

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Report No: CCIS15070057202

FCC REPORT (BLE)

Applicant: iMushroom Audio Co., Ltd.

Address of Applicant:

No.21, Nanxing Three Road, Nanfang Industrial Park, Beizha

Village, Humen Town, Dongguan, China

Equipment Under Test (EUT)

Product Name: Bluetooth Speaker

Model No.: B02CD, KSBMBR2RG, KSBMBR2

FCC ID: 2ABP8-B02CD

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 20 Jul., 2015

Date of Test: 20 Jul., to 10 Aug., 2015

Date of report issued: 10 Aug., 2015

Test Result: PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.





2 Version

Version No.	Date	Description
00	10 Aug., 2015	Original

Prepared by: Date: 10 Aug., 2015

Report Clerk

Reviewed by: Date: 10 Aug., 2015

Project Engineer



3 Contents

			Page
1	cov	ER PAGE	1
2	VER	SION	2
3		ITENTS	
4		T SUMMARY	
5		ERAL INFORMATION	
ວ	GEN	ERAL INFORMATION	
	5.1	CLIENT INFORMATION	
	5.2	GENERAL DESCRIPTION OF E.U.T	5
	5.3	TEST ENVIRONMENT AND MODE	
	5.4	DESCRIPTION OF SUPPORT UNITS	7
	5.5	LABORATORY FACILITY	7
	5.6	LABORATORY LOCATION	7
	5.7	TEST INSTRUMENTS LIST	8
6	TES	T RESULTS AND MEASUREMENT DATA	9
	6.1	ANTENNA REQUIREMENT:	9
	6.2	CONDUCTED EMISSION	10
	6.3	CONDUCTED OUTPUT POWER	13
	6.4	OCCUPY BANDWIDTH	15
	6.5	Power Spectral Density	18
	6.6	BAND EDGE	20
	6.6.1	Conducted Emission Method	20
	6.6.2	Radiated Emission Method	22
	6.7	Spurious Emission	27
	6.7.1	Conducted Emission Method	27
	6.7.2	Radiated Emission Method	30
7	TES	T SETUP PHOTO	35
R	FUT	CONSTRUCTIONAL DETAILS	36





4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Pass: The EUT complies with the essential requirements in the standard.





5 General Information

5.1 Client Information

Applicant:	iMushroom Audio Co., Ltd.
Address of Applicant:	No.21, Nanxing Three Road, Nanfang Industrial Park, Beizha Village, Humen Town, Dongguan, China
Manufacturer/Factory:	GUANGDONG iMushroom ELECTRONIC LIMITED
Address of Manufacturer/ Factory:	No.21, Nanxing Three Road, Nanfang Industrial Park, Beizha Village, Humen Town, Dongguan, China

5.2 General Description of E.U.T.

-	
Product Name:	Bluetooth Speaker
Model No.:	B02CD, KSBMBR2RG, KSBMBR2
Operation Frequency:	2402-2480 MHz
Channel numbers:	40
Channel separation:	2 MHz
Modulation technology:	GFSK
Data speed :	1Mbps
Antenna Type:	Internal Antenna
Antenna gain:	0 dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V-2500mAh
Remark:	The model No.: B02CD, KSBMBR2RG, KSBMBR2 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name and appearance colour.





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

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2442MHz
The Highest channel	2480MHz



Report No: CCIS15070057202

5.3 Test environment and mode

Operating Environment:					
Temperature:	24.0 °C				
Humidity:	54 % RH				
Atmospheric Pressure:	1010 mbar				
Test mode:					
Operation mode	Keep the EUT in continuous transmitting with modulation				

The sample was placed 0.8m 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. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.

5.4 Description of Support Units

Remark: Support unit is DELL PC model: OPTIPLEX745 with FCC DOC approved

5.5 Laboratory Facility

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

• FCC - Registration No.: 817957

Shenzhen Zhongjian Nanfang Testing Co., Ltd. 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 out files. Registration 817957, February 27, 2012.

• IC - Registration No.: 10106A-1

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

• CNAS - Registration No.: CNAS L6048

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,

Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282 Fax: +86-755-23116366

Shenzhen Zhongjian Nanfang Testing Co., Ltd. No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China Telephone: +86 (0) 755 23118282 Fax: +86 (0) 755 23116366





5.7 Test Instruments list

Rad	Radiated Emission:								
Item	n Test Equipment Manufacturer		Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)			
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017			
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	03-28-2015	03-28-2016			
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	03-28-2015	03-28-2016			
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A			
5	Amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2015	03-31-2016			
6	Amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2015	03-31-2016			
7	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2015	03-31-2016			
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2015	03-31-2016			
9	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A			
10	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A			
11	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	03-28-2015	03-28-2016			
12	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	03-28-2015	03-28-2016			
13	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2015	03-31-2016			
14	Universal radio communication tester	Rhode & Schwarz	CMU200	CCIS0069	03-28-2015	03-28-2016			
15	Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	04-08-2015	04-08-2016			

Con	Conducted Emission:									
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)				
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	11-10-2012	11-09-2015				
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-28-2015	03-28-2016				
3	LISN	CHASE	MN2050D	CCIS0074	03-28-2015	03-28-2016				
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2015	03-31-2016				
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A				



6 Test results and Measurement Data

6.1 Antenna requirement:

Standard requirement: FCC Part 15 C Section 15.203 /247(c)

15.203 requirement:

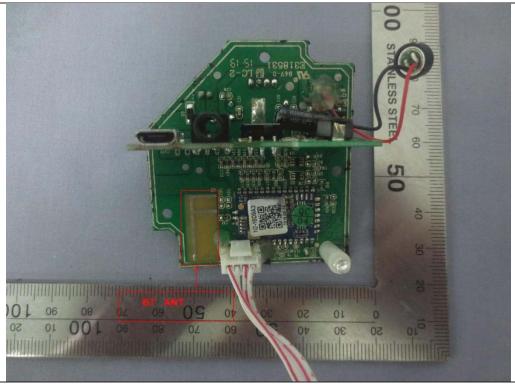
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:

The BLE antenna is an internal antenna which cannot replace by end-user, the best case gain of the antenna is 0 dBi.







6.2 Conducted Emission

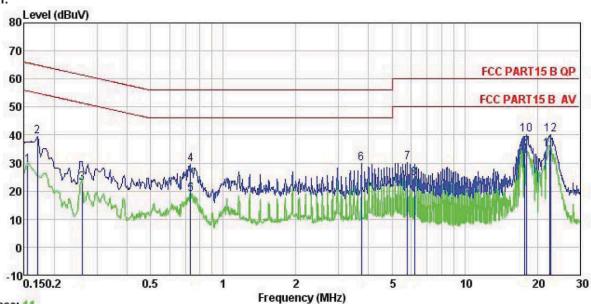
through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be									
Test Frequency Range: Class / Severity: Class B Receiver setup: RBW=9kHz, VBW=30kHz Limit: Frequency range (MHz) Quasi-peak O.15-0.5 Get to 56* G	Test Requirement:	FCC Part 15 C Section 15.207							
Class / Severity: Receiver setup: RBW=9kHz, VBW=30kHz Limit: Frequency range (MHz) Quasi-peak Average 0.15-0.5 66 to 56* 56 to 46* 0.5-5 56 46 5-30 60 50 * Decreases with the logarithm of the frequency. 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane LISN	Test Method:	ANSI C63.4: 2009							
Receiver setup: RBW=9kHz, VBW=30kHz Limit: Frequency range (MHz) Quasi-peak Average 0.15-0.5 66 to 56* 56 to 46* 0.5-5 56 46 5-30 60 50 *Decreases with the logarithm of the frequency. 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane LISN	Test Frequency Range:	150 kHz to 30 MHz							
Limit: Frequency range (MHz)	Class / Severity:	Class B							
Test procedure Test procedure O.15-0.5 68 to 56° 56 to 46°	Receiver setup:	RBW=9kHz, VBW=30kHz							
Test procedure 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 500hm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane LISN	Limit:	Francisco (MILE)	Limit (c	dBuV)					
Test procedure 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane Reference Plane Reference Plane LISN AUX Equipment Linder Test LISN Line impedence Stabilization Network Test table height=0.8m Test Instruments: Refer to section 5.7 for details Test mode: Refer to section 5.3 for details		Prequency range (MHZ) Quasi-peak Average							
Test procedure 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane LISN AUX Equipment Under Test LISN Line impedence Stabilization Network Test table height-0.8m Test Instruments: Refer to section 5.7 for details Test mode: Refer to section 5.3 for details									
** Decreases with the logarithm of the frequency. 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 500hm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane									
1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 500hm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane Reference Plane Remark E.U.T. Equipment Under Test LISN Line Impedence Stabilization Network Test table height=0.8m Test Instruments: Refer to section 5.7 for details Refer to section 5.3 for details				50					
a line impedance stabilization network (L.I.S.N.), which provides a 500hm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and 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 ANSI C63.4: 2009 on conducted measurement. Test setup: Reference Plane Reference Plane Remark E.U.T. Equipment Under Test LISN Line Impedence Stabilization Network Test table height-0.8m Test Instruments: Refer to section 5.7 for details Test mode: Refer to section 5.3 for details									
Remark: E.U.T Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m Test Instruments: Refer to section 5.7 for details Test mode: Refer to section 5.3 for details		 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted 							
Remark E.U.T Remark E.U.T: Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m Test Instruments: Refer to section 5.7 for details Refer to section 5.3 for details	Test setup:	Refere	ence Plane						
Test mode: Refer to section 5.3 for details		AUX Equipment Test table/Insulation pla Remark: E.U.T. Equipment Under Test LISN: Line Impedence Stabilization	U.T EMI Receiver	er — AC power					
	Test Instruments:	Refer to section 5.7 for details	;						
Test results: Passed	Test mode:	Refer to section 5.3 for details	;						
	Test results:	Passed							

Measurement Data





Neutral:



Trace: 11

Site

: CCIS Shielding Room : FCC PART15 B QP LISN NEUTRAL : Blood Condition

EUT

: BO2CD : BLE mode Model Test Mode

Power Rating: AC120V/60Hz Environment: Temp: 23 °C Huni:56% Atmos:101KPa Test Engineer: MT

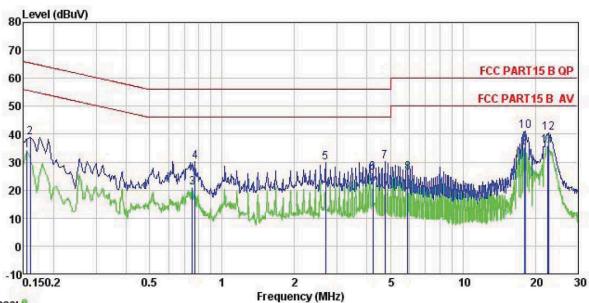
Remark

Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
MHz	dBu₹	<u>dB</u>	dB	dBu∀	−−dBuV	<u>dB</u>	
0.155	18.24	0.25	10.78	29.27	55.74	-26.47	Average
0.170	28.47	0.25	10.77	39.49	64.94	-25.45	QP
0.260	11.83	0.26	10.75	22.84	51.42	-28.58	Average
0.731	18.47	0.18	10.78	29.43	56.00	-26.57	QP
0.731	7.86	0.18	10.78	18.82	46.00	-27.18	Average
3.740	18.71	0.29	10.90	29.90	56.00	-26.10	QP
5.805	18.97	0.27	10.83	30.07	60.00	-29.93	QP
6.186	13.52	0.27	10.82	24.61	50.00	-25.39	Average
17.755	24.24	0.26	10.90	35.40	50.00	-14.60	Average
18.039	29.03	0.26	10.90	40.19	60.00	-19.81	QP
22.416	23.50	0.37	10.90	34.77	50.00	-15.23	Average
22.655	28.81	0.38	10.89	40.08	60.00	-19.92	QP
	MHz 0.155 0.170 0.260 0.731 0.731 3.740 5.805 6.186 17.755 18.039 22.416	Freq Level MHz dBuV 0.155 18.24 0.170 28.47 0.260 11.83 0.731 18.47 0.731 7.86 3.740 18.71 5.805 18.97 6.186 13.52 17.755 24.24 18.039 29.03 22.416 23.50	Freq Level Factor MHz dBuV dB	MHz dBuV dB dB 0.155 18.24 0.25 10.78 0.170 28.47 0.25 10.77 0.260 11.83 0.26 10.75 0.731 18.47 0.18 10.78 0.731 7.86 0.18 10.78 3.740 18.71 0.29 10.90 5.805 18.97 0.27 10.83 6.186 13.52 0.27 10.82 17.755 24.24 0.26 10.90 18.039 29.03 0.26 10.90 22.416 23.50 0.37 10.90	MHz dBuV dB dB dBuV 0.155 18.24 0.25 10.78 29.27 0.170 28.47 0.25 10.77 39.49 0.260 11.83 0.26 10.75 22.84 0.731 18.47 0.18 10.78 29.43 0.731 7.86 0.18 10.78 18.82 3.740 18.71 0.29 10.90 29.90 5.805 18.97 0.27 10.83 30.07 6.186 13.52 0.27 10.82 24.61 17.755 24.24 0.26 10.90 35.40 18.039 29.03 0.26 10.90 40.19 22.416 23.50 0.37 10.90 34.77	MHz dBuV dB dB dBuV dBuV 0.155 18.24 0.25 10.78 29.27 55.74 0.170 28.47 0.25 10.77 39.49 64.94 0.260 11.83 0.26 10.75 22.84 51.42 0.731 18.47 0.18 10.78 29.43 56.00 0.731 7.86 0.18 10.78 29.90 56.00 3.740 18.71 0.29 10.90 29.90 56.00 5.805 18.97 0.27 10.83 30.07 60.00 6.186 13.52 0.27 10.82 24.61 50.00 17.755 24.24 0.26 10.90 35.40 50.00 18.039 29.03 0.26 10.90 40.19 60.00 22.416 23.50 0.37 10.90 34.77 50.00	Freq Level Factor Loss Level Line Limit MHz dBuV dB dB dBuV dB dB </td





Line:



Trace: 9

: CCIS Shielding Room : FCC PART15 B QP LISN LINE Site Condition

EUT : Bluetooth Speaker : B02CD Model

Test Mode : BLE mode

Power Rating: AC120V/60Hz Environment: Temp: 23 C Huni:56% Atmos:101KPa

Test Engineer: MT

Remark

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
_	MHz	dBu∀	<u>dB</u>		—dBu∀	dBu√	<u>d</u> B	
1	0.155 0.160	23.00 27.80	0.27	10.78	34.05			Average
3	0.751	9.88	0.23	10.78 10.79	38.85 20.90	46.00		Average
2 3 4 5	0.771 2.692	19.26 18.79	0.23 0.27	10.80	30.29 29.99		-25.71 -26.01	A LONG SECTION AND ADDRESS OF THE PARTY OF T
	4.224	15.01	0.28	10.88	26.17	46.00	-19.83	Average
7 8 9	5.898	18.90 15.02	0.31	10.86 10.82	30.05 26.15	50.00		Average
9 10	17. 944 18. 232	23.78	0.33	10.90 10.91	35.01 41.30		-14.99 -18.70	Average OP
11 12	22. 535 22. 655	24.49 29.06	0.44	10.89 10.89	35.82 40.39	50.00		Average

- 1. An initial pre-scan was performed on the live and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss





6.3 Conducted Output Power

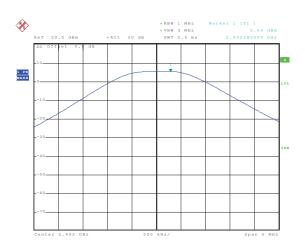
Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)				
Test Method:	ANSI C63.10:2009 and KDB558074v03r03 section 9.2.2				
Limit:	30dBm				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 5.7 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

Measurement Data

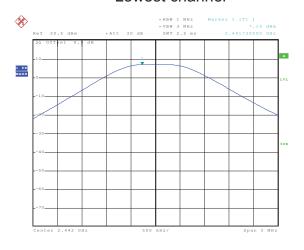
Test CH	Maximum Conducted Output Power (dBm)	Limit(dBm)	Result
Lowest	5.54		
Middle	7.10	30.00	Pass
Highest	7.21		

Test plot as follows:

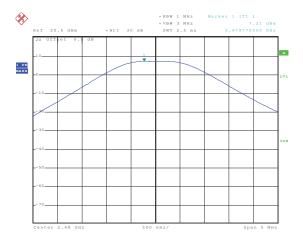




Lowest channel



Middle channel



Highest channel





6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)				
Test Method:	ANSI C63.10:2009 and KDB558074v03r03 section 8.1				
Limit:	>500kHz				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 5.7 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

Measurement Data

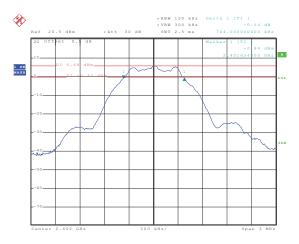
Test CH	6dB Emission Bandwidth (MHz)	Limit(kHz)	Result
Lowest	0.744		
Middle	0.750	>500	Pass
Highest	0.726		

Test CH	99% Occupy Bandwidth (MHz)	Limit(kHz)	Result
Lowest	1.05		
Middle	1.05	N/A	N/A
Highest	1.05		

Test plot as follows:

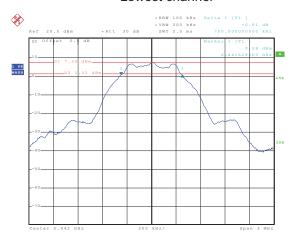


6dB EBW



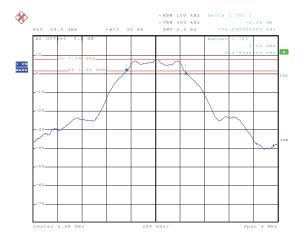
Date: 31.JUL.2015 11:03:46

Lowest channel



Date: 31.JUL.2015 11:02:38

Middle channel



Date: 31.JUL.2015 11:01:36

Highest channel

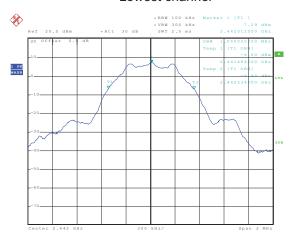


99% OBW



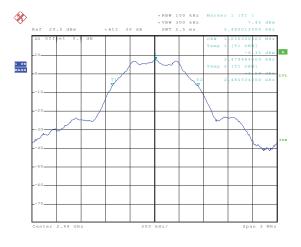
Date: 31.JUL.2015 11:04:38

Lowest channel



Date: 31.JUL.2015 11:05:14

Middle channel



Date: 31.JUL.2015 11:05:45

Highest channel





6.5 Power Spectral Density

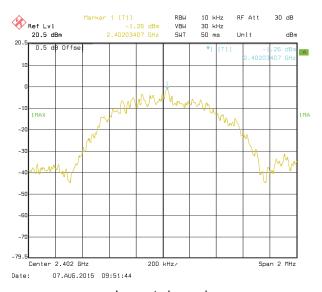
Test Requirement:	FCC Part 15 C Section 15.247 (e)				
Test Method:	ANSI C63.10:2009 and KDB558074v03r03 section 10.2				
Limit:	8 dBm				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 5.7 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

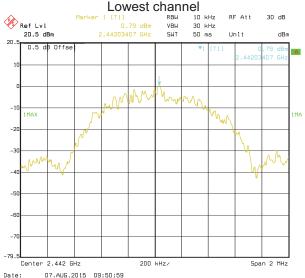
Measurement Data

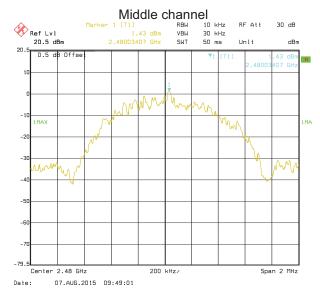
Test CH	Power Spectral Density (dBm)	Limit(dBm)	Result
Lowest	-1.26		
Middle	0.79	8.00	Pass
Highest	1.43		

Test plots as follow:









Highest channel





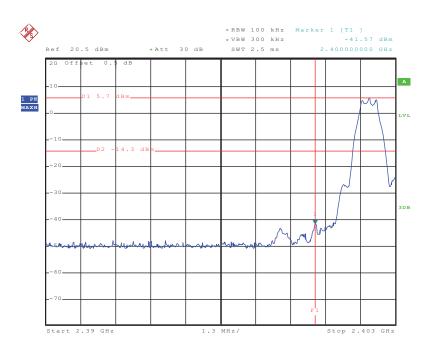
6.6 Band Edge

6.6.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)					
Test Method:	ANSI C63.10:2009 and KDB558074v03r03 section 13					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.					
Test setup:						
	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane					
Test Instruments:	Refer to section 5.7 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Passed					

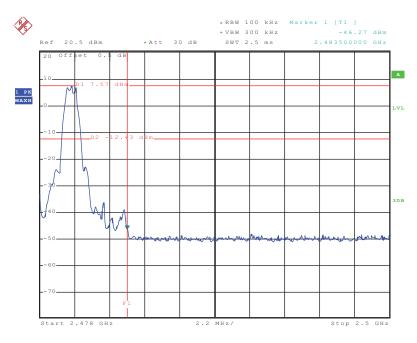
Test plots as follow:





Date: 31.JUL.2015 11:09:39

Lowest channel



Date: 31.JUL.2015 11:10:57

Highest channel





6.6.2 Radiated Emission Method

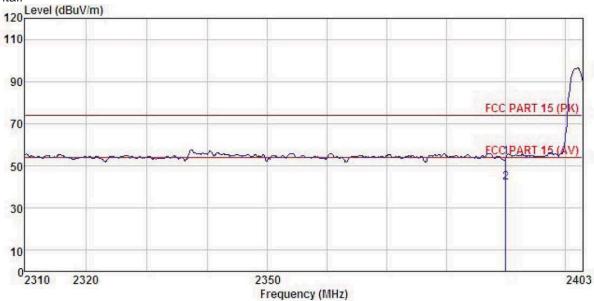
Limit: Above 1GHz RMS 1MHz 3MHz Average Ave	Remark Peak Value rerage Value
Test Frequency Range: 2.3GHz to 2.5GHz Test site: Measurement Distance: 3m Receiver setup: Frequency Detector RBW VBW Above 1GHz Peak 1MHz 3MHz Peak RMS 1MHz 3MHz Av Limit: Frequency Limit (dBuV/m @3m) Above 1GHz 54.00	Peak Value verage Value
Test site: Measurement Distance: 3m	Peak Value verage Value
Frequency Detector RBW VBW	Peak Value verage Value
Frequency Detector RBW VBW	Peak Value verage Value
Frequency Detector RBW VBW	Peak Value verage Value
Limit: Above 1GHz RMS 1MHz 3MHz Average Ave	erage Value
Limit: Frequency Limit (dBuV/m @3m) Above 1GHz 54.00 Av	
Frequency Limit (dBuV/m @3m) Above 1GHz 54.00 Av	
Above 1GHz 54.00 Av	Remark
Above 1312 74 00 F	verage Value
Test Procedure: 1. The EUT was placed on the top of a rotating table 0.8 r	Peak Value
the ground at a 3 meter camber. The table was rotated to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference antenna, which was mounted on the top of a variable-h tower. 3. The antenna height is varied from one meter to four meters the ground to determine the maximum value of the field Both horizontal and vertical polarizations of the antennamake the measurement. 4. For each suspected emission, the EUT was arranged to case and then the antennamas tuned to heights from a meters and the rota table was turned from 0 degrees to to find the maximum reading. 5. The test-receiver system was set to Peak Detect Funct Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10 of the limit specified, then testing could be stopped and the of the EUT would be reported. Otherwise the emissions have 10 dB margin would be re-tested one by one usin peak or average method as specified and then reported sheet.	receiving neight antenna eters above d strength. a are set to o its worst 1 meter to 4 o 360 degrees tion and dB lower than ne peak values is that did not ag peak, quasi-
Test setup: AE EUT Horn Anlenna Antenna Tower	
Test Instruments: Refer to section 5.7 for details	
Test mode: Refer to section 5.3 for details	
Test results: Passed	





Test channel: Lowest

Horizontal:



Site

: 3m chamber : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL Condition

: Bluetooth Speaker EUT

Model : B02CD Test mode : BLE-L Mode Power Rating: AC120V/60Hz Environment: Temp:25.5°C Test Engineer: MT REMARK:

Huni:55%

1 2

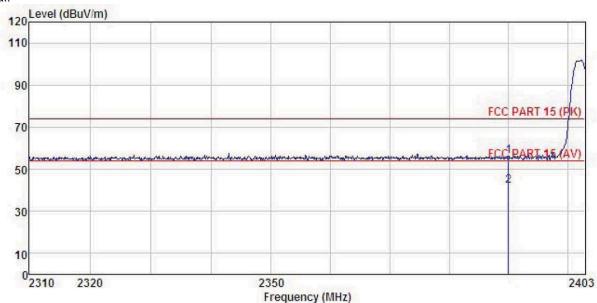
шщ.										
	Freq		Antenna Factor				Limit Line		Remark	
	MHz	dBu∜	dB/m	d <u>B</u>	<u>dB</u>	$\overline{dBuV/m}$	dBuV/m	dB		_
	2390,000 2390,000		All Parallel and All Pa	6.63 6.63		53.82 41.94		PROTECTION AND ADDRESS OF THE PARTY OF THE P	Peak Average	





Test channel: Lowest

Vertical:



: 3m chamber : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL : Bluetooth Speaker Condition

: Bluetooth Speaker

model : B02CD
Test mode : BLE-L Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5°C Huni:55%
Test Engineer: MT
REMARK :

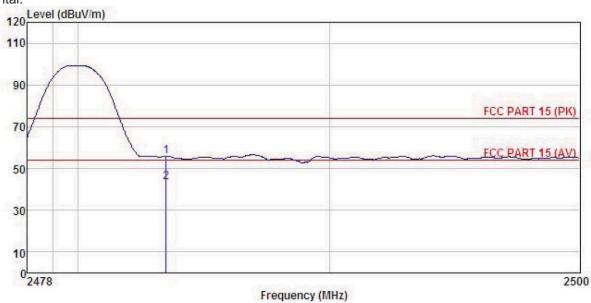
Fr	Freq		Antenna Factor							
	MHz	dBuV	$-\frac{dB}{m}$	dB	<u>d</u> B	dBuV/m	$\overline{dBuV/m}$	<u>dB</u>		-
1 2	2390.000 2390.000	22.09 7.94	27.58 27.58	6.63 6.63	0.00 0.00	56.30 42.15	74.00 54.00	-17.70 -11.85	Peak Average	





Test channel: Highest

Horizontal:



: 3m chamber : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL Site Condition

: Bluetooth Speaker : B02CD EUT

. DUZCD

rest mode : BLE-H Mode

Power Rating : AC120V/60Hz

Environment : Temp:25.5°C

Test Engineer: MT

REMARK

Huni:55%

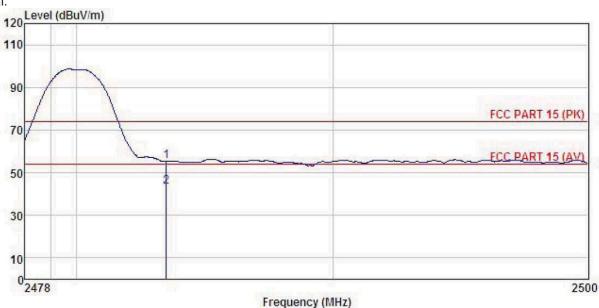
	Freq		Antenna Factor				Limit Line		Remark
1	MHz	dBu₹	— <u>dB</u> /m	dB	<u>d</u> B	$\overline{dBuV/m}$	dBuV/m	<u>dB</u>	
1 2	2483.500 2483.500			6.85 6.85		55.88 43.36			Peak Average





Test channel: Highest

Vertical:



Site

: 3m chamber : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL Condition

EUT : Bluetooth Speaker

Model : B02CD

Test mode : BLE-H Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5°C Huni:55%

Test Engineer: MT REMARK :

/ElliMI/			Antenna Factor						
9.	MHz	dBu∜	dB/m	<u>dB</u>	<u>dB</u>	$\overline{dBuV/m}$	dBu√/m	<u>dB</u>	
1 2	2483.500 2483.500				0.00 0.00				Peak Average





6.7 Spurious Emission

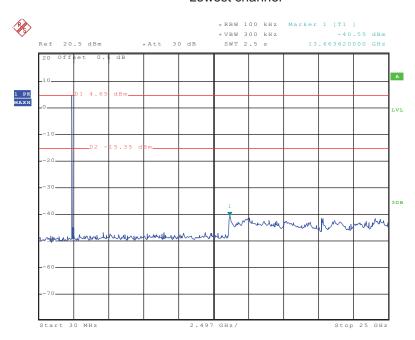
6.7.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)						
Test Method:	ANSI C63.10:2009 and KDB558074 section 11						
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.						
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane						
Test Instruments:	Refer to section 5.7 for details						
Test mode:	Refer to section 5.3 for details						
Test results:	Passed						

Test plot as follows:



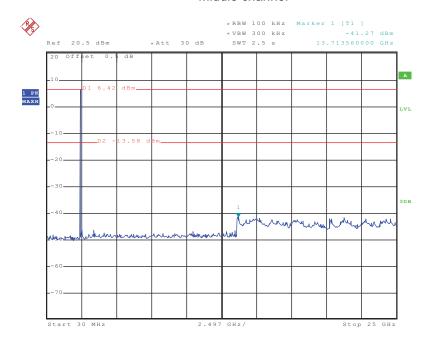
Lowest channel



Date: 31.JUL.2015 11:15:10

30MHz~25GHz

Middle channel

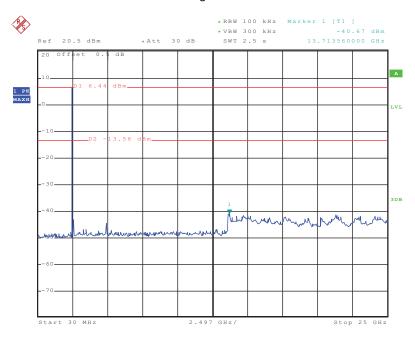


Date: 31.JUL.2015 11:13:56

30MHz~25GHz



Highest channel



Date: 31.JUL.2015 11:12:24

30MHz~25GHz



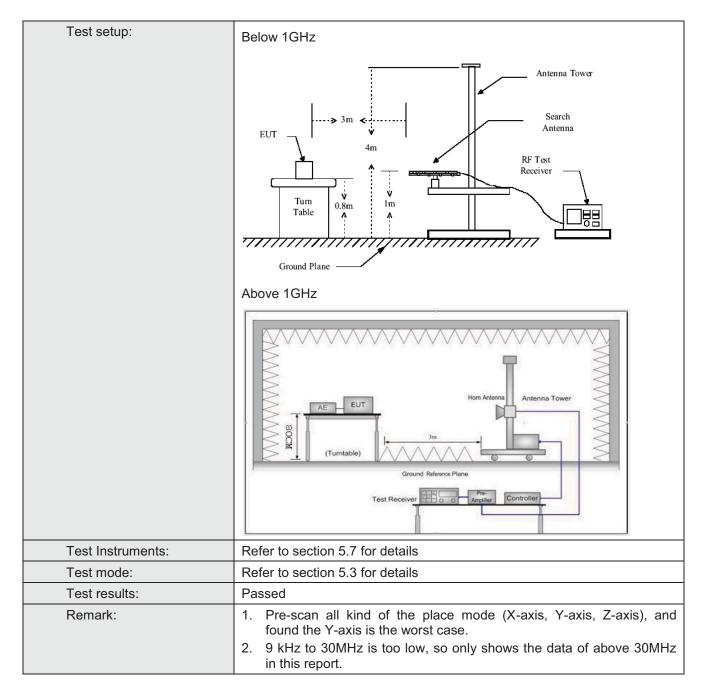


6.7.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205								
Test Method:	ANSI C63.4: 200	09							
Test Frequency Range:	9KHz to 25GHz								
Test site:	Measurement D	istance: 3m							
Receiver setup:									
·	Frequency	Detector	RBW	VBW	Remark				
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value				
	Above 1GHz	Peak	3MHz	Peak Value					
	Above Toriz	RMS	1MHz	3MHz	Average Value				
Limit:									
	Frequency		Limit (dBuV/m	@3m)	Remark				
	30MHz-88MHz		40.0		Quasi-peak Value				
	88MHz-216MHz		43.5		Quasi-peak Value				
	216MHz-960MH 960MHz-1GHz		46.0 54.0		Quasi-peak Value				
	960IVIHZ-TGHZ		54.0 54.0		Quasi-peak Value Average Value				
	Above 1GHz	-	74.0		Peak Value				
Test Procedure:	the ground to determin 2. The EUT of antenna, we tower. 3. The antenrest the ground Both horizon make the make the make the make the make to find the rest and to find the rest and to find the make the limit specified Bake 10 dBake 10 dB	at a 3 meter e the position was set 3 meter hich was mount and height is voto determine ontal and vertheasurement. Suspected emen the anter the rota table maximum reaction level of the cified, then to would be reparation margin would	camber. The of the highes eters away inted on the taried from on the maximum ical polarizations was turned ling. In was set in was set in a was turned ling. In was set in the EUT in peresting could be orted. Other is the interested.	table was at radiation. From the incop of a variance meter to the common of the EUT was also to height from 0 deg at mode whose stopped wise the end one by on	of the field strength. In antenna are set to stranged to its worst are set to 360 degrees The field strength. In antenna are set to stranged to its worst are from 1 meter to 4 are set to 360 degrees The field strength antenna are set to 360 degrees The field strength are set to stranged to its worst are from 1 meter to 4 are to 360 degrees The field strength antenna are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are set to 360 degrees The field strength are set to 360 degrees The field strength are set to 4 are set to 360 degrees The field strength are				





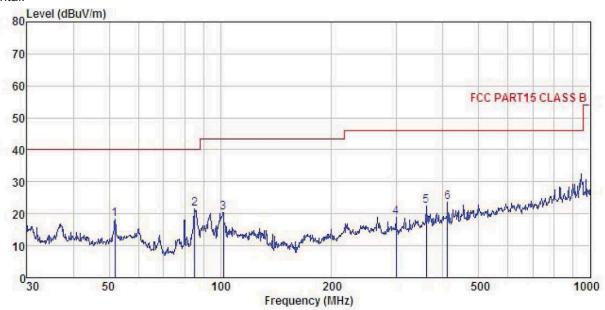






Below 1GHz

Horizontal:



Site

: 3m chamber : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL Condition

: Bluetooth Speaker

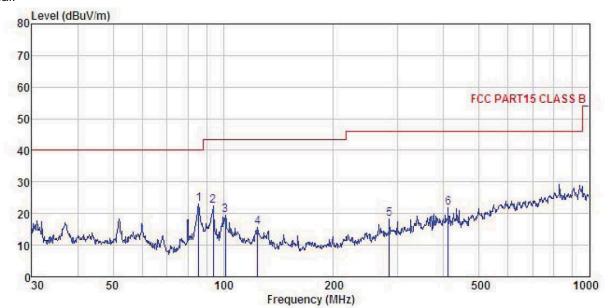
Model : B02CD
Test mode : BLE Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5°C Huni:55%
Test Engineer: MT
REMARK

EMARK										
			Antenna					Over		
	Freq	Level	Factor	Loss	ractor	Level	Line	Limit	Kemark	
0	MHz	dBu∜	dB/m	₫B	₫B	dBuV/m	dBu√/m	dB		
1	51.843	34.35	13.17	0.62	29.81	18.33	40.00	-21.67	QP	
2	85.298	39.79	10.45	0.88	29.60	21.52	40.00	-18.48	QP	
3	102.001	35.88	12.97	0.98	29.51	20.32	43.50	-23.18	QP	
4	298.268	32.65	13.00	1.76	28.45	18.96	46.00	-27.04	QP	
5 6	360.448	34.59	14.43	1.98	28.61	22.39	46.00	-23.61	QP	
6	411.824	34.85	15.31	2.15	28.80	23.51	46.00	-22.49	QP	





Vertical:



Site

: 3m chamber : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL : Bluetooth Speaker Condition

EUT

: B02CD

Test mode : BLE Mode

Power Rating : AC120V/60Hz

Environment : Temp:25.5°C Huni:55%

Test Engineer: MT

REMARK :

	Freq		Antenna Factor					Over Limit	Remark	
_	MHz	dBu∀	dB/m	<u>d</u> B	<u>ab</u>	$\overline{\mathtt{dBuV/m}}$	$\overline{dBuV/m}$	<u>dB</u>		
1	85.598	41.10	10.60	0.88	29.60	22.98	40.00	-17.02	QP	
2	93.768	38.45	12.58	0.93	29.56	22.40	43.50	-21.10	QP	
2 3 4 5 6	101.289	34.94	13.02	0.97	29.52	19.41	43.50	-24.09	QP	
4	124.133	34.08	9.80	1.15	29.36	15.67	43.50	-27.83	QP	
5	283.979	32.18	12.75	1.72	28.48	18.17	46.00	-27.83	QP	
6	411.824	33.13	15.31	2.15	28.80	21.79	46.00	-24.21	QP	



Above 1GHz

Test channel:			Lowest		Le	vel:	Peak	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	47.64	31.53	10.57	40.24	49.50	74.00	-24.50	Vertical
4804.00	51.76	31.53	10.57	40.24	53.62	74.00	-20.38	Horizontal

Т	Test channel:			Lowest		vel:	Average	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	37.56	31.53	10.57	40.24	39.42	54.00	-14.58	Vertical
4804.00	41.76	31.53	10.57	40.24	43.62	54.00	-10.38	Horizontal

Т	Test channel:			Middle		vel:	Peak	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	48.65	31.58	10.66	40.15	50.74	74.00	-23.26	Vertical
4884.00	50.24	31.58	10.66	40.15	52.33	74.00	-21.67	Horizontal

Т	Test channel:			Middle		vel:	Average	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	39.62	31.58	10.66	40.15	41.71	54.00	-12.29	Vertical
4884.00	41.27	31.58	10.66	40.15	43.36	54.00	-10.64	Horizontal

Т	Test channel:			Highest		vel:	Peak	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	47.85	31.69	10.73	40.03	50.24	74.00	-23.76	Vertical
4960.00	50.34	31.69	10.73	40.03	52.73	74.00	-21.27	Horizontal

Test channel:			Highest		Le	vel:	Average	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	38.54	31.69	10.73	40.03	40.93	54.00	-13.07	Vertical
4960.00	41.25	31.69	10.73	40.03	43.64	54.00	-10.36	Horizontal

Remark:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Telephone: +86 (0) 755 23118282 Fax: +86 (0) 755 23116366