

RF EXPOSURE REPORT

CERTIFICATE OF CONFORMITY

FCC Rule Part: FCC Part 2 (Section 2.1091)

Report No.: MFBCKS-WTW-P23030626

FCC ID: RF41689B

Product: Industrial Wireless System

Brand: KEYENCE

Model No.: WS-B01

Received Date: 2023/3/22

Test Date: 2023/7/20

Issued Date: 2023/11/28

Applicant: Keyence Corporation

Address: 1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku, Osaka, 533-8555, Japan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

FCC Registration / 723255 / TW2022

Designation Number:

Approved by: _____

May Chen / Manager

Date: _____

2023/11/28

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Prepared by : Claire Kuan / Specialist

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Release Control Record

Issue No.	Description	Date Issued
MFBCKS-WTW-P23030626	Original release.	2023/11/28

1 Certificate

Product: Industrial Wireless System

Brand: KEYENCE

Test Model: WS-B01

Sample Status: Engineering sample

Applicant: Keyence Corporation

Test Date: 2023/7/20

FCC Rule Part: FCC Part 2 (Section 2.1091)

Standard: KDB 447498 D04 Interim General RF Exposure Guidance v01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Applicable RF Exposure Limit

§ 1.1310 Radiofrequency radiation exposure limits.

(a) Specific absorption rate (SAR) shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b) of this part within the frequency range of 100 kHz to 6 GHz (inclusive).

(b) The SAR limits for occupational/controlled exposure are 0.4 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 8 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit for occupational/controlled exposure is 20 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 6 minutes to determine compliance with occupational/controlled SAR limits.

(c) The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

(e) Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields

➤ Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	f/1500	30
1500-100,000	1.0	30

f = frequency in MHz. * = Plane-wave equivalent power density.

➤ Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6

f = frequency in MHz. * = Plane-wave equivalent power density.

MPE-based Exemption – §1.1307(b)(3)(i)(C)

- The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.
- Table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits.

RF Source frequency (MHz)	Minimum Distance		Threshold ERP (watts)
	$\lambda_L / 2\pi$	$\lambda_H / 2\pi$	
0.3-1.34	159 m–35.6 m		$1,920 R^2$.
1.34-30	35.6 m–1.6 m		$3,450 R^2/f^2$.
30-300	1.6 m–159 mm		$3.83 R^2$.
300-1,500	159 mm–31.8 mm		$0.0128 R^2f$.
1,500-100,000	31.8 mm–0.5 mm		$19.2 R^2$.
R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.			

3 Test Results

Environmental Conditions:	25°C, 60% RH	Tested By:	Katina Lu
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CDD

MPE-based Exemption §1.1307(b)(3)(i)(C)					
Operation Mode	Frequency Band (MHz)	Maximum ERP (mW)	Distance (cm)	Limit Threshold (mW)	Test Result
WLAN 6 GHz	5955-7115	91.622	20	768	Pass

Note: Calculate the ERP of WLAN 6 GHz from the radiated field strength:

$$\text{ERP (dBm)} = \text{Radiated field strength (dBuV/m)} + 20 \times \text{Log}(d) - 104.77 - 2.15$$

d is the measurement distance, in 3 m.

$$\text{ERP} = 117 + 20 \times \text{Log}(3) - 104.77 - 2.15 = 19.62 \text{ dBm (91.622 mW)}$$

Beamforming

MPE-based Exemption §1.1307(b)(3)(i)(C)					
Operation Mode	Frequency Band (MHz)	Maximum ERP (mW)	Distance (cm)	Limit Threshold (mW)	Test Result
WLAN 6 GHz	5955-7115	107.647	20	768	Pass

Note: Calculate the ERP of WLAN 6 GHz from the radiated field strength:

$$\text{ERP (dBm)} = \text{Radiated field strength (dBuV/m)} + 20 \times \text{Log}(d) - 104.77 - 2.15$$

d is the measurement distance, in 3 m.

$$\text{ERP} = 117.7 + 20 \times \text{Log}(3) - 104.77 - 2.15 = 20.32 \text{ dBm (107.647 mW)}$$

4 Conclusion

Source-base time average power is below Exemption Criteria and/or Routine Evaluation MPE thresholds, therefore the device is compliant FCC RF exposure requirement.

5 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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