



# RF EXPOSURE EVALUATION REPORT

**FCC ID** : 2ARGE-6383  
**Equipment** : Digital Media Receiver  
**Model Name** : O2T2V3  
**Applicant** : Flake LLC  
4321 W. College Avenue; Suite 200  
Appleton, Wisconsin 54914  
**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.

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

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Approved by: Cona Huang / Deputy Manager

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### History of this test report

Report No.	Version	Description	Issued Date
FA8O0521-02	Rev. 01	Initial issue of report	Jul. 09, 2019



**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	Digital Media Receiver
Model Name	O2T2V3
FCC ID	2ARGE-6383
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2472 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 Zigbee: 2405 MHz ~ 2480 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20 / HT40 / VHT20 / VHT40 / VHT80 Bluetooth BR/EDR/LE Zigbee: OQPSK

**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:** Wan Liu

## **2. Maximum RF average output power among production units**

### <Non-beamforming mode>

Mode		Maximum Average Power (dBm)
2.4GHz WLAN	802.11b	21.5
	802.11g	21
	802.11n-HT20	21
5GHz WLAN	802.11a	21
	802.11n-HT20	21
	802.11n-HT40	21.5(FCC) 21(IC)
	802.11ac-VHT20	21
	802.11ac-VHT40	21
	802.11ac-VHT80	21
Bluetooth		8.5
Zigbee		16

### <Beamforming mode>

Mode		Maximum Average Power (dBm)
5GHz WLAN	802.11ac-VHT20	17
	802.11ac-VHT40	17
	802.11ac-VHT80	17.5



### 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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 <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
2.4GHz WLAN	2412.0	4.60	21.50	26.100	0.407	407.380	0.081	1.000	0.081
5GHz WLAN	5180.0	6.20	21.50	27.700	0.589	588.844	0.117	1.000	0.117
Bluetooth	2402.0	5.10	8.50	13.600	0.023	22.909	0.005	1.000	0.005
Zigbee	2405.0	4.90	16.00	20.900	0.123	123.027	0.024	1.000	0.024

**Note:** For conservativeness, the lowest uplink 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 <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
5GHz WLAN	5180.0	8.51	17.50	26.010	0.399	399.025	0.079	1.000	0.079

**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 only; therefore, in the table above which consider maximum directional 8.51dBi for WLAN 5GHz Beamforming mode.

### **4.2. Collocated Power Density Calculation**

2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	Bluetooth Power Density / Limit	Zigbee Power Density / Limit	Σ (Power Density / Limit)
0.081	0.117	0.005	0.024	0.227

**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 WLAN+Bluetooth+Zigbee.
2. Considering the all of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 4 collocated transmitters is compliant

## **Conclusion:**

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