

MPE Test Report

Report No.: ULC-ESH-P20120723B-7

FCC ID: 2AQOB-LWFPRO

Product: WI-FI PRO CEILING SPEAKERS

Model: LWFPRO, LWFPRO/IP

Received Date: Dec.09, 2020

Test Date: Dec.10, 2020 to May.07, 2021

Issued Date: May.07, 2021

Applicant: Lithe Audio Ltd.

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Manufacturer: Lithe Audio Ltd.

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Issued By: BUREAU VERITAS ADT (Shanghai) Corporation

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Release Control Record

Issue No.	Description	Date Issued
ULC-ESH-P20120723B-7	Original release	May.07, 2021

1 Certificate of Conformity

Product: WI-FI PRO CEILING SPEAKERS

Brand: --

Test Model: LWFPRO, LWFPRO/IP

Applicant: Lithe Audio Ltd.

Test Date: Dec.10, 2020 to May.07, 2021

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :



, Date:

May.07, 2021

Scott XU
Project Engineer

Approved by :



, Date:

May.07, 2021

2 General Description of EUT

BLE

Product	WI-FI PRO CEILING SPEAKERS
Brand	--
Test Model	LWFPRO
Power Rating	100-240V~, 50/60Hz, 2.0A for adapter; 24.0Vdc for WI-FI CEILING SPEAKERS
Modulation Type	GFSK
Modulation Technology	Bluetooth Low Energy 4.0
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	40
Output Power	5.39dBm
Antenna Type	PCB Antenna
Antenna Connector	--
Antenna Gain	3.5dBi

Note: For more details, please refer to the User's manual of the EUT.

BT

Product	WI-FI PRO CEILING SPEAKERS
Brand	--
Test Model	LWFPRO
Power Rating	100-240V~, 50/60Hz, 2.0A for adapter; 24.0Vdc for WI-FI CEILING SPEAKERS
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation Technology	BT-EDR, FHSS
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	79
Output Power	6.94dBm
Antenna Type	PCB antenna
Antenna Connector	--
Antenna Gain	3.5dBi

Note: For more details, please refer to the User's manual of the EUT.

WIFI 2.4G

Product	WI-FI PRO CEILING SPEAKERS
Brand	--
Test Model	LWFPRO
Power Rating	100-240V~, 50/60Hz, 2.0A for adapter; 24.0Vdc for WI-FI CEILING SPEAKERS
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Operating Frequency	2412~2462MHz
Number of Channel	11b/g/n(HT20):11;11n(HT40):7
Output Power	15.07dBm
Antenna Type	PCB Antenna
Antenna Connector	--
Antenna Gain	Ant1:3.5dBi Ant2:3.5dBi

Note: For more details, please refer to the User's manual of the EUT.

WIFI 5G

Product	WI-FI PRO CEILING SPEAKERS
Brand	--
Test Model	LWFPRO
Power Rating	100-240V~, 50/60Hz, 2.0A for adapter; 24.0Vdc for WI-FI CEILING SPEAKERS
Modulation Type	OFDM
Modulation Technology	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK), 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM), 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) for Wireless Module(LS9AD-AC11DBT-GV) 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) for Wireless Module(444-2250)
Operating Frequency	5150 ~ 5250MHz, 5250 ~ 5350MHz, 5470 ~ 5725MHz, 5745 ~ 5850MHz for Wireless Module(LS9AD-AC11DBT-GV, 444-2250)
Number of Channel	See clause 3.2
Output Power	13.11dBm for Wireless Module(LS9AD-AC11DBT-GV)

	14.34dBm for Wireless Module(444-2250)
Antenna Type	PCB Antenna for Wireless Module(LS9AD-AC11DBT-GV, 444-2250)
Antenna Connector	--
Antenna Gain	Ant1:5.9dBi, Ant2:5.9dBi for Wireless Module(LS9AD-AC11DBT-GV), Ant1:1dBi, Ant2:1dBi, Ant3:1dBi, Ant4:1dBi for Wireless Module(444-2250)

Note: For more details, please refer to the User's manual of the EUT.

3 RF Exposure

3.1 Limits For Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
300-1,500	-	-	F/1500	30
1,500-100,000	-	-	1.0	30

F = Frequency in MHz

3.2 MPE Calculation Formula

Power density (S) is calculated according to the formula:

$$S = PG / (4\pi R^2)$$

Where S = power density in mW/cm²

P = transmit power in mW

G = numeric gain of transmit antenna (numeric gain=Log-1(dB antenna gain/10))

R = distance (cm)

The antenna of this product, under normal use condition, is at least 20cm from the body of the user. So the device is classified as Mobile Device.

3.3 Calculation Result of Maximum Permissible Exposure

Frequency Band (MHz)	Max. Conducted Output power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
BLE					
2402-2480	5.39	3.5	20	0.0015415	1
BT					
2402-2480	6.94	3.5	20	0.0022026	1
WIFI 2.4GHz					
2412-2462	15.07	3.5	20	0.0143202	1
WIFI 5GHz					
5150-5850	13.11dBm for Wireless Module(LS9AD-AC11D BT-GV)	5.9	20	0.009119	1
5150-5850	14.34dBm for Wireless Module(444-2250)	1	20	0.012105	1

Conclusion:

The calculation result of MPE is less than the limit.

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