

MAXIMUM PERMISSIBLE EXPOSURE EVALUATION REPORT

Applicant: Qixiang Electron Science& Technology Co., Ltd

Address: Qixiang Building, Tangxi Industrial Zone, Luojiang, Quanzhou,
Fujian, 362011 China

Product Name: MOBILE RADIO

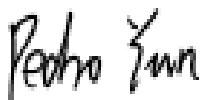
FCC ID: T4K588V

Standard(s): 47 CFR §1.1310, 47 CFR §2.1091
447498 D01 General RF Exposure Guidance v06

Report Number: 2402Z47737E-RF-00E

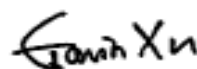
Report Date: 2025/1/2

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).



Reviewed By: Pedro Yun

Title: Project Engineer



Approved By: Gavin Xu

Title: RF Supervisor

Bay Area Compliance Laboratories Corp. (Dongguan)
No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China

Tel: +86-769-86858888

Fax: +86-769-86858891

www.baclcorp.com.cn

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2402Z47737E-RF-00E	Original Report	2025/1/2

1. GENERAL INFORMATION

1.1 General Description Of Equipment under Test

EUT Name:	MOBILE RADIO
EUT Model:	AT-588
Operation Frequency:	BT/BLE:2402-2480 MHz Amateur Radio Band: 144-148MHz Scanning Receiver:108-136MHz,136-174MHz
Maximum Peak Output Power (Conducted):	BT:2.03dBm BLE:0.6dBm Amateur Radio: 69.4 W
Rated Input Voltage:	DC 13.8V
Serial Number:	2U78-7
EUT Received Date:	2024/11/8
EUT Received Status:	Good

1.2 Accessory Information

Accessory Description	Manufacturer	Model	Parameters
MIC	Qixiang	AT-588	Unknown

1.3 Antenna Information Detail ▲

Radio	Antenna Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Bluetooth	Qixiang	PCB	50	2402-2480MHz	3.24dBi
VHF	Qixiang	Helical	50	108-174MHz	0 dBi

2. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

2.1 Applicable Standard

According to 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for Maximum Permissible Exposure (MPE)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
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
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz;

* = Plane-wave equivalent power density;

2.2 Calculation For Test Exclusion:

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

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 (appropriate units, e.g., cm);

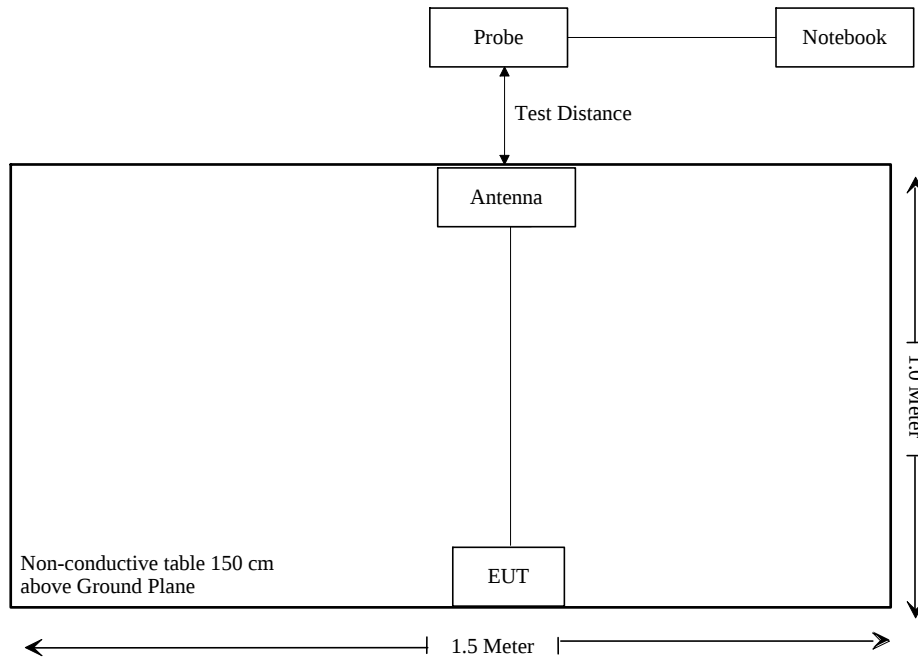
For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

2.3 MPE Test Procedure

1. Place the EUT's antenna was vertical polarization on the table.
2. The EUT was set to transmit at the frequency at maximum RF power.
3. The Distance between the test probe and the investigated EUT's antenna equal to the distance be specified as safety distance in the user manual.
4. Power density measurements were taken at different heights of the probe from the ground (0.8 to 3.0 meters) while rotating versus azimuth (from 0 °to 360 °) the antenna.
5. adjusted the distance between the test probe and the tested antenna to the real safe distance, R_{real} , such that the measured highest power density in the “worst case” position was the same or slightly less than the test limit.
6. The measurement results of final measurements conducted at the chosen azimuth and different heights of the probe above the ground.

2.4 Block Diagram of Test Setup



2.5 Test Data:

Test Information:

Serial No.:	2U78-2	Test Date:	2024/12/17
Test Site:	Chamber B	Test Mode:	Transmitting
Tester:	Leo Xiao	Test Result:	Pass

Environmental Conditions:

Temperature: (°C):	19.5	Relative Humidity: (%)	30	ATM Pressure: (kPa)	102.2
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Narda	Probe	Probe EF 0691	J-0311	2024/11/6	2025/11/5
Narda	Broadband Field Meter	NBM-520	B-0239	2024/11/6	2025/11/5

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:
147.9875MHz

Measuring Probe Height(cm)	Power Density(mW/cm ²)					
	40cm	50cm	55cm	60cm	70cm	80cm
80	0.052	0.028	0.011	0.027	0.021	0.019
90	0.057	0.035	0.016	0.033	0.026	0.023
100	0.061	0.045	0.025	0.041	0.033	0.031
110	0.065	0.057	0.039	0.048	0.041	0.036
120	0.075	0.073	0.052	0.058	0.049	0.042
130	0.111	0.098	0.084	0.073	0.061	0.049
140	0.192	0.141	0.112	0.091	0.074	0.057
150	0.311	0.194	0.153	0.118	0.088	0.067
160	0.389	0.196	0.181	0.131	0.103	0.074
170	0.364	0.209	0.182	0.146	0.108	0.083
180	0.274	0.186	0.163	0.142	0.112	0.087
190	0.182	0.161	0.142	0.143	0.109	0.086
200	0.172	0.145	0.125	0.136	0.108	0.084
210	0.217	0.163	0.128	0.131	0.105	0.083
220	0.291	0.176	0.141	0.138	0.107	0.084
230	0.302	0.189	0.143	0.141	0.105	0.082
240	0.265	0.163	0.132	0.129	0.097	0.075
250	0.208	0.139	0.112	0.113	0.088	0.068
260	0.135	0.112	0.086	0.091	0.074	0.059
270	0.089	0.078	0.065	0.069	0.057	0.048
280	0.067	0.059	0.049	0.053	0.046	0.038
290	0.047	0.043	0.036	0.041	0.034	0.031
300	0.031	0.031	0.027	0.031	0.027	0.024

Test Result Summary:

Maximum Power Density (mW/cm ²)	0.389
Measured Conducted Output Power (W)	69.2
Maximum Rated Power Including Tolerance (W)	70
Scaled Maximum Power Density(50% duty Cycle) (mW/cm ²)	0.197
Limit (mW/cm ²)	0.20
Safety Distance (cm)	40.00
Result	Compliant

144.0125MHz

Measuring Probe Height(cm)	Power Density(mW/cm ²)					
	40cm	50cm	55cm	60cm	70cm	80cm
80	0.049	0.037	0.021	0.032	0.029	0.028
90	0.061	0.045	0.024	0.038	0.033	0.031
100	0.071	0.055	0.033	0.047	0.038	0.034
110	0.085	0.069	0.048	0.058	0.047	0.039
120	0.111	0.091	0.069	0.074	0.058	0.047
130	0.165	0.121	0.101	0.086	0.072	0.057
140	0.253	0.162	0.134	0.117	0.086	0.067
150	0.366	0.201	0.169	0.139	0.099	0.077
160	0.394	0.228	0.189	0.153	0.106	0.084
170	0.391	0.217	0.186	0.152	0.112	0.089
180	0.272	0.183	0.165	0.141	0.113	0.093
190	0.189	0.154	0.143	0.129	0.113	0.094
200	0.198	0.153	0.135	0.125	0.108	0.091
210	0.277	0.178	0.147	0.132	0.105	0.086
220	0.355	0.201	0.166	0.141	0.106	0.085
230	0.378	0.208	0.174	0.142	0.106	0.084
240	0.353	0.221	0.163	0.146	0.102	0.081
250	0.283	0.191	0.132	0.138	0.106	0.084
260	0.195	0.145	0.101	0.112	0.089	0.073
270	0.129	0.103	0.075	0.084	0.068	0.059
280	0.091	0.073	0.056	0.063	0.054	0.047
290	0.053	0.051	0.041	0.046	0.041	0.037
300	0.037	0.034	0.031	0.032	0.031	0.029

Test Result Summary:

Maximum Power Density (mW/cm ²)	0.394
Measured Conducted Output Power (W)	69.4
Maximum Rated Power Including Tolerance (W)	70
Scaled Maximum Power Density(50% duty Cycle) (mW/cm ²)	0.199
Limit (mW/cm ²)	0.20
Safety Distance (cm)	40.00
Result	Compliant

For Bluetooth/BLE:

Operation Modes	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
BDR/EDR	2402-2480	3.24	2.11	2.5	1.78	20.00	0.0007	1.0
BLE	2402-2480	3.24	2.11	1	1.26	20.00	0.0005	1.0

Result: **Compliant**, the Stand-alone Maximum Permissible Exposure was compliant at the distance more than 20cm.

BT/BLE can't transmit simultaneously.

For Simultaneous transmission:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

$$= S_{VHF}/S_{limit-VHF} + S_{BT}/S_{limit-BT}$$

$$= 0.199/0.2 + 0.0007/1.0$$

$$= 0.9957$$

Result: The device meet FCC MPE for General Population/Uncontrolled use at the distance more than 40cm.

******* END OF REPORT *******