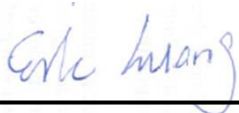


RF Exposure Evaluation Report

APPLICANT : Texas Instruments Incorporated
EQUIPMENT : WiFi and Bluetooth Module
BRAND NAME : Texas Instruments
MODEL NAME : WL18MODGB
MARKETING NAME : WL18xxMOD WiLink™ 8 Single-Band Combo Module –
Wi-Fi®, Bluetooth®, and Bluetooth Low Energy (LE)
FCC ID : Z64-WL18SBMOD
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 / Manager



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



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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 District, Taoyuan City, 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	WL18MODGB
Marketing Name	WL18xxMOD WiLink™ 8 Single-Band Combo Module –Wi-Fi®, Bluetooth®, and Bluetooth Low Energy (LE)
FCC ID	Z64-WL18SBMOD
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	802.11b/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
1	Ethertronics	PCB	100423	-0.6dBi
2	LSR	Rubber Whip / Dipole	001-0012	2dBi
3			080-0013	2dBi
4			080-0014	2dBi
5		PIFA	001-0016	2.5dBi
6			001-0021	2.5dBi
7		Laird	PCB	CAF94504
8	CAF94505			2dBi
9	Pulse	Chip	W3006	3.2dBi
10	TDK	CHIP	ANT016008	2.5dBi



3. Maximum RF average output power among production units

Bluetooth

Mode / Band	Average Power (dBm)			
	BR/EDR			LE
	1Mbps	2Mbps	3Mbps	
2.4 GHz Bluetooth	12	10	10	7

WLAN

Band / Mode	IEEE 802.11 Average Power (dBm)				
	Ant 1 (SISO Mode)				Ant 1+2 (MIMO Mode)
	11b	11g	HT20	HT40	HT20
2.4GHz Band	16.5	16.5	16.0	14.5	16.5

Note:

- 1. MIMO mode operation only supports 802.11n HT20 on this device.
- 2. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant.2



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/f ²)	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/f ²)	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)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
2.4GHz WLAN	2412.0	3.2	16.5	19.700	0.093	93.325	0.019	1.000	0.019
Bluetooth	2402.0	3.2	12.0	15.200	0.033	33.113	0.007	1.000	0.007

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
0.019	0.007	0.026

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. Considering the WLAN module collocation with the Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant

Conclusion:

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