MPE TEST REPORT

Applicant	Nokia Shanghai Bell Co., Ltd.
FCC ID	2ADZRHA140WB
Product	7368 Intelligent Services Access Manager CPE
Model	HA-140W-B
Report No.	R1910B0142-M2V2
Issue Date	February 18, 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.

Yu Wang

Performed by: Yu Wang

Guangchang Fan

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.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
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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. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

2 Description of Equipment under Test

Client Information

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

General Technologies

Model	HA-140W-B
SN	1#
Hardware Version	PEM2
Software Version	3FE48210FGCB55
Date of Testing:	December 12, 2019 ~ January 13, 2020
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 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.	

Information of Configuration:

No.	Name	Model/Code No.	Edition	Serial No. or Quantity
1.1	HA-140W-B	3FE48130BA	PEM2	1
1.2	HA-140W-B	3FE48130CA	PEM2	1
2.3	Power adapter	UES36WV-120250SPA	A/0	1
2.4	Power adapter	SOY-1200300EU	A/0	1
2.5	Power adapter	UES36WB-120250SPA	A/0	1
2.6	Power adapter	SOY-1200300GB	A/0	1

	Kit Code	EMA	Part Description	Power Adaptor
HA-140 W-B	3FE48111BA	3FE48130BA	7368CPE,AC2800,1xPOTS, 4xGE UNI,EU plug	UES36WV-120250SPA SOY-1200300EU
	3FE48111CA	3FE48130BA	7368CPE,AC2800,1xPOTS, 4xGE UNI,UK plug	UES36WB-120250SPA SOY-1200300GB
	3FE48111CB	3FE48130CA	7368CPE,3x3bgn + 4x4ac,1xPOTS,4xGE	UES36WB-120250SPA SOY-1200300GB

			UNI,UK plug, Hyperoptic customized	

	Name	RCR	KIT code	EMA code	PBA code	PB code	Part Description
HA-140W-B	US	ALU02561014	3FE48111AAAA	3FE48130AAAA	3FE48132AAAA	3FE48133AAAA	7368CPE,AC2800, 1xPOTS, 4xGE UNI, US plug
	EU	ALU02561014	3FE48111BAAA	3FE48130BAAA	3FE48132AAAA	3FE48133AAAA	7368CPE,AC2800,1xPOTS, 4xGE UNI, EU plug
	UK	ALU02561014	3FE48111CAAA	3FE48130BAAA	3FE48132AAAA	3FE48133AAAA	7368CPE,AC2800,1xPOTS, 4xGE UNI, UK plug
	Hyperoptic_UK	ALU02592417	3FE48111CBAA	3FE48130CAAA	3FE48132AAAA	3FE48133AAAA	7368CPE,3x3bgn + 4x4ac, 1xPOTS,4xGE UNI, UK plug, Hyperoptic customized

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	-	-

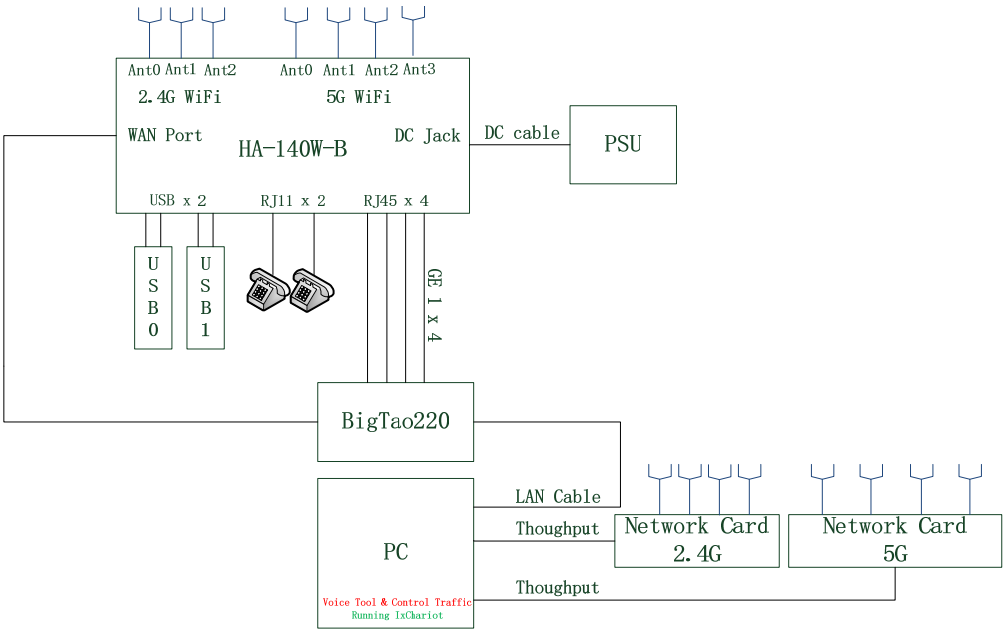
Note: This revised report (Report No.: R1910B0142-M2V2) supersedes and replaces the previously issued report (Report No.: R1910B0142-M2V1). Please discard or destroy the previously issued report and dispose of it accordingly.

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^(antenna gain/10)

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 MAXIMUN PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3-30	1842/f	4.89/f	*(900/f2)	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/f2)	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^2
Wi-Fi 5G	1.0mW/cm^2

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:

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

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

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/cm2)	Limit Value (mW/cm^2)	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 ∏= 3.1416 The MPE ratio = Mac Test Result÷Limit Value					

So the simultaneous transmitting antenna pairs as below:

∑of MPE ratios=WiFi 2.4G + WiFi 5G =0.114 +0.227 =0.341 <1

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