



# FCC RF Test Report

APPLICANT : ZTE CORPORATION  
EQUIPMENT : LTE/CDMA/WCDMA/GSM(GPRS)  
Multi-Mode Digital Mobile Phone  
BRAND NAME : ZTE  
MODEL NAME : N9560  
FCC ID : SRQ-ZTEN9560  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jan. 09, 2017 and testing was completed on Jan. 23, 2017. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Prepared by: James Huang / Manager

Approved by: Jones Tsai / Manager



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



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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 8.89 dB at 2483.510 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 7.08 dB at 0.150 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	
<b>Equipment</b>	LTE/CDMA/WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone
<b>Brand Name</b>	ZTE
<b>Model Name</b>	N9560
<b>FCC ID</b>	SRQ-ZTEN9560
<b>EUT supports Radios application</b>	CDMA/EV-DO/GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(16QAM uplink is not supported)/LTE/WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/Bluetooth v4.2 LE
<b>MEID Code</b>	Conducted: 99000882000772
<b>IMEI Code</b>	Radiation: 990008820007214 Conduction: 990006880007206
<b>HW Version</b>	N9560HW1.0
<b>SW Version</b>	N9560V1.0.0B01
<b>EUT Stage</b>	Identical Prototype

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



### 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx/Rx Channel Frequency Range</b>	2412 MHz ~ 2462 MHz
<b>Maximum (Peak) Output Power to antenna</b>	802.11b : 22.67 dBm (0.1849 W) 802.11g : 24.61 dBm (0.2891 W) 802.11n HT20 : 24.17 dBm (0.2612 W) 802.11n HT40 : 24.31 dBm (0.2698 W)
<b>Antenna Type / Gain</b>	PIFA Antenna with gain 0.50 dBi
<b>Type of Modulation</b>	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 (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>			<b>FCC Registration No.</b>
	TH01-KS	03CH02-KS	CO01-KS	418269

**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 were recorded in this report.

### 2.1 Carrier Frequency and 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

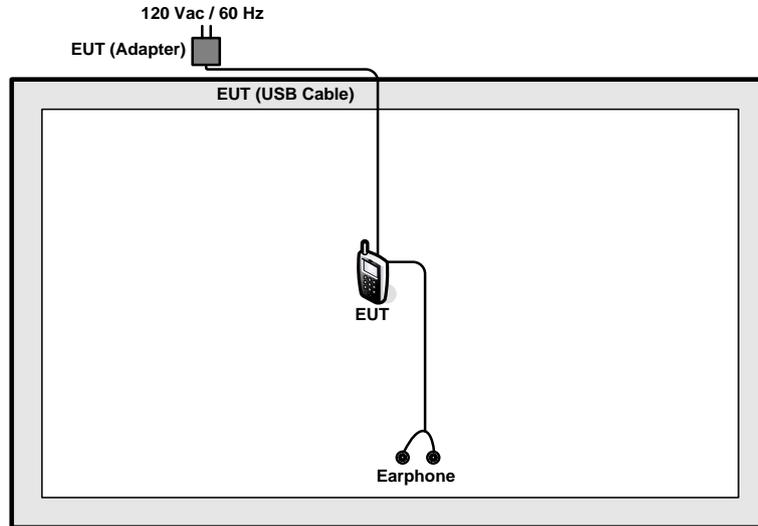
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

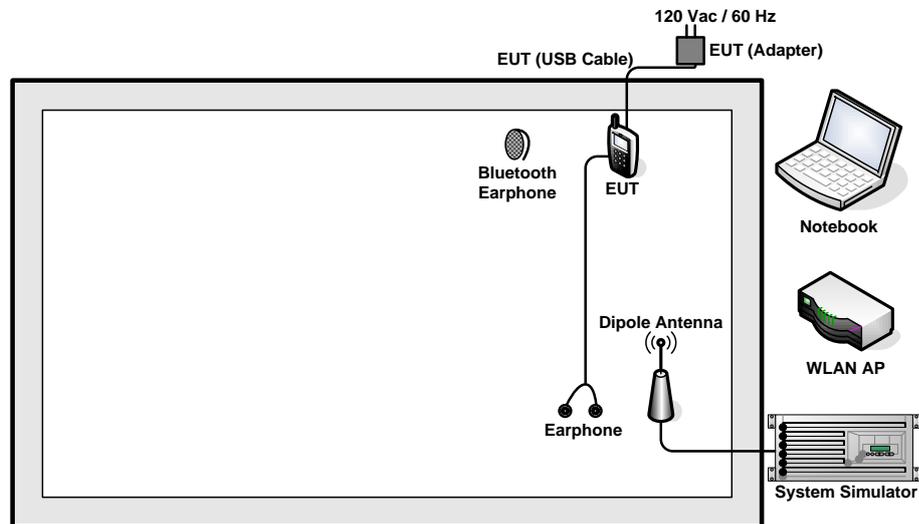
Test Cases	
<b>AC Conducted Emission</b>	Mode 1: GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter)
<b>Remark:</b> For Radiated TCs, The tests were performance with Adapter, Earphone and USB Cable.	

## 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	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
5.	Earphone	Lenovo	SH100	N/A	N/A	N/A

## 2.5 EUT Operation Test Setup

For WLAN function, 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 WLAN link with the Notebook 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 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.

*Offset = RF cable loss.*

Following shows an offset computation example with cable loss 5.9 dB.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 5.9 \text{ (dB)} \end{aligned}$$

### 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.

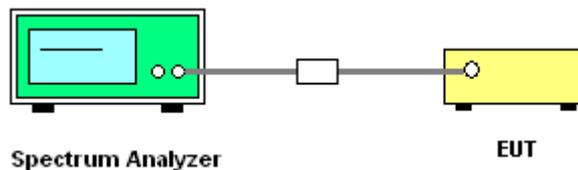
##### 3.1.2 Measuring Instruments

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.

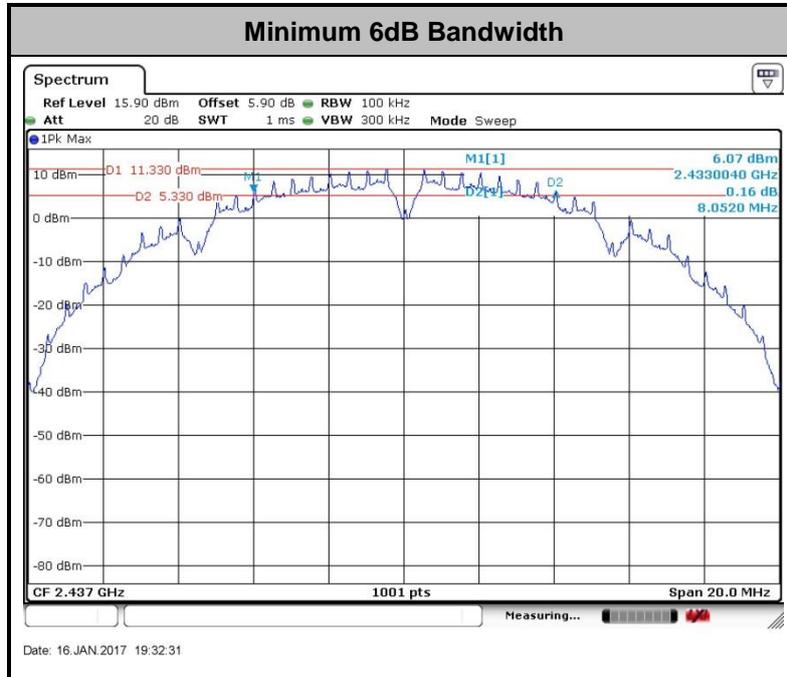
##### 3.1.4 Test Setup





### 3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

## 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.

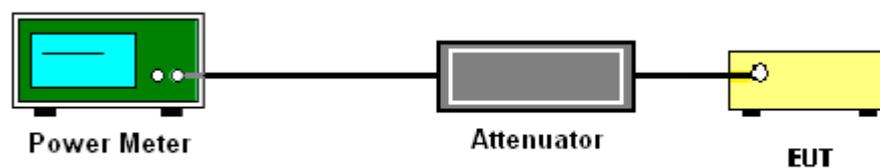
### 3.2.2 Measuring Instruments

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.

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

Please refer to Appendix A.

### 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.

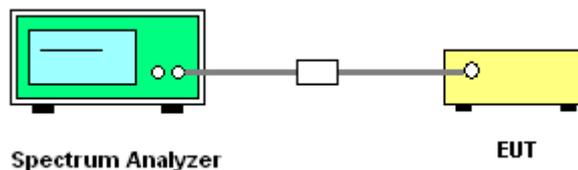
#### 3.3.2 Measuring Instruments

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.

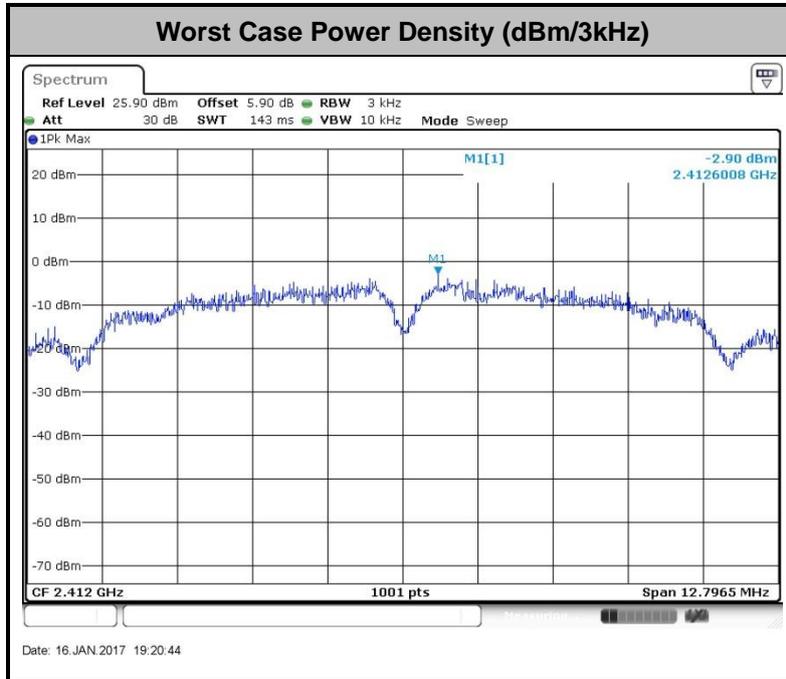
#### 3.3.4 Test Setup





### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



### 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).

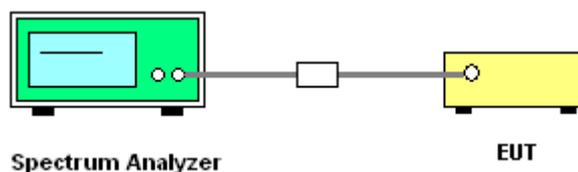
#### 3.4.2 Measuring Instruments

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.

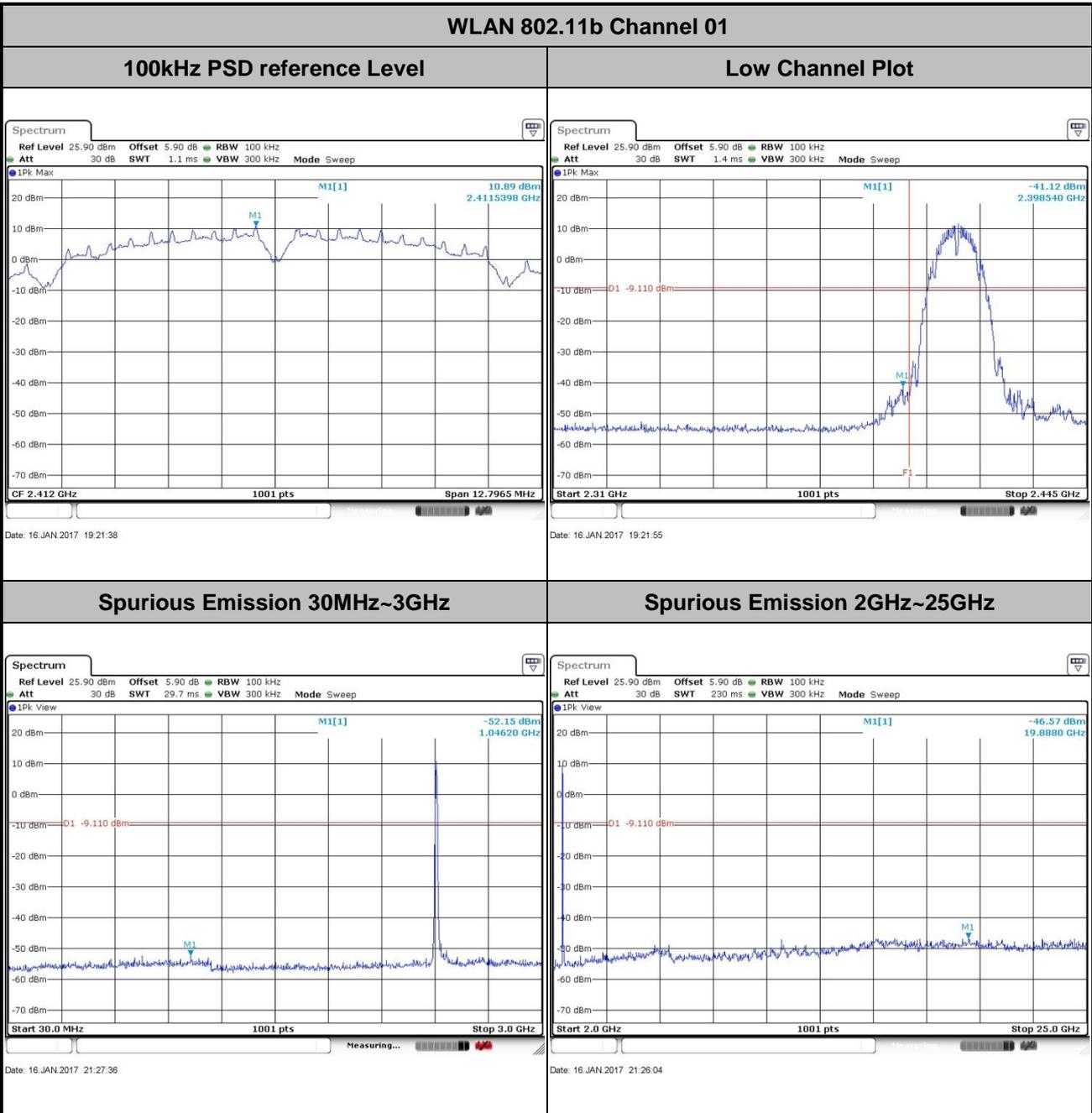
#### 3.4.4 Test Setup





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

Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	50~54%
Test Channel :	01	Test Engineer :	Ivan Zhang



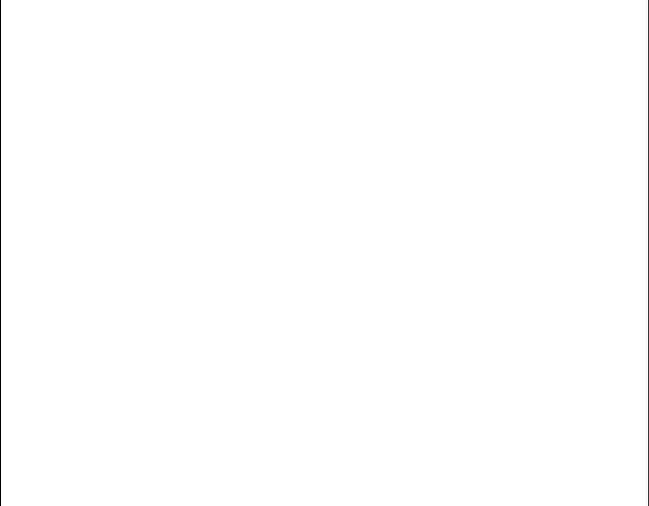
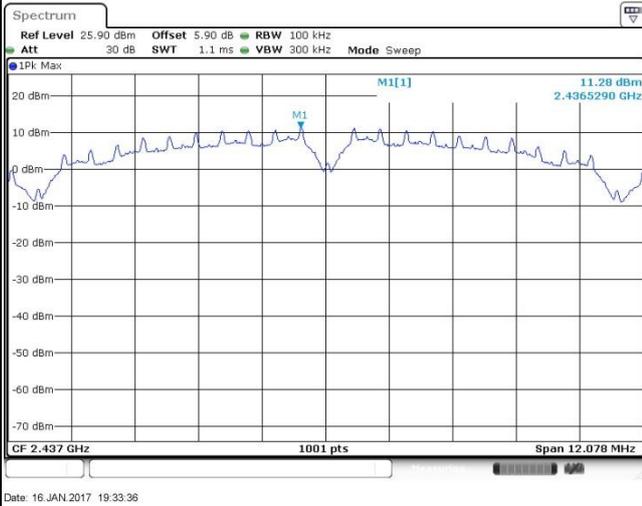


Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~54%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11b Channel 06

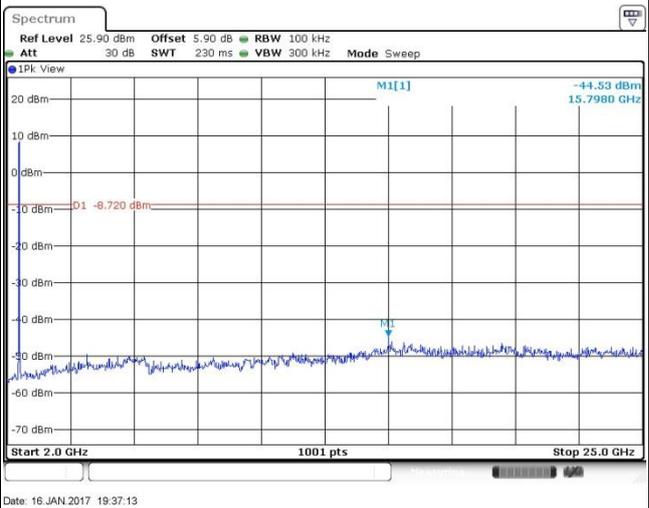
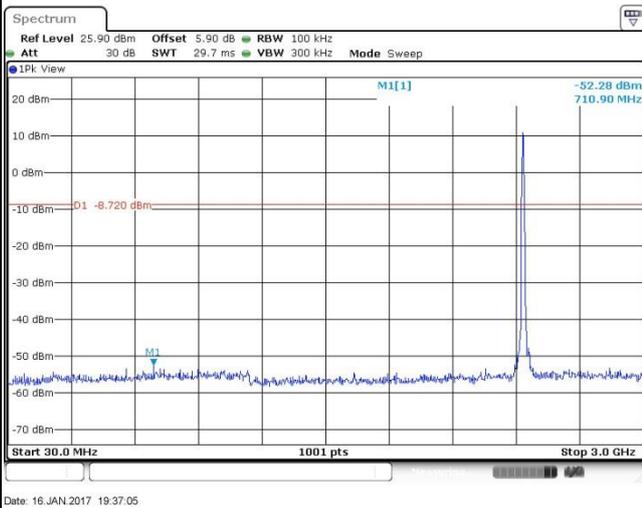
100kHz PSD reference Level

Mid Channel Plot



Spurious Emission 30MHz~3GHz

Spurious Emission 2GHz~25GHz

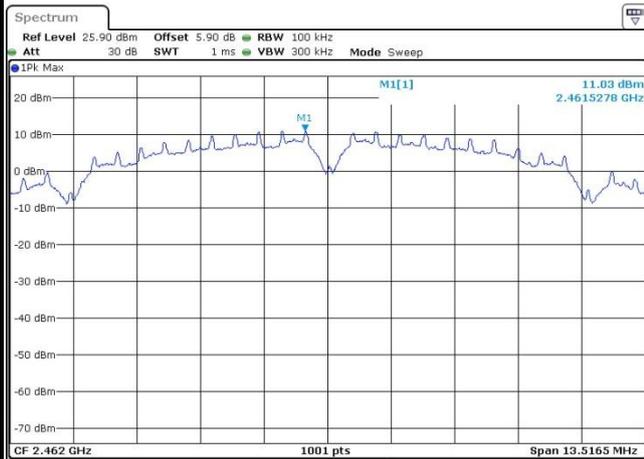




Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	50~54%
Test Channel :	11	Test Engineer :	Ivan Zhang

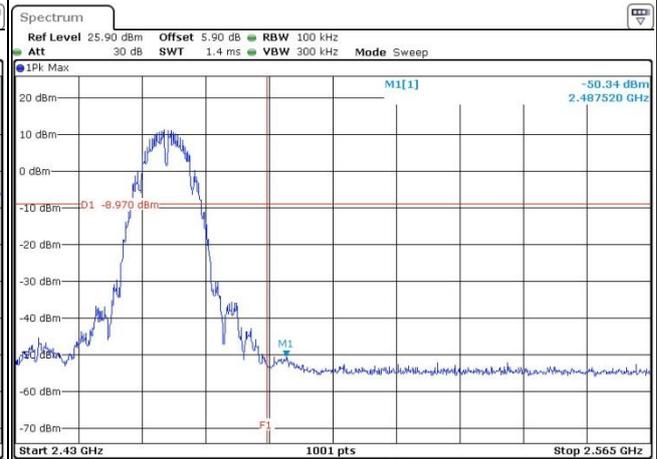
WLAN 802.11b Channel 11

100kHz PSD reference Level



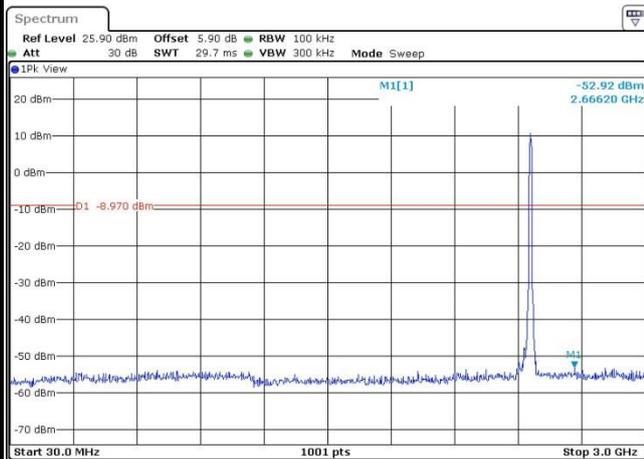
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High Channel Plot



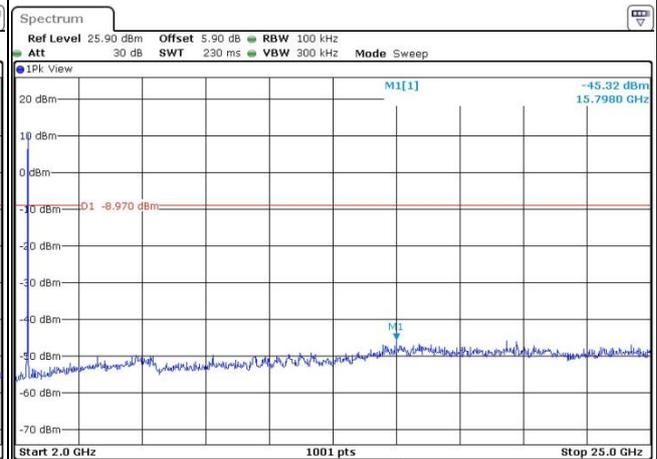
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Spurious Emission 30MHz~3GHz



Date: 16 JAN 2017 19:43:48

Spurious Emission 2GHz~25GHz



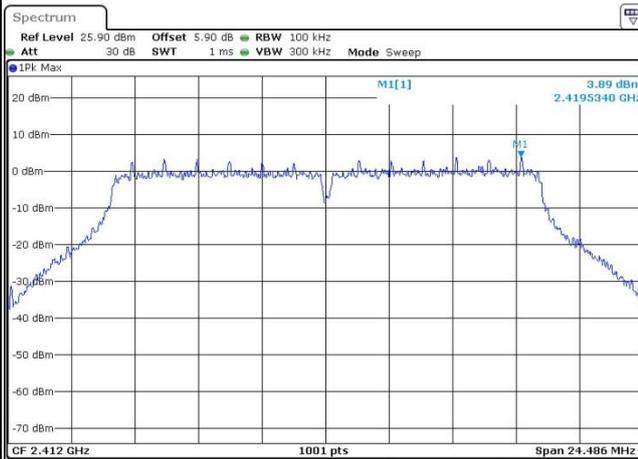
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Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	50~54%
Test Channel :	01	Test Engineer :	Ivan Zhang

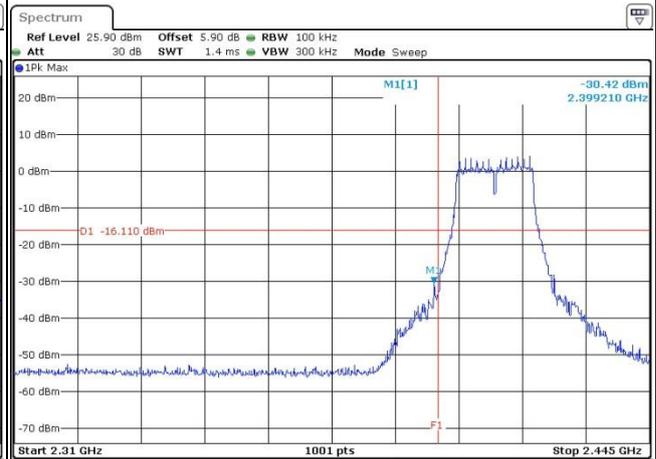
WLAN 802.11g Channel 01

100kHz PSD reference Level



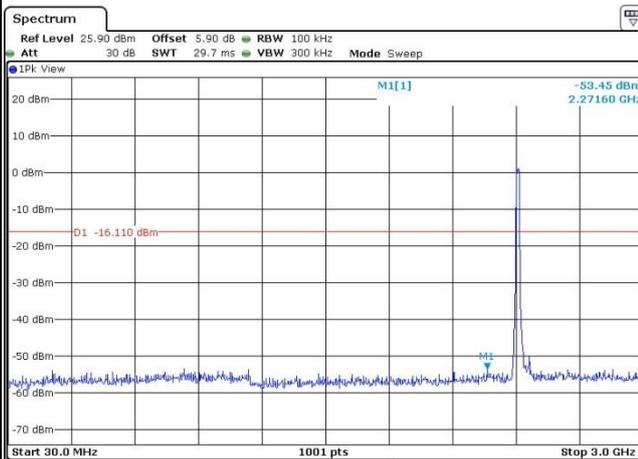
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Low Channel Plot



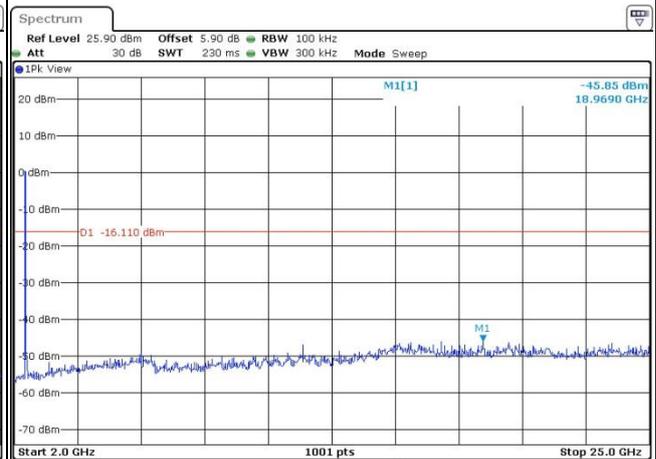
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Spurious Emission 30MHz~3GHz



Date: 16 JAN 2017 20:16:39

Spurious Emission 2GHz~25GHz



Date: 16 JAN 2017 20:14:02

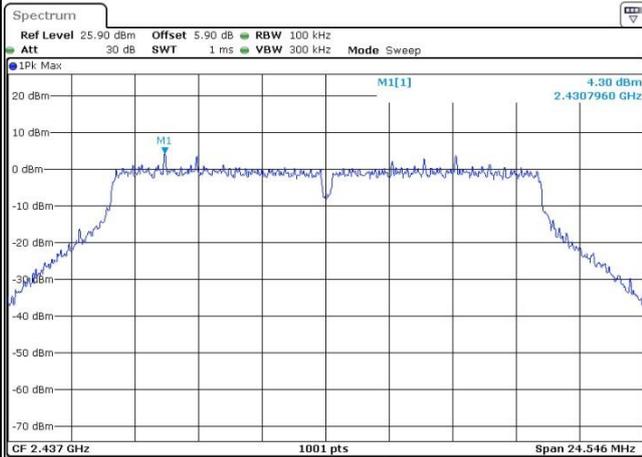


Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~54%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11g Channel 06

100kHz PSD reference Level

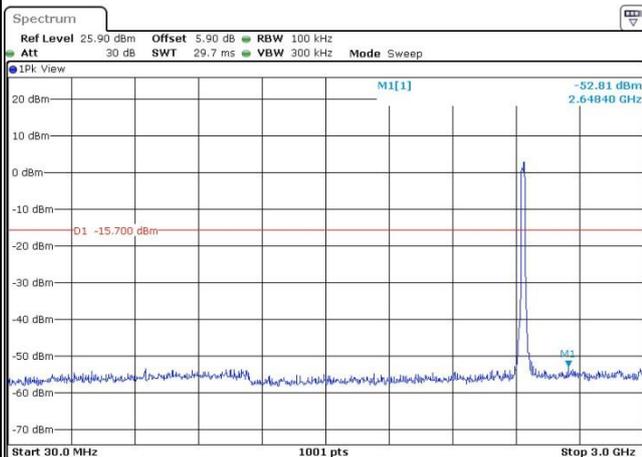
Mid Channel Plot



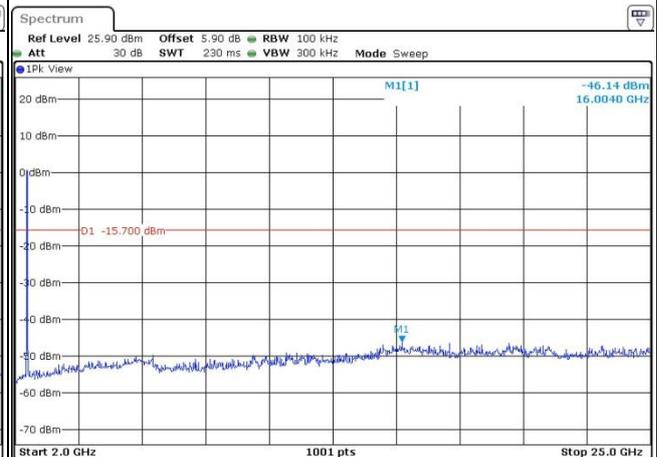
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Spurious Emission 30MHz~3GHz

Spurious Emission 2GHz~25GHz



Date: 16 JAN 2017 20:02:30



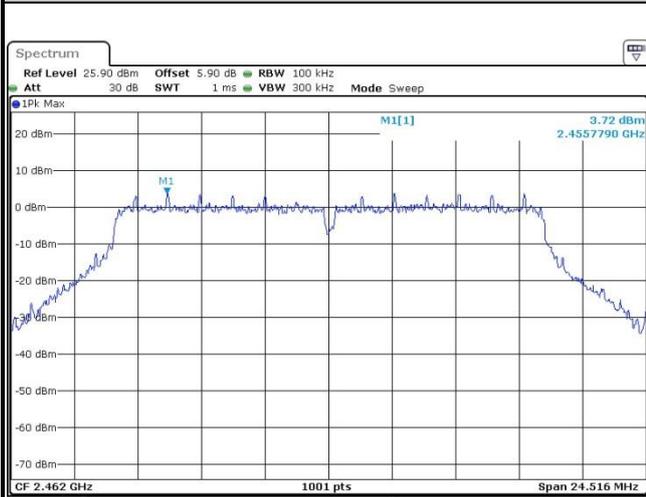
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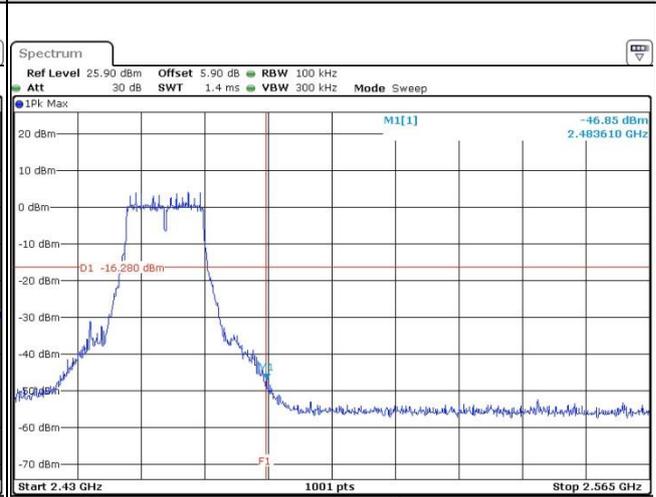
Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	50~54%
Test Channel :	11	Test Engineer :	Ivan Zhang

WLAN 802.11g Channel 11

100kHz PSD reference Level	High Channel Plot
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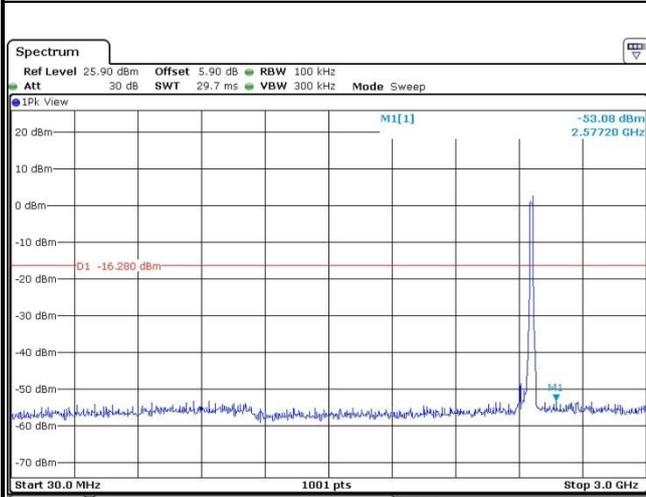


Date: 16 JAN 2017 20:07:20



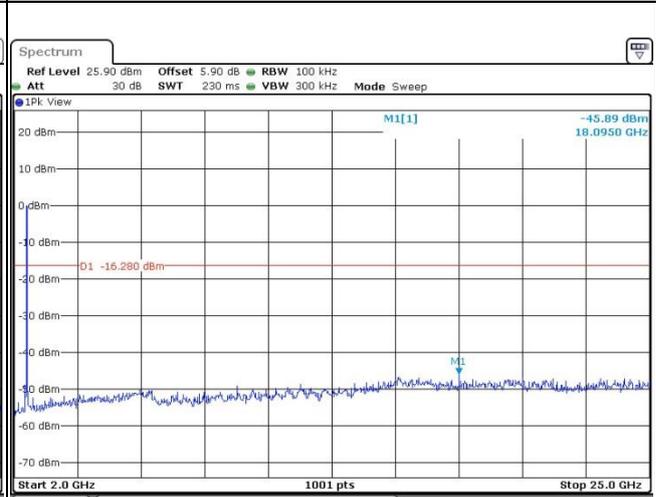
Date: 16 JAN 2017 20:07:30

Spurious Emission 30MHz~3GHz



Date: 16 JAN 2017 20:10:51

Spurious Emission 2GHz~25GHz



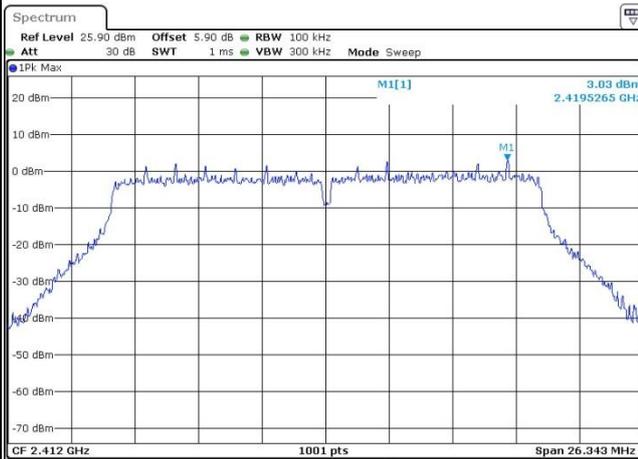
Date: 16 JAN 2017 20:09:17



Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	50~54%
Test Channel :	01	Test Engineer :	Ivan Zhang

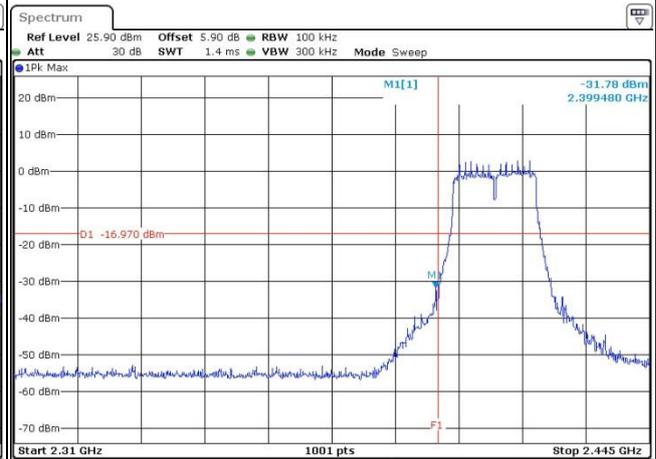
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



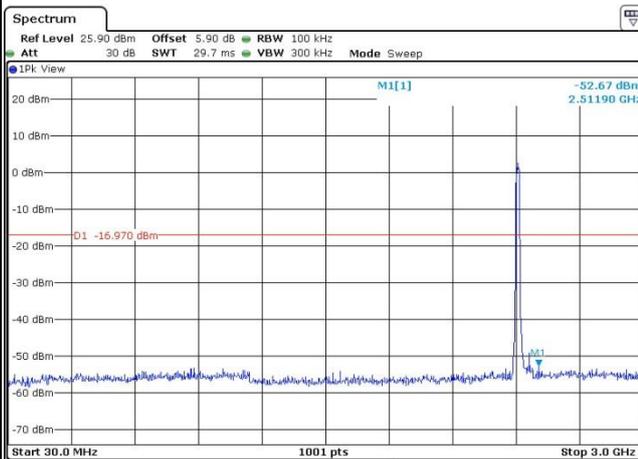
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Low Channel Plot



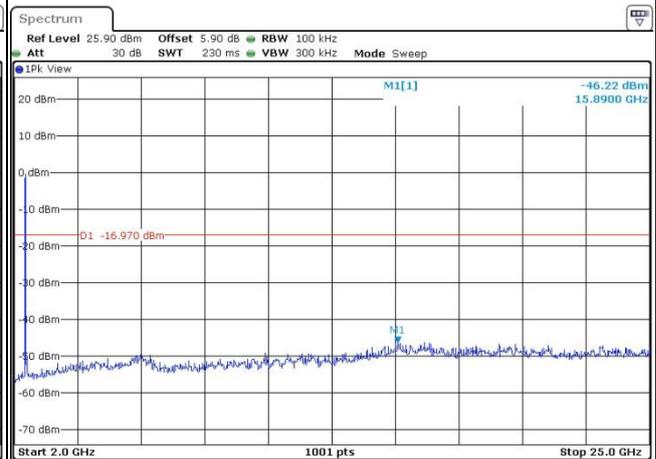
Date: 16 JAN 2017 20:22:16

Spurious Emission 30MHz~3GHz



Date: 16 JAN 2017 20:26:33

Spurious Emission 2GHz~25GHz



Date: 16 JAN 2017 20:23:23

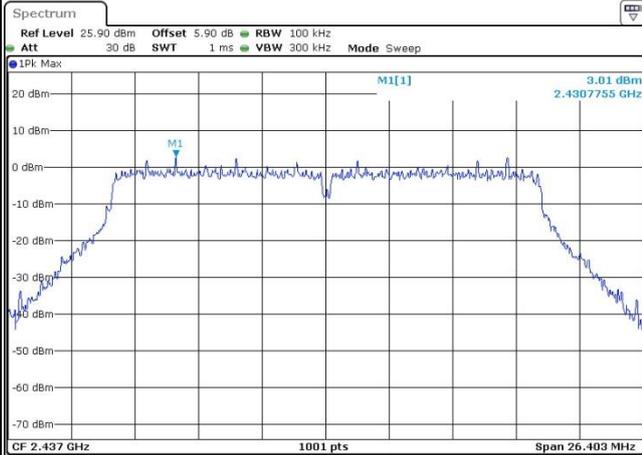


Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~54%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11n HT20 Channel 06

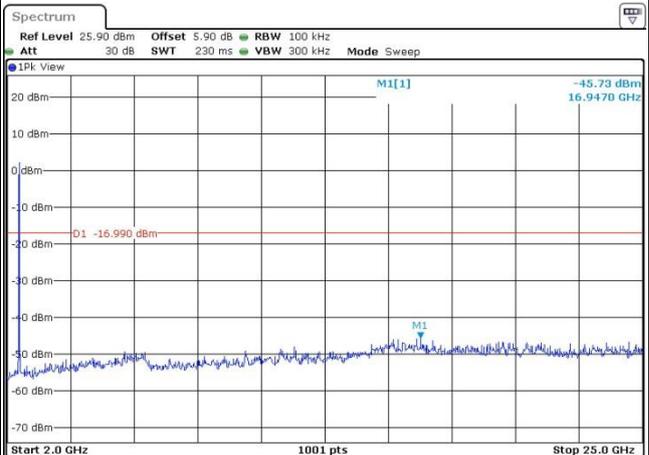
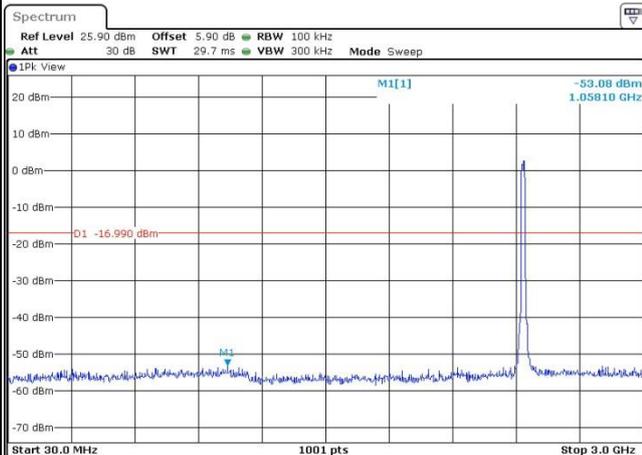
100kHz PSD reference Level

Mid Channel Plot



Spurious Emission 30MHz~3GHz

Spurious Emission 2GHz~25GHz

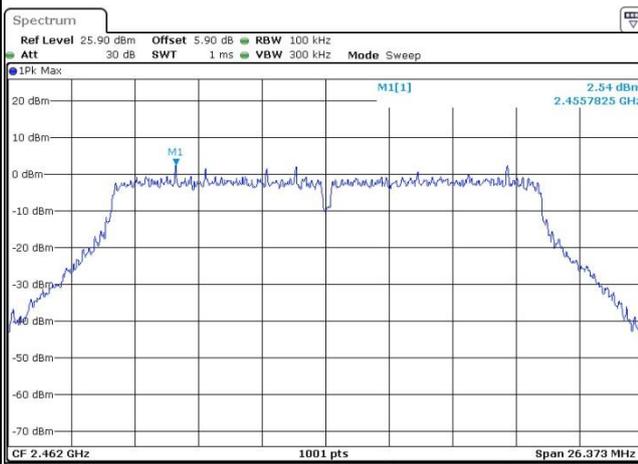




Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	50~54%
Test Channel :	11	Test Engineer :	Ivan Zhang

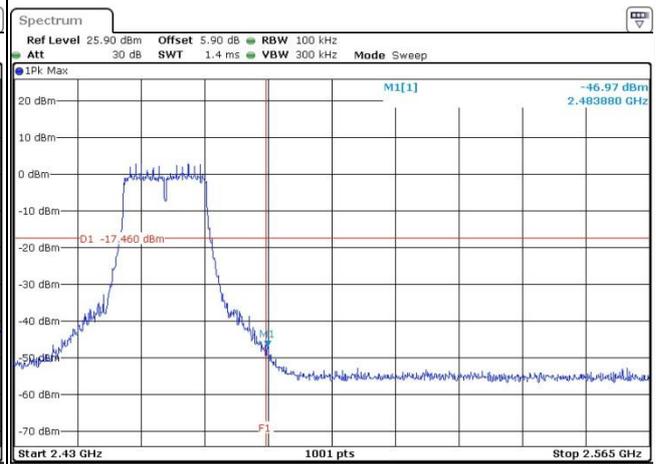
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



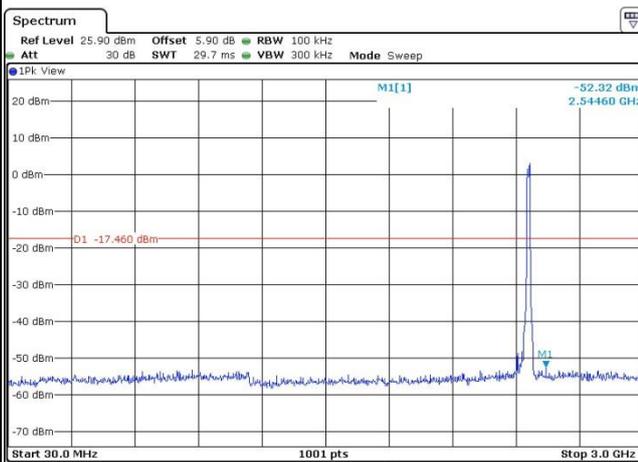
Date: 16 JAN 2017 20:40:41

High Channel Plot



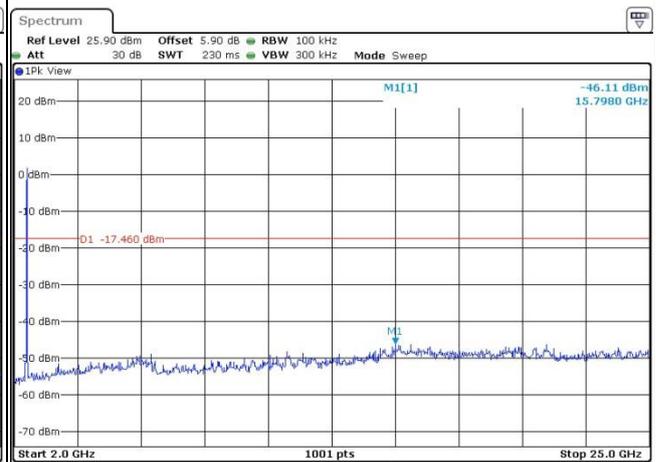
Date: 16 JAN 2017 20:40:53

Spurious Emission 30MHz~3GHz



Date: 16 JAN 2017 20:48:18

Spurious Emission 2GHz~25GHz



Date: 16 JAN 2017 20:42:36



Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	50~54%
Test Channel :	03	Test Engineer :	Ivan Zhang

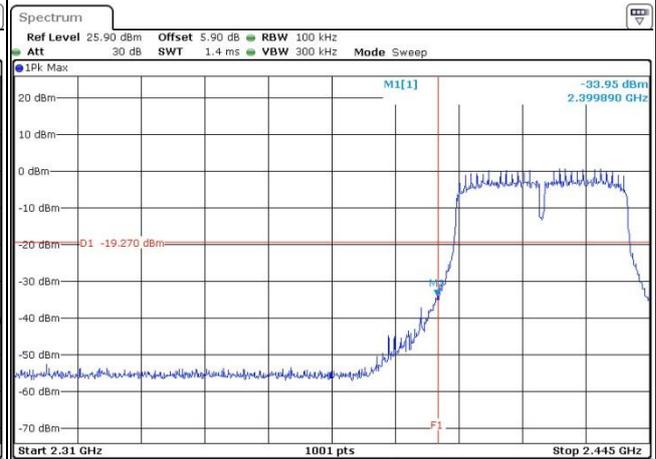
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



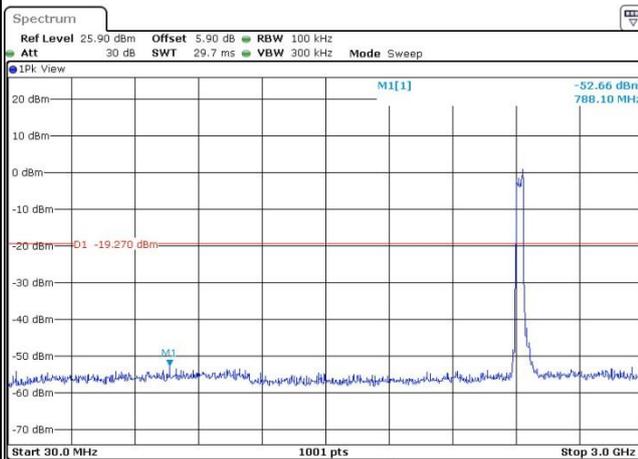
Date: 16 JAN 2017 20:54:37

Low Channel Plot



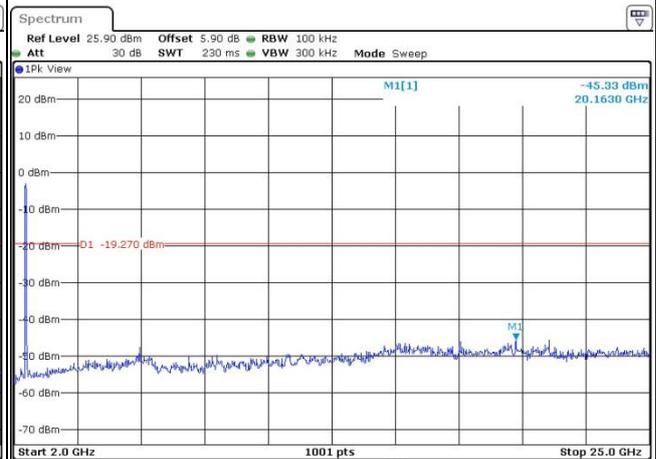
Date: 16 JAN 2017 20:55:20

Spurious Emission 30MHz~3GHz



Date: 16 JAN 2017 20:56:34

Spurious Emission 2GHz~25GHz



Date: 16 JAN 2017 20:56:42

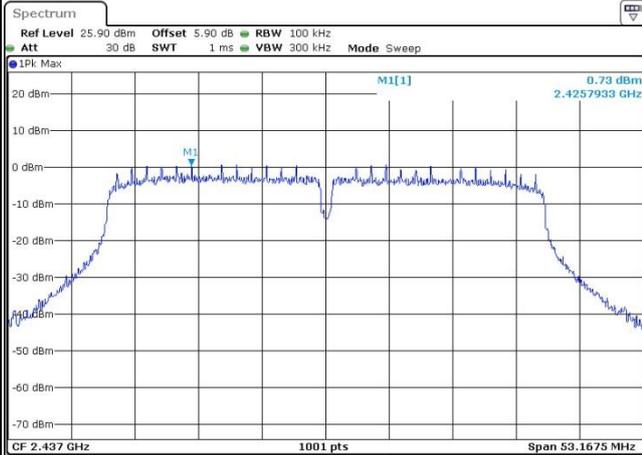


Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~54%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11n HT40 Channel 06

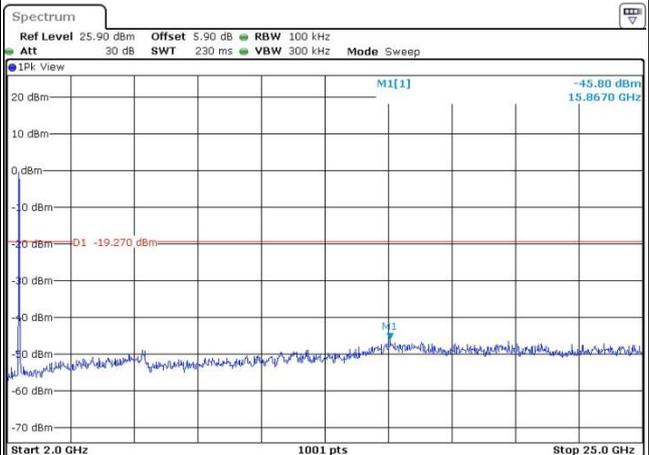
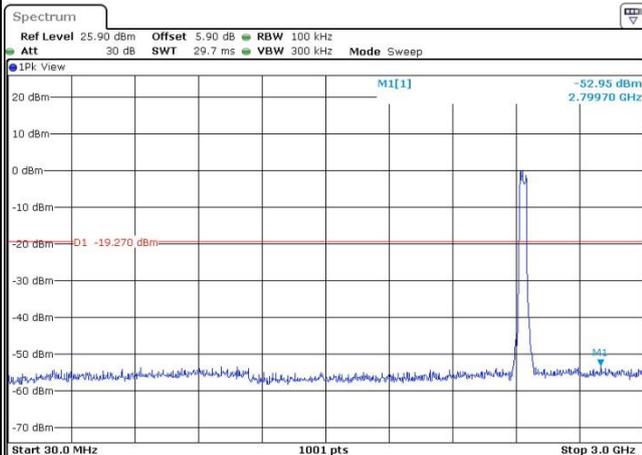
100kHz PSD reference Level

Mid Channel Plot



Spurious Emission 30MHz~3GHz

Spurious Emission 2GHz~25GHz

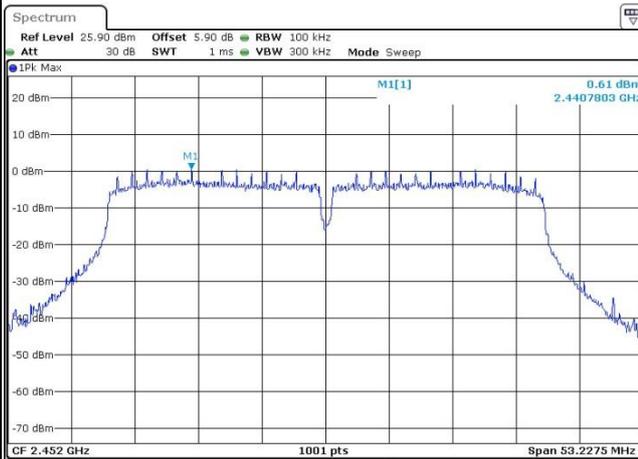




Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	50~54%
Test Channel :	09	Test Engineer :	Ivan Zhang

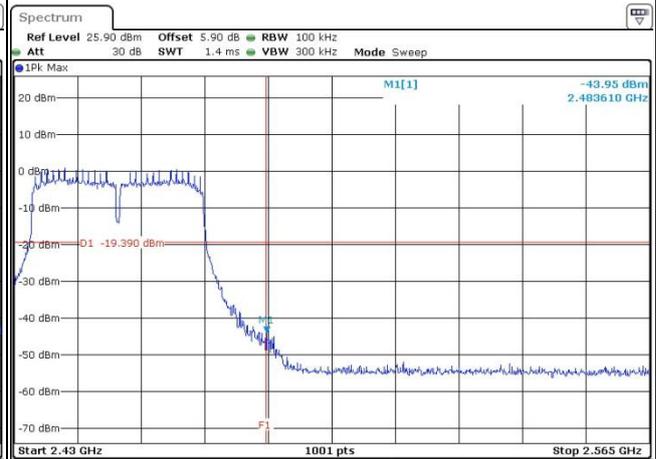
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



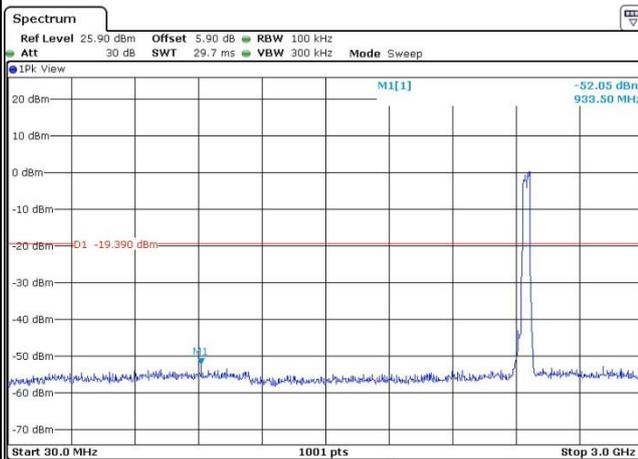
Date: 16 JAN 2017 21:04:00

High Channel Plot



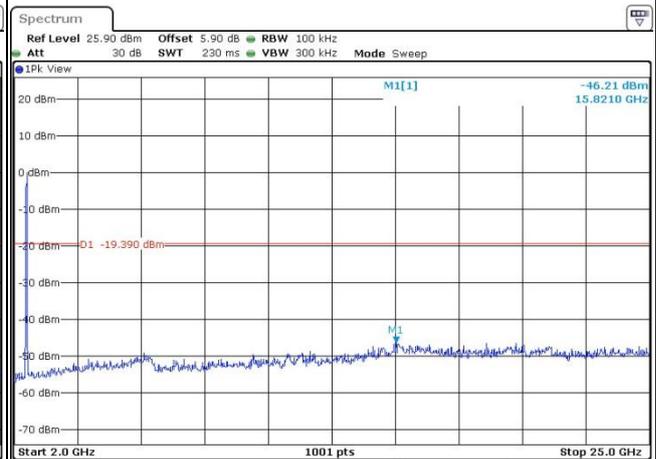
Date: 16 JAN 2017 21:05:35

Spurious Emission 30MHz~3GHz



Date: 16 JAN 2017 21:12:49

Spurious Emission 2GHz~25GHz



Date: 16 JAN 2017 21:05:54



### 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.

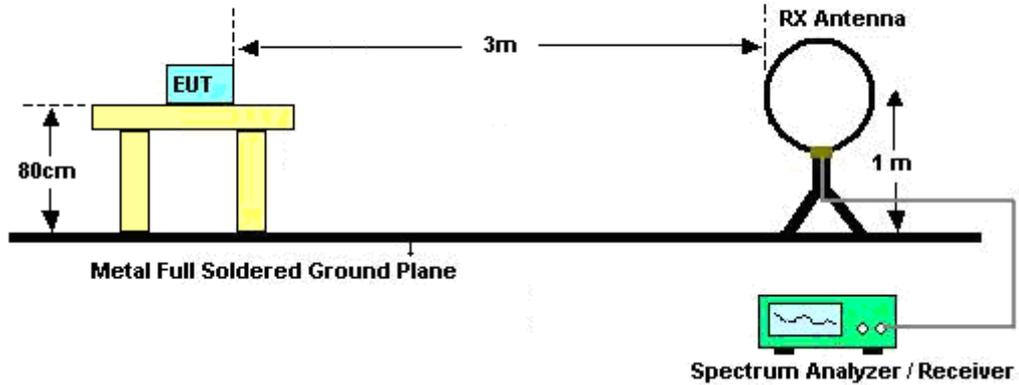


### 3.5.3 Test Procedures

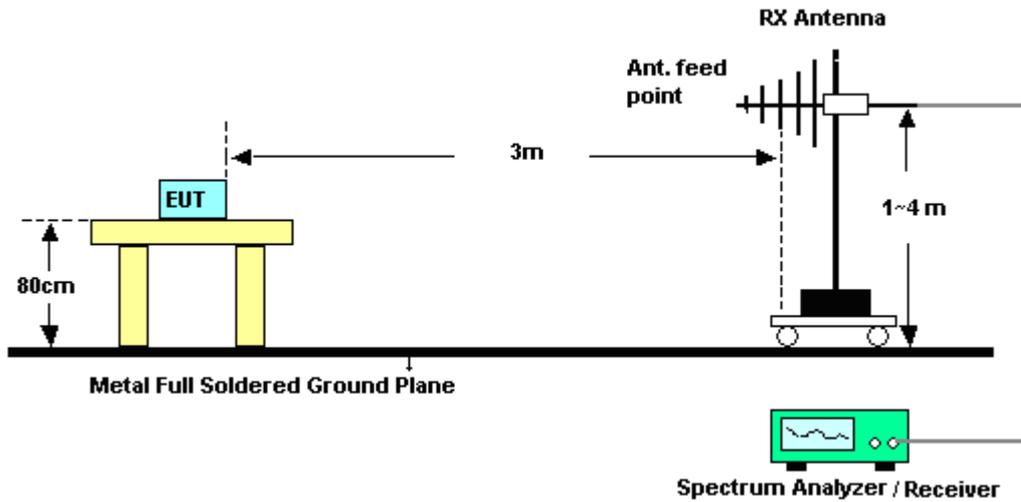
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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

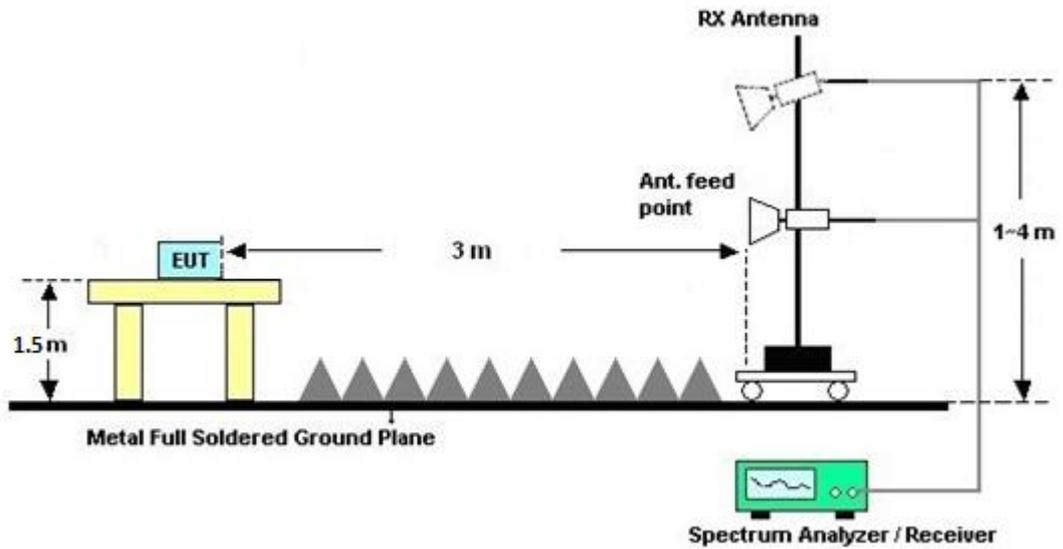
For radiated emissions below 30MHz



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.

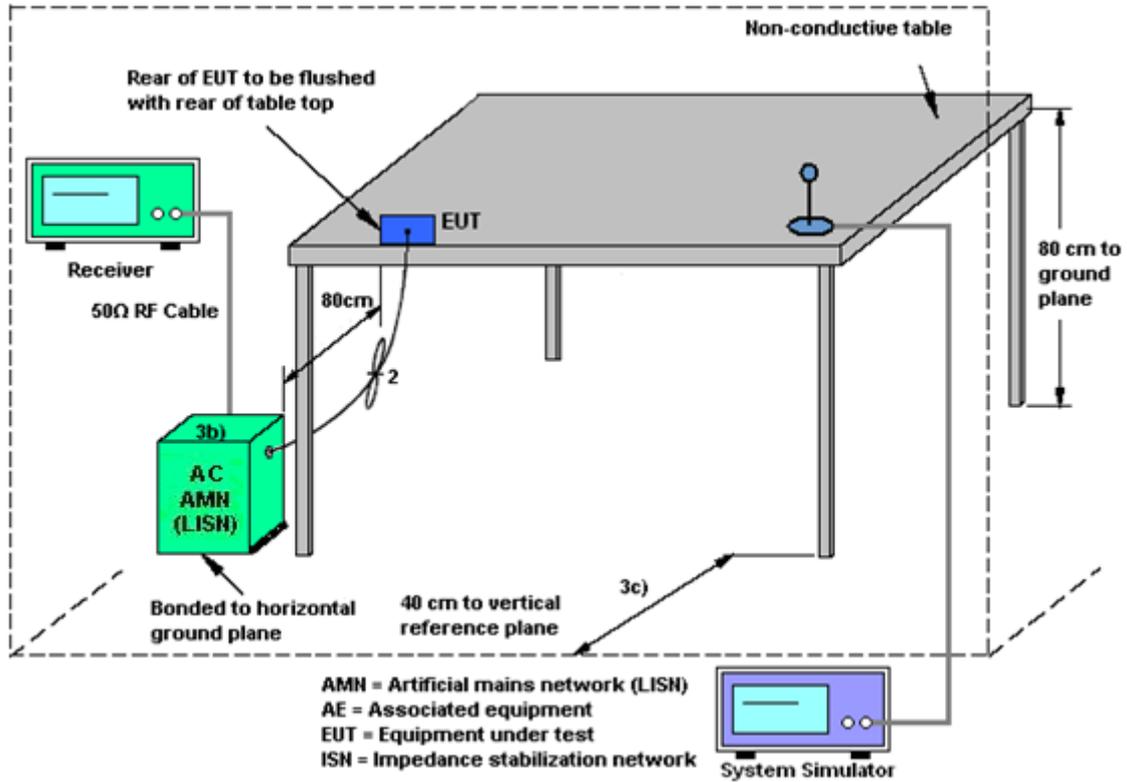
#### 3.6.2 Measuring Instruments

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.

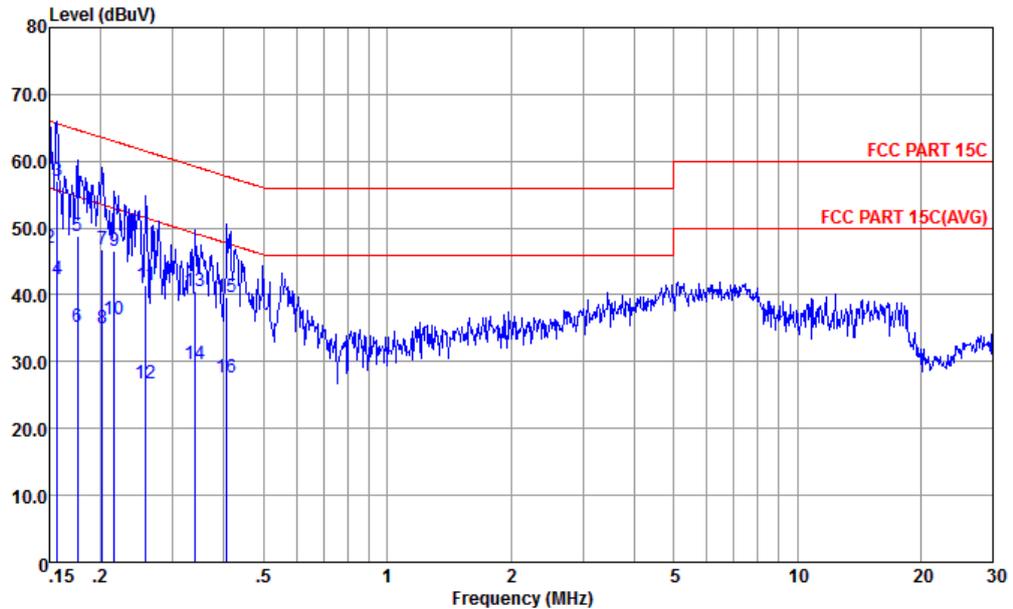
### 3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter)		

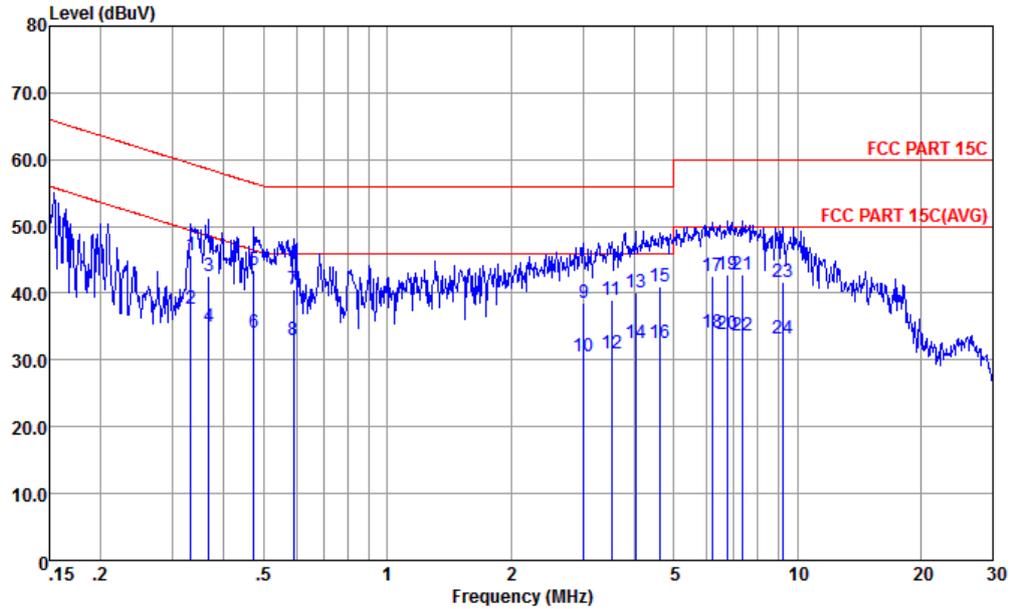


Site : CO01-KS  
 Condition : FCC PART 15C LISN-L-20151024 LINE  
 mode : Mode 1  
 IMEI : 990006880007206  
 : #10

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.150	58.92	-7.08	66.00	48.00	0.53	10.39	QP
2	0.150	46.92	-9.08	56.00	36.00	0.53	10.39	Average
3	0.156	56.97	-8.68	65.65	46.10	0.49	10.38	QP
4	0.156	42.37	-13.28	55.65	31.50	0.49	10.38	Average
5	0.176	48.72	-15.96	64.68	38.00	0.36	10.36	QP
6	0.176	35.12	-19.56	54.68	24.40	0.36	10.36	Average
7	0.202	46.75	-16.79	63.54	36.20	0.22	10.33	QP
8	0.202	34.95	-18.59	53.54	24.40	0.22	10.33	Average
9	0.216	46.64	-16.32	62.96	36.10	0.22	10.32	QP
10	0.216	36.24	-16.72	52.96	25.70	0.22	10.32	Average
11	0.258	41.41	-20.10	61.51	30.91	0.22	10.28	QP
12	0.258	26.71	-24.80	51.51	16.21	0.22	10.28	Average
13	0.341	40.56	-18.62	59.18	30.10	0.23	10.23	QP
14	0.341	29.66	-19.52	49.18	19.20	0.23	10.23	Average
15	0.406	39.63	-18.10	57.73	29.20	0.23	10.20	QP
16	0.406	27.63	-20.10	47.73	17.20	0.23	10.20	Average



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter)		



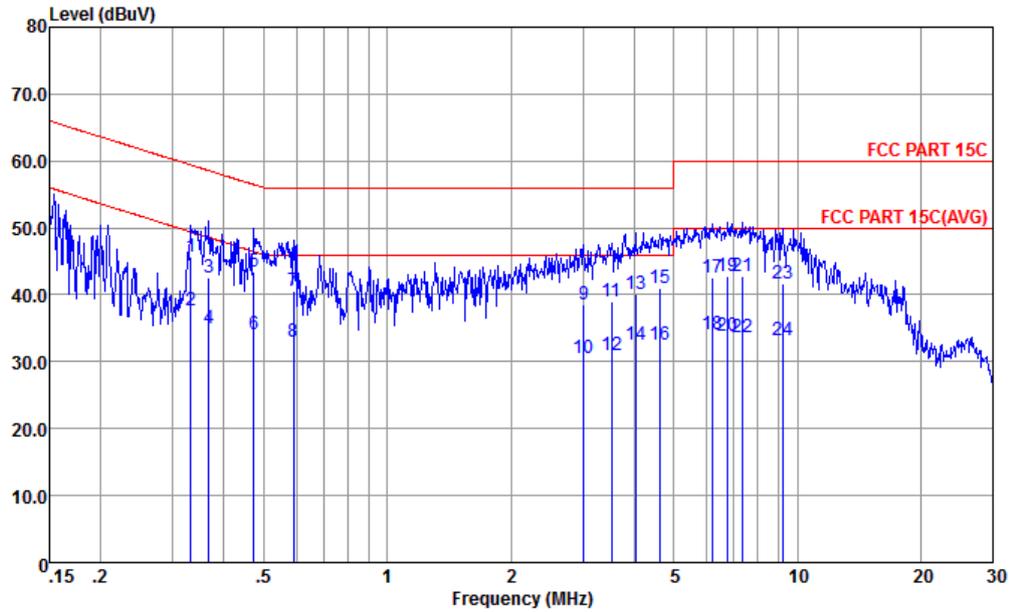
Site : CO01-KS  
 Condition : FCC PART 15C LISN-N-20151024 NEUTRAL

mode : Mode 1  
 IMEI : 990006880007206  
 : #10

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.332	45.65	-13.75	59.40	35.10	0.32	10.23	QP
2 *	0.332	37.65	-11.75	49.40	27.10	0.32	10.23	Average
3	0.367	42.53	-16.03	58.56	31.99	0.32	10.22	QP
4	0.367	34.93	-13.63	48.56	24.39	0.32	10.22	Average
5	0.474	43.51	-12.94	56.45	33.00	0.32	10.19	QP
6	0.474	34.01	-12.44	46.45	23.50	0.32	10.19	Average
7	0.592	40.51	-15.49	56.00	30.00	0.33	10.18	QP
8	0.592	33.01	-12.99	46.00	22.50	0.33	10.18	Average
9	3.009	38.59	-17.41	56.00	28.00	0.37	10.22	QP
10	3.009	30.59	-15.41	46.00	20.00	0.37	10.22	Average
11	3.528	38.90	-17.10	56.00	28.30	0.37	10.23	QP
12	3.528	30.90	-15.10	46.00	20.30	0.37	10.23	Average
13	4.027	40.10	-15.90	56.00	29.50	0.36	10.24	QP
14	4.027	32.50	-13.50	46.00	21.90	0.36	10.24	Average
15	4.622	40.90	-15.10	56.00	30.30	0.36	10.24	QP
16	4.622	32.60	-13.40	46.00	22.00	0.36	10.24	Average



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter)		



Site : CO01-KS  
 Condition : FCC PART 15C LISN-N-20151024 NEUTRAL  
 mode : Mode 1  
 IMEI : 990006880007206  
 : #10

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
17	6.186	42.58	-17.42	60.00	32.00	0.32	10.26	QP
18	6.186	34.08	-15.92	50.00	23.50	0.32	10.26	Average
19	6.769	42.68	-17.32	60.00	32.10	0.30	10.28	QP
20	6.769	33.78	-16.22	50.00	23.20	0.30	10.28	Average
21	7.329	42.68	-17.32	60.00	32.10	0.29	10.29	QP
22	7.329	33.58	-16.42	50.00	23.00	0.29	10.29	Average
23	9.204	41.61	-18.39	60.00	31.00	0.28	10.33	QP
24	9.204	33.21	-16.79	50.00	22.60	0.28	10.33	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	101040	10Hz~40GHz	Aug. 09, 2016	Jan. 13, 2017~ Jan. 16, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Jan. 13, 2017~ Jan. 16, 2017	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Jan. 13, 2017~ Jan. 16, 2017	Jan. 19, 2017	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Jan. 13, 2017~ Jan. 23, 2017	Aug. 08, 2017	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, MAX 30dB	Apr. 22, 2016	Jan. 13, 2017~ Jan. 23, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Jan. 13, 2017~ Jan. 23, 2017	Nov. 22, 2017	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Aug. 20, 2016	Jan. 13, 2017~ Jan. 23, 2017	Aug. 19, 2017	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 22, 2016	Jan. 13, 2017~ Jan. 23, 2017	Oct. 21, 2017	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Jan. 13, 2017~ Jan. 23, 2017	Mar. 02, 2017	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Jan. 13, 2017~ Jan. 23, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz	Oct. 13, 2016	Jan. 13, 2017~ Jan. 23, 2017	Oct. 12, 2017	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 13, 2016	Jan. 13, 2017~ Jan. 23, 2017	Oct. 12, 2017	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jan. 13, 2017~ Jan. 23, 2017	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jan. 13, 2017~ Jan. 23, 2017	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jan. 13, 2017~ Jan. 23, 2017	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Apr. 29, 2016	Jan. 22, 2017	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Jan. 22, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Jan. 22, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Jan. 22, 2017	Oct. 12, 2017	Conduction (CO01-KS)
RF Cable	WOKEN	Y5T	00100N1Q3N1	150kHz~30MHz	Aug. 26, 2016	Jan. 22, 2017	Aug. 25, 2017	Conduction (CO01-KS)

NCR: No Calibration Required



## 5 Uncertainty of Evaluation

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

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 (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.5dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.1dB
---	-------



## Appendix A. Conducted Test Results

**A1 - DTS Part**

Test Engineer:	Ivan Zhang	Temperature:	24~25	°C
Test Date:	2017/1/13~2017/1/16	Relative Humidity:	50~54	%

**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	13.39	8.53	0.50	Pass
11b	1Mbps	1	6	2437	13.39	8.05	0.50	Pass
11b	1Mbps	1	11	2462	13.54	9.01	0.50	Pass
11g	6Mbps	1	1	2412	18.48	16.32	0.50	Pass
11g	6Mbps	1	6	2437	18.53	16.36	0.50	Pass
11g	6Mbps	1	11	2462	18.48	16.34	0.50	Pass
HT20	MCS0	1	1	2412	19.03	17.56	0.50	Pass
HT20	MCS0	1	6	2437	19.03	17.60	0.50	Pass
HT20	MCS0	1	11	2462	18.88	17.58	0.50	Pass
HT40	MCS0	1	3	2422	36.26	35.13	0.50	Pass
HT40	MCS0	1	6	2437	36.56	35.45	0.50	Pass
HT40	MCS0	1	9	2452	36.56	35.49	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	22.33	30.00	0.50	22.83	36.00	Pass
11b	1Mbps	1	6	2437	22.44	30.00	0.50	22.94	36.00	Pass
11b	1Mbps	1	11	2462	22.67	30.00	0.50	23.17	36.00	Pass
11g	6Mbps	1	1	2412	24.18	30.00	0.50	24.68	36.00	Pass
11g	6Mbps	1	6	2437	24.61	30.00	0.50	25.11	36.00	Pass
11g	6Mbps	1	11	2462	24.47	30.00	0.50	24.97	36.00	Pass
HT20	MCS0	1	1	2412	23.68	30.00	0.50	24.18	36.00	Pass
HT20	MCS0	1	6	2437	24.17	30.00	0.50	24.67	36.00	Pass
HT20	MCS0	1	11	2462	24.01	30.00	0.50	24.51	36.00	Pass
HT40	MCS0	1	3	2422	23.96	30.00	0.50	24.46	36.00	Pass
HT40	MCS0	1	6	2437	24.31	30.00	0.50	24.81	36.00	Pass
HT40	MCS0	1	9	2452	24.14	30.00	0.50	24.64	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	0.10	19.75
11b	1Mbps	1	6	2437	0.10	19.80
11b	1Mbps	1	11	2462	0.10	19.96
11g	6Mbps	1	1	2412	0.60	15.45
11g	6Mbps	1	6	2437	0.60	15.71
11g	6Mbps	1	11	2462	0.60	15.61
HT20	MCS0	1	1	2412	0.62	14.20
HT20	MCS0	1	6	2437	0.62	14.90
HT20	MCS0	1	11	2462	0.62	14.58
HT40	MCS0	1	3	2422	0.64	14.66
HT40	MCS0	1	6	2437	0.64	15.00
HT40	MCS0	1	9	2452	0.64	14.81

**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	-2.90	0.50	8.00	Pass
11b	1Mbps	1	6	2437	-2.98	0.50	8.00	Pass
11b	1Mbps	1	11	2462	-3.88	0.50	8.00	Pass
11g	6Mbps	1	1	2412	-10.34	0.50	8.00	Pass
11g	6Mbps	1	6	2437	-8.74	0.50	8.00	Pass
11g	6Mbps	1	11	2462	-10.00	0.50	8.00	Pass
HT20	MCS0	1	1	2412	-10.99	0.50	8.00	Pass
HT20	MCS0	1	6	2437	-9.53	0.50	8.00	Pass
HT20	MCS0	1	11	2462	-10.62	0.50	8.00	Pass
HT40	MCS0	1	3	2422	-13.54	0.50	8.00	Pass
HT40	MCS0	1	6	2437	-14.23	0.50	8.00	Pass
HT40	MCS0	1	9	2452	-14.18	0.50	8.00	Pass



## Appendix B. Radiated Spurious Emission

### 2.4GHz 2400~2483.5MHz

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

WIFI Ant.	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		2389.3	54.85	-19.15	74	56.21	25.4	4.76	31.52	100	40	P	H
		2386.96	40.1	-13.90	54	41.46	25.4	4.76	31.52	100	40	A	H
	*	2412	108	-	-	109.18	25.54	4.78	31.5	100	40	P	H
	*	2414	104.06	-	-	105.24	25.54	4.78	31.5	100	40	A	H
		2389.43	54.5	-19.50	74	55.86	25.4	4.76	31.52	393	110	P	V
		2386.57	38.39	-15.61	54	39.75	25.4	4.76	31.52	393	110	A	V
	*	2412	105.91	-	-	107.09	25.54	4.78	31.5	393	110	P	V
	*	2414	102.51	-	-	103.69	25.54	4.78	31.5	393	110	A	V
802.11b CH 06 2437MHz		2389.95	44.97	-29.03	74	46.33	25.4	4.76	31.52	121	40	P	H
		2389.82	35.86	-18.14	54	37.22	25.4	4.76	31.52	121	40	A	H
	*	2438	108.22	-	-	109.05	25.83	4.82	31.48	121	40	P	H
	*	2436	104.61	-	-	105.61	25.69	4.8	31.49	121	40	A	H
		2485.72	42.79	-31.21	74	43.28	26.11	4.86	31.46	121	40	P	H
		2483.56	33.22	-20.78	54	33.71	26.11	4.86	31.46	121	40	A	H
		2388.13	43.11	-30.89	74	44.47	25.4	4.76	31.52	339	105	P	V
		2389.82	33.59	-20.41	54	34.95	25.4	4.76	31.52	339	105	A	V
	*	2436	106.28	-	-	107.28	25.69	4.8	31.49	339	105	P	V
	*	2436	102.95	-	-	103.95	25.69	4.8	31.49	339	105	A	V
		2483.56	42.07	-31.93	74	42.56	26.11	4.86	31.46	339	105	P	V
	2483.56	31.83	-22.17	54	32.32	26.11	4.86	31.46	339	105	A	V	



802.11b CH 11 2462MHz		2462	109.4	-	-	110.06	25.97	4.84	31.47	110	45	P	H
		2464	105.29	-	-	105.95	25.97	4.84	31.47	110	45	A	H
	*	2483.8	49.09	-24.91	74	49.58	26.11	4.86	31.46	110	45	P	H
	*	2487.16	38.16	-15.84	54	38.65	26.11	4.86	31.46	110	45	A	H
		2464	105.67	-	-	106.33	25.97	4.84	31.47	374	106	P	V
		2464	102.57	-	-	103.23	25.97	4.84	31.47	374	106	A	V
	*	2483.68	46.32	-27.68	74	46.81	26.11	4.86	31.46	374	106	P	V
	*	2486.62	34.87	-19.13	54	35.36	26.11	4.86	31.46	374	106	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 802.11b (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	37.09	-36.91	74	58.7	30.9	6.87	59.38	150	360	P	H
		4824	37.25	-36.75	74	58.86	30.9	6.87	59.38	150	360	P	V
802.11b CH 06 2437MHz		4872	36.93	-37.07	74	58.2	31.01	6.86	59.14	150	360	P	H
		7308	41.51	-32.49	74	56.25	35.34	8.47	58.55	150	360	P	H
		4872	37.69	-36.31	74	58.96	31.01	6.86	59.14	150	360	P	V
		7308	41.41	-32.59	74	56.15	35.34	8.47	58.55	150	360	P	V
802.11b CH 11 2462MHz		4926	37.19	-36.81	74	58.13	31.12	6.84	58.9	150	360	P	H
		7386	41.92	-32.08	74	56.86	35.55	8.49	58.98	150	360	P	H
		4926	37.48	-36.52	74	58.42	31.12	6.84	58.9	150	360	P	V
		7386	42.21	-31.79	74	57.15	35.55	8.49	58.98	150	360	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 802.11g (Band Edge @ 3m)**

WIFI Ant. 2	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		2389.95	57.01	-16.99	74	58.37	25.4	4.76	31.52	116	66	P	H
		2389.95	42.34	-11.66	54	43.7	25.4	4.76	31.52	116	66	A	H
	*	2420	105.4	-	-	106.4	25.69	4.8	31.49	116	66	P	H
	*	2418	97.35	-	-	98.53	25.54	4.78	31.5	116	66	A	H
		2389.69	60.96	-13.04	74	62.32	25.4	4.76	31.52	304	90	P	V
		2389.95	42.93	-11.07	54	44.29	25.4	4.76	31.52	304	90	A	V
	*	2418	105.36	-	-	106.54	25.54	4.78	31.5	304	90	P	V
	*	2420	97.23	-	-	98.23	25.69	4.8	31.49	304	90	A	V
802.11g CH 06 2437MHz		2389.69	44.95	-29.05	74	46.31	25.4	4.76	31.52	351	36	P	H
		2384.75	36.21	-17.79	54	37.64	25.35	4.75	31.53	351	36	A	H
	*	2432	105.5	-	-	106.5	25.69	4.8	31.49	351	36	P	H
	*	2430	97.83	-	-	98.83	25.69	4.8	31.49	351	36	A	H
		2490.04	42.98	-31.02	74	43.29	26.26	4.88	31.45	351	36	P	H
		2483.56	33	-21.00	54	33.49	26.11	4.86	31.46	351	36	A	H
		2384.75	43.9	-30.10	74	45.33	25.35	4.75	31.53	296	111	P	V
		2384.75	35.44	-18.56	54	36.87	25.35	4.75	31.53	296	111	A	V
	*	2430	106.01	-	-	107.01	25.69	4.8	31.49	296	111	P	V
	*	2430	98.38	-	-	99.38	25.69	4.8	31.49	296	111	A	V
		2489.32	44.98	-29.02	74	45.29	26.26	4.88	31.45	296	111	P	V
		2489.5	33.46	-20.54	54	33.77	26.26	4.88	31.45	296	111	A	V



802.11g CH 11 2462MHz		2466	104.93	-	-	105.59	25.97	4.84	31.47	100	64	P	H
		2466	97.1	-	-	97.76	25.97	4.84	31.47	100	64	A	H
	*	2483.62	60.89	-13.11	74	61.38	26.11	4.86	31.46	100	64	P	H
	*	2483.51	45.02	-8.98	54	45.51	26.11	4.86	31.46	100	64	A	H
		2466	105.79	-	-	106.45	25.97	4.84	31.47	325	103	P	V
		2466	98.01	-	-	98.67	25.97	4.84	31.47	325	103	A	V
	*	2483.98	62.42	-11.58	74	62.91	26.11	4.86	31.46	325	103	P	V
	*	2483.51	45.11	-8.89	54	45.6	26.11	4.86	31.46	325	103	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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

Table with 14 columns: 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). Rows include data for CH 01 (2412MHz), CH 06 (2437MHz), and CH 11 (2462MHz). A Remark section at the bottom states: 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. 2	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		2389.56	57.16	-16.84	74	58.52	25.4	4.76	31.52	136	59	P	H
		2389.95	40.47	-13.53	54	41.83	25.4	4.76	31.52	136	59	A	H
	*	2418	104.34	-	-	105.52	25.54	4.78	31.5	136	59	P	H
	*	2420	96.06	-	-	97.06	25.69	4.8	31.49	136	59	A	H
		2389.43	56.97	-17.03	74	58.33	25.4	4.76	31.52	304	90	P	V
		2389.95	42.08	-11.92	54	43.44	25.4	4.76	31.52	304	90	A	V
	*	2418	103.83	-	-	105.01	25.54	4.78	31.5	304	90	P	V
	*	2420	95.97	-	-	96.97	25.69	4.8	31.49	304	90	A	V
802.11n HT20 CH 06 2437MHz		2385.53	44.64	-29.36	74	46	25.4	4.76	31.52	265	59	P	H
		2385.4	36.44	-17.56	54	37.87	25.35	4.75	31.53	265	59	A	H
	*	2430	105.08	-	-	106.08	25.69	4.8	31.49	265	59	P	H
	*	2430	97.14	-	-	98.14	25.69	4.8	31.49	265	59	A	H
		2489.98	45.77	-28.23	74	46.08	26.26	4.88	31.45	265	59	P	H
		2488.6	34.46	-19.54	54	34.77	26.26	4.88	31.45	265	59	A	H
		2385.53	44.42	-29.58	74	45.78	25.4	4.76	31.52	266	94	P	V
		2385.53	35.92	-18.08	54	37.28	25.4	4.76	31.52	266	94	A	V
	*	2432	103.79	-	-	104.79	25.69	4.8	31.49	266	94	P	V
	*	2430	96.21	-	-	97.21	25.69	4.8	31.49	266	94	A	V
		2489.02	42.86	-31.14	74	43.17	26.26	4.88	31.45	266	94	P	V
	2488.78	32.85	-21.15	54	33.16	26.26	4.88	31.45	266	94	A	V	



<b>802.11n</b> <b>HT20</b> <b>CH 11</b> <b>2462MHz</b>		2466	103.94	-	-	104.6	25.97	4.84	31.47	120	58	P	H
		2464	95.93	-	-	96.59	25.97	4.84	31.47	120	58	A	H
	*	2483.51	64.59	-9.41	74	65.08	26.11	4.86	31.46	120	58	P	H
	*	2483.56	44.31	-9.69	54	44.8	26.11	4.86	31.46	120	58	A	H
		2464	103.88	-	-	104.54	25.97	4.84	31.47	324	92	P	V
		2466	96.12	-	-	96.78	25.97	4.84	31.47	324	92	A	V
	*	2484.34	59.24	-14.76	74	59.73	26.11	4.86	31.46	324	92	P	V
	*	2483.51	43.99	-10.01	54	44.48	26.11	4.86	31.46	324	92	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 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: 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). Rows include test results for 802.11n HT20 CH 01 (2412MHz) and CH 06 (2437MHz), and 802.11n HT20 CH 11 (2462MHz). A Remark section at the bottom states: '1. No other spurious found. 2. All results are PASS against Peak and Average limit line.'



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

Table with 14 columns: 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). Rows include test data for 802.11n HT40 CH 03 (2422MHz) and CH 06 (2437MHz).



<b>802.11n</b>  <b>HT40</b>  <b>CH 09</b>  <b>2452MHz</b>		2389.82	49.5	-24.50	74	50.86	25.4	4.76	31.52	101	58	P	H
		2389.95	38.87	-15.13	54	40.23	25.4	4.76	31.52	101	58	A	H
	*	2464	103.55	-	-	104.21	25.97	4.84	31.47	101	58	P	H
	*	2464	93.77	-	-	94.43	25.97	4.84	31.47	101	58	A	H
		2484.28	60.1	-13.90	74	60.59	26.11	4.86	31.46	101	58	P	H
		2483.62	43.36	-10.64	54	43.85	26.11	4.86	31.46	101	58	A	H
		2389.82	48.02	-25.98	74	49.38	25.4	4.76	31.52	178	140	P	V
		2389.82	38.76	-15.24	54	40.12	25.4	4.76	31.52	178	140	A	V
	*	2462	102.23	-	-	102.89	25.97	4.84	31.47	178	140	P	V
	*	2464	93.27	-	-	93.93	25.97	4.84	31.47	178	140	A	V
		2483.86	58.18	-15.82	74	58.67	26.11	4.86	31.46	178	140	P	V
		2483.68	41.61	-12.39	54	42.1	26.11	4.86	31.46	178	140	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 802.11n HT40 (Harmonic @ 3m)**

WIFI Ant. 2	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		4842	38.35	-35.65	74	59.85	30.93	6.87	59.3	100	360	P	H
HT40		7266	41.87	-32.13	74	56.53	35.26	8.46	58.38	100	360	P	H
CH 03		4842	37.12	-36.88	74	58.62	30.93	6.87	59.3	100	360	P	V
2422MHz		7266	42.14	-31.86	74	56.8	35.26	8.46	58.38	100	360	P	V
802.11n		4872	38.4	-35.60	74	59.67	31.01	6.86	59.14	150	360	P	H
HT40		7308	43.25	-30.75	74	57.99	35.34	8.47	58.55	150	360	P	H
CH 06		4872	37.07	-36.93	74	58.34	31.01	6.86	59.14	150	360	P	V
2437MHz		7308	41.35	-32.65	74	56.09	35.34	8.47	58.55	150	360	P	V
802.11n		4902	37.34	-36.66	74	58.39	31.08	6.85	58.98	100	360	P	H
HT40		7356	43.52	-30.48	74	58.37	35.47	8.49	58.81	100	360	P	H
CH 09		4902	36.78	-37.22	74	57.83	31.08	6.85	58.98	100	360	P	V
2452MHz		7356	41.61	-32.39	74	56.46	35.47	8.49	58.81	100	360	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 802.11g (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 802.11g LF		30	21.13	-18.87	40	27.04	25.1	0.09	31.1	-	-	P	H
		169.68	18.98	-24.52	43.5	31.69	16.86	1.41	30.98	-	-	P	H
		219.15	18.95	-27.05	46	32.31	16.14	1.64	31.14	-	-	P	H
		456.8	23.06	-22.94	46	30.23	21.72	2.71	31.6	-	-	P	H
		780.78	26.45	-19.55	46	27.79	26.68	2.72	30.74	-	-	P	H
		883.6	28.24	-17.76	46	28.29	28.2	2.88	31.13	100	214	P	H
		41.64	24.94	-15.06	40	36.67	19.18	0.37	31.28	100	87	P	V
		54.25	24.35	-15.65	40	41.39	13.7	0.76	31.5	-	-	P	V
		114.39	19.54	-23.96	43.5	32.78	16.93	0.59	30.76	-	-	P	V
		433.52	22.98	-23.02	46	30.61	21.37	2.57	31.57	-	-	P	V
		716.76	26.68	-19.32	46	29.2	25.87	2.48	30.87	-	-	P	V
		910.76	28.21	-17.79	46	27.69	28.51	3.15	31.14	-	-	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.	
2		( 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)

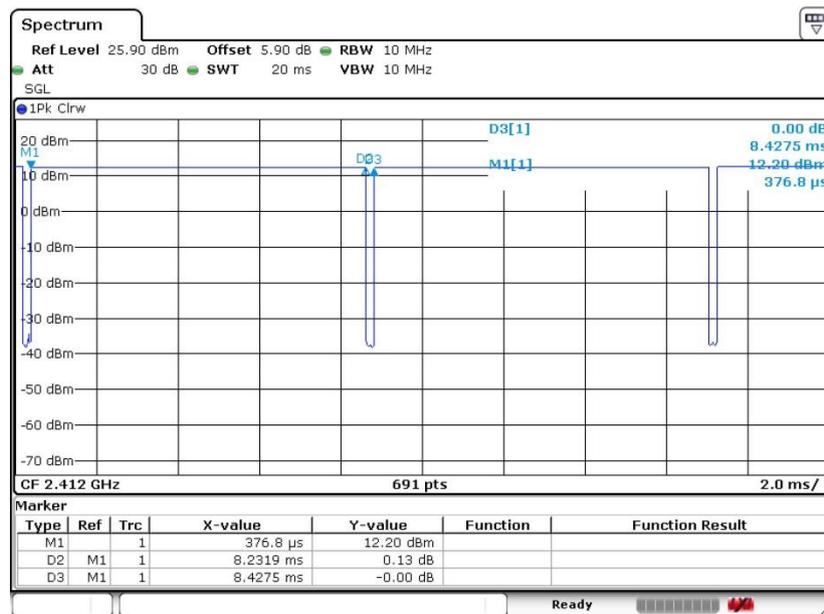
Both peak and average measured complies with the limit line, so test result is “PASS”.



## Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.68	8.23	0.12	300Hz
802.11g	87.04	1.36	0.74	1kHz
802.11n HT20	86.76	1.28	0.78	1kHz
802.11n HT40	86.34	1.23	0.81	1kHz

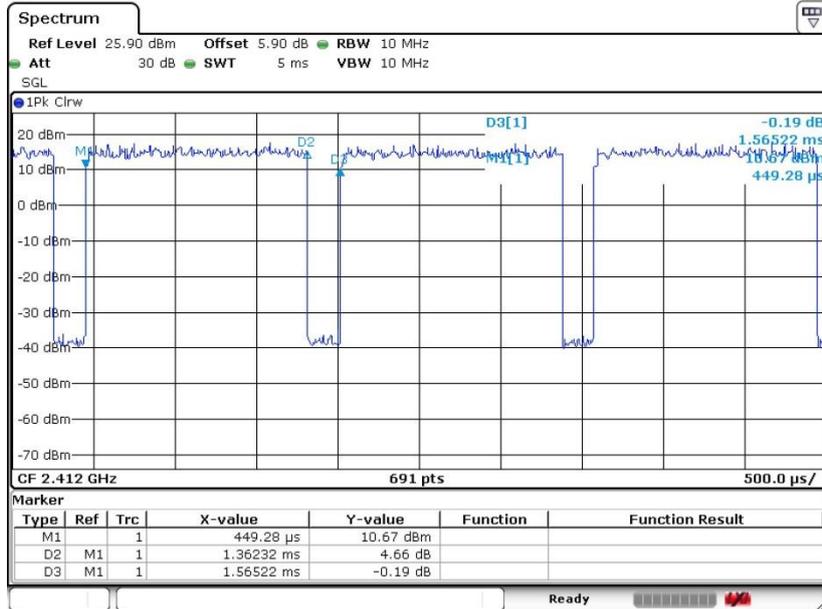
### 802.11b



Date: 13.JAN.2017 20:51:22

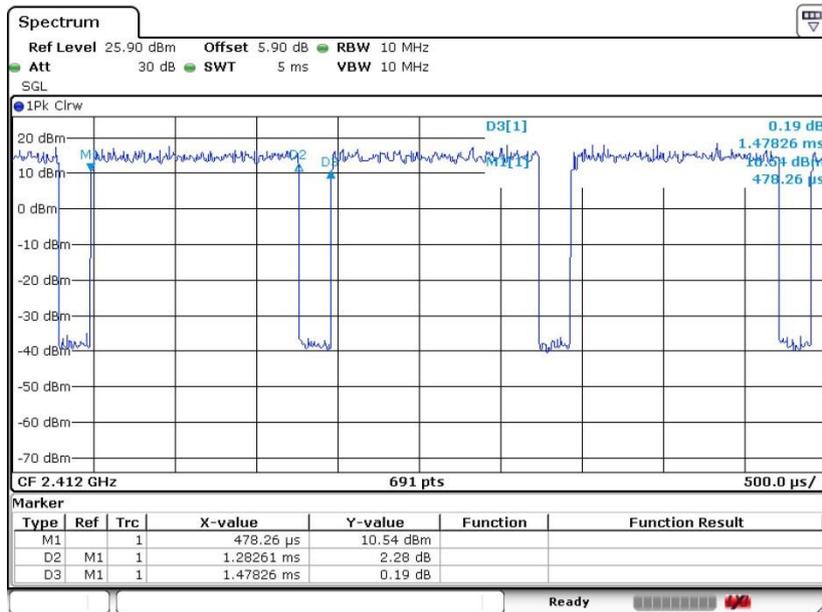


802.11g



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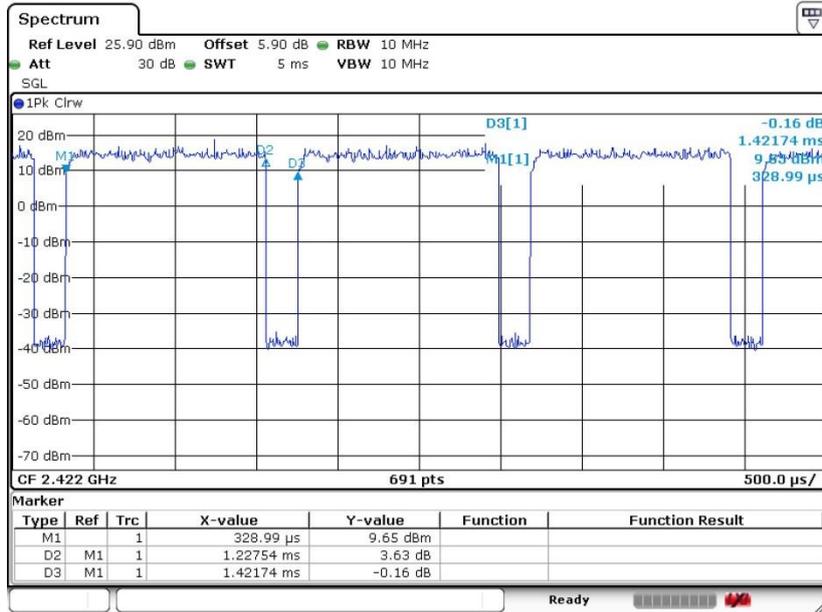
802.11n HT20



Date: 13.JAN.2017 20:57:36



802.11n HT40



Date: 13 JAN 2017 21:02:51