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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

IoT Wireless I/O Module

Model: WISE-4050 ; WISE-4060 ; WISE-4012E ;

WISE-40XXXXXXXXXXXXXXXXXX

(where "X" may be any alphanumeric character , "-" or blank)

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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	IoT Wireless I/O Module
Model Number	WISE-4050 ; WISE-4060 ; WISE-4012E ; WISE-40XXXXXXXXXXXXXXXXXX (where "X" may be any alphanumeric character , "-" or blank)
Identify Number	T150120L05
Received Date	January 20, 2015
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2.412GHz ~ 2.462GHz ☐ 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	Antenna Gain : 3.26 dBi (Numeric gain: 2.12)
Maximum Average output power	IEEE 802.11b Mode: 15.00 dBm (31.623 mW) IEEE 802.11g Mode: 16.45 dBm (44.157 mW) IEEE 802.11n HT 20 Mode: 16.39 dBm (43.551 mW)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

3. Test Results

No non-compliance noted.

Calculation

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

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:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

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

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

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:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
2437	31.623	2.12	20	0.0133	1

IEEE 802.11g mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
2437	44.157	2.12	20	0.0186	1

IEEE 802.11n HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
2437	43.551	2.12	20	0.0184	1