IEEE C95.1
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

802.11ac/b/g/n USB module

Model: WUBM-273ACN

Trade Name: N/A

Issued to

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1309

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	2016/1/12	Initial Issue	ALL	Kelly Cheng

TABLE OF CONTENTS

1. 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.

2. EUT SPECIFICATION

EUT	802.11ac/b/g/n USB module
Model	WUBM-273ACN
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2.412GHz ~ 2.462GHz 802.11n HT40: 2.422GHz ~ 2.452GHz 802.11a: 5150 ~ 5250MHz / 5725 ~ 5850MHz 802.11 HT20: 5150 ~ 5250MHz / 5725 ~ 5850MHz 802.11 HT40: 5150 ~ 5250MHz / 5725 ~ 5850MHz 802.11ac HT80: 5170 ~ 5330 MHz / 5775 MHz ☐ 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	5GHz: SparkLAN / WUBM-273ACN Antenna Gain : 1.68 dBi (Numeric gain: 1.47)
	          LCT / DFE_ACBSMA-BGP Antenna Gain : 5.00 dBi (Numeric gain: 3.16)
	2.4GHz: SparkLAN / WUBM-273ACN Antenna Gain : 0.23 dBi (Numeric gain: 1.05)
	          LCT / DFE_ACBSMA-BGP Antenna Gain : 3.00 dBi (Numeric gain: 2.00)

Maximum Average output power	IEEE 802.11b Mode: 22.10 dBm (162.181 mW) IEEE 802.11g Mode: 14.95 dBm (31.261 mW) IEEE 802.11n HT 20 Mode: 19.21 dBm (83.368 mW) IEEE 802.11n HT 40 Mode: 14.96 dBm (31.333 mW) IEEE 802.11a Mode: 20.62 dBm (115.345 mW) IEEE 802.11n HT20 Mode: 22.10 dBm (162.181 mW) IEEE 802.11n HT40 Mode: 18.77 dBm (75.336 mW) IEEE 802.11ac HT80 Mode: 17.32 dBm (53.951 mW)
Maximum Tune up Power	IEEE 802.11b Mode: 24.00 dBm (251.189 mW) IEEE 802.11g Mode: 16.00 dBm (39.811 mW) IEEE 802.11n HT 20 Mode: 21.00 dBm (125.893 mW) IEEE 802.11n HT 40 Mode: 16.50 dBm (44.668 mW) IEEE 802.11a Mode: 21.50 dBm (141.254 mW) IEEE 802.11n HT20 Mode: 23.00 dBm (199.526 mW) IEEE 802.11n HT40 Mode: 20.00 dBm (100.000 mW) IEEE 802.11ac HT80 Mode: 19.00 dBm (79.433 mW)

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Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

3. 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

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

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

4. 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)
6	2437	251.189	2	20	0.1000	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	39.811	2	20	0.0158	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
1	2412	125.893	2	20	0.0501	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	44.668	2	20	0.0178	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
165	5825	141.254	3.16	20	0.0888	1

IEEE 802.11a HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
165	5825	199.526	3.16	20	0.1255	1

IEEE 802.11a HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
46	5230	100	3.16	20	0.0629	1

IEEE 802.11ac HT80 Mode

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
155	5775	79.433	3.16	20	0.0500	1

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