

RF EXPOSURE EVALUATION

EUT Specification

EUT	WIFI+BT Module
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☒ WLAN: 5.18GHz ~ 5.320GHz ☒ 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	15.131 dBm (32.59mW) for 5G WIFI 23.056 dBm (202.12mW) for 2.4G WIFI 2.872 dBm (1.94mW) for BT
Antenna gain	See Antenna Information
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Antenna Information

Ant. (Chain)	Brand	Model name	Antenna Type	Connector	Gain (dBi)	Application range
1,2	FN-LI NK	K212-100 37-A	Diople	RP-SMA(M)	2.98	2.4G Band
					3.59	U-NII-1 Band
					3.79	U-NII-2A Band
					4.56	U-NII-2C Band
					3.85	U-NII-3 Band

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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = Power density in mW/cm²

P_{out} =output power to antenna in mW

G= gain of antenna in linear scale

π =3.1416

R= distance between observation point and center of the radiator in cm

P_d 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

Only the worst case was recorded in the report.

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: BT (8DPSK)					
Low	2412	2.872	1.94	0.00074	1
Test mode: 2.4G WIFI (IEEE 802.11g)					
Low	2412	23.056	202.12	0.07660	1
Test mode: 2.4G WIFI (IEEE 802.11n(HT20) MIMO)					
Low(ant1)	2412	19.914	98.04	0.03874	1
Low(ant2)	2412	18.760	75.16	0.02970	1
Test mode: 2.4G WIFI (IEEE 802.11a)					
Low	5700	15.131	32.59	0.01235	1
Test mode: 5G WIFI (IEEE 802.11 n(HT20) MIMO)					
Low(ant1)	5745	12.260	16.83	0.00812	1
Low(ant2)	5745	11.604	14.47	0.00698	1

When bluetooth and WiFi(2.4G) work together:

Ratio BT	2.4G WIFI (SISO) Ratio	2.4G WIFI (MIMO) Ratio	BT+2.4G WIFI (SISO) Ratio Total	BT+2.4G WIFI (MIMO) Ratio Total	Ratio Limits
0.00074	0.07660	0.06844	0.07734	0.06918	1

When bluetooth and WiFi(5G) work together:

Ratio BT	5G WIFI (SISO) Ratio	5G WIFI (MIMO) Ratio	BT+5G WIFI (SISO) Ratio Total	BT+5G WIFI (MIMO) Ratio Total	Ratio Limits
0.00074	0.01235	0.01511	0.01309	0.01585	1

Note: No simultaneously transmit for 2.4G WIFI and 5G WIFI.

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