



FCC RF Test Report

APPLICANT : Motorola Mobility, LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : 10722
FCC ID : IHDT56WB4
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

This is a variant report which is only valid together with the original test report. The product was received on May 17, 2017 and testing was completed on Jun. 03, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|----------------|-----------|--|-----------------------|--------|-------------------------------------|
| 3.1 | 15.247(d) | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) & 15.247(d) | Pass | Under limit 0.21 dB at 2483.560 MHz |
| 3.2 | 15.207 | AC Conducted Emission | 15.207(a) | Pass | Under limit 5.00 dB at 0.238 MHz |



1 General Description

1.1 Applicant

Motorola Mobility, LLC

222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

1.2 Manufacturer

Motorola Mobility, LLC

222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

1.3 Product Feature of Equipment Under Test

| Product Feature | |
|--|---|
| Equipment | Mobile Cellular Phone |
| Brand Name | Motorola |
| Model Name | 10722 |
| FCC ID | IHDT56WB4 |
| IMEI Code | 353311080000163 (for Radiation) 353311080000221 (for Conduction) |
| EUT supports Radios application | GSM/EGPRS/WCDMA/HSPA/LTE/NFC WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE |
| EUT Stage | Identical Prototype |

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report by adding WPC Back cover. All the test cases were performed on original report which can be referred to Sporton Report Number FR733129C. Based on the original report, only worst case was verified.

| Accessory List | |
|------------------|-----------------------|
| WPC Cover | Brand Name : Motorola |
| | Model Name : MD100W |



1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification | | | |
|---|--|-------|-------|
| Tx/Rx Channel Frequency Range | 2412 MHz ~ 2462 MHz | | |
| Antenna Type / Gain | Ant. 1 : Fixed internal Antenna type with gain -2.0 dBi Ant. 2 : Fixed internal Antenna type with gain -0.3 dBi | | |
| Type of Modulation | 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) | | |
| Antenna Function Description | | Ant.1 | Ant.2 |
| | 802.11 b/g/n/ac | V | V |
| | 802.11 b/g/n/ac MIMO | V | V |

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

| | |
|---------------------------|--|
| Test Site | SPORTON INTERNATIONAL INC. |
| Test Site Location | No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978 |
| Test Site No. | Sporton Site No. CO05-HY |

Note: The test site complies with ANSI C63.4 2014 requirement.

| | |
|---------------------------|--|
| Test Site | SPORTON INTERNATIONAL INC. |
| Test Site Location | No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855 |
| Test Site No. | Sporton Site No. 03CH11-HY |

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

2.1 Carrier Frequency and Channel

| Frequency Band | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|-----------------|---------|-------------|---------|-------------|
| 2400-2483.5 MHz | 1 | 2412 | 7 | 2442 |
| | 2 | 2417 | 8 | 2447 |
| | 3 | 2422 | 9 | 2452 |
| | 4 | 2427 | 10 | 2457 |
| | 5 | 2432 | 11 | 2462 |
| | 6 | 2437 | - | - |

2.2 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

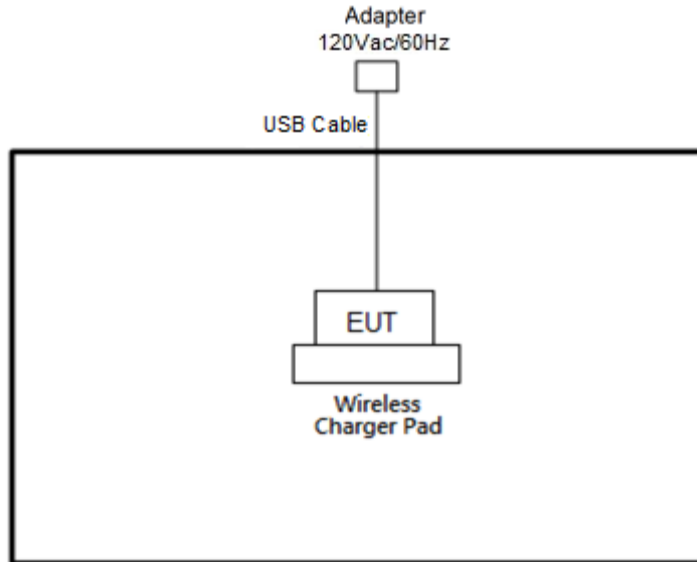
MIMO Antenna

| Modulation | Data Rate |
|--------------|-----------|
| 802.11n HT20 | MCS0 |

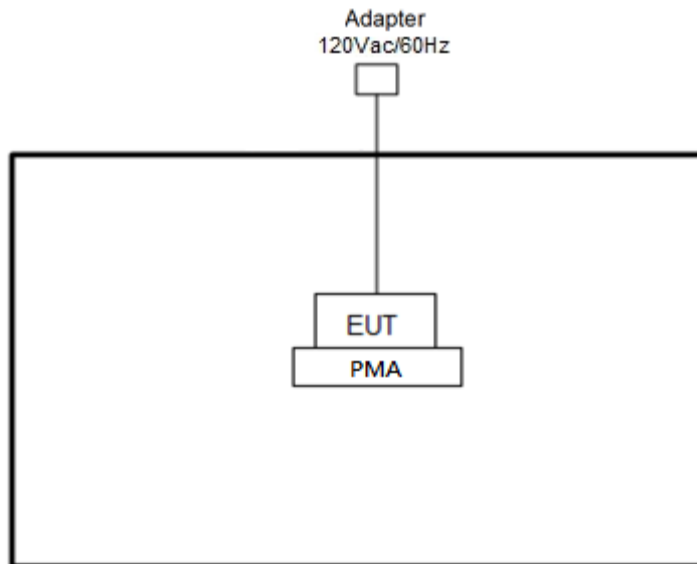
| Test Cases | |
|---|---|
| AC Conducted Emission | Mode 1 : GSM1900 Idle + Bluetooth Link + WLAN (2.4GHz) Link + Camera + WPC Back cover + Battery + LG Charging pad + USB Cable (Charging from Adapter) Mode 2 : WCDMA Band V Idle + Bluetooth Link + WLAN (2.4GHz) Link + MPEG4 + WPC Back cover + Battery + PMA Charging pad + Adapter |
| Remark: The worst case of conducted emission is mode 2; only the test data of it was reported. | |

2.3 Connection Diagram of Test System

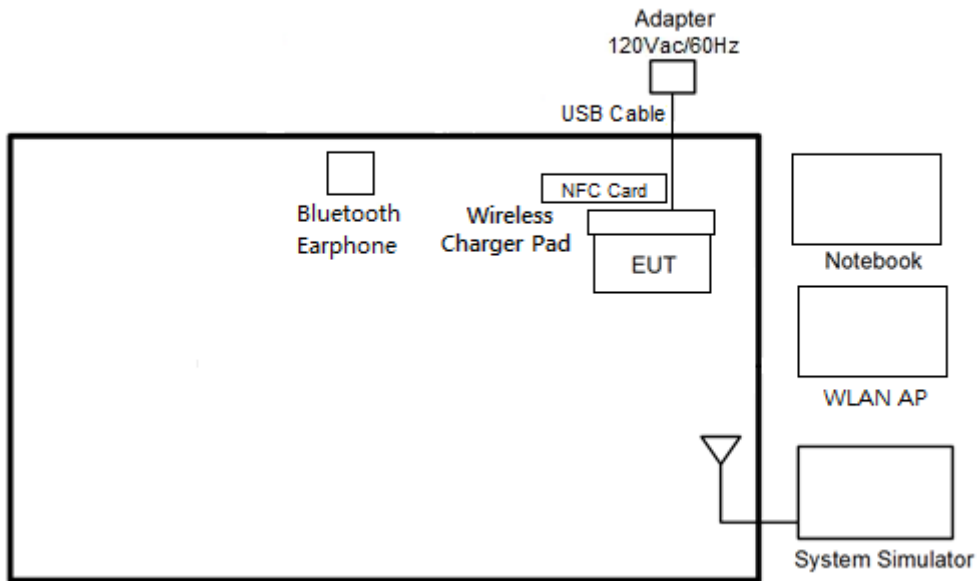
<WLAN Tx with WPC Charging Mode>



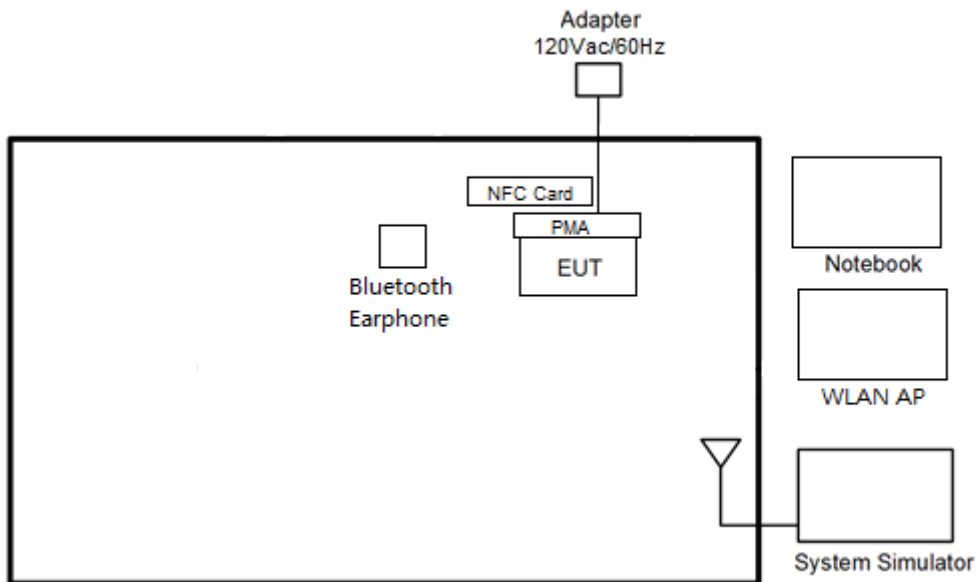
<WLAN Tx with PMA Charging Mode>



<AC Conducted Emission Mode with WPC Charging Mode>



<AC Conducted Emissions with PAM Charging Mode>





2.4 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|------|--------------------|---------------|----------------|--|------------|--|
| 1. | Notebook | DELL | Latitude E6320 | FCC DoC/ Contains FCC ID: QDS-BRCM1054 | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 2. | System Simulator | Anritsu | MT8820C | N/A | N/A | Unshielded, 1.8 m |
| 3. | WLAN AP | ASUS | RT-AC66U | MSQ-RTAC66U | N/A | Unshielded, 1.8 m |
| 4. | Bluetooth Earphone | Sony Ericsson | MW600 | PY7DDA-2029 | N/A | N/A |
| 5. | SD Card | Transcend | MicroSD HC 16G | FCC DoC | N/A | N/A |
| 6. | Adapter | HUAWEI | HW-059200UHQ | FCC DoC | N/A | N/A |
| 7. | USB Cable | HUAWEI | N/A | FCC DoC | N/A | N/A |
| 8. | WPC Pad | LG | WCD-100 | FCC DoC | N/A | N/A |
| 9. | PMA Pad | DURACELL | M-018B-518A | FCC DoC | N/A | N/A |

2.5 EUT Operation Test Setup

The RF test items, programmed RF utility, "QRCT" installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.



3 Test Result

3.1 Radiated Band Edges and Spurious Emission Measurement

3.1.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

| Frequency (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 |

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

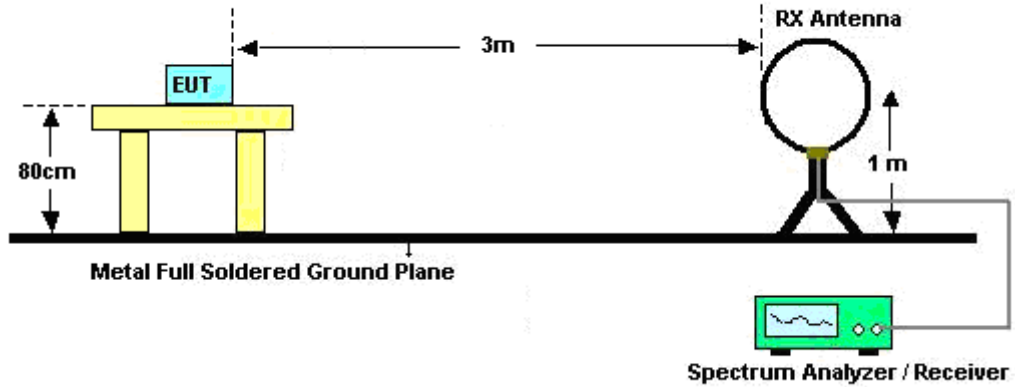


3.1.3 Test Procedures

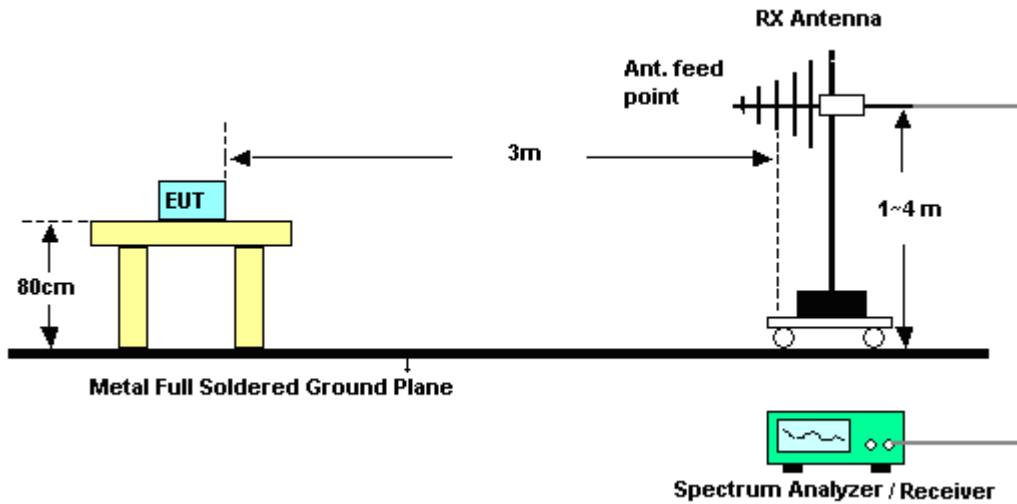
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.1.4 Test Setup

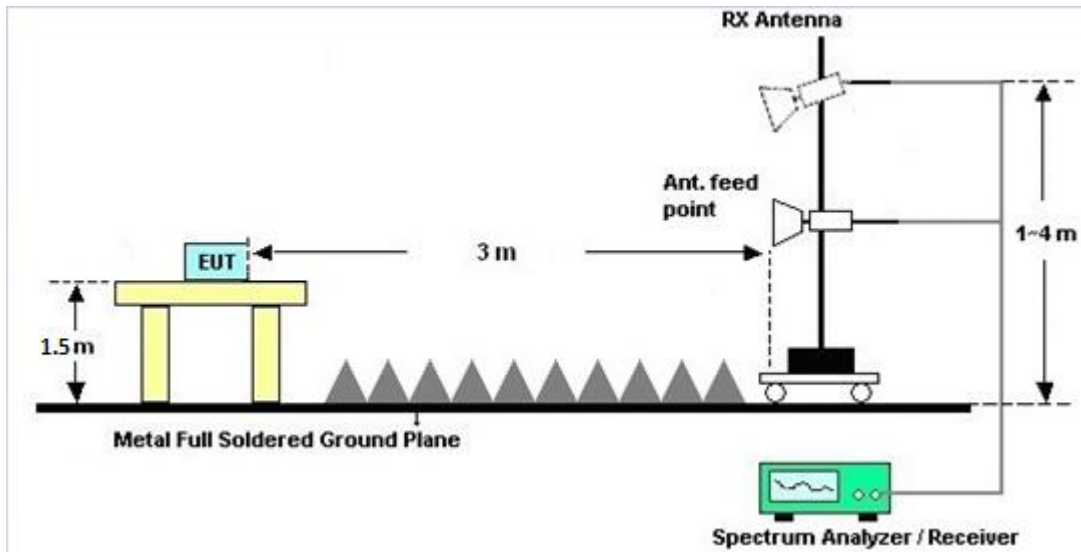
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and C.

3.1.7 Duty Cycle

Please refer to Appendix D.

3.1.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.



3.2 AC Conducted Emission Measurement

3.2.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of Emission (MHz) | Conducted Limit (dB μ V) | |
|--------------------------------|------------------------------|-----------|
| | Quasi-Peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

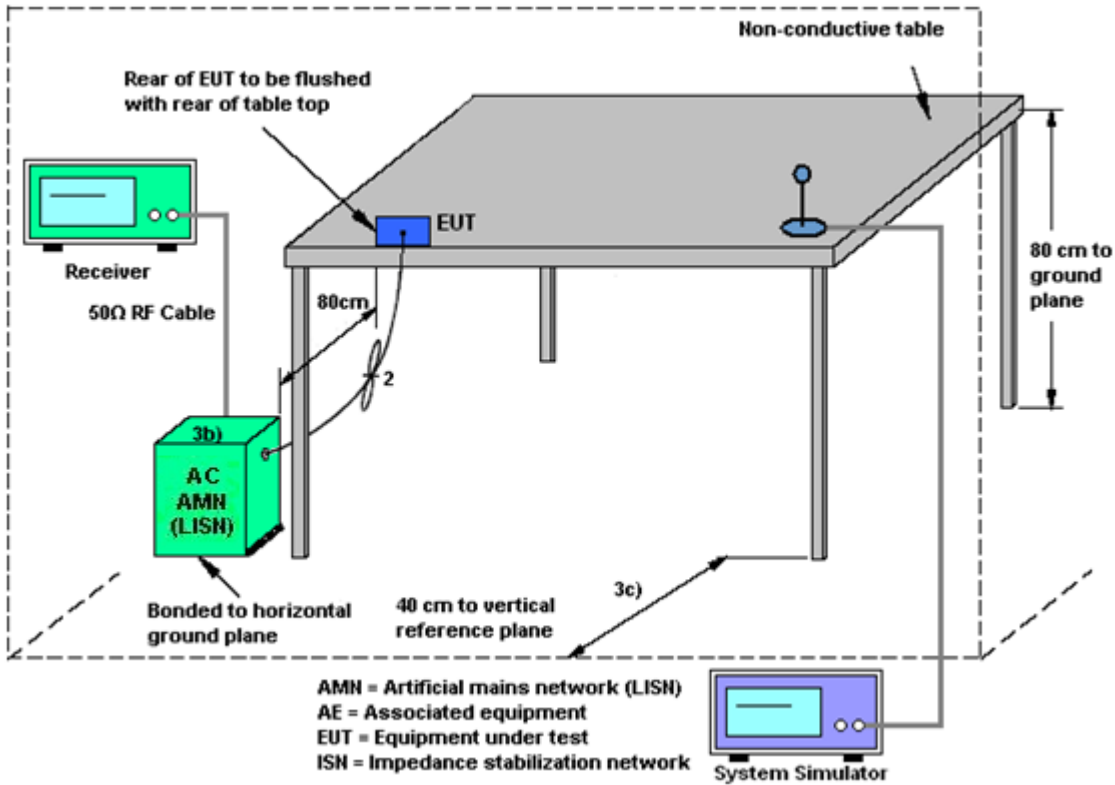
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.2.4 Test Setup



3.2.5 Test Result of AC Conducted Emission

Please refer to Appendix A.



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|----------------------|-----------------|----------------------------|--------------------|--------------------|------------------|---------------------------------|---------------|--------------------------|
| AC Power Source | ChainTek | APC-1000W | N/A | N/A | N/A | May 26, 2017~ Jun. 03, 2017 | N/A | Conduction (CO05-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESCI 7 | 100724 | 9kHz~7GHz | Aug. 30, 2016 | May 26, 2017~ Jun. 03, 2017 | Aug. 29, 2017 | Conduction (CO05-HY) |
| LISN | Rohde & Schwarz | ENV216 | 100080 | 9kHz~30MHz | Nov. 29, 2016 | May 26, 2017~ Jun. 03, 2017 | Nov. 28, 2017 | Conduction (CO05-HY) |
| Horn Antenna | SCHWARZBECK | BBHA 9120 D | 9120D-132 6 | 1GHz ~ 18GHz | Oct. 07, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Oct. 06, 2017 | Radiation (03CH11-HY) |
| Amplifier | SONOMA | 310N | 187312 | 9kHz~1GHz | Nov. 10, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Nov. 09, 2017 | Radiation (03CH11-HY) |
| Bilog Antenna | TESEQ | CBL 6111D&N-6-0 6 | 35414&AT- N0602 | 30MHz~1GHz | Oct. 15, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Oct. 14, 2017 | Radiation (03CH11-HY) |
| EMI Test Receiver | Agilent | N9038A(MXE) | MY532900 53 | 20Hz to 26.5GHz | Jan. 12, 2017 | Jun. 02, 2017~ Jun. 03, 2017 | Jan. 11, 2018 | Radiation (03CH11-HY) |
| Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 100488 | 9 kHz~30 MHz | Oct. 20, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Oct. 19, 2018 | Radiation (03CH11-HY) |
| Preamplifier | Keysight | 83017A | MY532700 80 | 1GHz~26.5GHz | Nov. 10, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Nov. 09, 2017 | Radiation (03CH11-HY) |
| Spectrum Analyzer | Keysight | N9010A | MY542004 86 | 10Hz ~ 44GHz | Oct. 12, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Oct. 11, 2017 | Radiation (03CH11-HY) |
| Antenna Mast | EMEC | AM-BS-4500- B | N/A | 1~4m | N/A | Jun. 02, 2017~ Jun. 03, 2017 | N/A | Radiation (03CH11-HY) |
| Preamplifier | MITEQ | JS44-180040 00-33-8P | 1840917 | 18GHz ~ 40GHz | Jun. 14, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Jun. 13, 2017 | Radiation (03CH11-HY) |
| Turn Table | EMEC | TT 2000 | N/A | 0~360 Degree | N/A | Jun. 02, 2017~ Jun. 03, 2017 | N/A | Radiation (03CH11-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170 584 | 18GHz- 40GHz | Nov. 08, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Nov. 07, 2017 | Radiation (03CH11-HY) |
| Preamplifier | MITEQ | AMF-7D-0010 1800-30-10P | 1815698 | 1GHz~18GHz | Dec. 01, 2016 | Jun. 02, 2017~ Jun. 03, 2017 | Nov. 30, 2017 | Radiation (03CH11-HY) |



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 2.70 |
|---|------|

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 5.20 |
|---|------|

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 5.50 |
|---|------|

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 5.20 |
|---|------|



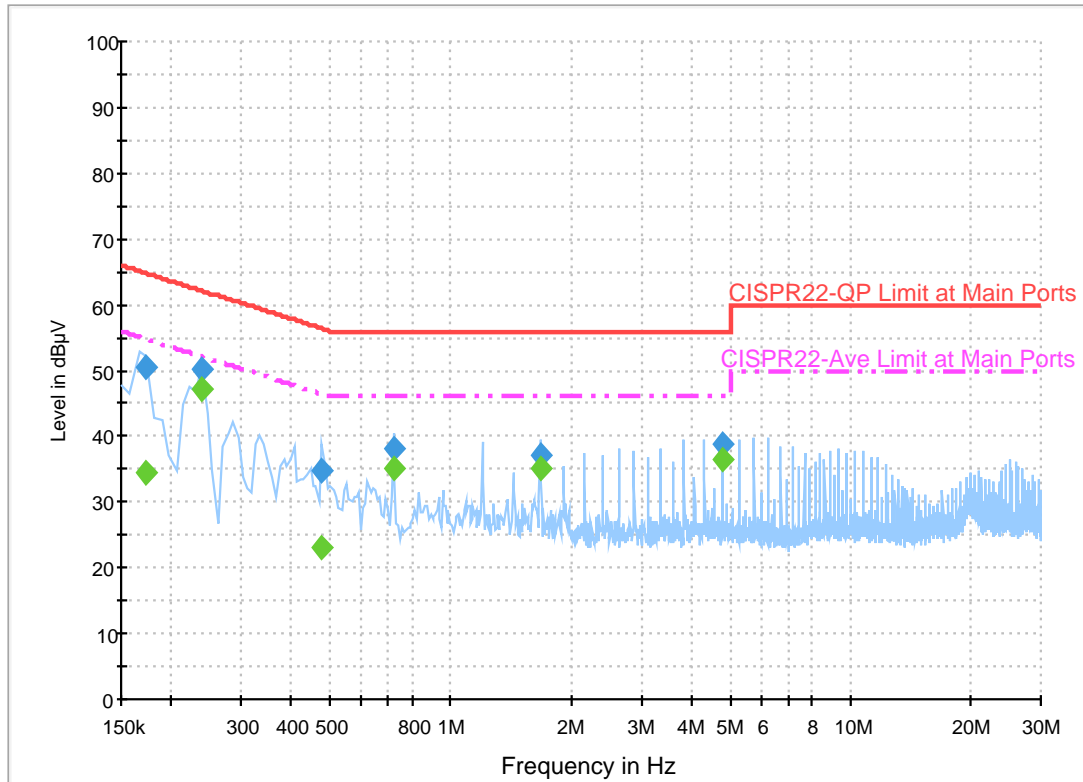
Appendix A. AC Conducted Emission Test Results

| | | | |
|-----------------|-----------|---------------------|---------|
| Test Engineer : | Eric Jeng | Temperature : | 21~24°C |
| | | Relative Humidity : | 52~55% |

EUT Information

Report NO : 733129-08
 Test Mode : Mode 2
 Test Voltage : 120Vac/60Hz
 Phase : Line

ENV216 Auto Test FCC Power Bar - L



Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|------------------|--------|------|------------|-------------|--------------|
| 0.174000 | 50.3 | Off | L1 | 19.6 | 14.5 | 64.8 |
| 0.238000 | 50.1 | Off | L1 | 19.6 | 12.1 | 62.2 |
| 0.478000 | 34.7 | Off | L1 | 19.6 | 21.7 | 56.4 |
| 0.718000 | 38.0 | Off | L1 | 19.6 | 18.0 | 56.0 |
| 1.678000 | 37.2 | Off | L1 | 19.6 | 18.8 | 56.0 |
| 4.798000 | 38.9 | Off | L1 | 19.8 | 17.1 | 56.0 |

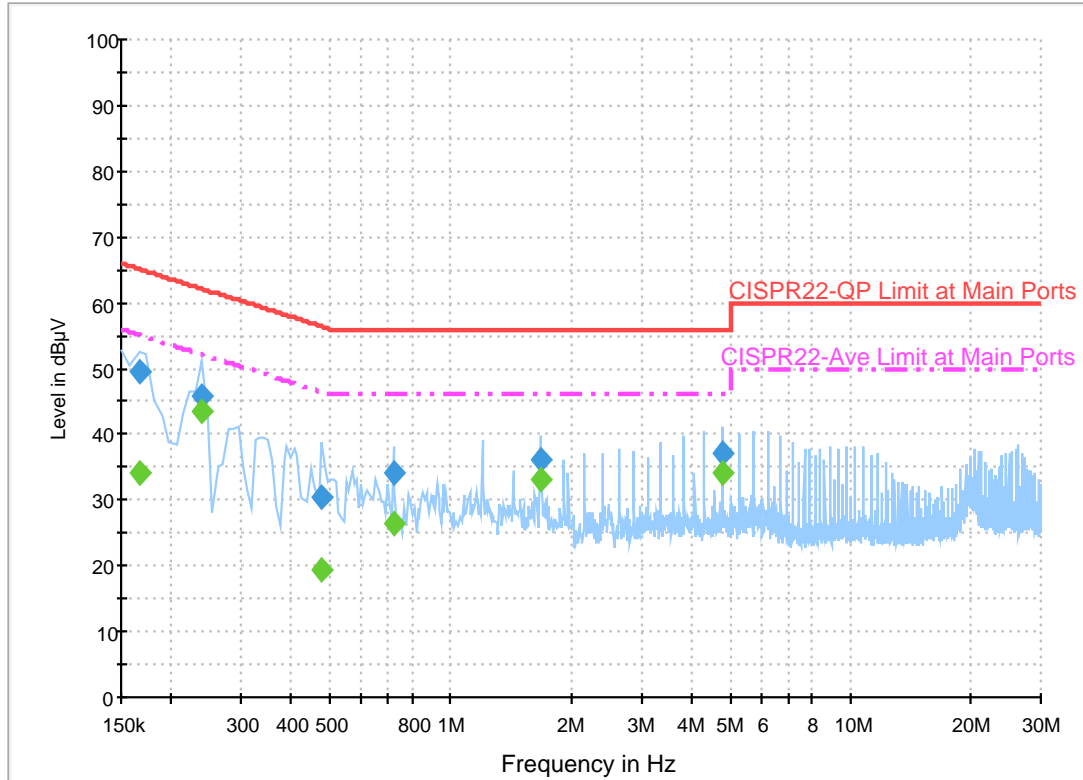
Final Result 2

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|----------------|--------|------|------------|-------------|--------------|
| 0.174000 | 34.4 | Off | L1 | 19.6 | 20.4 | 54.8 |
| 0.238000 | 47.2 | Off | L1 | 19.6 | 5.0 | 52.2 |
| 0.478000 | 23.1 | Off | L1 | 19.6 | 23.3 | 46.4 |
| 0.718000 | 35.3 | Off | L1 | 19.6 | 10.7 | 46.0 |
| 1.678000 | 35.3 | Off | L1 | 19.6 | 10.7 | 46.0 |
| 4.798000 | 36.5 | Off | L1 | 19.8 | 9.5 | 46.0 |

EUT Information

Report NO : 733129-08
 Test Mode : Mode 2
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

ENV216 Auto Test FCC Power Bar - N



Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|------------------|--------|------|------------|-------------|--------------|
| 0.166000 | 49.5 | Off | N | 19.5 | 15.7 | 65.2 |
| 0.238000 | 45.9 | Off | N | 19.5 | 16.3 | 62.2 |
| 0.478000 | 30.5 | Off | N | 19.5 | 25.9 | 56.4 |
| 0.718000 | 34.2 | Off | N | 19.5 | 21.8 | 56.0 |
| 1.678000 | 36.0 | Off | N | 19.6 | 20.0 | 56.0 |
| 4.798000 | 37.1 | Off | N | 19.7 | 18.9 | 56.0 |

Final Result 2

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|----------------|--------|------|------------|-------------|--------------|
| 0.166000 | 34.0 | Off | N | 19.5 | 21.2 | 55.2 |
| 0.238000 | 43.5 | Off | N | 19.5 | 8.7 | 52.2 |
| 0.478000 | 19.5 | Off | N | 19.5 | 26.9 | 46.4 |
| 0.718000 | 26.5 | Off | N | 19.5 | 19.5 | 46.0 |
| 1.678000 | 33.1 | Off | N | 19.6 | 12.9 | 46.0 |
| 4.798000 | 34.0 | Off | N | 19.7 | 12.0 | 46.0 |



Appendix B. Radiated Spurious Emission

| | | | |
|-----------------|------------------------|---------------------|---------|
| Test Engineer : | Jacky Hung, and Ken Wu | Temperature : | 20~24°C |
| | | Relative Humidity : | 50~55% |

<WPC Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI Ant. 1+2 | Note | Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Peak Avg. (P/A) | Pol. (H/V) | |
|-------------------------------------|---|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-------------------|--------------|---|
| 802.11n HT20 CH 11 2462MHz | * | 2462 | 105.92 | - | - | 96.1 | 27.09 | 6.38 | 33.58 | 301 | 106 | P | H | |
| | * | 2462 | 97.15 | - | - | 87.33 | 27.09 | 6.38 | 33.58 | 301 | 106 | A | H | |
| | | 2485.04 | 63.73 | -10.27 | 74 | 53.85 | 27.14 | 6.39 | 33.58 | 301 | 106 | P | H | |
| | | 2483.52 | 51.5 | -2.5 | 54 | 41.62 | 27.14 | 6.39 | 33.58 | 301 | 106 | A | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | | H |
| | * | 2462 | 107.14 | - | - | 97.32 | 27.09 | 6.38 | 33.58 | 110 | 135 | P | V | |
| | * | 2462 | 99.26 | - | - | 89.44 | 27.09 | 6.38 | 33.58 | 110 | 135 | A | V | |
| | | 2483.6 | 65.99 | -8.01 | 74 | 56.11 | 27.14 | 6.39 | 33.58 | 110 | 135 | P | V | |
| | | 2483.72 | 52.93 | -1.07 | 54 | 43.05 | 27.14 | 6.39 | 33.58 | 110 | 135 | A | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| Remark | 1. No other spurious found. 2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | | |



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1+2, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11n HT20 CH 11 at 4924 and 7386 MHz, and a Remark section.



Emission below 1GHz
2.4GHz WIFI 802.11n HT20 (LF)

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. | |
|---------------------------------|--|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|---|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | | |
| 1+2 | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) | |
| 2.4GHz 802.11n HT20 LF | | 30 | 21.33 | -18.67 | 40 | 28.76 | 24.36 | 0.68 | 32.5 | | | P | H | |
| | | 201.72 | 28.91 | -14.59 | 43.5 | 44.47 | 14.97 | 1.8 | 32.39 | | | P | H | |
| | | 220.89 | 29.63 | -16.37 | 46 | 44.77 | 15.31 | 1.88 | 32.39 | | | P | H | |
| | | 311.2 | 30.88 | -15.12 | 46 | 41.52 | 19.36 | 2.28 | 32.37 | | | P | H | |
| | | 740.3 | 29.25 | -16.75 | 46 | 30 | 28.03 | 3.44 | 32.35 | | | P | H | |
| | | 959.4 | 33.35 | -12.65 | 46 | 29.24 | 31.18 | 3.87 | 31.12 | 100 | 0 | P | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | 46.74 | 30.37 | -9.63 | 40 | 46.12 | 15.8 | 0.94 | 32.49 | 100 | 213 | P | V |
| | | | 169.59 | 27.42 | -16.08 | 43.5 | 42.52 | 15.53 | 1.69 | 32.42 | | | P | V |
| | | | 200.1 | 27.51 | -15.99 | 43.5 | 43.18 | 14.94 | 1.72 | 32.39 | | | P | V |
| | | | 333.6 | 26.08 | -19.92 | 46 | 36.21 | 19.83 | 2.34 | 32.36 | | | P | V |
| | | | 672.4 | 27.97 | -18.03 | 46 | 30.55 | 26.5 | 3.27 | 32.47 | | | P | V |
| | | | 953.8 | 33.54 | -12.46 | 46 | 29.77 | 30.94 | 3.82 | 31.16 | | | P | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| Remark | 1. No other spurious found. 2. All results are PASS against limit line. | | | | | | | | | | | | | |



<PMA Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI Ant. 1+2 | Note | Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Peak Avg. (P/A) | Pol. (H/V) | |
|----------------------------|------|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-------------------|--------------|---|
| 802.11n HT20 CH 11 2462MHz | * | 2462 | 108.26 | - | - | 98.44 | 27.09 | 6.38 | 33.58 | 316 | 114 | P | H | |
| | * | 2462 | 99.36 | - | - | 89.54 | 27.09 | 6.38 | 33.58 | 316 | 114 | A | H | |
| | | 2483.56 | 67.29 | -6.71 | 74 | 57.41 | 27.14 | 6.39 | 33.58 | 316 | 114 | P | H | |
| | | 2483.56 | 53.79 | -0.21 | 54 | 43.91 | 27.14 | 6.39 | 33.58 | 316 | 114 | A | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | | H |
| | * | 2462 | 104.16 | - | - | 94.34 | 27.09 | 6.38 | 33.58 | 334 | 67 | P | V | |
| | * | 2462 | 95.71 | - | - | 85.89 | 27.09 | 6.38 | 33.58 | 334 | 67 | A | V | |
| | | 2484.04 | 64.03 | -9.97 | 74 | 54.15 | 27.14 | 6.39 | 33.58 | 334 | 67 | P | V | |
| | | 2483.64 | 51.38 | -2.62 | 54 | 41.5 | 27.14 | 6.39 | 33.58 | 334 | 67 | A | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |

Remark

3. No other spurious found.

4. All results are PASS against Peak and Average limit line.



**2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)**

| WIFI Ant. 1+2 | Note | Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Peak Avg. (P/A) | Pol. (H/V) | |
|----------------------------|--|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-------------------|--------------|---|
| 802.11n HT20 CH 11 2462MHz | | 4924 | 42.35 | -31.65 | 74 | 64.95 | 31.79 | 9.83 | 64.66 | 100 | 0 | P | H | |
| | | 7386 | 43.65 | -30.35 | 74 | 58.67 | 37.82 | 11.64 | 64.86 | 100 | 0 | P | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | 4924 | 46.7 | -27.3 | 74 | 69.3 | 31.79 | 9.83 | 64.66 | 100 | 0 | P | V |
| | | | 7386 | 47.62 | -26.38 | 74 | 62.64 | 37.82 | 11.64 | 64.86 | 100 | 0 | P | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | | V |
| Remark | 3. No other spurious found. | | | | | | | | | | | | | |
| | 4. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | | |



Emission below 1GHz
2.4GHz WIFI 802.11b (LF)

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. | |
|-------------------------|--|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|---|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | | |
| 1+2 | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) | |
| 2.4GHz 802.11b LF | | 30.27 | 20.71 | -19.29 | 40 | 28.14 | 24.36 | 0.68 | 32.5 | | | P | H | |
| | | 85.35 | 29.06 | -10.94 | 40 | 46.42 | 13.88 | 1.22 | 32.48 | 100 | 82 | P | H | |
| | | 156.36 | 24.59 | -18.91 | 43.5 | 38.71 | 16.61 | 1.61 | 32.43 | | | P | H | |
| | | 338.5 | 26.02 | -19.98 | 46 | 36.02 | 19.96 | 2.34 | 32.35 | | | P | H | |
| | | 705.3 | 29.68 | -16.32 | 46 | 31.83 | 26.8 | 3.38 | 32.46 | | | P | H | |
| | | 952.4 | 33.17 | -12.83 | 46 | 29.46 | 30.9 | 3.82 | 31.18 | | | P | H | |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | 45.66 | 33.93 | -6.07 | 40 | 49.25 | 16.23 | 0.94 | 32.49 | 100 | 285 | P | V |
| | | | 54.57 | 31.71 | -8.29 | 40 | 50.63 | 12.62 | 0.94 | 32.49 | | | P | V |
| | | | 82.38 | 29.92 | -10.08 | 40 | 47.63 | 13.54 | 1.22 | 32.48 | | | P | V |
| | | | 326.6 | 25.1 | -20.9 | 46 | 35.4 | 19.65 | 2.34 | 32.36 | | | P | V |
| | | | 694.8 | 28.19 | -17.81 | 46 | 30.54 | 26.64 | 3.35 | 32.47 | | | P | V |
| | | | 952.4 | 33.93 | -12.07 | 46 | 30.22 | 30.9 | 3.82 | 31.18 | | | P | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| Remark | 3. No other spurious found. 4. All results are PASS against limit line. | | | | | | | | | | | | | |



Note symbol

| | |
|-----|--|
| * | Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| ! | Test result is over limit line. |
| P/A | Peak or Average |
| H/V | Horizontal or Vertical |



A calculation example for radiated spurious emission is shown as below:

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| 1+2 | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| 802.11b | | 2390 | 55.45 | -18.55 | 74 | 54.51 | 32.22 | 4.58 | 35.86 | 103 | 308 | P | H |
| CH 01 | | | | | | | | | | | | | |
| 2412MHz | | 2390 | 43.54 | -10.46 | 54 | 42.6 | 32.22 | 4.58 | 35.86 | 103 | 308 | A | H |

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix C. Radiated Spurious Emission Plots

| | | | |
|------------------------|------------------------|----------------------------|---------|
| Test Engineer : | Jacky Hung, and Ken Wu | Temperature : | 20~24°C |
| | | Relative Humidity : | 50~55% |

Note symbol

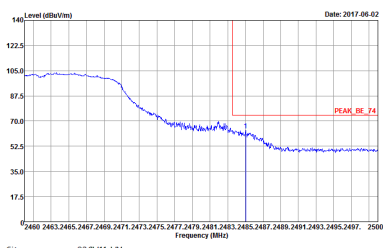
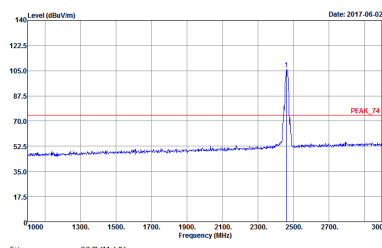
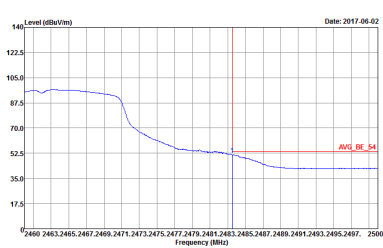
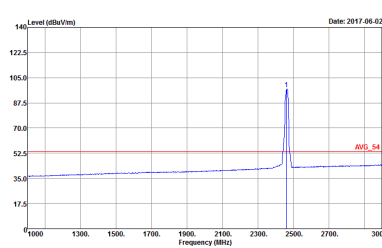
| | |
|----|------------------------------|
| -L | Low channel location |
| -R | High channel location |



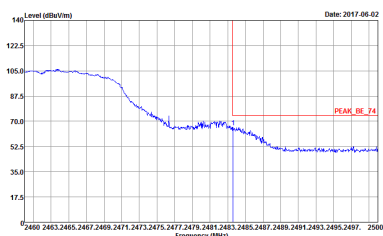
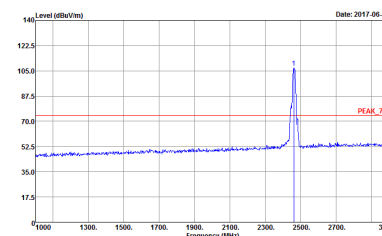
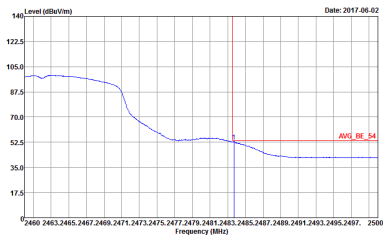
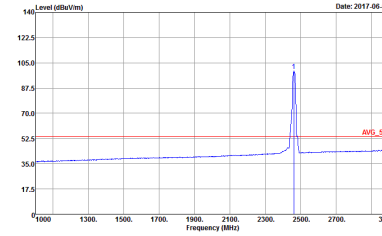
<WPC Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|--|--|
| ANT | 802.11n HT20 CH11 2462MHz | |
| 1+2 | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> |  <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> |
| Avg. |  <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> |  <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> |



| WIFI | 2.4GHz 2400~2483.5MHz Fundamental @ 3m | |
|------|---|---|
| ANT | 802.11n HT20 CH11 2462MHz | |
| 1+2 | Vertical | Fundamental |
| Peak |  <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 733129-08</p> |  <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 733129-08</p> |
| Avg. |  <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 733129-08</p> |  <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 733129-08</p> |



2.4GHz 2400~2483.5MHz

WIFI 802

| | | |
|----------------------|--|--|
| WIFI | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
| ANT | 802.11n HT20 CH11 2462MHz | |
| 1+2 | Horizontal | Vertical |
| Peak Avg. | <p>Site : 03CH11-4FY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak Project : 733129-08</p> | <p>Site : 03CH11-4FY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak Project : 733129-08</p> |



Emission below 1GHz
2.4GHz WIFI 802.11n HT20 (LF)

Table with 2 columns: Horizontal and Vertical. Each column contains a spectral plot of Level (dBuV/m) vs Frequency (MHz) from 50 to 1000 MHz. The plots show a blue signal line and a red limit line. A 'QP' label is present in the top right of each plot. Below the plots, there is a metadata block for 'QP / Peak' including Site, Condition, Detector, and Project information.



<PMA Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|--|
| ANT | 802.11n HT20 CH11 2462MHz | |
| 1+2 | Horizontal | Fundamental |
| Peak | <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> | <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> |
| Avg. | <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> | <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 733129-08</p> |



| WIFI | 2.4GHz 2400~2483.5MHz Fundamental @ 3m | |
|------|---|--|
| ANT | 802.11n HT20 CH11 2462MHz | |
| 1+2 | Vertical | Fundamental |
| Peak | <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 733129-08</p> | <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 733129-08</p> |
| Avg. | <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 733129-08</p> | <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 733129-08</p> |



2.4GHz 2400~2483.5MHz

WIFI 802

| | | |
|----------------------|--|--|
| WIFI | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
| ANT | 802.11n HT20 CH11 2462MHz | |
| 1+2 | Horizontal | Vertical |
| Peak Avg. | <p>Site : 03CH11-4FY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak Project : 733129-08</p> | <p>Site : 03CH11-4FY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak Project : 733129-08</p> |



Emission below 1GHz
2.4GHz WIFI 802.11n HT20 (LF)

| | | |
|--------------|---|---|
| WIFI | 2.4GHz 2400~2483.5MHz | |
| ANT | 802.11n HT20 LF | |
| 1+2 | Horizontal | Vertical |
| QP / Peak | <p>Site : 03CH11-4FY Condition : QP 3m BT-LOG 6111D-LF_ETC HORIZONTAL Detector : Peak Project : 733129-08</p> | <p>Site : 03CH11-4FY Condition : QP 3m BT-LOG 6111D-LF_ETC VERTICAL Detector : Peak Project : 733129-08</p> |



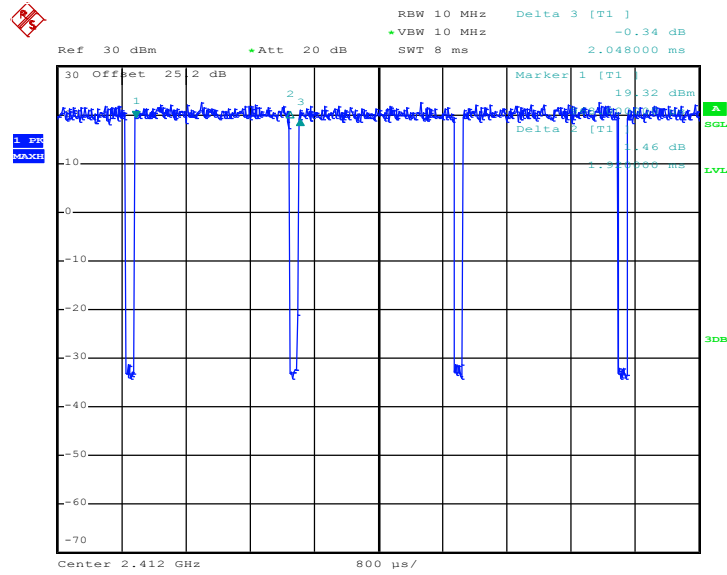
Appendix D. Duty Cycle Plots

| Antenna | Band | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting |
|---------|-------------------------------|---------------|-------|----------|-------------|
| 1+2 | 2.4GHz 802.11n HT20 for Ant 1 | 93.75 | 1920 | 0.521 | 1kHz |
| 1+2 | 2.4GHz 802.11n HT20 for Ant 2 | 94.488 | 1920 | 0.521 | 1kHz |



<MIMO Ant. 1>

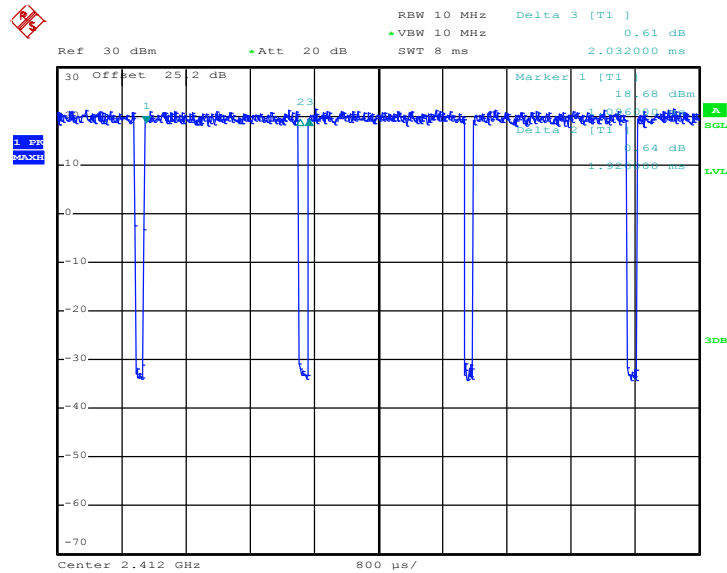
2.4GHz 802.11n HT20



Date: 1.APR.2017 15:58:17

<MIMO Ant. 2>

2.4GHz 802.11n HT20



Date: 1.APR.2017 15:59:35