



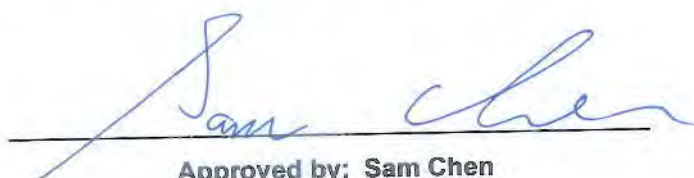
# FCC RADIO EXPOSURE TEST REPORT

**FCC ID** : 2AGMRTRM9995G  
**Equipment** : 802.11ac WiFi Radio Module  
**Brand Name** : EVEREST™ Network Solutions  
**Model Name** : TRM9995G  
**Applicant** : Tembo Systems, Inc.  
2933 Bunker Hill lane, Suite 100, Santa Clara, CA 95054  
U.S.A  
**Manufacturer** : Tembo Systems, Inc.  
2933 Bunker Hill lane, Suite 100, Santa Clara, CA 95054  
U.S.A  
**Standard** : 47 CFR Part 2.1091

The product was received on Apr. 25, 2018, and testing was started from May 16, 2018 and completed on Jun. 12, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**

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## Summary of Test Result

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

**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   |
| 5GHz WLAN              | 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850 | 5180-5240<br>5260-5320<br>5500-5700<br>5745-5825 | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |

Note: The host (AP1004UNe series) insert four radios. Radio 1 is 2.4GHz, Radio 2 is 5GHz band 1, band 2, Radio 3 is 5GHz band 3, Radio 4 is 5GHz band 4.

Radio 1 FCC ID: 2AGMRTRM9992G.

Radio 2~Radio 4 FCC ID: 2AGMRTRM9995G.

## 1.2 Antenna Information

| Ant. Set | Brand Holder       | Band                 | Model Name                            | Antenna Type        | Connector | Gain (dBi) | TX Function | Host System Model |
|----------|--------------------|----------------------|---------------------------------------|---------------------|-----------|------------|-------------|-------------------|
| 1        | Tembo Systems Inc. | Band 1, 2 and Band 4 | PCA-000007-XXX-X/<br>PCA-000005-XXX-X | OMNI Antenna        | I-PEX     | Note1      | 4TX/4RX     | AP1004WRe series  |
|          |                    | Band 3               | PCA-000006-000-X/<br>PCB-000015-XXX-X |                     |           |            |             |                   |
| 2        | Tembo Systems Inc. | Band 1 and Band 2    | PCA-000009-XXX-X                      | Directional Antenna | I-PEX     | Note1      | 4TX/4RX     | AP1004NRe series  |
|          |                    | Band 3               | PCB-000011-XXX-X                      |                     |           |            |             |                   |
|          |                    | Band 4               | PCA-000010-XXX-X                      |                     |           |            |             |                   |
| 3        | Tembo Systems Inc. | Band 1 and Band 2    | PCA-000033-000-X                      | Directional Antenna | I-PEX     | Note1      | 2TX/2RX     | AP1004UNe series  |
|          |                    | Band 3               | PCA-000046-000-X                      |                     |           |            | 4TX/4RX     |                   |
|          |                    | Band 4               | PCA-000034-000-X                      |                     |           |            | 2TX/2RX     |                   |

Note1:

| Ant. Set | Band   | Gain (dBi) | Cable loss | True Gain (dBi) | Array Gain (dBi) |
|----------|--------|------------|------------|-----------------|------------------|
| 1        | Band 1 | 5.06       | 9.90       | -4.84           | 4                |
|          | Band 2 | 4.55       | 9.90       | -5.35           | 4                |
|          | Band 3 | 4.82       | 1.35       | 3.47            | 4                |
|          | Band 4 | 5.03       | 10.9       | -5.87           | 4                |



| Ant. Set | Band   | Tested Antenna Gain (dBi) | Cable loss (dB) | Tested net antenna gain (dBi) | Certified Net Antenna Gain (dBi) | Array Gain (dBi) |
|----------|--------|---------------------------|-----------------|-------------------------------|----------------------------------|------------------|
| 2        | Band 1 | 13.6                      | 1.6             | 12                            | 13                               | 1                |
|          | Band 2 | 13.6                      | 1.6             | 12                            | 13                               | 1                |
|          | Band 3 | 15.3                      | 1.6             | 13.7                          | 14                               | 1                |
|          | Band 4 | 13.6                      | 1.6             | 12                            | 13                               | 1                |

| Ant. Set | Band   | Tested Antenna Gain (dBi) | Cable loss (dB) | Tested net antenna gain (dBi) | Certified Net Antenna Gain (dBi) | Array Gain (dBi) |
|----------|--------|---------------------------|-----------------|-------------------------------|----------------------------------|------------------|
| 3        | Band 1 | 19.25                     | 1.6             | 17.65                         | 18                               | 0                |
|          | Band 2 | 19.25                     | 1.6             | 17.65                         | 18                               | 0                |
|          | Band 3 | 15.30                     | 1.6             | 13.70                         | 14                               | 1                |
|          | Band 4 | 19.25                     | 1.6             | 17.65                         | 18                               | 0                |

**Note2: For Ant. Set 1:**

The EUT is a limited module which only limited to the host (model: AP1004WRe series).

The EUT was installed to the host (model: AP1004WRe series) to perform all the tests.

**For Ant. Set 2:**

The EUT is a limited module which only limited to the host (model: AP1004NRe series).

The EUT was installed to the host (model: AP1004NRe series) to perform all the tests.

**For Ant. Set 3:**

The EUT is a limited module which only limited to the host (model: AP1004UNe series).

The EUT was installed to the host (model: AP1004UNe series) to perform all the tests.

### 1.3 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA650411-01

Below is the table for the change of the product with respect to the original one.

| Modifications  | Performance Checking          |
|--|-------------------------------|
| <ol style="list-style-type: none"><li>1. Add the third set antenna with the same type (Directional Antenna) (Antenna type: Directional Ant. / Brand holder: Tembo Systems Inc. /Part Number: PCA-000033-000-X, PCA-000046-000-X, PCA-000034-000-X).</li><li>2. For Band 1, Band 2 and Band 4, the gain is higher than the original's gain.<br/>The third set antenna support 2TX/2RX but the original directional antenna support 4TX/4RX.</li><li>3. For Band 3, the gain is same as the original's gain.<br/>The third set antenna and the original directional antenna support 4TX/4RX.</li></ol> <p>Note: According the modification above, only available for the host system Model Name: AP1004UNe series.</p> | Maximum Permissible Exposure. |
| <ol style="list-style-type: none"><li>4. Adding brand name "EVEREST™ Network Solutions".</li></ol>   | It does not affect the test.  |



## 1.4 Testing Location

| Testing Location                    |        |   |
|-------------------------------------|--------|---|
| <input type="checkbox"/>            | HWA YA | ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL : 886-3-327-3456 FAX : 886-3-327-0973   |
| <input checked="" type="checkbox"/> | JHUBEI | ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.<br>TEL : 886-3-656-9065 FAX : 886-3-656-9085 |

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



## 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                   | 6  |
| 3.0-30                | 1842 / f                          | 4.89 / f                          | (900 / f)*                               | 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                   | 30   |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f)*                                 | 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 20 cm to show compliance with the power density limit. The following formula was used to calculate the Power Density:

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

**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 Calculated Result and Limit

### Exposure Environment: General Population / Uncontrolled Exposure

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|
| 2.4G;D1D | 10.50    | 22.83       | 33.33      | 0.50           | 33.83              | 2.41546          | 20            | 0.48053                 | 1                             |
| 5.2G;D1D | 18.00    | 17.99       | 35.99      | 0.01           | 36.00              | 3.98107          | 20            | 0.79199                 | 1                             |
| 5.3G;D1D | 18.00    | 11.92       | 29.92      | 0.08           | 30.00              | 1.00000          | 20            | 0.19894                 | 1                             |
| 5.6G;D1D | 14.00    | 15.97       | 29.97      | 0.03           | 30.00              | 1.00000          | 20            | 0.19894                 | 1                             |
| 5.8G;D1D | 18.00    | 17.90       | 35.90      | 0.10           | 36.00              | 3.98107          | 20            | 0.79199                 | 1                             |

Simultaneous Transmission Analysis Mode: 2.4G+5G B1, 2+5G B3+5G B4 for host model: AP1004UNe series

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|
| 2.4G;D1D | 10.50    | 22.83       | 33.33      | 0.50           | 33.83              | 2.41546          | 31            | 0.20001                 | 1.00000                       |
| 5.2G;D1D | 18       | 17.99       | 35.99      | 0.01           | 36.00              | 3.98107          | 31            | 0.32965                 | 1.00000                       |
| 5.3G;D1D | 18       | 11.92       | 29.92      | 0.08           | 30.00              | 1.00000          | 31            | 0.08280                 | 1.00000                       |
| 5.6G;D1D | 14       | 15.97       | 29.97      | 0.03           | 30.00              | 1.00000          | 31            | 0.08280                 | 1.00000                       |
| 5.8G;D1D | 18       | 17.90       | 35.90      | 0.09           | 36.00              | 3.98107          | 31            | 0.32965                 | 1.00000                       |

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|-----------------|
| 2.4G;D1D | 10.50    | 22.83       | 33.33      | 0.50           | 33.83              | 2.41546          | 31            | 0.20001                 | 1.00000                       | 0.20001         |
| 5.2G;D1D | 18       | 17.99       | 35.99      | 0.01           | 36.00              | 3.98107          | 31            | 0.32965                 | 1.00000                       | 0.32965         |
| 5.6G;D1D | 14       | 15.97       | 29.97      | 0.03           | 30.00              | 1.00000          | 31            | 0.08280                 | 1.00000                       | 0.08280         |
| 5.8G;D1D | 18       | 17.90       | 35.90      | 0.10           | 36.00              | 3.98107          | 31            | 0.32965                 | 1.00000                       | 0.32965         |
|          |          |             |            |                |                    |                  |               |                         | Sum Ratio                     | 0.94211         |
|          |          |             |            |                |                    |                  |               |                         | Ratio Limit                   | 1               |

————THE END————