

# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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## 1.1 General Information

### Client Information

Applicant: TIC Audio Inc  
Address of applicant: 15224 Stafford Street, City of Industry, CA 91744

Manufacturer: ZhangZhou Yile Electronics Technology Co., Ltd  
Address of manufacturer: Lantian Industrial District, Zhangzhou, Fujian, China

### General Description of EUT:

Product Name: Outdoor Wifi&Bluetooth Receiver-Amplifier  
Trade Name: TIC  
Model No.: AMP100, APM50, AMP6, AMP8, AMP10, AMP16, AMP18, AMP28, AMP150, AMP200, AMP66, AMP68, AMP86, AMP88, AMP98, WBR1, WBR2, WBR5, WBR6, WBR8, WBR10, WBR12, WBR16, WBR66, WBR68, WBR86, WBR88, WB6, WB8, WB16, WB18, WB66, WB60, WB68, WB86, WB88, WB98, WB80, WB36, WB38, WB5, WB4, WB3, WB1, WB2, WB7, WB17, WB26, WB28, WB38, WB48, WBLS6, WBLS8, WBLS10, WBLS16, WBLS66, WBLS68, WBLS88, WBLS98, WBLS86, WBLS78, WBLS77, WBLS80, WBP6, WBP5, WBP8, WBP10, WBP16, WBP18, WBP66, WBP68, WBP86, WBP88, WBP77, WBP98  
FCC ID: 2AJNG-AMP100  
Rated Voltage: Adapter: DC20V

### Technical Characteristics of EUT:

#### Wi-Fi

Support Standards: 802.11b, 802.11g, 802.11n(HT20)  
Frequency Range: 2412-2462MHz  
RF Output Power: 11.32dBm (Conducted)  
Type of Modulation: CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM  
Data Rate: 1-11Mbps, 6-54Mbps, up to 72.2Mbps  
Quantity of Channels: 11  
Channel Separation: 5MHz  
Type of Antenna: SMA-reverse  
Antenna Gain: 3.0dBi

#### Bluetooth

Bluetooth Version: V4.2  
Frequency Range: 2402-2480MHz  
RF Output Power: 6.404dBm (Conducted)  
Data Rate: 1Mbps, 2Mbps, 3Mbps

Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels:	79/40
Channel Separation:	1/2MHz
Type of Antenna:	SMA-reverse
Antenna Gain:	3.0dBi

## 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

WiFi

Maximum Tune-Up output power: 12.0 (dBm)

Maximum peak output power at antenna input terminal: 15.85 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2412 (MHz)

Antenna gain: 3 (dBi)

Directional gain (numeric gain): 2.0

The worst case is power density at prediction frequency at 20cm: 0.006(mw/cm<sup>2</sup>)

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

BT

Maximum Tune-Up output power: 7.0 (dBm)

Maximum peak output power at antenna input terminal: 5.01 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2402 (MHz)

Antenna gain: 3 (dBi)

Directional gain (numeric gain): 2.0

The worst case is power density at prediction frequency at 20cm: 0.002(mw/cm<sup>2</sup>)

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

Result: Pass