

FCC Certification Test Report

Report No.: FC170615E08-1

Test Model: P-R0002

Received Date: June 15, 2017

Test Date: June 21 to 22, 2017

Issued Date: June 30, 2017

Applicant: LOGITECH FAR EAST LTD.

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

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Taiwan R.O.C.

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Release Control Record

| Issue No. | Description | Date Issued |
|---------------|-------------------|---------------|
| FC170615E08-1 | Original release. | June 30, 2017 |



1 Certificate of Conformity

Product: Charging Coin Adapter

Brand: Logitech

Test Model: P-R0002

Sample Status: ENGINEERING SAMPLE

Applicant: LOGITECH FAR EAST LTD.

Test Date: June 21 to 22, 2017

Standards: FCC Part 18, Subpart C
FCC/OST MP-5: 1986

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 : Cindy Hsin , **Date:** June 30, 2017
Cindy Hsin / Specialist

Approved by : Ken Lu , **Date:** June 30, 2017
Ken Lu / Manager

2 Summary of Test Results

| Standard | Test Type | Result | Remarks |
|------------------------|----------------------------|--------|---|
| FCC Part 18, Subpart C | Field Strength Measurement | PASS | Minimum passing margin is -4.40 dB at 13.5604 MHz |

Note:

1. There is no deviation to the applied test methods and requirements covered by the scope of this report.

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Measurement | Frequency | Expanded Uncertainty (k=2) (\pm) |
|------------------------------------|----------------|--------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 1.84 dB |
| Radiated Emissions up to 1 GHz | 30MHz ~ 1GHz | 5.31 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 6GHz | 5.12 dB |
| | 6GHz ~ 18GHz | 4.80 dB |
| | 18GHz ~ 40GHz | 5.52 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Features of EUT

The tests reported herein were performed according to the method specified by LOGITECH FAR EAST LTD., for detailed feature description, please refer to the manufacturer's specifications or user's manual.

3.2 General Description of EUT

| | |
|---------------------|--------------------------|
| Product | Charging Coin Adapter |
| Brand | Logitech |
| Test Model | P-R0001 |
| Sample Status | ENGINEERING SAMPLE |
| Operating Software | NA |
| Power Supply Rating | DC 5V from USB interface |
| Accessory Device | NA |
| Data Cable Supplied | NA |

Note:

1. The EUT may have a lot of colors for marketing requirement.

| Brand | Model | Antenna Gain (dBi) | Frequency range(MHz) | Antenna Type | Connector Type | Cable Length |
|-------|-------|--------------------|----------------------|--------------|----------------|--------------|
| NA | NA | 1.6 | NA | Loop antenna | NA | NA |

2. 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.

3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode

Test mode is presented in the report as below.

| Mode | Test Condition |
|------|------------------|
| 1 | Normal Operation |

3.4 Test Program Used and Operation Descriptions

1. Turn on the power of all equipment.
2. The EUT links support unit E (Charging Coin Adapter) via BLE.
3. The EUT supplies power to the support unit E (Charging Coin Adapter) via wireless.
4. The EUT links support unit D (Mouse) via GSKF.
5. Support unit A (Laptop) runs "EMC test.exe" then sends "H" messages to itself.

3.5 Primary Clock Frequencies of Internal Source

The EUT is provided by LOGITECH FAR EAST LTD., for detailed internal source, please refer to the manufacturer's specifications.

3.6 Miscellaneous

Labelling Requirements for Part 18 Devices:

➤ Verification

The specific labelling requirements for a device subject to the Verification procedure are contained in Section 15.19(a). These labelling requirements are:

If the device is subject only to Verification, include a label bearing a unique identifier (Section 2.954) and one of three compliance statements specified in Section 15.19(a). If the labeling area for the device is so small, and/or it is not practical to place the compliance statement on the device, then the statement can be placed in the user manual or product packaging (Section 15.19(a)(5)). However, the device must still be labelled with the unique identifier (Verification). Generally, devices smaller than the palm of the hand are considered too small for the compliance statement.

➤ Certification

If the device is subject to Certification: (1) Section 2.925 contains information on identification of the equipment; (2) include a label bearing an FCC Identifier (FCC ID) (Section 2.926) and (3) include the appropriate compliance statement in Section 15.19(a). If the device is considered too small and therefore it is impractical (smaller than the palm of the hand) to display the compliance statement, then the statement may be placed in the user manual or product packaging. However, the device must still be labelled with the FCC ID. If the device is unquestionably too small for the FCC ID to be readable (smaller than 4-6 points), the FCC ID may be placed in the user manual. However, it must be determined that the device itself is too small – the label area allocated to the FCC ID may not be reduced because of over crowded identification of other product and regulatory information.

An electronic display of the FCC ID (see 9. Electronic Labelling below) may be used for Certification of Section 15.212 modular transmitters and software defined radios (Section 2.944).

➤ Declaration of Conformity (DoC):

The labelling requirements for a device subject to the DoC procedure are specified in Section 15.19(b). The label should include the FCC logo along with the Trade Name and Model Number, which satisfies the unique identifier requirement of Section 2.1074 if it represents the identical equipment tested for DoC compliance. For personal computers assembled from authorized components, the following additional text must also be included: “Assembled from tested components,” “Complete system not tested.” When the device is so small and/or when it is not practical to place the required additional text on the device, the text may be placed in the user manual or pamphlet supplied to the user. However, the FCC logo, Trade Name, and Model Number must still be displayed on the device (Section 15.19(b)(3)).



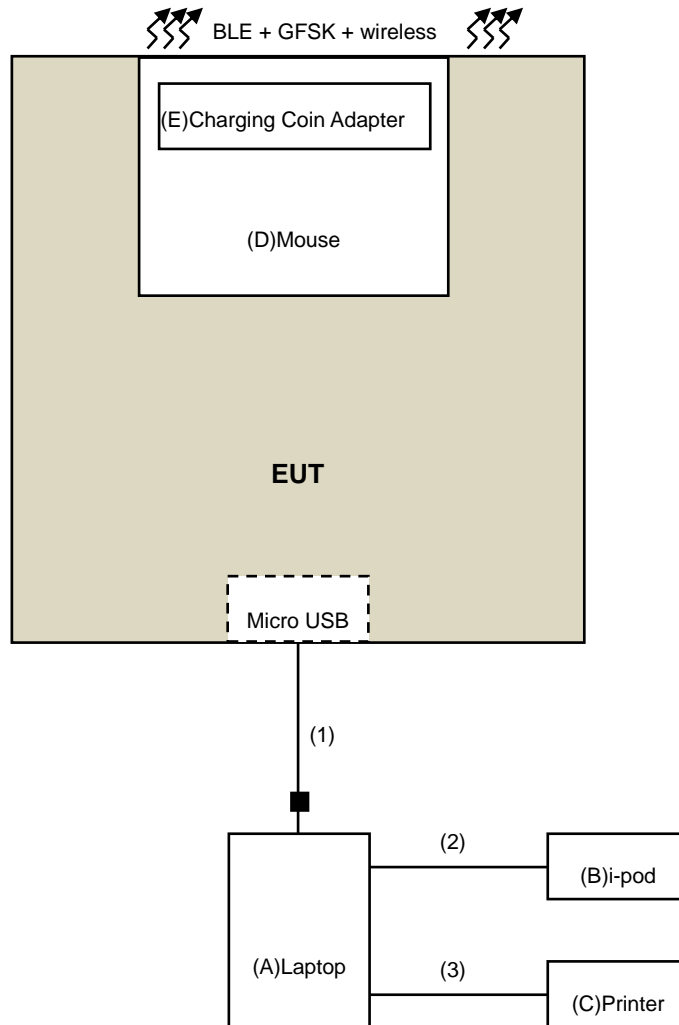
Part 15 Declaration of Conformity (DoC) Label Examples

Equipment certified as software defined radio may use a means that readily displays the FCC ID on an electronic display screen, instead of labelling the device (Section 2.925 (e)).

Further information may refer to FCC KDB:784748 D01 Labelling Part 15 &18 Guidelines

* Insert either “A” or “B” but not both to identify the applicable Class of ITE.

4 Connection Diagram of EUT and Peripheral Devices



4.1 Configuration of Peripheral Devices and Cable Connections

| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|-----------|----------|-----------|--------------|---------|--------------------|
| A | Laptop | DELL | E6230 | NA | NA | Supplied by client |
| B | i-pod | Apple | MC749TA/A | CC4DMFJUDFDM | NA | Provided by Lab |
| C | Printer | EPSON | LQ-300+II | G88Y074083 | FCC DoC | Provided by Lab |
| D | Mouse | Logitech | G703 | NA | NA | Supplied by client |
| E | Mouse Pad | Logitech | P-R0002 | NA | NA | Supplied by client |

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

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|------------------------|------|------------|--------------------|--------------|--------------------|
| 1 | USB to Micro USB Cable | 1 | 1.8 | Yes | 1 | Supplied by client |
| 2 | USB Cable | 1 | 1.8 | Yes | 0 | Provided by Lab |
| 3 | USB Cable | 1 | 0.1 | Yes | 0 | Provided by Lab |

Note: The cores is originally attached to the cables.

5 Field Strength

5.1 Limits

| ANY TYPE UNLESS OTHERWISE SPECIFIED(MISCELLANEOUS) | | | |
|--|-------------------|---------------------|---------------------|
| Frequency (MHz) | at 300 meters | at 10 meters | at 3 meters |
| | Quasi-Peak (uV/m) | Quasi-Peak (dBuV/m) | Quasi-Peak (dBuV/m) |
| Any ISM frequency | 25 | 57.50 | 67.95 |
| Any Non- ISM frequency | 15 | 53.06 | 63.52 |

| Frequency band in which device operates (MHz) | Range of frequency measurements | |
|---|--|---|
| | Lowest frequency | Highest frequency |
| Below 1.705 | Lowest frequency generated in the device, but not lower than 9 kHz. | 30 MHz |
| 1.705 to 30 | Lowest frequency generated in the device, but not lower than 9 kHz. | 400 MHz |
| 30 to 500 | Lowest frequency generated in the device or 25 MHz, whichever is lower. | Tenth harmonic or 1,000 MHz, whichever is higher. |
| 500 to 1,000 | Lowest frequency generated in the device or 100 MHz, whichever is lower. | Tenth harmonic. |
| Above 1,000 | do | Tenth harmonic or highest detectable emission. |

5.2 Test Instruments (below 30MHz)

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---------------------------------------|--------------------------|----------------------------|------------------------|-------------------------|
| Test Receiver Agilent | N9038A | MY51210105 | July 06, 2016 | July 05, 2017 |
| *Pre-Amplifier EMCI | EMC001340 | 980142 | Jan. 20, 2016 | Jan. 19, 2018 |
| *Loop Antenna Electro-Metrics | EM-6879 | 264 | Dec. 16, 2016 | Dec. 15, 2018 |
| RF Cable | 5D-FB | LOOPCAB-001 LOOPCAB-002 | Jan. 17, 2017 | Jan. 16, 2018 |
| Software BVADT | ADT_Radiated_ V8.7.08 | NA | NA | NA |
| Antenna Tower & Turn Table CT | NA | NA | NA | NA |

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. Tested Date: June 22, 2017

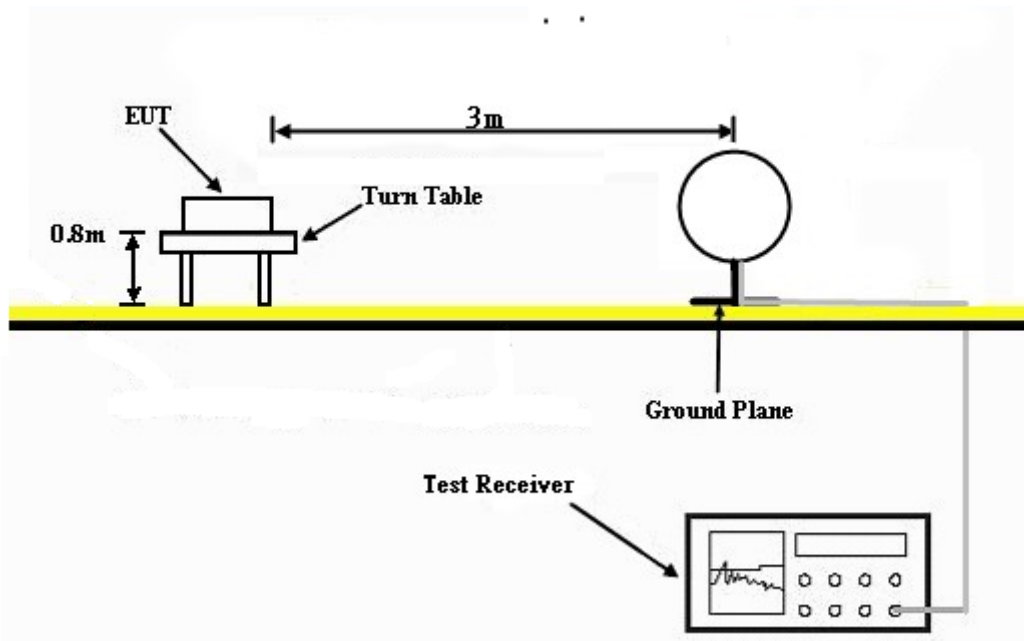
5.3 Test Arrangement

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility.
- The loop antenna is placed at a height of 1.0 m (center of loop) at a set distance of 3 m from the periphery of the EUT.
- Emission readings in frequency range of 0.15 MHz to 30 MHz are measured using a Quasi-Peak detector.
- During the compliance scan, a number of variables should be altered in combination in order to maximize the emission for each frequency.

The variables are:

- EUT Azimuth. This is varied by rotating the turntable a full 360° for each frequency of interest.
- Antenna Azimuth. Position the loop antenna vertically in all azimuths, record the maximum readings obtained.

Note1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz for quasi-peak detection (QP) at frequency up to 30MHz.



Note2: KDB 414788 OATS and Chamber Correlation Justification

-Based on FCC 15.31(f)(2) : measurements may be performed at a distance closer than that specified in the regulations; however, an attempts should be made to avoid making measurements in the near field.

-OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

5.4 Test Results

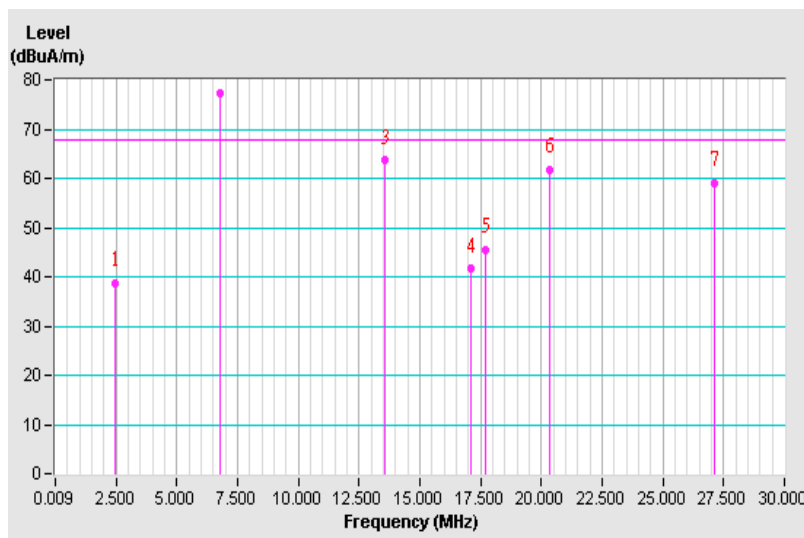
| | | | |
|-----------------|--------------------------|--|--|
| Frequency Range | 9kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 200Hz; Quasi-Peak (QP), 9kHz |
| Input Power | DC 5V from USB interface | Environmental Conditions | 25°C, 60%RH |
| Tested by | Mike Hsieh | | |
| Test Mode | Mode 1 | | |

| 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 | 2.4413 | 38.80 QP | 68.00 | -29.20 | 1.00 H | 234 | 40.90 | -2.10 |
| 2* | 6.7795 | 77.30 QP | NA | NA | 1.00 H | 304 | 80.50 | -3.20 |
| 3 | 13.5604 | 63.60 QP | 68.00 | -4.40 | 1.00 H | 360 | 67.30 | -3.70 |
| 4 | 17.0844 | 41.60 QP | 68.00 | -26.40 | 1.00 H | 297 | 45.80 | -4.20 |
| 5 | 17.6947 | 45.50 QP | 68.00 | -22.50 | 1.00 H | 204 | 49.80 | -4.30 |
| 6 | 20.3399 | 61.70 QP | 68.00 | -6.30 | 1.00 H | 360 | 66.20 | -4.50 |
| 7 | 27.1209 | 58.90 QP | 68.00 | -9.10 | 1.00 H | 360 | 61.90 | -3.00 |

*: The test No.2 has no limit in ISM band.

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value
5. The test point 2 is main power and it has no limit in this ISM band.



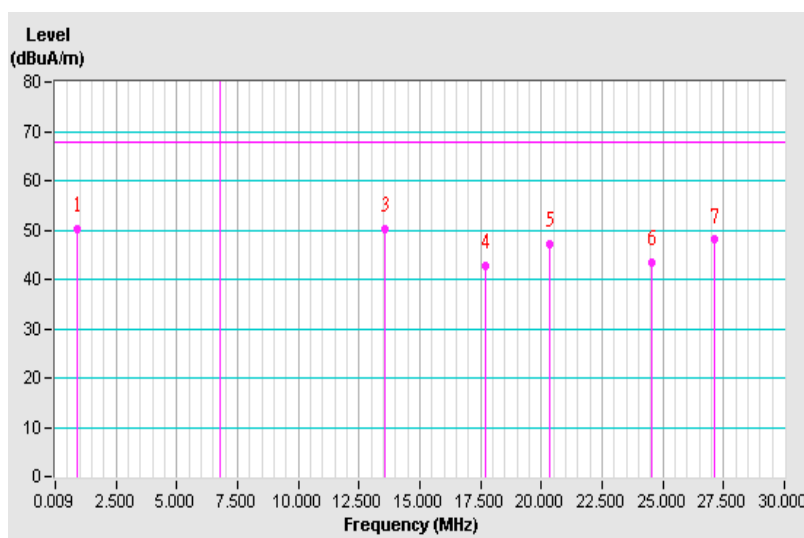
| | | | |
|-----------------|--------------------------|--|--|
| Frequency Range | 9kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 200Hz; Quasi-Peak (QP), 9kHz |
| Input Power | DC 5V from USB interface | Environmental Conditions | 25°C, 60%RH |
| Tested by | Mike Hsieh | | |
| Test Mode | Mode 1 | | |

| 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 | 0.9207 | 50.20 QP | 68.00 | -17.80 | 1.00 V | 16 | 49.00 | 1.20 |
| 2* | 6.7795 | 82.90 QP | NA | NA | 1.00 V | 63 | 86.10 | -3.20 |
| 3 | 13.5604 | 50.20 QP | 68.00 | -17.80 | 1.00 V | 330 | 53.90 | -3.70 |
| 4 | 17.6947 | 42.70 QP | 68.00 | -25.30 | 1.00 V | 253 | 47.00 | -4.30 |
| 5 | 20.3399 | 47.10 QP | 68.00 | -20.90 | 1.00 V | 319 | 51.60 | -4.50 |
| 6 | 24.5326 | 43.60 QP | 68.00 | -24.40 | 1.00 V | 117 | 47.20 | -3.60 |
| 7 | 27.1209 | 48.00 QP | 68.00 | -20.00 | 1.00 V | 326 | 51.00 | -3.00 |

*: The test No.2 has no limit in ISM band.

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value
5. The test point 2 is main power and it has no limit in this ISM band.



5.5 Test Instruments (30MHz ~ 1000MHz)

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|--|--------------------------|--------------|-----------------|------------------|
| Test Receiver Agilent | N9038A | MY51210105 | July 06, 2016 | July 05, 2017 |
| Pre-Amplifier Mini-Circuits | ZFL-1000VH2B | AMP-ZFL-03 | Nov. 10, 2016 | Nov. 09, 2017 |
| Trilog Broadband Antenna SCHWARZBECK | VULB 9168 | 9168-360 | Dec. 13, 2016 | Dec. 12, 2017 |
| Fixed attenuator Mini-Circuits | UNAT-5+ | PAD-CHG-01 | Oct. 05, 2016 | Oct. 04, 2017 |
| RF Cable | 8D-FB | CHGCAB-001-1 | Oct. 02, 2016 | Oct. 01, 2017 |
| | | CHGCAB-001-2 | Oct. 02, 2016 | Oct. 01, 2017 |
| | RF-141 | CHGCAB-004 | Oct. 02, 2016 | Oct. 01, 2017 |
| Software BVADT | ADT_Radiated _V8.7.08 | NA | NA | NA |
| Antenna Tower & Turn Table CT | NA | NA | NA | NA |

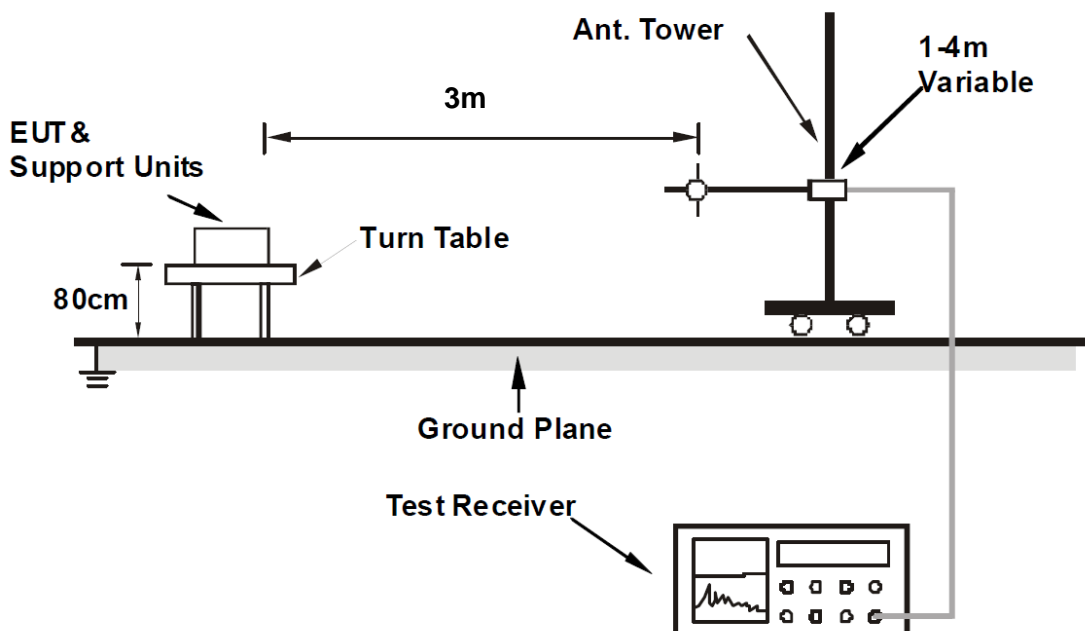
Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. Tested Date: June 21, 2017

5.6 Test Arrangement (30MHz ~ 1000MHz)

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna is a broadband antenna, and its height 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.
- 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.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is up to 1 GHz.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

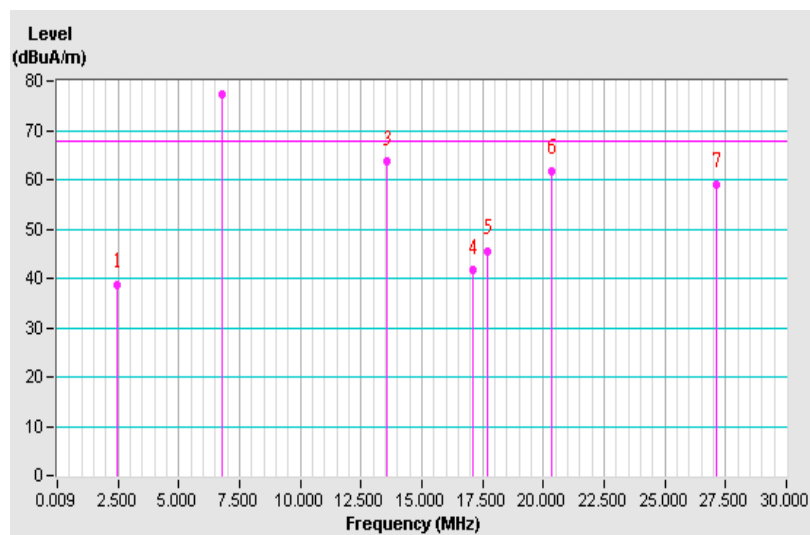
5.7 Test Results

| | | | |
|-----------------|--------------------------|--|--|
| Frequency Range | 9kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 200Hz; Quasi-Peak (QP), 9kHz |
| Input Power | DC 5V from USB interface | Environmental Conditions | 25°C, 60%RH |
| Tested by | Mike Hsieh | | |
| Test Mode | Mode 1 | | |

| 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 | 2.4413 | 38.80 QP | 68.00 | -29.20 | 1.00 H | 234 | 40.90 | -2.10 |
| 2 | 6.7795 | 77.30 QP | 68.00 | 9.30 | 1.00 H | 304 | 80.50 | -3.20 |
| 3 | 13.5604 | 63.60 QP | 68.00 | -4.40 | 1.00 H | 360 | 67.30 | -3.70 |
| 4 | 17.0844 | 41.60 QP | 68.00 | -26.40 | 1.00 H | 297 | 45.80 | -4.20 |
| 5 | 17.6947 | 45.50 QP | 68.00 | -22.50 | 1.00 H | 204 | 49.80 | -4.30 |
| 6 | 20.3399 | 61.70 QP | 68.00 | -6.30 | 1.00 H | 360 | 66.20 | -4.50 |
| 7 | 27.1209 | 58.90 QP | 68.00 | -9.10 | 1.00 H | 360 | 61.90 | -3.00 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



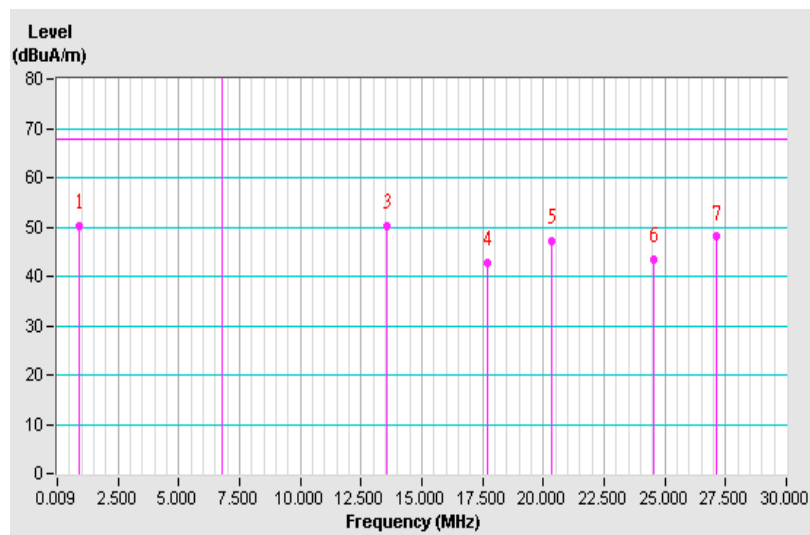
| | | | |
|-----------------|--------------------------|--|--|
| Frequency Range | 9kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 200Hz; Quasi-Peak (QP), 9kHz |
| Input Power | DC 5V from USB interface | Environmental Conditions | 25°C, 60%RH |
| Tested by | Mike Hsieh | | |
| Test Mode | Mode 1 | | |

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 | 0.9207 | 50.20 QP | 68.00 | -17.80 | 1.00 V | 16 | 49.00 | 1.20 |
| 2 | 6.7795 | 82.90 QP | 68.00 | 14.90 | 1.00 V | 63 | 86.10 | -3.20 |
| 3 | 13.5604 | 50.20 QP | 68.00 | -17.80 | 1.00 V | 330 | 53.90 | -3.70 |
| 4 | 17.6947 | 42.70 QP | 68.00 | -25.30 | 1.00 V | 253 | 47.00 | -4.30 |
| 5 | 20.3399 | 47.10 QP | 68.00 | -20.90 | 1.00 V | 319 | 51.60 | -4.50 |
| 6 | 24.5326 | 43.60 QP | 68.00 | -24.40 | 1.00 V | 117 | 47.20 | -3.60 |
| 7 | 27.1209 | 48.00 QP | 68.00 | -20.00 | 1.00 V | 326 | 51.00 | -3.00 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



5.8 Test Instruments (above 1000MHz)

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------------|--------------------------|----------------------------|-----------------|------------------|
| Test Receiver Agilent | N9038A | MY51210105 | July 06, 2016 | July 05, 2017 |
| Horn_Antenna FT-RF | HA-07M18G-NF | 0000320091110 | Dec. 15, 2016 | Dec. 14, 2017 |
| Pre-Amplifier Agilent | 8449B | 3008A02578 | June 19, 2017 | June 18, 2018 |
| RF Cable | 104 RF cable | 150406 131217 131205 | Jan. 14, 2017 | Jan. 13, 2018 |
| Spectrum Analyzer Agilent | E4446A | MY48250253 | Nov. 23, 2016 | Nov. 22, 2017 |
| Pre-Amplifier SPACEK LABS | SLKKa-48-6 | 9K16 | Dec. 10, 2016 | Dec. 09, 2017 |
| Horn Antenna SCHWARZBECK | BBHA 9170 | 9170-424 | Dec. 15, 2016 | Dec. 14, 2017 |
| RF Cable | SUCOFLEX 102 | 36442/2 36434/2 | Dec. 09, 2016 | Dec.08, 2017 |
| Software BVADT | ADT_Radiated_ V8.7.08 | NA | NA | NA |
| Antenna Tower & Turn Table CT | NA | NA | NA | NA |

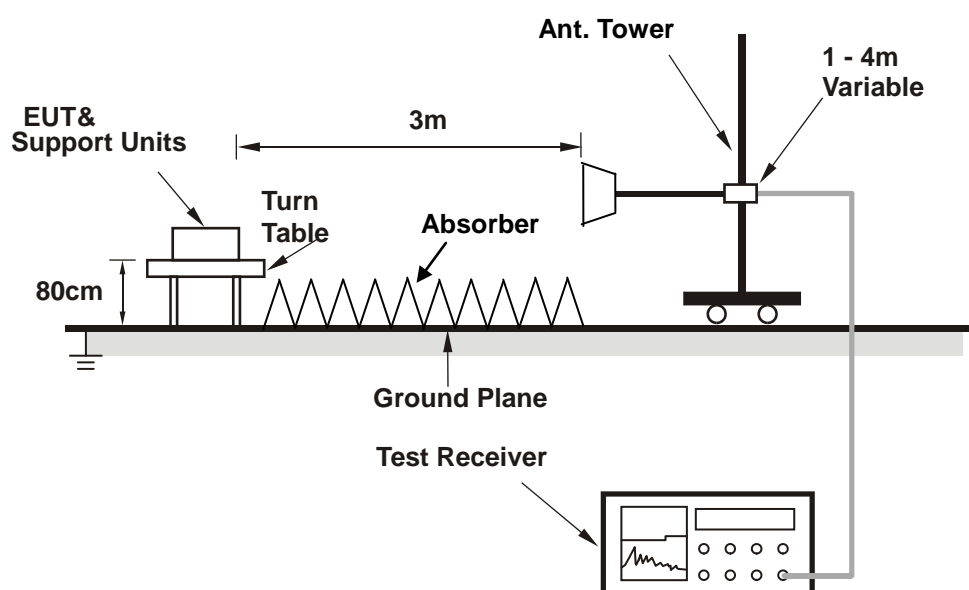
Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. Tested Date: June 21, 2017

5.9 Test Arrangement (above 100MHz)

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The spectrum analyzer system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection (PK) at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.



The test arrangement is in accordance with ANSI 63.4:2014. For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.10 Supplementary Information

There is not any deviation from the test standards for the test method.

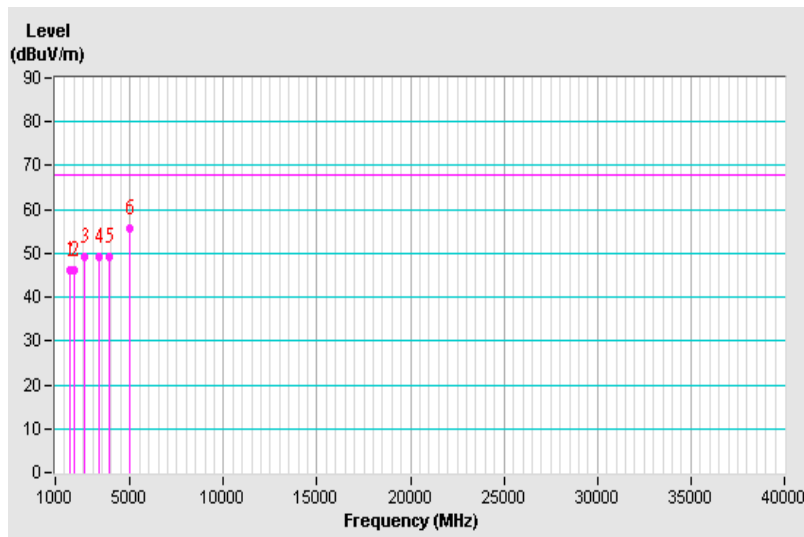
5.11 Test Results

| | | | |
|-----------------|---------------------|--|--------------------------------|
| Frequency Range | 1GHz ~ 40GHz | Detector Function & Resolution Bandwidth | Peak (PK) / Average (AV), 1MHz |
| Input Power | DC 5V from Wireless | Environmental Conditions | 23°C, 73%RH |
| Tested by | Jason Huang | | |
| Test Mode | Mode 1 | | |

| 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 | 1761.2200 | 45.99 PK | 68.00 | -22.01 | 1.00 H | 323 | 46.58 | -0.59 |
| 2 | 1995.7100 | 46.12 PK | 68.00 | -21.88 | 1.00 H | 125 | 45.61 | 0.51 |
| 3 | 2568.0000 | 49.27 PK | 68.00 | -18.73 | 1.00 H | 355 | 45.86 | 3.41 |
| 4 | 3334.1200 | 49.34 PK | 68.00 | -18.66 | 1.00 H | 149 | 44.01 | 5.33 |
| 5 | 3891.7700 | 49.15 PK | 68.00 | -18.85 | 1.00 H | 45 | 41.88 | 7.27 |
| 6 | 4987.5400 | 55.67 PK | 68.00 | -12.33 | 1.00 H | 121 | 44.52 | 11.15 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



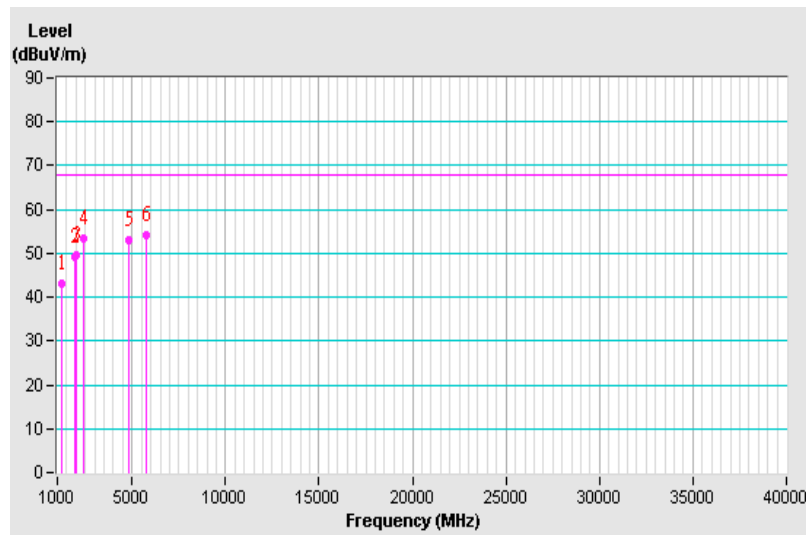
| | | | |
|-----------------|---------------------|--|--------------------------------|
| Frequency Range | 1GHz ~ 40GHz | Detector Function & Resolution Bandwidth | Peak (PK) / Average (AV), 1MHz |
| Input Power | DC 5V from Wireless | Environmental Conditions | 23°C, 73%RH |
| Tested by | Jason Huang | | |
| Test Mode | Mode 1 | | |

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 | 1234.1100 | 42.99 PK | 68.00 | -25.01 | 1.00 V | 15 | 46.69 | -3.70 |
| 2 | 1944.2800 | 49.34 PK | 68.00 | -18.66 | 1.00 V | 172 | 49.05 | 0.29 |
| 3 | 1992.6200 | 49.54 PK | 68.00 | -18.46 | 1.00 V | 152 | 49.05 | 0.49 |
| 4 | 2405.9100 | 53.30 PK | 68.00 | -14.70 | 1.00 V | 79 | 50.40 | 2.90 |
| 5 | 4804.1200 | 53.11 PK | 68.00 | -14.89 | 1.00 V | 48 | 42.50 | 10.61 |
| 6 | 5721.0500 | 54.27 PK | 68.00 | -13.73 | 1.00 V | 166 | 40.88 | 13.39 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



6 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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Fax: 886-2-26051924

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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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