

TEST REPORT

FCC ID: 2ACJAHNDPF

Product: photo frame

Model No.: SDPF1095-B

Additional Model No.: HN-DPF1000, HN-DPF10XX ("XX" 00-99)

Trade Mark: N/A

Report No.: TCT171116E010

Issued Date: Dec. 01, 2017

Issued for:

Shenzhen Harmony Technology Co., Ltd
Block 2, Jiayuan Industrial Zone, Heping Community, high-tech park,
No 2 Fuyuan Road, Fuyong, Bao'an, Shenzhen, China

Issued By:

Shenzhen Tongce Testing Lab.
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1. Test Certification

Product:	photo frame
Model No.:	SDPF1095-B
Additional Model No.:	HN-DPF1000, HN-DPF10XX("XX" 00-99)
Trade Mark:	N/A
Applicant:	Shenzhen Harmony Technology Co., Ltd
Address:	Block 2, Jiayuan Industrial Zone, Heping Community, high-tech park, No 2 Fuyuan Road, Fuyong, Bao'an, Shenzhen, China
Manufacturer:	Shenzhen Harmony Technology Co., Ltd
Address:	Block 2, Jiayuan Industrial Zone, Heping Community high-tech Park, No 2 Fuyuan Road, Fuyong, Bao'an, Shenzhen, China
Date of Test:	Nov. 17, 2017 - Nov. 30, 2017
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 KDB 558074 D01 DTS Meas Guidance v03r05

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Garen

Date: Nov. 30, 2017

Reviewed By:

Date: Dec. 01, 2017

Approved By:

Date: Dec. 01, 2017



2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203/§15.247 (c)	PASS
AC Power Line Conducted Emission	§15.207	PASS
Conducted Peak Output Power	§15.247 (b)(3) §2.1046	PASS
6dB Emission Bandwidth	§15.247 (a)(2) §2.1049	PASS
Power Spectral Density	§15.247 (e)	PASS
Band Edge	1§5.247(d) §2.1051, §2.1057	PASS
Spurious Emission	§15.205/§15.209 §2.1053, §2.1057	PASS

Note:

- 1. PASS: Test item meets the requirement.
- 2. Fail: Test item does not meet the requirement.
- 3. N/A: Test case does not apply to the test object.
- 4. The test result judgment is decided by the limit of test standard.





3. EUT Description

Product:	photo frame		
Model No.:	SDPF1095-B		
Additional Model No.:	HN-DPF1000, HN-DPF10XX("XX" 00-99)		
Trade Mark:	N/A		
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20))		
Channel Separation:	5MHz		
Number of Channel:	11 for 802.11b/802.11g/802.11n(HT20)		
Modulation Technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)		
Modulation Technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)		
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps		
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps		
Data speed (IEEE 802.11n):	Up to 150Mbps		
Antenna Type:	Internal Antenna		
Antenna Gain:	1.0dBi		
Power Supply:	Adapter Information: MODEL: HJ-050200U INPUT: AC 100-240V, 50/60Hz, 0.6A Max OUTPUT: 5V, 2A		
Remark:	All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.		



Operation Frequency each of channel For 802.11b/g/n(HT20)

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

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

802.11b/802.11g/802.11n (HT20)

Channel	Frequency
The lowest channel	2412MHz
The middle channel	2437MHz
The Highest channel	2462MHz



4. Genera Information

4.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 98.46%)

The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. For the full battery state and The output power to the maximum state.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate	
802.11b	1Mbps	
802.11g	6Mbps	
802.11n(H20)	6.5Mbps	

Final Test Mode:

Operation mode:		Keep the EUT in continuous transmitting	
		with modulation	

- 1. For WIFI function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.
- 2.According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup" 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20). Duty cycle setting during the transmission is 98.5% with maximum power setting for all modulations.



4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	1	1	/

Note:

- 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. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.





5. Facilities and Accreditations

5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

• FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District,

Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, 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 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%



6. Test Results and Measurement Data

6.1. Antenna requirement

Standard requirement: FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

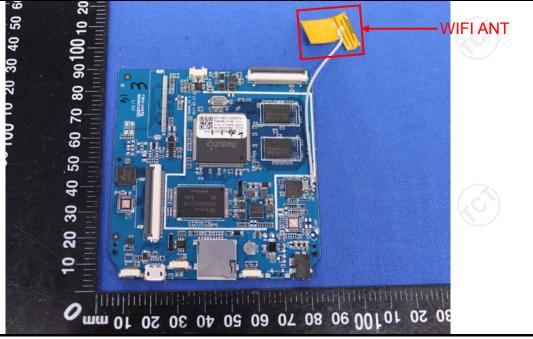
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:

The WIFI antenna is internal antenna which permanently attached, and the best case gain of the antenna is 1.0dBi.







6.2. Conducted Emission

6.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207			
Test Method:	ANSI C63.10:2013			
Frequency Range:	150 kHz to 30 MHz			
Receiver setup:	RBW=9 kHz, VBW=30	kHz, Sweep time	=auto	
	Frequency range Limit (dBuV)			
	(MHz)	Quasi-peak	Áverage	
Limits:	0.15-0.5	66 to 56*	56 to 46*	
	0.5-5	56	46	
	5-30	60	50	
	Reference	e Plane		
Test Setup:	Remark E.U.T AC power Remark E.U.T: Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m			
Test Mode:	transmitting with modu	lation		
Test Procedure:	 The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 			
Test Result:	PASS			



6.2.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)					
Equipment	Manufacturer	Model	Serial Number	Calibration Due	
Test Receiver	R&S	ESPI	101401	Jun. 12, 2018	
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 27, 2018	
Coax cable (9KHz-30MHz)	тст	CE-05	N/A	Sep. 27, 2018	
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A	

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

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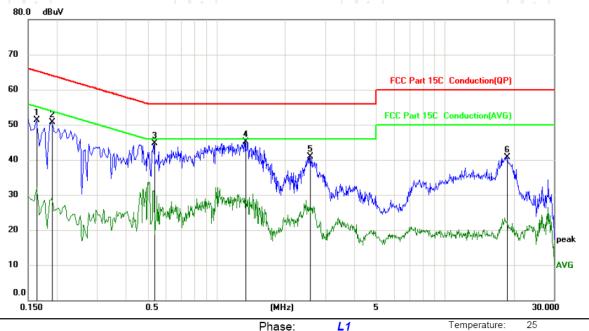
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6.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Limit: FCC Part 15C Conduction(QP)

Power: AC 120V/60Hz Humidity: 55 %

	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
-			MHz	dBuV	dB	dBuV	dBu∀	dB	Detector	Comment
_	1		0.1635	39.74	11.49	51.23	65.28	-14.05	peak	
_	2		0.1905	39.23	11.47	50.70	64.01	-13.31	peak	
-	3		0.5325	33.32	11.29	44.61	56.00	-11.39	peak	
-	4	*	1.3380	33.69	11.38	45.07	56.00	-10.93	peak	
-	5		2.5574	29.31	11.50	40.81	56.00	-15.19	peak	
	6		18.6990	29.89	10.88	40.77	60.00	-19.23	peak	

Note:

Freq. = Emission frequency in MHz

Reading level $(dB\mu V)$ = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

Measurement ($dB\mu V$) = Reading level ($dB\mu V$) + Corr. Factor (dB)

Limit $(dB\mu V)$ = Limit stated in standard

 $Margin (dB) = Measurement (dB\mu V) - Limits (dB\mu V)$

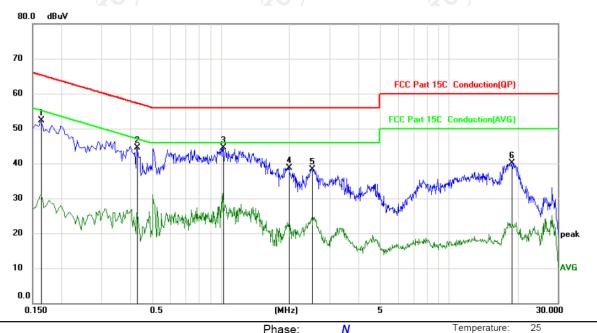
Q.P. =Quasi-Peak

AVG =average

^{*} is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.



Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Limit: FCC Part 15C Conduction(QP)

AC 120V/60Hz Power:

Humidity:

55 %

No	. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBu∀	dB	Detector	Comment	
1		0.1635	40.76	11.49	52.25	65.28	-13.03	peak		
2		0.4290	33.19	11.35	44.54	57.27	-12.73	peak		
3	*	1.0230	33.33	11.22	44.55	56.00	-11.45	peak		
4		1.9815	27.09	11.69	38.78	56.00	-17.22	peak		
5		2.5125	26.80	11.51	38.31	56.00	-17.69	peak		
6		18.8430	29.18	10.85	40.03	60.00	-19.97	peak		

Note:

Site

Freq. = Emission frequency in MHz

Reading level $(dB\mu V)$ = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

Measurement $(dB\mu V)$ = Reading level $(dB\mu V)$ + Corr. Factor (dB)

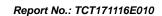
 $Limit (dB\mu V) = Limit stated in standard$

 $Margin (dB) = Measurement (dB\mu V) - Limits (dB\mu V)$

Q.P. =Quasi-Peak

AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.





6.3. Maximum Conducted (Average) Output Power

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)			
Test Method:	KDB 558074			
Limit:	30dBm			
Test Setup:	Spectrum Analyzer EUT			
Test Mode:	Transmitting mode with modulation			
Test Procedure:	 Transmitting mode with modulation The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r05. 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. Measure the conducted output power and record the 			
Test Result:	PASS			

6.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF Cable (9KHz-26.5GHz)	тст	RE-06	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-01	N/A	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

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6.3.3. Test Data

802.11b mode			
Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	12.21	30.00	PASS
Middle	12.23	30.00	PASS
Highest	11.89	30.00	PASS

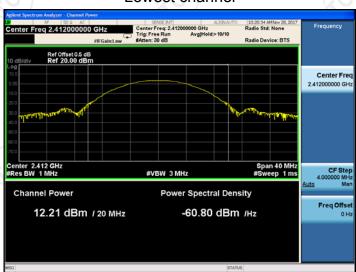
802.11g mode			
Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	12.51	30.00	PASS
Middle	12.65	30.00	PASS
Highest	12.46	30.00	PASS

802.11n(H20) mode			
Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	12.54	30.00	PASS
Middle	12.49	30.00	PASS
Highest	12.18	30.00	PASS

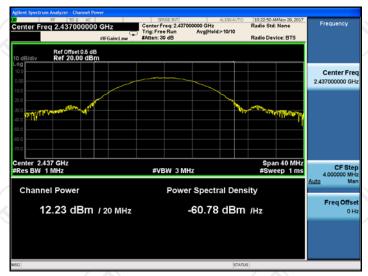


Test plots as follows: 802.11b Modulation

Lowest channel



Middle channel



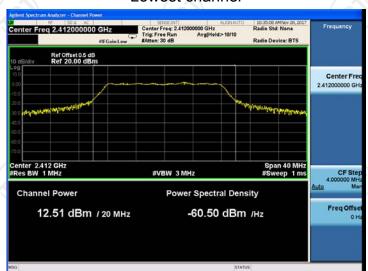
Highest channel



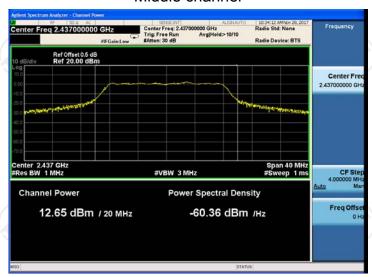


802.11g Modulation

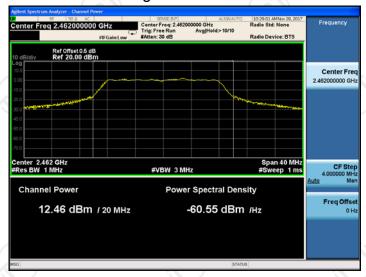
Lowest channel



Middle channel



Highest channel



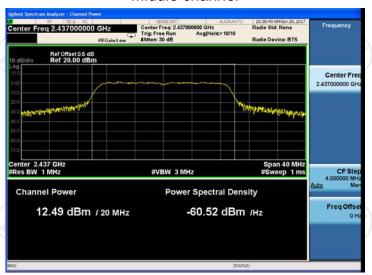


802.11n (HT20) Modulation

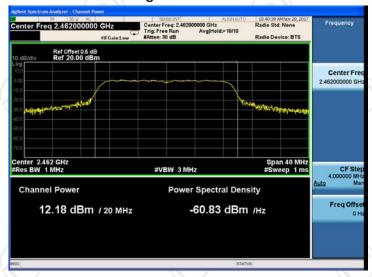
Lowest channel



Middle channel



Highest channel







6.4. Emission Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB 558074
Limit:	>500kHz
Test Setup:	EUT.
	Spectrum Analyzer
Test Mode:	Transmitting mode with modulation
Test Procedure:	 The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r05. Set to the maximum power setting and enable the EUT transmit continuously. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. Measure and record the results in the test report.
Test Result:	PASS

6.4.2. Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Due	
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018	
RF Cable (9KHz-26.5GHz)	тст	RE-06	N/A	Sep. 27, 2018	
Antenna Connector	тст	RFC-01	N/A	Sep. 27, 2018	

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

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6.4.3. Test data

Took also and	6dB Emission Bandwidth (MHz)				
Test channel	802.11b	802.11g	802.11n(H20)		
Lowest	8.86	16.49	17.74		
Middle	8.85	16.49	17.77		
Highest	8.83	16.49	17.77		
Limit:		>500k			
Test Result:		PASS			

Test plots as follows:



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802.11b Modulation

Lowest channel



Middle channel



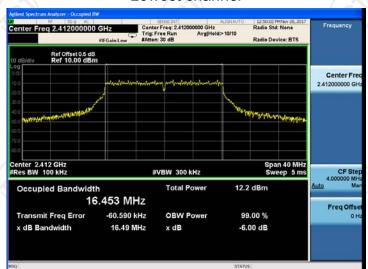
Highest channel





802.11g Modulation

Lowest channel



Middle channel



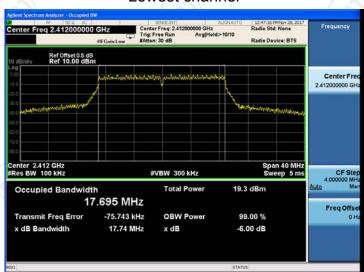
Highest channel





802.11n (HT20) Modulation

Lowest channel



Middle channel



Highest channel







6.5. Power Spectral Density

6.5.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB 558074
Limit:	The average power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	 The testing follows Measurement Procedure 10.3 Method AVGPSD of FCC KDB Publication No.558074 D01 DTS Meas. Guidance v03r05 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. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): 3 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x RBW. Set the span to at least 1.5 times the OBW. Detector = RMS, Sweep time = auto couple. Employ trace averaging (RMS) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level. Measure and record the results in the test report.
Test Result:	PASS

6.5.2. Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Due	
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018	
RF Cable (9KHz-26.5GHz)	тст	RE-06	N/A	Sep. 27, 2018	
Antenna Connector	TCT	RFC-01	N/A	Sep. 27, 2018	

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



6.5.3. Test data

Test channel	AVG Power Spectral Density (dBm/3kHz)			
	802.11b	802.11g	802.11n(H20)	
Lowest	-19.26	-25.45	-27.92	
Middle	-19.69	-25.76	-27.71	
Highest	-19.46	-25.76	-28.03	
Limit:	8dBm/3kHz			
Test Result:	PASS			

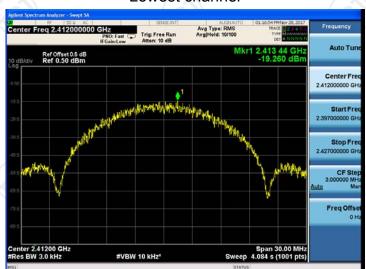
Test plots as follows:



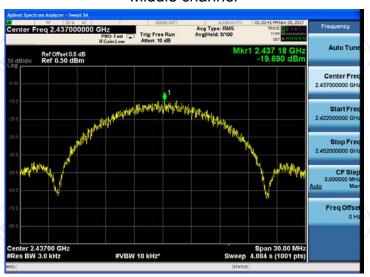


802.11b Modulation

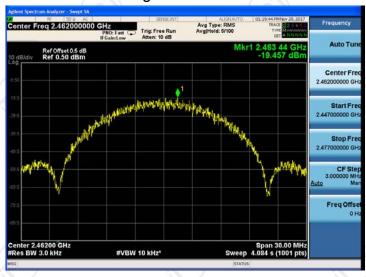
Lowest channel



Middle channel



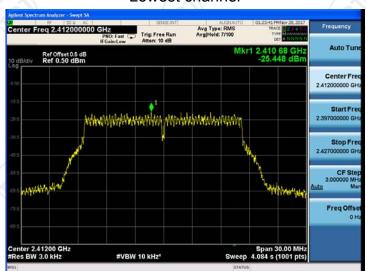
Highest channel



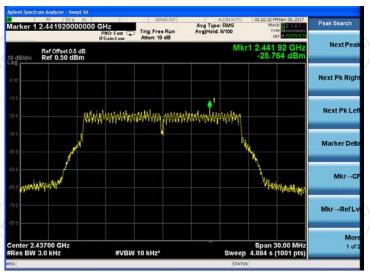


802.11g Modulation

Lowest channel



Middle channel



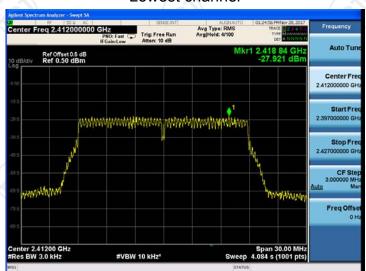
Highest channel





802.11n (HT20) Modulation

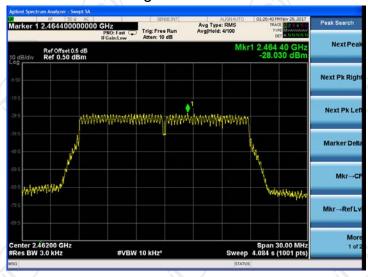
Lowest channel



Middle channel



Highest channel





6.6. Conducted Band Edge and Spurious Emission Measurement

6.6.1. Test Specification

FCC Part15 C Section 15.247 (d)			
KDB558074			
In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).			
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1201			
Transmitting mode with modulation 1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05. 2. 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. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). 5. Measure and record the results in the test report.			
against the limit line in the operating frequency band. PASS			