RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

FCC ID: 2ACAL-ABBG0004

EUT Specification

EUT	AB BLE Gateway V4
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5825GHz ☒ Others: 2.402GHz~2.480GHz (BT5.0)
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others ___
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	0.382 dBm (0.0011W) for BT5.0 19.58 dBm (0.0908W) for Wifi
Antenna gain (Max)	2 dBi for BT5.0 3.7 dBi for Wifi
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

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
(A) Limits for Occupational/Control Exposures				
300-1500	**--**	**--**	**F/300**	**6**
1500-100000	**--**	**--**	**5**	**6**
(B) Limits for General Population/Uncontrol Exposures				
300-1500	**--**	**--**	**F/1500**	**6**
1500-100000	**--**	**--**	**1**	**30**

Friis transmission formula: Pd=(Pout*G)\(4*pi*R2)

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
Pd the limit of MPE, 1mW/cm2. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

Operating Mode	Channel Frequency (MHz)	Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
802.11b	2412	19.58	19.58±1	20.58	3.7	0.0533	1
	2437	18.49	18.49±1	19.49	3.7	0.0415	1
	2462	17.02	17.02±1	18.02	3.7	0.0296	1
802.11g	2412	17.12	17.12±1	18.12	3.7	0.0303	1
	2437	16.26	16.26±1	17.26	3.7	0.0248	1
	2462	15.00	15.00±1	16.00	3.7	0.0186	1
802.11n (HT20)	2412	16.95	16.95±1	17.95	3.7	0.0291	1
	2437	16.03	16.03±1	17.03	3.7	0.0235	1
	2462	14.53	14.53±1	15.53	3.7	0.0167	1
802.11n (HT40)	2422	16.97	16.97±1	17.97	3.7	0.0292	1
	2437	16.26	16.26±1	17.26	3.7	0.0248	1
	2452	15.61	15.61±1	16.61	3.7	0.0214	1
BT5.0 BLE	2402	0.353	0.353±1	1.353	2	0.0004	1
	2440	-0.793	-0.793±1	0.207	2	0.0003	1
	2480	0.382	0.382±1	1.382	2	0.0004	1