

FCC RF Test Report

APPLICANT : VERTU Corporation Limited
EQUIPMENT : GSM 4 Band/CDMA/EVDO 2 Band/TD-SCDMA
2Band/UMTS 5 Band/HSUPA/HSDPA/LTE 21
Band/WLAN/BT/NFC mobile phone
BRAND NAME : VERTU
MODEL NAME : CONSTELLATION X
TYPE NAME : VM-08
FCC ID : P7QVM-08
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jul. 20, 2016 and testing was completed on Dec. 27, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.



Prepared by: James Huang / Manager



Approved by: Jones Tsai / Manager



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

SPORTON INTERNATIONAL (KUNSHAN) INC.

TEL : 86-0512-5790-0158

FAX : 86-0512-5790-0958

FCC ID : P7QVM-08

Page Number : 1 of 45

Report Issued Date : Feb. 17, 2017

Report Version : Rev. 01

Report Template No.: BU5-FR15CWL MA Version 1.3



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 Testing Location	7
1.7 Applicable Standards.....	7
1.8 Specification of Accessory.....	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	12
2.5 EUT Operation Test Setup	12
2.6 Measurement Results Explanation Example.....	12
3 TEST RESULT	13
3.1 6dB and 99% Bandwidth Measurement	13
3.2 Peak Output Power Measurement	15
3.3 Power Spectral Density Measurement	17
3.4 Conducted Band Edges and Spurious Emission Measurement	19
3.5 Radiated Band Edges and Spurious Emission Measurement	35
3.6 AC Conducted Emission Measurement.....	39
3.7 Antenna Requirements.....	43
4 LIST OF MEASURING EQUIPMENT	44
5 UNCERTAINTY OF EVALUATION	45
APPENDIX A. CONDUCTED TEST RESULTS	
APPENDIX B. RADIATED SPURIOUS EMISSION	
APPENDIX C. DUTY CYCLE PLOTS	
APPENDIX D. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR672003C	Rev. 01	Initial issue of report	Feb. 17, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	RSS-247 5.2(1)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	RSS-Gen 6.6	99% Bandwidth	-	Pass	-
3.2	15.247(b)	RSS-247 A5.4(4)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	RSS-247 5.2(2)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	RSS-247 5.5	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
			Conducted Spurious Emission		Pass	-
3.5	15.247(d)	RSS-247 5.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.23 dB at 2483.620 MHz
3.6	15.207	RSS-GEN 8.8	AC Conducted Emission	15.207(a)	Pass	Under limit 13.64 dB at 18.622 MHz
3.7	15.203 & 15.247(b)	N/A	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

VERTU Corporation Limited

Beacon Hill Road, Church Crookham, Hampshire GU52 8DY, United Kingdom.

1.2 Manufacturer

VERTU Corporation Limited

Beacon Hill Road, Church Crookham, Hampshire GU52 8DY, United Kingdom.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM 4 Band/CDMA/EVDO 2 Band/TD-SCDMA 2Band/UMTS 5 Band/HSUPA/HSDPA/LTE 21 Band/WLAN/BT/NFC mobile phone
Brand Name	VERTU
Model Name	CONSTELLATION X
Type Name	VM-08
FCC ID	P7QVM-08
GSM Operating Band(s)	GSM 850/900/1800/1900MHz
WCDMA Operating Band(s)	FDD Band I / II / IV / V /VIII
CDMA Operating Band(s)	CDMA2000 BC0/BC1
LTE Operating Band(s)	FDD Band 1/2/3/4/5/7/8/12/13/17/19/20/25/26/28/29/30 TDD Band 38/39/40/41
GPRS / EGPRS Multi Slot Class	GPRS Class 33, EGPRS Class 33
Wi-Fi Specification	2.4GHz 802.11b/g/n HT20 5GHz 802.11a/n HT20/HT40 5GHz 802.11ac VHT20/VHT40/VHT80
Bluetooth Version	Bluetooth v3.0 + EDR / Bluetooth v4.0 LE/ Bluetooth v4.2 LE
NFC Type	A, B, F, V
IMEI Code	Conducted: 004402550120731/004402550120749 Conduction:004402550120376/004402550120384 Radiation: 004402550120491/004402550120509
HW Version	PIO2
SW Version	6.0.1_1.434.0.070
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. Manufacturer's declaration LTE band 40 disabled by software.

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		<Ant. 1> 802.11b : 24.59 dBm (0.2877 W) 802.11g : 24.52 dBm (0.2831 W) 802.11n HT20 : 24.95 dBm (0.3126 W) <Ant. 2> 802.11b : 21.46 dBm (0.1400 W) 802.11g : 22.12 dBm (0.1629 W) 802.11n HT20 : 21.80 dBm (0.1514 W) MIMO <Ant. 1 + 2> 802.11n HT20 : 25.44 dBm (0.3499 W)		
99% Occupied Bandwidth		802.11b : 12.99MHz 802.11g : 16.83MHz 802.11n HT20 : 17.78MHz		
Antenna Type / Gain		<Ant 1> PIFA Antenna with gain -2.00 dBi <Ant 2> PIFA Antenna with gain -2.00 dBi		
Type of Modulation		802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function for Transmitter				
		Ant. 1	Ant. 2	
		802.11 b/g/n	V	V
		802.11 n		
		MIMO	V	V

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

1.5 Modification of EUT

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

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC Registration No.
	TH01-KS	03CH03-KS	CO01-KS	306251

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

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013
- IC RSS-247 Issue 1
- IC RSS-Gen Issue 4

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.

1.8 Specification of Accessory

Specification of Accessory			
AC Adapter	Brand Name	VERTU	Model Name AC-32V
	Power Rating	I/P: 100-240Vac, 450mA, O/P: 5Vdc, 2000mA	
Battery	Brand Name	VERTU	Model Name VBL-04
	Power Rating	3.82Vdc, 3200mAh	
USB Cable	Brand Name	VERTU	Model Name VC-02
	Signal Line Type	1.20m shielded cable, without ferrite core	
Earphone 1	Brand Name	VERTU	Model Name WH5-V
	Signal Line Type	1.20m Unshielded cable, without ferrite core	
Earphone 2	Brand Name	VERTU	Model Name HP-1V
	Signal Line Type	1.57m Unshielded cable, without ferrite core	
Earphone 3	Brand Name	VERTU	Model Name HP-1V
	Signal Line Type	1.55m Unshielded cable, without ferrite core	
Wireless Charger Pad	Brand Name	VERTU	Model Name AC-35V
	Power Rating	I/P: 5Vac, 1800mA	
Car Charger	Brand Name	VERTU	Model Name DC-30V
	Power Rating	I/P: 12/24Vdc, 1.35A MAX, O/P: 5.15Vdc, 2.1A MAX	
Bluetooth Travel Speaker	Brand Name	VERTU	Model Name SP-1V
	Power Rating	I/P: 5Vdc, 2Ah	
Portable Battery Charger	Brand Name	VERTU	Model Name DC-10V
	Power Rating	I/P: 5Vdc, 2A, O/P: 5Vdc, 1.5/2.1A	

2 Test Configuration of Equipment Under Test

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

2.1 Carrier Frequency and Channel

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

2.2 Test Mode

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

Single Antenna

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

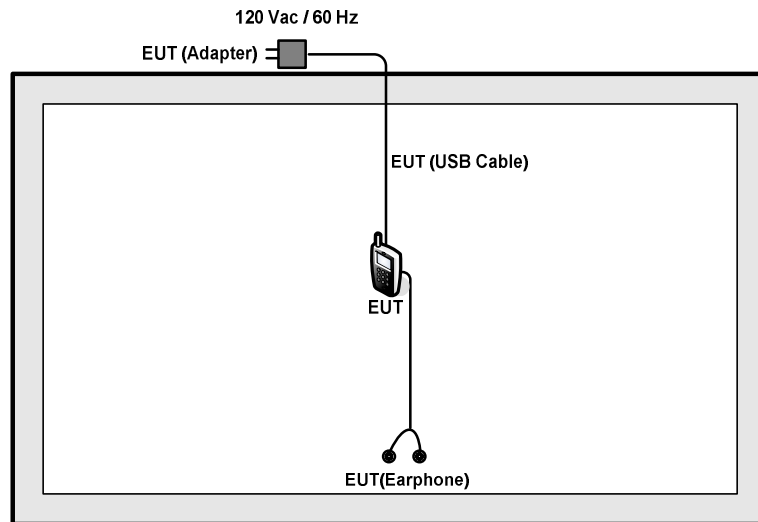
MIMO Antenna

Modulation	Data Rate
802.11n HT20	MCS0

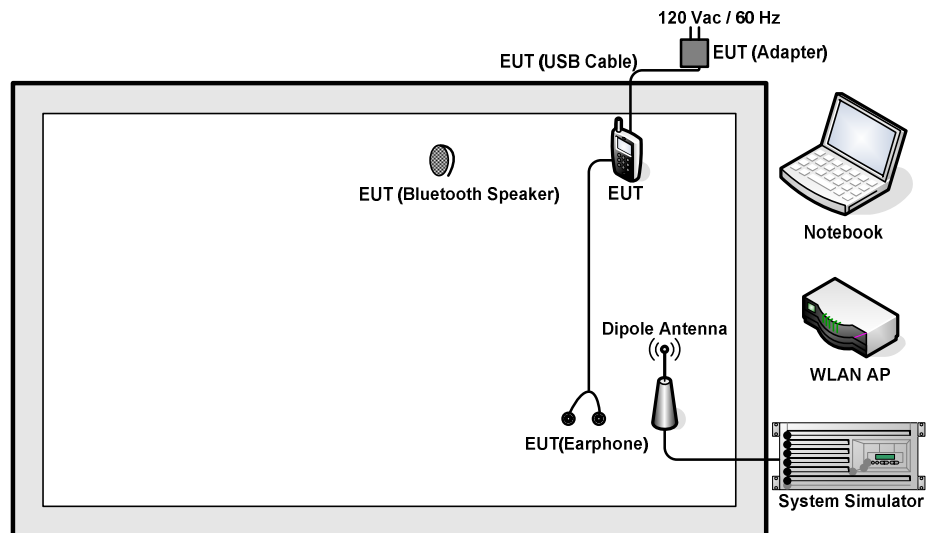
Test Cases	
AC Conducted	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + USB Cable (Charging from Adapter) +
Emission	Earphone 1

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	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	FCC DoC	N/A	Shielded cable DC O/P 1.8 m Unshielded AC I/P cable 1.2 m

2.5 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

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

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.6 dB.

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

= 5.6 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

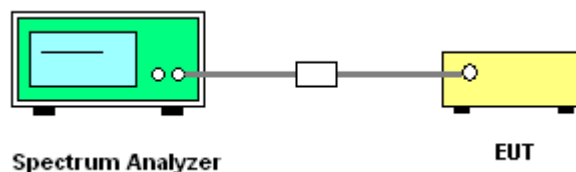
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

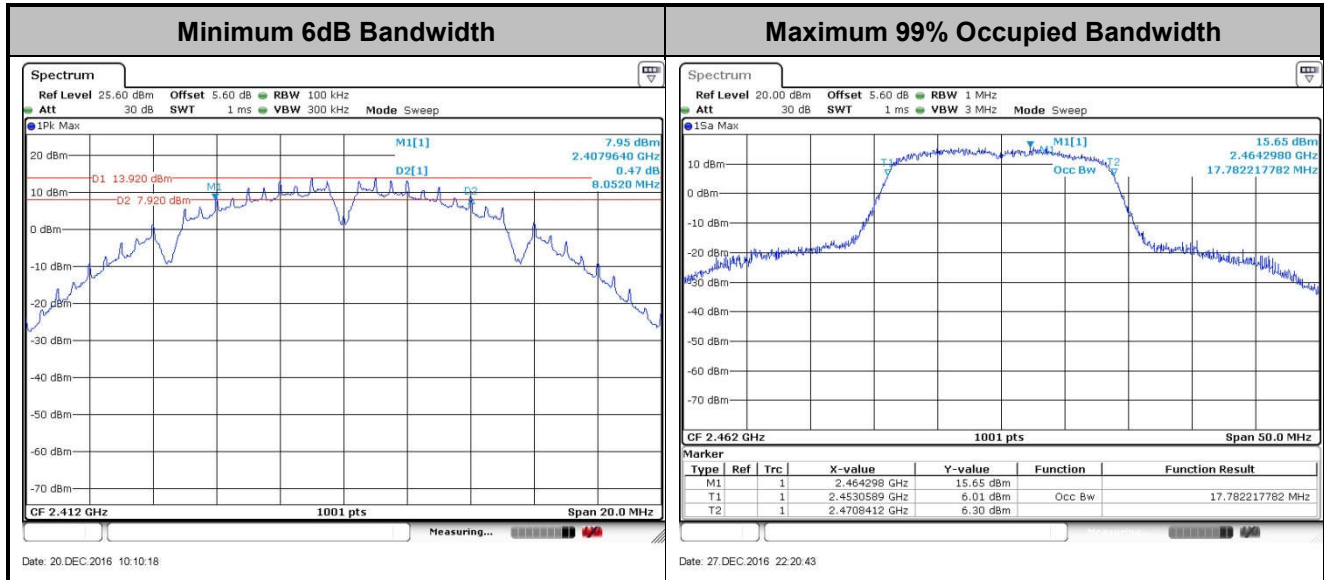
3.1.4 Test Setup





3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.



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

3.2 Peak Output Power Measurement

3.2.1 Limit of Peak 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.

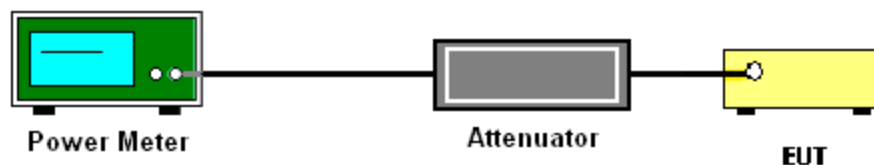
3.2.2 Measuring Instruments

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 v03r05 section 9.1.2 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup





3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

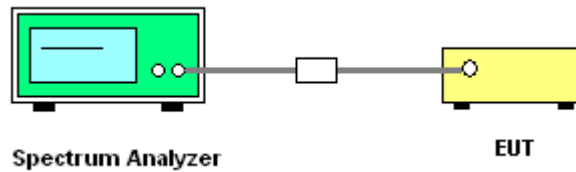
If measurements performed using method (2) plus $10 \log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

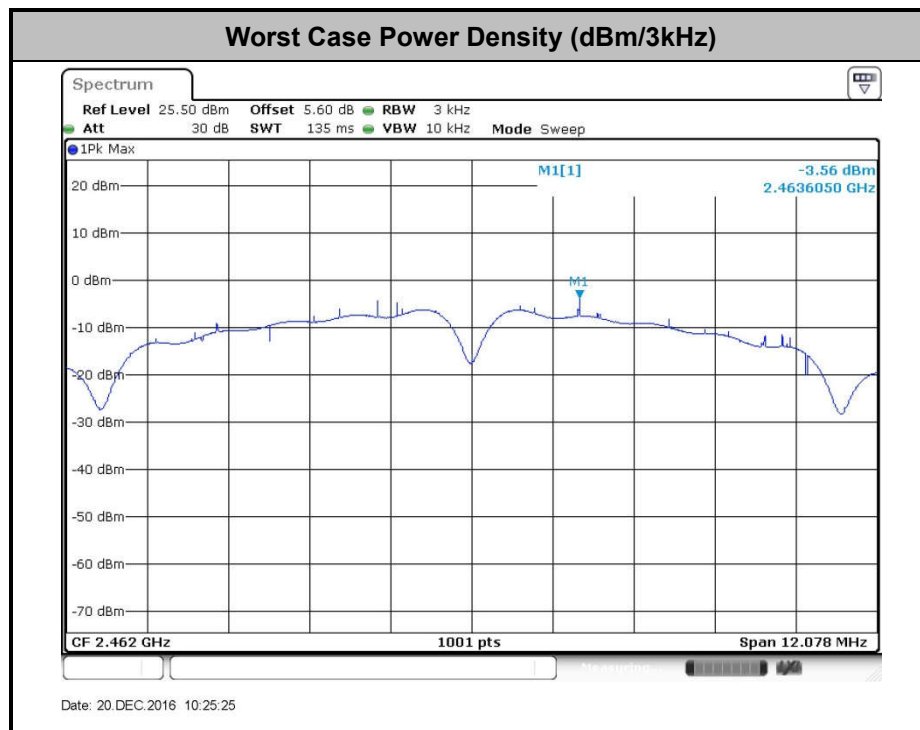
Method (2): Measure and add $10 \log(N)$ dB, where N is the number of outputs. (N=2)

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

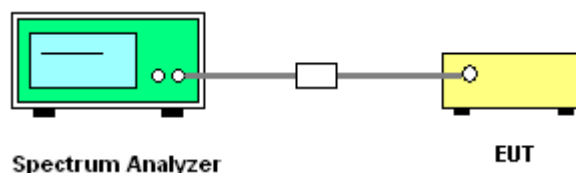
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup

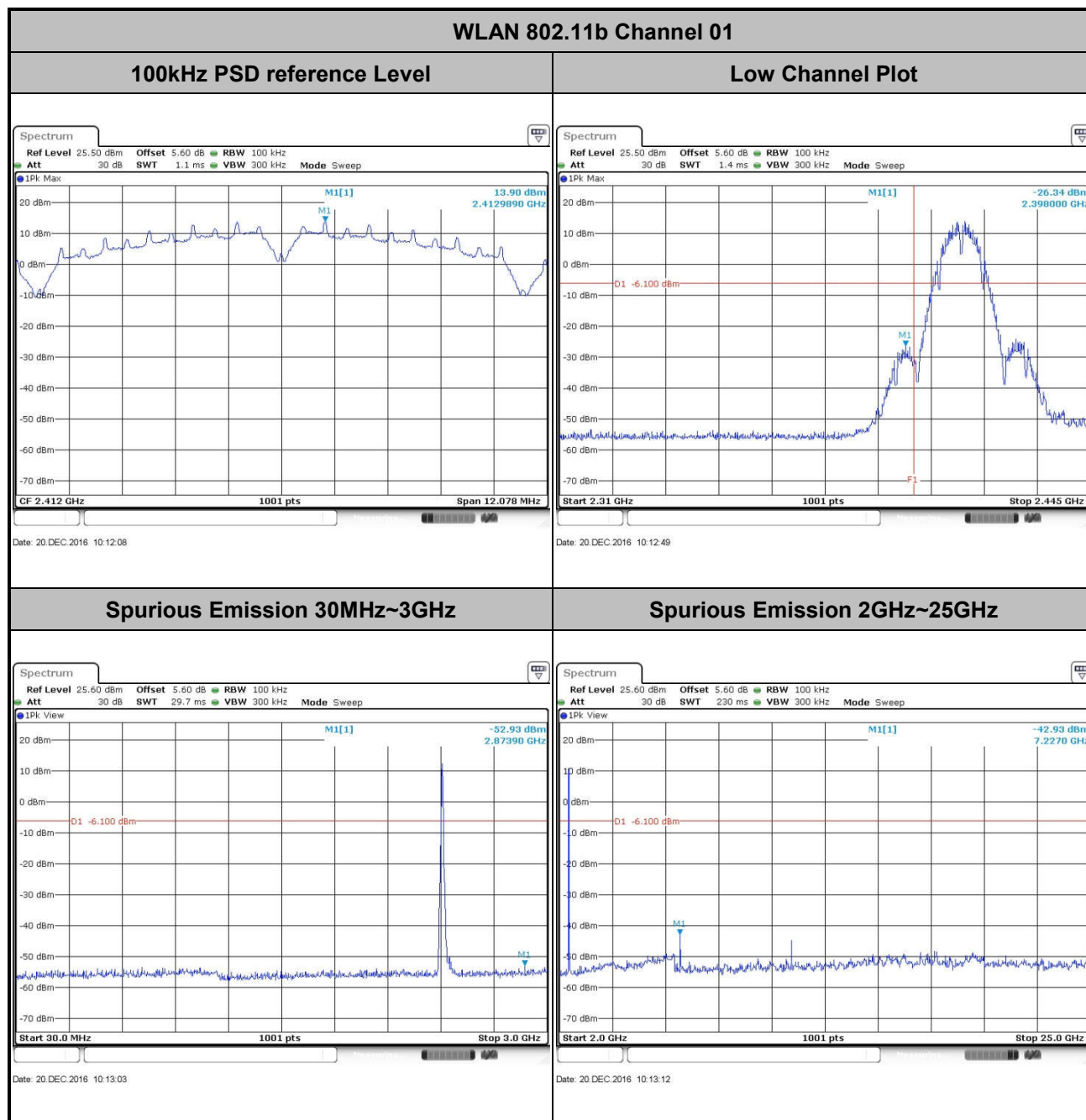




3.4.5 Test Result of Conducted Band Edges and Spurious Emission

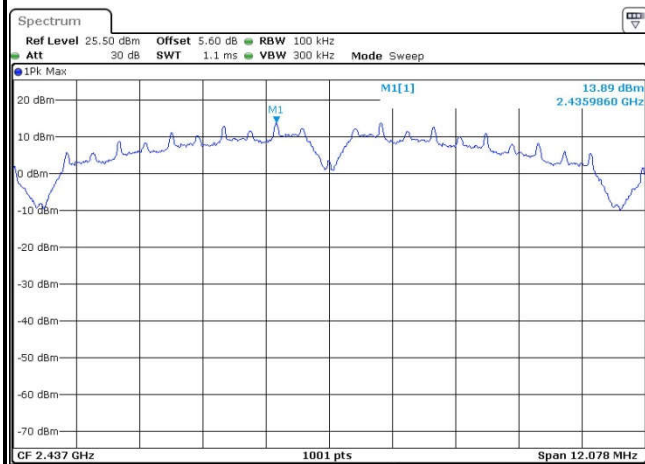
Number of TX = 1, Ant. 1 (Measured)

Number of TX	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

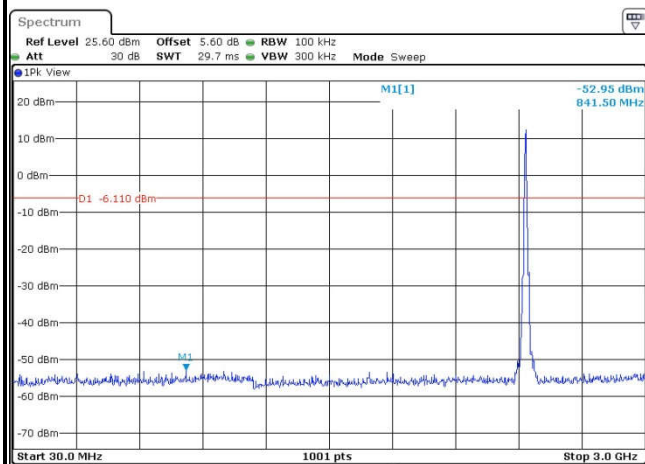




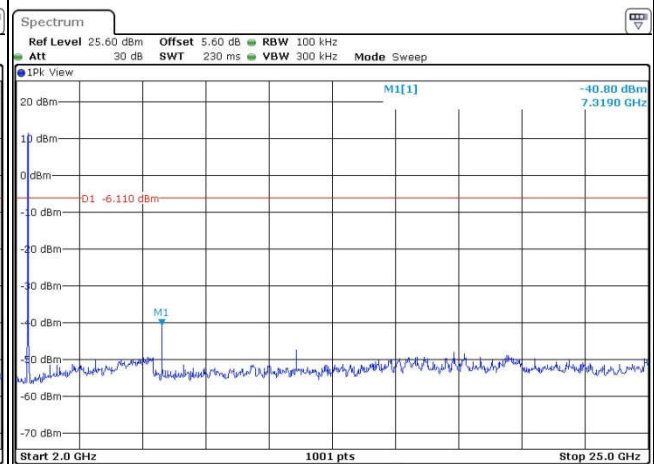
Number of TX :	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11b Channel 06**100kHz PSD reference Level**

Date: 20 DEC 2016 10:21:09

Spurious Emission 30MHz~3GHz

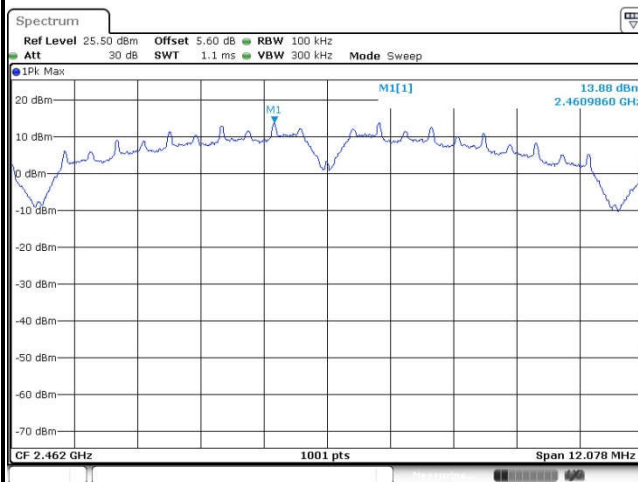
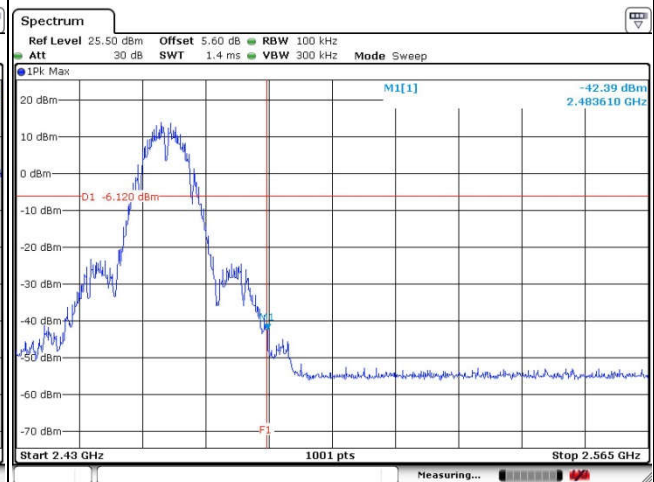
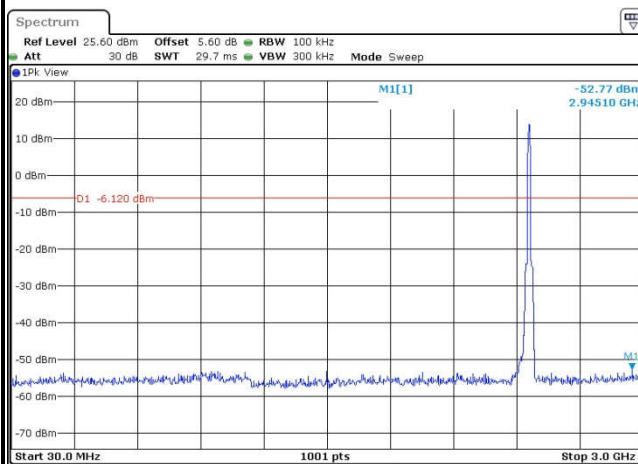
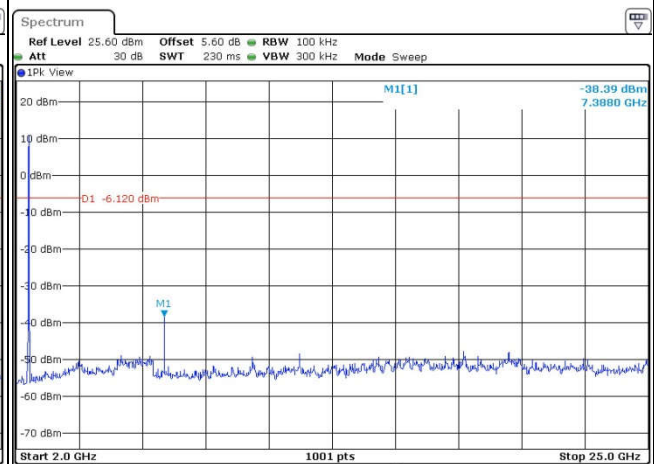
Date: 20 DEC 2016 10:21:54

Spurious Emission 2GHz~25GHz

Date: 20 DEC 2016 10:22:02



Number of TX :	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

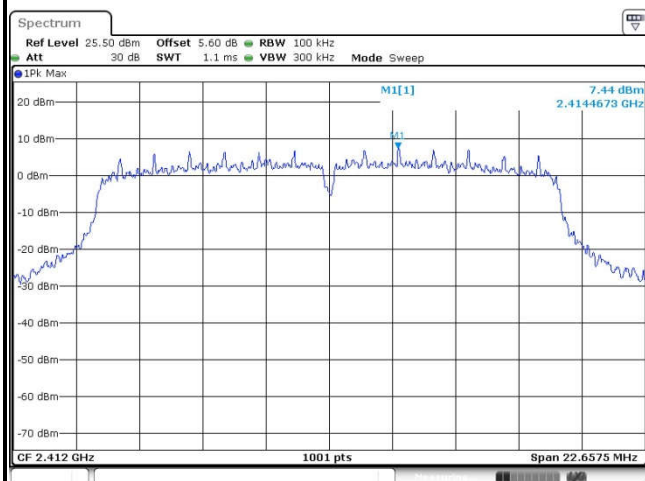
WLAN 802.11b Channel 11**100kHz PSD reference Level****High Channel Plot****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



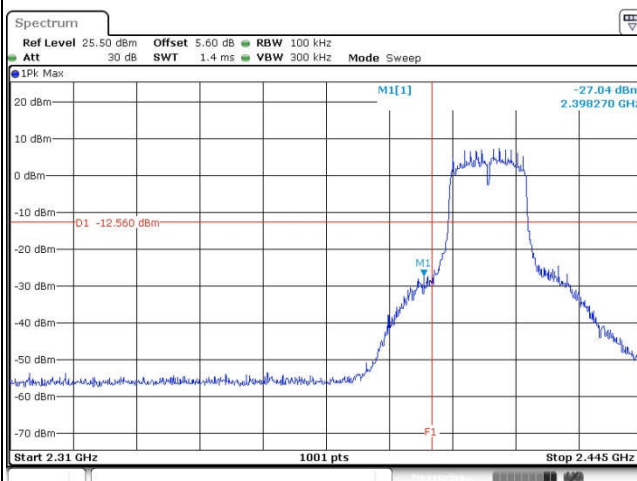
Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

WLAN 802.11g Channel 01

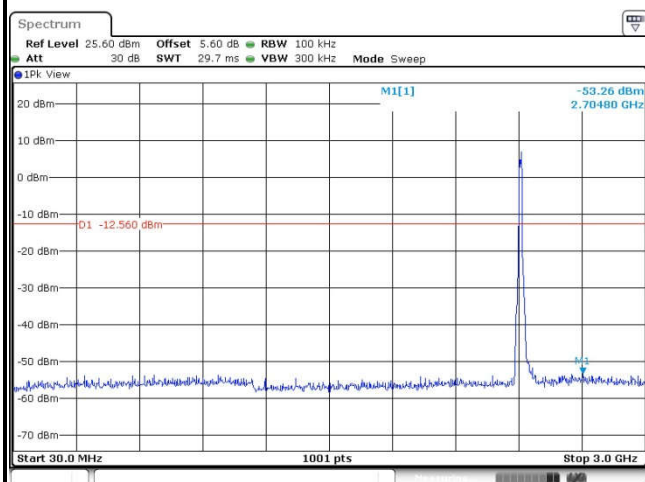
100kHz PSD reference Level



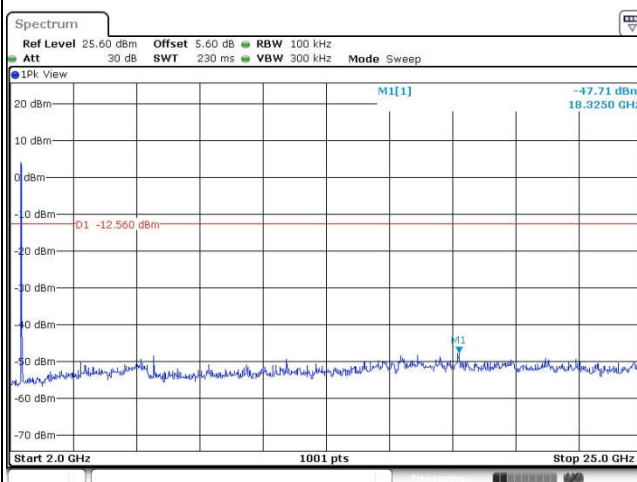
Low Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

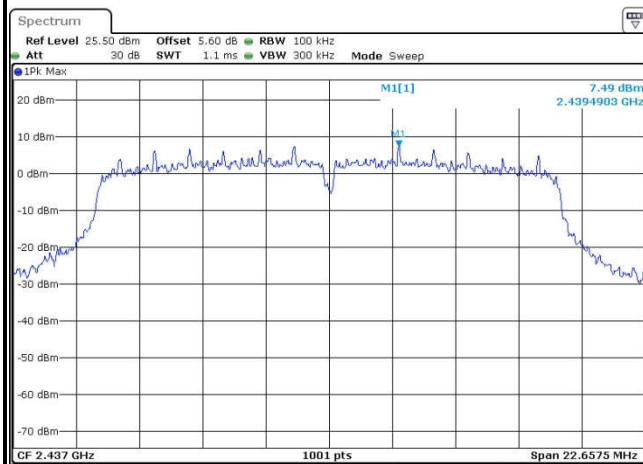




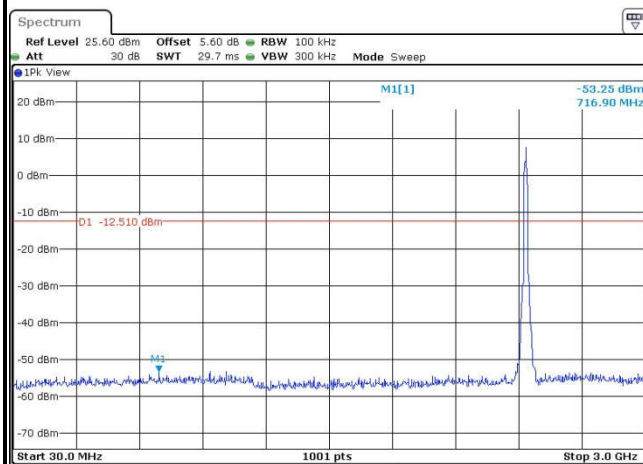
Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11g Channel 06

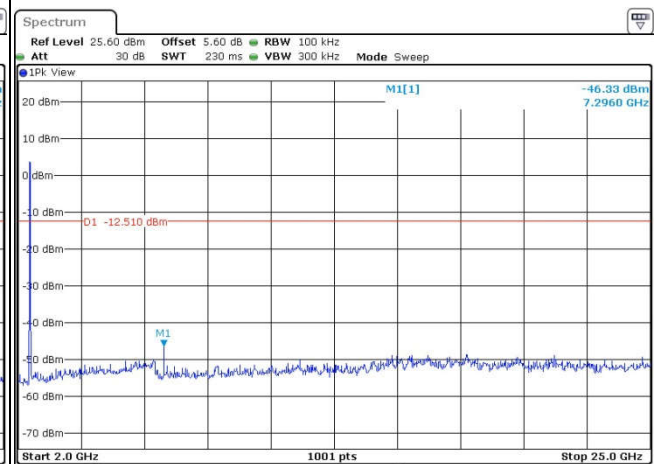
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

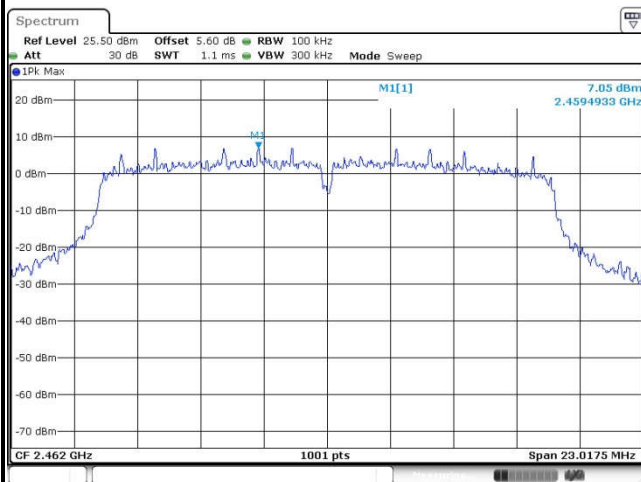




Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

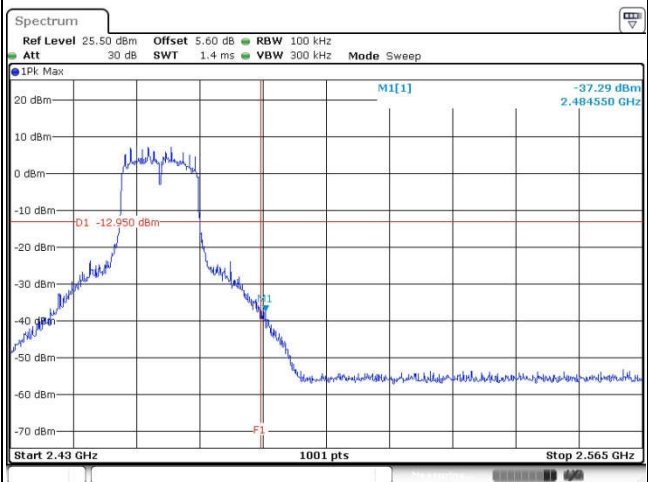
WLAN 802.11g Channel 11

100kHz PSD reference Level



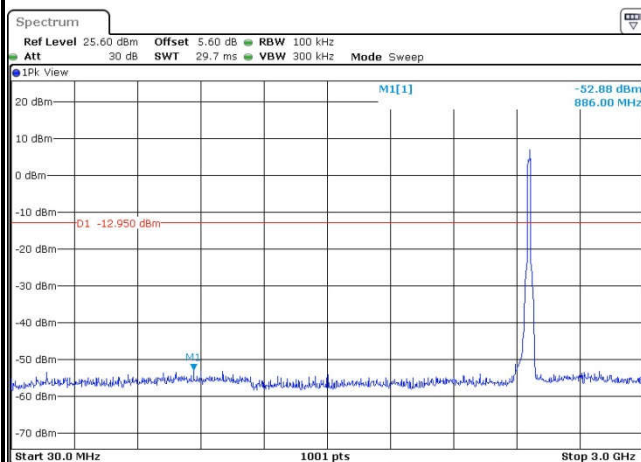
Date: 27.DEC.2016 22:35:56

High Channel Plot



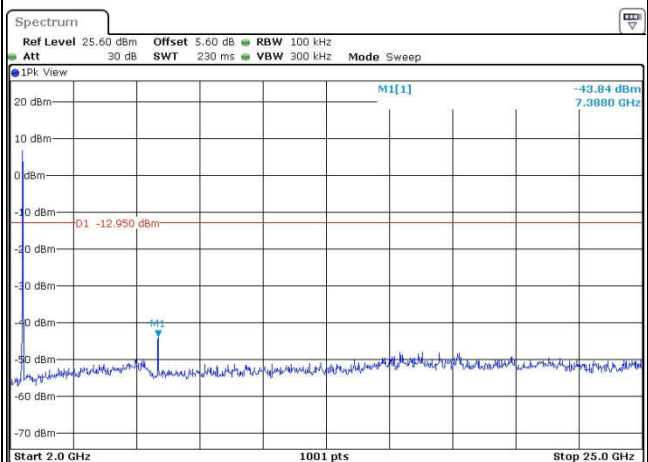
Date: 27.DEC.2016 22:36:05

Spurious Emission 30MHz~3GHz



Date: 27.DEC.2016 22:36:15

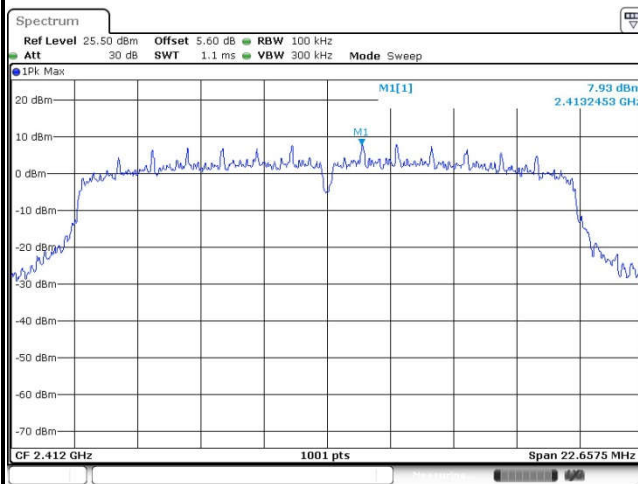
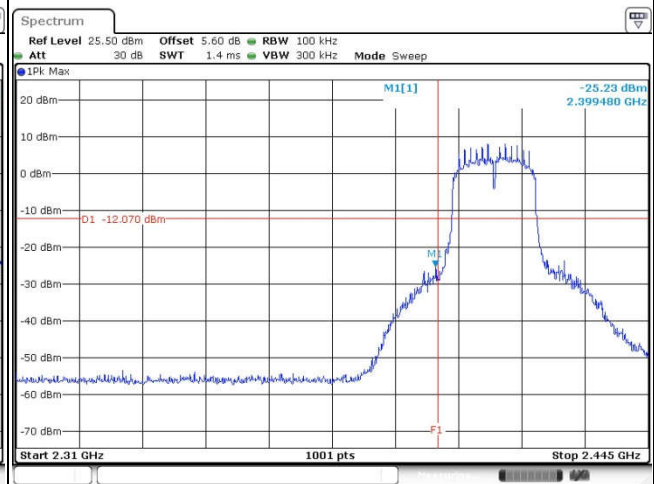
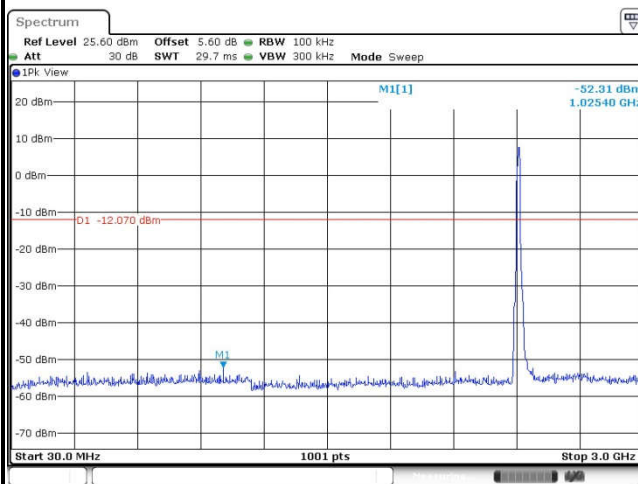
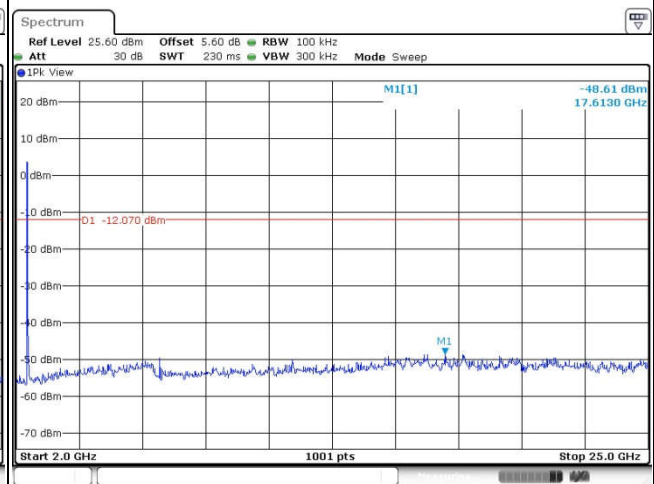
Spurious Emission 2GHz~25GHz



Date: 27.DEC.2016 22:36:23

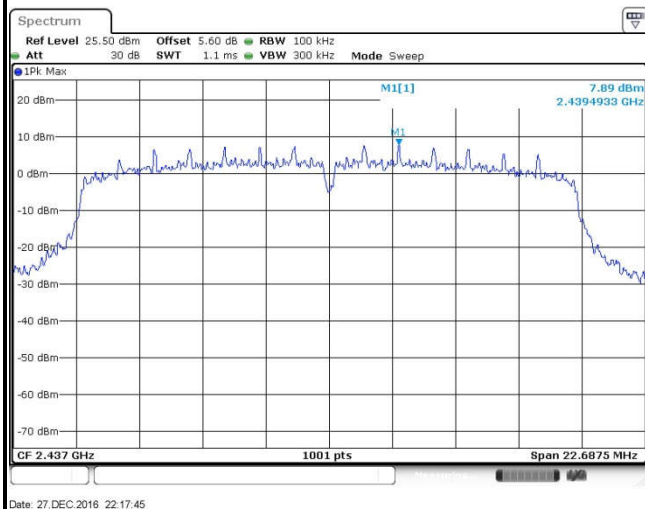
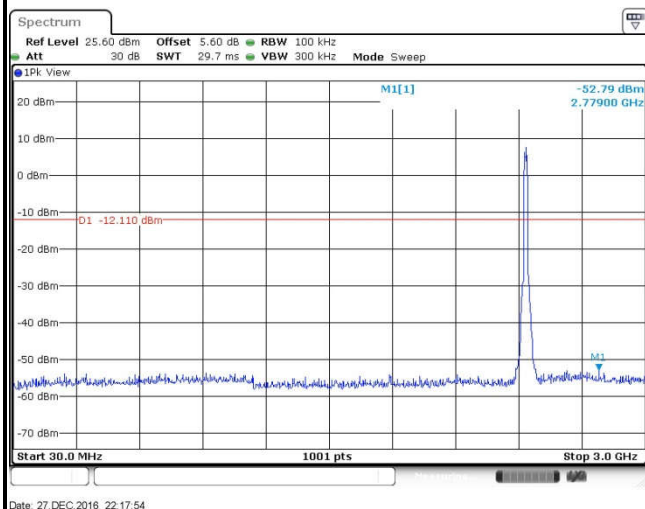
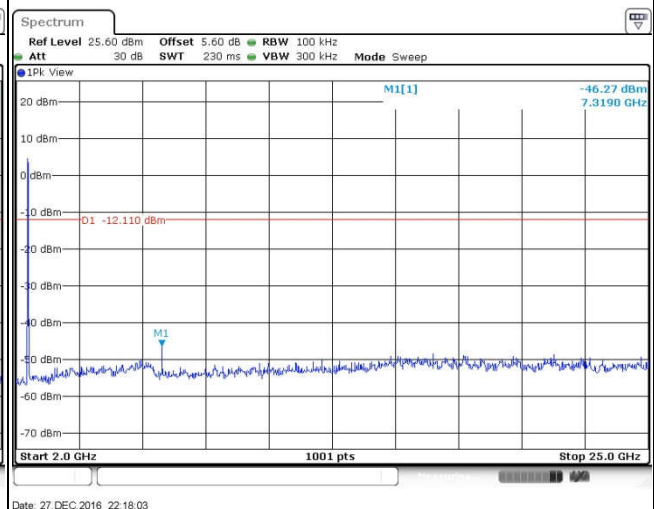


Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

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

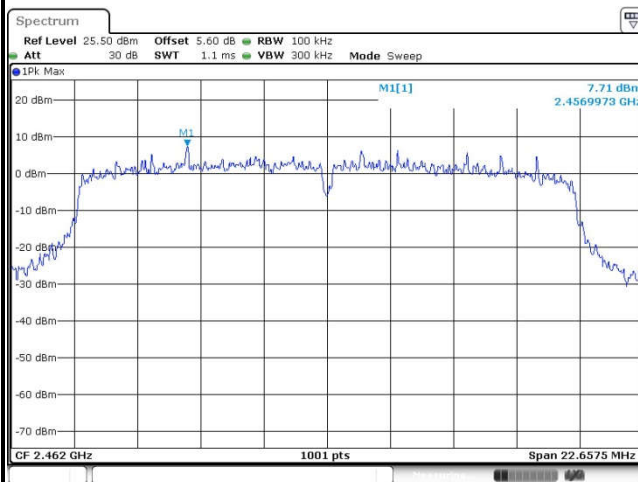
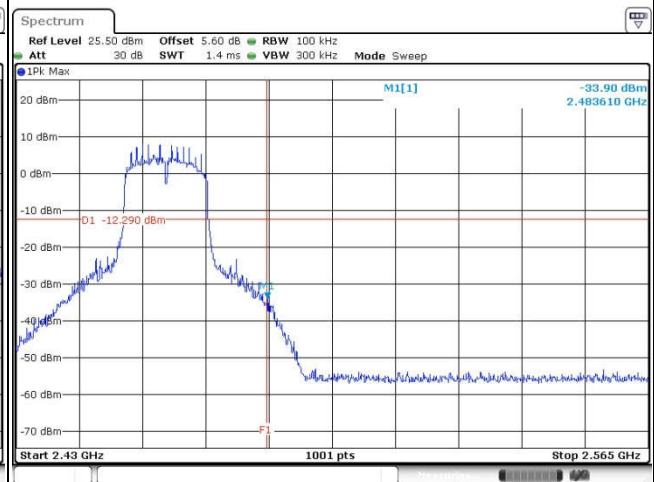
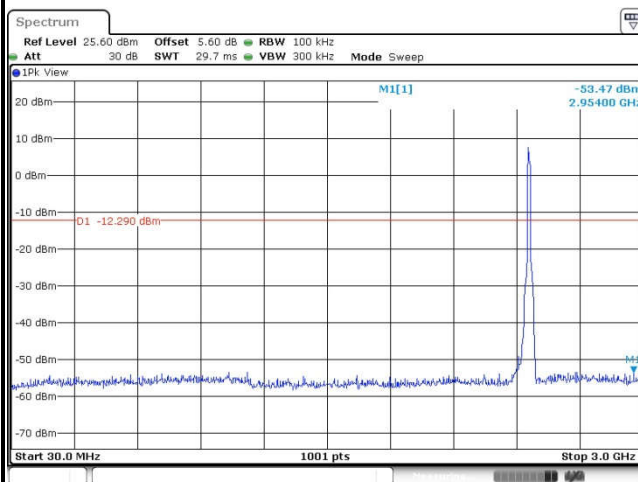
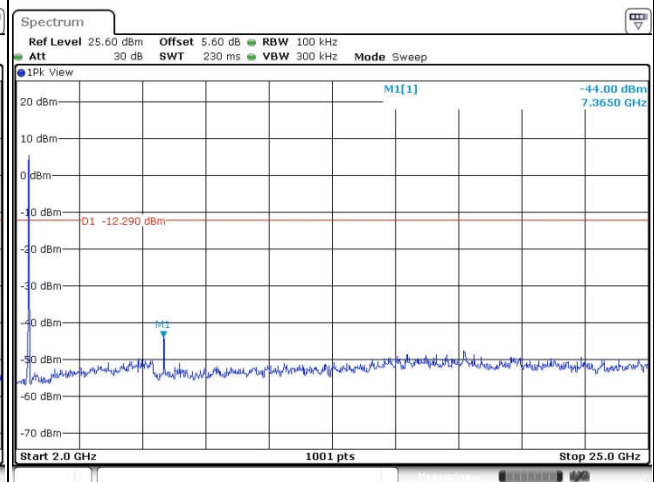


Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 06**100kHz PSD reference Level****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 11**100kHz PSD reference Level****High Channel Plot****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**

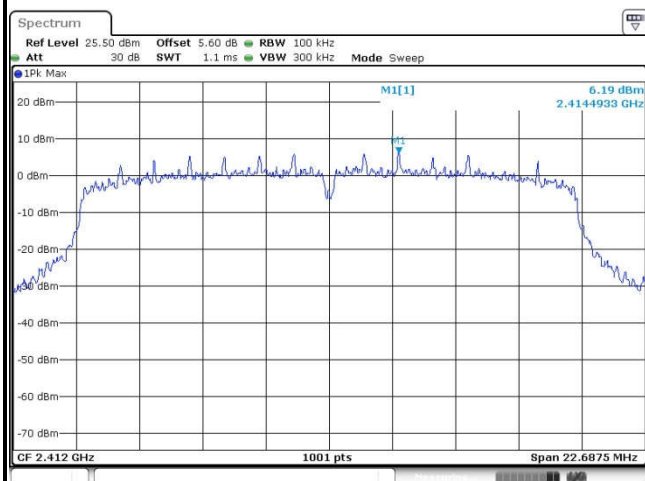


Number of TX = 2, Ant. 1 (Measured)

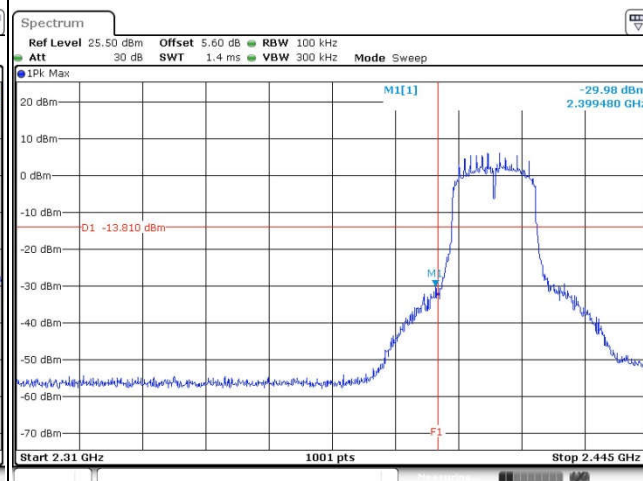
Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 01

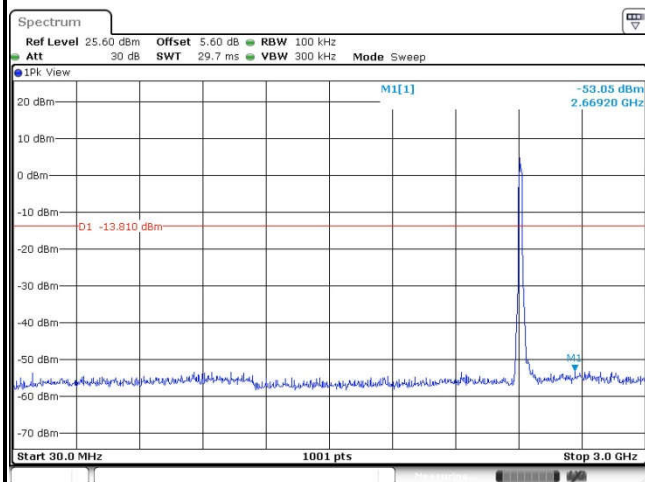
100kHz PSD reference Level



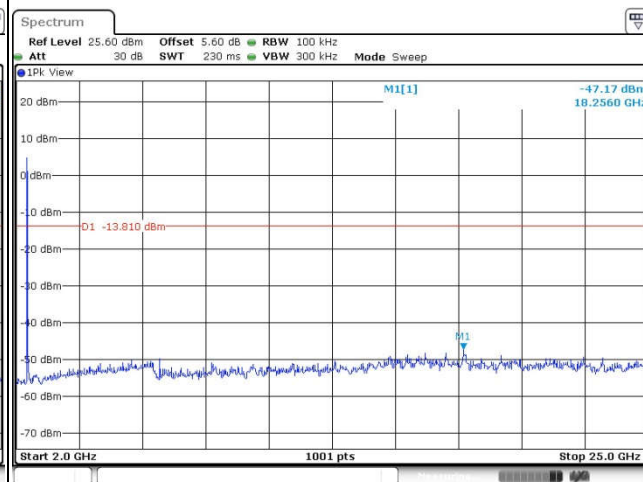
Low Channel Plot



Spurious Emission 30MHz~3GHz

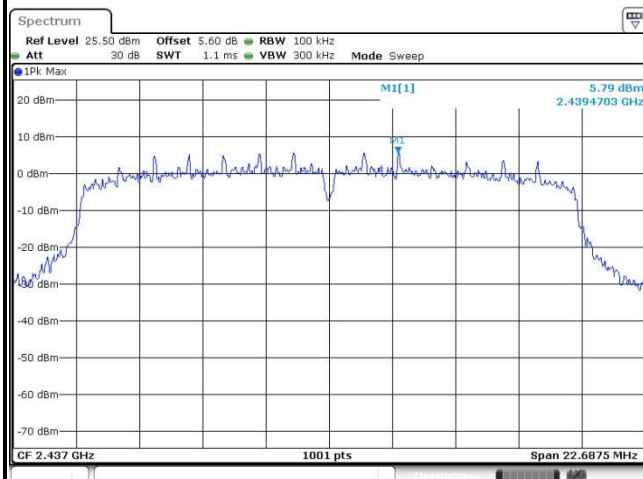


Spurious Emission 2GHz~25GHz

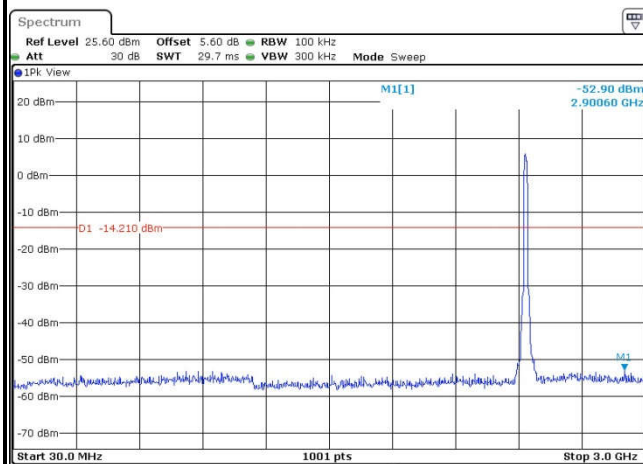




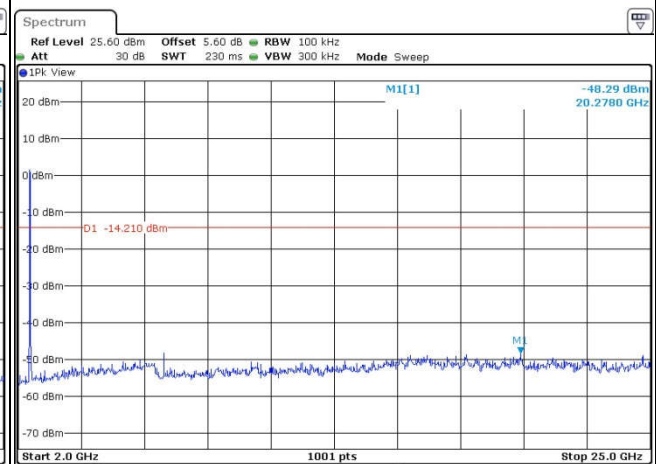
Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 06**100kHz PSD reference Level**

Date: 27.DEC.2016 22:03:16

Spurious Emission 30MHz~3GHz

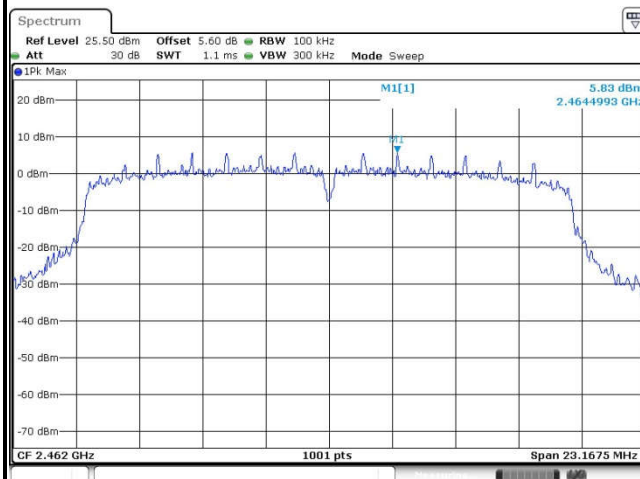
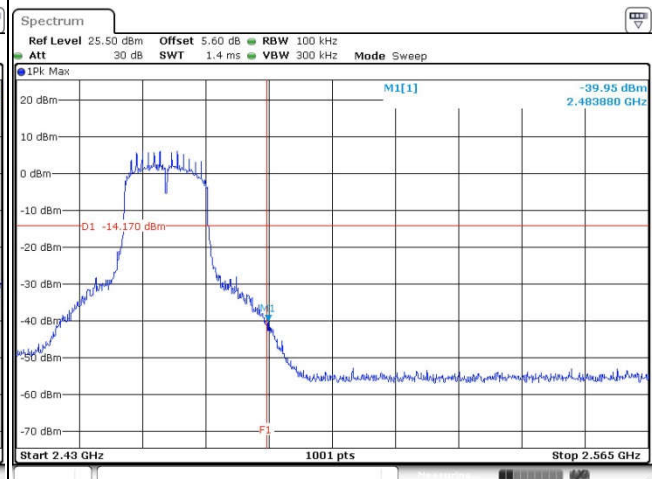
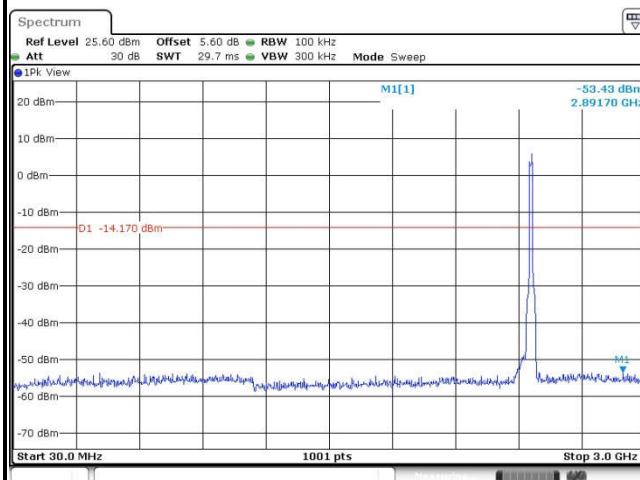
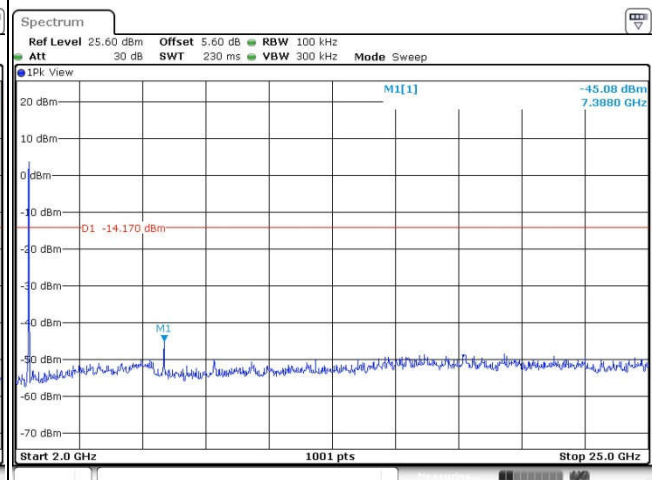
Date: 27.DEC.2016 22:04:18

Spurious Emission 2GHz~25GHz

Date: 27.DEC.2016 22:04:26

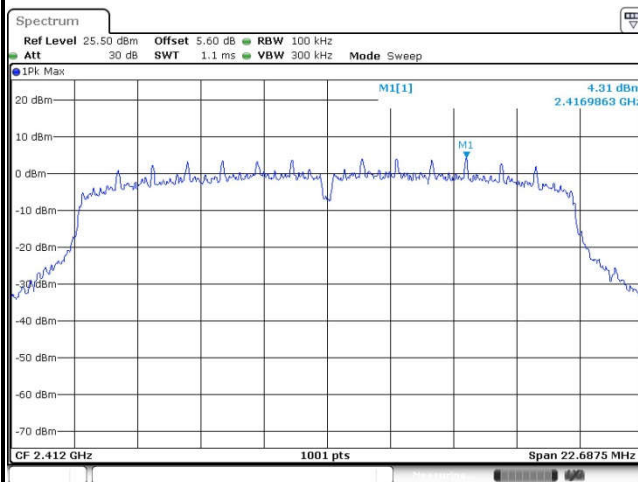
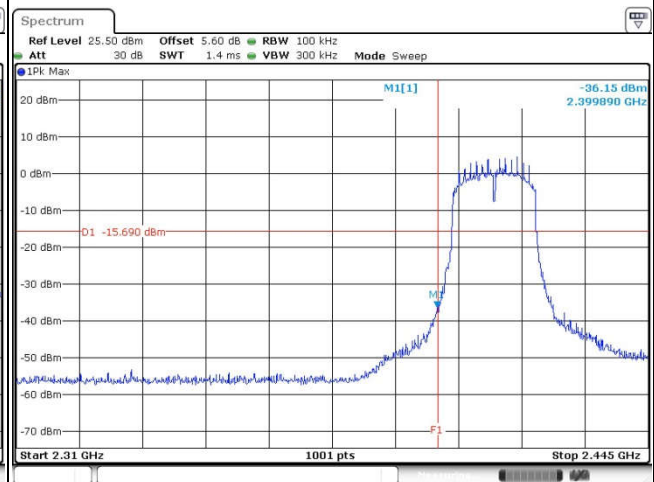
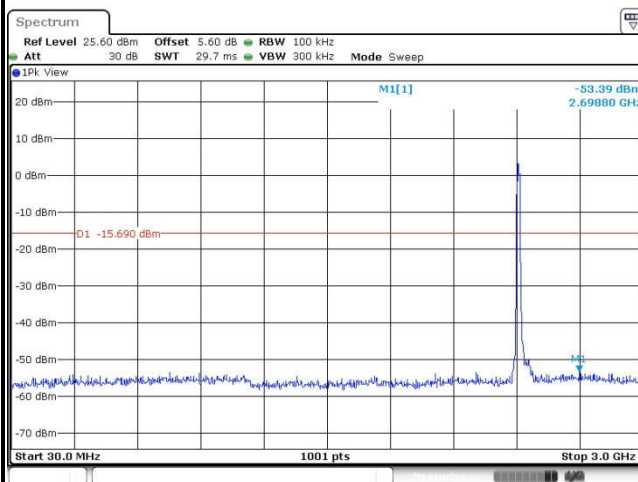
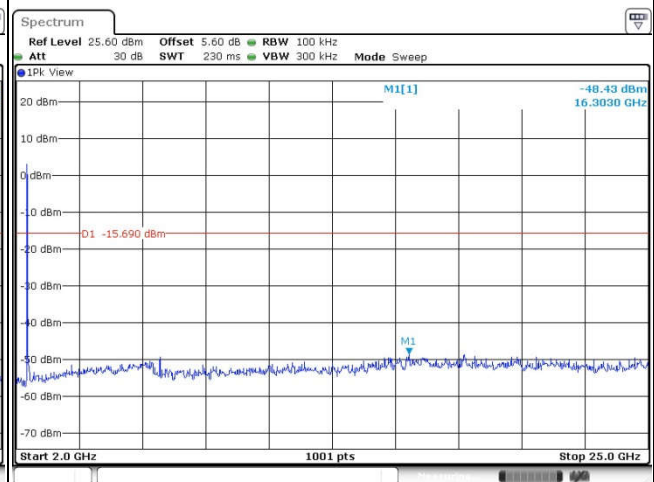


Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 11**100kHz PSD reference Level****High Channel Plot****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**

**Number of TX = 2, Ant. 2 (Measured)**

Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

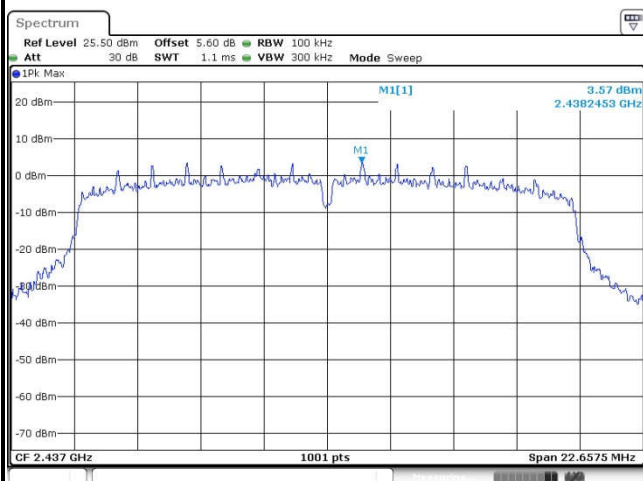
WLAN 802.11n HT20 Channel 01**100kHz PSD reference Level****Low Channel Plot****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



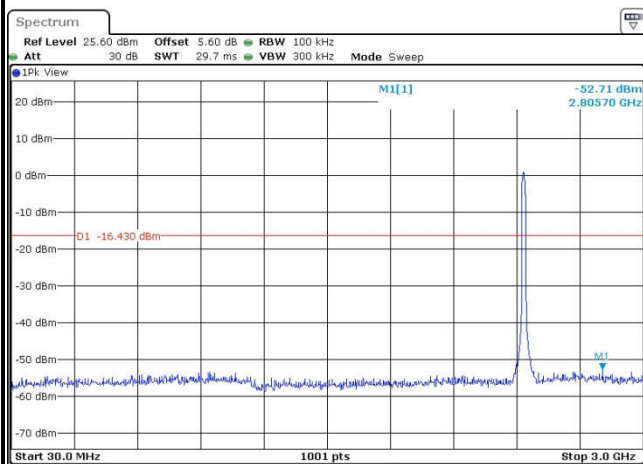
Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 06

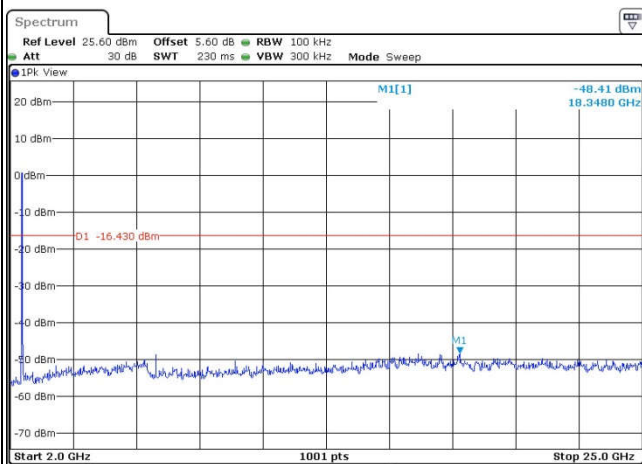
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

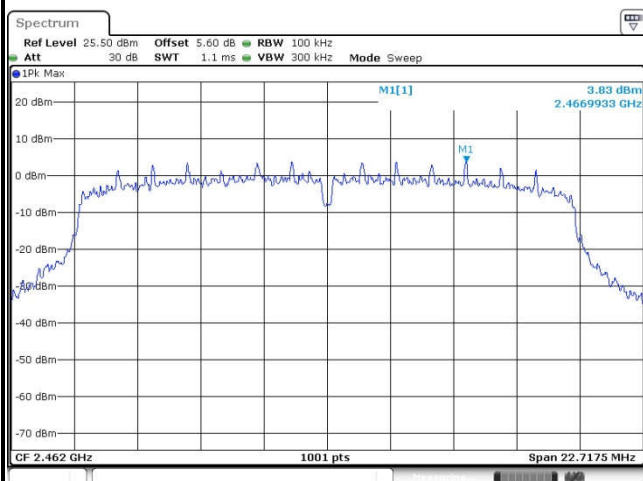




Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

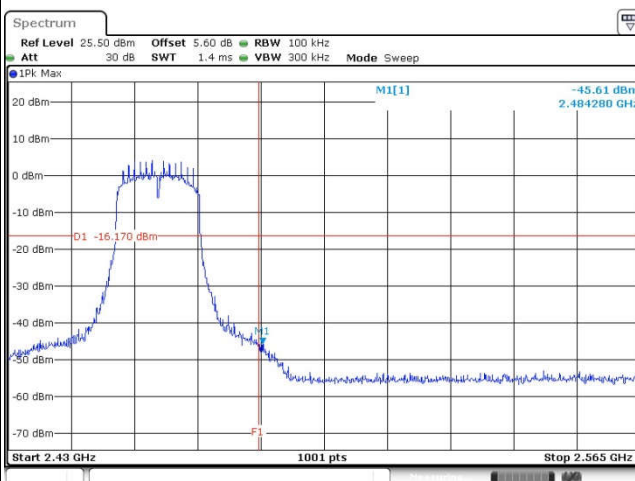
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



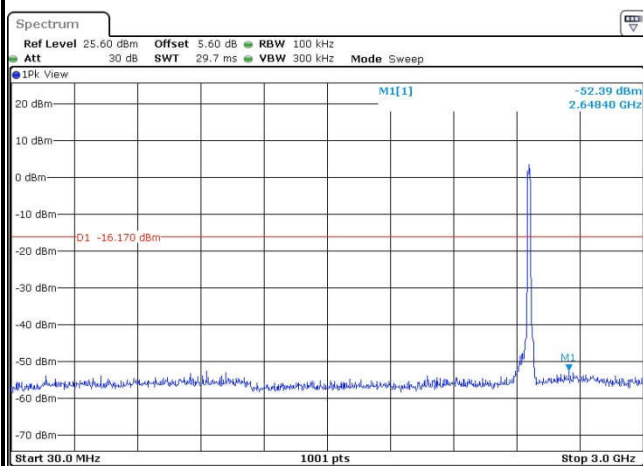
Date: 27.DEC.2016 21:52:13

High Channel Plot



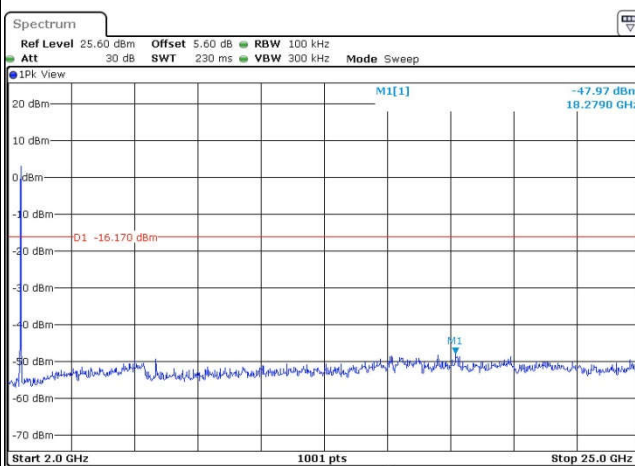
Date: 27.DEC.2016 21:52:52

Spurious Emission 30MHz~3GHz



Date: 27.DEC.2016 21:53:10

Spurious Emission 2GHz~25GHz



Date: 27.DEC.2016 21:53:18

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

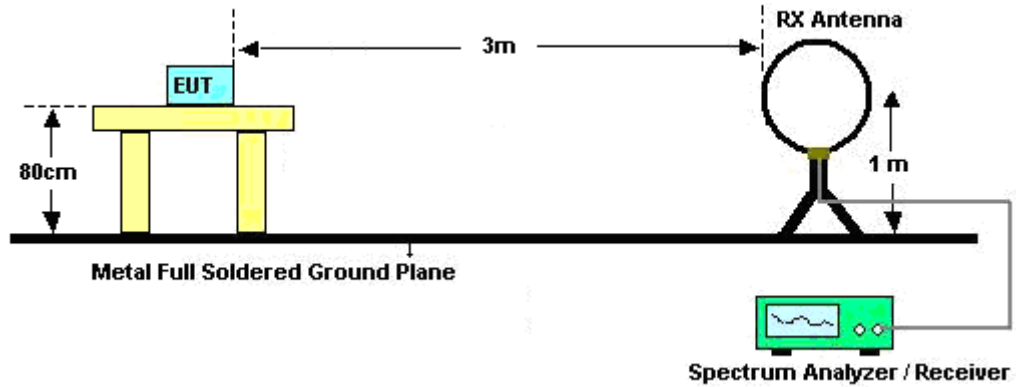
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

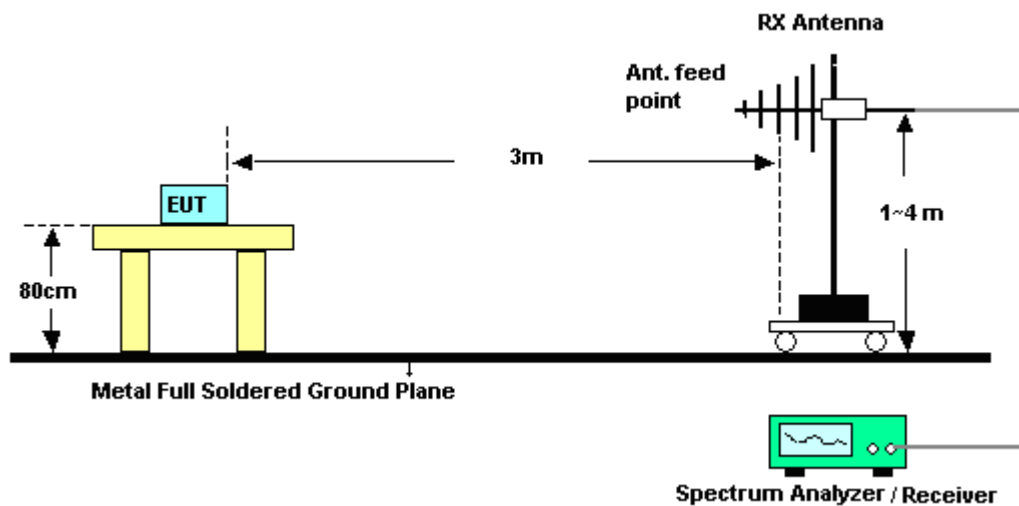
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

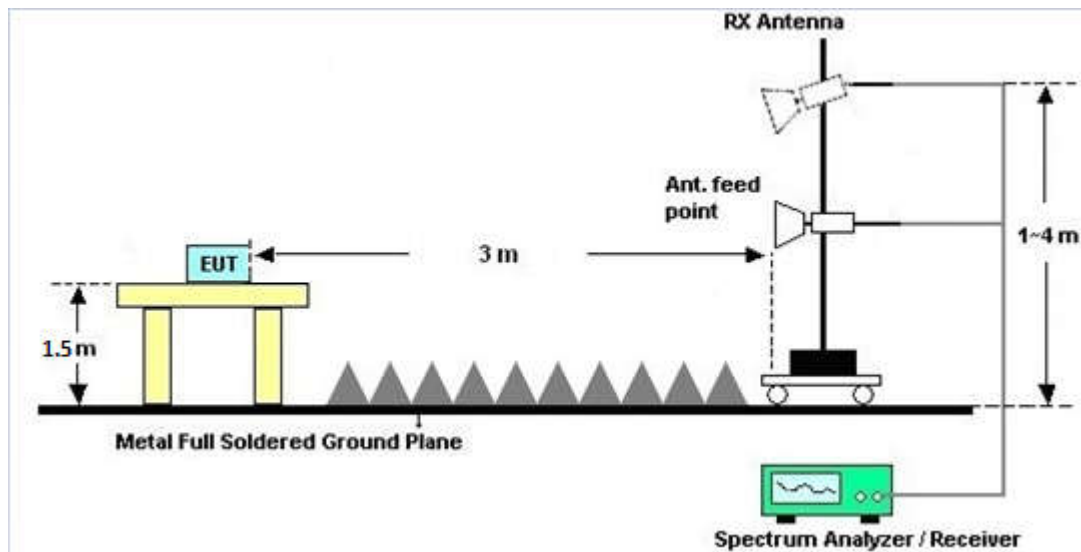
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.5.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix B.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

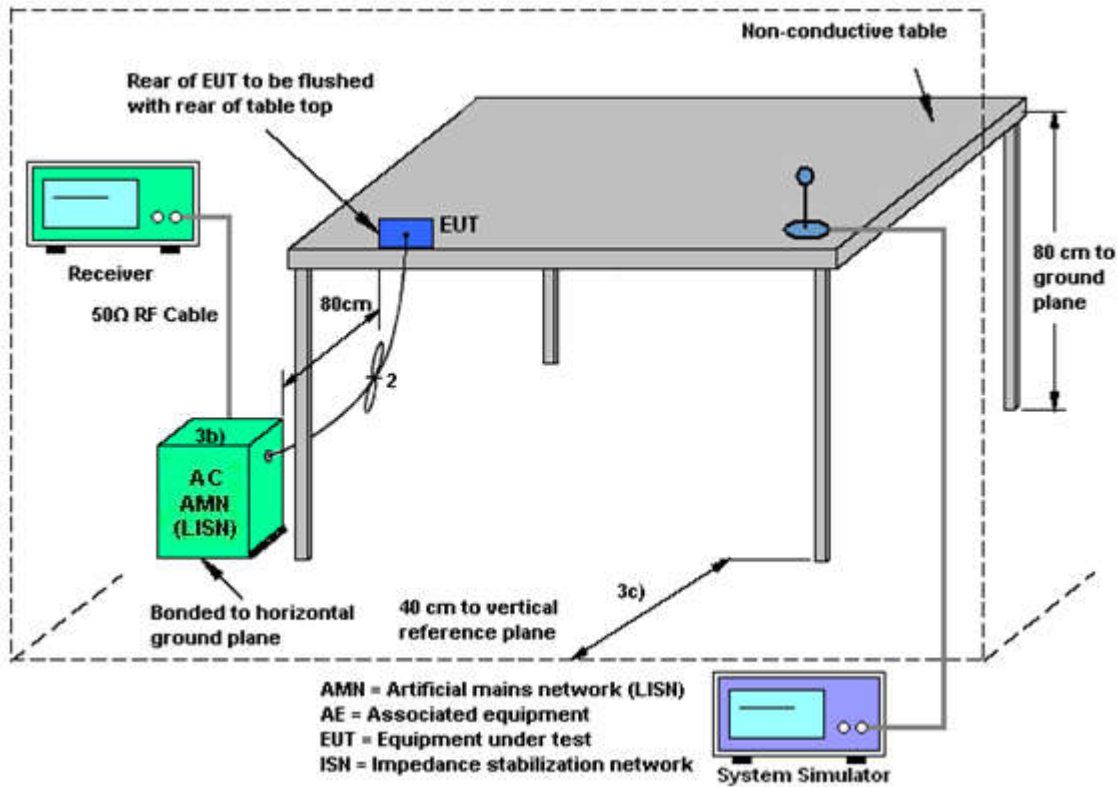
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

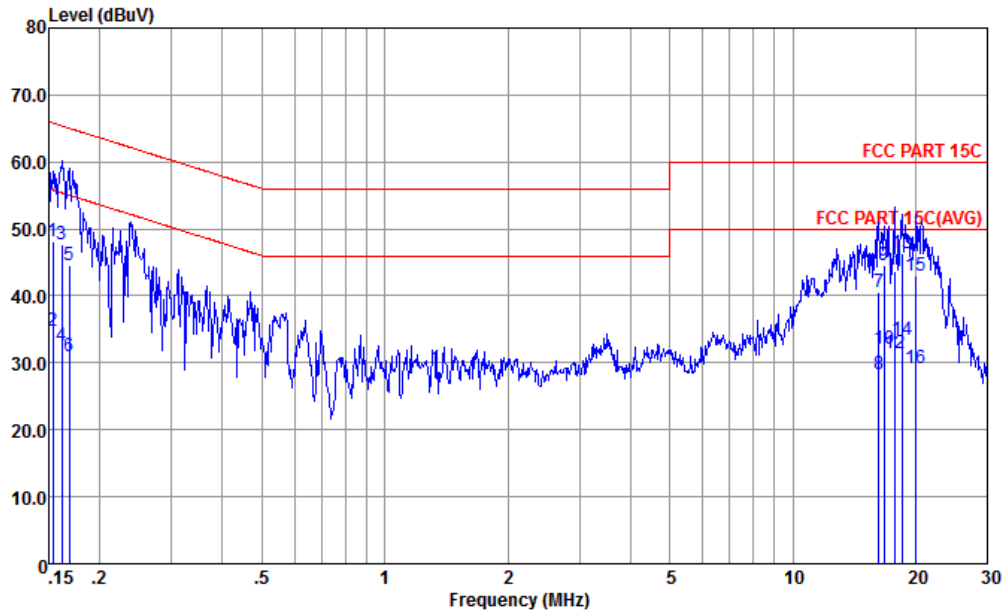
3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + USB Cable (Charging from Adapter) + Earphone 1		

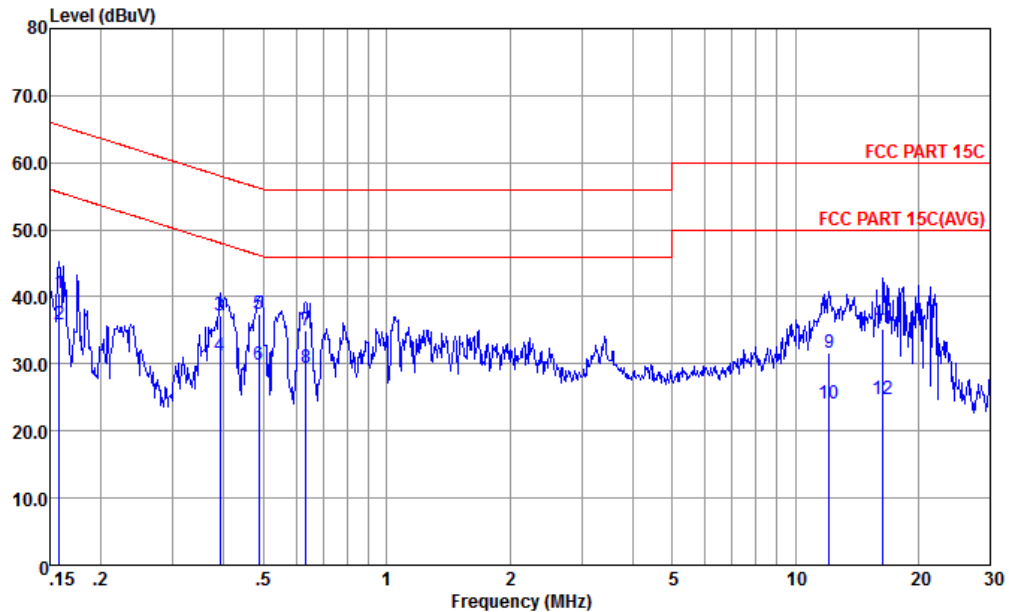


Site : CO01-KS
Condition : FCC PART 15C LISN-L-20151024 LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.153	48.20	-17.62	65.82	37.30	0.51	10.39	QP
2	0.153	34.70	-21.12	55.82	23.80	0.51	10.39	Average
3	0.162	47.73	-17.65	65.38	36.90	0.45	10.38	QP
4	0.162	32.43	-22.95	55.38	21.60	0.45	10.38	Average
5	0.169	44.68	-20.35	65.03	33.90	0.41	10.37	QP
6	0.169	31.08	-23.95	55.03	20.30	0.41	10.37	Average
7	16.226	40.64	-19.36	60.00	29.80	0.26	10.58	QP
8	16.226	28.34	-21.66	50.00	17.50	0.26	10.58	Average
9	16.750	44.49	-15.51	60.00	33.60	0.26	10.63	QP
10	16.750	31.99	-18.01	50.00	21.10	0.26	10.63	Average
11	17.755	43.58	-16.42	60.00	32.59	0.27	10.72	QP
12	17.755	31.38	-18.62	50.00	20.39	0.27	10.72	Average
13 *	18.622	46.36	-13.64	60.00	35.30	0.27	10.79	QP
14	18.622	33.46	-16.54	50.00	22.40	0.27	10.79	Average
15	20.056	43.07	-16.93	60.00	31.90	0.27	10.90	QP
16	20.056	29.27	-20.73	50.00	18.10	0.27	10.90	Average



Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + USB Cable (Charging from Adapter) + Earphone 1		



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

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.158	40.58	-24.98	65.56	29.90	0.30	10.38	QP
2	0.158	35.98	-19.58	55.56	25.30	0.30	10.38	Average
3	0.391	37.32	-20.71	58.03	26.80	0.32	10.20	QP
4	0.391	31.12	-16.91	48.03	20.60	0.32	10.20	Average
5	0.486	37.41	-18.82	56.23	26.90	0.32	10.19	QP
6 *	0.486	29.91	-16.32	46.23	19.40	0.32	10.19	Average
7	0.634	35.01	-20.99	56.00	24.50	0.33	10.18	QP
8	0.634	29.41	-16.59	46.00	18.90	0.33	10.18	Average
9	12.124	31.66	-28.34	60.00	20.99	0.28	10.39	QP
10	12.124	24.16	-25.84	50.00	13.49	0.28	10.39	Average
11	16.398	35.16	-24.84	60.00	24.31	0.26	10.59	QP
12	16.398	24.76	-25.24	50.00	13.91	0.26	10.59	Average

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(N_{ANT}/N_{SS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant. 1	Ant. 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
24 GHz	-200	-200	-200	1.01	0.00	0.00

Power Limit Reduction = $DG(\text{Power}) - 6\text{dBi}$, (min = 0)

PSD Limit Reduction = $DG(\text{PSD}) - 6\text{dBi}$, (min = 0)



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	Dec. 20, 2016~ Dec. 27, 2016	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Dec. 20, 2016~ Dec. 27, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Dec. 20, 2016~ Dec. 27, 2016	Jan. 19, 2017	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Dec. 27, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Dec. 27, 2016	Apr. 21, 2017	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Dec. 27, 2016	Nov. 22, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Dec. 27, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Dec. 27, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Dec. 27, 2016	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Dec. 27, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Jan. 20, 2016	Dec. 27, 2016	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Dec. 27, 2016	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 27, 2016	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 27, 2016	NCR	Radiation (03CH03-KS)
RF Cable	HUBER+SUHNER	SUCOFLEX104	03CH01KS005	30MHz~18GHz	Jun. 22, 2016	Dec. 27, 2016	Jun. 21, 2017	Radiation (03CH03-KS)
RF Cable	HUBER+SUHNER	SUCOFLEX104	03CH01KS006	30MHz~18GHz	Jun. 22, 2016	Dec. 27, 2016	Jun. 21, 2017	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Apr. 29, 2016	Dec. 20, 2016	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Dec. 20, 2016	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Dec. 20, 2016	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Dec. 20, 2016	Oct. 12, 2017	Conduction (CO01-KS)
RF Cable	WOKEN	Y5T	00100N1Q3N1	150kHz~30MHz	Aug. 26, 2016	Dec. 20, 2016	Aug. 25, 2017	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5 dB
---	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5 dB
---	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6 dB
---	--------



Appendix A. Conducted Test Results

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2016/12/20~2017/12/27	Relative Humidity:	51~55	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	1	1	2412	12.89		8.05		0.50	Pass
11b	1Mbps	1	6	2437	12.99		8.05		0.50	Pass
11b	1Mbps	1	11	2462	12.99		8.05		0.50	Pass
11g	6Mbps	1	1	2412	16.73		15.11		0.50	Pass
11g	6Mbps	1	6	2437	16.78		15.11		0.50	Pass
11g	6Mbps	1	11	2462	16.83		15.35		0.50	Pass
HT20	MCS0	1	1	2412	17.68		15.11		0.50	Pass
HT20	MCS0	1	6	2437	17.73		15.13		0.50	Pass
HT20	MCS0	1	11	2462	17.78		15.11		0.50	Pass
HT20	MCS0	2	1	2412	17.68	17.68	15.13	15.13	0.50	Pass
HT20	MCS0	2	6	2437	17.63	17.68	15.13	15.11	0.50	Pass
HT20	MCS0	2	11	2462	17.73	17.78	15.45	15.15	0.50	Pass

TEST RESULTS DATA
Peak Output Power

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
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	24.33	21.32		30.00	30.00	-2.00	-2.00	22.33	19.32	36.00	36.00	Pass
11b	1Mbps	1	6	2437	24.26	21.19		30.00	30.00	-2.00	-2.00	22.26	19.19	36.00	36.00	Pass
11b	1Mbps	1	11	2462	24.59	21.46		30.00	30.00	-2.00	-2.00	22.59	19.46	36.00	36.00	Pass
11g	6Mbps	1	1	2412	24.52	22.12		30.00	30.00	-2.00	-2.00	22.52	20.12	36.00	36.00	Pass
11g	6Mbps	1	6	2437	24.30	22.05		30.00	30.00	-2.00	-2.00	22.30	20.05	36.00	36.00	Pass
11g	6Mbps	1	11	2462	24.37	22.10		30.00	30.00	-2.00	-2.00	22.37	20.10	36.00	36.00	Pass
HT20	MCS0	1	1	2412	24.95	21.65		30.00	30.00	-2.00	-2.00	22.95	19.65	36.00	36.00	Pass
HT20	MCS0	1	6	2437	24.78	21.56		30.00	30.00	-2.00	-2.00	22.78	19.56	36.00	36.00	Pass
HT20	MCS0	1	11	2462	24.94	21.80		30.00	30.00	-2.00	-2.00	22.94	19.80	36.00	36.00	Pass
HT20	MCS0	2	1	2412	23.51	20.70	25.34	30.00		-2.00		23.34		36.00		Pass
HT20	MCS0	2	6	2437	23.29	20.50	25.13	30.00		-2.00		23.13		36.00		Pass
HT20	MCS0	2	11	2462	23.58	20.85	25.44	30.00		-2.00		23.44		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.06	0.06	21.78	18.84	
11b	1Mbps	1	6	2437	0.06	0.06	21.71	18.69	
11b	1Mbps	1	11	2462	0.06	0.06	21.91	18.89	
11g	6Mbps	1	1	2412	0.33	0.33	17.89	17.25	
11g	6Mbps	1	6	2437	0.33	0.33	17.80	17.00	
11g	6Mbps	1	11	2462	0.33	0.33	17.85	17.22	
HT20	MCS0	1	1	2412	0.35	0.35	17.96	15.85	
HT20	MCS0	1	6	2437	0.35	0.35	18.01	15.68	
HT20	MCS0	1	11	2462	0.35	0.35	18.16	16.06	
HT20	MCS0	2	1	2412	0.35	0.35	16.20	14.18	18.32
HT20	MCS0	2	6	2437	0.35	0.35	16.07	14.09	18.20
HT20	MCS0	2	11	2462	0.35	0.35	16.21	14.32	18.38

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-4.94		-	-2.00	-2.00	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-3.66			-2.00	-2.00	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-3.56			-2.00	-2.00	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-9.78			-2.00	-2.00	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-9.62			-2.00	-2.00	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-9.47			-2.00	-2.00	8.00	8.00	Pass
HT20	MCS0	1	1	2412	-9.19			-2.00	-2.00	8.00	8.00	Pass
HT20	MCS0	1	6	2437	-8.83			-2.00	-2.00	8.00	8.00	Pass
HT20	MCS0	1	11	2462	-8.62			-2.00	-2.00	8.00	8.00	Pass
HT20	MCS0	2	1	2412	-10.97	-11.97	-7.96	1.01		8.00		Pass
HT20	MCS0	2	6	2437	-9.80	-11.97	-6.79	1.01		8.00		Pass
HT20	MCS0	2	11	2462	-8.94	-11.73	-5.93	1.01		8.00		Pass

Measured power density (dBm) has offset with cable loss.



Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2388.65	51.09	-22.91	74	55.64	27	5.47	37.02	176	359	P	H
		2389.95	41.8	-12.2	54	46.35	27	5.47	37.02	176	359	A	H
	*	2412	110.01	-	-	114.41	27.13	5.47	37	176	359	P	H
	*	2412	106.57	-	-	110.97	27.13	5.47	37	176	359	A	H
		2386.83	51.89	-22.11	74	56.44	27	5.47	37.02	167	283	P	V
		2387.61	41.89	-12.11	54	46.44	27	5.47	37.02	167	283	A	V
	*	2412	109.63	-	-	114.03	27.13	5.47	37	167	283	P	V
	*	2412	106.33	-	-	110.73	27.13	5.47	37	167	283	A	V
802.11b CH 06 2437MHz		2389.56	51.11	-22.89	74	55.66	27	5.47	37.02	147	359	P	H
		2389.3	40.7	-13.3	54	45.25	27	5.47	37.02	147	359	A	H
	*	2436	111.38	-	-	115.63	27.26	5.48	36.99	147	359	P	H
	*	2438	107.78	-	-	111.87	27.39	5.49	36.97	147	359	A	H
		2484.4	52.44	-21.56	74	56.23	27.64	5.51	36.94	147	359	P	H
		2483.5	41.95	-12.05	54	45.74	27.64	5.51	36.94	147	359	A	H
		2384.1	51.3	-22.7	74	55.92	26.95	5.45	37.02	161	282	P	V
		2388.13	40.46	-13.54	54	45.01	27	5.47	37.02	161	282	A	V
	*	2438	109.64	-	-	113.73	27.39	5.49	36.97	161	282	P	V
	*	2438	106.38	-	-	110.47	27.39	5.49	36.97	161	282	A	V
		2484.22	51.83	-22.17	74	55.62	27.64	5.51	36.94	161	282	P	V
		2485.18	41.32	-12.68	54	45.11	27.64	5.51	36.94	161	282	A	V



802.11b CH 11 2462MHz	*	2462	111.77	-	-	115.72	27.51	5.5	36.96	169	358	P	H
	*	2462	108.05	-	-	112	27.51	5.5	36.96	169	358	A	H
		2483.5	55.52	-18.48	74	59.31	27.64	5.51	36.94	169	358	P	H
	!	2483.5	49.34	-4.66	54	53.13	27.64	5.51	36.94	169	358	A	H
	*	2462	110.01	-	-	113.96	27.51	5.5	36.96	146	279	P	V
	*	2462	106.29	-	-	110.24	27.51	5.5	36.96	146	279	A	V
		2483.5	54.8	-19.2	74	58.59	27.64	5.51	36.94	146	279	P	V
	!	2483.5	48.35	-5.65	54	52.14	27.64	5.51	36.94	146	279	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	41.87	-32.13	74	39.32	31.51	7.72	36.68	100	360	P	H
		4824	41.03	-32.97	74	38.48	31.51	7.72	36.68	100	292	P	V
802.11b CH 06 2437MHz		4872	44.05	-29.95	74	41.36	31.59	7.76	36.66	100	360	P	H
		7308	45.42	-28.58	74	38.32	34.03	9.76	36.69	100	360	P	H
		4872	45.21	-28.79	74	42.52	31.59	7.76	36.66	100	360	P	V
		7308	47.18	-26.82	74	40.08	34.03	9.76	36.69	100	360	P	V
802.11b CH 11 2462MHz		4926	43.3	-30.7	74	40.48	31.67	7.8	36.65	100	360	P	H
		7386	44.76	-29.24	74	37.39	34.29	9.86	36.78	100	360	P	H
		4926	41.58	-32.42	74	38.76	31.67	7.8	36.65	100	238	P	V
		7386	45.11	-28.89	74	37.74	34.29	9.86	36.78	100	238	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		2389.95	53.53	-20.47	74	58.08	27	5.47	37.02	100	33	P	H
		2389.95	42.87	-11.13	54	47.42	27	5.47	37.02	100	33	A	H
	*	2414	105.18	-	-	109.58	27.13	5.47	37	100	33	P	H
	*	2414	97.2	-	-	101.6	27.13	5.47	37	100	33	A	H
		2389.95	53.79	-20.21	74	58.34	27	5.47	37.02	347	303	P	V
		2389.95	43.05	-10.95	54	47.6	27	5.47	37.02	347	303	A	V
	*	2410	105.68	-	-	110.08	27.13	5.47	37	347	303	P	V
	*	2414	97.58	-	-	101.98	27.13	5.47	37	347	303	A	V
802.11g CH 06 2437MHz		2364.47	50.96	-23.04	74	55.64	26.91	5.43	37.02	104	322	P	H
		2389.43	40.63	-13.37	54	45.18	27	5.47	37.02	104	322	A	H
	*	2436	105.14	-	-	109.39	27.26	5.48	36.99	104	322	P	H
	*	2434	97.23	-	-	101.48	27.26	5.48	36.99	104	322	A	H
		2493.28	51.32	-22.68	74	54.96	27.77	5.52	36.93	104	322	P	H
		2483.68	41.24	-12.76	54	45.03	27.64	5.51	36.94	104	322	A	H
		2381.37	51.08	-22.92	74	55.7	26.95	5.45	37.02	330	281	P	V
		2389.95	40.5	-13.5	54	45.05	27	5.47	37.02	330	281	A	V
	*	2434	105.32	-	-	109.57	27.26	5.48	36.99	330	281	P	V
	*	2436	97.2	-	-	101.45	27.26	5.48	36.99	330	281	A	V
		2498.08	51.57	-22.43	74	55.21	27.77	5.52	36.93	330	281	P	V
		2486.68	41.26	-12.74	54	45.05	27.64	5.51	36.94	330	281	A	V



802.11g CH 11 2462MHz	*	2460	108.08	-	-	112.03	27.51	5.5	36.96	100	289	P	H
	*	2460	99.92	-	-	103.87	27.51	5.5	36.96	100	289	A	H
		2483.56	65.38	-8.62	74	69.17	27.64	5.51	36.94	100	289	P	H
	!	2483.5	52.7	-1.3	54	56.49	27.64	5.51	36.94	100	289	A	H
	*	2460	104.21	-	-	108.16	27.51	5.5	36.96	261	304	P	V
	*	2460	95.98	-	-	99.93	27.51	5.5	36.96	261	304	A	V
		2483.98	62.27	-11.73	74	66.06	27.64	5.51	36.94	261	304	P	V
	!	2483.5	49.36	-4.64	54	53.15	27.64	5.51	36.94	261	304	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	42.06	-31.94	74	39.51	31.51	7.72	36.68	200	0	P	H
		4824	42.06	-31.94	74	39.51	31.51	7.72	36.68	300	0	P	V
802.11g CH 06 2437MHz		4872	43.02	-30.98	74	40.33	31.59	7.76	36.66	100	360	P	H
		7308	45.76	-28.24	74	38.66	34.03	9.76	36.69	100	360	P	H
		4872	42.76	-31.24	74	40.07	31.59	7.76	36.66	100	360	P	V
		7308	46.84	-27.16	74	39.74	34.03	9.76	36.69	100	360	P	V
802.11g CH 11 2462MHz		4924	42.23	-31.77	74	39.41	31.67	7.8	36.65	300	360	P	H
		7380	49.5	-24.5	74	42.18	34.24	9.84	36.76	300	360	P	H
		4924	42.52	-31.48	74	39.7	31.67	7.8	36.65	300	0	P	V
		7386	48.97	-25.03	74	41.6	34.29	9.86	36.78	300	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 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2386.96	51.05	-22.95	74	55.6	27	5.47	37.02	175	239	P	H
		2388.26	41.61	-12.39	54	46.16	27	5.47	37.02	175	239	A	H
	*	2412	104.83	-	-	109.23	27.13	5.47	37	175	239	P	H
	*	2412	101.48	-	-	105.88	27.13	5.47	37	175	239	A	H
		2328.33	50.85	-23.15	74	55.65	26.82	5.39	37.01	260	87	P	V
		2389.95	40.23	-13.77	54	44.78	27	5.47	37.02	260	87	A	V
	*	2412	101.49	-	-	105.89	27.13	5.47	37	260	87	P	V
	*	2410	98.07	-	-	102.47	27.13	5.47	37	260	87	A	V
802.11b CH 06 2437MHz		2343.15	50.17	-23.83	74	54.91	26.86	5.41	37.01	144	238	P	H
		2388.65	40.04	-13.96	54	44.59	27	5.47	37.02	144	238	A	H
	*	2436	103.94	-	-	108.19	27.26	5.48	36.99	144	238	P	H
	*	2438	100.8	-	-	104.89	27.39	5.49	36.97	144	238	A	H
		2488.78	51.09	-22.91	74	54.73	27.77	5.52	36.93	144	238	P	H
		2485.42	41.12	-12.88	54	44.91	27.64	5.51	36.94	144	238	A	H
		2377.6	51.11	-22.89	74	55.73	26.95	5.45	37.02	260	85	P	V
		2389.82	39.86	-14.14	54	44.41	27	5.47	37.02	260	85	A	V
	*	2436	99.86	-	-	104.11	27.26	5.48	36.99	260	85	P	V
	*	2436	96.66	-	-	100.91	27.26	5.48	36.99	260	85	A	V
		2485	51.08	-22.92	74	54.87	27.64	5.51	36.94	260	85	P	V
		2484.16	40.7	-13.3	54	44.49	27.64	5.51	36.94	260	85	A	V



802.11b CH 11 2462MHz	*	2462	105.1	-	-	109.05	27.51	5.5	36.96	100	238	P	H
	*	2464	101.72	-	-	105.67	27.51	5.5	36.96	100	238	A	H
		2485.84	54.46	-19.54	74	58.25	27.64	5.51	36.94	100	238	P	H
		2486.8	46.09	-7.91	54	49.88	27.64	5.51	36.94	100	238	A	H
	*	2462	99.05	-	-	103	27.51	5.5	36.96	314	90	P	V
	*	2462	95.55	-	-	99.5	27.51	5.5	36.96	314	90	A	V
		2485.6	51.62	-22.38	74	55.41	27.64	5.51	36.94	314	90	P	V
		2486.38	41.81	-12.19	54	45.6	27.64	5.51	36.94	314	90	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. 2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	46.57	-27.43	74	44.02	31.51	7.72	36.68	100	360	P	H
		4824	44.09	-29.91	74	41.54	31.51	7.72	36.68	100	360	P	V
802.11b CH 06 2437MHz		4872	46.28	-27.72	74	43.59	31.59	7.76	36.66	100	360	P	H
		7308	44.97	-29.03	74	37.87	34.03	9.76	36.69	100	360	P	H
		4872	46.66	-27.34	74	43.97	31.59	7.76	36.66	100	360	P	V
		7308	46.34	-27.66	74	39.24	34.03	9.76	36.69	100	360	P	V
802.11b CH 11 2462MHz		4926	46.98	-27.02	74	44.16	31.67	7.8	36.65	100	360	P	H
		7386	45.16	-28.84	74	37.79	34.29	9.86	36.78	100	360	P	H
		4926	48.21	-25.79	74	45.39	31.67	7.8	36.65	100	360	P	V
		7386	44.96	-29.04	74	37.59	34.29	9.86	36.78	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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

WIFI Ant. 2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.95	66.81	-7.19	74	71.36	27	5.47	37.02	100	114	P	H
	!	2389.95	49.85	-4.15	54	54.4	27	5.47	37.02	100	114	A	H
	*	2416	105.99	-	-	110.39	27.13	5.47	37	100	114	P	H
	*	2414	98.25	-	-	102.65	27.13	5.47	37	100	114	A	H
		2389.95	61.94	-12.06	74	66.49	27	5.47	37.02	149	173	P	V
		2389.82	47.53	-6.47	54	52.08	27	5.47	37.02	149	173	A	V
	*	2416	104.09	-	-	108.49	27.13	5.47	37	149	173	P	V
	*	2414	95.95	-	-	100.35	27.13	5.47	37	149	173	A	V
802.11g CH 06 2437MHz		2356.93	51.31	-22.69	74	55.99	26.91	5.43	37.02	202	130	P	H
		2388.91	41.01	-12.99	54	45.56	27	5.47	37.02	202	130	A	H
	*	2434	104.92	-	-	109.17	27.26	5.48	36.99	202	130	P	H
	*	2434	97.01	-	-	101.26	27.26	5.48	36.99	202	130	A	H
		2487.82	51.21	-22.79	74	54.85	27.77	5.52	36.93	202	130	P	H
		2484.04	41.18	-12.82	54	44.97	27.64	5.51	36.94	202	130	A	H
		2389.04	51.08	-22.92	74	55.63	27	5.47	37.02	166	193	P	V
		2389.43	40.93	-13.07	54	45.48	27	5.47	37.02	166	193	A	V
	*	2434	104.28	-	-	108.53	27.26	5.48	36.99	166	193	P	V
	*	2436	96.36	-	-	100.61	27.26	5.48	36.99	166	193	A	V
		2490.16	51.59	-22.41	74	55.23	27.77	5.52	36.93	166	193	P	V
		2483.74	41.32	-12.68	54	45.11	27.64	5.51	36.94	166	193	A	V



802.11g CH 11 2462MHz	*	2460	105.97	-	-	109.92	27.51	5.5	36.96	100	113	P	H
	*	2460	97.65	-	-	101.6	27.51	5.5	36.96	100	113	A	H
		2483.5	62.41	-11.59	74	66.2	27.64	5.51	36.94	100	113	P	H
	!	2483.5	52.17	-1.83	54	55.96	27.64	5.51	36.94	100	113	A	H
	*	2460	103.6	-	-	107.55	27.51	5.5	36.96	289	204	P	V
	*	2460	95.7	-	-	99.65	27.51	5.5	36.96	289	204	A	V
		2483.68	59.94	-14.06	74	63.73	27.64	5.51	36.94	289	204	P	V
	!	2483.56	50.18	-3.82	54	53.97	27.64	5.51	36.94	289	204	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. 2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	42.99	-31.01	74	40.44	31.51	7.72	36.68	100	360	P	H
		4824	43.38	-30.62	74	40.83	31.51	7.72	36.68	100	360	P	V
802.11g CH 06 2437MHz		4872	43.69	-30.31	74	41	31.59	7.76	36.66	100	360	P	H
		7308	46.75	-27.25	74	39.65	34.03	9.76	36.69	100	360	P	H
		4872	42.83	-31.17	74	40.14	31.59	7.76	36.66	100	360	P	V
		7308	45.59	-28.41	74	38.49	34.03	9.76	36.69	100	360	P	V
802.11g CH 11 2462MHz		4926	43.86	-30.14	74	41.04	31.67	7.8	36.65	100	360	P	H
		7386	45.89	-28.11	74	38.52	34.29	9.86	36.78	100	360	P	H
		4926	44.2	-29.8	74	41.38	31.67	7.8	36.65	100	360	P	V
		7386	46.31	-27.69	74	38.94	34.29	9.86	36.78	100	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	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		2389.69	55.45	-18.55	74	60	27	5.47	37.02	100	140	P	H
		2389.95	45.64	-8.36	54	50.19	27	5.47	37.02	100	140	A	H
	*	2410	108.9	-	-	113.3	27.13	5.47	37	100	140	P	H
	*	2408	100.6	-	-	105	27.13	5.47	37	100	140	A	H
		2389.82	56	-18	74	60.55	27	5.47	37.02	271	305	P	V
		2389.95	47.38	-6.62	54	51.93	27	5.47	37.02	271	305	A	V
	*	2416	107.5	-	-	111.9	27.13	5.47	37	271	305	P	V
	*	2416	99.37	-	-	103.77	27.13	5.47	37	271	305	A	V
802.11n HT20 CH 06 2437MHz		2389.04	51.71	-22.29	74	56.26	27	5.47	37.02	127	141	P	H
		2388.91	41.79	-12.21	54	46.34	27	5.47	37.02	127	141	A	H
		2434	108.54	-	-	112.79	27.26	5.48	36.99	127	141	P	H
		2434	100.55	-	-	104.8	27.26	5.48	36.99	127	141	A	H
		2495.92	52.13	-21.87	74	55.77	27.77	5.52	36.93	127	141	P	H
		2485.06	41.97	-12.03	54	45.76	27.64	5.51	36.94	127	141	A	H
		2389.43	51.02	-22.98	74	55.57	27	5.47	37.02	270	297	P	V
		2389.95	41.12	-12.88	54	45.67	27	5.47	37.02	270	297	A	V
		2440	107.63	-	-	111.72	27.39	5.49	36.97	270	297	P	V
		2440	99.62	-	-	103.71	27.39	5.49	36.97	270	297	A	V
		2484.46	52.14	-21.86	74	55.93	27.64	5.51	36.94	270	297	P	V
		2484.46	41.99	-12.01	54	45.78	27.64	5.51	36.94	270	297	A	V



802.11n HT20 CH 11 2462MHz	*	2458	109.17	-	-	113.12	27.51	5.5	36.96	100	143	P	H
	*	2458	101.32	-	-	105.27	27.51	5.5	36.96	100	143	A	H
		2484.28	64.35	-9.65	74	68.14	27.64	5.51	36.94	100	143	P	H
	!	2483.62	52.77	-1.23	54	56.56	27.64	5.51	36.94	100	143	A	H
	*	2464	108.59	-	-	112.54	27.51	5.5	36.96	100	308	P	V
	*	2464	100.56	-	-	104.51	27.51	5.5	36.96	100	308	A	V
		2483.86	63.03	-10.97	74	66.82	27.64	5.51	36.94	100	308	P	V
	!	2483.5	51.99	-2.01	54	55.78	27.64	5.51	36.94	100	308	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	42.81	-31.19	74	40.26	31.51	7.72	36.68	100	360	P	H
		4824	43.31	-30.69	74	40.76	31.51	7.72	36.68	100	360	P	V
802.11n HT20 CH 06 2437MHz		4872	43.35	-30.65	74	40.66	31.59	7.76	36.66	100	360	P	H
		7308	45.44	-28.56	74	38.34	34.03	9.76	36.69	100	360	P	H
		4872	42.87	-31.13	74	40.18	31.59	7.76	36.66	100	360	P	V
		7308	45.96	-28.04	74	38.86	34.03	9.76	36.69	100	360	P	V
802.11n HT20 CH 11 2462MHz		4926	42.92	-31.08	74	40.1	31.67	7.8	36.65	100	360	P	H
		7386	46.16	-27.84	74	38.79	34.29	9.86	36.78	100	360	P	H
		4926	43.31	-30.69	74	40.49	31.67	7.8	36.65	100	360	P	V
		7386	46.23	-27.77	74	38.86	34.29	9.86	36.78	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF	!	44.55	35.79	-4.21	40	46.93	19.45	0.83	31.42	100	20	P	H
		91.11	26.71	-16.79	43.5	39.3	17.7	1.15	31.44	-	-	P	H
		158.04	26.88	-16.62	43.5	39.33	17.57	1.52	31.54	-	-	P	H
		191.02	25.99	-17.51	43.5	39.64	16.17	1.68	31.5	-	-	P	H
		303.54	25.23	-20.77	46	35.25	19.18	2.15	31.35	-	-	P	H
		448.07	27.33	-18.67	46	30.53	25.41	2.63	31.24	-	-	P	H
	!	45.52	34.76	-5.24	40	46.46	18.9	0.83	31.43	150	10	P	V
		67.83	25.74	-14.26	40	42.71	13.54	0.99	31.5	-	-	P	V
		91.11	23.7	-19.8	43.5	36.29	17.7	1.15	31.44	-	-	P	V
		159.01	26.66	-16.84	43.5	39.14	17.53	1.53	31.54	-	-	P	V
		323.91	26.8	-19.2	46	35.76	20.13	2.21	31.3	-	-	P	V
		855.47	31.07	-14.93	46	29.3	28.94	3.73	30.9	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**2.4GHz 2400~2483.5MHz****Note symbol**

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



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

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

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

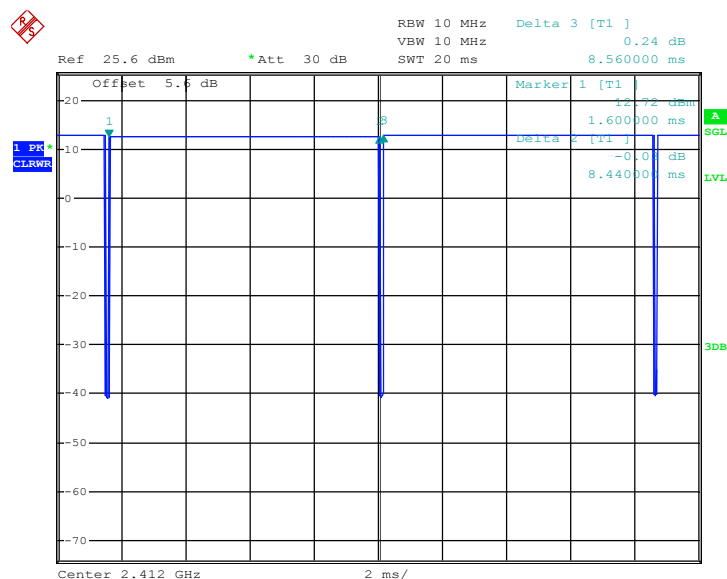
= -10.46(dB)

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

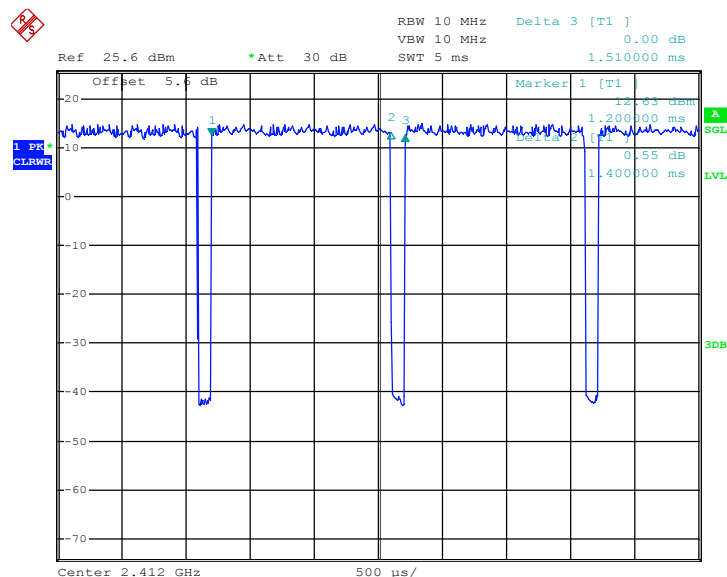
Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11b	98.60	-	-	10Hz
1	802.11g	98.71	-	-	10Hz
2	802.11b	92.72	1.40	0.71	1KHz
2	802.11g	92.72	1.40	0.71	1KHz
1+2	802.11n HT20	92.25	1.31	0.76	1KHz

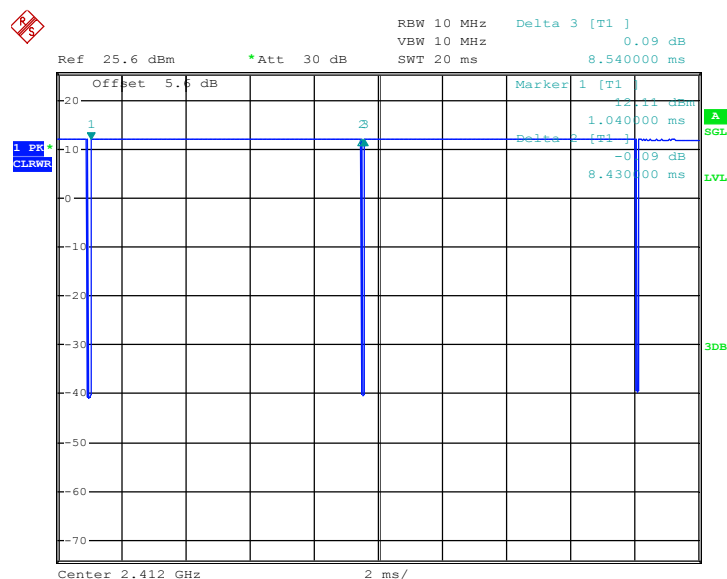
802.11b for Ant.1



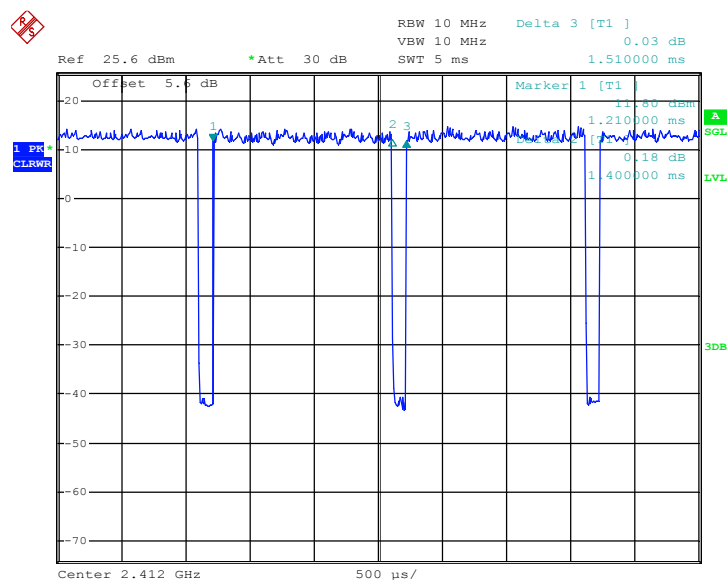
802.11g for Ant.1



802.11b for Ant.2



802.11g for Ant.2





802.11n20 for Ant.1+2

