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 Power Meter		
Model	SPM120		
Brand	ST&T		
RF Module	Ralink	**Model:**	RT5350F
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/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)		
Antenna Specification	Antenna Gain (2.4GHz)	3.35 dBi	(Numeric gain: 2.16)
Maximum Average output power	IEEE 802.11b Mode :	12.25 dBm	(16.788 mW)
	IEEE 802.11g Mode :	12.91 dBm	(19.543 mW)
	IEEE 802.11n HT20 Mode :	12.26 dBm	(16.827 mW)
	IEEE 802.11n HT40 Mode :	9.74 dBm	(9.419 mW)
Maximum Tune up Power	IEEE 802.11b Mode :	14.00 dBm	(0.025 W)
	IEEE 802.11g Mode :	14.00 dBm	(0.025 W)
	IEEE 802.11n HT20 Mode :	14.00 dBm	(0.025 W)
	IEEE 802.11n HT40 Mode :	11.00 dBm	(0.013 W)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A		

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	August 14, 2014	Initial Issue	ALL	Eva Lin

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 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

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)	Result
High	2462	25.119	2.16	20	0.0108	1	Pass

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)	Result
Low	2412	25.119	2.16	20	0.0108	1	Pass

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)	Result
Low	2412	25.119	2.16	20	0.0108	1	Pass

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)	Result
Mid	2437	12.589	2.16	20	0.0054	1	Pass