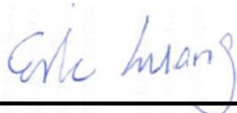


# RF Exposure Evaluation Report

APPLICANT : Adtran  
EQUIPMENT : BSAP-2020,DUAL RADIO  
BRAND NAME : Adtran  
MODEL NAME : BSAP-2020,DUAL RADIO  
FCC ID : HDCBSAP2020  
STANDARD : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Eric Huang / Deputy Manager



Approved by: Jones Tsai / Manager



## **SPORTON INTERNATIONAL INC.**

**No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)**



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**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA5D2212-03	Rev. 01	Initial issue of report	Aug. 18, 2016



## 1. Administration Data

### 1.1. Testing Laboratory

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Adtran
Address	901 Explorer Boulevard Huntsville, AL 35806-2807 United States

Manufacturer	
Company Name	Senao Networks, Inc.
Address	3F, No. 529, Chung Cheng Rd., Hsintien, Taipei, Taiwan, R.O.C

## 2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	BSAP-2020,DUAL RADIO
Brand Name	Adtran
Model Name	BSAP-2020,DUAL RADIO
FCC ID	HDCBSAP2020
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	· 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80
EUT Stage	Production Unit

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



**3. Maximum RF average output power among production units**

Band / Mode	IEEE 802.11 Average Power (dBm)			
	11b	11g	HT20	HT40
2.4GHz Band	26.5	20.5	21.0	19.5

Band / Mode	IEEE 802.11 Average Power (dBm)					
	11a	11n-HT20	11n-HT40	11ac-VHT20	11ac-VHT40	11ac-VHT80
5.2GHz Band	27.0	26.5	25.0	26.5	25.0	15.0
5.3GHz Band	21.5	21.5	24.0	21.5	24.0	17.0
5.5GHz Band	21.0	21.0	22.5	21.0	22.5	17.0
5.8GHz Band	24.0	24.0	24.0	24.0	24.0	14.5



### 4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



### 5. Radio Frequency Radiation Exposure Evaluation

#### 5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
2.4GHz WLAN	2412.0	3.52	26.50	30.020	1.005	1004.616	0.200	1.000	0.200
5GHz WLAN	5180.0	5.98	27.00	32.980	1.986	1986.095	0.395	1.000	0.395

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

#### 5.2. Collocated Power Density Calculation

WLAN2.4GHz Power Density / Limit	WLAN5GHz Power Density / Limit	$\Sigma$ (Power Density / Limit) of WLAN2.4GHz+WLAN5GHz
0.200	0.395	0.595

Note:

- $\Sigma$ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WLAN2.4GHz+WLAN5GHz.
- Considering the WLAN2.4GHz collocation with the WLAN5GHz transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant

### Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.