RF Exposure Evaluation

FCC ID: 2AVAA-XN002

1. Client Information

Applicant	:	Shenzhen Double New Technology Co.,Ltd
Address	:	301B, No.13, phase I, zone 3, Xinhe community, Fuhai street, Bao'an District, Shenzhen, China
Manufacturer	:	Shenzhen Double New Technology Co.,Ltd
Address	:	301B, No.13, phase I, zone 3, Xinhe community, Fuhai street, Bao'an District, Shenzhen, China

2. General Description of EUT

EUT Name	:	Micro laser engraving machine	
Models No.	:	XN002,XN003,XN004,XN005,XN006,XN007,XN008	
Model Difference	:	All these models are in the same PCB, layout and electrical circuit, the only difference is color.	
Product Description	:	Operation Frequency:	Bluetooth V4.1: 2402~2480 MHz
		Antenna Gain:	1.5dBi PCB Antenna
Power Supply	:	DC Voltage Supply from AC/DC Adapter.	
Power Rating	:	AC/DC Adapter 1: GQ12-050200-ZU Input: 100~240V/50~60Hz 0.4A Output: 5V 2A AC/DC Adapter 2:GQ24-120200-AU Input: 100~240V/50~60Hz 1.0A Output: 12V 2.0A	
Software Version	:	V1.0	
Hardware Version	:	V1.8	
Connecting I/OPort(S)	:	Please refer to the User's Manual	
Remark	:	The antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.	

Note: More test information about the EUT please refer the RF Test Report.

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, China
Tel: +86 75526509301 Fax: +86 75526509195

SAR Test Exclusion Calculations

1. **FCC: According to KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.**
   (1) Clause 4.3: General SAR test reduction and exclusion guidance
   Sub clause 4.31: Standalone SAR test exclusion considerations
   1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6GHz at test separation distance≤5 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[$\sqrt{f_{(GHz)}}$] ≤3.0 for 1-g SAR
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[$\sqrt{f_{(GHz)}}$] ≤7.5.0 for 10-g SAR

2. Calculation:

Test separation: 5mm						
Bluetooth Mode (GFSK)						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.402	-0.796	-1±1	0	1.00	0.30997	**3.0**
2.441	-0.650	-1±1	0	1.00	0.31247	**3.0**
2.480	-1.001	-1±1	0	1.00	0.31496	**3.0**
Bluetooth Mode (Pi/4-DQPSK)						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.402	-1.286	-1±1	0	1.00	0.30997	**3.0**
2.441	-1.016	-1±1	0	1.00	0.31247	**3.0**
2.480	-1.372	-1±1	0	1.00	0.31496	**3.0**
Bluetooth Mode (8-DPSK)						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.402	-0.948	-1±1	0	1.00	0.30997	**3.0**
2.441	-0.648	-1±1	0	1.00	0.31247	**3.0**
2.480	-1.026	-1±1	0	1.00	0.31496	**3.0**

Test separation: 5mm						
BLE Mode (GFSK)						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dBm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.402	-0.911	-1±1	0	1.00	0.310	**3.0**
2.442	-0.659	-1±1	0	1.00	0.313	**3.0**
2.480	-1.051	-1±1	0	1.00	0.315	**3.0**

So the worst RF Exposure Evaluation is calculated as *0.315< limit 3.0*.
The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

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