RF EXPOSURE EVALUATION

EUT Specification

EUT	Thermal Receipt Printer
Frequency band (Operating)	☒WLAN: 2.412GHz ~ 2.462GHz ☐WLAN: 5.18GHz ~ 5.24GHz ☐WLAN: 5.50GHz ~ 5.70GHz ☐WLAN: 5.745GHz ~ 5825GHz ☒Others(Bluetooth: 2.402GHz ~ 2.480GHz) ☐Others(Zigbee: 2.405GHz ~ 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	17.97 dBm (62.66mW) for 2.4G WIFI -5.709 dBm (0.27mW) for BDR+EDR -5.605 dBm (0.28mW) for BLE
Antenna gain	1dBi
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	Channel Frequency (MHz)	Max Output power (dBm)	Max Output power (mW)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
Test mode: GFSK					
Low	2402	-5.709	0.27	0.00007	1
Middle	2441	-8.149	0.15	0.00004	1
High	2480	-5.716	0.27	0.00007	1
Test mode: π/4-DQPSK					
Low	2402	-5.761	0.27	0.00007	1
Middle	2441	-8.215	0.15	0.00004	1
High	2480	-5.759	0.27	0.00007	1
Test mode: 8DPSK					
Low	2402	-5.799	0.26	0.00007	1
Middle	2441	-8.256	0.15	0.00004	1
High	2480	-5.744	0.27	0.00007	1
Test mode: GFSK(BLE)					
Low	2402	-5.612	0.27	0.00007	1
Middle	2441	-7.987	0.16	0.00004	1
High	2480	-5.605	0.28	0.00007	1

Channel	Channel Frequency (MHz)	Max Output power (dBm)	Max Output power (mW)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
Test mode: IEEE 802.11b					
Low	2412	17.97	62.66	0.01569	1
Middle	2437	16.02	39.99	0.01002	1
High	2462	16.17	41.40	0.01037	1
Test mode: IEEE 802.11g					
Low	2412	16.09	40.64	0.01018	1
Middle	2437	15.23	33.34	0.00835	1
High	2462	16.00	39.81	0.00997	1
Test mode: IEEE 802.11n(HT20)					
Low	2412	14.92	31.05	0.00778	1
Middle	2437	12.90	19.50	0.00488	1
High	2462	14.09	25.64	0.00642	1

When bluetooth and WiFi(2.4G) work together:

Ratio BT	Ratio 2.4G WIFI	Ratio Total	Ratio Limits
0.00007	0.01569	0.01576	1

According to KDB447498 D01 V06, Compliance with RF Exposure requirement.