RF Exposure Evaluation Report

APPLICANT	:	**Quectel Wireless Solutions Co., Ltd.**
EQUIPMENT	:	**Wi-Fi & Bluetooth Module**
BRAND NAME	:	**Quectel**
MODEL NAME	:	**SC66-MW**
FCC ID	:	**XMR201905SC66MW**
STANDARD	:	**47 CFR Part 2.1091** **FCC KDB 447498 D01 v06**

We, Sporton International (Kunshan) Inc., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Mark Qu

TESTING
NVLAP LAB CODE 600155-0

Approved by: Mark Qu / Manager

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone,
Jiangsu Province 215335, China

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History of this test report

Report No.	Version	Description	Issued Date
FA931313	Rev. 01	Initial issue of report	Apr. 28, 2019

1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	Sporton International (Kunshan) Inc.
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958

Applicant	
Company Name	Quectel Wireless Solutions Co., Ltd.
Address	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China

Manufacturer	
Company Name	Quectel Wireless Solutions Co., Ltd.
Address	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Wi-Fi & Bluetooth Module
Brand Name	Quectel
Model Name	SC66-MW
FCC ID	XMR201905SC66MW
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	R1.0
SW Version	SC66MWNAR01A02
EUT Stage	Identical Prototype
Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

3. Maximum RF average output power among production units

<WLAN 2.4GHz>

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	18.00
	802.11g	15.50
	802.11n-HT20	14.00
	802.11n-HT40	14.50

<WLAN 5GHz>

Mode		Maximum Average Power (dBm)
5.2GHz	802.11a	15.00
	802.11n-HT20	15.00
	802.11n-HT40	15.00
	802.11ac-VHT20	15.00
	802.11ac-VHT40	14.00
	802.11ac-VHT80	13.00
5.3GHz	802.11a	15.00
	802.11n-HT20	15.00
	802.11n-HT40	15.00
	802.11ac-VHT20	15.00
	802.11ac-VHT40	14.00
	802.11ac-VHT80	13.00
5.5GHz	802.11a	15.00
	802.11n-HT20	15.00
	802.11n-HT40	15.00
	802.11ac-VHT20	15.00
	802.11ac-VHT40	14.00
	802.11ac-VHT80	13.00
5.8GHz	802.11a	15.00
	802.11n-HT20	15.00
	802.11n-HT40	15.00
	802.11ac-VHT20	15.00
	802.11ac-VHT40	14.00
	802.11ac-VHT80	14.00

Note: WLAN2.4GHz/WLAN5GHz all support SISO/MIMO mode, we only chose MIMO tune up power to perform MPE calculation conservatively for MIMO power is higher.

Band / Mode	Average Power (dBm)			
	BR / EDR			LE
	1M	2M	3M	GFSK
Bluetooth	10.50	8.50	8.50	1.00

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/mW^2)	Limit (mW/mW^2)	Power Density / Limit
Bluetooth	2402.0	5.38	10.50	15.88	38.73	0.008	1.000	**0.008**
2.4GHz WLAN	2412.0	5.38	18.00	23.38	217.77	0.043	1.000	0.043
5.2GHz WLAN	5180.0	4.48	15.00	19.48	88.72	0.018	1.000	0.018
5.3GHz WLAN	5260.0	4.48	15.00	19.48	88.72	0.018	1.000	0.018
5.5GHz WLAN	5500.0	5.05	15.00	20.05	101.16	0.020	1.000	**0.020**
5.8GHz WLAN	5745.0	4.54	15.00	19.54	89.95	0.018	1.000	0.018

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

5.2. Collocated Power Density Calculation

WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ (Power Density / Limit) of WLAN+Bluetooth
0.020	0.008	0.028

Note:

1. Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WLAN + Bluetooth.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.