

# Partial FCC RF Test Report


APPLICANT : DT Research Inc.  
EQUIPMENT : WLAN Module  
BRAND NAME : DT Research Inc.  
MODEL NAME : 600B  
FCC ID : YE3600B  
STANDARD : FCC Part 15 Subpart E §15.407  
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

This is a partial report which is included Conducted Output Power Measurement and Conducted Emission test item. The product was received on Feb. 25, 2013 and completely tested on Feb. 27, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the 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 INC., the test report shall not be reproduced except in full.



---

Reviewed by: Joseph Lin / Supervisor

---

Approved by: Jones Tsai / Manager

## SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

---

SPORTON INTERNATIONAL INC.

TEL : 886-3-327-3456

FAX : 886-3-328-4978

FCC ID : YE3600B

Page Number : 1 of 26

Report Issued Date : Mar. 26, 2013

Report Version : Rev. 01



## TABLE OF CONTENTS

<b>REVISION HISTORY .....</b>	<b>3</b>
<b>SUMMARY OF TEST RESULT .....</b>	<b>4</b>
<b>1 GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1 Applicant .....	5
1.2 Manufacturer .....	5
1.3 Feature of Equipment Under Test .....	5
1.4 Product Specification of Equipment Under Test .....	6
1.5 Testing Site .....	8
1.6 Applied Standards .....	8
<b>2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST .....</b>	<b>9</b>
2.1 Carrier Frequency and Channel .....	10
2.2 Pre-Scanned RF Power .....	11
2.3 Test Mode .....	14
2.4 Connection Diagram of Test System .....	14
2.5 Support Unit used in test configuration and system .....	15
<b>3 TEST RESULT .....</b>	<b>16</b>
3.1 Maximum Conducted Output Power Measurement .....	16
3.2 AC Conducted Emission Measurement .....	20
3.3 Antenna Requirements .....	24
<b>4 LIST OF MEASURING EQUIPMENTS .....</b>	<b>25</b>
<b>5 UNCERTAINTY OF EVALUATION .....</b>	<b>26</b>
<b>APPENDIX A. PHOTOGRAPHS OF EUT</b>	
<b>APPENDIX B. SETUP PHOTOGRAPHS</b>	



## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR322535D	Rev. 01	Initial issue of report	Mar. 26, 2013

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.407(a)	RSS-210 A9.2	Maximum Conducted Output Power	$\leq 17, 24, 30$ dBm (depend on band)	Pass	-
3.2	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 8.90 dB at 0.190 MHz
3.3	15.203 & 15.407(a)	RSS-210 A9.2	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

DT Research Inc.

6F., NO.1, NingPo E. St., Taipei, 100 Taiwan, R.O.C.

## 1.2 Manufacturer

DT Research Inc.

6F., NO.1, NingPo E. St., Taipei, 100 Taiwan, R.O.C.

## 1.3 Feature of Equipment Under Test

Product Feature	
Equipment	WLAN Module
Brand Name	DT Research Inc.
Model Name	600B
FCC ID	YE3600B
Installed into Mobile Tablet	Brand Name : DT Research Inc. Model Name : DT365
EUT supports Radios application	WLAN 11abgn / Bluetooth 2.1/3.0/4.0
EUT Stage	Production Unit

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
<b>Tx/Rx Channel Frequency Range</b>	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5580 MHz 5660 MHz ~ 5700 MHz
<b>Maximum Output Power</b>	<b>&lt;5180 MHz ~ 5240 MHz&gt;</b> <b>&lt;Ant. 1&gt;</b> 802.11a : 16.05 dBm / 0.0403 W <b>&lt;Ant. 2&gt;</b> 802.11a : 15.58 dBm / 0.0361 W <b>&lt;SISO Ant. 1&gt;</b> 802.11n HT20 : 16.49 dBm / 0.0446 W 802.11n HT40 : 16.37 dBm / 0.0434 W <b>&lt;SISO Ant. 2&gt;</b> 802.11n HT20 : 15.91 dBm / 0.0390 W 802.11n HT40 : 15.76 dBm / 0.0377 W <b>&lt;MIMO Ant. 1+2&gt;</b> 802.11n HT20 : 16.08 dBm / 0.0406 W 802.11n HT40 : 16.08 dBm / 0.0406 W <b>&lt;5260 MHz ~ 5320 MHz&gt;</b> <b>&lt;Ant. 1&gt;</b> 802.11a : 16.24 dBm / 0.0421 W <b>&lt;Ant. 2&gt;</b> 802.11a : 15.89 dBm / 0.0388 W <b>&lt;SISO Ant. 1&gt;</b> 802.11n HT20 : 16.47 dBm / 0.0444 W 802.11n HT40 : 15.95 dBm / 0.0394 W <b>&lt;SISO Ant. 2&gt;</b> 802.11n HT20 : 15.58 dBm / 0.0361 W 802.11n HT40 : 14.95 dBm / 0.0313 W <b>&lt;MIMO Ant. 1+2&gt;</b> 802.11n HT20 : 15.85 dBm / 0.0385 W 802.11n HT40 : 15.59 dBm / 0.0362 W <b>&lt;5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz&gt;</b> <b>&lt;Ant. 1&gt;</b> 802.11a : 16.37 dBm / 0.0434 W <b>&lt;Ant. 2&gt;</b> 802.11a : 15.48 dBm / 0.0353 W <b>&lt;SISO Ant. 1&gt;</b> 802.11n HT20 : 16.36 dBm / 0.0433 W 802.11n HT40 : 16.30 dBm / 0.0427 W <b>&lt;SISO Ant. 2&gt;</b> 802.11n HT20 : 15.49 dBm / 0.0354 W 802.11n HT40 : 15.65 dBm / 0.0367 W <b>&lt;MIMO Ant. 1+2&gt;</b> 802.11n HT20 : 15.94 dBm / 0.0393 W 802.11n HT40 : 15.94 dBm / 0.0393 W

Product Specification subjective to this standard														
<b>Antenna Type</b>	<p>&lt;5150 MHz ~ 5250 MHz&gt;  <b>Ant. 1 (Main Antenna):</b> PIFA Antenna with gain 3.50 dBi  <b>Ant. 2 (Aux. Antenna):</b> PIFA Antenna with gain 2.30 dBi            &lt;5250 MHz ~ 5350 MHz&gt;  <b>Ant. 1 (Main Antenna):</b> PIFA Antenna with gain 3.60 dBi  <b>Ant. 2 (Aux. Antenna):</b> PIFA Antenna with gain 2.76 dBi            &lt;5470 MHz ~ 5725 MHz &gt;  <b>Ant. 1 (Main Antenna):</b> PIFA Antenna with gain 3.64 dBi  <b>Ant. 2 (Aux. Antenna):</b> PIFA Antenna with gain 2.05 dBi</p>													
<b>Type of Modulation</b>	OFDM (BPSK / QPSK / 16QAM / 64QAM)													
<b>Antenna Function Description</b>	<table border="1"> <thead> <tr> <th></th><th>Ant 1.</th><th>Ant 2.</th></tr> </thead> <tbody> <tr> <td>802.11 a</td><td>V</td><td>V</td></tr> <tr> <td>802.11 n SISO</td><td>V</td><td>V</td></tr> <tr> <td>802.11 n MIMO</td><td>V</td><td>V</td></tr> </tbody> </table> <p>Note: MIMO mode is completely uncorrelated.            Ant. 1 and Ant. 2 could not transmit simultaneously under 802.11 a/n SISO mode</p>			Ant 1.	Ant 2.	802.11 a	V	V	802.11 n SISO	V	V	802.11 n MIMO	V	V
	Ant 1.	Ant 2.												
802.11 a	V	V												
802.11 n SISO	V	V												
802.11 n MIMO	V	V												

## 1.5 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	TH02-HY	CO05-HY	722060/4086B-1

## 1.6 Applied 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 D01 General UNII Test Procedures v01r02
- FCC KDB 662911 D01 Multiple Transmitter Output v01r02.
- 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).

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	36	5180	44	5220
	<b>38</b>	<b>5190</b>	<b>46</b>	<b>5230</b>
	40	5200	48	5240

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2	52	5260	60	5300
	<b>54</b>	<b>5270</b>	<b>62</b>	<b>5310</b>
	56	5280	64	5320

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5600 MHz and 5650-5725 MHz Band 3	100	5500	116	5580
	<b>102</b>	<b>5510</b>	132	5660
	104	5520	<b>134</b>	<b>5670</b>
	108	5540	136	5680
	<b>110</b>	<b>5550</b>	140	5700
	112	5560		

**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 antenna configurations as following table and the highest power data rates were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

<Ant. 1>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Power (dBm) <5180 ~ 5240MHz >	16.05	16.03	15.98	15.99	16.01	16.03	16.02	16.04
Power (dBm) <5260-5320 MHz>	16.24	16.23	16.17	16.22	16.21	16.20	16.17	16.16
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	16.37	16.36	16.21	16.28	16.26	16.33	16.31	16.34

5GHz 802.11a/n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Power (dBm) <5180 ~ 5240MHz >	16.49	16.48	16.48	16.45	16.44	16.46	16.45	16.48
Power (dBm) <5260-5320 MHz>	16.47	16.45	16.44	16.42	16.43	16.44	16.42	16.45
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	16.36	16.28	16.30	16.30	16.34	16.35	16.34	16.32

5GHz 802.11a/n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Power (dBm) <5180 ~ 5240MHz >	16.37	16.35	16.35	16.23	16.31	16.36	16.35	16.34
Power (dBm) <5260-5320 MHz>	15.95	15.94	15.90	15.85	15.94	15.94	15.93	15.93
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	16.30	16.28	16.29	16.16	16.25	16.27	16.26	16.28

**<Ant. 2>**

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Power (dBm) <5180 ~ 5240MHz >	15.58	15.56	15.51	15.49	15.50	15.56	15.56	15.54
Power (dBm) <5260-5320 MHz>	15.89	15.83	15.80	15.85	15.81	15.84	15.88	15.84
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	15.48	15.47	15.45	15.43	15.39	15.43	15.42	15.45

5GHz 802.11a/n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Power (dBm) <5180 ~ 5240MHz >	15.91	15.85	15.86	15.78	15.87	15.88	15.88	15.88
Power (dBm) <5260-5320 MHz>	15.58	15.51	15.55	15.57	15.54	15.52	15.53	15.54
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	15.49	15.41	15.48	15.47	15.48	15.48	15.45	15.46

5GHz 802.11a/n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Power (dBm) <5180 ~ 5240MHz >	15.76	15.71	15.73	15.72	15.72	15.74	15.72	15.67
Power (dBm) <5260-5320 MHz>	14.95	14.92	14.92	14.93	14.93	14.94	14.92	14.88
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	15.65	15.64	15.63	15.62	15.62	15.61	15.60	15.57

**<MIMO Ant. 1+2>**

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Power (dBm) <5180 ~ 5240MHz >	16.08	16.06	16.05	16.06	16.04	16.07	16.06	16.06
Power (dBm) <5260-5320 MHz>	15.85	15.77	15.78	15.78	15.74	15.84	15.80	15.78
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	15.94	15.90	15.93	15.91	15.91	15.94	15.93	15.93

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Power (dBm) <5180 ~ 5240MHz >	16.08	16.07	16.06	16.06	16.03	15.92	16.01	16.04
Power (dBm) <5260-5320 MHz>	15.59	15.58	15.57	15.58	15.58	15.58	15.49	15.57
Power (dBm) <5500-5580 MHz and 5660-5700 MHz >	15.94	15.93	15.93	15.93	15.93	15.91	15.91	15.79

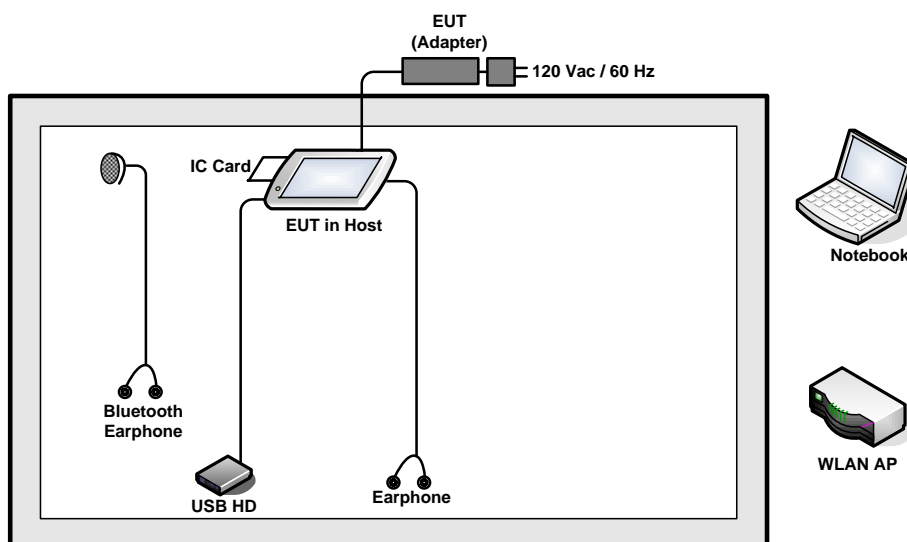
Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant 1 and MIMO Ant 2.

## 2.3 Test Mode

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

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5G) Link + Bluetooth Link + Camera + MPEG4 + H Patten + TC
<b>Remark:</b> TC stands for Test Configuration, and consists of USB Data Link with USB HD, Adapter, SD Card, Earphone, and IC Card.	

## 2.4 Connection Diagram of Test System



## 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-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	USB3.0 HD	WD	WDBPCK5000ABK-PESN	FCC DoC	Shielded, 0.5 m	N/A
4.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
5.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
6.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
7.	IC Card	N/A	N/A	N/A	N/A	N/A

### 3 Test Result

#### 3.1 Maximum Conducted Output Power Measurement

##### 3.1.1 Limit of Maximum Conducted Output Power

For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or  $4 \text{ dBm} + 10\log B$ , where B is the 26 dB emissions bandwidth in 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the bands 5250-5350 MHz and 5470-5600 MHz and 5650-5725 MHz, bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or  $11 \text{ dBm} + 10\log B$ , where B is the 26 dB emissions bandwidth in 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

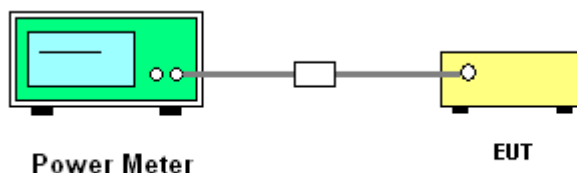
##### 3.1.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D01 General UNII Test Procedures v01r02.

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.

##### 3.1.4 Test Setup





**3.1.5 Test Result of Maximum Conducted Output Power**

<b>Test Mode :</b>	802.11a	<b>Temperature :</b>	24~26℃
<b>Test Engineer :</b>	Jeff Chou and Coyote Lin	<b>Relative Humidity :</b>	45~49%
<b>Duty Cycle</b>	99.05% for Ant. 1 98.58% for Ant. 2	<b>Duty Factor</b>	0.04dB for Ant. 1 0.06dB for Ant. 2

Band	Channel	Frequency (MHz)	802.11a Output Power (dBm)				Max. Limits (dBm)	Pass /Fail
			Measured		Final			
			Ant. 1	Ant. 2	Ant. 1	Ant. 2		
NII Band 1	36	5180	16.01	15.52	16.05	15.58	17	Pass
	44	5220	15.81	15.41	15.85	15.47	17	Pass
	48	5240	15.45	15.21	15.49	15.27	17	Pass
NII Band 2	52	5260	15.51	14.96	15.55	15.02	24	Pass
	60	5300	16.03	15.02	16.07	15.08	24	Pass
	64	5320	16.20	15.83	16.24	15.89	24	Pass
NII Band 3	100	5500	16.12	15.38	16.16	15.44	24	Pass
	116	5580	16.33	15.42	16.37	15.48	24	Pass
	140	5700	16.29	15.35	16.33	15.41	24	Pass

**Note:**

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
3. For the 5250-5350 MHz and 5470-5600MHz and 5650-5725MHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log (26dB BW).

<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Jeff Chou and Coyote Lin	<b>Relative Humidity :</b>	45~49%
<b>Duty Cycle</b>	98.47% for SISO Ant. 1 98.48% for SISO Ant. 2 97.06% for MIMO Ant. 1 98.02% for MIMO Ant. 2	<b>Duty Factor</b>	0.07dB for SISO Ant. 1 0.07dB for SISO Ant. 2 0.13dB for MIMO Ant. 1 0.09dB for MIMO Ant. 2

Band	Ch.	Frequency (MHz)	802.11n HT20 Peak Output Power (dBm)									Max. Limits (dBm)	Pass /Fail
			Measured				Final						
			SISO Ant. 1	SISO Ant. 2	MIMO Ant. 1	MIMO Ant. 2	SISO Ant. 1	SISO Ant. 2	MIMO Ant. 1	MIMO Ant. 2	MIMO Ant. 1+2		
NII Band 1	36	5180	15.79	15.84	12.61	13.09	15.86	15.91	12.74	13.18	15.97	17	Pass
	44	5220	16.42	15.76	12.76	13.16	16.49	15.83	12.89	13.25	16.08	17	Pass
	48	5240	16.24	15.72	12.57	12.98	16.31	15.79	12.70	13.07	15.90	17	Pass
NII Band 2	52	5260	15.75	15.30	11.98	12.36	15.82	15.37	12.11	12.45	15.29	24	Pass
	60	5300	16.31	15.02	12.26	12.49	16.38	15.09	12.39	12.58	15.49	24	Pass
	64	5320	16.40	15.51	12.59	12.86	16.47	15.58	12.72	12.95	15.85	24	Pass
NII Band 3	100	5500	16.24	15.34	12.71	12.64	16.31	15.41	12.84	12.73	15.79	24	Pass
	116	5580	16.29	15.42	12.72	12.92	16.36	15.49	12.85	13.01	15.94	24	Pass
	140	5700	16.14	15.32	11.91	12.58	16.21	15.39	12.04	12.67	15.37	24	Pass

**Note:**

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
3. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
4. For the 5250-5350 MHz and 5470-5600MHz and 5650-5725MHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log (26dB BW).

<b>Test Mode :</b>	802.11n HT40	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Jeff Chou and Coyote Lin	<b>Relative Humidity :</b>	45~49%
<b>Duty Cycle</b>	96.94% for SISO Ant. 1 97.94% for SISO Ant. 2 94.32% for MIMO Ant. 1 95.40% for MIMO Ant. 2	<b>Duty Factor</b>	0.13dB for SISO Ant. 1 0.09dB for SISO Ant. 2 0.25dB for MIMO Ant. 1 0.20dB for MIMO Ant. 2

Band	Ch.	Frequency (MHz)	802.11n HT40 Peak Output Power (dBm)									Max. Limits (dBm)	Pass /Fail
			Measured				Final						
			SISO Ant. 1	SISO Ant. 2	MIMO Ant. 1	MIMO Ant. 2	SISO Ant. 1	SISO Ant. 2	MIMO Ant. 1	MIMO Ant. 2	MIMO Ant. 1+2		
NII Band 1	38	5190	12.46	12.34	9.93	10.37	12.59	12.43	10.18	10.57	13.39	17	Pass
	46	5230	16.24	15.67	12.64	13.03	16.37	15.76	12.89	13.23	16.08	17	Pass
NII Band 2	54	5270	15.82	14.86	12.24	12.46	15.95	14.95	12.49	12.66	15.59	24	Pass
	62	5310	11.24	11.97	11.78	12.21	11.37	12.06	12.03	12.41	15.24	24	Pass
NII Band 3	102	5510	14.85	14.51	12.48	12.53	14.98	14.60	12.73	12.73	15.74	24	Pass
	110	5550	16.17	15.56	12.59	12.80	16.30	15.65	12.84	13.00	15.94	24	Pass
	134	5670	16.03	15.22	11.77	12.45	16.16	15.31	12.02	12.65	15.36	24	Pass

**Note:**

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
3. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
4. For the 5250-5350 MHz and 5470-5600MHz and 5650-5725MHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log (26dB BW).

## 3.2 AC Conducted Emission Measurement

### 3.2.1 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 $\mu$ 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.

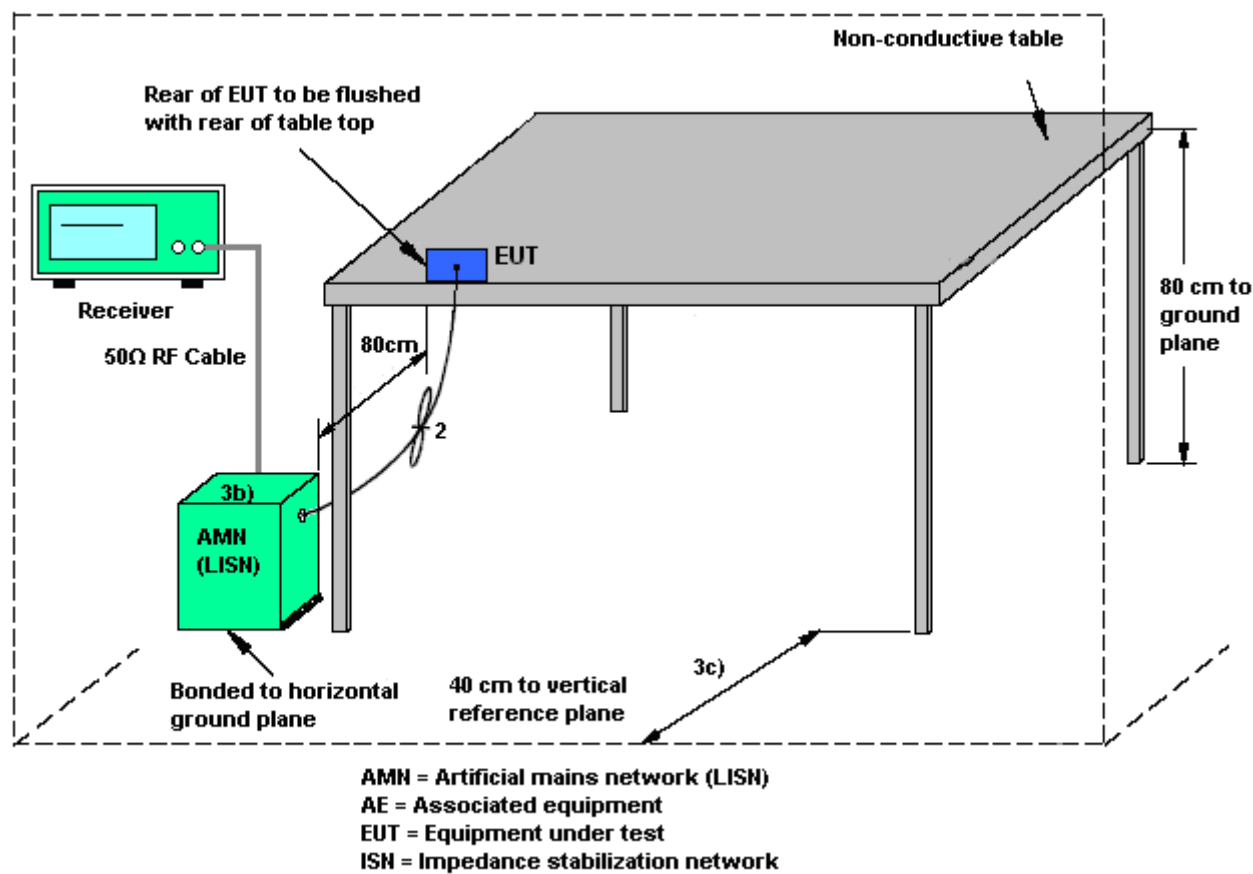
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

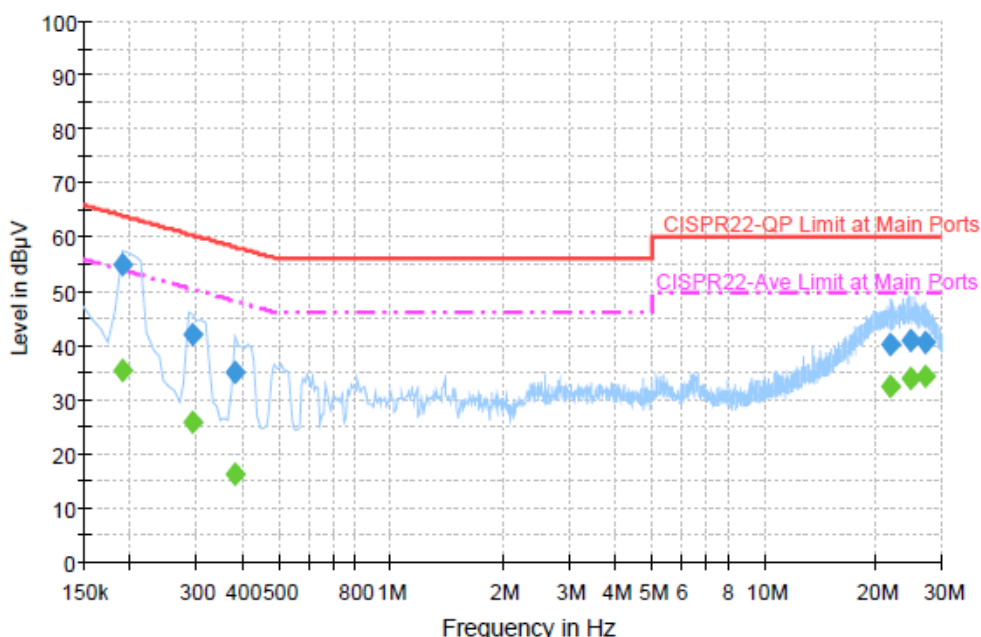
1. The testing follows the guidelines in ANSI C63.4-2003 test site requirement.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

### 3.2.4 Test Setup



### 3.2.5 Test Result of AC Conducted Emission

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	20~22℃
<b>Test Engineer :</b>	Slash Huang	<b>Relative Humidity :</b>	45~47%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WLAN (5G) Link + Bluetooth Link + Camera + MPEG4 + H Patten + TC		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		



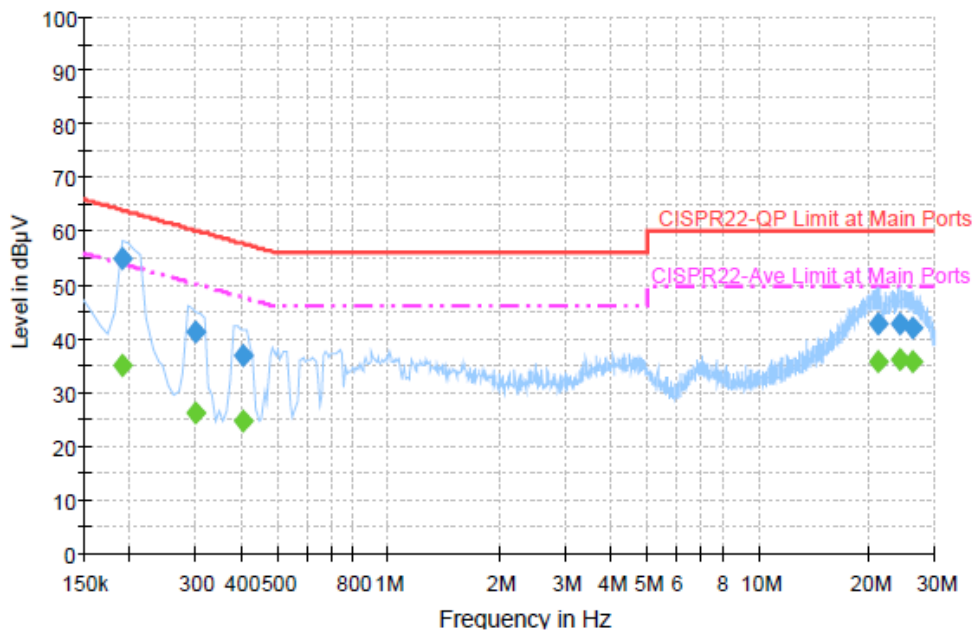
#### Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	55.1	Off	L1	19.4	8.9	64.0
0.294000	41.9	Off	L1	19.4	18.5	60.4
0.382000	35.0	Off	L1	19.4	23.2	58.2
21.926000	40.1	Off	L1	19.8	19.9	60.0
24.654000	40.8	Off	L1	19.9	19.2	60.0
26.958000	40.6	Off	L1	19.9	19.4	60.0

#### Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	35.2	Off	L1	19.4	18.8	54.0
0.294000	26.0	Off	L1	19.4	24.4	50.4
0.382000	16.3	Off	L1	19.4	31.9	48.2
21.926000	32.4	Off	L1	19.8	17.6	50.0
24.654000	33.9	Off	L1	19.9	16.1	50.0
26.958000	34.3	Off	L1	19.9	15.7	50.0

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	20~22°C
<b>Test Engineer :</b>	Slash Huang	<b>Relative Humidity :</b>	45~47%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WLAN (5G) Link + Bluetooth Link + Camera + MPEG4 + H Patten + TC		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		


**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	55.0	Off	N	19.4	9.0	64.0
0.302000	41.3	Off	N	19.4	18.9	60.2
0.406000	37.0	Off	N	19.4	20.7	57.7
21.094000	42.6	Off	N	19.9	17.4	60.0
24.102000	42.7	Off	N	20.1	17.3	60.0
26.086000	41.9	Off	N	20.0	18.1	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	35.0	Off	N	19.4	19.0	54.0
0.302000	26.1	Off	N	19.4	24.1	50.2
0.406000	24.7	Off	N	19.4	23.0	47.7
21.094000	35.9	Off	N	19.9	14.1	50.0
24.102000	36.2	Off	N	20.1	13.8	50.0
26.086000	35.8	Off	N	20.0	14.2	50.0

### 3.3 Antenna Requirements

#### 3.3.1 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.

#### 3.3.2 Antenna Connected Construction

Non-standard connector used.

#### 3.3.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit. The EUT supports MIMO mode. The composite antenna gain is as following table.

When the antenna gain of EUT is over 6 dBi, the maximum peak output power and PSD limit should be reduced as following table.

	2.4GHz	5GHz
Composite gain (dBi)	1.32	3.22
PSD Array gain (dBi)	0.00	0.00
Power limit reduction (dBi)	0.00	0.00
PSD limit reduction	0.00	0.23

*Power limit reduction = Composite gain – 6dBi, ( min = 0 )*

*PSD limit reduction = Composite gain + PSD Array gain – 6dBi, ( min = 0 )*

FCC KDB 662911 D01 Multiple Transmitter Output v01r02

For CDD transmissions, directional gain is calculated as

Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain =  $10 \log(N_{ANT}/N_{SS}=1)$  dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;



## 4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 06, 2012	Feb. 26, 2013~ Feb. 27, 2013	Jun. 05, 2013	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Sep. 08, 2012	Feb. 26, 2013~ Feb. 27, 2013	Sep. 07, 2013	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Sep. 08, 2012	Feb. 26, 2013~ Feb. 27, 2013	Sep. 07, 2013	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9KHz ~ 2.75GHz	Nov. 13, 2012	Feb. 27, 2013	Nov. 12, 2013	Conduction (CO05-HY)
Two-LISN	Rohde & Schwarz	ENV216	100081	9KHz ~ 30MHz	Dec. 12, 2012	Feb. 27, 2013	Dec. 11, 2013	Conduction (CO05-HY)
Two-LISN	Rohde & Schwarz	ENV216	100080	9KHz ~ 30MHz	Dec. 06, 2012	Feb. 27, 2013	Dec. 05, 2013	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Feb. 27, 2013	N/A	Conduction (CO05-HY)

## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.26
--	------



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP322535 as below.