RF EXPOSURE EVALUATION

EUT Specification

EUT	WIFI+BT combo Module
Frequency band (Operating)	☒WLAN: 2.412GHz ~ 2.462GHz ☐WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐WLAN: 5.745GHz ~ 5825GHz ☒Others(Bluetooth: 2.402GHz ~ 2.480GHz)
Device category	☐Portable (<20cm separation) ☒Mobile (>20cm separation) ☐Others ___
Antenna diversity	☒Single antenna ☐Multiple antennas ☐Tx diversity ☐Rx diversity ☐Tx/Rx diversity
Max. output power	12.32dBm(17.06mW)
Antenna gain	2.99dBi
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*R^2)

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

Channel	Channel Frequency (MHz)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
Test Mode: 802.11b						
Low	2412	11.42	±0.5	15.56	0.0062	1
Middle	2437	11.89	±0.5	17.34	0.0069	1
High	2462	12.02	±0.5	17.86	0.0071	1
Test Mode: 802.11g						
Low	2412	11.88	±0.5	17.30	0.0069	1
Middle	2437	12.32	±0.5	19.14	0.0076	1
High	2462	12.27	±0.5	18.92	0.0075	1
Test Mode: 802.11n(HT20)						
Low	2412	11.66	±0.5	16.44	0.0065	1
Middle	2437	12.11	±0.5	18.24	0.0072	1
High	2462	12.21	±0.5	18.66	0.0074	1
Test Mode: 802.11n(HT40)						
Low	2422	10.00	±0.5	11.22	0.0044	1
Middle	2437	10.10	±0.5	11.48	0.0045	1
High	2452	10.49	±0.5	12.56	0.0050	1

Channel	Channel Frequency (MHz)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
Test Mode: BLE						
Low	2402	1.50	±0.5	1.58	0.00063	1
Middle	2440	1.42	±0.5	1.56	0.00062	1
High	2480	-1.30	±0.5	0.83	0.00033	1
Test Mode: GFSK						
Low	2402	0.23	±0.5	1.18	0.00047	1
Middle	2441	0.13	±0.5	1.16	0.00046	1
High	2480	-2.58	±0.5	0.62	0.00025	1
Test Mode: π4/-DQPSK						
Low	2402	1.14	±0.5	1.46	0.00058	1
Middle	2441	1.10	±0.5	1.45	0.00057	1
High	2480	-1.35	±0.5	0.82	0.00033	1
Test Mode: 8DPSK						
Low	2402	1.57	±0.5	1.61	0.00064	1
Middle	2441	1.48	±0.5	1.58	0.00063	1
High	2480	-1.12	±0.5	0.87	0.00035	1

Note: For the device consider simultaneous transmission of 2.4G WIFI and BT, the worst MPE evaluation = 0.0076 + 0.00064 = 0.00824 < 1.0