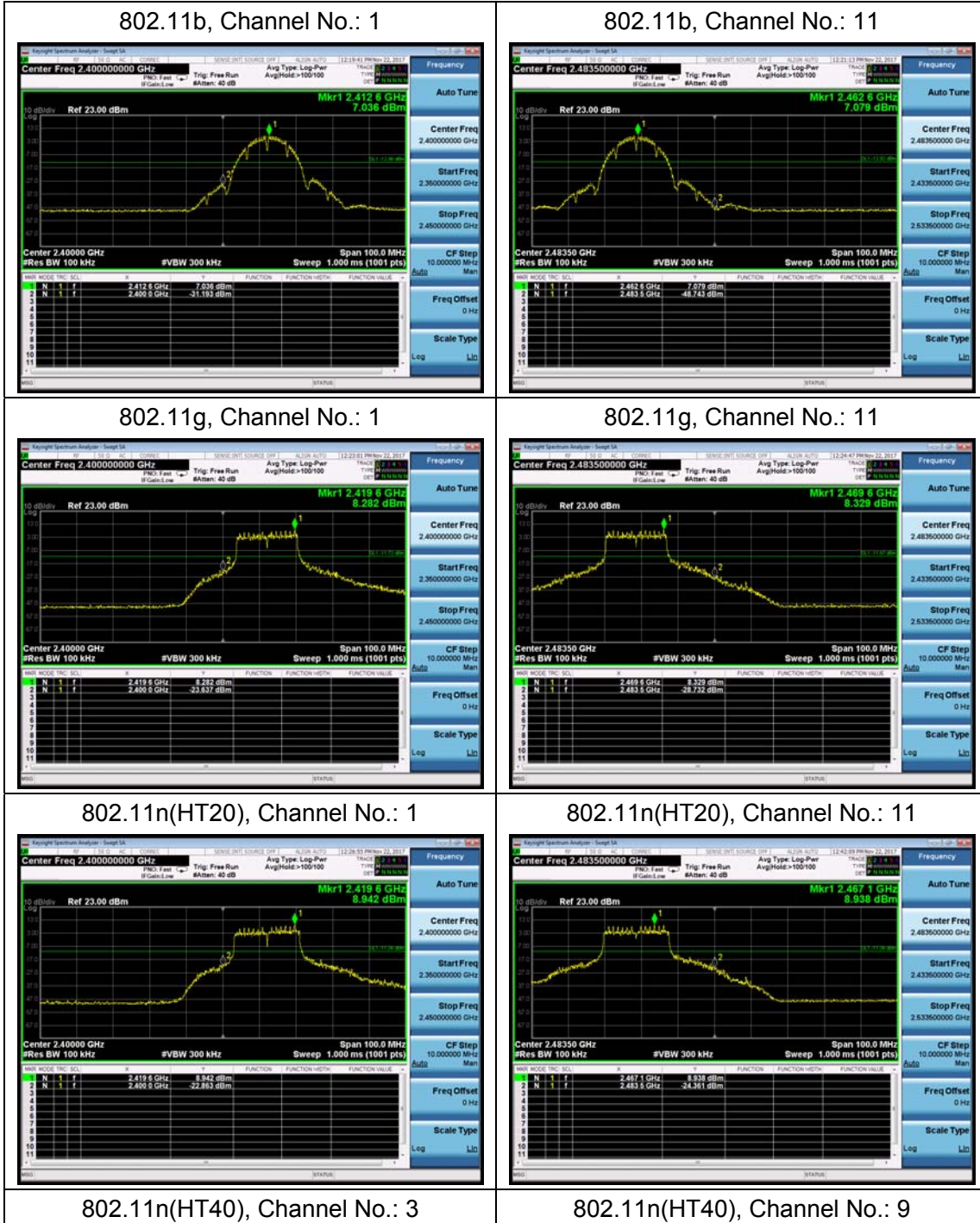
Measurement Uncertainty

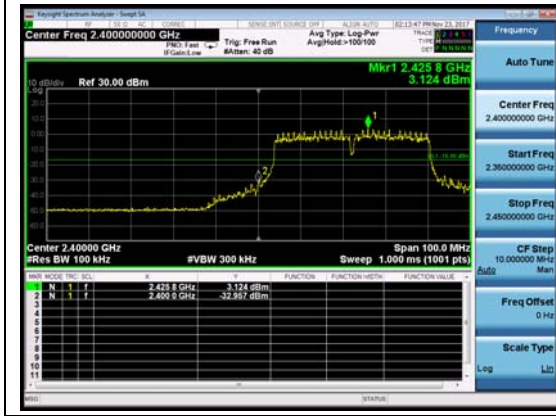
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

| Frequency | Uncertainty |
|-----------|-------------|
| 2GHz-3GHz | 1.407 dB |



Test Results: PASS





5.4. Power Spectral Density

Ambient condition

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

Method of Measurement

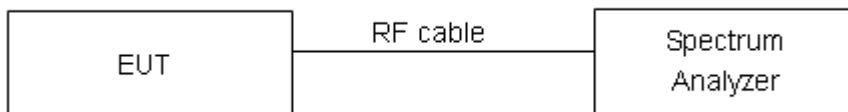
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

RBW is set to 3 kHz and VBW is set to 10 kHz for Wi-Fi 2.4G on spectrum analyzer.

Set the span to 1.5 times the DTS channel bandwidth. Sweep time = auto couple. Trace mode = max hold. The Average power spectral density is recorded.

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

Test setup



Limits

Rule Part 15.247(e) specifies that” 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. “

| | |
|--------|----------------|
| Limits | ≤ 8 dBm / 3kHz |
|--------|----------------|

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:****SISO Antenna 1**

| Network Standards | Channel Number | Read Value (dBm / 3kHz) | Power Spectral Density (dBm / 3kHz) | Limit (dBm / 3kHz) | Conclusion |
|---|----------------|-------------------------|-------------------------------------|--------------------|------------|
| 802.11b | 1 | -17.14 | -17.14 | 8 | PASS |
| | 6 | -17.43 | -17.43 | 8 | PASS |
| | 11 | -16.64 | -16.64 | 8 | PASS |
| 802.11g | 1 | -16.34 | -15.02 | 8 | PASS |
| | 6 | -16.88 | -15.57 | 8 | PASS |
| | 11 | -16.88 | -15.56 | 8 | PASS |
| Note: Power Spectral Density =Read Value+Duty cycle correction factor | | | | | |

SISO Antenna 2

| Network Standards | Channel Number | Read Value (dBm / 3kHz) | Power Spectral Density (dBm / 3kHz) | Limit (dBm / 3kHz) | Conclusion |
|---|----------------|-------------------------|-------------------------------------|--------------------|------------|
| 802.11b | 1 | -16.71 | -16.71 | 8 | PASS |
| | 6 | -16.73 | -16.73 | 8 | PASS |
| | 11 | -16.64 | -16.64 | 8 | PASS |
| 802.11g | 1 | -15.18 | -13.87 | 8 | PASS |
| | 6 | -16.33 | -15.01 | 8 | PASS |
| | 11 | -16.12 | -14.80 | 8 | PASS |
| Note: Power Spectral Density =Read Value+Duty cycle correction factor | | | | | |

MIMO

| Network Standards | Channel Number | Antenna 1 | | | Antenna 2 | | | Total PSD | | Limit (dBm / 3kHz) | Conclusion |
|-------------------|----------------|-------------------------|------------------------|------------|-------------------------|------------------------|------------|------------------------|--------------|--------------------|------------|
| | | Read Value (dBm / 3kHz) | Power Spectral Density | | Read Value (dBm / 3kHz) | Power Spectral Density | | Power Spectral Density | | | |
| | | | (dBm / 3kHz) | (mW/ 3kHz) | | (dBm / 3kHz) | (mW/ 3kHz) | (mW/ 3kHz) | (dBm / 3kHz) | | |
| 802.11n HT20 | 1 | -15.82 | -13.81 | 0.042 | -14.99 | -12.98 | 0.050 | 0.092 | -10.37 | 8 | PASS |
| | 6 | -17.11 | -15.10 | 0.031 | -16.24 | -14.23 | 0.038 | 0.069 | -11.63 | 8 | PASS |
| | 11 | -17.95 | -15.94 | 0.025 | -15.56 | -13.55 | 0.044 | 0.070 | -11.58 | 8 | PASS |
| 802.11n HT40 | 3 | -19.86 | -17.03 | 0.020 | -17.94 | -15.11 | 0.031 | 0.051 | -12.95 | 8 | PASS |
| | 6 | -19.15 | -16.31 | 0.023 | -19.00 | -16.16 | 0.024 | 0.048 | -13.22 | 8 | PASS |
| | 9 | -19.38 | -16.55 | 0.022 | -20.78 | -17.94 | 0.016 | 0.038 | -14.18 | 8 | PASS |

Note: 1. Power Spectral Density =Read Value+Duty cycle correction factor
 2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density= $10\log(10^{(PSD\ antenna1\ in\ dBm/10)}+10^{(PSD\ antenna2\ in\ dBm/10)})$
 3. The manufacturer declared the transmitter output signals is CDD mode. And $N_{ss}=1$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = $G_{ANT} + \text{Array Gain}$, For power spectral density (PSD) measurements on all devices, Array Gain = $10\log(N_{ANT}/N_{SS})\text{ dB}=3.01$.
 So directional gain = $G_{ANT} + \text{Array Gain} = 1.5+3.01=4.51\text{ dBi}<6\text{dBi}$. So the power limit is 8dBm.

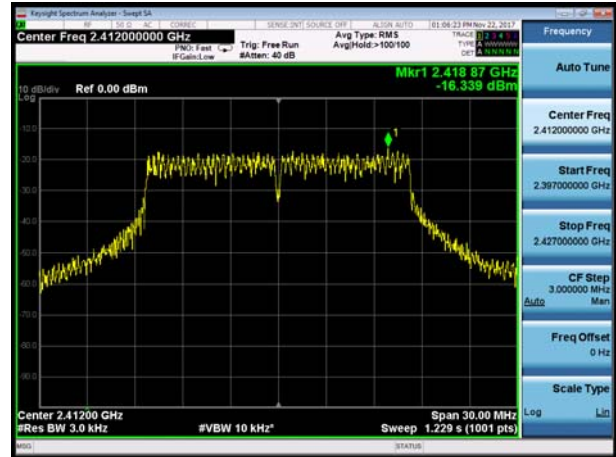


SISO Antenna 1

802.11b, Channel No.: 1



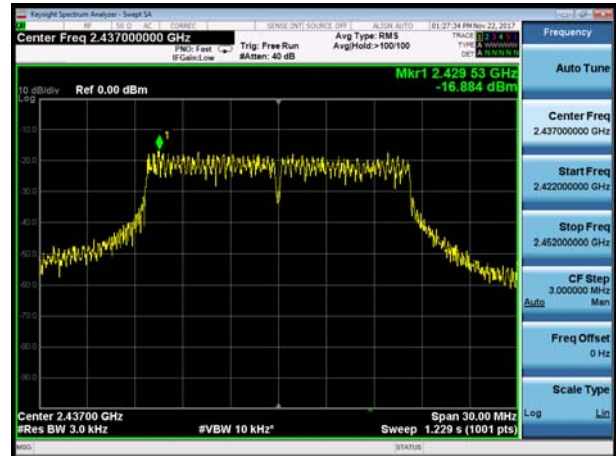
802.11g, Channel No.: 1



802.11b, Channel No.: 6



802.11g, Channel No.: 6



802.11b, Channel No.: 11



802.11g, Channel No.: 11



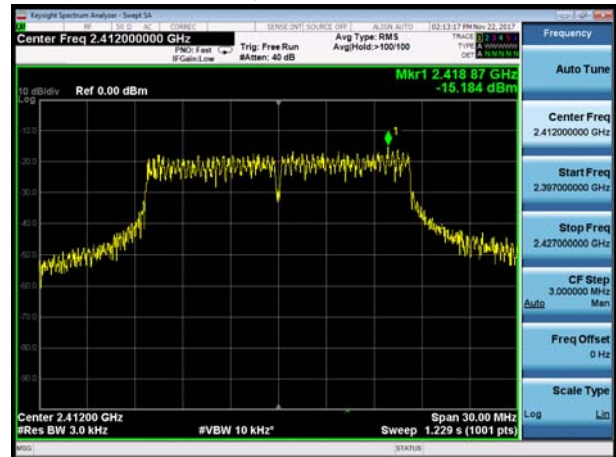


SISO Antenna 2

802.11b, Channel No.: 1



802.11g, Channel No.: 1



802.11b, Channel No.: 6



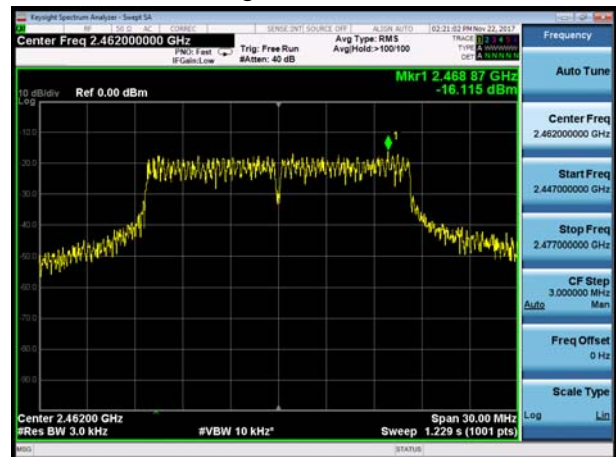
802.11g, Channel No.: 6



802.11b, Channel No.: 11



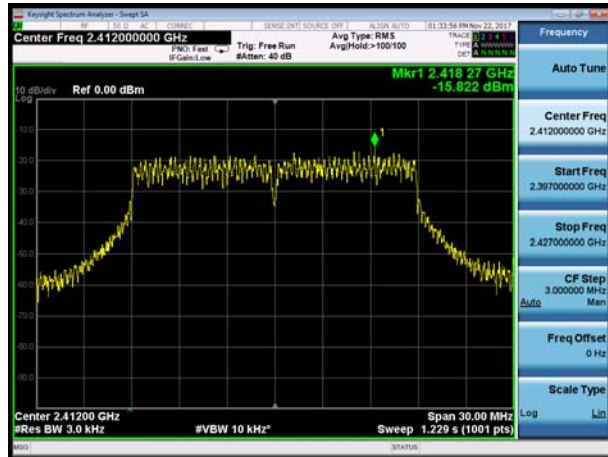
802.11g, Channel No.: 11





MIMO Antenna 1

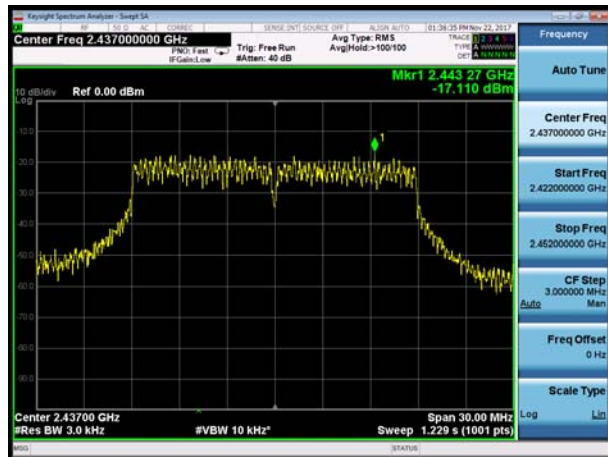
802.11n(HT20), Channel No. 1



802.11n(HT40), Channel No. 3



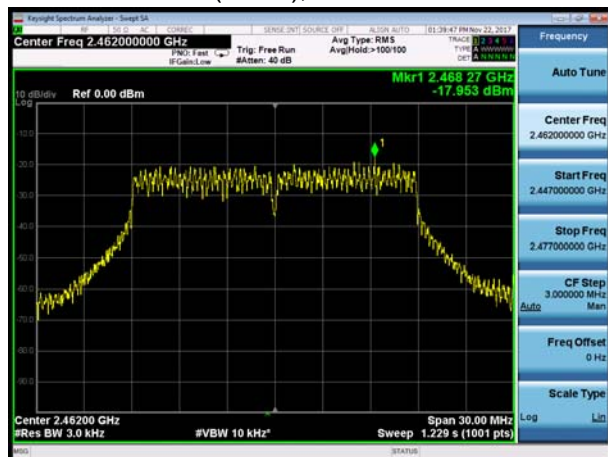
802.11n(HT20), Channel No. 6



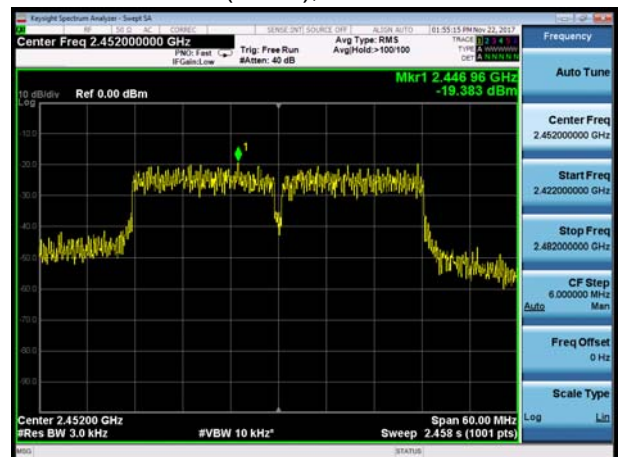
802.11n(HT40), Channel No. 6



802.11n(HT20), Channel No. 11



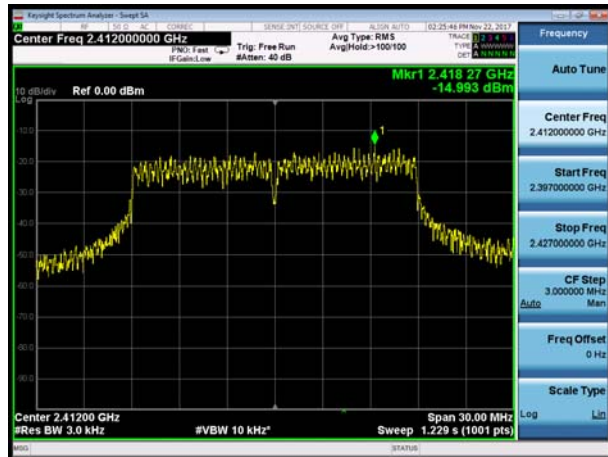
802.11n(HT40), Channel No. 9



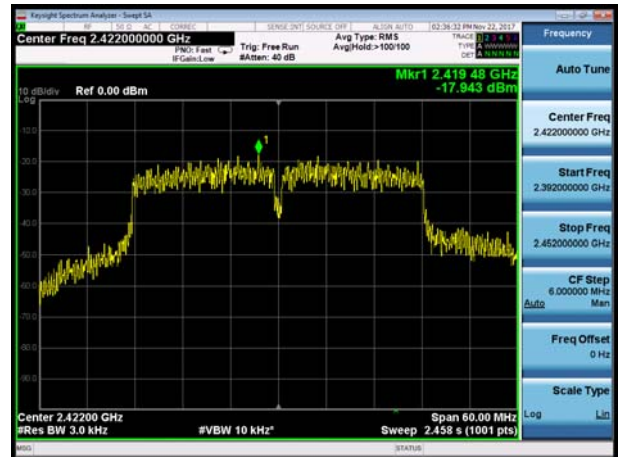


MIMO Antenna 2

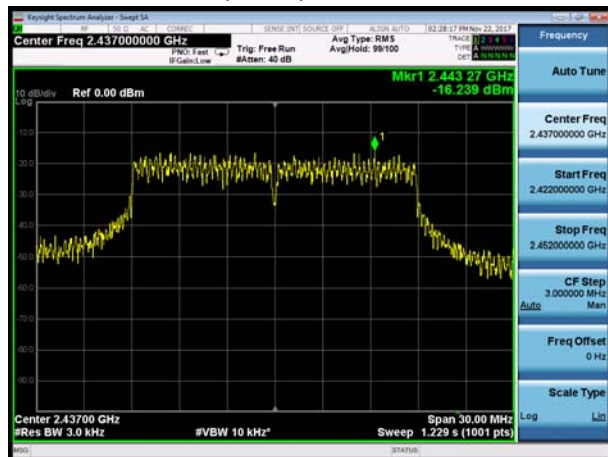
802.11n(HT20), Channel No. 1



802.11n(HT40), Channel No. 3



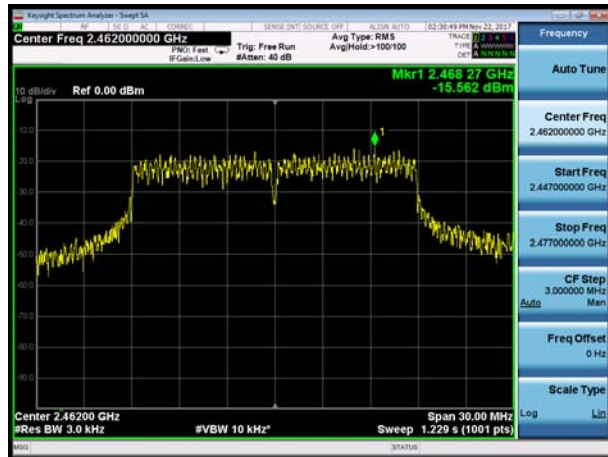
802.11n(HT20), Channel No. 6



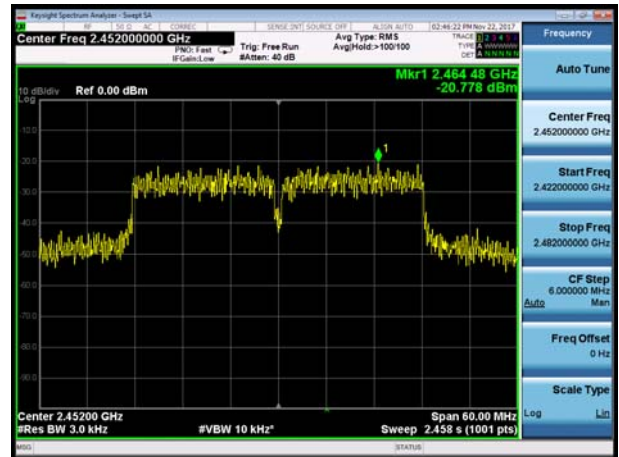
802.11n(HT40), Channel No. 6



802.11n(HT20), Channel No. 11



802.11n(HT40), Channel No. 9



5.5. Spurious RF Conducted Emissions

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 with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW to 100kHz and VBW to 300 kHz, Sweep is set to ATUO.

The test is in transmitting mode.

Test setup



Limits

Rule Part 15.247(d) pacifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.”

Antenna 1

| Network Standards | Carrier frequency (MHz) | Reference value (dBm) | Limit |
|-------------------|-------------------------|-----------------------|--------|
| 802.11b | 2412 | -7.198 | 12.802 |
| | 2437 | -6.589 | 13.411 |
| | 2462 | -7.481 | 12.519 |
| 802.11g | 2412 | -3.884 | 16.116 |
| | 2437 | -3.200 | 16.800 |
| | 2462 | -4.174 | 15.826 |
| 802.11n HT20 | 2412 | -4.117 | 15.883 |
| | 2437 | -4.297 | 15.703 |
| | 2462 | -5.113 | 14.887 |
| 802.11n HT40 | 2422 | -8.017 | 11.983 |
| | 2437 | -8.150 | 11.850 |
| | 2452 | -8.868 | 11.132 |

**Measurement Uncertainty**

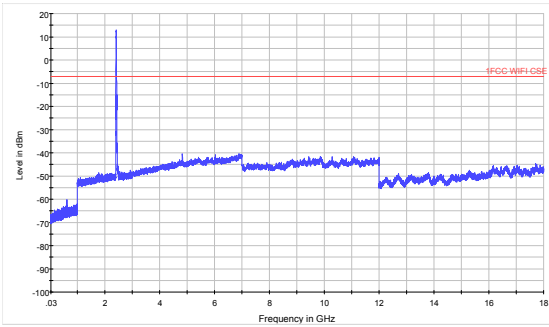
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

| Frequency | Uncertainty |
|-------------|-------------|
| 100kHz-2GHz | 0.684 dB |
| 2GHz-26GHz | 1.407 dB |

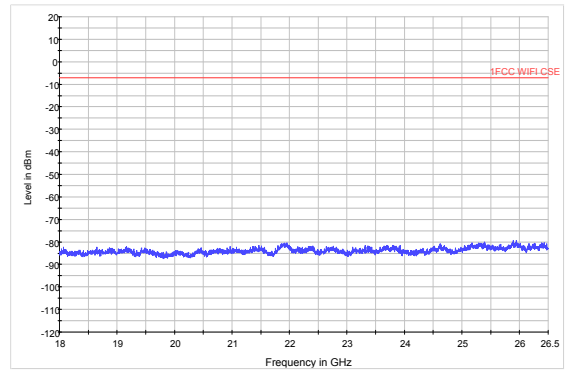
Test Results:

Antenna 1 was selected as the worst case.

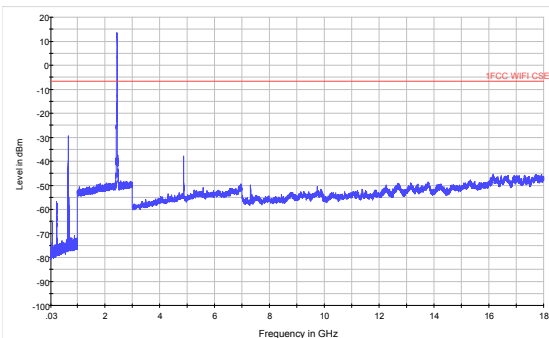
Antenna 1



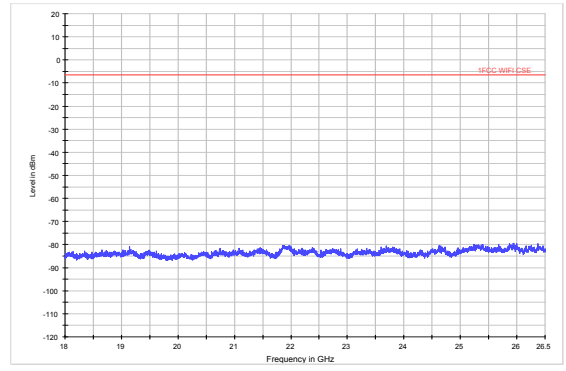
802.11b CH1 30MHz to 18GHz



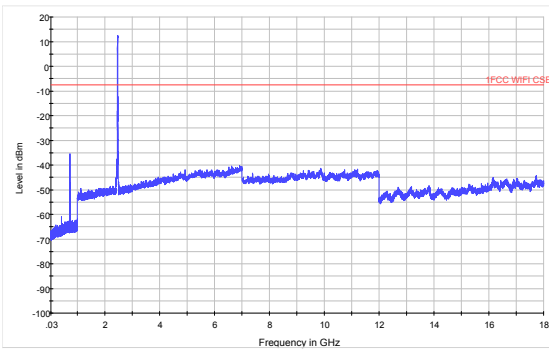
802.11b CH1 18GHz to 26.5GHz



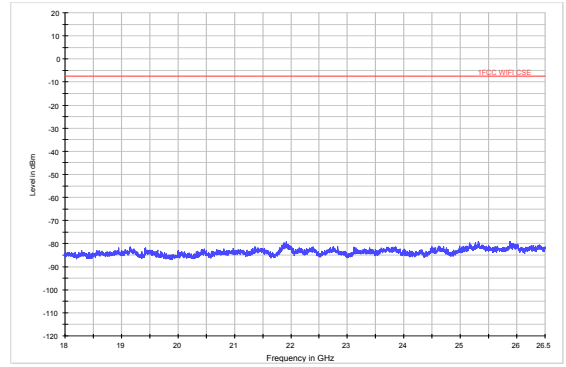
802.11b CH6 30MHz to 18GHz



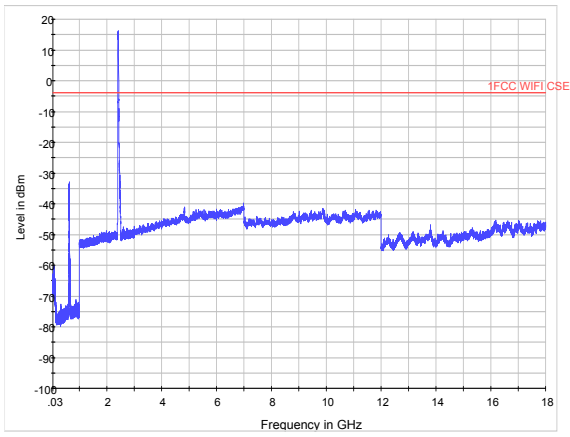
802.11b CH6 18GHz to 26.5GHz



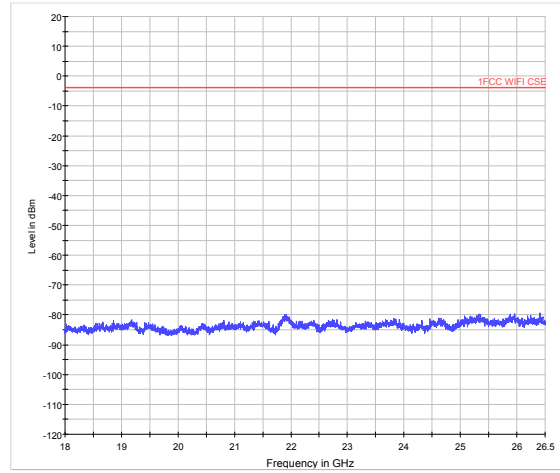
802.11b CH11 30MHz to 18GHz



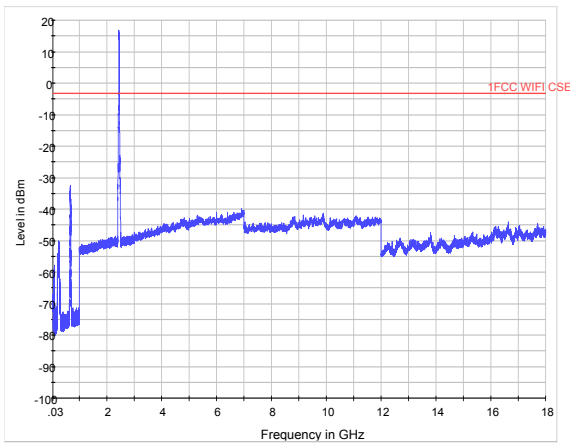
802.11b CH11 18GHz to 26.5GHz



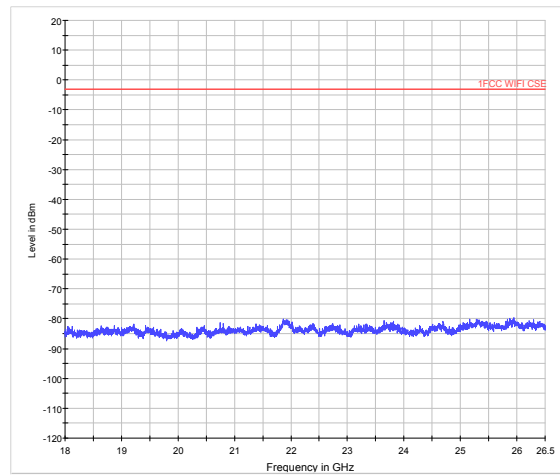
802.11g CH1 30MHz to 18GHz



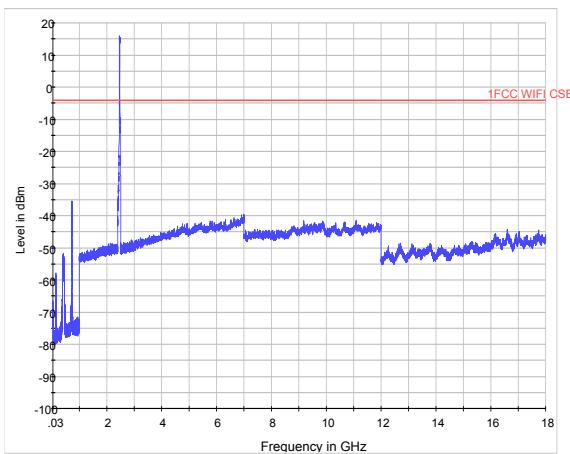
802.11g CH1 18GHz to 26.5GHz



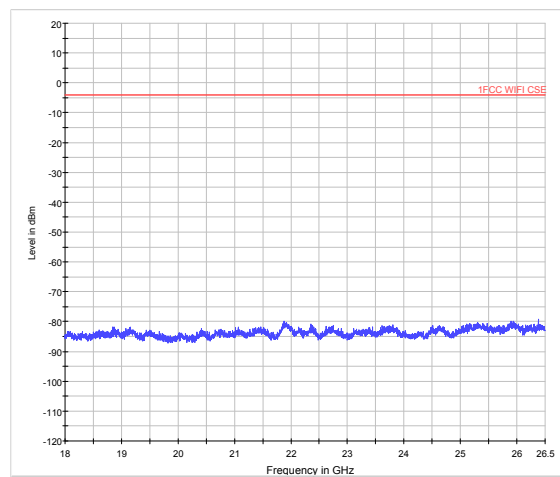
802.11g CH6 30MHz to 18GHz



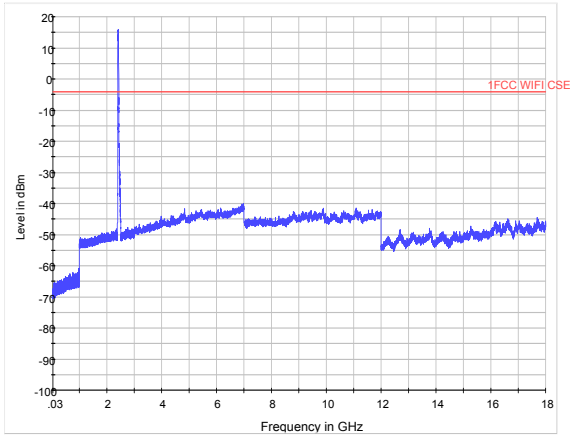
802.11g CH6 18GHz to 26.5GHz



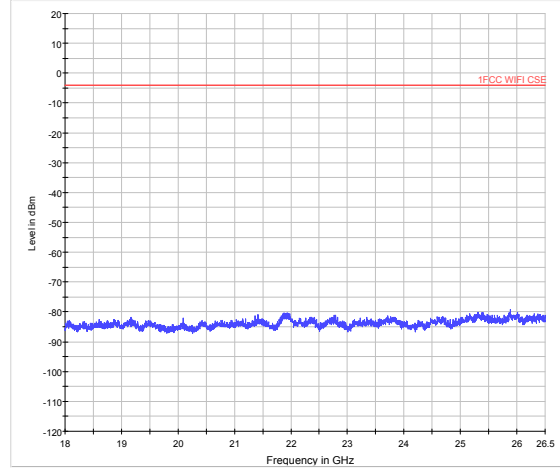
802.11g CH11 30MHz to 18GHz



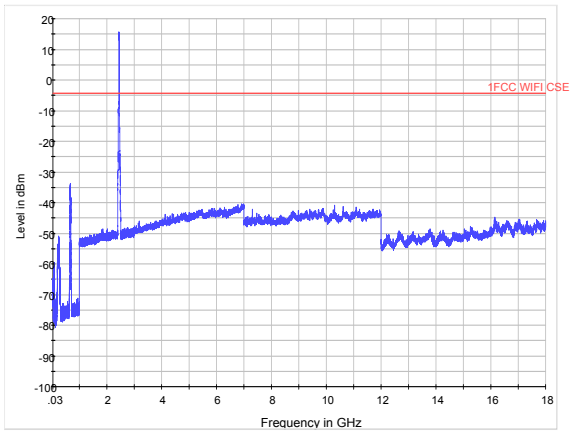
802.11g CH11 18GHz to 26.5GHz



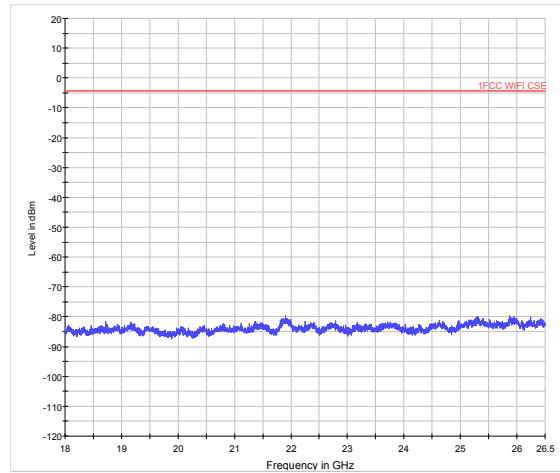
802.11n (HT20) CH1 30MHz to 18GHz



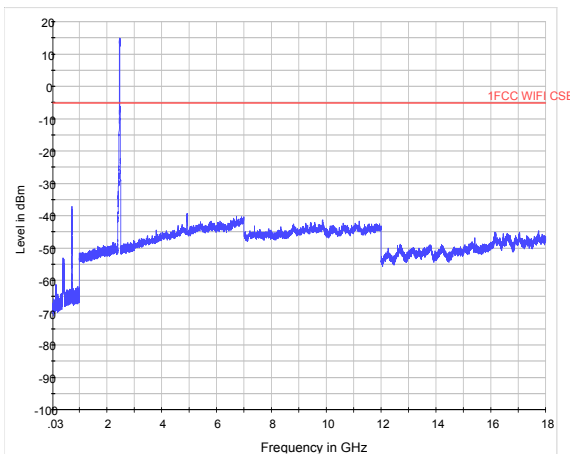
802.11n (HT20) CH1 18GHz to 26.5GHz



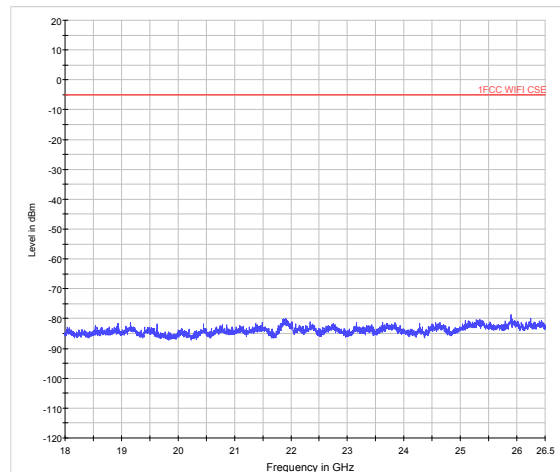
802.11n (HT20) CH6 30MHz to 18GHz



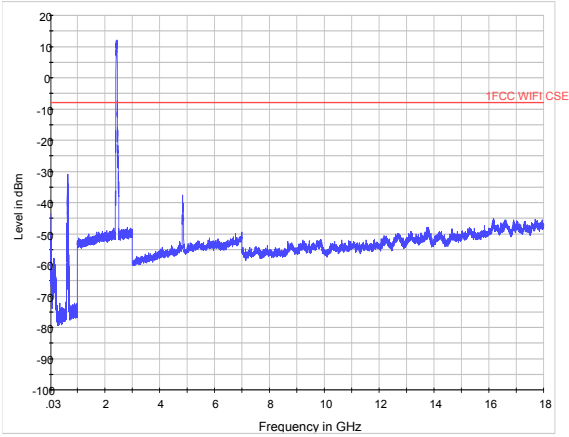
802.11n (HT20) CH6 18GHz to 26.5GHz



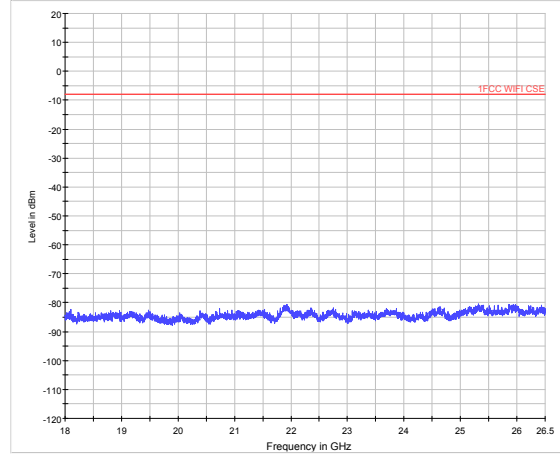
802.11n (HT20) CH11 30MHz to 18GHz



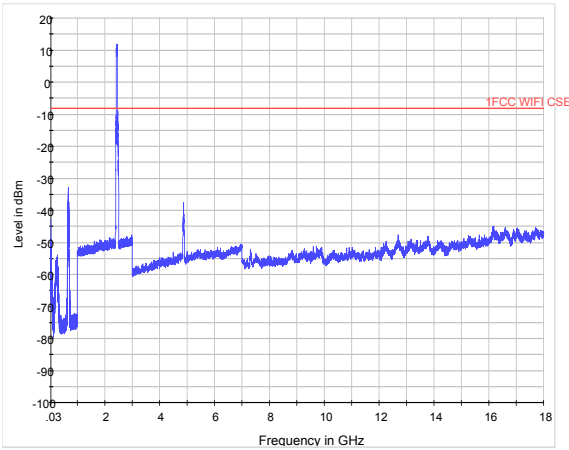
802.11n (HT20) CH11 18GHz to 26.5GHz



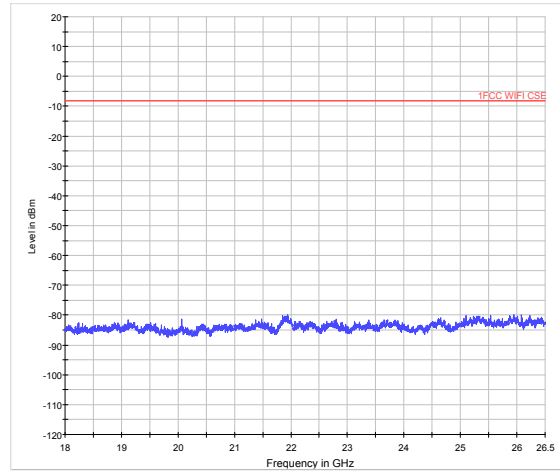
802.11n (HT40) CH3 30MHz to 18GHz



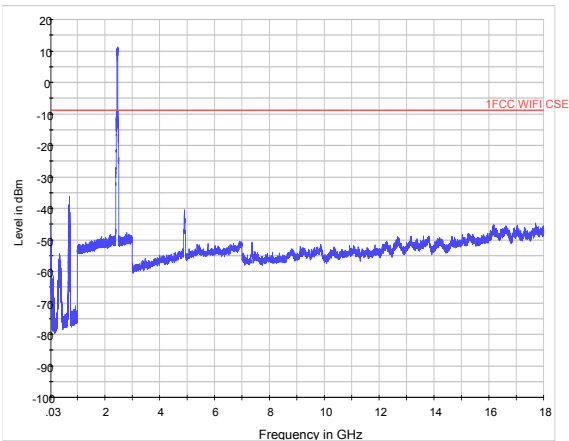
802.11n (HT40) CH3 18GHz to 26.5GHz



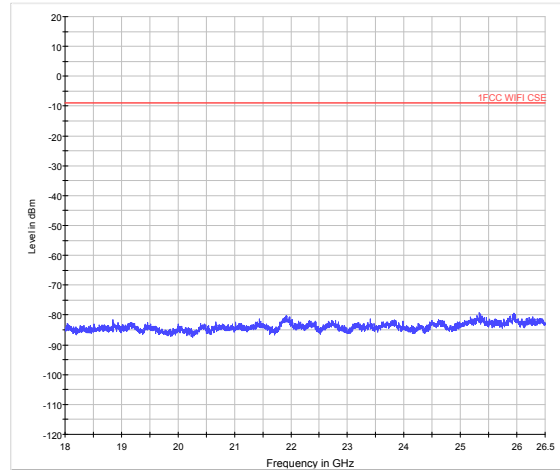
802.11n (HT40) CH6 30MHz to 18GHz



802.11n (HT40) CH6 18GHz to 26.5GHz



802.11n (HT40) CH9 30MHz to 18GHz



802.11n (HT40) CH9 18GHz to 26.5GHz

5.6. Radiated Emissions in the Restricted Band

Ambient condition

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

Method of Measurement

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 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. Sweep the Restricted Band and the emissions less than 20 dB below the permissible value are reported.

This method refer to **KDB 558074**.

The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:

I) Peak emission levels are measured by setting the instrument as follows:

- 1) RBW = 1 MHz.
- 2) VBW \geq [3 \times RBW]
- 3) Detector = peak.
- 4) Sweep time = auto.
- 5) Trace mode = max hold.
- 6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately $1 / D$, where D is the duty cycle.

II) Average emission levels are measured by setting the instrument as follows:

- a) RBW = 1 MHz.
- b) VBW \geq [3 \times RBW].
- c) Detector = RMS (power averaging), if [span / (# of points in sweep)] \leq RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
- d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
- e) Sweep time = auto.
- f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of $1 / D$, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
- g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction

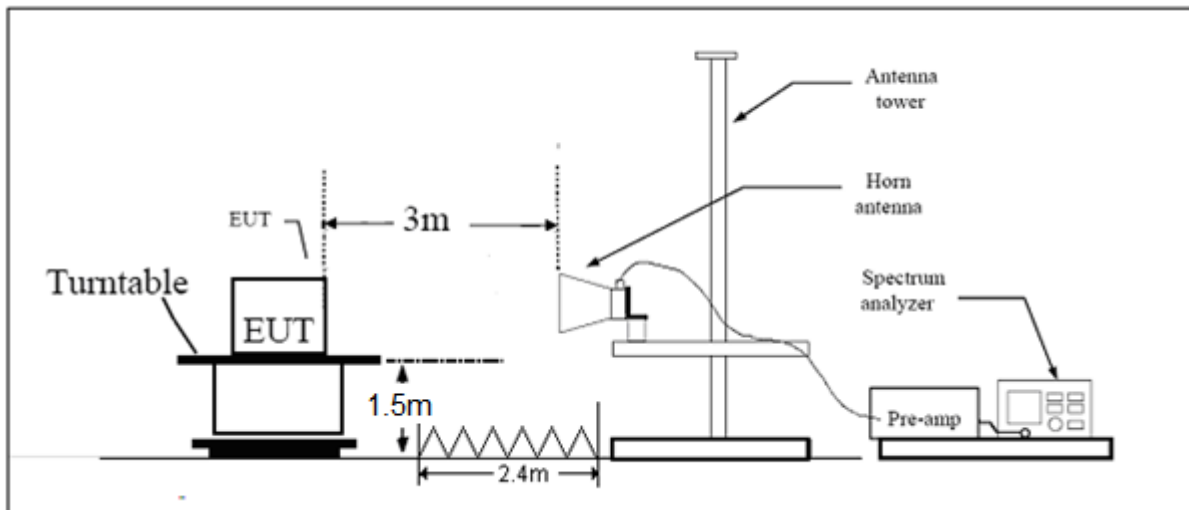
factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

- 1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is $[10 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
- 2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is $[20 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
- 3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

The field strength of spurious 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 antenna is vertical.

The test is in transmitting mode.

Test setup



Note: Area side: 2.4mX3.6m

Limits

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

Limit in restricted band

| Frequency of emission (MHz) | Field strength(uV/m) | Field strength(dBuV/m) |
|-----------------------------|----------------------|------------------------|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above960 | 500 | 54 |

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Peak Limit=74 dBuV/m

Average Limit=54 dBuV/m

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

**Test Results:****PASS**

| Band | T _{on} (ms) | T _(on+off) (ms) | Duty cycle | Duty cycle correction Factor(dB) |
|--------------|----------------------|----------------------------|------------|----------------------------------|
| 802.11b | 12.44 | 12.58 | 0.99 | NA |
| 802.11g | 0.25 | 0.34 | 0.74 | 1.32 |
| 802.11n HT20 | 0.23 | 0.36 | 0.63 | 2.01 |
| 802.11n HT40 | 0.13 | 0.24 | 0.52 | 2.83 |

Note: when Duty cycle>0.98, Duty cycle correction Factor not required.

Antenna 2**802.11b-Channel 1**

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2390 | 43.8 | -- | 200.0 | V | 135 | -- | 43.88 | 30.12 | 74 |
| 2390 | -- | 31.8 | 200.0 | V | 135 | -- | 31.8 | 22.2 | 54 |

802.11b-Channel 11

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2483.5 | 45.17 | -- | 200.0 | V | 135 | -- | 45.17 | 28.83 | 74 |
| 2483.5 | -- | 32.49 | 200.0 | V | 135 | -- | 32.49 | 21.51 | 54 |

802.11g-Channel 1

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2390 | 49.86 | -- | 150 | V | 65 | 1.32 | 51.18 | 22.82 | 74 |
| 2390 | -- | 34.11 | 150 | V | 65 | 1.32 | 35.43 | 18.57 | 54 |

802.11g-Channel 11

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2483.5 | 53.48 | -- | 150 | V | 78 | 1.32 | 54.8 | 19.2 | 74 |
| 2483.5 | -- | 37.46 | 150 | V | 78 | 1.32 | 38.78 | 15.22 | 54 |

**MIMO****802.11n HT20 -Channel 1**

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2390 | 46.96 | -- | 200 | V | 90 | 2.01 | 48.97 | 25.03 | 74 |
| 2390 | -- | 32.93 | 200 | V | 90 | 2.01 | 34.94 | 19.06 | 54 |

802.11n HT20-Channel 11

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2483.5 | 51.72 | -- | 200 | V | 90 | 2.01 | 53.73 | 20.27 | 74 |
| 2483.5 | -- | 37.28 | 200 | V | 90 | 2.01 | 39.29 | 14.71 | 54 |

802.11n HT40 -Channel 3

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2390 | 53.68 | -- | 150 | V | 46 | 2.83 | 56.51 | 17.49 | 74 |
| 2390 | -- | 37.92 | 150 | V | 46 | 2.83 | 40.75 | 13.25 | 54 |

802.11n HT40-Channel 9

| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Duty cycle correction Factor(dB) | conclusion value (dBuV/m) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|------------------|-------------|--------------|---------------|----------------------------------|---------------------------|-------------|----------------|
| 2483.5 | 56.02 | -- | 150 | V | 46 | 2.83 | 58.85 | 15.15 | 74 |
| 2483.5 | -- | 44.17 | 150 | V | 46 | 2.83 | 47.00 | 7.00 | 54 |

5.7. Radiates Emission

Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C | 45%~50% | 102.5kPa |

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 through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, below 30MHz, the center of the loop shall be 1 meters; above 30MHz, 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=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz (detector: Peak):

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

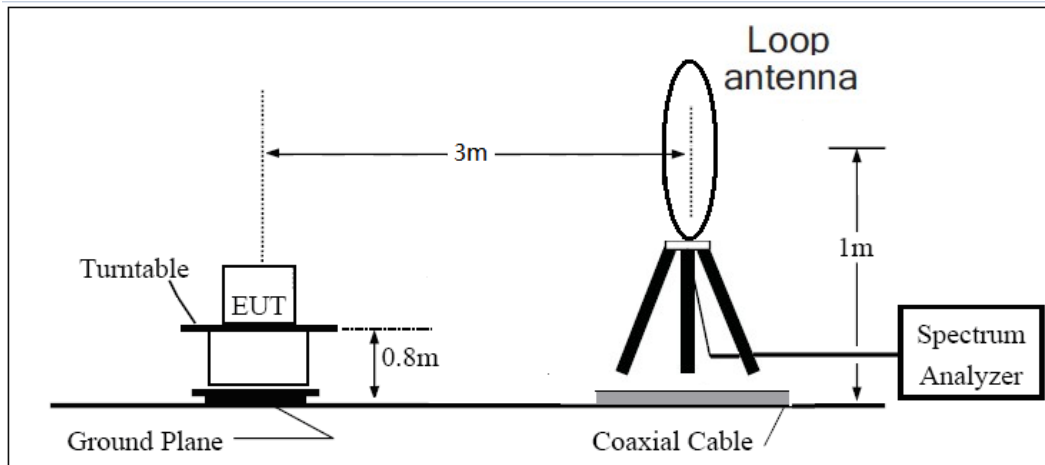
(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

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.

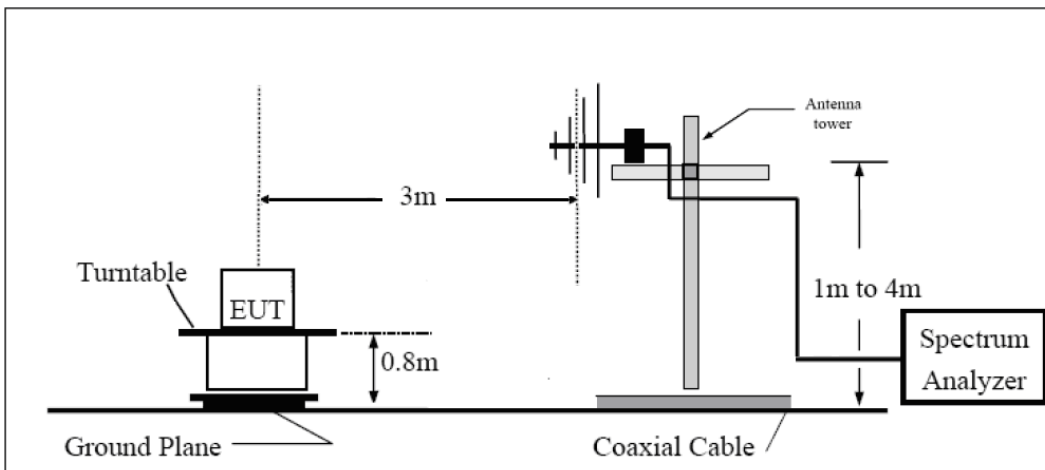
The test is in transmitting mode.

Test setup

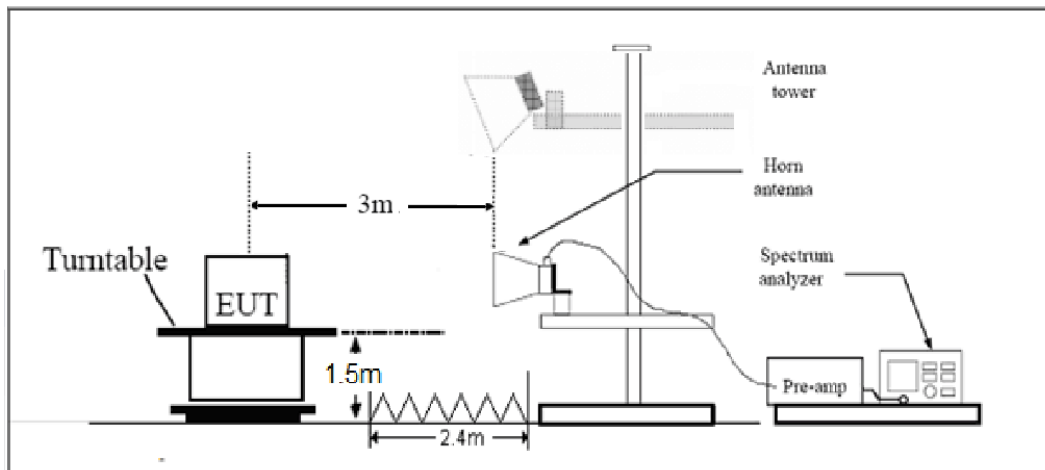
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits

Rule Part 15.247(d) specifies that “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)).”

Limit in restricted band

| 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 |

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

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 |
| Above 1GHz | 3.68 dB |

Test result

Sweep from 9 kHz to 30MHz, and the emissions more than 20 dB below the permissible value are not reported.

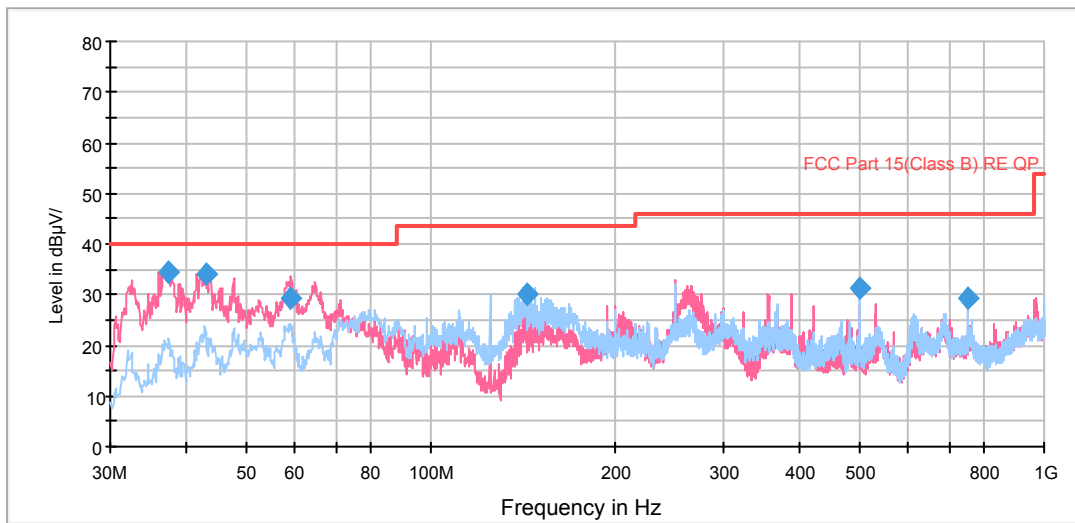
The following graphs display the maximum values of horizontal and vertical by software. For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

After the pre test, Antenna 2 was selected as the worst antenna.

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, 802.11b, Channel 11 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Continuous TX mode:

RE 0.03-1GHz QP Class B



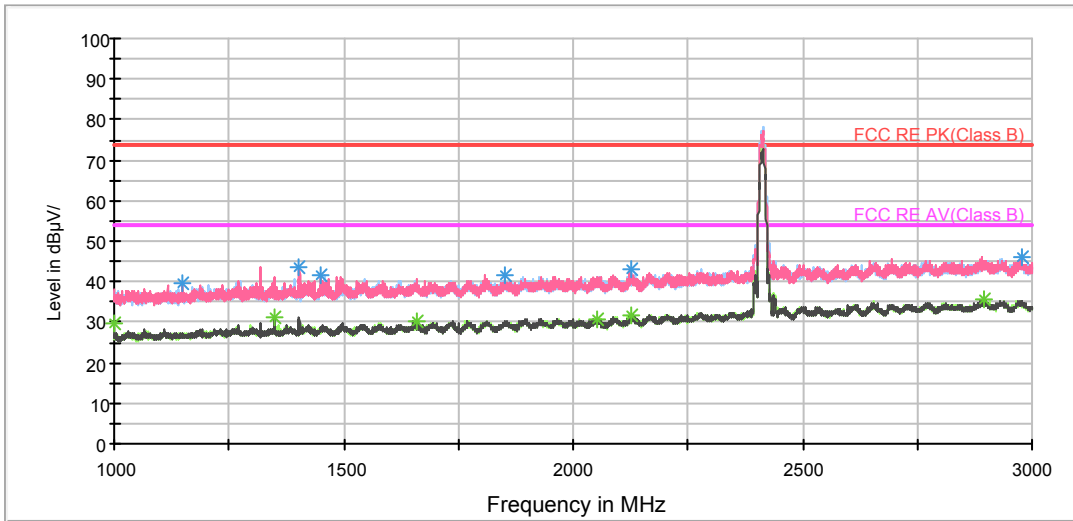
Radiates Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dBuV/m) | Height (cm) | Reading value (dBuV/m) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------------|-------------|------------------------|--------------|---------------|---------------------|-------------|----------------|
| 37.376250 | 34.4 | 100.0 | 52.8 | V | 239.0 | -18.4 | 5.6 | 40.0 |
| 42.953750 | 34.1 | 100.0 | 51.8 | V | 223.0 | -17.7 | 5.9 | 40.0 |
| 59.201250 | 29.1 | 100.0 | 50.6 | V | 98.0 | -21.5 | 10.9 | 40.0 |
| 143.267500 | 29.9 | 125.0 | 58.0 | H | 324.0 | -28.1 | 13.6 | 43.5 |
| 500.025000 | 31.1 | 100.0 | 51.7 | H | 293.0 | -20.6 | 14.9 | 46.0 |
| 750.043750 | 29.5 | 219.0 | 44.8 | H | 209.0 | -15.3 | 16.5 | 46.0 |

- Remark: 1. Quasi-Peak = Reading value + Correction factor
- 2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)
- 3. Margin = Limit – Quasi-Peak

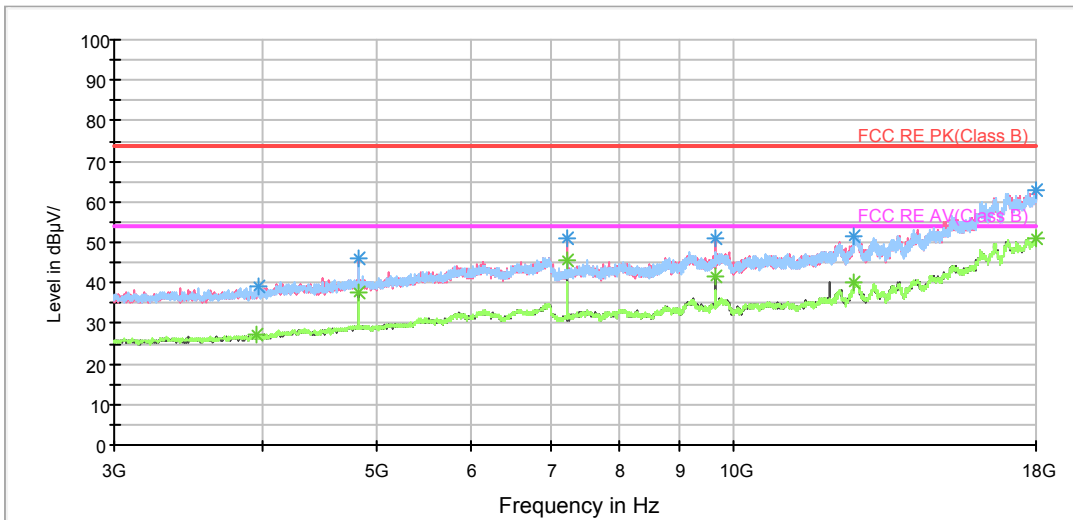
802.11b CH1

RE 1G-3GHz PK+AV



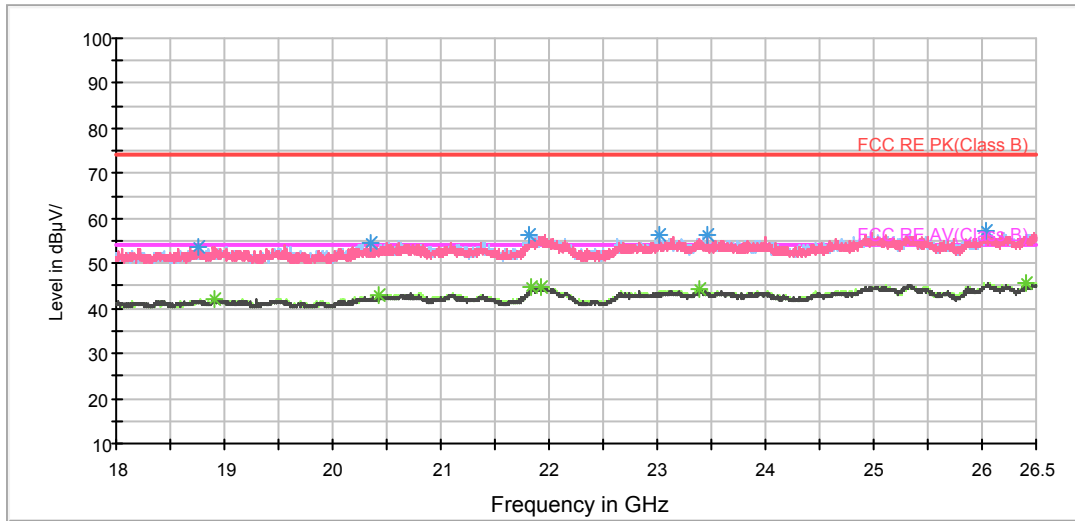
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1147.250000 | 39.7 | 100.0 | V | 43.0 | 48.8 | -9.1 | 34.3 | 74 |
| 1403.750000 | 43.6 | 150.0 | V | 302.0 | 51.8 | -8.2 | 30.4 | 74 |
| 1450.250000 | 41.7 | 150.0 | V | 302.0 | 49.4 | -7.7 | 32.3 | 74 |
| 1851.750000 | 41.5 | 100.0 | V | 43.0 | 47.5 | -6.0 | 32.5 | 74 |
| 2125.500000 | 43.0 | 200.0 | H | 236.0 | 47.5 | -4.5 | 31.0 | 74 |
| 2977.500000 | 46.1 | 100.0 | V | 54.0 | 47.1 | -1.0 | 27.9 | 74 |

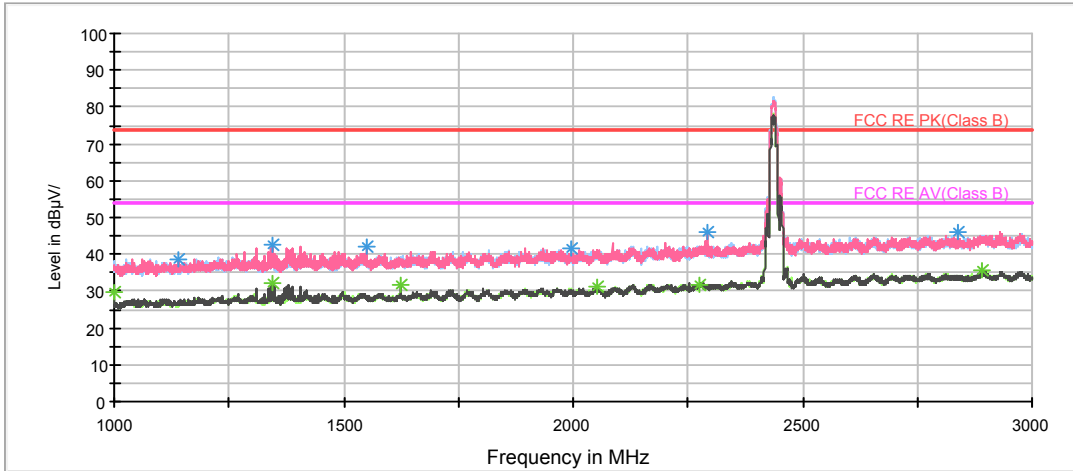
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.7 | 100.0 | H | 158.0 | 39.3 | -9.6 | 24.3 | 54 |
| 1350.500000 | 31.3 | 150.0 | V | 255.0 | 39.8 | -8.5 | 22.7 | 54 |
| 1657.500000 | 30.0 | 150.0 | V | 231.0 | 36.7 | -6.7 | 24.0 | 54 |
| 2051.250000 | 30.9 | 100.0 | H | 191.0 | 36.3 | -5.4 | 23.1 | 54 |
| 2127.750000 | 31.8 | 200.0 | H | 358.0 | 36.3 | -4.5 | 22.2 | 54 |
| 2895.000000 | 35.4 | 100.0 | H | 0.0 | 36.4 | -1.0 | 18.6 | 54 |

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

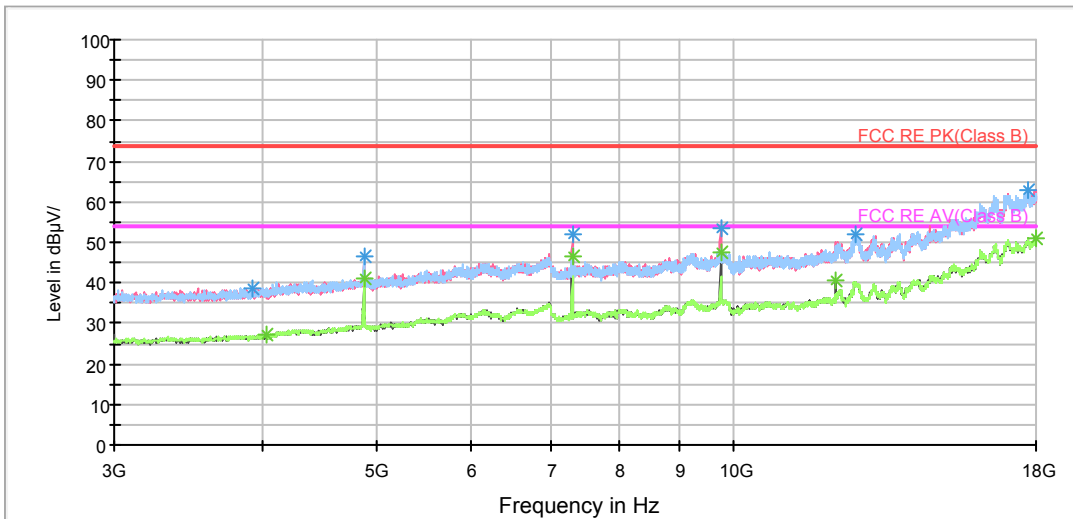
802.11b CH6

RE 1G-3GHz PK+AV



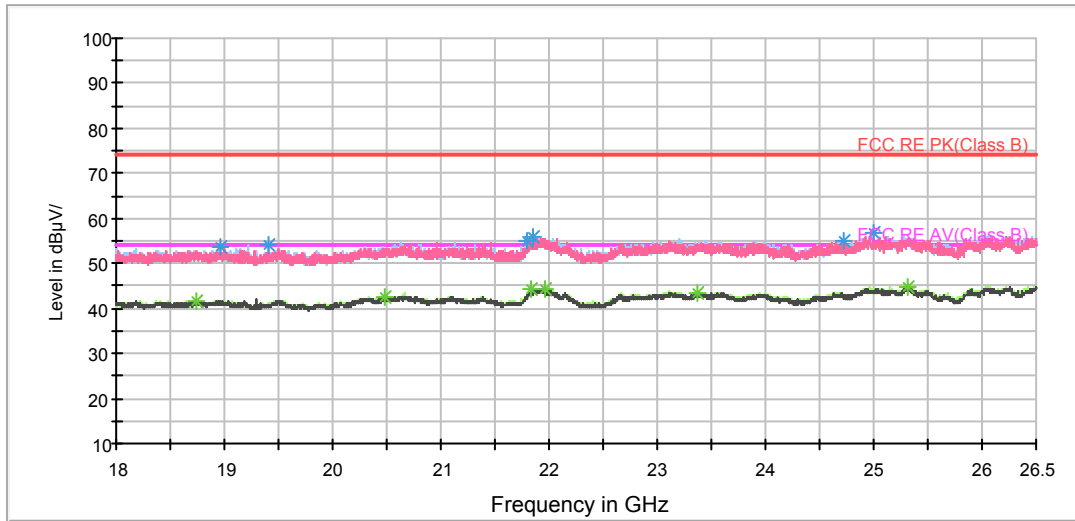
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1141.500000 | 38.8 | 100.0 | V | 115.0 | 48.0 | -9.2 | 35.2 | 74 |
| 1344.750000 | 42.7 | 150.0 | V | 260.0 | 51.1 | -8.4 | 31.3 | 74 |
| 1551.000000 | 41.8 | 150.0 | V | 248.0 | 49.4 | -7.6 | 32.2 | 74 |
| 1996.000000 | 41.6 | 100.0 | H | 86.0 | 47.1 | -5.5 | 32.4 | 74 |
| 2291.500000 | 46.2 | 200.0 | V | 71.0 | 50.2 | -4.0 | 27.8 | 74 |
| 2838.000000 | 46.0 | 100.0 | V | 105.0 | 47.5 | -1.5 | 28.0 | 74 |

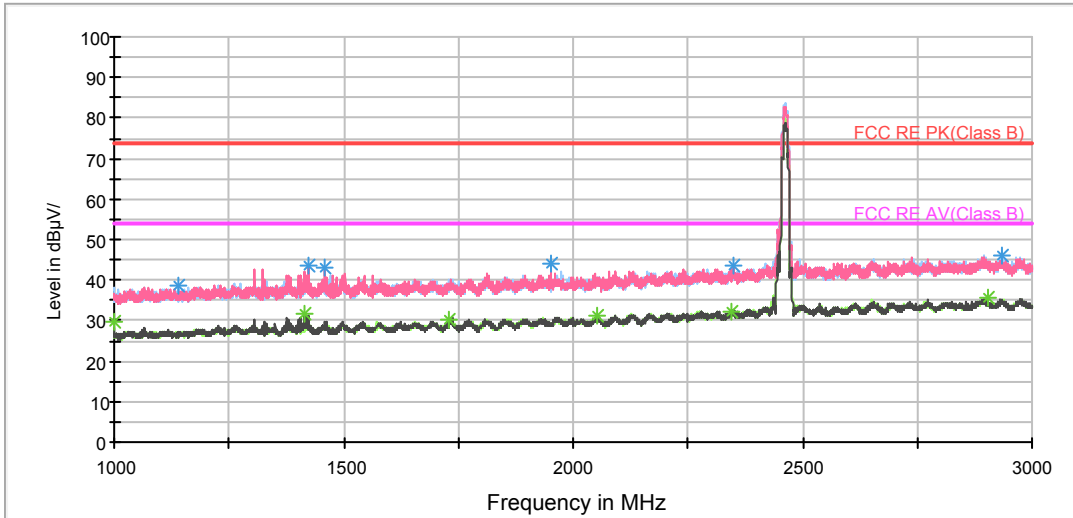
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.7 | 100.0 | H | 317.0 | 39.3 | -9.6 | 24.3 | 54 |
| 1344.750000 | 31.9 | 150.0 | V | 260.0 | 40.3 | -8.4 | 22.1 | 54 |
| 1625.750000 | 31.5 | 150.0 | V | 0.0 | 37.7 | -6.2 | 22.5 | 54 |
| 2052.500000 | 31.2 | 100.0 | V | 48.0 | 36.6 | -5.4 | 22.8 | 54 |
| 2273.000000 | 31.9 | 200.0 | H | 0.0 | 35.7 | -3.8 | 22.1 | 54 |
| 2890.500000 | 35.5 | 100.0 | V | 191.0 | 36.4 | -0.9 | 18.5 | 54 |

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

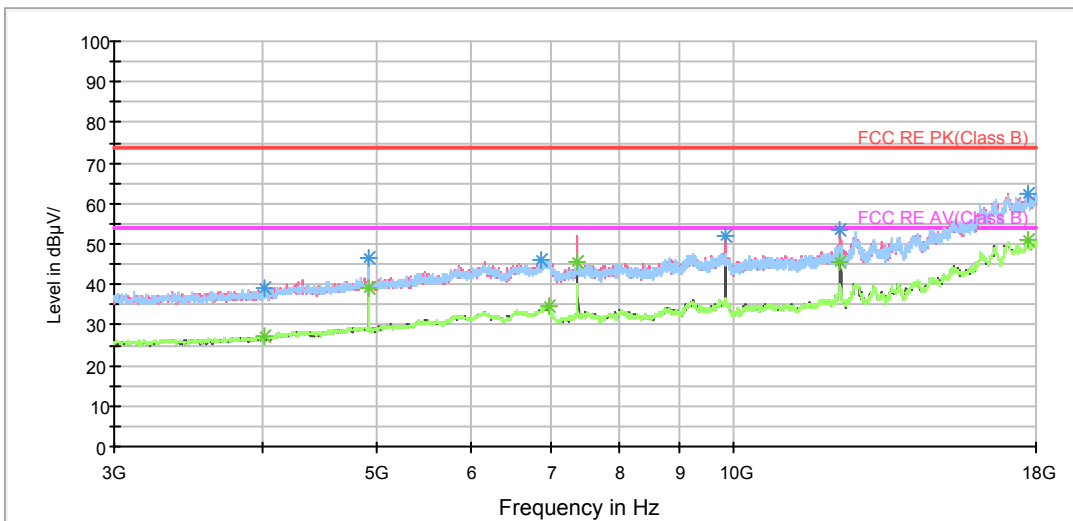
802.11b CH11

RE 1G-3GHz PK+AV



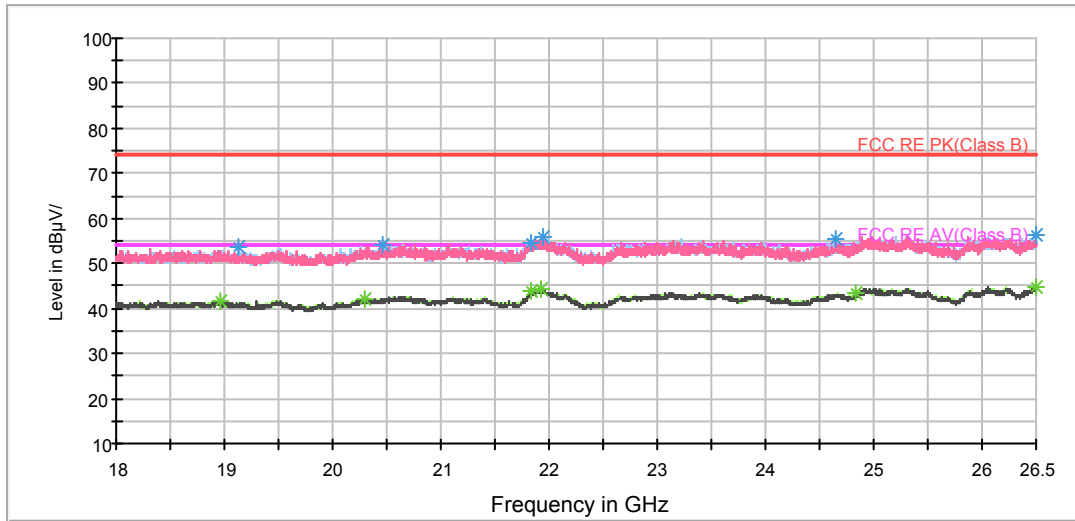
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1138.250000 | 38.4 | 100.0 | H | 346.0 | 47.5 | -9.1 | 35.6 | 74 |
| 1425.250000 | 43.4 | 150.0 | V | 283.0 | 51.4 | -8.0 | 30.6 | 74 |
| 1460.000000 | 43.0 | 150.0 | V | 272.0 | 51.0 | -8.0 | 31.0 | 74 |
| 1953.500000 | 44.0 | 100.0 | V | 272.0 | 49.7 | -5.7 | 30.0 | 74 |
| 2348.000000 | 43.3 | 200.0 | V | 53.0 | 46.8 | -3.5 | 30.7 | 74 |
| 2934.750000 | 45.9 | 100.0 | H | 301.0 | 47.2 | -1.3 | 28.1 | 74 |

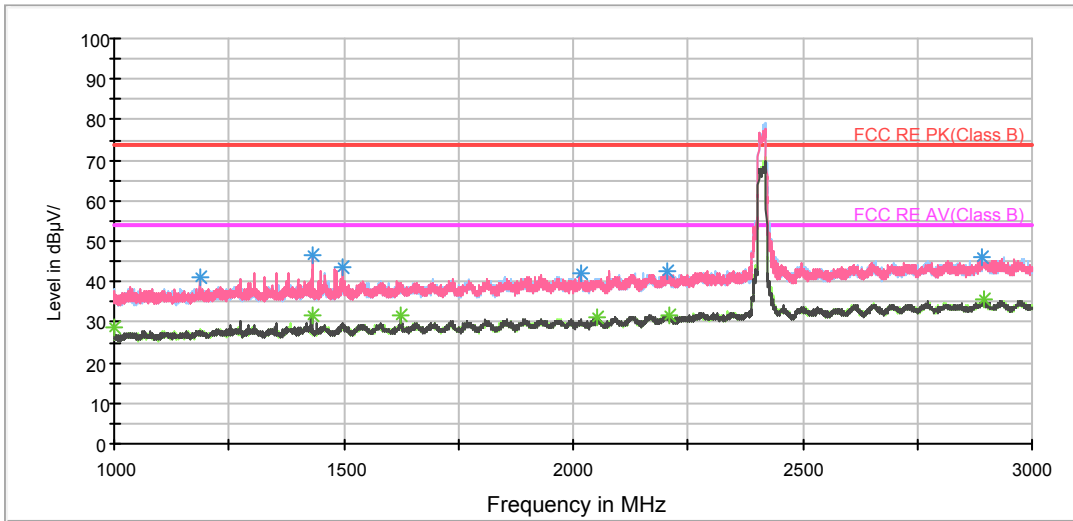
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.9 | 100.0 | H | 157.0 | 39.5 | -9.6 | 24.1 | 54 |
| 1415.750000 | 31.5 | 150.0 | V | 283.0 | 39.5 | -8.0 | 22.5 | 54 |
| 1729.750000 | 30.0 | 150.0 | V | 98.0 | 36.7 | -6.7 | 24.0 | 54 |
| 2051.500000 | 31.1 | 100.0 | V | 31.0 | 36.5 | -5.4 | 22.9 | 54 |
| 2344.000000 | 32.4 | 200.0 | H | 357.0 | 35.9 | -3.5 | 21.6 | 54 |
| 2903.750000 | 35.5 | 100.0 | H | 135.0 | 36.6 | -1.1 | 18.5 | 54 |

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

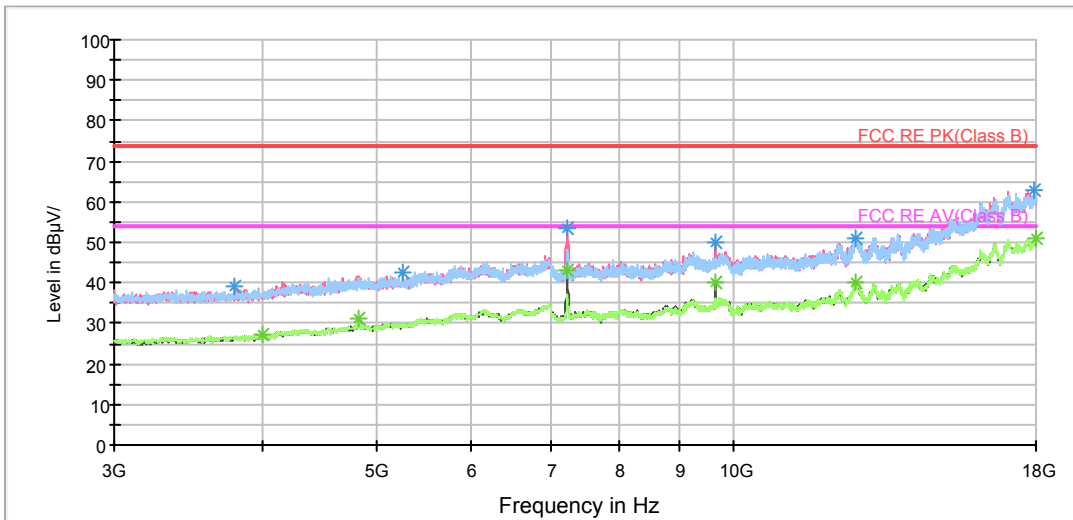
802.11g CH1

RE 1G-3GHz PK+AV



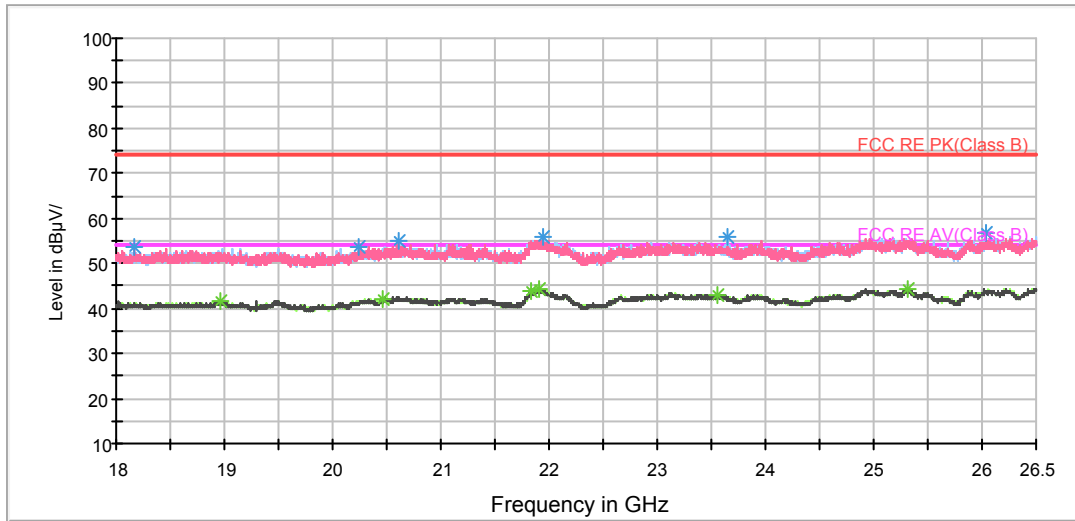
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1185.750000 | 41.0 | 100.0 | V | 0.0 | 49.8 | -8.8 | 33.0 | 74 |
| 1430.500000 | 46.6 | 150.0 | V | 294.0 | 54.6 | -8.0 | 27.4 | 74 |
| 1499.500000 | 43.7 | 150.0 | V | 165.0 | 51.6 | -7.9 | 30.3 | 74 |
| 2017.500000 | 42.2 | 100.0 | V | 248.0 | 48.0 | -5.8 | 31.8 | 74 |
| 2206.000000 | 42.7 | 200.0 | H | 296.0 | 47.0 | -4.3 | 31.3 | 74 |
| 2893.000000 | 45.9 | 100.0 | H | 273.0 | 46.8 | -0.9 | 28.1 | 74 |

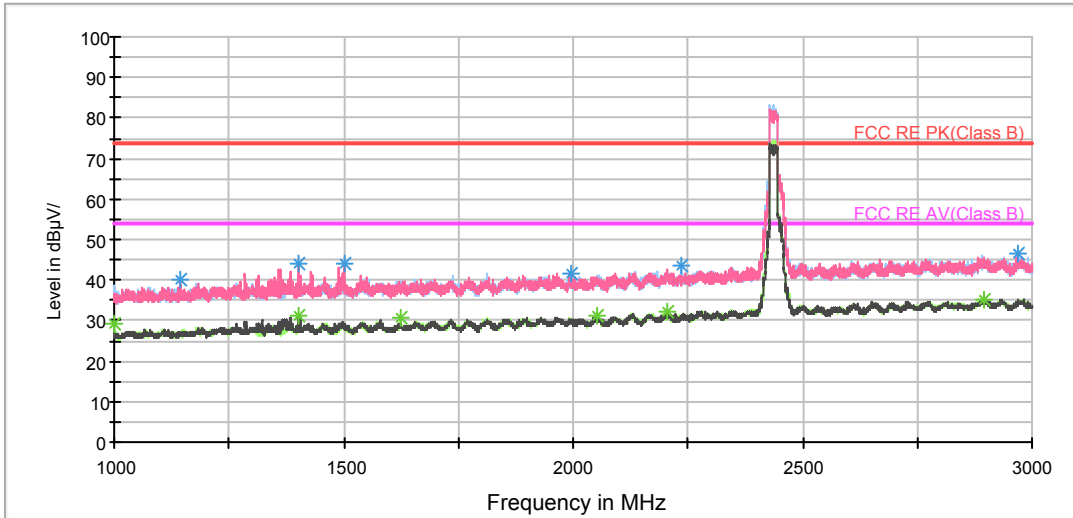
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.250000 | 28.8 | 100.0 | H | 273.0 | 38.4 | -9.6 | 25.2 | 54 |
| 1430.250000 | 31.7 | 150.0 | V | 294.0 | 39.7 | -8.0 | 22.3 | 54 |
| 1625.500000 | 31.9 | 150.0 | V | 248.0 | 38.1 | -6.2 | 22.1 | 54 |
| 2051.750000 | 31.0 | 100.0 | V | 43.0 | 36.4 | -5.4 | 23.0 | 54 |
| 2209.000000 | 31.7 | 200.0 | H | 148.0 | 36.1 | -4.4 | 22.3 | 54 |
| 2896.250000 | 35.5 | 100.0 | V | 43.0 | 36.5 | -1.0 | 18.5 | 54 |

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

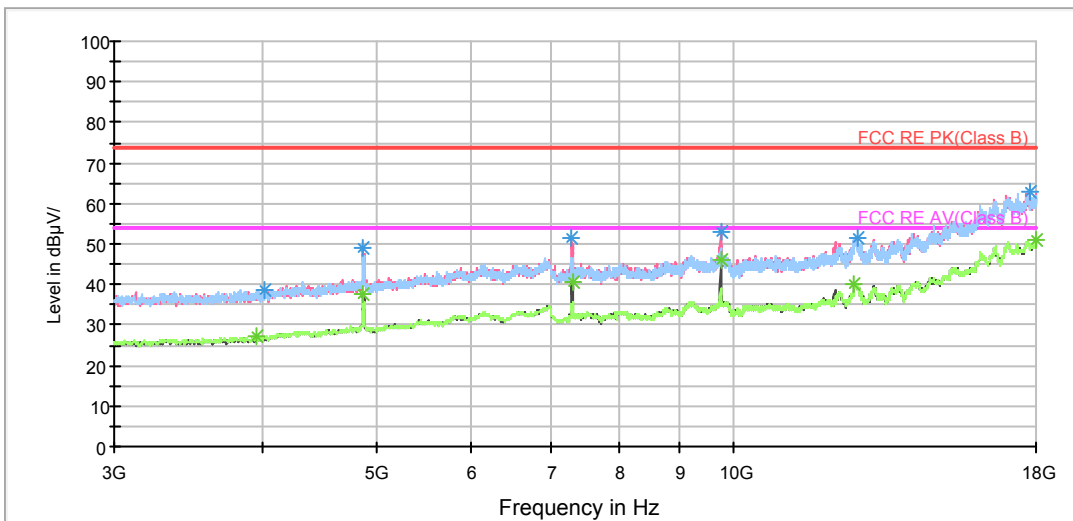
802.11g CH6

RE 1G-3GHz PK+AV



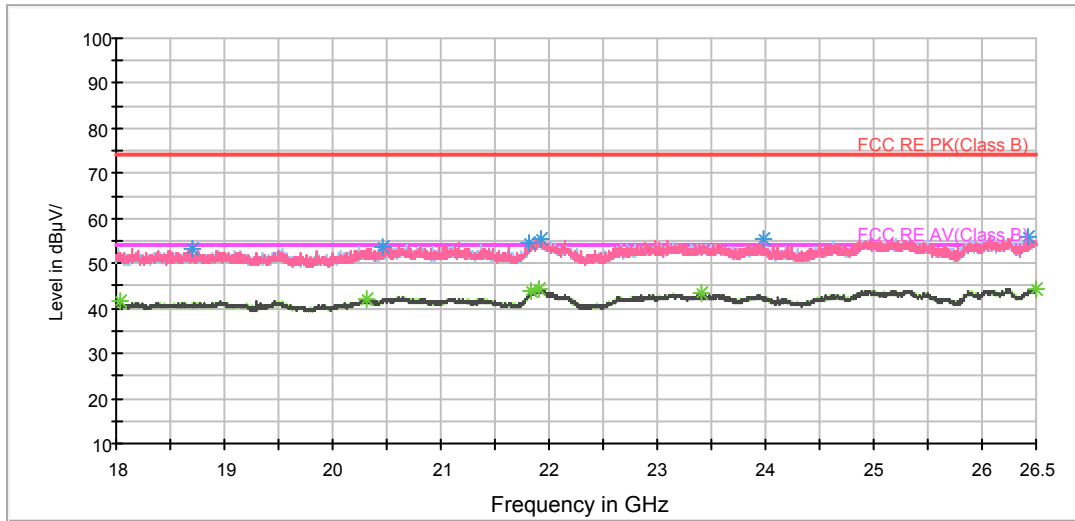
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1145.000000 | 40.2 | 100.0 | V | 46.0 | 49.4 | -9.2 | 33.8 | 74 |
| 1402.500000 | 44.3 | 150.0 | V | 295.0 | 52.5 | -8.2 | 29.7 | 74 |
| 1500.000000 | 44.3 | 150.0 | V | 260.0 | 52.2 | -7.9 | 29.7 | 74 |
| 1995.750000 | 41.8 | 100.0 | V | 91.0 | 47.2 | -5.4 | 32.2 | 74 |
| 2237.250000 | 43.5 | 200.0 | H | 251.0 | 48.2 | -4.7 | 30.5 | 74 |
| 2970.000000 | 46.4 | 100.0 | V | 46.0 | 47.5 | -1.1 | 27.6 | 74 |

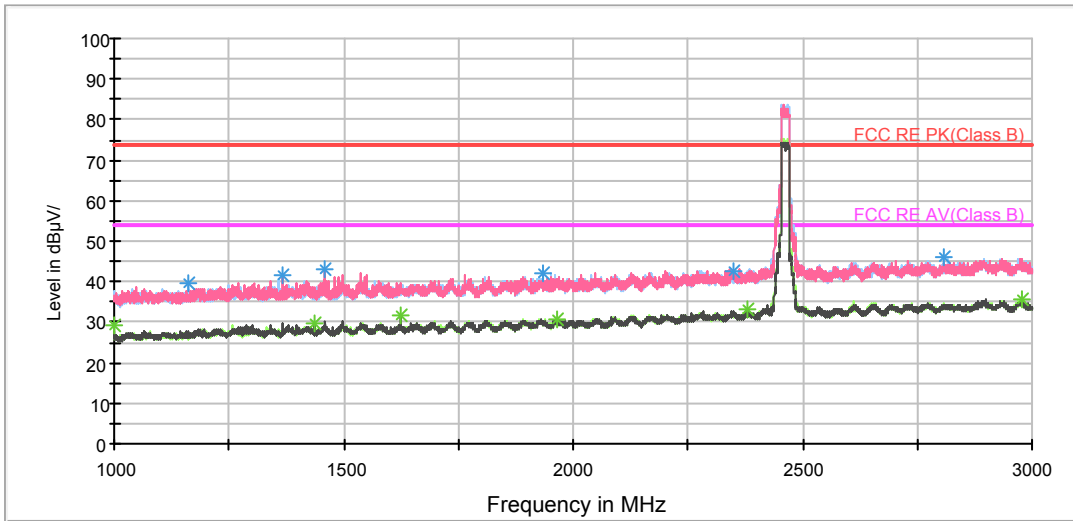
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.1 | 100.0 | H | 229.0 | 38.7 | -9.6 | 24.9 | 54 |
| 1400.250000 | 31.1 | 150.0 | V | 295.0 | 39.3 | -8.2 | 22.9 | 54 |
| 1625.500000 | 30.5 | 150.0 | H | 309.0 | 36.7 | -6.2 | 23.5 | 54 |
| 2053.500000 | 30.9 | 100.0 | V | 0.0 | 36.3 | -5.4 | 23.1 | 54 |
| 2205.000000 | 32.3 | 200.0 | H | 297.0 | 36.6 | -4.3 | 21.7 | 54 |
| 2895.250000 | 35.2 | 100.0 | H | 331.0 | 36.2 | -1.0 | 18.8 | 54 |

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

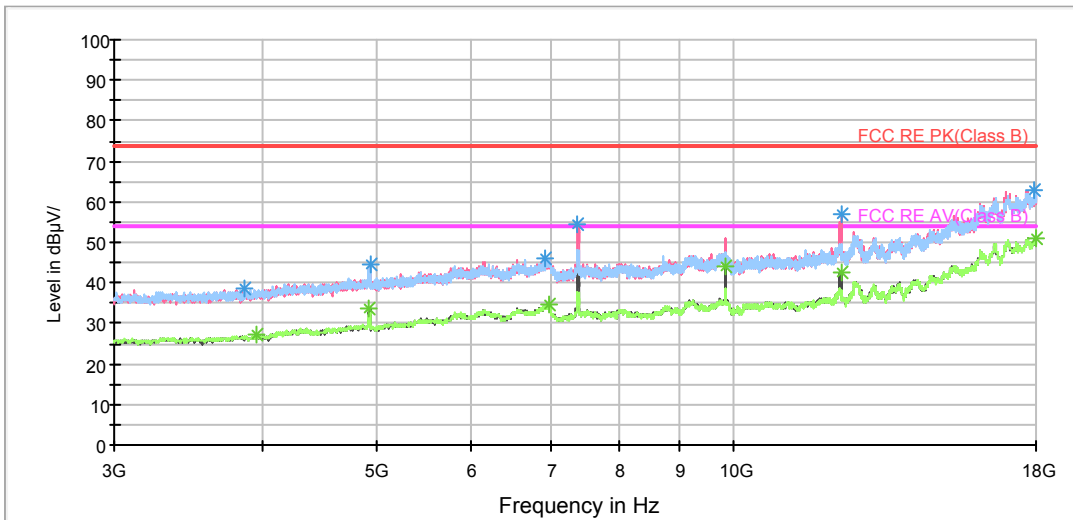
802.11g CH11

RE 1G-3GHz PK+AV



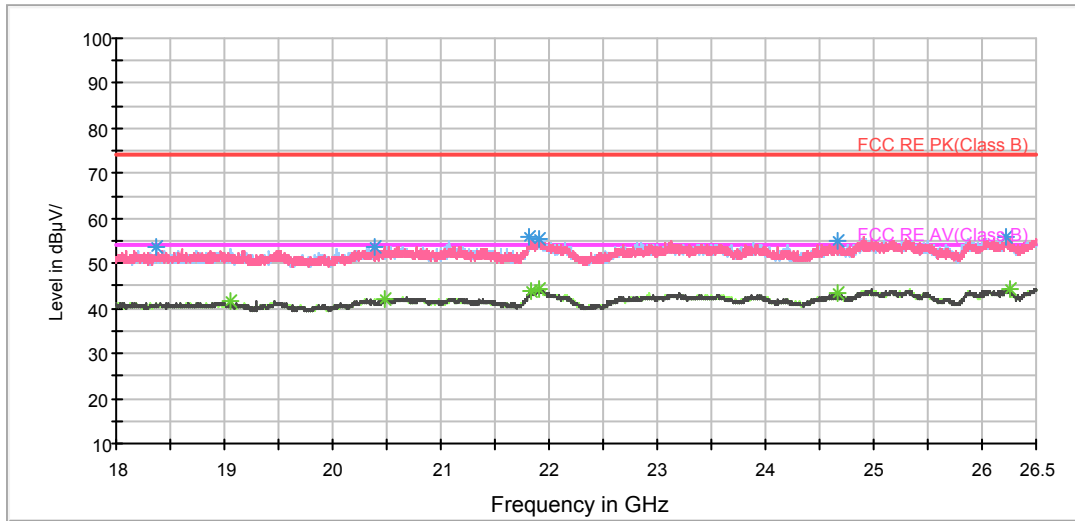
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1163.250000 | 39.4 | 100.0 | H | 333.0 | 48.3 | -8.9 | 34.6 | 74 |
| 1366.750000 | 41.6 | 150.0 | V | 295.0 | 49.9 | -8.3 | 32.4 | 74 |
| 1459.500000 | 42.8 | 150.0 | V | 89.0 | 50.8 | -8.0 | 31.2 | 74 |
| 1935.750000 | 42.3 | 100.0 | V | 306.0 | 48.2 | -5.9 | 31.7 | 74 |
| 2350.500000 | 42.6 | 200.0 | H | 0.0 | 46.1 | -3.5 | 31.4 | 74 |
| 2807.000000 | 45.9 | 100.0 | H | 54.0 | 47.5 | -1.6 | 28.1 | 74 |

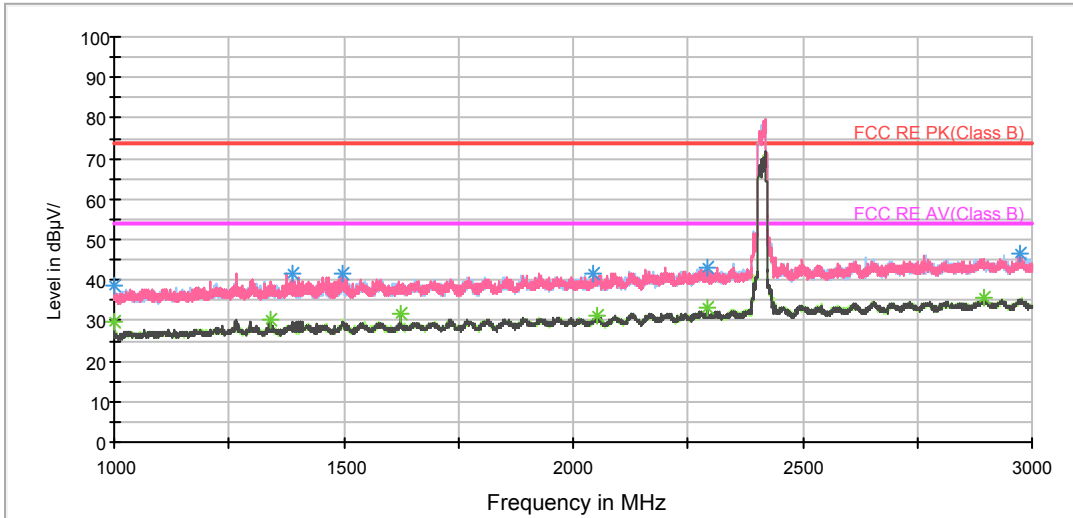
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.1 | 100.0 | H | 136.0 | 38.7 | -9.6 | 24.9 | 54 |
| 1436.250000 | 29.5 | 150.0 | V | 34.0 | 37.5 | -8.0 | 24.5 | 54 |
| 1625.500000 | 31.9 | 150.0 | V | 282.0 | 38.1 | -6.2 | 22.1 | 54 |
| 1964.250000 | 30.9 | 100.0 | V | 0.0 | 36.4 | -5.5 | 23.1 | 54 |
| 2378.750000 | 33.2 | 200.0 | V | 247.0 | 36.9 | -3.7 | 20.8 | 54 |
| 2977.500000 | 35.5 | 100.0 | V | 178.0 | 36.5 | -1.0 | 18.5 | 54 |

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

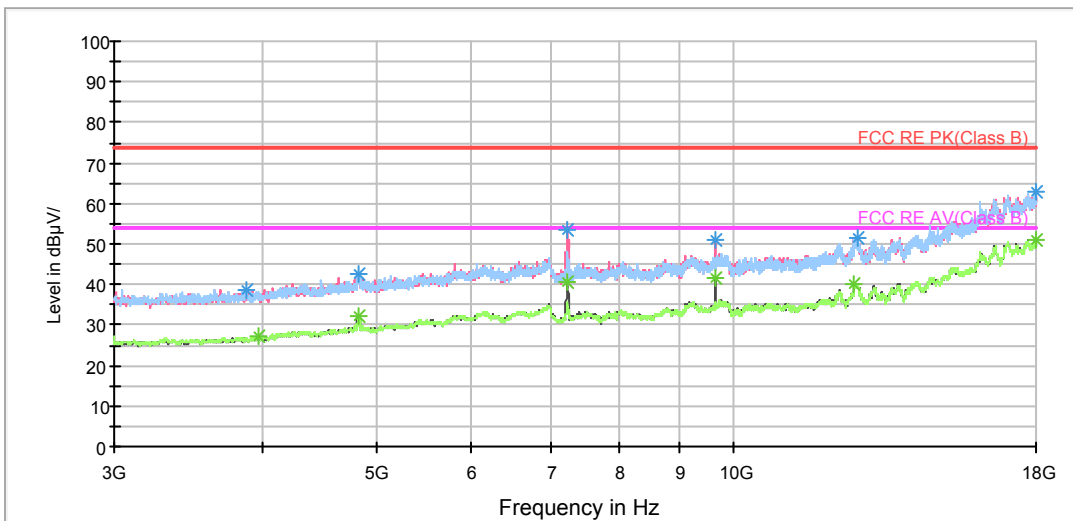
802.11n (HT20) CH1

RE 1G-3GHz PK+AV



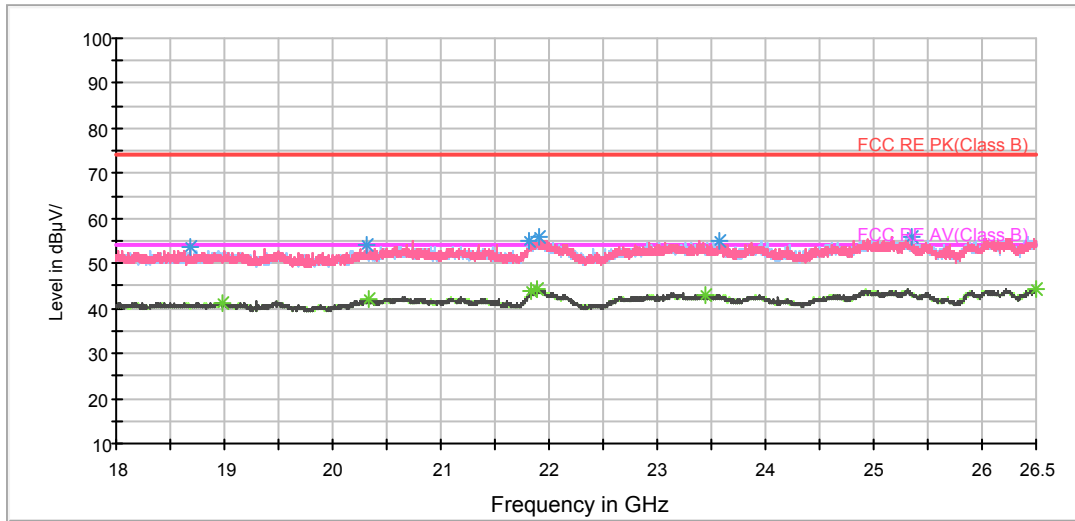
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 38.5 | 100.0 | V | 146.0 | 48.1 | -9.6 | 35.5 | 74 |
| 1388.500000 | 41.5 | 150.0 | H | 165.0 | 49.5 | -8.0 | 32.5 | 74 |
| 1496.500000 | 41.5 | 150.0 | V | 258.0 | 49.4 | -7.9 | 32.5 | 74 |
| 2044.750000 | 41.6 | 100.0 | H | 165.0 | 47.0 | -5.4 | 32.4 | 74 |
| 2292.750000 | 43.3 | 200.0 | V | 101.0 | 47.4 | -4.1 | 30.7 | 74 |
| 2973.500000 | 46.3 | 100.0 | V | 258.0 | 47.3 | -1.0 | 27.7 | 74 |

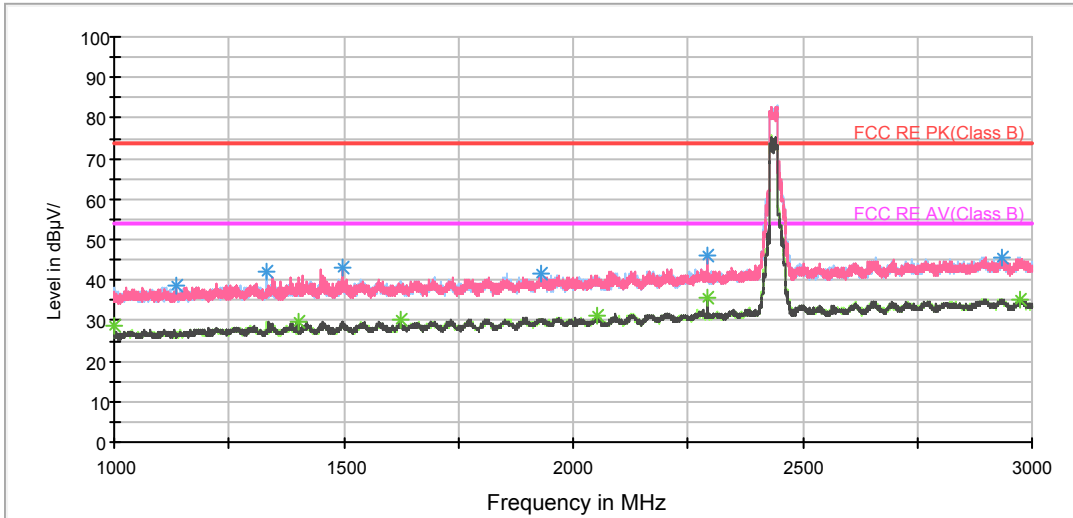
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.6 | 100.0 | H | 154.0 | 39.2 | -9.6 | 24.4 | 54 |
| 1339.250000 | 30.3 | 150.0 | V | 258.0 | 38.7 | -8.4 | 23.7 | 54 |
| 1625.500000 | 31.6 | 150.0 | V | 1.0 | 37.8 | -6.2 | 22.4 | 54 |
| 2052.750000 | 31.0 | 100.0 | H | 108.0 | 36.4 | -5.4 | 23.0 | 54 |
| 2292.750000 | 33.3 | 200.0 | V | 101.0 | 37.4 | -4.1 | 20.7 | 54 |
| 2895.000000 | 35.4 | 100.0 | H | 243.0 | 36.4 | -1.0 | 18.6 | 54 |

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

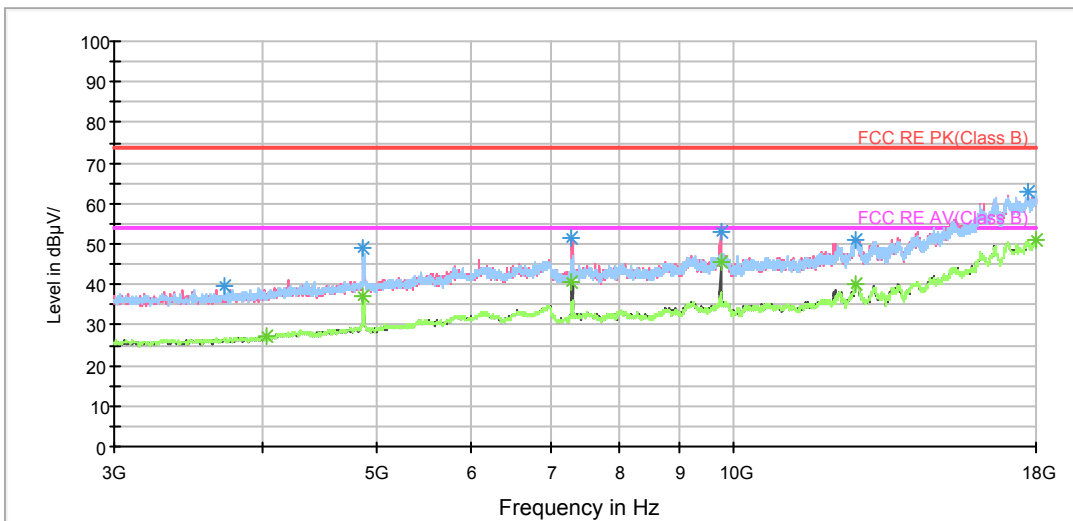
802.11n (HT20) CH6

RE 1G-3GHz PK+AV



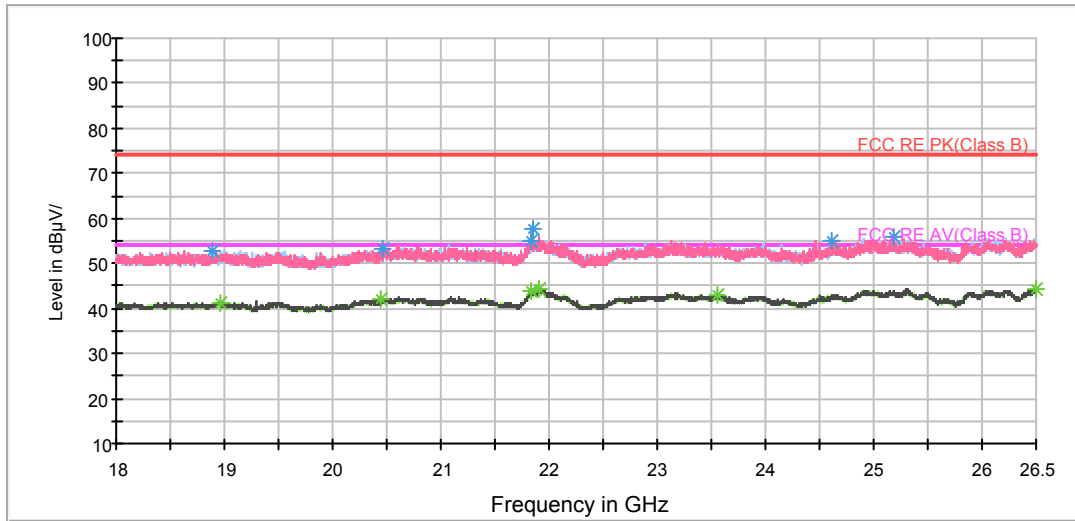
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1135.750000 | 38.4 | 100.0 | V | 77.0 | 47.5 | -9.1 | 35.6 | 74 |
| 1332.000000 | 42.1 | 150.0 | H | 14.0 | 50.4 | -8.3 | 31.9 | 74 |
| 1498.500000 | 42.9 | 150.0 | V | 259.0 | 50.8 | -7.9 | 31.1 | 74 |
| 1929.500000 | 41.5 | 100.0 | V | 122.0 | 47.2 | -5.7 | 32.5 | 74 |
| 2291.500000 | 46.0 | 200.0 | V | 77.0 | 50.0 | -4.0 | 28.0 | 74 |
| 2933.000000 | 45.7 | 100.0 | H | 114.0 | 47.1 | -1.4 | 28.3 | 74 |

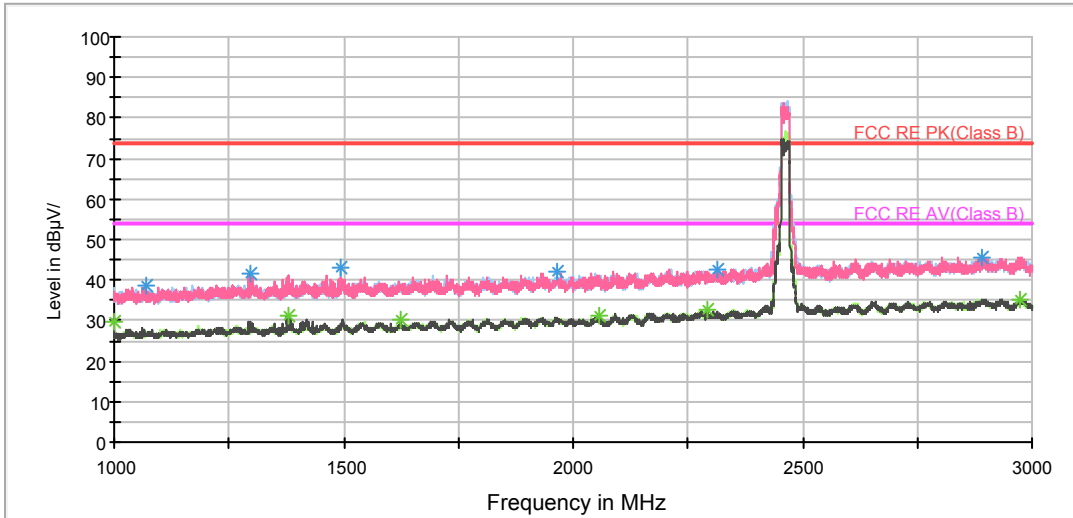
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 28.8 | 100.0 | H | 350.0 | 38.4 | -9.6 | 25.2 | 54 |
| 1402.250000 | 29.7 | 150.0 | V | 282.0 | 37.9 | -8.2 | 24.3 | 54 |
| 1625.750000 | 30.3 | 150.0 | V | 10.0 | 36.5 | -6.2 | 23.7 | 54 |
| 2054.000000 | 31.2 | 100.0 | H | 0.0 | 36.6 | -5.4 | 22.8 | 54 |
| 2291.750000 | 35.9 | 200.0 | V | 77.0 | 39.9 | -4.0 | 18.1 | 54 |
| 2975.250000 | 35.3 | 100.0 | V | 0.0 | 36.3 | -1.0 | 18.7 | 54 |

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

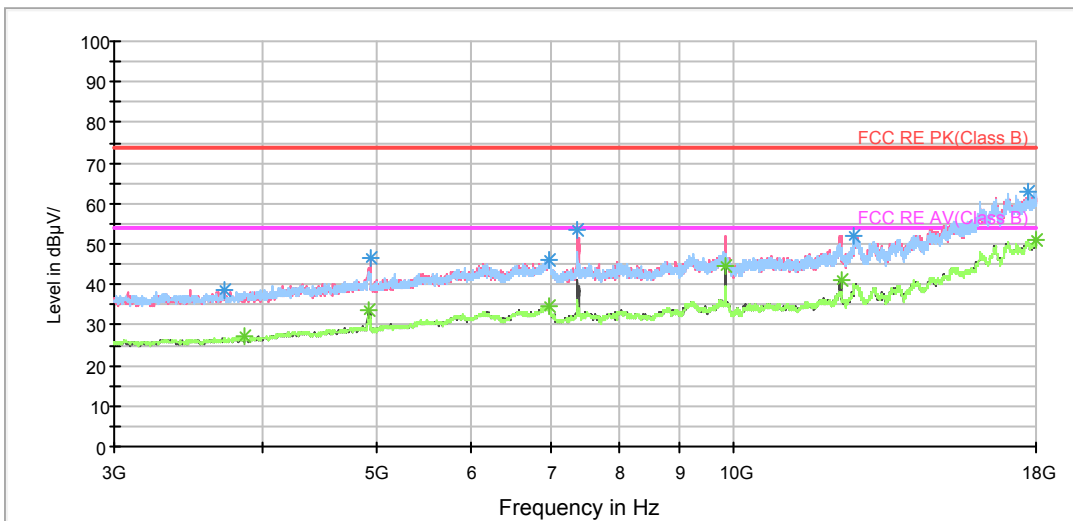
802.11n (HT20) CH11

RE 1G-3GHz PK+AV



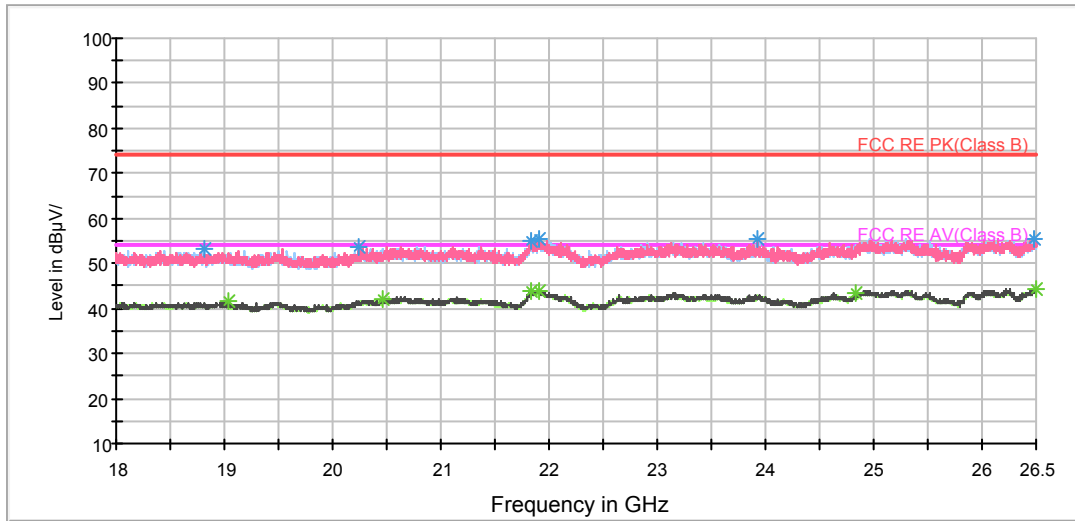
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1069.000000 | 38.6 | 100.0 | H | 171.0 | 47.9 | -9.3 | 35.4 | 74 |
| 1298.000000 | 41.5 | 200.0 | V | 258.0 | 50.2 | -8.7 | 32.5 | 74 |
| 1491.750000 | 43.0 | 100.0 | H | 262.0 | 50.9 | -7.9 | 31.0 | 74 |
| 1966.250000 | 41.9 | 150.0 | H | 0.0 | 47.4 | -5.5 | 32.1 | 74 |
| 2313.500000 | 42.5 | 150.0 | H | 160.0 | 46.6 | -4.1 | 31.5 | 74 |
| 2889.500000 | 45.6 | 100.0 | H | 240.0 | 46.5 | -0.9 | 28.4 | 74 |

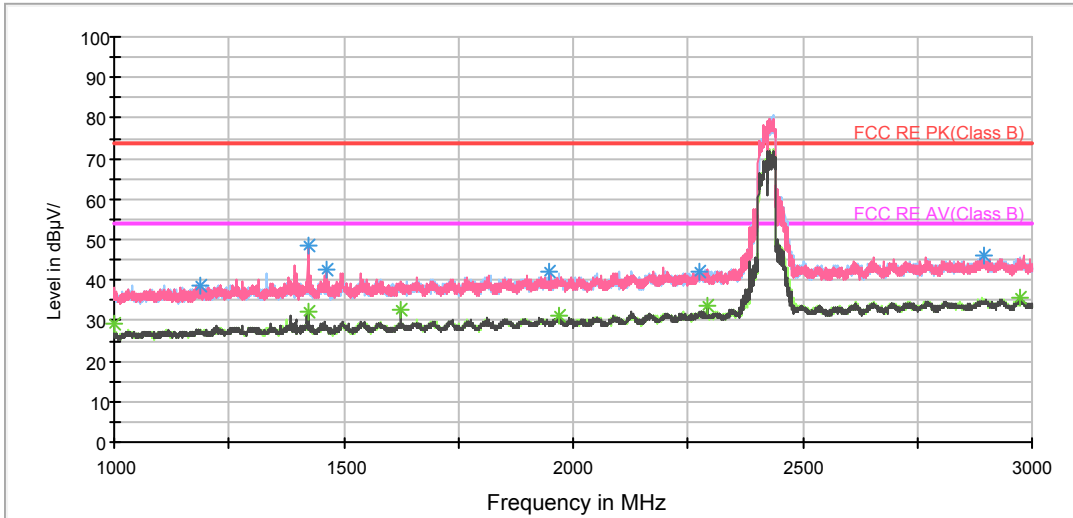
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.5 | 100.0 | H | 148.0 | 39.1 | -9.6 | 24.5 | 54 |
| 1378.500000 | 31.2 | 200.0 | V | 306.0 | 39.2 | -8.0 | 22.8 | 54 |
| 1625.500000 | 30.3 | 100.0 | V | 201.0 | 36.5 | -6.2 | 23.7 | 54 |
| 2058.500000 | 30.9 | 150.0 | H | 296.0 | 36.2 | -5.3 | 23.1 | 54 |
| 2292.500000 | 32.5 | 150.0 | V | 122.0 | 36.6 | -4.1 | 21.5 | 54 |
| 2972.500000 | 35.2 | 100.0 | H | 78.0 | 36.2 | -1.0 | 18.8 | 54 |

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

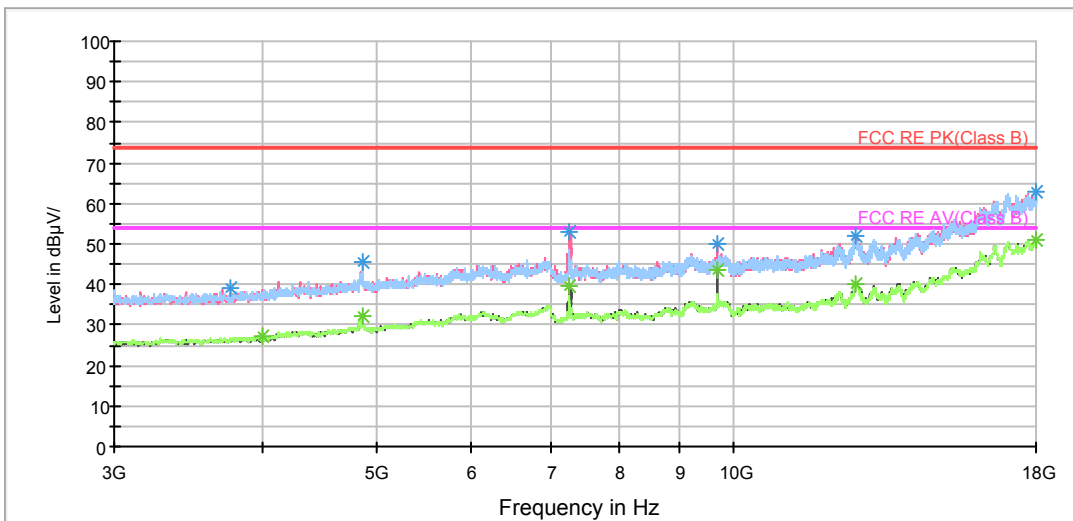
802.11n (HT40) CH3

RE 1G-3GHz PK+AV



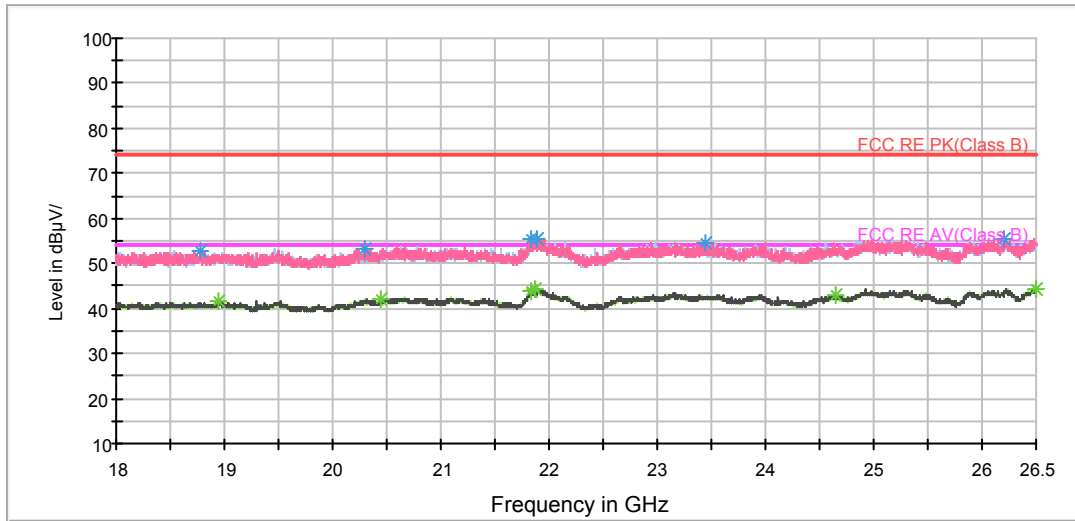
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1188.500000 | 38.8 | 150.0 | V | 191.0 | 47.7 | -8.9 | 35.2 | 74 |
| 1422.500000 | 48.4 | 150.0 | V | 306.0 | 56.4 | -8.0 | 25.6 | 74 |
| 1463.500000 | 42.5 | 100.0 | V | 259.0 | 50.5 | -8.0 | 31.5 | 74 |
| 1946.500000 | 42.3 | 200.0 | V | 283.0 | 47.8 | -5.5 | 31.7 | 74 |
| 2276.750000 | 41.9 | 100.0 | H | 124.0 | 45.5 | -3.6 | 32.1 | 74 |
| 2893.750000 | 45.9 | 150.0 | V | 91.0 | 46.8 | -0.9 | 28.1 | 74 |

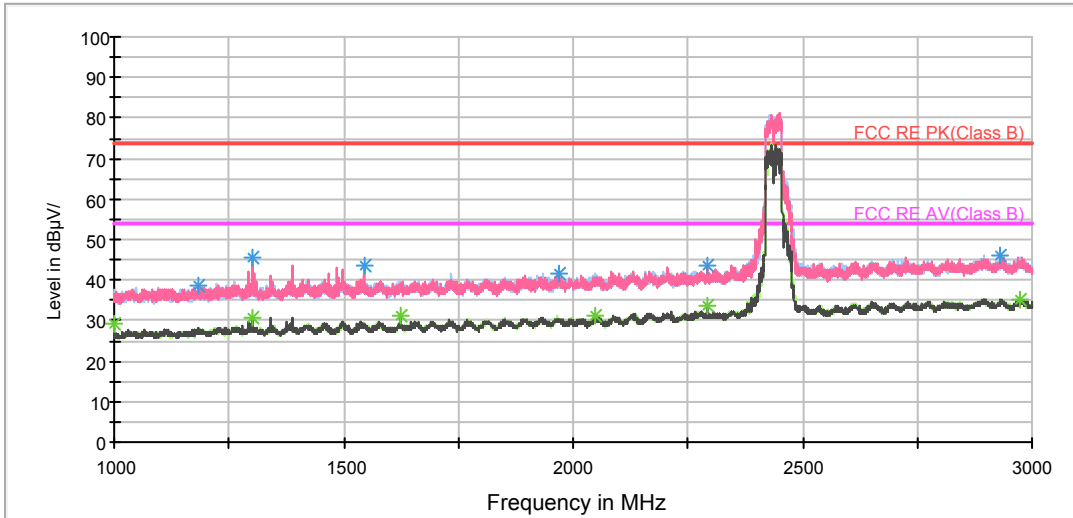
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.1 | 150.0 | H | 271.0 | 38.7 | -9.6 | 24.9 | 54 |
| 1422.500000 | 32.1 | 150.0 | V | 306.0 | 40.1 | -8.0 | 21.9 | 54 |
| 1625.500000 | 32.6 | 100.0 | V | 0.0 | 38.8 | -6.2 | 21.4 | 54 |
| 1967.250000 | 31.0 | 200.0 | V | 191.0 | 36.6 | -5.6 | 23.0 | 54 |
| 2290.750000 | 33.5 | 100.0 | V | 124.0 | 37.5 | -4.0 | 20.5 | 54 |
| 2973.250000 | 35.6 | 150.0 | H | 170.0 | 36.6 | -1.0 | 18.4 | 54 |

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

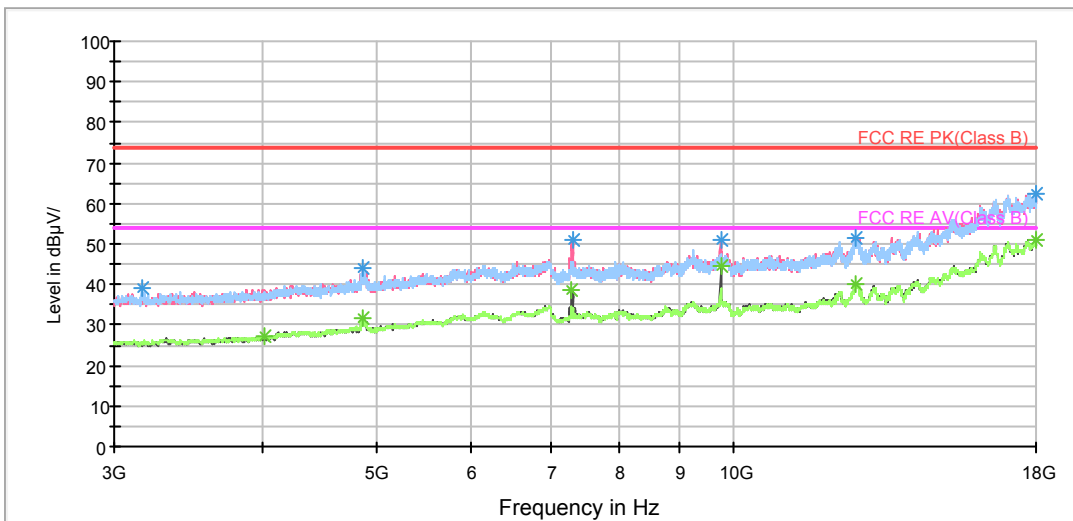
802.11n (HT40) CH6

RE 1G-3GHz PK+AV



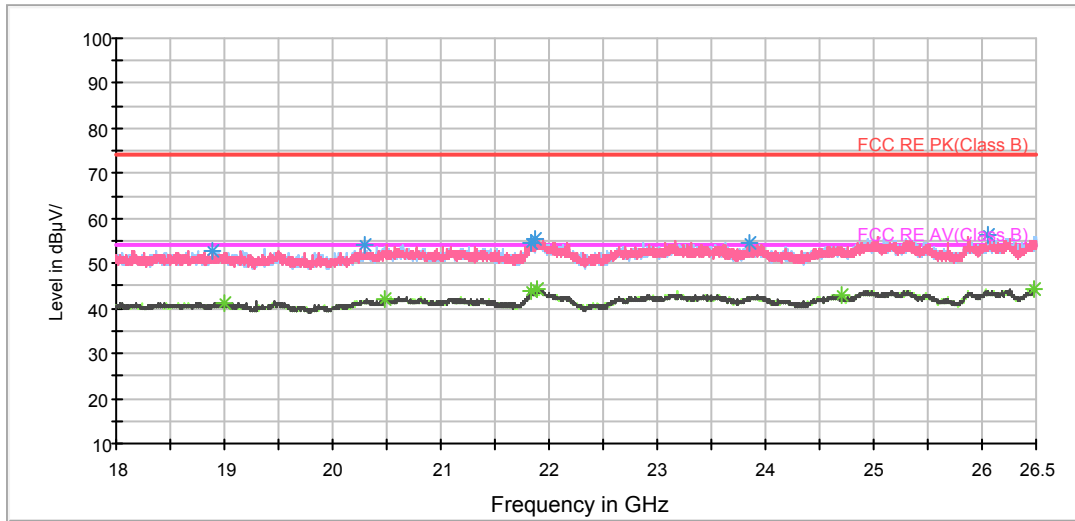
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1183.000000 | 38.7 | 100.0 | V | 203.0 | 47.4 | -8.7 | 35.3 | 74 |
| 1300.500000 | 45.8 | 150.0 | V | 261.0 | 54.5 | -8.7 | 28.2 | 74 |
| 1543.750000 | 43.4 | 150.0 | V | 249.0 | 51.0 | -7.6 | 30.6 | 74 |
| 1969.000000 | 41.6 | 100.0 | V | 11.0 | 47.3 | -5.7 | 32.4 | 74 |
| 2291.750000 | 43.8 | 200.0 | V | 1.0 | 47.8 | -4.0 | 30.2 | 74 |
| 2931.250000 | 46.1 | 100.0 | H | 221.0 | 47.5 | -1.4 | 27.9 | 74 |

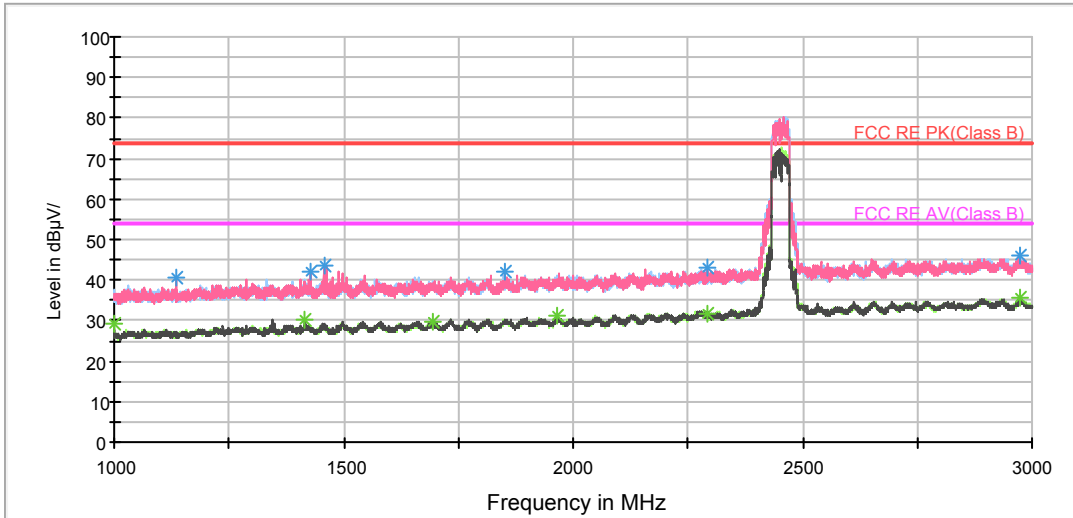
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

| Frequency (MHz) | Average (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.3 | 100.0 | H | 221.0 | 38.9 | -9.6 | 24.7 | 54 |
| 1300.500000 | 30.8 | 150.0 | V | 261.0 | 39.5 | -8.7 | 23.2 | 54 |
| 1625.500000 | 31.3 | 150.0 | V | 0.0 | 37.5 | -6.2 | 22.7 | 54 |
| 2048.000000 | 31.0 | 100.0 | V | 56.0 | 36.4 | -5.4 | 23.0 | 54 |
| 2291.750000 | 33.5 | 200.0 | V | 1.0 | 37.5 | -4.0 | 20.5 | 54 |
| 2972.750000 | 35.3 | 100.0 | V | 215.0 | 36.3 | -1.0 | 18.7 | 54 |

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

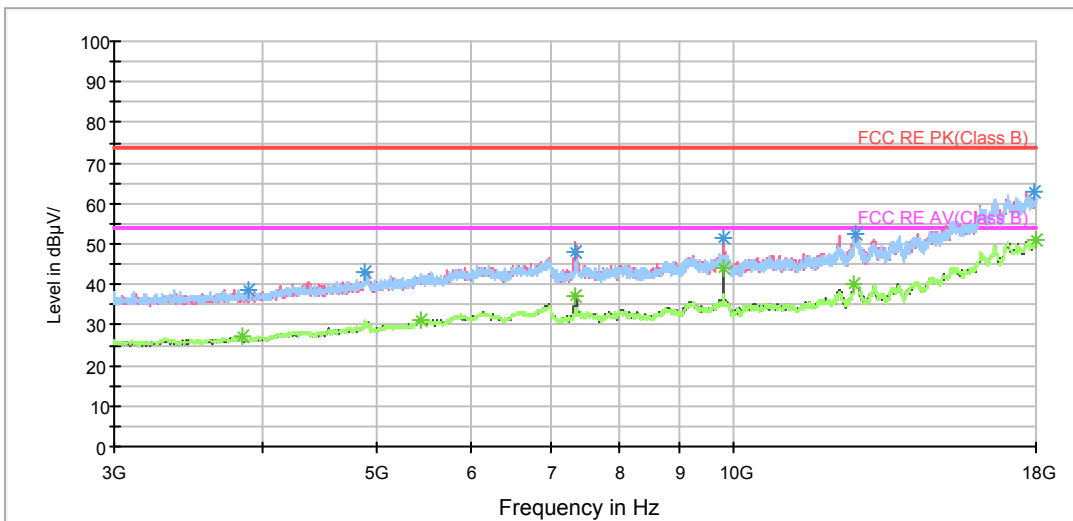
802.11n (HT40) CH9

RE 1G-3GHz PK+AV



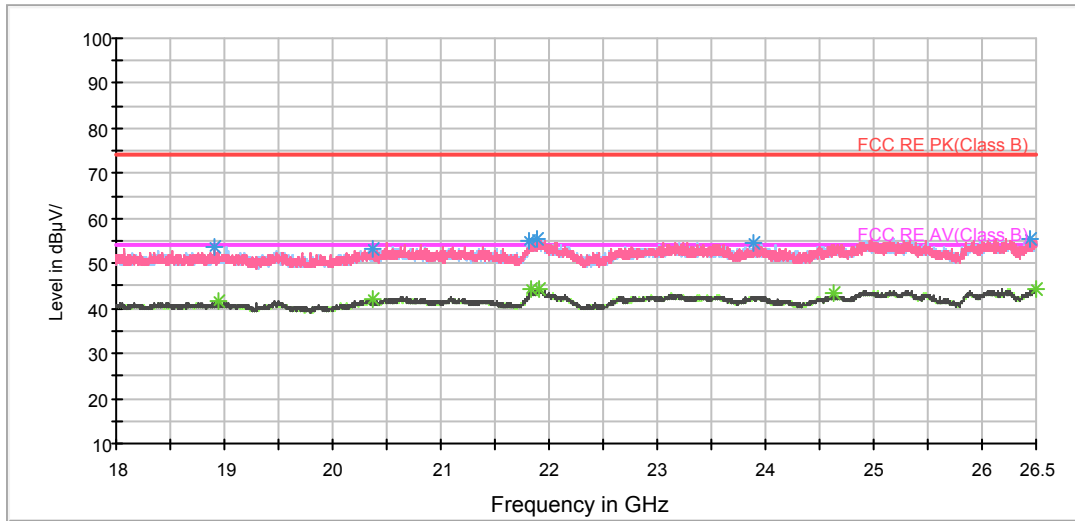
Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

| Frequency (MHz) | Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Reading value (dBuV/m) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1135.750000 | 40.5 | 150.0 | V | 244.0 | 49.6 | -9.1 | 33.5 | 74 |
| 1427.250000 | 42.3 | 150.0 | V | 291.0 | 50.3 | -8.0 | 31.7 | 74 |
| 1456.500000 | 43.6 | 100.0 | V | 256.0 | 51.5 | -7.9 | 30.4 | 74 |
| 1852.500000 | 42.0 | 200.0 | V | 234.0 | 48.0 | -6.0 | 32.0 | 74 |
| 2291.750000 | 42.9 | 100.0 | V | 333.0 | 46.9 | -4.0 | 31.1 | 74 |
| 2975.750000 | 46.2 | 150.0 | H | 0.0 | 47.2 | -1.0 | 27.8 | 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) |
|-----------------|------------------|-------------|--------------|---------------|------------------------|---------------------|-------------|----------------|
| 1000.000000 | 29.1 | 150.0 | H | 150.0 | 38.7 | -9.6 | 24.9 | 54 |
| 1417.000000 | 30.3 | 150.0 | V | 43.0 | 38.3 | -8.0 | 23.7 | 54 |
| 1692.750000 | 29.8 | 100.0 | V | 86.0 | 36.4 | -6.6 | 24.2 | 54 |
| 1967.000000 | 31.2 | 200.0 | V | 53.0 | 36.8 | -5.6 | 22.8 | 54 |
| 2291.000000 | 31.8 | 100.0 | V | 65.0 | 35.8 | -4.0 | 22.2 | 54 |
| 2972.000000 | 35.5 | 150.0 | H | 103.0 | 36.5 | -1.0 | 18.5 | 54 |

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

5.8. Conducted Emission

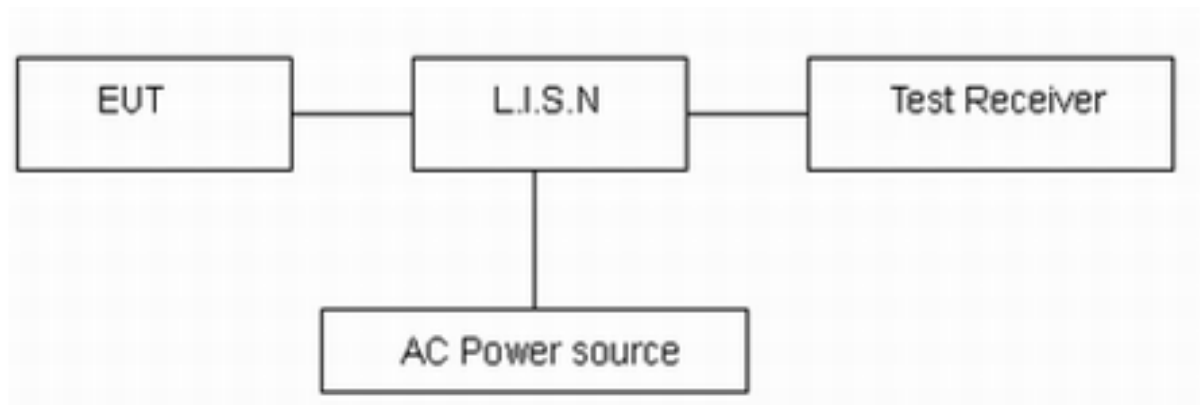
Ambient condition

| 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 L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, 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 (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 |

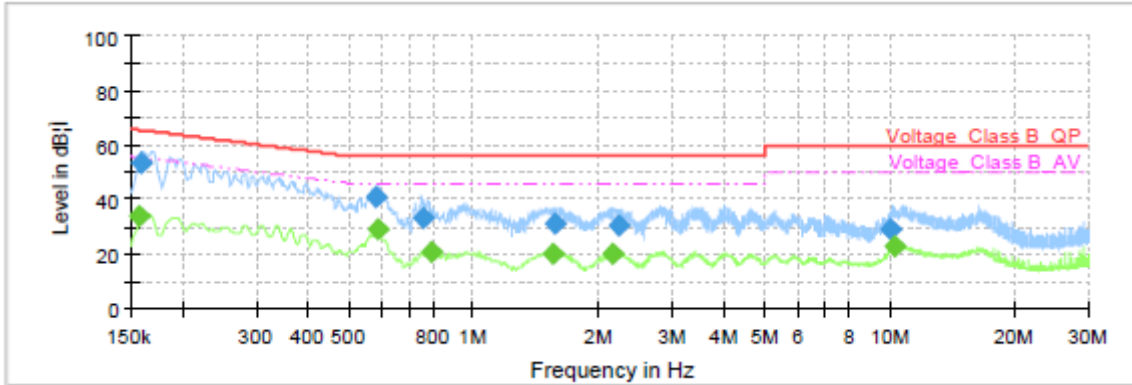
*: Decreases with the logarithm of the frequency.

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:

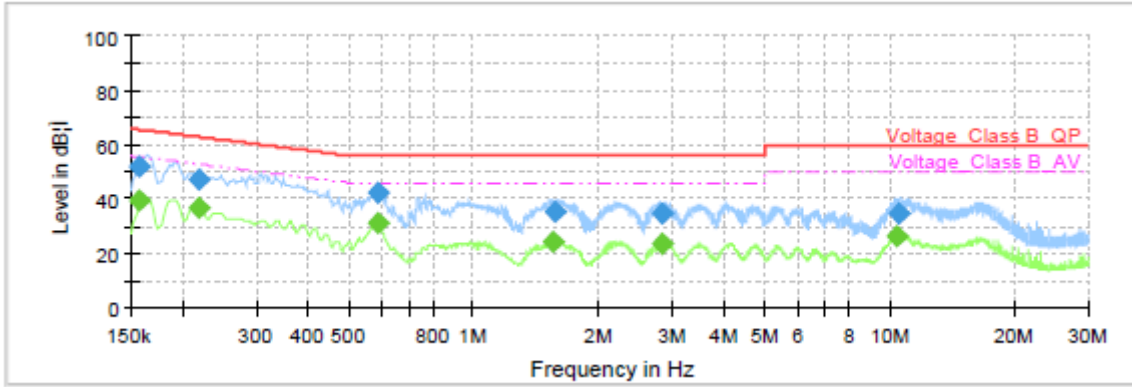
Following plots, Blue trace uses the peak detection and Green trace uses the average detection. During the test, the Conducted Emission was performed in all modes with all channels, 802.11b, Channel 11 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



Final Result

| Frequency (MHz) | QuasiPeak (dB _i i V) | Average (dB _i i V) | Limit (dB _i i V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|-----------------|---------------------------------|-------------------------------|-----------------------------|-------------|-----------------|-----------------|------|--------|------------|
| 0.156750 | --- | 34.14 | 55.63 | 21.50 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 0.159000 | 53.80 | --- | 65.52 | 11.72 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 0.584250 | 40.64 | --- | 56.00 | 15.36 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 0.586500 | --- | 28.85 | 46.00 | 17.15 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 0.755250 | 33.50 | --- | 56.00 | 22.51 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 0.793500 | --- | 20.77 | 46.00 | 25.23 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 1.547250 | --- | 20.46 | 46.00 | 25.54 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 1.569750 | 31.03 | --- | 56.00 | 24.97 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 2.163750 | --- | 20.43 | 46.00 | 25.57 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 2.244750 | 30.64 | --- | 56.00 | 25.36 | 1000.0 | 9.000 | L1 | ON | 19.6 |
| 10.099500 | 29.40 | --- | 60.00 | 30.60 | 1000.0 | 9.000 | L1 | ON | 19.9 |
| 10.335750 | --- | 22.89 | 50.00 | 27.11 | 1000.0 | 9.000 | L1 | ON | 19.9 |

L Line



Final Result

| Frequency (MHz) | QuasiPeak (dB _i V) | Average (dB _i V) | Limit (dB _i V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|-----------------|-------------------------------|-----------------------------|---------------------------|-------------|-----------------|-----------------|------|--------|------------|
| 0.156750 | --- | 39.34 | 55.63 | 16.30 | 1000.0 | 9.000 | N | ON | 19.7 |
| 0.156750 | 52.00 | --- | 65.63 | 13.64 | 1000.0 | 9.000 | N | ON | 19.7 |
| 0.217500 | --- | 36.74 | 52.91 | 16.17 | 1000.0 | 9.000 | N | ON | 19.7 |
| 0.217500 | 47.55 | --- | 62.91 | 15.37 | 1000.0 | 9.000 | N | ON | 19.7 |
| 0.586500 | --- | 31.54 | 46.00 | 14.46 | 1000.0 | 9.000 | N | ON | 19.6 |
| 0.586500 | 42.13 | --- | 56.00 | 13.87 | 1000.0 | 9.000 | N | ON | 19.6 |
| 1.554000 | --- | 24.30 | 46.00 | 21.70 | 1000.0 | 9.000 | N | ON | 19.6 |
| 1.565250 | 35.71 | --- | 56.00 | 20.29 | 1000.0 | 9.000 | N | ON | 19.6 |
| 2.820750 | 34.51 | --- | 56.00 | 21.49 | 1000.0 | 9.000 | N | ON | 19.6 |
| 2.845500 | --- | 23.38 | 46.00 | 22.62 | 1000.0 | 9.000 | N | ON | 19.6 |
| 10.405500 | --- | 26.27 | 50.00 | 23.73 | 1000.0 | 9.000 | N | ON | 19.9 |
| 10.527000 | 34.90 | --- | 60.00 | 25.10 | 1000.0 | 9.000 | N | ON | 19.9 |

N Line



6. Main Test Instruments

| Name | Manufacturer | Type | Serial Number | Calibration Date | Expiration Date |
|--------------------------------------|-------------------|-----------|---------------|------------------|-----------------|
| Spectrum Analyzer | R&S | FSV30 | 100815 | 2016-12-16 | 2017-12-15 |
| EMI Test Receiver | R&S | ESCI | 100948 | 2017-05-20 | 2018-05-19 |
| TRILOG Broadband Antenna | Schwarzbeck | VULB 9163 | 9163-201 | 2014-12-06 | 2017-12-05 |
| Double Ridged Waveguide Horn Antenna | R&S | HF907 | 100126 | 2014-12-06 | 2017-12-05 |
| Loop Antenna | SCHWARZBECK | FMZB1519 | 1519-047 | 2017-02-18 | 2020-02-17 |
| Standard Gain Horn | ETS-Lindgren | 3160-09 | 00102644 | 2015-01-30 | 2018-01-29 |
| EMI Test Receiver | R&S | ESCS30 | 100138 | 2016-12-16 | 2017-12-15 |
| LISN | R&S | ENV216 | 101171 | 2016-12-16 | 2019-12-15 |
| Power Sensor | Keysight | U2021XA | MY57060002 | 2017-03-01 | 2018-02-28 |
| Spectrum Analyzer | Agilent | N9010A | MY47191109 | 2017-05-20 | 2018-05-19 |
| RF Cable | Agilent | SMA 15cm | 0001 | 2017-08-04 | 2018-02-03 |
| Software (CE) | ROHDE&SCHW ARZ | EMC32 | 9.26.0 | / | / |
| Software (RE/RSE) | ROHDE&SCHW ARZ | EMC32 | 8.52.0 | / | / |

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

ANNEX A: EUT Appearance and Test Setup

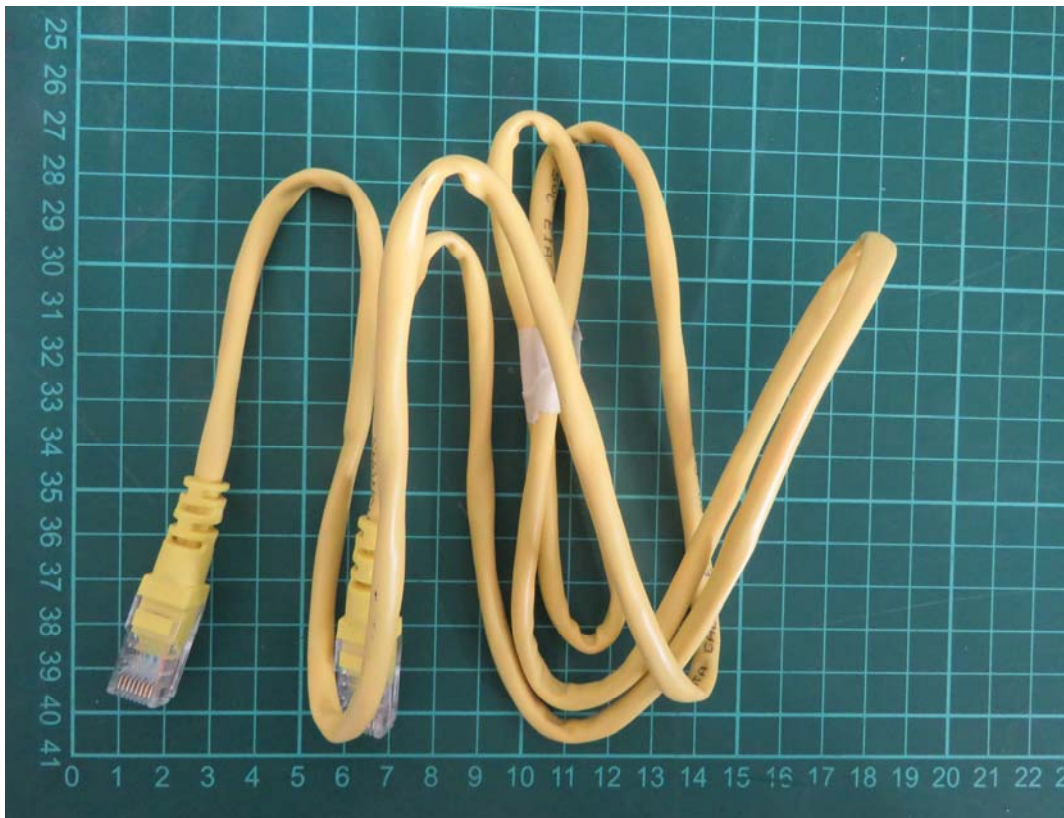
A.1 EUT Appearance



a: EUT



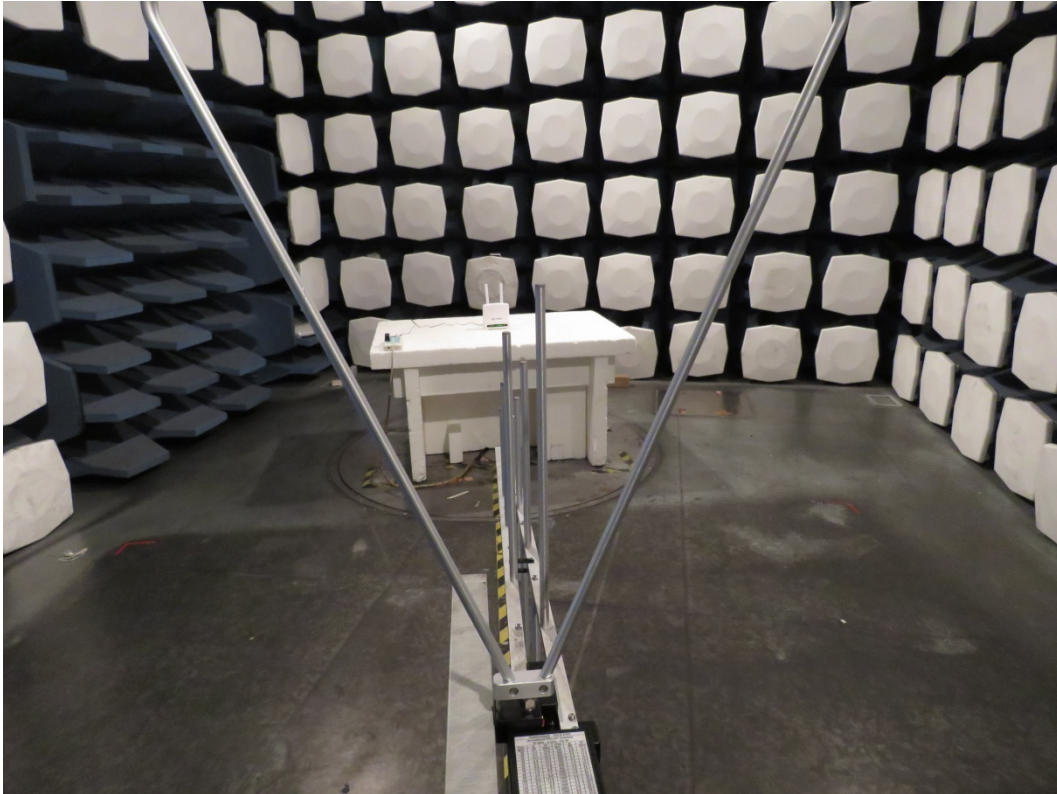
b: Adapter



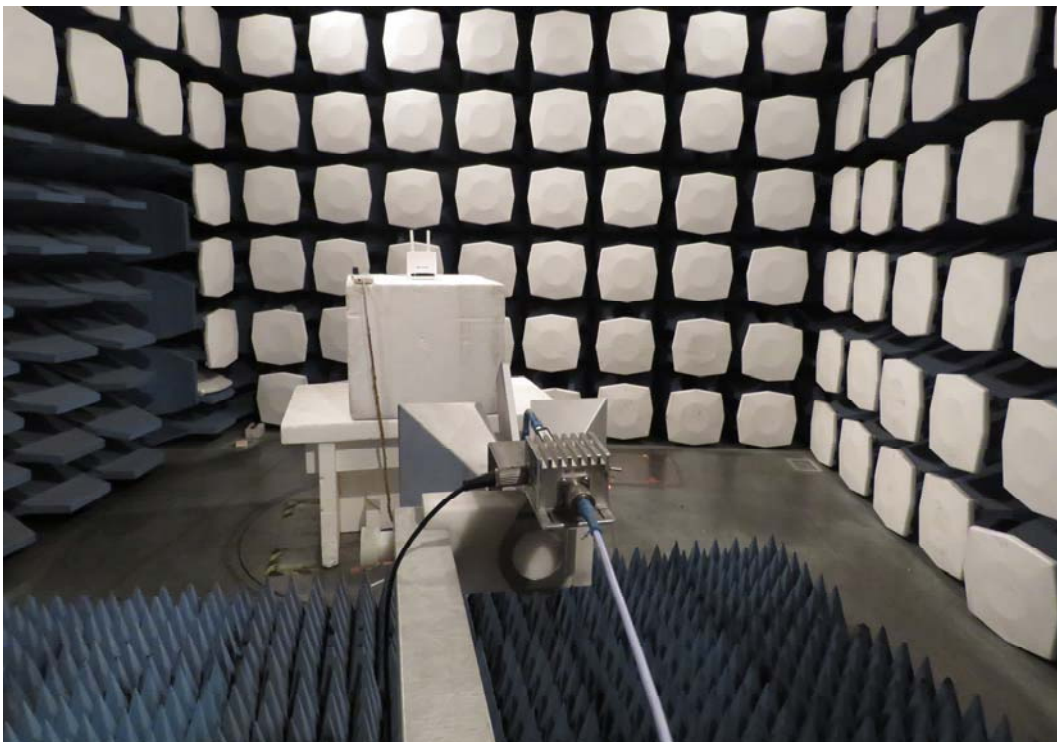
c: Network cable

Picture 1 EUT and Accessory

A.2 Test Setup



30M Hz-1GHz



Above 1GHz

Picture 2 Radiated Emission Test Setup



Picture 3 Conducted Emission Test Setup