IEEE C95.1 2005
KDB 447498 D01 V06
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

802.11a/b/g/n/ac, 2T2R Wireless LAN USB2.0 Module

Model: WN4517L

Trade Name: LITE-ON

Issued to

Lite-On Technology Corp.
Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C

Issued by

Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: January 11, 2017

Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		January 11, 2017		Initial Issue	ALL	Doris Chu

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1. TEST RESULT CERTIFICATION

We hereby certify that:

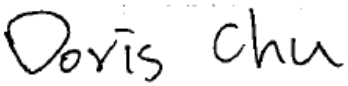
The equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirement of the applicable standards. The test record, data evaluation and Equipment under Test (EUT) configurations represented herein are true and accurate accounts of the measurement of the sample's RF characteristics under the conditions specified 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:

Sam Chuang
Manager
Compliance Certification Services Inc.

Prepared by:



Doris Chu
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

Product	802.11a/b/g/n/ac, 2T2R Wireless LAN USB2.0 Module
Model	WN4517L
Brand name	LITE-ON
Model Discrepancy	N/A
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz ~ 2452MHz 802.11a/n HT20: 5180MHz ~ 5700MHz / 5745MHz ~ 5825MHz 802.11n HT40: 5190MHz ~ 5670MHz / 5755MHz ~ 5795MHz 802.11ac VHT 20: 5180MHz ~ 5700MHz / 5745MHz ~ 5825MHz 802.11ac VHT 40: 5190MHz ~ 5670MHz / 5755MHz ~ 5795MHz 802.11ac VHT 80: 5210MHz / 5775MHz ☐ 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	**2.4G** PIFA Antenna Ant 1: Gain: 2.48dBi Ant 2: Gain: 0.76dBi Ant 3: Gain: 2.30dBi **5G** PIFA Antenna Ant 1: Gain: 2.95dBi Ant 2: Gain: 2.49dBi Ant 3: Gain: 4.36dBi 2.4GHz: Antenna Gain : 2.48 dBi (Numeric gain: 1.77) Worst 5GHz: Antenna Gain : 4.36 dBi (Numeric gain: 2.73) Worst 2.4GHz: Directional gain = 2.48 dBi +10log (2) = 5.49 dBi (Numeric gain: 3.54) 5GHz: Directional gain = 4.36 dBi +10log (2) = 7.37 dBi (Numeric gain: 5.46)
Maximum Average output power	IEEE 802.11b Mode: 16.94 dBm (49.431 mW) IEEE 802.11g Mode: 16.10 dBm (40.738 mW) IEEE 802.11n HT 20 Mode: 17.96 dBm (62.517 mW) IEEE 802.11n HT 40 Mode: 17.83 dBm (60.674 mW) IEEE 802.11a Mode: 14.77 dBm (29.992 mW) IEEE 802.11n HT 20 Mode: 16.91 dBm (49.091 mW) IEEE 802.11n HT 40 Mode: 16.90 dBm (48.978 mW) IEEE 802.11ac VHT 20 MHz: 17.91 dBm (61.802 mW) IEEE 802.11ac VHT 40 MHz: 16.91 dBm (49.091 mW) IEEE 802.11ac VHT 80 MHz: 15.77 dBm (37.757 mW)
Maximum Tune up Power	IEEE 802.11b Mode: 17.50 dBm (56.234 mW) IEEE 802.11g Mode: 16.50 dBm (44.668 mW) IEEE 802.11n HT 20 Mode: 18.50 dBm (70.795 mW) IEEE 802.11n HT 40 Mode: 18.50 dBm (70.795 mW) IEEE 802.11a Mode: 15.50 dBm (35.481 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) IEEE 802.11ac VHT 20 MHz: 18.50 dBm (70.795 mW) IEEE 802.11ac VHT 40 MHz: 17.50 dBm (56.234 mW) IEEE 802.11ac VHT 80 MHz: 16.50 dBm (44.668 mW)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Notes: For 2.4GHz and 5GHz could not be use as transmit/receive at the same time.

4. TEST RESULTS

No non-compliance noted.

Calculation

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

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 (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

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

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

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 / cm²

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
11	2462	56.234	1.77	20	0.0198	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	44.668	1.77	20	0.0157	1

IEEE 802.11n HT 20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	70.795	3.54	20	0.0499	1

IEEE 802.11n HT 40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	70.795	3.54	20	0.0499	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
157	5785	35.481	2.73	20	0.0193	1

IEEE 802.11n HT 20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
56	5280	56.234	5.46	20	0.0611	1

IEEE 802.11n HT 40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
134	5670	56.234	5.46	20	0.0611	1

IEEE 802.11ac VHT 20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
149	5745	70.795	5.46	20	0.0769	1

IEEE 802.11ac VHT 40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
151	5755	56.234	5.46	20	0.0611	1

IEEE 802.11ac VHT 80 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
138	5690	44.668	5.46	20	0.0485	1