

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-203-RWD-074
AGR No. : A202A-298R
Applicant : SMC Corporation
Address : 4-2-2, Kinunodai, Tsukubamirai-shi, Ibaraki-ken, Japan
Manufacturer : SMC Corporation
Address : 4-2-2, Kinunodai, Tsukubamirai-shi, Ibaraki-ken, Japan
Type of Equipment : Wireless module
FCC ID. : 2AJE7SMC-WEX02
Model Name : P5740-133
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 7 pages (including this page)
Date of Incoming : February 26, 2020
Date of issue : March 27, 2020

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: _____

Ha-Ram, Lee / Manager
ONETECH Corp.

Approved by: _____

Jae-Ho Lee / Chief Engineer
ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-203-RWD-074	March 27, 2020	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

Applicant : SMC Corporation
 Address : 4-2-2, Kinunodai, Tsukubamirai-shi, Ibaraki-ken, Japan
 Contact Person : Akira Nishigori / Assistant manager
 Telephone No. : +81-297-52-6665
 FCC ID : 2AJE7SMC-WEX02
 Model Name : P5740-133
 Serial Number : N/A
 Date : March 27, 2020

EQUIPMENT CLASS	<i>DSS – PART 15 SPREAD SPECTRUM TRANSMITTER</i>
E.U.T. DESCRIPTION	Wireless module
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 SMC Corporation, Model P5740-133 (referred to as the EUT in this report) is a Wireless module. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Wireless module	
OPERATING FREQUENCY	2 403 MHz ~ 2 481 MHz (1 Mbps, 250 kbps)	
RF OUTPUT POWER	1 Mbps	12.30 dBm
	250 kbps	12.25 dBm
NUMBER OF CHANNEL	79 Channels	
MODULATION TYPE	GFSK	
ANTENNA TYPE	PCB Antenna	
ANTENNA GAIN	1.36 dBi	
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1 MHz)	38.4 MHz	
RATED SUPPLY VOLTAGE	DC 3.3 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

4.2 EUT Description

Kind of EUT	Wireless module
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 240 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz <input type="checkbox"/> Bluetooth BLE: 2 402 MHz ~ 2 480 MHz <input checked="" type="checkbox"/> FHSS: 2 403 MHz ~ 2 481 MHz
MAX. RF OUTPUT POWER	12.30 dBm
Antenna Gain	1.36 dBi
Exposure Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> N/A

4.3 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		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 403	1 Mbps	12.30 ± 0.5	12.80	19.05	1.36	1.37	1.44	0.005 2	1.00
~ 2 481	250 kbps	12.25 ± 0.5	12.75	18.84			1.43	0.005 1	1.00

According to above table, for 2 403 ~ 2481 MHz Band(1 Mbps), safe distance,

$$D = 0.282 * \sqrt{(19.05 * 1.37)/1.00} = 1.44 \text{ cm.}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 19.05 * 1.36 / (4 * 3.14 * 20^2) = 0.005 2$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna



Tested by: Seion Lee / Assistant Manager