

RF Exposure Report

Report No.: SABAOZ-WTW-P20070419A

FCC ID: UIDWC4T

Test Model: WC4T

Received Date: July 08, 2020

Test Date: Aug. 21, 2020

Issued Date: Oct. 08, 2020

Applicant: ARRIS

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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SABAOZ-WTW-P20070419A	Original release.	Oct. 08, 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.

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Phoenix Huang / Specialist

Approved by : Clark Lin, **Date:** Oct. 08, 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

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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.

$$\text{Directional gain} = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi}$$

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

For 2.4GHz and 5GHz (U-NII-1 and U-NII-3 band) data was copied from the original test report (Report No.: SABAOZ-WTW-P20070419)

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)	5180~5240	488.826	6.87	33	0.17375	1
WLAN 5GHz (U-NII-2A)	5260~5320	233.577	6.94	33	0.08437	1
WLAN 5GHz (U-NII-2C)	5500~5700	242.49	7.93	33	0.11002	1
WLAN 5GHz (U-NII-3)	5745~5825	989.696	7.92	33	0.44799	1

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.37 \text{ dBi}$
- 5GHz:
 - For U-NII-1: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 6.87 \text{ dBi}$
 - For U-NII-2A: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 6.94 \text{ dBi}$
 - For U-NII-2C: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.93 \text{ dBi}$
 - For U-NII-3: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.92 \text{ dBi}$

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

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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