RF EXPOSURE EVALUATION

EUT Specification

EUT	Retail AI Camera Z3
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	10.16 dBm (10.38mW) for 5G WIFI Band1 9.61 dBm (9.14mW) for 5G WIFI Band4 17.93 dBm (62.09mW) for 2.4G WIFI 0.92 dBm (1.24mW) for BT 9.42 dBm (8.75mW) for Zigbee
Antenna gain	3.02dBi for Zigbee antenna 2.5dBi for BT antenna 2.5dBi for 2.4G wifi antenna 1.8dBi for 5G wifi antenna
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	-0.368	0.92	0.00033	1
Middle	2441	-1.978	0.63	0.00022	1
High	2480	-2.409	0.57	0.00020	1
Test mode: π/4-DQPSK					
Low	2402	-1.169	0.76	0.00027	1
Middle	2441	-2.724	0.53	0.00019	1
High	2480	-3.170	0.48	0.00017	1
Test mode: 8DPSK					
Low	2402	-1.443	0.72	0.00025	1
Middle	2441	-2.938	0.51	0.00018	1
High	2480	-3.370	0.46	0.00016	1
Test mode: O-QPSK (Zigbee)					
Low	2402	9.42	8.75	0.00349	1
Middle	2441	9.10	8.13	0.00324	1
High	2480	9.18	8.28	0.00330	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	12.77	18.92	0.00669	1
Middle	2437	13.40	21.88	0.00774	1
High	2462	12.86	19.32	0.00683	1
Test mode: IEEE 802.11g					
Low	2412	17.13	51.64	0.01827	1
Middle	2437	17.87	61.24	0.02166	1
High	2462	17.32	53.95	0.01908	1
Test mode: IEEE 802.11n(HT20)					
Low	2412	17.30	53.70	0.01899	1
Middle	2437	17.93	62.09	0.02196	1
High	2462	17.28	53.46	0.01891	1
Test mode: IEEE 802.11n(HT40)					
Low	2422	16.27	42.36	0.01498	1
Middle	2437	16.39	43.55	0.01540	1
High	2452	15.71	37.24	0.01317	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 802.11a					
Low	5180	6.02	4.00	0.00120	1
Middle	5200	9.69	9.31	0.00280	1
High	5240	8.48	7.05	0.00212	1
Test mode: IEEE 802.11n(HT20)					
Low	5180	9.11	8.15	0.00245	1
Middle	5200	9.23	8.38	0.00252	1
High	5240	8.24	6.67	0.00201	1
Test mode: IEEE 802.11n(HT40)					
Low	5190	10.13	10.30	0.00310	1
High	5230	8.28	6.73	0.00203	1
Test mode: IEEE 802.11 ac(VHT20)					
Low	5180	9.13	8.18	0.00246	1
Middle	5200	9.31	8.53	0.00257	1
High	5240	8.04	6.37	0.00192	1
Test mode: IEEE 802.11 ac(VHT40)					
Low	5190	10.16	10.38	0.00313	1
High	5230	8.36	6.85	0.00206	1
Test mode: IEEE 802.11 ac(VHT80)					
Low	5210	8.61	7.26	0.00219	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 802.11a					
Low	5745	8.43	6.97	0.00210	1
Middle	5785	8.80	7.59	0.00229	1
High	5825	8.52	7.11	0.00214	1
Test mode: IEEE 802.11n(HT20)					
Low	5745	9.61	9.14	0.00275	1
Middle	5785	9.84	9.64	0.00290	1
High	5825	8.62	7.28	0.00219	1
Test mode: IEEE 802.11n(HT40)					
Low	5755	9.10	8.13	0.00245	1
High	5795	9.34	8.59	0.00259	1
Test mode: IEEE 802.11 ac(VHT20)					
Low	5745	8.63	7.29	0.00220	1
Middle	5785	8.84	7.66	0.00231	1
High	5825	8.61	7.26	0.00219	1
Test mode: IEEE 802.11 ac(VHT40)					
Low	5755	8.93	7.82	0.00236	1
High	5795	9.02	7.98	0.00240	1
Test mode: IEEE 802.11 ac(VHT80)					
Low	5775	8.14	6.52	0.00196	1

When bluetooth, zigbee and WiFi(2.4G) work together:

Power density at 20cm (mW/ cm2) BT	Power density at 20cm (mW/ cm2) 2.4G WIFI	Power density at 20cm (mW/ cm2) zigbee	Ratio Total	Ratio Limits
0.00033	0.02196	0.00349	0.02578	1

When bluetooth, zigbee and WiFi(5G) work together:

Power density at 20cm (mW/ cm2) BT	Power density at 20cm (mW/ cm2) 5G WIFI	Power density at 20cm (mW/ cm2) zigbee	Ratio Total	Ratio Limits
0.00033	0.00313	0.00349	0.00695	1

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