



SPORTON International Inc.

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Certificate No.: CB10302093

Maximum Permissible Exposure

Applicant's company	Roku, Inc.
Applicant Address	12980 Saratoga Avenue Suite #D Saratoga California United States 95070
FCC ID	TC2-N1002
Manufacturer's company	1. Dong Guan G-Com Computer Co. Ltd. 2. LITE-ON TECHNOLOGY (Changzhou) CO., LTD
Manufacturer Address	1. 1ST ROW YIN SHAN RD., YIN HWU INDUSTRIAL, GUANGDONG, China 2. A9 Building, No.88 Yanghu Road, Wujin Hi-Tech Industrial Development Zone, Changzhou City, Jiangsu Province 213100 China

Product Name	2 x 2 Wi-Fi Module
Brand Name	Roku
Model Name	WM03, WM04
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
EUT Freq. Range	2400 ~ 2483.5MHz / 5150 ~ 5250MHz / 5725 ~ 5850MHz
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SPORTON INTERNATIONAL INC.

Table of Contents

1. TABLE FOR MULTIPLE LISTING.....	1
2. MAXIMUM PERMISSIBLE EXPOSURE.....	2
2.1. Applicable Standard	2
2.2. MPE Calculation Method	2
2.3. Calculated Result and Limit.....	3

History of This Assessment Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA412906	Rev. 01	Initial issue of report	Mar. 11, 2014

1. TABLE FOR MULTIPLE LISTING

The model names in the following table are all refer to the identical product.

Brand Name	Model Name	Metal Ring	Photo
Roku	WM03	V	
	WM04	X	

Note:

From the above models, model: WM03 was selected as representative model for the test and its data was recorded in this report.

2. MAXIMUM PERMISSIBLE EXPOSURE

2.1. Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2. MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

2.3. Calculated Result and Limit

For 5GHz UNII Band:

Antenna Type : PIFA Antenna

Max Conducted Power for IEEE 802.11n 20MHz (2TX) : 16.33 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.26	2.6669	16.3312	42.9658	0.022807	1	Complies

For 5GHz ISM Band:

Antenna Type : PIFA Antenna

Max Conducted Power for IEEE 802.11n 20MHz (2TX) : 21.34 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.26	2.6669	21.3401	136.1487	0.072271	1	Complies

For 2.4GHz Band:

Antenna Type : PIFA Antenna

Max Conducted Power for IEEE 802.11n 20MHz (2TX) : 23.35 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
3.53	2.2542	23.3459	216.0663	0.096948	1	Complies