DEKRA Testing and Certification (Suzhou) Co., Ltd.
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China
TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098

Test report No:
2440634R-RF-US-P20V01

SAR Exemption Evaluation Report

Product Name	AIROC Bluetooth LE Module
Trademark	
Model and /or type reference	CYW20829–P4TAI200, CYW20829–P4EPI200, CYW20829–P4EFI200
FCC ID	WAP829I20
IC	7922A-829I20
Applicant´s name / address	Cypress Semiconductor 198 Champion Ct, San Jose, California 95134, United States
Test method requested, standard	FCC 47CFR §2.1093 RSS-102: Issue 6
Verdict Summary	IN COMPLIANCE
Documented By (name / position & signature)	Tim Cao / Project Manager
Approved by (name / position & signature)	Jack Zhang / Manager
Date of issue	2024-08-19
Report Version	V1.0
Report template No	Template_FCC MPE-RF-V1.0

INDEX

page

COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date (receive sample)	Apr. 23, 2024
Date (start test)	May. 15, 2024
Date (finish test)	May. 25, 2024

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15℃ - 35 ℃
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT : Equipment Under Test
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
HCP : Horizontal Coupling Plane
VCP : Vertical Coupling Plane
UN : Nominal voltage
Tx : Transmitter
Rx : Receiver
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2440634R-RF-US-P20V01	V1.0	Initial issue of report.	2024-07-08

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on the device are for the purpose of demonstrating Compliance with FCC 47CFR §2.1091, RSS-102: Issue 5.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, it is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:

   - Chapter 1.4 Antenna information.

1. RF Exposure Evaluation

1.1. Limits

For FCC KDB 447498 D04V01

According to § 1.1307(b)(3)(i)(B)

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:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

For ISED RSS-102 Issue 6

Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Finally, when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption threshold.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18℃and 78％ RH.

1.3. General Description of the Item(s)

Product Name .....:	AIROC Bluetooth LE Module
Model No.....:	CYW20829–P4TAI200, CYW20829–P4EPI200, CYW20829–P4EFI200
Trademark.....:	
FCC ID.....:	WAP829I20
IC .....:	7922A-829I20
SoftwareVersion .....:	REV1.0
HardwareVersion.....:	REV1.0
Operating temperature.....:	-30°C to +85°C
Manufacturer .....:	Cypress Semiconductor
Manufacturer address.....:	198 Champion Ct, San Jose, California 95134, United States
Factory.....:	FITTEC ELECTRONICS (Suzhou) CO., LTD.
Factory address.....:	No. 29, Donfu Road, Loufeng East District, Suzhou Industrial Park, Suzhou, Jiangsu Province, P.R.China
Model difference.....:	Three modules share the same design, the difference is antenna configuration, CYW20829–P4TAI200 is PCB antenna; CYW20829–P4EPI200 is RF pad which connect external antenna, CYW20829–P4EFI200 is RF connector which connect external antenna. CYW20829–P4EFI200 as the main test equipment, and the other 2 models verify power and RSE.

Wireless specification .....:	Bluetooth (LE)					
Operating frequency range(s)	2402~2480MHz					
Type of Modulation .....:	GFSK					
PHYs.....:	☒	LE 1M	☒	LE 2M	☒	LE Coded S=2/8
Data Rate.....:	☒	1Mbit/s	☒	2Mbit/s	☒	500/125 Kbit/s
Number of channels .....:	40					

Rated power supply..... :	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☐	AC: 100 - 240 Vac, 50/60 Hz
	☒	DC: 3.3 Vdc
	☐	Poe:
Mounting position ..... :	☐	Table top equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment

	☐	Hand-held/Portable equipment
	☒	Other:

1.4. Antenna Information

Antenna Delivery .....:	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others: ……		
Antenna technology.....:	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type.....:	☒	External	☒	Dipole
			☐	Sectorized
	☒	Internal	☐	Ceramic Chip
			☐	PIFA
			☒	PCB
			☐	Others……..

Antenna Gain .....:	External Antenna	Internal Antenna
	2.0 dBi	-0.5 dBi

Note 1: The data shown in report was based on External Antenna which gain is higher.

Note 2: The antenna information for the EUT in clause 1.4 are provided and confirmed by the client.

1.5. Test Result of RF Exposure Evaluation

Mode	Exposure Condition	Pmax (dBm)	EIRP (mW)	Distance (mm)	f(GHz)	FCC Pth (mW)
Bluetooth	Body	20.95	124.45	40	2.480	143

Mode	Exposure Condition	Pmax (dBm)	EIRP (mW)	Distance (mm)	f(GHz)	ISED Pth (mW)
Bluetooth	Body	20.95	124.45	40	2.480	170

EIRP= Conducted+ Antenna Gain

Maximum TX Power is 124.45 mW

Conclusion: As long as the distance to the user is greater than 40 mm, the AIROC Bluetooth LE module does not require SAR because the maximum output power (conducted and EIRP) is below the FCC and ISED thresholds.

The End