FCC RF Test Report

APPLICANT	:	CT Asia
EQUIPMENT	:	Mobile phone
BRAND NAME	:	BLU
MODEL NAME	:	Dash 4.5
MARKETING NAME	:	DASH 4.5
FCC ID	:	YHLBLUDASH45
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Apr. 25, 2013 and completely tested on Jun. 06, 2013. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai / Manager

Testing Laboratory 2627

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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR342511C	Rev. 01	Initial issue of report	Jul. 01, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	A8.4	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	A8.2(b)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	A8.5	Conducted Band Edges	≤ 20dBc	Pass	-
			Conducted Spurious Emission		Pass	-
3.5	15.247(d)	A8.5	Radiated Band Edges	15.209(a) & 15.247(d)	Pass	Under limit 5.93 dB at 2483.500 MHz
			Radiated Spurious Emission			
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 7.58 dB at 0.370 MHz
3.7	15.203 & 15.247(b)	A8.4	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

Ragentek Technology Group

Building D10-D11, No. 58-60, Lane 3188, Xiupu Road, PuDong District, Shanghai, PRC

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile phone
Brand Name	BLU
Model Name	Dash 4.5
Marketing Name	Dash 4.5
FCC ID	YHLBLUDASH45
EUT supports Radios application	GSM/GPRS/WCDMA/HSPA/HSPA+/ WLAN 11bgn/Bluetooth/Bluetooth v4.0 - LE
HW Version	V1.2
SW Version	BLU-D310-V05-GENERIC
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

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 : 13.63 dBm (0.0231 W) 802.11g : 20.23 dBm (0.1054 W) 802.11n HT20 : 17.84 dBm (0.0608 W)
Antenna Type	Monopole Antenna type with gain 0 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 (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	**Sporton Site No.**	**FCC/IC Registration No.**
	03CH01-KS	149928/4086E-1

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	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 (Y 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	13.62	13.61	13.59	13.58
CH 06	2437 MHz	**13.63**	13.59	13.57	13.55
CH 11	2462 MHz	12.46	12.39	12.36	12.31

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	20.21	20.17	20.08	20.04	20.01	19.98	19.96	19.91
CH 06	2437 MHz	**20.23**	20.16	20.12	20.09	20.03	20.01	19.99	19.96
CH 11	2462 MHz	19.17	19.11	18.98	18.95	18.91	18.88	18.83	18.81

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	17.54	17.09	17.05	17.02	17.01	16.98	16.96	16.95
CH 06	2437 MHz	**17.84**	17.54	17.29	17.18	17.13	17.11	17.08	17.03
CH 11	2462 MHz	16.81	16.58	16.26	16.19	16.11	16.09	16.06	16.04

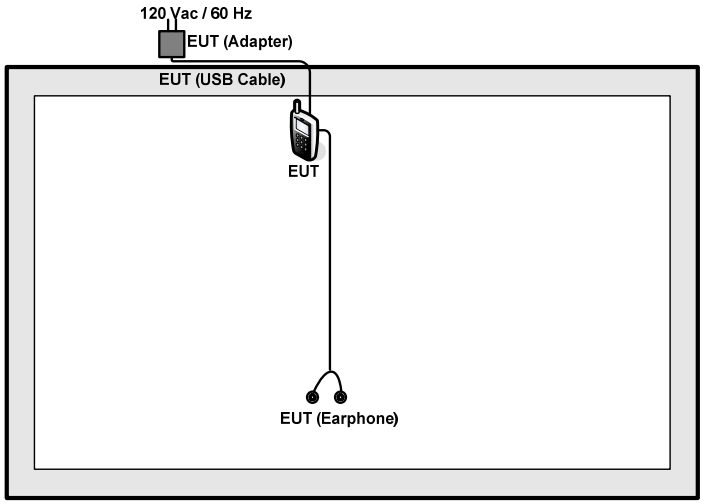
2.3 Test Mode

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

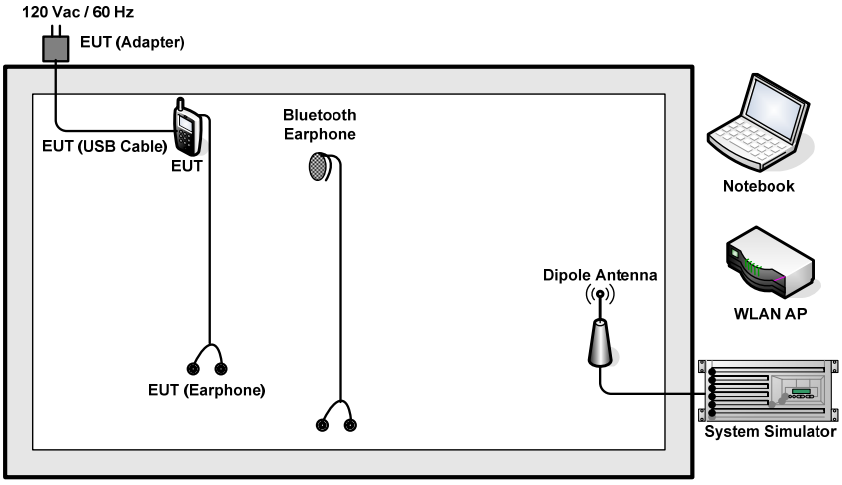
Test Cases				
	Test Items	Mode	Data Rate	Test Channel
Conducted TCs	6dB BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Conducted Band Edge	802.11b	1 Mbps	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 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-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	N/A	N/A

2.6 RF Utility

For WLAN RF test items, 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 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 5.6 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.

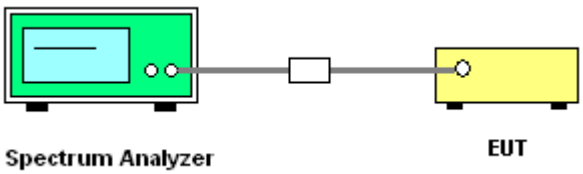
3.1.2 Measuring Instruments

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

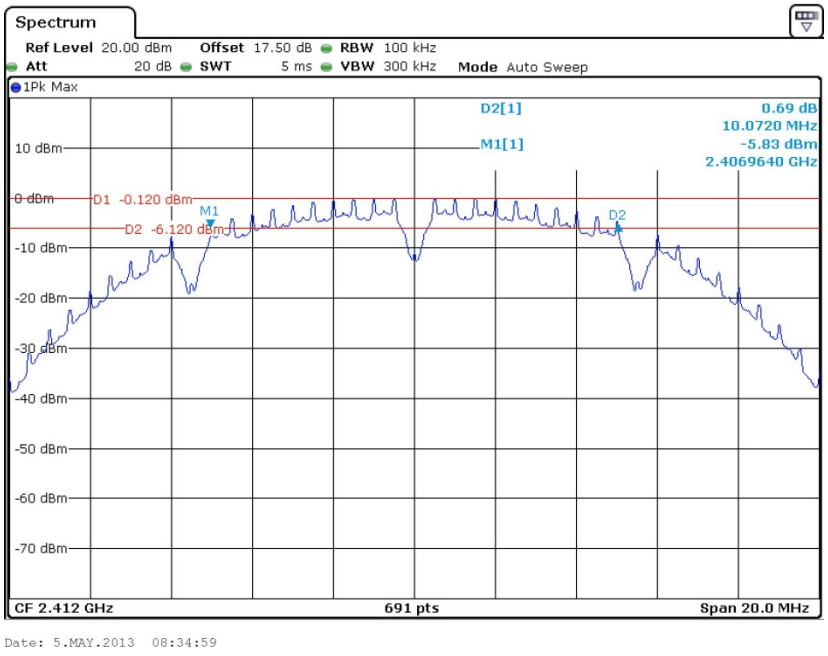


3.1.5 Test Result of 6dB Bandwidth

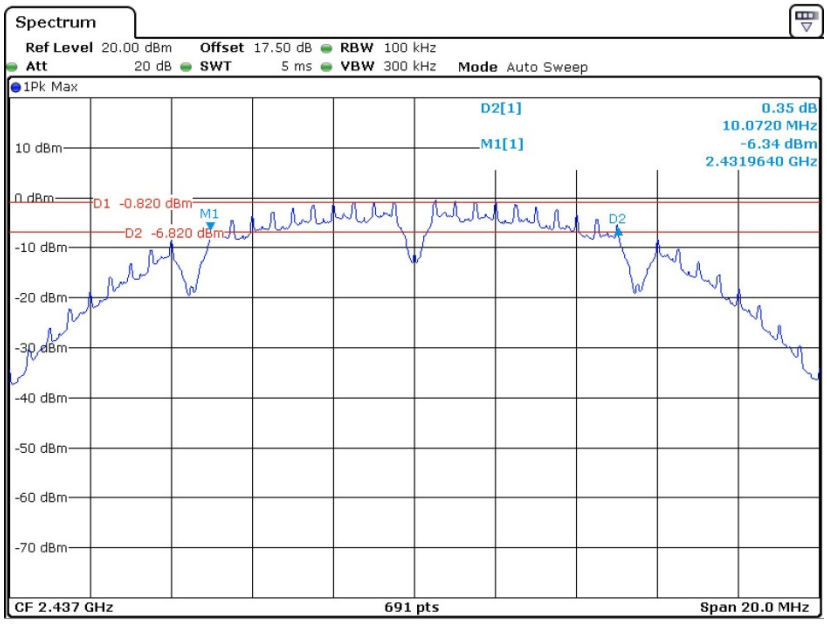
Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.0720	0.5	Pass
06	2437	10.0720	0.5	Pass
11	2462	10.0720	0.5	Pass

6 dB Bandwidth Plot on 802.11b Channel 01



6 dB Bandwidth Plot on 802.11b Channel 06



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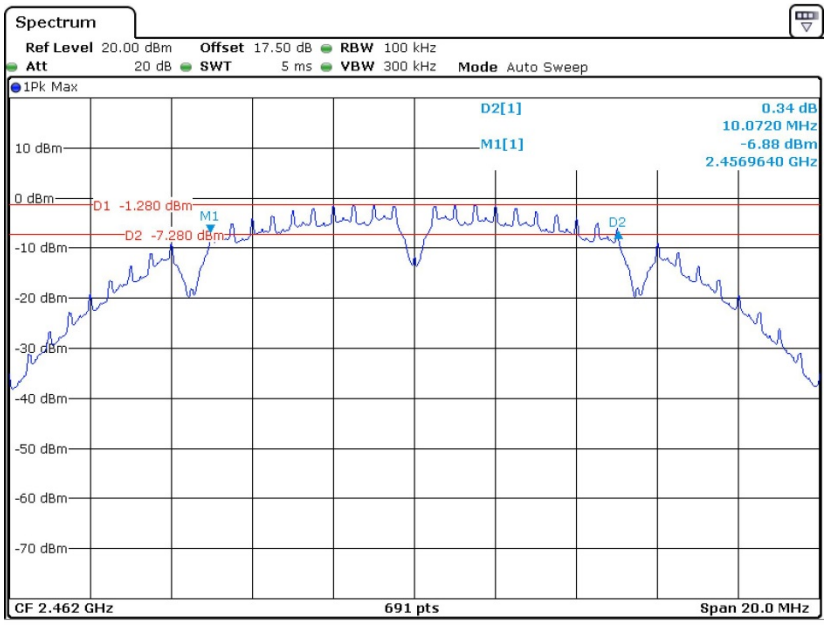
6 dB Bandwidth Plot on 802.11b Channel 11



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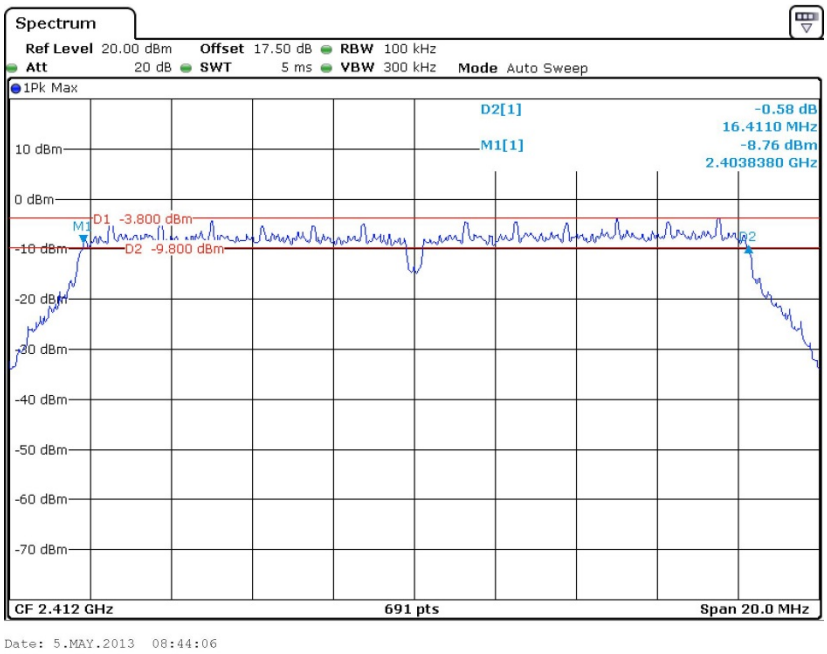
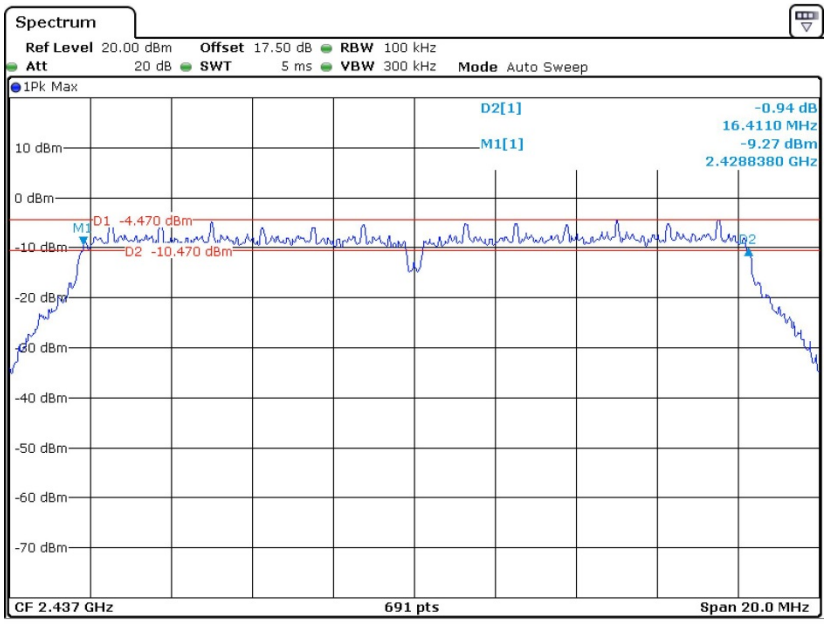
Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.4110	0.5	Pass
06	2437	16.4110	0.5	Pass
11	2462	16.3820	0.5	Pass

6 dB Bandwidth Plot on 802.11g Channel 01



6 dB Bandwidth Plot on 802.11g Channel 06



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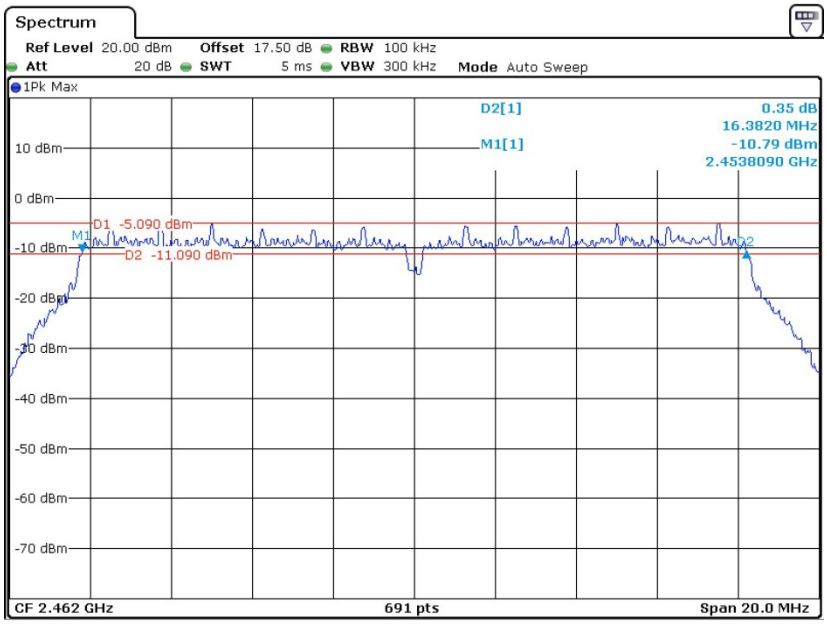
6 dB Bandwidth Plot on 802.11g Channel 11

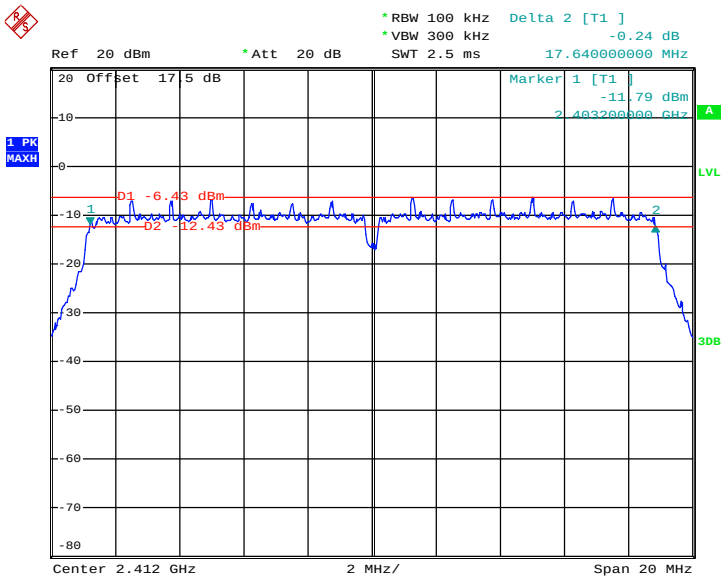


Date: 5.MAY.2013 08:40:18

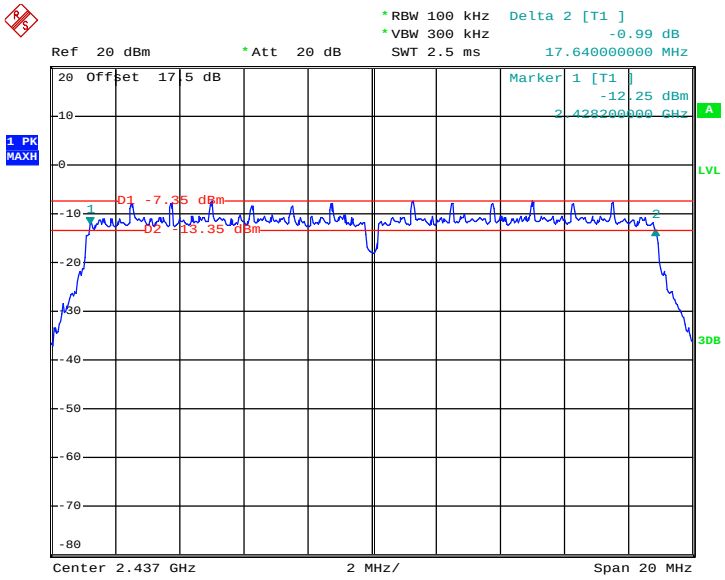
Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.6400	0.5	Pass
06	2437	17.6400	0.5	Pass
11	2462	17.6400	0.5	Pass

6 dB Bandwidth Plot on 802.11n HT20 Channel 01

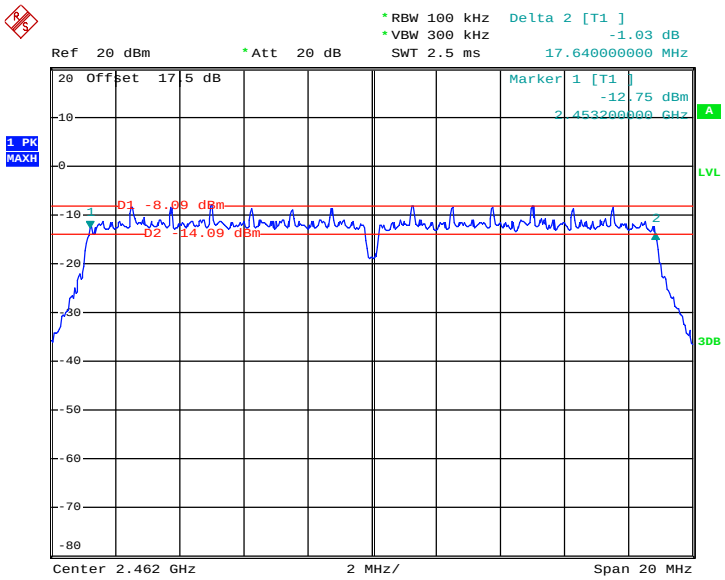


6 dB Bandwidth Plot on 802.11n HT20 Channel 06



Date: 6.JUN.2013 16:53:16

6 dB Bandwidth Plot on 802.11n HT20 Channel 11



Date: 6.JUN.2013 16:54:35

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.

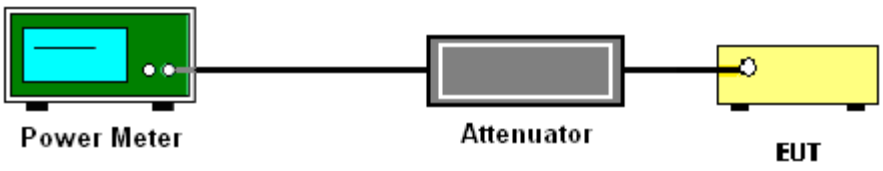
3.2.2 Measuring Instruments

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 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 :	802.11b	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	13.62	30	Pass
06	2437	13.63	30	Pass
11	2462	12.46	30	Pass

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

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.21	30	Pass
06	2437	20.23	30	Pass
11	2462	19.17	30	Pass

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

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.54	30	Pass
06	2437	17.84	30	Pass
11	2462	16.81	30	Pass

3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%
Duty Cycle:	98.98%	Duty Factor:	0.04dB

Channel	Frequency (MHz)	802.11b Average Output Power (dBm)
01	2412	11.59
06	2437	11.65
11	2462	10.51

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%
Duty Cycle:	92.96%	Duty Factor:	0.32dB

Channel	Frequency (MHz)	802.11g Average Output Power (dBm)
01	2412	9.98
06	2437	10.15
11	2462	8.67

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Fly Chen	Relative Humidity :	50~53%
Duty Cycle:	92.42%	Duty Factor:	0.34dB

Channel	Frequency (MHz)	802.11n HT20 Average Output Power (dBm)
01	2412	7.49
06	2437	7.74
11	2462	6.42

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.

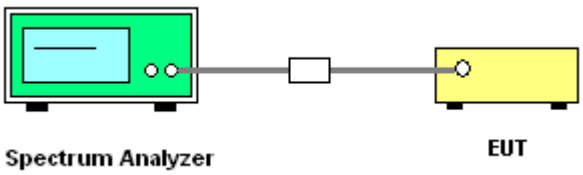
3.3.2 Measuring Instruments

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.
7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Fly Chen	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	0.26	-13.46	8	Pass
06	2437	0.35	-13.59	8	Pass
11	2462	-0.77	-14.78	8	Pass

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Fly Chen	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	-3.87	-15.94	8	Pass
06	2437	-4.57	-16.65	8	Pass
11	2462	-5.11	-15.46	8	Pass

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

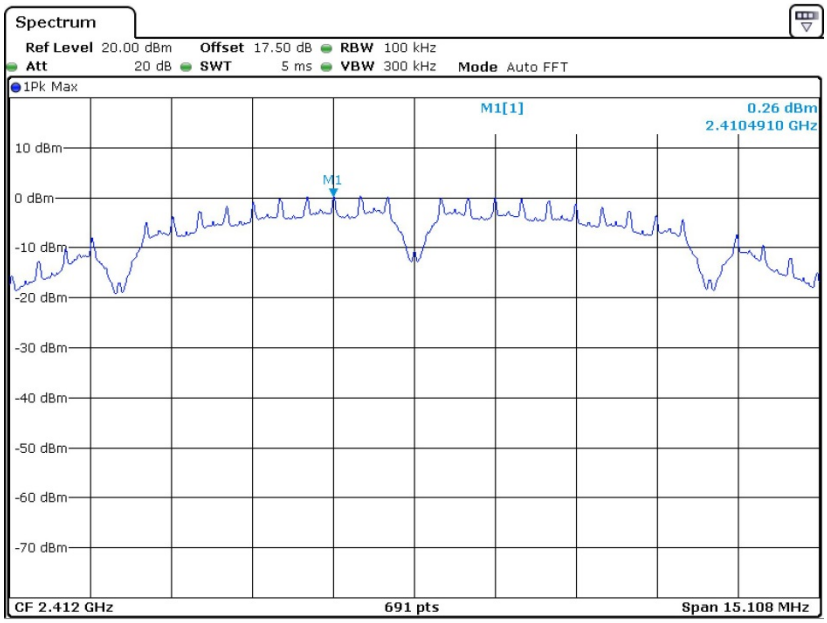
Channel	Frequency (MHz)	802.11n HT20 Power Density		Max. Limits (dBm/3kHz)	Pass/Fail
		PSD/100kHz (dBm)	PSD/3kHz (dBm)		
01	2412	-6.25	-18.90	8	Pass
06	2437	-7.15	-19.68	8	Pass
11	2462	-7.67	-20.66	8	Pass

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.*

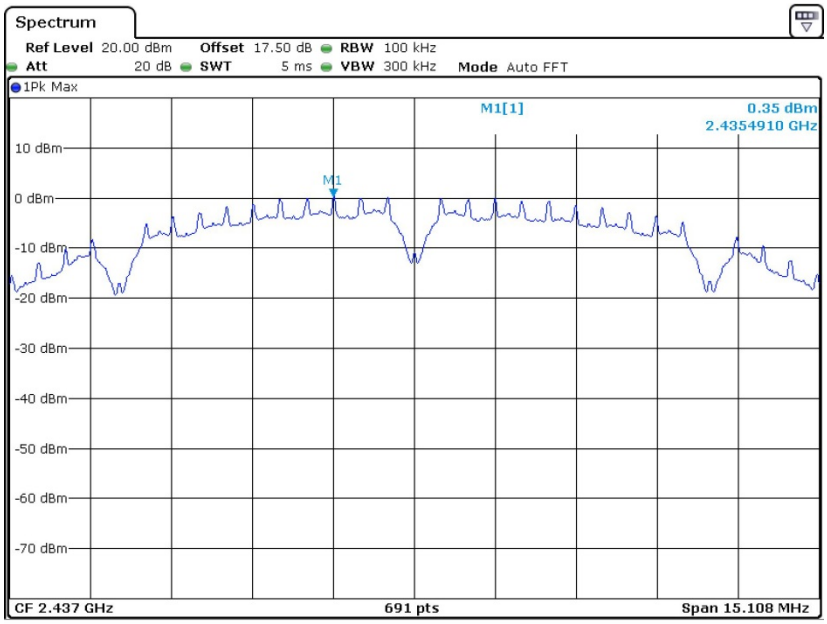
3.3.6 Test Result of Power Spectral Density Plots (100kHz)

PSD 100kHz Plot on 802.11b Channel 01



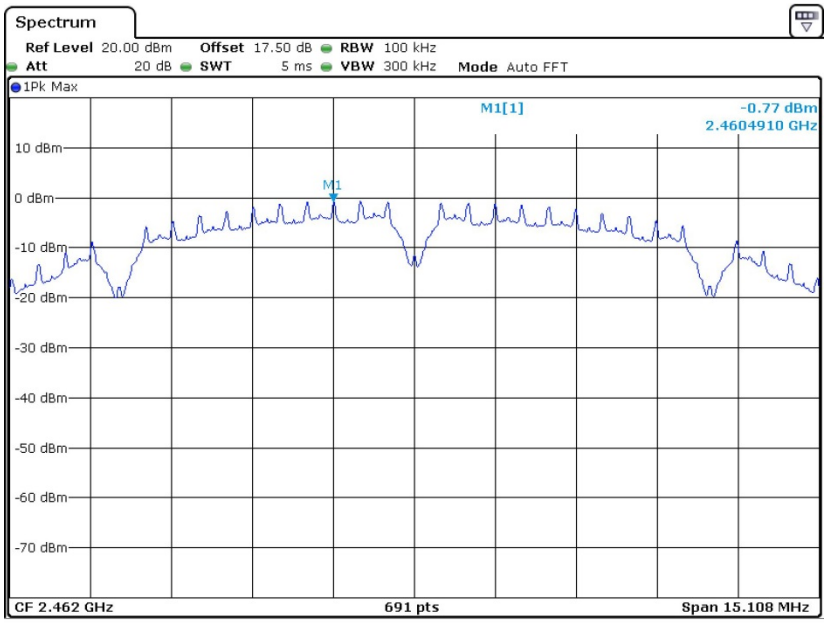
Date: 5.MAY.2013 09:27:06

PSD 100kHz Plot on 802.11b Channel 06



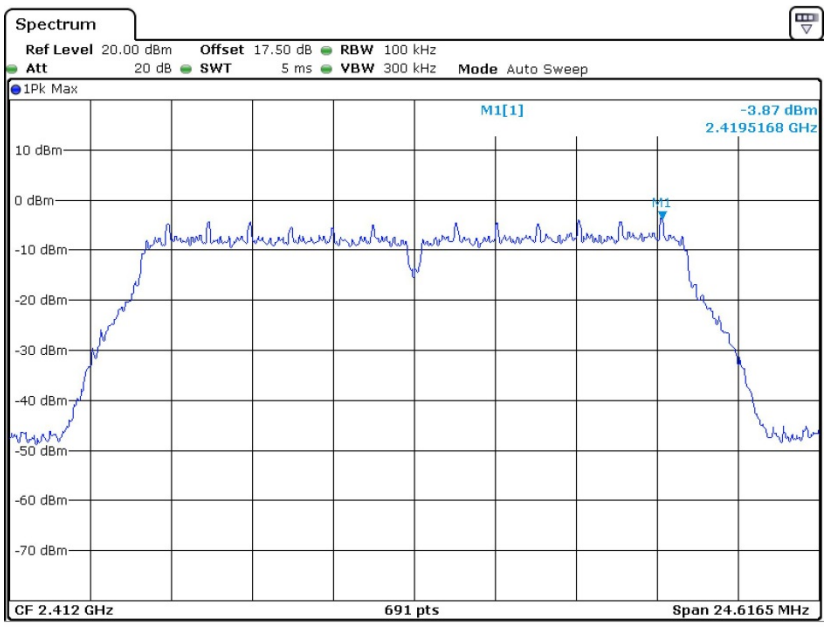
Date: 5.MAY.2013 09:26:29

PSD 100kHz Plot on 802.11b Channel 11



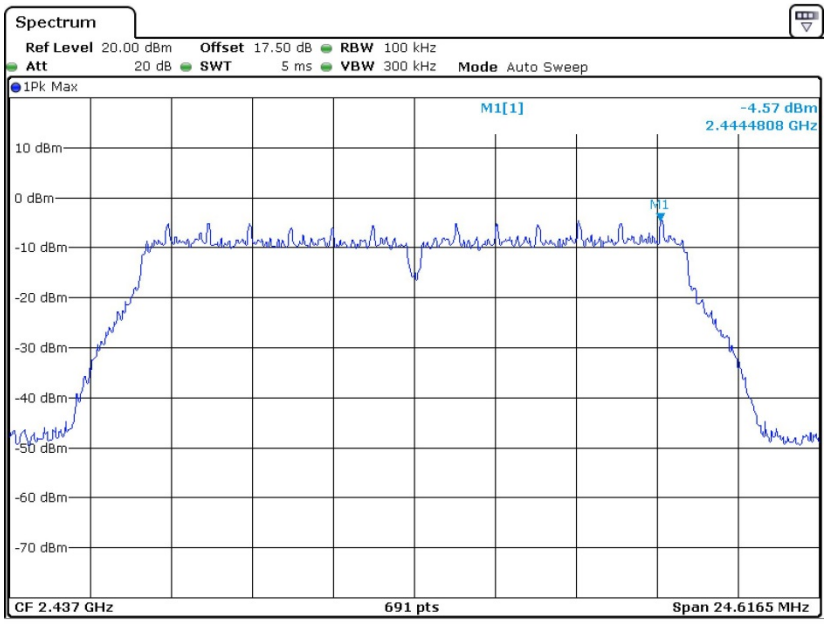
Date: 5.MAY.2013 09:25:19

PSD 100kHz Plot on 802.11g Channel 01



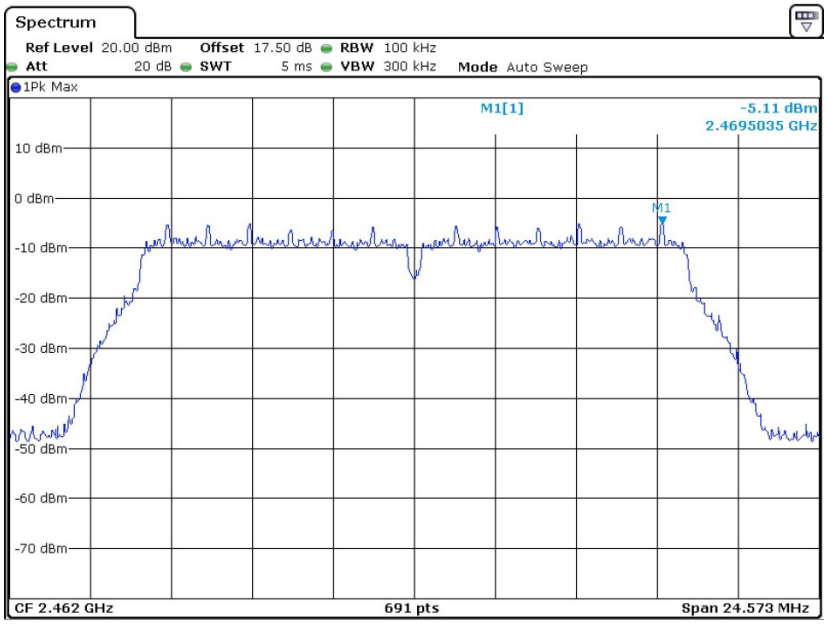
Date: 5.MAY.2013 09:30:57

PSD 100kHz Plot on 802.11g Channel 06



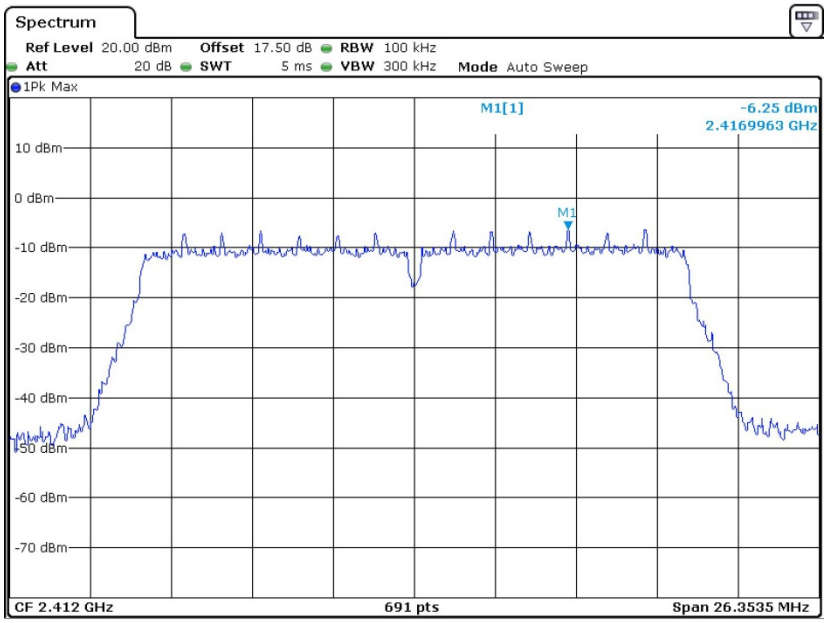
Date: 5.MAY.2013 09:31:39

PSD 100kHz Plot on 802.11g Channel 11



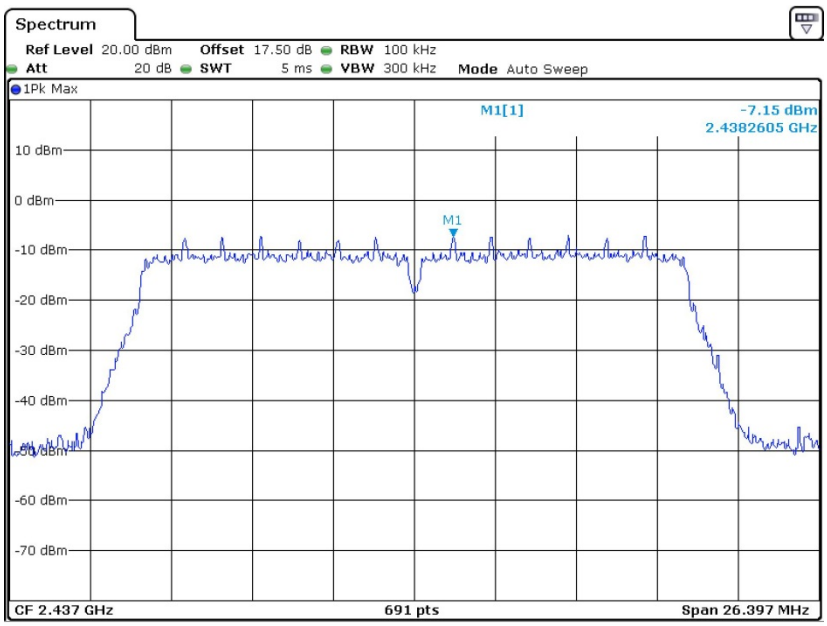
Date: 5.MAY.2013 09:33:05

PSD 100kHz Plot on 802.11n HT20 Channel 01



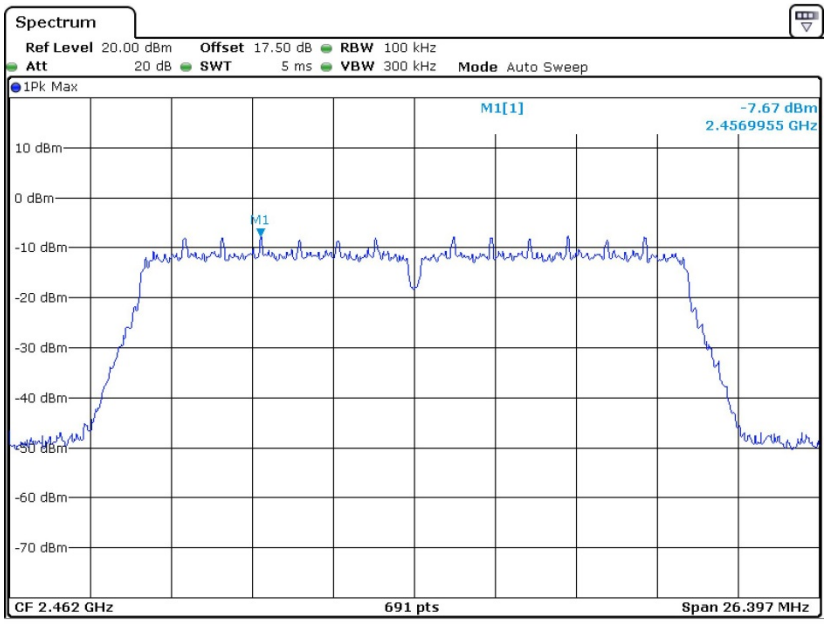
Date: 5.MAY.2013 09:38:37

PSD 100kHz Plot on 802.11n HT20 Channel 06



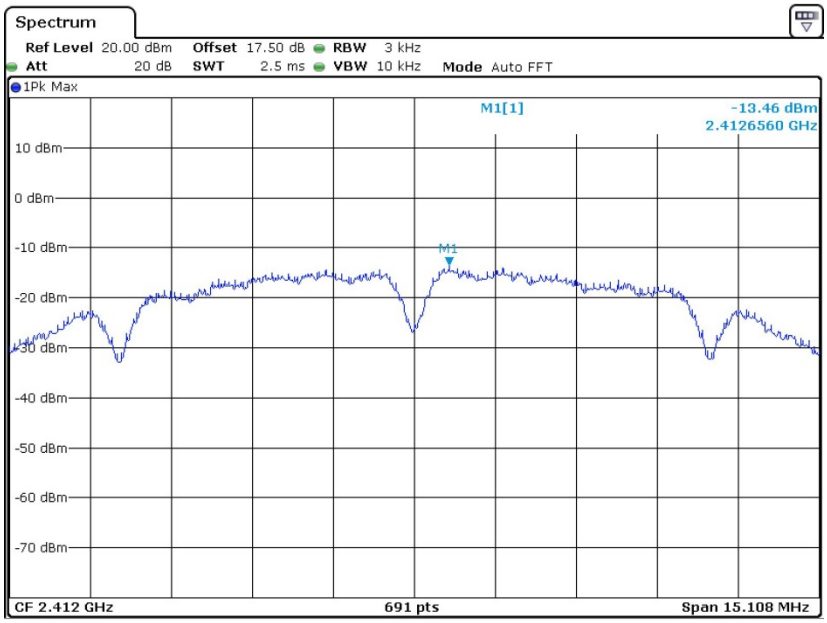
Date: 5.MAY.2013 09:39:25

PSD 100kHz Plot on 802.11n HT20 Channel 11



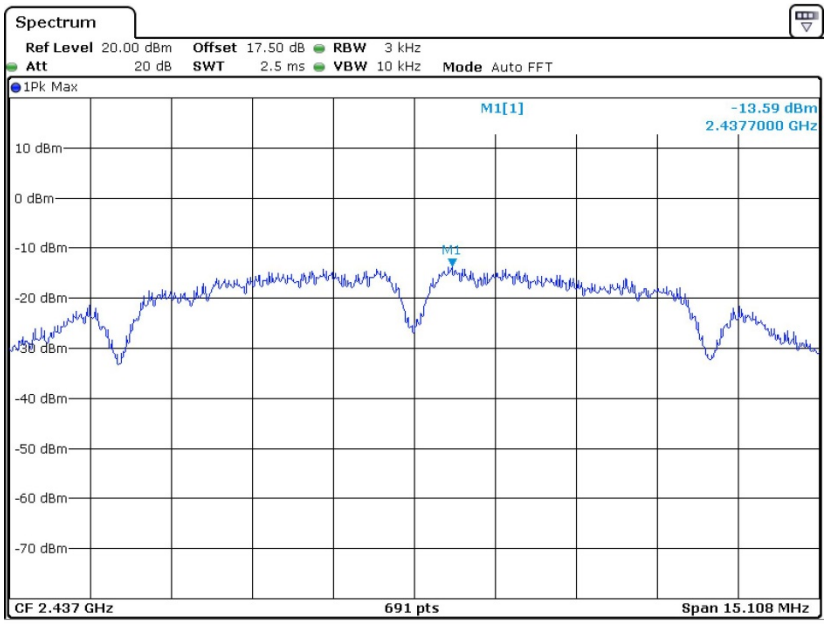
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

PSD 3kHz Plot on 802.11b Channel 01



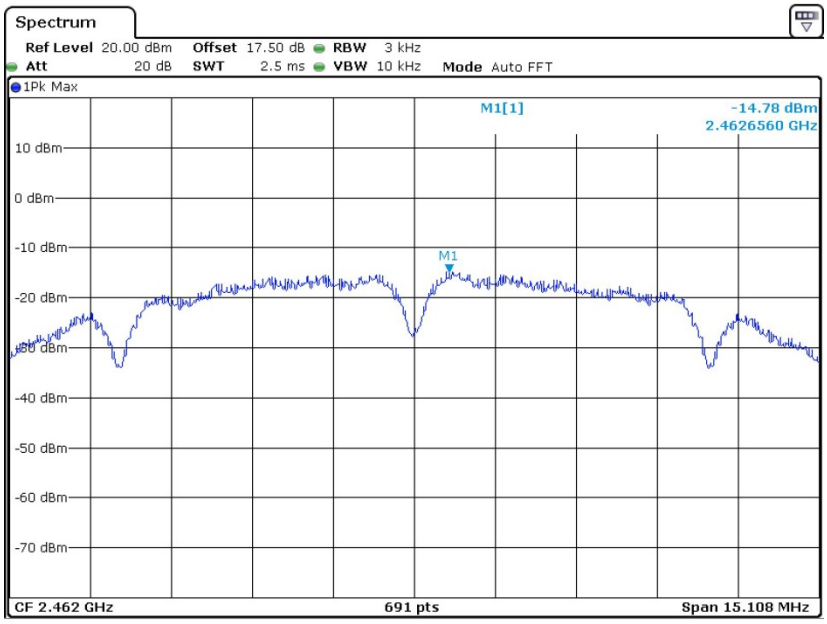
Date: 5.MAY.2013 09:21:56

PSD 3kHz Plot on 802.11b Channel 06



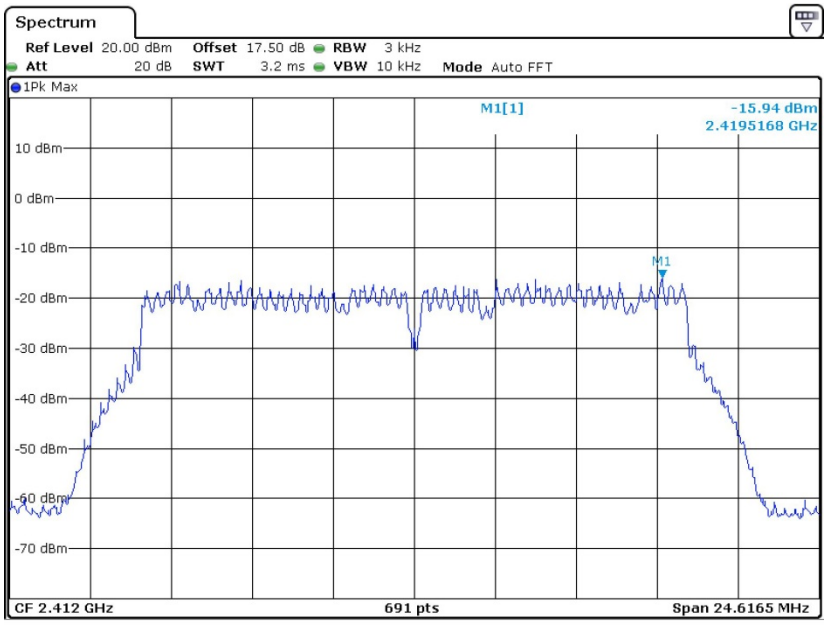
Date: 5.MAY.2013 09:23:28

PSD 3kHz Plot on 802.11b Channel 11



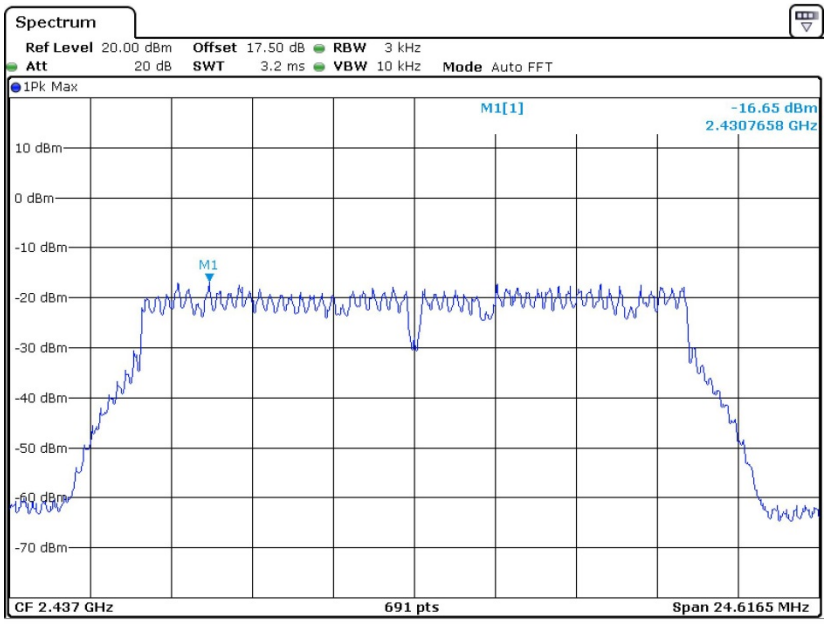
Date: 5.MAY.2013 09:24:33

PSD 3kHz Plot on 802.11g Channel 01



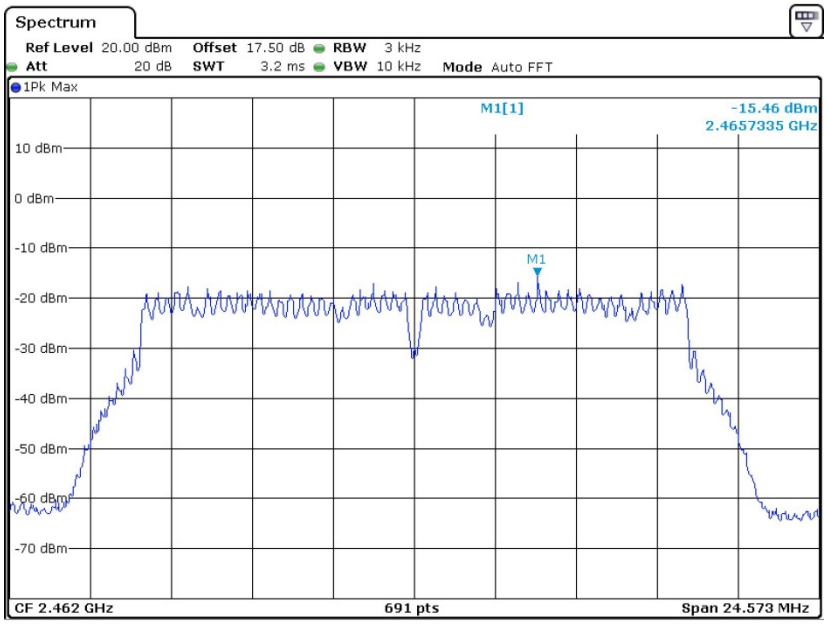
Date: 5.MAY.2013 09:36:13

PSD 3kHz Plot on 802.11g Channel 06



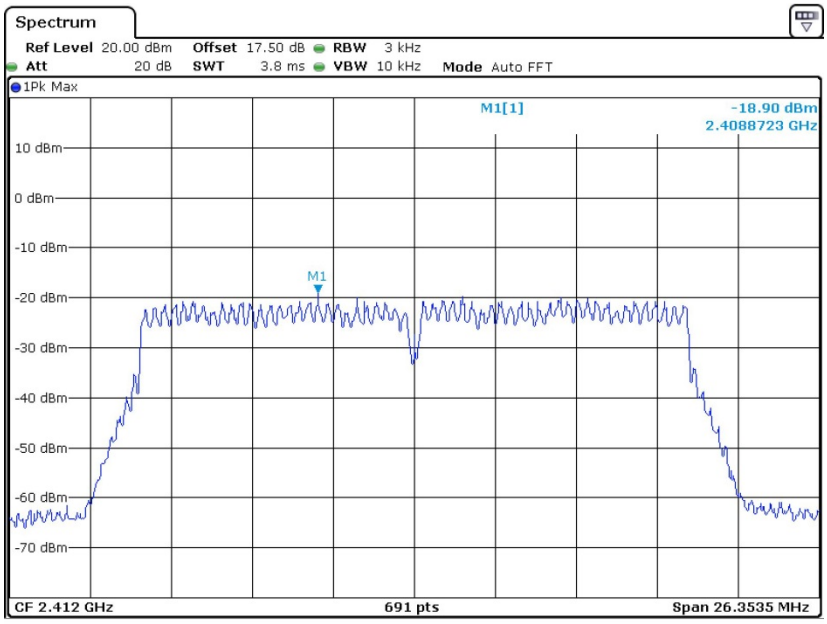
Date: 5.MAY.2013 09:35:12

PSD 3kHz Plot on 802.11g Channel 11



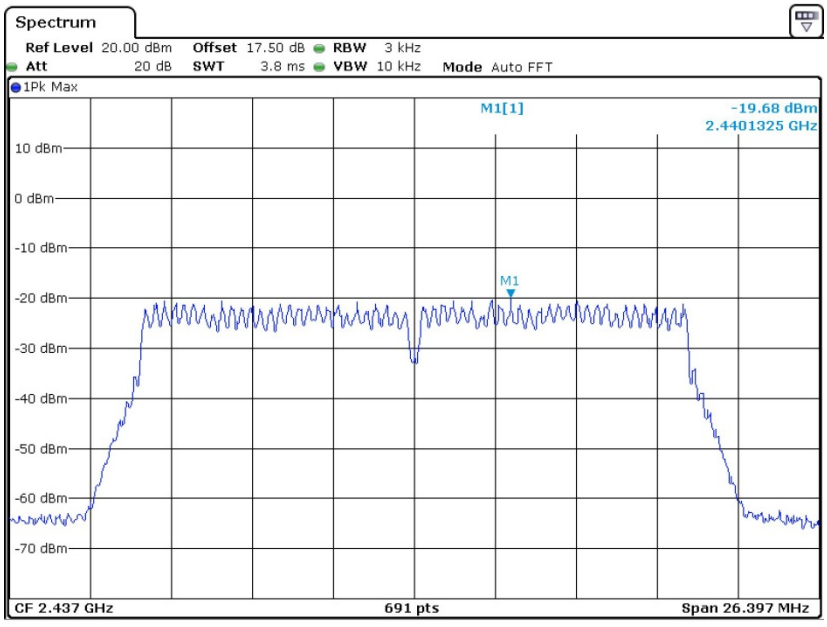
Date: 5.MAY.2013 09:34:01

PSD 3kHz Plot on 802.11n HT20 Channel 01



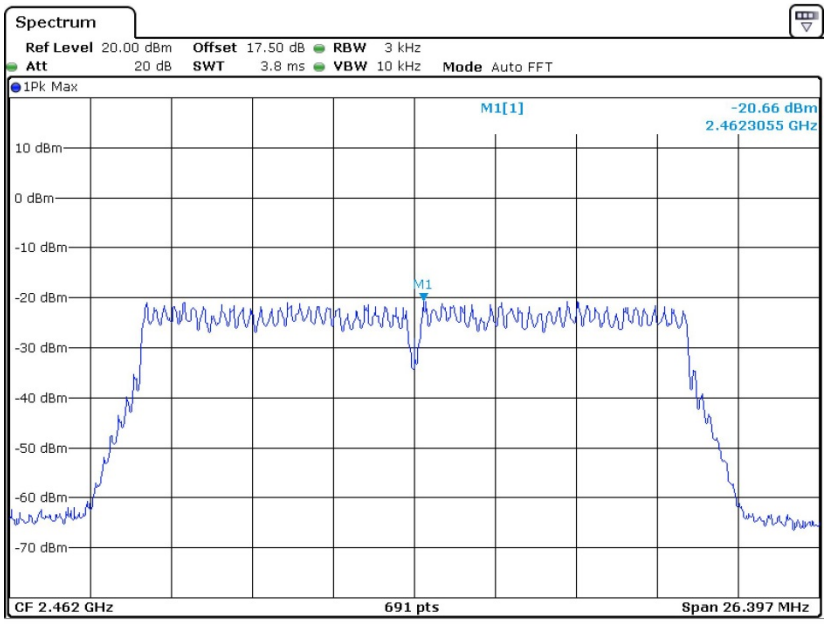
Date: 5.MAY.2013 09:37:44

PSD 3kHz Plot on 802.11n HT20 Channel 06



Date: 5.MAY.2013 09:43:34

PSD 3kHz Plot on 802.11n HT20 Channel 11



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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval.
5. 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.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Measure and record the results in the test report.

3.4.4 Test Setup