RF Exposure Evaluation Report

APPLICANT	:	Texas Instruments Incorporated
EQUIPMENT	:	WiFi and Bluetooth Module
BRAND NAME	:	Texas Instruments
MODEL NAME	:	WL18MODGI
FCC ID	:	Z64-WL18DBMOD
STANDARD	:	47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

Table of Contents

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA741330	Rev. 01	Initial issue of report	Mar. 23, 2018

1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Texas Instruments Incorporated
Address	12500 TI BLVD., Dallas Texas, 75243

Manufacturer	
Company Name	Texas Instruments Incorporated
Address	12500 TI BLVD., Dallas Texas, 75243

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	WiFi and Bluetooth Module
Brand Name	Texas Instruments
Model Name	WL18MODGI
FCC ID	Z64-WL18DBMOD
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 ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480MHz
Mode	802.11a/b/g/n HT20/HT40 Bluetooth BR, EDR, LE v4.2
EUT Stage	Production Unit
Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

Antenna information					
	Brand	**Antenna Type**	**Model**	**2.4GHz ~2.5GHz Gain**	**4.9GHz ~5.8GHz Gain**
1	Ethertronics	PCB	100423	-0.6dBi	4.5dBi
2	LSR	Rubber Whip / Dipole	001-0012	2dBi	2dBi
3			080-0013	2dBi	2dBi
4			080-0014	2dBi	2dBi
5		PIFA	001-0016	2.5dBi	3dBi
6			001-0021	2.5dBi	3dBi
7	Laird	PCB	CAF94504	2dBi	4dBi
8			CAF94505	2dBi	4dBi
9	Pulse	Chip	W3006	3.2dBi	4.2dBi
10	TDK	CHIP	ANT016008	2.5dBi	3.96dBi
Note: Many antennas with the WLAN/BT module, the MPE calculation was selected worse antenna gain perform.					

3. Maximum RF average output power

Mode	Average Power (dBm)		
	Bluetooth	2.4GHz WLAN	5GHz WLAN
	12.5	17.5	19.5

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. Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)
Bluetooth	2402.0	3.2	12.5	15.700	0.037	37.154	0.007	1.000
2.4GHz WLAN	2412.0	3.2	17.5	20.700	0.117	117.490	0.023	1.000
5GHz WLAN	5180.0	4.5	19.5	24.000	0.251	251.189	0.050	1.000

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

Conclusion:

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