

RF Exposure Report

Report No.: MFACXM-WTW-P22040515

FCC ID: 2AEUPBHASG001

Test Model: 5F48E9

Received Date: 2022/4/14

Test Date: 2022/9/26

Issued Date: 2022/9/26

Applicant: Ring LLC

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Applicable RF Exposure Limit	5
3 Applicable Evaluation Criteria	6
4 Test Setup	7
5 Test Instruments	7
6 Test Result	8
7 Conclusion	11

Release Control Record

Issue No.	Description	Date Issued
MFACXM-WTW-P22040515	Original release.	2022/9/26

1 Certificate of Conformity

Product: Amazon Sidewalk Bridge Pro by Ring

Brand: Ring

Test Model: 5F48E9

Sample Status: Engineering sample

Applicant: Ring LLC

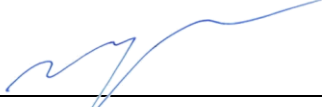
Test Date: 2022/8/12

FCC Rule Part: FCC Part 2 (Section 2.1091 & 2.1093)

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 EMC characteristics under the conditions specified in this report.

Prepared by : Vivian Huang , **Date:** 2022/9/26
Vivian Huang / Specialist

Approved by :  , **Date:** 2022/9/26
May Chen / Manager

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.

3 Applicable Evaluation Criteria

Routine Evaluation Procedure - Single and/or Multiple RF Sources

- MPE compliance are measurement in all directions surrounding the antenna and radiating structures of the device.

For non-directional antennas, MPE evaluation points shall be along radials extending from the antenna (axis) that are no more than 30° apart. The direction of maximum exposure shall be aligned with one of the radials.

For each specific exposure condition, the evaluation points along the longest dimension (e.g., vertical) shall use a spatial resolution of 10 cm or less, and shall extend at least 10 cm beyond the exposed portions of a person's body or until the evaluated results are less than 10% of the MPE limit. For exposures occurring next to the ground or next to a ground plane, the evaluation points shall be no closer than 10 cm from the ground.

Simultaneous Operations - Multiple RF Sources

- Fixed RF sources operating in the same time-averaging period – §1.1307(b)(3)(ii)(B)

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluated_k term) should be used to determine exemption for simultaneous transmission according to Formula below,

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

The sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE should be less than 1, to determine simultaneous transmission exposure compliance.

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using [paragraph \(b\)\(3\)\(i\)\(B\)](#) of this section for P_{th} , including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

$P_{th,i}$ = the exemption threshold power (P_{th}) according to [paragraph \(b\)\(3\)\(i\)\(B\)](#) of this section for fixed, mobile, or portable RF source i .

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j , at a distance of at least $\lambda/2\pi$ according to the applicable formula of [paragraph \(b\)\(3\)\(i\)\(C\)](#) of this section.

$Exposure\ Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k , as applicable from [§ 1.1310 of this chapter](#).

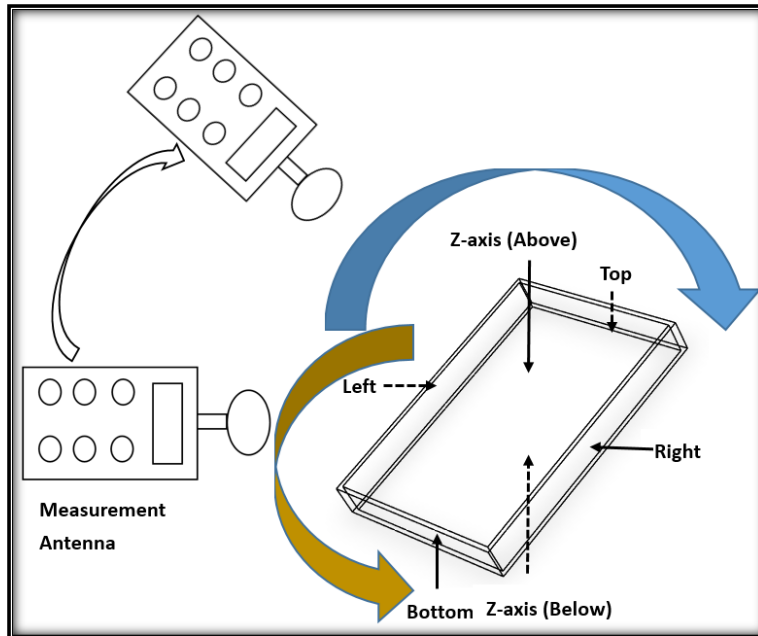
b = number of fixed, mobile, or portable RF sources claiming exemption using [paragraph \(b\)\(3\)\(i\)\(C\)](#) of this section for Threshold ERP, including existing exempt transmitters and those being added.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

ERP_j = the ERP of fixed, mobile, or portable RF source j .

$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

4 Test Setup



Note: The measurement antenna are move and surrounding the EUT when performed the test, the test results recorded the highest values for each sides of the EUT (left/right/top/bottom/z-axis)

5 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
EM Field Meter Wavecontrol	SMP2 Dual	22SN1914	2022/4/21	2023/4/20
Probe	WPF60	22WP230187	2022/4/21	2023/4/20

Notes:

1. The test was performed in 966 Chamber No. 4.
2. The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/9/26

6 Test Result

Signal RF Source

Routine Evaluation (General Population)					
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Test Distance (cm)	Limit (mW/cm ²)	Test Result
Bluetooth	2402-2480	0.013	18	1	Pass
WLAN 2.4GHz	2412-2462	0.077	18	1	Pass
WLAN 5GHz	5180-5825	0.062	18	1	Pass
FSK	902.5-927.5	0.054	18	0.601	Pass
LoRa	923.3-927.5	0.043	18	0.615	Pass
WWAN	698-716	0.039	18	0.465	Pass

Multiple RF Sources (Simultaneous Operations)

Simultaneously transmission condition.

Condition	Technology			
1	WLAN (2.4GHz)	LoRa	Bluetooth	-
2	WLAN (5GHz)	LoRa	Bluetooth	-
3	WLAN (2.4GHz)	FSK	Bluetooth	-
4	WLAN (5GHz)	FSK	Bluetooth	-
5	LTE	LoRa	Bluetooth	-
6	LTE	FSK	Bluetooth	-
7	WLAN (2.4GHz)	LoRa	FSK	Bluetooth
8	WLAN (5GHz)	LoRa	FSK	Bluetooth
9	LTE	LoRa	FSK	Bluetooth

Condition 1

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.16	1	Pass
WLAN 2.4GHz	2412-2462	0.077	1	0.077			
LoRa	923.3-927.5	0.043	0.615	0.07			

Condition 2

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.145	1	Pass
WLAN 5GHz	5180-5825	0.062	1	0.062			
LoRa	923.3-927.5	0.043	0.615	0.07			

Condition 3

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.18	1	Pass
WLAN 2.4GHz	2412-2462	0.077	1	0.077			
FSK	902.5-927.5	0.054	0.601	0.09			

Condition 4

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.165	1	Pass
WLAN 5GHz	5180-5825	0.062	1	0.062			
FSK	902.5-927.5	0.054	0.601	0.09			

Condition 5

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.167	1	Pass
LoRa	923.3-927.5	0.043	0.615	0.07			
WWAN	698-716	0.039	0.465	0.084			

Condition 6

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.187	1	Pass
FSK	902.5-927.5	0.054	0.601	0.09			
WWAN	698-716	0.039	0.465	0.084			

Condition 7

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.25	1	Pass
WLAN 2.4GHz	2412-2462	0.077	1	0.077			
FSK	902.5-927.5	0.054	0.601	0.09			
LoRa	923.3-927.5	0.043	0.615	0.07			

Condition 8

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.235	1	Pass
WLAN 5GHz	5180-5825	0.062	1	0.062			
FSK	902.5-927.5	0.054	0.601	0.09			
LoRa	923.3-927.5	0.043	0.615	0.07			

Condition 9

Multiple RF Sources (Simultaneous Operations)							
Routine Evaluation (General Population)					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
Bluetooth	2402-2480	0.013	1	0.013	0.257	1	Pass
FSK	902.5-927.5	0.054	0.601	0.09			
LoRa	923.3-927.5	0.043	0.615	0.07			
WWAN	698-716	0.039	0.465	0.084			

7 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.

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