RF EXPOSURE EVALUATION REPORT

Product Name:	Soundbar Speaker
Trade Mark:	or PHILIPS
HVIN:	HTL3320/37
Model No.:	HTL3320/37
Add. Model No.:	HTL3320/98, HTL3320/10, HTL3320/05, HTL3320/12, HTL3320/00, HTL3320/xx , HTL3325/98, HTL3325/37, HTL3325/10, HTL3325/05, HTL3325/12, HTL3325/00, HTL3325/xx (/xx= blank or /00 to /99, denoted for different country destination)
Report Number:	200722005RFC-3
Test Standards:	FCC 47 CFR Part 1 Subpart I RSS-102 Issue 5
FCC ID:	2AR2SHTL3320
IC:	24589-HTL3320
Test Result:	PASS
Date of Issue:	August 25, 2020

Prepared for:

MMD Hong Kong Holding Limited
Units 1006-1007,10th Floor, C-Bons International Center,108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong, China

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Prepared by:	Ryan Zhou	Reviewed by:	
	Ryan Zhou Senior Project Engineer		Kevin Liang Assistant Manager
Approved by:	Billy Li Technical Director	Date:	August 25, 2020

Version

Version No.	Date	Description
V1.0	August 25, 2020	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	MMD Hong Kong Holding Limited
Address of Applicant:	Units 1006-1007,10th Floor, C-Bons International Center,108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong, China
Manufacturer:	MMD Hong Kong Holding Limited
Address of Manufacturer:	Units 1006-1007,10th Floor, C-Bons International Center,108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong, China
Factories:	Zhong shan City Richsound Electronic Industrial Ltd
Address of Factories:	No.16, East Shagang Road, Gangkou, Zhongshan, Guangdong, China

1.2 EUT INFORMATION

Product Name:	Soundbar Speaker	
HVIN:	HTL3320/37	
Model No. :	HTL3320/37	
Add. Model No. :	HTL3320/98, HTL3320/10, HTL3320/05, HTL3320/12, HTL3320/00, HTL3320/xx , HTL3325/98, HTL3325/37, HTL3325/10, HTL3325/05, HTL3325/12, HTL3325/00, HTL3325/xx (/xx= blank or /00 to /99, denoted for different country destination)	
Trade Mark:	or PHILIPS	
DUT Stage:	Identical Prototype	
EUT Supports Function:	2.4 GHz ISM Band:	Bluetooth V4.2
		2.4GHz Wireless Digital Audio
Sample Received Date:	July 22, 2020	
Sample Tested Date:	July 31, 2020 to August 17, 2020	
Note: The additional model HTL3320/98, HTL3320/10, HTL3320/05, HTL3320/12, HTL3320/00, HTL3320/xx , HTL3325/98, HTL3325/37, HTL3325/10, HTL3325/05, HTL3325/12, HTL3325/00, HTL3325/xx (/xx= blank or /00 to /99, denoted for different country destination) is identical with the test model HTL3320/37 except the model number and trade mark for marketing purpose.		

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For BT	
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, π/4DQPSK
Number of Channels:	79
Channel Separation:	1 MHz
Hopping Channel Type:	Adaptive Frequency Hopping Systems
Antenna Type:	PCB Antenna
Antenna Gain:	-2.0 dBi
Maximum Peak Power:	1.240 dBm

For 2.4GHz Wireless Digital Audio	
Frequency Range:	2404.5 MHz to 2479.5 MHz
Type of Modulation:	GFSK
Number of Channels:	16
Channel Separation:	5 MHz
Antenna Type:	Internal Integral Antenna
Antenna Gain:	0 dBi
Maximum Peak Power:	-13.547dBm
Frequency Range:	2404.5 MHz to 2479.5 MHz

1.4 OTHER INFORMATION

Test channels for 2.4GHz Wireless Digital Audio				
Type of Modulation	**Tx/Rx Frequency**	**Test RF Channel Lists**		
		Lowest(L)	**Middle(M)**	**Highest(H)**
GFSK	2404.5 MHz to 2479.5 MHz	Channel 0	Channel 8	Channel 15
		2404.5 MHz	2444.5 MHz	2479.5 MHz

Test channels for BT				
Mode	**Tx/Rx Frequency**	**Test RF Channel Lists**		
		Lowest(L)	**Middle(M)**	**Highest(H)**
GFSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz
π/4DQPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz

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 1 Subpart I
RSS-102 Issue 5

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.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

2. EQUIPMENT LIST

Please refer to the RF test report.

3. MPE EVALUATION

3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
3	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

3.2 MPE COMPLIANCE REQUIREMENT

3.2.1 Limits

3.2.1.1 FCC 47 CFR Part 1 Subpart I

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

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 Times $\|E\|^2$, $\|H\|^2$ 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
1500-100000	/	/	**1**	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density.

3.2.1.2 RSS-102 Issue 5

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.
RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz[6] and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

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 METHOD

FCC 47 CFR Part 1 Subpart I
S = PG/4πR^2= EIRP/4πR^2
S = power density (in appropriate units, e.g., mw/cm2)
P = power input to the antenna (in appropriate units, e.g., mw)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.
R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

3.4 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.*

3.4.1 For BT & 2.4GHz Wireless Digital Audio

For BT function, operating at 2402MHz to 2480 MHz for GFSK, π/4 DQPSK and
For 2.4GHz Wireless Digital Audio function, operating at 2404.5MHz to 2479.5 MHz for GFSK.

3.4.2.1 Antenna Type:

BT: PCB Antenna
2.4GHz Wireless Digital Audio: Internal Integral Antenna

3.4.2.2 Antenna Gain:

BT: -2.0dBi
2.4GHz Wireless Digital Audio: 0dBi

3.4.2.3 Results for FCC 47 CFR Part 1 Subpart I

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)	(dB)	(dBi)	(dBm)	(mW)	(mW/cm^2)	
BT	2402-2480	0	2	-2.0	0	1.0	1	0.000199
2.4GHz Wireless Digital Audio	2404.5-2479.5	-17	2	0	-15	0.03	1	0.000006

3.4.2.4 Results for RSS-102 Issue 5

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
	(MHz)	(dBm)	(dB)	(dBi)	(dBm)	(W)	(W)
BT	2402-2480	0	2	-2.0	0.0	0.001	2.6764
2.4GHz Wireless Digital Audio	2404.5-2479.5	-17	2	0	-15	0.00003	2.6783

3.4.2 Simultaneous Multi-band Transmission MPE Analysis

3.4.4.1 List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	2.4GHz Wireless Digital Audio+ BT	Support

3.4.4.2 Results for transmit simultaneously

FCC 47 CFR Part 1 Subpart I

No.	Configurations	Maximum MPE Value			Limits
		2.4GHz Wireless Digital Audio	BT	Transmit simultaneously	
1	2.4GHz Wireless Digital Audio + BT	0.000006	0.000199	**0.000205**	1

Note:

According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

Transmit simultaneously MPE = Σ of MPE ratios

MPE ratios = Field strengths or power density / MPE limit at the test frequency

RSS-102 Issue 5

No.	Configurations	Maximum MPE Value			Limits
		2.4GHz Wireless Digital Audio	BT	Transmit simultaneously	
1	2.4GHz Wireless Digital Audio+ BT	0.0000112	0.000374	**0.0003852**	1

Note:

According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

Transmit simultaneously MPE = Σ of MPE ratios

MPE ratios = Field strengths or power density / MPE limit at the test frequency

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 ***