



Report No: FCC 1612235 File reference No: 2017-01-12

Applicant: Techcool Industry Development Co., Ltd.

Product: Car Charger Bluetooth Earphone

Model No: CB06, CB07, CB08, CB09, ST01, ST02, ST03, ST04, TBH16

Trademark: SORNBEO

Test Standards: FCC Part 15.247

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10, FCC Part 15.247 for the

evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: January 12, 2017

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

# SHENZHEN TIMEWAY TESTING LABORATORIES

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

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# **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

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

# **CNAL-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

# FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

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# **Test Report Conclusion**

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#### 1.0 General Details

#### 1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Room 512-519,5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen,

Guangdong China

Telephone: (755) 83448688 Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m & 10 m OATS

### 1.2 Applicant Details

Applicant: Techcool Industry Development Co., Ltd.

Address: 3F, 1ST Bldg Dawei Shahe Industrial Park, Jiangshi Village, Gongming Town, Shenzhen City,

China.

Telephone: 0755-29090562

Fax: --

### 1.3 Description of EUT

Product: Car Charger Bluetooth Earphone

Manufacturer: Techcool Industry Development Co., Ltd.

Address: 3F ,1ST Bldg Dawei Shahe Industrial Park, Jiangshi Village, Gongming

Town, Shenzhen City, China.

Brand Name: SORNBEO

Additional Brand Name: N/A Model Number: CB06

Additional Model Number: CB07, CB08, CB09, ST01, ST02, ST03, ST04, TBH16

Type of Modulation GFSK (Bluetooth BLE)

Frequency range 2402-2480MHz Frequency Selection By software

Channel Number 40

# 1.4 Submitted Sample: 2 Samples

The report refers only to the sample tested and does not apply to the bulk.

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1.5 Test Duration 2016-12-30 to 2017-01-12

Test Uncertainty Conducted Emissions Uncertainty = 3.6dB Radiated Emissions Uncertainty =4.7dB

Test Engineer 1.7

The sample tested by

Print Name: Terry Tang

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2.0 Test Equipment						
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date	
ESPI Test Receiver	R&S	ESPI 3	100379	2016-08-22	2017-08-21	
TWO	R&S	E7112 75	100204	2016 09 22	2017 09 21	
Line-V-NETW		EZH3-Z5	100294	2016-08-22	2017-08-21	
TWO	R&S	EZH3-Z5	100253	2016-08-22	2017-08-21	
Line-V-NETW		EZN3-Z3	100233	2010-08-22	2017-08-21	
	R&S					
Ultra Broadband		HL562	100157	2016-08-23	2017-08-22	
ANT						
	R&S	ESDV	100008	2016-08-22	2017-08-21	
ESDV Test Receiver		LSD V	100000	2010-00-22	2017-00-21	
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2016-08-22	2017-08-21	
System Controller	CT	SC100	-			
Printer	EPSON	РНОТО ЕХЗ	CFNH234850			
Computer	IBM	8434	1S8434KCE99BLXLO*	-	-	
Loop Antenna	EMCO	6502	00042960	2016-08-23	2017-08-22	
ESPI Test Receiver	R&S	ESI26	838786/013	2016-08-22	2017-08-21	
3m OATS		-	N/A	2016-08-24	2017-08-23	
Horn Antenna	R&S	BBHA 9170	BBHA9170265	2016-08-24	2017-08-23	
Horn Antenna	R&S	BBHA 9120D	9120D-631	2016-08-24	2017-08-23	
Power meter	Anritsu	ML2487A	6K00003613	2016-08-22	2017-08-21	
Power sensor	Anritsu	MA2491A	32263	2016-08-22	2017-08-21	
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2016-08-23	2017-08-21	
LISN	AFJ	LS16C	10010947251	2016-08-22	2017-08-21	
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2016-08-23	2017-08-22	
9*6*6 Anechoic			N/A	2016-08-24	2017-08-23	
EMI Test Receiver	RS	ESCS30	100139	2016-08-22	2017-08-21	
RF Cable	SCHWARZBEC			2016-08-23	2017-08-22	
Kr Cable	K			2010-08-23	2017-08-22	
Pre-Amplifier	HP	8447D	2727A05017	2016-08-05	2017-08-04	
Pre-Amplifier	EM	EM30265		2016-08-05	2017-08-04	

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#### 3.0 **Technical Details**

#### 3.1 **Summary of test results**

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107 & 15.207	<b>Conducted Emission Test</b>	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	PASS	Complies
FCC Part 15, Paragraph 15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	PASS	Complies

#### 3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

#### **EUT Modification** 4.0

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

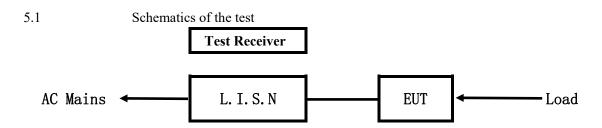
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#### **5.Power Line Conducted Emission Test**

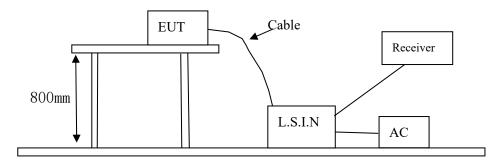


**EUT: Equipment Under Test** 

#### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10 –2013.

Test Voltage: 120V~, 60Hz Block diagram of Test setup



# 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

# A. EUT

Device	Manufacturer	Model	FCC ID
Car Charger Bluetooth Earphone	Techcool Industry Development Co., Ltd.	CB06, CB07, CB08, CB09, ST01, ST02, ST03, ST04, TBH16	2АН69СВ06ВЕТС

The report refers only to the sample tested and does not apply to the bulk.

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#### B. Internal Device

Device	Manufacturer	Model	Rating

# C. Peripherals

Device	Manufacturer	Model	Rating

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

### 5.5 Power line conducted Emission Limit according to Paragraph 15.207 and 15.107

Frequency	Class A Lim	its (dB µ V)	Class B Lim	nits (dB µ V)
(MHz)	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
$0.15 \sim 0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*
$0.50 \sim 5.00$	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

Notes:

- 1. \*Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

#### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

Note: Not applicable.

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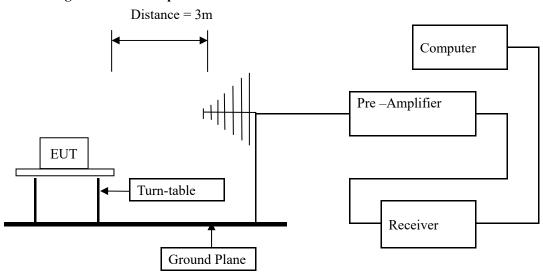
Date: 2017-01-12



#### **6** Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=1MHz VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

### **Block diagram of Test setup**



- 6.2 Configuration of The EUT

  Same as section 5.3 of this report
- 6.3 EUT Operating Condition
  Same as section 5.4 of this report.

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#### 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

### Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109

		9 1
Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
- 2. In the Above Table, the higher limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

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#### Test result

# General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

**EUT set Condition: Charging and Keep Bluetooth Transmitting** 

**Results: Pass** 

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \( \mu \)V/m)
926.000	40.95	Н	46.00
947.560	40.73	V	46.00

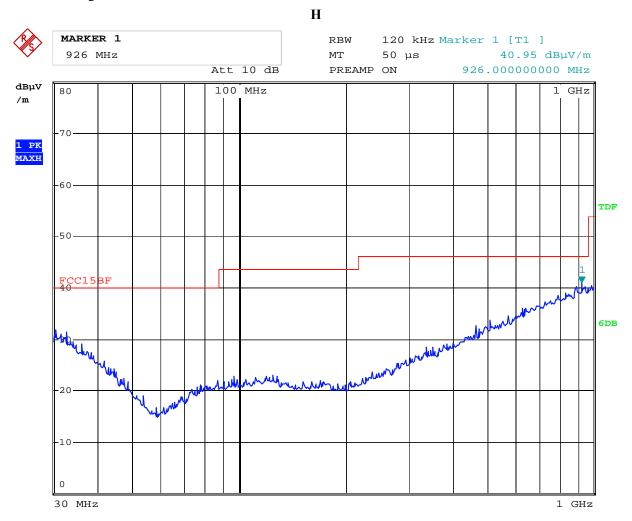
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# Test Figure:



Date: 12.JAN.2017 11:13:19

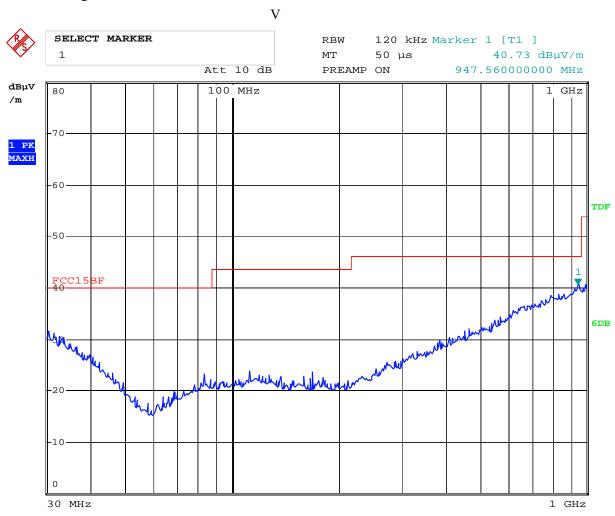
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# Test Figure:



Date: 12.JAN.2017 11:07:14

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# **Operation Mode: Transmitting under Low Channel (2402MHz)**

	8	, ,	
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \u03b4 V/m)
4804	-	H/V	74(Peak)/ 54(AV)
7206		H/V	74(Peak)/ 54(AV)
9608		H/V	74(Peak)/ 54(AV)
12010		H/V	74(Peak)/ 54(AV)
14412		H/V	74(Peak)/ 54(AV)
16814		H/V	74(Peak)/ 54(AV)
19216		H/V	74(Peak)/ 54(AV)
21618		H/V	74(Peak)/ 54(AV)
24020		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

# **Operation Mode: Transmitting g under Middle Channel (2440MHz)**

			<u> </u>
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \( \mu \)V/m)
4880		H/V	74(Peak)/ 54(AV)
7320		H/V	74(Peak)/ 54(AV)
9760		H/V	74(Peak)/ 54(AV)
12200		H/V	74(Peak)/ 54(AV)
14640		H/V	74(Peak)/ 54(AV)
17080		H/V	74(Peak)/ 54(AV)
19520		H/V	74(Peak)/ 54(AV)
21960		H/V	74(Peak)/ 54(AV)
24400		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

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# Operation Mode: Transmitting under High Channel (2480MHz)

	0 0	· , , , , , , , , , , , , , , , , , , ,	
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \( \mu \)V/m)
4960		H/V	74(Peak)/ 54(AV)
7440		H/V	74(Peak)/ 54(AV)
9920		H/V	74(Peak)/ 54(AV)
12400		H/V	74(Peak)/ 54(AV)
14880		H/V	74(Peak)/ 54(AV)
17360		H/V	74(Peak)/ 54(AV)
19840		H/V	74(Peak)/ 54(AV)
22320		H/V	74(Peak)/ 54(AV)
24800		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

<sup>2.</sup> Remark "---" means that the emissions level is too low to be measured

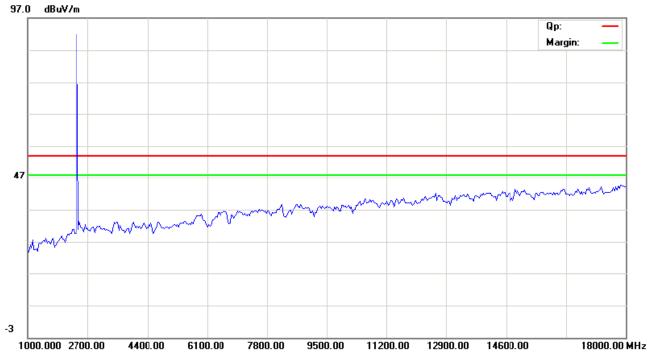
Date: 2017-01-12



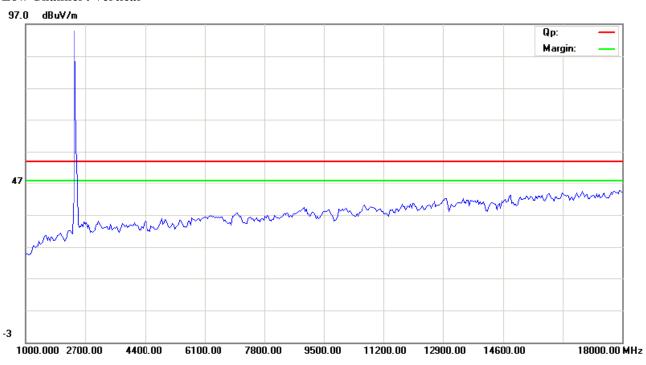
Please refer to the following test plots for details:

# Low Channel: Horizontal





### Low Channel: Vertical



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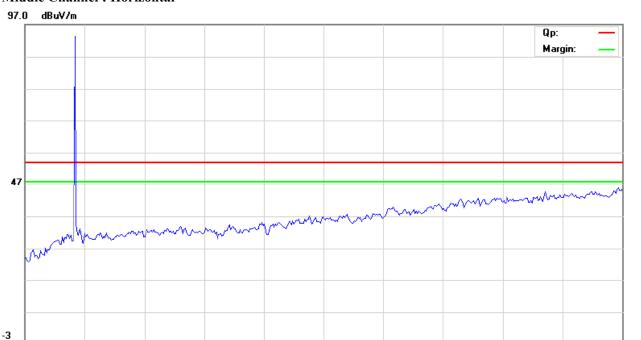
18000.00 MHz

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### **Middle Channel: Horizontal**



9500.00

11200.00

12900.00

14600.00

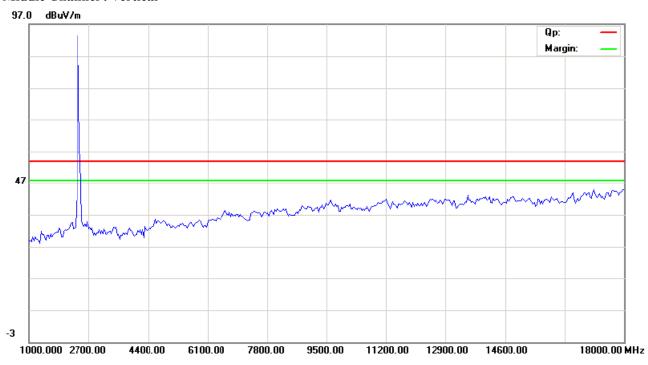
#### Middle Channel: Vertical

4400.00

6100.00

7800.00

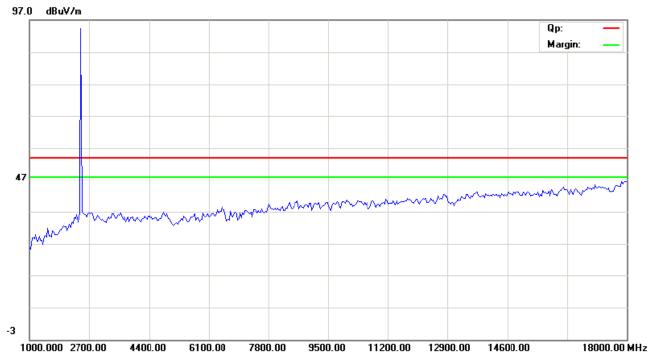
1000.000 2700.00



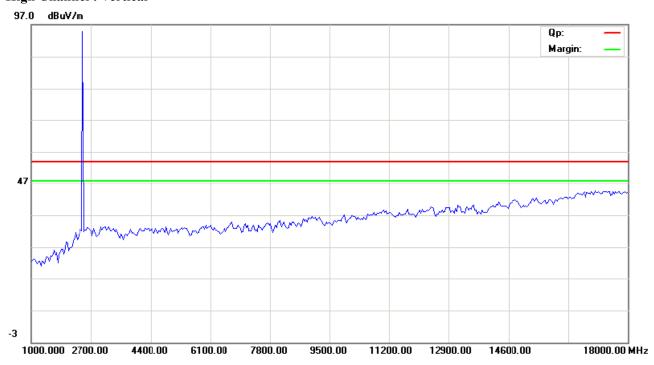
Date: 2017-01-12



# **High Channel: Horizontal**



# **High Channel: Vertical**



# Note: for the radiated emissions above 18G, it is the floor noise.

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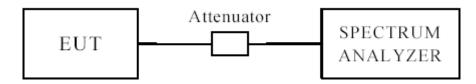
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# 7.0 6dB Bandwidth Measurement

## 7.1 Test Setup



# 7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

## 7.3 Test Procedure

- 1. Set resolution bandwidth (RBW) = 100 kHz
- 2. Set the video bandwidth (VBW)  $\geq$  3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode =  $\max$  hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.4 Test Result

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### 6dB BW

ALD DIT							
EUT Car Charger Blu		uetooth Earphone	Model		CB06		
Mode		Keep Tra	ansmitting	Input Voltage		DC3.7V	
Temperature 24		24 d	deg. C, Hui		lity		56% RH
Channel	Channel Frequency (MHz)		6 dB Bandwidth (kHz)		Minimum Limit (kHz)		Pass/ Fail
Low		2402	752		0.5		Pass
Middle		2440	752		0.5		Pass
High	·	2480	745	•	0.5		Pass

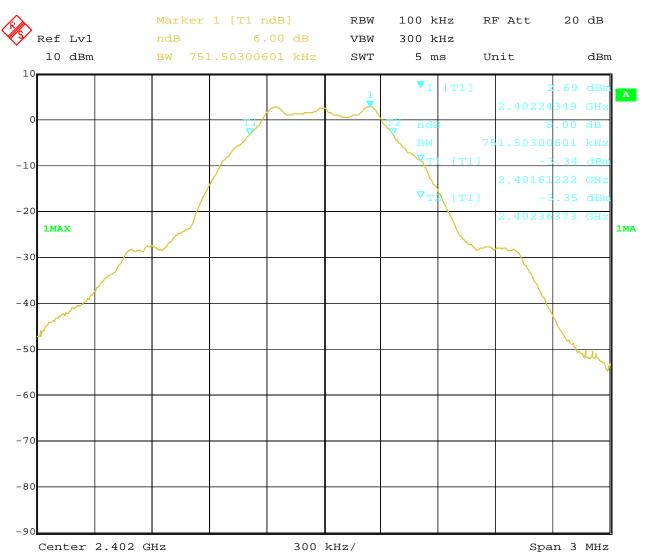
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# Test Figure:

# 1. Condition: Low Channel

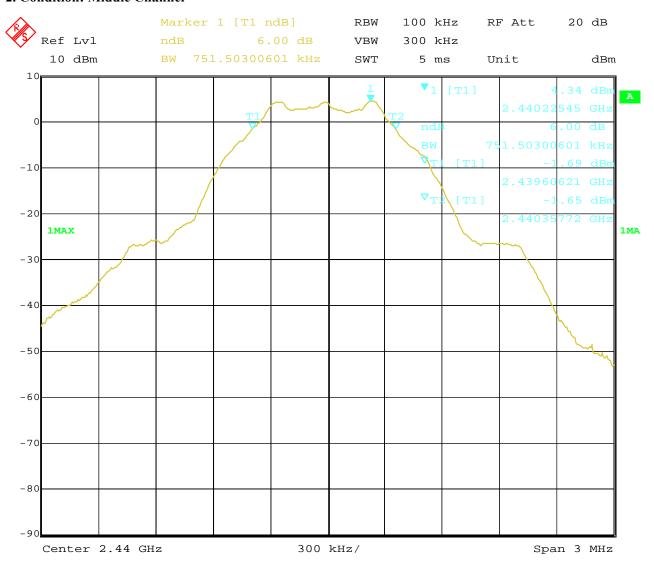


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# 2. Condition: Middle Channel

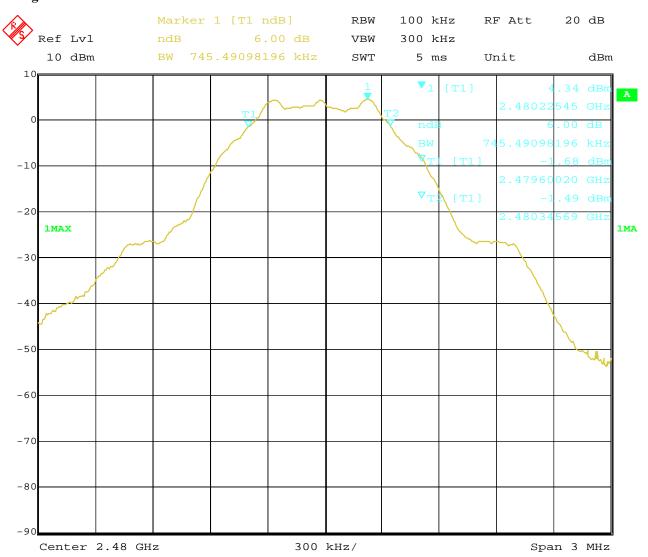


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# 3. High Channel



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# 8. Maximum Output Power

# 8.1 Test Setup



### 8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

#### **8.3 Test Procedure**

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the Peak power were measured.

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### **8.4Test Results**

EUT	Car Charger Bluetoot	Car Charger Bluetooth Earphone		CB06	
Mode	Keep Transmit	ting	Input Voltage	DC3.7V	
Temperatur	e 24 deg. C,	24 deg. C,		56% RH	
Channel	Channel Frequency (MHz)	Max. Power Output (dBm)		Peak Power Limit (dBm)	Pass/ Fail
Low	2402	4.60		30	Pass
Middle	2440	5.18		30	Pass
High	2480	5.14		30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

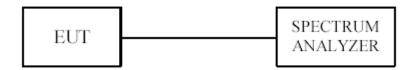
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# 9. Power Spectral Density Measurement

# 9.1 Test Setup



### 9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.

#### 9.3 Test Procedure

- 1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
- 2. Set the RBW = 10 kHz.
- 3. Set the VBW  $\geq$  30 kHz.
- 4. Set the span to 1.5 times the DTS channel bandwidth.
- 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.
- 11. The resulting peak PSD level must be  $\leq 8$  dBm.

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#### 9.4Test Result

EUT		Car Charger Bluetooth Earphone		Model		CB06		
Mode		Keep Transmitting		Input Voltage	Г	OC3.7V		
Temperature		2	24 deg. C,	Humidity		5	56% RH	
Channel	Re	Power ading (Bm)	Cable Loss (dB)	Final Power Spectral Density (dBm)		Maximum Limit (dBm)	Pass/ Fail	
Low	-:	5.31	0.2		-5.11	8	Pass	
Middle	-4	4.77	0.2		-4.57	8	Pass	
High	High -4.98		0.2		-4.78	8	Pass	

Note: The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss

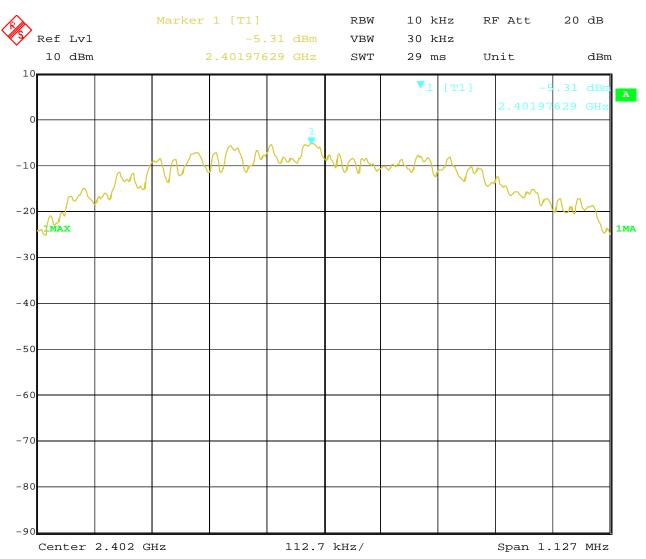
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# Test Figure:

# 1. Condition: Low Channel

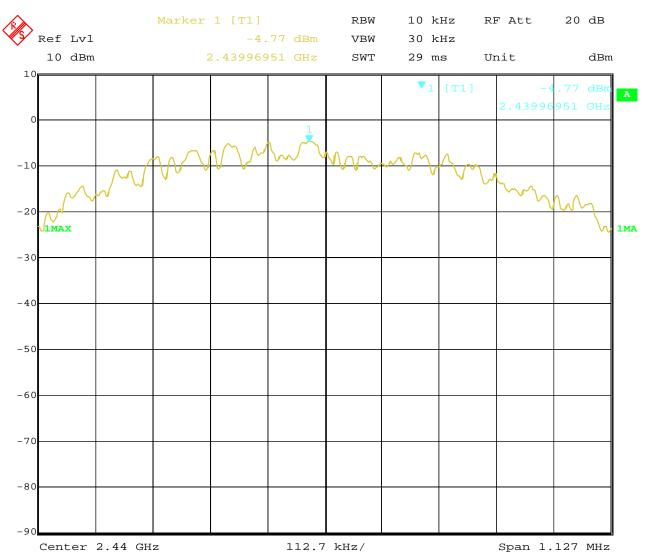


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### 2. Condition: Middle Channel

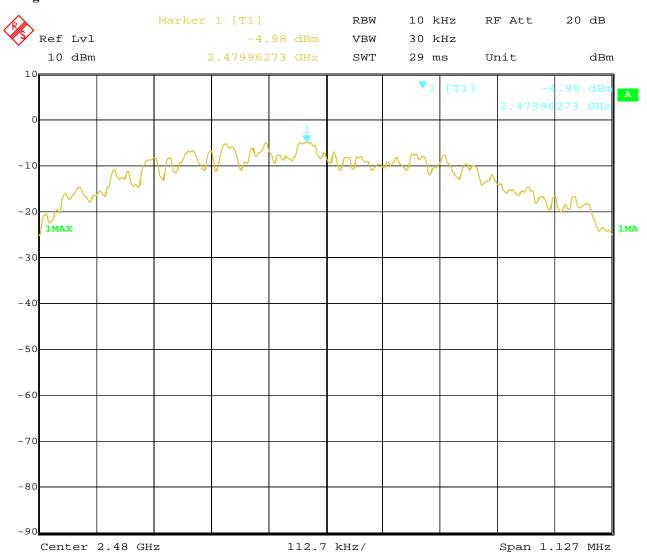


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# 3. High Channel



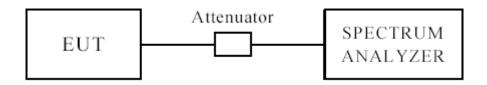
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# **10 Out of Band Measurement**

# 10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

#### 10.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

#### **10.3 Test Procedure**

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of Radiated emission test. (Peak values with RBW=1MHz, VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector)

For bandage test, the spectrum set as follows: RBW=VBW=100 kHz. A conducted measurement used

#### 10.4 Test Result

Please see next pages

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

2. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

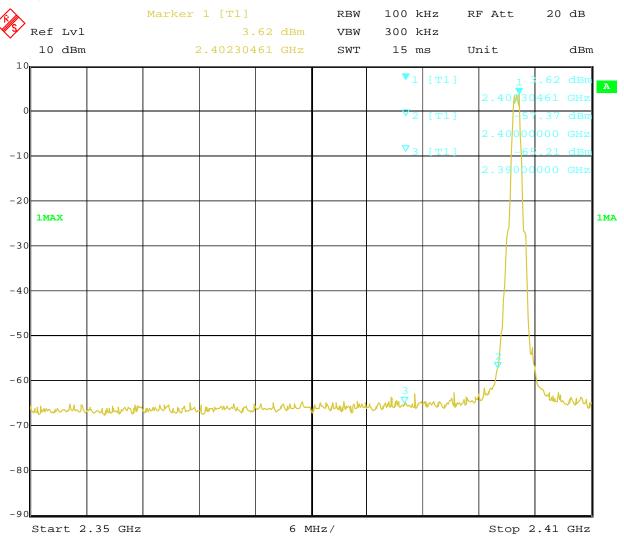
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# 10.4 Band-edge and Restricted band Measurement

EUT	Car Charger Bl	uetooth Earphone	Model	CB06
Mode	Keep Tr	ansmitting	Input Voltage	DC3.7V
Temperature	perature 24 deg. C,			56% RH
Test Result:	Pass		Detector	PK
2400	PK (dBμV/m) 44.3		T ::4	74(dBμV/m)
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$
2390	PK (dBμV/m)	38.7	Limit	$74(dB\mu V/m)$
	AV (dBμV/m)		Limit	54(dBµV/m)

# **Test Figure:**



Note: The Max. FS in Restrict Band are measured in conventional method.

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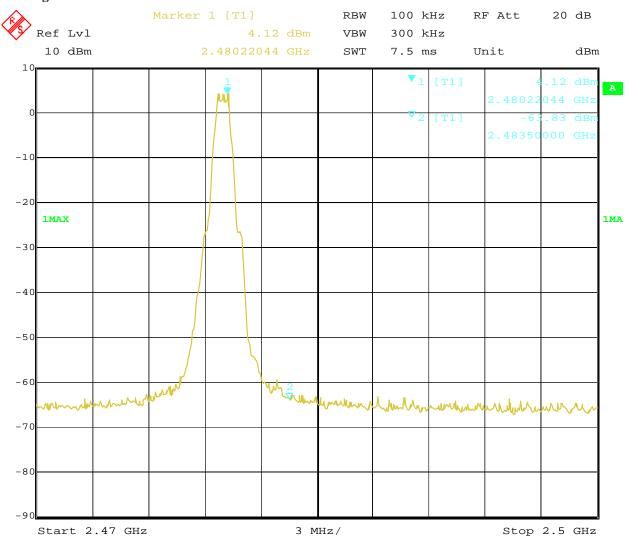
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### 10.4 Band-edge and Restricted band Measurement

EUT	Car Charger	Bluetooth Earphone	Model	CB06
Mode	Mode Keeping Transmitting			DC3.7V
Temperature	Temperature 24 deg. C,			56% RH
Test Result:		Pass	Detector	PK
2483.5	PK (dBμV/m)	40.1	T : '	$74(dB\mu V/m)$
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$

# **Test Figure:**



Note: The Max. FS in Restrict Band are measured in conventional method.

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# 11.0 Antenna Requirement

## 11.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 11.2 Antenna Connected construction

PCB antenna used. The maximum Gain of the antennas is 0dBi.

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### 12.0 FCC ID Label

# FCC ID: 2AH69CB06BETC

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

#### Mark Location:



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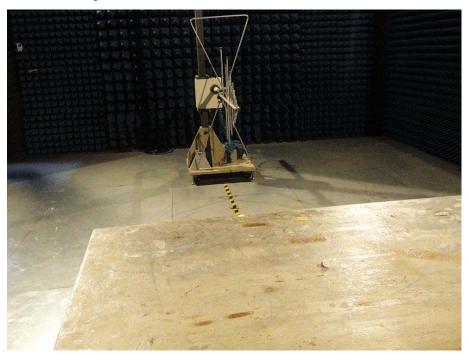


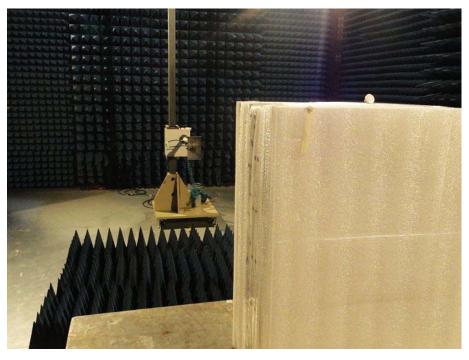
#### 13.0 **Photo of testing**

Conducted Emission Test Setup:

N/A

Radiated Emission Test Setup:





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# Photographs – EUT

# Outside view





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Outside view





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Outside view





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Outside view





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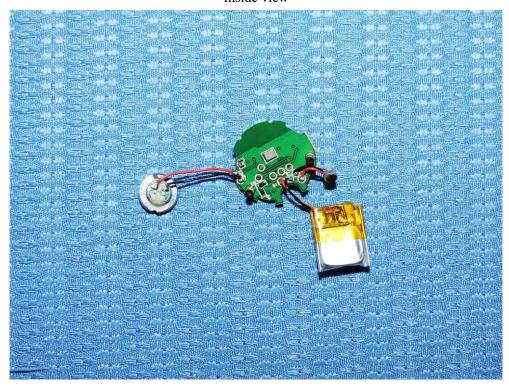
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Inside view





**End of the report** 

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