# TEST REPORT

FCC ID: 2ACZTCF390 Product: Bluetooth Electronic Scale Model No.: CF398 Additional Model No.: Please refer to page 5 Trade Mark: N/A Report No.: TCT180516E005

Issued Date: May 29, 2018

Issued for:

Shenzhen Unique Scales Co., Ltd 5th Floor, A5 Building, No.41 Wuhe South Rd., Bantian, Long Gang District, Shenzhen, China

Issued By:

Shenzhen Tongce Testing Lab. 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China TEL: +86-755-27673339

#### FAX: +86-755-27673332

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## TCT通测检测 1. Test Certification

Product:	Bluetooth Electronic Scale		
Model No.:	CF398		
Additional Model No.:	Please refer to page 5		
Trade Mark:	N/A		
Applicant: Shenzhen Unique Scales Co., Ltd			
Address: 5th Floor, A5 Building, No.41 Wuhe South Rd., Bantian, Long Gan District, Shenzhen, China			
Manufacturer:	Shenzhen Unique Scales Co., Ltd		
Address:	5th Floor, A5 Building, No.41 Wuhe South Rd., Bantian, Long Gang District, Shenzhen, China		
Date of Test:	May 17, 2018 - May 28, 2018		
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 KDB 558074 D01 DTS Meas Guidance v04		

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:	Ples	Date:	May 28, 2018	
(C)	Rleo	-	Ó	
Reviewed By:	Beng zhao	Date:	May 29, 2018	
	Beryl Zhao			
Approved By:	Tomsm	Date:	May 29, 2018	
(C	Tomsin	Į,	S)	
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Report No.: TCT180516E005



## 2. Test Result Summary

	rement		CFR 47 Se	ection			Result	
Antenna r	equirement	§	15.203/§15	5.247 (c)	× C	)	PASS	N.
	ne Conducted ssion		§15.20	7			N/A	
	Peak Output wer		§15.247 ( §2.104			¢.	PASS	
6dB Emissi	on Bandwidth		§15.247 ( §2.104			)	PASS	
Power Spe	ctral Density		§15.247	(e)			PASS	
Banc	l Edge		1§5.247 §2.1051, §2			<i>a</i> .	PASS	
	(G)		§15.205/§1	15.209			PASS	
	Emission tem meets the requir m does not meet the	rement.	§2.1053, §2	2.1057				
lote: 1. PASS: Test I 2. Fail: Test ite 3. N/A: Test ca	tem meets the requir	rement. requirement. the test object	§2.1053, §2			9		
lote: 1. PASS: Test I 2. Fail: Test ite 3. N/A: Test ca	tem meets the requir m does not meet the se does not apply to	rement. requirement. the test object	§2.1053, §2			9		
lote: 1. PASS: Test I 2. Fail: Test ite 3. N/A: Test ca	tem meets the requir m does not meet the se does not apply to	rement. requirement. the test object	§2.1053, §2					
lote: 1. PASS: Test I 2. Fail: Test ite 3. N/A: Test ca	tem meets the requir m does not meet the se does not apply to	rement. requirement. the test object	§2.1053, §2					



## 3. EUT Description

Product:	Bluetooth Electronic Scale
Model No.:	CF398
Additional Model No.:	CF335, CF350, CF351, CF366, CF368, CF369, CF375, CF376, CF377, CF378, CF379, CF380, CF383, CF385, CF386, CF387, CF388, CF390, CF392, CF391, CF393, CF395, CF396, CF397, CF500, CF501, CF502, CF503, CF505, CF506, CF507, CF508, CF509, CW222, CW223, CW272, CW273, CW276, CW278
Trade Mark:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Bluetooth Version:	V4.0
<b>Operation Frequency:</b>	2402MHz~2480MHz
Channel Separation:	2MHz
Number of Channel:	40
Modulation Technology:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	2.0dBi
Power Supply:	DC 4.5V (3*AA batteries)
Remark:	All models above are identical in interior structure, electrical circuits and components, and just appearance are different for the marketing requirement.

### Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
	····		····		<u> </u>		~~···
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz
Remark:	Remark: Channel 0, 12 & 39 have been tested.						

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## 4. Genera Information

「CT通测检测 TESTING CENTRE TECHNOLOGY

## 4.1. Test environment and mode

Operating Environment:				
Temperature:	25.0 °C			
Humidity:	56 % RH			
Atmospheric Pressure:	1010 mbar			
Test Mode:				
Engineering mode:	Koon the ELIT in continuous transmitting			

Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 98.46%) with Fully-charged battery.

The sample was placed (0.1m 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.

## 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
	/		N.		

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

## FCC Part15 C Section 15.203 /247(c) **Standard requirement:** 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 Bluetooth antenna is PCB antenna which permanently attached, and the best case gain of the antenna is 2.0dBi. CF3988LE LED UL 0 2018 02 28 Antenna 07 09 HIIK 09 30 0 50



### 6.2. Conducted Emission

#### 6.2.1. Test Specification

Frequency Range:       150 kHz to 30 MHz         Receiver setup:       RBW=9 kHz, VBW=30 kHz, Sweep time=auto         Limits:       Imit (dBuV) (MHz)         Quasi-peak       Average         0.15-0.5       66 to 56*         0.5-5       56         0.5-5       56         0.5-5       56         40cm       80cm         Filter       Filter         Reference Plane       Imit (BuV)         Filter       Filter         Remark       EUT Equipment Under Test         LINU       Impedence Stabilization Network         Test Mode:       Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a lin impedance stabilization network (L.I.S.N.). Thi provides a 500hm/50uH coupling impedance for th measuring equipment.         2. The peripheral devices are also connected to the mai power through a LISN that provides a 500hm/50uH coupling impedance for th measuring equipment.	Test Requirement:	FCC Part15 C Section	15.207			
Receiver setup:       RBW=9 kHz, VBW=30 kHz, Sweep time=auto         Limits:       Frequency range       Limit (dBuV)         Quasi-peak       Average         0.15-0.5       66 to 56*         0.5-5       56         0.5-30       60         60       50         Reference Plane         Formark         E.U.T       Adapter         Test Setup:       Formark         FUT E gupment Under Test       LISN Une impedence Stabilization Network         Test Mode:       Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a lin impedance stabilization network (L.I.S.N.). Thi provides a 500hm/50uH coupling impedance for th measuring equipment.         2. The peripheral devices are also connected to the mai power through a LISN that provides a 500hm/50ul coupling impedance for th measuring equipment.         3. Both sides of A.C. line are checked for maximur conducted interference. In order to find the maximur emission, the relative positions of equipment and allo the interface cables must be changed according the interface cables must be changed according the interface cables must be changed according the ANSI C63.10: 2013 on conducted measurement.	Test Method:	ANSI C63.10:2013				
Limits:       Frequency range (MHz)       Limit (dBuV)         Quasi-peak       Average         0.15-0.5       66 to 56*         0.5-5       56       46         5-30       60       50         Reference Plane         Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Colspan="2">Colspan="2">Ac powe         Test Setup:         Remark: EUT Equipment Under Test         LIM Line Impedence Stabilization Network         Test Mode:         Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 500hm/50UH coupling impedance for the measuring equipment.         Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 500hm/50UH coupling impedance for the measuring equipment.         Charging impedance with 500hm termination. (Pleas refer to the block diagram of the test setup and photographs).         3. Both sides of A.C. line are checked for maximum conducted interfreence. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according the interface cables m	Frequency Range:	150 kHz to 30 MHz				
Limits:       Quasi-peak       Average         0.15-0.5       66 to 56*       56 to 46*         0.5-5       56       46         5-30       60       50         Reference Plane         Image: test Setup:       Reference Plane         Remark:       E.U.T       Adapter         Est Mode:       Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a lin impedance stabilization network (L.I.S.N.). Thi provides a 500hm/50uH coupling impedance for the measuring equipment.         Test Mode:         Test Procedure:         Description of the block diagram of the test setup an photographs).         Both sides of A.C. line are checked for maximur conducted interference. In order to find the maximur emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.	Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto				
Limits:       Quasi-peak       Average         0.15-0.5       66 to 56*       56 to 46*         0.5-5       56       46         5-30       60       50         Reference Plane         Image: test Setup:       Reference Plane         Remark:       E.U.T       Adapter         Est Mode:       Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a lin impedance stabilization network (L.I.S.N.). Thi provides a 500hm/50uH coupling impedance for the measuring equipment.         Test Mode:         Test Procedure:         Description of the block diagram of the test setup an photographs).         Both sides of A.C. line are checked for maximur conducted interference. In order to find the maximur emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.		Frequency range	Limit (	dBuV)		
Limits:       0.15-0.5       66 to 56*       56 to 46*         0.5-5       56       46         5-30       60       50         Reference Plane         Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Colspan="2">Image: Colspan="2">Colspan="2"Co				,		
0.5-5       56       46         5-30       60       50         Reference Plane         Image: Colspan="2">Image: Colspan="2"         Test Mode:         Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a lin impedance stabilization network (L.I.S.N.). Thi provides a 500hm/50uH coupling impedance for the measuring equipment.         Test Procedure:         Test Procedure:         Test Procedure:         Image: Colspan="2"         The peripheral devices are also connected to the mai power through a LISN that provides a 500hm/50ul coupling impedance with 500hm termination. (Pleas refer to the block diagram of the test setup an 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 the interfa	Limits:	0.15-0.5				
5-30       60       50         Reference Plane         Image: Solution of the solution of the solution plane         Test Setup:         Remark         EUT Equipment Under Test         LISN Line Impedence Stabilization Network         Test Mode:         Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a lin impedance stabilization network (L.I.S.N.). Thi provides a 500hm/50uH coupling impedance for th measuring equipment.         2. The peripheral devices are also connected to the mai power through a LISN that provides a 500hm/50uH coupling impedance for th measuring equipment.         3. Both sides of A.C. line are checked for maximur conducted interference. In order to find the maximur 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 Setup:       Image: Constraint of the set o			60	50		
Test Setup:       Image: Constraint of the second sec		Refere	nce Plane	1201		
<ul> <li>The E.U.T is connected to an adapter through a lin impedance stabilization network (L.I.S.N.). Thi provides a 50ohm/50uH coupling impedance for th measuring equipment.</li> <li>The peripheral devices are also connected to the mai power through a LISN that provides a 50ohm/50ul coupling impedance with 50ohm termination. (Pleas refer to the block diagram of the test setup an photographs).</li> <li>Both sides of A.C. line are checked for maximur conducted interference. In order to find the maximur emission, the relative positions of equipment and all of the interface cables must be changed according t ANSI C63.10: 2013 on conducted measurement.</li> </ul>	Test Setup:	Remark: E.U.T: Equipment Under Test LISN: Line Impedence Stabilization	ne			
<ul> <li>impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the mais power through a LISN that provides a 50ohm/50ul coupling impedance with 50ohm termination. (Pleas refer to the block diagram of the test setup an photographs).</li> <li>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.</li> </ul>	Test Mode:	Charging + Transmittir	ng Mode			
		impedance stabiliz	zation network	(L.I.S.N.). This		
	Test Procedure:	<ul> <li>2. The peripheral device power through a Licoupling impedance refer to the block photographs).</li> <li>3. Both sides of A.C. conducted interference emission, the relative the interface cables</li> </ul>	ent. ces are also conne ISN that provides e with 50ohm term diagram of the . line are checkence. In order to fir we positions of equ s must be chang	a 50ohm/50ul- nination. (Please test setup and d for maximun nd the maximun ipment and all o ed according to		



## 6.3. Conducted Output Power

#### 6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074
Limit:	30dBm
Test Setup:	Spectrum Analyzer EUT
Test Mode:	Refer to item 4.1
Test Procedure:	<ol> <li>The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04.</li> <li>Set spectrum analyzer as following:         <ul> <li>a) Set the RBW ≥ DTS bandwidth.</li> <li>b) Set VBW ≥ 3 x RBW.</li> <li>c) Set span ≥ 3 x RBW</li> <li>d) Sweep time = auto couple.</li> <li>e) Detector = peak.</li> <li>f) Trace mode = max hold.</li> <li>g) Allow trace to fully stabilize.</li> <li>h) Use peak marker function to determine the peak amplitude level.</li> </ul> </li> </ol>
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	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).

## 6.3.3. Test Data

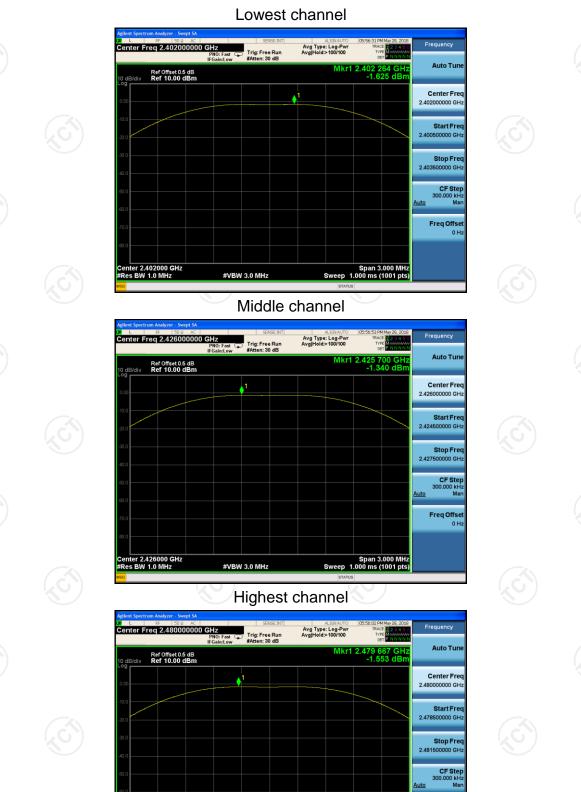
TCT通测检测 TESTING CENTRE TECHNOLOGY

BT LE mode			
Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	-1.63	30.00	PASS
Middle	-1.34	30.00	PASS
Highest	-1.55	30.00	PASS

#### Test plots as follows:

Test plo	ots as follov	vs:						
							Page	11 of 34
<u>Hotline</u>	e: 400-6611-	140 Tel: 8	<u> 86-755-27673</u>	<u>3339 Fax:</u>	<u>86-755-2767</u>	<u>3332 http</u>	<u>://www.tct-la</u>	<u>b.com</u>

#### BT LE mode



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Freq Offse 0 Hi

Span 3.000 MHz Sweep 1.000 ms (1001 pts) Report No.: TCT180516E005

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

#VBW 3.0 MHz

nter 2.480000 GHz s BW 1.0 MHz



## 6.4. Emission Bandwidth

#### 6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB558074
Limit:	>500kHz
Test Setup:	
Test Mode:	Spectrum Analyzer
Test Procedure:	<ol> <li>The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>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.</li> <li>Measure and record the results in the test report.</li> </ol>
Test Result:	PASS

#### 6.4.2. Test Instruments

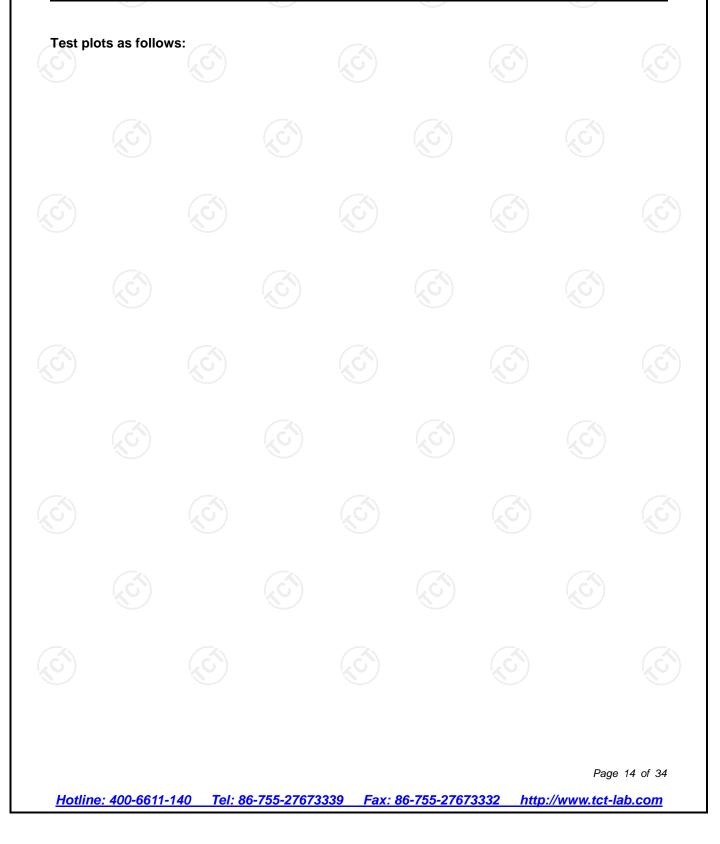
	RI	F Test Room		
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF cable (9kHz-26.5GHz)	🕥 тст	RE-06	N/A	Sep. 27, 2018
Antenna Connector	ТСТ	RFC-01	N/A	Sep. 27, 2018

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

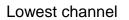


#### 6.4.3. Test data

	Test channel	6dB Emission Bandwidth (kHz)				
6	Test channel	BT LE mode	Limit	Result		
Ø	Lowest	805.3	>500k	<u>_</u>		
	Middle	757.6	>500k	PASS		
	Highest	806.7	>500k			



#### BT LE mode





Highest channel

Agilent Spectrum Analyzer - Occupied BW						
Off         E         50 R         AC         A	Trig:	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Ho n: 30 dB	ALIGN AUTO Id>10/10	05:54:19 P Radio Std Radio Dev		Frequency
10 dB/div Ref 10.00 dBm						
10.00						Center Fred 2.48000000 GHz
-20.0						
-40.0						
-50.0						
-60.0						
-70.0						
Center 2.48 GHz #Res BW 100 kHz	;	¢VBW 300 kHz			an 2 MHz ep 1 ms	CF Step 200.000 kHz
Occupied Bandwidth		Total Power	4.66	6 dBm		<u>Auto</u> Mar
1.1	122 MHz					Freq Offse
Transmit Freq Error	-12.120 kHz	OBW Power	99	9.00 %		0 Ha
x dB Bandwidth	806.7 kHz	x dB	-6.	00 dB		
MSG			STATU:	5		

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## 6.5. Power Spectral Density

### 6.6. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074
Limit:	The peak 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:	Refer to item 4.1
Test Procedure:	<ol> <li>The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No.558074 D01 DTS Meas. Guidance v04</li> <li>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.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): 3 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x RBW. In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)</li> <li>Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.</li> <li>Measure and record the results in the test report.</li> </ol>
Test Result:	PASS

#### 6.6.1. Test Instruments

	RI	F Test Room	1	
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).

#### 6.6.2. Test data

TCT通测检测 TESTING CENTRE TECHNOLOGY

Test channel	Power Spectral I	Power Spectral Density (dBm/3kHz)				
Test channel	BT LE mode	Limit	Result			
Lowest	-8.09	8 dBm/3kHz	1 and			
Middle	-7.91	8 dBm/3kHz	PASS			
Highest	-9.65	8 dBm/3kHz				
		$\mathcal{I}$				

Test plots as follows:

		vs.						
<u>Hotlin</u>	<u>e: 400-6611-</u>	140 Tel: 8	36-755-27673	3339 Fax:	<u>86-755-2767</u>	<u>3332 http</u>	Page ://www.tct-la	17 of 34 I <mark>b.com</mark>



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## TCT通测检测 TESTING CENTRE TECHNOLOGY 6.7. Conducted Band Edge and Spurious Emission Measurement

### 6.7.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074
Limit:	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).
Test Setup:	
	Spectrum Analyzer EUT
Test Mode:	Refer to item 4.1
Test Procedure:	<ol> <li>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.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>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</li> </ol>
	<ul> <li>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).</li> <li>4. Measure and record the results in the test report.</li> <li>5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> </ul>

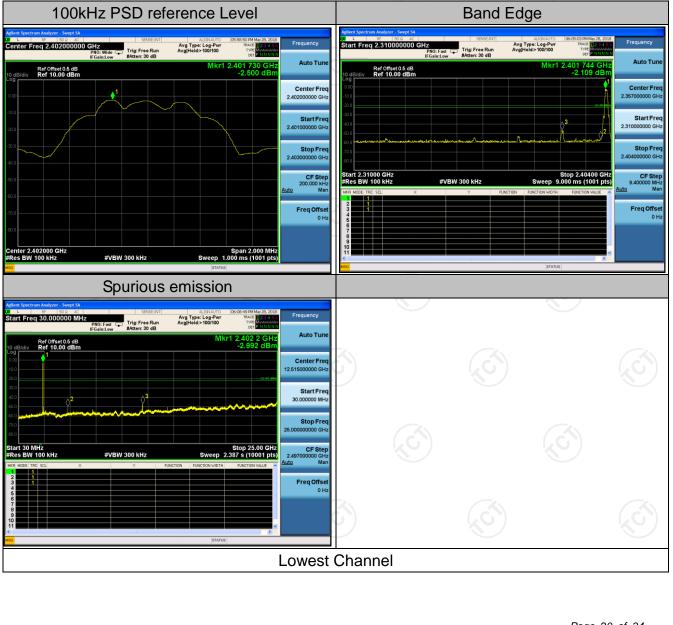
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#### 6.7.2. Test Instruments

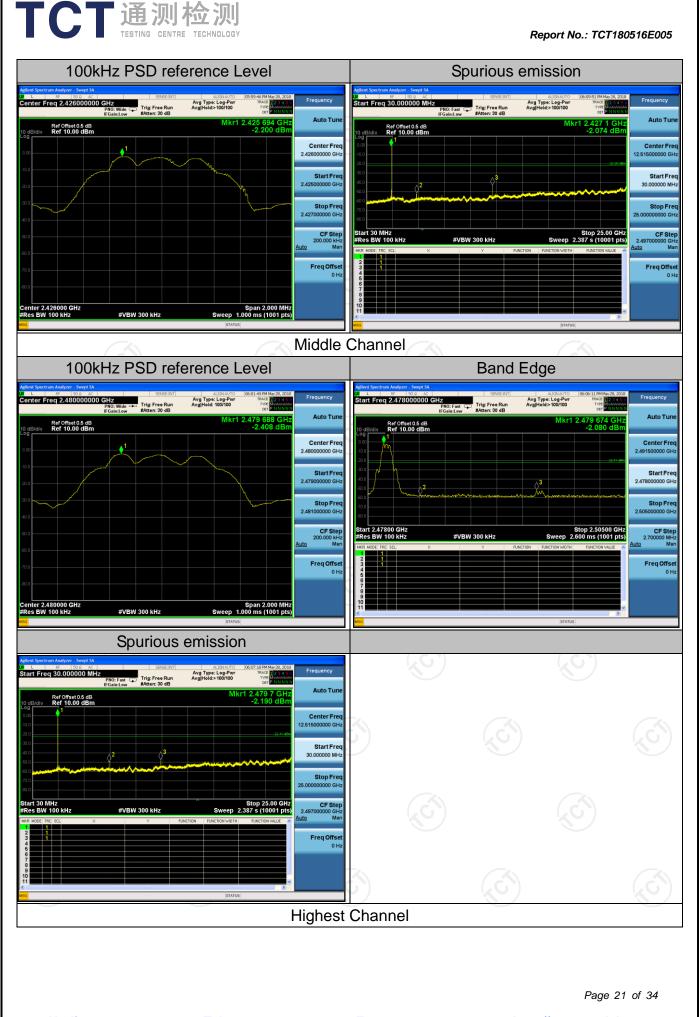
RF Test Room											
Equipment	Manufacturer	Model	Serial Number	Calibration Due							
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018							
Spectrum Analyzer	ROHDE&SCH WARZ	FSQ	200061	Sep. 27, 2018							
RF cable (9kHz-26.5GHz)	тст	RE-06	N/A	Sep. 27, 2018							
Antenna Connector	тст	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).

#### 6.7.3. Test Data



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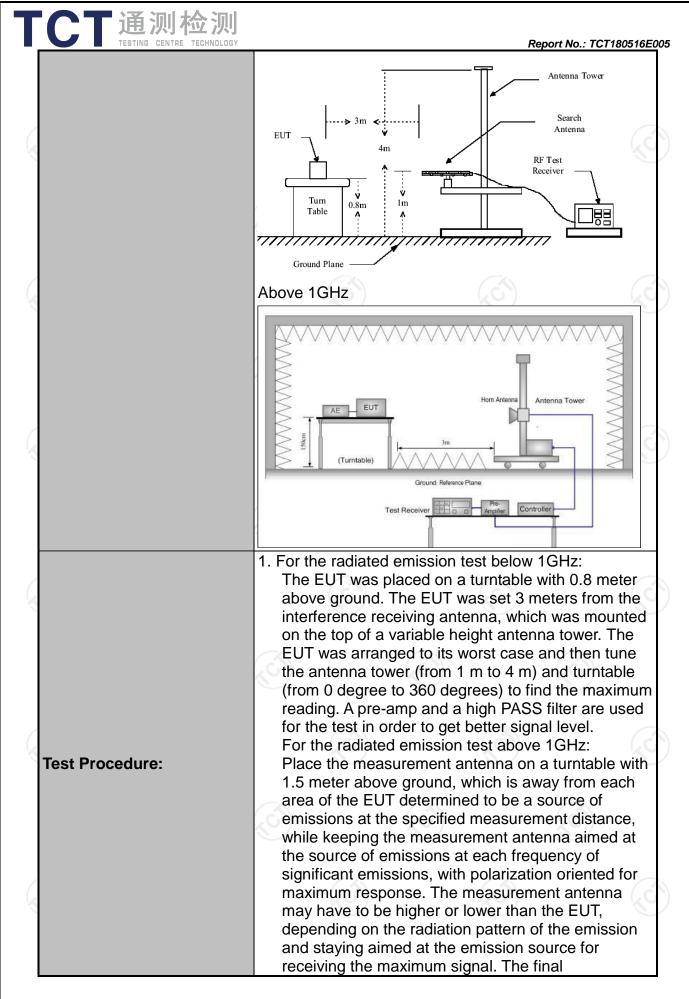
## 6.8. Radiated Spurious Emission Measurement

#### 6.8.1. Test Specification

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Test Requirement:	FCC Part15 C Section 15.209							
Test Method:	ANSI C63.10	): 2013						
Frequency Range:	9 kHz to 25 (	GHz				6		
Measurement Distance:	3 m				K	9		
Antenna Polarization:	Horizontal &	Vertical						
Operation mode:	Refer to item 4.1							
	Frequency 9kHz- 150kHz 150kHz-	Detector Quasi-pea Quasi-pea		VBW 1kHz 30kHz		Remark si-peak Value si-peak Value		
Receiver Setup:	30MHz	Quasi-pea	K 9KI IZ	JUNIZ	Qua	si-peak value		
	30MHz-1GHz Above 1GHz	Quasi-pea Peak	k 100KHz 1MHz	300KHz 3MHz		si-peak Value eak Value		
	Above TGHZ	Peak	1MHz	10Hz	Ave	erage Value		
	Frequen	ю	Field Stre (microvolts)		Measurement Distance (meters)			
	0.009-0.4		2400/F(ł		300			
	0.490-1.7		24000/F(	KHZ)		30 30		
	30-88		30 100		-Ke	30		
	88-216		150			3		
Limit:	216-96	0	200		3			
	Above 9	60	500			3		
	Frequency		Field Strength (microvolts/meter)		asurement Distance Detec meters)			
	Above 1CH	. (	500	3		Average		
	Above 1GHz	2	5000		3 Pea			
Test setup:	For radiated	Distance = 3m	s below 30	)MHz		Computer -		

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<b>CT</b> 通测检测	
	<ul> <li>Report No.: TCT180516E</li> <li>measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</li> <li>Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</li> <li>For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</li> <li>Use the following spectrum analyzer settings: <ul> <li>Set RBW=100 kHz for f &lt; 1 GHz; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold;</li> <li>Set RBW = 1 MHz, VBW= 3MHz for f 1 GHz for peak measurement. For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</li> </ul> </li> </ul>
Test mode:	Refer to section 4.1 for details
Test results:	PASS



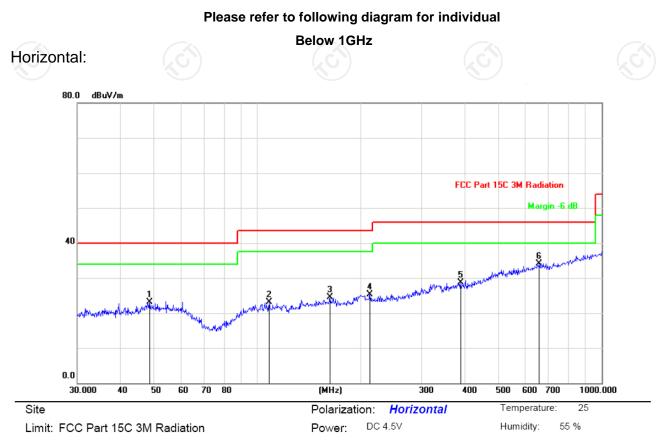


#### 6.8.2. Test Instruments

Radiated Emission Test Site (966)										
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due						
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 27, 2018						
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Sep. 27, 2018						
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 27, 2018						
Pre-amplifier	HP	8447D	2727A05017	Sep. 27, 2018						
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 27, 2018						
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 27, 2018						
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 27, 2018						
Horn Antenna	Schwarzbeck	BBH 9170	582	Jun. 07, 2018						
Antenna Mast	Keleto	CC-A-4M	N/A	N/A						
Coax cable (9KHz-1GHz)	тст	RE-low-01	N/A	Sep. 27, 2018						
Coax cable (9KHz-40GHz)	тст	RE-high-02	N/A	Sep. 27, 2018						
Coax cable (9KHz-1GHz)	тст	RE-low-03	N/A	Sep. 27, 2018						
Coax cable (9KHz-40GHz)	тст	RE-high-04	N/A	Sep. 27, 2018						
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A						

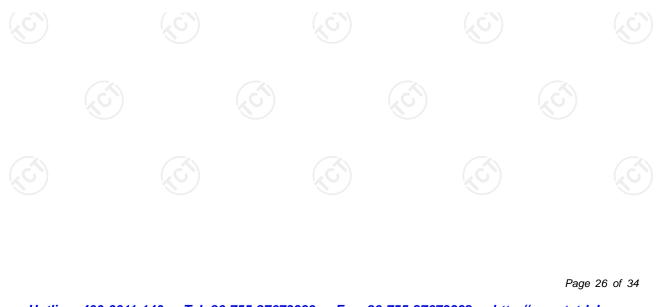
**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

#### 6.8.3. Test Data



Report No.: TCT180516E005

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		48.6719	35.69	-12.65	23.04	40.00	-16.96	peak			
2		108.2667	35.44	-12.38	23.06	43.50	-20.44	peak			
3		162.6106	39.56	-15.02	24.54	43.50	-18.96	peak			
4	2	212.2693	37.57	-12.26	25.31	43.50	-18.19	peak			
5	;	389.3548	34.80	-6.10	28.70	46.00	-17.30	peak			
6	* (	658.8360	34.45	-0.33	34.12	46.00	-11.88	peak			

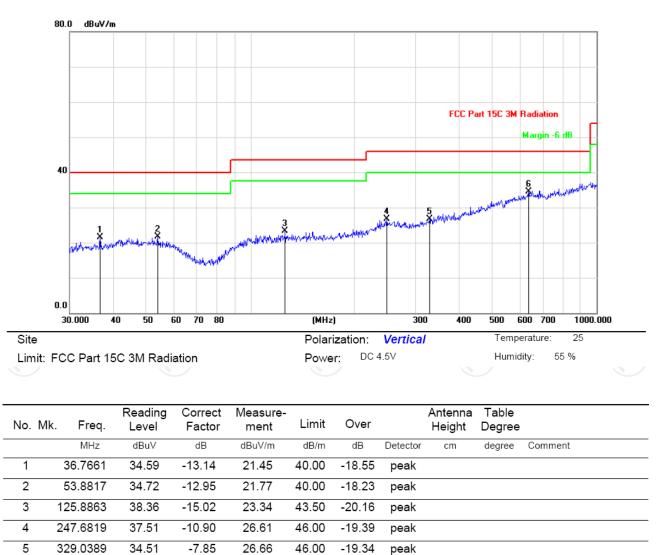


#### Vertical:

636.1340

6 \*

34.96



**Note:** 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

46.00

34.46

-0.50

2. Measurements were conducted in all three channels (high, middle, low), and the worst case Mode (Middle channel) was submitted only.

-11.54

peak

Report No.: TCT180516E005

Above 1GHz

_ow chann	el: 2402 N	IHz							
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emissic Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
2390	Н	48.31		-7.52	40.79		74	54	-13.21
4804	Н	44.15		7.44	51.59		74	54	-2.41
7206	Н	36.54		13.54	50.08		74	54	-3.92
	Н								
			(.6		(	G		$(\mathbf{c})$	
2390	V	50.38		-7.52	42.86		74	54	-11.14
4804	V	43.64		7.44	51.08		74	54	-2.92
7206	V	36.21		13.54	49.75		74	54	-4.25
×	V			(	×		-		
G )		$(\mathbf{J}\mathbf{G})$	•		5)	•	$(\mathcal{O})$		
Middle cha	nnel: 2440	) MHz		C					6
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emissic Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4880	ZGĤ)	42.36	-4,0	7.01	49.37	<u>G</u>	74	54	-4.63
7320	H	35.19		13.21	48.40	<u> </u>	74	54	-5.60
	Н								

4880	V	43.36	 7.01	50.37	 74	54	-3.63
7320	V	34.52	 13.21	47.73	 74	54	-6.27
	V		 				

#### High channel: 2480 MHz

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i ligit enam									
Frequency	Ant Pol	Peak	AV	Correction	Emissic	on Level	Peak limit	AV limit	Margin
(MHz)	H/V	reading (dBµV)	reading (dBµV)	Factor (dB/m)	Peak (dBµV/m)	AV (dBµV/m)		(dBµV/m)	(dB)
2483.5	Н	47.39		-7.52	39.87		74	54	-14.13
4960	Н	42.66		7.44	50.10		74	54	-3.90
7440	Н	33.47		13.54	47.01		74	54	-6.99
<u> </u>	Н			🏹	)				
2483.5	V	47.13		-7.52	39.61		74	54	-14.39
4960	V	41.58		7.44	49.02	~~	74	54	-4.98
7440	J.GV	33.42	-+.C	13.54	46.96	<u>, G-</u> -	74	54	-7.04
	V								

#### Note:

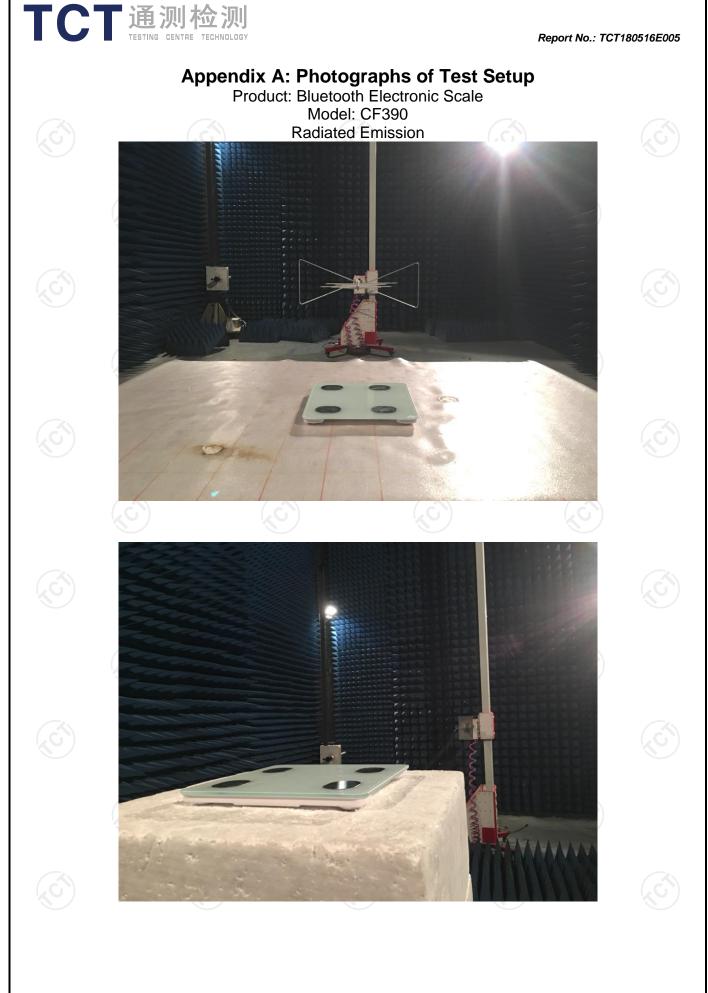
1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss - Pre-amplifier

2. Margin (dB) = Emission Level (Peak) (dB $\mu$ V/m)-Average limit (dB $\mu$ V/m)

3. The emission levels of other frequencies are very lower than the limit and not show in test report.

4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.



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