# Partial FCC Test Report

| | |
|---|---|
| **Report No.:** | RFBBGM-WTW-P22050652-1 |
| **FCC ID:** | WIYSLM500QA |
| **Test Model:** | SLM500 |
| **Received Date:** | May 20, 2022 |
| **Test Date:** | Jun. 03 ~ Aug. 03, 2022 |
| **Issued Date:** | Aug. 25, 2022 |
| **Applicant:** | CASTLES TECHNOLOGY CO., LTD. |
| **Address:** | 6F, NO. 207-5, SEC. 3, BEIXIN RD., XINDIAN DISTRICT, NEW TAIPEI CITY 23143, TAIWAN (R. O. C.) |
| **Issued By:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch<br>Lin Kou Laboratories |
| **Lab Address:** | No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan |
| **Test Location (1):** | No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan |
| **Test Location (2):** | B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan |
| **FCC Registration / Designation Number:** | 788550 / TW0003<br>427177 / TW0011 |

## Table of Contents

## Release Control Record

| Issue No. | Description | Date Issued |
|---|---|---|
| RFBBGM-WTW-P22050652-1 | Original Release | Aug. 25, 2022 |

## 1 Certificate of Conformity

| | |
|---|---|
| **Product:** | Smart module |
| **Brand:** | CASTLES TECHNOLOGY |
| **Test Model:** | SLM500 |
| **Sample Status:** | Identical Prototype |
| **Applicant:** | CASTLES TECHNOLOGY CO., LTD. |
| **Test Date:** | Jun. 03 ~ Aug. 03, 2022 |
| **Standards:** | 47 CFR FCC Part 15, Subpart C (Section 15.247)<br>ANSI C63.10:2013 |

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Lena Wang , **Date:** Aug. 25, 2022

Lena Wang / Specialist

**Approved by :** Jeremy Lin , **Date:** Aug. 25, 2022

Jeremy Lin / Project Engineer

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (Section 15.247) | | | |
|---|---|---|---|
| **FCC Clause** | **Test Item** | **Result** | **Remarks** |
| 15.207 | AC Power Conducted Emission | Pass | Meet the requirement of limit.<br>Minimum passing margin is -8.63 dB at 0.68200 MHz. |
| 15.205 / 15.209 / 15.247(d) | Radiated Emissions and Band Edge Measurement | Pass | Meet the requirement of limit.<br>Minimum passing margin is -5.76 dB at 2483.50 MHz. |
| 15.247(d) | Antenna Port Emission | N/A | Refer to note |
| 15.247(a)(2) | 6 dB Bandwidth | N/A | Refer to note |
| --- | Occupied Bandwidth Measurement | N/A | Refer to note |
| 15.247(b) | Conducted power | Pass | Meet the requirement of limit. |
| 15.247(e) | Power Spectral Density | N/A | Refer to note |
| 15.203 | Antenna Requirement | N/A | Refer to note |

Note:

1. This report is a partial report, and only test items of AC Power Conducted Emission, Conducted power and Radiated Emissions tests were verified and recorded in this report. Other testing data please refer to SGS report no.: SZCR210300003003.
2. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| **Measurement** | **Frequency** | **Expanded Uncertainty (k=2) (±)** |
|---|---|---|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.79 dB |
| Radiated Emissions up to 1 GHz | 9 kHz ~ 30 MHz | 3.04 dB |
| | 30 MHz ~ 200 MHz | 2.0153 dB |
| | 200 MHz ~ 1000 MHz | 2.0224 dB |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz | 1.0121 dB |
| | 18 GHz ~ 40 GHz | 1.1508 dB |

### 2.2 Modification Record

There were no modifications required for compliance.

## 3 General Information

### 3.1 General Description of EUT

| | |
|---|---|
| **Product** | Smart module |
| **Brand** | CASTLES TECHNOLOGY |
| **Test Model** | SLM500 |
| **Status of EUT** | Identical Prototype |
| **Power Supply Rating** | 5.0 Vdc (host equipment)<br>3.85 Vdc (Li-ion battery) |
| **Modulation Type** | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM |
| **Modulation Technology** | DSSS, OFDM |
| **Transfer Rate** | 802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps<br>802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps<br>802.11n: up to 72.2Mbps |
| **Operating Frequency** | 2412 ~ 2462 MHz |
| **Number of Channel** | 11 for 802.11b, 802.11g, 802.11n (HT20) |
| **Output Power** | 59.156 mW |
| **Antenna Type** | PIFA antenna with 0.08 dBi gain |
| **Antenna Connector** | N/A |
| **Accessory Device** | Refer to Note as below |
| **Data Cable Supplied** | Refer to Note as below |

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of SGS report no.: SZCR210300003003. The differences from the original report are adding an End-product (POS Terminal (Brand: Adyen, Model: AMS1)), changing antenna type and disabling 802.11n (HT40). Only AC Power Conducted Emission, Conducted Power and radiated emissions were verified and recorded in this report. Other testing data please refer to the original SGS report no.: SZCR210300003003. And Modular has C2PC the Major change is mainly for GSM power retest. When testing, the modified sample is used for testing.
2. The EUT was installed in POS Terminal (Brand: Adyen, Model: AMS1).
3. The EUT provides 1 completed transmitter and 1 receiver.

| Modulation Mode | Tx Function |
|---|---|
| **802.11b** | 1TX |
| **802.11g** | 1TX |
| **802.11n (HT20)** | 1TX |

4. The POS Terminal contains following accessory devices.

| Product | Brand | Model | Description |
|---|---|---|---|
| Adapter | CASTLES TECHNOLOGY | 1A52-UB52A | I/P: 100-240 Vac, 50/60 Hz, 0.3 A<br>O/P: 5 Vdc, 2 A |
| Battery | CASTLES TECHNOLOGY | S1AMS1 | 3.85 Vdc |
| USB Cable | CHANG YANG ELECTRONICS CO.,LTD | CY-AS-HK0059 | 0.95 m shielded cable w/o core |

5. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
6. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

7. BT & WWAN & NFC (FCC ID: WIYAMS1001) technology can transmit at same time.
8. WLAN 2.4G & WWAN & NFC (FCC ID: WIYAMS1001) technology can transmit at same time.
9. WLAN 5G & WWAN & NFC (FCC ID: WIYAMS1001) technology can transmit at same time.

### 3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 1 | 2412 | 7 | 2442 |
| 2 | 2417 | 8 | 2447 |
| 3 | 2422 | 9 | 2452 |
| 4 | 2427 | 10 | 2457 |
| 5 | 2432 | 11 | 2462 |
| 6 | 2437 | | |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To | | | | Description |
|---|---|---|---|---|---|
| | RE≥1G | RE<1G | PLC | Power | |
| - | √ | √ | √ | √ | - |

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz
**PLC:** Power Line Conducted Emission **Power: Maximum Output Power**

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
**NOTE:** "-"means no effect.

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

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---|---|---|---|---|---|---|
| - | 802.11b | 1 to 11 | 1, 6, 11 | DSSS | DBPSK | 1.0 |
| - | 802.11g | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.0 |
| - | 802.11n (HT20) | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.5 |

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

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---|---|---|---|---|---|---|
| - | 802.11n (HT20) | 1 to 11 | 6 | OFDM | BPSK | 6.5 |

**Power Line Conducted Emission Test:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---|---|---|---|---|---|---|
| - | 802.11n (HT20) | 1 to 11 | 6 | OFDM | BPSK | 6.5 |

**Conducted Output Power Measurement:**

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---|---|---|---|---|---|---|
| - | 802.11b | 1 to 11 | 1, 6, 11 | DSSS | DBPSK | 1.0 |
| - | 802.11g | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.0 |
| - | 802.11n (HT20) | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.5 |

**Test Condition:**

| Applicable To | Environmental Conditions | Input Power | Tested by |
|---|---|---|---|
| RE≥1G | 25 deg. C, 60 % RH | 120 Vac, 60 Hz | Charles Haaio |
| RE<1G | 25 deg. C, 60 % RH | 120 Vac, 60 Hz | Charles Haaio |
| PLC | 25 deg. C, 75 % RH | 120 Vac, 60 Hz | Noah Chang |
| Power | 25 deg. C, 60 % RH | 120 Vac, 60 Hz | Wayne Lin |

### 3.3 Duty Cycle of Test Signal

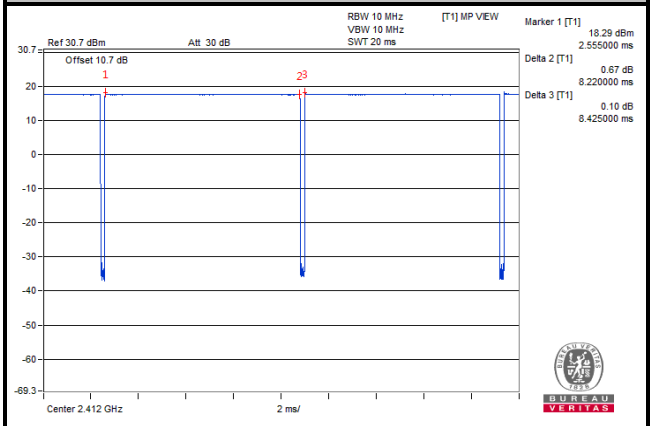
Duty cycle of test signal is < 98 %, duty factor shall be considered.

**802.11b**: Duty cycle = 8.22/8.425 = 0.976, Duty factor = 10 * log(1/0.976) = 0.11

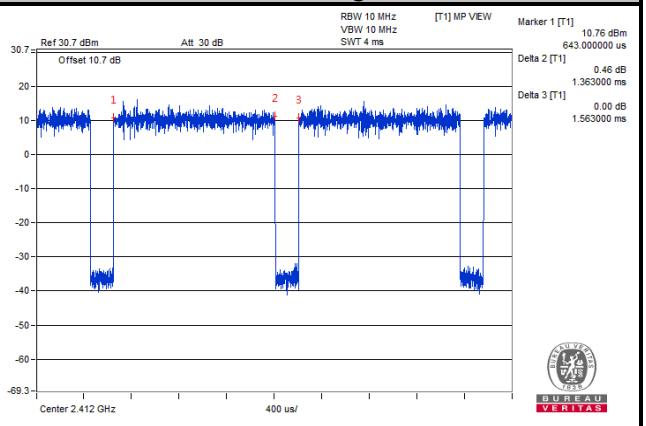
**802.11g:** Duty cycle = 1.363/1.563 = 0.872, Duty factor = 10 * log(1/0.872) = 0.59

**802.11n (HT20):** Duty cycle = 1.276/1.475 = 0.865, Duty factor = 10 * log(1/0.865) = 0.63

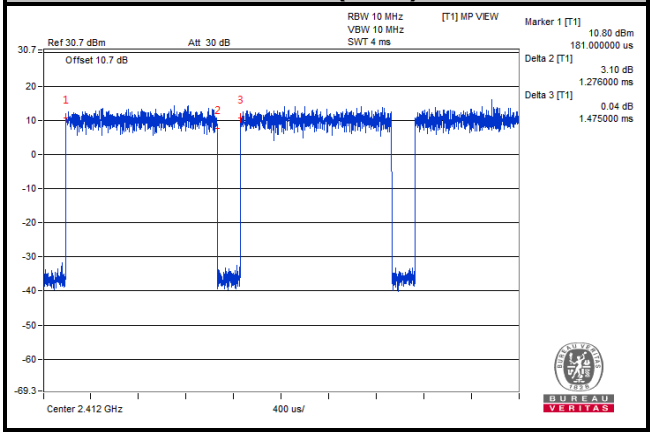
**802.11b**




**802.11g**




**802.11n (HT20)**



### 3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

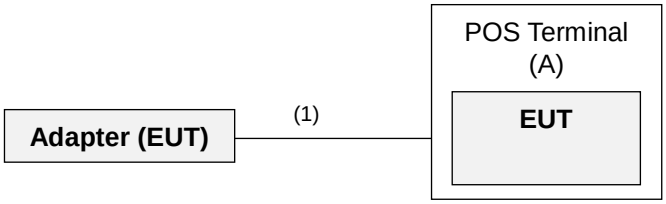
| No. | Product | Brand | Model No. | Serial No. | FCC ID |
|---|---|---|---|---|---|
| A | POS Terminal | Adyen | AMS1 | NA | NA |

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|---|---|---|---|---|---|---|
| 1. | USB cable | 1 | 0.95 | Y | 0 | Provided by client |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

3.4.1 Configuration of System under Test




### 3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

**Test Standard:**

**FCC Part 15, Subpart C (15.247)**
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

**References Test Guidance:**

**KDB 558074 D01 Meas Guidance v05r02**

All test items have been performed as a reference to the above KDB test guidance.

# 4 Test Types and Results

## 4.1 Radiated Emission and Bandedge Measurement

### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 ~ 0.490 | 2400/F (kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F (kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

**NOTE**:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|---|---|---|---|---|
| Test Receiver<br>Agilent | N9038A | MY52260177 | Sep. 01, 2021 | Aug. 31, 2022 |
| Spectrum Analyzer<br>R&S | FSU43 | 101261 | Apr. 11, 2022 | Apr. 10, 2023 |
| Horn Antenna<br>ETS-Lindgren | 3117 | 00143293 | Nov. 14, 2021 | Nov. 13, 2022 |
| Bi_Log Antenna<br>Schwarzbeck | VULB9168 | 9168-616 | Oct. 27, 2021 | Oct. 26, 2022 |
| Horn Antenna<br>Schwarzbeck | BBHA 9170 | 9170-480 | Nov. 14, 2021 | Nov. 13, 2022 |
| Attenuator<br>WOKEN | MDCS18N-10 | MDCS18N-10-01 | Apr. 05, 2022 | Apr. 04, 2023 |
| Loop Antenna<br>EMCI | EM-6879 | 269 | Sep. 16, 2021 | Sep. 15, 2022 |
| MXG Vector signal generator<br>Agilent | N5182B | MY53050430 | Nov. 25, 2021 | Nov. 24, 2022 |
| Preamplifier<br>Agilent | 310N | 187226 | Jun. 17, 2021 | Jun. 16, 2022 |
| | | | Jun. 14, 2022 | Jun. 13, 2023 |
| Preamplifier<br>Agilent | 83017A | MY39501357 | Jun. 17, 2021 | Jun. 16, 2022 |
| | | | Jun. 14, 2022 | Jun. 13, 2023 |
| Pre-Ammlifier<br>EMCI | EMC 184045 | 980116 | Oct. 05, 2021 | Oct. 04, 2022 |
| Power Meter<br>Anritsu | ML2495A | 1012010 | Sep. 09, 2021 | Sep. 08, 2022 |
| Power Sensor<br>Anritsu | MA2411B | 1315050 | Sep. 09, 2021 | Sep. 08, 2022 |
| RF Coaxial Cable<br>ETS-Lindgren | EMC104-SM-SM-10000 | Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-4 | Jun. 17, 2021 | Jun. 16, 2022 |
| | | | Jun. 14, 2022 | Jun. 13, 2023 |
| RF Coaxial Cable<br>ETS-Lindgren | RFC-SMS-100-SMS-24-IN | Cable-CH1-02(RFC-SMS-100-SMS-24) | Jun. 17, 2021 | Jun. 16, 2022 |
| | | | Jun. 14, 2022 | Jun. 13, 2023 |
| Fix tool for Boresight antenna tower<br>BV | BAF-01 | 10 | NA | NA |
| E3 Software<br>AUDIX | E3 | NA | NA | NA |
| Software<br>BVADT | ADT_Radiated_V8.7.08 | NA | NA | NA |
| Software<br>BVADT | ADT_RF Test Software V6.6.5.4 | NA | NA | NA |
| Antenna Tower<br>MF | NA | NA | NA | NA |
| Turn Table<br>MF | NA | NA | NA | NA |
| Controller<br>Max-Full | MF-7802 | NA | NA | NA |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HsinTien 966 chamber 6

4.1.3 Test Procedures

**For Radiated Emission below 30 MHz**

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

**Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

**For Radiated Emission above 30 MHz**

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

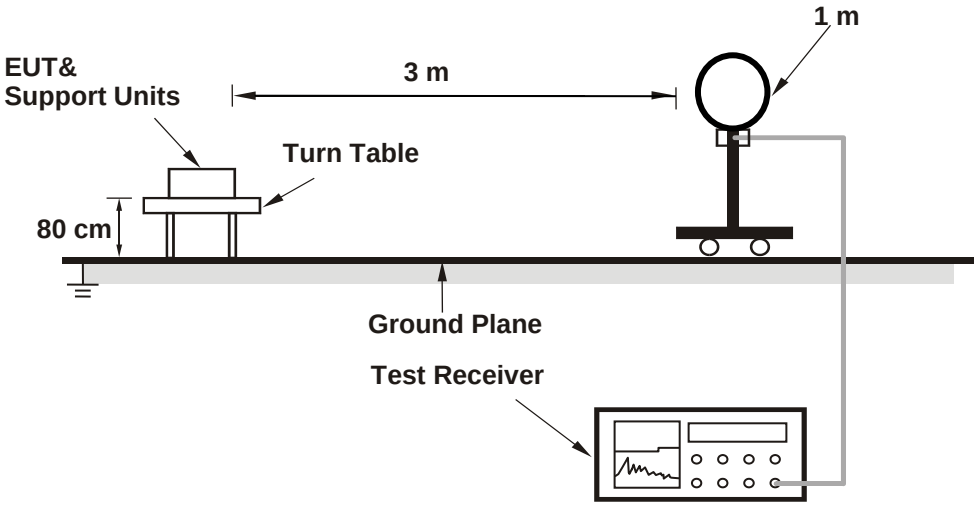
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (11b: RBW = 1 MHz, VBW =1 kHz ; 11g: RBW = 1 MHz, VBW = 1 kHz ;
   11n (HT20): RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

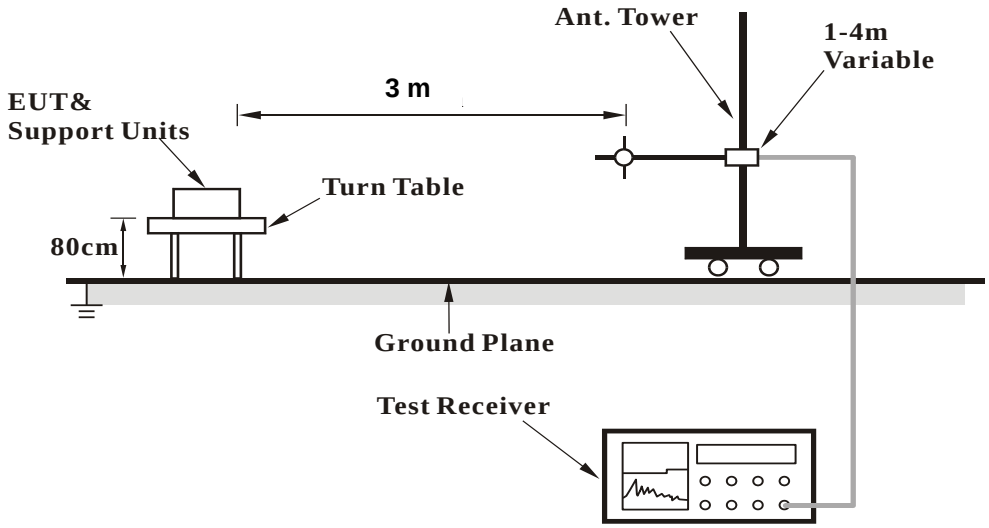
No deviation.

4.1.5 Test Set Up

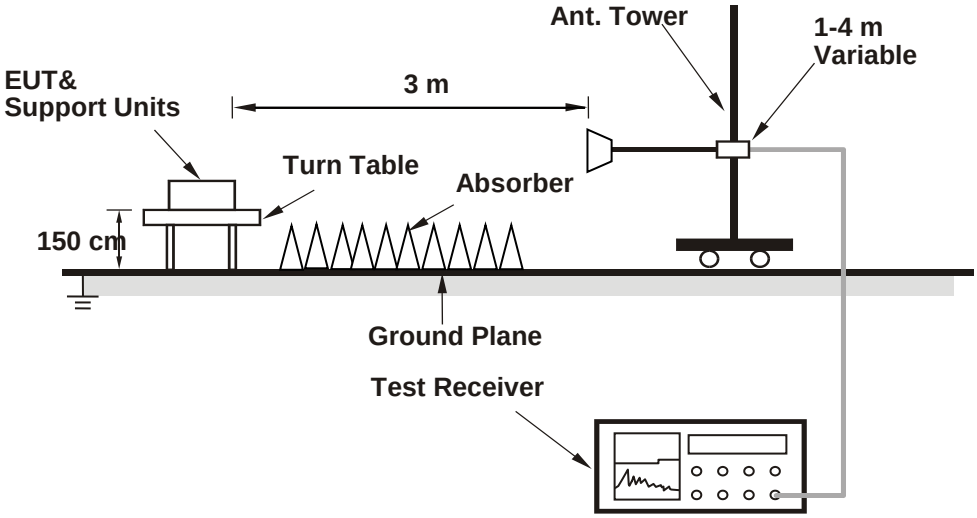
**<Radiated Emission below 30 MHz>**




**<Radiated Emission 30 MHz to 1 GHz>**



**<Radiated Emission above 1 GHz>**




For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

**Above 1 GHz Data：**

**802.11b**

| **RF Mode** | TX 802.11b | **Channel** | CH 1：2412 MHz |
|---|---|---|---|
| **Frequency Range** | 1GHz ~ 25GHz | **Detector Function** | Peak (PK)<br>Average (AV) |

| **Antenna Polarity & Test Distance : Horizontal at 3 m** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **No** | **Frequency (MHz)** | **Emission Level (dBuV/m)** | **Limit (dBuV/m)** | **Margin (dB)** | **Antenna Height (m)** | **Table Angle (Degree)** | **Raw Value (dBuV)** | **Correction Factor (dB/m)** |
| 1 | 2390.00 | 52.94 PK | 74.00 | -21.06 | 2.76 H | 24 | 14.94 | 38.00 |
| 2 | 2390.00 | 43.51 AV | 54.00 | -10.49 | 2.76 H | 24 | 5.51 | 38.00 |
| 3 | *2412.00 | 104.70 PK | | | 2.76 H | 24 | 66.60 | 38.10 |
| 4 | *2412.00 | 102.69 AV | | | 2.76 H | 24 | 64.59 | 38.10 |
| 5 | 4824.00 | 51.30 PK | 74.00 | -22.70 | 1.56 H | 164 | 39.73 | 11.57 |
| 6 | 4824.00 | 43.50 AV | 54.00 | -10.50 | 1.56 H | 164 | 31.93 | 11.57 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| **No** | **Frequency (MHz)** | **Emission Level (dBuV/m)** | **Limit (dBuV/m)** | **Margin (dB)** | **Antenna Height (m)** | **Table Angle (Degree)** | **Raw Value (dBuV)** | **Correction Factor (dB/m)** |
| 1 | 2390.00 | 52.87 PK | 74.00 | -21.13 | 2.21 V | 359 | 14.87 | 38.00 |
| 2 | 2390.00 | 42.80 AV | 54.00 | -11.20 | 2.21 V | 359 | 4.80 | 38.00 |
| 3 | *2412.00 | 95.95 PK | | | 2.21 V | 359 | 57.85 | 38.10 |
| 4 | *2412.00 | 93.93 AV | | | 2.21 V | 359 | 55.83 | 38.10 |
| 5 | 4824.00 | 51.78 PK | 74.00 | -22.22 | 2.63 V | 102 | 40.21 | 11.57 |
| 6 | 4824.00 | 44.03 AV | 54.00 | -9.97 | 2.63 V | 102 | 32.46 | 11.57 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

| RF Mode | TX 802.11b | Channel | CH 6：2437 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2437.00 | 104.38 PK | | | 2.64 H | 29 | 66.42 | 37.96 |
| 2 | *2437.00 | 102.43 AV | | | 2.64 H | 29 | 64.47 | 37.96 |
| 3 | 4874.00 | 51.06 PK | 74.00 | -22.94 | 1.35 H | 205 | 39.52 | 11.54 |
| 4 | 4874.00 | 43.28 AV | 54.00 | -10.72 | 1.35 H | 205 | 31.74 | 11.54 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2437.00 | 95.70 PK | | | 2.21 V | 347 | 57.74 | 37.96 |
| 2 | *2437.00 | 93.58 AV | | | 2.21 V | 347 | 55.62 | 37.96 |
| 3 | 4874.00 | 51.57 PK | 74.00 | -22.43 | 2.13 V | 184 | 40.03 | 11.54 |
| 4 | 4874.00 | 43.72 AV | 54.00 | -10.28 | 2.13 V | 184 | 32.18 | 11.54 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

| RF Mode | TX 802.11b | Channel | CH 11：2462 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 104.06 PK | | | 2.10 H | 15 | 66.14 | 37.92 |
| 2 | *2462.00 | 101.17 AV | | | 2.10 H | 15 | 63.25 | 37.92 |
| 3 | 2483.50 | 53.14 PK | 74.00 | -20.86 | 2.10 H | 15 | 46.57 | 6.57 |
| 4 | 2483.50 | 42.73 AV | 54.00 | -11.27 | 2.10 H | 15 | 36.16 | 6.57 |
| 5 | 4924.00 | 48.60 PK | 74.00 | -25.40 | 1.64 H | 118 | 36.98 | 11.62 |
| 6 | 4924.00 | 41.45 AV | 54.00 | -12.55 | 1.64 H | 118 | 29.83 | 11.62 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 93.20 PK | | | 2.07 V | 360 | 55.28 | 37.92 |
| 2 | *2462.00 | 90.50 AV | | | 2.07 V | 360 | 52.58 | 37.92 |
| 3 | 2483.50 | 52.80 PK | 74.00 | -21.20 | 2.07 V | 360 | 14.85 | 37.95 |
| 4 | 2483.50 | 42.40 AV | 54.00 | -11.60 | 2.07 V | 360 | 4.45 | 37.95 |
| 5 | 4924.00 | 48.10 PK | 74.00 | -25.90 | 1.64 V | 117 | 36.48 | 11.62 |
| 6 | 4924.00 | 41.30 AV | 54.00 | -12.70 | 1.64 V | 117 | 29.68 | 11.62 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

## 802.11g

| RF Mode | TX 802.11g | Channel | CH 1：2412 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2390.00 | 58.10 PK | 74.00 | -15.90 | 2.76 H | 238 | 20.10 | 38.00 |
| 2 | 2390.00 | 45.36 AV | 54.00 | -8.64 | 2.76 H | 238 | 7.36 | 38.00 |
| 3 | *2412.00 | 98.28 PK | | | 2.76 H | 238 | 60.18 | 38.10 |
| 4 | *2412.00 | 90.13 AV | | | 2.76 H | 238 | 52.03 | 38.10 |
| 5 | 4824.00 | 51.09 PK | 74.00 | -22.91 | 2.71 H | 76 | 39.52 | 11.57 |
| 6 | 4824.00 | 43.20 AV | 54.00 | -10.80 | 2.71 H | 76 | 31.63 | 11.57 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2390.00 | 53.26 PK | 74.00 | -20.74 | 2.21 V | 359 | 15.26 | 38.00 |
| 2 | 2390.00 | 42.81 AV | 54.00 | -11.19 | 2.21 V | 359 | 4.81 | 38.00 |
| 3 | *2412.00 | 93.48 PK | | | 2.21 V | 359 | 55.38 | 38.10 |
| 4 | *2412.00 | 84.89 AV | | | 2.21 V | 359 | 46.79 | 38.10 |
| 5 | 4824.00 | 51.22 PK | 74.00 | -22.78 | 1.33 V | 149 | 39.65 | 11.57 |
| 6 | 4824.00 | 43.42 AV | 54.00 | -10.58 | 1.33 V | 149 | 31.85 | 11.57 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

| RF Mode | TX 802.11g | Channel | CH 6：2437 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2437.00 | 98.02 PK | | | 2.64 H | 29 | 60.06 | 37.96 |
| 2 | *2437.00 | 89.85 AV | | | 2.64 H | 29 | 51.89 | 37.96 |
| 3 | 4874.00 | 51.25 PK | 74.00 | -22.75 | 1.63 H | 28 | 39.71 | 11.54 |
| 4 | 4874.00 | 43.49 AV | 54.00 | -10.51 | 1.63 H | 28 | 31.95 | 11.54 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2437.00 | 93.15 PK | | | 2.21 V | 347 | 55.19 | 37.96 |
| 2 | *2437.00 | 84.59 AV | | | 2.21 V | 347 | 46.63 | 37.96 |
| 3 | 4874.00 | 50.89 PK | 74.00 | -23.11 | 1.26 V | 85 | 39.35 | 11.54 |
| 4 | 4874.00 | 43.16 AV | 54.00 | -10.84 | 1.26 V | 85 | 31.62 | 11.54 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

| RF Mode | TX 802.11g | Channel | CH 11：2462 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 100.88 PK | | | 2.10 H | 15 | 62.96 | 37.92 |
| 2 | *2462.00 | 93.61 AV | | | 2.10 H | 15 | 55.69 | 37.92 |
| 3 | 2483.50 | 60.53 PK | 74.00 | -13.47 | 2.10 H | 15 | 22.58 | 37.95 |
| 4 | 2483.50 | 46.87 AV | 54.00 | -7.13 | 2.10 H | 15 | 8.92 | 37.95 |
| 5 | 4924.00 | 48.01 PK | 74.00 | -25.99 | 1.13 H | 328 | 36.39 | 11.62 |
| 6 | 4924.00 | 41.38 AV | 54.00 | -12.62 | 1.13 H | 328 | 29.76 | 11.62 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 90.18 PK | | | 2.07 V | 360 | 52.26 | 37.92 |
| 2 | *2462.00 | 83.54 AV | | | 2.07 V | 360 | 45.62 | 37.92 |
| 3 | 2483.50 | 53.46 PK | 74.00 | -20.54 | 2.07 V | 360 | 15.51 | 37.95 |
| 4 | 2483.50 | 42.52 AV | 54.00 | -11.48 | 2.07 V | 360 | 4.57 | 37.95 |
| 5 | 4924.00 | 47.84 PK | 74.00 | -26.16 | 1.34 V | 111 | 36.22 | 11.62 |
| 6 | 4924.00 | 41.33 AV | 54.00 | -12.67 | 1.34 V | 111 | 29.71 | 11.62 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

### 802.11n (HT20)

| RF Mode | TX 802.11n (HT20) | Channel | CH 1：2412 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2390.00 | 60.00 PK | 74.00 | -14.00 | 2.76 H | 238 | 22.00 | 38.00 |
| 2 | 2390.00 | 47.16 AV | 54.00 | -6.84 | 2.76 H | 238 | 9.16 | 38.00 |
| 3 | *2412.00 | 97.59 PK | | | 2.76 H | 238 | 59.49 | 38.10 |
| 4 | *2412.00 | 90.00 AV | | | 2.76 H | 238 | 51.90 | 38.10 |
| 5 | 4824.00 | 51.69 PK | 74.00 | -22.31 | 1.53 H | 149 | 40.12 | 11.57 |
| 6 | 4824.00 | 43.91 AV | 54.00 | -10.09 | 1.53 H | 149 | 32.34 | 11.57 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2390.00 | 53.27 PK | 74.00 | -20.73 | 2.21 V | 359 | 15.27 | 38.00 |
| 2 | 2390.00 | 43.28 AV | 54.00 | -10.72 | 2.21 V | 359 | 5.28 | 38.00 |
| 3 | *2412.00 | 93.98 PK | | | 2.21 V | 359 | 55.88 | 38.10 |
| 4 | *2412.00 | 84.78 AV | | | 2.21 V | 359 | 46.68 | 38.10 |
| 5 | 4824.00 | 50.77 PK | 74.00 | -23.23 | 1.83 V | 162 | 39.20 | 11.57 |
| 6 | 4824.00 | 43.02 AV | 54.00 | -10.98 | 1.83 V | 162 | 31.45 | 11.57 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

| RF Mode | TX 802.11n (HT20) | Channel | CH 6：2437 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2437.00 | 97.21 PK | | | 2.64 H | 29 | 59.25 | 37.96 |
| 2 | *2437.00 | 89.72 AV | | | 2.64 H | 29 | 51.76 | 37.96 |
| 3 | 4874.00 | 51.34 PK | 74.00 | -22.66 | 2.10 H | 127 | 39.80 | 11.54 |
| 4 | 4874.00 | 43.70 AV | 54.00 | -10.30 | 2.10 H | 127 | 32.16 | 11.54 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2437.00 | 93.63 PK | | | 2.21 V | 347 | 55.67 | 37.96 |
| 2 | *2437.00 | 84.45 AV | | | 2.21 V | 347 | 46.49 | 37.96 |
| 3 | 4874.00 | 50.93 PK | 74.00 | -23.07 | 2.72 V | 54 | 39.39 | 11.54 |
| 4 | 4874.00 | 43.14 AV | 54.00 | -10.86 | 2.72 V | 54 | 31.60 | 11.54 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

| RF Mode | TX 802.11n (HT20) | Channel | CH 11：2462 MHz |
|---|---|---|---|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK)<br>Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 101.00 PK | | | 2.10 H | 15 | 63.08 | 37.92 |
| 2 | *2462.00 | 94.50 AV | | | 2.10 H | 15 | 56.58 | 37.92 |
| 3 | 2483.50 | 63.11 PK | 74.00 | -10.89 | 2.10 H | 15 | 25.16 | 37.95 |
| **4** | **2483.50** | **48.24 AV** | **54.00** | **-5.76** | **2.10 H** | **15** | **10.29** | **37.95** |
| 5 | 4924.00 | 48.23 PK | 74.00 | -25.77 | 1.15 H | 54 | 36.61 | 11.62 |
| 6 | 4924.00 | 41.57 AV | 54.00 | -12.43 | 1.15 H | 54 | 29.95 | 11.62 |
| **Antenna Polarity & Test Distance : Vertical at 3 m** | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 90.39 PK | | | 2.07 V | 360 | 52.47 | 37.92 |
| 2 | *2462.00 | 83.40 AV | | | 2.07 V | 360 | 45.48 | 37.92 |
| 3 | 2483.50 | 54.04 PK | 74.00 | -19.96 | 2.07 V | 360 | 16.09 | 37.95 |
| 4 | 2483.50 | 43.06 AV | 54.00 | -10.94 | 2.07 V | 360 | 5.11 | 37.95 |
| 5 | 4924.00 | 47.91 PK | 74.00 | -26.09 | 1.15 V | 174 | 36.29 | 11.62 |
| 6 | 4924.00 | 41.42 AV | 54.00 | -12.58 | 1.15 V | 174 | 29.80 | 11.62 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

### 9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 30 MHz ~ 1 GHz Worst-Case Data:

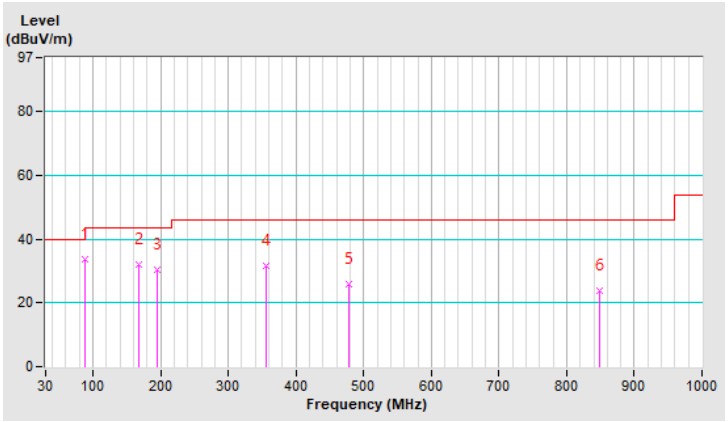
### 802.11n (HT20)

| | | | |
|---|---|---|---|
| **RF Mode** | TX 802.11n (HT20) | **Channel** | CH 6：2437 MHz |
| **Frequency Range** | 30MHz ~ 1GHz | **Detector Function** | Quasi-Peak (QP) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **No** | **Frequency (MHz)** | **Emission Level (dBuV/m)** | **Limit (dBuV/m)** | **Margin (dB)** | **Antenna Height (m)** | **Table Angle (Degree)** | **Raw Value (dBuV)** | **Correction Factor (dB/m)** |
| **1** | **88.82** | **33.90 QP** | **43.50** | **-9.60** | **1.28 H** | **279** | **56.79** | **-22.89** |
| 2 | 168.54 | 32.06 QP | 43.50 | -11.44 | 1.16 H | 168 | 49.00 | -16.94 |
| 3 | 194.77 | 30.40 QP | 43.50 | -13.10 | 1.15 H | 241 | 50.08 | -19.68 |
| 4 | 356.80 | 31.81 QP | 46.00 | -14.19 | 1.14 H | 144 | 46.23 | -14.42 |
| 5 | 477.84 | 26.00 QP | 46.00 | -20.00 | 1.64 H | 209 | 37.34 | -11.34 |
| 6 | 848.80 | 23.65 QP | 46.00 | -22.35 | 1.15 H | 163 | 28.74 | -5.09 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

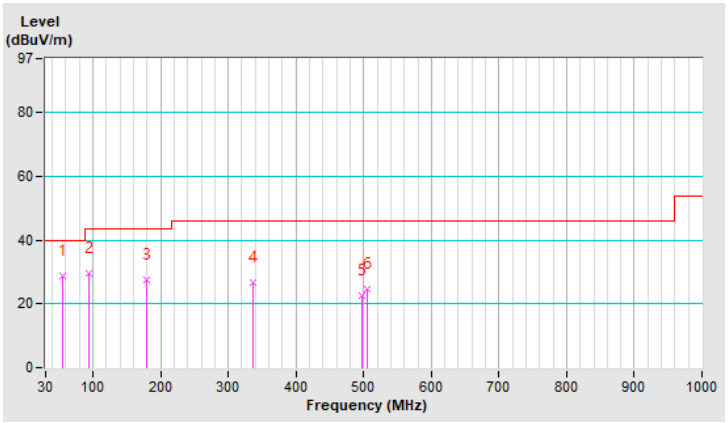


| RF Mode | TX 802.11n (HT20) | Channel | CH 6：2437 MHz |
|---|---|---|---|
| Frequency Range | 30MHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |

| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 55.38 | 28.94 QP | 40.00 | -11.06 | 1.14 V | 241 | 46.32 | -17.38 |
| 2 | 93.41 | 29.64 QP | 43.50 | -13.86 | 1.55 V | 228 | 52.14 | -22.50 |
| 3 | 178.80 | 27.55 QP | 43.50 | -15.95 | 1.78 V | 163 | 45.43 | -17.88 |
| 4 | 336.64 | 26.74 QP | 46.00 | -19.26 | 1.04 V | 336 | 41.39 | -14.65 |
| 5 | 498.50 | 22.73 QP | 46.00 | -23.27 | 1.15 V | 207 | 33.72 | -10.99 |
| 6 | 504.40 | 24.46 QP | 46.00 | -21.54 | 1.64 V | 2 | 35.38 | -10.92 |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 4.2.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|---|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESCI | 100613 | Dec. 03, 2021 | Dec. 02, 2022 |
| RF signal cable<br>Woken | 5D-FB | Cable-cond1-01 | Jan. 15, 2022 | Jan. 14, 2023 |
| LISN/AMN<br>ROHDE & SCHWARZ<br>(EUT) | ENV216 | 101826 | Mar. 14, 2022 | Mar. 13, 2023 |
| LISN/AMN<br>ROHDE & SCHWARZ<br>(Peripheral) | ESH3-Z5 | 100311 | Sep. 07, 2021 | Sep. 06, 2022 |
| Software<br>ADT | BV ADT_Cond_<br>V7.3.7.4 | NA | NA | NA |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-12040.
4. Test Date: 2022/8/3

4.2.3 Test Procedures

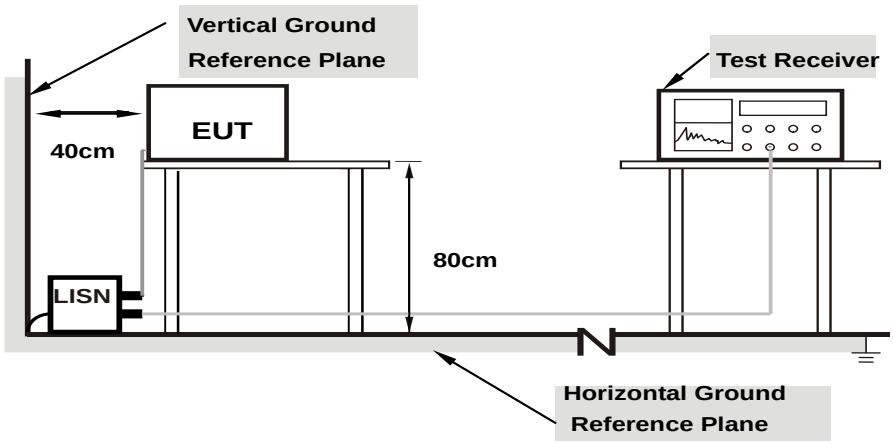
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

**Note:** The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup




**Note: 1.Support units were connected to second LISN.**

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

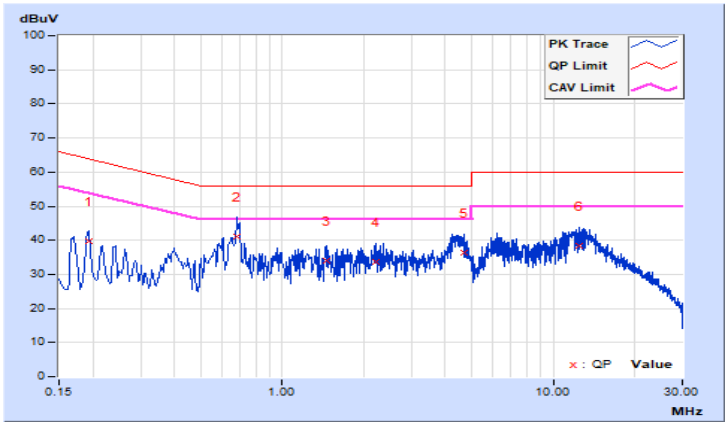
4.2.7 Test Results

| | | | |
|---|---|---|---|
| **Frequency Range** | 150kHz ~ 30MHz | **Detector Function & Resolution Bandwidth** | Quasi-Peak (QP) / Average (AV), 9kHz |
| **Input Power** | 120Vac, 60Hz | **Environmental Conditions** | 25 °C, 75% RH |
| **Tested by** | Noah Chang | **Test Date** | 2022/8/3 |

| Phase Of Power : Line (L) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **No** | **Frequency (MHz)** | **Correction Factor (dB)** | **Reading Value (dBuV)** | | **Emission Level (dBuV)** | | **Limit (dBuV)** | | **Margin (dB)** | |
| | | | **Q.P.** | **AV.** | **Q.P.** | **AV.** | **Q.P.** | **AV.** | **Q.P.** | **AV.** |
| 1 | 0.19316 | 9.71 | 30.10 | 19.85 | 39.81 | 29.56 | 63.90 | 53.90 | -24.09 | -24.34 |
| **2** | **0.68200** | **9.82** | **31.27** | **27.55** | **41.09** | **37.37** | **56.00** | **46.00** | **-14.91** | **-8.63** |
| 3 | 1.45400 | 9.87 | 24.28 | 18.04 | 34.15 | 27.91 | 56.00 | 46.00 | -21.85 | -18.09 |
| 4 | 2.20600 | 9.91 | 23.89 | 17.76 | 33.80 | 27.67 | 56.00 | 46.00 | -22.20 | -18.33 |
| 5 | 4.68600 | 9.96 | 26.57 | 20.24 | 36.53 | 30.20 | 56.00 | 46.00 | -19.47 | -15.80 |
| 6 | 12.49000 | 10.09 | 28.22 | 16.82 | 38.31 | 26.91 | 60.00 | 50.00 | -21.69 | -23.09 |

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

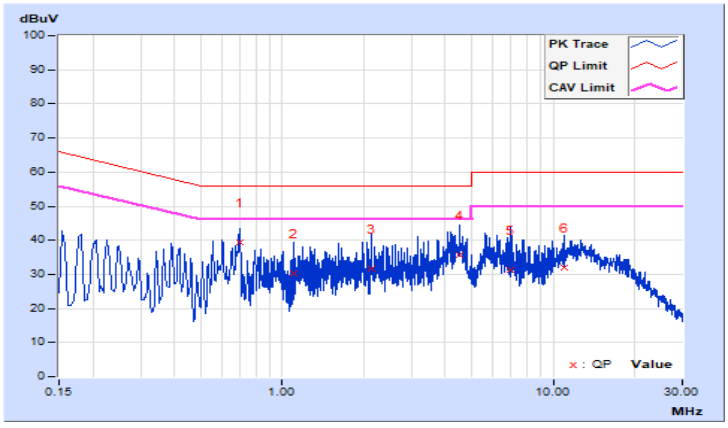


| | | | |
|---|---|---|---|
| **Frequency Range** | 150kHz ~ 30MHz | **Detector Function & Resolution Bandwidth** | Quasi-Peak (QP) / Average (AV), 9kHz |
| **Input Power** | 120Vac, 60Hz | **Environmental Conditions** | 25 °C, 75% RH |
| **Tested by** | Noah Chang | **Test Date** | 2022/8/3 |

| Phase Of Power : Neutral (N) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **No** | **Frequency (MHz)** | **Correction Factor (dB)** | **Reading Value (dBuV)** | | **Emission Level (dBuV)** | | **Limit (dBuV)** | | **Margin (dB)** | |
| | | | **Q.P.** | **AV.** | **Q.P.** | **AV.** | **Q.P.** | **AV.** | **Q.P.** | **AV.** |
| 1 | 0.69800 | 9.83 | 29.45 | 23.73 | 39.28 | 33.56 | 56.00 | 46.00 | -16.72 | -12.44 |
| 2 | 1.09800 | 9.87 | 20.43 | 10.63 | 30.30 | 20.50 | 56.00 | 46.00 | -25.70 | -25.50 |
| 3 | 2.12600 | 9.92 | 21.58 | 13.20 | 31.50 | 23.12 | 56.00 | 46.00 | -24.50 | -22.88 |
| 4 | 4.52200 | 9.98 | 25.75 | 16.38 | 35.73 | 26.36 | 56.00 | 46.00 | -20.27 | -19.64 |
| 5 | 7.00200 | 10.02 | 21.23 | 11.73 | 31.25 | 21.75 | 60.00 | 50.00 | -28.75 | -28.25 |
| 6 | 10.96200 | 10.07 | 21.80 | 12.65 | 31.87 | 22.72 | 60.00 | 50.00 | -28.13 | -27.28 |

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

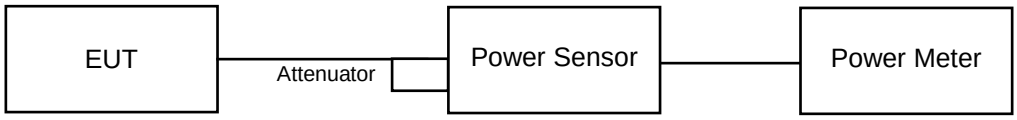


## 4.3 Conducted Output Power Measurement

### 4.3.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

### 4.3.2 Test Setup




### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.3.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

### 4.3.5 Deviation from Test Standard

No deviation.

### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

**802.11b**

| Channel | Frequency (MHz) | Peak Power (mW) | Peak Power (dBm) | Average Power (mW) | Average Power (dBm) | Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| 1 | 2412 | 56.494 | 17.52 | 31.117 | 14.93 | 30 | Pass |
| 6 | 2437 | 53.703 | 17.30 | 29.242 | 14.66 | 30 | Pass |
| 11 | 2462 | 54.954 | 17.40 | 30.549 | 14.85 | 30 | Pass |

**802.11g**

| Channel | Frequency (MHz) | Peak Power (mW) | Peak Power (dBm) | Average Power (mW) | Average Power (dBm) | Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| 1 | 2412 | 54.325 | 17.35 | 7.447 | 8.72 | 30 | Pass |
| 6 | 2437 | 57.412 | 17.59 | 7.603 | 8.81 | 30 | Pass |
| 11 | 2462 | 55.847 | 17.47 | 7.311 | 8.64 | 30 | Pass |

**802.11n (HT20)**

| Channel | Frequency (MHz) | Peak Power (mW) | Peak Power (dBm) | Average Power (mW) | Average Power (dBm) | Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| 1 | 2412 | 56.364 | 17.51 | 6.902 | 8.39 | 30 | Pass |
| 6 | 2437 | **59.156** | **17.72** | 7.178 | 8.56 | 30 | Pass |
| 11 | 2462 | 57.677 | 17.61 | 6.982 | 8.44 | 30 | Pass |

## 5 Pictures of Test Arrangements

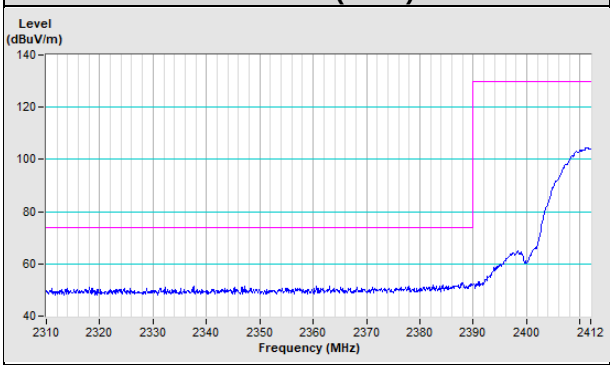
Please refer to the attached file (Test Setup Photo).

## Annex A- Band Edge Measurement

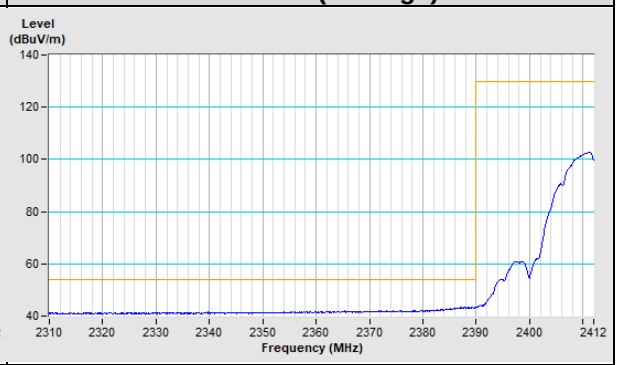
### 802.11b

**802.11b Channel 1**

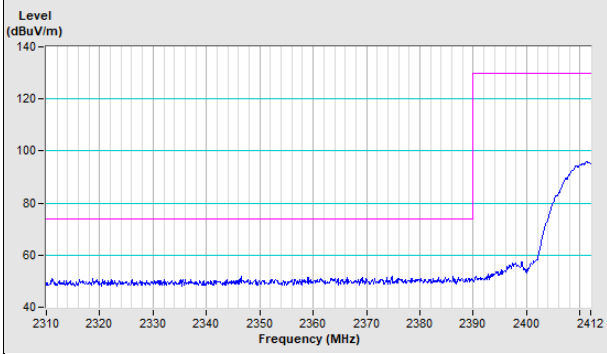
**Horizontal (Peak)**



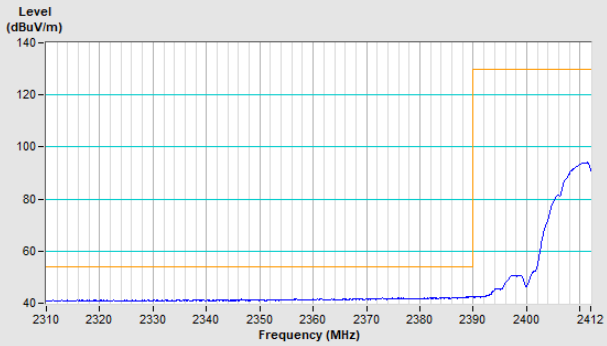

**Horizontal (Average)**




**Vertical (Peak)**

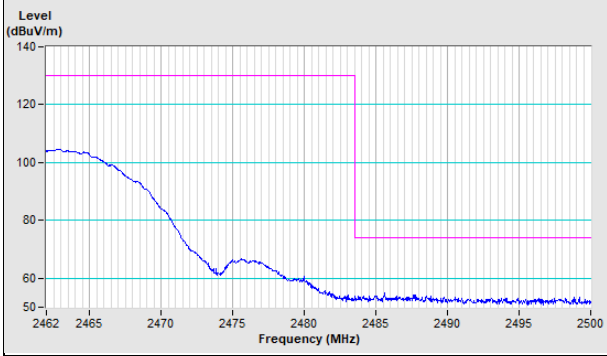



**Vertical (Average)**

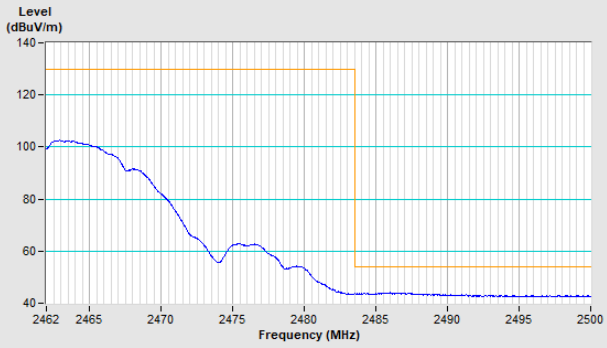



**802.11b Channel 11**

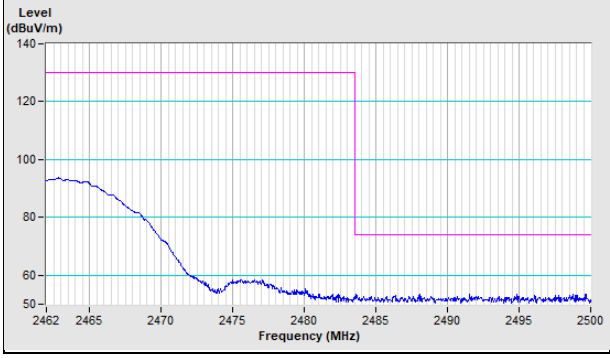
**Horizontal (Peak)**



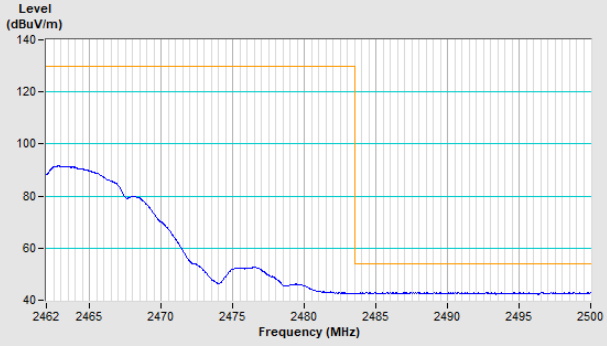

**Horizontal (Average)**




**Vertical (Peak)**



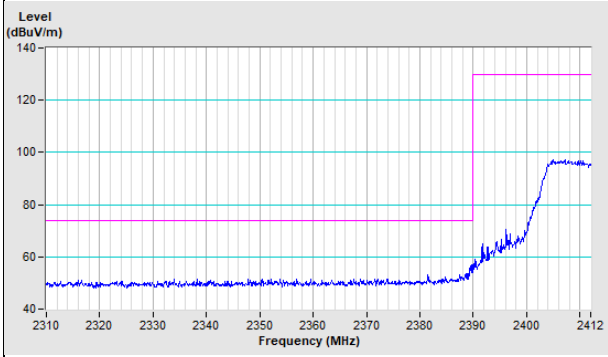

**Vertical (Average)**



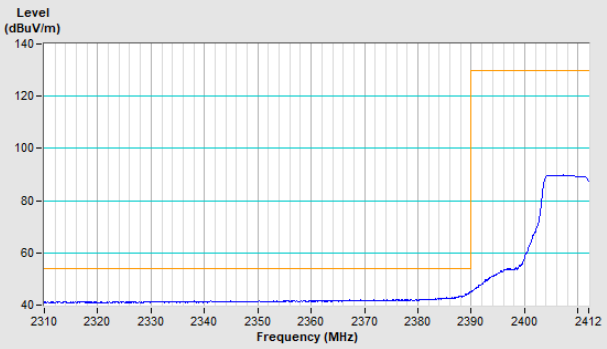
## 802.11g

### 802.11g Channel 1

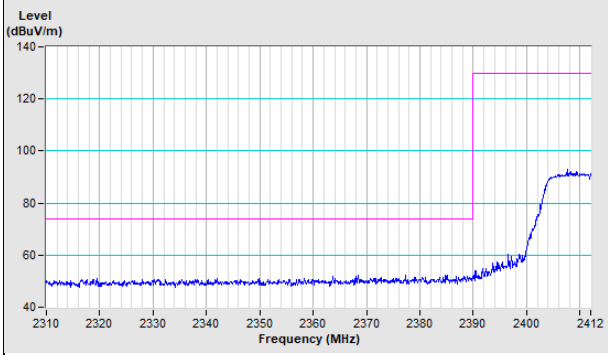
#### Horizontal (Peak)



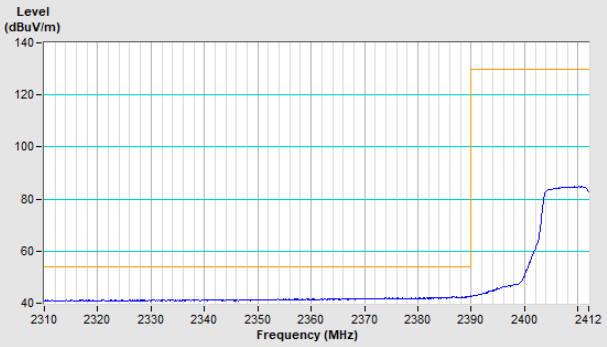

#### Horizontal (Average)




#### Vertical (Peak)

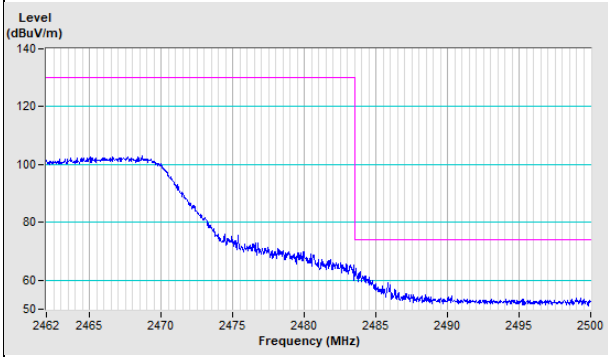



#### Vertical (Average)

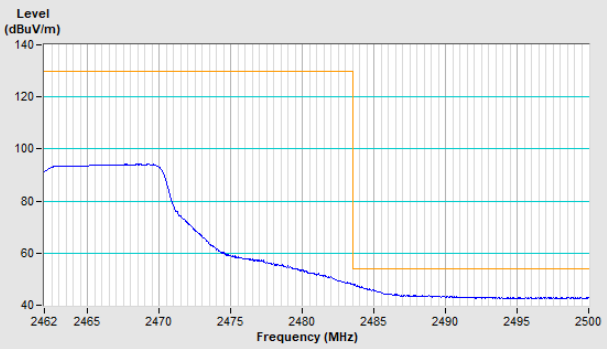



### 802.11g Channel 11

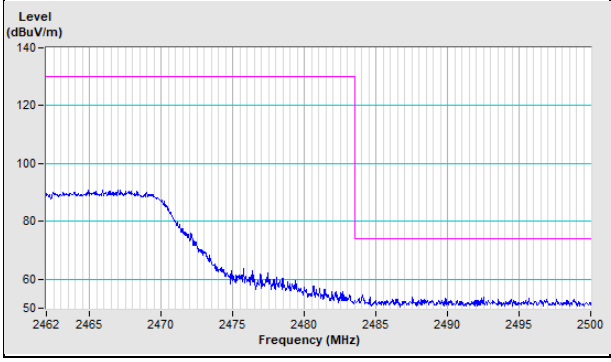
#### Horizontal (Peak)



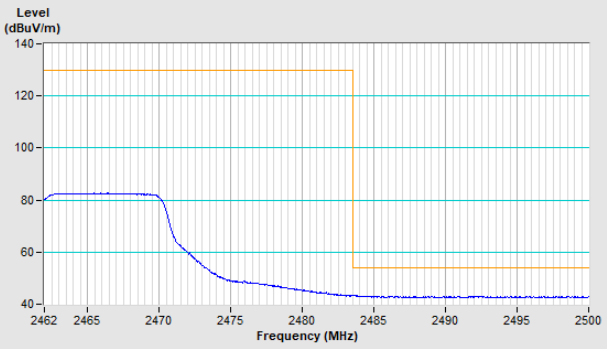

#### Horizontal (Average)




#### Vertical (Peak)



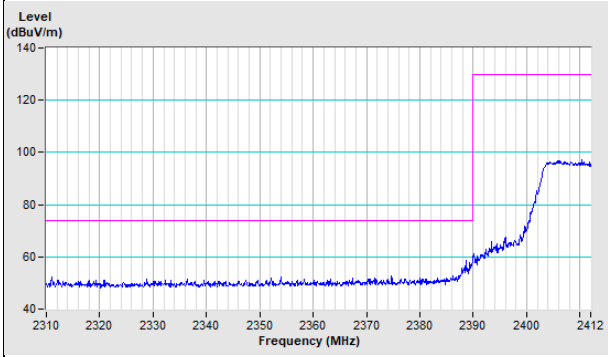

#### Vertical (Average)



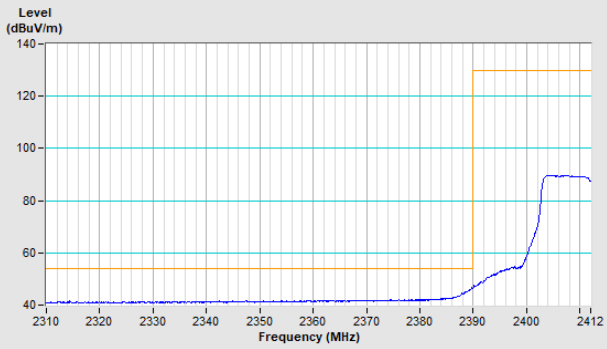
## 802.11n (HT20)

### 802.11n (HT20) Channel 1

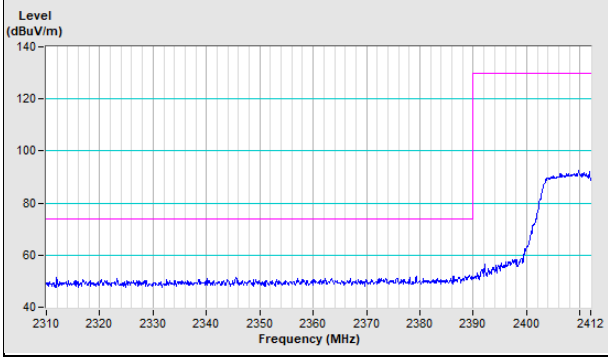
#### Horizontal (Peak)



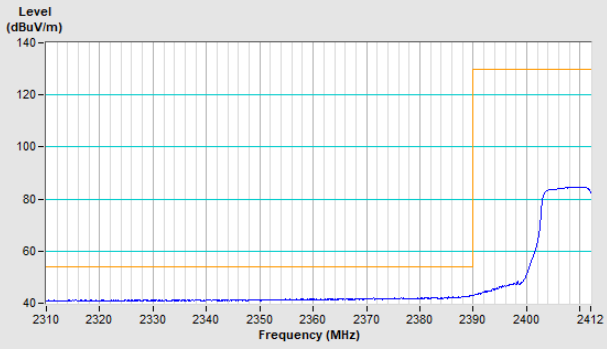

#### Horizontal (Average)




#### Vertical (Peak)

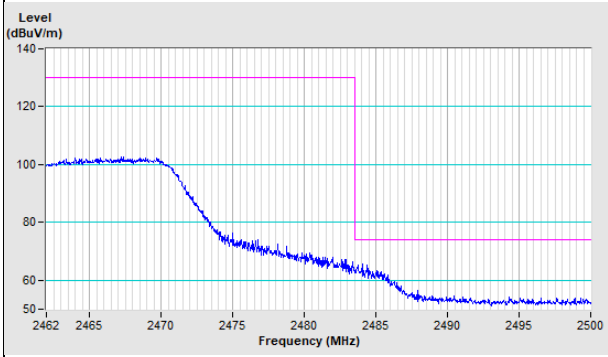



#### Vertical (Average)

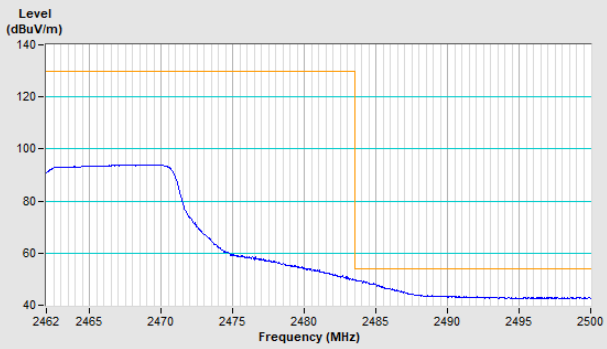



### 802.11n (HT20) Channel 11

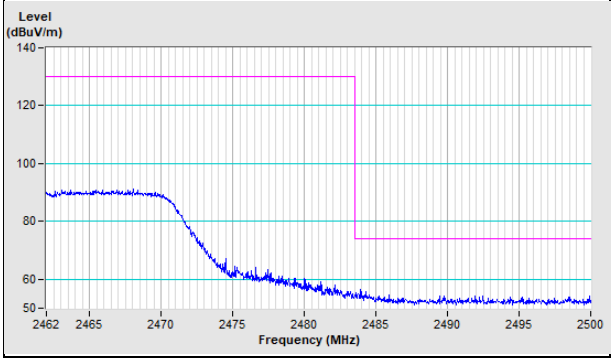
#### Horizontal (Peak)



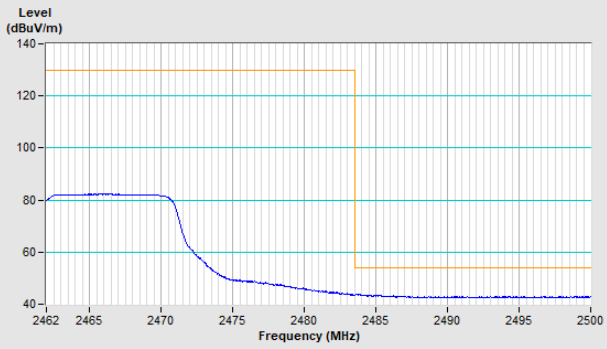

#### Horizontal (Average)




#### Vertical (Peak)




#### Vertical (Average)



**Appendix – Information of the Testing Laboratories**

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following: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**Email:** service.adt@tw.bureauveritas.com
**Web Site:** www.bureauveritas-adt.com


The address and road map of all our labs can be found in our web site also.

**--- END ---**