1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	ShenZhen HaiLingKe Electronic co.,Ltd
Address of applicant:	3F Caiyue Mansion,No.24 Liuxian blvd,LongHua District, Shenzhen, Guangdong, China
Manufacturer:	ShenZhen HaiLingKe Electronic co.,Ltd
Address of manufacturer:	3F Caiyue Mansion,No.24 Liuxian blvd,LongHua District, Shenzhen, Guangdong, China

General Description of EUT:

Product Name:	WIFI module
Trade Name:	HI-LINK
Model No.:	HLK-RM58S
Adding Model(s):	/
FCC ID:	2AD56HLK-RM58S
Rated Voltage:	DC 5V

Technical Characteristics of EUT:

Wi-Fi (2.4G)

Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n-HT20 2422-2452MHz for 802.11n-HT40
RF Output Power:	15.44dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11 for 802.11b/g/n-HT20 7 for 802.11n-HT40
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	3.13dBi

Wi-Fi (5G)

Support Standards:	802.11a, 802.11n(HT20) , 802.11n-HT40, 802.11ac-VH80
Frequency Range:	5150-5250MHz, 5250-5350MHz, 5470-5725MHz, 5725-5850MHz
RF Output Power:	13.04dBm (Conducted)
Type of Modulation:	BPSK, QPSK,16QAM,64QAM, 256QAM
Data Rate:	6-54Mbps, up to 200Mbps
Type of Antenna:	Integral Antenna
Antenna Gain:	3.73dBi

1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, 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.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

For 2.4G Wi-Fi
Maximum Tune-Up output power: 18(dBm)
Maximum peak output power at antenna input terminal: 63.10 (mW)
Prediction distance: >20(cm)
Prediction frequency: 2412(MHz)
Antenna gain: 3.13(dBi)
Directional gain (numeric gain): 2.06
The worst case is power density at prediction frequency at 20cm: 0.0258(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For 5G Wi-Fi
Maximum Tune-Up output power: 17 (dBm)
Maximum peak output power at antenna input terminal: 50.12(mW)
Prediction distance: >20(cm)
Prediction frequency: 5240 (MHz)
Antenna gain:3.73(dBi)
Directional gain (numeric gain): 2.36
The worst case is power density at prediction frequency at 20cm: 0.0235(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

Result: Pass