

RF EXPOSURE REPORT

FOR

Applicant	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Wireless Adaptor with built-in amplifier
Model No.	:	CITATION AMP
Trade Mark	:	harman/kardon
FCC ID	:	APIHKCTAMP
IC	:	6132A-HKCTAMP
Manufacturer	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park,
Dongguan City, Guangdong Province, China, 523808

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REPORT

Table of Contents

	Test report declares.....	3
1.	General Information	5
1.1.	Description of equipment	5
1.2.	Assess laboratory	6
2.	RF Exposure Evaluation	7
2.1.	Requirement.....	7
2.2.	Calculation method.....	7
2.3.	Estimation result.....	8

Test Report Declare

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Standard Used: KDB447498 D01 General RF Exposure Guidance v06

We Declare:

The equipment described above is assessed by Dongguan Dongdian Testing Service Co., Ltd and in the configuration assessed the equipment complied with the standards specified above. The assessed results are contained in this report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these assess.

After evaluation, our opinion is that the equipment In Accordance with above standard.

Report No:	DDT-R20041019-1E17		
Date of Receipt:	May 21, 2020	Date of Test:	May 21, 2020 ~ Jul. 16, 2020

Prepared By:

Sam Li

Sam Li/Engineer

Approved By:



Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Jun. 16, 2020	

1. General Information

1.1. Description of equipment

EUT* Name	: Wireless Adaptor with built-in amplifier
Model Number	: CITATION AMP
EUT function description	: Please reference user manual of this device
Power supply	: AC 100-240V~, 50/60Hz, 125W
Serial number	: GG0906-EK0000162

BT/BLE:

Radio Specification	: Bluetooth V4.2
Operation Frequency	: 2402 MHz - 2480 MHz
Modulation	: GFSK, $\pi/4$ -DQPSK, 8DPSK
Data Rate	: 1 Mbps, 2 Mbps, 3 Mbps
Antenna Type	: Antenna 1: Dedicated FPCB antenna, maximum PK gain: 2.21 dBi

2.4G WIFI:

Radio Technology	: IEEE 802.11b/g/n
Operation frequency	: IEEE 802.11b: 2412 MHz - 2462 MHz : IEEE 802.11g: 2412 MHz - 2462 MHz : IEEE 802.11n HT20: 2412 MHz - 2462 MHz
Modulation	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) : IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) : IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	: IEEE 802.11b: 1, 2, 5.5, 11 Mbps : IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps : IEEE 802.11n HT20: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps
Antenna Type	: Antenna 1: Dedicated FPCB antenna, maximum PK gain: 2.21 dBi : Antenna 2: Dedicated FPCB antenna, maximum PK gain: 2.59 dBi

Antenna information			
	Ant1 gain	Ant2 gain	MIMO
IEEE 802.11b	2.21	2.59	/
IEEE 802.11g	2.21	2.59	/
IEEE 802.11n HT20	2.21	2.59	5.42

5G WIFI:

Radio Technology	: IEEE 802.11a/n/ac
Operation frequency	: IEEE 802.11a: 5180 MHz - 5240 MHz, 5260 MHz - 5320 MHz, 5500 MHz - 5700 MHz, 5745 MHz - 5825 MHz IEEE 802.11n HT20: 5180 MHz - 5240 MHz, 5260 MHz - 5320 MHz, 5500 MHz - 5700 MHz, 5745 MHz - 5825 MHz IEEE 802.11n HT40: 5190 MHz - 5230 MHz, 5270 MHz - 5310 MHz, 5510 MHz - 5670 MHz, 5755 MHz - 5795 MHz IEEE 802.11ac HT20: 5180 MHz - 5240 MHz, 5260 MHz - 5320 MHz, 5500 MHz - 5700 MHz, 5745 MHz - 5825 MHz IEEE 802.11ac HT40: 5190 MHz - 5230 MHz, 5270 MHz - 5310 MHz, 5510 MHz - 5670 MHz, 5755 MHz - 5795 MHz IEEE 802.11ac HT80: 5210 MHz, 5290 MHz, 5530 MHz, 5610 MHz, 5775 MHz
Modulation	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	: IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: 14.4, 28.9, 43.3, 57.8, 86.7, 115.6, 130.0, 144.4 Mbps IEEE 802.11n HT40: 30, 60, 90, 120, 180, 240, 270, 300 Mbps IEEE 802.11ac HT20: 14.4, 28.8, 43.4, 57.8, 86.6, 115.6, 130, 144.4, 173.4 Mbps IEEE 802.11ac HT40: 30, 60, 90, 120, 180, 240, 270, 300, 360, 400 Mbps IEEE 802.11ac HT80: 65, 130, 195, 260, 390, 520, 585, 650, 780, 866.6 Mbps
Antenna Type	: Antenna 1: Dedicated FPCB antenna, maximum PK gain: 3.38 dBi Antenna 2: Dedicated FPCB antenna, maximum PK gain: 3.3 dBi

Antenna information			
	Ant1 gain	Ant2 gain	MIMO
IEEE 802.11a	3.38	3.3	/
IEEE 802.11n HT20	3.38	3.3	6.35
IEEE 802.11n HT40	3.38	3.3	6.35
IEEE 802.11ac VHT20	3.38	3.3	6.35
IEEE 802.11ac VHT40	3.38	3.3	6.35
IEEE 802.11ac VHT80	3.38	3.3	6.35

1.2. Assess laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City,
Guangdong Province, China, 523808

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com

CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

FCC Designation Number: CN1182; Test Firm Registration Number: 540522

Industry Canada site registration number: 10288A-1

2. RF Exposure Evaluation

2.1. Requirement

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

Limits for General Population/Uncontrolled Exposure

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2. Calculation method

$$E(\text{V/m}) = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } S(\text{mW/cm}^2) = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (mW)

G = EUT Antenna numeric gain (numeric)=

d = Separation distance between radiator and human body (m)

The formula can be changed to

We can change the formula to:

$$S = \frac{30 \times P \times G}{377 \times d^2} \quad \text{or, } d = \sqrt{\frac{30 \times P \times G}{377 \times S}}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2 m, as well as the gain of the used antenna, the RF power density can be obtained.

2.3. Estimation result

Mode	PK Output power (dBm)	Output power (mW)	Antenna Gain (dBi)	Antenna Gain (linear)	MPE Values (mW/cm ²)	MPE Limit (mW/cm ²)
BT	6.57	4.54	2.21	1.66	0.00150	1
BLE	3.65	2.32	2.21	1.66	0.00077	1
2.4G wifi	15.17	32.89	5.42	3.48	0.02277	1
5G wifi	20.10	102.33	6.35	4.32	0.08794	1

Maximum Simultaneous transmission MPE Ratio for Bluetooth and 2.4G WLAN and 5G WLAN

Maximum MPE ratio Bluetooth	Maximum MPE ratio 2.4G wifi	Maximum MPE ratio 5G wifi	Maximum MPE Ratio WISA	ΣMPE ratios	Limit	Results
0.00150	0.02277	0.08794	0.0047	0.11691	1.000	Pass

Note: The estimation distance is 20 cm

Maximum MPE Ratio WISA from FCC ID: UA9800 (Report No.: FOCU0169.1)

Conclusion: No SAR evaluation required since transmitter power is below FCC threshold

END OF REPORT