

Certificate of Test

NCT CO., LTD. 211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, 18511, Republic of Korea (Tel: +82-31-323-6070 / Fax: +82-31-323-6071)	Report No.: NW2401-F002-1 Page (1) / (6)	NCT
1. Client - o Name : ENPLUG CO.,LTD - o Address : A-704. 705, 46, Dallaenae-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do, Republic of Korea - o Date of Receipt : 2024-01-12 2. Use of Report : FCC Certification 3. Test Sample - o Description / Model : Health Hub / EUM-100 - o FCC ID : 2BEJA-EUM-100 4. Place of Test : ☒ Fixed test ☐ Field test (Address:211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, 18511, Republic of Korea) 5. Date of Test : 2024-01-16 ~ 2024-01-23 6. Test method used : FCC Part 1.1310 7. Testing Environment : - o Temperature: (25 ± 5) °C, Humidity: Less than 75 % R.H. * Unless specified otherwise in the individual methods, the tests were conducted on ambient conditions. 8. Test Results : Refer to the test results The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full This test report is not related to KOLAS recognition and RRA designation.		
Affirmation	Tested by Jiwon, Hong 	Technical Manager Il-shin, Kim  (signature)
		Feb 05, 2024
NCT CO., LTD.		

Contact us at report@nct.re.kr to confirm the authenticity of this report

Table of contents

1. General Information	3
2. Information's about Test Item	3
3. Test Report	4
3.1 Test Report Version	4
3.2 SAR Test Exclusion Considerations for FCC	5

1. General Information's

1.1 Test Performed

Laboratory : NCT Co., Ltd.
Address : 211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, 18511, Korea
Telephone : +82-31-323-6070
Facsimile : +82-31-323-6071
FCC Designation No. : KR0166
FCC Registration Number : 409631

2. Information's about Test Item

2.1 Applicant Information

Company name : ENPLUG CO.,LTD
Address : A-704. 705, 46, Dallaenae-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do,
Republic of Korea
Telephone / Facsimile : +82-10-3453-4387 / +82-31-711-2400

2.2 Equipment Under Test (EUT) description

Test item particulars : Health Hub
Model and/or type reference : EUM-100
Additional model name : -
Serial number : Prototype
Antenna type and gain : On board ceramic chip antenna with Max gain: 2.1 dBi
Date (s) of performance of tests: : 2024-01-16 ~ 2024-01-23
Date of receipt of test item : 2024-01-12
EUT condition : Pre-production, not damaged
Number of channel : 40
EUT Power Source : DC 5.00 V
Type of Modulation : GFSK
Firmware version : 1.0
Hardware version : 1.0
Test software name(version) : Tera Term Version 4.106

Test Report No.: NW2310-F002-1

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3. Test Report

3.1 Test Report Version

Test Report No.	Date	Description
NW2401-F002	2024-01-29	Initial issue
NW2401-F002-1	2024-02-05	Modify 3.2.4 MPE Calculation

Test Report No.: NW2310-F002-1

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3.2 SAR Test Exclusion Considerations for FCC

3.2.1 Introduction

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), a device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitting antenna and the body of the user or nearby persons. In this context, the term “fixed location” means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 cm separation requirement. The limits to be used for MPE evaluation are specified in §1.1310. All unlicensed personal communications service (PCS) devices and unlicensed NII devices shall be subject to the limits for general population/uncontrolled exposure.

3.2.2 RF Radiation Exposure Limits

According to 47 CFR §1.1310, the criteria listed in below table shall be used to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093.

Frequency range (MHz)	Electric Field strength (V/m)	Magnetic field strength (A/m)	Power Density (mW/cm ²)	Averaging time (minutes)
0.3 ~ 1.34	614	1.63	*100	30
1.34 ~ 30	824 / f	2.19 / f	*180 / f ²	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1,500			f / 1500	30
1,500 ~ 100,000			1	30

Limits for maximum permissible exposure (MPE)

f = frequency in MHz. * = Plane-wave equivalent power density.

3.2.3 MPE Assessment Method

Calculations can be made to predict RF field strength and power density levels around typical RF sources. For example, in the case of a single radiating antenna, a prediction for power density in the far-field of the antenna can be made by use of the general Equations below. This equation is generally accurate in the far-field of an antenna but will over-predict power density in the near field, where they could be used for making a "worst case" or conservative prediction.

$$\text{Power Density}(S) = \frac{PG}{4\pi R^2}$$

Where,

S = Power Density, unit in mW/cm²

P = Power input to the antenna, unit in 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, unit in cm

PG = Output Power including antenna gain

3.2.4 MPE Calculation

- standalone

Modulation	Frequency (MHz)	Measured Output power	Tune-up tolerance	Max. Power with tune-up tolerance (P)		Antenna Gain (G)		Power Density(S)	Limit of Power Density (S)	Result
		(dBm)		(dBm)	(mW)	(dBi)	(numeric)	(mW/cm ²)	(mW/cm ²)	
BLE 1M	2402	9.57	± 1.00	10.57	11.40	2.01	1.59	0.0036	1.00	PASS
	2442	9.38		10.38	10.91	2.01	1.59	0.0034	1.00	PASS
	2480	8.58		9.58	9.08	2.01	1.59	0.0029	1.00	PASS
LTE Cat M1 BAND 2	1850 ~ 1910	20.89	± 1.00	21.89	154.53	1.60	1.45	0.0444	1.00	PASS
										PASS
										PASS

The EUT will only be used with a separation of 20 centimeters or greater.

For LTE Cat.M1 Measured Output power, see CTK-2024-00283 report.

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- simultaneous

When a number of source at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE in accordance with the provisions of Table (A) and Table (B). To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity.

In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

Modulation	Power Density (S)	Total exposure ratio(<1)	Result
	(mW/cm2)		
LTE Cat M1 BAND 2	0.0444	0.0480	PASS
BLE 1M	0.0036		

According to the Table above, it can be concluded that the TER calculation result of all simultaneous transmission possibilities is less than 1, so it is into compliance.