APPENDIX I
RADIO FREQUENCY EXPOSURE

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.

EUT Specification

EUT	Smart Surge Protector		
Model	PX31BW		
RF Module	Ralink	Model:	WM101A
Model Discrepancy	N/A		
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2.412GHz ~ 2.462GHz 　 802.11n HT40: 2.422GHz ~ 2.452GHz ☐ Others		
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others		
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)		
Antenna Specification	2.4GHz:　Antenna Gain :　2.52 dBi　(Numeric gain 1.79)		
Maximum Average output power	IEEE 802.11b Mode:　　　19.70 dBm　(93.325 mW) IEEE 802.11g Mode:　　　15.35 dBm　(34.277 mW) IEEE 802.11n HT 20 Mode:　15.22 dBm　(33.266 mW) IEEE 802.11n HT 40 Mode:　15.55 dBm　(35.892 mW)		
Maximum Tune up Power	IEEE 802.11b Mode:　　　21.00 dBm　(125.893 mW) IEEE 802.11g Mode:　　　17.00 dBm　(50.119 mW) IEEE 802.11n HT 20 Mode:　17.00 dBm　(50.119 mW) IEEE 802.11n HT 40 Mode:　17.00 dBm　(50.119 mW)		
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A		

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	2014/04/28	Initial Issue	ALL	Scott Hsu

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Rev.00

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TEST RESULTS

No non-compliance noted.

Calculation

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

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

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

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

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^2*

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
1	2412	125.893	1.79	20	0.0448	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
1	2412	50.119	1.79	20	0.0179	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
1	2412	50.119	1.79	20	0.0179	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
1	2412	50.119	1.79	20	0.0179	1