



RF EXPOSURE EVALUATION REPORT

FCC ID : 2AOAI-5432
Equipment : Digital Media Receiver
Model Name : L9D29R
Applicant : Reny7 LLC
6701 Democracy Blvd. Suite 300
Bethesda, Maryland, 20817
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

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Approved by: Jones Tsai / Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA830922-01	Rev. 01	Initial issue of report	Jul. 18, 2018

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Digital Media Receiver
Model Name	L9D29R
FCC ID	2AOAI-5432
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2472 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz Zigbee: 2405 MHz ~ 2480 MHz
Mode	802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE Zigbee: BPSK

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: Eric Huang

Report Producer: Wan Liu

2. Maximum RF average output power among production units

<Non-beamforming mode>

Mode		Maximum Average Power (dBm)		
		Ant 0	Ant 1	Ant 0+1
2.4GHz WLAN	802.11b	22.0	22.5	25.0
	802.11g	19.5	20.0	23.0
	802.11n-HT20	18.5	19.0	22.0
5GHz WLAN	802.11a	18.0	18.9	21.0
	802.11n-HT20	17.5	17.5	21.0
	802.11n-HT40	17.5	17.5	20.5
	802.11ac-VHT20	17.5	17.5	21.0
	802.11ac-VHT40	17.5	17.5	20.5
	802.11ac-VHT80	16.5	16.5	19.5
Bluetooth BR/EDR		10.5		
Bluetooth LE		3.0		
Zigbee		18.5		

<Beamforming mode>

Mode		Maximum Average Power (dBm)	
		Ant 0+1	
5GHz WLAN	802.11ac-VHT20	21.0	
	802.11ac-VHT40	20.5	
	802.11ac-VHT80	20.0	



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/f ²)	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/f ²)	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

<Non-beamforming mode>

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
Zigbee	2405.0	7.34	18.50	25.840	0.384	383.707	0.076	1.000	0.076
Bluetooth	2402.0	4.30	10.50	14.800	0.030	30.200	0.006	1.000	0.006
2.4GHz WLAN	2412.0	4.80	25.00	29.800	0.955	954.993	0.190	1.000	0.190
5GHz WLAN	5180.0	4.50	21.00	25.500	0.355	354.813	0.071	1.000	0.071

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

<Beamforming mode>

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
5GHz WLAN	5180.0	7.36	21.00	28.360	0.685	685.488	0.136	1.000	0.136

Note:

1. For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.
2. This device supports Beamforming for WLAN 5GHz VHT20/VHT40/VHT80; therefore, in the table above which consider maximum directional 7.36dBi for WLAN 5GHz Beamforming mode.

4.2. Collocated Power Density Calculation

Maximum Bluetooth Power Density / Limit	Maximum WLAN Power Density / Limit	Σ (Power Density / Limit) of Bluetooth+WLAN
0.006	0.190	0.196

Note:

1. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for Bluetooth+WLAN.
2. Considering all 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.