

# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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## 1.1 Client Information

### Client Information

Applicant: Guangzhou Mingguan Trade Development Co., Ltd  
Address of applicant: Room 201, No. 5 Guangtangxihenglu, Tianhe District, Guangzhou City, Guangdong Province

Manufacturer: Guangzhou Mingguan Trade Development Co., Ltd  
Address of manufacturer: Room 201, No. 5 Guangtangxihenglu, Tianhe District, Guangzhou City, Guangdong Province

### General Description of EUT

Product Name: Automotive LED Atmosphere Light  
Trade Name: /  
Model No.: LED-DPD-03  
Adding Model(s): LED-DPD-04, LED-DPD-12  
Rated Voltage: DC 12V  
Power Adapter Model: /  
Serial number: 612420220548A05  
FCC ID: 2A5JP-DPD

Technical Characteristics of EUT	
Bluetooth Version:	V4.0 BLE
Frequency Range:	2402-2480MHz
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB
Antenna Gain:	0.5dBi

## 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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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<sup>2</sup>)

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

Maximum peak output power: 5.42(dBm)

Tune-Up output power: 5.5(dBm), 3.548(mW)

Prediction distance: >20(cm)

Prediction frequency: 2402 (MHz)

Antenna gain: 0.54 (dBi)

Directional gain: 1.12 (numeric)

The worst case is power density at prediction frequency at 20cm: 0.0007(mw/cm<sup>2</sup>)

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

$0.0007(\text{mw/cm}^2) < 1 (\text{mw/cm}^2)$

So the transmitter complies with the RF exposure requirements and the SAR is not required.