# FCC Test Report

| | |
|---|---|
| **Report No.:** | RF120420C08L |
| **FCC ID:** | PY312100187 |
| **Test Model:** | WNDR4300 |
| **Received Date:** | Aug. 14, 2015 |
| **Test Date:** | Aug. 27 ~ Oct. 14, 2015 |
| **Issued Date:** | Oct. 14, 2015 |
| **Applicant:** | NETGEAR, INC. |
| **Address:** | 350 East Plumeria Drive San Jose, CA 95134 |
| **Issued By:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch |
| **Lab Address:** | No. 47-2, 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 Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.) |

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## Release Control Record

| Issue No. | Description | Date Issued |
|---|---|---|
| RF120420C08L | Original release | Oct. 14, 2015 |

## 1 Certificate of Conformity

| | |
|---|---|
| **Product:** | N750 Wireless Dual Band Gigabit Router |
| **Brand:** | NETGEAR |
| **Test Model:** | WNDR4300 |
| **Sample Status:** | ENGINEERING SAMPLE |
| **Applicant:** | NETGEAR, INC. |
| **Test Date:** | Aug. 27 ~ Oct. 14, 2015 |
| **Standards:** | 47 CFR FCC Part 15, Subpart E (Section 15.407)<br>ANSI C63.10:2013 |

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :** _____ , **Date:** Oct. 14, 2015

Ivy Lin / Specialist

**Approved by :** _____ , **Date:** Oct. 14, 2015

Ken Liu / Senior Manager

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart E (SECTION 15.407) | | | |
|---|---|---|---|
| FCC Clause | Test Item | Result | Remarks |
| 15.407(b)(6) | AC Power Conducted Emissions | Pass | Meet the requirement of limit. Minimum passing margin is -10.48dB at 0.29844MHz. |
| 15.407(b) (1/2/3/4/6) | Radiated Emissions & Band Edge Measurement | Pass | Meet the requirement of limit. Minimum passing margin is -0.1dB at 5722.90, 5860.10MHz. |
| 15.407(a)(1/2/3) | Max Average Transmit Power | Pass | Meet the requirement of limit. |
| 15.407(a)(1/2/3) | Peak Power Spectral Density | Pass | Meet the requirement of limit. |
| 15.407(e) | 6dB bandwidth | Pass | Meet the requirement of limit. (U-NII-3 Band only) |
| 15.407(g) | Frequency Stability | Pass | Meet the requirement of limit. |
| 15.203 | Antenna Requirement | Pass | Antenna connector is UFL not a standard connector. |

### 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 | Expended Uncertainty (k=2) (±) |
|---|---|---|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 2.44 dB |
| Radiated Emissions up to 1 GHz | 30MHz ~ 200MHz | 3.59 dB |
| | 200MHz ~1000MHz | 3.60 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz | 2.29 dB |
| | 18GHz ~ 40GHz | 2.29 dB |

### 2.2 Modification Record

There were no modifications required for compliance.

## 3 General Information

### 3.1 General Description of EUT

| | |
|---|---|
| Product | N750 Wireless Dual Band Gigabit Router |
| Brand | NETGEAR |
| Test Model | WNDR4300 |
| Status of EUT | ENGINEERING SAMPLE |
| Power Supply Rating | 12Vdc (Adapter) |
| Modulation Type | 64QAM, 16QAM, QPSK, BPSK |
| Modulation Technology | OFDM |
| Transfer Rate | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11n: up to 450.0Mbps |
| Operating Frequency | 5745 ~ 5825MHz |
| Number of Channel | 5 for 802.11a, 802.11n (HT20)<br>2 for 802.11n (HT40) |
| Output Power | 450.843mW |
| Antenna Type | Printed antenna with 2.50dBi gain |
| Antenna Connector | UFL |
| Accessory Device | Adapter |
| Data Cable Supplied | NA |

Note:

1. This report is prepared for FCC class II permissive change. The differences compared with the original design are updating standard to new rule version for U-NII-3 and adding new adapters. All test data had been re-tested.
2. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

| Modulation Mode | TX Function |
|---|---|
| 802.11a | 3TX |
| 802.11n (HT20) | 3TX |
| 802.11n (HT40) | 3TX |

3. The EUT consumes power from the following adapters. (New adapters are adapter 3 and 4)

| Adapter 1 | |
|---|---|
| Brand | NETGEAR |
| Model | MU30-5120250-A1 |
| Part No. | 332-10234-01 |
| Input Power | 100-240Vac, 50/60Hz, 0.8A |
| Output Power | 12Vdc, 2.5A |
| Power Line | 1.8m non-shielded cable without core |

| Adapter 2 | |
|---|---|
| Brand | NETGEAR |
| Model | P030WF120B 11200-6LF |
| Part No. | 332-10200-02 |
| Input Power | 100-240Vac, 50/60Hz, 1.0A |
| Output Power | 12Vdc, 2.5A |
| Power Line | 1.8m non-shielded cable without core |

| Adapter 3 | |
|---|---|
| Brand | NETGEAR |
| Model | 2ABB018F |
| Part No. | 332-10748-01 |
| Input Power | 100-240Vac, 50/60Hz, 0.6A |
| Output Power | 12Vdc, 1.5A |
| Power Line | 1.8m cable without core attached on adapter |

| Adapter 4 | |
|---|---|
| Brand | NETGEAR |
| Model | MU18A2120150-A1 |
| Part No. | 332-10749-01 |
| Input Power | 100-240Vac, 50/60Hz, 0.5A |
| Output Power | 12Vdc, 1.5A |
| Power Line | 1.8m cable without core attached on adapter |

## 3.2 Description of Test Modes

**FOR 5745 ~ 5825MHz**

5 channels are provided for 802.11a, 802.11n (HT20):

| Channel | Frequency | Channel | Frequency |
|---|---|---|---|
| 149 | 5745MHz | 161 | 5805MHz |
| 153 | 5765MHz | 165 | 5825MHz |
| 157 | 5785MHz | | |

2 channels are provided for 802.11n (HT40):

| Channel | Frequency | Channel | Frequency |
|---|---|---|---|
| 151 | 5755MHz | 159 | 5795MHz |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT CONFIGURE MODE | APPLICABLE TO | | | | DESCRIPTION |
|---|---|---|---|---|---|
| | RE≥1G | RE<1G | PLC | APCM | |
| A | - | √ | √ | - | Adapter Model: 2ABB018F |
| B | √ | √ | √ | √ | Adapter Model: MU18A2120150-A1 |

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

**PLC:** Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

**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 | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|---|
| B | 802.11a | 5745-5825 | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 6.0 |
| B | 802.11n (HT20) | | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 7.2 |
| B | 802.11n (HT40) | | 151 to 159 | 151, 159 | OFDM | BPSK | 15.0 |

**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 | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|---|
| A, B | 802.11n (HT20) | 5745-5825 | 149 to 165 | 157 | 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 | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|---|
| A, B | 802.11n (HT20) | 5745-5825 | 149 to 165 | 157 | OFDM | BPSK | 7.2 |

**Antenna Port Conducted Measurement:**

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ 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 | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|---|
| B | 802.11a | 5745-5825 | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 6.0 |
| B | 802.11n (HT20) | | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 7.2 |
| B | 802.11n (HT40) | | 151 to 159 | 151, 159 | OFDM | BPSK | 15.0 |

**Test Condition:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|---|---|---|---|
| RE≥1G | 23deg. C, 66%RH | 120Vac, 60Hz | Alan Wu |
| RE<1G | 25deg. C, 65%RH,<br>25deg. C, 67%RH | 120Vac, 60Hz | Bayu Chen,<br>Alan Wu |
| PLC | 24deg. C, 62%RH | 120Vac, 60Hz | Alan Wu |
| APCM | 25deg. C, 60%RH | 120Vac, 60Hz | Leo Tsai |

### 3.3 Duty Cycle of Test Signal

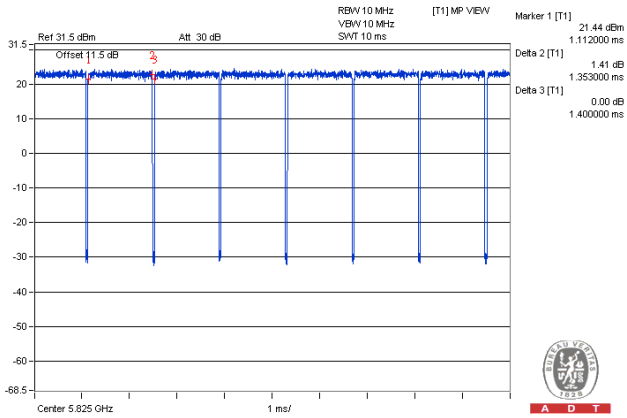
Duty cycle of test signal is < 98 %, duty factor is required

**802.11a**: Duty cycle = 1.353/1.400= 0.966, Duty factor = 10 * log(1/0.966) = 0.15

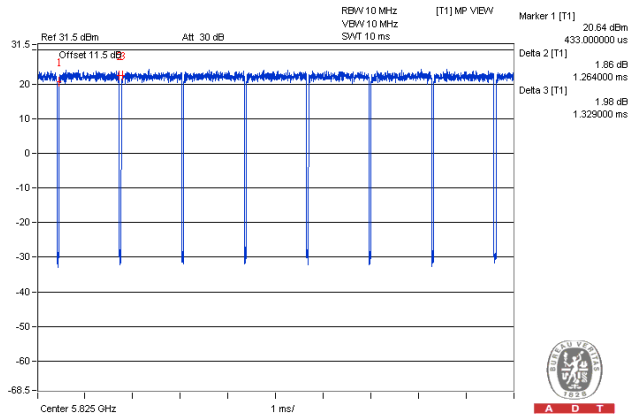
**802.11n (HT20):** Duty cycle = 1.264/1.329= 0.951, Duty factor = 10 * log(1/0.951) = 0.22

**802.11n (HT40):** Duty cycle = 0.624/0.669= 0.933, Duty factor = 10 * log(1/0.933) = 0.30

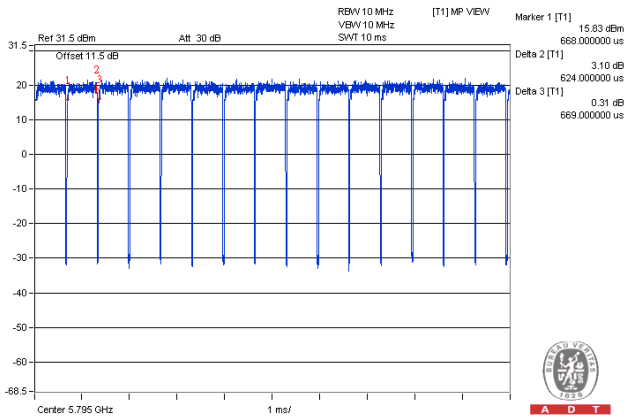
**802.11a**




**802.11n (HT20)**




**802.11n (HT40)**



### 3.4 Description of Support Units

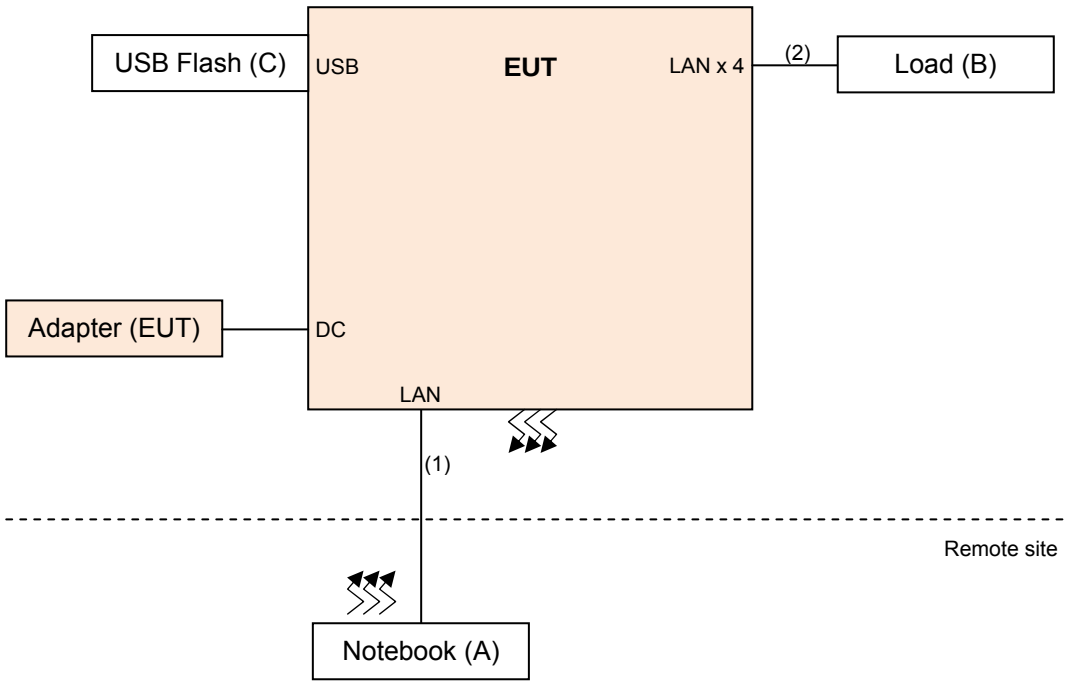
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|---|---|---|---|---|---|---|
| A. | Notebook | DELL | E5420 | 33MKMQ1 | FCC DoC Approved | - |
| B. | Load | N/A | N/A | N/A | N/A | - |
| C. | USB Flash | N/A | N/A | N/A | N/A | - |

Note: 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. | RJ45 cable | 1 | 10 | N | 0 | - |
| 2. | RJ45 cable | 4 | 1.8 | N | 0 | - |

#### 3.4.1 Configuration of System under Test



### 3.5 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 E (15.407)**
**789033 D02 General UNII Test Procedures New Rules v01**
**662911 D01 Multiple Transmitter Output v02r01**
ANSI C63.10-2013

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.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

**NOTE**:

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

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

| APPLICABLE TO | LIMIT | |
|---|---|---|
| 789033 D02 General UNII Test Procedures New Rules v01 | FIELD STRENGTH AT 3m | |
| | PK:74 (dBμV/m) | AV:54 (dBμV/m) |
| APPLICABLE TO | EIRP LIMIT | EQUIVALENT FIELD STRENGTH AT 3m |
| 15.407(b)(1) | PK:-27 (dBm/MHz) | PK:68.2(dBμV/m) |
| 15.407(b)(2) | | |
| 15.407(b)(3) | | |
| 15.407(b)(4) | PK:-27 (dBm/MHz) *1<br>PK:-17 (dBm/MHz) *2 | PK: 68.2(dBμV/m) *1<br>PK: 78.2 (dBμV/m) *2 |

**NOTE:** *1 beyond 10MHz of the band edge *2 within 10 MHz of band edge

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

### 4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|
| Test Receiver ROHDE & SCHWARZ | ESCI | 100613 | Nov. 06, 2014 | Nov. 10, 2015 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100040 | Jul. 08, 2015 | Jul. 07, 2016 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-155 | Feb. 06, 2015 | Feb. 05, 2016 |
| HORN Antenna SCHWARZBECK | BBHA 9120D | 9120D-1170 | Feb. 05, 2015 | Feb. 04, 2016 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170241 | Feb. 09, 2015 | Feb. 08, 2016 |
| Preamplifier Agilent | 8449B | 3008A01960 | Aug. 09, 2015 | Aug. 08, 2016 |
| Preamplifier Agilent | 8447D | 2944A10631 | Aug. 09, 2015 | Aug. 08, 2016 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | Cable-CH4-02(295012+ 309220) | Aug. 09, 2015 | Aug. 08, 2016 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | Cable-CH4-03(250724) | Aug. 09, 2015 | Aug. 08, 2016 |
| Software BV ADT | ADT_Radiated_ V7.6.15.9.4 | NA | NA | NA |
| Antenna Tower inn-co GmbH | MA 4000 | 010303 | NA | NA |
| Antenna Tower Controller BV ADT | AT100 | AT93021703 | NA | NA |
| Turn Table BV ADT | TT100 | TT93021703 | NA | NA |
| Turn Table Controller BV ADT | SC100. | SC93021703 | NA | NA |
| 26GHz ~ 40GHz Amplifier | EM26400 | 815221 | Oct. 18, 2014 | Oct. 17, 2015 |
| WIT Standard Temperature And Humidity Chamber | TH-4S-C | W981030 | Jun. 08, 2015 | Jun. 07, 2016 |

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 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.

### 4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

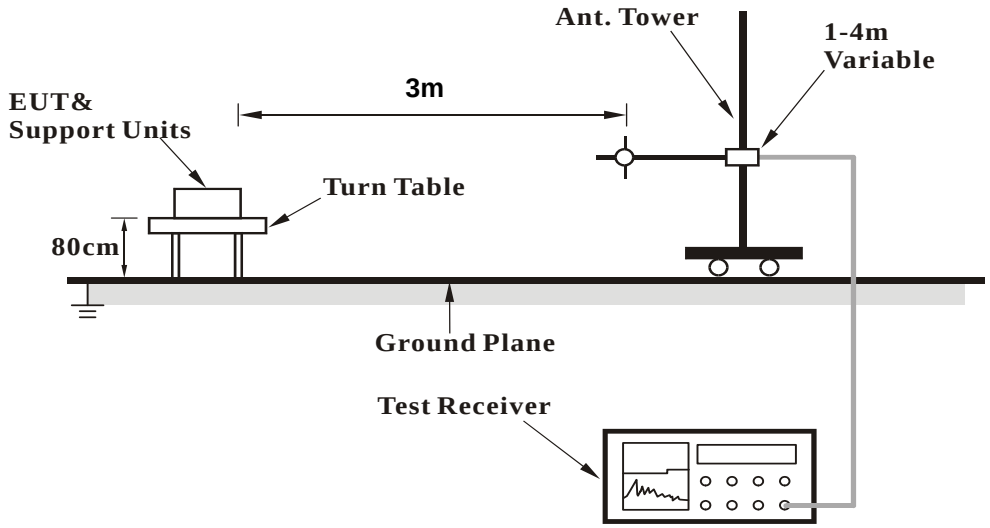
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

### 4.1.4 Deviation from Test Standard

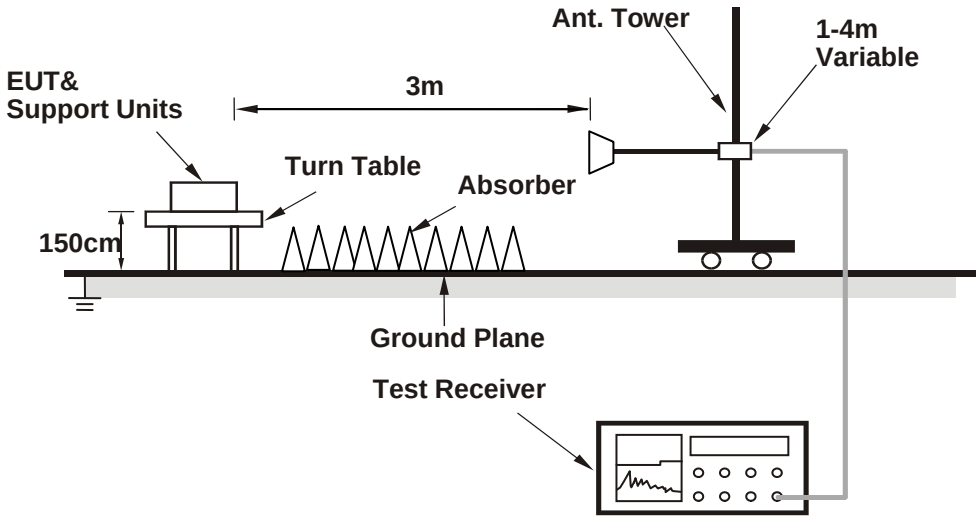
No deviation.

### 4.1.5 Test Set Up

**<Frequency Range below 1GHz>**




**<Frequency Range above 1GHz>**




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

### 4.1.6 EUT Operating Conditions

a. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
b. The necessary accessories enable the system in full functions.

### 4.1.7 Test Results

Above 1GHz data:

802.11a

| CHANNEL | TX Channel 149 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | #5714.90 | 68.3 PK | 74.0 | -5.7 | 2.02 H | 140 | 62.30 | 6.00 |
| 2 | #5714.90 | 51.6 AV | 54.0 | -2.4 | 2.02 H | 140 | 45.60 | 6.00 |
| 3 | #5722.90 | 77.7 PK | 78.2 | -0.5 | 2.02 H | 140 | 71.60 | 6.10 |
| 4 | #5725.00 | 66.3 PK | 78.2 | -11.9 | 2.02 H | 140 | 60.20 | 6.10 |
| 5 | *5745.00 | 114.7 PK | | | 2.02 H | 140 | 74.40 | 40.30 |
| 6 | *5745.00 | 104.0 AV | | | 2.02 H | 140 | 63.70 | 40.30 |
| 7 | 11490.00 | 60.1 PK | 74.0 | -13.9 | 1.00 H | 284 | 42.50 | 17.60 |
| 8 | 11490.00 | 47.4 AV | 54.0 | -6.6 | 1.00 H | 284 | 29.80 | 17.60 |
| 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 | #5714.90 | 68.0 PK | 74.0 | -6.0 | 1.59 V | 293 | 62.00 | 6.00 |
| 2 | #5714.90 | 52.0 AV | 54.0 | -2.0 | 1.59 V | 293 | 46.00 | 6.00 |
| **3** | **#5722.90** | **78.1 PK** | **78.2** | **-0.1** | **1.59 V** | **293** | **72.00** | **6.10** |
| 4 | #5725.00 | 66.7 PK | 78.2 | -11.5 | 1.59 V | 293 | 60.60 | 6.10 |
| 5 | *5745.00 | 117.4 PK | | | 1.59 V | 293 | 77.10 | 40.30 |
| 6 | *5745.00 | 107.0 AV | | | 1.59 V | 293 | 66.70 | 40.30 |
| 7 | 11490.00 | 63.1 PK | 74.0 | -10.9 | 1.00 V | 236 | 45.50 | 17.60 |
| 8 | 11490.00 | 49.7 AV | 54.0 | -4.3 | 1.00 V | 236 | 32.10 | 17.60 |

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 radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | 5440.00 | 65.8 PK | 74.0 | -8.2 | 1.99 H | 146 | 60.20 | 5.60 |
| 2 | 5440.00 | 53.6 AV | 54.0 | -0.4 | 1.99 H | 146 | 48.00 | 5.60 |
| 3 | *5785.00 | 117.8 PK | | | 2.05 H | 151 | 77.50 | 40.30 |
| 4 | *5785.00 | 106.6 AV | | | 2.05 H | 151 | 66.30 | 40.30 |
| 5 | 11570.00 | 60.9 PK | 74.0 | -13.1 | 1.00 H | 281 | 43.40 | 17.50 |
| 6 | 11570.00 | 47.8 AV | 54.0 | -6.2 | 1.00 H | 281 | 30.30 | 17.50 |
| 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 | 5440.00 | 61.3 PK | 74.0 | -12.7 | 1.68 V | 287 | 55.70 | 5.60 |
| 2 | 5440.00 | 48.4 AV | 54.0 | -5.6 | 1.68 V | 287 | 42.80 | 5.60 |
| 3 | *5785.00 | 120.2 PK | | | 1.65 V | 286 | 79.90 | 40.30 |
| 4 | *5785.00 | 109.6 AV | | | 1.65 V | 286 | 69.30 | 40.30 |
| 5 | 11570.00 | 63.8 PK | 74.0 | -10.2 | 1.00 V | 239 | 46.30 | 17.50 |
| 6 | 11570.00 | 50.3 AV | 54.0 | -3.7 | 1.00 V | 239 | 32.80 | 17.50 |

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.

| CHANNEL | TX Channel 165 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | *5825.00 | 115.3 PK | | | 2.02 H | 143 | 74.90 | 40.40 |
| 2 | *5825.00 | 104.5 AV | | | 2.02 H | 143 | 64.10 | 40.40 |
| 3 | #5850.00 | 62.4 PK | 78.2 | -15.8 | 2.02 H | 143 | 56.00 | 6.40 |
| 4 | #5852.10 | 77.6 PK | 78.2 | -0.6 | 2.02 H | 143 | 71.20 | 6.40 |
| 5 | #5860.10 | 70.3 PK | 74.0 | -3.7 | 2.02 H | 143 | 63.90 | 6.40 |
| 6 | #5860.10 | 50.5 AV | 54.0 | -3.5 | 2.02 H | 143 | 44.10 | 6.40 |
| 7 | 11650.00 | 60.8 PK | 74.0 | -13.2 | 1.00 H | 288 | 43.50 | 17.30 |
| 8 | 11650.00 | 47.6 AV | 54.0 | -6.4 | 1.00 H | 288 | 30.30 | 17.30 |
| 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 | *5825.00 | 119.2 PK | | | 1.63 V | 292 | 78.80 | 40.40 |
| 2 | *5825.00 | 108.8 AV | | | 1.63 V | 292 | 68.40 | 40.40 |
| 3 | #5850.00 | 63.0 PK | 78.2 | -15.2 | 2.63 V | 292 | 56.60 | 6.40 |
| 4 | #5852.10 | 77.9 PK | 78.2 | -0.3 | 1.63 V | 292 | 71.50 | 6.40 |
| 5 | #5860.10 | 73.1 PK | 74.0 | -0.9 | 1.63 V | 292 | 66.70 | 6.40 |
| 6 | #5860.10 | 53.8 AV | 54.0 | -0.2 | 1.63 V | 292 | 47.40 | 6.40 |
| 7 | 11650.00 | 63.6 PK | 74.0 | -10.4 | 1.00 V | 231 | 46.30 | 17.30 |
| 8 | 11650.00 | 50.2 AV | 54.0 | -3.8 | 1.00 V | 231 | 32.90 | 17.30 |

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 radiated frequency is out of the restricted band.

802.11n (HT20)

| CHANNEL | TX Channel 149 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | #5714.90 | 69.0 PK | 74.0 | -5.0 | 2.01 H | 153 | 63.00 | 6.00 |
| 2 | #5714.90 | 51.0 AV | 54.0 | -3.0 | 2.01 H | 153 | 45.00 | 6.00 |
| 3 | #5722.90 | 77.1 PK | 78.2 | -1.1 | 2.01 H | 153 | 71.00 | 6.10 |
| 4 | #5725.00 | 58.7 PK | 78.2 | -19.5 | 2.01 H | 153 | 52.60 | 6.10 |
| 5 | *5745.00 | 113.9 PK | | | 2.01 H | 153 | 73.60 | 40.30 |
| 6 | *5745.00 | 103.8 AV | | | 2.01 H | 153 | 63.50 | 40.30 |
| 7 | 11490.00 | 59.9 PK | 74.0 | -14.1 | 1.00 H | 282 | 42.30 | 17.60 |
| 8 | 11490.00 | 47.3 AV | 54.0 | -6.7 | 1.00 H | 282 | 29.70 | 17.60 |
| 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 | #5714.90 | 70.0 PK | 74.0 | -4.0 | 1.74 V | 288 | 64.00 | 6.00 |
| 2 | #5714.90 | 53.5 AV | 54.0 | -0.5 | 1.74 V | 288 | 47.50 | 6.00 |
| 3 | #5722.90 | 77.9 PK | 78.2 | -0.3 | 1.74 V | 288 | 71.80 | 6.10 |
| 4 | #5725.00 | 60.6 PK | 78.2 | -17.6 | 1.74 V | 288 | 54.50 | 6.10 |
| 5 | *5745.00 | 115.0 PK | | | 1.74 V | 289 | 74.70 | 40.30 |
| 6 | *5745.00 | 104.7 AV | | | 1.74 V | 289 | 64.40 | 40.30 |
| 7 | 11490.00 | 62.7 PK | 74.0 | -11.3 | 1.00 V | 237 | 45.10 | 17.60 |
| 8 | 11490.00 | 49.1 AV | 54.0 | -4.9 | 1.00 V | 237 | 31.50 | 17.60 |

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 radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | 5440.00 | 65.9 PK | 74.0 | -8.1 | 1.99 H | 153 | 60.30 | 5.60 |
| 2 | 5440.00 | 53.8 AV | 54.0 | -0.2 | 1.99 H | 153 | 48.20 | 5.60 |
| 3 | *5785.00 | 117.7 PK | | | 1.99 H | 153 | 77.40 | 40.30 |
| 4 | *5785.00 | 107.3 AV | | | 1.99 H | 153 | 67.00 | 40.30 |
| 5 | 11570.00 | 60.4 PK | 74.0 | -13.6 | 1.00 H | 289 | 42.90 | 17.50 |
| 6 | 11570.00 | 47.7 AV | 54.0 | -6.3 | 1.00 H | 289 | 30.20 | 17.50 |
| 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 | 5440.00 | 61.6 PK | 74.0 | -12.4 | 1.79 V | 282 | 56.00 | 5.60 |
| 2 | 5440.00 | 49.0 AV | 54.0 | -5.0 | 1.79 V | 282 | 43.40 | 5.60 |
| 3 | *5785.00 | 119.3 PK | | | 1.72 V | 286 | 79.00 | 40.30 |
| 4 | *5785.00 | 109.0 AV | | | 1.72 V | 286 | 68.70 | 40.30 |
| 5 | 11570.00 | 63.3 PK | 74.0 | -10.7 | 1.00 V | 231 | 45.80 | 17.50 |
| 6 | 11570.00 | 49.9 AV | 54.0 | -4.1 | 1.00 V | 231 | 32.40 | 17.50 |

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.

| CHANNEL | TX Channel 165 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | *5825.00 | 114.6 PK | | | 1.98 H | 160 | 74.20 | 40.40 |
| 2 | *5825.00 | 104.1 AV | | | 1.98 H | 160 | 63.70 | 40.40 |
| 3 | #5850.00 | 64.5 PK | 78.2 | -13.7 | 1.98 H | 160 | 58.10 | 6.40 |
| 4 | #5852.10 | 77.9 PK | 78.2 | -0.3 | 1.98 H | 160 | 71.50 | 6.40 |
| 5 | #5860.10 | 71.4 PK | 74.0 | -2.6 | 1.98 H | 160 | 65.00 | 6.40 |
| 6 | #5860.10 | 51.8 AV | 54.0 | -2.2 | 1.98 H | 160 | 45.40 | 6.40 |
| 7 | 11650.00 | 60.0 PK | 74.0 | -14.0 | 1.00 H | 285 | 42.70 | 17.30 |
| 8 | 11650.00 | 47.5 AV | 54.0 | -6.5 | 1.00 H | 285 | 30.20 | 17.30 |
| 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 | *5825.00 | 117.3 PK | | | 2.22 V | 284 | 76.90 | 40.40 |
| 2 | *5825.00 | 107.3 AV | | | 2.22 V | 284 | 66.90 | 40.40 |
| 3 | #5850.00 | 66.5 PK | 78.2 | -11.7 | 2.23 V | 284 | 60.10 | 6.40 |
| 4 | #5852.10 | 77.6 PK | 78.2 | -0.6 | 2.23 V | 284 | 71.20 | 6.40 |
| 5 | #5860.10 | 73.5 PK | 74.0 | -0.5 | 2.23 V | 284 | 67.10 | 6.40 |
| 6 | #5860.10 | 53.8 AV | 54.0 | -0.2 | 2.23 V | 284 | 47.40 | 6.40 |
| 7 | 11650.00 | 63.2 PK | 74.0 | -10.8 | 1.00 V | 234 | 45.90 | 17.30 |
| 8 | 11650.00 | 49.5 AV | 54.0 | -4.5 | 1.00 V | 234 | 32.20 | 17.30 |

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 radiated frequency is out of the restricted band.

802.11n (HT40)

| | | | |
|---|---|---|---|
| CHANNEL | TX Channel 151 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | #5714.90 | 68.6 PK | 74.0 | -5.4 | 1.98 H | 152 | 62.60 | 6.00 |
| 2 | #5714.90 | 52.0 AV | 54.0 | -2.0 | 1.98 H | 152 | 46.00 | 6.00 |
| 3 | #5722.90 | 73.2 PK | 78.2 | -5.0 | 1.98 H | 152 | 67.10 | 6.10 |
| 4 | #5725.00 | 53.7 PK | 78.2 | -24.5 | 1.98 H | 152 | 47.60 | 6.10 |
| 5 | *5755.00 | 106.7 PK | | | 1.98 H | 152 | 66.40 | 40.30 |
| 6 | *5755.00 | 95.9 AV | | | 1.98 H | 152 | 55.60 | 40.30 |
| 7 | 11510.00 | 59.3 PK | 74.0 | -14.7 | 1.00 H | 285 | 41.90 | 17.40 |
| 8 | 11510.00 | 47.1 AV | 54.0 | -6.9 | 1.00 H | 285 | 29.70 | 17.40 |
| 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 | #5714.90 | 69.2 PK | 74.0 | -4.8 | 1.74 V | 298 | 63.20 | 6.00 |
| 2 | #5714.90 | 53.6 AV | 54.0 | -0.4 | 1.74 V | 298 | 47.60 | 6.00 |
| 3 | #5722.90 | 73.5 PK | 78.2 | -4.7 | 1.74 V | 298 | 67.40 | 6.10 |
| 4 | #5725.00 | 54.7 PK | 78.2 | -23.5 | 1.74 V | 298 | 48.60 | 6.10 |
| 5 | *5755.00 | 108.1 PK | | | 1.74 V | 298 | 67.80 | 40.30 |
| 6 | *5755.00 | 97.5 AV | | | 1.74 V | 298 | 57.20 | 40.30 |
| 7 | 11510.00 | 62.3 PK | 74.0 | -11.7 | 1.00 V | 236 | 44.90 | 17.40 |
| 8 | 11510.00 | 48.7 AV | 54.0 | -5.3 | 1.00 V | 236 | 31.30 | 17.40 |

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 radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 159 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| 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 | *5795.00 | 112.1 PK | | | 2.01 H | 151 | 71.80 | 40.30 |
| 2 | *5795.00 | 101.8 AV | | | 2.01 H | 151 | 61.50 | 40.30 |
| 3 | #5850.00 | 50.6 PK | 78.2 | -27.6 | 2.01 H | 151 | 44.20 | 6.40 |
| 4 | #5852.10 | 71.4 PK | 78.2 | -6.8 | 2.01 H | 151 | 65.00 | 6.40 |
| 5 | #5860.10 | 68.5 PK | 74.0 | -5.5 | 2.01 H | 151 | 62.10 | 6.40 |
| 6 | #5860.10 | 49.6 AV | 54.0 | -4.4 | 2.01 H | 151 | 43.20 | 6.40 |
| 7 | 11590.00 | 59.9 PK | 74.0 | -14.1 | 1.00 H | 280 | 42.60 | 17.30 |
| 8 | 11590.00 | 47.3 AV | 54.0 | -6.7 | 1.00 H | 280 | 30.00 | 17.30 |
| 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 | *5795.00 | 114.5 PK | | | 1.65 V | 297 | 74.20 | 40.30 |
| 2 | *5795.00 | 104.0 AV | | | 1.65 V | 297 | 63.70 | 40.30 |
| 3 | #5850.00 | 53.9 PK | 78.2 | -24.3 | 1.65 V | 297 | 47.50 | 6.40 |
| 4 | #5852.10 | 72.4 PK | 78.2 | -5.8 | 1.65 V | 297 | 66.00 | 6.40 |
| 5 | #5860.10 | 71.6 PK | 74.0 | -2.4 | 1.65 V | 297 | 65.20 | 6.40 |
| **6** | **#5860.10** | **53.9 AV** | **54.0** | **-0.1** | **1.65 V** | **297** | **47.50** | **6.40** |
| 7 | 11590.00 | 62.9 PK | 74.0 | -11.1 | 1.00 V | 230 | 45.60 | 17.30 |
| 8 | 11590.00 | 49.4 AV | 54.0 | -4.6 | 1.00 V | 230 | 32.10 | 17.30 |

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 radiated frequency is out of the restricted band.

Below 1GHz worst-case data:

802.11n (HT20)

| | | | |
|---|---|---|---|
| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |
| TTEST MODE | A | | |

| 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 | 45.52 | 17.6 QP | 40.0 | -22.4 | 1.51 H | 350 | 32.10 | -14.50 |
| 2 | 119.24 | 23.3 QP | 43.5 | -20.2 | 1.51 H | 159 | 39.80 | -16.50 |
| 3 | 200.72 | 23.7 QP | 43.5 | -19.8 | 1.01 H | 146 | 40.30 | -16.60 |
| 4 | 249.22 | 31.2 QP | 46.0 | -14.8 | 1.01 H | 112 | 45.60 | -14.40 |
| 5 | 321.00 | 29.7 QP | 46.0 | -16.3 | 1.01 H | 160 | 41.50 | -11.80 |
| 6 | 600.36 | 31.1 QP | 46.0 | -14.9 | 1.51 H | 316 | 37.40 | -6.30 |
| 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 | 45.52 | 29.6 QP | 40.0 | -10.4 | 1.49 V | 267 | 44.10 | -14.50 |
| 2 | 64.92 | 30.5 QP | 40.0 | -9.5 | 1.24 V | 12 | 45.70 | -15.20 |
| 3 | 99.84 | 23.8 QP | 43.5 | -19.7 | 1.24 V | 216 | 42.50 | -18.70 |
| 4 | 121.18 | 22.1 QP | 43.5 | -21.4 | 1.00 V | 65 | 38.50 | -16.40 |
| 5 | 249.22 | 25.2 QP | 46.0 | -20.8 | 1.99 V | 212 | 39.60 | -14.40 |
| 6 | 499.48 | 30.6 QP | 46.0 | -15.4 | 1.00 V | 228 | 39.20 | -8.60 |

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

| | | | |
|---|---|---|---|
| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |
| TTEST MODE | 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 | 55.13 | 34.8 QP | 40.0 | -5.2 | 1.24 H | 12 | 48.80 | -14.00 |
| 2 | 97.81 | 35.2 QP | 43.5 | -8.3 | 1.99 H | 95 | 54.20 | -19.00 |
| 3 | 124.98 | 37.2 QP | 43.5 | -6.3 | 1.99 H | 95 | 53.20 | -16.00 |
| 4 | 249.17 | 35.2 QP | 46.0 | -10.8 | 1.24 H | 98 | 49.80 | -14.60 |
| 5 | 600.38 | 29.6 QP | 46.0 | -16.4 | 1.50 H | 21 | 36.50 | -6.90 |
| 6 | 875.91 | 34.2 QP | 46.0 | -11.8 | 1.00 H | 298 | 36.30 | -2.10 |
| 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 | 53.18 | 36.9 QP | 40.0 | -3.1 | 1.24 V | 12 | 50.70 | -13.80 |
| 2 | 68.71 | 36.8 QP | 40.0 | -3.2 | 1.00 V | 125 | 52.40 | -15.60 |
| 3 | 95.87 | 38.3 QP | 43.5 | -5.2 | 1.00 V | 163 | 57.40 | -19.10 |
| 4 | 124.98 | 39.6 QP | 43.5 | -3.9 | 1.00 V | 157 | 55.60 | -16.00 |
| 5 | 249.17 | 34.2 QP | 46.0 | -11.8 | 2.00 V | 128 | 48.80 | -14.60 |
| 6 | 600.38 | 31.7 QP | 46.0 | -14.3 | 1.00 V | 139 | 38.60 | -6.90 |

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

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

**Note:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 4.2.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESCS 30 | 100288 | Apr. 27, 2015 | Apr. 26, 2016 |
| RF signal cable (with 10dB PAD)<br>Woken | 5D-FB | Cable-cond2-01 | Dec. 26, 2014 | Dec. 25, 2015 |
| LISN<br>ROHDE & SCHWARZ<br>(EUT) | ESH2-Z5 | 100100 | Dec. 30, 2014 | Dec. 29, 2015 |
| LISN<br>ROHDE & SCHWARZ<br>(Peripheral) | ESH3-Z5 | 100312 | Jul. 21, 2015 | Jul. 20, 2016 |
| 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 2.
3. The VCCI Site Registration No. is C-2047.

### 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.

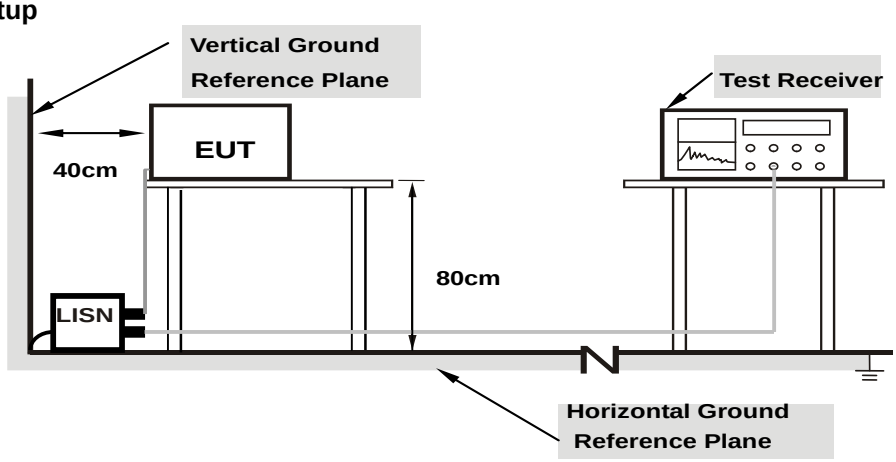
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

### 4.2.4 Deviation from Test Standard

No deviation.

### 4.2.5 Test Setup




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

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.

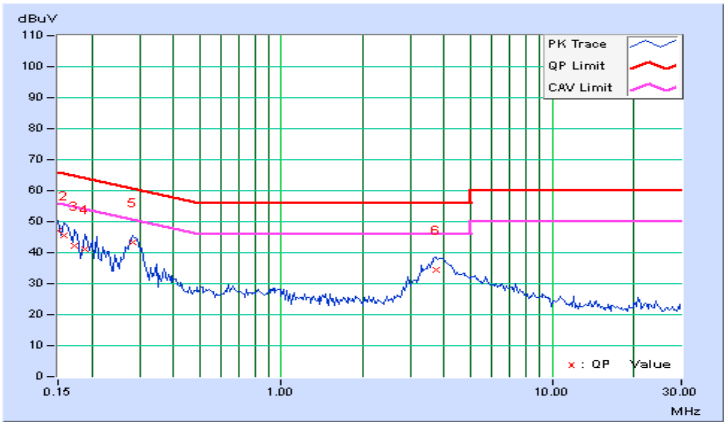
### 4.2.7 Test Results

| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|
| Test Mode | A | | |

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 9.91 | 37.00 | 23.57 | 46.91 | 33.48 | 66.00 | 56.00 | -19.09 | -22.52 |
| 2 | 0.15781 | 9.91 | 35.56 | 20.79 | 45.47 | 30.70 | 65.58 | 55.58 | -20.11 | -24.88 |
| 3 | 0.17344 | 9.91 | 32.30 | 20.15 | 42.21 | 30.06 | 64.79 | 54.79 | -22.58 | -24.73 |
| 4 | 0.18906 | 9.91 | 31.23 | 21.88 | 41.14 | 31.79 | 64.08 | 54.08 | -22.93 | -22.28 |
| 5 | 0.28281 | 9.92 | 33.26 | 27.72 | 43.18 | 37.64 | 60.73 | 50.73 | -17.55 | -13.09 |
| 6 | 3.72656 | 10.17 | 24.23 | 18.76 | 34.40 | 28.93 | 56.00 | 46.00 | -21.60 | -17.07 |

**REMARKS:**

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

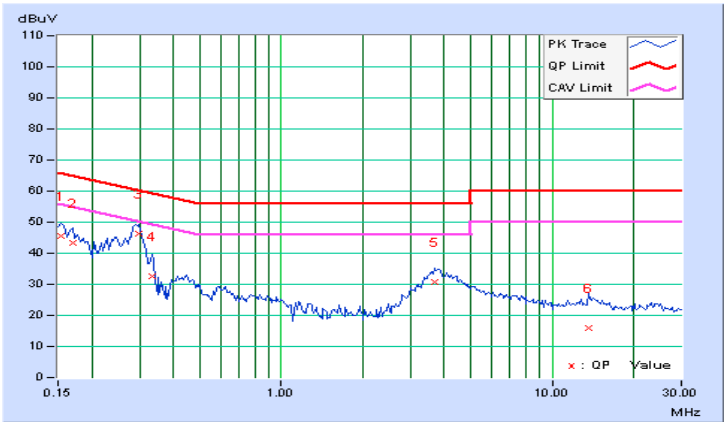


| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|
| Test Mode | A | | |

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15391 | 9.92 | 35.66 | 21.19 | 45.58 | 31.11 | 65.79 | 55.79 | -20.21 | -24.68 |
| 2 | 0.16953 | 9.92 | 33.37 | 20.50 | 43.29 | 30.42 | 64.98 | 54.98 | -21.69 | -24.56 |
| **3** | **0.29844** | **9.94** | **36.23** | **29.87** | **46.17** | **39.81** | **60.29** | **50.29** | **-14.12** | **-10.48** |
| 4 | 0.33359 | 9.94 | 22.47 | 16.04 | 32.41 | 25.98 | 59.36 | 49.36 | -26.95 | -23.38 |
| 5 | 3.68359 | 10.20 | 20.62 | 14.94 | 30.82 | 25.14 | 56.00 | 46.00 | -25.18 | -20.86 |
| 6 | 13.56641 | 10.57 | 5.37 | 1.73 | 15.94 | 12.30 | 60.00 | 50.00 | -44.06 | -37.70 |

**REMARKS:**

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

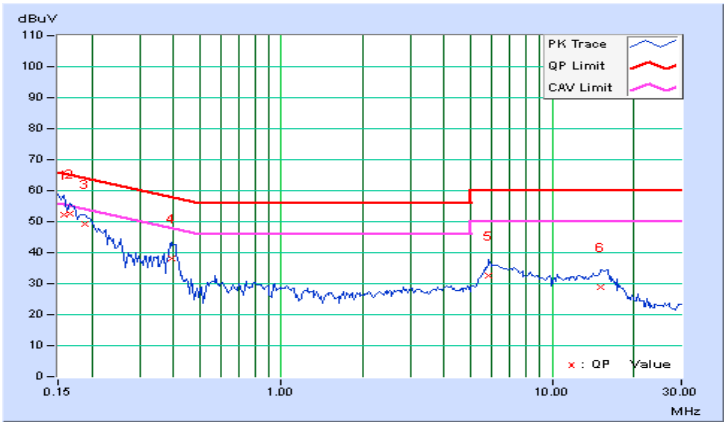


| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|
| Test Mode | B | | |

| No | Freq. | Corr. Factor | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15781 | 9.91 | 42.35 | 26.66 | 52.26 | 36.57 | 65.58 | 55.58 | -13.32 | -19.01 |
| 2 | 0.16562 | 9.91 | 42.54 | 28.24 | 52.45 | 38.15 | 65.18 | 55.18 | -12.73 | -17.03 |
| 3 | 0.18906 | 9.91 | 39.33 | 24.98 | 49.24 | 34.89 | 64.08 | 54.08 | -14.83 | -19.18 |
| 4 | 0.39219 | 9.93 | 28.31 | 23.89 | 38.24 | 33.82 | 58.02 | 48.02 | -19.78 | -14.20 |
| 5 | 5.85156 | 10.25 | 22.36 | 17.67 | 32.61 | 27.92 | 60.00 | 50.00 | -27.39 | -22.08 |
| 6 | 15.18750 | 10.50 | 18.31 | 13.52 | 28.81 | 24.02 | 60.00 | 50.00 | -31.19 | -25.98 |

**REMARKS:**

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

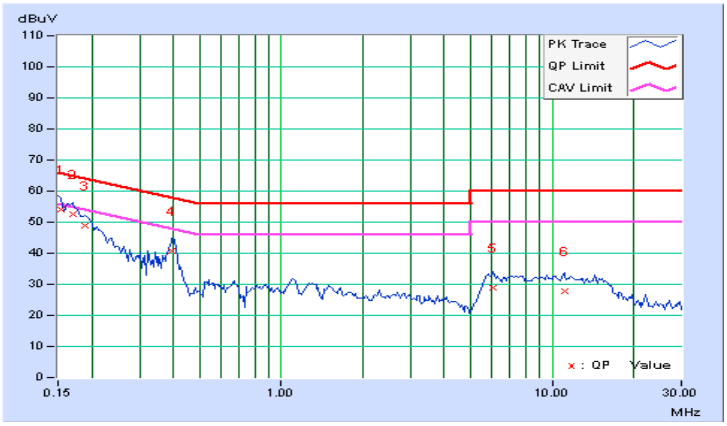


| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|
| Test Mode | B | | |

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15391 | 9.92 | 44.26 | 30.18 | 54.18 | 40.10 | 65.79 | 55.79 | -11.61 | -15.69 |
| 2 | 0.16953 | 9.92 | 42.82 | 29.90 | 52.74 | 39.82 | 64.98 | 54.98 | -12.24 | -15.16 |
| 3 | 0.18906 | 9.92 | 39.15 | 26.18 | 49.07 | 36.10 | 64.08 | 54.08 | -15.00 | -17.97 |
| 4 | 0.39609 | 9.95 | 30.80 | 27.27 | 40.75 | 37.22 | 57.93 | 47.93 | -17.18 | -10.71 |
| 5 | 6.05859 | 10.30 | 18.41 | 13.39 | 28.71 | 23.69 | 60.00 | 50.00 | -31.29 | -26.31 |
| 6 | 11.10156 | 10.49 | 17.31 | 13.07 | 27.80 | 23.56 | 60.00 | 50.00 | -32.20 | -26.44 |

**REMARKS:**

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



## 4.3 Transmit Power Measurment

### 4.3.1 Limits of Transmit Power Measurement

| Operation Band | EUT Category | | LIMIT |
|---|---|---|---|
| U-NII-1 | - | Outdoor Access Point | 1 Watt (30 dBm)<br>(Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon) |
| | - | Fixed point-to-point Access Point | 1 Watt (30 dBm) |
| | - | Indoor Access Point | 1 Watt (30 dBm) |
| | - | Mobile and Portable client device | 250mW (24 dBm) |
| U-NII-2A | - | | 250mW (24 dBm) or 11 dBm+10 log B* |
| U-NII-2C | - | | 250mW (24 dBm) or 11 dBm+10 log B* |
| U-NII-3 | √ | | 1 Watt (30 dBm) |

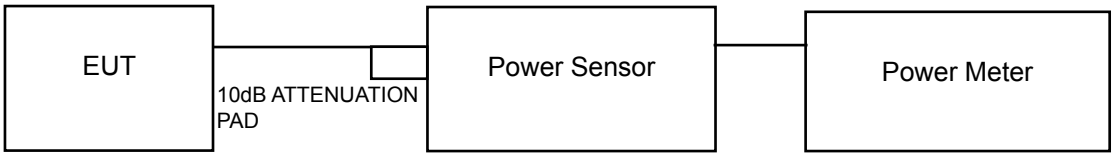
*B is the 26 dB emission bandwidth in megahertz

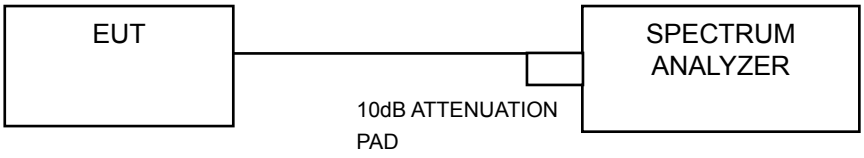
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any $N_{ANT}$;
Array Gain = 5 log($N_{ANT}/N_{SS}$) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log($N_{ANT}/N_{SS}$) dB.

### 4.3.2 Test Setup




### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.3.4 Test Procedure

**FOR AVERAGE POWER MEASUREMENT**

**For 802.11a, 802.11n (HT20), 802.11n (HT40)**

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

**FOR OCCUPIED BANDWIDTH**

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 300 kHz RBW and 1MHz VBW. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

### 4.3.5 Deviation fromTest Standard

No deviation.

### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 4.3.7 Test Result

**POWER OUTPUT:**

**802.11a**

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 149 | 5745 | 19.27 | 17.97 | 18.42 | 216.691 | 23.36 | 30.00 | Pass |
| 157 | 5785 | 22.09 | 21.52 | 21.30 | 438.610 | 26.42 | 30.00 | Pass |
| 165 | 5825 | 21.70 | 21.38 | 20.82 | 406.096 | 26.09 | 30.00 | Pass |

**802.11n (HT20)**

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 149 | 5745 | 18.73 | 17.41 | 17.42 | 184.934 | 22.67 | 30.00 | Pass |
| 157 | 5785 | 21.95 | 21.75 | 21.60 | **450.843** | 26.54 | 30.00 | Pass |
| 165 | 5825 | 20.19 | 20.20 | 19.89 | 306.684 | 24.87 | 30.00 | Pass |

**802.11n (HT40)**

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 151 | 5755 | 14.38 | 14.21 | 14.32 | 80.819 | 19.08 | 30.00 | Pass |
| 159 | 5795 | 20.11 | 20.12 | 19.98 | 304.908 | 24.84 | 30.00 | Pass |

## OCCUPIED BANDWIDTH:

### 802.11a

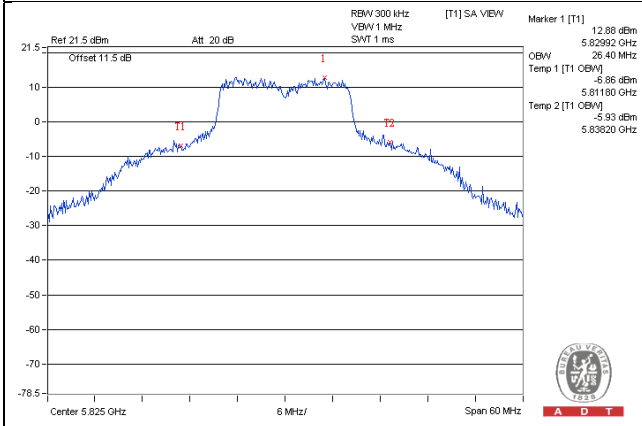
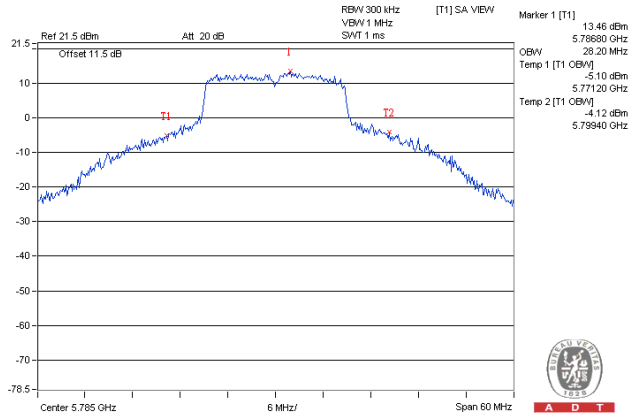
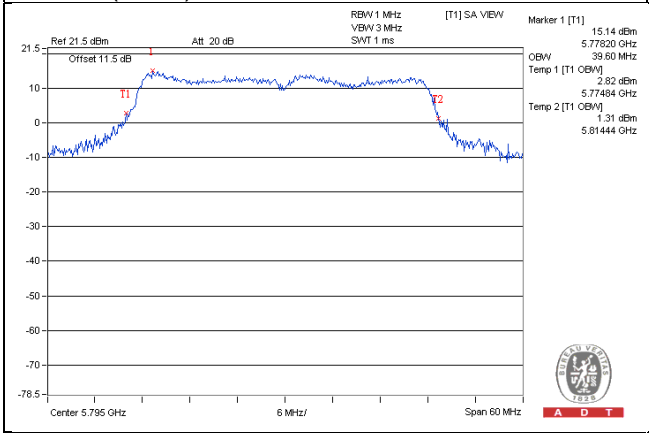
| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) | | |
|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 |
| 149 | 5745 | 17.74 | 17.30 | 17.74 |
| 157 | 5785 | 25.08 | 25.92 | 26.17 |
| 165 | 5825 | 21.84 | 22.20 | 26.40 |

### 802.11n (HT20)

| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) | | |
|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 |
| 149 | 5745 | 18.36 | 18.24 | 18.84 |
| 157 | 5785 | 26.40 | 24.96 | 28.20 |
| 165 | 5825 | 19.20 | 18.84 | 23.52 |

### 802.11n (HT40)

| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) | | |
|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 |
| 151 | 5755 | 38.28 | 38.28 | 37.80 |
| 159 | 5795 | 38.88 | 39.00 | 39.60 |

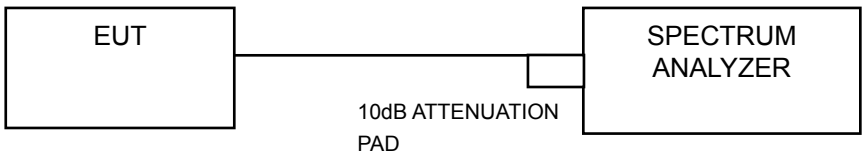
| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a | 802.11n (HT20) |
|  |  |
| 802.11n (HT40) | |
|  | |

## 4.4 Peak Power Spectral Density Measurement

### 4.4.1 Limits of Peak Power Spectral Density Measurement

| Operation Band | EUT Category | | LIMIT |
|---|---|---|---|
| U-NII-1 | - | Outdoor Access Point | 17dBm/ MHz |
| | - | Fixed point-to-point Access Point | |
| | - | Indoor Access Point | |
| | - | Mobile and Portable client device | 11dBm/ MHz |
| U-NII-2A | - | | 11dBm/ MHz |
| U-NII-2C | - | | 11dBm/ MHz |
| U-NII-3 | √ | | 30dBm/ 500kHz |

### 4.4.2 Test Setup




### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 Test Procedures

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.

b. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS

c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.

d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)

e. Sweep time = auto, trigger set to “free run”.

f. Trace average at least 100 traces in power averaging mode.

g. Record the max value and add 10 log (1/duty cycle)

### 4.4.5 Deviation from Test Standard

No deviation.

### 4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

### 4.4.7 Test Results

**802.11a**

| TX chain | Channel | Freq. (MHz) | PSD (dBm/ 300kHz) | PSD (dBm/ 500kHz) | 10 log (N=3) dB | Duty Factor | Total PSD (dBm/ 500kHz) | Limit (dBm/ 500kHz) | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 149 | 5745 | -2.78 | -0.56 | 4.77 | 0.15 | 4.36 | 28.73 | Pass |
| | 157 | 5785 | 0.09 | 2.31 | 4.77 | 0.15 | 7.23 | 28.73 | Pass |
| | 165 | 5825 | -0.33 | 1.89 | 4.77 | 0.15 | 6.81 | 28.73 | Pass |
| 1 | 149 | 5745 | -3.24 | -1.02 | 4.77 | 0.15 | 3.90 | 28.73 | Pass |
| | 157 | 5785 | 0.59 | 2.81 | 4.77 | 0.15 | 7.73 | 28.73 | Pass |
| | 165 | 5825 | 0.14 | 2.36 | 4.77 | 0.15 | 7.28 | 28.73 | Pass |
| 2 | 149 | 5745 | -1.81 | 0.41 | 4.77 | 0.15 | 5.33 | 28.73 | Pass |
| | 157 | 5785 | 0.78 | 3.00 | 4.77 | 0.15 | 7.92 | 28.73 | Pass |
| | 165 | 5825 | 0.37 | 2.59 | 4.77 | 0.15 | 7.51 | 28.73 | Pass |

Note:
1. Directional gain = 2.50dBi + 10log(3) = 7.27dBi > 6dBi, so the power density limit shall be reduced to 30-(7.27-6) = 28.73dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

**802.11n (HT20)**

| TX chain | Channel | Freq. (MHz) | PSD (dBm/ 300kHz) | PSD (dBm/ 500kHz) | 10 log (N=3) dB | Duty Factor | Total PSD (dBm/ 500kHz) | Limit (dBm/ 500kHz) | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 149 | 5745 | -3.87 | -1.65 | 4.77 | 0.22 | 3.34 | 28.73 | Pass |
| | 157 | 5785 | -0.21 | 2.01 | 4.77 | 0.22 | 7.00 | 28.73 | Pass |
| | 165 | 5825 | -1.71 | 0.51 | 4.77 | 0.22 | 5.50 | 28.73 | Pass |
| 1 | 149 | 5745 | -4.29 | -2.07 | 4.77 | 0.22 | 2.92 | 28.73 | Pass |
| | 157 | 5785 | 0.32 | 2.54 | 4.77 | 0.22 | 7.53 | 28.73 | Pass |
| | 165 | 5825 | -1.92 | 0.30 | 4.77 | 0.22 | 5.29 | 28.73 | Pass |
| 2 | 149 | 5745 | -2.31 | -0.09 | 4.77 | 0.22 | 4.90 | 28.73 | Pass |
| | 157 | 5785 | 0.48 | 2.70 | 4.77 | 0.22 | 7.69 | 28.73 | Pass |
| | 165 | 5825 | -0.84 | 1.38 | 4.77 | 0.22 | 6.37 | 28.73 | Pass |

Note:
1. Directional gain = 2.50dBi + 10log(3) = 7.27dBi > 6dBi, so the power density limit shall be reduced to 30-(7.27-6) = 28.73dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

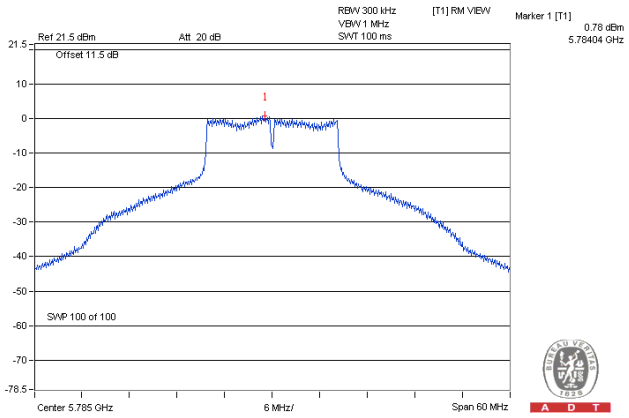
## 802.11n (HT40)

| TX chain | Channel | Freq. (MHz) | PSD (dBm/ 300kHz) | PSD (dBm/ 500kHz) | 10 log (N=3) dB | Duty Factor | Total PSD (dBm/ 500kHz) | Limit (dBm/ 500kHz) | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 151 | 5755 | -10.44 | -8.22 | 4.77 | 0.30 | -3.15 | 28.73 | Pass |
| | 159 | 5795 | -5.28 | -3.06 | 4.77 | 0.30 | 2.01 | 28.73 | Pass |
| 1 | 151 | 5755 | -10.81 | -8.59 | 4.77 | 0.30 | -3.52 | 28.73 | Pass |
| | 159 | 5795 | -5.37 | -3.15 | 4.77 | 0.30 | 1.92 | 28.73 | Pass |
| 2 | 151 | 5755 | -10.13 | -7.91 | 4.77 | 0.30 | -2.84 | 28.73 | Pass |
| | 159 | 5795 | -4.03 | -1.81 | 4.77 | 0.30 | 3.26 | 28.73 | Pass |

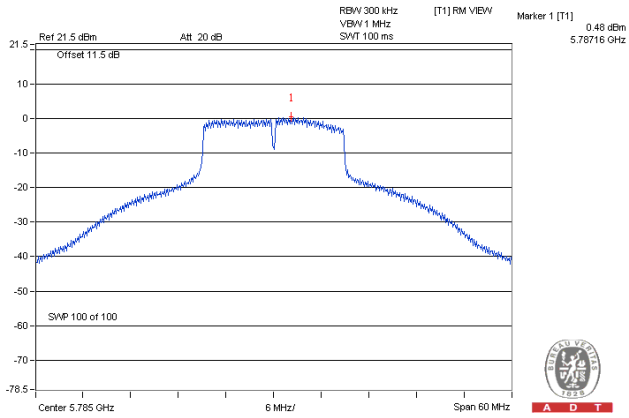
Note:
1. Directional gain = 2.50dBi + 10log(3) = 7.27dBi > 6dBi, so the power density limit shall be reduced to 30-(7.27-6) = 28.73dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

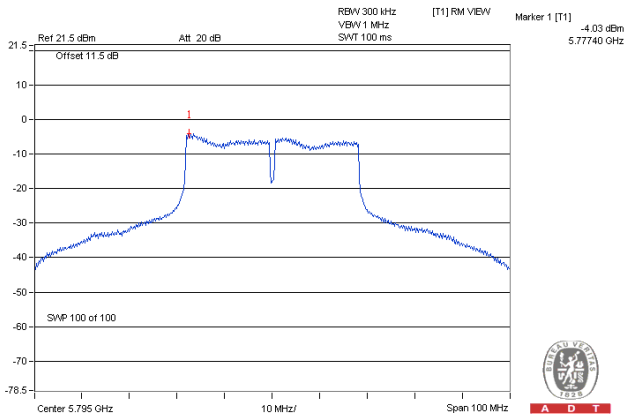
802.11a




802.11n (HT20)




802.11n (HT40)

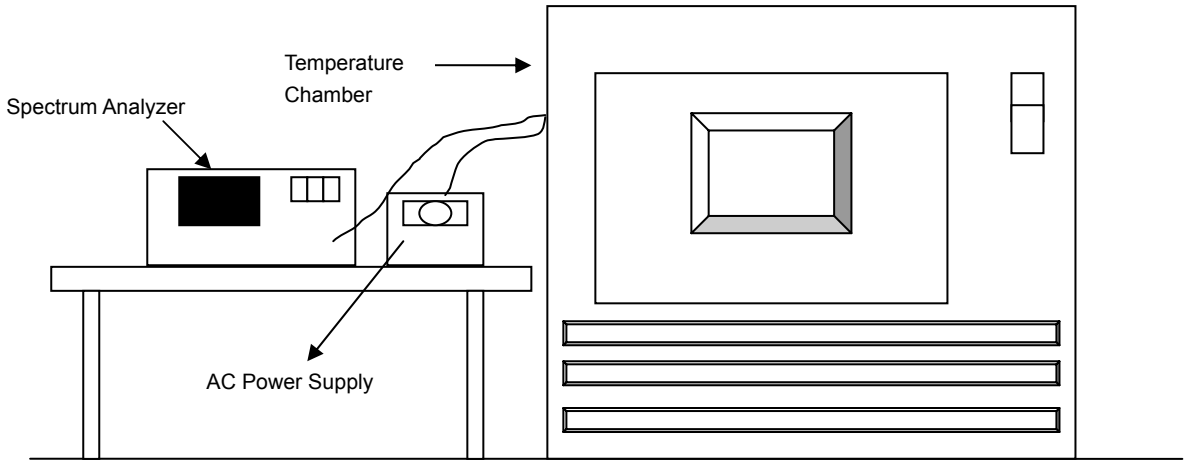


## 4.5 Frequency Stability

### 4.5.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

### 4.5.2 Test Setup




### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

### 4.5.7 Test Results

| Frequemcy Stability Versus Temp. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Operating Frequency: 5745MHz | | | | | | | | | |
| Temp. (℃) | Power Supply (Vac) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Frequency Drift (%) | Measured Frequency (MHz) | Frequency Drift (%) | Measured Frequency (MHz) | Frequency Drift (%) | Measured Frequency (MHz) | Frequency Drift (%) |
| 50 | 120 | 5745.0156 | 0.00027 | 5745.0146 | 0.00025 | 5745.0147 | 0.00026 | 5745.0111 | 0.00019 |
| 40 | 120 | 5744.9746 | -0.00044 | 5744.9728 | -0.00047 | 5744.9733 | -0.00046 | 5744.9758 | -0.00042 |
| 30 | 120 | 5745.0255 | 0.00044 | 5745.0288 | 0.00050 | 5745.0249 | 0.00043 | 5745.0265 | 0.00046 |
| 20 | 120 | 5745.0078 | 0.00014 | 5745.0046 | 0.00008 | 5745.0061 | 0.00011 | 5745.0071 | 0.00012 |
| 10 | 120 | 5744.9821 | -0.00031 | 5744.9801 | -0.00035 | 5744.9804 | -0.00034 | 5744.9797 | -0.00035 |
| 0 | 120 | 5745.0147 | 0.00026 | 5745.0187 | 0.00033 | 5745.0148 | 0.00026 | 5745.0149 | 0.00026 |
| -10 | 120 | 5745.0085 | 0.00015 | 5745.0078 | 0.00014 | 5745.0061 | 0.00011 | 5745.0084 | 0.00015 |
| -20 | 120 | 5745.0024 | 0.00004 | 5745.0015 | 0.00003 | 5745.0034 | 0.00006 | 5745.0041 | 0.00007 |
| -30 | 120 | 5745.0154 | 0.00027 | 5745.0168 | 0.00029 | 5745.0179 | 0.00031 | 5745.0156 | 0.00027 |

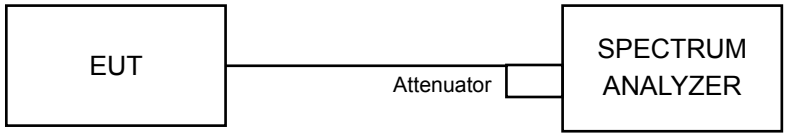
| Frequemcy Stability Versus Temp. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Operating Frequency: 5745MHz | | | | | | | | | |
| Temp. (℃) | Power Supply (Vac) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Frequency Drift (%) | Measured Frequency (MHz) | Frequency Drift (%) | Measured Frequency (MHz) | Frequency Drift (%) | Measured Frequency (MHz) | Frequency Drift (%) |
| 20 | 138 | 5745.0074 | 0.00013 | 5745.0052 | 0.00009 | 5745.0052 | 0.00009 | 5745.0078 | 0.00014 |
| | 120 | 5745.0078 | 0.00014 | 5745.0046 | 0.00008 | 5745.0061 | 0.00011 | 5745.0071 | 0.00012 |
| | 102 | 5745.0073 | 0.00013 | 5745.0041 | 0.00007 | 5745.0068 | 0.00012 | 5745.007 | 0.00012 |

## 4.6 6dB Bandwidth Measurment

### 4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### 4.6.2 Test Setup




### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

**MEASUREMENT PROCEDURE REF**

a. Set resolution bandwidth (RBW) = 100kHz

b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.

c. Trace mode = max hold.

d. Sweep = auto couple.

e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 4.6.7 Test Results

**802.11a**

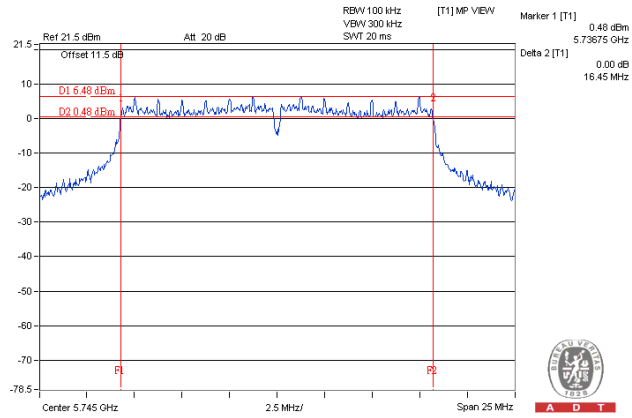
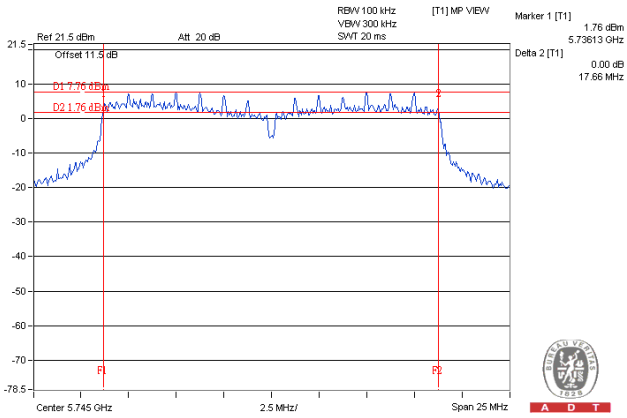
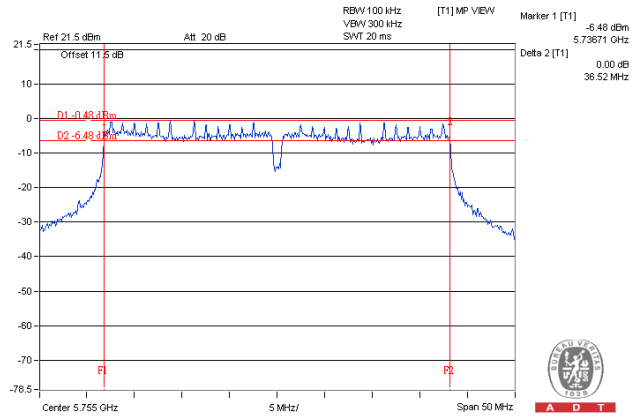
| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | | | Minimum Limit (MHz) | Pass / Fail |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 | | |
| 149 | 5745 | 16.39 | 16.45 | 16.38 | 0.5 | Pass |
| 157 | 5785 | 16.41 | 15.78 | 16.39 | 0.5 | Pass |
| 165 | 5825 | 16.37 | 16.36 | 16.36 | 0.5 | Pass |

**802.11n (HT20)**

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | | | Minimum Limit (MHz) | Pass / Fail |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 | | |
| 149 | 5745 | 17.60 | 17.39 | 17.66 | 0.5 | Pass |
| 157 | 5785 | 17.60 | 16.97 | 17.26 | 0.5 | Pass |
| 165 | 5825 | 17.33 | 17.34 | 17.61 | 0.5 | Pass |

**802.11n (HT40)**

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | | | Minimum Limit (MHz) | Pass / Fail |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 2 | | |
| 151 | 5755 | 36.16 | 36.52 | 35.86 | 0.5 | Pass |
| 159 | 5795 | 36.41 | 36.47 | 36.49 | 0.5 | Pass |

| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a | 802.11n (HT20) |
|  |  |
| 802.11n (HT40) | |
|  | |

## 5 Pictures of Test Arrangements

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

**Appendix – Information on the Testing Laboratories**

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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


**Linko EMC/RF Lab**
Tel: 886-2-26052180
Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab/Telecom Lab**
Tel: 886-3-5935343
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety**
Tel: 886-3-3183232
Fax: 886-3-3270892

**Email:** service.adt@tw.bureauveritas.com
**Web Site:** www.bureauveritas-adt.com


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

**--- END ---**