

## RF EXPOSURE REPORT

### FOR

|                             |   |                                                            |
|-----------------------------|---|------------------------------------------------------------|
| <b>Applicant</b>            | : | Harman International Industries, Incorporated              |
| <b>Address</b>              | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |
| <b>Equipment under Test</b> | : | Streaming wireless adaptor                                 |
| <b>Model No.</b>            | : | ADAPT+                                                     |
| <b>Trade Mark</b>           | : | Harman Kardon                                              |
| <b>FCC ID</b>               | : | APIHKADAPTP                                                |
| <b>IC</b>                   | : | 6132A-HKADAPTP                                             |
| <b>Manufacturer</b>         | : | Harman International Industries, Incorporated              |
| <b>Address</b>              | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |

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

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# REPORT

## TABLE OF CONTENTS

|      |                                |   |
|------|--------------------------------|---|
|      | Test report declares.....      | 3 |
| 1.   | General information .....      | 4 |
| 1.1. | Description of Equipment ..... | 4 |
| 1.2. | Assess laboratory.....         | 4 |
| 2.   | RF Exposure evaluation .....   | 4 |
| 2.1. | Requirement .....              | 4 |
| 2.2. | Calculation Method .....       | 5 |
| 2.3. | Estimation Result .....        | 5 |

## 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.**

|                         |                   |                      |                               |
|-------------------------|-------------------|----------------------|-------------------------------|
| <b>Report No.:</b>      | DDT-R17Q0626-5E21 |                      |                               |
| <b>Date of Receipt:</b> | Jun. 26, 2017     | <b>Date of Test:</b> | Jun. 26, 2017 ~ Sep. 05, 2017 |

**Prepared By:**

*Damon Hu*

**Damon Hu/Engineer**

**Approved By:**



**Kevin Feng/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.

## 1. General information

### 1.1. Description of Equipment

|                          |                                                                                                                                                                                                                                                                             |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT* Name                | : Streaming wireless adaptor                                                                                                                                                                                                                                                |
| Model Number             | : ADAPT+                                                                                                                                                                                                                                                                    |
| EUT function description | : Please reference user manual of this device                                                                                                                                                                                                                               |
| Power supply             | : DC 5V from external AC ADAPTER                                                                                                                                                                                                                                            |
| Radio Specification      | : Bluetooth V4.1 (BDR/EDR/BLE)                                                                                                                                                                                                                                              |
| Operation frequency      | : 2402MHz-2480MHz, 2412MHz-2462MHz, 5150MHz-5250MHz, 5250MHz-5350MHz, 5470MHz-5725MHz, 5725MHz-5850MHz                                                                                                                                                                      |
| Modulation               | : IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)<br>IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)<br>IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK,BPSK)<br>IEEE 802.11ac: HT20, HT40, HT80: OFDM (256QAM, 64QAM, 16QAM, QPSK,BPSK) |
| Data rate                | : IEEE 802.11b: 1, 2, 5.5, 11 Mbps<br>IEEE 802.11g, 11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>IEEE 802.11n HT20: up to 150 Mbps, HT40: up to 300Mbps<br>IEEE 802.11ac VHT20: up to 150 Mbps, VHT40: up to 300 Mbps<br>VHT80: up to 866.7 Mbps                               |
| Antenna Type             | : Integrated antenna 1:<br>2.4G band maximum PK gain 2.60dBi; 5G band maximum PK gain 2.81dBi<br>Integrated antenna 2:<br>2.4G band maximum PK gain 4.20dBi; 5G band maximum PK gain 5.41dBi                                                                                |
| Sample Type              | : Series production                                                                                                                                                                                                                                                         |

### 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: +86-0769-89201699 <http://www.dgddt.com> Email: ddt@dgddt.com

## 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 0.2m 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> 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=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

## 2.3. Estimation Result

**Standalone MPE****Antenna 1****2.4G Wifi**

| Mode               | Output power<br>(Including tune-up tolerance) |         | Antenna Gain (dBi) | Antenna Gain (linear) | Duty Cycle | MPE (mW/cm <sup>2</sup> ) | MPE Limits (mW/cm <sup>2</sup> ) |
|--------------------|-----------------------------------------------|---------|--------------------|-----------------------|------------|---------------------------|----------------------------------|
|                    | (dBm)                                         | (mW)    |                    |                       |            |                           |                                  |
| IEEE 802.11 b      | 17                                            | 50.1187 | 2.60               | 1.8197                | 100%       | 0.0182                    | 1.0000                           |
| IEEE 802.11 g      | 17                                            | 50.1187 | 2.60               | 1.8197                | 100%       | 0.0182                    | 1.0000                           |
| IEEE 802.11 n HT20 | 17                                            | 50.1187 | 2.60               | 1.8197                | 100%       | 0.0182                    | 1.0000                           |
| IEEE 802.11 n HT40 | 17                                            | 50.1187 | 2.60               | 1.8197                | 100%       | 0.0182                    | 1.0000                           |

**5G Wifi**

| Mode                 | Output power<br>(Including tune-up tolerance) |         | Antenna Gain<br>(dBi) | Antenna Gain<br>(linear) | Duty Cycle | MPE<br>(mW/cm <sup>2</sup> ) | MPE Limits<br>(mW/cm <sup>2</sup> ) |
|----------------------|-----------------------------------------------|---------|-----------------------|--------------------------|------------|------------------------------|-------------------------------------|
|                      | (dBm)                                         | (mW)    |                       |                          |            |                              |                                     |
| IEEE 802.11 a        | 12                                            | 15.8489 | 2.81                  | 1.9099                   | 100%       | 0.0060                       | 1.0000                              |
| IEEE 802.11 n HT20   | 12                                            | 15.8489 | 2.81                  | 1.9099                   | 100%       | 0.0060                       | 1.0000                              |
| IEEE 802.11 n HT40   | 12                                            | 15.8489 | 2.81                  | 1.9099                   | 100%       | 0.0060                       | 1.0000                              |
| IEEE 802.11 ac VHT20 | 12                                            | 15.8489 | 2.81                  | 1.9099                   | 100%       | 0.0060                       | 1.0000                              |
| IEEE 802.11 ac VHT40 | 12                                            | 15.8489 | 2.81                  | 1.9099                   | 100%       | 0.0060                       | 1.0000                              |
| IEEE 802.11 ac VHT80 | 12                                            | 15.8489 | 2.81                  | 1.9099                   | 100%       | 0.0060                       | 1.0000                              |

**Antenna 2****2.4G Wifi**

| Mode               | Output power<br>(Including tune-up tolerance) |         | Antenna Gain<br>(dBi) | Antenna Gain<br>(linear) | Duty Cycle | MPE<br>(mW/cm <sup>2</sup> ) | MPE Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------|-----------------------------------------------|---------|-----------------------|--------------------------|------------|------------------------------|-------------------------------------|
|                    | (dBm)                                         | (mW)    |                       |                          |            |                              |                                     |
| IEEE 802.11 b      | 17                                            | 50.1187 | 4.20                  | 2.6303                   | 100%       | 0.0262                       | 1.0000                              |
| IEEE 802.11 g      | 17                                            | 50.1187 | 4.20                  | 2.6303                   | 100%       | 0.0262                       | 1.0000                              |
| IEEE 802.11 n HT20 | 17                                            | 50.1187 | 4.20                  | 2.6303                   | 100%       | 0.0262                       | 1.0000                              |
| IEEE 802.11 n HT40 | 17                                            | 50.1187 | 4.20                  | 2.6303                   | 100%       | 0.0262                       | 1.0000                              |

**5G Wifi**

| Mode                 | Output power<br>(Including tune-up tolerance) |         | Antenna Gain<br>(dBi) | Antenna Gain<br>(linear) | Duty Cycle | MPE<br>(mW/cm <sup>2</sup> ) | MPE Limits<br>(mW/cm <sup>2</sup> ) |
|----------------------|-----------------------------------------------|---------|-----------------------|--------------------------|------------|------------------------------|-------------------------------------|
|                      | (dBm)                                         | (mW)    |                       |                          |            |                              |                                     |
| IEEE 802.11 a        | 14                                            | 25.1189 | 5.41                  | 3.4754                   | 100%       | 0.0174                       | 1.0000                              |
| IEEE 802.11 n HT20   | 14                                            | 25.1189 | 5.41                  | 3.4754                   | 100%       | 0.0174                       | 1.0000                              |
| IEEE 802.11 n HT40   | 14                                            | 25.1189 | 5.41                  | 3.4754                   | 100%       | 0.0174                       | 1.0000                              |
| IEEE 802.11 ac VHT20 | 14                                            | 25.1189 | 5.41                  | 3.4754                   | 100%       | 0.0174                       | 1.0000                              |
| IEEE 802.11 ac VHT40 | 14                                            | 25.1189 | 5.41                  | 3.4754                   | 100%       | 0.0174                       | 1.0000                              |
| IEEE 802.11 ac VHT80 | 14                                            | 25.1189 | 5.41                  | 3.4754                   | 100%       | 0.0174                       | 1.0000                              |

**BT**

| Mode                       | Output power<br>(Including tune-up tolerance) |        | Antenna Gain<br>(dBi) | Antenna Gain<br>(linear) | Duty Cycle | MPE<br>(mW/cm <sup>2</sup> ) | MPE Limits<br>(mW/cm <sup>2</sup> ) |
|----------------------------|-----------------------------------------------|--------|-----------------------|--------------------------|------------|------------------------------|-------------------------------------|
|                            | (dBm)                                         | (mW)   |                       |                          |            |                              |                                     |
| BT Classic(GFSK)           | 6                                             | 3.9811 | 4.20                  | 2.6303                   | 100%       | 0.0021                       | 1.0000                              |
| BT Classic<br>(Pi/4 QPSK ) | 6                                             | 3.9811 | 4.20                  | 2.6303                   | 100%       | 0.0021                       | 1.0000                              |
| BT Classic<br>(8-DPSK )    | 6                                             | 3.9811 | 4.20                  | 2.6303                   | 100%       | 0.0021                       | 1.0000                              |
| BT LE                      | 6                                             | 3.9811 | 4.20                  | 2.6303                   | 100%       | 0.0021                       | 1.0000                              |

Remark:

- 1.Maximum average power including tune-up tolerance;
- 2.MPE use distance is 20cm from manufacturer declaration of user manual.
- 3.We choose 2402MHz (lowest frequency operate at 2.4GHz) and 5180MHz(lowest frequency operate at 5GHz) to calculate MPE limit as higher frequency will have higher MPE limits.

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\Sigma$  of MPE ratios  $\leq 1.0$

**Antenna 1 and Antenna 2**

| Max. MPE<br>Antenna1<br>(mW/cm <sup>2</sup> ) | Max. MPE<br>Antenna 2<br>(mW/cm <sup>2</sup> ) | $\Sigma$ MPE ratios | Limit | Results |
|-----------------------------------------------|------------------------------------------------|---------------------|-------|---------|
| 0.0182                                        | 0.0262                                         | 0.0444              | 1.000 | Pass    |

Note: The estimation distance is 20cm

**Conclusion**

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

----- END OF REPORT-----