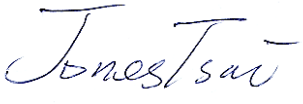
FCC RF Test Report

APPLICANT	**:**	**Enda Gormley Sile LLC**
EQUIPMENT	**:**	**HDMI Digital Media Receiver**
MODEL NAME	**:**	**W87CUN**
FCC ID	**:**	**2ABDU-0509**
STANDARD	**:**	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	**:**	**(NII) Unlicensed National Information Infrastructure**

The testing completed on Aug. 22, 2014. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.

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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR441920-02C	Rev. 01	Initial issue of report	Aug. 13, 2014
FR441920-02C	Rev. 02	1. Revising Peak Power to Average Power at page 9. 2. Add 26dB Occupied Bandwidth results in section 3.1.5.	Aug. 22, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	RSS-210 A9.2	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	RSS-210 A9.2	Maximum Conducted Output Power	≤ 17, 24, 30 dBm (depend on band)	Pass	-
3.3	15.407(a)	RSS-210 A9.2	Power Spectral Density	≤ 4, 11, 17 dBm (depend on band)	Pass	-
3.4	15.407(b)	RSS-210 A9.3	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 0.55 dB at 5334.000 MHz
3.5	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 3.50 dB at 0.510 MHz
3.6	15.407(g)	-	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	RSS-210 A9.4	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	RSS-210 A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Enda Gormley Sile LLC
11670 Fountains Drive
Suite 200
Maple Grove, Minnesota, 55369

1.2 Feature of Equipment Under Test

Product Feature	
Equipment	HDMI Digital Media Receiver
Model Name	W87CUN
FCC ID	2ABDU-0509
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth v3.0 BR/EDR

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

1.3 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>5180 MHz ~ 5240 MHz</td></tr>
<tr><td>Maximum Output Power</td><td><Ant. 1>
802.11a : 16.61 dBm / 0.0458 W
<Ant. 2>
802.11a : 16.44 dBm / 0.0441 W
MIMO <Ant. 1 + 2>
802.11n HT20 : 16.17 dBm / 0.0414 W
802.11n HT40 : 18.92 dBm / 0.0780 W</td></tr>
<tr><td>Antenna Type</td><td>Ant. 1 : PCB printing Antenna with gain 3.40 dBi
Ant. 2 : PCB printing Antenna with gain 5.10 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM))</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><td></td><td>Chain
Port 0
Ant. 1</td><td>Chain
Port 1
Ant. 2</td></tr>
<tr><td>802.11a</td><td>V</td><td>V</td></tr>
<tr><td>802.11n
MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

1.4 Modification of EUT

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

1.5 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**		
	TH02-HY	CO05-HY	03CH07-HY

1.6 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 I (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.

<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**
Average Power (dBm)	**16.61**	16.42	16.50	16.58	16.57	16.57	16.46	16.46

<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**
Average Power (dBm)	**16.44**	16.40	16.43	16.33	16.43	16.41	16.43	16.37

MIMO <Ant. 1 + 2>

5GHz 802.11n HT20 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	**16.17**	16.17	16.13	16.12	16.09	16.14	16.11	16.10
Data Rate (MHz)	**MCS 8**	**MCS 9**	**MCS 10**	**MCS 11**	**MCS 12**	**MCS 13**	**MCS 14**	**MCS 15**
Average Power (dBm)	16.16	16.14	16.15	16.15	16.12	16.15	16.14	16.09

5GHz 802.11n HT40 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	**18.92**	18.88	18.85	18.85	18.82	18.78	18.74	18.72
Data Rate (MHz)	**MCS 8**	**MCS 9**	**MCS 10**	**MCS 11**	**MCS 12**	**MCS 13**	**MCS 14**	**MCS 15**
Average Power (dBm)	18.83	18.77	18.72	18.75	18.83	18.83	18.80	18.72

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

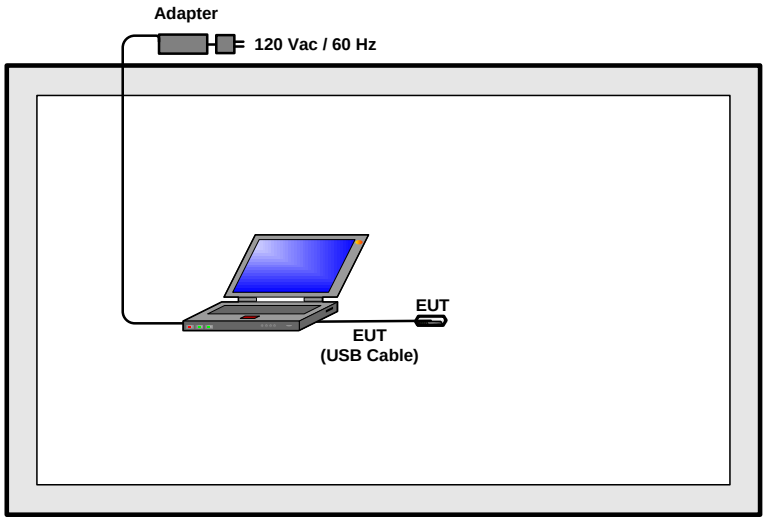
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	**Mode**	**Data rate**	**Test Channel**
Conducted TCs	**26dB BW Power Spectral Density**	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0**	**L/M/H**
		802.11n HT40	**MCS0**	**L/M/H**
	Output Power	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0**	**L/M/H**
		802.11n HT40	**MCS0**	**L/M/H**
	20dB Occupied Bandwidth	**802.11a**	**6 Mbps**	**H**
		802.11n HT20	**MCS0**	**H**
		802.11n HT40	**MCS0**	**H**
	Frequency Stability	**802.11a**	**6 Mbps**	**L**
Radiated TCs	**Radiated Band Edge**	**802.11a**	**6 Mbps**	**L/H**
		802.11n HT20	**MCS0**	**L/H**
		802.11n HT40	**MCS0**	**L/H**
	Radiated Spurious Emission	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0**	**L/M/H**
		802.11n HT40	**MCS0**	**L/M/H**
AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + Bluetooth Link + HDMI Extender Cable + MPEG4 + USB Cable (Charging from Adapter) <Fig. 1> Mode 2 **:** WLAN (5GHz) Link + HDMI Extender Cable + MPEG4 + USB Cable (Charging from Adapter) <Fig. 2>			
Remark: The worst case of conducted emission is mode 1; only the test data of it was reported.				

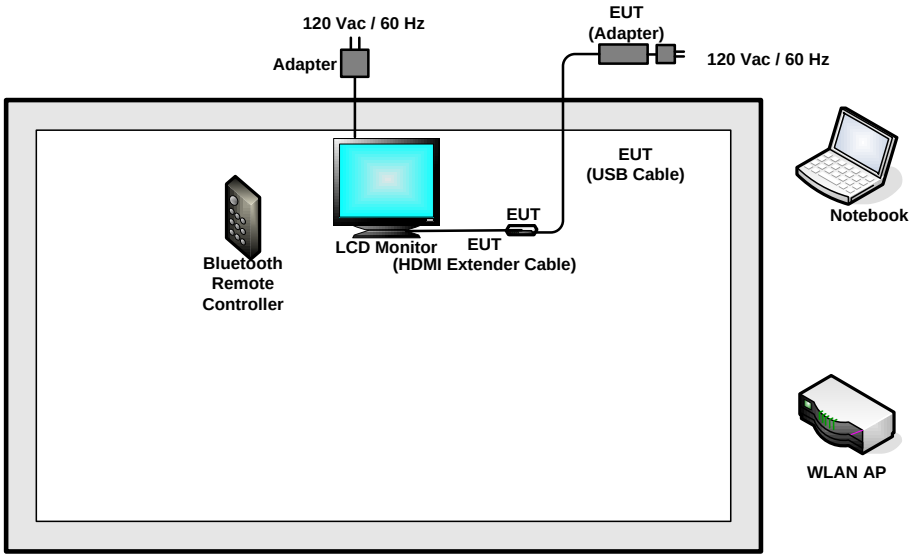
Ch. #		**Band I：5150-5250 MHz**		
		802.11a	**802.11n HT20**	**802.11n HT40**
L	**Low**	36	36	38
M	**Middle**	44	44	-
H	**High**	48	48	46

2.4 Connection Diagram of Test System

<WLAN Tx Mode>

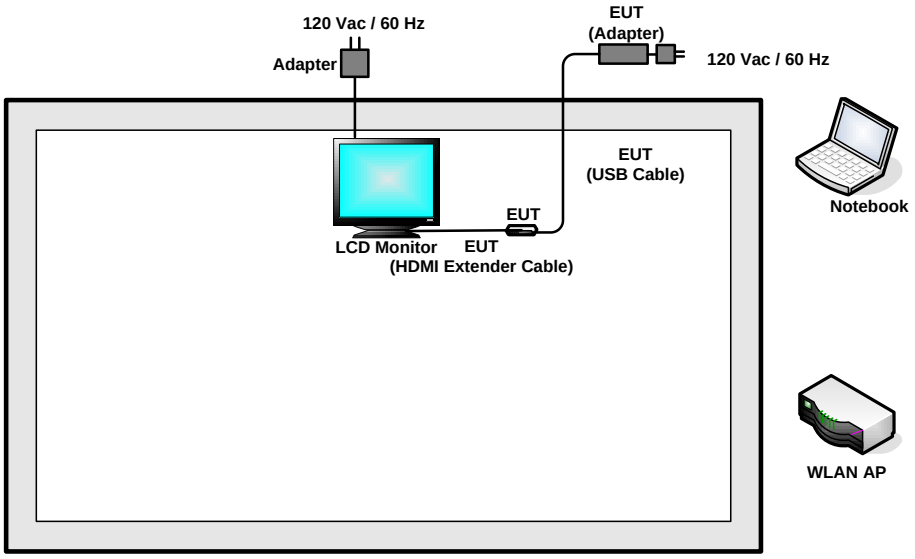


<AC Conducted Emission with Bluetooth Remote Controller Mode>



<Fig. 1>

< AC Conducted Emission Mode>



<Fig. 1>

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.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
3.	Bluetooth Remote Controller	N/A	CV98LM	2ABDV-0929	N/A	N/A
4.	Notebook	DELL	Vostro 1510	FCC DoC/ Contains FCC ID: E2K4965AGNM	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “ADB” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

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 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

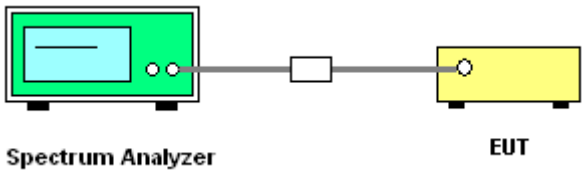
3.1.2 Measuring Instruments

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. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup

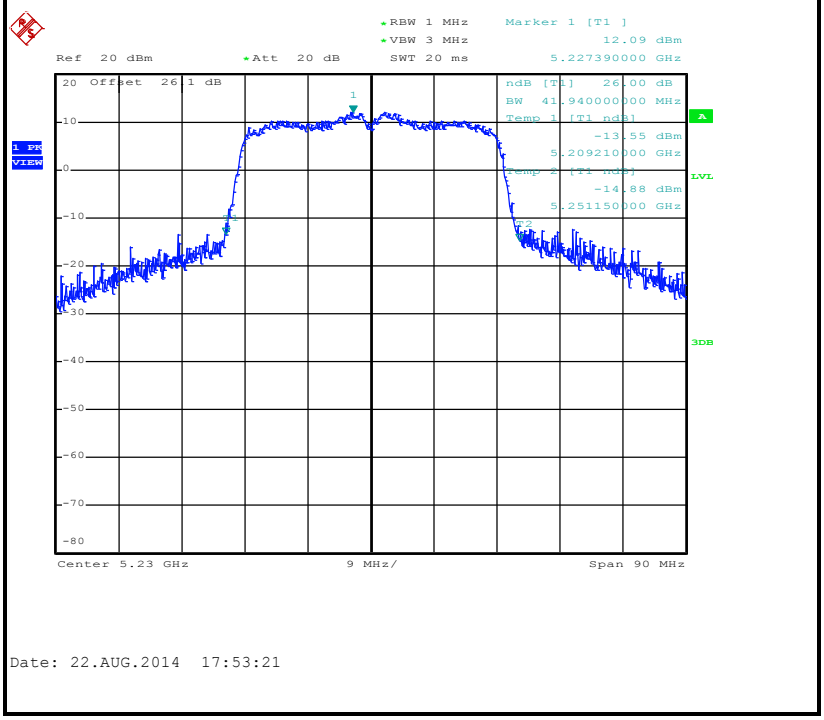


3.1.5 Test Result of 26dB & 99% Occupied Bandwidth Plots

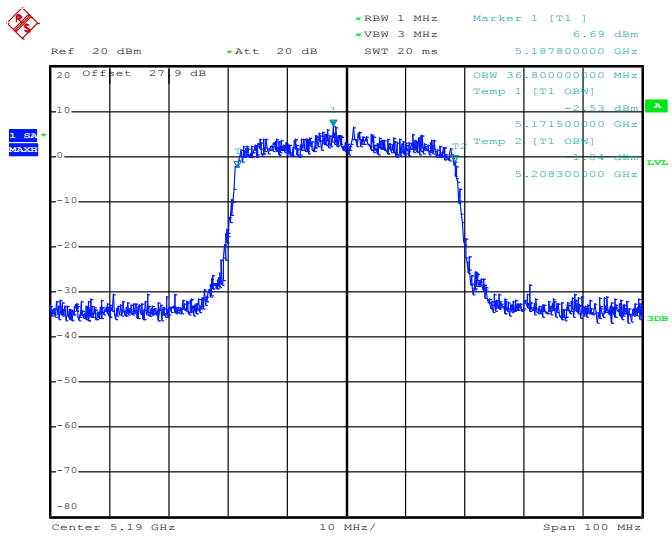
Test Band :	5GHz band I	Temperature :	21~26℃
Test Engineer :	Stuart Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth EIRP Limit (dBm)			
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	17.25	-	21.55	-	22.37	-		
11a	6Mbps	1	44	5220	17.05	-	22.05	-	22.32	-		
11a	6Mbps	1	48	5240	17.15	-	21.95	-	22.34	-		
HT20	MCS0	2	36	5180	17.95	18.00	22.05	21.90	22.54			
HT20	MCS0	2	44	5220	17.95	17.95	22.10	22.10	22.54			
HT20	MCS0	2	48	5240	17.90	17.95	22.25	22.00	22.53			
HT40	MCS0	2	38	5190	36.60	36.80	41.40	41.40	23.01			
HT40	MCS0	2	46	5230	36.60	36.70	41.58	41.94	23.01			

Maximum 26dB Occupied Bandwidth



Maximum 99% Occupied Bandwidth

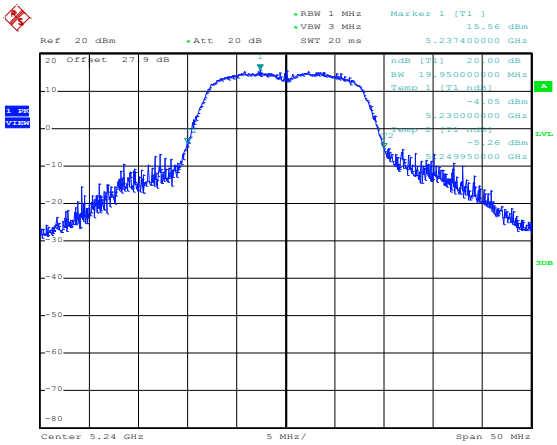


3.1.6 Test Result of 20dB Occupied Bandwidth

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	20dB Bandwidth (MHz)		20dB Bandwidth Upper Frequency (FH) (MHz)		Upper Limit Line (MHz)	Pass/Fail
					Ant. 1	Ant. 2	Ant. 1	Ant. 2		
11a	6Mbps	1	48	5240	19.95	-	5249.95	-	5250	Pass
HT20	MCS0	2	48	5240	20.10	-	5249.90	-		Pass
HT40	MCS0	2	46	5230	39.96	-	5249.98	-		Pass

20dB Occupied Bandwidth

802.11a CH48 5240MHz



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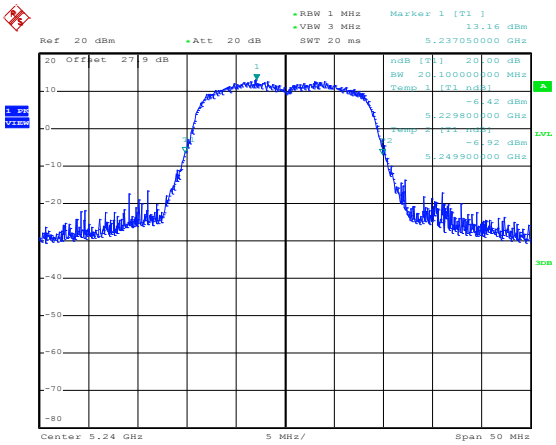
802.11n HT20 CH48 5240MHz



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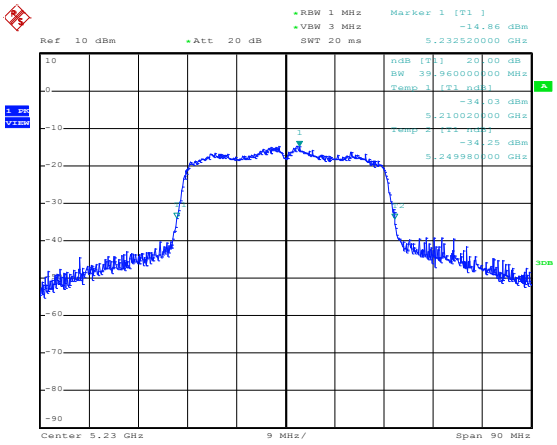
802.11n HT40 CH46 5230MHz



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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.

3.2.2 Measuring Instruments

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

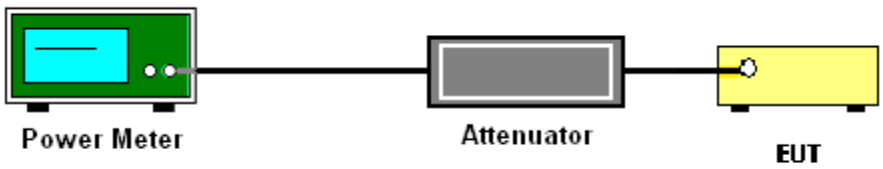
3.2.3 Test Procedures

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 I	Temperature :	21~26℃
Test Engineer :	Stuart Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Power Limit (dBm)		DG (dBi)			Pass /Fail
					Ant. 1	Ant. 2	Ant. 1	Ant. 2	Sum Power	Ant. 1	Ant. 2	Ant. 1	Ant. 2		
11a	6Mbps	1	36	5180	0.23	0.23	16.61	16.44	-	24.00	24.00	3.40	5.10		Pass
11a	6Mbps	1	44	5220	0.23	0.23	16.55	16.09		24.00	24.00	3.40	5.10		Pass
11a	6Mbps	1	48	5240	0.23	0.23	16.48	16.35		24.00	24.00	3.40	5.10		Pass
HT20	MCS0	2	36	5180	0.22	0.20	12.09	12.92	15.54	22.70		7.30			Pass
HT20	MCS0	2	44	5220	0.22	0.20	12.11	13.39	15.81	22.70		7.30			Pass
HT20	MCS0	2	48	5240	0.22	0.20	12.67	13.60	16.17	22.70		7.30			Pass
HT40	MCS0	2	38	5190	0.44	0.44	10.23	10.95	13.62	22.70		7.30			Pass
HT40	MCS0	2	46	5230	0.44	0.44	15.55	16.23	18.92	22.70		7.30			Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. Sum Power is a calculated result from sum of the Ant 1 and Ant 2.

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 #

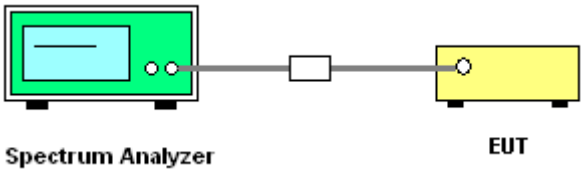
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

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 ≥ 3 MHz.
   - Number of points in sweep ≥ 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



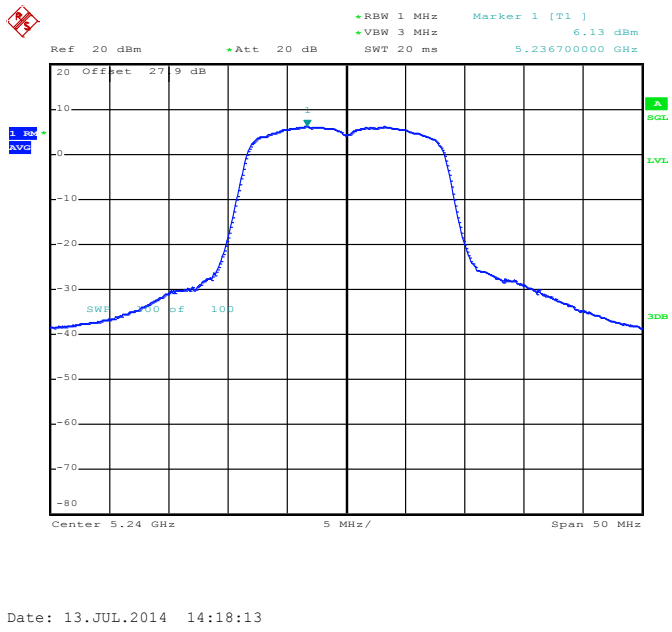
3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band I	Temperature :	21~26℃
Test Engineer :	Stuart Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Sum Power	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.23	0.23	6.29		-	11.00	11.00	3.40	5.10	-	Pass
11a	6Mbps	1	44	5220	0.23	0.23	6.45			11.00	11.00	3.40	5.10		Pass
11a	6Mbps	1	48	5240	0.23	0.23	6.36			11.00	11.00	3.40	5.10		Pass
HT20	MCS0	2	36	5180	0.22	0.20	-		4.85	9.70		7.30		-	Pass
HT20	MCS0	2	44	5220	0.22	0.20			5.00	9.70		7.30			Pass
HT20	MCS0	2	48	5240	0.22	0.20			5.74	9.70		7.30			Pass
HT40	MCS0	2	38	5190	0.44	0.44			0.57	9.70		7.30			Pass
HT40	MCS0	2	46	5230	0.44	0.44			6.06	9.70		7.30			Pass

Note: Sum PSD is a bin-by-bin combined result of Ant 1 and Ant 2.

Worst Case Power Density (dBm/MHz)



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.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/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 ≥ 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(us)	1/T(kHz)	VBW Setting
1	802.11a	94.95	2070	0.48	1kHz
2	802.11a	94.95	2070	0.48	1kHz
1+2	802.11n HT20 for Ant1	95.02	1910	0.52	1kHz
1+2	802.11n HT20 for Ant2	95.52	1920	0.52	
1+2	802.11n HT40 for Ant1	90.29	930	1.08	3kHz
1+2	802.11n HT40 for Ant2	90.29	930	1.08	

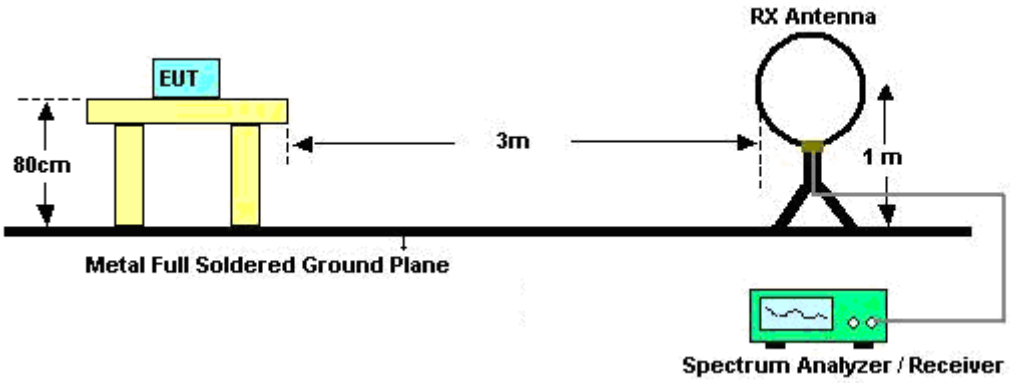
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters 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.

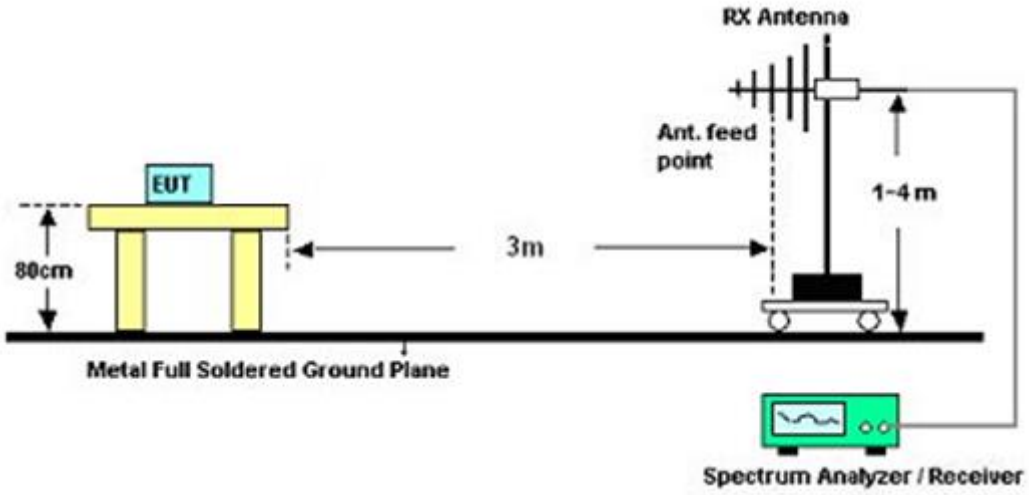
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again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

3.4.4 Test Setup

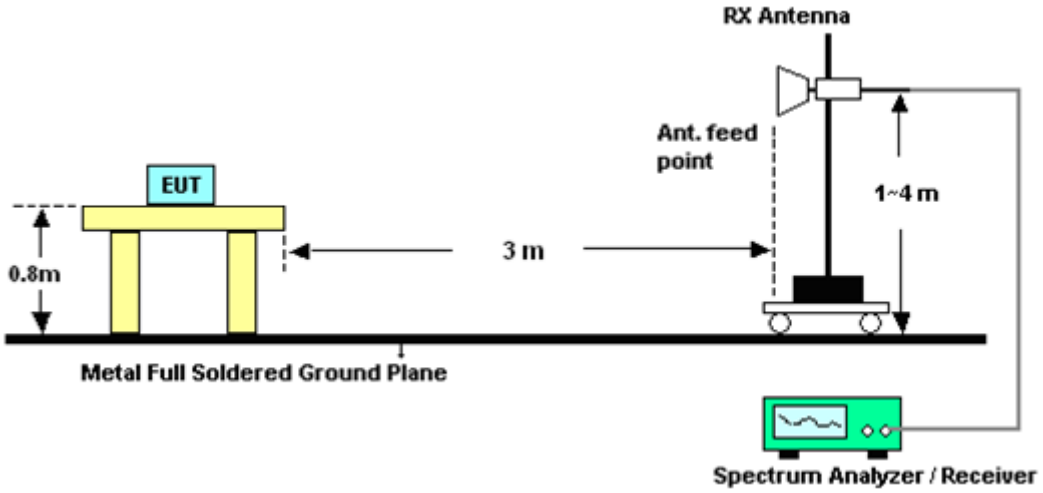
For radiated emissions below 30MHz



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

<Ant. 1>

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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**
5148.8	68.17	-5.83	74	57.15	34.29	9.22	32.49	100	319	Peak
5149.85	50.93	-3.07	54	39.91	34.29	9.22	32.49	100	319	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**
5149.85	60.25	-13.75	74	49.23	34.29	9.22	32.49	194	102	Peak
5150	43.48	-10.52	54	32.46	34.29	9.22	32.49	194	102	Average

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	48	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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**
5131.25	56.26	-17.74	74	45.28	34.25	9.18	32.45	100	328	Peak
5149.55	42.77	-11.23	54	31.75	34.29	9.22	32.49	100	328	Average
5350.22	59.53	-14.47	74	48.34	34.81	9.56	33.18	100	328	Peak
5392.24	47.45	-6.55	54	36.18	34.9	9.65	33.28	100	328	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**
5114.6	53.7	-20.3	74	42.78	34.2	9.14	32.42	188	103	Peak
5145.8	40.62	-13.38	54	29.6	34.29	9.22	32.49	188	103	Average
5351.32	55.84	-18.16	74	44.65	34.81	9.56	33.18	188	103	Peak
5392.46	43.96	-10.04	54	32.69	34.9	9.65	33.28	188	103	Average

<Ant. 2>

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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**
5145.2	71.91	-2.09	74	60.89	34.29	9.22	32.49	100	79	Peak
5150	52.72	-1.28	54	41.7	34.29	9.22	32.49	100	79	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**
5147.6	65.18	-8.82	74	54.16	34.29	9.22	32.49	189	128	Peak
5147.6	50.16	-3.84	54	39.14	34.29	9.22	32.49	189	128	Average

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	48	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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**
5124.2	60.24	-13.76	74	49.26	34.25	9.18	32.45	139	64	Peak
5138.45	47.06	-6.94	54	36.08	34.25	9.18	32.45	139	64	Average
5393.01	59.69	-14.31	74	48.42	34.9	9.65	33.28	139	64	Peak
5392.57	47.31	-6.69	54	36.04	34.9	9.65	33.28	139	64	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**
5036	54.71	-19.29	74	44.03	33.99	9.01	32.32	200	120	Peak
5021.6	42.32	-11.68	54	31.64	33.99	9.01	32.32	200	120	Average
5388.06	58.87	-15.13	74	47.6	34.9	9.65	33.28	200	120	Peak
5387.51	46.77	-7.23	54	35.5	34.9	9.65	33.28	200	120	Average

MIMO <Ant. 1+2>

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Channel :	36	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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	67.85	-6.15	74	56.83	34.29	9.22	32.49	100	64	Peak
5149.55	50.19	-3.81	54	39.17	34.29	9.22	32.49	100	64	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
5146.25	63.82	-10.18	74	52.8	34.29	9.22	32.49	188	114	Peak
5149.55	47.13	-6.87	54	36.11	34.29	9.22	32.49	188	114	Average

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Channel :	48	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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
5132	58.53	-15.47	74	47.55	34.25	9.18	32.45	111	65	Peak
5140.25	46.01	-7.99	54	34.95	34.29	9.22	32.45	111	65	Average
5391.36	64.25	-9.75	74	52.94	34.94	9.65	33.28	111	65	Peak
5391.47	52.78	-1.22	54	41.47	34.94	9.65	33.28	111	65	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
5140.85	56.38	-17.62	74	45.32	34.29	9.22	32.45	186	107	Peak
5145.5	43.59	-10.41	54	32.57	34.29	9.22	32.49	186	107	Average
5388.72	57.39	-16.61	74	46.12	34.9	9.65	33.28	186	107	Peak
5386.3	44.93	-9.07	54	33.66	34.9	9.65	33.28	186	107	Average

Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Channel :	38	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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	71.45	-2.55	74	60.11	34.61	9.22	32.49	100	66	Peak
5149.4	52.81	-1.19	54	41.47	34.61	9.22	32.49	100	66	Average
5351.21	57.73	-16.27	74	46.54	34.81	9.56	33.18	100	66	Peak
5351.43	46.47	-7.53	54	35.28	34.81	9.56	33.18	100	66	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
5149.7	67.19	-6.81	74	56.17	34.29	9.22	32.49	190	105	Peak
5149.7	49.9	-4.1	54	38.88	34.29	9.22	32.49	190	105	Average
5393.01	55.09	-18.91	74	43.82	34.9	9.65	33.28	190	105	Peak
5353.85	42.99	-11.01	54	31.8	34.81	9.56	33.18	190	105	Average

Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Channel :	46	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh		

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
5147.6	68.65	-5.35	74	57.31	34.61	9.22	32.49	100	67	Peak
5146.7	52.8	-1.2	54	41.46	34.61	9.22	32.49	100	67	Average
5369.03	63.04	-10.96	74	51.76	34.85	9.61	33.18	100	67	Peak
5376.62	52.48	-1.52	54	41.3	34.85	9.61	33.28	100	67	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
5145.95	62.42	-11.58	74	51.4	34.29	9.22	32.49	200	94	Peak
5149.1	47.52	-6.48	54	36.5	34.29	9.22	32.49	200	94	Average
5364.96	61.43	-12.57	74	50.15	34.85	9.61	33.18	200	94	Peak
5366.72	50.24	-3.76	54	38.96	34.85	9.61	33.18	200	94	Average

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

<Ant. 1>

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Horizontal
Remark :	1. 5182 MHz is fundamental signal which can be ignored. 2. 10362 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5182	102.76	-	-	91.35	34.66	9.27	32.52	100	319	Average
5182	112.51	-	-	101.1	34.66	9.27	32.52	100	319	Peak
5334	51.88	-2.12	54	40.53	34.87	9.56	33.08	100	339	Average
5334	61.34	-12.66	74	49.99	34.87	9.56	33.08	100	339	Peak
10362	45.45	-8.55	54	53.39	37.22	13.71	58.87	104	31	Average
10362	54.66	-19.34	74	62.6	37.22	13.71	58.87	104	31	Peak
15540	49.44	-4.56	54	51.03	40.34	15.56	57.49	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Vertical
Remark :	1. 5182 MHz is fundamental signal which can be ignored. 2. 10365 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5182	95.21	-	-	83.8	34.66	9.27	32.52	194	102	Average
5182	104.96	-	-	93.55	34.66	9.27	32.52	194	102	Peak
10365	44.96	-9.04	54	52.9	37.22	13.71	58.87	123	247	Average
10365	52.25	-21.75	74	60.19	37.22	13.71	58.87	123	247	Peak
15540	47.99	-6.01	54	49.58	40.34	15.56	57.49	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	44	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Horizontal
Remark :	1. 5222 MHz is fundamental signal which can be ignored. 2. 10437 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5222	102.15	-	-	90.75	34.7	9.35	32.65	100	328	Average
5222	112.66	-	-	101.26	34.7	9.35	32.65	100	328	Peak
5368	50.63	-3.37	54	39.29	34.91	9.61	33.18	100	341	Average
5368	61.58	-12.42	74	50.24	34.91	9.61	33.18	100	341	Peak
10437	44.8	-9.2	54	52.71	37.26	13.71	58.88	125	37	Average
10437	54.06	-19.94	74	61.97	37.26	13.71	58.88	125	37	Peak
15660	49.95	-4.05	54	51.16	40.49	15.65	57.35	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	44	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Vertical
Remark :	1. 5222 MHz is fundamental signal which can be ignored. 2. 10443 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5222	96.98	-	-	85.58	34.7	9.35	32.65	190	103	Average
5222	106.23	-	-	94.83	34.7	9.35	32.65	190	103	Peak
10443	45.41	-8.59	54	53.32	37.26	13.71	58.88	164	143	Average
10443	56.46	-17.54	74	64.37	37.26	13.71	58.88	164	143	Peak
15660	49.96	-4.04	54	51.17	40.49	15.65	57.35	100	0	Peak

Test Mode :	802.11a	Temperature :	21~25°C
Test Channel :	48	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Horizontal
Remark :	1. 5238 MHz is fundamental signal which can be ignored. 2. 10482 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5238	102.73	-	-	91.26	34.73	9.39	32.65	100	328	Average
5238	112.41	-	-	100.94	34.73	9.39	32.65	100	328	Peak
10482	44.1	-9.9	54	51.98	37.29	13.72	58.89	103	30	Average
10482	53.05	-20.95	74	60.93	37.29	13.72	58.89	103	30	Peak
15723	49.83	-4.17	54	50.84	40.57	15.69	57.27	100	0	Peak

Test Mode :	802.11a	Temperature :	21~25°C
Test Channel :	48	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Vertical
Remark :	1. 5242 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. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5242	98.45	-	-	86.96	34.75	9.39	32.65	188	103	Average
5242	108.31	-	-	96.82	34.75	9.39	32.65	188	103	Peak
10479	43.64	-10.36	54	51.52	37.29	13.72	58.89	165	145	Average
10479	52.24	-21.76	74	60.12	37.29	13.72	58.89	165	145	Peak
15720	49.49	-4.51	54	50.5	40.57	15.69	57.27	100	0	Peak

<Ant. 2>

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Horizontal
Remark :	1. 5178 MHz is fundamental signal which can be ignored. 2. 10362 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
127.74	33.48	-10.02	43.5	51.6	11.84	1.14	31.1	-	-	Peak
213.87	33.74	-9.76	43.5	54.18	9.24	1.38	31.06	100	79	Peak
275.97	34.28	-11.72	46	50.75	12.84	1.64	30.95	-	-	Peak
310.5	35.62	-10.38	46	51.53	13.3	1.79	31	-	-	Peak
664	31.51	-14.49	46	38.76	20.35	2.87	30.47	-	-	Peak
836.9	28.76	-17.24	46	32.81	23.08	3.24	30.37	-	-	Peak
5178	104.84	-	-	93.43	34.66	9.27	32.52	100	79	Average
5178	114.56	-	-	103.15	34.66	9.27	32.52	100	79	Peak
5330	49.53	-4.47	54	38.22	34.87	9.52	33.08	100	76	Average
5330	60.39	-13.61	74	49.08	34.87	9.52	33.08	100	76	Peak
10362	48.75	-5.25	54	56.69	37.22	13.71	58.87	100	0	Peak
15540	48.71	-5.29	54	50.3	40.34	15.56	57.49	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Vertical
Remark :	1. 5178 MHz is fundamental signal which can be ignored. 2. 10362 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
30.27	32.39	-7.61	40	44.56	18.8	0.53	31.5	100	38	Peak
51.6	28.63	-11.37	40	51.12	8	0.71	31.2	-	-	Peak
121.53	29.34	-14.16	43.5	47.89	11.44	1.11	31.1	-	-	Peak
312.6	29.96	-16.04	46	45.85	13.32	1.79	31	-	-	Peak
664	36.31	-9.69	46	43.56	20.35	2.87	30.47	-	-	Peak
864.2	28.65	-17.35	46	32.61	23.12	3.29	30.37	-	-	Peak
5178	101.83	-	-	90.42	34.66	9.27	32.52	189	128	Average
5178	111.49	-	-	100.08	34.66	9.27	32.52	189	128	Peak
10362	47.07	-6.93	54	55.01	37.22	13.71	58.87	100	0	Peak
15537	49.85	-4.15	54	51.44	40.34	15.56	57.49	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	44	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Horizontal
Remark :	1. 5222 MHz is fundamental signal which can be ignored. 2. 10437 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5070	50.89	-3.11	54	39.69	34.49	9.1	32.39	100	69	Average
5070	61.87	-12.13	74	50.67	34.49	9.1	32.39	100	69	Peak
5222	103.9	-	-	92.5	34.7	9.35	32.65	100	77	Average
5222	113.99	-	-	102.59	34.7	9.35	32.65	100	77	Peak
5374	49.64	-4.36	54	38.4	34.91	9.61	33.28	100	77	Average
5374	60.18	-13.82	74	48.94	34.91	9.61	33.28	100	77	Peak
10437	48.96	-5.04	54	56.87	37.26	13.71	58.88	100	0	Peak
15660	48.31	-5.69	54	49.52	40.49	15.65	57.35	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	44	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Vertical
Remark :	1. 5222 MHz is fundamental signal which can be ignored. 2. 10437 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5222	99.94	-	-	88.54	34.7	9.35	32.65	125	124	Average
5222	110.69	-	-	99.29	34.7	9.35	32.65	125	124	Peak
10437	47.54	-6.46	54	55.45	37.26	13.71	58.88	100	0	Peak
15660	49.49	-4.51	54	50.7	40.49	15.65	57.35	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	48	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Horizontal
Remark :	1. 5238 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. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5238	104.05	-	-	92.58	34.73	9.39	32.65	139	64	Average
5238	113.53	-	-	102.06	34.73	9.39	32.65	139	64	Peak
10479	45.87	-8.13	54	53.75	37.29	13.72	58.89	100	0	Peak
15720	48.93	-5.07	54	49.94	40.57	15.69	57.27	100	0	Peak

Test Mode :	802.11a	**Temperature :**	21~25°C
Test Channel :	48	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Vertical
Remark :	1. 5242 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. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5242	100.18	-	-	88.69	34.75	9.39	32.65	200	120	Average
5242	109.99	-	-	98.5	34.75	9.39	32.65	200	120	Peak
10479	47.25	-6.75	54	55.13	37.29	13.72	58.89	100	0	Peak
15720	48.02	-5.98	54	49.03	40.57	15.69	57.27	100	0	Peak

MIMO <Ant. 1+2>

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Horizontal
Remark :	1. 5184 MHz is fundamental signal which can be ignored. 2. 10356 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
36.48	31.72	-8.28	40	47.06	15.32	0.6	31.26	100	269	Peak
128.55	32.77	-10.73	43.5	50.81	11.92	1.14	31.1	-	-	Peak
240.06	33.83	-12.17	46	51.9	11.4	1.53	31	-	-	Peak
309.8	35.81	-10.19	46	51.73	13.29	1.79	31	-	-	Peak
664	33.65	-12.35	46	40.9	20.35	2.87	30.47	-	-	Peak
916	28.34	-17.66	46	31.52	23.77	3.38	30.33	-	-	Peak
5184	105	-	-	93.59	34.66	9.27	32.52	100	64	Average
5184	114.92	-	-	103.51	34.66	9.27	32.52	100	64	Peak
5334	53.45	-0.55	54	42.1	34.87	9.56	33.08	153	63	Average
5334	63.5	-10.5	74	52.15	34.87	9.56	33.08	153	63	Peak
10356	49.58	-4.42	54	57.52	37.21	13.71	58.86	100	0	Peak
15540	47.47	-6.53	54	49.06	40.34	15.56	57.49	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	36	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Vertical
Remark :	1. 5184 MHz is fundamental signal which can be ignored. 2. 10356 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
30.81	31.78	-8.22	40	44.42	18.28	0.54	31.46	100	74	Peak
121.53	28.38	-15.12	43.5	46.93	11.44	1.11	31.1	-	-	Peak
210.9	29.1	-14.4	43.5	49.63	9.2	1.36	31.09	-	-	Peak
332.9	29.07	-16.93	46	44.33	13.88	1.86	31	-	-	Peak
666.1	36.01	-9.99	46	43.25	20.36	2.87	30.47	-	-	Peak
895.7	28.56	-17.44	46	32.49	23.05	3.33	30.31	-	-	Peak
5184	100.95	-	-	89.54	34.66	9.27	32.52	188	114	Average
5184	110.8	-	-	99.39	34.66	9.27	32.52	188	114	Peak
10356	47.2	-6.8	54	55.14	37.21	13.71	58.86	100	0	Peak
15540	47.38	-6.62	54	48.97	40.34	15.56	57.49	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	44	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Horizontal
Remark :	1. 5222 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. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5072	50.13	-3.87	54	38.9	34.52	9.1	32.39	101	66	Average
5072	61.55	-12.45	74	50.32	34.52	9.1	32.39	101	66	Peak
5222	105.9	-	-	94.5	34.7	9.35	32.65	100	64	Average
5222	115.87	-	-	104.47	34.7	9.35	32.65	100	64	Peak
5372	53.39	-0.61	54	42.05	34.91	9.61	33.18	148	68	Average
5372	64.43	-9.57	74	53.09	34.91	9.61	33.18	148	68	Peak
10440	50.89	-3.11	54	58.8	37.26	13.71	58.88	100	0	Peak
15657	50.26	-3.74	54	51.47	40.49	15.65	57.35	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	44	**Relative Humidity :**	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	**Polarization :**	Vertical
Remark :	1. 5216 MHz is fundamental signal which can be ignored. 2. 10443 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5216	101.98	-	-	90.48	34.7	9.35	32.55	188	107	Average
5216	111.88	-	-	100.38	34.7	9.35	32.55	188	107	Peak
10443	50.86	-3.14	54	58.77	37.26	13.71	58.88	100	0	Peak
15657	48.91	-5.09	54	50.12	40.49	15.65	57.35	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Channel :	48	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Horizontal
Remark :	1. 5244 MHz is fundamental signal which can be ignored. 2. 10482 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5244	105.18	-	-	93.69	34.75	9.39	32.65	111	65	Average
5244	114.98	-	-	103.49	34.75	9.39	32.65	111	65	Peak
10482	48.13	-5.87	54	56.01	37.29	13.72	58.89	100	0	Peak
15720	47.25	-6.75	54	48.26	40.57	15.69	57.27	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Channel :	48	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Vertical
Remark :	1. 5244 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. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5244	101.54	-	-	90.05	34.75	9.39	32.65	186	107	Average
5244	111.41	-	-	99.92	34.75	9.39	32.65	186	107	Peak
10479	49.11	-4.89	54	56.99	37.29	13.72	58.89	100	0	Peak
15720	48.32	-5.68	54	49.33	40.57	15.69	57.27	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Channel :	38	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Horizontal
Remark :	1. 5192 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. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5192	101.77	-	-	90.3	34.68	9.31	32.52	100	66	Average
5192	111.71	-	-	100.24	34.68	9.31	32.52	100	66	Peak
10380	46.35	-7.65	54	54.28	37.23	13.71	58.87	100	0	Peak
15570	45.63	-8.37	54	47.12	40.38	15.58	57.45	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Channel :	38	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Vertical
Remark :	1. 5188 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. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5188	96.45	-	-	85.04	34.66	9.27	32.52	190	105	Average
5188	105.73	-	-	94.32	34.66	9.27	32.52	190	105	Peak
10380	46.08	-7.92	54	54.01	37.23	13.71	58.87	100	0	Peak
15570	46.5	-7.5	54	47.99	40.38	15.58	57.45	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Channel :	46	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Horizontal
Remark :	1. 5232 MHz is fundamental signal which can be ignored. 2. 10467 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5232	106.54	-	-	95.11	34.73	9.35	32.65	100	67	Average
5232	115.59	-	-	104.16	34.73	9.35	32.65	100	67	Peak
10467	42.01	-11.99	54	49.89	37.28	13.72	58.88	166	329	Average
10467	56.97	-17.03	74	64.85	37.28	13.72	58.88	166	329	Peak
15702	50.61	-3.39	54	51.66	40.55	15.69	57.29	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Channel :	46	Relative Humidity :	49~53%
Test Engineer :	Kai Wang and Stan Hsieh	Polarization :	Vertical
Remark :	1. 5232 MHz is fundamental signal which can be ignored. 2. 10458 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit. 4. No spurious emissions are detected other than listed points as below.		

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
5232	102.8	-	-	91.37	34.73	9.35	32.65	200	94	Average
5232	112.07	-	-	100.64	34.73	9.35	32.65	200	94	Peak
10458	41.43	-12.57	54	49.32	37.27	13.72	58.88	152	210	Average
10458	56.41	-17.59	74	64.3	37.27	13.72	58.88	152	210	Peak
15693	50.16	-3.84	54	51.27	40.53	15.67	57.31	100	0	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 (dBμV)	
	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.

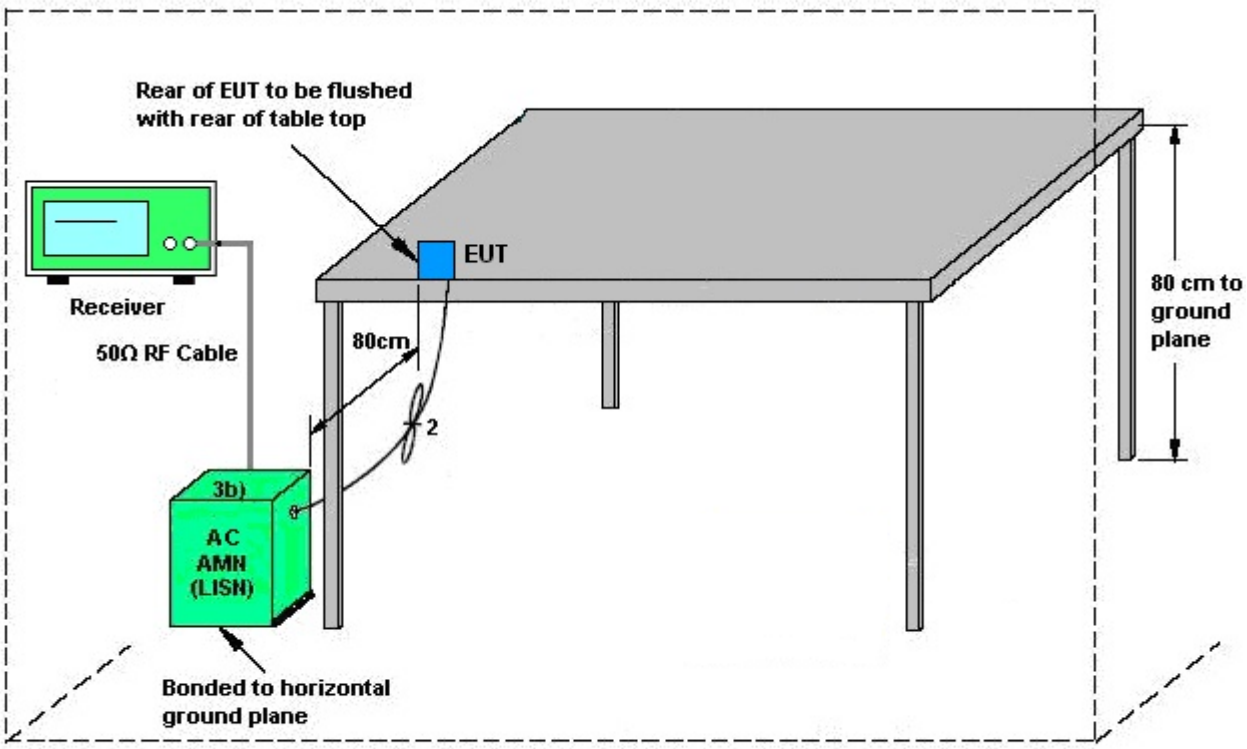
3.5.2 Measuring Instruments

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.

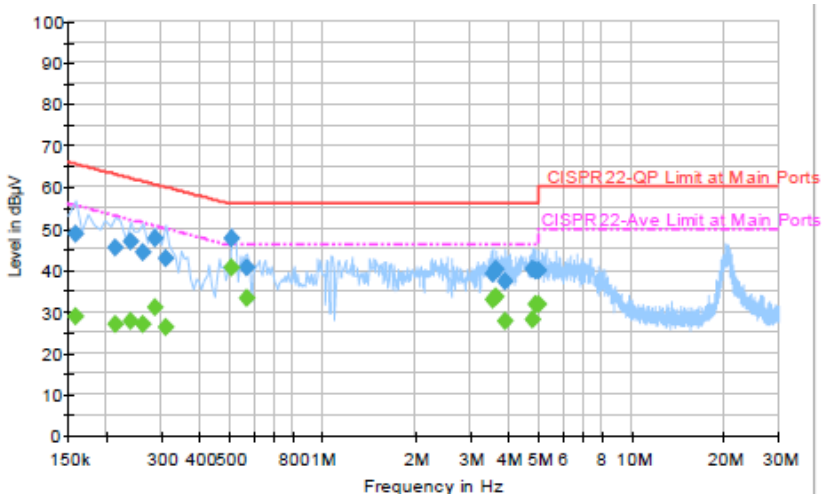
3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.5.5 Test Result of AC Conducted Emission

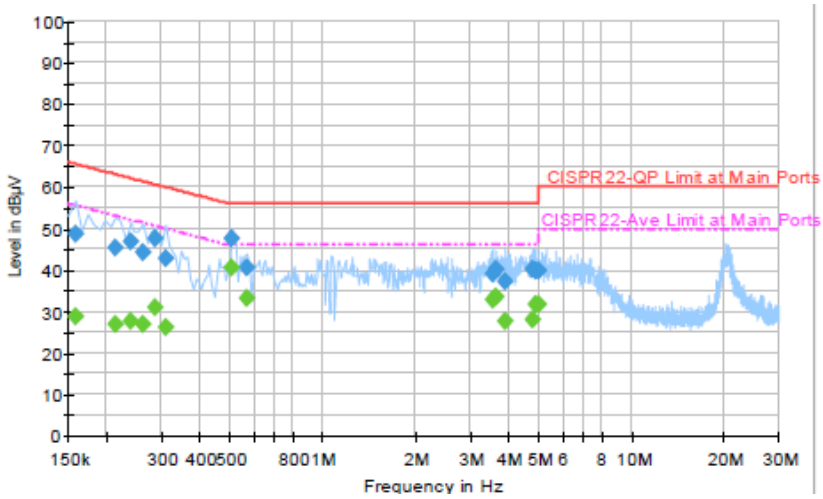
Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5GHz) Link + Bluetooth Link + HDMI Extender Cable + MPEG4 + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	48.7	Off	L1	19.3	16.9	65.6
0.214000	45.4	Off	L1	19.4	17.6	63.0
0.238000	46.9	Off	L1	19.4	15.3	62.2
0.262000	44.4	Off	L1	19.4	17.0	61.4
0.286000	47.5	Off	L1	19.3	13.1	60.6
0.310000	42.8	Off	L1	19.4	17.2	60.0
0.510000	47.5	Off	L1	19.4	8.5	56.0
0.566000	40.4	Off	L1	19.4	15.6	56.0
3.574000	39.3	Off	L1	19.5	16.7	56.0
3.638000	40.1	Off	L1	19.5	15.9	56.0
3.918000	37.2	Off	L1	19.5	18.8	56.0
4.814000	40.4	Off	L1	19.6	15.6	56.0
4.918000	40.0	Off	L1	19.6	16.0	56.0
4.998000	39.9	Off	L1	19.6	16.1	56.0

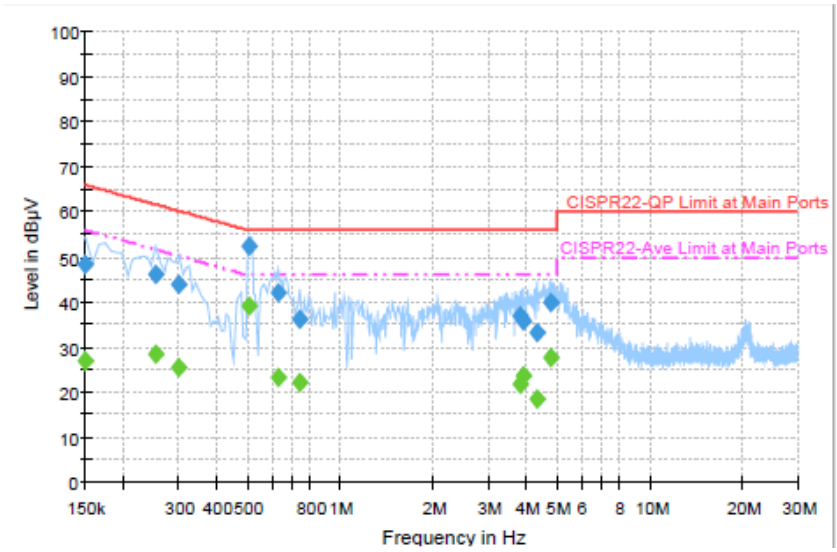
Test Mode :	Mode 1	**Temperature :**	20~22℃
Test Engineer :	Cosmo Xu	**Relative Humidity :**	45~47%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN (5GHz) Link + Bluetooth Link + HDMI Extender Cable + MPEG4 + USB Cable (Charging from Adapter)		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	28.9	Off	L1	19.3	26.7	55.6
0.214000	27.0	Off	L1	19.4	26.0	53.0
0.238000	27.7	Off	L1	19.4	24.5	52.2
0.262000	27.1	Off	L1	19.4	24.3	51.4
0.286000	30.8	Off	L1	19.3	19.8	50.6
0.310000	26.3	Off	L1	19.4	23.7	50.0
0.510000	40.7	Off	L1	19.4	5.3	46.0
0.566000	33.3	Off	L1	19.4	12.7	46.0
3.574000	32.7	Off	L1	19.5	13.3	46.0
3.638000	33.6	Off	L1	19.5	12.4	46.0
3.918000	27.6	Off	L1	19.5	18.4	46.0
4.814000	28.2	Off	L1	19.6	17.8	46.0
4.918000	31.7	Off	L1	19.6	14.3	46.0
4.998000	31.9	Off	L1	19.6	14.1	46.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5GHz) Link + Bluetooth Link + HDMI Extender Cable + MPEG4 + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	48.2	Off	N	19.4	17.8	66.0
0.254000	46.2	Off	N	19.4	15.4	61.6
0.302000	44.1	Off	N	19.3	16.1	60.2
0.510000	52.5	Off	N	19.4	3.5	56.0
0.630000	42.0	Off	N	19.5	14.0	56.0
0.742000	36.1	Off	N	19.5	19.9	56.0
3.814000	36.8	Off	N	19.6	19.2	56.0
3.894000	35.7	Off	N	19.6	20.3	56.0
4.302000	33.3	Off	N	19.6	22.7	56.0
4.790000	39.7	Off	N	19.6	16.3	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	26.9	Off	N	19.4	29.1	56.0
0.254000	28.6	Off	N	19.4	23.0	51.6
0.302000	25.6	Off	N	19.3	24.6	50.2
0.510000	39.1	Off	N	19.4	6.9	46.0
0.630000	23.3	Off	N	19.5	22.7	46.0
0.742000	22.2	Off	N	19.5	23.8	46.0
3.814000	21.6	Off	N	19.6	24.4	46.0
3.894000	23.5	Off	N	19.6	22.5	46.0
4.302000	18.5	Off	N	19.6	27.5	46.0
4.790000	27.6	Off	N	19.6	18.4	46.0

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.

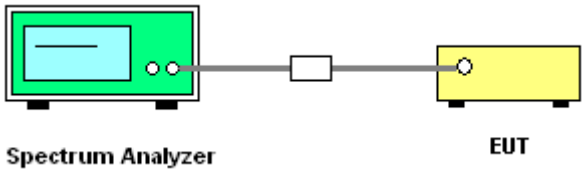
3.6.2 Measuring Instruments

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 I	Test Engineer :	Stuart Lin

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	5179.975	-0.025	-4.83	20	4.75
11a	6Mbps	1	36	5180	5179.975	-0.025	-4.83	20	5.2
11a	6Mbps	1	36	5180	5179.950	-0.050	-9.65	20	5
11a	6Mbps	1	36	5180	5180.050	0.050	9.65	-30	5
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	50	5

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

Non-standard antenna connector is used.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

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 kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth 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.

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	3.40	5.10	7.30	7.30	1.30	1.30

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	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Jul. 04, 2014~ Aug. 22, 2014	Jun. 08, 2015	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 17, 2013	Jul. 04, 2014~ Jul. 13, 2014	Aug. 16, 2014	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 17, 2013	Jul. 04, 2014~ Jul. 13, 2014	Aug. 16, 2014	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 19, 2013	Jul. 04, 2014~ Jul. 13, 2014	Jul. 18, 2014	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	101749	10Hz ~ 30GHz	Feb. 10, 2014	Jul. 03, 2014~ Jul. 08, 2014	Feb. 09, 2015	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Sep. 06, 2013	Jul. 03, 2014~ Jul. 08, 2014	Sep. 05, 2014	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100330	9 kHz~30 MHz	Nov. 15, 2012	Jul. 03, 2014~ Jul. 08, 2014	Nov. 14, 2014	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Oct. 10, 2013	Jul. 03, 2014~ Jul. 08, 2014	Oct. 09, 2014	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 22, 2013	Jul. 03, 2014~ Jul. 08, 2014	Aug. 21, 2014	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 03, 2013	Jul. 03, 2014~ Jul. 08, 2014	Oct. 02, 2014	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz 32dB GAIN	Mar. 17, 2014	Jul. 03, 2014~ Jul. 08, 2014	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Nov. 29, 2013	Jul. 03, 2014~ Jul. 08, 2014	Nov. 28, 2014	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	159075	1GHz ~ 18GHz	Apr. 21, 2014	Jul. 03, 2014~ Jul. 08, 2014	Apr. 20, 2015	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Jul. 03, 2014~ Jul. 08, 2014	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	Jul. 03, 2014~ Jul. 08, 2014	N/A	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	Jul. 08, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	Jul. 08, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Jul. 08, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jul. 08, 2014	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**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.50**