RF EXPOSURE EVALUATION

EUT Specification

EUT	FoobotSAT
Frequency band (Operating)	☒WLAN: 2.412GHz ~ 2.472GHz ☐WLAN: 5.18GHz ~ 5.24GHz ☐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	For WIFI: 15.51dBm(35.56mW) For BLE: 4.63dBm(2.90mW)
Antenna gain	0 dBi
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)
300-1500	**--**	**--**	**F/1500**
1500-100000	**--**	**--**	**1**

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	Gain	Channel Frequency (MHz)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm (mW/ cm2)	Power density Limits (mW/cm2)
GFSK							
Low	0	2402	3.78	± 0.5	2.68	5.33e-4	1
Middle	0	2440	4.63	± 0.5	3.26	6.48e-4	1
High	0	2480	4.45	± 0.5	3.13	6.22e-4	1

Channel	Gain	Channel Frequency (MHz)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm (mW/ cm2)	Power density Limits (mW/cm2)
802.11b							
Low	0	2412	15.44	± 0.5	39.26	0.0078	1
Middle	0	2437	15.37	± 0.5	38.64	0.0078	1
High	0	2462	15.51	± 0.5	39.90	0.0079	1
802.11g							
Low	0	2412	14.36	± 0.5	30.62	0.0061	1
Middle	0	2437	14.40	± 0.5	30.90	0.0061	1
High	0	2462	14.59	± 0.5	32.28	0.0064	1
802.11n HT20							
Low	0	2412	14.34	± 0.5	30.48	0.0061	1
Middle	0	2437	14.32	± 0.5	30.34	0.0060	1
High	0	2462	14.51	± 0.5	31.70	0.0063	1
802.11n HT40							
Low	0	2422	12.09	± 0.5	18.16	0.0036	1
Middle	0	2437	12.11	± 0.5	18.24	0.0036	1
High	0	2452	11.95	± 0.5	17.58	0.0035	1

Note: Bluetooth and WIFI can be used at the same time.

Power density at 20cm (mW/ cm2)	Power density at 20cm (mW/ cm2)	Total Power density at 20cm (mW/ cm2)	Limits (mW/cm2)	Test Result
BLE	WIFI	BLE+WIFI		
6.48e-4	0.0079	0.008548	1	Pass