

FCC RF Test Report

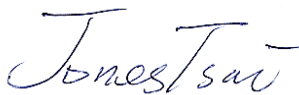
APPLICANT : Lenovo (Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT : Portable Tablet Computer
BRAND NAME : lenovo
MODEL NAME : YOGA Tablet 2-1051L
FCC ID : O57YT21051L
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Jun. 20, 2014 and testing was completed on Jul. 30, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
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SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|----------------|-----------------------|--|--|--------|---|
| 3.1 | 2.1049 15.403(i) | 99% Bandwidth | - | Pass | - |
| 3.2 | 15.407(a) | Maximum Conducted Output Power | ≤ 17, 24, 30 dBm (depend on band) | Pass | - |
| 3.3 | 15.407(a) | Power Spectral Density | ≤ 4, 11, 17 dBm (depend on band) | Pass | - |
| 3.4 | 15.407(b) | Unwanted Emissions | ≤ -17, -27 dBm (depend on band)&15.209(a) | Pass | Under limit 5.10 dB at 30.000 MHz for Quasi-Peak |
| 3.5 | 15.207 | AC Conducted Emission | 15.207(a) | Pass | Under limit 10.97 dB at 0.630 MHz |
| 3.6 | 15.407(g) | Frequency Stability | Within Operation Band | Pass | - |
| 3.7 | 15.407(c) | Automatically Discontinue Transmission | Discontinue Transmission | Pass | - |
| 3.8 | 15.203 & 15.407(a) | Antenna Requirement | N/A | Pass | - |

1 General Description

1.1 Applicant

Lenovo (Shanghai) Electronics Technology Co., Ltd.

No. 68 Building, 199 Fenju Road, Wai Gao Qiao FTZ, Shanghai, China

1.2 Manufacturer

Lenovo PC HK Limited

23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3 Factory

LENOVO MOBILE COMMUNICATION TECHNOLOGY CO LTD.

NO.999 QISHAN NORTH 2ND ROAD, INFORMATION & OPTOELECTRONICS PARK, TORCH HIGH TECH, XIAMEN FUJIAN 361009, CHINA

LENOVO MOBILE COMMUNICATION (WUHAN) CO LTD.

19 GAOXIN 4TH RD EAST LAKE HIGH-TECH, ZONE WUHAN HUBEI 430205, CHINA

1.4 Feature of Equipment Under Test

| Product Feature | |
|---------------------------------|---|
| Equipment | Portable Tablet Computer |
| Brand Name | lenovo |
| Model Name | YOGA Tablet 2-1051L |
| FCC ID | O57YT21051L |
| EUT supports Radios application | GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/HSPA+(Downlink only)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5G 802.11a/n HT20/HT40 Bluetooth v3.0+EDR/Bluetooth v4.0 LE |
| HW Version | Lenovopad YOGA Tablet 2-1051L |
| SW Version | Lenovo TAB2-W10-S100001-140527-PRC |
| EUT Stage | Production Unit |

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT sample 1 and sample 2, the differences between two samples is only different supplier for Battery/EMMC/Panel/Touch panel/front and back camera.

1.5 Product Specification of Equipment Under Test

| Product Specification subjective to this standard | | | |
|---|--|--------------|--------------|
| Tx/Rx Channel Frequency Range | 5180 MHz ~ 5240 MHz | | |
| Maximum Output Power | 802.11a : 10.26 dBm / 0.0106 W 802.11n HT20 : 9.94 dBm / 0.0099 W 802.11n HT40 : 9.49 dBm / 0.0089 W | | |
| 99% Occupied Bandwidth | 802.11a : 17.15 MHz 802.11n HT20 : 18.00 MHz 802.11n HT40 : 36.80 MHz | | |
| Antenna Type | Chain Port 0 : IFA Antenna with gain 0.50 dBi Chain Port 1 : IFA Antenna with gain 0.00 dBi | | |
| Type of Modulation | 802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) | | |
| Antenna Function Description | | Chain Port 0 | Chain Port 1 |
| | 802.11 a | V | V |
| | 802.11 n SISO | V | V |
| | 802.11 n MIMO | V | V |

1.6 Modification of EUT

No modifications are made to the EUT during all test items.



1.7 Testing Location

| | | | | |
|---------------------------|--|-----------|---------|-----------------------------|
| Test Site | SPORTON INTERNATIONAL (KUNSHAN) INC. | | | |
| Test Site Location | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958 | | | |
| Test Site No. | Sporton Site No. | | | FCC Registration No. |
| | TH01-KS | 03CH01-KS | CO01-KS | 149928 |

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.4-2003

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.



2.1 Carrier Frequency and Channel

| Frequency Band | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|--------------------------------------|-----------|-------------|-----------|-------------|
| 5150-5250 MHz Band 1 (U-NII-1) | 36 | 5180 | 44 | 5220 |
| | 38 | 5190 | 46 | 5230 |
| | 40 | 5200 | 48 | 5240 |

Note: The above Frequency and Channel in boldface were 802.11n HT40.



2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

| 5GHz 802.11a Average Power (dBm) | | | | | | | | | | |
|----------------------------------|----|-------|----|-------|--------|--------|--------|--------|--------|--------|
| Data Rate (MHz) | CH | 6Mbps | CH | 9Mbps | 12Mbps | 18Mbps | 24Mbps | 36Mbps | 48Mbps | 54Mbps |
| Chain Port 0 | 36 | 9.43 | 48 | 9.76 | 9.69 | 9.71 | 9.79 | 9.74 | 9.65 | 9.70 |
| | 44 | 9.63 | | | | | | | | |
| | 48 | 10.26 | | | | | | | | |
| Chain Port 1 | 36 | 10.00 | 36 | 9.97 | 9.89 | 9.96 | 9.92 | 9.92 | 9.93 | 9.97 |
| | 44 | 9.91 | | | | | | | | |
| | 48 | 9.99 | | | | | | | | |

| 5GHz 802.11n HT20 Average Power (dBm) | | | | | | | | | | |
|---------------------------------------|----|------|----|-------|--------|--------|--------|--------|--------|--------|
| Data Rate (MHz) | CH | MCS0 | CH | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| Chain Port 0 | 36 | 9.54 | 48 | 9.65 | 9.75 | 9.71 | 9.73 | 9.60 | 9.67 | 9.74 |
| | 44 | 9.74 | | | | | | | | |
| | 48 | 9.76 | | | | | | | | |
| Chain Port 1 | 36 | 9.87 | 48 | 9.90 | 9.91 | 9.89 | 9.88 | 9.87 | 9.89 | 9.91 |
| | 44 | 9.89 | | | | | | | | |
| | 48 | 9.92 | | | | | | | | |
| Data Rate (MHz) | CH | MCS8 | CH | MCS 9 | MCS 10 | MCS 11 | MCS 12 | MCS 13 | MCS 14 | MCS 15 |
| Chain Port 0+1(0) | 36 | 6.90 | 36 | 6.69 | 6.38 | 5.21 | 5.52 | 5.29 | 5.41 | 5.44 |
| | 44 | 6.45 | | | | | | | | |
| | 48 | 5.85 | | | | | | | | |
| Chain Port 0+1(1) | 36 | 6.95 | 36 | 6.48 | 6.76 | 5.64 | 5.73 | 5.81 | 5.62 | 5.88 |
| | 44 | 6.43 | | | | | | | | |
| | 48 | 6.11 | | | | | | | | |
| Chain Port 0+1 | 36 | 9.94 | 36 | 9.60 | 9.58 | 8.44 | 8.64 | 8.57 | 8.53 | 8.67 |
| | 44 | 9.45 | | | | | | | | |
| | 48 | 8.99 | | | | | | | | |



| 5GHz 802.11n HT40 Average Power (dBm) | | | | | | | | | | |
|---------------------------------------|----|------|----|-------|--------|--------|--------|--------|--------|--------|
| Data Rate (MHz) | CH | MCS0 | CH | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| Chain Port 0 | 38 | 9.37 | 46 | 9.15 | 9.09 | 9.05 | 8.78 | 8.61 | 8.67 | 8.66 |
| | 46 | 9.41 | | | | | | | | |
| Chain Port 1 | 38 | 9.45 | 38 | 9.33 | 9.30 | 9.12 | 9.03 | 8.83 | 9.09 | 8.67 |
| | 46 | 9.42 | | | | | | | | |
| Data Rate (MHz) | CH | MCS8 | CH | MCS 9 | MCS 10 | MCS 11 | MCS 12 | MCS 13 | MCS 14 | MCS 15 |
| Chain Port 0+1(0) | 38 | 6.50 | 38 | 6.05 | 5.94 | 5.78 | 5.97 | 5.86 | 5.87 | 5.96 |
| | 46 | 6.28 | | | | | | | | |
| Chain Port 0+1(1) | 38 | 6.45 | 38 | 6.24 | 6.09 | 5.94 | 6.13 | 6.03 | 6.07 | 5.78 |
| | 46 | 6.21 | | | | | | | | |
| Chain Port 0+1 | 38 | 9.49 | 38 | 9.16 | 9.03 | 8.87 | 9.06 | 8.96 | 8.98 | 8.88 |
| | 46 | 9.26 | | | | | | | | |

Note: Chain Port 0+1 is a calculated result from sum of the power Chain Port 0+1(0) and Chain Port 0+1(1).

2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

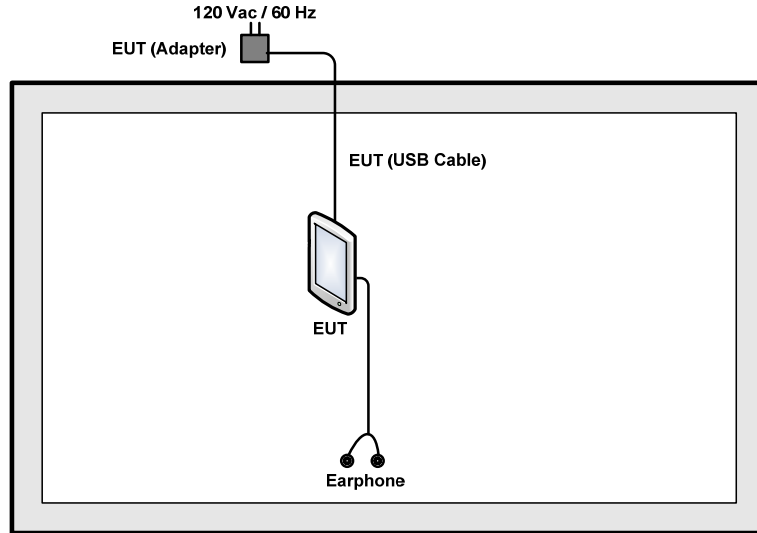
| Test Cases | | | | |
|--|--|--------------|------------|--------------|
| | Test Items | Mode | Data rate | Test Channel |
| Conducted TCs | 99% BW Power Spectral Density | 802.11a | 6 Mbps | L/M/H |
| | | 802.11n HT20 | MCS0/ MCS8 | L/M/H |
| | | 802.11n HT40 | MCS0/ MCS8 | L/M/H |
| | 20dB Occupied Bandwidth | 802.11a | 6 Mbps | H |
| | | 802.11n HT20 | MCS0/ MCS8 | H |
| | | 802.11n HT40 | MCS0/ MCS8 | H |
| | Output Power | 802.11a | 6 Mbps | L/M/H |
| | | 802.11n HT20 | MCS0/ MCS8 | L/M/H |
| | | 802.11n HT40 | MCS0/ MCS8 | L/M/H |
| | Frequency Stability | 802.11a | 6 Mbps | L |
| Radiated TCs | Radiated Band Edge | 802.11a | 6 Mbps | L/H |
| | | 802.11n HT20 | MCS8 | L/H |
| | | 802.11n HT40 | MCS8 | L/H |
| | Radiated Spurious Emission | 802.11a | 6 Mbps | L/M/H |
| | | 802.11n HT20 | MCS8 | L/M/H |
| | | 802.11n HT40 | MCS8 | L/M/H |
| AC Conducted Emission | Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (5G) Link + USB Cable 1 (Charging from Adapter 1) + Earphone + Battery 1 for Sample 1 Mode 2 : GSM850 Idle + Bluetooth Link + WLAN (5G) Link + USB Cable 2 (Charging from Adapter 2) + Earphone + Battery 2 for Sample 2 | | | |
| Remark: 1. The worst case of conducted emission is mode 2; only the test data of it was reported. 2. For Radiated Test Cases, all the test modes were performed with Adapter 1, Battery 1, Earphone and USB Cable 1 for Sample 1, only the worst mode (802.11n HT20 CH44) based on Sample 1 need to verify Adapter 2, Battery 2 and USB Cable 2 for Sample 2. | | | | |



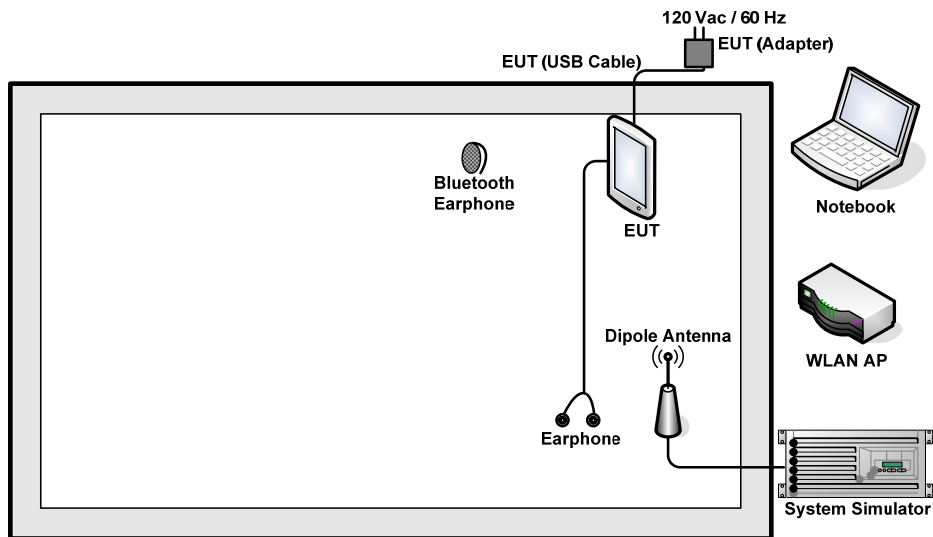
| Ch. # | | Band I : 5150-5250 MHz | | |
|-------|--------|------------------------|--------------|--------------|
| | | 802.11a | 802.11n HT20 | 802.11n HT40 |
| L | Low | 36 | 36 | 38 |
| M | Middle | 44 | 44 | - |
| H | High | 48 | 48 | 46 |

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|------|--------------------|------------|------------|-------------|-------------------|--|
| 1. | WLAN AP | D-Link | DIR-855 | KA2DIR855A2 | N/A | Unshielded, 1.8 m |
| 2. | System Simulator | R&S | CMU 200 | N/A | N/A | Unshielded, 1.8 m |
| 3. | DC Power Supply | GWINSTEK | GPS-3030D | N/A | N/A | Unshielded, 1.8 m |
| 4. | Notebook | Lenovo | G480 | N/A | N/A | AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m |
| 5. | Bluetooth Earphone | Lenovo | LBH505 | N/A | N/A | N/A |
| 6. | Earphone | Lenovo | SH100 | N/A | Unshielded, 1.2 m | N/A |

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 7.3 dB and 10dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 7.3 + 10 = 17.3 \text{ (dB)} \end{aligned}$$

3 Test Result

3.1 99% Occupied Bandwidth Measurement

3.1.1 Description of 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

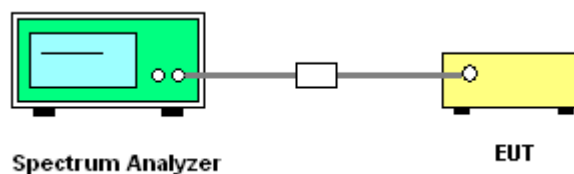
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) $\geq 3 * RBW$.
7. Measure and record the results in the test report.

3.1.4 Test Setup

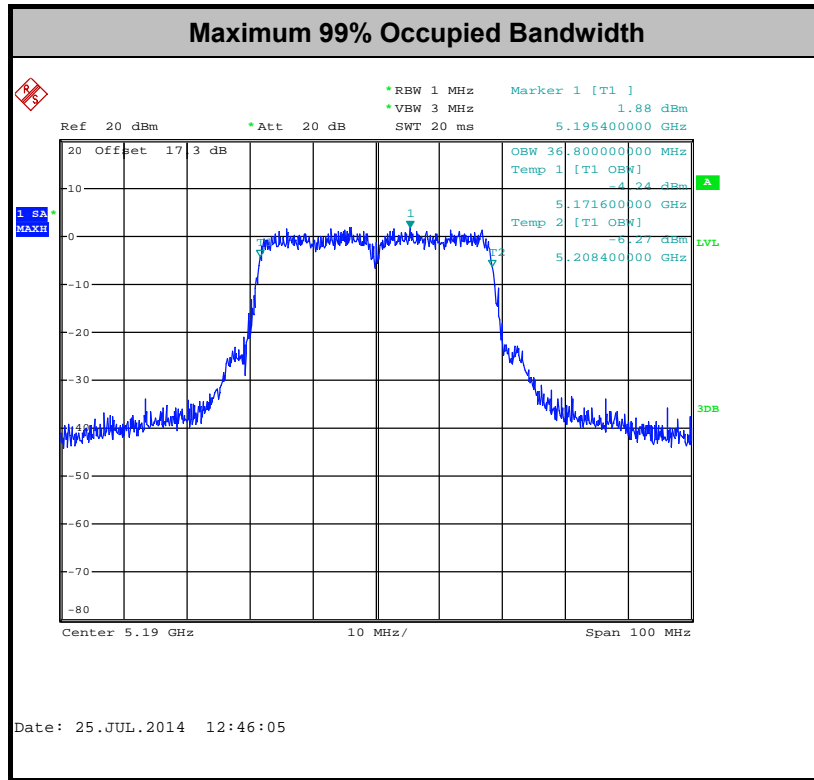




3.1.5 Test Result of 99% Occupied Bandwidth

| | | | |
|-----------------|-------------|---------------------|---------|
| Test Band : | 5GHz band 1 | Temperature : | 24~25°C |
| Test Engineer : | Issac Song | Relative Humidity : | 49~51% |

| Mod. | Data Rate | N _{TX} | Channel | Freq. (MHz) | 99% Bandwidth (MHz) | | 99% Bandwidth EIRP Limit (dBm) | |
|------|-----------|-----------------|---------|-------------|---------------------|--------------|--------------------------------|--------------|
| | | | | | Chain Port 0 | Chain Port 1 | Chain Port 0 | Chain Port 1 |
| 11a | 6Mbps | 1 | 36 | 5180 | 17.10 | - | 22.33 | - |
| 11a | 6Mbps | 1 | 44 | 5220 | 17.15 | - | 22.34 | - |
| 11a | 6Mbps | 1 | 48 | 5240 | 17.10 | - | 22.33 | - |
| HT20 | MCS0 | 1 | 36 | 5180 | - | 17.90 | - | 22.53 |
| HT20 | MCS0 | 1 | 44 | 5220 | - | 18.00 | - | 22.55 |
| HT20 | MCS0 | 1 | 48 | 5240 | - | 18.00 | - | 22.55 |
| HT40 | MCS0 | 1 | 38 | 5190 | - | 36.80 | - | 23.01 |
| HT40 | MCS0 | 1 | 46 | 5230 | - | 36.50 | - | 23.01 |
| HT20 | MCS8 | 2 | 36 | 5180 | 17.90 | 18.00 | 22.53 | |
| HT20 | MCS8 | 2 | 44 | 5220 | 17.90 | 17.95 | 22.53 | |
| HT20 | MCS8 | 2 | 48 | 5240 | 17.90 | 17.90 | 22.53 | |
| HT40 | MCS8 | 2 | 38 | 5190 | 36.70 | 36.70 | 23.01 | |
| HT40 | MCS8 | 2 | 46 | 5230 | 36.70 | 36.60 | 23.01 | |





3.1.6 Test Result of 20dB Occupied Bandwidth

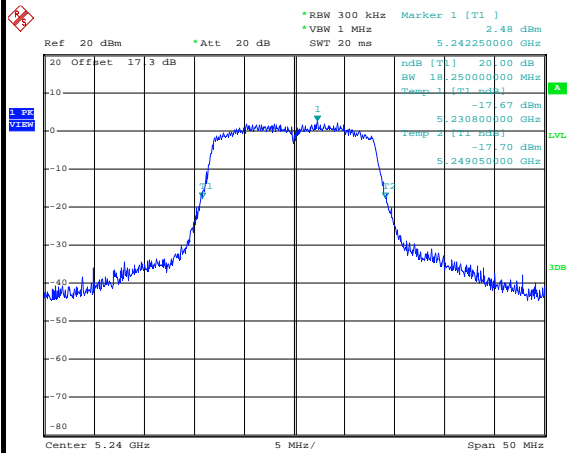
| Mod. | Data Rate | N _{TX} | Channel | Freq. (MHz) | 20dB Bandwidth (MHz) | | 20dB Bandwidth Upper Frequency (FH) (MHz) | | Upper Limit Line (MHz) | Pass/Fail |
|------|-----------|-----------------|---------|-------------|----------------------|--------------|---|--------------|------------------------|-----------|
| | | | | | Chain Port 0 | Chain Port 1 | Chain Port 0 | Chain Port 1 | | |
| 11a | 6Mbps | 1 | 48 | 5240 | 18.25 | - | 5249.05 | - | 5250 | Pass |
| HT20 | MCS0 | 1 | 48 | 5240 | - | 19.10 | - | 5249.55 | | Pass |
| HT40 | MCS0 | 1 | 46 | 5230 | - | 39.80 | - | 5249.80 | | Pass |
| HT20 | MCS8 | 2 | 48 | 5240 | 18.95 | - | 5249.45 | - | | Pass |
| HT40 | MCS8 | 2 | 46 | 5230 | 39.60 | | 5249.80 | | | Pass |



Number of TX = 1

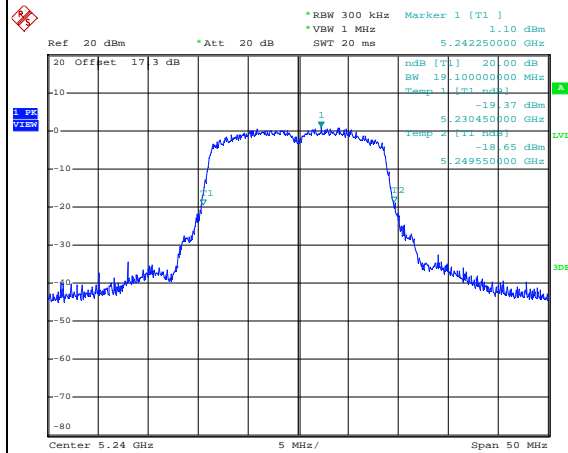
20dB Occupied Bandwidth

802.11a CH48 5240MHz for Chain 1



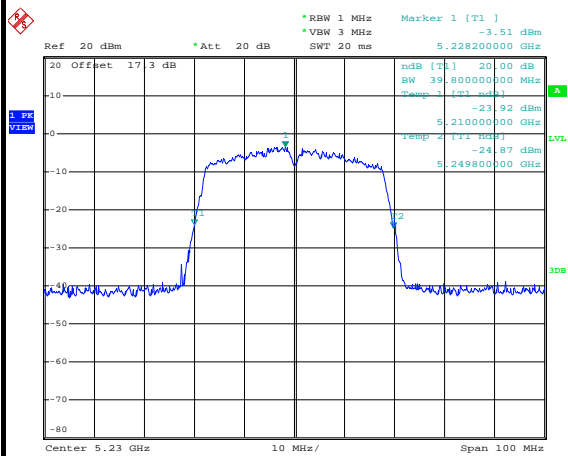
Date: 25.JUL.2014 12:34:19

802.11n HT20 CH48 5240MHz for Chain 1



Date: 25.JUL.2014 12:42:03

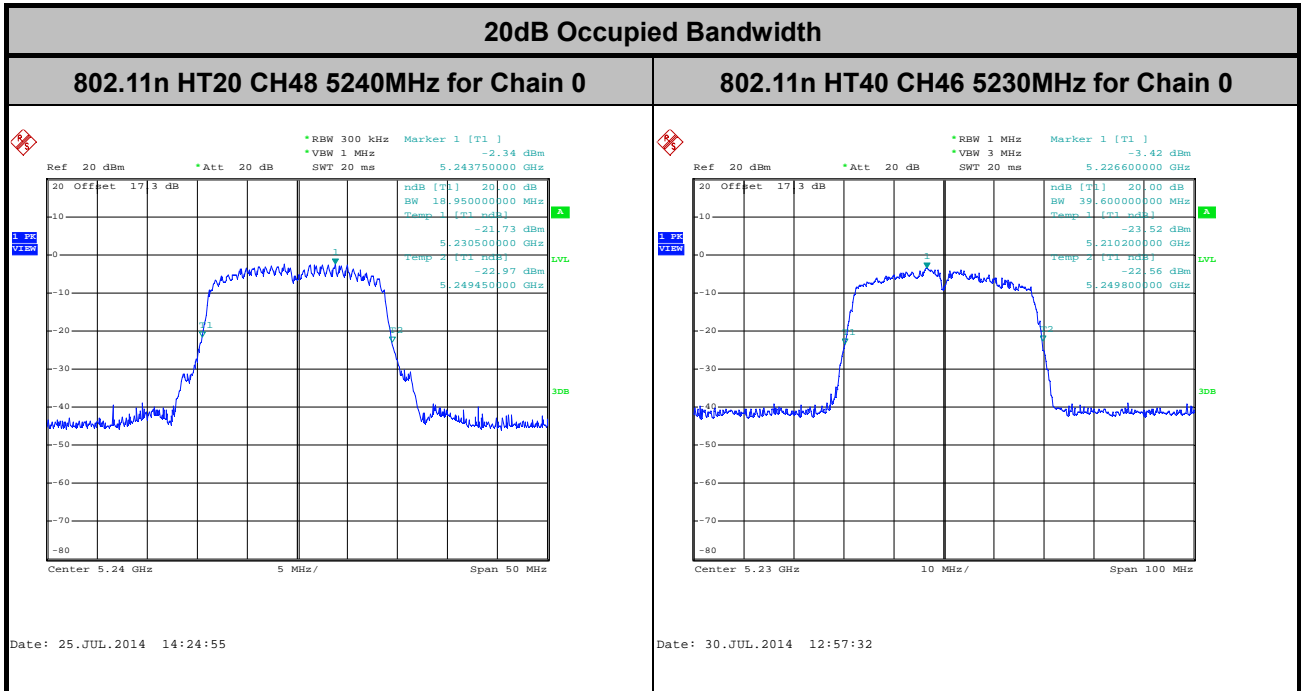
802.11n HT40 CH46 5230MHz for Chain 1



Date: 30.JUL.2014 12:57:17



Number of TX = 2





3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

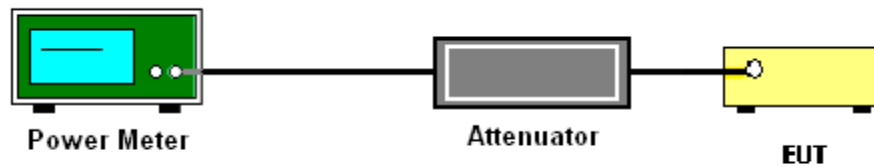
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

3.2.4 Test Setup





3.2.5 Test Result of Maximum Conducted Output Power

| | | | |
|-----------------|-------------|---------------------|---------|
| Test Band : | 5GHz band 1 | Temperature : | 24~25°C |
| Test Engineer : | Issac Song | Relative Humidity : | 49~51% |

| Mod. | Data Rate | N _{TX} | CH. | Freq. (MHz) | Duty Factor (dB) | | Average Conducted Power (dBm) | | | FCC Power Limit (dBm) | | DG (dBi) | | Pass /Fail |
|------|-----------|-----------------|-----|-------------|------------------|--------------|-------------------------------|--------------|-----------|-----------------------|--------------|--------------|--------------|------------|
| | | | | | Chain Port 0 | Chain Port 1 | Chain Port 0 | Chain Port 1 | Sum Power | Chain Port 0 | Chain Port 1 | Chain Port 0 | Chain Port 1 | |
| 11a | 6Mbps | 1 | 36 | 5180 | 0.18 | 0.20 | 9.43 | 10.00 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| 11a | 6Mbps | 1 | 44 | 5220 | 0.18 | 0.20 | 9.63 | 9.91 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| 11a | 6Mbps | 1 | 48 | 5240 | 0.18 | 0.20 | 10.26 | 9.99 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS0 | 1 | 36 | 5180 | 0.22 | 0.20 | 9.54 | 9.87 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS0 | 1 | 44 | 5220 | 0.22 | 0.20 | 9.74 | 9.89 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS0 | 1 | 48 | 5240 | 0.22 | 0.20 | 9.76 | 9.92 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| HT40 | MCS0 | 1 | 38 | 5190 | 0.22 | 0.24 | 9.37 | 9.45 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| HT40 | MCS0 | 1 | 46 | 5230 | 0.22 | 0.24 | 9.41 | 9.42 | - | 24.00 | 24.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS8 | 2 | 36 | 5180 | 0.41 | 0.41 | 6.90 | 6.95 | 9.94 | 24.00 | 24.00 | 3.26 | 3.26 | Pass |
| HT20 | MCS8 | 2 | 44 | 5220 | 0.41 | 0.41 | 6.45 | 6.43 | 9.45 | 24.00 | 24.00 | 3.26 | 3.26 | Pass |
| HT20 | MCS8 | 2 | 48 | 5240 | 0.41 | 0.41 | 5.85 | 6.11 | 8.99 | 24.00 | 24.00 | 3.26 | 3.26 | Pass |
| HT40 | MCS8 | 2 | 38 | 5190 | 0.45 | 0.41 | 6.50 | 6.45 | 9.49 | 24.00 | 24.00 | 3.26 | 3.26 | Pass |
| HT40 | MCS8 | 2 | 46 | 5230 | 0.45 | 0.41 | 6.28 | 6.21 | 9.26 | 24.00 | 24.00 | 3.26 | 3.26 | Pass |

Note:

- Final Output Power equals to Measured Output Power adds the duty factor.
- Sum Power is a calculated result from sum of the Chain Port 0 and Chain Port 1.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
Section F) Maximum power spectral density.

Method SA-2

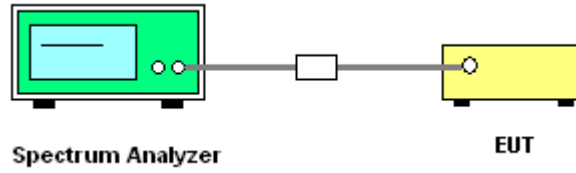
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
 - Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW \geq 3 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

3.3.4 Test Setup



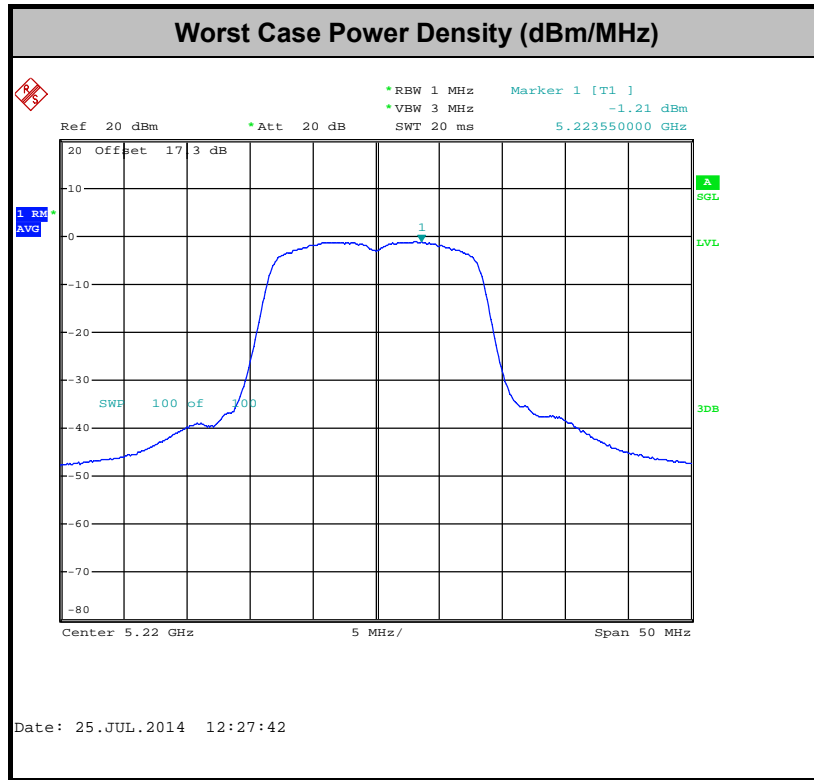


3.3.5 Test Result of Power Spectral Density

| | | | |
|-----------------|-------------|---------------------|---------|
| Test Band : | 5GHz band 1 | Temperature : | 24~25°C |
| Test Engineer : | Issac Song | Relative Humidity : | 49~51% |

| Mod. | Data Rate | N _{TX} | CH. | Freq. (MHz) | Duty Factor (dB) | | Average Power Density (dBm/MHz) | | | Average PSD Limit (dBm) | | DG (dBi) | | Pass /Fail |
|------|-----------|-----------------|-----|-------------|------------------|--------------|---------------------------------|--------------|-----------|-------------------------|--------------|--------------|--------------|------------|
| | | | | | Chain Port 0 | Chain Port 1 | Chain Port 0 | Chain Port 1 | Sum Power | Chain Port 0 | Chain Port 1 | Chain Port 0 | Chain Port 1 | |
| 11a | 6Mbps | 1 | 36 | 5180 | 0.18 | 0.20 | -1.74 | - | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| 11a | 6Mbps | 1 | 44 | 5220 | 0.18 | 0.20 | -1.03 | - | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| 11a | 6Mbps | 1 | 48 | 5240 | 0.18 | 0.20 | -1.21 | - | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS0 | 1 | 36 | 5180 | 0.22 | 0.20 | - | -2.52 | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS0 | 1 | 44 | 5220 | 0.22 | 0.20 | - | -2.54 | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS0 | 1 | 48 | 5240 | 0.22 | 0.20 | - | -2.57 | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| HT40 | MCS0 | 1 | 38 | 5190 | 0.22 | 0.24 | - | -6.18 | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| HT40 | MCS0 | 1 | 46 | 5230 | 0.22 | 0.24 | - | -6.53 | - | 11.00 | 11.00 | 0.50 | 0.00 | Pass |
| HT20 | MCS8 | 2 | 36 | 5180 | 0.41 | 0.41 | - | - | -1.36 | 11.00 | 11.00 | 3.26 | 3.26 | Pass |
| HT20 | MCS8 | 2 | 44 | 5220 | 0.41 | 0.41 | - | - | -1.10 | 11.00 | 11.00 | 3.26 | 3.26 | Pass |
| HT20 | MCS8 | 2 | 48 | 5240 | 0.41 | 0.41 | - | - | -1.37 | 11.00 | 11.00 | 3.26 | 3.26 | Pass |
| HT40 | MCS8 | 2 | 38 | 5190 | 0.45 | 0.41 | - | - | -9.01 | 11.00 | 11.00 | 3.26 | 3.26 | Pass |
| HT40 | MCS8 | 2 | 46 | 5230 | 0.45 | 0.41 | - | - | -8.65 | 11.00 | 11.00 | 3.26 | 3.26 | Pass |

Note: Sum PSD is a bin-by-bin combined result of Chain Port 0 and Chain Port 1.



3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.
- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

| Frequency (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: The following formula is used to convert the EIRP to field strength.

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

| EIRP (dBm) | Field Strength at 3m (dBμV/m) |
|------------|-------------------------------|
| -17 | 78.3 |
| - 27 | 68.3 |

- (3) KDB789033 v01 G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01. Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

| Antenna | Band | Duty Cycle(%) | T(ms) | 1/T(kHz) | VBW Setting |
|---------|--------------|---------------|-------|----------|-------------|
| 0 | 802.11a | 95.83 | 2.07 | 0.48 | 1kHz |
| 1 | 802.11a | 95.48 | 2.07 | 0.48 | 1kHz |
| 0+1 | 802.11n HT20 | 90.98 | 0.99 | 1.01 | 3kHz |
| 0+1 | 802.11n HT40 | 90.91 | 0.98 | 1.02 | 3kHz |

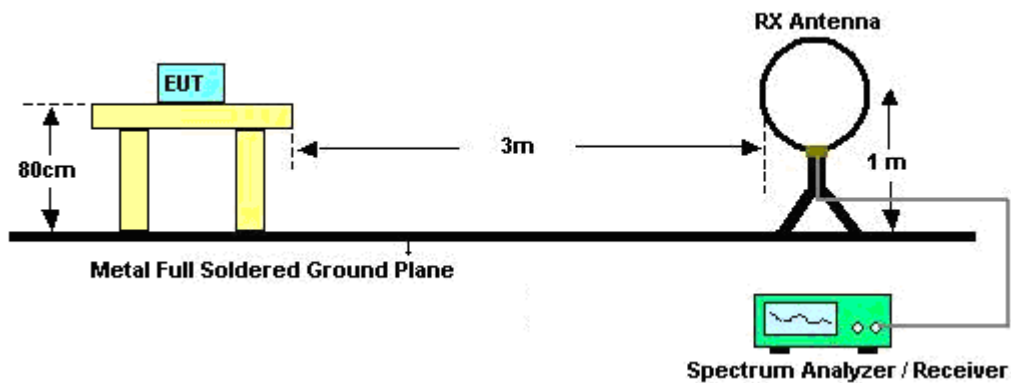
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the

limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.

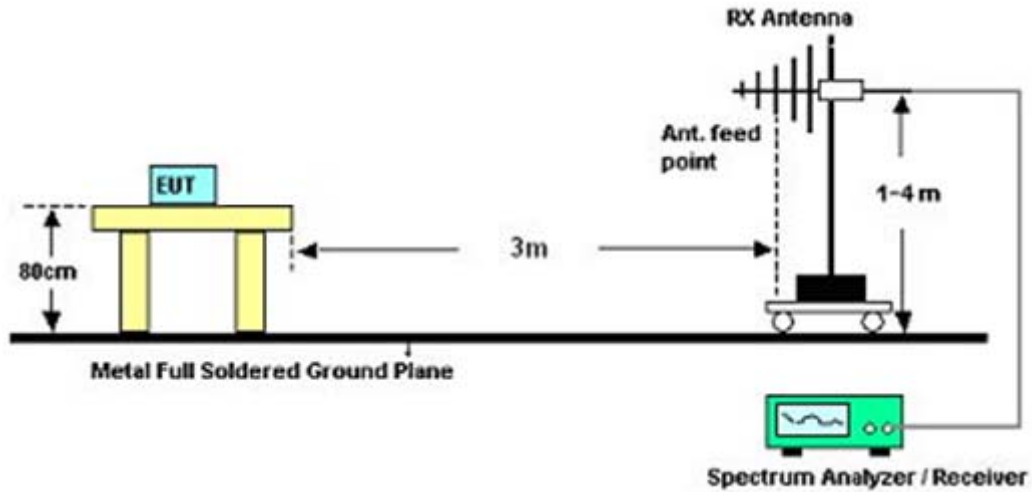
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

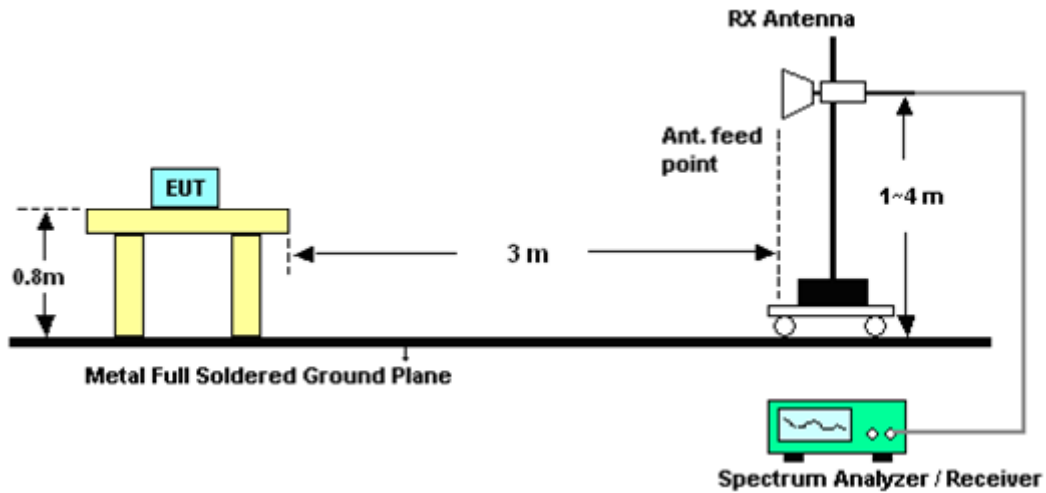
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.4.6 Test Result of Radiated Band Edges

<Sample 1>

| | | | |
|-----------------|------------------------|---------------------|---------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBµV/m) | Over Limit (dB) | Limit Line (dBµV/m) | Read Level (dBµV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5149.7 | 63.37 | -10.63 | 74 | 63.22 | 34.11 | 3.9 | 37.86 | 100 | 292 | Peak |
| 5102.55 | 49.1 | -4.9 | 54 | 48.87 | 34.04 | 3.86 | 37.67 | 100 | 292 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBµV/m) | Over Limit (dB) | Limit Line (dBµV/m) | Read Level (dBµV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5149.25 | 62.87 | -11.13 | 74 | 62.72 | 34.11 | 3.9 | 37.86 | 100 | 9 | Peak |
| 5102.6 | 45.92 | -8.08 | 54 | 45.69 | 34.04 | 3.86 | 37.67 | 100 | 9 | Average |

| | | | |
|-----------------|------------------------|---------------------|---------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBµV/m) | Over Limit (dB) | Limit Line (dBµV/m) | Read Level (dBµV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5352.15 | 50.09 | -23.91 | 74 | 50.78 | 34.39 | 4 | 39.08 | 100 | 347 | Peak |
| 5350.25 | 37.31 | -16.69 | 54 | 38 | 34.39 | 4 | 39.08 | 100 | 347 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBµV/m) | Over Limit (dB) | Limit Line (dBµV/m) | Read Level (dBµV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5353.35 | 49.83 | -24.17 | 74 | 50.52 | 34.39 | 4 | 39.08 | 100 | 22 | Peak |
| 5353.25 | 35.73 | -18.27 | 54 | 36.42 | 34.39 | 4 | 39.08 | 100 | 22 | Average |



| | | | |
|-----------------|------------------------|---------------------|---------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5103.6 | 54.74 | -19.26 | 74 | 54.51 | 34.04 | 3.86 | 37.67 | 100 | 0 | Peak |
| 5102.45 | 41.41 | -12.59 | 54 | 41.18 | 34.04 | 3.86 | 37.67 | 100 | 0 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5105.95 | 47.75 | -26.25 | 74 | 47.56 | 34.06 | 3.86 | 37.73 | 200 | 162 | Peak |
| 5101.9 | 34.4 | -19.6 | 54 | 34.17 | 34.04 | 3.86 | 37.67 | 200 | 162 | Average |

| | | | |
|-----------------|------------------------|---------------------|---------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5352.75 | 50.39 | -23.61 | 74 | 51.08 | 34.39 | 4 | 39.08 | 100 | 0 | Peak |
| 5352.95 | 36.14 | -17.86 | 54 | 36.83 | 34.39 | 4 | 39.08 | 100 | 0 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5352.55 | 47.72 | -26.28 | 74 | 48.41 | 34.39 | 4 | 39.08 | 200 | 163 | Peak |
| 5399.8 | 33.66 | -20.34 | 54 | 34.59 | 34.46 | 4.03 | 39.42 | 200 | 163 | Average |



| | | | |
|-----------------|-------------------------------|---------------------|---------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5103.5 | 59.25 | -14.75 | 74 | 59.02 | 34.04 | 3.86 | 37.67 | 100 | 340 | Peak |
| 5102.8 | 46.89 | -7.11 | 54 | 46.66 | 34.04 | 3.86 | 37.67 | 100 | 340 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5103.25 | 55.5 | -18.5 | 74 | 55.27 | 34.04 | 3.86 | 37.67 | 100 | 13 | Peak |
| 5103.4 | 43.41 | -10.59 | 54 | 43.18 | 34.04 | 3.86 | 37.67 | 100 | 13 | Average |

| | | | |
|-----------------|-------------------------------|---------------------|---------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5352.55 | 49.82 | -24.18 | 74 | 50.51 | 34.39 | 4 | 39.08 | 100 | 347 | Peak |
| 5353.65 | 37 | -17 | 54 | 37.69 | 34.39 | 4 | 39.08 | 100 | 347 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5360.85 | 48.33 | -25.67 | 74 | 49.11 | 34.41 | 4.01 | 39.2 | 100 | 23 | Peak |
| 5360.75 | 35.36 | -18.64 | 54 | 36.14 | 34.41 | 4.01 | 39.2 | 100 | 23 | Average |



| | | | |
|-----------------|-------------------------------|---------------------|---------|
| Test Mode : | 802.11n HT40 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 38 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5149.3 | 62.42 | -11.58 | 74 | 62.27 | 34.11 | 3.9 | 37.86 | 100 | 0 | Peak |
| 5150 | 43.65 | -10.35 | 54 | 43.5 | 34.11 | 3.9 | 37.86 | 100 | 0 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5150 | 61.06 | -12.94 | 74 | 60.91 | 34.11 | 3.9 | 37.86 | 100 | 12 | Peak |
| 5149.9 | 41.15 | -12.85 | 54 | 41 | 34.11 | 3.9 | 37.86 | 100 | 12 | Average |

| | | | |
|-----------------|-------------------------------|---------------------|---------|
| Test Mode : | 802.11n HT40 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 46 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | | |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5383.5 | 50.52 | -23.48 | 74 | 51.37 | 34.44 | 4.02 | 39.31 | 100 | 0 | Peak |
| 5380.35 | 36.88 | -17.12 | 54 | 37.73 | 34.44 | 4.02 | 39.31 | 100 | 0 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 5359.8 | 48.67 | -25.33 | 74 | 49.35 | 34.39 | 4.01 | 39.08 | 100 | 10 | Peak |
| 5381.75 | 35.53 | -18.47 | 54 | 36.38 | 34.44 | 4.02 | 39.31 | 100 | 10 | Average |

3.4.7 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

<Sample 1>

| | | | |
|-----------------|---|---------------------|------------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5180 MHz is fundamental signal which can be ignored.. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5180 | 104.52 | - | - | 104.44 | 34.16 | 3.92 | 38 | 100 | 339 | Peak |
| 5180 | 92.52 | - | - | 92.44 | 34.16 | 3.92 | 38 | 100 | 339 | Average |
| 10359 | 34.08 | -39.92 | 74 | 59.39 | 1.46 | 7.72 | 34.49 | 100 | 261 | Peak |

| | | | |
|-----------------|--|---------------------|----------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5180 | 104.47 | - | - | 104.39 | 34.16 | 3.92 | 38 | 100 | 16 | Peak |
| 5180 | 91.52 | - | - | 91.44 | 34.16 | 3.92 | 38 | 100 | 16 | Average |
| 10359 | 34.84 | -39.16 | 74 | 60.15 | 1.46 | 7.72 | 34.49 | 100 | 14 | Peak |



| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5000 | 64.67 | -9.33 | 74 | 64.25 | 33.9 | 3.79 | 37.27 | 100 | 310 | Peak |
| 5000 | 48.03 | -5.97 | 54 | 47.61 | 33.9 | 3.79 | 37.27 | 100 | 310 | Average |
| 5220 | 104.09 | - | - | 104.12 | 34.2 | 3.95 | 38.18 | 100 | 340 | Peak |
| 5220 | 91.94 | - | - | 91.97 | 34.2 | 3.95 | 38.18 | 100 | 340 | Average |
| 5440 | 65.29 | -8.71 | 74 | 66.01 | 34.51 | 4.01 | 39.24 | 105 | 290 | Peak |
| 5440 | 48.74 | -5.26 | 54 | 49.46 | 34.51 | 4.01 | 39.24 | 105 | 290 | Average |
| 10440 | 33 | -41 | 74 | 58.15 | 1.53 | 7.76 | 34.44 | 100 | 251 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5002 | 60.53 | -13.47 | 74 | 60.11 | 33.9 | 3.79 | 37.27 | 200 | 0 | Peak |
| 5002 | 44.27 | -9.73 | 54 | 43.85 | 33.9 | 3.79 | 37.27 | 200 | 0 | Average |
| 5220 | 103.72 | - | - | 103.75 | 34.2 | 3.95 | 38.18 | 100 | 21 | Peak |
| 5220 | 91.67 | - | - | 91.7 | 34.2 | 3.95 | 38.18 | 100 | 21 | Average |
| 5442 | 60.32 | -13.68 | 74 | 61.04 | 34.51 | 4.01 | 39.24 | 178 | 20 | Peak |
| 5442 | 44.39 | -9.61 | 54 | 45.11 | 34.51 | 4.01 | 39.24 | 178 | 20 | Average |
| 10440 | 33.69 | -40.31 | 74 | 58.84 | 1.53 | 7.76 | 34.44 | 100 | 95 | Peak |



| | | | |
|------------------------|---|----------------------------|------------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5240 MHz is fundamental signal which can be ignored. 2. 10479/5462 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5020 | 63.92 | -10.08 | 74 | 63.54 | 33.92 | 3.8 | 37.34 | 100 | 315 | Peak |
| 5020 | 47.27 | -6.73 | 54 | 46.89 | 33.92 | 3.8 | 37.34 | 100 | 315 | Average |
| 5240 | 104.53 | - | - | 104.64 | 34.23 | 3.95 | 38.29 | 100 | 347 | Peak |
| 5240 | 92.52 | - | - | 92.63 | 34.23 | 3.95 | 38.29 | 100 | 347 | Average |
| 5462 | 61.75 | -12.25 | 74 | 62.36 | 34.53 | 4.01 | 39.15 | 105 | 298 | Peak |
| 5462 | 47.08 | -6.92 | 54 | 47.69 | 34.53 | 4.01 | 39.15 | 105 | 298 | Average |
| 10479 | 32.76 | -41.24 | 74 | 57.82 | 1.56 | 7.79 | 34.41 | 100 | 152 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11a – Chain Port 0 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5022 | 60.27 | -13.73 | 74 | 59.93 | 33.95 | 3.8 | 37.41 | 100 | 358 | Peak |
| 5022 | 44.72 | -9.28 | 54 | 44.38 | 33.95 | 3.8 | 37.41 | 100 | 358 | Average |
| 5240 | 101.97 | - | - | 102.08 | 34.23 | 3.95 | 38.29 | 100 | 22 | Peak |
| 5240 | 89.81 | - | - | 89.92 | 34.23 | 3.95 | 38.29 | 100 | 22 | Average |
| 5456 | 61.72 | -12.28 | 74 | 62.33 | 34.53 | 4.01 | 39.15 | 196 | 15 | Peak |
| 5456 | 45.33 | -8.67 | 54 | 45.94 | 34.53 | 4.01 | 39.15 | 196 | 15 | Average |
| 10479 | 32.04 | -41.96 | 74 | 57.1 | 1.56 | 7.79 | 34.41 | 100 | 105 | Peak |



| | | | |
|------------------------|---|----------------------------|------------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5180 MHz is fundamental signal which can be ignored.. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5180 | 101.85 | - | - | 101.77 | 34.16 | 3.92 | 38 | 100 | 0 | Peak |
| 5180 | 90.13 | - | - | 90.05 | 34.16 | 3.92 | 38 | 100 | 0 | Average |
| 10359 | 33.89 | -40.11 | 74 | 59.2 | 1.46 | 7.72 | 34.49 | 100 | 109 | Peak |

| | | | |
|------------------------|---|----------------------------|----------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5180 MHz is fundamental signal which can be ignored.. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5180 | 91.31 | - | - | 91.23 | 34.16 | 3.92 | 38 | 180 | 161 | Peak |
| 5180 | 79.13 | - | - | 79.05 | 34.16 | 3.92 | 38 | 180 | 161 | Average |
| 10359 | 33.41 | -40.59 | 74 | 58.72 | 1.46 | 7.72 | 34.49 | 100 | 15 | Peak |



| | | | |
|------------------------|---|----------------------------|------------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440/5302 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5220 | 103.89 | - | - | 103.92 | 34.2 | 3.95 | 38.18 | 100 | 0 | Peak |
| 5220 | 92.1 | - | - | 92.13 | 34.2 | 3.95 | 38.18 | 100 | 0 | Average |
| 5302 | 59.8 | -14.2 | 74 | 60.24 | 34.32 | 3.98 | 38.74 | 100 | 0 | Peak |
| 5302 | 46.77 | -7.23 | 54 | 47.21 | 34.32 | 3.98 | 38.74 | 100 | 0 | Average |
| 10440 | 34.37 | -39.63 | 74 | 59.52 | 1.53 | 7.76 | 34.44 | 100 | 185 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5220 | 91.95 | - | - | 91.98 | 34.2 | 3.95 | 38.18 | 183 | 164 | Peak |
| 5220 | 79.86 | - | - | 79.89 | 34.2 | 3.95 | 38.18 | 183 | 164 | Average |
| 10440 | 33.61 | -40.39 | 74 | 58.76 | 1.53 | 7.76 | 34.44 | 100 | 59 | Peak |



| | | | |
|------------------------|---|----------------------------|------------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5240 | 103.41 | - | - | 103.52 | 34.23 | 3.95 | 38.29 | 100 | 0 | Peak |
| 5240 | 91.27 | - | - | 91.38 | 34.23 | 3.95 | 38.29 | 100 | 0 | Average |
| 10479 | 33.05 | -40.95 | 74 | 58.11 | 1.56 | 7.79 | 34.41 | 100 | 208 | Peak |

| | | | |
|------------------------|---|----------------------------|----------|
| Test Mode : | 802.11a – Chain Port 1 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5240 | 90.88 | - | - | 90.99 | 34.23 | 3.95 | 38.29 | 200 | 163 | Peak |
| 5240 | 78.98 | - | - | 79.09 | 34.23 | 3.95 | 38.29 | 200 | 163 | Average |
| 10479 | 33.05 | -40.95 | 74 | 58.11 | 1.56 | 7.79 | 34.41 | 100 | 261 | Peak |



| | | | |
|------------------------|---|----------------------------|------------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5180 MHz is fundamental signal which can be ignored. 2. 10359/5614 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5180 | 102.63 | - | - | 102.55 | 34.16 | 3.92 | 38 | 100 | 340 | Peak |
| 5180 | 90.75 | - | - | 90.67 | 34.16 | 3.92 | 38 | 100 | 340 | Average |
| 5614 | 59.83 | -14.17 | 74 | 59.52 | 34.66 | 3.99 | 38.34 | 103 | 0 | Peak |
| 5614 | 47.89 | -6.11 | 54 | 47.58 | 34.66 | 3.99 | 38.34 | 103 | 0 | Average |
| 10359 | 33.27 | -40.73 | 74 | 58.58 | 1.46 | 7.72 | 34.49 | 100 | 112 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 36 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5180 | 99.54 | - | - | 99.46 | 34.16 | 3.92 | 38 | 100 | 13 | Peak |
| 5180 | 88.3 | - | - | 88.22 | 34.16 | 3.92 | 38 | 100 | 13 | Average |
| 10359 | 33.89 | -40.11 | 74 | 59.2 | 1.46 | 7.72 | 34.49 | 308 | 0 | Peak |



| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 31.94 | 24.48 | -15.52 | 40 | 41.01 | 16.55 | 0.5 | 33.58 | - | - | Peak |
| 119.24 | 29.66 | -13.84 | 43.5 | 50.44 | 11.8 | 1.02 | 33.6 | 100 | 112 | Peak |
| 247.28 | 27.21 | -18.79 | 46 | 47.32 | 11.88 | 1.45 | 33.44 | - | - | Peak |
| 270.56 | 28.04 | -17.96 | 46 | 47.53 | 12.39 | 1.53 | 33.41 | - | - | Peak |
| 499.48 | 21.36 | -24.64 | 46 | 35.28 | 17.19 | 2.02 | 33.13 | - | - | Peak |
| 750.71 | 24.75 | -21.25 | 46 | 35.17 | 19.9 | 2.46 | 32.78 | - | - | Peak |
| 5004 | 63.38 | -10.62 | 74 | 63.01 | 33.92 | 3.79 | 37.34 | 100 | 317 | Peak |
| 5004 | 50.22 | -3.78 | 54 | 49.85 | 33.92 | 3.79 | 37.34 | 100 | 317 | Average |
| 5220 | 102.34 | - | - | 102.37 | 34.2 | 3.95 | 38.18 | 100 | 341 | Peak |
| 5220 | 90.14 | - | - | 90.17 | 34.2 | 3.95 | 38.18 | 100 | 341 | Average |
| 5434 | 61.48 | -12.52 | 74 | 62.2 | 34.51 | 4.01 | 39.24 | 155 | 288 | Peak |
| 5434 | 48.08 | -5.92 | 54 | 48.8 | 34.51 | 4.01 | 39.24 | 155 | 288 | Average |
| 10440 | 32.24 | -41.76 | 74 | 57.39 | 1.53 | 7.76 | 34.44 | 100 | 169 | Peak |



| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30 | 34.9 | -5.1 | 40 | 49.99 | 18 | 0.48 | 33.57 | 100 | 12 | QP |
| 47.46 | 31.86 | -8.14 | 40 | 56.32 | 8.5 | 0.64 | 33.6 | - | - | Peak |
| 158.04 | 25.94 | -17.56 | 43.5 | 48.7 | 9.67 | 1.15 | 33.58 | - | - | Peak |
| 275.41 | 25.61 | -20.39 | 46 | 44.95 | 12.53 | 1.54 | 33.41 | - | - | Peak |
| 509.18 | 25.81 | -20.19 | 46 | 39.52 | 17.38 | 2.02 | 33.11 | - | - | Peak |
| 682.81 | 21.79 | -24.21 | 46 | 33.15 | 19.18 | 2.36 | 32.9 | - | - | Peak |
| 5000 | 60.54 | -13.46 | 74 | 60.12 | 33.9 | 3.79 | 37.27 | 115 | 0 | Peak |
| 5000 | 46.09 | -7.91 | 54 | 45.67 | 33.9 | 3.79 | 37.27 | 115 | 0 | Average |
| 5220 | 98.3 | - | - | 98.33 | 34.2 | 3.95 | 38.18 | 124 | 0 | Peak |
| 5220 | 86.7 | - | - | 86.73 | 34.2 | 3.95 | 38.18 | 124 | 0 | Average |
| 5436 | 57.12 | -16.88 | 74 | 57.84 | 34.51 | 4.01 | 39.24 | 179 | 0 | Peak |
| 5436 | 43.47 | -10.53 | 54 | 44.19 | 34.51 | 4.01 | 39.24 | 179 | 0 | Average |
| 10440 | 32.73 | -41.27 | 74 | 57.88 | 1.53 | 7.76 | 34.44 | 100 | 239 | Peak |



| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5024 | 61.6 | -12.4 | 74 | 61.26 | 33.95 | 3.8 | 37.41 | 100 | 340 | Peak |
| 5024 | 48.2 | -5.8 | 54 | 47.86 | 33.95 | 3.8 | 37.41 | 100 | 340 | Average |
| 5240 | 102.2 | - | - | 102.31 | 34.23 | 3.95 | 38.29 | 100 | 347 | Peak |
| 5240 | 90.55 | - | - | 90.66 | 34.23 | 3.95 | 38.29 | 100 | 347 | Average |
| 10479 | 33.41 | -40.59 | 74 | 58.47 | 1.56 | 7.79 | 34.41 | 100 | 109 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 48 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5024 | 59.24 | -14.76 | 74 | 58.9 | 33.95 | 3.8 | 37.41 | 117 | 0 | Peak |
| 5024 | 45.55 | -8.45 | 54 | 45.21 | 33.95 | 3.8 | 37.41 | 117 | 0 | Average |
| 5240 | 98.65 | - | - | 98.76 | 34.23 | 3.95 | 38.29 | 100 | 23 | Peak |
| 5240 | 86.69 | - | - | 86.8 | 34.23 | 3.95 | 38.29 | 100 | 23 | Average |
| 5454 | 57.37 | -16.63 | 74 | 57.98 | 34.53 | 4.01 | 39.15 | 123 | 0 | Peak |
| 5454 | 45.26 | -8.74 | 54 | 45.87 | 34.53 | 4.01 | 39.15 | 123 | 0 | Average |
| 10479 | 31.33 | -42.67 | 74 | 56.39 | 1.56 | 7.79 | 34.41 | 100 | 341 | Peak |



| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 802.11n HT40 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 38 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5190 | 100.21 | - | - | 100.13 | 34.16 | 3.92 | 38 | 100 | 0 | Peak |
| 5190 | 88.43 | - | - | 88.35 | 34.16 | 3.92 | 38 | 100 | 0 | Average |
| 10380 | 32.45 | -41.55 | 74 | 57.72 | 1.48 | 7.73 | 34.48 | 100 | 94 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11n HT40 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 38 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5190 | 96.96 | - | - | 96.88 | 34.16 | 3.92 | 38 | 100 | 12 | Peak |
| 5190 | 85.97 | - | - | 85.89 | 34.16 | 3.92 | 38 | 100 | 12 | Average |
| 10380 | 33.05 | -40.95 | 74 | 58.32 | 1.48 | 7.73 | 34.48 | 100 | 115 | Peak |



| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 802.11n HT40 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 46 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5230 MHz is fundamental signal which can be ignored. 2. 10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5230 | 100.51 | - | - | 100.62 | 34.23 | 3.95 | 38.29 | 100 | 0 | Peak |
| 5230 | 88.2 | - | - | 88.31 | 34.23 | 3.95 | 38.29 | 100 | 0 | Average |
| 10461 | 32.19 | -41.81 | 74 | 57.28 | 1.55 | 7.78 | 34.42 | 100 | 71 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11n HT40 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 46 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5230 MHz is fundamental signal which can be ignored. 2. 10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|-------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| 5230 | 96.54 | - | - | 96.65 | 34.23 | 3.95 | 38.29 | 100 | 10 | Peak |
| 5230 | 84.73 | - | - | 84.84 | 34.23 | 3.95 | 38.29 | 100 | 10 | Average |
| 10461 | 31.4 | -42.6 | 74 | 56.49 | 1.55 | 7.78 | 34.42 | 100 | 258 | Peak |



<Sample 2>

| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Horizontal |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5140 | 60.27 | -13.73 | 74 | 53.41 | 35.25 | 5.38 | 33.77 | 100 | 338 | Peak |
| 5140 | 48.46 | -5.54 | 54 | 41.6 | 35.25 | 5.38 | 33.77 | 100 | 338 | Average |
| 5220 | 104.15 | - | - | 97.24 | 35.27 | 5.4 | 33.76 | 100 | 338 | Peak |
| 5220 | 91.8 | - | - | 84.89 | 35.27 | 5.4 | 33.76 | 100 | 338 | Average |
| 10440 | 33.06 | -40.94 | 74 | 58.21 | 1.53 | 7.76 | 34.44 | 100 | 309 | Peak |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 802.11n HT20 – Chain Port 0+1 | Temperature : | 22~23°C |
| Test Channel : | 44 | Relative Humidity : | 42~43% |
| Test Engineer : | Star Wei | Polarization : | Vertical |
| Remark : | 1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5220 | 98.26 | - | - | 91.35 | 35.27 | 5.4 | 33.76 | 125 | 4 | Peak |
| 5220 | 87.26 | - | - | 80.35 | 35.27 | 5.4 | 33.76 | 125 | 4 | Average |
| 10440 | 33.58 | -40.42 | 74 | 58.73 | 1.53 | 7.76 | 34.44 | 100 | 102 | Peak |

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dB μ V) | |
|-----------------------------|------------------------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

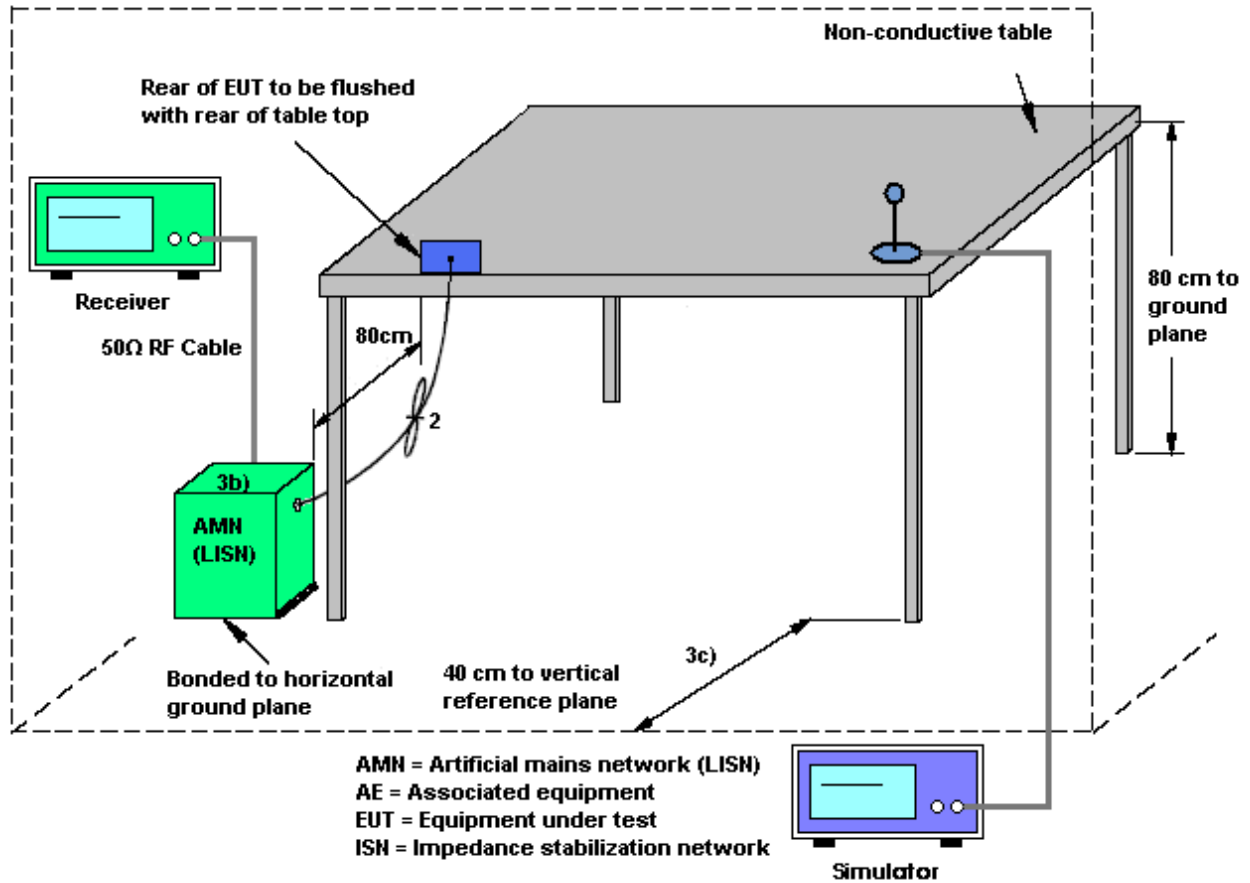
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

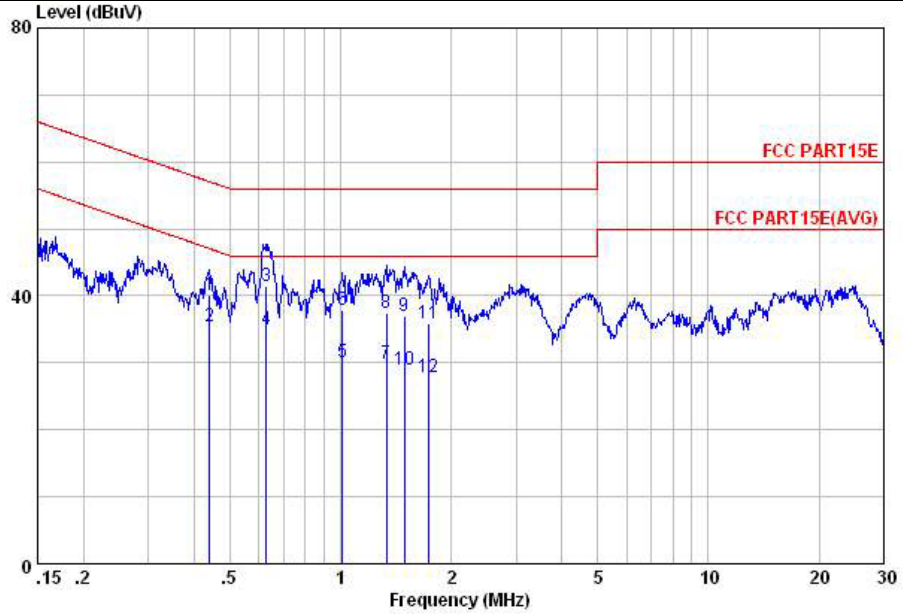
3.5.4 Test Setup





3.5.5 Test Result of AC Conducted Emission

| | | | |
|-----------------|---|---------------------|---------|
| Test Mode : | Mode 2 | Temperature : | 22~24°C |
| Test Engineer : | Eligah Wang | Relative Humidity : | 34~36% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Line |
| Function Type : | GSM850 Idle + Bluetooth Link + WLAN (5G) Link + USB Cable 2 (Charging from Adapter 2) + Earphone + Battery 2 for Sample 2 | | |



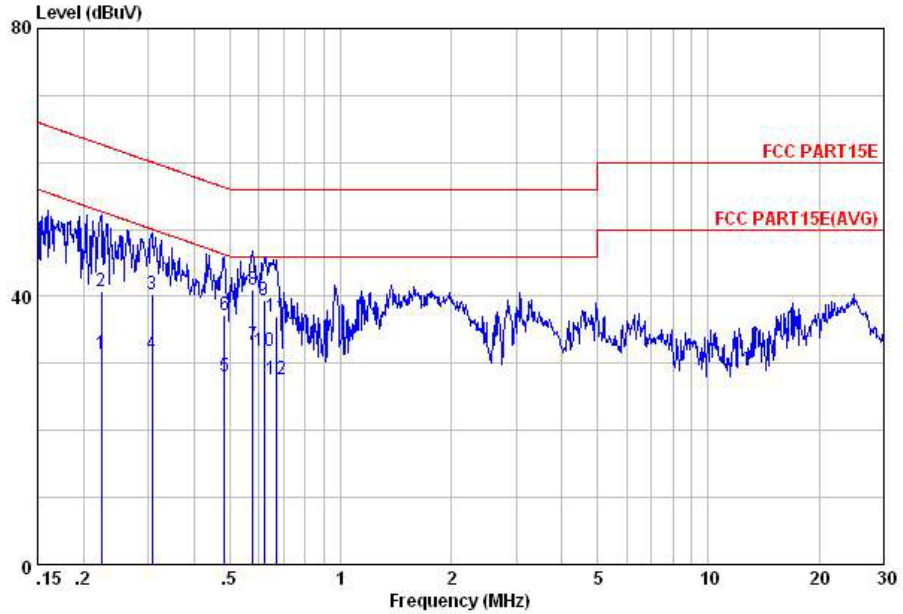
Site : C001-KS
 Condition: FCC PART15E LISN-L20130306 LINE

mode : Mode 2

| | Freq | Level | Over | Limit | Read | LISN | Cable | Remark |
|----|------|-------|--------|-------|-------|--------|-------|---------|
| | MHz | dBuV | Limit | Line | Level | Factor | Loss | |
| | | | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.44 | 40.13 | -16.94 | 57.07 | 29.60 | 0.26 | 10.27 | QP |
| 2 | 0.44 | 35.43 | -11.64 | 47.07 | 24.90 | 0.26 | 10.27 | Average |
| 3 | 0.63 | 41.53 | -14.47 | 56.00 | 31.10 | 0.20 | 10.23 | QP |
| 4 | 0.63 | 35.03 | -10.97 | 46.00 | 24.60 | 0.20 | 10.23 | Average |
| 5 | 1.01 | 30.18 | -15.82 | 46.00 | 19.90 | 0.10 | 10.18 | Average |
| 6 | 1.01 | 37.88 | -18.12 | 56.00 | 27.60 | 0.10 | 10.18 | QP |
| 7 | 1.33 | 29.88 | -16.12 | 46.00 | 19.60 | 0.10 | 10.18 | Average |
| 8 | 1.33 | 37.38 | -18.62 | 56.00 | 27.10 | 0.10 | 10.18 | QP |
| 9 | 1.49 | 37.09 | -18.91 | 56.00 | 26.80 | 0.10 | 10.19 | QP |
| 10 | 1.49 | 28.89 | -17.11 | 46.00 | 18.60 | 0.10 | 10.19 | Average |
| 11 | 1.73 | 35.89 | -20.11 | 56.00 | 25.60 | 0.10 | 10.19 | QP |
| 12 | 1.73 | 27.89 | -18.11 | 46.00 | 17.60 | 0.10 | 10.19 | Average |



| | | | |
|-----------------|---|---------------------|---------|
| Test Mode : | Mode 2 | Temperature : | 22~24°C |
| Test Engineer : | Eligah Wang | Relative Humidity : | 34~36% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Neutral |
| Function Type : | GSM850 Idle + Bluetooth Link + WLAN (5G) Link + USB Cable 2 (Charging from Adapter 2) + Earphone + Battery 2 for Sample 2 | | |



Site : C001-KS
 Condition: FCC PART15E LISN-N20130306 NEUTRAL

mode : Mode 2

| | Freq | Level | Over | Limit | Read | LISN | Cable | Remark |
|----|------|-------|--------|-------|-------|--------|-------|---------|
| | MHz | dBuV | Limit | Line | Level | Factor | Loss | |
| | | | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.22 | 31.40 | -21.30 | 52.70 | 19.90 | 0.95 | 10.55 | Average |
| 2 | 0.22 | 40.80 | -21.90 | 62.70 | 29.30 | 0.95 | 10.55 | QP |
| 3 | 0.31 | 40.37 | -19.69 | 60.06 | 29.29 | 0.70 | 10.38 | QP |
| 4 | 0.31 | 31.37 | -18.69 | 50.06 | 20.29 | 0.70 | 10.38 | Average |
| 5 | 0.48 | 28.18 | -18.09 | 46.27 | 17.60 | 0.31 | 10.27 | Average |
| 6 | 0.48 | 37.18 | -19.09 | 56.27 | 26.60 | 0.31 | 10.27 | QP |
| 7 | 0.58 | 32.81 | -13.19 | 46.00 | 22.30 | 0.26 | 10.25 | Average |
| 8 | 0.58 | 40.91 | -15.09 | 56.00 | 30.40 | 0.26 | 10.25 | QP |
| 9 | 0.62 | 39.36 | -16.64 | 56.00 | 28.90 | 0.23 | 10.23 | QP |
| 10 | 0.62 | 31.76 | -14.24 | 46.00 | 21.30 | 0.23 | 10.23 | Average |
| 11 | 0.67 | 37.03 | -18.97 | 56.00 | 26.60 | 0.21 | 10.22 | QP |
| 12 | 0.67 | 27.73 | -18.27 | 46.00 | 17.30 | 0.21 | 10.22 | Average |

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

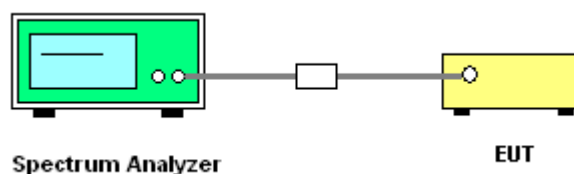
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.6.4 Test Setup





3.6.5 Test Result of Frequency Stability

| | | | |
|-------------|-------------|-----------------|------------|
| Test Band : | 5GHz band 1 | Test Engineer : | Issac Song |
|-------------|-------------|-----------------|------------|

| Mod. | Data Rate | NTX | Channel | Freq. (MHz) | Center Frequency (MHz) | Frequency Deviation (MHz) | Frequency Stability (ppm) | Temperature (°C) | Voltage (V) |
|------|-----------|-----|---------|-------------|------------------------|---------------------------|---------------------------|------------------|-------------|
| 11a | 6Mbps | 1 | 36 | 5180 | 5180.000 | 0.000 | 0.00 | 20 | 3.6 |
| 11a | 6Mbps | 1 | 36 | 5180 | 5179.950 | -0.050 | -9.65 | 20 | 4.35 |
| 11a | 6Mbps | 1 | 36 | 5180 | 5179.950 | -0.050 | -9.65 | 20 | 3.75 |
| 11a | 6Mbps | 1 | 36 | 5180 | 5180.000 | 0.000 | 0.00 | -10 | 3.75 |
| 11a | 6Mbps | 1 | 36 | 5180 | 5179.975 | -0.025 | -4.83 | 50 | 3.75 |

Note:

1. Center Frequency = (Low Frequency + High Frequency) / 2.
2. The frequency band 5180-5240MHz which was verified by testing against other standard is less than 20 ppm which is sufficient to maintain the signal within the 5150-5250MHz band.



3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.8 Antenna Requirements

3.8.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

The EUT supports CDD mode.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.



| | Chain Port 0 (dBi) | Chain Port 1 (dBi) | DG for Power (dBi) | DG for PSD (dBi) | Power Limit Reduction (dB) | PSD Limit Reduction (dB) |
|---------------|--------------------------|--------------------------|-----------------------------|---------------------------|-------------------------------------|-----------------------------------|
| Band I | 0.50 | 0.00 | 3.26 | 3.26 | 0.00 | 0.00 |

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|--------------|-----------|------------------|----------------------------|------------------|---------------------------------|---------------|--------------------------|
| Spectrum Analyzer | R&S | FSP40 | 100319 | 9kHz~40GHz | Dec. 28, 2013 | Jul. 25, 2014~ Jul. 30, 2014 | Dec. 27, 2014 | Conducted (TH01-KS) |
| Pulse Power Sensor | Anritsu | MA2411B | 0917070 | 30MHz~40GHz | Feb. 27, 2014 | Jul. 25, 2014~ Jul. 30, 2014 | Feb. 26, 2015 | Conducted (TH01-KS) |
| Power Meter | Anritsu | ML2495A | 1005002 | 50MHz Bandwidth | Feb. 27, 2014 | Jul. 25, 2014~ Jul. 30, 2014 | Feb. 26, 2015 | Conducted (TH01-KS) |
| Thermal Chamber | Ten Billion | TTC-B3S | TBN-9605 02 | -40~+150°C | Dec. 10, 2013 | Jul. 25, 2014~ Jul. 30, 2014 | Dec. 09, 2014 | Conducted (TH01-KS) |
| EMI Test Receiver | R&S | ESCI | 100534 | 9kHz~3GHz | Nov. 05, 2013 | Jul. 25, 2014 | Nov. 04, 2014 | Radiation (03CH01-KS) |
| Spectrum Analyzer | R&S | FSP40 | 100319 | 9kHz~40GHz | Dec. 28, 2013 | Jul. 25, 2014 | Dec. 27, 2014 | Radiation (03CH01-KS) |
| Loop Antenna | R&S | HFH2-Z2 | 100321 | 9kHz~30MHz | Oct. 09, 2013 | Jul. 25, 2014 | Oct. 08, 2014 | Radiation (03CH01-KS) |
| Bilog Antenna | SCHAFFNER | CBL6112D | 23182 | 25MHz~2GHz | Jan. 08, 2014 | Jul. 25, 2014 | Jan. 07, 2015 | Radiation (03CH01-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 75959 | 1GHz~18GHz | Jan. 08, 2014 | Jul. 25, 2014 | Jan. 07, 2015 | Radiation (03CH01-KS) |
| Active Horn Antenna | com-power | AHA-118 | 701030 | 1GHz~18GHz | Nov. 18, 2013 | Jul. 25, 2014 | Nov. 17, 2014 | Radiation (03CH01-KS) |
| SHF-EHF Horn | Schwarzbeck | BBHA 9170 | BBHA1702 49 | 15GHz~40GHz | Mar. 10, 2014 | Jul. 25, 2014 | Mar. 09, 2015 | Radiation (03CH01-KS) |
| Amplifier | com-power | PA-103A | 161073 | 1MHz~1GHz | May 04, 2014 | Jul. 25, 2014 | May 03, 2015 | Radiation (03CH01-KS) |
| Amplifier | Agilent | 8449B | 3008A023 71 | 1GHz~26.5GHz | Dec. 10, 2013 | Jul. 25, 2014 | Dec. 09, 2014 | Radiation (03CH01-KS) |
| AC Power Source | Chroma | 61601 | F1040900 04 | N/A | NCR | Jul. 25, 2014 | NCR | Radiation (03CH01-KS) |
| Turn Table | MF | MF7802 | N/A | 0~360 degree | NCR | Jul. 25, 2014 | NCR | Radiation (03CH01-KS) |
| Antenna Mast | MF | MF7802 | N/A | 1 m~4 m | NCR | Jul. 25, 2014 | NCR | Radiation (03CH01-KS) |
| EMI Receiver | R&S | ESCI7 | 100768 | 9kHz~7GHz; | May 04, 2014 | Jul. 06, 2014 | May 03, 2015 | Conduction (CO01-KS) |
| AC LISN | MessTec | AN3016 | 060103 | 9kHz~30MHz | Dec. 10, 2013 | Jul. 06, 2014 | Dec. 09, 2014 | Conduction (CO01-KS) |
| AC LISN (for auxiliary equipment) | MessTec | AN3016 | 060105 | 9kHz~30MHz | Dec. 10, 2013 | Jul. 06, 2014 | Dec. 09, 2014 | Conduction (CO01-KS) |
| AC Power Source | Chroma | 61602 | ABP00000 0811 | AC 0V~300V, 45Hz~1000Hz | Nov. 12, 2013 | Jul. 06, 2014 | Nov. 11, 2014 | Conduction (CO01-KS) |



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 2.3 |
|---|-----|

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 2.5 |
|---|-----|