

TEST REPORT

Product Name : combo smoke & co alarm Model Number : GS888W, GS888W-C, GS888W-D FCC ID : 2ASYY-GS888W					
Prepared for Address	:	Siterwell Electronics Co., Limited No.666 Qingfeng Road, Jiangbei District, Ningbo, Zhejiang Province, China.			
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Report Number Date(s) of Tests Date of Issue		EDG2305310126E01301R May 31, 2023 to June 19, 2023 June 21, 2023			

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1 TEST RESULT CERTIFICATION

Applicant	:	: Siterwell Electronics Co., Limited			
Address	:	No.666 Qingfeng Road, Jiangbei District, Ningbo, Zhejiang Province, China.			
Manufacturer	:	Siterwell Electronics Co., Limited			
Address	:	No.666 Qingfeng Road, Jiangbei District, Ningbo, Zhejiang Province, China.			
EUT	:	combo smoke & co alarm			
Model Name	:	GS888W, GS888W-C, GS888W-D			
Trademark	:	N/A			

Measurement Procedure Used:

APPLICABLE STANDARDS					
STANDARD TEST RESULT					
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C	PASS				

The above equipment was tested by EMTEK (DONGGUAN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 15.247

The test results of this report relate only to the tested sample identified in this report.

Date of Test :	May 31, 2023 to June 19, 2023
Prepared by :	Warren Deng
	Warren deng /Engineer Tim Do M
Reviewer :	Tim Dong /Supervisor
Approved & Authorized Signer :	Sam Lv /Manager

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EUT TECHNICAL DESCRIPTION 2

Characteristics	Description		
Product	combo smoke & co alarm		
Model Number GS888W, GS888W-C, GS888W-D (Note: The three models are only named differently. Everything else is same. We chose "GS888W" for RF testing)			
Sample Number	EDG2305310126E013-1-1		
IEEE 802.11 WLAN Mode Supported	⊠802.11b ⊠802.11g ⊠802.11n(20MHz channel bandwidth)		
B02.11 b:1,2,5.5,11Mbps; B02.11 g:6,9,12,18,24,36,48,54Mbps; B02.11 n: MCS0~7,up to 150Mbps;			
Modulation DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/ CCK /16QAM/64QAM for 802.11g/n20;			
Operating Frequency Range	2412-2462MHz for 802.11b/g/n(HT20);		
Number of Channels	⊠11 channels for 802.11b/g n(HT20);		
Transmit Power Max	16.07 dBm		
Smart system	SISO for802.11 b/g/n(HT20) ☐MIMO for802.11n(HT20);		
Antenna Type	PCB Antenna		
Antenna Gain	1.52 dBi		
Power supply DC 4.5V			
Temperature Range	-10℃~+55℃		
Date of Received	May 31, 2023		

Note: for more details, please refer to the User's manual of the EUT.

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FCC Part Clause	Test Parameter	Verdict	Remark		
15.247(a)(2)	DTS (6dB) Bandwidth	PASS			
15.247(b)(3)	Maximum Peak Conducted Output Power	PASS			
15.247(e)	Maximum Power Spectral Density Level	PASS			
15.247(d)	Unwanted Emission Into Non-Restricted Frequency Bands	PASS			
15.247(d) 15.209	Unwanted Emission Into Restricted Frequency Bands (conducted)	PASS			
15.247(d) 15.209	Radiated Spurious Emission	PASS			
15.207	Conducted Emission Test	N/A			
15.247(b)	Antenna Application	PASS			
	NOTE1:N/A (Not Applicable) NOTE2: According to FCC OET KDB 558074, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.				

3 SUMMARY OF TEST RESULT

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2ASYY-GS888W filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

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TEST METHODOLOGY 4

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards: FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C FCC KDB 558074 D01 15.247 Meas Guidance v05r02

4.2 MEASUREMENT EQUIPMENT USED

4.2.1 **Conducted Emission Test Equipment**

Equipment Manufacturer		Model No.	Serial No.	Last Cal.	Cal. Interval
Test Receiver	Rohde& Schwarz	ESCI	100137	2023/05/19	1Year
L.I.S.N.	Rohde& Schwarz	ENV216	101209	2023/05/19	1Year
RF Switching Unit	CDS	RSU-M2	38401	2023/05/19	1Year

4.2.2 Radiated Emission Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	ESCI	101415	2023/05/19	1Year
Power Amplifier	HP	8447F	OPTH64	2023/05/19	1Year
Bilog Antenna	Schwarzbeck	VULB9163	141	2023/05/22	1Year
Horn antenna	Schwarzbeck	BBHA9120D	1272	2023/05/22	1Year
Power Amplifier	LUNAR EM	LNA1G18-40	J1010000081	2023/05/19	1Year
Loop Antenna	Schwarzbeck	FMZB1513	1513-60	2022/05/22	2 Year
Signal Analyzer	R&S	FSV30	103039	2023/05/19	1Year
Bilog Antenna	Schwarzbeck	VULB9163	141	2023/05/22	1Year
Band reject Filter(50dB)	WI/DE	WRCGV-2400(2400- 2485MHz)	2	2023/05/20	1 Year

4.2.3 Radio Frequency Test Equipment

Equipment Manufacturer		Model No.	Serial No.	Last Cal.	Cal. Interval
Wireless Connectivity Tester			102543	2022/06/21	1Year
Automatic Control Unit	Tonscend	JS0806-2	2118060480	2022/06/21	1Year
Signal Analyzer	KEYSIGHT	N9010B	MY60242456	2022/06/21	1Year
Analog Signal Generator	KEYSIGHT	N5173B	MY61252625	2022/06/21	1Year
UP/DOWN-Converter	R&S	CMW-Z800A	100274	2022/06/21	1Year
Vector Signal Generator	KEYSIGHT	N5182B	MY61252674	2022/06/21	1Year
Frequency Extender	KEYSIGHT	N5182BX07	MY59362541	2022/06/21	1Year
Temperature&Humidity test chamber	ESPEC	EL-02KA	12107166	2022/06/21	1 Year

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4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (🛛 802.11b:1 Mbps; 🖾 802.11g: 6 Mbps; 🖾 802.11n(HT20): MCS0; 🗌 802.11n(HT40): MCS0) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

	Frequency		Frequency	Channel	Frequency
Channel	(MHz)	Channel	(MHz)		(MHz)
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		

Frequency and Channel list for 802.11b/g/n (HT20):

Frequency and Channel list for 802.11n (HT40):

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel	(MHz)	Channel	(MHz)	Channel	(MHz)
3	2422	6	2437	9	2452
4	2427	7	2442		
5	2432	8	2447		

Test Frequency and Channel for 802.11b/g/n (HT20):

Lowest F	requency	Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462

Test Frequency and Channel for 802.11n (HT40):

Lowest F	requency	Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452

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4.4 TEST SOFTWARE

Item	Software
Radiated Emission	SecureCRT(V6.6.1)
Conducted Emission	SecureCRT(V6.6.1)





FACILITIES AND ACCREDITATIONS 5

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

EMTEK (DONGGUAN) CO., LTD.

-1&2F., Building 2, Zone A, Zhongda Marine Biotechnology Research and Development Base, No. 9, Xincheng Avenue, Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 32.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description	
EMC Lab.	: Accredited by CNAS, 2020.08.27 The certificate is valid until 2024.07.05 The Laboratory has been assessed and proved to be in compliance with CNAS/CL01:2018 The Certificate Registration Number is L3150
	Designation by FCC Designation Number: CN1300 Test Firm Registration Number: 945551
	Accredited by A2LA, April 05, 2021 The Certificate Registration Number is 4321.02
	Accredited by Industry Canada The Certificate Registration Number is CN0113
Name of Firm Site Location	 EMTEK (Dongguan) Co., Ltd. -1&2/F.,Buiding 2,Zone A,Zhongda Marine Biotechnology Research and Development Base,N.9,Xincheng Avenue,Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China

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6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	± 1x10^-5
Maximum Peak Output Power Test	± 1.0 dB
Conducted Emissions Test	± 2.0 dB
Radiated Emission Test	± 2.0 dB
Power Density	± 2.0 dB
Occupied Bandwidth Test	± 1.0 dB
Band Edge Test	± 3 dB
All emission, radiated	± 3 dB
Antenna Port Emission	± 3 dB
Temperature	± 0.5 °C
Humidity	± 3 %

Measurement Uncertainty for a level of Confidence of 95%

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7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP 1

The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

Below 30MHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT androtated about its vertical axis formaximum response at each azimuth about the EUT. The center of the loopshall be 1 m above the ground. For certain applications, the loop antennaplane may also need to be positioned horizontally at the specified distance from the EUT.

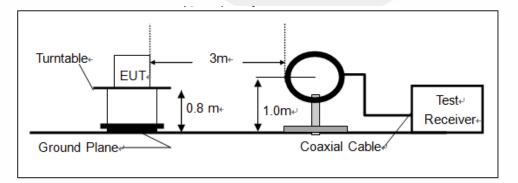
30MHz-1GHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:

The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

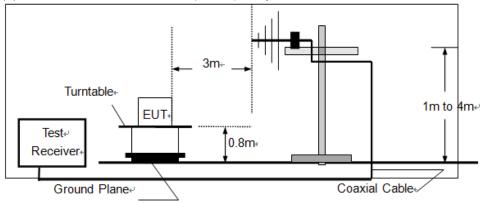
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



K (Dongguan) Co., Ltd.

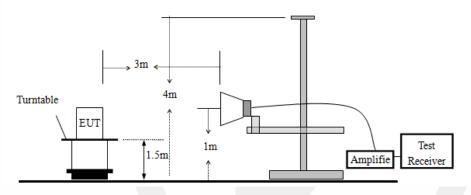
东莞市信测科技有限公司 地址:广东省东莞市松山湖高新技术产业开发区新城大道9号中大海洋生物科技研发基地A区2号办公楼负一层. 第二层 网址:Http://www.emtek.com.cn 邮箱:E-mail: project@emtek.com.cn Add: -1&2/F ...Building 2,Zone A,Zhongda Marine Biotechnology Research and Development Base ,No.9, Xincheng Avenue,Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China Http://www.emtek.com.cn E-mail: project@emtek.com.cn





(b)Radiated Emission Test Set-Up, Frequency Below 1000MHz

(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

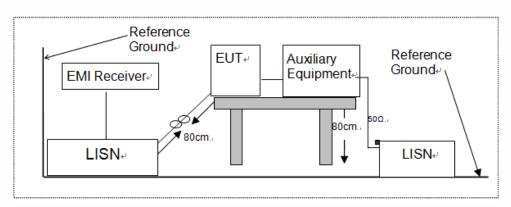


7.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

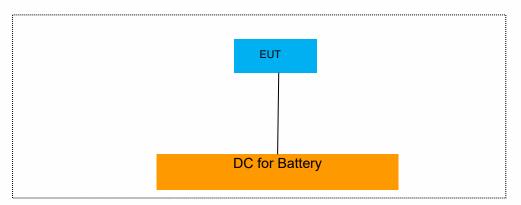


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7.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



7.5 SUPPORT EQUIPMENT

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
1	1	1	/

Auxiliary Cable List and Details						
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite			
1	1	1	1			

Auxiliary Equipment List ar	Auxiliary Equipment List and Details							
Description	Manufacturer	Model	Serial Number					
1	1	1	/					

Notes:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
- 3. Unless otherwise denoted as EUT in *[Remark]* column , device(s) used in tested system is a support equipment

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8 **TEST REQUIREMENTS**

8.1 DTS (6DB) BANDWIDTH

8.1.1 Applicable Standard

According to FCC Part15.247 (a)(2) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.1.2 **Conformance Limit**

The minimum -6 dB bandwidth shall be at least 500 kHz.

8.1.3 **Test Configuration**

Test according to clause 7.1 radio frequency test setup 1

8.1.4 **Test Procedure**

The EUT was operating in IEEE 802.11b/g/n mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously

Set RBW = 100 kHz.

Set the video bandwidth (VBW) =300kHz.

Set Span=2 times OBW

Set Detector = Peak.

Set Trace mode = max hold.

Set Sweep = auto couple.

Allow the trace to stabilize.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Measure and record the results in the test report.

8.1.5 **Test Results**

Temperature:	23 ℃
Relative Humidity:	63%
ATM Pressure:	1011 mbar

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (MHz)	Limit (kHz)	Verdict
	1	2412	9.098	>500	PASS
802.11b	6	2437	9.301	>500	PASS
	11	2462	9.092	>500	PASS
	1	2412	16.450	>500	PASS
802.11g	6	2437	16.440	>500	PASS
	11	2462	16.460	>500	PASS
000.11m	1	2412	17.700	>500	PASS
802.11n (HT20)	6	2437	17.680	>500	PASS
(1120)	11	2462	17.690	>500	PASS

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est Model		DTS (6d 8	B) Bandwidth 02.11g	
			l 6: 2437MHz	
Spectrum Analyzer 1				Frequency 🔹
KEYSIGHT Coupling: DC Align: Auto	Input Z: 50 Ω Atten: 30 dB Corr CCorr μW Path: Stan Freq Ref. Int (S)	dard Gate: Off Av	enter Freq: 2.437000000 GHz g]Hold:>10/10 idio Std: None	Center Frequency 2.437000000 GHz Settings
1 Graph v	Ref LvI Offset			Span 30.000 MHz
Scale/Div 10.0 dB	Ref Value 20.00) dBm		CF Step
-10.0	www.	mon harden h	why a	3.000000 MHz Auto Man
-20.0 -30.0 -40.0 -50.0			Market Market Contraction of the second seco	Freq Offset 0 Hz
-60.0				
Center 2.43700 GHz #Res BW 100.00 kHz	#Video BW 300	0.00 kHz		
2 Metrics v				
		Measure Trace	Trace 1	
Occupied Bandwidth 16.476	MHz	Total Power	21.3 dBm	
Transmit Freq Error x dB Bandwidth	-2.429 kHz 16.44 MHz	% of OBW Power x dB	99.00 % -6.00 dB	
	10.44 Miliz	× 00	-0.00 dB	
	Jun 14, 2023 3:32:35 PM			
	_		dP) Popdwidth	
Fest Model		0) 510	dB) Bandwidth 302.11g	
-			l 11: 2462MHz	
Spectrum Analyzer 1	-			🗱 Frequency 🔻 🔆
KEYSIGHT Input: RF	Input Z: 50 Ω Atten: 30 dB		enter Freq: 2.462000000 GHz	
Coupling: DC Align: Auto	Corr CCorr µW Path: Stan Freq Ref: Int (S)		rg Hold:>10/10 adio Std: None	2.462000000 GHz
LNT 1 Graph ▼				Span 30.000 MHz
Scale/Div 10.0 dB	Ref LvI Offset 1 Ref Value 20.00			CF Step
Log 10.0				3.000000 MHz
-10.0	www.www.	man frank		Auto Man
-20.0 -30.0			Mur manne	Freq Offset
-40.0				0 Hz
-60.0				
-70.0 Center 2.46200 GHz	#Video BW 300	0.00 kHz	Span 30 Mi	
-70.0 Center 2.46200 GHz #Res BW 100.00 kHz	#Video BW 300).00 kHz	Span 30 Mi Sweep 2.93 ms (1001 pt	
-70.0 Center 2.46200 GHz #Res BW 100.00 kHz 2 Metrics	#Video BW 300	0.00 kHz Measure Trace		
-70.0 Center 2.46200 GHz #Res BW 100.00 kHz			Sweep 2.93 ms (1001 pt	
2 Metrics		Measure Trace	Sweep 2.93 ms (1001 pr	

Add: -182/F ...Building 2.Zone A.Zhongda Marine Biotechnology Research and Development Base .No.9, Xincheng Avenue, Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China Http://www.emtek.com.cn E-mail: project@emtek.com.cn



Spectrum Navycer Image: Field Line South Program South	est Model		802.	dB) Bandwidth 11n (HT20) el 1: 2412MHz		
1 Graph	Occupied BW T KEYSIGHT Input: RF Coupling: DC Align: Auto	Corr CCorr μW Path: Sta	ndard Gate: Off	Avg Hold:>10/10	Center Frequency 2.412000000 GHz	Settings
#Res BW 100.00 KHz Sweep 2.93 ms (1001 pts) 2 Motrics Measure Trace Coccupied Bandwidth Total Power 17 fassmit Eroc Erocupied Bandwidth 17.70 MHz 18 of OBW Power 99.00 % x dB Bandwidth 17.70 MHz 17 of State Division 17.70 MHz 17 of State Division 17.70 MHz 18 of OBW Power 99.00 % x dB Bandwidth 17.70 MHz 18 of OBW Power 99.00 % 19 of OBW Power 10 of Division Spectrum Analyzer 1 Imput 2.50 0 Atten 30 dB Center Frag 2.437000000 GHz Spectrum Analyzer 1 Imput 2.50 0 Whath: Standard Torg Free Run Center Frag 2.43700000 GHz Center Frag 2.43700000 GHz Settings Spectrum Analyzer 1 Imput 2.50 0 Whath: Standard Torg Free Run Augintiad-1000 GHz Scate/Div 10.0 dB Ref Lvi Offset 11.00 dB Center 2.43700 GHz Freq Offset 10 of ph Ref Lvi Offset 11.00 dB Center 2.43700 GHz Sweep 2.93 ms (1001 pts) 2000 Imput 2.43700.000 Hz Sweep 2.03 ms (1001 p	Scale/Div 10.0 dB	Ref Value 20.0			30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz	
est Model 802.11n (HT20) Channel 6: 2437MHz Spectrum Analyzer 1 Coupled BW	2 Metrics Occupied Bandwidth 17.652 M Transmit Freq Error x dB Bandwidth	-21.266 kHz 17.70 MHz Jun 14, 2023	Total Power % of OBW Power	Trace 1 21.1 dBm 99.00 % -6.00 dB		
KEYSIGHT Input Z 50 Ω Corr CCorr Freq Ref. Int (S) Atten: 30 dB W Path: Standard Cate: Off #IF Gain: Low Center Freq: 2.437000000 GHz Avg Hold>1010 Radio Stdt None Center Freq: 2.437000000 GHz Center Freq: 2.437000000 GHz 1 Graph Ref Lvi Offset 11.00 dB Ref Value 20.00 dBm Ref Lvi Offset 11.00 dB Ref Value 20.00 dBm Span 30.000 MHz Span 30.000 MHz Span 30.000 MHz 200 Monophysical Attack Ref Lvi Offset 11.00 dB Ref Value 20.00 dBm Freq Offset 0 Hz Auto 200 Monophysical Attack Span 30.000 MHz Span 30.000 MHz Freq Offset 0 Hz Auto 200 Monophysical Attack Wideo BW 300.00 kHz Span 30 MHz Span 30 MHz 200 Monophysical Attack Measure Trace Trace 1 Measure Trace Trace 1 Occupied Bandwidth 17.645 MHz Measure Trace Trace 1 Measure Trace Trace 1 Measure Transmit Freq Error -36.230 kHz % of OBW Power 99.00 % 99.00 % Measure 99.00 %	Spectrum Analyzer 1		802	2.11n (HT20)	Frequency	
1 Graph Scale/Div 10.0 dB Ref Value 20.00 dBm CF Step 3.0000 MHz Auto Man Freq Offset 0 Hz Cr Step 3.0000 MHz Auto Man Freq Offset 0 Hz Cr Step 3.00000 MHz Auto Man Freq Offset 0 Hz Cr Step 3.00000 MHz Auto Man Freq Offset 0 Hz Cr Step 3.00000 MHz Auto Man Freq Offset 0 Hz Cr Step 3.00000 MHz Cr Step 0 Hz Cr Step 3.00000 MHz Cr Step 3.00000 MHz Cr Step 1.000 MHz 1.000 MH	KEYSIGHT Input: RF Coupling: DC Align: Auto	Corr CCorr µW Path: Sta	ndard Gate: Off	Avg Hold:>10/10	Center Frequency 2.437000000 GHz	Settings
-700 Center 2.43700 GHz #Video BW 300.00 kHz Span 30 MHz #Res BW 100.00 kHz Sweep 2.93 ms (1001 pts) 2 Metrics Occupied Bandwidth 17.645 MHz Transmit Freq Error -36.230 kHz % of OBW Power	1 Graph v Scale/Div 10.0 dB Log 0.00 -10.0 -20.0 40.0 -50.0	Ref Value 20.0	0 dBm		30.000 MHz CF Step 3.000000 MHz Auto Man ✓ Freq Offset	
Measure Trace Trace 1 Occupied Bandwidth 17.645 MHz Total Power 21.4 dBm Transmit Freq Error -36.230 kHz % of OBW Power 99.00 %	-70.0 Center 2.43700 GHz #Res BW 100.00 kHz	#Video BW 30	0.00 kHz			
	Occupied Bandwidth	Hz				

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est Model			B) Bandwidth 1n (HT20)	
		Channel	11: 2462MHz	
Spectrum Analyzer 1 Occupied BW]			Frequency v 🔆
Coupling: DC Align: Auto	Input Z: 50 Ω Atten: 30 dB Corr CCorr μW Path: Standar Freq Ref: Int (S)	d Gate: Off Ave	nter Freq: 2.462000000 GHz g Hold:>10/10 dio Std: None	Center Frequency 2.462000000 GHz
LN 1 Graph ▼	Ref LvI Offset 11.			Span 30.000 MHz
Scale/Div 10.0 dB	Ref Value 20.00 d			CF Step 3.000000 MHz
-10.0	materition	www.www.		Auto Man
-30.0 4				M Freq Offset 0 Hz
-60.0				
Center 2.46200 GHz #Res BW 100.00 kHz	#Video BW 300.0	0 kHz	Span 30 MH Sweep 2.93 ms (1001 pts	
2 Metrics				
Occupied Bandwidth		Measure Trace	Trace 1	
17.653 N	/Hz	Total Power	21.1 dBm	
Transmit Freq Error x dB Bandwidth	-35.901 kHz 17.69 MHz	% of OBW Power x dB	99.00 % -6.00 dB	
	Jun 14, 2023 3:44:45 PM			



8.2 MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

8.2.1 Applicable Standard

According to FCC Part15.247 (b)(3) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.2.2 **Conformance Limit**

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm).

Test Configuration 8.2.3

Test according to clause 7.1 radio frequency test setup 1

8.2.4 **Test Procedure**

a) Set span to at least 1.5 times the OBW.

b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.

c) Set VBW \geq 3 x RBW.

d) Number of points in sweep $\geq 2 \times \text{span}$ / RBW. (This gives bin-to-bin spacing $\leq \text{RBW/2}$, so that narrowband signals are not lost between frequency bins.)

e) Sweep time = auto.

f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle \geq 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

8.2.5	lest Results	

Temperature:	23 ℃
Relative Humidity:	63%
ATM Pressure:	1011 mbar

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm)	Limit (dBm)	Verdict
	1	2412	14.99	30	PASS
802.11b	6	2437	16.07	30	PASS
	11	2462	14.78	30	PASS
	1	2412	13.54	30	PASS
802.11g	6	2437	13.54	30	PASS
	11	2462	12.96	30	PASS
902 11p	1	2412	14.65	30	PASS
802.11n (HT20) -	6	2437	14.87	30	PASS
(1120)	11	2462	14.30	30	PASS

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Test Mo	del		Duty cycle 802.11b Channel 1: 2412MHz					
pectrum Analyz wept SA	er 1 🗸	+					Frequency	y • 🕄
	nput: RF Coupling: DC Nign: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 30 dB µW Path: Standard	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log-Power Trig: Free Run	123456 WWWWWW NNNNN	Center Frequency 2.412000000 GHz	Settings
Spectrum cale/Div 10 dB	•		Ref LvI Offset 11.00 Ref Level 20.00 dB				Span 0.00000000 Hz Swept Span Zero Span	
0.0						<u> </u>	Full Span	
.00							Start Freq 2.412000000 GHz	
0.0							Stop Freq 2.412000000 GHz	
60.0							AUTO TUNE	
0.0							CF Step 1.000000 MHz	
i0.0 i0.0							Auto Man	
0.0							Freq Offset 0 Hz	
enter 2.412000 Res BW 1.0 MH			#Video BW 3.0 M	Hz	Sweep 8.40	Span 0 Hz ms (1001 pts)	X Axis Scale Log Lin	
1 50		? Jun 14, 2023 4:46:51 PM	\square				Signal Track (Span Zoom)	1

Duty cycle 802.11g annel 1: 2412MHz

				Channe	51 1. 24 12101	I IZ		
Spectrum Analy Swept SA	/zer 1	+					Free	uency 🔹 🛃
Keysight S	Input: RF Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	µW Path: Standard Ga		wg Type: Log-Power rig: Free Run	123456 WWWWWW	Center Frequence 2.412000000 G Span	
Spectrum	v		Ref LvI Offset 11.00 dl	в			0.00000000 Hz	
Scale/Div 10 d	IB		Ref Level 20.00 dBm				Swept Spar	
_og							Zero Span	
10.0							Full Span	
0.00							Start Freq	
							2.412000000 G	Hz
10.0							Stop Freq	
20.0							2.412000000 G	Hz
							AUTO TUN	
40.0							CF Step	
50.0							1.000000 MHz	
							Auto Man	
60.0							Freq Offset	
70.0							0 Hz	
							X Axis Scale	
enter 2.4120			#Video BW 3.0 MHz			Span 0 Hz	Log	
Res BW 1.0 N						ms (1001 pts)	Lin	
1 5		Jun 14, 2023 4:43:38 PM	$\supset \land$				Signal Track (Span Zoom)	

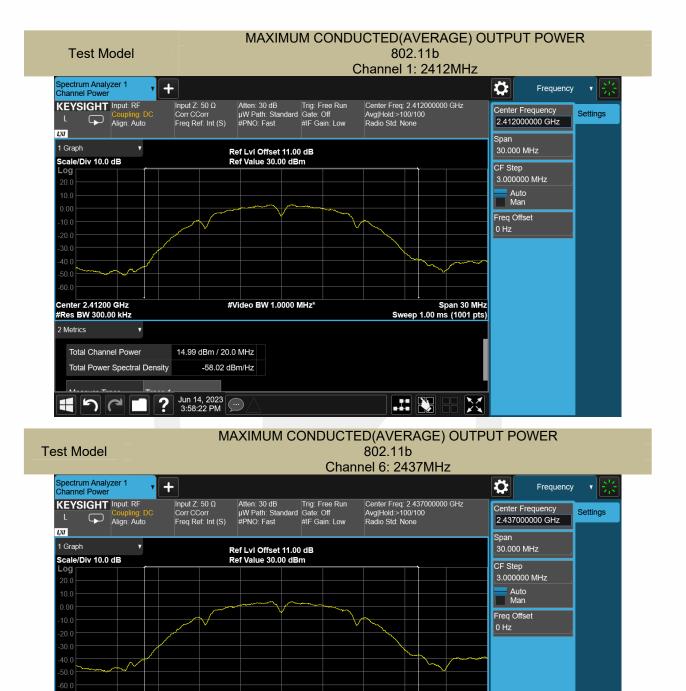
Ch

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Test Model		Duty cycle 802.11n(HT20) Channel 1: 2412MHz					
Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF Coupling: DC Align: Auto		tten: 30 dB PNO: Fast V Path: Standard Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log-Power Trig: Free Run	123456 WWWWW NNNNNN	Frequency Center Frequency 2.412000000 GHz	Settings	
Spectrum v Scale/Div 10 dB -000		vi Offset 11.00 dB .evel 20.00 dBm			Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.412000000 GHz		
					Stop Freq 2.412000000 GHz AUTO TUNE CF Step		
50.0					1.000000 MHz Auto Man Freq Offset 0 Hz		
Center 2.412000000 GHz Res BW 1.0 MHz	#Vi Jun 14, 2023 4:04:04 PM	ideo BW 3.0 MHz	Sweep 8.40	Span 0 Hz ms (1001 pts)	X Axis Scale Log Lin Signal Track (Span Zoom)		





Center 2.43700 GHz

#Res BW 300.00 kHz

ょ

Total Channel Power

Total Power Spectral Density

3

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?

2 Metrics

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Span 30 MHz

 \gtrsim

Sweep 1.00 ms (1001 pts)

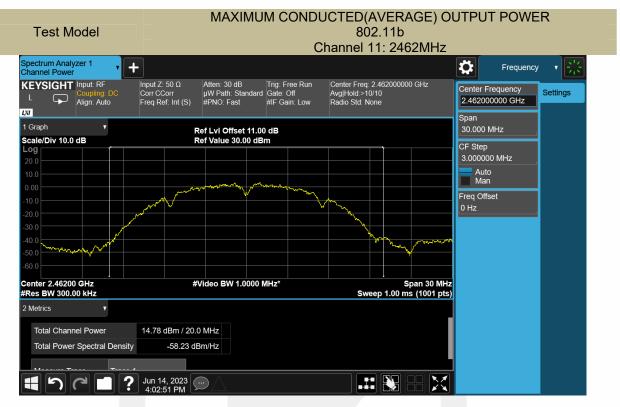
#Video BW 1.0000 MHz*

16.07 dBm / 20.0 MHz

Jun 14, 2023 4:00:58 PM

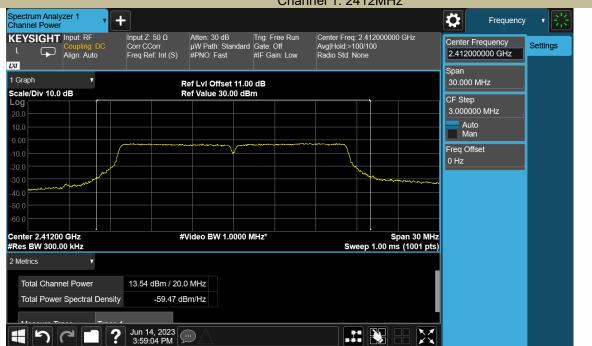
-56.94 dBm/Hz





MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER 802.11q

Channel 1: 2412MHz



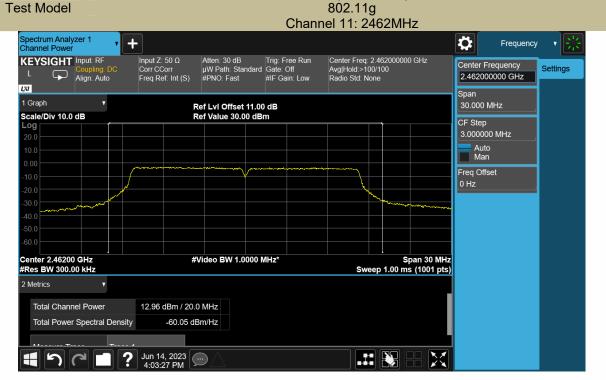
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	MAXIMU	IM CONDU		E) OUTPUT POWER			
Test Model	802.11g						
		(Channel 6: 2437M	Hz			
Spectrum Analyzer 1]			Frequency V			
Coupling: DC	Input Z: 50 Ω Atten: 30 dB Corr CCorr μW Path: Standard Freq Ref: Int (S) #PNO: Fast	Trig: Free Run d Gate: Off #IF Gain: Low	Center Freq: 2.437000000 GHz Avg Hold:>100/100 Radio Std: None	Center Frequency 2.437000000 GHz			
LM				Span			
1 Graph v	Ref LvI Offset 11.0			30.000 MHz			
Scale/Div 10.0 dB	Ref Value 30.00 dE	Bm		CF Step			
20.0				3.000000 MHz			
10.0				Auto Man			
-10.0				Freq Offset			
-20.0				0 Hz			
-30.0				**********			
-40.0							
-60.0							
Center 2.43700 GHz #Res BW 300.00 kHz	#Video BW 1.0000	MHz*	Span 3 Sweep 1.00 ms (10				
2 Metrics							
Total Channel Power	13.54 dBm / 20.0 MHz						
Total Power Spectral Density	-59.47 dBm/Hz						
	Jun 14, 2023 📖 🔿						
	4:01:34 PM						

MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER



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Test Model	MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER 802.11n(HT20) Channel 1: 2412MHz					
Spectrum Analyzer 1 Channel Power KEYSIGHT Input: RF Coupling: DC Align: Auto ZV 1 Graph Scale/Div 10.0 dB	Input Z: 50 Ω Atten: 30 dB Corr CCorr Freq Ref: Int (S) #PNO: Fast Ref LvI Offset 11.0 Ref Value 30.00 dE	Trig: Free Run I Gate: Off #F Gain: Low 0 dB	Center Freq: 2.412000000 GHz Avg Hold:=100/100 Radio Std: None	Center Frequency 2.412000000 GHz Span 30.000 MHz CF Step	sy v 💦	
20 0 10 0 0.00 -10 0 -20 0 -30 0 -40 0 -50 0				3.00000 MHz Auto Man Freq Offset 0 Hz		
-60.0 Center 2.41200 GHz #Res BW 300.00 kHz	#Video BW 1.0000	MHz*	Span 30 Sweep 1.00 ms (100			
2 Metrics	14.65 dBm / 20.0 MHz -58.36 dBm/Hz Jun 14, 2023 4:02:07 PM					

MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER 802.11n(HT20)



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Test Model	MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER 802.11n(HT20) Channel 11: 2462MHz				
Spectrum Analyzer 1 v + Channel Power v + KEYSIGHT Input RF Coupling: DC Coupling: Auto	Input Z: 50 Ω Atten: 30 dB Corr CCorr μW Path: Standard	Gate: Off	Center Freq. 2.462000000 GHz Avg Hold.>100/100 Radio Std. None	Frequency Center Frequency 2.46200000 GHz Span	
1 Graph v Scale/Div 10.0 dB Log 200 100 100 -200 -300 -300 -300 -500 -600 Center 2.46200 GHz #Res BW 300.00 kHz 2 Metrics v	Ref LvI Offset 11.00 Ref Value 30.00 dBr	n	Span 30 MH Sweep 1.00 ms (1001 pts	z CF Step 3.00000 MHz Auto Man Freq Offset 0 Hz	
Total Channel Power Total Power Spectral Density	14.30 dBm / 20.0 MHz -58.71 dBm/Hz Jun 14, 2023				



8.3 MAXIMUM POWER SPECTRAL DENSITY

Applicable Standard 8.3.1

According to FCC Part15.247(e) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.3.2 **Conformance Limit**

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.3.3 **Test Configuration**

Test according to clause 7.1 radio frequency test setup 1

8.3.4 **Test Procedure**

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance

The transmitter output (antenna port) was connected to the spectrum analyzer Set analyzer center frequency to DTS channel center frequency. Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz

Set the VBW to:10 kHz.

Set Detector = peak.

Set Sweep time = auto couple.

Set Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW. Note: If antenna Gain exceeds 6 dBi, then PSD Limit=8-(Gain- 6)

8.3.5 **Test Results**

Temperature:	23 ℃
Relative Humidity:	63%
ATM Pressure:	1011 mbar

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
	1	2412	-8.20	8	PASS
802.11b	6	2437	-7.01	8	PASS
	11	2462	-7.57	8	PASS
	1	2412	-12.71	8	PASS
802.11g	6	2437	-13.31	8	PASS
	11	2462	-13.82	8	PASS
802.11n	1	2412	-11.30	8	PASS
(HT20)	6	2437	-11.39	8	PASS
(1120)	11	2462	-11.84	8	PASS

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Power Spectral Density 802.11b



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Power Spectral Density 802.11q



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Power Spectral Density 802.11q



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Power Spectral Density 802.11n (HT20) Channel 6: 2437MHz



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8.4 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

8.4.1 Applicable Standard

According to FCC Part15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.4.2 Conformance Limit

According to FCC Part 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 a radiated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

8.4.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.4.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to \geq 1.5 times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW \ge 3 x RBW.

Set Detector = peak.

Set Sweep time = auto couple.

Set Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Emission level measurement

Set the center frequency and span to encompass frequency range to be measured.

Set the RBW = 100 kHz.

Set the VBW =300 kHz.

Set Detector = peak

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements. Report the three highest emissions relative to the limit.

8.4.5 Test Results



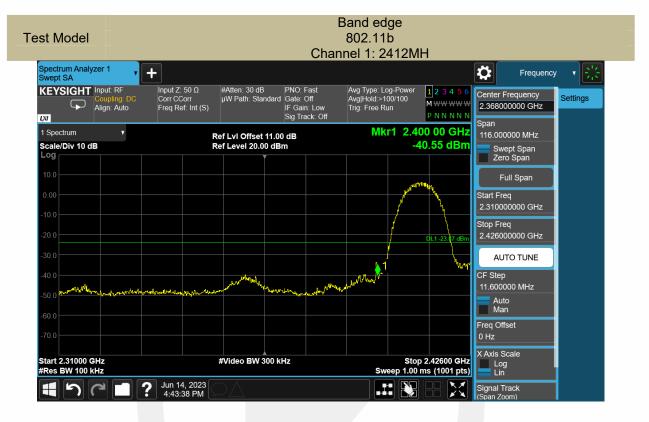
All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b recorded was report as below:



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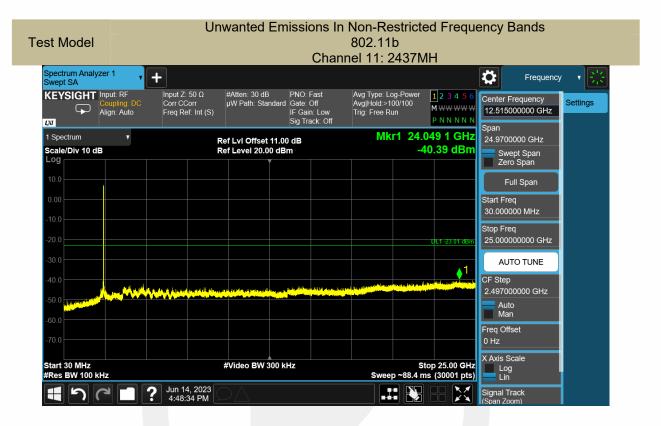




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Fest Model	_	Unwan		In Non-Restrict 802.11b		lency Bands	
			C	hannel 1: 2462N	ЛН		
Spectrum Analyzer 1 Swept SA	• +					Frequency	- * 🔆
KEYSIGHT Input: Coupli Align:	ng: DC Corr C	Z: 50 Ω #Atten: Corr μW Pati Ref: Int (S)	30 dB PNO: Fast n: Standard Gate: Off IF Gain: Low Sig Track: Of		1 2 3 4 5 6 M WW WW W P N N N N N	12.515000000 GHz	Settings
1 Spectrum Scale/Div 10 dB	•		ffset 11.00 dB 20.00 dBm		876 0 GHz 0.94 dBm	Span 24.9700000 GHz	
Log						Swept Span Zero Span	
10.0						Full Span	
0.00						Start Freq 30.000000 MHz	
-10.0					DL1 -23.76 dBm	Stop Freq 25.000000000 GHz	
-30.0						AUTO TUNE	
-40.0		والمالية والمراجع والمراجع والمراجع والمراجع	Understand of the second of th	Harry Herberg and the state of the		CF Step 2.497000000 GHz	
-50.0		alle all fille an alle an				Auto Man	
-70.0						Freq Offset 0 Hz	
Start 30 MHz		#Video	BW 300 kHz		top 25.00 GHz	X Axis Scale Log	
#Res BW 100 kHz	Jun ² 4:52	14, 2023		Sweep ~88.4 m	ns (30001 pts)	Lin Signal Track (Span Zoom)	

Band edge 802.11b



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Test Model



8.5 RADIATED SPURIOUS EMISSION

8.5.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 D01 15.247 Meas Guidance v05r02

8.5.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). According to FCC Part15.205, Restricted bands

According to FOC Fait 15.200, Restricted bands								
MHz	MHz	MHz	GHz					
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15					
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46					
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75					
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5					
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2					
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5					
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7					
6.26775-6.26825	123-138	2200-2300	14.47-14.5					
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2					
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4					
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12					
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0					
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8					
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5					
12.57675-12.57725	322-335.4	3600-4400	(2)					
13.36-13.41								

According to FCC Part15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted	Field Strength (µV/m)	Field Strength	Measurement
Frequency(MHz)		(dBµV/m)	Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

8.5.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.5.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

 $\label{eq:RBW} \mbox{= 1 MHz for } f \geq 1 \mbox{ GHz(1GHz to 25GHz), 100 kHz for } f < 1 \mbox{ GHz(30MHz to 1GHz), 200Hz for } f < 150 \mbox{KHz(9KHz to 150KHz), 9KHz for } f < 30 \mbox{MHz(150KHz to 30KHz)} \mbox{ } \mbox{ }$

 $VBW \ge RBW$ Sweep = auto



Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

8.5.5 Test Results

Temperature:	18 ℃
Relative Humidity:	69%
ATM Pressure:	1011 mbar

Spurious Emission below 30MHz(9KHz to 30MHz)

Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m	Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK È	ÁÝ	PK	AV	PK	AV	

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =40log(Specific distance/ test distance)(dB); Limit line=Specific limits(dBuV) + distance extrapolation factor



- Spurious Emission Above 1GHz(1GHz to 25GHz)
- All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b recorded was report as below:

Test mode:	802.1 [′]	lb Freque		ency:	ency: Channel 1: 2412MHz		
Freq.			ission dBuV/m)	sion		Ove	er(dB)
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4824.000	V	51.11	34.74	74.00	54.00	-22.89	-19.26
7236.000	V	44.14	29.18	74.00	54.00	-29.86	-24.82
17972.000	V	54.20	37.22	74.00	54.00	-19.80	-16.78
4824.500	Н	59.43	43.04	74.00	54.00	-14.57	-10.96
7235.000	Н	47.10	31.80	74.00	54.00	-26.90	-22.20
17949.500	Η	54.77	39.87	74.00	54.00	-19.23	-14.13

Test mod	e: 802.	11 b	Frequ	ency:	Channe	6: 2437MH	Z
Freq.	Ant.Po I.	Emis Level(d		Limit 3m((dBuV/m)	Ove	er(dB)
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4874.000	V	52.68	36.45	74.00	54.00	-21.32	-17.55
7311.000	V	46.09	30.21	74.00	54.00	-27.91	-23.79
9748.000	V	52.04	38.06	74.00	54.00	-21.96	-15.94
4874.000	H	60.54	43.02	74.00	54.00	-13.46	-10.98
7312.500	H	49.70	33.45	74.00	54.00	-24.30	-20.55
9748.000	H	51.25	34.03	74.00	54.00	-22.75	-19.97

Test mode:	802.1	1 b	Frequency:		Channe	Ηz	
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m	(dBuV/m)	Ove	er(dB)
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4924.000	V	54.06	37.03	74.00	54.00	-19.94	-16.97
7386.000	V	43.53	28.17	74.00	54.00	-30.47	-25.83
17944.500	V	53.67	36.83	74.00	54.00	-20.33	-17.17
4924.000	Н	60.39	43.18	74.00	54.00	-13.61	-10.82
7386.500	Н	47.23	31.17	74.00	54.00	-26.77	-22.83
17935.500	Н	53.68	38.21	74.00	54.00	-20.32	-15.79

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).

(2) Emission Level= Reading Level+Correct Factor.

(3) Correct Factor= Ant_F + Cab_L - Preamp

(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b recorded was report as below:

Test mode:	802.11 b	Frequency: C		Channel 1: 2412MHz	<u>-</u>
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2374.000	Н	61.27	74.00	46.29	54.00
2353.320	V	58.00	74.00	42.16	54.00
Test mode:	802.11 b	Frequ	ency: C	Channel 11: 2462MH	z
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2496.057	Н	59.58	74.00	42.31	54.00
2491.305	V	61.27	74.00	44.25	54.00

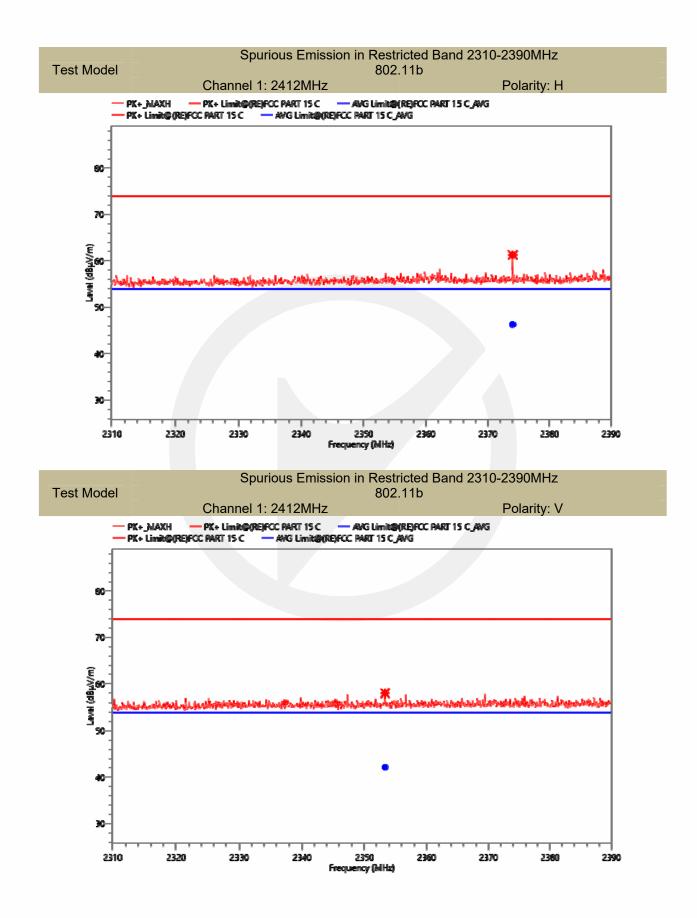
Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).

(2) Emission Level= Reading Level+Correct Factor +Cable Loss.

(3) Correct Factor= Ant_F + Cab_L - Preamp

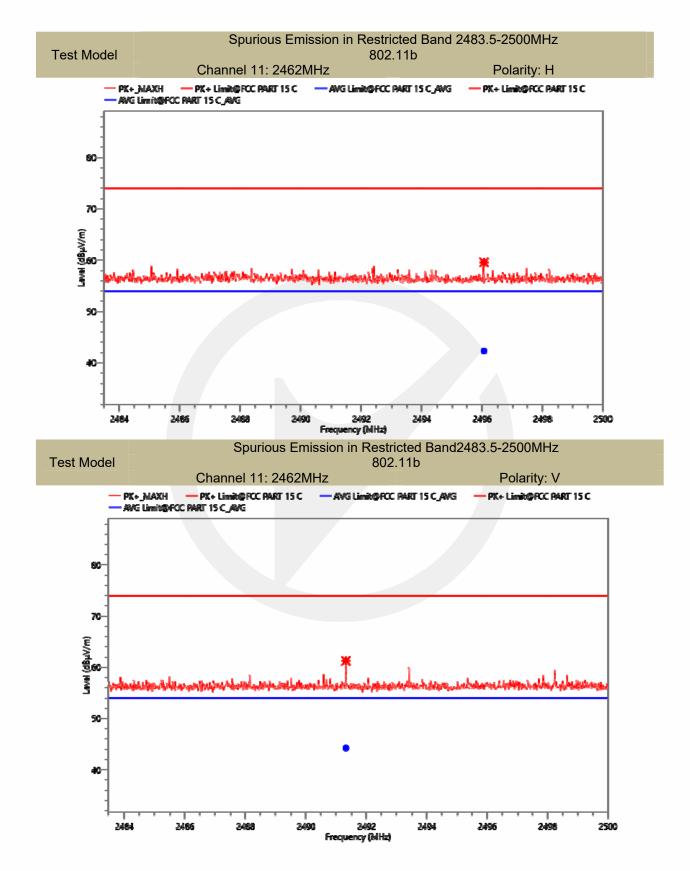
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.





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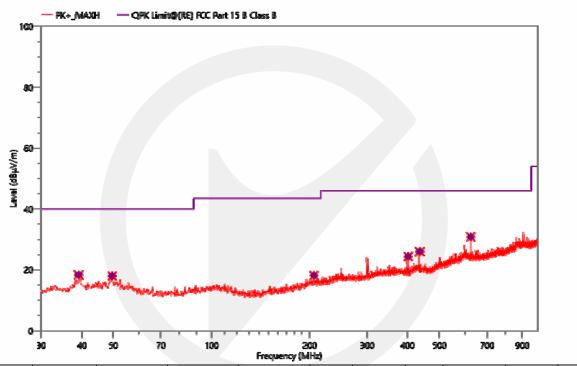


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- Spurious Emission below 1GHz (30MHz to 1GHz)
- All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11g recorded was report as below:

Project Information									
Mode:	Mode: 2412 MHz Voltage: DC 4.5V								
Environment:	Temp: 18℃; Humi:69%	Engineer:	Lucas Xu						

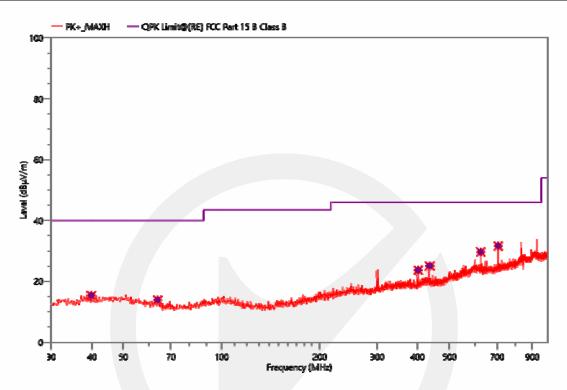


Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
39.118	42.94	18.31	40.00	21.69	QPK	100	V	32.4	-24.63	PASS
49.594	42.15	18.00	40.00	22.00	QPK	100	V	21.3	-24.15	PASS
205.764	42.65	18.13	43.50	25.37	QPK	200	V	48.7	-24.52	PASS
401.607	44.77	24.39	46.00	21.61	QPK	200	V	322.0	-20.38	PASS
435.072	45.07	25.98	46.00	20.02	QPK	100	V	163.3	-19.09	PASS
625.095	45.85	30.82	46.00	15.18	QPK	100	V	209.6	-15.03	PASS

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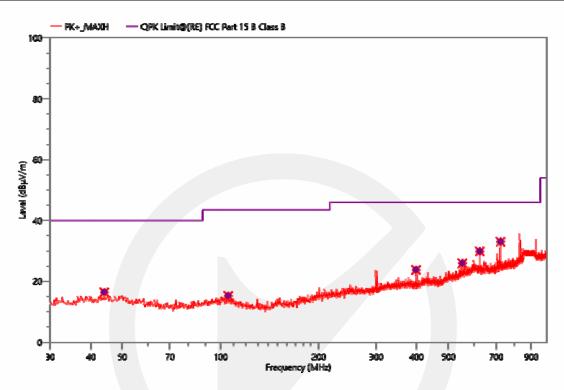
Project Information									
Mode: 2412 MHz Voltage: DC 4.5V									
Environment:	Environment: Temp: 18°C; Humi:69% Engineer: Lucas Xu								



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
39.797	39.93	15.35	40.00	24.65	QPK	200	Н	290.0	-24.58	PASS
63.659	40.14	13.84	40.00	26.16	QPK	100	Н	20.7	-26.3	PASS
401.607	44.05	23.67	46.00	22.33	QPK	200	Н	33.9	-20.38	PASS
434.975	44.15	25.06	46.00	20.94	QPK	100	Н	360	-19.09	PASS
625.095	44.67	29.64	46.00	16.36	QPK	100	Н	213.8	-15.03	PASS
704.538	46.52	31.61	46.00	14.39	QPK	100	Н	211.4	-14.91	PASS



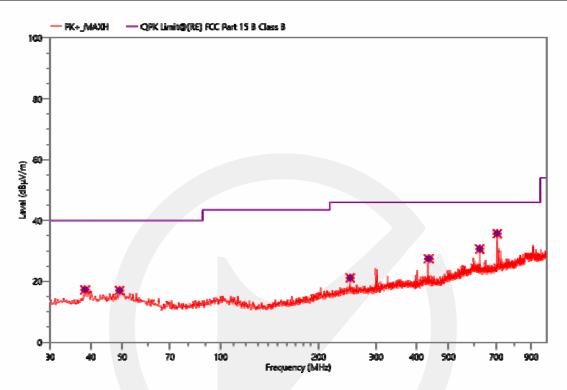
Project Information							
Mode:	Mode: 2437 MHz Voltage: DC 4.5V						
Environment:	Environment: Temp: 18°C; Humi:69% Engineer: Lucas Xu						



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
43.968	40.57	16.41	40.00	23.59	QPK	100	Н	88.0	-24.16	PASS
105.563	40.95	15.25	43.50	28.25	QPK	100	Н	189.7	-25.7	PASS
398.406	44.24	23.76	46.00	22.24	QPK	200	Н	117.5	-20.48	PASS
552.054	42.08	25.94	46.00	20.06	QPK	100	Н	68.9	-16.14	PASS
625.095	44.88	29.85	46.00	16.15	QPK	100	Н	230.0	-15.03	PASS
721.901	47.52	32.99	46.00	13.01	QPK	100	Н	282.7	-14.53	PASS



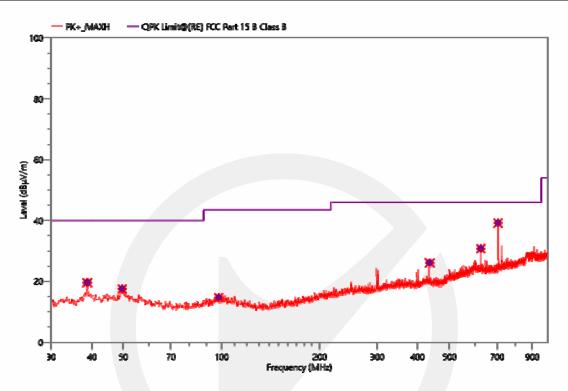
Project Information							
Mode:	Mode: 2437 MHz Voltage: DC 4.5V						
Environment:	Environment: Temp: 18°C; Humi:69% Engineer: Lucas Xu						



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
38.439	41.91	17.22	40.00	22.78	QPK	100	V	60.9	-24.69	PASS
49.012	41.13	16.99	40.00	23.01	QPK	200	V	341.4	-24.14	PASS
249.996	43.82	21.12	46.00	24.88	QPK	100	V	278.7	-22.7	PASS
435.072	46.54	27.45	46.00	18.55	QPK	100	V	335.4	-19.09	PASS
625.095	45.66	30.63	46.00	15.37	QPK	100	V	52.5	-15.03	PASS
704.441	50.59	35.68	46.00	10.32	QPK	200	V	262.8	-14.91	PASS



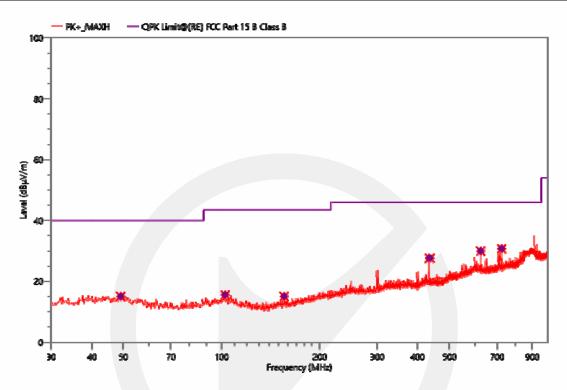
Project Information							
Mode:	Mode: 2462 MHz Voltage: DC 4.5V						
Environment:	Environment: Temp: 18°C; Humi:69% Engineer: Lucas Xu						



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
38.730	44.25	19.59	40.00	20.41	QPK	200	V	255.2	-24.66	PASS
49.594	41.68	17.53	40.00	22.47	QPK	100	V	0.1	-24.15	PASS
97.900	40.13	14.68	43.50	28.82	QPK	100	V	199.8	-25.45	PASS
435.072	45.18	26.09	46.00	19.91	QPK	100	V	290.7	-19.09	PASS
625.095	45.79	30.76	46.00	15.24	QPK	100	V	339.4	-15.03	PASS
703.762	54.09	39.16	46.00	6.84	QPK	100	V	140.3	-14.93	PASS



Project Information							
Mode:	Mode: 2462 MHz Voltage: DC 4.5V						
Environment:	Environment: Temp: 18°C; Humi:69% Engineer: Lucas Xu						



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
49.109	39.18	15.04	40.00	24.96	QPK	100	Н	126.7	-24.14	PASS
102.556	41.00	15.53	43.50	27.97	QPK	200	H	154.6	-25.47	PASS
155.615	41.97	15.02	43.50	28.48	QPK	100	Н	185.7	-26.95	PASS
434.975	46.71	27.62	46.00	18.38	QPK	200	Н	81.6	-19.09	PASS
625.095	44.95	29.92	46.00	16.08	QPK	100	Н	189.3	-15.03	PASS
721.998	45.25	30.72	46.00	15.28	QPK	100	Н	209.3	-14.53	PASS



8.6 CONDUCTED EMISSIONS TEST

8.6.1 Applicable Standard

According to FCC Part 15.207(a)

8.6.2 Conformance Limit

	Conducted Emission Limit	
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.6.3 Test Configuration

Test according to clause 7.3conducted emission test setup

8.6.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane. Maximum procedure was performed on the highest emissions to ensure EUT compliance. Repeat above procedures until all frequency measured were complete.

8.6.5 Test Results

N/A



8.7 ANTENNA APPLICATION

8.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217,§15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.7.2 Result

PASS.

Note:

The EUT has 1 antenna: one an PCB antenna for WIFI 2.4G, the gain is 1.52 dBi,

 \boxtimes Antenna uses a permanently attached antenna which is not replaceable.

Not using a standard antenna jack or electrical connector for antenna replacement

The antenna has to be professionally installed (please provide method of installation)

Which in accordance to section 15.203, please refer to the internal photos.

*** End of Report ***



声明

Statement

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Objections shall be raised within 20 days from the date receiving the report.