

EMF TEST REPORT

Report number		RAPA24-O-005
Applicant	Name	NZIA Connect Inc.
	Logo	N/A
	Address	#1302, 286, Beotkkot-ro, Geumcheon-gu, Seoul, Republic of Korea
Manufacturer	Name	NZIA Connect Inc.
	Address	#1302, 286, Beotkkot-ro, Geumcheon-gu, Seoul, Republic of Korea
Type of equipment		TVWS Wireless Networking Radio System
Basic model name		NZC-WS20
Multi model name		N/A
Serial number		N/A
FCC ID		2AUON-NZC-WS20
Test duration		Nov 16, 2023 to Feb 6, 2024
Date of issue		Feb 8, 2024
Total page		7 Pages (including this page)

SUMMARY

The equipment complies with the regulation; FCC Part 15 Subpart H

This test report only contains the result of a single test of the sample supplied for the examination.
It is not a general valid assessment of the features of the respective products of the mass-production.

Feb 8, 2024

Feb 8, 2024

김민기

류우열

Tested by MinGu Ji
Tester

Reviewed by Wooyeol- Ryu
Executive Manager

Test Report Version History

Version	Date	Reason for revision
1.0	Feb 8, 2024	Original Document

CONTENTS

1. Description of EUT	4
1.1 Applicant	4
1.2 Manufacturer	4
1.3 Basic description	4
1.4 General description	4
1.5 Alternative type(s)/model(s)	4
2. General information of test	5
2.1 Test standards and results	5
2.2 Description of EUT during the test	5
2.3 Test configuration	5
2.4 Test Facility	5
3. MAXIMUM PERMISSIBLE EXPOSURE	6
3.1 RF Exposure Calculation	6
3.2 EUT Description	6
3.3 Calculated MPE Safe Distance	7
3.4 Data for Intermodulation Calculated MPE Safe Distance	오류! 책갈피가 정의되어 있지 않습니다.

1. Description of EUT

1.1 Applicant

- Company name : NZIA Connect Inc.
- Address : #1302, 286, Beotkkot-ro, Geumcheon-gu, Seoul, Republic of Korea
- Contact person : Lee Nam Ku / Senior Researcher / kevin@nzia.kr
- Phone/Fax : +82-70-4282-4700 / +82-2-851-3873

1.2 Manufacturer

- Company name : NZIA Connect Inc.
- Address : #1302, 286, Beotkkot-ro, Geumcheon-gu, Seoul, Republic of Korea
- Phone/Fax : +82-70-4282-4700 / +82-2-851-3873

1.3 Basic description

- Product name : TVWS Wireless Networking Radio System
- Basic model name : NZC-WS20
- Alternative model name : N/A

1.4 General description

- EQUIPMENT CLASS : WGF – White Space Device with Geo-location - Fixed
- Frequency Range : 470 MHz ~ 698 MHz
- Output Power : 16.03 dBm
- Modulation Type : QPSK
- Antenna Type : Patch Antenna
- Antenna Gain : 8.28 dBi
- Power Supply : AC 110.0 ~ 230.0 V

Start of Frequency range, MHz	End of Frequency range, MHz	Frequency range Bandwidth, MHz	Channel size, MHz	Low channel	Mid channel	High channel
470	698	228	6	473	587	695

1.5 Alternative type(s)/model(s)

There is no alternative type(s) and/or model(s).

2. General information of test

2.1 Test standards and results

Applied Standards : FCC Part 15 Subpart C		
Section	Description of Test	Result
ANSI 63.10 6.9.3	99 % Occupied Bandwidth	Pass
15.709 (b) (ii)	OUTPUT POWER AND POWER SPECTRAL DENSITY	Pass
15.709 (d)	BAND-EDGE and ADJACENT CHANNEL EMISSIONS	Pass
15.709 (d)	Radiated Emission which fall in the Restricted Band	Pass
15.207	Conducted Limits	Pass
15.209	Radiated Emission Limits	Pass
15.203	Antenna Requirement	Pass

2.2 Description of EUT during the test

During the test, keep the EUT in continuously transmitting mode.

There was no mechanical or circuitry modification to improve RF and spurious characteristic, and any RF and spurious suppression device(s) was not added against the device tested.

The EUT was moved throughout the X, Y, and Z axis and worst case data was recorded in this report.

2.3 Test configuration

• Type of peripheral equipment used

Model	Manufacturer	Description	Connected to
650G1	HP	Notebook	EUT
PA-1900-32HT	LITE-ON TECHNOLOGY(CHANGZHOU_Co., Ltd.	Power Adapter	Notebook

2.4 Test Facility

- FCC Registration No: 927453
- IC Company address code: 9355B
- RRA Designation Number: KR0027

• Place of Test

Anyang Test Site(RF Test Room)

#101 & B104 Anyang Megavalley, 268, Hagui-ro, Dongan-gu, Anyang-si, Gyeonggi-do, 14056, Korea

3. MAXIMUM PERMISSIBLE EXPOSURE

3.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $f/1500$ mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric field strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * 10 S)}$$

Changing to units of mW and cm, using P (mW) = P (W) / 1 000, d (cm) = 0.01 * d (m)

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

3.2 EUT Description

Kind of EUT	TVWS Wireless Networking Radio System
Operating Frequency Band	☐ Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz ☐ WLAN: 2 412 MHz ~ 2 462 MHz ☐ WLAN: 5 180 MHz ~ 5 240 MHz ☐ WLAN: 5 745 MHz ~ 5 825 MHz ☐ Bluetooth: 2 402 MHz ~ 2 480 MHz ☐ Bluetooth BLE: 2 402 MHz ~ 2 480 MHz ☒ Other : 473 MHz ~ 695 MHz
MAX. RF OUTPUT POWER	16.03 dBm
Antenna Gain	8.28 dBi
Exposure Evaluation Applied	☒ MPE ☐ SAR Exclusion ☐ N/A

3.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear		
473	TVWS	16.03 ± 0.5	16.53	44.98	8.28	6.730	0.060 2	0.32
589	TVWS	7.97 ± 0.5	8.47	7.03	8.28	6.730	0.009 4	0.39
695	TVWS	9.85 ± 0.5	10.35	10.84	8.28	6.730	0.014 5	0.46

2.93

Tested by MinGu Ji
/ Tester