

RF EXPOSURE EVALUATION

EUT Specification

EUT	Retail AI Camera Z2
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☒ WLAN: 5.18GHz ~ 5.24GHz ☒ WLAN: 5.745GHz ~ 5825GHz ☒ Others BT: 2.402-2.480GHz
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	16.28dBm (42.46 mW) for 2.4G WIFI 4.264dBm (2.67 mW) for BT 13.94dBm (24.77 mW) for U-NII-1 10.54dBm (11.32 mW) for U-NII-3
Antenna gain	2.5 dBi for BT and 2.4G WIFI 4.15 dBi fo 5G 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)
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/cm^2

P_{out} = 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

P_d the limit of MPE, $1mW/cm^2$. 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

For 2.4G WIFI:

Channel	Gain	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	2.5	2412	14.95	± 0.5	35.08	0.01241	1
Middle	2.5	2437	14.78	± 0.5	33.73	0.01193	1
High	2.5	2462	14.38	± 0.5	30.76	0.01088	1
Test Mode: 802.11g							
Low	2.5	2412	16.28	± 0.5	47.64	0.01685	1
Middle	2.5	2437	15.86	± 0.5	43.25	0.01530	1
High	2.5	2462	15.70	± 0.5	41.69	0.01475	1
Test Mode: 802.11n(HT20)							
Low	2.5	2412	16.14	± 0.5	46.13	0.01632	1
Middle	2.5	2437	16.24	± 0.5	47.21	0.01670	1
High	2.5	2462	15.69	± 0.5	41.59	0.01471	1

For 5G WIFI U-NII-1

Channel	Gain	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: 802.11a							
Low	4.15	5180	13.94	±0.5	27.80	0.01438	1
Middle	4.15	5200	13.40	±0.5	24.55	0.01270	1
High	4.15	5240	13.50	±0.5	25.12	0.01299	1
Test Mode: 802.11n(HT20)							
Low	4.15	5180	13.07	±0.5	22.75	0.01177	1
Middle	4.15	5200	13.38	±0.5	24.43	0.01264	1
High	4.15	5240	13.30	±0.5	23.99	0.01241	1
Test Mode: 802.11n(HT40)							
Low	4.15	5190	13.02	±0.5	22.49	0.01163	1
High	4.15	5230	13.08	±0.5	22.80	0.01179	1

For 5G WIFI U-NII-3

Channel	Gain	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: 802.11a							
Low	4.15	5745	9.83	±0.5	10.79	0.00558	1
Middle	4.15	5785	10.44	±0.5	12.42	0.00642	1
High	4.15	5825	10.27	±0.5	11.94	0.00618	1
Test Mode: 802.11n(HT20)							
Low	4.15	5745	9.66	±0.5	10.38	0.00537	1
Middle	4.15	5785	10.54	±0.5	12.71	0.00657	1
High	4.15	5825	9.97	±0.5	11.14	0.00576	1
Test Mode: 802.11n(HT40)							
Low	4.15	5755	9.31	±0.5	9.57	0.00495	1
High	4.15	5795	10.13	±0.5	11.56	0.00598	1

For BT

Channel	Gain	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: GFSK							
Low	2.5	2402	3.969	±0.5	2.80	0.00099	1
Middle	2.5	2441	3.641	±0.5	2.59	0.00092	1
High	2.5	2480	4.264	±0.5	3.00	0.00106	1
Test Mode: π/4-DQPSK							
Low	2.5	2402	3.032	±0.5	2.26	0.00080	1
Middle	2.5	2441	2.766	±0.5	2.12	0.00075	1
High	2.5	2480	3.068	±0.5	2.27	0.00080	1
Test Mode: 8DPSK							
Low	2.5	2402	2.987	±0.5	2.23	0.00079	1
Middle	2.5	2441	2.623	±0.5	2.05	0.00073	1
High	2.5	2480	2.874	±0.5	2.17	0.00077	1

When Bluetooth and WIFI (2.4G) work together:

Power density at 20cm (mW/ cm ²) BT	Power density at 20cm (mW/ cm ²) 2.4G WIFI	Power density at 20cm (mW/ cm ²) Total	Power density Limits (mW/cm ²)
0.00106	0.01685	0.01791	1

When Bluetooth and WIFI (5G) work together:

Power density at 20cm (mW/ cm ²) BT	Power density at 20cm (mW/ cm ²) 5G WIFI	Power density at 20cm (mW/ cm ²) Total	Power density Limits (mW/cm ²)
0.00106	0.01438	0.01544	1