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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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

Report No.: T181026D03-MF

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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 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted

Approved by: *Reporter:*
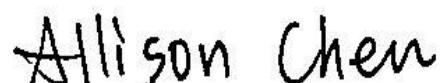
_____   _____
Sam Chuang   Allison Chen
Manager   Report coordinator
Compliance Certification Services Inc.   Compliance Certification Services Inc.

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

EUT	Smart Energy Wireless Router
Model	Lumani SG600R2
Model Discrepancy	N/A
Frequency band (Operating)	☒ IEEE 802.11b/g/n HT20 Mode: 2.412GHz ~ 2.462GHz IEEE 802.11n HT40 Mode: 2.422GHz ~ 2.452GHz ☐ Zigbee: 2405MHz ~ 2480MHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)
Antenna Specification	**For WIFI 2.4GHz** Dipole Antenna Antenna 1 Gain : 2.22 dBi (Numeric gain: 1.67)
Maximum tune up power	**For WIFI 2.4GHz** 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)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

4. TEST RESULTS

No non-compliance noted.

Calculation

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

     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 (mW) = P (W) / 1000 and

     d (cm) = d(m) / 100

Yields

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

     Where   d = Distance in cm

               P = Power in mW

               G = Numeric antenna gain

               S = Power density in mW / cm^2

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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 = Power in mW*

G = Numeric antenna gain

S = Power density in mW / cm^2

IEEE 802.11b Mode:

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

IEEE 802.11g Mode:

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

IEEE 802.11n HT20 Mode:

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

IEEE 802.11n HT40 Mode:

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

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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--