# FCC Test Report

Product Name	Wireless Motherboard
Model No	TA10TA2
FCC ID.	WL6-TA1BC30TA1

Applicant	ELITEGROUP COMPUTER SYSTEMS CO., LTD.
Address	No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan

Date of Receipt	Mar. 18, 2014
Issue Date	Apr. 02, 2014
Report No.	1430325R-RFUSP27V00
Report Version	V1.0
BC-MRA	Testing Laboratory 0914

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government. The test report shall not be reproduced without the written approval of QuieTek Corporation.

# Test Report Certification

Issue Date: Apr. 02, 2014 Report No.: 1430325R-RFUSP27V00



Product Name	Wireless Motherboard	
Applicant	ELITEGROUP COMPUTER SYSTEMS CO., LTD.	
Address	No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan	
Manufacturer	ELITEGROUP COMPUTER SYSTEMS CO., LTD.	
Model No.	TA10TA2	
FCC ID.	WL6-TA1BC30TA1	
EUT Rated Voltage	DC 3.7V (Power by Battery)	
EUT Test Voltage	AC 120V/60Hz	
Trade Name	ECS	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012	
	ANSI C63.10: 2009, KDB 558074	
Test Result	Complied	

The test results relate only to the samples tested.

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Documented By :

sanne liv

(Senior Adm. Specialist / Joanne Lin)

Tested By

Dan Chen

(Engineer / Alan Chen)

Approved By

(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

### 1. GENERAL INFORMATION

#### 1.1. EUT Description

Product Name	Wireless Motherboard		
Trade Name	ECS		
Model No.	TA10TA2		
FCC ID.	WL6-TA1BC30TA1		
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW		
Number of Channels	hannels 802.11b/g/n-20MHz: 11		
Data Speed 802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 72.2Mbps			
Type of Modulation 802.11b:DSSS (DBPSK, DQPSK, CCK)			
	802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)		
Antenna Type PIFA Antenna			
Antenna Gain Refer to the table "Antenna List"			
Channel Control	Auto		

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WGT	13H130-JV9050	PIFA Antenna	2.13 dBi for 2.4GHz
2	JEM	13H130-JV9070	PIFA Antenna	1.30 dBi for 2.4GHz

Note: 1.The antenna of EUT is conform to FCC 15.203.

2. Only the higher gain antenna was tested and recorded in this report.

802.11b/g/n-20MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

- 1. The EUT is a Wireless Motherboard with a built-in WLAN and Bluetooth transceiver, this report for WLAN
- 2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
- 3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps \$ 802.11g is 6Mbps \$ 802.11n(20M-BW) is 7.2Mbps .
- 4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
- 5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

#### **1.3.** Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Pro	luct	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	РРТ	N/A	Non-Shielded, 0.8m
2	Monitor	DELL	U2410f	CN-082WXD-72872-16E-060L	Non-Shielded, 0.8m
3	Earphone	Dr.AV	CD-806B	N/A	N/A
4	Battery	TCL	TA10-1S5100-T1-T2	N/A	N/A

Signal Cable Type		Signal cable Description
Α	USB Cable	Shielded, 1.2m
В	HDMI Cable	Shielded, 1.2m
С	Earphone Cable	Non-Shielded, 1.2m

#### 1.4. Configuration of Tested System



#### **1.5.** EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute program "adb.exe V1.0.29" on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous Transmit.
- (5) Verify that the EUT works properly.

#### 1.6. Test Facility

#### Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from

QuieTek Corporation's Web Site: <u>http://www.quietek.com/tw/ctg/cts/accreditations.htm</u> The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site: <u>http://www.quietek.com/</u>

Site Description:	File on
	Federal Communications Commission
	FCC Engineering Laboratory
	7435 Oakland Mills Road
	Columbia, MD 21046
	Registration Number: 92195

Site Name:	Quietek Corporation			
Site Address:	No.5-22, Ruishukeng,			
	Linkou Dist. New Taipei City 24451,			
	Taiwan, R.O.C.			
	TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789			
	E-Mail : <u>service@quietek.com</u>			

FCC Accreditation Number: TW1014

#### 2. Conducted Emission

## 2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
Х	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
Х	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2014	Peripherals
Х	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2014	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2014	EUT
Х	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2014	
	No.1 Shielded Room				

Note:

- 1. All equipments are calibrated every one year.
- 2. The test instruments marked by "X" are used to measure the final test results.

### 2.2. Test Setup



#### 2.3. Limits

FCC Part 15 Sub	FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit					
Frequency	L	imits				
MHz	QP	AVG				
0.15 - 0.50	66-56	56-46				
0.50-5.0	56	46				
5.0 - 30	60	50				

#### 2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

#### 2.5. Uncertainty

± 2.26 dB

#### 2.6. Test Result of Conducted Emission

Product	:	Wireless Motherboard
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	dBµV	dB	dBµV
Line 1					
Quasi-Peak					
0.267	9.790	25.660	35.450	-27.207	62.657
0.627	9.790	22.860	32.650	-23.350	56.000
1.052	9.800	18.570	28.370	-27.630	56.000
1.650	9.810	12.430	22.240	-33.760	56.000
5.630	9.840	22.900	32.740	-27.260	60.000
7.173	9.850	19.300	29.150	-30.850	60.000
Average					
0.267	9.790	16.910	26.700	-25.957	52.657
0.627	9.790	10.220	20.010	-25.990	46.000
1.052	9.800	6.530	16.330	-29.670	46.000
1.650	9.810	2.170	11.980	-34.020	46.000
5.630	9.840	9.260	19.100	-30.900	50.000
7.173	9.850	4.970	14.820	-35.180	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.

2. " " means the worst emission level.

3. Measurement Level = Reading Level + Correct Factor

	Product	: Wireless Motherboard								
	Test Item	: Conducted Emission Test								
	Power Line	: Line 2								
	Test Mode	: Mode 3:	Transmit (802.11	n MCS0 7.2Mbps 20	M-BW) (2437MI	Hz)				
	Frequency	Correct	Reading	Measurement	Margin	Limit				
		Factor	Level	Level						
_	MHz	dB	dBµV	dBµV	dB	dBµV				
	Line 2									
	Quasi-Peak									
	0.158	9.781	29.350	39.131	-26.640	65.771				
	0.232	9.780	23.910	33.690	-29.967	63.657				
	0.408	9.790	22.360	32.150	-26.479	58.629				
	0.685	9.790	23.970	33.760	-22.240	56.000				
	1.056	9.790	18.910	28.700	-27.300	56.000				
	7.689	9.870	23.210	33.080	-26.920	60.000				
	Average									
	0.158	9.781	12.320	22.101	-33.670	55.771				
	0.232	9.780	7.580	17.360	-36.297	53.657				
	0.408	9.790	7.840	17.630	-30.999	48.629				
	0.685	9.790	8.860	18.650	-27.350	46.000				
	1.056	9.790	3.610	13.400	-32.600	46.000				
	7.689	9.870	8.700	18.570	-31.430	50.000				

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. "means the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

#### 3. Peak Power Output

#### 3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
Х	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2013
Note:				
1.	All equipments are	calibrated with trac	eable calibrations. Each calibra	ation is traceable to the
	national or internat	ional standards.		
•		1 1 1 (1 (177)	1	. 1.

2. The test instruments marked with "X" are used to measure the final test results.

#### 3.2. Test Setup



#### 3.3. Limits

The maximum peak power shall be less 1 Watt.

#### 3.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.3 PKPM1 Peak power meter method.

#### 3.5. Uncertainty

± 1.27 dB

## **3.6.** Test Result of Peak Power Output

Product	:	Wireless Motherboard
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

Channel No. Frequency		Average Power For different Data Rate (Mbps)			Peak Power	Required	Pogult	
Channel No	(MHz)	1	2	5.5	11	1	Limit	Result
			Measur	ement Lev	vel (dBm)			
01	2412	11.92				15.08	<30dBm	Pass
06	2437	11.80	11.78	11.64	11.58	15.08	<30dBm	Pass
11	2462	11.96				15.19	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product	:	Wireless Motherboard
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)

		Average Power						Peak				
	Frequency		For different Data Rate (Mbps)						Power	Required		
Channel No	(MHz)	6	9	12	18	24	36	48	54	6	Limit	Result
			Ν	Aeasure	ement I	Level (d	lBm)					
01	2412	15.82								23.68	<30dBm	Pass
06	2437	15.85	15.79	15.73	15.67	15.61	15.55	15.49	15.33	23.61	<30dBm	Pass
11	2462	14.89								23.09	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product	:	Wireless Motherboard
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

		Average Power     Peak										
Channel No	Frequency	7.0		or diffe	erent Da	ata Rate	e (Mbps	5)	70.0	Power	Required	Result
	(MHz)	1.2	14.4	21.7	28.9	43.3	57.8	65	12.2	1.2	Limit	
				Ν	Aeasure	ement I	level (d	lBm)				
01	2412	14.78								23.02	<30dBm	Pass
06	2437	14.69	14.51	14.33	14.15	13.97	13.79	13.61	13.43	23.01	<30dBm	Pass
11	2462	12.78								22.53	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

#### 4. Radiated Emission

#### 4.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	Х	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	Х	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	Х	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	Х	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	Х	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	Х	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2014
	Х	Controller	QuieTek	QTK-CONTROLLER/CTRL3	N/A
	Х	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

#### 4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



#### 4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits							
Frequency MHz	Field strength	Measurement distance					
	(microvolts/meter)	(meter)					
0.009-0.490	2400/F(kHz)	300					
0.490-1.705	24000/F(kHz)	30					
1.705-30	30	30					
30-88	100	3					
88-216	150	3					
216-960	200	3					
Above 960	500	3					

Remarks: E field strength  $(dB\mu V/m) = 20 \log E$  field strength (uV/m)

#### 4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2009 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas. The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The worst radiated emission is measured in the Open Area Test Site on the Final Measurement. The frequency range from 9kHz to 10th harmonics is checked.

#### 4.5. Uncertainty

- ± 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

#### 4.6. Test Result of Radiated Emission

Product	:	Wireless Motherboard
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$
Horizontal					
<b>Peak Detector:</b>					
4824.000	3.261	49.380	52.641	-21.359	74.000
7236.000	10.650	37.560	48.210	-25.790	74.000
9648.000	13.337	36.980	50.316	-23.684	74.000
Average Detector:					
Vertical					
<b>Peak Detector:</b>					
4824.000	6.421	49.880	56.301	-17.699	74.000
7236.000	11.495	39.150	50.645	-23.355	74.000
9648.000	13.807	37.590	51.396	-22.604	74.000
Average Detector:					
4824.000	6.421	45.470	51.891	-2.109	54.000

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Motherboard						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	: Mode 1:	Transmit (802.11	b 1Mbps) (2437 MH	z)			
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$		
Horizontal							
<b>Peak Detector:</b>							
4874.000	3.038	48.590	51.627	-22.373	74.000		
7311.000	11.795	37.150	48.944	-25.056	74.000		
9748.000	12.635	36.590	49.225	-24.775	74.000		
Average Detector:							
Vertical							
<b>Peak Detector:</b>							
4874.000	5.812	49.590	55.401	-18.599	74.000		
7311.000	12.630	36.980	49.609	-24.391	74.000		
9748.000	13.126	36.150	49.276	-24.724	74.000		
Average Detector:							
4874.000	5.812	45.690	51.501	-2.499	54.000		

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Motherboard						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	: Mode 1:	Transmit (802.11	b 1Mbps) (2462 MH	z)			
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m		
Horizontal							
<b>Peak Detector:</b>							
4924.000	2.858	49.840	52.697	-21.303	74.000		
7386.000	12.127	37.560	49.688	-24.312	74.000		
9848.000	12.852	36.590	49.443	-24.557	74.000		
Average Detector:							
Vertical							
<b>Peak Detector:</b>							
4924.000	5.521	49.290	54.810	-19.190	74.000		
7386.000	13.254	37.150	50.404	-23.596	74.000		
9848.000	13.367	36.590	49.957	-24.043	74.000		
Average Detector:							
4924.000	5.521	45.790	51.310	-2.690	54.000		

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Motherboard							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 2:	Transmit (802.11	lg 6Mbps) (2412MHz	z)				
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m			
Horizontal								
<b>Peak Detector:</b>								
4824.000	3.261	51.390	54.651	-19.349	74.000			
7236.000	10.650	54.910	65.560	-8.440	74.000			
9648.000	13.337	37.590	50.926	-23.074	74.000			
Average Detector:								
4824.000	3.261	36.220	39.481	-14.519	54.000			
7236.000	10.650	38.050	48.700	-5.300	54.000			
Vertical								
<b>Peak Detector:</b>								
4824.000	6.421	51.590	58.011	-15.989	74.000			
7236.000	11.495	54.560	66.055	-7.945	74.000			
9648.000	13.807	37.150	50.956	-23.044	74.000			
Average Detector:								
4824.000	6.421	36.940	43.361	-10.639	54.000			
7236.000	11.495	38.560	50.055	-3.945	54.000			

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Motherboard						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	: Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$		
Horizontal							
<b>Peak Detector:</b>							
4874.000	3.038	52.010	55.047	-18.953	74.000		
7311.000	11.795	54.560	66.354	-7.646	74.000		
9748.000	12.635	36.590	49.225	-24.775	74.000		
Average Detector:							
4874.000	3.038	36.590	39.627	-14.373	54.000		
7311.000	11.795	39.560	51.354	-2.646	54.000		
<b>Peak Detector:</b>							
4874.000	5.812	52.560	58.371	-15.629	74.000		
7386.000	13.254	55.150	68.404	-5.596	74.000		
9848.000	13.367	36.890	50.257	-23.743	74.000		
Average Detector:							
4924.000	5.521	36.980	42.500	-11.500	54.000		
7386.000	13.254	38.150	51.404	-2.596	54.000		

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Motherboard							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OA	ATS						
Test Mode	: Mode 2:	Transmit (802.11	lg 6Mbps) (2462 MH	z)				
Frequency	Correct	Reading	Measurement	Margin	Limit			
riequency	Easter	Laval	Laval	Margin	Linnt			
MI	Pactor			ID				
MHZ	dB	dBμV	dBµV/m	dB	dBµV/m			
Horizontal								
<b>Peak Detector:</b>								
4924.000	2.858	51.450	54.307	-19.693	74.000			
7386.000	12.127	54.150	66.278	-7.722	74.000			
9848.000	12.852	36.590	49.443	-24.557	74.000			
Average Detector:								
4924.000	2.858	36.580	39.437	-14.563	54.000			
7386.000	12.127	39.150	51.278	-2.722	54.000			
Vertical								
<b>Peak Detector:</b>								
4924.000	5.521	52.380	57.900	-16.100	74.000			
7386.000	13.254	55.690	68.944	-5.056	74.000			
9848.000	13.367	37.150	50.517	-23.483	74.000			
Average Detector:								
4924.000	5.521	36.890	42.410	-11.590	54.000			
7386.000	13.254	38.590	51.844	-2.156	54.000			

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Motherboard					
Test Item	: Harmonic Radiated Emission Data					
Test Site	: No.3 OATS					
Test Mode	: Mode 3:	Transmit (802.11	n MCS0 7.2Mbps 20	M-BW)(2412MI	Hz)	
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m	
Horizontal						
<b>Peak Detector:</b>						
4824.000	3.261	52.160	55.421	-18.579	74.000	
7236.000	10.650	54.260	64.910	-9.090	74.000	
9648.000	13.337	37.120	50.456	-23.544	74.000	
					74.000	
Average Detector:						
4824.000	3.261	37.150	40.411	-13.589	54.000	
7236.000	10.650	37.150	47.800	-6.200	54.000	
Vertical						
Peak Detector:						
4824.000	6.421	53.150	59.571	-14.429	74.000	
7236.000	11.495	55.150	66.645	-7.355	74.000	
9648.000	13.807	36.590	50.396	-23.604	74.000	
Average Detector:						
4824.000	6.421	37.150	43.571	-10.429	54.000	
7236.000	11.495	38.260	49.755	-4.245	54.000	

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Wireless Motherboard
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$
Horizontal					
<b>Peak Detector:</b>					
4874.000	3.038	52.560	55.597	-18.403	74.000
7236.000	10.650	54.260	64.910	-9.090	74.000
9648.000	13.337	36.130	49.466	-24.534	74.000
Average Detector:					
4824.000	3.261	37.150	40.411	-13.589	54.000
7236.000	10.650	37.590	48.240	-5.760	54.000
Vertical					
<b>Peak Detector:</b>					
4874.000	5.812	53.560	59.371	-14.629	74.000
7311.000	12.630	55.190	67.819	-6.181	74.000
9748.000	13.126	36.970	50.096	-23.904	74.000
Average Detector:					
4874.000	5.812	38.560	44.371	-9.629	54.000
7311.000	12.630	38.590	51.219	-2.781	54.000

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Wireless Motherboard
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$
Horizontal					
Peak Detector:					
4924.000	2.858	52.690	55.547	-18.453	74.000
7386.000	12.127	54.550	66.678	-7.322	74.000
9848.000	12.852	37.510	50.363	-23.637	74.000
Average Detector:					
4924.000	2.858	37.510	40.367	-13.633	54.000
7386.000	12.127	37.150	49.278	-4.722	54.000
Vertical					
Peak Detector:					
4924.000	5.521	53.540	59.060	-14.940	74.000
7386.000	13.254	55.650	68.904	-5.096	74.000
9848.000	13.367	37.140	50.507	-23.493	74.000
Average Detector:					
4924.000	5.521	37.560	43.080	-10.920	54.000
7386.000	13.254	38.560	51.814	-2.186	54.000

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Motherboard					
Test Item	: General Radiated Emission Data					
Test Site	: No.3 OATS					
Test Mode	: Mode 1	Transmit (802.11	b 1Mbps)(2437 MHz	z)		
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	dBµV/m	dB	dBµV/m	
Horizontal						
148.340	-7.806	37.606	29.800	-13.700	43.500	
299.660	-4.751	36.061	31.310	-14.690	46.000	
460.680	4.030	35.270	39.300	-6.700	46.000	
652.740	1.899	35.481	37.380	-8.620	46.000	
825.400	7.346	31.177	38.523	-7.477	46.000	
949.560	7.036	33.892	40.928	-5.072	46.000	
Vertical						
132.820	-3.932	38.829	34.897	-8.603	43.500	
299.660	-4.061	36.318	32.257	-13.743	46.000	
499.480	-0.199	37.665	37.465	-8.535	46.000	
689.600	2.302	37.216	39.518	-6.482	46.000	
848.680	0.299	34.123	34.422	-11.578	46.000	
949.560	3.156	33.892	37.048	-8.952	46.000	

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.

Product	: Wireless Motherboard					
Test Item	: General Radiated Emission Data					
Test Site	: No.3 OATS					
Test Mode	: Mode 2:	: Transmit (802.11	g 6Mbps)(2437 MHz	z)		
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m	
Horizontal						
132.820	-7.442	38.829	31.387	-12.113	43.500	
299.660	-4.751	36.318	31.567	-14.433	46.000	
431.580	0.757	39.762	40.519	-5.481	46.000	
598.420	3.524	33.283	36.807	-9.193	46.000	
755.560	5.039	35.349	40.388	-5.612	46.000	
928.220	7.230	32.854	40.084	-5.916	46.000	
Vertical						
132.820	-3.932	38.829	34.897	-8.603	43.500	
299.660	-4.061	36.318	32.257	-13.743	46.000	
499.480	-0.199	37.665	37.465	-8.535	46.000	
693.480	1.748	38.216	39.964	-6.036	46.000	
848.680	0.299	34.123	34.422	-11.578	46.000	
967.020	3.889	26.834	30.723	-23.277	54.000	

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.

Product Test Item	<ul> <li>Wireless Motherboard</li> <li>General Radiated Emission Data</li> </ul>					
Test Mode	: No.3 O	ATS : Transmit (802.11	n MCS0 7.2Mbps 20	M-BW)(2437 M	Hz)	
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m	
Horizontal						
148.340	-7.806	37.606	29.800	-13.700	43.500	
299.660	-4.751	36.318	31.567	-14.433	46.000	
431.580	0.757	39.762	40.519	-5.481	46.000	
598.420	3.524	33.283	36.807	-9.193	46.000	
718.700	3.818	37.849	41.667	-4.333	46.000	
926.280	6.832	32.457	39.289	-6.711	46.000	
Vertical						
132.820	-3.932	38.829	34.897	-8.603	43.500	
299.660	-4.061	36.329	32.268	-13.732	46.000	
460.680	-1.930	35.270	33.340	-12.660	46.000	
660.500	-1.111	35.328	34.217	-11.783	46.000	
840.920	2.284	31.101	33.385	-12.615	46.000	
967.020	3.889	26.914	30.803	-23.197	54.000	

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.

#### 5. **RF** antenna conducted test

#### 5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

#### 5.2. Test Setup

#### **RF** antenna Conducted Measurement:



#### 5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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)).

#### 5.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

## 5.5. Uncertainty

The measurement uncertainty Conducted is defined as  $\pm$  1.27dB

#### 5.6. Test Result of RF antenna conducted test

Product	:	Wireless Motherboard
Test Item	:	RF antenna conducted test
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)





#### Channel 06 (2437MHz) 30MHz-25GHz





Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	Wireless Motherboard
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)







#### Channel 11 (2462MHz) 30MHz-25GHz



Note: The above test pattern is synthesized by multiple of the frequency range.
Product	:	Wireless Motherboard
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

### Channel 01 (2412MHz) 30MHz-25GHz





### Channel 11 (2462MHz) 30MHz-25GHz



Note: The above test pattern is synthesized by multiple of the frequency range.

## 6. Band Edge

## 6.1. Test Equipment

## **RF Radiated Measurement:**

The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
$\square$ Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	Х	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	Х	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2014
	X Controller		QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	Х	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All instruments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

## 6.2. Test Setup

## **RF Radiated Measurement:**



## 6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

## 6.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2009 on radiated measurement.

## 6.5. Uncertainty

- ± 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

## 6.6. Test Result of Band Edge

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

### **RF Radiated Measurement (Horizontal):**

Channel No	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Result
Chamiler 100.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
01 (Peak)	2389.400	31.507	25.942	57.449	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	24.973	56.482	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	32.547	64.108			Pass
01 (Peak)	2413.000	31.646	74.393	106.039			Pass
01 (Average)	2388.400	31.503	14.268	45.771	74.00	54.00	Pass
01 (Average)	2390.000	31.509	13.786	45.295	74.00	54.00	Pass
01 (Average)	2400.000	31.561	26.635	58.196			Pass
01 (Average)	2412.800	31.645	69.847	101.491			Pass

#### Figure Channel 01:



### Figure Channel 01:

Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.

- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

## **RF Radiated Measurement (Vertical):**

Channel No	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Regult
Chamier NO.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
01 (Peak)	2378.200	30.970	26.040	57.010	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	24.574	55.489	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	28.743	59.655			Pass
01 (Peak)	2413.000	30.956	67.824	98.780			Pass
01 (Average)	2390.000	30.915	12.557	43.472	74.00	54.00	Pass
01 (Average)	2400.000	30.912	20.748	51.660			Pass
01 (Average)	2412.800	30.955	63.550	94.505			Pass

Figure Channel 01:

Vertical (Peak)





Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.

- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

### **RF Radiated Measurement (Horizontal):**

Channel No	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Result
chamer roo.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	neosun
11 (Peak)	2462.900	32.026	73.333	105.359			Pass
11 (Peak)	2483.500	32.182	26.303	58.485	74.00	54.00	Pass
11 (Average)	2461.300	32.014	68.947	100.961			Pass
11 (Average)	2483.500	32.182	15.833	48.015	74.00	54.00	Pass
11 (Average)	2485.100	32.194	17.068	49.262	74.00	54.00	Pass

### Figure Channel 11:

## Horizontal (Peak)





### Horizontal (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

## **RF Radiated Measurement (Vertical):**

Channal Ma	Frequency	Correct Factor	Reading Level	<b>Emission Level</b>	Peak Limit	Average Limit	Dogult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
11 (Peak)	2462.900	31.296	66.458	97.754			Pass
11 (Peak)	2483.500	31.435	24.643	56.078	74.00	54.00	Pass
11 (Average)	2462.700	31.295	63.119	94.414			Pass
11 (Average)	2483.500	31.435	12.913	44.348	74.00	54.00	Pass

### Figure Channel 11:

### Vertical (Peak)



### Figure Channel 11:

## Vertical (Average)



Note: 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.

2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.

- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

## **RF Radiated Measurement (Horizontal):**

Channal Ma	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Dogult
Channel No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	(dBµV/m)	$(dB\mu V/m)$	Result
01 (Peak)	2390.000	31.509	40.167	71.676	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	52.230	83.791			Pass
01 (Peak)	2412.000	31.639	76.915	108.553			Pass
01(Average)	2390.000	31.509	19.856	51.365	74.00	54.00	Pass
01(Average)	2400.000	31.561	31.864	63.425			Pass
01(Average)	2413.400	31.649	59.479	91.128			Pass

### Figure Channel 01:

#### Horizontal (Peak)





Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.

- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

### **RF Radiated Measurement (Vertical):**

Channel No.	Frequency	Correct Factor	Reading Level	<b>Emission Level</b>	Peak Limit	Average Limit	Dogult
	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
01 (Peak)	2390.000	30.915	32.922	63.837	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	46.398	77.310			Pass
01 (Peak)	2412.000	30.950	70.999	101.948			Pass
01 (Average)	2390.000	30.915	15.593	46.508	74.00	54.00	Pass
01 (Average)	2400.000	30.912	26.220	57.132			Pass
01 (Average)	2413.000	30.956	53.584	84.540			Pass

### Figure Channel 01:

#### Vertical (Peak)





### Vertical (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.

- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

## **RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Result
11 (Peak)	2461.700	32.017	75.052	107.069			Pass
11 (Peak)	2483.500	32.182	40.326	72.508	74.00	54.00	Pass
11 (Average)	2462.900	32.026	57.486	89.512			Pass
11 (Average)	2483.500	32.182	18.208	50.390	74.00	54.00	Pass

### Figure Channel 11:

#### Horizontal (Peak)





Note: 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.

- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

## **RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Result
11 (Peak)	2461.700	31.288	68.267	99.555			Pass
11 (Peak)	2483.500	31.435	35.657	67.092	74.00	54.00	Pass
11 (Average)	2462.900	31.296	51.510	82.806			Pass
11 (Average)	2483.500	31.435	14.757	46.192	74.00	54.00	Pass

Figure Channel 11:

#### Vertical (Peak)





## Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

### **RF Radiated Measurement (Horizontal):**

Channel Ma	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Dogult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
01 (Peak)	2389.600	31.508	39.667	71.175	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	37.696	69.205	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	51.439	83.000			Pass
01 (Peak)	2412.600	31.642	75.462	107.105			Pass
01 (Average)	2390.000	31.509	19.488	50.997	74.00	54.00	Pass
01 (Average)	2400.000	31.561	28.021	59.582			Pass
01 (Average)	2413.000	31.646	58.034	89.680			Pass





- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

### **RF Radiated Measurement (Vertical):**

Channal No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Dogult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
01 (Peak)	2390.000	30.915	35.200	66.115	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	44.244	75.156			Pass
01 (Peak)	2412.600	30.953	68.860	99.813			Pass
01 (Average)	2390.000	30.915	15.337	46.252	74.00	54.00	Pass
01 (Average)	2400.000	30.912	22.361	53.273			Pass
01 (Average)	2413.000	30.956	52.173	83.129			Pass

### Figure Channel 01:

### Vertical (Peak)





### Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

#### **RF Radiated Measurement (Horizontal):**

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Dogult
	(MHz)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
11 (Peak)	2461.900	32.018	72.896	104.915			Pass
11 (Peak)	2483.500	32.182	38.445	70.627	74.00	54.00	Pass
11 (Peak)	2484.100	32.186	39.891	72.078	74.00	54.00	Pass
11 (Average)	2463.100	32.028	55.150	87.178			Pass
11 (Average)	2483.500	32.182	15.071	47.253	74.00	54.00	Pass

#### Figure Channel 11:

#### Horizontal (Peak)



### Figure Channel 11:

#### Horizontal (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Wireless Motherboard
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

### **RF Radiated Measurement (Vertical):**

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Result
	(MHZ)	(dB)	(αΒμν)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	
11 (Peak)	2461.100	31.285	65.351	96.635			Pass
11 (Peak)	2483.500	31.435	32.213	63.648	74.00	54.00	Pass
11 (Peak)	2483.700	31.437	34.476	65.913	74.00	54.00	Pass
11 (Average)	2462.900	31.296	49.144	80.440			Pass
11 (Average)	2483.500	31.435	13.121	44.556	74.00	54.00	Pass

#### Figure Channel 11:

#### Vertical (Peak)





- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

## 7. Occupied Bandwidth

## 7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

### Note:

- 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
- 2. The test instruments marked with "X" are used to measure the final test results.

## 7.2. Test Setup



## 7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

## 7.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

## 7.5. Uncertainty

 $\pm$  150Hz

# 7.6. Test Result of Occupied Bandwidth

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Channel No. Frequency		Measurement Level	Required Limit	Result
(MHz)		(kHz)	(kHz)	
1	2412	7650	>500	Pass

## Figure Channel 1:

Agilent Spect	rum Analyzer - Swe	ept SA							
Center F	RF 50 Ω req 2.41200	AC 00000 GHz	SEN	SE:INT	Avg Type	ALIGNAUTO : Log-Pwr	08:41:00 P TRAC TYP	M Mar 20, 2014	Frequency
<b></b>		PNO: Fast IFGain:Low	#Atten: 30	dB		Mkr	2 2.408	45 GHz	Auto Tune
10 dB/div Log 10.0	Ref 20.00 (		2 And Markey				-3.4	+8 авт 2.30 авт	Center Freq 2.412000000 GHz
-10.0 -20.0 -30.0 -40.0			N		My y				Start Freq 2.387000000 GHz
-50.0 -60.0	un gunnel	www.m. yugon				Myran	and work was	not making	<b>Stop Freq</b> 2.437000000 GHz
Center 2. #Res BW	41200 GHz 100 kHz	#VE	BW 300 kHz	FUNC	TION FU	Sweep	Span 5 4.80 ms (	0.00 MHz 1001 pts)	CF Step 5.000000 MHz <u>Auto</u> Man
1 N 1 2 N 1 3 N 1 4 5 6		2.412 55 GHz 2.408 45 GHz 2.416 10 GHz	3.70 dE -3.48 dE -4.16 dE	sm sm sm					Freq Offset 0 Hz
7 8 9 10 11 12									
MSG						STATUS			

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437	7150	>500	Pass

## Figure Channel 6:

Agilent Spect	um Ana	alyzer - Swe	pt SA								
Center F	RF req 2	50 Ω 2.43700	AC 0000 GH	z	SE Tria: From		Avg T <sub>}</sub>	ALIGNAUTO /pe: Log-Pwr	08:48:19 F	M Mar 20, 2014	Frequency
10 dB/div	Ref	20.00 c	IFG IBm	i0: Fast 🔾 Jain:Low	#Atten: 30	D dB		Mkr	¤ 2 2.433 -2.	45 GHz 57 dBm	Auto Tune
10.0 0.00 -10.0				٨.	2 Martine	1 Marcology				-1.78 dBm	Center Freq 2.437000000 GHz
-20.0 -30.0 -40.0				and a start				Nu Antrat.			Start Freq 2.412000000 GHz
-50.0 -60.0	hum	ww	and and	¢				Went	and the server	alle an one	<b>Stop Freq</b> 2.462000000 GHz
Center 2. #Res BW	4370 100	0 GHz kHz	X	#VB\	V 300 kHz	EUN	CTION	Sweep	Span 5 4.80 ms (	0.00 MHz 1001 pts)	CF Step 5.000000 MHz Auto Man
1 N 2 N 3 N 4 5 6 7 8 9 10 11 12 12	f		2.436 55 2.433 45 2.440 60	5 GHz 5 GHz D GHz	4.22 d -2.57 d -2.54 d	Bm Bm Bm I I I I I I I I I I I I I I I I					Freq Offset 0 Hz

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462	7650	>500	Pass

## Figure Channel 11:

Agilent Spectrum Analyzer -	Swept SA						
Center Freq 2.462	0Ω AC 0000000 GHz	SENSE:INT	Avg Type	ALIGNAUTO : Log-Pwr	08:55:40 F TRAC	M Mar 20, 2014	Frequency
10 dB/div Ref 20.0	IFGain:Low	#Atten: 30 dB		Mkr	⊳ 2 2.458 -2.	45 GHz 30 dBm	Auto Tune
10.0 0.00 -10.0		2 minute	3			-1.59.dBm	Center Freq 2.462000000 GHz
-20.0 -30.0 -40.0							Start Fred 2.437000000 GH:
-50.0 -60.0 -70.0	m swa			V.V.	1 marine	nun	Stop Fred 2.487000000 GH;
Center 2.46200 GHz #Res BW 100 kHz	z #VB	W 300 kHz		Sweep	Span 5 4.80 ms (	0.00 MHz 1001 pts)	CF Step 5.000000 MH
1 N 1 f 2 N 1 f 3 N 1 f 4 5 6 7	2.462 55 GHz 2.458 45 GHz 2.466 10 GHz	4.41 dBm -2.30 dBm -3.10 dBm					Freq Offset
7     8       9     10       11     12							

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412	15200	>500	Pass

## Figure Channel 1:

								- Swept SA	Analyzer	ectrun	ent Spe	Agile
Frequency	PM Mar 20, 2014 CE 1 2 3 4 5 6 PE M MANANAN	09:02:21 F TRAC TYL	ALIGNAUTO : Log-Pwr	Avg Typ			GHz	50 Ω AC 2000000	<sup>RF</sup> q 2.41	r Fre	nter	XI R Cer
Auto Tun	45 GHz 30 dBm	ت 2 2.404 -1.5	Mkr		30 dB	#Atten: 3	PNO: Fast IFGain:Low	00 dBm	Ref 20.	iv	dB/di	10 c
Center Fre 2.412000000 GH	-0.44 dBm			and 23	1 mjrolomburb	hand April Umber	2					10.0 10.0 0.00
Start Fre 2.387000000 GH	Muryound	to a manufacture of the open starting	and the second	<u>\</u>			-orally a	water for a state of the second	- Mounty	and with		-20.0 -30.0 -40.0
- Stop Fre _ 2.437000000 G⊢												-50.0 -60.0 -70.0
Z 5.000000 MH Auto Ma	0.00 MHz 1001 pts)	Span 5 I.80 ms (	Sweep 4	ICTION FU	Z	300 kHz	#VI	1z ×	200 GI 00 kHz	2.41 W 1	nter es B	Cer #Re
Freq Offso					dBm dBm	-1.30 d -1.74 d	9 65 GHz	2.41	f f	1	N	2 3 4 5 6
	_											7 9 10 11
			STATUS									ISG

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437	15450	>500	Pass

## Figure Channel 6:

Agilent Spectrum Analyzer - Swep	ot SA					
RL RF 50 Ω Center Freq 2.437000	AC 0000 GHz		Avg Type: I	LIGNAUTO Log-Pwr	09:08:55 PM Mar 20, 2014 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dl	PNO: Fast C+ IFGain:Low	#Atten: 30 dB		Mkr2 :	2.429 40 GHz -2.95 dBm	Auto Tune
10.0 0.00 -10.0	2	bendendary militared	unter A 3		-0.70 dBm	Center Freq 2.437000000 GHz
-20.0 -30.0 -40.0	Yordan Brache Allia and		ha	M. W.	upper al franch and a second	<b>Start Freq</b> 2.412000000 GHz
-50.0						<b>Stop Freq</b> 2.462000000 GHz
Center 2.43700 GHz #Res BW 100 kHz	#VBW	300 kHz	NCTION FUNC	Sweep 4.8	Span 50.00 MHz 30 ms (1001 pts) FUNCTION VALUE	CF Step 5.000000 MHz <u>Auto</u> Man
1     N     1     f       2     N     1     f       3     N     1     f       4	2.438 35 GHz 2.429 40 GHz 2.444 85 GHz	5.30 dBm -2.95 dBm -1.79 dBm				Freq Offset 0 Hz
MSG	I,	1	I	STATUS		

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462	15200	>500	Pass

## Figure Channel 11:

Agilent Spect	rum Ana	lyzer - Swe	pt SA								
Center F	RF req 2	50 Ω 2.46200	AC 0000 GH	z	SE Tria: From		Avg Typ	ALIGNAUTO e: Log-Pwr	09:15:27   TRA	PM Mar 20, 2014 CE 1 2 3 4 5 6	Frequency
10 dB/div	Ref	20.00 c	PN IFG	IO: Fast ᇅ Sain:Low	#Atten: 3	) dB		Mkr	2 2.454 -1.	45 GHz 38 dBm	Auto Tune
Log 10.0 0.00				2-	ul-alimbertor	1	and 3			-0.65 dBm	Center Freq 2.462000000 GHz
-20.0 -30.0 -40.0	rupha M	uningWhat	ty-ytyshadad	1			<b>\</b>	Mwwww.adagaq	Montyalyalya	here aloughtern	Start Fred 2.437000000 GHz
-50.0 -60.0 -70.0											Stop Fred 2.487000000 GHz
Center 2. #Res BW	46200 100   10 scu	) GHz (Hz	× 2.463 30	#VB	N 300 kHz Y 5.35 d	FUN Bm	iction FU	Sweep	Span 5 4.80 ms (	0.00 MHz 1001 pts)	CF Step 5.000000 MHz <u>Auto</u> Mar
2 N 3 N 4 5 6 7	1 f 1 f		2.454 4 2.469 6	5 GHz 5 GHz	-1.38 d -2.53 d	Bm Bm					Freq Offset 0 Hz
8 9 10 11 12											
MSG								STATUS	;		21

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412	15200	>500	Pass

## Figure Channel 1:

Agilent Spect	trum Analyzer - Swe	ept SA						
Center F	RF 50 Ω Freq 2.41200	AC 00000 GHz	SENSE:	NT Avg Type	ALIGNAUTO e: Log-Pwr	09:22:17 PM TRACE	Mar 20, 2014	Frequency
10 dB/div	Ref 20.00 c	PNO: Fast ( IFGain:Low	#Atten: 30 dB		Mkr	2 2.404 4 -2.1	5 GHz 6 dBm	Auto Tune
Log 10.0 0.00		2 produced	boyout	1 			<u>-1.43 dBm</u>	Center Fred 2.412000000 GH:
-20.0	www.andthanduhanduhanduhanduhanduhanduhanduhandu	Wewerdowllaw			Manhandrowstower 1	mat an wind	Law and Mark	Start Free 2.387000000 GH:
-50.0 -60.0 -70.0								Stop Free 2.437000000 GH:
Center 2. #Res BW	.41200 GHz 100 kHz	#VB	W 300 kHz	FUNCTION FU	Sweep -	Span 50 4.80 ms (10 FUNCTION	.00 MHz 001 pts) value	CF Step 5.000000 MH: <u>Auto</u> Mar
1 N 2 N 3 N 4 5 6	1 f 1 f 1 f	2.413 30 GHz 2.404 45 GHz 2.419 65 GHz	4.57 dBm -2.16 dBm -3.43 dBm					Freq Offse 0 H:
7 8 9 10 11								
MSG					STATUS			

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437	15200	>500	Pass

## Figure Channel 6:

Agilent Spectrum Analyzer - Swept	SA					
M RL RF 50 Ω Center Freq 2.437000	AC 000 GHz	SENSE:INT	ALI Avg Type: Lo	GNAUTO 09:28:57 >g-Pwr TRA	PM Mar 20, 2014 CE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dB	PNO: Fast ( ) ' IFGain:Low #/	Atten: 30 dB		Mkr2 2.429 -1.	45 GHz 76 dBm	Auto Tune
10.0 0.00 -10.0	2 million and and and	A all grade at	3		-1.07 dBm	Center Freq 2.437000000 GHz
-20.0 -30.0 -40.0	hon Aspon half			light on many	Manall worker	<b>Start Freq</b> 2.412000000 GHz
-50.0						<b>Stop Freq</b> 2.462000000 GHz
Center 2.43700 GHz #Res BW 100 kHz MKR MODE TRE SCL	#VBW 30	0 kHz Y Fut	S1 NOTION FUNCTI	Span : weep 4.80 ms	50.00 MHz (1001 pts)	CF Step 5.000000 MHz Auto Man
1 N 1 f 2 N 1 f 3 N 1 f 4 5 6	2.438 30 GHz 2.429 45 GHz 2.444 65 GHz	4.93 dBm -1.76 dBm -2.98 dBm				Freq Offset 0 Hz
7 8 9 10 11 12						
MSG				STATUS		

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462	15200	>500	Pass

## Figure Channel 11:

Agilent Spect	rum Analyz	er - Swept SA								
Center F	<sup>RF</sup> req 2.4	50 Ω AC 62000000 GH	lz			Avg Type	ALIGNAUTO : Log-Pwr	09:35:31 F TRAC TY	M Mar 20, 2014	Frequency
10 dB/div	Ref 2	0.00 dBm	NU: Fast 🕞 Gain:Low	#Atten: 30 d	dB		Mkr	⊳ 2 2.454 -4.:	45 GHz 26 dBm	Auto Tune
Log 10.0 0.00			2 m	t-northang	Al	3			2.58 dBm	Center Fred 2.462000000 GHz
-20.0 -30.0 -40.0	urmund t	upplo undolimant					un an	internation	allo raturant	Start Fred 2.437000000 GHz
-50.0										Stop Fred 2.487000000 GHz
Center 2. #Res BW	46200 C 100 kH	SHz z 2.463 3	#VBW	/ 300 kHz 3.42 dBi	FUN	CTION FU	Sweep 4	Span 5 1.80 ms ( EUNCIII	0.00 MHz 1001 pts) INVALUE	CF Step 5.000000 MHz <u>Auto</u> Mar
2 N 3 N 4 5 6 7	1 f 1 f	<u>2.454</u> 4 2.469 6	5 GHz 5 GHz	-4.26 dBı -4.74 dBı	m m					Freq Offset 0 Hz
7 9 10 11 12										
MSG							STATUS			II

## 8. **Power Density**

## 8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

Note:

- 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
- 2. The test instruments marked with "X" are used to measure the final test results.

## 8.2. Test Setup



## 8.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

### 8.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

## 8.5. Uncertainty

 $\pm$  1.27 dB

# 8.6. Test Result of Power Density

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2412	3.950	< 8dBm	Pass

## Figure Channel 1:

Agiler	nt Spectrum Ana	lyzer - Swe	pt SA								
lx∥ ℝ Cer	ter Freq 2	50 Ω 2.41200	AC 0000 GH	lz	SE		Avg Type	ALIGNAUTO : Log-Pwr	08:41:33 P TRAC	M Mar 20, 2014	Frequency
10 di Log	B/div Ref	20.00 d	Bm	IO: Wide 🕞 Gain:Low	#Atten: 30	D dB		Mkr1	2.412 5 3.9	28 GHz 95 dBm	Auto Tune
10.0						1					Center Freq 2.412000000 GHz
0.00 -10.0	m	M	M	- And	M		A	m	m	m	<b>Start Freq</b> 2.406262500 GHz
-20.0 -30.0										4	<b>Stop Freq</b> 2.417737500 GHz
-40.0											<b>CF Step</b> 1.147500 MHz <u>Auto</u> Man
-50.0											Freq Offset 0 Hz
-70.0 Cen	ter 2.41200	0 GHz							Span 1	1.48 MHz	
#Re	s BW 100 k	Hz		#VBW	300 kHz			Sweep	1.13 ms (	1001 pts)	

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437MHz)

Channel No.	Frequency Measurement Le (MHz) (dBm)		Required Limit (dBm)	Result
6	2437	4.160	< 8dBm	Pass

## Figure Channel 6:

Agilent	t Spectrum Analyzer - Swept SA	w w							
LXI RL	. RF 50Ω AC		SEN	VSE:INT		ALIGNAUTO	08:48:51 F	M Mar 20, 2014	Fraguanau
Cent	ter Freq 2.43700000	) GHz PNO: Wide 🖵 IFGain:Low	Trig: Free #Atten: 30	Run dB	Avg Type	: Log-Pwr	TRAC TYI DI	ЖЕ 123456 РЕМИНИИИ ET ΡΝΝΝΝΝ	Frequency
10 dB	3/div Ref 20.00 dBm					Mkr1	2.437 5 4.	36 GHz 16 dBm	Auto Tune
10.0				1					Center Freq 2.437000000 GHz
0.00 -	mm	nn	m			m	m	M	<b>Start Freq</b> 2.431637500 GHz
-20.0 - -30.0 -									<b>Stop Freq</b> 2.442362500 GHz
-40.0 ·									<b>CF Step</b> 1.072500 MHz <u>Auto</u> Man
-60.0									Freq Offset 0 Hz
-70.0 Cent	ter 2.437000 GHz	#\/B\M	300 kHz			Sween	Span 1	0.73 MHz	
MSG		****	000 MHZ			STATUS	s and the constant	1001 pt3)	

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11	2462	4.640	< 8dBm	Pass

## Figure Channel 11:

Agilent Spectrum A	nalyzer - Swept SA								
Center Freq	F 50 Ω AC 2.462000000 G	Hz	SEN		Avg Type	ALIGNAUTO : Log-Pwr	08:56:13 P TRAC	M Mar 20, 2014	Frequency
10 dB/div Re	ہ ⊫ 1∓	NO: Wide 😱 Gain:Low 🕴	#Atten: 30	dB		Mkr1	2.462 5 4.0	28 GHz 54 dBm	Auto Tune
10.0			0	1	1000				Center Freq 2.462000000 GHz
0.00 -10.0	nnm				<u>A.</u>	An	h	m	Start Freq 2.456262500 GHz
-20.0									<b>Stop Freq</b> 2.467737500 GHz
-40.0									CF Step 1.147500 MHz <u>Auto</u> Man
-60.0									Freq Offset 0 Hz
-70.0 Center 2.4620 #Res BW 100	000 GHz I kHz	#VBW 3	100 kHz			Sweep	Span 1 1.13 ms (	1.48 MHz 1001 pts)	
MSG						STATUS			

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2412	5.670	< 8dBm	Pass

## Figure Channel 1:

Agilent Spectrur	m Analyzer - Swept	SA		125				1	
Conton Fra	RF 50 Ω 4		SEN	SE:INT	Aug Type		09:02:54 F	M Mar 20, 2014	Frequency
Center Fre	eq 2.412000	PNO: Fast 🖵 IFGain:Low	Trig: Free #Atten: 30	Run dB	OLA LANC	. Log-i wi			Auto Tune
10 dB/div Log	Ref 20.00 dB	n					2.413 2	67 dBm	
10.0				1_					Center Freq
0.00		λ	manny	manhan	A	Anna	A		2.41200000 GH2
0.00	Mallower	<del>իստչելի չ</del> , իշնչ չի թա <u>ր</u> ,0 <sub>00</sub> է լ	4		- i stroof of		american		Start Freq
-10.0	لمس ا						N		2.400600000 GHz
-20.0	J.							www	<b>Stop Freq</b> 2.423400000 GHz
-40.0									CF Step 2.280000 MHz
-50.0									<u>Auto</u> Man
-60.0									Freq Offset 0 Hz
-70.0									
Center 2.41 #Res BW 1	1200 GHz 00 kHz	#VBW	300 kHz		1	Sweep	Span 2 2.20 ms (	2.80 MHz 1001 pts)	
MSG		1	100-1-10000000000000000000000000000000			STATU	5		1

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6	2437	5.810	< 8dBm	Pass

## Figure Channel 6:

Agilen	t Spectru	ım Analyzer - Sw	ept SA			12	23		90		
LXI RI	L	RF 50 Ω	AC		SE	VSE:INT		ALIGN AUTO	09:09:27 F	M Mar 20, 2014	Fraguanau
Cen	ter Fr	eq 2.4370	00000	GHz PNO: Fast 🖵	Trig: Free #Atten: 30	Run dB	Avg Type	e: Log-Pwr	TRAC TYF DB	E 1 2 3 4 5 6 E M WWWWW T P N N N N N	Frequency
10 dE	3/div	Ref 20.00	dBm					Mkr1	2.438 2 5.1	75 GHz 81 dBm	Auto Tune
10.0					0	1-	A				Center Freq 2.437000000 GHz
0.00 -10.0		prote	W marson	nd shop on her	MANNU LANUY	1 min wh	Mhactine	Mulmerin	why		Start Freq 2.425412500 GHz
-20.0 -30.0	muhi	un .							Ŋ	WWW	<b>Stop Freq</b> 2.448587500 GHz
-40.0 -50.0											CF Step 2.317500 MHz <u>Auto</u> Man
-60.0											Freq Offset 0 Hz
-70.0 Cent #Res	ter 2.4 s BW 1	3700 GHz 100 kHz		#VBW	300 kHz			Sweep	Span 2 2.27 ms (	3.18 MHz 1001 pts)	
MSG	orana na se				100000000000000000000000000000000000000			STATUS			

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11	2462	5.280	< 8dBm	Pass

## Figure Channel 11:

Agilent Spectrum Analyzer - Swept SA				
	SENSE:INT	ALIGN AUTO	09:16:01 PM Mar 20, 2014	Frequency
PNO: Fast C	Trig: Free Run	Avg Type. Log-r wi	TYPE MWWWWW	
IFGain:Low	#Atten: 30 dB		DETIPNINININ	
		Mkr1	2.463 277 GHz	Autorune
10 dB/div Ref 20.00 dBm	10	N	5.28 dBm	
Log				Contor From
10.0				2 462000000 CU-
				2.46200000 GH2
0.00	while been been formall here	Angelanbarra	A	
will broken and the	¥		and buy	Start Freq
-10.0				2.450600000 GHz
N			W.	
-20.0				
at any N			MALIA	Stop Freq
-30.0 4440/24			1 A A A	2.473400000 GHz
-40.0				CF Step
				2.280000 MHz Auto Man
-50.0				
-60.0				Freq Offset
				0 Hz
-70.0				
Center 2.46200 GHz	1		Span 22.80 MHz	
#Res BW 100 kHz #VBW	300 kHz	Sweep	2.20 ms (1001 pts)	
MSG		STATUS	3	

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Channel No.	Channel No. Frequency Measu (MHz) (dl		Limit (dBm)	Result
1	2412	4.780	< 8dBm	Pass

# Figure Channel 1:

Agilent Spectrum Analyzer - Swept	t SA						
RL RF 50 Ω Center Freq 2.412000	AC 0000 GHz	SENSE:IN	गा Avg Type	ALIGNAUTO : Log-Pwr	09:22:50 P TRAC	M Mar 20, 2014 E 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dE	PNO: Fast 🖵 IFGain:Low BM	<sup>-</sup> Trig: Free Run #Atten: 30 dB		Mkr1	2.413 3 4.	00 GHz 78 dBm	Auto Tune
10.0			• <sup>1</sup>				Center Freq 2.412000000 GHz
0.00 mambara	Andreaman	mallman mar	al more than the second party	ndroudby	mbury		Start Freq 2.400600000 GHz
-20.0						L. Marker	<b>Stop Freq</b> 2.423400000 GHz
-40.0							<b>CF Step</b> 2.280000 MHz <u>Auto</u> Man
-60.0							Freq Offset 0 Hz
Center 2.41200 GHz #Res BW 100 kHz	#VBW	300 kHz		Sweep	Span 2 2.20 ms (	2.80 MHz 1001 pts)	

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Channel No.	Frequency (MHz)	Frequency (MHz)Measurement Level (dBm)		Result
6	2437	4.640	< 8dBm	Pass

## Figure Channel 6:

Agilent Spect	trum Analyzer - Swept SA								
LXI RL	RF 50 Ω AC		SENSE:I	NT		ALIGNAUTO	09:29:30 F	M Mar 20, 2014	Frequency
Center F	req 2.43700000	) GHz PNO: Fast 🖵 IFGain:Low	Trig: Free Run #Atten: 30 dB	n /	avg Type	Log-Pwr		2 1 2 3 4 5 6 2 MWWWWW T P N N N N N	Auto Tune
10 dB/div	Ref 20.00 dBm		1			IVIKI	2.438 3	64 dBm	
10.0				<b>●</b> <sup>1</sup>			0		Center Freq 2.437000000 GHz
-10.0	manbando	on the second	ngentrym juny	m Margara A.	andun	A-~~~	many		Start Freq 2.425600000 GHz
-20.0	M							h water Mar	Stop Freq 2.448400000 GHz
-40.0									CF Step 2.280000 MHz <u>Auto</u> Mar
-60.0									Freq Offset 0 Hz
-70.0									
Center 2 #Res BW	.43700 GHz 7100 kHz	#VBW	300 kHz			Sweep	Span 2 2.20 ms (	2.80 MHz 1001 pts)	
MSG						STATU	s		

Product	:	Wireless Motherboard
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Channel No. Frequency Mea		Measurement Level	Required Limit	Result
(MHz)		(dBm)	(dBm)	
11	2462	3.410	< 8dBm	Pass

## Figure Channel 11:

Agilent Spectrum Analyzer - Swept SA					
M RL RF 50 Ω AC Center Freq 2.462000000 GH	Hz se	NSE:INT Avg Type:	ALIGNAUTO 09:36:04 : Log-Pwr TR.	PM Mar 20, 2014 ACE 1 2 3 4 5 6	Frequency
ہے۔ ۱۵ dB/div Ref 20.00 dBm	NO: Fast 🖵 Thg. rree Gain:Low #Atten: 30	) dB	Mkr1 2.463 3	277 GHz .41 dBm	Auto Tune
10.0		↓1			Center Freq 2.462000000 GHz
-10.0	www.www.haroof	Jan and Jane In	Armanutan		Start Freq 2.450600000 GHz
-20.0					<b>Stop Freq</b> 2.473400000 GHz
-40.0 -50.0				, ala M	<b>CF Step</b> 2.280000 MHz <u>Auto</u> Man
-60.0					<b>Freq Offset</b> 0 Hz
Center 2.46200 GHz #Res BW 100 kHz	#VBW 300 kHz		Span Sweep 2.20 ms	22.80 MHz (1001 pts)	

# 9. EMI Reduction Method During Compliance Testing

No modification was made during testing.
Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs