




Test report No:
2310228R-RF-US-P20V01

SAR Exemption Evaluation Report

Product Name	Motion Controller
Trademark	
FCC ID	2A5NV-C1B10
Model and /or type reference	C1B10
Applicant's name / address	Qingdao Chuangjian Weilai Technology Co., Ltd Room 401, 4th Floor, Building 3, Qingdao Research Institute, 393 Songling Road, Laoshan District, Qingdao City, Shandong Province, P.R.China
Test method requested, standard	FCC 47CFR §2.1093
Verdict Summary	IN COMPLIANCE
Documented By (name / position & signature)	Jun Xu/ Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2023-03-28
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INDEX

	page
Competences and Guarantees.....	3
General conditions.....	3
Environmental conditions.....	3
Possible test case verdicts	4
Abbreviations	4
Document History	5
Remarks and Comments	5
1. RF Exposure Evaluation.....	8
1.1. Limits	8
1.2. Test Procedure	10
1.3. Test Result of RF Exposure Evaluation	10

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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.

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GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Jan. 09, 2023
Date (start test)	Feb. 01, 2023
Date (finish test)	Feb. 16, 2023

1. This report is only referred to the item that has undergone the test.
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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 °C – 35 °C
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
U_N	: Nominal voltage
T_x	: Transmitter
R_x	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2310228R-RF-US-P20V01	V1.0	Initial issue of report.	2023-02-22
2310228R-RF-US-P20V01	V2.0	Page1 and Page6 customers modify applicant/manufacture address. Version 1.0 is out of date.	2023-03-28

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 a sample of the device are for the purpose of demonstrating Compliance with FCC 47CFR §2.1093.
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 relate only to the samples 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 1.1 General Description of the Item(s);
 - Chapter 1.2 Antenna Informaion;

1.1 General Description of the Item(s)

Product Name	Motion Controller
Model No.	C1B10
FCC ID	2A5NV-C1B10
Hardware Version	R7
Software Version	R0031
Manufacturer.....	Qingdao Chuangjian Weilai Technology Co., Ltd
Manufacturer address.....	Room 401, 4th Floor, Building 3, Qingdao Research Institute, 393 Songling Road, Laoshan District, Qingdao City, Shandong Province, P.R.China
Factory	Goertek Inc.
Address.....	No. 8877 Yingqian Street, High-Tech Industrial Development District, Weifang, Shandong, 261031, China

Wireless specification	Bluetooth 5.2				
Operating frequency range(s).....	2400~2483.5MHz				
Type of Modulation	GFSK				
PHYs	<input checked="" type="checkbox"/>	LE 1M	<input checked="" type="checkbox"/>	LE 2M	<input type="checkbox"/> LE Coded S=2/8
Data Rate.....	<input checked="" type="checkbox"/>	1Mbit/s	<input checked="" type="checkbox"/>	2Mbit/s	<input type="checkbox"/> 500/125 Kbit/s
Number of channel	40				

Rated power supply	Voltage and Frequency	
	<input type="checkbox"/>	AC: 220 – 240 V, 50/60 Hz
	<input type="checkbox"/>	AC: 110 – 130 Vac, 50/60 Hz
	<input checked="" type="checkbox"/>	Battery:3.0V 20mA
	<input type="checkbox"/>	Adapter: Input: 100-240V,50/60H, 0.3A Output:5V,2A ,10W
Mounting position.....	<input type="checkbox"/>	Table top equipment
	<input type="checkbox"/>	Wall/Ceiling mounted equipment
	<input type="checkbox"/>	Floor standing equipment
	<input checked="" type="checkbox"/>	Hand-held equipment
	<input type="checkbox"/>	Other: Watch

1.2 Antenna Information

Antenna model / type number.....:	N/A		
Antenna serial number.....:	N/A		
Antenna Delivery	<input checked="" type="checkbox"/>	1TX + 1RX	
	<input type="checkbox"/>	2TX + 2RX	
	<input type="checkbox"/>	Others:.....	
Antenna technology	<input checked="" type="checkbox"/>	SISO	
	<input type="checkbox"/>	MIMO	<input type="checkbox"/> CDD
			<input type="checkbox"/> Beam-forming
Antenna Type	<input type="checkbox"/>	External	<input type="checkbox"/> Dipole
			<input type="checkbox"/> Sectorized
	<input checked="" type="checkbox"/>	Internal	<input checked="" type="checkbox"/> FPC
			<input type="checkbox"/> PCB
			<input type="checkbox"/> Metal Monopole Antenna
			<input type="checkbox"/> Ceramic chip
			<input type="checkbox"/> Others.....
Antenna Gain	1.51dBi		

2. RF Exposure Evaluation

2.1. Limits

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$.

As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

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 P_{th} (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). P_{th} is given by Formula (B.2).

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

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

2.2. 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°C and 78% RH.

2.3. Test Result of RF Exposure Evaluation

Product	:	Motion Controller
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

Based on The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm and the formula below:

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

where

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

The tune-up tolerance is 0.5 dB, the maximum conducted power we used to calculate RF exposure is 7.32dBm.

Wireless Configuration	Exposure Condition	Pmax	Pmax	Distance	Frequency (GHz)	Calculation Result	Stand-alone Test exclusion threshold	SAR Test
		(dBm)	(mw)			(mw)	(mw)	
BT	Body	7.32	5.40	5.	2.48	5.40	7.5	No

Threshold for no SAR evaluation in 5mm is 5.4mW. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation are multiplied by a factor of 2.5. Maximum TX Power is 6.32mW Conducted.

Maximum TX Power is 5.40mW

Conclusion: 2.4GHz SAR was not required.

_____ The End _____