1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	YABER TECHNOLOGIES CO.,LIMITED
Address of applicant:	Room 406, 4 Floor, B Building, BanTian International Center, HuanCheng South Road, BanTian Street, LongGang District, Shenzhen
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General Description of EUT:

Product Name:	LED Projector
Brand Name:	/
Model No.:	Pro U9
Adding Model(s):	Y9, PRO Y9, Pro Y9
Rated Voltage:	AC 100V-240V, 50/60Hz
Battery Capacity:	/
Power Adapter:	/
FCC ID:	2A4K9-PROU9
Equipment Type:	Fixed device

Technical Characteristics of EUT:	
Wi-Fi(5GHz)	
Support Standards:	802.11a, 802.11n(HT20), 802.11n-HT40, 802.11ac-VHT80
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	15.77dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Quantity of Channels:	/
Type of Antenna:	Integral Antenna
Antenna Gain:	5.46dBi
Wi-Fi(2.4GHz)	
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:	15.60dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
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:	4.12dBi
Bluetooth	
Bluetooth Version:	V4.2 (BR/EDR mode)
Frequency Range:	2402-2480MHz
RF Output Power:	2.50dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, π/4 DQPSK, 8DPSK
Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	4.12dBi

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

Wi-Fi(5GHz)
Maximum Tune-Up output power: 16.0(dBm)
Maximum peak output power at antenna input terminal: 39.81(mW)
Prediction distance: >20(cm)
Prediction frequency: 5200 (MHz)
Antenna gain: 5.46 (dBi)
Directional gain (numeric gain): 3.52
The worst case is power density at prediction frequency at 20cm: 0.0278(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

Wi-Fi(2.4GHz)
Maximum Tune-Up output power: 16.0(dBm)
Maximum peak output power at antenna input terminal: 39.81(mW)
Prediction distance: >20(cm)
Prediction frequency: 2462 (MHz)
Antenna gain: 4.12 (dBi)
Directional gain (numeric gain): 2.58
The worst case is power density at prediction frequency at 20cm: 0.0205(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

Bluetooth
Maximum Tune-Up output power: 3.0(dBm)
Maximum peak output power at antenna input terminal: 2.00(mW)
Prediction distance: >20(cm)
Prediction frequency: 2402(MHz)
Antenna gain: 4.12 (dBi)
Directional gain (numeric gain): 2.58
The worst case is power density at prediction frequency at 20cm: 0.0010(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

Mode for Simultaneous Multi-band Transmission

Wi-Fi(5GHz) + Wi-Fi(2.4GHz)

The worst case is power density at prediction frequency at 20cm: 0.0278+0.0205=0.0483(mw/cm2)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

Result: Pass