RF Exposure Report

FCC ID:	2BBQK-HESTON120
Applicant:	Marshall Group AB
Address:	Centralplan 15 111 20 Stockholm Sweden
Manufacturer:	Marshall Group AB
Address:	Centralplan 15 111 20 Stockholm Sweden
Product:	TV SOUNDBAR
Brand(s):	Marshall
Test Model(s):	HESTON 120
Series Model(s):	N/A
Test Date:	May 13, 2024~ Jul. 05, 2024
Issued Date:	Jul. 05, 2024
Issued By:	Hwa-Hsing (Dongguan) Testing Co., Ltd.
Address:	No.101, Building N1, Yuyuan 2 Road, Yuyuan Industrial Park, HuangJiang Town, Dongguan City, People's Republic of China
Test Firm Registration No.:	915896
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.1

The above equipment has been tested by **Hwa-Hsing (Dongguan) Testing Co., Ltd.**, 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 : Wendy Lee

Wendy Lee

Reviewed by : Sye Yang

Sye Yang

Approved by : Scott He

Scott He

HWA-HSING (DONGGUAN) TESTING CO., LTD. LYNS-TCi

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Release control record

Issue No.	Reason for change	Date issued
24041601-SE-US-01	Original Release	Jul.05, 2024

1 General Information

1.1 General Description of EUT

Product(s)	TV SOUNDBAR
Test Model(s)	HESTON 120
Series Model(s)	N/A
Status of EUT	Engineering Prototype
Power Supply Rating	100-240V~ 50/60Hz,240W
Modulation Type	GFSK for DTS(BLE)
Transfer Rate	1Mbps/2 Mbps
Operating Frequency	1M: 2402 ~ 2480MHz 2M: 2404 ~ 2478MHz
Output Power(AVG)	5.39dBm
Antenna Type	PCB Antenna
Antenna Gain	3.33dBi Gain
Antenna Connector	I-PEX
Accessory Device	N/A
Cable Supplied	HDMI cable: Shielded, 150cm AC cable: Unshielded, 200cm

Note:

1. Please refer to the EUT photo document (Reference No.: 24041601-01&02) for detailed product photo.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

2 RF exposure limit

Limits for maximum permissible exposure (MPE)

Limits for general population / uncontrolled exposure				
Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Average time (minutes)
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30
Note: F = Frequency in MHz				

2.1 MPE calculation formula

$$Pd = (Pout*G) / (4*pi*r^2)$$

Where:

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Classification:

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user.

3 Calculation result of maximum conducted power

The antennas provided to the EUT, please refer to the following table:

Function	Frequency Band	Antenna Gain (dBi)	Antenna Type	Transmit and Receive Chain	Maximum AVG Power(dBm)
BLE	2400~2483.5MHz	3.33	PCB	1TX,1RX	5.39

Function	Max power (mW)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm^2)	Limit (mW/cm^2)
BLE	3.46	3.33	20	0.001482	1.0

The EUT had been contain another wiress module(FCC ID:2AJYB-ST1955) .

Wireless Function	Frequency Band(MHz)	Antenna	Maximum Conducted Power(mW)
Bluetooth	2402~2480	1	3.98
BLE	2402~2480	1	4.27
WIFI2.4G	2412~2462	1	87.12
WIFI2.4G	2412~2462	2	99.31
WIFI5G	5180~5825	1	31.65
WIFI5G	5180~5825	2	32.35

Function	Max power (dBm)	Antenna gain (dBi)	Antenna	Distance (cm)	Power density (mW/cm^2)	Limit (mW/cm^2)
Bluetooth	6.00	3.13	1	20	0.001628	1.0
BLE	6.30	3.13	1	20	0.001745	1.0
WIFI2.4G	19.40	3.13	1	20	0.035623	1.0
WIFI2.4G	19.97	2.05	2	20	0.031676	1.0
WIFI5G	15.00	1.94	1	20	0.009834	1.0
WIFI5G	15.10	3.60	2	20	0.014748	1.0

Note: The above wireless function can be transmission simultaneous.

Worst situation is(0.001482/1) + (0.001745 /1) + (0.035623 /1)+ (0.031676/1) + (0.009834/1) + (0.014748/1) + (0.001628/1) = 0.096736, which is less than the limit.

Note: The above wireless function can not be transmission simultaneous.

Conclusion:

Therefore, the worst-case situation is 0.096736 mW/cm^2, which is less than “1”. This confirmed that the device compliance with FCC 1.1310 MPE limit.

Appendix – Information on the Testing Laboratories

We, Hwa-Hsing (Dongguan) Testing Co., Ltd., A global provider of TESTING and CERTIFICATION services for consumer products, electronic products and wireless information technology products. Adhering to the core values “HONEST and TRUSTWORTHY, OBJECTIVE and IMPARTIALITY, RIGOROUS and AFFICIENT”, commitment to provide professional, perfect and efficient comprehensive ONE-STOP solution of TESTING and CERTIFICATION services for Manufacturers, Buyers, Traders, Brands, Retailers. Assist client to better manage risk, protect their brands, reduce costs and cut time to over 150 markets in global. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lab Address: No.101, Building N1, Yuyuan 2 Road, Yuyuan Industrial Park, HuangJiang Town, Dongguan City, People’s Republic of China
Contact Tel: 0769-83078199
Email: Customerservice.dg@hwa-hsing.com
Web Site: www.hwa-hsing.com

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