

FCC Test Report

Product Name	Wireless Motherboard
Model No.	TH80GA
FCC ID.	WL6-TH8AG20GA4

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

Date of Receipt	Feb. 05, 2016
Issued Date	Mar. 22, 2016
Report No.	1620222R-RFUSP23V00
Report Version	V1.0
MIIIIII.	



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 report 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

Issued Date: Mar. 22, 2016 Report No.: 1620222R-RFUSP23V00



Product Name	Wireless Motherboard	
Applicant	ELITEGROUP COMPUTER SYSTEMS CO., LTD	
Address	No.239,Sec.2,Ti Ding Blvd.,Taipei Taiwan	
Manufacturer	Elitegroup Computer Systems(SIP) CO., LTD.	
Model No.	TH80GA	
FCC ID.	WL6-TH8AG20GA4	
EUT Rated Voltage	DC 3.7V	
EUT Test Voltage	DC 3.7V	
Trade Name	ECS ELITEGROUP	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2014	
	ANSI C63.4: 2014, ANSI C63.10: 2013	
Test Result	Complied	

Documented By :

Jinn Chen

(Senior Adm. Specialist / Jinn Chen)

Tested By :

TN

(Assistant Engineer / Bill Lin)

Approved By :

(Director / Vincent Lin)

TABLE OF CONTENTS

Des	scription	Page
1.	GENERAL INFORMATION	5
1.1.	EUT Description	5
1.2.	Operational Description	7
1.3.	Tested System Details	
1.4.	Configuration of Tested System	
1.5.	EUT Exercise Software	
1.6.	Test Facility	9
2.	CONDUCTED EMISSION	10
2.1.	Test Equipment	
2.2.	Test Setup	
2.3.	Limits	
2.4.	Test Procedure	
2.5.	Uncertainty	
2.6.	Test Result of Conducted Emission	
3.	PEAK POWER OUTPUT	
3.1.	Test Equipment	
3.2.	Test Setup	
3.3.	Limit	
3.4.	Test Procedure	
3.5.	Uncertainty	
3.6.	Test Result of Peak Power Output	14
4.	RADIATED EMISSION	16
4.1.	Test Equipment	16
4.2.	Test Setup	16
4.3.	Limits	
4.4.	Test Procedure	
4.5.	Uncertainty	
4.6.	Test Result of Radiated Emission	
5.	RF ANTENNA CONDUCTED TEST	
5.1.	Test Equipment	
5.2.	Test Setup	
5.3.	Limits	
5.4.	Test Procedure	
5.5.	Uncertainty	
5.6.	Test Result of RF Antenna Conducted Test	
6.	BAND EDGE	
6.1.	Test Equipment	
6.2.	Test Setup	
6.3.	Limit	
6.4.	Test Procedure	
6.5.	Uncertainty	

6.6.	Test Result of Band Edge		
7.	CHANNEL NUMBER	48	
7.1.	Test Equipment		
7.2.	Test Setup		
7.3.	Limit		
7.4.	Test Procedure		
7.5.	Uncertainty		
7.6.	Test Result of Channel Number	49	
8.	CHANNEL SEPARATION	51	
8.1.	Test Equipment	51	
8.2.	Test Setup	51	
8.3.	Limit	51	
8.4.	Test Procedure	51	
8.5.	Uncertainty	51	
8.6.	Test Result of Channel Separation		
9.	DWELL TIME	56	
9.1.	Test Equipment	56	
9.2.	Test Setup	56	
9.3.	Limit		
9.4.	Test Procedure		
9.5.	Uncertainty	56	
9.6.	Test Result of Dwell Time	57	
10.	OCCUPIED BANDWIDTH	61	
10.1.	Test Equipment	61	
10.2.	Test Setup	61	
10.3.	Limits		
10.4.	Test Procedure		
10.5.	Uncertainty	61	
10.6.	Test Result of Occupied Bandwidth	62	
11.	EMI REDUCTION METHOD DURING COMPLIANCE TESTING	66	
Attachm Attachm	ent 1: EUT Test Photographs ent 2: EUT Detailed Photographs		

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Motherboard	
Trade Name	ECS ELITEGROUP	
Model No.	TH80GA	
FCC ID.	WL6-TH8AG20GA4	
Frequency Range	2402 – 2480MHz	
Channel Number	79	
Type of Modulation	FHSS: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps)	
Antenna Type	PIFA Antenna	
Channel Control	Auto	
Antenna Gain Refer to the table "Antenna List"		
USB Cable	Shielded, 1.7m	

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	SOUTH STAR	13H130-JJ5370	PIFA Antenna	2.71 dBi for 2.4 GHz

Note:

1. The antenna of EUT conforms to FCC 15.203.

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

- 1. The EUT is a Notebook with a built-in WLAN
 Bluetooth transceiver, this report for Bluetooth.
- 2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
- 3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
- 4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
- 5. Bluetooth operation was evaluated at both 1Mb/s and 3Mb/s data rates. 2Mb/s data rate was found, through pre-testing, to produce emissions similar to those for 3Mb/s.

Test Mode	Mode 1: Transmit - 1Mbps (GFSK)	
	Mode 2: Transmit - 3Mbps (8DPSK)	



1.3. Tested System Details

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

Prod	uct	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	M65	CG098	Non-Shielded, 0.8m
2	Earphone	PCHOME	N/A	N/A	N/A

Signal Cable Type		Signal cable Description	
A USB Cable		Shielded, 1.7m	
В	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 software "phone Tool 10.81.0.0" on the EUT.
- 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	30-65
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/chinese/about/certificates.aspx?bval=5</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 : service@quietek.com			

FCC Accreditation Number: TW1014

2. Conducted Emission

2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2015	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2016	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2016	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2016	EUT
Х	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2016	
	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 Subpart C Paragraph 15.207 (dBµV) Limit					
Frequency	Limits				
MHz	QP	AV			
0.15 - 0.50	66-56	56-46			
0.50-5.0	56	46			
5.0 - 30	60	50			

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and Peripherals 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 refer 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 the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

2.5. Uncertainty

± 2.26 dB



2.6. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

3. Peak Power Output

3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Power Meter	Anritsu	ML2495A/6K00003357	May, 2015
Х	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2015

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

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

3.2. Test Setup



3.3. Limit

The maximum peak power shall be less 1Watt.

3.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

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

Channel No.	Frequency	Measurement	Required Limit	Result
	(MHz)	(dBm)		
Channel 00	2402.00	5.89	1 Watt= 30 dBm	Pass
Channel 39	2441.00	6.56	1 Watt= 30 dBm	Pass
Channel 78	2480.00	6.76	1 Watt= 30 dBm	Pass



Product	:	Wireless Motherboard
Test Item	:	Peak Power Output
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Channel No.	Frequency	Measurement	Required Limit	Result
	(MHz)	(dBm)		
Channel 00	2402.00	5.71	1 Watt= 30 dBm	Pass
Channel 39	2441.00	6.28	1 Watt= 30 dBm	Pass
Channel 78	2480.00	6.56	1 Watt= 30 dBm	Pass



4. **Radiated Emission**

4.1. Test Equipment

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

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	Х	Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep, 2015
	Х	Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun., 2015
	Х	EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun., 2015
	Х	Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun., 2015
	Χ	Coaxial signal switch	Arnist	MP59B/ 6200798682	Jun., 2015

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
CB # 8	Х	Spectrum Analyzer	R&S	FSP40/ 100339	Oct., 2015
	Х	Horn Antenna	ETS-Lindgren	3117/ 35205	Mar., 2016
	Х	Horn Antenna	Schwarzbeck	BBHA9170/209	Jan., 2016
	Х	Horn Antenna	TRC	AH-0801/95051	Aug., 2015
	Х	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2016
	Х	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2015
	Х	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2015

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

sBelow 1GHz





Above 1GHz



4.3. Limits

➤ General Radiated Emission 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 Limits					
Frequency MHz	uV/m @3m	dBµV/m@3m			
30-88	100	40			
88-216	150	43.5			
216-960	200	46			
Above 960	500	54			

Remarks: 1. RF Voltage $(dB\mu V) = 20 \log RF$ Voltage (uV)

- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 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: 2013 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 measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

Product Test Item Test Site Test Mode	 Wireless Motherboard Harmonic Radiated Emission No.3 OATS Mode 1: Transmit - 1Mbps (GFSK)(2402MHz) 							
Frequency	Correct	Correct Reading Measurement Margin Limit						
MHz	Factor dB	Level dBµV	Level dBμV/m	dB	dBµV/m			
Horizontal		•	· · ·					
Peak Detector:								
4804.000	2.511	42.740	45.250	-28.750	74.000			
7206.000	9.511	39.610	49.121	-24.879	74.000			
9608.000	10.394	39.180	49.574	-24.426	74.000			
Average								
Detector:								
Vertical								
Peak Detector:								
4804.000	2.923	43.580	46.502	-27.498	74.000			
7206.000	9.988	39.130	49.119	-24.881	74.000			
9608.000	10.847	39.030	49.877	-24.123	74.000			
Average								
Detector:								

4.6. Test Result of Radiated Emission

- 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					
Test Site	est Site : No.3 OATS					
Test Mode	: Mode 1	: Transmit - 1Mbp	os (GFSK)(2441MHz))		
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m	
Horizontal						
Peak Detector:						
4882.000	2.025	42.630	44.655	-29.345	74.000	
7323.000	9.762	40.070	49.831	-24.169	74.000	
9764.000	9.682	38.660	48.341	-25.659	74.000	
Average						
Detector:						
Vertical						
Peak Detector:						
4882.000	2.488	42.090	44.578	-29.422	74.000	
7323.000	10.375	39.570	49.944	-24.056	74.000	
9764.000	10.315	39.270	49.585	-24.415	74.000	
Average						

Detector:

- 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
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4960.000	2.582	42.470	45.052	-28.948	74.000
7440.000	10.555	40.130	50.685	-23.315	74.000
9920.000	10.206	39.550	49.756	-24.244	74.000
Average					
Detector:					
Vertical					
Peak Detector:					
4960.000	3.398	40.930	44.329	-29.671	74.000
7440.000	11.214	38.020	49.234	-24.766	74.000
9920.000	11.245	38.300	49.545	-24.455	74.000
Average					
Detector:					

- 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						
Test Site	: No.3 OATS						
Test Mode	: Mode 2	: Mode 2: Transmit - 3Mbps (8DPSK)(2402MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m		
Horizontal							
Peak Detector:							
4804.000	2.511	41.100	43.610	-30.390	74.000		
7206.000	9.511	40.030	49.541	-24.459	74.000		
9608.000	10.394	38.720	49.114	-24.886	74.000		
Average							
Detector:							
Vertical							
Peak Detector:							
4804.000	2.923	42.880	45.802	-28.198	74.000		
7206.000	9.988	39.980	49.969	-24.031	74.000		
9608.000	10.847	38.840	49.687	-24.313	74.000		
Average							
Detector:							

--

Note:

-

- 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					
Test Site	: No.3 OA	ATS				
Test Mode	: Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	dBµV/m	dB	dBµV/m	
Horizontal						
Peak Detector:						
4882.000	2.025	41.550	43.575	-30.425	74.000	
7323.000	9.762	40.340	50.101	-23.899	74.000	
9764.000	9.682	39.230	48.911	-25.089	74.000	
Average						
Detector:						
Vertical						
Peak Detector:						
4882.000	2.488	42.300	44.788	-29.212	74.000	
7323.000	10.375	39.700	50.074	-23.926	74.000	
9764.000	10.315	38.320	48.635	-25.365	74.000	
Average						
Detector:						

Note:

--

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						
Test Site	: No.3 OA	: No.3 OATS					
Test Mode	e : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBµV	dBµV/m	dB	dBµV/m		
Horizontal							
Peak Detector:							
4960.000	2.582	40.700	43.282	-30.718	74.000		
7440.000	10.555	40.020	50.575	-23.425	74.000		
9920.000	10.206	39.250	49.456	-24.544	74.000		
Average							
Detector:							
Vertical							
Peak Detector:							
4960.000	3.398	43.940	47.339	-26.661	74.000		
7440.000	11.214	38.260	49.474	-24.526	74.000		
9920.000	11.245	39.500	50.745	-23.255	74.000		
Average							

Detector:

--

- 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
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m
Horizontal					
103.720	2.006	29.462	31.467	-12.033	43.500
264.740	2.656	21.382	24.038	-21.962	46.000
400.540	3.081	17.276	20.357	-25.643	46.000
594.540	3.524	21.649	25.173	-20.827	46.000
780.780	3.927	16.193	20.120	-25.880	46.000
957.320	3.926	25.636	29.562	-16.438	46.000
Vertical					
132.820	5.600	25.095	30.695	-12.805	43.500
315.180	6.204	15.861	22.065	-23.935	46.000
464.560	6.656	19.205	25.861	-20.139	46.000
643.040	7.081	13.215	20.296	-25.704	46.000
798.240	7.378	18.547	25.925	-20.075	46.000
984.480	7.359	24.924	32.283	-21.717	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
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m
Horizontal					
103.720	2.006	27.400	29.405	-14.095	43.500
284.140	2.763	21.030	23.793	-22.207	46.000
437.400	3.137	23.320	26.457	-19.543	46.000
604.240	3.537	16.475	20.012	-25.988	46.000
792.420	3.946	20.929	24.875	-21.125	46.000
951.500	3.918	26.381	30.299	-15.701	46.000
Vertical					
103.720	5.429	25.649	31.077	-12.423	43.500
249.220	6.016	14.937	20.953	-25.047	46.000
410.240	6.524	18.357	24.881	-21.119	46.000
586.780	6.936	13.482	20.418	-25.582	46.000
759.440	7.312	17.605	24.917	-21.083	46.000
963.140	7.364	22.460	29.824	-24.176	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., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

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

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

5.2. Test Setup



5.3. Limits

According to FCC Section 15.247(d). 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

5.5. Uncertainty

± 150Hz



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 - 1Mbps (GFSK)

Figure Channel 00:







Figure Channel 78:



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



Product	:	Wireless Motherboard
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)







Figure Channel 78:



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.
◯ CB # 8	Х	Spectrum Analyzer	R&S	FSP40/ 100339	Oct., 2015
	Х	Horn Antenna	ETS-Lindgren	3117/ 35205	Mar., 2016
	Х	Horn Antenna	Schwarzbeck	BBHA9170/209	Jan., 2016
	Х	Horn Antenna	TRC	AH-0801/95051	Aug., 2015
	Х	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2016
	Х	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2015
	Χ	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2015

Note: 1. All equipments 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:

Above 1GHz



6.3. Limit

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)).

6.4. Test Procedure

The EUT is placed on a turn table which is 1.5 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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

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
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
00 (Peak)	2388.600	31.504	22.756	54.260	74.00	54.00	Pass
00 (Peak)	2390.000	31.509	22.405	53.914	74.00	54.00	Pass
00 (Peak)	2400.000	31.561	26.738	58.299			
00 (Peak)	2402.200	31.574	60.525	92.100			
00 (Average)	2343.200	31.326	11.988	43.314	74.00	54.00	Pass
00 (Average)	2390.000	31.509	11.553	43.062	74.00	54.00	Pass
00 (Average)	2400.000	31.561	19.167	50.728			
00 (Average)	2402.000	31.573	48.764	80.338			

Figure Channel 00:



Figure Channel 00:

Horizontal (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

RF Radiated Measurement (VERTICAL):

Channal Na	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
00 (Peak)	2353.600	31.084	23.104	54.188	74.00	54.00	Pass
00 (Peak)	2390.000	30.915	22.530	53.445	74.00	54.00	Pass
00 (Peak)	2400.000	30.912	24.231	55.143			
00 (Peak)	2402.200	30.917	56.651	87.569			
00 (Average)	2342.200	31.137	12.012	43.149	74.00	54.00	Pass
00 (Average)	2390.000	30.915	11.554	42.469	74.00	54.00	Pass
00 (Average)	2400.000	30.912	16.427	47.339			
00 (Average)	2402.000	30.917	45.698	76.615			

Figure Channel 00:

VERTICAL (Peak)



Figure Channel 00:

VERTICAL (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

RF Radiated Measurement (Horizontal):

Channal No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
78 (Peak)	2480.100	32.157	63.163	95.319			
78 (Peak)	2483.500	32.182	26.784	58.966	74.00	54.00	Pass
78 (Average)	2479.900	32.155	51.446	83.601			
78 (Average)	2483.500	32,182	20.255	52,437	74.00	54.00	Pass

Figure Channel 78:

Horizontal (Peak)





Horizontal (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
78 (Peak)	2480.100	31.413	60.234	91.647			
78 (Peak)	2483.500	31.435	23.321	54.756	74.00	54.00	Pass
78 (Average)	2479.900	31.411	48.293	79.704			
78 (Average)	2483.500	31.435	11.492	42.927	74.00	54.00	Pass

Figure Channel 78:

VERTICAL (Peak)



Figure Channel 78:

VERTICAL (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

RF Radiated Measurement (Horizontal):

Channal No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Recult
Channel No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
00 (Peak)	2383.000	31.483	23.055	54.537	74.00	54.00	Pass
00 (Peak)	2390.000	31.509	21.579	53.088	74.00	54.00	Pass
00 (Peak)	2400.000	31.561	35.763	67.324			
00 (Peak)	2402.200	31.574	62.310	93.885			
00 (Average)	2343.000	31.325	9.890	41.215	74.00	54.00	Pass
00 (Average)	2390.000	31.509	9.152	40.661	74.00	54.00	Pass
00 (Average)	2400.000	31.561	20.112	51.673			
00 (Average)	2402.000	31.573	46.321	77.895			

Figure Channel 00:

Horizontal (Peak)



Figure Channel 00:

Horizontal (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

RF Radiated Measurement (VERTICAL):

Channal No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
00 (Peak)	2381.200	30.956	22.313	53.269	74.00	54.00	Pass
00 (Peak)	2390.000	30.915	21.292	52.207	74.00	54.00	Pass
00 (Peak)	2400.000	30.912	30.056	60.968			
00 (Peak)	2402.200	30.917	57.522	88.440			
00 (Average)	2341.400	31.141	9.911	41.052	74.00	54.00	Pass
00 (Average)	2390.000	30.915	9.124	40.039	74.00	54.00	Pass
00 (Average)	2400.000	30.912	16.547	47.459			
00 (Average)	2402.000	30.917	42.622	73.539			

Figure Channel 00:

VERTICAL (Peak)



Figure Channel 00:

VERTICAL (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
	(MHz)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
78 (Peak)	2479.900	32.155	64.035	96.190			
78 (Peak)	2483.500	32.182	23.590	55.772	74.00	54.00	Pass
78 (Peak)	2523.500	32.198	23.631	55.829	74.00	54.00	Pass
78 (Average)	2480.100	32.157	47.693	79.849			
78 (Average)	2483.500	32.182	12.271	44.453	74.00	54.00	Pass

Figure Channel 00:

Horizontal (Peak)



Figure Channel 00:

Horizontal (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

RF Radiated Measurement (VERTICAL):

Channel No	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Result
Chamier 100.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dBµV/m)	Result
78 (Peak)	2479.700	31.410	60.885	92.295			
78 (Peak)	2483.500	31.435	22.991	54.426	74.00	54.00	Pass
78 (Peak)	2501.300	31.530	23.097	54.627	74.00	54.00	Pass
78 (Average)	2480.100	31.413	45.083	76.496			
78 (Average)	2483.500	31.435	11.181	42.616	74.00	54.00	Pass

Figure Channel 78:

VERTICAL (Peak)



Figure Channel 78:

VERTICAL (Average)



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

Product	:	Wireless Motherboard
Test Item	:	Hopping Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

RF Radiated Measurement (Horizontal):

Channal No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
00 (Peak)	2390.000	31.509	26.705	58.214	74.00	54.00	Pass
00 (Peak)	2400.000	31.561	33.101	64.662			
00 (Peak)	2440.000	31.852	67.181	99.033			
00 (Average)	2390.000	31.509	14.092	45.601	74.00	54.00	Pass
00 (Average)	2400.000	31.561	18.688	50.249			
00 (Average)	2440.000	31.852	57.949	89.801			

Figure Channel 00:

Horizontal (Peak)



Figure Channel 00:

Horizontal (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Hopping Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

RF Radiated Measurement (VERTICAL):

Channel Ma	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
00 (Peak)	2390.000	30.915	27.848	58.763	74.00	54.00	Pass
00 (Peak)	2400.000	30.912	32.852	63.764			
00 (Peak)	2439.855	31.138	67.367	98.505			
00 (Average)	2342.754	31.134	15.305	46.439	74.00	54.00	Pass
00 (Average)	2390.000	30.915	14.646	45.561	74.00	54.00	Pass
00 (Average)	2400.000	30.912	19.291	50.203			
00 (Average)	2440.000	31.139	49.150	80.289			

Figure Channel 00:

VERTICAL (Peak)



Figure Channel 00:

VERTICAL (Average)



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

Product	:	Wireless Motherboard
Test Item	:	Hopping Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
78 (Peak)	2469.152	32.073	68.381	100.454			
78 (Peak)	2483.500	32.182	26.995	59.177	74.00	54.00	Pass
78 (Peak)	2486.399	32.204	28.211	60.415	74.00	54.00	Pass
78 (Average)	2469.007	32.072	68.189	100.261			
78 (Average)	2483.500	32.182	14.477	46.659	74.00	54.00	Pass
78 (Average)	2509.297	32.253	16.270	48.523	74.00	54.00	Pass

Figure Channel 78:

Horizontal (Peak)



Figure Channel 78:

Horizontal (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Hopping Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
78 (Peak)	2469.152	31.338	70.836	102.175			
78 (Peak)	2483.500	31.435	27.508	58.943	74.00	54.00	Pass
78 (Peak)	2530.891	31.558	28.671	60.229	74.00	54.00	Pass
78 (Average)	2469.007	31.338	70.722	102.060			
78 (Average)	2483.500	31.435	14.656	46.091	74.00	54.00	Pass
78 (Average)	2509.152	31.546	16.451	47.996	74.00	54.00	Pass

Figure Channel 78:

VERTICAL (Peak)



Figure Channel 78:

VERTICAL (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Hopping Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

RF Radiated Measurement (Horizontal):

Channel No	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Result
Chamier No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
00 (Peak)	2366.957	31.418	28.054	59.473	74.00	54.00	Pass
00 (Peak)	2390.000	31.509	27.012	58.521	74.00	54.00	Pass
00 (Peak)	2400.000	31.561	36.360	67.921			
00 (Peak)	2440.000	31.852	64.233	96.085			
00 (Average)	2345.362	31.334	14.935	46.269	74.00	54.00	Pass
00 (Average)	2390.000	31.509	13.863	45.372	74.00	54.00	Pass
00 (Average)	2400.000	31.561	25.290	56.851			
00 (Average)	2440.000	31.852	51.398	83.250			

Figure Channel 00:

Horizontal (Peak)



Figure Channel 00:

Horizontal (Average)



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



Product	:	Wireless Motherboard
Test Item	:	Hopping Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Dogult
	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
00 (Peak)	2390.000	30.915	27.913	58.828	74.00	54.00	Pass
00 (Peak)	2400.000	30.912	37.158	68.070			
00 (Peak)	2440.000	31.139	66.875	98.014			
00 (Average)	2342.609	31.135	15.193	46.328	74.00	54.00	Pass
00 (Average)	2390.000	30.915	14.441	45.356	74.00	54.00	Pass
00 (Average)	2400.000	30.912	26.029	56.941			
00 (Average)	2440.000	31.139	47.045	78.184			



VERTICAL (Peak)



Figure Channel 00:

VERTICAL (Average)



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



:	Wireless Motherboard
:	Hopping Band Edge
:	No.3 OATS
:	Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)
	: : :

RF Radiated Measurement (Horizontal):

Channal No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel No.	(MHz)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
78 (Peak)	2469.007	32.072	66.123	98.195			
78 (Peak)	2483.500	32.182	27.021	59.203	74.00	54.00	Pass
78 (Peak)	2484.804	32.193	28.663	60.855	74.00	54.00	Pass
78 (Average)	2470.022	32.080	63.310	95.390			
78 (Average)	2483.500	32.182	14.307	46.489	74.00	54.00	Pass
78 (Average)	2509.007	32.253	16.087	48.341	74.00	54.00	Pass

Figure Channel 00:

Horizontal (Peak)



Figure Channel 00:

Horizontal (Average)



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

Product	:	Wireless Motherboard
Test Item	:	Hopping Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Dogult
	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
78 (Peak)	2467.993	31.331	68.259	99.590			
78 (Peak)	2483.500	31.435	27.199	58.634	74.00	54.00	Pass
78 (Peak)	2496.399	31.520	29.166	60.686	74.00	54.00	Pass
78 (Average)	2470.022	31.344	65.504	96.848			
78 (Average)	2483.500	31.435	14.642	46.077	74.00	54.00	Pass
78 (Average)	2509.587	31.546	15.965	47.511	74.00	54.00	Pass

Figure Channel 78:

VERTICAL (Peak)



Figure Channel 78:

VERTICAL (Average)



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

7. Channel Number

7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

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

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

7.2. Test Setup



7.3. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

7.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

7.5. Uncertainty

N/A

7.6. Test Result of Channel Number

Product	:	Wireless Motherboard
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Frequency Range	Measurement	Required Limit	Pogult		
(MHz)	(Hopping Channel)	(Hopping Channel)	Result		
2402 ~ 2480	79	>75	Pass		

2402-2421MHz

2422-2441MHz

E Kongit Gashun Autom - Segt G		B Sough Gerban Autom - and G
Senter Freq 2.411000000 GHz Trac Free Dun Total Free Dun	Frequency	Center Freq 2.431500000 GHz Avg Type Log-Pwr This 1.334 Frequency
Fight to B Atten: 20 dB Atten: 20 dB Atten: 20 dB	Auto Tune	BroainLow BAtten: 20 dB BALLY 2 441 OD GUT AUto Tune
10 dB/div Ref 10.00 dBm -0.90 dBm		10 dB/div Ref 10.00 dBm 0.14 dBm
	Center Freq 2.411000000 GHz	2431500000 GHz
400	Start Freq 2.400500000 GHz	300 Start Freq 400 2.421500000 GHz 400 CH2
400	Stop Freq 2.421500000 GHz	400
Start 2.40050 GHz Stop 2.42150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.533 ms (1001 pts	CF Step 2.100000 MHz	Start 2.42150 GHz Stop 2.44150 GHz CF Step #Res BW 100 kHz #VBW 100 kHz Sweep 2.467 ms (1001 pts) 2.000000 MHz
Mag Model Hille Col. K Y RUCEROM RUCEROMMORE - 1 N 1 f 2.402 000 GHz - 3.28 dBm N 1 f 2.421 000 GHz - 0.99 dBm	euto mart	Line r Patienton Patientono Patientono Patienton
	Freq Offset D Hz	3 Freq Offset
SG STATUS		NSG STATUS

2442-2461MHz

2462-2480MHz

B Annught Granthum Analyzer - Sweet SA									1. 64	and the Put	A LANGER - S	weat SA								
Center Freq 2.451500000 GH	2	ria: Free Ry	INT	Avg Type:	Log-Pwr	04:32:35 PH TRAC	4Feb 37,2928	Frequency	Cent	ter Fred	2.4715	00000 GH	łz	Trin: Free	Run	Avg Typ	tog-Pwr	NACESERIES	1 2 3 4 5 6	Frequency
IFG.	ein:Low #	Atten: 20 di	6				TP NNNNN	Auto Tune	_			. #	ND: Fast C.	#Atten: 20) dB			2	TPNNNN	Auto Tune
10 dB/div Ref 10.00 dBm					MKr2	0.0	61 dBm	1 Year Care	10 dE	Mdiv R	ef 10.00	dBm					MKG	2 2.480	78 dBm	And a contract of the
	W	VV	ΨΨ	N	M	M	M	Center Freq 2.451500000 GHz	0.00	N/A	W	MA	M	MA	AM	M	NA	M	2	Center Freq 2.471600000 GHz
-300 -400 -600			_					Start Freq 2.441500000 GHz	-30.0 -40.0 -50.0										A	Start Freq 2.461500000 GHz
40.0 -70.0 -80.0		-						Stop Freq 2.461500000 GHz	-70.0 -70.0 -80.0								-			Stop Freq 2.481500000 GHz
Start 2.44150 GHz #Res BW 100 kHz	#VBW 10	00 kHz		SI	weep 2.	Stop 2.46 467 ms (150 GHz 1001 pts)	CF Step 2.000000 MHz	Stari #Res	2.4615 5 BW 10	0 GHz 0 kHz		#VBW	100 kHz			Sweep 2	Stop 2.48 .467 ms (1	150 GHz 1001 pts)	CF Step 2.000000 MHz
1 N 7 F 2.442.00	GHz	0.45 dBm	FUNCT	ON FUNC	FRONTWOTH	FUNCTION	NAME >	COLO MIEST	1	N N		2.452.0	0.GHz	1.02 dE	E FUN	TRON	NOTION WOTH	FUNCTION	N WALKE	COLV. ment
2 N 1 2451 00 3 4 5	GHz	0.61 dBm			_			Freq Offset D Hz	345	N		2,480 0	0 GHz	0.78 dE	3em	_				Freq Offset D Hz
6 7 8 9 10	-			=					6 7 8 9				-			=				
<u>n</u>	1	~ 1					+		11	11	1		1	~	11.	1			- + [*]	
ANNU -					STATES				MASIS .								STATES	A		



Product	:	Wireless Motherboard
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Frequency Range	Measurement	Required Limit	Result		
(MHz)	(Hopping Channel)	(Hopping Channel)	Robuit		
2402 ~ 2480	79	>75	Pass		

2402-2421MHz

2422-2441MHz

Bit Screeper Seattran Assess - Google Sk		🖪 Annual General Addition - Search GA
Center Freq 2.411000000 GHz Tric Freq Sun Kur Strate Sun Kur	Frequency	Center Freq 2.431500000 GHz Tric Freq Pure Avg Type Log-Pure Trics 13, 25 6 Frequency
PROFiled B Section 20 dB Section 20 dB Mkr2 2,421 000 GHz	Auto Tune	Microsoft Antiper 20 dB Sector Microsoft Antiper 20 dB Attent 20 dB At
	Center Freq 2.411000000 GHz	10 delad v Ref 10.00 dBm 1,00 dBm 2,00
400 400 400	Start Freq 2.400500000 GHz	300 300 400 400 2.421500000 GHz
400	Stop Freq 2.421500000 GHz	40.0
Start 2.40050 GHz Stop 2.42150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.533 ms (1001 pts)	CF Step 2.100000 MHz Auto Man	Start 2.42150 GHz Stop 2.44150 GHz CF Step #Res BW 100 kHz #VBW 100 kHz Sweep 2.447 ms (1001 pts) AG7 ms (1001 pts) AG7 ms (1001 pts)
1 N 1 F 2.402.000 GHz -1.19 dBm	Freq Offset D Hz	N I 2.422 00 GHz -0.76 dBm N I 2.441 00 GHz 1.58 dBm I I I 1.58 dBm
117 atarina atarina		anni gtàrma

2442-2461MHz

2462-2480MHz

The Annual Stream Andrew Court St	2.4.6	🕱 Annyi tarahan Antara Sarat M
Center Freq 2.451500000 GHz Avg Type: Log-Pwr Trid: Free Run	45.6 Frequency	Center Freq 2.471500000 GHz Frequency Http://www.www.
Il GalnLow RAten: 20 dB 0017 4 Mkr2 2.461 00 10 dB/div Ref 10.00 dBm	Hz Auto Tune	Section 20 dB Section 20 dB Mkr2 2.480 00 GHz Auto Tune 10 dB/div Ref 10.00 dBm 1.75 dBm
	Center Freq 2.451500000 GHz	Log 00 2 00 2 0 0 0 0 0 0 0 0 0 0 0 0 0
400 400 400	Start Freq 2.441500000 GHz	300 Start Free 400 2461500000 GHz
400	Stop Freq 2.461500000 GHz	40.0
Start 2.44150 GHz Stop 2.46150 #Res BW 100 kHz #VBW 100 kHz Sweep 2.467 ms (1001	CF Step 2 000000 MHz Auto Man	Start 2.46150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.467 ms (1001 pt) August 2.467 ms (1001 pt)
Line 1 X 1 Z 2442 00 GHz 1.36 dBm 1 N 1 7 2.442 00 GHz 1.36 dBm 3 3 3 1 2.461 00 GHz -1.63 dBm 3 4 -	Freq Offset	I N f 2.462.00 GHz -1.40 dBm -1.40 dBm I N f 2.480.00 GHz -1.75 dBm -1.40 dBm I N f 2.480.00 GHz 1.75 dBm -1.40 dBm I N f 2.480.00 GHz 1.75 dBm -1.40 dBm I O Hz O Hz -1.40 dBm -1.40 dBm I O Hz O Hz -1.40 dBm -1.40 dBm </td
ann gtàran		time status



8. Channel Separation

8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

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

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

8.2. Test Setup



8.3. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

8.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

8.5. Uncertainty

 \pm 150Hz

8.6. Test Result of Channel Separation

Product	:	Wireless Motherboard
Test Item	:	Channel Separation
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

	Fraquanay	Measurement	Limit	Limit of (2/3)*20dB		
Channel No.	(MHz)	Level	(1-11-2)	Dandwidth (1/117)	Result	
	(MHZ)	(kHz)	(кпz)	Ballowidul (KHZ)		
00	2402	1000	>25 kHz	753.3	Pass	
39	2441	1000	>25 kHz	753.3	Pass	
78	2480	1000	>25 kHz	753.3	Pass	

NOTE: The 20dB Bandwidth is refer to section 10.

🌉 Key:	sight S	pectru	m An	alyzer - Swe	pt SA											
Cent	ter F	Free	RF 2 2 .	50 Ω 40200	AC 0000 GH	Ηz	_	SEN	NSE:INT	Avg	⊿ Type:	LIGN AUTO	03:53:12 TR	PM Feb 17, 2016	5	Frequency
10 dE	3/div		Ref	10.00 d	PI IF	NO: Wide Gain:Low	, -	#Atten: 2	0 dB			Mk	r2 2.403 -1	00 GHz		Auto Tune
Log 0.00 -10.0 -20.0										2						Center Freq 2.402000000 GHz
-30.0 -40.0 -50.0							mus								:	Start Freq 2.397000000 GHz
-60.0 -70.0 -80.0	~nloh4	phone	in the second			bogde						- Wordsport				Stop Freq 2.407000000 GHz
Cent #Res	ter 2 s BW	2.40: V 10	200 10 k	0 GHz Hz		#V	вw	100 kHz			#S	weep (Span 500.0 ms	10.00 MHz (1001 pts)	Au	CF Step 1.000000 MHz to Man
MKR M 1 2 3 4 5 6 7 8 9 10 11 <	N N	TRC 1 1	F f		× 2.402 0 2.403 0	00 GHz 00 GHz		Y -0.92 dE -1.00 dE	50 57 57 57 57 57 57 57 57 57 57 57 57 57		FUNG		FUNC			Freq Offset 0 Hz

Channel 00 (2402MHz)



							01141111		(=	(11)			
🊺 Ke	ysight	Spect	rum A	nalyzer - Swe	ept SA								
lxi R	L		RF	50 Ω	AC		SE	NSE:INT		ALIGN AUTO	04:10:24 P	M Feb 17, 2016	Frequency
Cen	ter	Fre	q 2	2.44100	0000 GH	z		_	Avg Ty	pe: Log-Pwr	TRAC	E 1 2 3 4 5 6	Frequency
			-		PN	IO: Wide C	Trig: Fre	e Run					
					IFO	Gain:Low	#Atten: 2	UdB			5.		A
										Mkr	2 2.442	00 GHz	Auto Tune
10 -			Dat	10.00 -	Bm						0	61 dBm	
Log			Rei	10.00 0			-	/_	A 1				
0.00							(V' .	7 2				Conton From
0.00							1	γ	7				Center Freq
-10.0	-		-				+		- <u>\</u>				2.441000000 GHz
20.0													
-20.0													
-30.0			-+-				+/						Start From
-40.0										\sim			Startineq
-40.0							/ *						2.436000000 GHz
-50.0				~~~~	prove (·					m	
-60 O						John Martin				"un	and the second		
-00.0	were	where	and a	and the second se								J. War	Stop Freg
-70.0			·				-						2 446000000 CU
.80 N													2.44000000 GH2
00.0													
.	tor	2.47	140		1	1					Enon 4		05.04+**
		2.44	+ 10			-43 (D)	M 400 KU-			40	Spail i		CF Step
#Re	SD	W 1	00	KHZ		#VD				#Sweep 5	00.0 ms (1001 pts)	1.000000 MHZ
MKR	MODE	TRC	SCL		х		Y	FUN	CTION F	UNCTION WIDTH	FUNCTION	DN VALUE	<u>Auto</u> Man
1	Ν	1	f		2,441 0	0 GHz	0.74 d	Bm					
2	N	1	f		2.442 0	0 GHz	0.61 d	Bm					
3													FreqOffset
4													0 Hz
5								_				E	
7													
8													
9													
10													
11													
•		_	_				III					E E	
MSG										STATUS	5		

Channel 39 (2441MHz)

Channel 78 (2480MHz)





Product	:	Wireless Motherboard
Test Item	:	Channel Separation
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

	Enggueneu	Measurement	Limit	Limit of (2/3)*20dB	
Channel No.	(MHz)	Level	$(l_{2}\mathbf{U}_{2})$	Dondwidth (kHz)	Result
	(MHZ)	(kHz)	(KHZ)	Ballowioui (KHZ)	
00	2402	1000	>25 kHz	950.0	Pass
39	2441	1000	>25 kHz	952.0	Pass
78	2480	1000	>25 kHz	950.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

🊺 Ke	eysight :	Spectr	um A	nalyzer - Swe	ept SA										
Cer	iter	Fre	RF q2	50 Ω 2.40200	AC 0000 G	Hz		SEN	NSE:INT	A	vg Typ	ALIGN AUTO e: Log-Pwr	04:38:40 P	M Feb 17, 2016 CE 1 2 3 4 5 6	Frequency
10 d	B/div	,	Ref	10.00 d	dBm	PNO: Wide FGain:Lov	, ,	#Atten: 2	odB			Mkr	2 2.403 -0.	00 GHz 44 dBm	Auto Tune
Log 0.00 -10.0 -20.0) 							ليتمسر)1 ^	2 	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				Center Freq 2.402000000 GHz
-30.0 -40.0 -50.0														MM IL	Start Freq 2.397000000 GHz
-60.0 -70.0 -80.0	willing the second second	Ward	www	~~											Stop Freq 2.407000000 GHz
Cer #Re	nter : es Bl	2.40 N 10	20	00 GHz kHz		#V	BW	100 kHz			#	Sweep 5	Span 1 00.0 ms (0.00 MHz 1001 pts)	CF Step 1.000000 MHz Auto Man
MKR 1 2 3 4 5 6 7 8 9 10 11 1	Mode N N	1 1			x 2.402 2.403	00 GHz 00 GHz		Y -0.51 dE -0.44 dE	3m 3m	FUNCTION		NCTION WIDTH	FUNCTI	E	Freq Offset 0 Hz
MSG												STATUS	5		<u>r</u>

Channel 00 (2402MHz)



Der .		_					0114111		(= · · · · ·	(1112)			
鱦 Key	/sight !	Spect	rum A	Analyzer - Sw	ept SA								
	L.	-	RF	50 Ω		-	SI	ENSE:INT	A	ALIGN AUTO	04:52:49 P	MFeb 17, 2016	Frequency
Cen	ter	Fre	ed ₹	2.44100	10000 GF	1Z	Tria: Fr	e Run	Avgiyp	e. Log-Fwi	TY	PE M WWWW	
					IF	Gain:Low	#Atten:	20 dB			D	ET P NNNN	
		_	_							Mire	0.0.440		Auto Tune
										INIKE	2 2.442	UU GHZ	
10 di	3/div		Ref	f 10.00 (dBm						-4.	86 aBM	
Log								()1	2				
0.00			-		-		1	4 <u>~</u>	an an				Center Freq
-10.0							~~~	~~~~					2.441000000 GHz
10.0									7				
-20.0													
-30.0			_										Otort From
10.0							-			III.			StartFreq
-40.0										The Think			2.436000000 GHz
-50.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	- mark						m	which a	
60.0			- I.	and the second s								have	
-60.0	and the second	My YL	~****									1	Stop Fred
-70.0			-										
-90 O													2.446000000 GHZ
-00.0													
Con	tor	2 4 /	110			1					Enan 1	0.00 MHz	OF Oton
		2.44 A/ 4	* 10			-#\/E			4	Curson E	o o parri	1001 mto	
#Re:	5 04	NY I	00			#VC		<u> </u>	#	Sweep 5	00.0 IIIS (1001 pts)	1.000000 WHZ
MKR	MODE	TRC	SCL		X		Y	F	UNCTION FU	NCTION WIDTH	FUNCTI	ON VALUE	Auto Man
1	Ν	1	f		2.441 0	0 GHz	1.15 c	IBm					
2	Ν	1	f		2.442 0	0 GHz	-4.86 c	IBm					Erog Offect
3													Frequised
4													0 Hz
6												=	
Ž													
8													
9													
10													
11		_											
							ur .					r	
MSG										STATUS	5		

Channel 39 (2441MHz)

Channel 78 (2480MHz)



9. Dwell Time

9.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

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

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

9.2. Test Setup



9.3. Limit

The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

9.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

9.5. Uncertainty

 \pm 25msec

9.6. **Test Result of Dwell Time**

Product	:	Wireless Motherboard
Test Item	:	Dwell Time
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.877	13	50	0.75	0.299	0.4	Pass
2441	2.877	13	50	0.75	0.299	0.4	Pass
2480	2.877	13	50	0.75	0.299	0.4	Pass

Duty cycle = ((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

CH 00 Time Interval between hops

CH 00 Transmission Time Center Freq 2.402000000 GHz 4 31 PH PH 37, 29 (5) TRACE 1 2 3 4 5 6 THE WWWWWWW Center Freq 2.40200000 GHz Foor Freq 2.40200000 GHz Foor Tast Freq 2.40200000 GHz Avg Type: Log-Pwr Frequ Avg Type: Log-Pwr Freq Tast C Trig: Video Atten: 30 dl PANAN Auto Tur Auto Tu Mkr3 6.593 ms -0.77 dBm Ref 20.00 dB Ref 20.00 dE Center Fre Center Fre ¢3 000 G Start Free 2000000 GH Start Fre 000 G Pisals! Sec.1 Stop Free 2.402000000 GH Stop Fre 2.402000000 GH CF Step 1.000000 MHz Mar CF Stej 1.000000 MH Ma enter 2.402000000 GH; es BW 1.0 MHz Span 0 Hz Sweep 10.00 ms (1001 pts) #VBW 1.0 MHz 1 N 1 2 N 1 N 1 2.847 ms 3.716 ms 6.593 ms -1.04 dBm -0.71 dBm -0.77 dBm Freq Offse Freq Offse 0H 0H Span 0 Hz Sweep 50.00 ms (1001 pts) nter 2.402000000 GHz s BW 1.0 MHz #VBW 1.0 MHz

CH39 Time Interval between hops

CH 39Transmission Time

Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHz Any Type Log-Pur Twist [2:3:5] Frequency Center Freq 2.41000000 GHZ Any Freq 2.41000000 GHZ Any Freq 2.410000000 GHZ Any Freq 2.410000000 GHZ Any Freq 2.410000000 GHZ Any Freq 2.41000	in the second
Tria Video	amey
Bedrafiew Atten: 30 dB antif MINNY Bedrafie Atten: 30 dB antif MINNY Atten: 30 dB antif MINNY	to Tune
10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm	
24410000 GHz 102	iter Freq 0000 GHz
000 000 <td>art Freq</td>	art Freq
400	top Freq 0000 GHz
Center 2.441000000 GHz Res BW 1.0 MHz FVBW 1.0 MHz Sweep 10.00 ms (1001 pts) Auto Men Auto Men Auto	CF Step 2000 MHz Man
1 1 2.447 ms 0.82 dBm 2 N 1 3.716 ms 0.94 dBm 8 N 1 6.583 ms 0.89 dBm 4 - - - - 5 - - - -	q Offset 0 Hz
9 70 8 700 9 700 100 700 111 Center 2.441000000 GHz Span 0 Hz	
Res BW 1.0 MHz #VBW 1.0 MHz Sweep 50.00 ms (1001 pts)	



CH 78 Time Interval between hops

CH 78 Transmission Time

Statute Contact and in	Same SA					BE See	of Century and the loss	en sa					0.0
Center Freq 2.480	000000 GHz	(TWI) EARLY	Avg Type: Log-Pwr	04:38:29 PHPie 37,2928 TRACE 1 2 3 4 5 6	Frequency	Cente	er Freq 2.48000	0000 GHz	STATE OF	Avg Type	Log-Pwr	04:38:15 PH Fee 37, 29(8) TRALE 1 2 3 4 5 6	Frequency
	PND: Fast G	Atten: 30 ttB	1	OTTP NNNNN	Auto Tune		1.12	PND: Fast Ca IFGain:Low	Atten: 30 dB	1.1.1		OFT P NNNNN	AutoTupe
10 dB/div Ref 20.00	dBm			Mkr3 6,593 ms 1.71 dBm	Auto func	10 dB/	div Ref 20.00 d	Bm					Auto Tune
10.0	Q ¹ Q ²		*3		Center Freq 2.48000000 GHz	18.0							Center Freq 2.48000000 GHz
-100 -200				τησι ζως	Start Freq 2.49000000 GHz	11 GD =		<u>pp</u>					Start Freq 2.48000000 GHz
-60.0 -60.0	Universit		historial		Stop Freq 2.480000000 GHz	300 -							Stop Freq 2.48000000 GHz
Center 2.480000000 Res BW 1.0 MHz	GHz #VBW	/ 1.0 MHz	Sweep 10	Span 0 Hz 1,00 ms (1001 pts)	CF Step 1.000000 MHz Auto Men	-40.0					1	THIS ML	CF Step 1.000000 MHz Auto Man
1 N 1 2 N 1 3 N 1 4 5	2.847 ms 3.716 ms 6.593 ms	1.42 dBm 1.78 dBm 1.71 dBm			Freq Offset 0 Hz	60 0 -							Freq Offset 0 Hz
7 8 9 10 11						Cente Res B	r 2.48000000 G	Hz #VBW	1.0 MHz		weep 50	Span 0 Hz	
			STATIO		L	***					IN CATLON	the state of the state	

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

Product	:	Wireless Motherboard
Test Item	:	Dwell Time
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.888	13	50	0.75	0.300	0.4	Pass
2441	2.887	13	50	0.75	0.300	0.4	Pass
2480	2.887	13	50	0.75	0.300	0.4	Pass

Duty cycle =((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

CH 00 Time Interval between hops

Center Freq 2.40200000 GHz HOLTest Foolniture Foolniture enter Freq 2.402000000 GHz INO: Tast Atten: 30 d TRACE 123 TRACE 123 TIME WWW OFT P NN Avg Type: Log-Pwr Frequency Avg Type: Log-Pw Frequ Auto Tur Auto Tu 4kr3 6.603 ms -2.39 dBm Ref 20.00 dB Ref 20.00 dB Center Fre Center Fr 2000000 Gi Start Fre Start Fr 2000000 G 1041 Stop Free Stop Fre 2 40 7 40 CF Step 1.000000 MHz Man enter 2.402000000 GHz es BW 1.0 MHz CF Ste Span 0 Hz Sweep 10.00 ms (1001 pts) #VBW 1.0 MHz M 2.857 ms 3.716 ms 6.603 ms 1 N 1 2 N 1 -2.46 dBm -0.11 dBm -2.39 dBm Freq Offse Freq Offse 0H Span 0 Hz Sweep 50.00 ms (1001 pts) 2.402000000 GH #VBW 1.0 MHz

CH39 Time Interval between hops

CH 39Transmission Time

CH 00 Transmission Time

R Annual Gentury and Tanga G		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	B Supplication makes limit to	
Center Freq 2.441000000 GHz	Avg Type: Log-Pwr TRACE 123456	Frequency	Center Freq 2.441000000 GHz Avg Type: Log-Pwr THL2 (23.45 6 F	Frequency
FGdiriLum Atten: 30 ttB	Mkr3 6,603 ms -0.67 dBm	Auto Tune	V GelixLow Anten: 30 dB Sec19 MMMM	Auto Tune
	3	Center Freq 2.441000000 GHz	100 24	Center Free
200	TREDILVE	Start Freq 2.441000000 GHz	100	Start Free 441000000 GH
600	Vanan	Stop Freq 2.441000000 GHz	20 24	Stop Free
Center 2.441000000 GHz Res BW 1.0 MHz #VBW 1.0 MHz	Span 0 Hz Sweep 10.00 ms (1001 pts)	CF Step 1.000000 MHz Auto Man	Acceler 0	CF Step 1.000000 MH
Uncertain Content X Y T Dim Dim <thdim< th=""> Dim <thdim< th=""> <thdi< td=""><td></td><td>Freq Offset 0 Hz</td><td>800</td><td>Freq Offse</td></thdi<></thdim<></thdim<>		Freq Offset 0 Hz	800	Freq Offse
6 7 8 9 10 11			Center 2.441000000 GHz Span 0 Hz	
1.) MML	grátes.	<u> </u>		



CH 78 Time Interval between hops

CH 78 Transmission Time

Strangt Castor Annual Cas	er 64		And a state of the	< 0 <u>88</u>	18 Sec.	regist Game	-	- 154		-		-				
Center Freq 2.48000	00000 GHz	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency	Cen	ter Fre	q 2.4800	00000 G	Hz	Trig Vi	teo	Avg Typ	e: Log-Pwr	DEHIT'SA PH TRAC	#Fee 37,2928 2 1 2 3 4 5 4 2 WWWWWW	Frequency
In Journey Part 20 00	FGainLow Atten	30 mB	Mkr3 6.633 ms	Auto Tune	10.45		Def 20.00	dBm	Gein:Low	Atten:	30 dB		-	3	TPANAAA	Auto Tune
10.00	1 2 ²	→~~~		Center Freq 2.48000000 GHz	10.0	arury	Ker 20.00						-			Center Freq 2.48000000 GHz
-200 -200 			TRACENT	Start Freq 2.480000000 GHz	10.000 -110.00	-	na boon					-	a, Jstar	inna be	ren brest	Start Freq 2,49000000 GHz
400 400 700	hayphing	system		Stop Freq 2.480000000 GHz	-38.0											Stop Freq 2.48000000 GHz
Center 2.480000000 C Res BW 1.0 MHz	Hz #VBW 1.0 MH	tz Sweep 1	Span 0 Hz 0.00 ms (1001 pts)	CF Step 1.000000 MHz Auto Man	-4010										19214	CF Step 1.000000 MHz <u>Auto</u> Man
1 N 1 2 N 1 4 5	2.887 ms 0.81 3.746 ms -0.67 6.633 ms 0.37	dBm dBm dBm		Freq Offset 0 Hz	60 0							-	-	्य	*	Freq Offset 0 Hz
7 8 9 10 11					Cent	ter 2.48 BW 1.0	0000000 (GHz	#VB	W 1.0 MH	2		Sweep 5	S 0.00 ms (pan 0 Hz	
10400 I		grātu			11/10						-		IS CATES		prof	

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.



10. Occupied Bandwidth

10.1. Test Equipment

_	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

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

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

10.2. Test Setup



10.3. Limits

N/A

10.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

10.5. Uncertainty

± 150Hz

10.6. Test Result of Occupied Bandwidth

Product	:	Wireless Motherboard
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1130		NA
39	2441	1130		NA
78	2480	1130		NA

🊺 Ke	ysight	Spectr	um A	nalyzer - Swe	ept SA										
<mark>IXI</mark> R Cen	L ter	Fre	RF a 2	50 Ω 2.40200	AC	Ηz	SE	NSE:INT	Avg	ALIGN	AUTO - Pwr	04:06:21 P TRAC	M Feb 17, 2016	5	Frequency
			-1		P IF	NO: Wide Gain:Low	Trig: Fre #Atten: 2	e Run 10 dB			Mkrź	2 2.401		1	Auto Tune
10 d	B/div	,	Ref	10.00 c	1Bm		1	я.		1		-20.	74 dBm		
0.00 -10.0							2	∑1 3					-20.71 dBm		Center Freq 2.402000000 GHz
-20.0 -30.0 -40.0									-						Start Freq 2.397000000 GHz
-60.0 -70.0 -80.0	ham	. <u>^~</u> ~	~~~^		mmmm	and the second s	·			- Alar		h.	n-n-m		Stop Freq 2.407000000 GHz
Cen #Re	ter : s B\	2.40 N 1	020	00 GHz kHz		#VB	W 100 kHz	 :		Swee	ep 1.	Span 1 267 ms (0.00 MHz 1001 pts)		CF Step 1.000000 MHz uto Man
1 2 3 4 5	NODE N N N	1 1 1	SCL f f		× 2.401 9 2.401 4 2.402 5	08 GHz 12 GHz 55 GHz	∙ -0.71 d -20.74 d -21.84 d	Bm Bm Bm	NCTION	FUNCTION	WIDTH	FUNCTI			Freq Offset 0 Hz
7 8 9 10 11															
MSG							m				STATUS		•		

Figure Channel 00:



						0						
🊺 Keysi	ght Specti	rum A	nalyzer - Swe	ept SA								
XI RL	or Ero	RF	50 Ω		1-	SE	NSE:INT	ΑναΤι	ALIGN AUTO	04:18:14 P	M Feb 17, 2016	Frequency
Cente		<u>q</u> 2	.44 100	PI IF	NO:Wide C Gain:Low	Trig: Fre #Atten: 2	e Run 10 dB		pe. Log i m	TY D		- / -
10 dB/	div	Ref	10.00 a	1Bm					Mkr	2 2.440 -19.	42 GHz 07 dBm	Auto Tuno
Log Γ			10.00				<u>∖</u> ∖1					
0.00		+				1	Ň					Center Fre
-10.0		-				2 ²	3					2.441000000 GH
20.0 =		-				<u> </u>	+				-19.01 dBm	
30.0 -												Start Fre
40.0						h	L	4	_			2 436000000 GE
50.0			1.40 M			/		N				2.40000000 Gi
60.0					man			mon	- and			
70.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	n	\sim	"WY WWW	1				and have have and	- w	mmm	Stop Fre
70.0 -												2.446000000 GH
80.0												
Cente	er 2.44	110	00 GHz							Span 1	0.00 MHz	CE Ste
#Res	BW 1	00	kHz		#VB	W 100 kHz	1		Sweep 1	.267 ms (1001 pts)	1.000000 MH
MKRI MC		SCI		x		Y	EUN		- UNCTION WIDTH	EUNCTI		<u>Auto</u> Ma
1 1	1 1	f		2.441 1	4 GHz	0.99 d	Bm					
2 N	V 1	f		2.440 4	2 GHz	<u>-19.07 d</u>	Bm Bm					Freq Offse
4				2.4410	0 0112	-10.01 u						0 F
<u>5</u>											E	
7												
8												
10												
SG									STATUS	3		<u>L</u>

Figure Channel 39:

Figure Channel 78:





:	Wireless Motherboard
:	Occupied Bandwidth Data
:	No.3 OATS
:	Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)
	: : :

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1425		NA
39	2441	1428		NA
78	2480	1425		NA

Figure Channel 00:

Keysight Spectrum Analyzer - Swept SA			and the state of the	- 5 ×
L ²⁷ RL RF 50 Ω AC Center Freq 2.402000000 GHz	SENSE(INT	ALIGN AUTO Avg Type: Log-Pwr	07:34:16 PM Feb 24, 2016 TRACE 1 2 3 4 5 6	Frequency
PNO: Wide CP IFGain:Low 10 dB/div Ref 10.00 dBm	7 Trig: Free Run Atten: 20 dB	Avg Hold:>100/100	2.402 138 GHz -5.685 dBm	Auto Tune
.0.00		1		Center Freq 2.402000000 GHz
-10.0			rik	Start Freq 2.401000000 GHz
-30.0		1.425 M	Hz	Stop Freq 2.403000000 GHz
-50.0			~	CF Step 200.000 kHz <u>Auto</u> Man
-70.0				Freq Offset 0 Hz
-800	200 / Ц 7	Swoon 2	Span 2.000 MHz	
MSG #VES DVV JU KTIZ #VDVV	JUU KIIZ	sweep 2	.007 ms (1001 pts)	



Keysight Spectrum Analyzer - Swept SA				and the second second	
2/ RL RF 50 Ω AC		SENSE(INT	ALIGN AUTO	07:36:39 PM Feb 24, 2016	Frequency
10 dB/div Ref 10.00 dBm	PNO: Wide PNO: Wide PNO: Wide PNO: Wide PNO: Wide PNO: Wide PNO: PNO: PNO: PNO: PNO: PNO: PNO: PNO:	rig: Free Run Atten: 20 dB	Avg Hold:>100/100	1 2.441 138 GHz -3.678 dBm	Auto Tune
0.00		\sim	1		Center Fred 2.441000000 GHz
20.0	~~~		-20.00		Start Free 2.440000000 GH:
40.0			1.428 P	VIHZ	Stop Free 2.442000000 GH
50.0					CF Stej 200.000 kH <u>Auto</u> Mar
70.0			+ +		Freq Offse
80.0				Span 2.000 MHz	
#Res BW 30 kHz	#VBW 30	00 kHz	Sweep	2.067 ms (1001 pts)	

Figure Channel 39:

Figure Channel 78:



11. EMI Reduction Method During Compliance Testing

No modification was made during testing.