

RF EXPOSURE EVALUATION REPORT

Equipment : CC2652RSIPMOT
Brand Name : Texas Instruments Incorporated
Model Name : CC2652RSIPMOT
Marketing Name : CC2652RSIP SimpleLink™ Multiprotocol
2.4-GHz Wireless System-in-Package
Applicant : Texas Instruments
12500 TI BLVD., Dallas, Texas, 75243
Manufacturer : Texas Instruments
12500 TI BLVD., Dallas, Texas, 75243
Standard : EN IEC 62311:2020
EN 50665:2017

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with EN IEC 62311:2020, EN 50665:2017 and it complies with applicable limit.

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



Approved by: Cona Huang / Deputy Manager



SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan



Table of Contents

1. GENERAL INFORMATION	4
1.1. Description of Equipment Under Test (EUT)	4
2. MAXIMUM RF OUTPUT POWER (UNIT: DBM)	5
3. RF EXPOSURE LIMIT INTRODUCTION	6
4. RF EXPOSURE EVALUATION	7
4.1. Power Density Calculations	7



History of this test report

Report No.	Version	Description	Issued Date
EA1N0955	Rev. 01	Initial issue of report	Mar. 07, 2022



1. General Information

1.1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	CC2652RSIPMOT
Brand Name	Texas Instruments Incorporated
Model Name	CC2652RSIPMOT
Marketing Name	CC2652RSIP SimpleLink™ Multiprotocol 2.4-GHz Wireless System-in-Package
Wireless Technology and Frequency Range	Bluetooth: 2400 MHz ~ 2483.5 MHz Zigbee: 2405 MHz ~ 2480 MHz
Mode	Bluetooth LE Zigbee: BPSK
EUT Stage	Identical Prototype

Reviewed by: **Jason Wang**

Report Producer: **Daisy Peng**

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	Chip	LTA-3216-2G4S3-A1	1dBi
39	Scientific		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

2. Maximum RF Output Power (Unit: dBm)

Mode	Maximum Average Power (dBm)	
	Setting 0	Setting 5
Bluetooth LE	0	3.80
ZigBee	0	3.80

3. RF Exposure Limit Introduction

The table of the reference field levels shown as below is given in Annex III of the Council Recommendation 1999/519/EC.

And the EN IEC 62311 standard may not include in TAF scope

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m ²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	$87/f$	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

Notes:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{1.05}$ -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

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

4. RF Exposure Evaluation

4.1. Power Density Calculations

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (W/m ²)	Limit (W/m ²)
Bluetooth	2400	5.30	3.80	9.10	8.13	0.02	10.00
Zigbee	2405	5.30	3.80	9.10	8.13	0.02	10.00

Conclusion:

According to Council Recommendation 1999/519/EC, the RF exposure analysis concludes that the RF Exposure is CE compliant.