



RADIO EXPOSURE TEST REPORT

FCC ID : HEDOAP101

Equipment : Outdoor Access Point

Brand Name : Edgecore

Model Name : OAP101XYYYY, OAP101eXYYYY
(Please refer to section 1.3 for detail information.)

Applicant : Accton Technology Corporation
No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.

Manufacturer : Accton Technology Corporation
No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.

Standard : 47 CFR Part 2.1091

The product was received on Jun. 26, 2023, and testing was started from Jul. 10, 2023 and completed on Sep. 06, 2023. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



Table of Contents

History of this test report.....3
Summary of Test Result.....4
1 General Description5
1.1 EUT General Information5
1.2 Antenna Information6
1.3 Table for Multiple Listing8
1.4 Accessories9
1.5 Applicable Standards9
1.6 Testing Location9
2 Maximum Permissible Exposure10
2.1 Limit of Maximum Permissible Exposure10
2.2 MPE Calculation Method10
2.3 MPE Exemption11
2.4 Calculated Result and Limit.....12

Photographs of EUT v01



History of this test report

| Report No. | Version | Description | Issued Date |
|-------------|---------|-------------------------|---------------|
| FA361450-02 | 01 | Initial issue of report | Oct. 11, 2023 |
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Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|---------------|-----------------|---------------------|--------------------|--------|
| 2 | - | Exposure evaluation | PASS | - |

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Vicky Huang



1 General Description

1.1 EUT General Information

| RF General Information | | | |
|------------------------|--|--|---|
| Evaluation Mode | Frequency Range (MHz) | Operating Frequency (MHz) | Modulation Type |
| 2.4GHz WLAN | 2400-2483.5 | 2412-2462 | 802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) |
| 5GHz WLAN | 5150-5250 5250-5350 5470-5725 5725-5850 | 5180-5250 5250-5320 5500-5720 5745-5825 | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) |
| Bluetooth | 2400-2483.5 | 2402-2480 | LE: GFSK |



1.2 Antenna Information

For EUT 1:

| Ant. | Port | | | Brand | Model Name | Antenna Type | Connector | Remark | Gain (dBi) |
|------|-----------|--------|------|--------|-----------------|--------------|-----------|---------------|------------|
| | Bluetooth | 2.4GHz | 5GHz | | | | | | |
| 1 | 1 | - | - | Accton | KG458-160Y17U7X | PCB | I-PEX | Internal Ant. | Note1 |
| 2 | - | 1 | - | Accton | KG458-150L17U7X | PCB | I-PEX | Internal Ant. | |
| 3 | - | 2 | - | Accton | KG458-250F17U7X | PCB | I-PEX | Internal Ant. | |
| 4 | - | - | 1 | Accton | KG459-200G17U7X | PCB | I-PEX | Internal Ant. | |
| 5 | - | - | 2 | Accton | KG459-405W17U7X | PCB | I-PEX | Internal Ant. | |

Note1:

| Ant. | Gain (dBi) | | |
|------|------------|--------|------|
| | Bluetooth | 2.4GHz | 5GHz |
| 1 | 5.91 | - | - |
| 2 | - | 5.67 | - |
| 3 | - | 5.99 | - |
| 4 | - | - | 6.91 |
| 5 | - | - | 6.29 |

Note 2: Directional gain information

| Type | Maximum Output Power | Power Spectral Density |
|--------|---|---|
| Non-BF | Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4 | $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left[\sum_{k=1}^{N_{ANT}} S_{j,k} \right]^2}{N_{ANT}} \right]$ |
| BF | $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left[\sum_{k=1}^{N_{ANT}} S_{j,k} \right]^2}{N_{ANT}} \right]$ | $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left[\sum_{k=1}^{N_{ANT}} S_{j,k} \right]^2}{N_{ANT}} \right]$ |

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left[\sum_{k=1}^{N_{ANT}} S_{j,k} \right]^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20};$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2))^2$$

$$DG = 10 \log[(NSS1(g1,1) + NSS1(g1,2))^2 / N_{ANT}] => 10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$$

Where ;

$$2.4G \ G1= 5.67 \text{ dBi} ; G2= 5.99 \text{ dBi} ; DG= 8.84\text{dBi}$$

$$5G \ G1= 6.91 \text{ dBi} ; G2= 6.29 \text{ dBi} ; DG= 9.62\text{dBi}$$



For EUT 2:

| Ant. | Port | | | Brand | Model Name | Antenna Type | Connector | Remark | Gain (dBi) |
|------|-----------|--------|------|-------------|-----------------|--------------|-----------|---------------|------------|
| | Bluetooth | 2.4GHz | 5GHz | | | | | | |
| 1 | 1 | - | - | Accton | KG458-160Y17U7X | PCB | I-PEX | Internal Ant. | Note3 |
| 2 | - | 1 | - | Accton | KG458-150L17U7X | PCB | I-PEX | Internal Ant. | |
| 3 | - | 2 | - | Accton | KG458-250F17U7X | PCB | I-PEX | Internal Ant. | |
| 4 | - | - | 1 | Master Wave | 98110UNXX001 | Omni Dipole | I-PEX | External Ant. | |
| 5 | - | - | 2 | Master Wave | 98110UNXX001 | Omni Dipole | I-PEX | External Ant. | |

Note3:

| Ant. | Gain (dBi) | | | Cable Loss (dB) | | | Net Gain (dBi) | | |
|------|------------|--------|------|-----------------|--------|------|----------------|--------|------|
| | Bluetooth | 2.4GHz | 5GHz | Bluetooth | 2.4GHz | 5GHz | Bluetooth | 2.4GHz | 5GHz |
| 1 | 5.91 | - | - | - | - | - | - | - | - |
| 2 | - | 5.67 | - | - | - | - | - | - | - |
| 3 | - | 5.99 | - | - | - | - | - | - | - |
| 4 | - | - | 6.54 | - | - | 1.1 | - | - | 5.44 |
| 5 | - | - | 6.54 | - | - | 2.13 | - | - | 4.41 |

Note4: Directional gain information

| Type | Maximum Output Power | Power Spectral Density |
|--------|---|---|
| Non-BF | Directional gain = Max gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4 | $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} \xi_{j,k} \right)^2}{N_{ANT}} \right]$ |
| BF | $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} \xi_{j,k} \right)^2}{N_{ANT}} \right]$ | $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} \xi_{j,k} \right)^2}{N_{ANT}} \right]$ |

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} \xi_{j,k} \right)^2}{N_{ANT}} \right]$$

NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2)= 10^{G2/20};

g_{j,k}=(N_{ss1}(g1,1) + N_{ss1}(g1,2))²

DG = 10 log[(N_{ss1}(g1,1) + N_{ss1}(g1,2))² / N_{ANT}] => 10 log[(10^{G1/20} + 10^{G2/20})² / N_{ANT}]

Where ;

2.4G G1= 5.67 dBi ; G2= 5.99 dBi ;DG= 8.84dBi

5G G1= 5.44 dBi ; G2= 4.41 dBi ;DG= 7.95dBi



Note5: The above information was declared by manufacturer.

Note6: **For WLAN 2.4GHz function:**

For IEEE 802.11b/g/n/VHT/ax mode (2TX/2RX):

Port 1 and Port 2 can be use as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For WLAN 5GHz function:

For IEEE 802.11a/n/ac/ax mode (2TX/2RX):

Port 1 and Port 2 can be use as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously

For Bluetooth function:

For Bluetooth mode (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

1.3 Table for Multiple Listing

The model names which are identical to each other in all aspects except for the following table:

| EUT | Model Name | BT | 2.4GHz | 5GHz |
|-----|--------------------------|----|--------|-------------------------|
| 1 | OAP101XXXXZ (Note 1) | V | V | V (Internal Antenna) |
| 2 | OAP101eXXXXZ (Note 1) | V | V | V (External Antenna) |

Note 1: The difference of "XXXXZ" would be marketing strategy X can be symbol "(" or "blank" Y can be "A~Z, a~z, 1~9 or blank and "Z can be symbol ")" or "blank"

Note 2: The above information was declared by manufacturer.

Note 3: From the above models, model: OAP101(EUT 1) and OAP101e(EUT 2) was selected as representative model for the test and its data was recorded in this report.



1.4 Accessories

| Accessories |
|------------------|
| DC Jack*1 |
| Sealing Collar*3 |

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2.1091
- ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ 47 CFR Part 1.1307
- ♦ 47 CFR Part 1.1310

1.6 Testing Location

| Testing Location Information |
|--|
| Test Lab. : Sporton International Inc. Hsinchu Laboratory |
| Hsinchu ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) |
| (TAF: 3787) TEL: 886-3-656-9065 FAX: 886-3-656-9085 |
| Test site Designation No. TW3787 with FCC. |
| Conformity Assessment Body Identifier (CABID) TW3787 with ISED. |



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-3.0 | 614 | 1.63 | *(100) | <6 |
| 3.0-30 | 1842/f | 4.89/f | *(900/f ²) | <6 |
| 30-300 | 61.4 | 0.163 | 1.0 | <6 |
| 300-1500 | - | - | f/300 | <6 |
| 1500-100,000 | - | - | 5 | <6 |

(B) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-1.34 | 614 | 1.63 | *(100) | <30 |
| 1.34-30 | 824/f | 2.19/f | *(180/f ²) | <30 |
| 30-300 | 27.5 | 0.073 | 0.2 | <30 |
| 300-1500 | - | - | f/1500 | <30 |
| 1500-100,000 | - | - | 1.0 | <30 |

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 51 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= Pth.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz};$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$.

| Single RF Sources Subject to Routine Environmental Evaluation | |
|---|--|
| RF Source frequency (MHz) | Threshold ERP (watts) |
| 0.3-1.34 | 1,920 R ² . |
| 1.34-30 | 3,450 R ² /f ² . |
| 30-300 | 3.83 R ² . |
| 300-1,500 | 0.0128 R ² f. |
| 1,500-100,000 | 19.2R ² . |

Note: R is in meters, f is in MHz.



2.4 Calculated Result and Limit

Exposure Environment: **General Population / Uncontrolled Exposure**

EUT 1:

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Distance (cm) | S (mW/cm ²) | S Limit (mW/cm ²) | Option | TL EIRP (dBm) | TL Ratio |
|------------|----------|-------------|------------|----------------|--------------------|---------------|-------------------------|-------------------------------|--------|---------------|----------|
| 2.4G;G1D | 5.99 | 29.79 | 35.78 | 0.21 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| 5.2G;D1D | 6.91 | 25.97 | 32.88 | 0.50 | 33.38 | 51 | 0.06663 | 1.00000 | C | 39.133 | 0.2659 |
| 5.3G;D1D | 6.91 | 23.05 | 29.96 | 0.03 | 29.99 | 51 | 0.03052 | 1.00000 | C | 39.133 | 0.1218 |
| 5.6G;D1D | 9.62 | 20.29 | 29.91 | 0.08 | 29.99 | 51 | 0.03052 | 1.00000 | C | 39.133 | 0.1218 |
| 5.8G;D1D | 9.62 | 26.36 | 35.98 | 0.01 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| 2.4G;BT-LE | 5.91 | 3.13 | 9.04 | 0.50 | 9.54 | 51 | 0.00028 | 1.00000 | C | 39.133 | 0.0011 |

EUT 2:

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Distance (cm) | S (mW/cm ²) | S Limit (mW/cm ²) | Option | TL EIRP (dBm) | TL Ratio |
|------------|----------|-------------|------------|----------------|--------------------|---------------|-------------------------|-------------------------------|--------|---------------|----------|
| 2.4G;G1D | 5.99 | 29.79 | 35.78 | 0.21 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| 5.2G;D1D | 5.44 | 21.67 | 27.11 | 0.50 | 27.61 | 51 | 0.01765 | 1.00000 | C | 39.133 | 0.0704 |
| 5.3G;D1D | 7.95 | 22.01 | 29.96 | 0.03 | 29.99 | 51 | 0.03052 | 1.00000 | C | 39.133 | 0.1218 |
| 5.6G;D1D | 7.95 | 22.02 | 29.97 | 0.02 | 29.99 | 51 | 0.03052 | 1.00000 | C | 39.133 | 0.1218 |
| 5.8G;D1D | 7.95 | 27.79 | 35.74 | 0.25 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| 2.4G;BT-LE | 5.91 | 3.13 | 9.04 | 0.50 | 9.54 | 51 | 0.00028 | 1.00000 | C | 39.133 | 0.0011 |



Simultaneous Transmission Analysis Mode:

Mode 1: EUT 1-WLAN 2.4GHz+WLAN 5GHz+Bluetooth

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Distance (cm) | S (mW/cm ²) | Limit (mW/cm ²) | Option | TL EIRP (dBm) | TL Ratio |
|----------------|-------------|----------------|---------------|-------------------|-----------------------|------------------|----------------------------|--------------------------------|--------|------------------|----------|
| 5.8G:D1D | 9.62 | 26.36 | 35.98 | 0.01 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| 2.4G:BT-LE | 5.91 | 3.13 | 9.04 | 0.50 | 9.54 | 51 | 0.00028 | 1.00000 | C | 39.133 | 0.0011 |
| 2.4G:G1D | 5.99 | 29.79 | 35.78 | 0.21 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| Sum TL Ratio_C | 0.9711 | | | | | | | | | | |
| Ratio Limit | 1 | | | | | | | | | | |

Mode 2: EUT 2-WLAN 2.4GHz+WLAN 5GHz+Bluetooth

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Distance (cm) | S (mW/cm ²) | Limit (mW/cm ²) | Option | TL EIRP (dBm) | TL Ratio |
|----------------|-------------|----------------|---------------|-------------------|-----------------------|------------------|----------------------------|--------------------------------|--------|------------------|----------|
| 5.8G:D1D | 7.95 | 27.79 | 35.74 | 0.25 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| 2.4G:BT-LE | 5.91 | 3.13 | 9.04 | 0.50 | 9.54 | 51 | 0.00028 | 1.00000 | C | 39.133 | 0.0011 |
| 2.4G:G1D | 5.99 | 29.79 | 35.78 | 0.21 | 35.99 | 51 | 0.12152 | 1.00000 | C | 39.133 | 0.4850 |
| Sum TL Ratio_C | 0.9711 | | | | | | | | | | |
| Ratio Limit | 1 | | | | | | | | | | |

Note: The above antenna gain was declared by manufacturer.

—————THE END—————