FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	10870, 10869
FCC ID	:	IHDT56WK4
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Jun. 17, 2017 and testing was completed on Jul. 11, 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.

James Huang

Prepared by: James Huang / Manager

Approved by: Jones Tsai / Manager

Testing Laboratory 2627

Sporton International (KunShan) INC.
No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR761702-03C	Rev. 01	Initial issue of report	Aug. 07, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	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 3.29 dB at 7311.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.36 dB at 0.614 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	10870, 10869
FCC ID	IHDT56WK4
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+ (16QAM uplink is not supported)/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/ Bluetooth v 4.0 LE/ Bluetooth v4.1 LE/ Bluetooth v4.2 LE/ Bluetooth v5.0 LE
IMEI Code	Conducted: 356485080009379/356485080009387 Conduction: 356485080012175/356485080012183 Radiation: 356485080013454/356485080013462
HW Version	DVT2
SW Version	NPW26.75
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(Model name: 10869) and sample 2(Model name: 10870), the differences between two samples are only for SIM slot, sample 1 is dual SIM slot, sample 2 is single SIM slot. We only choose dual SIM sample to perform full tests.

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 : 23.53 dBm (0.2254 W) 802.11g : 25.36 dBm (0.3436 W) 802.11n HT20 : 25.31 dBm (0.3396 W) 802.11n HT40 : 24.61 dBm (0.2891 W)
Antenna Type / Gain	Loop Antenna with gain -2.70 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1 (US)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-22
	Power Rating	I/P: 100 - 240 Vac, 500 mA, O/P: 5/9/12 Vdc, 3000/1600/1200 mA		
AC Adapter 2 (US)	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-22
	Power Rating	I/P: 100 - 240 Vac, 500 mA, O/P: 5/9/12 Vdc, 3000/1600/1200 mA		
AC Adapter 3 (US)	**Brand Name**	Motorola (LiteOn)	**Model Name**	SC-22
	Power Rating	I/P: 100 - 240 Vac, 500 mA, O/P: 5/9/12 Vdc, 3000/1600/1200 mA		
Battery	**Brand Name**	Motorola (Sunwoda)	**Model Name**	HX40
	Power Rating	3.8Vdc, 2810mAh	**Type**	Li-ion
Earphone	**Brand Name**	Motorola (Cosonic)	**Model Name**	SH38C16618
	Signal Line Type	1.10 meter, non-shielded cable, without ferrite core		
USB Cable 1	**Brand Name**	Motorola (Saibao)	**Model Name**	SKN6473A
	Signal Line Type	1.10 meter, shielded cable, without ferrite core		
USB Cable 2	**Brand Name**	Motorola (Foxlink)	**Model Name**	SKN6473A
	Signal Line Type	1.10 meter, shielded cable, without ferrite core		
USB Cable 3	**Brand Name**	Motorola (Cabletech)	**Model Name**	SKN6473A
	Signal Line Type	1.10 meter, shielded cable, without ferrite core		

1.7 Testing Location

Test Site	Sporton International (KunShan) INC.	
Test Site Location	No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	**Sporton Site No.**	
	TH01-KS	CO01-KS

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

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 v04
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

2.2 Test Mode

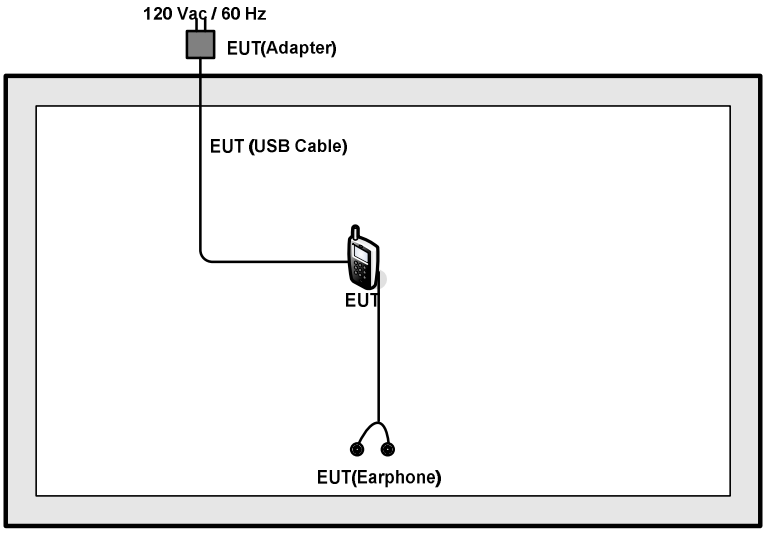
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11b	11 Mbps
802.11g	54 Mbps
802.11n HT20	MCS6
802.11n HT40	MCS6

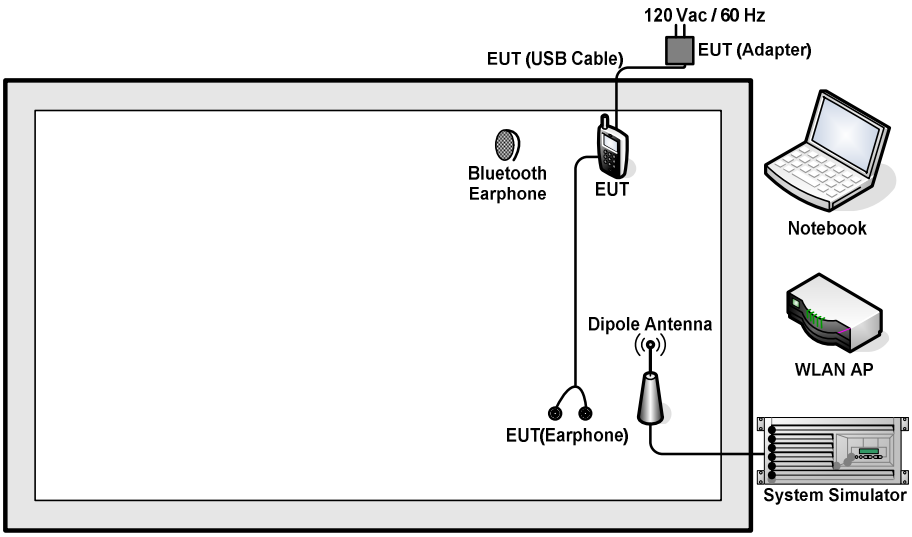
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + Battery + USB Cable 1(Charging from Adapter 1) for Sample 1

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-855	KA2IR855A2	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A

2.5 EUT Operation Test Setup

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

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

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss 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 5.7 dB.

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

= 5.7 (dB)

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.

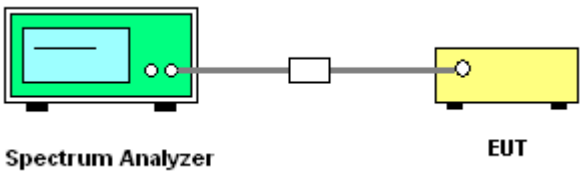
3.1.2 Measuring Instruments

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 v04.
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.

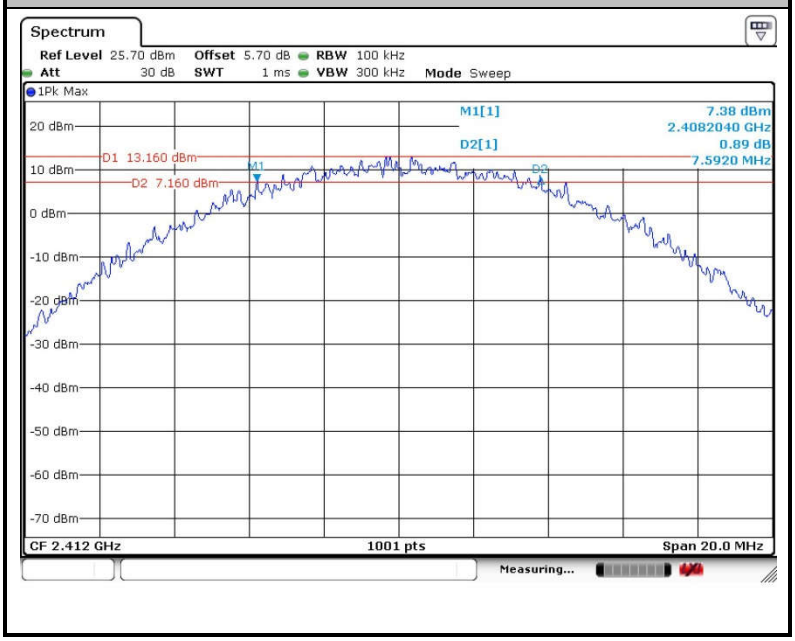
3.1.4 Test Setup



3.1.5 Test Result of 6dB Occupied Bandwidth

Please refer to Appendix A.

Minimum 6dB Bandwidth



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.

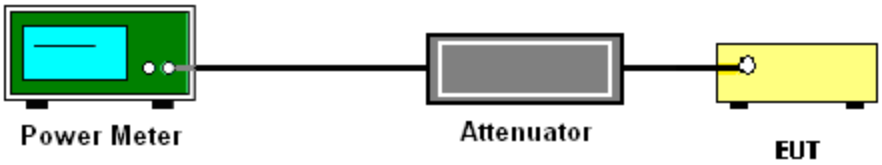
3.2.2 Measuring Instruments

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 v04 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.

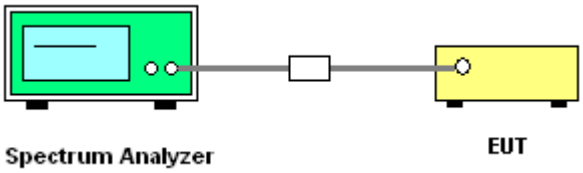
3.3.2 Measuring Instruments

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 v04
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.

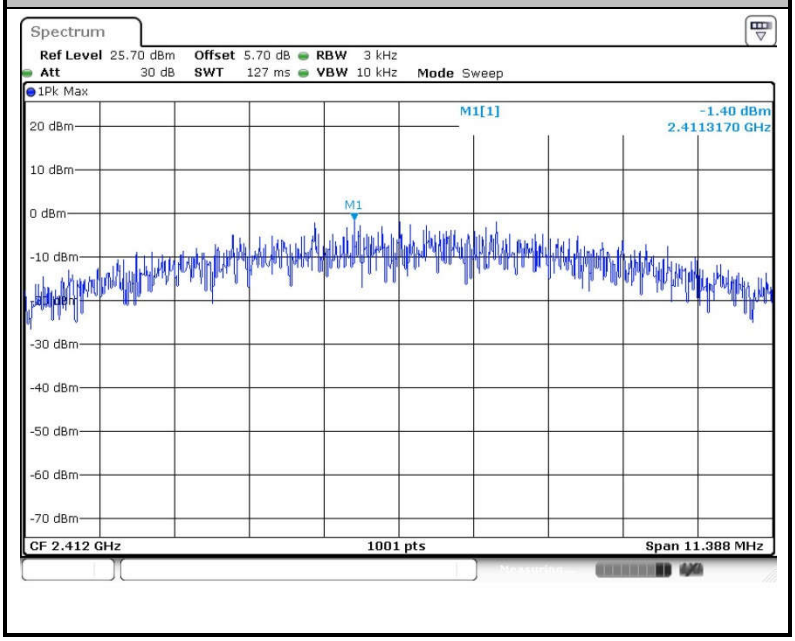
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz)



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.

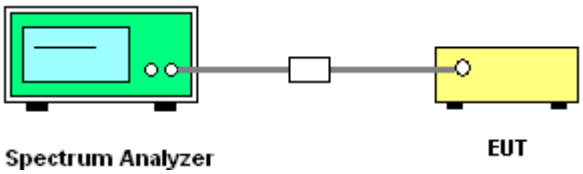
3.4.2 Measuring Instruments

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 v04.
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.
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

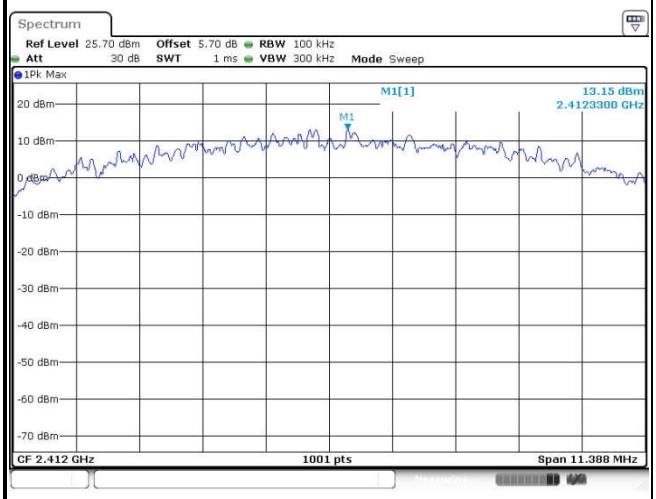


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

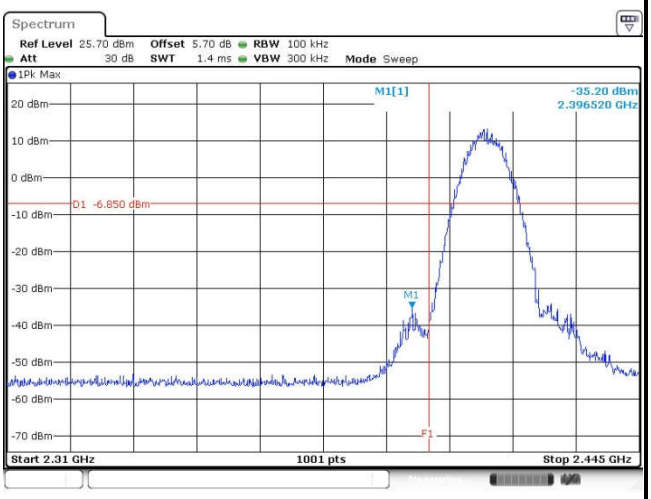
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~55%
Test Channel :	01	**Test Engineer :**	Silent Hai

WLAN 802.11b Channel 01

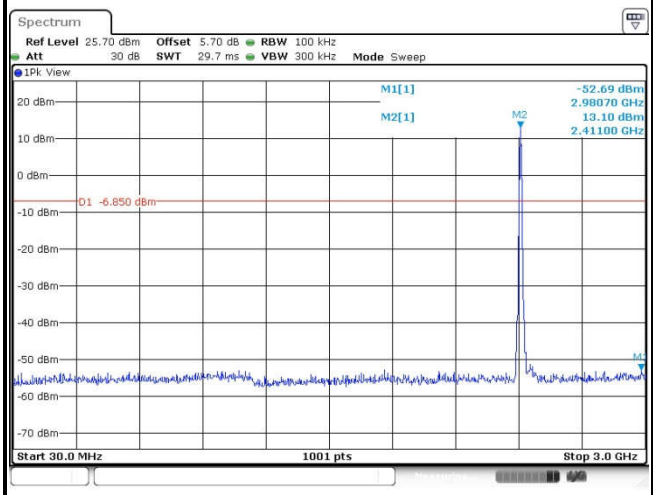
100kHz PSD reference Level



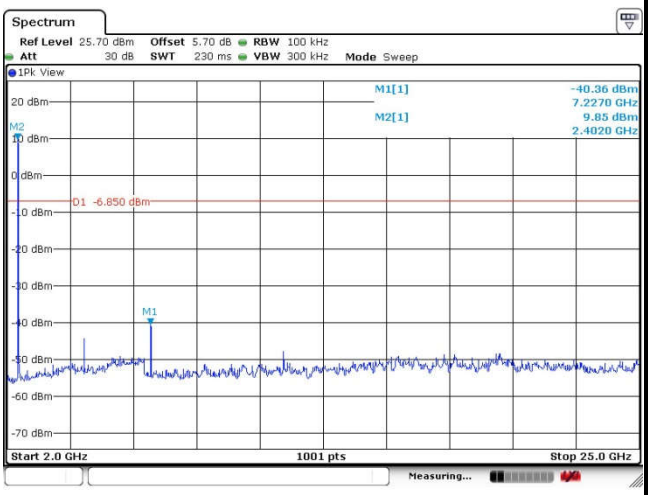
Low Channel Plot



Spurious Emission 30MHz~3GHz



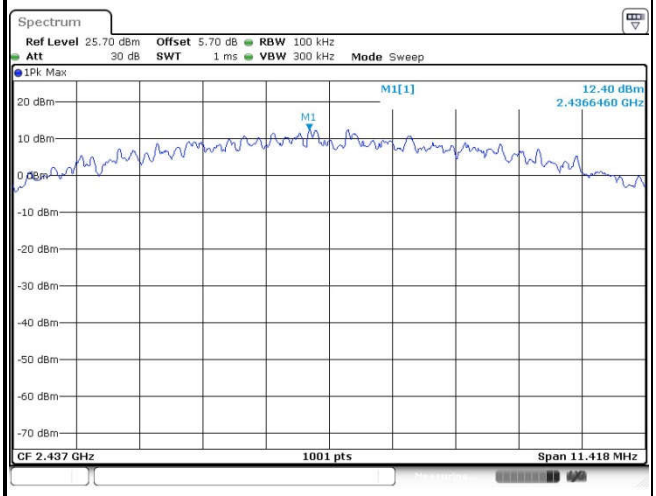
Spurious Emission 2GHz~25GHz



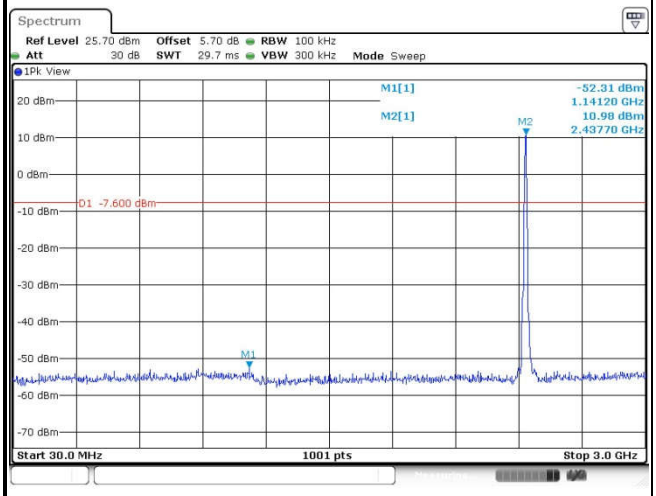
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~55%
Test Channel :	06	**Test Engineer :**	Silent Hai

WLAN 802.11b Channel 06

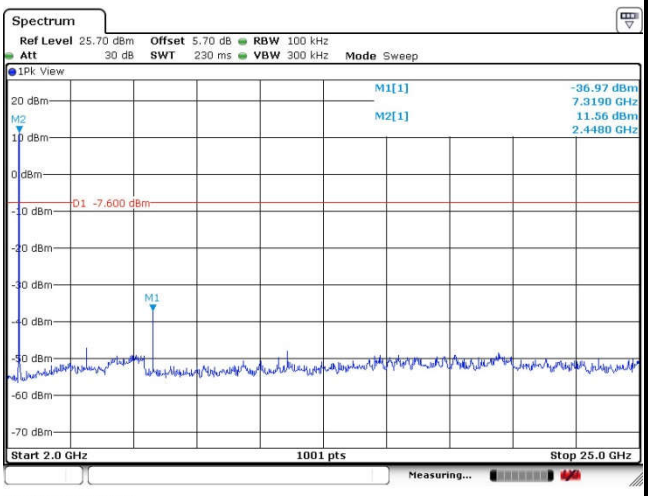
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



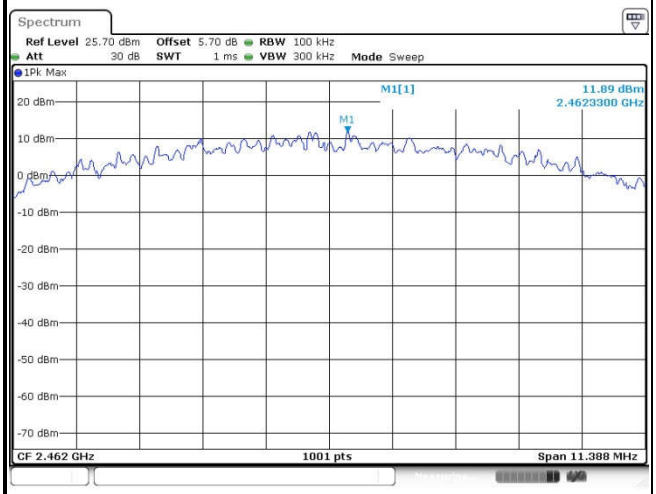
Spurious Emission 2GHz~25GHz



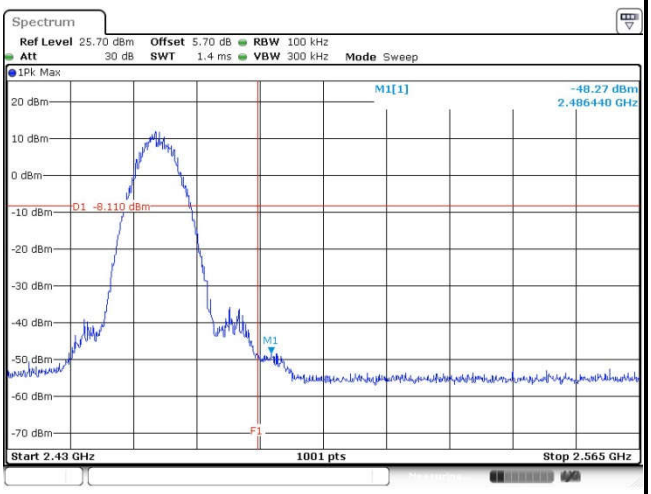
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~55%
Test Channel :	11	**Test Engineer :**	Silent Hai

WLAN 802.11b Channel 11

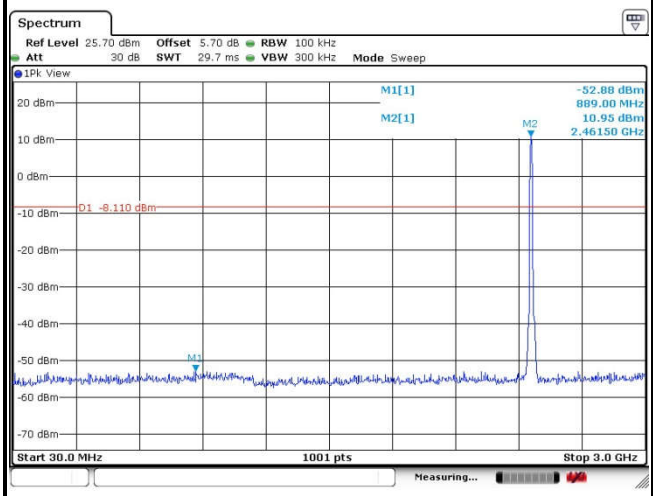
100kHz PSD reference Level



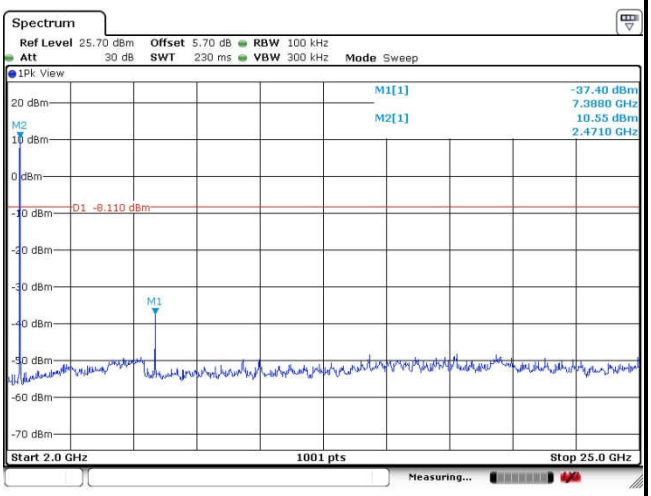
High Channel Plot



Spurious Emission 30MHz~3GHz



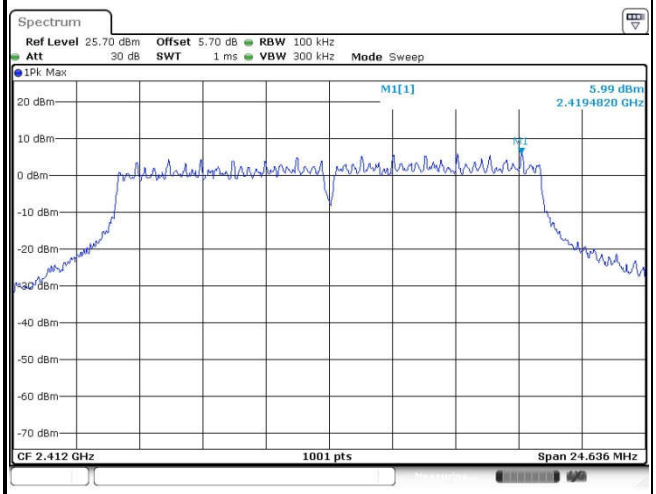
Spurious Emission 2GHz~25GHz



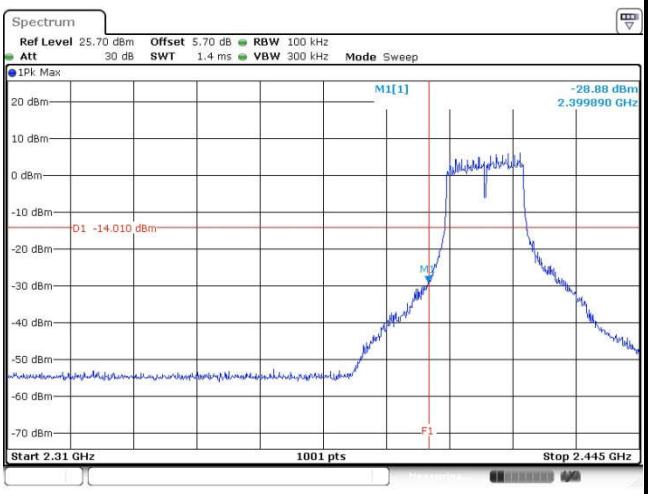
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~55%
Test Channel :	01	**Test Engineer :**	Silent Hai

WLAN 802.11g Channel 01

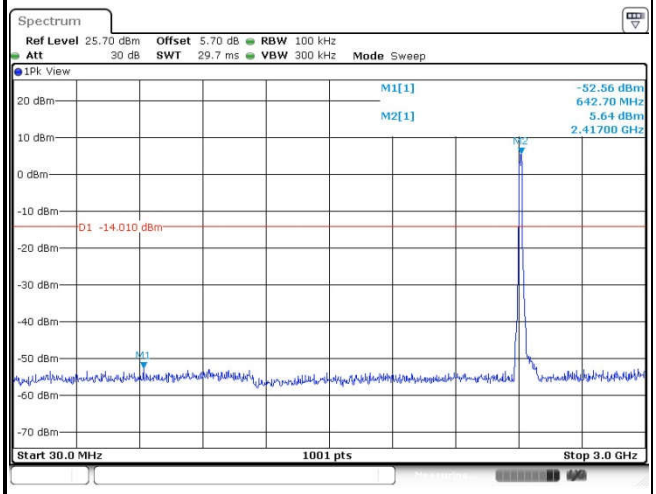
100kHz PSD reference Level



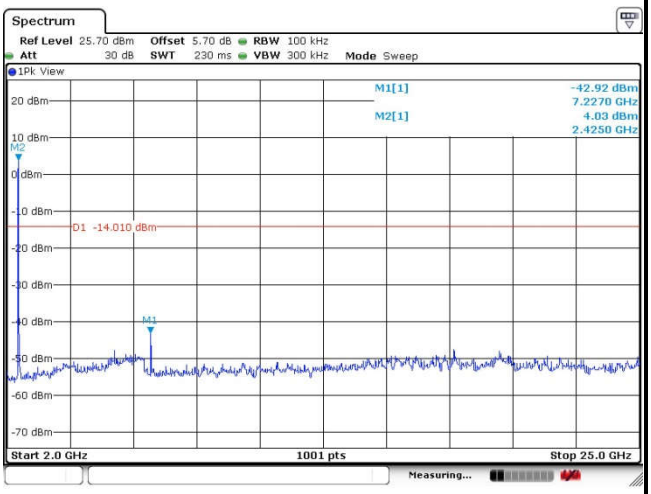
Low Channel Plot



Spurious Emission 30MHz~3GHz



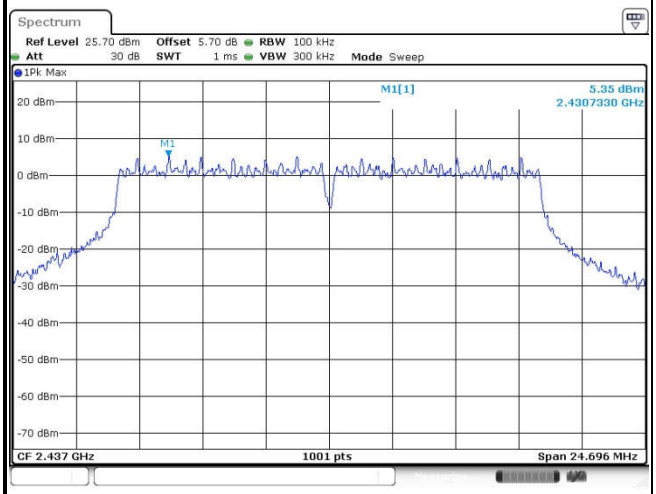
Spurious Emission 2GHz~25GHz



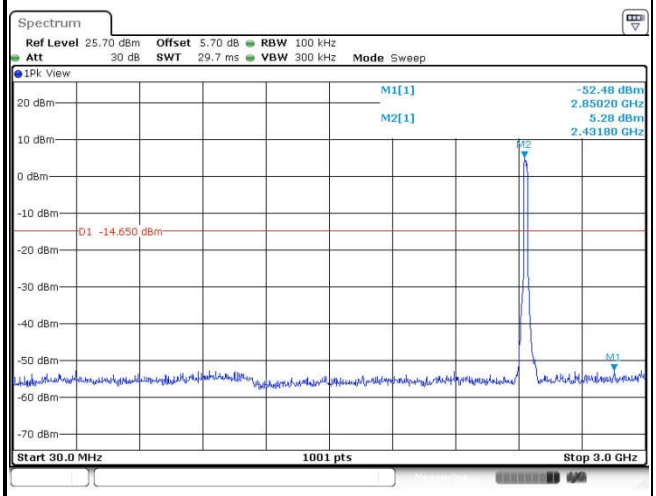
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~55%
Test Channel :	06	**Test Engineer :**	Silent Hai

WLAN 802.11g Channel 06

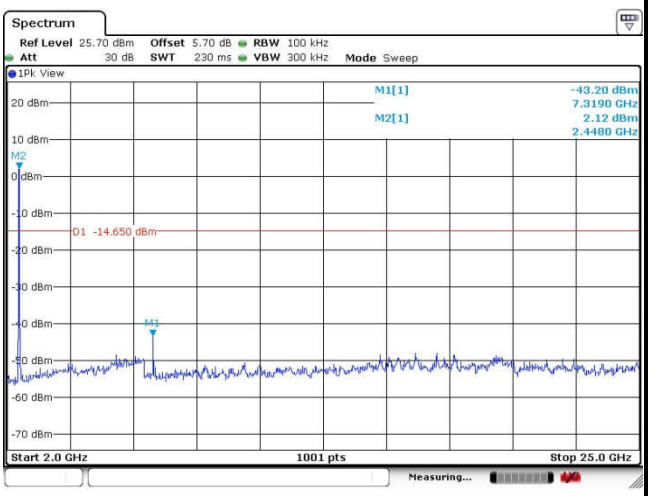
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



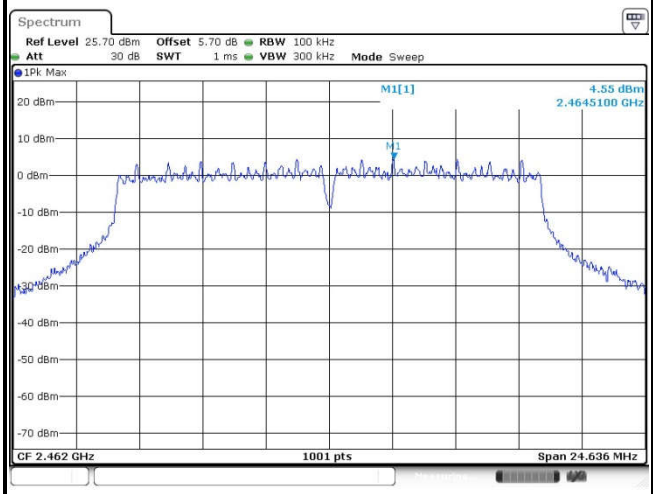
Spurious Emission 2GHz~25GHz



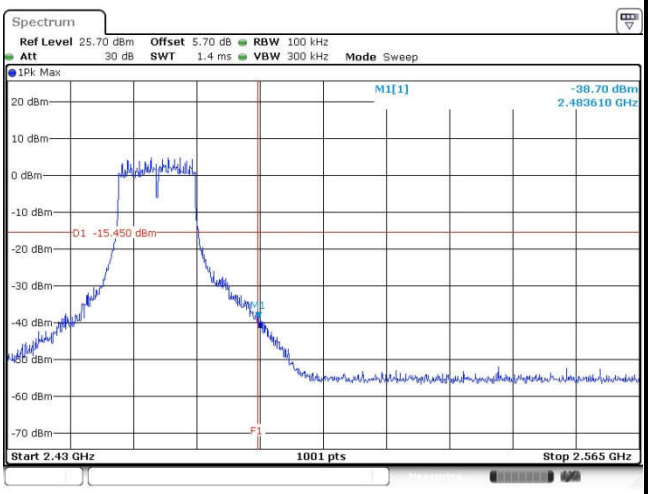
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~55%
Test Channel :	11	**Test Engineer :**	Silent Hai

WLAN 802.11g Channel 11

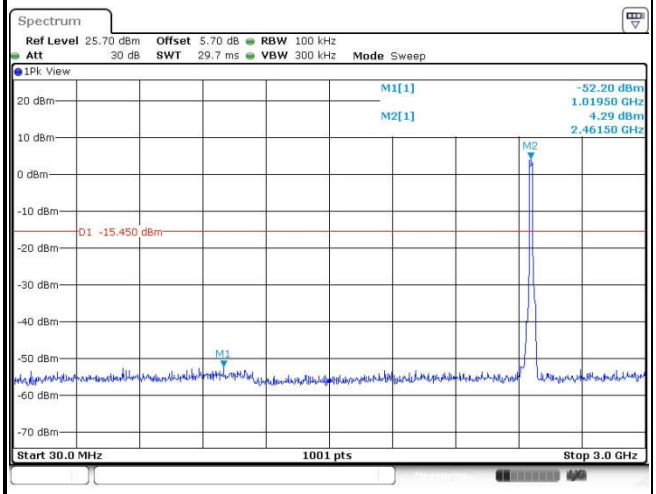
100kHz PSD reference Level



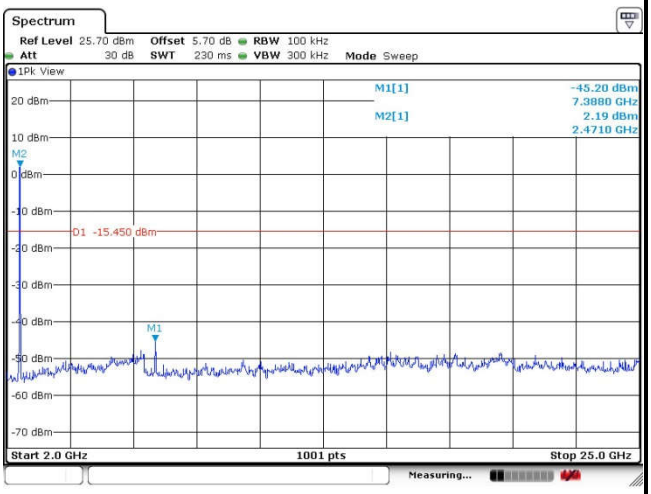
High Channel Plot



Spurious Emission 30MHz~3GHz



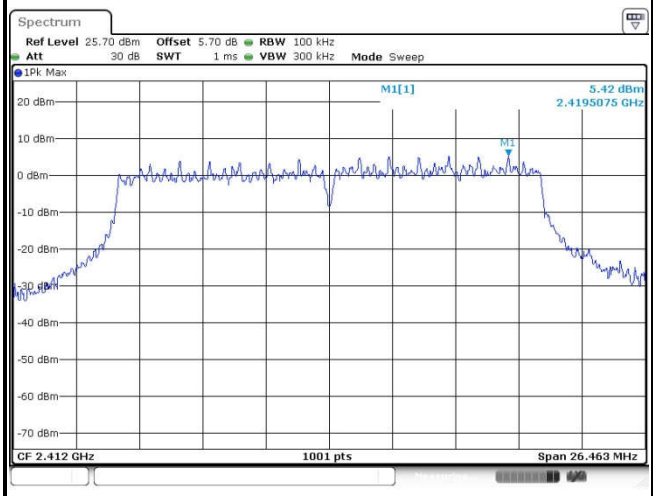
Spurious Emission 2GHz~25GHz



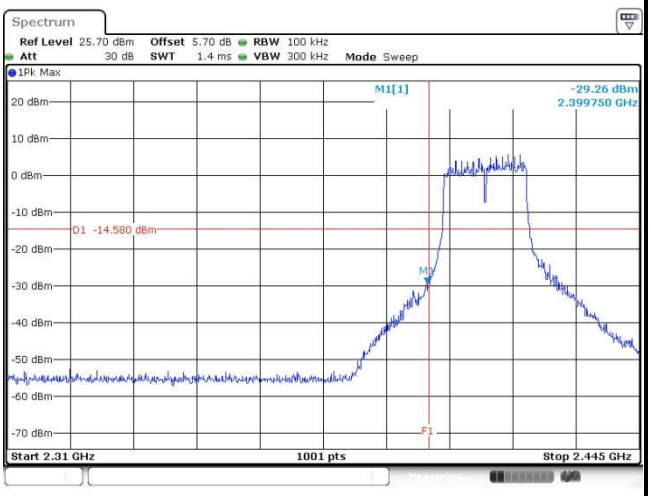
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~55%
Test Channel :	01	**Test Engineer :**	Silent Hai

WLAN 802.11n HT20 Channel 01

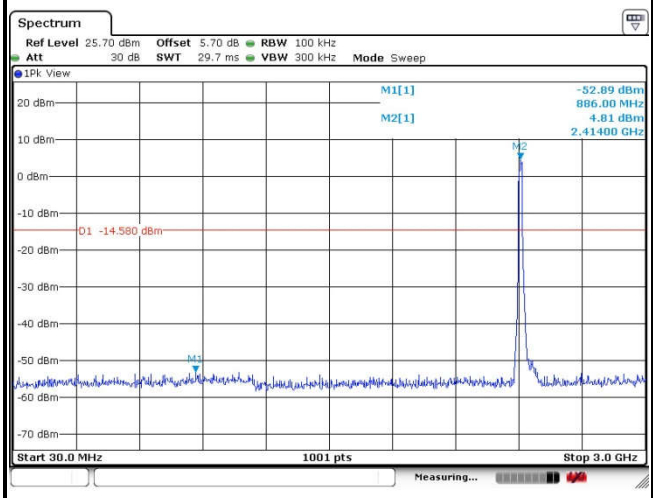
100kHz PSD reference Level



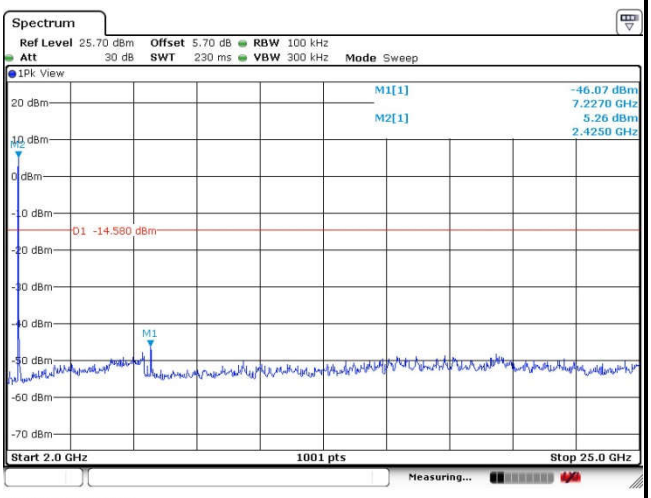
Low Channel Plot



Spurious Emission 30MHz~3GHz



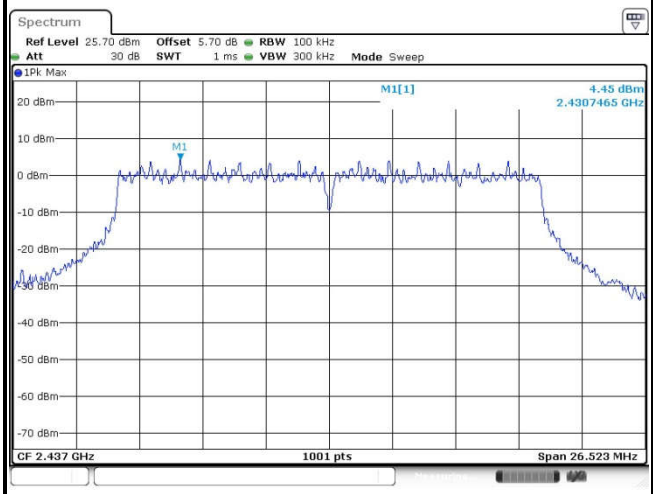
Spurious Emission 2GHz~25GHz



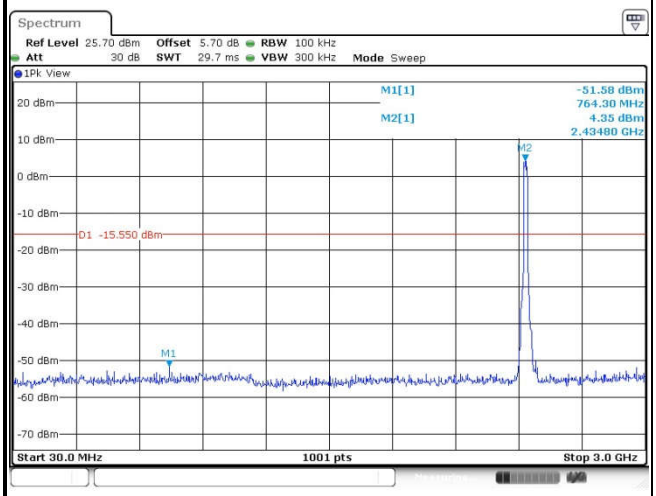
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~55%
Test Channel :	06	**Test Engineer :**	Silent Hai

WLAN 802.11n HT20 Channel 06

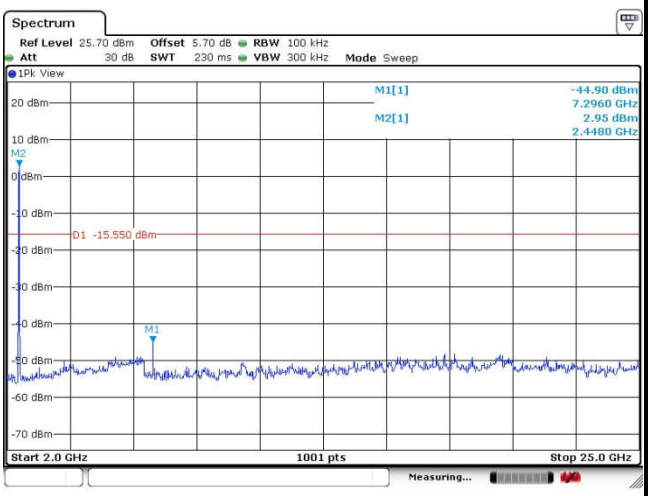
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



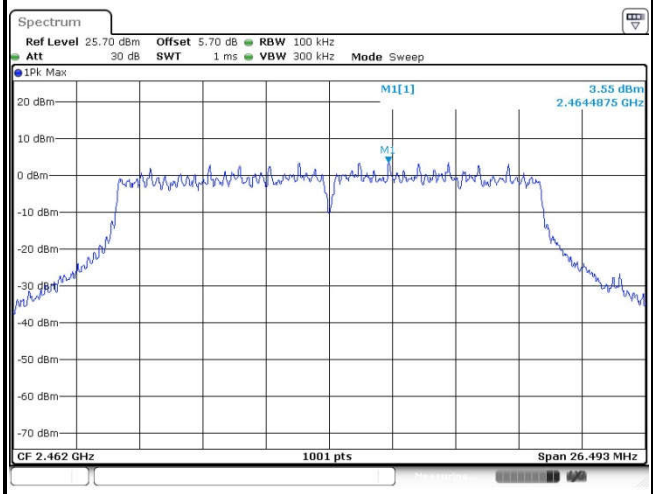
Spurious Emission 2GHz~25GHz



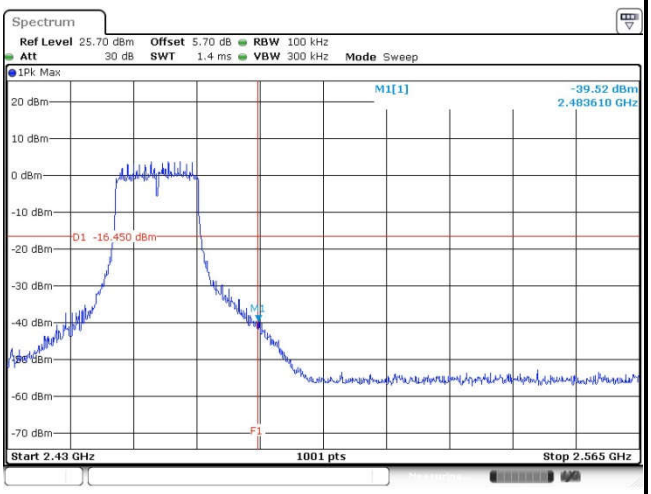
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~55%
Test Channel :	11	**Test Engineer :**	Silent Hai

WLAN 802.11n HT20 Channel 11

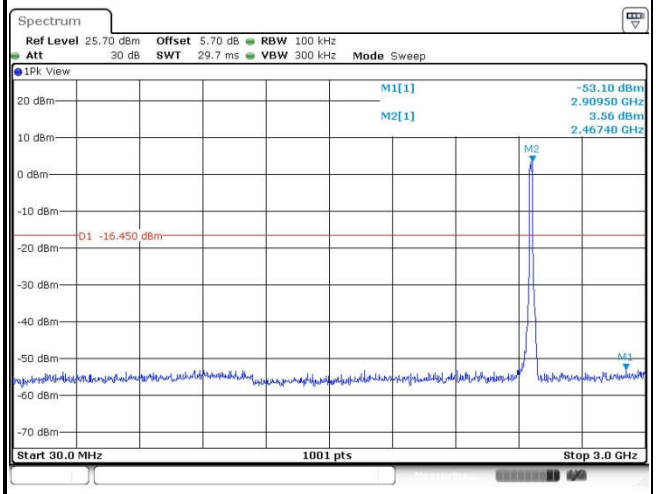
100kHz PSD reference Level



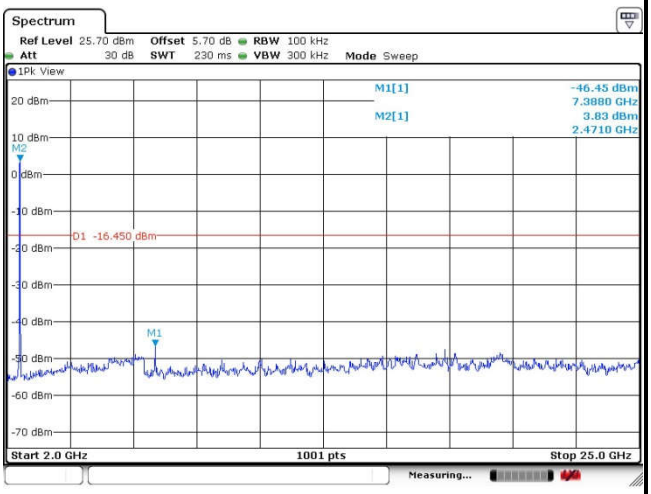
High Channel Plot



Spurious Emission 30MHz~3GHz



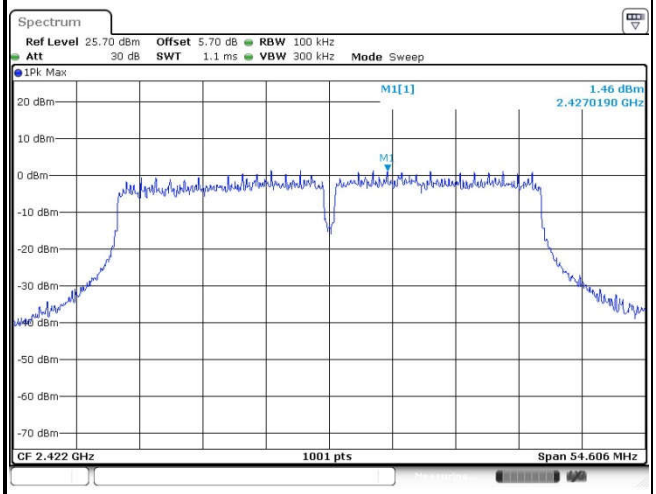
Spurious Emission 2GHz~25GHz



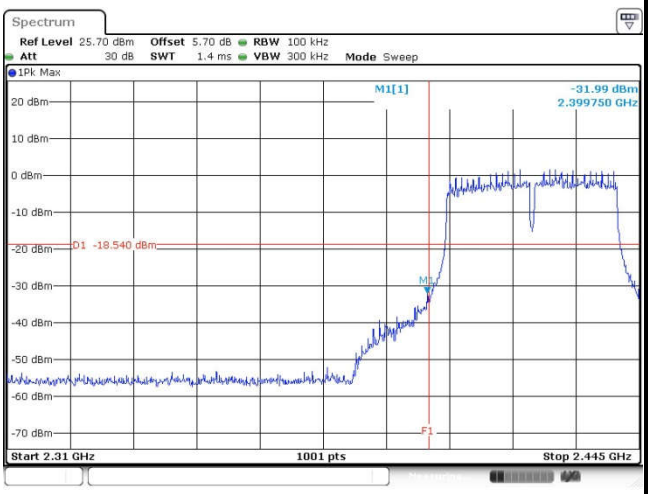
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~55%
Test Channel :	03	**Test Engineer :**	Silent Hai

WLAN 802.11n HT40 Channel 03

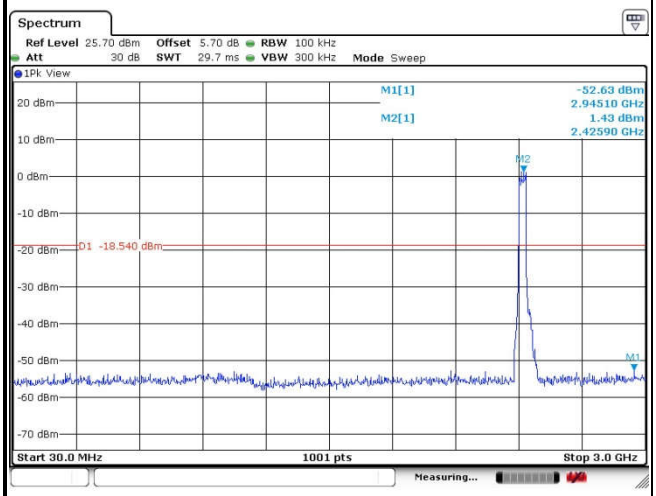
100kHz PSD reference Level



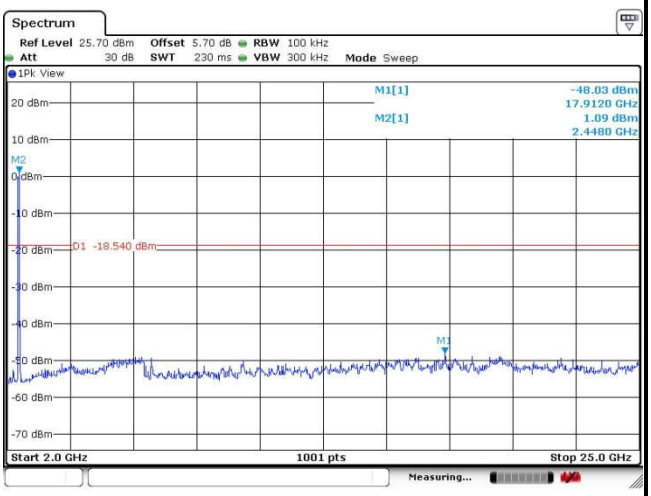
Low Channel Plot



Spurious Emission 30MHz~3GHz



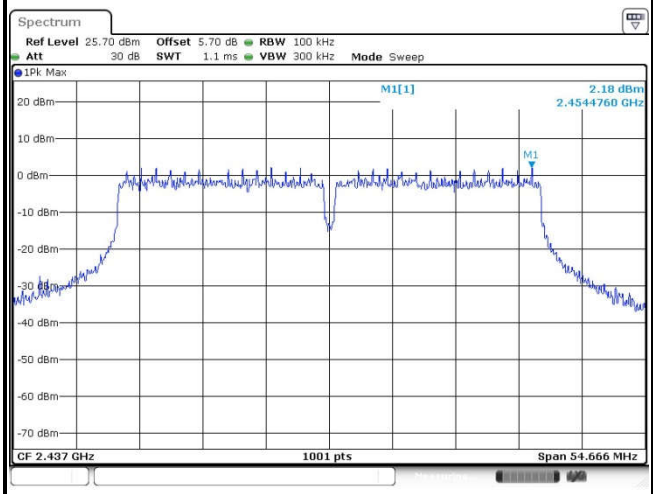
Spurious Emission 2GHz~25GHz



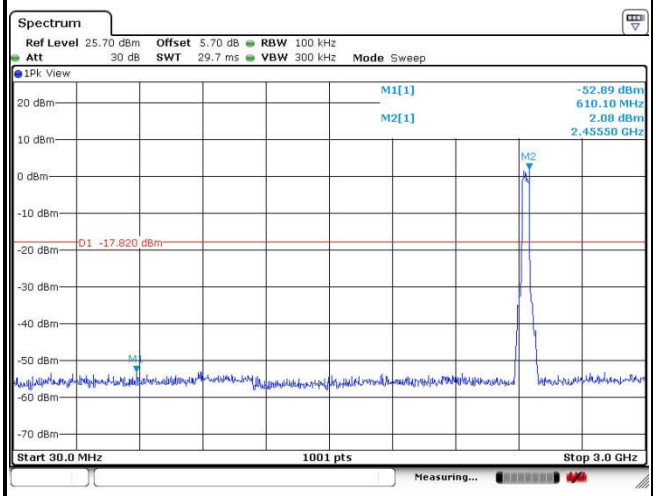
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~55%
Test Channel :	06	**Test Engineer :**	Silent Hai

WLAN 802.11n HT40 Channel 06

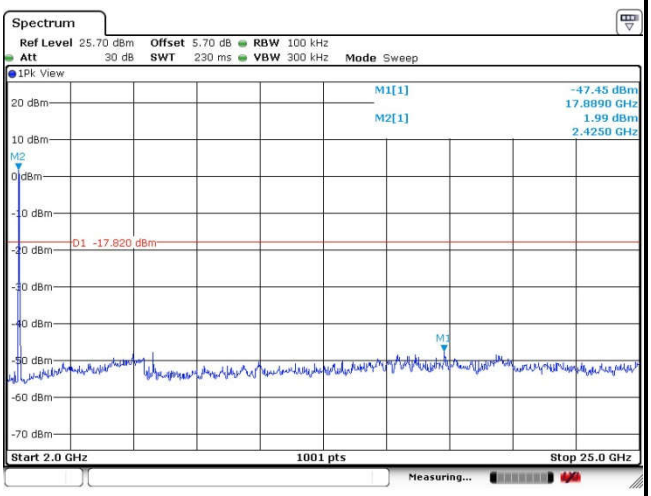
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



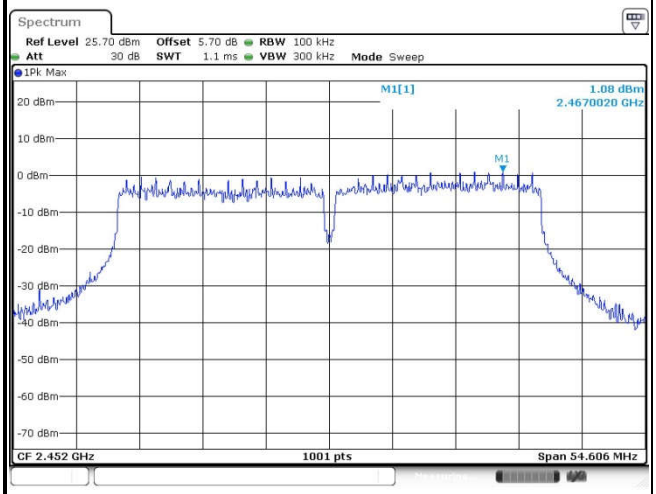
Spurious Emission 2GHz~25GHz



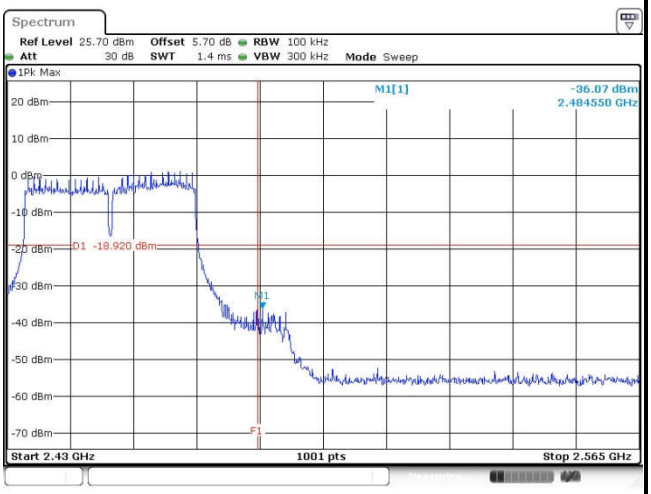
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~55%
Test Channel :	09	**Test Engineer :**	Silent Hai

WLAN 802.11n HT40 Channel 09

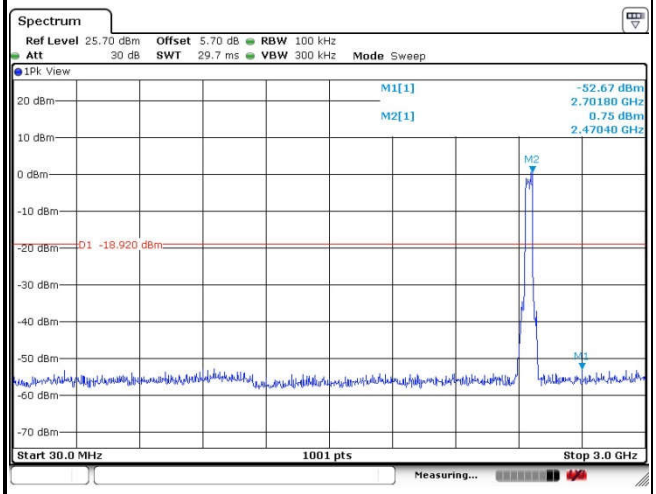
100kHz PSD reference Level



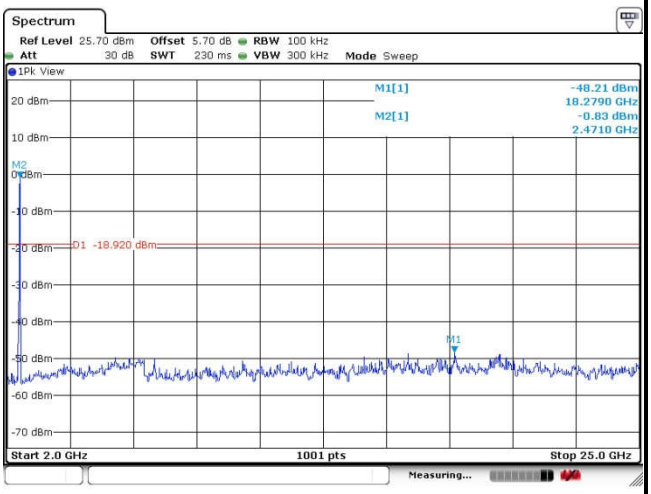
High Channel Plot



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 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

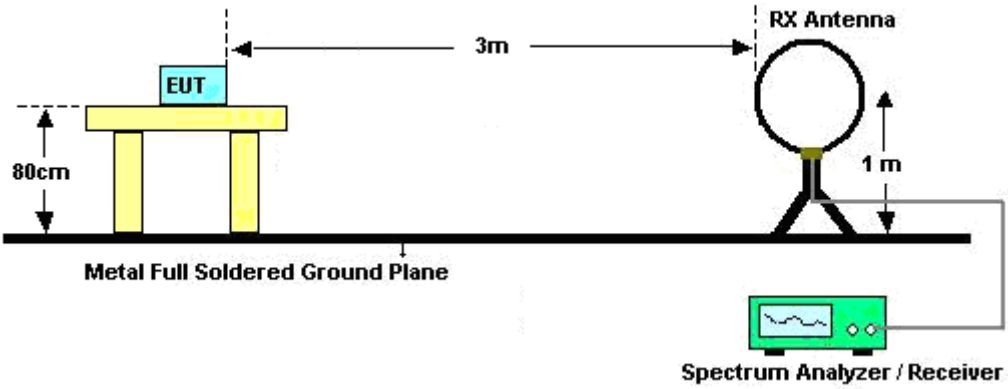
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

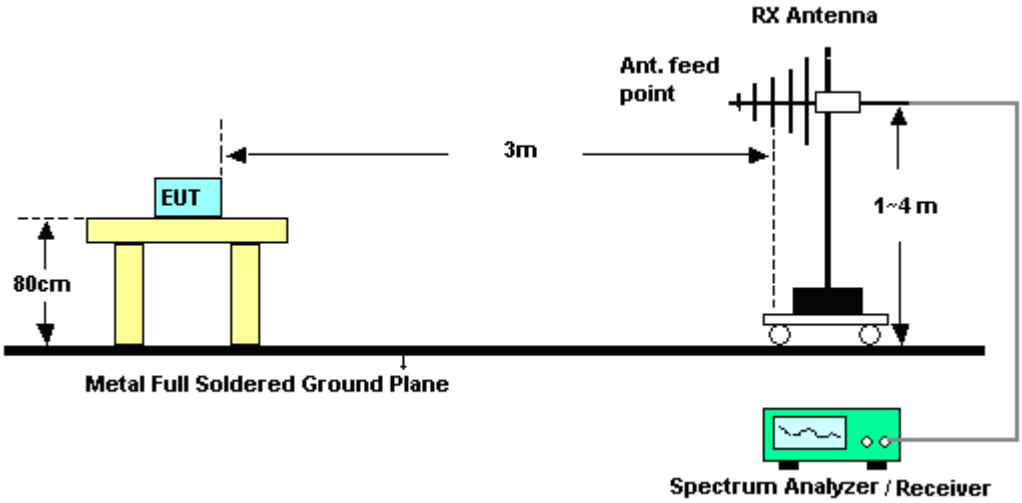
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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

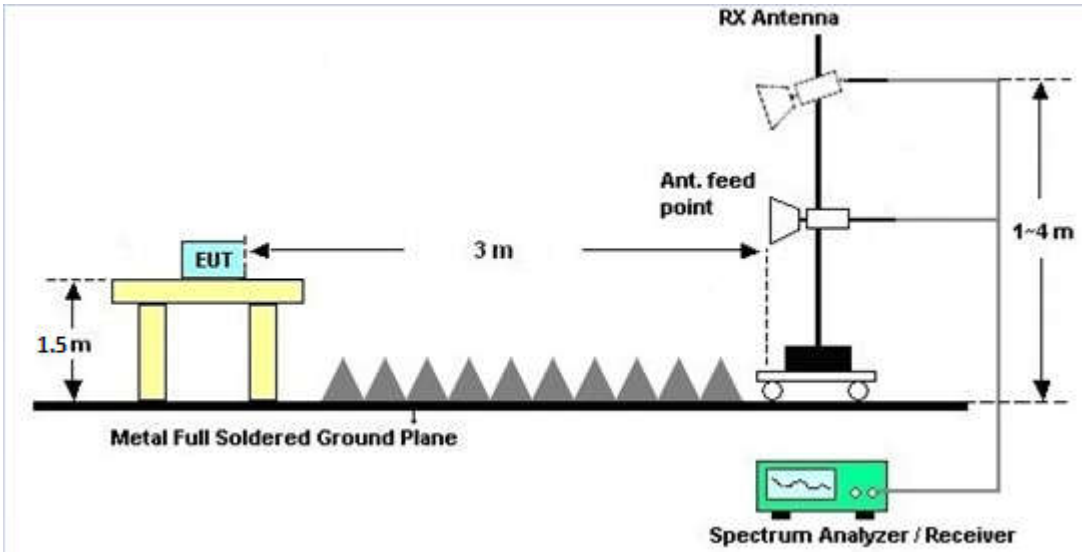
For radiated emissions below 30MHz



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 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 (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.

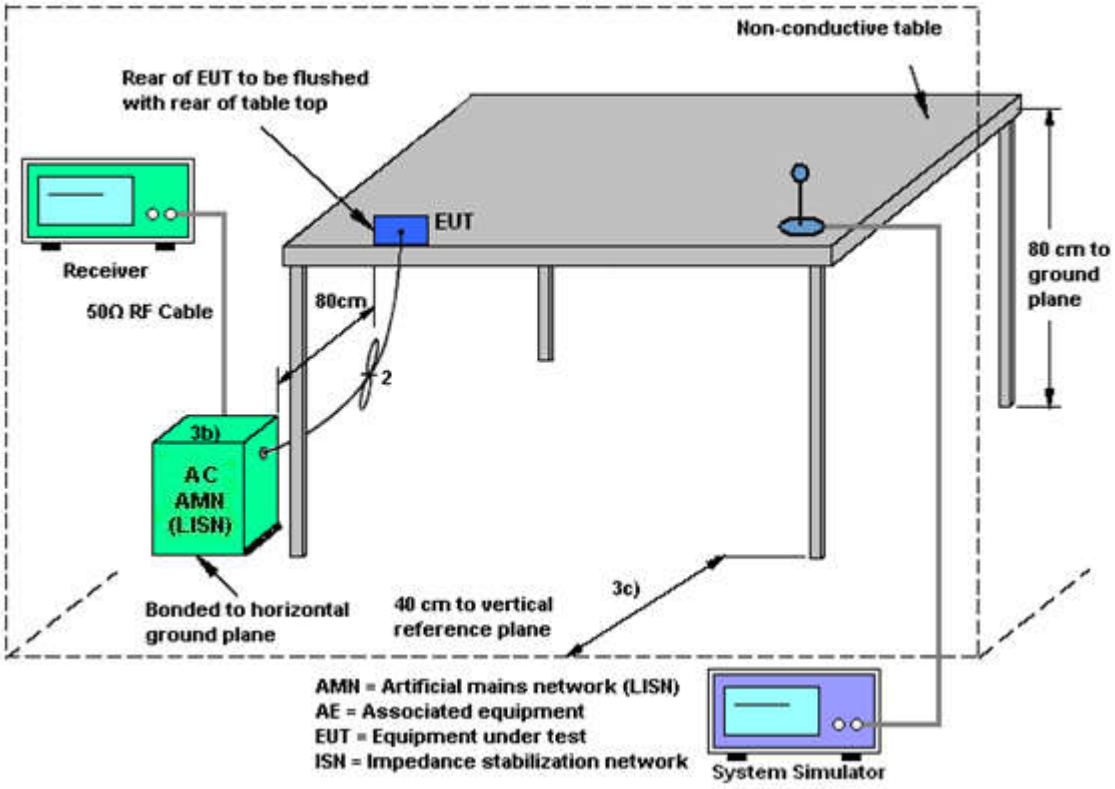
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

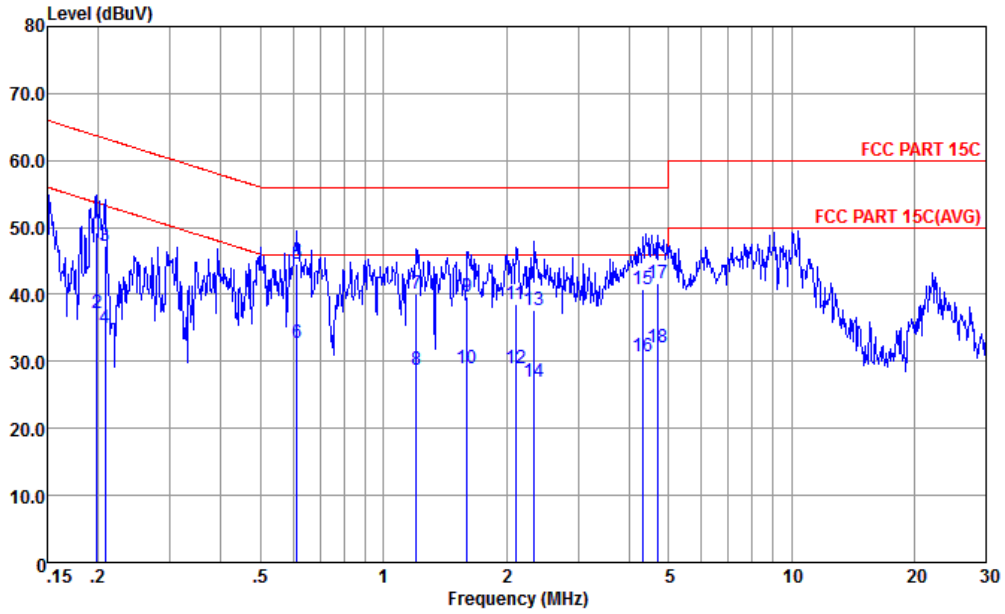
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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 :**	24~27℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	42~45%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + Battery + USB Cable 1(Charging from Adapter 1) for Sample 1		

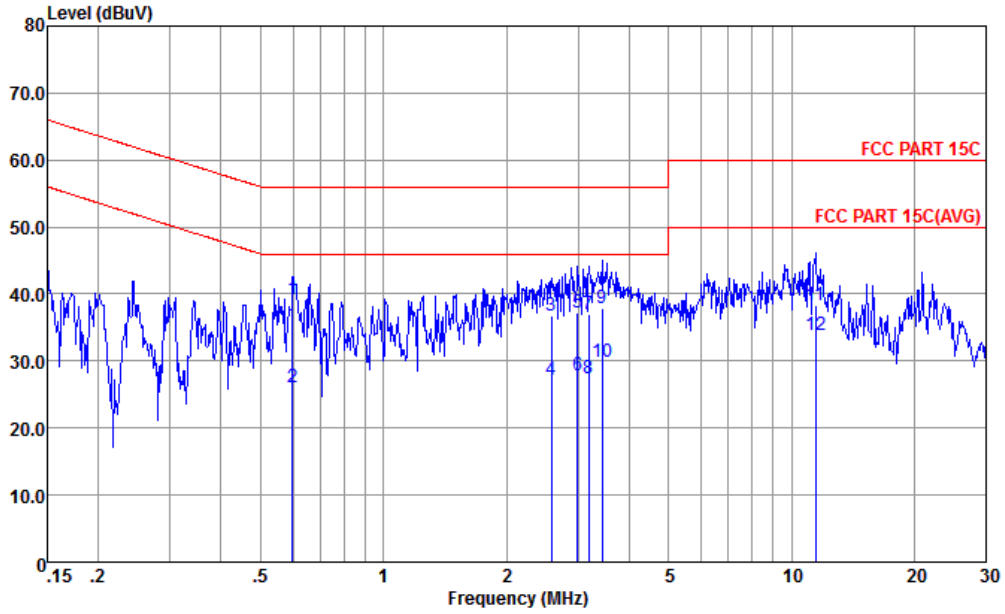


Site : CO01-KS
Condition : FCC PART 15C LISN-L-161017-060103 LINE

mode : Mode 1
: 356485080012175/356485080012183 #3

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.199	49.21	-14.46	63.67	38.60	0.28	10.33	QP
2	0.199	37.21	-16.46	53.67	26.60	0.28	10.33	Average
3	0.208	47.20	-16.07	63.27	36.60	0.27	10.33	QP
4	0.208	34.90	-18.37	53.27	24.30	0.27	10.33	Average
5 *	0.614	44.64	-11.36	56.00	34.20	0.26	10.18	QP
6	0.614	32.74	-13.26	46.00	22.30	0.26	10.18	Average
7	1.203	40.04	-15.96	56.00	29.60	0.25	10.19	QP
8	1.203	28.64	-17.36	46.00	18.20	0.25	10.19	Average
9	1.602	39.71	-16.29	56.00	29.29	0.23	10.19	QP
10	1.602	29.01	-16.99	46.00	18.59	0.23	10.19	Average
11	2.110	38.60	-17.40	56.00	28.20	0.21	10.19	QP
12	2.110	29.00	-17.00	46.00	18.60	0.21	10.19	Average
13	2.346	37.61	-18.39	56.00	27.20	0.21	10.20	QP
14	2.346	26.91	-19.09	46.00	16.50	0.21	10.20	Average
15	4.338	40.75	-15.25	56.00	30.30	0.21	10.24	QP
16	4.338	30.75	-15.25	46.00	20.30	0.21	10.24	Average
17	4.721	41.65	-14.35	56.00	31.20	0.21	10.24	QP
18	4.721	32.05	-13.95	46.00	21.60	0.21	10.24	Average

Test Mode :	Mode 1	**Temperature :**	24~27℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	42~45%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + Battery + USB Cable 1(Charging from Adapter 1) for Sample 1		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-161017-060103 NEUTRAL

mode : Mode 1
: 356485080012175/356485080012183 #3

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.598	39.16	-16.84	56.00	28.60	0.38	10.18	QP
2	0.598	26.06	-19.94	46.00	15.50	0.38	10.18	Average
3	2.581	36.81	-19.19	56.00	26.20	0.40	10.21	QP
4	2.581	27.21	-18.79	46.00	16.60	0.40	10.21	Average
5	2.993	37.21	-18.79	56.00	26.59	0.40	10.22	QP
6	2.993	27.81	-18.19	46.00	17.19	0.40	10.22	Average
7	3.190	36.92	-19.08	56.00	26.31	0.39	10.22	QP
8	3.190	27.42	-18.58	46.00	16.81	0.39	10.22	Average
9	3.436	37.82	-18.18	56.00	27.20	0.39	10.23	QP
10	3.436	29.82	-16.18	46.00	19.20	0.39	10.23	Average
11	11.438	38.25	-21.75	60.00	27.60	0.28	10.37	QP
12 *	11.438	33.95	-16.05	50.00	23.30	0.28	10.37	Average

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the 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	Jul. 09, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Jul. 09, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Jul. 09, 2017	Jan. 18, 2018	Conducted (TH01-KS)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 20, 2017	Jul. 11, 2017	Apr. 19, 2018	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 20, 2017	Jul. 11, 2017	Apr. 19, 2018	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	Jul. 11, 2017	May 13, 2018	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	May 14, 2017	Jul. 11, 2017	May 13, 2018	Radiation (03CH03-SZ)
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1285	1GHz~18GHz	Jan. 12, 2017	Jul. 11, 2017	Jan. 11, 2018	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Aug. 10, 2016	Jul. 11, 2017	Aug. 09, 2017	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 11, 2016	Jul. 11, 2017	Oct. 10, 2017	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 06, 2017	Jul. 11, 2017	Jan. 05, 2018	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 16, 2016	Jul. 11, 2017	Jul. 15, 2017	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jul. 11, 2017	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul. 11, 2017	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jul. 11, 2017	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 20, 2017	Jul. 11, 2017	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Jul. 11, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Jul. 11, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Jul. 11, 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))	2.3dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

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

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB

Appendix A. Conducted Test Results

Report Number : FR761702-03C

A1 - DTS Part

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2017/7/9	Relative Humidity:	51~55	%

TEST RESULTS DATA
6dB Bandwidth

2.4GHz Band							
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	11Mbps	1	1	2412	7.59	0.50	Pass
11b	11Mbps	1	6	2437	7.61	0.50	Pass
11b	11Mbps	1	11	2462	7.59	0.50	Pass
11g	54Mbps	1	1	2412	16.42	0.50	Pass
11g	54Mbps	1	6	2437	16.46	0.50	Pass
11g	54Mbps	1	11	2462	16.42	0.50	Pass
HT20	MCS6	1	1	2412	17.64	0.50	Pass
HT20	MCS6	1	6	2437	17.68	0.50	Pass
HT20	MCS6	1	11	2462	17.66	0.50	Pass
HT40	MCS6	1	3	2422	36.40	0.50	Pass
HT40	MCS6	1	6	2437	36.44	0.50	Pass
HT40	MCS6	1	9	2452	36.40	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	11Mbps	1	1	2412	23.53	30.00	-2.70	20.83	36.00	Pass
11b	11Mbps	1	6	2437	23.27	30.00	-2.70	20.57	36.00	Pass
11b	11Mbps	1	11	2462	22.67	30.00	-2.70	19.97	36.00	Pass
11g	54Mbps	1	1	2412	25.12	30.00	-2.70	22.42	36.00	Pass
11g	54Mbps	1	6	2437	25.36	30.00	-2.70	22.66	36.00	Pass
11g	54Mbps	1	11	2462	24.78	30.00	-2.70	22.08	36.00	Pass
HT20	MCS6	1	1	2412	25.07	30.00	-2.70	22.37	36.00	Pass
HT20	MCS6	1	6	2437	25.31	30.00	-2.70	22.61	36.00	Pass
HT20	MCS6	1	11	2462	24.61	30.00	-2.70	21.91	36.00	Pass
HT40	MCS6	1	3	2422	24.32	30.00	-2.70	21.62	36.00	Pass
HT40	MCS6	1	6	2437	24.61	30.00	-2.70	21.91	36.00	Pass
HT40	MCS6	1	9	2452	23.79	30.00	-2.70	21.09	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	20.49
11b	1Mbps	1	6	2437	0.00	20.07
11b	1Mbps	1	11	2462	0.00	19.15
11g	6Mbps	1	1	2412	0.28	19.24
11g	6Mbps	1	6	2437	0.28	18.84
11g	6Mbps	1	11	2462	0.28	18.02
HT20	MCS0	1	1	2412	0.32	18.24
HT20	MCS0	1	6	2437	0.32	17.70
HT20	MCS0	1	11	2462	0.32	16.89
HT40	MCS0	1	3	2422	0.62	17.05
HT40	MCS0	1	6	2437	0.62	17.94
HT40	MCS0	1	9	2452	0.62	16.47

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	11Mbps	1	1	2412	-1.40	-2.70	8.00	Pass
11b	11Mbps	1	6	2437	-2.03	-2.70	8.00	Pass
11b	11Mbps	1	11	2462	-2.66	-2.70	8.00	Pass
11g	54Mbps	1	1	2412	-9.75	-2.70	8.00	Pass
11g	54Mbps	1	6	2437	-10.42	-2.70	8.00	Pass
11g	54Mbps	1	11	2462	-10.63	-2.70	8.00	Pass
HT20	MCS6	1	1	2412	-8.71	-2.70	8.00	Pass
HT20	MCS6	1	6	2437	-9.92	-2.70	8.00	Pass
HT20	MCS6	1	11	2462	-10.52	-2.70	8.00	Pass
HT40	MCS6	1	3	2422	-15.92	-2.70	8.00	Pass
HT40	MCS6	1	6	2437	-14.54	-2.70	8.00	Pass
HT40	MCS6	1	9	2452	-15.60	-2.70	8.00	Pass

Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)
802.11b CH 01 2412MHz		2387.175	42.65	-31.35	74	42.91	27.43	5.64	33.33	184	161	P	H
		2385.81	33.47	-20.53	54	33.73	27.43	5.64	33.33	184	161	A	H
	*	2412	103.08	-	-	103.27	27.49	5.64	33.32	184	161	P	H
	*	2412	96.72	-	-	96.91	27.49	5.64	33.32	184	161	A	H
		2352.315	41.82	-32.18	74	42.26	27.3	5.59	33.33	263	168	P	V
		2389.8	32.7	-21.3	54	32.95	27.43	5.64	33.32	263	168	A	V
	*	2412	102.87	-	-	103.06	27.49	5.64	33.32	263	168	P	V
	*	2412	97.04	-	-	97.23	27.49	5.64	33.32	263	168	A	V
802.11b CH 06 2437MHz		2385.74	42.24	-31.76	74	42.5	27.43	5.64	33.33	184	161	P	H
		2388.96	31.95	-22.05	54	32.21	27.43	5.64	33.33	184	161	A	H
	*	2437	102.22	-	-	102.24	27.61	5.68	33.31	184	161	P	H
	*	2437	95.8	-	-	95.82	27.61	5.68	33.31	184	161	A	H
		2488.94	42.42	-31.58	74	42.21	27.8	5.72	33.31	184	161	P	H
		2483.5	33.56	-20.44	54	33.41	27.74	5.72	33.31	184	161	A	H
		2368.1	41.76	-32.24	74	42.2	27.3	5.59	33.33	263	168	P	V
		2389.8	31.41	-22.59	54	31.66	27.43	5.64	33.32	263	168	A	V
	*	2437	101.38	-	-	101.4	27.61	5.68	33.31	263	168	P	V
	*	2437	95.15	-	-	95.17	27.61	5.68	33.31	263	168	A	V
		2486.91	42.04	-31.96	74	41.89	27.74	5.72	33.31	263	168	P	V
		2484.95	32.33	-21.67	54	32.18	27.74	5.72	33.31	263	168	A	V

802.11b CH 11 2462MHz	*	2462	100.81	-	-	100.76	27.68	5.68	33.31	184	161	P	H
	*	2462	94.75	-	-	94.7	27.68	5.68	33.31	184	161	A	H
		2484.04	43.09	-30.91	74	42.94	27.74	5.72	33.31	184	161	P	H
		2483.96	34.35	-19.65	54	34.2	27.74	5.72	33.31	184	161	A	H
	*	2462	98.96	-	-	98.91	27.68	5.68	33.31	362	98	P	V
	*	2462	92.93	-	-	92.88	27.68	5.68	33.31	362	98	A	V
		2485.6	44.04	-29.96	74	43.89	27.74	5.72	33.31	362	98	P	V
		2484.04	33.57	-20.43	54	33.42	27.74	5.72	33.31	362	98	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	45.89	-28.11	74	63.18	31.49	7.82	56.6	147	360	P	H
		4824	43.23	-30.77	74	60.52	31.49	7.82	56.6	147	360	P	V
802.11b CH 06 2437MHz		4874	46.78	-27.22	74	64.26	31.61	7.82	56.91	147	360	P	H
		7311	49.81	-24.19	74	62.47	36.17	9.17	58	147	360	P	H
		4874	42.06	-31.94	74	59.54	31.61	7.82	56.91	147	360	P	V
		7311	53.56	-20.44	74	66.22	36.17	9.17	58	147	360	P	V
		7311	50.71	-3.29	54	63.37	36.17	9.17	58	208	353	A	V
802.11b CH 11 2462MHz		4924	48.45	-25.55	74	64.98	31.73	7.82	56.08	147	360	P	H
		7386	43.41	-30.59	74	55.93	36.28	9.21	58.01	147	360	P	H
		4924	44.86	-29.14	74	61.39	31.73	7.82	56.08	147	360	P	V
		7386	47.13	-26.87	74	59.65	36.28	9.21	58.01	147	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. 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		2390	53.99	-20.01	74	54.24	27.43	5.64	33.32	398	152	P	H
		2390	43.98	-10.02	54	44.23	27.43	5.64	33.32	398	152	A	H
	*	2412	99.38	-	-	99.57	27.49	5.64	33.32	398	152	P	H
	*	2412	92	-	-	92.19	27.49	5.64	33.32	398	152	A	H
		2389.485	53.57	-20.43	74	53.83	27.43	5.64	33.33	175	164	P	V
		2390	37.91	-16.09	54	38.16	27.43	5.64	33.32	175	164	A	V
	*	2412	98	-	-	98.19	27.49	5.64	33.32	175	164	P	V
	*	2412	89.02	-	-	89.21	27.49	5.64	33.32	175	164	A	V
802.11g CH 06 2437MHz		2389.38	42.3	-31.7	74	42.56	27.43	5.64	33.33	389	155	P	H
	*	2389.94	31.63	-22.37	54	31.88	27.43	5.64	33.32	389	155	A	H
	*	2437	98.5	-	-	98.52	27.61	5.68	33.31	389	155	P	H
		2437	89.57	-	-	89.59	27.61	5.68	33.31	389	155	A	H
		2484.04	45.36	-28.64	74	45.21	27.74	5.72	33.31	389	155	P	H
		2483.5	33.33	-20.67	54	33.18	27.74	5.72	33.31	389	155	A	H
		2388.26	41.81	-32.19	74	42.07	27.43	5.64	33.33	129	166	P	V
		2389.8	31.64	-22.36	54	31.89	27.43	5.64	33.32	129	166	A	V
	*	2437	98.12	-	-	98.14	27.61	5.68	33.31	129	166	P	V
	*	2437	88.96	-	-	88.98	27.61	5.68	33.31	129	166	A	V
		2484.39	44.67	-29.33	74	44.52	27.74	5.72	33.31	129	166	P	V
		2483.5	33.26	-20.74	54	33.11	27.74	5.72	33.31	129	166	A	V

802.11g CH 11 2462MHz	*	2462	98.81	-	-	98.76	27.68	5.68	33.31	380	151	P	H
	*	2462	90.32	-	-	90.27	27.68	5.68	33.31	380	151	A	H
		2483.84	51.23	-22.77	74	51.08	27.74	5.72	33.31	380	151	P	H
		2483.56	41.04	-12.96	54	40.89	27.74	5.72	33.31	380	151	A	H
	*	2462	96.71	-	-	96.66	27.68	5.68	33.31	198	161	P	V
	*	2462	88.96	-	-	88.91	27.68	5.68	33.31	198	161	A	V
		2483.64	48.19	-25.81	74	48.04	27.74	5.72	33.31	198	161	P	V
		2483.72	38.92	-15.08	54	38.77	27.74	5.72	33.31	198	161	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	43.51	-30.49	74	60.8	31.49	7.82	56.6	153	360	P	H
		4824	43.35	-30.65	74	60.64	31.49	7.82	56.6	153	360	P	V
802.11g CH 06 2437MHz		4874	41.08	-32.92	74	58.56	31.61	7.82	56.91	153	360	P	H
		7311	43.09	-30.91	74	55.75	36.17	9.17	58	153	360	P	H
		4874	40.85	-33.15	74	58.33	31.61	7.82	56.91	153	360	P	V
		7311	47.41	-26.59	74	60.07	36.17	9.17	58	153	360	P	V
802.11g CH 11 2462MHz		4924	43.4	-30.6	74	59.93	31.73	7.82	56.08	153	360	P	H
		7386	42.28	-31.72	74	54.8	36.28	9.21	58.01	153	360	P	H
		4924	42.16	-31.84	74	58.69	31.73	7.82	56.08	153	360	P	V
		7386	42.28	-31.72	74	54.8	36.28	9.21	58.01	153	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		2389.8	52.99	-21.01	74	53.24	27.43	5.64	33.32	396	155	P	H
		2390	35.81	-18.19	54	36.06	27.43	5.64	33.32	396	155	A	H
	*	2412	97.62	-	-	97.81	27.49	5.64	33.32	396	155	P	H
	*	2412	88.9	-	-	89.09	27.49	5.64	33.32	396	155	A	H
		2389.38	48.68	-25.32	74	48.94	27.43	5.64	33.33	100	124	P	V
		2390	32.84	-21.16	54	33.09	27.43	5.64	33.32	100	124	A	V
	*	2412	95.72	-	-	95.91	27.49	5.64	33.32	100	124	P	V
	*	2412	86.76	-	-	86.95	27.49	5.64	33.32	100	124	A	V
802.11n HT20 CH 06 2437MHz		2389.66	41.81	-32.19	74	42.07	27.43	5.64	33.33	380	151	P	H
		2389.94	34.5	-19.5	54	34.75	27.43	5.64	33.32	380	151	A	H
	*	2437	98.47	-	-	98.49	27.61	5.68	33.31	380	151	P	H
	*	2437	91.3	-	-	91.32	27.61	5.68	33.31	380	151	A	H
		2483.62	43.89	-30.11	74	43.74	27.74	5.72	33.31	380	151	P	H
		2483.55	36.76	-17.24	54	36.61	27.74	5.72	33.31	380	151	A	H
		2387.98	42.85	-31.15	74	43.11	27.43	5.64	33.33	125	360	P	V
		2389.94	34.28	-19.72	54	34.53	27.43	5.64	33.32	125	360	A	V
	*	2437	97.38	-	-	97.4	27.61	5.68	33.31	125	360	P	V
	*	2437	90.43	-	-	90.45	27.61	5.68	33.31	125	360	A	V
		2484.46	43.72	-30.28	74	43.57	27.74	5.72	33.31	125	360	P	V
		2483.62	36.47	-17.53	54	36.32	27.74	5.72	33.31	125	360	A	V

802.11n HT20 CH 11 2462MHz	*	2462	97.05	-	-	97	27.68	5.68	33.31	380	151	P	H
	*	2462	90.13	-	-	90.08	27.68	5.68	33.31	380	151	A	H
		2483.72	53.54	-20.46	74	53.39	27.74	5.72	33.31	380	151	P	H
		2483.56	42.19	-11.81	54	42.04	27.74	5.72	33.31	380	151	A	H
	*	2462	96.13	-	-	96.08	27.68	5.68	33.31	117	0	P	V
	*	2462	89.55	-	-	89.5	27.68	5.68	33.31	117	0	A	V
		2483.6	53.41	-20.59	74	53.26	27.74	5.72	33.31	117	0	P	V
		2483.72	41.07	-12.93	54	40.92	27.74	5.72	33.31	117	0	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	42.81	-31.19	74	60.1	31.49	7.82	56.6	153	360	P	H
		4824	43.29	-30.71	74	60.58	31.49	7.82	56.6	153	360	P	V
802.11n HT20 CH 06 2437MHz		4874	40.13	-33.87	74	57.61	31.61	7.82	56.91	153	360	P	H
		7311	42.96	-31.04	74	55.62	36.17	9.17	58	153	360	P	H
		4874	40.84	-33.16	74	58.32	31.61	7.82	56.91	153	360	P	V
		7311	44.99	-29.01	74	57.65	36.17	9.17	58	153	360	P	V
802.11n HT20 CH 11 2462MHz		4924	44.31	-29.69	74	60.84	31.73	7.82	56.08	153	360	P	H
		7386	42.62	-31.38	74	55.14	36.28	9.21	58.01	153	360	P	H
		4924	42.96	-31.04	74	59.49	31.73	7.82	56.08	153	360	P	V
		7386	41.95	-32.05	74	54.47	36.28	9.21	58.01	153	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 HT40 (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 HT40 CH 03 2422MHz		2387	48.07	-25.93	74	48.33	27.43	5.64	33.33	279	215	P	H
		2389.52	40.77	-13.23	54	41.03	27.43	5.64	33.33	279	215	A	H
	*	2422	92.5	-	-	92.62	27.55	5.64	33.31	279	215	P	H
	*	2422	84.15	-	-	84.27	27.55	5.64	33.31	279	215	A	H
		2484.67	44.13	-29.87	74	43.98	27.74	5.72	33.31	279	215	P	H
		2483.5	34.83	-19.17	54	34.68	27.74	5.72	33.31	279	215	A	H
		2389.66	55.38	-18.62	74	55.64	27.43	5.64	33.33	155	174	P	V
		2389.8	48.24	-5.76	54	48.49	27.43	5.64	33.32	155	174	A	V
	*	2422	92.24	-	-	92.36	27.55	5.64	33.31	155	174	P	V
	*	2422	85.66	-	-	85.78	27.55	5.64	33.31	155	174	A	V
		2484.74	43.73	-30.27	74	43.58	27.74	5.72	33.31	155	174	P	V
		2485.16	35.72	-18.28	54	35.57	27.74	5.72	33.31	155	174	A	V
802.11n HT40 CH 06 2437MHz		2388.68	45.7	-28.3	74	45.96	27.43	5.64	33.33	279	215	P	H
		2389.1	36.97	-17.03	54	37.23	27.43	5.64	33.33	279	215	A	H
	*	2437	92.82	-	-	92.84	27.61	5.68	33.31	279	215	P	H
	*	2437	85.85	-	-	85.87	27.61	5.68	33.31	279	215	A	H
		2484.18	51.36	-22.64	74	51.21	27.74	5.72	33.31	279	215	P	H
		2483.76	39.55	-14.45	54	39.4	27.74	5.72	33.31	279	215	A	H
		2389.52	49.28	-24.72	74	49.54	27.43	5.64	33.33	188	161	P	V
		2389.38	40.06	-13.94	54	40.32	27.43	5.64	33.33	188	161	A	V
	*	2437	92.7	-	-	92.72	27.61	5.68	33.31	188	161	P	V
	*	2437	85	-	-	85.02	27.61	5.68	33.31	188	161	A	V
		2484.18	51.3	-22.7	74	51.15	27.74	5.72	33.31	188	161	P	V
		2484.46	41.18	-12.82	54	41.03	27.74	5.72	33.31	188	161	A	V

802.11n HT40 CH 09 2452MHz		2388.68	41.27	-32.73	74	41.53	27.43	5.64	33.33	216	171	P	H
		2389.8	33.66	-20.34	54	33.91	27.43	5.64	33.32	216	171	A	H
	*	2452	92.71	-	-	92.73	27.61	5.68	33.31	216	171	P	H
	*	2452	85.78	-	-	85.8	27.61	5.68	33.31	216	171	A	H
		2483.69	51.3	-22.7	74	51.15	27.74	5.72	33.31	216	171	P	H
		2483.5	43.49	-10.51	54	43.34	27.74	5.72	33.31	216	171	A	H
		2387.14	41.33	-32.67	74	41.59	27.43	5.64	33.33	157	178	P	V
		2387.98	34.44	-19.56	54	34.7	27.43	5.64	33.33	157	178	A	V
	*	2452	92.2	-	-	92.22	27.61	5.68	33.31	157	178	P	V
	*	2452	85.21	-	-	85.23	27.61	5.68	33.31	157	178	A	V
		2485.02	49.56	-24.44	74	49.41	27.74	5.72	33.31	157	178	P	V
		2483.5	41.49	-12.51	54	41.34	27.74	5.72	33.31	157	178	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 HT40 (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		4844	41.27	-32.73	74	58.5	31.53	7.82	56.58	147	360	P	H
HT40		7266	43.66	-30.34	74	56.66	36.13	9.14	58.27	147	360	P	H
CH 03		4844	42.05	-31.95	74	59.28	31.53	7.82	56.58	147	360	P	V
2422MHz		7266	44.6	-29.4	74	57.6	36.13	9.14	58.27	147	360	P	V
802.11n		4874	40.18	-33.82	74	57.66	31.61	7.82	56.91	147	360	P	H
HT40		7311	43.01	-30.99	74	55.67	36.17	9.17	58	147	360	P	H
CH 06		4874	40.43	-33.57	74	57.91	31.61	7.82	56.91	147	360	P	V
2437MHz		7311	44.1	-29.9	74	56.76	36.17	9.17	58	147	360	P	V
802.11n		4904	41.99	-32.01	74	58.83	31.69	7.82	56.35	147	360	P	H
HT40		7356	42.13	-31.87	74	54.67	36.23	9.19	57.96	147	360	P	H
CH 09		4904	40.91	-33.09	74	57.75	31.69	7.82	56.35	147	360	P	V
2452MHz		7356	41.86	-32.14	74	54.4	36.23	9.19	57.96	147	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		30.97	25.98	-14.02	40	32.97	24.52	0.27	31.78	100	120	P	H
		107.6	24.03	-19.47	43.5	37.76	16.73	1.09	31.55	-	-	P	H
		303.54	23.44	-22.56	46	33.35	19.55	1.87	31.33	-	-	P	H
		556.71	27.01	-18.99	46	31.24	24.39	2.58	31.2	-	-	P	H
		676.02	28.5	-17.5	46	31.38	25.46	2.88	31.22	-	-	P	H
		921.43	30.77	-15.23	46	30.01	28.62	3.42	31.28	-	-	P	H
		30.97	26	-14	40	32.99	24.52	0.27	31.78	100	214	P	V
		100.81	22.72	-20.78	43.5	36.71	16.53	1.06	31.58	-	-	P	V
		172.59	22.8	-20.7	43.5	36.08	16.69	1.37	31.34	-	-	P	V
		523.73	25.96	-20.04	46	30.98	23.66	2.49	31.17	-	-	P	V
		769.14	28.35	-17.65	46	30.08	26.42	3.08	31.23	-	-	P	V
		881.66	31.31	-14.69	46	31.06	28.18	3.34	31.27	-	-	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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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)

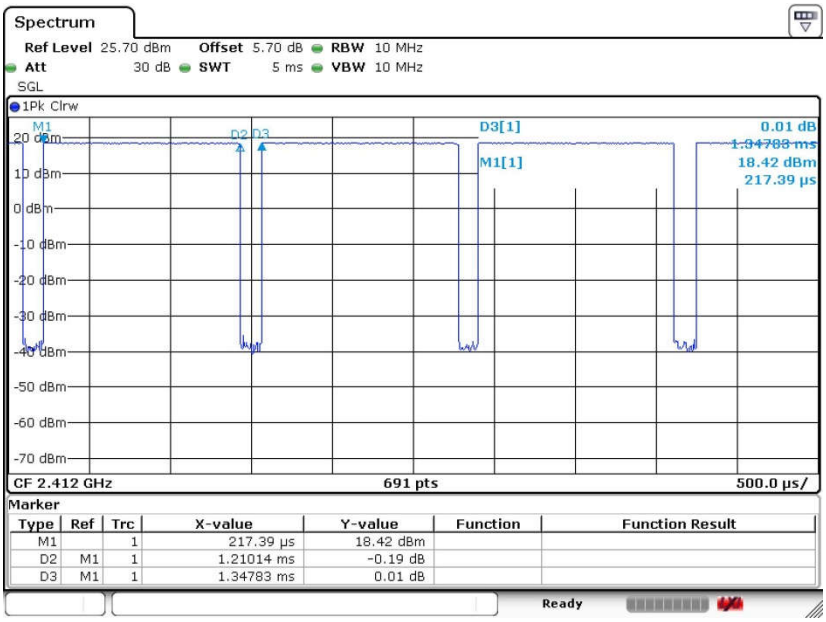
= -10.46(dB)

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

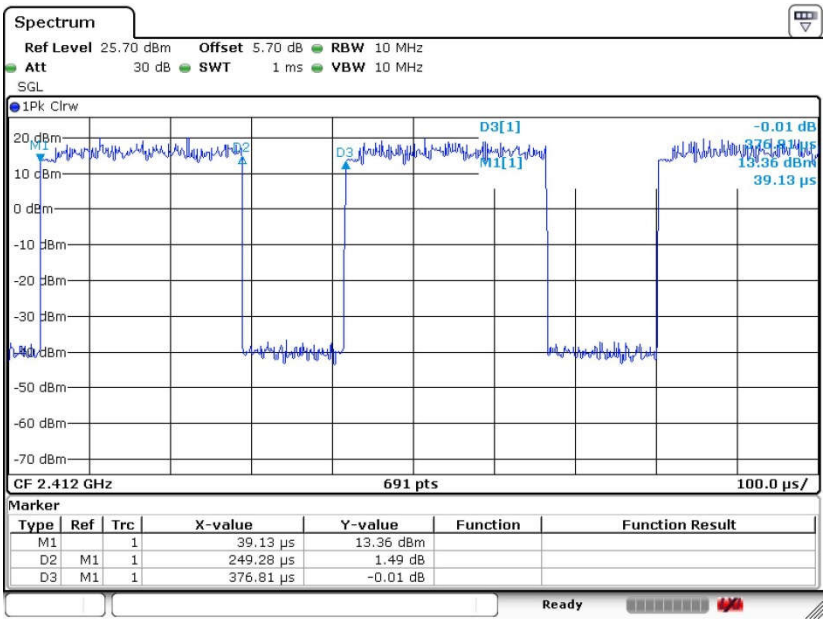
Appendix C. Duty Cycle Plots

Band	Data Rate	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	11Mbps	89.87	1.21	0.826	1KHz
802.11g	54Mbps	66.16	0.249	4.016	10kHz
802.11n HT20	MCS6	66.54	0.248	4.032	10kHz
802.11n HT40	MCS6	52.72	0.141	7.092	10kHz

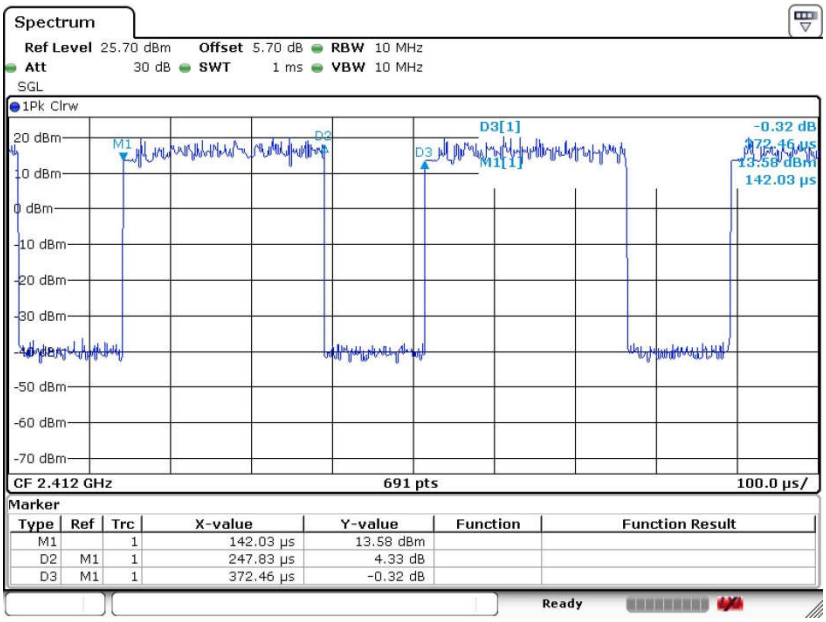
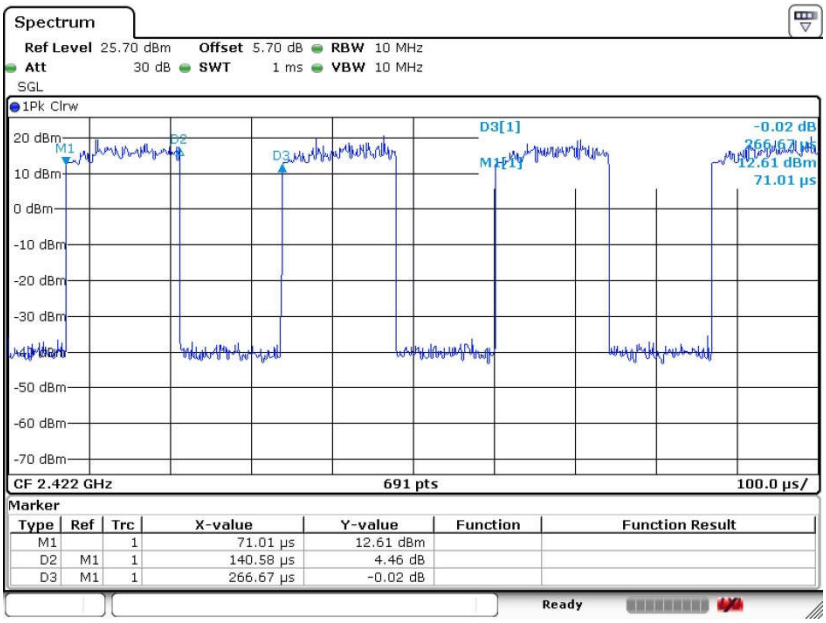
802.11b



802.11g



802.11n HT20



802.11n HT40