

### SHANTOU CITY HENGDI INDUSTRY CO., LTD

Application For Certification

#### FCC ID: 2AALAHD17F24GR

#### **DRONE POCKET SIZE 9INCH WITH CAMERA STREAMING**

#### Model: HD2017F

#### 2.4GHz Wi-Fi Transceiver

#### Report No.: GZHH00245129-001

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-15]

Prepared and Checked by:

Approved by:

Sign on file

Terry Tang Senior Engineer Kidd Yang Senior Project Engineer Date: July 8, 2017

• The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.

- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results referenced from this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
- For Terms And Conditions of the services, it can be provided upon request.
- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF no.: FCC 15C\_Tx\_c

#### Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China

Tel / Fax: 86-20-8213 9688/86-20-3205 7538 Website: www.china.intertek-etlsemko.com

## LIST OF EXHIBITS

#### INTRODUCTION

EXHIBIT 1:	Summary of Tests
EXHIBIT 2:	General Description
EXHIBIT 3:	System Test Configuration
EXHIBIT 4:	Measurement Results
EXHIBIT 5:	Equipment Photographs
EXHIBIT 6:	Product Labeling
EXHIBIT 7:	Technical Specifications
EXHIBIT 8:	Instruction Manual
EXHIBIT 9:	Confidentiality Request
EXHIBIT 10:	Miscellaneous Information
EXHIBIT 11:	Test Equipment List

#### MEASUREMENT/TECHNICAL REPORT

### DRONE POCKET SIZE 9INCH WITH CAMERA STREAMING

### Model: HD2017F

### FCC ID: 2AALAHD17F24GR

This report concerns (check one) O	riginal Grant <u>X</u> Class II Change
Equipment Type: <u>DTS - Part 15 Digi</u> portion)	tal Transmission Systems (Wi-Fi transmitter
Deferred grant requested per 47 CFR	0.457(d)(1)(ii)? Yes NoX
	If yes, defer until : date
Company Name agrees to notify the C	ommission by: date
of the intended date of announceme issued on that date.	nt of the product so that the grant can be
Transition Rules Request per 15.37?	Yes NoX
If no, assumed Part 15, Subpart C [10-01-15] Edition] provision.	for intentional radiator - the new 47 CFR
Report prepared by:	
lr ,	erry Tang Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Block E, No.7-2 Guang Dong Software Scienc Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China Phone: 86-20-8213 9688 Fax: 86-20-3205 7538

### **Table of Contents**

1.0	Summary of Test results	2
2.0	General Description	4
2.1 2.2 2.3 2.4	Product Description Related Submittal(s) Grants Test Methodology. Test Facility	4 4
3.0	System Test Configuration	6
3.1 3.2 3.3 3.4 3.5 3.6	Justification EUT Exercising Software Special Accessories Measurement Uncertainty Equipment Modification Support Equipment List and Description	6 7 7 7
4.0	Measurement Results	9
4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.10	Maximum Conducted Output Power at Antenna Terminals Minimum 6 dB RF Bandwidth Maximum Power Density Reading Out of Band Conducted Emissions. Out of Band Radiated Emissions. Transmitter Radiated Emissions in Restricted Bands Field Strength Calculation Radiated Spurious Emission Radiated Emissions from Digital Section of Transceiver. Transmitter Duty Cycle Calculation and Measurements	10 17 24 40 41 42 43 54 55
5.0	Equipment Photographs	
6.0 7.0 8.0	Product Labelling <u>Technical Specifications</u> Instruction Manual	. 61
9.0	Confidentiality Request	
	Discussion of Pulse Desensitization	
11.0	Test Equipment List	

#### List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

# EXHIBIT 1

## SUMMARY OF TEST RESULTS

#### 1.0 <u>Summary of Test results</u>

### DRONE POCKET SIZE 9INCH WITH CAMERA STREAMING

#### Model: HD2017F

#### FCC ID: 2AALAHD17F24GR

TEST ITEM	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

## EXHIBIT 2

## **GENERAL DESCRIPTION**

#### 2.0 General Description

#### 2.1 Product Description

The Equipment Under Test (EUT) is a DRONE POCKET SIZE 9INCH WITH CAMERA STREAMING with Wi-Fi function operating at 2412-2462MHz for 802.11b/g/n-HT20, 11 channels with 5MHz channel spacing. The EUT is powered by rechargeable battery (DC 3.7V) which can be charged by USB port(DC 5V). For more detailed features description, please refer to the user's manual.

Type of Modulation: CCK, BPSK, QPSK, 16QAM, 64QAM

Antenna Type: Integral Antenna

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

#### 2.2 Related Submittal(s) Grants

This is an application for certification of: DTS- Part 15 Digital Transmission Systems (2.4GHz Wi-Fi transmitter portion).

#### 2.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.10: 2013 and KDB 558074 D01 v04. Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

#### 2.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Guangzhou Branch** and located at Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 549654).

## **EXHIBIT 3**

## SYSTEM TEST CONFIGURATION

#### 3.0 System Test Configuration

#### 3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by one fully 3.7V rechargeable battery during the test.

On 802.11b/g/n-HT20 mode, only one antenna is used, and all data rate were tested and only the worst case data is shown in the report.

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

The unit was operated standalone and placed at the centre of turntable.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

#### 3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

#### The parameters of test software setting:

During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

3.3 Special Accessories

N/A.

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

3.5 Equipment Modification

Any modifications installed previous to testing by SHANTOU CITY HENGDI INDUSTRY CO., LTD will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
iPod (Provided by Intertek)	Apple	A1421

## **EXHIBIT 4**

## MEASUREMENT RESULTS

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

#### 4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna power of the EUT was connected to the input of a broadband peak RF power meter. The power meter have a video bandwidth that is greater than DTS bandwidth and utilize a fast-responding diode detector. Power was read directly at the EUT antenna terminals with cable loss added.

For antennas with gains of 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm).

IEEE 802.11b (Antenna Gain = 0dBi) (CCK, 1Mbps)			
Frequency (MHz) Output in dBm Output in mWatt			
Low Channel: 2412 17.4 55.0			
Middle Channel: 2437 17.4 55.0			
High Channel: 2462 17.5 56.2			

IEEE 802.11g (Antenna Gain = 0dBi) (16QAM, 6Mbps)			
Frequency (MHz)Output in dBmOutput in mWatt			
Low Channel: 2412	16.9	49.0	
Middle Channel: 2437 17.0 50.1			
High Channel: 2462	17.2	52.5	

IEEE 802.11n-HT20 (Antenna Gain = 0dBi) (64QAM, 6Mbps)			
Frequency (MHz) Output in dBm Output in mWat			
Low Channel: 2412	17.0	50.1	
Middle Channel: 2437 17.1 51.3		51.3	
High Channel: 2462	17.3	53.7	

Cable loss: 1.0 dB External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 17.5dBm

For RF Exposure, the information is saved with filename: RF exposure.pdf.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

#### 4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a) (2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074 D01 v04. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

IEEE 802.11b (CCK, 1Mbps)		
Frequency (MHz)6 dB Bandwidth (MHz)		
2412	10.072	
2437	10.724	
2462	10.767	

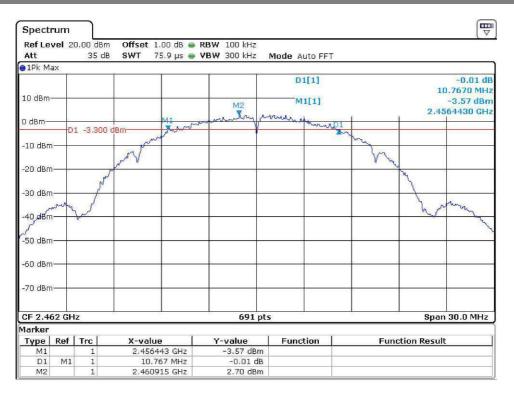
IEEE 802.11g (16QAM, 6Mbps)		
Frequency (MHz) 6 dB Bandwidth (MHz)		
2412	16.454	
2437	16.498	
2462	16.498	

IEEE 802.11n-HT20 (64QAM, 6Mbps)		
Frequency (MHz)6 dB Bandwidth (MHz)		
2412	17.670	
2437 17.670		
2462	17.670	

The test plots are attached as below.

#### 802.11b

19	տ ]							
	l 20.00 dBm		CONTRACTOR AND ADDRESS OF ADDRESS	BW 100 kHz				(v
Att 1Pk Max	35 dB	SWT 7	5.9 µs 🥌 V	BW 300 kHz	Mode Auto FF			
					D1[1]			-0.20 dB
10 dBm					o M1[1]		1	0.0720 MHz -3.06 dBm
				manny )	hermonite		2.40	070070 GHz
0 dBm	D1 -2.810	dBm	Torner	Marine M	- Work And advanced	NI		
-10 dBm—		- Nor	1ª			- Ward		
		ww				my		
-20 dBm—	لر	hr		0			4	59
-30 dBm—							4	
and a	my f							monthing -
-40 dBm—	YN	-					"h/	- Marin
,≁ -50 dBm—								N.
-50 UBIII								
-60 dBm—						v		
-70 dBm—	2							8
					and the second sec			00.0101
CF 2.412 Iarker	GHz			691 pl	IS		Spar	n 30.0 MHz
	ef   Trc	X-valu	e	Y-value	Function	Fun	ction Resul	t
M1	1		IO7 GHz	-3.06 dBm				
D1   M2	M1 1 1		72 MHz -78 GHz	-0.20 dB 3.19 dBm				
Att	35 dB			<b>BW</b> 100 kHz				
11 - 11 - 12 - 13 - 14 - 14 - 14 - 14 - 14 - 14 - 14	55 05	SWT 7	5.9 µs 💩 V	BW 300 kHz	Mode Auto FF	т		
11.000-000		SWT 7	5.9 µs 👄 V		Mode Auto FF M2[1]	T	9.44	
1Pk Max		SWT 7	5.9 µs 🕳 V	BW 300 kHz	M2[1]	T	2,4	375210 GHz
) 1Pk Max 10 dBm—		SWT 7		BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
) 1Pk Max 10 dBm	D1 -3.690		5.9 µs 🖝 V	BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
) 1Pk Max 10 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
) 1Pk Max 10 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
) 1Pk Max 10 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
) 1Pk Max 10 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
Pk Max ما 20 ما 2				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
10 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
10 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
1Pk Max     10 dBm     0 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
<ul> <li>10 dBm</li> <li>10 dBm</li> <li>0 dBm</li> <li>-10 dBm</li> <li>-20 dBm</li> <li>-30 dBm</li> <li>-30 dBm</li> <li>-50 dBm</li> <li>-60 dBm</li> </ul>				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
10 dBm				BW 300 kHz	M2[1]			375210 GHz -4.05 dBm
10 dBm				BW 300 kHz	M2[1]		2.4	375210 GHz -4.05 dBm 315300 GHz
<ul> <li>1Pk Max</li> <li>10 dBm</li> <li>0 dBm</li> <li>-10 dBm</li> <li>-20 dBm</li> <li>-30 dBm</li> <li>-30 dBm</li> <li>-50 dBm</li> <li>-60 dBm</li> <li>-70 dBm</li> <li>CF 2.437</li> </ul>				BW 300 kHz	M2[1]		2.4	375210 GHz -4.05 dBm
<ul> <li>1Pk Max</li> <li>10 dBm</li> <li>0 dBm</li> <li>-10 dBm</li> <li>-20 dBm</li> <li>-30 dBm</li> <li>-30 dBm</li> <li>-50 dBm</li> <li>-60 dBm</li> <li>-70 dBm</li> <li>-70 dBm</li> <li>CF 2.437</li> <li>Yarker</li> </ul>	D1 -3.690 /	dBm-	M1 Vorward	BW 300 kHz	M2[1] 2 M1[1] 12 M1[1]	A DI Man Jun Man Jun M	2.4	
	D1 -3.690	dBm 	M1 	BW 300 kHz	M2[1] 2 M1[1] 12 M1[1] 12 M1[1] 13 M1[1] 14 M1[1]	A DI Man Jun Man Jun M	2.4	375210 GHz
	D1 -3.690	dBm	M1	BW 300 kHz	M2[1] 2 M1[1] 2 M1[1]	A DI Man Jun Man Jun M	2.4	375210 GHz



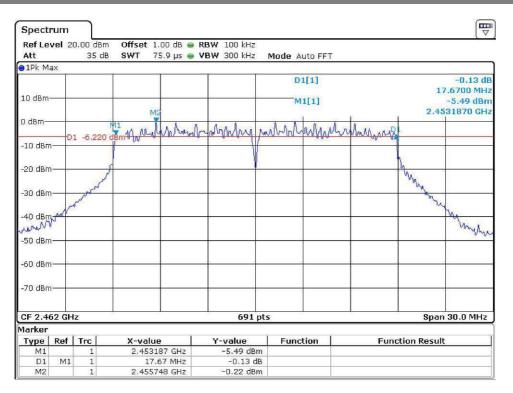
### 802.11g

Spectrum									
Ref Level 2 Att	20.00 dBm 35 dB		dB 👄 RBW 10 µs 👄 VBW 30		<b>1ode</b> Auto FF	τ			×
1Pk Max				Ť					
					D1[1]				0.20 dl
LO dBm					M1[1]				16.4540 MH -5.89 dBn
R.		Ma				r	Ĩ	2.4	1037510 GH
) dBm	D1 -6.800 c	MI MULMA	Mythin	MM m	Marshally	nhala	4, Q1		
10 dBm	JI -0.000 C			V			107		
20 dBm	1	5				6.	Y		- 33
30 dBm	Arment							a Jan a Jura	
	Ser and							Nr.	ala
							-		M
1/1/1/ 50 dBm									Munu
60 dBm									
70 dBm									
F 2.412 G	LI-7			691 pts	2 43			Sna	in 30.0 MHz
arker	12			031 hr3				эрс	11 JU.0 MI12
Type   Ref	Trc	X-value	Y-v	alue	Function	T	Func	tion Resu	ılt
M1	1	2.403751 0	GHz -5	.89 dBm					
D1 M1 M2	1 1	16.454 N		0.20 dB					
		2,405748 0	iHz – U	.80 dBm					
Ref Level 2	20.00 dBm	<b>Offset</b> 1.00 (	db 👄 RBW 11	00 kHz					T (T
Ref Level 2 Att		<b>Offset</b> 1.00 (		00 kHz	<b>1ode</b> Auto FF	-т			Ţ
Ref Level 2 Att	20.00 dBm	<b>Offset</b> 1.00 (	db 👄 RBW 11	00 kHz	Node Auto FF D1[1]				0.05 d
Ref Level 2 Att 1Pk Max	20.00 dBm	<b>Offset</b> 1.00 (	db 👄 RBW 11	00 kHz	D1[1]	T			0.05 d 16.4980 MH
Ref Level 2 Att 1Pk Max	20.00 dBm	Offset 1.00 ( SWT 75.9	db 👄 RBW 11	00 kHz		PT			0.05 d 16.4980 MH -6.69 dBi
Ref Level 2 Att 1Pk Max 0 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I			0.05 d 16.4980 MH -6.69 dBi
Ref Level 2 Att 1Pk Max 0 dBm dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1]	I	V NR1		0.05 d 16.4980 MH -6.69 dBi
Ref Level 2 Att 1Pk Max 0 dBm dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	V NR1		0.05 d 16.4980 MH -6.69 dBi
Act Level 2 Att 1Pk Max 0 dBm dBm 10 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dB 1287510 GH
Acf Level 2 Att 1Pk Max 0 dBm dBm 10 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dB 1287510 GH
Acf Level 2 Att 1Pk Max 0 dBm dBm 10 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dBr 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dBr 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dB 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm           40 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dBr 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           0 dBm           20 dBm           30 dBm           40 dBm           50 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dBr 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           0 dBm           20 dBm           30 dBm           40 dBm           50 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dBr 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm           40 dBm           50 dBm           50 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dB 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm           50 dBm           50 dBm           70 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/		D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dB 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm           40 dBm           50 dBm	20.00 dBm 35 dB	Offset 1.00 ( SWT 75.9)	dB <b>● RBW</b> 1/ µs <b>● VBW</b> 3/	00 kHz 00 kHz N	D1[1] M1[1]	I	U T	2.4	0.05 d 16.4980 MH -6.69 dBr 1287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           0 dBm           10 dBm           20 dBm           30 dBm           40 dBm           50 dBm           60 dBm           70 dBm           70 dBm           72 dBm           73 dBm           74 dBm	20.00 dBm 35 dB 01 -6.630 c	Offset 1.00 ( SWT 75.9)	dB RBW 11 ps VBW 31 March Mar Market March Market	00 kHz N	D1[1]	I		2.4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	m 30.0 MHz
10 dBm	20.00 dBm 35 dB 01 -6.630 c	Offset 1.00 ( SWT 75.9)	dB RBW 11 ps VBW 31 Mmm/mm/mm		D1[1] M1[1]	I		2.4	0.05 d 16.4980 MH -6.69 dBr -287510 GH
Ref Level 2           Att           1Pk Max           0 dBm           0 dBm           10 dBm           20 dBm           30 dBm           40 dBm           50 dBm           70 dBm	20.00 dBm 35 dB 01 -6.630 c mm <sup>2</sup> m <sup>2</sup> M <sup>2</sup> M <sup>2</sup> M <sup>2</sup> M <sup>2</sup> M <sup>2</sup> M <sup>2</sup> M <sup>2</sup> M	Offset 1.00 ( SWT 75.9)	de RBW 11 µs VBW 31	00 kHz N	D1[1]	I		2.4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.05 d 16.4980 MH -6.69 dB -287510 GH

Spect	rum						
Ref Le Att		0.00 di 35			Mode Auto FFT		( •
1Pk M	эх						
10 dBm·					D1[1]		0.42 dE 16.4980 MH -5.93 dBn
0 dBm—	16		Ma	1 4 1			2.4537510 GH
-10 dBm	D	1 -6,40	DO dem Willing	Wallowing M	gunlan mar	and my sty	
-20 dBm	i			V			
-30 dBm	r	anter	and the second sec			- Vy	and and a second
-40 dBm	horas	ul <sup>u</sup>				_	Mar
~1.0 -50 dBm	1						"mun
-60 dBm	r						
-70 dBm	i						
CF 2.4	52 GH	z	20	691 pts	<u>.</u>		Span 30.0 MHz
1arker	Def	Tree	Monthan 1	window 1	management of		n mara a la
Type M1	Ref	1rc	2.453751 GHz	Y-value -5.93 dBm	Function	Functior	n Result
D1	M1	1	16.498 MHz	0.42 dB			
M2	0.001.040	1	2.455748 GHz	-0.40 dBm			

#### 802.11n-HT20

Spectrum Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz 75.9 µs 💿 VBW 300 kHz 35 dB Att SWT Mode Auto FFT 😑 1 Pk Max D1[1] -0.93 dB 17.6700 MHz 10 dBm M1[1] -5.66 dBm 2.4031870 GHz M 0 dBm Angel algarding melyphone Inry. M.L D1 -6.640 d -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm-Um -60 dBm -70 dBm-CF 2.412 GHz 691 pts Span 30.0 MHz Marker Type Ref Trc X-value Y-value Function **Function Result** 2.403187 GHz -5.66 dBm M1 1 D1 17.67 MHz -0.93 dB M1 1 M2 2.405748 GHz -0.64 dBm Spectrum Offset 1.00 dB ● RBW 100 kHz SWT 75.9 µs ● VBW 300 kHz Ref Level 20.00 dBm 35 dB Att Mode Auto FFT 🖯 1Pk Max D1[1] 0.25 dB 17.6700 MHz 10 dBm M1[1] -6.79 dBm 2.4281870 GHz 64 0 dBm D1 -6.420 deman under aller aller and Manhandhard -10 dBm -20 dBm 1 NOVAGENOV -30 dBm -40 dBm🚽 Andrew he him -50 dBm -60 dBm -70 dBm-CF 2.437 GHz Span 30.0 MHz 691 pts Marker X-value 2.428187 GHz Y-value -6.79 dBm Type | Ref | Trc | Function **Function Result** M1 1 D1 17.67 MHz 0.25 dB M1 M2 1 2.430748 GHz -0.42 dBm



Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v04.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/3 kHz.

IEEE 802.11b (	CCK, 1Mbps)
Frequency (MHz)	Power Density with RBW 100KHz
2412	2.54
2437	3.22
2462	3.13

IEEE 802.11g (1	6QAM, 6Mbps)
Frequency (MHz)	Power Density with RBW 100KHz
2412	-0.67
2437	-0.49
2462	-0.17

IEEE 802.11n-HT20	) (64QAM, 6Mbps)
Frequency (MHz)	Power Density with RBW 100KHz
2412	-0.88
2437	-0.49
2462	-0.18

The test plots are attached as below.

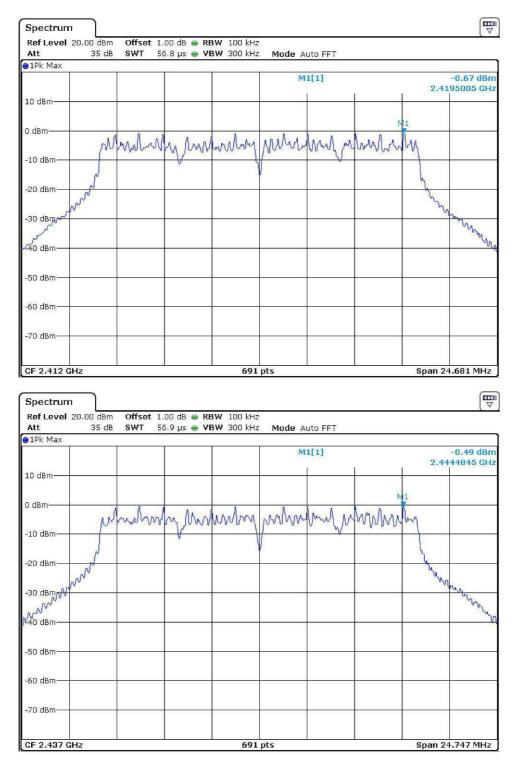
#### 802.11b

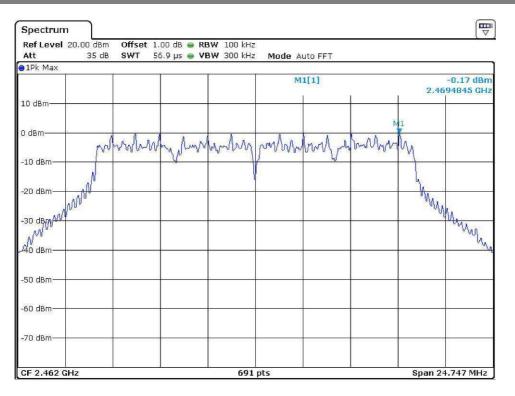
Spectrum 
 Offset
 1.00 dB ●
 RBW
 100 kHz

 SWT
 37.9 μs ●
 VBW
 300 kHz
 Ref Level 20.00 dBm 35 dB Att Mode Auto FFT ⊖1Pk Max M1[1] 2.54 dBm 2.4132680 GHz 10 dBm-MI MAR 0 dBm A. M -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.412 GHz 691 pts Span 15.108 MHz Spectrum Offset 1.00 dB ● RBW 100 kHz SWT 37.9 µs ● VBW 300 kHz Ref Level 20.00 dBm 35 dB Att Mode Auto FFT 😑 1 Pk Max M1[1] 3.22 dBm 2.4364410 GHz 10 dBm M1 A 0 dBmmany -10 dBm Ma Mr. -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm-CF 2.437 GHz 691 pts Span 16.086 MHz

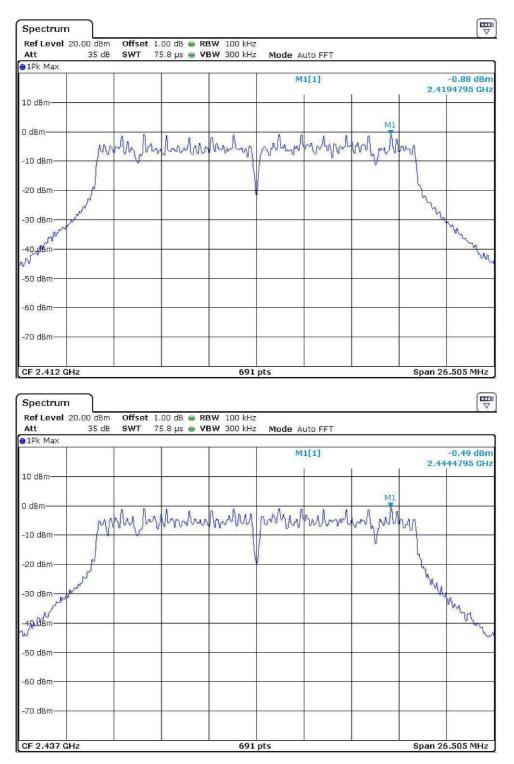
Att 35 dB SWT 37.9 µs 🕳 VI	3W 300 kHz Mode Auto FFT	
)1Pk Max	and the second	I-
	M1[1]	3.13 dBm 2.4625138 GHz
LO dBm		
	money Anderson and and	
) dBm	many martines and	www.www.
10 10 Martin		Munshing
) dBm 10 dBm Mwwwwwwwwwwwwww Marker Mwwwwwwwwwww		Then the
20 dBm		
30 dBm		
40 dBm		
50 dBm		
60 dBm		
70 dBm		

#### 802.11g





#### 802.11n-HT20



Att	35 dB	SWT 7	5.8 µs 💿 VE	3W 300 kHz	Mode A	uto FFT			
1Pk Max		1	1	r	64	1[1]			-0.18 dBm
					111	1[1]			94795 GHz
10 dBm									
							MI		
0 dBm		Max Jak	houter	Rel. Jack	No ROMAN	alass. M.	DAR IN	o. L.	
-10 dBm	par	Incol Dance	A manufacture	a Non And	I house all	A OF A A NO A	man Man	IN	
							Ň		
-20 dBm								1	
	- And							Mar Mary	
-30 dBm	p.							V	W.
10.00									Wild May
W									www.
-50 dBm									
-60 dBm				-					
-70 dBm		1		0	-				

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

#### 4.4 Out of Band Conducted Emissions, FCC Rule 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. The Measurement Procedure was set according to the FCC KDB 558074 D01 v04.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

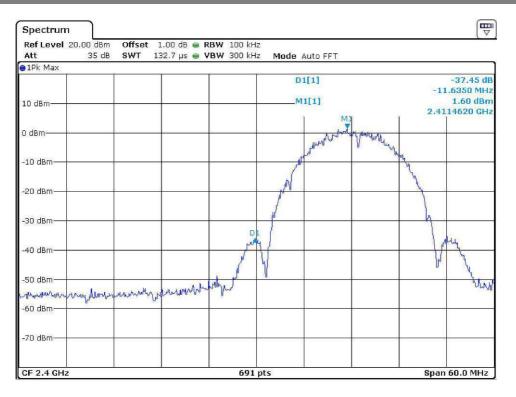
Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b and 6Mbps for 802.11g and 6Mbps for 802.11n-HT20.

The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

The test plots are attached as below.

#### 802.11b Channel 01 (2412MHz) Reference Level: 2.54dBm

Att	20.00 dBm 35 dB		.00 dB 👄 RE 24 ms 👄 VE			uto Currer			
1Pk Max	35 08	SWI	24 ms 🖷 Vi	3W 300 KHZ	MODE A	uto Sweep			
					M	1[1]			37.09 dBn 39830 GH
.0 dBm								<u> </u>	39630 GH
I dBm									
10 dBm—	(								
20 dBm	D1 -17.460	dBm							
co dom									
30 dBm—									
40 dBm—									
									6
50 dBm	and marked an ad	the-alitate reduction	- Unerward	Al-webyparty.	durde at Lobar	my a shine the	444 HANNAMAN	an and the the	mehrule
60 dBm-	and the and the state			W-	withou and mo has				
70 dBm									
			1						
Spectrur	n			691	<u>.</u>			Sto	
Spectrur Ref Level Att	_		00 dB 👄 RE 26 ms 🖷 VI	<b>W</b> 100 kHz		uto Sweep		Sto	
Spectrur Ref Level Att	n 20.00 dBm			<b>W</b> 100 kHz	Mode A				(The second seco
Spectrur	n 20.00 dBm			<b>W</b> 100 kHz	Mode A	uto Sweep	 		(₩ \ 45.45 dBr
Spectrur Ref Level Att 1Pk Max	n 20.00 dBm			<b>W</b> 100 kHz	Mode A				(₩ \ 45.45 dBr
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm			<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm			<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm			<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm 35 dB	SWT 2		<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm	SWT 2		<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm 35 dB	SWT 2		<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm 35 dB	SWT 2		<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm 35 dB	SWT 2		<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm 35 dB	SWT 2		<b>W</b> 100 kHz	Mode A				
Spectrur Ref Level Att .1Pk Max .0 dBm 10 dBm 20 dBm 30 dBm 40 dBm	n 20.00 dBm 35 dB	SWT 2		3W 100 kHz 3W 300 kHz	Mode A	1[1]			45.45 dBn 2.4995 GH
Spectrur Ref Level Att 1Pk Max 0 dBm	n 20.00 dBm 35 dB -D1 -17.460	SWT 2	26 ms  VI	3W 100 kHz 3W 300 kHz	Mode A	1[1]			45.45 dBn 2.4995 GH
Spectrur           Ref Level           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm           40 dBm	n 20.00 dBm 35 dB -D1 -17.460	SWT 2	26 ms  VI	3W 100 kHz 3W 300 kHz	Mode A	1[1]			45.45 dBn 2.4995 GH
Spectrur           Ref Level           Att           1Pk Max           0 dBm           dBm           10 dBm           20 dBm           30 dBm           40 dBm	n 20.00 dBm 35 dB -D1 -17.460	SWT 2	26 ms  VI	3W 100 kHz 3W 300 kHz	Mode A	1[1]			45.45 dBn 2.4995 GH



#### Channel 06 (2437MHz) Reference Level: 3.22dBm

Spectrum Ref Level 20.00 dBm Offset 1.00 dB 👄 RBW 100 kHz Att 35 dB SWT 24 ms 💿 VBW 300 kHz Mode Auto Sweep ⊖1Pk Max M1[1] -48.35 dBm 2.35660 GHz 10 dBm-0 dBm--10 dBm D1 -16.780 dBm -20 dBm -30 dBm -40 dBm M1 -50 dBm and all how to get amurally malitahnadan. Hate HALKIN -60 dBm -70 dBm Stop 2.4 GHz Start 1.0 MHz 691 pts Spectrum Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz 226 ms 💿 VBW 300 kHz 35 dB Att SWT Mode Auto Sweep 😑 1 Pk Max M1[1] 47.50 dBm 6.8015 GHz 10 dBm-0 dBm--10 dBm D1 -16.780 dBm--20 dBm--30 dBm -40 dBm MI -50 dBm - a which we wanter of work had durant home way Hudur Herethank -60 dBm -70 dBm Stop 25.0 GHz Start 2.4835 GHz 691 pts

#### Channel 11 (2462MHz) Reference Level: 3.13dBm

Spectrum Ref Level 20.00 dBm 
 Offset
 1.00 dB ●
 RBW
 100 kHz

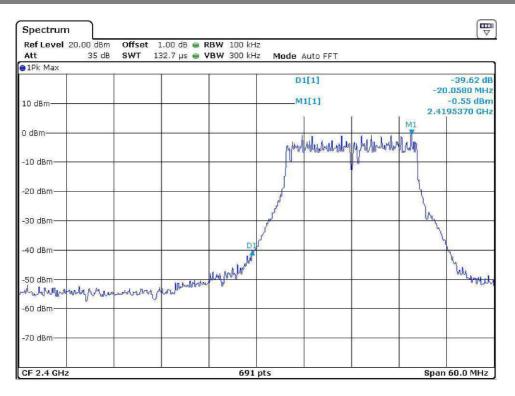
 SWT
 24 ms ●
 VBW
 300 kHz
 35 dB Att Mode Auto Sweep ⊖1Pk Max M1[1] 49.57 dBm 2.38440 GHz 10 dBm-0 dBm--10 dBm D1 -16.870 dBm--20 dBm--30 dBm -40 dBm D. -50 dBm Martinet John haut the why you your us helent -60 dBm -70 dBm Stop 2.4 GHz 691 pts Start 1.0 MHz Spectrum 
 Offset
 1.00 dB
 RBW
 100 kHz

 SWT
 226 ms
 VBW
 300 kHz
 Ref Level 20.00 dBm Att 35 dB Mode Auto Sweep 😑 1 Pk Max M1[1] 47.47 dBm 6.8665 GHz 10 dBm-0 dBm--10 dBm-D1 -16.870 dBm -20 dBm--30 dBm -40 dBm M -50 dBm mut many hours from a walk man a hard walk ad unhadow -60 dBm -70 dBm-691 pts Start 2.4835 GHz Stop 25.0 GHz



#### 802.11g Channel 01 (2412MHz) Reference Level: -0.67dBm

Ref Level 20.00 att 35	iBm Offset i dB SWT	1.00 dB 👄 RB 24 ms 👄 VB			uto Russer			
11Pk Max	UD SWI	24 115 👿 ¥t	<b>314</b> 300 KHZ	MOUE A	uto sweep			
	Ĩ			M	1[1]			39.30 dBn
10 dBm							2.	39830 GH:
) dBm								
-10 dBm	~	>	·			· · · · ·		
	contraction in a							
20 dBm01 -20	.670 dBm							
30 dBm								
00 4 2019 619 (1008-62-71)								
40 dBm								
								H.
-50 dBm	k or used as hele stat	1. Mun Marked	hadintingue	lk I	a ince bus have	Juny on a line	Hu mure will	uthopsal M
-60 dBm	and the first of the second		the lose	When when	htten hollower and			, , , , , , , <u>,</u>
oo dom								
-70 dBm		_						
Spectrum	dam Offect	1 00 d0 = 0	691	•			Sto	Ē
Spectrum Ref Level 20.00 d Att 35		1.00 dB ● RE 226 ms ● VE	<b>3W</b> 100 kHz		uto Sweep		Sto	p 2.4 GHz
Spectrum Ref Level 20.00 d Att 35			<b>3W</b> 100 kHz	Mode A	uto Sweep			(III
Spectrum Ref Level 20.00 c Att 35 1Pk Max			<b>3W</b> 100 kHz	Mode A				
Spectrum Ref Level 20.00 c Att 35 1Pk Max			<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Att 35 1Pk Max 10 dBm			<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 c Att 35 1Pk Max			<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 d Att 35 1Pk Max			<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 ( Att 35 )1Pk Max 10 dBm -10 dBm	de swr		<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 ( Att 35 )1Pk Max 10 dBm -10 dBm	de swr		<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 c Att 35 1Pk Max 10 dBm 0 dBm -10 dBm -20 d	de swr		<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 c Att 35 1Pk Max 10 dBm 0 dBm -10 dBm -20 d	de swr		<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 d Att 35 01Pk Max 10 dBm 0 dBm	de swr		<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum         Ref Level 20.00 d           Att         35           1Pk Max         10 dBm           10 dBm         10 dBm           -10 dBm         -10 dBm           -30 dBm         -20 dBm           -40 dBm         -40 dBm	.670 dBm		<b>3W</b> 100 kHz	Mode A				( ▼ 44.90 dBn
Spectrum Ref Level 20.00 d Att 35 1Pk Max 10 dBm -10 dBm -20 dBm -20 dBm -10 dBm -20 dBm -40 dBm	.670 dBm	226 ms • VI	3W 100 kHz 3W 300 kHz	Mode A	1[1]			(₩ 44.90 dBn 2.4995 GH2
Spectrum         Ref Level 20.00 d           Att         35           1Pk Max         10 dBm           10 dBm         10 dBm           -10 dBm         10 -20           -30 dBm         01 -20           -30 dBm         -20 -40 mm	.670 dBm		<b>3W</b> 100 kHz	Mode A	1[1]			( ▼ 44.90 dBn
Spectrum           Ref Level 20.00 d           Att 35           )1Pk Max           10 dBm           10 dBm           10 dBm           20 dBm           20 dBm           20 dBm           20 dBm           50 dBm	.670 dBm	226 ms • VI	3W 100 kHz 3W 300 kHz	Mode A	1[1]			(₩ 44.90 dBn 2.4995 GH2
Spectrum         Ref Level 20.00 d           Att         35           1) Pk Max         10 dBm           10 dBm         10 dBm           20 dBm         D1 -20           30 dBm         40 dBm           40 dBm         50 dBm	.670 dBm	226 ms • VI	3W 100 kHz 3W 300 kHz	Mode A	1[1]	The state of the s		(₩ 44.90 dBn 2.4995 GH2

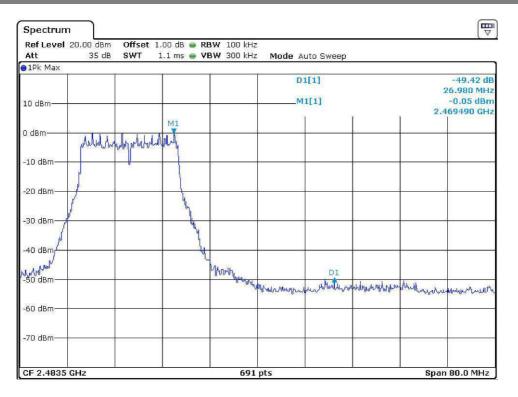


#### Channel 06 (2437MHz) Reference Level: -0.49dBm

Spectrum Ref Level 20.00 dBm Offset 1.00 dB . RBW 100 kHz Att 35 dB SWT 24 ms 👜 VBW 300 kHz Mode Auto Sweep ⊖1Pk Max M1[1] -46.35 dBm 2.35660 GHz 10 dBm-0 dBm--10 dBm -20 dBm-D1 -20.490 dBm--30 dBm -40 dBm M1 -50 dBm metrosenalliprotecturandes montertand Jablanger Manual 1 mon durillevelietu MI NHAPMAN hout show and -60 dBm -70 dBm Start 1.0 MHz Stop 2.4 GHz 691 pts Spectrum Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz 226 ms 💿 VBW 300 kHz 35 dB Att SWT Mode Auto Sweep 😑 1 Pk Max M1[1] 45.79 dBm 2.4995 GHz 10 dBm-0 dBm--10 dBm -20 dBm-D1 -20.490 dBm -30 dBm -40 dBm -50 dBman may 1 where where where the week where the Mayne hall and some and sold sold LonA million interstanting where -60 dBm -70 dBm-Stop 25.0 GHz Start 2.4835 GHz 691 pts

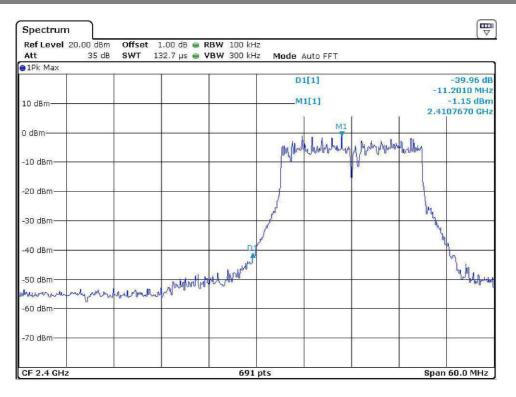
#### Channel 11 (2462MHz) Reference Level: -0.17dBm

Att	0.00 dBm 35 dB	Offset 1 SWT		RBW 100 kH VBW 300 kH		uto Sweep			
1Pk Max			1	- F		4741		55	
					148	1[1]			-44.77 dBm .37740 GHz
.0 dBm					2				
dBm				2					
10 dBm			~	0					2
20 d8m - D	1 00 170	dam							
	1 -20,170	usm							
30 dBm				-					
40 dBm									M
50 d8m			-	0 20.5	-		a sa sa		1975
	wouldness	nulphallows	voley John and ten	-mark Habrandry	automation	and the product of the	mander	abistikuluerthet	moundedd
50 dBm				-					
70 dBm									
							1		
Spectrum					l pts			Sto	-
Spectrum Ref Level 2 Att				691 RBW 100 kH VBW 300 kH	z	uto Sweep		Sto	Ē
Spectrum Ref Level 2 Att 1Pk Max	0.00 dBm			<b>RBW</b> 100 kH	z z <b>Mode</b> A	uto Sweep 1[1]			-46.80 dBn
Spectrum Ref Level 2 Att 1Pk Max	0.00 dBm			<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Gpectrum Ref Level 2 Att 1Pk Max 0 dBm	0.00 dBm			<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Gpectrum Ref Level 2 Att 1Pk Max 0 dBm	0.00 dBm			<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Spectrum Ref Level 2 Att	0.00 dBm			<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBm 6.9965 GH;
Spectrum Ref Level 2 Att 1Pk Max 0 dBm dBm 10 dBm	0.00 dBm 35 dB	SWT :		<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Spectrum Ref Level 2 Att 1Pk Max 0 dBm dBm 10 dBm	0.00 dBm 35 dB	SWT :		<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Spectrum Ref Level 2 Att 1Pk Max 0 dBm dBm 10 dBm 20 dBm	0.00 dBm 35 dB	SWT :		<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Spectrum Ref Level 2 Att 1Pk Max 0 dBm dBm 10 dBm 20 dBm 30 dBm	0.00 dBm 35 dB	SWT :		<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Spectrum Ref Level 2 Att 1Pk Max 0 dBm dBm 10 dBm 20 dBm 30 dBm	0.00 dBm 35 dB 1 -20.170	SWT :		<b>RBW</b> 100 kH	z z <b>Mode</b> A				-46.80 dBn
Spectrum Ref Level 2 Att 11Pk Max 0 dBm 1 dBm 10 dBm 20 dBm 30 dBm 40 dBm	0.00 dBm 35 dB 1 -20.170	SWT :		<b>RBW</b> 100 kH	Z Mode A	1[1]			-46.80 dBn 6.9965 GH:
Spectrum Ref Level 2 Att 1Pk Max 0 dBm 10 dBm 20 dBm 20 dBm 30 dBm	0.00 dBm 35 dB 1 -20.170	dBm		RBW 100 kH	Z Mode A	1[1]			-46.80 dBn
Spectrum Ref Level 2 Att 1Pk Max 0 dBm dBm 10 dBm 20 dBm 30 dBm 40 dBm	0.00 dBm 35 dB 1 -20.170	dBm	226 ms	RBW 100 kH	Z Mode A	1[1]	And the second second		-46.80 dBn 6.9965 GH:
Spectrum Ref Level 2 Att 1Pk Max 0 dBm dBm 10 dBm 20 dBm 20 dBm 40 dBm 50 dBm	0.00 dBm 35 dB 1 -20.170	dBm	226 ms	RBW 100 kH	Z Mode A	1[1]	au Antonio I		-46.80 dBn 6.9965 GH:



#### 802.11n-HT20 Channel 01 (2412MHz) Reference Level: -0.88dBm

Att				3W 100 kHz					
1Pk Max	35 dB	SWT	24 ms 💩 VI	<b>BW</b> 300 kHz	Mode A	uto Sweep			
					M	1[1]			42.27 dBn
.0 dBm						I	1	2.	39830 GH:
) dBm									
10 dBm				0					
20. dBmD	1 -20.880	dBm							
30 dBm									
SO GDIT									
40 dBm					-				
50 dBm			1						1
	hhiddenthat	unununu	Antonio	how and we way	hunderworkton	porter god work	monthemandu	haldgriftenhold	Materia hall
60 dBm									
70 dBm									
				C	e e		с		
Start 1.0 MH	1942) (*			691					p 2.4 GHz
Ref Level 2 Att	35 dB			3W 100 kHz BW 300 kHz		uto Sween			
	2000/06/06/06/06					are encep			
1Pk Max			1		M			92	17 50 dBp
1Pk Max					м	1[1]			47.50 dBn 4995 GH:
					M				
10 dBm					M				
10 dBm					M				
10 dBm					M				
10 dBm					M				
10 dBm		dBm			M				
10 dBm		dBm			M				
10 dBm		dBm			M				
10 dBm		dBm			M				
10 dBm		dBm			M				
10 dBm 10 dBm 10 dBm 20 dBm 30 dBm 40 dBm		dBm				1[1]			.4995 GH:
0 dBm ) dBm 10 dBm 20 dBm 30 dBm 40 dBm	1 -20.880	dBm		unun	M	1[1]	ann sur		
0 dBm 0 dBm 10 dBm 20 dBm 30 dBm 40 dBm	1 -20.880			with		1[1]			.4995 GH:
0 dBm 1 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 50 dBm	1 -20.880			unny		1[1]	ann hun		.4995 GH:

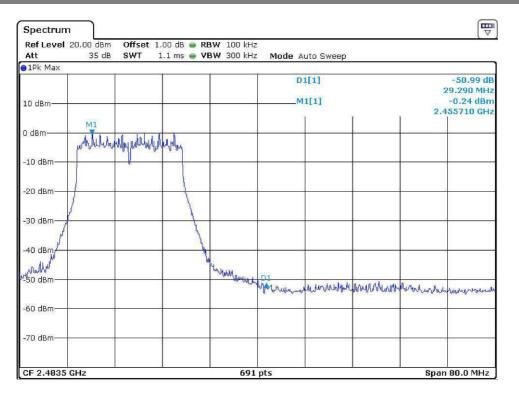


#### Channel 06 (2437MHz) Reference Level: -0.49dBm

Spectrum Ref Level 20.00 dBm Offset 1.00 dB . RBW 100 kHz Att 35 dB SWT 24 ms 👜 VBW 300 kHz Mode Auto Sweep ⊖1Pk Max M1[1] -47.07 dBm 2.35660 GHz 10 dBm-0 dBm--10 dBm -20 dBm-D1 -20.490 dBm--30 dBm -40 dBm M1 -50 dBm mulphonahamithen Menowhere during the Jelner Mar My William Roberne ull. he we have a hard the 4. ALAMA -60 dBm -70 dBm Start 1.0 MHz Stop 2.4 GHz 691 pts Spectrum Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz 226 ms 💿 VBW 300 kHz 35 dB Att SWT Mode Auto Sweep 😑 1 Pk Max M1[1] 43.05 dBm 2.5325 GHz 10 dBm-0 dBm--10 dBm -20 dBm-D1 -20.490 dBm -30 dBm 140 dBm -50 dBminipunt www.www.www.www.ww with My Murine Alter hand ALLAN PARTICK -60 dBm -70 dBm-Stop 25.0 GHz Start 2.4835 GHz 691 pts

#### Channel 11 (2462MHz) Reference Level: -0.18dBm

Spectrum Ref Level 20.00 dBm Offset 1.00 dB . RBW 100 kHz Att 35 dB SWT 24 ms 👜 VBW 300 kHz Mode Auto Sweep ⊖1Pk Max M1[1] -45.80 dBm 2.38090 GHz 10 dBm-0 dBm -10 dBm 20 dBm-D1 -20.180 dBm -30 dBm -40 dBm M -50 dBm work with the work of the work whether utherhory. multillite and whether the allow Maller the ed. new -60 dBm -70 dBm Start 1.0 MHz Stop 2.4 GHz 691 pts Spectrum Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz 226 ms 💿 VBW 300 kHz 35 dB Att SWT Mode Auto Sweep 😑 1 Pk Max M1[1] 45.73 dBm 2.5325 GHz 10 dBm-0 dBm--10 dBm 20 d8m-D1 -20.180 dBm -30 dBm -40 dBm -50 dBmontheuthout have and aller were free worker Northan Marine ALM ... M. Augurer -60 dBm -70 dBm-Stop 25.0 GHz Start 2.4835 GHz 691 pts



Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

- [X] Not required, since all emissions are more than 20dB below fundamental
- [ ] See attached data sheet

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b) (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

#### 4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD

Where  $FS = Field Strength in dB\mu V/m$   $RA = Receiver Amplitude (including preamplifier) in dB\mu V$  CF = Cable Attenuation Factor in dB AF = Antenna Factor in dB AG = Amplifier Gain in dBPD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD

#### Example

Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 42 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA =  $62.0 \text{ dB}\mu\text{V}$ AF = 7.4 dB CF = 1.6 dB AG = 29.0 dB PD = 0 dB FS =  $62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V/m}$ 

Level in mV/m = Common Antilogarithm [(42 dB $\mu$ V/m)/20] = 125.9  $\mu$ V/m

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

#### 4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission (802.11n- HT20-Channel 06) at 7311.0MHz is passed by 10.4dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11b-Channel 01)

#### **Radiated Emissions**

Polarization	Frequency	Reading	Pre-	Antenna	Net	Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	299.570	37.9	20.0	13.3	31.2	46.0	-14.8
Horizontal	453.500	37.8	20.0	15.7	33.5	46.0	-12.5
Horizontal	782.710	34.8	20.0	19.3	34.1	46.0	-11.9
Vertical	200.410	37.7	20.0	13.5	31.2	43.5	-12.3
Vertical	542.110	37.9	20.0	15.8	33.7	46.0	-12.3
Vertical	682.470	33.9	20.0	20.3	34.2	46.0	-11.8

NOTES: 1. Quasi-Peak detector is used for frequency below 1GHz.

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11b-Channel 01)

#### **Radiated Emissions**

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4824.000	60.5	41.3	33.5	52.7	74.0	-21.3
Horizontal	*2390.000	63.6	41.4	29.1	51.3	74.0	-22.7

Polarization	Frequency	Reading	Pre-	Antenna	Net	Average Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4824.000	48.0	41.3	33.5	40.2	54.0	-13.8
Horizontal	*2390.000	43.5	41.4	29.1	31.2	54.0	-22.8

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11b-Channel 06)

#### **Radiated Emissions**

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4874.000	60.6	41.2	33.4	52.8	74.0	-21.2
Horizontal	*7311.000	61.9	40.5	35.8	57.2	74.0	-16.8

Polarization	Frequency	Reading	Pre-	Antenna	Net	Average Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4874.000	46.5	41.2	33.4	38.7	54.0	-15.3
Horizontal	*7311.000	47.0	40.5	35.8	42.3	54.0	-11.7

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11b-Channel 11)

**Radiated Emissions** 

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4924.000	60.4	41.2	33.3	52.5	74.0	-21.5
Horizontal	*2483.500	63.4	41.4	29.3	51.3	74.0	-22.7

Polarization	Frequency	Reading	Pre-	Antenna	Net	Average Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4924.000	46.6	41.2	33.3	38.7	54.0	-15.3
Horizontal	*2483.500	43.1	41.4	29.3	31.0	54.0	-23.0

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
  - 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
  - 3. Negative value in the margin column shows emission below limit.
  - 4. Horn antenna used for the emission over 1000MHz.
  - \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11g-Channel 01)

**Radiated Emissions** Polarization Peak Limit Frequency Reading Pre-Antenna Net Margin at 3m (dB) (MHz) (dBµV) Amp Factor at 3m Gain (dB) (dBµV/m) (dBµV/m) (dB) Horizontal \*4824.000 59.8 41.3 33.5 52.0 74.0 -22.0 Horizontal \*2390.000 63.8 41.4 29.1 51.5 74.0 -22.5

Polarization	Frequency (MHz)	Reading (dBµV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	47.9	41.3	33.5	40.1	54.0	-13.9
Horizontal	*2390.000	42.8	41.4	29.1	30.5	54.0	-23.5

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11g-Channel 06)

Radiated Emissions										
Polarization	Frequency	Frequency Reading Pre- Antenna Net Peak Li								
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)			
			Gain	(dB)	(dBµV/m)	(dBµV/m)				
			(dB)							
Horizontal	*4874.000	59.9	41.2	33.4	52.1	74.0	-21.9			
Horizontal	*7311.000	61.7	40.5	35.8	57.0	74.0	-17.0			

Radi	ated	Emi	ssio	ons	

Polarization	Frequency (MHz)	Reading (dBµV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	46.8	41.2	33.4	39.0	54.0	-15.0
Horizontal	*7311.000	47.1	40.5	35.8	42.4	54.0	-11.6

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
  - 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
  - 3. Negative value in the margin column shows emission below limit.
  - 4. Horn antenna used for the emission over 1000MHz.
  - Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11g-Channel 11)

**Radiated Emissions** 

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
		,	Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4924.000	60.1	41.2	33.3	52.2	74.0	-21.8
Horizontal	*2483.500	62.7	41.4	29.3	50.6	74.0	-23.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	47.1	41.2	33.3	39.2	54.0	-14.8
Horizontal	*2483.500	43.0	41.4	29.3	30.9	54.0	-23.1

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11n-HT20)-Channel 01

		Nau		11112210113			
Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4824.000	59.5	41.3	33.5	51.7	74.0	-22.3
Horizontal	*2390.000	63.2	41.4	29.1	50.9	74.0	-23.1

#### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	46.5	41.3	33.5	38.7	54.0	-15.3
Horizontal	*2390.000	43.2	41.4	29.1	30.9	54.0	-23.1

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11n-HT20)-Channel 06

		Nau		11113310113	5		
Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4874.000	59.6	41.2	33.4	51.8	74.0	-22.2
Horizontal	*7311.000	61.7	40.5	35.8	57.0	74.0	-17.0

#### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	46.5	41.2	33.4	38.7	54.0	-15.3
Horizontal	*7311.000	48.3	40.5	35.8	43.6	54.0	-10.4

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F Worst Case Operating Mode: Transmitting (802.11n-HT20)-Channel 11

**Radiated Emissions** 

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
		,	Gain	(dB)	(dBµV/m)	(dBµV/m)	. ,
			(dB)				
Horizontal	*4924.000	60.0	41.2	33.3	52.1	74.0	-21.9
Horizontal	*2483.500	62.8	41.4	29.3	50.7	74.0	-23.3

Polarization	Frequency	Reading	Pre-	Antenna	Net	Average Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	*4924.000	46.5	41.2	33.3	38.6	54.0	-15.4
Horizontal	*2483.500	55.4	41.4	29.3	43.3	54.0	-10.7

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
  - 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
  - 3. Negative value in the margin column shows emission below limit.
  - 4. Horn antenna used for the emission over 1000MHz.
  - \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

- 4.9 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109
- [ ] Not required No digital part
- [ ] Test results are attached
- [x] Included in the separated report.

Applicant: SHANTOU CITY HENGDI INDUSTRY CO., LTD Date of Test: July 6, 2017 Model: HD2017F

4.10 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
х	Not applicable, duty cycle was not used.

# EXHIBIT 5

# **EQUIPMENT PHOTOGRAPHS**

#### 5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf & internal photos.pdf.

# **EXHIBIT 6**

# PRODUCT LABELLING

#### 6.0 Product Labeling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

# EXHIBIT 7

# **TECHNICAL SPECIFICATIONS**

#### 7.0 <u>Technical Specifications</u>

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

# **EXHIBIT 8**

# **INSTRUCTION MANUAL**

#### 8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

# EXHIBIT 9

# CONFIDENTIALITY REQUEST

#### 9.0 <u>Confidentiality Request</u>

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

# **EXHIBIT 10**

# **MISCELLANEOUS INFORMATION**

#### 10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.* 

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

# **EXHIBIT 11**

# **TEST EQUIPMENT LIST**

## 11.0 Test Equipment List

				Cal. Due date	Calibration
Equipment No.	Equipment	Model	Manufacturer	(MM-DD- YYYY)	Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m <sup>3</sup>	ETS·LINDGREN	5/1/2018	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	3/27/2018	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	5/18/2018	1 <b>Y</b>
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	6/6/2018	1 <b>Y</b>
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz) (TX)	VULB 9161	SCHWARZBECK	6/6/2018	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	9/8/2017	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	6/6/2018	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	5/4/2018	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	5/4/2018	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	5/18/2018	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	5/18/2018	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	5/25/2018	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	5/9/2018	1Y
EM086-11	Power Meter	NRP2	R&S	1/5/2018	1Y
EM086-11-01	Power Sensor	NRP-Z91	R&S	1/5/2018	1Y