1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	Early Sail Technology Co., Limited
Address of applicant:	Flat 3B, 3/F, Bank Tower, NOS.351&353 King's Road, North Point, HongKong, CHINA
Manufacturer:	Early Sail Technology Co., Limited
Address of manufacturer:	Flat 3B, 3/F, Bank Tower, NOS.351&353 King's Road, North Point, HongKong, CHINA

General Description of EUT:

Product Name:	WiFi to Ethernet Adapter, Wireless Access Point, WiFi Range Extender
Trade Name:	BrosTrend
Model No.:	AC8
Adding Model(s):	A8, E8
Rated Voltage:	AC120V/60Hz
Battery Capacity:	/
FCC ID:	2A8EL-AC8
Equipment Type:	Fixed device

Technical Characteristics of EUT:

Wi-Fi (2.4G)

Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power:	Antenna 0:17.33dBm (Conducted) Antenna 1:17.49dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	Dipole Antenna
Antenna Gain:	2.5dBi

Wi-Fi (5G)

Support Standards:	802.11a, 802.11n-HT20, 802.11n-HT40, 802.11ac-VHT20, 802.11ac-VHT40,802.11ac-VHT80
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	5150-5250MHz: Antenna 0: 15.79dBm (Conducted) Antenna 1: 15.91dBm (Conducted) 5725-5850MHz:

	Antenna 0: 15.92dBm (Conducted) Antenna 1: 15.67dBm (Conducted)
Type of Modulation:	BPSK, QPSK,16QAM, 64QAM, 256QAM
Type of Antenna:	Dipole Antenna
Antenna Gain:	5150-5250MHz Antenna 0 & 1: 3.0dBi 5725-5850MHz Antenna 0 & 1: 3.0dBi

1.2 RF Exposure Exemption

According to §1.1307(b)(3) and KDB 447498 D04 Interim General RF Exposure Guidance v01, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Option A: FCC Rule Part 1.1307 (b)(3)(i)(A):The available maximum time-averaged power is no more than 1mW, regardless of separation distance.

Option B: FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. P_{th} is given by:

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

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

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

d = the separation distance (cm);

Option C: FCC Rule Part 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. R must be at least λ/2π, where λ is the free-space operating wavelength in meters.

Single RF Sources Subject to Routine Environmental Evaluation	
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

For Multiple RF sources: FCC Rule Part 1.1307(b)(3)(ii):

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a}\frac{P_i}{P_{th,i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{th,j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

1.3 Calculated Result

Radio Access Technology	Prediction Frequency (MHz)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Tune-Up Time-Averaged Power (dBm)	ERP (dBm)
Wi-Fi (2.4G) Antenna 0	2402	17.33	2.5	100	17.33	17.68
Wi-Fi (2.4G) Antenna 1	2402	17.49	2.5	100	17.49	17.84
Wi-Fi (5G) Antenna 0	5725	15.92	3.0	100	15.92	16.77
Wi-Fi (5G) Antenna 1	5150	15.91	3.0	100	15.91	16.76

Frequency (MHz)	Option	Min. Distance (cm)	Max. Power (dBm)	Max. Power (mW)	Exposure Limit (mW)	Ratio	Result Pass/Fail
2402	C	20.00	17.68	58.61	768.00	0.08	Pass
2402	C	20.00	17.84	60.81	768.00	0.08	Pass
5725	C	20.00	16.77	47.53	768.00	0.06	Pass
5150	C	20.00	16.76	47.42	768.00	0.06	Pass

*Note: 1. Time-Averaged Power=Output Power * Duty Cycle; ERP= Time-Averaged Power+ Antenna gain-2.15dB*

2. Option A, B and C refers as clause 1.2.

3. For option B, Max (time-averaged power, effective radiated power (ERP)) converts to Max. Power. For option C, ERP converts to Max. Power;

4. For option B, P_{th} (mW) converts to Exposure Limit (mW); For option C, ERP (W) converts to Exposure Limit (mW).

5. Ratio= Tune-Up ERP (mW)/ Exposure Limit (mW)

Mode for Simultaneous Multi-band Transmission:

Radio Access Technology	Ratio 1	Ratio 2	Simultaneous Ratio	Limit	Result
					Pass/Fail
Wi-Fi Antenna 0&1	0.08	0.08	0.16	1	Pass

Result: Pass