1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	SHENZHEN GIEC DIGITAL CO.,LTD
Address of applicant:	1st&3rd Building,No.26 Puzai Road,Pingdi,Longgang District,Shenzhen, China
Manufacturer:	SHENZHEN GIEC DIGITAL CO.,LTD
Address of manufacturer:	1st&3rd Building,No.26 Puzai Road,Pingdi,Longgang District,Shenzhen, China

General Description of EUT:

Product Name:	Smart Camera
Trade Name:	/
Model No.:	GK-IPC1014
Adding Model(s):	GK-IPC1012, GK-IPC1013, GK-IPC1015, AD-CAM-IN-WH-011
Rated Voltage:	DC 5V
Battery Capacity:	/
Power Adapter:	Model: DCT06W050100US-C0 Input: 100-240V~50/60Hz 200mA Output: 5.0V-1.0A
FCC ID:	2AHYK-GKIPC10AA
Equipment Type:	Mobile device

Technical Characteristics of EUT:

Wi-Fi (5G)

Support Standards:	802.11a, 802.11n(HT20), 802.11n-HT40, 802.11ac-VHT20/40, 802.11ax-HE20/40
Frequency Range:	5180-5240MHz, 5745-5825MHz
Max. RF Output Power:	5180-5240MHz:16.83dBm (Conducted) 5745-5825MHz:13.89dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM,256QAM
Type of Antenna:	PCB Antenna
Antenna Gain:	5180-5240MHz:1.71dBi 5745-5825MHz:1.31dBi

Wi-Fi (2.4G)

Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n/ax(HT/HE20) 2422-2452MHz for 802.11n/ax(HT/HE40)
RF Output Power:	16.51dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Quantity of Channels:	11 for 802.11b/g/n/ax(HT/HE20); 7 for 802.11n/ax(HT/HE40)

Channel Separation:	5MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	1.42dBi
Bluetooth	
Bluetooth Version:	V5.1 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	1Mbps: 5.69dBm (Conducted) 2Mbps: 6.30dBm (Conducted)
Data Rate:	1Mbps, 2Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	1.42dBi

1.2 RF Exposure Exemption

According to §1.1307(b)(3) and KDB 447498 D04 Interim General RF Exposure Guidance v01, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Option A: FCC Rule Part 1.1307 (b)(3)(i)(A):The available maximum time-averaged power is no more than 1mW, regardless of separation distance.

Option B: FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. P_{th} is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\,cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\,cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Option C: FCC Rule Part 1.1307 (b)(3)(i)(C): The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. R must be at least λ/2π, where λ is the free-space operating wavelength in meters.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2
1.34-30	3,450 R^2/f^2
30-300	3.83 R^2
300-1,500	0.0128 R^2f
1,500-100,000	19.2R^2

For Multiple RF sources: FCC Rule Part 1.1307(b)(3)(ii):

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a}\frac{P_i}{P_{th,i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{th,j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

1.3 Calculated Result

Radio Access Technology	Prediction Frequency (MHz)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Tune-Up Time-Averaged Power (dBm)	ERP (dBm)
Bluetooth	2402	6.30	1.42	100	7.00	6.27
Wi-Fi (2.4G)	2412	16.51	1.42	100	17.00	16.27
Wi-Fi (5G)	5180	16.83	1.71	100	17.00	16.56
Wi-Fi (5G)	5745	13.89	1.31	100	14.00	13.16

Frequency (MHz)	Option	Min. Distance (cm)	Max. Power (dBm)	Max. Power (mW)	Exposure Limit (mW)	Ratio	Result Pass/Fail
2402	C	20.00	6.27	4.24	768.00	0.01	Pass
2412	C	20.00	16.27	42.36	768.00	0.06	Pass
5180	C	20.00	16.56	45.29	768.00	0.06	Pass

5745	C	20.00	13.16	20.70	768.00	0.03	Pass

*Note: 1. Time-Averaged Power=Output Power * Duty Cycle; ERP= Time-Averaged Power+ Antenna gain-2.15dB*

2. Option A, B and C refers as clause 1.2.

3. For option B, Max (time-averaged power, effective radiated power (ERP)) converts to Max. Power. For option C, ERP converts to Max. Power;

4. For option B, P_{th} (mW) converts to Exposure Limit (mW); For option C, ERP (W) converts to Exposure Limit (mW).

5. Ratio= Tune-Up ERP (mW)/ Exposure Limit (mW)

Mode for Simultaneous Multi-band Transmission:

Radio Access Technology	Ratio 1	Ratio 2	Simultaneous Ratio	Limit	Result
					Pass/Fail
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Note: BT and Wi-Fi can't transmit at the same time.

Result: Pass