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 2Tx2R + BT V4.2 LE USB Combo Module

Model: WCBN4508M

Trade Name: LITE-ON

Issued to

LITE-ON Technology Corp.
Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan

Issued by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
Issued Date: June 13, 2018

Testing Laboratory
1309

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	June 13, 2018	Initial Issue	ALL	Doris Chu

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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.

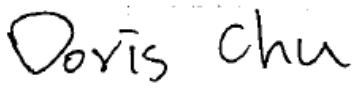
The test results of this report relate only to the tested sample EUT identified in this report.

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:

Sam Chuang
Manager
Compliance Certification Services Inc.

Reporter:



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

EUT	802.11a/b/g/n/ac 2Tx2R + BT V4.2 LE USB Combo Module
Model	WCBN4508M
Trade Name	LITE-ON
Model Discrepancy	N/A
Frequency band (Operating)	☒ Bluetooth 2.1 + EDR / 4.0: 2402MHz ~ 2480MHz 802.11b/g/n 20: 2412MHz ~ 2462MHz 802.11n 40: 2422MHz ~ 2452MHz 802.11a/n 20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5700MHz / 5745MHz ~ 5825MHz 802.11n 40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5670MHz / 5755MHz ~ 5795MHz 802.11ac VHT80: 5210MHz / 5290MHz / 5530MHz / 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)

<table>
<tr><td>Antenna Specification</td><td>
BT
PCB Antenna
Ant 0: Gain: 3 dBi
Ant 1 Gain: 3.3 dBi
2.4G
PCB Antenna
Ant 0: Gain: 3 dBi
Ant 1 Gain: 3.3 dBi
5G
PCB Antenna
Ant 0: Gain: 1.7 dBi
Ant 1 Gain: 2.3 dBi

BT: Antenna Gain : 3.30 dBi (Numeric gain: 2.14) Worst
2.4GHz: Antenna Gain : 3.30 dBi (Numeric gain: 2.14) Worst
5GHz: Antenna Gain : 2.30 dBi (Numeric gain: 1.70) Worst

2.4GHz: Directional Gain : 3.15 dBi (Numeric gain: 2.07) Worst
5GHz: Directional Gain : 2.01 dBi (Numeric gain: 1.59) Worst

Notes:
1. Directional Gain: 10LOG(((10^(Ant0/10)+10^(Ant1/10))/2))
</td></tr>
<tr><td>Max tune up Power</td><td>
<table>
<tr><td>Bluetooth Mode:</td><td>1.00 dBm</td><td>(1.259 mW)</td></tr>
<tr><td>IEEE 802.11b Mode:</td><td>21.00 dBm</td><td>(125.893 mW)</td></tr>
<tr><td>IEEE 802.11g Mode:</td><td>21.50 dBm</td><td>(141.254 mW)</td></tr>
<tr><td>IEEE 802.11n 20 MHz Mode:</td><td>21.00 dBm</td><td>(125.893 mW)</td></tr>
<tr><td>IEEE 802.11n 40 MHz Mode:</td><td>22.50 dBm</td><td>(177.828 mW)</td></tr>
<tr><td>IEEE 802.11a Mode:</td><td>19.50 dBm</td><td>(89.125 mW)</td></tr>
<tr><td>IEEE 802.11n 20 MHz Mode:</td><td>22.50 dBm</td><td>(177.828 mW)</td></tr>
<tr><td>IEEE 802.11n 40 MHz Mode:</td><td>23.00 dBm</td><td>(199.526 mW)</td></tr>
<tr><td>IEEE 802.11ac VHT 80 MHz Mode:</td><td>22.50 dBm</td><td>(177.828 mW)</td></tr>
</table>
</td></tr>
<tr><td>Evaluation applied</td><td>☒ MPE Evaluation*
☐ SAR Evaluation
☐ N/A</td></tr>
</table>

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 / cm²

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

Bluetooth:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
19	2440	1.259	2.14	20	0.0005	1

IEEE 802.11b:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
1	2412	125.893	2.14	20	0.0536	1

IEEE 802.11g:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
6	2437	141.254	2.14	20	0.0602	1

IEEE 802.11n 20:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
6	2437	125.893	2.07	20	0.0519	1

IEEE 802.11n 40:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
6	2437	177.828	2.07	20	0.0733	1

IEEE 802.11a:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
149	5745	89.125	1.70	20	0.0302	1

IEEE 802.11n 20:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
149	5745	177.828	1.59	20	0.0563	1

IEEE 802.11n 40:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
151	5755	199.526	1.59	20	0.0631	1

IEEE 802.11ac VHT80:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
155	5775	177.828	1.59	20	0.0563	1

6. SIMULTANEOUS TRANSMISSION SAR ANALYSIS

Both of the WLAN and BT 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+BT

Therefore, the worst-case situation is 0.0733 / 1 + 0.0005 / 1 = 0.0738, which is less than “1”.