

FCC TEST REPORT
for
ASA P&E(Shenzhen) Co.,Ltd.

Tablet PC
Model No.:QD0904

Prepared for : Shenzhen Peilin Sports Technology Company Ltd.
Address : No.28, Industrial North district of XinHe Community,
Fuyong Town, BaoAn District, Shenzhen, China. 518103

Prepared By : Coffee-T Electronics Technology Co Ltd
Address : Unit 12, 8F Honghai Building,Qianhai
Road,Nanshan,Shenzhen,China
+86-755-86622903
+86-755-86622819

Report Number : CTE13IR-018F
Date of Test : Aug. 28 ~ Sep 03, 2013
Date of Report : Sep 03, 2013

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Appendix I (2 Pages)

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TEST REPORT

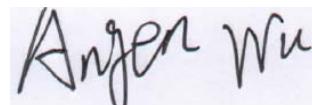
Applicant : ASA P&E(Shenzhen) Co.,Ltd.
Manufacturer : ASA P&E(Shenzhen) Co.,Ltd.
EUT : Tablet PC
Model No. : QD0904
Serial No. : N/A
Rating : DC 5V
Trade Mark : N/A

Measurement Procedure Used:
FCC Part15 Subpart C, Paragraph 15.247: 2011

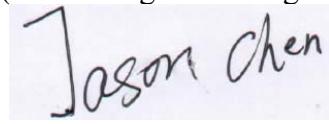
The device described above is tested by Coffee-T Electronics Technology Co Ltd to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Coffee-T Electronics Technology Co Ltd is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Coffee-T Electronics Technology Co Ltd.

Date of Test : Aug. 28 ~ Sep 03, 2013



Prepared by : (Tested Engineer / Angel wu)



Reviewer : (Project Manager /Jason Chen)



Approved & Authorized Signer : (Manager /Sumy li)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Tablet PC

Model Number : QD0904

Test Power Supply : DC 5V

RF Transmission Frequency : 2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20))
2422MHz~2452MHz (802.11n(HT40))

Channels : 11 For (802.11b/802.11g/802.11n(HT20))
7 For (802.11n(HT40))

Modulation
802.11b CCK
802.11g OFDM
802.11n MCS

Antenna Type : Internal

Antenna Gain : 0 dBi

Applicant : ASA P&E(Shenzhen) Co.,Ltd.

Address : Honghu Road, Yanchuan, Song gang, Bao'an District,Shenzhen
City,China

Manufacturer : ASA P&E(Shenzhen) Co.,Ltd.

Address : Honghu Road, Yanchuan, Song gang, Bao'an District,Shenzhen
City,China

Date of receiver : Sep 03, 2013

Date of Test : Aug. 28 ~ Sep 03, 2013

1.2. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS - LAB Code: L3503

Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021

Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, August 20, 2010.

1.3. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.3dB

Conduction Uncertainty : Uc = 3.4dB

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC Part 15, Paragraph 15.247.

3.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107, 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15, Paragraph 15.247(b)(1)	Peak Output Power	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS	Complies
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-	N/A
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS	Complies

* The digital circuit porting of the EUT has been tested and verified to comply with FCC Part 15, Subpart B., Class B Digital Devices and the associated Radio Receiver has also been tested and found to comply with FCC Part 15, Subpart B – Radio Receivers.

3.2. Description of Test Modes

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps lowest data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps lowest data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6.5 Mbps lowest data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT40: Channel 3(2422MHz), Channel 6(2437MHz) and Channel 9(2452MHz) with 13.5 Mbps lowest data rate (the worst case) are chosen for the final testing.

3.3. List of channels:

✓ - available

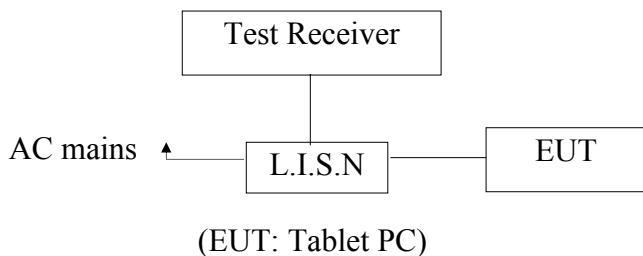
X - tested

Number	Frequency(MHz)		802.11 b/g/n (HT20)	802.11 b/g/n (HT40)
1	2412	✓	X	
2	2417	✓		
3	2422	✓		X
4	2427	✓		
5	2432	✓		
6	2437	✓	X	X
7	2442	✓		
8	2447	✓		
9	2452	✓		X
10	2457	✓		
11	2462	✓	X	

4. Conducted Emission Test

4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



4.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

EUT : Tablet PC
Model Number : QD0904
Applicant : ASA P&E(Shenzhen) Co.,Ltd.

4.4. Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown as Section 4.1.

4.4.2. Turn on the power of all equipment.

4.4.3. Let the EUT work in test mode (ON) and measure it.

4.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 4.6.

4.6. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Nov. 12, 2012	1 Year
2.	LISN	SchwarzBeck	NSLK 8126	8126377	May 19, 2012	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	May 19, 2012	1 Year
4.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A

Conduction Uncertainty : $U_c = 3.4\text{dB}$

4.7. Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150KHz to 30 MHz is investigated.

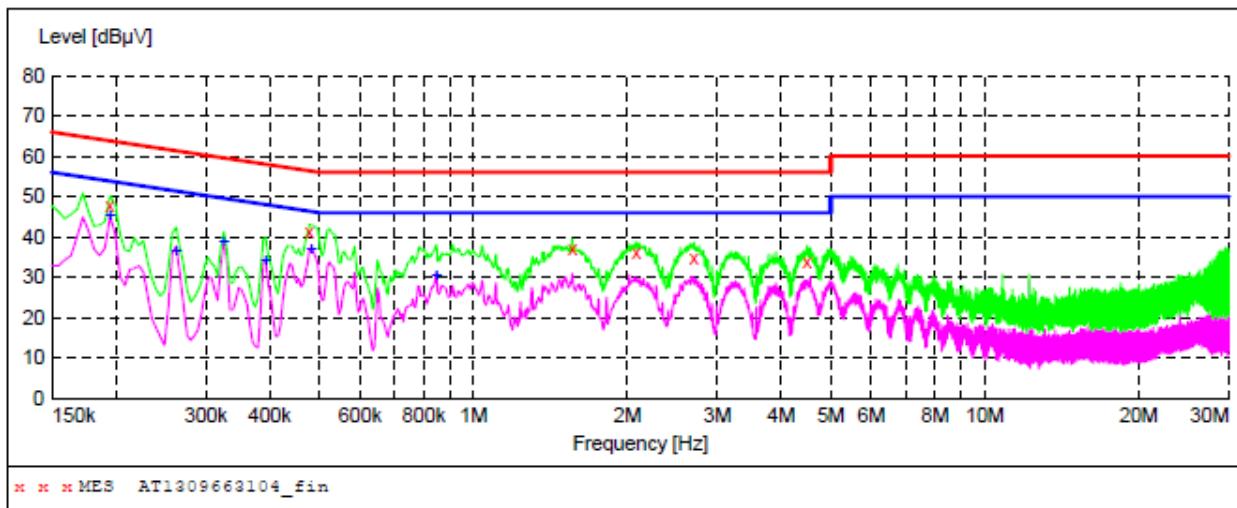
Please refer the following pages.

CONDUCTED EMISSION TEST DATA

EUT: Tablet PC M/N:QD0904
Operating Condition: USB Charging and Playing
Test Site: 1# Shielded Room
Operator: Angel wu
Test Specification: AC 120V/60Hz for USB
Comment: Live Line
 Tem:25°C Hum:50% 9/2/2013 9.12 pm

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages


MEASUREMENT RESULT: "AT1309663104_fin"

9/2/2013 3:22PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.195000	48.00	20.1	64	15.8	QP	L1	GND
0.478500	41.20	20.1	56	15.2	QP	L1	GND
1.562500	36.90	20.3	56	19.1	QP	L1	GND
2.084500	36.00	20.3	56	20.0	QP	L1	GND
2.701000	34.60	20.4	56	21.4	QP	L1	GND
4.492000	33.90	20.5	56	22.1	QP	L1	GND

MEASUREMENT RESULT: "AT1309663104_fin2"

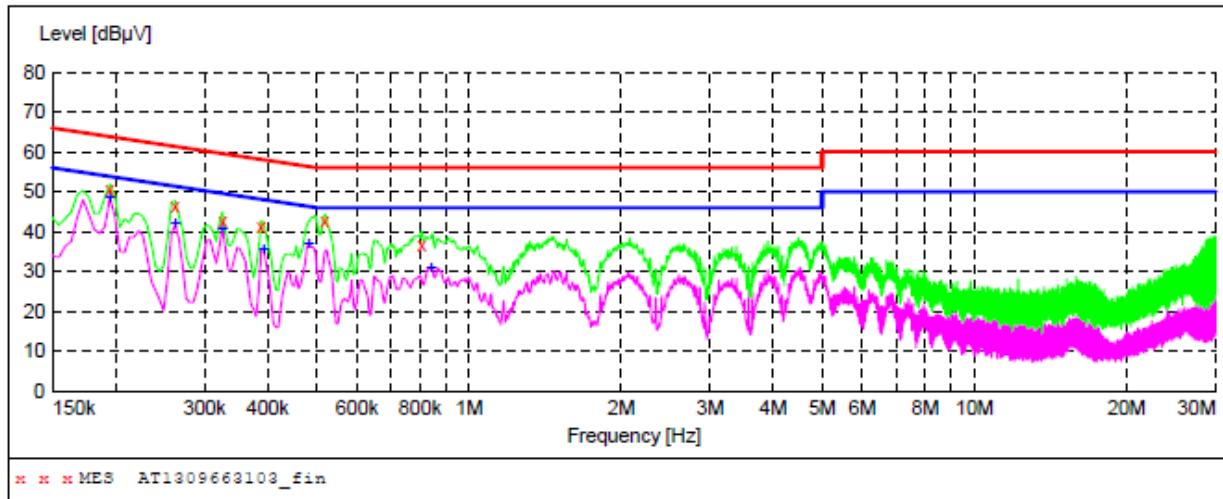
9/2/2013 3:22PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.195000	45.30	20.1	54	8.5	AV	L1	GND
0.262500	36.70	20.1	51	14.7	AV	L1	GND
0.325500	39.20	20.1	50	10.4	AV	L1	GND
0.393000	34.30	20.1	48	13.7	AV	L1	GND
0.483000	37.00	20.1	46	9.3	AV	L1	GND
0.847500	30.50	20.1	46	15.5	AV	L1	GND

CONDUCTED EMISSION TEST DATA

EUT: Tablet PC M/N:QD0904
Operating Condition: USB Charging and Playing
Test Site: 1# Shielded Room
Operator: Angel wu
Test Specification: AC 120V/60Hz for USB
Comment:
Tem:25°C Hum:50% 9/2/2013 9.17 pm

SCAN TABLE: "Voltage (150K~30M) FIN"
Short Description: 150K-30M Disturbance Voltages


MEASUREMENT RESULT: "AT1309663103_fin"

9/2/2013 3:20PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.195000	50.60	20.1	64	13.2	QP	N	GND
0.262500	46.20	20.1	61	15.2	QP	N	GND
0.325500	42.60	20.1	60	17.0	QP	N	GND
0.388500	41.30	20.1	58	16.8	QP	N	GND
0.519000	42.70	20.1	56	13.3	QP	N	GND
0.807000	36.80	20.1	56	19.2	QP	N	GND

MEASUREMENT RESULT: "AT1309663103_fin2"

9/2/2013 3:20PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.195000	48.60	20.1	54	5.2	AV	N	GND
0.262500	42.40	20.1	51	9.0	AV	N	GND
0.325500	41.00	20.1	50	8.6	AV	N	GND
0.393000	35.90	20.1	48	12.1	AV	N	GND
0.483000	37.00	20.1	46	9.3	AV	N	GND
0.843000	31.20	20.1	46	14.8	AV	N	GND

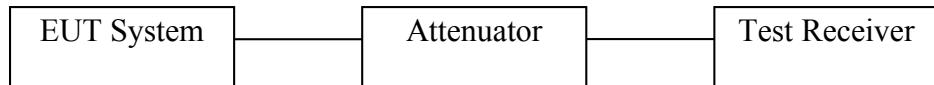
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5. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

5.1 Test Setup



5.2 6dB Bandwidth

a. Limit

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

b. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz(802.11b/802.11g/802.11n(HT20)), RBW=300kHz, VBW = 3*RBW, Span = 50MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

c. Test Setup See 5.1

d. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	July 03, 2013	1 Year
2	EMI Receiver	Rohde & Schwarz	ESCI	100627	July 03, 2013	1 Year
3.	Preamplifier	Instruments corporation	EMC011830	980100	July 03, 2013	1 Year
4	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	July 03, 2013	1 Year
5	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

e. Test Results

Pass.

f. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	9.12		Pass
Mid	2437	9.12	>500	Pass
High	2462	9.04		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.32		Pass
Mid	2437	16.36	>500	Pass
High	2462	16.44		Pass

Test mode: IEEE 802.11n (HT20)

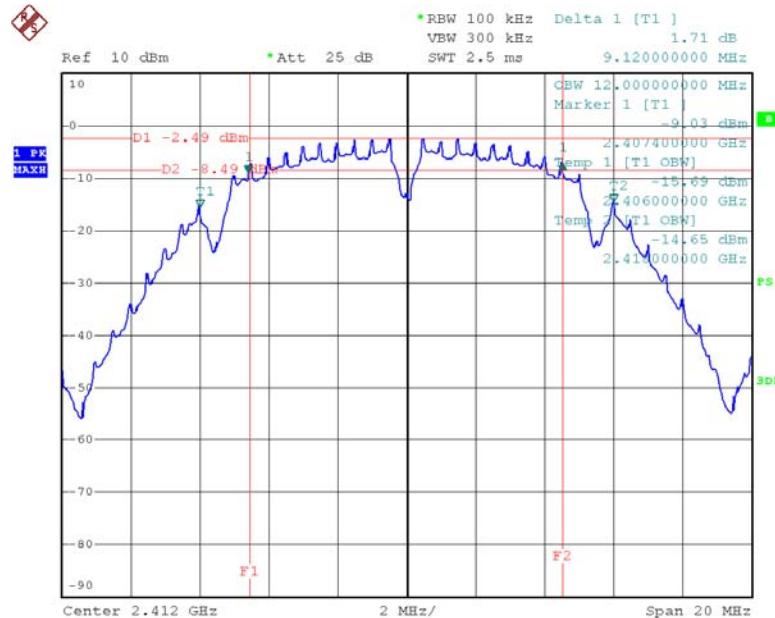
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	17.68		Pass
Mid	2437	17.72	>500	Pass
High	2462	17.68		Pass

Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2422	35.08		Pass
Mid	2437	36.16	>500	Pass
High	2452	35.92		Pass

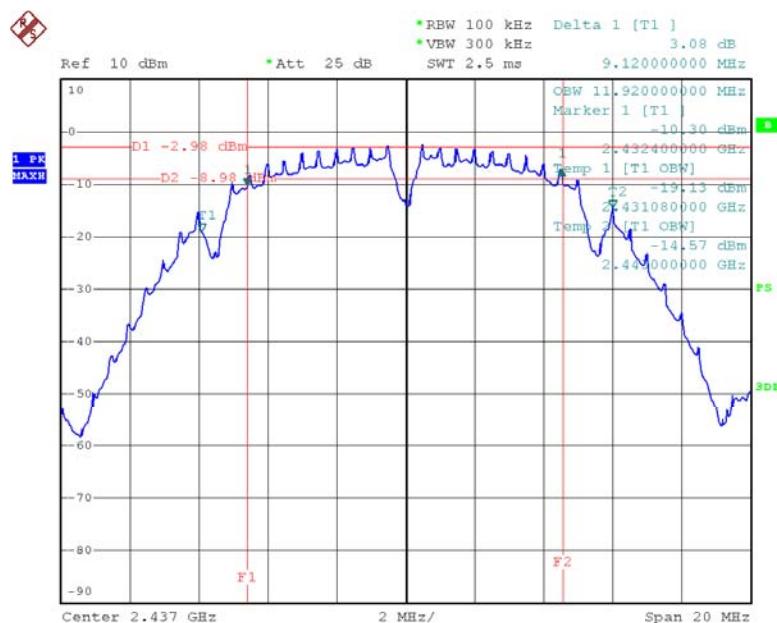
Test Plots See the following page.

Test Mode: 802.11b---Low



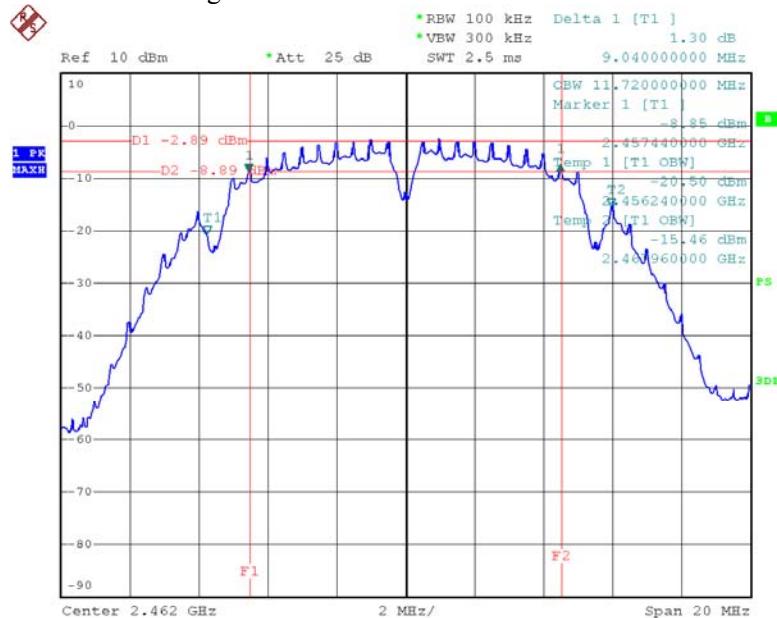
Date: 3.SEP.2013 15:41:53

Test Mode: 802.11b---Mid



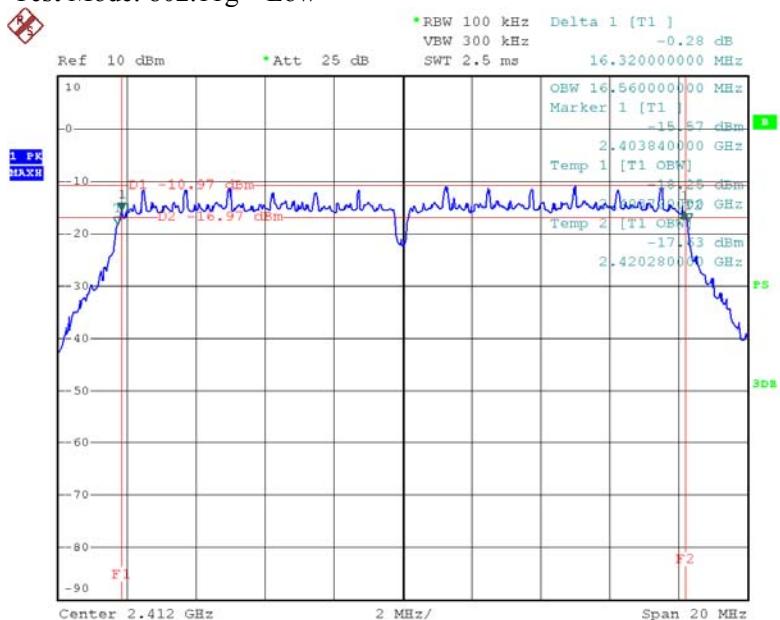
Date: 3.SEP.2013 15:49:28

Test Mode: 802.11b---High



Date: 3.SEP.2013 15:51:21

Test Mode: 802.11g---Low



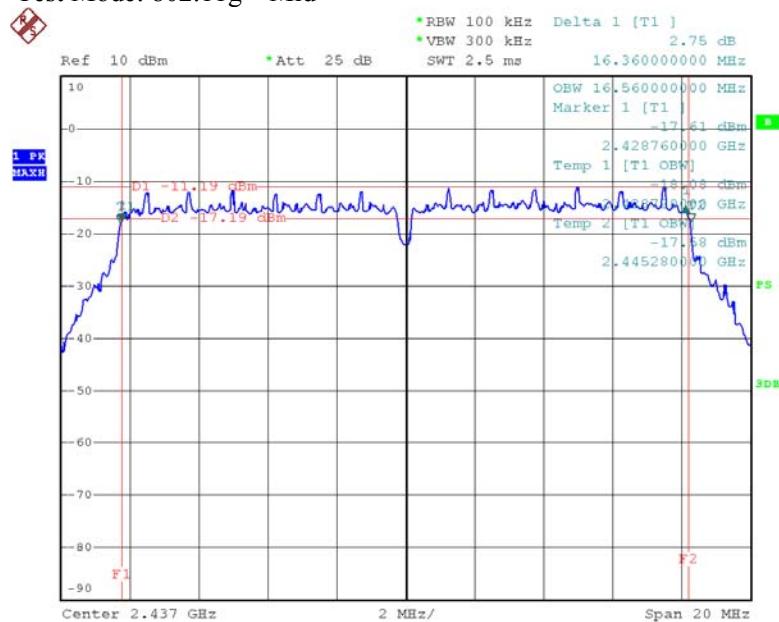
Date: 3.SEP.2013 16:00:24

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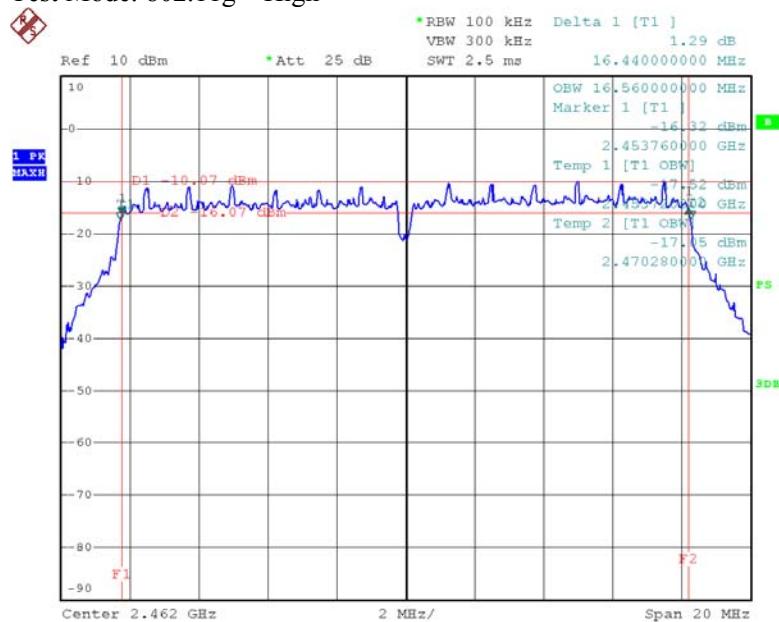
Http://www.szkht.com.cn

Test Mode: 802.11g---Mid



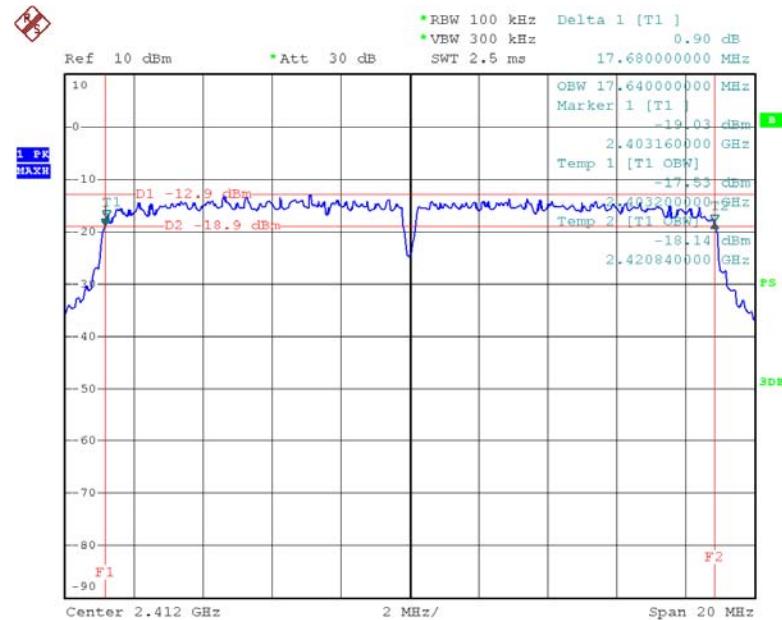
Date: 3.SEP.2013 16:13:10

Test Mode: 802.11g---High



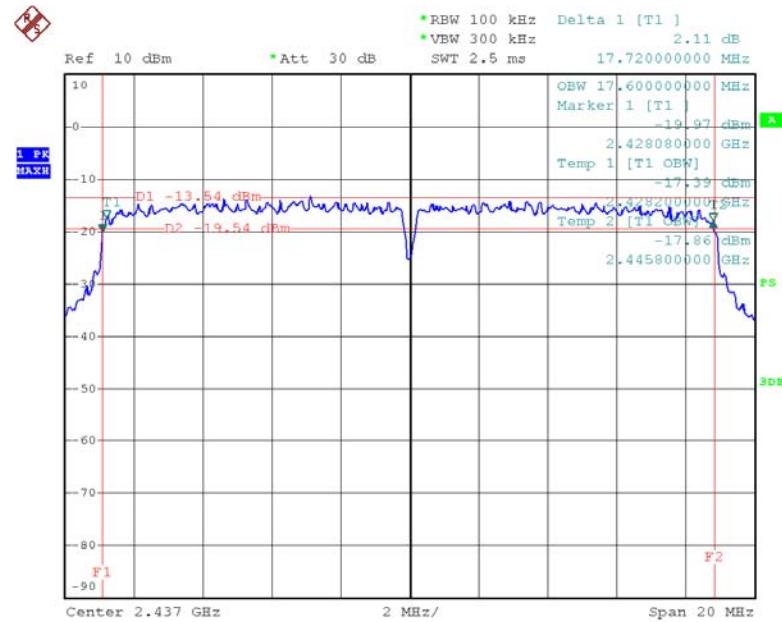
Date: 3.SEP.2013 16:02:10

Test Mode: 802.11n (HT20) ---Low



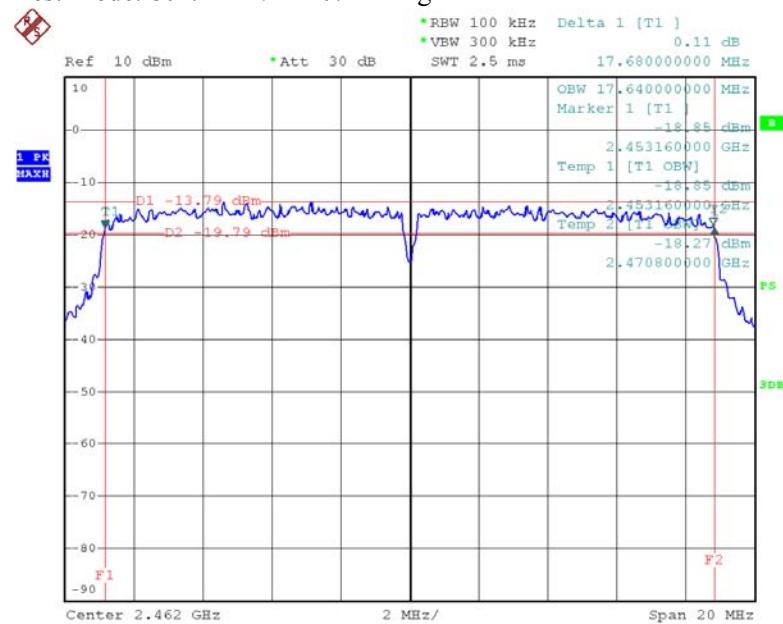
Date: 3.SEP.2013 07:09:33

Test Mode: 802.11n (HT20) ---Mid



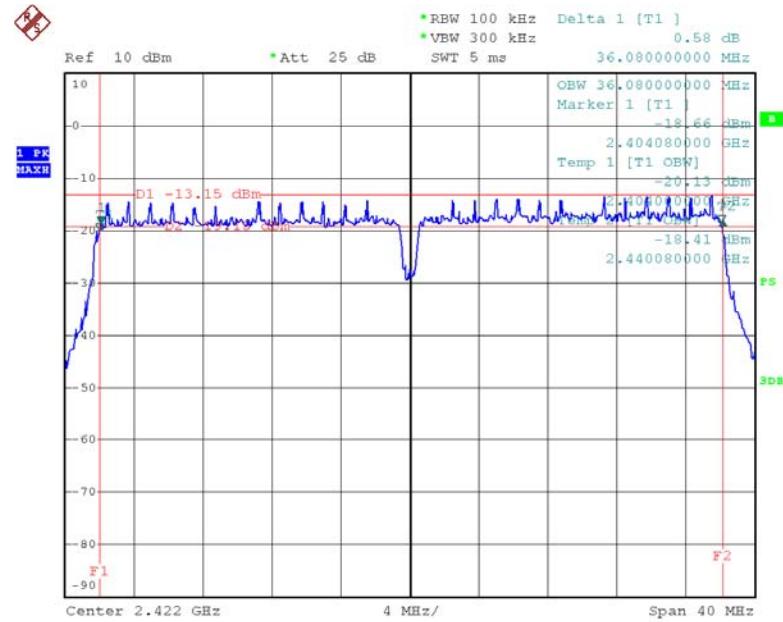
Date: 3.SEP.2013 08:14:42

Test Mode: 802.11n (HT20) ---High



Date: 3.SEP.2013 07:16:58

Test Mode: 802.11n (HT40) ---Low



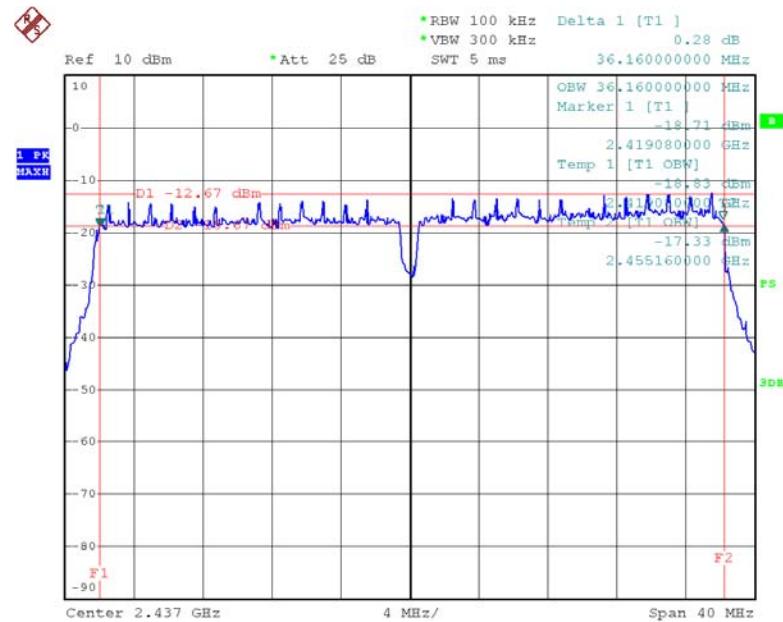
Date: 3.SEP.2013 17:11:59

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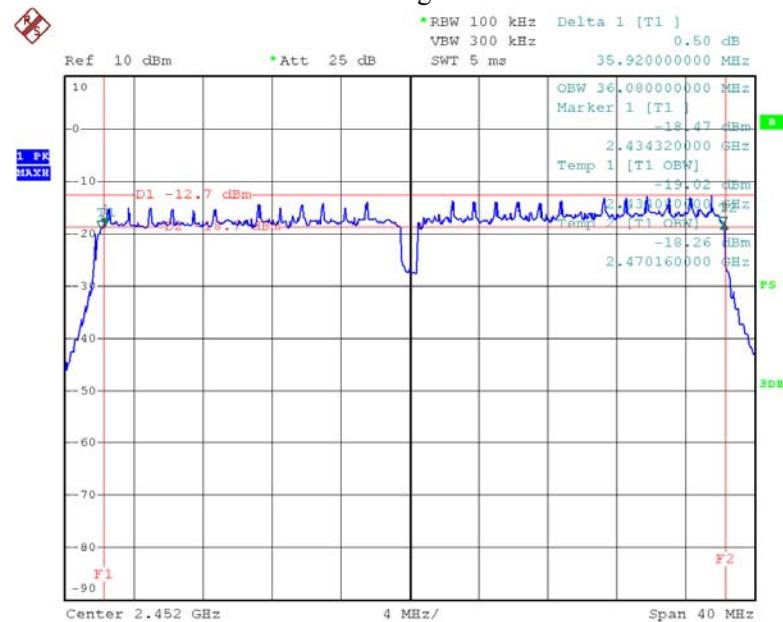
[Http://www.szkht.com.cn](http://www.szkht.com.cn)

Test Mode: 802.11n (HT40) ---Mid



Date: 3.SEP.2013 17:19:55

Test Mode: 802.11n (HT40) ---High



Date: 3.SEP.2013 16:04:10

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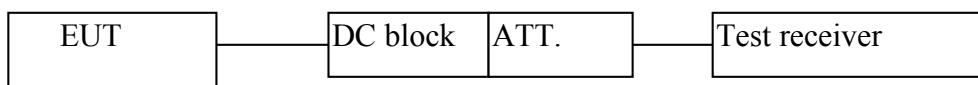
5.3 Maximum Peak output power test

a. Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt (30dBm).
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. Configuration of Measurement



c. Data Rates

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6.5Mbps data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT40: Channel 3(2422MHz), Channel 6(2437MHz) and Channel 9(2452MHz) with 13.5Mbps data rate (the worst case) are chosen for the final testing.

d. Test Procedure

This test was according the kdb 58074 5.2.1.2 Measurement Procedure PK2:

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	July 03, 2013	1 Year
2	EMI Receiver	Rohde & Schwarz	ESCI	100627	July 03, 2013	1 Year
3.	Preamplifier	Instruments corporation	EMC01183 0	980100	July 03, 2013	1 Year
4	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	July 03, 2013	1 Year
5	EMI Test Software	SHURPLE	N/A	N/A	N/A	N/A

	EZ-EMC				
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e. Test Results

Pass

f. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	9.47	30	1	Pass
Mid	2437	9.32			Pass
High	2462	9.13			Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	8.64	30	1	Pass
Mid	2437	8.45			Pass
High	2462	8.18			Pass

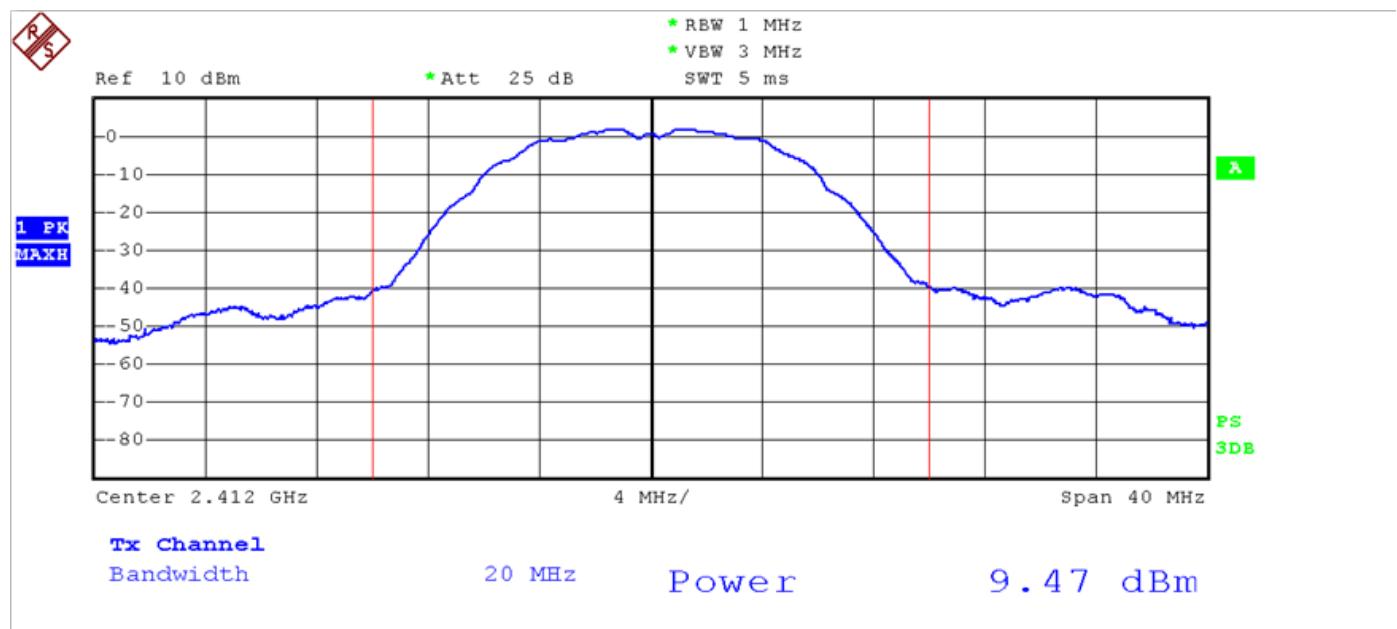
Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	9.30	30	1	Pass
Mid	2437	8.79			Pass
High	2462	8.37			Pass

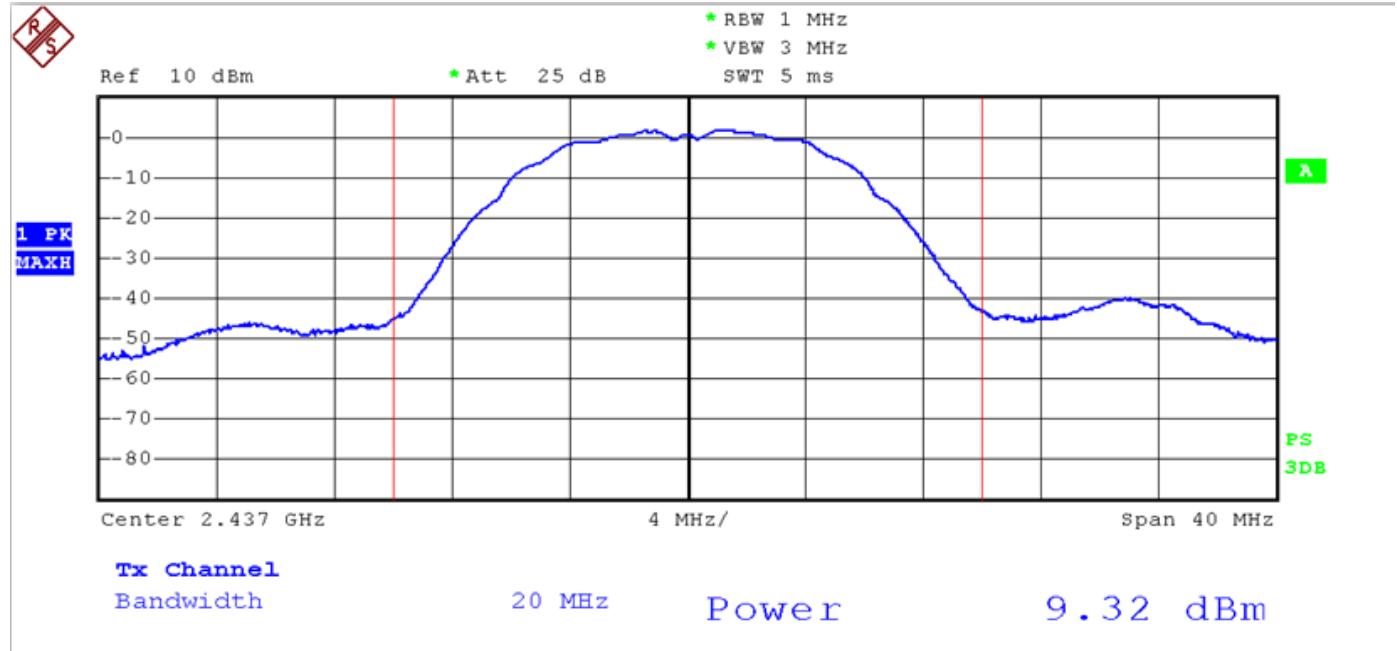
Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2422	8.47	30	1	Pass
Mid	2437	8.31			Pass
High	2452	8.78			Pass

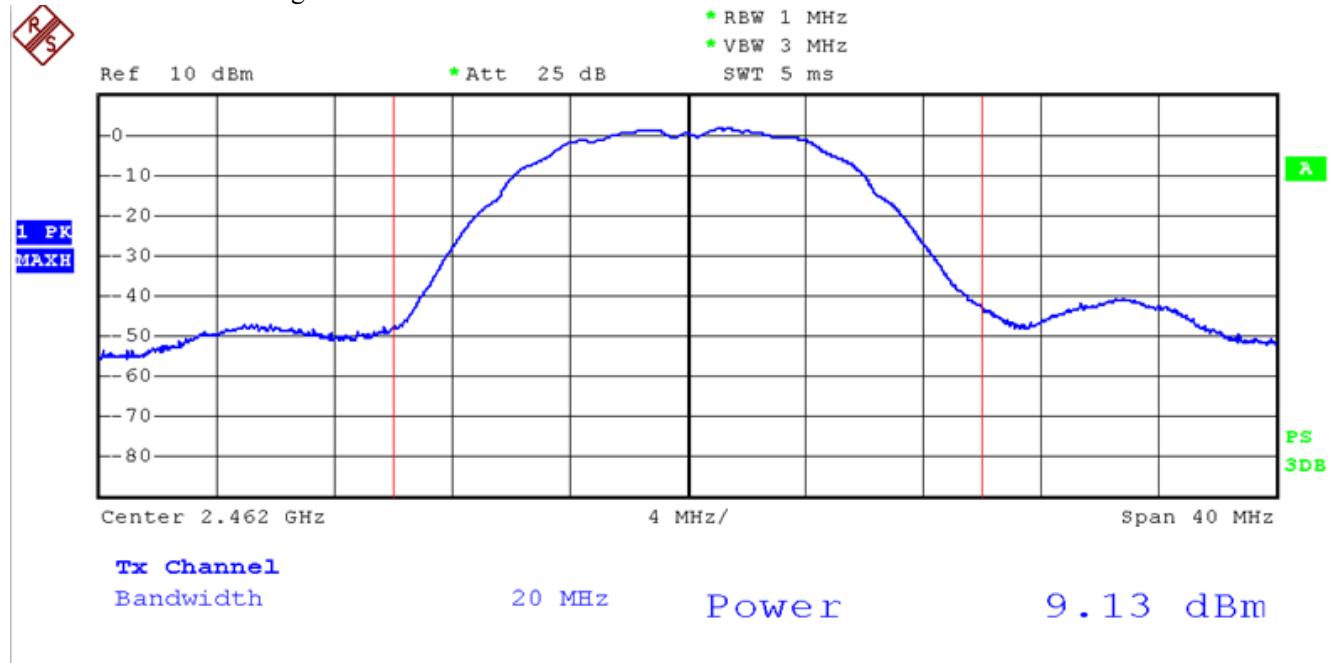
Test Mode: 802.11b ---Low



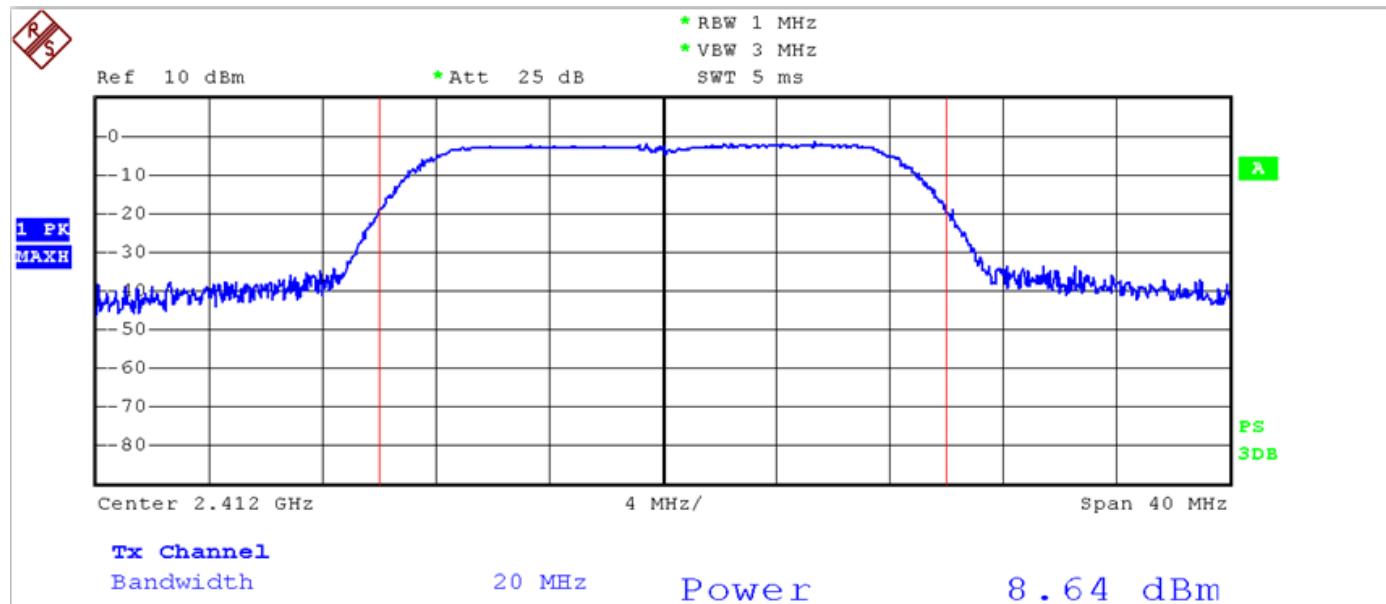
Test Mode: 802.11b---Mid



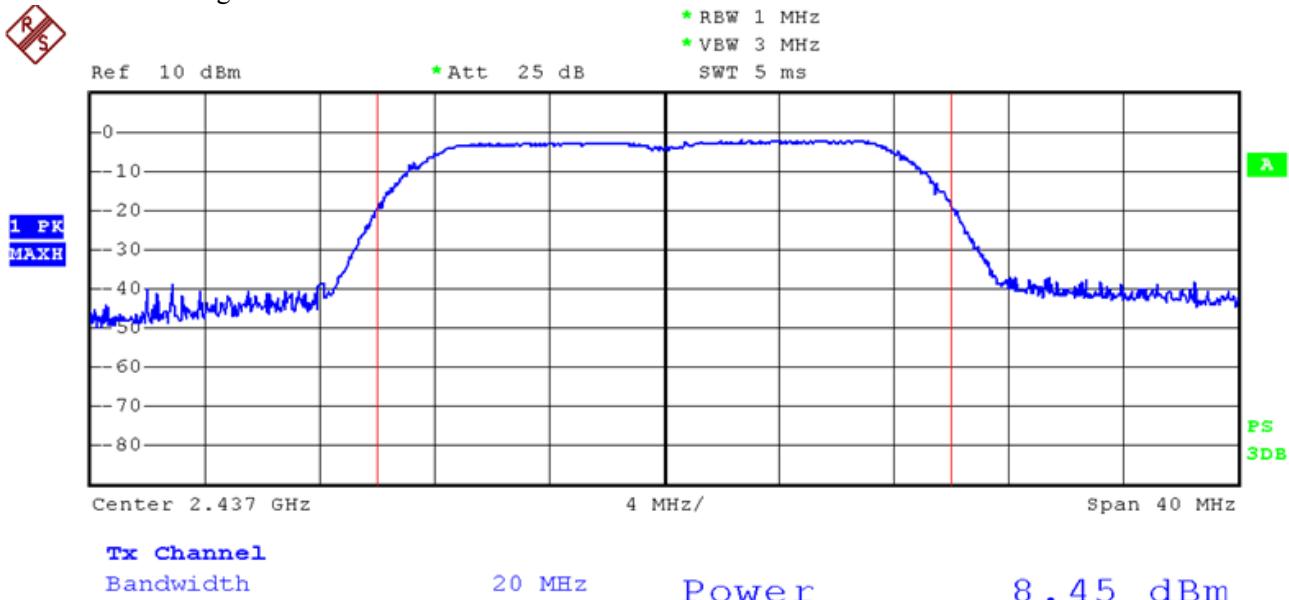
Test Mode: 802.11b---High



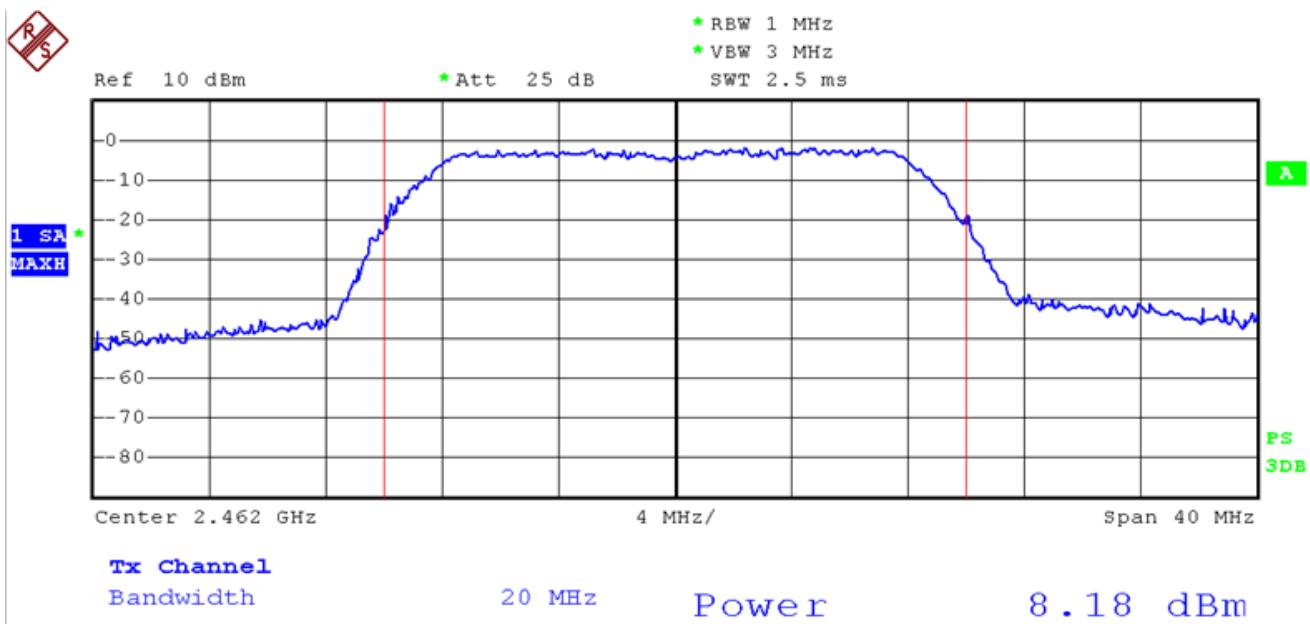
Test Mode: 802.11g ---Low



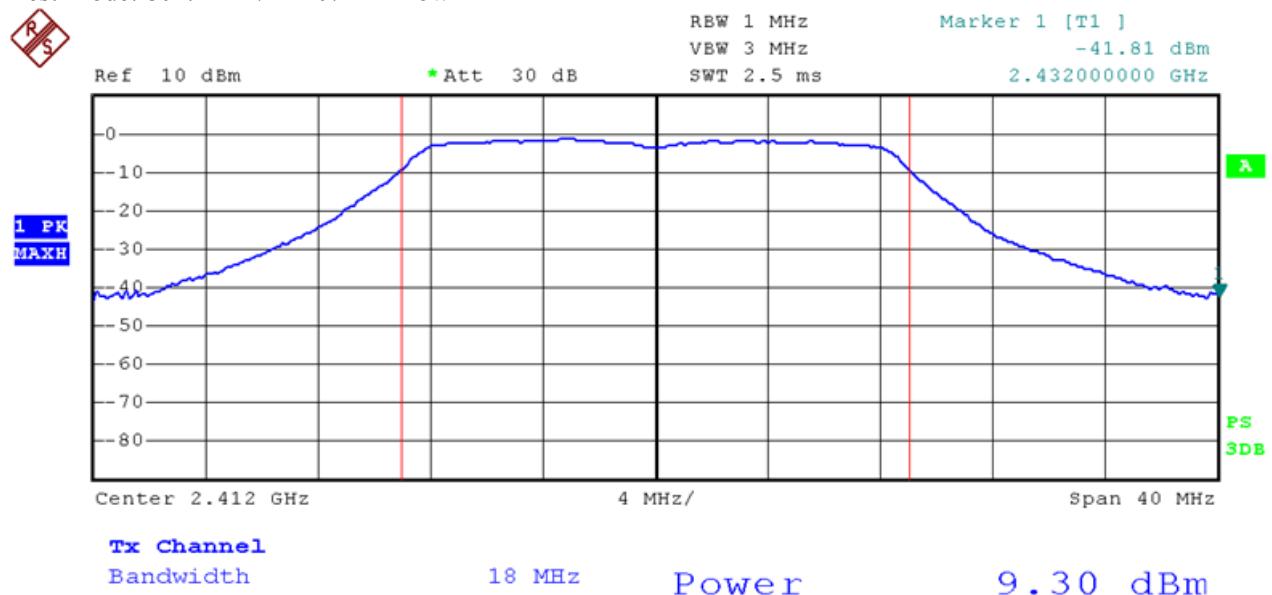
Test Mode: 802.11g---Mid



Test Mode: 802.11g---High



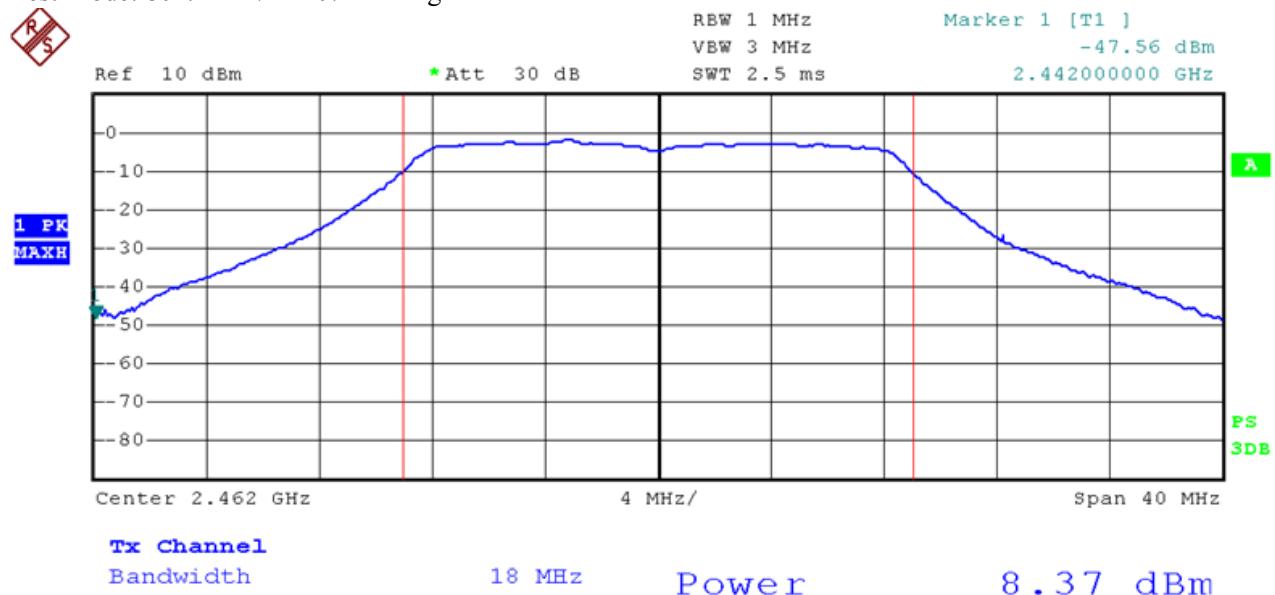
Test Mode: 802.11n (HT20) ---Low



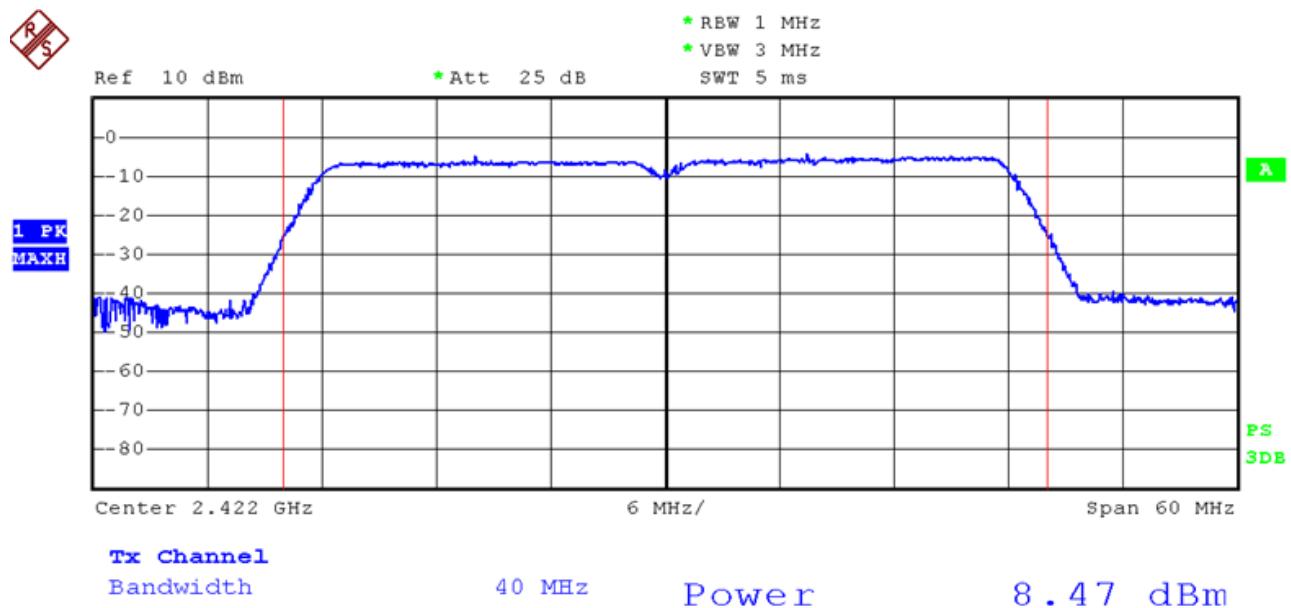
Test Mode: 802.11n (HT20) ---Mid



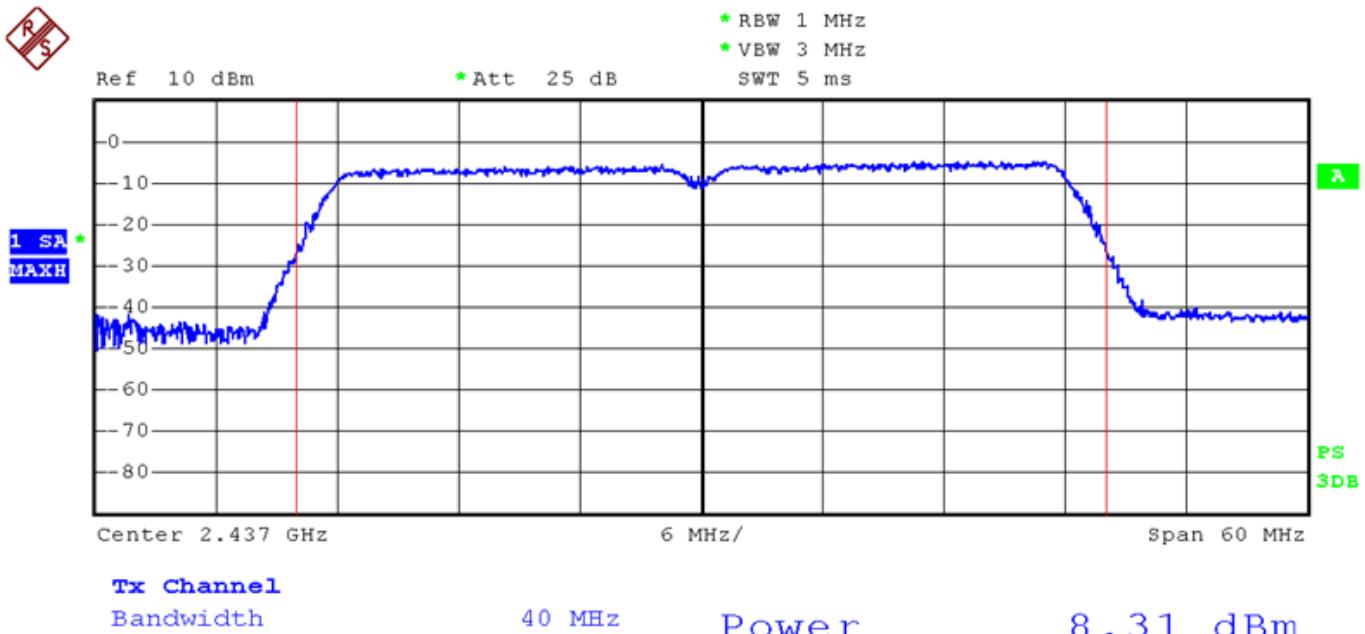
Test Mode: 802.11n (HT20) ---High



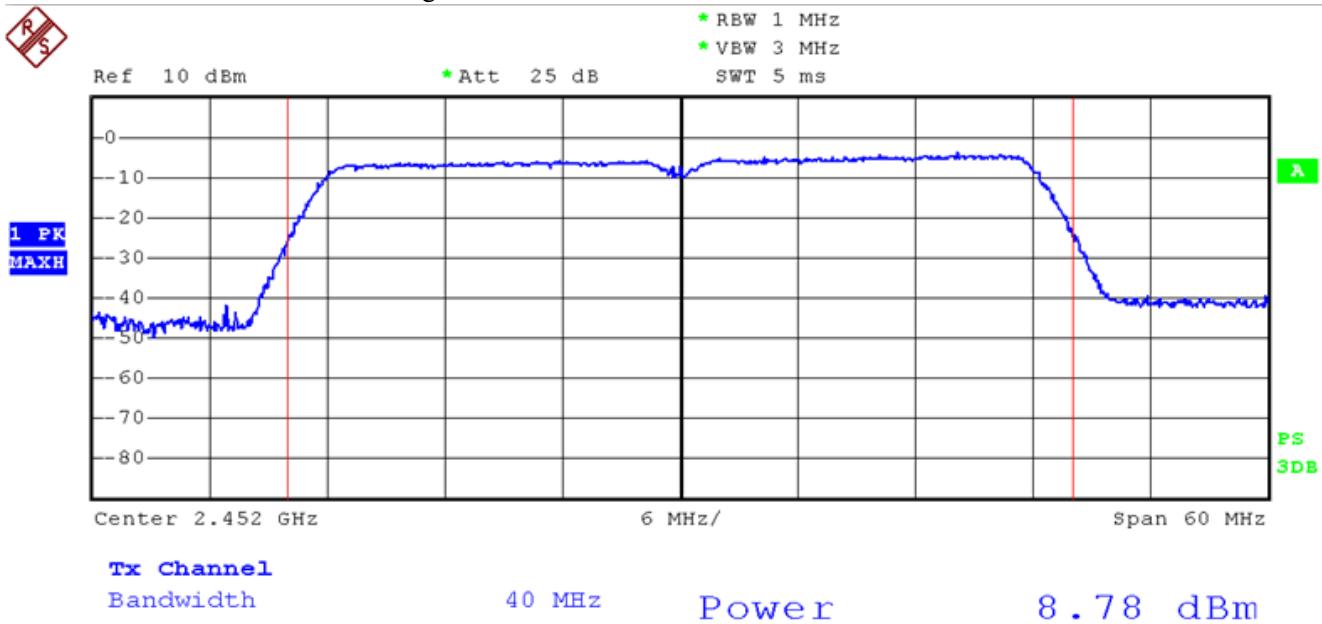
Test Mode: 802.11n (HT40) ---Low



Test Mode: 802.11n (HT40) --- Mid



Test Mode: 802.11n (HT40) --- High



5.4 Band Edges Measurement

a. Limit

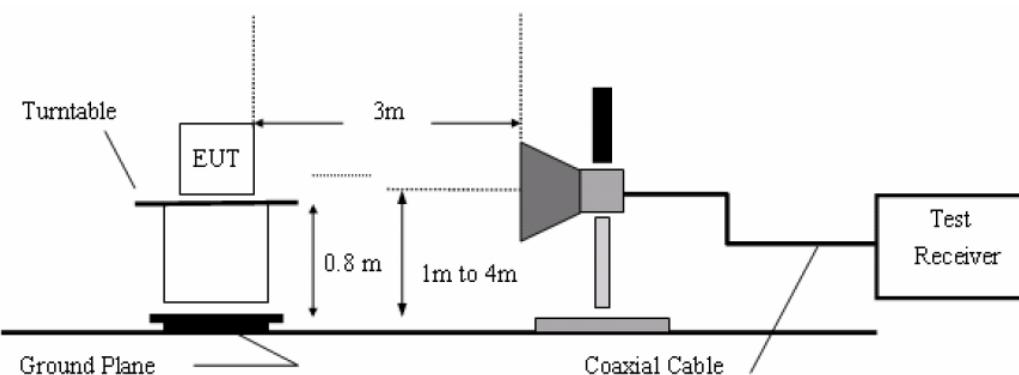
According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

b. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Peak detector: RBW=1MHz, VBW=3MHz, SWT=AUTO
Average detector: RBW=1MHz, VBW=10Hz, SWT=AUTO
For Emission within 2MHz if an authorized band edge measured using the integration method. In accordance with KDB 558074 D01v03r01 section 13.0 band-edge measurements.
The EUT is tested in 9*6*6 Chamber.
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	July 03, 2013	1 Year
2	EMI Receiver	Rohde & Schwarz	ESCI	100627	July 03, 2013	1 Year
3.	Preamplifier	Instruments corporation	EMC011830	980100	July 03, 2013	1 Year
4	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	July 03, 2013	1 Year
5	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A



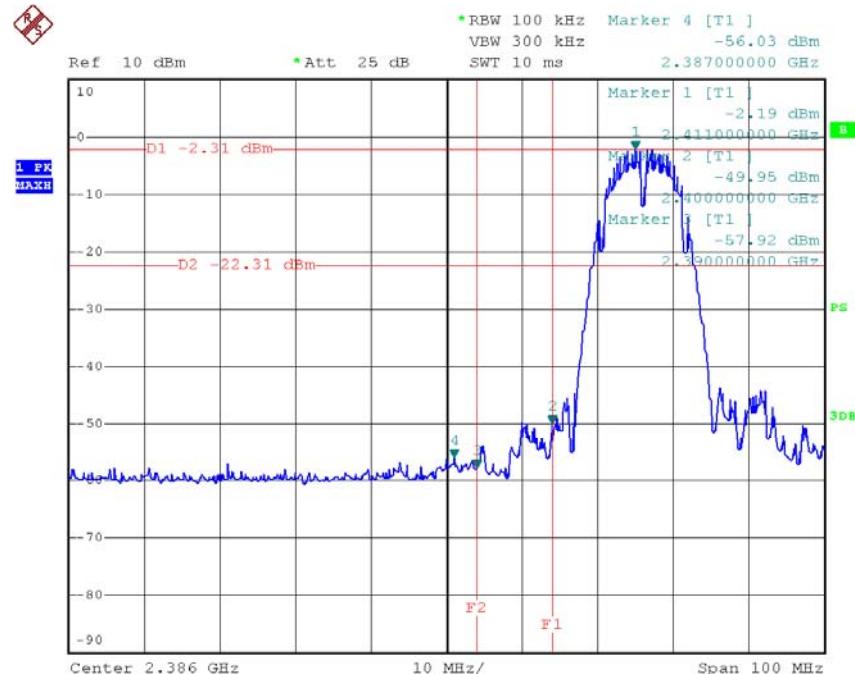
c. Test Results

Pass

d. Test Plots

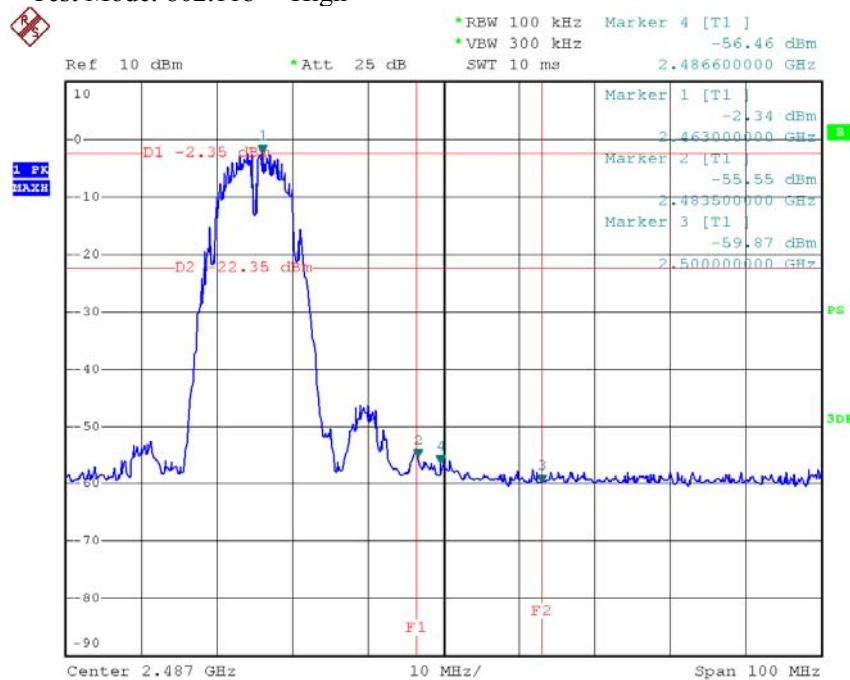
See the following page.

Test Mode: 802.11b ---Low



Date: 3.SEP.2013 15:45:09

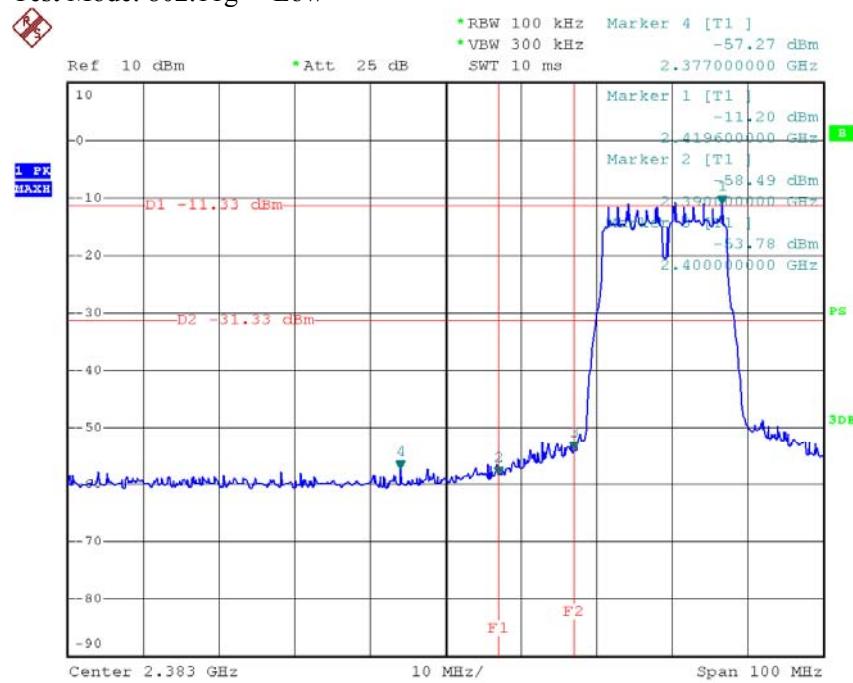
Test Mode: 802.11b ---High



Date: 3.SEP.2013 15:52:21

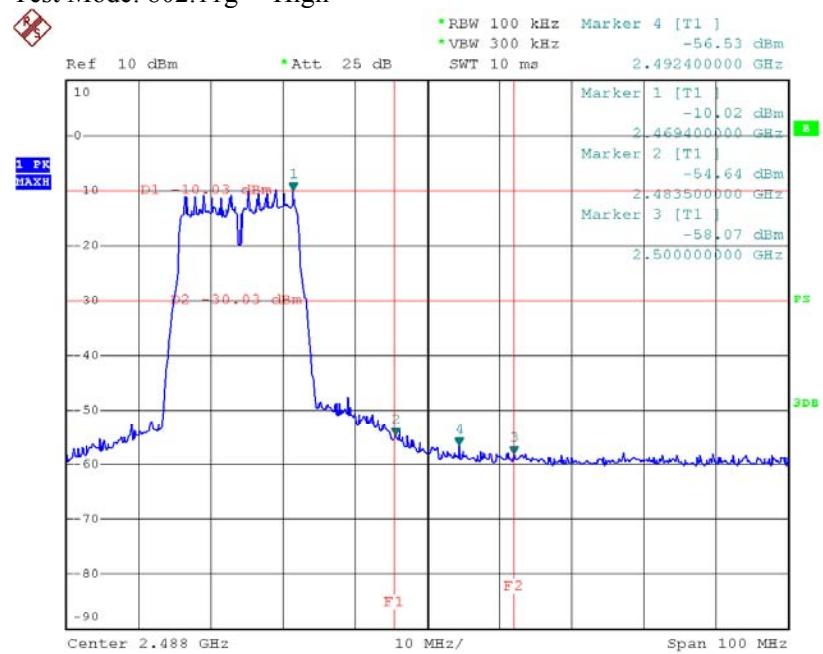
Unit 12, 8F Honghai Building, Qianhai Road, Nanshan, Shenzhen, China
Tel: +86-755-86622903 (50 Lines) Fax: +86-755-86622819
[Http://www.szkht.com.cn](http://www.szkht.com.cn)

Test Mode: 802.11g ---Low



Date: 3.SEP.2013 16:06:57

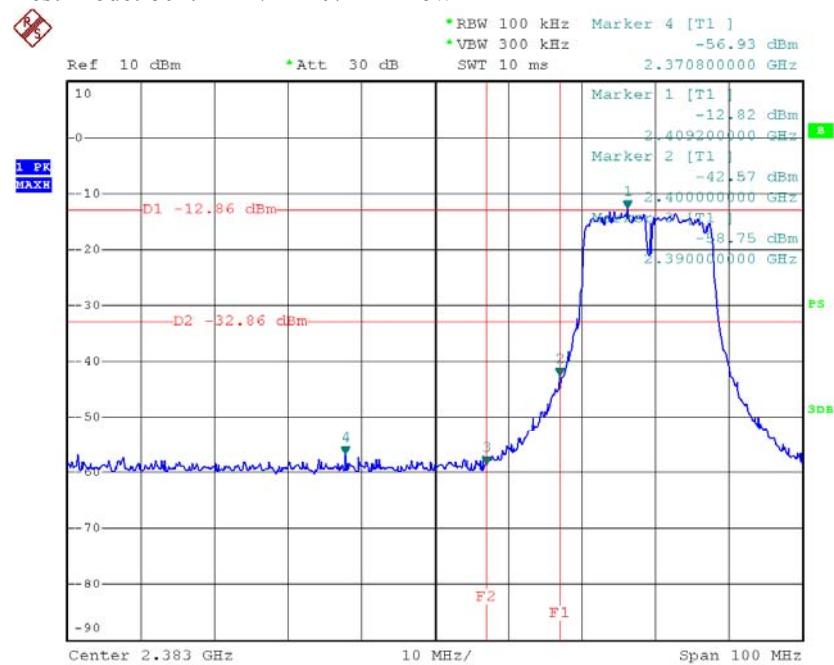
Test Mode: 802.11g ---High



Date: 3.SEP.2013 16:03:57

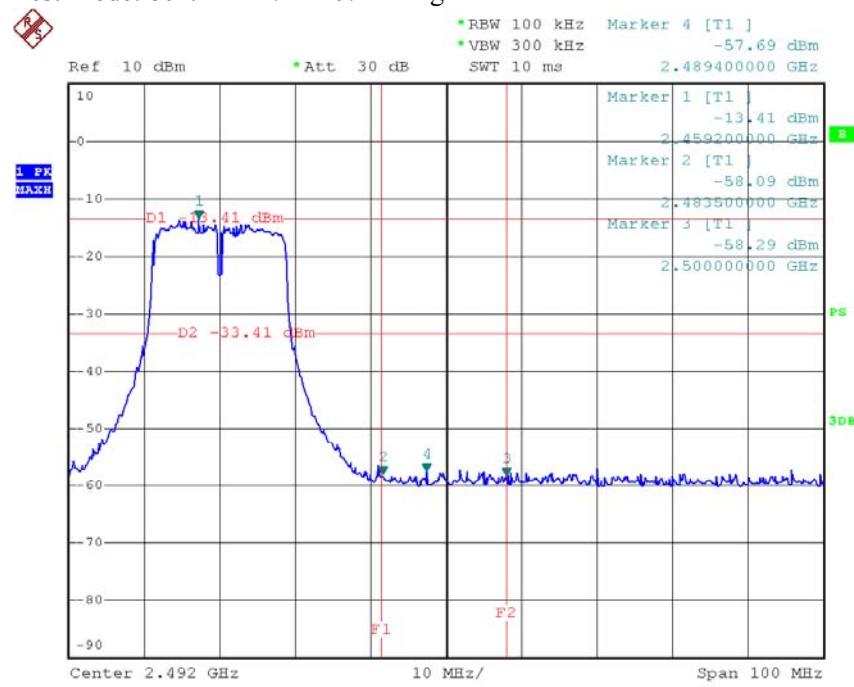
Unit 12, 8F Honghai Building, Qianhai Road, Nanshan, Shenzhen, China
Tel: +86-755-86622903 (50 Lines) Fax: +86-755-86622819
[Http://www.szkht.com.cn](http://www.szkht.com.cn)

Test Mode: 802.11n (HT20) ---Low



Date: 3.SEP.2013 07:11:33

Test Mode: 802.11n (HT20) ---High



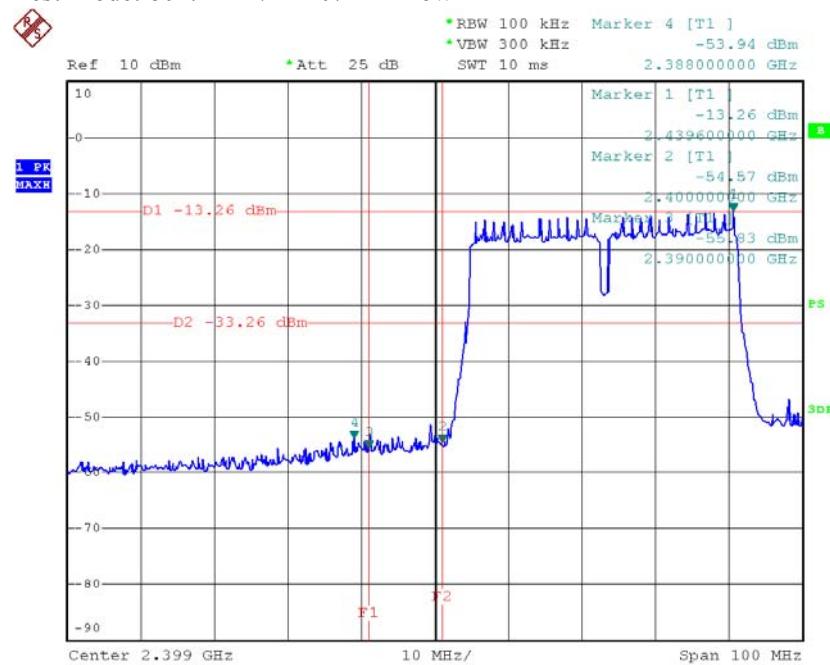
Date: 3.SEP.2013 07:15:44

Unit 12, 8F Honghai Building, Qianhai Road, Nanshan, Shenzhen, China

Tel:+86-755-86622903(50 Lines) Fax:+86-755-86622819

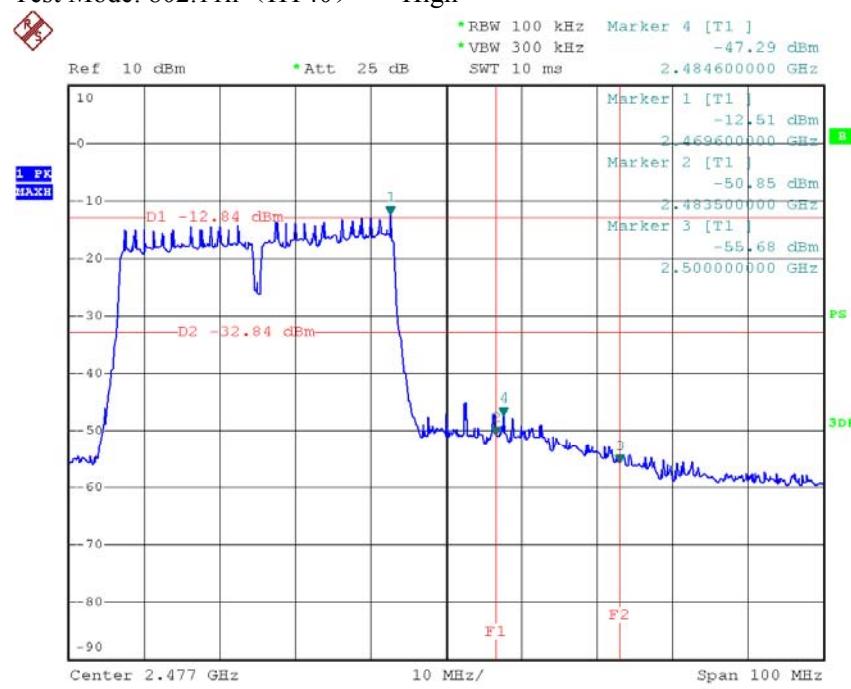
[Http://www.szkht.com.cn](http://www.szkht.com.cn)

Test Mode: 802.11n (HT40) ---Low



Date: 3.SEP.2013 17:10:53

Test Mode: 802.11n (HT40) ---High



Date: 3.SEP.2013 17:08:09

Unit 12, 8F Honghai Building, Qianhai Road, Nanshan, Shenzhen, China

Tel: +86-755-86622903 (50 Lines) Fax: +86-755-86622819

[Http://www.szkht.com.cn](http://www.szkht.com.cn)

5.5 Peak Power Spectral Density

a. Limit

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

b. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5MHz, Sweep=500s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	July 03, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	July 03, 2013	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	July 03, 2013	1 Year
4.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

c. Test Setup

See 5.1

d. Test Results

Pass

e. Test Data

Please refer to the following data.

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-16.73	-		Pass
Mid	2437	-17.21	-	8.00	Pass
High	2462	-16.95	-		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Σ PPSD (dBm)	Limit (dBm)	Result
Low	2412	-24.90	-		Pass
Mid	2437	-24.20	-	8.00	Pass
High	2462	-23.43	-		Pass

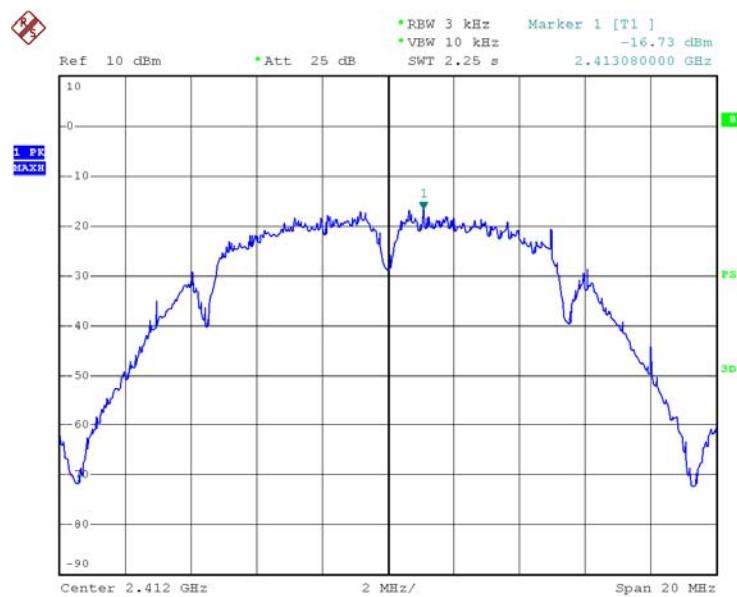
Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-27.73	-		Pass
Mid	2437	-27.59	-	8.00	Pass
High	2462	-28.17	-		Pass

Test mode: IEEE 802.11n (HT40)

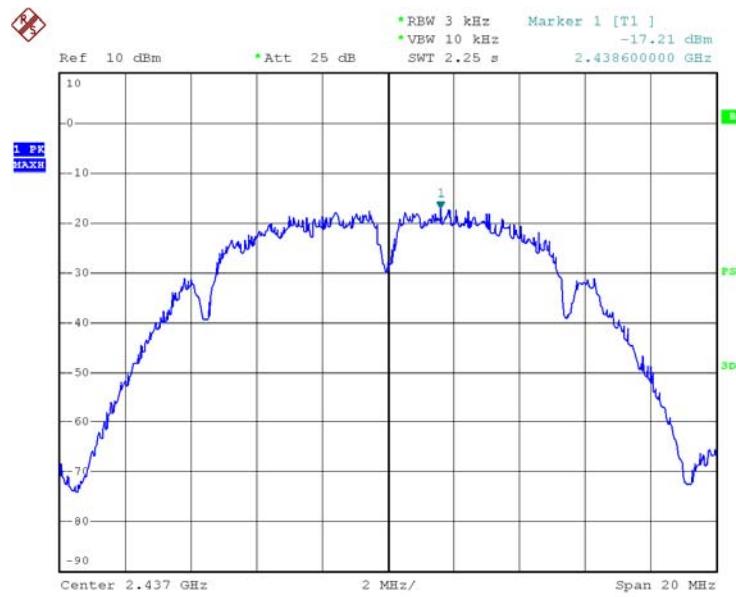
Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2422	-27.71	-		Pass
Mid	2437	-25.92	-	8.00	Pass
High	2452	-26.67	-		Pass

f. Test Plot See the following pages
802.11 b CH--Low



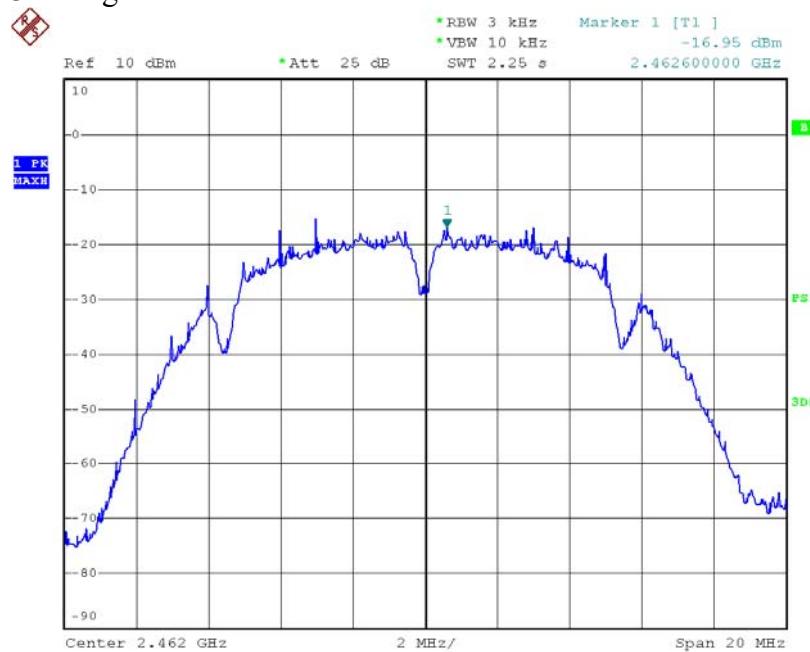
Date: 3.SEP.2013 15:46:39

802.11 b CH--Mid

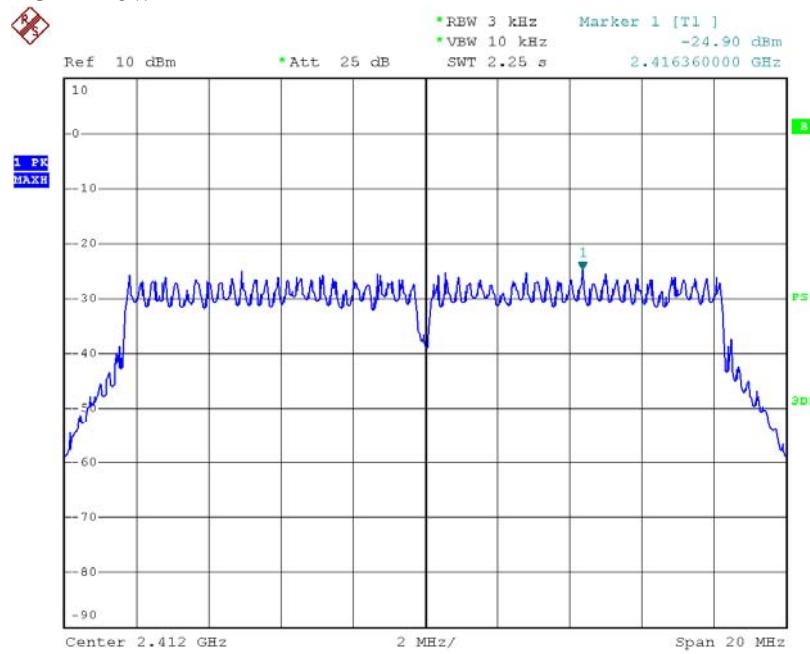


Date: 3.SEP.2013 15:48:13

802.11 b CH-High

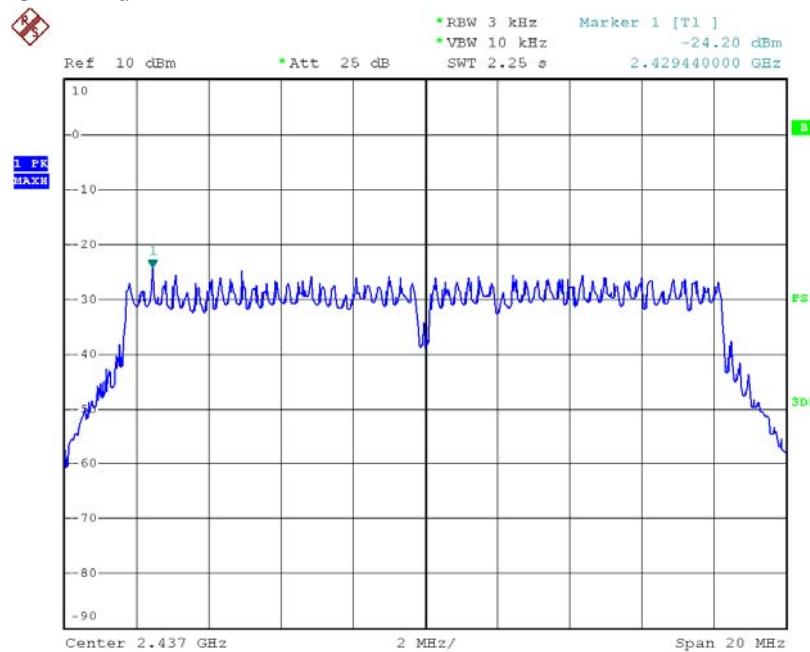


802.11g CH-Low



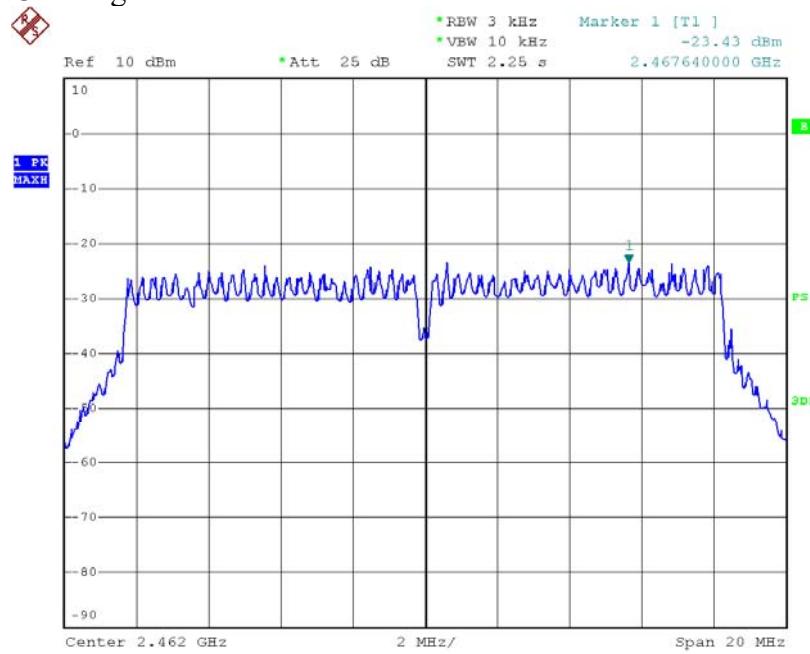
Date: 3.SEP.2013 16:09:48

802.11g CH--Mid



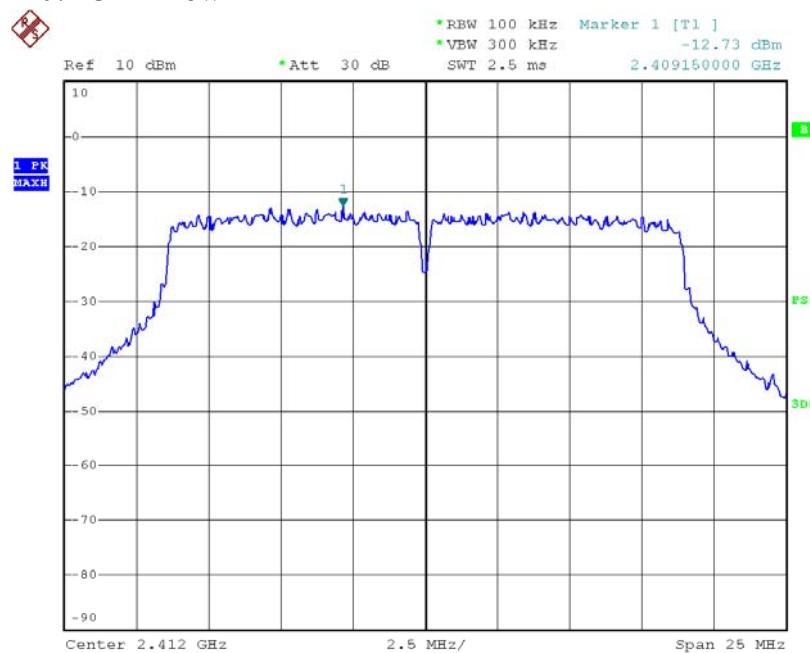
Date: 3.SEP.2013 16:12:04

802.11g CH--High



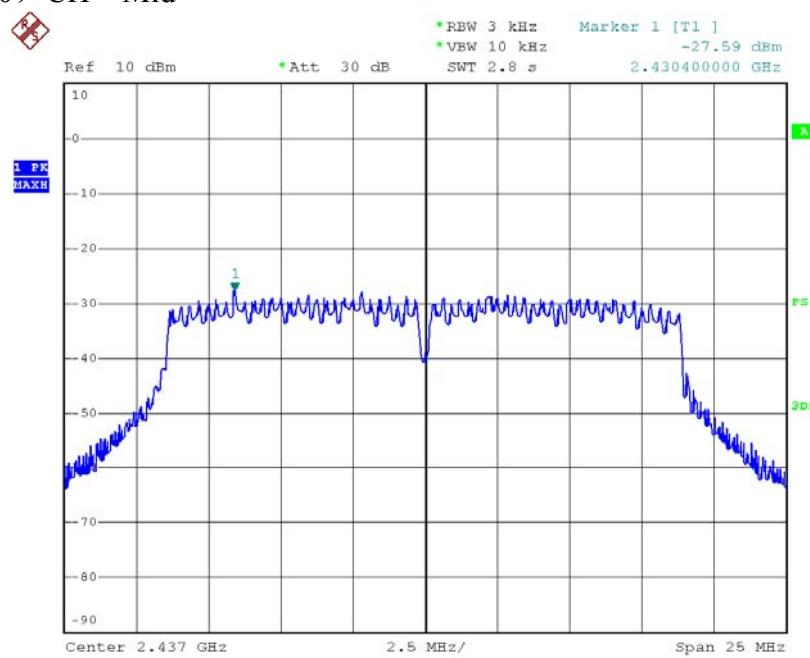
Date: 3.SEP.2013 16:01:11

802.11n (HT20) CH—Low



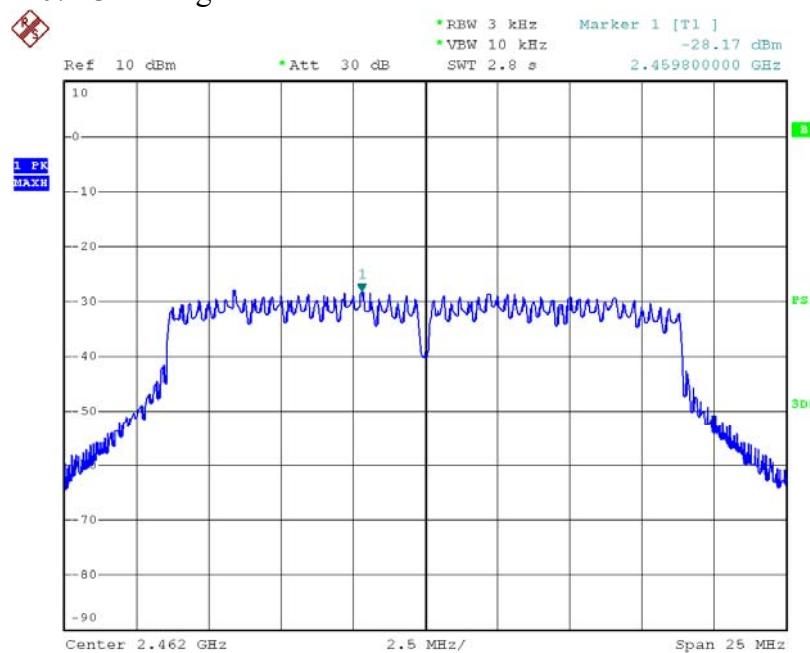
Date: 3.SEP.2013 07:08:07

802.11n (HT20) CH—Mid



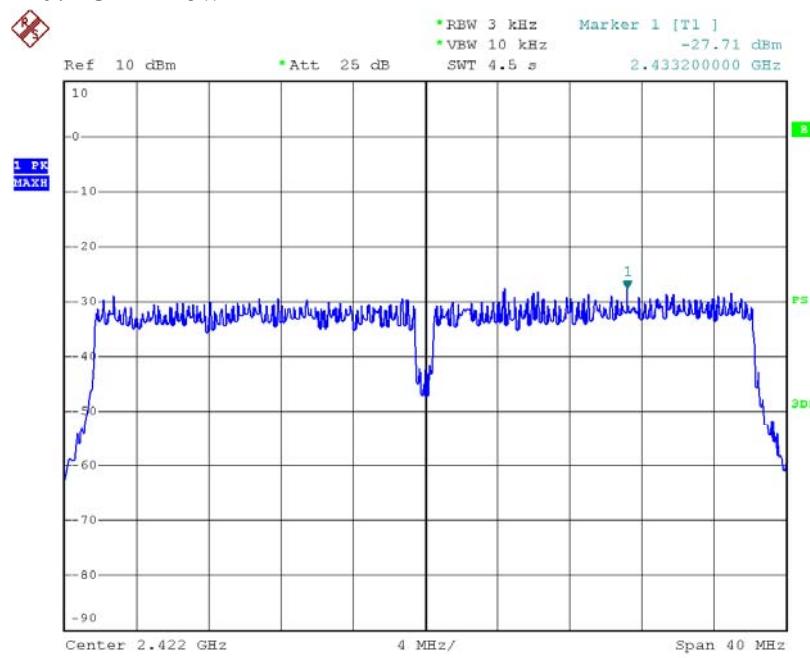
Date: 3.SEP.2013 08:16:13

802.11n (HT20) CH—High



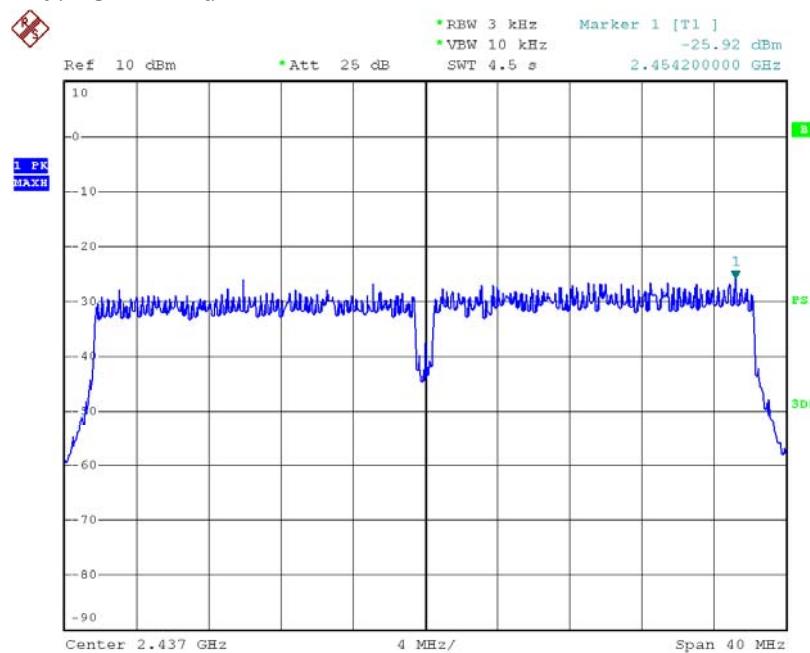
Date: 3.SEP.2013 07:18:47

802.11n (HT40) CH—Low



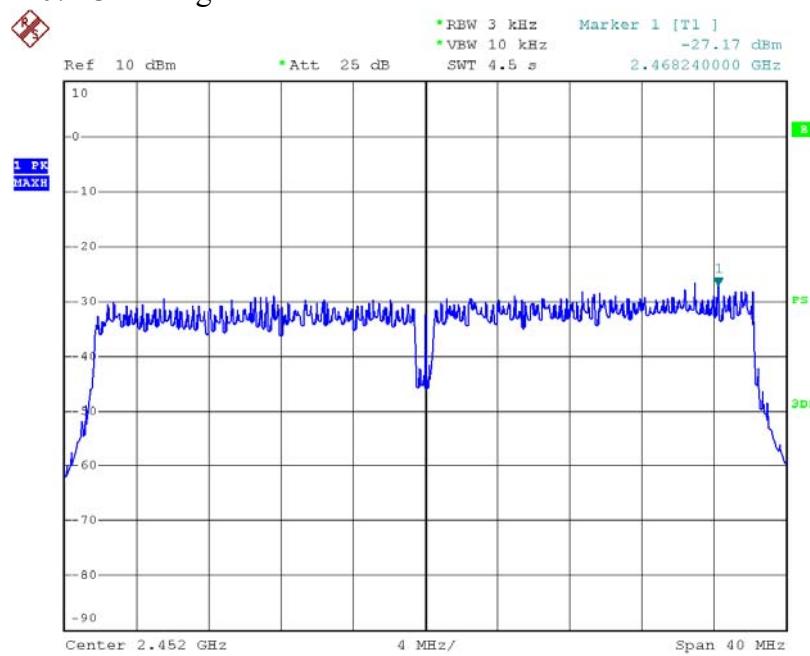
Date: 3.SEP.2013 17:13:13

802.11n (HT40) CH—Mid



Date: 3.SEP.2013 17:18:51

802.11n (HT40) CH—High



Date: 3.SEP.2013 17:05:45

5.6 Radiated Emissions

5.6.1.1. Test Limits (< 30 MHZ)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

5.6.1.2. Test Limits (\geq 30 MHZ)

FIELD STRENGTH of Fundamental: 902-928 MHZ 2.4-2.4835 GHz 94 dB μ V/m @3m	FIELD STRENGTH of Harmonics 54 dB μ V/m @3m	S15.209 30 - 88 MHz 88 - 216 MHz 216 - 960 MHz ABOVE 960 MHz	40 dB μ V/m @3M 43.5 46 54dB μ V/m
---	---	--	---

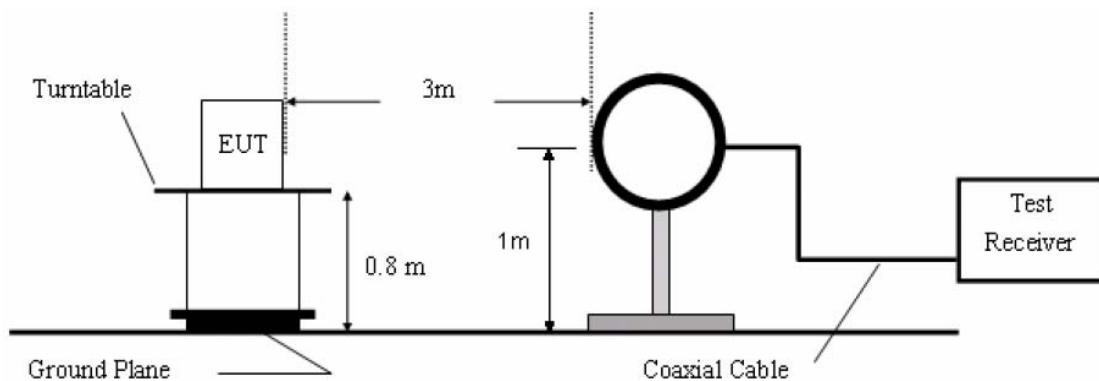
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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) (see Section 15.205(c)).

Test Equipment

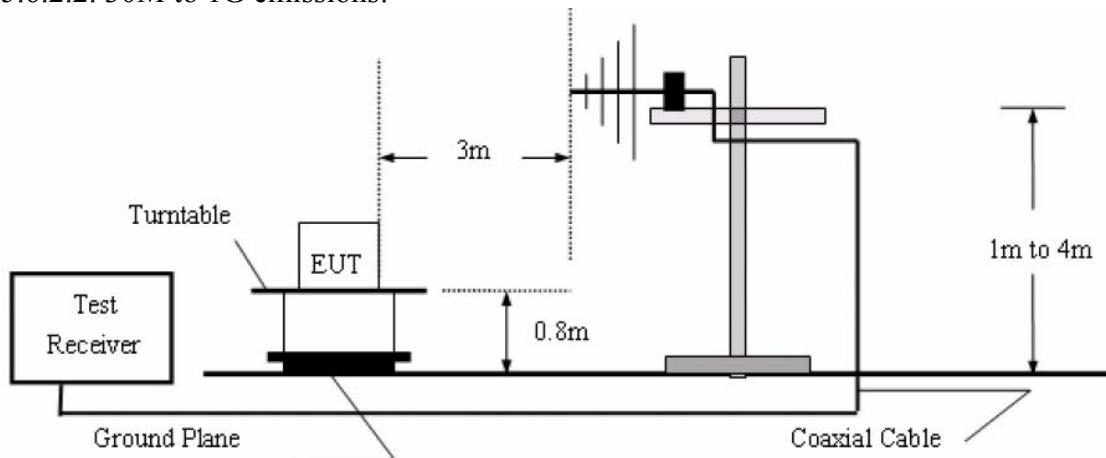
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	July 03, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC01183 0	980100	July 03, 2013	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	July 03, 2013	1 Year
4.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

5.6.2. Test Configuration:

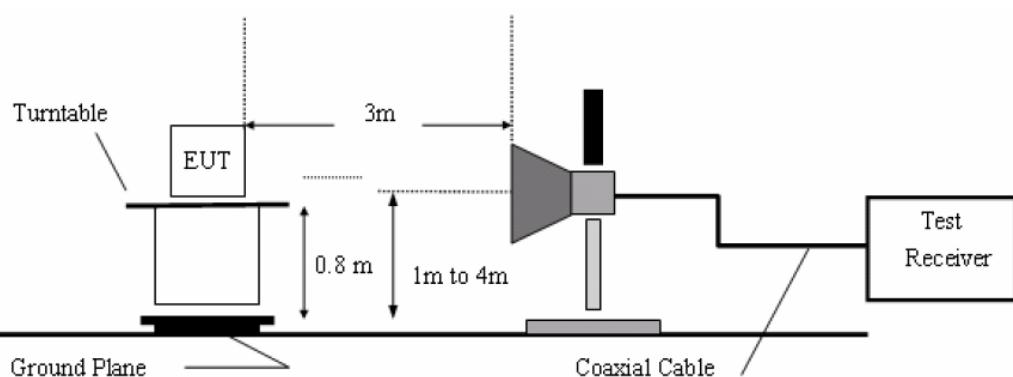
5.6.2.1. 9k to 30MHz emissions:



5.6.2.2. 30M to 1G emissions:



5.6.2.3. 1G to 40G emissions:



5.6.3. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 5.6.4.

g. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	July 03, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	July 03, 2013	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	July 03, 2013	1 Year
4.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

5.6.4. Test Results

Below 30MHz

There is no emissions were detected below 30MHz

From 30MHz to 1 GHz

Operation Mode: Normal link

Test Date: Apr. 28, 2013

Temperature: 25°C

Tested by: Angel wu

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV/m)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
52.4215	V	Peak	39.42	-10.92	28.50	40.00	-11.50
110.9420	V	Peak	41.11	-16.12	28.89	43.50	-14.61
236.2111	V	Peak	38.57	-11.49	28.03	46.00	-17.97
570.8260	V	Peak	40.07	-11.85	30.30	46.00	-15.70
624.7895	V	Peak	39.87	-9.49	35.74	46.00	-10.26
814.2530	V	Peak	37.96	-8.34	31.18	46.00	-14.82
52.4215	H	Peak	32.13	-10.42	21.71	43.50	-18.29
110.9420	H	Peak	38.73	-13.78	24.95	46.00	-21.05
236.2111	H	Peak	36.44	-12.17	24.27	46.00	-21.73
570.8260	H	Peak	39.25	-11.85	27.40	46.00	-18.60
624.7895	H	Peak	36.69	-11.00	25.69	46.00	-20.31
814.2530	H	Peak	44.35	-8.39	35.96	46.00	-10.04

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz and the IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Above 1 GHz (The worst Mode)

Operation Mode: TX / IEEE 802.11g / CH Low
Temperature: 25oC
Humidity: 50 % RH

Test Date: Sep. 02, 2013
Tested by: Angel wu
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limi (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak	AV (dBuV/)				
1.	4824	H	57.29	35.76	4.58	34.94	66.69	---	74.00	54.00	-11.31	Peak
2.	4824	H	36.31	35.76	4.58	34.94	---	41.71	74.00	54.00	-12.29	AVG
3.	7240	H	43.96	37.85	5.63	35.25	52.19	---	74.00	---	-21.81	Peak
4.	9648	H	44.28	39.39	6.34	35.70	54.31	---	74.00	---	-19.69	Peak
5.	12060	H	---	---	---	---	---	---	---	---	---	---
6.	14472	H	---	---	---	---	---	---	---	---	---	---
7.	16884	H	---	---	---	---	---	---	---	---	---	---
8.	19296	H	---	---	---	---	---	---	---	---	---	---
9.	21708	H	---	---	---	---	---	---	---	---	---	---
10.	24120	H	---	---	---	---	---	---	---	---	---	---

Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission

1.	4824	V	53.78	35.13	4.58	34.94	58.55	---	74.00	54.00	-15.45	Peak
2.	4824	V	38.22	35.13	4.58	34.94	---	42.99	74.00	54.00	-11.01	AVG
3.	7240	V	41.31	36.90	5.63	35.25	48.59	---	74.00	---	-25.40	Peak
4.	9648	V	43.45	38.57	6.34	35.70	52.66	---	74.00	---	-21.34	Peak
5.	12060	V	---	---	---	---	---	---	---	---	---	---
6.	14472	V	---	---	---	---	---	---	---	---	---	---
7.	16884	V	---	---	---	---	---	---	---	---	---	---
8.	19296	V	---	---	---	---	---	---	---	---	---	---
9.	21708	V	---	---	---	---	---	---	---	---	---	---
10.	24120	V	---	---	---	---	---	---	---	---	---	---

Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission

Operation Mode: TX / IEEE 802.11g / CH Mid
Temperature: 25°C
Humidity: 50 % RH

Test Date: Sep. 02, 2013
Tested by: Angel wu
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limi (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4874	H	41.17	35.83	4.61	34.93	---	46.68	74.00	54.00	-7.32	AVG
2.	4874	H	45.34	35.83	4.61	34.93	50.85	---	74.00	54.00	-23.15	Peak
3.	7311	H	42.14	37.86	5.64	35.26	50.38	---	74.00	54.00	-23.64	Peak
4.	9748	H	42.15	39.51	6.36	35.70	52.32	---	74.00	---	-21.68	Peak
5.	12185	H	---	---	---	---	---	---	---	---	---	---
6.	14622	H	---	---	---	---	---	---	---	---	---	---
7.	17059	H	---	---	---	---	---	---	---	---	---	---
8.	19496	H	---	---	---	---	---	---	---	---	---	---
9.	21933	H	---	---	---	---	---	---	---	---	---	---
10.	24370	H	---	---	---	---	---	---	---	---	---	---

Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission

1.	4874	V	45.20	35.18	4.61	34.93	---	49.56	74.00	54.00	-4.04	AVG
2.	4874	V	51.26	35.18	4.61	34.93	56.12	---	74.00	54.00	-17.88	Peak
3.	7311	V	42.27	36.92	5.64	35.26	49.57	---	74.00	54.00	-24.43	Peak
4.	9748	V	41.28	38.71	6.36	35.70	50.65	---	74.00	---	-23.35	Peak
5.	12185	V	---	---	---	---	---	---	---	---	---	---
6.	14622	V	---	---	---	---	---	---	---	---	---	---
7.	17059	V	---	---	---	---	---	---	---	---	---	---
8.	19496	V	---	---	---	---	---	---	---	---	---	---
9.	21933	V	---	---	---	---	---	---	---	---	---	---
10.	24370	V	---	---	---	---	---	---	---	---	---	---

Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission

Operation Mode: TX / IEEE 802.11g / CH High
Temperature: 25°C
Humidity: 50 % RH

Test Date: Sep. 02, 2013
Tested by: Angel wu
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limi (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4924	H	39.25	35.90	4.68	34.92	---	44.95	74.00	54.00	-9.05	AVG
2.	4924	H	46.21	35.90	4.68	34.92	51.87	---	74.00	54.00	-22.13	Peak
3.	7386	H	41.12	37.88	5.65	35.28	49.37	---	74.00	54.00	-24.63	Peak
4.	9848	H	42.20	39.61	6.38	35.70	52.49	---	74.00	---	-21.87	Peak
5.	12310	H	---	---	---	---	---	---	---	---	---	---
6.	14772	H	---	---	---	---	---	---	---	---	---	---
7.	17234	H	---	---	---	---	---	---	---	---	---	---
8.	19696	H	---	---	---	---	---	---	---	---	---	---
9.	22158	H	---	---	---	---	---	---	---	---	---	---
10.	24620	H	---	---	---	---	---	---	---	---	---	---

Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission

1.	4924	V	48.12	35.23	4.68	34.92	53.11	---	74.00	54.00	-20.89	Peak
2.	4924	V	44.44	35.23	4.68	34.92	---	49.43	74.00	54.00	-4.77	AVG
3.	7386	V	42.36	36.96	5.65	35.28	49.69	---	74.00	54.00	-24.31	Peak
4.	9848	V	42.24	38.81	6.38	35.70	51.73	---	74.00	---	-22.27	Peak
5.	12310	V	---	---	---	---	---	---	---	---	---	---
6.	14772	V	---	---	---	---	---	---	---	---	---	---
7.	17234	V	---	---	---	---	---	---	---	---	---	---
8.	19696	V	---	---	---	---	---	---	---	---	---	---
9.	22158	V	---	---	---	---	---	---	---	---	---	---
10.	24620	V	---	---	---	---	---	---	---	---	---	---

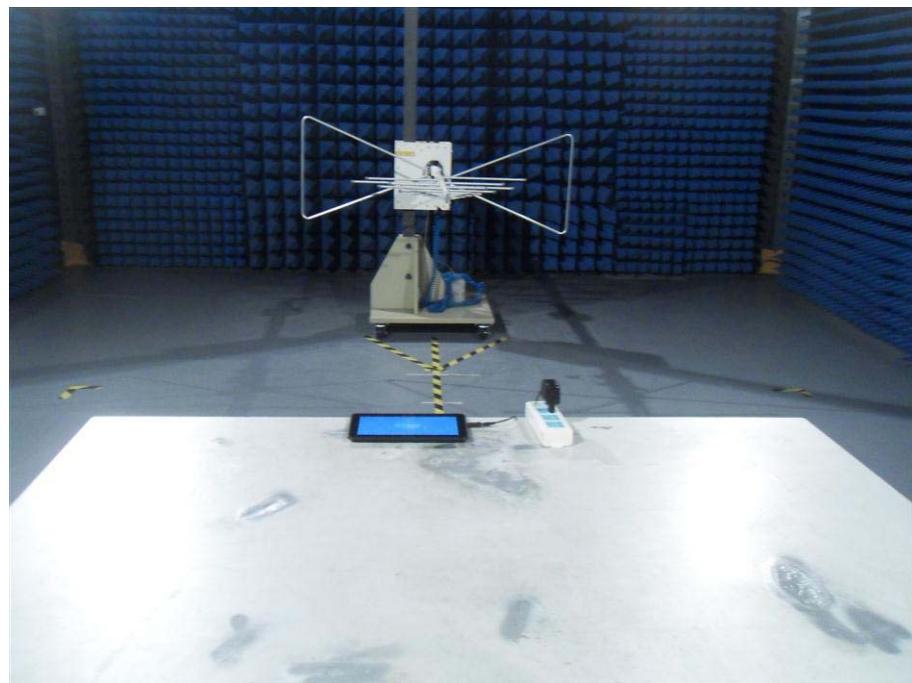
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission

6. PHOTOGRAPH

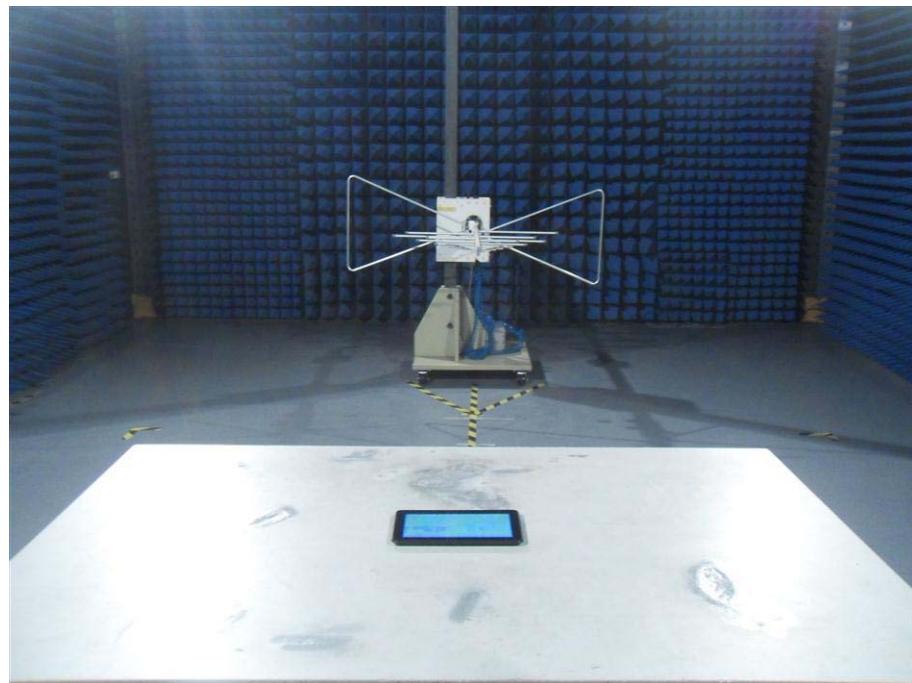
6.1. Photo of Conducted Emission Measurement



6.2. Photo of Radiation Emission Test



Unit 12, 8F Honghai Building, Qianhai Road, Nanshan, Shenzhen, China
Tel: +86-755-86622903 (50 Lines) Fax: +86-755-86622819
[Http://www.szkht.com.cn](http://www.szkht.com.cn)



Appendix I (External Photos)

Figure 1
The EUT-Front View



Figure 2
The EUT-Back View



Figure 3
The EUT-Flank View



Appendix II (Internal Photos)

Figure 4
The EUT-Inside View



Figure 5
The EUT-Inside View



Figure 6
PCB of the EUT



Figure 7
WIFI Module

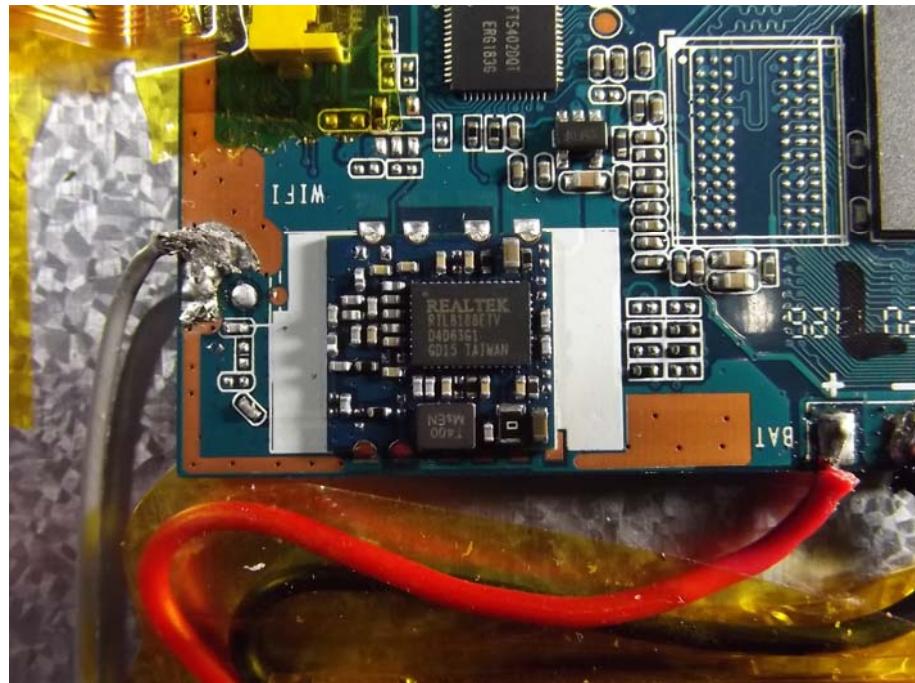


Figure 8
Antenna Photo (Distance>5mm)

