

SAR Evaluation Report

Applicant:	Guoguang Electric Co., Ltd.
Address of Applicant:	No.8 Jinghu Road, Xinhua Street, Huadu Reg, Guangzhou, China
Manufacturer:	CRAZYBABY INC.
Address of Manufacturer:	10 East South Temple Ste 850, Salt Lake City, UT 84133
Product name:	Wireless Speaker
Model:	L161
Rating(s):	Adapter: I/P: 100-240V~, 50/60Hz, 0.5A Max. O/P: 5Vdc 2A Main Unit: 5Vdc 2A Li-ion battery: 3.7Vdc, 2250mAh
Trademark:	Crazybaby
Standards:	47 CFR Part 1.1307 (2013) 47 CFR Part 2.1093 (2013) KDB447498D01 General RF Exposure Guidance v06
FCC ID:	2AAP80000L161
Date of Receipt:	2017-02-13
Date of Test:	2017-02-13~2017-03-10
Date of Issue:	2017-03-10
Test Result	Pass*

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

Authorized Signature:

Mar.10, 2017 Galen Xiao

Project Manager

Date

Name/Position

Signature

Possible test case verdicts:

test case does not apply to the test object ...: N/A

test object does meet the requirement: P (Pass)

test object does not meet the requirement ...: F (Fail)

Testing Laboratory information:

Testing Laboratory Name: I-Test Laboratory

Address.....: 1-2 floor, South Block, Building A2 , No 3 Keyan Lu,
Science City, Guangzhou, Guangdong Province, P.R. China

Testing location : Same as above

Tel : 0086-20-32209330

Fax : 0086-20-62824387

E-mail : itl@i-testlab.com

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report would be invalid test report without all the signatures of testing technician and approver.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

General product information:

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2 General Information

2.1 Client Information

Applicant: Guoguang Electric Co., Ltd.
Address of Applicant: No.8 Jinghu Road, Xinhua Street, Huadu Reg, Guangzhou, China

2.2 General Description of E.U.T.

Name: Wireless Speaker
Model No.: L161
Trade Mark: Crazybaby
Bluetooth: 2402 MHz to 2480 MHz
Operating Frequency: 802.11b/g/n-HT20: 2412 MHz to 2462 MHz
802.11n-HT40: 2422 MHz to 2452 MHz
Bluetooth: 79 channels with 1MHz step for Classic mode,
40 channels with 2MHz step for BLE mode
Channels: 802.11b/g/n(HT20): 11 channels with 5MHz step
802.11n(HT40): 7 channels with 5MHz step
Bluetooth Version: 4.1
Modulation Technique: Frequency Hopping Spread Spectrum (FHSS)
Type of Modulation: Bluetooth: GFSK, ($\pi/4$) DQPSK, 8DPSK
802.11b/g/n: CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Antenna Reference: Bluetooth: FPCB antenna with 2.54dBi peak gain
Wi-Fi: Dipole antenna with 2.66dBi peak gain
Function: Wireless Speaker

2.3 Details of E.U.T.

EUT Power Supply: AC Power, Class II
Rated power: 100-240V~, 50/60Hz, 0.5A Max.
Test mode for Bluetooth:
For Classic mode:
The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2402MHz), middle (2441MHz) and highest (2480MHz) are chosen for Bluetooth full testing.
Normal mode: the Bluetooth has been tested on the Modulation of GFSK;
EDR mode: the Bluetooth has been tested on the Modulation of ($\pi/4$)DQPSK and 8DPSK, compliance test and record the worst case on ($\pi/4$)DQPSK and 8DPS.

For BLE mode:

The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2402MHz), middle (2440MHz) and highest (2480MHz) are chosen for full testing.

Test mode for WIFI:

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz,
TM2	802.11g	2412MHz, 2437MHz, 2462MHz,
TM3	802.11n(HT20)	2412MHz, 2437MHz, 2462MHz,
TM4	802.11n(HT40)	2422MHz, 2437MHz, 2452MHz,

Power cord:

Direct plug for adapter; 1m for USB-cable

2.4 Description of Support Units

The EUT has been tested as an independent unit for fixed frequency by testing lab.

2.5 Test Location

All tests were performed at:

I-Test Laboratory

1-2 floor, South Block, Building A2 , No 3 Keyan Lu, Science City, Guangzhou, Guangdong Province, P.R. China

0086-20-32209330

itl@i-testlab.com

No tests were sub-contracted.

2.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

2.7 Abnormalities from Standard Conditions

None.

2.8 Other Information Requested by the Customer

None.

2.9 Test Facility

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

- CNAS(Lab code:L4957)
- FCC (Registration No.:935596)
- IC (Registration NO.:8368A)

3 SAR Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

3.1.2 Limits

1. The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,

So,

Numeric Threshold = $(\text{max. power of channel}) / (\text{Min Test separation Distance}) \times [\sqrt{f(\text{GHz})}]$

max. power of channel = $(\text{Numeric Threshold}) \times (\text{Min Test separation Distance}) / [\sqrt{f(\text{GHz})}]$

Where,

$f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison

2. For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$\{[\text{Power allowed at numeric threshold for 50 mm in step 1}]\} + \{[(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$ mW, for > 1500 MHz and ≤ 6 GHz

3.1.3 EUT RF Exposure

For WIFI:

The Max Conducted peak Output Power is 18.51dBm in 802.11b Highest channel (2.462GHz);

The best case gain of the antenna is 2.66dBi

EIRP = $18.51 + 2.66 = 21.17\text{dBm}$

21.17dBm logarithmic terms convert to numeric result is nearly 130.92 mW

EIRP = 130.92 mW

According to the formula, calculate the EIRP test result:

$\{[\text{Power allowed at numeric threshold for 50 mm}]\} + \{[(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$

SAR Exclusion Threshold = $(3.0 \times 50) / \sqrt{2.462} + [(200 - 50) \times 10] = 1651.57 \text{ mW}$

For 4.1 (classic mode):

The Max Conducted peak Output Power is 8.71dBm in highest channel(2.480 GHz);

The best case gain of the antenna is 2.54 dBi

EIRP = $8.71\text{dBm} + 2.54\text{dBi} = 11.25\text{dBm}$

11.25dBm logarithmic terms convert to numeric result is nearly 13.34mW

EIRP = 13.34 mW

According to the formula, calculate the EIRP test result:

$$\{[\text{Power allowed at numeric threshold for 50 mm}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$$

$$\text{SAR Exclusion Threshold} = (3.0 \times 50) / \sqrt{2.480 + [(200 - 50) \times 10]} = 1651.57 \text{ mW}$$

For 4.1 (ble mode):

The Max Conducted peak Output Power is 8.31dBm in highest channel(2.480 GHz);

The best case gain of the antenna is 2.54dBi

$$\text{EIRP} = 8.31 \text{ dBm} + 2.54 \text{ dBi} = 10.85 \text{ dBm}$$

10.85dBm logarithmic terms convert to numeric result is nearly 12.2mW

$$\text{EIRP} = 12.2 \text{ mW}$$

According to the formula, calculate the EIRP test result:

$$\{[\text{Power allowed at numeric threshold for 50 mm}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$$

$$\text{SAR Exclusion Threshold} = (3.0 \times 50) / \sqrt{2.440 + [(200 - 50) \times 10]} = 1651.57 \text{ mW}$$

So the SAR report is not required.