



# RF EXPOSURE EVALUATION REPORT

**FCC ID** : ZAT-CC2652PSIP  
**Equipment** : CC2652PSIP SimpleLink™ Multiprotocol  
2.4-GHz Wireless System-in-Package With  
Integrated Power Amplifier  
**Brand Name** : Texas Instruments  
**Model Name** : CC2652PSIPMOT  
**Marketing Name** : CC2652PSIP SimpleLink™ Multiprotocol  
2.4-GHz Wireless System-in-Package With  
Integrated Power Amplifier  
**Applicant** : Texas Instruments Incorporated  
12500 TI BLVD., Dallas, Texas, 75243  
**Manufacturer** : Texas Instruments Incorporated  
12500 TI BLVD., Dallas, Texas, 75243  
**Standard** : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager



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**1. Description of Equipment Under Test (EUT)**

<b>Product Feature &amp; Specification</b>	
<b>EUT Type</b>	CC2652PSIP SimpleLink™ Multiprotocol 2.4-GHz Wireless System-in-Package With Integrated Power Amplifier
<b>Brand Name</b>	Texas Instruments
<b>Model Name</b>	CC2652PSIPMOT
<b>Marketing Name</b>	CC2652PSIP SimpleLink™ Multiprotocol 2.4-GHz Wireless System-in-Package With Integrated Power Amplifier
<b>FCC ID</b>	ZAT-CC2652PSIP
<b>Wireless Technology and Frequency Range</b>	Bluetooth: 2402 MHz ~ 2480 MHz Zigbee: 2405 MHz ~ 2480 MHz
<b>Mode</b>	Bluetooth LE (125 kbps, 500 kbps, 1Mbps, 2Mbps) Zigbee (OQPSK DSSS1:8, 250 kbps)

**Reviewed by: Jason Wang**

**Report Producer: Paula Chen**



Bluetooth LE (125 kbps, 500 kbps, 1Mbps, 2Mbps) and Zigbee (OQPSK DSSS1:8, 250 kbps)

Antenna Information				
	Brand	Antenna Type	Model	2.4 GHz Gain
1	Texas Instruments	Inverted F - PCB	Custom Antenna	3.3dBi
2			Custom Antenna	5.3dBi
3	Ethertronics	Dipole	1000423	-0.6dBi
4	LSR	Rubber Whip / Dipole	001-0012	2dBi
5			080-0013	2dBi
6			080-0014	2dBi
7		PIFA	001-0016	2.5dBi
8	001-0021		2.5dBi	
9	Laird	PCB	CAF94504	2dBi
10			CAF9405	2dBi
11	Pulse	Ceramic Chip	W3006	3.2dBi
12	ACX	Multilayer Chip	AT3216-BR2R7HAA	0.5dBi
13			AT312-T2R4PAA	1.5dBi
14	TDK	Multilayer Ceramic Chip Antenna	ANT016008LCD2442MA1	1.6dBi
15			ANT016008LCD2442MA2	2.5dBi
16	Mitsubishi Material	Chip Antenna	AM03DP-ST01	1.6dBi
17		Antenna Unit	UB18CP-100ST01	-1.0dBi
18	Taiyo Yuden	Chip Antenna / Helical Monopole	AF216M245001	1.5dBi
19		Chip Antenna / Monopole Type	AH212M245001	1.3dBi
20			AH316M245001	1.9dBi
21	Antenna Technology	Dipole	AA2402SPU	2.0dBi
22			AA2402RSPU	2.0dBi
23			AA2402A-UFLLP	2.0dBi
24			AA2402AU-UFLLP	2.0dBi
25	Staf	Mono-pole	1019-016	2.14dBi
26			1019-017	2.14dBi
27			1019-018	2.14dBi
28			1019-019	2.14dBi
29	Map Electronics	Rubber Whip	MEIWX-2411SAXX-2400	2.0dBi
30			MEIWX-2411RSXX-2400	2.0dBi
31			MEIWX-1511RSXX-2400	5.0dBi
32			MEIWX-151XSAXX-2400	5.0dBi
33			MEIWX-1451RSXX-2400	4.0dBi
34			MEIWX-282XSAXX-2400	2.0dBi
35			MEIWX-282XRSXX-2400	2.0dBi
36			MEIWF-HP01RS2X-2400	2.0dBi
37	Yageo	Chip	ANT3216A063R2400A	1.69dBi
38	Mag Layers Scientific	Chip	LTA-3216-2G4S3-A1	1dBi
39			LTA-3216-2G4S3-A3	2dBi
40	Advantech	Rubber Whip / Dipole	AN2450-5706RS	2.38dBi
41			AN2450-5010BRS	5.03dBi
42			AN2450-92K01BRS	5.03dBi
43			R-AN2400-5701RS	3.3dBi

Note: Antenna 1 is the default antenna used on the test HW (the Launchpad)



**2. Maximum RF average output power among production units**

Band	Setting	Maximum Average Power (dBm)
Bluetooth LE	10	12.4
	9	11.2
	5	5.9
	0	2
Zigbee	10	12.3
	5	5.7
	2	2.9
	0	1.5

### **3. RF Exposure Limit Introduction**

According to Part1.1307b, Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th} \text{ (mW)} = ERP_{20cm} (d / 20)^x \text{ for distance } d \leq 20cm$$

$$P_{th} \text{ (mW)} = ERP_{20cm} \text{ for distance } 20cm < d \leq 40cm$$

$$x = -\log_{10} \left( \frac{60}{ERP_{20cm} \sqrt{f}} \right)$$

ERP <sub>20cm</sub> (mW)	0.3 GHz ≤ f < 1.5 GHz:	2040 f
	1.5 GHz ≤ f ≤ 6 GHz:	3060

### **4. RF Exposure Evaluation**

#### **4.1. Standalone assessment**

Setting	Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	P <sub>th</sub>	P <sub>th</sub> (mW)	Part1.1307 option(b) Threshold (mW)
10	Bluetooth	1.9	12.4	5.3	3.15	3.39	2.07	3.40	2.19	3060.000
9	Bluetooth	3.3	11.2	5.5	3.35	3.55	2.16	2.20	1.66	3060.000
5	Bluetooth	5.3	5.9	2.2	0.05	1.66	1.01	-3.10	0.49	3060.000
0	Bluetooth	5.3	2.0	-1.7	-3.85	0.68	0.41	-7.00	0.20	3060.000
10	Zigbee	3.3	12.3	9.6	7.45	9.12	5.56	6.30	4.27	3060.000
5	Zigbee	5.3	5.7	5.0	2.85	3.16	1.93	-0.30	0.93	3060.000
2	Zigbee	3.3	2.9	0.2	-1.95	1.05	0.64	-3.10	0.49	3060.000
0	Zigbee	5.3	1.5	0.8	-1.35	1.20	0.73	-4.50	0.35	3060.000

### **Conclusion:**

According to 47 CFR §1.1307, the RF exposure analysis concludes that the RF Exposure is FCC compliant.