

### **FCC CERTIFICATION TEST REPORT**

**REPORT NO.:** FC121011C12

MODEL NO .: LOLA-R

FCC ID: FSUKT002

**RECEIVED:** Oct. 11, 2012

**TESTED:** Oct. 16, 2012

**ISSUED:** Oct. 18, 2012

**APPLICANT: KYE SYSTEMS CORP.** 

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**ISSUED BY:** Bureau Veritas Consumer Products Services

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#### **RELEASE CONTROL RECORD**

| ISSUE NO.   | REASON FOR CHANGE | DATE ISSUED   |
|-------------|-------------------|---------------|
| FC121011C12 | Original release. | Oct. 18, 2012 |

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#### 1 CERTIFICATION

**PRODUCT:** Dongle BRAND: hp

**MODEL NO.:** LOLA-R

**APPLICANT: KYE SYSTEMS CORP.** 

**TESTED:** Oct. 16, 2012

**TEST SAMPLE: ENGINEERING SAMPLE** 

STANDARD: FCC Part 15, Subpart B, Class B

ICES-003:2012, Class B

ANSI C63.4-2009

The above equipment (Model: LOLA-R) 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.

APPROVED BY: \_\_\_\_\_\_, DATE: \_\_\_\_\_\_, DCt. 18, 2012



#### **2 SUMMARY OF TEST RESULTS**

The EUT has been tested according to the following specifications.

| Standard                           | Test Type                            | Result | Remarks  |
|------------------------------------|--------------------------------------|--------|--|
| FCC Part 15,<br>Subpart B, Class B | Conducted emission test              | PASS   | Meet the requirement of limit.<br>Minimum passing margin is<br>-10.45dB at 0.86944MHz. |
| ICES-003:2012,<br>Class B          | Radiated emission test (30MHz~18GHz) | PASS   | Meet the requirement of limit.  Minimum passing margin is -13.14dB at 53.33MHz.        |

#### 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      | Uncertainty |  |
|------------------------|----------------|-------------|--|
| Conducted emission     | 150kHz ~ 30MHz | 2.44 dB     |  |
| De dieta di ancienione | 30MHz ~ 1GHz   | 4.12 dB     |  |
| Radiated emission      | Above 1GHz     | 2.26 dB     |  |

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.



#### **3 GENERAL INFORMATION**

#### 3.1 GENERAL DESCRIPTION OF EUT

| PRODUCT          | Dongle                     |
|------------------|----------------------------|
| MODEL NO.        | LOLA-R                     |
| POWER SUPPLY     | 5Vdc (from host equipment) |
| DATA CABLE       | NA                         |
| ACCESSORY DEVICE | NA                         |

#### NOTE:

- 1. The EUT's highest working frequency is 2.48GHz.
- 2. The above EUT information is declared by manufacturer and for more detailed feature description, please refer to the manufacturer's specifications or user's manual.

#### 3.2 DESCRIPTION OF TEST MODES

The EUT consumes power from Notebook, which designed with AC power supply of 100-240V, 50/60Hz. For radiated emission evaluation, 230Vac/50Hz (for EN 55022), 120V/60Hz (for FCC Part 15), 100Vac/50Hz (for VCCI) & 110Vac/60Hz (for CNS 13438) had been covered during the pre-test. The worst radiated emission 30MHz~1GHz data was found at 110V/60Hz and recorded in the applied test report.



#### 3.3 DESCRIPTION OF SUPPORT UNITS

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

| NO. | PRODUCT                    | BRAND | MODEL NO.    | SERIAL NO.                   | FCC ID           |
|-----|----------------------------|-------|--------------|------------------------------|------------------|
| 1   | PC                         | DELL  | optiplex 390 | 1H64YBX                      | FCC DoC Approved |
| 2   | 24" LCD Monitor            | DELL  | U2410        | CN082WXD-72872-0<br>CR-02HL  | QDS-BRCM1019     |
| 3   | External USB 1.1<br>Floppy | SONY  | MPF82E       | 50010133                     | NA               |
| 4   | Printer                    | EPSON | T22          | MEEZ070220                   | FCC DoC Approved |
| 5   | Keyboard                   | DELL  | KB212-B      | CN-05V23T-71581-2<br>98-00ZG | FCC DoC Approved |
| 6   | Mouse                      | DELL  | MS-111T      | CN-0KW2YH-71616-<br>28H-0L30 | FCC DoC Approved |
| 7   | TrackPad                   | hp    | ATOLL        | NA                           | FSUKT001         |

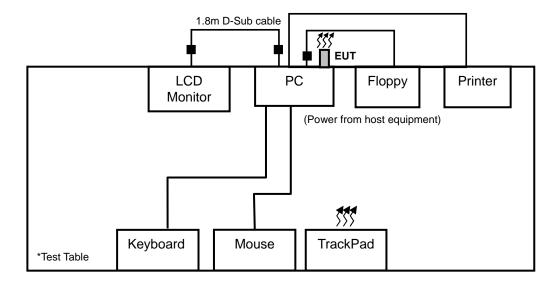
| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |  |  |  |  |  |  |
|-----|---|--|--|--|--|--|--|
| 1   | NA  |  |  |  |  |  |  |
| 2   | 1.8m shielded D-Sub cable with two cores.           |  |  |  |  |  |  |
| 3   | 0.5m shielded USB cable with one core.              |  |  |  |  |  |  |
| 4   | 1.5m non-shielded USB cable                         |  |  |  |  |  |  |
| 5   | 1.8m non-shielded USB cable                         |  |  |  |  |  |  |
| 6   | 1.8m non-shielded USB cable                         |  |  |  |  |  |  |
| 7   | NA  |  |  |  |  |  |  |

#### NOTE:

- 1. All power cords of the above support units are non shielded (1.8m).
- 2. Item 7 was provided by client.



#### 3.4 CONFIGURATION OF SYSTEM UNDER TEST





#### **4 EMISSION TEST**

#### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107) ICES-003:2012 Issue 5 (section: 6.1)

| Eroguepov (MHz) | Class A    | (dBuV)  | Class B (dBuV) |         |  |
|-----------------|------------|---------|----------------|---------|--|
| Frequency (MHz) | Quasi-peak | Average | Quasi-peak     | Average |  |
| 0.15-0.5        | 79         | 66      | 66-56          | 56-46   |  |
| 0.5-5           | 73         | 60      | 56             | 46      |  |
| 5-30            | 73         | 60      | 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.
- 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER              | MODEL NO.                | SERIAL NO.     | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |  |
|---|--------------------------|----------------|---------------------|-------------------------|--|
| Test Receiver<br>ROHDE & SCHWARZ        | ESCS30                   | 100291         | Nov. 23, 2011       | Nov. 22, 2012           |  |
| RF signal cable<br>Woken                | 5D-FB                    | Cable-HYC01-01 | Dec. 29, 2011       | Dec. 28, 2012           |  |
| LISN<br>ROHDE & SCHWARZ<br>(Peripheral) | ESH3-Z5                  | 100312         | Jul. 02, 2012       | Jul. 01, 2013           |  |
| LISN<br>ROHDE & SCHWARZ<br>(EUT)        | ESH3-Z5                  | 835239/001     | Feb. 07, 2012       | Feb. 06, 2013           |  |
| Software<br>ADT                         | BV ADT_Cond_<br>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.



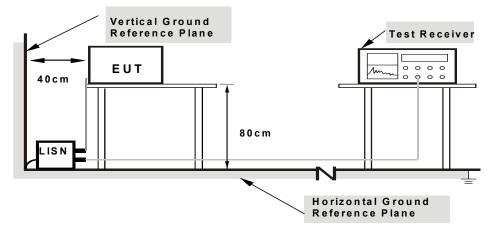
#### 4.1.3 TEST PROCEDURE

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

| under (Limit - 20dB) was not reported. |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
| 4.1.4 DEVIATION FROM TEST STANDARD     |  |  |  |  |  |  |  |
| No deviation.                          |  |  |  |  |  |  |  |
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#### 4.1.5 TEST SETUP



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

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Plugged the EUT into PC and placed on the test table.
- b. The PC ran test program "Hpattern" to enable all functions.
- c. The PC sent "H" patterns to the monitor, and the monitor displayed them.
- d. The PC sent "H" patterns to the printer, and the printer printed them.
- e. The PC read/write data with the external floppy.
- f. The PC communicated with TrackPad via the EUT.
- g. Steps c~f were repeated.

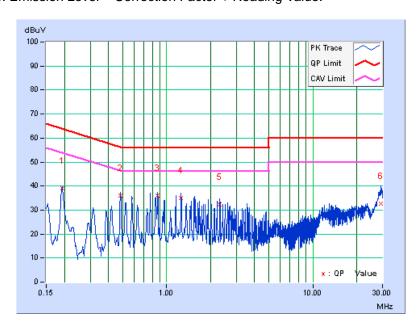


#### 4.1.7 TEST RESULTS

| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz     | 6dB BANDWIDTH | 9 kHz  |
|--------------------------|-------------------|---------------|--------|
| ENVIRONMENTAL CONDITIONS | 23 deg. C, 66% RH | PHASE         | Line 1 |
| TESTED BY                | Fox Chang         |               |        |

|    | Freq.    | Corr.  | Reading Value |           | Emissio | n Level             | Lir   | nit       | Mai    | gin    |  |
|----|----------|--------|---------------|-----------|---------|---------------------|-------|-----------|--------|--------|--|
| No |          | Factor | [dB           | [dB (uV)] |         | [dB (uV)] [dB (uV)] |       | [dB (uV)] |        | (dB)   |  |
|    | [MHz]    | (dB)   | Q.P.          | AV.       | Q.P.    | AV.                 | Q.P.  | AV.       | Q.P.   | AV.    |  |
| 1  | 0.19305  | 0.13   | 38.81         | 36.09     | 38.94   | 36.22               | 63.90 | 53.90     | -24.97 | -17.69 |  |
| 2  | 0.48235  | 0.14   | 35.94         | 35.60     | 36.08   | 35.74               | 56.30 | 46.30     | -20.22 | -10.56 |  |
| 3  | 0.86944  | 0.18   | 35.68         | 35.37     | 35.86   | 35.55               | 56.00 | 46.00     | -20.14 | -10.45 |  |
| 4  | 1.25653  | 0.20   | 34.80         | 32.49     | 35.00   | 32.69               | 56.00 | 46.00     | -21.00 | -13.31 |  |
| 5  | 2.31617  | 0.24   | 32.19         | 29.85     | 32.43   | 30.09               | 56.00 | 46.00     | -23.57 | -15.91 |  |
| 6  | 29.18566 | 1.54   | 31.11         | 19.49     | 32.65   | 21.03               | 60.00 | 50.00     | -27.35 | -28.97 |  |

- 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.

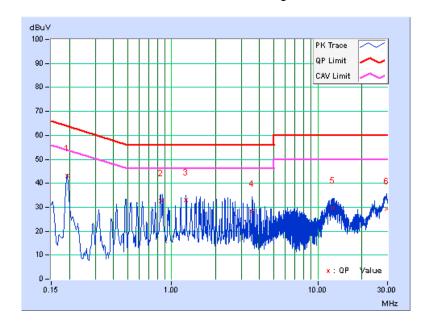




| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz     | 6dB BANDWIDTH | 9 kHz  |
|--------------------------|-------------------|---------------|--------|
| ENVIRONMENTAL CONDITIONS | 23 deg. C, 66% RH | PHASE         | Line 2 |
| TESTED BY                | Fox Chang         |               |        |

|    | Freq.    | Corr.  | Reading Value |       | Emission Level |       | Limit     |       | Margin |        |
|----|----------|--------|---------------|-------|----------------|-------|-----------|-------|--------|--------|
| No |          | Factor | [dB           | (uV)] | [dB (uV)]      |       | [dB (uV)] |       | (dB)   |        |
|    | [MHz]    | (dB)   | Q.P.          | AV.   | Q.P.           | AV.   | Q.P.      | AV.   | Q.P.   | AV.    |
| 1  | 0.19305  | 0.14   | 42.85         | 42.34 | 42.99          | 42.48 | 63.90     | 53.90 | -20.92 | -11.43 |
| 2  | 0.83986  | 0.19   | 32.54         | 23.55 | 32.73          | 23.74 | 56.00     | 46.00 | -23.27 | -22.26 |
| 3  | 1.25687  | 0.22   | 32.64         | 29.43 | 32.86          | 29.65 | 56.00     | 46.00 | -23.14 | -16.35 |
| 4  | 3.57125  | 0.32   | 27.91         | 21.78 | 28.23          | 22.10 | 56.00     | 46.00 | -27.77 | -23.90 |
| 5  | 12.65809 | 0.69   | 28.88         | 20.29 | 29.57          | 20.98 | 60.00     | 50.00 | -30.43 | -29.02 |
| 6  | 29.46718 | 1.24   | 27.91         | 17.83 | 29.15          | 19.07 | 60.00     | 50.00 | -30.85 | -30.93 |

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





#### 4.2 RADIATED EMISSION MEASUREMENT

# 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT TEST STANDARD: FCC Part 15, Subpart B (section: 15.109) ICES-003:2012 Issue 5 (section: 6.2)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

| Radiated Emissions Limits at 10 meters (dBµV/m) |                                  |                                   |                      |                      |  |  |
|---|----------------------------------|-----------------------------------|----------------------|----------------------|--|--|
| Frequencies (MHz)                               | FCC 15B/<br>ICES-003,<br>Class A | FCC 15B /<br>ICES-003,<br>Class B | CISPR 22,<br>Class A | CISPR 22,<br>Class B |  |  |
| 30-88   | 39                               | 29.5                              |                      |                      |  |  |
| 88-216  | 43.5                             | 33.1                              | 40                   | 30                   |  |  |
| 216-230   | 46.4                             | 35.6                              |                      |                      |  |  |
| 230-960   | 40.4                             | 33.0                              | 47                   | 27                   |  |  |
| 960-1000  | 49.5                             | 43.5                              | 47                   | 37                   |  |  |
| 1000-3000                                       | Avg: 49.5                        | Avg: 43.5                         | Not defined          | Not defined          |  |  |
| Above 3000                                      | Peak: 69.5                       | Peak: 63.5                        | Not defined          | Not defined          |  |  |

|                   | Radiated Emissions Limits at 3 meters (dBµV/m) |                                   |                      |                      |  |  |  |
|-------------------|--|-----------------------------------|----------------------|----------------------|--|--|--|
| Frequencies (MHz) | FCC 15B /<br>ICES-003,<br>Class A              | FCC 15B /<br>ICES-003,<br>Class B | CISPR 22,<br>Class A | CISPR 22,<br>Class B |  |  |  |
| 30-88             | 49.5   | 40                                |                      |                      |  |  |  |
| 88-216            | 54   | 43.5                              | 50.5                 | 40.5                 |  |  |  |
| 216-230           | 56.9   | 46                                |                      |                      |  |  |  |
| 230-960           | 50.9   | 40                                | 57.5                 | 47.5                 |  |  |  |
| 960-1000          | 60   | 54                                | 57.5                 | 47.5                 |  |  |  |
| 1000-3000         | Avg: 60  | Avg: 54                           | Avg: 56<br>Peak: 76  | Avg: 50<br>Peak: 70  |  |  |  |
| Above 3000        | Peak: 80 Peak: 74                              |                                   | Avg: 60<br>Peak: 80  | Avg: 54<br>Peak: 74  |  |  |  |

**NOTE:** 1. The lower limit shall apply at the transition frequencies.

- 2. Emission level  $(dBuV/m) = 20 \log Emission level (uV/m)$ .
- 3. As shown in 15.35(b), for frequencies above 1000MHz, 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 20dB under any condition of modulation.
- 4. QP detector shall be applied if not specified.



## FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz)                         |  |  |
|--|--|--|--|
| Below 1.705  | 30   |  |  |
| 1.705-108  | 1000   |  |  |
| 108-500  | 2000   |  |  |
| 500-1000   | 5000   |  |  |
| Above 1000   | 5th harmonic of the highest frequency or 40GHz, whichever is lower |  |  |



#### 4.2.2 TEST INSTRUMENTS

Frequency range 30MHz~1GHz

| DESCRIPTION & MANUFACTURER             | MODEL NO.                      | SERIAL NO.     | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|--|--------------------------------|----------------|---------------------|-------------------------|
| Test Receiver<br>ROHDE & SCHWARZ (V)   | ESIB7                          | 100187         | Jan. 30, 2012       | Jan. 29, 2013           |
| Test Receiver<br>ROHDE & SCHWARZ (H)   | ESIB7                          | 100186         | Nov. 29, 2011       | Nov. 28, 2012           |
| Spectrum Analyzer<br>Agilent           | E4446A                         | MY48250266     | Aug. 29, 2012       | Aug. 28, 2013           |
| BILOG Antenna<br>SCHWARZBECK (V)       | VULB9168                       | 9168-148       | Apr. 02, 2012       | Apr. 01, 2013           |
| BILOG Antenna<br>SCHWARZBECK (H)       | VULB9168                       | 9168-149       | Apr. 06, 2012       | Apr. 05, 2013           |
| Preamplifier<br>Agilent (V)            | 8447D                          | 2944A10636     | Oct. 29, 2011       | Oct. 28, 2012           |
| Preamplifier<br>Agilent (H)            | 8447D                          | 2944A10637     | Oct. 29, 2011       | Oct. 28, 2012           |
| Preamplifier<br>Agilent                | 8449B                          | 3008A01959     | Oct. 29, 2011       | Oct. 28, 2012           |
| RF signal cable<br>Woken (V)           | 8D-FB                          | Cable-Hych1-01 | Oct. 29, 2011       | Oct. 28, 2012           |
| RF signal cable<br>Woken (H)           | 8D-FB                          | Cable-Hych1-02 | Oct. 29, 2011       | Oct. 28, 2012           |
| Software<br>ADT                        | BV ADT_Radiated_<br>V 7.7.03.7 | NA             | NA                  | NA                      |
| Antenna Tower (V)                      | MFA-440                        | 9707           | NA                  | NA                      |
| Antenna Tower (H)                      | MFA-440                        | 970705         | NA                  | NA                      |
| Turn Table                             | DS430                          | 50303          | NA                  | NA                      |
| Controller (V)                         | MF7802                         | 074            | NA                  | NA                      |
| Controller (H)                         | MF7802                         | 08093          | NA                  | NA                      |
| Fix tool for Boresight antenna tower   | BAF-01                         | 1              | NA                  | NA                      |
| RF signal cable<br>EAST COST Microwave | HP 160S-29                     | NA             | Oct. 29, 2011       | Oct. 28, 2012           |

**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 1.
- 3. The FCC Site Registration No. is 477732.
- 4. The IC Site Registration No. is IC 7450F-1.
- 5. The VCCI Site Registration No. is R-1893, G-113.



Frequency range above 1GHz

| DESCRIPTION & MANUFACTURER              | MODEL NO.                       | SERIAL NO.            | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---------------------------------|-----------------------|---------------------|-------------------------|
| Test Receiver<br>ROHDE & SCHWARZ        | ESIB7                           | 100188                | May 11, 2012        | May 10, 2013            |
| Spectrum Analyzer<br>Agilent            | E4446A                          | MY48250266            | Aug. 29, 2012       | Aug. 28, 2013           |
| BILOG Antenna<br>SCHWARZBECK            | VULB9168                        | 9168-157              | Apr. 02, 2012       | Apr. 01, 2013           |
| RF signal cable<br>Woken                | 8D-FB                           | NA                    | Mar. 24, 2012       | Mar. 23, 2013           |
| HORN Antenna<br>SCHWARZBECK             | BBHA 9120 D                     | 9120D-405             | Feb. 03, 2012       | Feb. 02, 2013           |
| HORN Antenna<br>SCHWARZBECK             | BBHA 9170                       | BBHA9170243           | Jan. 03, 2012       | Jan. 02, 2013           |
| Preamplifier<br>Agilent<br>(Below 1GHz) | 8447D                           | 2944A10629            | Oct. 29, 2011       | Oct. 28, 2012           |
| Preamplifier<br>Agilent<br>(Above 1GHz) | 8449B                           | 3008A01959            | Oct. 29, 2011       | Oct. 28, 2012           |
| RF signal cable<br>HUBER+SUHNER         | SUCOFLEX 104                    | 230132/4              | Nov. 03, 2011       | Nov. 02, 2012           |
| RF signal cable<br>HUBER+SUHNER         | SUCOFLEX 104                    | 309223/4+309<br>218/4 | Nov. 03, 2011       | Nov. 02, 2012           |
| Software<br>ADT                         | BV ADT_Radiated_<br>V7.6.15.9.3 | NA                    | NA                  | NA                      |
| Antenna Tower<br>ADT                    | AT100                           | AT93021702            | NA                  | NA                      |
| Turn Table<br>ADT                       | TT100                           | TT93021702            | NA                  | NA                      |
| Controller<br>ADT                       | SC100                           | SC93021702            | NA                  | NA                      |
| Fix tool for Boresight antenna tower    | BAF-01                          | 2                     | 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 2.
- 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 4. The FCC Site Registration No. is 686814.
- 5. The IC Site Registration No. is IC 7450F-2.
- 6. The VCCI Site Registration No. is G-18.



#### 4.2.3 TEST PROCEDURE

#### Frequency range 30MHz~1GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 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 1 meter to 4 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 1GHz.

**NOTE:** The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-Peak (QP) detection at frequency below 1GHz.



#### Frequency range above 1GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from 1 meter to 4 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.
- d. 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 test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.

#### NOTE:

- 1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak (PK) detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz for Average (AV) detection at frequency above 1GHz.
- 2. For measurement of frequency above 1000MHz, the EUT was set 3 meters away from the receiver antenna.

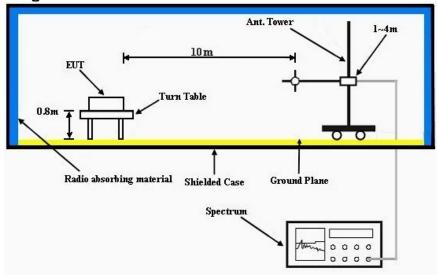
#### 4.2.4 DEVIATION FROM TEST STANDARD

| No deviation. |  |  |
|---------------|--|--|
|               |  |  |

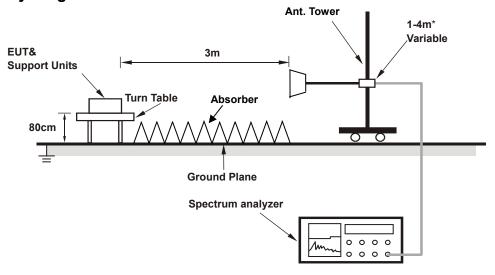


#### 4.2.5 TEST SETUP

#### Frequency range 30MHz~1GHz



#### Frequency range above 1GHz



\*: depends on the EUT height and the antenna 3dB beamwidth both, refer to section 8.3.2.2 of ANSI C63.4: 2009.

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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

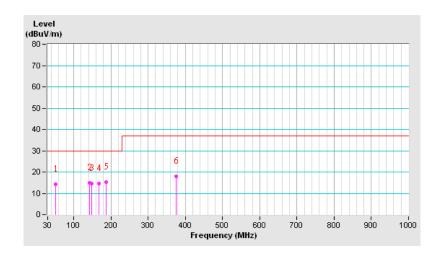


#### 4.2.7 TEST RESULTS

| DETECTOR<br>FUNCTION &<br>BANDWIDTH | Ouasi-Peak 120 kHz | FREQUENCY<br>RANGE | 30-1000 MHz |
|-------------------------------------|--------------------|--------------------|-------------|
| ENVIRONMENTAL CONDITIONS            | 23 deg. C, 64% RH  | TESTED BY          | Rolan Zheng |

|     | ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M |                               |                   |                |                          |                            |                        |                                |
|-----|--|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No. | Freq.<br>(MHz)                                       | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1   | 51.38  | 14.37 QP                      | 30.00             | -15.63         | 4.00 H                   | 58                         | 0.35                   | 14.02                          |
| 2   | 142.75   | 15.05 QP                      | 30.00             | -14.95         | 3.50 H                   | 20                         | 0.89                   | 14.16                          |
| 3   | 148.58   | 14.60 QP                      | 30.00             | -15.40         | 2.50 H                   | 129                        | -0.23                  | 14.83                          |
| 4   | 168.02   | 14.53 QP                      | 30.00             | -15.47         | 4.00 H                   | 0                          | 0.46                   | 14.07                          |
| 5   | 187.45   | 15.38 QP                      | 30.00             | -14.62         | 1.00 H                   | 205                        | 2.70                   | 12.68                          |
| 6   | 376.01   | 18.00 QP                      | 37.00             | -19.00         | 2.50 H                   | 18                         | 0.06                   | 17.94                          |

- 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.

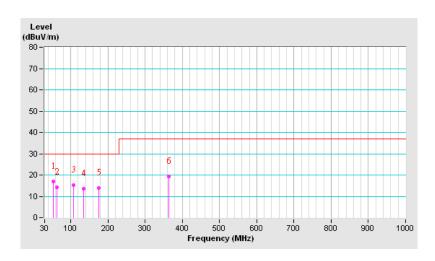




| DETECTOR<br>FUNCTION &<br>BANDWIDTH | Ouasi-Peak 120 kHz | FREQUENCY<br>RANGE | 30-1000 MHz |
|-------------------------------------|--------------------|--------------------|-------------|
| ENVIRONMENTAL CONDITIONS            | 23 deg. C, 64% RH  | TESTED BY          | Rolan Zheng |

|     | ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M |                               |                   |                |                          |                            |                        |                                |  |
|-----|--|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|
| No. | Freq.<br>(MHz)                                     | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |  |
| 1   | 53.33  | 16.86 QP                      | 30.00             | -13.14         | 4.00 V                   | 331                        | 3.00                   | 13.86                          |  |
| 2   | 63.05  | 14.21 QP                      | 30.00             | -15.79         | 3.00 V                   | 223                        | 0.88                   | 13.33                          |  |
| 3   | 107.76   | 15.39 QP                      | 30.00             | -14.61         | 3.00 V                   | 32                         | 4.75                   | 10.64                          |  |
| 4   | 134.97   | 13.52 QP                      | 30.00             | -16.48         | 1.00 V                   | 11                         | -0.15                  | 13.67                          |  |
| 5   | 175.79   | 13.86 QP                      | 30.00             | -16.14         | 1.00 V                   | 74                         | 0.01                   | 13.85                          |  |
| 6   | 364.35   | 19.28 QP                      | 37.00             | -17.72         | 1.00 V                   | 254                        | 1.63                   | 17.65                          |  |

- 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.

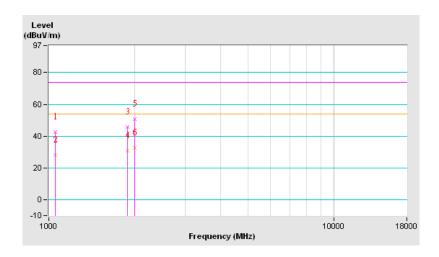




| INPUT POWER<br>(SYSTEM)  | 120Vac, 60 Hz     | FREQUENCY<br>RANGE                  | 1-18 GHz            |  |
|--------------------------|-------------------|-------------------------------------|---------------------|--|
| ENVIRONMENTAL CONDITIONS | 23 deg. C, 66% RH | DETECTOR<br>FUNCTION &<br>BANDWIDTH | Peak/Average, 1 MHz |  |
| TESTED BY                | Felix Chen        |                                     |                     |  |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|---|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No.   | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1   | 1054.40        | 42.68 PK                      | 74.00             | -31.32         | 1.50 H                   | 237                        | 14.70                  | 27.98                          |
| 2   | 1054.40        | 28.18 AV                      | 54.00             | -25.82         | 1.50 H                   | 237                        | 0.20                   | 27.98                          |
| 3   | 1891.14        | 45.63 PK                      | 74.00             | -28.37         | 1.49 H                   | 279                        | 15.24                  | 30.39                          |
| 4   | 1891.14        | 30.78 AV                      | 54.00             | -23.22         | 1.49 H                   | 279                        | 0.39                   | 30.39                          |
| 5   | 1999.40        | 50.78 PK                      | 74.00             | -23.22         | 1.50 H                   | 279                        | 20.12                  | 30.66                          |
| 6   | 1999.40        | 32.74 AV                      | 54.00             | -21.26         | 1.50 H                   | 279                        | 2.08                   | 30.66                          |

- 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.

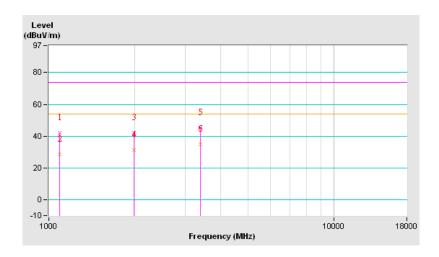




| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz    | FREQUENCY<br>RANGE | 1-18GHz             |  |
|--------------------------|------------------|--------------------|---------------------|--|
| ENVIRONMENTAL CONDITIONS | 123 ded C 66% RH |                    | Peak/Average, 1 MHz |  |
| TESTED BY                | Felix Chen       |                    |                     |  |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|---|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No.   | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1   | 1091.83        | 42.19 PK                      | 74.00             | -31.81         | 1.48 V                   | 323                        | 14.08                  | 28.11                          |
| 2   | 1091.83        | 28.44 AV                      | 54.00             | -25.56         | 1.48 V                   | 323                        | 0.33                   | 28.11                          |
| 3   | 1991.85        | 42.36 PK                      | 74.00             | -31.64         | 1.48 V                   | 180                        | 11.72                  | 30.64                          |
| 4   | 1991.85        | 31.34 AV                      | 54.00             | -22.66         | 1.48 V                   | 180                        | 0.70                   | 30.64                          |
| 5   | 3394.43        | 45.50 PK                      | 74.00             | -28.50         | 1.00 V                   | 189                        | 10.70                  | 34.80                          |
| 6   | 3394.43        | 35.11 AV                      | 54.00             | -18.89         | 1.00 V                   | 189                        | 0.31                   | 34.80                          |

- 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.





#### 5 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.

Hsin Chu EMC/RF Lab

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

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Web Site: <a href="mailto:www.bureauveritas-adt.com">www.bureauveritas-adt.com</a>

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



# 6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING

| CHANGES TO THE EUT BY THE LAB                                     |
|---|
| No modifications were made to the EUT by the lab during the test. |
| END   |
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