



# FCC RF Test Report

**APPLICANT** : Motorola Mobility LLC  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Motorola  
**MODEL NAME** : 10710  
**FCC ID** : IHDT56WD3  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

The product was received on Feb. 13, 2017 and testing was completed on Mar. 10, 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 Development Zone, Jiangsu, 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	-
3.1	-	99% Bandwidth	-	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 0.40 dB at 2389.820 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.81 dB at 0.165 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-



# 1 General Description

## 1.1 Applicant

Motorola Mobility LLC  
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

## 1.2 Manufacturer

Motorola Mobility LLC  
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	10710
FCC ID	IHDT56WD3
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/HSPA+/ LTE/NFC WLAN2.4GHz 802.11b/g/n HT20 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE / Bluetooth v4.1 LE / Bluetooth v4.2 LE
IMEI Code	Conducted: 355633080010936/355633080017949 Conduction: 355633080011116/355633080018129 Radiation: 355633080020844/355633080022980
HW Version	B4-3
SW Version	nicklaus_oem_userdebug_7.0_NMA25.11_122_intcfg-test-keys_oem
EUT Stage	Identical Prototype

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT sample 1 and sample 2, the differences between two samples are only for SIM slot, sample 1 is dual SIM slot, sample 2 is single SIM slot. According to the difference, the sample 1 to perform full test.



### 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 : 19.98 dBm (0.0995 W) 802.11g : 24.13 dBm (0.2588 W) 802.11n HT20 : 23.94 dBm (0.2477 W)
<b>99% Occupied Bandwidth</b>	802.11b : 12.99MHz 802.11g : 18.38MHz 802.11n HT20 : 18.93MHz
<b>Antenna Type / Gain</b>	LDS Antenna with gain -1.50 dBi
<b>Type of Modulation</b>	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

### 1.5 Specification of Accessory

Specification of Accessory				
<b>AC Adapter (EU)</b>	<b>Brand Name</b>	Motorola (AcBel)	<b>Model Name</b>	C-P36 SPN5944A
	<b>Power Rating</b>	I/P: 100 - 240 Vac, 0.3 A, O/P: 5.2 Vdc, 2.0 A		
<b>AC Adapter (UK)</b>	<b>Brand Name</b>	Motorola (AcBel)	<b>Model Name</b>	C-P37 SPN5940A
	<b>Power Rating</b>	I/P: 100 - 240 Vac, 0.3 A, O/P: 5.2 Vdc, 2.0 A		
<b>AC Adapter (US)</b>	<b>Brand Name</b>	Motorola (AcBel)	<b>Model Name</b>	C-P35 SPN5945A
	<b>Power Rating</b>	I/P: 100 - 240 Vac, 0.3 A, O/P: 5.2 Vdc, 2.0 A		
<b>AC Adapter (IN)</b>	<b>Brand Name</b>	Motorola (AcBel)	<b>Model Name</b>	C-P49 SPN5946A
	<b>Power Rating</b>	I/P: 100 - 240 Vac, 0.3 A, O/P: 5.2 Vdc, 2.0 A		
<b>AC Adapter (AR)</b>	<b>Brand Name</b>	Motorola (AcBel)	<b>Model Name</b>	C-P47 SPN5942A
	<b>Power Rating</b>	I/P: 100 - 240 Vac, 0.5 A, O/P: 5.2 Vdc, 2.0 A		
<b>Battery</b>	<b>Brand Name</b>	Motorola (Amperex)	<b>Model Name</b>	HE50
	<b>Power Rating</b>	0.38 Vdc, 5000 mAh	<b>Type</b>	Li-ion
<b>USB Cable</b>	<b>Brand Name</b>	Motorola (Li Qi)	<b>Model Name</b>	LQ-035050
	<b>Signal Line Type</b>	1.0m shielded cable without core		
<b>Earphone</b>	<b>Brand Name</b>	Motorola (Tenji)	<b>Model Name</b>	TJ-101814
	<b>Signal Line Type</b>	1.30m unshielded cable without core		



### 1.6 Modification of EUT

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

### 1.7 Testing Location

<b>Test Site</b>	Sporton International (KunShan) INC.			
<b>Test Site Location</b>	No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, 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.

### 1.8 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 (X plane) 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 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

802.11b mode Peak Power (dBm)					
Channel	Freq. (MHz)	Data Rate (MHz)			
		1M bps	2M bps	5.5M bps	11M bps
CH 01	2412 MHz	19.92	19.82	19.88	19.90
CH 06	2437 MHz	19.89	19.81	19.68	19.75
CH 11	2462 MHz	19.98	19.88	19.80	19.82

802.11g mode Peak Power (dBm)									
Channel	Freq. (MHz)	Data Rate (MHz)							
		6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
CH 01	2412 MHz	23.24	23.19	23.93	24.06	23.16	23.08	23.78	24.13
CH 06	2437 MHz	22.48	22.46	23.76	23.65	22.58	22.57	23.74	23.81
CH 11	2462 MHz	22.13	21.96	23.34	23.38	22.18	22.07	23.52	23.63

802.11n HT20 mode Peak Power (dBm)									
Channel	Freq. (MHz)	Data Rate (MHz)							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	22.50	22.85	22.95	23.75	23.80	23.85	23.91	23.94
CH 06	2437 MHz	22.58	22.35	22.12	22.43	22.23	23.29	23.55	23.75
CH 11	2462 MHz	22.55	22.15	22.11	22.26	22.35	23.55	23.75	23.76



### 2.3 Test Mode

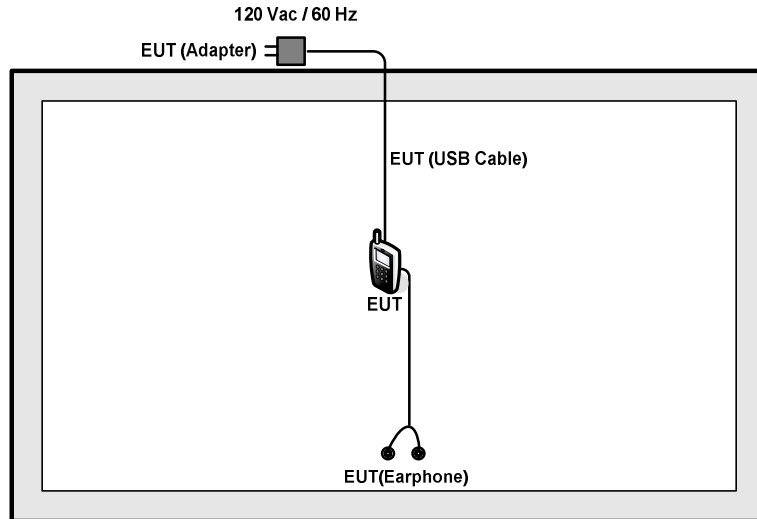
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	54 Mbps
802.11n HT20	MCS7

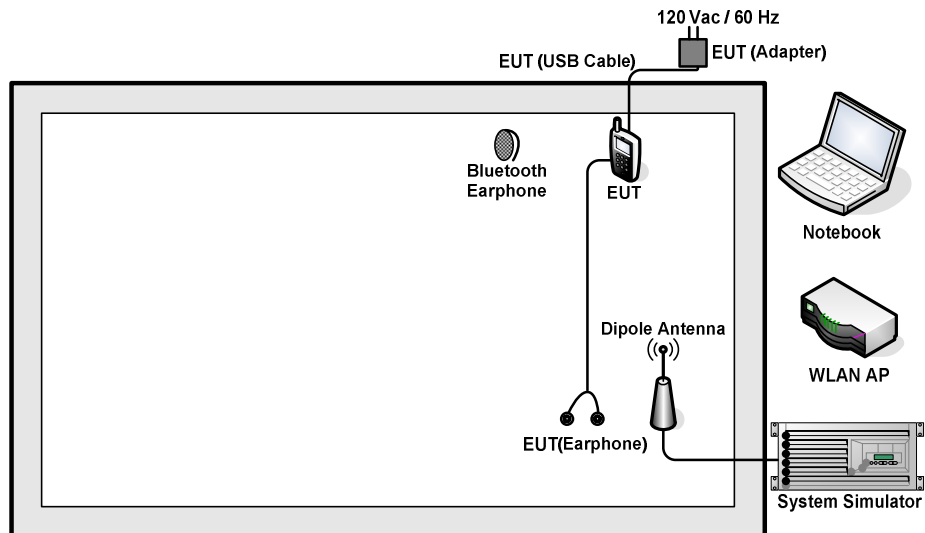
Test Cases	
AC Conducted	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + USB Cable (Charging from Adapter) +
Emission	Earphone + Battery + SIM 1 for Sample 1

## 2.4 Connection Diagram of Test System

### <WLAN Tx Mode>



### <AC Conducted Emission Mode>



## 2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	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	FCC DoC	N/A	Shielded cable DC O/P 1.8 m Unshielded AC I/P cable 1.2 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A

## 2.6 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 connect with the Notebook under large package sizes transmission.

## 2.7 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss 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.*

Following shows an offset computation example with cable loss 5.60dB.

*Offset(dB) = RF cable loss(dB).*

*=5.60 (dB)*

### 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB and 99% Bandwidth

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

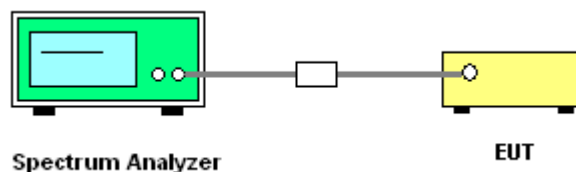
##### 3.1.2 Measuring Instruments

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. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

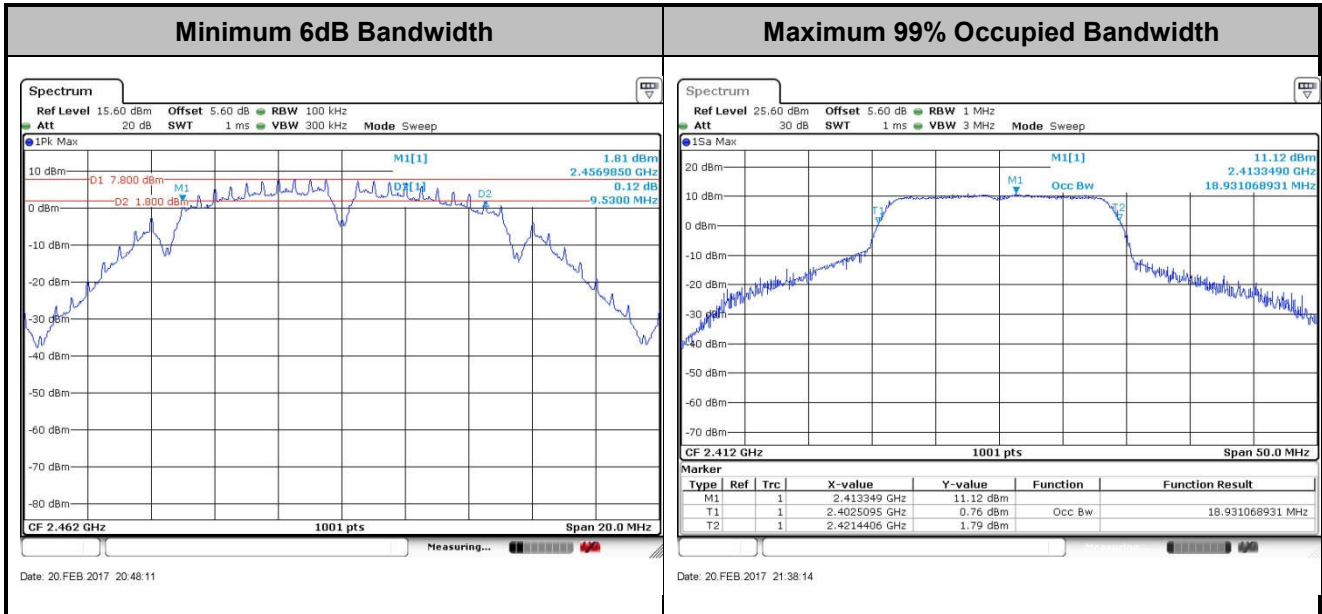
##### 3.1.4 Test Setup





### 3.1.5 Test Result of 6dB and 99% Occupied 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.

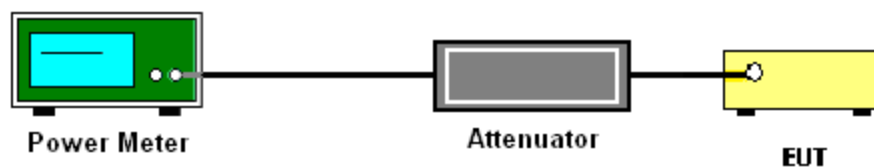
### 3.2.2 Measuring Instruments

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.

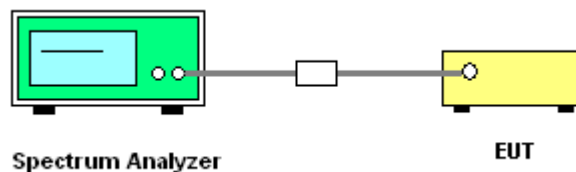
#### 3.3.2 Measuring Instruments

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.

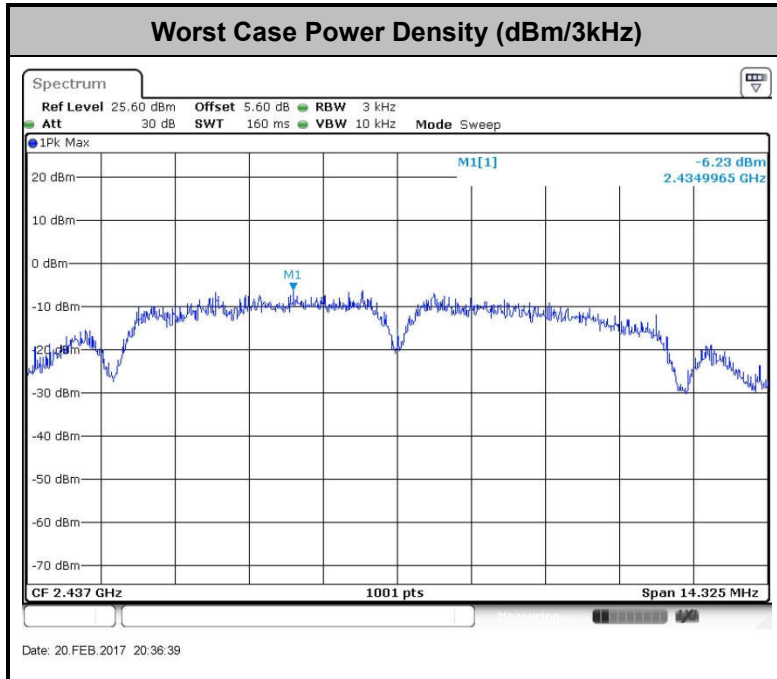
#### 3.3.4 Test Setup





### 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).

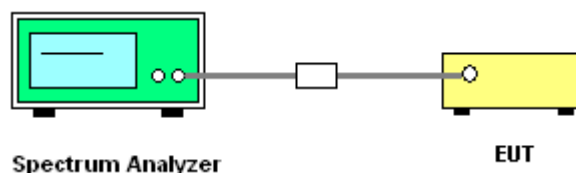
#### 3.4.2 Measuring Instruments

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.

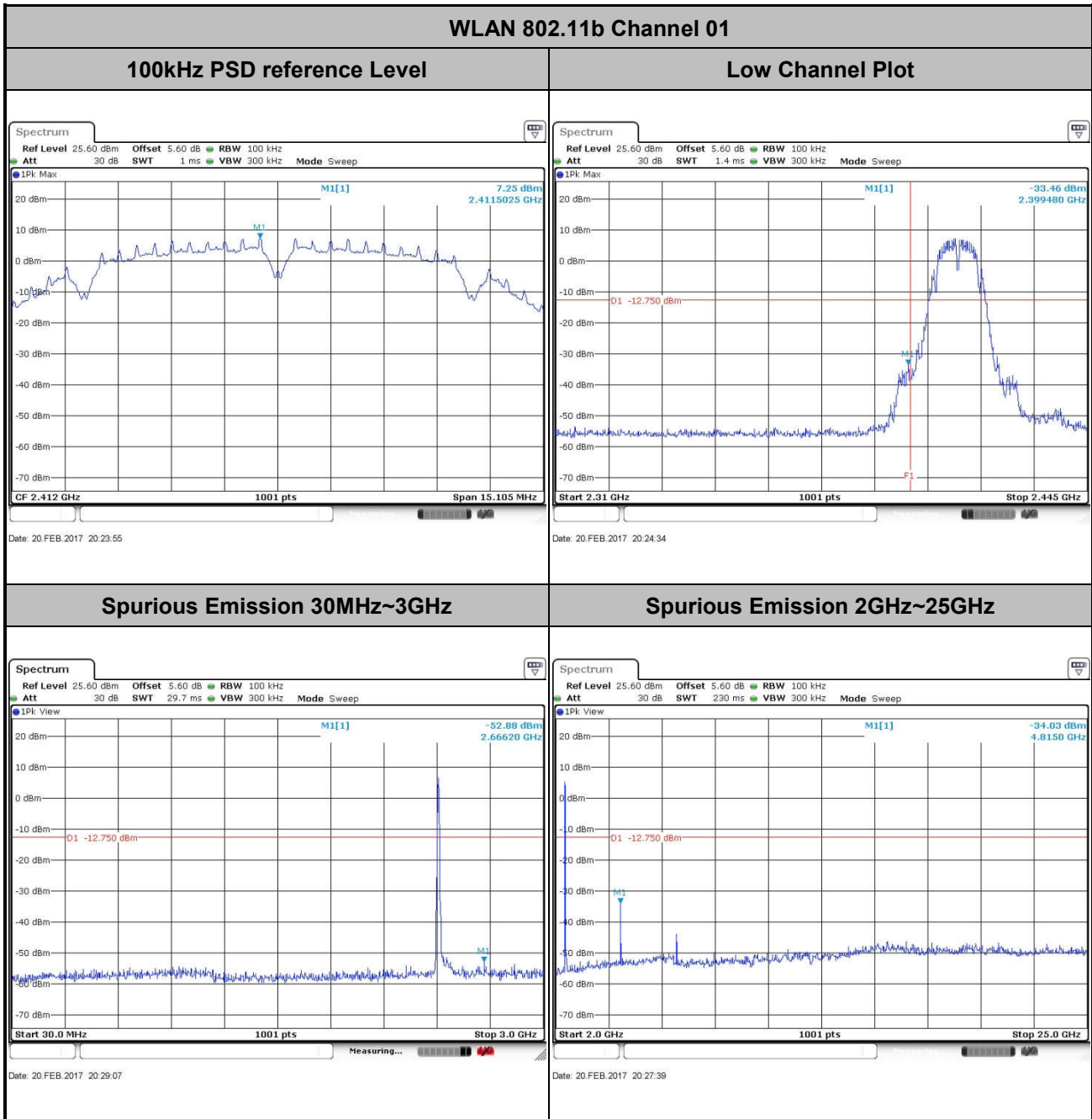
#### 3.4.4 Test Setup





### 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 :	54~55%
Test Channel :	01	Test Engineer :	Ivan Zhang

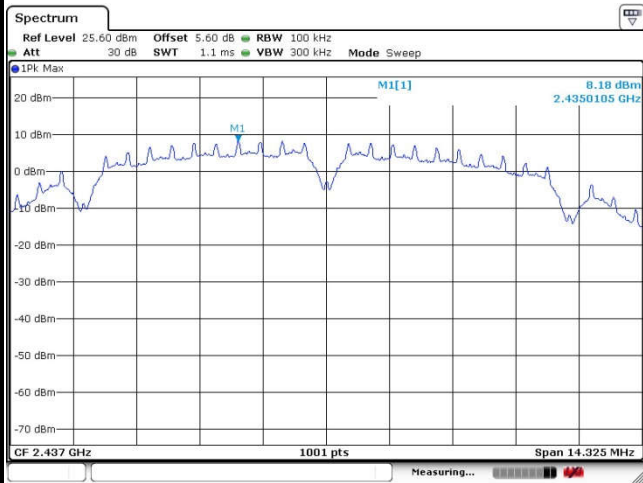




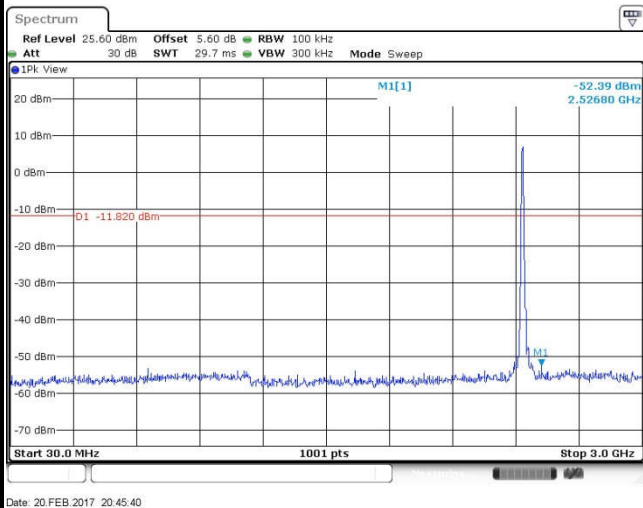
Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11b Channel 06

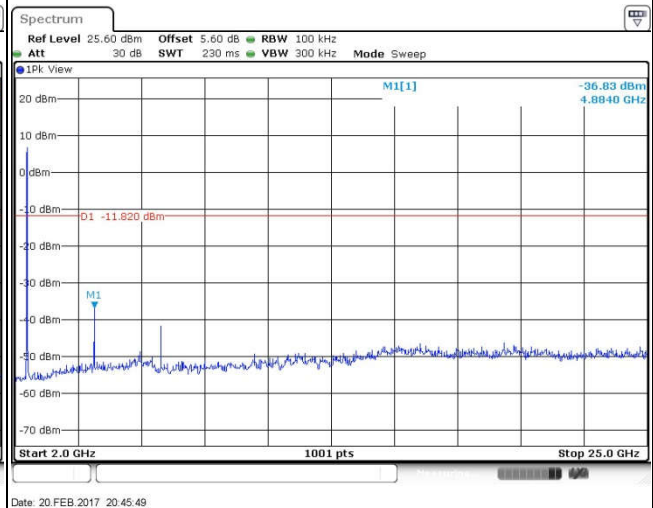
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

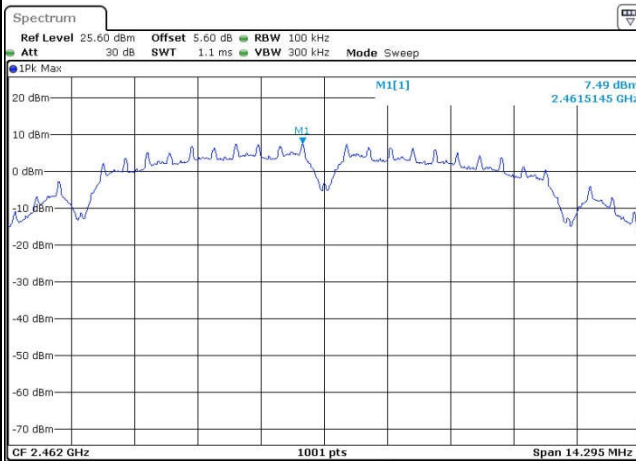




Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Zhang

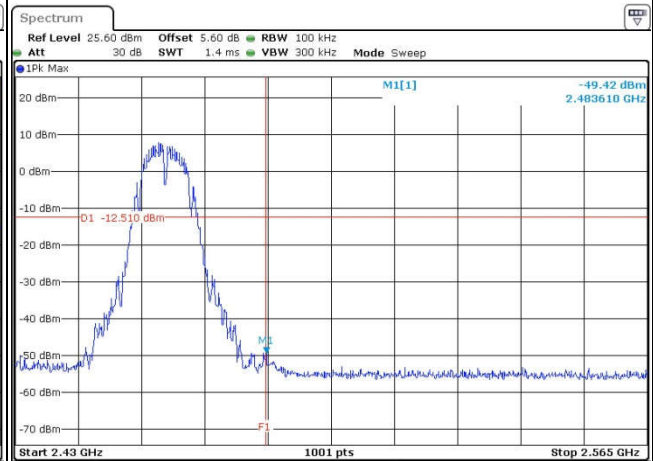
WLAN 802.11b Channel 11

100kHz PSD reference Level



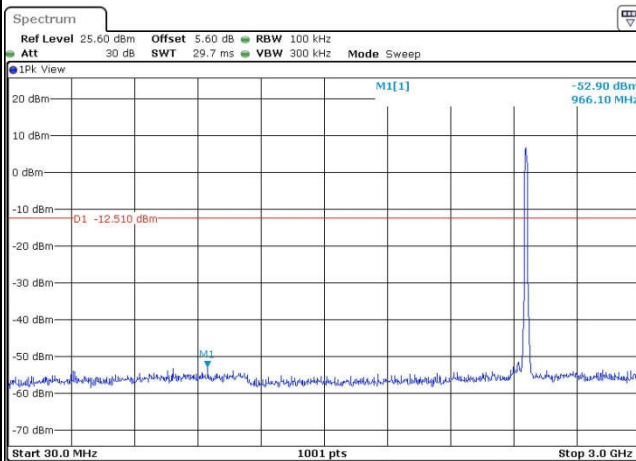
Date: 20.FEB.2017 20:51:09

High Channel Plot



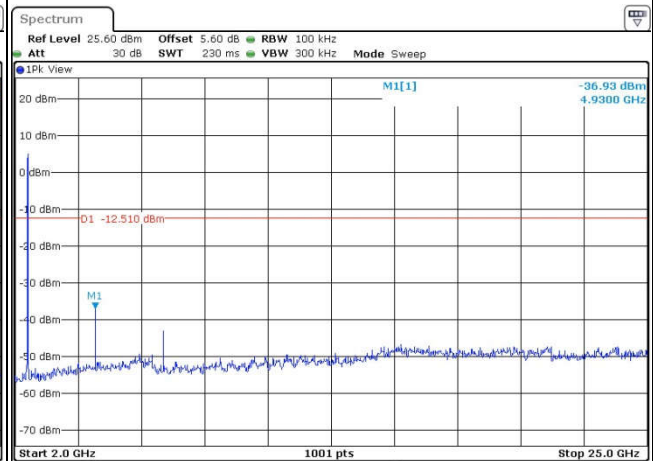
Date: 20.FEB.2017 20:51:44

Spurious Emission 30MHz~3GHz



Date: 20.FEB.2017 20:53:20

Spurious Emission 2GHz~25GHz



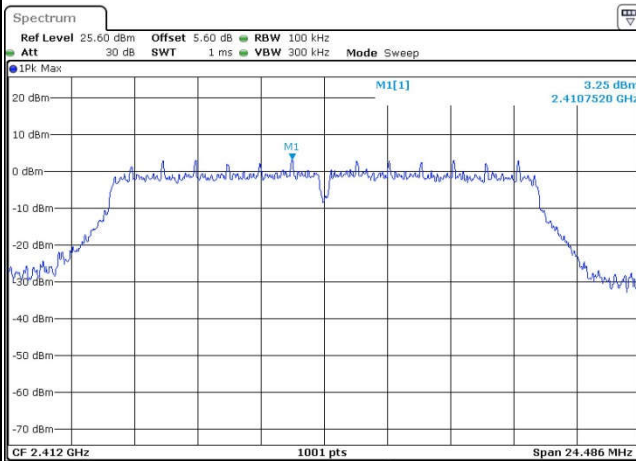
Date: 20.FEB.2017 20:53:28



Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	01	Test Engineer :	Ivan Zhang

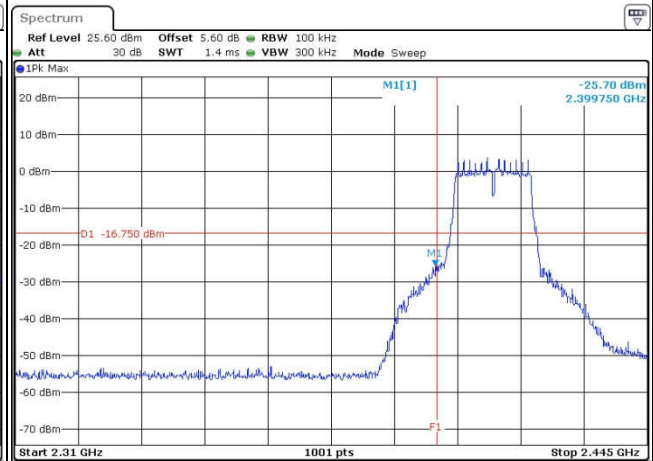
WLAN 802.11g Channel 01

100kHz PSD reference Level



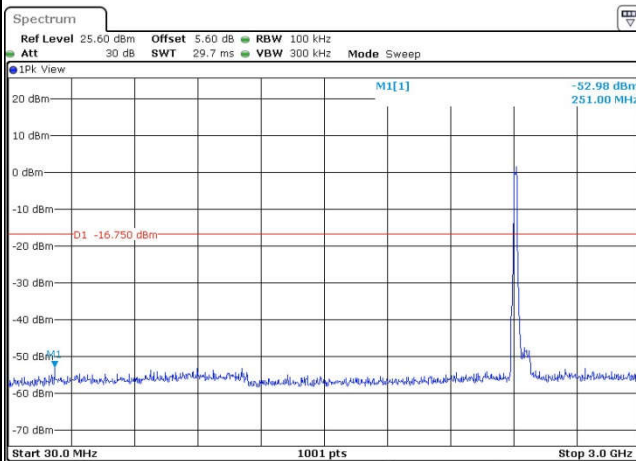
Date: 20.FEB.2017 20:58:43

Low Channel Plot



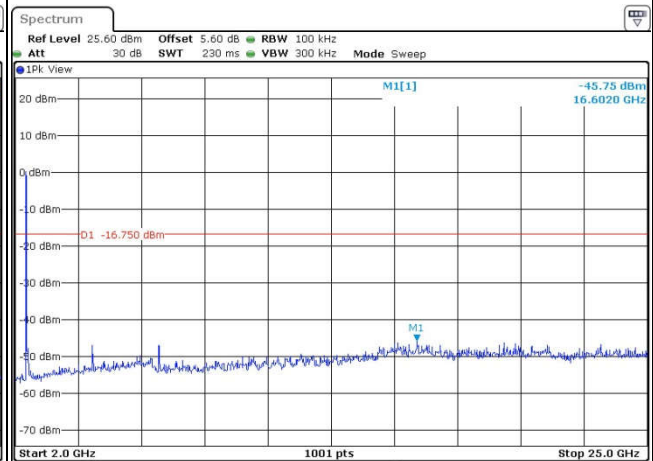
Date: 20.FEB.2017 21:00:18

Spurious Emission 30MHz~3GHz



Date: 20.FEB.2017 21:01:15

Spurious Emission 2GHz~25GHz



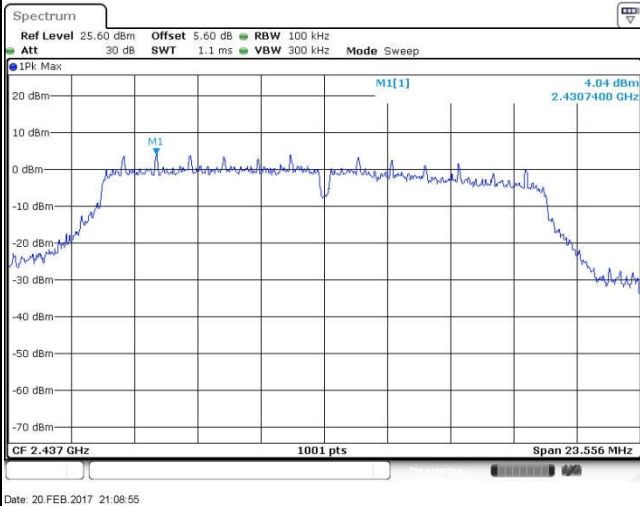
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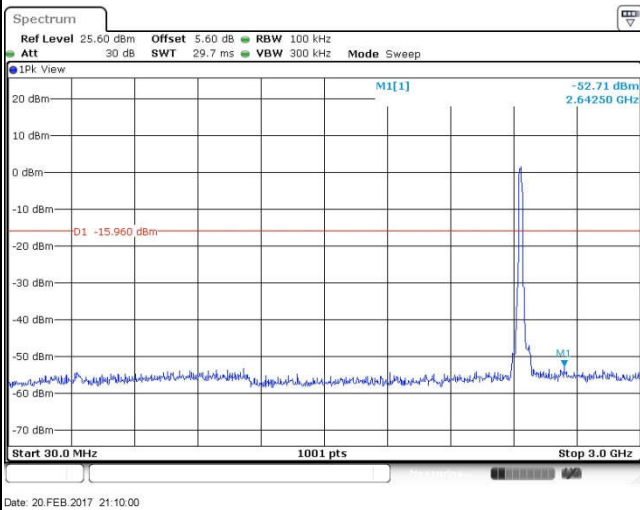
Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11g Channel 06

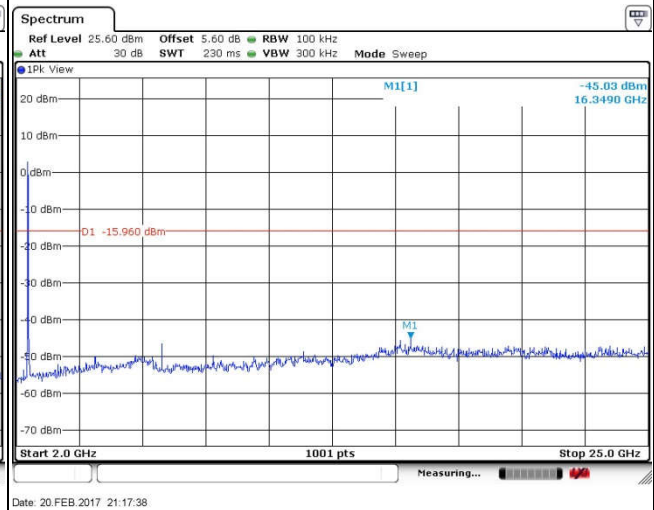
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

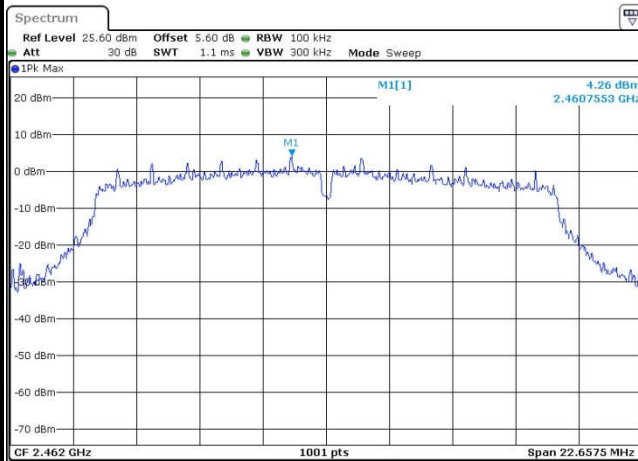




Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Zhang

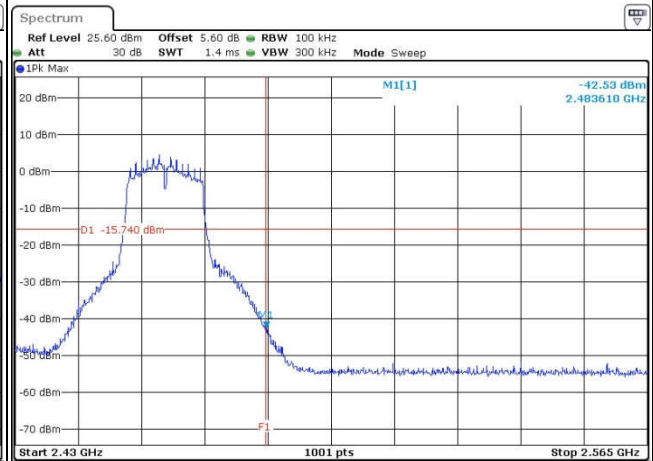
WLAN 802.11g Channel 11

100kHz PSD reference Level



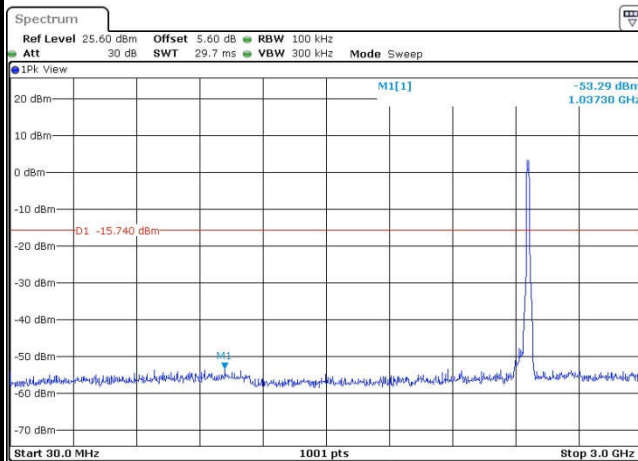
Date: 20.FEB.2017 21:22:32

High Channel Plot



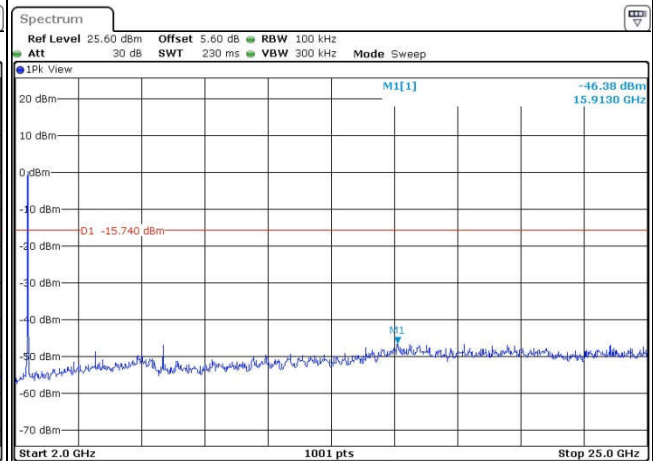
Date: 20.FEB.2017 21:23:24

Spurious Emission 30MHz~3GHz



Date: 20.FEB.2017 21:23:58

Spurious Emission 2GHz~25GHz



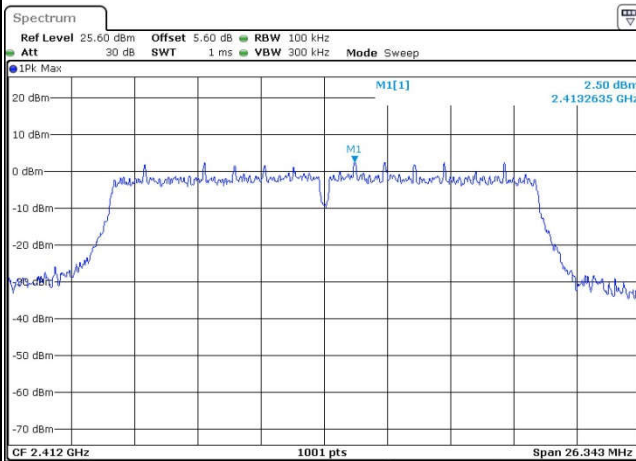
Date: 20.FEB.2017 21:24:06



Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	01	Test Engineer :	Ivan Zhang

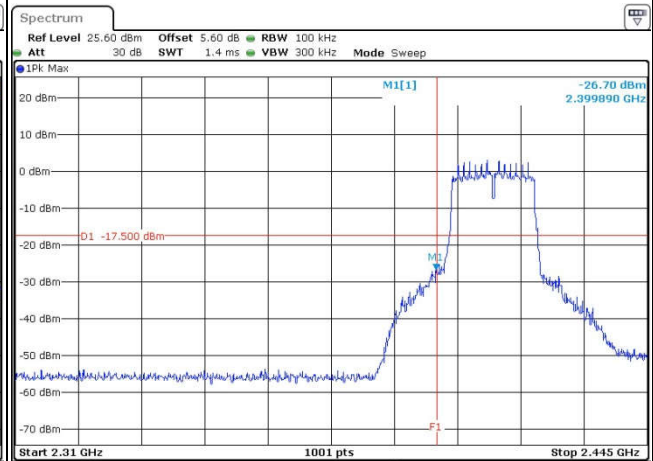
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



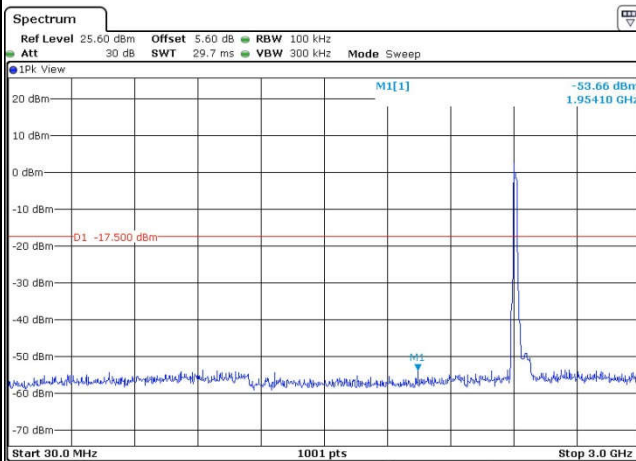
Date: 20.FEB.2017 21:33:33

Low Channel Plot



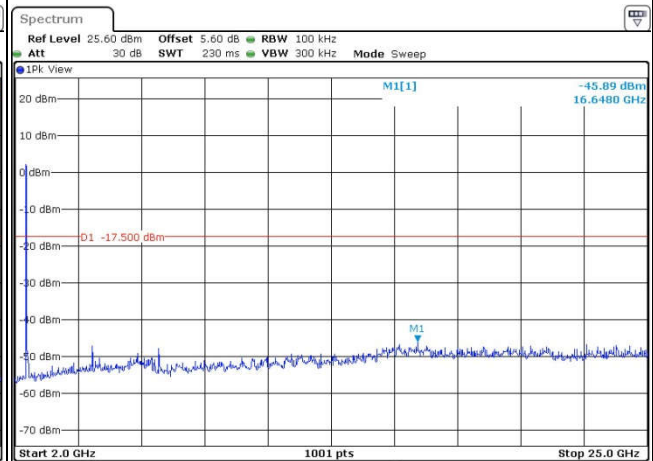
Date: 20.FEB.2017 21:33:58

Spurious Emission 30MHz~3GHz



Date: 20.FEB.2017 21:37:25

Spurious Emission 2GHz~25GHz



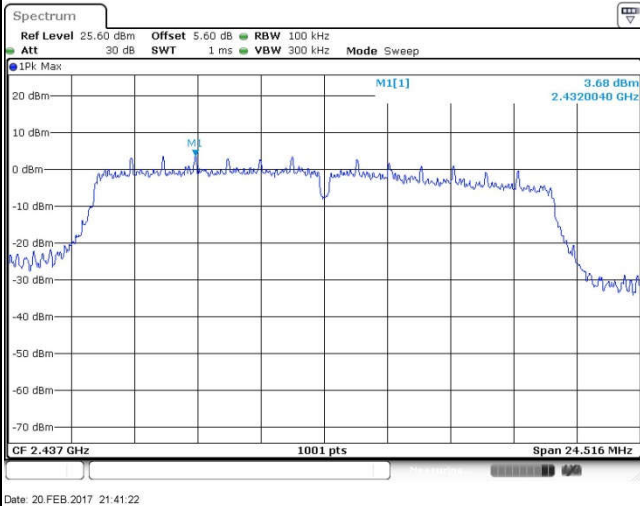
Date: 20.FEB.2017 21:35:27



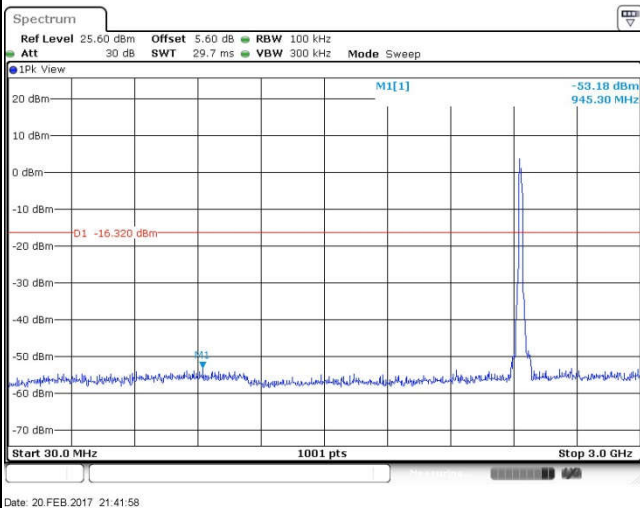
Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11n HT20 Channel 06

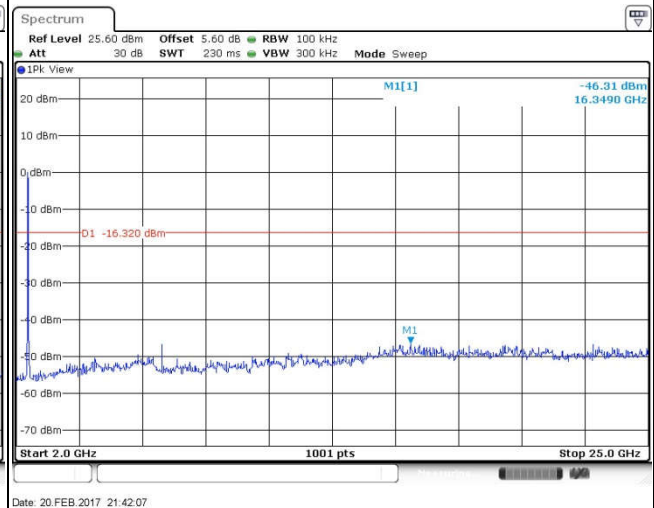
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

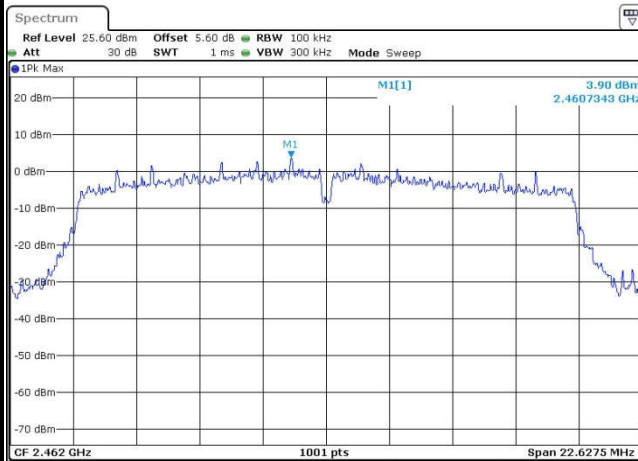




Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Zhang

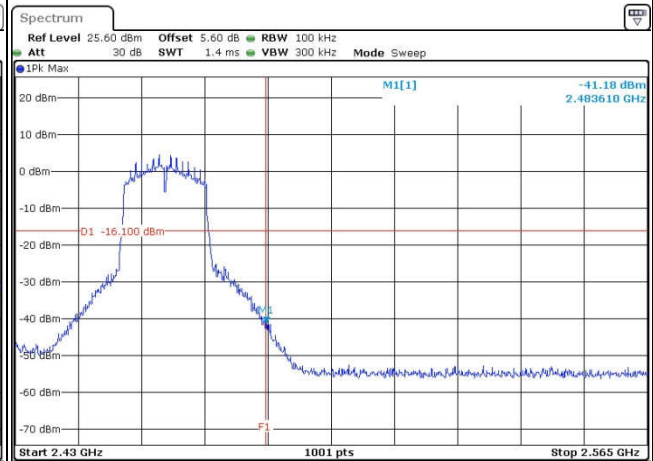
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



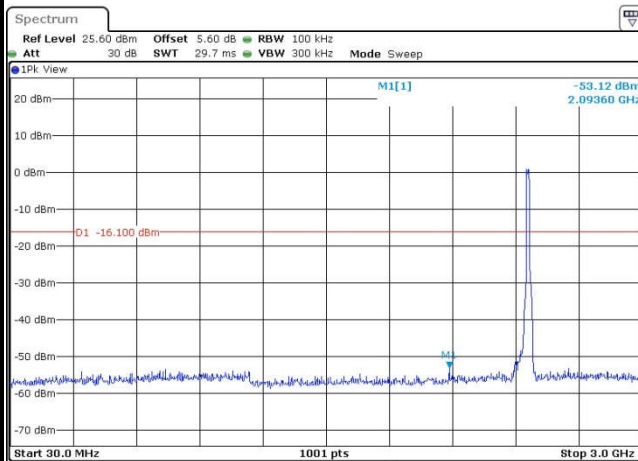
Date: 20.FEB.2017 21:49:17

High Channel Plot



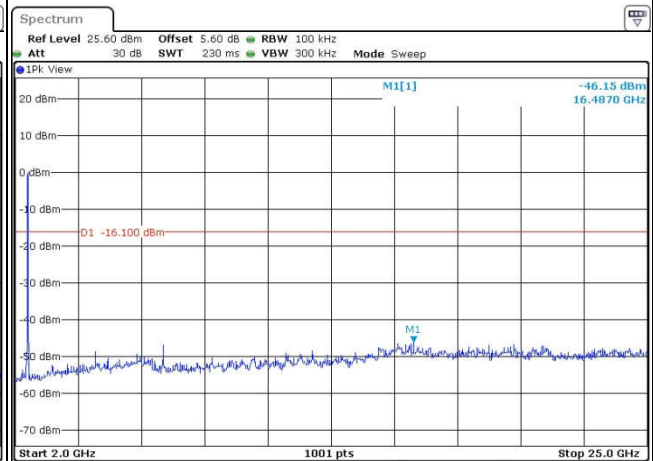
Date: 10.MAR.2017 10:03:29

Spurious Emission 30MHz~3GHz



Date: 20.FEB.2017 21:50:25

Spurious Emission 2GHz~25GHz



Date: 20.FEB.2017 21:50:33



### 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.

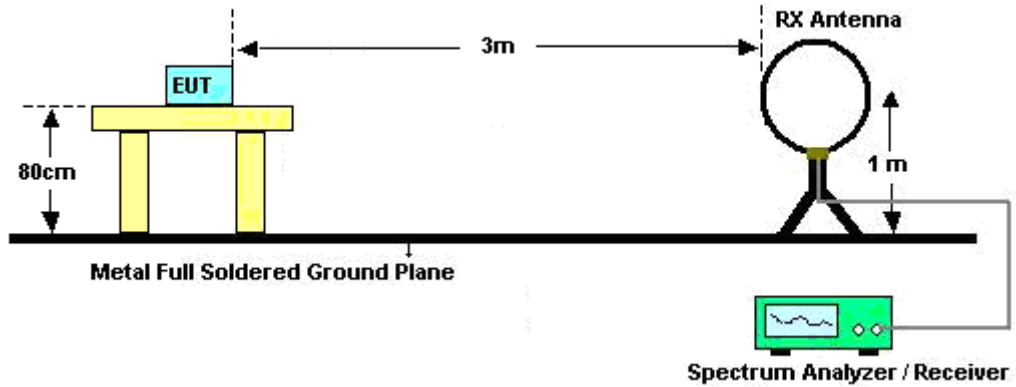


### **3.5.3 Test Procedures**

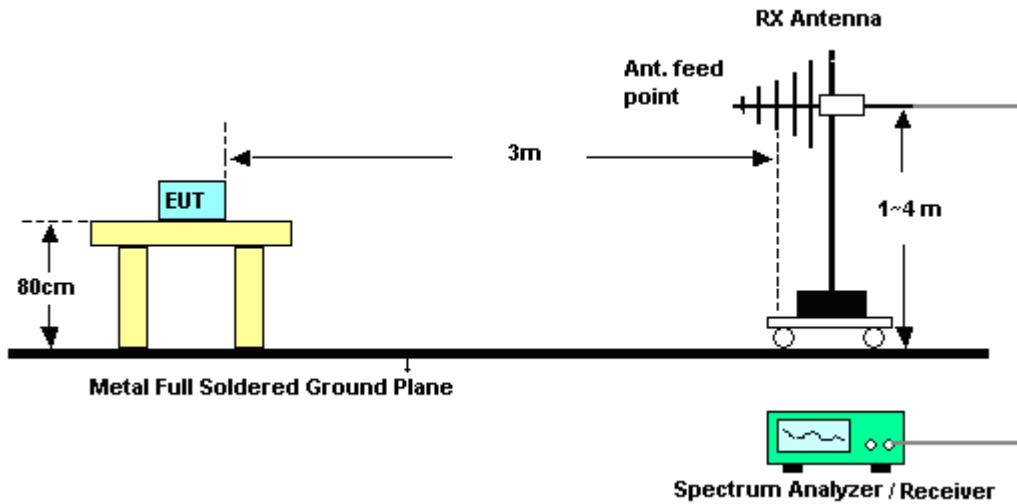
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the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

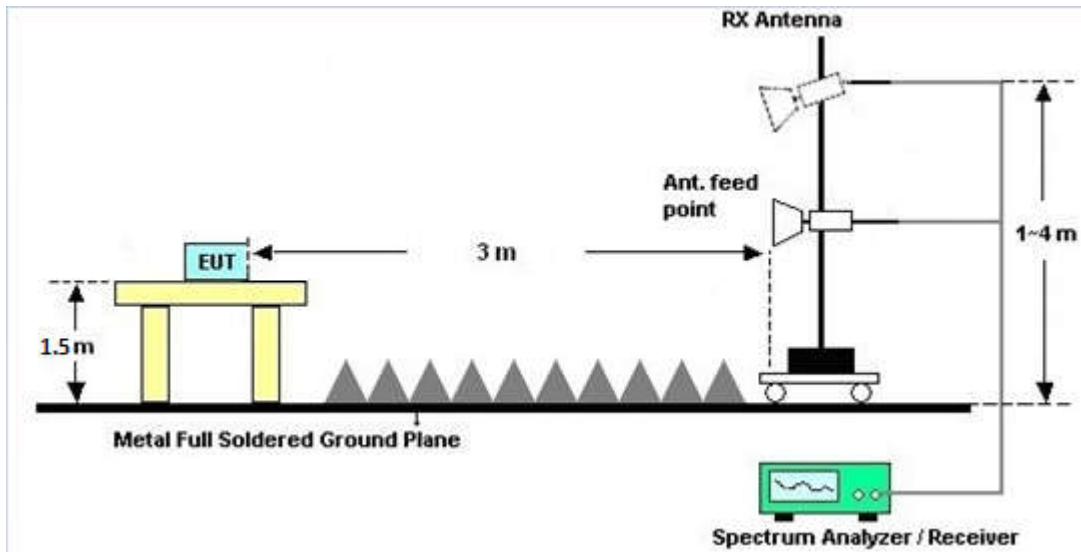
For radiated emissions below 30MHz



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 (dBµV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

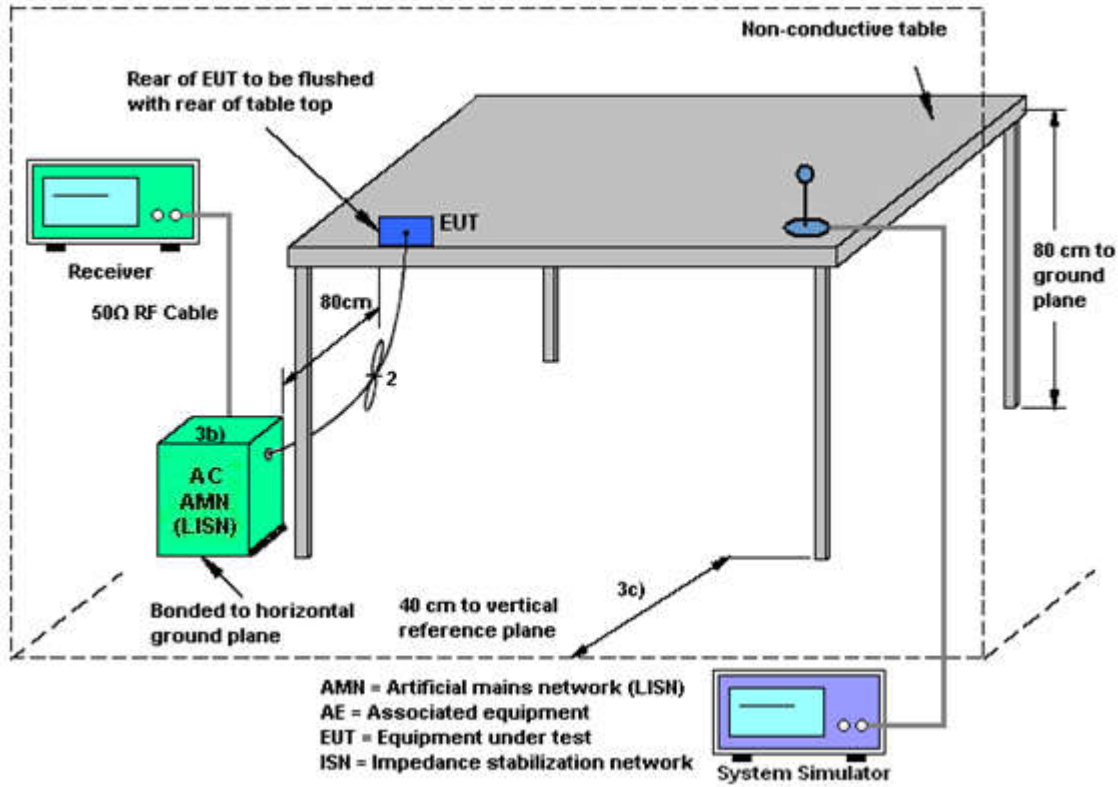
#### 3.6.2 Measuring Instruments

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.

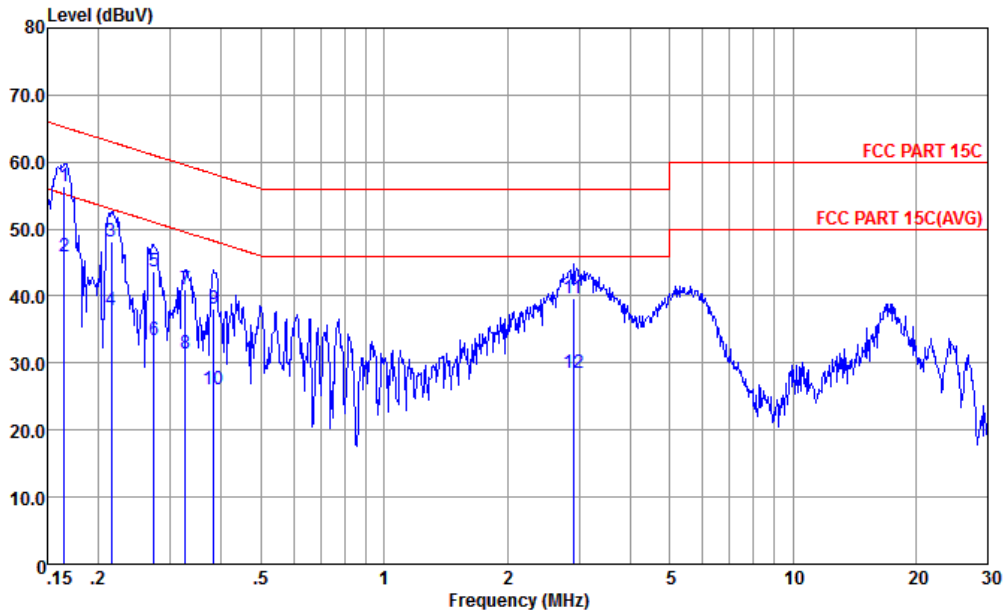
### 3.6.4 Test Setup





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 + USB Cable (Charging from Adapter) + Earphone + Battery + SIM 1 for Sample 1		



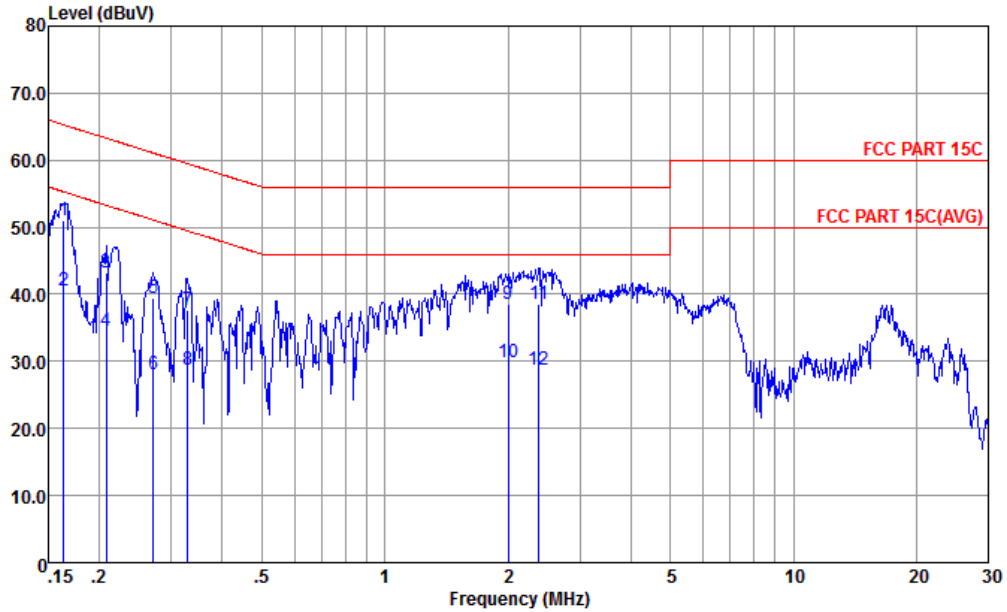
Site : CO01-KS  
 Condition : FCC PART 15C LISN-L-20151024 LINE

mode : Mode 1  
 IMEI : 355633080011116/355633080018129 #7

	Freq	Level	Over Limit	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.165	56.40	-8.81	65.21	45.61	0.42	10.37	QP
2	0.165	45.80	-9.41	55.21	35.01	0.42	10.37	Average
3	0.215	48.04	-14.97	63.01	37.50	0.22	10.32	QP
4	0.215	37.84	-15.17	53.01	27.30	0.22	10.32	Average
5	0.273	43.70	-17.33	61.03	33.21	0.22	10.27	QP
6	0.273	33.40	-17.63	51.03	22.91	0.22	10.27	Average
7	0.327	41.06	-18.47	59.53	30.59	0.23	10.24	QP
8	0.327	31.46	-18.07	49.53	20.99	0.23	10.24	Average
9	0.383	38.03	-20.18	58.21	27.59	0.23	10.21	QP
10	0.383	26.03	-22.18	48.21	15.59	0.23	10.21	Average
11	2.900	39.70	-16.30	56.00	29.30	0.18	10.22	QP
12	2.900	28.60	-17.40	46.00	18.20	0.18	10.22	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 + USB Cable (Charging from Adapter) + Earphone + Battery + SIM 1 for Sample 1		



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

mode : Mode 1  
 IMEI : 355633080011116/355633080018129 #7

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.163	50.98	-14.32	65.30	40.30	0.30	10.38	QP
2	0.163	40.58	-14.72	55.30	29.90	0.30	10.38	Average
3	0.208	43.24	-20.03	63.27	32.61	0.31	10.32	QP
4	0.208	34.64	-18.63	53.27	24.01	0.31	10.32	Average
5	0.272	39.49	-21.58	61.07	28.91	0.31	10.27	QP
6	0.272	28.19	-22.88	51.07	17.61	0.31	10.27	Average
7	0.329	37.75	-21.74	59.49	27.19	0.32	10.24	QP
8	0.329	28.75	-20.74	49.49	18.19	0.32	10.24	Average
9	2.001	38.57	-17.43	56.00	28.00	0.38	10.19	QP
10	2.001	29.77	-16.23	46.00	19.20	0.38	10.19	Average
11	2.384	38.48	-17.52	56.00	27.90	0.38	10.20	QP
12	2.384	28.78	-17.22	46.00	18.20	0.38	10.20	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. 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	Feb. 20, 2017~ Mar. 10, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Feb. 20, 2017~ Mar. 10, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Feb. 20, 2017~ Mar. 10, 2017	Jan. 18, 2018	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Feb. 17, 2017~ Mar. 10, 2017	Aug. 08, 2017	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, MAX 30dB	Apr. 22, 2016	Feb. 17, 2017~ Mar. 10, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Feb. 17, 2017~ Mar. 10, 2017	Nov. 22, 2017	Radiation (03CH01-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Aug. 20, 2016	Feb. 17, 2017~ Mar. 10, 2017	Aug. 19, 2017	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 22, 2016	Feb. 17, 2017~ Mar. 10, 2017	Oct. 21, 2017	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Feb. 17, 2017~ Mar. 10, 2017	Feb. 14, 2018	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Feb. 17, 2017~ Mar. 10, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz	Oct. 13, 2016	Feb. 17, 2017~ Mar. 10, 2017	Oct. 12, 2017	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 13, 2016	Feb. 17, 2017~ Mar. 10, 2017	Oct. 12, 2017	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Feb. 17, 2017~ Mar. 10, 2017	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Feb. 17, 2017~ Mar. 10, 2017	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Feb. 17, 2017~ Mar. 10, 2017	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Apr. 29, 2016	Mar. 08, 2017	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Mar. 08, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Mar. 08, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Mar. 08, 2017	Oct. 12, 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% ( $U = 2Uc(y)$ )	2.3 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.2 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.7 dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.3 dB
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## **Appendix A. Conducted Test Results**

**A1 - DTS Part**

Test Engineer:	Ivan Zhang	Temperature:	24~25	°C
Test Date:	2017/2/20~2017/3/10	Relative Humidity:	54~55	%

**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	12.99	10.07	0.50	Pass
11b	1Mbps	1	6	2437	12.99	9.55	0.50	Pass
11b	1Mbps	1	11	2462	12.49	9.53	0.50	Pass
11g	54Mbps	1	1	2412	18.03	16.32	0.50	Pass
11g	54Mbps	1	6	2437	18.38	15.70	0.50	Pass
11g	54Mbps	1	11	2462	17.58	15.11	0.50	Pass
HT20	MCS7	1	1	2412	18.93	17.56	0.50	Pass
HT20	MCS7	1	6	2437	18.88	16.34	0.50	Pass
HT20	MCS7	1	11	2462	18.48	15.09	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	19.92	30.00	-1.50	18.42	36.00	Pass
11b	1Mbps	1	6	2437	19.89	30.00	-1.50	18.39	36.00	Pass
11b	1Mbps	1	11	2462	19.98	30.00	-1.50	18.48	36.00	Pass
11g	54Mbps	1	1	2412	24.13	30.00	-1.50	22.63	36.00	Pass
11g	54Mbps	1	6	2437	23.81	30.00	-1.50	22.31	36.00	Pass
11g	54Mbps	1	11	2462	23.63	30.00	-1.50	22.13	36.00	Pass
HT20	MCS7	1	1	2412	23.94	30.00	-1.50	22.44	36.00	Pass
HT20	MCS7	1	6	2437	23.75	30.00	-1.50	22.25	36.00	Pass
HT20	MCS7	1	11	2462	23.76	30.00	-1.50	22.26	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	0.00	17.11
11b	1Mbps	1	6	2437	0.00	17.22
11b	1Mbps	1	11	2462	0.00	17.18
11g	54Mbps	1	1	2412	0.81	15.01
11g	54Mbps	1	6	2437	0.81	15.03
11g	54Mbps	1	11	2462	0.81	14.09
HT20	MCS7	1	1	2412	0.86	14.36
HT20	MCS7	1	6	2437	0.86	14.21
HT20	MCS7	1	11	2462	0.86	14.27

**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	-6.68	-1.50	8.00	Pass
11b	1Mbps	1	6	2437	-6.23	-1.50	8.00	Pass
11b	1Mbps	1	11	2462	-7.11	-1.50	8.00	Pass
11g	54Mbps	1	1	2412	-10.47	-1.50	8.00	Pass
11g	54Mbps	1	6	2437	-10.52	-1.50	8.00	Pass
11g	54Mbps	1	11	2462	-10.21	-1.50	8.00	Pass
HT20	MCS7	1	1	2412	-12.12	-1.50	8.00	Pass
HT20	MCS7	1	6	2437	-9.89	-1.50	8.00	Pass
HT20	MCS7	1	11	2462	-10.79	-1.50	8.00	Pass



## Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

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 CH 01 2412MHz		2388.39	44.56	-29.44	74	45.92	25.4	4.76	31.52	117	98	P	H
		2388.65	34.97	-19.03	54	36.33	25.4	4.76	31.52	117	98	A	H
	*	2410	104.47	-	-	105.65	25.54	4.78	31.5	117	98	P	H
	*	2410	101.46	-	-	102.64	25.54	4.78	31.5	117	98	A	H
		2389.43	42	-32	74	43.36	25.4	4.76	31.52	297	66	P	V
		2388.78	32.82	-21.18	54	34.18	25.4	4.76	31.52	297	66	A	V
	*	2412	101.06	-	-	102.24	25.54	4.78	31.5	297	66	P	V
	*	2410	97.87	-	-	99.05	25.54	4.78	31.5	297	66	A	V
802.11b CH 06 2437MHz		2389.95	42.12	-31.88	74	43.48	25.4	4.76	31.52	185	210	P	H
		2389.95	32.25	-21.75	54	33.61	25.4	4.76	31.52	185	210	A	H
	*	2438	104.41	-	-	105.24	25.83	4.82	31.48	185	210	P	H
	*	2438	101.35	-	-	102.18	25.83	4.82	31.48	185	210	A	H
		2484.04	47	-27	74	47.49	26.11	4.86	31.46	185	210	P	H
		2487.28	37.43	-16.57	54	37.92	26.11	4.86	31.46	185	210	A	H
		2389.04	40.67	-33.33	74	42.03	25.4	4.76	31.52	381	130	P	V
		2389.95	30.66	-23.34	54	32.02	25.4	4.76	31.52	381	130	A	V
	*	2438	102.37	-	-	103.2	25.83	4.82	31.48	381	130	P	V
	*	2438	99.35	-	-	100.18	25.83	4.82	31.48	381	130	A	V
		2487.82	46.8	-27.2	74	47.11	26.26	4.88	31.45	381	130	P	V
	2487.4	36.43	-17.57	54	36.92	26.11	4.86	31.46	381	130	A	V	



802.11b CH 11 2462MHz	*	2462	103.84	-	-	104.5	25.97	4.84	31.47	160	209	P	H
	*	2460	100.63	-	-	101.29	25.97	4.84	31.47	160	209	A	H
		2483.92	51.92	-22.08	74	52.41	26.11	4.86	31.46	160	209	P	H
		2483.5	43.49	-10.51	54	43.98	26.11	4.86	31.46	160	209	A	H
	*	2462	101.58	-	-	102.24	25.97	4.84	31.47	374	129	P	V
	*	2460	98.41	-	-	99.07	25.97	4.84	31.47	374	129	A	V
		2483.74	51.27	-22.73	74	51.76	26.11	4.86	31.46	374	129	P	V
		2483.5	43.3	-10.7	54	43.79	26.11	4.86	31.46	374	129	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)

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).



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		2388.78	63.19	-10.81	74	64.55	25.4	4.76	31.52	180	266	P	H
		2389.82	53.6	-0.4	54	54.96	25.4	4.76	31.52	180	266	A	H
	*	2410	104.53	-	-	105.71	25.54	4.78	31.5	180	266	P	H
	*	2410	97.89	-	-	99.07	25.54	4.78	31.5	180	266	A	H
		2389.69	63.08	-10.92	74	64.44	25.4	4.76	31.52	282	258	P	V
		2389.69	53.18	-0.82	54	54.54	25.4	4.76	31.52	282	258	A	V
	*	2410	102.83	-	-	104.01	25.54	4.78	31.5	282	258	P	V
	*	2410	96.48	-	-	97.66	25.54	4.78	31.5	282	258	A	V
802.11g CH 06 2437MHz		2389.95	45.39	-28.61	74	46.75	25.4	4.76	31.52	214	194	P	H
		2389.95	38.08	-15.92	54	39.44	25.4	4.76	31.52	214	194	A	H
	*	2440	106.19	-	-	107.02	25.83	4.82	31.48	214	194	P	H
	*	2438	98.62	-	-	99.45	25.83	4.82	31.48	214	194	A	H
		2484.82	53.5	-20.5	74	53.99	26.11	4.86	31.46	214	194	P	H
		2483.62	44.88	-9.12	54	45.37	26.11	4.86	31.46	214	194	A	H
		2389.17	42.42	-31.58	74	43.78	25.4	4.76	31.52	351	259	P	V
		2389.69	34.94	-19.06	54	36.3	25.4	4.76	31.52	351	259	A	V
	*	2440	104.32	-	-	105.15	25.83	4.82	31.48	351	259	P	V
	*	2438	97.14	-	-	97.97	25.83	4.82	31.48	351	259	A	V
		2487.94	50.08	-23.92	74	50.39	26.26	4.88	31.45	351	259	P	V
		2486.62	41.61	-12.39	54	42.1	26.11	4.86	31.46	351	259	A	V



802.11g CH 11 2462MHz	*	2460	104.37	-	-	105.03	25.97	4.84	31.47	190	195	P	H
	*	2462	97.81	-	-	98.47	25.97	4.84	31.47	190	195	A	H
		2483.56	66.14	-7.86	74	66.63	26.11	4.86	31.46	190	195	P	H
		2483.92	53.18	-0.82	54	53.67	26.11	4.86	31.46	190	195	A	H
	*	2460	103.26	-	-	103.92	25.97	4.84	31.47	300	259	P	V
	*	2460	96.14	-	-	96.8	25.97	4.84	31.47	300	259	A	V
		2484.04	64.41	-9.59	74	64.9	26.11	4.86	31.46	300	259	P	V
		2483.74	52.93	-1.07	54	53.42	26.11	4.86	31.46	300	259	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 802.11g (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	38.56	-35.44	74	60.17	30.9	6.87	59.38	150	360	P	H
		4824	37.28	-36.72	74	58.89	30.9	6.87	59.38	150	360	P	V
802.11g CH 06 2437MHz		4872	37.48	-36.52	74	58.75	31.01	6.86	59.14	150	360	P	H
		7308	42.18	-31.82	74	56.92	35.34	8.47	58.55	150	360	P	H
		4872	36.75	-37.25	74	58.02	31.01	6.86	59.14	150	360	P	V
802.11g CH 11 2462MHz		7308	40.47	-33.53	74	55.21	35.34	8.47	58.55	150	360	P	V
		4926	37.98	-36.02	74	58.92	31.12	6.84	58.9	150	360	P	H
		7386	41.33	-32.67	74	56.27	35.55	8.49	58.98	150	360	P	H
		4926	37.08	-36.92	74	58.02	31.12	6.84	58.9	150	360	P	V
		7386	41.2	-32.8	74	56.14	35.55	8.49	58.98	150	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n 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		2389.56	63.79	-10.21	74	65.15	25.4	4.76	31.52	100	292	P	H
		2389.95	52.88	-1.12	54	54.24	25.4	4.76	31.52	100	292	A	H
	*	2410	105.69	-	-	106.87	25.54	4.78	31.5	100	292	P	H
	*	2412	97.49	-	-	98.67	25.54	4.78	31.5	100	292	A	H
		2389.95	61.69	-12.31	74	63.05	25.4	4.76	31.52	261	263	P	V
		2389.69	50.41	-3.59	54	51.77	25.4	4.76	31.52	261	263	A	V
	*	2410	101.27	-	-	102.45	25.54	4.78	31.5	261	263	P	V
	*	2412	94.19	-	-	95.37	25.54	4.78	31.5	261	263	A	V
802.11n HT20 CH 06 2437MHz		2389.95	48.51	-25.49	74	49.87	25.4	4.76	31.52	146	297	P	H
		2389.95	41.3	-12.7	54	42.66	25.4	4.76	31.52	146	297	A	H
	*	2440	104.44	-	-	105.27	25.83	4.82	31.48	146	297	P	H
	*	2436	97.56	-	-	98.56	25.69	4.8	31.49	146	297	A	H
		2485.42	54.78	-19.22	74	55.27	26.11	4.86	31.46	146	297	P	H
		2484.22	45.26	-8.74	54	45.75	26.11	4.86	31.46	146	297	A	H
		2380.85	46.98	-27.02	74	48.41	25.35	4.75	31.53	249	263	P	V
		2389.69	39.6	-14.4	54	40.96	25.4	4.76	31.52	249	263	A	V
	*	2438	101.18	-	-	102.01	25.83	4.82	31.48	249	263	P	V
	*	2440	94.35	-	-	95.18	25.83	4.82	31.48	249	263	A	V
		2485.72	51.18	-22.82	74	51.67	26.11	4.86	31.46	249	263	P	V
	2486.02	42.77	-11.23	54	43.26	26.11	4.86	31.46	249	263	A	V	



<b>802.11n</b> <b>HT20</b> <b>CH 11</b> <b>2462MHz</b>	*	2456	104.47	-	-	105.13	25.97	4.84	31.47	163	296	P	H
	*	2460	96.93	-	-	97.59	25.97	4.84	31.47	163	296	A	H
		2483.68	63.95	-10.05	74	64.44	26.11	4.86	31.46	163	296	P	H
		2483.8	53.57	-0.43	54	54.06	26.11	4.86	31.46	163	296	A	H
	*	2462	99.37	-	-	100.03	25.97	4.84	31.47	240	263	P	V
	*	2460	92.6	-	-	93.26	25.97	4.84	31.47	240	263	A	V
		2483.62	60.5	-13.5	74	60.99	26.11	4.86	31.46	240	263	P	V
	2484.1	50.02	-3.98	54	50.51	26.11	4.86	31.46	240	263	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)**

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	37.63	-36.37	74	59.24	30.9	6.87	59.38	150	360	P	H
		4824	38.14	-35.86	74	59.75	30.9	6.87	59.38	150	360	P	V
802.11n HT20 CH 06 2437MHz		4872	37.17	-36.83	74	58.44	31.01	6.86	59.14	150	360	P	H
		7308	41.49	-32.51	74	56.23	35.34	8.47	58.55	150	360	P	H
		4872	36.84	-37.16	74	58.11	31.01	6.86	59.14	150	360	P	V
		7308	41.15	-32.85	74	55.89	35.34	8.47	58.55	150	360	P	V
802.11n HT20 CH 11 2462MHz		4926	37.81	-36.19	74	58.75	31.12	6.84	58.9	150	360	P	H
		7386	40.54	-33.46	74	55.48	35.55	8.49	58.98	150	360	P	H
		4926	37.27	-36.73	74	58.21	31.12	6.84	58.9	150	360	P	V
		7386	41.27	-32.73	74	56.21	35.55	8.49	58.98	150	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

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	25.41	-14.59	40	30.12	26.3	0.09	31.1	100	21	P	H
		151.25	22.33	-21.17	43.5	34.88	17.27	1.08	30.9	-	-	P	H
		172.59	21.96	-21.54	43.5	35.04	16.58	1.33	30.99	-	-	P	H
		357.86	27.3	-18.7	46	35.1	21.42	2.28	31.5	-	-	P	H
		746.83	30.95	-15.05	46	31.76	27.27	2.73	30.81	-	-	P	H
		900.09	30.98	-15.02	46	29.88	29.1	3.1	31.1	-	-	P	H
		40.67	33.04	-6.96	40	44.33	19.64	0.31	31.24	100	360	P	V
		92.08	21.28	-22.22	43.5	34.69	17.06	0.21	30.68	-	-	P	V
		349.13	22.55	-23.45	46	30.61	21.17	2.27	31.5	-	-	P	V
		587.75	26.28	-19.72	46	29.6	25.33	2.85	31.5	-	-	P	V
		690.57	28.29	-17.71	46	29.95	26.7	2.48	30.84	-	-	P	V
	907.85	31.68	-14.32	46	30.4	29.27	3.14	31.13	-	-	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”.

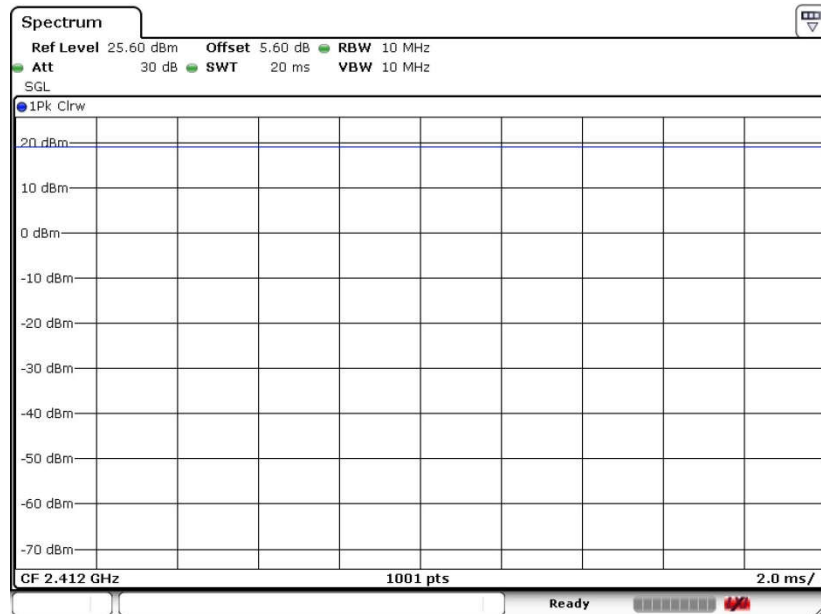


## Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11b	100	-	-	10Hz
1	802.11g	83.02	0.176	5.682	10KHz
1	802.11n HT20	82.00	0.164	6.098	10KHz

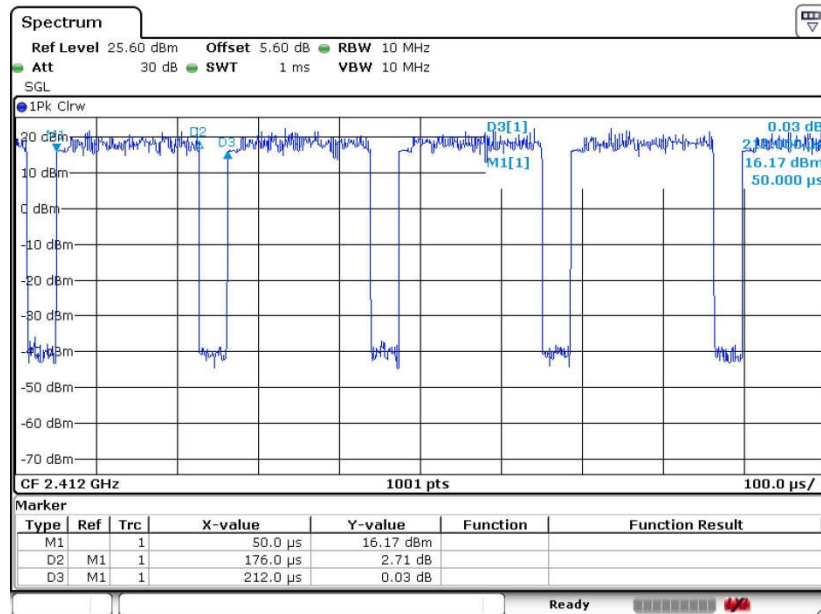


802.11b



Date: 17.FEB.2017 14:08:02

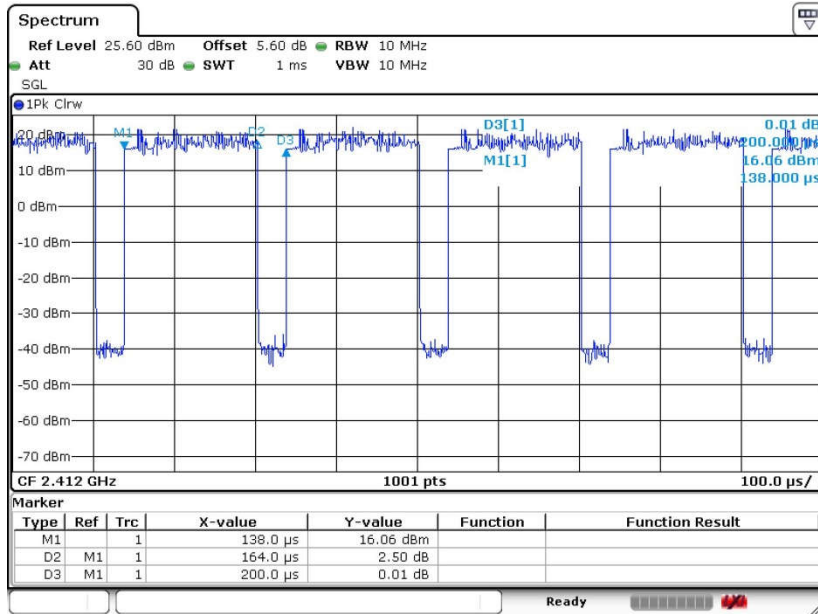
802.11g



Date: 17.FEB.2017 14:56:52



802.11n20



Date: 17.FEB.2017 14:38:46