

**Note:** This report shall not be reproduced except in full, without the written approval of Shenzhen Tongce Testing Lab. This document may be altered or revised by Shenzhen Tongce Testing Lab. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.

# TABLE OF CONTENTS

TCT通测检测 TESTING CENTRE TECHNOLOGY

1. Te	st Certific	ation			 	 3
2. Te	st Result :	Summar	y	<u>(</u> (C))	 <u>(0)</u>	 
	T Descrip	-	-			
4. Ge	nera Infor	mation				6
	. Test envir					
4.2.	. Descriptio	n of Supp	ort Units.			 6
5. Fa	cilities an	d Accrec	litations	<u>    (c)    </u>		 
5.1.	. Facilities.					 7
5.2.	Location .				 	 7
5.3.	. Measurem	ent Uncer	tainty			7
6. Tes	st Results	and Me	asureme	ent Data	 	 8
	Antenna rec	- I I I I I I I I I I I I I I I I I I I				
6.2.	Conducted	Emission		<u><u>k</u><u></u></u>	 <u> </u>	 9
6.3.	Conducted	Output Pov	ver		 	 10
-	Emission B					-
6.5.	Power Spec	tral Density	y			16
6.6.	Test Specifi	ication			 	 16
	Conducted	-	-			
6.8.	Radiated Sp	ourious Emi	ission Mea	surement		 
Арре	ndix A: Pl	hotograp	ohs of Te	st Setup		
Appe	ndix B: Pl	hotograp	hs of El	JT		

### 「CT通测检测 TESTING CENTRE TECHNOLOGY 1. Test Certification

Report	No	TCT171116E011
Report		

Product:	AR Blaster V.3
Model No.:	2AMXIAR003
Additional Model No.:	AR003, AR-001, AR-002, AR-003
Trade Mark:	Blackfin
Applicant:	Ningbo Zhonghai Electrical Appliance Co.,Ltd
Address:	JISHAN INDUSTRIAL DISTRICT, NINGBO ZHEJIANG CHINA 315613
Manufacturer:	NINGBO ZHONGHAI ELECTRICAL CO., LTD
Address:	JISHAN INDUSTRIAL DISTRICT, XIDIAN TOWN, NINGHAI CITY, NINGBO ZHEJIANG CHINA 315613
Date of Test:	Nov. 17, 2017 – Nov. 22, 2017
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.

Ride cheng Tested By: Nov. 22, 2017 Date: Ride cheng **Reviewed By:** Nov. 23, 2017 Date: Joe Zhou Approved By: Date: Nov. 23, 2017 Tomsin Page 3 of 37



# 2. Test Result Summary

	rement		CFR 47 Secti	on		Result	
Antenna r	equirement	Ş	15.203/§15.24	7 (c)	KO I	PASS	K
	ne Conducted ssion		§15.207	( <b>C</b> 1)		N/A	
	Peak Output wer		§15.247 (b)(3 §2.1046	3)		PASS	
6dB Emissio	on Bandwidth		§15.247 (a)(2 §2.1049	2)	Ó	PASS	
Power Spe	ctral Density		§15.247 (e)			PASS	
Band	Edge		1§5.247(d) §2.1051, §2.10			PASS	
	(.c)		§15.205/§15.2			PASS	
1. PASS: Test in	Emission em meets the requir n does not meet the	rement.	§2.1053, §2.10	057			
lote: 1. PASS: Test it 2. Fail: Test iter 3. N/A: Test cas		ement. requirement. the test object	ct.	057			
lote: 1. PASS: Test it 2. Fail: Test iter 3. N/A: Test cas	em meets the requir n does not meet the se does not apply to	ement. requirement. the test object	ct.	057			
lote: 1. PASS: Test it 2. Fail: Test iter 3. N/A: Test cas	em meets the requir n does not meet the se does not apply to	ement. requirement. the test object	ct.	057			
lote: 1. PASS: Test it 2. Fail: Test iter 3. N/A: Test cas	em meets the requir n does not meet the se does not apply to	ement. requirement. the test object	ct.	057			



# 3. EUT Description

Product:	AR Blaster V.3
Model No.:	2AMXIAR003
Additional Model No.:	AR003, AR-001, AR-002, AR-003
Trade Mark:	Blackfin
BT Version:	V4.0
Operation Frequency:	2402MHz~2480MHz
Channel Separation:	2MHz
Number of Channel:	40
Modulation Technology:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	2.99dBi
Power Supply:	DC 3.0V via 2*AAA batteries
Remark:	All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
	S						S
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	- 29	2460MHz	39	2480MHz







Page 5 of 37

# 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:	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
	/			

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

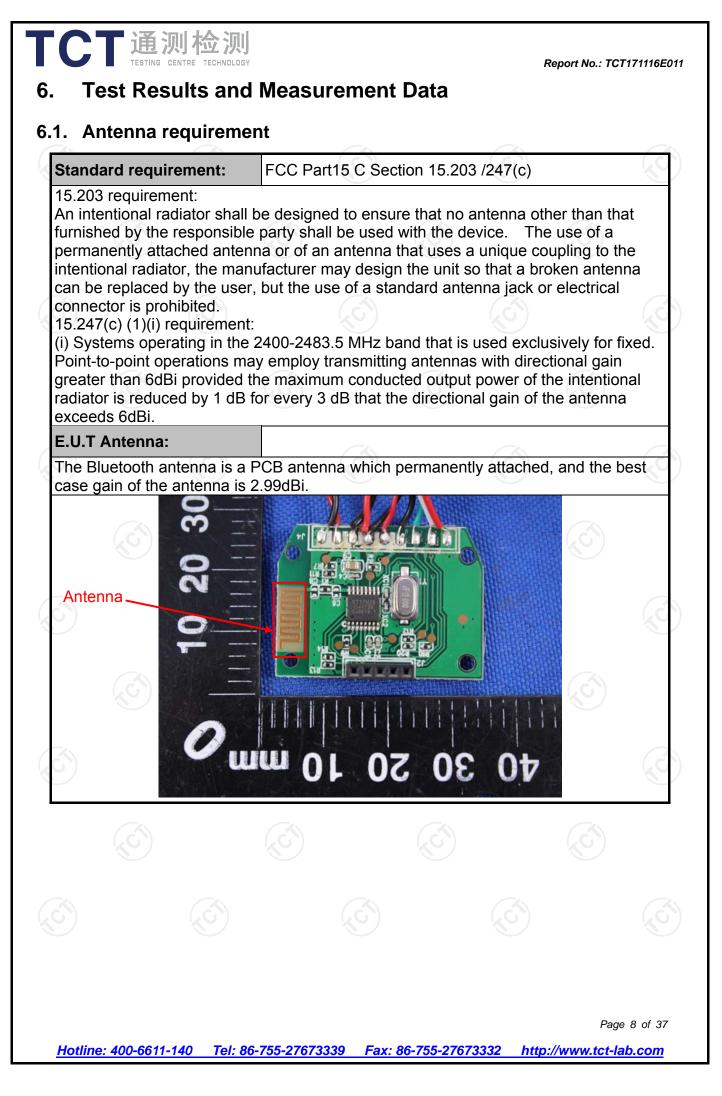
Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

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 %.

Item	MU
Conducted Emission	±2.56dB
RF power, conducted	±0.12dB
Spurious emissions, conducted	±0.11dB
All emissions, radiated(<1G)	±3.92dB
All emissions, radiated(>1G)	±4.28dB
Temperature	±0.1°C
Humidity	±1.0%
	Conducted Emission         RF power, conducted         Spurious emissions, conducted         All emissions, radiated(<1G)



# 6.2. Conducted Emission

#### 6.2.1. Test Specification

Receiver setup:       RBW=9 kHz, VBW=30 kHz, Sweep time=auto         Limits:       Frequency range       Limit (dBuV)         0.15-0.5       66 to 56*       56 to 46*         0.5-5       56       46         5-30       60       50         Reference Plane         Image: E.U.T       Adapter         Filter       Ac power         Resceiver       E.U.T         Resceiver       Ac power         Resceiver       E.U.T         Adapter       E.U.T         Filter       Ac power         Resceiver       E.U.T         Test Mode:       Charging + Transmitting Mode         1. The E.U.T is connected to an adapter through a lin	Test Requirement:	FCC Part15 C Section 15.207						
Receiver setup:       RBW=9 kHz, VBW=30 kHz, Sweep time=auto         Limits:       Frequency range       Limit (dBuV)         (MHz)       Quasi-peak       Average         0.15-0.5       66 to 56*       56 to 46*         0.5-5       56       46         5-30       60       50         Reference Plane         Formark         E.U.T       Adapter         Fill       Filler       AC power         Remark         E.U.T       Adapter         Fill       EUT Equipment Under Test       EUT Equipment Under Test         USN Line impedence Stabilization Network       Test table height-2 8m       Test Mode         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.         Test Procedure:         Test Procedure:         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 the interface cables must be changed according the interface cables mus	Test Method:	ANSI C63.10:2013	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">ENIT         Test Setup:         Reference Plane         Image: Colspan="2">ENIT         Reference Plane         Image: Colspan="2">ENIT         Test Setup:         Reference Plane         Image: Colspan="2">ENIT         Reference Plane         Image: Colspan="2">ENIT         Test table/Insulation plane         Remark         EUT Equipment Under Test         ENT         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 with 500hm termination. (Pleas refer to the block diagram of the test setup an photographs).         3. Both	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         Reference Plane       Image: test test test test test test test te	Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto						
Imits:       (MHz)       Quasi-peak       Average         0.15-0.5       66 to 56*       56 to 46*         0.5-5       56       46         5-30       60       50         Reference Plane         Imit       E.U.T       Adapter         Filter       AC power         Remark       E.U.T       Adapter         E.U.T       Adapter       EMI         Remark       EUT       Europeon         E.U.T       Adapter       EMI         Remark       EUT       Europeon         EUT       Equipment Under Test       EMI         LISN Line impedence Stabilization Network       Test table height=0 8m         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 with 500hm termination. (Pleas refer to the block diagram of the test setup an photographs).         3. 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 interface cables must be changed according to the interface cables		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"Co			Quasi-peak	Áverage				
5-30       60       50         Reference Plane         Image: Colspan="2">Image: Colspan="2" Image: Colspan="2" Imag	Limits:	0.15-0.5						
Test Setup:       Reference Plane         Image: Test Setup:       Image: Test table/Insulation plane         Remerk:       E.U.T         EUT:       Equipment Under Test         USN 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 50ohm/50uH coupling impedance for th measuring equipment.         2. The peripheral devices are also connected to the mai power through a LISN that provides a 50ohm/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.		0.5-5	56	46				
Test Setup:       Image: Constraint of the set setup of the setup		5-30	60	50				
Test Setup:       Image: Constraint of the set o		Refere	nce Plane					
<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:	Test table/Insulation pla Remarkc E.U.T: Equipment Under Test LISN: Line Impedence Stabilizatio.	ne	ter _ AC power				
<ul> <li>Test Procedure:</li> <li>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 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 provides a 50ohm/s measuring equipme 2. The peripheral devic power through a L	zation network 50uH coupling im nt. ces are also conne ISN that provides	(L.I.S.N.). This pedance for the ected to the main a 50ohm/50uH				
	Test Procedure:	refer to the block photographs). 3. Both sides of A.C. conducted interferen emission, the relativ the interface cables	diagram of the line are checkence. In order to fin positions of equ s must be chang	test setup and ed for maximum nd the maximum 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 × 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	R&S	FSU	200054	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).

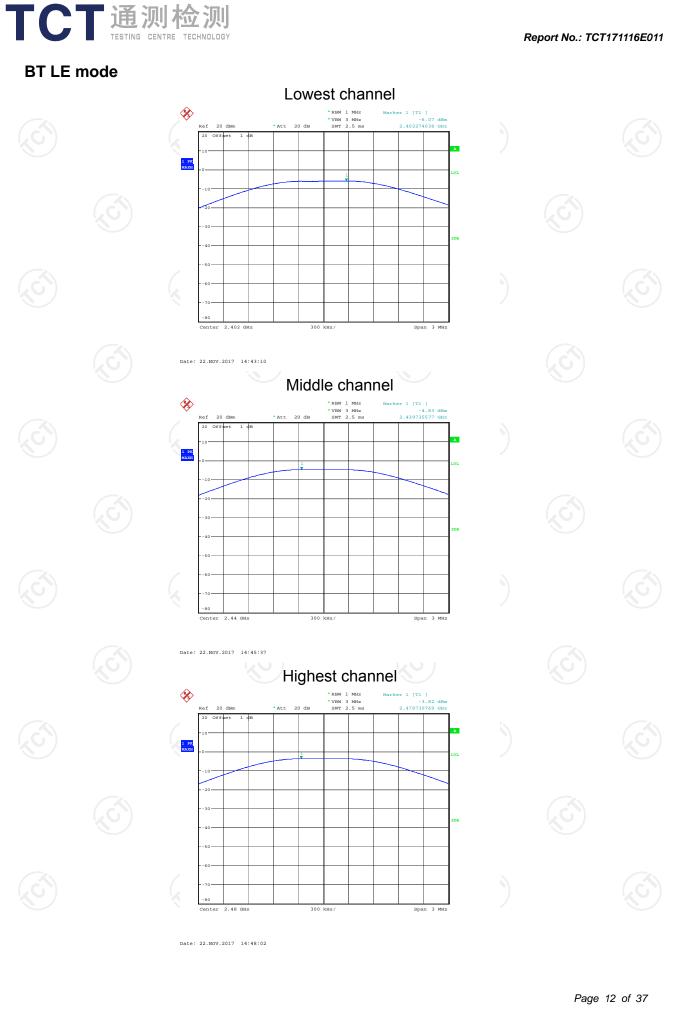
# 6.3.3. Test Data

TCT通测检测 TESTING CENTRE TECHNOLOGY

BT LE mode							
Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result				
Lowest	-6.07	30.00	PASS				
Middle	-4.83	30.00	PASS				
Highest	-3.82	30.00	PASS				

#### Test plots as follows:

	ots as follo	ws.						
							00	11 of 27
<u>Hotlin</u>	e: 400-6611	-140 Tel: 8	86-755-27673	3339 Fax:	86-755-2767	<mark>73332 http</mark>	Page ://www.tct-la	11 of 37 ab.com





### 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:	Spectrum Analyzer EUT
Test Mode:	Refer to item 4.1
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

RF Test Room									
Equipment	Manufacturer	Model	Serial Number	Calibration Due					
Spectrum Analyzer	R&S	FSU	200054	Sep. 27, 2018					
RF cable (9kHz-26.5GHz)	с тст	RE-06	N/A	Sep. 27, 2018					
Antenna Connector	ТСТ	RFC-01	N/A	Sep. 27, 2018					

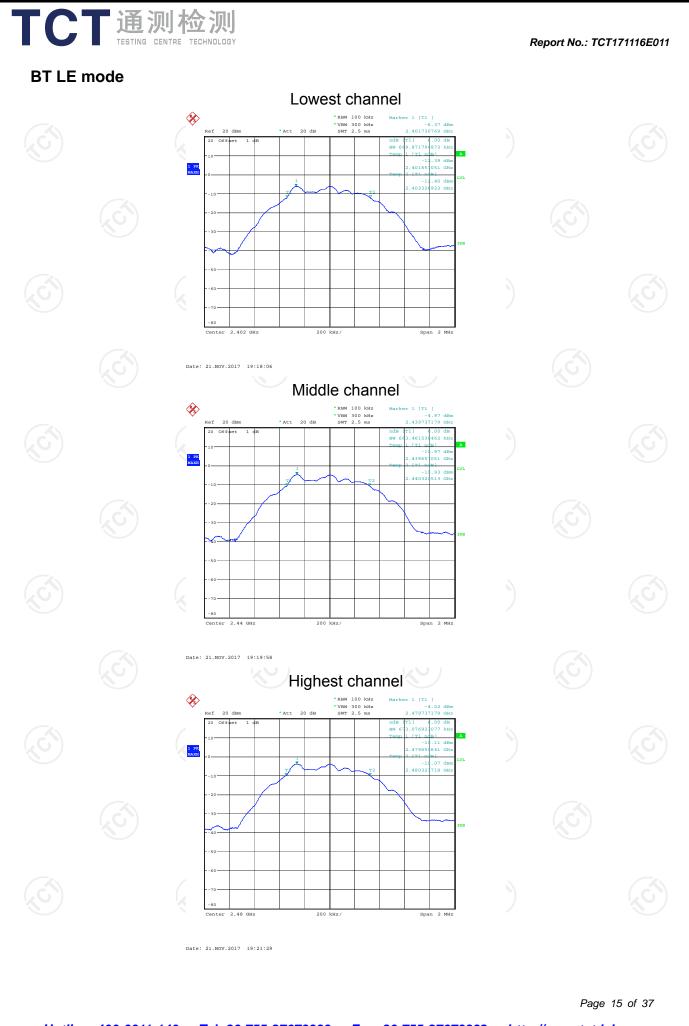
**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



### 6.4.3. Test data

	Toot obonnol	6dB Emission Bandwidth (kHz)				
(	Test channel	BT LE mode	Limit	Result		
0	Lowest	669.87	>500k	J.		
	Middle	663.46	>500k	PASS		
	Highest	673.08	>500k			

<u>Hotline: 400-6611-</u>	140 7-1- 96	755-27673:	220 Ear	86-755-27673	2222 httm	Page //www.tct-la	14 of 37





# 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

RF Test Room								
Equipment	nt Manufacturer Model Serial Number Calibra							
Spectrum Analyzer	R&S	FSU	200054	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).

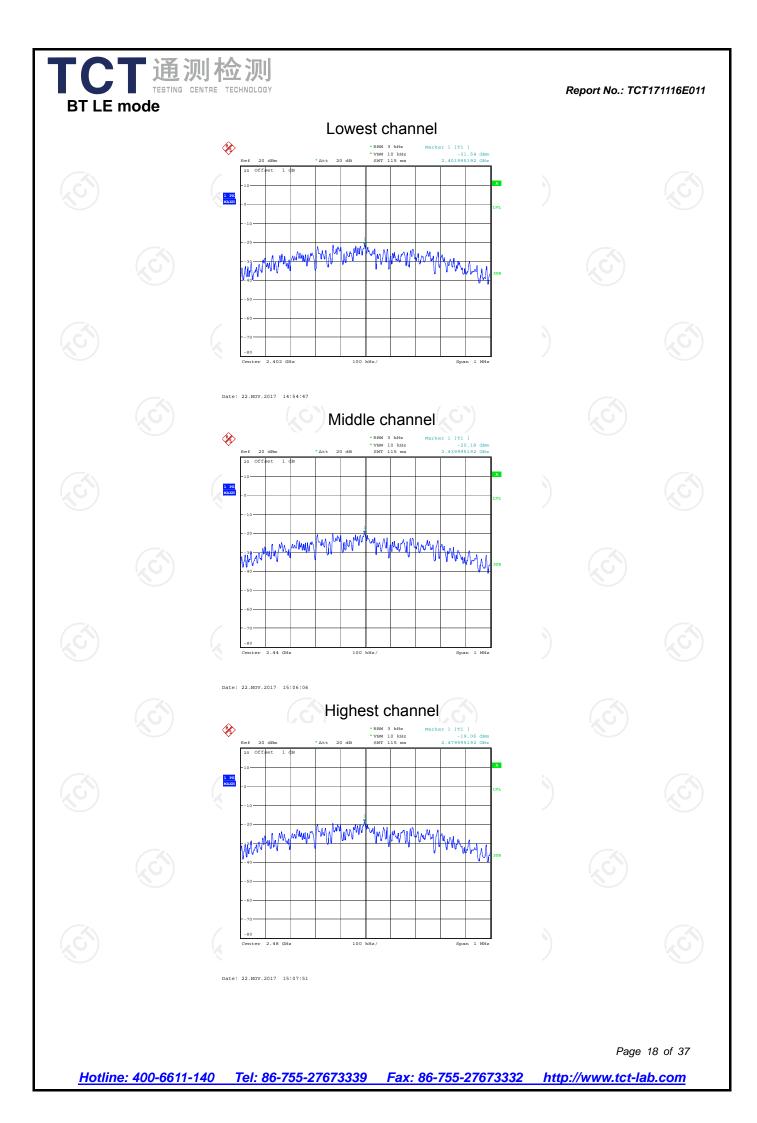
### 6.6.2. Test data

TCT 通测检测 TESTING CENTRE TECHNOLOGY

Test shapp	Test channel	Power Spec	ctral Density (dBm/3kHz)
	lest channel	BT LE mode	Limit Result
4	Lowest	-21.54	8 dBm/3kHz
	Middle	-20.18	8 dBm/3kHz PASS
	Highest	-19.06	8 dBm/3kHz

Test plots as follows:

	ts as follow	vs:						
<u>Hotline</u>	e: 400-6611-	-140 Tel: 8	<b>36-755-2767</b> 3	3339 Fax:	<u>86-755-2767</u>	<u>3332 http</u>	Page ://www.tct-la	17 of 37 1 <b>b.com</b>



# 6.7. Conducted Band Edge and Spurious Emission Measurement

### 6.7.1. Test Specification

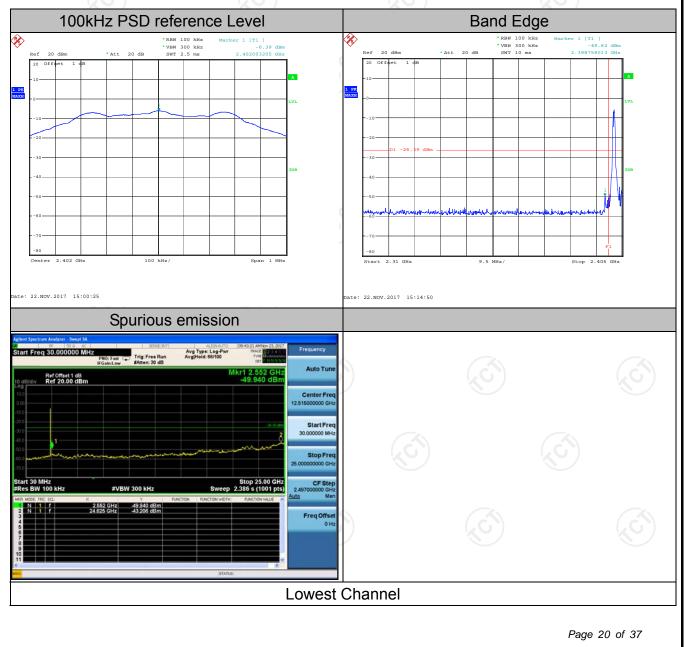
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074
Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted 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 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>Measure and record the results in the test report.</li> <li>The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> </ol>
	against the limit line in the operating nequency band.

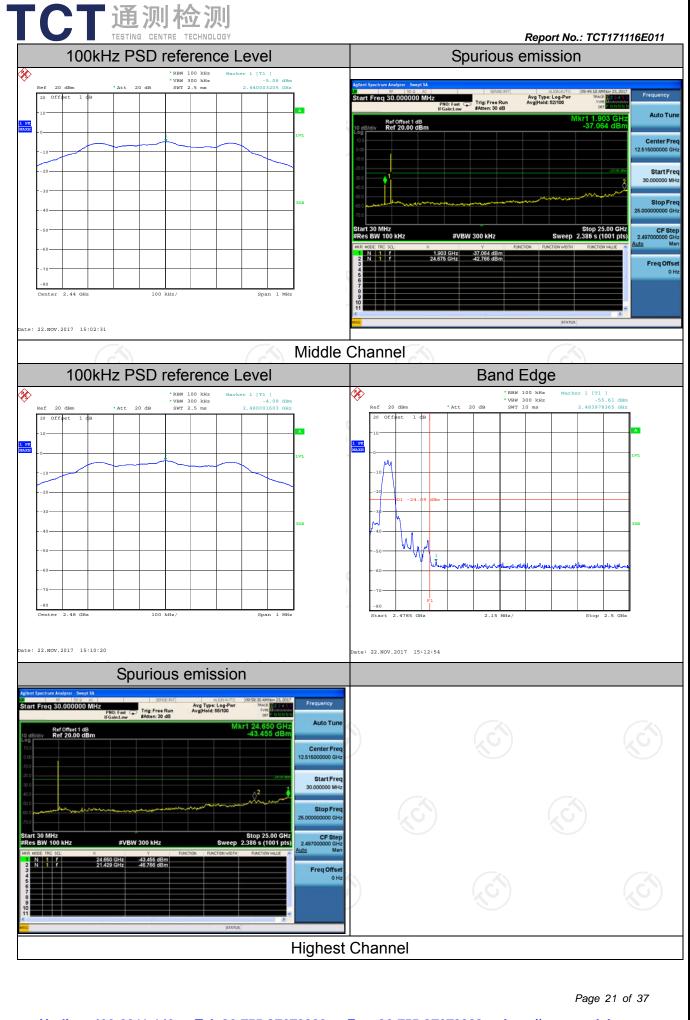
#### 6.7.2. Test Instruments

	RF Test Room									
	Equipment	Equipment Manufacturer Model Serial		Serial Number	Calibration Due					
	Spectrum Analyzer	R&S	FSU	200054	Sep. 27, 2018					
ę	Spectrum Analyzer	ROHDE&SCH WARZ	FSQ	200061	Sep. 27, 2018					
	RF cable (9kHz-26.5GHz)	ТСТ	RE-06	N/A	Sep. 27, 2018					
1	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





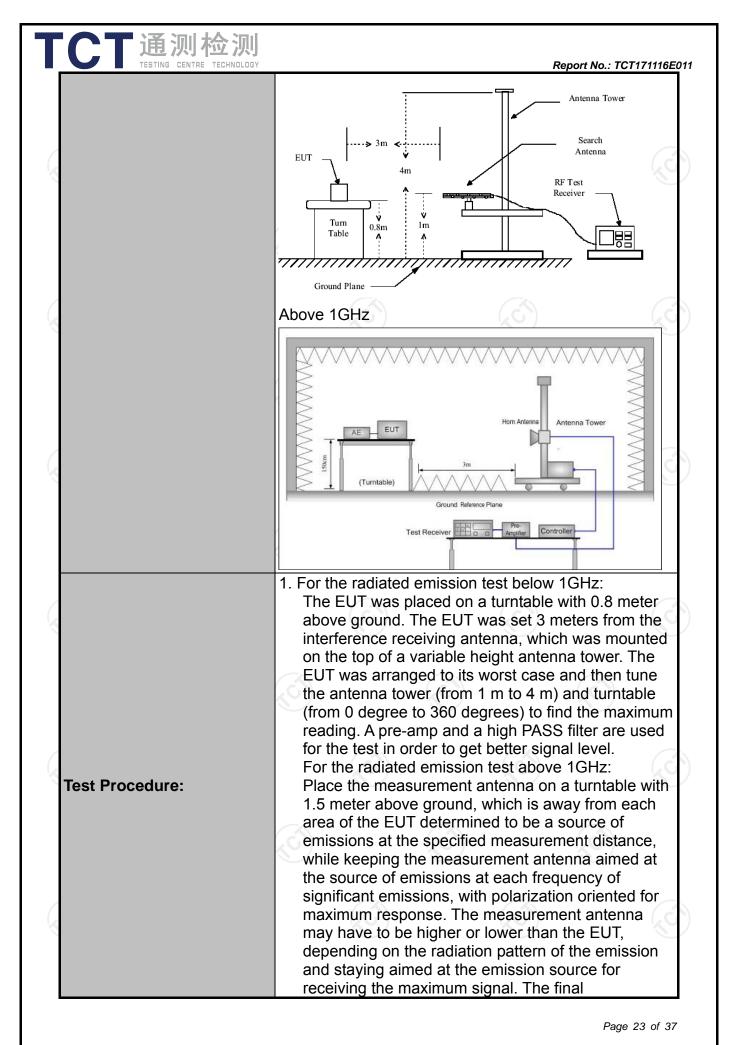
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

# 6.8. Radiated Spurious Emission Measurement

### 6.8.1. Test Specification

TCT通测检测 TESTING CENTRE TECHNOLOGY

Test Requirement:	FCC Part15	C Sectior	n 15.209 🛛						
Test Method:	ANSI C63.10	): 2013							
Frequency Range:	9 kHz to 25 (	GHz	3		G	0			
Measurement Distance:	3 m	X	9		K.	)			
Antenna Polarization:	Horizontal & Vertical								
Operation mode:	Refer to item 4.1								
Receiver Setup:	Frequency 9kHz- 150kHz 150kHz-	Detector Quasi-peal Quasi-peal		VBW 1kHz 30kHz		Remark si-peak Value si-peak Value			
Receiver Setup:	30MHz 30MHz-1GHz Above 1GHz	Quasi-peal Peak Peak	k 100KHz 1MHz 1MHz	300KHz 3MHz 10Hz	Р	si-peak Value 'eak Value erage Value			
	Frequen 0.009-0.4		Field Stre (microvolts 2400/F(I	/meter)	Measurement Distance (meters) 300				
	0.490-1.7	705	24000/F(		30				
	1.705-3		30		30				
	30-88		<u>100</u> 150		3				
Limit:	216-96		200	3					
	Above 960		500			3			
	Frequency Above 1GHz	(micro	ield Strength crovolts/meter) 500 500 3		се	Detector Average Peak			
Test setup:	For radiated	Distance = 3m	s below 30	)MHz		Computer			



CT 通测检测							
TESTING CENTRE TECHNOLOGY	<ul> <li>Report No.: TCT1711161</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</li> </ul>						
	<ul> <li>measurement will be repeated using the quasi-peak detector and reported.</li> <li>4. Use the following spectrum analyzer settings: <ul> <li>(1) Span shall wide enough to fully capture the emission being measured;</li> <li>(2) Set RBW=100 kHz for f &lt; 1 GHz; VBW ≥RBW; Sweep = auto; Detector function = peak; Trace = max hold;</li> </ul> </li> </ul>						
	<ul> <li>(3) Set RBW = 1 MHz, VBW= 3MHz for f 1 GHz for peak measurement.</li> <li>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>						
Test mode:	Refer to section 4.1 for details						
Test results:	PASS						

Page 24 of 37

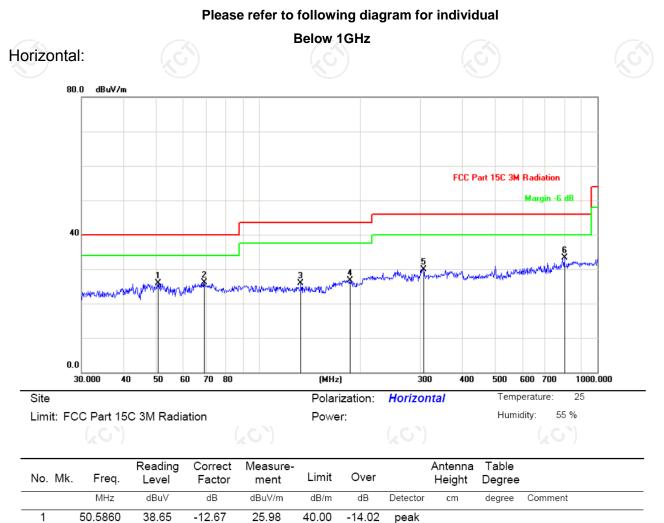


### 6.8.2. Test Instruments

	Radiated Em	ission Test Sit	te (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



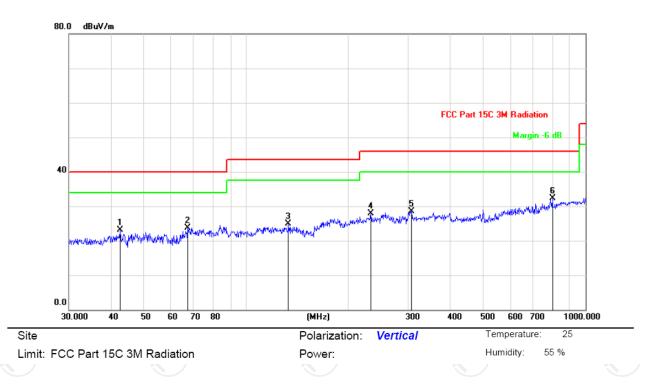
Report No.: TCT171116E011

1	50.5860	38.65	-12.67	25.98	40.00	-14.02	peak
2	69.1141	43.05	-16.90	26.15	40.00	-13.85	peak
3	133.1511	41.59	-15.72	25.87	43.50	-17.63	peak
4	185.7882	40.39	-13.61	26.78	43.50	-16.72	peak
5	306.7537	38.45	-8.50	29.95	46.00	-16.05	peak
6 *	798.9797	31.52	1.88	33.40	46.00	-12.60	peak

S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S
S<

#### Vertical:

**I** 



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		42.4508	35.99	-12.79	23.20	40.00	-16.80	peak			
2		67.2022	39.84	-16.17	23.67	40.00	-16.33	peak			
3		133.1511	40.59	-15.72	24.87	43.50	-18.63	peak			
4		232.5318	39.39	-11.48	27.91	46.00	-18.09	peak			
5		306.7537	36.95	-8.50	28.45	46.00	-17.55	peak			
6	*	798.9797	30.52	1.88	32.40	46.00	-13.60	peak			

**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

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

Page 27 of 37

Report No.: TCT171116E011

Above 1GHz

Low chann	el: 2402 N	1Hz							
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
2390	Н	45.66		-7.12	38.54		74	54	-15.46
4804	Н	43.41		7.36	50.77		74	54	-3.23
7206	Н	37.34		13.25	50.59		74	54	-3.41
	H								
(	.G)		(.G		(	.G)		$(\mathbf{G})$	
2390	V	51.75		-7.36	44.39	<u> </u>	74	54	-9.61
4804	V	43.27		7.12	50.39		74	54	-3.61
7206	V	37.85		12.47	50.32		74	54	-3.68
×	V			(	×		*		
<b>G</b> `)		(20)			5)		$(\mathcal{O})$		20
Middle cha	nnel: 2440	MHz		e					6

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Peak		Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4880	KCH)	44.71	-40	7.03	51.74	<u>(G</u> )-	74	54	-2.26
7320	F	36.52		13.41	49.93		74	54	-4.07
	Н								
4880	V	43.38		7.36	50.74		74	54	-3.26
7320	V	35.64		13.42	49.06		74	54	-4.94
	V								

#### High channel: 2480 MHz

ingii enam									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Peak	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
2483.5	Н	48.45		-7.27	41.18		74	54	-12.82
4960	Н	43.68		7.34	51.02		74	54	-2.98
7440	Н	34.30		13.51	47.81		74	54	-6.19
	Н			🌾	)				
2483.5	V	46.53		-7.80	38.73		74	54	-15.27
4960	V	40.79		7.63	48.42		74	54	-5.58
7440	J G V	32.37	-+.0	12.98	45.35	<u>, G</u> +	74	54	-8.65
	V								

#### Note:

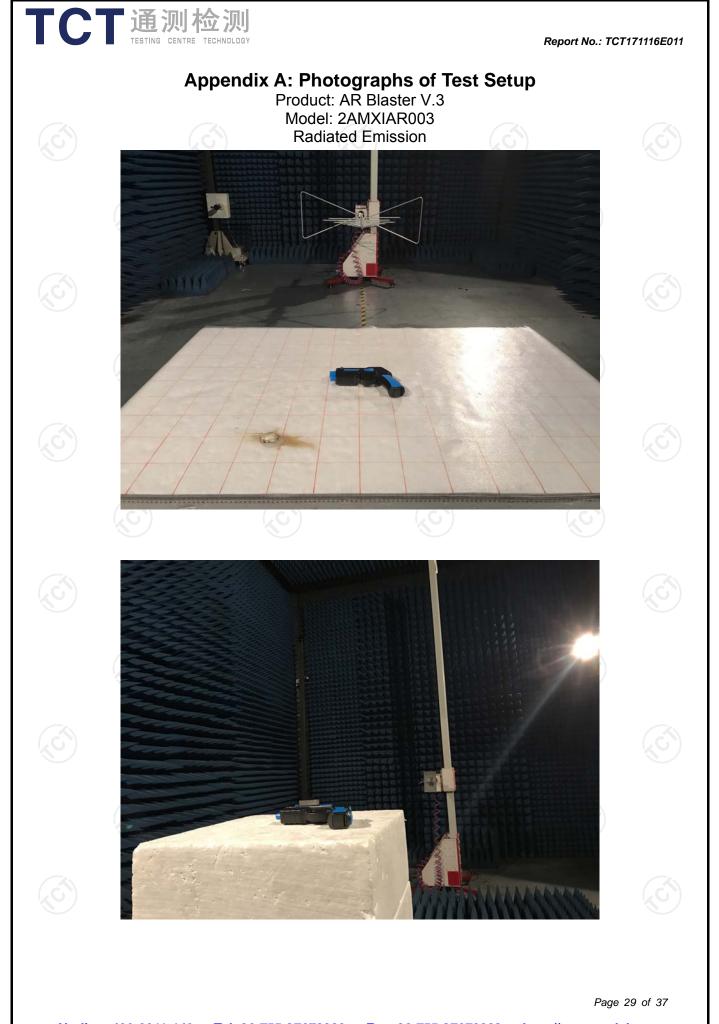
1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss - Pre-amplifier

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.



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

