



# FCC RF Test Report

**APPLICANT** : ZTE CORPORATION  
**EQUIPMENT** : CDMA/LTE Multi-mode Digital Mobile Phone  
**BRAND NAME** : ZTE  
**MODEL NAME** : ZTE N9510  
**FCC ID** : Q78-ZTEN9510  
**STANDARD** : FCC Part 15 Subpart E §15.407  
**CLASSIFICATION** : (NII) Unlicensed National Information Infrastructure

The product was received on Feb. 04, 2013 and completely tested on Apr. 24, 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.

Approved by: Jones Tsai / Manager



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



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## 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	≤ 17dBm	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 (depend on band)&15.209(a)	Pass	Under limit 2.96 dB at 5149.850 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 9.84 dB at 0.540 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 & Specification	
<b>Equipment</b>	CDMA/LTE Multi-mode Digital Mobile Phone
<b>Brand Name</b>	ZTE
<b>Model Name</b>	ZTE N9510
<b>FCC ID</b>	Q78-ZTEN9510
<b>EUT supports Radios application</b>	CDMA/EV-DO/LTE/WLAN 11abgn/Bluetooth EDR/Bluetooth 4.0 – LE/NFC
<b>HW Version</b>	czfA
<b>SW Version</b>	N9510V1.0.0B02
<b>EUT Stage</b>	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

Product Specification subjective to this standard	
<b>Tx/Rx Frequency Range</b>	5180 MHz ~ 5240 MHz
<b>Maximum Output Power to Antenna</b>	802.11a : 12.70 dBm / 0.0186 W 802.11n HT20 : 11.64 dBm / 0.0146 W
<b>Antenna Type</b>	PIFA Antenna with gain 3.00 dBi
<b>Type of Modulation</b>	OFDM (BPSK / QPSK / 16QAM / 64QAM)

### 1.5 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.			
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
<b>Test Site No.</b>	<b>Sporton Site No.</b>			<b>FCC/IC Registration No.</b>
	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
- ♦ 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 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

## 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)	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	12.70	12.60	12.55	12.68	12.65	12.26	12.62	12.64
44	5220	11.99	11.82	11.64	11.59	11.44	11.39	11.29	11.26
48	5240	12.33	12.21	12.07	11.95	11.62	11.47	11.41	11.04

Ch.	Freq. (MHz)	802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
36	5180	11.64	11.38	11.40	11.39	11.59	11.48	11.48	11.57
44	5220	11.02	10.97	10.83	10.85	10.74	10.60	10.29	10.66
48	5240	11.29	11.10	10.80	10.83	10.80	10.86	10.72	10.61

### 2.3 Test Mode

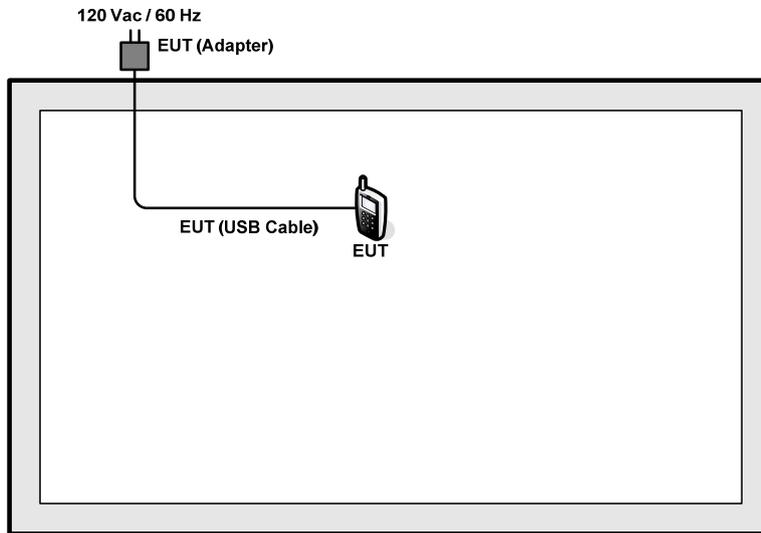
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	Mode	Data rate	Test Channel
Conducted TCs	26dB BW	802.11a	6 Mbps	L/M/H
	Power Spectral Density	802.11n HT20	6.5 Mbps	L/M/H
	Output Power	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
	Peak Excursion	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
Frequency Stability	802.11a	6 Mbps	L/M/H	
	802.11n HT20	6.5 Mbps	L/M/H	
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	L/H
		802.11n HT20	6.5 Mbps	L/H
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
AC Conducted Emission	Mode 1 : CDMA2000 BC0 + USB Cable (Charging from Adapter) + Bluetooth Link + WLAN 5GHz Link + NFC Tx			

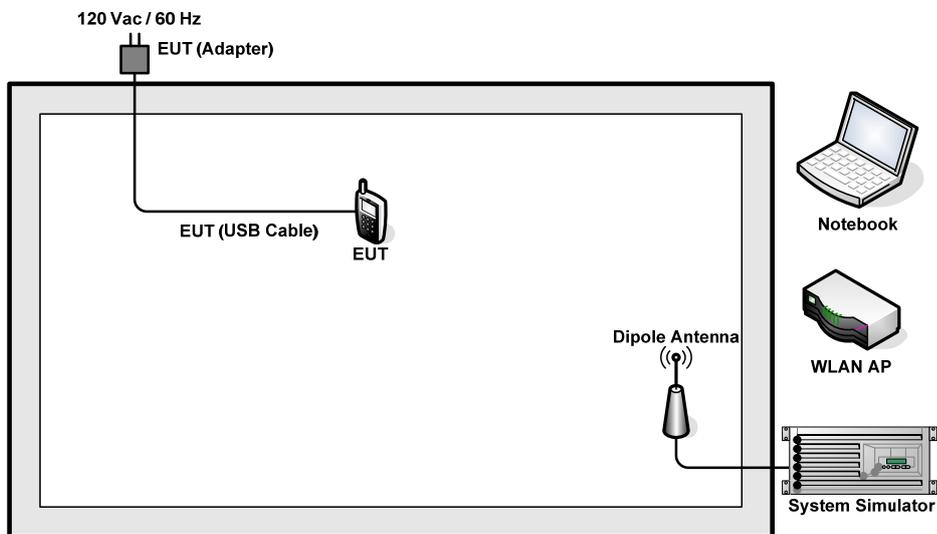
Ch. #		Band I	
		5150-5250 MHz	
		802.11a	802.11n HT20
L	Low	36	36
M	Middle	44	44
H	High	48	48

## 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.	Bluetooth Base Station	R&S	CBT	FCC DoC	N/A	Unshielded, 1.8m
3.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
4.	Notebook	Dell	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m
5.	WLAN AP	D-link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
6.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	N/A	N/A

## 2.6 Description of RF Function Operation Test Setup

For WLAN function, turn on “FCC Test” software on the EUT directly. Then, the EUT will get into the engineering modes to contact with WLAN AP 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:

$$\begin{aligned} \text{Offset (dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 5.6 + 10 = 15.6 \text{ (dB)} \end{aligned}$$

### 3 Test Result

#### 3.1 26dB Bandwidth Measurement

##### 3.1.1 Description of Bandwidth Measurement

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.

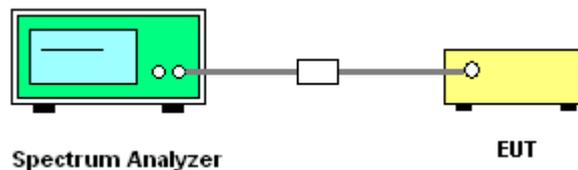
##### 3.1.2 Measuring Instruments

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

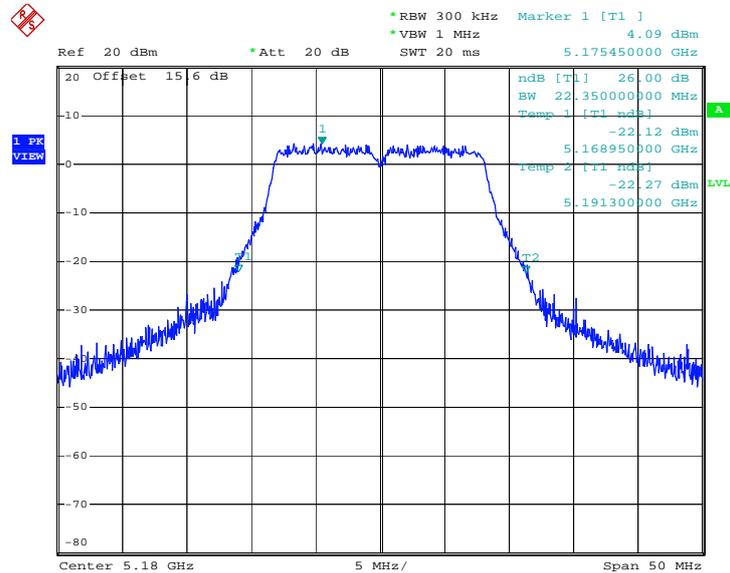


3.1.5 Test Result of 26dB Bandwidth Plots

Test Mode :	802.11a	Temperature :	23~24°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Band	Channel	Frequency (MHz)	802.11a 26dB Bandwidth (MHz)	Pass/Fail
NII Band 1	36	5180	22.35	N/A
	44	5220	22.75	N/A
	48	5240	22.30	N/A

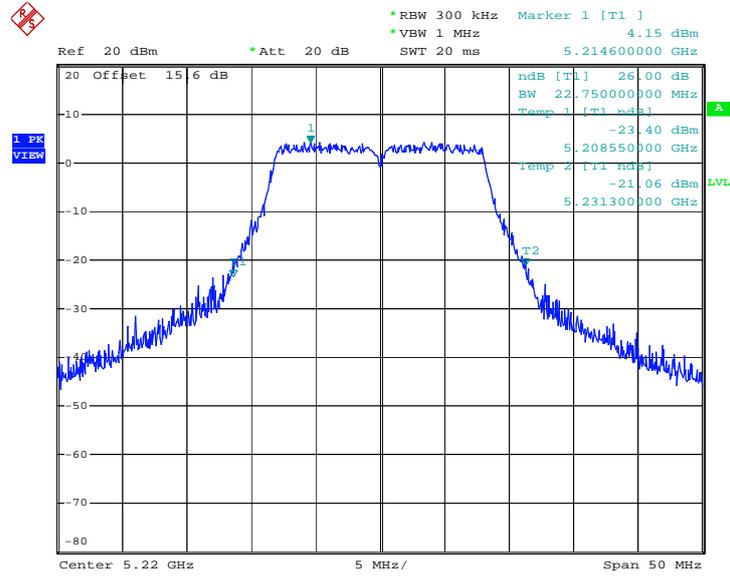
26 dB Bandwidth Plot on 802.11a Channel 36



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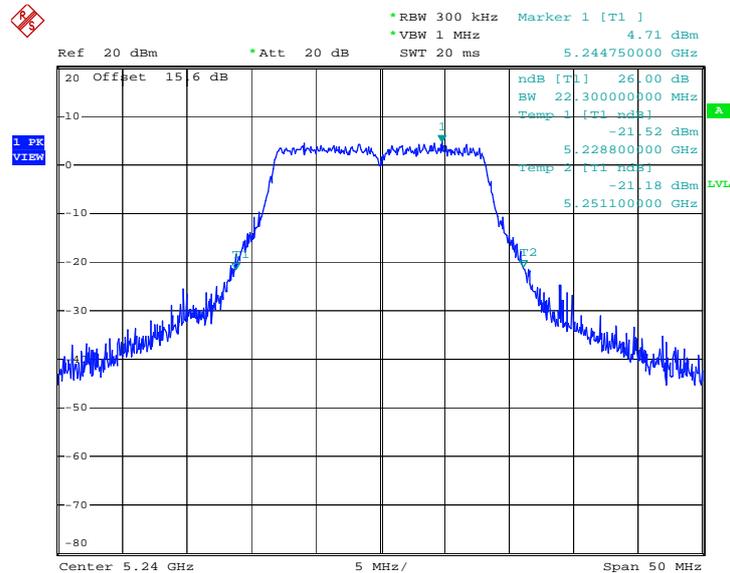


26 dB Bandwidth Plot on 802.11a Channel 44



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26 dB Bandwidth Plot on 802.11a Channel 48



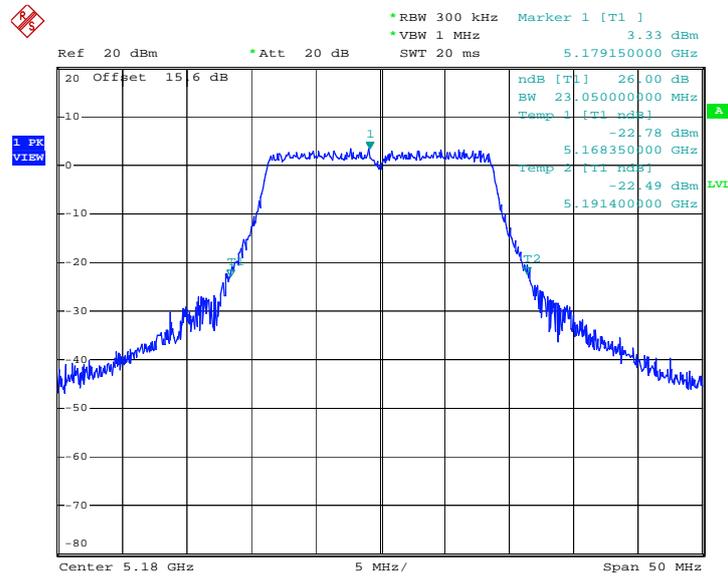
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Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Band	Channel	Frequency (MHz)	802.11n HT20 26dB Bandwidth (MHz)	Pass/Fail
NII Band 1	36	5180	23.05	N/A
	44	5220	22.70	N/A
	48	5240	22.85	N/A

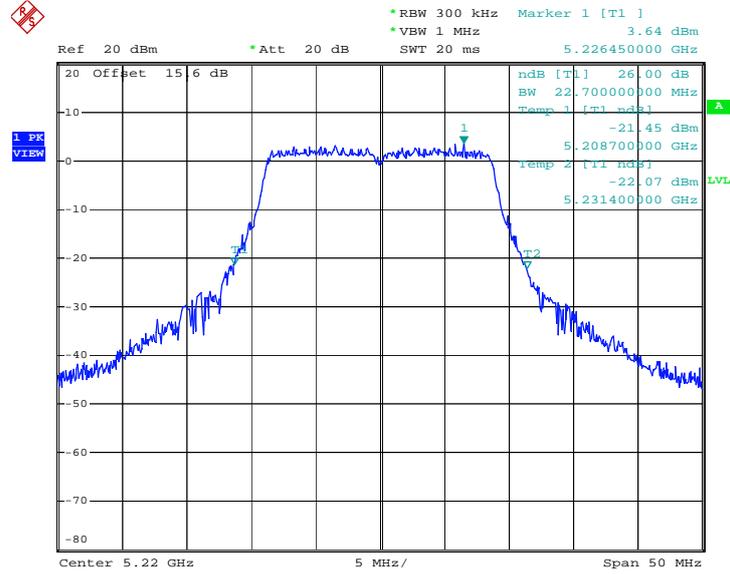
26 dB Bandwidth Plot on 802.11n HT20 Channel 36



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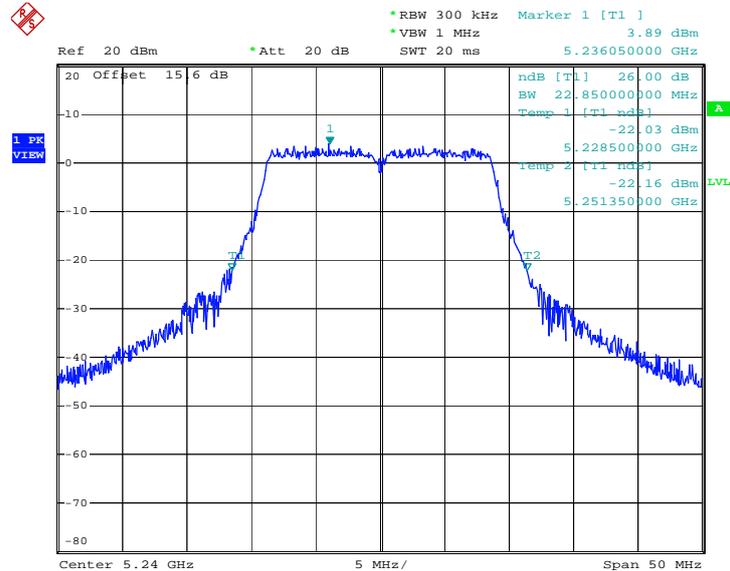


26 dB Bandwidth Plot on 802.11n HT20 Channel 44



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26 dB Bandwidth Plot on 802.11n HT20 Channel 48



Date: 24.APR.2013 11:54:04

## 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.

### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

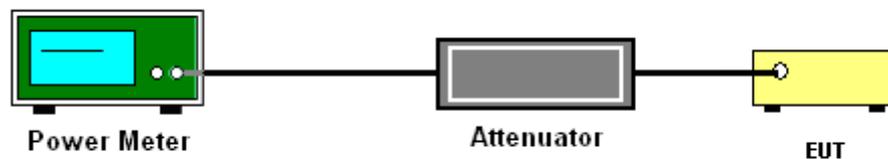
### 3.2.3 Test Procedures

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°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%
Duty Cycle :	86.88%	Duty Factor :	0.61dB

Band	Channel	Frequency (MHz)	Output Power (dBm)		Max. Limits (dBm )	Pass/Fail
			Measured	Final		
NII Band 1	36	5180	12.09	12.70	17	Pass
	44	5220	11.38	11.99	17	Pass
	48	5240	11.72	12.33	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°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%
Duty Cycle :	85.85%	Duty Factor :	0.66dB

Band	Channel	Frequency (MHz)	Output Power (dBm)		Max. Limits (dBm )	Pass/Fail
			Measured	Final		
NII Band 1	36	5180	10.98	11.64	17	Pass
	44	5220	10.36	11.02	17	Pass
	48	5240	10.63	11.29	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).

### 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).

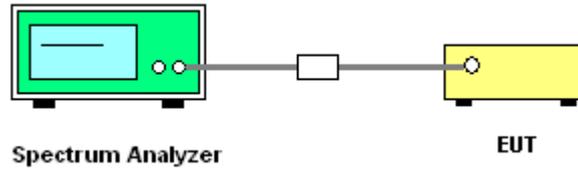
Note: Though the rule refers to “peak power spectral density”, the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission.

##### # 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  $\geq$  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.

### 3.3.4 Test Setup





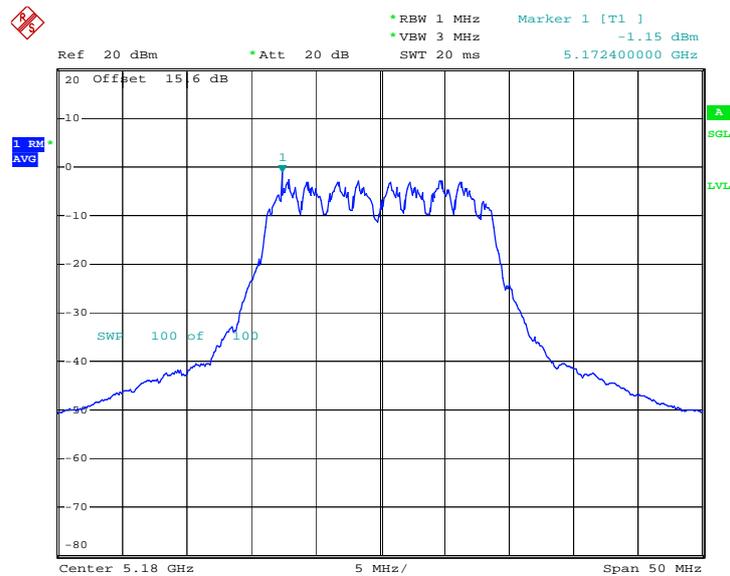
3.3.5 Test Result of Power Spectral Density

Test Mode :	802.11a	Temperature :	23~24°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%
Duty Cycle:	86.88%	Duty Factor:	0.61dB

Band	Channel	Frequency (MHz)	802.11a PSD (dBm)		Max. Limits (dBm)	Pass/Fail
			Measured	Final		
NII Band 1	36	5180	-1.15	-0.54	4	Pass
	44	5220	-2.25	-1.64	4	Pass
	48	5240	0.08	0.69	4	Pass

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

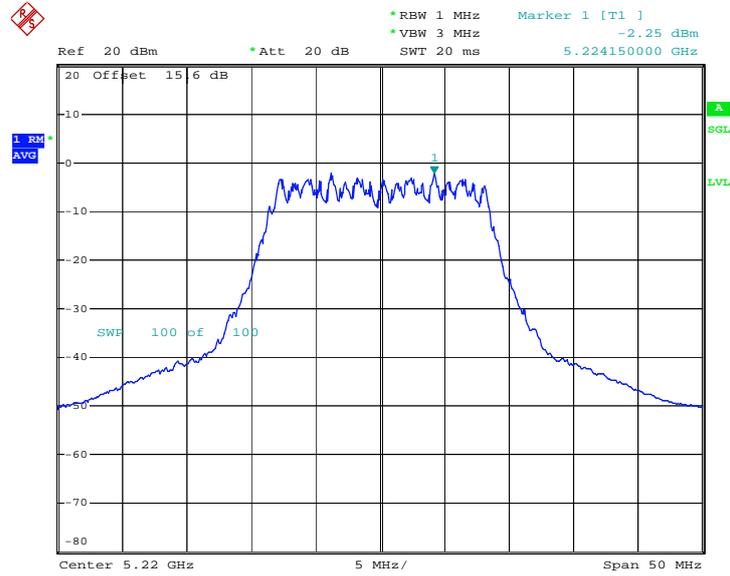
PSD Plot on 802.11a Channel 36



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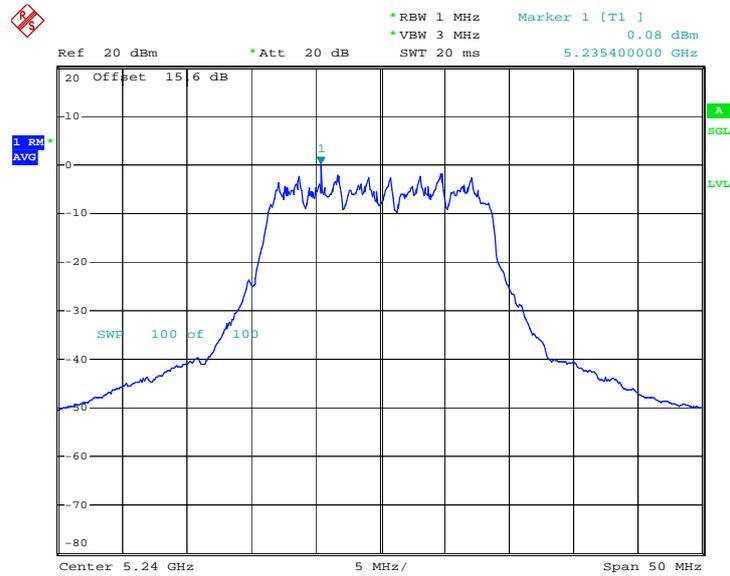


PSD Plot on 802.11a Channel 44



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PSD Plot on 802.11a Channel 48



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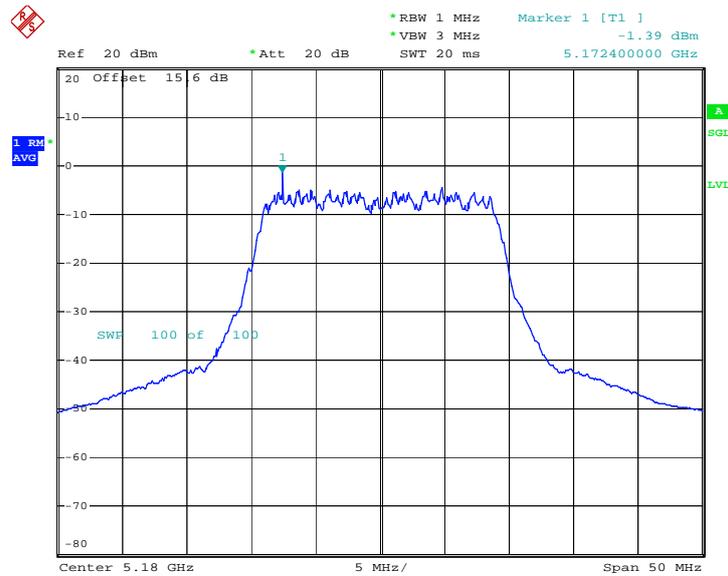


Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%
Duty Cycle :	85.85%	Duty Factor :	0.66dB

Band	Channel	Frequency (MHz)	802.11n HT20 PSD (dBm)		Max. Limits (dBm)	Pass/Fail
			Measured	Final		
NII Band 1	36	5180	-1.39	-0.73	4	Pass
	44	5220	-4.67	-4.01	4	Pass
	48	5240	-1.33	-0.67	4	Pass

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

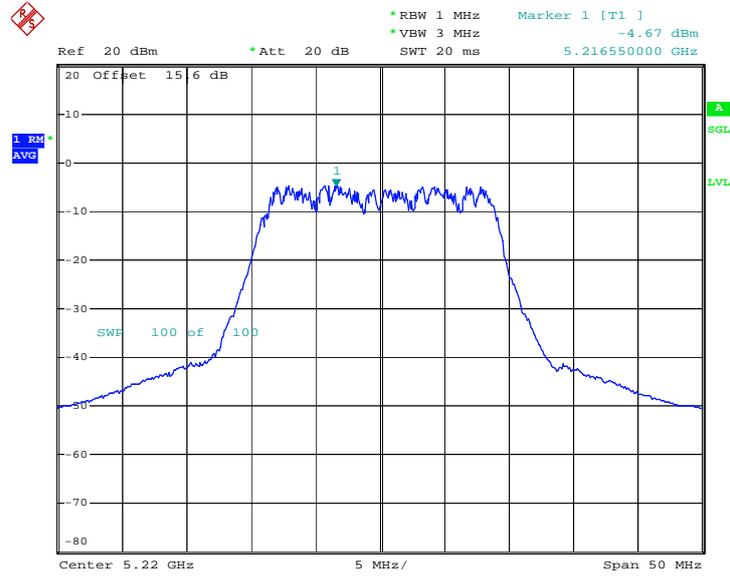
PSD Plot on 802.11n HT20 channel 36



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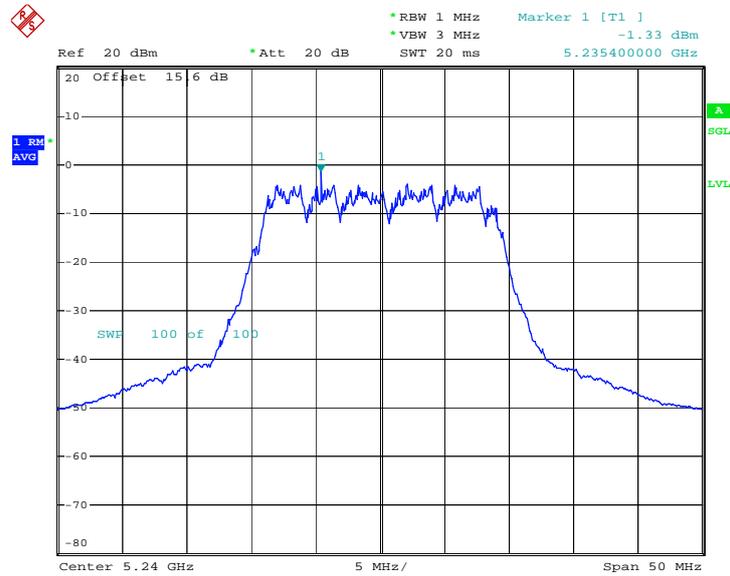


PSD Plot on 802.11n HT20 Channel 44



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PSD Plot on 802.11n HT20 Channel 48



Date: 24.APR.2013 11:54:22

### 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.

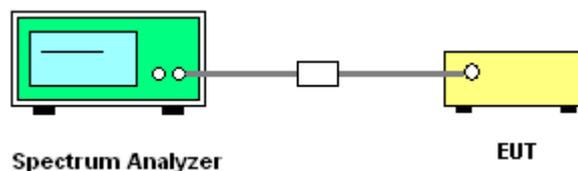
#### 3.4.3 Test Procedures

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  $\geq$  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

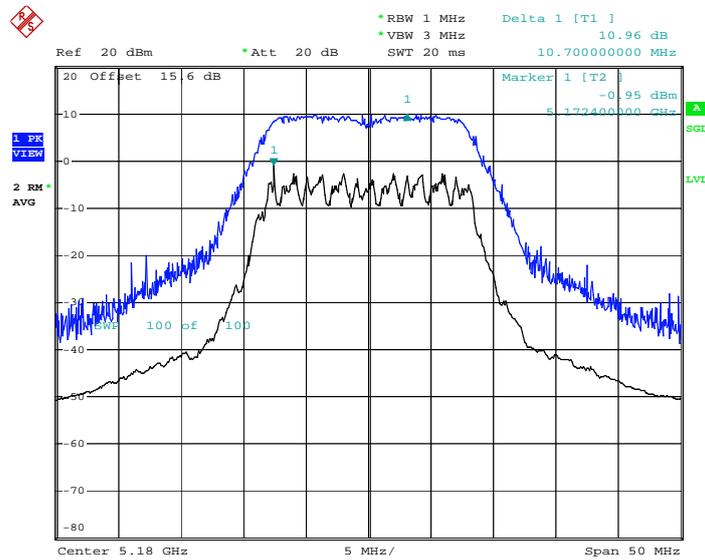


3.4.5 Test Result of Peak Excursion Ratio

Test Mode :	802.11a	Temperature :	23~24°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Mode	Channel		Excursion Ratio(dB)	Limit
802.11a	CH 36	5180MHz	10.96	<13dB
	CH 44	5220MHz	12.47	
	CH 48	5240MHz	10.70	

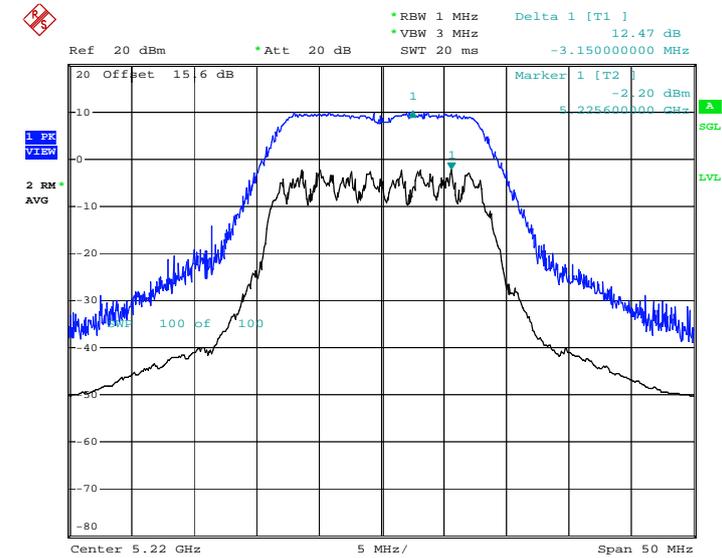
Peak Excursion Ratio Plot on 802.11a Channel 36



Date: 24.APR.2013 11:23:41

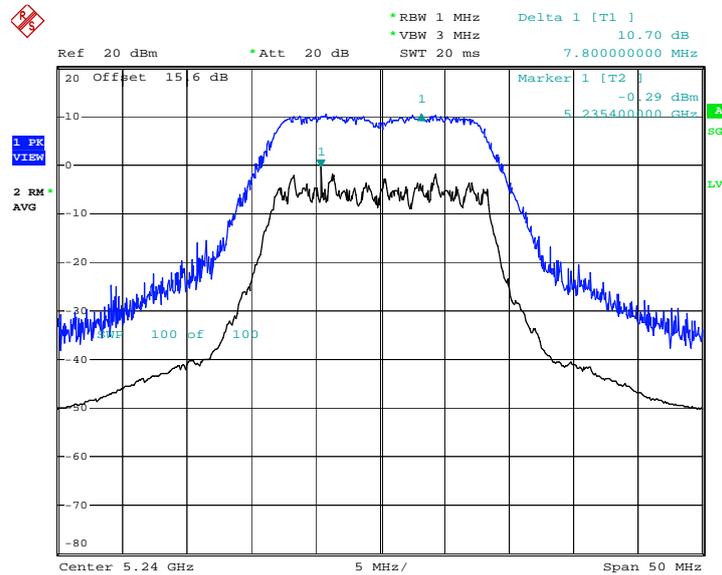


Peak Excursion Ratio Plot on 802.11a Channel 44



Date: 24.APR.2013 11:38:30

Peak Excursion Ratio Plot on 802.11a Channel 48



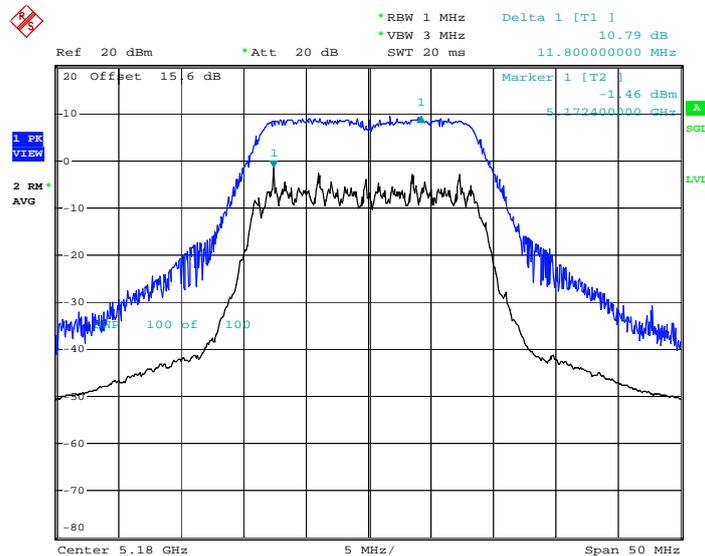
Date: 24.APR.2013 11:32:22



Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Mode	Channel		Excursion Ratio(dB)	Limit
802.11n HT20-MCS0	CH 36	5180MHz	10.79	<13dB
	CH 44	5220MHz	11.15	
	CH 48	5240MHz	10.53	
802.11n HT20-MCS1	CH 36	5180MHz	12.27	<13dB
	CH 44	5220MHz	11.14	
	CH 48	5240MHz	10.53	
802.11n HT20-MCS3	CH 36	5180MHz	11.59	<13dB
	CH 44	5220MHz	12.42	
	CH 48	5240MHz	10.76	
802.11n HT20-MCS5	CH 36	5180MHz	10.55	<13dB
	CH 44	5220MHz	12.58	
	CH 48	5240MHz	10.91	

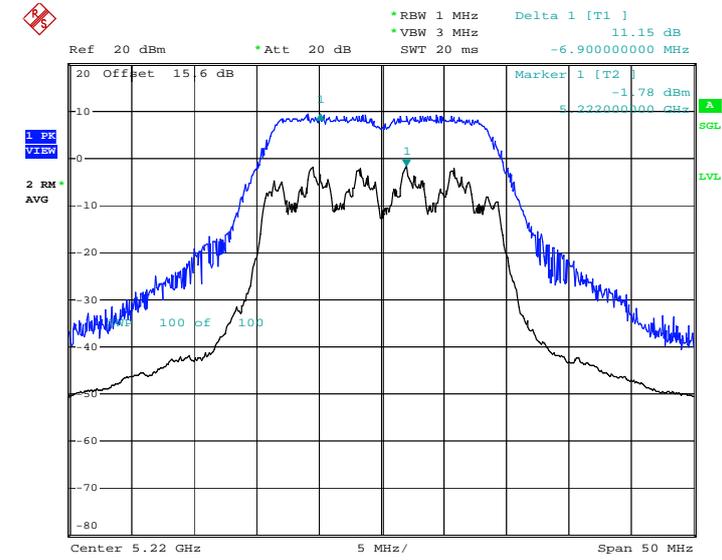
Peak Excursion Ratio Plot on 802.11n HT20 - MCS0 Channel 36



Date: 24.APR.2013 11:42:52

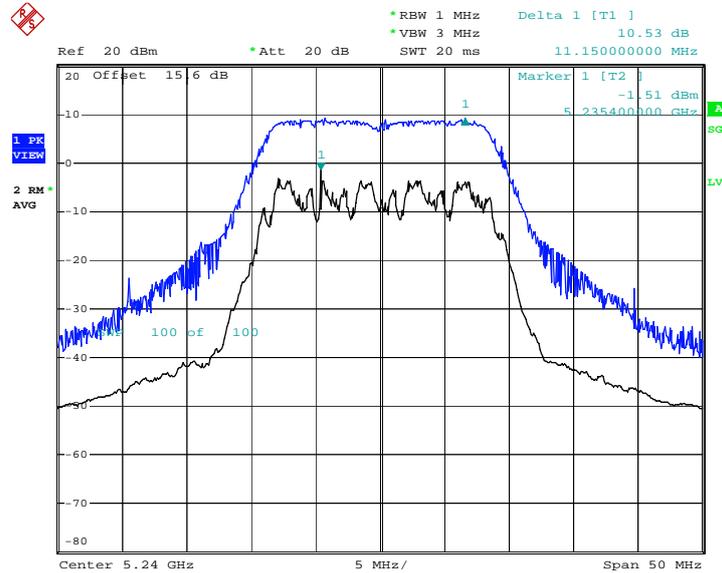


Peak Excursion Ratio Plot on 802.11n HT20 - MCS0 Channel 44



Date: 24.APR.2013 11:51:38

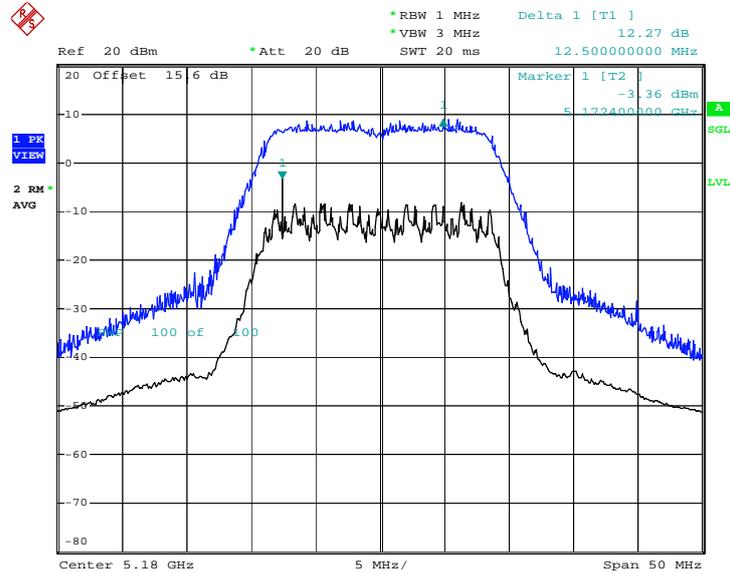
Peak Excursion Ratio Plot on 802.11n HT20 - MCS0 Channel 48



Date: 24.APR.2013 11:54:41

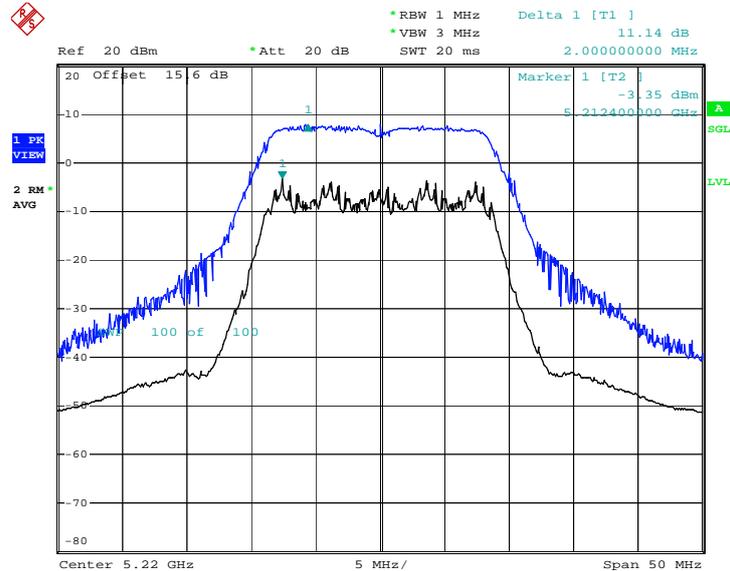


Peak Excursion Ratio Plot on 802.11n HT20 – MCS1 Channel 36



Date: 26.APR.2013 11:52:47

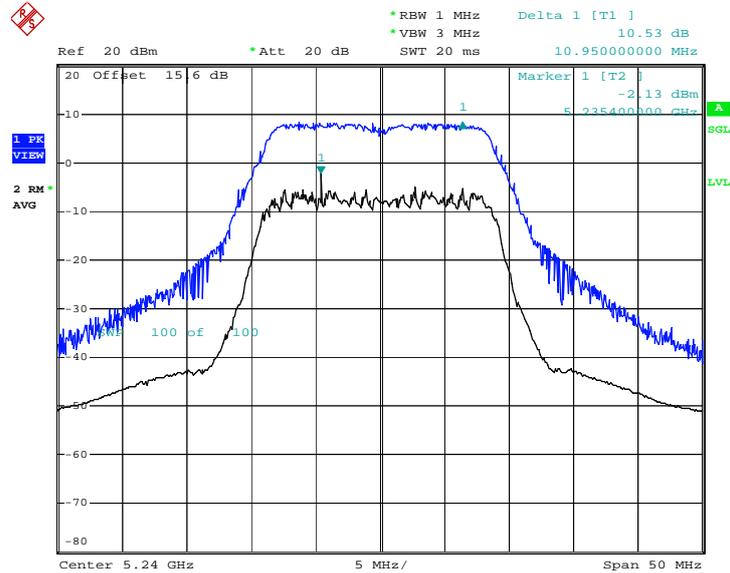
Peak Excursion Ratio Plot on 802.11n HT20 – MCS1 Channel 44



Date: 26.APR.2013 13:29:04

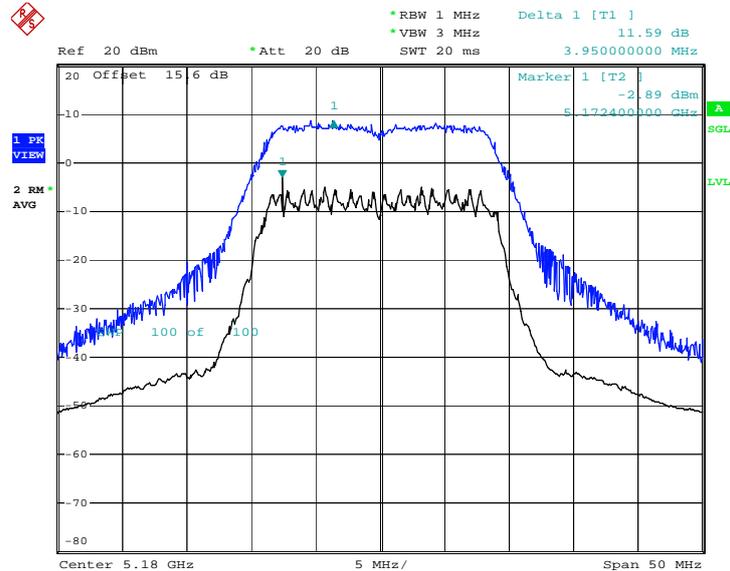


Peak Excursion Ratio Plot on 802.11n HT20 – MCS1 Channel 48



Date: 26.APR.2013 12:01:38

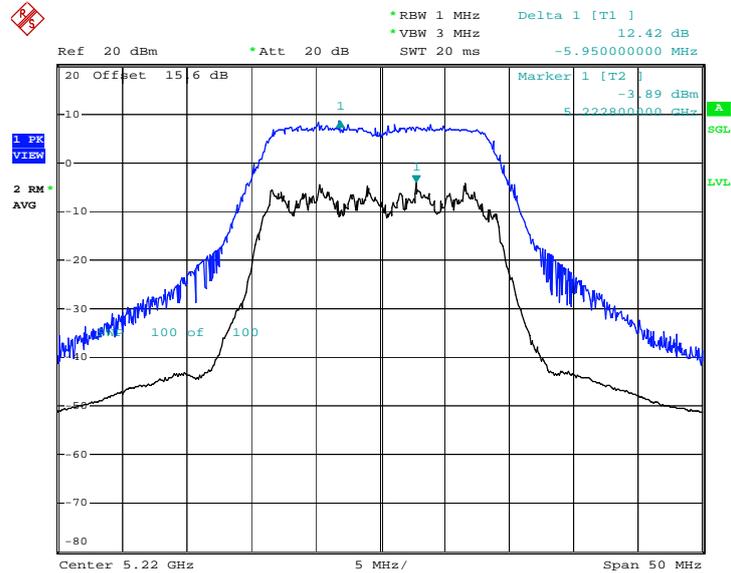
Peak Excursion Ratio Plot on 802.11n HT20 – MCS3 Channel 36



Date: 26.APR.2013 13:42:39

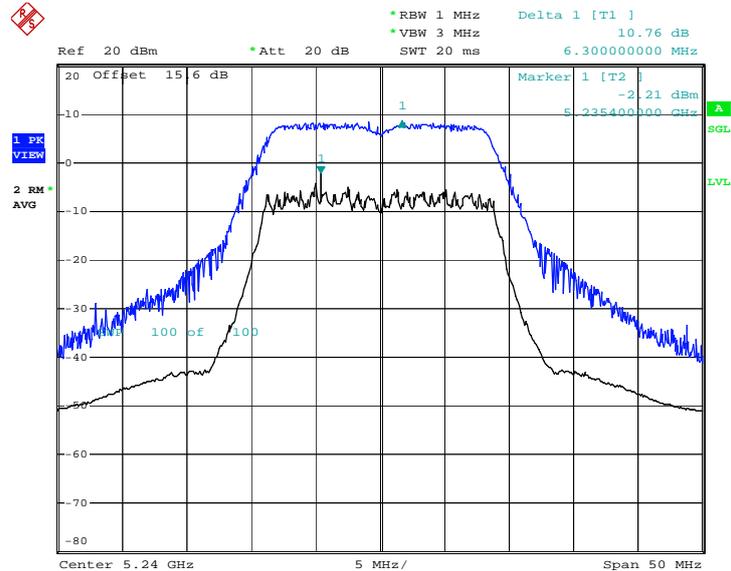


Peak Excursion Ratio Plot on 802.11n HT20 – MCS3 Channel 44



Date: 26.APR.2013 13:29:32

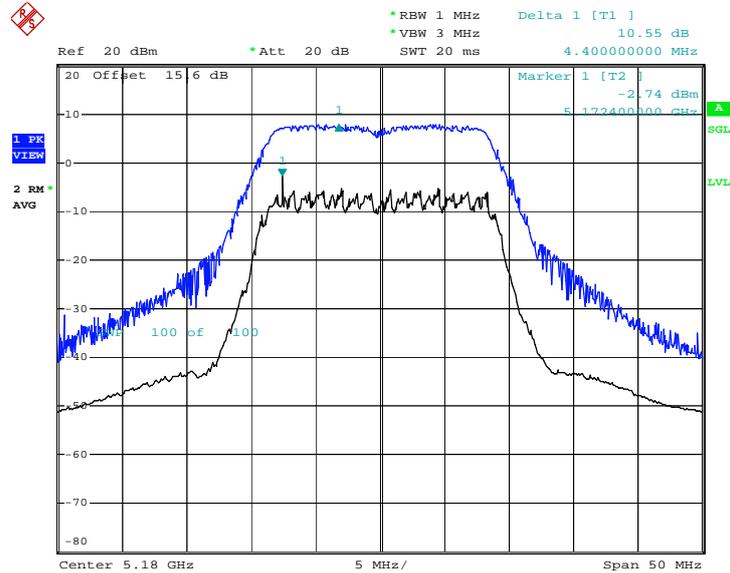
Peak Excursion Ratio Plot on 802.11n HT20 – MCS3 Channel 48



Date: 26.APR.2013 12:02:53

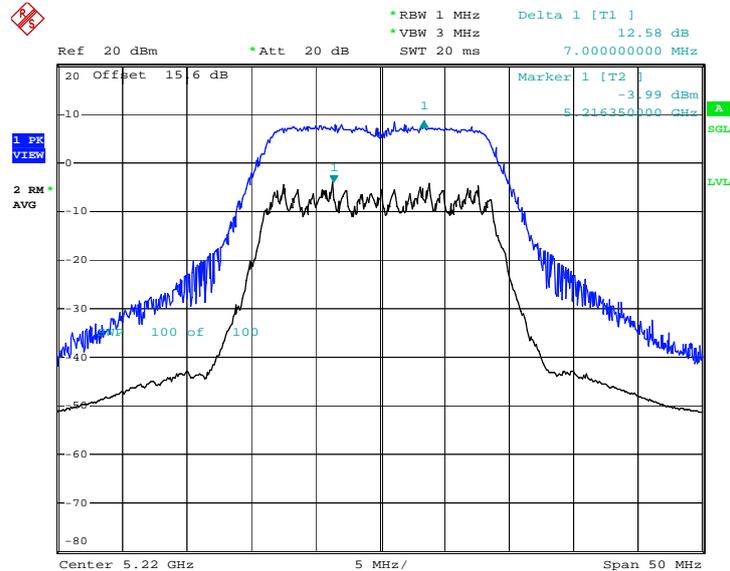


Peak Excursion Ratio Plot on 802.11n HT20 – MCS5 Channel 36



Date: 26.APR.2013 13:43:05

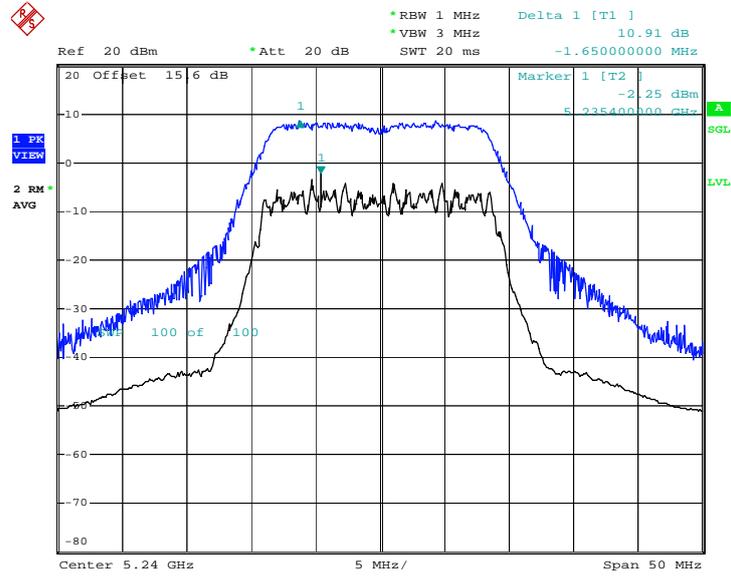
Peak Excursion Ratio Plot on 802.11n HT20 – MCS5 Channel 44



Date: 26.APR.2013 13:30:00



Peak Excursion Ratio Plot on 802.11n HT20 – MCS5 Channel 48



Date: 26.APR.2013 13:33:51

### 3.5 Unwanted Radiated Emission 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.

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

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

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 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

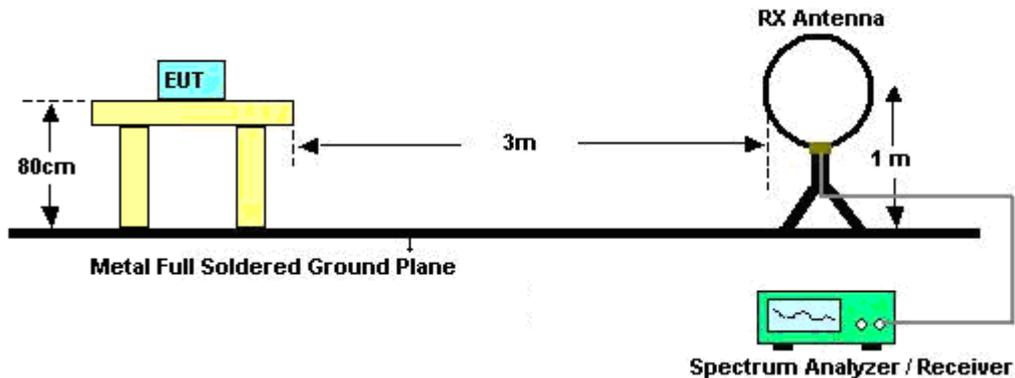
- The setting follows H) 6) of FCC KDB 789033.
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- $VBW \geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control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

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	86.875	1.390	0.719	1KHz
802.11n HT20	85.848	1.286	0.778	1KHz

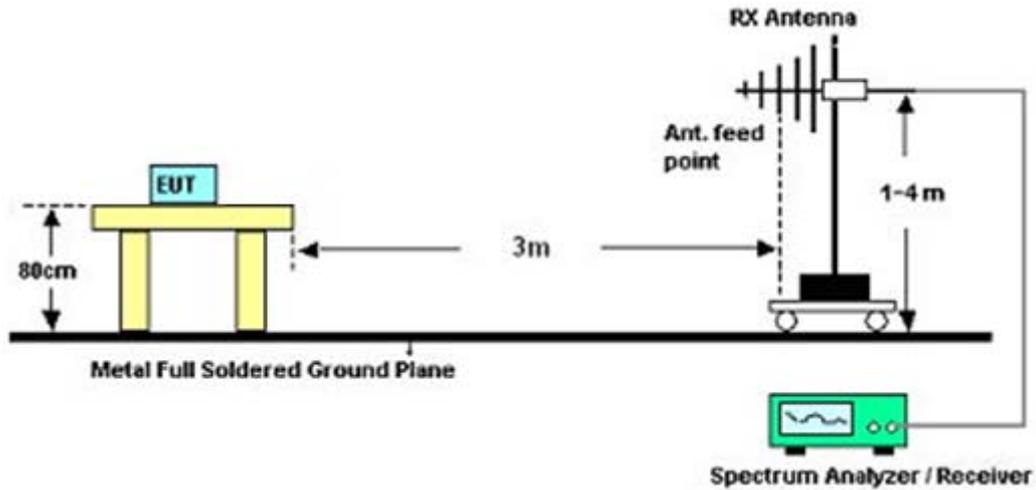
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters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

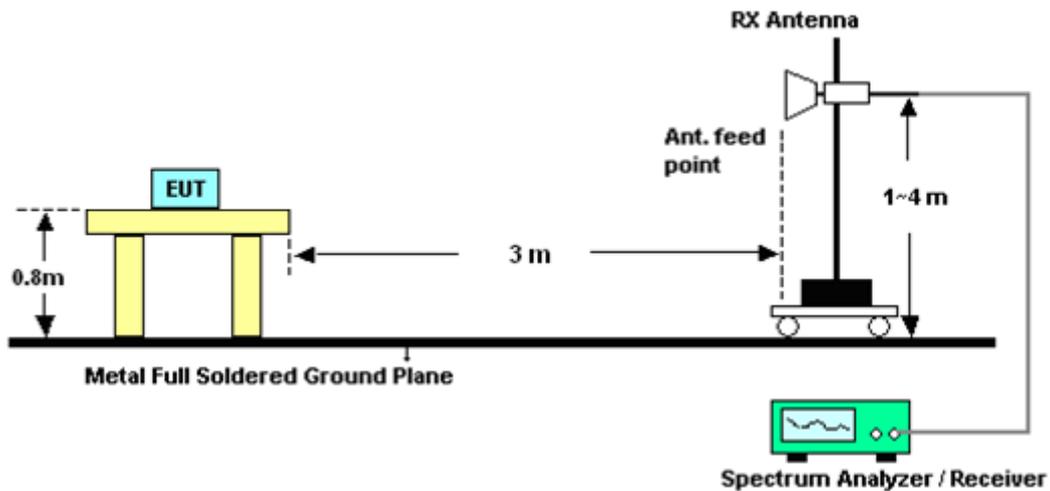
For radiated emissions below 30MHz



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

3.5.6.1 Test Result of Radiated Band Edges

Test Mode :	802.11a	Temperature :	21~22°C
Test Channel :	36	Relative Humidity :	43~43%
Test Engineer :	Steven Hao		

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
5147.27	68.36	-5.64	74	61.31	35.25	3.21	31.41	100	50	Peak
5149.95	51.04	-2.96	54	43.99	35.25	3.21	31.41	100	50	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
5145.26	62.47	-11.53	74	55.42	35.25	3.21	31.41	167	340	Peak
5149.95	47.98	-6.02	54	40.93	35.25	3.21	31.41	167	340	Average

Test Mode :	802.11a	Temperature :	21~22°C
Test Channel :	48	Relative Humidity :	43~43%
Test Engineer :	Steven Hao		

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
5376.51	53.6	-20.4	74	46.23	35.33	3.27	31.23	130	68	Peak
5398.07	40.62	-13.38	54	33.18	35.35	3.28	31.19	130	68	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
5371.78	53.75	-20.25	74	46.38	35.33	3.27	31.23	105	300	Peak
5408.52	40.59	-13.41	54	33.15	35.35	3.28	31.19	105	300	Average



Test Mode :	802.11n HT20	Temperature :	21~22°C
Test Channel :	36	Relative Humidity :	43~43%
Test Engineer :	Steven Hao		

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
5149.95	67.17	-6.83	74	60.12	35.25	3.21	31.41	124	62	Peak
5149.95	50.8	-3.2	54	43.75	35.25	3.21	31.41	124	62	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
5147.27	61.55	-12.45	74	54.5	35.25	3.21	31.41	101	315	Peak
5149.95	46.22	-7.78	54	39.17	35.25	3.21	31.41	101	315	Average

Test Mode :	802.11n HT20	Temperature :	21~22°C
Test Channel :	48	Relative Humidity :	43~43%
Test Engineer :	Steven Hao		

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
5362.65	53.44	-20.56	74	46.07	35.33	3.27	31.23	103	298	Peak
5357.92	40.41	-13.59	54	33.06	35.32	3.27	31.24	103	298	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
5394.11	53.42	-20.58	74	46.01	35.34	3.28	31.21	101	300	Peak
5395.1	40.54	-13.46	54	33.1	35.35	3.28	31.19	101	300	Average

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

<b>Test Mode :</b>	802.11a	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	36	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
30.11	20.32	-19.68	40	35.55	18	0.34	33.57	-	-	Peak
106.39	20.83	-22.67	43.5	42.42	11.43	0.59	33.61	-	-	Peak
129.01	21.34	-22.16	43.5	42.55	11.71	0.67	33.59	-	-	Peak
194.45	21.46	-22.04	43.5	45.46	8.75	0.81	33.56	-	-	Peak
219.08	22.67	-23.33	46	45.31	10.03	0.85	33.52	-	-	Peak
942.13	31.37	-14.63	46	41.36	20.7	1.75	32.44	145	0	Peak
5180	107.91	-	-	100.81	35.26	3.22	31.38	168	53	Peak
5180	95.59	-	-	88.49	35.26	3.22	31.38	168	53	Average
10360	63.7	-10.3	74	52.48	37.5	3.53	29.81	103	3	Peak
10360	46.4	-7.6	54	35.18	37.5	3.53	29.81	103	3	Average



<b>Test Mode :</b>	802.11a	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	36	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
30	30.42	-9.58	40	45.65	18	0.34	33.57	125	78	Peak
40.85	25.21	-14.79	40	46.82	11.64	0.39	33.64	-	-	Peak
129.01	23.44	-20.06	43.5	44.65	11.71	0.67	33.59	-	-	Peak
222.17	17.92	-28.08	46	40.32	10.25	0.86	33.51	-	-	Peak
552.88	23.21	-22.79	46	36.39	18.5	1.33	33.01	-	-	Peak
875.25	28.21	-17.79	46	38.61	20.48	1.7	32.58	-	-	Peak
5180	104.18	-	-	97.08	35.26	3.22	31.38	200	51	Peak
5180	92.81	-	-	85.71	35.26	3.22	31.38	200	51	Average
10360	65.84	-8.16	74	54.62	37.5	3.53	29.81	129	0	Peak
10360	49.49	-4.51	54	38.27	37.5	3.53	29.81	129	0	Average



<b>Test Mode :</b>	802.11a	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	44	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	<ol style="list-style-type: none"> <li>5220 MHz is fundamental signal which can be ignored.</li> <li>10440 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.</li> <li>Average measurement was not performed if peak level went lower than the average limit.</li> </ol>		

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	107.63	-	-	100.49	35.27	3.23	31.36	100	69	Peak
5220	93.23	-	-	86.09	35.27	3.23	31.36	100	69	Average
10440	64.65	-9.35	74	53.32	37.55	3.6	29.82	104	0	Peak
10440	48.42	-5.58	54	37.09	37.55	3.6	29.82	104	0	Average

<b>Test Mode :</b>	802.11a	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	44	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	<ol style="list-style-type: none"> <li>5220 MHz is fundamental signal which can be ignored.</li> <li>10440 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.</li> <li>Average measurement was not performed if peak level went lower than the average limit.</li> </ol>		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
5220	103.14	-	-	96	35.27	3.23	31.36	139	7	Peak
5220	91.98	-	-	84.84	35.27	3.23	31.36	139	7	Average
10440	66.43	-7.57	74	55.1	37.55	3.6	29.82	116	360	Peak
10440	49.12	-4.88	54	37.79	37.55	3.6	29.82	116	360	Average



<b>Test Mode :</b>	802.11a	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	48	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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	109.08	-	-	101.92	35.28	3.23	31.35	134	61	Peak
5240	96.75	-	-	89.59	35.28	3.23	31.35	134	61	Average
10480	65.09	-8.91	74	53.68	37.6	3.64	29.83	103	353	Peak
10480	48.69	-5.31	54	37.28	37.6	3.64	29.83	103	353	Average

<b>Test Mode :</b>	802.11a	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	48	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	103.85	-	-	96.69	35.28	3.23	31.35	100	306	Peak
5240	92.14	-	-	84.98	35.28	3.23	31.35	100	306	Average
10480	66.03	-7.97	74	54.62	37.6	3.64	29.83	116	1	Peak
10480	48.66	-5.34	54	37.25	37.6	3.64	29.83	116	1	Average



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	36	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	<ol style="list-style-type: none"> <li>5180 MHz is fundamental signal which can be ignored.</li> <li>10360 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.</li> <li>Average measurement was not performed if peak level went lower than the average limit.</li> </ol>		

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	107.41	-	-	100.31	35.26	3.22	31.38	100	65	Peak
5180	95.68	-	-	88.58	35.26	3.22	31.38	100	65	Average
10360	64.38	-9.62	74	53.16	37.5	3.53	29.81	104	8	Peak
10360	47.41	-6.59	54	36.19	37.5	3.53	29.81	104	8	Average

<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	36	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	<ol style="list-style-type: none"> <li>5180 MHz is fundamental signal which can be ignored.</li> <li>10360 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.</li> <li>Average measurement was not performed if peak level went lower than the average limit.</li> </ol>		

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	103.5	-	-	96.4	35.26	3.22	31.38	139	350	Peak
5180	91.99	-	-	84.89	35.26	3.22	31.38	139	350	Average
10360	67.04	-6.96	74	55.82	37.5	3.53	29.81	130	346	Peak
10360	49.84	-4.16	54	38.62	37.5	3.53	29.81	130	346	Average



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	44	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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	108.29	-	-	101.15	35.27	3.23	31.36	135	64	Peak
5220	96.33	-	-	89.19	35.27	3.23	31.36	135	64	Average
10440	63.69	-10.31	74	52.36	37.55	3.6	29.82	102	332	Peak
10440	46.7	-7.3	54	35.37	37.55	3.6	29.82	102	332	Average

<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	44	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	102.61	-	-	95.47	35.27	3.23	31.36	102	314	Peak
5220	91.76	-	-	84.62	35.27	3.23	31.36	102	314	Average
10440	63.81	-10.19	74	52.48	37.55	3.6	29.82	100	3	Peak
10440	47.91	-6.09	54	36.58	37.55	3.6	29.82	100	3	Average



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	48	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	<ol style="list-style-type: none"> <li>5240 MHz is fundamental signal which can be ignored.</li> <li>10480 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.</li> <li>Average measurement was not performed if peak level went lower than the average limit.</li> </ol>		

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	107.97	-	-	100.81	35.28	3.23	31.35	121	64	Peak
5240	96.62	-	-	89.46	35.28	3.23	31.35	121	64	Average
10480	64.3	-9.7	74	52.89	37.6	3.64	29.83	103	338	Peak
10480	47	-7	54	35.59	37.6	3.64	29.83	103	338	Average

<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	48	<b>Relative Humidity :</b>	43~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	<ol style="list-style-type: none"> <li>5240 MHz is fundamental signal which can be ignored.</li> <li>10480 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.</li> <li>Average measurement was not performed if peak level went lower than the average limit.</li> </ol>		

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	104.2	-	-	97.04	35.28	3.23	31.35	101	309	Peak
5240	92.24	-	-	85.08	35.28	3.23	31.35	101	309	Average
10480	64.86	-9.14	74	53.45	37.6	3.64	29.83	106	348	Peak
10480	48.06	-5.94	54	36.65	37.6	3.64	29.83	106	348	Average

## 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 $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

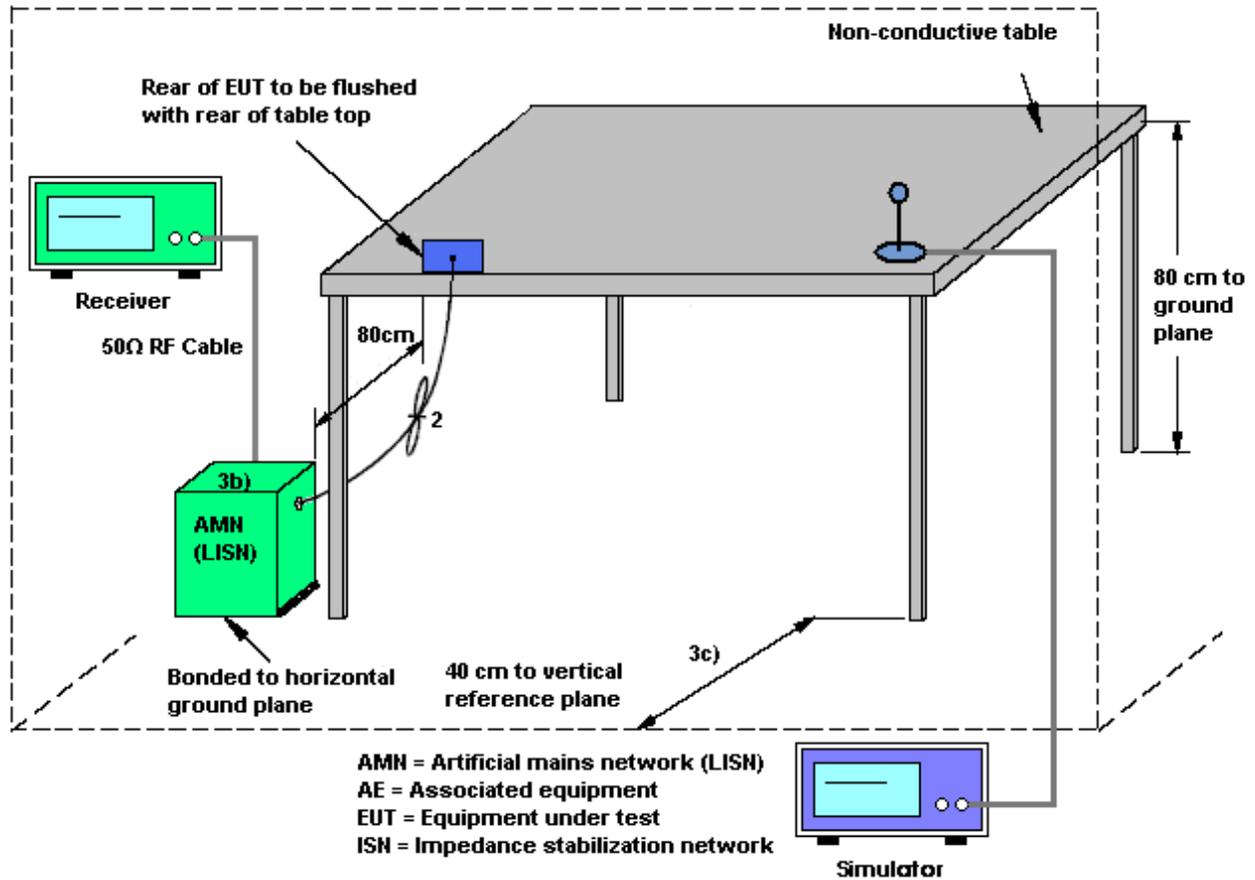
### 3.6.2 Measuring Instruments

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.

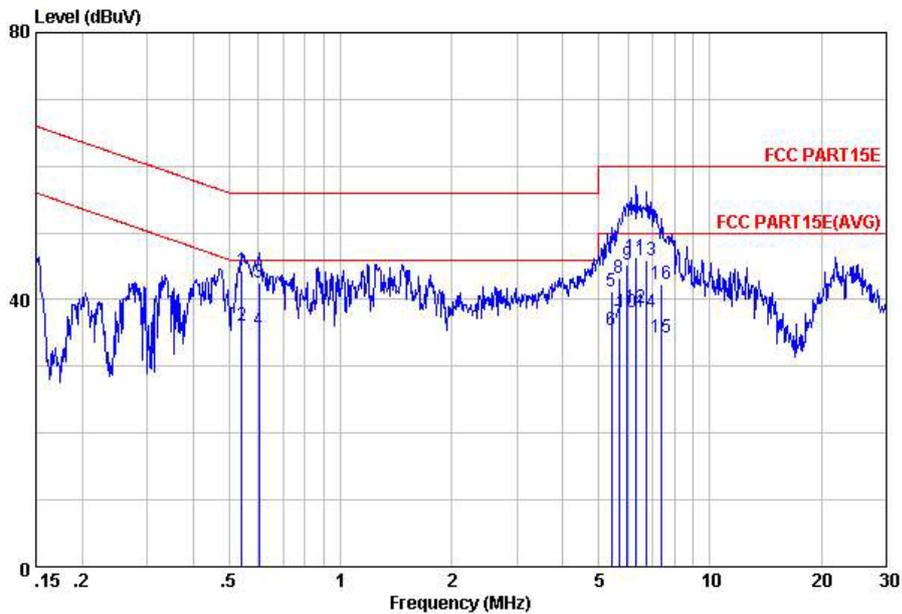
### 3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	CDMA2000 BC0 + USB Cable (Charging from Adapter) + Bluetooth Link + WLAN 5GHz Link + NFC Tx		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

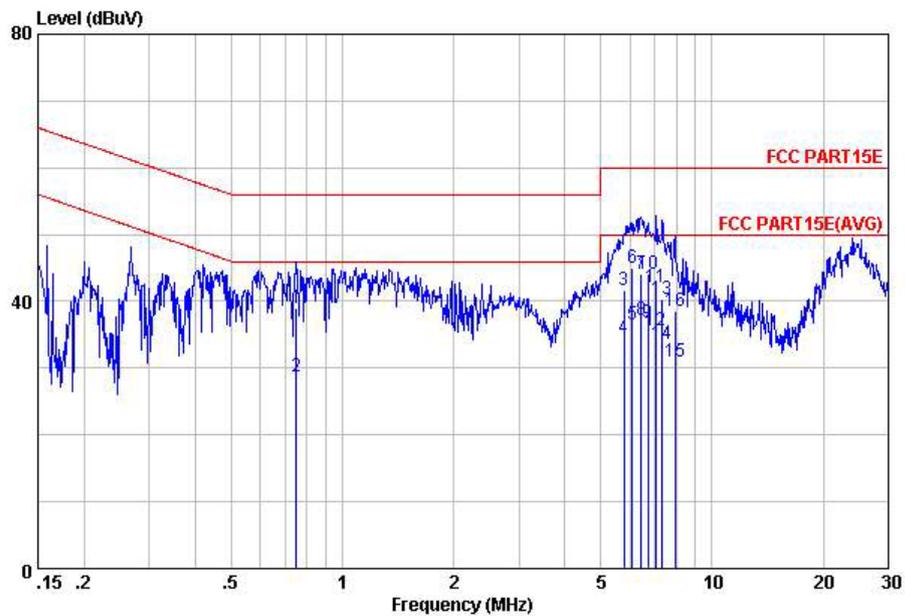


Site : C001-KS  
 Condition: FCC PART15E LISN-L20130306 LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.54	44.36	-11.64	56.00	33.90	0.20	10.26	QP
2	0.54	36.16	-9.84	46.00	25.70	0.20	10.26	Average
3	0.60	42.66	-13.34	56.00	32.20	0.20	10.26	QP
4	0.60	35.36	-10.64	46.00	24.90	0.20	10.26	Average
5	5.42	41.34	-18.66	60.00	30.80	0.20	10.34	QP
6	5.42	35.54	-14.46	50.00	25.00	0.20	10.34	Average
7	5.68	36.64	-13.36	50.00	26.10	0.20	10.34	Average
8	5.68	43.14	-16.86	60.00	32.60	0.20	10.34	QP
9	5.96	45.14	-14.86	60.00	34.60	0.20	10.34	QP
10	5.96	38.14	-11.86	50.00	27.60	0.20	10.34	Average
11	6.32	46.35	-13.65	60.00	35.81	0.20	10.34	QP
12	6.32	38.74	-11.26	50.00	28.20	0.20	10.34	Average
13	6.73	45.85	-14.15	60.00	35.30	0.20	10.35	QP
14	6.73	38.15	-11.85	50.00	27.60	0.20	10.35	Average
15	7.41	34.25	-15.75	50.00	23.70	0.20	10.35	Average
16	7.41	42.25	-17.75	60.00	31.70	0.20	10.35	QP



Test Mode :	Mode 1	Temperature :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	CDMA2000 BC0 + USB Cable (Charging from Adapter) + Bluetooth Link + WLAN 5GHz Link + NFC Tx		
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	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.75	38.96	-17.04	56.00	28.50	0.19	10.27	QP
2	0.75	28.76	-17.24	46.00	18.30	0.19	10.27	Average
3	5.77	41.74	-18.26	60.00	31.20	0.20	10.34	QP
4	5.77	34.44	-15.56	50.00	23.90	0.20	10.34	Average
5	6.09	36.64	-13.36	50.00	26.10	0.20	10.34	Average
6	6.09	44.94	-15.06	60.00	34.40	0.20	10.34	QP
7	6.42	44.05	-15.95	60.00	33.50	0.20	10.35	QP
8	6.42	37.25	-12.75	50.00	26.70	0.20	10.35	Average
9	6.70	36.75	-13.25	50.00	26.20	0.20	10.35	Average
10	6.70	44.15	-15.85	60.00	33.60	0.20	10.35	QP
11	7.06	42.05	-17.95	60.00	31.50	0.20	10.35	QP
12	7.06	35.55	-14.45	50.00	25.00	0.20	10.35	Average
13	7.33	40.25	-19.75	60.00	29.70	0.20	10.35	QP
14	7.33	33.75	-16.25	50.00	23.20	0.20	10.35	Average
15	7.94	30.96	-19.04	50.00	20.40	0.20	10.36	Average
16	7.94	38.56	-21.44	60.00	28.00	0.20	10.36	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.

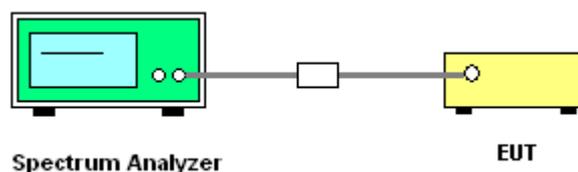
### 3.7.2 Measuring Instruments

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°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Band	Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
NII Band 1	36	5180	5171.70	5188.30	0.00
	44	5220	5211.75	5228.30	4.79
	48	5240	5231.70	5248.30	0.00

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Band	Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
NII Band 1	36	5180	5171.10	5188.90	0.00
	44	5220	5211.05	5228.90	-4.79
	48	5240	5231.05	5248.90	-4.77

## 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 gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 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	Apr. 24, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 22, 2012	Apr. 24, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 22, 2012	Apr. 24, 2013	Aug. 21, 2013	Conducted (TH01-KS)
DC Power Supply	GWINSTEK	GPS-3030D	E1884515	N/A	Aug. 22, 2012	Apr. 24, 2013	Aug. 21, 2013	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 08, 2012	Apr. 22, 2013	Nov. 07, 2013	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	100400	9kHz~30GHz	Jun. 01, 2012	Apr. 22, 2013	May 31, 2013	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2012	Apr. 22, 2013	Dec. 06, 2013	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 03, 2012	Apr. 22, 2013	Jul. 02, 2014	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2013	Apr. 22, 2013	Jan. 06, 2014	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz	Jun. 01, 2012	Apr. 22, 2013	May 31, 2013	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 29, 2012	Apr. 22, 2013	Dec. 28, 2013	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2012	Apr. 22, 2013	Nov. 06, 2013	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170249	15GHz~40GHz	Nov. 23, 2012	Apr. 22, 2013	Nov. 22, 2013	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 01, 2012	Apr. 23, 2013	May 31, 2013	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Dec. 29, 2012	Apr. 23, 2013	Dec. 28, 2013	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Dec. 29, 2012	Apr. 23, 2013	Dec. 28, 2013	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	N/A	Nov. 15, 2012	Apr. 23, 2013	Nov. 14, 2013	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/066	2G Full-Band	Dec. 29, 2012	Apr. 23, 2013	Dec. 28, 2013	Conduction (CO01-KS)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.54
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### Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.72
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### Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.26
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## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP320404 as below.