



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
FCC ID : IHDT56XJ1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on May 15, 2018 and testing was completed on May 25, 2018. 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.

This report contains data that were produced under subcontract by Laboratory SPORTON INTERNATIONAL INC.

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.



Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.

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China***



TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Product Feature of Equipment Under Test.....	5
1.4 Product Specification of Equipment Under Test.....	6
1.5 Modification of EUT	6
1.6 Specification of Accessory.....	6
1.7 Testing Location	7
1.8 Applicable Standards.....	8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	9
2.1 Carrier Frequency and Channel	9
2.2 Test Mode.....	10
2.3 Connection Diagram of Test System.....	11
2.4 Support Unit used in test configuration and system	11
2.5 EUT Operation Test Setup	12
2.6 Measurement Results Explanation Example.....	12
3 TEST RESULT	13
3.1 6dB Bandwidth Measurement	13
3.2 Output Power Measurement.....	15
3.3 Power Spectral Density Measurement	16
3.4 Conducted Band Edges and Spurious Emission Measurement	18
3.5 Radiated Band Edges and Spurious Emission Measurement	28
3.6 AC Conducted Emission Measurement.....	32
3.7 Antenna Requirements.....	34
4 LIST OF MEASURING EQUIPMENT	35
5 UNCERTAINTY OF EVALUATION	36
APPENDIX A. CONDUCTED TEST RESULTS	
APPENDIX B. AC CONDUCTED EMISSION TEST RESULT	
APPENDIX C. RADIATED SPURIOUS EMISSION	
APPENDIX D. DUTY CYCLE PLOTS	
APPENDIX E. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR851503C	Rev. 01	Initial issue of report	May 31, 2018

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 3.23 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 7.83 dB at 0.240 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
FCC ID	IHDT56XJ1
EUT supports Radios application	CDMA/EV-DO/GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HS DPA/HSPA+ (16QAM uplink is not supported)LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20/ WLAN 5GHz 802.11a/n HT20/HT40/ WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.2 LE/ Bluetooth v5.0 LE
IMEI Code	Conducted: 355550090015731 Conduction: 355550090016408 Radiation: 355550090017364
HW Version	DVT2
SW Version	fastboot_messi_verizon_oem_vzw_userdebug_8.1.0_ODX2 8.56_50ee_intcfg-test-keys_vzw
EUT Stage	Identical Prototype

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



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	802.11b : 19.22 dBm (0.0836 W) 802.11g : 25.48 dBm (0.3532 W) 802.11n HT20 : 25.35 dBm (0.3428 W)
99% Occupied Bandwidth	802.11b : 14.04MHz 802.11g : 18.53MHz 802.11n HT20 : 19.43MHz
Antenna Type / Gain	Fixed internal Antenna with gain 0.50 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Motorola (Salom)	Model Name	SC-22
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2	Brand Name	Motorola (Chenyang)	Model Name	SC-22
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 3	Brand Name	Motorola (Salom)	Model Name	SC-51
	Power Rating	I/P: 100-240 Vac, 600mA, O/P: 5Vdc,3000mA or 9Vdc,2000mA or 12Vdc,1500mA		
AC Adapter 4	Brand Name	Motorola (Chenyang)	Model Name	SC-51
	Power Rating	I/P: 100-240 Vac, 600mA, O/P: 5Vdc,3000mA or 9Vdc,2000mA or 12Vdc,1500mA		
Battery	Brand Name	Motorola (Sunwoda)	Model Name	JS40
	Power Rating	3.8Vdc,3000mAh	Type	Li-ion
USB Cable 1	Brand Name	Motorola (Cabletech)	Model Name	SKN6473A
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		
USB Cable 2	Brand Name	Motorola (Luxshare)	Model Name	SKN6473A
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		
Audio Cable	Brand Name	Motorola (Luxshare)	Model Name	SC18C27844
	Signal Line Type	0.08 meter, shielded cable, without ferrite core		

1.7 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.		FCC Test Firm Registration No.
	TH01-KS	CO01-KS	630927

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

SPORTON INTERNATIONAL INC. is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and under the FCC-recognized accredited testing laboratories by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No.58, Aly. 75, Ln. 564 Wenhua 3rd Rd. Guishan Dist. Taoyuan City Taiwan TEL: 86-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.	FCC designation No.	FCC Test Firm Registration No.
	03CH11-HY	TW0007	214511

Note:

1. The test site complies with ANSI C63.4 2014 requirement.
2. Test data subcontracted: radiated spurious emissions only in section 3.5 of this report.



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

- a. 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: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

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		



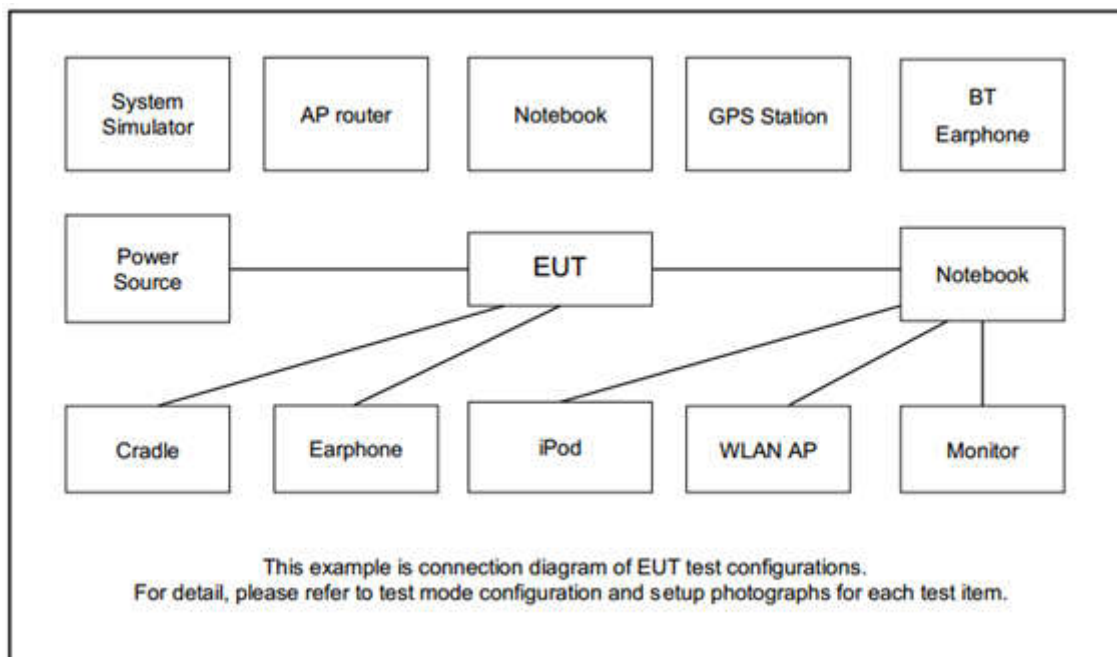
2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

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

Test Cases	
AC Conducted Emission	Mode 1 :GSM 850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable 2(Charging from Adapter 2)
Remark: For Radiated Test Cases, The tests were performed with Adapter 2 and USB Cable 2.	

2.3 Connection Diagram of Test System



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.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
3.	Notebook	Lenovo	G480	FCC DoC	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
4.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m



2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously 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 5.4dB.

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

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.

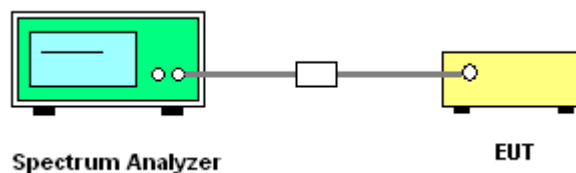
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

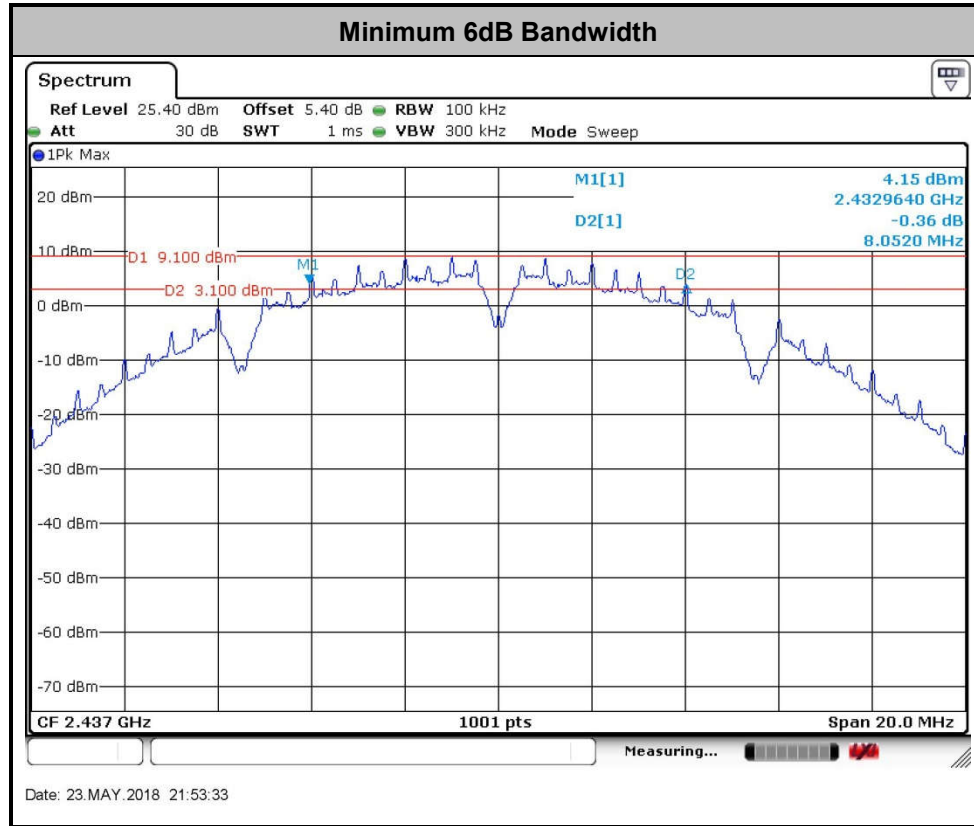
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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.



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 with directional gain greater than 6dBi is 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.

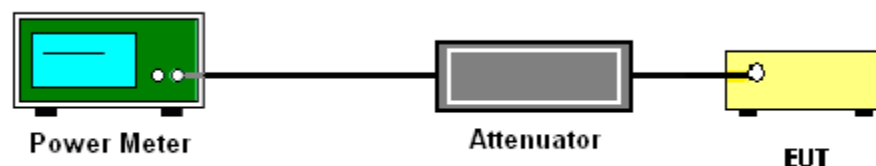
3.2.2 Measuring Instruments

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 9.1.3 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.

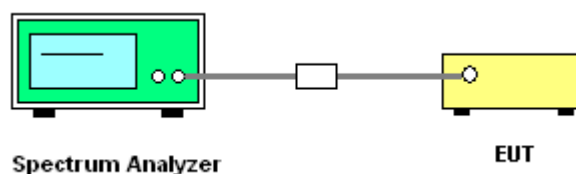
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

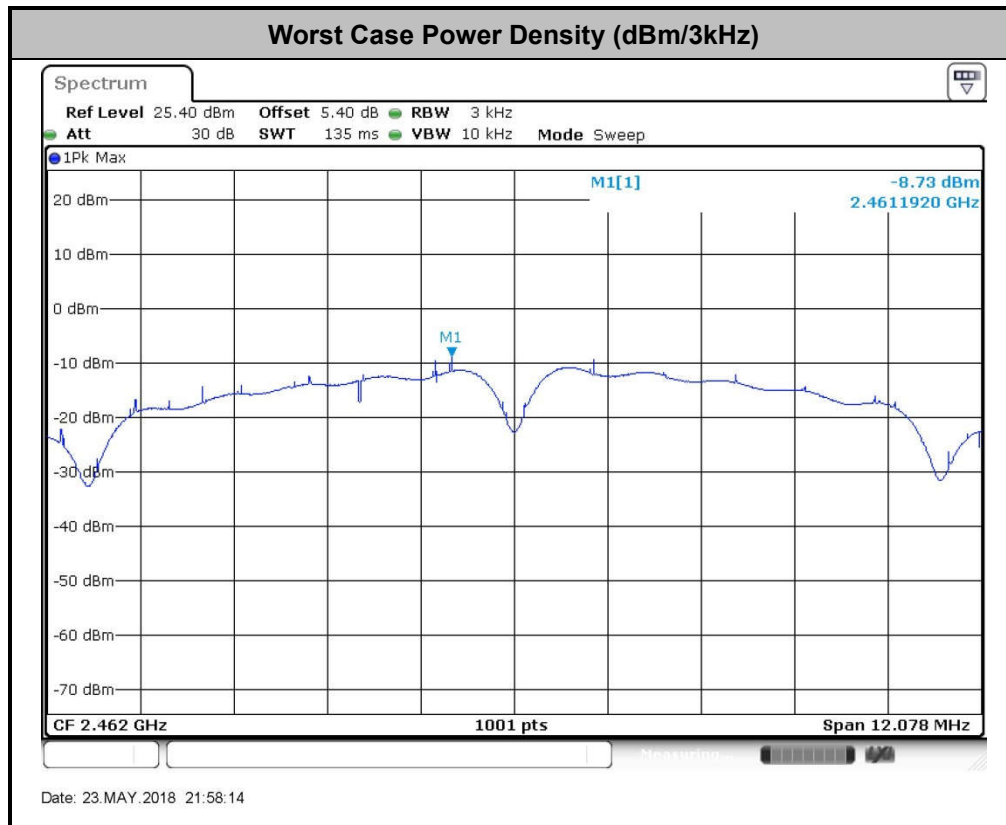
1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. 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.

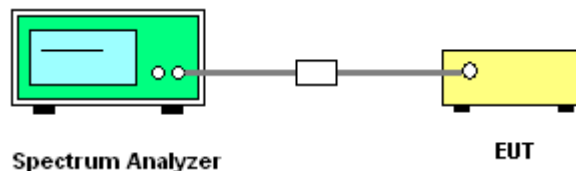
3.4.2 Measuring Instruments

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 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

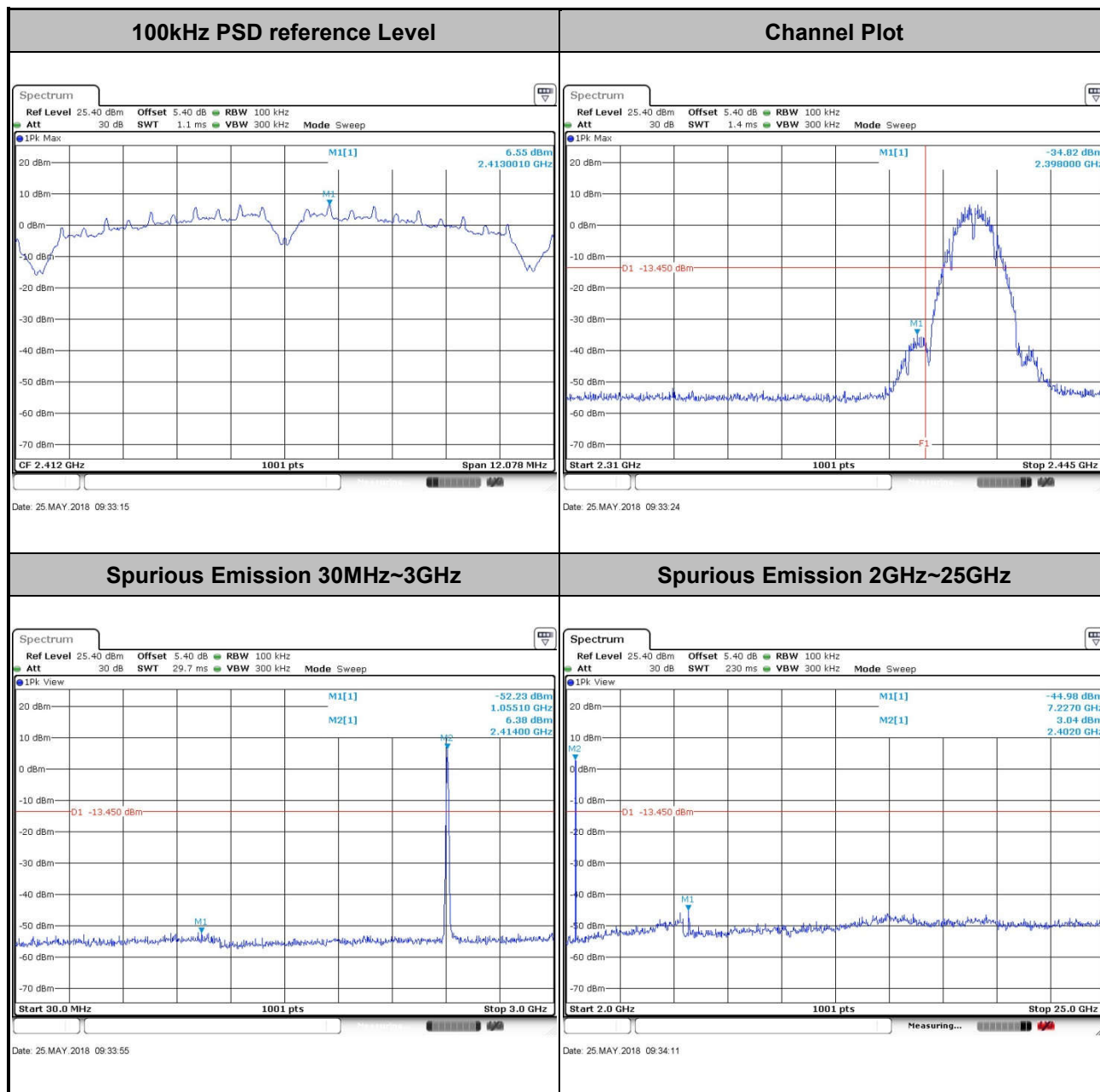




3.4.5 Test Result of Conducted Band Edges and Spurious Emission

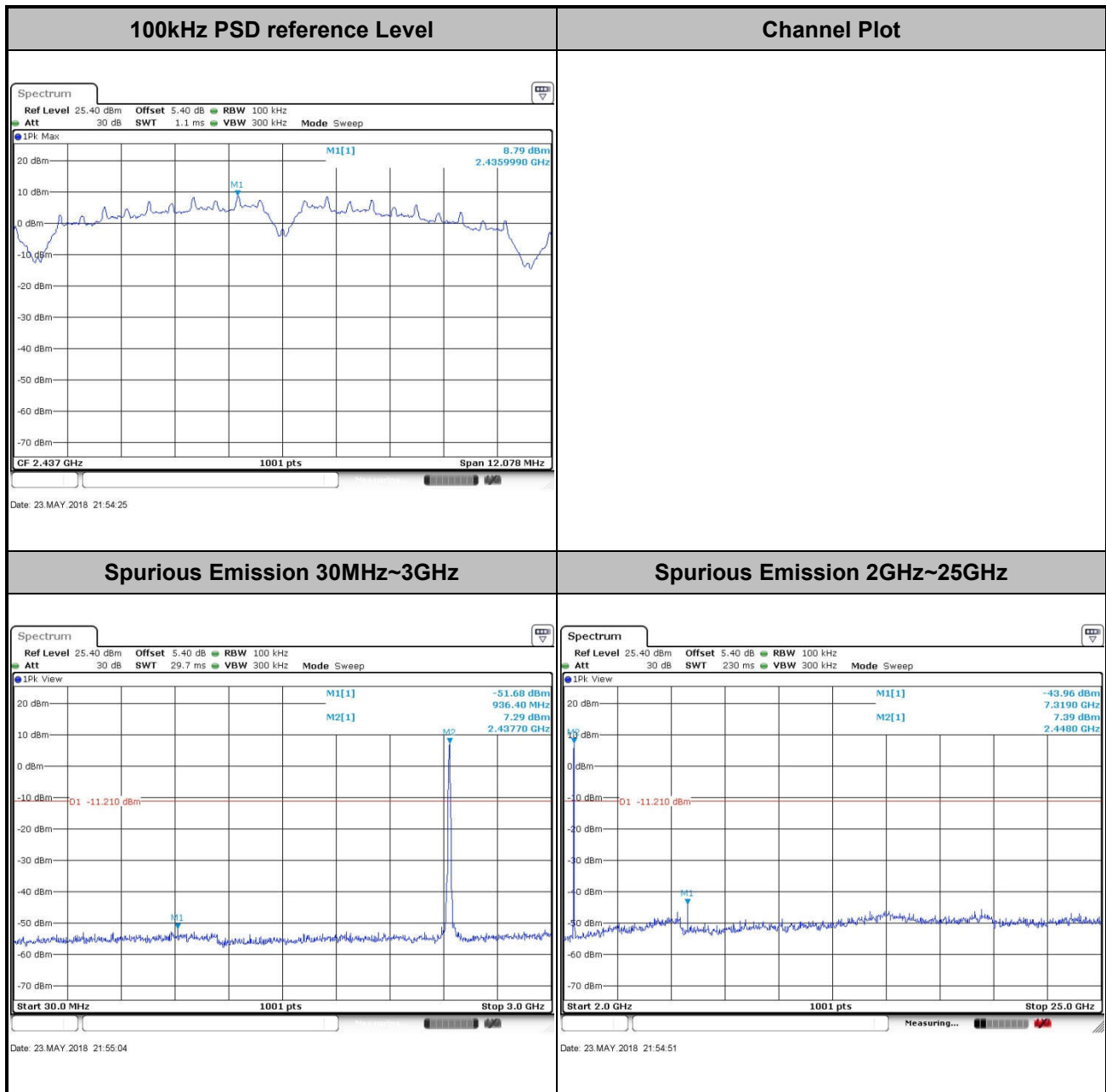
Test Engineer :	Silent Hai	Temperature :	21~25°C
		Relative Humidity :	51~55%

Test Mode :	802.11b	Test Channel :	01
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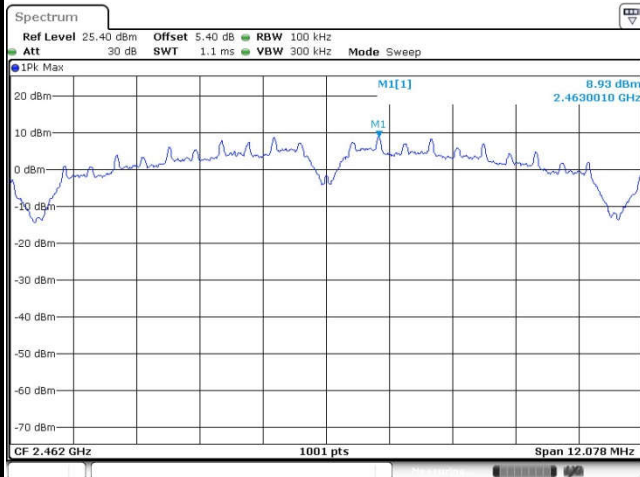
Test Mode :	802.11b	Test Channel :	06
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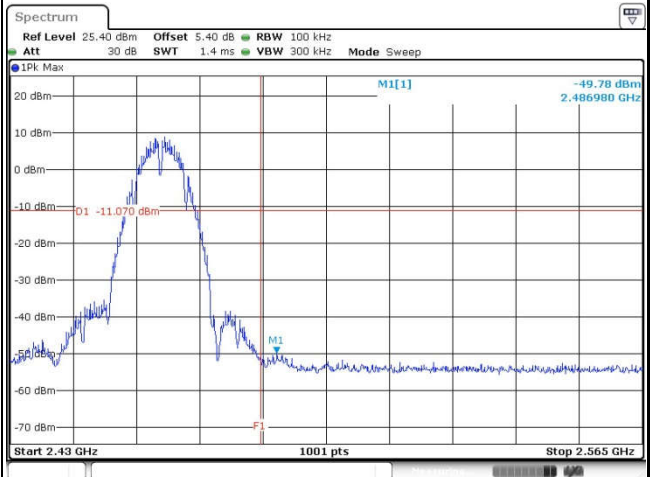


Test Mode :	802.11b	Test Channel :	11
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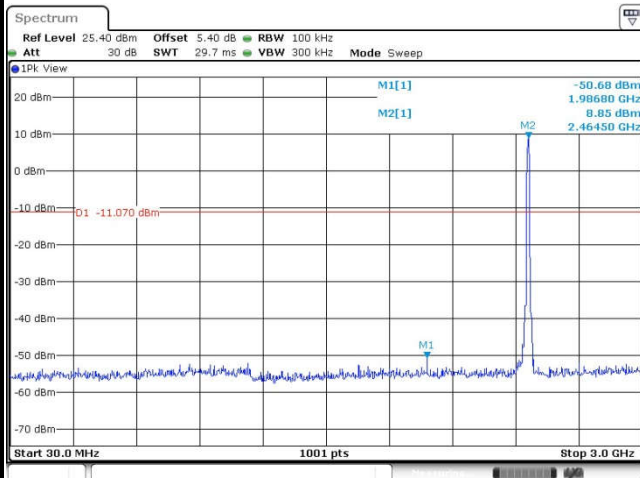
100kHz PSD reference Level



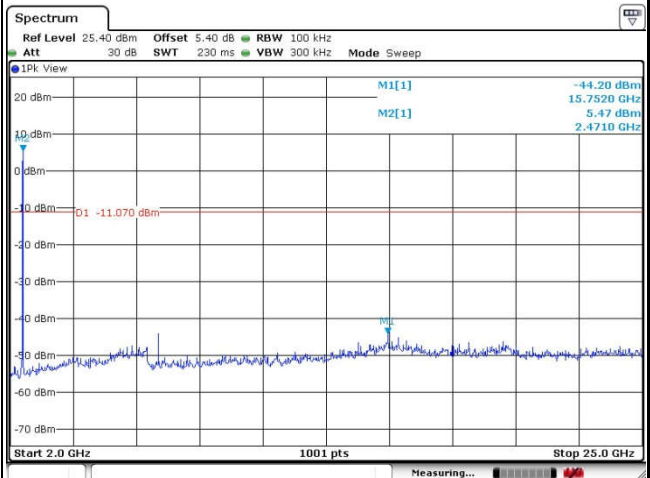
Channel Plot



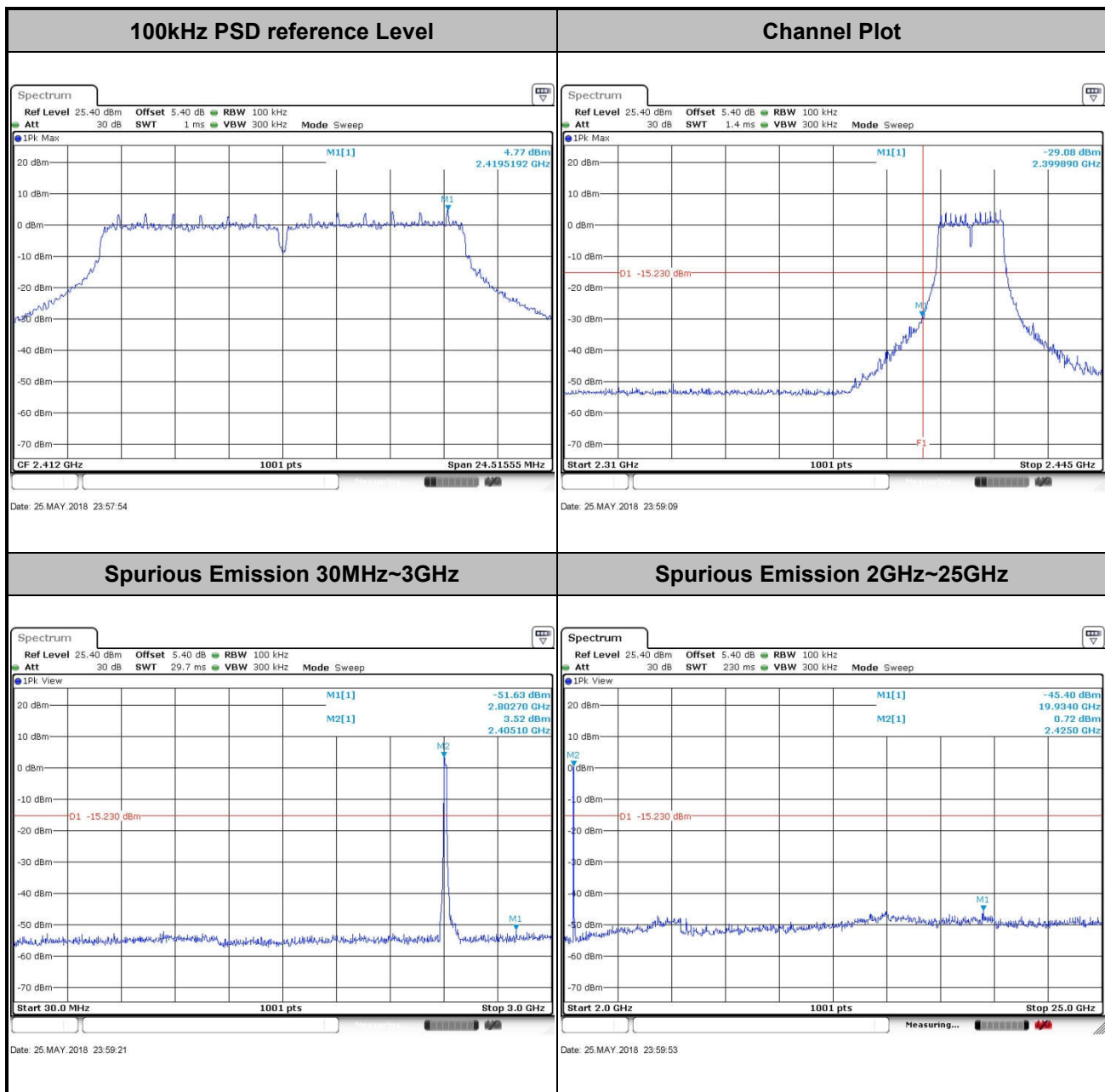
Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

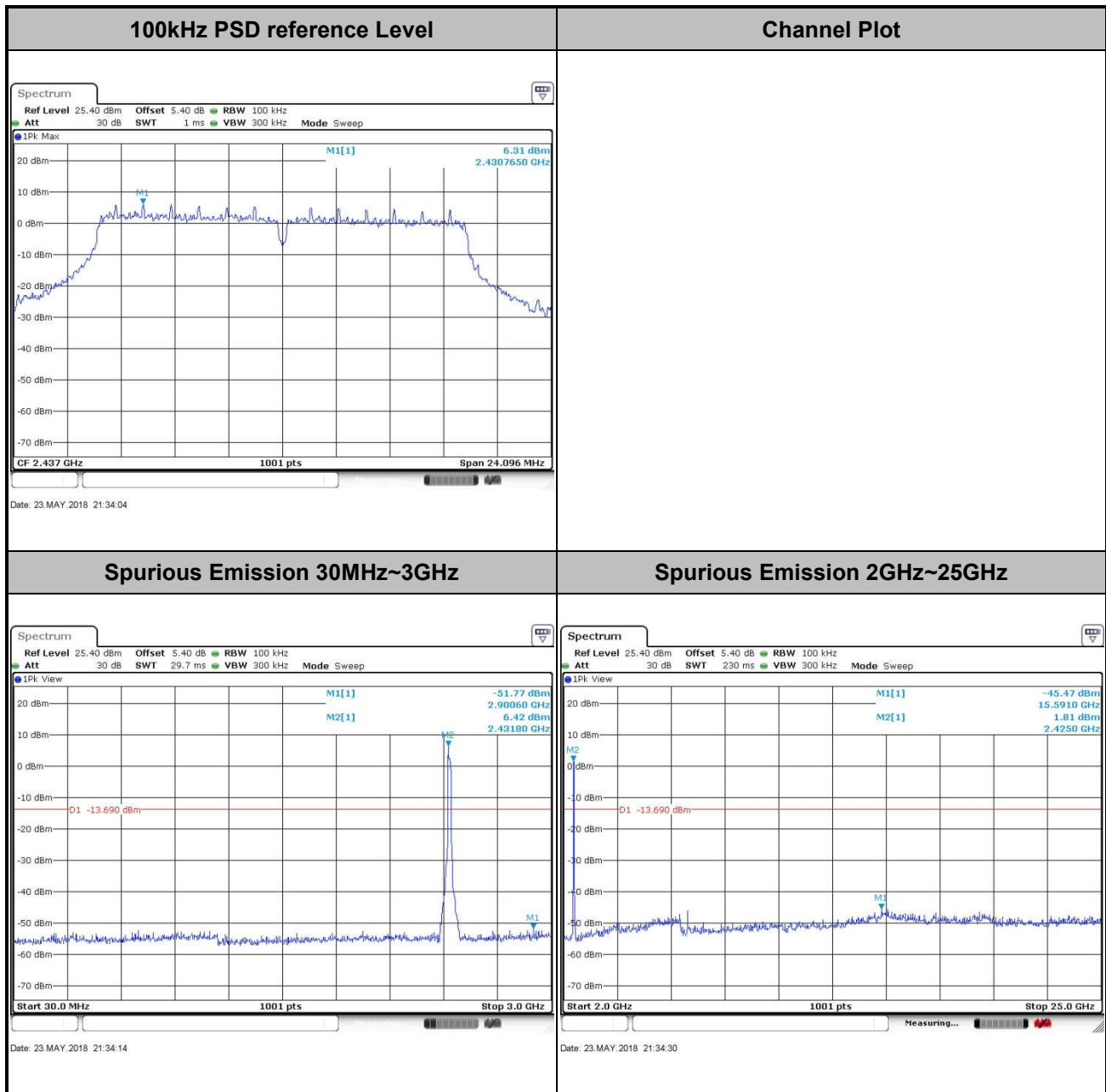


Test Mode :	802.11g	Test Channel :	01
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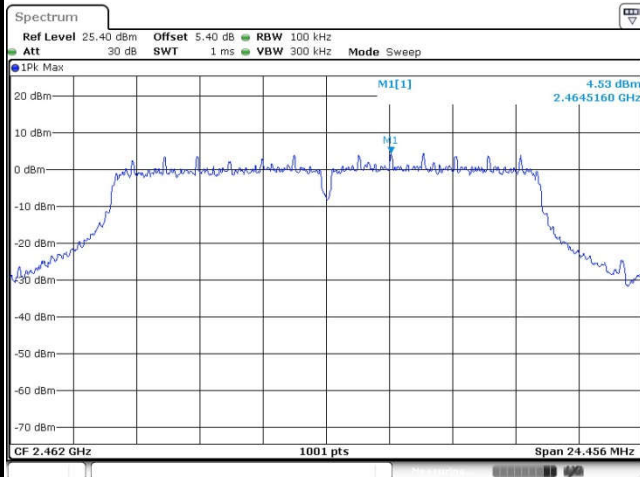
Test Mode :	802.11g	Test Channel :	06
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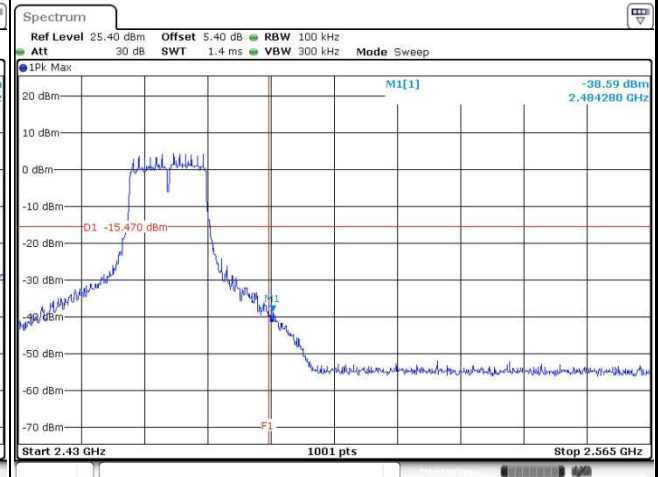


Test Mode :	802.11g	Test Channel :	11
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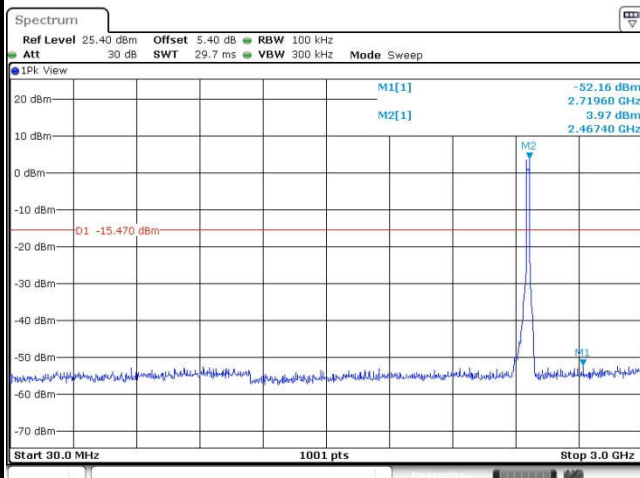
100kHz PSD reference Level



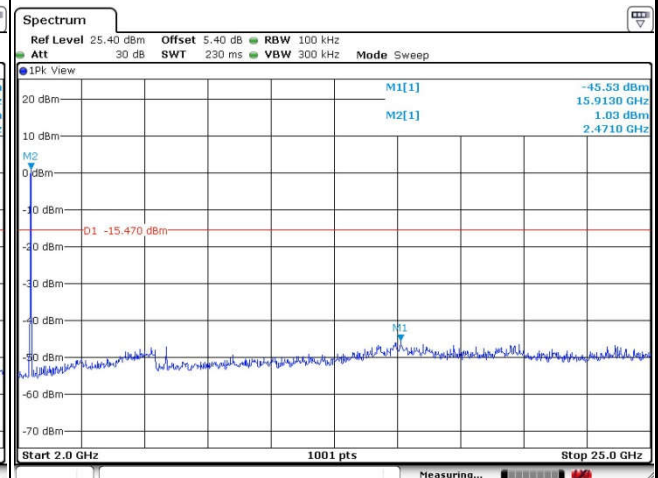
Channel Plot



Spurious Emission 30MHz~3GHz

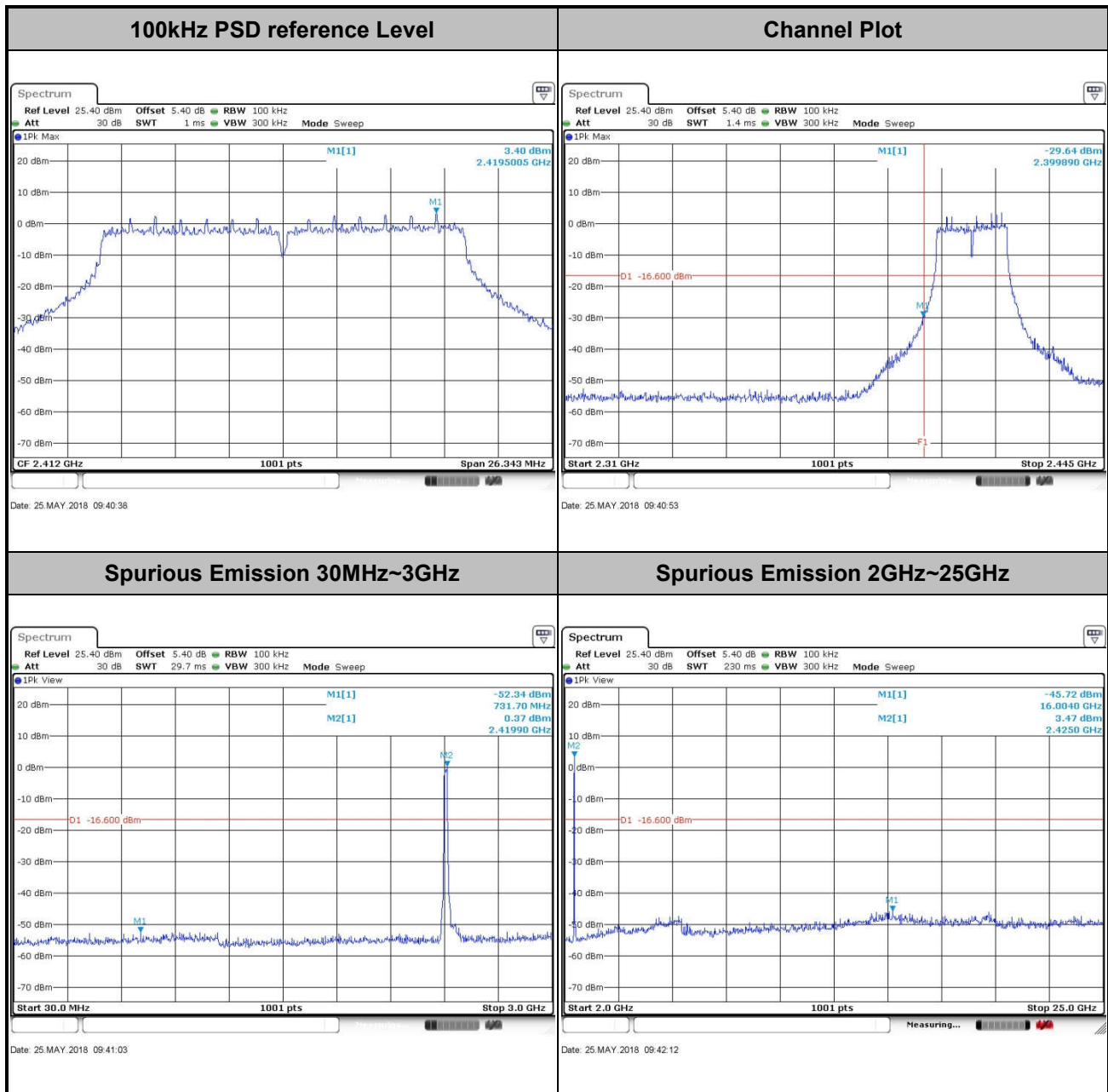


Spurious Emission 2GHz~25GHz



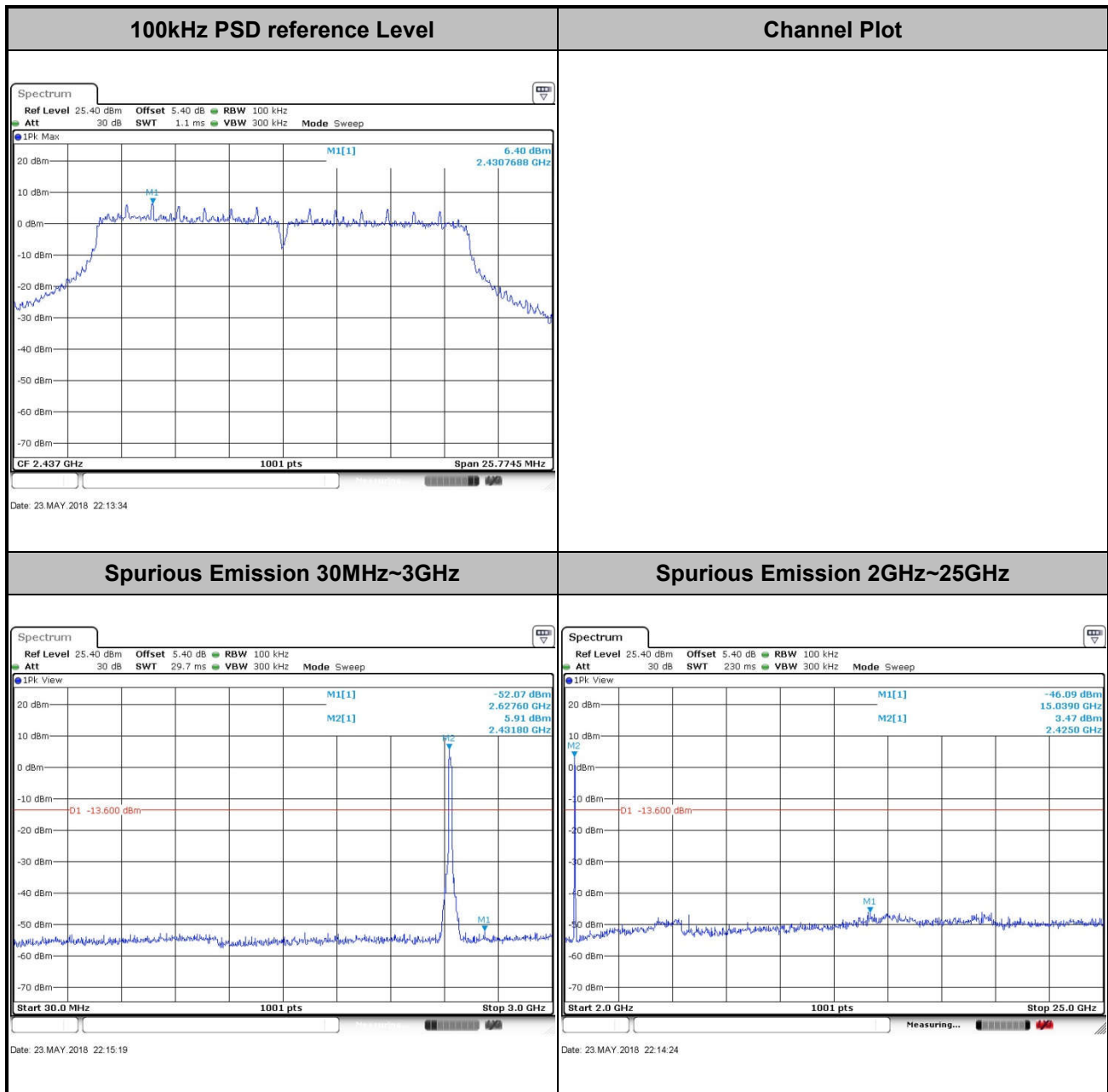


Test Mode :	802.11n HT20	Test Channel :	01
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Test Mode :	802.11n HT20	Test Channel :	06
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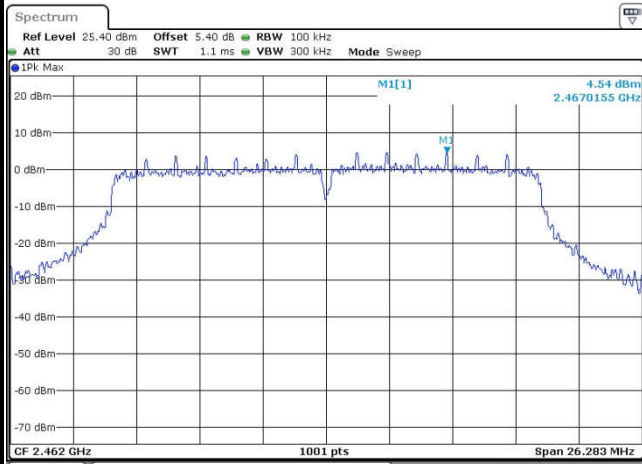




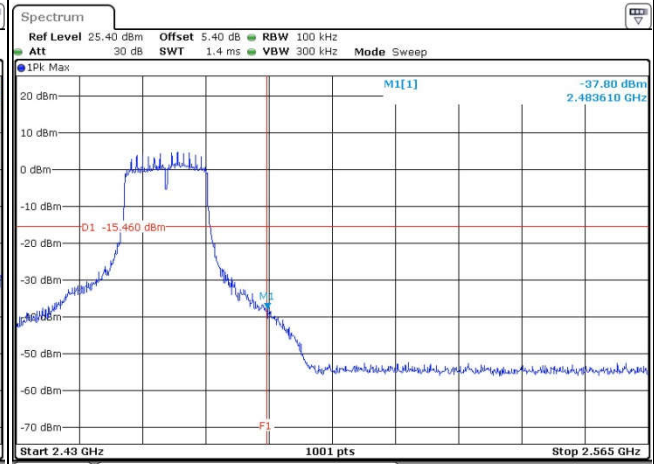
Test Mode : 802.11n HT20

Test Channel : 11

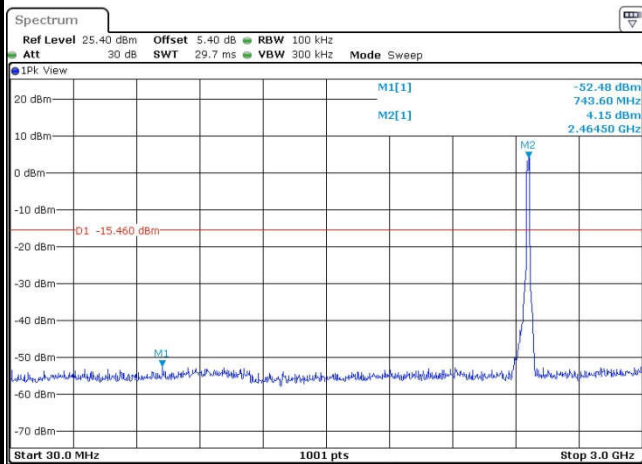
100kHz PSD reference Level



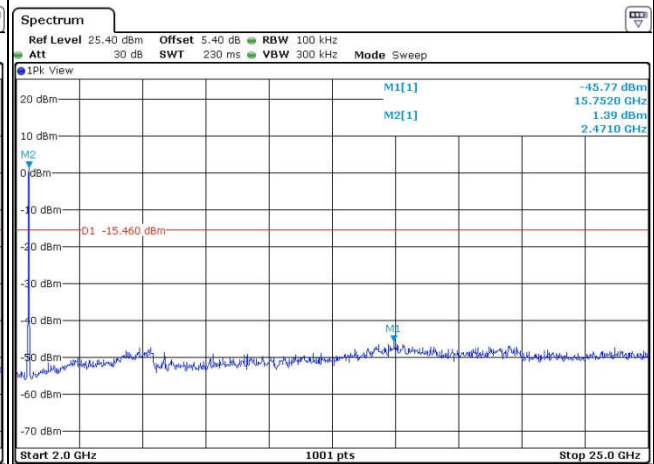
Channel Plot



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

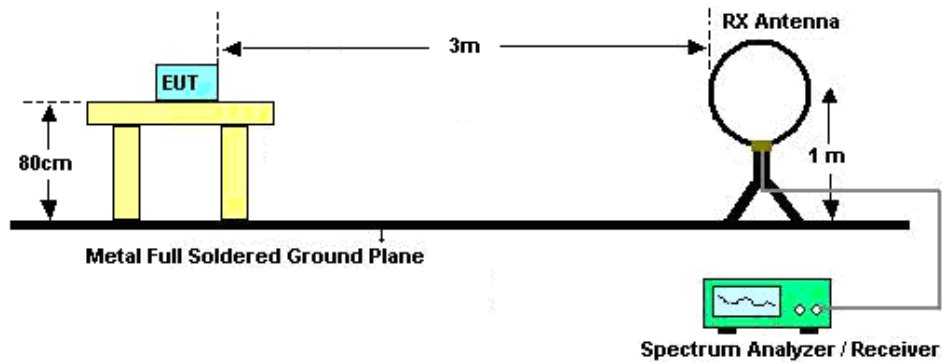
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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 testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. 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:

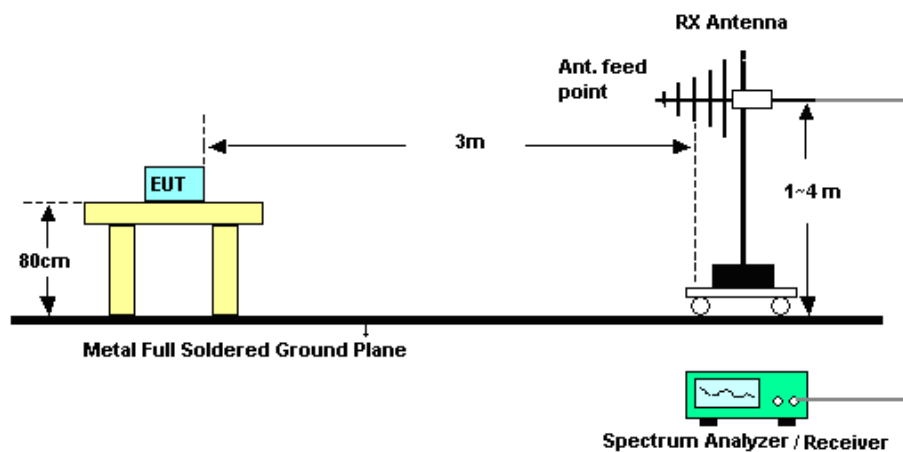
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

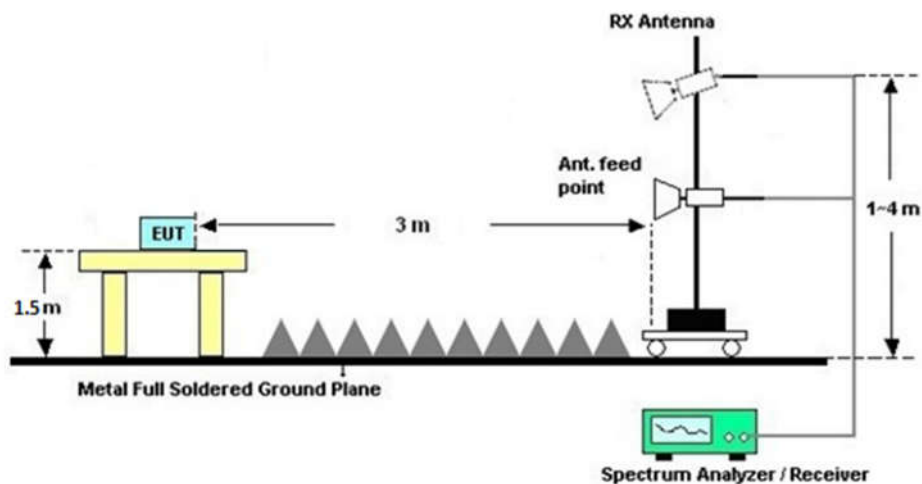
For radiated emissions below 30MHz



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 was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

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.

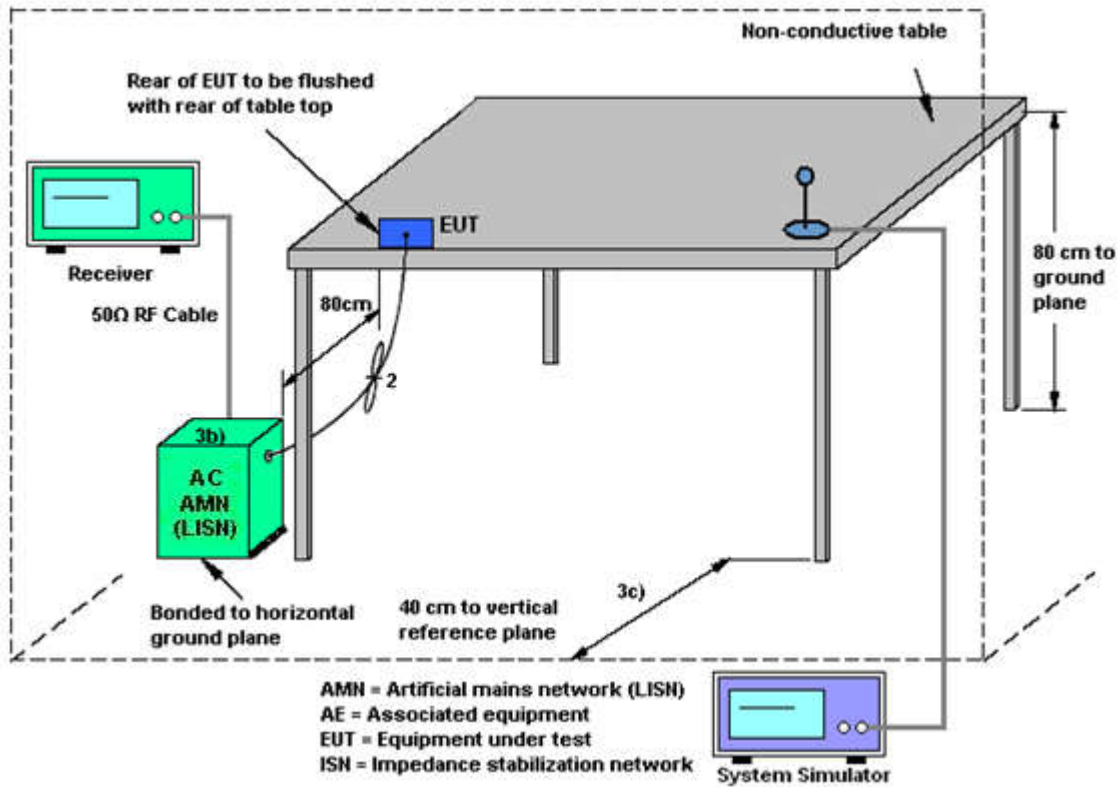
3.6.2 Measuring Instruments

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

Please refer to Appendix B.



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 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. 08, 2017	May 23, 2018~ May 25, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	May 23, 2018~ May 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	May 23, 2018~ May 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 19, 2018	May 25, 2018	Apr. 18, 2019	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	May 25, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	May 25, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	May 25, 2018	Oct. 11, 2018	Conduction (CO01-KS)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	May 24, 2018~ May 25, 2018	Jul. 17, 2018	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Jan. 16, 2018	May 24, 2018~ May 25, 2018	Jan. 15, 2019	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-0 6	35414&AT- N0602	30MHz~1GHz	Oct. 14, 2017	May 24, 2018~ May 25, 2018	Oct. 13, 2018	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-132 6	1GHz ~ 18GHz	Oct. 16, 2017	May 24, 2018~ May 25, 2018	Oct. 15, 2018	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTN-303B	TP140325	N/A	Oct. 12, 2017	May 24, 2018~ May 25, 2018	Oct. 11, 2018	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	May 24, 2018~ May 25, 2018	Nov. 22, 2018	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY532700 80	1GHz~26.5GHz	Jan. 16, 2018	May 24, 2018~ May 25, 2018	Jan. 15, 2019	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 86	10Hz ~ 44GHz	Oct. 19, 2017	May 24, 2018~ May 25, 2018	Oct. 18, 2018	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	NCR	May 24, 2018~ May 25, 2018	NCR	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	NCR	May 24, 2018~ May 25, 2018	NCR	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	NCR	May 24, 2018~ May 25, 2018	NCR	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Nov. 27, 2017	May 24, 2018~ May 25, 2018	Nov. 26, 2018	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-3 03K	171000180 0054002	1GHz~18GHz	Apr. 17, 2018	May 24, 2018~ May 25, 2018	Apr. 16, 2019	Radiation (03CH11-HY)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.3dB
--	-------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.2dB
--	-------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.5dB
--	-------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.2dB
--	-------



Appendix A. conducted test results

A1 - DTS Part

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2018/5/23~2018/5/25	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	14.04	8.05	0.50	Pass
11b	1Mbps	1	6	2437	13.84	8.05	0.50	Pass
11b	1Mbps	1	11	2462	13.59	8.05	0.50	Pass
11g	6Mbps	1	1	2412	18.48	16.34	0.50	Pass
11g	6Mbps	1	6	2437	18.53	16.06	0.50	Pass
11g	6Mbps	1	11	2462	18.18	16.30	0.50	Pass
HT20	MCS0	1	1	2412	19.43	17.56	0.50	Pass
HT20	MCS0	1	6	2437	19.33	17.18	0.50	Pass
HT20	MCS0	1	11	2462	19.03	17.52	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	16.81	30.00	0.50	17.31	36.00	Pass
11b	1Mbps	1	6	2437	19.11	30.00	0.50	19.61	36.00	Pass
11b	1Mbps	1	11	2462	19.22	30.00	0.50	19.72	36.00	Pass
11g	6Mbps	1	1	2412	24.77	30.00	0.50	25.27	36.00	Pass
11g	6Mbps	1	6	2437	25.48	30.00	0.50	25.98	36.00	Pass
11g	6Mbps	1	11	2462	25.12	30.00	0.50	25.62	36.00	Pass
HT20	MCS0	1	1	2412	23.96	30.00	0.50	24.46	36.00	Pass
HT20	MCS0	1	6	2437	25.35	30.00	0.50	25.85	36.00	Pass
HT20	MCS0	1	11	2462	25.05	30.00	0.50	25.55	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

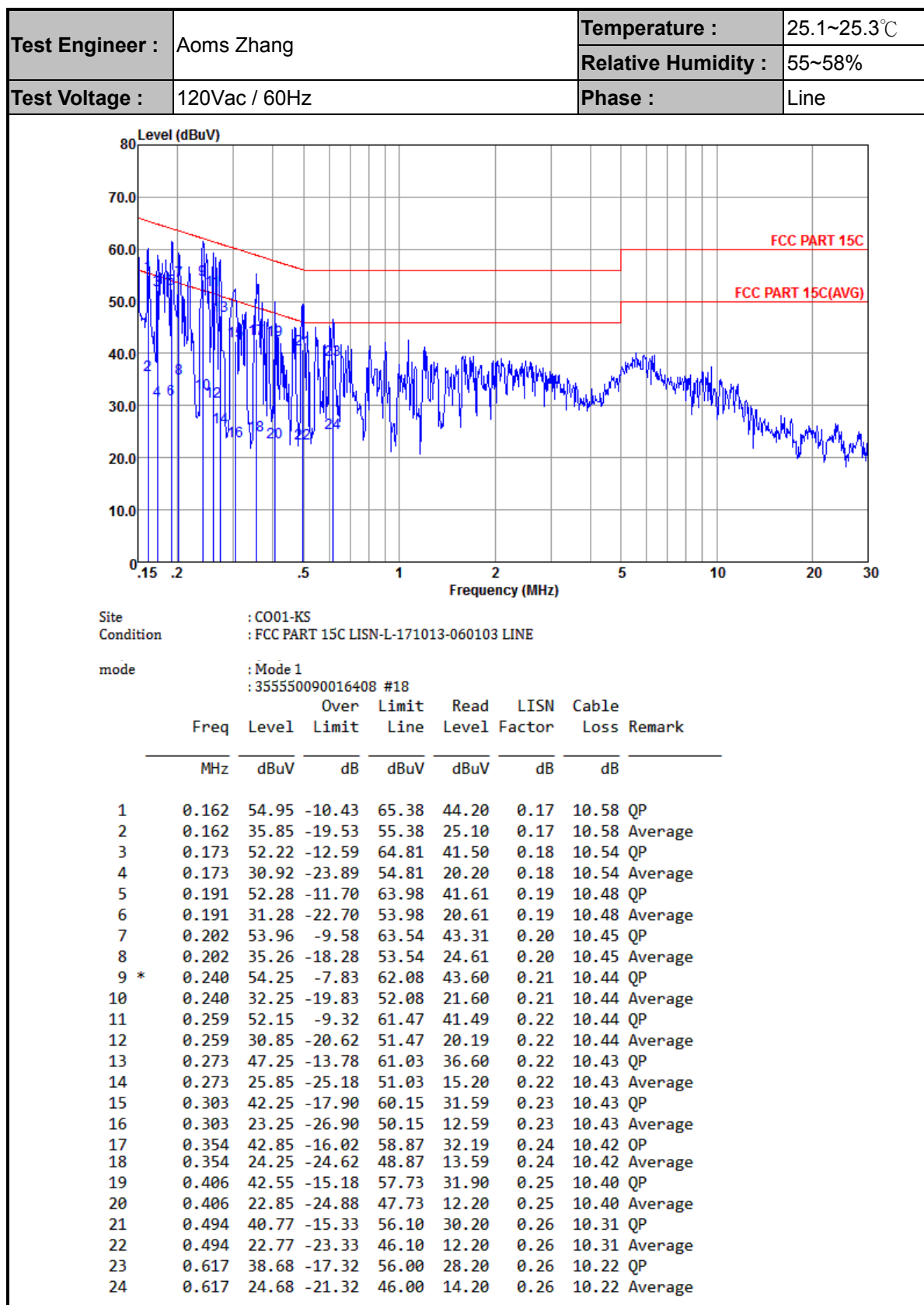
2.4GHz Band						
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	14.56
11b	1Mbps	1	6	2437	0.00	16.68
11b	1Mbps	1	11	2462	0.00	16.79
11g	6Mbps	1	1	2412	0.08	14.71
11g	6Mbps	1	6	2437	0.08	16.71
11g	6Mbps	1	11	2462	0.08	15.34
HT20	MCS0	1	1	2412	0.08	13.85
HT20	MCS0	1	6	2437	0.08	16.76
HT20	MCS0	1	11	2462	0.08	15.53

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	-11.84	0.50	8.00	Pass
11b	1Mbps	1	6	2437	-9.38	0.50	8.00	Pass
11b	1Mbps	1	11	2462	-8.73	0.50	8.00	Pass
11g	6Mbps	1	1	2412	-10.39	0.50	8.00	Pass
11g	6Mbps	1	6	2437	-8.98	0.50	8.00	Pass
11g	6Mbps	1	11	2462	-11.49	0.50	8.00	Pass
HT20	MCS0	1	1	2412	-11.46	0.50	8.00	Pass
HT20	MCS0	1	6	2437	-9.25	0.50	8.00	Pass
HT20	MCS0	1	11	2462	-10.48	0.50	8.00	Pass

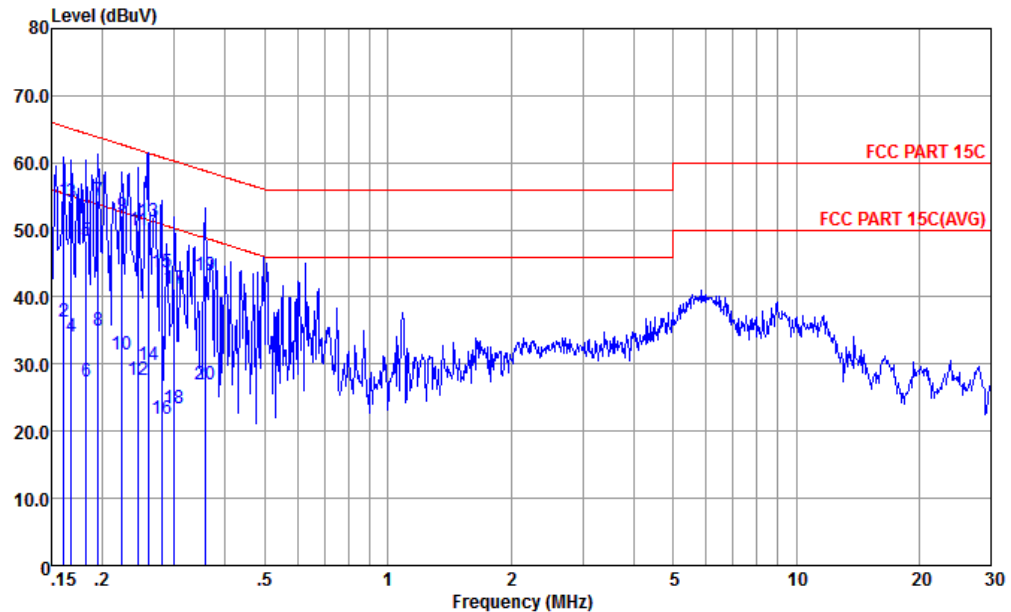


Appendix B. AC Conducted Emission Test Results





Test Engineer :	Aoms Zhang	Temperature :	25.1~25.3℃
		Relative Humidity :	55~58%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Site : CO01-KS
Condition : FCC PART 15C LISN-N-171013-060103 NEUTRAL
mode : Mode 1
: 355550090016408 #18

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.161	54.46	-10.97	65.43	43.60	0.28	10.58	QP
2	0.161	36.36	-19.07	55.43	25.50	0.28	10.58	Average
3	0.168	54.13	-10.95	65.08	43.30	0.28	10.55	QP
4	0.168	34.13	-20.95	55.08	23.30	0.28	10.55	Average
5	0.182	48.29	-16.08	64.37	37.50	0.28	10.51	QP
6	0.182	27.39	-26.98	54.37	16.60	0.28	10.51	Average
7 *	0.195	54.35	-9.45	63.80	43.60	0.28	10.47	QP
8	0.195	34.95	-18.85	53.80	24.20	0.28	10.47	Average
9	0.223	52.23	-10.47	62.70	41.50	0.28	10.45	QP
10	0.223	31.33	-21.37	52.70	20.60	0.28	10.45	Average
11	0.246	49.92	-11.99	61.91	39.20	0.28	10.44	QP
12	0.246	27.62	-24.29	51.91	16.90	0.28	10.44	Average
13	0.259	51.32	-10.15	61.47	40.60	0.28	10.44	QP
14	0.259	29.92	-21.55	51.47	19.20	0.28	10.44	Average
15	0.279	43.62	-17.23	60.85	32.91	0.28	10.43	QP
16	0.279	21.92	-28.93	50.85	11.21	0.28	10.43	Average
17	0.299	41.31	-18.97	60.28	30.60	0.28	10.43	QP
18	0.299	23.31	-26.97	50.28	12.60	0.28	10.43	Average
19	0.358	43.20	-15.58	58.78	32.50	0.29	10.41	QP
20	0.358	26.90	-21.88	48.78	16.20	0.29	10.41	Average



Appendix C. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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		2378.985	52.93	-21.07	74	43.22	27.09	16.22	33.6	307	89	P	H
		2389.905	42.4	-11.6	54	32.57	27.13	16.29	33.59	307	89	A	H
	*	2412	107.52	-	-	97.63	27.18	16.3	33.59	307	89	P	H
	*	2412	104.48	-	-	94.59	27.18	16.3	33.59	307	89	A	H
		2352.21	51.79	-22.21	74	42.2	27.04	16.15	33.6	347	130	P	V
		2387.595	41.77	-12.23	54	31.95	27.13	16.29	33.6	347	130	A	V
	*	2412	104.24	-	-	94.35	27.18	16.3	33.59	347	130	P	V
	*	2412	101.28	-	-	91.39	27.18	16.3	33.59	347	130	A	V
802.11b CH 06 2437MHz		2382.96	52	-22	74	42.22	27.09	16.29	33.6	299	86	P	H
		2390	41.55	-12.45	54	31.72	27.13	16.29	33.59	299	86	A	H
	*	2437	106.87	-	-	96.88	27.27	16.31	33.59	299	86	P	H
	*	2437	103.66	-	-	93.67	27.27	16.31	33.59	299	86	A	H
		2485.12	52.74	-21.26	74	42.64	27.36	16.32	33.58	299	86	P	H
		2483.92	41.95	-12.05	54	31.86	27.36	16.31	33.58	299	86	A	H
		2339.6	52.01	-21.99	74	42.46	27	16.15	33.6	389	116	P	V
		2389.04	41.39	-12.61	54	31.57	27.13	16.29	33.6	389	116	A	V
	*	2437	105.03	-	-	95.04	27.27	16.31	33.59	389	116	P	V
	*	2437	101.68	-	-	91.69	27.27	16.31	33.59	389	116	A	V
		2492.96	53.26	-20.74	74	43.11	27.4	16.32	33.57	389	116	P	V
		2483.76	41.61	-12.39	54	31.52	27.36	16.31	33.58	389	116	A	V



802.11b CH 11 2462MHz	*	2462	107.14	-	-	97.1	27.31	16.31	33.58	296	88	P	H
	*	2462	103.91	-	-	93.87	27.31	16.31	33.58	296	88	A	H
		2490.8	52.97	-21.03	74	42.83	27.4	16.32	33.58	296	88	P	H
		2485.48	43.11	-10.89	54	33.01	27.36	16.32	33.58	296	88	A	H
	*	2462	103.77	-	-	93.73	27.31	16.31	33.58	388	126	P	V
	*	2462	100.68	-	-	90.64	27.31	16.31	33.58	388	126	A	V
		2491.72	52.33	-21.67	74	42.19	27.4	16.32	33.58	388	126	P	V
		2484	41.78	-12.22	54	31.69	27.36	16.31	33.58	388	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 802.11b (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	46.65	-27.35	74	61.91	31.29	10.02	56.57	100	0	P	H
		4824	46.1	-27.9	74	61.36	31.29	10.02	56.57	100	0	P	V
802.11b CH 06 2437MHz		4874	46.67	-27.33	74	61.85	31.38	9.99	56.55	100	0	P	H
		7311	46.62	-27.38	74	54.8	36.28	11.77	56.23	100	0	P	H
		4874	44.16	-29.84	74	59.34	31.38	9.99	56.55	100	0	P	V
		7311	44.33	-29.67	74	52.51	36.28	11.77	56.23	100	0	P	V
802.11b CH 11 2462MHz		4924	42.22	-31.78	74	57.28	31.48	9.99	56.53	100	0	P	H
		7386	44.36	-29.64	74	52.33	36.47	11.68	56.12	100	0	P	H
		4924	40.48	-33.52	74	55.54	31.48	9.99	56.53	100	0	P	V
		7386	43.46	-30.54	74	51.43	36.47	11.68	56.12	100	0	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2388.96	64.62	-9.38	74	54.8	27.13	16.29	33.6	305	88	P	H
		2390	50.46	-3.54	54	40.63	27.13	16.29	33.59	305	88	A	H
	*	2412	107.42	-	-	97.53	27.18	16.3	33.59	305	88	P	H
	*	2412	99.66	-	-	89.77	27.18	16.3	33.59	305	88	A	H
		2389.275	62.16	-11.84	74	52.34	27.13	16.29	33.6	347	128	P	V
		2389.275	47.81	-6.19	54	37.99	27.13	16.29	33.6	347	128	A	V
	*	2412	104.42	-	-	94.53	27.18	16.3	33.59	347	128	P	V
	*	2412	96.67	-	-	86.78	27.18	16.3	33.59	347	128	A	V
802.11g CH 06 2437MHz		2390	55.46	-18.54	74	45.63	27.13	16.29	33.59	271	87	P	H
		2390	44.71	-9.29	54	34.88	27.13	16.29	33.59	271	87	A	H
	*	2437	109.21	-	-	99.22	27.27	16.31	33.59	271	87	P	H
	*	2437	101.43	-	-	91.44	27.27	16.31	33.59	271	87	A	H
		2484.08	54.71	-19.29	74	44.62	27.36	16.31	33.58	271	87	P	H
		2483.84	44.53	-9.47	54	34.44	27.36	16.31	33.58	271	87	A	H
		2387.28	52.18	-21.82	74	42.36	27.13	16.29	33.6	386	128	P	V
		2390	42.81	-11.19	54	32.98	27.13	16.29	33.59	386	128	A	V
	*	2437	106.34	-	-	96.35	27.27	16.31	33.59	386	128	P	V
	*	2437	98.76	-	-	88.77	27.27	16.31	33.59	386	128	A	V
		2485.12	53.59	-20.41	74	43.49	27.36	16.32	33.58	386	128	P	V
		2484.16	43.4	-10.6	54	33.31	27.36	16.31	33.58	386	128	A	V



802.11g CH 11 2462MHz	*	2462	107.49	-	-	97.45	27.31	16.31	33.58	300	87	P	H
	*	2462	99.92	-	-	89.88	27.31	16.31	33.58	300	87	A	H
		2483.56	64.5	-9.5	74	54.41	27.36	16.31	33.58	300	87	P	H
		2483.68	50.12	-3.88	54	40.03	27.36	16.31	33.58	300	87	A	H
	*	2462	103.55	-	-	93.51	27.31	16.31	33.58	382	139	P	V
	*	2462	95.83	-	-	85.79	27.31	16.31	33.58	382	139	A	V
		2483.52	59.99	-14.01	74	49.9	27.36	16.31	33.58	382	139	P	V
		2483.52	46.67	-7.33	54	36.58	27.36	16.31	33.58	382	139	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	41.43	-32.57	74	56.69	31.29	10.02	56.57	100	0	P	H
		4824	41.1	-32.9	74	56.36	31.29	10.02	56.57	100	0	P	V
802.11g CH 06 2437MHz		4874	41.2	-32.8	74	56.38	31.38	9.99	56.55	100	0	P	H
		7311	52.99	-21.01	74	61.17	36.28	11.77	56.23	100	294	P	H
		7311	38.23	-15.77	54	46.41	36.28	11.77	56.23	100	294	A	H
		4874	41.34	-32.66	74	56.52	31.38	9.99	56.55	100	0	P	V
		7311	52.29	-21.71	74	60.47	36.28	11.77	56.23	400	55	P	V
		7311	37.22	-16.78	54	45.4	36.28	11.77	56.23	400	55	A	V
802.11g CH 11 2462MHz		4924	40.54	-33.46	74	55.6	31.48	9.99	56.53	100	0	P	H
		7386	50.05	-23.95	74	58.02	36.47	11.68	56.12	100	331	P	H
		7386	35.85	-18.15	54	43.82	36.47	11.68	56.12	100	331	A	H
		4924	39.14	-34.86	74	54.2	31.48	9.99	56.53	100	0	P	V
		7386	45.07	-28.93	74	53.04	36.47	11.68	56.12	100	0	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.905	62.26	-11.74	74	52.43	27.13	16.29	33.59	306	89	P	H
		2390	50.14	-3.86	54	40.31	27.13	16.29	33.59	306	89	A	H
	*	2412	106.81	-	-	96.92	27.18	16.3	33.59	306	89	P	H
	*	2412	98.94	-	-	89.05	27.18	16.3	33.59	306	89	A	H
		2390	58.89	-15.11	74	49.06	27.13	16.29	33.59	394	119	P	V
		2390	48.35	-5.65	54	38.52	27.13	16.29	33.59	394	119	A	V
	*	2412	104.59	-	-	94.7	27.18	16.3	33.59	394	119	P	V
	*	2412	96.71	-	-	86.82	27.18	16.3	33.59	394	119	A	V
802.11n HT20 CH 06 2437MHz		2389.36	54.68	-19.32	74	44.86	27.13	16.29	33.6	300	87	P	H
		2389.2	44.35	-9.65	54	34.53	27.13	16.29	33.6	300	87	A	H
	*	2437	108.61	-	-	98.62	27.27	16.31	33.59	300	87	P	H
	*	2437	101.02	-	-	91.03	27.27	16.31	33.59	300	87	A	H
		2484.64	53.92	-20.08	74	43.82	27.36	16.32	33.58	300	87	P	H
		2484	44.97	-9.03	54	34.88	27.36	16.31	33.58	300	87	A	H
		2387.6	52.55	-21.45	74	42.73	27.13	16.29	33.6	388	121	P	V
		2389.2	43.48	-10.52	54	33.66	27.13	16.29	33.6	388	121	A	V
	*	2437	106.98	-	-	96.99	27.27	16.31	33.59	388	121	P	V
	*	2437	99.34	-	-	89.35	27.27	16.31	33.59	388	121	A	V
		2484.88	53.1	-20.9	74	43	27.36	16.32	33.58	388	121	P	V
		2483.84	43.38	-10.62	54	33.29	27.36	16.31	33.58	388	121	A	V



802.11n HT20 CH 11 2462MHz	*	2462	106.79	-	-	96.75	27.31	16.31	33.58	299	87	P	H
	*	2462	99.04	-	-	89	27.31	16.31	33.58	299	87	A	H
		2484.95	63.22	-10.78	74	53.12	27.36	16.32	33.58	299	87	P	H
		2483.5	50.77	-3.23	54	40.68	27.36	16.31	33.58	299	87	A	H
	*	2462	104.96	-	-	94.92	27.31	16.31	33.58	375	122	P	V
	*	2462	96.9	-	-	86.86	27.31	16.31	33.58	375	122	A	V
		2485.05	60.71	-13.29	74	50.61	27.36	16.32	33.58	375	122	P	V
		2483.5	49.28	-4.72	54	39.19	27.36	16.31	33.58	375	122	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)	Path 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	40.01	-33.99	74	55.27	31.29	10.02	56.57	100	0	P	H
		4824	39.97	-34.03	74	55.23	31.29	10.02	56.57	100	0	P	V
802.11n HT20 CH 06 2437MHz		4874	42.13	-31.87	74	57.31	31.38	9.99	56.55	100	0	P	H
		7311	55.49	-18.51	74	63.67	36.28	11.77	56.23	100	293	P	H
		7311	39.41	-14.59	54	47.59	36.28	11.77	56.23	100	293	A	H
		4874	39.16	-34.84	74	54.34	31.38	9.99	56.55	100	0	P	V
		7311	55.23	-18.77	74	63.41	36.28	11.77	56.23	400	60	P	V
		7311	39.35	-14.65	54	47.53	36.28	11.77	56.23	400	60	A	V
802.11n HT20 CH 11 2462MHz		4924	41.5	-32.5	74	56.56	31.48	9.99	56.53	100	0	P	H
		7386	46.77	-27.23	74	54.74	36.47	11.68	56.12	100	0	P	H
		4924	40.38	-33.62	74	55.44	31.48	9.99	56.53	100	0	P	V
		7386	43.69	-30.31	74	51.66	36.47	11.68	56.12	100	0	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	Path	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		94.8	22.89	-20.61	43.5	38.98	15.15	1.24	32.48	-	-	P	H
		210.09	23.02	-20.48	43.5	38.64	14.99	1.78	32.39	-	-	P	H
		268.68	26.85	-19.15	46	37.76	19.3	2.17	32.38	-	-	P	H
		388.9	22.7	-23.3	46	31.16	21.25	2.62	32.33	-	-	P	H
		673.1	28.07	-17.93	46	30.88	26.27	3.39	32.47	-	-	P	H
		948.2	33.26	-12.74	46	29.98	30.51	3.99	31.22	100	0	P	H
		45.39	35.45	-4.55	40	50.78	16.14	1.02	32.49	100	0	P	V
		147.99	22.56	-20.94	43.5	36.43	16.88	1.69	32.44	-	-	P	V
		271.11	21.06	-24.94	46	32.14	19.13	2.17	32.38	-	-	P	V
		460.3	24.13	-21.87	46	30.52	23.16	2.81	32.36	-	-	P	V
		742.4	29.9	-16.1	46	30.98	27.74	3.53	32.35	-	-	P	V
		888	32.31	-13.69	46	31.09	29.05	3.89	31.72	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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

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

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path 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) + Path 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)

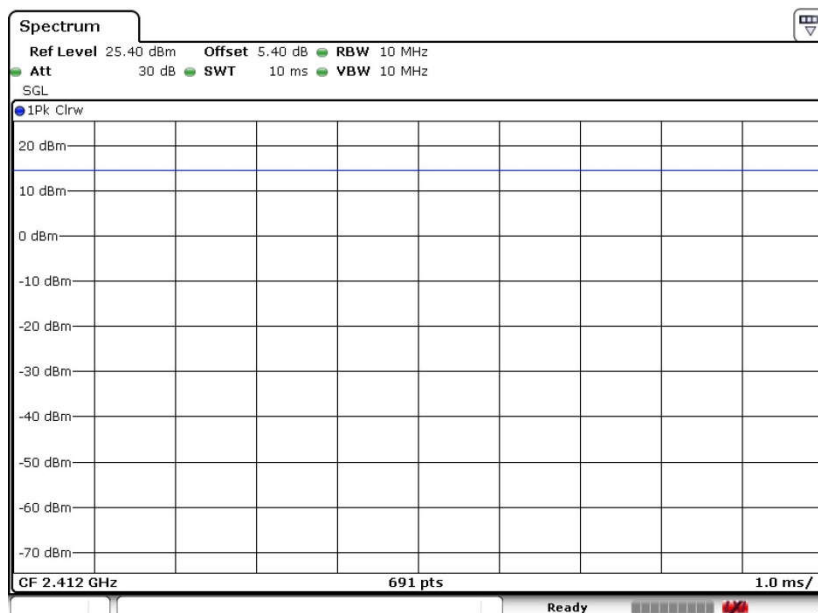
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

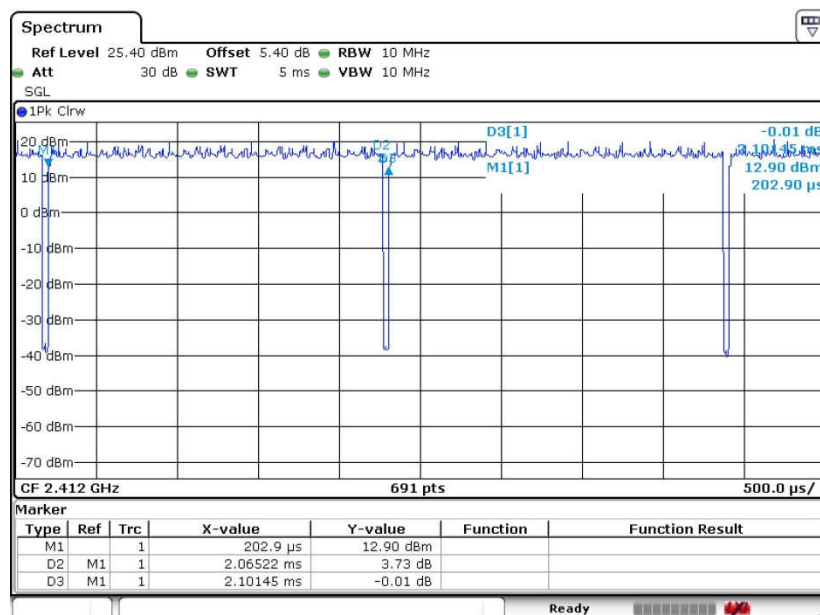
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
11b	100%	-	-	10Hz
11g	98.28%	-	-	10Hz
11n HT20	98.15%	-	-	10Hz

11b





11g



11n HT20

