


RF EXPOSURE EVALUATION REPORT

FCC ID : ZAT-2651R3SIPA
Equipment : CC2651R3SIPA SimpleLink™ Multiprotocol
2.4-GHz Wireless System-in-Package Module
with Integrated Antenna & 352-KB Memory
Brand Name : Texas Instruments
Model Name : CC2651R3SIPAT0MOUR
Marketing Name : CC2651R3SIPA SimpleLink™ Multiprotocol
2.4-GHz Wireless System-in-Package Module
with Integrated Antenna & 352-KB Memory
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.

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Approved by: Cona Huang / Deputy Manager



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History of this test report

Report No.	Version	Description	Issued Date
FA242614	Rev. 01	Initial issue of report	Jul. 14, 2022

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

Product Feature & Specification	
EUT Type	CC2651R3SIPA SimpleLink™ Multiprotocol 2.4-GHz Wireless System-in-Package Module with Integrated Antenna & 352-KB Memory
Brand Name	Texas Instruments
Model Name	CC2651R3SIPAT0MOUR
Marketing Name	CC2651R3SIPA SimpleLink™ Multiprotocol 2.4-GHz Wireless System-in-Package Module with Integrated Antenna & 352-KB Memory
FCC ID	ZAT-2651R3SIPA
Wireless Technology and Frequency Range	Bluetooth: 2402 MHz ~ 2480 MHz Zigbee: 2405 MHz ~ 2480 MHz
Mode	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	3.3 dBi
2		CC2651R3SIPA integrated antenna – PCB	Custom Antenna	1.5 dBi
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-282XSAXX-2400	2.0dBi
32			MEIWX-282XRSXX-2400	2.0dBi
33			MEIWF-HP01RS2X-2400	2.0dBi
34	Yageo	Chip	ANT3216A063R2400A	1.69dBi
35	Mag Layers Scientific	Chip	LTA-3216-2G4S3-A1	1dBi
36			LTA-3216-2G4S3-A3	2dBi
37	Advantech	Rubber Whip / Dipole	AN2450-5706RS	2.38dBi
38			R-AN2400-5701RS	3.3dBi

Note: Antenna 2 is the default antenna used on the test HW (the Launchpad)

2. Maximum RF average output power among production units

Band	Maximum Average Power (dBm)
Bluetooth LE	4.77
Zigbee	4.73

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 P_{th} (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). P_{th} is given by:

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

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

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

$$ERP_{20cm} \text{ (mW)} \begin{matrix} 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz:} & 2040 f \\ 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz:} & 3060 \end{matrix}$$

4. RF Exposure Evaluation

4.1. Standalone assessment

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	P _{th}	P _{th} (mW)	Part1.1307 option(b) Threshold (mW)
Bluetooth	3.30	4.77	-0.9	-3.08	0.81	0.49	-4.23	0.38	3060.000
Zigbee	3.30	4.73	2.0	-0.12	1.60	0.97	-1.27	0.75	3060.000

Conclusion:

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