TEST REPORT

Applicant	MMD Hong Kong Holding Limited
Address	Unit 1006, 10th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Manufacturer or Supplier	MMD Hong Kong Holding Limited
Address	Unit 1006, 10th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong
Product	Active Noise Canceling wireless headphones
Brand Name	PHILIPS or
Model	TAH8507HS
Additional Model & Model Difference	TAH8507
Date of tests	Mar. 10, 2022 ~ Mar. 25, 2022

the tests have been carried out according to the requirements of the following standards:

☒ **FCC Part 15, Subpart C, Section 15.247**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Lucas Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	 Date: May 11, 2022

Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

No. 96, Guantai Road (Houjie Section), Houjie Town, Dongguan City, Guangdong Province. 523942. People's Republic of China.

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@bureauveritas.com

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF2203WDG0246-1	Original release	May 11, 2022

Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

No. 96, Guantai Road (Houjie Section), Houjie Town, Dongguan City, Guangdong Province. 523942. People's Republic of China.

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@bureauveritas.com

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.205 15.209	Transmitter Radiated Emission Below 1GHz	PASS	Meet the requirement of limit.

Note: This report base the FCC ID: 2AR2STAH8506 to Add series models; Replace the built-in microphone with an external pluggable microphone and Change the appearance of product (Enclosure changes). These change content has been re-evaluate the items as above table, and all of others test result are not affected the latest changes, see the original grant report of FCC ID: 2AR2STAH8506 from FCC OET Authorization Search

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.47dB
	1GHz ~ 18GHz	4.84dB
	18GHz ~ 40GHz	4.67dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Active Noise Canceling wireless headphones
MODEL NO.	TAH8507HS
ADDITIONAL MODELS	TAH8507
FCC ID	2AR2STAH8506
POWER SUPPLY	DC 5V from USB port input or DC 3.7V from battery
MODULATION TECHNOLOGY	FHSS
MODULATION TYPE	GFSK, π/4 DQPSK, 8DPSK
OPERATING FREQUENCY	2402MHz~2480MHz
NUMBER OF CHANNEL	79
PEAK OUTPUT POWER	3.90dBm (Max. Measured)
ANTENNA TYPE	FPCB Antenna, -1.0dBi Gain
I/O PORTS	Please see the User Manual
CABLE SUPPLIED	USB cable: 0.5m, detachable, un-shielding Audio cable: 1.2m, detachable, un-shielding
I/O PORTS	Refer to user's manual

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2203WDG0246) for detailed product photo.
4. Additional models (see above table) are identical with the test model except model number for trading purpose.
5. The Lab. Designation Number: CN1174; Test Firm Registration Number: 749762

3.2 DESCRIPTION OF TEST MODES

79 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

3.2.1. CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photograph of the test configuration for reference.

3.2.2. TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, power supply voltage range and antenna ports The worst case was found when positioned on X axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	-	-	-	DC 3.7V from battery

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0 to 78	39	FHSS	GFSK	DH5

For the test results, only the worst case was shown in test report.

☒ **TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	23.1deg. C,45%RH	DC 3.7V from battery	King

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. Section 15.247

KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

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

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit without any other necessary accessory or support units.

4 TEST TYPES AND RESULTS

4.1. RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 TEST INSTRUMENTS

FREQUENCY RANGE BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Next Cal. Date
EMI Test Receiver (10kHz~7GHz)	Rohde&Schwarz	ESR 7	101961	2023/01/12
Loop Antenna	EMCI	HLA 6121	45745	2023-04-15
Preamplifier	EMCI	EMC001340	980201	2022-04-15
Broadband antenna (25MHz~2500MHz)	Schwarzbeck	VULB 9168	00937	2022/04/15
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	NSEMC003	2022/04/14
Signal Amplifier (30MHz~1000MHz)	Com-power	PAM-103	18020051	2023/01/14
Attenuator	R&S	TS2GA-6dB	18101101	N/A
Test software	EZ	EZ_EMC V1.1.4.2	N/A	N/A

NOTES: 1. The test was performed in 966 Chamber.

2. The calibration interval of the above test instruments is 12 / 24 months(The Antenna and Chamber interval of 24 months, others are 12 months). And the calibrations are traceable to CEPREI/CHINA.

4.1.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.

g. 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, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

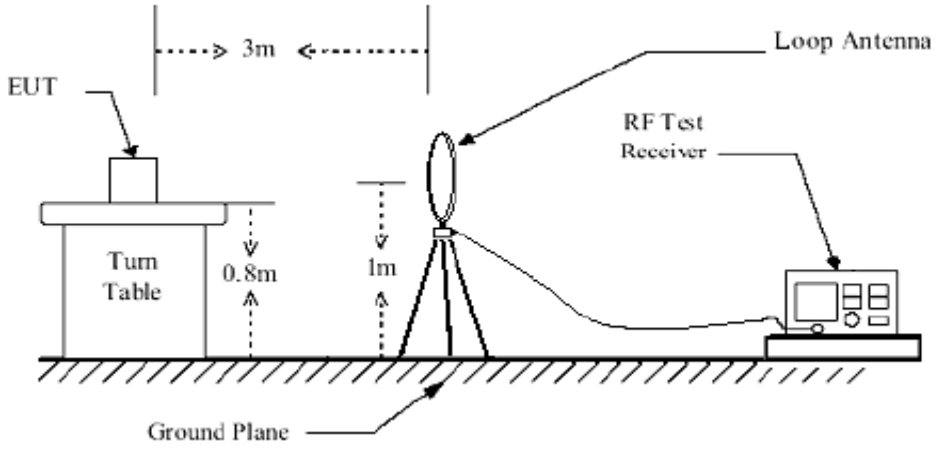
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

4.1.4 DEVIATION FROM TEST STANDARD

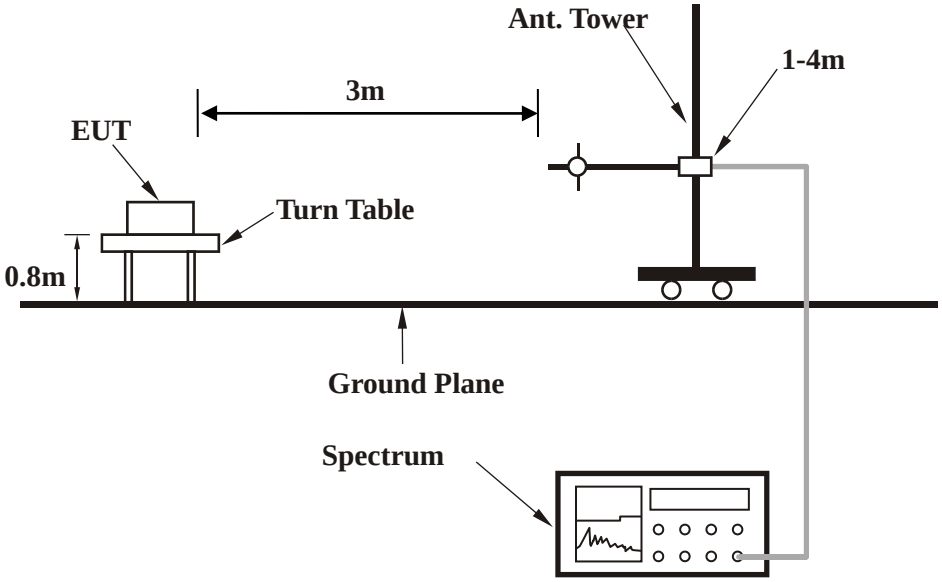
No deviation.

4.1.5 TEST SETUP

Below 30MHz test setup



Below 1GHz test setup



Note: For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

a. Set the EUT under full load condition and placed them on a testing table.

b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

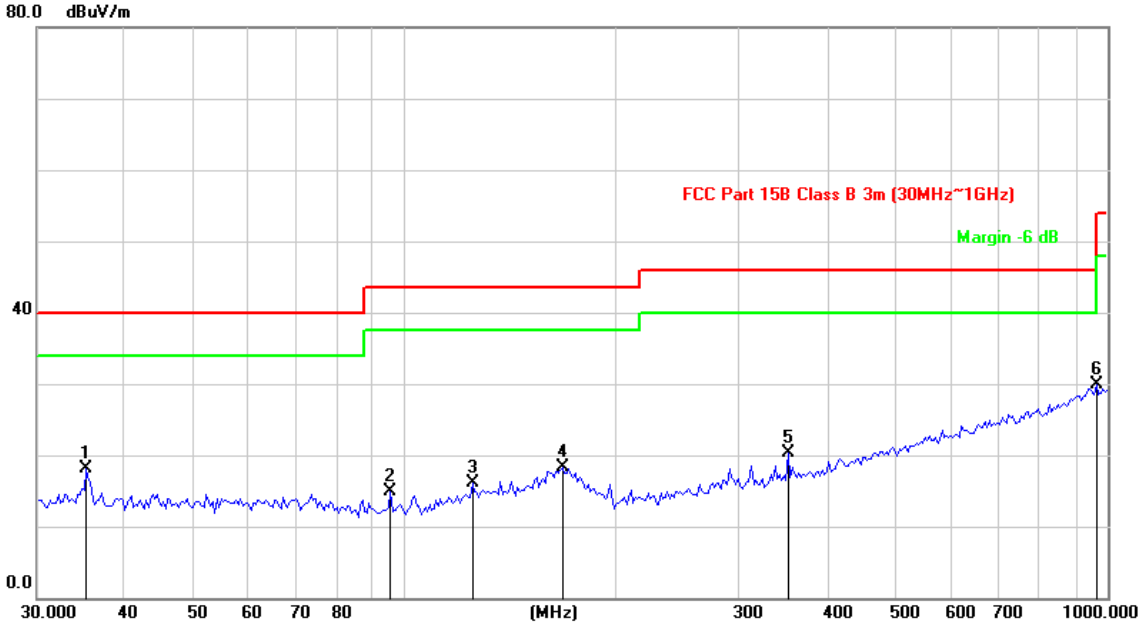
GFSK DH5

CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	READING (dBuV)	CORRECTION FACTOR (dB/m)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)
1	35.2626	34.86	-16.77	18.09	40.00	-21.91	200	298
2	95.6485	32.75	-17.89	14.86	43.50	-28.64	300	185
3	124.9249	32.03	-15.88	16.15	43.50	-27.35	200	230
4	167.8136	30.95	-12.73	18.22	43.50	-25.28	100	233
5	350.9722	32.99	-12.73	20.26	46.00	-25.74	100	163
6	965.4742	29.93	-0.09	29.84	54.00	-24.16	200	154

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value

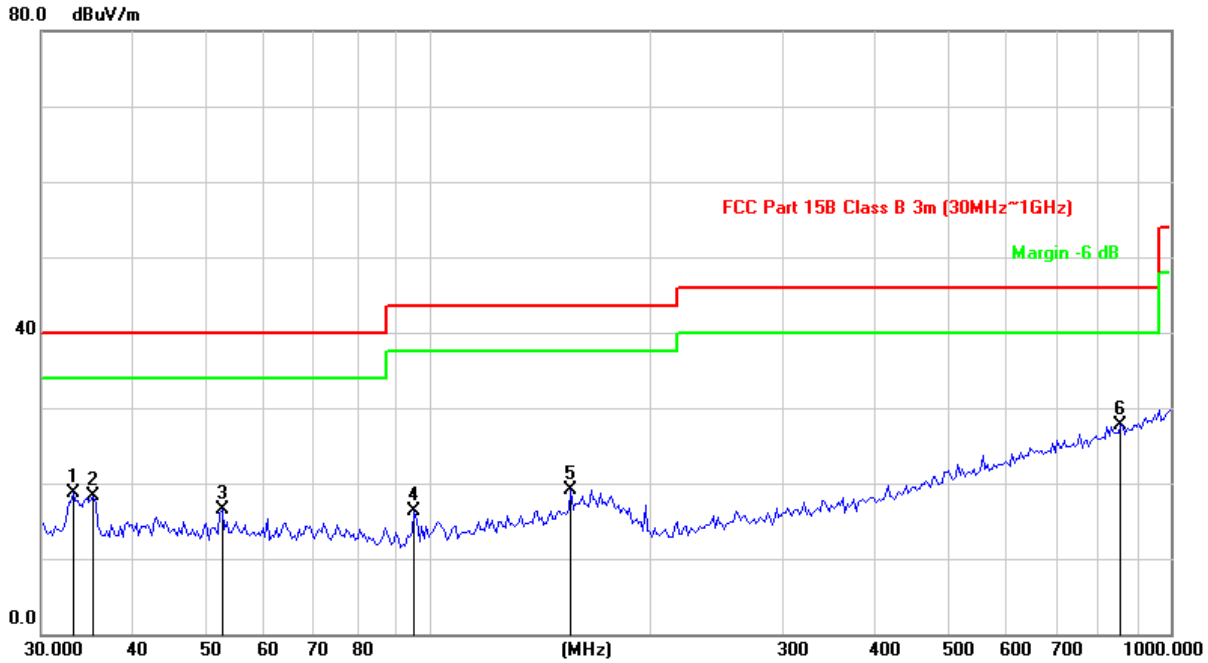


CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	READING (dBuV)	CORRECTION FACTOR (dB/m)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)
1	35.2626	34.86	-16.77	18.09	40.00	-21.91	200	298
2	95.6485	32.75	-17.89	14.86	43.50	-28.64	300	185
3	124.9249	32.03	-15.88	16.15	43.50	-27.35	200	230
4	167.8136	30.95	-12.73	18.22	43.50	-25.28	100	233
5	350.9722	32.99	-12.73	20.26	46.00	-25.74	100	163
6	965.4742	29.93	-0.09	29.84	54.00	-24.16	200	154

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---