

FCC Test Report

Report No.: AGC00210210317FE05

FCC ID : 2AVUHTT-PA015

APPLICATION PURPOSE: Original Equipment

PRODUCT DESIGNATION: Smart Pet Feeder

BRAND NAME : TAOTRONICS

MODEL NAME : TT-PA015

APPLICANT Shenzhen NearbyExpress Technology Development

Company Limited

DATE OF ISSUE : May 14, 2021

STANDARD(S)

TEST PROCEDURE(S)

: FCC Part 15.247

REPORT VERSION: V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes	
V1.0	9 /	May 14, 2021	Valid	Initial Release	

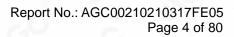
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1. VERIFICATION OF CONFORMITY

Applicant	Shenzhen NearbyExpress Technology Development Company Limited
Address	Room 701, 702, 703, 705, 706, 708, 709, Building E, Galaxy World Phase II, Minle Community, Minzhi Street, Longhua District, Shenzhen, Guangdong, China 518000
manufacturer	Shenzhen NearbyExpress Technology Development Company Limited
Address	Room 701, 702, 703, 705, 706, 708, 709, Building E, Galaxy World Phase II, Minle Community, Minzhi Street, Longhua District, Shenzhen, Guangdong, China 518000
Factory	Shanghai Niaoyu Huaxiang Pet Co., Ltd.
Address	Building H, Xuhui Vanke Center, No.55 Ding'an Rd, Xuhui District, Shanghai
Product Designation	Smart Pet Feeder
Brand Name	TAOTRONICS
Test Model	TT-PA015
Date of test	Mar. 31, 2021 to May 13, 2021
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BGN/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) 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 radiated emission limits of FCC Rules Part 15.247.

Prepared By	John Zerry	
	John Zeng (Project Engineer)	May 14, 2021
Reviewed By	Max 2 hang	
	Max Zhang (Reviewer)	May 14, 2021
Approved By	Formerles	
	Forrest Lei (Authorized Officer)	May 14, 2021

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "Smart Pet Feeder". It is designed by way of utilizing the DSSS and OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.412GHz~2.462GHz
Output Power (Average)	IEEE 802.11b:15.76dBm; IEEE 802.11g:13.10dBm; IEEE 802.11n(20):12.99dBm
Output Power (Peak)	IEEE 802.11b:18.54dBm; IEEE 802.11g:20.60dBm; IEEE 802.11n(20):20.55dBm
Modulation	DSSS(DBPSK/DQPSK/CCK); OFDM(BPSK/QPSK/16-QAM/64-QAM)
Number of channels	11
Hardware Version	V3.2
Software Version	V1.0
Antenna Designation	PCB antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	2.54dBi
Power Supply DC 3.7V by battery or DC 5V by adapter	

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
GC C	. 1	2412 MHZ
	2	2417 MHZ
	3	2422 MHZ
SO SO	4	2427 MHZ
	5	2432 MHZ
2400~2483.5MHZ	6	2437 MHZ
\GCC	7	2442 MHZ
	8	2447 MHZ
	9	2452 MHZ
10° 20	10	2457 MHZ
	11 0	2462 MHZ

Note: For 20MHZ bandwidth system use Channel 1 to Channel 11.

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2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		rate(I	ata Mbps) nsGl
					20MHz	40MHz	20MHz	20MHz 40MHz		40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1 💿	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5
7	<u></u> 1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

Symbol	Explanation	
NSS	Number of spatial streams	
R	Code rate	
NBPSC	Number of coded bits per single carrie	
NCBPS	Number of coded bits per symbol	
NDBPS	Number of data bits per symbol	
GI	Guard interval	

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2.4. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AVUHTT-PA015** filing to comply with the FCC Part 15 requirements.

2.5. TEST METHODOLOGY

KDB 558074 D01 15.247 Meas Guidance v05: Guidance for compliance measurements on Digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules

ANSI C63.10:2013: American National Standard for Testing Unlicensed Wireless Devices

2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.8. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device. For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty		
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 3.1 \text{ dB}$		
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 4.0 \text{ dB}$		
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.8 \text{ dB}$		
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$		
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$		
Uncertainty of spurious emissions, conducted	$U_c = \pm 2 \%$		
Uncertainty of Occupied Channel Bandwidth	U _c = ±2 %		

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel transmitting (TX)
2	Middle channel transmitting (TX)
3	High channel transmitting (TX)

Note:

Transmit by 802.11b with Date rate (1/2/5.5/11)

Transmit by 802.11g with Date rate (6/9/12/18/24/36/48/54)

Transmit by 802.11n (20MHz) with Date rate (6.5/13/19.5/26/39/52/58.5/65)

The test channel for 20MHZ bandwidth system is channel 1, 6 and 11.

Note:

- 1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency Individually, and the EUT is operating at its maximum duty cycle>or equal 98%
- 2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
- 3. The test software is the AmebaZ2_mptool_1v3 which can set the EUT into the individual test modes.

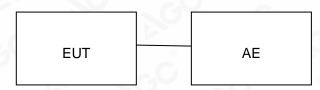
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5. SYSTEM TEST CONFIGURATION 5.1. CONFIGURATION OF EUT SYSTEM

Configure:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Equipment Model No. ID or Specification		Remark
1	Smart Pet Feeder	TT-PA015	2AVUHTT-PA015	EUT
2	Control Box	N/A	USB-TTL	AE
3	Adapter	XCMS03-0510	N/A	AE
4	Charger line	N/A	1.45m unshielded	Accessory

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT	
§15.247	Output Power	Compliant	
§15.247	6 dB Bandwidth	Compliant	
§15.247	Conducted Spurious Emission	Compliant	
§15.247	Maximum Conducted Output Power Spectral Density	Compliant	
§15.209	Radiated Emission	Compliant	
§15.247	Band Edges	Compliant	
§15.207	Line Conduction Emission	Compliant	

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd			
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China			
Designation Number	CN1259			
FCC Test Firm Registration Number	975832			
A2LA Cert. No.	5054.02			
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA			

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03,2020	Jul. 02, 2021
Test software	FARA	EZ-EMC(Ver.A GC-CON03A1)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 07, 2020	Dec. 06, 2021
2.4GHz Fliter	Micro-tronics	087	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	Weinachel Corp	58-30-33	N/A	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBE CK	BBHA 9170	#768	Sep.21, 2019	Sep. 20, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	00034609	May. 17, 2019	May. 16, 2021
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 17, 2019	May. 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBE CK	VULB9168	D69250	Sep. 20, 2019	Sep. 19, 2021
Test software	FARA	EZ-EMC(Ver. RA-03A)	N/A	N/A	N/A

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7. OUTPUT POWER

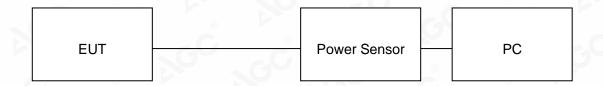
7.1. MEASUREMENT PROCEDURE

For average power test:

- 1. Connect EUT RF output port to power sensor through an RF attenuator.
- 2. Connect the power sensor to the PC.
- 3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 4. Record the maximum power from the software.

Note: The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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7.3. LIMITS AND MEASUREMENT RESULT

Test Data of Conducted Output Power					
Test Mode	Test Channel (MHz)	Average Power (dBm)	Peak Power (dBm)	Limits (dBm)	Pass or Fail
C	2412	15.21	17.96	≪30	Pass
802.11b	2437	15.56	18.31	\$ 0	Pass
	2462	15.76	18.54	≼30	Pass
802.11g	2412	12.37	19.96	≪3 0	Pass
	2437	12.77	20.39	≼3 0	Pass
	2462	13.10	20.60	\$ 0	Pass
802.11n20	2412	12.38	20.00	₹30	Pass
	2437	12.66	20.28	≪3 0	Pass
	2462	12.99	20.55	\$ 0	Pass

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8. BANDWIDTH

8.1. MEASUREMENT PROCEDURE

6dB bandwidth:

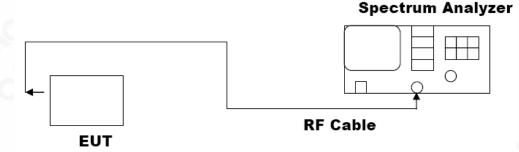
- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW≥3×RBW.
- 4. Set SPA Trace 1 Max hold, then View.

Occupied bandwidth:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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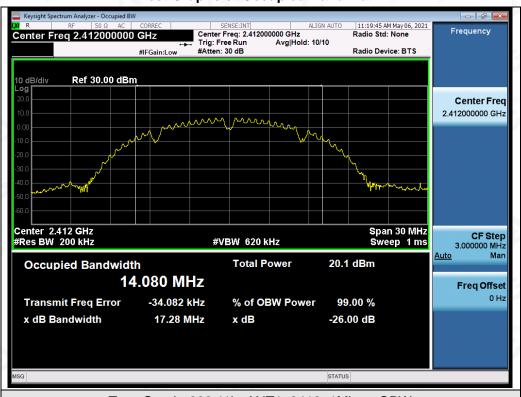
8.3. LIMITS AND MEASUREMENT RESULTS

Test Data of Occupied Bandwidth and DTS Bandwidth						
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-6dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail	
- C	2412	14.080	9.057	∌.5	Pass	
802.11b	2437	14.082	9.067	∌.5	Pass	
	2462	14.083	9.068	≥0.5	Pass	
802.11g	2412	16.772	16.343	₹0.5	Pass	
	2437	16.637	16.344	₹0.5	Pass	
	2462	16.667	16.354	∌.5	Pass	
802.11n20	2412	17.758	17.566	₹0.5	Pass	
	2437	17.828	17.556	₹0.5	Pass	
	2462	17.860	17.593	₹0.5	Pass	

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Test Graphs of Occupied Bandwidth

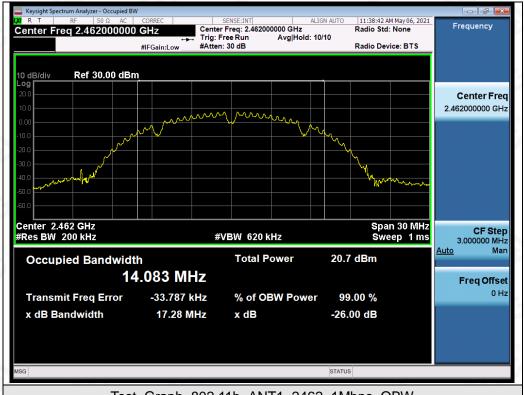




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Test_Graph_802.11b_ANT1_2437_1Mbps_OBW

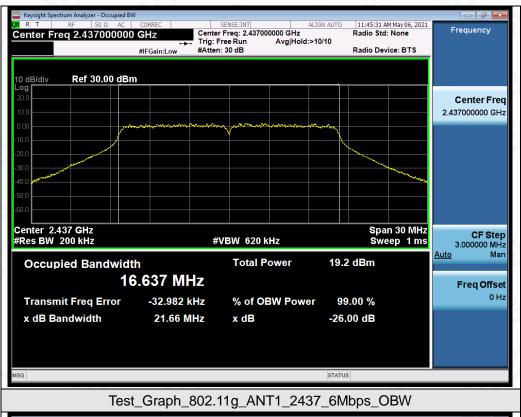






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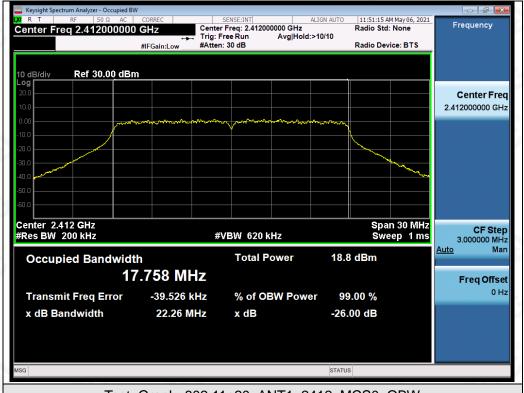


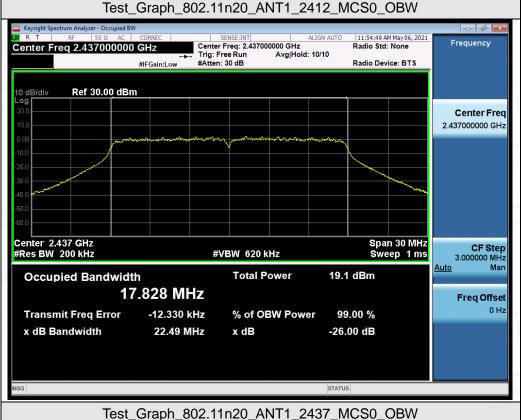




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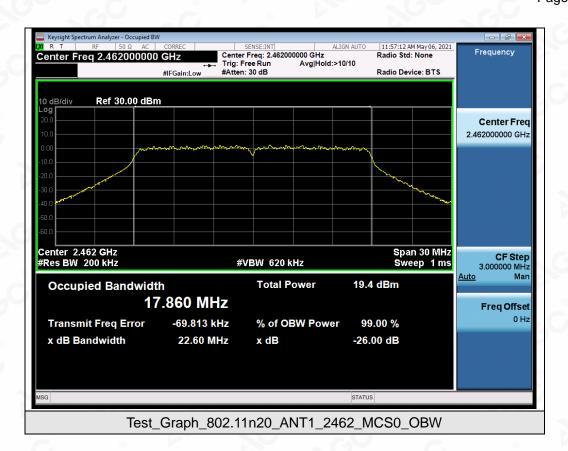






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Test Graphs of DTS Bandwidth





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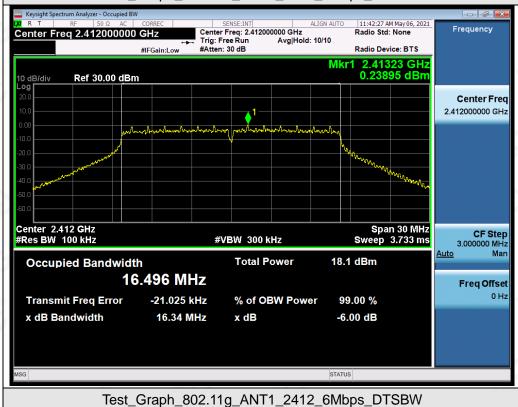
a/Inspection

The test results

the test report.







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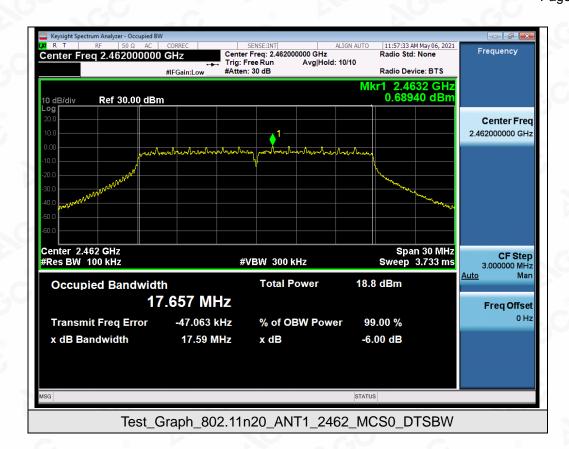






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9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements. Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW>RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW>RBW) are conform to the requirement.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2.

9.3. MEASUREMENT EQUIPMENT USEDJN

The same as described in section 6.

9.4. LIMITS AND MEASUREMENT RESULT

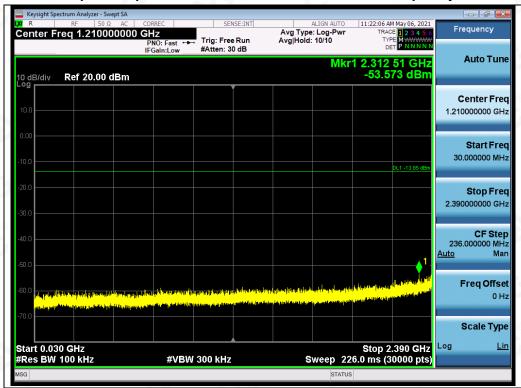
LIMITS AND MEASUREMENT RESULT						
Annii alda Limita	Measurement Result					
Applicable Limits	Test Data	Criteria				
In any 100 KHz Bandwidth Outside the	At least -20dBc than the limit					
frequency band in which the spread spectrum	Specified on the BOTTOM	PASS				
intentional radiator is operating, the radio frequency	Channel	c.C				
power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation 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))	At least -20dBc than the limit Specified on the TOP Channel	PASS				

Note: The limits reference level is according to the test plot of -6dB bandwidth.

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Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands



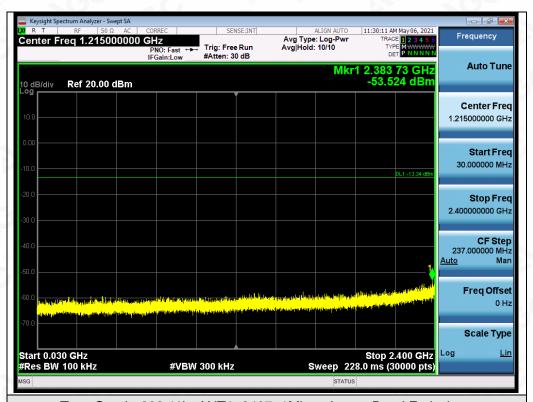
Test_Graph_802.11b_ANT1_2412_1Mbps_Lower Band Emissions

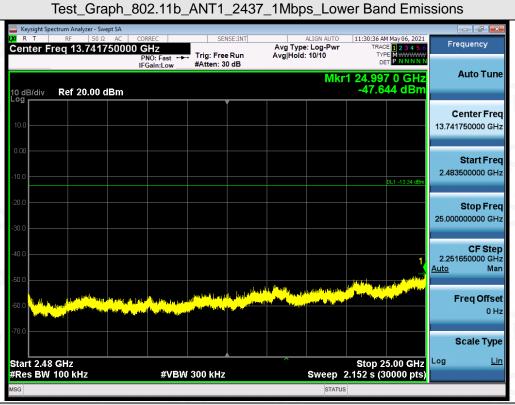


Test_Graph_802.11b_ANT1_2412_1Mbps_Higher Band Emissions

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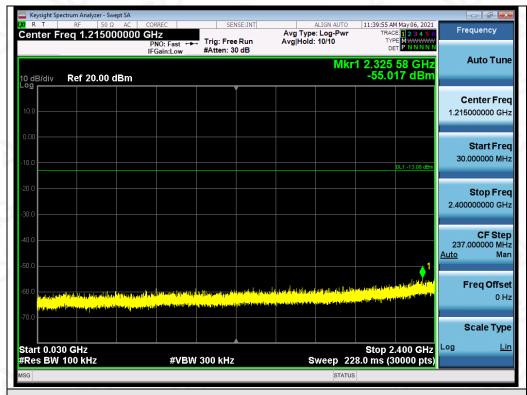




Test_Graph_802.11b_ANT1_2437_1Mbps_Higher Band Emissions

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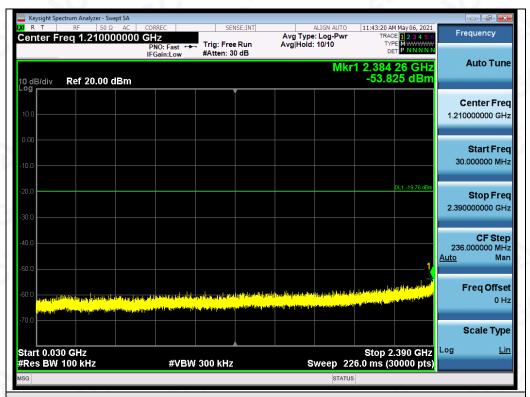


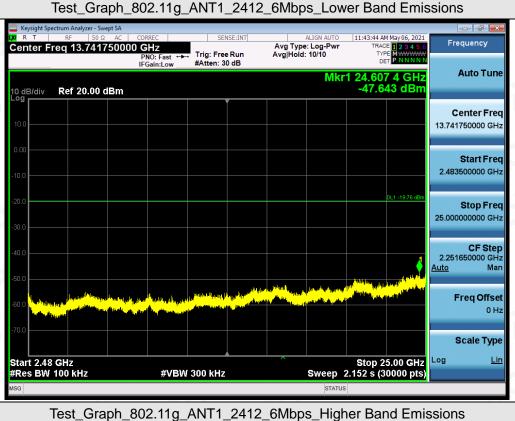


Test_Graph_802.11b_ANT1_2462_1Mbps_Higher Band Emissions

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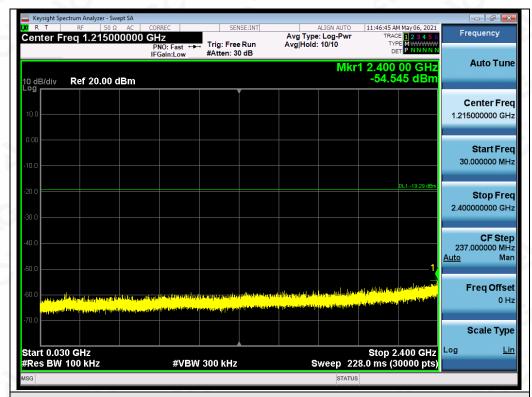






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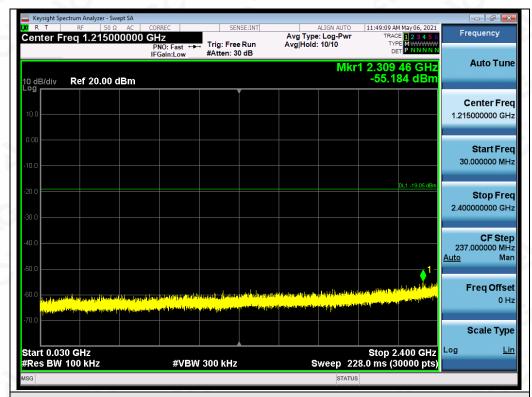


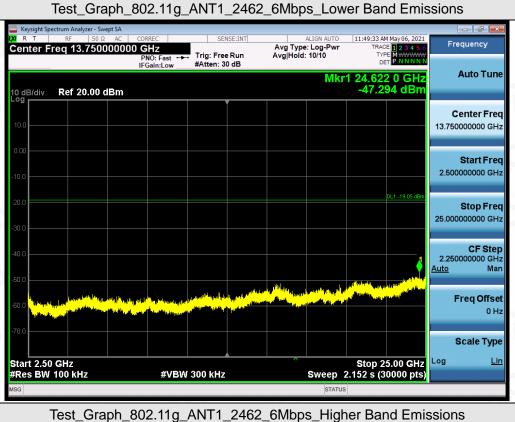




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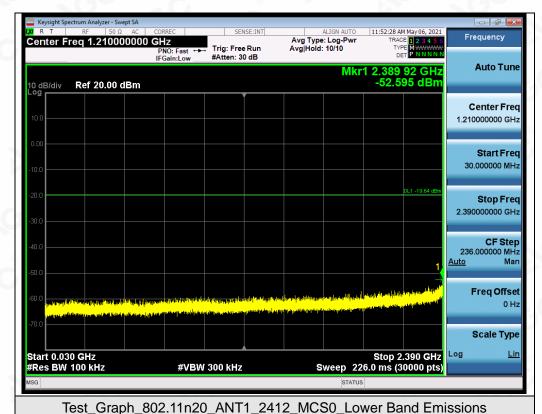






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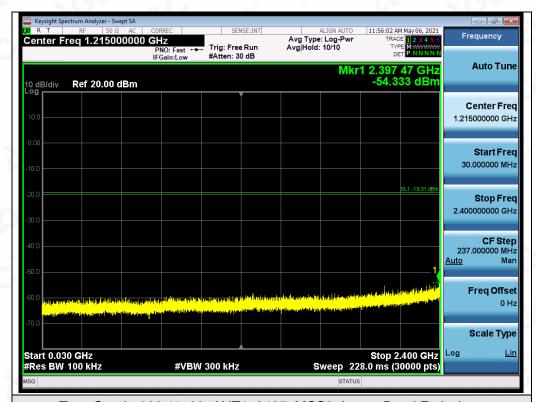


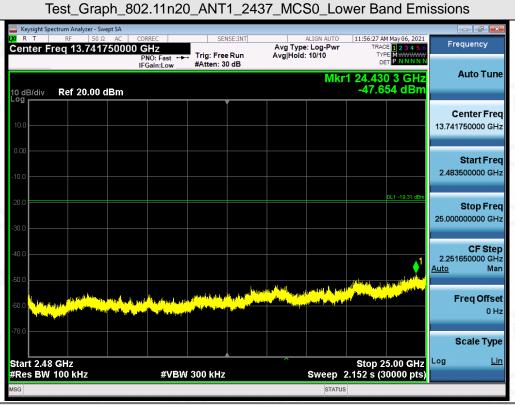




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Test_Graph_802.11n20_ANT1_2437_MCS0_Higher Band Emissions

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Test_Graph_802.11n20_ANT1_2462_MCS0_Higher Band Emissions

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g/Inspection



Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands



Test_Graph_802.11b_ANT1_2412_1Mbps_Lower Band Edge Emissions



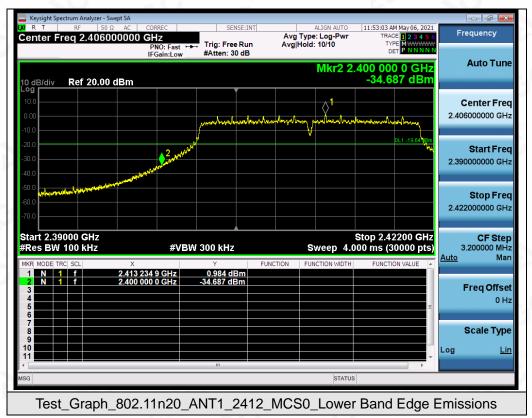
Test_Graph_802.11g_ANT1_2412_6Mbps_Lower Band Edge Emissions

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Attestation of Global Compliance(Shenzhen)Co., Ltd Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/

g/Inspection
The test results
the test report.





Note: Emissions from 2483.5-2500MHz which fall in the restricted bands had been considered with the radiated emission limits specified.

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10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

10.1 MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the ANSI C63.10 (2013) item 11.10 was used in this testing.

10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer to Section 8.2.

10.3 MEASUREMENT EQUIPMENT USED

Refer to Section 6.

10.4 LIMITS AND MEASUREMENT RESULT

	Test Data of Conducted Output Power Spectral Density						
Test Mode	Test Channel (MHz)	Power density (dBm/20kHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail		
	2412	1.826	-6.413		Pass		
802.11b	2437	1.349	-6.89		Pass		
	2462	3.021	-5.218	- \$8	Pass		
9	2412	-4.975	-13.214		Pass		
802.11g	2437	-4.686	-12.925		Pass		
	2462	-4.514	-12.753		Pass		
7.0	2412	-5.292	-13.531		Pass		
802.11n20	2437	-5.388	-13.627		Pass		
	2462	-4.898	-13.137		Pass		

Note: Power density(dBm/3kHz) = Power density(dBm/20kHz) - 10*log(20/3).

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