

TEST REPORT

Product Name : WiFi Stick

Model Number : S5-WiFi-ST-4Pin, S5-WiFi-ST-USB

FCC ID : 2AWE8-S5-WIFI

Prepared for : Ginlong Technologies Co., Ltd.

Address : No.57 Jintong Road, Binhai Industrial Park, Xiangshan,

Zhejiang

Prepared by : EMTEK (NINGBO) CO., LTD.

Address : No. 8, Building 8, Lane 216, Qingyi Road, Ningbo Hi-Tech

Zone, Ningbo, Zhejiang, China

Tel: +86-574-27907998 Fax: +86-574-27721538

Report Number : ENB2312280211W00201R

Date(s) of Tests : December 28, 2023 to March 18, 2024

Date of Issue : March 25, 2024

Report No. ENB2312280211W00201R



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1 TEST RESULT CERTIFICATION

Applicant : Ginlong Technologies Co., Ltd.

Address : No.57 Jintong Road, Binhai Industrial Park, Xiangshan, Zhejiang

Manufacturer : Ginlong Technologies Co., Ltd.

Address : No.57 Jintong Road, Binhai Industrial Park, Xiangshan, Zhejiang

EUT : WiFi Stick

Model Name : S5-WiFi-ST-4Pin, S5-WiFi-ST-USB

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 (NINGBO) 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:	December 28, 2023 to March 18, 2024
Prepared by :	June Gao/Engineer
Reviewer:	Vinay/Supervisor
Approved & Authorized Signer :	Tony Wei/Manager



2 EUT TECHNICAL DESCRIPTION

Characteristics	Description		
Product	WiFi Stick		
Model Number	S5-WiFi-ST-4Pin, S5-WiFi-ST-USB (Note: The two models only have different power supply interfaces. PCB Layout, schematic design, etc. are the same. We chose S5-WiFi-ST-4Pin for testing.)		
Sample Number	ENB2312280211W002-1-1		
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/n(HT20)/n(HT40);		
Operating Frequency Range			
Number of Channels	☐ 11 channels for 802.11b/g n(HT20);☐ 7 Channels for 802.11n(HT40);		
Transmit Power Max	16.72 dBm		
Smart system	⊠SISO for802.11 b/g/n(HT20)/n(HT40); □MIMO for802.11n(HT20);		
Antenna Type	PCB Antenna		
Antenna Gain	-0.37 dBi		
Power supply	DC 5V		
Temperature Range	-30℃~+65℃		
Date of Received	December 28, 2023		

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



3 SUMMARY OF TEST RESULT

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.				

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2AWE8-S5-WIFI filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules



4 TEST METHODOLOGY

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 Radiated Emission Test Equipment

Equ.No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-185	EMI Test Receiver	R&S	ESR7	102480	Apr 28, 2023	1 Year
ENE-190	-190 Antenna Schwarzbeck VULB 9163 01499 M		May 21, 2022	2 Year		
ENE-195	E-195 Pre-Amplifier JS Denki PA09K03-40 JSPA21019		Apr 28, 2023	1 Year		
ENE-204	Low Frequency Notch Filter RF Switching	JS Denki	JSDSW-F	JSDSW2211D 02	Apr 28, 2023	1 Year
ENE-251	6dB Attenuator	Mini-Circuits	UNAT-6+	11542	July 06, 2023	1 Year
ENE-279-1	RF Cable	Rosenberger	L17-C001-7000	1	May 31, 2023	1 Year
ENE-279-2	RF Cable	Rosenberger	L17-C001-3500	1	May 31, 2023	1 Year
ENE-279-3	RF Cable	Rosenberger	L17-C001-1500	1	May 31, 2023	
ENE-279-4	RF Cable	Rosenberger	1	1	May 31, 2023	1 Year
ENE-279-5	RF Cable	Rosenberger	1	1	May 31, 2023	1 Year
ENE-279-6	RF Cable	Rosenberger	L08-C446-1500	1	May 31, 2023	1 Year
ENE-144	3-Meter Anechoic Chamber2#	SKET	9*6*6m	1	June 19, 2022	3 Year
ENE-171	EXA Signal Analyzer	KEYSIGHT	N9010B	MY60242467	Dec 14, 2023	1 Year
ENE-191	Horn Antenna	Schwarzbeck	BBHA 9120 D	02588	May 21, 2022	2 Year
ENE-198	Pre-Amplifier	JS Denki	PA0118-50	JSPA21022	Apr 28, 2023	1 Year
ENE-281-1	RF Cable	Rosenberger	LA2-C125-3500	1	May 31, 2023	1 Year
ENE-281-2	RF Cable	Rosenberger	LA2-C125-1500	1	May 31, 2023	1 Year
ENE-281-3	RF Cable	Rosenberger	LU7-C1511-120 0	1	May 31, 2023	1 Year
ENE-285-1	RF Cable	Rosenberger	LA2-C199-6500	1	May 31, 2023	1 Year
ENE-206	High Frequency Notch FilterRf Switching	JS Denki	JSDSW-F	202083582	Apr 28, 2023	1 Year

4.2.2 Radio Frequency Test Equipment

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-256	EXA Signal Anaalyzer	Keysight	N9010B	MY62060219	July 05, 2023	1 Year



ENE-172	RF Control Unit	Tonscend	JS0806-2(V.6E)	21L8060521	March 01, 2023	1 Year
ENE-172	RF Control Unit	Tonscend	JS0806-2(V.6E)	21L8060521	Feb 27, 2024	1 Year
ENE-092	DC Power Supply	KEFUNA	KDP3603	2004D3062946	July 07, 2023	1 Year

Note: The ENE-172 was calibrated on February 27, 2024, and was not tested on that date.





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 (\boxtimes 802.11b:1 Mbps; \boxtimes 802.11g: 6 Mbps; \boxtimes 802.11n(HT20): MCS0; \boxtimes 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 and Channel list for 802.11b/g/n (HT20):

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

Channel	Frequency	Channel	Frequency	Channal	Frequency
Charmer	(MHz)	Chamilei	(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 Frequency		Middle Frequency Highest Freque		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 Frequency		Middle F	requency	Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452



4.4 TEST SOFTWARE

Item	Software
Radiated Emission:	UI_mptool (V2.0)





5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

No. 8, Building 8, Lane 216, Qingyi Road, Ningbo Hi-Tech Zone, Ningbo, Zhejiang, 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

The Certificate Registration Number is L6666.

The Laboratory has been assessed and proved to be in compliance with

CNAS-CL01:2018 (identical to ISO/IEC 17025:2017)

Designation by FCC

Designation Number: CN1354

Test Firm Registration Number: 427606

Accredited by A2LA

The Certificate Number is 4321.03. The certificate isvalid until May 31, 2025

Designation by Industry Canada

The Conformity Assessment Body Identifier is CN0114

Name of Firm : EMTEK (NINGBO) CO., LTD.

Site Location : No. 8, Building 8, Lane 216, Qingyi Road, Hi-Tech Zone, Ningbo,

Zhejiang, China

宁波市信測检測技术有限公司地址: 浙江省宁波市高新区清逸路216弄8幢8号网址: Http://www.emtek.com.cn邮箱: nb@emtek.com.cnEMTEK(Ningbo) Co., Ltd.Add: No. 8, Building 8, Lane 216, Qingyi Road, High-tech Zone, Ningbo, Zhejiang, ChinaHttp://www.emtek.com.cnE-mail: nb@emtek.com.cn

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6 TEST SYSTEM UNCERTAINTY

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

Uncertainty		
± 1x10^-5		
± 1.0 dB		
± 2.0 dB		
± 2.0 dB		
± 2.0 dB		
± 1.0 dB		
± 3 dB		
± 3 dB		
± 3 dB		
± 0.5 °C		
± 3 %		

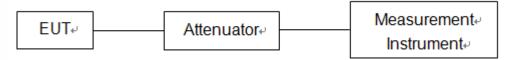
Measurement Uncertainty for a level of Confidence of 95%



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.

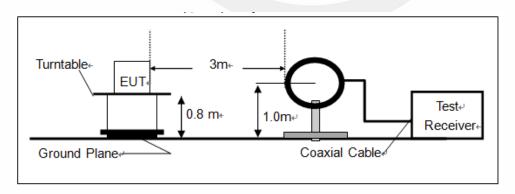
30MHz-1GHz:

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).

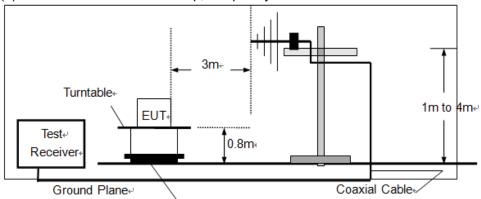
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



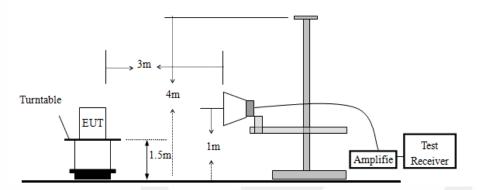
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(b)Radiated Emission Test Set-Up, Frequency Below 1000MHz



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



7.3 CONDUCTED EMISSION TEST SETUP

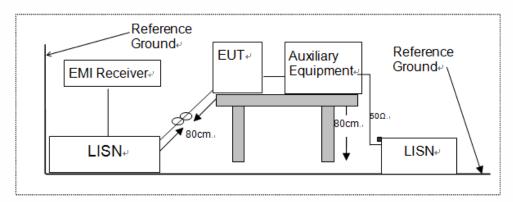
The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All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

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.

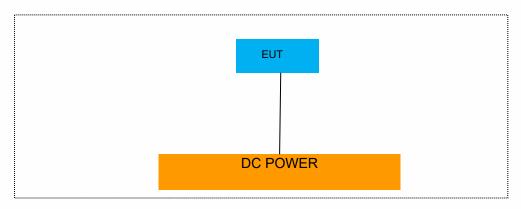
According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

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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	1		

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

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 <code>[Remark]</code> column, device(s) used in tested system is a support equipment



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:	17 ℃	
Relative Humidity:	60%	
ATM Pressure:	1011 mbar	

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (MHz)	Limit (kHz)	Verdict
	1	2412	10.06	>500	PASS
802.11b	6	2437	10.06	>500	PASS
	11	2462	10.05	>500	PASS
	1	2412	16.32	>500	PASS
802.11g	6	2437	16.33	>500	PASS
	11	2462	16.33	>500	PASS
802.11n (HT20)	1	2412	16.82	>500	PASS
	6	2437	16.90	>500	PASS
	11	2462	17.07	>500	PASS
802.11n (HT40)	3	2422	35.17	>500	PASS
	6	2437	35.18	>500	PASS
	9	2452	35.18	>500	PASS

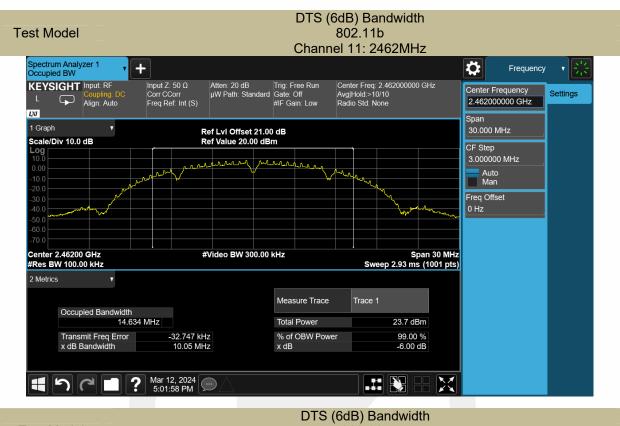
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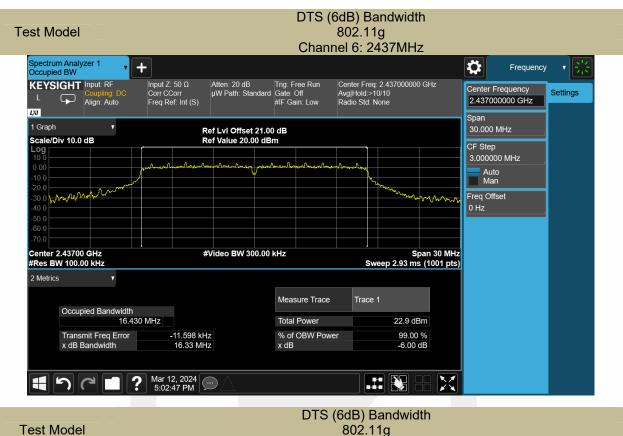






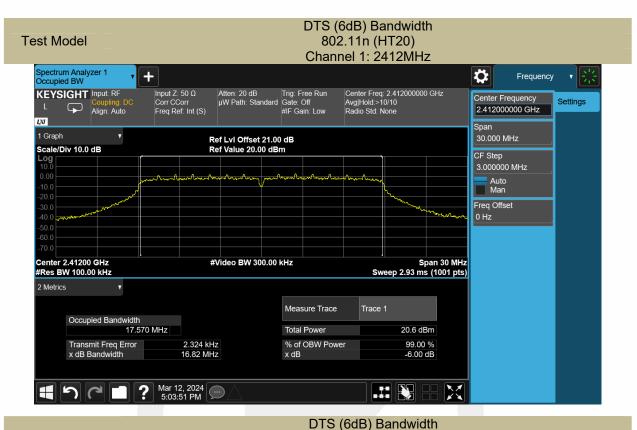


















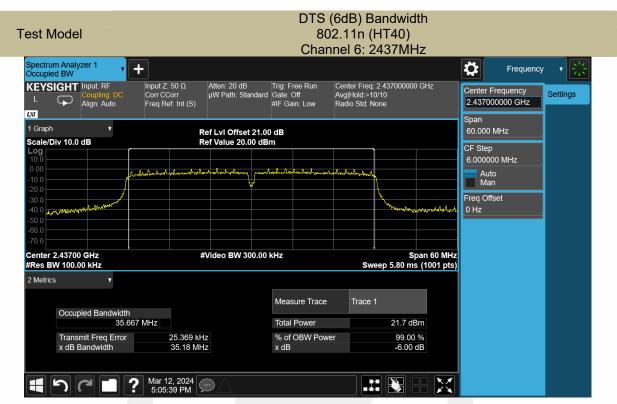
x dB

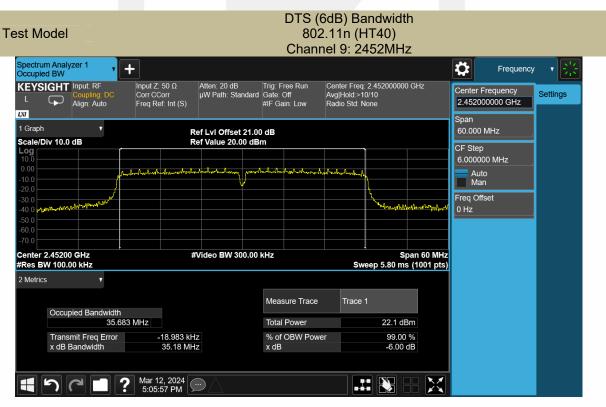
x dB Bandwidth

35 17 MHz

-6 00 dB









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.

8.2.5 Test Results

Temperature:	17 ℃
Relative Humidity:	60%
ATM Pressure:	1011 mbar

Operation Mode	Channel Number	Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Mode	Nullibel	Frequency (MHz)	Level (dbill)	(ubiii)	verdict
	1	2412	16.16	30	PASS
802.11b	6	2437	16.67	30	PASS
	11	2462	16.72	30	PASS
	1	2412	15.24	30	PASS
802.11g	6	2437	16.21	30	PASS
	11	2462	15.99	30	PASS
802.11n (HT20)	1	2412	13.77	30	PASS
	6	2437	14.58	30	PASS
	11	2462	14.54	30	PASS
000 44.5	3	2422	12.27	30	PASS
802.11n (HT40)	6	2437	12.38	30	PASS
(1140)	9	2452	12.52	30	PASS

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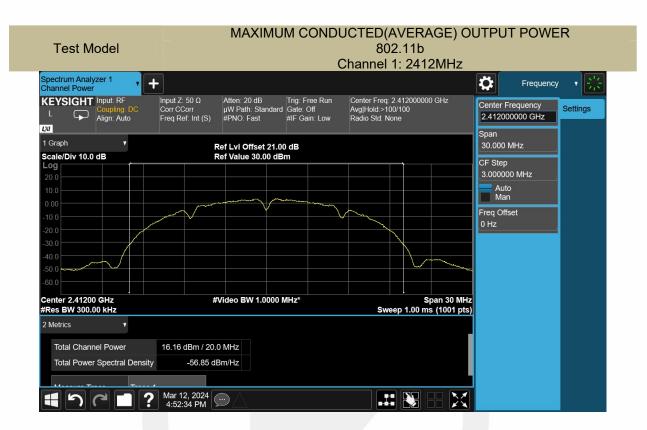
宁波市信测检测技术有限公司 EMTEK(Ningbo) Co., Ltd.

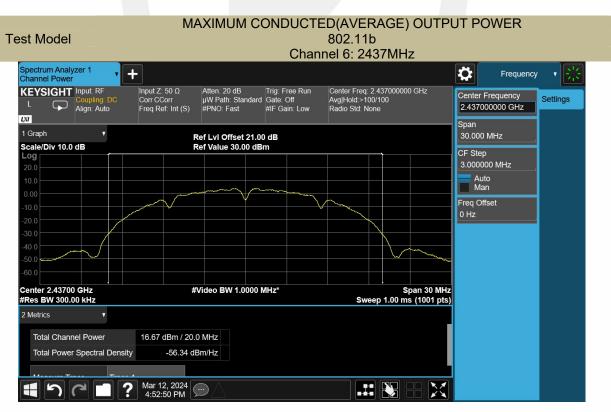




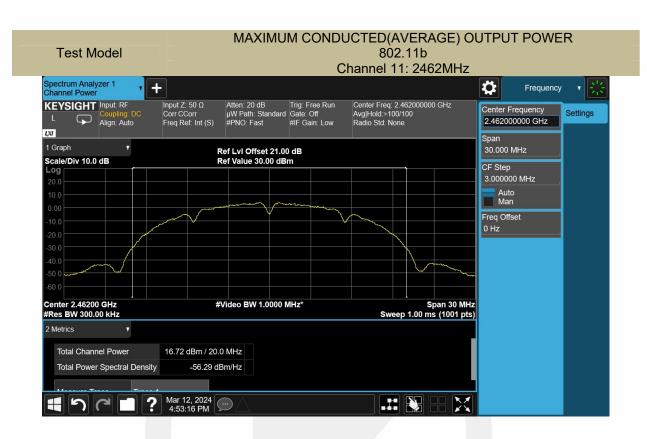








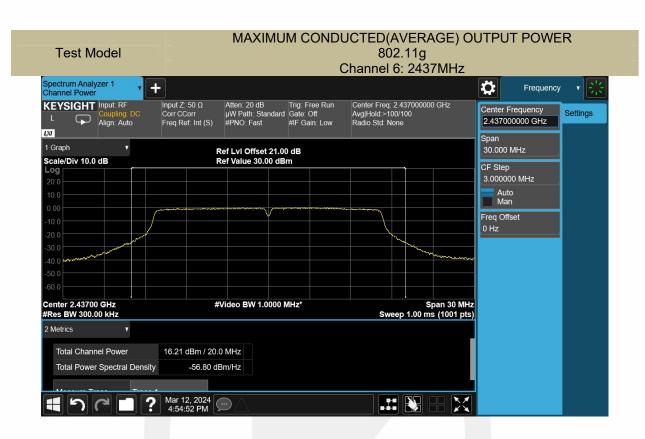






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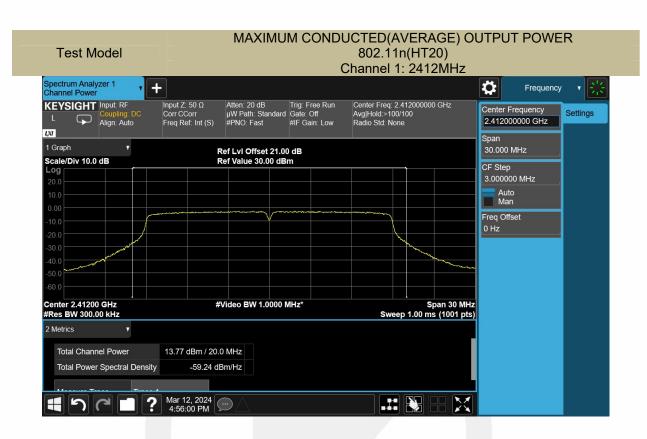


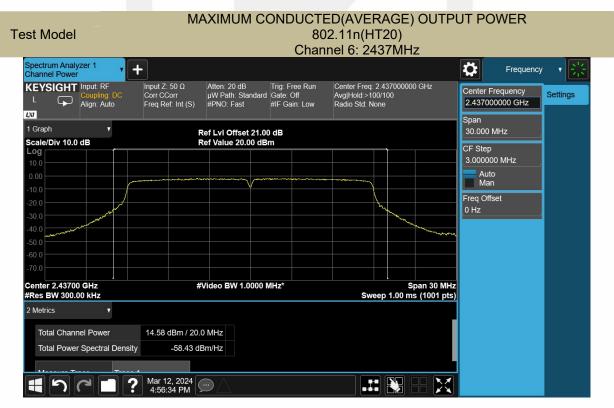
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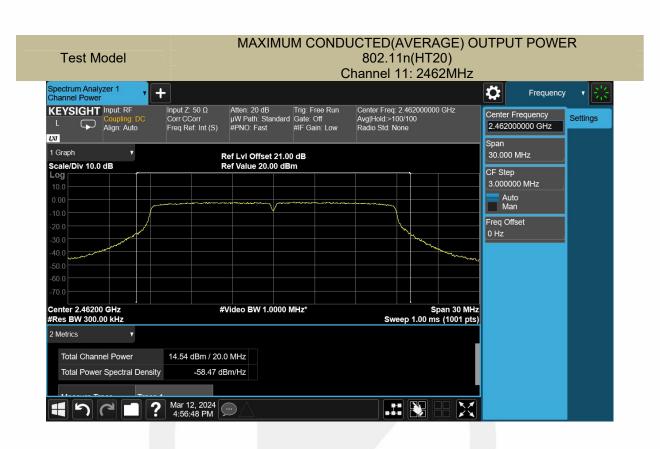


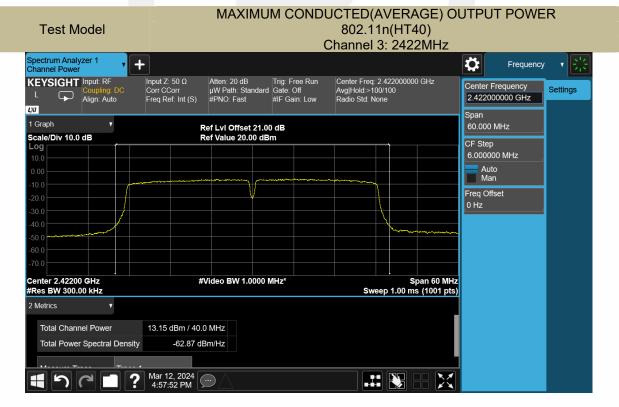




宁波市信测检测技术有限公司 EMTEK(Ningbo) Co., Ltd.

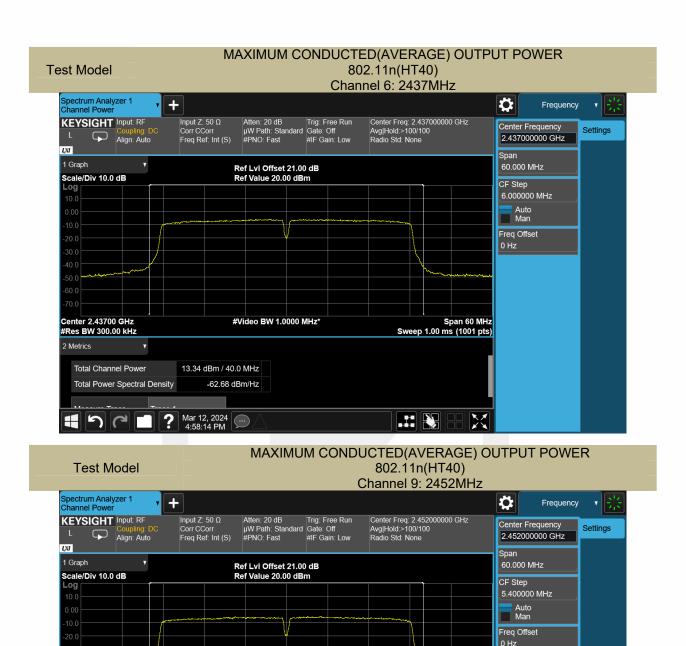






宁波市信测检测技术有限公司 EMTEK(Ningbo) Co., Ltd.





#Video BW 1.0000 MHz*

13.80 dBm / 40.0 MHz -62.22 dBm/Hz

Mar 12, 2024 4:58:32 PM

Center 2.45200 GHz #Res BW 300.00 kHz

Total Channel Power

Total Power Spectral Density

2 Metrics

Span 60 MHz Sweep 1.00 ms (1001 pts)