

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

Test Report No. : OT-19O-RWD-017

AGR No. : A197A-013

Applicant : SOOIL Development Co., Ltd.

Address : 2725, Nambusunhwan-ro, Gangnam-gu, 06274, Seoul, Korea

Manufacturer : SOOIL Development Co., Ltd (Heukseok)

Address : 2725, Nambusunhwan-ro, Gangnam-gu, 06274, Seoul, Korea

Type of Equipment : Insulin Pump

FCC ID. : VF9DANAI4

Model Name : Diabecare DANA-i

Serial number : N/A

Total page of Report : 7 pages (including this page)

Date of Incoming : September 17, 2019

Date of issue : October 07, 2019

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.

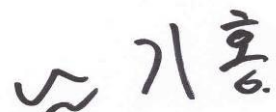
It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Tae-Ho, Kim / Senior Manager
ONETECH Corp.

Approved by:



Ki-Hong, Nam / Chief Engineer
ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-19O-RWD-017	October 07, 2019	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : SOOIL Development Co., Ltd.
Address : 2725, Nambusunhwan-ro, Gangnam-gu, 06274, Seoul, Korea
Contact Person : Geun-Sang, Lim / General Manager
Telephone No. : +82-2-2824-2133
FCC ID : VF9DANA14
Model Name : Diabecare DANA-i
Brand Name : -
Serial Number : N/A
Date : October 07, 2019

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Insulin Pump
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 558074 D01 15.247 Meas Guidance v05r02
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 SOOIL Development Co., Ltd., Model Diabecare DANA-i (referred to as the EUT in this report) is an Insulin Pump, Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Insulin Pump
Temperature Range	1 °C ~ 40 °C
Operating Frequency	2 402 MHz ~ 2 480 MHz
Modulation Type	GFSK
RF Output Power	0.22 dBm
ANTENNA TYPE	Chip Antenna
ANTENNA GAIN	1.05 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 kHz, 16 MHz
RATED SUPPLY VOLTAGE	DC 1.5 V

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 Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $f/1500 \text{ mW/cm}^2$ for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm^2 for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm^2 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/cm^2 , Z = Impedance of free space, 377Ω

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/cm^2

Kind of EUT	Insulin Pump
Device Category	<input checked="" type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input type="checkbox"/> Others
Exposure Evaluation Applied	<input type="checkbox"/> MPE <input type="checkbox"/> SAR <input checked="" type="checkbox"/> N/A

Tested by: Hyung-Kwon, Oh / Assistant Manager

4.2 Test Result for Bluetooth LE

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

$$[(\text{Max. Power of channel, including tune-up tolerance, mW})/(\text{Mim. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 3$$

$$= (3.69/5) \times \sqrt{2.480} = 1.16$$

Conclusion: The SAR test exclusion threshold is less than 3, so the device meets the RF Exposure Requirement and are excluded from SAR Test.

Operating Mode	Frequency (MHz)	Target Power W/tolerance (dBm)	Max tune up power (dBm)	Max tune up power (mW)	Separation distance (mm)	RF exposure
Bluetooth LE	2 402.00	0.50 ± 0.50	1.00	1.26	5.00	0.39



Tested by: Hyung-Kwon, Oh / Assistant Manager