



# **A Test Lab Techno Corp.**

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## **MPE Report**

|                       |                                                                                          |
|-----------------------|------------------------------------------------------------------------------------------|
| Test Report No.       | : 1605FS15-01                                                                            |
| Applicant             | : EDIMAX TECHNOLOGY CO., LTD.                                                            |
| Product Type          | : AC900 Outdoor AP                                                                       |
| Trade Name            | : EDIMAX                                                                                 |
| Model Number          | : EW-7429HOA, GAP-429HOA, OAP900                                                         |
| Date of Received      | : Feb.22, 2016                                                                           |
| Test Period           | : Feb.26, 2016                                                                           |
| Date of Issued        | : Jul. 15, 2016                                                                          |
| Test Specification    | : ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013<br>47 CFR § 2.1091<br>47 CFR § 1.1310 |
| Location of Test Lab. | : Chang-an Lab.                                                                          |

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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Approved By : Bill Hu  
(Bill Hu)

Tested By : Mark Duan  
(Mark Duan)



# Contents

|    |                                                |   |
|----|------------------------------------------------|---|
| 1. | Description of Equipment under Test (EUT)..... | 3 |
| 2. | Human Exposure Assessment.....                 | 4 |
| 3. | RF Output Power .....                          | 5 |
| 4. | Test Result .....                              | 6 |



## 1. Description of Equipment under Test (EUT)

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |             |                 |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|-----------------|
| Applicant           | EDIMAX TECHNOLOGY CO., LTD.<br>No.3, Wu-Chuan 3rd Road, Wu-Gu, New Taipei City 24891, Taiwan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |             |                 |
| Manufacturer        | EDIMAX TECHNOLOGY CO., LTD.<br>No.3, Wu-Chuan 3rd Road, Wu-Gu, New Taipei City 24891, Taiwan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |             |                 |
| Product Type        | AC900 Outdoor AP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |             |                 |
| Trade Name          | EDIMAX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |             |                 |
| Model Number        | EW-7429HOA, GAP-429HOA, OAP900<br>(*Those model numbers differ from each other in selling region.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |             |                 |
| FCC ID              | NDD9574291601                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |             |                 |
| Frequency Range     | IEEE 802.11a U-NII Band I : 5180 - 5240 MHz<br>IEEE 802.11a U-NII Band III : 5745 - 5825 MHz<br>IEEE 802.11n 5GHz 20MHz U-NII Band I : 5180 - 5240 MHz<br>IEEE 802.11ac 20MHz U-NII Band I : 5180 - 5240 MHz<br>IEEE 802.11n 5GHz 20MHz U-NII Band III : 5745 - 5825 MHz<br>IEEE 802.11ac 20MHz U-NII Band III : 5745 - 5825 MHz<br>IEEE 802.11n 5GHz 40MHz U-NII Band I : 5190 - 5230 MHz<br>IEEE 802.11ac 40MHz U-NII Band I : 5190 - 5230 MHz<br>IEEE 802.11n 5GHz 40MHz U-NII Band III : 5755 - 5795 MHz<br>IEEE 802.11ac 40MHz U-NII Band III : 5755 - 5795 MHz<br>IEEE 802.11ac 80MHz U-NII Band I : 5210 MHz<br>IEEE 802.11ac 80MHz U-NII Band III : 5755 MHz |                |             |                 |
| Transmit Power      | IEEE 802.11a U-NII Band I : 0.004 W 5.49 dBm<br>IEEE 802.11a U-NII Band III : 0.083 W 19.18 dBm<br>IEEE 802.11n 5GHz 20MHz U-NII Band I : 0.002 W 3.97 dBm<br>IEEE 802.11n 5GHz 20MHz U-NII Band III : 0.042 W 16.25 dBm<br>IEEE 802.11n 5GHz 40MHz U-NII Band I : 0.002 W 3.96 dBm<br>IEEE 802.11n 5GHz 40MHz U-NII Band III : 0.044 W 16.46 dBm<br>IEEE 802.11ac 80MHz U-NII Band I : 0.002 W 3.52 dBm<br>IEEE 802.11ac 80MHz U-NII Band III : 0.054 W 17.32 dBm                                                                                                                                                                                                   |                |             |                 |
| Antenna information | Antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Model          | Type        | Max. Gain (dBi) |
|                     | Internal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | C059-690332-A  | PCB Antenna | 13.9            |
|                     | External                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | C059-690332-FO | PCB Antenna | 12.9            |
| Antenna Delivery    | IEEE 802.11a U-NII Band: 1*T <sub>x</sub> + 1*R <sub>x</sub> (ANT-0)<br>IEEE 802.11ac 20MHz/40MHz/80MHz U-NII Band: 2*T <sub>x</sub> + 2*R <sub>x</sub> (MIMO)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |             |                 |
| Temperature Range   | -30 ~ +60°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |             |                 |
| RF Evaluation       | 0.549 mW/cm <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |             |                 |

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties



## 2. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled "Radiofrequency radiation exposure limits", generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as "a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. " This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: "IMPORTANT: To meet the FCC's RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna". Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a "mobile device" as defined in section § 2.1091 paragraph (b).

Exposure evaluation

$$S = \frac{PG}{4\pi R^2}$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna.



### 3. RF Output Power

| Band                   | Data Rate | CH  | Frequency (MHz) | Average Conducted power (dBm) |       |         |
|------------------------|-----------|-----|-----------------|-------------------------------|-------|---------|
|                        |           |     |                 | ANT-0                         | ANT-1 | ANT-0+1 |
| IEEE 802.11a           | 6M        | 36  | 5180.0          | 5.49                          | ---   | ---     |
|                        |           | 40  | 5200.0          | 5.48                          | ---   | ---     |
|                        |           | 44  | 5220.0          | 5.17                          | ---   | ---     |
|                        |           | 48  | 5240.0          | 5.09                          | ---   | ---     |
|                        |           | 149 | 5745.0          | 16.39                         | ---   | ---     |
|                        |           | 153 | 5765.0          | 19.18                         | ---   | ---     |
|                        |           | 157 | 5785.0          | 19.17                         | ---   | ---     |
|                        |           | 161 | 5805.0          | 18.95                         | ---   | ---     |
|                        |           | 165 | 5825.0          | 16.88                         | ---   | ---     |
|                        | 54M       | 36  | 5180.0          | 5.44                          | ---   | ---     |
|                        |           | 40  | 5200.0          | 5.43                          | ---   | ---     |
|                        |           | 44  | 5220.0          | 5.12                          | ---   | ---     |
|                        |           | 48  | 5240.0          | 5.03                          | ---   | ---     |
|                        |           | 149 | 5745.0          | 16.33                         | ---   | ---     |
|                        |           | 153 | 5765.0          | 19.14                         | ---   | ---     |
|                        |           | 157 | 5785.0          | 19.15                         | ---   | ---     |
|                        |           | 161 | 5805.0          | 18.89                         | ---   | ---     |
| IEEE 802.11ac<br>20MHz | 13M       | 36  | 5180.0          | 0.47                          | 0.92  | 3.71    |
|                        |           | 40  | 5200.0          | 0.57                          | 1.13  | 3.87    |
|                        |           | 44  | 5220.0          | 0.57                          | 1.25  | 3.93    |
|                        |           | 48  | 5240.0          | 0.47                          | 1.40  | 3.97    |
|                        |           | 149 | 5745.0          | 12.56                         | 13.35 | 15.98   |
|                        |           | 153 | 5765.0          | 12.65                         | 13.48 | 16.10   |
|                        |           | 157 | 5785.0          | 12.37                         | 13.21 | 15.82   |
|                        |           | 161 | 5805.0          | 12.26                         | 12.93 | 15.62   |
|                        |           | 165 | 5825.0          | 12.64                         | 13.76 | 16.25   |
|                        | 156M      | 36  | 5180.0          | 0.43                          | 0.86  | 3.66    |
|                        |           | 40  | 5200.0          | 0.52                          | 1.08  | 3.82    |
|                        |           | 44  | 5220.0          | 0.52                          | 1.20  | 3.88    |
|                        |           | 48  | 5240.0          | 0.42                          | 1.37  | 3.93    |
|                        |           | 149 | 5745.0          | 12.52                         | 13.32 | 15.95   |
|                        |           | 153 | 5765.0          | 12.63                         | 13.44 | 16.06   |
|                        |           | 157 | 5785.0          | 12.31                         | 13.19 | 15.78   |
|                        |           | 161 | 5805.0          | 12.21                         | 12.88 | 15.57   |
| IEEE 802.11ac<br>40MHz | 27M       | 38  | 5190.0          | 0.57                          | 1.17  | 3.89    |
|                        |           | 46  | 5230.0          | 0.59                          | 1.28  | 3.96    |
|                        |           | 151 | 5755.0          | 13.26                         | 13.63 | 16.46   |
|                        |           | 159 | 5795.0          | 13.18                         | 13.64 | 16.43   |
|                        | 360M      | 38  | 5190.0          | 0.53                          | 1.12  | 3.85    |
|                        |           | 46  | 5230.0          | 0.56                          | 1.26  | 3.93    |
|                        |           | 151 | 5755.0          | 13.21                         | 13.62 | 16.43   |
|                        |           | 159 | 5795.0          | 13.15                         | 13.60 | 16.39   |
| IEEE 802.11ac<br>80MHz | 58.6M     | 42  | 5210.0          | 0.11                          | 0.88  | 3.52    |
|                        |           | 155 | 5775.0          | 13.37                         | 15.09 | 17.32   |
|                        | 780M      | 42  | 5210.0          | 0.06                          | 0.86  | 3.49    |
|                        |           | 155 | 5775.0          | 13.34                         | 15.06 | 17.29   |

#### 4. Test Result

| Band                       | Data Rate | Frequency (MHz) | Limit (mw/cm <sup>2</sup> ) | Distance (cm) [R] | Max Tune-up power (dBm) [P] | Directional Gain (dBi) | Numeric Directional Gain [G] | Duty Cycle | [P] x [G] With Duty Cycle (mW) [TP] | Power Density [S] (mw/cm <sup>2</sup> ) |
|----------------------------|-----------|-----------------|-----------------------------|-------------------|-----------------------------|------------------------|------------------------------|------------|-------------------------------------|-----------------------------------------|
| IEEE 802.11a               | 6M        | 5180            | 1.000                       | 20                | 5.60                        | 13.90                  | 24.55                        | 1          | 89.140                              | 0.018                                   |
|                            |           | 5200            | 1.000                       | 20                | 5.60                        | 13.90                  | 24.55                        | 1          | 89.140                              | 0.018                                   |
|                            |           | 5220            | 1.000                       | 20                | 5.30                        | 13.90                  | 24.55                        | 1          | 83.190                              | 0.017                                   |
|                            |           | 5240            | 1.000                       | 20                | 5.20                        | 13.90                  | 24.55                        | 1          | 81.290                              | 0.016                                   |
|                            |           | 5745            | 1.000                       | 20                | 16.50                       | 13.90                  | 24.55                        | 1          | 1096.610                            | 0.218                                   |
|                            |           | 5765            | 1.000                       | 20                | 19.30                       | 13.90                  | 24.55                        | 1          | 2089.540                            | 0.416                                   |
|                            |           | 5785            | 1.000                       | 20                | 19.30                       | 13.90                  | 24.55                        | 1          | 2089.540                            | 0.416                                   |
|                            |           | 5805            | 1.000                       | 20                | 19.10                       | 13.90                  | 24.55                        | 1          | 1995.500                            | 0.397                                   |
|                            |           | 5825            | 1.000                       | 20                | 17.00                       | 13.90                  | 24.55                        | 1          | 1230.410                            | 0.245                                   |
| IEEE 802.11ac 20MHz (MIMO) | 13M       | 5180            | 1.000                       | 20                | 3.90                        | 16.91                  | 49.09                        | 1          | 120.500                             | 0.024                                   |
|                            |           | 5200            | 1.000                       | 20                | 4.00                        | 16.91                  | 49.09                        | 1          | 123.310                             | 0.025                                   |
|                            |           | 5220            | 1.000                       | 20                | 4.10                        | 16.91                  | 49.09                        | 1          | 126.180                             | 0.025                                   |
|                            |           | 5240            | 1.000                       | 20                | 4.10                        | 16.91                  | 49.09                        | 1          | 126.180                             | 0.025                                   |
|                            |           | 5745            | 1.000                       | 20                | 16.10                       | 16.91                  | 49.09                        | 1          | 1999.830                            | 0.398                                   |
|                            |           | 5765            | 1.000                       | 20                | 16.20                       | 16.91                  | 49.09                        | 1          | 2046.410                            | 0.407                                   |
|                            |           | 5785            | 1.000                       | 20                | 16.00                       | 16.91                  | 49.09                        | 1          | 1954.310                            | 0.389                                   |
|                            |           | 5805            | 1.000                       | 20                | 15.80                       | 16.91                  | 49.09                        | 1          | 1866.350                            | 0.371                                   |
|                            |           | 5825            | 1.000                       | 20                | 16.40                       | 16.91                  | 49.09                        | 1          | 2142.860                            | 0.426                                   |
| IEEE 802.11ac 40MHz (MIMO) | 27M       | 5190            | 1.000                       | 20                | 4.00                        | 16.91                  | 49.09                        | 1          | 123.310                             | 0.025                                   |
|                            |           | 5230            | 1.000                       | 20                | 4.10                        | 16.91                  | 49.09                        | 1          | 126.180                             | 0.025                                   |
|                            |           | 5755            | 1.000                       | 20                | 16.60                       | 16.91                  | 49.09                        | 1          | 2243.850                            | 0.446                                   |
|                            |           | 5795            | 1.000                       | 20                | 16.60                       | 16.91                  | 49.09                        | 1          | 2243.850                            | 0.446                                   |
| IEEE 802.11ac 80MHz (MIMO) | 58.6M     | 5210.0          | 1.000                       | 20                | 3.70                        | 16.91                  | 49.09                        | 1          | 115.080                             | 0.023                                   |
|                            |           | 5775.0          | 1.000                       | 20                | 17.50                       | 16.91                  | 49.09                        | 1          | 2760.530                            | 0.549                                   |

**Note:**

1. The Numeric Directional Gain calculated by  $10^{(\text{Directional Gain(dBi)} / 10)}$ .
2. Each band max power which perform MPE of any configurations.
3. Internal antenna of the antenna gain is 13.9dBi, the antenna of the external antenna gain 12.9dBi, so that the maximum antenna gain is 13.9dBi.
4. The device operating 802.11a mode is only with transmit signals to 1TX.  
Directional Gain = Antenna Gain
5. The device operating 802.11n & 802.11ac mode is MIMO with transmit signals to 2TX.  
Directional Gain =  $10 \cdot \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$