

APPLICATION CERTIFICATION FCC Part 15C On Behalf of XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD

Massage Chair Model No.: EC-624C, OS-Pro Maxim

FCC ID: YMX-EC624C

Prepared for Address	:	XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD NO.168, QIANPU ROAD, SIMING DISTRICT, XIAMEN, FUJIAN, CHINA
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Report No.	:	ATE20161133
Date of Test	:	June 25-July 2, 2016
Date of Report	:	July 11, 2016



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D: YMX-EC		ACCURATE TECHNOLOGY CO., LTD
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Test Report Certification

Applicant	:	XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO.,
Manufacturer	:	XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD
EUT Description	:	Massage Chair
Model No.	:	EC-624C, OS-Pro Maxim
Trade Mark	:	N/A

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2015 ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of Apr 08, 2016 KDB558074 D01 DTS Meas Guidance v03r05 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : Date of Report:

Prepared by :

June 25-July 2, 2016 July 11, 2016

Bobwa

(Bob Wang, Engineer)

Approved & Authorized Signer :

(Sean Liu, Manager)



1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT Model Number	:	Massage Chair EC-624C, OS-Pro Maxim (Note: These samples are same except for the screen size is different for the marketing requirement. So we prepare the EC-624C for
Bluetooth version Frequency Range Number of Channels	:	test.) Bluetooth V4.0 BLE 2402MHz-2480MHz 40
Antenna Gain Antenna type	:	1dBi PCB Antenna
Power Supply Modulation mode Applicant	: : :	AC 110-120V; 60Hz GFSK XIAMEN COMFORT SCIENCE & TECHNOLOGY
Address	:	GROUP CO., LTD NO.168, QIANPU ROAD, SIMING DISTRICT, XIAMEN, FUJIAN, CHINA
Manufacturer	:	XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD
Address	:	NO.168, QIANPU ROAD, SIMING DISTRICT, XIAMEN, FUJIAN, CHINA
Date of sample received Date of Test	: :	June 20, 2016 June 25-July 2, 2016



Channel	Frequceny (MHz)	Channel	Frequceny (MHz)	Channel	Frequceny (MHz)	Channe 1	Frequceny (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

1.2.Carrier Frequency of Channels

1.3. Special Accessory and Auxiliary Equipment

N/A



1.4.Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen
		Listed by FCC The Registration Number is 752051
		Listed by Industry Canada The Registration Number is 5077A-2
		Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
		The Certificate Registration Number is L3193
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.
		Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2



2. MEASURING DEVICE AND TEST EQUIPMENT

Kind of equipment	Manufacturer	Туре	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 9, 2016	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 9, 2016	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 9, 2016	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 9, 2016	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 14, 2016	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 14, 2016	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 14, 2016	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 14, 2016	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 9, 2016	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 9, 2016	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 9, 2016	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 9, 2016	1 Year

Table 1: List of Test and Measurement Equipment

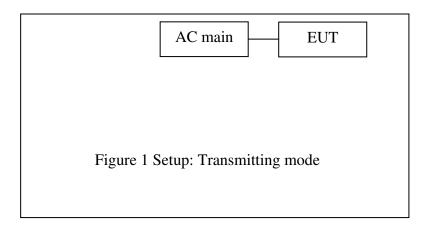


3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **BLE Transmitting mode** Low Channel: 2402MHz Middle Channel: 2440MHz High Channel: 2480MHz

3.2. Configuration and peripherals





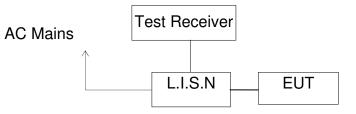
4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant



5. POWER LINE CONDUCTED MEASUREMENT

5.1.Block Diagram of Test Setup



(EUT: Massage Chair)

5.2. Power Line Conducted Emission Measurement Limits

Frequency	Limit dB(μV)					
(MHz)	Quasi-peak Level	Average Level				
0.15 - 0.50	66.0 - 56.0 *	56.0 - 46.0 *				
0.50 - 5.00	56.0	46.0				
5.00 - 30.00	60.0	50.0				
	all apply at the transition fre es linearly with the logarithm o 0.50MHz.					

5.3.Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

5.4. Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

- 5.4.2. Turn on the power of all equipment.
- 5.4.3.Let the EUT work in test mode and measure it.



5.5.Test Procedure

The EUT is put on the plane 0.1 m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

5.6. Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150kHz to 30MHz is checked.



Test mode : BT EUT mode : E0		nicating(AC 120	V/60Hz)			
MEASUREMENT		COFM	R62004	_fin"			
6/2/2016 11:5 Frequency		Transd	Limi+	Margin	Detector	Line	PE
MHz	dBµV	dB	dBµV	dB	Dettettet	LINC	
0.650000 4.980000				28.0 29.7		N N	GND GND
7.930000		11.2		34.0		N	
MEASUREMENT	RESULT	: "COFM	R62004	_fin2"			
6/2/2016 11:5			T (()	Maria	Detector	T .	55
Frequency MHz	dBµV				Detector	Line	ΡE
0.650000 1.945000	24.50	11.0	46	11.5	AV	N N	GND GND
7.920000	18.40	11.2	50	31.6	AV	N	GND
MEASUREMENT	RESULT	: "COFM	R6200 3	_fin"			
6/2/2016 11:5 Frequency		Transd	T.imi+	Margin	Detector	Lino	ਸ਼ਹ
	dBµV				Detector	птие	115
0.645000 3.240000				22.4		L1 L1	
13.390000		11.3		48.0		L1	GND
MEASUREMENT	RESULT	: "COFM	R6200 3	_fin2"			
6/2/2016 11:5			÷••••		D	. .	
Frequency MHz	Level dBµV				Detector	Line	PE
0.645000		10.8	46	13.8	AV	L1	GND
3.240000 5.200000	23.60 8.70	11.1 11.2			AV AV	L1 L1	GND GND

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.



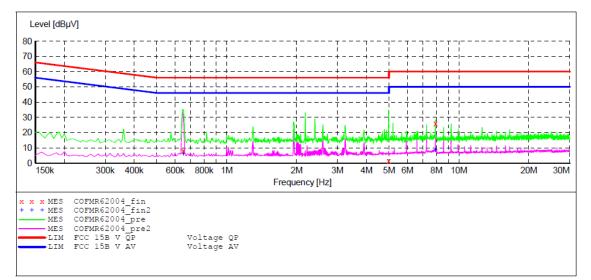
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT:	Massage Chair M/N:EC-624C
Manufacturer:	COMFORT
Operating Condition:	BT communicating
Test Site:	1#Shielding Room
Operator:	DING
Test Specification:	N 120V/60Hz
Comment:	Report NO.:ATE20161133
Start of Test:	6/2/2016 / 11:53:59AM

SCAN TABLE: "V 9K-30MHz fin"

 Short Desci	ciption:	ST	JB STD VTER	RM2 1.70		
Start	Stop	Step –	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	NSLK8126 2008
			Average			
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	NSLK8126 2008
			Average			



MEASUREMENT RESULT: "COFMR62004 fin"

6/2/2016 11:5 Frequency MHz			Margin dB	Detector	Line	PE
4.980000	26.30	10.8 11.2 11.2	 28.0 29.7 34.0	ÕР	N N N	GND GND GND

MEASUREMENT RESULT: "COFMR62004_fin2"

6/2/2016 11:57AM

Frequency MHz	Level dBµV		Margin dB	Detector	Line	PE
1.945000	24.50	 46		AV	N N N	GND GND GND



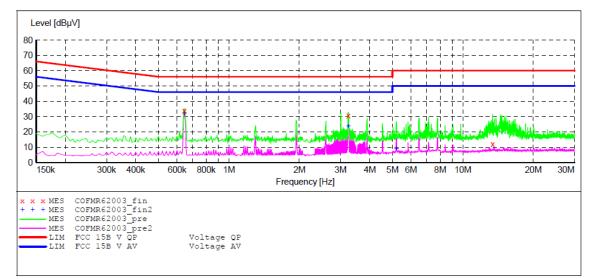
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Manufacturer:	Massage Chair M/N:EC-624C COMFORT
Operating Condition:	
Test Site:	1#Shielding Room
Operator:	DING
Test Specification:	
Comment:	Report NO.:ATE20161133
Start of Test:	6/2/2016 / 11:49:45AM

SCAN TABLE: "V 9K-30MHz fin"

escription:	<u>-</u>	SUB STD VTE	RM2 1.70		
Stop	Step	Detector	Meas.	IF	Transducer
cy Frequency	Width		Time	Bandw.	
150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	NSLK8126 2008
		Average			
Hz 30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	NSLK8126 2008
		Average			
	Stop cy Frequency 150.0 kHz	Stop Step cy Frequency Width 150.0 kHz 100.0 Hz	Stop Step Detector cy Frequency Width 150.0 kHz 100.0 Hz QuasiPeak Average Hz 30.0 MHz 5.0 kHz QuasiPeak	cy Frequency Width Time 150.0 kHz 100.0 Hz QuasiPeak 1.0 s Average Hz 30.0 MHz 5.0 kHz QuasiPeak 1.0 s	Stop Step Detector Meas. IF cy Frequency Width Time Bandw. 150.0 kHz 100.0 Hz QuasiPeak 1.0 s 200 Hz Average Hz 30.0 MHz 5.0 kHz QuasiPeak 1.0 s 9 kHz



MEASUREMENT RESULT: "COFMR62003 fin"

6/2/2016 11:5 Frequency MHz		Limit dBµV	Margin dB	Detector	Line	PE
0.645000 3.240000 13.390000	30.50	56	22.4 25.5 48.0	ÕР	L1 L1 L1	GND GND GND

MEASUREMENT RESULT: "COFMR62003_fin2"

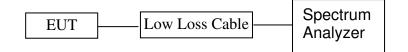
6/2/2016 11:53AM

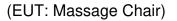
Frequency MHz		Transd dB		-	Detector	Line	PE
0.645000 3.240000 5.200000	23.60	11.1	46	22.4	AV	L1 L1 L1	GND GND GND



6. 6DB BANDWIDTH MEASUREMENT

6.1.Block Diagram of Test Setup





6.2. The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.3.EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4. Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

- 6.4.2.Turn on the power of all equipment.
- 6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

6.5.Test Procedure

- 6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 6.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to300 kHz.
- 6.5.3.The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.



6.6.Test Result

Channel	Frequency (MHz)	6 dB Bandwith (MHz)	Minimum Limit(MHz)	PASS/FAIL
0	2402	0.689	0.5	PASS
19	2440	0.695	0.5	PASS
39	2480	0.683	0.5	PASS

The spectrum analyzer plots are attached as below.

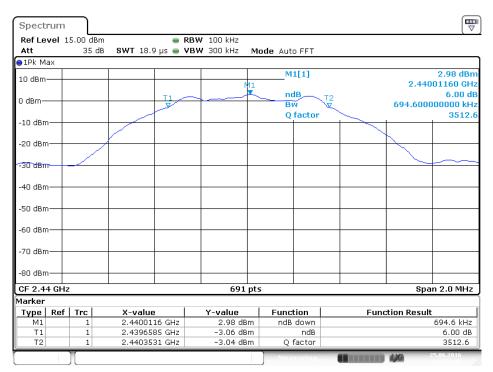
Spectrum										Ē
Ref Level 1 Att	L5.00 dBm 35 dB	OUT 10.0		3W 100 kHz 3W 300 kHz			-			
ALL 1Pk Max	35 UB	5WI 18.9	a ha 🕋 🗚	3 W 300 KH2	MO	de Auto FF1				
DIPK Max					1	M1[1]				0.79 dBm
10 dBm						MILI			2 403	201160 GHz
					M1	ndB			2.402	6.00 dE
0 dBm			TI	+	<u> </u>		√ T2		688.900	000000 kHz
			F			Q facto	nr 🔍		0001700	3487.0
-10 dBm								~~		1
-20 dBm-+		<u> </u>								
-30 dBm										
										T
-40 dBm										
-50 dBm										
-60 dBm				_						
-70 dBm										
-80 dBm										
05 0 400 0	-								0	0.0.00
CF 2.402 G	IZ			69.	. pts				Spa	n 2.0 MHz
Marker										
Type Ref		X-value		Y-value		Function		Func	tion Resul	
M1	1	2.402013		0.79 d		ndB dowi				688.9 kHz
T1 T2	1	2.401664		-5.15 d		ndl Q facto				6.00 dB 3487.0
12		2.402353	SI GHZ	-5.22 d	sm	ų facto	1			3487.0
	Π					Measurin	G		120	25.06.2016

channel 0

Date: 25.JUN.2016 17:53:58

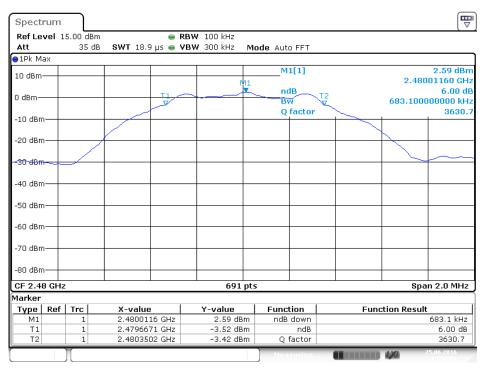


channel 19



Date: 25.JUN.2016 17:56:35

channel 39



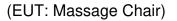
Date: 25.JUN.2016 17:58:01



7. MAXIMUM PEAK OUTPUT POWER

7.1.Block Diagram of Test Setup





7.2. The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

7.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4. Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

- 7.4.2.Turn on the power of all equipment.
- 7.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

7.5.Test Procedure

- 7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 7.5.2.Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz.
- 7.5.3.Measurement the maximum peak output power.



7.6.Test Result

Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
0	2402	1.11	30	PASS
19	2440	1.85	30	PASS
39	2480	1.59	30	PASS

The spectrum analyzer plots are attached as below.

Spectrum						
Ref Level 15.00 Att 3	● RBW 1 MH ms ● VBW 3 MH) Sweep			
∋1Pk Max						
10 dBm			M1[1]		2.402	1.11 dBm 01160 GHz
0 dBm	 	M1				
-10 dBm						
-20 dBm						
-30 dBm						
-40 dBm				_		
-50 dBm				_		
-60 dBm				_		
-70 dBm						
-80 dBm				_		
CF 2.402 GHz		691 pts			Spa	n 2.0 MHz
			Measuring		1/0	5.06.2016 17:39:01

channel 0

Date: 25.JUN.2016 17:39:01

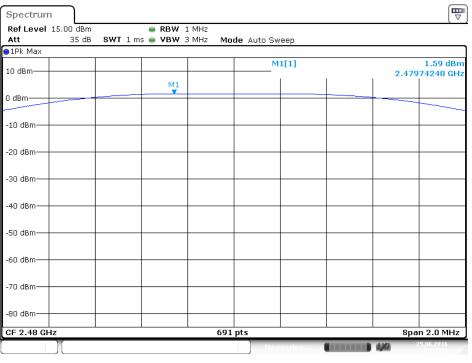


channel 19

Ref Level 1 Att	5.00 dBm 35 dB	SWT 1 ms	RBW 1 VBW 3		le Auto Sweep		
1Pk Max	00 40	0111 1115	• 1011 0	inite moa	ie Auto Sweep		
10 dBm					M1[1]	1.85 dBn 2.43974240 GH:
0 dBm			M1 ▼				
-10 dBm							
-20 dBm							
-30 dBm							
-40 dBm							
-50 dBm							
-60 dBm							
-70 dBm							
-80 dBm							
CF 2.44 GHz	I			691	pts	•	Span 2.0 MHz

Date: 25.JUN.2016 17:40:56

channel 39

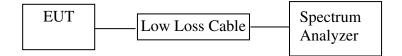


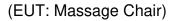
Date: 25.JUN.2016 17:42:00



8. POWER SPECTRAL DENSITY MEASUREMENT

8.1.Block Diagram of Test Setup





8.2. The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4. Operating Condition of EUT

- 8.4.1.Setup the EUT and simulator as shown as Section 8.1.
- 8.4.2.Turn on the power of all equipment.
- 8.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.



8.5.Test Procedure

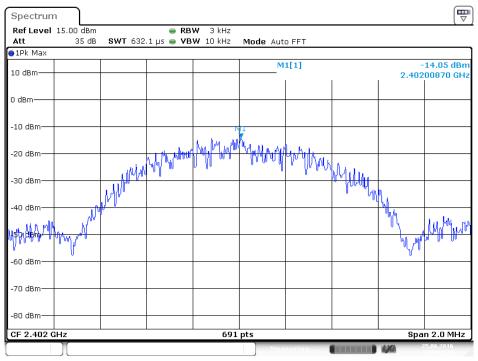
- 8.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 8.5.2.Measurement Procedure PKPSD:
- 8.5.3. This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.
 - 1. Set analyzer center frequency to DTS channel center frequency.
 - 2. Set the span to 1.5 times the DTS channel bandwidth.
 - 3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
 - 4. Set the VBW \geq 3 x RBW.
 - 5. Detector = peak.
 - 6. Sweep time = auto couple.
 - 7. Trace mode = max hold.
 - 8. Allow trace to fully stabilize.
 - 9. Use the peak marker function to determine the maximum amplitude level.
 - 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
- 8.5.4.Measurement the maximum power spectral density.



8.6.Test Result

CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/3KHz)	LIMIT (dBm/3KHz)	PASS/FAIL
0	2402	-14.05	8	PASS
19	2440	-12.53	8	PASS
39	2480	-11.62	8	PASS

The spectrum analyzer plots are attached as below.

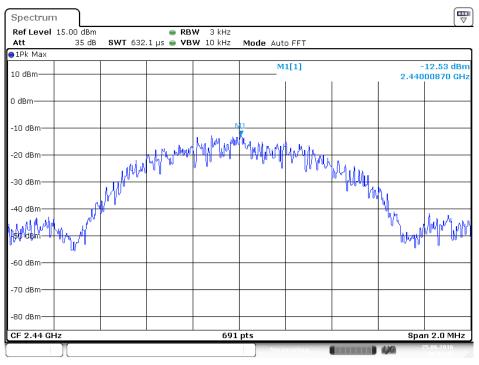


channel 0

Date: 25.JUN.2016 18:02:37

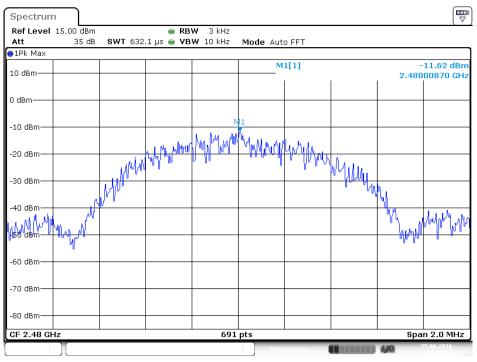


channel 19



Date: 25.JUN.2016 18:01:48

channel 39



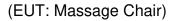
Date: 25.JUN.2016 18:00:18



9. BAND EDGE COMPLIANCE TEST

9.1.Block Diagram of Test Setup





9.2. The Requirement For Section 15.247(d)

Section 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.209(a).

9.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.4. Operating Condition of EUT

- 9.4.1.Setup the EUT and simulator as shown as Section 9.1.
- 9.4.2.Turn on the power of all equipment.
- 9.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2480MHz TX frequency to transmit.



9.5.Test Procedure

Conducted Band Edge:

- 9.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.
- 9.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.
- 9.5.3. Radiate Band Edge:
- 9.5.4. The EUT is placed on a turntable, which is 0.1m above the ground plane and worked at highest radiated power.
- 9.5.5.The turntable was rotated for 360 degrees to determine the position of maximum emission level.
- 9.5.6.EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 9.5.7.Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

9.5.8.RBW=1MHz, VBW=1MHz

9.5.9. The band edges was measured and recorded.

9.6.Test Result

Pass

Channel	Frequency	Delta peak to band emission	Limit(dBc)
0	2.4GHz	37.65	20
39	2.4835GHz	56.35	20

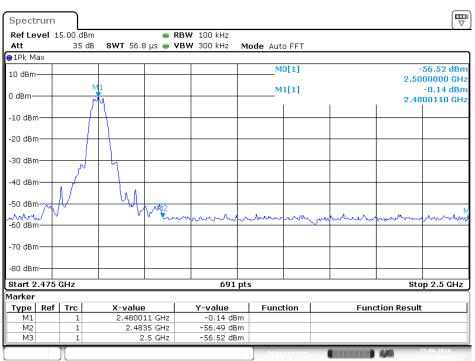


channel 0

Spectrum								♥
Ref Level	15.00 dB	m	■ RBW 100 kHz					
Att	35 d	B SWT 227.5 µs	> VBW 300 kHz	Mode Au	ito FFT			
●1Pk Max								
10 dBm				M	3[1]			7.92 dBm
				м	1[1]			0000 GHz
0 dBm					1[1]			1970 GHz
								X
-10 dBm								
-20 dBm								11
-20 UBIII								
-30 dBm								
								Д. —
-40 dBm							M	
-50 dBm							u	l Ma
						N. N. N.	в <u>"</u> М	4
-60 dBm	whenne	mound	abonogulanetter	monthearth	hunder	munichan	augus	June
-70 dBm								
-80 dBm								
Start 2.31 (GHz		691	pts			Stop	2.41 GHz
Marker								
	Trc	X-value	Y-value	Func	tion	Fund	tion Result	
M1 M2	1	2.40197 GHz 2.4 GHz						
M2 M3	1	2.4 GHz 2.39 GHz						
)(2105 011	01172 00)			4.964 _ 25	.06.2016
	Л			Mea			4/4	

Date: 25.JUN.2016 17:51:20

channel 39



Date: 25.JUN.2016 17:47:07



Radiated Band Edge Result

Date of Test:	June 28, 2016	Temperature:	25°C
EUT:	Massage Chair	Humidity:	50%
Model No.:	EC-624C	Power Supply:	AC 120V/60Hz
Test Mode:	TX (2402MHz) GFSK	Test Engineer:	Ding

Frequency	Reading	(dBµV/m)	Factor(dB)	Result(dBµV/m)		Limit(dBµV/m)		Margin(dB)		Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
2390.000	33.68	42.13	-7.64	26.04	34.49	54.00	74.00	-27.96	-39.51	Vertical
2400.000	59.49	69.83	-7.61	51.88	62.22	54.00	74.00	-2.12	-11.78	Vertical
2390.000	29.68	39.44	-7.64	22.04	31.80	54.00	74.00	-31.96	-42.20	Horizontal
2400.000	52.79	62.19	-7.61	45.18	54.58	54.00	74.00	-8.82	-19.42	Horizontal

Date of Test:	June 28, 2016	Temperature:	25°C
EUT:	Massage Chair	Humidity:	50%
Model No.:	EC-624C	Power Supply:	AC 120V/60Hz
Test Mode:	TX (2480MHz) GFSK	Test Engineer:	Ding

Frequency	Reading	(dBµV/m)	Factor(dB)	Result(Result(dBµV/m)		Limit(dBµV/m)		Margin(dB)	
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
2483.500	49.25	59.56	-7.37	41.88	52.19	54.00	74.00	-12.12	-21.81	Vertical
2500.000	30.59	41.09	-7.32	23.27	33.77	54.00	74.00	-30.73	-40.23	Vertical
2483.500	46.28	55.51	-7.37	38.91	48.14	54.00	74.00	-15.09	-25.86	Horizontal
2500.000	29.94	39.84	-7.32	22.62	32.52	54.00	74.00	-31.38	-41.48	Horizontal

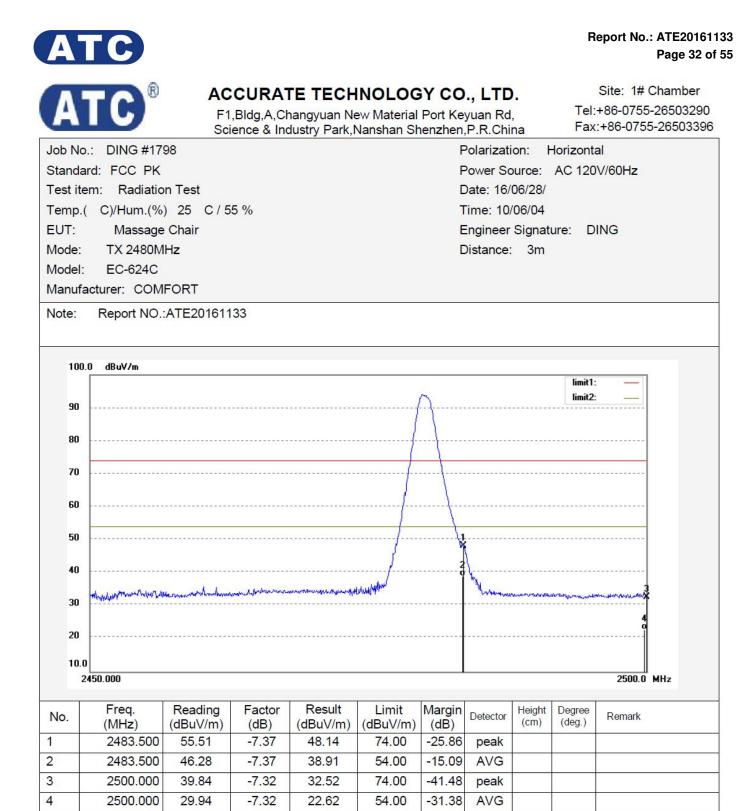
Note:

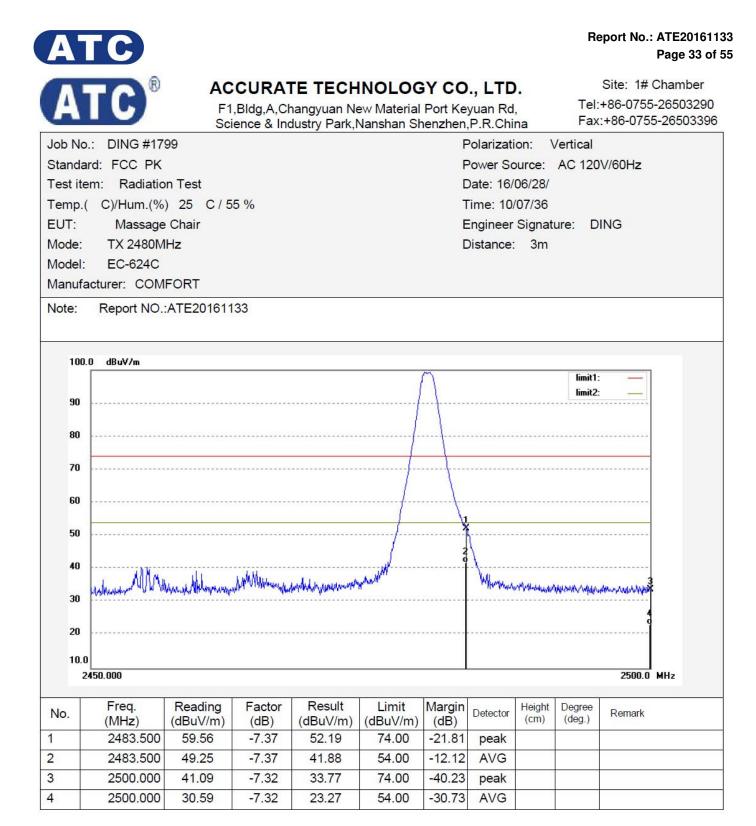
1. Emissions attenuated more than 20 dB below the permissible value are not reported.

- 2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows: Result = Reading + Corrected Factor
- 3. Display the measurement of peak values.

A	TC®	F1	,Bldg,A,Ch	TE TECH nangyuan Ne dustry Park,I	ew Material	Port Ke	yuan Rd	,			Chamber -26503290 5-26503396
Job No	b.: DING #179	6				F	Polarizati	ion: H	Horizonta	al	
Standa	ard: FCC PK					F	Power Sc	ource:	AC 120	V; 60Hz	
Test ite	em: Radiation	Test				C)ate: 16/	06/28/			
Temp.	(C)/Hum.(%)	25 C/5	5 %			Т	ime: 10/	/00/50			
EUT:	Massage (Chair				E	Ingineer	Signat	ure: D	ING	
Mode:	TX 2402MH	łz				C	istance:	3m			
Model:	EC-624C										
Manufa	acturer: COMF	ORT									
100).0 dBu∀/m										
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	o									2450.0	MHz
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20 10.1 2	2310.000	Reading	Factor	Result	Limit	Margin	-				
20 10.1 2	2310.000 Freq.	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	(cm)	(deg.)	Remark	
20 10.1 2 No. 1	2310.000 Freq.					Margin (dB) -42.20	Detector peak		(deg.)	Remark	
20 10.1 2 No. 1 2	2310.000 Freq. (MHz) 2390.000 2390.000	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	ADDRUGUS GROUNDER		(deg.)	Remark	
20 10.1 2 No. 1	2310.000 Freq. (MHz) 2390.000	(dBuV/m) 39.44	(dB) -7.64	(dBuV/m) 31.80	(dBuV/m) 74.00	(dB) -42.20	peak		(deg.)	Remark	

A	TC®	F1	Bldg,A,Ch	TE TECH nangyuan Ne dustry Park,I	ew Material	Port Ke	yuan Rd	,	Tel:		Chamber -26503290 5-26503396
Job No	o.: DING #179	7				F	Polarizati	on:	Vertical		
Standa	ard: FCC PK					F	ower Sc	ource:	AC 120	V; 60Hz	
Test ite	em: Radiation	Test				C)ate: 16/	06/28/			
Temp.	.(C)/Hum.(%)	25 C/5	5 %			Т	ime: 10/	02/47			
EUT:	Massage	Chair				E	Ingineer	Signat	ure: D	ING	
Mode:	TX 2402MH	łz				C)istance:	3m			
Model:	: EC-624C										
Manuf	acturer: COMF	ORT									
100	0.0 dBuV/m								limit1:		
						Δ			limit2:		
90											
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40 30 20 10.(2	0 2310.000 Freq.	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	2450.0 Remark	MHz
40 30 20 10.1 2 No.	0 2310.000 Freq.	Reading (dBuV/m) 42.13	Factor (dB) -7.64	Result (dBuV/m) 34.49	Limit (dBuV/m) 74.00	Margin (dB) -39.51	Detector peak		Degree (deg.)		MHz
40 30 20	0 2310.000 Freq. (MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	anananana M		Degree (deg.)		MHz
40 30 20 10. 2 2 10. 2 10. 2 10. 2 10 2 10	0 2310.000 Freq. (MHz) 2390.000	(dBuV/m) 42.13	(dB) -7.64	(dBuV/m) 34.49	(dBuV/m) 74.00	(dB) -39.51	peak		Degree (deg.)		MHz





Note:

- 1. Emissions attenuated more than 20 dB below the permissible value are not reported.
- 2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

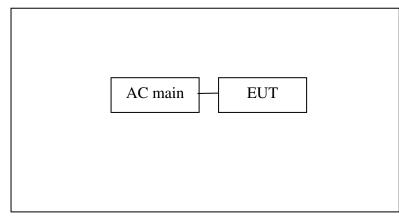
3. Display the measurement of peak values.



10.RADIATED SPURIOUS EMISSION TEST

10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

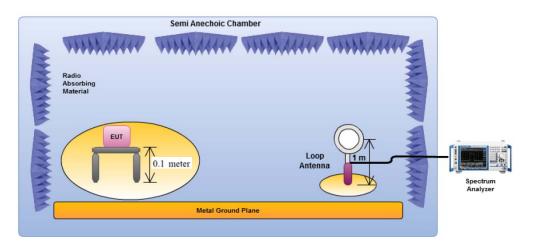


Setup: Transmitting mode

(EUT: Massage Chair)

10.1.2.Semi-Anechoic Chamber Test Setup Diagram

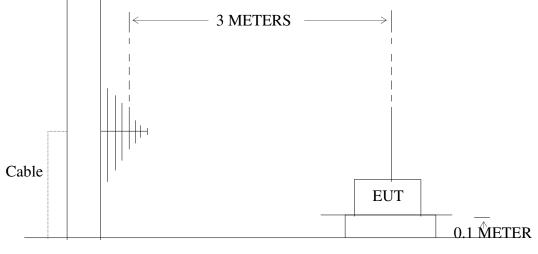
Below 30MHz





30MHz-1GHz

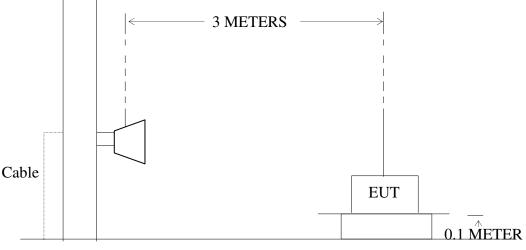
ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



GROUND PLANE

Above 1GHz

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



GROUND PLANE

10.2. The Limit For Section 15.247(d)

Section 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, provided the

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transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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).

10.3.Restricted bands of operation

- 10.3.1.FCC Part 15.205 Restricted bands of operation
- (a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

permitted in any of the needlency builds instea below.			
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	$(^{2})$
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

10.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission



characteristics in normal application.

10.5.Operating Condition of EUT

10.5.1.Setup the EUT and simulator as shown as Section 10.1.

- 10.5.2.Turn on the power of all equipment.
- 10.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

10.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.1 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 0.1 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 25GHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

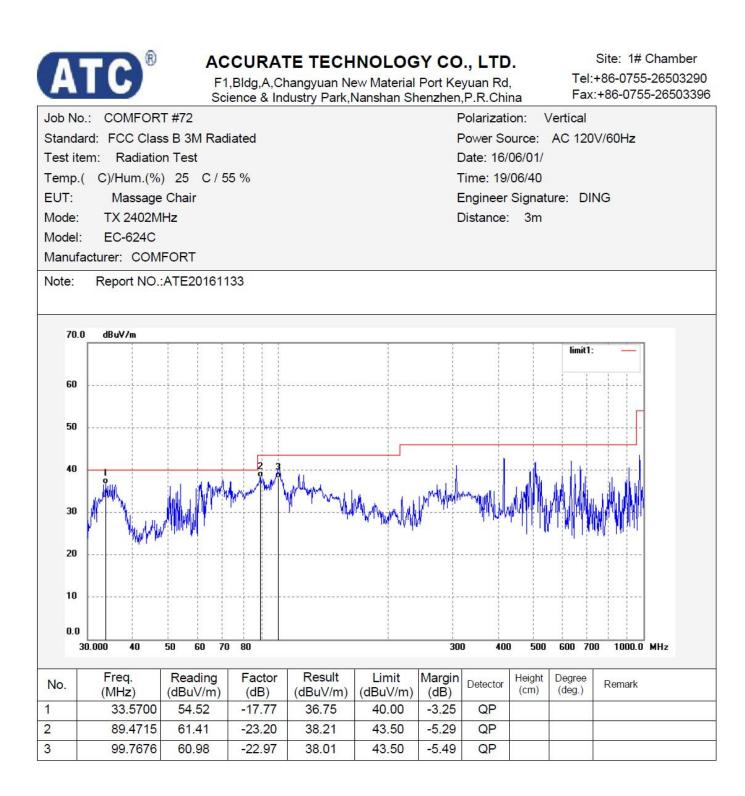
10.7.The Field Strength of Radiation Emission Measurement Results PASS.

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

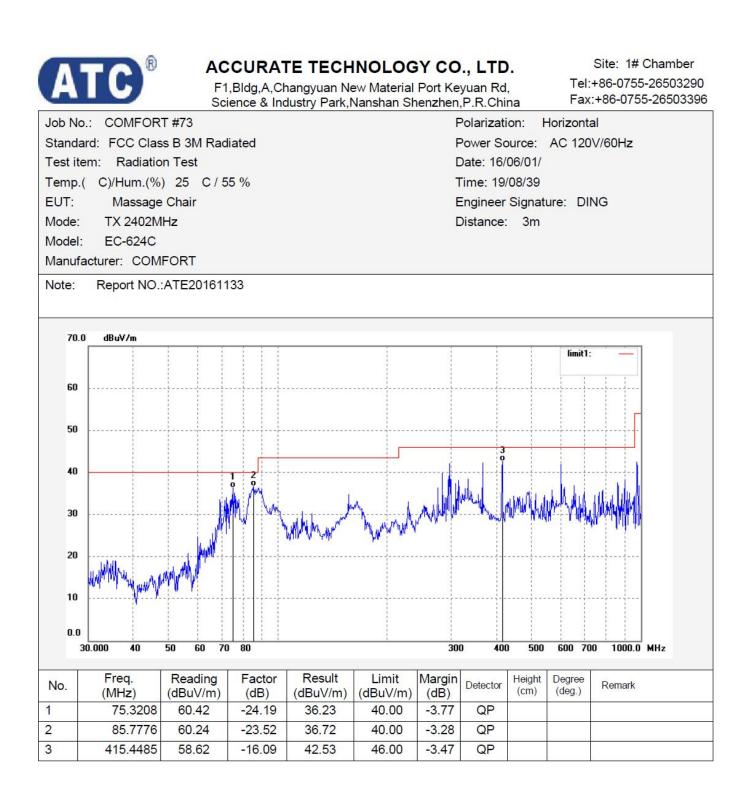
2. *: Denotes restricted band of operation.

3. The radiation emissions from 18-25GHz are not reported, because the test values lower than the limits of 20dB.

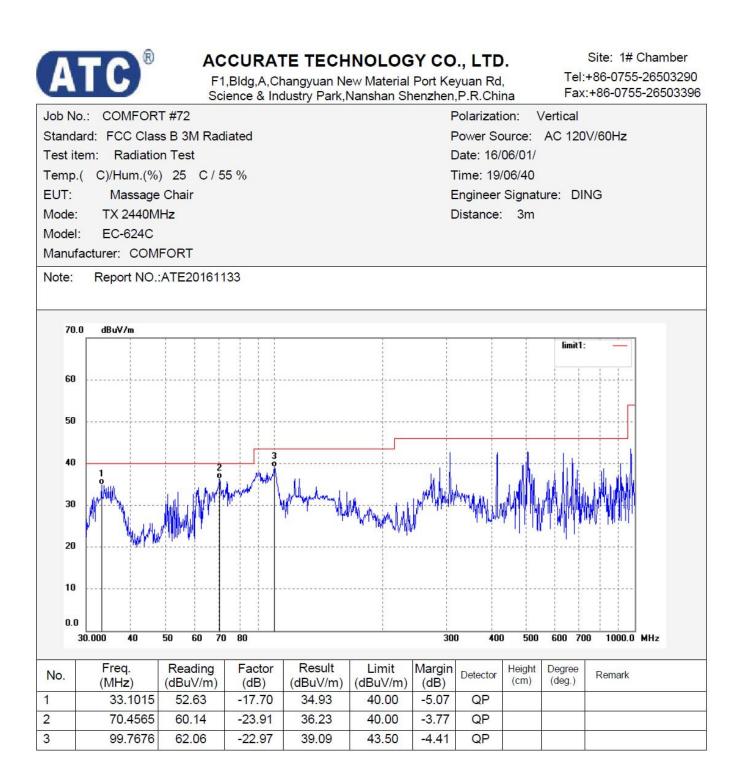




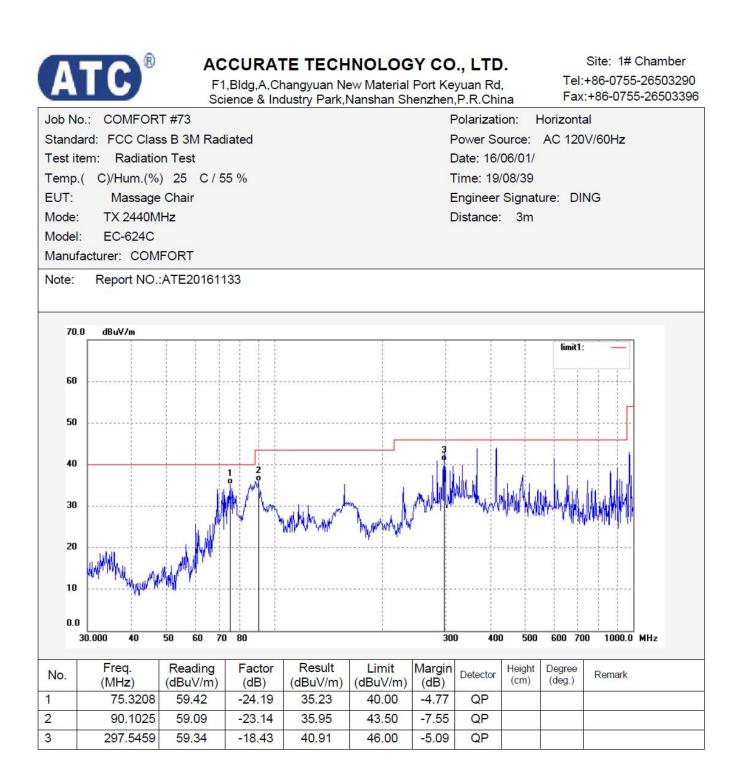




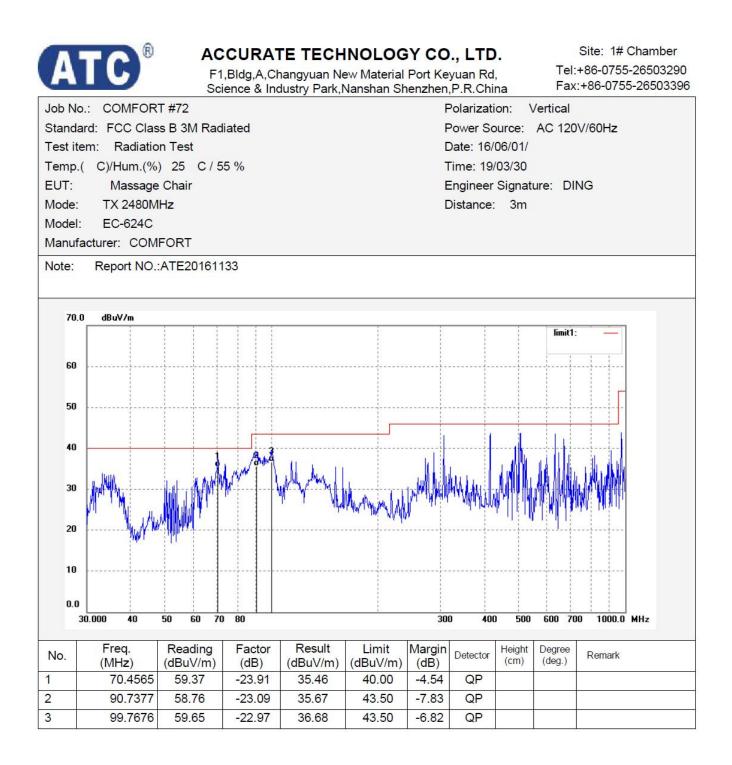


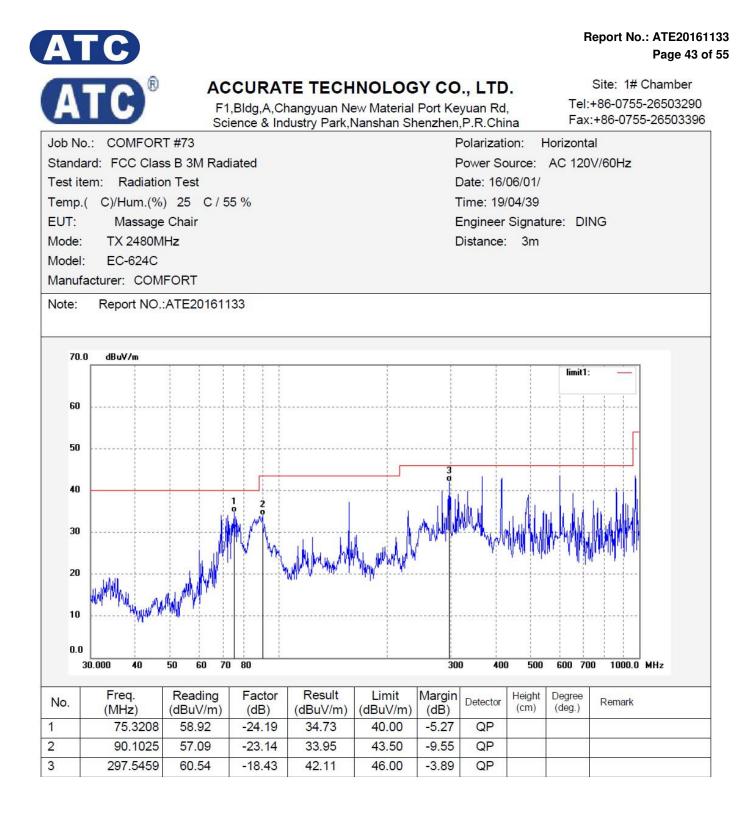














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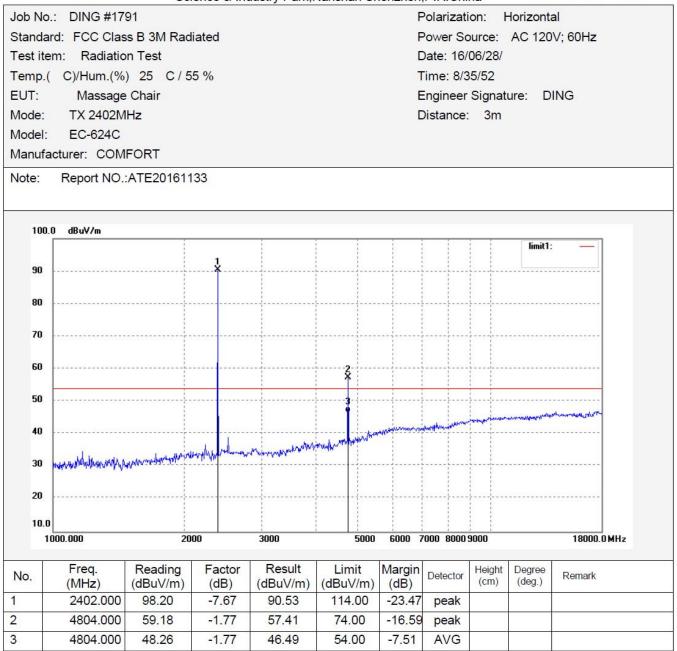
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b No.	: DING #17	90					Polarizati	on: \	/ertical	
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st ite	m: Radiatio	n Test		I	Date: 16/	06/28/				
mp.(C)/Hum.(%) 25 C/5	5 %			-	Time: <mark>8</mark> /2	4/03		
JT:	Massage	Chair					Engineer	Signat	ure: D	ING
ode:	TX 2402M	Hz					Distance:	3m		
odel:	EC-624C									
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	000.000	20	00	3000	5000	6000	7000 80009	9000		18000.0 MHz
b .	Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height (cm)	Degree (deg.)	Remark
1	(MHz) 2402.000	(dBuV/m) 103.41	(dB) -7.67	(dBuV/m) 95.74	(dBuV/m) 114.00	(dB) -18.26	peak	(cm)	(uey.)	
	4804.000	60.23	-1.77	58.46	74.00	-15.54				
	4804.000	50.68	-1.77	48.91	54.00	-5.09	AVG			
	-00000	50.00	-1.11	40.01	57.00	0.03	AVO			





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ATC ATC[®]

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No.	.: DING #17	92				F	Polarizati	on: H	Iorizonta	al
andai	rd: FCC Clas	s B 3M Rad	F	Power Source: AC 120V; 60Hz						
st ite	m: Radiatio	n Test	[Date: 16/	06/28/					
mp.(C)/Hum.(%) 25 C/5	55 %			-	Time: 8/3	7/25		
T:	Massage	Chair				E	Engineer	Signat	ure: D	ING
de:	TX 2440M					[Distance:	3m		
del:	EC-624C									
nufa	cturer: COM	FORT								
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10.0				2000		0000	7000 0000			10000 01444
10	000.000	20	000	3000	5000	6000	7000 8000	9000		18000.0 MHz
3.9	Freq.	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
).	(MHz)	(aba viiii)					and a second second	-		
) .	(MHZ) 2440.000	101.12	-7.56	93.56	114.00	-20.44	peak			
).			-7.56 -1.50	93.56 57.60	114.00 74.00	-20.44 -16.40				



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	104.46	-7.56	96.90	114.00	-17.10	peak			
2	4880.000	59.79	-1.50	58.29	74.00	-15.71	peak			
3	4880.000	47.95	-1.50	46.45	54.00	-7.55	AVG			



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ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 1# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

		00		austry raik,	Nanshan Or		i,i .ix.on	IIa			
Job No	b.: DING #17	94					Polarizat	ion: \	/ertical		
Standa	ard: FCC Clas	s B 3M Rad	liated	Power Source: AC 120V; 60Hz							
Test it	em: Radiatio	n Test					Date: 16/	06/28/			
Temp.	(C)/Hum.(%) 25 C/5	5 %				Time: 8/4	10/34			
EUT:	Massage	Chair					Engineer	Signat	ure: D	ING	
Mode:	TX 2480M	Hz					Distance	: 3m			
Model	EC-624C										
Manuf	acturer: COM	FORT									
Note:	Report NO.	ATE201611	133								
100).0 dBuV/m										
			1 *						limit1:		
90											
80			·				+	·			
70											
60					2 X		· · · · · · · · · · · · · · · · · · ·				
50							· · · · · · · · · · · · · · · · · · ·			New Manager of the second	
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20							ļļ				
10.	0										
	1000.000	20	100	3000	5000	6000	: : 7000 8000	<u>: :</u> 9000		18000.0 MHz	
	Freq.	Reading	Factor	Result	Limit	Margin	1	Height	Degree		
No.	(MHz)	(dBuV/m)	(dB)	(dBuV/m)		(dB)	Detector	(cm)	(deg.)	Remark	
1	2480.000	102.34	-7.47	94.87	114.00	-19.13	3 peak				
2	4960.000	59.61	-1.17	58.44	74.00	-15.50	peak				

47.08

-1.17

54.00

-6.92

AVG

3

4960.000

48.25



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ACCURATE TECHNOLOGY CO., LTD.

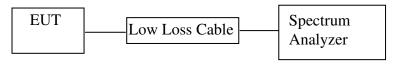
F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China

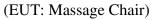
			ience & Ind	dustry Park,	Vanshan Sh	enzhen	,P.R.Chi	na	Fax	.+00-0755-205033
o No.	.: DING #17	95		F	Polarizati	on: H	lorizonta	al		
andai	rd: FCC Clas	s B 3M Rad	F	Power Sc	ource:	AC 120	V; 60Hz			
st ite	m: Radiatio	n Test	0	Date: 16/	06/28/					
mp.(C)/Hum.(%) 25 C/5	5 %			٦	Time: <mark>8</mark> /4	2/12		
IT:	Massage	Chair				E	Engineer	Signat	ure: D	ING
de:	TX 2480M	Hz				C	Distance:	3m		
del:	EC-624C									
anufa	cturer: COM	FORT								
te:	Report NO.:	ATE201611	133							_
100.1			1 X						limit1:	-
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10.0										
	000.000	20	000	3000	5000	6000 7	7000 8000	9000		18000.0 MHz
1	Freq.	Reading	Factor	Result	Limit	Margin		Height	Degree	2.7.21 66
D .	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Detector	(cm)	(deg.)	Remark
	2480.000	102.84	-7.47	95.37	114.00	-18.63	^B peak			
	4960.000	59.15	-1.17	57.98	74.00	-16.02	peak			



11.CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

11.1.Block Diagram of Test Setup



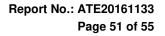


11.2. The Requirement For Section 15.247(d)

Section 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.209(a).

11.3.EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.





11.4.Operating Condition of EUT

- 11.4.1.Setup the EUT and simulator as shown as Section 10.1.
- 11.4.2.Turn on the power of all equipment.
- 11.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

11.5.Test Procedure

- 11.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.
- 11.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz
- 11.5.3. The Conducted Spurious Emission was measured and recorded.

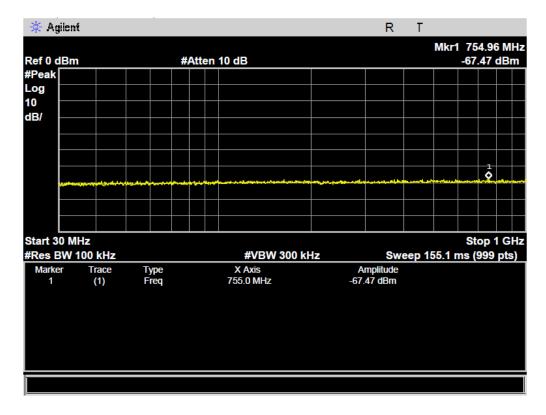
11.6.Test Result

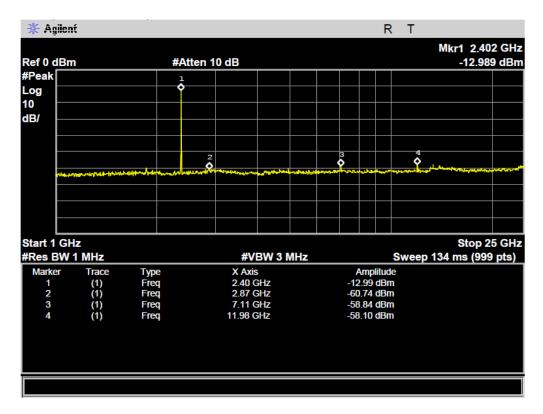
Pass.

The spectrum analyzer plots are attached as below.



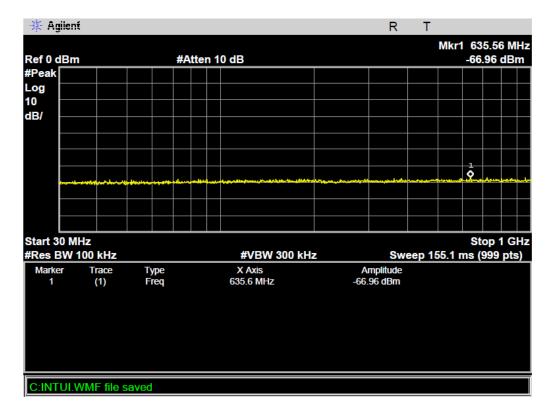
BLE Channel Low 2402MHz

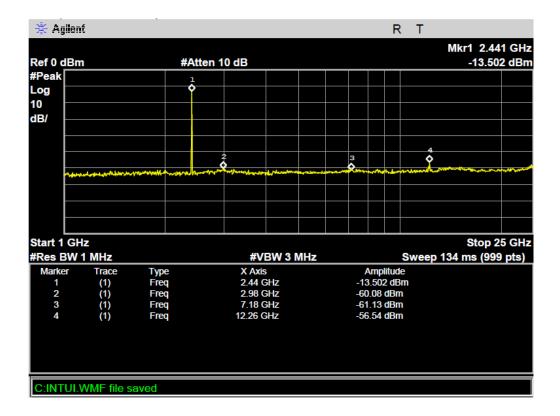






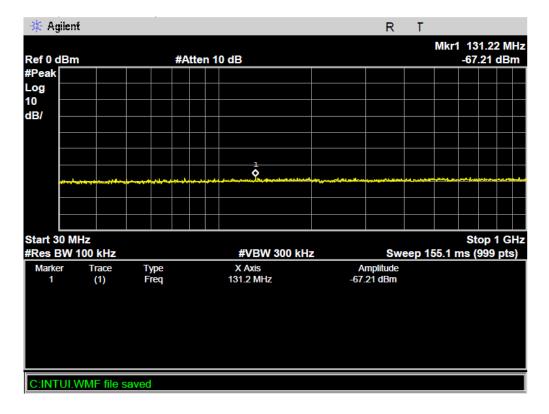
BLE Channel Middle 2440MHz







BLE Channel High 2480MHz



🔆 Agi	llent									R	٦	Г			
													Mkr	1 2.48	0 GHz
Ref 0 d	Bm	#	Atten 1	l0 dB										-14.95	7 dBm
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Log			Ý												
10															
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Start 1	GHz													Stop 2	5 GHz
#Res B	W 1 MHz			#V	BW 3	MHz					Swe	eep	134 n	ns (999	9 pts)
Marke	r Trace	Туре		X Axis						itude					
1	(1)	Freq		2.48 (7 dBr	n				
2	(1)	Freq		3.03 0		-60.92 dBm									
3	(1) (1)	Freq Freq								-60.66 dBm -60.2 dBm					
- *	(')	10.24 0	3112			-00).z u	DIII							
C:INT	UI.WMF file	saved													



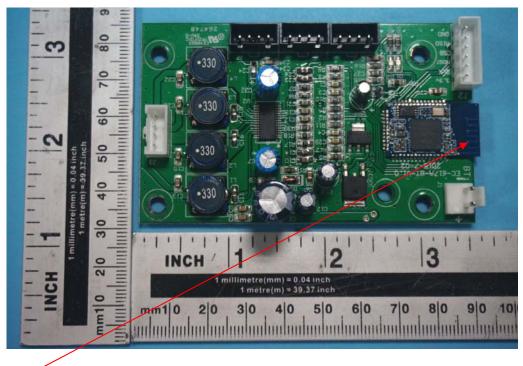
12.ANTENNA REQUIREMENT

12.1.The Requirement

According to Section 15.203, 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.

12.2.Antenna Construction

Device is equipped with external Antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 1dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna