

|                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                         |                                                                             |                        |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------|--------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                                                                                 | CN228IHN (FCC-MPE) 001                                                                  | <b>Auftrags-Nr.:</b><br>Order no.:                                          | 238550055              | Seite 1 von 10<br>Page 1 of 10 |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                                                                        | N/A                                                                                     | <b>Auftragsdatum:</b><br>Order date:                                        | 2022-11-11             |                                |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                                                                             | Emplus Technologies, Inc<br>Bld B, 10F, No.209, Sec.1, Nangang Rd., Taipei City, Taiwan |                                                                             |                        |                                |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                                                                        | 11AX Dual band AP                                                                       |                                                                             |                        |                                |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                                                                                 | WAP388 and WAP388-C                                                                     |                                                                             |                        |                                |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                                                                   | FCC Certification                                                                       |                                                                             |                        |                                |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                                                                                | IEEE Std C95.1<br>47 CFR §2.1091<br>47 CFR §1.1310                                      |                                                                             |                        |                                |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                                                                       | 2022-11-15                                                                              |                                                                             |                        |                                |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                                                                  | A003372209-005                                                                          |                                                                             |                        |                                |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                                                                     | 2022-11-10 - 2022-12-16                                                                 |                                                                             |                        |                                |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                                                                                | EMC/RF Taipei Testing Site                                                              |                                                                             |                        |                                |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                                                                             | Taipei Testing Laboratories                                                             |                                                                             |                        |                                |
| <b>Prüfergebnis*:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                                                                      | Pass                                                                                    |                                                                             |                        |                                |
| <b>überprüft von:</b><br>compiled by:                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>genehmigt von:</b><br>authorized by:                                                 |                                                                             |                        |                                |
| <b>Datum:</b><br>Date: 2023-01-04                                                                                                                                                                                                                                                                                                                                                                                                                           | <br>Ethan Shao                                                                          |                                                                             | <br>Brenda Chen        |                                |
| <b>Stellung / Position:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 | Assistant Project Engineer                                                              | <b>Ausstellungsdatum:</b><br>Issue date: 2023-01-04                         | Senior Project Manager |                                |
| <b>Sonstiges / Other:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                         |                                                                             |                        |                                |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                                                                             |                                                                                         | Prüfmuster vollständig und unbeschädigt<br>Test item complete and undamaged |                        |                                |
| <p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft<br/>P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>* Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor<br/>P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested</p>            |                                                                                         |                                                                             |                        |                                |
| <p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br/>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</p> |                                                                                         |                                                                             |                        |                                |

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### APPENDIX EP - PHOTOGRAPHS OF EUT

**Prüfbericht - Nr.: CN228IHN (FCC-MPE) 001**  
Test Report No.

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## HISTORY OF THIS TEST REPORT

| Report No.                | Description      | Date Issued |
|---------------------------|------------------|-------------|
| CN228IHN<br>(FCC-MPE) 001 | Original Release | 2023-01-04  |

# 1 General Remarks

## 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:  
**Appendix EP - Photographs of EUT**

## 1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

## 2 Test Sites

### 2.1 Test Facilities

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.  
Taipei City 105  
Taiwan (R.O.C.)

### 2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,  
New Taipei City 244  
Taiwan (R.O.C.)

## 3 General Product Information

### 3.1 Product Function and Intended Use

The EUT is 11AX Dual band AP. It contains WLAN compatible module enabling the user to communicate data through a Wireless interface.

For details refer to the User Guide, Data Sheet and Circuit Diagram.

### 3.2 Ratings and System Details

#### Basic Information of EUT

| Item                        | EUT Information     |
|-----------------------------|---------------------|
| Kind of Equipment/Test Item | 11AX Dual band AP   |
| Type Identification         | WAP388 and WAP388-C |
| FCC ID                      | 2AL6XWAP388         |

#### Technical Specification of EUT

| Item                | EUT Information                                                                                          |
|---------------------|----------------------------------------------------------------------------------------------------------|
| Operating Frequency | WLAN 2.4G: 2412 MHz ~ 2462 MHz<br>WLAN 5G:<br>Band 1: 5180 MHz ~ 5240 MHz<br>Band 4: 5745 MHz ~ 5825 MHz |
| Modulation          | DSSS (DBPSK, DQPSK, CCK)<br>OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)<br>OFDMA (1024QAM)                   |
| Operation Voltage   | 12 Vdc (Adapter)<br>54 Vdc (POE Injector)                                                                |
| Antenna Information | Refer to note as below                                                                                   |

Note:

1. All models are listed as below.

| Main Model | Series Model | Difference                                                                                                                                           |
|------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAP388     | WAP388-C     | 1. WAP388: 2.5G LANx1 + 1G LANx1 + NOR Flash<br>2. WAP388-C: 2.5G LANx1 (remove 1G LAN + NOR Flash)<br>1GbE RJ45 is not available for WAP388-C model |

2. The antenna list is as below.

| ANT            | Type                   | Gain (dBi) |        |        |
|----------------|------------------------|------------|--------|--------|
|                |                        | 2.4 GHz    | 5 GHz  |        |
|                |                        |            | Band 1 | Band 4 |
| 1              | PIFA                   | 4.5        | 5.8    | 5.4    |
| 2              | PIFA                   | 4.6        | 4.6    | 5.2    |
| 3              | Dipole                 | -          | 5.9    | 5.3    |
| 4              | Dipole                 | -          | 5.3    | 5.8    |
| Max. Peak Gain |                        | 4.6        | 5.9    | 5.8    |
| CDD            | Power Directional Gain | 4.6        | 5.9    | 5.8    |
|                | PSD Directional Gain   | 7.56       | 11.44  | 11.45  |
| Beamforming    | Power Directional Gain | 7.56       | 11.44  | 11.45  |
|                | PSD Directional Gain   | 7.56       | 11.44  | 11.45  |

Note: PSD Directional Gain =  $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$

## 4 Maximum Permissible Exposure Evaluation

### 4.1 Introduction

This Standard specifies requirements for, and provides guidance on, assessing compliance with the exposure limits of radiofrequency (RF) safety standards such as IEEE Std C95.1. This includes methodologies for making an assessment (by measurement or computation) of human exposure to ambient RF fields and induced body currents in the frequency range of 0 kHz to 300 GHz.

This Standard may also be used as a guide for making low-level environmental exposure assessments in areas around RF sources listed above, as well as other sources such as Wi-Fi devices.

### 4.2 Reference Levels

Where appropriate, the reference levels are derived from the basic restrictions by mathematical modelling and by extrapolation from the results of laboratory investigations at specific frequencies. They are given for the condition of maximum coupling of the field to the exposed individual, thereby providing maximum protection.

According to FCC 1.1310, the criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b).

The FCC MPE limits from 47 CFR §1.1310 are shown in the table below

| Frequency Range<br>[MHz]                                | Electric Field<br>Strength<br>[V/m] | Magnetic Field Strength<br>[A/m] | Power Density<br>[mW/cm <sup>2</sup> ] | Average<br>Time<br>[minutes] |
|---------------------------------------------------------|-------------------------------------|----------------------------------|----------------------------------------|------------------------------|
| (A) Limits for Occupational/Controlled Exposure         |                                     |                                  |                                        |                              |
| 0.3 – 3.0                                               | 614                                 | 1.63                             | *100                                   | 6                            |
| 3.0 – 30                                                | 1842/f                              | 4.89/f                           | *900/f <sup>2</sup>                    | 6                            |
| 30 – 300                                                | 61.4                                | 0.163                            | 1.0                                    | 6                            |
| 300 – 1500                                              |                                     |                                  | f/300                                  | 6                            |
| 1500 – 100000                                           |                                     |                                  | 5                                      | 6                            |
| (B) Limits for General Population/Uncontrolled Exposure |                                     |                                  |                                        |                              |
| 0.3 – 1.34                                              | 614                                 | 1.63                             | *100                                   | 30                           |
| 1.34 – 30                                               | 824/f                               | 2.19/f                           | *180/f <sup>2</sup>                    | 30                           |
| 30 – 300                                                | 27.5                                | 0.073                            | 0.2                                    | 30                           |
| 300 – 1500                                              |                                     |                                  | f/1500                                 | 30                           |
| 1500 – 100000                                           |                                     |                                  | 1.0                                    | 30                           |

NOTE –

- (1)  $f$  is the frequency in MHz.
- (2) Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded. For the specific case of occupational exposures at frequencies up to 100 kHz, the derived electric fields can be increased by a factor of 2 under conditions in which adverse indirect effects from contact with electrically charged conductors can be excluded.
- (3) For frequencies between 100 kHz and 10 GHz, the quantities Seq, E2 and H2 are averages over any 6 minutes.
- (4) For frequencies exceeding 10 GHz, Seq, the quantities E2 and H2 are averages over any  $68/f$  1.05 minutes ( $f$  in GHz).

## 4.3 Classification of the Assessment Methods

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. So, this product under normal use is located on electromagnetic far field between the human body.

### MPE Calculation Method according to KDB 447487 D01 General RF Exposure Guidance v06

Power Density:  $S_{(mW/cm^2)} = PG/4\pi R^2$  or  $EIRP/4\pi R^2$

Where:

S = power density (mW/cm<sup>2</sup>)

P = power input to the antenna (mW)

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 (cm)

## 5 Test Results

### 5.1 Maximum Power Density

The maximum power density at a distance of 20 cm are shown as below:

**<CDD>**

| Mode        | Frequency (MHz) | Average Output Power (dBm) | Average Output Power (mW) | Antenna Gain (dBi) | Power Density (mW/cm <sup>2</sup> ) | Limit of Power Density (mW/cm <sup>2</sup> ) | Pass / Fail |
|-------------|-----------------|----------------------------|---------------------------|--------------------|-------------------------------------|----------------------------------------------|-------------|
| WLAN 2.4GHz | 2437            | 25.01                      | 316.96                    | 4.6                | 0.182                               | 1                                            | Pass        |
| WLAN 5GHz   | 5795            | 28.75                      | 749.89                    | 5.8                | 0.567                               | 1                                            | Pass        |

**<Beamforming>**

| Mode        | Frequency (MHz) | Average Output Power (dBm) | Average Output Power (mW) | Antenna Gain (dBi) | Power Density (mW/cm <sup>2</sup> ) | Limit of Power Density (mW/cm <sup>2</sup> ) | Pass / Fail |
|-------------|-----------------|----------------------------|---------------------------|--------------------|-------------------------------------|----------------------------------------------|-------------|
| WLAN 2.4GHz | 2437            | 21.65                      | 146.22                    | 7.56               | 0.166                               | 1                                            | Pass        |
| WLAN 5GHz   | 5795            | 22.73                      | 187.50                    | 11.44              | 0.520                               | 1                                            | Pass        |

#### Conclusion

The device complies with the FCC exposure requirements since the maximum transmitter power density is below the FCC limit.

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

$WLAN\ 2.4GHz + WLAN\ 5GHz = 0.182 / 1 + 0.567 / 1 = 0.749$

**Therefore the maximum calculations of above situations are less than the "1" limit.**