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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

802.11 b/g/n High Performance Embedded WiFi Module

Model: CJM210EC

Data Applies To: CJM210ECI

Issued for

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0240

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	10/14/2015	Initial Issue	All Page	Vera Hsu

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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

Product Name	802.11 b/g/n High Performance Embedded WiFi Module
Model Number	CJM210EC
Data Applies To	CJM210ECI
Identify Number	T150918S02
Received Date	September 18, 2015
Frequency band (Operating)	☒ 802.11b/g/gn HT20: 2412MHz ~ 2462MHz 802.11gn HT40: 2422MHz ~ 2452MHz ☐ 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	Ant. 1 (Chip Antenna) Antenna Gain：0.00 dBi (Numeric gain: 1.00) Ant. 2 (Dipole Antenna Antenna Gain：5.00 dBi (Numeric gain: 3.16)
Maximum Peak output power	For Ant. 1 (Chip Antenna) IEEE 802.11b Mode: 15.05 dBm (31.989 mW) IEEE 802.11g Mode: 24.27 dBm (267.301 mW) IEEE 802.11gn HT 20 Mode 23.91 dBm (246.037 mW) IEEE 802.11gn HT 40 Mode 20.65 dBm (116.145 mW) For Ant. 2 (Dipole Antenna) IEEE 802.11b Mode: 12.92 dBm (19.588 mW) IEEE 802.11g Mode: 24.56 dBm (285.759 mW) IEEE 802.11gn HT 20 Mode 24.87 dBm (306.902 mW) IEEE 802.11gn HT 40 Mode 23.41 dBm (219.280 mW)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

The difference of the series models:

Model Number	Radio	Antenna Option	
		Dipole	Chip
CJM210EC	802.11 b/g/n 1T1R	1 MMCX port	No Connector
CJM210ECI	802.11 b/g/n 1T1R	1 IPEX port	No Connector

3. 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 watts / meter

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

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

For Ant. 1 (Chip Antenna)

IEEE 802.11b mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2412	31.989	1	20	0.0064	1

IEEE 802.11g mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2437	267.301	1	20	0.0532	1

IEEE 802.11gn HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2437	246.037	1	20	0.0490	1

IEEE 802.11gn HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2437	116.145	1	20	0.0231	1

For Ant. 2 (Dipole Antenna)

IEEE 802.11b mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2462	19.588	3.16	20	0.0123	1

IEEE 802.11g mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2437	285.759	3.16	20	0.1797	1

IEEE 802.11gn HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2437	306.902	3.16	20	0.1930	1

IEEE 802.11gn HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
2437	219.28	3.16	20	0.1379	1