SAR Exclusion Report

FCC Rule Part	:	**CFR §2.1093**
Standards	:	**IEEE Std 1528:2013** **KDB 865664 D01 v01r04, KDB 865664 D02 v01r02,** **KDB 447498 D01_v06_2015.10.23_General RF Exposure Guidance**
Report No.	:	**SFBAOZ-WTW-P24080124**
Applicant	:	**Alpha Networks Inc.**
Address	:	**No. 8, Li-Hsin 7th Rd., Hsinchu Science Park, Hsinchu 300094, Taiwan**
Product	:	**Arming Station Pro**
Brand	:	**AVIGILON**
Model No.	:	**220-4463B**
FCC ID	:	**RRK-AAAC2361**
Sample Received Date	:	**Aug. 07, 2024**
Date of Evaluation	:	**Sep. 06, 2024**
Lab Address	:	**No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan**
Test Location	:	**No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City, Taiwan**
FCC Accredited No.	:	**TW0003**

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch – Lin Kou Laboratories**, 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 SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by TAF or any government agencies.

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Testing Laboratory 2021

Table of Contents

Release Control Record

Issue No.	Reason for Change	Date Issued
SFBAOZ-WTW-P24080124	Initial release	Dec. 03, 2024

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported SAR_{10g} (W/kg)
DXX	RFID	Not Required
DXX	NFC	Not Required

Note:

1. The SAR limit **(Head & Body: SAR_{1g} 1.6 W/kg)** for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	Arming Station Pro
Brand Name	AVIGILON
Model Name	220-4463B
FCC ID	RRK-AAAC2361
Tx Frequency Bands	RFID: 125kHz NFC : 13.56MHz
Uplink Modulations	RFID : ASK NFC : ASK
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 3.1 of this report
Antenna Type	RFID: Wire Loop Antenna NFC: Printed Antenna
EUT Stage	Engineering Sample

Note: The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

3. SAR Measurement Evaluation

3.1 Maximum Output Power

The maximum Tune up power (Unit: dBm) including tune-up tolerance is shown as below.

RFID			
Mode	**Channel**	**Frequency (MHz)**	**Max. Tune-up**
ASK	1	0.125	-92.79

NFC			
Mode	**Channel**	**Frequency (MHz)**	**Max. Tune-up**
ASK	1	13.56	-50.79

3.2 SAR Testing Exclusions

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

A. For the test separation distance <= 50 mm

$$\frac{\text{Max. Tune up Power}_{(mW)}}{\text{Min. Test Separation Distance}_{(mm)}} \times \sqrt{f_{(GHz)}} \leq 3.0$$

- When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
- For the test separation distance > 50 mm, and the frequency at 100 MHz to 1500 MHz

$$\left[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\ \text{mm}) \times \left(\frac{f_{(MHz)}}{150}\right)\right]_{(mW)}$$

- For the test separation distance > 50 mm, and the frequency at > 1500 MHz to 6 GHz

$$[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\ \text{mm}) \times 10]_{(mW)}$$

B. For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following.

(1). {[Power allowed at numeric threshold for 50 mm in step A)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

(2). {[Power allowed at numeric threshold for 50 mm in step A)] + [(test separation distance – 50 mm)×10]} mW, for > 1500 MHz and ≤ 6 GHz

C. For frequencies below 100 MHz, the following may be considered for SAR test exclusion.

(1). For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step B) is multiplied by [1 + log(100/f(MHz))]

(2). For test separation distances ≤ 50 mm, the power threshold determined by the equation in C.(1) for 50 mm and 100 MHz is multiplied by ½

(3). SAR measurement procedures are not established below 100 MHz.

Mode	Frequency (MHz)	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Exclusion	Require SAR Testing?
RFID_Ant 0	0.125	-92.79	0.0000000005	2314.25 (mW)	No
NFC_Ant 0	13.56	-50.79	0.0000083368	1107.43 (mW)	No

Note:

1. When the device output power is less than the power threshold shown in above table, the SAR testing exclusion is applied.
2. The exclusion is multiplied by 2.5 for extremity limits.

Summary:

Since the SAR assess for all device orientations apply SAR test exclusion per KDB 447498, SAR testing for this device is not required.

<Estimated SAR Calculation>

According to KDB 447498 D01, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR was estimated according to following formula to result in substantially conservative SAR values of <= 0.4 W/kg to determine simultaneous transmission SAR test exclusion.

$$\text{Estimated SAR} = \frac{\text{Max. Tune up Power}_{(\text{mW})}}{\text{Min. Test Separation Distance}_{(\text{mm})}} \times \frac{\sqrt{f_{(\text{GHz})}}}{7.5}$$

If the minimum test separation distance is < 5 mm, a distance of 5 mm is used for estimated SAR calculation. When the test separation distance is > 50 mm, the 0.4 W/kg is used for SAR-1g and the 1.0 W/kg is used for SAR-10g

Mode	Frequency (GHz)	Max. Tune-up Power (dBm)	Separation Distance (mm)	Estimated 10g SAR (W/kg)
RFID	0.000125	-92.79	5	0.00
NFC	0.01356	-50.79	5	0.00

Note:

1. The separation distance is determined from the outer housing of the EUT to the user.
2. This SAR estimation formula has been considered in conjunction with the SAR Test Exclusion Thresholds to result in substantially conservative SAR values of ≤ 0.4 W/kg.
3. When standalone SAR testing is not required, an estimated SAR can be applied to determine simultaneous transmission SAR test exclusion.

<Simultaneous Multi-band Transmission Evaluation>

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Extremity Exposure Condition
A	MAX. RFID + MAX. NFC	Yes

Simultaneous Transmission SAR Evaluation (Extremity)			
Position	1	2	A(1+2)
	Max RFID 10g SAR W/kg	Max NFC 10g SAR W/kg	Summing result 10g SAR W/kg
worst	0.00	0.00	0.00

4. Information on 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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