

RF Exposure Report

Report No.: MFBDIS-WTW-P22031091A

FCC ID: 2AKCZ-108

Test Model: APL68-108

Received Date: Mar. 28, 2022

Test Date: Jul. 05, 2022

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33383, TAIWAN

**FCC Registration /
Designation Number:** 788550 / TW0003

Test Location (2): No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

**FCC Registration /
Designation Number:** 281270 / TW0032



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Release Control Record

Issue No.	Description	Date Issued
MFBDYS-WTW-P22031091A	Original Release	Feb. 15, 2023

1 Certificate of Conformity

Product: Wireless Access Point

Brand: SONICWALL

Test Model: APL68-108

Sample Status: Engineering sample

Applicant: SonicWall Inc.

Date of Evaluation: Jul. 05, 2022

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

Standards: 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.

Prepared by : Celine Chou , **Date:** Feb. 15, 2023
Celine Chou / Senior Specialist

Approved by : Jeremy Lin , **Date:** Feb. 15, 2023
Jeremy Lin / Project Engineer

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

➤ 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

3 Applicable Evaluation Criteria

Exemption Evaluation

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. 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)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2f$.
1,500-100,000	$19.2R^2$.
R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.	

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

- For mobile devices that are not exempt per Table 1 of §1.1307(b)(1)(i)(C) and device at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz.

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

SAR-based Exemption - §1.1307(b)(3)(i)(B)

- The SAR-based exemption formula of §1.1307(b)(3)(i)(B), 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.

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

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)

When 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

Routine Evaluation

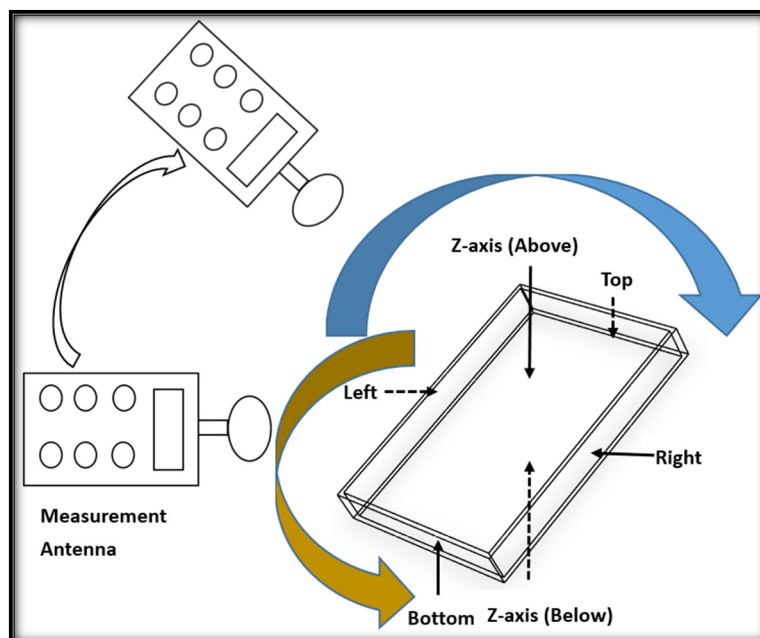
Routine Evaluation Procedure - Single and/or Multiple RF Sources

- 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.

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)

Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Probe SGH	SMP2 Dual	22SN1913	Apr. 21, 2022	Apr. 20, 2023

Multiple RF Sources

☒ 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 Result

Scanning radio (Radio 3)

MPE-based Exemption §1.1307(b)(3)(i)(C)							
Operation Mode	Frequency Band (MHz)	Maximum Power (mW)	Antenna Gain (dBi)	ERP (mW)	Distance (cm)	Limit Threshold (mW)	Test Result
WLAN 5GHz	5180-5240	17.742	3.81	25.975	20	768	Pass
WLAN 2.4GHz	2412-2462	17.742	3.93	26.703	20	768	Pass

2G traffic radio (Radio 2), 5G traffic radio (Radio 1) and BT LE

Routine Evaluation (General Population)					
Operation Mode	Frequency Band (MHz)	Power Density (mW/cm ²)	Test Distance (cm)	Limit (mW/cm ²)	Test Result
CDD Mode					
WLAN 2.4GHz	2412-2462	0.086	10	1	Pass
WLAN 5GHz	5180-5825	0.064	10	1	Pass
Bluetooth	2402-2480	0.057	10	1	Pass
Beamforming Mode					
WLAN 2.4GHz	2412-2462	0.058	10	1	Pass
WLAN 5GHz	5180-5825	0.063	10	1	Pass

Multiple RF Sources (Simultaneous Operations)

Co-location Condition 1

Multiple RF Sources (Simultaneous Operations)							
Exemption Evaluation					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	ERP (mW)	Limit Threshold (mW)	Ratio			
WLAN 5GHz	5180-5240	25.975	768	0.034	0.241	1	Pass
Routine Evaluation (General Population)							
Operation Mode	Operation Mode	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
WLAN 2.4GHz	2412-2462	0.086	1	0.086			
WLAN 5GHz	5180-5825	0.064	1	0.064			
Bluetooth	2402-2480	0.057	1	0.057			

Co-location Condition 2

Multiple RF Sources (Simultaneous Operations)							
Exemption Evaluation					Sum of Ratios	Limit of Ratios	Test Result
Operation Mode	Frequency Band (MHz)	ERP (mW)	Limit Threshold (mW)	Ratio			
WLAN 2.4GHz	2412-2462	26.730	768	0.035	0.156	1	Pass
Routine Evaluation (General Population)							
Operation Mode	Operation Mode	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio			
WLAN 5GHz	5180-5825	0.064	1	0.064			
Bluetooth	2402-2480	0.057	1	0.057			

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- The antenna information is listed as below.

No.	Type	Connector	Gain (dBi)					
			2400MHz	2450MHz	2500MHz	5150MHz	5500MHz	5850MHz
2G1	PIFA	I-PEX	3.05	3.14	3.21	-	-	-
2G2	PIFA	I-PEX	3.52	3.43	3.64	-	-	-
5G1	PIFA	I-PEX	-	-	-	4.52	4.63	5.07
5G2	PIFA	I-PEX	-	-	-	4.13	4.98	4.62
Scan	PIFA	I-PEX	3.83	3.93	3.81	3.81	4.23	4.89
BLE	PIFA	I-PEX	3.09	3.70	3.58	-	-	-

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

5 Conclusion

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

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