FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	LTE uFi
BRAND NAME	:	ZTE
MODEL NAME	:	203Z / GL09P / MF98+
FCC ID	:	Q78-MF98PLUS
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Apr. 23, 2013 and completely tested on Jun. 05, 2013. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

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

Reviewed by:

Jones Tsai

Jones Tsai / Manager

Testing Laboratory 2627

SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR342301B	Rev. 01	Initial issue of report	Jun. 20, 2013

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	≤ 17 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 4 dBm	Pass	-
3.4	15.407(a)(6)	Peak Excursion Ratio	≤ 13dB	Pass	-
3.5	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm	Pass	Under limit 8.34 dB at 35.820 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 4.07 dB at 0.470 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

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	LTE uFi
Brand Name	ZTE
Model Name	203Z / GL09P / MF98+
FCC ID	Q78-MF98PLUS
EUT supports Radios application	WCDMA/HSPA/HSPA+/WLAN 11abgn
HW Version	xr4B
SW Version	Alpha4.0
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

<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><5180 MHz ~ 5240 MHz for MIMO Ant 0+1>
802.11a : 8.51 dBm / 0.0071 W
802.11n HT20 : 8.54 dBm / 0.0071 W
802.11n HT40 : 8.86 dBm / 0.0077 W</td></tr>
<tr><td>Antenna Type</td><td><Ant.0>
802.11a/n : Fixed Internal Antenna with gain 1.9 dBi
<Ant.1>
802.11a/n : Fixed Internal Antenna with gain 2.7 dBi</td></tr>
<tr><td>Type of Modulation</td><td>OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><td></td><td>Ant.0</td><td>Ant.1</td></tr>
<tr><td>802.11 a</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n MIMO</td><td>V</td><td>V</td></tr>
</table>
Note: MIMO mode is completely uncorrelated.
</td></tr>
</table>

1.5 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH01-KS	CO01-KS	03CH01-KS	149928/4086E-1

The test site complies with ANSI C63.4 2003 requirement.

1.6 Applied Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D01 General UNII Test Procedures v01r03
- FCC KDB 662911 D01 Multiple Transmitter Output v01r02.
- ANSI C63.10-2009

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 (Y plane) were recorded in this report.

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

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

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1	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 antenna configurations as following table and the highest power data rates were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

Ch.	Freq. (MHz)	Ant. Chain	802.11a RF Power (dBm)							
			OFDM Data Rate							
			6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
36	5180	Ant.0	8.04	7.89	7.97	8.05	7.90	8.02	8.24	7.79
		Ant.1	8.36	8.20	8.18	8.15	7.90	8.07	7.94	7.98
44	5220	Ant.0	8.34	7.99	7.96	8.11	8.07	8.21	8.24	8.24
		Ant.1	**8.51**	8.38	8.34	8.43	8.39	7.78	8.21	7.86
48	5240	Ant.0	8.10	8.08	8.06	7.83	7.92	7.78	7.74	7.94
		Ant.1	8.05	7.98	7.94	8.06	8.03	8.04	8.20	8.31

Ch.	Freq. (MHz)	Ant. Chain	WLAN 5.2GHz 802.11n HT-20 RF Power (dBm)							
			OFDM Data Rate							
			6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
36	5180	SISO Ant.0	5.43	5.23	5.24	5.42	5.28	5.37	5.07	5.36
		SISO Ant.1	6.06	5.78	5.89	5.87	6.00	6.05	5.70	5.75
44	5220	SISO Ant.0	5.03	4.83	4.94	5.11	5.14	5.21	5.32	5.29
		SISO Ant.1	5.80	5.51	5.48	5.57	5.64	5.71	5.74	5.74
48	5240	SISO Ant.0	4.97	4.79	4.64	4.70	4.71	4.83	4.88	4.83
		SISO Ant.1	5.87	5.54	5.59	5.56	5.70	5.81	5.77	5.74
Ch.	**Freq. (MHz)**	**Ant. Chain**	**13 Mbps**	**26 Mbps**	**39 Mbps**	**52 Mbps**	**78 Mbps**	**104 Mbps**	**117 Mbps**	**130 Mbps**
36	5180	MIMO Ant.0+1(0)	5.27	4.97	4.87	4.76	4.92	5.16	5.25	5.16
		MIMO Ant.0+1(1)	5.78	5.40	5.70	5.45	5.56	5.10	5.45	5.65
		MIMO Ant.0+1	**8.54**	8.20	8.32	8.13	8.26	8.14	8.36	8.42
44	5220	MIMO Ant.0+1(0)	5.39	5.14	5.29	4.85	5.11	5.14	5.17	5.13
		MIMO Ant.0+1(1)	5.34	5.26	5.09	5.53	5.15	5.34	5.28	5.20
		MIMO Ant.0+1	8.38	8.21	8.20	8.21	8.14	8.25	8.24	8.18
48	5240	MIMO Ant.0+1(0)	5.06	4.75	5.03	4.83	5.15	5.20	5.11	5.18
		MIMO Ant.0+1(1)	5.10	4.99	4.97	5.50	5.07	5.12	5.17	5.09
		MIMO Ant.0+1	8.09	7.89	8.01	8.19	8.12	8.17	8.15	8.15

Ch.	Freq. (MHz)	Ant. Chain	WLAN 5.2GHz 802.11n HT-40 RF Power (dBm)							
			OFDM Data Rate							
			13.5 Mbps	27 Mbps	40.5 Mbps	54 Mbps	81 Mbps	108 Mbps	121.5 Mbps	135 Mbps
38	5190	SISO Ant.0	5.35	5.08	5.17	5.23	5.14	5.14	5.25	5.31
		SISO Ant.1	5.11	4.66	4.69	4.75	4.87	5.04	5.06	5.02
46	5230	SISO Ant.0	5.25	4.60	4.98	4.99	5.07	5.08	4.98	5.03
		SISO Ant.1	4.10	4.23	4.27	4.31	4.44	4.48	4.42	4.38
Ch.	**Freq. (MHz)**	**Ant. Chain**	**27 Mbps**	**54 Mbps**	**81 Mbps**	**108 Mbps**	**162 Mbps**	**216 Mbps**	**243 Mbps**	**270 Mbps**
38	5190	MIMO Ant.0+1(0)	5.30	5.07	5.15	5.29	5.62	5.12	5.08	5.08
		MIMO Ant.0+1(1)	5.48	5.59	5.53	5.83	5.46	5.42	5.60	5.55
		MIMO Ant.0+1	8.41	8.35	8.35	8.58	8.55	8.28	8.36	8.33
46	5230	MIMO Ant.0+1(0)	5.64	5.06	5.14	5.36	5.58	5.16	5.22	5.32
		MIMO Ant.0+1(1)	6.04	5.72	5.58	5.69	5.61	5.59	5.81	5.72
		MIMO Ant.0+1	**8.86**	8.41	8.38	8.54	8.61	8.39	8.54	8.54

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

2.3 Test Mode

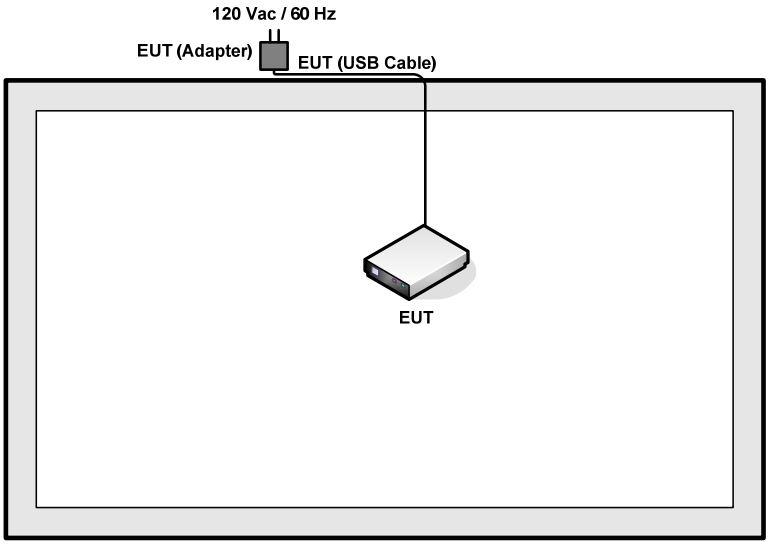
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	Mode	Data rate	Test Channel
Conducted TCs	26dB BW Power Spectral Density	802.11a	6 Mbps	L/M/H
		802.11n HT20	13 Mbps	L/M/H
		802.11n HT40	27 Mbps	L/M/H
	Output Power	802.11a	6 Mbps	L/M/H
		802.11n HT20	13 Mbps	L/M/H
		802.11n HT40	27 Mbps	L/M/H
	Peak Excursion	802.11a	6 Mbps	L/M/H
		802.11n HT20	13 Mbps	L/M/H
		802.11n HT40	27 Mbps	L/M/H
	Frequency Stability	802.11a	6 Mbps	L/M/H
		802.11n HT20	13 Mbps	L/M/H
		802.11n HT40	27 Mbps	L/M/H
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	L/H
		802.11n HT20	13 Mbps	L/H
		802.11n HT40	27 Mbps	L/H
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H
		802.11n HT20	13 Mbps	L/M/H
		802.11n HT40	27 Mbps	L/M/H
AC Conducted Emission	Mode 1 : WCDMA Band V Idle + WLAN 5.2GHz Link + USB Cable (Charging from Adapter)			

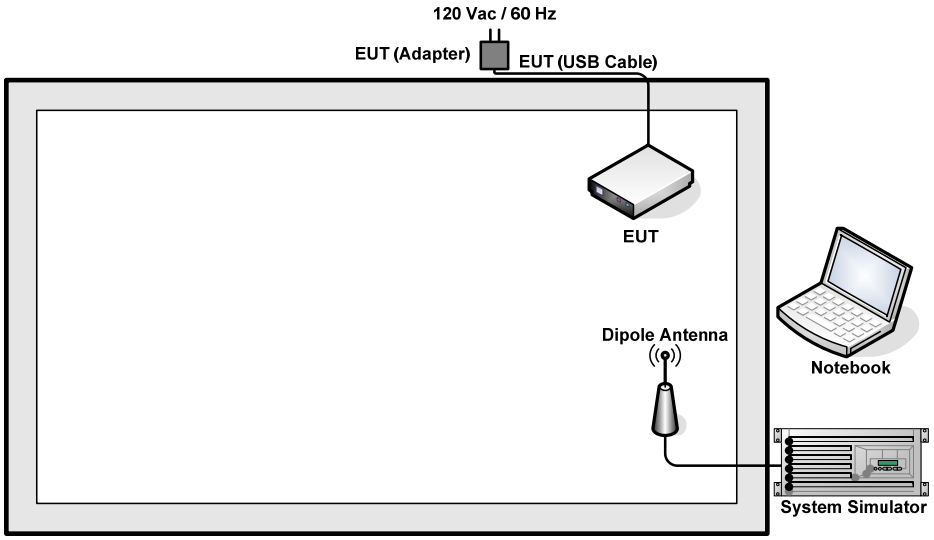
Ch. #		Band I : 5150-5250 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	36	36	38
M	Middle	44	44	-
H	High	48	48	46

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	Acer	Trave Imate 4320	QDS-BRCM1028	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m

2.6 Description of RF Function Operation Test Setup

For WLAN function, programmed RF utility, “ADB” installed in the notebook make the EUT provides 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.

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 5.6 dB and 10dB attenuator.

Example :
Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 5.6+ 10 = 15.6 (dB)

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.

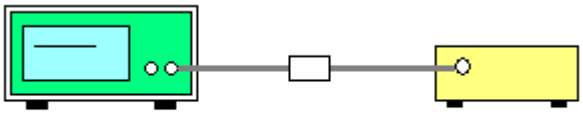
3.1.2 Measuring Instruments

See list of measuring instruments 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



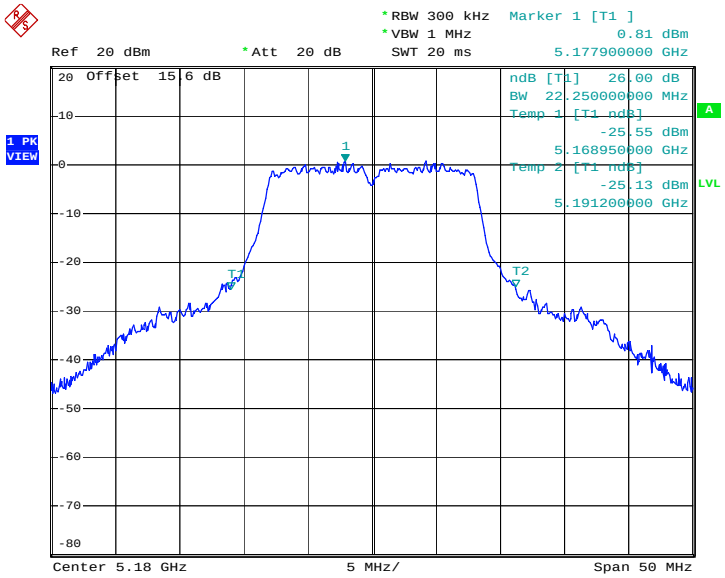
3.1.5 Test Result of 26dB Bandwidth

Test Mode :	802.11a	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11a 26dB Bandwidth (MHz)	Pass/Fail
		Ant.1	
36	5180	22.250	N/A
44	5220	22.900	N/A
48	5240	22.300	N/A

802.11a – Ant.1

26 dB Bandwidth Plot on Channel 36



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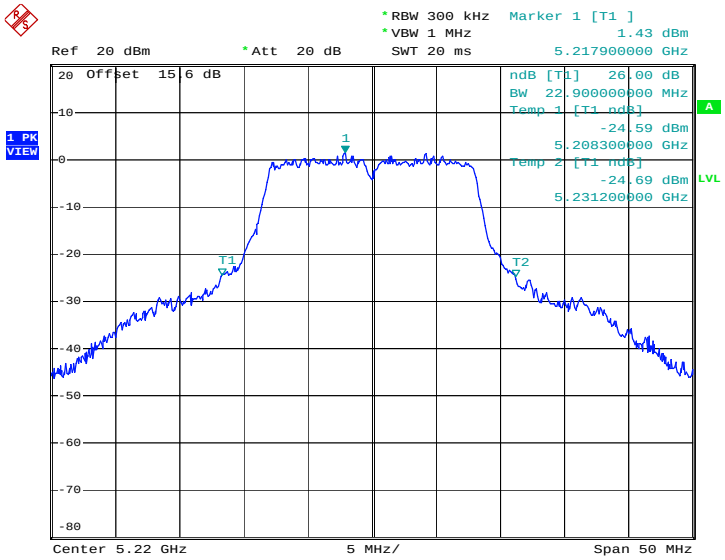
802.11a – Ant.1

26 dB Bandwidth Plot on Channel 44



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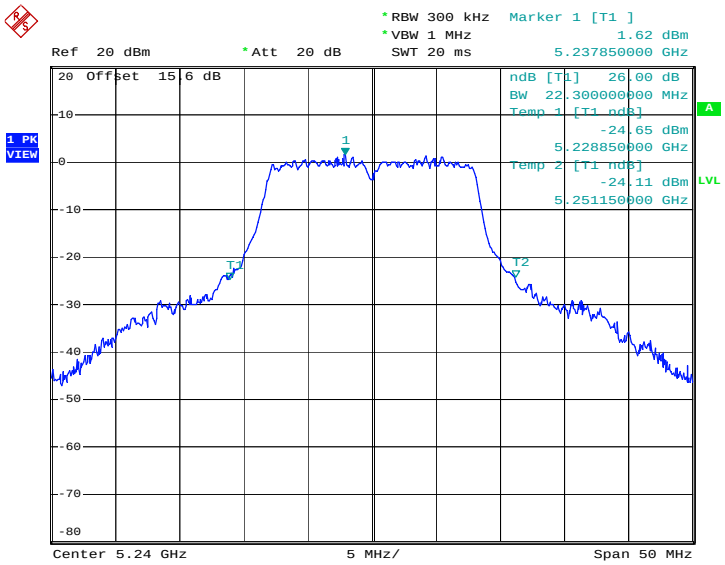
802.11a – Ant.1

26 dB Bandwidth Plot on Channel 48



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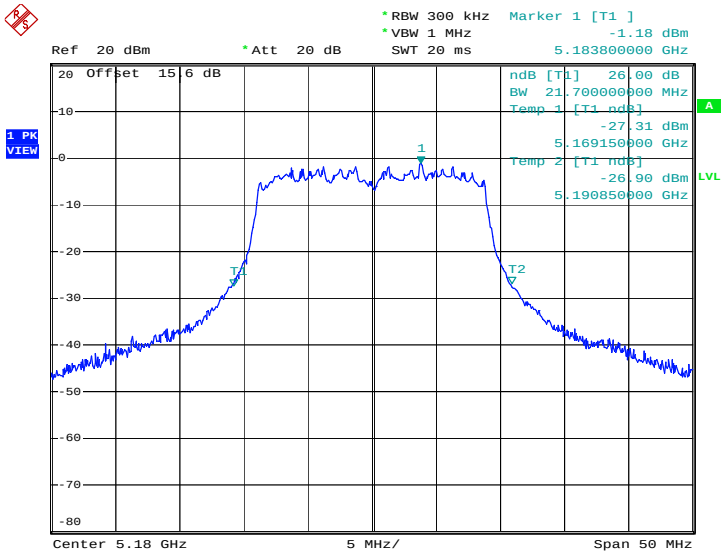
Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11n HT20 26dB Bandwidth (MHz)		Pass/Fail
		MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	
36	5180	21.700	21.500	N/A
44	5220	21.600	21.450	N/A
48	5240	21.550	21.650	N/A

802.11n HT20 – MIMO Ant.0+1(0)

26 dB Bandwidth Plot on Channel 36



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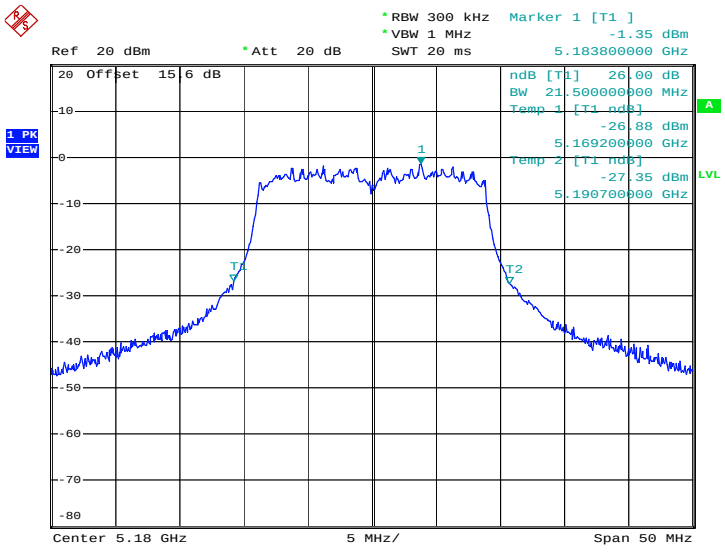
802.11n HT20 – MIMO Ant.0+1(1)

26 dB Bandwidth Plot on Channel 36



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802.11n HT20 – MIMO Ant.0+1(0)

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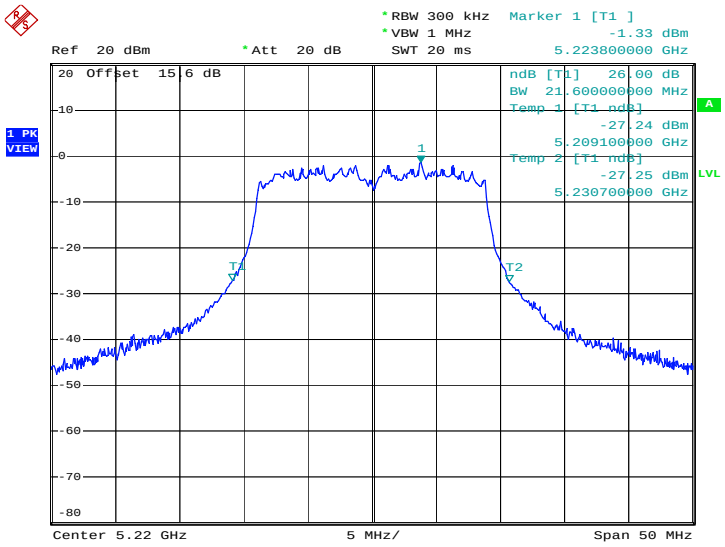

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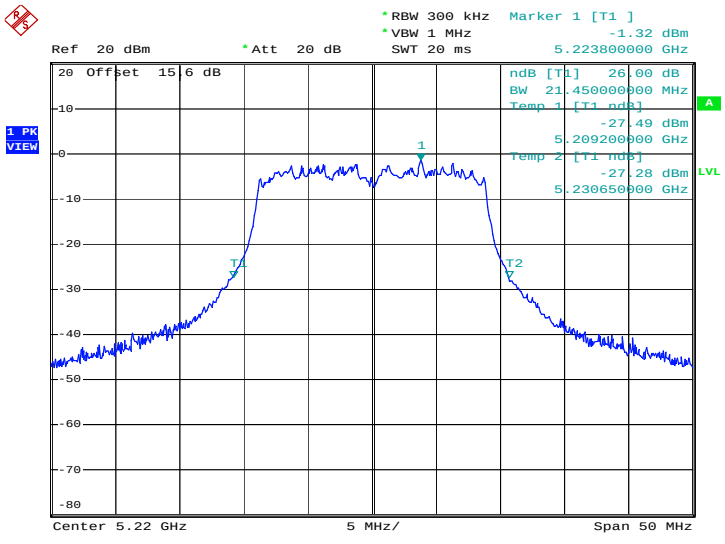
802.11n HT20 – MIMO Ant.0+1(1)

26 dB Bandwidth Plot on Channel 44



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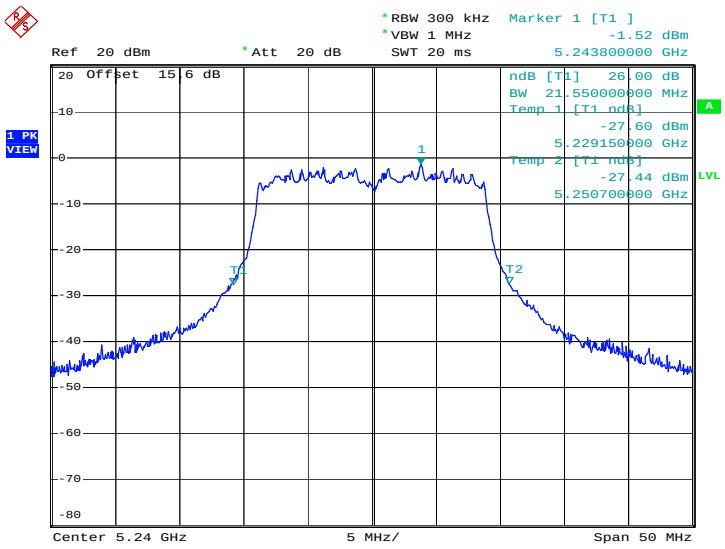
802.11n HT20 – MIMO Ant.0+1(0)

26 dB Bandwidth Plot on Channel 48



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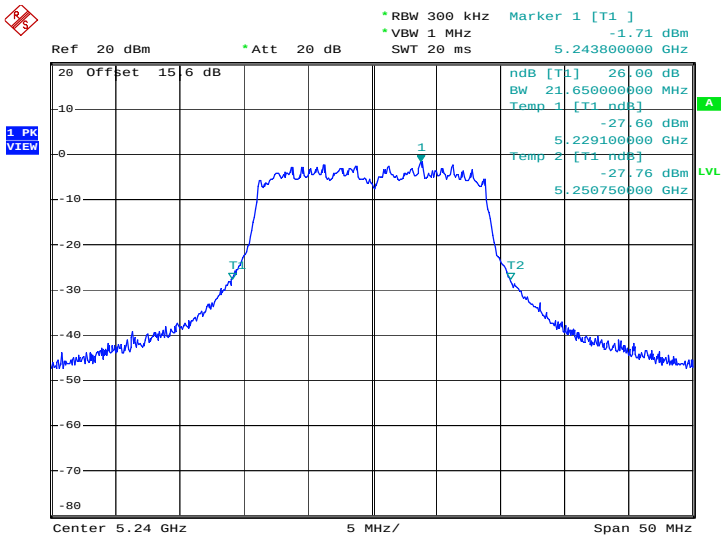
802.11n HT20 – MIMO Ant.0+1(1)

26 dB Bandwidth Plot on Channel 48



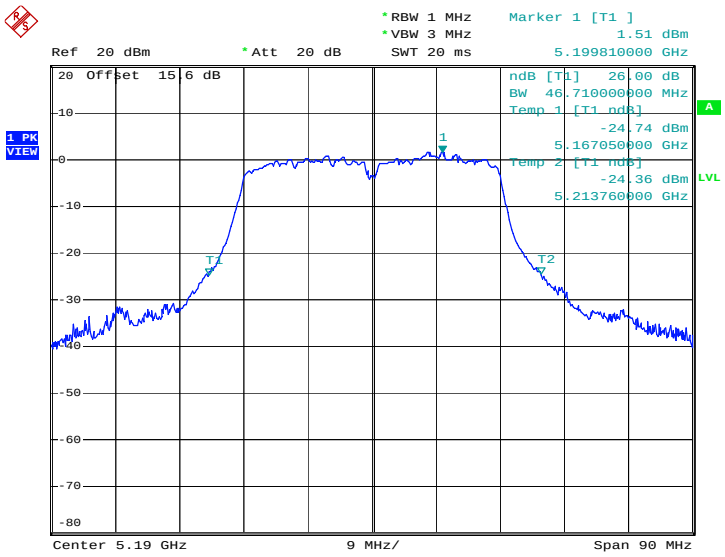
Date: 29.MAY.2013 20:15:47

Test Mode :	802.11n HT40	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11n HT40 26dB Bandwidth (MHz)		Pass/Fail
		MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	
38	5190	46.710	46.080	N/A
46	5230	46.350	46.080	N/A

802.11n HT40 – MIMO Ant.0+1(0)

26 dB Bandwidth Plot on Channel 38



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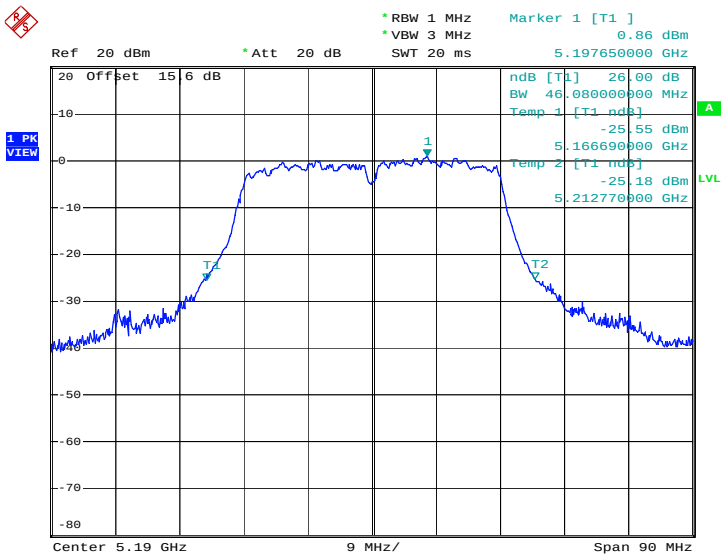
802.11n HT40 – MIMO Ant.0+1(1)

26 dB Bandwidth Plot on Channel 38



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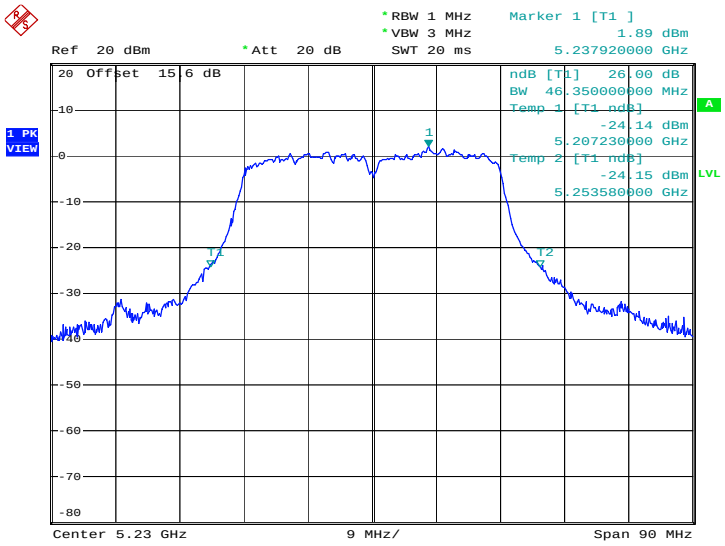
802.11n HT40 – MIMO Ant.0+1(0)

26 dB Bandwidth Plot on Channel 46



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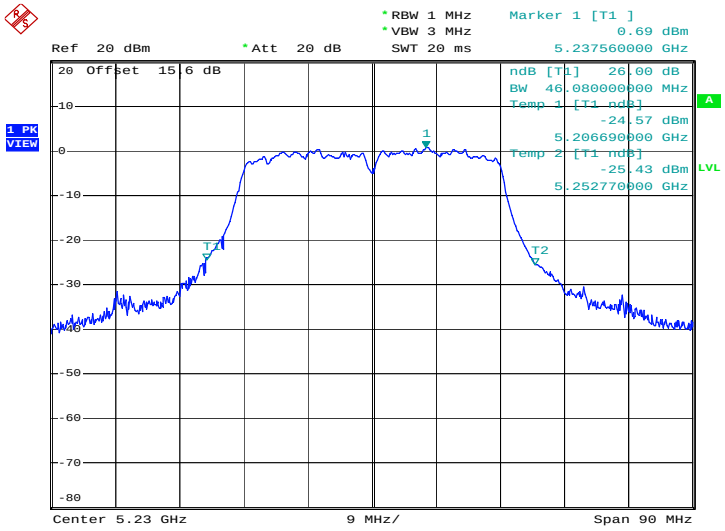
802.11n HT40 – MIMO Ant.0+1(1)

26 dB Bandwidth Plot on Channel 46



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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 dBm + 10log B, where B is the 26 dB emissions bandwidth in 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

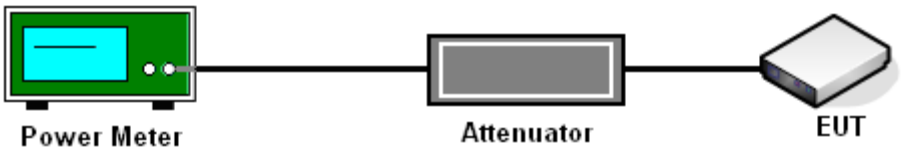
3.2.3 Test Procedures

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 Mode :	802.11a	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%
Duty Cycle :	98.3% for Ant.1	Duty Factor :	0.07dB for Ant.1

Channel	Frequency (MHz)	802.11a Output Power (dBm)		Max. Limits (dBm)	Pass/Fail
		Measured	Final		
		Ant.1	Ant.1		
36	5180	8.29	8.36	17	Pass
44	5220	8.44	8.51	17	Pass
48	5240	7.98	8.05	17	Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).

Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%
Duty Cycle :	98.17% for SISO Ant.0 97.96% for SISO Ant.1 96.14% for MIMO Ant.0+1(0) 97.24% for MIMO Ant.0+1(1)	Duty Factor :	0.08dB for SISO Ant.0 0.09dB for SISO Ant.1 0.17dB for MIMO Ant.0+1(0) 0.12dB for MIMO Ant.0+1(1)

Channel	Frequency (MHz)	802.11n HT20 Output Power (dBm)									Max. Limits (dBm)	Pass /Fail
		Measured				Final						
		SISO Ant.0	SISO Ant.1	MIMO Ant.0+1 (0)	MIMO Ant.0+1 (1)	SISO Ant.0	SISO Ant.1	MIMO Ant.0+1 (0)	MIMO Ant.0+1 (1)	MIMO Ant.0+1		
36	5180	5.35	5.97	5.10	5.66	5.43	6.06	5.27	5.78	8.54	17	Pass
44	5220	4.95	5.71	5.22	5.22	5.03	5.80	5.39	5.34	8.38	17	Pass
48	5240	4.89	5.78	4.89	4.98	4.97	5.87	5.06	5.10	8.09	17	Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant.0+1 is a calculated result from sum of the power MIMO Ant.0+1(0) and MIMO Ant.0+1(1).
3. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).

Test Mode :	802.11n HT40	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%
Duty Cycle :	94.95% for SISO Ant.0 95.73% for SISO Ant.1 93.66% for MIMO Ant.0+1(0) 91.94% for MIMO Ant.0+1(1)	Duty Factor :	0.23dB for SISO Ant.0 0.19dB for SISO Ant.1 0.28dB for MIMO Ant.0+1(0) 0.36dB for MIMO Ant.0+1(1)

Channel	Frequency (MHz)	802.11n HT40 Output Power (dBm)									Max. Limits (dBm)	Pass /Fail
		Measured				Final						
		SISO Ant.0	SISO Ant.1	MIMO Ant.0+1 (0)	MIMO Ant.0+1 (1)	SISO Ant.0	SISO Ant.1	MIMO Ant.0+1 (0)	MIMO Ant.0+1 (1)	MIMO Ant.0+1		
38	5190	5.12	4.92	5.02	5.12	5.35	5.11	5.30	5.48	8.41	17	Pass
46	5230	5.02	3.91	5.36	5.68	5.25	4.10	5.64	6.04	8.86	17	Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant.0+1 is a calculated result from sum of the power MIMO Ant.0+1(0) and MIMO Ant.0+1(1).
3. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5150-5250 MHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

See list of measuring instruments 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).

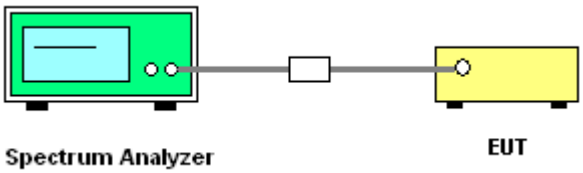
1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - Sweep 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 v01r02.

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

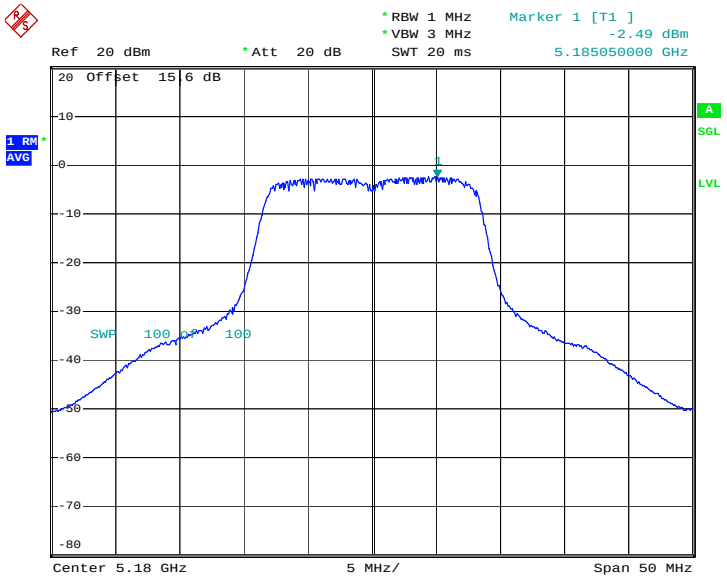
Test Mode :	802.11a	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%
Duty Cycle :	98.3% for Ant.1	Duty Factor :	0.07dB for Ant.1

Channel	Frequency (MHz)	802.11a PSD (dBm)		Max. Limits (dBm)	Pass/Fail
		Measured	Final		
		Ant.1	Ant.1		
36	5180	-2.49	-2.42	4	Pass
44	5220	-2.16	-2.09	4	Pass
48	5240	-2.01	-1.94	4	Pass

Note: Result of Final PSD equals to Measured PSD adds the duty factor.

802.11a - Ant.1

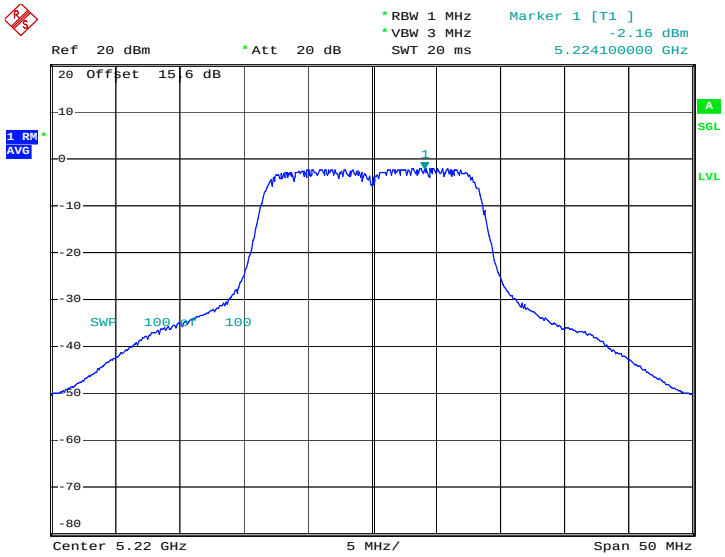
PSD Plot on Channel 36



Date: 29.MAY.2013 18:48:04

802.11a - Ant.1

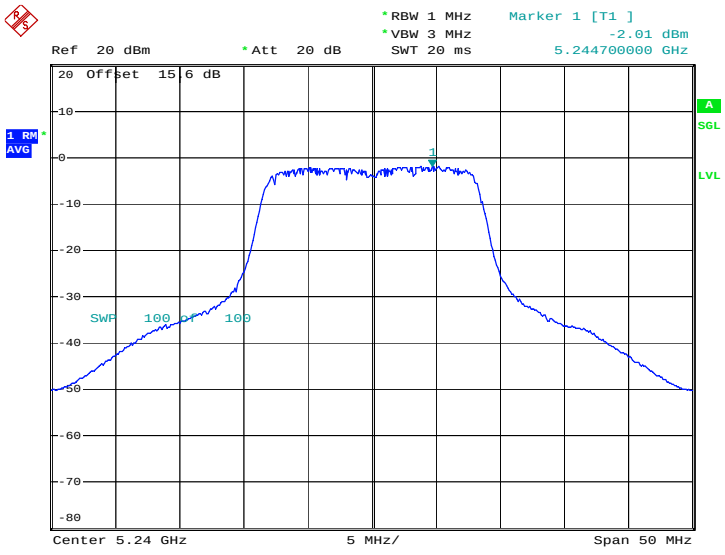
PSD Plot on Channel 44



Date: 29.MAY.2013 18:58:34

802.11a - Ant.1

PSD Plot on Channel 48



Date: 29.MAY.2013 19:01:47

Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%
Duty Cycle:	96.14% for MIMO Ant.0+1(0) 97.24% for MIMO Ant.0+1(1)	Duty Factor:	0.17dB for MIMO Ant.0+1(0) 0.12dB for MIMO Ant.0+1(1)

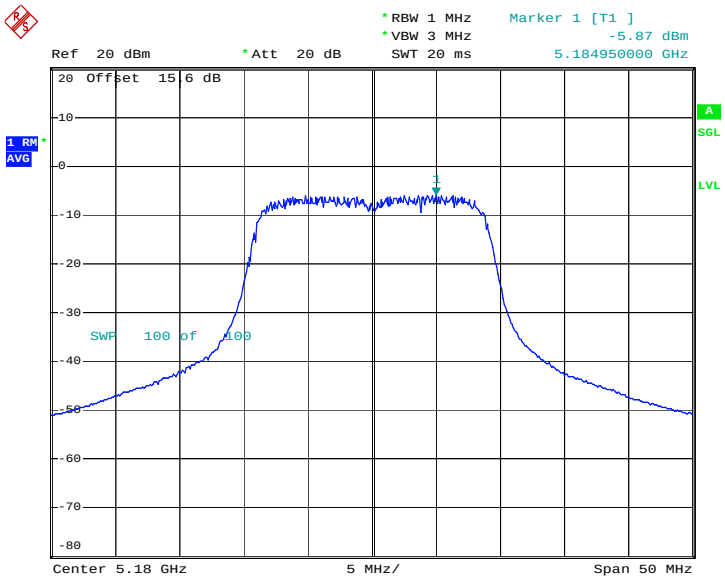
Channel	Frequency (MHz)	802.11n HT20 PSD (dBm)			Max. Limits (dBm)	Pass /Fail
		Measured		Final		
		MIMO Ant.0+1(0)	MIMO Ant.0+1 (1)	MIMO Ant.0+1		
36	5180	-5.87	-6.12	-2.86	4	Pass
44	5220	-6.42	-6.46	-3.41	4	Pass
48	5240	-6.41	-6.59	-3.40	4	Pass

Note:

1. Result of Final PSD equals to Measured PSD adds the duty factor.
2. Final MIMO Ant.0+1 is the bin-by-bin combination result from MIMO Ant.0+1(0) and MIMO Ant.0+1(1).

802.11n HT20 – MIMO Ant.0+1(0)

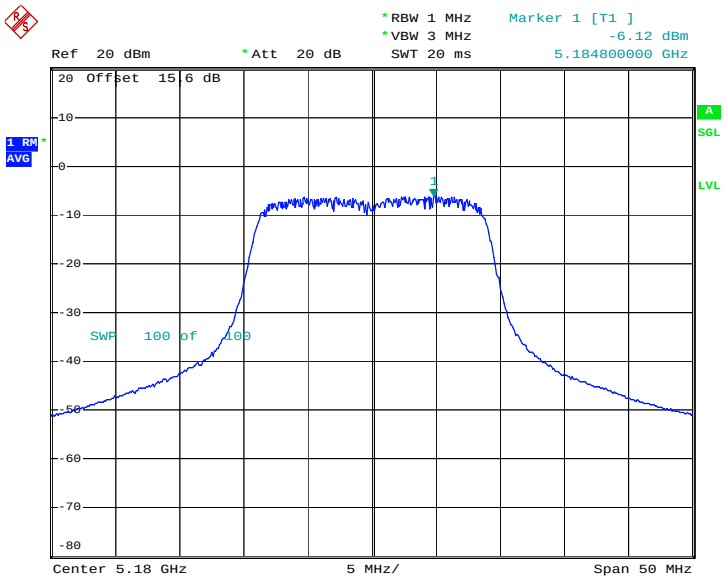
PSD Plot on Channel 36



Date: 29.MAY.2013 19:11:48

802.11n HT20 – MIMO Ant.0+1(1)

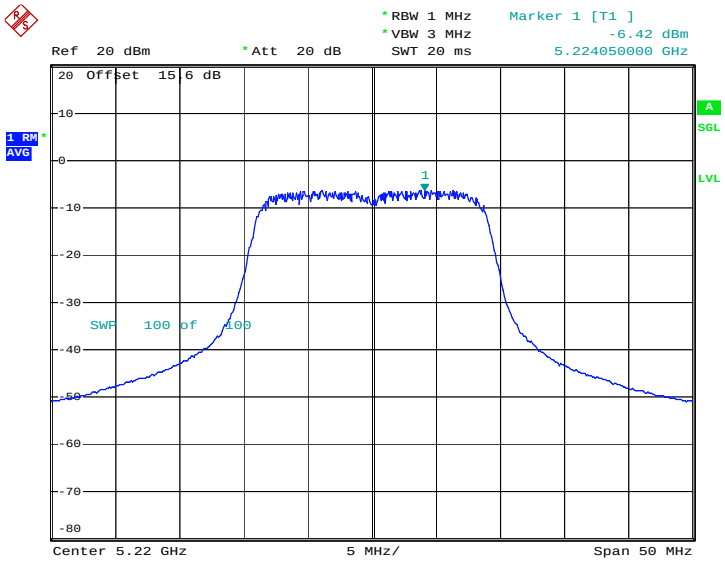
PSD Plot on Channel 36



Date: 29.MAY.2013 20:06:52

802.11n HT20 – MIMO Ant.0+1(0)

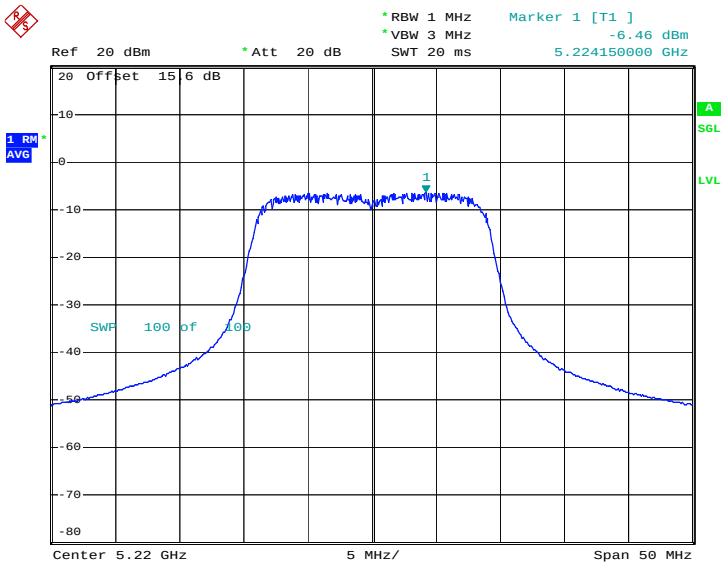
PSD Plot on Channel 44



Date: 29.MAY.2013 19:21:18

802.11n HT20 – MIMO Ant.0+1(1)

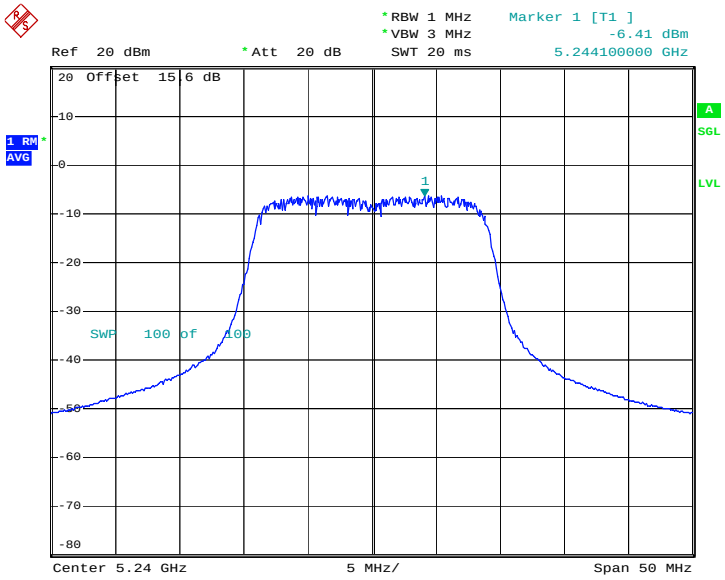
PSD Plot on Channel 44



Date: 29.MAY.2013 20:11:18

802.11n HT20 – MIMO Ant.0+1(0)

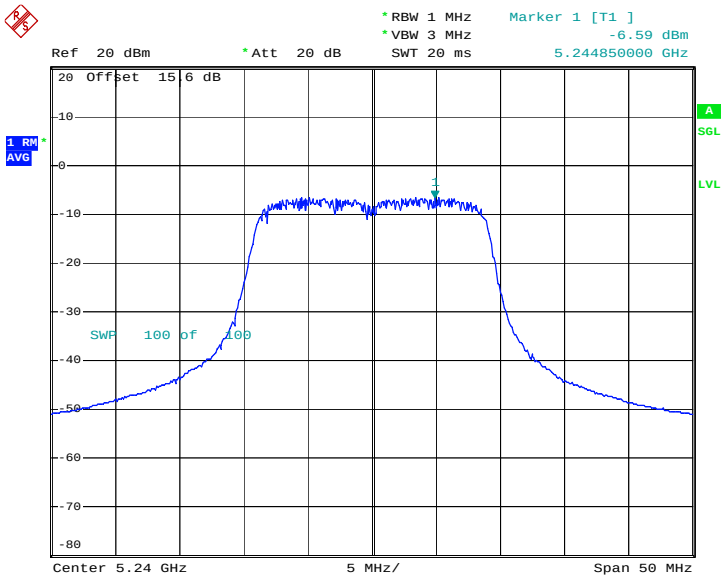
PSD Plot on Channel 48



Date: 29.MAY.2013 19:26:29

802.11n HT20 – MIMO Ant.0+1(1)

PSD Plot on Channel 48



Date: 29.MAY.2013 20:16:05

Test Mode :	802.11n HT40	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%
Duty Cycle:	94.95% for SISO Ant.0 95.73% for SISO Ant.1 93.66% for MIMO Ant.0+1(0) 91.94% for MIMO Ant.0+1(1)	Duty Factor:	0.23dB for SISO Ant.0 0.19dB for SISO Ant.1 0.28dB for MIMO Ant.0+1(0) 0.36dB for MIMO Ant.0+1(1)

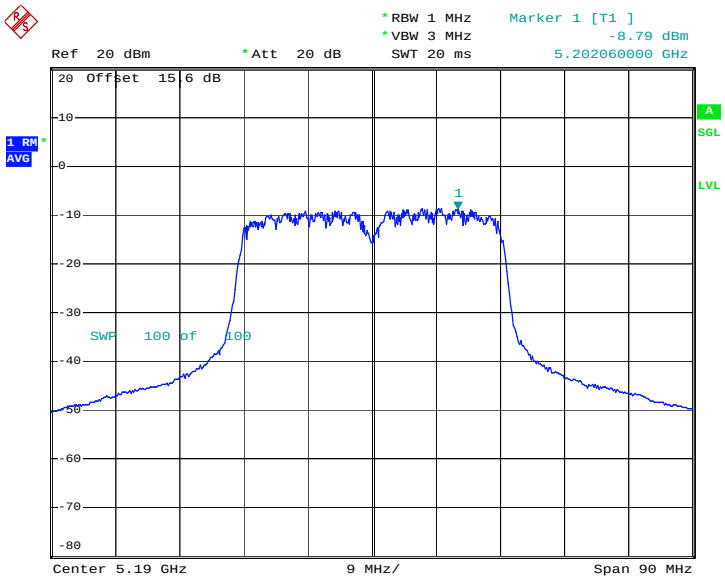
Channel	Frequency (MHz)	802.11n HT40 PSD (dBm)			Max. Limits (dBm)	Pass /Fail
		Measured		Final		
		MIMO Ant.0+1 (0)	MIMO Ant.0+1 (1)	MIMO Ant.0+1		
38	5190	-8.79	-9.13	-5.78	4	Pass
46	5230	-8.26	-9.15	-5.25	4	Pass

Note:

1. Result of Final PSD equals to Measured PSD adds the duty factor if less than 98%.
2. Final MIMO Ant.0+1 is the bin-by-bin combination result from MIMO Ant.0+1(0) and MIMO Ant.0+1(1).

802.11n HT40 – MIMO Ant.0+1(0)

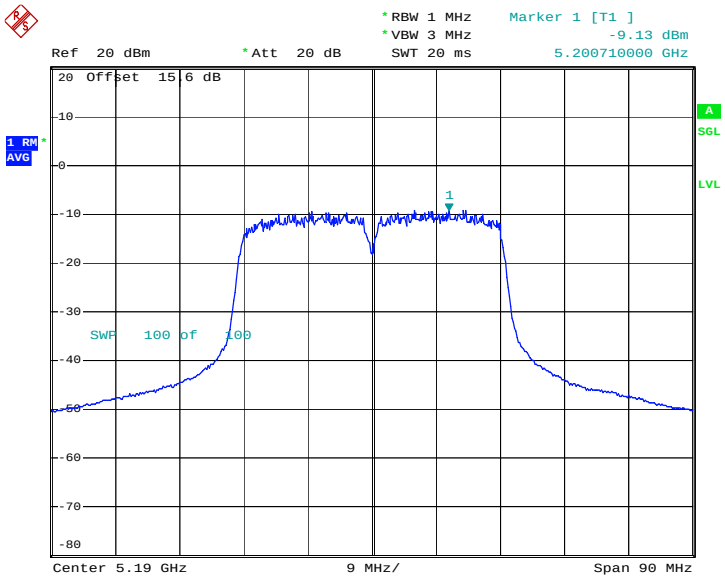
PSD Plot on Channel 38



Date: 29.MAY.2013 20:26:01

802.11n HT40 – MIMO Ant.0+1(1)

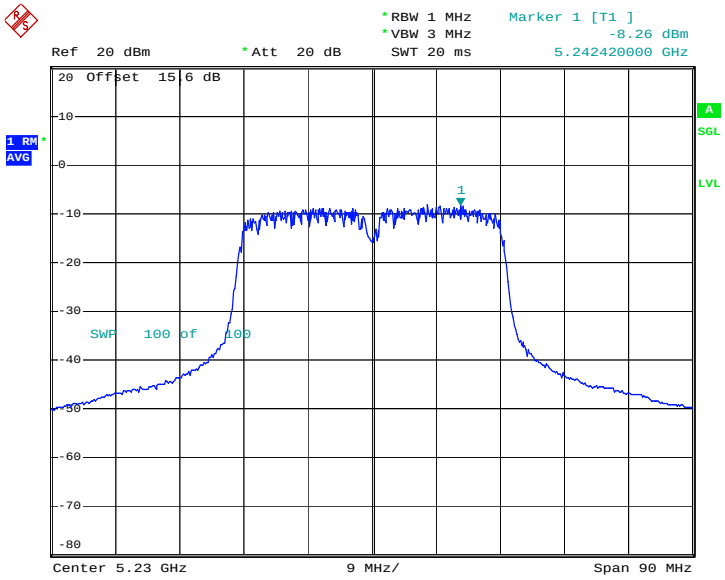
PSD Plot on Channel 38



Date: 29.MAY.2013 20:40:23

802.11n HT40 – MIMO Ant.0+1(0)

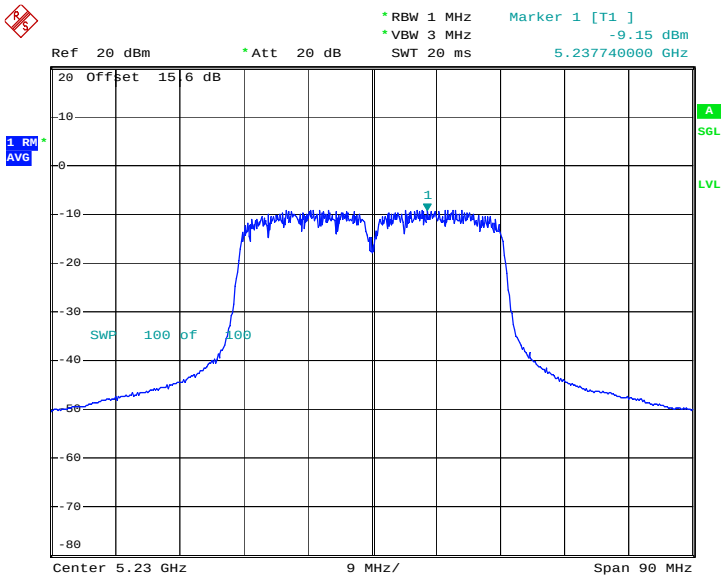
PSD Plot on Channel 46



Date: 29.MAY.2013 20:30:18

802.11n HT40 – MIMO Ant.0+1(1)

PSD Plot on Channel 46



Date: 29.MAY.2013 22:14:04

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

See list of measuring instruments of this test report.

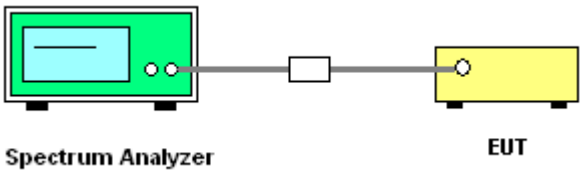
3.4.3 Test Procedures

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 ≥ 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



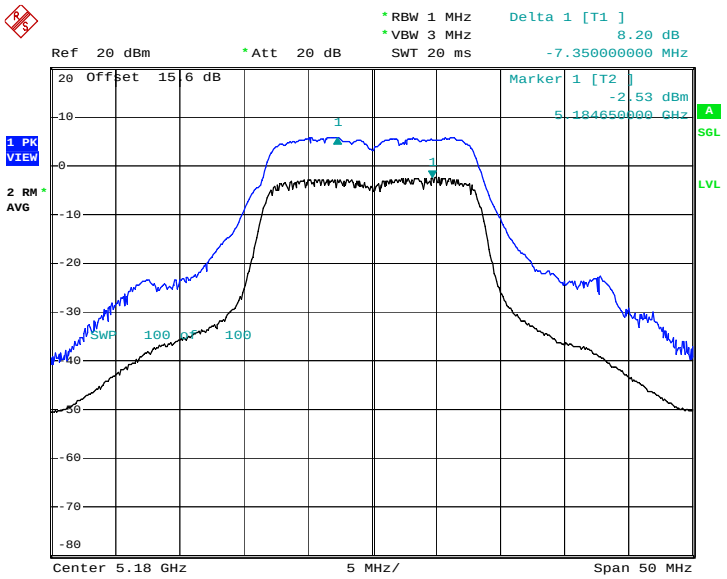
3.4.5 Test Result of Peak Excursion Ratio

Test Mode :	802.11a	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11a Peak Excursion Ratio (dB)	Limit
		Ant.1	
36	5180	8.20	<13dB
44	5220	8.20	
48	5240	8.67	

802.11a – Ant.1

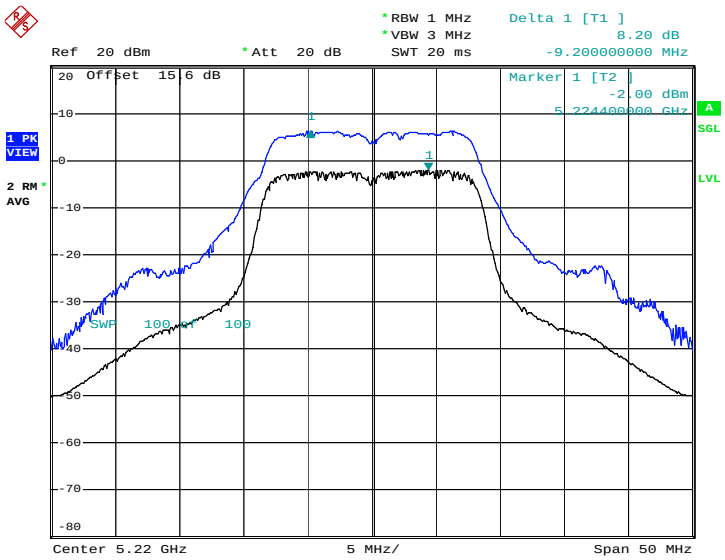
Peak Excursion Ratio Plot on Channel 36



Date: 29.MAY.2013 18:48:23

802.11a – Ant.1

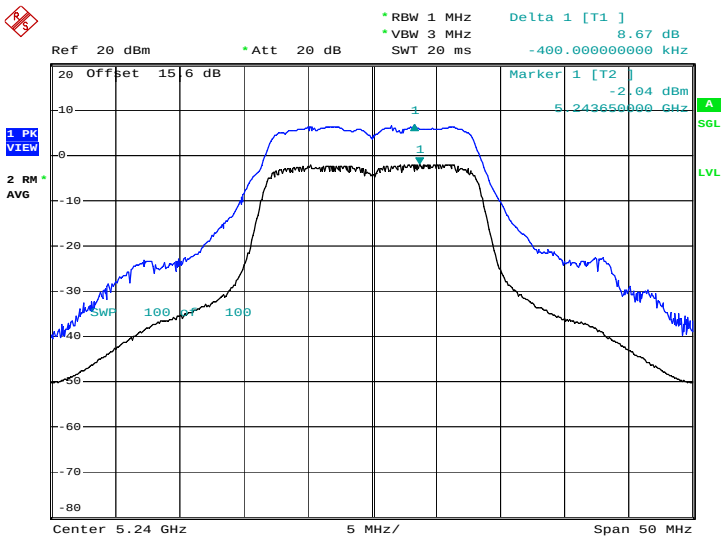
Peak Excursion Ratio Plot on Channel 44



Date: 29.MAY.2013 18:58:54

802.11a – Ant.1

Peak Excursion Ratio Plot on Channel 48



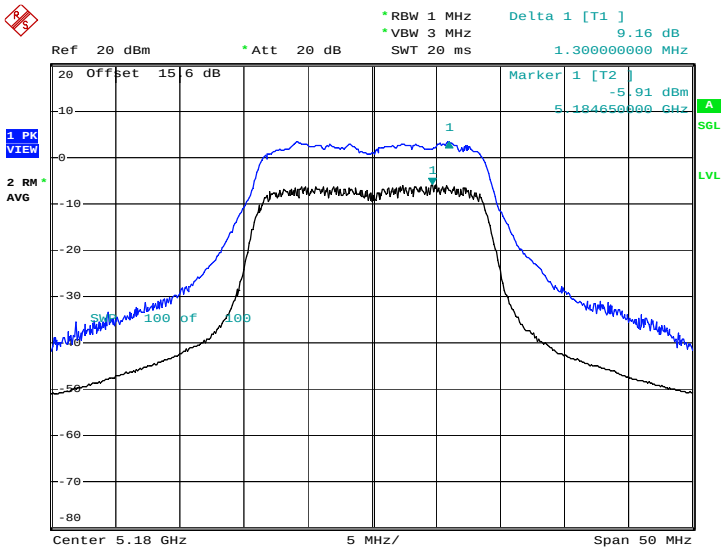
Date: 29.MAY.2013 19:02:06

Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11n HT20 Peak Excursion Ratio (dB)		Limit
		MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	
36	5180	9.16	9.42	<13dB
44	5220	9.27	9.33	
48	5240	9.53	9.89	

802.11n HT20 - MIMO Ant.0+1(0)

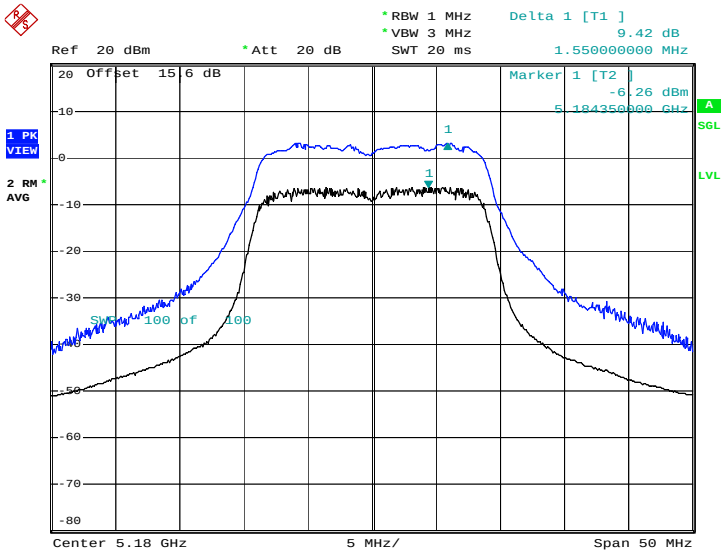
Peak Excursion Ratio Plot on Channel 36



Date: 29.MAY.2013 19:12:08

802.11n HT20 - MIMO Ant.0+1(1)

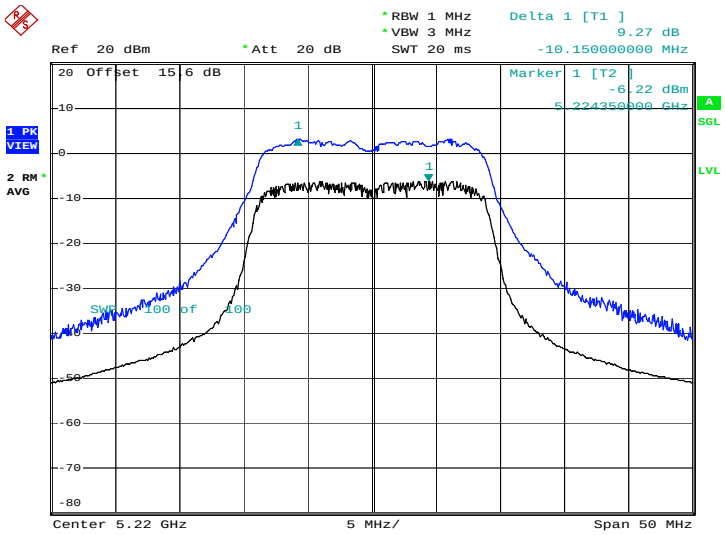
Peak Excursion Ratio Plot on Channel 36



Date: 29.MAY.2013 20:07:11

802.11n HT20 - MIMO Ant.0+1(0)

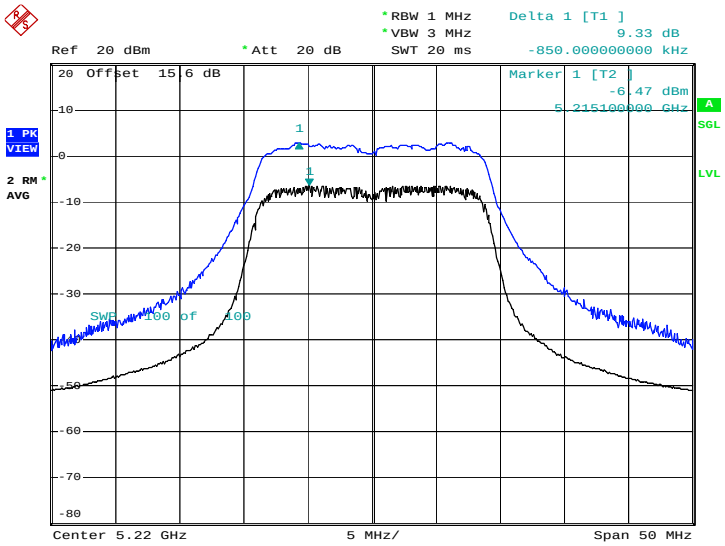
Peak Excursion Ratio Plot on Channel 44



Date: 29.MAY.2013 19:21:37

802.11n HT20 - MIMO Ant.0+1(1)

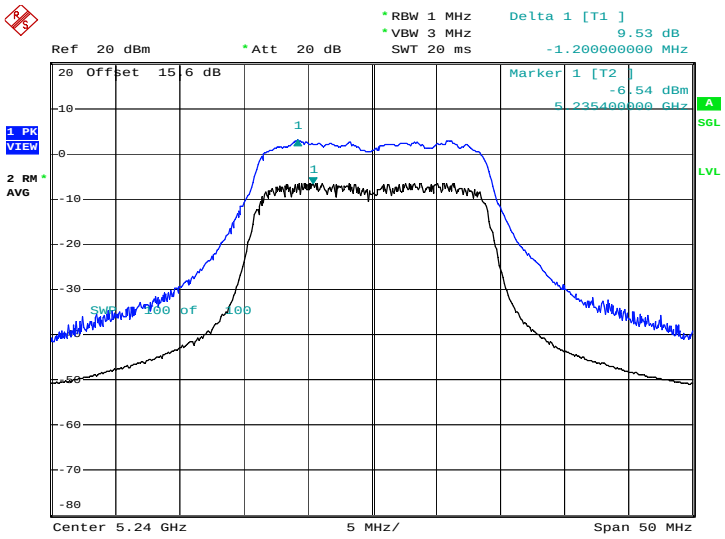
Peak Excursion Ratio Plot on Channel 44



Date: 29.MAY.2013 20:11:38

802.11n HT20 - MIMO Ant.0+1(0)

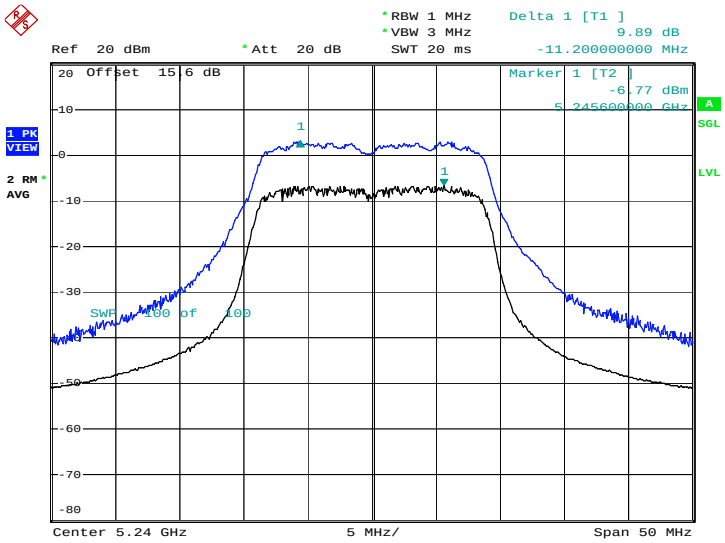
Peak Excursion Ratio Plot on Channel 48



Date: 29.MAY.2013 19:26:49

802.11n HT20 - MIMO Ant.0+1(1)

Peak Excursion Ratio Plot on Channel 48



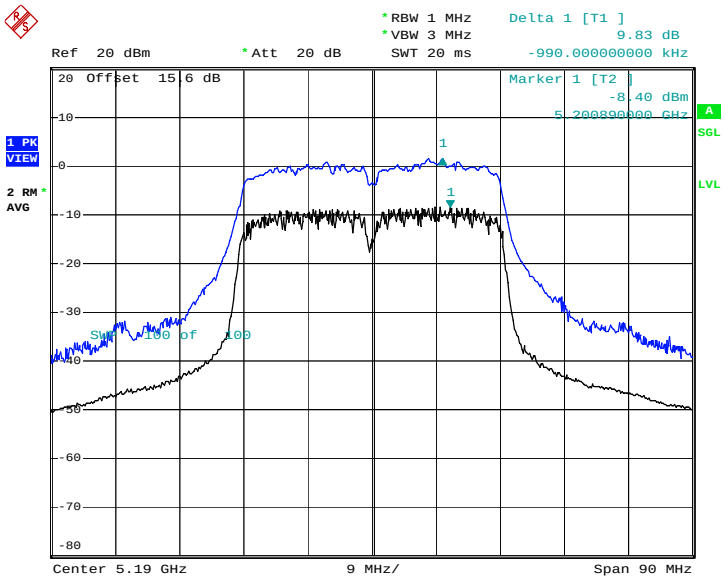
Date: 29.MAY.2013 20:16:24

Test Mode :	802.11n HT40	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11n HT40 Peak Excursion Ratio (dB)		Limit
		MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	
38	5190	9.83	9.84	<13dB
46	5230	9.94	9.63	

802.11n HT40 - MIMO Ant.0+1(0)

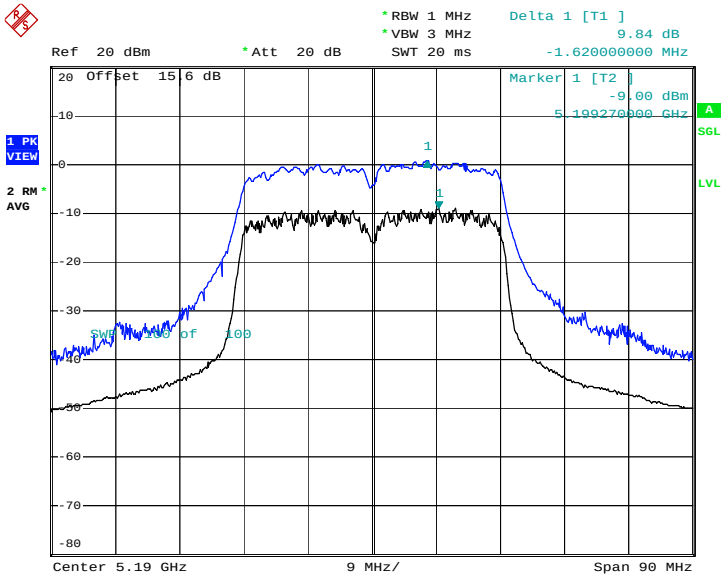
Peak Excursion Ratio Plot on Channel 38



Date: 29.MAY.2013 20:26:21

802.11n HT40 - MIMO Ant.0+1(1)

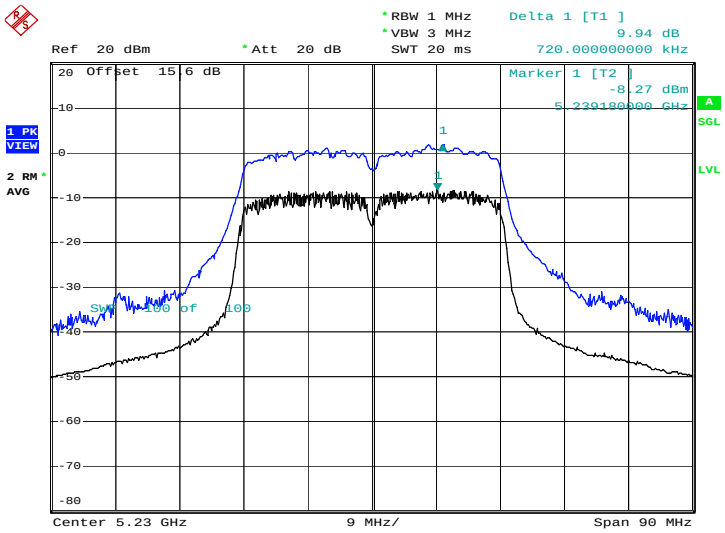
Peak Excursion Ratio Plot on Channel 38



Date: 29.MAY.2013 20:40:43

802.11n HT40 - MIMO Ant.0+1(0)

Peak Excursion Ratio Plot on Channel 46



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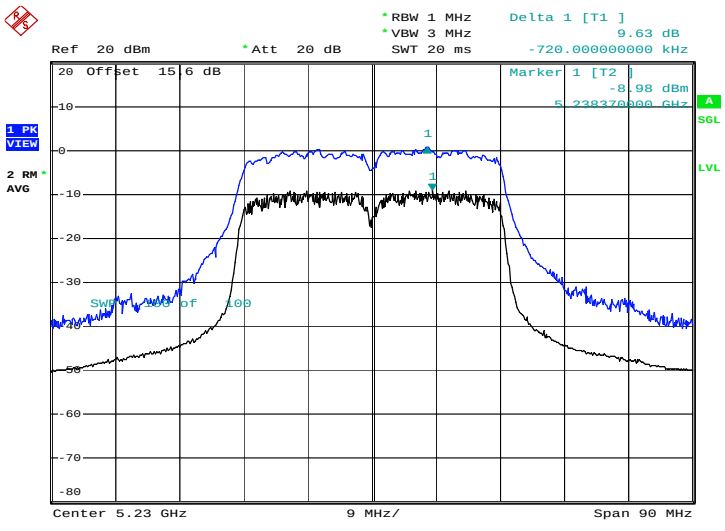
802.11n HT40 - MIMO Ant.0+1(1)

Peak Excursion Ratio Plot on Channel 46



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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 Part15.205.

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 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 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

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.10-2009 test site requirement and 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 ≥ 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 ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle (%)	T(ms)	1/T(KHz)	VBW Setting
SISO Ant.1	802.11a	98.30	-	-	10 Hz
MIMO Ant.0+1	802.11n HT20	97.24	0.99	1.01	3KHz
MIMO Ant.0+1	802.11n HT40	93.66	0.50	1.99	3KHz

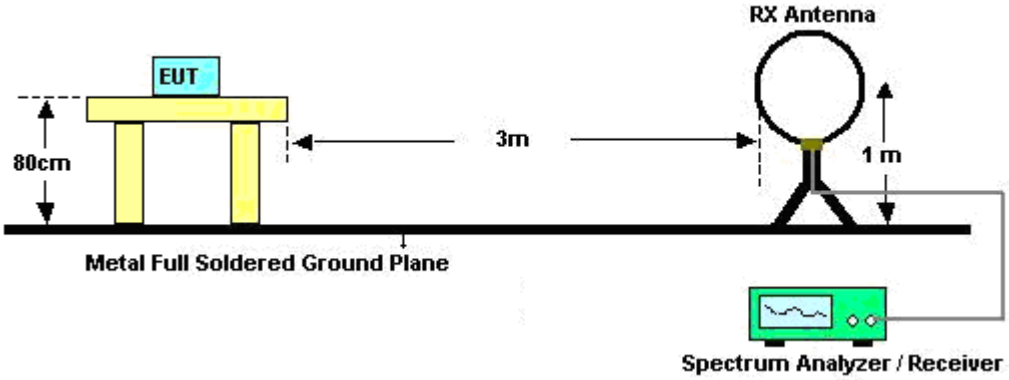
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters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

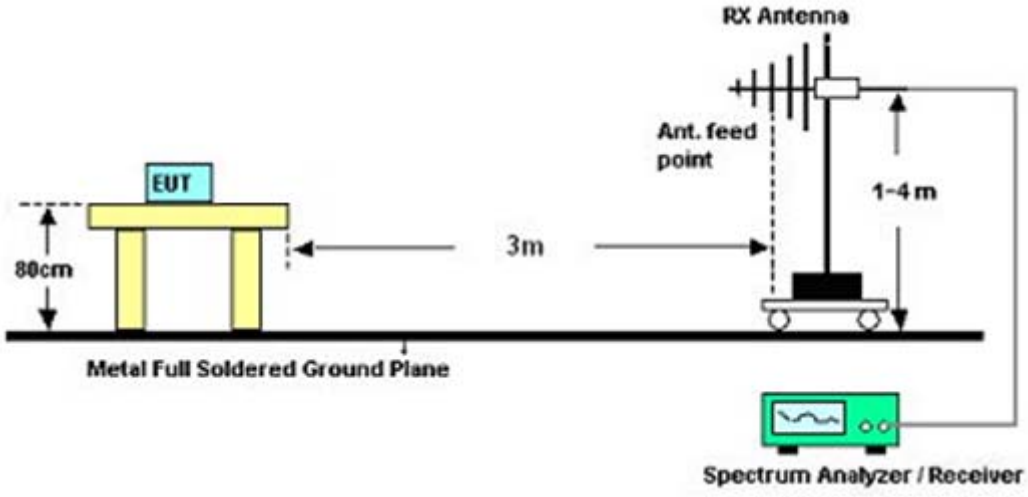
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level 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

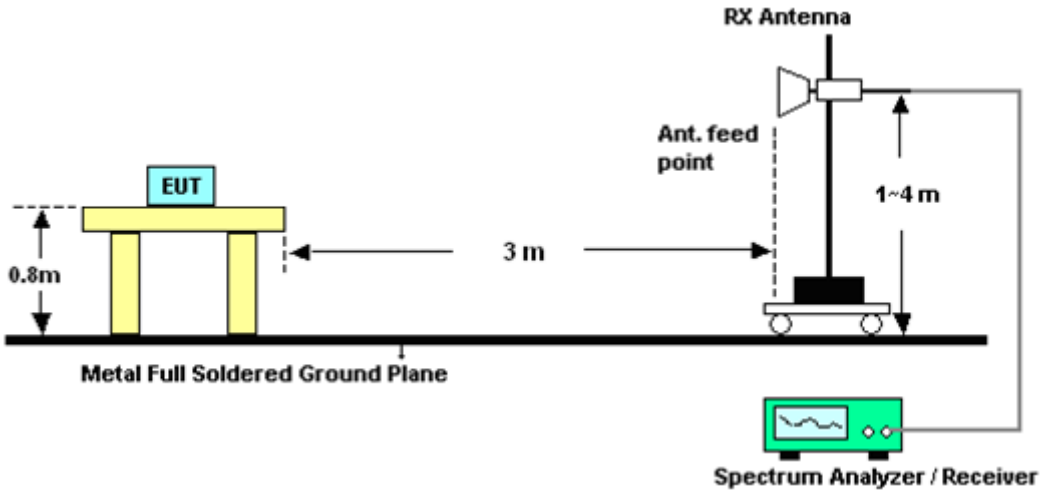
For radiated emissions below 30MHz



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

Test Mode :	802.11a – Ant.1	Temperature :	23~24°C
Test Channel :	36	Relative Humidity :	43~44%
Test Engineer :	Stone Gu		

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
4612.2	52.59	-21.41	74	44.93	35.13	4.13	31.6	140	55	Peak
5150	38.35	-15.65	54	30.13	35.25	4.38	31.41	120	354	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5150	53.93	-20.07	74	45.71	35.25	4.38	31.41	142	288	Peak
5150	38.63	-15.37	54	30.41	35.25	4.38	31.41	141	287	Average

Test Mode :	802.11a – Ant.1	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	43~44%
Test Engineer :	Stone Gu		

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
5388.06	55.24	-18.76	74	46.62	35.34	4.49	31.21	110	52	Peak
5451.09	41.29	-12.71	54	32.52	35.38	4.52	31.13	120	63	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
5409.07	54.49	-19.51	74	45.83	35.35	4.5	31.19	120	350	Peak
5440.09	41.7	-12.3	54	32.97	35.37	4.51	31.15	120	350	Average

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	36	Relative Humidity :	43~44%
Test Engineer :	Stone Gu		

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
4899.3	51.95	-22.05	74	44.01	35.19	4.27	31.52	138	66	Peak
4878.84	39.71	-14.29	54	31.79	35.18	4.26	31.52	130	56	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
4665.66	52.38	-21.62	74	44.64	35.15	4.16	31.57	109	236	Peak
4931.64	40.02	-13.98	54	32.06	35.19	4.28	31.51	108	320	Average

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	43~44%
Test Engineer :	Stone Gu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5352.2	55.6	-18.4	74	47.04	35.32	4.48	31.24	140	120	Peak
5454.83	43.02	-10.98	54	34.25	35.38	4.52	31.13	120	56	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
5427.33	55.33	-18.67	74	46.63	35.36	4.51	31.17	115	312	Peak
5372	43.06	-10.94	54	34.48	35.33	4.48	31.23	115	200	Average

Test Mode :	802.11n HT40 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	38	Relative Humidity :	43~44%
Test Engineer :	Stone Gu		

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
4658.4	55.97	-18.03	74	48.27	35.14	4.14	31.58	100	0	Peak
5150	43.46	-10.54	54	35.24	35.25	4.38	31.41	120	320	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
5148.78	58.05	-15.95	74	49.83	35.25	4.38	31.41	120	260	Peak
5150	45.28	-8.72	54	37.06	35.25	4.38	31.41	130	250	Average

Test Mode :	802.11n HT40 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	46	Relative Humidity :	43~44%
Test Engineer :	Stone Gu		

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
5375.19	55.9	-18.1	74	47.31	35.33	4.49	31.23	125	46	Peak
5437.01	43.43	-10.57	54	34.7	35.37	4.51	31.15	125	46	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
5384.65	55.99	-18.01	74	47.37	35.34	4.49	31.21	100	125	Peak
5392.57	43.42	-10.58	54	34.8	35.34	4.49	31.21	100	125	Average

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

Note: Below 1GHz for radiated emission measurement, pre-scanned all test modes and only choose the worst case mode was recorded in the report.

Test Mode :	802.11a – Ant.1	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 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	100.66	-	-	92.39	35.26	4.39	31.38	139	56	Peak
5180	86.56	-	-	78.29	35.26	4.39	31.38	139	56	Average
10359	46.9	-27.1	74	54.6	15.5	6.61	29.81	100	25	Peak

Test Mode :	802.11a – Ant.1	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5180	104.06	-	-	95.79	35.26	4.39	31.38	141	287	Peak
5180	90.48	-	-	82.21	35.26	4.39	31.38	141	287	Average
10359	52.27	-21.73	74	59.97	15.5	6.61	29.81	100	360	Peak
10359	36.78	-17.22	54	44.48	15.5	6.61	29.81	100	360	Average

Test Mode :	802.11a – Ant.1	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 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
5220	97.96	-	-	89.64	35.27	4.41	31.36	100	231	Peak
5220	83.32	-	-	75	35.27	4.41	31.36	100	231	Average
10440	47.05	-26.95	74	54.65	15.57	6.65	29.82	100	91	Peak

Test Mode :	802.11a – Ant.1	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 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
5220	104.81	-	-	96.49	35.27	4.41	31.36	141	300	Peak
5220	91.58	-	-	83.26	35.27	4.41	31.36	141	300	Average
10440	49.22	-24.78	74	56.82	15.57	6.65	29.82	100	49	Peak

Test Mode :	802.11a – Ant.1	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 5240 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. 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
5240	100.05	-	-	91.7	35.28	4.42	31.35	111	52	Peak
5240	85.69	-	-	77.34	35.28	4.42	31.35	111	52	Average
10480	44.22	-29.78	74	51.77	15.6	6.68	29.83	100	64	Peak

Test Mode :	802.11a – Ant.1	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 5240 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. 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
5240	105.09	-	-	96.74	35.28	4.42	31.35	128	340	Peak
5240	91.41	-	-	83.06	35.28	4.42	31.35	128	340	Average
10480	46.63	-27.37	74	54.18	15.6	6.68	29.83	100	49	Peak

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	36	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 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	96.1	-	-	87.83	35.26	4.39	31.38	138	62	Peak
5180	85.25	-	-	76.98	35.26	4.39	31.38	138	62	Average
10360	45.59	-28.41	74	53.29	15.5	6.61	29.81	100	16	Peak

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	36	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 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	101.39	-	-	93.12	35.26	4.39	31.38	108	330	Peak
5180	89.53	-	-	81.26	35.26	4.39	31.38	108	330	Average
10360	46.39	-27.61	74	54.09	15.5	6.61	29.81	100	19	Peak

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 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
5220	95.18	-	-	86.86	35.27	4.41	31.36	138	53	Peak
5220	84.01	-	-	75.69	35.27	4.41	31.36	138	53	Average
10440	45.48	-28.52	74	53.08	15.57	6.65	29.82	100	46	Peak

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 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
5220	101.15	-	-	92.83	35.27	4.41	31.36	104	337	Peak
5220	89.72	-	-	81.4	35.27	4.41	31.36	104	337	Average
10440	46.23	-27.77	74	53.83	15.57	6.65	29.82	100	68	Peak

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 5240 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. 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
5240	95.84	-	-	87.49	35.28	4.42	31.35	140	53	Peak
5240	83.7	-	-	75.35	35.28	4.42	31.35	140	53	Average
10480	43.02	-30.98	74	50.57	15.6	6.68	29.83	100	15	Peak

Test Mode :	802.11n HT20 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 5240 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. 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
5240	102.6	-	-	94.25	35.28	4.42	31.35	115	312	Peak
5240	91.54	-	-	83.19	35.28	4.42	31.35	115	312	Average
10480	45.01	-28.99	74	52.56	15.6	6.68	29.83	100	79	Peak

Test Mode :	802.11n HT40 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	38	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 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
35.82	31.66	-8.34	40	50.26	14.65	0.37	33.62	100	49	Peak
99.84	32.44	-11.06	43.5	54.98	10.5	0.58	33.62	-	-	Peak
213.33	35.01	-8.49	43.5	58.05	9.65	0.84	33.53	-	-	Peak
329.73	34.55	-11.45	46	52.91	13.95	1.06	33.37	-	-	Peak
401.51	31.74	-14.26	46	47.89	16.01	1.15	33.31	-	-	Peak
489.78	28.15	-17.85	46	42.93	17.05	1.31	33.14	-	-	Peak
5190	95.43	-	-	87.16	35.26	4.39	31.38	130	0	Peak
5190	94.81	-	-	86.54	35.26	4.39	31.38	130	0	Average
10380	46.07	-27.93	74	53.74	15.52	6.62	29.81	100	16	Peak

Test Mode :	802.11n HT40 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	38	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209. 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
97.9	30.86	-12.64	43.5	53.76	10.15	0.57	33.62	-	-	Peak
225.94	33.41	-12.59	46	55.45	10.59	0.87	33.5	-	-	Peak
329.73	34.1	-11.9	46	52.46	13.95	1.06	33.37	100	12	Peak
407.33	25.79	-20.21	46	41.9	16.03	1.16	33.3	-	-	Peak
489.78	31.15	-14.85	46	45.93	17.05	1.31	33.14	-	-	Peak
939.86	28.57	-17.43	46	38.57	20.69	1.75	32.44	-	-	Peak
5190	99.86	-	-	91.59	35.26	4.39	31.38	118	290	Peak
5190	88.87	-	-	80.6	35.26	4.39	31.38	118	290	Average
10380	46.48	-27.52	74	54.15	15.52	6.62	29.81	100	67	Peak

Test Mode :	802.11n HT40 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	46	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 10460 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
5230	97.91	-	-	89.56	35.28	4.42	31.35	150	59	Peak
5230	85.41	-	-	77.06	35.28	4.42	31.35	150	59	Average
10460	43.16	-30.84	74	50.74	15.59	6.66	29.83	100	46	Peak

Test Mode :	802.11n HT40 – MIMO Ant.0+1	Temperature :	23~24°C
Test Channel :	46	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 10460 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
5230	100.45	-	-	92.1	35.28	4.42	31.35	104	316	Peak
5230	89.63	-	-	81.28	35.28	4.42	31.35	104	316	Average
10460	44.27	-29.73	74	51.85	15.59	6.66	29.83	100	16	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 (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.

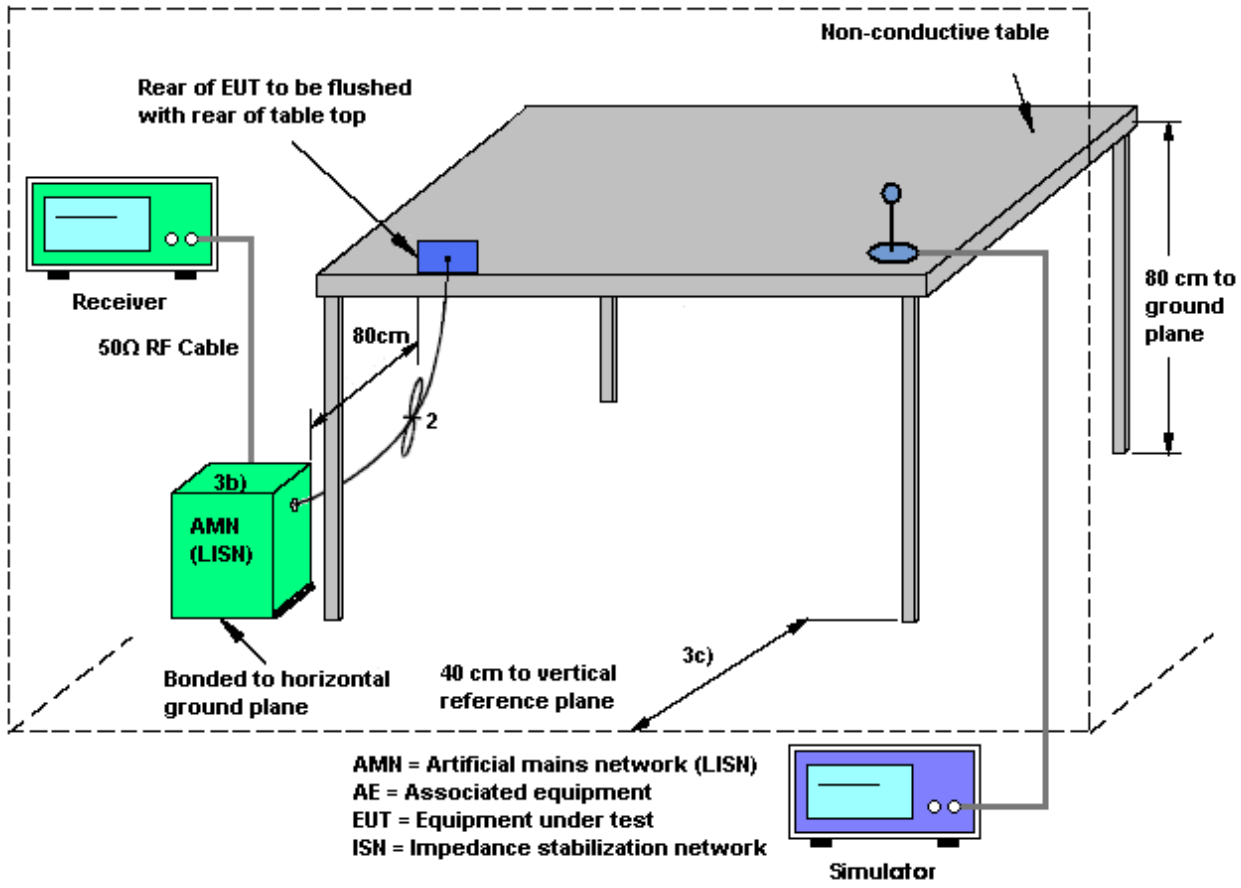
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

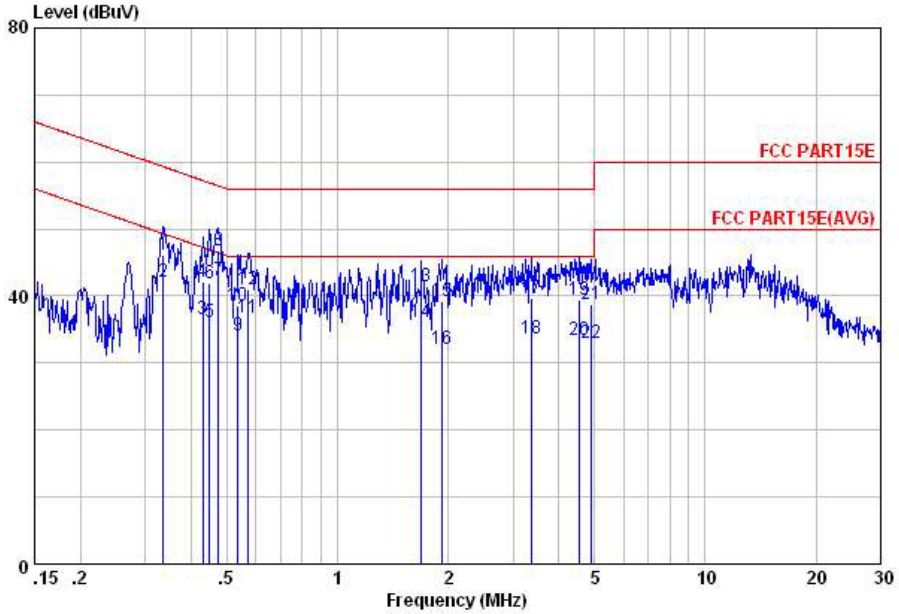
1. The testing follows the guidelines in ANSI C63.10-2009 test site requirement.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

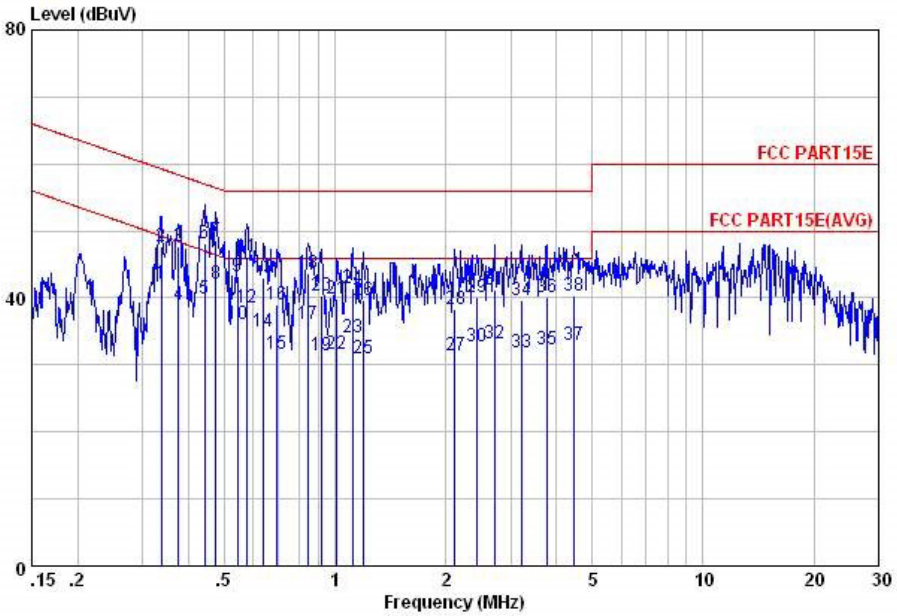
Test Mode :	Mode 1	**Temperature :**	19~20℃
Test Engineer :	Tom Wang	**Relative Humidity :**	39~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WCDMA Band V Idle + WLAN 5.2GHz Link + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition: FCC PART15E LISN-L20130306 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.34	46.23	-13.08	59.31	35.50	0.49	10.24	QP
2	0.34	42.13	-7.18	49.31	31.40	0.49	10.24	Average
3	0.43	36.52	-10.72	47.24	26.00	0.27	10.25	Average
4	0.43	42.12	-15.12	57.24	31.60	0.27	10.25	QP
5	0.45	36.10	-10.79	46.89	25.60	0.25	10.25	Average
6	0.45	41.80	-15.09	56.89	31.30	0.25	10.25	QP
7	0.47	42.38	-4.07	46.45	31.91	0.22	10.25	Average
8	0.47	46.78	-9.67	56.45	36.31	0.22	10.25	QP
9	0.53	34.06	-11.94	46.00	23.60	0.20	10.26	Average
10	0.53	38.46	-17.54	56.00	28.00	0.20	10.26	QP
11	0.57	36.86	-9.14	46.00	26.40	0.20	10.26	Average
12	0.57	41.06	-14.94	56.00	30.60	0.20	10.26	QP
13	1.69	41.50	-14.50	56.00	31.10	0.10	10.30	QP
14	1.69	36.00	-10.00	46.00	25.60	0.10	10.30	Average
15	1.93	39.30	-16.70	56.00	28.90	0.10	10.30	QP
16	1.93	32.10	-13.90	46.00	21.70	0.10	10.30	Average
17	3.38	39.59	-16.41	56.00	29.10	0.16	10.33	QP
18	3.38	33.59	-12.41	46.00	23.10	0.16	10.33	Average
19	4.53	39.43	-16.57	56.00	28.91	0.19	10.33	QP
20	4.53	33.53	-12.47	46.00	23.01	0.19	10.33	Average
21	4.87	38.83	-17.17	56.00	28.30	0.20	10.33	QP
22	4.87	32.93	-13.07	46.00	22.40	0.20	10.33	Average

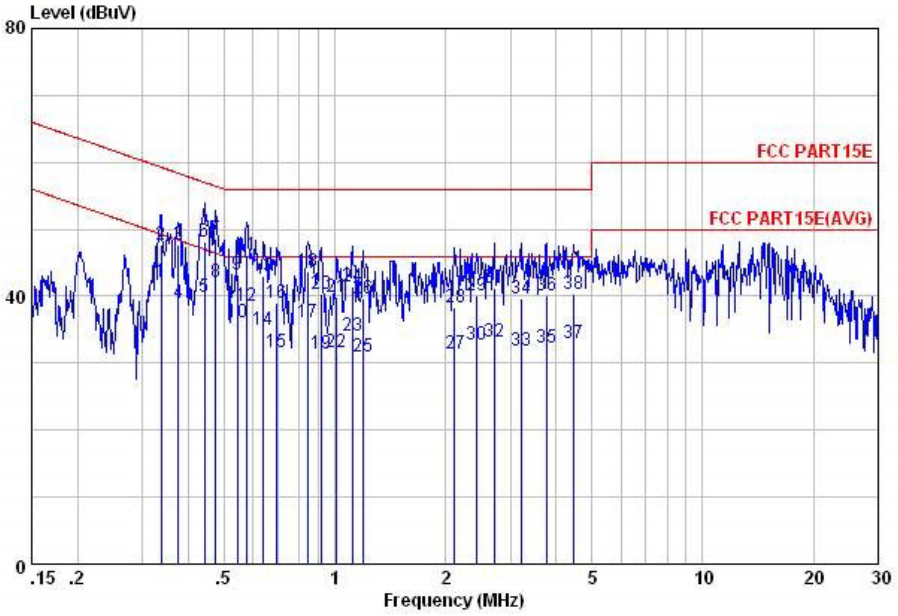
Test Mode :	Mode 1	Temperature :	19~20℃
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + WLAN 5.2GHz Link + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition: FCC PART15E LISN-N20130306 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.34	42.19	-7.08	49.27	31.39	0.55	10.25	Average
2	0.34	47.69	-11.58	59.27	36.89	0.55	10.25	QP
3	0.38	47.60	-10.79	58.39	36.90	0.45	10.25	QP
4	0.38	38.90	-9.49	48.39	28.20	0.45	10.25	Average
5	0.44	39.80	-7.22	47.02	29.20	0.35	10.25	Average
6	0.44	48.10	-8.92	57.02	37.50	0.35	10.25	QP
7	0.47	48.47	-7.98	56.45	37.90	0.32	10.25	QP
8	0.47	42.17	-4.28	46.45	31.60	0.32	10.25	Average
9	0.54	43.34	-12.66	56.00	32.80	0.28	10.26	QP
10	0.54	36.04	-9.96	46.00	25.50	0.28	10.26	Average
11	0.58	46.02	-9.98	56.00	35.50	0.26	10.26	QP
12	0.58	38.52	-7.48	46.00	28.00	0.26	10.26	Average
13	0.64	43.09	-12.91	56.00	32.60	0.22	10.27	QP
14	0.64	35.09	-10.91	46.00	24.60	0.22	10.27	Average
15	0.70	31.57	-14.43	46.00	21.10	0.20	10.27	Average
16	0.70	39.07	-16.93	56.00	28.60	0.20	10.27	QP
17	0.84	36.12	-9.88	46.00	25.69	0.15	10.28	Average
18	0.84	43.72	-12.28	56.00	33.29	0.15	10.28	QP
19	0.92	31.50	-14.50	46.00	21.10	0.12	10.28	Average
20	0.92	40.30	-15.70	56.00	29.90	0.12	10.28	QP
21	1.01	39.88	-16.12	56.00	29.50	0.10	10.28	QP
22	1.01	31.58	-14.42	46.00	21.20	0.10	10.28	Average
23	1.12	34.18	-11.82	46.00	23.80	0.10	10.28	Average
24	1.12	41.38	-14.62	56.00	31.00	0.10	10.28	QP
25	1.19	30.88	-15.12	46.00	20.50	0.10	10.28	Average
26	1.19	39.68	-16.32	56.00	29.30	0.10	10.28	QP
27	2.12	31.40	-14.60	46.00	21.00	0.10	10.30	Average

Test Mode :	Mode 1	Temperature :	19~20℃
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + WLAN 5.2GHz Link + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



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

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
28	2.12	38.30	-17.70	56.00	27.90	0.10	10.30	QP
29	2.43	40.12	-15.88	56.00	29.70	0.11	10.31	QP
30	2.43	32.82	-13.18	46.00	22.40	0.11	10.31	Average
31	2.71	41.13	-14.87	56.00	30.70	0.12	10.31	QP
32	2.71	33.23	-12.77	46.00	22.80	0.12	10.31	Average
33	3.21	31.88	-14.12	46.00	21.41	0.15	10.32	Average
34	3.21	39.58	-16.42	56.00	29.11	0.15	10.32	QP
35	3.76	32.31	-13.69	46.00	21.80	0.18	10.33	Average
36	3.76	40.01	-15.99	56.00	29.50	0.18	10.33	QP
37	4.48	33.03	-12.97	46.00	22.51	0.19	10.33	Average
38	4.48	40.23	-15.77	56.00	29.71	0.19	10.33	QP

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.

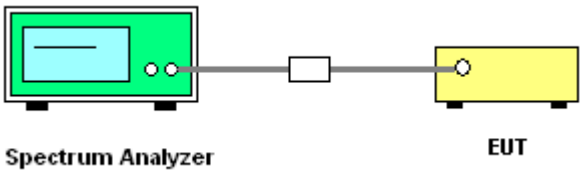
3.7.2 Measuring Instruments

See list of measuring instruments 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 Mode :	802.11a	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
		Ant.1	Ant.1	SISO Ant.1
36	5180	5171.70	5188.30	0.00
44	5220	5211.70	5228.30	0.00
48	5240	5231.70	5248.30	0.00

Test Mode :	802.11n HT-20	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	Low Frequency (Fl)		High Frequency (Fh)		Frequency Stability (ppm)	
		MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	MIMO Ant.0+1(0)	MIMO Ant.0+1(1)
36	5180	5171.15	5171.10	5188.90	5188.85	4.83	-4.83
44	5220	5211.10	5211.10	5228.90	5228.90	0.00	0.00
48	5240	5231.15	5231.05	5248.90	5248.85	4.77	-9.54

Test Mode :	802.11n HT-40	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	Low Frequency (Fl)		High Frequency (Fh)		Frequency Stability (ppm)	
		MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	MIMO Ant.0+1(0)	MIMO Ant.0+1(1)	MIMO Ant.0+1(0)	MIMO Ant.0+1(1)
38	5190	5171.7300	5171.7300	5208.2700	5208.1800	0.00	-8.67
46	5230	5211.7300	5211.7300	5248.1800	5248.1800	-8.60	-8.60

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

See list of measuring instruments of this test report.

3.8.3 Test Result of Automatically Discontinue Transmission

During no any information transmission, 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 Connected Construction

Non-standard connector used.

3.9.3 Antenna Gain

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

FCC KDB 662911 D01 Multiple Transmitter Output v01r02

For CDD transmissions, directional gain is calculated as

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

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

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

For power measurements on IEEE 802.11 devices,

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 29, 2012	May 29, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 22, 2012	May 29, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 22, 2012	May 29, 2013	Aug. 21, 2013	Conducted (TH01-KS)
DC Power Supply	GWINSTEK	GPS-3030D	E1884515	N/A	Aug. 22, 2012	May 29, 2013	Aug. 21, 2013	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 08, 2012	Jun. 05, 2013	Nov. 07, 2013	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	100400	9kHz~30GHz	May 31, 2013	Jun. 05, 2013	May 30, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2012	Jun. 05, 2013	Dec. 06, 2013	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/ 001	9 kHz~30 MHz	Jul. 03, 2012	Jun. 05, 2013	Jul. 02, 2014	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2013	Jun. 05, 2013	Jan. 06, 2014	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz	May 31, 2013	Jun. 05, 2013	May 30, 2014	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 29, 2012	Jun. 05, 2013	Dec. 28, 2013	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2012	Jun. 05, 2013	Nov. 06, 2013	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170249	15GHz~40GHz	Nov. 23, 2012	Jun. 05, 2013	Nov. 22, 2013	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 01, 2012	May 28, 2013	May 31, 2013	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Dec. 29, 2012	May 28, 2013	Dec. 28, 2013	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Dec. 29, 2012	May 28, 2013	Dec. 28, 2013	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	N/A	Nov. 15, 2012	May 28, 2013	Nov. 14, 2013	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/066	2G Full-Band	Dec. 29, 2012	May 28, 2013	Dec. 28, 2013	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**

Appendix A. Photographs of EUT

Please refer to Sporton report number EP342301 as below.