



# MPE TEST REPORT

**Applicant**      Nokia Shanghai Bell Co., Ltd.

**FCC ID**          2ADZPHA140WB

**Product**        7368 Intelligent Services Access Manager CPE

**Model**           HA-140W-B

**Report No.**     R1910B0142-M2V3

**Issue Date**     February 21, 2020

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC 47 CFR Part 1 1.1310**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Approved by: Guangchang Fan

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# 1 Test Laboratory

## 1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

## 1.2. Test facility

### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

## 1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
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## 1.4 Laboratory Environment

|                                                                                                                                                                                                 |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Temperature                                                                                                                                                                                     | Min. = 18°C, Max. = 25 °C |
| Relative humidity                                                                                                                                                                               | Min. = 30%, Max. = 70%    |
| Ground system resistance                                                                                                                                                                        | < 0.5                     |
| Ambient noise is checked and found very low and in compliance with requirement of standards.<br>Reflection of surrounding objects is minimized and in compliance with requirement of standards. |                           |

## 2 Description of Equipment under Test

### Client Information

|                             |                                                                              |
|-----------------------------|------------------------------------------------------------------------------|
| <b>Applicant</b>            | Nokia Shanghai Bell Co., Ltd.                                                |
| <b>Applicant address</b>    | No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China                 |
| <b>Manufacturer</b>         | SHENZHEN TWOWING TECHNOLOGIES CO.,LTD.                                       |
| <b>Manufacturer address</b> | Nangang Industrial Building, Tangtou Industrial Park,Shiyan, Shengzhen,China |

### General Technologies

|                                                                                                                                                                                                                                                                                                                                                                                                                 |                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Model</b>                                                                                                                                                                                                                                                                                                                                                                                                    | HA-140W-B                            |
| <b>SN</b>                                                                                                                                                                                                                                                                                                                                                                                                       | 1#                                   |
| <b>Hardware Version</b>                                                                                                                                                                                                                                                                                                                                                                                         | PEM2                                 |
| <b>Software Version</b>                                                                                                                                                                                                                                                                                                                                                                                         | 3FE48210FGCB55                       |
| <b>Date of Testing:</b>                                                                                                                                                                                                                                                                                                                                                                                         | December 12, 2019 ~ January 13, 2020 |
| <p>Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.</p> <p>2. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.</p> |                                      |

### Information of Configuration:

| No. | Name          | Model/Code No.    | Edition | Serial No. or Quantity |
|-----|---------------|-------------------|---------|------------------------|
| 1.1 | HA-140W-B     | 3FE48130AA        | PEM2    | 1                      |
| 2.2 | Power adapter | UES36WU-120250SPA | A/0     | 1                      |
| 2.3 | Power adapter | SUV-1200300       | A/0     | 1                      |

|           | Kit Code   | EMA            | Part Description                         | Power Adaptor                    |
|-----------|------------|----------------|------------------------------------------|----------------------------------|
| HA-140W-B | 3FE48111AA | 3FE<br>48130AA | 7368CPE,AC2800,1xPOTS,4xG<br>UNI,US plug | UES36WU-120250SPA<br>SUV-1200300 |

|               | Name | RCR             | KIT<br>code      | EMA code         | PBA code         | PB<br>code       | Part Description                                   |
|---------------|------|-----------------|------------------|------------------|------------------|------------------|----------------------------------------------------|
| HA-140<br>W-B | US   | ALU02<br>561014 | 3FE4811<br>1AAAA | 3FE48130<br>AAAA | 3FE48132<br>AAAA | 3FE48133<br>AAAA | 7368CPE,AC2800,<br>1xPOTS,<br>4xGE UNI,<br>US plug |

### Auxiliary equipment details

| No. | Name           | Brand name | Model    | NSB code | Valid Until      |
|-----|----------------|------------|----------|----------|------------------|
| 1   | BigTao220      | XINERTEL   | DE8709   | -        | No Cal. Required |
| 2   | PC             | Thinkpad   | T470     | -        | No Cal. Required |
| 3   | Phone          | NA         | NA       | -        | No Cal. Required |
| 4   | USB            | Sandisk    | CZ73-16  | -        | No Cal. Required |
| 5   | 2.4G WIFI Card | Asus       | PCE-AC88 | -        | No Cal. Required |
| 6   | 5G WIFI Card   | Asus       | PCE-AC88 | -        | No Cal. Required |

### Information of Ports

| No. | Port name | Number | Shielded or unshielded | Cable type (optic, twisted pair, etc.) | Max. Cable length |
|-----|-----------|--------|------------------------|----------------------------------------|-------------------|
| 1   | Power     | 1      | unshielded             | -                                      | -                 |
| 2   | GE        | 4      | unshielded             | -                                      | -                 |
| 3   | POTS      | 1      | unshielded             | -                                      | -                 |
| 4   | USB       | 2      | shielded               | -                                      | -                 |
| 5   | WAN       | 1      | unshielded             | -                                      | -                 |

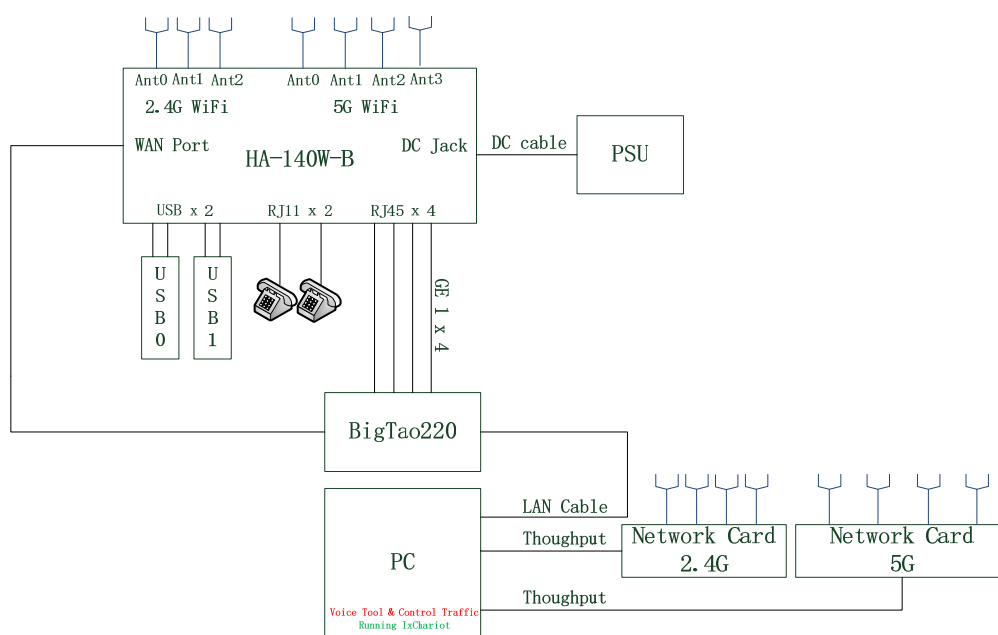
**Note:** This revised report (Report No.: R1910B0142-M2V3) supersedes and replaces the previously issued report (Report No.: R1910B0142-M2V2). Please discard or destroy the previously issued report and dispose of it accordingly.

## Test Configuration

Description: The HA-140W-B is an ethernet gateway which has 1 POT, 4 GE ports, 1 ethernet WAN port, 2 USB ports, 2.4G wi-fi and 5G wi-fi.

Function test should be done during the test for EUT operating status, and or should be done after the test for EUT power off status.

The basic functional test consists of the traffic test, POTs connection test and WIFI connection test, which establishes the communication traffic generator and HA-140W-B (EUT). The POTs keep connecting though OFLT program. The 2.4G wi-fi and 5G wi-fi keep connecting. The USB ports run read/write script though program. The EUT runs 4 traffics on each line with BigTao, the each upstream of 3 GE is 300Mbps, and downstream is 900Mbps.



### 3 Maximum conducted output power (measured) and antenna Gain

The numeric gain (G) of the antenna with a gain specified in dB is determined by

Numeric gain (G)=10<sup>^(antenna gain/10)</sup>

| Band       | Maximum Conducted Output Power (dBm) |         | Antenna Gain (dBi) | Numeric gain |
|------------|--------------------------------------|---------|--------------------|--------------|
|            | (dBm)                                | (mW)    |                    |              |
| WI-FI 2.4G | 24.57                                | 286.418 | 3                  | 1.995        |
| WI-FI 5G   | 27.58                                | 572.796 | 3                  | 1.995        |

## 4 Test Result

According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following

TABLE 1 – LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency Range<br>(MHz)                                | Electric Field<br>Strength<br>(V/m) | Magnetic Field<br>Strength<br>(A/m) | Power Density<br>(mW/cm <sup>2</sup> ) | Averaging Time<br>(minutes) |
|---------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|-----------------------------|
| (A) Limits for Occupational/Controlled Exposures        |                                     |                                     |                                        |                             |
| 0.3-3.0 .....                                           | 614                                 | 1.63                                | *(100)                                 | 6                           |
| 3-30 .....                                              | 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                           |
| 1500-100,000 .....                                      |                                     |                                     | 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                          |
| 1500-100,000 .....                                      |                                     |                                     | 1.0                                    | 30                          |

f = frequency in MHz

\* = Plane-wave equivalent power density

Note1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

Note2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



The maximum permissible exposure for 1500~100,000MHz is 1.0. So

| Band       | The maximum permissible exposure |
|------------|----------------------------------|
| Wi-Fi 2.4G | 1.0mW/cm <sup>2</sup>            |
| Wi-Fi 5G   | 1.0mW/cm <sup>2</sup>            |

**RF Exposure Calculations:**

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

$$S = PG / 4\pi R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

| Band                                                                              | PG (mW)  | Test Result (mW/cm <sup>2</sup> ) | Limit Value (mW/cm <sup>2</sup> ) | The MPE ratio | Conclusion |
|-----------------------------------------------------------------------------------|----------|-----------------------------------|-----------------------------------|---------------|------------|
| Wi-Fi 2.4G                                                                        | 571.479  | 0.114                             | 1.000                             | 0.114         | PASS       |
| Wi-Fi 5G                                                                          | 1142.878 | 0.227                             | 1.000                             | 0.227         | PASS       |
| Note: R = 20cm<br>$\pi = 3.1416$<br>The MPE ratio = Mac Test Result ÷ Limit Value |          |                                   |                                   |               |            |

So the simultaneous transmitting antenna pairs as below:

$\Sigma$  of MPE ratios = WiFi 2.4G + WiFi 5G = 0.114 + 0.227 = 0.341 < 1

\*\*\*\*\*END OF REPORT \*\*\*\*\*