RF EXPOSURE EVALUATION REPORT

FCC ID	:	**A4RGZRNL**
Equipment	:	**Interactive Media Streaming Device**
Model Name	:	**GZRNL**
Applicant	:	**Google LLC** **1600 Amphitheatre Parkway,** **Mountain View, California, 94043 USA**
Standard	:	**47 CFR Part 2.1091**

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

Cona Huang

Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FA971035-01	Rev. 01	Initial issue of report	Apr. 21, 2020
FA971035-01	Rev. 02	Update BT/BLE tune up	Apr. 27, 2020
FA971035-01	Rev. 03	Update Section 2	May 08, 2020
FA971035-01	Rev. 04	Update Tune-up	May 12, 2020

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Interactive Media Streaming Device
Model Name	GZRNL
FCC ID	A4RGZRNL
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20 / HT40 / VHT20 / VHT40 / VHT80 Bluetooth BR/EDR/LE
HW Version	1
SW Version	9.92.51.11.5
EUT Stage	Identical Prototype

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

Reviewed by: Jason Wang

Report Producer: Daisy Peng

2. Maximum RF average output power among production units

2.4 GHz BLE MAXIMUM OUTPUT POWER (incl. Tune Up tolerance)			
Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BT	7	5.0
2402 - 2480	BLE	7	5.0

2.4 GHz Wifi MAXIMUM OUTPUT POWER (incl. Tune Up tolerance)			
Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	18.0	63.1
2412 - 2462	802.11g	18.0	63.1
2412 - 2462	802.11n HT20	18.0	63.1

5GHz Wifi MAXIMUM OUTPUT POWER (incl. Tune Up tolerance)			
Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5825	802.11a	17.0	63.1
5180 - 5825	802.11n HT20	17.0	63.1
5190 - 5795	802.11n HT40	15.0	31.6
5210 - 5755	802.11ac VHT80	15.0	31.6

3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
2.4GHz WLAN	2412.0	3.02	18.00	21.020	0.126	126.474	0.025	1.000	0.025
5GHz WLAN	5180.0	4.58	17.00	21.580	0.144	143.880	0.029	1.000	0.029
Bluetooth	2402.0	3.02	7.00	10.020	0.010	10.046	0.002	1.000	0.002

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

4.2. Collocated Power Density Calculation

5GHz WLAN Power Density / Limit	Bluetooth Power Density / Limit	∑(Power Density / Limit) of 5GHz WLAN + Bluetooth
0.029	0.002	0.031

Note:

1. 2.4GHz WLAN and Bluetooth cannot transmit simultaneously.
2. ∑(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for 5GHz WLAN + Bluetooth.
3. Considering the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.