

# FCC RF Test Report

**APPLICANT** : ZTE CORPORATION  
**EQUIPMENT** : CDMA/LTE Dual-Mode Digital Mobile Phone  
**BRAND NAME** : ZTE  
**MODEL NAME** : ZTE N9511  
**FCC ID** : SRQ-ZTEN9511  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

The product was received on Jun. 05, 2013 and completely tested on Jul. 15, 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: Joseph Lin / Supervisor



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	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 8.33 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.54 dB at 0.510 MHz
3.7	15.203 & 15.247(b)	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	CDMA/LTE Dual-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	ZTE N9511
FCC ID	SRQ-ZTEN9511
EUT supports Radios application	CDMA/EV-DO/LTE/WLAN 11bgn/Bluetooth 2.1/3.0/4.0
HW Version	cyfA
SW Version	N9511V1.0.0B01
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

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz
Maximum Output Power to Antenna	802.11b : 16.72 dBm (0.0470 W) 802.11g : 22.03 dBm (0.1596 W) 802.11n HT20 : 21.33 dBm (0.1358 W)
Antenna Type	802.11b/g/n : PIFA Antenna type with gain -3.0 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

## 1.5 Modification of EUT

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

## 1.6 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

**Note:** The test site complies with ANSI C63.4 2003 requirement.

## 1.7 Applied Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01
- ♦ 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)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

## 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.

Channel	Frequency	802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	16.72	16.61	16.58	16.66
CH 06	2437 MHz	16.33	16.42	16.48	16.61
CH 11	2462 MHz	16.15	16.02	16.05	16.12

Channel	Frequency	802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	21.66	21.55	21.49	21.53	21.46	21.65	21.52	21.59
CH 06	2437 MHz	22.03	21.85	21.65	21.62	21.55	21.69	21.56	21.88
CH 11	2462 MHz	21.75	21.82	21.75	21.78	21.65	21.69	21.85	21.84

Channel	Frequency	802.11n HT20 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
CH 01	2412 MHz	21.33	21.15	21.09	20.96	20.85	20.79	20.88	20.98
CH 06	2437 MHz	21.02	20.98	20.93	20.91	20.72	20.81	20.76	21.06
CH 11	2462 MHz	21.15	20.86	20.75	20.69	20.62	20.63	20.77	20.82

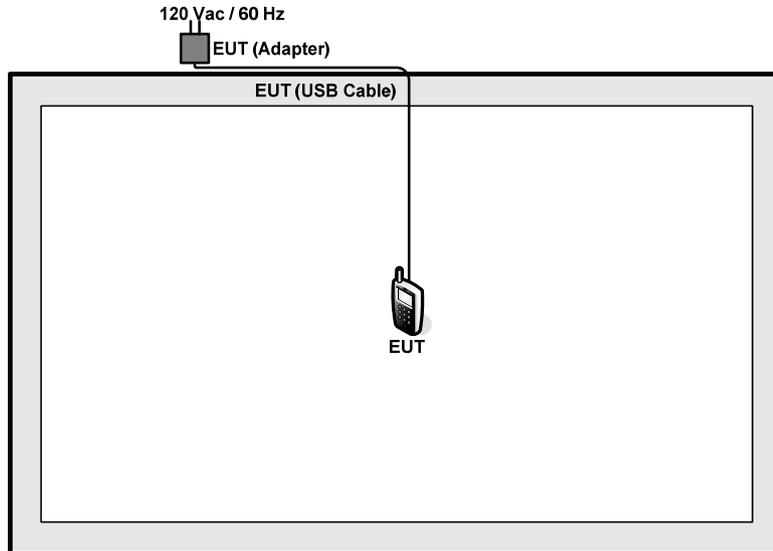
## 2.3 Test Mode

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

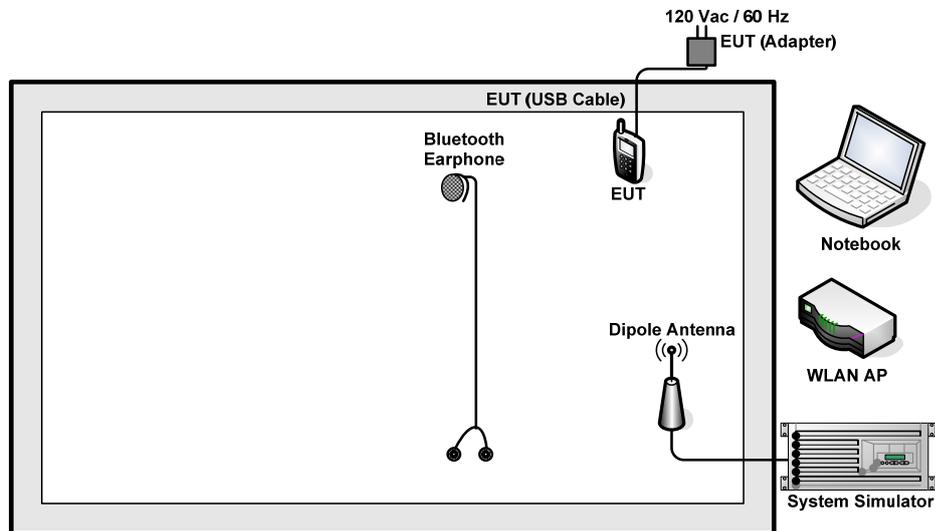
Test Cases				
	Test Items	Mode	Data Rate	Test Channel
Conducted TCs	6dB BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Conducted Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	6.5 Mbps	1/11
Conducted Spurious Emission	802.11b	1 Mbps	1/6/11	
	802.11g	6 Mbps	1/6/11	
	802.11n HT20	6.5 Mbps	1/6/11	
Radiated TCs	Radiated Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	6.5 Mbps	1/11
	Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
AC Conducted Emission	Mode 1 : CDMA2000 BC0 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter)			

## 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	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 0.9m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	N/A	N/A

## 2.6 EUT Operation Test Setup

For WLAN RF test items, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

## 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 6dB Bandwidth Measurement

##### 3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

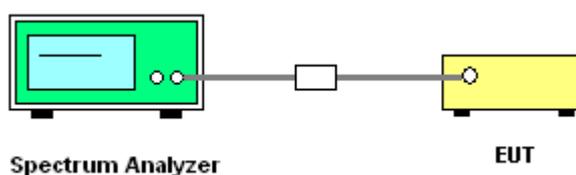
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r01.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. Measure and record the results in the test report.

##### 3.1.4 Test Setup





3.1.5 Test Result of 6dB Bandwidth

Test Mode :	802.11b	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	9.04	0.5	Pass
06	2437	8.08	0.5	Pass
11	2462	8.04	0.5	Pass

Test Mode :	802.11g	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.32	0.5	Pass
06	2437	16.32	0.5	Pass
11	2462	16.32	0.5	Pass

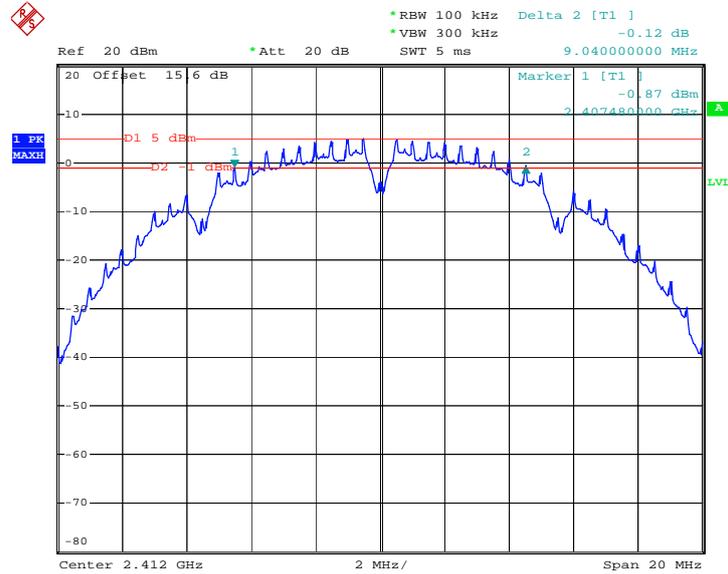
Test Mode :	802.11n HT20	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	802.11n HT20 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.52	0.5	Pass
06	2437	17.56	0.5	Pass
11	2462	17.20	0.5	Pass



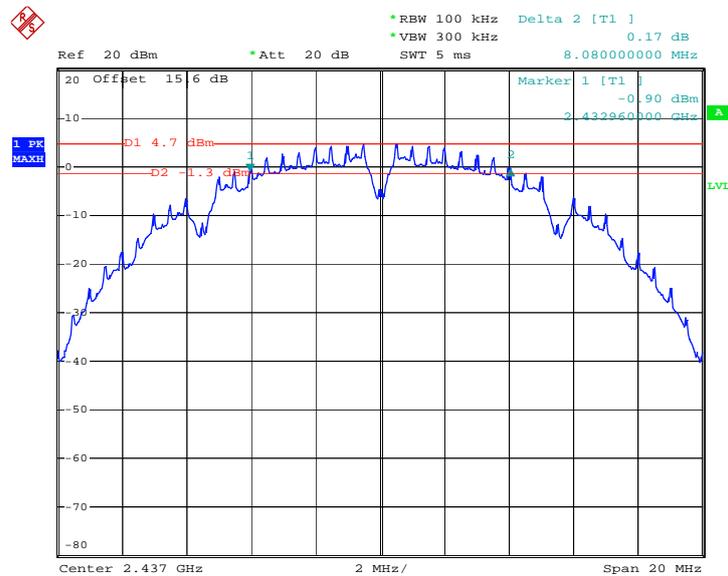
### 3.1.6 Test Result of 6dB Bandwidth Plots

#### 6 dB Bandwidth Plot on 802.11b Channel 01



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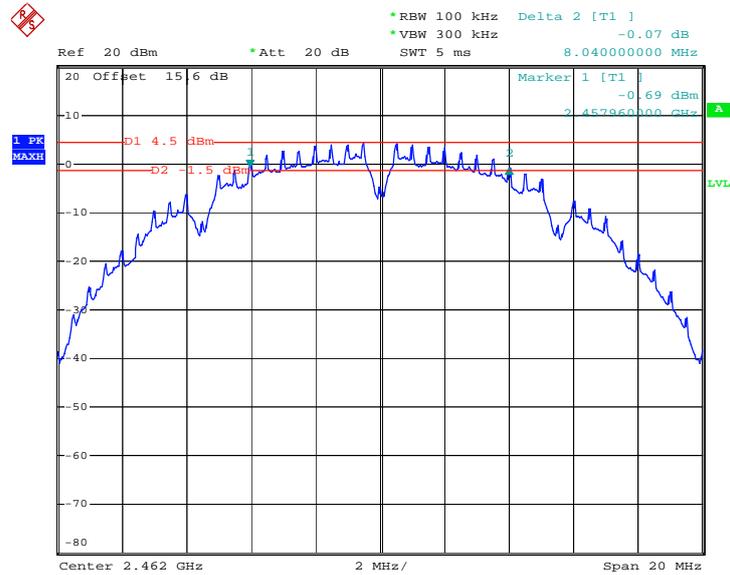
#### 6 dB Bandwidth Plot on 802.11b Channel 06



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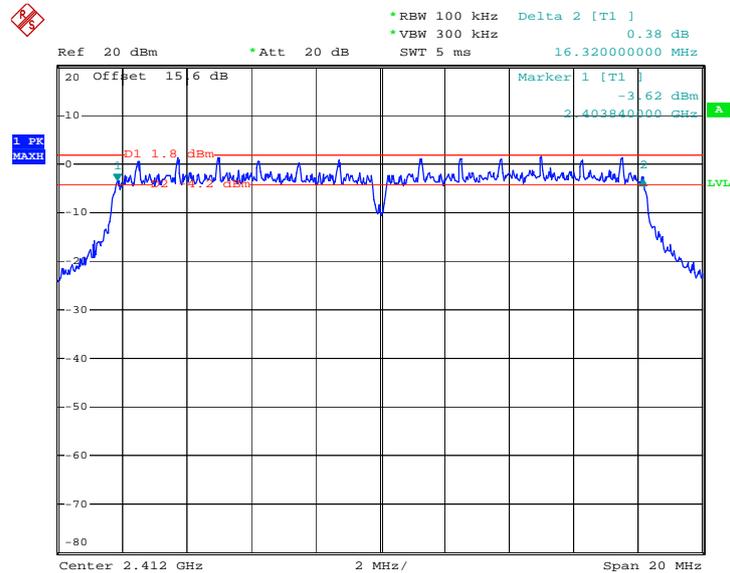


6 dB Bandwidth Plot on 802.11b Channel 11



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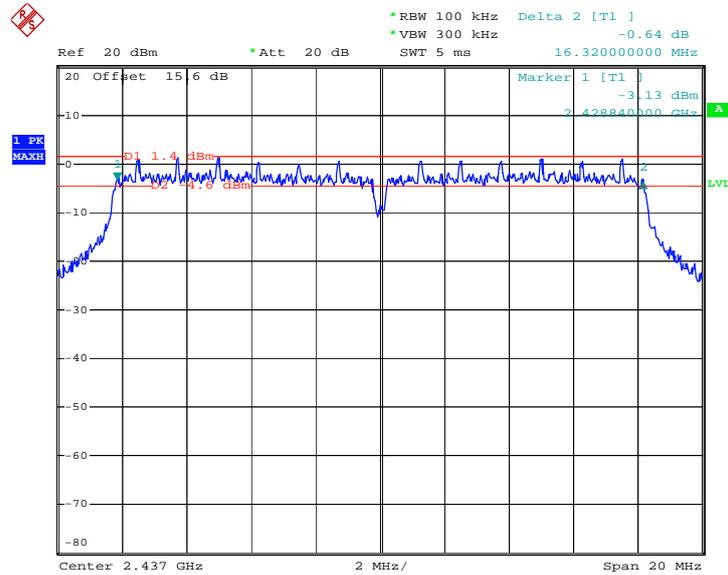
6 dB Bandwidth Plot on 802.11g Channel 01



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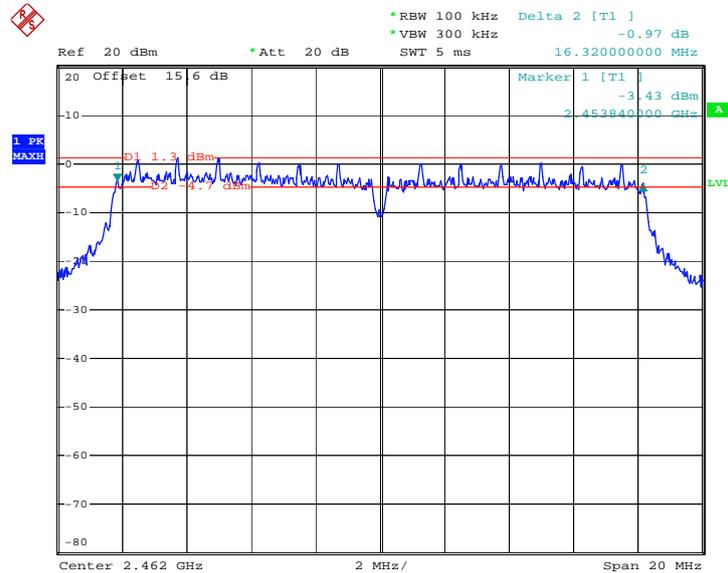


6 dB Bandwidth Plot on 802.11g Channel 06



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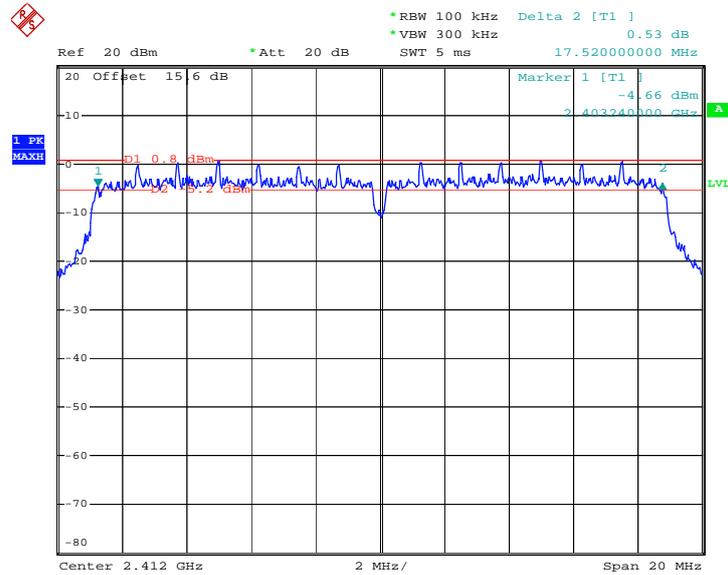
6 dB Bandwidth Plot on 802.11g Channel 11



Date: 23.JUN.2013 20:34:06

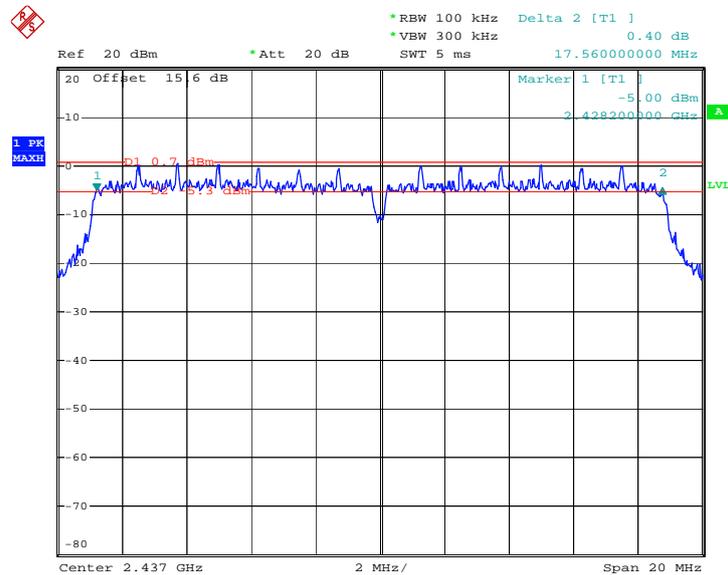


6 dB Bandwidth Plot on 802.11n HT20 Channel 01



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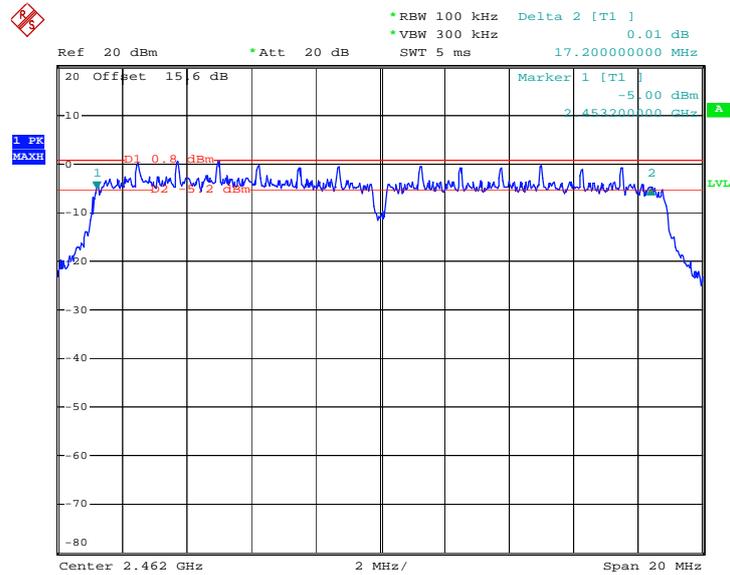
6 dB Bandwidth Plot on 802.11n HT20 Channel 06



Date: 23.JUN.2013 20:48:23



6 dB Bandwidth Plot on 802.11n HT20 Channel 11



Date: 23.JUN.2013 20:55:51

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting Antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the Antenna exceeds 6dBi.

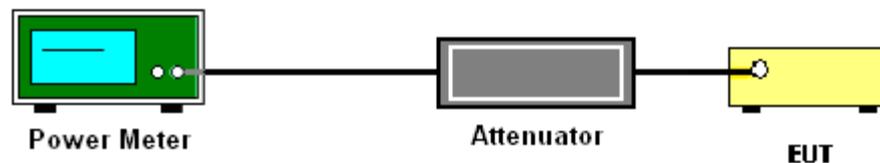
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup





3.2.5 Test Result of Peak Output Power

Test Mode :	802.11b	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	16.72	30	Pass
06	2437	16.33	30	Pass
11	2462	16.15	30	Pass

Test Mode :	802.11g	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	21.66	30	Pass
06	2437	22.03	30	Pass
11	2462	21.75	30	Pass

Test Mode :	802.11n HT20	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	802.11n HT20 Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	21.33	30	Pass
06	2437	21.02	30	Pass
11	2462	21.15	30	Pass



3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	802.11b	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%
Duty Cycle:	97.63%	Duty Factor:	0.10dB

Channel	Frequency (MHz)	802.11b Average Output Power (dBm)
01	2412	14.09
06	2437	13.65
11	2462	13.33

Test Mode :	802.11g	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%
Duty Cycle:	87.26%	Duty Factor:	0.59dB

Channel	Frequency (MHz)	802.11g Average Output Power (dBm)
01	2412	13.34
06	2437	13.18
11	2462	12.92

Test Mode :	802.11n HT20	Temperature :	20~21°C
Test Engineer :	Neil Zhu	Relative Humidity :	40~41%
Duty Cycle:	86.41%	Duty Factor:	0.63dB

Channel	Frequency (MHz)	802.11n HT20 Average Output Power (dBm)
01	2412	12.62
06	2437	12.34
11	2462	12.05

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

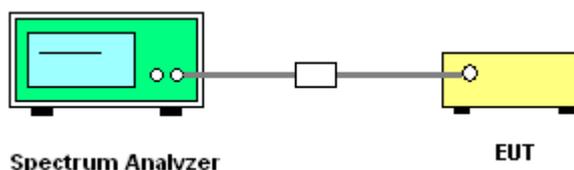
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

#### 3.3.4 Test Setup



**3.3.5 Test Result of Power Spectral Density**

<b>Test Mode :</b>	802.11b	<b>Temperature :</b>	20~21°C
<b>Test Engineer :</b>	Neil Zhu	<b>Relative Humidity :</b>	40~41%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm/3kHz)	Pass/Fail
		PSD/100kHz (dBm)	PSD/3kHz (dBm)		
01	2412	5.02	-9.23	8	Pass
06	2437	4.30	-9.04	8	Pass
11	2462	4.23	-9.12	8	Pass

<b>Test Mode :</b>	802.11g	<b>Temperature :</b>	20~21°C
<b>Test Engineer :</b>	Neil Zhu	<b>Relative Humidity :</b>	40~41%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm/3kHz)	Pass/Fail
		PSD/100kHz (dBm)	PSD/3kHz (dBm)		
01	2412	1.32	-13.41	8	Pass
06	2437	1.14	-13.12	8	Pass
11	2462	1.11	-13.64	8	Pass

<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	20~21°C
<b>Test Engineer :</b>	Neil Zhu	<b>Relative Humidity :</b>	40~41%

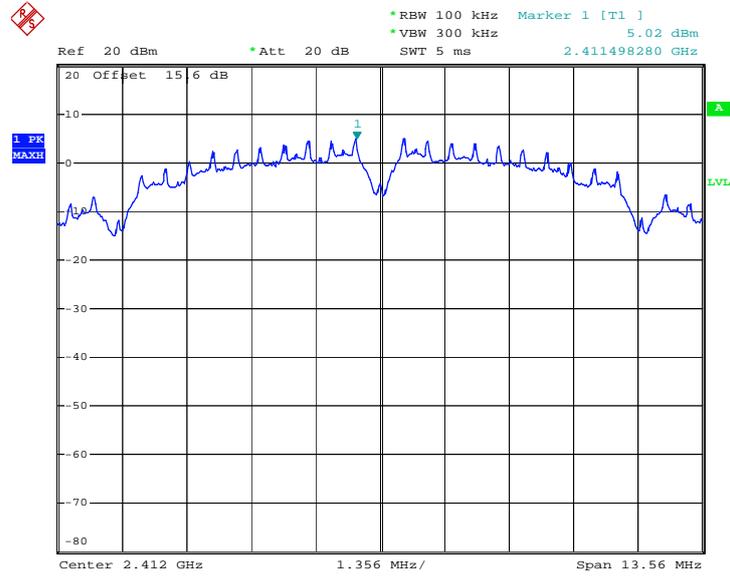
Channel	Frequency (MHz)	802.11n HT20 Power Density		Max. Limits (dBm/3kHz)	Pass/Fail
		PSD/100kHz (dBm)	PSD/3kHz (dBm)		
01	2412	0.39	-13.98	8	Pass
06	2437	0.40	-14.27	8	Pass
11	2462	0.38	-13.75	8	Pass

**Note:**

1. Measured power density (dBm) has offset with cable loss.
2. The Measured power density (dBm)/ 100kHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.

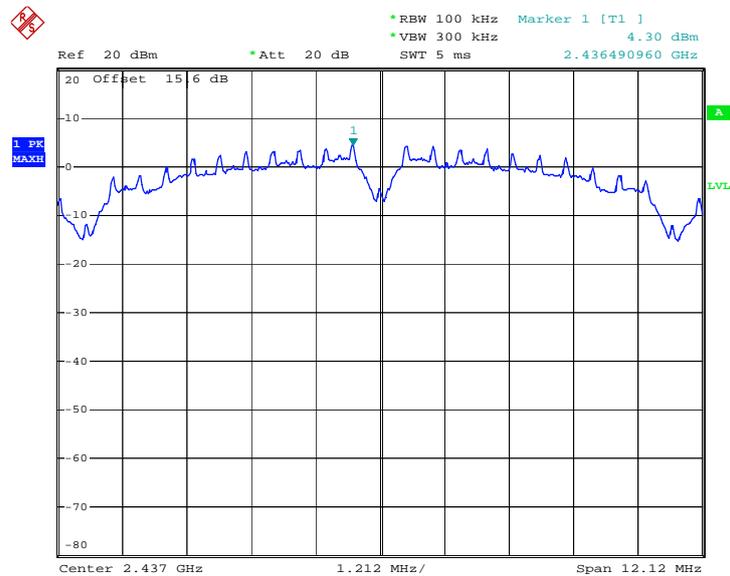
### 3.3.6 Test Result of Power Spectral Density Plots (100kHz)

PSD 100kHz Plot on 802.11b Channel 01



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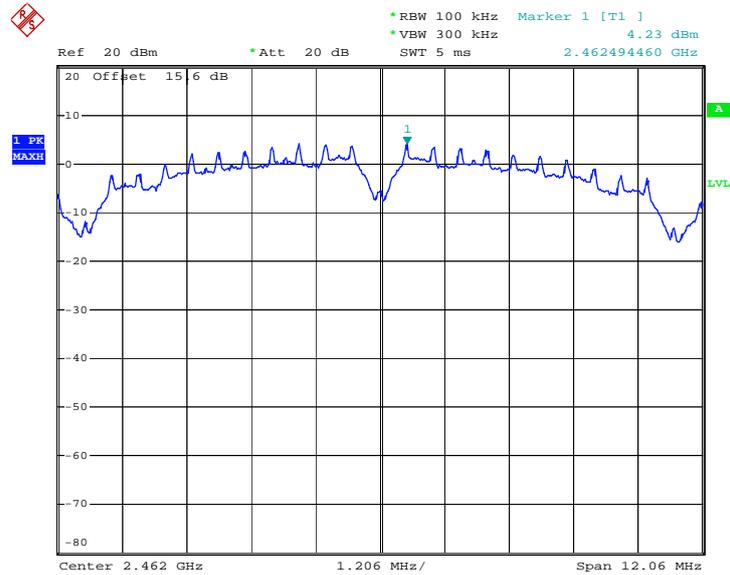
PSD 100kHz Plot on 802.11b Channel 06



Date: 23.JUN.2013 20:16:21

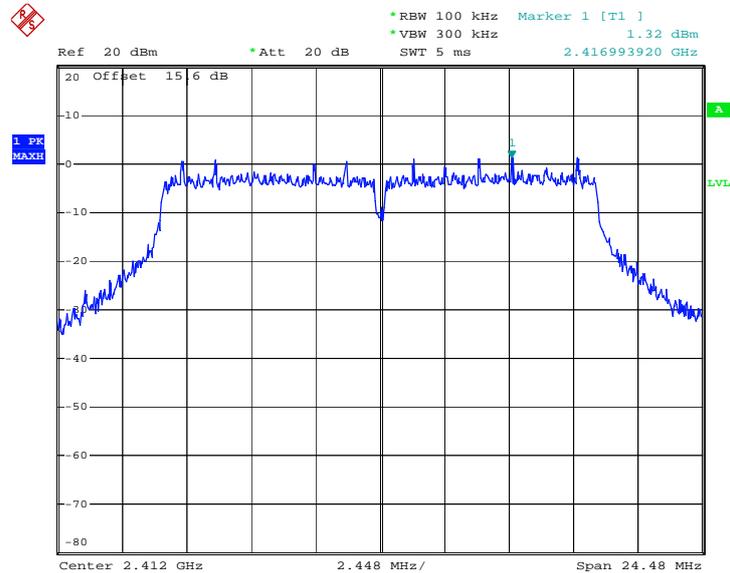


PSD 100kHz Plot on 802.11b Channel 11



Date: 23.JUN.2013 20:18:40

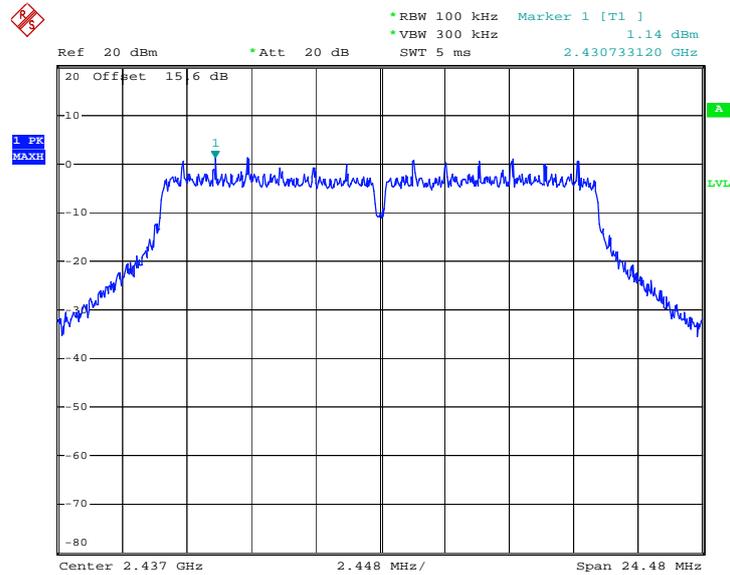
PSD 100kHz Plot on 802.11g Channel 01



Date: 23.JUN.2013 20:22:00

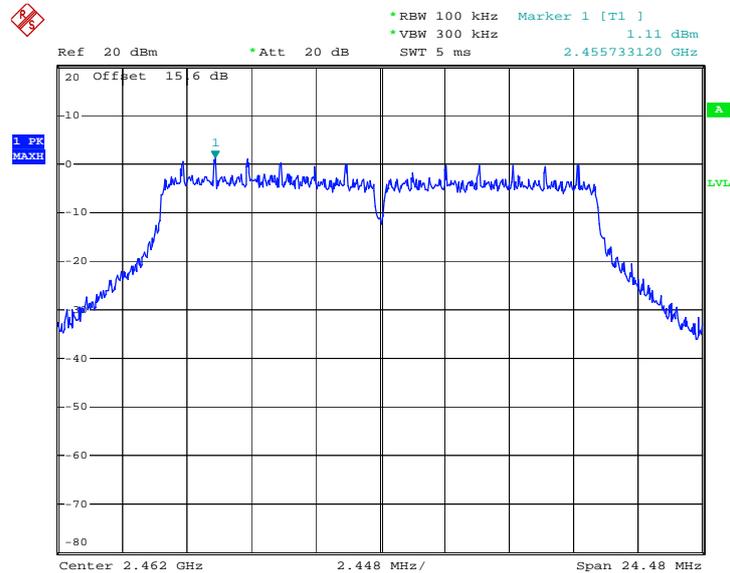


PSD 100kHz Plot on 802.11g Channel 06



Date: 23.JUN.2013 20:28:23

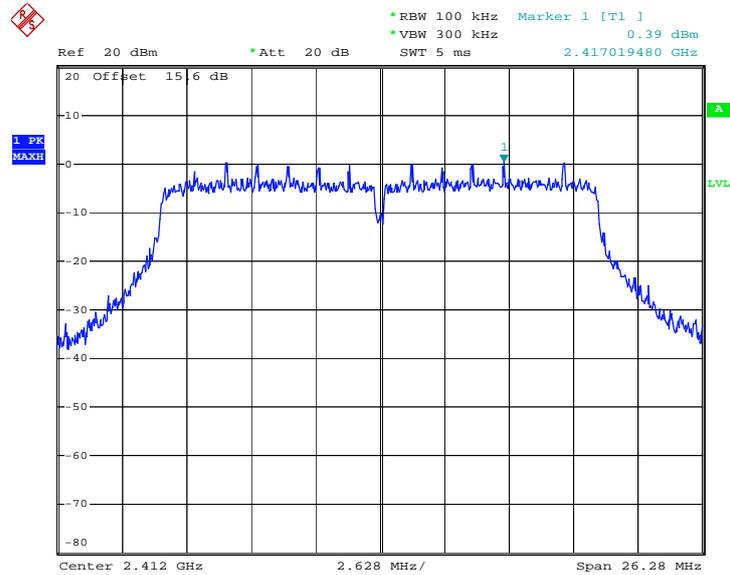
PSD 100kHz Plot on 802.11g Channel 11



Date: 23.JUN.2013 20:34:39

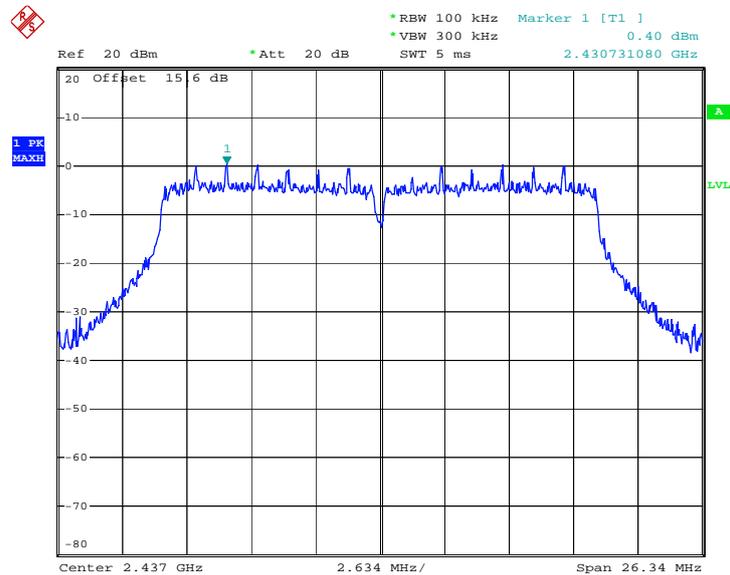


PSD 100kHz Plot on 802.11n HT20 Channel 01



Date: 23.JUN.2013 20:41:48

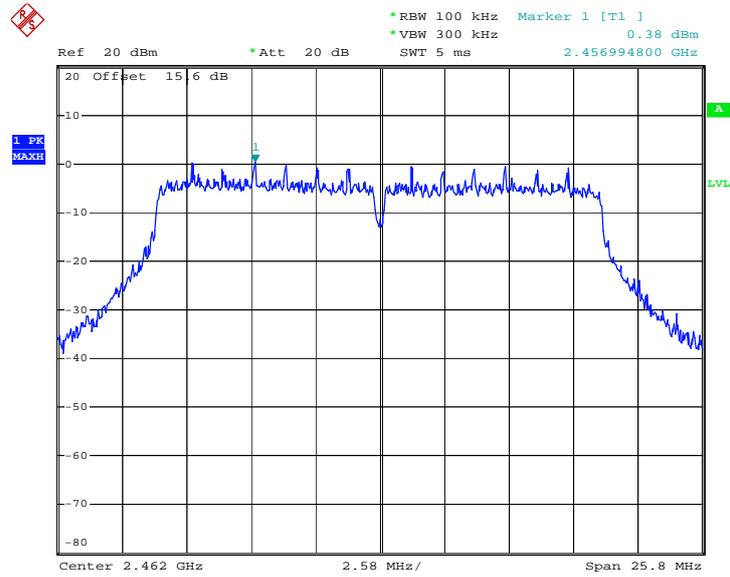
PSD 100kHz Plot on 802.11n HT20 Channel 06



Date: 23.JUN.2013 20:48:56



PSD 100kHz Plot on 802.11n HT20 Channel 11

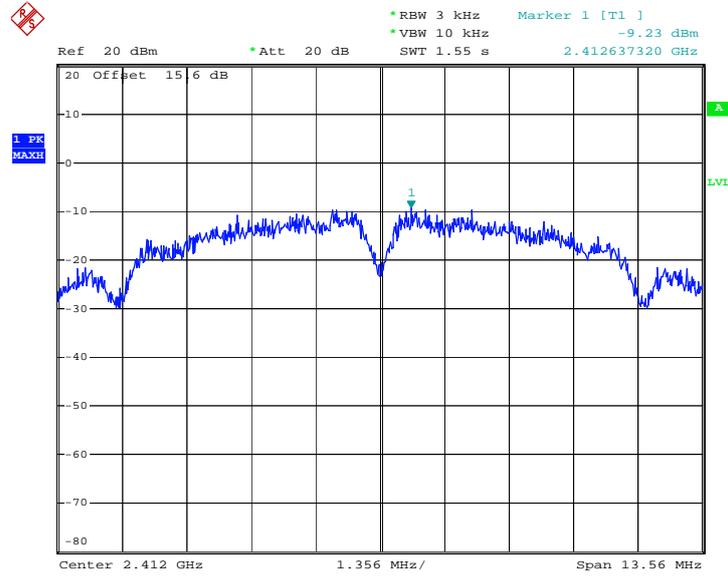


Date: 23.JUN.2013 20:56:24



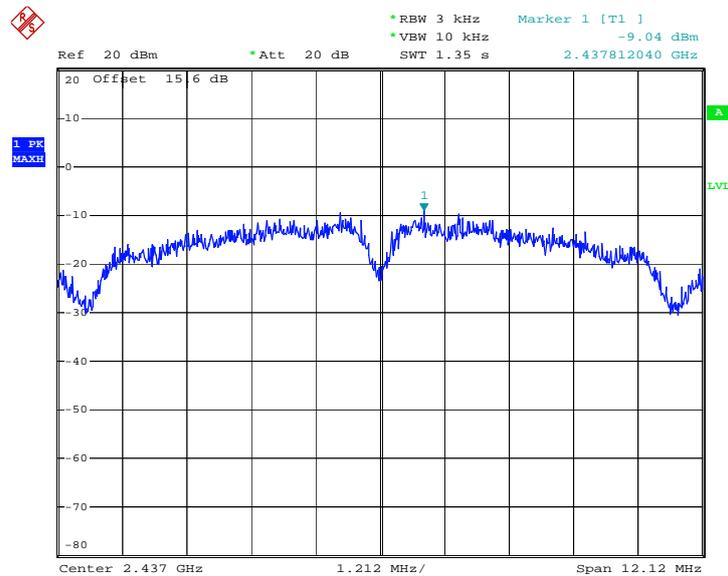
### 3.3.7 Test Result of Power Spectral Density Plots (3kHz)

PSD 3kHz Plot on 802.11b Channel 01



Date: 23.JUN.2013 20:13:22

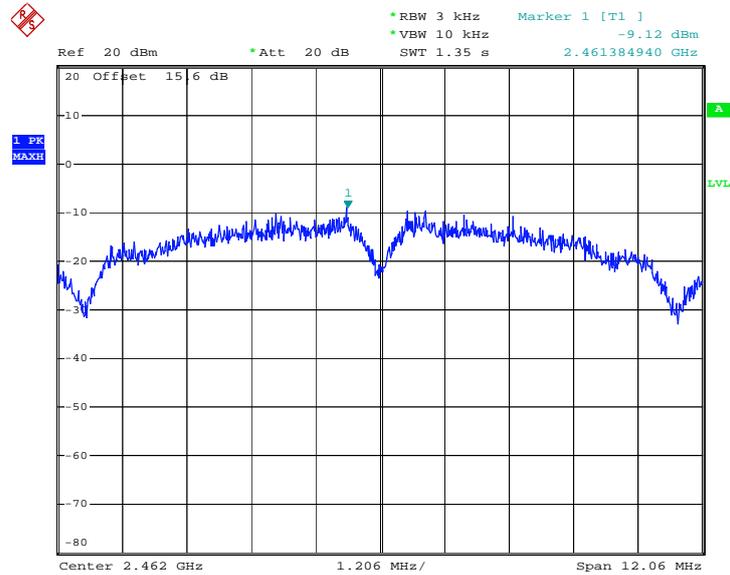
PSD 3kHz Plot on 802.11b Channel 06



Date: 23.JUN.2013 20:16:11

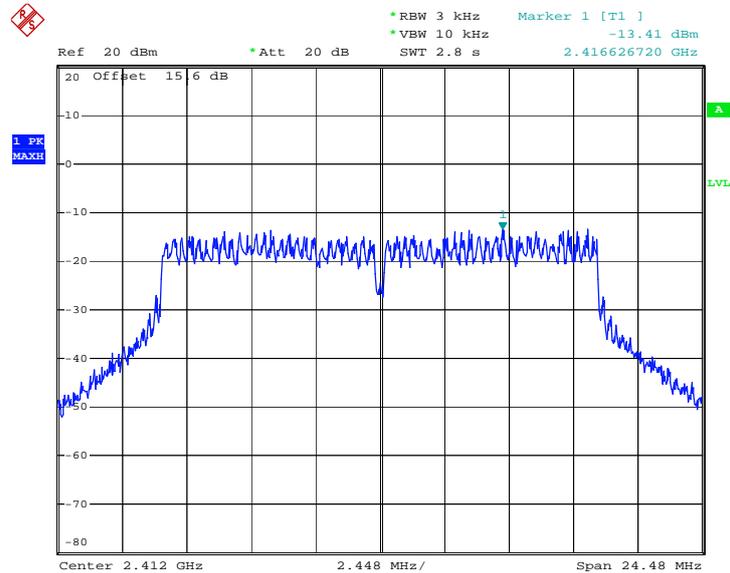


PSD 3kHz Plot on 802.11b Channel 11



Date: 23.JUN.2013 20:18:30

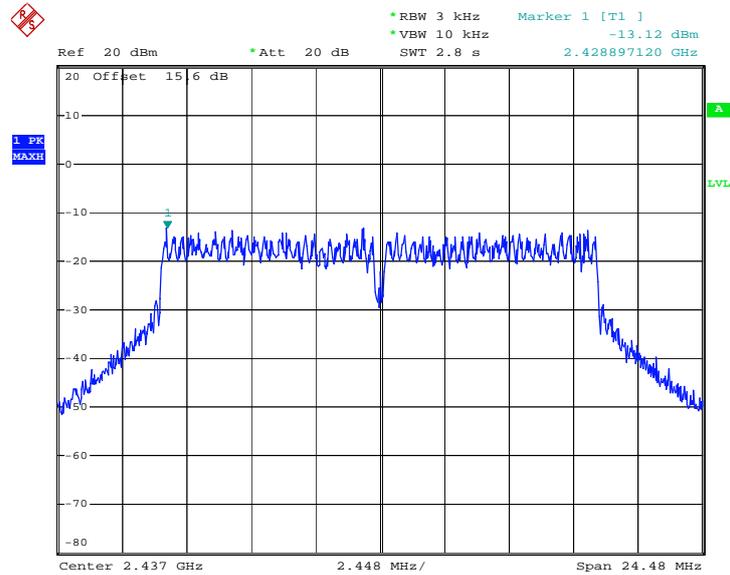
PSD 3kHz Plot on 802.11g Channel 01



Date: 23.JUN.2013 20:21:50

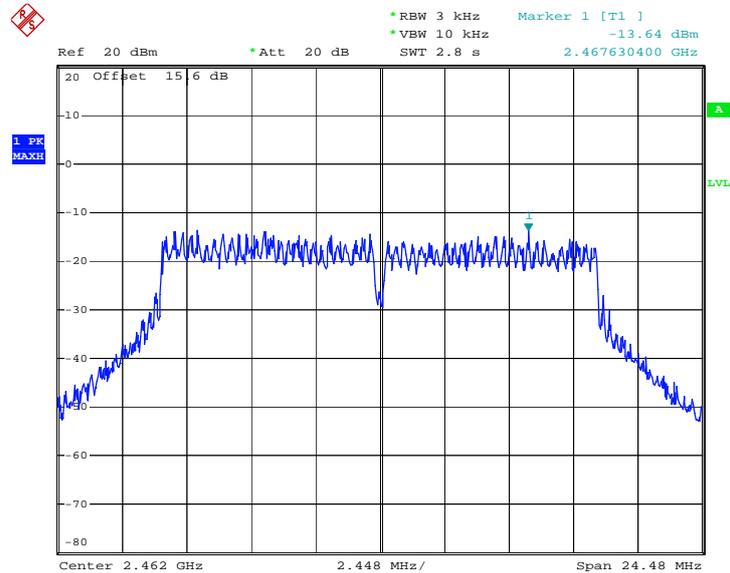


PSD 3kHz Plot on 802.11g Channel 06



Date: 23.JUN.2013 20:28:13

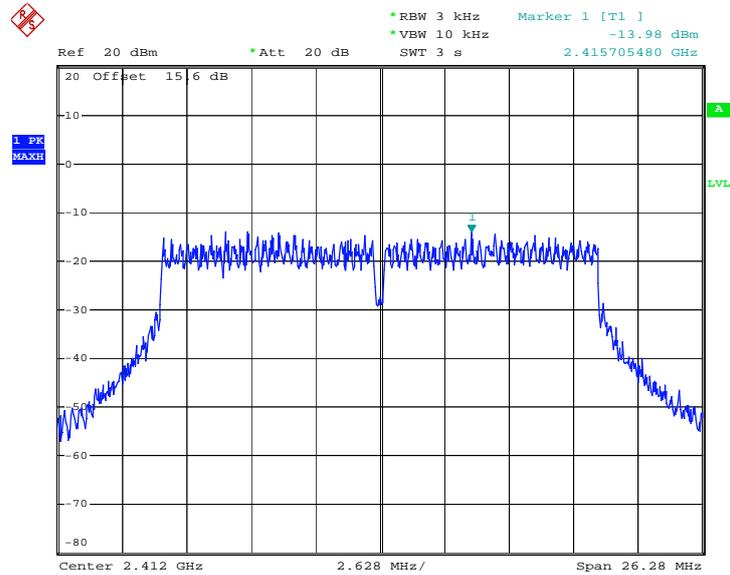
PSD 3kHz Plot on 802.11g Channel 11



Date: 23.JUN.2013 20:34:29

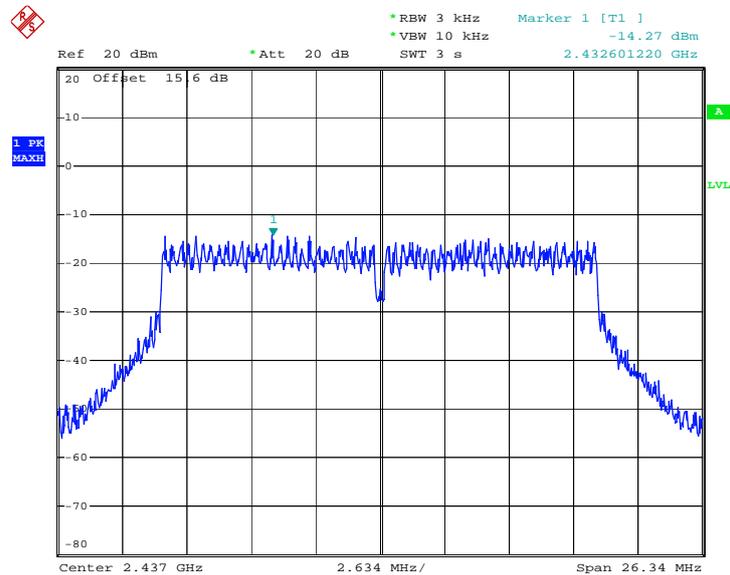


PSD 3kHz Plot on 802.11n HT20 Channel 01



Date: 23.JUN.2013 20:41:38

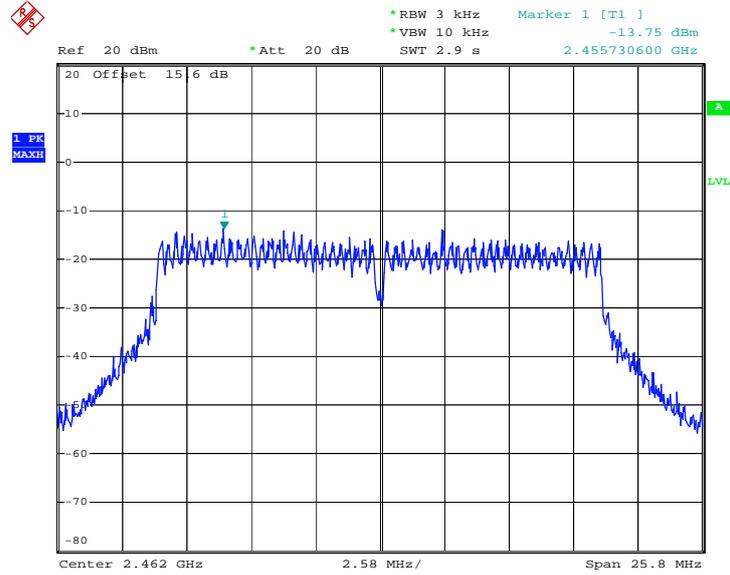
PSD 3kHz Plot on 802.11n HT20 Channel 06



Date: 23.JUN.2013 20:48:46



PSD 3kHz Plot on 802.11n HT20 Channel 11



Date: 23.JUN.2013 20:56:15

## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

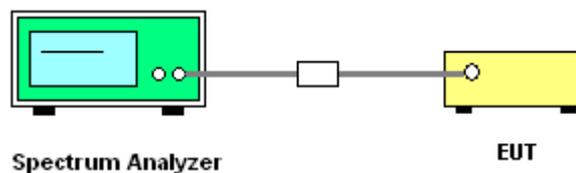
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

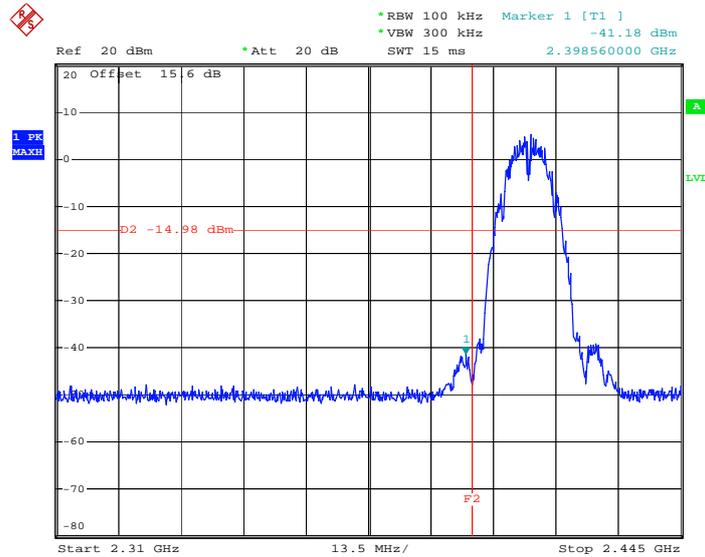
### 3.4.4 Test Setup



2.4.5 Test Result of Conducted Spurious at Band Edges

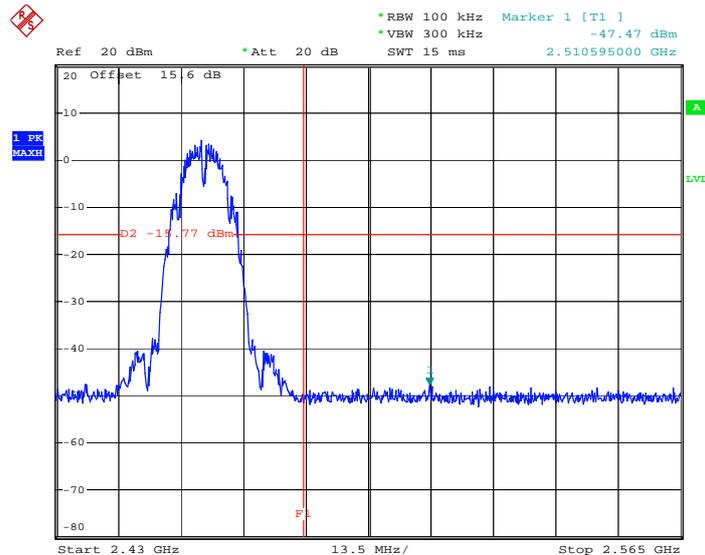
Test Mode :	802.11b	Temperature :	20~21°C
Test Band :	Low and High	Relative Humidity :	40~41%
Test Channel :	01 and 11	Test Engineer :	Neil Zhu

Low Band Edge Plot on 802.11b Channel 01



Date: 23.JUN.2013 20:13:47

High Band Edge Plot on 802.11b Channel 11

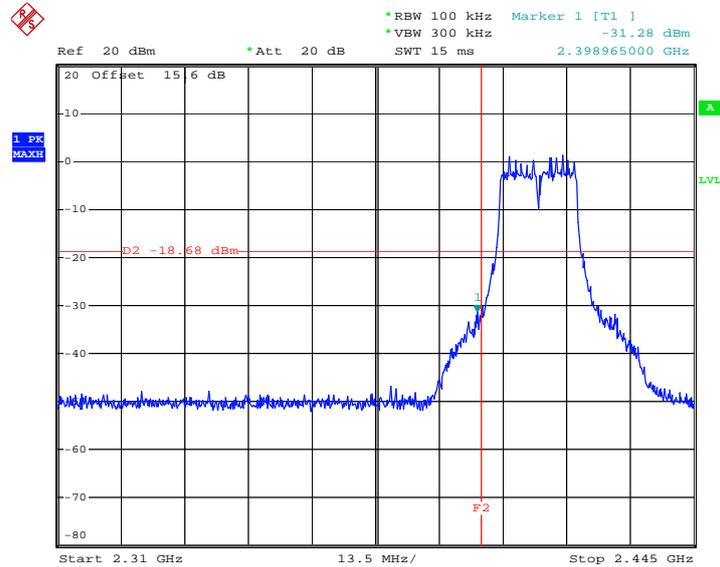


Date: 23.JUN.2013 20:18:55



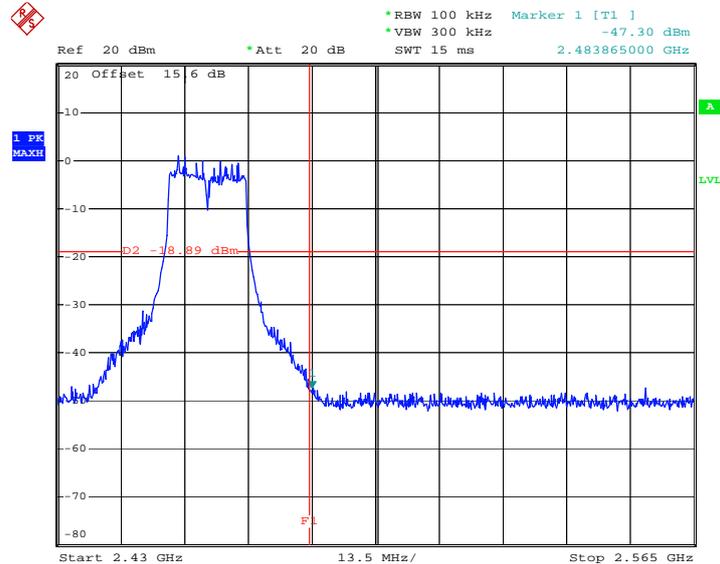
Test Mode :	802.11g	Temperature :	20~21°C
Test Band :	Low and High	Relative Humidity :	40~41%
Test Channel :	01 and 11	Test Engineer :	Neil Zhu

Low Band Edge Plot on 802.11g Channel 01



Date: 23.JUN.2013 20:22:15

High Band Edge Plot on 802.11g Channel 11

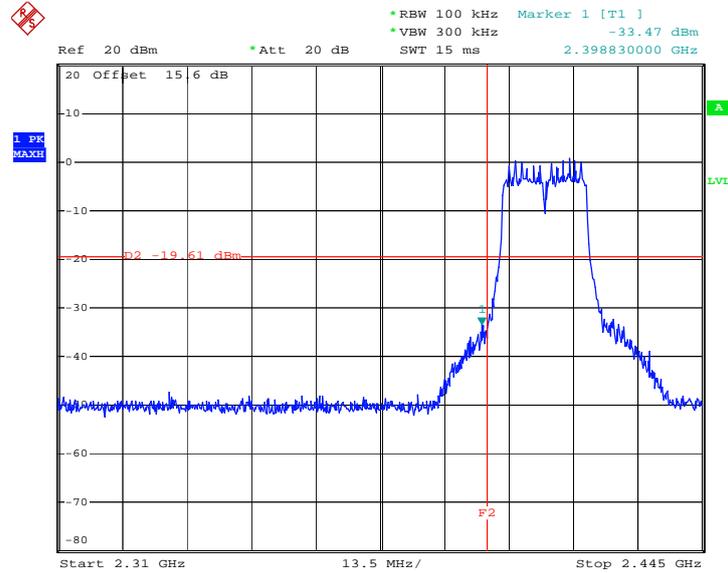


Date: 23.JUN.2013 20:34:54



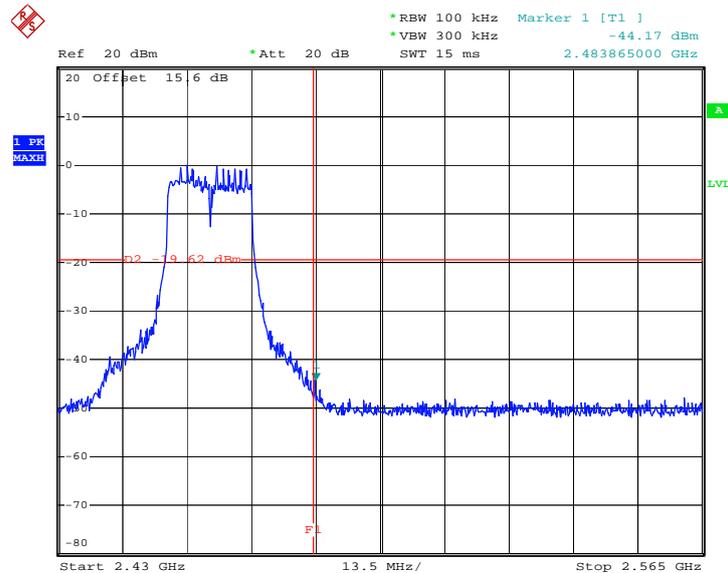
Test Mode :	802.11n HT20	Temperature :	20~21°C
Test Band :	Low and High	Relative Humidity :	40~41%
Test Channel :	01 and 11	Test Engineer :	Neil Zhu

Low Band Edge Plot on 802.11n HT20 Channel 01



Date: 23.JUN.2013 20:42:03

High Band Edge Plot on 802.11n HT20 Channel 11



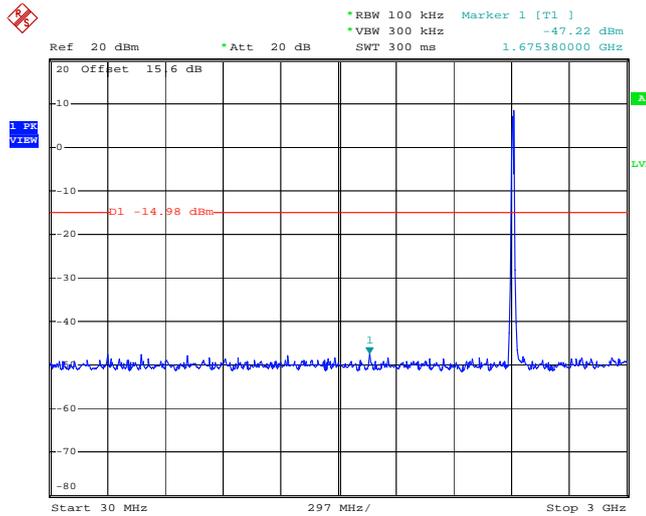
Date: 23.JUN.2013 20:56:40

### 3.4.5 Test Result of Conducted Spurious Emission

Test Mode :	802.11b	Temperature :	20~21°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	40~41%
Test Channel :	01, 06, 11	Test Engineer :	Neil Zhu

#### 802.11b 30 MHz~3 GHz

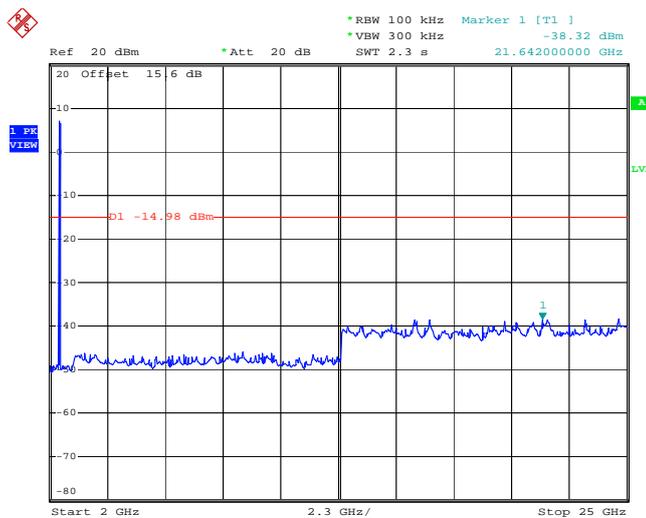
#### Conducted Spurious Emission Plot on Channel 01



Date: 28.JUN.2013 18:17:05

#### 802.11b 2 GHz~25 GHz

#### Conducted Spurious Emission Plot on Channel 01

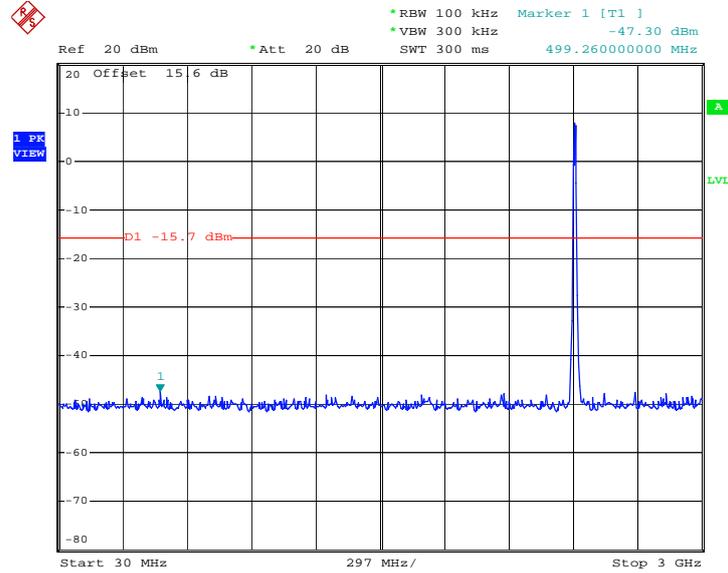


Date: 28.JUN.2013 18:17:30



802.11b 30 MHz~3 GHz

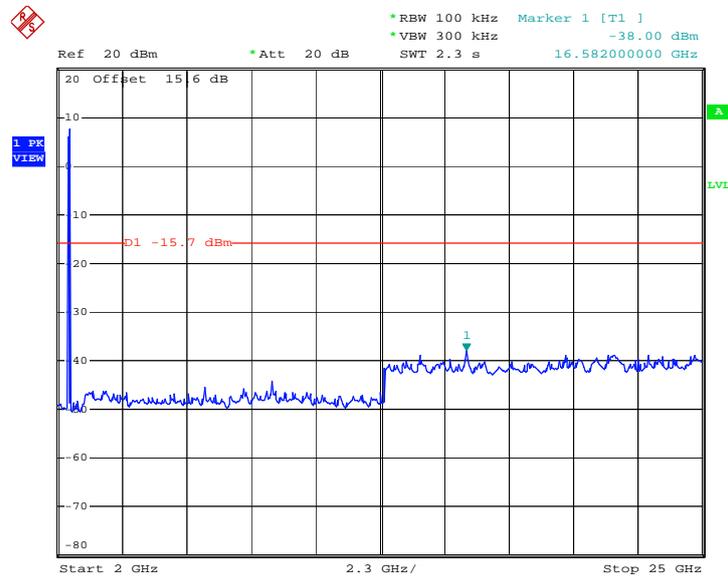
Conducted Spurious Emission Plot on Channel 06



Date: 28.JUN.2013 18:18:36

802.11b 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 06

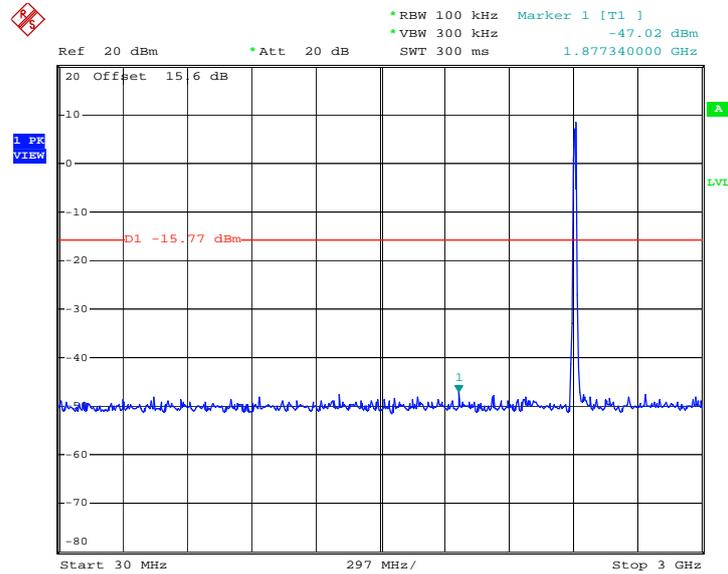


Date: 29.JUN.2013 14:11:21



802.11b 30 MHz~3 GHz

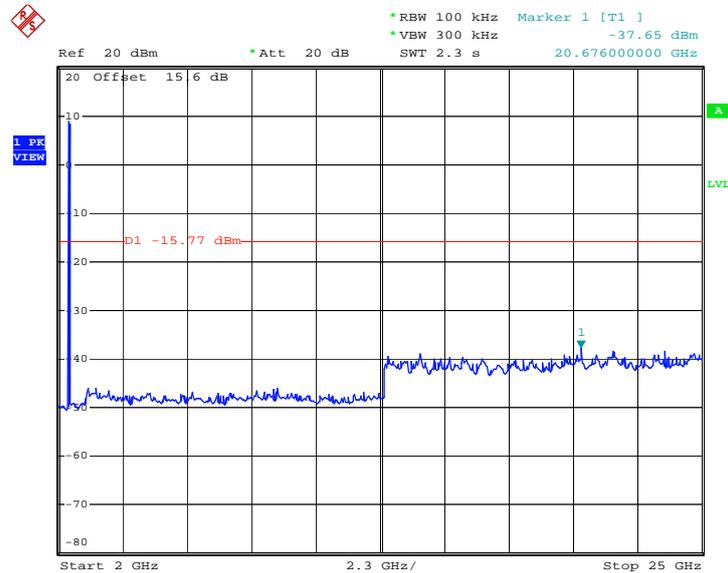
Conducted Spurious Emission Plot on Channel 11



Date: 28.JUN.2013 18:19:08

802.11b 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



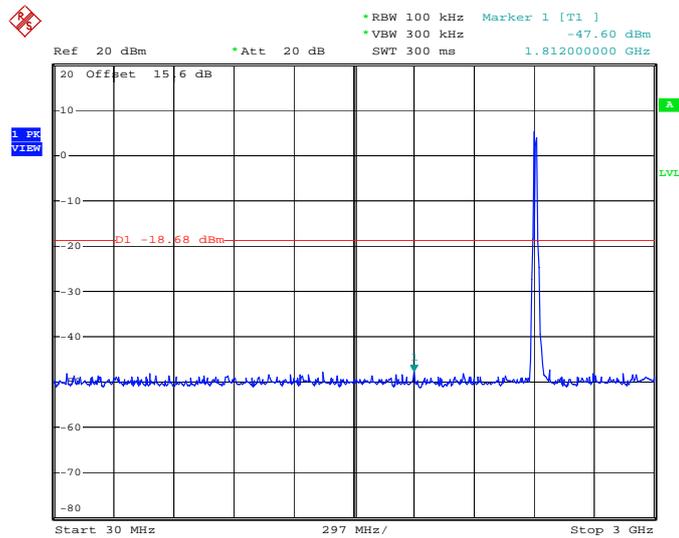
Date: 28.JUN.2013 18:19:38



Test Mode :	802.11g	Temperature :	20~21°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	40~41%
Test Channel :	01, 06, 11	Test Engineer :	Neil Zhu

802.11g 30 MHz~3 GHz

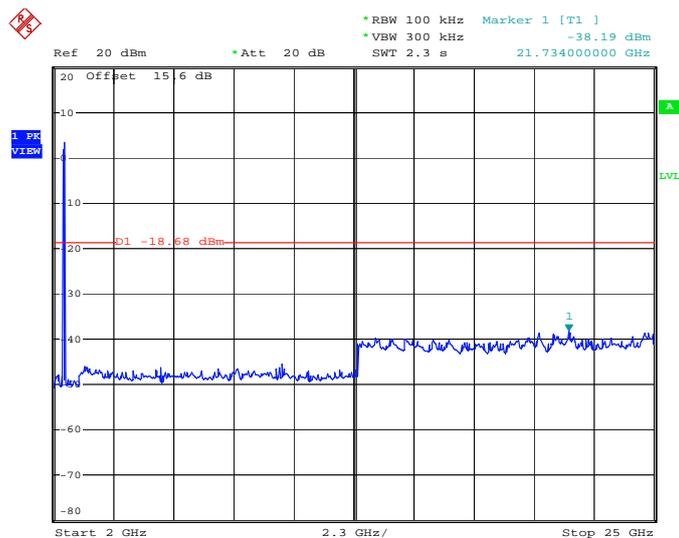
Conducted Spurious Emission Plot on Channel 01



Date: 28.JUN.2013 18:22:27

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 01

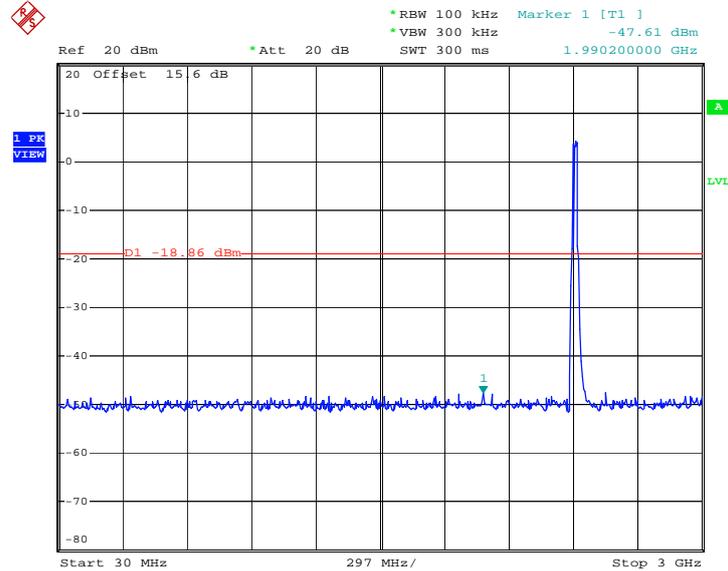


Date: 28.JUN.2013 18:22:01



802.11g 30 MHz~3 GHz

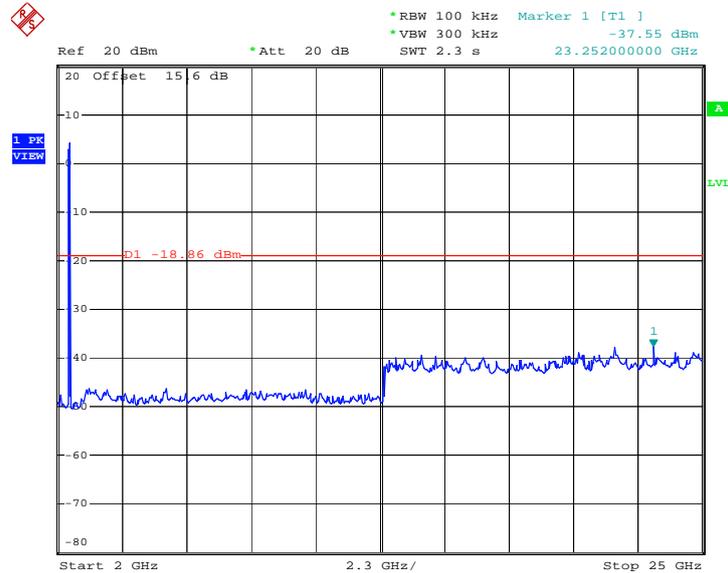
Conducted Spurious Emission Plot on Channel 06



Date: 28.JUN.2013 18:23:18

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 06

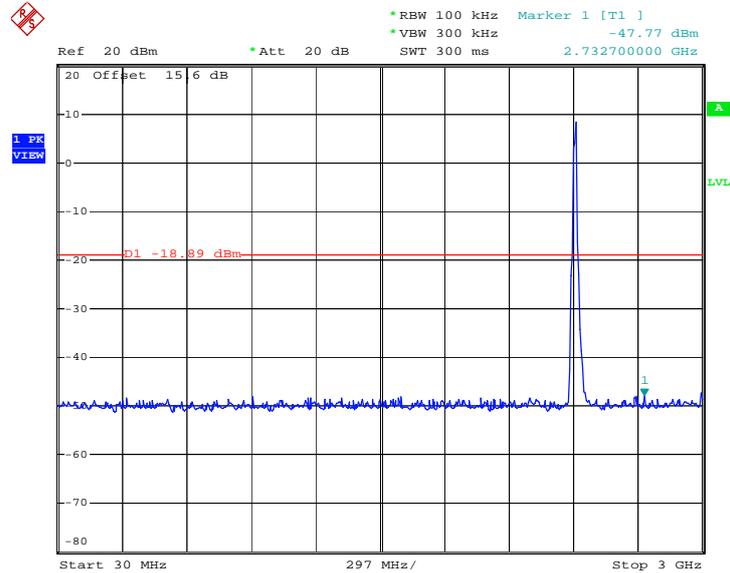


Date: 28.JUN.2013 18:23:41



802.11g 30 MHz~3 GHz

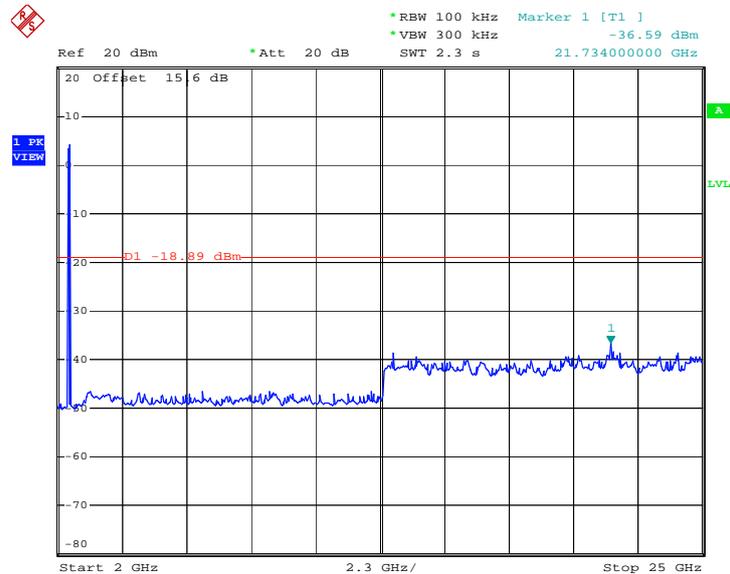
Conducted Spurious Emission Plot on Channel 11



Date: 28.JUN.2013 18:24:41

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



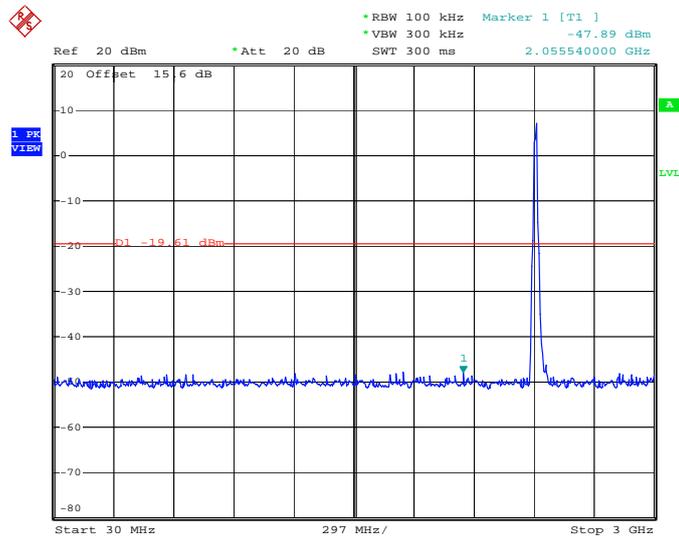
Date: 28.JUN.2013 18:24:15



Test Mode :	802.11n HT20	Temperature :	20~21°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	40~41%
Test Channel :	01, 06, 11	Test Engineer :	Neil Zhu

802.11n HT20 30 MHz~3 GHz

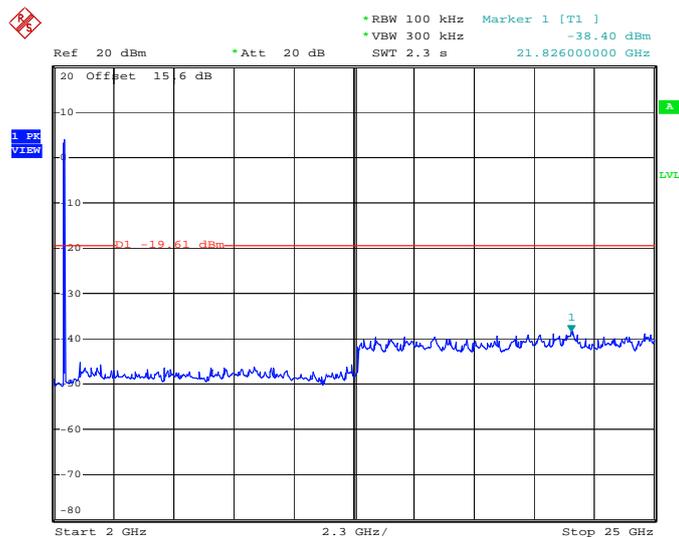
Conducted Spurious Emission Plot on Channel 01



Date: 28.JUN.2013 18:26:16

802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 01

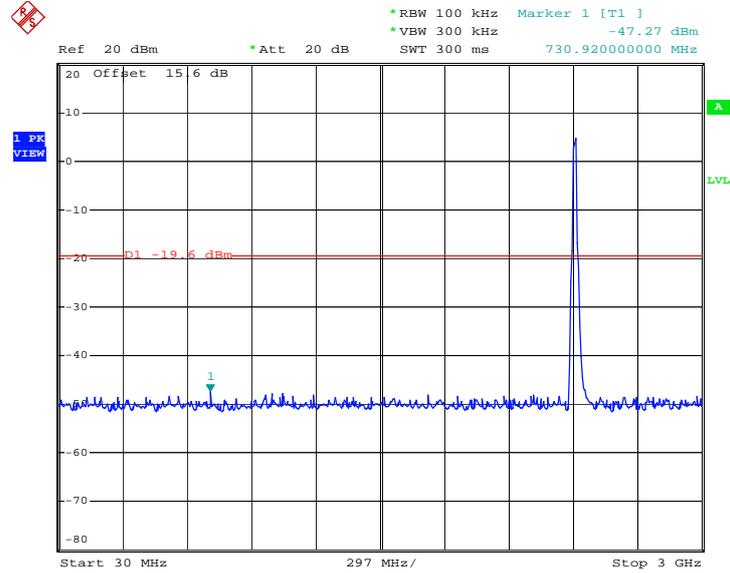


Date: 28.JUN.2013 18:26:44



802.11n HT20 30 MHz~3 GHz

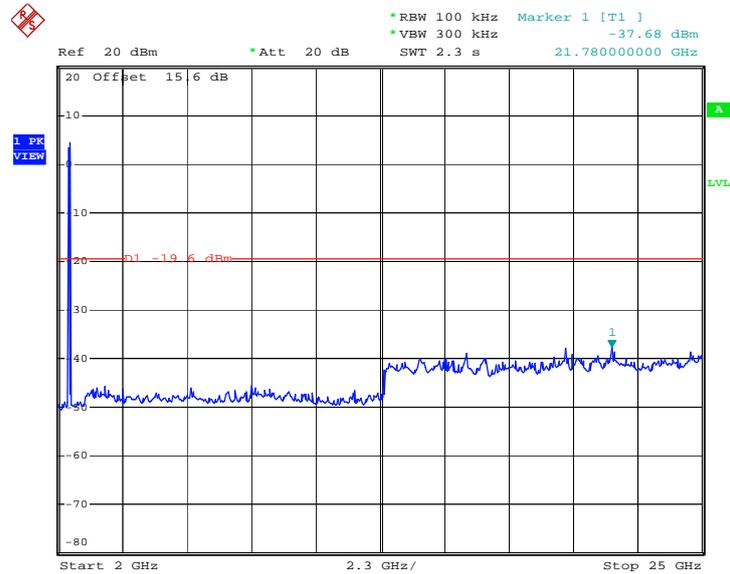
Conducted Spurious Emission Plot on Channel 06



Date: 28.JUN.2013 18:27:37

802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 06

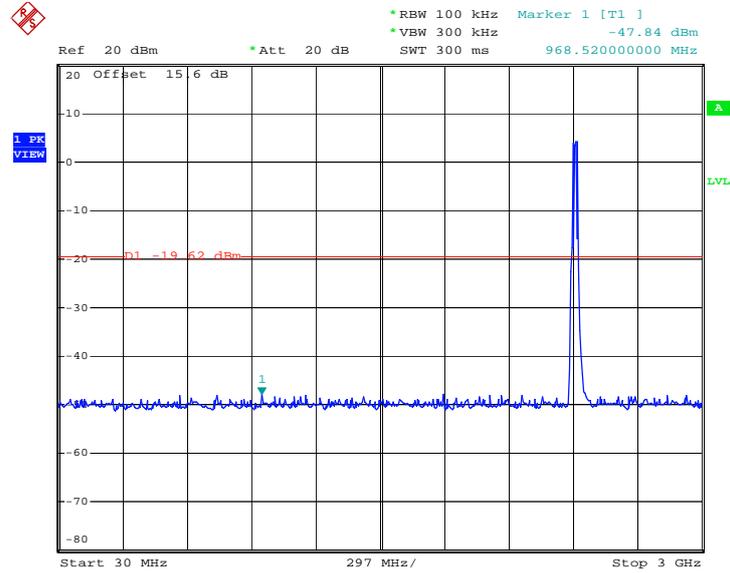


Date: 28.JUN.2013 18:27:15



802.11n HT20 30 MHz~3 GHz

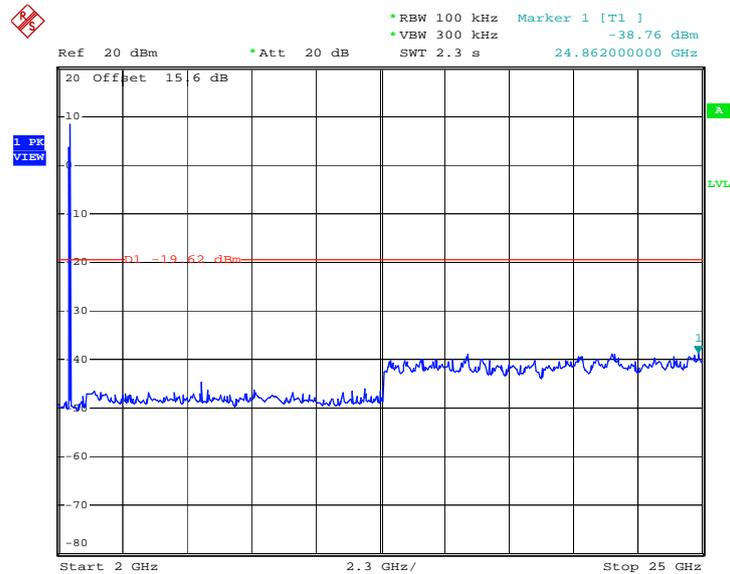
Conducted Spurious Emission Plot on Channel 11



Date: 28.JUN.2013 18:28:14

802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



Date: 28.JUN.2013 18:28:39

### 3.5 Radiated Band Edges and Spurious Emission Measurement

#### 3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

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

#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.



### 3.5.3 Test Procedures

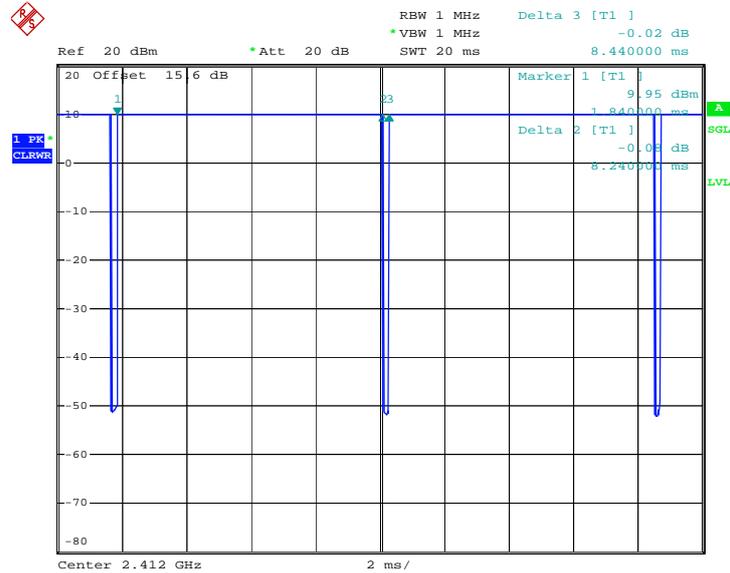
1. The testing follows the guidelines in ANSI C63.10-2009.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz;  $VBW \geq RBW$ ; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.  
For average measurement:
    - $VBW = 10$  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
802.11b	97.63	8.240	0.121	300Hz
802.11g	87.26	1.370	0.730	1kHz
802.11n HT20	86.41	1.284	0.779	1kHz

**Note:** For average measurement with duty cycle < 98%, use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.



802.11b Duty Cycle



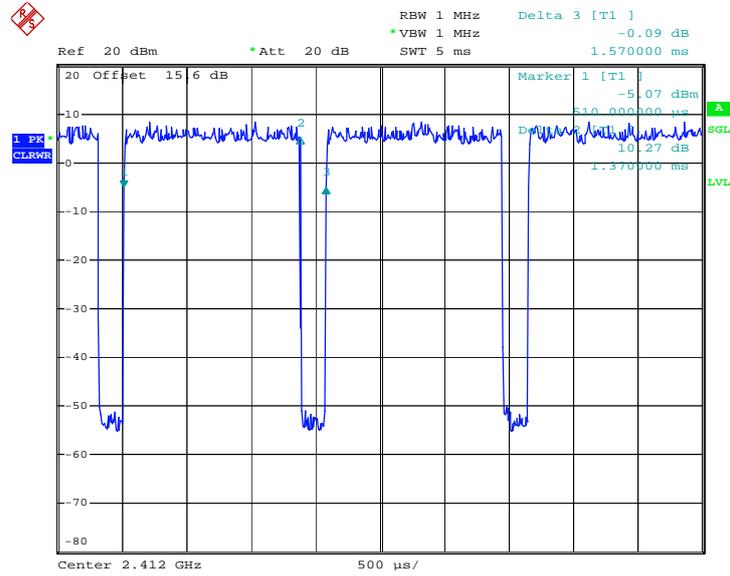
Date: 21.JUN.2013 23:20:58

**Note:**

The total loss is 15.6dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer by setting into the amplitude level offset. That means the measured result shown on the spectrum analyzer has added the total loss and been compliance with the limit line.



### 802.11g Duty Cycle



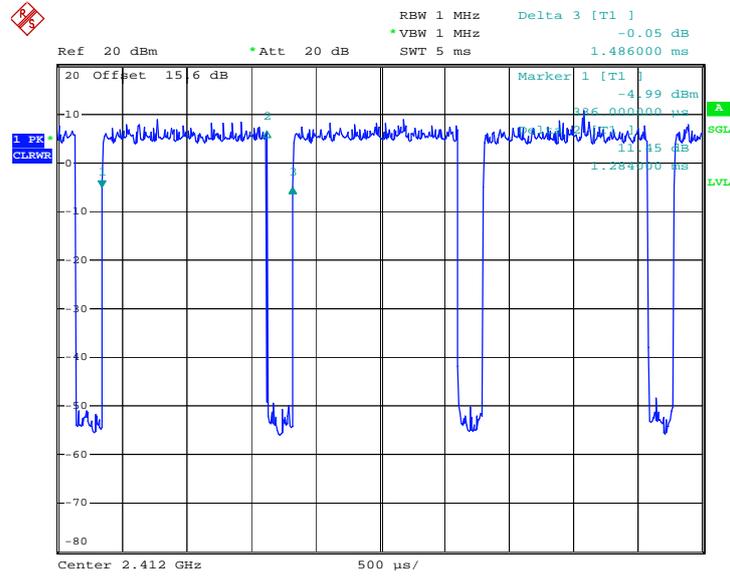
Date: 21.JUN.2013 23:23:02

**Note:**

The total loss is 15.6dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer by setting into the amplitude level offset. That means the measured result shown on the spectrum analyzer has added the total loss and been compliance with the limit line.



802.11n HT20 Duty Cycle



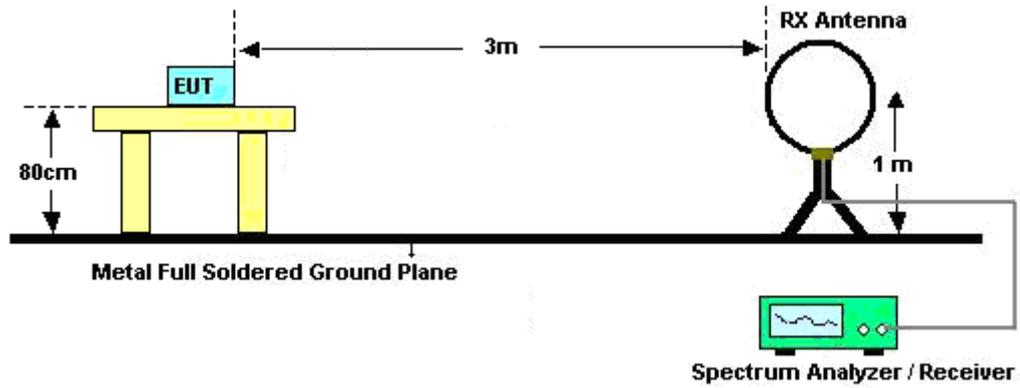
Date: 21.JUN.2013 23:27:01

**Note:**

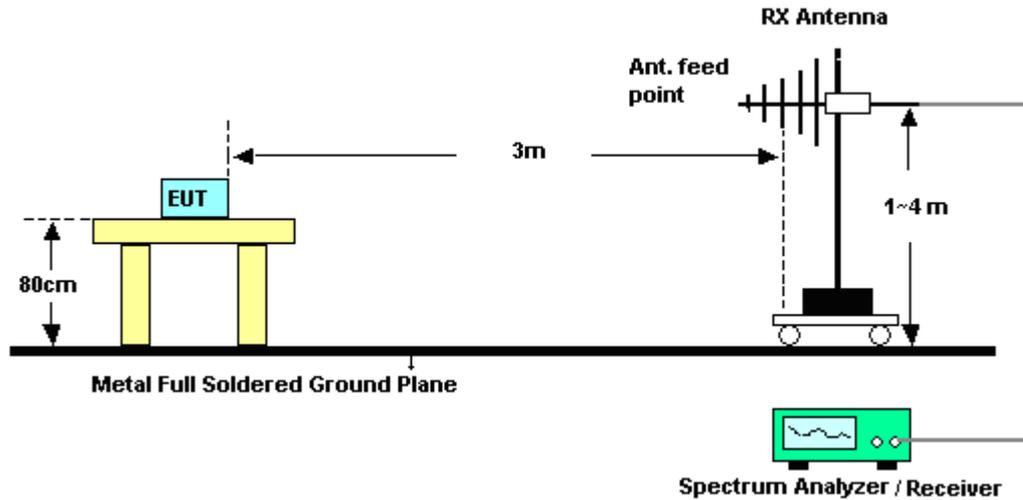
The total loss is 15.6dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer by setting into the amplitude level offset. That means the measured result shown on the spectrum analyzer has added the total loss and been compliance with the limit line.

### 3.5.4 Test Setup

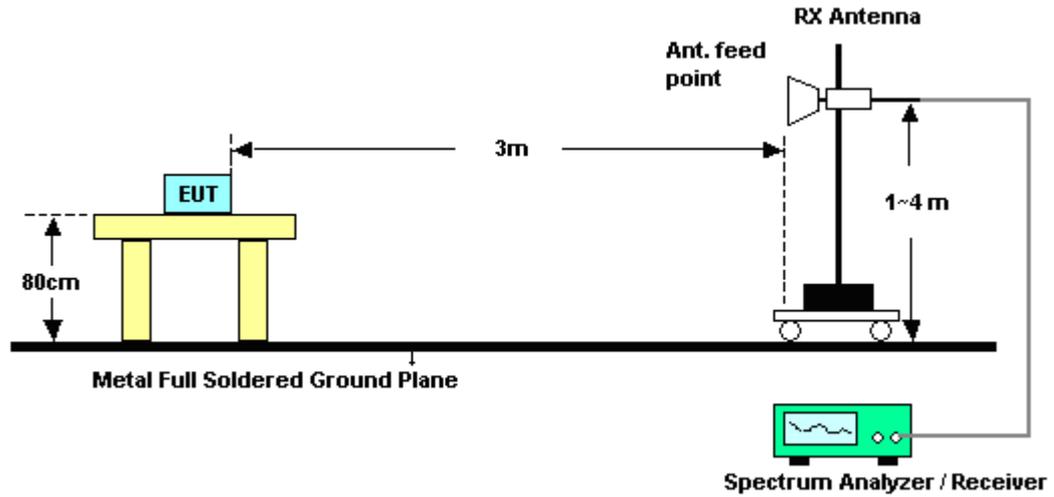
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.5.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)

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 :	802.11b	Temperature :	22~23°C
Test Band :	Low	Relative Humidity :	42~43%
Test Channel :	01	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
2386.14	49.67	-24.33	74	45.42	32.86	2.9	31.51	161	52	Peak
2389.47	36.78	-17.22	54	32.53	32.86	2.9	31.51	161	52	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
2385.87	50.26	-23.74	74	46.01	32.86	2.9	31.51	100	154	Peak
2389.2	36.58	-17.42	54	32.33	32.86	2.9	31.51	100	154	Average

Test Mode :	802.11b	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	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
2484.76	51.42	-22.58	74	46.96	33.01	2.96	31.51	102	58	Peak
2485.03	37.3	-16.7	54	32.84	33.01	2.96	31.51	102	58	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
2483.8	51.06	-22.94	74	46.6	33.01	2.96	31.51	160	0	Peak
2483.71	37.42	-16.58	54	32.96	33.01	2.96	31.51	160	0	Average



Test Mode :	802.11g	Temperature :	22~23°C
Test Band :	Low	Relative Humidity :	42~43%
Test Channel :	01	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
2390	58.14	-15.86	74	53.88	32.86	2.91	31.51	100	44	Peak
2390	39.55	-14.45	54	35.29	32.86	2.91	31.51	100	44	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
2390	55.88	-18.12	74	51.62	32.86	2.91	31.51	101	121	Peak
2390	38.03	-15.97	54	33.77	32.86	2.91	31.51	101	121	Average

Test Mode :	802.11g	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	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
2483.74	63.26	-10.74	74	58.8	33.01	2.96	31.51	179	50	Peak
2483.5	44.44	-9.56	54	39.98	33.01	2.96	31.51	179	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
2483.56	63.34	-10.66	74	58.88	33.01	2.96	31.51	189	360	Peak
2483.5	42.69	-11.31	54	38.23	33.01	2.96	31.51	189	360	Average



Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Band :	Low	Relative Humidity :	42~43%
Test Channel :	01	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
2389.92	59.11	-14.89	74	54.85	32.86	2.91	31.51	191	49	Peak
2390	39.75	-14.25	54	35.49	32.86	2.91	31.51	191	49	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
2389.83	57.7	-16.3	74	53.44	32.86	2.91	31.51	160	341	Peak
2389.92	39.35	-14.65	54	35.09	32.86	2.91	31.51	160	341	Average

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	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
2483.65	63.46	-10.54	74	59	33.01	2.96	31.51	185	63	Peak
2483.5	44.68	-9.32	54	40.22	33.01	2.96	31.51	185	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
2483.5	65.67	-8.33	74	61.21	33.01	2.96	31.51	130	350	Peak
2483.5	45.05	-8.95	54	40.59	33.01	2.96	31.51	130	350	Average

### 3.5.7 Test Result of Radiated Emission (30MHz ~ 10<sup>th</sup> 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.

<b>Test Mode :</b>	802.11b	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	<ol style="list-style-type: none"> <li>2412 MHz is fundamental signal which can be ignored.</li> <li>7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 101.87dBμV/m - 20dB = 81.87dBμV/m.</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
2412	101.87	-	-	97.58	32.89	2.91	31.51	191	55	Peak
2412	97.34	-	-	93.05	32.89	2.91	31.51	191	55	Average
4824	50.24	-23.76	74	42.37	35.17	4.23	31.53	100	16	Peak
7236	53.6	-28.27	81.87	42.98	36.18	5.39	30.95	100	25	Peak

<b>Test Mode :</b>	802.11b	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	<ol style="list-style-type: none"> <li>2412 MHz is fundamental signal which can be ignored.</li> <li>7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.</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
2412	97.41	-	-	93.12	32.89	2.91	31.51	103	151	Peak
2412	92.68	-	-	88.39	32.89	2.91	31.51	103	151	Average
4824	50.21	-23.79	74	42.34	35.17	4.23	31.53	100	61	Peak
7236	53.08	-24.33	77.41	42.46	36.18	5.39	30.95	100	31	Peak



<b>Test Mode :</b>	802.11b	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2437 MHz is fundamental signal which can be ignored. 2. 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
2437	103.15	-	-	98.78	32.95	2.93	31.51	155	171	Peak
2437	98.84	-	-	94.47	32.95	2.93	31.51	155	171	Average
4874	50.18	-23.82	74	42.26	35.18	4.26	31.52	100	16	Peak
7312	53.62	-20.38	74	42.9	36.2	5.46	30.94	100	31	Peak

<b>Test Mode :</b>	802.11b	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2437 MHz is fundamental signal which can be ignored. 2. 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
2437	105.21	-	-	100.84	32.95	2.93	31.51	108	0	Peak
2437	100.28	-	-	95.91	32.95	2.93	31.51	108	0	Average
4874	50.31	-23.69	74	42.39	35.18	4.26	31.52	100	13	Peak
7312	53.47	-20.53	74	42.75	36.2	5.46	30.94	100	31	Peak



<b>Test Mode :</b>	802.11b	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2462 MHz is fundamental signal which can be ignored. 2. 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
2462	104.01	-	-	99.6	32.98	2.94	31.51	102	56	Peak
2462	99.67	-	-	95.26	32.98	2.94	31.51	102	56	Average
4924	50.38	-23.62	74	42.42	35.19	4.28	31.51	100	1	Peak
7386	53.42	-20.58	74	42.6	36.24	5.51	30.93	100	23	Peak

<b>Test Mode :</b>	802.11b	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2462 MHz is fundamental signal which can be ignored. 2. 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
2462	104.07	-	-	99.66	32.98	2.94	31.51	160	0	Peak
2462	99.68	-	-	95.27	32.98	2.94	31.51	160	0	Average
4924	50.83	-23.17	74	42.87	35.19	4.28	31.51	100	13	Peak
7386	52.26	-21.74	74	41.44	36.24	5.51	30.93	100	2	Peak



<b>Test Mode :</b>	802.11g	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	<ol style="list-style-type: none"> <li>2412 MHz is fundamental signal which can be ignored.</li> <li>7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.</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
2412	103.25	-	-	98.96	32.89	2.91	31.51	194	51	Peak
2412	91.81	-	-	87.52	32.89	2.91	31.51	194	51	Average
4824	50.76	-23.24	74	42.89	35.17	4.23	31.53	100	0	Peak
7236	53.02	-30.23	83.25	42.4	36.18	5.39	30.95	105	64	Peak

<b>Test Mode :</b>	802.11g	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	<ol style="list-style-type: none"> <li>2412 MHz is fundamental signal which can be ignored.</li> <li>7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.</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
2412	100.94	-	-	96.65	32.89	2.91	31.51	103	132	Peak
2412	89.04	-	-	84.75	32.89	2.91	31.51	103	132	Average
4824	50.81	-23.19	74	42.94	35.17	4.23	31.53	121	36	Peak
7236	52.94	-28	80.94	42.32	36.18	5.39	30.95	142	158	Peak



<b>Test Mode :</b>	802.11g	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2437 MHz is fundamental signal which can be ignored. 2. 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
2437	105.32	-	-	100.95	32.95	2.93	31.51	187	62	Peak
2437	94.93	-	-	90.56	32.95	2.93	31.51	187	62	Average
4874	50.75	-23.25	74	42.83	35.18	4.26	31.52	110	241	Peak
7311	53.24	-20.76	74	42.54	36.2	5.44	30.94	100	0	Peak

<b>Test Mode :</b>	802.11g	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2437 MHz is fundamental signal which can be ignored. 2. 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
2437	106.14	-	-	101.77	32.95	2.93	31.51	162	360	Peak
2437	95.4	-	-	91.03	32.95	2.93	31.51	162	360	Average
4874	50.2	-23.8	74	42.28	35.18	4.26	31.52	104	56	Peak
7311	53.05	-20.95	74	42.35	36.2	5.44	30.94	100	138	Peak



<b>Test Mode :</b>	802.11g	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2462 MHz is fundamental signal which can be ignored. 2. 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
2462	105.2	-	-	100.79	32.98	2.94	31.51	153	57	Peak
2462	94.3	-	-	89.89	32.98	2.94	31.51	153	57	Average
4924	50.25	-23.75	74	42.29	35.19	4.28	31.51	105	64	Peak
7386	53.25	-20.75	74	42.43	36.24	5.51	30.93	100	45	Peak

<b>Test Mode :</b>	802.11g	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2462 MHz is fundamental signal which can be ignored. 2. 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
2462	103.98	-	-	99.57	32.98	2.94	31.51	108	336	Peak
2462	92.9	-	-	88.49	32.98	2.94	31.51	108	336	Average
4924	50.11	-23.89	74	42.15	35.19	4.28	31.51	126	79	Peak
7386	52.65	-21.35	74	41.83	36.24	5.51	30.93	173	154	Peak



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2412	104.24	-	-	99.95	32.89	2.91	31.51	191	46	Peak
2412	92.55	-	-	88.26	32.89	2.91	31.51	191	46	Average
4824	49.8	-24.2	74	41.93	35.17	4.23	31.53	100	22	Peak
7236	53.45	-30.79	84.24	42.83	36.18	5.39	30.95	100	64	Peak

<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2412	103.9	-	-	99.61	32.89	2.91	31.51	160	355	Peak
2412	92.5	-	-	88.21	32.89	2.91	31.51	160	355	Average
4824	50.9	-23.1	74	43.03	35.17	4.23	31.53	100	24	Peak
7236	53.28	-30.62	83.9	42.66	36.18	5.39	30.95	100	6	Peak



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2437 MHz is fundamental signal which can be ignored. 2. 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
2437	104.62	-	-	100.25	32.95	2.93	31.51	188	40	Peak
2437	93.46	-	-	89.09	32.95	2.93	31.51	188	40	Average
4874	50.85	-23.15	74	42.93	35.18	4.26	31.52	100	16	Peak
7312	53.64	-20.36	74	42.92	36.2	5.46	30.94	100	24	Peak

<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2437 MHz is fundamental signal which can be ignored. 2. 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
2437	104.76	-	-	100.39	32.95	2.93	31.51	131	329	Peak
2437	93.71	-	-	89.34	32.95	2.93	31.51	131	329	Average
4874	50.03	-23.97	74	42.11	35.18	4.26	31.52	100	25	Peak
7312	53.36	-20.64	74	42.64	36.2	5.46	30.94	100	23	Peak



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2462 MHz is fundamental signal which can be ignored. 2. 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	25.35	-14.65	40	40.58	18	0.34	33.57	100	21	Peak
97.9	24.46	-19.04	43.5	47.36	10.15	0.57	33.62	-	-	Peak
191.99	19.26	-24.24	43.5	43.42	8.59	0.81	33.56	-	-	Peak
383.08	28.44	-17.56	46	45.06	15.56	1.14	33.32	-	-	Peak
649.83	23.73	-22.27	46	36.32	18.9	1.46	32.95	-	-	Peak
937.92	25.38	-20.62	46	35.39	20.68	1.75	32.44	-	-	Peak
2462	103.48	-	-	99.07	32.98	2.94	31.51	185	63	Peak
2462	91.9	-	-	87.49	32.98	2.94	31.51	185	63	Average
4924	50.12	-23.88	74	42.16	35.19	4.28	31.51	100	12	Peak
7386	52.83	-21.17	74	42.01	36.24	5.51	30.93	100	26	Peak



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Steven Hao	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2462 MHz is fundamental signal which can be ignored. 2. 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
37.76	28.61	-11.39	40	48.16	13.7	0.38	33.63	100	164	Peak
90.14	23.94	-19.56	43.5	48.11	8.9	0.55	33.62	-	-	Peak
131.85	23.95	-19.55	43.5	45.31	11.55	0.68	33.59	-	-	Peak
191.99	24.27	-19.23	43.5	48.43	8.59	0.81	33.56	-	-	Peak
400.54	21.33	-24.67	46	37.49	16	1.15	33.31	-	-	Peak
528.58	23.93	-22.07	46	37.67	17.99	1.33	33.06	-	-	Peak
2462	104.57	-	-	100.16	32.98	2.94	31.51	130	356	Peak
2462	92.93	-	-	88.52	32.98	2.94	31.51	130	356	Average
4924	50.9	-23.1	74	42.94	35.19	4.28	31.51	100	13	Peak
7386	53.25	-20.75	74	42.43	36.24	5.51	30.93	100	26	Peak

## 3.6 AC Conducted Emission Measurement

### 3.6.1 Limit of AC Conducted Emission

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

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ 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.

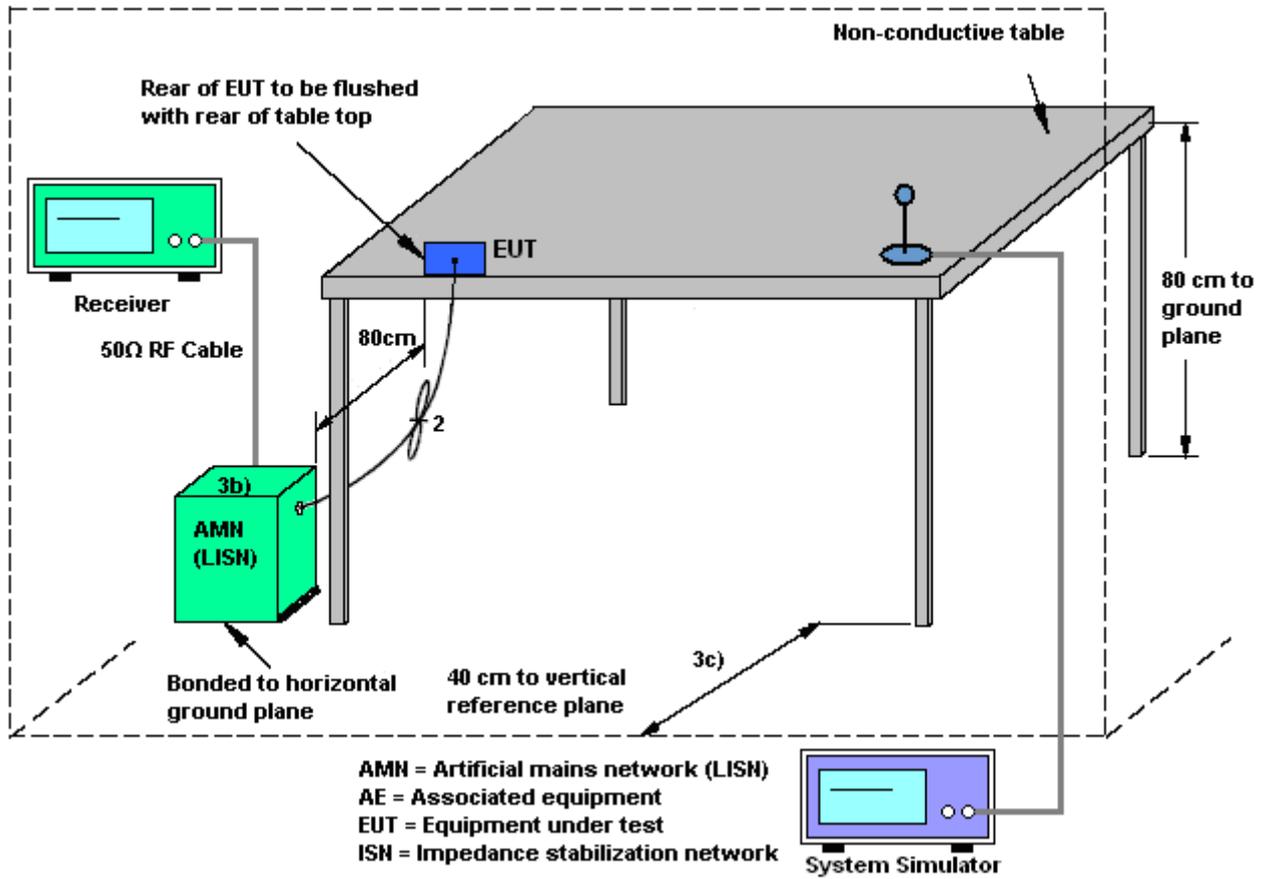
### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.6.3 Test Procedures

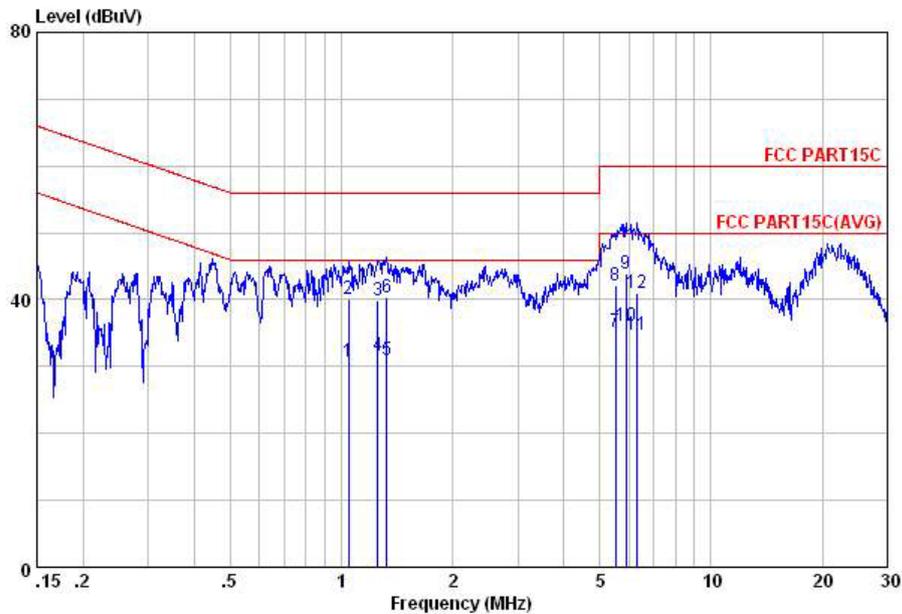
1. The testing follows the guidelines in ANSI C63.10-2009.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter)		

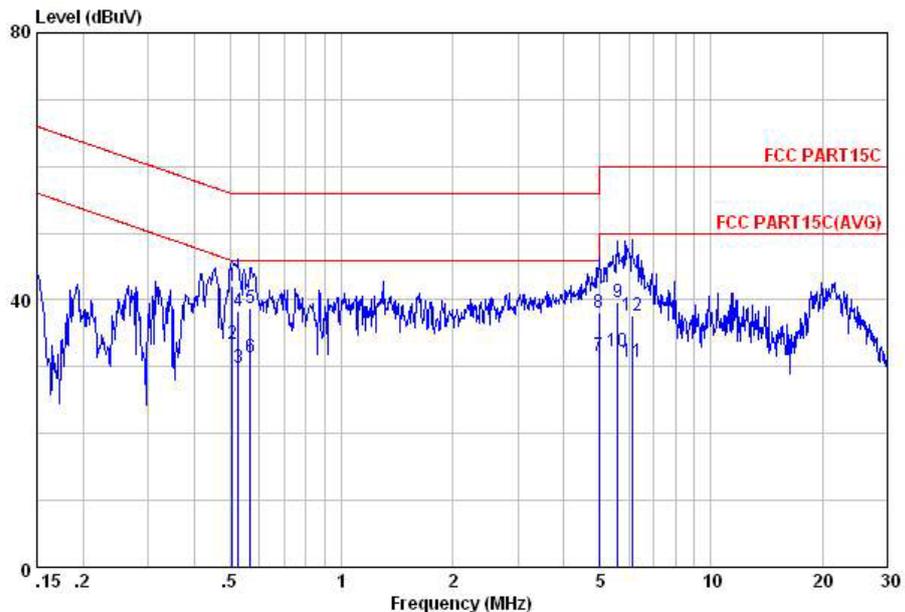


Site : C001-KS  
 Condition: FCC PART15C LISN-L20130306 LINE  
 mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	1.04	30.68	-15.32	46.00	20.40	0.10	10.18	Average
2	1.04	40.08	-15.92	56.00	29.80	0.10	10.18	QP
3	1.26	39.98	-16.02	56.00	29.70	0.10	10.18	QP
4	1.26	31.68	-14.32	46.00	21.40	0.10	10.18	Average
5	1.32	30.98	-15.02	46.00	20.70	0.10	10.18	Average
6	1.32	40.28	-15.72	56.00	30.00	0.10	10.18	QP
7	5.51	35.27	-14.73	50.00	24.80	0.20	10.27	Average
8	5.51	42.07	-17.93	60.00	31.60	0.20	10.27	QP
9	5.90	43.88	-16.12	60.00	33.40	0.20	10.28	QP
10	5.90	36.18	-13.82	50.00	25.70	0.20	10.28	Average
11	6.32	34.70	-15.30	50.00	24.20	0.20	10.30	Average
12	6.32	41.00	-19.00	60.00	30.50	0.20	10.30	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 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter)		



Site : C001-KS  
 Condition: FCC PART15C LISN-M20130306 NEUTRAL

mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.51	42.16	-13.84	56.00	31.60	0.30	10.26	QP
2	0.51	33.46	-12.54	46.00	22.90	0.30	10.26	Average
3	0.53	29.95	-16.05	46.00	19.40	0.29	10.26	Average
4	0.53	38.35	-17.65	56.00	27.80	0.29	10.26	QP
5	0.57	38.82	-17.18	56.00	28.30	0.27	10.25	QP
6	0.57	31.32	-14.68	46.00	20.80	0.27	10.25	Average
7	4.98	31.66	-14.34	46.00	21.20	0.20	10.26	Average
8	4.98	38.06	-17.94	56.00	27.60	0.20	10.26	QP
9	5.59	39.57	-20.43	60.00	29.10	0.20	10.27	QP
10	5.59	32.27	-17.73	50.00	21.80	0.20	10.27	Average
11	6.12	30.69	-19.31	50.00	20.20	0.20	10.29	Average
12	6.12	37.59	-22.41	60.00	27.10	0.20	10.29	QP



## **3.7 Antenna Requirements**

### **3.7.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### **3.7.2 Antenna Connected Construction**

Non-standard connector used.

### **3.7.3 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.

## 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	Jun. 23, 2013~ Jul. 03, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 22, 2012	Jun. 23, 2013~ Jul. 03, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 22, 2012	Jun. 23, 2013~ Jul. 03, 2013	Aug. 21, 2013	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 08, 2012	Jul. 15, 2013	Nov. 07, 2013	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	100400	9kHz~30GHz	May 23, 2013	Jul. 15, 2013	May 22, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2012	Jul. 15, 2013	Dec. 06, 2013	Radiation (03CH01-KS)
HFH2-Z2 Loop Antenna	R&S	HFH2-Z2	100321	9kHz-30MHz	Oct. 22, 2012	Jul. 15, 2013	Oct. 21, 2013	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	1908/7/13	00075957	1GHz~18GHz	Dec. 07, 2012	Jul. 15, 2013	Dec. 06, 2013	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz	May 23, 2013	Jul. 15, 2013	May 22, 2014	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 29, 2012	Jul. 15, 2013	Dec. 28, 2013	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2012	Jul. 15, 2013	Nov. 06, 2013	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170249	15GHz~40GHz	Nov. 23, 2012	Jul. 15, 2013	Nov. 22, 2013	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0 ~ 360 degree	N/A	Jul. 15, 2013	N/A	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m - 4 m	N/A	Jul. 15, 2013	N/A	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 23, 2013	Jun. 24, 2013	May 22, 2014	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Dec. 29, 2012	Jun. 24, 2013	Dec. 28, 2013	Conduction (CO01-KS)
LISN (for auxiliary equipment)	MessTec	AN3016	60105	9kHz~30MHz	Dec. 29, 2012	Jun. 24, 2013	Dec. 28, 2013	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	N/A	Nov. 15, 2012	Jun. 24, 2013	Nov. 14, 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
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### 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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