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FCC TEST REPORT (15.247)

REPORT NO.: RF110427C20A

MODEL NO.: VAP2404

FCC ID: ACQ-VAP2404

RECEIVED: Nov. 02, 2011

TESTED: Nov. 02 ~ Nov. 29, 2011

ISSUED: Dec. 22, 2011

APPLICANT: Motorola Mobility Inc.

ADDRESS: 101 Tournament Drive Horsham, PA 19044 United States

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|------------------|-------------------|---------------|
| Original release | N/A | Dec. 22, 2011 |



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1. CERTIFICATION

PRODUCT: VAP2404 Video Access Point/Client

MODEL: VAP2404

BRAND: Motorola Mobility Inc.

APPLICANT: Motorola Mobility Inc.

TEST SAMPLE: ENGINEERING SAMPLE

TESTED: Nov. 02 ~ Nov. 29, 2011

STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**

ANSI C63.4-2003

ANSI C63.10-2009

This report is issued as a supplementary report of **RF110427C20** for changing component & layout. This report shall be used combining with its original report.

| | | | | |
|-------------|---|---|---------|---------------|
| PREPARED BY | : |  | , DATE: | Dec. 22, 2011 |
| | | Ivy Lin / Specialist | | |
| APPROVED BY | : |  | , DATE: | Dec. 22, 2011 |
| | | Gary Chang / Technical Manager | | |

NOTE: The emission tests were performed for the addendum. Refer to original report for the other test data.



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2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) | | | |
|---|-----------------------------|--------|--|
| STANDARD SECTION | TEST TYPE | RESULT | REMARK |
| 15.207 | AC Power Conducted Emission | PASS | Meet the requirement of limit. Minimum passing margin is -11.15dB at 0.455MHz. |
| 15.247(d) 15.209 | Radiated Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -1.3dB at 550.97MHz. |
| 15.247(d) | Band Edge Measurement | NA | Refer to Note |
| 15.247(a)(2) | 6dB bandwidth | NA | Refer to Note |
| 15.247(b) | Conducted power | NA | Refer to Note |
| 15.247(e) | Power Spectral Density | NA | Refer to Note |
| 15.203 | Antenna Requirement | PASS | Antenna connector is I-PEX not a standard connector. |

NOTE: The emission tests were performed for the addendum. Refer to original report for the other test data

2.1 MEASUREMENT UNCERTAINTY

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

| MEASUREMENT | FREQUENCY | UNCERTAINTY |
|---------------------|-----------------|-------------|
| Conducted emissions | 9kHz~30MHz | 2.44 dB |
| Radiated emissions | 30MHz ~ 200MHz | 3.19 dB |
| | 200MHz ~1000MHz | 3.21 dB |
| | 1GHz ~ 18GHz | 2.26 dB |
| | 18GHz ~ 40GHz | 1.94 dB |

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



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

| | |
|------------------------------|---|
| EUT | VAP2404 Video Access Point/Client |
| MODEL NO. | VAP2404 |
| FCC ID | ACQ-VAP2404 |
| POWER SUPPLY | 12Vdc (adapter) |
| MODULATION TYPE | 64QAM, 16QAM, QPSK, BPSK for OFDM |
| MODULATION TECHNOLOGY | DSSS, OFDM |
| TRANSFER RATE | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n (20MHz): up to 300.0Mbps |
| OPERATING FREQUENCY | 5745 ~ 5825MHz |
| NUMBER OF CHANNEL | 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) |
| OUTPUT POWER | 475.1mW |
| ANTENNA TYPE | Dipole antenna with 2.0dBi gain |
| ANTENNA CONNECTOR | I-PEX |
| I/O PORTS | Refer to users' manual |
| DATA CABLE | NA |
| ACCESSORY DEVICES | Adapter |

NOTE:

1. This is a supplementary report of RF110427C20. This report shall be combined together with its original report.
2. This report is prepared for FCC class II permissive change. Difference compared with the original report is changing component & layout. Therefore, re-tested emission tests and presented in the test report.
3. The frequency bands used in this EUT are listed as follows:

| Frequency Band (MHz) | 5180~5320 | 5500~5580 | 5670~5700 | 5745~5825 |
|----------------------|-----------|-----------|-----------|-----------|
| 802.11a | √ | √ | √ | √ |
| 802.11n (20MHz) | √ | √ | √ | √ |
| 802.11n (40MHz) | √ | √ | √ | √ |

4. The EUT has disabled the 5600-5650MHz band by S/W to avoid 5600-5650MHz band for FCC certification.
5. The EUT incorporates a MIMO function. Physically, the EUT provides four completed transmitters and four receivers.

| MODULATION MODE | TX FUNCTION |
|-----------------|-------------|
| 802.11a | 4TX |
| 802.11n (20MHz) | 4TX |
| 802.11n (40MHz) | 4TX |



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6. The EUT was powered by the following adapters:

| ADAPTER 1 | |
|---------------------|---|
| BRAND | LEADER |
| MODEL | MT12-Y120100-A1 |
| INPUT POWER | 100-120Vac, 50/60Hz, 0.3A |
| OUTPUT POWER | 12Vdc, 1.0A |
| POWER LINE | DC: 1.8m non-shielded cable with 1 core |

| ADAPTER 2 | |
|---------------------|---|
| BRAND | DELTA ELECTRONICS. INC |
| MODEL | EADP-13BB B |
| INPUT POWER | 100-240Vac, 0.4A, 50/60Hz |
| OUTPUT POWER | 12Vdc, 1.085A |
| POWER LINE | DC: 1.8m non-shielded cable with 1 core |

7. This report is issued for version: VAP2404 Rev. 2.0

8. 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

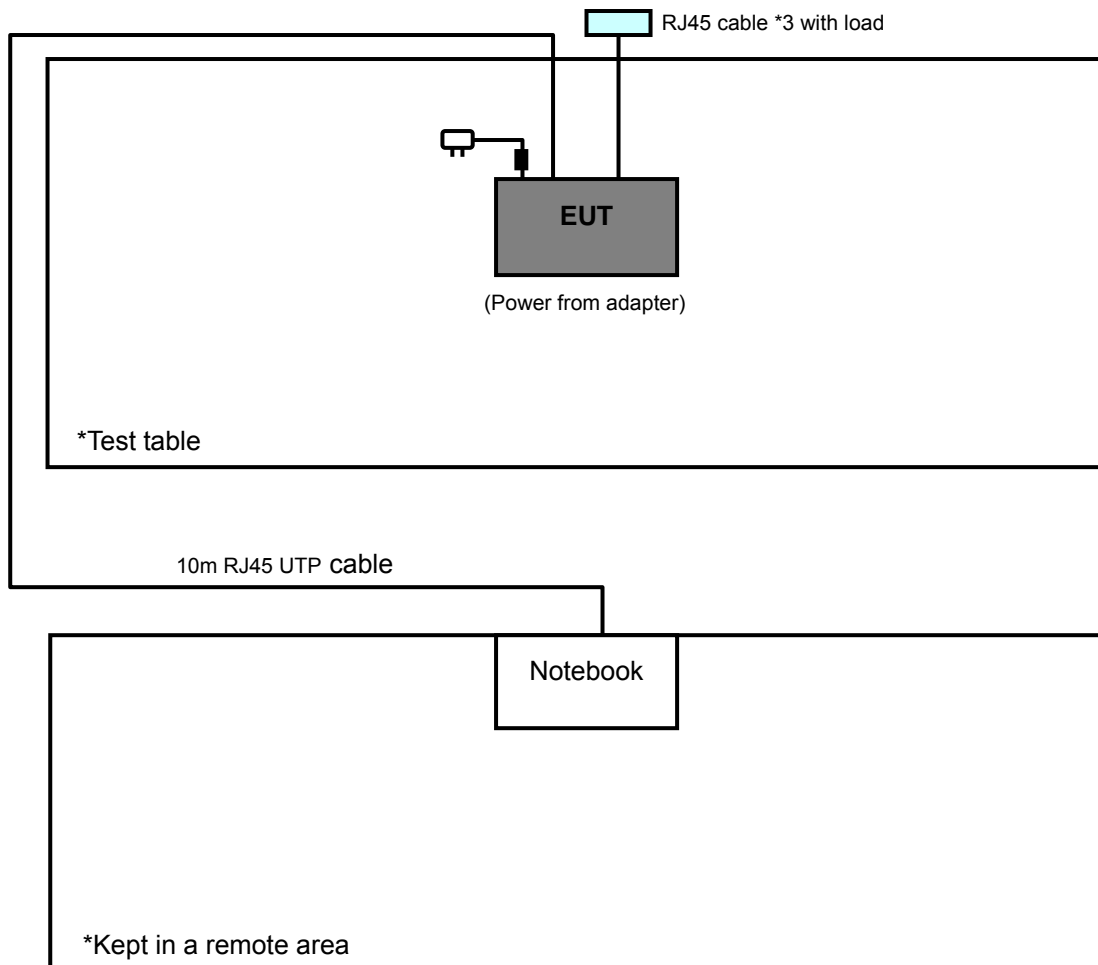
5 channels are provided for 802.11a, 802.11n (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 149 | 5745MHz | 161 | 5805MHz |
| 153 | 5765MHz | 165 | 5825MHz |
| 157 | 5785MHz | | |

2 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 151 | 5755MHz | 159 | 5795MHz |

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | APPLICABLE TO | | | DESCRIPTION |
|--------------------|---------------|-------|-----|--------------------------------|
| | RE≥1G | RE<1G | PLC | |
| A | - | √ | √ | Adapter model: MT12-Y120100-A1 |
| B | √ | √ | √ | Adapter model: EADP-13BB B |

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE: "-" means no effect.

RADIATED EMISSION TEST (ABOVE 1GHz):

- 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) |
|--------------------|-----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| B | 802.11n (20MHz) | 149 to 165 | 149 | OFDM | BPSK | 7.2 |

RADIATED EMISSION TEST (BELOW 1GHz):

- 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) |
|--------------------|-----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A, B | 802.11n (20MHz) | 149 to 165 | 149 | OFDM | BPSK | 7.2 |

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) |
|--------------------|-----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A, B | 802.11n (20MHz) | 149 to 165 | 149 | OFDM | BPSK | 7.2 |

TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|---------------|--------------------------|--------------|---------------|
| RE≥1G | 25deg. C, 65%RH | 120Vac, 60Hz | Brad Wu |
| RE<1G | 25deg. C, 65%RH | 120Vac, 60Hz | Haru Yang |
| PLC | 25deg. C, 68%RH | 120Vac, 60Hz | Anderson Hong |



3.3 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)

ANSI C63.4-2003

ANSI C63.10-2009

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

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

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|-----|----------|-------|-----------|-------------|-----------|
| 1 | NOTEBOOK | DELL | PP05L | 25191592336 | E2K24CLNS |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|---|
| 1 | 10m RJ45 UTP cable. |

NOTE:

- 1. All power cords of the above support units are non-shielded (1.8m).
- 2. Item 1 acted a communication partner to transfer data.



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4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| FREQUENCIES (MHz) | FIELD STRENGTH (microvolts/meter) | MEASUREMENT DISTANCE (meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. 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.



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4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|--|------------------------------|------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESI7 | 838496/016 | Dec. 27, 2010 | Dec. 26, 2011 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100039 | Feb. 23, 2011 | Feb. 22, 2012 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-155 | Apr. 12, 2011 | Apr. 11, 2012 |
| HORN Antenna SCHWARZBECK | BBHA 9120D | 9120D-408 | Jan. 06, 2011 | Jan. 05, 2012 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | 148 | Jul. 20, 2011 | Jul. 19, 2012 |
| Preamplifier Agilent | 8449B | 3008A01961 | Oct. 29, 2011 | Oct. 28, 2012 |
| Preamplifier Agilent | 8447D | 2944A10738 | Oct. 29, 2011 | Oct. 28, 2012 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 309220/4 | Nov. 03, 2011 | Nov. 02, 2012 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 250724/4 | Nov. 03, 2011 | Nov. 02, 2012 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 295012/4 | Nov. 03, 2011 | Nov. 02, 2012 |
| Software ADT. | ADT_Radiated_ V7.6.15.9.2 | NA | NA | NA |
| Antenna Tower inn-co GmbH | MA 4000 | 010303 | NA | NA |
| Antenna Tower Controller inn-co GmbH | CO2000 | 019303 | NA | NA |
| Turn Table ADT. | TT100. | TT93021704 | NA | NA |
| Turn Table Controller ADT. | SC100. | SC93021704 | NA | NA |
| 26GHz ~ 40GHz Amplifier | EM26400 | 815221 | 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 4.
 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 460141.
 5. The IC Site Registration No. is IC7450F-4.



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4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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 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.
- 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

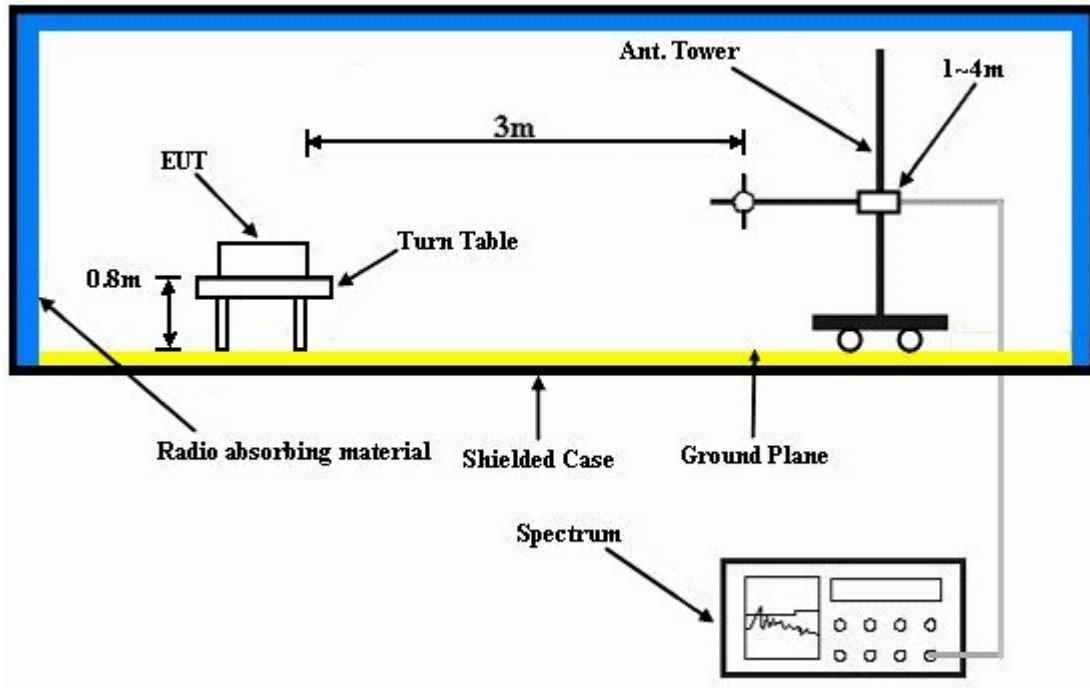
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Prepared notebook to act as communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".



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4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA : 802.11n (20MHz)

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|--------------------------|-------------------------------|--------------------|---------------------------|
| CHANNEL | Channel 149 | FREQUENCY RANGE | 1 ~ 40GHz |
| INPUT POWER (SYSTEM) | 120 Vac, 60Hz | DETECTOR FUNCTION | Peak (PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY | Brad Wu |
| TEST MODE | B: Adapter model: EADP-13BB B | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5725.00 | 78.7 PK | 90.1 | -11.4 | 1.16 H | 258 | 38.20 | 40.50 |
| 2 | #5725.00 | 58.5 AV | 79.3 | -20.8 | 1.16 H | 258 | 18.00 | 40.50 |
| 3 | *5745.00 | 110.1 PK | | | 1.13 H | 253 | 69.60 | 40.50 |
| 4 | *5745.00 | 99.3 AV | | | 1.13 H | 253 | 58.80 | 40.50 |
| 5 | 11490.00 | 60.1 PK | 74.0 | -13.9 | 1.22 H | 245 | 8.20 | 51.90 |
| 6 | 11490.00 | 47.6 AV | 54.0 | -6.4 | 1.22 H | 245 | -4.30 | 51.90 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5725.00 | 87.2 PK | 100.2 | -13.0 | 1.09 V | 246 | 46.70 | 40.50 |
| 2 | #5725.00 | 68.0 AV | 89.7 | -21.7 | 1.09 V | 246 | 27.50 | 40.50 |
| 3 | *5745.00 | 120.2 PK | | | 1.00 V | 25 | 79.70 | 40.50 |
| 4 | *5745.00 | 109.7 AV | | | 1.00 V | 25 | 69.20 | 40.50 |
| 5 | 11490.00 | 63.9 PK | 74.0 | -10.1 | 1.00 V | 36 | 12.00 | 51.90 |
| 6 | 11490.00 | 49.3 AV | 54.0 | -4.7 | 1.00 V | 36 | -2.60 | 51.90 |

- 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).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. "#":The radiated frequency is out the restricted band.



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BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|--------------------------|-----------------------------------|--------------------|---------------|
| CHANNEL | Channel 149 | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER (SYSTEM) | 120 Vac, 60Hz | DETECTOR FUNCTION | Quasi-Peak |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY | Haru Yang |
| TEST MODE | A: Adapter model: MT12-Y120100-A1 | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 249.60 | 42.6 QP | 46.0 | -3.4 | 1.50 H | 76 | 29.10 | 13.50 |
| 2 | 375.98 | 41.9 QP | 46.0 | -4.1 | 1.00 H | 232 | 24.10 | 17.80 |
| 3 | 500.42 | 44.3 QP | 46.0 | -1.7 | 1.75 H | 91 | 22.90 | 21.40 |
| 4 | 550.97 | 44.3 QP | 46.0 | -1.7 | 1.50 H | 76 | 21.70 | 22.60 |
| 5 | 626.80 | 44.5 QP | 46.0 | -1.5 | 1.25 H | 172 | 20.40 | 24.10 |
| 6 | 838.72 | 41.0 QP | 46.0 | -5.0 | 2.00 H | 256 | 13.10 | 27.90 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 97.95 | 39.7 QP | 43.5 | -3.8 | 1.25 V | 211 | 28.80 | 10.90 |
| 2 | 249.60 | 40.8 QP | 46.0 | -5.2 | 1.75 V | 136 | 27.30 | 13.50 |
| 3 | 500.42 | 43.5 QP | 46.0 | -2.5 | 1.00 V | 133 | 22.10 | 21.40 |
| 4 | 550.97 | 44.7 QP | 46.0 | -1.3 | 1.00 V | 271 | 22.10 | 22.60 |
| 5 | 626.80 | 43.1 QP | 46.0 | -2.9 | 1.00 V | 121 | 19.00 | 24.10 |
| 6 | 838.72 | 42.6 QP | 46.0 | -3.4 | 1.75 V | 250 | 14.70 | 27.90 |

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



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| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|--------------------------|-------------------------------|--------------------|---------------|
| CHANNEL | Channel 149 | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER (SYSTEM) | 120 Vac, 60Hz | DETECTOR FUNCTION | Quasi-Peak |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY | Haru Yang |
| TEST MODE | B: Adapter model: EADP-13BB B | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 249.60 | 44.4 QP | 46.0 | -1.6 | 1.25 H | 85 | 30.90 | 13.50 |
| 2 | 500.42 | 44.5 QP | 46.0 | -1.5 | 1.75 H | 196 | 23.10 | 21.40 |
| 3 | 550.97 | 44.6 QP | 46.0 | -1.4 | 1.50 H | 157 | 22.00 | 22.60 |
| 4 | 576.25 | 42.6 QP | 46.0 | -3.4 | 1.50 H | 151 | 19.40 | 23.20 |
| 5 | 601.52 | 44.7 QP | 46.0 | -1.3 | 1.50 H | 187 | 21.00 | 23.70 |
| 6 | 626.80 | 42.3 QP | 46.0 | -3.7 | 1.25 H | 196 | 18.20 | 24.10 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 53.23 | 38.2 QP | 40.0 | -1.8 | 1.50 V | 22 | 24.00 | 14.20 |
| 2 | 249.60 | 41.0 QP | 46.0 | -5.0 | 1.00 V | 10 | 27.50 | 13.50 |
| 3 | 500.42 | 44.3 QP | 46.0 | -1.7 | 1.00 V | 109 | 22.90 | 21.40 |
| 4 | 550.97 | 44.7 QP | 46.0 | -1.3 | 1.00 V | 109 | 22.10 | 22.60 |
| 5 | 601.52 | 44.2 QP | 46.0 | -1.8 | 1.75 V | 214 | 20.50 | 23.70 |
| 6 | 751.23 | 38.8 QP | 46.0 | -7.2 | 1.50 V | 133 | 12.60 | 26.20 |

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



4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBµV) | |
|-----------------------------|------------------------|----------|
| | Quasi-peak | Average |
| 0.15 ~ 0.5 | 66 to 56 | 56 to 46 |
| 0.5 ~ 5 | 56 | 46 |
| 5 ~ 30 | 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 0.50MHz.
 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.

4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|----------------------------------|---------------------|----------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESCS30 | 100291 | Nov. 23, 2011 | Nov. 22, 2012 |
| RF signal cable Woken | 5D-FB | Cable-HYC01-01 | Dec. 22, 2011 | Dec. 21, 2012 |
| LISN ROHDE & SCHWARZ | ESH3-Z5 | 100312 | Jul. 07, 2011 | Jul. 06, 2012 |
| LISN ROHDE & SCHWARZ | ESH3-Z5 | 835239/001 | Feb. 22, 2011 | Feb. 21, 2012 |
| Software ADT | ADT_Cond_ V7.3.7 | 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.



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4.2.3 TEST PROCEDURES

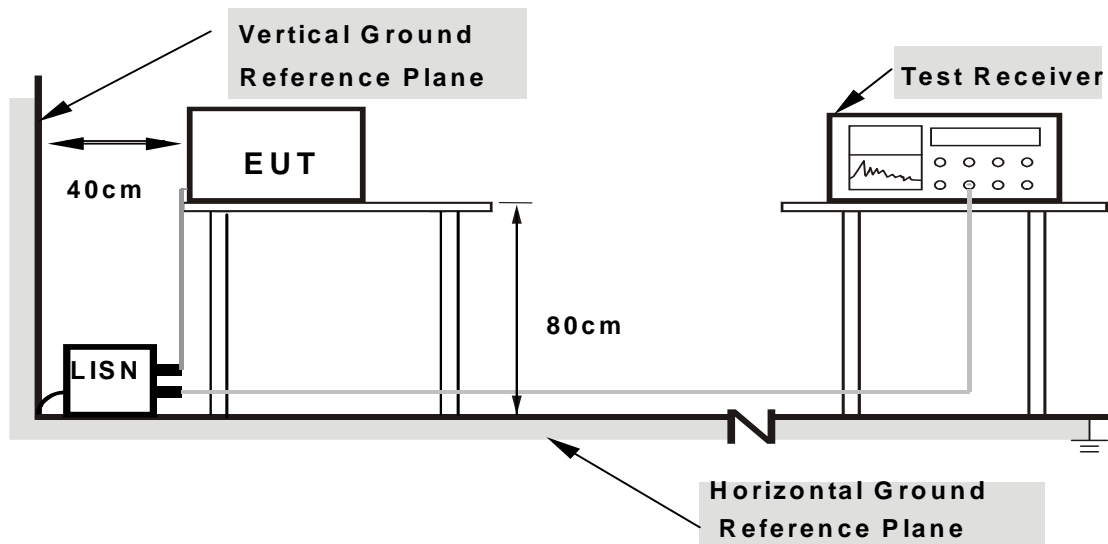
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) 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



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

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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

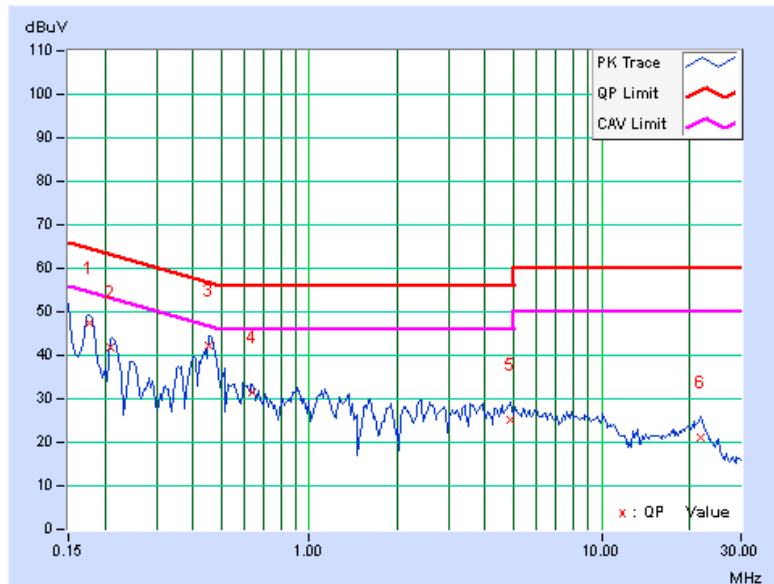
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

| | | | |
|------------------|-----------------------------------|----------------------|------|
| PHASE | Line 1 | 6dB BANDWIDTH | 9kHz |
| TEST MODE | A: Adapter model: MT12-Y120100-A1 | | |

| No | Freq. [MHz] | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|----------|----------------|----------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|---------------|---------------|
| | | Factor (dB) | Q.P. [dB (uV)] | AV. [dB (uV)] | Q.P. [dB (uV)] | AV. [dB (uV)] | Q.P. [dB (uV)] | AV. [dB (uV)] | Q.P. (dB) | AV. (dB) |
| 1 | 0.177 | 0.12 | 47.29 | 39.02 | 47.41 | 39.14 | 64.61 | 54.61 | -17.20 | -15.47 |
| 2 | 0.209 | 0.12 | 41.78 | 31.58 | 41.90 | 31.70 | 63.26 | 53.26 | -21.36 | -21.56 |
| 3 | 0.455 | 0.12 | 42.25 | 35.52 | 42.37 | 35.64 | 56.79 | 46.79 | -14.42 | -11.15 |
| 4 | 0.638 | 0.14 | 31.47 | 27.17 | 31.61 | 27.31 | 56.00 | 46.00 | -24.39 | -18.69 |
| 5 | 4.891 | 0.36 | 24.78 | 18.98 | 25.14 | 19.34 | 56.00 | 46.00 | -30.86 | -26.66 |
| 6 | 21.738 | 1.21 | 19.84 | 14.94 | 21.05 | 16.15 | 60.00 | 50.00 | -38.95 | -33.85 |

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



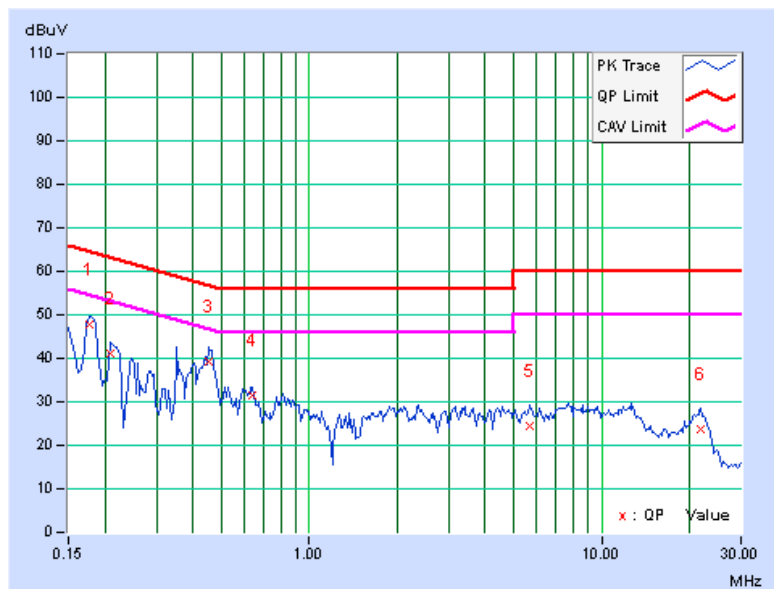


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| | | | |
|-----------|-----------------------------------|---------------|------|
| PHASE | Line 2 | 6dB BANDWIDTH | 9kHz |
| TEST MODE | A: Adapter model: MT12-Y120100-A1 | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|-------------------------|----------------------------|-------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.177 | 0.13 | 47.65 | 37.49 | 47.78 | 37.62 | 64.61 | 54.61 | -16.83 | -16.99 |
| 2 | 0.209 | 0.13 | 41.14 | 30.56 | 41.27 | 30.69 | 63.26 | 53.26 | -21.99 | -22.57 |
| 3 | 0.455 | 0.14 | 39.27 | 30.18 | 39.41 | 30.32 | 56.79 | 46.79 | -17.38 | -16.47 |
| 4 | 0.638 | 0.16 | 31.23 | 26.99 | 31.39 | 27.15 | 56.00 | 46.00 | -24.61 | -18.85 |
| 5 | 5.680 | 0.40 | 23.89 | 17.78 | 24.29 | 18.18 | 60.00 | 50.00 | -35.71 | -31.82 |
| 6 | 21.938 | 1.00 | 22.71 | 18.05 | 23.71 | 19.05 | 60.00 | 50.00 | -36.29 | -30.95 |

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



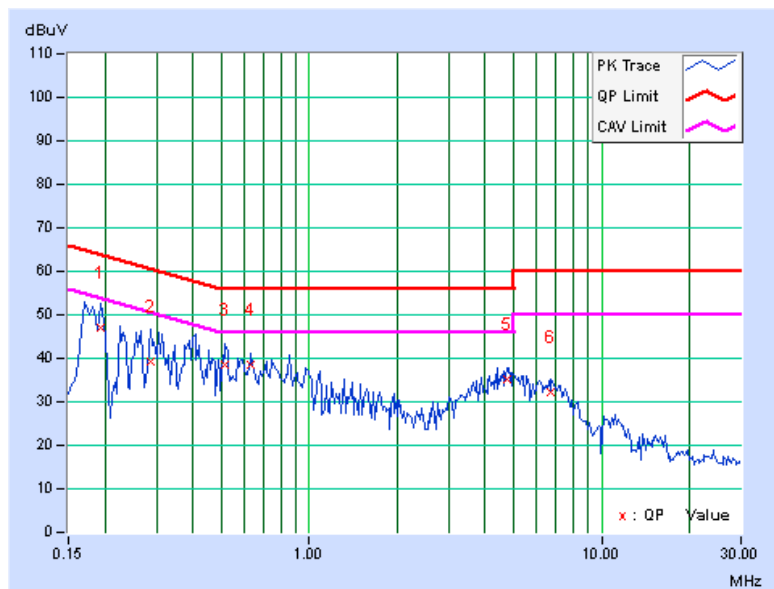


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| | | | |
|------------------|-------------------------------|----------------------|------|
| PHASE | Line 1 | 6dB BANDWIDTH | 9kHz |
| TEST MODE | B: Adapter model: EADP-13BB B | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|-------------------------|----------------------------|-------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.193 | 0.12 | 46.97 | 36.82 | 47.09 | 36.94 | 63.91 | 53.91 | -16.82 | -16.97 |
| 2 | 0.287 | 0.12 | 39.23 | 29.80 | 39.35 | 29.92 | 60.62 | 50.62 | -21.27 | -20.70 |
| 3 | 0.517 | 0.13 | 38.34 | 28.90 | 38.47 | 29.03 | 56.00 | 46.00 | -17.53 | -16.97 |
| 4 | 0.630 | 0.14 | 38.40 | 27.29 | 38.54 | 27.43 | 56.00 | 46.00 | -17.46 | -18.57 |
| 5 | 4.727 | 0.35 | 34.91 | 25.07 | 35.26 | 25.42 | 56.00 | 46.00 | -20.74 | -20.58 |
| 6 | 6.727 | 0.47 | 31.85 | 21.78 | 32.32 | 22.25 | 60.00 | 50.00 | -27.68 | -27.75 |

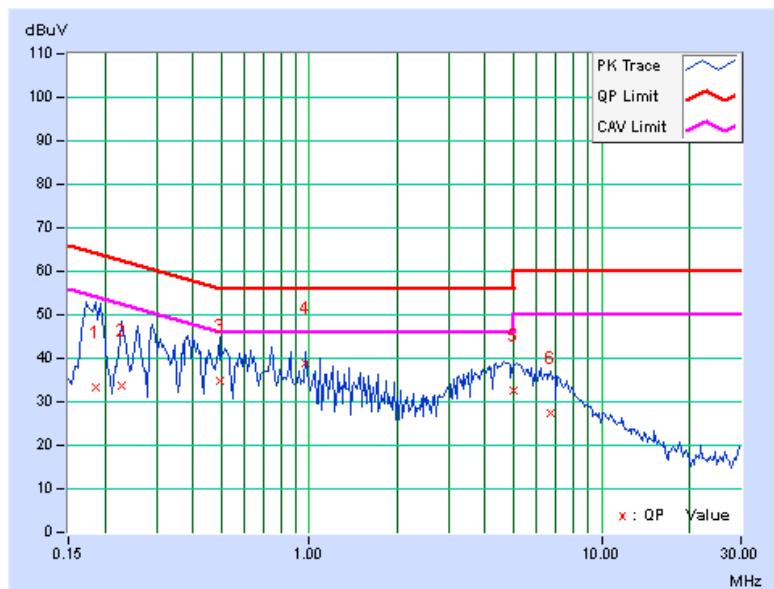
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



| | | | |
|------------------|-------------------------------|----------------------|------|
| PHASE | Line 2 | 6dB BANDWIDTH | 9kHz |
| TEST MODE | B: Adapter model: EADP-13BB B | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|-------------------------|----------------------------|-------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.185 | 0.13 | 33.12 | 23.32 | 33.25 | 23.45 | 64.25 | 54.25 | -31.00 | -30.80 |
| 2 | 0.228 | 0.13 | 33.53 | 21.51 | 33.66 | 21.64 | 62.52 | 52.52 | -28.86 | -30.88 |
| 3 | 0.494 | 0.15 | 34.61 | 24.05 | 34.76 | 24.20 | 56.10 | 46.10 | -21.35 | -21.91 |
| 4 | 0.974 | 0.18 | 38.65 | 25.61 | 38.83 | 25.79 | 56.00 | 46.00 | -17.17 | -20.21 |
| 5 | 4.973 | 0.37 | 32.17 | 22.64 | 32.54 | 23.01 | 56.00 | 46.00 | -23.46 | -22.99 |
| 6 | 6.691 | 0.45 | 27.08 | 19.78 | 27.53 | 20.23 | 60.00 | 50.00 | -32.47 | -29.77 |

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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6. 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.

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5.phtml.

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

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Web Site: www.adt.com.tw

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



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7. 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---