

SAR TEST EXCLUSION EVALUATION REPORT

Product Name: Active Noise Canceling True wireless headphones

Trade Mark:  or PHILIPS

Model No./HVIN: TAT3509

Add. Model No.: TAT3519, TAT3509xx/yy, TAT3519xx/yy
(xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination)

Report Number: 2402069267RFC-3

Test Standards: FCC 47 CFR Part 2.1093
RSS-102 Issue 6

FCC ID: 2AR2STAT3509

IC: 24589-TAT3509

Test Result: PASS

Date of Issue: June 27, 2024

Prepared for:

MMD Hong Kong Holding Limited
Units 1208-11, 12th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

TEL: +86-755-2823 0888

FAX: +86-755-2823 0886

Prepared by: David Chen
David Chen
Senior Project Engineer

Reviewed by: Henry Lu
Henry Lu
Team Leader

Approved by: Robben Chen
Robben Chen

Date: June 27, 2024

Assistant Manager

Version

Version No.	Date	Description
V1.0	June 27, 2024	Original

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com<http://www.uttlab.com>UTTR-RF-RSS102-V1.1

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	MMD Hong Kong Holding Limited
Address of Applicant:	Units 1208-11,12th Floor,C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong
Manufacturer:	MMD Hong Kong Holding Limited
Address of Manufacturer:	Units 1208-11,12th Floor,C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

1.2 EUT INFORMATION

Product Name:	Active Noise Canceling True wireless headphones	
Model No. /HVIN:	TAT3509	
Add. Model No.:	TAT3519,TAT3509xx/yy, TAT3519xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination)	
Trade Mark:	 or PHILIPS	
DUT Stage:	Identical Prototype	
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	Bluetooth 5.3
Software Version:	V1.013 (Provided by the customer)	
Hardware Version:	V02 (Provided by the customer)	
Sample Received Date:	May 6, 2024	
Note:	The additional model TAT3519,TAT3509xx/yy, TAT3519xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination) is identical with the test model TAT3509 except the model number for marketing purpose.	

Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For BLE		
Frequency Band:	2400 MHz to 2483.5 MHz	
Frequency Range:	2402 MHz to 2480 MHz	
Bluetooth Version:	Bluetooth LE/2LE	
Type of Modulation:	GFSK	
Number of Channels:	40	
Channel Separation:	2 MHz	
Antenna Type:	FPC Antenna	
Antenna Gain: (Provided by the customer)	Left earbud: -0.2 dBi	
	Right earbud: -0.28 dBi	
Maximum Conducted Peak Power:	Left earbud:	0.99 dBm
	Right earbud:	4.02 dBm

For BT_EDR	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	Bluetooth BR + EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Channel Separation:	1 MHz
Antenna Type:	FPC Antenna
Antenna Gain: (Provided by the customer)	Left earbud: -0.2 dBi
	Right earbud: -0.28 dBi
Maximum Conducted Peak Power:	Left earbud: 1.84 dBm
	Right earbud: 4.99 dBm

1.4 OTHER INFORMATION

Test channels for BT_LE				
Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
GFSK	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 19	Channel 39
		2402 MHz	2440 MHz	2480 MHz

Test channels for BT_EDR				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
GFSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 39	Channel 78
$\pi/4$ DQPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	2402 MHz	2441 MHz	2480 MHz
		Channel 0	Channel 39	Channel 78
8DPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	2402 MHz	2441 MHz	2480 MHz
		Channel 0	Channel 39	Channel 78

1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR Part 2.1093
RSS-102 Issue 6

All test items have been performed and recorded as per the above standards

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

Shenzhen UnionTrust Quality and Technology Co., Ltd.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

2. EQUIPMENT LIST

Please refer to the RF test report.

3. SAR TEST EXCLUSION EVALUATION

3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 2.1093	Radiofrequency radiation exposure evaluation: portable devices.
2	RSS-102 Issue 6	Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)
3	KDB 447498 D04 Interim General RF Exposure Guidance v01	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

3.2 EXEMPTION LIMITS FOR ROUTINE EVALUATION – SAR EVALUATION

3.2.1 SAR Test Exclusion Threshold

3.2.1.1 KDB 447498 D04

According to KDB 447498 D04, SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad \text{(B.1)}$$

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad \text{(B.2)}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

3.2.1.2 RSS-102 Issue 6

According to RSS-102 Issue 6, Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

When the operating frequency of the device is between two frequencies located in table 11, linear interpolation shall be applied for the applicable separation distance. If the separation distance of the device is between two distances located in table 11, linear interpolation may be applied for the applicable frequency. Alternatively, the limit corresponding to the smaller distance may be employed. For example, in case of a 7 mm separation distance, either use the exception value for a 5 mm separation distance or interpolate between the limits corresponding to 5 mm and 10 mm separation distances.

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3.3 MPE CALCULATION RESULTS

Note: For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.3.1 For BT and BLE

For BR+EDR & BLE function, operating at 2402MHz to 2480 MHz for GFSK, $\pi/4$ DQPSK, 8DPSK

3.3.1.1 Antenna Type:

Chain 0: FPC Antenna

3.3.1.2 Antenna Gain:

Chain 0: 2402MHz to 2480 MHz: Left earbud: -0.2 dBi ,
Right earbud: -0.28 dBi

3.3.1.3 Results for FCC 47 CFR Part 2.1093

For Left earbud

Operating Mode	Frequency	Tune-up Power (conducted average)	Tolerance	Antenna Gain	Calculated maximum EIRP		Separation Distance	SAR Test Exclusion Threshold
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(mW)	(mm)	(mW)
BR+EDR	2402-2480	-1.5	1.5	-0.2	0	1.0000	5	3
BT LE	2402-2480	0	1.0	-0.2	1.0	1.2589	5	3

For Right earbud

Operating Mode	Frequency	Tune-up Power (conducted average)	Tolerance	Antenna Gain	Calculated maximum EIRP		Separation Distance	SAR Test Exclusion Threshold
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(mW)	(mm)	(mW)
BR+EDR	2402-2480	1.5	1.5	-0.28	3.0	1.9953	5	3
BT LE	2402-2480	3.0	1.0	-0.28	4.0	2.5119	5	3

So the transmitter complies with the RF exposure requirements and the SAR is not required.

3.3.1.1 Results for RSS-102 Issue 6

For Left earbud

Operating Mode	Frequency	Tune-up Power (conducted average)	Tolerance	Antenna Gain	Calculated maximum EIRP		Separation Distance	SAR Test Exclusion Threshold
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(mW)	(mm)	(mW)
BR+EDR	2402-2480	-1.5	1.5	-0.2	-0.2	0.9550	5	3
BT LE	2402-2480	0	1.0	-0.2	0.8	1.2022	5	3

For Right earbud

Operating Mode	Frequency	Tune-up Power (conducted average)	Tolerance	Antenna Gain	Calculated maximum EIRP		Separation Distance	SAR Test Exclusion Threshold
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(mW)	(mm)	(mW)
BR+EDR	2402-2480	1.5	1.5	-0.28	-0.28	0.9376	5	3
BT LE	2402-2480	3.0	1.0	-0.28	3.72	2.3550	5	3

So the transmitter complies with the RF exposure requirements and the SAR is not required.

APPENDIX 1 PHOTOS OF TEST SETUP

N/A

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal Photos.

*** End of Report ***

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