

**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**

**802.11bgn WLAN module**

**Model: AP-WM2017AA**

**Trade Name: APPRO**

*Issued to*

**APPRO Technology Inc.**  
13F, No. 66, Zhongzheng Rd., Xinzhuang Dist., New Taipei City, Taiwan.

*Issued by*

**Compliance Certification Services Inc.**  
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New Taipei City 24891, Taiwan. (R.O.C.)  
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Issued Date: November 21, 2017



Testing Laboratory  
1309

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## Revision History

| Rev. | Issue Date        | Revisions                 | Effect Page | Revised By   |
|------|-------------------|---------------------------|-------------|--------------|
| 00   | November 21, 2017 | Initial Issue             | ALL         | Allison Chen |
| 01   | December 1, 2017  | Modify Max tune up power. | P.5, P.7    | Allison Chen |

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## 1. TEST RESULT CERTIFICATION

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

| APPLICABLE STANDARDS  |                         |
|---|-------------------------|
| STANDARD  | TEST RESULT             |
| IEEE C95.1 2005<br>KDB 447498 D03<br>47 C.F.R. Part 1, Subpart I, Section 1.1310<br>47 C.F.R. Part 2, Subpart J, Section 2.1091 | No non-compliance noted |


Approved by:



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Sam Chuang  
Manager  
Compliance Certification Services Inc.

Tested by:



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Allison Chen  
Report coordinator  
Compliance Certification Services Inc.

## 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

| <b>EUT</b>                        | 802.11bgn WLAN module   |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
|-----------------------------------|---|------------|--|--|-------------------|---------|------------|-------------------|---------|------------|-------------------|---------|------------|-------------------|---------|------------|
| <b>Model</b>                      | AP-WM2017AA   |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| <b>Trade Name</b>                 | APPRO   |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| <b>Frequency band (Operating)</b> | <input checked="" type="checkbox"/> 802.11b/g/n HT20: 2412MHz ~ 2462MHz<br><input checked="" type="checkbox"/> 802.11n HT40: 2422MHz ~ 2452MHz<br><input type="checkbox"/> 802.11a/n HT20: 5180MHz ~ 5700MHz / 5745MHz ~ 5825MHz<br><input type="checkbox"/> 802.11n HT40: 5190MHz ~ 5670MHz / 5755MHz ~ 5795MHz<br><input type="checkbox"/> Others   |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| <b>Device category</b>            | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others  |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| <b>Exposure classification</b>    | <input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> )<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )   |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| <b>Antenna Specification</b>      | WIFI 2.4G                                      1.04 dBi (Numeric gain: 1.27)<br><br>Type: FPC Antenna   |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| <b>Max tune up Power</b>          | <table border="1"> <thead> <tr> <th>WIFI</th><th></th><th></th></tr> </thead> <tbody> <tr> <td>IEEE 802.11b mode</td><td>18.0dBm</td><td>(63.096mW)</td></tr> <tr> <td>IEEE 802.11g mode</td><td>15.0dBm</td><td>(31.623mW)</td></tr> <tr> <td>802.11n HT20 mode</td><td>15.0dBm</td><td>(31.623mW)</td></tr> <tr> <td>802.11n HT40 mode</td><td>16.0dBm</td><td>(39.811mW)</td></tr> </tbody> </table> | WIFI       |  |  | IEEE 802.11b mode | 18.0dBm | (63.096mW) | IEEE 802.11g mode | 15.0dBm | (31.623mW) | 802.11n HT20 mode | 15.0dBm | (31.623mW) | 802.11n HT40 mode | 16.0dBm | (39.811mW) |
| WIFI                              |   |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| IEEE 802.11b mode                 | 18.0dBm   | (63.096mW) |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| IEEE 802.11g mode                 | 15.0dBm   | (31.623mW) |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| 802.11n HT20 mode                 | 15.0dBm   | (31.623mW) |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| 802.11n HT40 mode                 | 16.0dBm   | (39.811mW) |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |
| <b>Evaluation applied</b>         | <input checked="" type="checkbox"/> MPE Evaluation*<br><input type="checkbox"/> SAR Evaluation<br><input type="checkbox"/> N/A  |            |  |  |                   |         |            |                   |         |            |                   |         |            |                   |         |            |

## 4. 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:

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

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

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 / cm<sup>2</sup>

## 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<sup>2</sup>

### 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> ) |
|-----|-----------|--------|-------------|--------|---------------------------------------|-----------------------------|
| 6   | 2437      | 63.096 | 1.27        | 20     | 0.0159                                | 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      | 31.623 | 1.27        | 20     | 0.0080                                | 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> ) |
|-----|-----------|--------|-------------|--------|---------------------------------------|-----------------------------|
| 6   | 2437      | 31.623 | 1.27        | 20     | 0.0080                                | 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      | 39.811 | 1.27        | 20     | 0.0101                                | 1.000                       |