

Maximum Permissible Exposure Report




For

IAG Group Ltd.

Sanecore Science & Technology Industry Park, Jiuwei Village, Xixiang Town,

Shenzhen, China

FCC ID: 2A05F-M-ONE

FCC Rule(s):	<u>FCC 47CFR Part 1.1310</u>
Product Description:	<u>Power Amplifier</u>
Tested Model:	<u>M-ONE</u>
Report No.:	<u>HCT17LR371E-2</u>
Sample Receipt Date:	<u>2017-12-13</u>
Tested Date:	<u>2018-01-03 to 2018-03-02</u>
Issued Date:	<u>2018-03-05</u>
Tested By:	<u>Jason Su / Engineer</u> 
Reviewed By:	<u>Silin Chen / EMC Manager</u> 
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Prepared By:	
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: IAG Group Ltd.
 Address of applicant: Sanecore Science & Technology Industry Park,
 Jiuwei Village, Xixiang Town, Shenzhen, China
 Manufacturer: IAG Group Ltd.
 Address of manufacturer: Sanecore Science & Technology Industry Park,
 Jiuwei Village, Xixiang Town, Shenzhen, China

General Description of EUT	
Product Name:	Power Amplifier
Trade Name:	audiolab
Model No.:	M-ONE
Adding Model(s):	N/A
Hardware Version:	JS1T_V01B
Software Version:	V4.2
Rated Voltage:	Input:AC100-120V 50/60Hz 150W
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	2402-2480MHz
Max RF Output Power:	3.790 dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels:	79
Type of Antenna:	Cylindrical Antenna
Antenna Gain:	2.90dBi

1.2 Test Standards

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1310

1.3 General Description of Test

Items	Description
EUT Frequency band	<input type="checkbox"/> FHSS: 2.400GHz ~ 2.483GHz <input type="checkbox"/> WLAN: 2.400GHz ~ 2.483GHz <input type="checkbox"/> WLAN: 5.150GHz ~ 5.250GHz

	<input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <input checked="" type="checkbox"/> Others: <u>BT: 2402-2480MHz</u>
Device category	<input type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input checked="" type="checkbox"/> Others <u>Fixed location (>20cm separation)</u>
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²) <input type="checkbox"/> Others: _____
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas: <ul style="list-style-type: none"> <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Max. output power	3.790dBm (2.40mW)
Antenna gain (Max)	2.90dBi (Numeric gain:1.95)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Note:

1. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.

1.4 Human Exposure Assessment Results

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	* 100	6
3.0–30	1842/f	4.89/f	* 900/f ²	6
30–300	61.4	0.163	1.0	6
300–1,500 .....	.....	.....	f/300	6
1,500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	* 100	30
1.34–30	824/f	2.19/f	* 180/f ²	30
30–300	27.5	0.073	0.2	30
300–1,500 .....	.....	.....	f/1500	30
1,500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where $E =$ Field Strength in Volts / meter

$P =$ Power in Watts

$G =$ Numeric antenna gain

$d =$ Distance in meters

$S =$ Power Density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770d^2}$$

Changing to units of mW and cm, using:

$$P (mW) = P (W) / 1000 \text{ and}$$

$$d (cm) = 100 * d (m)$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

Equation 1

Where $d =$ distance in cm

$P =$ Power in mW

$G =$ Numeric antenna gain

$S =$ Power Density in mW / cm²

EUT parameter (data from the separate report)	
Given $E = \frac{\sqrt{30 \times P \times G}}{d} \text{ \& \ } S = \frac{E^2}{3770}$	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
Exposure classification	S=1mW/cm ²
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)
Yields $S = \frac{30 \times P \times G}{3770d^2}, \quad d=0.2m=20cm$ $P=0.0024W=2.40mW, \quad G=1.95,$ $S=0.00093mW/cm^2$	

Conclusion:

$S=0.00093\text{mW}/\text{cm}^2$ is significant lower than the FCC 47CFR Part 1.1310 Limit $1\text{mW}/\text{cm}^2$.

(For mobile or fixed location transmitters, the maximum power density is $1.0\text{ mW} / \text{cm}^2$ even if the calculation indicates that the power density would be larger.)