



TEST REPORT

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Report No.		ICRT-TR-E232415-1A			
Client	Name	HANMI MICRONICS INC.			
	Address	72, Samdo-ro 48beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea.			
Product name		Wireless Keyboard			
Model name		CaluX			
Voltages		DC 3.7 V			
Place of test		<input checked="" type="checkbox"/> Inside test <input type="checkbox"/> Field test Address: 112, 113 Hwanggeum 3-ro 7beon-gil, Hagan-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea			
Date of test		08. Sep. 2023 ~ 22. Sep. 2023			
Test Method/Item		FCC rule part 1.1310			
Test Results		Refer to 4. RF Exposure			
Affirmation	Tested by	Technical Manager			
	Si-Yeon, Hwang (Signature)	Tae-Yang, Yoon (Signature)			
<input type="checkbox"/> The above test report is certified that the above mentioned products have been tested for the sample. <input type="checkbox"/> The above test report is not related to accreditation by KS Q ISO/IEC 17025 and Korea Laboratory Accreditation scheme. <input type="checkbox"/> The test report is prohibited for some reproduction without the approval of the ICR.					
2023. 09. 26					
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The authenticity of the test report can be checked on the G4B or ICR website.

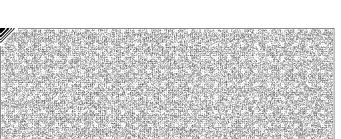
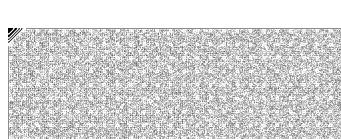
112, Hwanggeum3-ro 7beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea / Tel: 02-6351-9001 ~ 6



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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E232415-0A	2023. 09. 21	Initial Issue	All
ICRT-TR-E232415-1A	2023. 09. 26	Technical reissue	All



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1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	HANMI MICRONICS INC.
Address	72, Samdo-ro 48beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea.
Contact Person	Jason Kim
Telephone No.	+82 2-3273-2410
Fax No.	-
E-mail	jckim@micronics.co.kr

1.2 Manufacturer Information

Applicant	HANMI MICRONICS INC.
Address	72, Samdo-ro 48beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea.

1.3 Test Laboratory Information

Laboratory	ICR Co., Ltd.
Address	112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
Telephone No.	+82-2-6351-9002
Fax No.	+82-2-6351-9007
KOLAS No.	KT652
KC & FCC	KR0165

1.4 Measurement Uncertainty

Parameter	Uncertainty for ICR	Limit
Occupied Channel Bandwidth	0.19%	±5 %
RF output power, conducted	0.90 dB	±1.5 dB
Power Spectral Density, conducted	1.51 dB	±3 dB
Unwanted Emissions, conducted	1.36 dB	±3 dB
Supply voltages	0.02%	±3 %
Time	0.58%	±5 %
All emissions, radiated (Under the 1 GHz)	3.22 dB	±6 dB
All emissions, radiated (Above the 1 GHz)	3.67 dB	±6 dB



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2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	Wireless Keyboard
Model Name	CaluX
Additional Model Name	-
Hardware Version	2.0
Software Version	1.0
Power Supply	DC 3.7 V

2.2 Additional Information

Device Type	Stand-alone	
Operating Frequency	Bluetooth LE 1 Mbps	2 402 MHz ~ 2 480 MHz
	Bluetooth BDR	2 402 MHz ~ 2 480 MHz
	FHSS	2 402 MHz ~ 2 479 MHz
RF Output Power	Bluetooth LE 1 Mbps	-4.18 dBm
	Bluetooth BDR	-5.08 dBm
	FHSS	1.28 dBm
Modulation Type	GFSK	
Antenna Type	PCB Antenna	
Antenna Gain	1.58 dBi	
Operating Mode	The EUT is continuous transmission mode during the test	

2.3 Modifications of EUT

- None



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3. Test Summary

3.1 Test standards and results

FCC rule part 1.1310			
Clause	Test items	Applied	Results
FCC rule part 1.1310	Radiofrequency radiation exposure.	■	PASS



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4. Result

4.1 RF Exposure

4.1.1 Regulation

FCC rule part 1.1310(d)

(1) Evaluation with respect to the SAR limits in this section must demonstrate compliance with both the whole-body and peak spatial-average limits using technically supported measurement or computational methods and exposure conditions in advance of authorization (licensing or equipment certification) and in a manner that facilitates independent assessment and, if appropriate, enforcement. Numerical computation of SAR must be supported by adequate documentation showing that the numerical method as implemented in the computational software has been fully validated; in addition, the equipment under test and exposure conditions must be modeled according to protocols established by FCC-accepted numerical computation standards or available FCC procedures for the specific computational method.

(2) For operations within the frequency range of 300 kHz and 6 GHz (inclusive), the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in Table 1 in paragraph (e)(1) of this section, may be used instead of whole-body SAR limits as set forth in paragraphs (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in § 1.1307(b) of this part, except for portable devices as defined in § 2.1093 of this chapter as these evaluations shall be performed according to the SAR provisions in § 2.1093.

4.1.2 SAR test exclusion guidance

KDB 447498 D01 V06 4.3. General SAR test exclusion guidance

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.²⁸ The minimum test separation distance defined in 4.1 f) is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander. To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified, typically in the SAR measurement or SAR analysis report, by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting are required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops and tablets, etc.



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4.1.3 Limit

KDB 447498 D01 V06 4.3. General SAR test exclusion guidance

a) For 100 MHz to 6 GHz and test separation distances \leq 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR,}$

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is \leq 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is $<$ 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

b) For 100 MHz to 6 GHz and test separation distances $>$ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):

1) $\{[\text{Power allowed at numeric threshold for 50 mm in step a}]\} + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]$ mW, for 100 MHz to 1500 MHz

2) $\{[\text{Power allowed at numeric threshold for 50 mm in step a}]\} + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]$ mW, for $>$ 1500 MHz and \leq 6 GHz

c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):

1) For test separation distances $>$ 50 mm and $<$ 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$

2) For test separation distances \leq 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$

3) SAR measurement procedures are not established below 100 MHz.

When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any SAR test results below 100 MHz to be acceptable.



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4.1.4 Result

Mode	Frequency [MHz]	Max Power / tolerance [dBm]	Max Tune-up Power [dBm]	Min. test separation distance [mm]	SAR test exclusion thresholds	for 10-g SAR
FHSS	2 402	1.28 ± 1.0	2.28	5.00	0.52	≤ 7.5
BLE BDR	2 402	-5.08 ± 1.0	-4.08	5.00	0.12	≤ 7.5
BLE LE	2 402	-4.18 ± 1.0	-3.18	5.00	0.15	≤ 7.5

END OF REPORT.