TENMARS
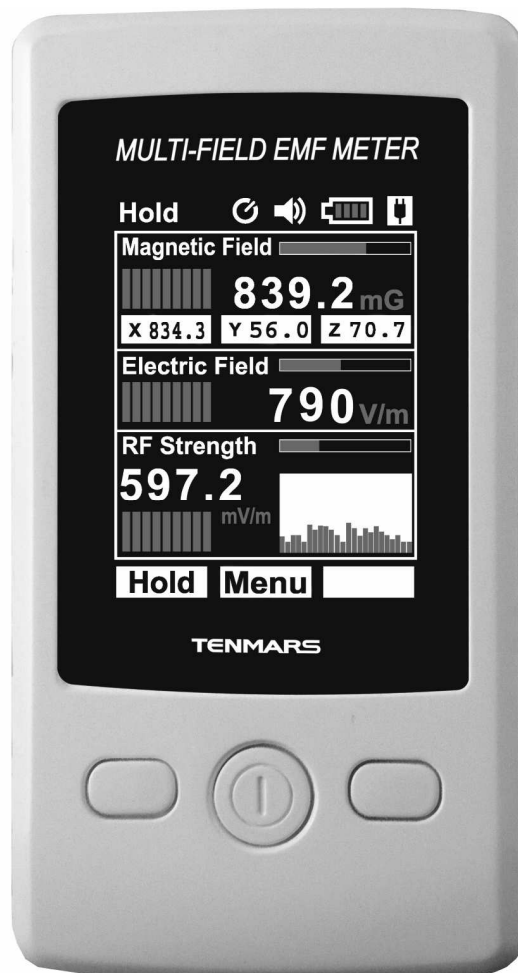
MULTI-FIELD EMF METER

TM-190
User's Manual

C E

HB2TM1900004

Meun

1. Features

- Data hold (HOLD)
- Low battery indication： HIGH. LOW
- Over load display "OL".
- Brightness options: low-Middle-high
- Magnetic unit: Gauss(mG) or Tesla(μT)
- RF Strength Unit: (uW/m² ~mW/m²) (μW/cm²) (m V/m ~V/m) (mA/m) (dBm).
- Languages: English; Traditional Chinese; Simplified Chinese; Japanese; Español.
- Power Off Time：No; 1; 3; 5; 10; 15; 30. Factory default sets as "5". Settings can be changed by the user. is displayed on the screen after power off time is set.
- Keys/Alarm Sounds: On ; Off
- Low-Frequency EMF Readings: Individual and aggregated XYZ axial readings .
- RF Historical Records:

  Up to 20 groups .
- Information: Software version: V1.0
- High-frequency EMF Readings: Please perform tests according to the indicated direction RF SENSOR.

● Electric field Measurement Precautions: Please perform tests according to the indicated direction ‾‾‾‾‾‾‾. Please hold the meter at the bottom Electric Field SENSOR of the display, as shown in the figure below:
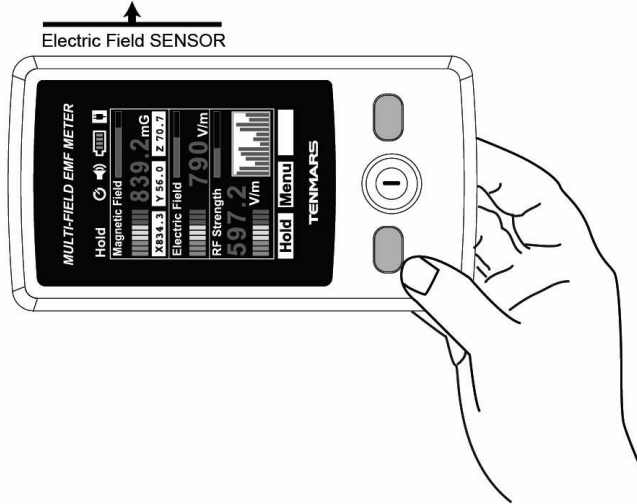
Fig. 1 Electric Field measurement:

	Magnetic Fields	Electric Field	RF strength
The Green zone	0~10.00mG	0~500V/m	0~0.99mW/m²;0~0.59V/m
The Yellow zone	10.01~100mG	501~1000V/m	1~9.99mW/m²;0.6~1.9V/m
The Red zone	101~2000mG	>1001V/m	>10mW/m²;>2V/m

The color zones are for reference only

● electromagnetic safety reference standard

international國際的	Council Recommendation1999/519/EC	42V/m(4.75W/m²)	59V/m(9.25W/m²)
international國際的	ICNIRP Guidelines,April1998	42V/m(4.75W/m²)	59V/m(9.25W/m²)
Austria 奧地利	ONORM S1120	49V/m(6.33W/m²)	61V/m(10W/m²)
Belgium比利時	Belgisch Staatsblad F.2001-1365	21V/m(1.18W/m²)	30V/m(2.31W/m²)
Germang 德國	26.Deutsche Verordnung	42V/m(4.75W/m²)	59V/m(9.25W/m²)
italy意大利	Decreto n.381,1998	20V/m(1W/m²)	20V/m(1W/m²)
the netherlands荷蘭	Health Council	51V/m(6.92W/m²)	83V/m(18W/m²)
switzerland瑞士	Verordnung 1999	4V/m(0.04W/m²)	6V/m(0.1W/m²)
united states美國	IEEE C95.1	49V/m(6.33W/m²)	68V/m(12W/m²)
china中國	Draft:National Quality Technology Monitoring Bureau	49V/m(6.33W/m²)	61V/m(10W/m²)
japan日本	Radio-Radiadiation Protection Guidelines,1990	49V/m(6.33W/m²)	61V/m(10W/m²)

1W/m²=0.1mW/Cm²=100uW/Cm².1mW/m²=0.1uW/Cm²

2.   Identifying Parts
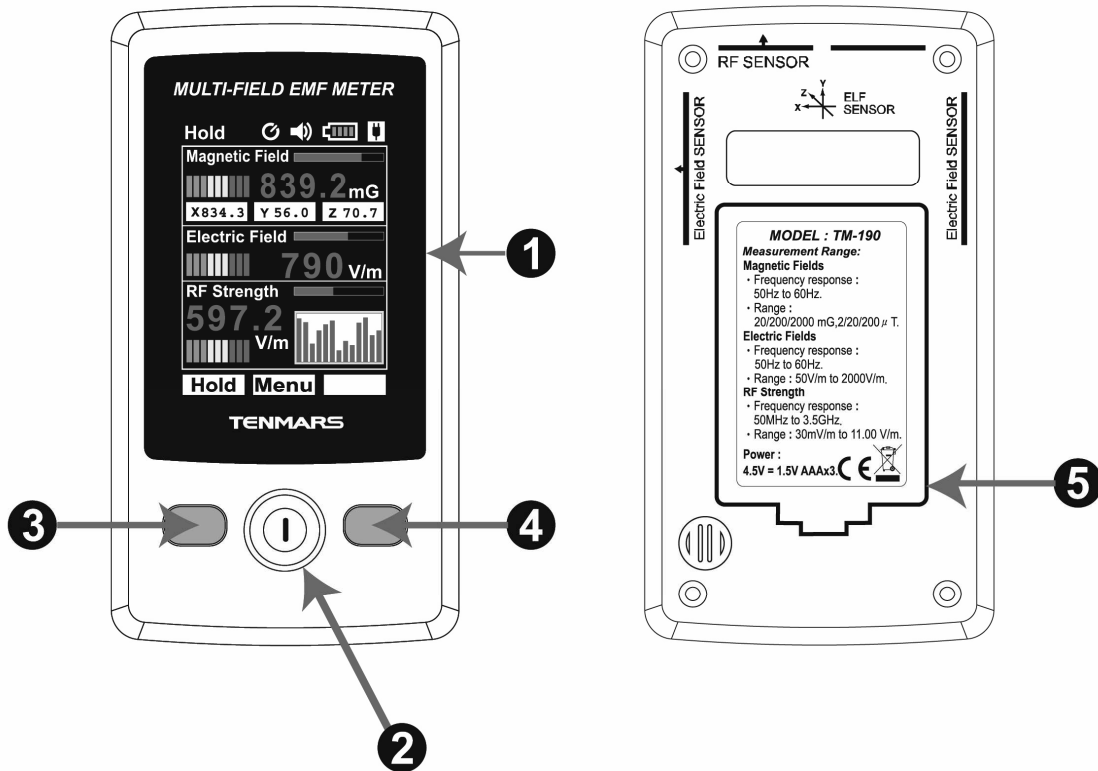
Fig. 2 Instrument description:

1.   2.4" 240*320 resolution color TFT.
2.   Power and Menu button
3.   Hold and Enter button
4.   Select and Down button
5.   Battery cover

3. TFT description
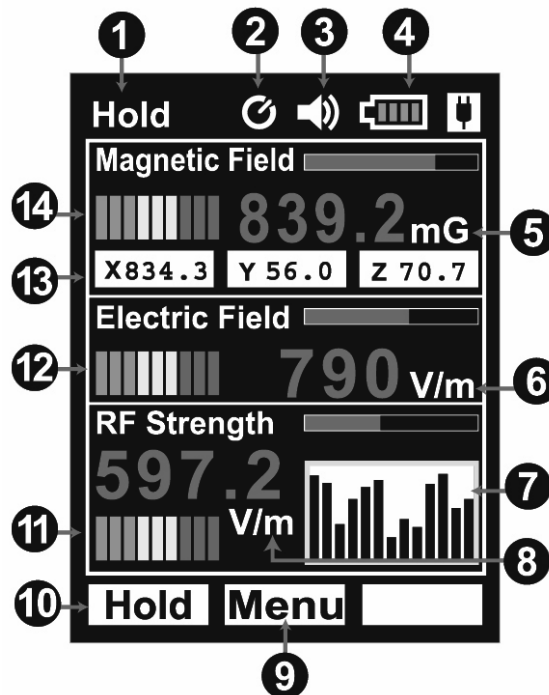
1 Data Hold indicator.
2 Auto power off indicator.
3 Buzzer indicator.
4 Battery indicator.
5 Tesla(uT) or Gauss(mG) display.
6 Electric Field (V/m) display.
7 RF strength history histogram display.
8 RF strength digital (mV/m/ W/m²/μW/cm²/dB) display.
9 Menu key indication
10 Hold/ Enter key indicator
11 RF electronic field warning indicator
12 LF electric field warning indicator
13 Individual XYZ axial value of LF electromagnetic wave display
14 LF electromagnetic wave warning indicator'

4. Measurement Procedures

4.1 POWER ON/OFF Button:

- Press ⊙ button to power on. LCD display measurement screen.(see Fig. 3)
- Press ⊙ button for 3 seconds to power off.

4.2 Reading Data:

Direct the front section of the meter at the desired electromagnetic field for measurements.
The meter simultaneously displays the electromagnetic field readings of individual and aggregated XYZ axes, where the aggregated calculation equation can be expressed as follows:

$$B = \sqrt{Bx^2 + By^2 + Bz^2}$$

Because of environment-related magnetic field factors, this electromagnetic field EMF meter may display a reading of under 0.50 mG prior to testing. This is caused by the magnetic noise in the environment, rather than meter failure.

4.3 Data hold (HOLD):

Press **Hold** to enable or disable the data hold function.

4.4 Menu Settings:

On the measurement screen: Press the middle ⓪ button to enter the main menu, where 7 options can be selected, namely, **Brightness**, **Magnetic unit, RF Strength Unit**, **Language**, **Power off**, **Sound**, and **Information**.

Press the right ⟨Select⟩ button to make the blue brick scroll down. Press the right ⟨Select⟩ button repeatedly, and the blue brick will cycle through the options.

Press the left ⟨Enter⟩ button to enter the selected option.

Press the left ⟨Enter⟩ button again to exit the selected option and return to the main menu.

Press the middle ⓪ button to return to the previous menu.

▌Brightness	**Brightness**	**Brightness**	**Brightness**
Magnetic Unit	**▌Magnetic Unit**	**Magnetic Unit**	**Magnetic Unit**
RF Strength Unit	**RF Strength Unit**	**▌RF Strength Unit**	**RF Strength Unit**
Language	**Language**	**Language**	**▌Language**
Power off	**Power off**	**Power off**	**Power off**
Sound	**Sound**	**Sound**	**Sound**
Information	**Information**	**Information**	**Information**
Enter **Menu.** Select	**Enter** **Menu.** Select	**Enter** **Menu.** Select	**Enter** **Menu.** Select

Brightness	**Brightness**	**Brightness**
Magnetic Unit	**Magnetic Unit**	**Magnetic Unit**
RF Strength Unit	**RF Strength Unit**	**RF Strength Unit**
Language	**Language**	**Language**
▌Power off	**Power off**	**Power off**
Sound	**▌Sound**	**Sound**
Information	**Information**	**▌Information**
Enter **Menu.** Select	**Enter** **Menu.** Select	**Enter** **Menu.** Select

4.4.1. Option Buttons:

☐ Press the right (Select) button to scroll to and check the next check box. Press the right (Select) button repeatedly to cycle through the check boxes.

☐ Press the left (Enter) button to exit to the main menu.

☐ Press the middle (⓪) button to return to the previous setting menu.

Enter Menu. Select

4.4.2. Screen Brightness options:

Following the operation procedures in 4.4, the Brightness setting comprises the following three options, namely, **Low**, **Middle**, and **High**. Under the sub-directory, use the option buttons to select and confirm the desired selection.

Brightness			Brightness			Brightness	
Low	☐		Low	☐		Low	☑
Middle	☑		Middle	☐		Middle	☐
High	☐		High	☑		High	☐
Enter Menu. Select			Enter Menu. Select			Enter Menu. Select	

Default: Middle

4.4.3. Magnetic Unit:

Following the operation procedures in 4.4, the Magnetic Unit setting comprises the following two options, namely, **Gauss/mG** and **Tesla/uT**. Under the sub-directory, use the option buttons to select and confirm the desired selection.

Magnetic Unit			Magnetic Unit	
Gauss/mG	☑		Gauss/mG	☐
Tesla/µT	☐		Tesla/µT	☑
Enter Menu. Select			Enter Menu. Select	
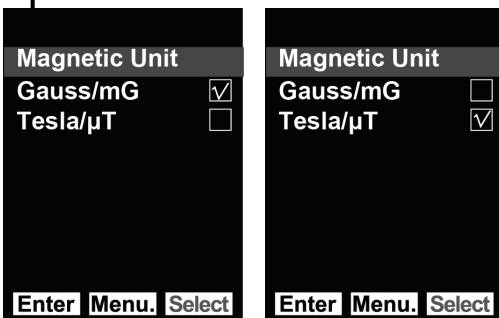
Default: mG

4.4.4. RF Strength Unit：

Following the operation procedures in 4.4, the **RF Strength Unit** setting comprises the following five options, namely, µW/m²~mW/m², µW/cm², mV/m~V/m, mA/m, and dBm (files are automatically skipped within the selected unit). Under the sub-directory, use the option buttons to select and confirm the desired selection.

Default: µV/m² ~ mW/m²

4.4.5. Language:
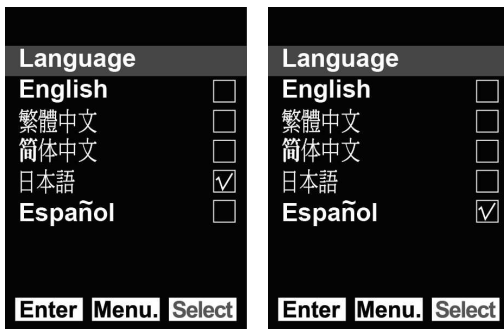
Following the operation procedures in 4.4, the Language setting comprises the following five options, namely, English, Traditional Chinese, Simplified Chinese, Japanese, and Español (Spanish). Under the sub-directory, use the option buttons to select and confirm the desired selection.

Language	
English	☑
繁體中文	☐
简体中文	☐
日本語	☐
Español	☐
Enter **Menu.** Select	

Language	
English	☐
繁體中文	☑
简体中文	☐
日本語	☐
Español	☐
Enter **Menu.** Select	

Language	
English	☐
繁體中文	☐
简体中文	☑
日本語	☐
Español	☐
Enter **Menu.** Select	

Language	
English	☐
繁體中文	☐
简体中文	☐
日本語	☑
Español	☐
Enter **Menu.** Select	

Language	
English	☐
繁體中文	☐
简体中文	☐
日本語	☐
Español	☑
Enter **Menu.** Select	
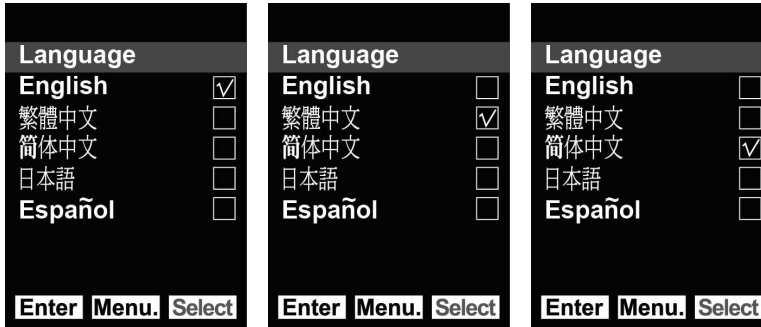
Default: English

4.4.6. Power Off Time:

Following the operation procedures in 4.4, the Power Off setting comprises the following seven options, namely, NO, 1, 3, 5, 10, 15, and 30 (min). Under the sub-directory, use the option buttons to select and confirm the desired selection.

Power off		Power off		Power off	
NO	☑	NO	☐	NO	☐
1	☐	1	☑	1	☐
3	☐	3	☐	3	☑
5	☐	5	☐	5	☐
10	☐	10	☐	10	☐
15	☐	15	☐	15	☐
30	☐	30	☐	30	☐
Enter **Menu.** Select		**Enter** **Menu.** Select		**Enter** **Menu.** Select	

| Power off		Power off		Power off		Power off	
NO	☐	NO	☐	NO	☐	NO	☐
1	☐	1	☐	1	☐	1	☐
3	☐	3	☐	3	☐	3	☐
5	☑	5	☐	5	☐	5	☐
10	☐	10	☑	10	☐	10	☐
15	☐	15	☐	15	☑	15	☐
30	☐	30	☐	30	☐	30	☑
Enter **Menu.** Select		**Enter** **Menu.** Select		**Enter** **Menu.** Select		**Enter** **Menu.** Select	
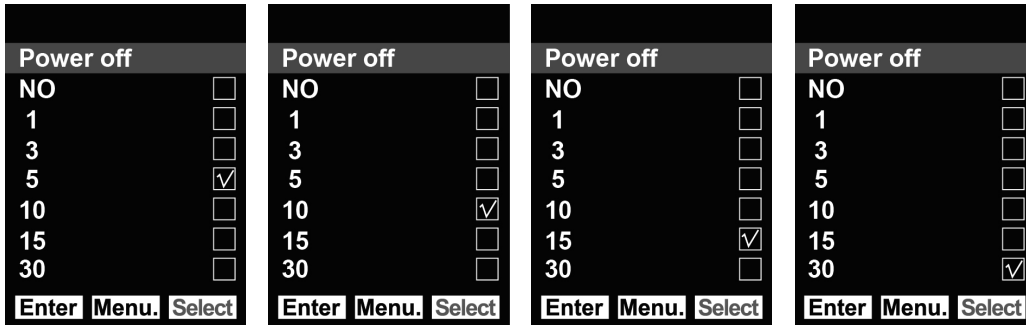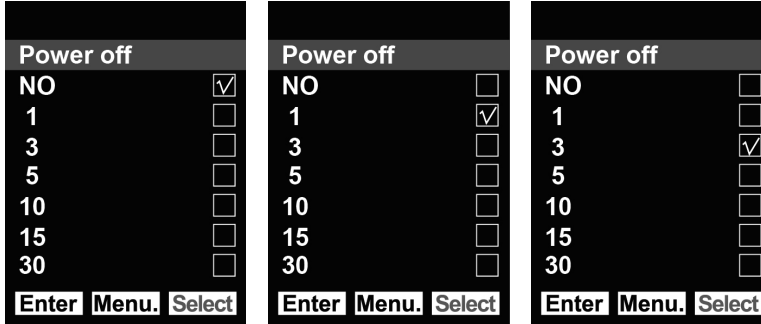
Default: 5min

4.4.7. Sound on/off:

Following the operation procedures in 4.4, the Sound setting comprises the following two options, namely, On and Off.

Press the right ⬭Select button to scroll to and check the next check box. Press the right ⬭Select button to cycle thought he options.

Press the left ⬭Enter button to select the "Enable" setting and enter the Keys/Alarm Sound menu (Section 4.4.8).

Press the left ⬭Enter button to select the "Disable" setting and return to the main menu(Fig. 3).

Press the middle ⬭ button to return to the measurement screen

Sound			Sound	
Enable	☑		Enable	☐
Disable	☐		Disable	☑
Enter Menu. Select			Enter Menu. Select	
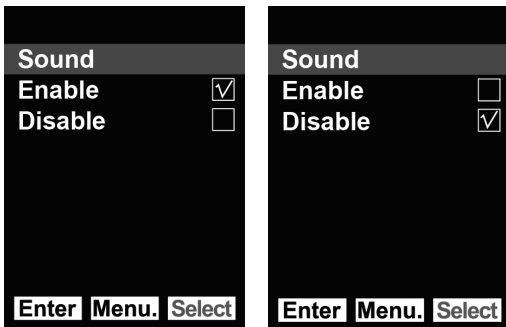
4.4.8. Keys/Alarm Sound:

Following the selection of the Enable option in the Sound settings menu, the Keys/Alarm Sound setting comprises the following two options, namely, Keys and Alarm.

Press the right ⬭Select button to scroll to and check the check the next check box. Press the right ⬭Select button repeatedly to cycle through the options.

Press the left ⬭Enter button to enter the next options screen.

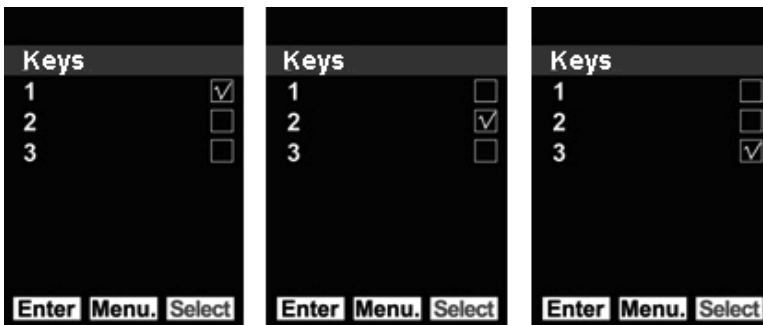| Sound		Sound	
Keys	☑	Keys	☐
Alarm	☐	Alarm	☑
Enter Menu. Select		Enter Menu. Select	

4.4.9. Keys Sound:

Following the selection of the Keys option in the Keys/Alarm Sound settings menu, the Keys setting comprises 3 options, namely 1, 2, and 3.

Press the right (Select) button to scroll to and check the next check box. Press the right (Select) button repeatedly to cycle through the options.

Press the left (Enter) button to exit to the main menu.

| Keys		Keys		Keys	
1	☑	1	☐	1	☐
2	☐	2	☑	2	☐
3	☐	3	☐	3	☑
Enter Menu. Select		Enter Menu. Select		Enter Menu. Select	

Default: 3

4.4.10. Alarm Sound:

Following the selection of the Alarm option in the Keys/Alarm Sound settings menu, the Alarm setting comprises 3 options, namely 1, 2, and 3.

Press the right (Select) button to scroll to and check the next check box. Press the right (Select) button repeatedly to cycle through the options.

Press the left (Enter) button to exit to the main menu.

14
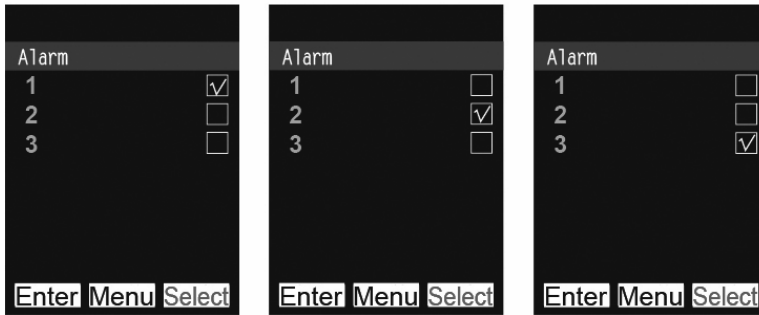
Default: 3

4.4.11. Information:

Following the operation procedures in 4.4, select the Information option to display the software version (V1.0).

Press the left (Enter) button to exit to the main menu.

Press the middle ⓞ button to return to the settings screen.

5.   Specifications

5.1 Sensor type: LF Magnetic Fields (MF)

- The meter is equipped with three individual aerial sensors to measure EMFs. The overload indications can be displayed simultaneously on three axes (X, Y, Z):
- Range: 20/200/2000mG, 2/20/200µT.
- Resolution: 0.02/0.1/1 mG or 0.002/0.01/0.1 µT.
- Frequency response: 50/60 Hz
- Sensor: Triple Axis (X, Y, Z).
- Accuracy: ±(15%+100dgt).

5.2 Sensor type: LF Electric Fields

- Range: 50V/m to 2000V/m.
- Frequency response: 50/60Hz
- Accuracy: ± (7% + 50dgt).

5.3 Sensor type: RF Strength

- Frequency range : 50MHz to 3.5GHz.
- Accuracy: ± 2dB at 2.45GHz
- Measurement units: µW/m²~mW/m²; µW/cm²; mV/m~V/m, mA/m, and dBm
- Specified measurement range: (0. 2µW/m² to 554.6mW/m²)
  (0.02µW/cm²to55.4µW/cm²)(36.1mV/mto14.46V/m) (0.02mA/m to 38.35mA/m)(-51dB to 16dBm)
- Display resolution: 0.2µW/m²,0.02µW/cm²,0.2mV/m, 0.02mA/m, 2dB
- Display: 4 digits Triple LCD display.
- Sample rate: 6 seconds per time.
- Battery life: Approximate 8 hours.
- Battery: 1.5V AAA Alkaline Battery*3.
- Audible Key tone alarm: Buzzer
- Operating temperature & humidity: 5°C to 40°C, below 80% RH.
- Storage temperature & humidity: -10°C to 60°C, below 70%.
- Weight: About 120g.
- Dimensions: 115(L)*60(W)*21(H) mm.

6.   Battery replacement

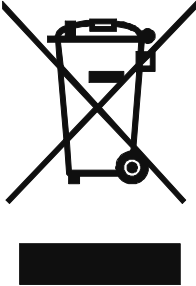| ⚠	**WARNING** **If the symbol** " ▯▯▯ " a**ppears on the screen, please replace the battery immediately**

- Turn off the instrument.
  - Open the battery covers and remove the battery.
  - Take three new 1.5VAAA alkaline batteries, and install the batteries according to the polarity.
  - Put back the battery cover.

7.   Safety and maintenance standards

- Do not operate around combustible gases or in damp environment.
- Operating altitude: below 2,000m.
- Operating environment: for indoor use, expose to pollution level II.
- This is a precision device. During use or storage, do not go beyond its spec. to prevent any possible damage or danger.
- Do not put this device in direct sunlight or where it is hot and/or damp.
- For long storage, remove the battery to prevent the battery from leaking and causing damage to the parts inside.
  - Clean the device with a dry soft cloth. The use of wet cloths, liquid and water is prohibited.

8. End of life

	Caution
	This symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal

TENMARS ◇YFE◇

Professional Electrical and Environment Test & Measurement Instruments:

Battery Capacity/Impedance Tester, TACHO Meter, LED light meter, Temperature & Humidity meter, Infrared Thermometer, Sound level meter, Light meter, EMF meter, UV Light meter, RF meter, Hot wire Anemometer, CO meter, Anemometer, Lan cable tester, CO_2 meter, Solar power meter, Radiation meter, Clamp meter, Multimeter, Phase Rotation test, Digital Insulation tester.

TENMARS ELECTRONICS CO., LTD

6F, 586, RUI GUANG ROAD, NEIHU,

TAIPEI 114, TAIWAN.