

**IEEE C95.1 2005  
KDB 447498 D03  
47 C.F.R. Part 1, Subpart I, Section 1.1310  
47 C.F.R. Part 2, Subpart J, Section 2.1091**

## **RF EXPOSURE REPORT**

**For**

### **Smart Energy Wireless Router**

**Model: Lumani SG600R2**

**Trade Name:** 

*Issued to*

**Lumani Pte Ltd  
71 Ayer Rajah Crescent #02-10/11 Singapore 139951**

*Issued by*

**Compliance Certification Services Inc.  
No.11, Wugong 6th Rd., Wugu Dist.,  
New Taipei City 24891, Taiwan. (R.O.C.)  
Issued Date: December 17, 2018**

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
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## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	December 17, 2018	Initial Issue	ALL	Allison Chen
01	January 31, 2019	Revised "Maximum average output power" to "Maximum tune up power" in section 3.	P.5	Allison Chen

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## 1. TEST RESULT CERTIFICATION

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
IEEE C95.1 2005	
KDB 447498 D03	
47 C.F.R. Part 1, Subpart I, Section 1.1310	No non-compliance noted
47 C.F.R. Part 2, Subpart J, Section 2.1091	

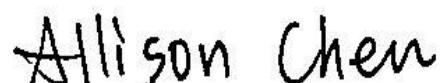
Approved by:



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Sam Chuang  
Manager  
Compliance Certification Services Inc.

Reporter:



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Allison Chen  
Report coordinator  
Compliance Certification Services Inc.

## 2. LIMIT

According to §15.247(i), 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 of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

## 3. EUT SPECIFICATION

<b>EUT</b>	Smart Energy Wireless Router
<b>Model</b>	Lumani SG600R2
<b>Model Discrepancy</b>	N/A
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> IEEE 802.11b/g/n HT20 Mode: 2.412GHz ~ 2.462GHz IEEE 802.11n HT40 Mode: 2.422GHz ~ 2.452GHz <input type="checkbox"/> Zigbee: 2405MHz ~ 2480MHz <input type="checkbox"/> Others
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure ( $S = 5\text{mW/cm}^2$ ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ( $S=1\text{mW/cm}^2$ )
<b>Antenna Specification</b>	<b>For WIFI 2.4GHz</b> Dipole Antenna Antenna 1 Gain : 2.22 dBi (Numeric gain: 1.67)
<b>Maximum tune up power</b>	<b>For WIFI 2.4GHz</b> IEEE 802.11b Mode: 21.00 dBm (125.893 mW) IEEE 802.11g Mode: 18.00 dBm (63.096 mW) IEEE 802.11n HT 20 Mode: 17.50 dBm (56.234 mW) IEEE 802.11n HT 40 Mode: 17.50 dBm (56.234 mW)
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

## 4. TEST RESULTS

**No non-compliance noted.**

### Calculation

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{377}$$

Where  $E$  = Field strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

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

Changing to units of mW and cm, using:

$$P(\text{mW}) = P(\text{W}) / 1000 \text{ and}$$

$$d(\text{cm}) = d(\text{m}) / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

## 5. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using  $d = 20$  cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where  $P = \text{Power in mW}$

$G = \text{Numeric antenna gain}$

$S = \text{Power density in mW / cm}^2$

### IEEE 802.11b Mode:

Ch.	Freq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
6	2437	125.893	1.67	20	0.0418	1.000

### IEEE 802.11g Mode:

Ch.	Freq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
6	2437	63.096	1.67	20	0.0210	1.000

### IEEE 802.11n HT20 Mode:

Ch.	Freq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
6	2437	56.234	1.67	20	0.0187	1.000

### IEEE 802.11n HT40 Mode:

Ch.	Freq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
6	2437	56.234	1.67	20	0.0187	1.000

## 6. SIMULTANEOUS TRANSMISSION SAR ANALYSIS

Both of the WiFi 2.4GHz and Zigbee can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + .....etc. < 1

CPD = Calculation power density

LPD = Limit of power density

### WiFi 2.4GHz + Zigbee

Therefore, the worst-case situation is  $0.0418 / 1 + 0.0026 / 1 = 0.0444$ , which is less than "1".

--End of Report--