

FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : 10718, 10719
FCC ID : IHDT56WF1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jan. 05, 2017 and testing was completed on Jan. 20, 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



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR710501C	Rev. 01	Initial issue of report	Feb. 24, 2017



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 7.99 dB at 2483.560 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.87 dB at 0.370 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	10718, 10719
FCC ID	IHDT56WF1
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(16QAM uplink is not supported)/DC-HSDPA/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/ Bluetooth v3.0 + EDR/ Bluetooth v4.0 LE/v4.1 LE/v4.2 LE
IMEI Code	Conducted: Sample1:355627080010474/355627080010482 Radiation: Sample1:355627080010839/355627080010847 Conduction: Sample 1: 355627080008791/355627080008809 Sample 2: 355628060004008
HW Version	98736_1_12
SW Version	alps-mp-n0.mp1-V1.0.2_wt6737m.35.n_P16
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(model name 10718) is dual SIM slot, sample 2(model name 10719) is single SIM slot. According to the difference, only sample 1 need to perform full test.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	802.11b : 19.04 dBm (0.0802 W) 802.11g : 23.10 dBm (0.2042 W) 802.11n HT20 : 22.63 dBm (0.1832 W)
Antenna Type / Gain	IFA Antenna with gain -2.00 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Specification of Accessory

Specification of Accessory				
AC Adapter	Brand Name	Motorola(Acbel)	Model Name	C-P56
	Power Rating	I/P: 100-240 Vac, 130mA, O/P: 5 Vdc, 1000mA		
Battery	Brand Name	Motorola (SCUD)	Model Name	HC40
	Power Rating	3.8Vdc, 2245/ 2350mAh (Min/Typ)	Type	Li-ion
Earphone	Brand Name	Motorola(NEW LEADER)	Model Name	NLD-EM127T-97SF
	Signal Line Type	1.200 meter, non-shielded cable, without ferrite core		
USB Cable	Brand Name	Motorola(STARW)	Model Name	XJ-007075
	Signal Line Type	1.016 meter, shielded cable, without ferrite core		

1.6 Modification of EUT

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

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No.		FCC Registration No.
	TH01-KS	03CH02-KS	418269

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	1F & 2F,Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	Sporton Site No.		
	CO01-SZ		

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 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	18.82	18.79	18.47	18.52
CH 06	2437 MHz	19.04	18.84	18.72	18.76
CH 11	2462 MHz	18.84	18.66	18.75	18.78

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	23.09	22.93	23.03	23.05	22.75	22.89	22.98	22.97
CH 06	2437 MHz	23.10	22.93	22.29	22.47	22.57	22.49	22.69	22.95
CH 11	2462 MHz	22.88	22.62	22.82	22.79	22.42	22.40	22.59	22.78

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	22.58	22.35	22.41	22.52	22.38	22.55	22.46	22.56
CH 06	2437 MHz	22.59	22.34	22.41	22.51	22.15	22.09	21.86	22.32
CH 11	2462 MHz	22.63	22.04	21.94	22.17	21.88	22.60	22.58	22.59

2.3 Test Mode

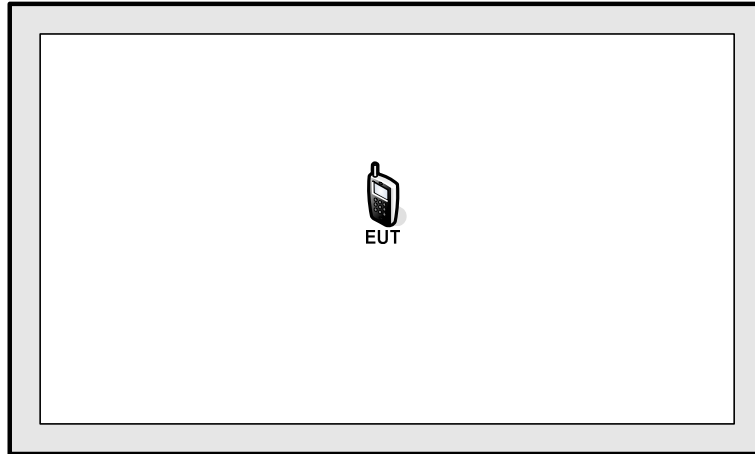
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

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

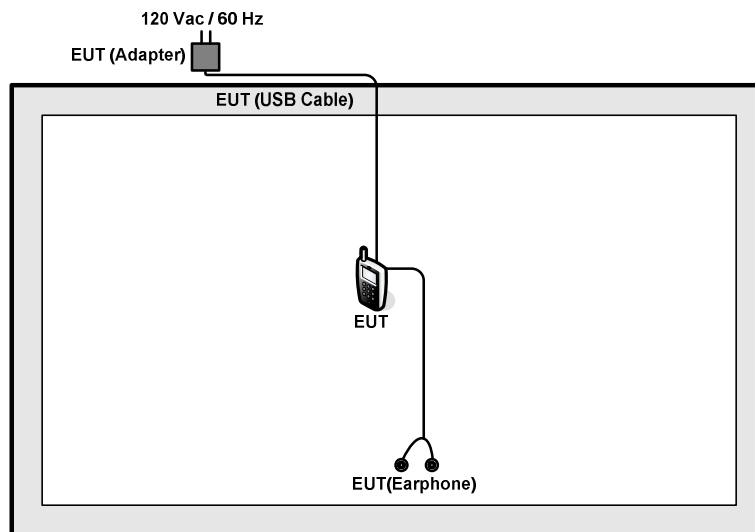
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + SIM 1 for Sample 1
	Mode 2 : GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) for Sample 2
Remark: The worst case of conducted emission is mode 1; only the test data of it was reported.	

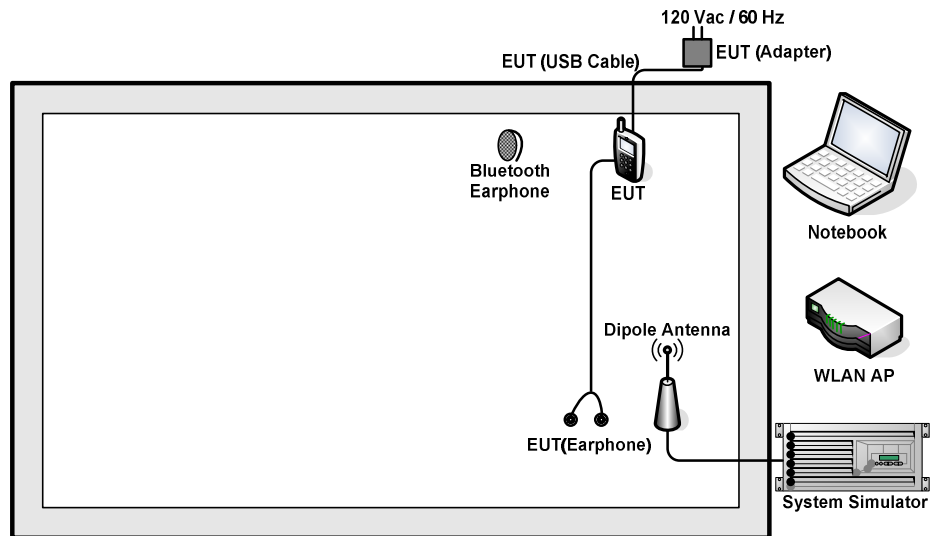
2.4 Connection Diagram of Test System

<WLAN Tx 802.11g/n HT20 Mode>



< WLAN Tx 802.11b 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	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
3.	NOTE BOOK	Lenovo	E540	FCC DoC	N/A	Shielded cable DC O/P 1.8 m Unshielded AC I/P cable1.2 m
4.	SD Card	SanDisk	4G class 4	FCC DoC	N/A	N/A
5.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	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 WLAN link 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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.4 dB.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 5.4 \text{ (dB)}\end{aligned}$$

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.

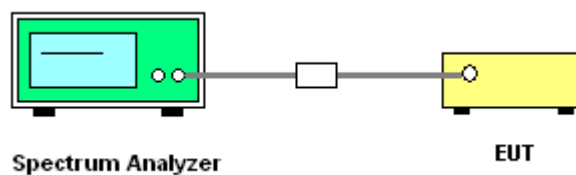
3.1.2 Measuring Instruments

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.

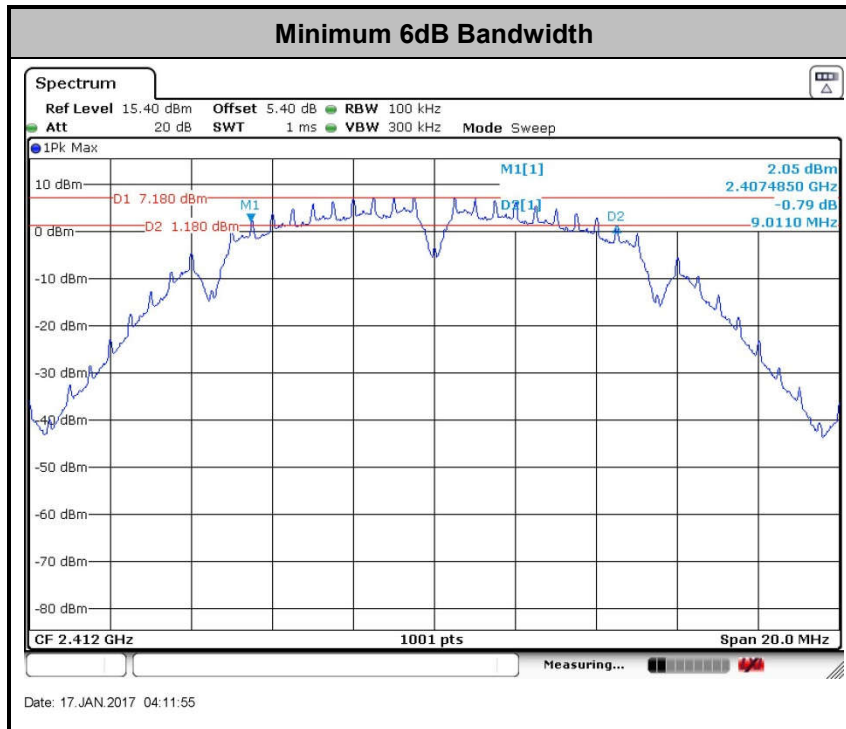
3.1.4 Test Setup





3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



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.

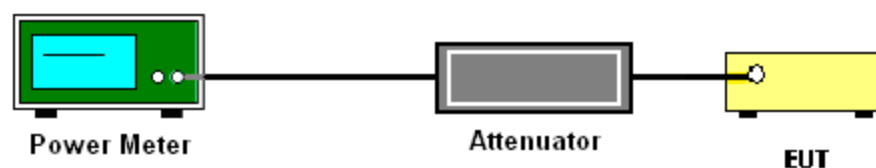
3.2.2 Measuring Instruments

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.

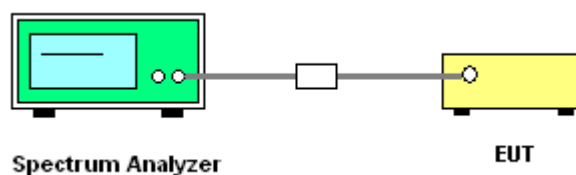
3.3.2 Measuring Instruments

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.

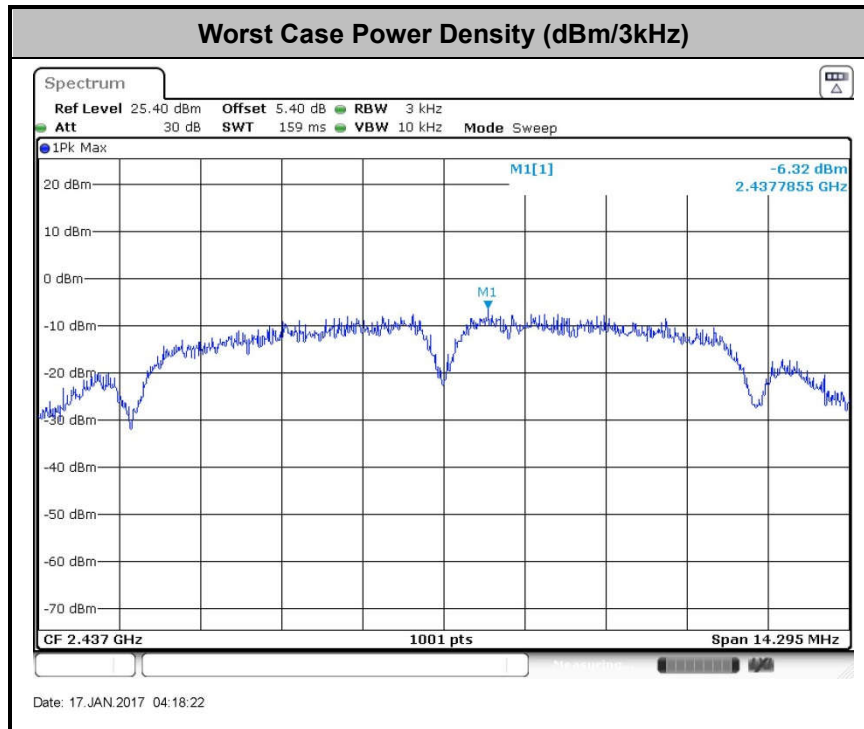
3.3.4 Test Setup





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).

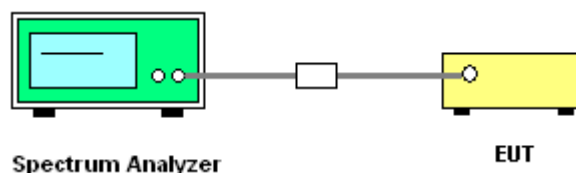
3.4.2 Measuring Instruments

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.

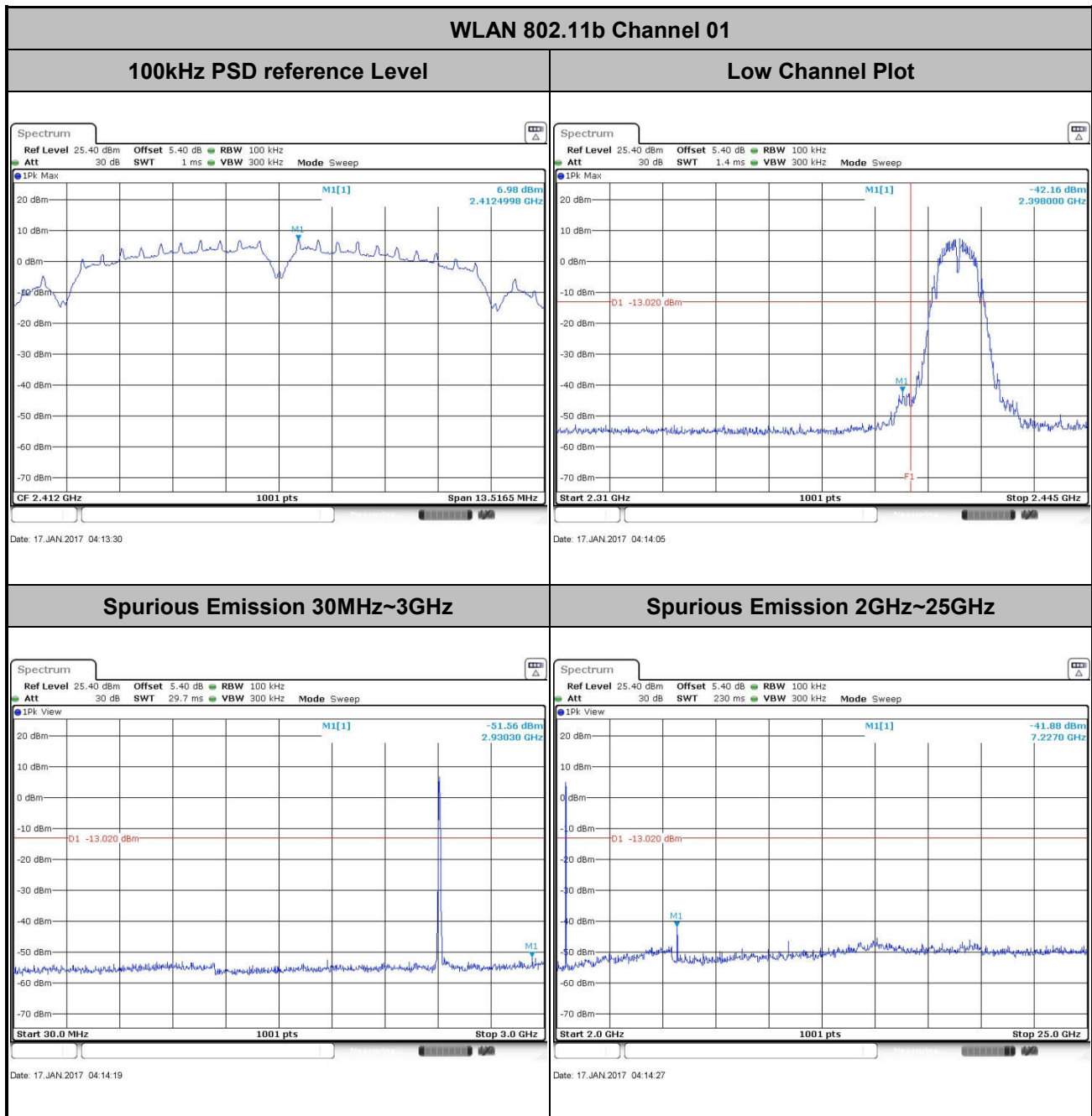
3.4.4 Test Setup





3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	Temperature :	21~25℃
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

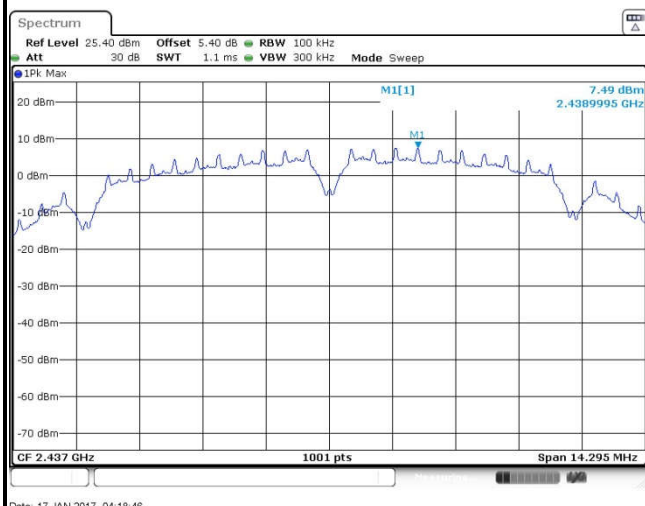




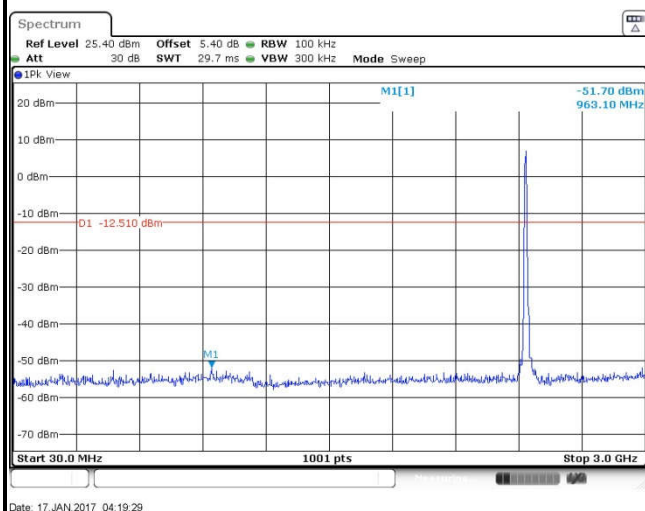
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11b Channel 06

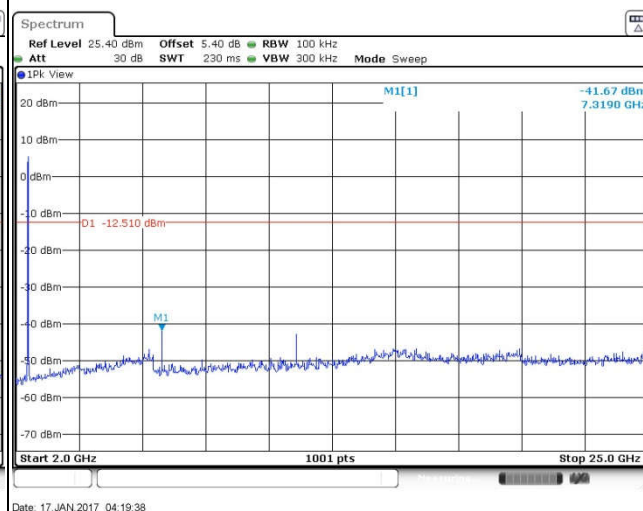
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

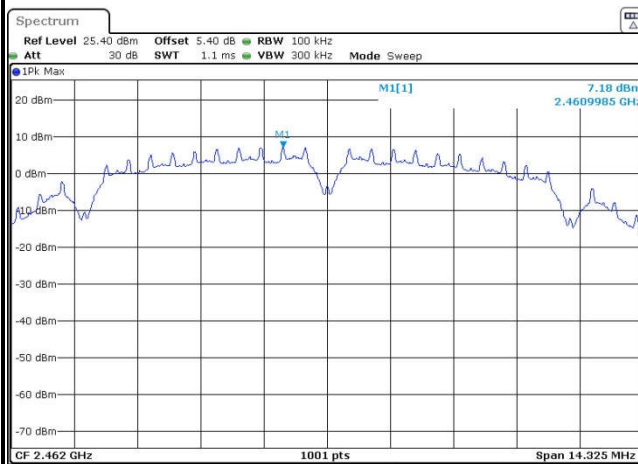


Spurious Emission 2GHz~25GHz

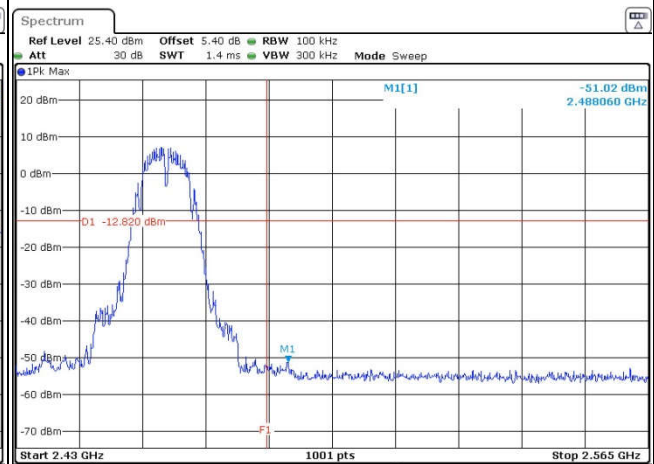




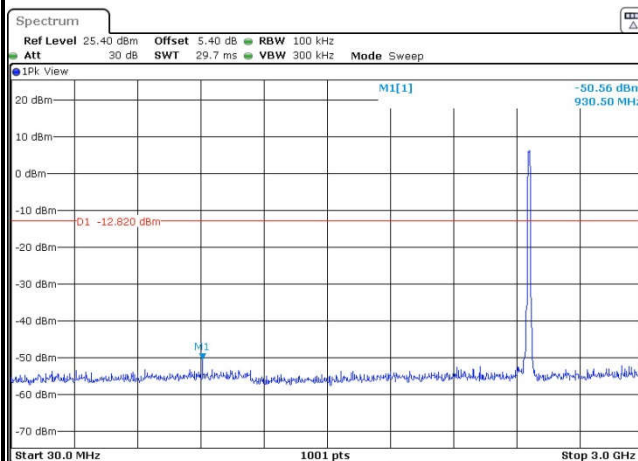
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

WLAN 802.11b Channel 11**100kHz PSD reference Level**

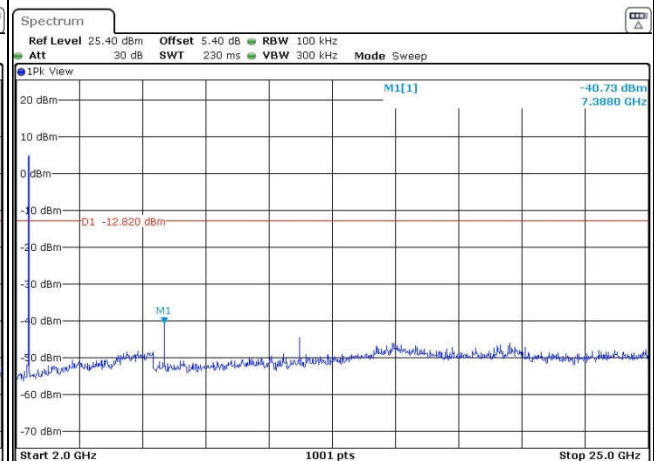
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High Channel Plot

Date: 17.JAN.2017 04:33:06

Spurious Emission 30MHz~3GHz

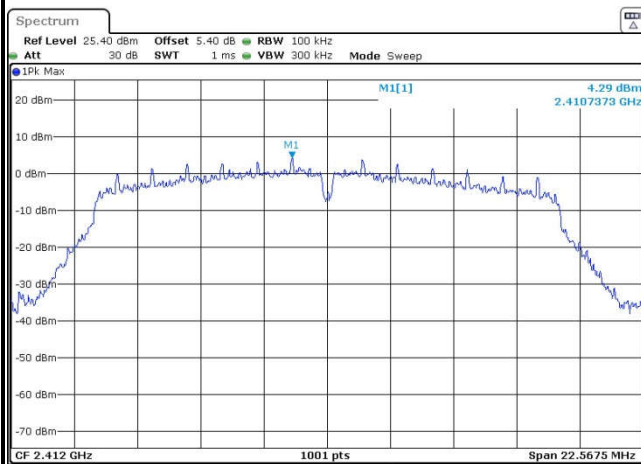
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Spurious Emission 2GHz~25GHz

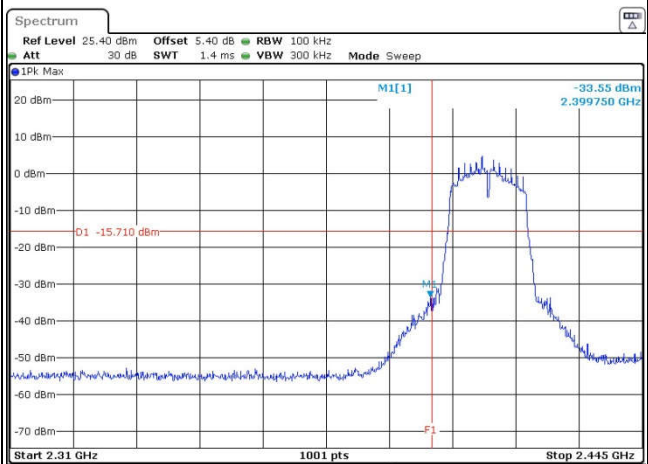
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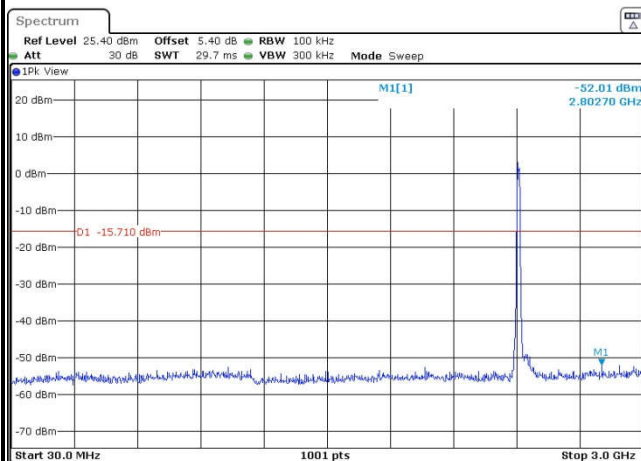
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

WLAN 802.11g Channel 01**100kHz PSD reference Level**

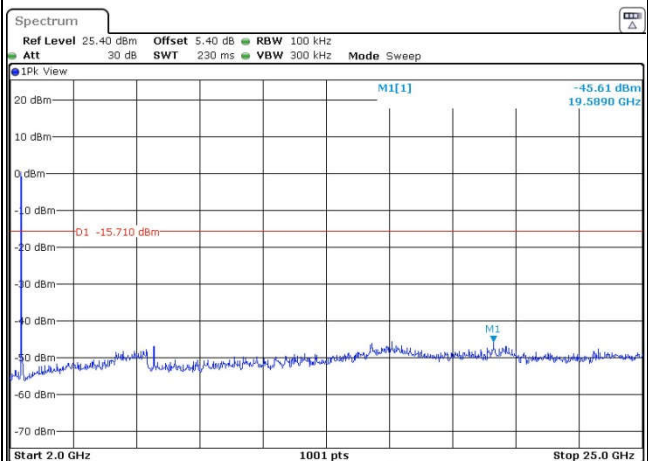
Date: 17.JAN.2017 04:40:04

Low Channel Plot

Date: 17.JAN.2017 04:40:29

Spurious Emission 30MHz~3GHz

Date: 17.JAN.2017 04:41:24

Spurious Emission 2GHz~25GHz

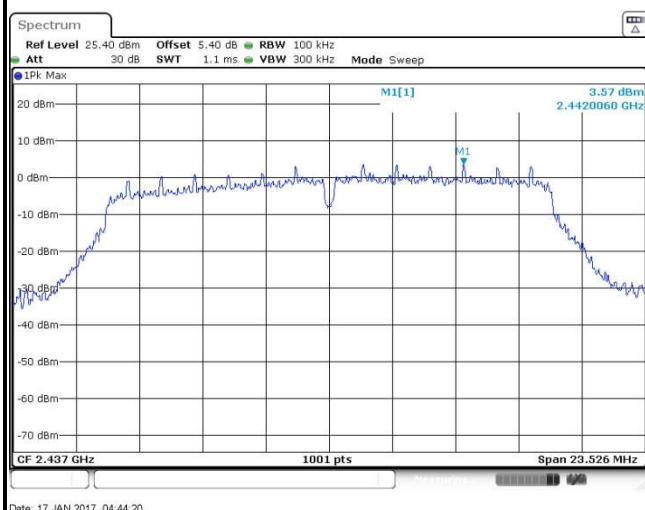
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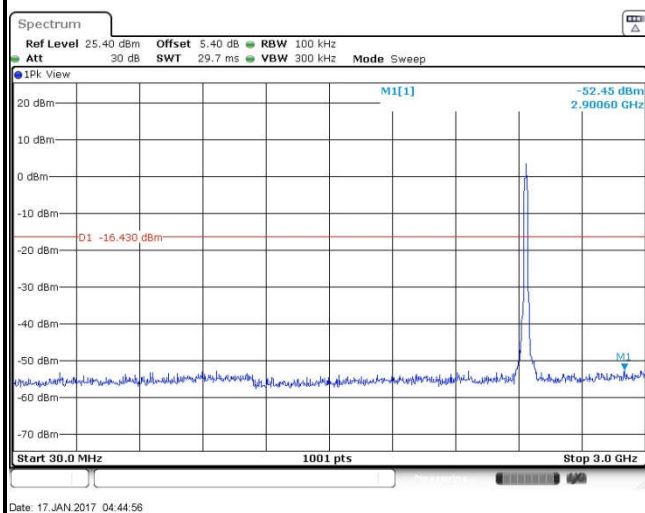
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11g Channel 06

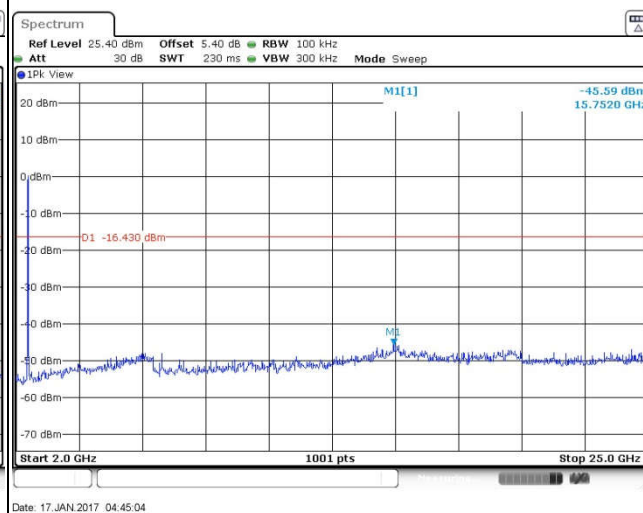
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

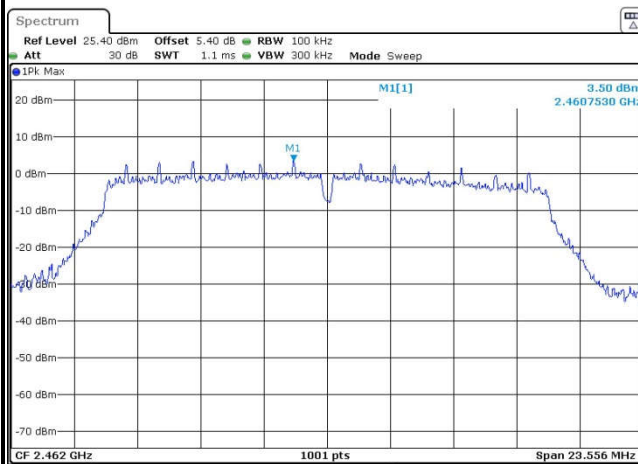
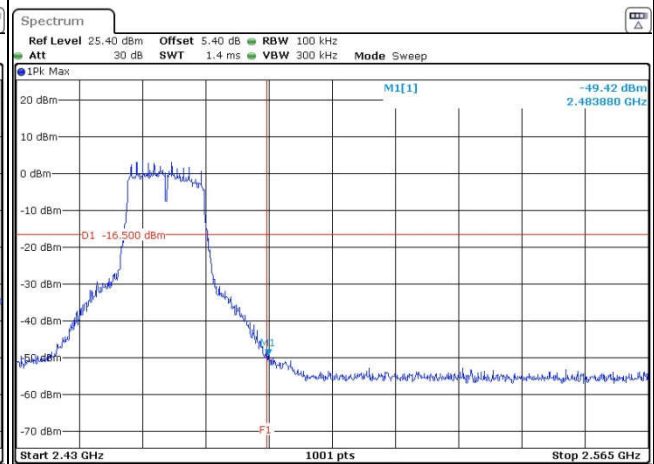
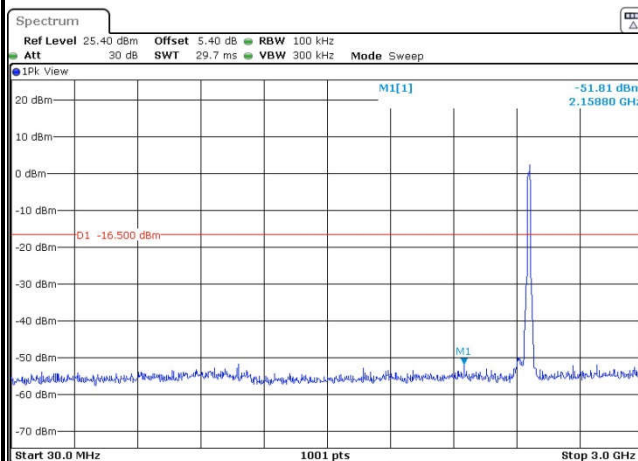
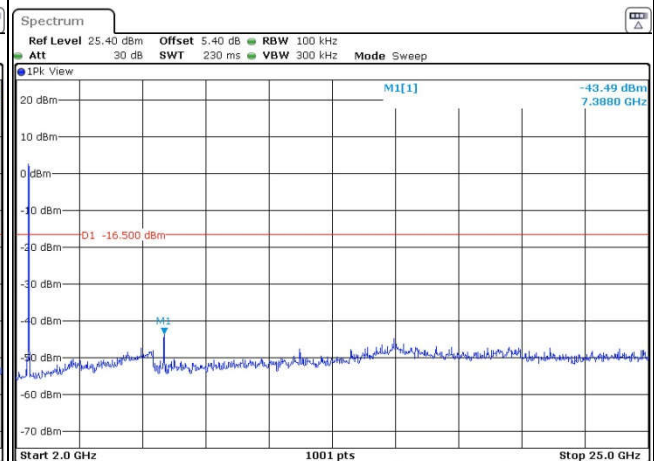


Spurious Emission 2GHz~25GHz



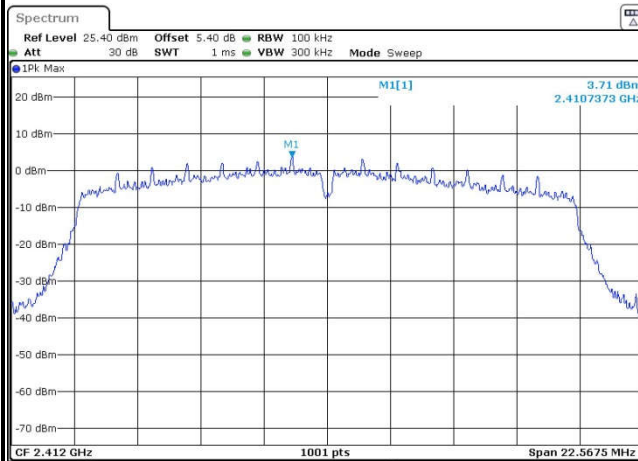
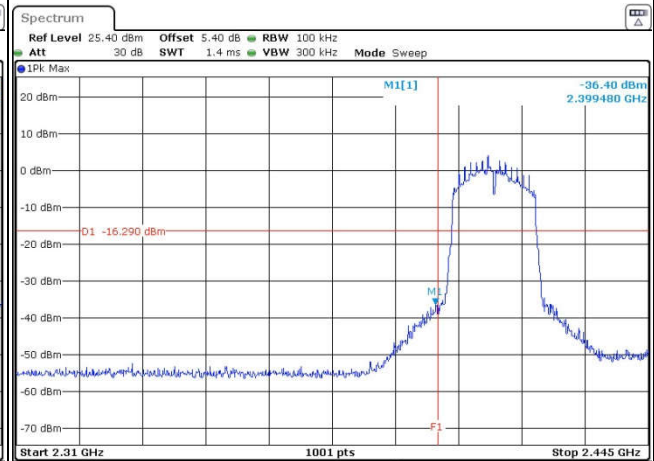
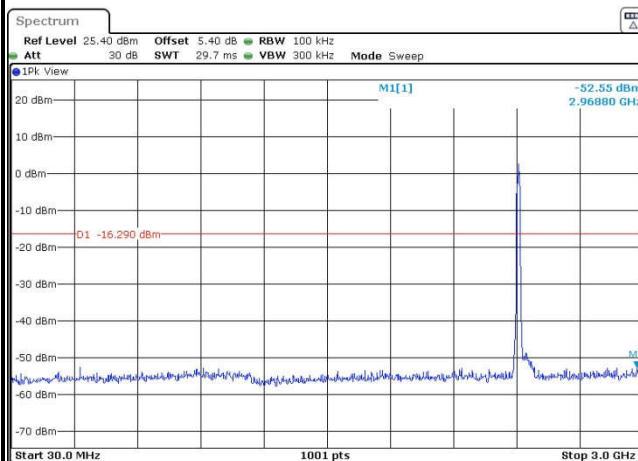
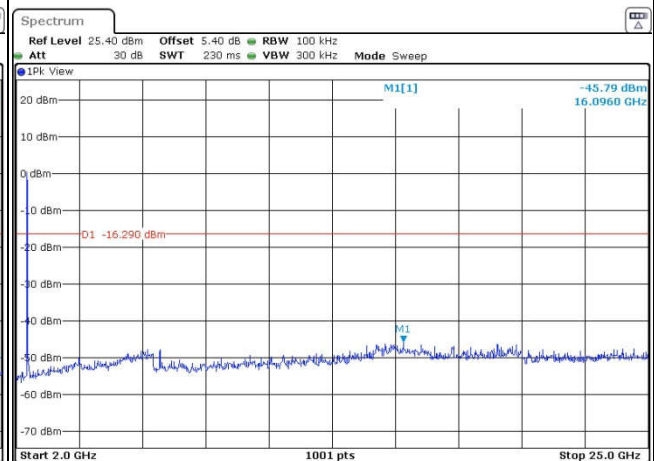


Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

WLAN 802.11g Channel 11**100kHz PSD reference Level****High Channel Plot****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

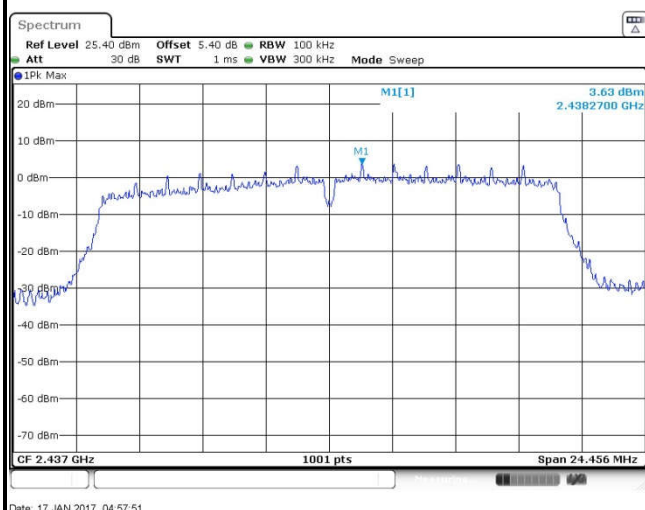
WLAN 802.11n HT20 Channel 01**100kHz PSD reference Level****Low Channel Plot****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



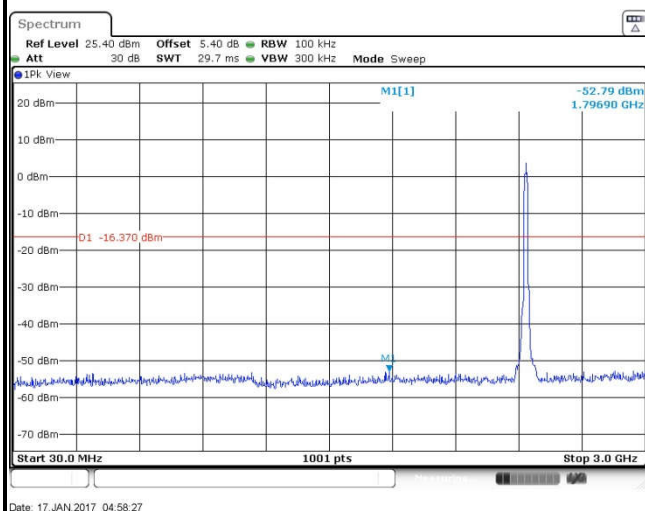
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 06

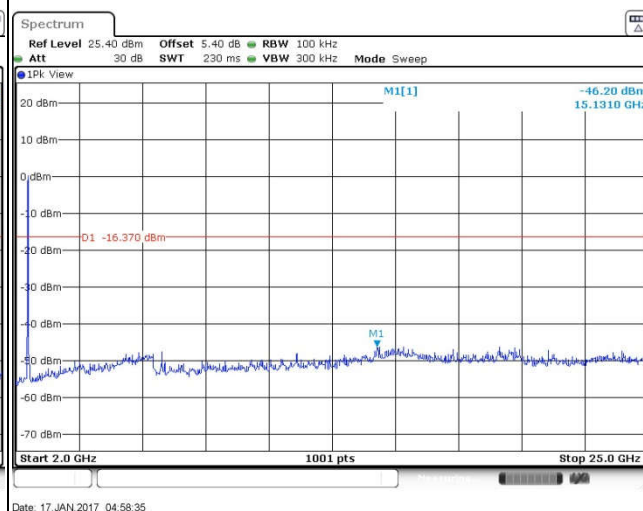
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

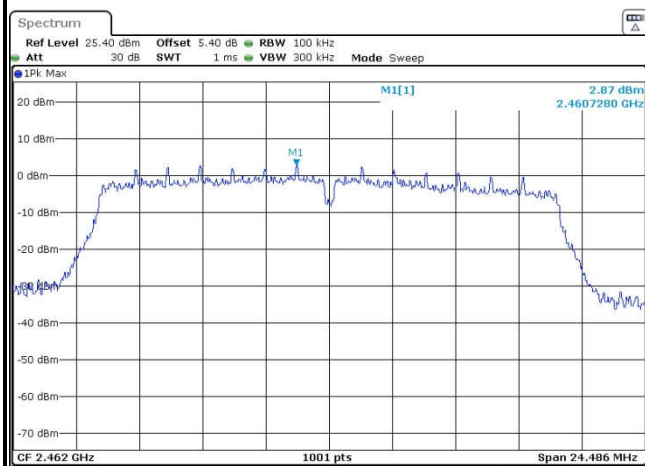




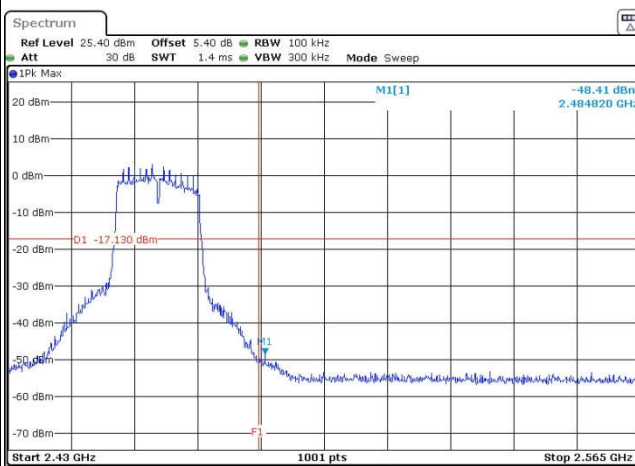
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 11

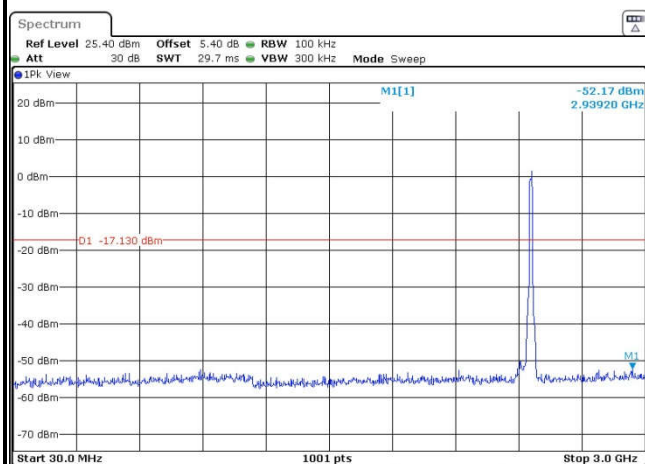
100kHz PSD reference Level



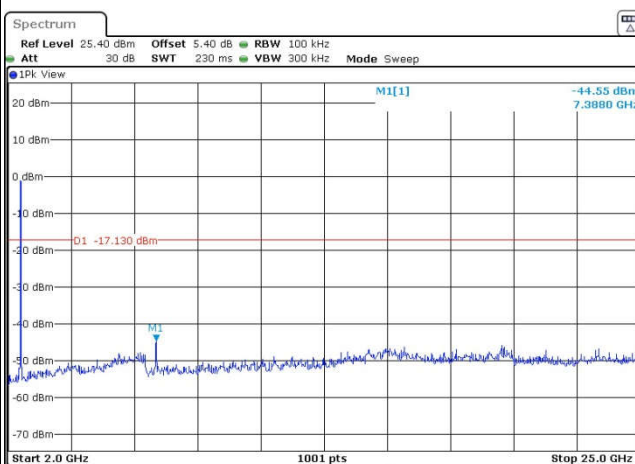
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz



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

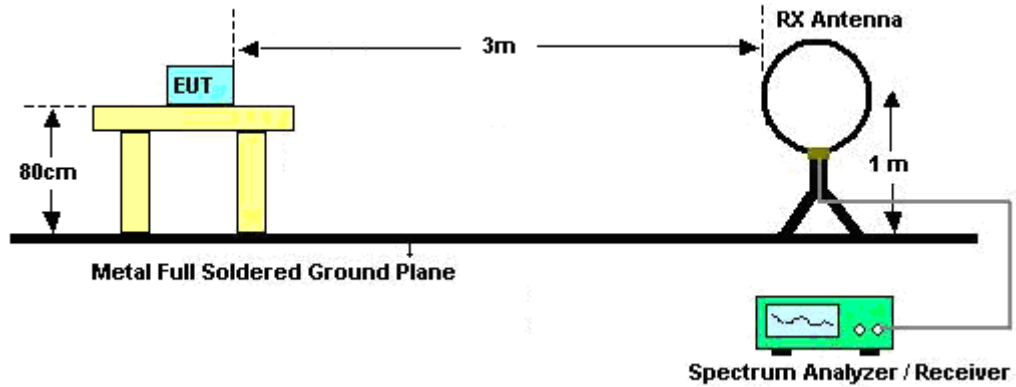
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the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

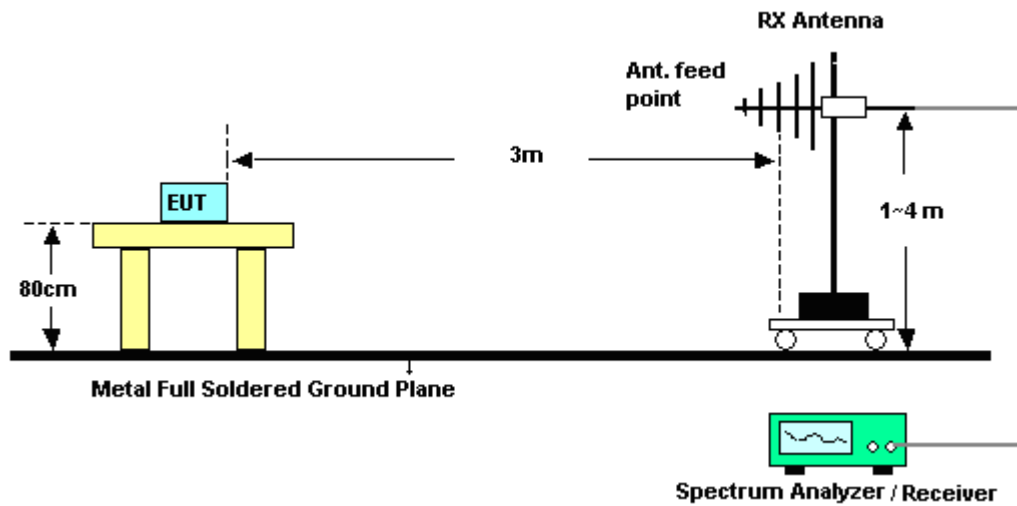
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

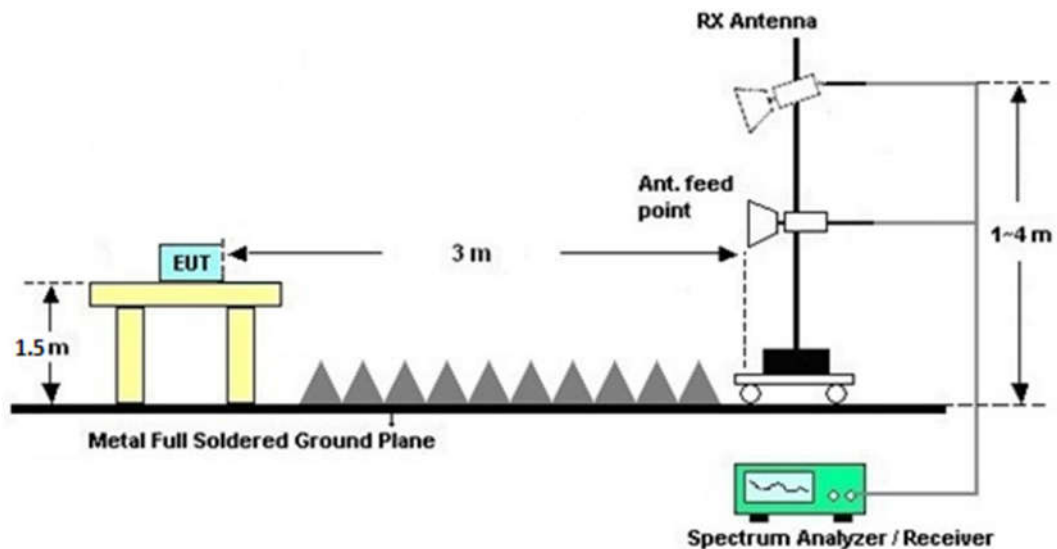
For radiated emissions below 30MHz



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 ~ 10th 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 μ 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.

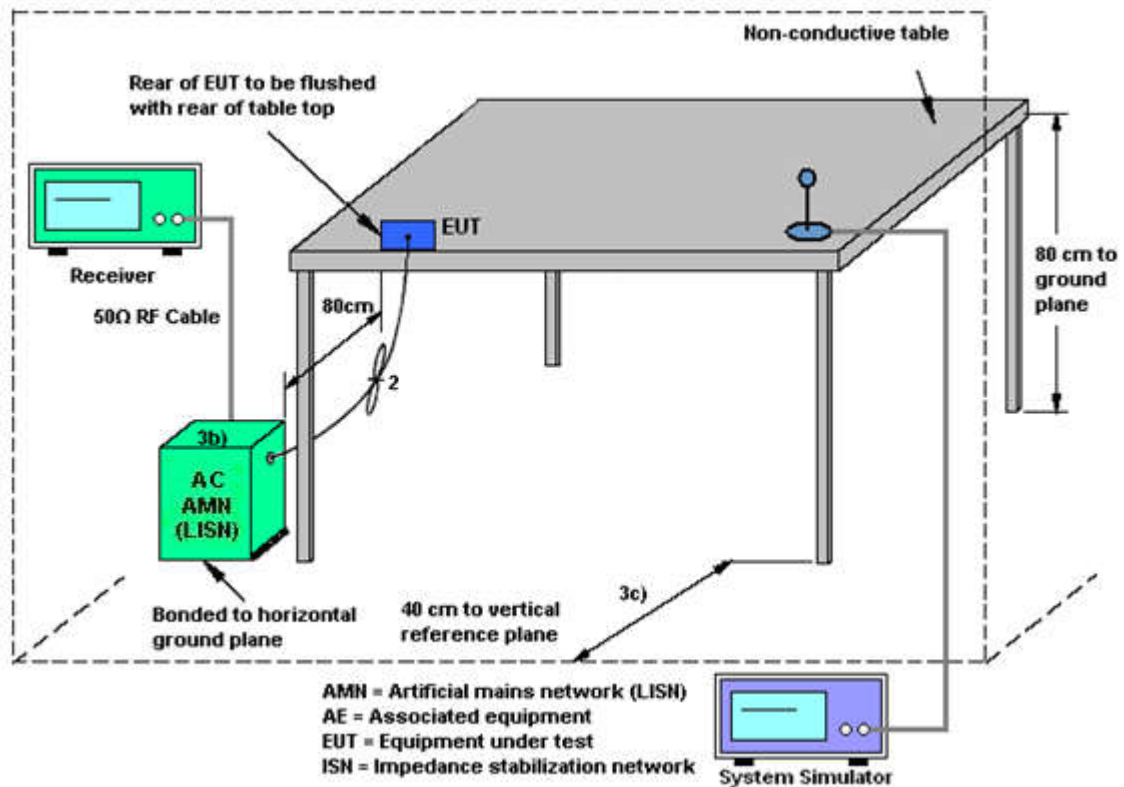
3.6.2 Measuring Instruments

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.

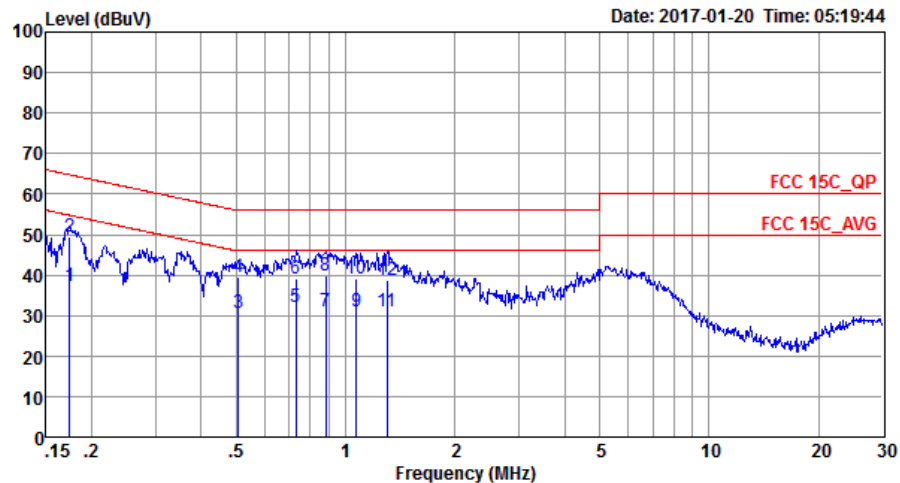
3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Tao Cheng	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + SIM 1 for Sample 1		



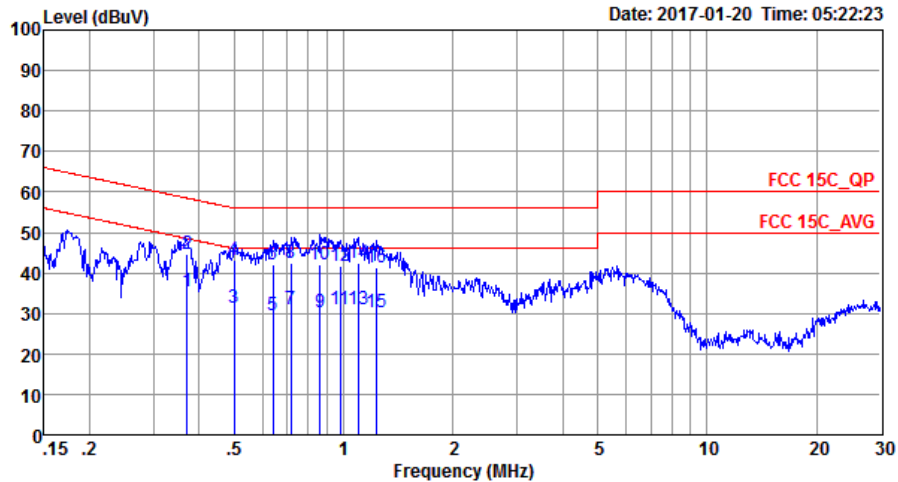
Site : CO01-SZ
Condition: FCC 15C QP LISN 20160509 LINE

Mode : Mode 1
IMEI : 355627080008791/355627080008809

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	37.17	-17.60	54.77	26.50	0.12	10.55	Average
2	0.17	49.47	-15.30	64.77	38.80	0.12	10.55	QP
3	0.51	30.73	-15.27	46.00	20.40	0.11	10.22	Average
4	0.51	39.63	-16.37	56.00	29.30	0.11	10.22	QP
5 *	0.73	32.27	-13.73	46.00	22.00	0.11	10.16	Average
6	0.73	39.27	-16.73	56.00	29.00	0.11	10.16	QP
7	0.88	30.87	-15.13	46.00	20.60	0.11	10.16	Average
8	0.88	39.87	-16.13	56.00	29.60	0.11	10.16	QP
9	1.07	31.17	-14.83	46.00	20.90	0.11	10.16	Average
10	1.07	39.27	-16.73	56.00	29.00	0.11	10.16	QP
11	1.30	31.07	-14.93	46.00	20.80	0.11	10.16	Average
12	1.30	38.57	-17.43	56.00	28.30	0.11	10.16	QP



Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Tao Cheng	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + SIM 1 for Sample 1		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20160509 NEUTRAL

Mode : Mode 1
IMEI : 355627080008791/355627080008809

	Freq	Level	Over Limit	Limit	Read	LISN	Cable	
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	Remark
1 *	0.37	35.60	-12.87	48.47	25.20	0.11	10.29	Average
2	0.37	44.60	-13.87	58.47	34.20	0.11	10.29	QP
3	0.50	31.43	-14.58	46.01	21.10	0.11	10.22	Average
4	0.50	43.13	-12.88	56.01	32.80	0.11	10.22	QP
5	0.64	29.69	-16.31	46.00	19.40	0.11	10.18	Average
6	0.64	42.19	-13.81	56.00	31.90	0.11	10.18	QP
7	0.72	31.07	-14.93	46.00	20.80	0.11	10.16	Average
8	0.72	42.47	-13.53	56.00	32.20	0.11	10.16	QP
9	0.86	30.37	-15.63	46.00	20.10	0.11	10.16	Average
10	0.86	42.07	-13.93	56.00	31.80	0.11	10.16	QP
11	0.98	31.17	-14.83	46.00	20.90	0.11	10.16	Average
12	0.98	41.67	-14.33	56.00	31.40	0.11	10.16	QP
13	1.09	31.17	-14.83	46.00	20.90	0.11	10.16	Average
14	1.09	42.37	-13.63	56.00	32.10	0.11	10.16	QP
15	1.24	30.37	-15.63	46.00	20.10	0.11	10.16	Average
16	1.24	41.17	-14.83	56.00	30.90	0.11	10.16	QP



3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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. 17, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Jan. 17, 2017	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Jan. 17, 2017	Jan. 19, 2017	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Jan. 19, 2017	Aug. 08, 2017	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, MAX 30dB	Apr. 22, 2016	Jan. 19, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Jan. 19, 2017	Nov. 22, 2017	Radiation (03CH01-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz-2GHz	Aug. 20, 2016	Jan. 19, 2017	Aug. 19, 2017	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 22, 2016	Jan. 19, 2017	Oct. 21, 2017	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Jan. 19, 2017	Mar. 02, 2017	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Jan. 19, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz	Oct. 13, 2016	Jan. 19, 2017	Oct. 12, 2017	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	1943529	1Ghz-18Ghz	Jan. 19, 2017	Jan. 19, 2017	Jan. 18, 2018	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jan. 19, 2017	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jan. 19, 2017	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jan. 19, 2017	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jan. 06, 2017	Jan. 20, 2017	Jan. 05, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Jan. 05, 2017	Jan. 20, 2017	Jan. 04, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103912	9kHz~30MHz	Jan. 05, 2017	Jan. 20, 2017	Jan. 04, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 16, 2016	Jan. 20, 2017	Jul. 15, 2017	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5dB
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Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

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



Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2017/1/17	Relative Humidity:	51~55	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band								
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	12.04	9.01	0.50	Pass
11b	1Mbps	1	6	2437	12.64	9.53	0.50	Pass
11b	1Mbps	1	11	2462	12.64	9.55	0.50	Pass
11g	6Mbps	1	1	2412	17.13	15.05	0.50	Pass
11g	6Mbps	1	6	2437	17.68	15.68	0.50	Pass
11g	6Mbps	1	11	2462	17.83	15.70	0.50	Pass
HT20	MCS0	1	1	2412	17.78	15.05	0.50	Pass
HT20	MCS0	1	6	2437	18.23	16.30	0.50	Pass
HT20	MCS0	1	11	2462	18.43	16.32	0.50	Pass

TEST RESULTS DATA
Peak Power Table

2.4GHz Band										
Mod.	Data Rate	N _{TX}	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	18.82	30.00	-2.00	16.82	36.00	Pass
11b	1Mbps	1	6	2437	19.04	30.00	-2.00	17.04	36.00	Pass
11b	1Mbps	1	11	2462	18.84	30.00	-2.00	16.84	36.00	Pass
11g	6Mbps	1	1	2412	23.09	30.00	-2.00	21.09	36.00	Pass
11g	6Mbps	1	6	2437	23.10	30.00	-2.00	21.10	36.00	Pass
11g	6Mbps	1	11	2462	22.88	30.00	-2.00	20.88	36.00	Pass
HT20	MCS0	1	1	2412	22.58	30.00	-2.00	20.58	36.00	Pass
HT20	MCS0	1	6	2437	22.59	30.00	-2.00	20.59	36.00	Pass
HT20	MCS0	1	11	2462	22.63	30.00	-2.00	20.63	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

2.4GHz Band						
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	15.73
11b	1Mbps	1	6	2437	0.00	16.05
11b	1Mbps	1	11	2462	0.00	15.86
11g	6Mbps	1	1	2412	0.11	13.92
11g	6Mbps	1	6	2437	0.11	14.08
11g	6Mbps	1	11	2462	0.11	13.96
HT20	MCS0	1	1	2412	0.12	13.35
HT20	MCS0	1	6	2437	0.12	13.50
HT20	MCS0	1	11	2462	0.12	13.37

TEST RESULTS DATA
Peak Power Density

2.4GHz Band								
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-7.06	-2.00	8.00	Pass
11b	1Mbps	1	6	2437	-6.32	-2.00	8.00	Pass
11b	1Mbps	1	11	2462	-7.12	-2.00	8.00	Pass
11g	6Mbps	1	1	2412	-9.92	-2.00	8.00	Pass
11g	6Mbps	1	6	2437	-10.57	-2.00	8.00	Pass
11g	6Mbps	1	11	2462	-10.10	-2.00	8.00	Pass
HT20	MCS0	1	1	2412	-10.86	-2.00	8.00	Pass
HT20	MCS0	1	6	2437	-8.87	-2.00	8.00	Pass
HT20	MCS0	1	11	2462	-11.34	-2.00	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		2388.52	41.32	-32.68	74	42.68	25.4	4.76	31.52	100	242	P	H
		2389.95	31.27	-22.73	54	32.63	25.4	4.76	31.52	100	242	A	H
	*	2410	101.48	-	-	102.66	25.54	4.78	31.5	100	242	P	H
	*	2410	98.1	-	-	99.28	25.54	4.78	31.5	100	242	A	H
		2370.84	40.35	-33.65	74	41.78	25.35	4.75	31.53	352	170	P	V
		2389.95	30.26	-23.74	54	31.62	25.4	4.76	31.52	352	170	A	V
	*	2410	98.74	-	-	99.92	25.54	4.78	31.5	352	170	P	V
	*	2410	95.42	-	-	96.6	25.54	4.78	31.5	352	170	A	V
802.11b CH 06 2437MHz		2388.91	42.85	-31.15	74	44.21	25.4	4.76	31.52	189	239	P	H
		2388.91	32.5	-21.5	54	33.86	25.4	4.76	31.52	189	239	A	H
	*	2438	101.7	-	-	102.53	25.83	4.82	31.48	189	239	P	H
	*	2438	97.13	-	-	97.96	25.83	4.82	31.48	189	239	A	H
		2483.74	45.75	-28.25	74	46.24	26.11	4.86	31.46	189	239	P	H
		2483.5	35.48	-18.52	54	35.97	26.11	4.86	31.46	189	239	A	H
		2389.04	41.32	-32.68	74	42.68	25.4	4.76	31.52	240	169	P	V
		2389.04	31.18	-22.82	54	32.54	25.4	4.76	31.52	240	169	A	V
	*	2438	97.52	-	-	98.35	25.83	4.82	31.48	240	169	P	V
	*	2438	94.32	-	-	95.15	25.83	4.82	31.48	240	169	A	V
		2484.88	43.56	-30.44	74	44.05	26.11	4.86	31.46	240	169	P	V
		2483.51	33.63	-20.37	54	34.12	26.11	4.86	31.46	240	169	A	V



802.11b CH 11 2462MHz		2483.74	47.88	-26.12	74	48.37	26.11	4.86	31.46	243	268	P	H
		2483.51	38.31	-15.69	54	38.8	26.11	4.86	31.46	243	268	A	H
	*	2460	101.28	-	-	101.94	25.97	4.84	31.47	243	268	P	H
	*	2460	97.8	-	-	98.46	25.97	4.84	31.47	243	268	A	H
		2483.68	44.26	-29.74	74	44.75	26.11	4.86	31.46	298	170	P	V
		2483.62	34.59	-19.41	54	35.08	26.11	4.86	31.46	298	170	A	V
	*	2460	98.23	-	-	98.89	25.97	4.84	31.47	298	170	P	V
	*	2460	94.65	-	-	95.31	25.97	4.84	31.47	298	170	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 802.11b (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	37.99	-36.01	74	59.6	30.9	6.87	59.38	150	360	P	H
		4824	38.5	-35.5	74	60.11	30.9	6.87	59.38	150	360	P	V
802.11b CH 06 2437MHz		4872	37.13	-36.87	74	58.4	31.01	6.86	59.14	150	360	P	H
		7311	41.96	-32.04	74	56.7	35.34	8.47	58.55	150	360	P	H
		4872	38.07	-35.93	74	59.34	31.01	6.86	59.14	150	360	P	V
		7311	41.41	-32.59	74	56.15	35.34	8.47	58.55	150	360	P	V
802.11b CH 11 2462MHz		4926	38.38	-35.62	74	59.32	31.12	6.84	58.9	150	360	P	H
		7386	41.82	-32.18	74	56.76	35.55	8.49	58.98	150	360	P	H
		4926	36.89	-37.11	74	57.83	31.12	6.84	58.9	150	360	P	V
		7386	42	-32	74	56.94	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 802.11g (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		2389.82	42.06	-31.94	74	43.42	25.4	4.76	31.52	243	53	P	H
		2389.95	32.59	-21.41	54	33.95	25.4	4.76	31.52	243	53	A	H
	*	2410	99.53	-	-	100.71	25.54	4.78	31.5	243	53	P	H
	*	2410	91.73	-	-	92.91	25.54	4.78	31.5	243	53	A	H
		2389.56	42.8	-31.2	74	44.16	25.4	4.76	31.52	176	114	P	V
		2389.95	34.14	-19.86	54	35.5	25.4	4.76	31.52	176	114	A	V
	*	2410	103.01	-	-	104.19	25.54	4.78	31.5	176	114	P	V
	*	2410	95.3	-	-	96.48	25.54	4.78	31.5	176	114	A	V
802.11g CH 06 2437MHz		2389.82	42.87	-31.13	74	44.23	25.4	4.76	31.52	286	142	P	H
		2389.95	33.95	-20.05	54	35.31	25.4	4.76	31.52	286	142	A	H
	*	2444	100.89	-	-	101.72	25.83	4.82	31.48	286	142	P	H
	*	2442	93.17	-	-	94	25.83	4.82	31.48	286	142	A	H
		2484.64	51.89	-22.11	74	52.38	26.11	4.86	31.46	286	142	P	H
		2484.58	41.43	-12.57	54	41.92	26.11	4.86	31.46	286	142	A	H
		2389.3	44.38	-29.62	74	45.74	25.4	4.76	31.52	121	100	P	V
		2389.95	34.79	-19.21	54	36.15	25.4	4.76	31.52	121	100	A	V
	*	2444	102.33	-	-	103.16	25.83	4.82	31.48	121	100	P	V
	*	2442	94.18	-	-	95.01	25.83	4.82	31.48	121	100	A	V
		2483.74	54.57	-19.43	74	55.06	26.11	4.86	31.46	121	100	P	V
		2484.46	44.01	-9.99	54	44.5	26.11	4.86	31.46	121	100	A	V



802.11g CH 11 2462MHz		2484.04	55.72	-18.28	74	56.21	26.11	4.86	31.46	298	45	P	H
		2483.51	39.83	-14.17	54	40.32	26.11	4.86	31.46	298	45	A	H
	*	2456	101.08	-	-	101.74	25.97	4.84	31.47	298	45	P	H
	*	2456	93.34	-	-	94	25.97	4.84	31.47	298	45	A	H
		2483.68	58.82	-15.18	74	59.31	26.11	4.86	31.46	200	126	P	V
		2483.62	42.63	-11.37	54	43.12	26.11	4.86	31.46	200	126	A	V
	*	2456	102.33	-	-	102.99	25.97	4.84	31.47	200	126	P	V
	*	2456	94.75	-	-	95.41	25.97	4.84	31.47	200	126	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)

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	37.79	-36.21	74	59.4	30.9	6.87	59.38	150	360	P	H
		4824	38.79	-35.21	74	60.4	30.9	6.87	59.38	150	360	P	V
802.11g CH 06 2437MHz		4872	37.62	-36.38	74	58.89	31.01	6.86	59.14	150	360	P	H
		7311	42.15	-31.85	74	56.89	35.34	8.47	58.55	150	360	P	H
		4872	38.43	-35.57	74	59.7	31.01	6.86	59.14	150	360	P	V
		7311	41.71	-32.29	74	56.45	35.34	8.47	58.55	150	360	P	V
802.11g CH 11 2462MHz		4926	37.03	-36.97	74	57.97	31.12	6.84	58.9	150	360	P	H
		7386	41.62	-32.38	74	56.56	35.55	8.49	58.98	150	360	P	H
		4926	36.76	-37.24	74	57.7	31.12	6.84	58.9	150	360	P	V
		7386	41.86	-32.14	74	56.8	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. 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		2389.69	44.67	-29.33	74	46.03	25.4	4.76	31.52	312	64	P	H
		2389.95	34.38	-19.62	54	35.74	25.4	4.76	31.52	312	64	A	H
	*	2410	100.7	-	-	101.88	25.54	4.78	31.5	312	64	P	H
	*	2410	92.92	-	-	94.1	25.54	4.78	31.5	312	64	A	H
		2389.95	44.88	-29.12	74	46.24	25.4	4.76	31.52	184	105	P	V
		2389.95	34.87	-19.13	54	36.23	25.4	4.76	31.52	184	105	A	V
	*	2410	102.34	-	-	103.52	25.54	4.78	31.5	184	105	P	V
	*	2410	94.85	-	-	96.03	25.54	4.78	31.5	184	105	A	V
802.11n HT20 CH 06 2437MHz		2389.95	43.02	-30.98	74	44.38	25.4	4.76	31.52	284	302	P	H
		2389.95	33.54	-20.46	54	34.9	25.4	4.76	31.52	284	302	A	H
	*	2444	102.8	-	-	103.63	25.83	4.82	31.48	284	302	P	H
	*	2442	93.55	-	-	94.38	25.83	4.82	31.48	284	302	A	H
		2484.76	50.12	-23.88	74	50.61	26.11	4.86	31.46	284	302	P	H
		2483.74	39.83	-14.17	54	40.32	26.11	4.86	31.46	284	302	A	H
		2389.69	42.11	-31.89	74	43.47	25.4	4.76	31.52	116	292	P	V
		2389.82	34.05	-19.95	54	35.41	25.4	4.76	31.52	116	292	A	V
	*	2440	99.33	-	-	100.16	25.83	4.82	31.48	116	292	P	V
	*	2438	91.56	-	-	92.39	25.83	4.82	31.48	116	292	A	V
		2483.74	50.7	-23.3	74	51.19	26.11	4.86	31.46	116	292	P	V
		2483.74	41.28	-12.72	54	41.77	26.11	4.86	31.46	116	292	A	V



802.11n HT20 CH 11 2462MHz		2483.68	64.09	-9.91	74	64.58	26.11	4.86	31.46	298	54	P	H
		2483.56	46.01	-7.99	54	46.5	26.11	4.86	31.46	298	54	A	H
	*	2456	103.47	-	-	104.13	25.97	4.84	31.47	298	54	P	H
	*	2456	95.59	-	-	96.25	25.97	4.84	31.47	298	54	A	H
		2484.28	61.85	-12.15	74	62.34	26.11	4.86	31.46	334	69	P	V
		2483.56	44.24	-9.76	54	44.73	26.11	4.86	31.46	334	69	A	V
	*	2456	102.49	-	-	103.15	25.97	4.84	31.47	334	69	P	V
	*	2456	94.77	-	-	95.43	25.97	4.84	31.47	334	69	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 802.11n 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	37.65	-36.35	74	59.26	30.9	6.87	59.38	150	360	P	H
		4824	37.41	-36.59	74	59.02	30.9	6.87	59.38	150	360	P	V
802.11n HT20 CH 06 2437MHz		4872	36.85	-37.15	74	58.12	31.01	6.86	59.14	150	360	P	H
		7311	41.94	-32.06	74	56.68	35.34	8.47	58.55	150	360	P	H
		4872	37.81	-36.19	74	59.08	31.01	6.86	59.14	150	360	P	V
		7311	41.47	-32.53	74	56.21	35.34	8.47	58.55	150	360	P	V
802.11n HT20 CH 11 2462MHz		4926	38.33	-35.67	74	59.27	31.12	6.84	58.9	150	360	P	H
		7386	42.53	-31.47	74	57.47	35.55	8.49	58.98	150	360	P	H
		4926	37.54	-36.46	74	58.48	31.12	6.84	58.9	150	360	P	V
		7386	41.79	-32.21	74	56.73	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 802.11n HT20 (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 802.11n HT20 LF		31.94	22.29	-17.71	40	29.34	23.94	0.07	31.06	-	-	P	H
		111.48	25.85	-17.65	43.5	39.2	16.85	0.55	30.75	-	-	P	H
		160.95	19.28	-24.22	43.5	31.19	17.37	1.66	30.94	-	-	P	H
		430.61	20.89	-25.11	46	28.53	21.35	2.57	31.56	-	-	P	H
		636.25	26.17	-19.83	46	28.95	25.07	3	30.85	-	-	P	H
		951.5	30.01	-15.99	46	29.05	28.92	3.35	31.31	100	214	P	H
		30	23.02	-16.98	40	28.93	25.1	0.09	31.1	100	214	P	V
		43.58	19.31	-20.69	40	31.94	18.26	0.47	31.36	-	-	P	V
		70.74	19.97	-20.03	40	37.56	13.04	0.77	31.4	-	-	P	V
		154.16	17.58	-25.92	43.5	29.45	17.77	1.28	30.92	-	-	P	V
		321	20.7	-25.3	46	30.2	19.75	2.25	31.5	-	-	P	V
		634.31	27.41	-18.59	46	30.23	25.07	2.99	30.88	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	P eak or A verage
H/V	H orizontal or V ertical



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

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. 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)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. 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)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

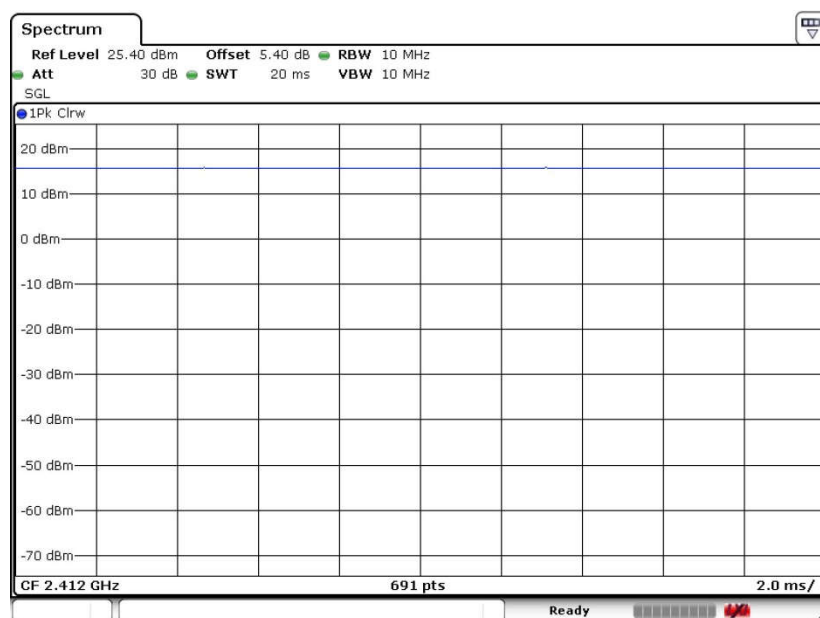
= -10.46(dB)

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

Appendix C. Duty Cycle Plots

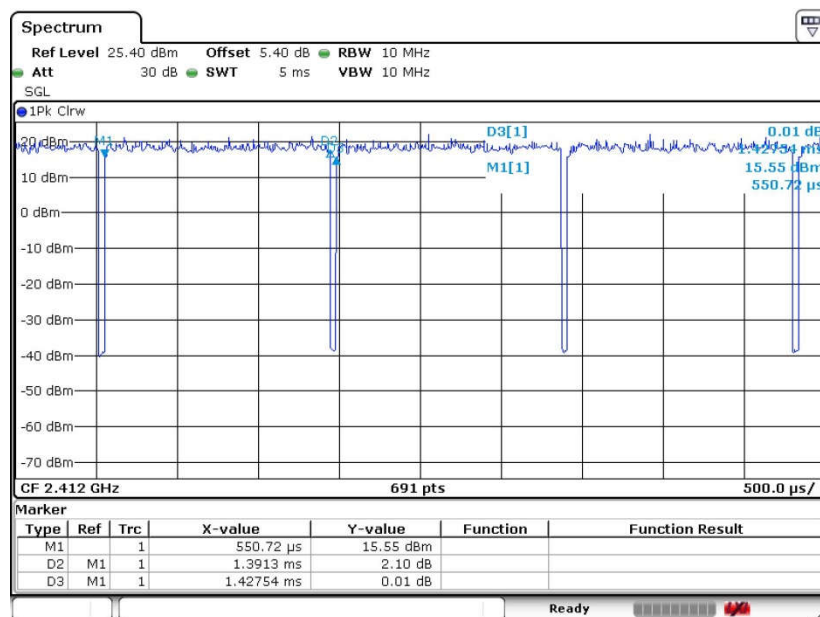
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100	-	-	10Hz
802.11g	97.46	1.39	0.72	1kHz
802.11n HT20	97.29	1.30	0.77	1kHz

802.11b





802.11g



802.11n HT20

