

FCC Test Report

Product Name	Wi-Fi Module
Model No	WSDB-741
FCC ID.	W2Z-02100006

Applicant	FUJIFILM CORPORATION
Address	7-3, Akasaka 9-chome, Minato-ku, Tokyo 107-0052, Japan

Date of Receipt	Oct. 12, 2017
Issue Date	Nov. 15, 2017
Report No.	17A0124R-RFUSP73V00-B
Report Version	V1.0
BC-MRA	Testing Laboratory 3023

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.

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	Issue Date: Nov. 15, 2017 Report No.: 17A0124R-RFUSP73V00
	DEKRA
Product Name	Wi-Fi Module
Applicant	FUJIFILM CORPORATION
Address	7-3, Akasaka 9-chome, Minato-ku, Tokyo 107-0052, Japan
Manufacturer	VIEWQUEST Technologies(china)Inc.
Model No.	WSDB-741
FCC ID.	W2Z-02100006
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	DC 3.3V
Trade Name	FUJIFILM
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2016
	ANSI C63.4: 2014, ANSI C63.10: 2013
	KDB 558074 D01 DTS Meas Guidance v04
Test Result	Complied
Documented By	Peggy Tu
	(Adm. Assistant / Peggy Tu)
Tested By	Paul Jiang
	(Engineer / Paul Jiang)
Approved By	Hond
	(Director / Vincent Lin)



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wi-Fi Module
Trade Name	FUJIFILM
Model No.	WSDB-741
FCC ID.	W2Z-02100006
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW
Number of Channels	802.11b/g/n-20MHz: 11
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 65Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK)
	802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	Chip Antenna
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	YAGEO	8010 Ceramic Chip Antenna	Chip Antenna	5.88dBi for 2.4 GHz

Note: 1. The antenna of EUT conforms to FCC 15.203.



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		

Duty Cycle:

802.11b	99.76%
802.11g	97.95%
802.11n-20	96.79%

802.11b:

*Duty cycle = Ton / (Ton + Toff)

ME Keysight S	pectrum #	nalyzer - Swe	R SA						-21/10/2015	and the second	0.0
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10 dB/div	Ref	0.00 dE	Bm					Δ	Mkr3 12	2.44 ms 0.03 dB	Auto Turk
-10.0	0241				♦34			-		*	Center Freq
-20.0											2.412000000 GHz
40.0							-	-			Start Free
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1000								STATIS.			

802.11n-20:

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Center Freq	2.412000000 G	Hz	Trig: Free Run	Avg Type	Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
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-70.0							Stop Freq 2.41200000 GHz
Center 2.4120 Res BW 1.0 M	000000 GHz IHZ	VBW 1.0	0 MHz	5	weep 5.000	Span 0 Hz) ms (1001 pts)	CF Step 1,000000 MHz Auto Man
1 N 1 2 A1 1 4 6 6 7	(Δ) 6 (Δ) 1.	98.7 μs 3.07 μs (Δ) 896 ms (Δ)	-19,51 dBm -1.97 dB 0.99 dB				Freq Offset 0 Hz
9 10 11					STAPUS		

802.11g:

M Keysight Spectrum Analyzer - Swept SA				0 0 0
Center Freq 2.412000000 GHz	Trig: Free Run	Avg Type: Log-Pwr t	7 PH Oct 12, 2017 NACE 1 2 3 4 5 6 TIPE WWWWW	Frequency
IFGeint.	w Atten: 10 dB	ΔMkr3	2.058 ms 1.93 dB	Auto Tune
100 200 weeks to week 2201	de 1		universale	Center Free 2.412000000 GH
	iotise strikespisie bi	n meretinente	and the first of the set	Start Free 2.412000000 GH
800			[Stop Free 2.412000000 GH
Center 2.412000000 GHz Res BW 1.0 MHz V	BW 1.0 MHz	Sweep 5.000 m	Span 0 Hz s (1001 pts)	CF Step 1.000000 MH Suto Ma
1 N t 838.7 μr 2 Δ1 t (Δ) 43.67 μr 3 Δ2 t (Δ) 2.058 mr 6 6 6 6 6	-23.33 dBm (Δ) 1.21 dB (Δ) 1.93 dB			Freq Offse 0 H
9 9 10 11				

- 1. The EUT is a Wi-Fi Module with a built-in WLAN&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. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report.
- 4. 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 and 802.11n(20M-BW) is 7.2Mbps)
- 5. 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.
- 6. 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:

Produ	uct	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude E5440	FS9TK32	Non-Shielded, 1.8m
2	LED Monitor	ViewSonic	VX2257-mhd	UFY163502150	Non-Shielded, 1.8m
3	Test Fixture	FUJIFILM	N/A	N/A	N/A

Signa	ll Cable Type	Signal cable Description
Α	Micro USB to USB Cable	Shielded, 0.5m, with one ferrite core bonded.
В	Micro USB Cable	Shielded, 1.8m
С	HDMI Cable	Shielded, 1.8m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- 1. Setup the EUT as shown in Section 1.4.
- 2. Execute software" Vendor Command Read/Write V01.05.20060915.OD" 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

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http://www.dekra.com.tw/english/about/certificates.aspx?bval=5

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: <u>http://www.dekra.com.tw/index_en.aspx</u>

Site Description:	Accredited by TAF Accredited Number: 3023
Site Name: Site Address:	DEKRA Testing and Certification Co., Ltd 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>info.tw@dekra.com</u>

FCC Accreditation Number: TW3023



1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2016/11/28	2017/11/27
Х	Spectrum Analyzer	Agilent	N9010A	MY48030495	2017/7/22	2018/7/21
Х	Power Meter	Anritsu	ML2495A	6K00003357	2017/6/23	2018/6/22
Х	Pulse power sensor	Anritsu	MA2411B	0846193	2017/6/23	2018/6/22
Х	EMI Test Receiver	R&S	ESCS 30	100369	2017/10/13	2018/10/12
Х	LISN	R&S	ESH3-Z5	836679/017	2017/1/18	2018/1/17
Х	LISN	R&S	ENV216	100097	2017/1/18	2018/1/17
X	Coaxial Cable	QTK(Arnist)	RG 400	LC018-RG	2017/6/25	2018/6/24

For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
Х	Spectrum Analyzer	R&S	FSP40	100170	2017/1/18	2018/1/17
Х	Loop Antenna	Teseq	HLA6121	37133	2017/3/18	2018/3/17
Х	Bi-Log Antenna	Schaffner Chase	CBL6112B	2707	2017/6/11	2018/6/10
Х	Horn Antenna	ETS-Lindgren	3117	00135205	2017/4/6	2018/4/5
Х	Horn Antenna	Schwarzbeck	BBHA9170	9170430	2017/4/14	2018/4/13
Х	Pre-Amplifier	QTK	AP/0100A	CHM/0901069	2017/6/23	2018/6/22
Х	Pre-Amplifier	EMCI	EMC012630SE	980210	2017/1/26	2018/1/24
Х	Pre-Amplifier	NARDA WE	DBL-1840N506	013	2017/9/30	2018/9/29
Х	Filter	MicroTRON	BRM50701	019	2017/11/2	2018/11/1
Х	Filter	Microwave Circuits	N0257881	36681	2017/1/3	2018/1/2
Х	EMI Test Receiver	R&S	ESR26	101385	2017/9/29	2018/9/28
Х	Coaxial Cable	QTK(Arnist)	SUCOFLEX 106	L1606-015C	2017/6/23	2018/6/22
Х	EMI Test Receiver	R&S	ESCS 30	838251/001	2017/7/21	2018/7/20
Х	Coaxial Cable	QTK(Arnist)	RG 214	LC003-RG	2017/6/16	2018/6/15
X	Coaxial signal switch	Anritsu	MP59B	6201415889	2017/6/16	2018/6/15

Note:

1. All equipments are calibrated every one year.

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

3. Test Software version :QuieTek EMI 2.0 V2.1.113.



2. Conducted Emission

2.1. Test Setup



2.2. Limits

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

2.3. 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 C63.4: 2014 on conducted measurement.

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

2.4. Uncertainty

± 2.26 dB



2.5. Test Result of Conducted Emission

Product	:	Wi-Fi Module
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Date	:	2017/10/30
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					
0.166	9.754	40.540	50.294	-15.249	65.543
0.232	9.770	35.710	45.480	-18.177	63.657
0.466	9.739	34.150	43.889	-13.082	56.971
0.541	9.744	30.800	40.544	-15.456	56.000
3.474	9.859	22.960	32.819	-23.181	56.000
9.451	9.956	23.960	33.916	-26.084	60.000
Average					
0.166	9.754	28.120	37.874	-17.669	55.543
0.232	9.770	23.770	33.540	-20.117	53.657
0.466	9.739	19.390	29.129	-17.842	46.971
0.541	9.744	15.100	24.844	-21.156	46.000
3.474	9.859	13.380	23.239	-22.761	46.000
9.451	9.956	18.330	28.286	-21.714	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	:	Wi-Fi Module
Test Item	:	Conducted Emission Test
Power Line	:	Line 2
Test Date	:	2017/10/30
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 2					
Quasi-Peak					
0.173	9.719	38.800	48.520	-16.823	65.343
0.232	9.754	33.300	43.054	-20.603	63.657
0.341	9.761	30.150	39.911	-20.632	60.543
0.502	9.785	30.920	40.706	-15.294	56.000
3.701	9.954	25.500	35.454	-20.546	56.000
4.681	9.994	21.160	31.154	-24.846	56.000
Average					
0.173	9.719	25.500	35.220	-20.123	55.343
0.232	9.754	19.890	29.644	-24.013	53.657
0.341	9.761	17.110	26.871	-23.672	50.543
0.502	9.785	14.970	24.756	-21.244	46.000
3.701	9.954	14.070	24.024	-21.976	46.000
4.681	9.994	10.260	20.254	-25.746	46.000

- 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 Setup



3.2. Limits

The maximum peak power shall be less 1 Watt.

3.3. Test Procedure

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.

3.4. Uncertainty

± 1.19 dB

3.5. Test Result of Peak Power Output

Product	:	Wi-Fi Module
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/27
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

Channal No.	Frequency	For d	Average ifferent Da	e Power ata Rate (N	Peak Power	Required	Pogult	
Channel No	(MHz)	1	2	5.5	11	1	Limit	Kesuit
			Measur					
01	2412	10.87				13.48	<30dBm	Pass
06	2437	10.85	10.79	10.71	10.62	13.45	<30dBm	Pass
11	2462	10.83				13.35	<30dBm	Pass

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



:	Wi-Fi Module
:	Peak Power Output Data
:	No.3 OATS
:	2017/10/27
:	Mode 2: Transmit (802.11g 6Mbps)
	:

			F	for diffe	Peak							
Channel No	Frequency (MHz)	6	9	12	18	24	36	48	54	6	Required Limit	Result
			Measurement Level (dBm)									
01	2412	10.87								20.98	<30dBm	Pass
06	2437	10.82	10.71	10.65	10.59	10.51	10.46	10.42	10.35	20.96	<30dBm	Pass
11	2462	10.89								21.02	<30dBm	Pass

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



Product	:	Wi-Fi Module
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/27
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Item Test Site Test Date Test Mode	: : : :	Peak Power Output Data No.3 OATS 2017/10/27 Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-B ³

	Engguenau		Average PowerPeakFor different Data Rate (Mbps)Power									
Channel No	(MHz)	HT0	HT1	HT2	HT3	HT4	HT5	HT6	HT7	HT0	Limit	Result
			Measurement Level (dBm)									
01	2412	10.94					-			20.98	<30dBm	Pass
06	2437	10.96	10.91	10.82	10.75	10.68	10.63	10.54	10.47	21.03	<30dBm	Pass
11	2462	10.83								20.88	<30dBm	Pass

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



4. Radiated Emission

4.1. Test Setup

Radiated Emission Under 30MHz



3m

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. 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						
IVITIZ	(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)

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 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.



The average measurement tested according to KDB 558074 section 12.2.5.3. Reduced VBW averaging across on- and off-times of the EUT transmissions with max hold.

$V D V \leq 1/1$.	VBW	\geq	1/	T	
--------------------	-----	--------	----	---	--

Mode	Duty Cycle	Т	1/T	VBW Setting(Hz)
802.11b	99.76%			10
802.11g	97.95%	2.0580	486	1K
802.11n20	96.79%	1.8980	527	1K

4.4. Uncertainty

± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Radiated Emission

Product	:	Wi-Fi Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/28
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	dBµV/m
Horizontal					
Peak Detector:					
4824.000	2.428	42.095	44.524	-29.476	74.000
7236.000	9.177	40.336	49.513	-24.487	74.000
9648.000	10.019	39.562	49.582	-24.418	74.000
Average Detector:					
Vertical					
Peak Detector:					
4824.000	2.836	42.687	45.524	-28.476	74.000
7236.000	9.676	40.280	49.956	-24.044	74.000
9648.000	10.556	38.967	49.524	-24.476	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	: Wi-Fi M	odule				
Test Item	: Harmonic Radiated Emission Data					
Test Site	: No.3 OATS					
Test Date	: 2017/10/	28				
Test Mode	: Mode 1:	Transmit (802.11	lb 1Mbps) (2437 MH	z)		
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	$dB\mu V/m$	dB	dBµV/m	
Horizontal						
Peak Detector:						
4874.000	2.076	42.148	44.225	-29.775	74.000	
7311.000	9.512	40.157	49.669	-24.331	74.000	
9748.000	9.630	38.620	48.250	-25.750	74.000	
Average Detector:						
Vertical						
Peak Detector:						
4874.000	2.532	42.315	44.847	-29.153	74.000	
7311.000	10.089	38.770	48.859	-25.141	74.000	
9748.000	10.266	36.418	46.685	-27.315	74.000	

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- 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.



: Wi-Fi M	lodule					
: Harmonic Radiated Emission Data						
: No.3 OATS						
: 2017/10	/28					
: Mode 1:	Transmit (802.11	b 1Mbps) (2462 MH	z)			
Correct	Reading	Measurement	Margin	Limit		
Factor	Level	Level				
dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$		
2.191	42.333	44.524	-29.476	74.000		
10.373	39.180	49.554	-24.446	74.000		
9.964	40.091	50.055	-23.945	74.000		
2.805	43.847	46.652	-27.348	74.000		
11.180	38.672	49.852	-24.148	74.000		
10.801	39.213	50.014	-23.986	74.000		
	 Wi-Fi M Harmon No.3 OA 2017/10, Mode 1: Correct Factor dB 2.191 10.373 9.964 2.805 11.180 10.801 	 Wi-Fi Module Harmonic Radiated Emiss No.3 OATS 2017/10/28 Mode 1: Transmit (802.11 Correct Reading Factor Level dB dBμV 2.191 42.333 10.373 39.180 9.964 40.091 2.805 43.847 11.180 38.672 10.801 39.213	 Wi-Fi Module Harmonic Radiated Emission Data No.3 OATS 2017/10/28 Mode 1: Transmit (802.11b 1Mbps) (2462 MH Correct Reading Measurement Factor Level Level dB dBμV dBμV/m 2.191 42.333 44.524 10.373 39.180 49.554 9.964 40.091 50.055 2.805 43.847 46.652 11.180 38.672 49.852 10.801 39.213 50.014 	 Wi-Fi Module Harmonic Radiated Emission Data No.3 OATS 2017/10/28 Mode 1: Transmit (802.11b 1Mbps) (2462 MHz) Correct Reading Measurement Margin Factor Level Level dB dBµV dBµV/m dB 2.191 42.333 44.524 -29.476 10.373 39.180 49.554 -24.446 9.964 40.091 50.055 -23.945 2.805 43.847 46.652 -27.348 11.180 38.672 49.852 -24.148 10.801 39.213 50.014 -23.986 		

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- 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	:	Wi-Fi Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/28
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$
Horizontal					
Peak Detector:					
4824.000	2.428	42.095	44.524	-29.476	74.000
7236.000	9.177	39.677	48.854	-25.146	74.000
9648.000	10.019	39.664	49.684	-24.316	74.000
Average Detector:					
Vertical					
Peak Detector:					
4824.000	2.836	43.010	45.847	-28.153	74.000
7236.000	9.676	40.308	49.984	-24.016	74.000
9648.000	10.556	38.339	48.896	-25.104	74.000

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- 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 = 1 KHz, 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	: Wi-Fi M	lodule				
Test Item	: Harmonic Radiated Emission Data					
Test Site	: No.3 OATS					
Test Date	: 2017/10/	/28				
Test Mode	: Mode 2:	Transmit (802.11	g 6Mbps) (2437 MH	z)		
F	0	D 1'		N4 ⁻	T · · ·	
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBµV	dBµV/m	dB	dBµV/m	
Horizontal						
Peak Detector:						
4874.000	2.076	42.475	44.552	-29.448	74.000	
7311.000	9.512	40.329	49.841	-24.159	74.000	
9748.000	9.630	38.620	48.250	-25.750	74.000	
Average Detector:						
Vertical						
Peak Detector:						
4874.000	2.532	42.065	44.597	-29.403	74.000	
7311.000	10.089	39.547	49.636	-24.364	74.000	
9748.000	10.266	38.507	48.774	-25.226	74.000	

- 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 = 1 KHz, 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	: Wi-Fi M	lodule					
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OA	ATS					
Test Date	: 2017/10	/28					
Test Mode	: Mode 2:	Transmit (802.11	lg 6Mbps) (2462 MH	z)			
Frequency	Correct	Reading	Measurement	Margin	Limit		
1 5	Factor	Level	Level	C			
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$		
Horizontal							
Peak Detector:							
4924.000	2.191	42.368	44.559	-29.441	74.000		
7386.000	10.373	39.273	49.647	-24.353	74.000		
9848.000	9.964	39.031	48.995	-25.005	74.000		
Average Detector:							
Vertical							
Peak Detector:							
4924.000	2.805	42.399	45.204	-28.796	74.000		
7386.000	11.180	37.976	49.156	-24.844	74.000		
9848.000	10.801	39.257	50.058	-23.942	74.000		

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- 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 = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/28
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4824.000	2.428	41.265	43.694	-30.306	74.000
7236.000	9.177	39.781	48.958	-25.042	74.000
9648.000	10.019	39.634	49.654	-24.346	74.000
Average Detector:					
Vertical					
Peak Detector:					
4824.000	2.836	41.890	44.727	-29.273	74.000
7236.000	9.676	39.972	49.648	-24.352	74.000
9648.000	10.556	39.314	49.871	-24.129	74.000

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- 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 = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/28
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					
Peak Detector:					
4874.000	2.076	41.810	43.887	-30.113	74.000
7311.000	9.512	39.342	48.854	-25.146	74.000
9748.000	9.630	38.211	47.841	-26.159	74.000
Average Detector:					
Vertical					
Peak Detector:					
4874.000	2.532	42.082	44.614	-29.386	74.000
7311.000	10.089	38.785	48.874	-25.126	74.000
9748.000	10.266	38.482	48.749	-25.251	74.000

- 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 = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/28
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	2.191	40.968	43.159	-30.841	74.000
7386.000	10.373	38.450	48.824	-25.176	74.000
9848.000	9.964	39.961	49.925	-24.075	74.000
Average Detector:					
Vertical					
Peak Detector:					
4924.000	2.805	40.449	43.254	-30.746	74.000
7386.000	11.180	38.645	49.825	-24.175	74.000
9848.000	10.801	39.786	50.587	-23.413	74.000

- 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 = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	General Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/27
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBµV	$dB\mu V/m$	dB	$dB\mu V/m$
Horizontal					
155.130	-8.139	36.366	28.227	-15.273	43.500
250.190	-6.134	44.542	38.409	-7.591	46.000
400.540	0.942	29.664	30.606	-15.394	46.000
547.010	4.217	24.438	28.655	-17.345	46.000
698.330	3.095	24.135	27.230	-18.770	46.000
793.390	6.386	24.727	31.113	-14.887	46.000
Vertical					
104.690	-4.842	36.904	32.063	-11.437	43.500
150.280	-5.350	36.981	31.631	-11.869	43.500
257.950	-4.952	34.441	29.489	-16.511	46.000
389.870	-0.732	27.399	26.666	-19.334	46.000
610.060	2.087	24.781	26.868	-19.132	46.000
755.560	2.829	25.126	27.955	-18.045	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	:	Wi-Fi Module
Test Item	:	General Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/27
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	dBµV/m
Horizontal					
104.690	-7.862	36.904	29.043	-14.457	43.500
179.380	-11.904	45.715	33.811	-9.689	43.500
227.880	-8.769	42.320	33.552	-12.448	46.000
367.560	0.592	29.911	30.502	-15.498	46.000
515.000	3.191	24.325	27.516	-18.484	46.000
702.210	2.753	26.331	29.084	-16.916	46.000
Vertical					
149.310	-5.372	34.774	29.402	-14.098	43.500
268.620	-6.222	31.999	25.777	-20.223	46.000
409.270	-4.434	31.480	27.046	-18.954	46.000
610.060	2.087	24.781	26.868	-19.132	46.000
755.560	2.829	25.518	28.347	-17.653	46.000
902.030	1.638	24.778	26.416	-19.584	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 = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	General Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/27
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					
240.490	-6.662	43.208	36.545	-9.455	46.000
299.660	-4.751	39.282	34.531	-11.469	46.000
419.940	-0.254	31.589	31.335	-14.665	46.000
468.440	3.544	29.897	33.441	-12.559	46.000
596.480	3.587	22.671	26.258	-19.742	46.000
737.130	3.138	30.290	33.428	-12.572	46.000
Vertical					
189.080	-5.617	35.337	29.720	-13.780	43.500
215.270	-5.945	36.638	30.693	-12.807	43.500
334.580	-2.253	33.495	31.242	-14.758	46.000
468.440	-3.566	30.178	26.612	-19.388	46.000
624.610	0.387	24.144	24.531	-21.469	46.000
807.940	3.361	27.372	30.733	-15.267	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 = 1 KHz, 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 Setup

RF antenna Conducted Measurement:



5.2. 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)).

5.3. 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.

5.4. Uncertainty

The measurement uncertainty Conducted is defined as ± 1.20 dB



5.5. Test Result of RF antenna conducted test

Product	:	Wi-Fi Module
Test Item	:	RF antenna conducted test
Test Site	:	No.3 OATS
Test Date	:	2017/10/25
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



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



Product	:	Wi-Fi Module
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Date	:	2017/10/25
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



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



Product	:	Wi-Fi Module
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Date	:	2017/10/25
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



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



6. Band Edge

6.1. Test Setup



6.2. 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.

6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 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 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 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 C63.10:2013 on radiated measurement.



The average measurement tested according to KDB 558074 section 12.2.5.3. Reduced VBW averaging across on- and off-times of the EUT transmissions with max hold.

$V D V \leq 1/1$.	VBW	\geq	1/	T	
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Mode	Duty Cycle	Т	1/T	VBW Setting(Hz)
802.11b	99.76%			10
802.11g	97.95%	2.0580	486	1K
802.11n20	96.79%	1.8980	527	1K

6.4. Uncertainty

± 4.08 dB above 1GHz

± 4.22 dB below 1GHz



6.5. Test Result of Band Edge

Product	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

RF Radiated Measurement (Horizontal):

Channel 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)	2387.400	-2.698	44.940	42.242	74.00	54.00	Pass
01 (Peak)	2390.000	-2.687	43.148	40.461	74.00	54.00	Pass
01 (Peak)	2399.300	-2.661	49.214	46.553			
01 (Peak)	2400.000	-2.660	48.463	45.803			
01 (Peak)	2413.000	-2.642	90.250	87.607			
01 (Average)	2388.800	-2.692	31.571	28.879	74.00	54.00	Pass
01 (Average)	2390.000	-2.687	31.406	28.719	74.00	54.00	Pass
01 (Average)	2399.800	-2.661	41.693	39.032			
01 (Average)	2400.000	-2.660	41.478	38.818			
01 (Average)	2411.300	-2.643	87.405	84.762			

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 = 3MHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
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	Result
Chamiler 140.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
01 (Peak)	2389.700	-4.157	44.973	40.815	74.00	54.00	Pass
01 (Peak)	2390.000	-4.159	42.496	38.337	74.00	54.00	Pass
01 (Peak)	2399.400	-4.171	48.207	44.036			
01 (Peak)	2400.000	-4.171	46.088	41.917			
01 (Peak)	2413.000	-4.163	85.322	81.158			
01 (Average)	2388.800	-4.155	31.203	27.048	74.00	54.00	Pass
01 (Average)	2390.000	-4.159	31.152	26.993	74.00	54.00	Pass
01 (Average)	2399.600	-4.171	37.779	33.608			
01 (Average)	2400.000	-4.171	37.399	33.228			
01 (Average)	2411.300	-4.167	82.886	78.718			

Figure Channel 01:



Figure Channel 01:

VERTICAL (Average)



- Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
 - 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
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	Decult
	(MHz)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
11 (Peak)	2461.100	-2.623	88.920	86.297			
11 (Peak)	2483.500	-2.601	42.215	39.613	74.00	54.00	Pass
11 (Peak)	2501.600	-2.620	44.006	41.386	74.00	54.00	Pass
11 (Average)	2461.300	-2.624	86.482	83.859			
11 (Average)	2483.500	-2.601	31.014	28.412	74.00	54.00	Pass
11 (Average)	2485.800	-2.600	31.122	28.522	74.00	54.00	Pass





Horizontal (Average)



- 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

RF Radiated Measurement (VERTICAL):

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)	2461.100	-4.037	83.670	79.633			
11 (Peak)	2483.500	-3.966	42.231	38.264	74.00	54.00	Pass
11 (Peak)	2509.200	-3.866	44.889	41.022	74.00	54.00	Pass
11 (Average)	2461.200	-4.036	81.104	77.067			
11 (Average)	2483.500	-3.966	30.739	26.772	74.00	54.00	Pass
11 (Average)	2495.200	-3.930	30.741	26.811	74.00	54.00	Pass

Figure Channel 11:

VERTICAL (Peak)



Figure Channel 11:

VERTICAL (Average)



- 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
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)	(dBµV/m)	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
01 (Peak)	2390.000	-2.687	53.176	50.489	74.00	54.00	Pass
01 (Peak)	2399.800	-2.661	66.741	64.080			
01 (Peak)	2400.000	-2.660	61.552	58.892			
01 (Peak)	2411.800	-2.644	94.470	91.827			
01 (Average)	2390.000	-2.687	36.015	33.328	74.00	54.00	Pass
01 (Average)	2400.000	-2.660	44.761	42.101			
01 (Average)	2418.100	-2.641	83.237	80.595			

Figure Channel 01:

Horizontal (Peak)



Figure Channel 01:

Horizontal (Average)



- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

RF Radiated Measurement (VERTICAL):

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
01 (Peak)	2389.200	-4.156	49.114	44.958	74.00	54.00	Pass
01 (Peak)	2390.000	-4.159	48.199	44.040	74.00	54.00	Pass
01 (Peak)	2400.000	-4.171	58.076	53.905			
01 (Peak)	2411.900	-4.167	89.445	85.279			
01 (Average)	2390.000	-4.159	33.601	29.442	74.00	54.00	Pass
01 (Average)	2400.000	-4.171	40.857	36.686			
01 (Average)	2405.800	-4.170	78.428	74.258			

Figure Channel 01:

VERTICAL (Peak)

Figure Channel 01:

VERTICAL (Average)

- 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (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)	2462.000	-2.623	93.429	90.806			
11 (Peak)	2483.500	-2.601	46.179	43.577	74.00	54.00	Pass
11 (Peak)	2484.500	-2.601	48.741	46.140	74.00	54.00	Pass
11 (Average)	2455.900	-2.627	82.833	80.206			
11 (Average)	2483.500	-2.601	33.846	31.244	74.00	54.00	Pass

Figure Channel 11:

Horizontal (Peak)

Horizontal (Average)

- 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

RF Radiated Measurement (VERTICAL):

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)	2462.300	-4.033	87.358	83.324			
11 (Peak)	2483.500	-3.966	43.342	39.375	74.00	54.00	Pass
11 (Peak)	2485.200	-3.961	47.762	43.801	74.00	54.00	Pass
11 (Average)	2455.700	-4.054	77.147	73.093			
11 (Average)	2483.500	-3.966	31.824	27.857	74.00	54.00	Pass
11 (Average)	2483.700	-3.966	31.958	27.992	74.00	54.00	Pass

Figure Channel 11:

VERTICAL (Peak)

Figure Channel 11:

VERTICAL (Average)

- 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Regult
Channel No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
01 (Peak)	2387.200	-2.699	53.661	50.962	74.00	54.00	Pass
01 (Peak)	2390.000	-2.687	52.676	49.989	74.00	54.00	Pass
01 (Peak)	2399.700	-2.661	65.462	62.801			
01 (Peak)	2400.000	-2.660	60.685	58.025			
01 (Peak)	2405.800	-2.652	92.575	89.923			
01 (Average)	2390.000	-2.687	37.022	34.335	74.00	54.00	Pass
01 (Average)	2400.000	-2.660	44.629	41.969			
01 (Average)	2418.200	-2.641	82.574	79.932			

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.
 - Average measurements: RBW = 1MHz, VBW = 5 MHz, Sweep: Auto.
 Average measurements: RBW = 1MHz, VBW = 1 KHz, Sweep: Auto.
 - 4. "*", means this data is the worst emission level.
 - 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

RF Radiated Measurement (VERTICAL):

Channal Na	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Average Limit	Decult
Channel No.	(MHz)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	$(dB\mu V/m)$	Result
01 (Peak)	2388.400	-4.154	50.108	45.955	74.00	54.00	Pass
01 (Peak)	2390.000	-4.159	48.121	43.962	74.00	54.00	Pass
01 (Peak)	2399.500	-4.171	61.747	57.576			
01 (Peak)	2400.000	-4.171	59.174	55.003			
01 (Peak)	2405.600	-4.170	88.392	84.222			
01 (Average)	2390.000	-4.159	34.767	30.608	74.00	54.00	Pass
01 (Average)	2400.000	-4.171	40.911	36.740			
01 (Average)	2406.100	-4.170	78.094	73.924			

Figure Channel 01:

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

Product	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2455.500	-2.627	92.092	89.465			
11 (Peak)	2483.500	-2.601	46.093	43.491	74.00	54.00	Pass
11 (Peak)	2485.100	-2.600	49.553	46.953	74.00	54.00	Pass
11 (Average)	2455.500	-2.627	82.377	79.750			
11 (Average)	2483.500	-2.601	34.306	31.704	74.00	54.00	Pass

Figure Channel 11:

Horizontal (Peak)

- 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 1 KHz, 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	:	Wi-Fi Module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/12
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	Dogult
	(MHz)	(dB)	(dBµV)	(dBµV/m)	(dBµV/m)	$(dB\mu V/m)$	Result
11 (Peak)	2455.500	-4.054	86.844	82.790			
11 (Peak)	2483.500	-3.966	44.252	40.285	74.00	54.00	Pass
11 (Peak)	2483.600	-3.966	45.219	41.253	74.00	54.00	Pass
11 (Average)	2455.500	-4.054	76.724	72.670			
11 (Average)	2483.500	-3.966	32.043	28.076	74.00	54.00	Pass

Figure Channel 11:

VERTICAL (Peak)

Figure Channel 11:

VERTICAL (Average)

- 2. Peak measurements: RBW = 1MHz, VBW = 3MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 1 KHz, 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. 6dB Bandwidth

7.1. Test Setup

7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

The EUT was setup according to ANSI C63.4: 2014; tested according to DTS test procedure of Jan KDB558074 for compliance to FCC 47CFR 15.247 requirements.

7.4. Uncertainty

± 283Hz

7.5. Test Result of 6dB Bandwidth

Product	:	Wi-Fi Module
Test Item	:	6dB Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	9150	>500	Pass
06	2437	9150	>500	Pass
11	2462	9150	>500	Pass

Figure Channel 01:

Agilent	Spectru	im An	alyzer - Swe	ept SA								
Cent	er Fr	RF eq 2	່ 50 Ω 2.41200	AC COR	REC	Trig: Free		Avg Ty	ALIGN AUTO e: Log-Pwr	08:21:03 PI TRA TY	M Oct 25, 2017 E 1 2 3 4 5 6 PE MWWWWW	Frequency
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Agilent	t Spe	ctrur	n An	alyzer - Sv	wept S	A												
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						IFO	Gain:Low		#Atten: 30) dB						DELLE NUMBER		
10 dE	3/div	,	Ref Re i	Offset 0 f 20.50).5 dE) dBr	3 n								Mkr	2 2.432 -3.	2 45 GHz .90 dBm		Auto Tune
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-49.5				and	men	Vin								"WW gran	My many		łŀ	
50.5	ww	hr	NV TH	- r											V	mar and		Stop Freq
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Cen	ter :	2.4	370	0 GHz											Span	50.00 MH		CE Sten
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1	N	1	f			2.437 5	0 GHz		2.71 di	3m	Tone	IGN		CHOIL MIDHI	- Tones			
2	N	1	f			2.432 4	5 GHz		-3.90 dl	3m								Erog Offect
4	N	1	Г			2.441 6	UGHZ		-4.74 at	3m								Fiequise
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10																		
11																		
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MSG														STATU	5			

Figure Channel 06:

Figure Channel 11:

Product	:	Wi-Fi Module
Test Item	:	6dB 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
01	2412	15950	>500	Pass
06	2437	16000	>500	Pass
11	2462	15800	>500	Pass

Figure Channel 01:

Agilent S	Spectru	m Ana	alyzer - Sw	ept SA									
Cente	er Fre	RF eq 2	50 Ω 2.41200	AC COF 00000 GH	REC	Trim Free	INT REF	Avg T	ALIGNAUTO ype: Log-Pwr	08:32:24 P	M Oct 25, 2017 CE 1 2 3 4 5	6	Frequency
10 dB/	div	Ref Ref	Offset 0.9	Pi IFC 5 dB d Bm	NO: Fast Ģ Gain:Low	#Atten: 3	e Run 0 dB		Mki	2 2.404 -5.	05 GH2 80 dBm		Auto Tune
Log 10.5 - 0.500 - -9.50 -						Magadla gull Armilian	1 porther dear	-	3		-5.17 dBr		Center Freq 2.412000000 GHz
-19.5 — -29.5 — -39.5 —		week	whether the state of the state	and the second					humman	Pound with we			Start Freq 2.387000000 GHz
-49.5 ~ -59.5 - -69.5 -	id Alerra												Stop Freq 2.437000000 GHz
Cente #Res	er 2.4 BW 1	120 100	0 GHz kHz		#VBV	/ 300 kHz		Swee	p (#Swp) 4	Span 5 .800 ms (0.00 MH: 1001 pts		CF Step 5.000000 MHz
1 1 2 1 3 1 4 5		f f f		× 2.405 7 2.404 0 2.420 0	5 GHz 5 GHz 0 GHz	0.82 d -5.80 d -6.36 d	Bm Bm Bm		FUNCTION WIDTH				Freq Offset
6 7 8 9 10 11													
MSG									STATU	s			

Agilent Spec	ctrum Analyz	zer - Swept	SA								
Center	 Freq 2.4	50 Ω 137000	AC COR 000 GH	REC Z	Tria: Free		Avg Ty	ALIGN AUTO pe: Log-Pwr	08:35:58 P	M Oct 25, 2017 CE 1 2 3 4 5 6 PF M Manadata	Frequency
10 dB/div	Ref Of Ref 2	fset 0.5 d 20.50 dB	IFG IB Sm	IO: Fast ⊆ Gain:Low	#Atten: 30) dB		Mkı	2 2.428 -5.	85 GHz 87 dBm	Auto Tune
10.5 0.500 -9.50				2 Lurlow	Jan Jacobrokan	1 million	3			-5.67 dBm	Center Freq 2.437000000 GHz
-19.5 -29.5 -39.5		Whenk to a state	antoninav	J ^{arde}				hurbhangels.	monthermonth	alter a	Start Freq 2.412000000 GHz
-49.5 مرابط -59.5 -69.5										a a su a	Stop Freq 2.462000000 GHz
Center 2 #Res BV	2.43700 (N 100 kH	GHz Iz	×	#VBV	/ 300 kHz	FL	Sweep	(#Swp) 4	Span 5 .800 ms (0.00 MHz 1001 pts)	CF Step 5.000000 MHz <u>Auto</u> Man
1 N 2 N 3 N 4 5	1 f 1 f 1 f		2.438 30 2.428 85 2.444 85	D GHz 5 GHz 5 GHz	0.33 di -5.87 di -5.72 di	3m 3m 3m					Freq Offset 0 Hz
7 8 9 10 11											
MSG								STATU	s		

Figure Channel 06:

Figure Channel 11:

Agilent Spectrum Analyzer	- Swept SA				
Center Freq 2.46	50 Ω AC CORREC	INT REF	ALIGNAUTO Avg Type: Log-Pwr	08:39:25 PM Oct 25, 2017 TRACE 1 2 3 4 5 6	Frequency
Ref Offs 10 dB/div Ref 20.	PNO: Fast IFGain:Low et 0.5 dB .50 dBm	#Atten: 30 dB	Mkr	2 2.454 05 GHz -6.06 dBm	Auto Tune
Log 10.5 0.500 -9.50	2	1	and maker the state of the stat	-5.45 dBm	Center Freq 2.462000000 GHz
-19.5 -29.5 -39.5	white provident		he h	Warmanna	Start Freq 2.437000000 GHz
-49.5					Stop Freq 2.487000000 GHz
Center 2.46200 GI #Res BW 100 kHz	Hz #V	BW 300 kHz	Sweep (#Swp) 4	Span 50.00 MHz .800 ms (1001 pts)	CF Step 5.000000 MHz Auto Man
MKRG MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 - - - 5 - 6 - 7 - - - 9 - - - 11 - - -	2.455 80 GHz 2.454 05 GHz 2.469 85 GHz	₹ 0.55 dBm -6.06 dBm -5.75 dBm			Freq Offset 0 Hz
MSG			STATUS	5	

Product	:	Wi-Fi Module
Test Item	:	6dB Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17650	>500	Pass
06	2437	17250	>500	Pass
11	2462	17250	>500	Pass

Figure Channel 01:

Agiler	it Spe	ctrur	n An	alyzer - Swe	pt SA											
Cen	ter	Fre	RF Pq 2	50 Ω 2.41200	AC COF	IREC	Trin F.	INT REF	=	Avg T	AL ype:l	IGN AUTO .og-Pwr	08:43:01 Pf	4 Oct 25, 2017 E 1 2 3 4 5 6	6	Frequency
10 d	B/div	,	Ref Ref	Offset 0.5 f 20.50 c	PI IFC dB iBm	NO: Fast Gain:Low	#Atten:	30 dB				Mkr	≥ 2 2.403 -6.5	20 GHz 51 dBm	ž	Auto Tune
Log 10.5 0.500 -9.50						2	1 Then the share the set	w	h.u.f	and mark (3			-5.24 dBm		Center Freq 2.412000000 GHz
-19.5 -29.5 -39.5		ا/لربري	(MAR	Madala for the second s	whereither						1	an the Martillan	pleaser and rate way	half man an		Start Freq 2.387000000 GHz
-49.5 -59.5 -69.5																Stop Freq 2.437000000 GHz
Cen #Re	iter : s Bi	2.4 [/] N 1	120 00	0 GHz kHz	X	#VE	300 kH	z	FUNC	Swee	p (#:	Swp) 4.	Span 5 .800 ms (0.00 MHz 1001 pts)		CF Step 5.000000 MHz Auto Man
1 2 3 4 5 6 7 8 9 10 11 <		1	f		2.405 8 2.403 2 2.420 8	0 GHz 0 GHz 5 GHz	0.76 -6.51 -6.55	dBm dBm dBm								Freq Offset 0 Hz
MSG												STATUS				

Agile	nt Spe	ectrur	n An	alyzer	- Swe	pt S/	l																			
Cei	nter	Fre	RF q2	2.43	50 Ω 700	AC 000) () (CORRI	EC	_		IN • Eree	NT RE	EF	Av	g Тур-	ALIGN e: Lo	IAUTO g-Pwr	08	46:28F TRA T\	M Oct	25,20	17 56	F	requen	су
			Ref	Offse	et 0.5	dB		PNC IFGa): Fast nin:Low	, -	#Atte	en: 30	dB					Mkr	2 2.	428	20 35				Auto	Tune
10.3 10.3 0.500		v		20.	50 0		•		2-		los frant	man	ls		Jurky	3						-5.39 d	Bm	2.4	Cente 3700000	r Freq 00 GHz
-19.0 -29.0 -39.0	5	mhi ^w		(worker)	m-qada	eno(1	proder		/								h Muo	lanore,	1 Alerton	~bhrvil	A.Vinv	M0		2.4	Star 1200000	t Freq 00 GHz
-49.(-59.(-69.(5																						 4	2.4	Stop 5200000	Freq 00 GHz
Cer #Ro	nter es B	2.4: W 1	370 00	0 GH kHz	łz		×		#V	BW	300 I	kHz		FUN	Sw	eep	(#Sv	wp) 4 N WIDTH	S .800	oan (ms Funct	50.0 (100	0 MH)1 pt	iz s)	<u>Auto</u>	CF 5.00000	Step 00 MHz Man
1 2 3 4 5	N N N	1 1 1	f f				2.430 2.428 2.445	0 80 3 20 5 45	GHz GHz GHz		0.0 -6. -5.9	61 dB 35 dB 96 dB	Sm Sm Sm												Freq	Offset 0 Hz
8 9 10																										
MSG												11						STATUS	5							

Figure Channel 06:

Figure Channel 11:

Agilent Sp	pectrum	n Ana	ılyzer - Swe	pt SA								
(x/ RL Cente	r Fre	RF q 2	50 Ω 2.46200	AC COR 0000 GH	REC	Trig: Fre	INT REF	Avg Typ	ALIGN AUTO e: Log-Pwr	08:50:25 Pf TRAC TY	4 Oct 25, 2017 E 1 2 3 4 5 6	Frequency
		Ref	Offset 0.5	dB	NU: Fast 🕞 Gain:Low	#Atten: 3	0 dB		Mkr	2 2.453 -6	20 GHz	Auto Tune
10.5			20.50 t		₹ ²	1 - In the the	porte alexande	manut	3		-5.47 dBm	Center Freq 2.462000000 GHz
-19.5 — -29.5 — -39.5 —	www.milin	AM	Langer and a	www.				1	Masharm	Dur nhe yough	Mymbula	Start Freq 2.437000000 GHz
-49.5												Stop Freq 2.487000000 GHz
Center #Res E	r 2.46 3W 1	20 00	0 GHz kHz		#VBV	V 300 kHz		Sweep	(#Swp) 4	Span 5 .800 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 9		f f f		× 2.455 8 2.453 2 2.470 4	D GHZ D GHZ 5 GHZ	0.53 di -6.47 di -5.95 di	Bm Bm Bm Bm			FUNCTI		Freq Offset 0 Hz
11 < MSG						Ш			STATUS	5	×	

8. **Power Density**

8.1. Test Setup

8.2. Limits

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

8.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; 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.

8.4. Uncertainty

 \pm 1.20 dB

8.5. Test Result of Power Density

Product	:	Wi-Fi Module
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	3.150	\leq 8dBm	Pass
06	2437	2.730	\leq 8dBm	Pass
11	2462	2.590	\leq 8dBm	Pass

Agilent Spectrum Analyzer - Swept SA <mark>d</mark> RL ALIGNAUTO 08:21:23 PM Oct 25, 2017 pe: Log-Pwr TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N INT REF Frequency Center Freq 2.412000000 GHz Avg Type: Log-Pwr Trig: Free Run #Atten: 30 dB PNO: Fast IFGain:Low Auto Tune Mkr1 2.412 494 GHz 3.15 dBm Ref Offset 0.5 dB Ref 20.50 dBm 10 dB/div Log **Center Freq** 10.5 2.412000000 GHz **♦**¹ .500 MAN M Start Freq _Λ ٨ 2.405137500 GHz 9.50 -19.5 Stop Freq 2.418862500 GHz -29.5 CF Step 1.372500 MHz Man -39 E Auto -49.E Freq Offset -59.5 0 Hz -69.5 Span 13.73 MHz Sweep (#Swp) 1.333 ms (1001 pts) Center 2.412000 GHz #Res BW 100 kHz #VBW 300 kHz SG STATUS

Figure Channel 01:

Agiler	it Spectru	ım Analyzer - Sv	wept SA								
(X) R Cen	ter Fr	RF 50 eq 2.4370	Ω AC CO 000000 GH		Trig: Free		Avg Type	ALIGN AUTO : Log-Pwr	08:25:36 PM TRAC TYI	1 Oct 25, 2017 E 1 2 3 4 5 6 E M WWWWWW	Frequency
10 di	3/div	Ref Offset 0 Ref 20.50	.5 dB dBm	Gain:Low	#Atten: 3) dB		Mkr1	2.437 5 2.	08 GHz 73 dBm	Auto Tune
L og 10.5						▲ 1					Center Freq 2.437000000 GHz
0.500 -9.50	ممر	~~~	h	h	-A-A	<u>}-</u> ~	-AAA	Arr	M	An	Start Freq 2.430137500 GHz
-19.5 -29.5										~	Stop Freq 2.443862500 GHz
-39.5											CF Step 1.372500 MHz <u>Auto</u> Man
-59.5											Freq Offset 0 Hz
-69.5 Cen #Re	ter 2.4 s BW	37000 GHz 100 kHz	2	#VBW	300 kHz		Sweep	(#Swp) 1	Span 1 .333 ms (3.73 MHz 1001 pts)	
MSG								STATUS	6		<u></u>

Figure Channel 06:

Figure Channel 11:

Product	:	Wi-Fi Module
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)

	Channel No.	Frequency	Measure Level	Limit	Popult
		(MHz)	(dBm)	(dBm)	Kesult
	01	2412	0.590	\leq 8dBm	Pass
	06	2437	0.580	\leq 8dBm	Pass
	11	2462	0.500	≤ 8 dBm	Pass

Figure Channel 01:

Agilen	t Spectrun	ı Analyzer - Sw	ept SA								
LXI RI	L Ann Fra	RF 50 Ω		DRREC	1	INT REF	Aug Type		08:32:45 PI	M Oct 25, 2017	Frequency
Cen	ter Fre	q 2.41200	JUUUU GI I IF	ĦZ PNO: Fast ⊊ :Gain:Low	Trig: Free #Atten: 30	e Run) dB	Avg type	. Log-Fwi	TY	PE MWWWWW ET P NNNNN	Auto Tune
10 dE Log	3/div	Ref Offset 0.9 Ref 20.50 (5 dB dBm					Mkr	1 2.413 2 0.	292 GHz 59 dBm	
10.5						▲ 1					Center Freq 2.412000000 GHz
0.500 -9.50		, which	handhand	hondraw	many	problem	Amer Ann	Amak	www		Start Freq 2.400037500 GHz
-19.5 -29.5									- ^V ve~	9 6 6 1	Stop Freq 2.423962500 GHz
-39.5 -49.5	www									Manyay	CF Step 2.392500 MHz <u>Auto</u> Man
-59.5											Freq Offset 0 Hz
-69.5 Cen	ter 2 / 1	200 GHz							Snan 2	3 03 MHz	
#Res	s BW 1	00 kHz		#VBW	/ 300 kHz		Sweep	#Swp)	2.333 ms ((1001 pts)	
MSG								STAT	us		

Agilen	t Spectru	m Analyzer - Sw	rept SA								
الا Cen	ter Fr	RF 50 Ω eq 2.4370	AC CO 00000 GH	RREC	Tria: Eroa		Avg Type	ALIGN AUTO : Log-Pwr	08:36:19 Pf	4 Oct 25, 2017	Frequency
10 di	3/div	Ref Offset 0. Ref 20.50	P IFI 5 dB dBm	NO: Fast 🕞 Gain:Low	#Atten: 30) dB		Mkr	1 2.430 7 0.	784 GHz 58 dBm	Auto Tune
10.5			▲1								Center Freq 2.437000000 GHz
0.500 -9.50			hardrowd	runhuul	mont	Junn	hundher	Annh	walny		Start Freq 2.425000000 GHz
-19.5 -29.5		and a second sec							- Ding	N.	Stop Freq 2.449000000 GHz
-39.5 -49.5	wWV*									~~ <u>~</u> ~~~~/	CF Step 2.400000 MHz <u>Auto</u> Man
-59.5											Freq Offset 0 Hz
-69.5 Cen	ter 2.4	3700 GHz							Span 2	4.00 MHz	
#Re ^{MSG}	s BW 1	00 kHz		#VBW	300 kHz		Sweep (#Swp) statu	2.333 ms (^{IS}	1001 pts)	

Figure Channel 06:

Figure Channel 11:

Agilen	it Spectru	m Analyzer - Sv	wept SA								
الار Cen	ter Fr	RF 50 eq 2.4620	Ω AC CO 000000 GH				Avg Type	ALIGN AUTO : Log-Pwr	08:39:46 P! TRAC	4 Oct 25, 2017 E 1 2 3 4 5 6	Frequency
10 di	3/div	Ref Offset 0 Ref 20.50	р IFI IS dB dBm	NO: Fast 🕞 Gain:Low	#Atten: 30) dB		Mkr1 :	2.455 79 0.	0 6 GHz 50 dBm	Auto Tune
10.5			▲1								Center Freq 2.462000000 GHz
0.500 -9.50		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hontrol	mulund	montionery	prulam	Ann Aur	Invertin	mhy		Start Freq 2.450150000 GHz
-19.5 -29.5		p n N									Stop Freq 2.473850000 GHz
-39.5 -49.5	SW W									WWWWWY	CF Step 2.370000 MHz <u>Auto</u> Man
-59.5											Freq Offset 0 Hz
-69.5 Cen	ter 2.4	6200 GHz							Span 2	3.70 MHz	
#Re: ^{MSG}	s BW 1	00 kHz		#VBW	/ 300 kHz		Sweep	#Swp) Statu	2.267 ms (1001 pts)	

Product	:	Wi-Fi Module
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	0.740	\leq 8dBm	Pass
06	2437	0.550	\leq 8dBm	Pass
11	2462	0.530	\leq 8dBm	Pass

Figure Channel 01:	Figure	Channel	01:
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Agilent Spectrum Analyzer - Swept SA											
Cen	μ RL RF 50 Ω CORREC INT REF ALIGN AUTO 08:43:21 PM Oct 25, 2017 Center Freq 2.412000000 GHz Trace [1:2:3 4 5 6] Avg Type: Log-Pwr Trace [1:2:3 4 5 6]									Frequency	
10 dE	PN0: Fast Ing. Free Num IFGain:Low #Atten: 30 dB Ref Offset 0.5 dB Mkr1 2.405 778 GHz 0 dB/div Ref 20.50 dBm										
Log 10.5			1								Center Freq 2.412000000 GHz
0.500 -9.50		, www.	When the	Munhor	hurnhan	portant	hontwork	nandrand	horny		Start Freq 2.398762500 GHz
-19.5 -29.5										1	Stop Freq 2.425237500 GHz
-39.5	www.	∧N 							Ч		CF Step 2.647500 MHz <u>Auto</u> Man
-59.5											Freq Offset 0 Hz
-69.5 Cen #Res	ter 2.41 s BW 10	200 GHz 200 kHz		#VBW	300 kHz		Sweep (#Swp) 2	Span 2 2.533 ms (6.48 MHz 1001 pts)	
MSG								STATUS	3		<u>[]</u>

Agilent Spectrum Analyzer - Swept SA											
Cen	μ RL RF 50 Ω CORREC INT REF ALIGNAUTO 08:46:48 PM Oct 25, 2017 Center Freq 2.437000000 GHz Trace 12.3.45 G Trace 12.3.45 G Trace 12.3.45 G Trace 12.3.45 G								4 Oct 25, 2017 E 1 2 3 4 5 6	Frequency	
10 di	PN0: Fast Institute Rulii Derl P NNNNN IFGain:Low #Atten: 30 dB Mkr1 2.430 790 GHz Ref Offset 0.5 dB 0.55 dBm 0.55 dBm										Auto Tune
Log 10.5			▲1								Center Freq 2.437000000 GHz
0.500 -9.50			Monther	hundry	hundry	partin	handagal	hundern	hung		Start Freq 2.424062500 GHz
-19.5 -29.5											Stop Freq 2.449937500 GHz
-39.5 -49.5	juvurti	M								Winnigh	CF Step 2.587500 MHz <u>Auto</u> Man
-59.5											Freq Offset 0 Hz
-69.5 Cen	ter 2.4	3700 GHz							Span 2	5.88 MHz	
#Re мsg	s BW 1	00 kHz		#VBW	i 300 kHz		Sweep	(#Swp) 2 Status	2.533 ms (1001 pts)	

Figure Channel 06:

Figure Channel 11:

Agilent Spectrum Analyzer - Swept SA											
اللا Cen	L Iter Fre	RF 50 Ω eq 2.46200	ac cof 00000 GH	RREC	Trei er Error		Avg Type	ALIGN AUTO :: Log-Pwr	08:50:46 Pf	4 Oct 25, 2017 E 1 2 3 4 5 6	Frequency
10 di	PNO: Fast Inst. free Kun IFGain:Low #Atten: 30 dB Ref Offset 0.5 dB Mkr1 2.455 790 GHz 10 dB/div Ref 20.50 dBm										Auto Tune
10.5			▲1								Center Freq 2.462000000 GHz
0.500 -9.50		N	Innha	hundryn	monthing	montum	heren harrow	howhow	my		Start Freq 2.449062500 GHz
-19.5 -29.5											Stop Freq 2.474937500 GHz
-39.5 -49.5	wardth	NT .								Municontro	CF Step 2.587500 MHz <u>Auto</u> Man
-59.5											Freq Offset 0 Hz
-69.5 Cen	ter 2.4	6200 GHz							Span 2	5.88 MHz	
#Re ^{мsg}	s BW 1	00 kHz		#VBW	300 kHz		Sweep ((#Swp) 2	2.533 ms (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