Data reference Letter

Shenzhen Typhur Technology Co., Ltd.
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Date: 2024-05-07

Federal Communications Commission
7435 Oakland Mills Road Columbia MD 21046 USA

Innovation, Science and Economic Development Canada
3701 Carling Avenue (Building 94), Ottawa, Ontario, K2H 8S2

To Whom It May Concern:

Request for FCC and IC Data reference:

Data reference request on:
Product Model: WT1000R
FCC ID: 2A6RN-WT1000R
IC: 28517-WT1000R

Original FCC and IC ID information
Product Model: WT1000
FCC ID: 2A6RN-WT1000 (grant date: 08/21/2023)
IC: 28517-WT1000 (grant date: 08/25/2023)
Note: original ID is transfered from FCC ID: 2AC7Z-ESPS3WROOM1U and IC: 21098-ESPS3WROOMU.

For the above device and pursuant to KDB 484596 D01 Referencing Test Data v02r03, Shenzhen Typhur Technology Co., Ltd. Wireless module (WT1000R) hereby requests the data reference for FCC and IC certification, detail difference description refer below.

*Single Modular		Single Modular (updated Bluetooth firmware)	
Items	Value	Items	Value
Bluetooth	Max. Conducted Output power: Bluetooth LE 1Mbps: 11.95dBm Bluetooth LE 2Mbps: 12.97dBm	Bluetooth firmware	Updated Bluetooth firmware only and the other are same as before. And the RF output power up to 20dBm.

- The wireless module test data refers to test report FR1D1609A, FR1D1609B, CR1D1609ATX and CR1D1609BTX as issued by Sporton International Inc. (Kunshan).
- There is no other change in hardware or in existing RF relevant portion of the product, and only updated the Bluetooth firmware.
- There is no any software/firmware that can be modified by end-user.
- Based on the above difference description, fully test on the Bluetooth LE mode, including the Wireless and EMF evaluation and additional spot check test for WiFi conducted output power.

Sincerely,

Wilson Huang

Applicant Signature

Printed Name: Wilson Huang

Title: Certification Engineer

Email: wilson.huang@typhur.com

1. Reference device

1.1. General information of product

- FCC ID: 2A6RN-WT1000
- Data of Grant: 08/21/2023
- Product Type: Single Modular
- Equipment Class: DTS
- FCC Rule: FCC Part 15.247
- Operation frequency: 2412-2462MHz for WiFi, 2402-2480MHz for Bluetooth LE
- Wireless mode: 2.4GHz WiFi up to 802.11n40, Bluetooth LE mode (1Mbps, 2Mbps)
- Refer test report: FR1D1609A and FR1D1609B as issued by Sporton International Inc.(Kunshan).
- Product photos (Single Modular):

Front view

Rear view

1.2. 2.4GHz Wi-Fi RF Output Power

2.4GHz Band Single Antenna																
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	18.41	-		30.00	-	2.33	-	20.74	-	36.00	-	Pass
11b	1Mbps	1	6	2437	15.73	-		30.00	-	2.33	-	18.06	-	36.00	-	Pass
11b	1Mbps	1	11	2462	16.93	-		30.00	-	2.33	-	19.26	-	36.00	-	Pass
11g	6Mbps	1	1	2412	23.28	-		30.00	-	2.33	-	25.61	-	36.00	-	Pass
11g	6Mbps	1	6	2437	25.11	-		30.00	-	2.33	-	27.44	-	36.00	-	Pass
11g	6Mbps	1	11	2462	23.78	-		30.00	-	2.33	-	26.11	-	36.00	-	Pass
HT20	MCS0	1	1	2412	23.44	-		30.00	-	2.33	-	25.77	-	36.00	-	Pass
HT20	MCS0	1	6	2437	24.55	-		30.00	-	2.33	-	26.88	-	36.00	-	Pass
HT20	MCS0	1	11	2462	23.45	-		30.00	-	2.33	-	25.78	-	36.00	-	Pass
HT40	MCS0	1	3	2422	23.31	-		30.00	-	2.33	-	25.64	-	36.00	-	Pass
HT40	MCS0	1	6	2437	24.10	-		30.00	-	2.33	-	26.43	-	36.00	-	Pass
HT40	MCS0	1	9	2452	24.02	-		30.00	-	2.33	-	26.35	-	36.00	-	Pass

1.3. Bluetooth LE RF Output Power

Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	11.95	30.00	2.33	14.28	36.00	Pass
BLE	1Mbps	1	19	2440	11.67	30.00	2.33	14.00	36.00	Pass
BLE	1Mbps	1	39	2480	8.73	30.00	2.33	11.06	36.00	Pass

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	12.97	30.00	2.33	15.30	36.00	Pass
BLE	2Mbps	1	19	2440	12.44	30.00	2.33	14.77	36.00	Pass
BLE	2Mbps	1	38	2480	11.89	30.00	2.33	14.22	36.00	Pass
BLE	2Mbps	1	39	2480	8.77	30.00	2.33	11.10	36.00	Pass

2. Variant Device

2.1. General information of Variant Device

- FCC ID: 2A6RN-WT1000R
- Data of Grant: PAG firstly.
- Product Type: Single Modular
- Equipment Class: DTS
- FCC Rule: FCC Part 15.247
- Operation frequency: 2412-2462MHz for WiFi, 2402-2480MHz for Bluetooth LE
- Wireless mode: 2.4GHz WiFi up to 802.11n40, Bluetooth LE mode (1Mbps, 2Mbps)
- Product photos (Single Modular):

Front view

Rear view

2.2. Data Referencing Applicability

The variant model WT1000R are same as the FCC ID: 2A6RN-WT1000 hardware designed including PCB Layout, Circuit Diagram, Product size, and only difference on the Bluetooth mode firmware, As the Bluetooth LE upgraded with firmware to increase its power up to 20dBm.

2.3. Spot-Check Plan for 2.4GHz Wi-Fi mode

2.4GHz Wi-Fi mode			
Rule Part	Test item	Data Referencing	Comments
15.203	Antenna Requirement	Y	
*FCC Part 15.247(b)(3)	Transmitter Output Power	N	Retest
FCC Part 15.247(e)	Transmitter Power Spectral Density	Y	
FCC Part 15.247(a)(2)	6dB Bandwidth	Y	
FCC Part 15.247(d)	Band Edge / Out-of-Band Emissions	Y	
FCC Part 15.205 & FCC Part 15.209	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	Y	

*Note: The 2.4GHz Wi-Fi power verification is used to ensure that the upgrading Bluetooth LE firmware does not affect the power of 2.4GHz Wi-Fi.

2.4GHz Wi-Fi spot check RF Output Power test data:

Test Mode	Test Channel (MHz)	Measured Peak Power (dBm)
11B	2412	18.69
	2437	15.43
	2462	16.77
11G	2412	23.17
	2437	24.94
	2462	23.61
11N20	2412	23.28
	2437	23.79
	2462	23.31
11N40	2422	22.83
	2437	23.52
	2452	23.18

2.4. Additional testing with Bluetooth LE mode

Bluetooth mode (1Mbps, 2Mbps)

Rule Part	Test item	Data Referencing	Comments
15.203	Antenna Requirement	Y	
*FCC Part 15.247(b)(3)	Transmitter Output Power	N	Retest
FCC Part 15.247(e)	Transmitter Power Spectral Density	N	Retest
FCC Part 15.247(a)(2)	6dB Bandwidth	N	Retest
FCC Part 15.247(d)	Band Edge / Out-of-Band Emissions	N	Retest
FCC Part 15.205 & FCC Part 15.209	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	N	Retest

*Note: The following data only shows the power of Bluetooth LE.

Bluetooth RF output power

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
Bluetooth LE (1 Mbps)	2402	18.77	0.0753	< 1.0
	2440	19.05	0.0804	
	2480	18.95	0.0785	
Max. Measured Value		**19.05**	**0.0804**	
Bluetooth LE (2 Mbps)	2402	18.97	0.0789	
	2440	19.48	0.0887	
	2480	19.37	0.0865	
Max. Measured Value		**19.48**	**0.0887**	