

FCC RF Test Report

APPLICANT : Brightstar Corporation
EQUIPMENT : mobile phone
BRAND NAME : Avvio
MODEL NAME : Avvio761/Avvio761S
FCC ID : WVBA761X
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Apr. 24, 2013 and completely tested on May 16, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

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

Reviewed 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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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR342404B	Rev. 01	Initial issue of report	May 20, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges	15.209(a) & 15.247(d)	Pass	Under limit 3.13 dB at 2389.470 MHz
		Radiated Spurious Emission			
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 9.69 dB at 0.570 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Brightstar Corporation

9725 NW 117th Ave., Miami, Florida, United States

1.2 Manufacturer

Heng Da Chuang Xin Technology Limited

A601 Guoren Building, 3rd Rd.of High-Tech park, Nanshan District, SZ, China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	mobile phone
Brand Name	Avvio
Model Name	Avvio761/Avvio761S
FCC ID	WVBA761X
EUT supports Radios application	GSM/GPRS/WCDMA/HSPA/WLAN 11bgn/Bluetooth
HW Version	UP815_v1.3
SW Version	Avvio761_Mexico_ES_V001_0422_SMT
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two different types of EUT. They are single SIM card mobile (model name: Avvio761) and dual SIM cards mobile (model name: Avvio761S). The others are the same including circuit design, PCB board, structure and all components. It is special to declare.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2412 MHz ~ 2462 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Maximum Output Power to Antenna	802.11b : 16.25 dBm (0.0422 W) 802.11g : 22.35 dBm (0.1718 W) 802.11n HT20 : 22.32 dBm (0.1706 W)
Antenna Type	PIFA Antenna type with gain -2.8 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 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/IC Registration No.
	TH01-SZ	CO01-SZ	03CH01-SZ	831040/4086F-1

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

1.6 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 C63.10-2009

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 antenna configurations as following table and the highest power data rates were chosen for full test 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	15.65	15.71	15.62	15.64
CH 06	2437 MHz	15.73	15.65	15.45	15.67
CH 11	2462 MHz	16.25	16.14	16.13	16.21

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	22.30	22.28	21.59	21.51	22.05	22.03	22.10	22.03
CH 06	2437 MHz	22.01	21.98	21.97	21.95	21.90	21.87	21.84	21.81
CH 11	2462 MHz	22.35	21.98	21.96	21.95	22.08	22.01	21.97	21.94

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	22.30	21.8	22.02	21.95	22.08	21.94	21.97	22.13
CH 06	2437 MHz	21.91	21.88	21.87	21.85	21.83	21.79	21.75	21.71
CH 11	2462 MHz	22.32	22.08	22.05	22.03	22.05	22.01	22.14	21.96

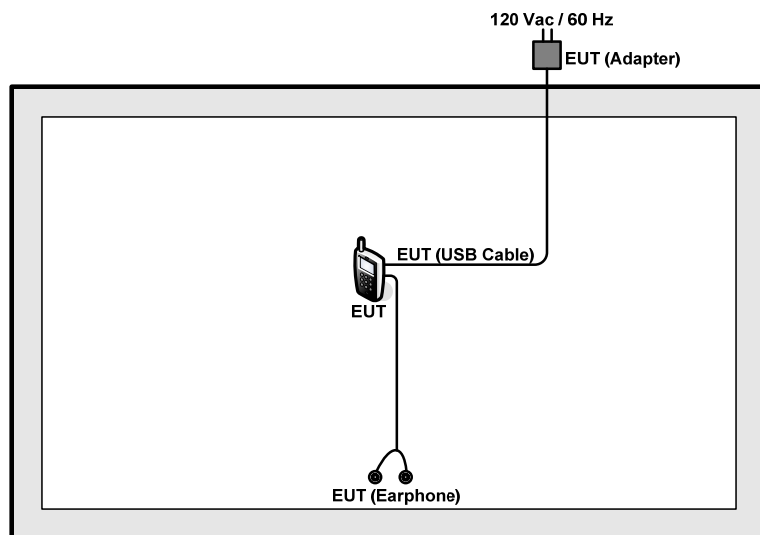
2.3 Test Mode

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

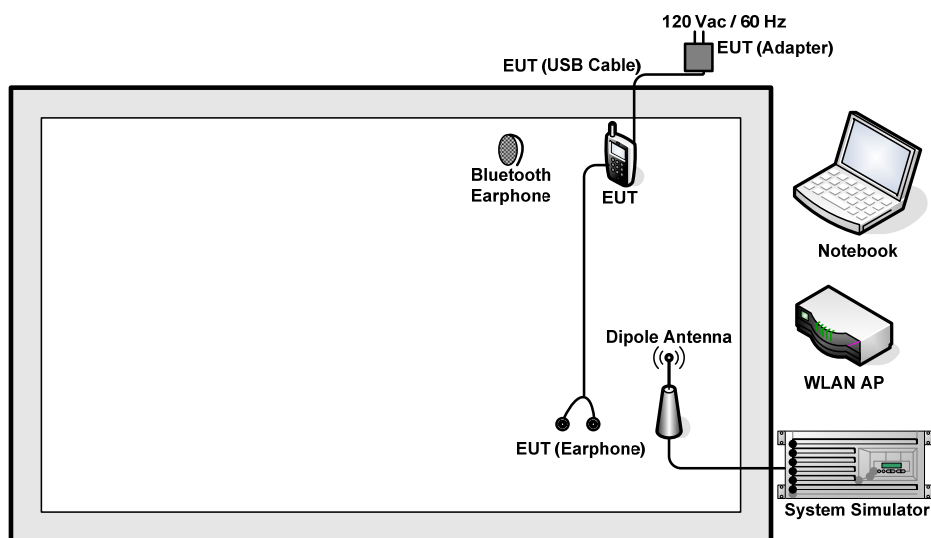
Test Cases				
Conducted TCs	Test Items	Mode	Data Rate	Test Channel
	6dB BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Conducted Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	6.5 Mbps	1/11
	Conducted Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
Radiated TCs	Radiated Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	6.5 Mbps	1/11
	Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adpater) + Earphone			

2.4 Connection Diagram of Test System

<Bluetooth 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	Netcore	NW616	N/A	N/A	Unshielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-108	N/A	N/A	N/A
5.	Notebook	DELL	P08S	FCC DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m

2.6 RF Utility

For WLAN function, programmed RF utility, “ADB” installed in the PC make the EUT provides functions like channel selection and power level for continuous transmitting and receiving signals.

2.7 Measurement Results Explanation Example

For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and 10dB attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and 10dB attenuator factor.

Offset = RF cable loss + attenuator factor.

Following table shows an offset computation example with cable loss 7.5 dB.

Example :

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.

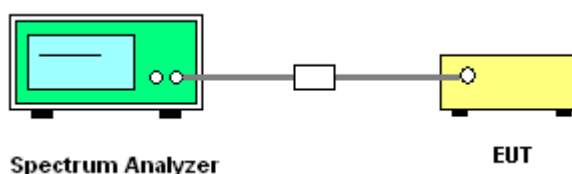
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB 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) = 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





Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	7.08	0.5	Pass
06	2437	7.08	0.5	Pass
11	2462	7.04	0.5	Pass

• RBW 100 kHz Delta 2 [T1]
 • VBW 300 kHz 0.07 dB
 Ref 20 dBm *Att 20 dB
 SWT 5 ms 7.080000000 MHz

20 Offset 17.5 dB
 Marker 1 [T1]
 -1.30 dBm
 2.408460000 GHz

1 PK
 MAXI

D1 4.57 dBm
 D2 -1.43 dBm

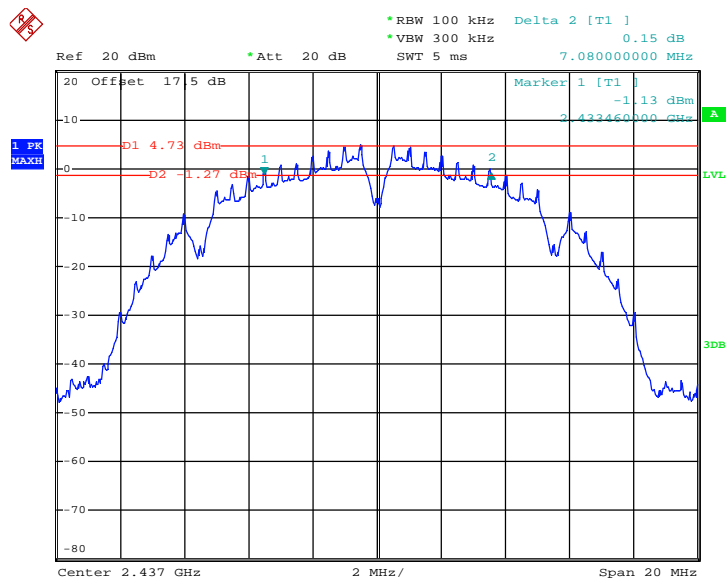
1
 2

LVL
 3DB

Center 2.412 GHz 2 MHz/
 Span 20 MHz

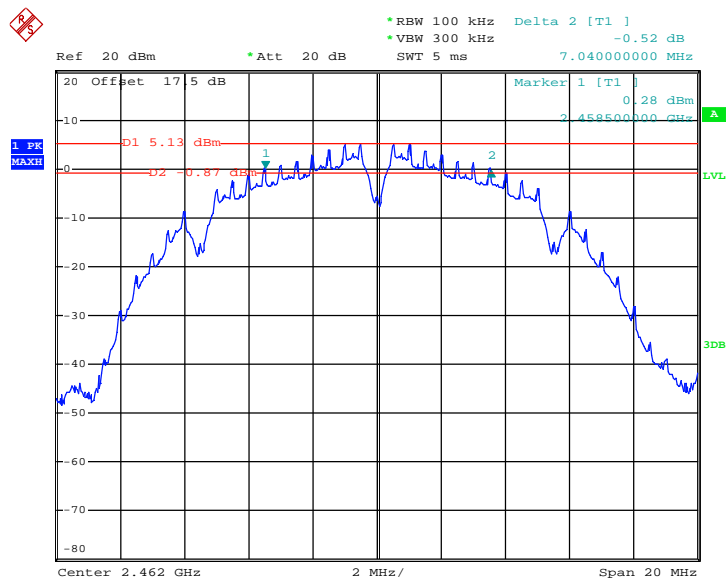
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6 dB Bandwidth Plot on 802.11b Channel 06



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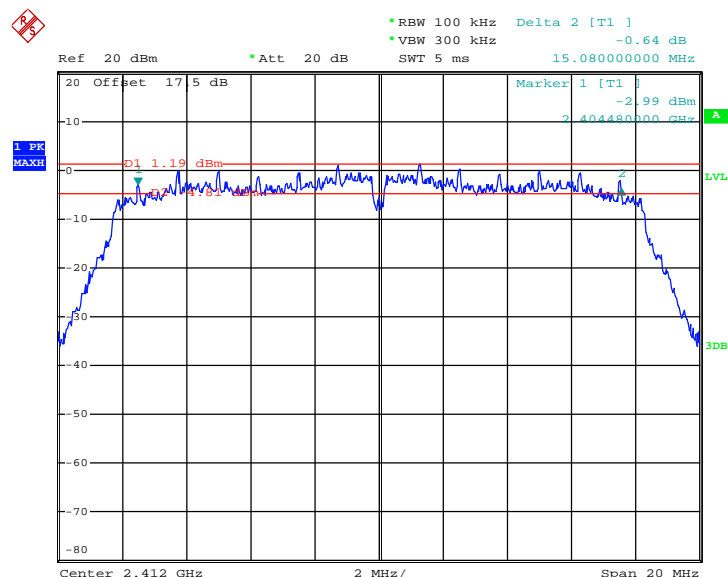
6 dB Bandwidth Plot on 802.11b Channel 11



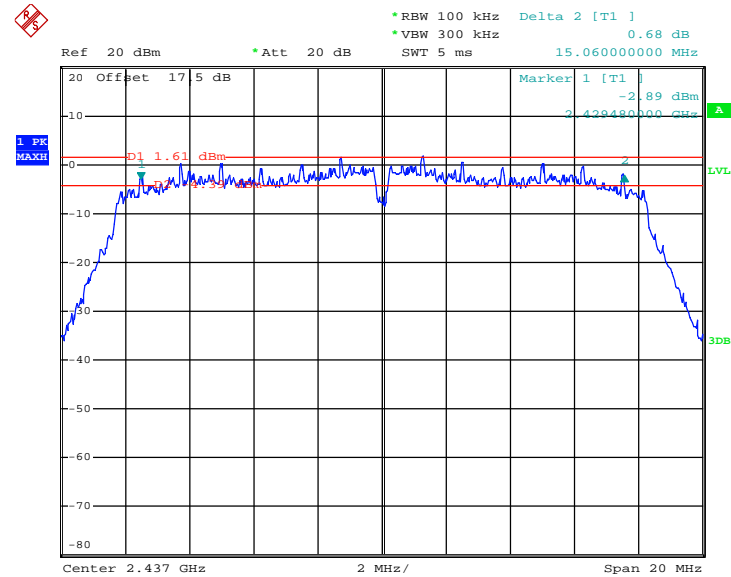
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Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

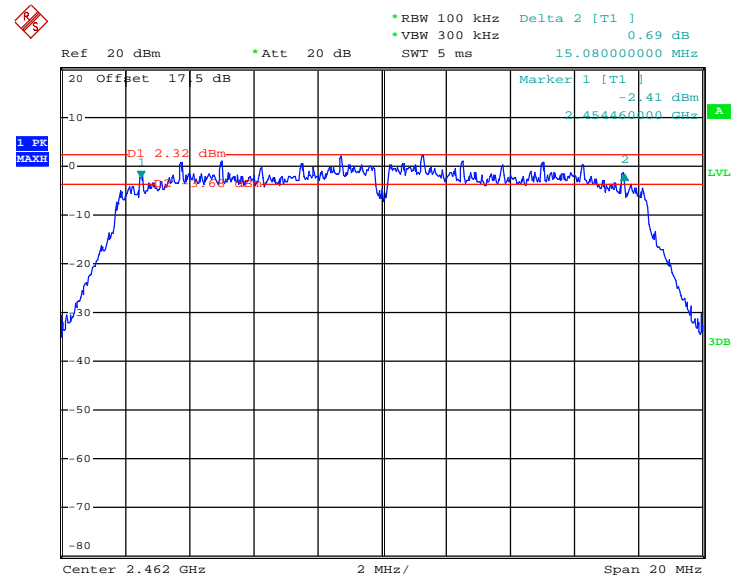
Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.08	0.5	Pass
06	2437	15.06	0.5	Pass
11	2462	15.08	0.5	Pass

6 dB Bandwidth Plot on 802.11g Channel 01


Date: 11.MAY.2013 13:46:56

6 dB Bandwidth Plot on 802.11g Channel 06


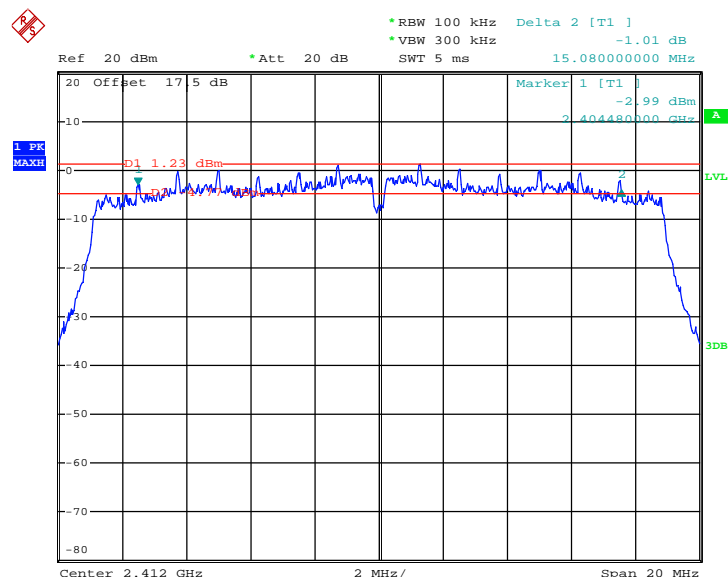
Date: 11.MAY.2013 13:51:54

6 dB Bandwidth Plot on 802.11g Channel 11


Date: 11.MAY.2013 13:56:43

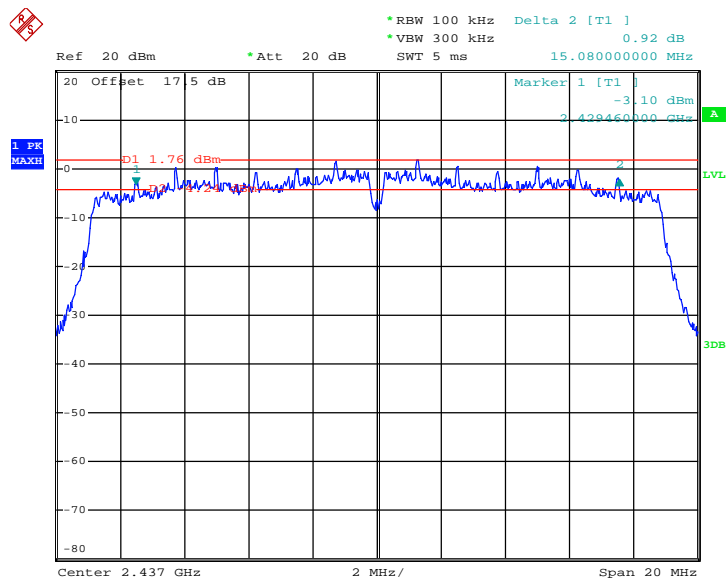
Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.08	0.5	Pass
06	2437	15.08	0.5	Pass
11	2462	15.08	0.5	Pass

6 dB Bandwidth Plot on 802.11n HT20 Channel 01


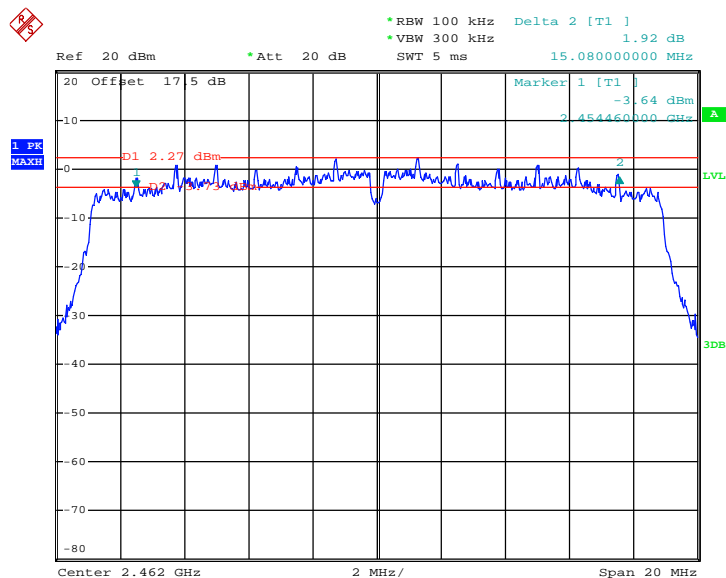
Date: 11.MAY.2013 14:01:33

6 dB Bandwidth Plot on 802.11n HT20 Channel 06



Date: 11.MAY.2013 14:05:01

6 dB Bandwidth Plot on 802.11n HT20 Channel 11



Date: 11.MAY.2013 14:08:15

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.

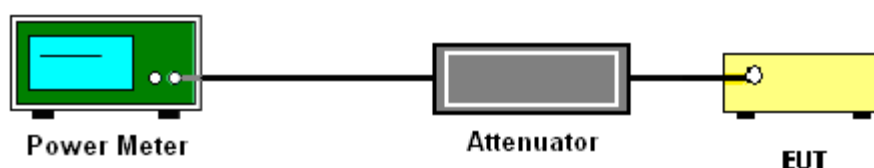
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB 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. 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 :	802.11b	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	15.65	30	Pass
06	2437	15.73	30	Pass
11	2462	16.25	30	Pass

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.30	30	Pass
06	2437	22.01	30	Pass
11	2462	22.35	30	Pass

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.30	30	Pass
06	2437	21.91	30	Pass
11	2462	22.32	30	Pass

3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%
Duty Cycle:	99.31%	Duty Factor:	0.03dB

Channel	Frequency (MHz)	802.11b Average Output Power (dBm)
01	2412	12.44
06	2437	12.56
11	2462	13.10

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%
Duty Cycle:	94.93%	Duty Factor:	0.23dB

Channel	Frequency (MHz)	802.11g Average Output Power (dBm)
01	2412	12.66
06	2437	12.70
11	2462	13.34

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%
Duty Cycle:	94.99%	Duty Factor:	0.22dB

Channel	Frequency (MHz)	802.11n HT20 Average Output Power (dBm)
01	2412	12.56
06	2437	12.55
11	2462	13.24

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.

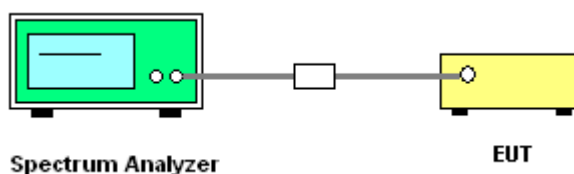
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Option 1 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 :	802.11b	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	4.25	-9.73	8	Pass
06	2437	4.52	-9.09	8	Pass
11	2462	5.27	-8.64	8	Pass

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	0.82	-12.25	8	Pass
06	2437	1.49	-12.04	8	Pass
11	2462	1.52	-11.32	8	Pass

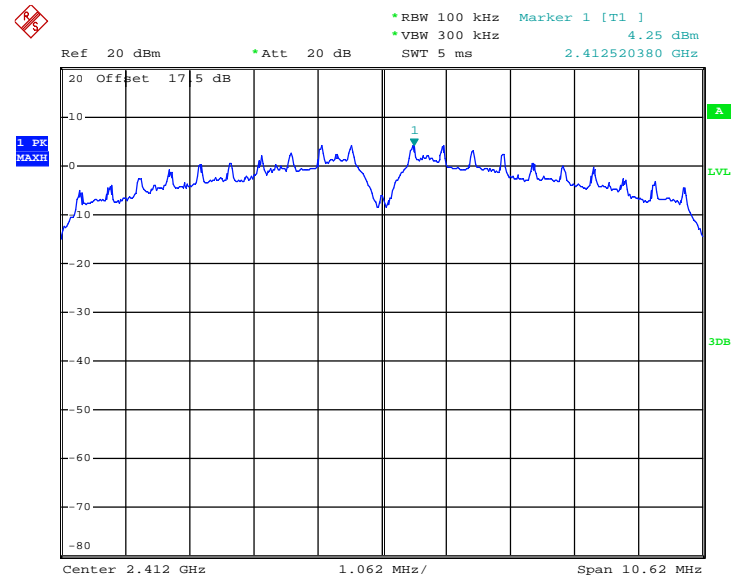
Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n HT20 Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	1.18	-12.97	8	Pass
06	2437	1.71	-11.14	8	Pass
11	2462	2.21	-10.77	8	Pass

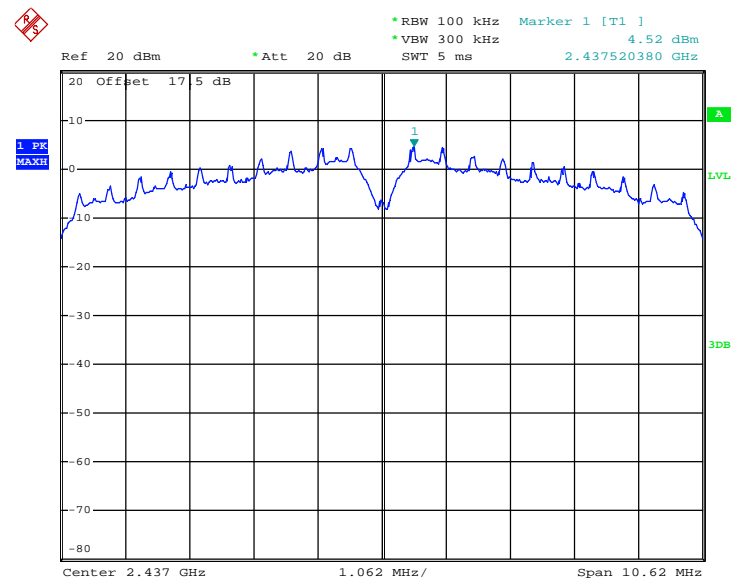
Note:

1. Measured power density (dBm) has offset with cable loss.
2. The Measured power density (dBm)/ 100KHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.

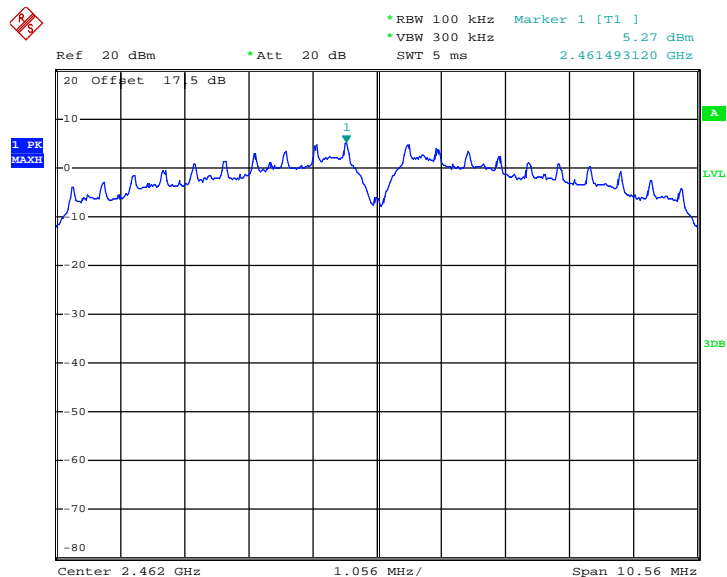
3.3.6 Test Result of Power Spectral Density Plots (100kHz)

PSD 100kHz Plot on 802.11b Channel 01


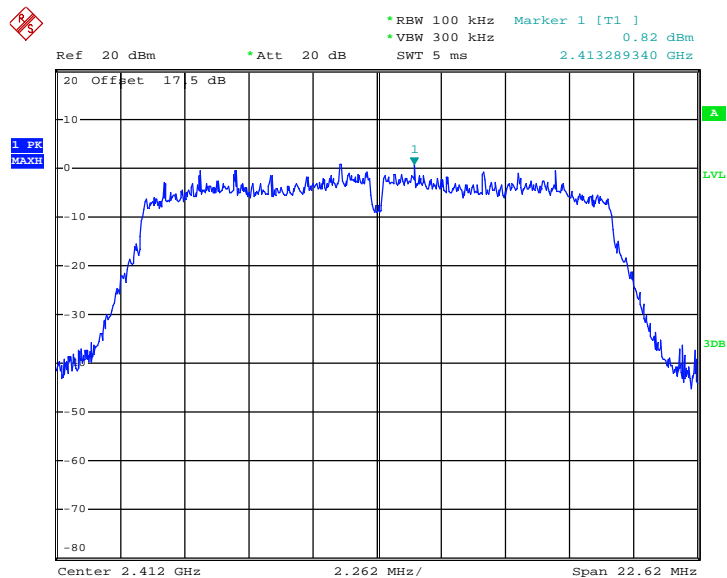
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PSD 100kHz Plot on 802.11b Channel 06


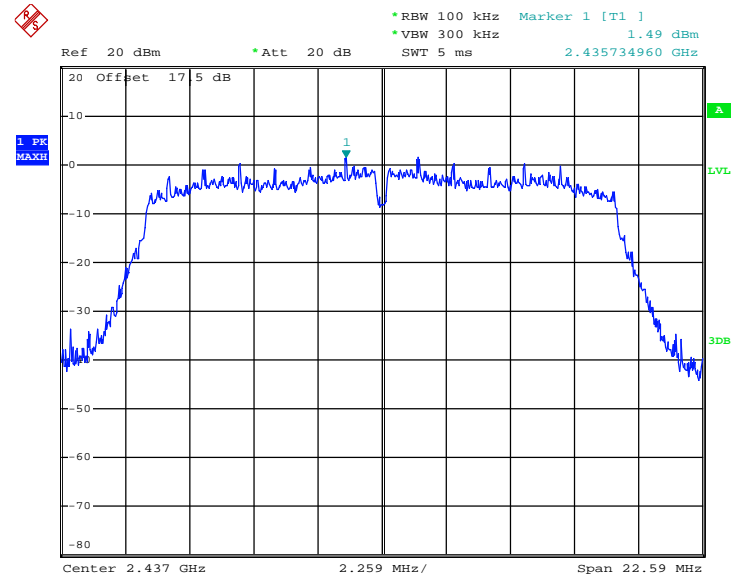
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PSD 100kHz Plot on 802.11b Channel 11


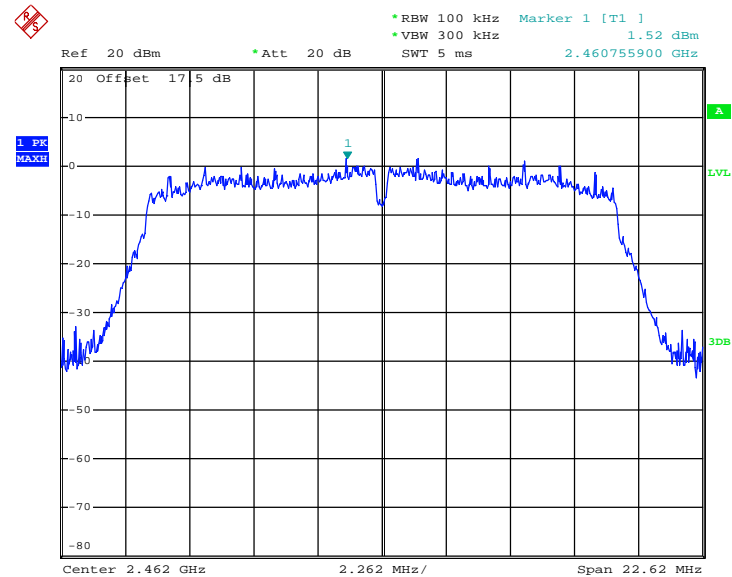
Date: 11.MAY.2013 13:42:27

PSD 100kHz Plot on 802.11g Channel 01


Date: 11.MAY.2013 13:47:47

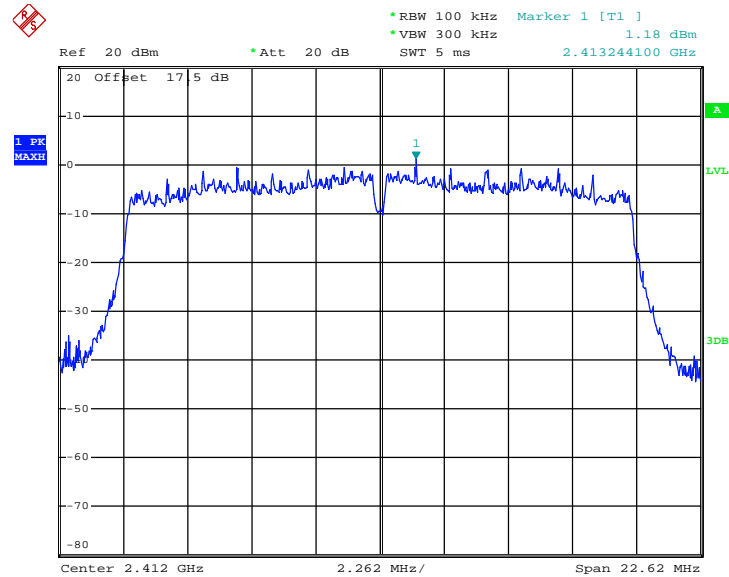
PSD 100kHz Plot on 802.11g Channel 06


Date: 11.MAY.2013 13:52:50

PSD 100kHz Plot on 802.11g Channel 11


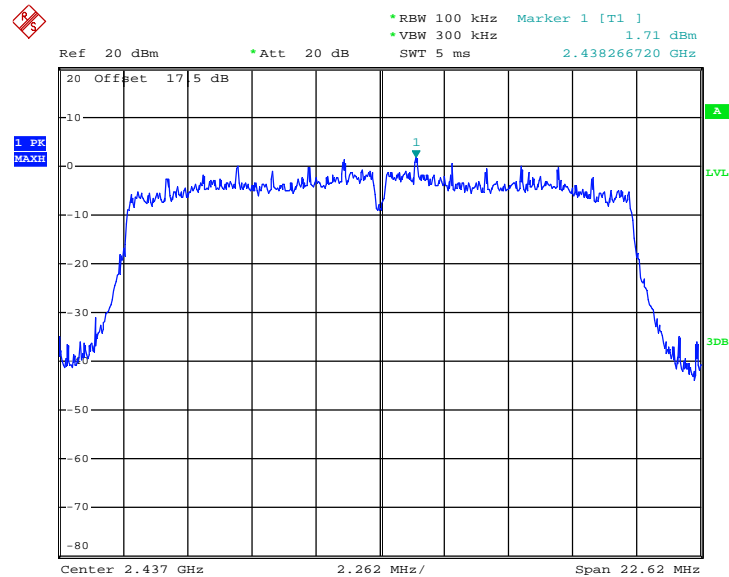
Date: 11.MAY.2013 13:57:25

PSD 100kHz Plot on 802.11n HT20 Channel 01



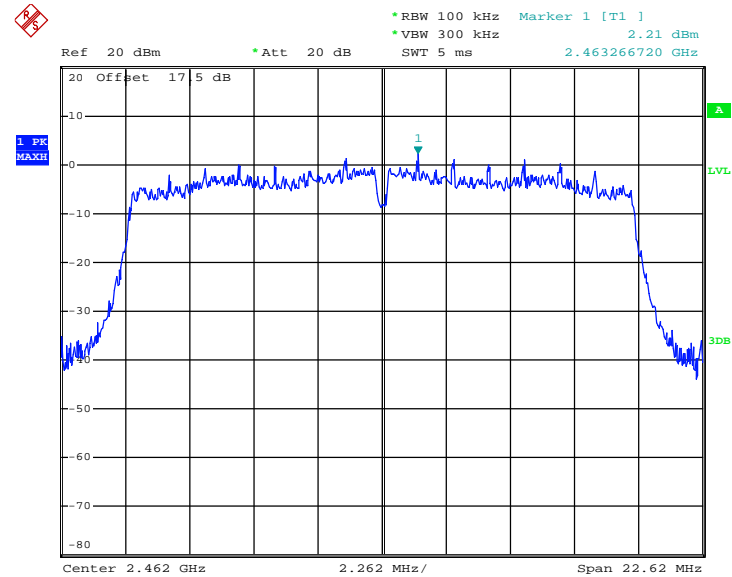
Date: 11.MAY.2013 14:02:15

PSD 100kHz Plot on 802.11n HT20 Channel 06



Date: 11.MAY.2013 14:05:42

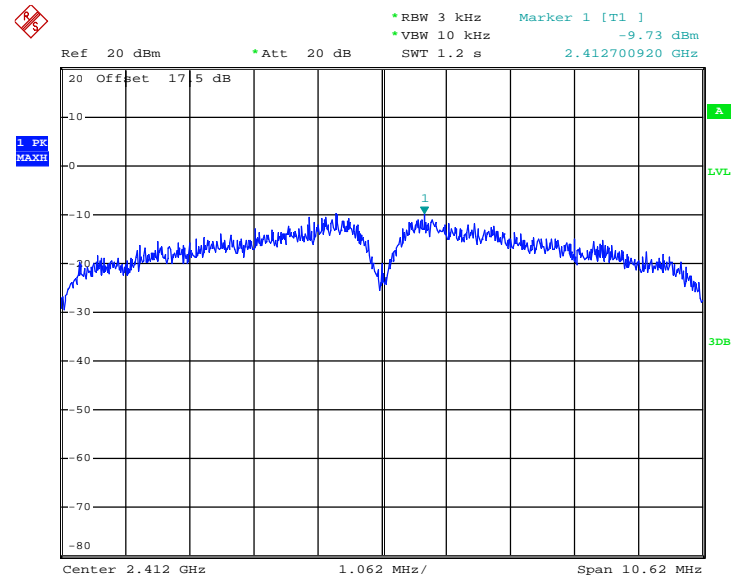
PSD 100kHz Plot on 802.11n HT20 Channel 11



Date: 11.MAY.2013 14:09:00

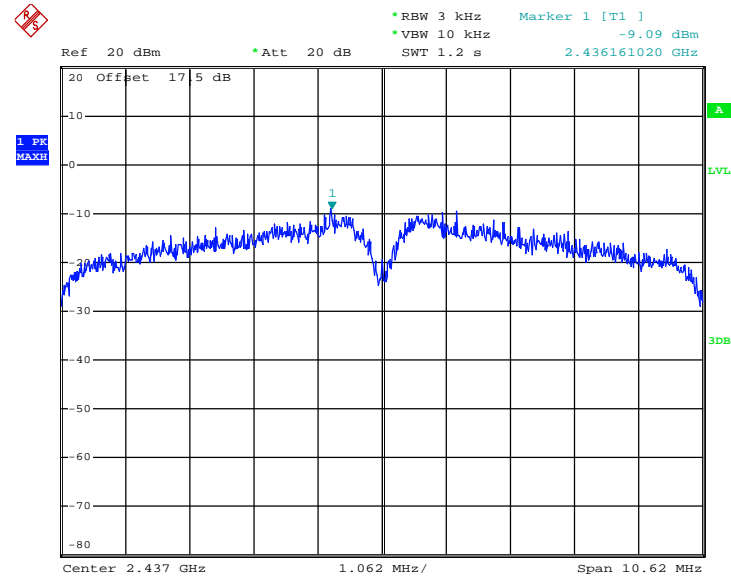
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

PSD 3kHz Plot on 802.11b Channel 01



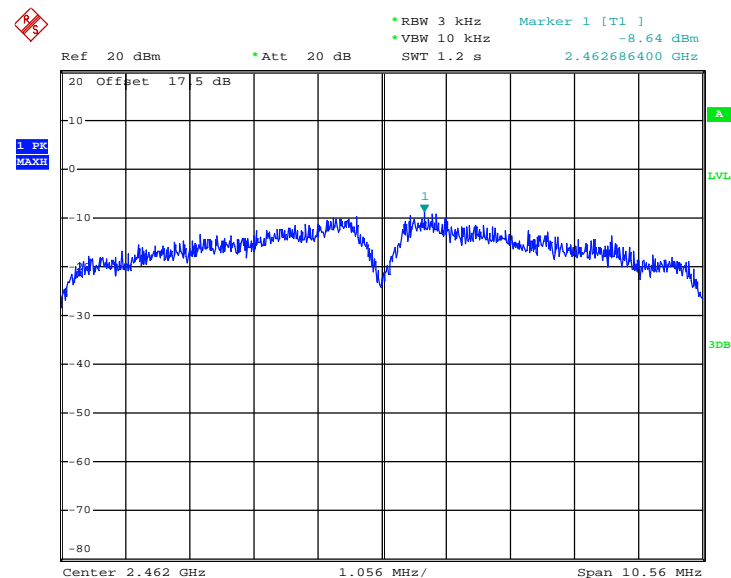
Date: 11.MAY.2013 13:31:53

PSD 3kHz Plot on 802.11b Channel 06



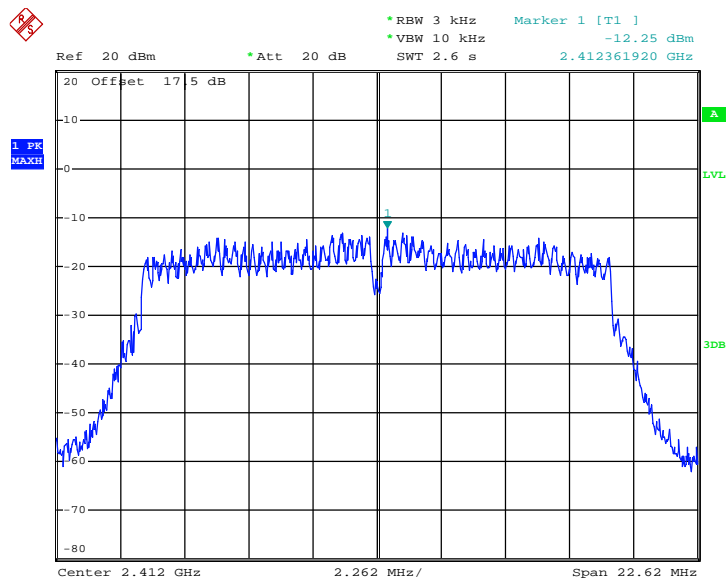
Date: 11.MAY.2013 13:36:19

PSD 3kHz Plot on 802.11b Channel 11



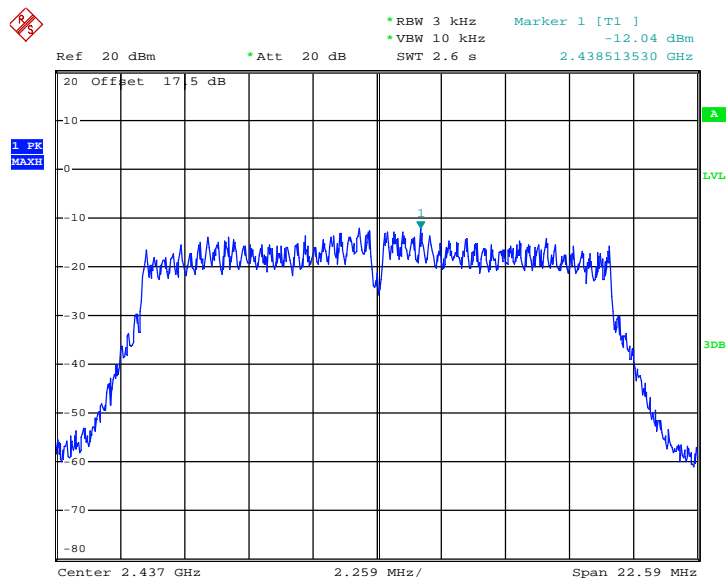
Date: 11.MAY.2013 13:41:29

PSD 3kHz Plot on 802.11g Channel 01

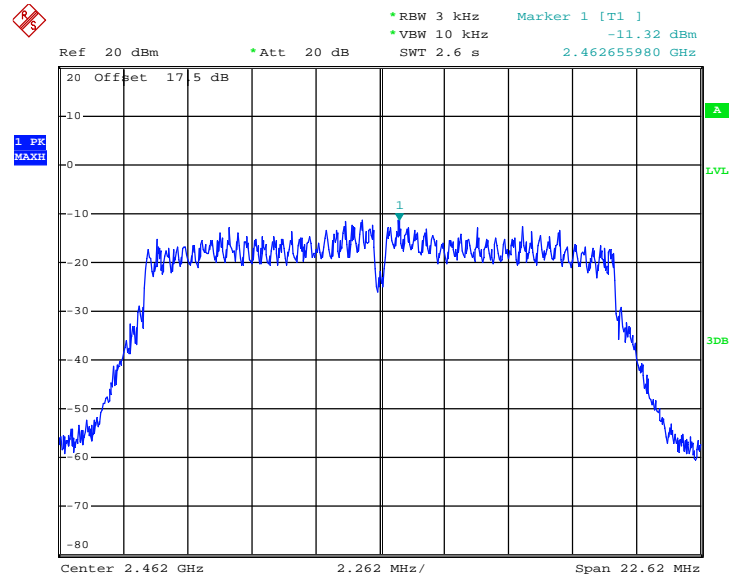


Date: 11.MAY.2013 13:47:26

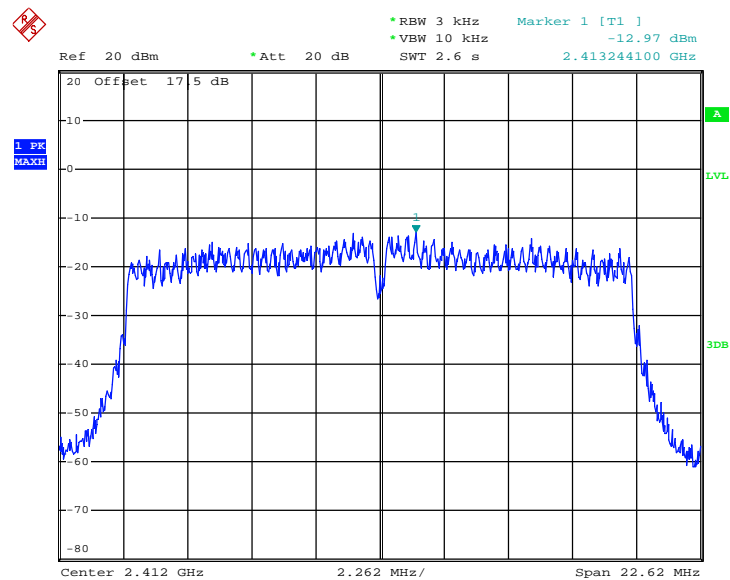
PSD 3kHz Plot on 802.11g Channel 06



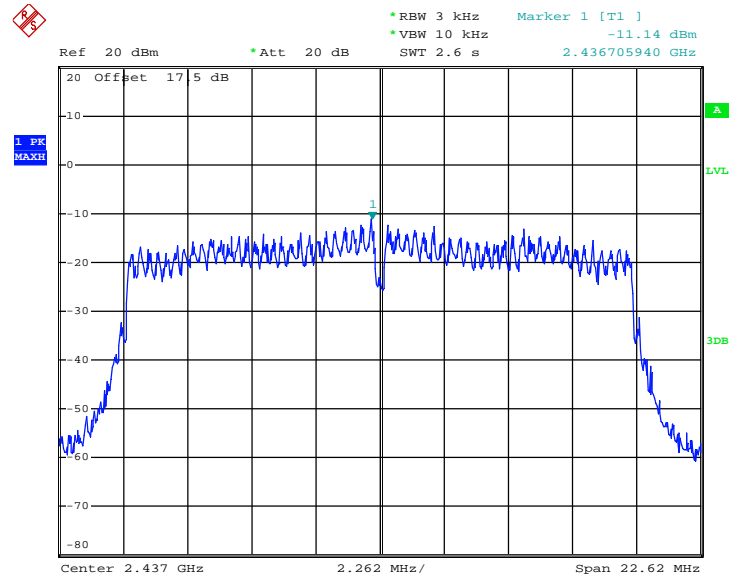
Date: 11.MAY.2013 13:52:21

PSD 3kHz Plot on 802.11g Channel 11


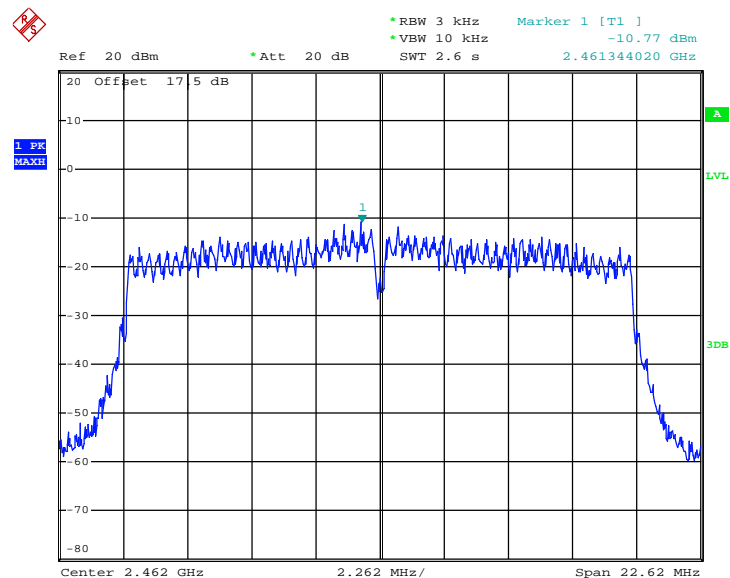
Date: 11.MAY.2013 13:57:08

PSD 3kHz Plot on 802.11n HT20 Channel 01


Date: 11.MAY.2013 14:02:03

PSD 3kHz Plot on 802.11n HT20 Channel 06


Date: 11.MAY.2013 14:05:27

PSD 3kHz Plot on 802.11n HT20 Channel 11


Date: 11.MAY.2013 14:08:41

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).

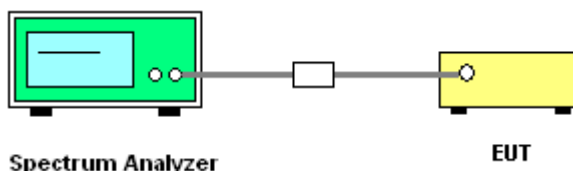
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB 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. The attenuation is set to 30dB, when maximum conducted output power procedure is used.
5. Measure and record the results in the test report.

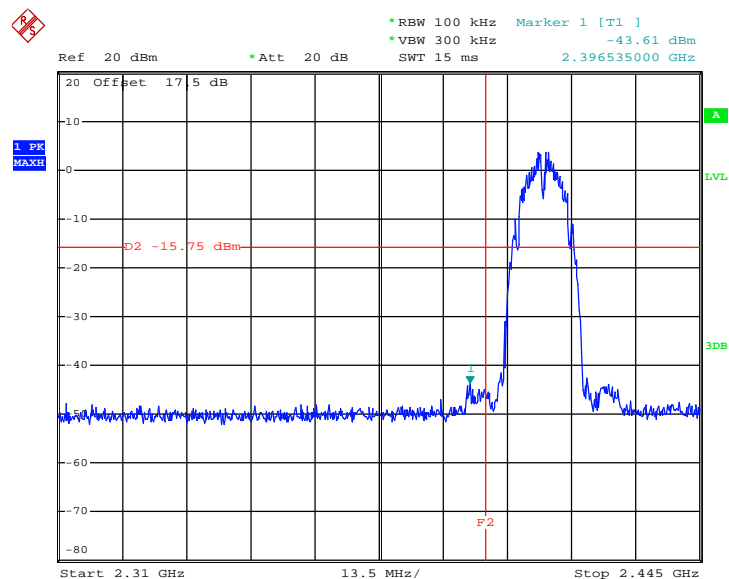
3.4.4 Test Setup



3.4.5 Test Plots of Conducted Band Edges

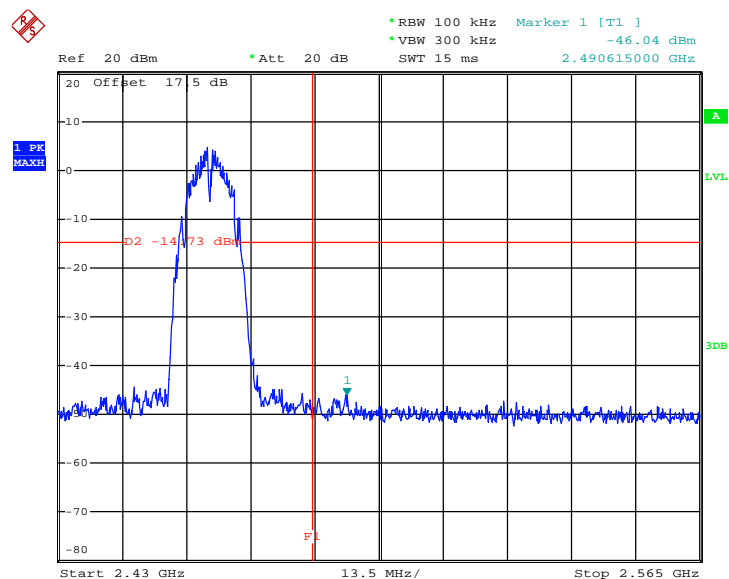
Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Blithe Li

Low Band Edge Plot on 802.11b Channel 01



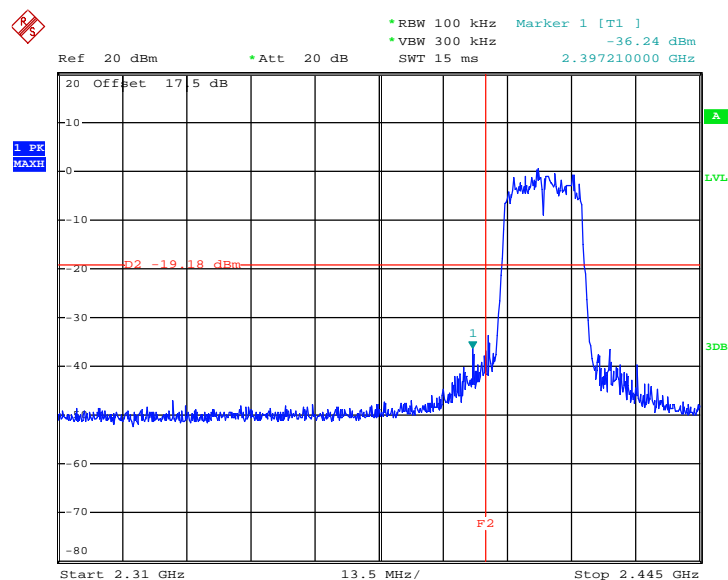
Date: 11.MAY.2013 13:32:26

High Band Edge Plot on 802.11b Channel 11

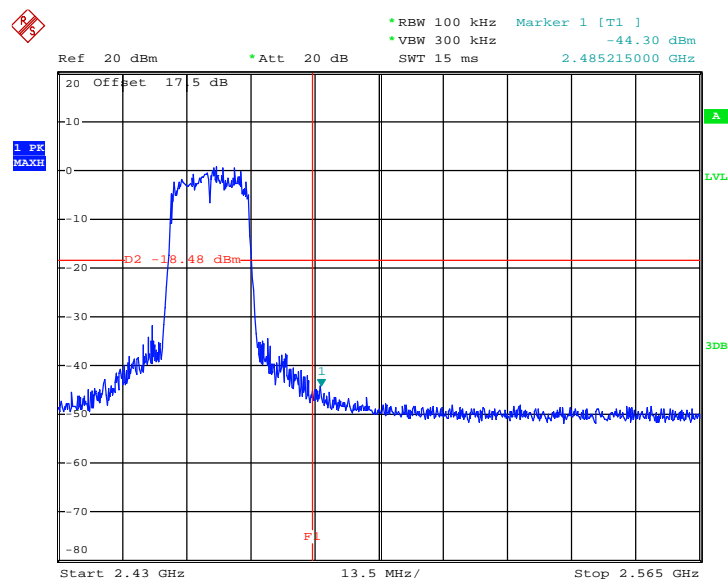


Date: 11.MAY.2013 13:43:11

Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Blithe Li

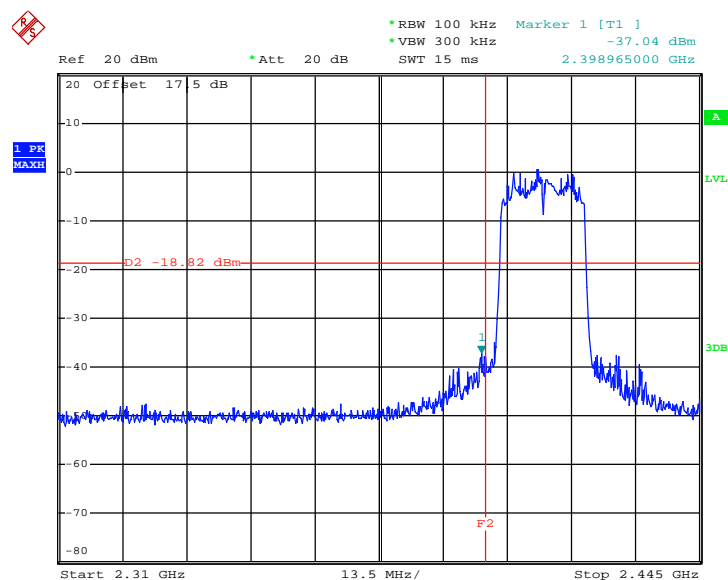
Low Band Edge Plot on 802.11g Channel 01


Date: 11.MAY.2013 13:49:13

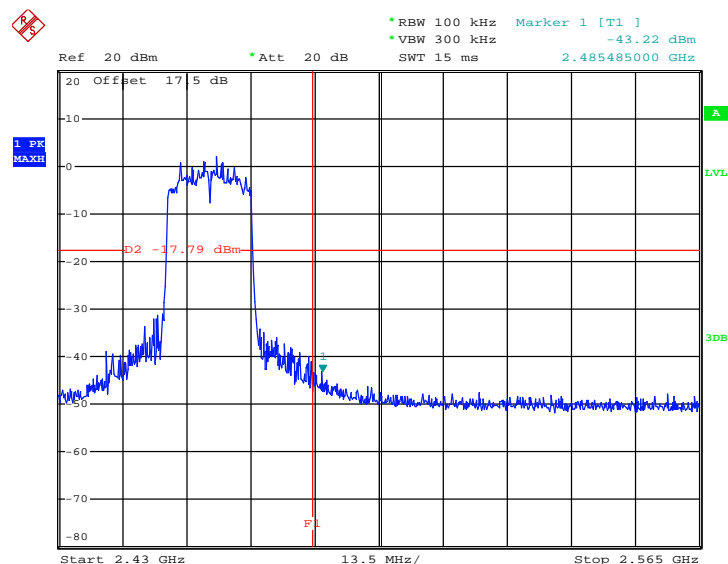
High Band Edge Plot on 802.11g Channel 11


Date: 11.MAY.2013 13:58:28

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Blithe Li

Low Band Edge Plot on 802.11n HT20 Channel 01


Date: 11.MAY.2013 14:02:41

High Band Edge Plot on 802.11n HT20 Channel 11


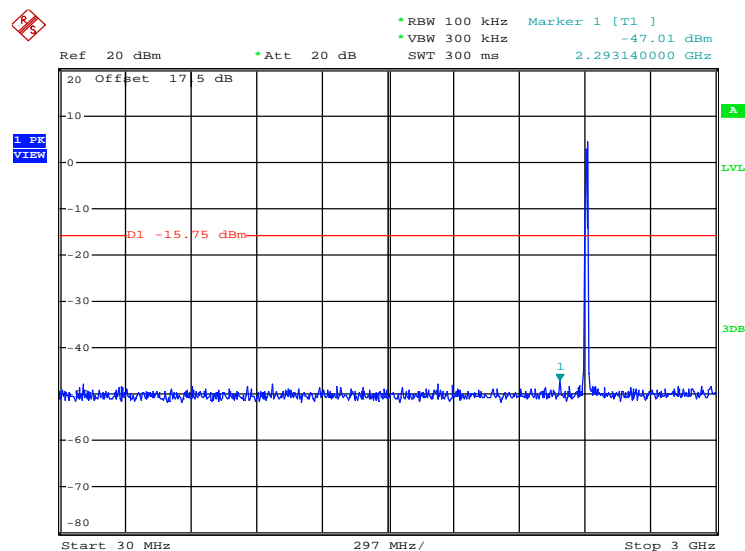
Date: 11.MAY.2013 14:09:30

3.4.6 Test Plots of Spurious Emission

Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Blithe Li

802.11b 30 MHz~3 GHz

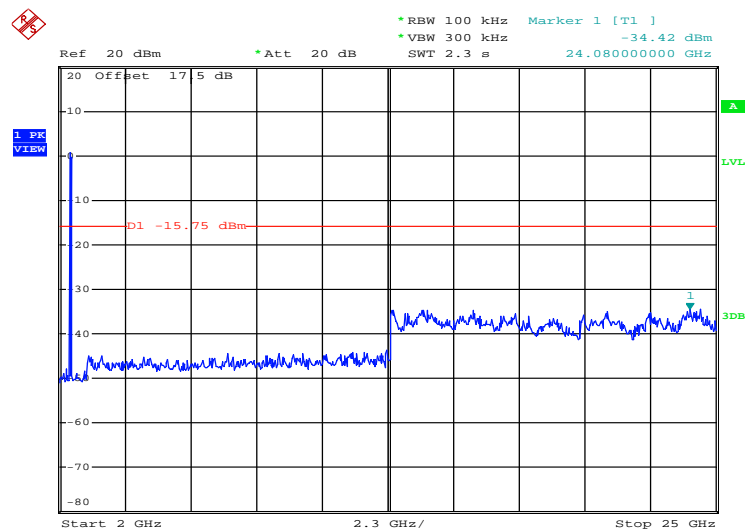
Conducted Spurious Emission Plot on Channel 01



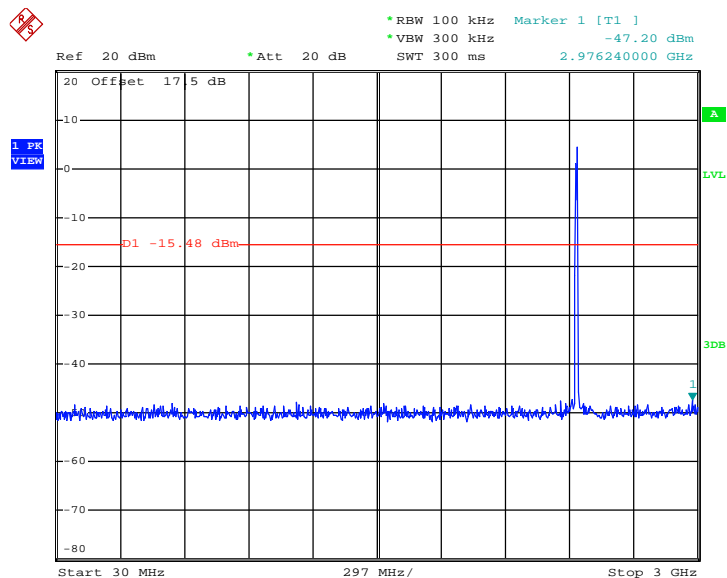
Date: 11.MAY.2013 13:32:47

802.11b 2 GHz~25 GHz

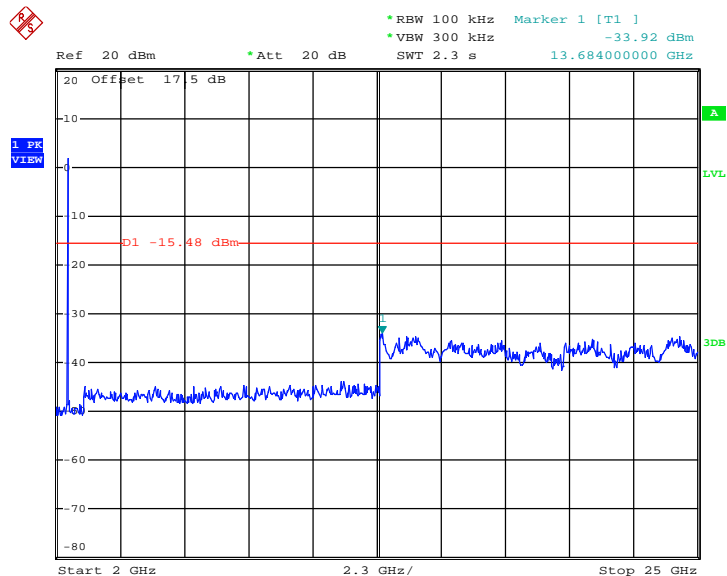
Conducted Spurious Emission Plot on Channel 01



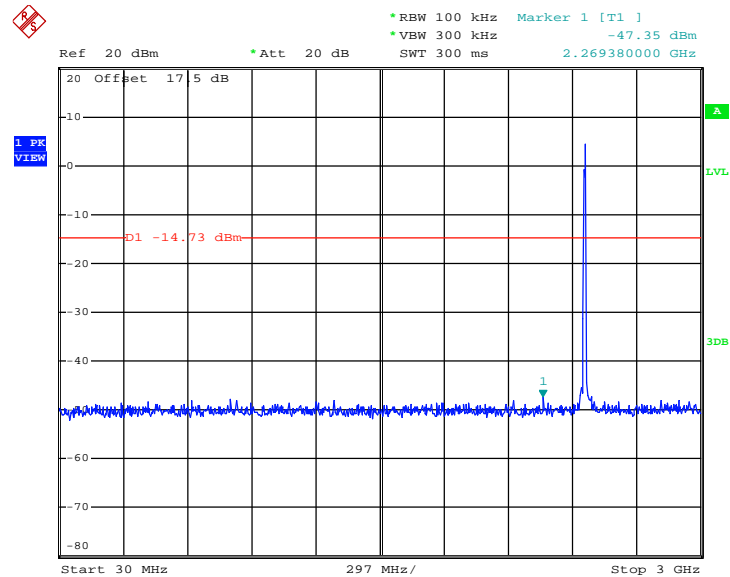
Date: 11.MAY.2013 13:33:06

802.11b 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 06


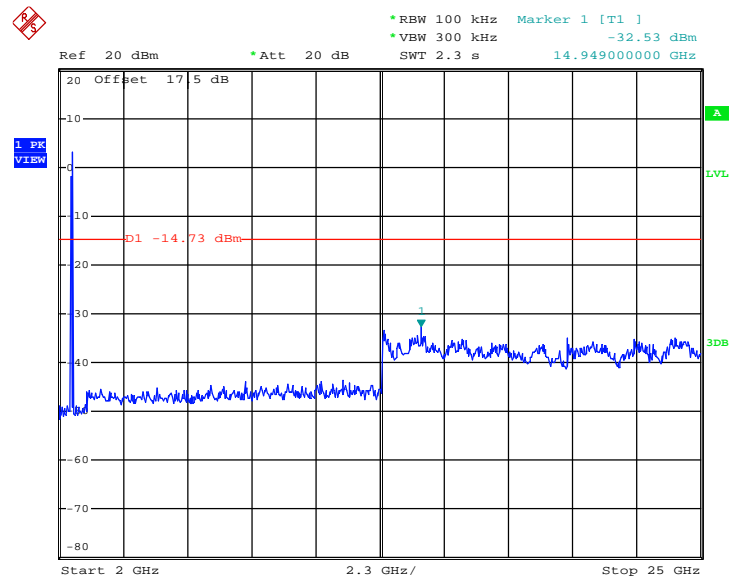
Date: 11.MAY.2013 13:38:20

802.11b 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 11.MAY.2013 13:38:39

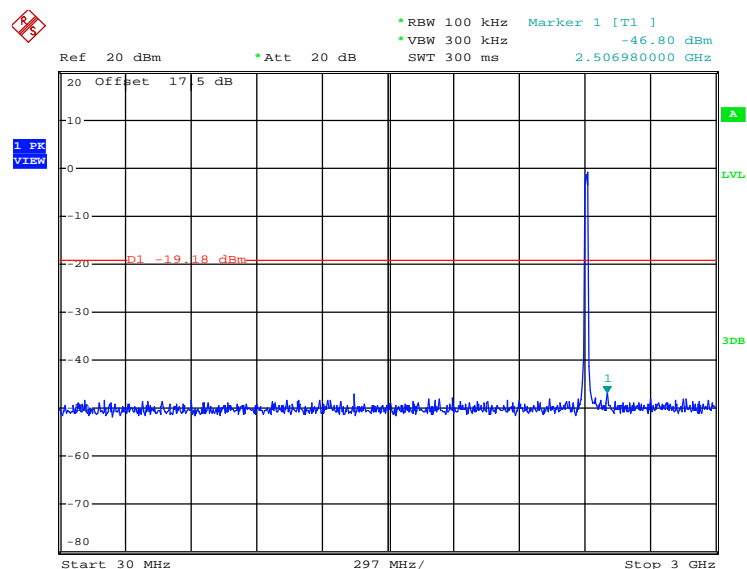
802.11b 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 11.MAY.2013 13:43:37

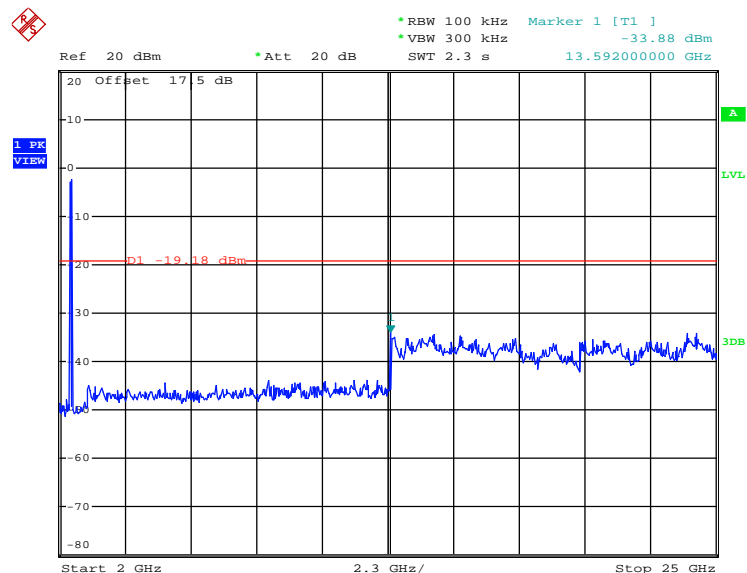
802.11b 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 11.MAY.2013 13:43:56

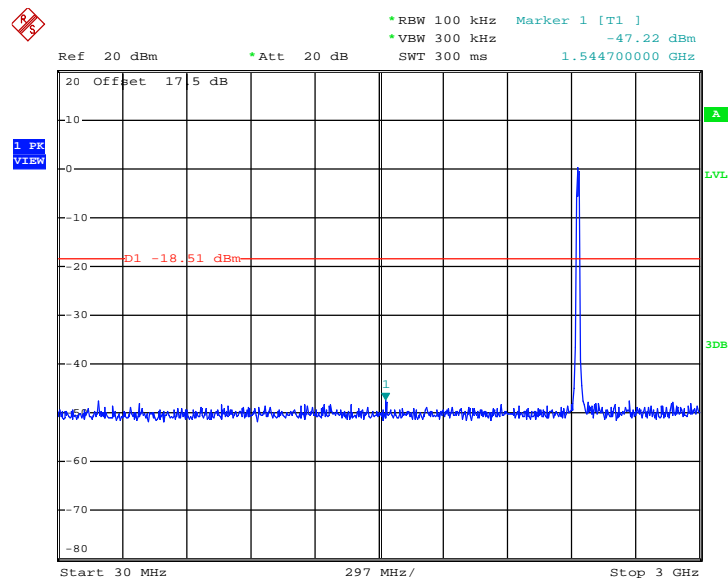
Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Blithe Li

802.11g 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 01


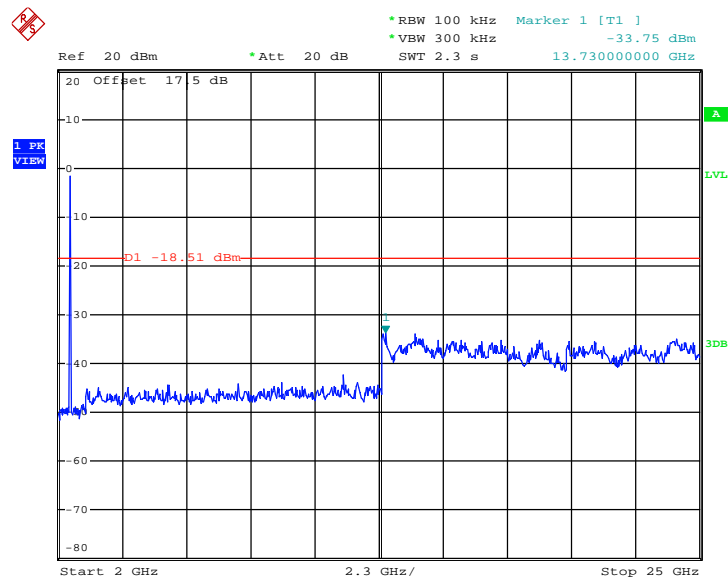
Date: 11.MAY.2013 15:11:08

802.11g 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 01


Date: 11.MAY.2013 15:11:27

802.11g 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 11.MAY.2013 13:53:33

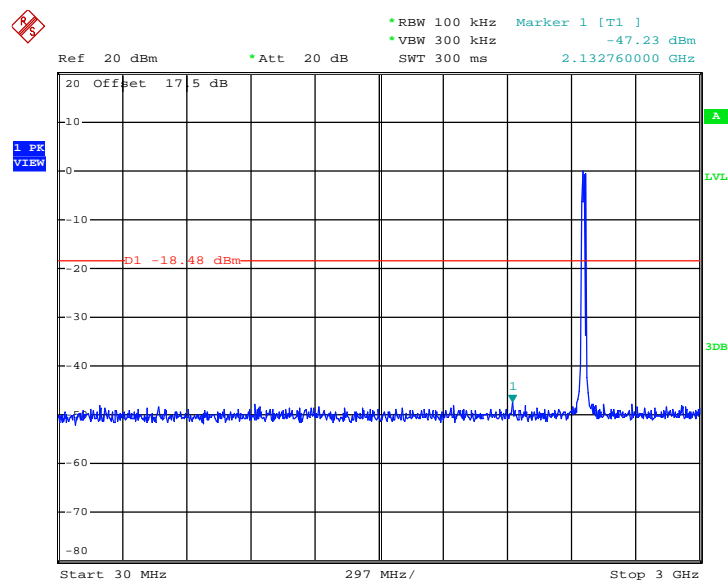
802.11g 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 11.MAY.2013 13:53:51



802.11g 30 MHz~3 GHz

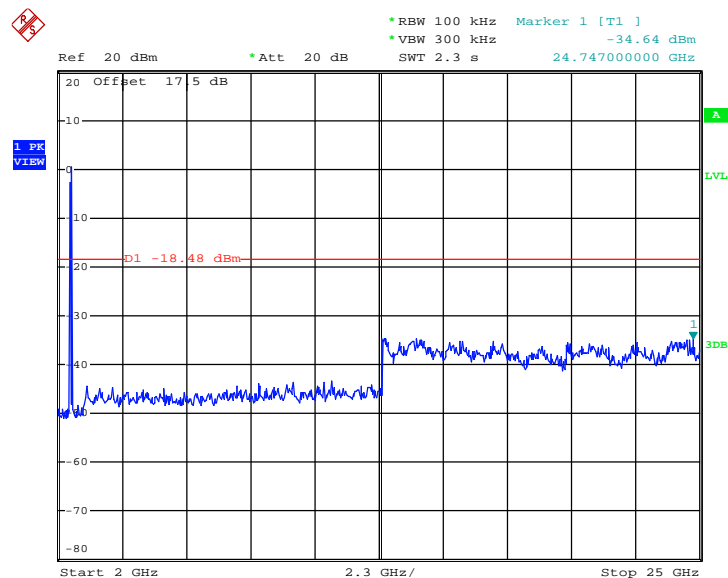
Conducted Spurious Emission Plot on Channel 11



Date: 11.MAY.2013 13:58:51

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



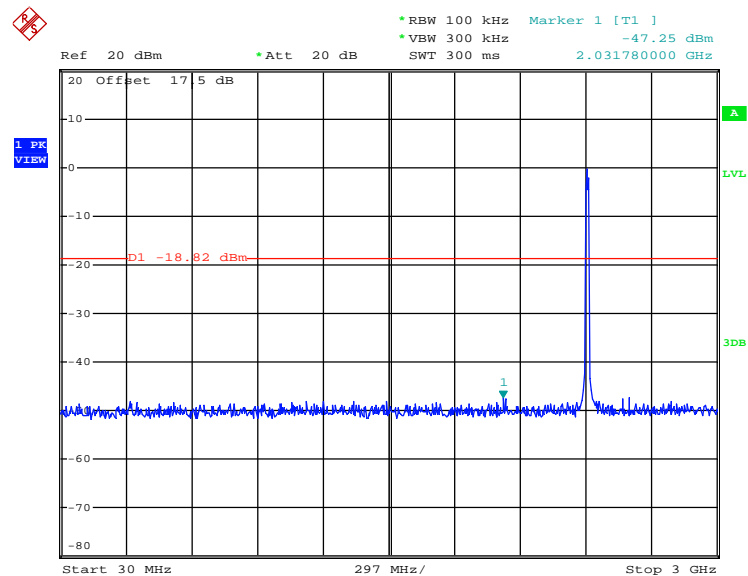
Date: 11.MAY.2013 13:59:10



Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Blithe Li

802.11n HT20 30 MHz~3 GHz

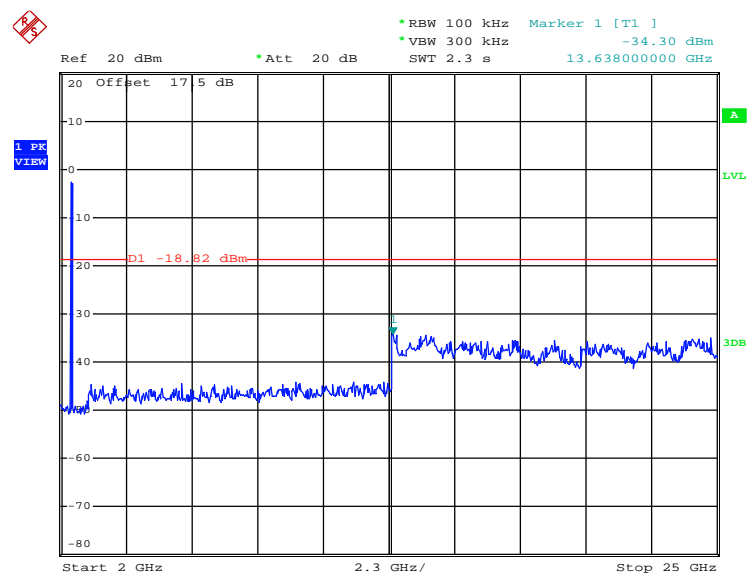
Conducted Spurious Emission Plot on Channel 01



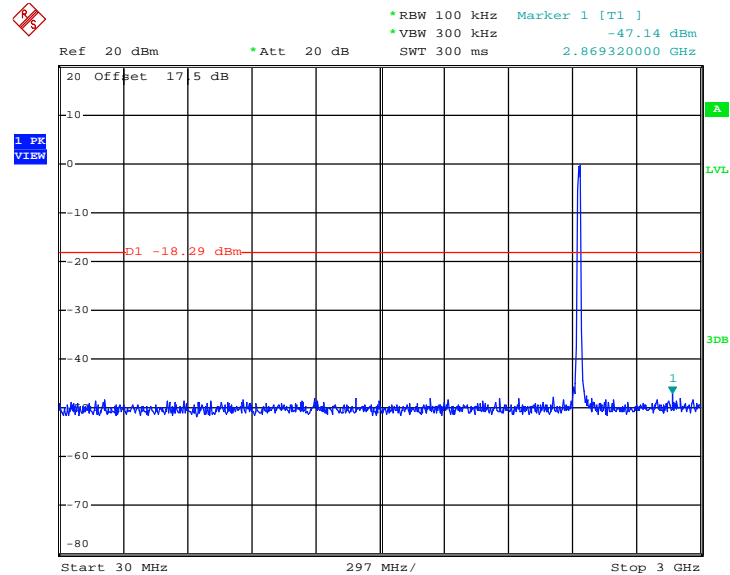
Date: 11.MAY.2013 15:13:32

802.11n HT20 2 GHz~25 GHz

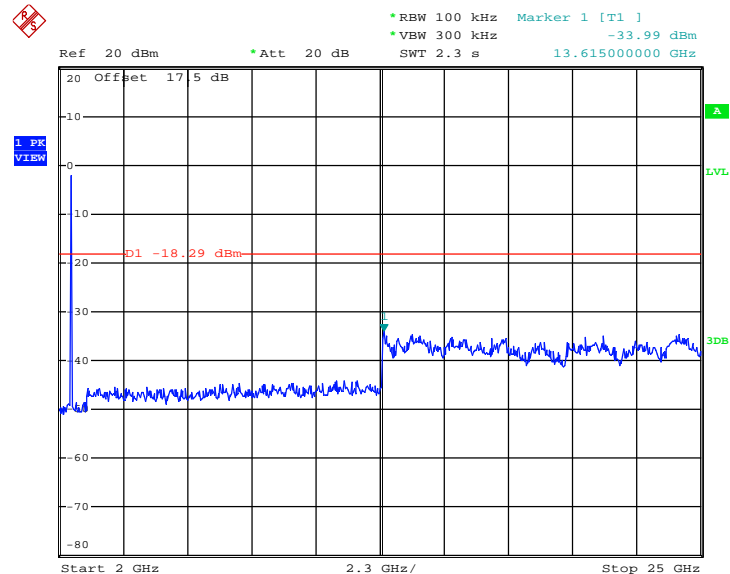
Conducted Spurious Emission Plot on Channel 01



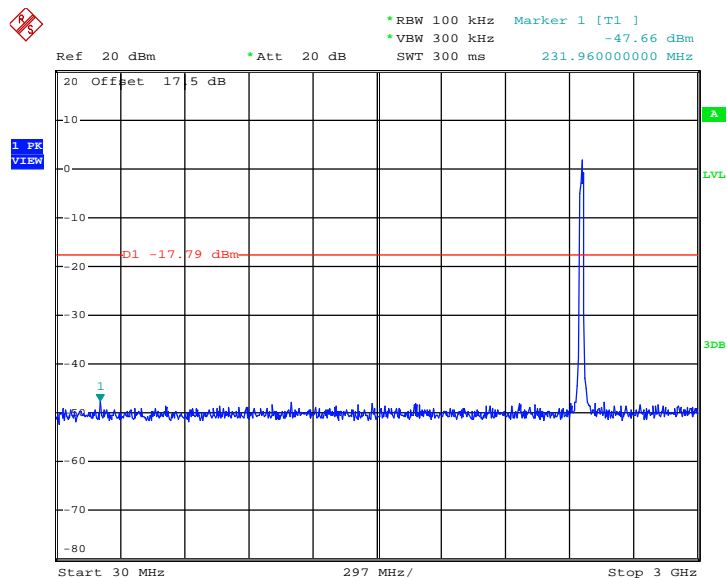
Date: 11.MAY.2013 15:13:51

802.11n HT20 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 06


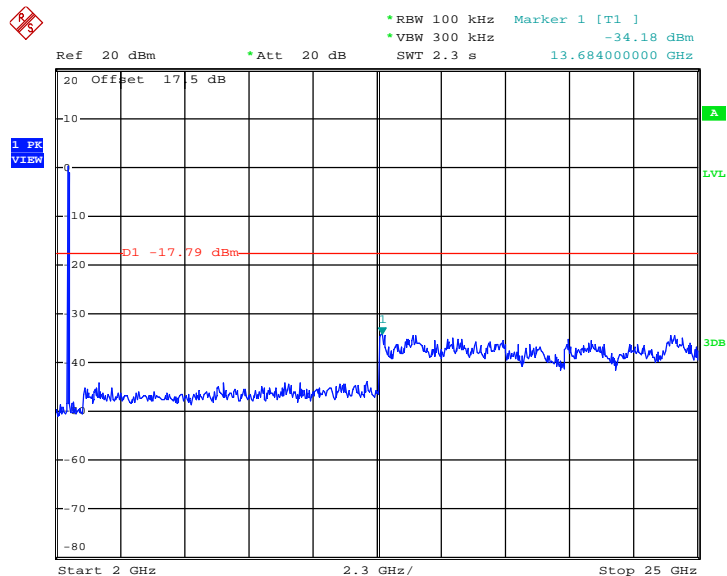
Date: 11.MAY.2013 14:06:15

802.11n HT20 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 11.MAY.2013 14:06:34

802.11n HT20 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 11.MAY.2013 14:10:13

802.11n HT20 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 11.MAY.2013 14:10:31

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated Band Edges and Spurious 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)
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

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows the guidelines in ANSI C63. 10-2009
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 - Preamplifier Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 KHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

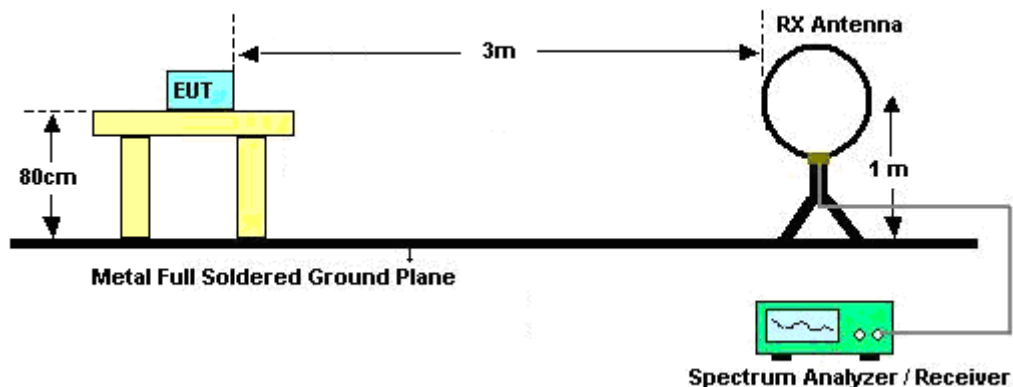
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(ms)	1/T(KHz)	VBW Setting
802.11b	99.31	-	-	10Hz
802.11g	94.93	2.0623	0.4849	1KHz
2.4G 802.11n HT20	94.99	1.9217	0.5204	1KHz

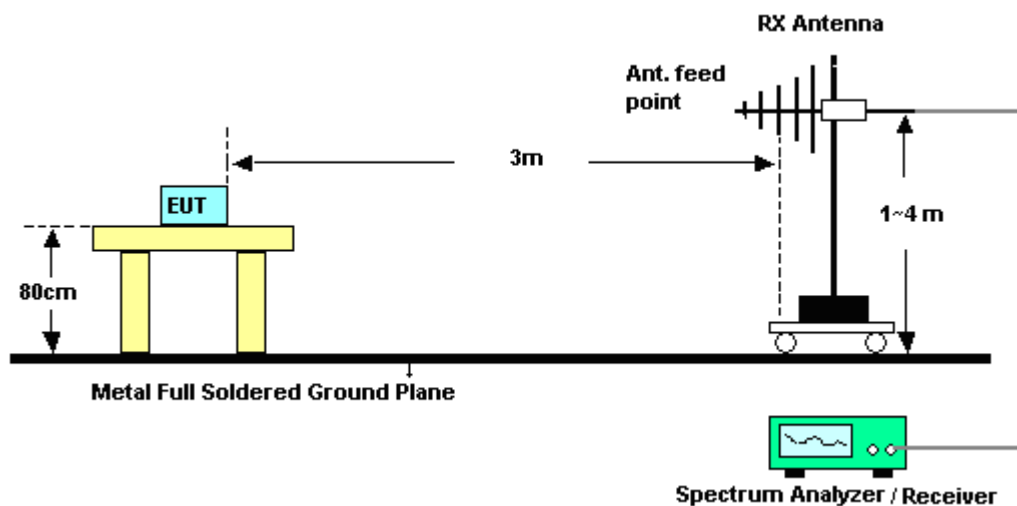
Note: For average measurement with duty cycle < 98%, use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.

3.5.4 Test Setup

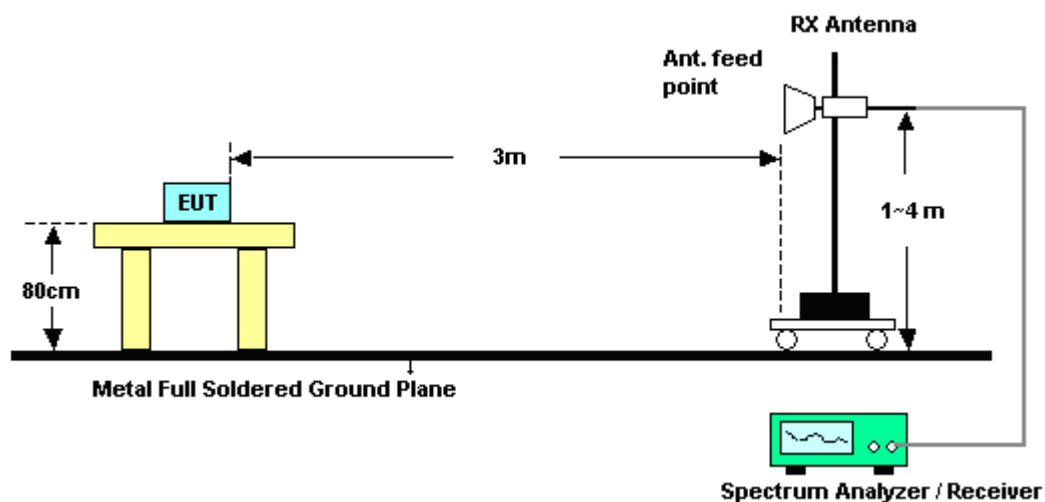
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Spurious Emission (9 KHz ~ 30 MHz)

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 Band Edges

Test Mode :	802.11b	Temperature :	24~25℃
Test Band :	Low	Relative Humidity :	51~54%
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	52.35	-21.65	74	45.58	32.14	4.42	29.79	172	109	Peak
2389.47	42.52	-11.48	54	35.75	32.14	4.42	29.79	172	109	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
2384.34	57.62	-16.38	74	50.87	32.12	4.42	29.79	118	117	Peak
2389.2	47.78	-6.22	54	41.01	32.14	4.42	29.79	118	117	Average

Test Mode :	802.11b	Temperature :	24~25℃
Test Band :	High	Relative Humidity :	51~54%
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
2484.61	52.81	-21.19	74	45.83	32.27	4.47	29.76	100	41	Peak
2494.78	40.16	-13.84	54	33.13	32.29	4.49	29.75	100	41	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
2485.12	55.67	-18.33	74	48.69	32.27	4.47	29.76	114	110	Peak
2494.78	43.87	-10.13	54	36.84	32.29	4.49	29.75	114	110	Average

Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	Low	Relative Humidity :	51~54%
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
2389.74	67.82	-6.18	74	61.05	32.14	4.42	29.79	116	95	Peak
2390	50.74	-3.26	54	43.96	32.14	4.42	29.78	116	95	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
2389.56	65.18	-8.82	74	58.41	32.14	4.42	29.79	144	88	Peak
2389.92	45.86	-8.14	54	39.08	32.14	4.42	29.78	144	88	Average

Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	High	Relative Humidity :	51~54%
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
2483.95	65.82	-8.18	74	58.84	32.27	4.47	29.76	138	66	Peak
2483.59	47.77	-6.23	54	40.79	32.27	4.47	29.76	138	66	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
2483.74	67.57	-6.43	74	60.59	32.27	4.47	29.76	100	90	Peak
2483.53	47.58	-6.42	54	40.6	32.27	4.47	29.76	100	90	Average

Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	Low	Relative Humidity :	51~54%
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	64.08	-9.92	74	57.31	32.14	4.42	29.79	100	40	Peak
2390	45.3	-8.7	54	38.52	32.14	4.42	29.78	100	40	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
2389.47	70.87	-3.13	74	64.1	32.14	4.42	29.79	122	101	Peak
2389.83	50.78	-3.22	54	44	32.14	4.42	29.78	122	101	Average

Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	High	Relative Humidity :	51~54%
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
2483.95	66.72	-7.28	74	59.74	32.27	4.47	29.76	136	289	Peak
2484.19	47.26	-6.74	54	40.28	32.27	4.47	29.76	136	289	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
2484.1	65.87	-8.13	74	58.89	32.27	4.47	29.76	100	360	Peak
2484.01	46.09	-7.91	54	39.11	32.27	4.47	29.76	100	360	Average

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

Note: Below 1GHz for radiated emission measurement, pre-scanned all test modes and only choose the worst case mode was recorded in the report.

Test Mode :	802.11b	Temperature :	24~25℃
Test Channel :	01	Relative Humidity :	51~54%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7236 MHz are not within restricted bands, and their limit lines are 20dB below the highest emission level. For example, 106.48 dBuV/m - 20dB = 86.48 dBuV/m. 3. 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
2399	52.69	-33.79	86.48	45.91	32.14	4.42	29.78	172	109	Peak
2412	106.48	-	-	99.65	32.17	4.44	29.78	172	109	Peak
2412	101.41	-	-	94.58	32.17	4.44	29.78	172	109	Average
4824	46.52	-27.48	74	36.23	33.68	5.95	29.34	100	123	Peak
7236	49.45	-37.03	86.48	34.62	35.29	7.58	28.04	100	151	Peak

Test Mode :	802.11b	Temperature :	24~25°C
Test Channel :	01	Relative Humidity :	51~54%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7236 MHz are not within restricted bands, and their limit lines are 20dB below the highest emission level. 3. 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
2399	57.07	-32.5	89.57	50.29	32.14	4.42	29.78	118	117	Peak
2412	109.57	-	-	102.74	32.17	4.44	29.78	118	117	Peak
2412	104.13	-	-	97.3	32.17	4.44	29.78	118	117	Average
4824	50.33	-23.67	74	40.04	33.68	5.95	29.34	146	51	Peak
7236	49.17	-40.4	89.57	34.34	35.29	7.58	28.04	200	224	Peak

Test Mode :	802.11b	Temperature :	24~25°C
Test Channel :	06	Relative Humidity :	51~54%
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	107.31	-	-	100.41	32.22	4.45	29.77	100	147	Peak
2437	101.88	-	-	94.98	32.22	4.45	29.77	100	147	Average
4874	47.4	-26.6	74	36.92	33.8	6.02	29.34	100	21	Peak
7311	50.73	-23.27	74	35.6	35.31	7.8	27.98	120	29	Peak

Test Mode :	802.11b	Temperature :	24~25°C
Test Channel :	06	Relative Humidity :	51~54%
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	107.78	-	-	100.88	32.22	4.45	29.77	168	62	Peak
2437	102.31	-	-	95.41	32.22	4.45	29.77	168	62	Average
4874	50.36	-23.64	74	39.88	33.8	6.02	29.34	100	215	Peak
7311	50.4	-23.6	74	35.27	35.31	7.8	27.98	196	68	Peak

Test Mode :	802.11b	Temperature :	24~25°C
Test Channel :	11	Relative Humidity :	51~54%
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	104.99	-	-	98.04	32.24	4.47	29.76	100	41	Peak
2462	100.07	-	-	93.12	32.24	4.47	29.76	100	41	Average
4924	50.95	-23.05	74	40.28	33.92	6.1	29.35	200	166	Peak
7386	50.76	-23.24	74	35.19	35.35	8.12	27.9	100	131	Peak

Test Mode :	802.11b	Temperature :	24~25℃
Test Channel :	11	Relative Humidity :	51~54%
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	109.03	-	-	102.08	32.24	4.47	29.76	114	110	Peak
2462	104.24	-	-	97.29	32.24	4.47	29.76	114	110	Average
4924	47.23	-26.77	74	36.56	33.92	6.1	29.35	177	96	Peak
7386	50.53	-23.47	74	34.96	35.35	8.12	27.9	200	122	Peak

Test Mode :	802.11g	Temperature :	24~25°C
Test Channel :	01	Relative Humidity :	51~54%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7236 MHz are not within restricted bands, and their limit lines are 20dB below the highest emission level. 3. 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
2399	73.92	-10.94	84.86	67.14	32.14	4.42	29.78	100	40	Average
2412	104.86	-	-	98.03	32.17	4.44	29.78	100	40	Peak
2412	93.82	-	-	86.99	32.17	4.44	29.78	100	40	Average
4824	51.47	-22.53	74	41.18	33.68	5.95	29.34	176	98	Peak
4824	46.15	-7.85	54	35.86	33.68	5.95	29.34	176	98	Average
7236	49.89	-34.97	84.86	35.06	35.29	7.58	28.04	100	125	Peak

Test Mode :	802.11g	Temperature :	24~25°C
Test Channel :	01	Relative Humidity :	51~54%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7236 MHz are not within restricted bands, and their limit lines are 20dB below the highest emission level. 3. 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
2399	72.61	-18.97	91.58	65.83	32.14	4.42	29.78	122	101	Peak
2412	111.58	-	-	104.75	32.17	4.44	29.78	122	101	Peak
2412	99.59	-	-	92.76	32.17	4.44	29.78	122	101	Average
4824	45.53	-28.47	74	35.24	33.68	5.95	29.34	200	33	Peak
7236	49.8	-41.78	91.58	34.97	35.29	7.58	28.04	100	355	Peak

Test Mode :	802.11g	Temperature :	24~25℃
Test Channel :	06	Relative Humidity :	51~54%
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	111.74	-	-	104.84	32.22	4.45	29.77	117	290	Peak
2437	100.74	-	-	93.84	32.22	4.45	29.77	117	290	Average
4874	45.89	-28.11	74	35.41	33.8	6.02	29.34	100	112	Peak
7311	50.37	-23.63	74	35.24	35.31	7.8	27.98	100	221	Peak

Test Mode :	802.11g	Temperature :	24~25°C
Test Channel :	06	Relative Humidity :	51~54%
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	108.17	-	-	101.27	32.22	4.45	29.77	100	240	Peak
2437	96.79	-	-	89.89	32.22	4.45	29.77	100	240	Average
4874	53.33	-20.67	74	42.85	33.8	6.02	29.34	100	269	Peak
4874	47.69	-6.31	54	37.21	33.8	6.02	29.34	100	269	Average
7311	50.67	-23.33	74	35.54	35.31	7.8	27.98	100	296	Peak

Test Mode :	802.11g	Temperature :	24~25°C
Test Channel :	11	Relative Humidity :	51~54%
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	107.19	-	-	100.24	32.24	4.47	29.76	138	66	Peak
2462	95.67	-	-	88.72	32.24	4.47	29.76	138	66	Average
4924	48.74	-25.26	74	38.07	33.92	6.1	29.35	100	227	Peak
7386	50.47	-23.53	74	34.9	35.35	8.12	27.9	125	336	Peak

Test Mode :	802.11g	Temperature :	24~25°C
Test Channel :	11	Relative Humidity :	51~54%
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	107.97	-	-	101.02	32.24	4.47	29.76	100	90	Peak
2462	96.14	-	-	89.19	32.24	4.47	29.76	100	90	Average
4924	51.46	-22.54	74	40.79	33.92	6.1	29.35	168	44	Peak
4924	45.94	-8.06	54	35.27	33.92	6.1	29.35	168	44	Average
7386	49.76	-24.24	74	34.19	35.35	8.12	27.9	100	286	Peak

Test Mode :	802.11n HT20	Temperature :	24~25℃
Test Channel :	01	Relative Humidity :	51~54%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7236 MHz are not within restricted bands, and their limit lines are 20dB below the highest emission level. 3. 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
105.66	31.61	-11.89	43.5	49.28	11.8	1.18	30.65	100	112	Peak
165.8	27.19	-16.31	43.5	46.47	9.9	1.27	30.45	-	-	Peak
197.81	25.34	-18.16	43.5	45.09	9.15	1.44	30.34	-	-	Peak
265.71	23.63	-22.37	46	39.03	13.03	1.68	30.11	-	-	Peak
402.48	21.32	-24.68	46	32.49	16.58	1.91	29.66	-	-	Peak
632.37	22.56	-23.44	46	30.3	19.08	2.34	29.16	-	-	Peak
2399	73.92	-10.94	84.86	67.14	32.14	4.42	29.78	100	40	Average
2412	104.86	-	-	98.03	32.17	4.44	29.78	100	40	Peak
2412	93.82	-	-	86.99	32.17	4.44	29.78	100	40	Average
4824	51.47	-22.53	74	41.18	33.68	5.95	29.34	176	98	Peak
4824	46.15	-7.85	54	35.86	33.68	5.95	29.34	176	98	Average
7236	49.89	-34.97	84.86	35.06	35.29	7.58	28.04	100	125	Peak

Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Channel :	01	Relative Humidity :	51~54%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7236 MHz are not within restricted bands, and their limit lines are 20dB below the highest emission level. 3. 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
103.72	30.83	-12.67	43.5	48.81	11.5	1.17	30.65	100	136	Peak
170.65	20.93	-22.57	43.5	40.28	9.8	1.28	30.43	-	-	Peak
190.05	19.56	-23.94	43.5	38.66	9.9	1.37	30.37	-	-	Peak
304.51	23.25	-22.75	46	38.49	13.04	1.7	29.98	-	-	Peak
373.38	25.12	-20.88	46	37.17	15.84	1.87	29.76	-	-	Peak
508.21	22.35	-23.65	46	31.78	17.74	2.15	29.32	-	-	Peak
2399	72.61	-18.97	91.58	65.83	32.14	4.42	29.78	122	101	Peak
2412	111.58	-	-	104.75	32.17	4.44	29.78	122	101	Peak
2412	99.59	-	-	92.76	32.17	4.44	29.78	122	101	Average
4824	45.53	-28.47	74	35.24	33.68	5.95	29.34	200	33	Peak
7236	49.8	-41.78	91.58	34.97	35.29	7.58	28.04	100	355	Peak

Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Channel :	06	Relative Humidity :	51~54%
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	108.2	-	-	101.3	32.22	4.45	29.77	100	41	Peak
2437	97.62	-	-	90.72	32.22	4.45	29.77	100	41	Average
4874	52.99	-21.01	74	42.51	33.8	6.02	29.34	110	227	Peak
4874	47.4	-6.6	54	36.92	33.8	6.02	29.34	110	227	Average
7311	50.86	-23.14	74	35.73	35.31	7.8	27.98	165	68	Peak

Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Channel :	06	Relative Humidity :	51~54%
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	110.51	-	-	103.61	32.22	4.45	29.77	152	98	Peak
2437	99.29	-	-	92.39	32.22	4.45	29.77	152	98	Average
4874	46.24	-27.76	74	35.76	33.8	6.02	29.34	100	224	Peak
7311	49.98	-24.02	74	34.85	35.31	7.8	27.98	100	221	Peak

Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Channel :	11	Relative Humidity :	51~54%
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	106.48	-	-	99.53	32.24	4.47	29.76	136	289	Peak
2462	95.39	-	-	88.44	32.24	4.47	29.76	136	289	Average
4924	49.87	-24.13	74	39.2	33.92	6.1	29.35	100	252	Peak
7386	50.48	-23.52	74	34.91	35.35	8.12	27.9	188	64	Peak

Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Channel :	11	Relative Humidity :	51~54%
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	104.22	-	-	97.27	32.24	4.47	29.76	100	360	Peak
2462	94.23	-	-	87.28	32.24	4.47	29.76	100	360	Average
4924	51.31	-22.69	74	40.64	33.92	6.1	29.35	146	175	Peak
4924	46.41	-7.59	54	35.74	33.92	6.1	29.35	146	175	Average
7386	50.92	-23.08	74	35.35	35.35	8.12	27.9	152	33	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 (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.

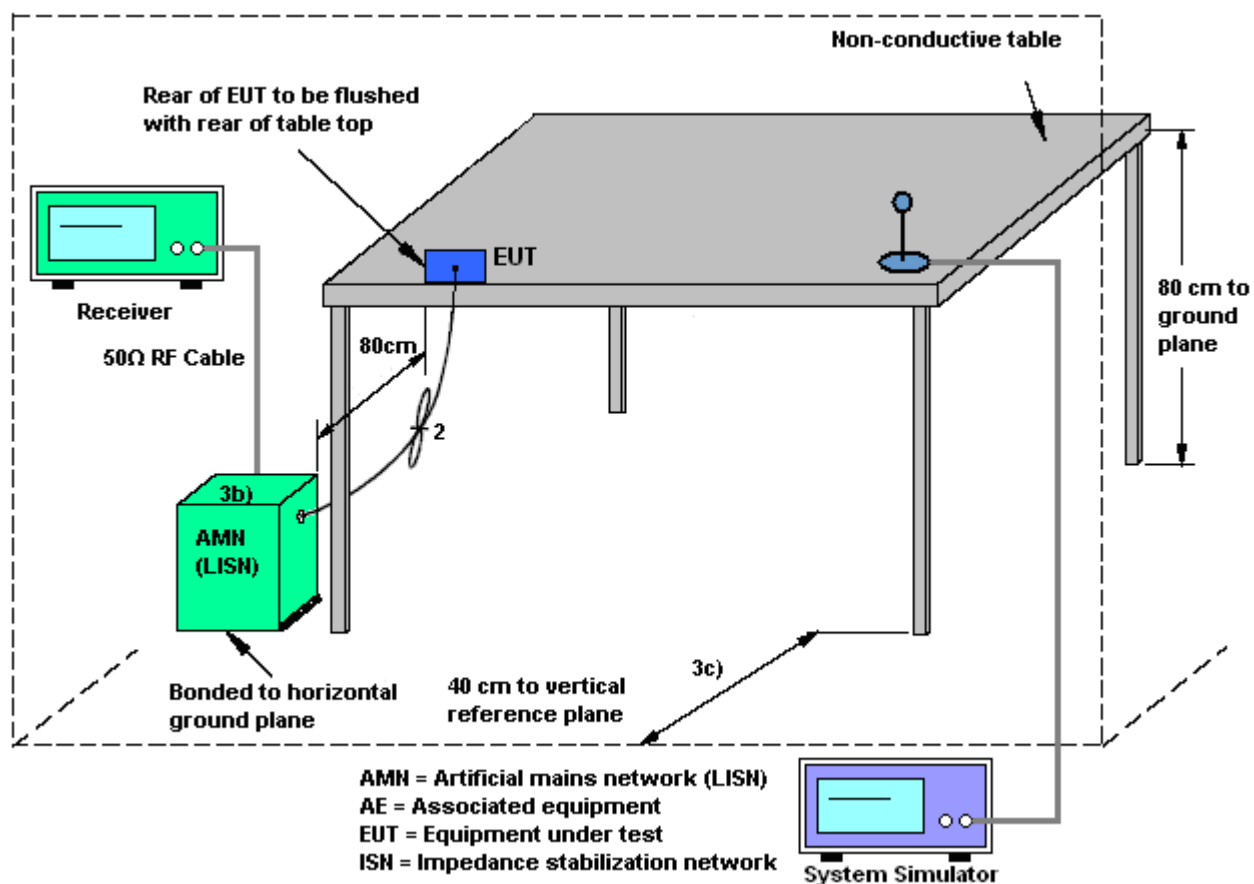
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

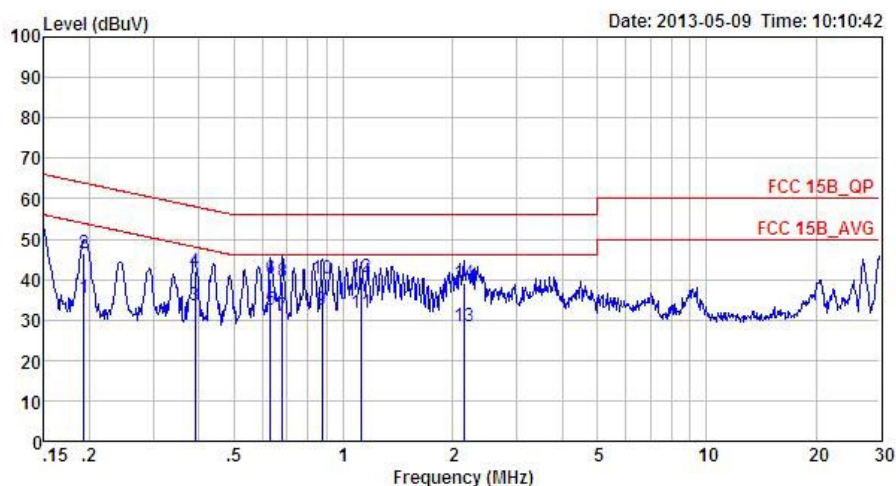
1. The testing follows the guidelines in ANSI C63.10-2009.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Leo Liao	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adpater) + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

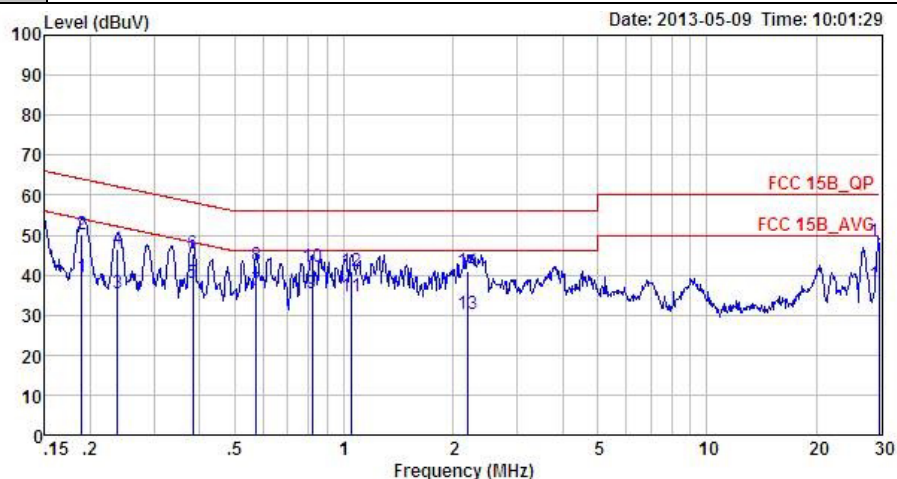


Site : C001-SZ
Condition: FCC 15B_QP LISN_L_2000601 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.19	35.48	-18.41	53.89	25.40	0.03	10.05	Average
2	0.19	46.68	-17.21	63.89	36.60	0.03	10.05	QP
3	0.39	33.70	-14.33	48.03	23.61	0.02	10.07	Average
4	0.39	41.90	-16.13	58.03	31.81	0.02	10.07	QP
5 *	0.63	32.62	-13.38	46.00	22.50	0.02	10.10	Average
6	0.63	40.22	-15.78	56.00	30.10	0.02	10.10	QP
7	0.68	31.12	-14.88	46.00	21.00	0.02	10.10	Average
8	0.68	39.62	-16.38	56.00	29.50	0.02	10.10	QP
9	0.88	32.33	-13.67	46.00	22.20	0.02	10.11	Average
10	0.88	40.23	-15.77	56.00	30.10	0.02	10.11	QP
11	1.12	31.85	-14.15	46.00	21.70	0.03	10.12	Average
12	1.12	40.75	-15.25	56.00	30.60	0.03	10.12	QP
13	2.14	28.30	-17.70	46.00	18.10	0.04	10.16	Average
14	2.14	39.00	-17.00	56.00	28.80	0.04	10.16	QP



Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Leo Liao	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adpater) + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15B_QP LISN_N_2000601 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.19	39.47	-14.59	54.06	29.40	0.02	10.05	Average
2	0.19	50.17	-13.89	64.06	40.10	0.02	10.05	QP
3	0.24	35.48	-16.69	52.17	25.40	0.02	10.06	Average
4	0.24	46.68	-15.49	62.17	36.60	0.02	10.06	QP
5	0.38	38.19	-10.02	48.21	28.10	0.02	10.07	Average
6	0.38	45.29	-12.92	58.21	35.20	0.02	10.07	QP
7 *	0.57	36.31	-9.69	46.00	26.20	0.02	10.09	Average
8	0.57	42.41	-13.59	56.00	32.30	0.02	10.09	QP
9	0.82	35.33	-10.67	46.00	25.20	0.02	10.11	Average
10	0.82	41.93	-14.07	56.00	31.80	0.02	10.11	QP
11	1.05	34.54	-11.46	46.00	24.40	0.02	10.12	Average
12	1.05	41.14	-14.86	56.00	31.00	0.02	10.12	QP
13	2.20	30.40	-15.60	46.00	20.20	0.04	10.16	Average
14	2.20	40.80	-15.20	56.00	30.60	0.04	10.16	QP
15	30.00	37.65	-12.35	50.00	26.14	1.02	10.49	Average
16	30.00	48.21	-11.79	60.00	36.70	1.02	10.49	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 Connected Construction

Non-standard connector 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	May 11, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	N/A	Mar. 28, 2013	May 11, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	N/A	Mar. 28, 2013	May 11, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
DC Power Supply	TOPWORD	3303DR	N/A714621	N/A	Mar. 28, 2013	May 11, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Thermal Chamber	Hongzhan	LP-150U	HD20120425	N/A	Mar. 28, 2013	May 11, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
ESCI TEST Receiver	R&S	ESCI	100724	9K-3GHz	Mar. 28, 2013	May 16, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSP30	101362	9kHz~30GHz	Oct. 11, 2012	May 16, 2013	Oct. 10, 2013	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 12, 2012	May 16, 2013	Oct. 11, 2013	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2Ghz	Nov. 03, 2012	May 16, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9K-3000MHZ GAIN 30db	Mar. 28, 2013	May 16, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	May 16, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
SHF-EHF-Horn	Schwarzbeck	BBHA9170	BBHA9170249	14Ghz~40Ghz	Nov. 23, 2012	May 16, 2013	Nov. 22, 2013	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100321	9KHZ-30MHZ	Oct. 22, 2012	May 16, 2013	Oct. 21, 2013	Radiation (03CH01-SZ)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170249	15GHz~40GHz	Nov. 23, 2012	May 16, 2013	Nov. 22, 2013	Radiation (03CH01-KS)
ESCIO TEST Receiver	R&S	1142.8007.03	100724	9kHz -3GHz	Mar. 28, 2013	May 09, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Mar. 28, 2013	May 09, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Mar. 28, 2013	May 09, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	N/A	Nov. 20, 2012	May 09, 2013	Nov. 19, 2013	Conduction (CO01-SZ)
AC Filter	ETS-LINDGREN	LRE-2030/PE N 256260	00093783	N/A	N/A	May 09, 2013	N/A	Conduction (CO01-SZ)
AC Filter	ETS-LINDGREN	LRE-2030/PE N 256260	00097973	N/A	N/A	May 09, 2013	N/A	Conduction (CO01-SZ)
System Simulator	Agilent	E5515C	MY50264168	GSM/WCDMA /CDMA2000	Oct. 09, 2012	May 09, 2013	Oct. 08, 2013	Conduction (CO01-SZ)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72
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Appendix A. Photographs of EUT

Please refer to Sporton report number EP342404 as below.