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**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**

**IoT Gateway**

**Model: S1**

**Trade Name:** **SIMPNIC**

*Issued to*

**CONNECTION TECHNOLOGY SYSTEMS INC.**  
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*Issued by*

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
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## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 19, 2018	Initial Issue	ALL	Allison Chen



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## 1. EUT SPECIFICATION

<b>EUT</b>	IoT Gateway
<b>Model</b>	S1
<b>Model Discrepancy</b>	N/A
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> IEEE 802.11b/g/n HT20 Mode: 2.412GHz ~ 2.462GHz IEEE 802.11n HT40 Mode: 2.422GHz ~ 2.452GHz <input checked="" type="checkbox"/> 908.4 ~ 916MHz <input type="checkbox"/> Others
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna Specification</b>	For WIFI 2.4GHz Antenna 1 Gain : 3.24 dBi (Numeric gain: 2.11) Antenna 2 Gain : 3.46 dBi (Numeric gain: 2.22)  Power Directional Gain : 3.35 dBi (Numeric gain: 2.16)  For Z-Wave Antenna Gain : 0.36 dBi (Numeric gain: 1.09)
<b>Maximum Average output power</b>	For WIFI 2.4GHz IEEE 802.11b Mode: 22.00 dBm (158.489 mW) IEEE 802.11g Mode: 21.50 dBm (141.254 mW) IEEE 802.11n HT 20 Mode: 21.50 dBm (141.254 mW) IEEE 802.11n HT 40 Mode: 21.00 dBm (125.893 mW)  For Z-Wave Z-Wave 3.00 dBm (1.995 mW)
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A



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## 2. 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:

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

$$d (cm) = d(m) / 100$$

Yields

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

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

### 3. 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 / cm<sup>2</sup>

#### Z-Wave:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
916	1.995	1.09	20	0.0004	1

#### IEEE 802.11b Mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
11	2462	158.489	2.22	20	0.0700	1.000

#### IEEE 802.11g Mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
6	2437	141.254	2.22	20	0.0624	1.000

#### IEEE 802.11n HT20 Mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
1	2412	141.254	2.16	20	0.0607	1.000

#### IEEE 802.11n HT40 Mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm <sup>2</sup> )
6	2437	125.893	2.16	20	0.0541	1.000