

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : OT-181-RWD-010

AGR No. : A179A-112

Applicant : NPC Co., Ltd.

Address : 289, Haeon-ro, Danwon-gu, Gyeonggi-do, Ansan-si, 15612, South Korea

Manufacturer : Natural & Human co., ltd.

Address : 406(Sicox tower), 484, Dunchon-daero, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea

Type of Equipment : Smart pad

FCC ID. : 2AN4P-NT-A7

Model Name : NT-A7

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 9 pages (including this page)

Date of Incoming : November 29, 2017

Date of issue : January 08, 2018

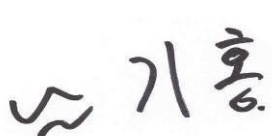
SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C Section 15.247**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:


Ki-Hong, Nam / Asst, Chief Engineer
ONETECH Corp.

Approved by:


Keun-Young, Choi / Vice President
ONETECH Corp.

CONTENTS

PAGE

1. VERIFICATION OF COMPLIANCE	4
2. GENERAL INFORMATION.....	5
2.1 PRODUCT DESCRIPTION.....	5
2.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT.....	6
3. EUT MODIFICATIONS.....	6
4. MAXIMUM PERMISSIBLE EXPOSURE.....	7
4.1 RF EXPOSURE LIMIT	7
4.2 EUT DESCRIPTION.....	8
4.3 TEST RESULT TEST RESULT CALCULATED MPE SAFE DISTANCE	9

Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
OT-181-RWD-010	January 08, 2018	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

Applicant : NPC Co., Ltd.
Address : 289, Haeon-ro, Danwon-gu, Gyeonggi-do, Ansan-si, 15612, South Korea
Contact Person : Sungwoo, Kim / Manager
Telephone No. : +82-31-697-7432
FCC ID : 2AN4P-NT-A7
Model Name : NT-A7
Serial Number : N/A
Date : January 08, 2018

EQUIPMENT CLASS	DSS – PART 15 SPREAD SPECTRUM TRANSMITTER
E.U.T. DESCRIPTION	Smart pad
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The NPC Co., Ltd., Model NT-A7 (referred to as the EUT in this report) is a Smart pad. Product specification information described herein was obtained from product data sheet or user's manual

Device Type	Smart pad			
Temperature Range	- 10 °C ~ + 70 °C			
Operating Frequency	Bluetooth LE	2 402 MHz ~ 2 480 MHz		
	Bluetooth	2 402 MHz ~ 2 480 MHz		
	WLAN	2.4 GHz Band	802.11b/g/n(HT20)	2 412 MHz ~ 2 462 MHz
			802.11n(HT40)	2 422 MHz ~ 2 452 MHz
RF Output Power	Bluetooth LE	6.55 dBm		
	Bluetooth	1 Mbps	5.99 dBm	
		2 Mbps	7.47 dBm	
		3 Mbps	7.45 dBm	
	WLAN	2.4 GHz Band	12.45 dBm(802.11b)	
			12.20 dBm(802.11g)	
			11.48 dBm(802.11n_HT20)	
			7.92 dBm(802.11n_HT40)	
Modulation Type	Bluetooth LE	DSSS Modulation(GFSK)		
	Bluetooth	1 Mbps: GFSK		
		2 Mbps: $\pi/4$ -QPSK		
	WLAN	3 Mbps: 8-DPSK		
		802.11b: DSSS Modulation(DBPSK/DQPSK/CCK)		
		802.11g/n(HT20)/n(HT40): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)		
Antenna Type	PCB ANTENNA			
Antenna Gain	4.71 dBi			
Electrical Rating	DC 5.0 V			
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	24 MHz			

2.2 Alternative type(s)/model(s); also covered by this test report.

-. None

3. EUT MODIFICATIONS

-. None

4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Limit

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 $P \text{ (mW)} = P \text{ (W)} / 1\,000$, $d \text{ (cm)} = 0.01 * d \text{ (m)}$

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

Where

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

4.2 EUT Description

Kind of EUT	Smart pad		
Operating Frequency Band	☒ Bluetooth LE: 2 402 MHz ~ 2 480 MHz ☒ Bluetooth: 2 402 MHz ~ 2 480 MHz ☒ WLAN: 2 412 MHz ~ 2 462 MHz ☒ WLAN: 2 422 MHz ~ 2 452 MHz		
Device Category	☐ Portable (< 20 cm separation) ☐ Mobile (> 20 cm separation) ☒ Others		
MAX. RF OUTPUT POWER	Bluetooth LE	6.55 dBm	
	Bluetooth	1 Mbps	5.99 dBm
		2 Mbps	7.47 dBm
		3 Mbps	7.45 dBm
	WLAN	2.4 GHz Band	12.45 dBm(802.11b)
			12.20 dBm(802.11g)
			11.48 dBm(802.11n_HT20)
			7.92 dBm(802.11n_HT40)
Antenna Gain	4.71 dBi		
Exposure Evaluation Applied	☒ MPE ☐ SAR ☐ N/A		

4.3 Test Result Test Result 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		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/ cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 402 ~ 2 480	1 Mbps	6.0 ± 0.5	6.50	4.47	4.71	2.96	1.03	0.002 6	1.00
	2 Mbps	7.5 ± 0.5	8.00	6.31			1.22	0.003 7	
	3 Mbps	7.5 ± 0.5	8.00	6.31			1.22	0.003 7	



Tested by: Hyung-Kwon, Oh / Assistant Manager