

FCC RF Test Report

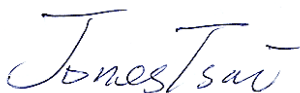
APPLICANT : Igluu LLC
EQUIPMENT : Digital Media Receiver
MODEL NAME : SK705DI
FCC ID : ZWJ-0823
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The testing completed on Jun. 10, 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



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

[illegible]

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	26dB Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	$\leq 17, 24, 30$ dBm (depend on band)	Pass	-
3.3	15.407(a)	Power Spectral Density	$\leq 4, 11, 17$ dBm (depend on band)	Pass	-
3.4	15.407(a)(6)	Peak Excursion Ratio	≤ 13 dB	Pass	-
3.5	15.407(b)	Unwanted Emissions	$\leq -17, -27$ dBm (depend on band)&15.209(a)	Pass	Under limit 1.45 dB at 5149.850 MHz for Average.
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 20.10 dB at 0.174 MHz
3.7	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.8	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.9	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Igluu LLC

830 Bear Tavern Road Suite 305 West Trenton, NJ 08628

1.2 Feature of Equipment Under Test

Product Feature	
Equipment	Digital Media Receiver
Model Name	SK705DI
FCC ID	ZWJ-0823
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 Bluetooth v2.0 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

Product Specification subjective to this standard				
Tx/Rx Channel Frequency Range		5180 MHz ~ 5240 MHz		
Maximum Output Power		<Ant. 1> 802.11a : 14.28 dBm / 0.0268 W 802.11n HT20 : 14.16 dBm / 0.0261 W 802.11n HT40 : 14.48 dBm / 0.0281 W MIMO <Ant. 1+2> 802.11n HT20 : 15.59 dBm / 0.0362 W 802.11n HT40 : 15.75 dBm / 0.0376 W		
Antenna Type		Ant. 1 : Fixed internal Antenna with gain 4.63 dBi Ant. 2 : Fixed internal Antenna with gain 3.30 dBi		
Type of Modulation		802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function Description				
		Ant. 1	Ant. 2	
		802.11 a	V	-
		802.11 n	V	V
		MIMO		

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 1 st 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	03CH06-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 D01 General UNII Test Procedures v01r03
- 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).

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

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

2.1 Carrier Frequency and Channel

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

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

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables.

<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)	14.28	14.00	14.00	14.10	14.08	14.14	14.11	14.13

5GHz 802.11n HT20 mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.16	13.88	14.04	14.11	14.08	14.12	14.13	14.08

5GHz 802.11n HT40 mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.48	14.21	14.15	13.69	13.74	13.89	13.96	14.02

MIMO <Ant. 1+2>

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	15.59	15.36	15.54	15.57	15.59	15.57	15.58	15.58
Data Rate (MHz)	MCS 8	MCS 9	MCS 10	MCS 11	MCS 12	MCS 13	MCS 14	MCS 15
Average Power (dBm)	15.39	15.30	15.39	15.59	15.25	15.19	15.07	15.17

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	15.75	15.63	15.68	15.54	15.58	15.68	15.66	15.52
Data Rate (MHz)	MCS 8	MCS 9	MCS 10	MCS 11	MCS 12	MCS 13	MCS 14	MCS 15
Average Power (dBm)	15.66	15.60	15.52	15.59	15.59	15.49	15.40	15.46

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

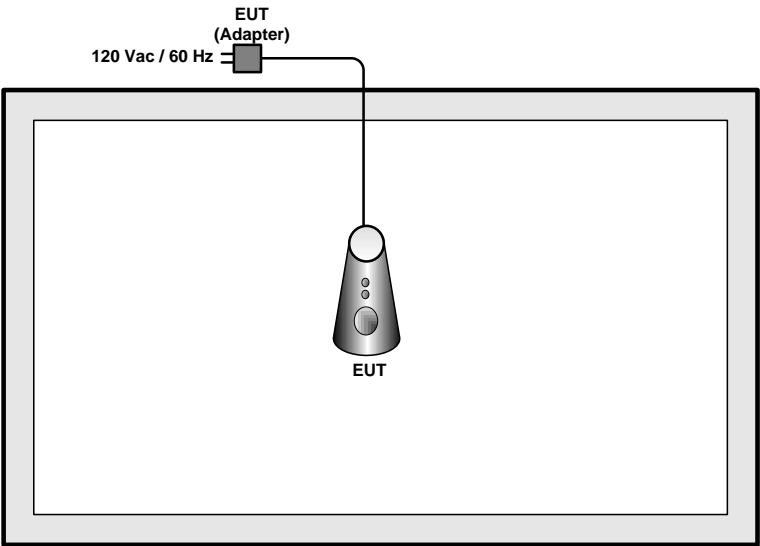
Final results of test modes, data rates and test channels are shown as following table.

Test Cases					
Conducted TCs	Test Items	Mode	Data rate	N _{TX}	Test Channel
	26dB BW Power Spectral Density	802.11a	6 Mbps	1	L/M/H
		802.11n HT20	MCS0	1&2	L/M/H
		802.11n HT40	MCS0	1&2	L/ H
	Output Power	802.11a	6 Mbps	1	L/M/H
		802.11n HT20	MCS0	1&2	L/M/H
		802.11n HT40	MCS0	1&2	L/ H
	Peak Excursion	802.11a	6 Mbps	1	L
		802.11n HT20	MCS0	1	L
		802.11n HT40	MCS0	1	L
	Frequency Stability	802.11a	6 Mbps	1	L
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	1	L/H
		802.11n HT20	MCS0	1&2	L/H
		802.11n HT40	MCS0	1&2	L/H
	Radiated Spurious Emission	802.11a	6 Mbps	1	L/M/H
		802.11n HT20	MCS0	1&2	L/M/H
		802.11n HT40	MCS0	1&2	L/ H
AC Conducted Emission	Mode 1 : WLAN Link + Bluetooth Link + Adapter + MP3				
	Mode 2 : WLAN Link + Adapter + MP3				
Note:					
1. The N _{TX} =2 means 2 antenna ports simultaneously transmit during test.					
2. The worst case of conducted emission is mode 2; only the test data of it was reported.					

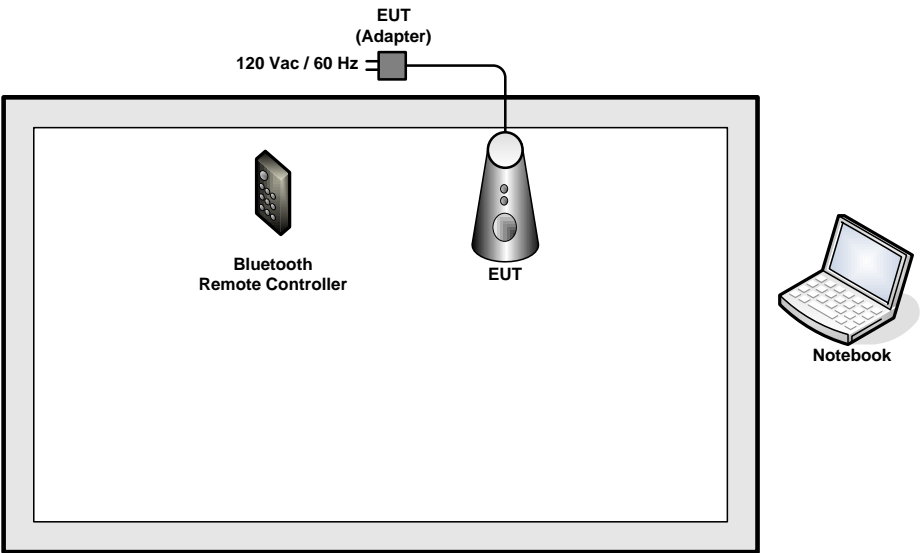
Ch. #		Band I : 5150-5250 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	36	36	38
M	Middle	44	44	-
H	High	48	48	46

2.4 Connection Diagram of Test System

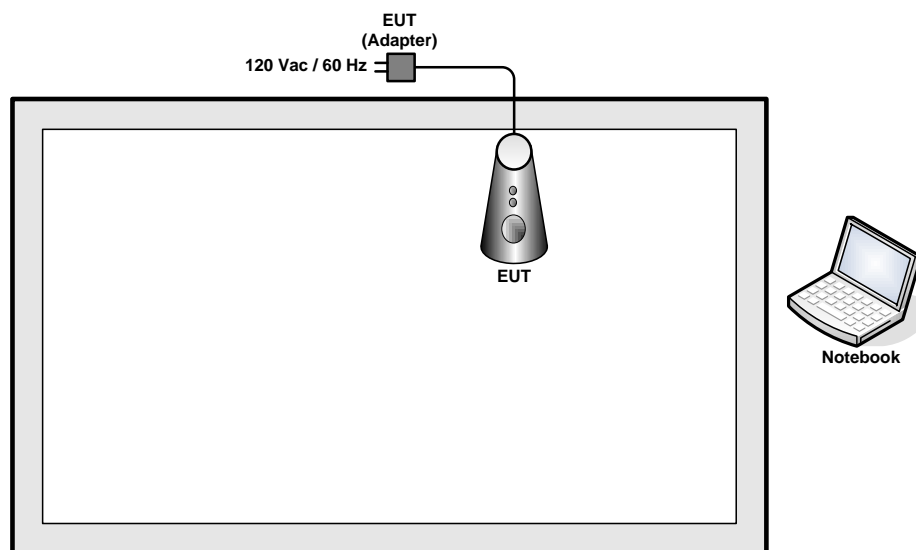
<WLAN Tx Mode>



<AC Conducted Emission with Bluetooth Remote Controller Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	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.	Bluetooth Remote Controller	N/A	PT346SK	2ACBD-0610	N/A	N/A

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, "Putty" 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.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 26dB Bandwidth Measurement

3.1.1 Description of 26dB Bandwidth

There is no restriction limits for bandwidth. The maximum conducted output power can be limited by measured emission bandwidth (B).

For the band 5150-5250 MHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B.

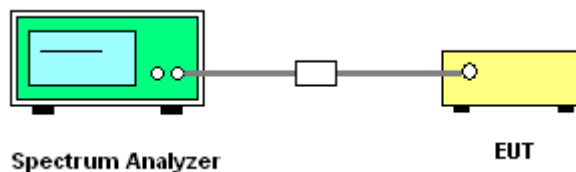
3.1.2 Measuring Instruments

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 D01 General UNII Test Procedures v01r03.
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. Measure and record the results in the test report.

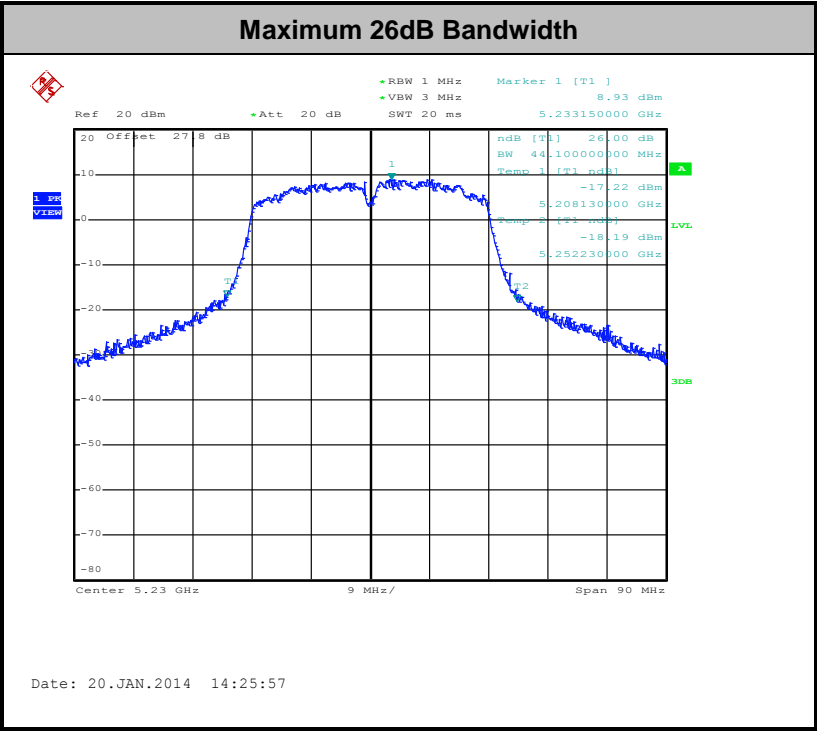
3.1.4 Test Setup



3.1.5 Test Result of 26dB Bandwidth

Test Band :	5GHz band 1	Temperature :	21~26℃
Test Engineer :	Bill Kuo and Stuart Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	26dB Bandwidth (MHz)		FCC 26dB Bandwidth Power Limit (dBm)	
					Ant 1	Ant 2	Ant 1	Ant 2
11a	6Mbps	1	36	5180	20.70	-	16.99	-
11a	6Mbps	1	44	5220	21.05	-	16.99	-
11a	6Mbps	1	48	5240	21.30	-	16.99	-
HT20	MCS0	1	36	5180	22.05	-	16.99	-
HT20	MCS0	1	44	5220	21.55	-	16.99	-
HT20	MCS0	1	48	5240	22.25	-	16.99	-
HT40	MCS0	1	38	5190	42.39	-	16.99	-
HT40	MCS0	1	46	5230	44.10	-	16.99	-
HT20	MCS0	2	36	5180	21.00	21.30	16.99	
HT20	MCS0	2	44	5220	21.15	21.25	16.99	
HT20	MCS0	2	48	5240	20.90	21.40	16.99	
HT40	MCS0	2	38	5190	42.21	43.02	16.99	
HT40	MCS0	2	46	5230	42.03	43.20	16.99	

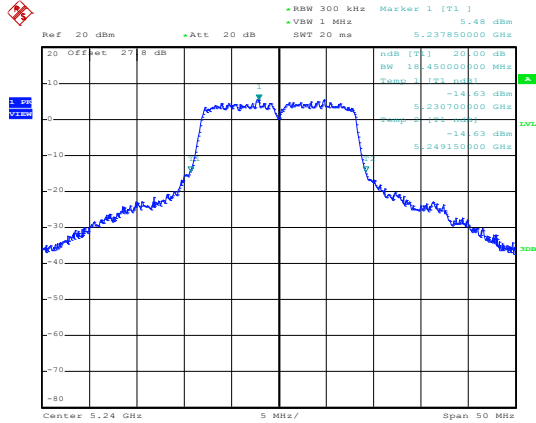


3.1.6 Test Result of 20dB Occupied Bandwidth

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	20dB Bandwidth (MHz)	20dB Bandwidth Upper Frequency (FH) (MHz)	Upper Limit Line (MHz)	Pass/Fail
11a	6Mbps	1	48	5240	18.45	5249.15	5250	Pass
HT20	MCS0	1	48	5240	19.65	5249.80		Pass
HT40	MCS0	1	46	5230	39.78	5249.89		Pass

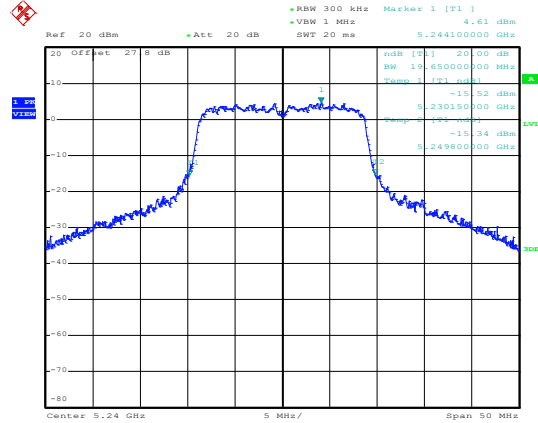
20dB Occupied Bandwidth

802.11a CH48 5240MHz



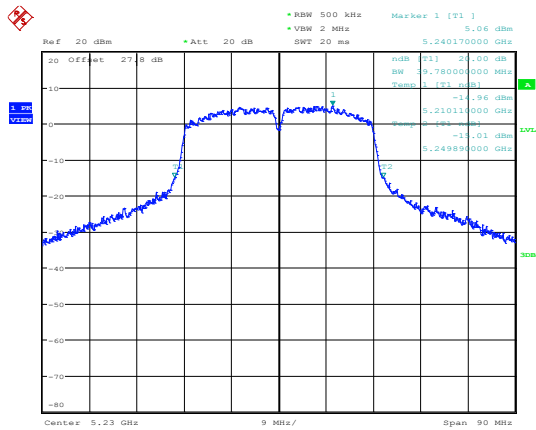
Date: 16.JAN.2014 20:48:38

802.11n HT20 CH48 5240MHz



Date: 16.JAN.2014 21:01:59

802.11n HT40 CH46 5230MHz



Date: 16.JAN.2014 21:43:05

3.2 Maximum Conducted Output Power Measurement

3.2.1 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.

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.

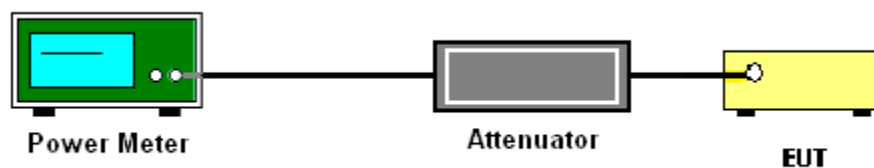
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D01 General UNII Test Procedures v01r03.

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Test Band :	5GHz band 1	Temperature :	21~26℃
Test Engineer :	Bill Kuo and 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	0.08	-	13.75	-	-	16.99	-	4.63	3.30	Pass
11a	6Mbps	1	44	5220	0.08	-	14.28	-		16.99	-	4.63	3.30	Pass
11a	6Mbps	1	48	5240	0.08	-	13.87	-		16.99	-	4.63	3.30	Pass
HT20	MCS0	1	36	5180	0.09	-	13.68	-		16.99	-	4.63	3.30	Pass
HT20	MCS0	1	44	5220	0.09	-	14.16	-		16.99	-	4.63	3.30	Pass
HT20	MCS0	1	48	5240	0.09	-	13.75	-		16.99	-	4.63	3.30	Pass
HT40	MCS0	1	38	5190	0.18	-	6.11	-		16.99	-	4.63	3.30	Pass
HT40	MCS0	1	46	5230	0.18	-	14.48	-		16.99	-	4.63	3.30	Pass
HT20	MCS0	2	36	5180	0.09	0.09	12.87	12.27	15.59	15.99		7.00		Pass
HT20	MCS0	2	44	5220	0.09	0.09	12.02	12.21	15.13	15.99		7.00		Pass
HT20	MCS0	2	48	5240	0.09	0.09	11.86	12.15	15.02	15.99		7.00		Pass
HT40	MCS0	2	38	5190	0.13	0.13	5.95	3.96	8.08	15.99		7.00		Pass
HT40	MCS0	2	46	5230	0.13	0.13	12.64	12.82	15.75	15.99		7.00		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. For the band 5150-5250 MHz, the maximum average conducted output power shall not exceed lesser of 50 mW (17dBm) or 4 dBm + 10log (B), where B is 26dB BW for FCC.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5150-5250 MHz, peak power spectral density shall not exceed 4 dBm in any 1-MHz.

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 D01 General UNII Test Procedures v01r03.

Section F) Peak power spectral density (PPSD).

Note: Though the rule refers to “peak power spectral density”, the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission.

Method SA-2

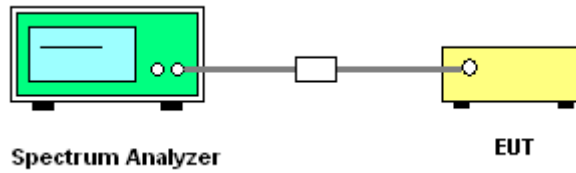
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
 - Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW \geq 3 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

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

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

3.3.4 Test Setup

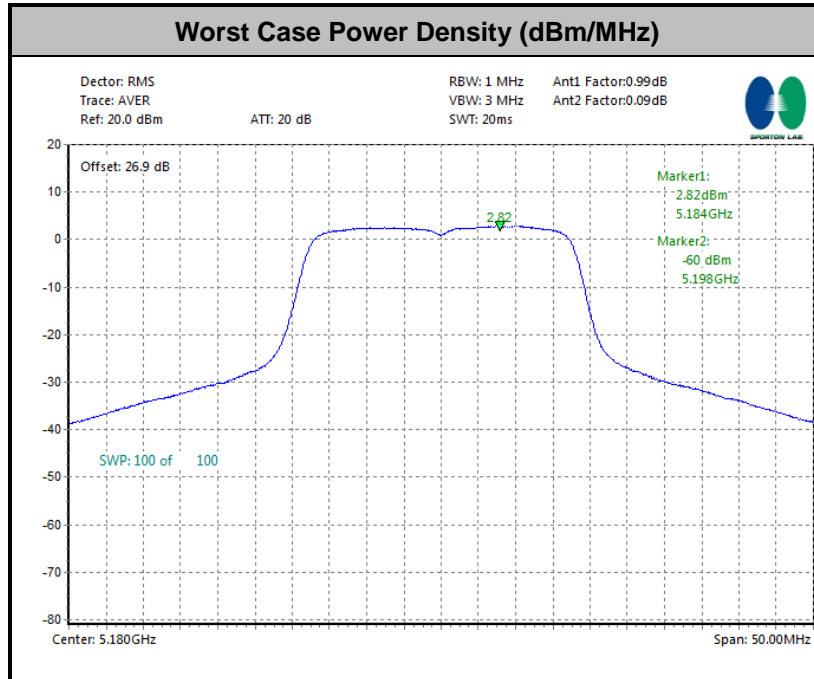


3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band 1	Temperature :	21~26°C
Test Engineer :	Bill Kuo and 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)		EIRP PSD Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Sum Power	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	36	5180	0.08	-	1.87	-	-	4.00	4.00	4.63	3.30	10.00	10.00	Pass
11a	6Mbps	1	44	5220	0.08	-	2.20	-		4.00	4.00	4.63	3.30	10.00	10.00	Pass
11a	6Mbps	1	48	5240	0.08	-	1.78	-		4.00	4.00	4.63	3.30	10.00	10.00	Pass
HT20	MCS0	1	36	5180	0.09	-	1.44	-		4.00	4.00	4.63	3.30	10.00	10.00	Pass
HT20	MCS0	1	44	5220	0.09	-	2.05	-		4.00	4.00	4.63	3.30	10.00	10.00	Pass
HT20	MCS0	1	48	5240	0.09	-	1.60	-		4.00	4.00	4.63	3.30	10.00	10.00	Pass
HT40	MCS0	1	38	5190	0.18	-	-0.85	-		4.00	4.00	4.63	3.30	10.00	10.00	Pass
HT40	MCS0	1	46	5230	0.18	-	-0.10	-		4.00	4.00	4.63	3.30	10.00	10.00	Pass
HT20	MCS0	2	36	5180	0.09	0.09	-		2.82	3.00	7.00	10.00	Pass			
HT20	MCS0	2	44	5220	0.09	0.09			2.45	3.00	7.00	10.00	Pass			
HT20	MCS0	2	48	5240	0.09	0.09			2.18	3.00	7.00	10.00	Pass			
HT40	MCS0	2	38	5190	0.13	0.13			-6.56	3.00	7.00	10.00	Pass			
HT40	MCS0	2	46	5230	0.13	0.13			0.23	3.00	7.00	10.00	Pass			

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



Note: Ant1 Factor = Ant1 Duty factor(0.09dB) + Ant1 and Ant2 cable loss difference(27.8dB -26.9dB).

3.4 Peak Excursion Ratio Measurement

3.4.1 Limit of Peak Excursion Ratio

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

3.4.2 Measuring Instruments

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

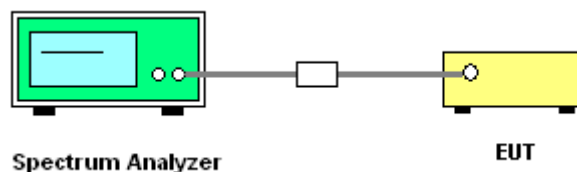
3.4.3 Test Procedures

The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03.

Section G) Peak excursion measurement

1. The transmitter output is connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emission bandwidth.
3. Find the maximum of the peak-max-hold spectrum.
 - *Set RBW = 1MHz.
 - *Set VBW \geq 3MHz.
 - *Detector = peak.
 - *Trace mode = max-hold.
 - *Allow the sweeps to continue until the trace stabilizes.
 - *Use the peak search function to find the peak of the spectrum.
4. Use the procedure found under section 3.3 to measure the PPSD.
5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

3.4.4 Test Setup



3.4.5 Test Result of Peak Excursion Ratio

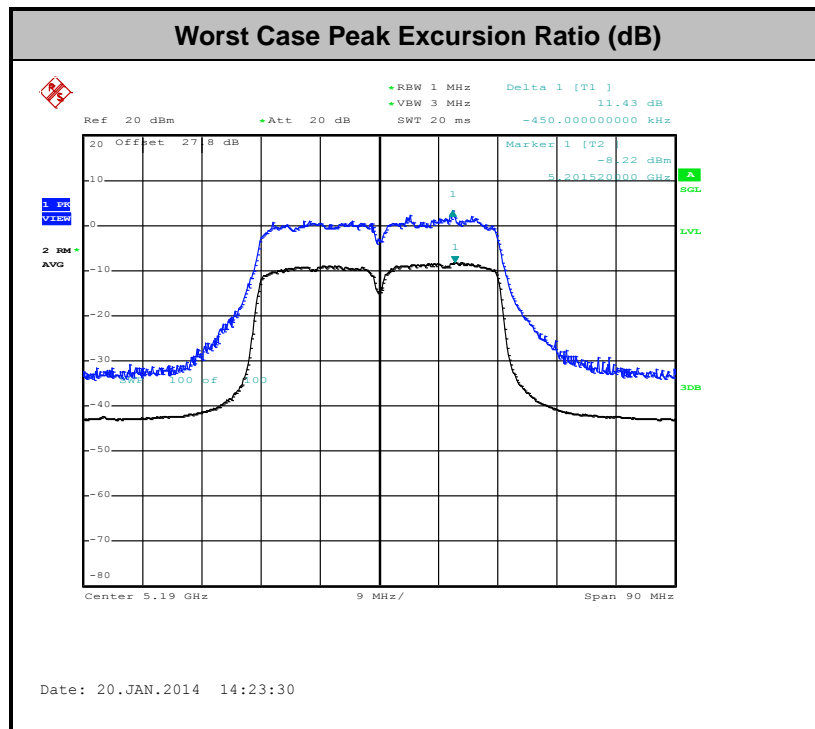
Test Band :	5GHz band 1	Temperature :	21~26°C
Test Engineer :	Bill Kuo and Stuart Lin	Relative Humidity :	45~54%

Mod.	N _{TX}	Channel	Freq. (MHz)	Measured Peak - Avg				
				BPSK	QPSK	16QAM	64QAM	256QAM
11a	1	36	5180	8.89	9.43	9.85	9.98	-
HT20	1	36	5180	8.67	9.34	9.38	10.04	-
HT40	1	38	5230	9.61	9.36	9.58	11.43	-

Mod.	N _{TX}	Channel	Freq. (MHz)	Duty Factor				
				BPSK	QPSK	16QAM	64QAM	256QAM
11a	1	36	5180	0.08	0.16	0.28	0.50	-
HT20	1	36	5180	0.09	0.17	0.30	0.54	-
HT40	1	38	5230	0.18	0.27	0.56	0.88	-

Mod.	N _{TX}	Channel	Freq. (MHz)	Peak Excursion Ratio (dB)					Max. Limits (dB)	Pass/Fail
				BPSK	QPSK	16QAM	64QAM	256QAM		
11a	1	36	5180	8.81	9.27	9.57	9.48	-	13	Pass
HT20	1	36	5180	8.58	9.17	9.08	9.50	-	13	Pass
HT40	1	38	5230	9.43	9.09	9.02	10.55	-	13	Pass

Note: All modulation measured based on the minimum data rate setting.



Note: Peak Excursion Ratio (dB) = Peak – (Average + Duty Cycle Offset)

3.5 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 Part 15.205.

3.5.1 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 Part 15.205 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.

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

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

- (3) KDB789033 v01r03 H)2)c)(i) 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.

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

1. The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03.

Section H) 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

- The setting follows the H) 5) of FCC KDB 789033.
- RBW = 1 MHz
- VBW \geq 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

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

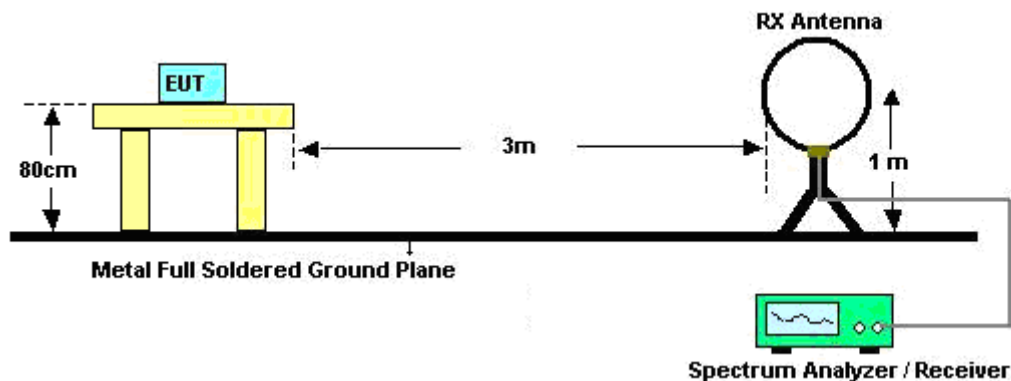
- The setting follows H) 6) of FCC KDB 789033.
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1	802.11a	98.1	-	-	10Hz
1	802.11n HT20	97.96	1920	0.52	1kHz
1	802.11n HT40	95.92	940	1.06	3kHz
1+2	802.11n HT20	97.96	1920	0.52	1kHz
1+2	802.11n HT40	96.94	950	1.05	3kHz

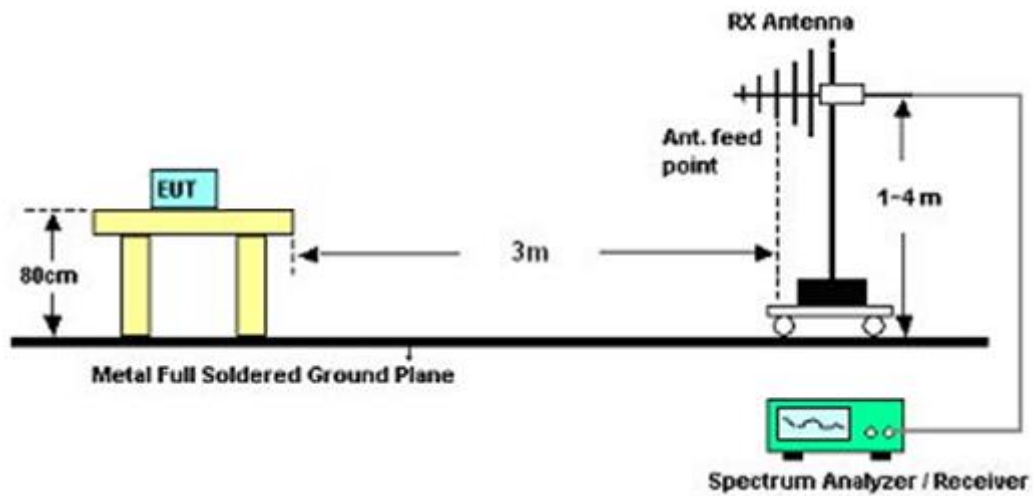
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.5.4 Test Setup

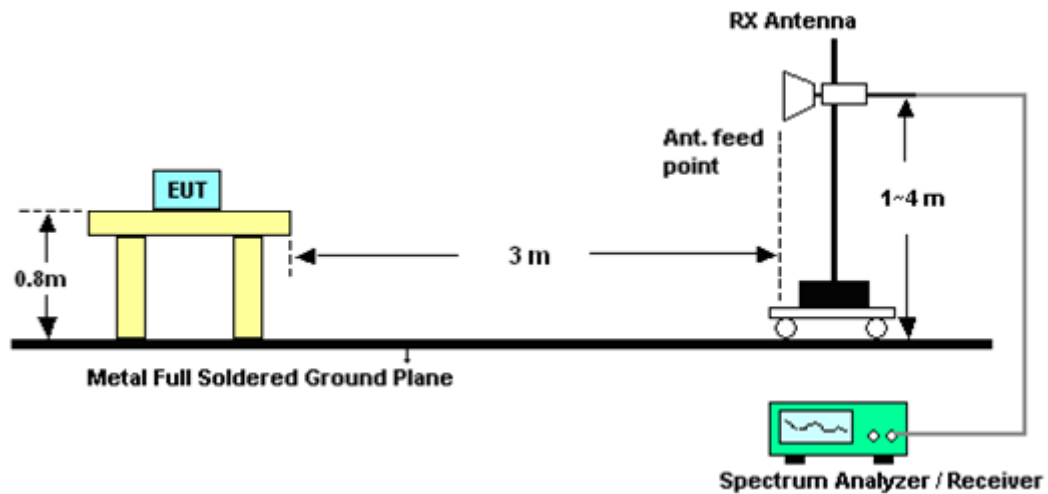
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 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.

3.5.6 Test Result of Radiated Band Edges

<Ant. 1>

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5149.55	63.25	-10.75	74	51.71	34.45	10.44	33.35	116	328	Peak
5150	46.24	-7.76	54	34.7	34.45	10.44	33.35	116	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
5149.4	67.28	-6.72	74	55.74	34.45	10.44	33.35	100	12	Peak
5148.2	49.75	-4.25	54	38.21	34.45	10.44	33.35	100	12	Average

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5125.25	56.01	-17.99	74	44.54	34.43	10.4	33.36	115	331	Peak
5148.05	43.89	-10.11	54	32.35	34.45	10.44	33.35	115	331	Average
5353.74	56.33	-17.67	74	44.23	34.65	10.72	33.27	115	331	Peak
5382.01	43.66	-10.34	54	31.44	34.68	10.79	33.25	115	331	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
5407.86	56.96	-17.04	74	44.68	34.7	10.82	33.24	100	8	Peak
5355.94	46.51	-7.49	54	34.41	34.65	10.72	33.27	100	8	Average
5147.9	56.64	-17.36	74	45.1	34.45	10.44	33.35	100	8	Peak
5148.05	48.49	-5.51	54	36.95	34.45	10.44	33.35	100	8	Average

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5147.9	62.43	-11.57	74	50.89	34.45	10.44	33.35	128	328	Peak
5150	48.16	-5.84	54	36.62	34.45	10.44	33.35	128	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
5148.5	65.35	-8.65	74	53.81	34.45	10.44	33.35	100	10	Peak
5148.2	50.64	-3.36	54	39.1	34.45	10.44	33.35	100	10	Average

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5148.2	54.81	-19.19	74	43.27	34.45	10.44	33.35	105	336	Peak
5148.05	45.14	-8.86	54	33.6	34.45	10.44	33.35	105	336	Average
5397.96	56.35	-17.65	74	44.11	34.7	10.79	33.25	105	336	Peak
5382.01	44.17	-9.83	54	31.95	34.68	10.79	33.25	105	336	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
5147.9	56.04	-17.96	74	44.5	34.45	10.44	33.35	100	9	Peak
5148.05	47.51	-6.49	54	35.97	34.45	10.44	33.35	100	9	Average
5351.1	57.63	-16.37	74	45.53	34.65	10.72	33.27	100	9	Peak
5355.83	45.68	-8.32	54	33.58	34.65	10.72	33.27	100	9	Average

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	38	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5149.4	56.74	-17.26	74	45.2	34.45	10.44	33.35	103	329	Peak
5149.7	45.09	-8.91	54	33.55	34.45	10.44	33.35	103	329	Average
5391.8	56.34	-17.66	74	44.12	34.68	10.79	33.25	103	329	Peak
5382.23	44.44	-9.56	54	32.22	34.68	10.79	33.25	103	329	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
5147.9	64.03	-9.97	74	52.49	34.45	10.44	33.35	100	38	Peak
5148.2	51.71	-2.29	54	40.17	34.45	10.44	33.35	100	38	Average
5425.79	56.49	-17.51	74	44.18	34.72	10.82	33.23	100	38	Peak
5407.97	45.81	-8.19	54	33.53	34.7	10.82	33.24	100	38	Average

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	46	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5098.25	55.17	-18.83	74	43.78	34.4	10.37	33.38	104	330	Peak
5148.05	45.07	-8.93	54	33.53	34.45	10.44	33.35	104	330	Average
5382.45	55.87	-18.13	74	43.65	34.68	10.79	33.25	104	330	Peak
5355.94	44.71	-9.29	54	32.61	34.65	10.72	33.27	104	330	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
5148.05	57.06	-16.94	74	45.52	34.45	10.44	33.35	100	9	Peak
5148.05	48.39	-5.61	54	36.85	34.45	10.44	33.35	100	9	Average
5357.26	56.95	-17.05	74	44.82	34.65	10.75	33.27	100	9	Peak
5382.01	46.39	-7.61	54	34.17	34.68	10.79	33.25	100	9	Average

MIMO <Ant. 1 + 2>

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5150	67.37	-6.63	74	55.83	34.45	10.44	33.35	100	312	Peak
5150	52.11	-1.89	54	40.57	34.45	10.44	33.35	100	312	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	66.42	-7.58	74	54.88	34.45	10.44	33.35	100	133	Peak
5150	50.98	-3.02	54	39.44	34.45	10.44	33.35	100	133	Average

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5138.3	55.15	-18.85	74	43.68	34.43	10.4	33.36	105	302	Peak
5122.1	44.79	-9.21	54	33.33	34.42	10.4	33.36	105	302	Average
5446.8	56.93	-17.07	74	44.55	34.75	10.86	33.23	105	302	Peak
5445.15	45.73	-8.27	54	33.37	34.73	10.86	33.23	105	302	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
5095.85	56.2	-17.8	74	44.81	34.4	10.37	33.38	100	5	Peak
5148.05	46.55	-7.45	54	35.01	34.45	10.44	33.35	100	5	Average
5440.2	56.78	-17.22	74	44.42	34.73	10.86	33.23	100	5	Peak
5381.9	46.54	-7.46	54	34.32	34.68	10.79	33.25	100	5	Average

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	38	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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	59.25	-14.75	74	47.71	34.45	10.44	33.35	118	344	Peak
5149.55	47.7	-6.3	54	36.16	34.45	10.44	33.35	118	344	Average
5404.56	56.5	-17.5	74	44.22	34.7	10.82	33.24	118	344	Peak
5356.16	44.35	-9.65	54	32.22	34.65	10.75	33.27	118	344	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	63.96	-10.04	74	52.42	34.45	10.44	33.35	100	11	Peak
5149.85	52.55	-1.45	54	41.01	34.45	10.44	33.35	100	11	Average
5371.56	56.65	-17.35	74	44.5	34.67	10.75	33.27	118	11	Peak
5355.83	45.5	-8.5	54	33.4	34.65	10.72	33.27	118	11	Average

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	46	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu		

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
5041.85	55.8	-18.2	74	44.59	34.35	10.26	33.4	100	315	Peak
5146.85	45.25	-8.75	54	33.71	34.45	10.44	33.35	100	315	Average
5440.53	57.06	-16.94	74	44.7	34.73	10.86	33.23	100	315	Peak
5439.87	46.14	-7.86	54	33.78	34.73	10.86	33.23	100	315	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
5100.35	55.38	-18.62	74	43.99	34.4	10.37	33.38	100	5	Peak
5122.25	45.85	-8.15	54	34.39	34.42	10.4	33.36	100	5	Average
5440.2	57.18	-16.82	74	44.82	34.73	10.86	33.23	100	5	Peak
5407.86	46.19	-7.81	54	33.91	34.7	10.82	33.24	100	5	Average

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

<Ant. 1>

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 5181 MHz is fundamental signal which can be ignored.. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit.		

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
5181	96.54	-	-	84.93	34.48	10.47	33.34	116	328	Average
5181	108.3	-	-	96.69	34.48	10.47	33.34	116	328	Peak
10359	49.89	-4.11	54	57.44	37.17	10.64	55.36	100	0	Peak
15540	43.42	-10.58	54	45.72	39.73	11.79	53.82	100	20	Average
15540	55.9	-18.1	74	58.2	39.73	11.79	53.82	100	20	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored.. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5180	100.68	-	-	89.07	34.48	10.47	33.34	100	12	Average
5180	112.06	-	-	100.45	34.48	10.47	33.34	100	12	Peak
10359	49.2	-4.8	54	56.75	37.17	10.64	55.36	100	0	Peak
15543	47.93	-6.07	54	50.23	39.73	11.79	53.82	127	74	Average
15543	57.6	-16.4	74	59.9	39.73	11.79	53.82	127	74	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	44	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 5219 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.		

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
5219	97.65	-	-	85.92	34.52	10.54	33.33	128	328	Average
5219	109.39	-	-	97.66	34.52	10.54	33.33	128	328	Peak
10443	41.45	-12.55	54	48.85	37.23	10.65	55.28	100	277	Average
10443	54.45	-19.55	74	61.85	37.23	10.65	55.28	100	277	Peak
15666	47.98	-6.02	54	49.88	39.87	11.75	53.52	126	344	Average
15666	57.53	-16.47	74	59.43	39.87	11.75	53.52	126	344	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	44	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5221 MHz is fundamental signal which can be ignored.. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5221	101.32	-	-	89.58	34.52	10.54	33.32	100	8	Average
5221	112.23	-	-	100.49	34.52	10.54	33.32	100	8	Peak
10440	39.56	-14.44	54	46.96	37.23	10.65	55.28	100	334	Average
10440	54.18	-19.82	74	61.58	37.23	10.65	55.28	100	334	Peak
15663	49.05	-4.95	54	50.95	39.87	11.75	53.52	157	75	Average
15663	59.53	-14.47	74	61.43	39.87	11.75	53.52	157	75	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 5239 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.		

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
5239	96.52	-	-	84.73	34.53	10.58	33.32	115	331	Average
5239	107.87	-	-	96.08	34.53	10.58	33.32	115	331	Peak
10479	49.86	-4.14	54	57.14	37.28	10.66	55.22	100	0	Peak
15723	44.14	-9.86	54	45.89	39.92	11.74	53.41	100	337	Average
15723	57.92	-16.08	74	59.67	39.92	11.74	53.41	100	337	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5239 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5239	100.66	-	-	88.87	34.53	10.58	33.32	100	8	Average
5239	111.82	-	-	100.03	34.53	10.58	33.32	100	8	Peak
10479	39.66	-14.34	54	46.94	37.28	10.66	55.22	100	338	Average
10479	51.44	-22.56	74	58.72	37.28	10.66	55.22	100	338	Peak
15726	46.14	-7.86	54	47.9	39.92	11.73	53.41	100	85	Average
15726	58.59	-15.41	74	60.35	39.92	11.73	53.41	100	85	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 5182 MHz is fundamental signal which can be ignored.. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit.		

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	97.98	-	-	86.37	34.48	10.47	33.34	128	328	Average
5182	107.99	-	-	96.38	34.48	10.47	33.34	128	328	Peak
10359	49.86	-4.14	54	57.41	37.17	10.64	55.36	100	0	Peak
15540	43.48	-10.52	54	45.78	39.73	11.79	53.82	100	18	Average
15540	57.75	-16.25	74	60.05	39.73	11.79	53.82	100	18	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5182 MHz is fundamental signal which can be ignored.. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit.		

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	101.18	-	-	89.57	34.48	10.47	33.34	100	10	Average
5182	111.43	-	-	99.82	34.48	10.47	33.34	100	10	Peak
10359	49.96	-4.04	54	57.51	37.17	10.64	55.36	100	0	Peak
15540	48.19	-5.81	54	50.49	39.73	11.79	53.82	151	76	Average
15540	57.91	-16.09	74	60.21	39.73	11.79	53.82	151	76	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	44	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	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.		

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	98.84	-	-	87.1	34.52	10.54	33.32	128	330	Average
5222	108.61	-	-	96.87	34.52	10.54	33.32	128	330	Peak
10440	42.52	-11.48	54	49.92	37.23	10.65	55.28	167	260	Average
10440	55.88	-18.12	74	63.16	37.28	10.66	55.22	167	260	Peak
15657	45.54	-8.46	54	47.49	39.86	11.75	53.56	100	21	Average
15657	57.14	-16.86	74	59.09	39.86	11.75	53.56	100	21	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	44	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5224 MHz is fundamental signal which can be ignored.. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5224	101.45	-	-	89.71	34.52	10.54	33.32	100	10	Average
5224	111.7	-	-	99.96	34.52	10.54	33.32	100	10	Peak
10440	39.88	-14.12	54	47.28	37.23	10.65	55.28	100	329	Average
10440	52.67	-21.33	74	60.07	37.23	10.65	55.28	100	329	Peak
15660	49.2	-4.8	54	51.1	39.87	11.75	53.52	150	77	Average
15660	61.15	-12.85	74	63.05	39.87	11.75	53.52	150	77	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
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.		

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	98.01	-	-	86.2	34.55	10.58	33.32	105	336	Average
5242	108.45	-	-	96.64	34.55	10.58	33.32	105	336	Peak
10479	49.89	-4.11	54	57.17	37.28	10.66	55.22	100	0	Peak
15720	56.79	-17.21	74	58.54	39.92	11.74	53.41	100	337	Peak
15720	44.71	-9.29	54	46.46	39.92	11.74	53.41	100	337	Average

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5242 MHz is fundamental signal which can be ignored.. 2. 10480 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5242	102.04	-	-	90.23	34.55	10.58	33.32	100	9	Average
5242	112.08	-	-	100.27	34.55	10.58	33.32	100	9	Peak
10480	40.71	-13.29	54	47.99	37.28	10.66	55.22	100	332	Average
10480	54.66	-19.34	74	61.94	37.28	10.66	55.22	100	332	Peak
15720	48.52	-5.48	54	50.27	39.92	11.74	53.41	124	72	Average
15720	58.89	-15.11	74	60.64	39.92	11.74	53.41	124	72	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	38	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	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.		

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	29.32	-10.68	40	41.98	18.5	0.64	31.8	100	157	Peak
41.34	28.45	-11.55	40	47.91	11.58	0.75	31.79	-	-	Peak
221.7	32.73	-13.27	46	53.44	9.4	1.63	31.74	-	-	Peak
601	25.73	-20.27	46	35.61	19.41	2.77	32.06	-	-	Peak
629	24.61	-21.39	46	34.09	19.78	2.79	32.05	-	-	Peak
818	25.2	-20.8	46	33.59	20.36	3.12	31.87	-	-	Peak
5192	89.75	-	-	78.08	34.5	10.51	33.34	104	338	Average
5192	100.11	-	-	88.44	34.5	10.51	33.34	104	338	Peak
10380	49.53	-4.47	54	57.05	37.18	10.64	55.34	100	0	Peak
15570	49.96	-4.04	54	52.16	39.77	11.78	53.75	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	38	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
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.		

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	39.42	-0.58	40	52.08	18.5	0.64	31.8	100	9	Peak
30	36.94	-3.06	40	49.6	18.5	0.64	31.8	100	9	QP
34.86	31.66	-8.34	40	47.26	15.5	0.69	31.79	-	-	Peak
41.34	32.72	-7.28	40	52.18	11.58	0.75	31.79	-	-	Peak
401.5	24.74	-21.26	46	38.48	15.89	2.19	31.82	-	-	Peak
548.5	27.27	-18.73	46	37.26	19.46	2.54	31.99	-	-	Peak
601	26.32	-19.68	46	36.2	19.41	2.77	32.06	-	-	Peak
5192	96.48	-	-	84.81	34.5	10.51	33.34	100	38	Average
5192	106.73	-	-	95.06	34.5	10.51	33.34	100	38	Peak
10380	48.74	-5.26	54	56.26	37.18	10.64	55.34	100	0	Peak
15570	50.41	-3.59	54	52.61	39.77	11.78	53.75	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	46	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 5232 MHz is fundamental signal which can be ignored. 2. 10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5232	96.36	-	-	84.61	34.53	10.54	33.32	104	330	Average
5232	105.94	-	-	94.19	34.53	10.54	33.32	104	330	Peak
10461	42.37	-11.63	54	49.68	37.27	10.66	55.24	100	278	Average
10461	53.26	-20.74	74	60.57	37.27	10.66	55.24	100	278	Peak
15690	45.36	-8.64	54	47.2	39.89	11.75	53.48	100	157	Average
15690	55.91	-18.09	74	57.75	39.89	11.75	53.48	100	157	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	46	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5232 MHz is fundamental signal which can be ignored. 2. 10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5232	99.68	-	-	87.93	34.53	10.54	33.32	100	9	Average
5232	110.1	-	-	98.35	34.53	10.54	33.32	100	9	Peak
10461	41.31	-12.69	54	48.62	37.27	10.66	55.24	100	56	Average
10461	52.14	-21.86	74	59.45	37.27	10.66	55.24	100	56	Peak
15699	48.16	-5.84	54	49.94	39.91	11.75	53.44	120	72	Average
15699	57.29	-16.71	74	59.07	39.91	11.75	53.44	120	72	Peak

MIMO <Ant. 1 + 2>

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 5182 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5182	102.61	-	-	91	34.48	10.47	33.34	100	312	Average
5182	112.52	-	-	100.91	34.48	10.47	33.34	100	312	Peak
10359	46.16	-7.84	54	53.71	37.17	10.64	55.36	100	252	Average
10359	57.54	-16.46	74	65.09	37.17	10.64	55.36	100	252	Peak
15539	45.53	-8.47	54	47.83	39.73	11.79	53.82	100	319	Average
15539	57.36	-16.64	74	59.66	39.73	11.79	53.82	100	319	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	36	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5182 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5182	103.49	-	-	91.88	34.48	10.47	33.34	100	133	Average
5182	113.03	-	-	101.42	34.48	10.47	33.34	100	133	Peak
10359	48.67	-5.33	54	56.22	37.17	10.64	55.36	100	18	Average
10359	59.67	-14.33	74	67.22	37.17	10.64	55.36	100	18	Peak
15541	47.16	-6.84	54	49.46	39.73	11.79	53.82	100	177	Average
15541	58.64	-15.36	74	60.94	39.73	11.79	53.82	100	177	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	44	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	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.		

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	103.43	-	-	91.69	34.52	10.54	33.32	100	312	Average
5222	113.22	-	-	101.48	34.52	10.54	33.32	100	312	Peak
10437	47.33	-6.67	54	54.73	37.23	10.65	55.28	100	255	Average
10437	58.63	-15.37	74	66.03	37.23	10.65	55.28	100	255	Peak
15658	46.36	-7.64	54	48.31	39.86	11.75	53.56	100	305	Average
15658	57.84	-16.16	74	59.79	39.86	11.75	53.56	100	305	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	44	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5222 MHz is fundamental signal which can be ignored. 2. 10442 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5222	103.44	-	-	91.71	34.52	10.54	33.33	100	6	Average
5222	113.93	-	-	102.2	34.52	10.54	33.33	100	6	Peak
10442	48.54	-5.46	54	55.94	37.23	10.65	55.28	100	28	Average
10442	60.46	-13.54	74	67.86	37.23	10.65	55.28	100	28	Peak
15663	47.84	-6.16	54	49.74	39.87	11.75	53.52	100	173	Average
15663	60	-14	74	61.9	39.87	11.75	53.52	100	173	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	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.		

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	102.76	-	-	90.97	34.53	10.58	33.32	105	302	Average
5238	112.54	-	-	100.75	34.53	10.58	33.32	105	302	Peak
10482	47.39	-6.61	54	54.67	37.28	10.66	55.22	100	246	Average
10482	59.53	-14.47	74	66.81	37.28	10.66	55.22	100	246	Peak
15720	46.42	-7.58	54	48.17	39.92	11.74	53.41	100	313	Average
15720	57.55	-16.45	74	59.3	39.92	11.74	53.41	100	313	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	48	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5242 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.		

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	104.03	-	-	92.22	34.55	10.58	33.32	100	5	Average
5242	114	-	-	102.19	34.55	10.58	33.32	100	5	Peak
10482	44.45	-9.55	54	51.73	37.28	10.66	55.22	100	26	Average
10482	56.71	-17.29	74	63.99	37.28	10.66	55.22	100	26	Peak
15718	46.14	-7.86	54	47.89	39.92	11.74	53.41	100	191	Average
15718	57.28	-16.72	74	59.03	39.92	11.74	53.41	100	191	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	38	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	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.		

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	32.25	-7.75	40	44.91	18.5	0.64	31.8	100	87	Peak
41.34	31.89	-8.11	40	51.35	11.58	0.75	31.79	-	-	Peak
59.16	30.25	-9.75	40	54.54	6.62	0.86	31.77	-	-	Peak
601	27.88	-18.12	46	37.76	19.41	2.77	32.06	-	-	Peak
818	25.5	-20.5	46	33.89	20.36	3.12	31.87	-	-	Peak
902	27.92	-18.08	46	34.98	21.08	3.37	31.51	-	-	Peak
5192	94.97	-	-	83.3	34.5	10.51	33.34	118	344	Average
5192	104.43	-	-	92.76	34.5	10.51	33.34	118	344	Peak
10380	49.93	-4.07	54	57.45	37.18	10.64	55.34	100	0	Peak
15570	50.49	-3.51	54	52.69	39.77	11.78	53.75	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	38	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
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.		

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	38.54	-1.46	40	51.2	18.5	0.64	31.8	100	12	Peak
30	36.54	-3.46	40	49.2	18.5	0.64	31.8	100	12	QP
34.86	32.89	-7.11	40	48.49	15.5	0.69	31.79	-	-	Peak
40.8	32.39	-7.61	40	51.2	12.24	0.74	31.79	-	-	Peak
394.5	25.58	-20.42	46	39.56	15.65	2.18	31.81	-	-	Peak
571.6	28.33	-17.67	46	38.4	19.31	2.64	32.02	-	-	Peak
837.6	30.41	-15.59	46	38.33	20.68	3.19	31.79	-	-	Peak
5192	97.74	-	-	86.07	34.5	10.51	33.34	100	11	Average
5192	107.57	-	-	95.9	34.5	10.51	33.34	100	11	Peak
10380	50.09	-3.91	54	57.61	37.18	10.64	55.34	100	0	Peak
15570	50.7	-3.3	54	52.9	39.77	11.78	53.75	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	46	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 5232 MHz is fundamental signal which can be ignored.. 2. 10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit.		

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	102.56	-	-	90.81	34.53	10.54	33.32	100	315	Average
5232	112.47	-	-	100.72	34.53	10.54	33.32	100	315	Peak
10461	47.88	-6.12	54	55.19	37.27	10.66	55.24	100	248	Average
10461	57.63	-16.37	74	64.94	37.27	10.66	55.24	100	248	Peak
15693	46.13	-7.87	54	47.97	39.89	11.75	53.48	100	306	Average
15693	55.18	-18.82	74	57.02	39.89	11.75	53.48	100	306	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	46	Relative Humidity :	44~47%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 5232 MHz is fundamental signal which can be ignored.. 2. 10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit.		

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	100.72	-	-	88.97	34.53	10.54	33.32	100	5	Average
5232	110.73	-	-	98.98	34.53	10.54	33.32	100	5	Peak
10461	45.7	-8.3	54	53.01	37.27	10.66	55.24	103	11	Average
10461	55.56	-18.44	74	62.87	37.27	10.66	55.24	103	11	Peak
15688	46.41	-7.59	54	48.25	39.89	11.75	53.48	100	150	Average
15688	56.14	-17.86	74	57.98	39.89	11.75	53.48	100	150	Peak

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

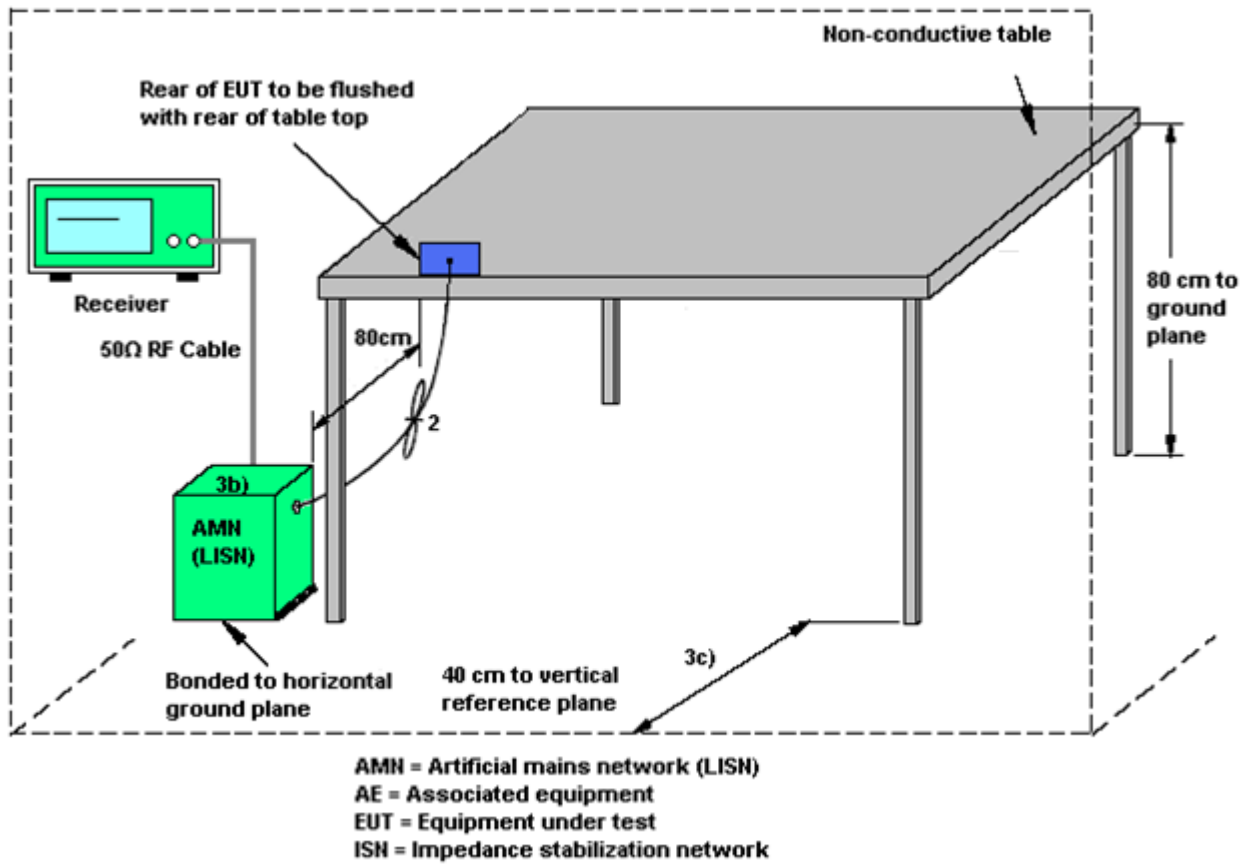
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

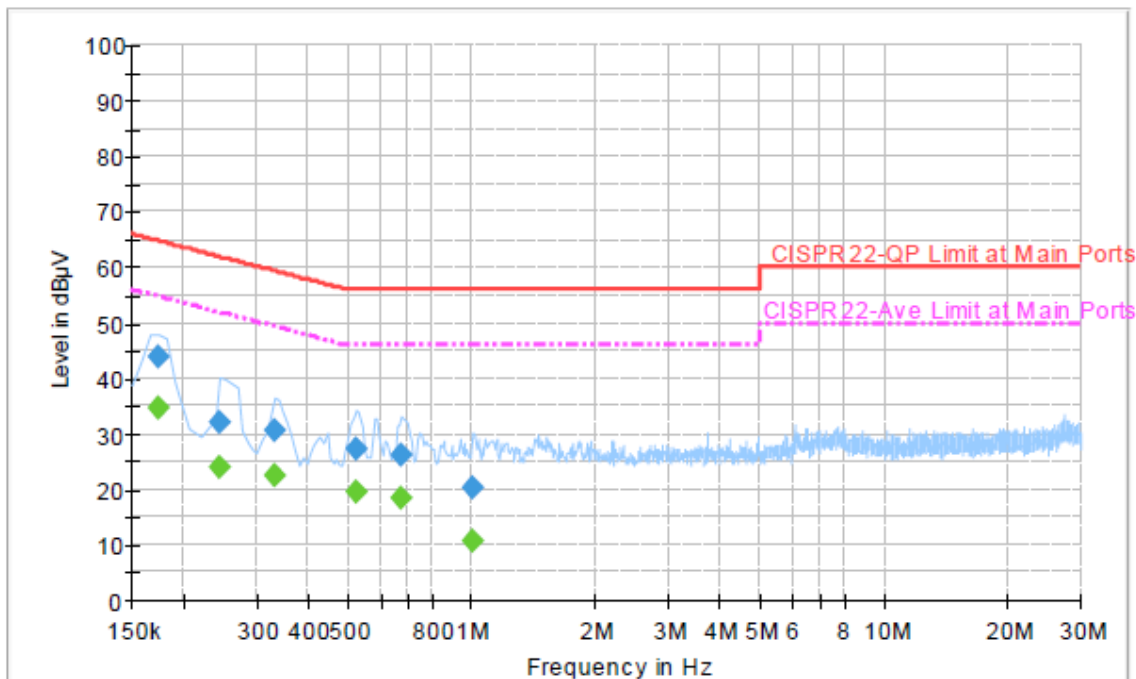
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	20~22℃
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Adapter + MP3		



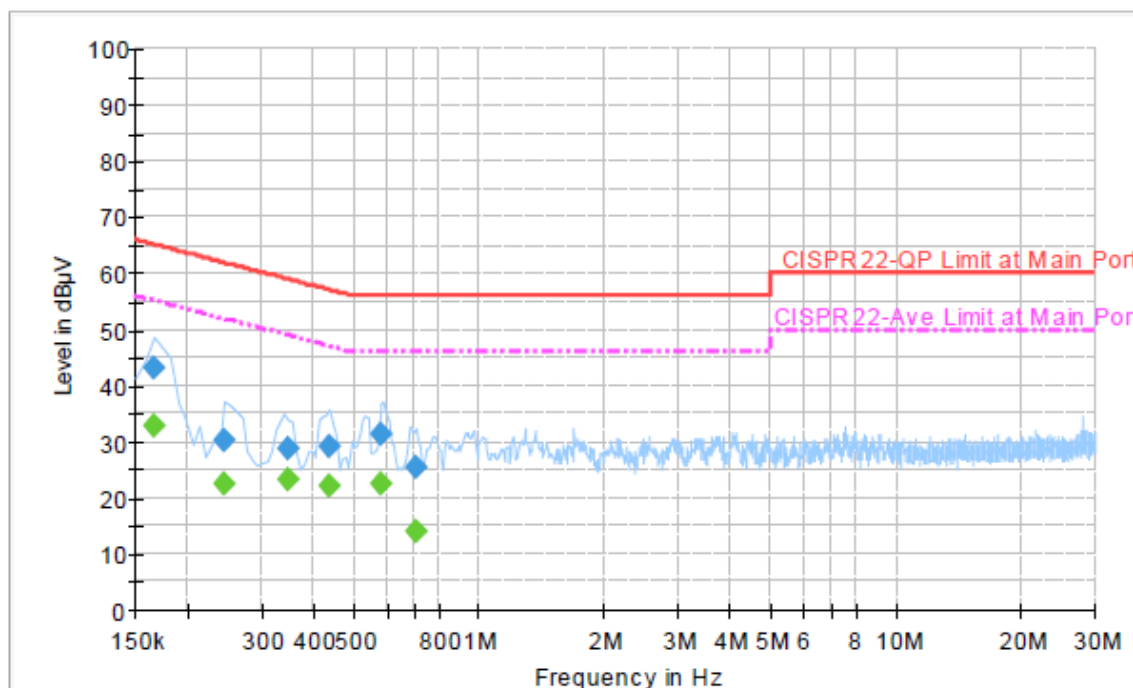
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	43.8	Off	L1	19.3	21.0	64.8
0.246000	32.2	Off	L1	19.4	29.7	61.9
0.334000	30.6	Off	L1	19.4	28.8	59.4
0.526000	27.4	Off	L1	19.4	28.6	56.0
0.678000	26.2	Off	L1	19.5	29.8	56.0
1.006000	20.3	Off	L1	19.5	35.7	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	34.7	Off	L1	19.3	20.1	54.8
0.246000	24.1	Off	L1	19.4	27.8	51.9
0.334000	22.5	Off	L1	19.4	26.9	49.4
0.526000	19.7	Off	L1	19.4	26.3	46.0
0.678000	18.6	Off	L1	19.5	27.4	46.0
1.006000	10.7	Off	L1	19.5	35.3	46.0

Test Mode :	Mode 2	Temperature :	20~22℃
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Adapter + MP3		



3.7 Frequency Stability Measurement

3.7.1 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.

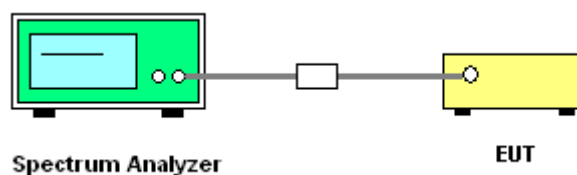
3.7.2 Measuring Instruments

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

3.7.3 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.

3.7.4 Test Setup



3.7.5 Test Result of Frequency Stability

Test Band :	5GHz band 1	Test Engineer :	Bill Kuo and Stuart Lin
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Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
11a	6Mbps	1	36	5180	5180.00	0	0.00	20	120
11a	6Mbps	1	36	5180	5180.00	0	0.00	20	102
11a	6Mbps	1	36	5180	5179.95	-0.05	-9.65	20	138
11a	6Mbps	1	36	5180	5180.00	0	0.00	0	120
11a	6Mbps	1	36	5180	5180.00	0	0.00	35	120

Note: Center Frequency = (Low Frequency + High Frequency) / 2.

3.8 Automatically Discontinue Transmission

3.8.1 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.

3.8.2 Measuring Instruments

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

3.8.3 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.

3.9 Antenna Requirements

3.9.1 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.

3.9.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.9.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

where

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

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

N_{ANT} = the total number of antennas

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

The EUT supports CDD mode.

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

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

			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant 1 (dBi)	Ant 2 (dBi)				
Band I	4.63	3.30	7.00	7.00	1.00	1.00

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 07, 2013	Jan. 16, 2014~ Feb. 05, 2014	Jun. 06, 2014	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz~40GHz	Oct. 23, 2013	Jun. 10, 2014	Oct. 22, 2014	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 17, 2013	Jan. 16, 2014~ Feb. 05, 2014	Aug. 16, 2014	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 17, 2013	Jan. 16, 2014~ Feb. 05, 2014	Aug. 16, 2014	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 19, 2013	Jan. 16, 2014~ Feb. 05, 2014	Jul. 18, 2014	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101067	9kHz ~ 30GHz	Nov. 20, 2013	Jan. 17, 2014~ Feb. 05, 2014	Nov. 19, 2014	Radiation (03CH06-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9kHz ~ 26.5GHz	Dec. 02, 2013	Jan. 17, 2014~ Feb. 05, 2014	Dec. 01, 2014	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/0003	20MHz ~ 1GHz	May 06, 2013	Jan. 17, 2014~ Feb. 05, 2014	May 05, 2014	Radiation (03CH06-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	860004/0001	9kHz ~ 30MHz	Jul. 03, 2012	Jan. 17, 2014~ Feb. 05, 2014	Jul. 02, 2014	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6112B	2885	30MHz ~ 2GHz	Oct. 10, 2013	Jan. 17, 2014~ Feb. 05, 2014	Oct. 09, 2014	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Aug. 02, 2013	Jan. 17, 2014~ Feb. 05, 2014	Aug. 01, 2014	Radiation (03CH06-HY)
Amplifier	SONOMA	310N	186713	9kHz ~ 1GHz	Apr. 12, 2013	Jan. 17, 2014~ Feb. 05, 2014	Apr. 11, 2014	Radiation (03CH06-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 18, 2013	Jan. 17, 2014~ Feb. 05, 2014	Jul. 17, 2014	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	15GHz ~ 40GHz	Oct. 03, 2013	Jan. 17, 2014~ Feb. 05, 2014	Oct. 02, 2014	Radiation (03CH06-HY)
Preamplifier	Agilent	8449B	3008A01917	1GHz ~ 26.5GHz	Apr. 12, 2013	Jan. 17, 2014~ Feb. 05, 2014	Apr. 11, 2014	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0 ~ 360 degree	N/A	Jan. 17, 2014~ Feb. 05, 2014	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF78020821 2	1 m ~ 4 m	N/A	Jan. 17, 2014~ Feb. 05, 2014	N/A	Radiation (03CH06-HY)
Amplifier	EM	EM18G40G	060604	18GHz ~ 40GHz	Oct. 17, 2013	Jan. 17, 2014~ Feb. 05, 2014	Oct. 16, 2014	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	May 14, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	May 14, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	May 14, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 14, 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% ($U = 2U_c(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

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