

TEST REPORT

Product Name	: Adapter Box
Model Number	: Adapter Box G2
FCC ID	: 2AMEH-ADAPTERBOXG2

Prepared for	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG)
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Report Number	:	EDG2209290149E01501R
Date(s) of Tests	:	September 29, 2022 to January 14, 2023
Date of Issue	:	January 30, 2023



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TEST RESULT CERTIFICATION 1

Applicant	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG) CO. ,LTD.
Address	:	No.288,Shizhu Road, Tonglu Economic Development Zone, Tonglu City, Zhejiang Province, 310000
Manufacturer	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG) CO. ,LTD.
Address	:	No.288,Shizhu Road, Tonglu Economic Development Zone, Tonglu City, Zhejiang Province, 310000
EUT	:	Adapter Box
Model Name	:	Adapter Box G2
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 :	September 29, 2022 to January 14, 2023				
Prepared by :	Warren Deng				
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	Tim Dong /Supervisor				
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EUT TECHNICAL DESCRIPTION 2

Characteristics	Description		
Product	Adapter Box		
Model Number	Adapter Box G2		
Sample Number	1#		
IEEE 802.11 WLAN Mode Supported	 ⊠ 802.11b ⊠ 802.11g ⊠ 802.11n(20MHz channel bandwidth) □ 802.11n(40MHz channel bandwidth) 		
Data Rate	802.11 b:1,2,5.5,11Mbps; 802.11 g:6,9,12,18,24,36,48,54Mbps; 802.11 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); 2422-2452MHz for 802.11n(HT40);			
Number of Channels	 ☑ 11 channels for 802.11b/g n(HT20); ☑ 7 Channels for 802.11n(HT40); 		
Transmit Power Max	16.33 dBm		
Smart system	⊠ SISO for802.11 b/g/n(HT20); □ MIMO for802.11n(HT20);		
Antenna Type	External Antenna		
Antenna Gain	3.42 dBi		
Test Voltage	AC 120V/60Hz		
Adapter	M/N: ABT020120A Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 12V, 2A, 24W		
Temperature Range	-40℃~+65℃		
Date of Received	September 29, 2022		

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 PASS				
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 2AMEH-ADAPTERBOXG2 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	2022/05/19	1Year
L.I.S.N.	Rohde& Schwarz	ENV216	101209	2022/05/19	1Year
RF Switching Unit	CDS	RSU-M2	38401	2022/05/19	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	2022/05/19	1Year
Power Amplifier	HP	8447F	OPTH64	2022/05/19	1Year
Bilog Antenna	Schwarzbeck	VULB9163	141	2022/05/22	1Year
Horn antenna	Schwarzbeck	BBHA9120D	1272	2022/05/22	1Year
Power Amplifier	LUNAR EM	LNA1G18-40	J1010000081	2022/05/19	1Year
Loop Antenna	Schwarzbeck	FMZB1513	1513-60	2022/05/22	2 Year
Signal Analyzer	R&S	FSV30	103039	2022/05/19	1Year
Bilog Antenna	Schwarzbeck	VULB9163	141	2022/05/22	1Year
Band reject Filter(50dB)	WI/DE	WRCGV-2400(2400- 2485MHz)	2	2022/05/20	1 Year

4.2.3 Radio Frequency Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Wireless Connectivity Tester	R&S	CMW270	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.

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

 \boxtimes 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 F	requency	Highes	st 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 F	requency	Highe	st 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:	EMC (Ver. EMEC-3A1)
Conducted Emission	EZ-EMC (Ver. CON-03A1)



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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
	Accredited 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 Eime	
Name of Firm Site Location	: EMTEK (Dongguan) Co., Ltd. : -1&2/F.,Buiding 2,Zone A,Zhongda Marine Biotechnology Research and
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	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 %

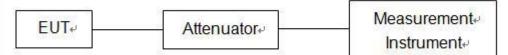
Measurement Uncertainty for a level of Confidence of 95%



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.

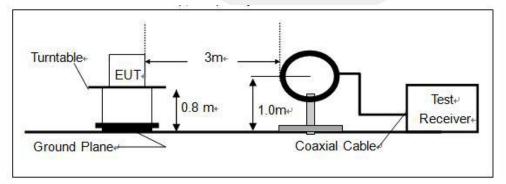
30MHz-1GHz:

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).

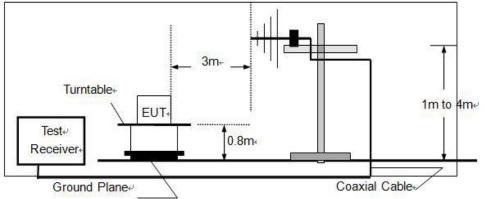
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



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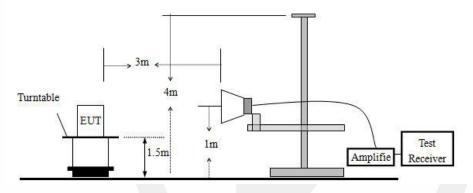
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(b)Radiated Emission Test Set-Up, Frequency Below 1000MHz

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

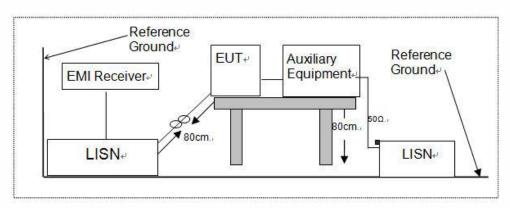


7.3 CONDUCTED EMISSION TEST SETUP

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	-				
EUT Cable List and Details						
Cable Description	Length (n)	Shielded/U	nshielded	With	n / Without Ferrite
1	/		1			/
Auxiliary Cable List a	AC PC	OWER				
Cable Description	Length (i	n)	Shielded/U	nshielded	With	n / Without Ferrite
/	1		1			/

Auxiliary Equipment List ar	nd Details		
Description	Manufacturer	Model	Serial Number

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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TEST REQUIREMENTS 8

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

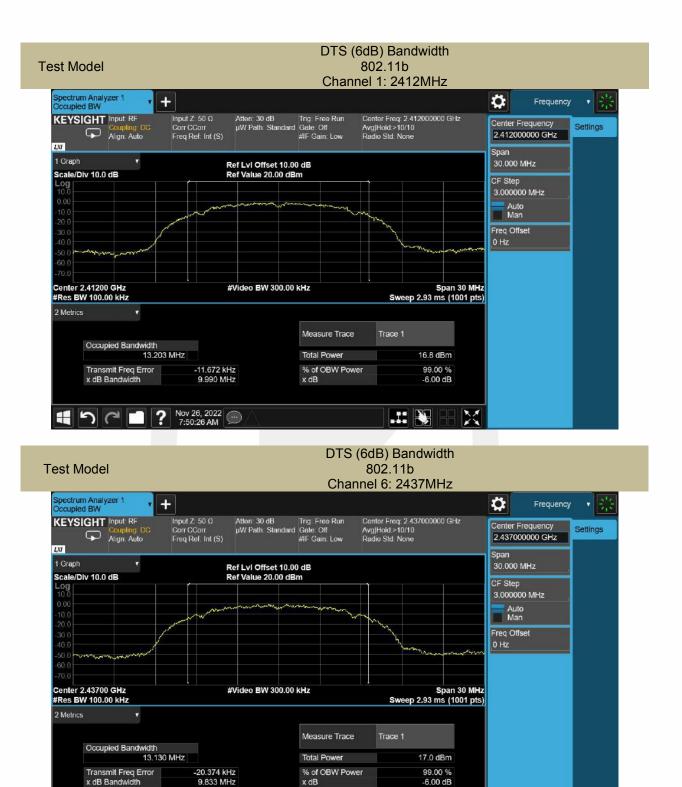
Temperature:	23° C
Relative Humidity:	56%
ATM Pressure:	1011 mbar

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (MHz)	Limit (kHz)	Verdict
	1	2412	12.203	>500	PASS
802.11b	6	2437	13.130	>500	PASS
	11	2462	13.146	>500	PASS
	1	2412	16.408	>500	PASS
802.11g	6	2437	16.406	>500	PASS
	11	2462	16.405	>500	PASS
902 11p	1	2412	17.455	>500	PASS
802.11n (HT20)	6	2437	17.476	>500	PASS
(1120)	11	2462	17.471	>500	PASS

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est Model		80	 Bandwidth 2.11g 	
		Channel	6: 2437MHz	
Spectrum Analyzer 1				🔅 Frequency 🔹 🎇
KEYSIGHT Input RF Coupling: DG Corr CC		ird Gate: Off Avg	ter Freq: 2.437000000 GHz Hold:>10/10 io Std: None	Center Frequency Settings 2.437000000 GHz
1 Graph	Ref Lvl Offset 10			Span 30.000 MHz
Scale/Div 10.0 dB	Ref Value 20.00 c	iBm		CF Step
0.00				3.000000 MHz
-10.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	Man
-30.0			- and a second	Freq Offset 0 Hz
-40.0 -50.0			manne	
-70.0				
Center 2.43700 GHz #Res BW 100.00 kHz	#Video BW 300.0	00 kHz	Span 30 MHz Sweep 2.93 ms (1001 pts	
2 Metrics				
		Measure Trace	Trace 1	
Occupied Bandwidth 16.406 MHz		Total Power	13.3 dBm	
	28.445 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	16.49 MHz	x dB	-6.00 dB	
	6 2022			
8:19:	6, 2022 05 AM			
	05 AM	DTS (6d		
	05 AM		B) Bandwidth	
	05 AM <u>99 </u>	80		
	05 AM	80	B) Bandwidth 02.11g	Frequency V
est Model Spectrum Analyzer 1 Coccupied BW KEYSIGHT Input RF Counciling DC Counciling DC	50 Q Atten: 30 dB	8(Channel Trig: Free Run Cent	B) Bandwidth 02.11g 11: 2462MHz	
est Model Spectrum Analyzer 1 Cocupied BW KEYSIGHT Input RF Coupling: DG Aign: Auto Freq Re	50 Q Atten: 30 dB	8(Channel Trig: Free Run Com rd Gate: Off Avg	B) Bandwidth 02.11g 11: 2462MHz	
est Model Spectrum Analyzer 1 Cocupied BW KEYSIGHT Input RF Coupling DC Corr CC	50 Q. Atten: 30 dB corr pW Path: Standa st: Int (S)	8(Channel Trig: Free Run Cen and Gale: Off Avg #IF Gain: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freq: 2.462000000 GHz Hold > 10/10	Center Frequency Settings
est Model Spectrum Analyzer 1 Coccupied BW KEYSIGHT Input RF Coupling: DC Align: Auto I Graph Scale/Div 10.0 dB	50 Q Atten: 30 dB orr µW Path Standa	8(Channel rf Gate: Off #IF Gam: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freq: 2.462000000 GHz Hold > 10/10	Center Frequency 2.46200000 GHz Span
est Model Spectrum Analyzer 1 Cccupied BW KEYSIGHT Input RF Coupling DC Align: Auto I Graph Scale/Div 10.0 dB Log	50 Q. Atten: 30 dB Jorr JuW Path: Standa f: Int (S) Ref Lvi Offset 10	8(Channel rf Gate: Off #IF Gam: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freq: 2.462000000 GHz Hold > 10/10	Center Frequency Settings 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz
est Model Spectrum Analyzer 1 Coccupied BW KEYSIGHT Input RF Coupling: DC Align: Auto I Graph Scale/Div 10.0 dB Cog 10.0 .00 .00 .00 .00 .00 .00 .00 .00 .0	50 Q. Atten: 30 dB Jorr JuW Path: Standa f: Int (S) Ref Lvi Offset 10	8(Channel ard Gate: Off Avg #IF Gain: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freq: 2.462000000 (GHz Hold>10/10 io Std: None	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step
est Model Spectrum Analyzer 1 Cocupied BW KEYSIGHT Input RF Coupling: DC Align: Auto Corr CC Freq Re Scale/Div 10.0 dB Log 10.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	50 Q Atten: 30 dB our µW Path: Standa f: Int (S) Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel ard Gate: Off Avg #IF Gain: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freq: 2.462000000 (GHz Hold>10/10 io Std: None	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset
est Model Spectrum Analyzer 1 Cocupied BW KEYSIGHT Input RF Coupling: DC Align: Auto Corr CC Freq Re Scale/Div 10.0 dB Log 10.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	50 Q Atten: 30 dB our µW Path: Standa f: Int (S) Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel ard Gate: Off Avg #IF Gain: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freq: 2.462000000 GHz Hold > 10/10 io Std. None	Center Frequency Settings 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man
Cocupied BW KEYSIGHT Input RF Coupling: DC Align: Auto KEYSIGHT Input RF Coupling: DC Align: Auto I Greph Scale/Div 10.0 dB Cog 10.0	50 Q Atten: 30 dB our µW Path: Standa f: Int (S) Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel ard Gate: Off Avg #IF Gain: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freg: 2.462000000 GHz Hold > 10/10 io Std: None	Center Frequency Settings 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset
Cest Model	50 Q Atten: 30 dB our µW Path: Standa f: Int (S) Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel	B) Bandwidth D2.11g 11: 2462MHz ter Freq: 2.462000000 GHz Hold > 10/10 io Std. None	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
est Model	50 0. Atten: 30 dB arr W Path: Standa Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel	B) Bandwidth 02.11g 11: 2462MHz tor Freq: 2.462000000 GHz Hold>10/10 to Std. None	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
Cectrum Analyzer 1 Coccupied BW KEYSIGHT Input RF Coupling: DC Align: Auto Scale/Div 10.0 dB Log 100 0.00 -200 	50 0. Atten: 30 dB arr W Path: Standa Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel Trig: Free Run Cent Avg] #IF Gain: Low Rad	B) Bandwidth 02.11g 11: 2462MHz ter Freg: 2.462000000 GHz Hold>10/10 io Std: None	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
Spectrum Analyzer 1 Imput 2: Cocupied BW Imput 2: KEYSIGHT Input RF Input 2: Coupling: DC Align. Auto 1 Graph Scale/Div 10.0 dB 100 Imput 2: 100 Imput 2: 000 Imput 2: 1 Graph Imput 2: Coupling: DC Imput 2: 1 Graph Imput 2: Coupling: DC Imput 2: Imput 2: Imput 2: Imput 2: Imput 2: Imput 2: Imput 2:	50 0. Atten: 30 dB arr W Path: Standa Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel	B) Bandwidth D2.11g 11: 2462MHz ter Freq: 2.462000000 GHz Hold > 10/10 io Std. None	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
Spectrum Analyzer 1 Coccupied Bandwidth Coupling: DC. Align: Auto Freq Re V Scale/Div 10.0 dB Control (Control (Contro) (Contro) (Control (Control (Control (Contro) (Contro	50 0 Atten: 30 dB with the standar Ref Lvi Offset 10 Ref Value 20.00 c with the standar Ref Value 20.00 c with the standar Ref Value 20.00 c with the standar Ref Value 20.00 c	8(Channel Trig: Free Run Gate: Off #IF Gain: Low Rad .00 dB BB .00 dB BB .00 kHz Measure Trace Total Power	B) Bandwidth D2.11g 11: 2462MHz tor Freq: 2.462000000 GHz Hold>10/10 to Std. None Span 30 MHz Sweep 2.93 ms (1001 pts) Trace 1 13.9 dBm	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
Spectrum Analyzer 1 Coccupied Bandwidth Coupling: DC. Align: Auto KEYSIGHT Input RF Coupling: DC. Freq Re U Scale/Div 10.0 dB 0.00 0.00	50 0. Atten: 30 dB put put Path: Standar Ref Lvi Offset 10 Ref Value 20.00 c	8(Channel Trig: Free Run Gate: Off #IF Gain: Low Rad	B) Bandwidth 02.11g 11: 2462MHz tor Freq: 2.462000000 GHz Hold>10/10 to Std. None Span 30 MHz Sweep 2.93 ms (1001 pts)	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
Coupled Bandwidth Coupled Bandw	50 Q Atten: 30 dB pW Path: Standa f: Int (S) Ref Lvi Offset 10 Ref Value 20.00 c #Video BW 300.0	8(Channel Ing Free Run Cont and Gate: Off Avg #IF Gam: Low Rad .00 dB IBm .00 dB .00 dB	B) Bandwidth D2.11g 11: 2462MHz ter Freq: 2.462000000 GHz Hold >10/10 io Std. None Span 30 MHz Sweep 2.93 ms (1001 pts) Trace 1 13.9 dBm 99.00 %	Center Frequency 2.462000000 GHz Span 30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz

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Test Model		802.1	B) Bandwidth 1n (HT20) I 1: 2412MHz	
Spectrum Analyzer 1 Occupied BW KEYSIGHT Input: RF Coupling DG Align. Auto Freq Ref. In	µW Path: Standar	Trig: Free Run Ce d Gate: Off Av	anter Freq: 2.412000000 GHz g Hold:>10/10 ddio Std. None	Frequency Frequency Center Frequency Settings
1 Graph Scale/Div 10.0 dB Log 100 0.00 -00 -300 -300 -300 -000 -000 -00	Ref Lvi Offset 10.0 Ref Value 20.00 dl		www	30.000 MHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
-70.0 Center 2.41200 GHz #Res BW 100.00 kHz 2 Metrics	#Video BW 300.00		Span 30 MH Sweep 2.93 ms (1001 pts	
	267 kHz 57 MHz	Measure Trace Total Power % of OBW Power x dB	Trace 1 13.0 dBm 99.00 % -6.00 dB	
Nov 26, 2 8:20:02		DTS (6)	dB) Bandwidth	
Test Model		802.	11n (HT20) el 6: 2437MHz	
Spectrum Analyzer 1 Coccupied BW KEYSIGHT Input: RF Coupling: DG Align: Auto	µW Path: Standar	d Gate: Off Av	anter Freq: 2.437000000 GHz g[Hold.+10/10 adio Std: None	Frequency Image: Center Frequency 2.437000000 GHz Settings
1 Graph Scale/Div 10.0 dB O O O O O O O O O O O O O O O O O O O	Ref LvI Offset 10.0 Ref Value 20.00 dl	3m		Span 30.000 MHz CF Step 3.000000 MHz Auto
-10.0 -20.0 -30.0 -40.0 -50.0 -60.0	innihinnih m		mun	Man Freq Offset
-70.0 Center 2.43700 GHz #Res BW 100.00 kHz 2 Metrics	#Video BW 300.00) kHz	Span 30 MH Sweep 2.93 ms (1001 pts	
Occupied Bandwidth 17.476 MHz		Measure Trace	Trace 1 13.3 dBm	
Transmit Freq Error -22.	465 kHz 60 MHz	% of OBW Power x dB	99.00 % -6.00 dB	

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			6dB) Bandwidt 2.11n (HT20)	h	
st Model					
		Chanr	nel 11: 2462MH	lz	
Spectrum Analyzer 1 Cccupied BW				\$	Frequency 🔻 🔆
Coupling: DC Co Align: Auto Fre	out Z: 50 0 Atten: 30 c mr CCom µW Path: 9 sq Ref. Int (S)	IB Trig: Free Run Standard Gate: Off #IF Gain: Low	Center Freq: 2.46200000 Avg Hold.>10/10 Radio Std: None	Center F	requency Settings
007 1 Graph v	Ref Lvi Offs	et 10.00 dB		Span 30.000 r	MHz
Scale/Div 10.0 dB	Ref Value 2	0.00 dBm		CF Step	
10.0				3.00000	
-10.0	mannan	mannan	mm	Auto Man	
-30.0			home	Freq Offs	set
-40.0 -50.0			Mr. M.	0 Hz	
-60.0					
Center 2.46200 GHz	#Video BW	300.00 kHz		pan 30 MHz	
#Res BW 100.00 kHz			Sweep 2.93 m	s (1001 pts)	
2 Metrics V		1		_	
Occupied Bandwidth		Measure Trace	Trace 1		
17.471 MH	z	Total Power	13.8 df	Bm	
Transmit Freq Error x dB Bandwidth	-34.248 kHz 17.40 MHz	% of OBW Pow x dB	ver 99.00 -6.00		
X OD Danuwidth	17.40 10112	IX GB	-0.00		
	lav 26 2022				
	lov 26, 2022 💮 🥼				

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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).

8.2.3 **Test Configuration**

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 $\geq 2 \times \text{span} / \text{RBW}$. (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.

Temperature:	23° C
Relative Humidity:	56%
ATM Pressure:	1011 mbar

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm)	Limit (dBm)	Verdict
	1	2412	15.51	30	PASS
802.11b	6	2437	15.70	30	PASS
	11	2462	16.33	30	PASS
	1	2412	15.29	30	PASS
802.11g	6	2437	15.46	30	PASS
	11	2462	15.86	30	PASS
902 11n	1	2412	15.41	30	PASS
802.11n (HT20)	6	2437	15.48	30	PASS
(1120)	11	2462	15.98	30	PASS

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Test Model	Duty cycle 802.11b Channel 1: 2412MHz				
	+				Frequency 🔹 🔆
KEYSIGHT Coupling: DG Align: Auto	Input Ζ΄ 50 Ω Corr CCorr Freq Ref. Int (S)	#Atten: 30 dB PNO: Best Wide µW Path: Standard Gate: Off IF Gain: Low Sig Track: Off	Trig: Free Run	123456 WWWWWW NNNNNN	Center Frequency 2.412000000 GHz
Spectrum r cale/Div 10 dB		Ref Lvi Offset 10.00 dB Ref Level 20.00 dBm			Span 0.00000000 Hz Swept Span Zero Span
10.0					Full Span
0.00					Start Freq 2.412000000 GHz
20.0					Stop Freq 2.412000000 GHz
30.0					AUTO TUNE
40.0					CF Step 100.000 kHz
60.0					Auto Man
					Freq Offset 0 Hz
enter 2.412000000 GHz Res BW 100 kHz		#Video BW 300 kHz	Sweep 16.2 m	Span 0 Hz s (1001 pts)	X Axis Scale
1 501	Nov 26, 2022 8:49:43 AM				Signal Track (Span Zoom)

Duty cycle

st iviodei		802.11g Channel 1: 2412MHz						
pectrum Analyze	er 1 🗸	+		<u>Circlin</u>			Frequenc	y v
	nput RF coupling: DG lign: Auto	Input Z: 50 0 Corr CCorr Freq Ref: Int (S)	#Atten: 30 dB µW Path: Standard	PNO: Best Wide 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 10.0 Ref Level 20.00 dB				Span 0.00000000 Hz Swept Span Zero Span	
							Full Span	
0.00							Start Freq 2.412000000 GHz	
20.0							Stop Freq 2.412000000 GHz	
30.0							AUTO TUNE	
40.0							CF Step 100.000 kHz	
60.0							Auto Man	
							Freq Offset 0 Hz	
Center 2.412000 Res BW 100 kH			#Video BW 300 k	Hz	Sweep 16.2	Span 0 Hz ms (1001 pts)	X Axis Scale Log Lin	
1 50		Nov 26, 2022 8:50:01 AM	\square		📰 🔛		Signal Track (Soan Zoom)	1

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Test Model	Duty cycle 802.11n(HT20) Channel 1: 2412MHz				
Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF Coupling: DG Align: Auto	Input Z: 50 0 Corr CCorr Freq Ref. Int (S) #Atten: 30 dB µW Path: Standard PNO: Bast Wide Gale: Off IF Gain: Low Sig Track. Off Avg Type: Log-Power Trig: Free Run 1 2 3 4 5 6 W WW WW W Center Frequency 2.412000000 GHz Settings				
Spectrum Scale/Div 10 dB	Ref Lvi Offset 10.00 dB Ref Level 20.00 dBm Full Span Start Freq 2.412000000 GHz AUTO TUNE CF Step 100.000 kHz				
-50.0 60.0 70.0 Center 2.412000000 GHz #Res BW 100 kHz II 5 C II 1	#Video BW 300 kHz Span 0 Hz Sweep 16.2 ms (1001 pts) Nov 26, 2022				

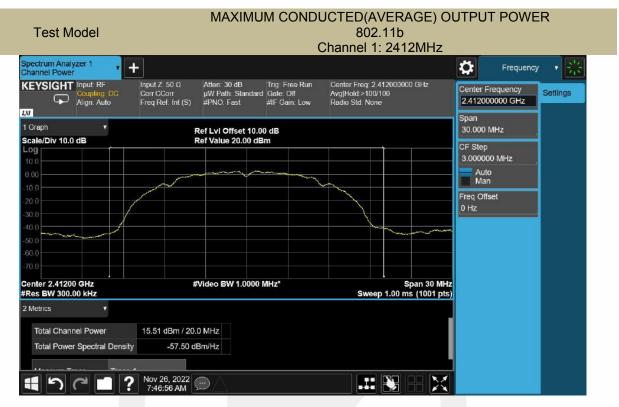
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MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER



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	MA	XIMUM COND	UCTED(AVERAG	E) OUTPUT POWER	
Test Model			802.11b		
		(Channel 11: 2462N	ЛНz	
Spectrum Analyzer 1 Channel Power	+			Frequency 🔹	22 22
KEYSIGHT Input: RF Coupling: DG Align: Auto	Input Z: 50 0 Atten: 3 Corr CCorr µW Pati Freq Ref: Int (S) #PNO	h: Standard Gate: Off	Center Freq: 2.462000000 GH Avg Hold:>100/100 Radio Std: None	Z Center Frequency Settings 2.462000000 GHz	
Da 1 Graph ▼		ffset 10.00 dB		Span 30.000 MHz	
Scale/Div 10.0 dB	Ref Value	20.00 dBm		CF Step	
10.0				3.000000 MHz	
0.00			m	Auto Man	
-20.0	1			Freq Offset	
-30.0				0 Hz	
-40.0					
-50.0					
-70.0					
Center 2.46200 GHz #Res BW 300.00 kHz	#Video B	W 1.0000 MHz*	Span Sweep 1.00 ms (1	30 MHz 001 pts)	
2 Metrics 🔹					
Total Channel Power	16.33 dBm / 20.0 MHz				
Total Power Spectral Dens	ity -56.68 dBm/Hz				
	Nov 26, 2022			N/	
	7:47:35 AM				

MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER

802.11g Channel 1: 2412MHz



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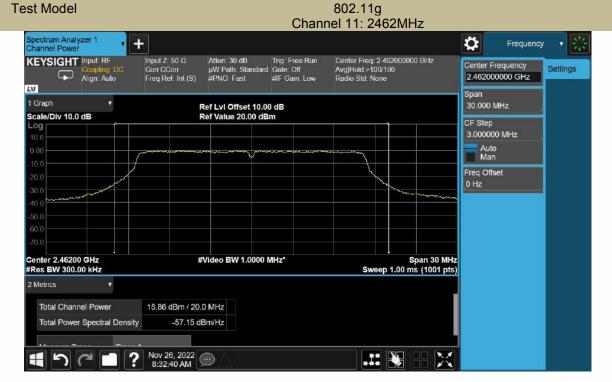
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Test Model



	MAXIN	IUM COND		GE) OUTPUT POWER
Test Model			802.11g	
			Channel 6: 2437	VHz
	+			🗱 Frequency 🔹 🔆
KEYSIGHT Input: RF Coupling: DG Align: Auto	Input Z: 50 0 Atten: 30 dB Corr CCorr µW Path: Stan Freq Ref: Int (S) #PNO. Fast	Trig: Free Run dard Gate: Off #IF Gain: Low	Center Freq: 2.437000000 G Avg[Hold:>100/100 Radio Std: None	Center Frequency 2.437000000 GHz
1 Graph	Ref Lvi Offset 1			Span 30.000 MHz
Scale/Div 10.0 dB	Ref Value 20.00	dBm		CF Step
10.0				3.000000 MHz
-10.0		****		Man
-20.0				Freq Offset
-30.0				0 Hz
-40.0				
-60.0				
Center 2.43700 GHz #Res BW 300.00 kHz	#Video BW 1.00	00 MHz*	Spa Sweep 1.00 ms (n 30 MHz 1001 pts)
2 Metrics v				
Total Channel Power	15.46 dBm / 20.0 MHz			
Total Power Spectral Densi	ty -57.55 dBm/Hz			
15011	Nov 26, 2022			
<u>الصار کار اهار اهم</u> ر اعظ	0.01.30 AIVI		يتكار أغتكا وتطعلوا والمست	

MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER



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Test Model	MAXIMU		JCTED(AVERAGE) (802.11n(HT20) Channel 1: 2412MHz	
Spectrum Analyzer 1	-			Frequency 🔹 👫
KEYSIGHT Input: RF Goupling: DG Align: Auto	Input Z: 50 0 Atten: 30 dB Corr CCorr µW Path: Slandar Freq Ref: Int (S) #PNO: Fast	Trig: Free Run d Gate: Off #IF Gain: Low	Center Freq: 2 412000000 GHz Avg Hold:>100/100 Radio Std: None	Center Frequency Settings 2.412000000 GHz
1 Graph v Scale/Div 10.0 dB	Ref Lvi Offset 10. Ref Value 20.00 di			Span 30.000 MHz
		500		CF Step 3.000000 MHz
0.00				Auto Man
-10.0 -20.0 -30.0				Freq Offset 0 Hz
-40.0				
-60.0				
-70.0 Center 2.41200 GHz	#Video BW 1.0000	MHz*	Span 30 M	Hz
#Res BW 300.00 kHz			Sweep 1.00 ms (1001 pt	
2 Metrics V				
Total Channel Power	15.41 dBm / 20.0 MHz			
Total Power Spectral Density	-57.60 dBm/Hz			
tt つ C ■ ?	Nov 26, 2022 💬 🔨			

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

			Char		
Spectrum Anal Channel Powe	yzer 1 🗸	+			Frequency 🔹
KEYSIGHT	Input: RF Coupling: DC Align: Auto	Corr CCorr J	Atten: 30 dB Trig: Free Run µW Path: Slandard Gate: Off #PNO: Fast #IF Gain: Low	Center Freq: 2.437000000 GHz Avg Hold.>100/100 Radio Std: None	Center Frequency 2.437000000 GHz Span
I Graph			f Lvi Offset 10.00 dB		30.000 MHz
Cale/Div 10.0		Re	f Value 20.00 dBm		CF Step 3.000000 MHz
0.00		and the second s			Auto Man
10.0 20.0 30.0					Freq Offset 0 Hz
40.0	and the second				
50.0 60.0					
70.0 Center 2.4370	0.647	#\/	deo BW 1.0000 MHz*	Span 30 MHz	
Res BW 300.			000 BW 1.0000 MHZ	Sweep 1.00 ms (1001 pts)	
2 Metrics	*				
Total Chan	nel Power	15.48 dBm / 20.0 I	MHz		
Total Powe	er Spectral Densit	ty -57.53 dBn	n/Hz		
					1
15	2	Nov 26, 2022 8:34:23 AM			

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Test Model



Test Model	MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER						
Test Model	802.11n(HT20) Channel 11: 2462MHz						
Spectrum Analyzer 1	+			🔅 Frequency 🔹 🔆			
KEYSIGHT Input: RF Coupling: DC Align: Auto	Input Z 50 0 Atten: 30 dB Corr CCorr µW Path Sta Freq Ref. Int (S) #PNO. Fast	Trig: Free Run andard Gate: Off #IF Gain: Low	Center Freq: 2.462000000 G Avg Hold:>100/100 Radio Std: None	Center Frequency 2.462000000 GHz Settings			
1 Graph ▼ Scale/Div 10.0 dB	Ref Lvi Offsel Ref Value 20.			Span 30.000 MHz			
				CF Step 3.000000 MHz			
0.00		V		Auto Man			
-10.0 -20.0				Freq Offset 0 Hz			
-30.0							
-50.0							
-60.0							
Center 2.46200 GHz #Res BW 300.00 kHz	#Video BW 1.	0000 MHz*	Sweep 1.00 ms (n 30 MHz 1001 pts)			
2 Metrics 🔹			· · · · · · · · · · · · · · · · · · ·				
Total Channel Power	15.98 dBm / 20.0 MHz						
Total Power Spectral Density	y -57.03 dBm/Hz						
	Nov 26, 2022		.:: 💦	X			
	8:34:38 AM						

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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° C		
Relative Humidity:	56%		
ATM Pressure:	1011 mbar		

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
802.11b	1	2412	-6.93	8	PASS
	6	2437	-6.59	8	PASS
	11	2462	-6.09	8	PASS
802.11g	1	2412	-12.98	8	PASS
	6	2437	-12.81	8	PASS
	11	2462	-12.26	8	PASS
802.11n (HT20)	1	2412	-12.21	8	PASS
	6	2437	-12.15	8	PASS
	11	2462	-11.62	8	PASS

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802.11b



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802.11a



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Power Spectral Density 802.11g



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Test Model





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



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Test Model





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8.4 NWANTED 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.

Test Configuration 8.4.3

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 \geq 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:



Unwanted Emissions In Non-Restricted Frequency Bands 802.11b

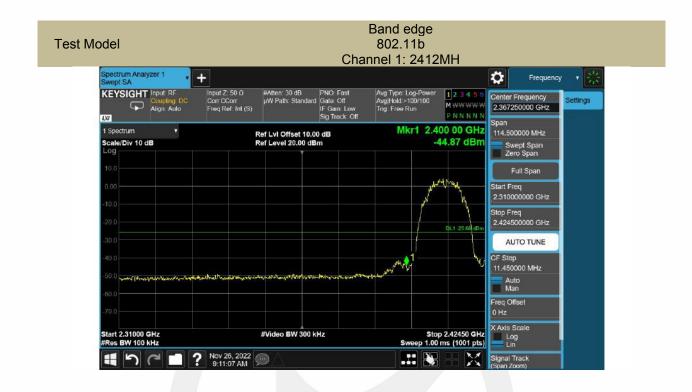


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Test Model



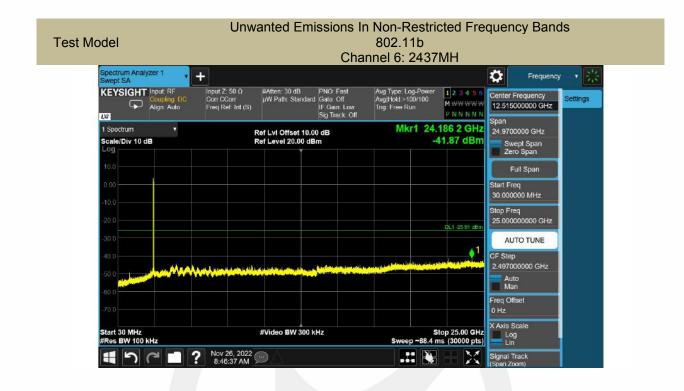


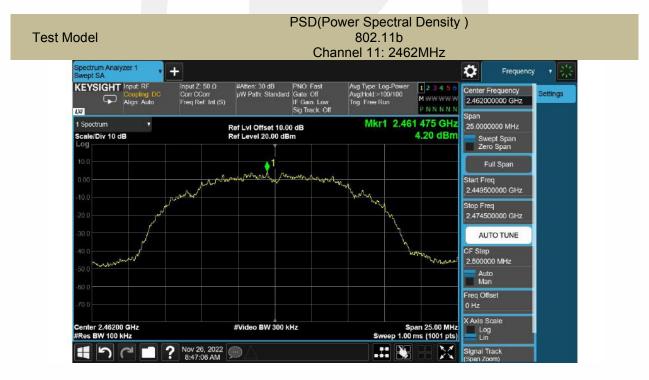


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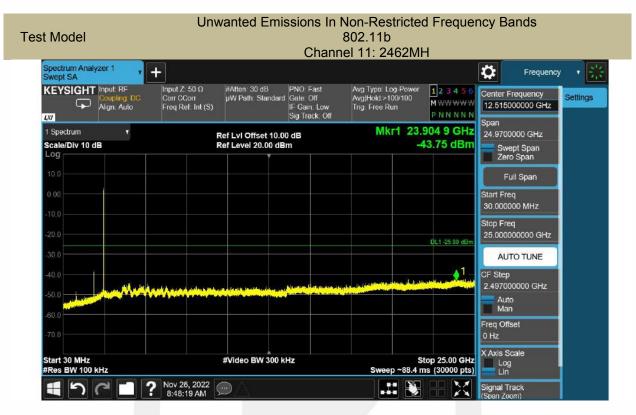






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Test Model

Band edge 802.11b



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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 1 CC 1 art 15			
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

RBW = 1 MHz for $f \ge 1$ GHz(1GHz to 25GHz), 100 kHz for f < 1 GHz(30MHz to 1GHz), 200Hz for f<150KHz(9KHz to 150KHz), 9KHz for f<30MHz(150KHz to 30KHz)

 $VBW \ge RBW$ 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:	22.5° C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

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

Freq. (MHz)	Ant.Pol.	Emis Level(d		Limit 3m((dBuV/m)	Over(dB)		
	H/V	PK	AV	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: Frequency.

Test mod	de: 802.11	b	Frequenc	sy:	Channel 1: 2412 MHz			
Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Verdict
4824.00	53.34	-7.42	45.92	74.00	28.08	PK+	V	PASS
4824.00	38.96	-7.42	31.54	54.00	22.46	AVG	V	PASS
7309.00	50.81	-0.55	50.26	74.00	23.74	PK+	V	PASS
7309.00	36.73	-0.55	36.18	54.00	17.82	AVG	V	PASS
9851.00	45.82	3.39	49.21	74.00	24.79	PK+	V	PASS
9851.00	33.10	3.39	36.49	54.00	17.51	AVG	V	PASS

Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Verdict
4824.00	54.79	-7.42	47.37	74.00	26.63	PK+	Н	PASS
4824.00	40.18	-7.42	32.76	54.00	21.24	AVG	Н	PASS
6700.00	47.15	-1.22	45.93	74.00	28.07	PK+	Н	PASS
6700.00	32.98	-1.22	31.76	54.00	22.24	AVG	Н	PASS
9194.50	46.15	2.76	48.91	74.00	25.09	PK+	Н	PASS
9194.50	30.88	2.76	33.64	54.00	20.36	AVG	Н	PASS

Test mode: 802.11 b

Frequency:

Channel 6:2437 MHz

Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)			Verdict
4874.00	59.38	-7.08	52.30 74.00 21.70 PK+ V		PASS			
4874.00	44.97	-7.08	37.89	54.00	16.11	AVG	V	PASS
7870.50	46.87	1.46	48.33	74.00	25.67	PK+	V	PASS
7870.50	33.34	1.46	34.80	54.00	19.20	AVG	V	PASS
9062.00	47.02	2.81	49.83	49.83 24.17 22.4		PK+	V	PASS
9062.00	31.80	2.81	34.61	19.39	16.08	AVG	V	PASS
				•				
Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Verdict
4874.00	58.63	-7.08	51.55	74.00	22.45	PK+	Н	PASS
4874.00	44.27	-7.08	37.19	54.00	16.81	AVG	Н	PASS
6732.00	47.68	-1.13	46.55	46.55 74.00 27.45 PK+ H		Н	PASS	
6732.00	32.95	-1.13	31.82	54.00	22.18	AVG	Н	PASS
8635.50	47.94	2.11	50.05	74.00	23.95	PK+	Н	PASS
8635.50	35.18	2.11	37.29	54.00	16.71	AVG	Н	PASS



Test mod	de: 802.11	C	Frequenc	cy:	Channel 11:2462 MHz			
Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Verdict
4924.00	52.74	-6.66	46.08	74.00	27.92	PK+	V	PASS
4924.00	38.85	-6.66	32.19	54.00	21.81	AVG	V	PASS
7304.00	47.34	-0.55	46.79	74.00	27.21	PK+	V	PASS
7304.00	31.62	-0.55	31.07	54.00	22.93	AVG	V	PASS
9848.50	46.38	3.38	49.76	74.00	24.24	PK+	V	PASS
9848.50	30.45	3.38	33.83	54.00	20.17	AVG	V	PASS
Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Verdict
4924.50	58.04	-6.66	51.38	74.00	22.62	PK+	Н	PASS
4924.50	44.17	-6.66	37.51	54.00	16.49	AVG	Н	PASS
7129.50	47.68	-0.45	47.23	74.00	26.77	PK+	Н	PASS
7129.50	33.71	-0.45	33.26	54.00	20.74	AVG	н	PASS
8995.00	45.51	2.73	48.24	74.00	25.76	PK+	Н	PASS
8995.00	32.08	2.73	34.81	54.00	19.19	AVG	Н	PASS

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.



■ 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 802.11 n40 recorded was report as below:

Test mode:	802.11 b	Frequency:		Channel 1: 2412MH:	2
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2388.60	Н	61.43	74.00	46.71	54.00
2388.84	V	59.66	74.00	44.83	54.00

Test mode:	802.11 n40) Freque	ency: (Z	
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2494.49	Н	62.35	74.00	47.86	54.00
2485.34	V	60.24	74.00	45.97	54.00

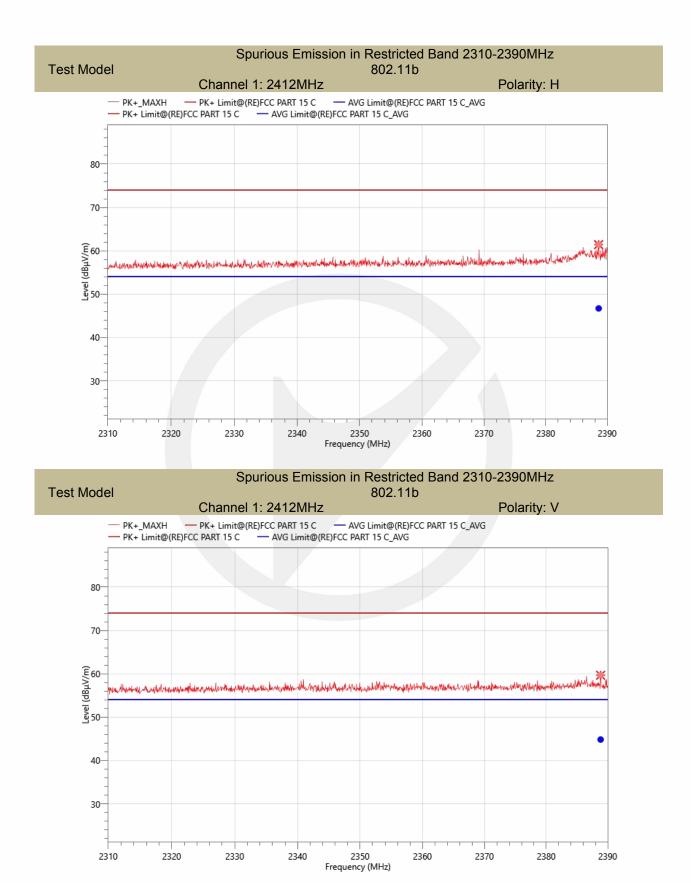
Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).

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

(3) Correct Factor= Ant_F + Cab_L - Preamp

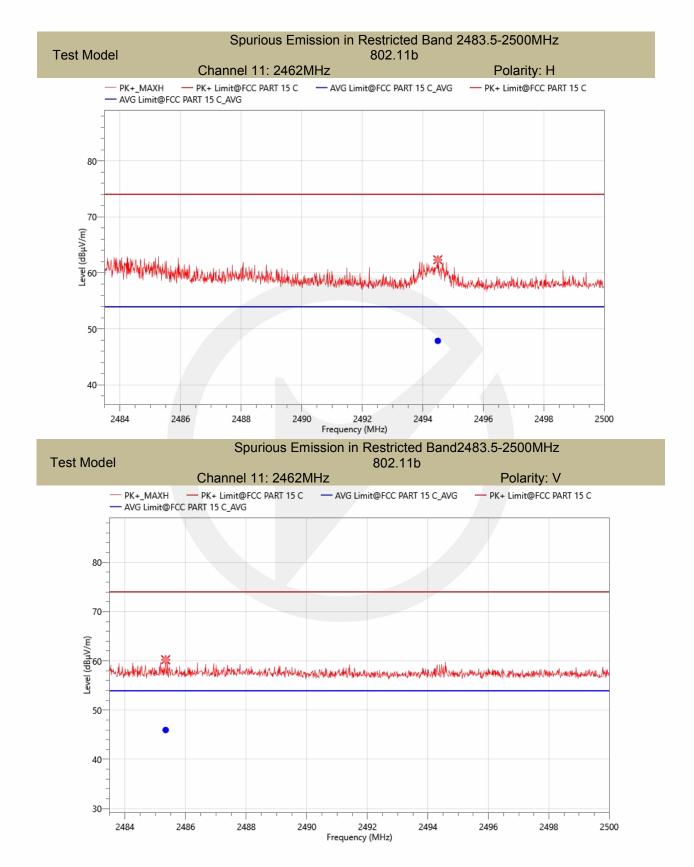
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.





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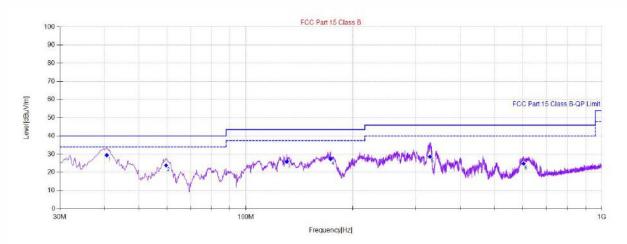


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- Spurious Emission below 1GHz (30MHz to 1GHz)
- All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b recorded was report as below:

Project Information								
Mode:	2412 MHz	Voltage:	AC 120V/60Hz					
Environment:	Temp: 25℃; Humi:60%	Engineer:	JACK ZHANG					



Final	Final Data List										
NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict	
1	40.672	60.49	-31.04	29.45	40.00	10.55	100	128	Vertical	Pass	
2	59.688	55.87	-32.05	23.82	40.00	16.18	100	93	Vertical	Pass	
3	130.512	59.55	-33.62	25.93	43.50	17.57	100	253	Vertical	Pass	
4	173.007	59.81	-32.50	27.31	43.50	16.19	100	23	Vertical	Pass	
5	329.208	55.79	-27.15	28.64	46.00	17.36	100	68	Vertical	Pass	
6	603.385	45.65	-20.84	24.81	46.00	21.19	100	212	Vertical	Pass	

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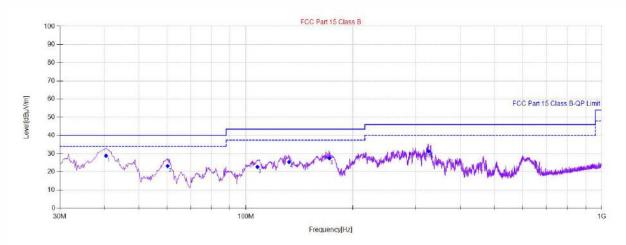
Project Information							
Mode: 2412 MHz Voltage: AC 120V/60Hz							
Environment:	Temp: 25℃; Humi:60%	Engineer:	JACK ZHANG				



Final	Final Data List									
NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	39.896	59.37	-31.18	28.19	40.00	11.81	100	208	Horizontal	Pass
2	125.855	56.34	-33.41	22.93	43.50	20.57	200	0	Horizontal	Pass
3	171.454	58.27	-32.57	25.70	43.50	17.80	200	315	Horizontal	Pass
4	295.412	68.12	-28.39	39.73	46.00	6.27	100	173	Horizontal	Pass
5	327.679	70.53	-27.14	43.39	46.00	2.61	100	149	Horizontal	Pass
6	506.753	50.06	-23.18	26.88	46.00	19.12	200	256	Horizontal	Pass



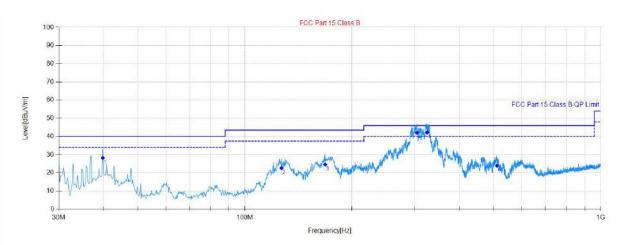
Project Information								
Mode:	Mode: 2437 MHz Voltage: AC 120V/60Hz							
Environment:	Temp: 25℃; Humi:60%	Engineer:	JACK ZHANG					



Final	Final Data List									
NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	40.478	59.95	-31.08	28.87	40.00	11.13	100	108	Vertical	Pass
2	60.270	55.35	-32.13	23.22	40.00	16.78	100	166	Vertical	Pass
3	107.810	54.23	-31.51	22.72	43.50	20.78	100	84	Vertical	Pass
4	132.259	59.11	-33.68	25.43	43.50	18.07	100	296	Vertical	Pass
5	171.648	60.06	-32.56	27.50	43.50	16.00	100	296	Vertical	Pass
6	326.491	58.46	-27.14	31.32	46.00	14.68	100	87	Vertical	Pass



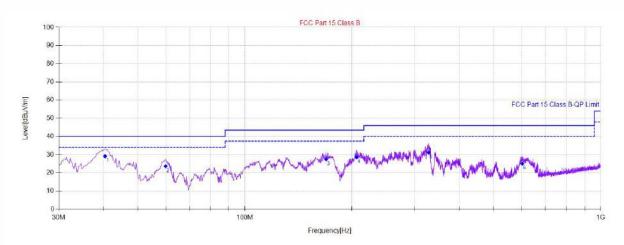
Project Information							
Mode: 2437 MHz Voltage: AC 120V/60Hz							
Environment:	Temp: 25℃; Humi:60%	Engineer:	JACK ZHANG				



Final	Final Data List									
NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	39.896	59.41	-31.18	28.23	40.00	11.77	100	150	Horizontal	Pass
2	126.825	56.11	-33.46	22.65	43.50	20.85	200	9	Horizontal	Pass
3	168.156	57.23	-32.67	24.56	43.50	18.94	200	322	Horizontal	Pass
4	304.759	70.25	-28.17	42.08	46.00	3.92	100	129	Horizontal	Pass
5	325.521	69.36	-27.13	42.23	46.00	3.77	100	161	Horizontal	Pass
6	511.216	47.07	-23.13	23.94	46.00	22.06	100	231	Horizontal	Pass



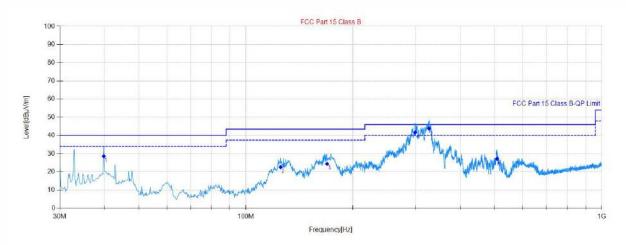
Project Information								
Mode:	Mode: 2462 MHz Voltage: AC 120V/60Hz							
Environment:	Temp: 25℃; Humi:60%	Engineer:	JACK ZHANG					



Final	Final Data List									
NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	40.478	60.27	-31.08	29.19	40.00	10.81	100	68	Vertical	Pass
2	59.882	55.77	-32.09	23.68	40.00	16.32	100	287	Vertical	Pass
3	169.126	60.11	-32.65	27.46	43.50	16.04	100	312	Vertical	Pass
4	205.993	59.16	-30.58	28.58	43.50	14.92	100	350	Vertical	Pass
5	328.432	58.34	-27.14	31.20	46.00	14.80	100	92	Vertical	Pass
6	602.220	45.96	-20.83	25.13	46.00	20.87	100	186	Vertical	Pass



Project Information								
Mode:	Mode: 2462 MHz Voltage: AC 120V/60Hz							
Environment:	Temp: 25℃; Humi:60%	Engineer:	JACK ZHANG					



Final	Final Data List									
NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	39.896	59.81	-31.18	28.63	40.00	11.37	100	144	Horizontal	Pass
2	125.273	56.00	-33.39	22.61	43.50	20.89	200	187	Horizontal	Pass
3	169.126	57.04	-32.65	24.39	43.50	19.11	200	325	Horizontal	Pass
4	299.326	70.09	-28.38	41.71	46.00	4.29	100	123	Horizontal	Pass
5	327.073	70.94	-27.14	43.80	46.00	2.20	100	144	Horizontal	Pass
6	507.918	50.32	-23.15	27.17	46.00	18.83	100	236	Horizontal	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

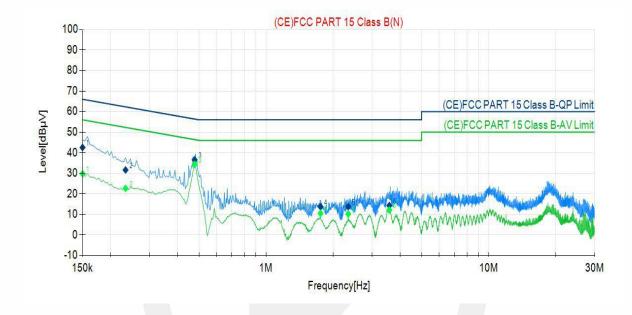
The EUT was placed on a table which is 0.8m above ground plane. Maximum procedure was performed on the highest emissions to ensure EUT compliance. Repeat above procedures until all frequency measured were complete.

8.6.5 Test Results

Pass



Project Information									
Mode: TX Voltage: AC 120V/60Hz									
Environment:									

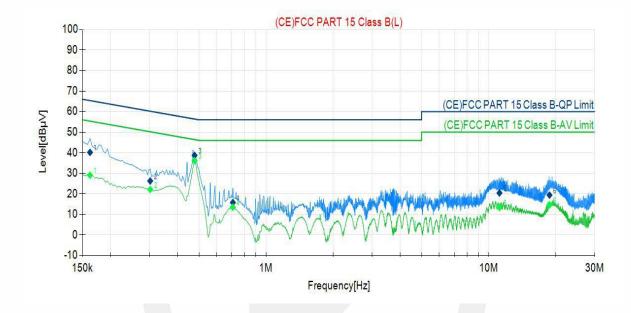


Final Data List											
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.150	10.50	32.05	42.55	66.00	23.45	19.28	29.78	56.00	26.22	PASS
2	0.234	10.45	21.16	31.61	62.31	30.70	12.18	22.63	52.31	29.68	PASS
3	0.478	10.41	26.13	36.54	56.37	19.83	23.91	34.32	46.37	12.05	PASS
4	1.758	10.54	3.15	13.69	56.00	42.31	-0.03	10.51	46.00	35.49	PASS
5	2.342	10.59	3.19	13.78	56.00	42.22	-0.41	10.18	46.00	35.82	PASS
6	3.582	10.69	3.61	14.30	56.00	41.70	1.43	12.12	46.00	33.88	PASS

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Project Information							
Mode: TX Voltage: AC 120V							
Environment:	Temp: 24℃; Humi:52%	Engineer:	Allen Tang				



Final Data List											
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.162	10.51	29.64	40.15	65.36	25.21	18.55	29.06	55.36	26.30	PASS
2	0.302	10.47	15.77	26.24	60.19	33.95	11.65	22.12	50.19	28.07	PASS
3	0.478	10.40	28.29	38.69	56.37	17.68	25.72	36.12	46.37	10.25	PASS
4	0.710	10.34	5.42	15.76	56.00	40.24	3.11	13.45	46.00	32.55	PASS
5	11.190	10.67	9.72	20.39	60.00	39.61	2.69	13.36	50.00	36.64	PASS
6	18.774	10.73	8.63	19.36	60.00	40.64	3.91	14.64	50.00	35.36	PASS

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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.

The EUT has 1 antenna: one an External antenna for WIFI 2.4G, the gain is 3.42 dBi Note:

- \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 ***

EMTEK (Dongguan) Co., Ltd.

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声明

Statement

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This report will be void without authorized signature or special seal for testing report.

- 未经许可本报告不得部分复制;
 This report shall not be copied partly without authorization.
- 本报告的检测结果仅对送测样品有效,委托方对样品的代表性和资料的真实性负责;
 The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.
- 4. 本检测报告中检测项目标注有特殊符号则该项目不在资质认定范围内,仅作为客户委托、科研、教学或内部质量控制等目的使用;
 The observations or tests with special mark fall outside the scope of accreditation, and are only

used for purpose of commission, research, training, internal quality control etc.

5. 本检测报告以实测值进行符合性判定,未考虑不确定度所带来的风险,本实验室不承担相关责任, 特别约定、标准或规范中有明确规定的除外;

The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards or regulations, EMTEK shall not assume any responsibility.

6. 对本检测报告若有异议,请于收到报告之日起20日内提出;

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