



# FCC RF Test Report

**APPLICANT** : ZTE CORPORATION  
**EQUIPMENT** : LTE/WCDMA/GSM(GPRS) Dual-Mode  
Digital Mobile Phone  
**BRAND NAME** : ZTE  
**MODEL NAME** : Z833  
**FCC ID** : SRQ-Z833  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

The product was received on Jul. 04, 2016 and testing was completed on Aug. 08, 2016. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

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**SPORTON INTERNATIONAL (SHENZHEN) INC.**

**1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town,  
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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 0.98 dB at 2386.340 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 17.02 dB at 0.460 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 Product Feature of Equipment Under Test

Product Feature	
Equipment	LTE/WCDMA/GSM(GPRS) Dual-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z833
FCC ID	SRQ-Z833
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM uplink is not supported)/LTE/ WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
IMEI Code	Conducted: 004401783975184 Conduction: 004401783975432 Radiation: 004401783975432
HW Version	Z833HW1.0
SW Version	Z833_MPCSV1.0.0B04
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

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to Antenna	802.11b : 21.31 dBm (0.1352 W) 802.11g : 23.60 dBm (0.2291 W) 802.11n HT20 : 23.11 dBm (0.2046 W)
Antenna Type/Gain	PIFA Antenna with gain 3.50 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 Location

<b>Test Site</b>	SPORTON INTERNATIONAL (SHENZHEN) INC.	
<b>Test Site Location</b>	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	TH01-SZ	

<b>Test Site</b>	SPORTON INTERNATIONAL (SHENZHEN) INC.	
<b>Test Site Location</b>	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Registration No.</b>
	03CH03-SZ	565805

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.	
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	CO01-KS	

**Note:** The test site complies with ANSI C63.4 2014 requirement.



## 1.7 Applicable 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 v03r05
- ♦ ANSI C63.10-2013

### **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 (Z plane) were recorded in this report.

### 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 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

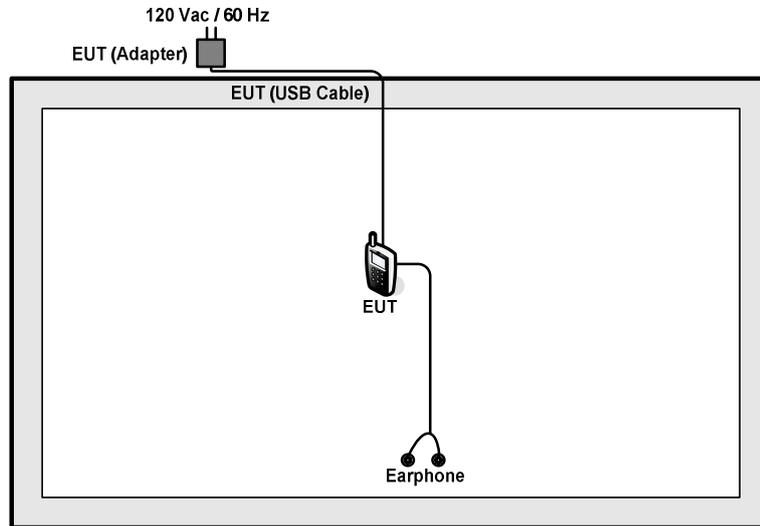
<2.4GHz>

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0

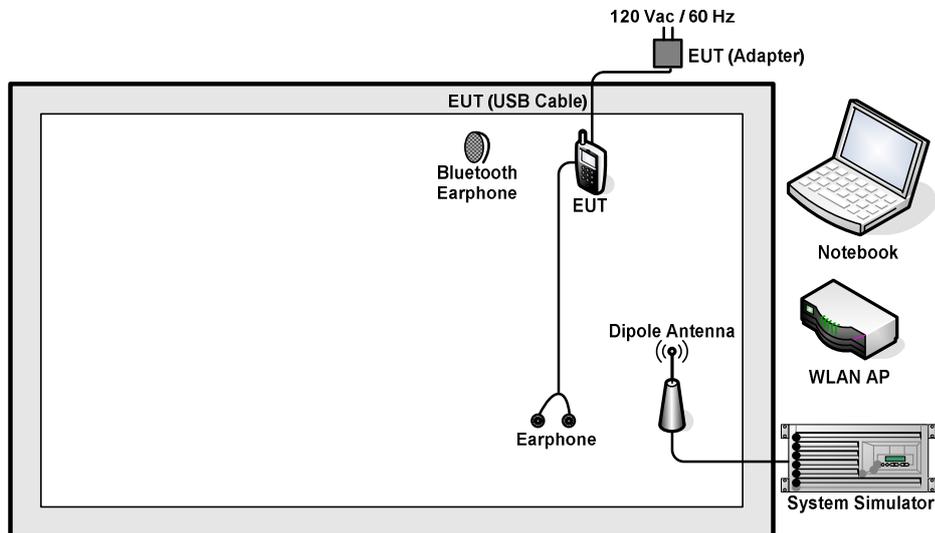
Test Cases	
AC Conducted Emission	Mode 1: GSM 850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone
<b>Remark:</b> For radiated test cases, the tests were performed with adapter, earphone, and USB cable.	

## 2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



## 2.4 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	CMU200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	N/A	N/A
5.	Earphone	Apple	N/A	N/A	Shielded, 1.0 m	N/A
6.	Earphone	Lenovo	SH100	N/A	Unshielded,1.2m	N/A

## 2.5 EUT Operation Test Setup

For WLAN RF test items, an 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.

## 2.6 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 5.0 dB and 10dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 5.0 + 10 = 15.0 \text{ (dB)} \end{aligned}$$

### 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

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

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r05.
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.

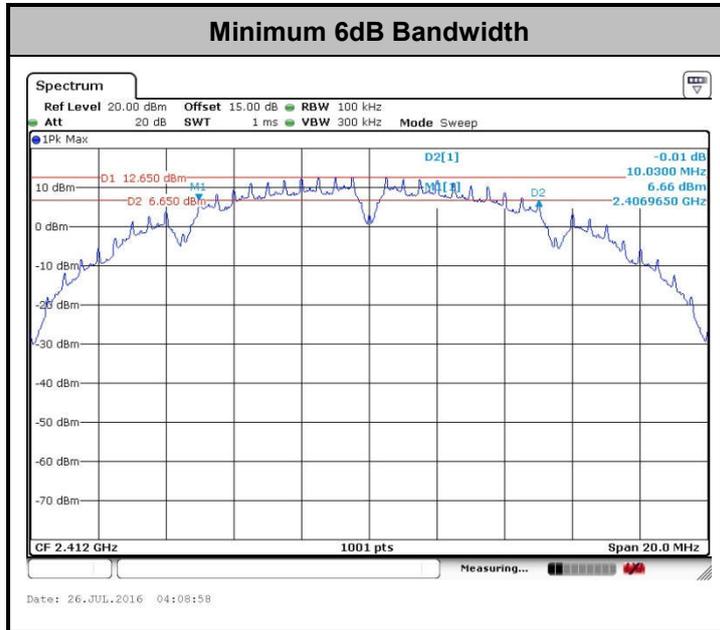
##### 3.1.4 Test Setup





### 3.1.5 Test Result of 6dB and Bandwidth

Please refer to Appendix A of this test report.



## 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.

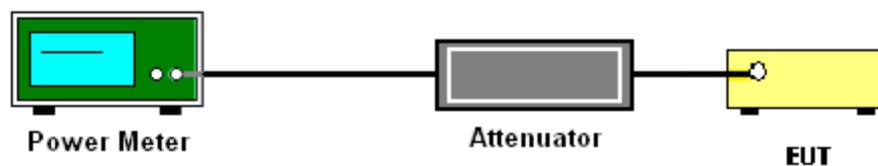
### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 v03r05 section 9.1.2 PKPM1 Peak power meter method.
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

Please refer to Appendix A of this test report.

### 3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A of this test report.

### 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.

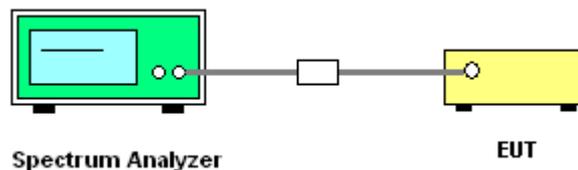
#### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 v03r05
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.

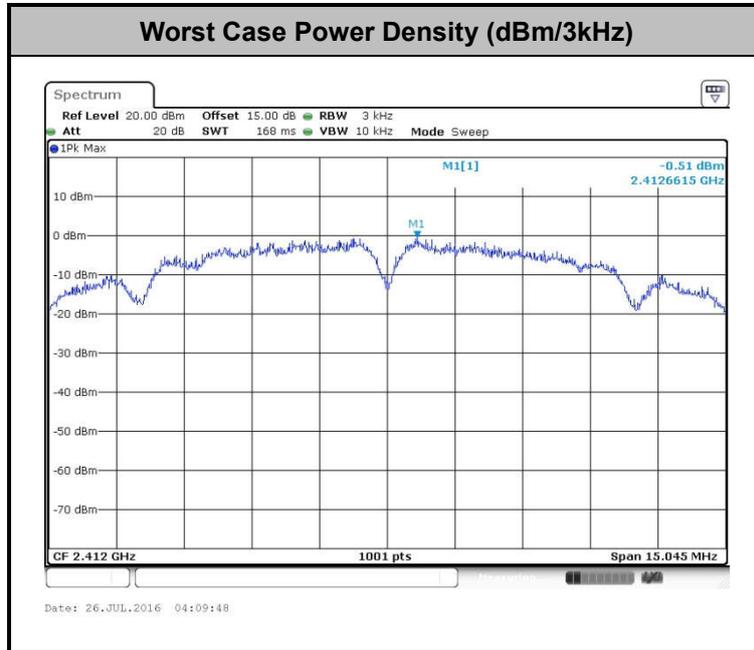
#### 3.3.4 Test Setup





### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.



## 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).

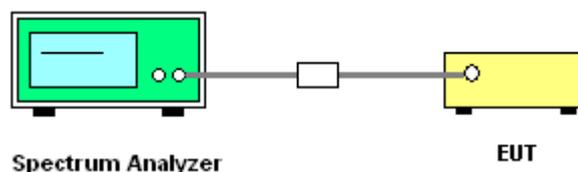
### 3.4.2 Measuring Instruments

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

### 3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
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.

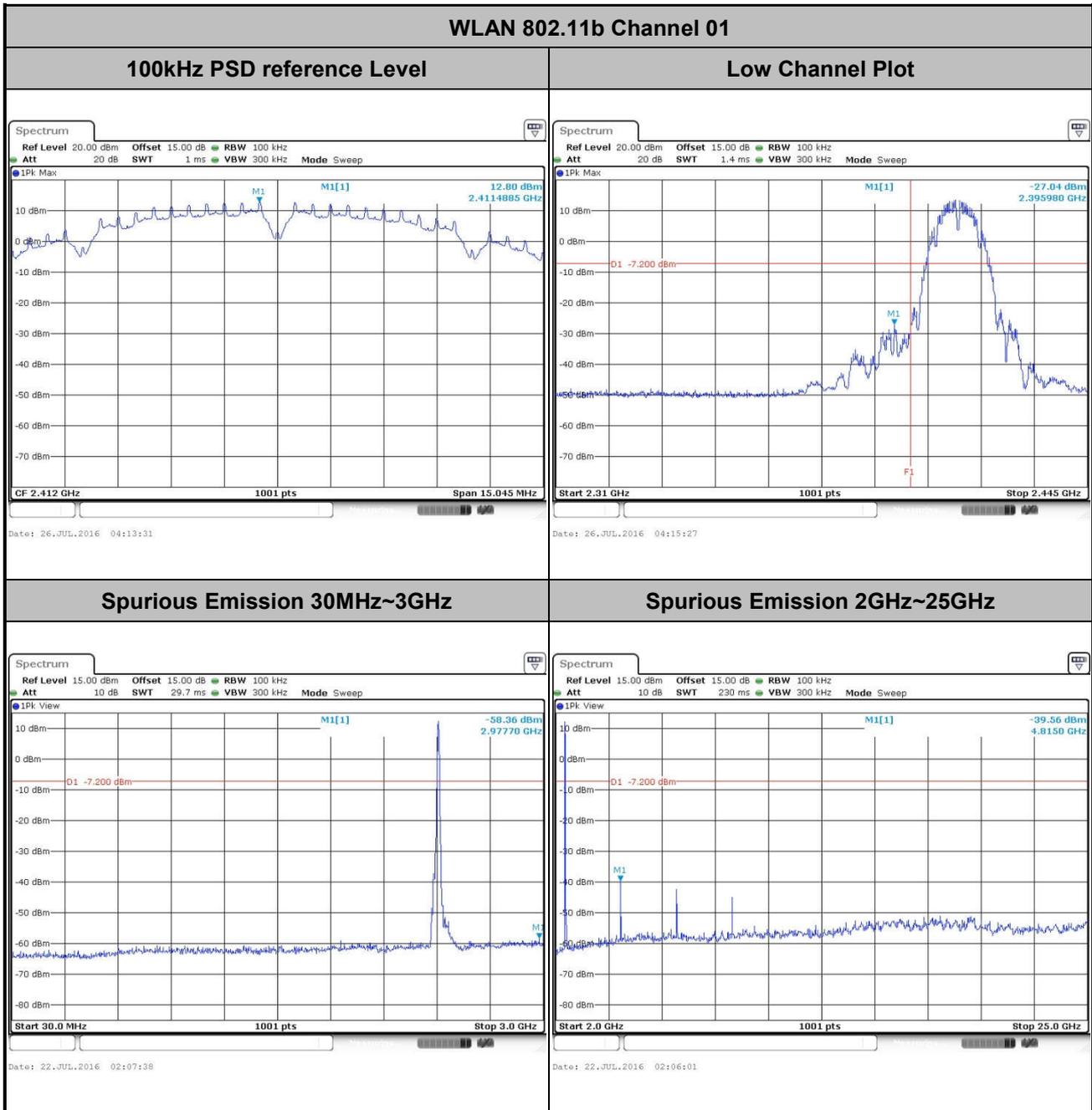
### 3.4.4 Test Setup





### 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Bruce Huang

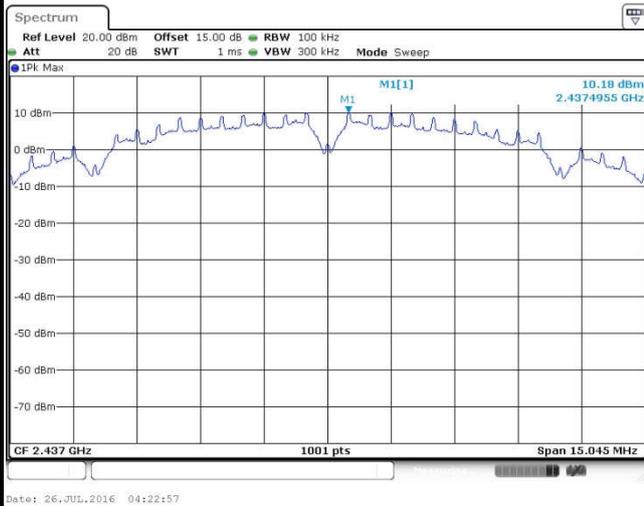




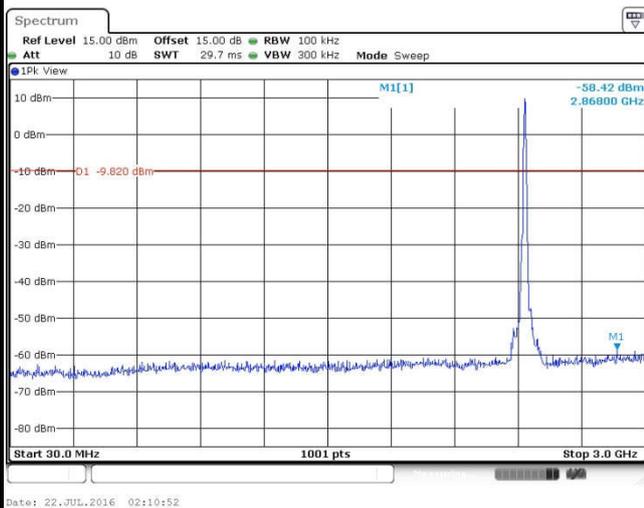
Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Bruce Huang

WLAN 802.11b Channel 06

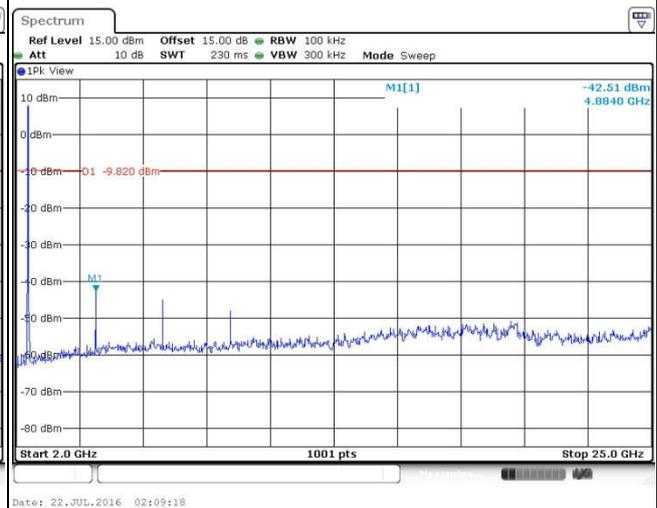
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

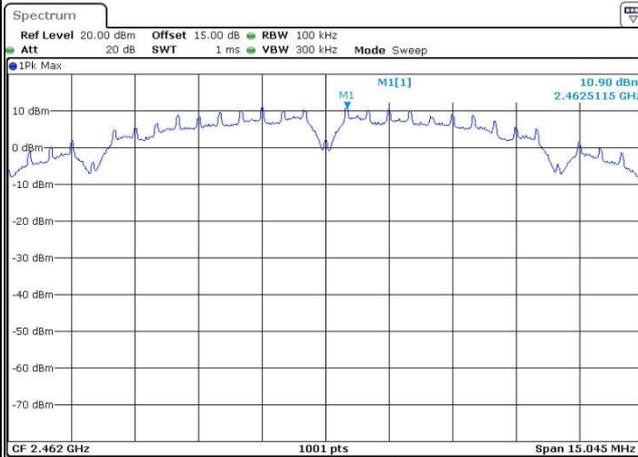




Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Bruce Huang

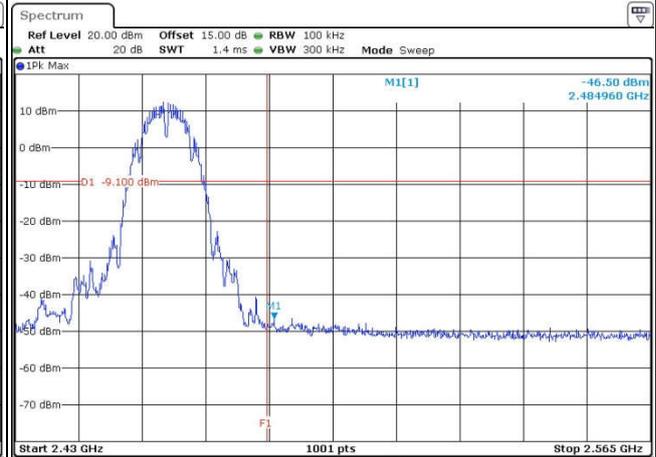
WLAN 802.11b Channel 11

100kHz PSD reference Level



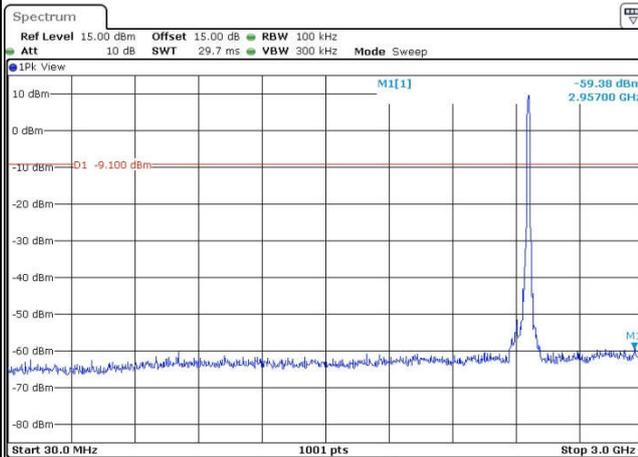
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High Channel Plot



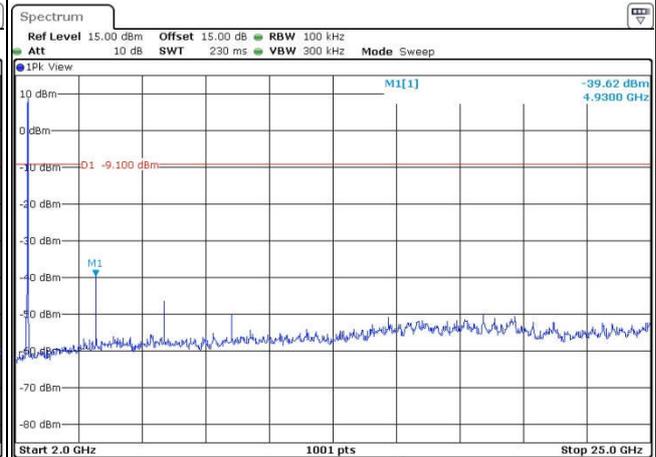
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Spurious Emission 30MHz~3GHz



Date: 22.JUL.2016 02:13:14

Spurious Emission 2GHz~25GHz



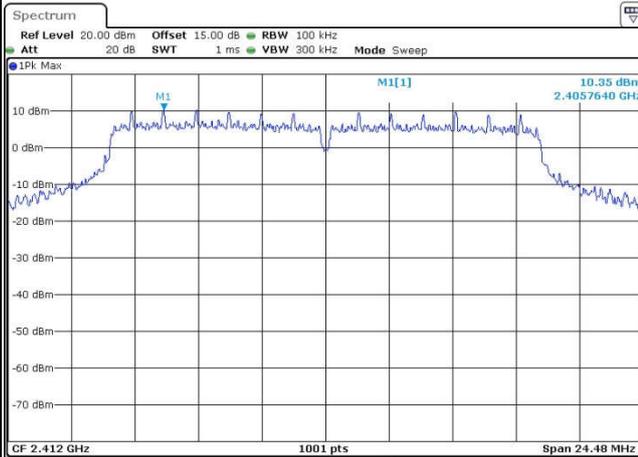
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Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Bruce Huang

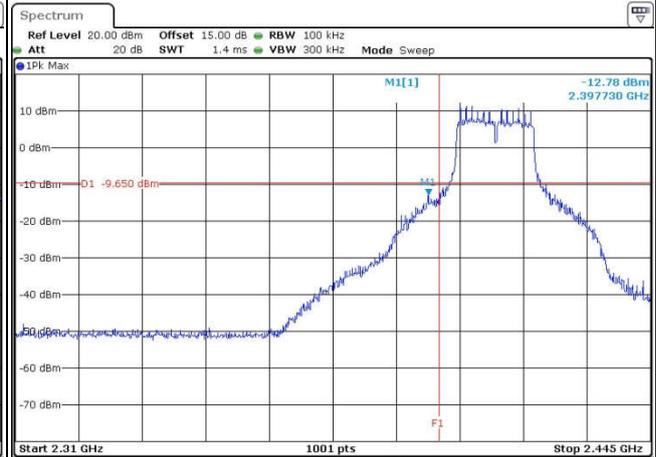
WLAN 802.11g Channel 01

100kHz PSD reference Level



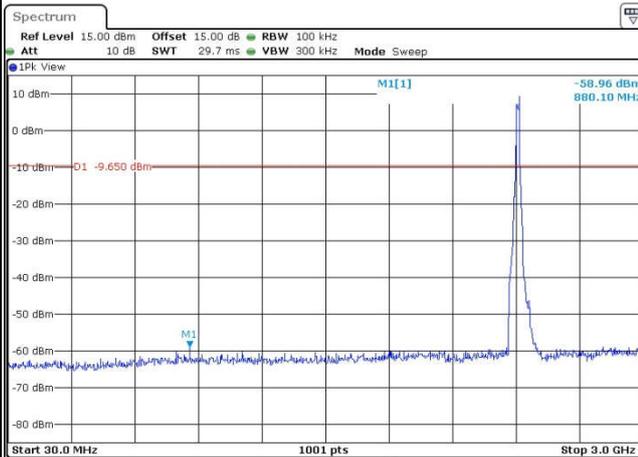
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Low Channel Plot



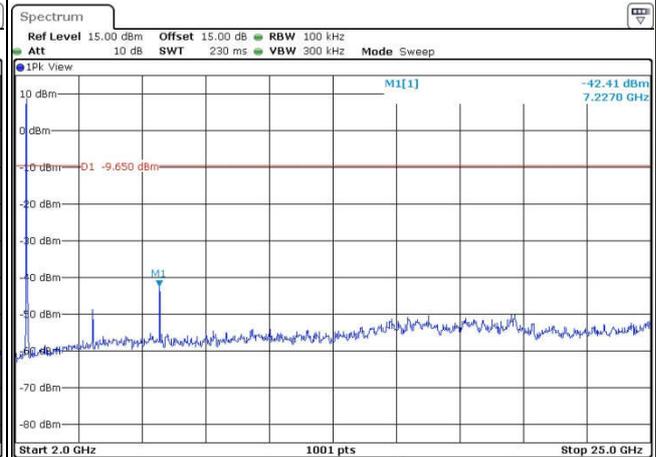
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Spurious Emission 30MHz~3GHz



Date: 26.JUL.2016 04:54:03

Spurious Emission 2GHz~25GHz



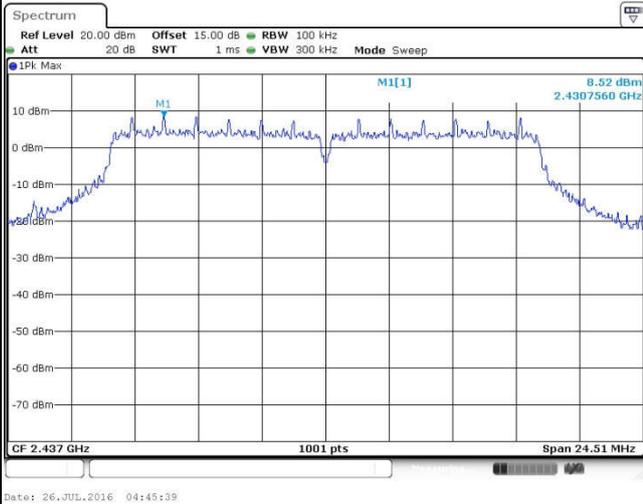
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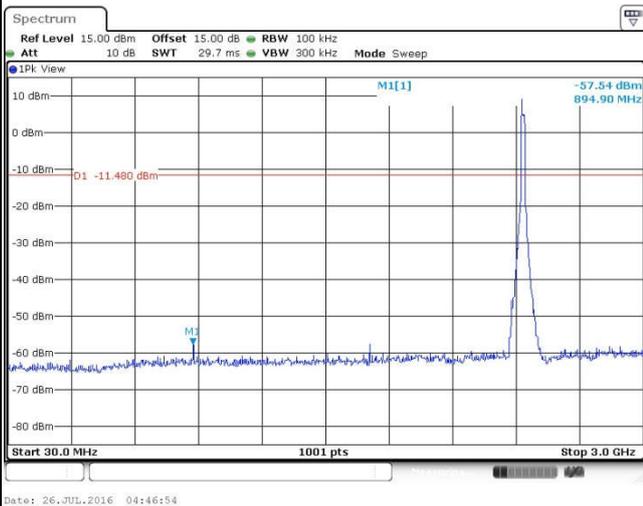
Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Bruce Huang

WLAN 802.11g Channel 06

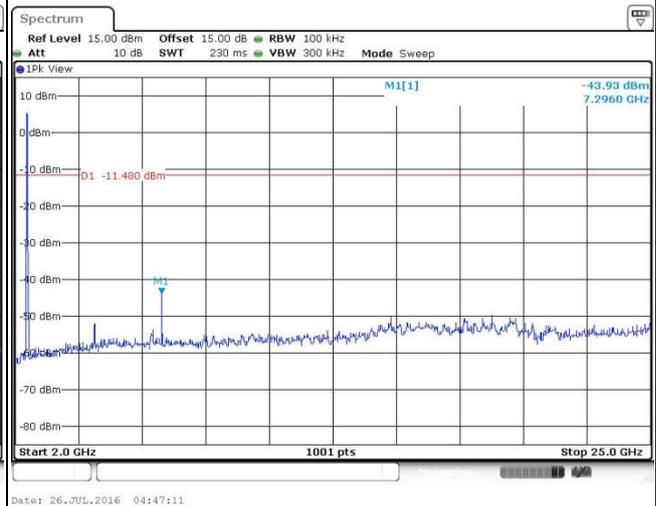
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

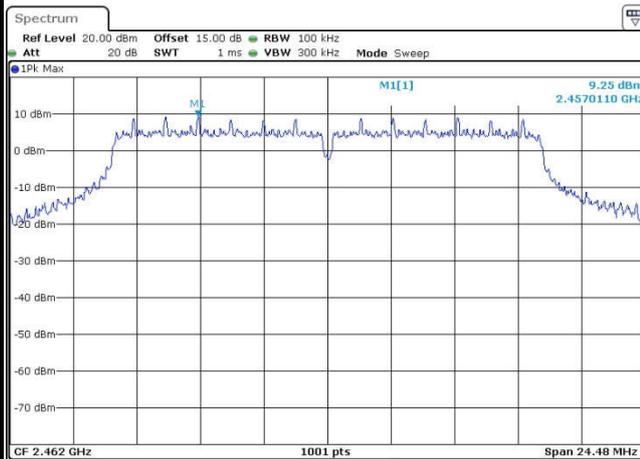




Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Bruce Huang

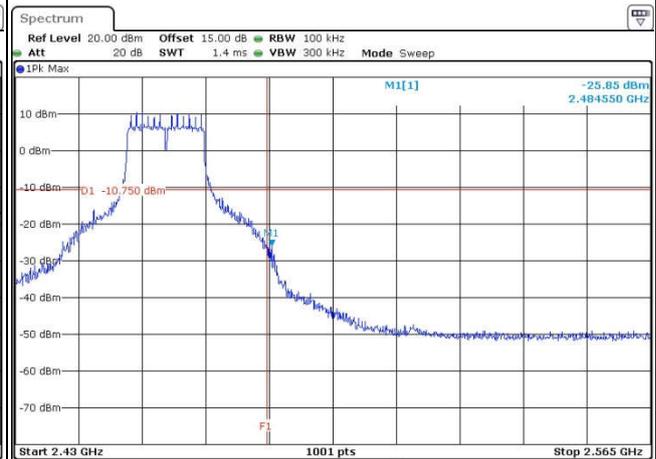
WLAN 802.11g Channel 11

100kHz PSD reference Level



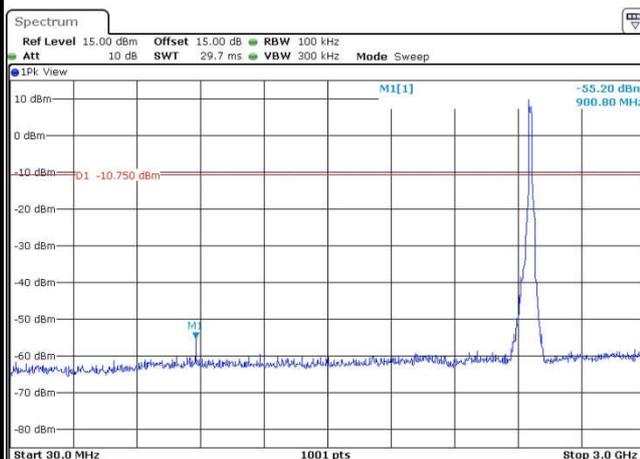
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High Channel Plot



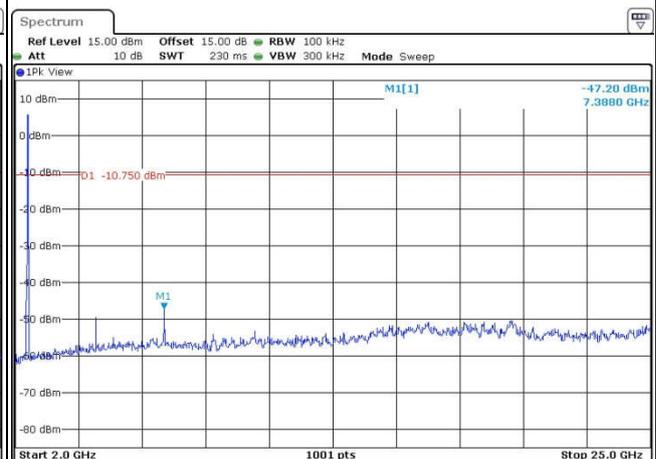
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Spurious Emission 30MHz~3GHz



Date: 26.JUL.2016 04:41:12

Spurious Emission 2GHz~25GHz



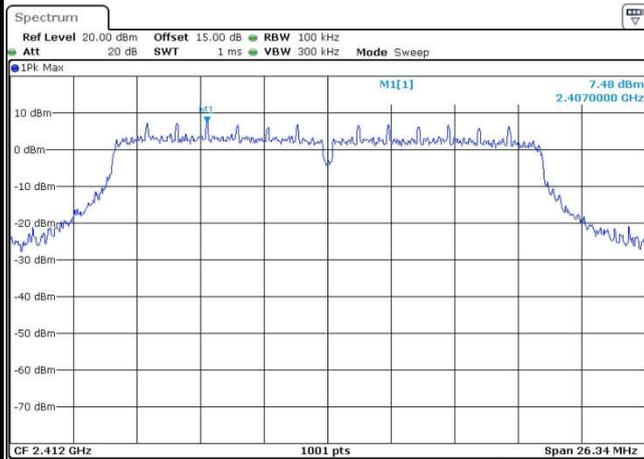
Date: 26.JUL.2016 04:41:21



Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Bruce Huang

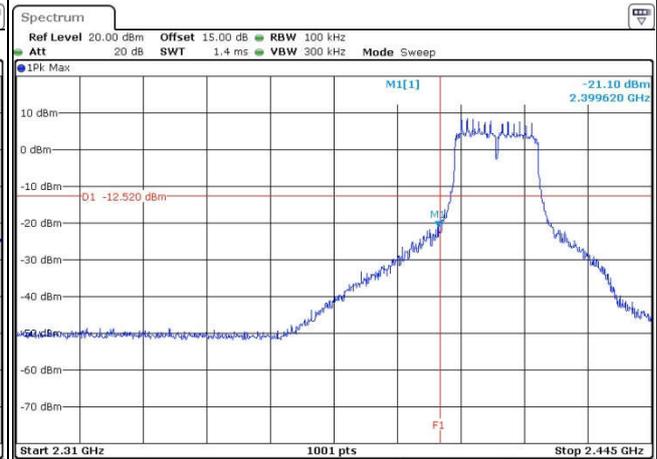
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



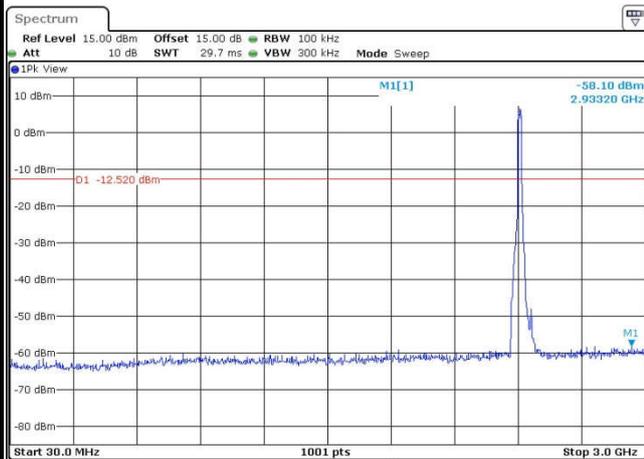
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Low Channel Plot



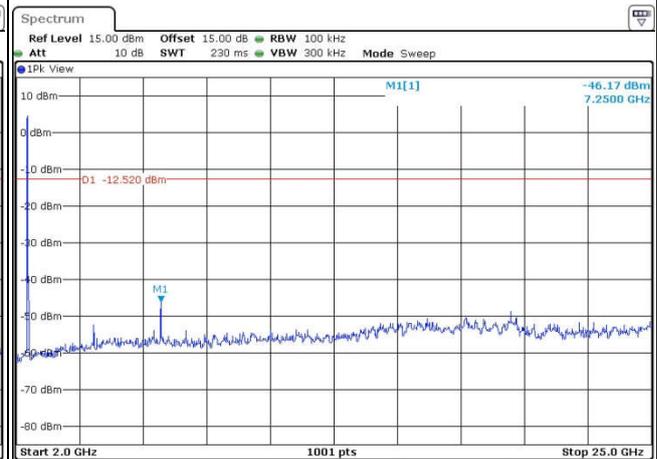
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Spurious Emission 30MHz~3GHz



Date: 26.JUL.2016 07:13:34

Spurious Emission 2GHz~25GHz



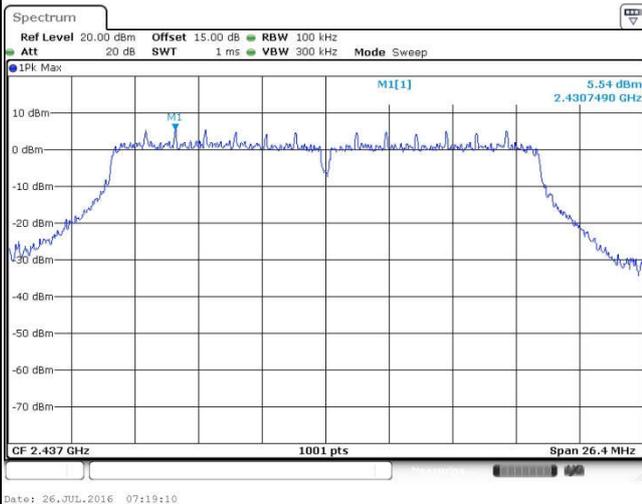
Date: 26.JUL.2016 07:12:37



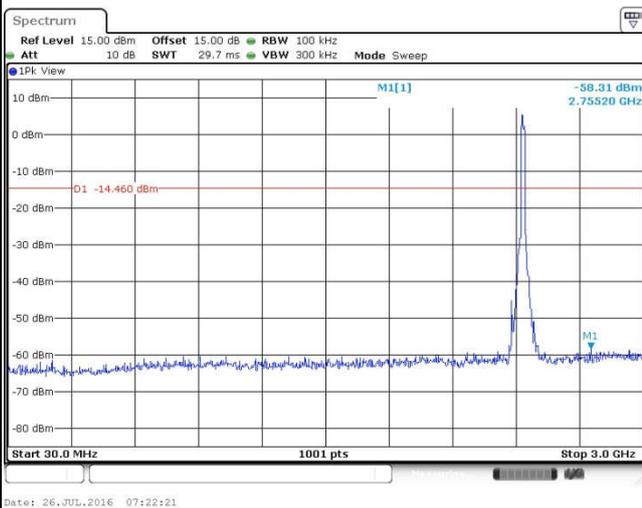
Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Bruce Huang

WLAN 802.11n HT20 Channel 06

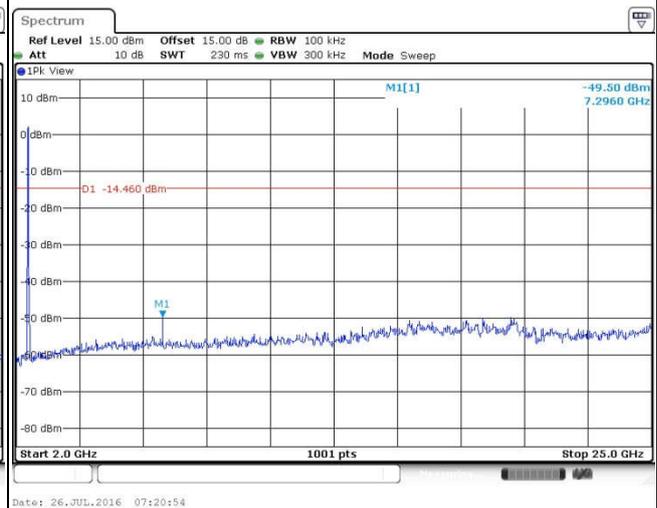
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

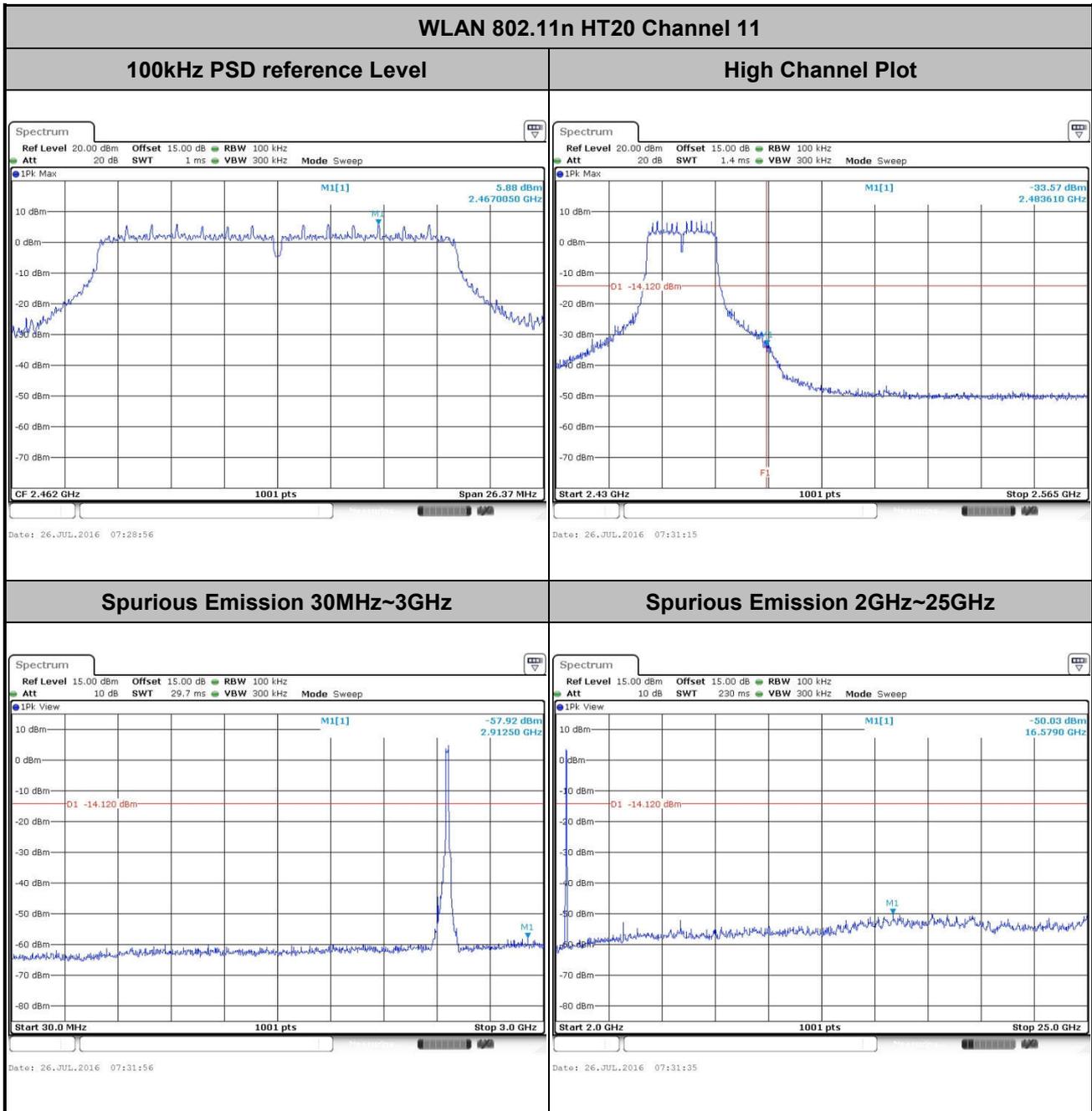


Spurious Emission 2GHz~25GHz





Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Bruce Huang





### 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

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

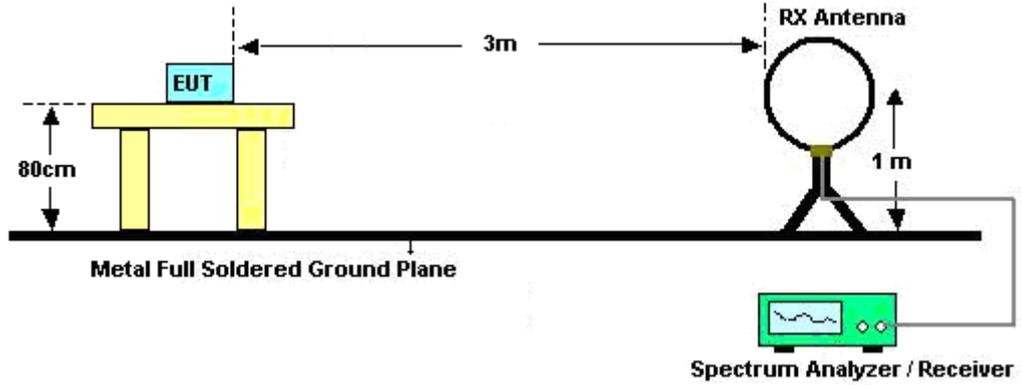


### **3.5.3 Test Procedures**

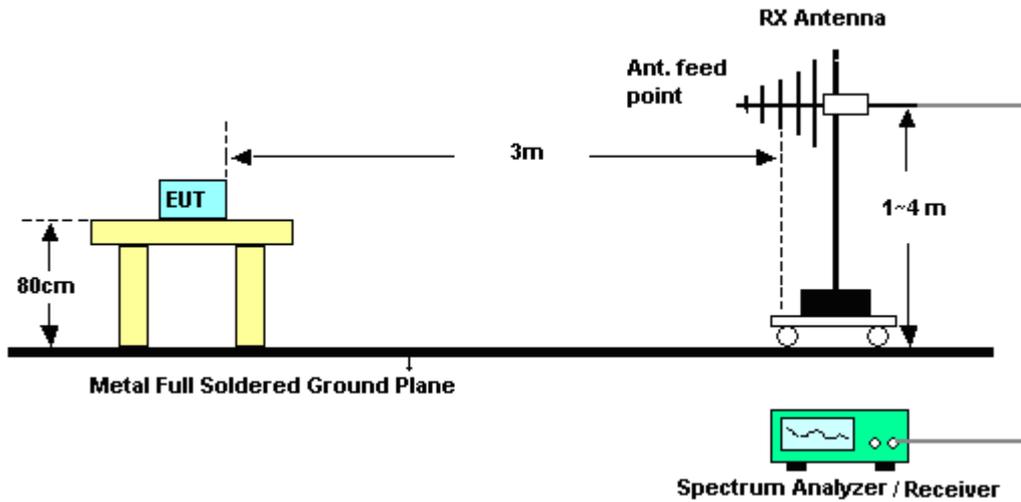
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively 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.

### 3.5.4 Test Setup

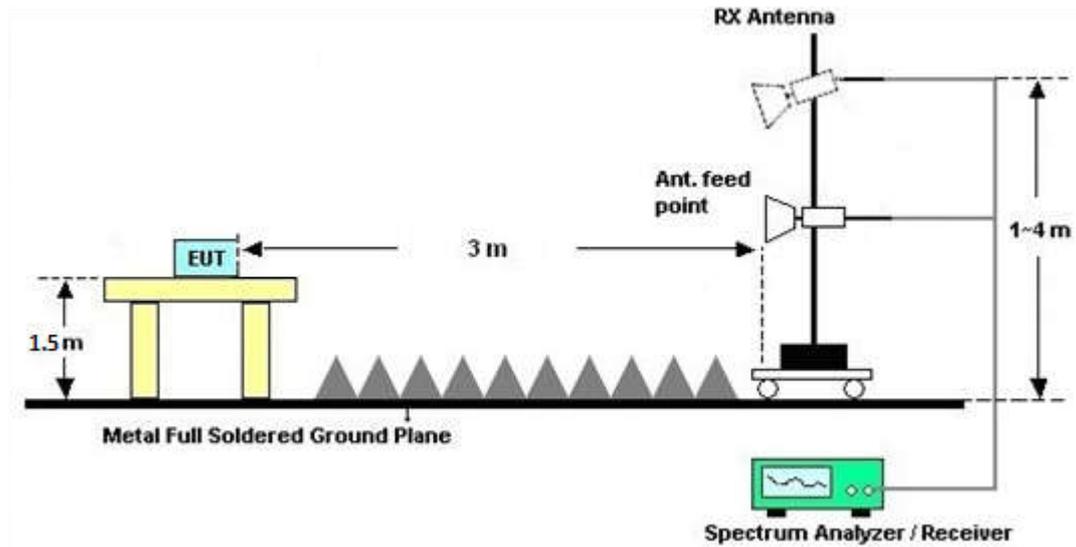
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.5.5 Test Results of Radiated Spurious 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 Spurious at Band Edges

Please refer to Appendix B.

### 3.5.7 Duty Cycle

Please refer to Appendix C.

### 3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)

Please refer to Appendix B.



### 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.

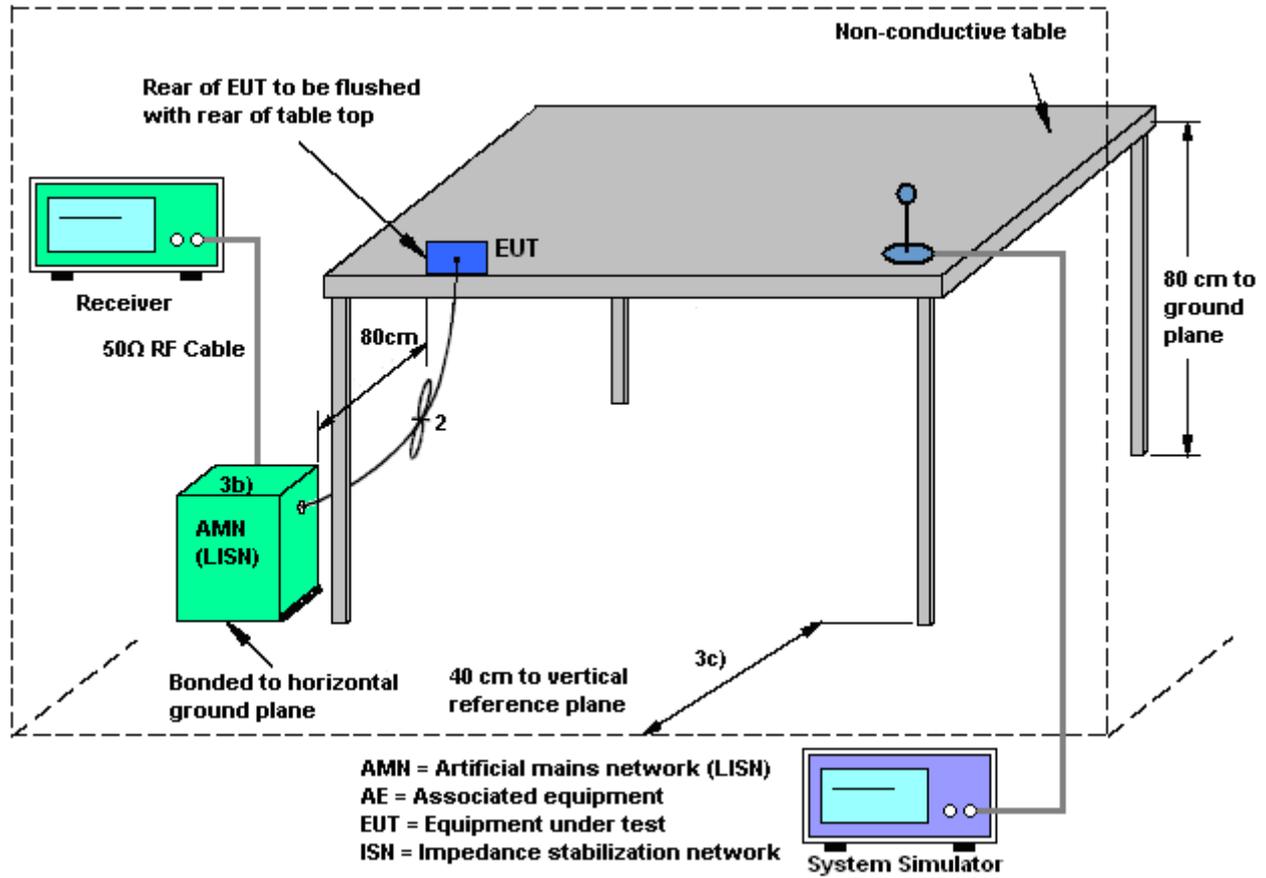
#### 3.6.2 Measuring Instruments

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

#### 3.6.3 Test Procedures

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

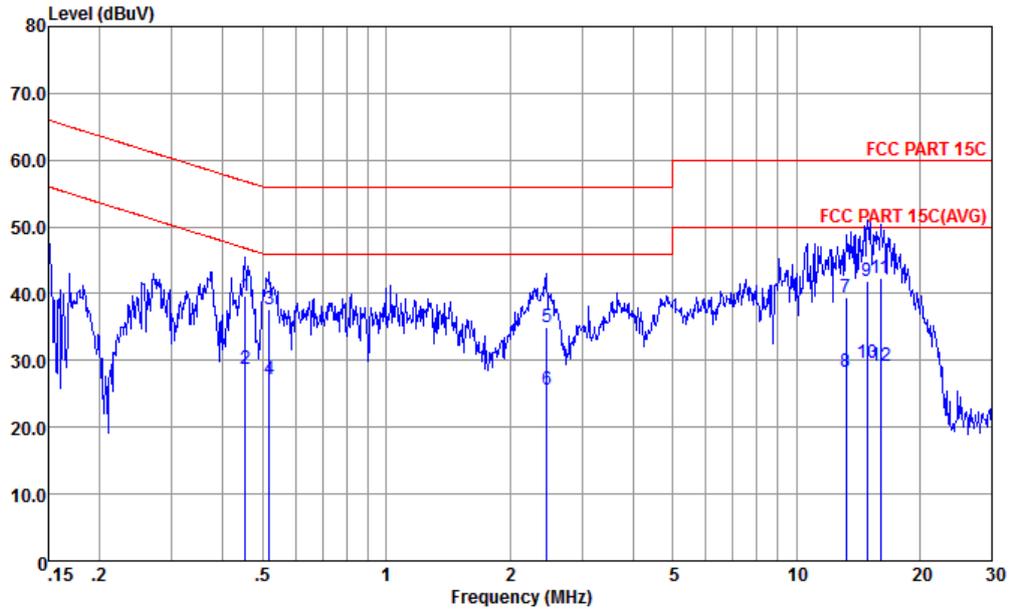
### 3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Amos Zhang	Relative Humidity :	44~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM 850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		



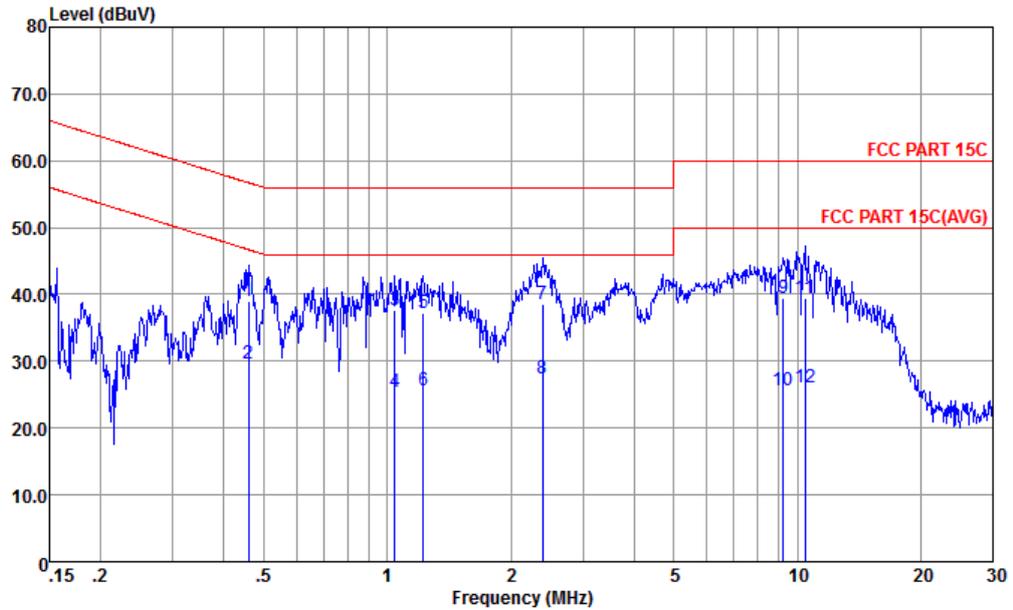
Site : CO01-KS  
 Condition : FCC PART 15C LISN-L-20151024 LINE

mode : Mode 1  
 : 004401783975432 #9

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.45	39.70	-17.10	56.80	29.30	0.23	10.17	QP
2	0.45	28.70	-18.10	46.80	18.30	0.23	10.17	Average
3	0.52	37.69	-18.31	56.00	27.30	0.23	10.16	QP
4	0.52	27.19	-18.81	46.00	16.80	0.23	10.16	Average
5	2.46	34.93	-21.07	56.00	24.60	0.18	10.15	QP
6	2.46	25.63	-20.37	46.00	15.30	0.18	10.15	Average
7	13.20	39.40	-20.60	60.00	28.80	0.26	10.34	QP
8	13.20	28.20	-21.80	50.00	17.60	0.26	10.34	Average
9	14.91	41.94	-18.06	60.00	31.30	0.26	10.38	QP
10	14.91	29.54	-20.46	50.00	18.90	0.26	10.38	Average
11	16.05	42.28	-17.72	60.00	31.60	0.26	10.42	QP
12	16.05	29.18	-20.82	50.00	18.50	0.26	10.42	Average



Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Amos Zhang	Relative Humidity :	44~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM 850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		



Site : CO01-KS  
 Condition : FCC PART 15C LISN-N-20151024 NEUTRAL

mode : Mode 1  
 : 004401783975432 #9

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.46	39.09	-17.62	56.71	28.60	0.32	10.17	QP
2 *	0.46	29.69	-17.02	46.71	19.20	0.32	10.17	Average
3	1.04	37.71	-18.29	56.00	27.20	0.37	10.14	QP
4	1.04	25.41	-20.59	46.00	14.90	0.37	10.14	Average
5	1.22	37.11	-18.89	56.00	26.60	0.37	10.14	QP
6	1.22	25.71	-20.29	46.00	15.20	0.37	10.14	Average
7	2.40	38.62	-17.38	56.00	28.09	0.38	10.15	QP
8	2.40	27.32	-18.68	46.00	16.79	0.38	10.15	Average
9	9.25	39.44	-20.56	60.00	28.90	0.28	10.26	QP
10	9.25	25.64	-24.36	50.00	15.10	0.28	10.26	Average
11	10.45	39.46	-20.54	60.00	28.90	0.28	10.28	QP
12	10.45	26.16	-23.84	50.00	15.60	0.28	10.28	Average



## **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 Anti-Replacement Construction**

An embedded-in antenna design is 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	FSV40	101078	9kHz~40GHz	May 07, 2016	Jul. 18, 2016~ Jul. 26, 2016	May 06, 2017	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 12, 2016	Jul. 18, 2016~ Jul. 26, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 12, 2016	Jul. 18, 2016~ Jul. 26, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY5445008 3	20Hz~8.4GHz	May 07, 2016	Jul. 18, 2016~ Aug. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY5515024 6	10Hz~44GHz	May 07, 2016	Jul. 18, 2016~ Aug. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 07, 2016	Jul. 18, 2016~ Aug. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	May 21, 2016	Jul. 18, 2016~ Aug. 08, 2016	May 20, 2017	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	May 07, 2016	Jul. 18, 2016~ Aug. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Aug.19, 2015	Jul. 18, 2016~ Aug. 08, 2016	Aug. 18, 2016	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 20, 2015	Jul. 18, 2016~ Aug. 08, 2016	Oct. 19, 2016	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1943528	1GHz~18GHz	Oct. 20, 2015	Jul. 18, 2016~ Aug. 08, 2016	Oct. 19, 2016	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY3950130 2	500MHz~26.5G Hz	Jan. 12, 2016	Jul. 18, 2016~ Aug. 08, 2016	Jan. 11, 2017	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	6160100019 85	N/A	NCR	Jul. 18, 2016~ Aug. 08, 2016	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul. 18, 2016~ Aug. 08, 2016	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jul. 18, 2016~ Aug. 08, 2016	NCR	Radiation (03CH03-SZ)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 10, 2015	Jul. 09, 2016	Sep. 09, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 24, 2015	Jul. 09, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 24, 2015	Jul. 09, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000 811	AC 0V~300V, 45Hz~1000Hz	Oct. 24, 2015	Jul. 09, 2016	Oct. 23, 2016	Conduction (CO01-KS)

NCR: No Calibration Required



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.3dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.1dB
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### Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.0dB
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### Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.0dB
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## **Appendix A. Conducted Test Results**

**A1 - DTS Part**

Test Engineer:	Bruce Huang	Temperature:	24~26	°C
Test Date:	2016/7/18~2016/7/26	Relative Humidity:	50~53	%

**TEST RESULTS DATA**  
**6dB and 99% Occupied Bandwidth**

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	14.49	10.03	0.50	Pass
11b	1Mbps	1	6	2437	14.19	10.03	0.50	Pass
11b	1Mbps	1	11	2462	14.29	10.03	0.50	Pass
11g	6Mbps	1	1	2412	20.38	16.32	0.50	Pass
11g	6Mbps	1	6	2437	19.73	16.34	0.50	Pass
11g	6Mbps	1	11	2462	19.48	16.32	0.50	Pass
HT20	MCS0	1	1	2412	19.28	17.56	0.50	Pass
HT20	MCS0	1	6	2437	19.63	17.60	0.50	Pass
HT20	MCS0	1	11	2462	19.28	17.58	0.50	Pass

**TEST RESULTS DATA**  
**Peak Power Table**

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
11b	1Mbps	1	1	2412	21.31	30.00	3.50	24.81	36.00	Pass
11b	1Mbps	1	6	2437	19.52	30.00	3.50	23.02	36.00	Pass
11b	1Mbps	1	11	2462	20.29	30.00	3.50	23.79	36.00	Pass
11g	6Mbps	1	1	2412	23.60	30.00	3.50	27.10	36.00	Pass
11g	6Mbps	1	6	2437	23.06	30.00	3.50	26.56	36.00	Pass
11g	6Mbps	1	11	2462	23.02	30.00	3.50	26.52	36.00	Pass
HT20	MCS0	1	1	2412	23.11	30.00	3.50	26.61	36.00	Pass
HT20	MCS0	1	6	2437	22.92	30.00	3.50	26.42	36.00	Pass
HT20	MCS0	1	11	2462	22.48	30.00	3.50	25.98	36.00	Pass

**TEST RESULTS DATA**  
**Average Power Table**  
**(Reporting Only)**

2.4GHz Band						
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.11	19.01
11b	1Mbps	1	6	2437	0.11	16.88
11b	1Mbps	1	11	2462	0.11	17.86
11g	6Mbps	1	1	2412	0.60	17.27
11g	6Mbps	1	6	2437	0.60	15.21
11g	6Mbps	1	11	2462	0.60	15.98
HT20	MCS0	1	1	2412	0.64	15.56
HT20	MCS0	1	6	2437	0.64	13.36
HT20	MCS0	1	11	2462	0.64	14.25

**TEST RESULTS DATA**  
**Peak Power Density**

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-0.51	3.50	8.00	Pass
11b	1Mbps	1	6	2437	-2.77	3.50	8.00	Pass
11b	1Mbps	1	11	2462	-3.03	3.50	8.00	Pass
11g	6Mbps	1	1	2412	-2.81	3.50	8.00	Pass
11g	6Mbps	1	6	2437	-5.02	3.50	8.00	Pass
11g	6Mbps	1	11	2462	-4.14	3.50	8.00	Pass
HT20	MCS0	1	1	2412	-4.69	3.50	8.00	Pass
HT20	MCS0	1	6	2437	-7.75	3.50	8.00	Pass
HT20	MCS0	1	11	2462	-5.53	3.50	8.00	Pass



## Appendix B. Radiated Spurious Emission

### 2.4GHz 2400~2483.5MHz

#### WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b CH 01 2412MHz		2386.55	53.56	-20.44	74	56.43	27.29	4.86	35.02	170	275	P	H
		2386.23	48.6	-5.4	54	51.47	27.29	4.86	35.02	170	275	A	H
	*	2412	101.02	-	-	103.81	27.33	4.88	35	170	275	P	H
	*	2412	98.67	-	-	101.46	27.33	4.88	35	170	275	A	H
		2385.92	57.32	-16.68	74	60.19	27.29	4.86	35.02	153	354	P	V
		2386.34	53.02	-0.98	54	55.89	27.29	4.86	35.02	153	354	A	V
	*	2412	104.35	-	-	107.14	27.33	4.88	35	153	354	P	V
	*	2412	102.57	-	-	105.36	27.33	4.88	35	153	354	A	V
802.11b CH 06 2437MHz		2383.22	50.28	-23.72	74	53.18	27.26	4.86	35.02	250	308	P	H
		2381.12	40.58	-13.42	54	43.48	27.26	4.86	35.02	250	308	A	H
	*	2437	99.04	-	-	101.77	27.36	4.88	34.97	250	308	P	H
	*	2437	95.98	-	-	98.71	27.36	4.88	34.97	250	308	A	H
		2494.47	51.99	-22.01	74	54.47	27.5	4.92	34.9	250	308	P	H
		2492.86	40.55	-13.45	54	43.03	27.5	4.92	34.9	250	308	A	H
		2384.2	51.3	-22.7	74	54.2	27.26	4.86	35.02	150	310	P	V
		2381.68	41.54	-12.46	54	44.44	27.26	4.86	35.02	150	310	A	V
	*	2437	102.94	-	-	105.67	27.36	4.88	34.97	150	310	P	V
	*	2437	100.04	-	-	102.77	27.36	4.88	34.97	150	310	A	V
		2492.37	52.84	-21.16	74	55.32	27.5	4.92	34.9	150	310	P	V
	2492.93	41.55	-12.45	54	44.03	27.5	4.92	34.9	150	310	A	V	



802.11b CH 11 2462MHz	*	2462	102.53	-	-	105.15	27.43	4.9	34.95	250	308	P	H
	*	2462	99.53	-	-	102.15	27.43	4.9	34.95	250	308	A	H
		2492.88	51.93	-22.07	74	54.41	27.5	4.92	34.9	250	308	P	H
		2486.08	41.73	-12.27	54	44.28	27.47	4.9	34.92	250	308	A	H
	*	2462	106.12	-	-	108.74	27.43	4.9	34.95	177	312	P	V
	*	2462	103.15	-	-	105.77	27.43	4.9	34.95	177	312	A	V
		2489	52.61	-21.39	74	55.11	27.5	4.92	34.92	177	312	P	V
		2487.68	43.09	-10.91	54	45.61	27.5	4.9	34.92	177	312	A	V
Remark	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11b (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	41.23	-32.77	74	60.09	32.56	6.97	58.39	250	0	P	H
		4824	45.87	-28.13	74	64.73	32.56	6.97	58.39	250	0	P	V
802.11b CH 06 2437MHz		4874	41.81	-32.19	74	60.82	32.66	6.99	58.66	150	360	P	H
		7311	55.04	-18.96	74	67.07	37.66	8.93	58.62	100	169	P	H
		7311	46.22	-7.78	54	58.25	37.66	8.93	58.62	150	169	A	H
		4874	42.29	-31.71	74	61.3	32.66	6.99	58.66	150	360	P	V
		7311	55.89	-18.11	74	67.92	37.66	8.93	58.62	150	96	P	V
		7311	49.58	-4.42	54	61.61	37.66	8.93	58.62	150	96	A	V
802.11b CH 11 2462MHz		4924	41.91	-32.09	74	60.67	32.76	7	58.52	250	0	P	H
		7386	54.61	-19.39	74	66.32	37.68	9.15	58.54	202	252	P	H
		7386	46.84	-7.16	54	58.55	37.68	9.15	58.54	202	252	A	H
		4924	46.07	-27.93	74	64.83	32.76	7	58.52	250	0	P	V
		7386	55.19	-18.81	74	66.9	37.68	9.15	58.54	237	290	P	V
		7386	48.82	-5.18	54	60.53	37.68	9.15	58.54	237	290	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11g (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11g CH 01 2412MHz		2389.49	61.74	-12.26	74	64.61	27.29	4.86	35.02	229	151	P	H
		2389.49	49.55	-4.45	54	52.42	27.29	4.86	35.02	229	151	A	H
	*	2412	96.99	-	-	99.78	27.33	4.88	35	229	151	P	H
	*	2412	90.17	-	-	92.96	27.33	4.88	35	229	151	A	H
		2389.91	62.87	-11.13	74	65.72	27.29	4.86	35	150	299	P	V
		2390	51.55	-2.45	54	54.4	27.29	4.86	35	150	299	A	V
	*	2412	100.53	-	-	103.32	27.33	4.88	35	150	299	P	V
	*	2412	92.9	-	-	95.69	27.33	4.88	35	150	299	A	V
802.11g CH 06 2437MHz		2384.62	50.54	-23.46	74	53.44	27.26	4.86	35.02	150	48	P	H
		2384.9	42.78	-11.22	54	45.68	27.26	4.86	35.02	150	48	A	H
	*	2437	99.79	-	-	102.48	27.4	4.88	34.97	150	48	P	H
	*	2437	93.15	-	-	95.84	27.4	4.88	34.97	150	48	A	H
		2489.43	50.11	-23.89	74	52.61	27.5	4.92	34.92	150	48	P	H
		2489.29	40.27	-13.73	54	42.77	27.5	4.92	34.92	150	48	A	H
		2384.76	50.78	-23.22	74	53.68	27.26	4.86	35.02	150	354	P	V
		2384.9	42.85	-11.15	54	45.75	27.26	4.86	35.02	150	354	A	V
	*	2437	100.75	-	-	103.44	27.4	4.88	34.97	150	354	P	V
	*	2437	94.04	-	-	96.73	27.4	4.88	34.97	150	354	A	V
		2489.22	49.82	-24.18	74	52.32	27.5	4.92	34.92	150	354	P	V
		2489.22	40.73	-13.27	54	43.23	27.5	4.92	34.92	150	354	A	V



802.11g CH 11 2462MHz	*	2462	91.91	-	-	94.53	27.43	4.9	34.95	150	154	P	H
	*	2462	84.38	-	-	87	27.43	4.9	34.95	150	154	A	H
		2483.72	60.73	-13.27	74	63.28	27.47	4.9	34.92	150	154	P	H
		2483.6	46.15	-7.85	54	48.7	27.47	4.9	34.92	150	154	A	H
	*	2462	99.49	-	-	102.11	27.43	4.9	34.95	150	300	P	V
	*	2462	92.05	-	-	94.67	27.43	4.9	34.95	150	300	A	V
		2483.72	68.41	-5.59	74	70.96	27.47	4.9	34.92	150	300	P	V
		2483.52	52.68	-1.32	54	55.23	27.47	4.9	34.92	150	300	A	V
<b>Remark</b>	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11g (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11g CH 01 2412MHz		4824	40.72	-33.28	74	59.58	32.56	6.97	58.39	250	0	P	H
		4824	41.9	-32.1	74	60.76	32.56	6.97	58.39	250	0	P	V
802.11g CH 06 2437MHz		4874	39.36	-34.64	74	58.37	32.66	6.99	58.66	150	360	P	H
		7311	49.7	-24.3	74	61.73	37.66	8.93	58.62	150	0	P	H
		4874	39.37	-34.63	74	58.38	32.66	6.99	58.66	150	360	P	V
		7311	52.94	-21.06	74	64.97	37.66	8.93	58.62	174	100	P	V
802.11g CH 11 2462MHz		4924	40.24	-33.76	74	59	32.76	7	58.52	250	0	P	H
		7386	50.28	-23.72	74	61.99	37.68	9.15	58.54	150	0	P	H
		4924	41.65	-32.35	74	60.41	32.76	7	58.52	250	0	P	V
		7386	50.12	-23.88	74	61.83	37.68	9.15	58.54	150	0	P	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 01 2412MHz		2389.8	64.43	-9.57	74	67.28	27.29	4.86	35	195	267	P	H
		2389.905	50.6	-3.4	54	53.45	27.29	4.86	35	195	267	A	H
	*	2412	99.4	-	-	102.19	27.33	4.88	35	195	267	P	H
	*	2412	92.07	-	-	94.86	27.33	4.88	35	195	267	A	H
		2389.70	65.33	-8.67	74	68.2	27.29	4.86	35.02	150	190	P	V
		2390.00	50.98	-3.02	54	53.83	27.29	4.86	35	150	190	A	V
	*	2412	99.1	-	-	101.89	27.33	4.88	35	150	190	P	V
	*	2412	90.61	-	-	93.4	27.33	4.88	35	150	190	A	V
802.11n HT20 CH 06 2437MHz		2384.34	51.78	-22.22	74	54.68	27.26	4.86	35.02	203	265	P	H
		2385.46	41.39	-12.61	54	44.29	27.26	4.86	35.02	203	265	A	H
	*	2437	95.6	-	-	98.29	27.4	4.88	34.97	203	265	P	H
	*	2437	89.28	-	-	91.97	27.4	4.88	34.97	203	265	A	H
		2488.59	48.78	-25.22	74	51.28	27.5	4.92	34.92	203	265	P	H
		2488.66	39.4	-14.6	54	41.9	27.5	4.92	34.92	203	265	A	H
		2384.48	50.6	-23.4	74	53.5	27.26	4.86	35.02	233	352	P	V
		2385.32	42.42	-11.58	54	45.32	27.26	4.86	35.02	233	352	A	V
	*	2437	98.34	-	-	101.03	27.4	4.88	34.97	233	352	P	V
	*	2437	92.37	-	-	95.06	27.4	4.88	34.97	233	352	A	V
		2489.15	50.6	-23.4	74	53.1	27.5	4.92	34.92	233	352	P	V
	2488.8	40.5	-13.5	54	43	27.5	4.92	34.92	233	352	A	V	



802.11n HT20 CH 11 2462MHz	*	2462	96.1	-	-	98.72	27.43	4.9	34.95	150	190	P	H
	*	2462	89.74	-	-	92.36	27.43	4.9	34.95	150	190	A	H
		2483.84	65.8	-8.2	74	68.35	27.47	4.9	34.92	150	190	P	H
		2483.52	49.74	-4.26	54	52.29	27.47	4.9	34.92	150	190	A	H
	*	2462	100.16	-	-	102.78	27.43	4.9	34.95	200	354	P	V
	*	2462	92.85	-	-	95.47	27.43	4.9	34.95	200	354	A	V
		2483.56	68.21	-5.79	74	70.76	27.47	4.9	34.92	200	354	P	V
	2483.52	50.76	-3.24	54	53.31	27.47	4.9	34.92	200	354	A	V	
<b>Remark</b>	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT20 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 01 2412MHz		4824	41.62	-32.38	74	60.48	32.56	6.97	58.39	250	0	P	H
		4824	41.87	-32.13	74	60.73	32.56	6.97	58.39	250	0	P	V
802.11n HT20 CH 06 2437MHz		4874	39.95	-34.05	74	58.96	32.66	6.99	58.66	150	360	P	H
		7311	49.56	-24.44	74	61.59	37.66	8.93	58.62	150	0	P	H
		4874	40.75	-33.25	74	59.76	32.66	6.99	58.66	150	360	P	V
		7311	54.67	-19.33	74	66.7	37.66	8.93	58.62	150	97	P	V
802.11n HT20 CH 11 2462MHz		4924	40.83	-33.17	74	59.59	32.76	7	58.52	150	347	P	H
		7386	49.93	-24.07	74	61.64	37.68	9.15	58.54	150	274	P	H
		4924	41.86	-32.14	74	60.62	32.76	7	58.52	150	347	P	V
		7386	50	-24	74	61.71	37.68	9.15	58.54	150	274	P	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz  
2.4GHz WIFI 802.11b (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
2.4GHz 802.11b LF		30	26.16	-13.84	40	30.62	26.7	0.62	31.78	100	220	P	H
		111.48	20.15	-23.35	43.5	32.13	18.57	0.99	31.54	-	-	P	H
		182.29	22.24	-21.26	43.5	35.89	16.38	1.28	31.31	-	-	P	H
		399.57	27.52	-18.48	46	30.94	26	1.82	31.24	-	-	P	H
		670.2	28.21	-17.79	46	30.8	26.27	2.37	31.23	-	-	P	H
		835.1	30.9	-15.1	46	31.61	27.89	2.65	31.25	-	-	P	H
		30	36.84	-3.16	40	41.3	26.7	0.62	31.78	100	150	QP	V
		43.58	36.15	-3.85	40	47.01	20.26	0.62	31.74	100	9	QP	V
		79.47	31.93	-8.07	40	47.25	15.52	0.83	31.67	-	-	P	V
		173.56	24.27	-19.23	43.5	37.57	16.76	1.28	31.34	-	-	P	V
		402.48	27.32	-18.68	46	30.8	25.94	1.82	31.24	-	-	P	V
		563.5	27.86	-18.14	46	31.91	25.03	2.13	31.21	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

- Level(dBμV/m) =  
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)  
= 55.45 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)  
= 43.54 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

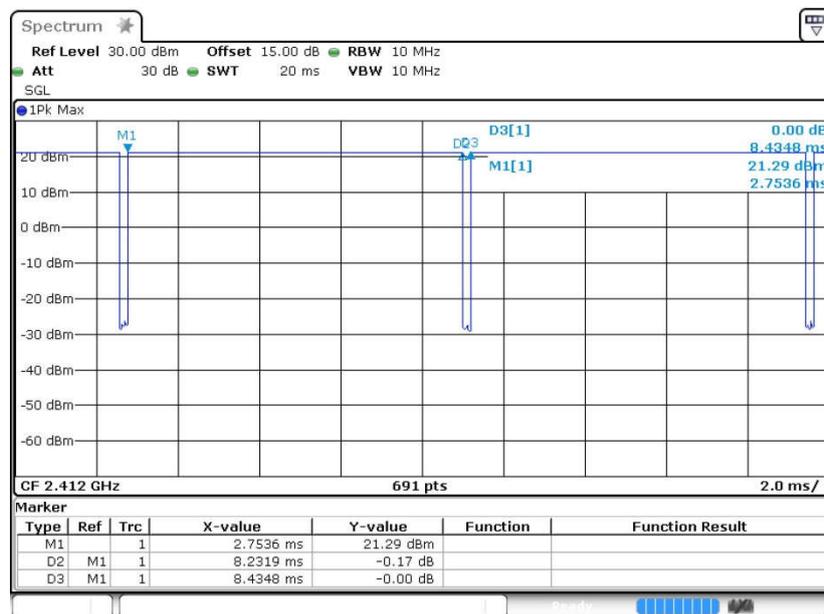
Both peak and average measured complies with the limit line, so test result is “PASS”.



## Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.59	8.23	0.12	300Hz
802.11g	87.04	1.36	0.73	1kHz
2.4GHz 802.11n HT20	86.27	1.28	0.78	1kHz

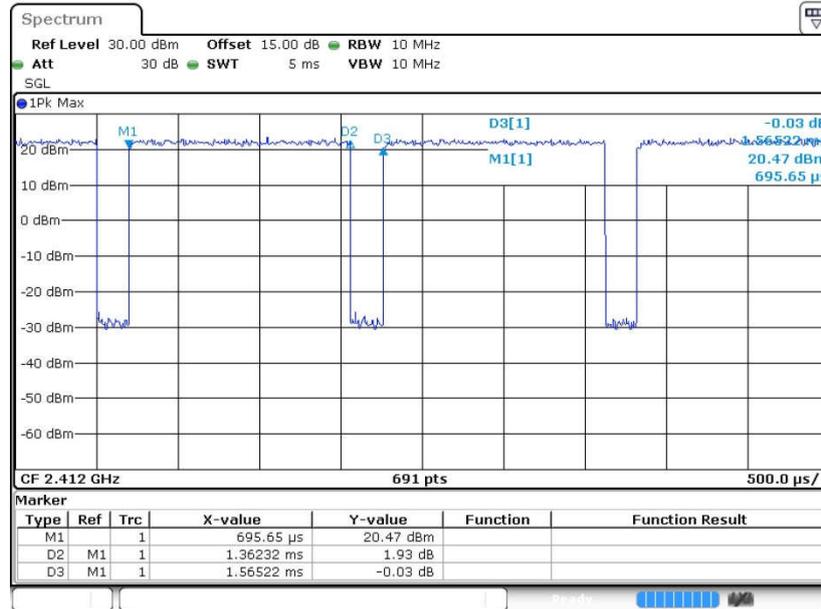
### 802.11b



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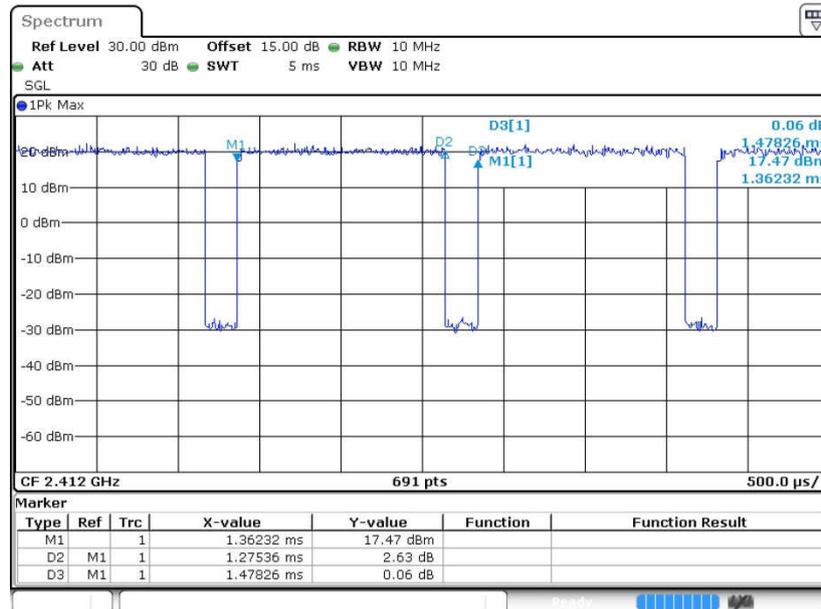


802.11g



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2.4GHz 802.11n HT20



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