TEST REPORT

Applicant:	CC&C Technologies, Inc.
Address:	8F, No.150, Jian Yi Rd, Zhonghe District, New Taipei City, 235, Taiwan
Equipment Type:	ac2x2+BT5.0 USB2.0
Model Name:	CM-8822CU-V2
Brand Name:	CC&C
FCC ID:	PANCM8822CUV2
Test Standard:	47 CFR Part 2.1091 KDB 447498 D04 v01
Sample Arrival Date:	Nov. 28, 2022
Test Date：	Dec. 02, 2022 - Dec. 13, 2022
Date of Issue:	Feb. 22, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xu Rui **Checked by:** Liyao Zong **Approved by:** Wei Yanquan (Chief Engineer)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jan. 05, 2023	Initial Issue
Rev. 02	Feb. 15, 2023	Updated antenna gain and note in Section 5.2 Added power table of WLAN 5.8G in Section 5.2 Updated table in Section 5.3 Updated note 3 and 5 in in Section 5.4
Rev. 03	Feb. 22, 2023	Updated power/limit ratio for Bluetooth in Section 5.4

TABLE OF CONTENTS

1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☑ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	CC&C Technologies, Inc.
Address	8F, No.150, Jian Yi Rd, Zhonghe District, New Taipei City, 235, Taiwan

2.2 Manufacturer Information

Manufacturer	CC&C Technologies, Inc.
Address	8F, No.150, Jian Yi Rd, Zhonghe District, New Taipei City, 235, Taiwan

2.3 Factory Information

Factory	Kunshan CC&C Technologies, Co., Ltd
Address	No.9 building, 3rd Main Street, Kunshan Free Trade Zone, Jiangsu Province, P. R. China

2.4 General Description for Equipment under Test (EUT)

EUT Name	ac2x2+BT5.0 USB2.0
Model Name Under Test	CM-8822CU-V2
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	V. A
Software Version	V15(WIFI+BT)
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40) 5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80) U-NII-1/3

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth; WLAN	
Frequency Range	Bluetooth	2400 ~ 2483.5 MHz
	802.11b/g	2400 ~ 2483.5 MHz
	802.11n(HT20/HT40)	2400 ~ 2483.5 MHz
	802.11a	5150 ~ 5250 MHz
		5725 ~ 5850 MHz
	802.11n (HT20/HT40)	5150 ~ 5250 MHz
		5725 ~ 5850 MHz
	802.11ac (VHT20/VHT40/VHT80)	5150 ~ 5250 MHz
		5725 ~ 5850 MHz
Antenna Type	Bluetooth	External Antenna
	WLAN	External Antenna
Exposure Category	General Population/Uncontrolled Exposure	
EUT Stage	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Device:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP20cm in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\,\text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \qquad (\text{B.1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula (B.2).

$$P_{\text{th}}\,(\text{mW}) = \begin{cases} ERP_{20\,\text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,\text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \qquad \text{(B.2)}$$

where

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

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

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

5 ASSESSMENT RESULT

5.1 Output Power

Mode	BR/EDR
Conducted Power (dBm)	9.96
Antenna Gain (dBi)	2.46
EIRP (dBm)	12.42
Note: This table listed the worst case power value, please refer to BL-EC22B1059-601 report for more details.	

Mode	BLE
Conducted Power (dBm)	9.81
Antenna Gain (dBi)	2.46
EIRP (dBm)	12.27
Note: This table listed the worst case power value, please refer to BL-EC22B1059-602 report for more details.	

Mode	WLAN 2.4G
Conducted Power (dBm)	19.79
Antenna Gain (dBi)	2.46
EIRP (dBm)	22.25
Note: This table listed the worst case power value, please refer to BL-EC22B1059-603 report for more details.	

Mode	WLAN 5.2G
Conducted Power (dBm)	18.80
Antenna Gain (dBi)	3.09
EIRP (dBm)	21.89
Note: This table listed the worst case power value, please refer to BL-EC22B1059-604 report for more details.	

Mode	WLAN 5.8G
Conducted Power (dBm)	19.10
Antenna Gain (dBi)	3.01
EIRP (dBm)	22.11
Note: This table listed the worst case power value, please refer to BL-EC22B1059-604 report for more details.	

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
BR/EDR	[8.00, 10.00]	[10.46, 12.46]	[8.31, 10.31]
BLE	[8.00, 10.00]	[10.46, 12.46]	[8.31, 10.31]
WALN 2.4G	[18.00, 20.00]	[20.46, 22.46]	[18.31, 20.31]
WLAN 5.2G	[18.00, 20.00]	[21.09, 23.09]	[18.94, 20.94]
WLAN 5.8G	[18.00, 20.00]	[21.01, 23.01]	[18.86, 20.86]
Note1: ERP= EIRP -2.15dB Note2: According KDB 447498 D04, used the greater of maximun conducted power and ERP to compare with the threshold value Pth.			

5.3 RF Exposure Evaluation Result

Evolution mode	Maximum power (dBm)	Maximum power (mw)	Distance (cm)	Threshold Power (mW)	Power / Limit	Verdict
BR/EDR	10.31	10.74	20	3060.00	0.004	Pass
BLE	10.31	10.74	20	3060.00	0.004	Pass
WALN 2.4G	20.31	107.40	20	3060.00	0.035	Pass
WLAN 5.2G	20.94	124.17	20	3060.00	0.041	Pass
WLAN 5.8G	20.86	121.90	20	3060.00	0.040	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency (GHz)	Power /Limit	Σ(Power / Limit) of BR/EDR + BLE + Max. WLAN	Verdict
BR/EDR	2.48	0.004	**0.049**	Pass
BLE	2.48	0.004		
Max. WLAN	5.825	0.041		

Note:

1. Σ(Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for BR/EDR + BLE + Max. WLAN.
2. Both of the 2.4GHz/5.8GHz can transmit simultaneously, the formula of calculated the Power is
   CP1 / LP1 + CP2 / LP2 + ……etc. < 1
   CP = Calculation power
   LP = Limit of power
3. The worst-case situation is 0.049, which is less than “1”. This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
4. The DUT work frequency range used is 2.48 GHz and 5.825 GHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
5. More power list please refer to BL-EC22B1059-601~604 test report.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

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