FCC RF Test Report

APPLICANT	:	CT Asia
EQUIPMENT	:	GSM & WCDMA Mobile Phone
BRAND NAME	:	BLU
MODEL NAME	:	Advance 4.5
FCC ID	:	YHLBLUADVANCE45
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Sep. 24, 2013 and testing was completed on Oct. 21, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

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APPENDIX A. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR392412C	Rev. 01	Initial issue of report	Oct. 30, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.83 dB at 4924.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.20 dB at 0.560 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

CT Asia
Unit 01, 15/F, Seaview Centre, 139-141 Hoi bun road, Kwun Tong, Kowloon, Hongkong

1.2 Manufacturer

BEIJING BENYWAVE TECHNOLOGY CO., LTD.
NO.55 Jiachang 2 road, OPTO-Mechatronics Industrial Park, Tongzhou district, Beijing 101111

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	GSM & WCDMA Mobile Phone
Brand Name	BLU
Model Name	Advance 4.5
FCC ID	YHLBLUADVANCE45
EUT supports Radios application	GSM/GPRS/WCDMA/HSPA/HSPA+(Downlink Only) WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth v3.0 + EDR/ Bluetooth v 4.0
HW Version	TBW8100_P1_001
SW Version	700010_9230_V000015
EUT Stage	Production Unit

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

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to Antenna	802.11b : 17.68 dBm (0.0586 W) 802.11g : 22.34 dBm (0.1714 W) 802.11n HT20 : 21.93 dBm (0.1560 W)
Antenna Type	PIFA Antenna with gain -0.19 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Testing Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.			
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398			
Test Site No.	Sporton Site No.			FCC Registration No.
	TH01-SZ	CO01-SZ	03CH01-SZ	831040

Note: The test site complies with ANSI C63.4 2003 requirement.

1.7 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 DTS Meas. Guidance v03r01
- 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

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 (X plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency Channel

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

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	**17.68**	17.61	17.61	17.65
CH 06	2437 MHz	16.83	16.79	16.78	16.81
CH 11	2462 MHz	16.38	16.36	16.35	16.36

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	**22.34**	22.26	21.96	21.98	22.02	21.95	21.92	21.98
CH 06	2437 MHz	21.71	21.65	21.52	21.56	21.42	21.39	21.32	21.26
CH 11	2462 MHz	21.31	21.28	21.25	21.21	21.17	21.09	21.14	21.05

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	**21.93**	21.86	21.71	21.76	21.87	21.72	21.75	21.71
CH 06	2437 MHz	21.49	21.45	21.42	21.37	21.32	21.35	21.26	21.22
CH 11	2462 MHz	21.22	21.17	21.19	21.13	21.15	21.08	21.02	20.98

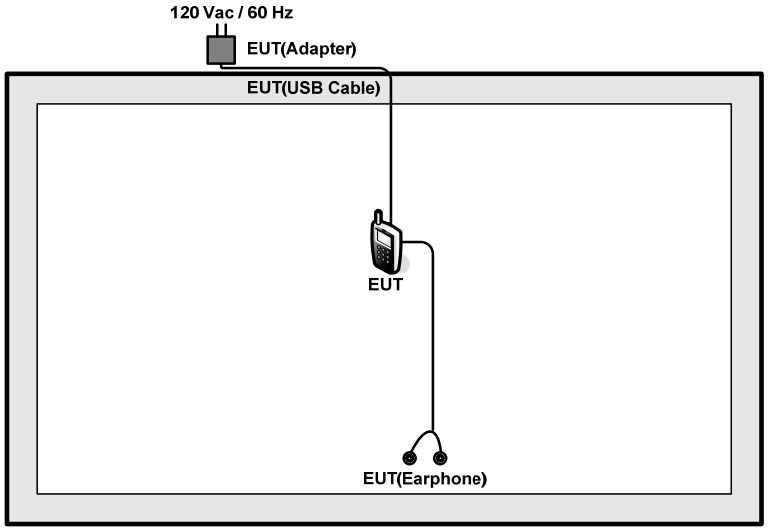
2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

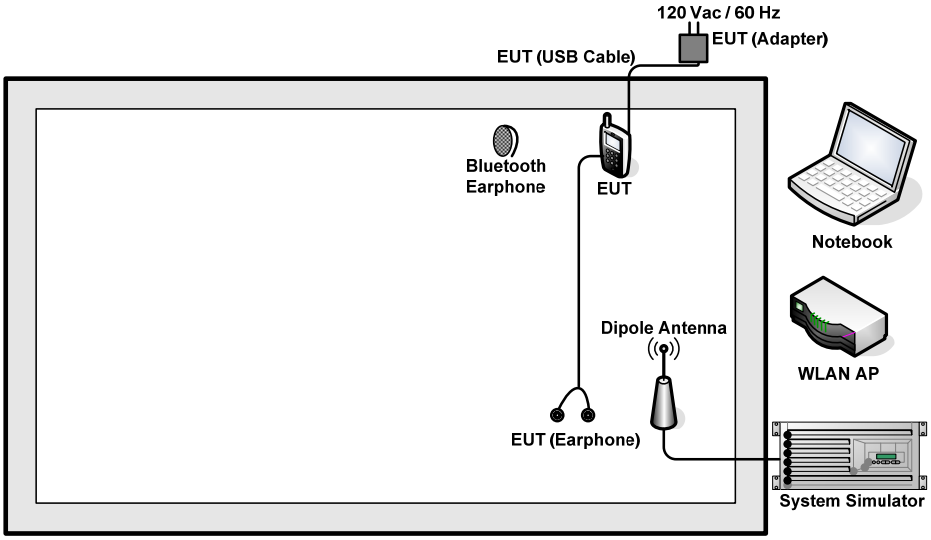
Test Cases				
Conducted TCs	Test Items	Mode	Data Rate	Test Channel
	6dB BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
	Conducted Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS0	1/11
	Conducted Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
Radiated TCs	Radiated Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS0	1/11
	Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone			

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Agilent	E5515C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	TOPWORD	3303DR	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-612	N/A	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	P08S	FCC DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-108	N/A	N/A	N/A

2.6 EUT Operation Test Setup

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

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

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor 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 and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 7.5 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 7.5 + 10 = 17.5 (dB)

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

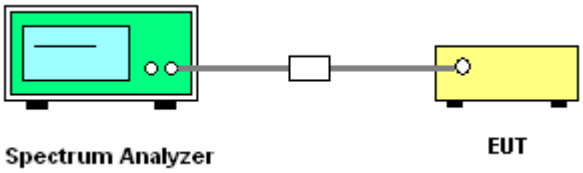
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r01.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. Measure and record the results in the test report.

3.1.4 Test Setup

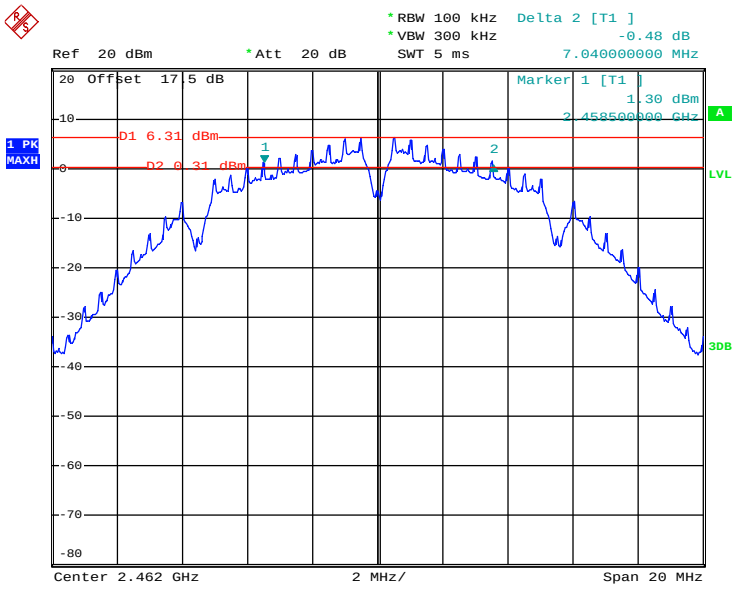


3.1.5 Test Result of 6dB Occupied Bandwidth

Test Band :	2.4GHz	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	7.08	0.5	Pass
11b	1Mbps	1	6	2437	7.08	0.5	Pass
11b	1Mbps	1	11	2462	7.04	0.5	Pass
11g	6Mbps	1	1	2412	15.12	0.5	Pass
11g	6Mbps	1	6	2437	15.12	0.5	Pass
11g	6Mbps	1	11	2462	15.08	0.5	Pass
HT20	MCS0	1	1	2412	15.08	0.5	Pass
HT20	MCS0	1	6	2437	15.08	0.5	Pass
HT20	MCS0	1	11	2462	15.08	0.5	Pass

Minimum 6dB Bandwidth



3.2 Output Power Measurement

3.2.1 Limit of Output Power

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

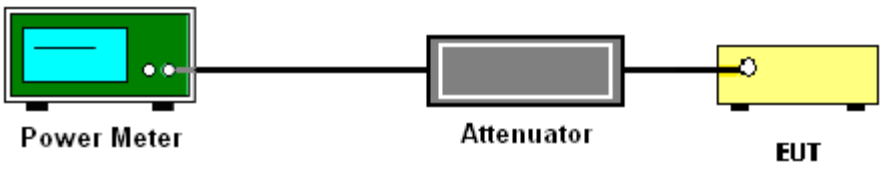
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Test Mode :	2.4GHz	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	RF Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	17.68	30	-0.19	Pass
11b	1Mbps	1	6	2437	16.83	30	-0.19	Pass
11b	1Mbps	1	11	2462	16.38	30	-0.19	Pass
11g	6Mbps	1	1	2412	22.34	30	-0.19	Pass
11g	6Mbps	1	6	2437	21.71	30	-0.19	Pass
11g	6Mbps	1	11	2462	21.31	30	-0.19	Pass
HT20	MCS0	1	1	2412	21.93	30	-0.19	Pass
HT20	MCS0	1	6	2437	21.49	30	-0.19	Pass
HT20	MCS0	1	11	2462	21.22	30	-0.19	Pass

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

3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	2.4GHz	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Duty Factor (dB)	Average Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	0.03	14.87	30	-0.19	Pass
11b	1Mbps	1	6	2437	0.03	13.97	30	-0.19	Pass
11b	1Mbps	1	11	2462	0.03	13.54	30	-0.19	Pass
11g	6Mbps	1	1	2412	0.22	13.86	30	-0.19	Pass
11g	6Mbps	1	6	2437	0.22	13.08	30	-0.19	Pass
11g	6Mbps	1	11	2462	0.22	12.76	30	-0.19	Pass
HT20	MCS0	1	1	2412	0.22	13.74	30	-0.19	Pass
HT20	MCS0	1	6	2437	0.22	12.90	30	-0.19	Pass
HT20	MCS0	1	11	2462	0.22	12.57	30	-0.19	Pass

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

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.

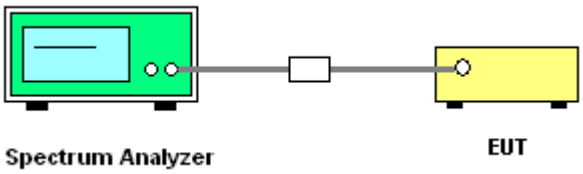
3.3.2 Measuring Instruments

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 v03r01
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

3.3.4 Test Setup



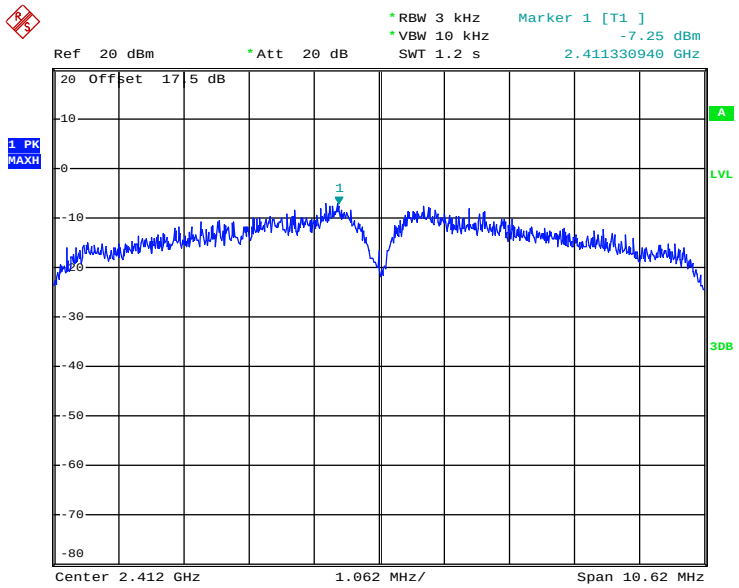
3.3.5 Test Result of Power Spectral Density

Test Mode :	2.4GHz	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Peak Power Density (dBm/3kHz)	Max. Limits (dBm/3kHz)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	-7.25	8	-0.19	Pass
11b	1Mbps	1	6	2437	-7.88	8	-0.19	Pass
11b	1Mbps	1	11	2462	-8.49	8	-0.19	Pass
11g	6Mbps	1	1	2412	-11.44	8	-0.19	Pass
11g	6Mbps	1	6	2437	-12.32	8	-0.19	Pass
11g	6Mbps	1	11	2462	-12.17	8	-0.19	Pass
HT20	MCS0	1	1	2412	-12.09	8	-0.19	Pass
HT20	MCS0	1	6	2437	-11.48	8	-0.19	Pass
HT20	MCS0	1	11	2462	-12.79	8	-0.19	Pass

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

Worst Case Power Density (dBm/3kHz)



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement 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 v03r01.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

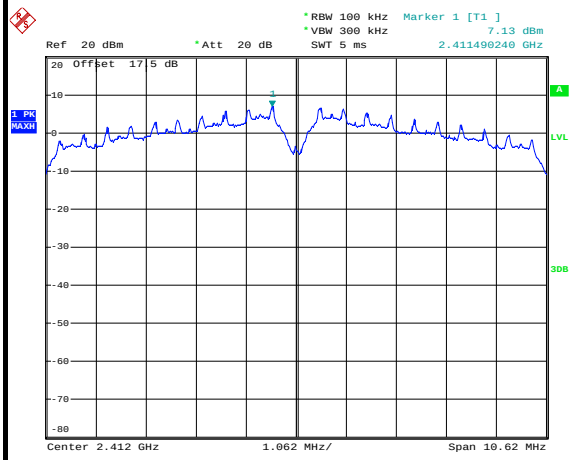
3.4.4 Test Setup

3.4.5 Test Result of Conducted Band Edges and Spurious Emission

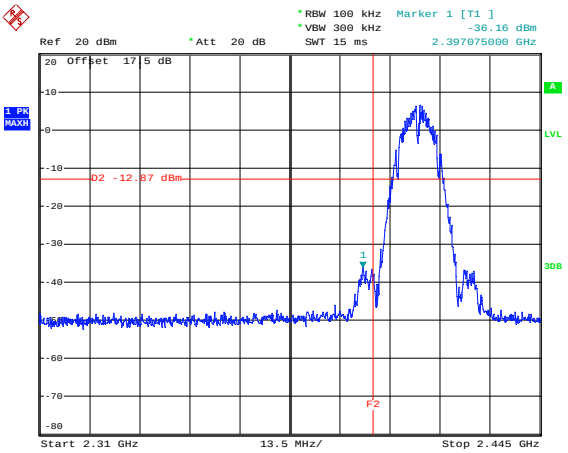
Test Mode :	802.11b	Temperature :	24~26℃
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Fly Chen

WLAN 802.11b Channel 01

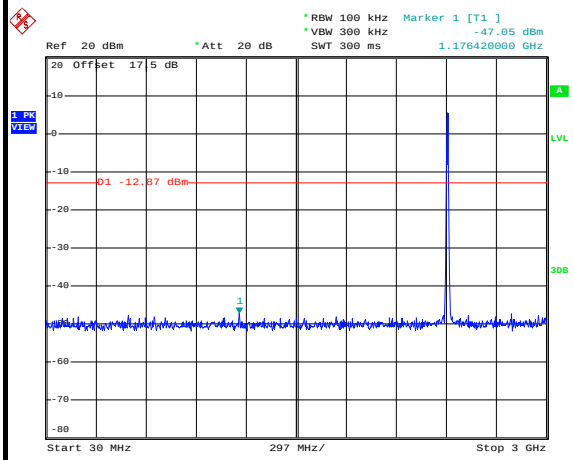
100kHz PSD reference Level



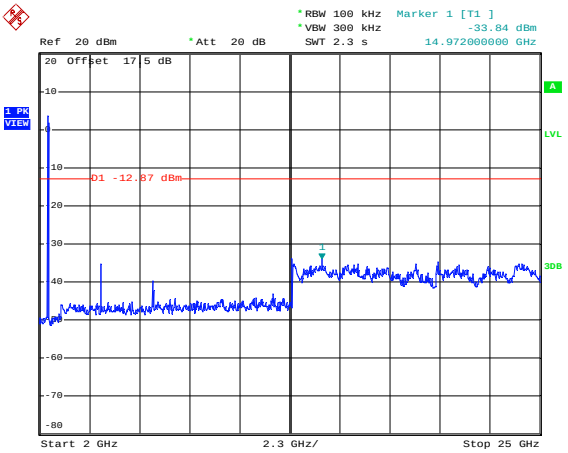
Low Channel Plot



Spurious Emission 30MHz~3GHz



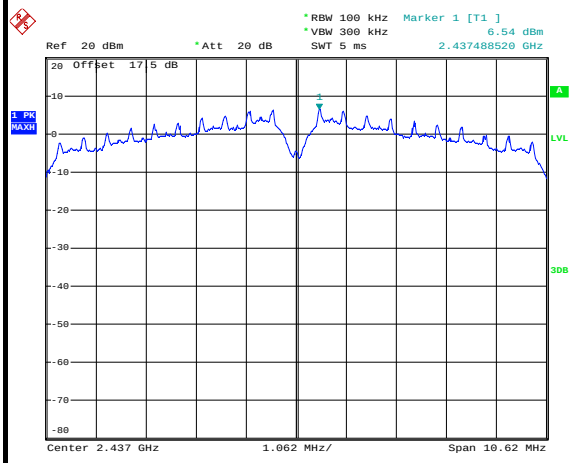
Spurious Emission 2GHz~25GHz



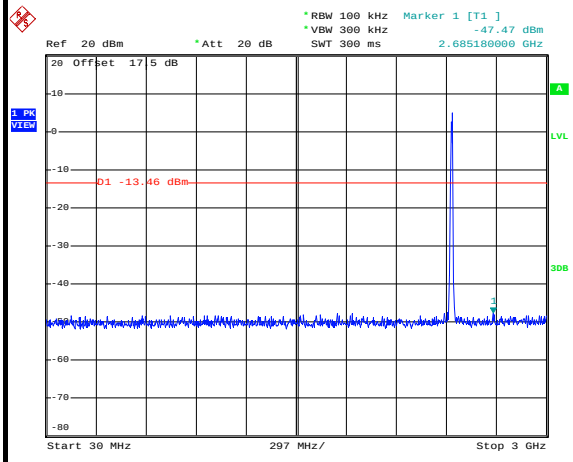
Test Mode :	802.11b	Temperature :	24~26℃
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Fly Chen

WLAN 802.11b Channel 06

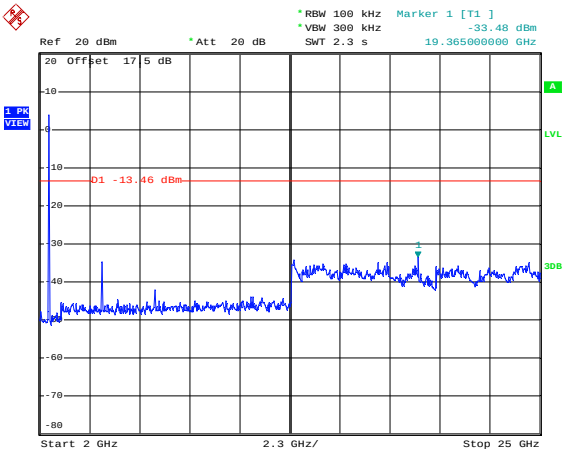
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



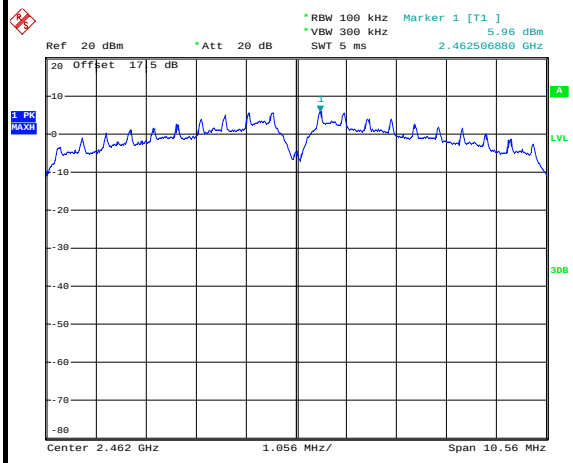
Spurious Emission 2GHz~25GHz



Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	50~53%
Test Channel :	11	**Test Engineer :**	Fly Chen

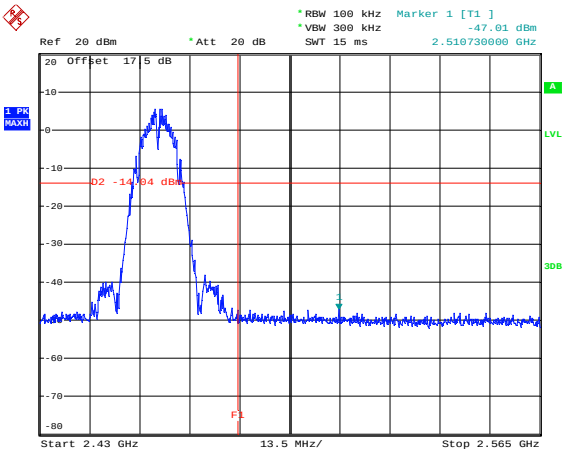
WLAN 802.11b Channel 11

100kHz PSD reference Level



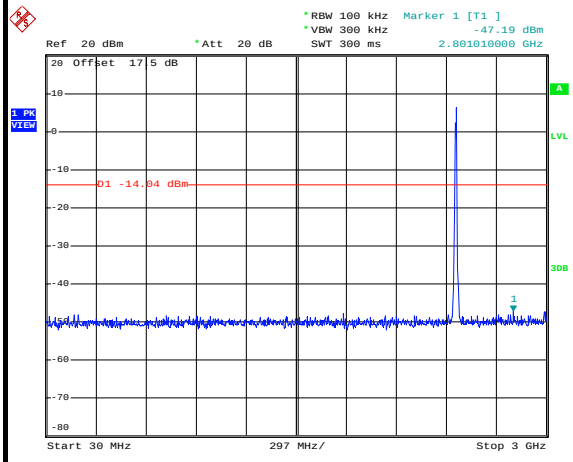
Date: 17.OCT.2013 21:00:54

High Channel Plot



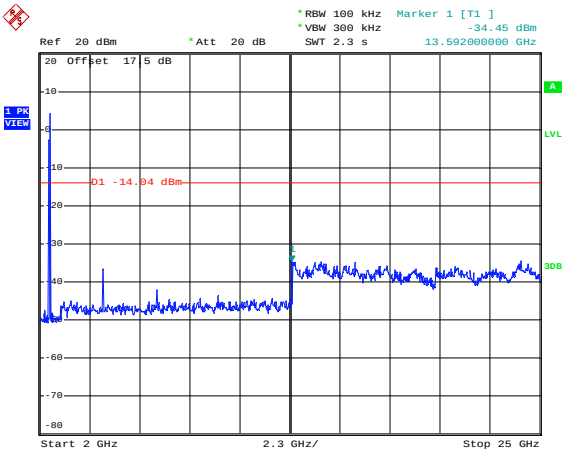
Date: 17.OCT.2013 21:01:08

Spurious Emission 30MHz~3GHz



Date: 17.OCT.2013 21:01:27

Spurious Emission 2GHz~25GHz

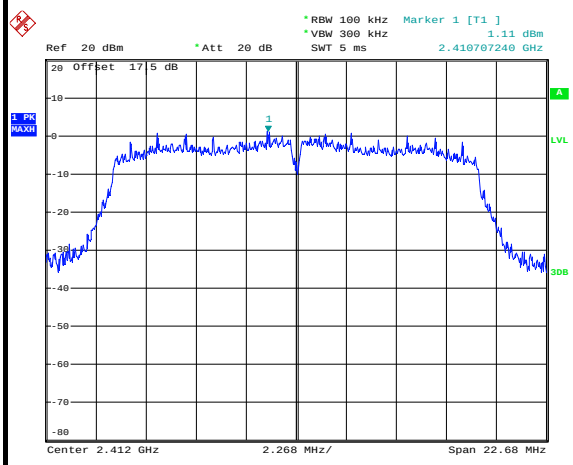


Date: 17.OCT.2013 21:01:46

Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	50~53%
Test Channel :	01	**Test Engineer :**	Fly Chen

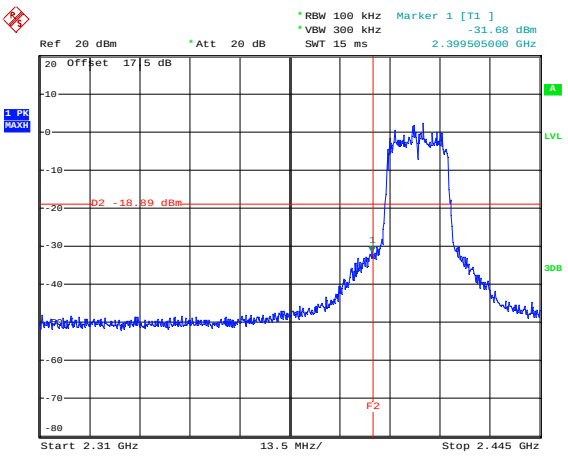
WLAN 802.11g Channel 01

100kHz PSD reference Level



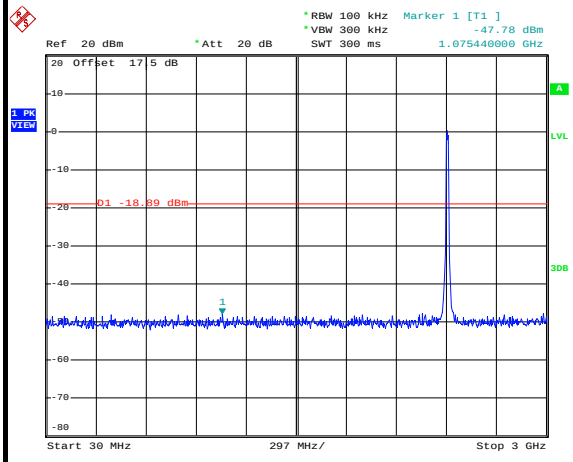
Date: 17.OCT.2013 14:52:02

Low Channel Plot



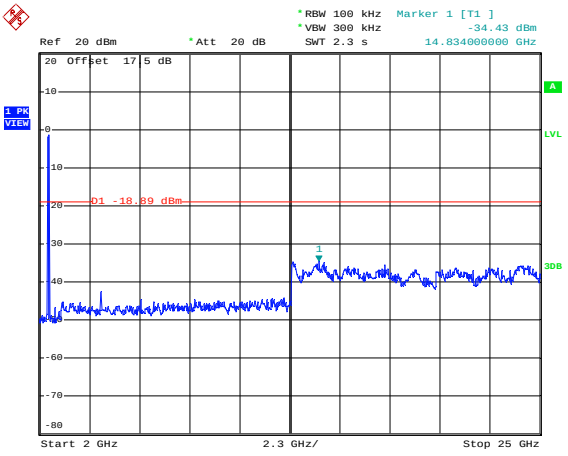
Date: 17.OCT.2013 14:52:16

Spurious Emission 30MHz~3GHz



Date: 17.OCT.2013 14:52:36

Spurious Emission 2GHz~25GHz

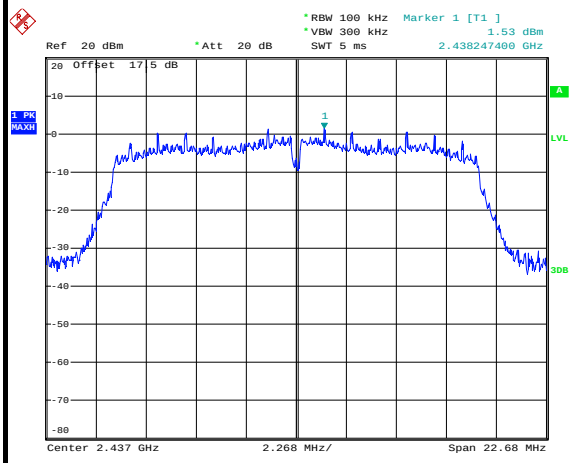


Date: 17.OCT.2013 14:52:54

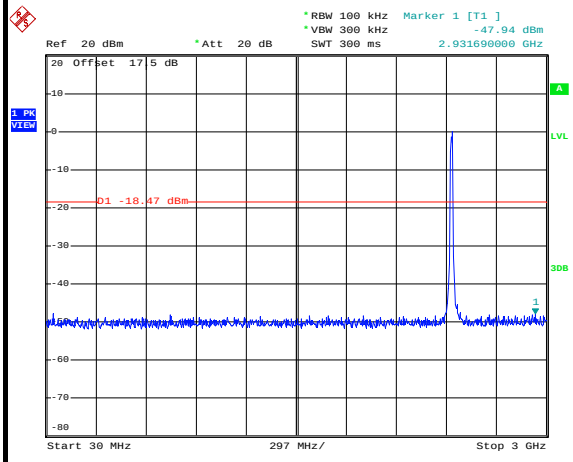
Test Mode :	802.11g	Temperature :	24~26℃
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Fly Chen

WLAN 802.11g Channel 06

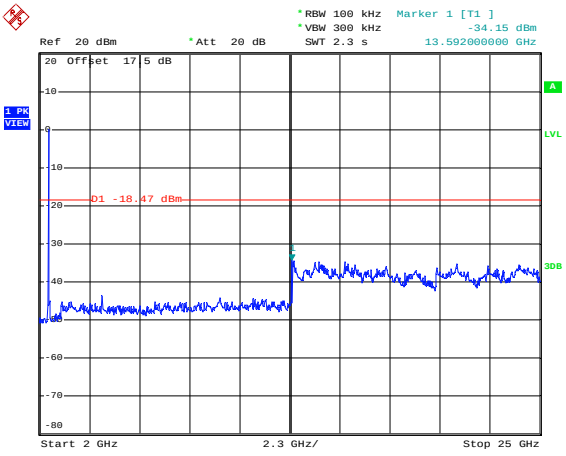
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



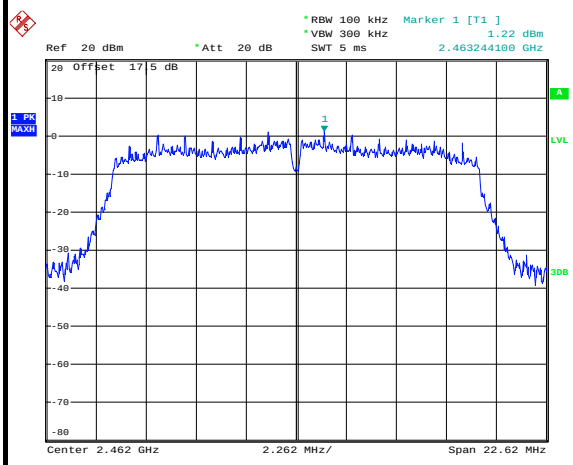
Spurious Emission 2GHz~25GHz



Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	50~53%
Test Channel :	11	**Test Engineer :**	Fly Chen

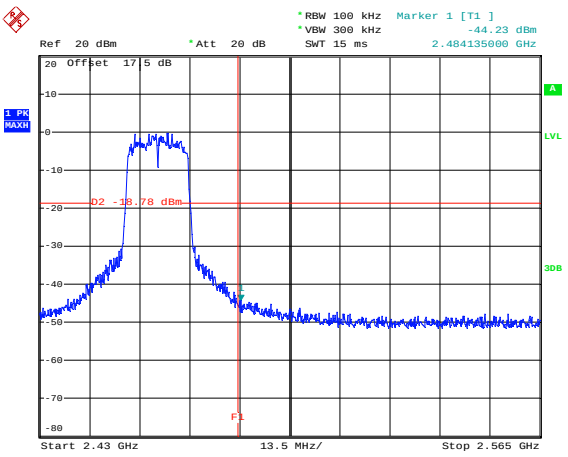
WLAN 802.11g Channel 11

100kHz PSD reference Level



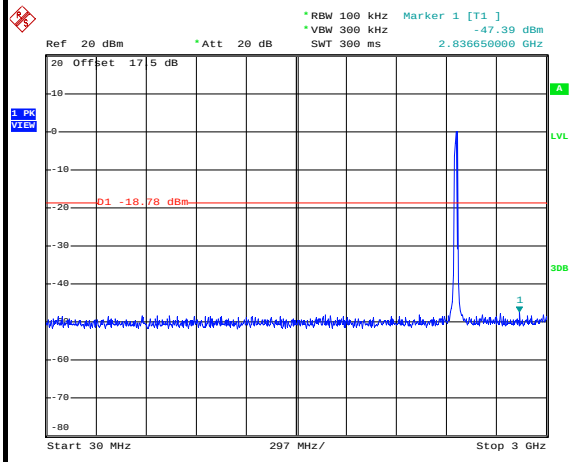
Date: 17.OCT.2013 14:59:15

High Channel Plot



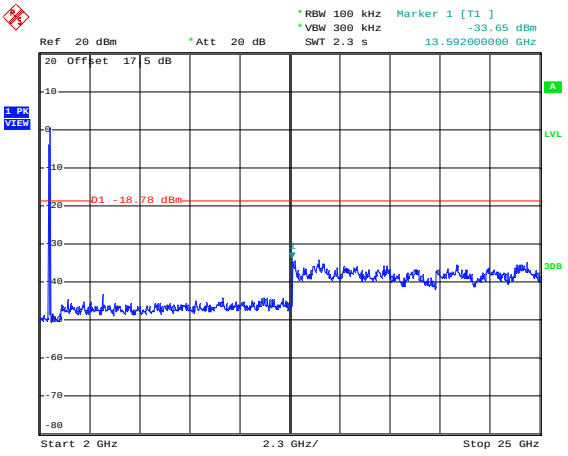
Date: 17.OCT.2013 14:59:29

Spurious Emission 30MHz~3GHz



Date: 17.OCT.2013 14:59:48

Spurious Emission 2GHz~25GHz

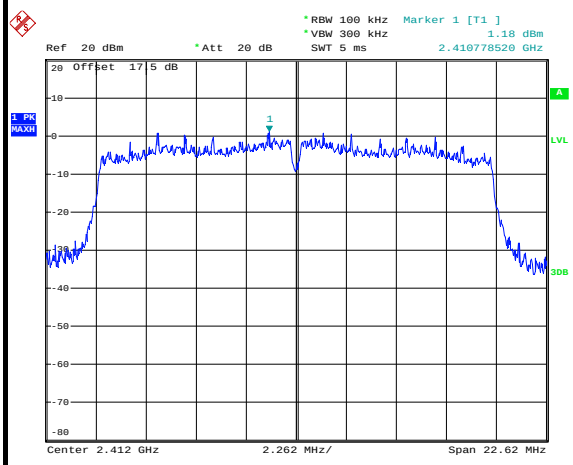


Date: 17.OCT.2013 15:00:06

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Fly Chen

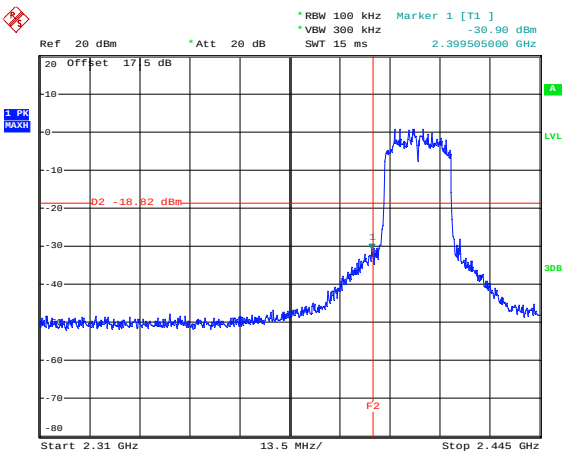
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



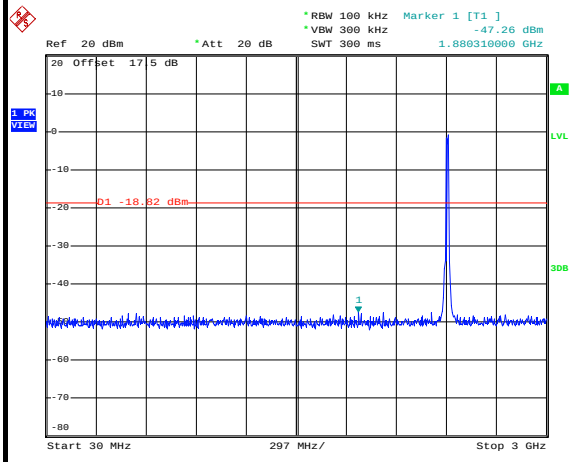
Date: 17.OCT.2013 14:38:51

Low Channel Plot



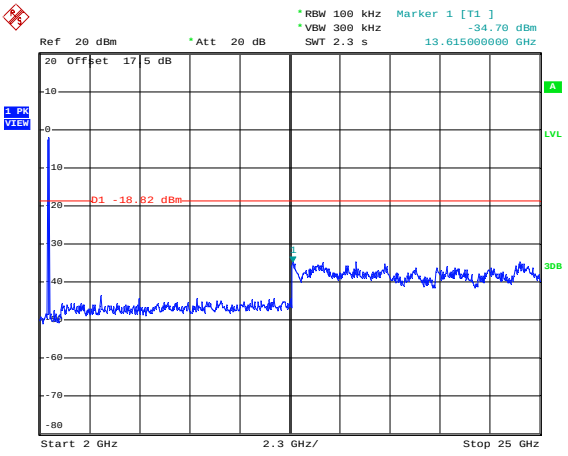
Date: 17.OCT.2013 14:39:04

Spurious Emission 30MHz~3GHz



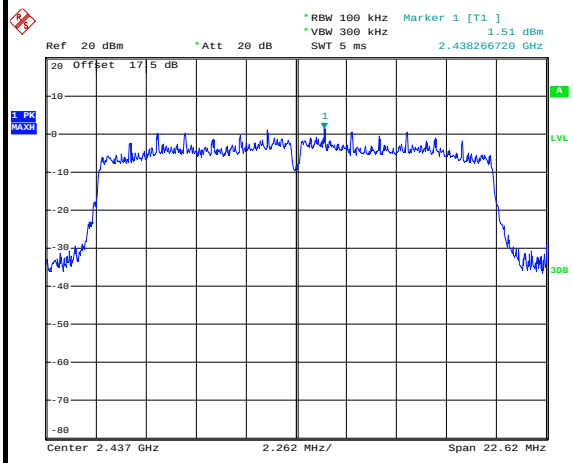
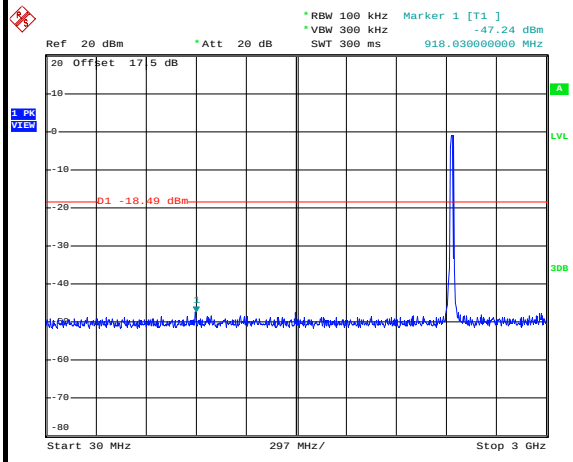
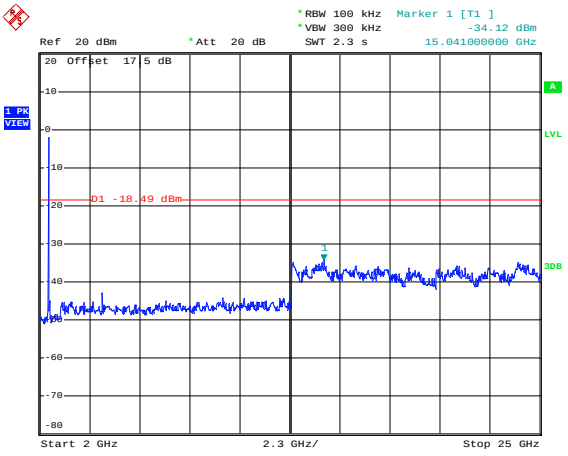
Date: 17.OCT.2013 14:39:24

Spurious Emission 2GHz~25GHz



Date: 17.OCT.2013 14:39:42

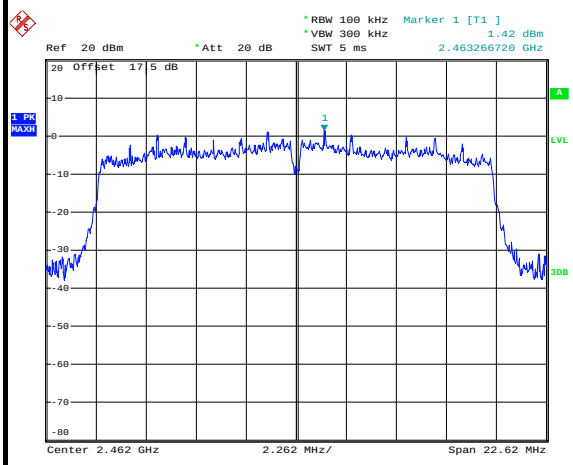
Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Fly Chen

WLAN 802.11n HT20 Channel 06	
100kHz PSD reference Level	
 Date: 17.OCT.2013 14:43:49	
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
 Date: 17.OCT.2013 14:44:09	 Date: 17.OCT.2013 14:44:28

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Fly Chen

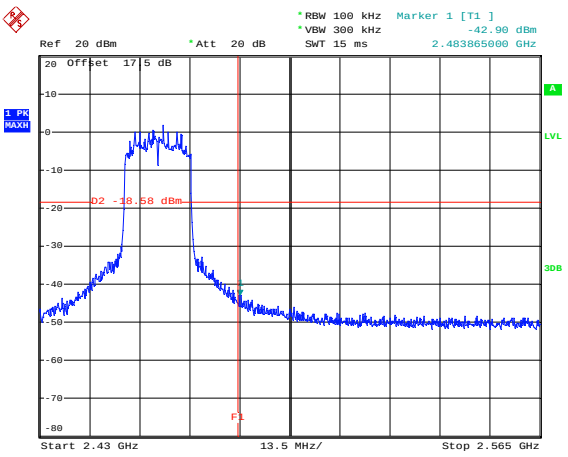
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



Date: 17.OCT.2013 14:47:24

High Channel Plot



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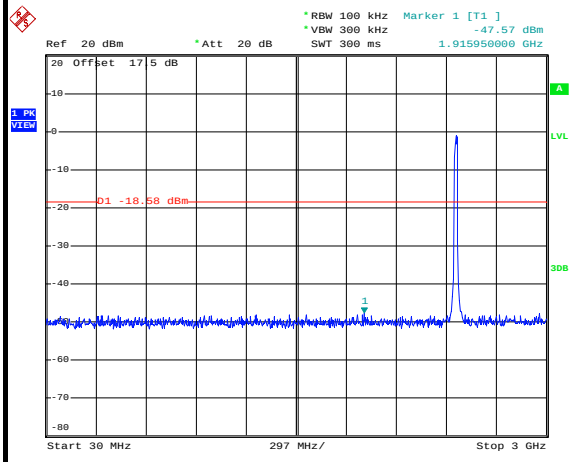
Spurious Emission 30MHz~3GHz



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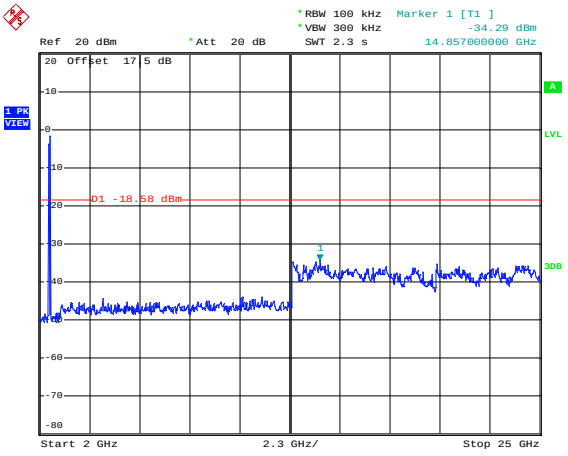
Spurious Emission 2GHz~25GHz



Date: 17.OCT.2013 14:48:15

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.

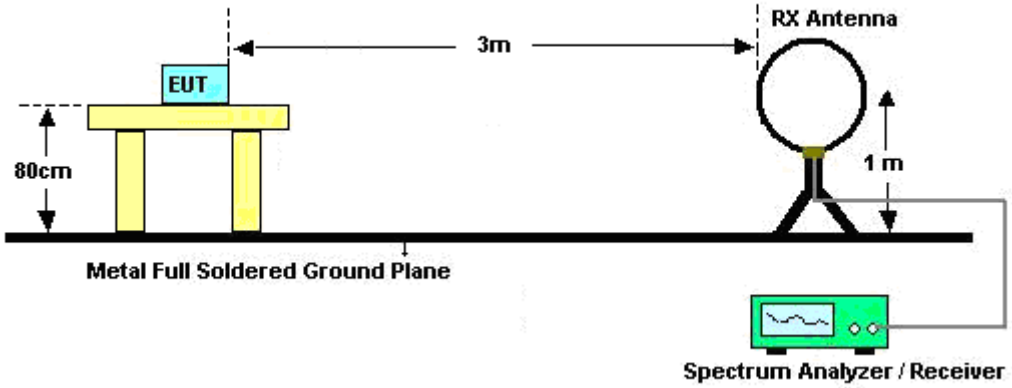
3.5.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
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 above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

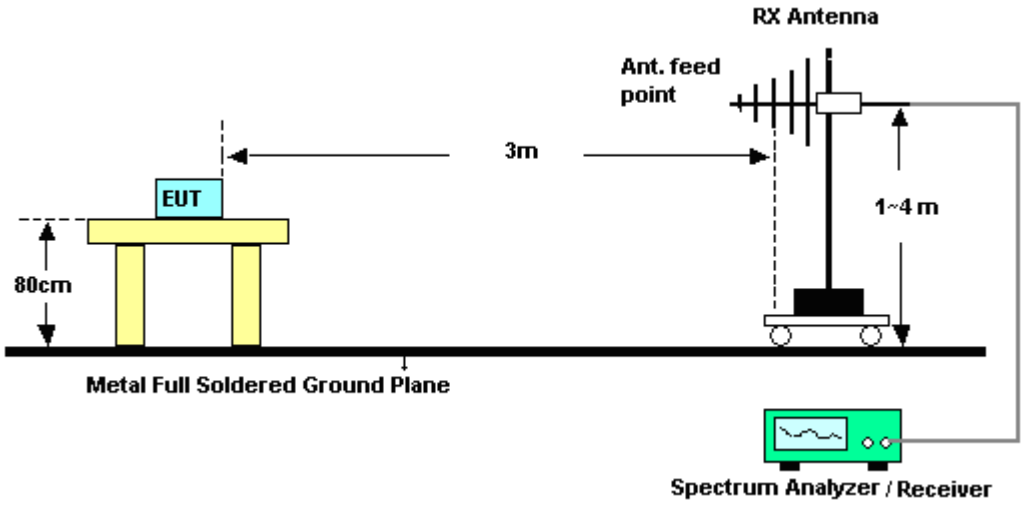
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	99.38	-	-	10Hz
802.11g	95.13	2.070	0.483	1kHz
2.4GHz 802.11n HT20	94.96	1.920	0.521	1kHz

3.5.4 Test Setup

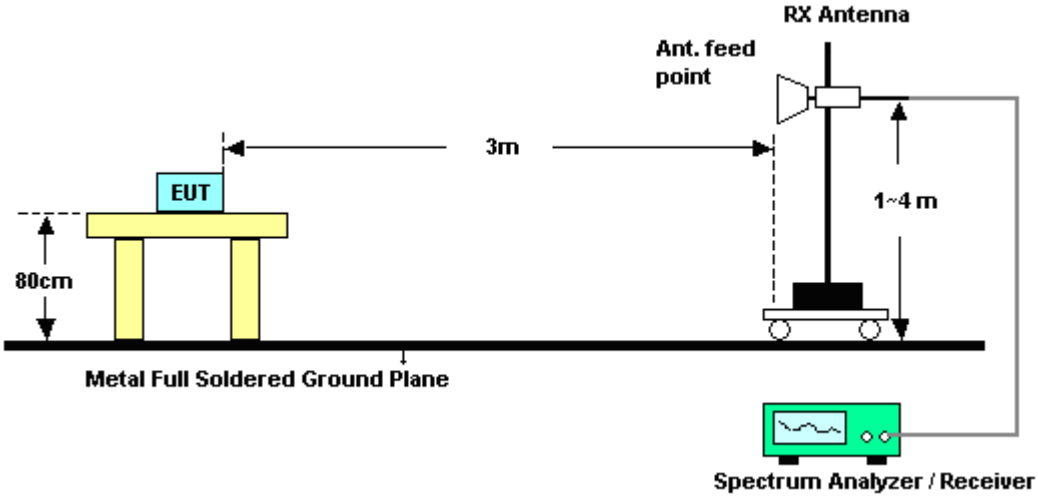
For radiated emissions below 30MHz



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

Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	Low	Relative Humidity :	49~52%
Test Channel :	01	Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.47	53.46	-20.54	74	45.52	32.14	5.59	29.79	136	31	Peak
2389.02	46.16	-7.84	54	38.22	32.14	5.59	29.79	136	31	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2385.6	48.66	-25.34	74	40.72	32.14	5.59	29.79	185	144	Peak
2389.02	39.56	-14.44	54	31.62	32.14	5.59	29.79	185	144	Average

Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	High	Relative Humidity :	49~52%
Test Channel :	11	Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	53.61	-20.39	74	45.39	32.27	5.71	29.76	127	88	Peak
2483.5	44.9	-9.1	54	36.68	32.27	5.71	29.76	127	88	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.01	49.54	-24.46	74	41.32	32.27	5.71	29.76	100	63	Peak
2483.5	38.33	-15.67	54	30.11	32.27	5.71	29.76	100	63	Average

Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	Low	Relative Humidity :	49~52%
Test Channel :	01	Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.65	58.51	-15.49	74	50.57	32.14	5.59	29.79	107	83	Peak
2389.92	40.71	-13.29	54	32.73	32.14	5.62	29.78	107	83	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.92	49.35	-24.65	74	41.37	32.14	5.62	29.78	118	138	Peak
2389.74	36.87	-17.13	54	28.93	32.14	5.59	29.79	118	138	Average

Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	High	Relative Humidity :	49~52%
Test Channel :	11	Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.89	64.15	-9.85	74	55.93	32.27	5.71	29.76	133	77	Peak
2483.59	48.77	-5.23	54	40.55	32.27	5.71	29.76	133	77	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.22	57.11	-16.89	74	48.89	32.27	5.71	29.76	133	77	Peak
2483.68	40.71	-13.29	54	32.49	32.27	5.71	29.76	133	77	Average

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	Low	Relative Humidity :	49~52%
Test Channel :	01	Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.92	53.29	-20.71	74	45.31	32.14	5.62	29.78	200	62	Peak
2389.83	38.39	-15.61	54	30.41	32.14	5.62	29.78	200	62	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.74	49.86	-24.14	74	41.92	32.14	5.59	29.79	200	131	Peak
2389.38	36.72	-17.28	54	28.78	32.14	5.59	29.79	200	131	Average

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	High	Relative Humidity :	49~52%
Test Channel :	11	Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.59	66.58	-7.42	74	58.36	32.27	5.71	29.76	134	77	Peak
2483.59	49.33	-4.67	54	41.11	32.27	5.71	29.76	134	77	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.68	57.92	-16.08	74	49.7	32.27	5.71	29.76	164	129	Peak
2483.62	41.92	-12.08	54	33.7	32.27	5.71	29.76	164	129	Average

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

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

Test Mode :	802.11b	**Temperature :**	24~26°C
Test Channel :	01	**Relative Humidity :**	49~52%
Test Engineer :	Robin Luo	**Polarization :**	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	105.6	-	-	97.59	32.17	5.62	29.78	136	31	Peak
2412	102.8	-	-	94.79	32.17	5.62	29.78	136	31	Average
4824	37.69	-36.31	74	52.91	33.68	8.36	57.26	105	198	Peak

Test Mode :	802.11b	**Temperature :**	24~26°C
Test Channel :	01	**Relative Humidity :**	49~52%
Test Engineer :	Robin Luo	**Polarization :**	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	102.93	-	-	94.92	32.17	5.62	29.78	185	144	Peak
2412	100.75	-	-	92.74	32.17	5.62	29.78	185	144	Average
4824	38.72	-35.28	74	53.94	33.68	8.36	57.26	105	198	Peak

Test Mode :	802.11b	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	106.44	-	-	98.34	32.22	5.65	29.77	130	90	Peak
2437	104.02	-	-	95.92	32.22	5.65	29.77	130	90	Average
4874	37.9	-36.1	74	52.86	33.8	8.41	57.17	145	265	Peak
7311	39.41	-34.59	74	51.27	35.31	9.99	57.16	174	321	Peak

Test Mode :	802.11b	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	98.96	-	-	90.86	32.22	5.65	29.77	100	60	Peak
2437	96.7	-	-	88.6	32.22	5.65	29.77	100	60	Average
4874	38.43	-35.57	74	53.39	33.8	8.41	57.17	145	265	Peak
7311	40.05	-33.95	74	51.91	35.31	9.99	57.16	174	321	Peak

Test Mode :	802.11b	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	104.96	-	-	96.8	32.24	5.68	29.76	127	88	Peak
2462	102.81	-	-	94.65	32.24	5.68	29.76	127	88	Average
4924	38.8	-35.2	74	53.5	33.92	8.46	57.08	146	347	Peak
7386	40.27	-33.73	74	51.95	35.35	10.02	57.05	145	274	Peak

Test Mode :	802.11b	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	97.1	-	-	88.94	32.24	5.68	29.76	100	63	Peak
2462	94.39	-	-	86.23	32.24	5.68	29.76	100	63	Average
4924	38.14	-35.86	74	52.84	33.92	8.46	57.08	146	347	Peak
7386	40.29	-33.71	74	51.97	35.35	10.02	57.05	145	274	Peak

Test Mode :	802.11g	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	103.48	-	-	95.47	32.17	5.62	29.78	107	83	Peak
2412	94.23	-	-	86.22	32.17	5.62	29.78	107	83	Average
4824	60.72	-13.28	74	75.94	33.68	8.36	57.26	100	303	Peak
4824	48.89	-5.11	54	64.11	33.68	8.36	57.26	100	303	Average

Test Mode :	802.11g	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	97.5	-	-	89.49	32.17	5.62	29.78	118	138	Peak
2412	88.85	-	-	80.84	32.17	5.62	29.78	118	138	Average
4824	55.42	-18.58	74	70.64	33.68	8.36	57.26	100	281	Peak
4824	43.87	-10.13	54	59.09	33.68	8.36	57.26	100	281	Average

Test Mode :	802.11g	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	107.01	-	-	98.91	32.22	5.65	29.77	106	76	Peak
2437	97.22	-	-	89.12	32.22	5.65	29.77	106	76	Average
4875	50.09	-23.91	74	65.05	33.8	8.41	57.17	100	360	Peak
7311	39.8	-34.2	74	51.66	35.31	9.99	57.16	174	321	Peak

Test Mode :	802.11g	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	100.06	-	-	91.96	32.22	5.65	29.77	200	138	Peak
2437	91.03	-	-	82.93	32.22	5.65	29.77	200	138	Average
4874	45.62	-28.38	74	60.58	33.8	8.41	57.17	145	265	Peak
7311	39.68	-34.32	74	51.54	35.31	9.99	57.16	174	321	Peak

Test Mode :	802.11g	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	108.06	-	-	99.9	32.24	5.68	29.76	133	77	Peak
2462	99.18	-	-	91.02	32.24	5.68	29.76	133	77	Average
4924	48.06	-25.94	74	62.76	33.92	8.46	57.08	100	360	Peak
7386	40	-34	74	51.68	35.35	10.02	57.05	145	274	Peak

Test Mode :	802.11g	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	99.91	-	-	91.75	32.24	5.68	29.76	133	77	Peak
2462	90.45	-	-	82.29	32.24	5.68	29.76	133	77	Average
4924	50.21	-23.79	74	64.91	33.92	8.46	57.08	146	347	Peak
7386	39.4	-34.6	74	51.08	35.35	10.02	57.05	145	274	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	101.52	-	-	93.51	32.17	5.62	29.78	200	62	Peak
2412	92.86	-	-	84.85	32.17	5.62	29.78	200	62	Average
4824	60.26	-13.74	74	75.48	33.68	8.36	57.26	100	263	Peak
4824	49.37	-4.63	54	64.59	33.68	8.36	57.26	100	263	Average

Test Mode :	2.4GHz 802.11n HT20	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	97.51	-	-	89.5	32.17	5.62	29.78	200	131	Peak
2412	88.66	-	-	80.65	32.17	5.62	29.78	200	131	Average
4824	51.22	-22.78	74	66.44	33.68	8.36	57.26	100	0	Peak
4824	40.37	-13.63	54	55.59	33.68	8.36	57.26	100	251	Average

Test Mode :	2.4GHz 802.11n HT20	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	105.61	-	-	97.51	32.22	5.65	29.77	106	74	Peak
2437	96.64	-	-	88.54	32.22	5.65	29.77	106	74	Average
4874	59.21	-14.79	74	74.17	33.8	8.41	57.17	100	308	Peak
4874	48.05	-5.95	54	63.01	33.8	8.41	57.17	100	308	Average
7311	39.89	-34.11	74	51.75	35.31	9.99	57.16	100	0	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	100.15	-	-	92.05	32.22	5.65	29.77	200	130	Peak
2437	91.59	-	-	83.49	32.22	5.65	29.77	200	130	Average
4874	50.09	-23.91	74	65.05	33.8	8.41	57.17	145	254	Peak
7311	39.65	-34.35	74	51.51	35.31	9.99	57.16	100	360	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
164.83	19.5	-24	43.5	38.49	9.9	1.56	30.45	200	0	Peak
259.89	21.89	-24.11	46	36.43	13.7	1.89	30.13	200	0	Peak
312.27	23.9	-22.1	46	38.49	13.32	2.05	29.96	200	0	Peak
468.44	26.94	-19.06	46	36.93	17	2.45	29.44	200	0	Peak
779.81	35.19	-10.81	46	40.42	20.6	3.13	28.96	151	245	Peak
883.6	29.52	-16.48	46	34.15	20.9	3.29	28.82	200	0	Peak
2462	107.36	-	-	99.2	32.24	5.68	29.76	134	77	Peak
2462	98.69	-	-	90.53	32.24	5.68	29.76	134	77	Average
4924	60.45	-13.55	74	75.15	33.92	8.46	57.08	100	253	Peak
4924	50.17	-3.83	54	64.87	33.92	8.46	57.08	100	253	Average
7386	38.66	-35.34	74	50.34	35.35	10.02	57.05	145	214	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	49~52%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
35.82	24.24	-15.76	40	42.19	11.8	0.81	30.56	145	214	Peak
123.12	16.28	-27.22	43.5	33.26	12.25	1.36	30.59	100	0	Peak
525.67	23.56	-22.44	46	32.35	17.9	2.61	29.3	100	0	Peak
616.85	24.68	-21.32	46	32	19.04	2.81	29.17	100	0	Peak
834.13	26.93	-19.07	46	31.36	21.2	3.26	28.89	100	0	Peak
977.69	27.18	-26.82	54	30.36	22.04	3.48	28.7	100	0	Peak
2462	100.42	-	-	92.26	32.24	5.68	29.76	164	129	Peak
2462	91.83	-	-	83.67	32.24	5.68	29.76	164	129	Average
4924	57.66	-16.34	74	72.36	33.92	8.46	57.08	100	217	Peak
4924	46.34	-7.66	54	61.04	33.92	8.46	57.08	100	217	Average
7386	39.57	-34.43	74	51.25	35.35	10.02	57.05	145	245	Peak

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

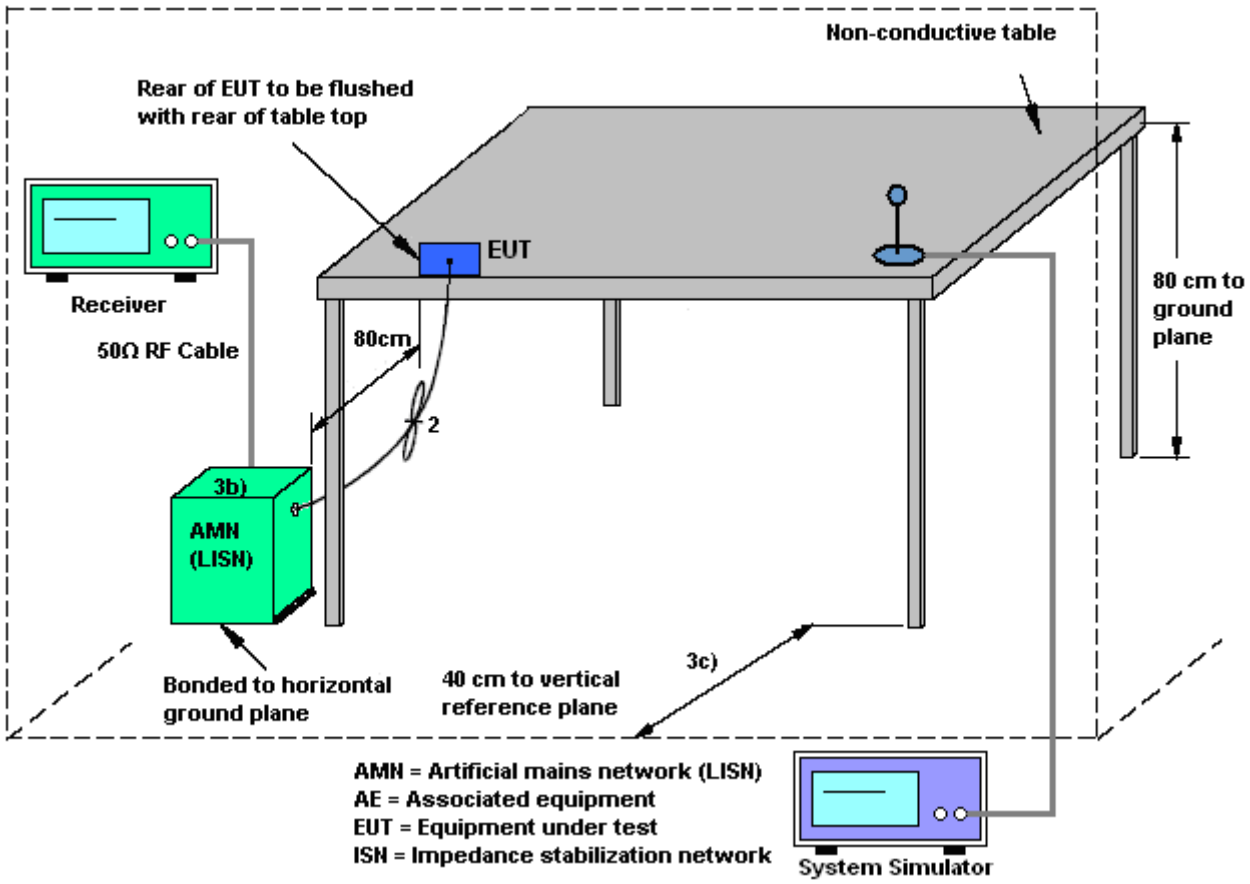
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

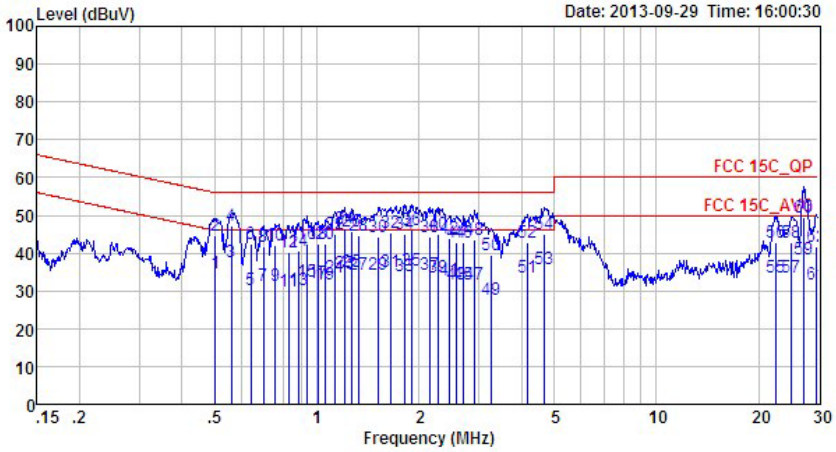
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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 with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

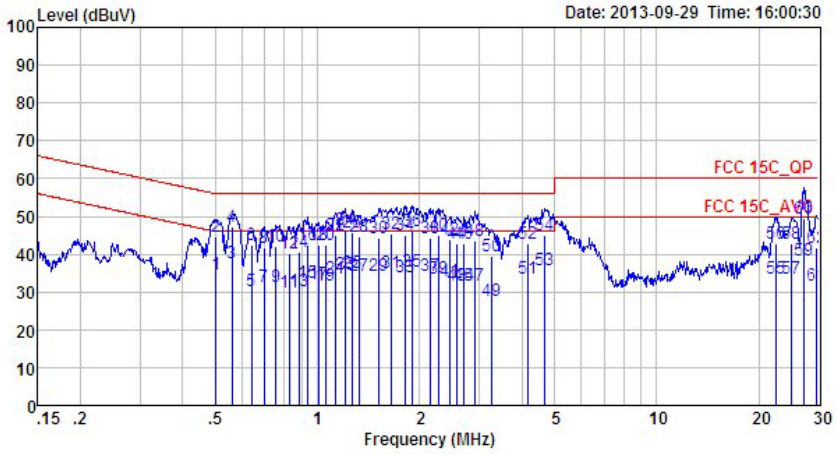
Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Henry Chen	Relative Humidity :	49~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_L_20130328 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.50	34.60	-11.40	46.00	24.30	0.14	10.16	Average
2		0.50	44.80	-11.20	56.00	34.50	0.14	10.16	QP
3	*	0.56	37.80	-8.20	46.00	27.50	0.15	10.15	Average
4		0.56	47.30	-8.70	56.00	37.00	0.15	10.15	QP
5		0.64	30.40	-15.60	46.00	20.10	0.15	10.15	Average
6		0.64	42.30	-13.70	56.00	32.00	0.15	10.15	QP
7		0.70	31.41	-14.59	46.00	21.10	0.16	10.15	Average
8		0.70	41.76	-14.24	56.00	31.45	0.16	10.15	QP
9		0.75	31.51	-14.49	46.00	21.20	0.17	10.14	Average
10		0.75	42.11	-13.89	56.00	31.80	0.17	10.14	QP
11		0.83	29.73	-16.27	46.00	19.40	0.18	10.15	Average
12		0.83	40.33	-15.67	56.00	30.00	0.18	10.15	QP
13		0.88	30.43	-15.57	46.00	20.10	0.19	10.14	Average
14		0.88	40.63	-15.37	56.00	30.30	0.19	10.14	QP
15		0.93	32.54	-13.46	46.00	22.20	0.19	10.15	Average
16		0.93	42.54	-13.46	56.00	32.20	0.19	10.15	QP
17		1.01	31.95	-14.05	46.00	21.60	0.20	10.15	Average
18		1.01	42.35	-13.65	56.00	32.00	0.20	10.15	QP
19		1.06	31.56	-14.44	46.00	21.21	0.20	10.15	Average
20		1.06	42.56	-13.44	56.00	32.21	0.20	10.15	QP
21		1.13	33.66	-12.34	46.00	23.29	0.21	10.16	Average
22		1.13	44.86	-11.14	56.00	34.49	0.21	10.16	QP
23		1.21	34.87	-11.13	46.00	24.50	0.21	10.16	Average
24		1.21	46.37	-9.63	56.00	36.00	0.21	10.16	QP
25		1.27	34.87	-11.13	46.00	24.50	0.21	10.16	Average
26		1.27	45.77	-10.23	56.00	35.40	0.21	10.16	QP
27		1.33	34.48	-11.52	46.00	24.11	0.21	10.16	Average
28		1.33	44.68	-11.32	56.00	34.31	0.21	10.16	QP
29		1.52	34.19	-11.81	46.00	23.80	0.22	10.17	Average

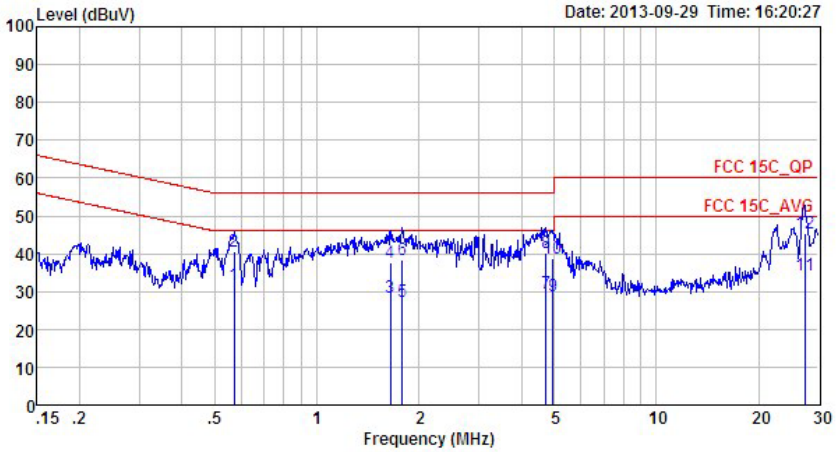
Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Henry Chen	Relative Humidity :	49~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_L_20130328 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
30	1.52	44.39	-11.61	56.00	34.00	0.22	10.17	QP
31	1.64	35.20	-10.80	46.00	24.80	0.22	10.18	Average
32	1.64	45.40	-10.60	56.00	35.00	0.22	10.18	QP
33	1.81	34.11	-11.89	46.00	23.70	0.23	10.18	Average
34	1.81	45.11	-10.89	56.00	34.70	0.23	10.18	QP
35	1.90	35.41	-10.59	46.00	25.00	0.23	10.18	Average
36	1.90	46.01	-9.99	56.00	35.60	0.23	10.18	QP
37	2.14	34.42	-11.58	46.00	23.99	0.24	10.19	Average
38	2.14	44.42	-11.58	56.00	33.99	0.24	10.19	QP
39	2.27	33.73	-12.27	46.00	23.30	0.24	10.19	Average
40	2.27	45.03	-10.97	56.00	34.60	0.24	10.19	QP
41	2.46	32.74	-13.26	46.00	22.29	0.25	10.20	Average
42	2.46	43.74	-12.26	56.00	33.29	0.25	10.20	QP
43	2.57	31.85	-14.15	46.00	21.40	0.25	10.20	Average
44	2.57	42.65	-13.35	56.00	32.20	0.25	10.20	QP
45	2.71	31.56	-14.44	46.00	21.10	0.26	10.20	Average
46	2.71	42.86	-13.14	56.00	32.40	0.26	10.20	QP
47	2.92	31.67	-14.33	46.00	21.21	0.26	10.20	Average
48	2.92	43.57	-12.43	56.00	33.11	0.26	10.20	QP
49	3.28	27.68	-18.32	46.00	17.20	0.27	10.21	Average
50	3.28	39.48	-16.52	56.00	29.00	0.27	10.21	QP
51	4.18	33.52	-12.48	46.00	23.01	0.29	10.22	Average
52	4.18	42.92	-13.08	56.00	32.41	0.29	10.22	QP
53	4.70	35.64	-10.36	46.00	25.11	0.30	10.23	Average
54	4.70	44.94	-11.06	56.00	34.41	0.30	10.23	QP
55	22.54	33.58	-16.42	50.00	21.30	1.71	10.57	Average
56	22.54	42.88	-17.12	60.00	30.60	1.71	10.57	QP
57	25.05	33.62	-16.38	50.00	21.00	2.07	10.55	Average
58	25.05	42.82	-17.18	60.00	30.20	2.07	10.55	QP
59	27.27	38.42	-11.58	50.00	26.00	1.85	10.57	Average
60	27.27	49.42	-10.58	60.00	37.00	1.85	10.57	QP
61	29.68	31.83	-18.17	50.00	19.60	1.61	10.62	Average
62	29.68	41.73	-18.27	60.00	29.50	1.61	10.62	QP

Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Henry Chen	Relative Humidity :	49~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_N_20130328 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.57	31.89	-14.11	46.00	21.70	0.04	10.15	Average
2		0.57	40.49	-15.51	56.00	30.30	0.04	10.15	QP
3		1.64	28.53	-17.47	46.00	18.30	0.05	10.18	Average
4		1.64	37.63	-18.37	56.00	27.40	0.05	10.18	QP
5		1.78	27.44	-18.56	46.00	17.20	0.06	10.18	Average
6		1.78	38.44	-17.56	56.00	28.20	0.06	10.18	QP
7		4.72	29.54	-16.46	46.00	19.20	0.11	10.23	Average
8		4.72	40.34	-15.66	56.00	30.00	0.11	10.23	QP
9		4.95	28.75	-17.25	46.00	18.40	0.11	10.24	Average
10		4.95	38.85	-17.15	56.00	28.50	0.11	10.24	QP
11		27.42	34.18	-15.82	50.00	22.40	1.21	10.57	Average
12		27.42	45.28	-14.72	60.00	33.50	1.21	10.57	QP

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Mar. 28, 2013	Oct. 17, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	N/A	Mar. 28, 2013	Oct. 17, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	N/A	Mar. 28, 2013	Oct. 17, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
ESCI TEST Receiver	R&S	ESCI	100724	9kHz -3GHz	Mar. 28, 2013	Oct. 21, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSP30	101362	9kHz~30GHz	Nov. 11, 2012	Oct. 21, 2013	Nov. 10, 2013	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Nov. 12, 2012	Oct. 21, 2013	Nov. 11, 2013	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz ~2GHz	Nov. 03, 2012	Oct. 21, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz-3000MHz GAIN 30db	Mar. 28, 2013	Oct. 21, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Oct. 21, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
SHF-EHF-Horn	Schwarzbeck	BBHA9170	BBHA9170249	14GHz~40GHz	Nov. 23, 2012	Oct. 21, 2013	Nov. 22, 2013	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz-30MHz	Nov. 22, 2012	Oct. 21, 2013	Nov. 21, 2013	Radiation (03CH01-SZ)
Turn Table	EM Electronice	EM 1000	N/A	0 ~ 360 degree	N/A	Oct. 21, 2013	N/A	Radiation (03CH01-SZ)
Antenna Mast	EM Electronice	EM 1000	N/A	1 m - 4 m	N/A	Oct. 21, 2013	N/A	Radiation (03CH01-SZ)
AC LISN	ETS-LINDGREN	3816/2SH	00103912	0.1MHz~108MHz	Feb. 28, 2013	Sep. 29, 2013	Feb. 27, 2014	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	ETS-LINDGREN	3816/2SH	00103892	0.1MHz~108MHz	Feb. 28, 2013	Sep. 29, 2013	Feb. 27, 2014	Conduction (CO01-SZ)
ESCIO TEST Receiver	R&S	1142.8007.03	100724	9kHz-3GHz	Mar. 08, 2013	Sep. 29, 2013	Mar. 07, 2014	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891 N/A	N/A	Oct. 12, 2012	Sep. 29, 2013	Oct. 11, 2013	Conduction (CO01-SZ)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**