

FCC Test Report

Report No.: RF160104C15-5

FCC ID: GKR-TP00078ASI

Test Model: TP00078A

Received Date: Jan. 04, 2016

Test Date: Jan. 30, 2016 ~ Feb. 02, 2016

Issued Date: Feb. 18, 2016

Applicant: Compal Electronics Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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A D T

Release Control Record

| Issue No. | Description | Date Issued |
|---------------|------------------|---------------|
| RF160104C15-5 | Original Release | Feb. 18, 2016 |

1 Certificate of Conformity

Product: Tablet Computer

Brand: Lenovo

Test Model: TP00078A

Sample Status: Production Unit

Applicant: Compal Electronics Inc.

Test Date: Jan. 30, 2016 ~ Feb. 02, 2016

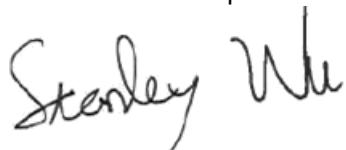
Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)

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 EMC characteristics under the conditions specified in this report.

Prepared by : Evonne Liu, **Date:** Feb. 18, 2016

Evonne Liu / Specialist



Approved by : Stanley Wu, **Date:** Feb. 18, 2016

Stanley Wu / Assistant Manager

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. Minimum passing margin is -7.36 dB at 0.17744 MHz. |
| 15.205 / 15.209 / 15.247(d) | Radiated Emissions and Band Edge Measurement | Pass | Meet the requirement of limit. Minimum passing margin is -0.6 dB at 2484 MHz. |
| 15.247(d) | Antenna Port Emission | N/A | Refer to Note |
| 15.247(a)(2) | 6dB bandwidth | N/A | Refer to Note |
| 15.247(b) | Conducted power | N/A | Refer to Note |
| 15.247(e) | Power Spectral Density | N/A | Refer to Note |
| 15.203 | Antenna Requirement | N/A | Refer to Note |

Note: Only test item of Conducted and Radiated Emissions were performed for this report. Other testing data is referring to QuieTex module report (Test Report No.:1540055R-RFUSP01V00, Issue Date: May 13, 2015 / 1570011S-CUSTOM, Issue Date: Jul. 01, 2015).

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

| Measurement | Frequency | Expended Uncertainty (k=2) (±) |
|------------------------------------|-------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.44 dB |
| Radiated Emissions up to 1 GHz | 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 | Tablet Computer |
| Brand | Lenovo |
| Test Model | TP00078A |
| Status of EUT | Production Unit |
| Power Supply Rating | 20.0 Vdc (adapter) 15.2 Vdc (Li-ion battery) |
| Modulation Type | CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM |
| Modulation Technology | DSSS, OFDM |
| Transfer Rate | 802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7 |
| Operating Frequency | 2412 ~ 2462MHz |
| Number of Channel | 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (HT40) |
| Antenna Connector | N/A |
| Accessory Device | Refer to Note as below |
| Data Cable Supplied | Refer to Note as below |

Note:

1. The antenna information is listed as below.

| Antenna Type | Brand Name | Parts Number | Antenna Gain | |
|--------------|-------------------|--|---------------------------|--------------------------|
| | | | 2.4GHz | 5GHz |
| PIFA | Ethertronics Inc. | WLAN Main Antenna: 5002022 WLAN Aux. Antenna: 5002030 | Main: 0.85 Aux.: -0.71 | Main: 0.46 Aux.: 0.36 |

2. The EUT contains following accessory devices.

| Product | Brand | Model | Description |
|-------------|--------|-------------|---|
| Adapter 1 | Lenovo | ADLX45NCC2A | I/P: 100-240Vac, 50-60Hz, 1.3A O/P: 20Vdc, 2.25A |
| Adapter 2 | Lenovo | ADLX45NDC2A | I/P: 100-240Vac, 50-60Hz, 1.3A O/P: 20Vdc, 2.25A |
| Battery | Lenovo | SB10F46465 | 15.2Vdc, 2.895Ah |
| WLAN Module | Intel | 8260NGW | -- |
| WWAN Module | Sierra | EM7455 | -- |

3. The EUT provides 1 completed transmitter and 1 receiver.

| Modulation Mode | TX Function |
|-----------------|-------------|
| 802.11b | 1TX |
| 802.11g | 1TX |
| 802.11n (20MHz) | 1TX |
| 802.11n (40MHz) | 1TX |

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

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 | | |

7 channels are provided for 802.11n (HT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 3 | 2422 | 7 | 2442 |
| 4 | 2427 | 8 | 2447 |
| 5 | 2432 | 9 | 2452 |
| 6 | 2437 | | |

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE≥1G: Radiated Emission above 1 GHz RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

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 | 11 | DSSS | DBPSK | 1.0 |

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) |
|--------------------|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| - | 802.11b | 1 to 11 | 11 | DSSS | DBPSK | 1.0 |

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) |
|--------------------|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| - | 802.11b | 1 to 11 | 11 | DSSS | DBPSK | 1.0 |

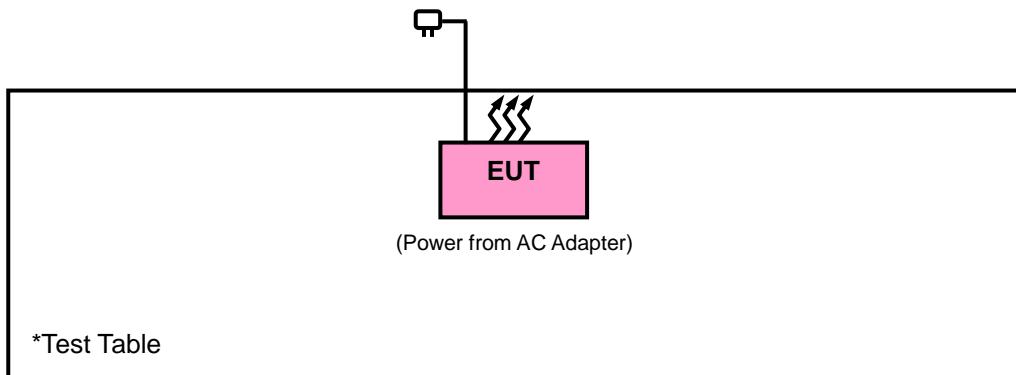
Test Condition:

| Applicable To | Environmental Conditions | Input Power | Tested by |
|---------------|--------------------------|----------------|-----------|
| RE≥1G | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Gavin Wu |
| RE<1G | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Gavin Wu |
| PLC | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Toby Tian |

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r04

662911 D01 Multiple Transmitter Output v02r01

KDB 996369 D01 Module Certification Guide v02

ANSI C63.10-2013

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

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 (dB_uV/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 Agilent | N9038A | MY51210203 | Jan. 21, 2016 | Jan. 20, 2017 |
| Spectrum Analyzer Agilent | N9010A | MY52220314 | Sep. 03, 2015 | Sep. 02, 2016 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSU43 | 101261 | Dec. 17, 2015 | Dec. 16, 2016 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-472 | Feb. 05, 2015 | Feb. 04, 2016 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-969 | Feb. 09, 2015 | Feb. 08, 2016 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | 9170-480 | Feb. 05, 2015 | Feb. 04, 2016 |
| Loop Antenna | EM-6879 | 269 | Jul. 31, 2015 | Jul. 30, 2016 |
| Preamplifier EMCI | EMC 012645 | 980115 | Dec. 21, 2015 | Dec. 20, 2016 |
| Preamplifier EMCI | EMC 184045 | 980116 | Dec. 21, 2015 | Dec. 20, 2016 |
| Preamplifier EMCI | EMC 330H | 980112 | Dec. 28, 2015 | Dec. 27, 2016 |
| Power Meter Anritsu | ML2495A | 1232002 | Sep. 21, 2015 | Sep. 20, 2016 |
| Power Sensor Anritsu | MA2411B | 1207325 | Sep. 21, 2015 | Sep. 20, 2016 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 309219/4 2950114 | Oct. 12, 2015 | Oct. 11, 2016 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 250130/4 | Oct. 12, 2015 | Oct. 11, 2016 |
| RF Coaxial Cable Worken | 8D-FB | Cable-Ch10-01 | Oct. 12, 2015 | Oct. 11, 2016 |
| Software BV ADT | E3 6.120103 | NA | NA | NA |
| Antenna Tower MF | MFA-440H | NA | NA | NA |
| Turn Table MF | MFT-201SS | NA | NA | NA |
| Antenna Tower & Turn Table Controller MF | 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 HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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:

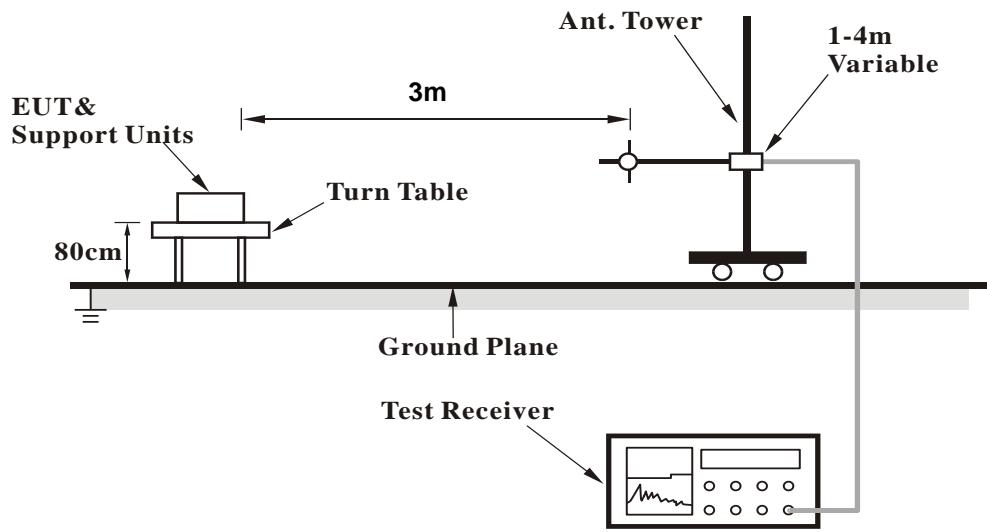
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10 Hz (Duty cycle \geq 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

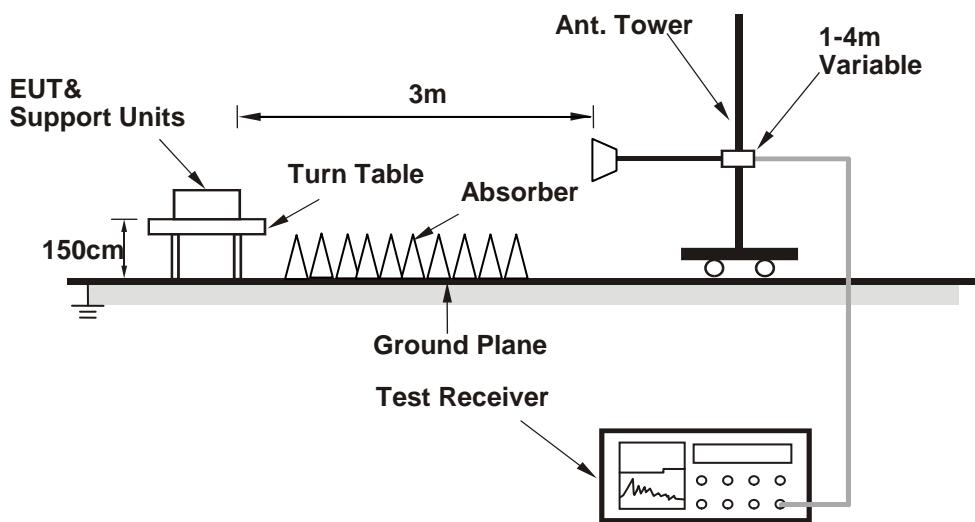
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- 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

| EUT Test Condition | | | Measurement Detail | | | | | | |
|--------------------------|--|--------------------|--------------------|--|-------------------|--|---------------------------|--|--|
| Channel | | Channel 11 | | | Frequency Range | | 1 GHz ~ 25 GHz | | |
| Input Power | | 120 Vac, 60 Hz | | | Detector Function | | Peak (PK) Average (AV) | | |
| Environmental Conditions | | 25 deg. C, 65 % RH | | | Tested By | | Gavin Wu | | |

| Antennal Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|--|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2382 | 40.34 | 46.9 | 54 | -13.66 | 26.86 | 4.08 | 37.5 | 171 | 116 | Average |
| 2382 | 57.22 | 63.78 | 74 | -16.78 | 26.86 | 4.08 | 37.5 | 171 | 116 | Peak |
| 2462 | 105.75 | 111.91 | | | 27.1 | 4.13 | 37.39 | 171 | 116 | Average |
| 2462 | 111.02 | 117.18 | | | 27.1 | 4.13 | 37.39 | 171 | 116 | Peak |
| 2484 | 49.19 | 55.21 | 54 | -4.81 | 27.15 | 4.15 | 37.32 | 171 | 116 | Average |
| 2484 | 73.4 | 79.42 | 74 | -0.6 | 27.15 | 4.15 | 37.32 | 171 | 116 | Peak |
| 4924 | 34.22 | 49.25 | 54 | -19.78 | 31.12 | 6.88 | 53.03 | 100 | 215 | Average |
| 4924 | 45.17 | 60.2 | 74 | -28.83 | 31.12 | 6.88 | 53.03 | 100 | 215 | Peak |
| 7386 | 43.52 | 50.79 | 54 | -10.48 | 36.05 | 8.28 | 51.6 | 100 | 158 | Average |
| 7386 | 50.34 | 57.61 | 74 | -23.66 | 36.05 | 8.28 | 51.6 | 100 | 158 | Peak |
| Antennal Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2384 | 40.3 | 46.86 | 54 | -13.7 | 26.86 | 4.08 | 37.5 | 100 | 286 | Average |
| 2384 | 57.03 | 63.59 | 74 | -16.97 | 26.86 | 4.08 | 37.5 | 100 | 286 | Peak |
| 2462 | 103.14 | 109.3 | | | 27.1 | 4.13 | 37.39 | 100 | 286 | Average |
| 2462 | 108.84 | 115 | | | 27.1 | 4.13 | 37.39 | 100 | 286 | Peak |
| 2484 | 46.69 | 52.71 | 54 | -7.31 | 27.15 | 4.15 | 37.32 | 100 | 286 | Average |
| 2484 | 72.28 | 78.3 | 74 | -1.72 | 27.15 | 4.15 | 37.32 | 100 | 286 | Peak |
| 4924 | 37.32 | 52.35 | 54 | -16.68 | 31.12 | 6.88 | 53.03 | 100 | 131 | Average |
| 4924 | 44.7 | 59.73 | 74 | -29.3 | 31.12 | 6.88 | 53.03 | 100 | 131 | Peak |
| 7386 | 49.6 | 56.87 | 54 | -4.4 | 36.05 | 8.28 | 51.6 | 100 | 262 | Average |
| 7386 | 52.83 | 60.1 | 74 | -21.17 | 36.05 | 8.28 | 51.6 | 100 | 262 | Peak |

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

2. 2462 MHz: 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:
802.11b

| EUT Test Condition | | Measurement Detail | | | | | | | |
|--------------------------|--------------------|--------------------|--|--|--|------------------------------|--|--|--|
| Channel | Channel 11 | Frequency Range | | | | 30 MHz ~ 1 GHz | | | |
| Input Power | 120 Vac, 60 Hz | Detector Function | | | | Peak (PK) Quasi-peak (QP) | | | |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | | | | Gavin Wu | | | |

| Antennal Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|--|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 62.01 | 32.09 | 51 | 40 | -7.91 | 11.71 | 0.83 | 31.45 | 103 | 190 | Peak |
| 192.96 | 39.24 | 59.83 | 43.5 | -4.26 | 9.84 | 1.27 | 31.7 | 117 | 356 | Peak |
| 231.76 | 34.31 | 54.02 | 46 | -11.69 | 10.71 | 1.42 | 31.84 | 106 | 256 | Peak |
| 399.57 | 21.23 | 36.12 | 46 | -24.77 | 15.33 | 1.91 | 32.13 | 104 | 13 | Peak |
| 500.45 | 25.93 | 38.13 | 46 | -20.07 | 17.33 | 2.09 | 31.62 | 137 | 16 | Peak |
| 531.49 | 25.83 | 37.35 | 46 | -20.17 | 18.04 | 2.14 | 31.7 | 137 | 147 | Peak |
| Antennal Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 62.01 | 33.36 | 52.27 | 40 | -6.64 | 11.71 | 0.83 | 31.45 | 113 | 87 | Peak |
| 128.94 | 26.09 | 45.22 | 43.5 | -17.41 | 11.61 | 1.14 | 31.88 | 121 | 159 | Peak |
| 191.99 | 30.69 | 51.2 | 43.5 | -12.81 | 9.91 | 1.27 | 31.69 | 127 | 187 | Peak |
| 260.86 | 29.18 | 47.74 | 46 | -16.82 | 11.79 | 1.52 | 31.87 | 108 | 287 | Peak |
| 531.49 | 23.73 | 35.25 | 46 | -22.27 | 18.04 | 2.14 | 31.7 | 139 | 80 | Peak |
| 567.38 | 23.45 | 34.46 | 46 | -22.55 | 18.86 | 2.2 | 32.07 | 132 | 310 | Peak |

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

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 ROHDE & SCHWARZ | ESCI | 100613 | Nov. 16, 2015 | Nov. 15, 2016 |
| RF signal cable (with 10dB PAD) Woken | 5D-FB | Cable-cond1-01 | Dec. 26, 2015 | Dec. 25, 2016 |
| LISN ROHDE & SCHWARZ (EUT) | ESH3-Z5 | 835239/001 | Feb. 26, 2015 | Feb. 25, 2016 |
| LISN ROHDE & SCHWARZ (Peripheral) | ESH3-Z5 | 100311 | Jul. 24, 2015 | Jul. 23, 2016 |
| Software ADT | BV ADT_Cond_V7.3.7.3 | 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-2040.

4.2.3 Test Procedures

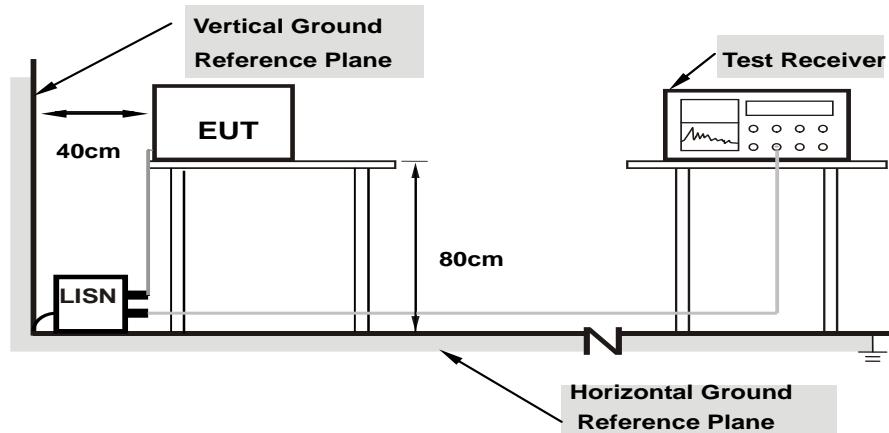
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance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

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

4.2.6 EUT Operating Conditions

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

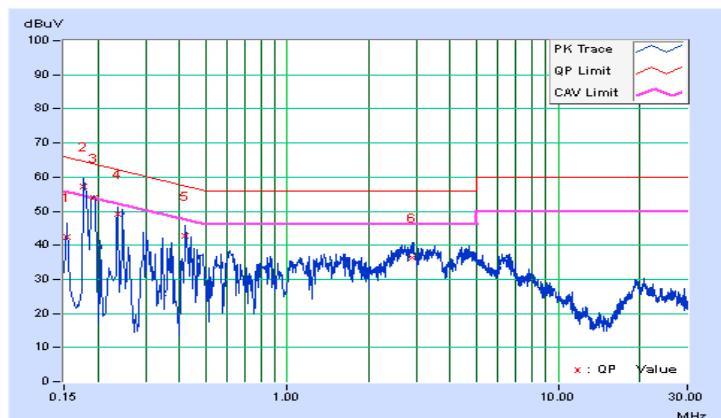
4.2.7 Test Results

| | | | |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 65%RH |
| Tested by | Toby Tian | Test Date | 2016/2/2 |

| 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 | 0.15391 | 10.02 | 32.42 | 23.48 | 42.44 | 33.50 | 65.79 | 55.79 | -23.34 | -22.28 |
| 2 | 0.17744 | 10.07 | 47.17 | 31.21 | 57.24 | 41.28 | 64.60 | 54.60 | -7.36 | -13.32 |
| 3 | 0.19255 | 10.10 | 43.61 | 25.68 | 53.71 | 35.78 | 63.93 | 53.93 | -10.21 | -18.14 |
| 4 | 0.23602 | 10.12 | 39.01 | 21.78 | 49.13 | 31.90 | 62.24 | 52.24 | -13.10 | -20.33 |
| 5 | 0.41979 | 10.14 | 32.51 | 19.42 | 42.65 | 29.56 | 57.45 | 47.45 | -14.81 | -17.90 |
| 6 | 2.87918 | 10.34 | 26.11 | 16.28 | 36.45 | 26.62 | 56.00 | 46.00 | -19.55 | -19.38 |

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

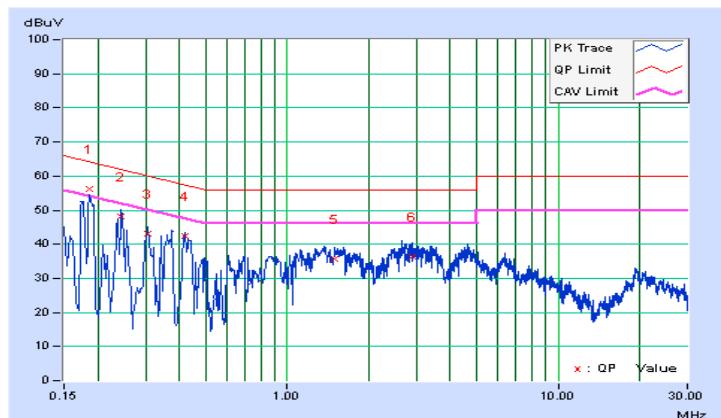


| | | | |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 65%RH |
| Tested by | Toby Tian | Test Date | 2016/2/2 |

| 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 | 0.18519 | 10.03 | 46.04 | 32.72 | 56.07 | 42.75 | 64.25 | 54.25 | -8.18 | -11.50 |
| 2 | 0.24407 | 10.06 | 38.18 | 25.25 | 48.24 | 35.31 | 61.96 | 51.96 | -13.71 | -16.64 |
| 3 | 0.30640 | 10.10 | 32.91 | 20.40 | 43.01 | 30.50 | 60.07 | 50.07 | -17.06 | -19.57 |
| 4 | 0.41979 | 10.15 | 32.39 | 21.02 | 42.54 | 31.17 | 57.45 | 47.45 | -14.91 | -16.28 |
| 5 | 1.49504 | 10.25 | 25.36 | 12.92 | 35.61 | 23.17 | 56.00 | 46.00 | -20.39 | -22.83 |
| 6 | 2.91437 | 10.36 | 26.04 | 16.23 | 36.40 | 26.59 | 56.00 | 46.00 | -19.60 | -19.41 |

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



5 Pictures of Test Arrangements

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

Appendix – Information on 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 accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

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

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