IEEE C95.1
KDB 447498 D03
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

SmartPLUG

Model: SPM185

Trade Name: apower

Issued to

ST&T Electric Corp.

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Issued By

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	December 02, 2016	Initial Issue	ALL	Sunny Chang

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1. TEST RESULT CERTIFICATION

We hereby certify that:

The equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirement of the applicable standards. The test record, data evaluation and Equipment under Test (EUT) configurations represented herein are true and accurate accounts of the measurement of the sample's RF characteristics under the conditions specified in this report.
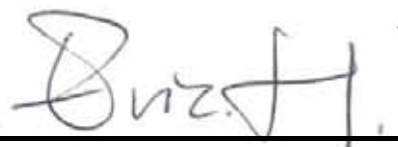
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
IEEE C95.1 2005 KDB 447498 D03 47 C.F.R. Part 1, Subpart I, Section 1.1310 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted

Approved by: *Reviewed by:*

Jeter Wu   **Eric Huang**
Assistant Manager   Assistant Section Manager

2. 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.

3. EUT SPECIFICATION

EUT	SmartPLUG
Model	SPM185
Trade Name	apower
Model Discrepancy	N/A
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz ~ 2452MHz ☐ 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	Antenna (1TX1RX) Manufacturer: Master Wave Technology Co., Ltd. Type: PCB Mode: 98P63MIPF001 Gain 2.96 dBi 2.4GHz Antenna Gain: 2.960 dBi (Numeric gain: 1.98) worst
Maximum Average output power	IEEE 802.11b Mode : 16.350 dBm (43.152 mW) IEEE 802.11g Mode : 18.310 dBm (67.764 mW) IEEE 802.11n HT20 Mode : 17.500 dBm (56.234 mW) IEEE 802.11n HT40 Mode : 15.200 dBm (33.113 mW)
Maximum Tune up Power	IEEE 802.11b Mode : 16.350 dBm (43.152 mW) IEEE 802.11g Mode : 18.310 dBm (67.764 mW) IEEE 802.11n HT20 Mode : 17.500 dBm (56.234 mW) IEEE 802.11n HT40 Mode : 15.200 dBm (33.113 mW)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz ~ 2452MHz ☐ Others

Notes: For 2.4GHz and 5GHz could not be use as transmit/receive at the same time.

4. TEST RESULTS

No non-compliance noted.

Calculation

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

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

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

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

5. 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	2402	43.152	1.98	20	0.0170	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
High	2437	67.764	1.98	20	0.0267	1	Pass

IEEE 802.11n HT 20 Mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)	Result
High	2412	56.234	1.98	20	0.0221	1	Pass

IEEE 802.11n HT 40 Mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)	Result
High	2422	33.113	1.98	20	0.0130	1	Pass

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