RF Exposure Report

Report No.:	SABAOZ-WTW-P20070419
FCC ID:	UIDWC4T
Test Model:	WC4T
Received Date:	July 22, 2020
Test Date:	Aug. 21, 2020
Issued Date:	Sep. 22, 2020
Applicant:	ARRIS
Address:	3871 LAKEFIELD DRIVE SUWANEE GA 30024-1292 UNITED STATES
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SABAOZ-WTW-P20070419	Original release.	Sep. 22, 2020

1 Certificate of Conformity

Product:	SURFboard Wi-Fi Router
Brand:	ARRIS
Test Model:	WC4T
Sample Status:	Engineering Sample
Applicant:	ARRIS
Test Date:	Aug. 21, 2020
Standards:	FCC Part 2 (Section 2.1091) IEEE C95.3-2002
References Test Guidance:	KDB 447498 D01 General RF Exposure Guidance v06

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:** Sep. 22, 2020

Vivian Huang / Specialist

Approved by : , **Date:** Sep. 22, 2020

Clark Lin / Technical Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

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

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 33 cm away from the body of the user.

So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Frequency Range (GHz)	4TX Directional Antenna Gain (dBi) (Worst configuration)	3TX Directional Antenna Gain (dBi) (Worst configuration)
2.4~2.4835	7.37 (Antenna 5 / 6 / 7 / 8)	-
5.15 ~ 5.25	-	6.87 (Antenna 5 / 6 / 8)
5.25 ~ 5.35	-	6.94 (Antenna 5 / 7 / 8)
5.47 ~ 5.725	7.93 (Antenna 1 / 2 / 3 / 4)	-
5.725 ~ 5.85	7.92 (Antenna 1 / 2 / 3 / 4)	-

Note:

The directional gain is being calculated by individual antenna gains and per KDB 662911 formula.

$$\text{Directional gain} = 10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]\ \text{dBi}$$

More detailed information, please refer to Operation Description exhibit.

*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.5 Calculation Result

Operation Mode	Evaluation Frequency (MHz)	Max Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN 2.4GHz	2412~2462	613.378	7.37	33	0.24462	1
WLAN 5GHz (U-NII-1)	5180~5250	488.826	6.87	33	0.17375	1
WLAN 5GHz (U-NII-3)	5745~5825	989.696	7.92	33	0.44799	1

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
   2.4GHz: $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.37dBi$
   5GHz: For U-NII-1: $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 6.87dBi$
   For U-NII-3: $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.92dBi$

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz (U-NII-1) + WLAN 5GHz (U-NII-3) = 0.24462 / 1 + 0.17375 / 1 + 0.44799 / 1 = 0.86636

Therefore the maximum calculations of above situations are less than the "1" limit.

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