

FCC Test Report

FCC Part 15 Subpart C §15.247

Product Name : GSM MOBILE PHONE
Model No. : M4TEL SS220
FCC ID : CLNSS220G

Prepared By: : Inventec Appliances(Pudong) Corporation
Address: : No.789 Pu Xing Road,Shanghai,PRC
Date of Receipt : 2012.03.8
Date of Test : 2012.03.8-2012.03.16
Report No. : 20120308FCC-C



Test Report Certification

Date of Issue : Mar.08.2012

Report No. : 20120308FCC-C

Product Name : GSM MOBILE PHONE
Model No. : M4TEL SS220
Trade Name : M4TEL
Applicant : MFOURTEL MEXICO S.A. DE C.V.
Address :
Montecito 38, Piso 23, Oficina 15. Colonia Nápoles. C.P. 03810 Mexico
Standard : FCC Part 15 Subpart C §15.247
Classification : WiFi: Digital Spread Spectrum(DSS)
TX/RX Frequency Range WLAN 802.11b/g (2400 MHz ~ 2483.5 MHz)
Test Result : Complied

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Inventec Appliances(Pudong) Corporation

Documented By :  Mar. 16.2012
Kelly Lin/Engineer

Tested By :  Mar. 16.2012
Byran Hung/Senior Engineer

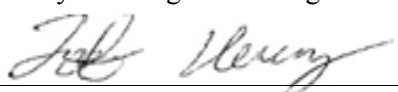
Approved By :  Mar. 16.2012
Jeff Huang/Director of Operations

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test.....	6
1.4 Applied Standards	7
2. Test Configuration of Equipment Under Test.....	8
2.1 RF Power	8
2.2 Test Modes.....	9
2.3 Connection Diagram of Test System	10
3. Test Result for WLAN Function	12
3.1 6dB and 99% Bandwidth Measurement	12
3.2 Output Power Measurement	21
3.3 Band Edges Measurement	22
3.4 Power Spectral Density Measurement.....	35
3.5 AC Conducted Emission Measurement.....	40
3.6 Radiated Emission Measurement	44
4. List of Measuring Equipment.....	61
5. Uncertainty Evaluation.....	61

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	Gen 4.4.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)	A8.4	Output Power Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	Section 15.207(a)	Pass	-
3.7	15.247(d)	A8.5	Radiated Emission	FCC 47 CFR Part 15 Subpart C/ Section 15.209(a) & 15.247(d)	Pass	-
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1. GENERAL INFORMATION

1.1 Applicant

Company Name:MFOURTEL MEXICO S.A. DE C.V.

Address: Montecito 38, Piso 23, Oficina 15. Colonia Nápoles. C.P. 03810 Mexico

1.2 Manufacturer

Company Name:CK Telecom Limited

Address: Technology Road.High-Tech Development Zone. Heyuan, Guangdong,P.R.China.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM MOBILE PHONE
Brand Name	M4TEL
Model Name	M4TEL SS220
FCC ID	CLNSS220G
Tx/Rx Frequency Range	WLAN 802.11b/g (2400 MHz ~ 2483.5 MHz)
Number of Channels	802.11b/g : CH01 CH06 CH11
Carrier Frequency of Each Channel	802.11b/g : 2412MHz 2437MHz 2462MHz
Channel Spacing	802.11b/g : 5MHz
Maximum Output Power to Antenna	802.11b : 17.58 (dBm) 802.11g : 17.82 (dBm)
Antenna Type	Monopole Antenna
HW Version	NICOLE-V2.0
SW Version	NICOLE-S03A_M4TEL_L2EN_100_111111
Type of Modulation	802.11 b type of modulation:DSSS 802.11g type of modulation:OFDM

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Transmission System (DTS) and Digital Spread Spectrum(DSS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description

1.4 Applied 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 DTA Measurement Guidance v01
- ANSI C63.4-2003

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

2.1 RF Power

Preliminary tests were performed in different data rate and recorded the RF Output Power in the following table:

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		At DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	17.45	16.94	17.33	17.01
CH 06	2437 MHz	17.58	16.62	17.03	17.03
CH 11	2462 MHz	17.42	17.12	16.83	16.68

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		At OFDM Data Rate							
		6	9	12	18	24	36	48	54
		Mbps	Mbps	Mbps	Mbps	Mbps	Mbps	Mbps	Mbps
CH01	2412MHz	17.66	17.08	17.66	16.97	17.53	17.11	17.39	17.35
CH06	2437MHz	17.82	16.93	17.69	17.62	17.47	17.25	17.27	17.52
CH11	2462MHz	17.58	17.38	17.52	17.82	17.62	17.12	17.18	17.62

Remark:

The EUT is programmed to transmit signal continuously for all testing.

2.2 Test Modes

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 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), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

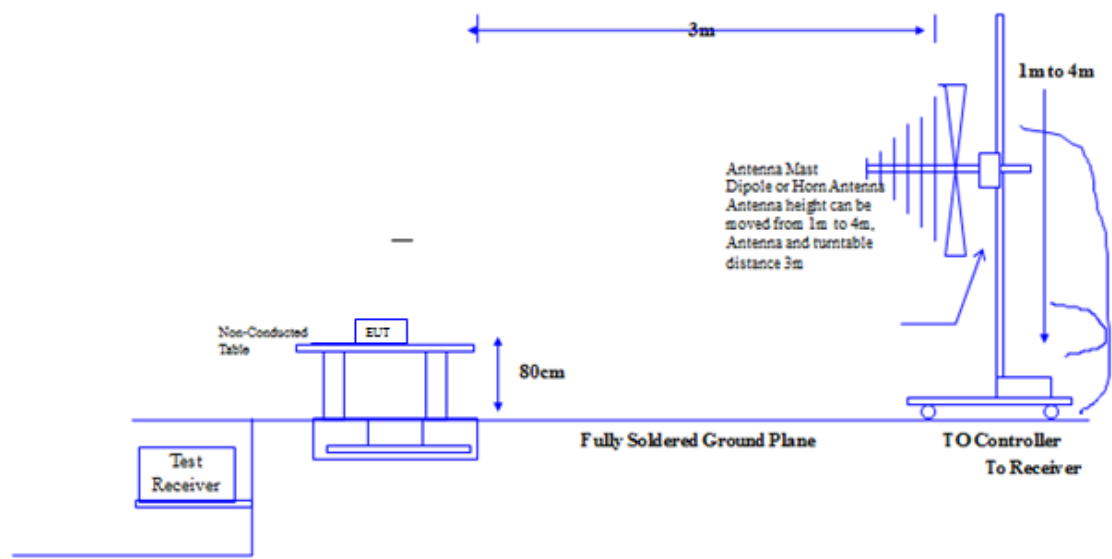
Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

Test Item	802.11b (Modulation : DSSS)	802.11g (Modulation : OFDM)
Conducted TCs	Mode 1: 802.11b_CH01_2412 MHz Mode 2: 802.11b_CH06_2437 MHz Mode 3: 802.11b_CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz

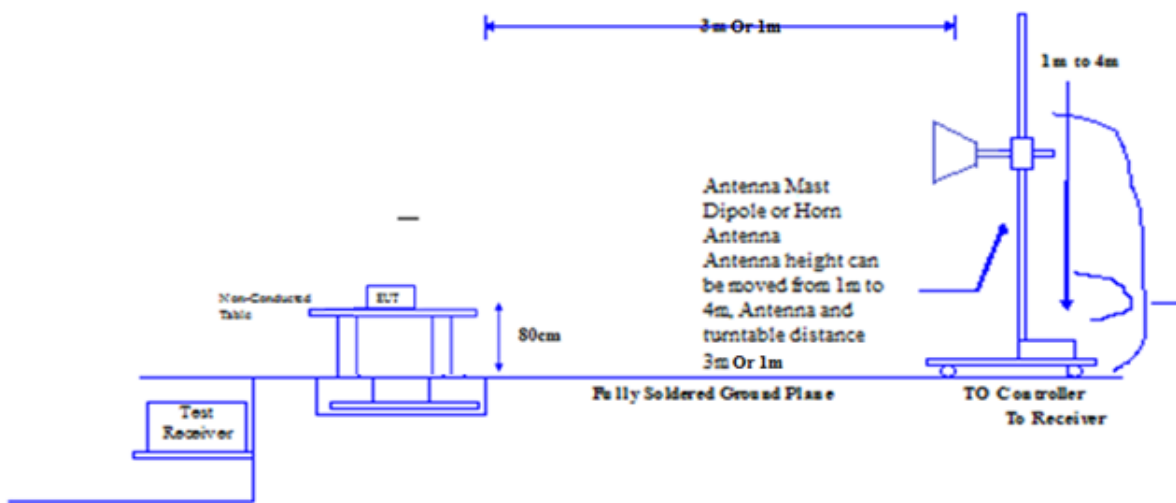
Test Cases		
Radiated TCs	Mode 1: 802.11b_CH01_ 2412 MHz + Battery Mode 2: 802.11b_CH06_ 2437 MHz + Battery Mode 3: 802.11b_CH11_ 2462 MHz + Battery	Mode 4 : 802.11g_CH01_ 2412 MHz + Battery Mode 5 : 802.11g_CH06_ 2437 MHz + Battery Mode 6 : 802.11g_CH11_ 2462 MHz + Battery
AC Conducted Emission	Mode 1 : GSM 850 Idle + WLAN Link (2.4G) + Bluetooth Link + Adapter+ Battery Mode 2: GSM 1900 Idle + WLAN Link (2.4G) + Bluetooth Link + Adapter+ Battery	

2.3 Connection Diagram of Test System

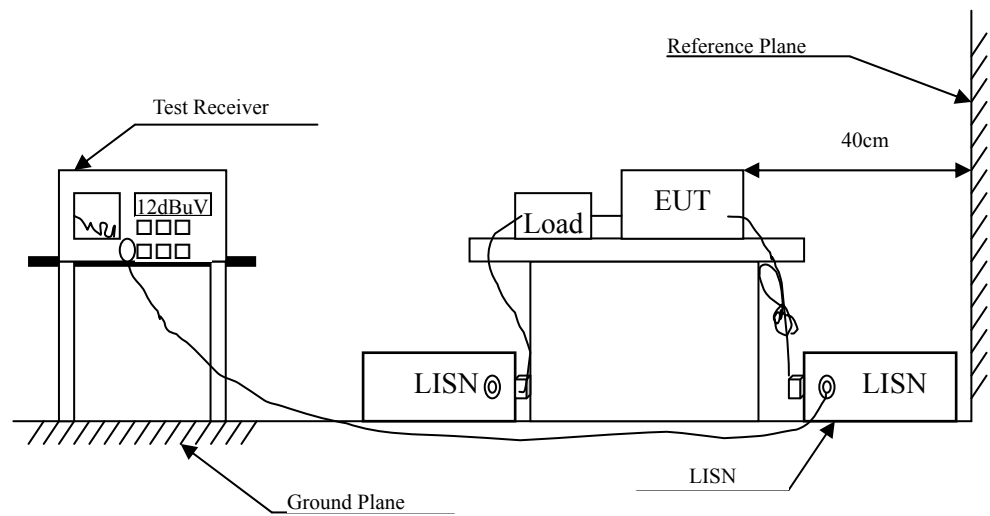
30MHz~1GHz



Above 1GHz



<Conduction Test>



3. Test Result for WLAN Function

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

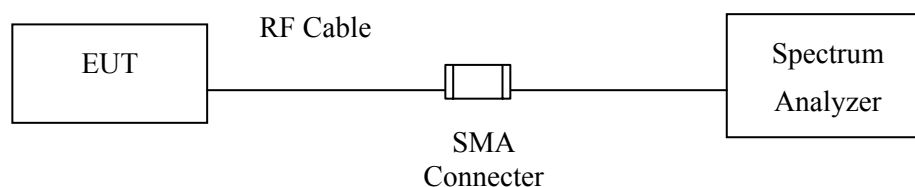
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Measurement Guidance v01..
2. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

3.1.4 Test Setup

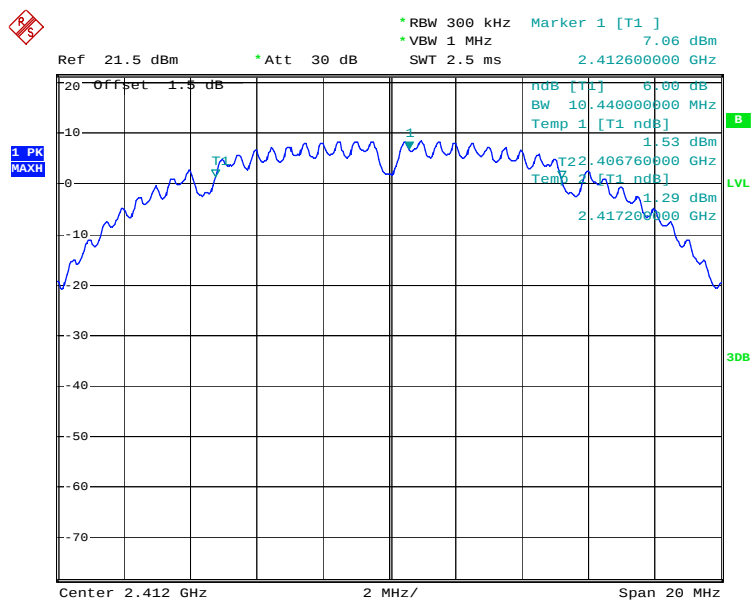


3.1.5 Test Result of 6dB Bandwidth

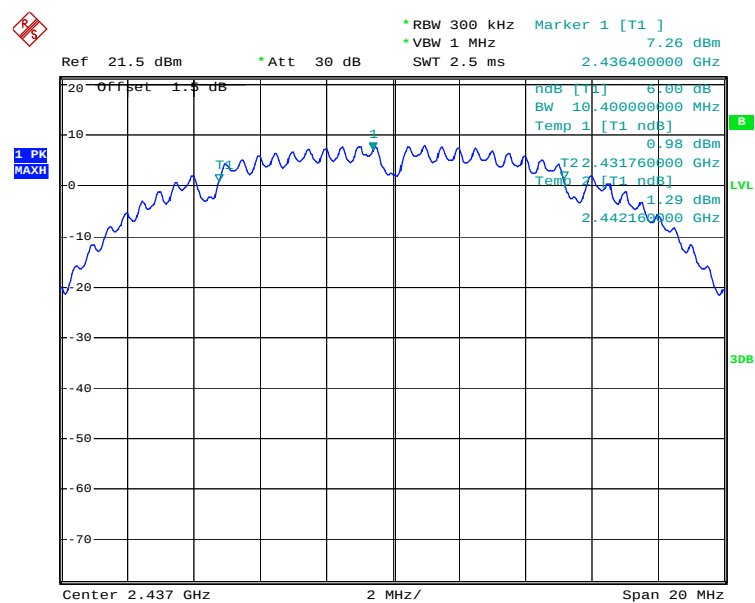
Test Mode :	Mode 1, 2, 3	Temperature :	23℃~26℃
Test Engineer :	Hogan He	Relative Humidity :	40%~60%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.44	0.5	Pass
06	2437	10.40	0.5	Pass
11	2462	10.48	0.5	Pass

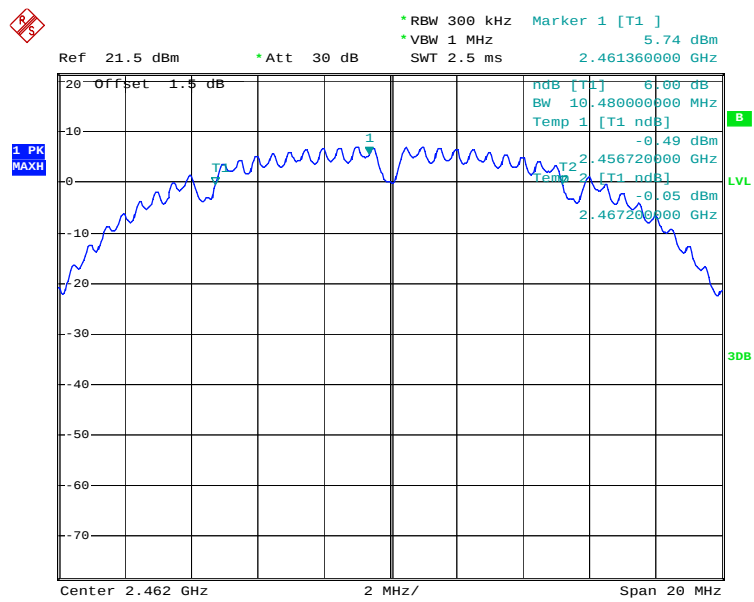
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



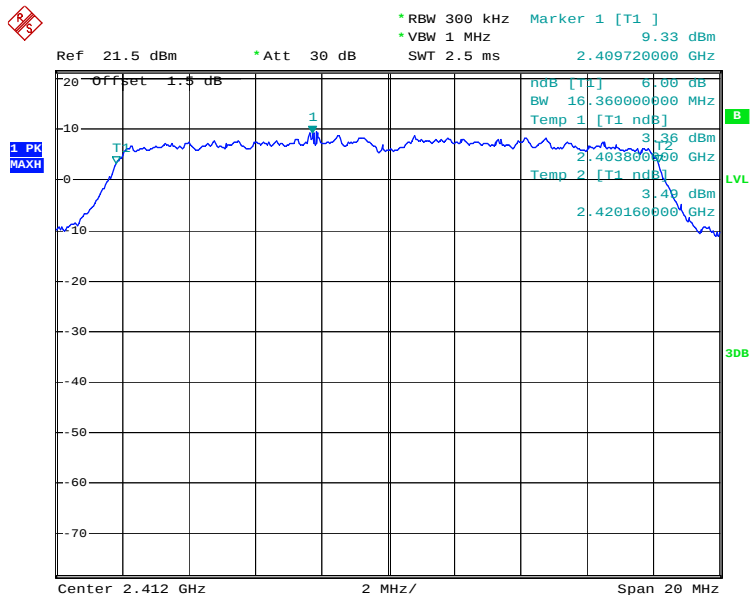
Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11



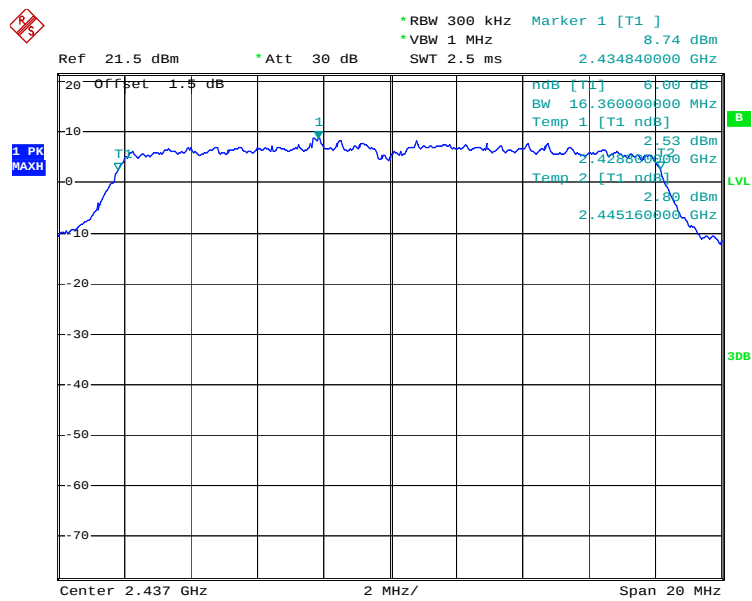
Test Mode :	Mode 4, 5, 6	Temperature :	23℃~26℃
Test Engineer :	Hogan He	Relative Humidity :	40%~60%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.36	0.5	Pass
06	2437	16.36	0.5	Pass
11	2462	16.36	0.5	Pass

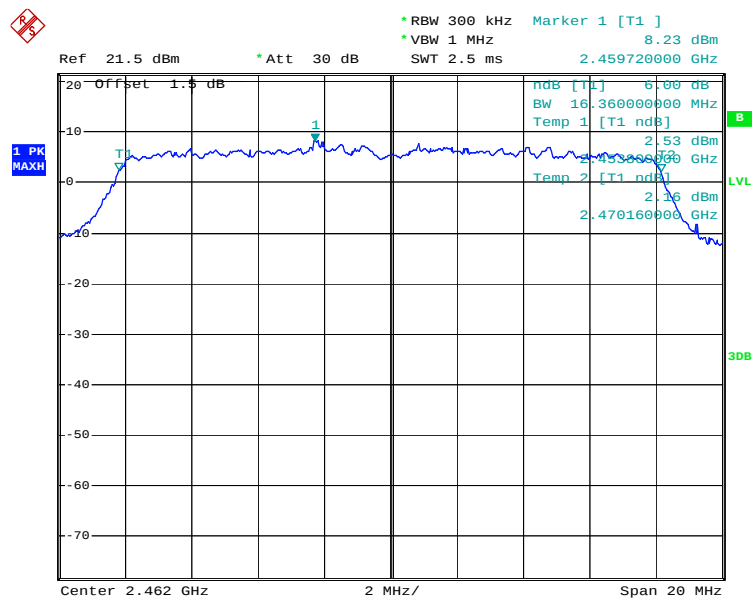
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11

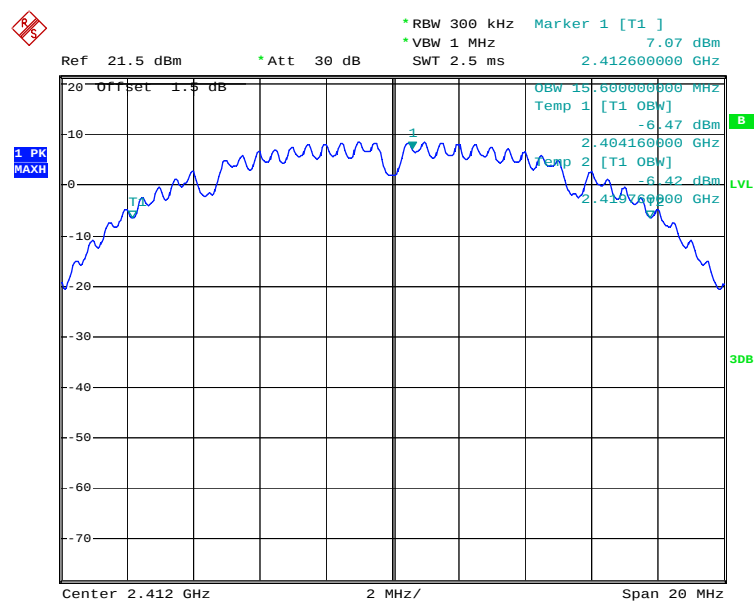


3.1.6 Test Result of 99% Occupied Bandwidth

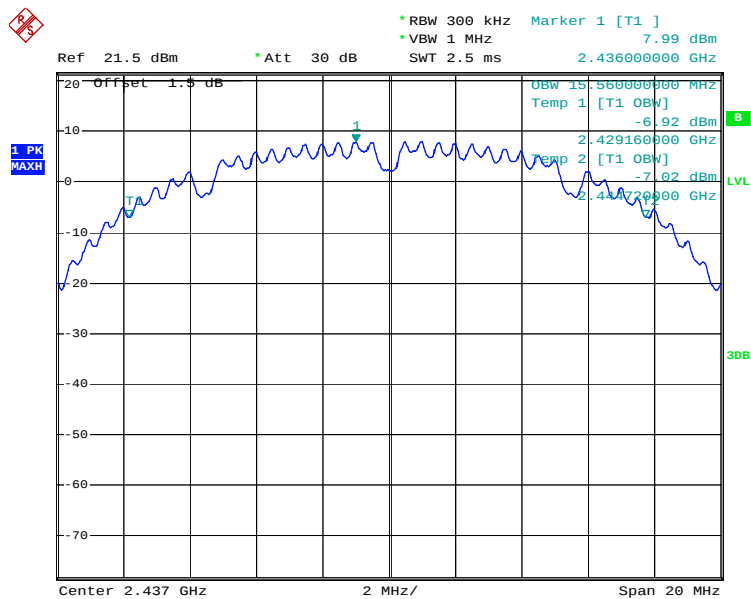
Test Mode :	Mode 1, 2, 3	Temperature :	23℃~26℃
Test Engineer :	Hogan He	Relative Humidity :	40%~60%

Channel	Frequency (MHz)	802.11b 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	15.60	Pass
06	2437	15.56	Pass
11	2462	15.56	Pass

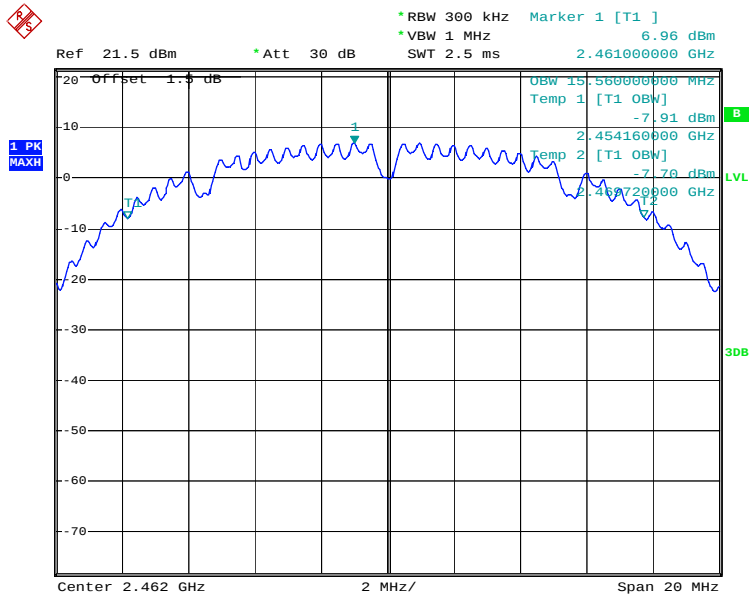
Mode 1 : 99% Occupied Bandwidth Plot on 802.11b Channel 01



Mode 2 : 99% Occupied Bandwidth Plot on 802.11b Channel 06



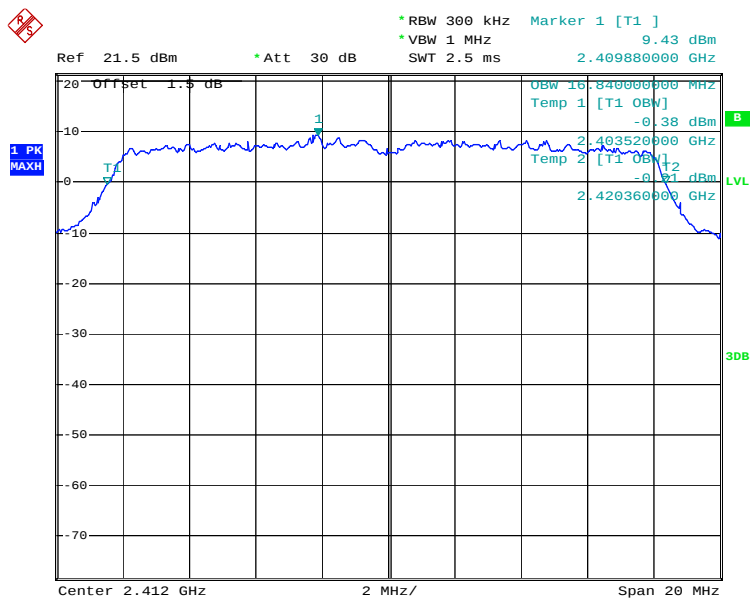
Mode 3 : 99% Occupied Bandwidth Plot on 802.11b Channel 11



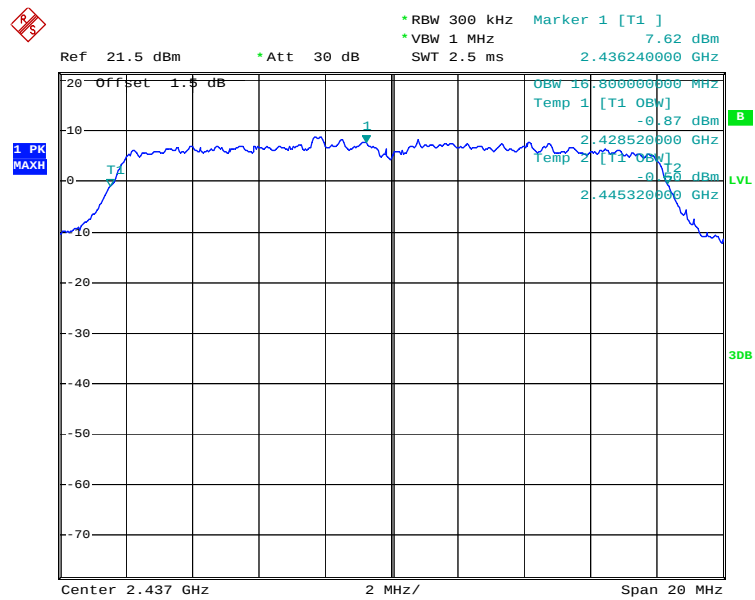
Test Mode :	Mode 4, 5, 6	Temperature :	23℃~26℃
Test Engineer :	Hogan He	Relative Humidity :	40%~60%

Channel	Frequency (MHz)	802.11g 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	16.84	Pass
06	2437	16.80	Pass
11	2462	16.80	Pass

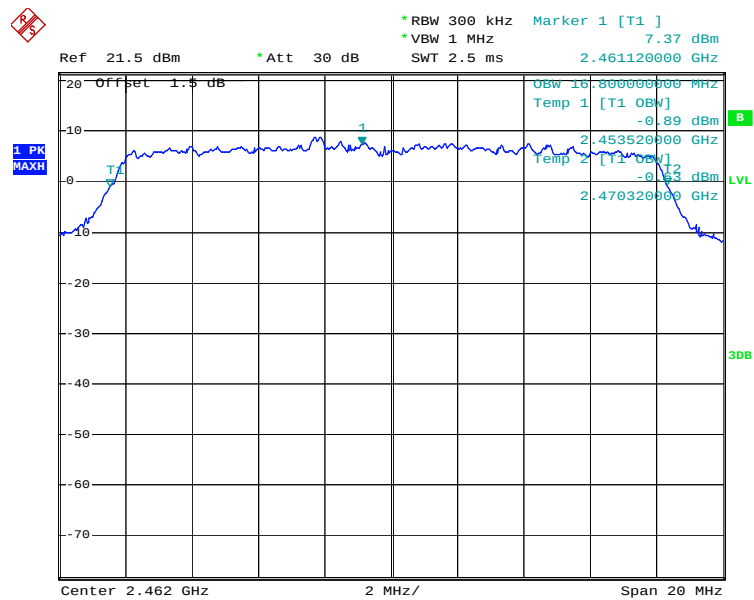
Mode 4 : 99% Occupied Bandwidth Plot on 802.11g Channel 01



Mode 5 : 99% Occupied Bandwidth Plot on 802.11g Channel 06



Mode 6 : 99% Occupied Bandwidth Plot on 802.11g Channel 11



3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz and 5725-5850MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

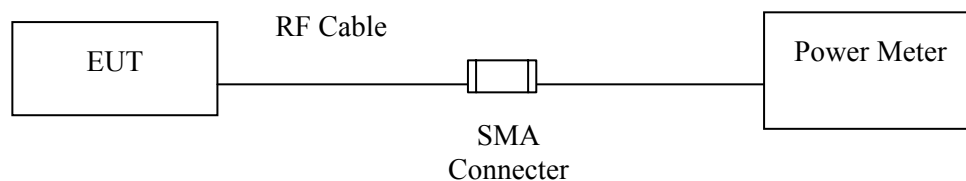
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTA Measurement Guidance v01.
2. The RF output of EUT was connected to the power meter by a low loss cable.
3. Measure the power by power meter.

3.2.4 Test Setup



3.2.5 Test Result of Output Power

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.45	30	Pass
06	2437	17.58	30	Pass
11	2462	17.42	30	Pass

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.66	30	Pass
06	2437	17.82	30	Pass
11	2462	17.58	30	Pass

3.3 Band Edges Measurement

3.3.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. 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.

3.3.2 Measuring Instruments

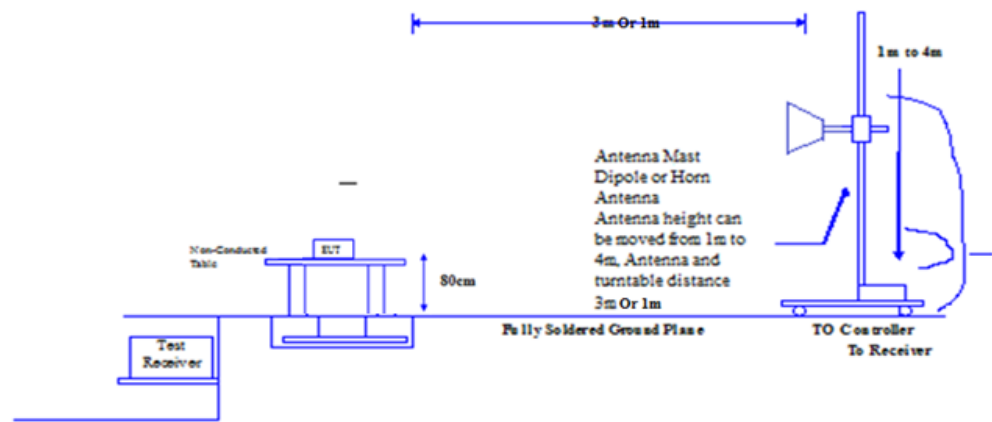
See list of measuring instruments of this test report.

3.3.3 Test Procedures

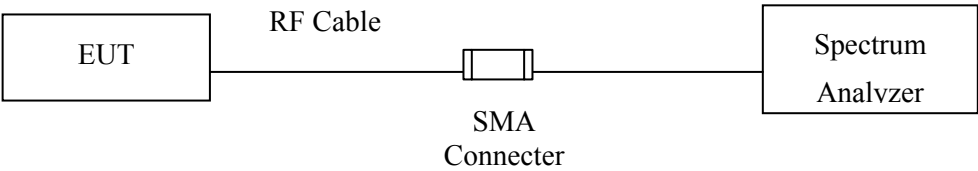
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 D01 DTA Measurement Guidance v01.
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) > RBW. Band edge emissions must be at least 20 dB below the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the output power of this device was measured by power meter, the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements peak radiated emission above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep=Auto. For measurements average radiated emission above 1 GHz, set RBW = 1MHz, VBW = 10Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c)

3.3.4 Test Setup

Radiated Band Edge



Conducted Band Edge



3.3.5 Test Result of Radiated Band Edges

Test Band :	802.11b
Test Channel	01

Frequency GHz	Level dBuv/m	Over Limit dB	Limit Line dBuv/m	Read Level dBuv	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Remark	Polarity
2.39(802.11b)	58.61	-15.39	74	48.12	27.5	6.99	24	Peak	Vertical
2.39(802.11b)	45.66	-8.34	54	35.17	27.5	6.99	24	Average	Vertical
2.39(802.11b)	59.52	-14.48	74	49.03	27.5	6.99	24	Peak	Horizontal
2.39(802.11b)	47.3	-6.7	54	36.81	27.5	6.99	24	Average	Horizontal

Test Band :	802.11b
Test Channel	11

Frequency GHz	Level dBuv/m	Over Limit dB	Limit Line dBuv/m	Read Level dBuv	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Remark	Polarity
2.4835(802.11b)	57.66	-16.34	74	46.38	27.6	7.68	24	Peak	Vertical
2.4835(802.12b)	46.16	-7.84	54	34.88	27.6	7.68	24	Average	Vertical
2.4835(802.13b)	57.12	-16.88	74	45.84	27.6	7.68	24	Peak	Horizontal
2.4835(802.14b)	47.56	-6.44	54	36.28	27.6	7.68	24	Average	Horizontal

Test Band :	802.11g
Test Channel	01

Frequency GHz	Level dBuv/m	Over Limit dB	Limit Line dBuv/m	Read Level dBuv	Antenna Factor dB	Cable Loss dB	Preamplifier Factor dB	Remark	Polarity
2.39(802.11g)	66.13	-7.87	74	55.64	27.5	6.99	24	Peak	Vertical
2.39(802.11g)	48.54	-5.46	54	38.05	27.5	6.99	24	Average	Vertical
2.39(802.12g)	69.38	-4.62	74	58.89	27.5	6.99	24	Peak	Horizontal
2.39(802.11g)	48.17	-5.83	54	37.68	27.5	6.99	24	Average	Horizontal

Test Band :	802.11g
Test Channel	11

Frequency GHz	Level dBuv/m	Over Limit dB	Limit Line dBuv/m	Read Level dBuv	Antenna Factor dB	Cable Loss dB	Preamplifier Factor dB	Remark	Polarity
2.4835(802.11g)	58.83	-15.17	74	47.55	27.6	7.68	24	Peak	Vertical
2.4835(802.12g)	46.86	-7.14	54	35.58	27.6	7.68	24	Average	Vertical
2.4835(802.13g)	62.55	-11.45	74	51.27	27.6	7.68	24	Peak	Horizontal
2.4835(802.14g)	47.93	-6.07	54	36.65	27.6	7.68	24	Average	Horizontal

Test Mode :	Mode 1 and 3	Temperature :	23℃~26℃
Test Band :	802.11b	Relative Humidity :	40%~60%
Test Channel :	01 and 11	Test Engineer :	Hogan He

Ref 21.5 dBm * Att 30 dB * RBW 100 kHz Marker 1 [T1] -15.49 dBm
 * VBW 100 kHz 2.396990000 GHz
 * SWT 500 ms

20 Offset 1.0 dB

10.17

1 PK VIEW

-9.83dBm

LVL

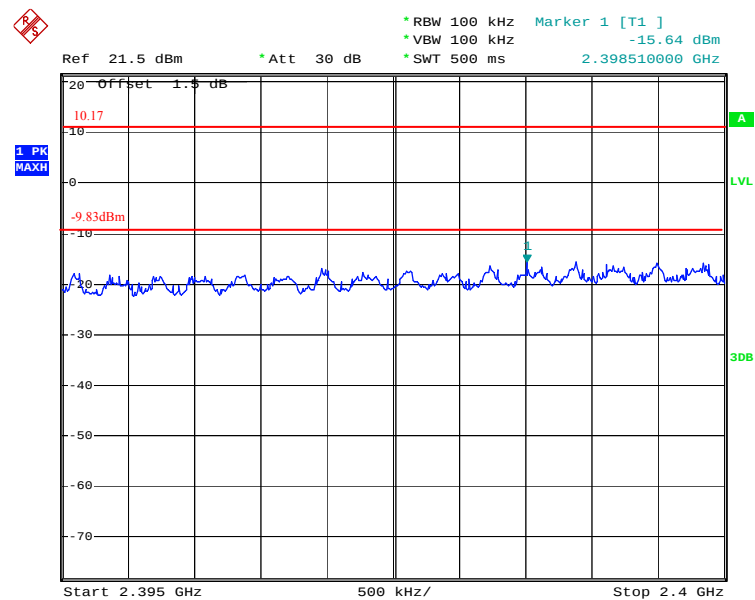
3dB

Start 2.395 GHz 500 kHz/ Stop 2.4 GHz

Version:1.0

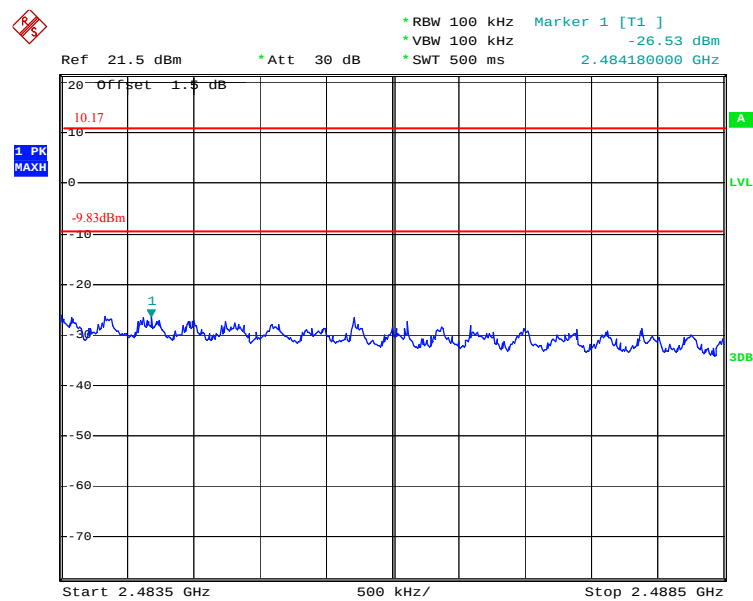
Test Mode :	Mode 4 and 6	Temperature :	23℃~26℃
Test Band :	802.11g	Relative Humidity :	40%~60%
Test Channel :	01 and 11	Test Engineer :	Hogan He

Low Band Edge Plot on 802.11g Channel 01



Date: 9.MAR.2012 11:29:18

High Band Edge Plot on 802.11g Channel 11



Date: 9.MAR.2012 11:31:47

3.3.7 Spurious Emission Measurement**3.3.8 Limit of Spurious Emission Measurement**

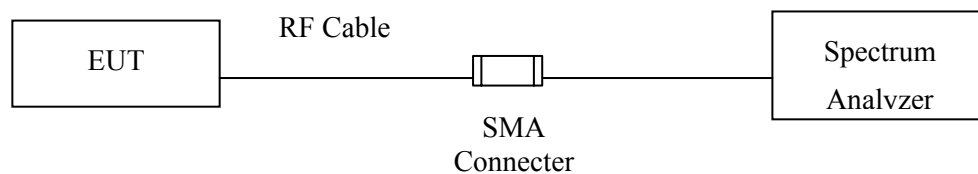
All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band.

3.3.9 Measuring Instruments

See list of measuring instruments of this test report.

3.3.10 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

3.3.11 Test Setup

Test Mode :	Mode 1	Temperature :	23℃~26℃
Test Band :	802.11b	Relative Humidity :	40%~60%
Test Channel :	01	Test Engineer :	Hogan He

1 PK MAXH

Ref 21.5 dBm Att 30 dB RBW 100 kHz VBW 100 kHz SWT 2.6 s Marker 1 [T1] -31.08 dBm

Down20dB

Start 9 kHz 299.9991 MHz/ Stop 3 GHz

Ref 21.5 dBm * Att 30 dB * RBW 100 kHz * VBW 100 kHz * SWT 2.6 s Marker 1 [T1] -36.07 dBm 4.792000000 GHz

Offset 1.5 dB

1 PK MAX

Down 20 dB

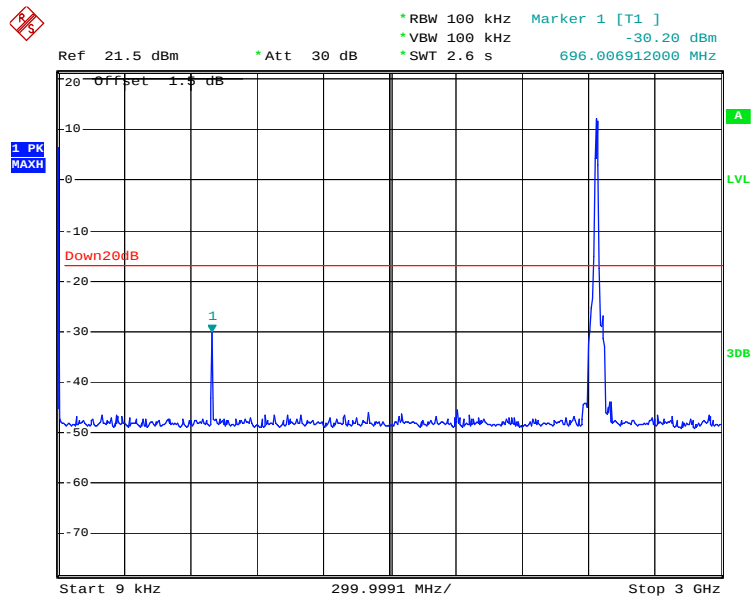
1

Start 1 GHz 2.4 GHz/ Stop 25 GHz

Version:1.0

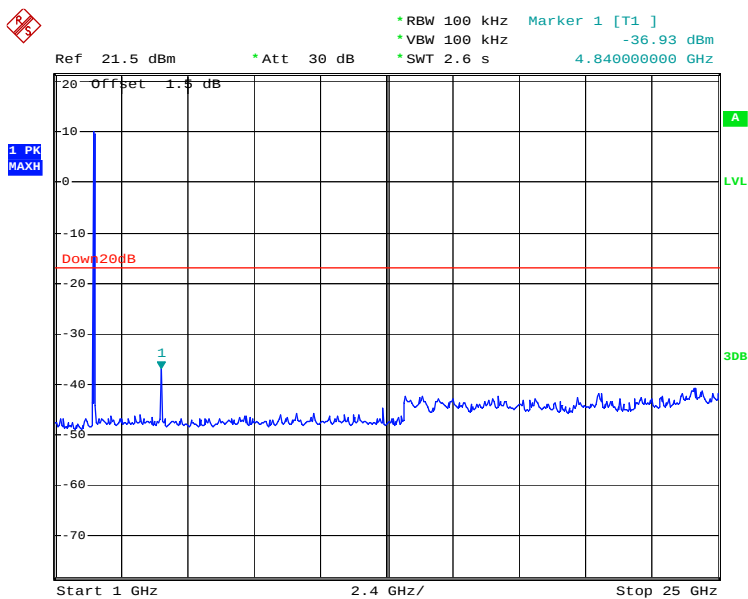
Test Mode :	Mode 2	Temperature :	23℃~26℃
Test Band :	802.11b	Relative Humidity :	40%~60%
Test Channel :	06	Test Engineer :	Hogan He

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.MAR.2012 11:50:31

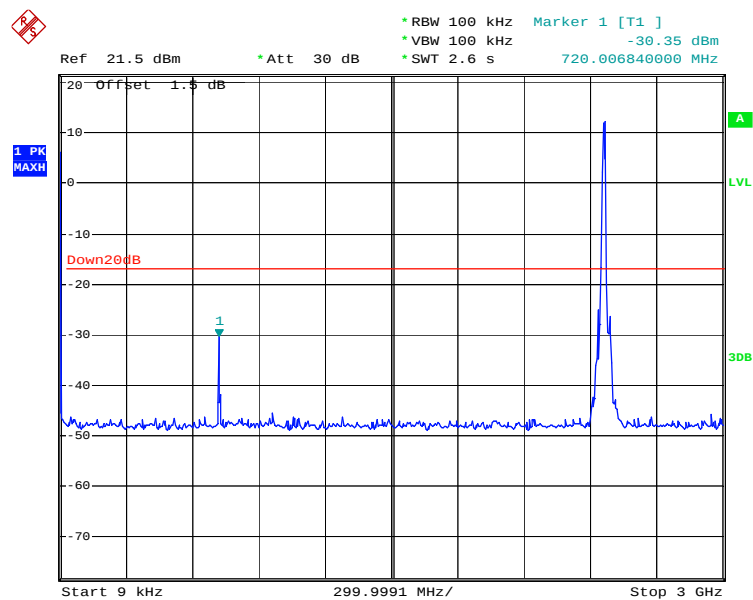
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.MAR.2012 11:51:11

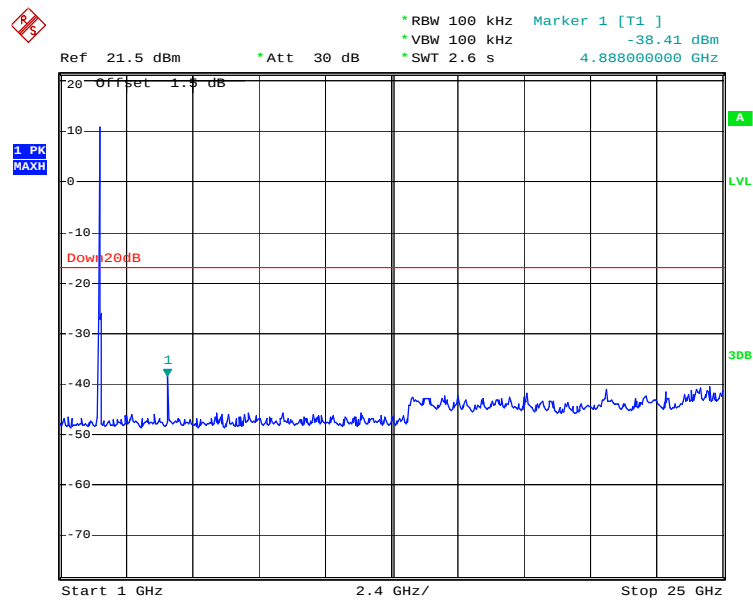
Test Mode :	Mode 3	Temperature :	23℃~26℃
Test Band :	802.11b	Relative Humidity :	40%~60%
Test Channel :	11	Test Engineer :	Hogan He

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.MAR.2012 11:53:02

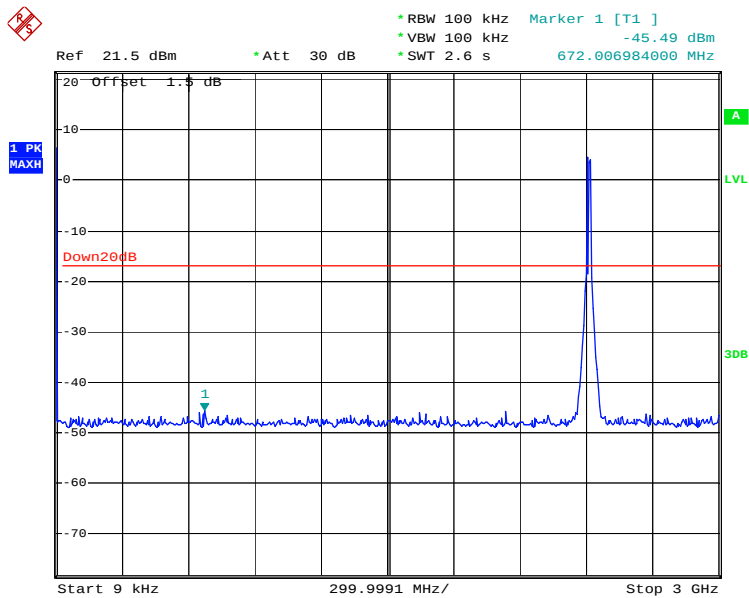
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.MAR.2012 11:54:41

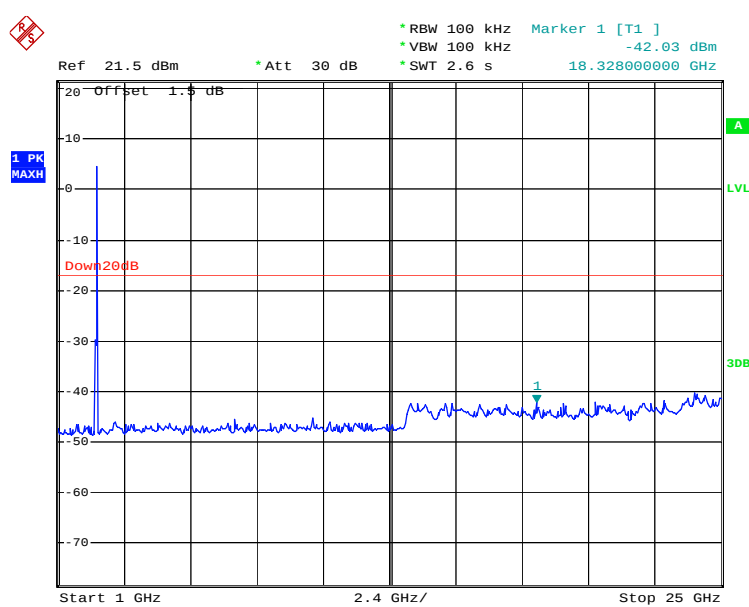
Test Mode :	Mode 4	Temperature :	23℃~26℃
Test Band :	802.11g	Relative Humidity :	40%~60%
Test Channel :	01	Test Engineer :	Hogan He

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.MAR.2012 11:46:17

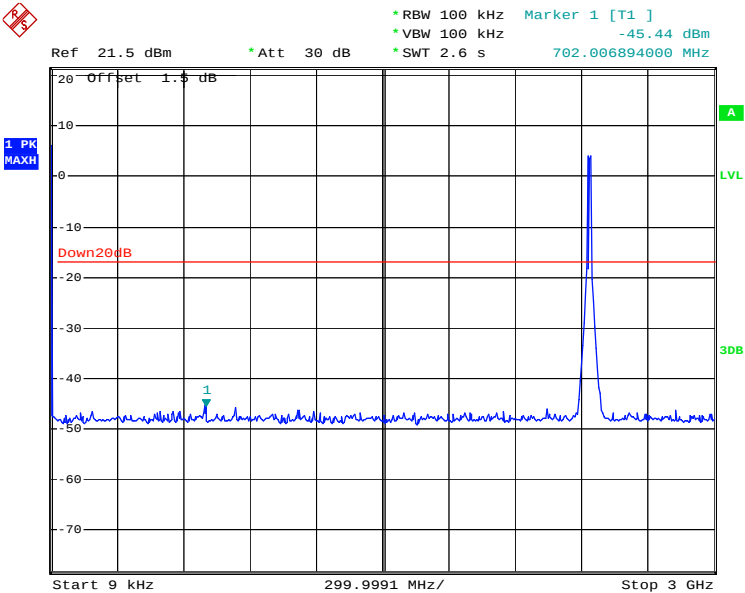
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.MAR.2012 11:47:03

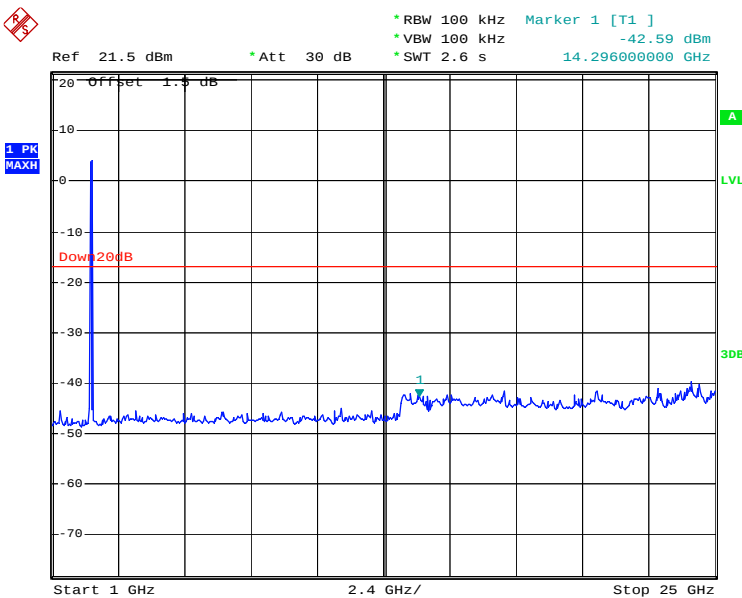
Test Mode :	Mode 5	Temperature :	23℃~26℃
Test Band :	802.11g	Relative Humidity :	40%~60%
Test Channel :	06	Test Engineer :	Hogan He

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.MAR.2012 11:45:16

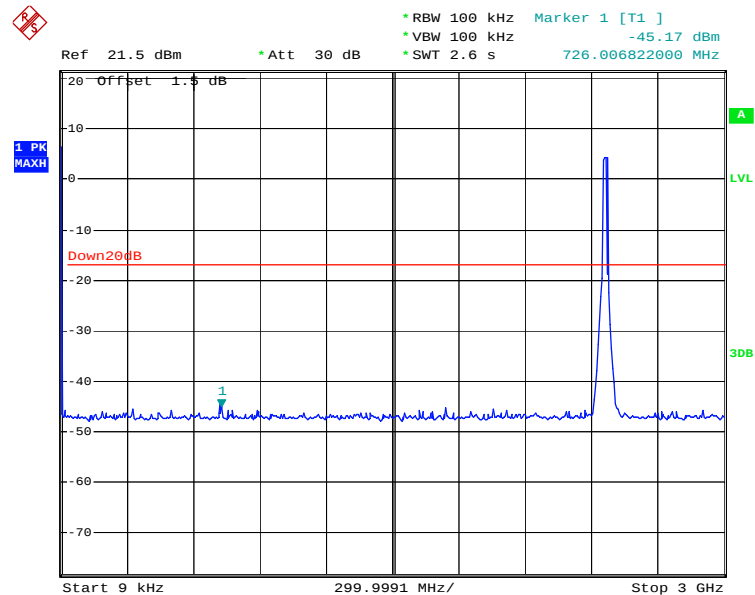
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.MAR.2012 11:44:28

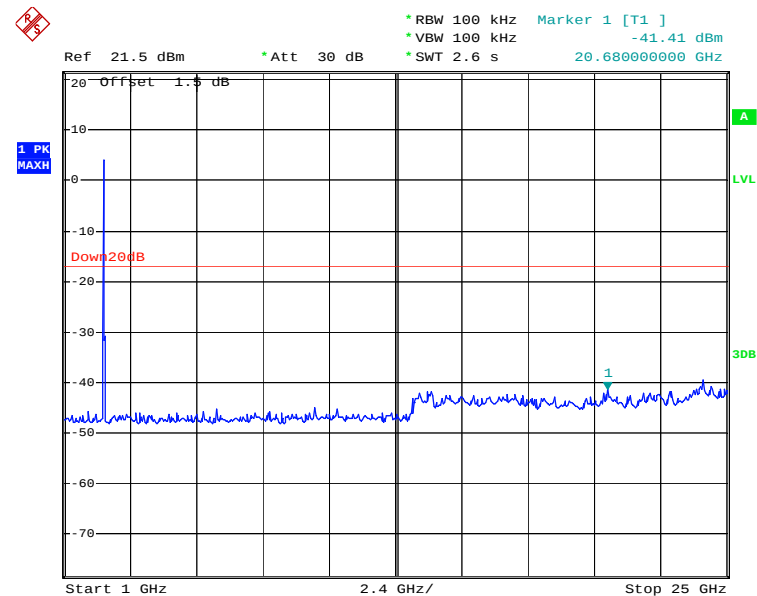
Test Mode :	Mode 6	Temperature :	23℃~26℃
Test Band :	802.11g	Relative Humidity :	40%~60%
Test Channel :	11	Test Engineer :	Hogan He

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.MAR.2012 11:41:49

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.MAR.2012 11:43:01

3.4 Power Spectral Density Measurement

3.4.1 Limit of Power Spectral Density

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

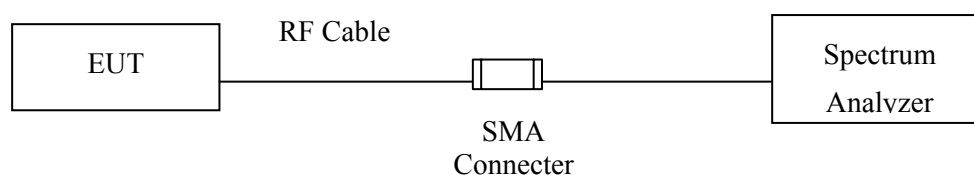
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 D01 DTA Measurement Guidance v01.
2. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
3. Set the RBW = 100 kHz.
4. Set the VBW $\geq$ 300 kHz.
5. Set the span to 5-30 % greater than the EBW.
6. Detector = peak.
7. Sweep time = auto couple
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
11. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3\text{ kHz}/100\text{ kHz} = -15.2\text{ dB})$.
12. The resulting peak PSD level must be $\leq 8\text{ dBm}$.

3.4.4 Test Setup

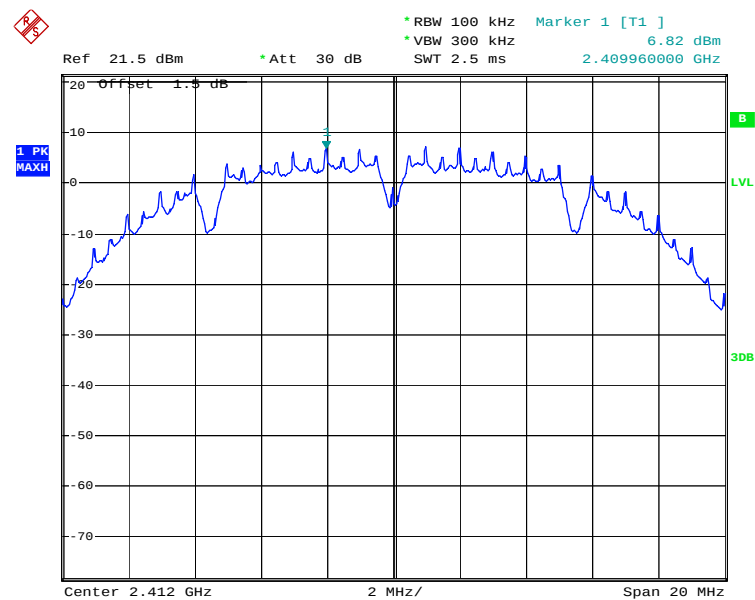


3.4.5 Test Result of Power Spectral Density

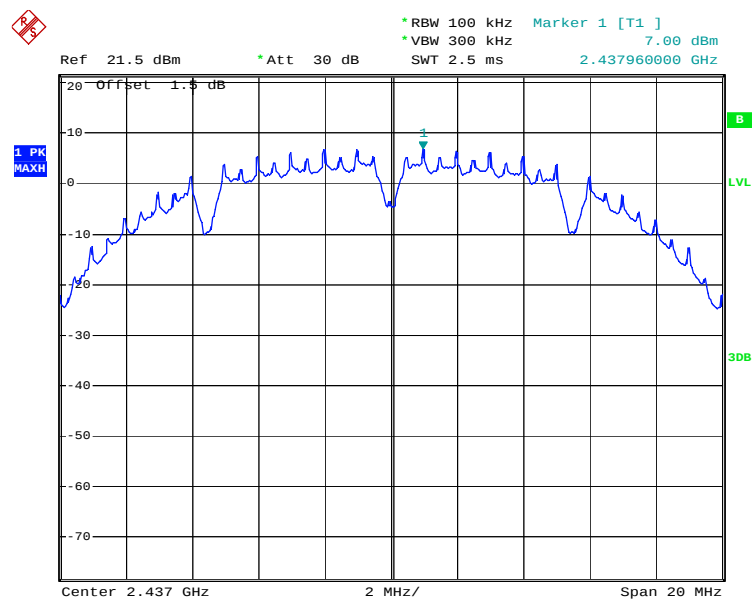
Test Mode :	Mode 1, 2, 3	Temperature :	23℃~26℃
Test Engineer :	Hogan He	Relative Humidity :	40%~60%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-8.38	8	Pass
06	2437	-8.20	8	Pass
11	2462	-8.69	8	Pass

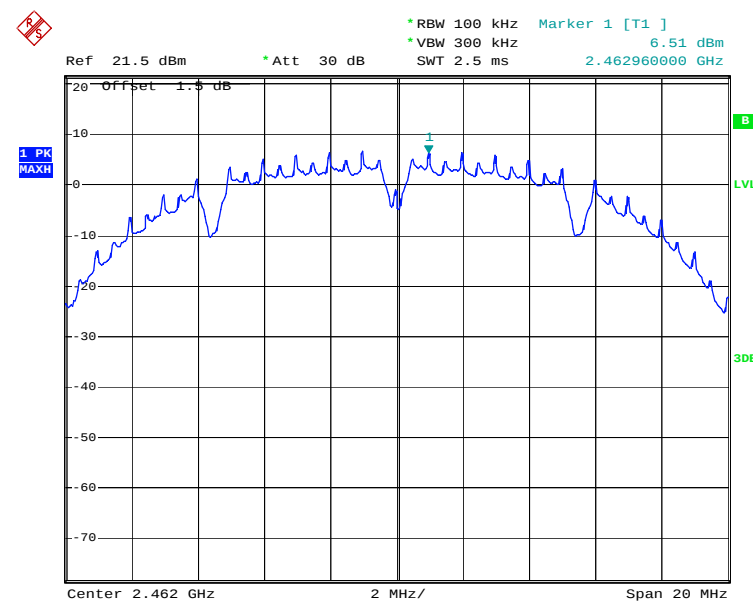
Mode 1 : PSD Plot on 802.11b Channel 01



Mode 2 : PSD Plot on 802.11b Channel 06



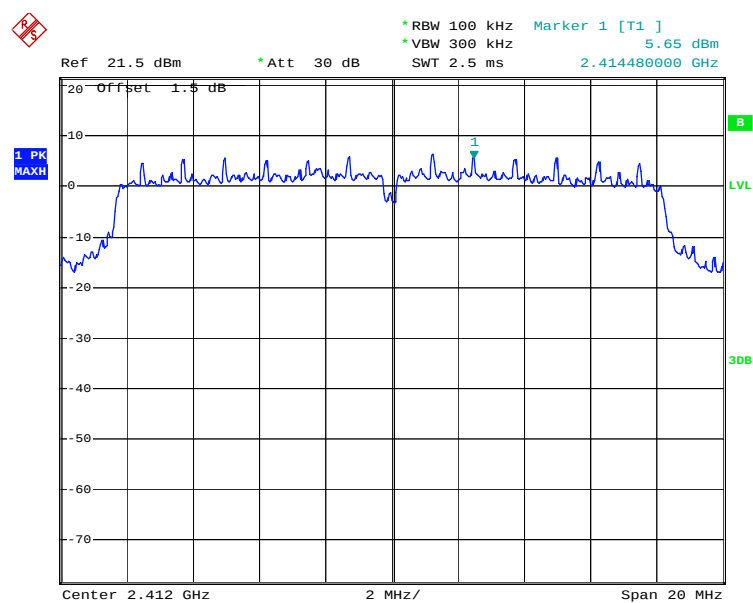
Mode 3 : PSD Plot on 802.11b Channel 11



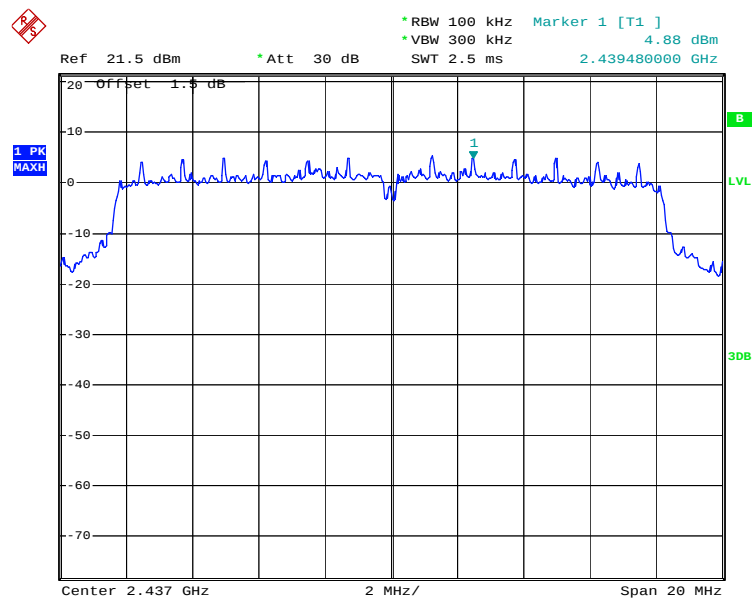
Test Mode :	Mode 4, 5, 6	Temperature :	23℃~26℃
Test Engineer :	Hogan He	Relative Humidity :	40%~60%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-9.55	8	Pass
06	2437	-10.22	8	Pass
11	2462	-10.73	8	Pass

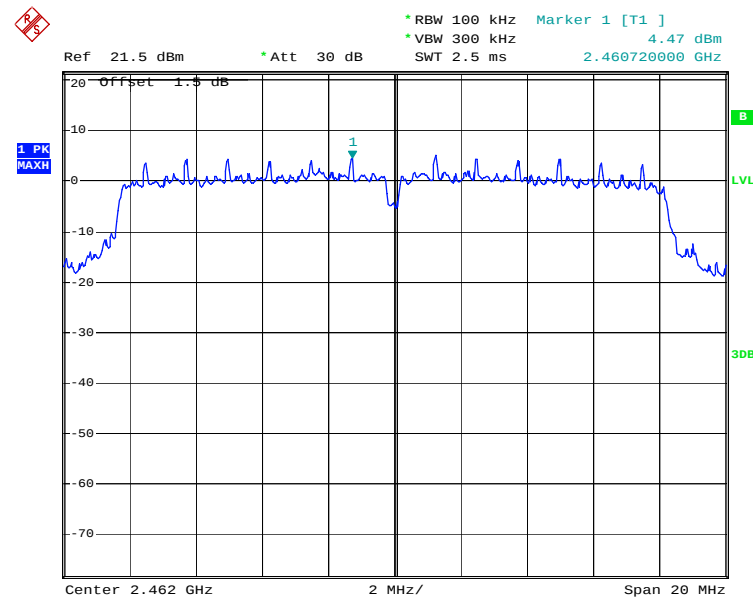
Mode 4 : PSD Plot on 802.11g Channel 01



Mode 5 : PSD Plot on 802.11g Channel 06



Mode 6 : PSD Plot on 802.11g Channel 11



3.5 AC Conducted Emission Measurement

3.5.1 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 (dBuV)	
	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.

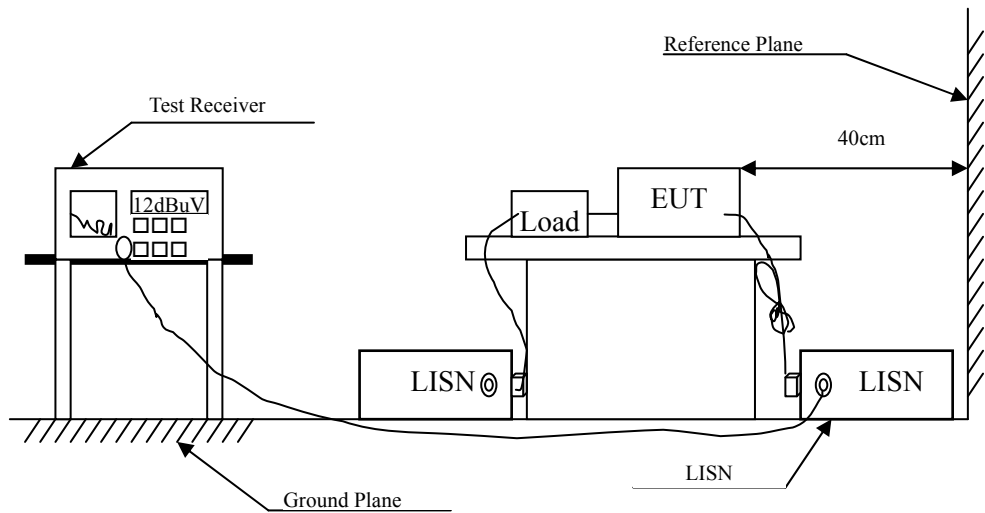
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003.
2. 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.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth (RBW=9kHz and VBW=30kHz) with Maximum Hold Mode for QP limit measurement.
10. Set the test-receiver system to Average Detect Function and specified bandwidth (RBW=9kHz and VBW=30kHz) with Maximum Hold Mode for QP limit measurement.

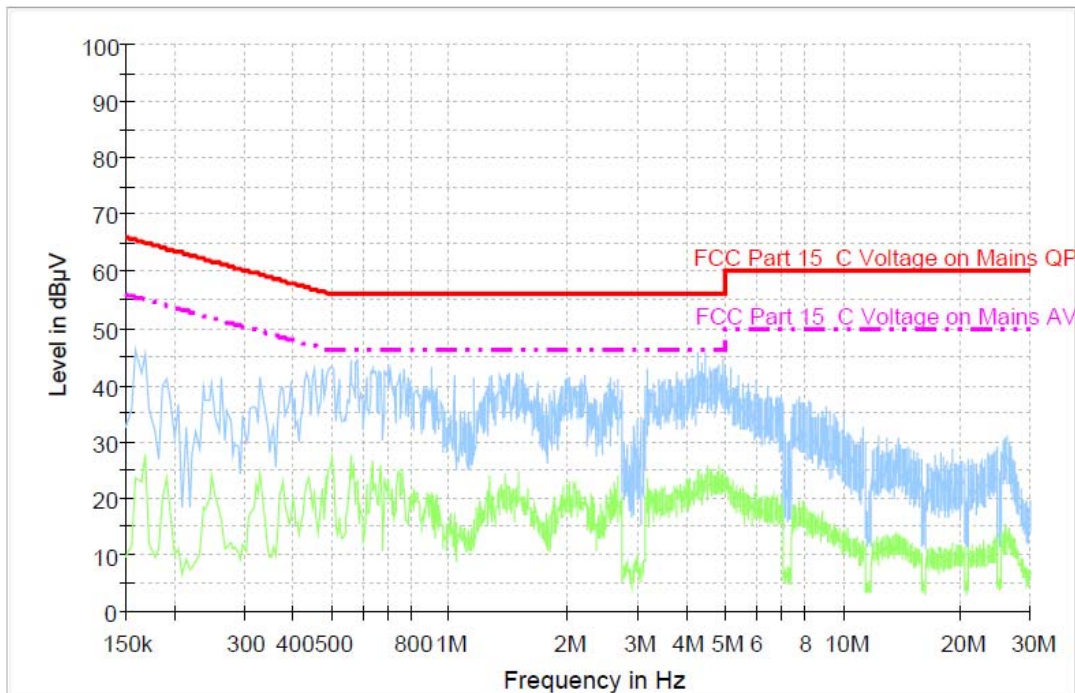
3.5.4 Test Setup



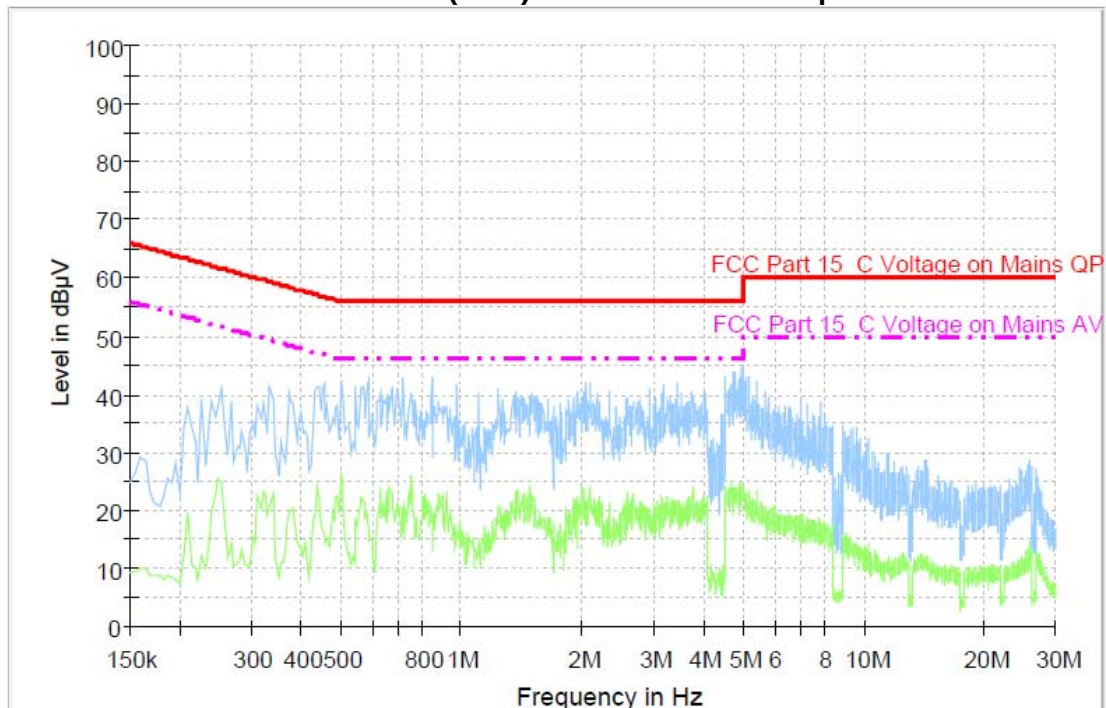
3.5.5 Test Result of AC Conducted Emission

Test Voltage:120V/60Hz

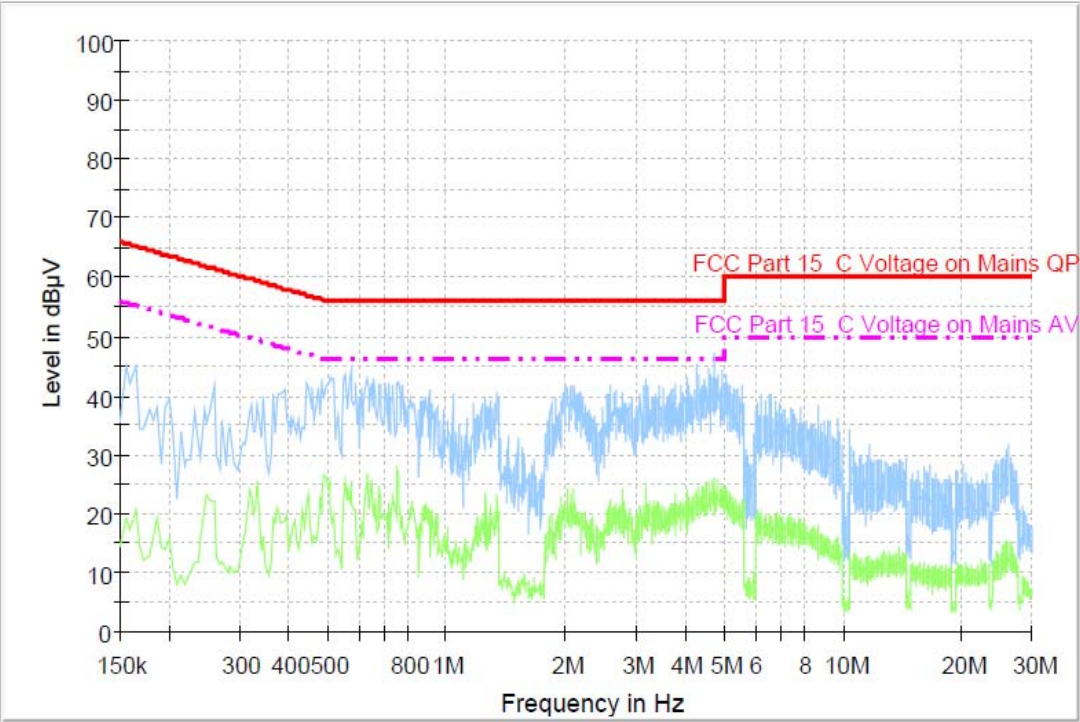
Test mode:GSM850+WLAN Link(2.4G)+Bluetooth Link+Earphone+Neutral



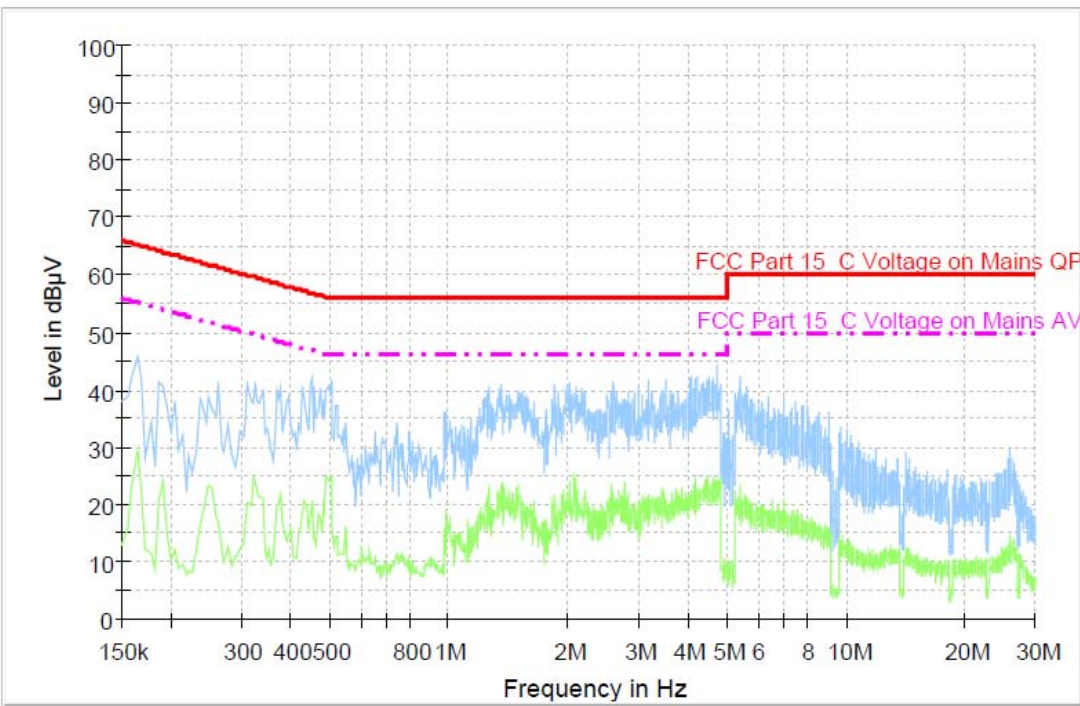
Test mode:GSM850+WLAN Link(2.4G)+Bluetooth Link+Earphone+Line



Test mode:GSM1900+WLAN Link(2.4G)+Bluetooth Link+Earphone+Neutral



Test mode:GSM1900+WLAN Link(2.4G)+Bluetooth Link+Earphone+Line



3.6 Radiated Emission Measurement

3.6.1 Limit of Radiated Emission

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)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.6.2 Measuring Instruments

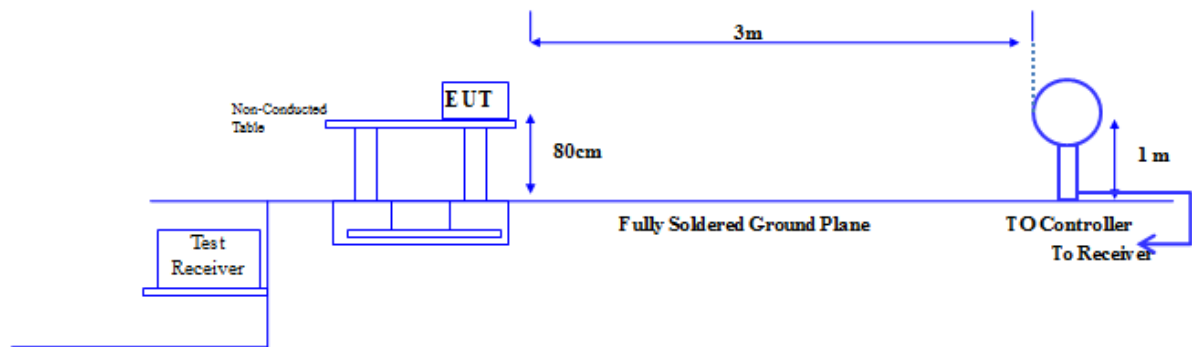
See list of measuring instruments of this test report.

3.6.3 Test Procedures

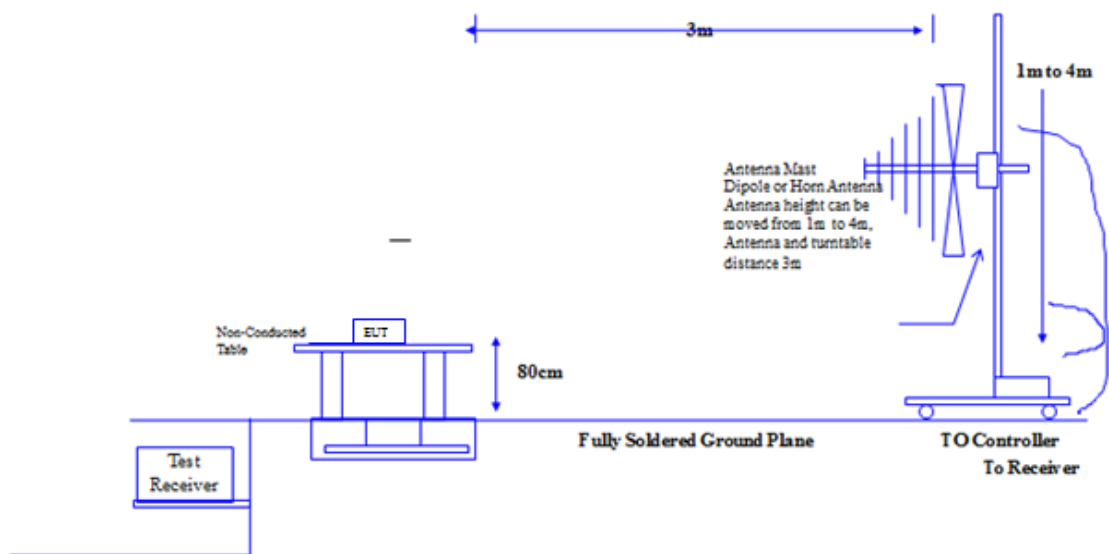
1. The testing follows the guidelines in FCC KDB Publication No. 558074 D01 DTA Measurement Guidance v01.
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.6.4 Test Setup

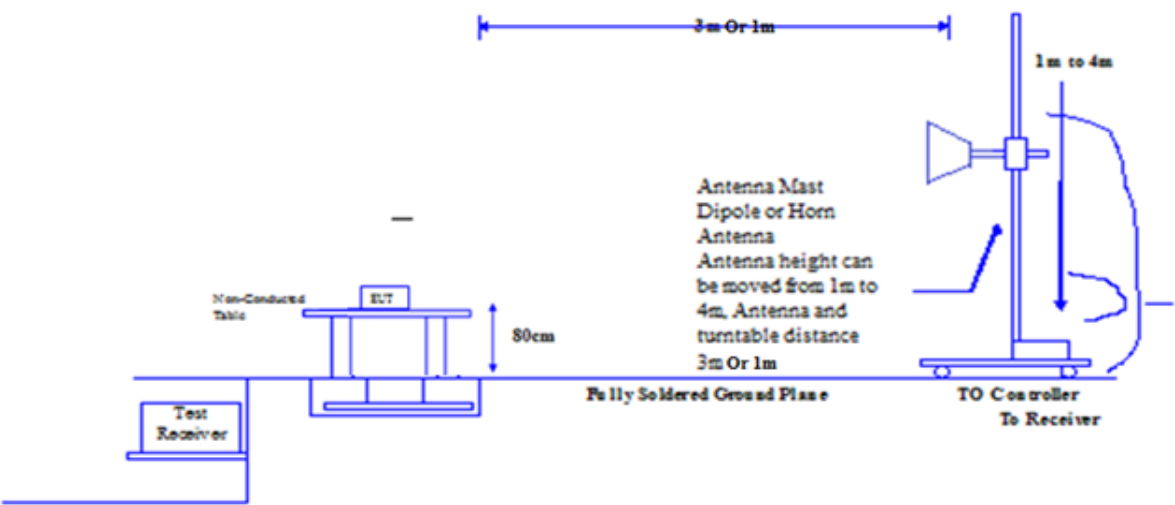
9kHz~30MHz



30MHz~1GHz



Above 1GHz



3.6.5 Radiated Emission Measurement Results (9kHz ~ 30MHz)

Test Engineer :	Hogan. He	Temperature :	23℃~26℃
		Relative Humidity :	45%~60%

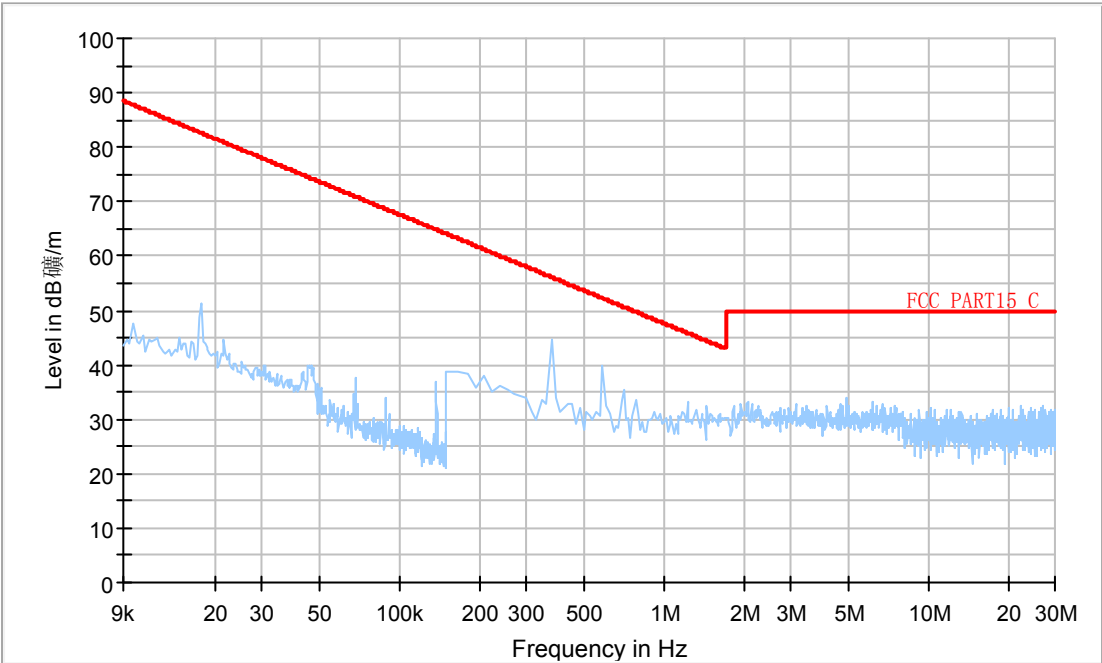
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Notes:

No emission found between lowest internal or generated frequency to 30MHz.

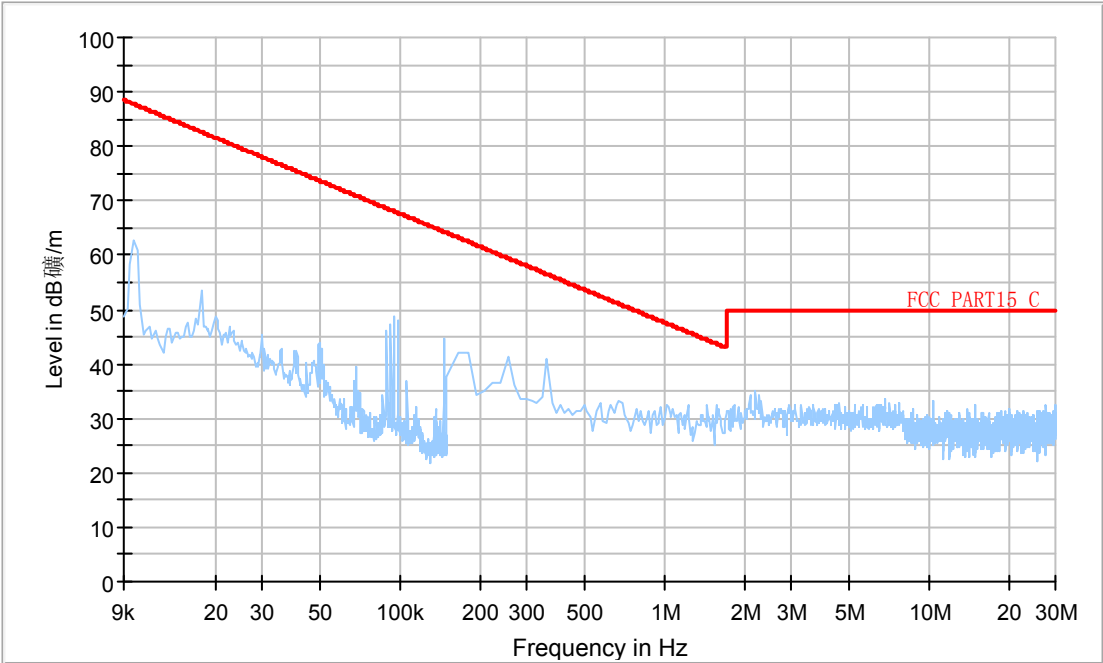
Radiated Emission Plot between 9 kHz ~ 30MHz (Horizontal)

20120419 FCC PART 15C 9K-30M



Radiated Emission Plot between 9 kHz ~ 30MHz (Vertical)

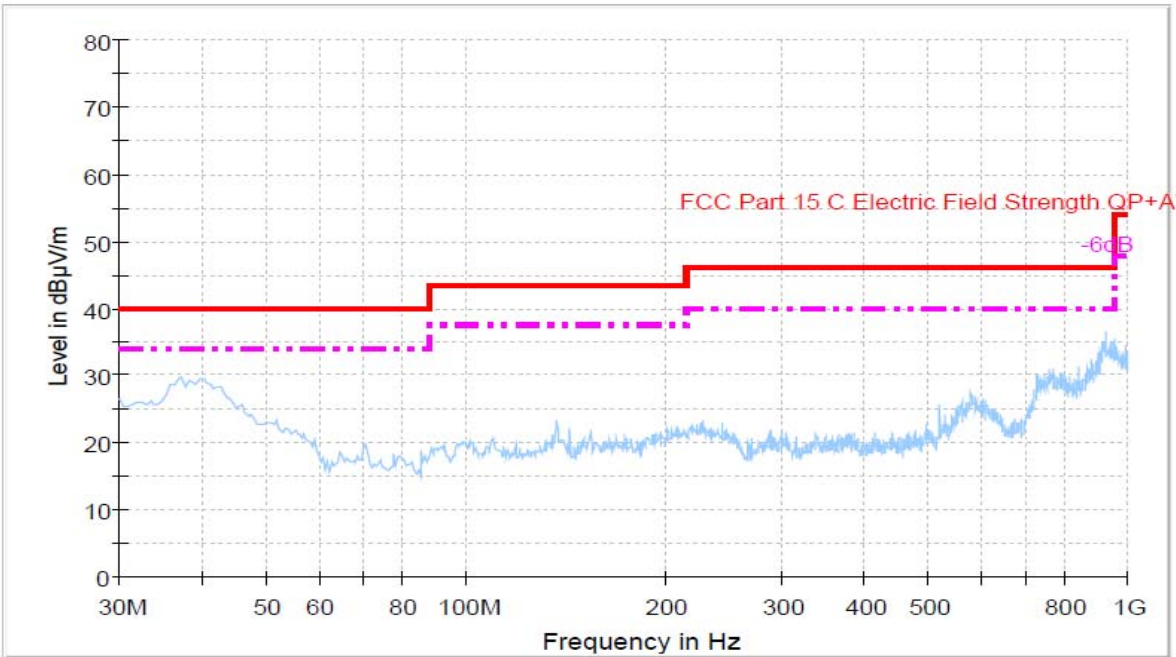
20120419 FCC PART 15C 9K-30M



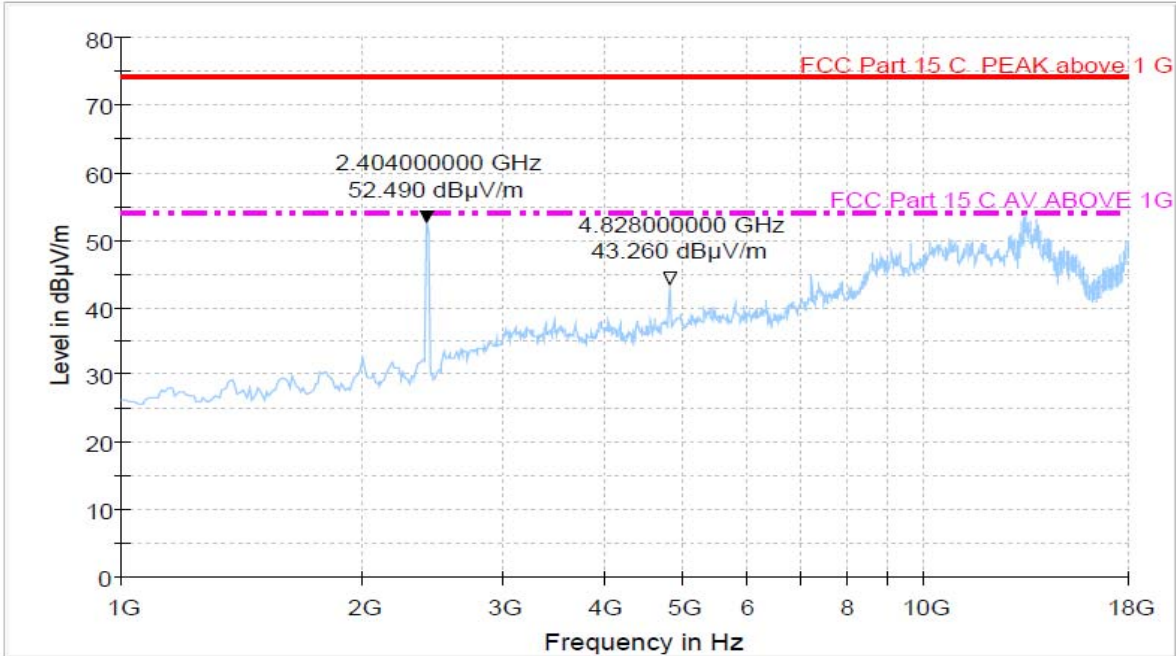
3.6.6 Radiated Emission Measurement Results (30MHz-18GHz)

Test Channel :	01	Test Mode	Mode 1
Test Band :	802.11b	Test Engineer :	Guo-Zheng Li

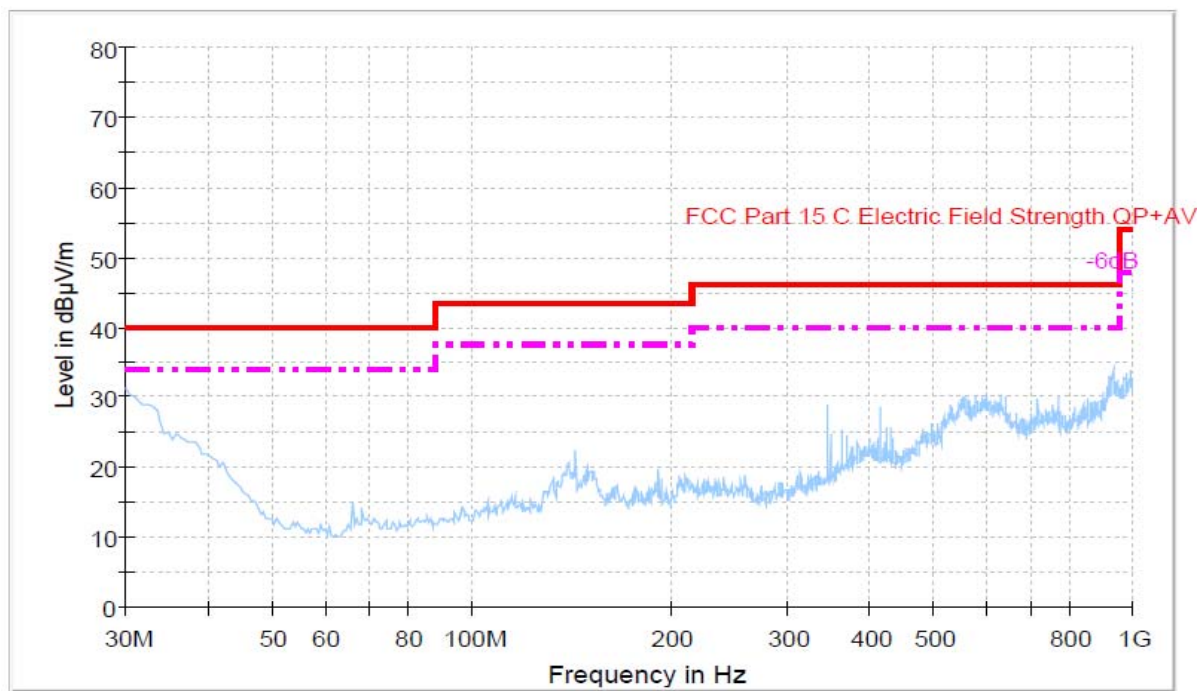
Radiated Emission 30MHz-1GHz Vertical



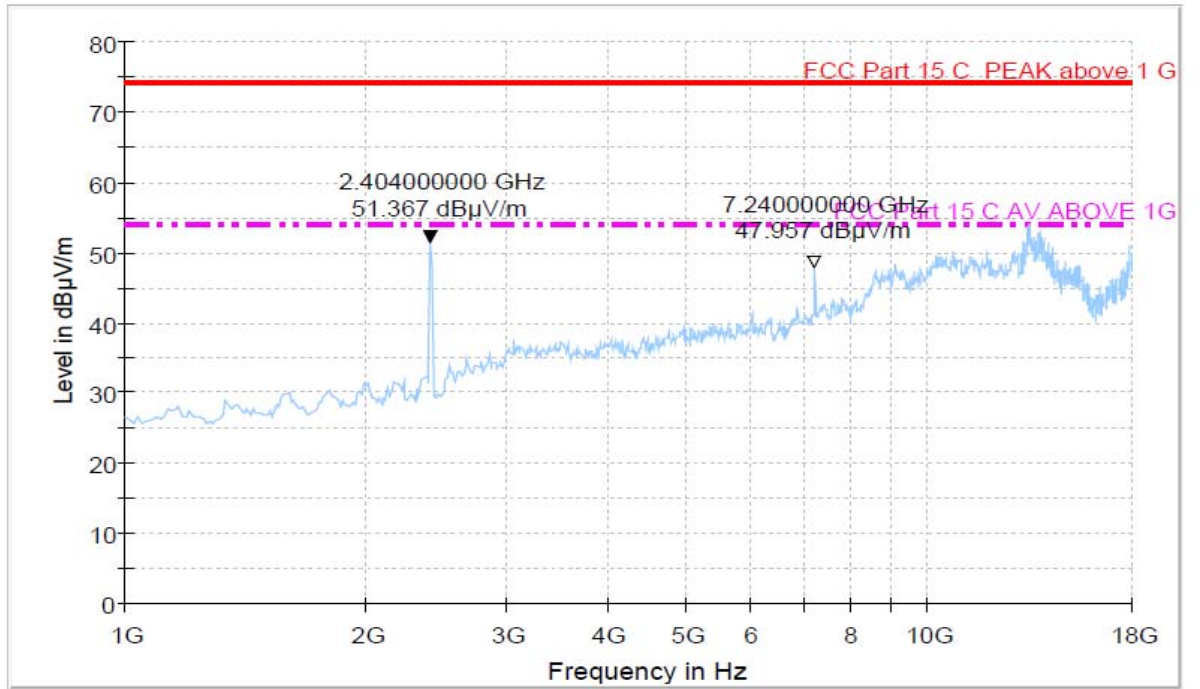
Radiated Emission 1GHz-18GHz Vertical



Radiated Emission 30MHz-1GHz Horizontal

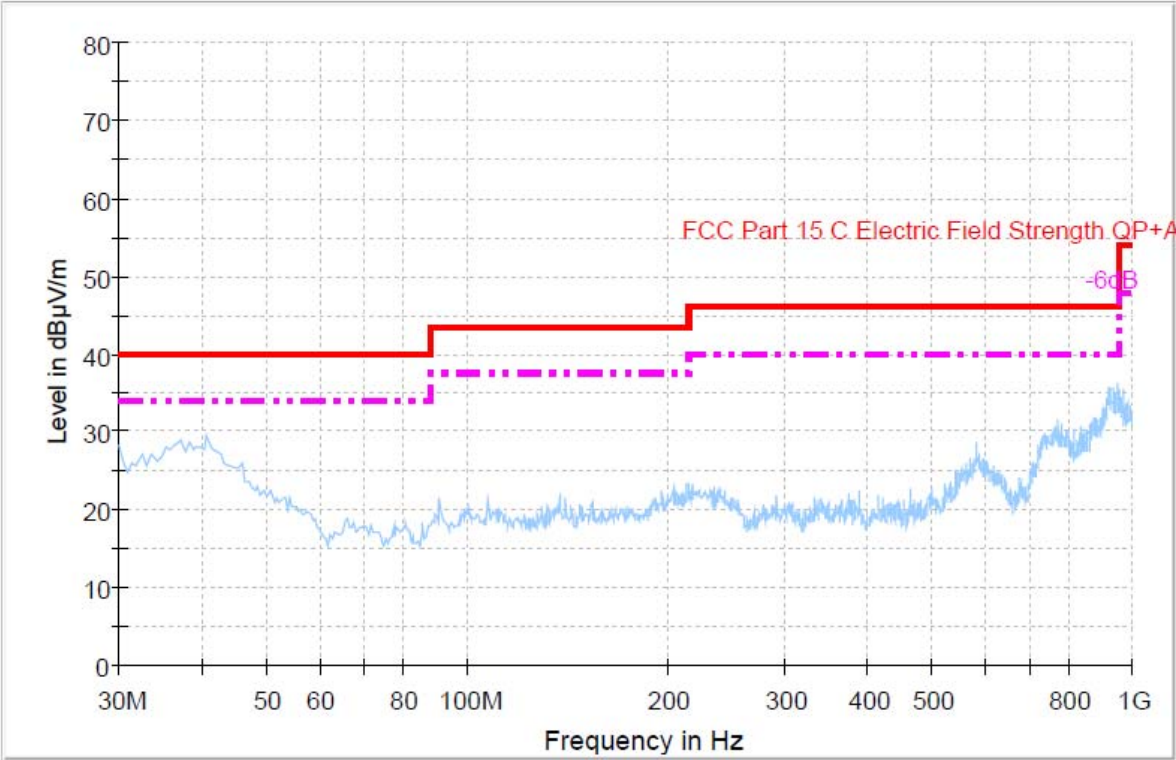


Radiated Emission 1GHz-18GHz Horizontal

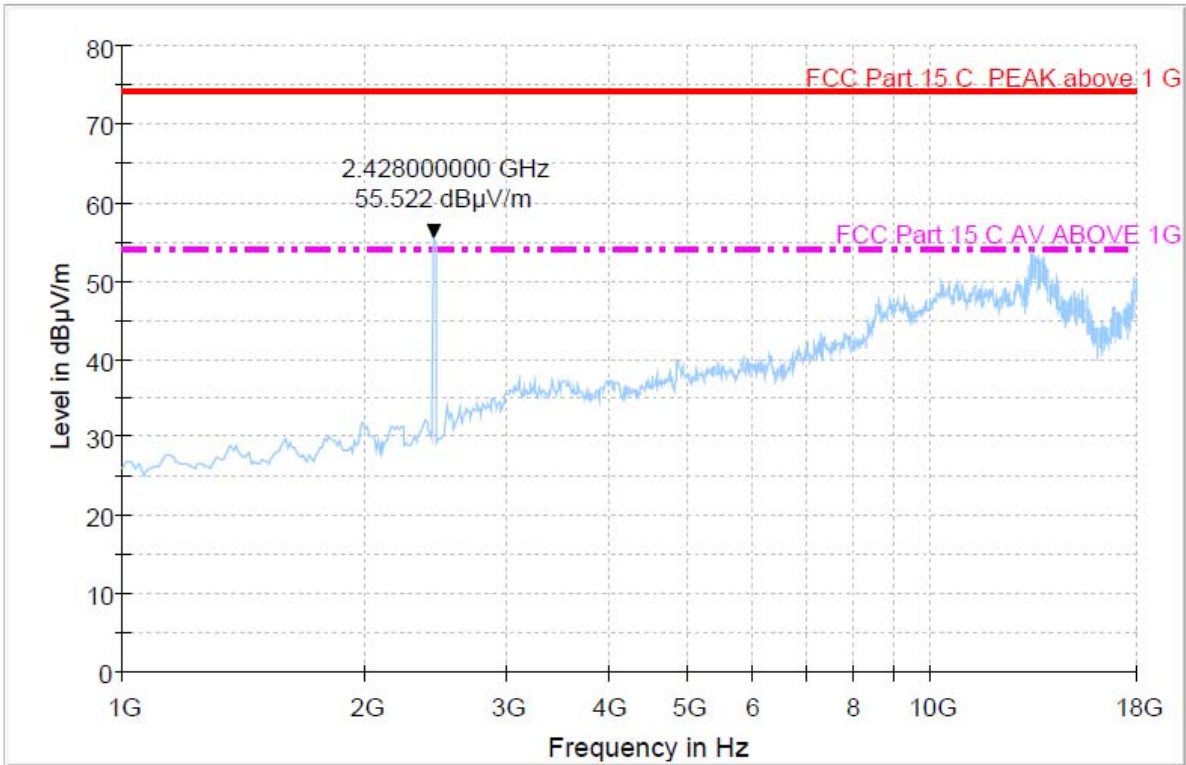


Test Channel :	06	Test Mode	Mode 2
Test Band :	802.11b	Test Engineer :	Guo-Zheng Li

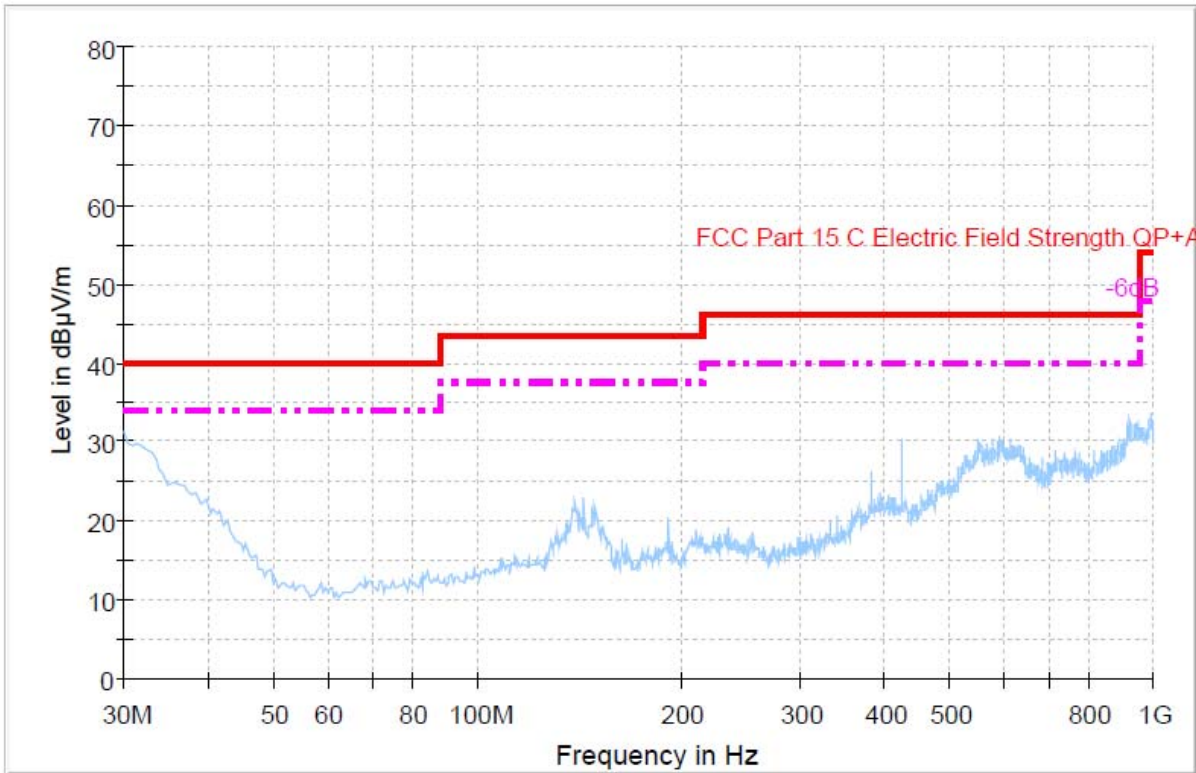
Radiated Emission 30MHz-1GHz Vertical



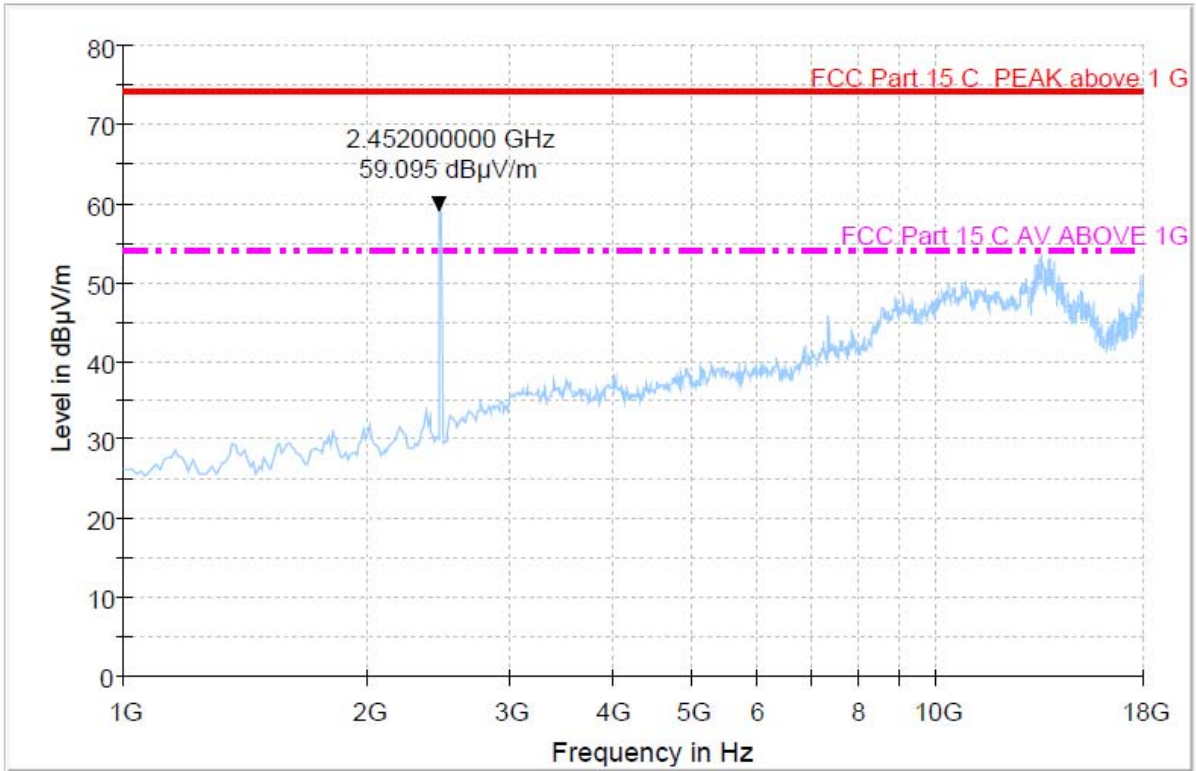
Radiated Emission 1GHz-18GHz Vertical



Radiated Emission 30MHz-1GHz Horizontal

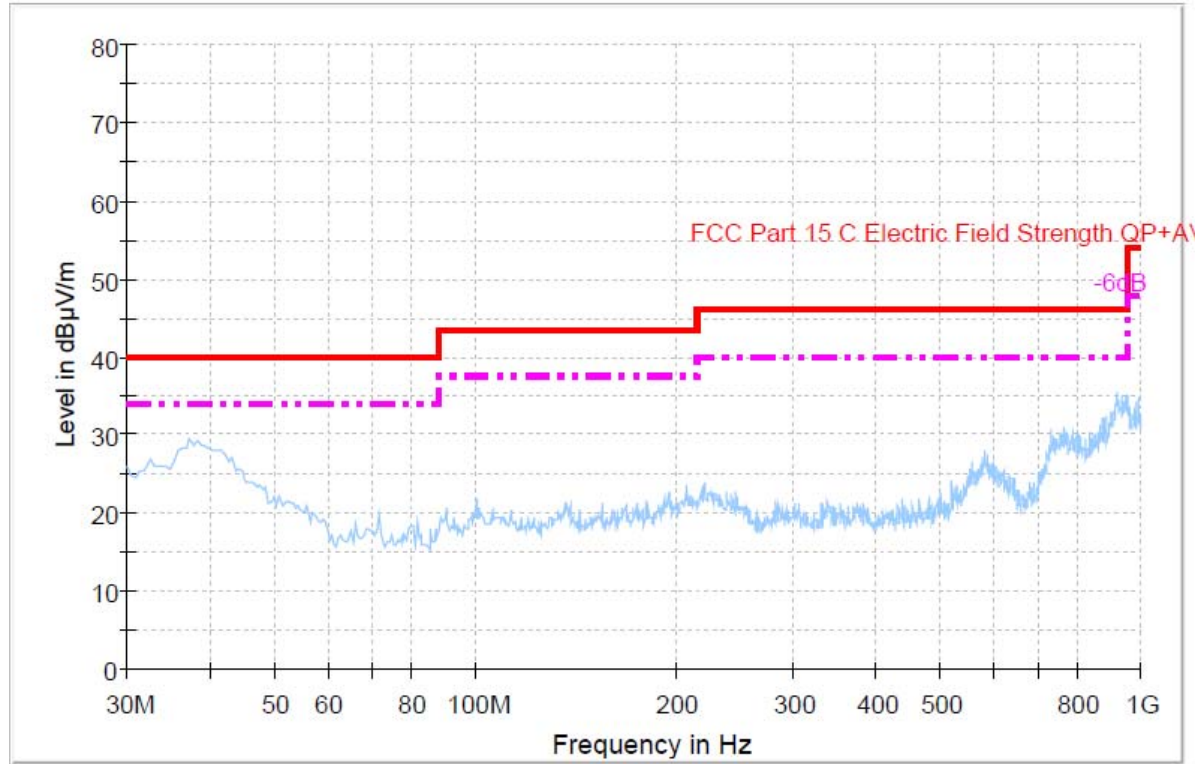


Radiated Emission 1GHz-18GHz Horizontal

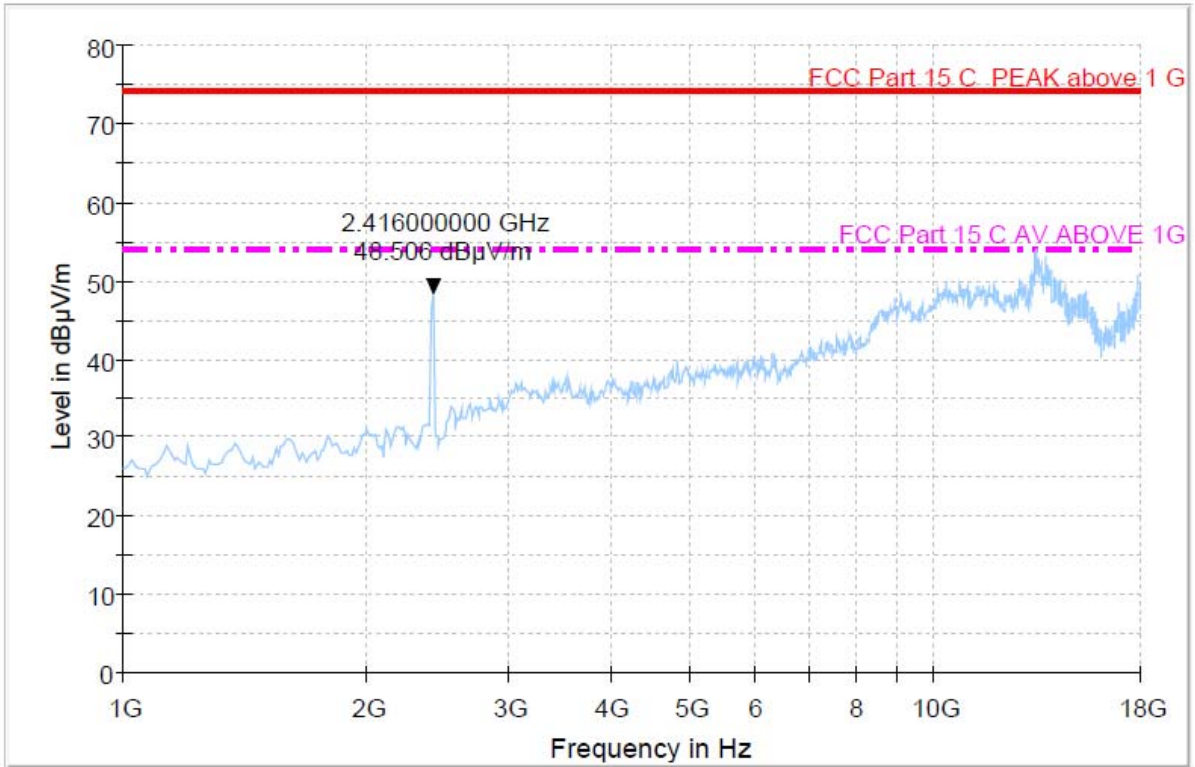


Test Channel :	11	Test Mode	Mode 3
Test Band :	802.11b	Test Engineer :	Guo-Zheng Li

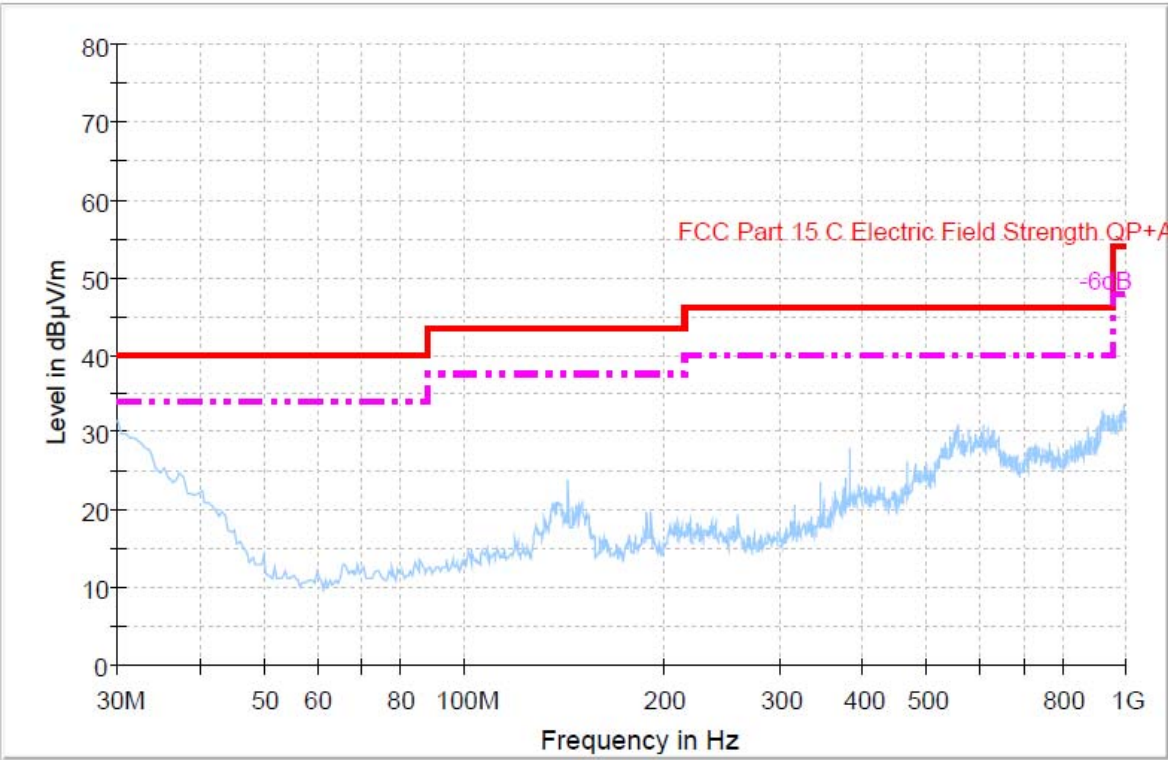
Radiated Emission 30MHz-1GHz Vertical



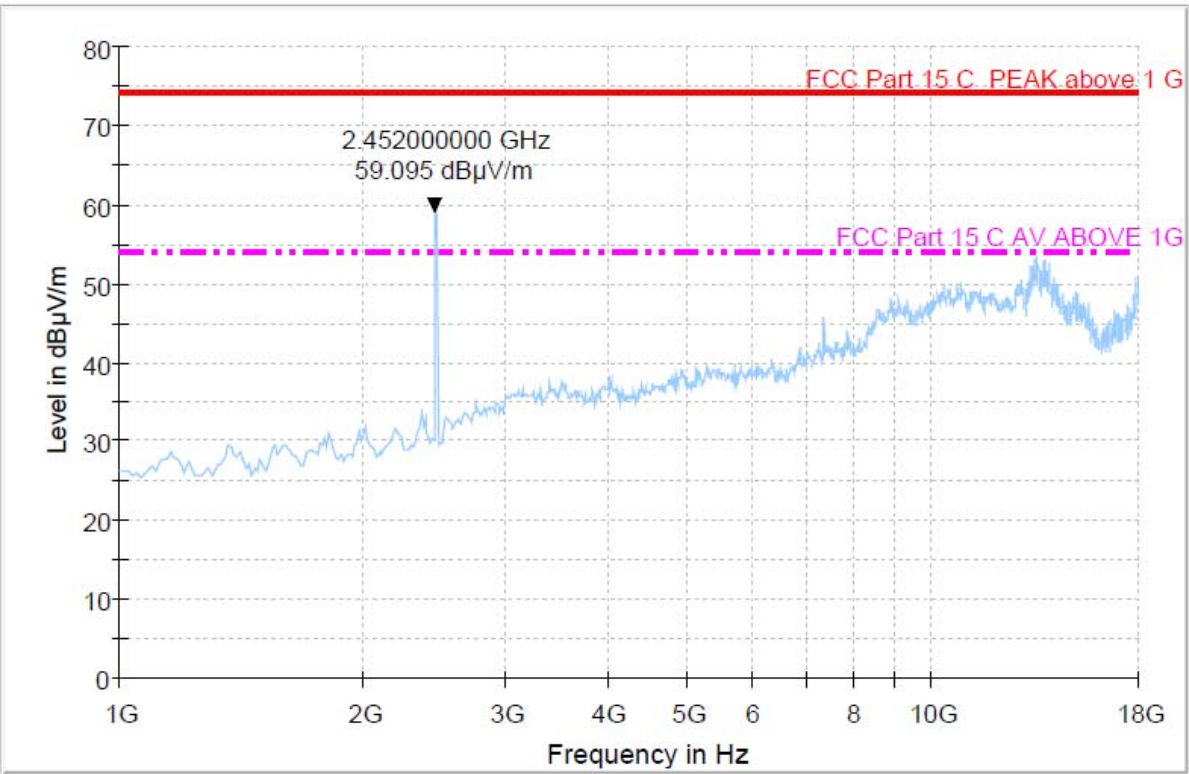
Radiated Emission 1GHz-18GHz Vertical



Radiated Emission 30MHz-1GHz Horizontal

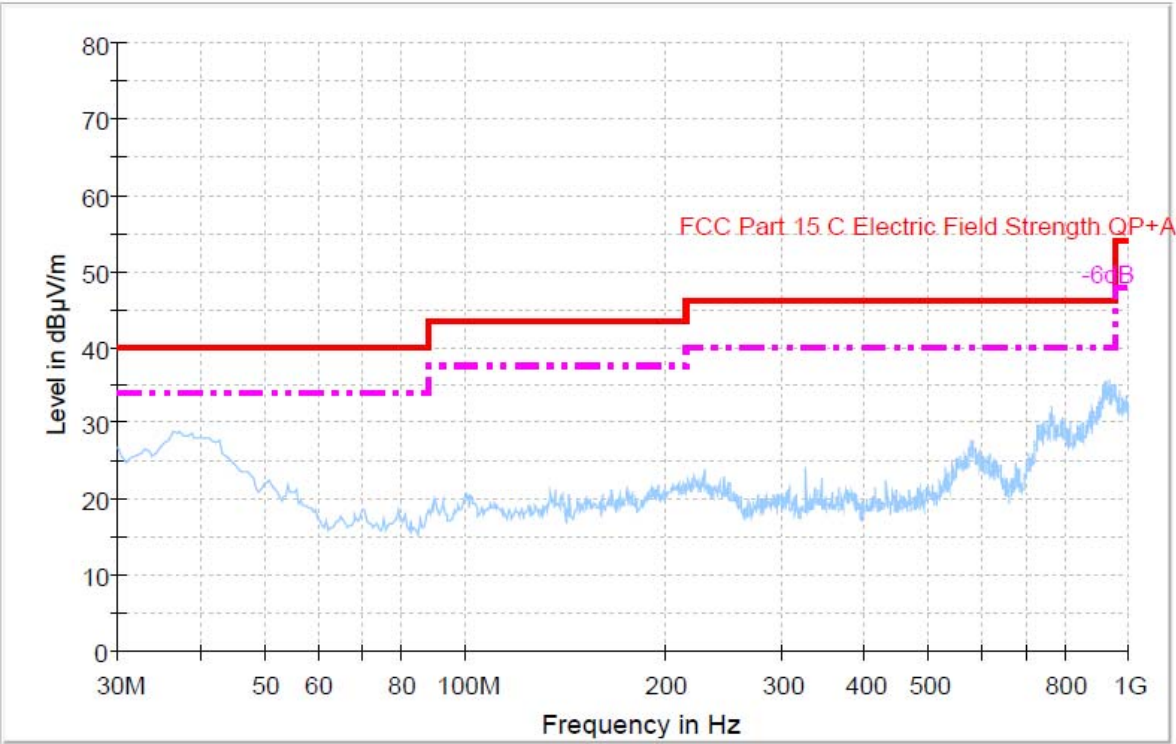


Radiated Emission 1GHz-18GHz Horizontal

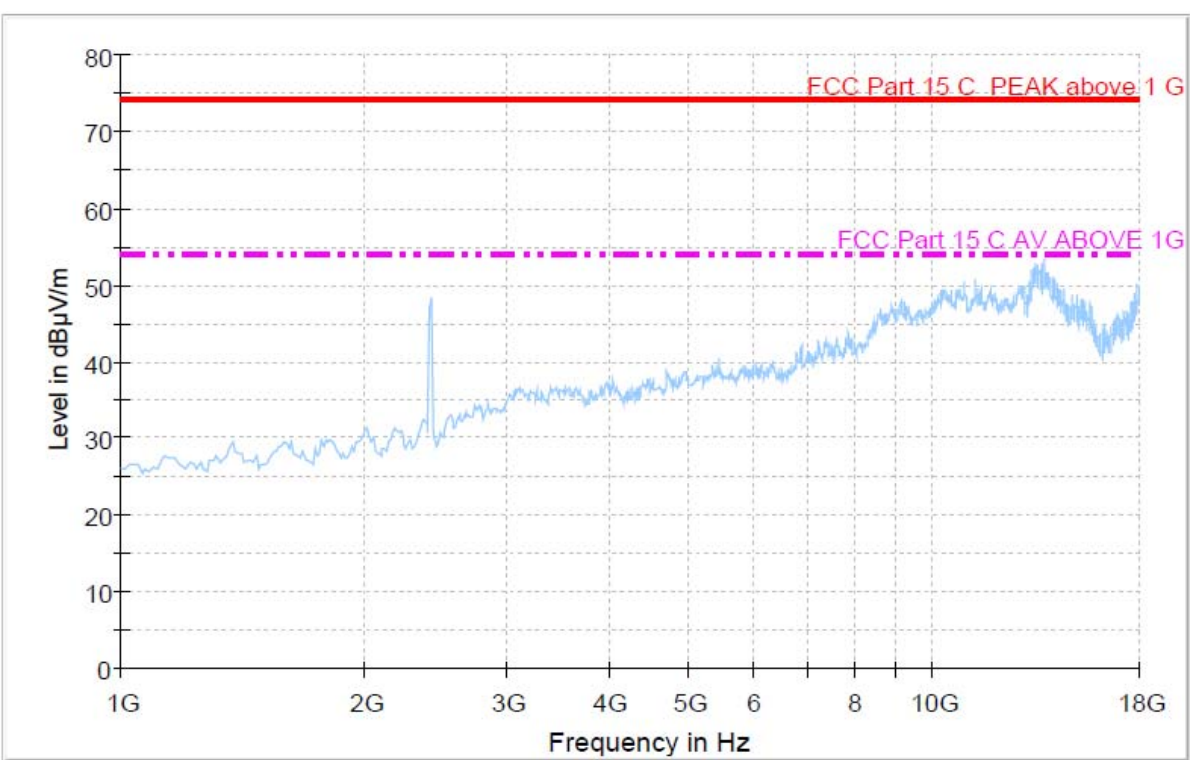


Test Channel :	01	Test Mode	Mode 4
Test Band :	802.11g	Test Engineer :	Guo-Zheng Li

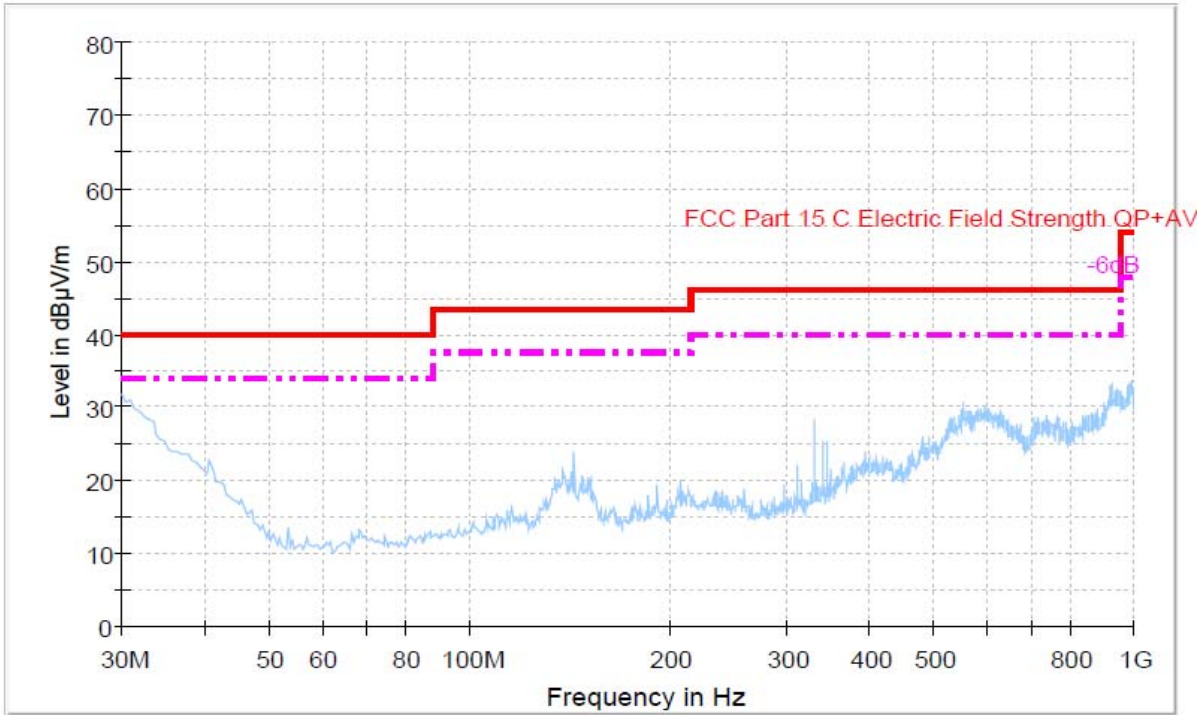
Radiated Emission 30MHz-1GHz Vertical



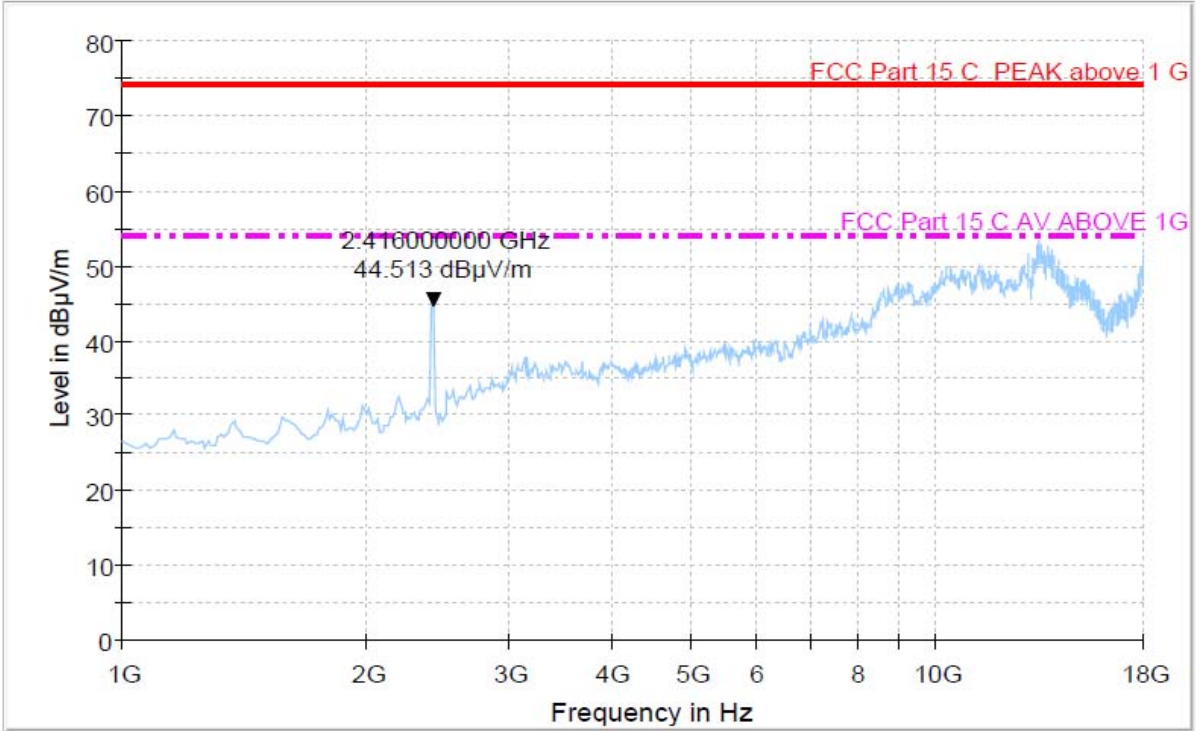
Radiated Emission 1GHz-18GHz Vertical



Radiated Emission 30MHz-1GHz Horizontal

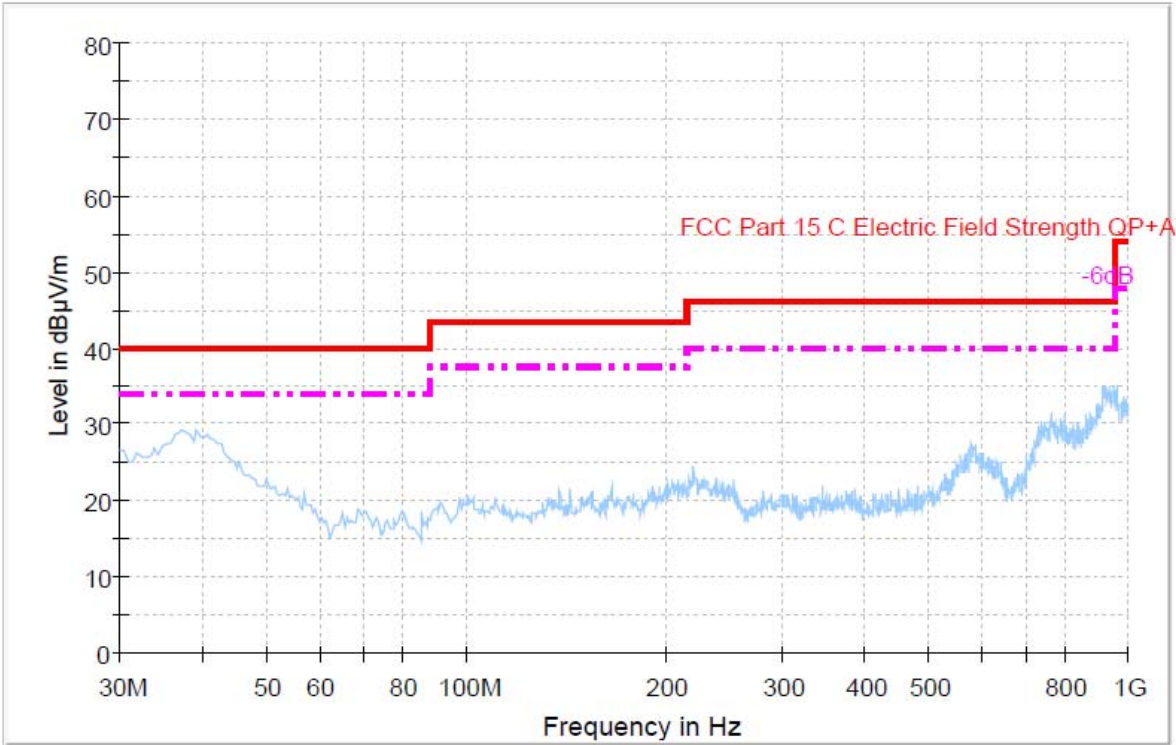


Radiated Emission 1GHz-18GHz Horizontal

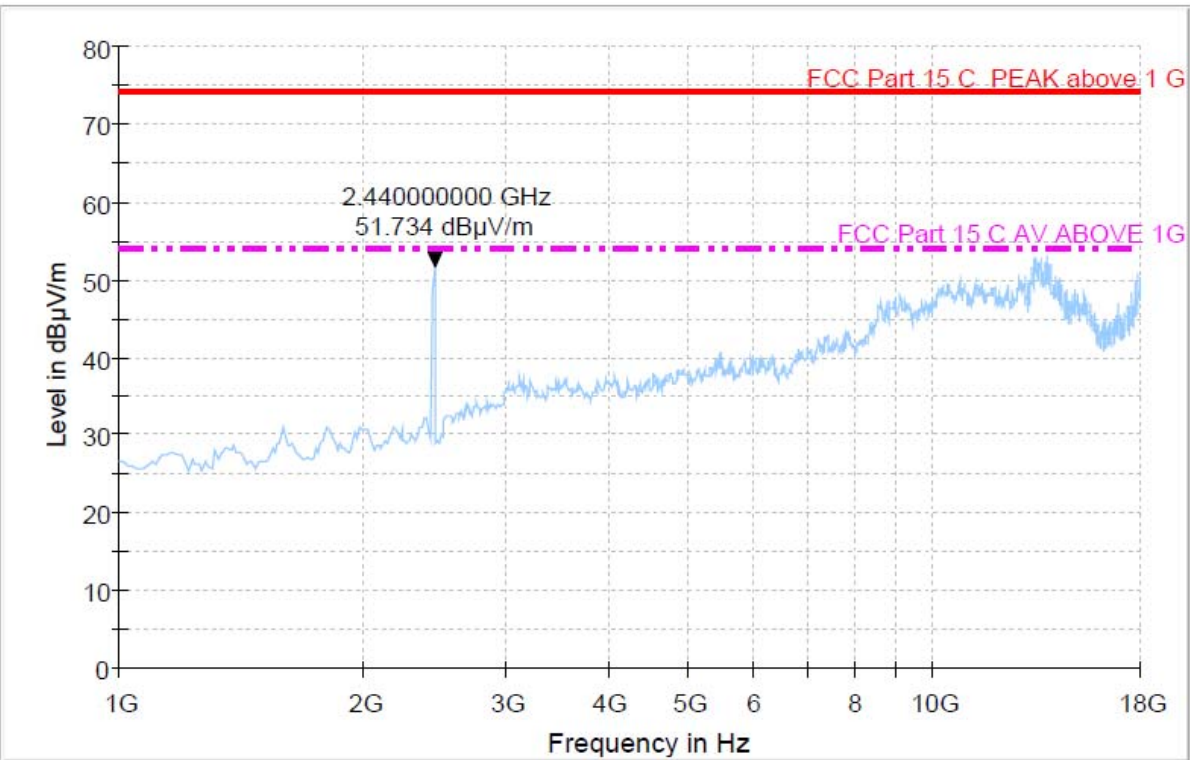


Test Channel :	06	Test Mode	Mode 5
Test Band :	802.11g	Test Engineer :	Guo-Zheng Li

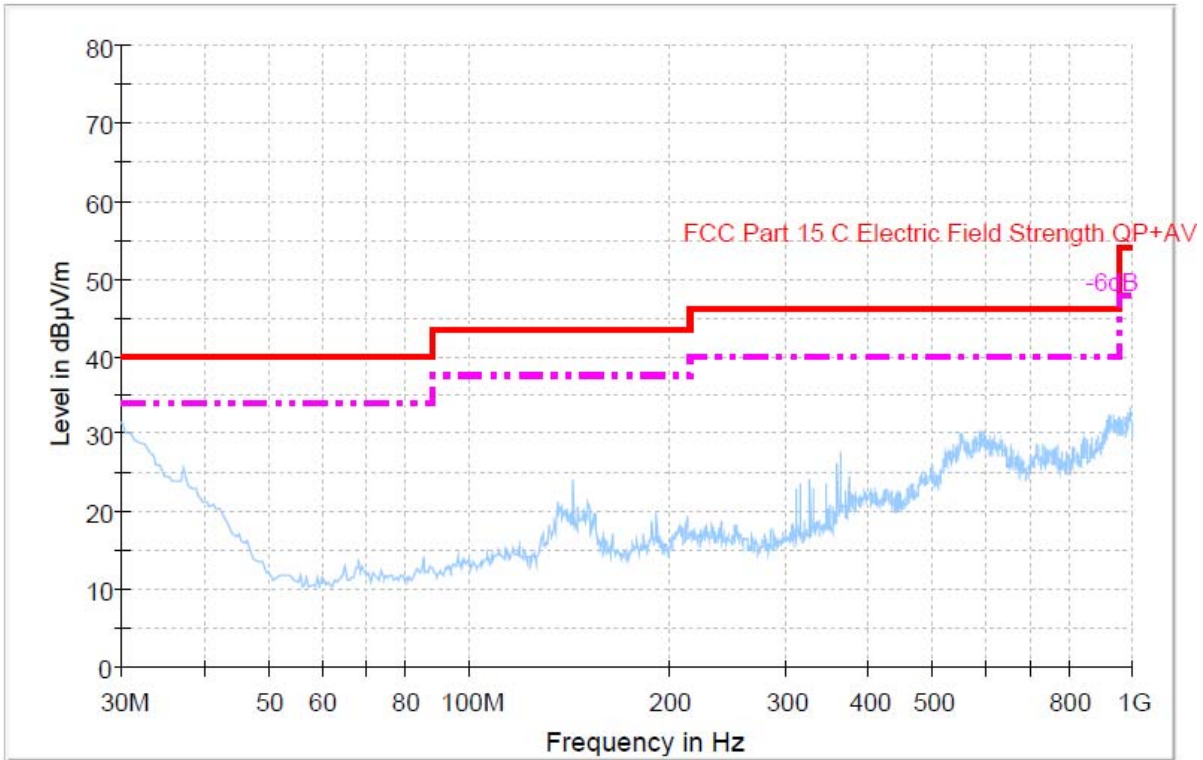
Radiated Emission 30MHz-1GHz Vertical



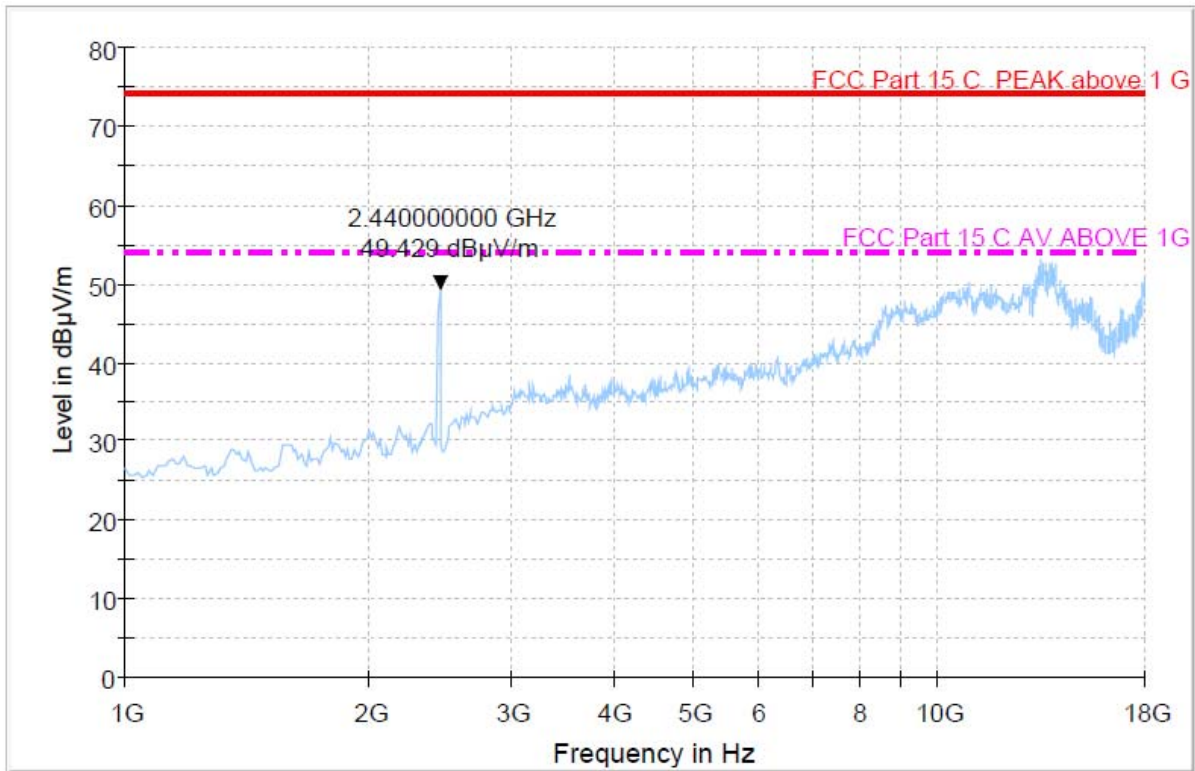
Radiated Emission 1GHz-18GHz Vertical



Radiated Emission 30MHz-1GHz Horizontal

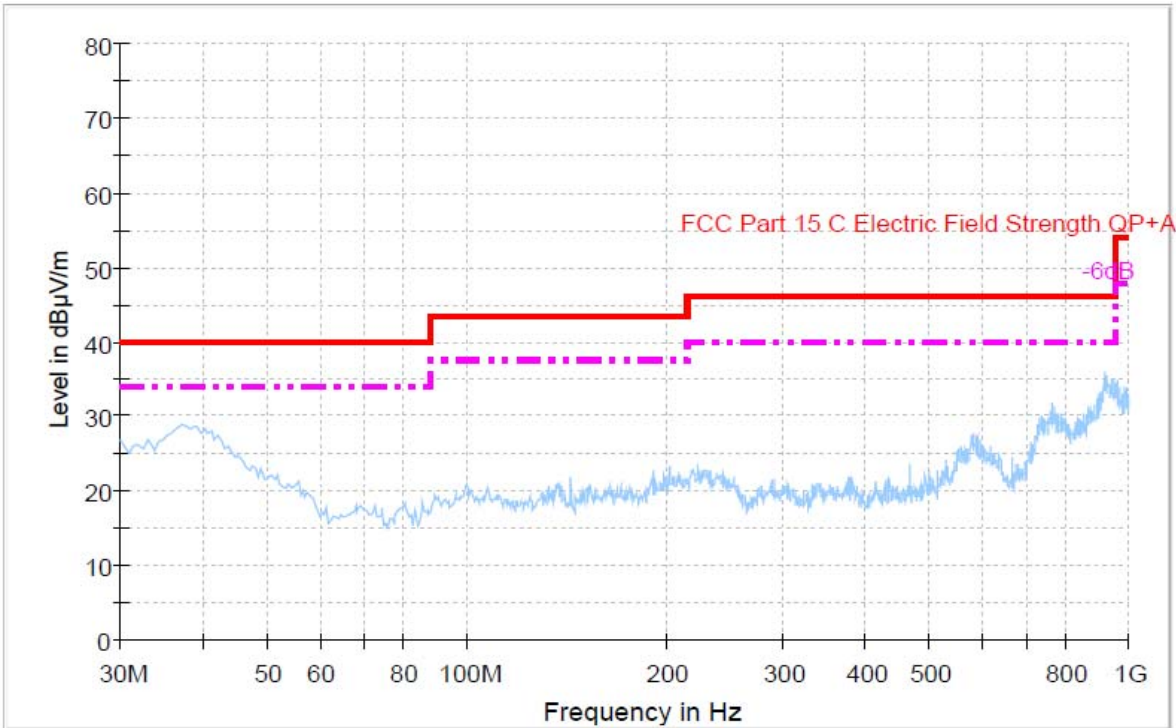


Radiated Emission 1GHz-18GHz Horizontal

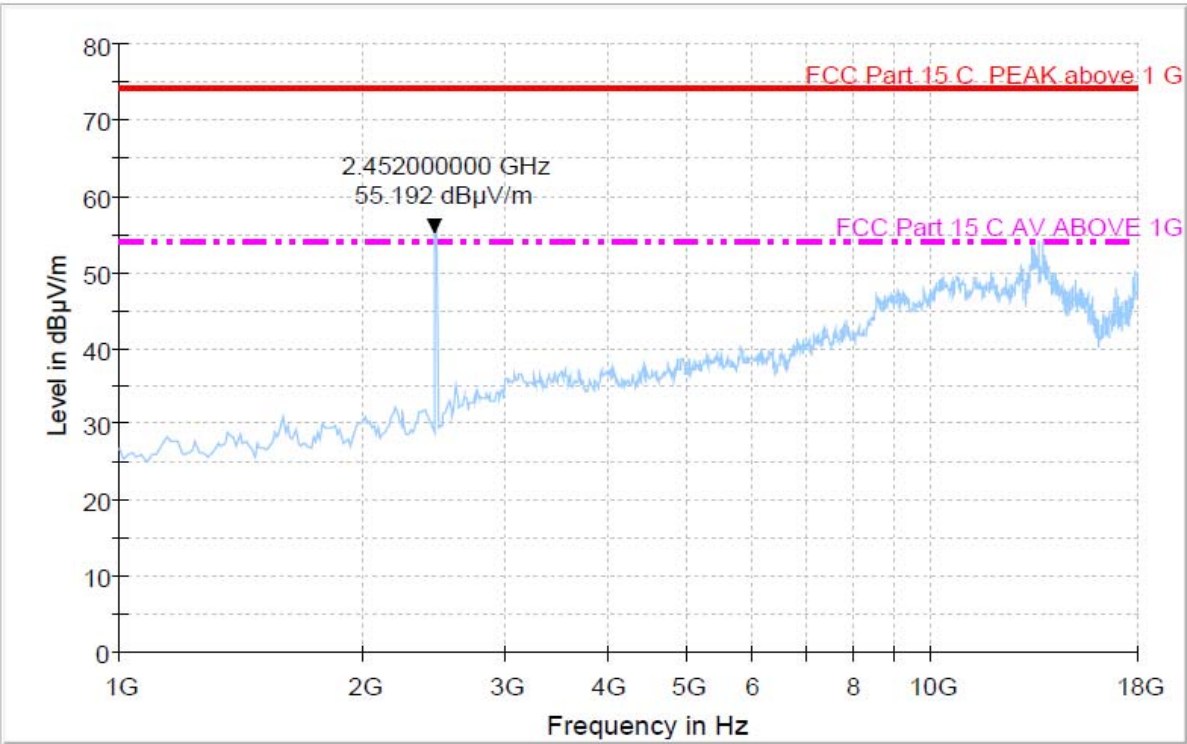


Test Channel :	11	Test Mode	Mode 6
Test Band :	802.11g	Test Engineer :	Guo-Zheng Li

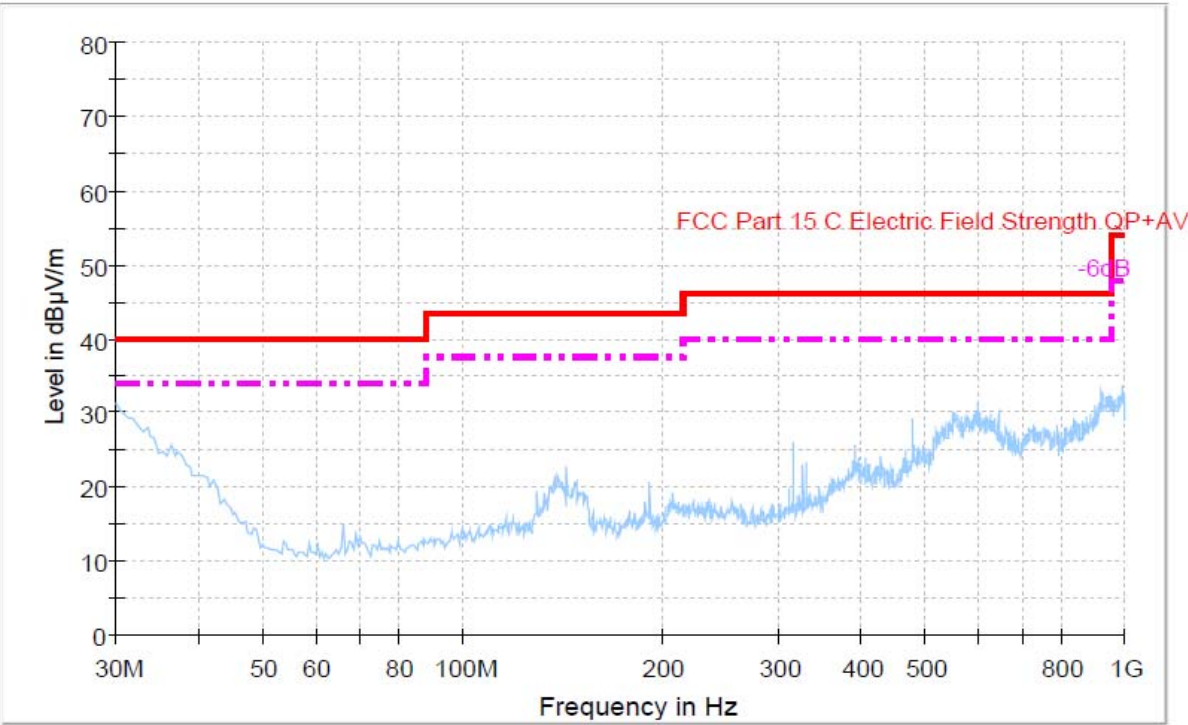
Radiated Emission 30MHz-1GHz Vertical



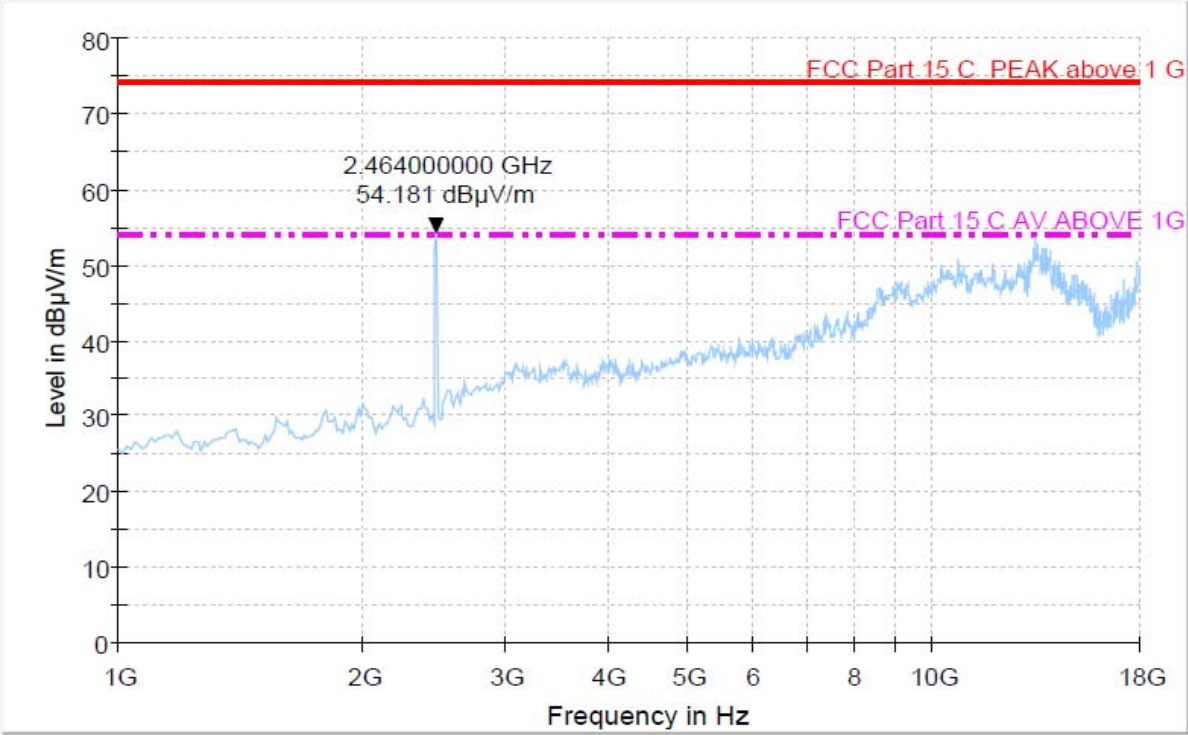
Radiated Emission 1GHz-18GHz Vertical



Radiated Emission 30MHz-1GHz Horizontal



Radiated Emission 1GHz-18GHz Horizontal



3.6.7 Radiated Emission Measurement Results (18GHz-25GHz)

Test Engineer :	Hogan. He	Temperature :	23℃~26℃
		Relative Humidity :	40%~60%

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Notes:

The amplitude of radiated emissions that are attenuated by more than 20dB below the permissible value has no need to be reported. The measurement performed at 1meter distance from turn table to antenna.

4. List of Measuring Equipment

No	Instrument/Ancillary	Provider	Type/Model	Cal. Date
1	RF Preselector	Agilent	N9039A(9KHz-1GHz)	2011.10.12
2	Spectrum Analyzer	Agilent	E4440A(3Hz-26.5GHz)	2011.8.16
3	Spectrum Analyzer	Agilent	E4440A(3Hz-26.5GHz)	2011.8.16
4	Pre-Amplifier	Agilent	83006A(0.01GHz-26.5GHz)	2011.8.16
5	Pre-Amplifier	Agilent	83006A(0.01GHz-26.5GHz)	2011.8.16
6	Pre-Amplifier	Agilent	83006A(0.01GHz-26.5GHz)	2011.8.16
7	Pre-Amplifier	Agilent	8447D(0.1MHz-1300MHz)	2011.4.22
8	Pre-Amplifier	Agilent	8447D(0.1MHz-1300MHz)	2011.4.22
9	Loop Antenna	Schwarzbeck	FMZB1519(9KHz~30MHz)	2012.01.07
10	Antenna	Schwarzbeck	VULB9168(30MHz-1500MHz)	2012.2.22
11	Antenna	Schwarzbeck	VULB9168(30MHz-1500MHz)	2012.2.22
12	Antenna	Schwarzbeck	BBHA 9170 (15G-26.5G)	2011.11.09
13	Antenna	ETS-Lindgren	3117(1GHz-18GHz)	2012.2.22
14	Antenna	ETS-Lindgren	3117(1GHz-18GHz)	2012.2.22
15	Power Meter	Agilent	E4418B (EPM Series)	2011.12.14
16	Power Sensor	Agilent	E4412A (E-series CW)	2011.12.14

5. Uncertainty Evaluation

5.1 Uncertainty of Radiated Spurious Emission evaluation (30MHz~1GHz)

Radiated Spurious Emission Measurement Uncertainty Evaluation					
Contribution		Probability Distribution	Partition Coefficient	u(xi)	
				Horizontal 30-1000MHz	Vertical 30-1000MHz
Cable Loss Calibration	U ₀₁	U-Shape	1.41	0.17	0.17
Sine wave voltage accuracy of Spectrum analyzer	U02	Triangle	2.45	0.82	0.82
Impulse response of spectrum analyzer	U03	Triangle	2.45	0.61	0.61
Pulse repetition rate of spectrum analyzer	U04	Triangle	2.45	0.61	0.61
Spectrum analyzer noise level	U05	Normal	2.00	0.25	0.25
Measurement of the signal path mismatch	U06	U-Shape	1.41	0.13	0.13
Free-space antenna factor	U07	Normal	2.00	1.00	1.00
Antenna Factor Interpolation for Frequency	U08	Rectangular	1.73	0.17	0.17
Antenna factor with height in the correlation	U09	Rectangular	1.73	0.17	0.17
Measurement antenna and the absorbing material in the image of the mutual coupling effect	U10	Rectangular	1.73	0.50	0.50
Antenna phase center variation	U11	Rectangular	1.73	0.58	0.58
Antenna cross polarization response	U12	Rectangular	1.73	0.52	0.52
Antenna imbalance	U13	Rectangular	1.73	0.52	0.52
Test distance error	U14	Rectangular	1.73	0.17	0.17
Desktop terrain clearance variation	U15	Normal	2.00	0.05	0.05
Random uncertainty	U16	Standard deviation	1.00	0.20	0.19
Pre-Amplifier gain Calibration	U17	U-Shape	1.41	0.13	0.13
Combined Standard Uncertainty Uc(y)	Uc	Normal	1.00	1.95	1.95
Measuring Uncertainty for a level of Confidence of 95%(U=2Uc(y))	U=kUc	Normal	2	3.90	3.89

5.2 Uncertainty of Radiated Spurious Emission evaluation (1GHz~26.5GHz)

Radiated Spurious Emission Measurement Uncertainty Evaluation					
Contribution		Probability Distribution	Partition Coefficient	u(xi)	
				Horizontal 1-25GHz	Vertical 1-25GHz
Cable Loss Calibration	U01	U-Shape	1.41	0.17	0.17
Sine wave voltage accuracy of Spectrum analyzer	U02	Triangle	2.45	0.82	0.82
Impulse response of spectrum analyzer	U03	Triangle	2.45	0.61	0.61
Pulse repetition rate of spectrum analyzer	U04	Triangle	2.45	0.61	0.61
Spectrum analyzer noise level	U05	Normal	2.00	0.25	0.25
Measurement of the signal path mismatch	U06	U-Shape	1.41	0.13	0.13
Free-space antenna factor	U07	Normal	2.00	1.00	1.00
Antenna Factor Interpolation for Frequency	U08	Rectangular	1.73	0.17	0.17
Antenna factor with height in the correlation	U09	Rectangular	1.73	NA	NA
Measurement antenna and the absorbing material in the image of the mutual coupling effect	U10	Rectangular	1.73	0.50	0.50
Antenna phase center variation	U11	Rectangular	1.73	0.58	0.58
Antenna cross polarization response	U12	Rectangular	1.73	0.52	0.52
Antenna imbalance	U13	Rectangular	1.73	0.52	0.52
Test distance error	U14	Rectangular	1.73	0.17	0.17
Desktop terrain clearance variation	U15	Normal	2.00	0.05	0.05
Random uncertainty	U16	Standard deviation	1.00	0.22	0.23
Pre-Amplifier gain Calibration	U17	U-Shape	1.41	0.13	0.13
Combined Standard Uncertainty Uc(y)	Uc	Normal	1.00	1.94	1.94
Measuring Uncertainty for a level of Confidence of 95%(U=2Uc(y))	U=kUc	Normal	2	3.89	3.89