

# Recreational Vehicle Intelligent Control System Host D880 User Manual

Ver.	Verison Discription	Author	Review	Approval	Date
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# 1. Overview of the Intelligent System

## 1.1 Product Overview

With the growing popularity of self-driving travel, as multi-functional travel tools, have become increasingly prevalent. However, the intelligent control system, which serves as the core for RVs safety and intelligent control, has failed to keep pace with market development. Currently, the entire intelligent control system of most RVs is a patchwork of household and industrial components, which cannot meet the requirements of driving control.

To address this issue, Intibeam Technology developed the "RVs Intelligent Control System" in May 2023 in accordance with automotive-grade requirements. The system integrates advanced functions and devices such as AI human-computer interaction, voice control, automotive-grade on-board equipment, 3D surround view and monitoring, Beidou positioning, WIFI/BT communication, mobile phone APP expansion, and cloud data center. It provides users with a convenient and user-friendly interactive interface, enabling centralized control and management of various on-board devices via touch screen, intelligent voice, mobile phone APP and other methods, and offering users a comprehensive, intelligent control and driving assistance solution.

The system not only achieves high integration of RV control to facilitate mobile living, but also enhances travel safety and comfort, allowing users to enjoy an unprecedented intelligent experience on the road. Through the intelligent control system or mobile phone APP, you can easily control all on-board devices, enjoy wonderful music and video, and fully appreciate the beautiful scenery along the journey.

## 1.2 Product Picture



## 2. Basic Parameters

Category	Name	Spec
Wireless	Wifi 2.4GHz&Bluetooth	
Wireless Frequency Band	BLE:2402-2480 MHz 2.4G WIFI:2412-2462 MHz	
Max Power	BLE:11.99dBm 2.4G WiFi:29.30 dBm	
Host Parameters	Main Processor	8-core ARM Cortex-A76/A55, 8GB+64GB
	Coprocessor	ARM Cortex-M4
	Operating System	Andriod 14.0 + FreeRTOS real-time System
Host Interfaces	ACC	ACC Power-on control
	HDMI	HDMI
	USB2.0	USB2.0
	Type-C	Type-C
	USB3.0	USB3.0

Category	Name	Spec
	DMIC	Audio input
	LAN0	Standard Network Port
	LAN1	Standard Network Port
	LIN-OUT	Audio Output Interface
	PWR	Power Button
	BOOT	Reset Power Button
	DC	12V/24V-IN
	12pin Interfaces I	See Interface Information Summary
	12pin Interfaces II	See Interface Information Summary
	12pin Interfaces III	See Interface Information Summary
	12pin Interfaces IV	See Interface Information Summary
12pin Interfaces V	See Interface Information Summary	
Mechanical Characteristics	4pin Interface*12	IN1-(A1-A4) 12V/24V, IN2-(B2-B4) 12V/24V, IN3-(S1-S4,T1-T4) 12V/24V/48VGND-(Common Ground for IN1/IN2) (B1, H3, H4)OUT1-(C1-C4,F4,G1-G4,H1,H2), OUT2-(D1-D4,E1-E4,F1,F2), OUT3-(P1-P8) See Interface Information Summary
	24pin Interface	See Interface Information Summary
	12pin Interface	See Interface Information Summary
Power Characteristics	Static Power Consumption	< 5W
	Standby Power Consumption	< 1W
Mechanical Characteristics	Overall Dimension	306mm × 71mm × 265mm (L×W×H)
	Installation Method	Wall-mounted

Category	Name	Spec
	Housing Material	Aluminum Alloy
Environmental Characteristics	Operating Temperature	-40~+85°C
	Storage Temperature	-45~+90°C

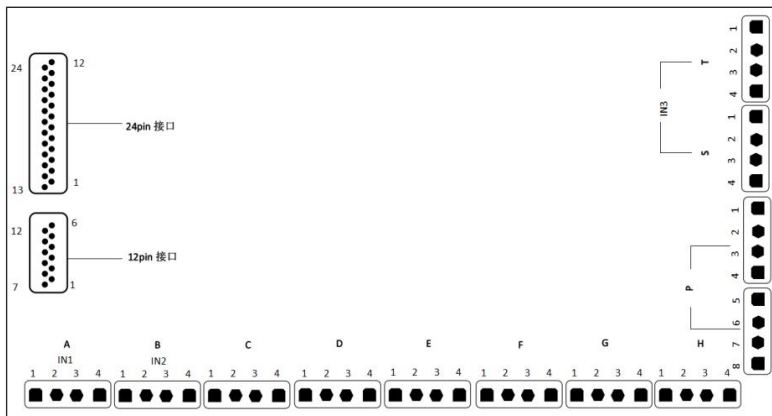
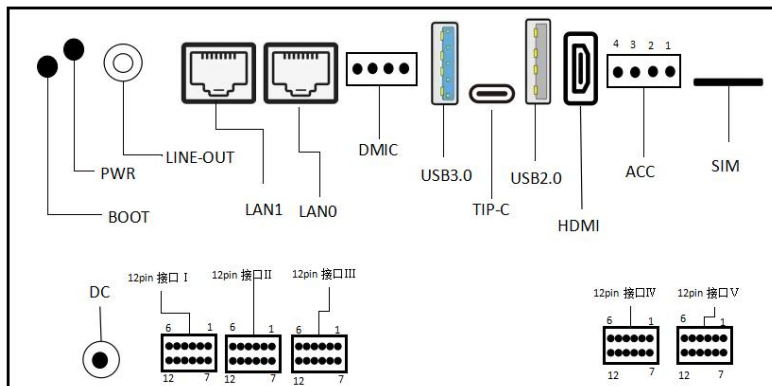
### 3. Product Function

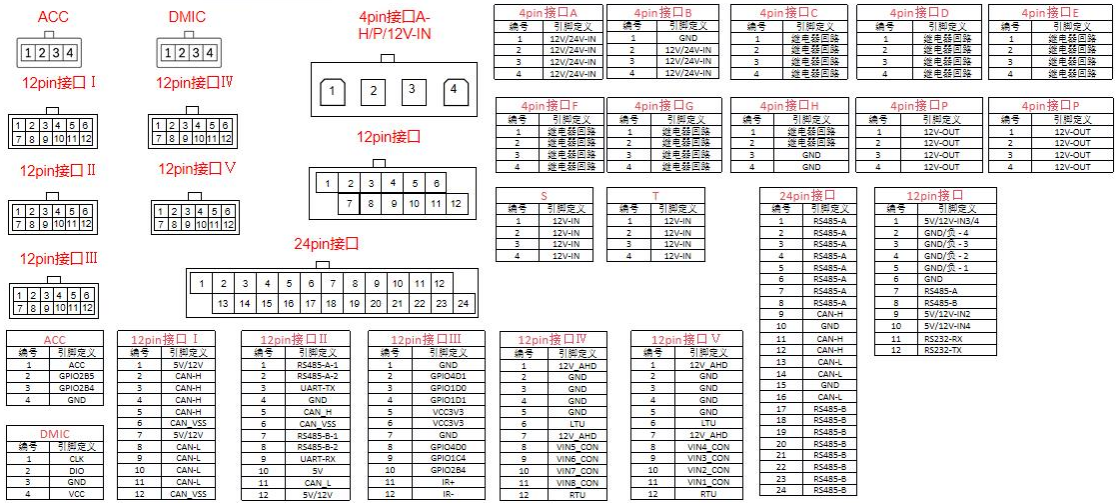
Function Category	Main Function Description
Intelligent Device Control	<ul style="list-style-type: none"> <li>• Centralized Control: Integrated control of in-vehicle lighting, lifting roof, electric support legs, tailgate, air conditioner, heater, water pump, audio and other devices via touch screen or voice.</li> <li>• Multi-channel Relay Output: Provides 28 independent control interfaces (8 channels of constant power + 21 relays) to meet the access requirements of various electrical appliances.</li> <li>• Automated Scenarios: Supports one-click scene modes and customizable multi-device linkage scenarios.</li> </ul>
Energy Management and Monitoring	<ul style="list-style-type: none"> <li>• Power Input: Supports 12V voltage DC input.</li> <li>• Real-time Current Monitoring: Built-in 8-channel Hall current sensors for real-time monitoring of power consumption and operating status of each channel.</li> <li>• Battery and Inverter Management: Monitors battery level and solar charging status, and intelligently manages inverter operation.</li> </ul>
Environmental Sensing and Regulation	<ul style="list-style-type: none"> <li>• Multi-parameter Monitoring: Real-time monitoring of in-vehicle temperature (<math>\pm 0.5^{\circ}\text{C}</math>), humidity (<math>\pm 3\%\text{RH}</math>), PM2.5, CO and CO<sub>2</sub> concentrations.</li> <li>• Safety Early Warning: The system actively issues an alarm when CO or CO<sub>2</sub> concentrations exceed the standard to ensure occupant safety.</li> <li>• Linkage Regulation: Air conditioners, heaters, exhaust fans and other devices can be adjusted automatically or manually based on environmental data.</li> </ul>
Panoramic Safety Monitoring	<ul style="list-style-type: none"> <li>• 360° Surround View: Provides a dead-angle-free panoramic view around the vehicle via 4-channel 1080P wide-angle cameras.</li> <li>• Multiple Display Modes: Supports 2D panoramic view, 3D stereoscopic view and single-camera close-up.</li> <li>• Starlight Night Vision: Features starlight-level night vision, enabling clear imaging even in low light environments down to 0.1lux.</li> <li>• Video Storage: Supports event-triggered or continuous surround view video recording and storage.</li> </ul>

Function Category	Main Function Description
Intelligent Human-Computer Interaction	<ul style="list-style-type: none"> <li>• Touch Screen Interaction: 13.3-inch full HD touch screen with an intuitive and smooth graphical operation interface.</li> <li>• Intelligent Voice Control: Integrated AI voice large model, supporting Chinese and English wake-up words and commands, and enabling screen-off wake-up and control.</li> <li>• Remote Control: Supports remote status monitoring and device control via mobile phone APP.</li> </ul>
Communication and Expansion	<ul style="list-style-type: none"> <li>• Multi-protocol Support: Natively supports CAN, RS485, RS232, Bluetooth and other communication protocols for easy connection with vehicle bus and other intelligent devices.</li> <li>• Rich Hardware Interfaces: Provides a variety of control, video, network and USB interfaces with strong expandability.</li> </ul>
System Maintenance and Safety	<ul style="list-style-type: none"> <li>• OTA Remote Upgrade: Supports remote wireless upgrade of system firmware and applications without device disassembly.</li> <li>• Automotive-grade Reliability: Core components comply with AEC-Q100 automotive-grade standards, adaptable to harsh on-board environments.</li> </ul>

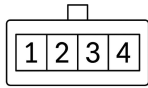
## 4. Interface Definition

### 4.1 Interface Information Summary



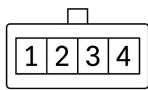


## 4.2 Interface Information Summary



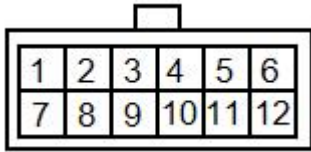
ACC	
Pin No.	Pin Definition
1	ACC
2	GPIO2B5
3	GPIO2B4
4	GND

## 4.3 DMIC Interface Definition



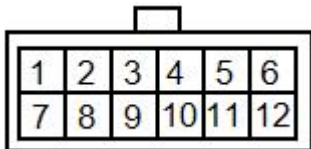
DMIC	
Pin No.	Pin Definition
1	CLK
2	DIO
3	GND
4	VCC

#### 4.4 12pin Interface I Definition



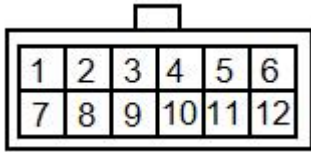
12pin Interface I	
Pin No.	Pin Definition
1	5V/12V
2	CAN-H
3	CAN-H
4	CAN-H
5	CAN-H
6	CAN_VSS
7	5V/12V
8	CAN-L
9	CAN-L
10	CAN-L
11	CAN-L
12	CAN_VSS

#### 4.5 12pin Interface II Definition



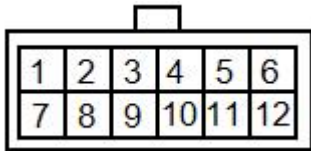
12pin Interface II	
Pin No.	Pin Definition
1	RS485-A-1
2	RS485-A-2
3	UART-TX
4	GND
5	CAN_H
6	CAN_VSS
7	RS485-B-1
8	RS485-B-2
9	UART-RX
10	5V
11	CAN_L
12	5V/12V

#### 4.6 12pin Interface III Definition



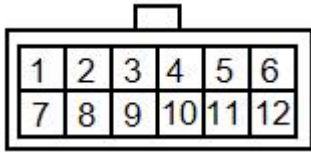
12pin Interface III	
Pin No.	Pin Definition
1	GND
2	GPIO4D1
3	GPIO1D0
4	GPIO1D1
5	VCC3V3
6	VCC3V3
7	GND
8	GPIO4D0
9	GPIO1C4
10	GPIO2B4
11	IR+
12	IR-

#### 4.7 12pin Interface IV Definition



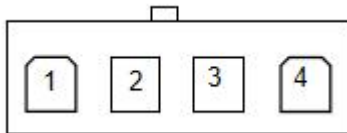
12pin Interface IV	
Pin No.	Pin Definition
1	12V_AHD
2	GND
3	GND
4	GND
5	GND
6	LTU
7	12V_AHD
8	VIN5_CON
9	VIN6_CON
10	VIN7_CON
11	VIN8_CON
12	RTU

## 4.8 12pin Interface V Definition



12pin Interface V	
Pin No.	Pin Definition
1	12V_AHD
2	GND
3	GND
4	GND
5	GND
6	LTU
7	12V_AHD
8	VIN4_CON
9	VIN3_CON
10	VIN2_CON
11	VIN1_CON
12	RTU

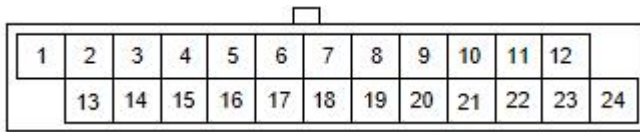
## 4.9 4pin\*12 Interface Definition



Port Summary	Port No.	Rated Current	Port Discription
IN1	A1	30A	12V-IN
	A2	30A	12V-IN
	A3	30A	12V-IN
	A4	30A	12V-IN
GND	B1	30A	GND
IN2	B2	30A	12V-IN
	B3	30A	12V-IN
	B4	30A	12V-IN
OUT1	C1	30A	OUT
	C2	30A	OUT
	C3	30A	OUT
	C4	30A	OUT

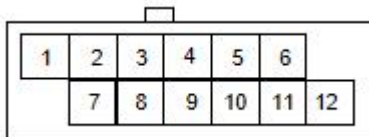
OUT2	D1	30A	OUT
	D2	30A	OUT
	D3	30A	OUT
	D4	30A	OUT
OUT2	E1	30A	OUT
	E2	30A	OUT
	E3	30A	OUT
	E4	30A	OUT
OUT2	F1	30A	OUT
	F2	30A	OUT
OUT1	F3	30A	OUT
	F4	30A	OUT
OUT1	G1	30A	OUT
	G2	30A	OUT
	G3	30A	OUT
	G4	30A	OUT
OUT1	H1-H2	30A	OUT
GND	H3	30A	GND
GND	H4	30A	GND
IN3	S1	30A	12V-IN
	S2	30A	12V-IN
	S3	30A	12V-IN
	S4	30A	12V-IN
	T1	30A	12V-IN
	T2	30A	12V-IN
	T3	30A	12V-IN
	T4	30A	12V-IN
OUT3	P1	30A	OUT
	P2	30A	OUT
	P3	30A	OUT
	P4	30A	OUT
	P5	30A	OUT
	P6	30A	OUT
	P7	30A	OUT
	P8	30A	OUT

## 4.10 24pin Interface Definition



Port No.	Port Definition.	Port No.	Port Definition.
1	RS485-A	13	CAN-L
2	RS485-A	14	CAN-L
3	RS485-A	15	GND
4	RS485-A	16	CAN-L
5	RS485-A	17	RS485-B
6	RS485-A	18	RS485-B
7	RS485-A	19	RS485-B
8	RS485-A	20	RS485-B
9	CAN-H	21	RS485-B
10	GND	22	RS485-B
11	CAN-H	23	RS485-B
12	CAN-H	24	RS485-B

## 4.11 12pin Interface 4 Definition



Port No.	Port Definition.
1	5V/12V-IN
2	GND/Negative-4
3	OUT3
4	OUT2
5	OUT1
6	GND
7	RS485-A
8	RS485-B
9	5V/12V-IN2
10	5V/12V-IN4
11	RS232-RX
12	RS232-TX

## 5.APP Operation Interface Introduction

### Vehicle Camera Surround View System

**Function Description:** Provides a 360° dead-angle-free view of the environment around the vehicle through integrated multi-camera technology. Drivers can view the front, rear, left and right sides of the vehicle to avoid blind spot collisions and handle complex road conditions.

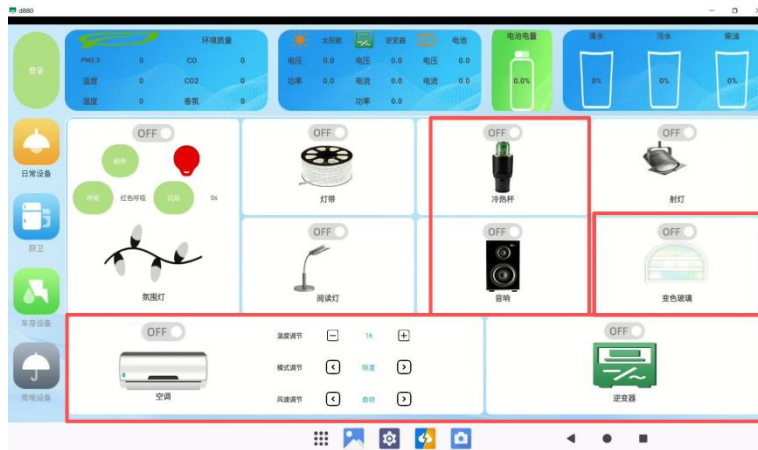
**Features:** Offers independent viewing angles for different directions to improve safety; supports real-time video monitoring and recording in the main view, with recordings storable and replayable.



### Electrical Appliance Control

**Function Description:** Controls various in-vehicle electrical appliances (e.g., refrigerator, air conditioner, heater) via touch screen or voice. Users can view the real-time operating status of electrical appliances and implement centralized control.

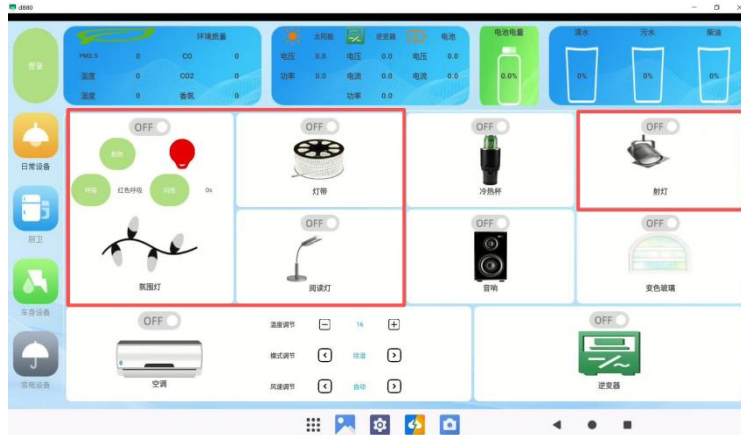
**Features:** Supports one-click operation for convenient device control.



## Light Control

**Function Description:** Provides intelligent light management; users can control and adjust in-vehicle light modes (e.g., colorful ambient light, light strip, reading light) via touch screen or mobile phone APP to enhance the comfortable atmosphere.

**Features:** Supports multiple light control modes to adapt to different scene requirements.



## Air Quality Display

**Function Description:** Monitors in-vehicle air quality in real time, including the concentrations of pollutants such as PM2.5 and CO<sub>2</sub>. The system automatically adjusts air purification equipment based on monitoring data to ensure in-vehicle air quality.

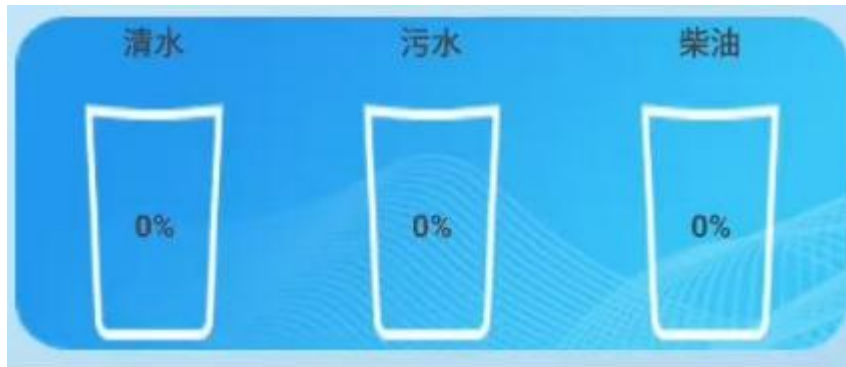
**Features:** Provides health protection, especially for vehicle owners on long trips, with automatic adjustment to keep the air fresh.



## Liquid Level Display

**Function Description:** Monitors the liquid levels of various in-vehicle liquids (e.g., water tank, fuel tank) in real time via liquid level sensors, ensuring vehicle owners are informed of the liquid storage status at all times.

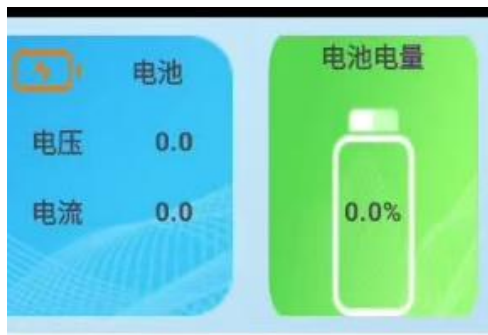
**Features:** Suitable for monitoring water, oil and other liquids, facilitating rational management and usage by vehicle owners.



## Battery Data Display

**Function Description:** Displays the real-time power status of the in-vehicle battery, including the current and remaining power, helping vehicle owners arrange usage rationally to avoid power shortage.

**Features:** Displays battery voltage and status information to remind vehicle owners to charge in a timely manner.



## Inverter Data Display

**Function Description:** Monitors the operating status of the inverter and displays its voltage and current data to ensure the stability and safety of power conversion.

**Features:** Displays the real-time output voltage and current of the inverter to ensure the normal operation of the power system.



## Solar Energy Display

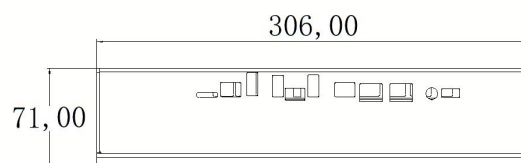
**Function Description:** Displays the voltage and current data of solar panels, monitors the operating status of the solar charging system, and helps vehicle owners optimize the utilization of solar energy.

**Features:** Enables real-time data monitoring to ensure the efficient operation of the solar energy system and provide green energy.

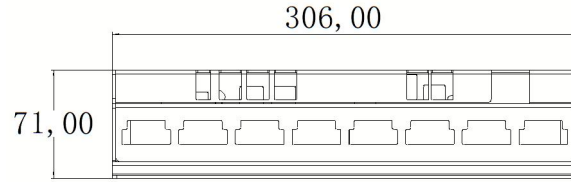


## 6.Product Dimension and Structure

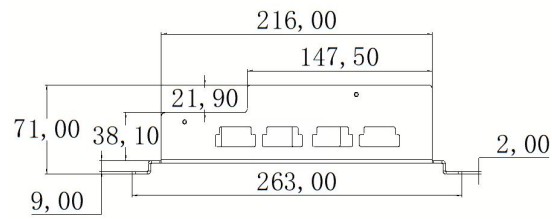
### Front View



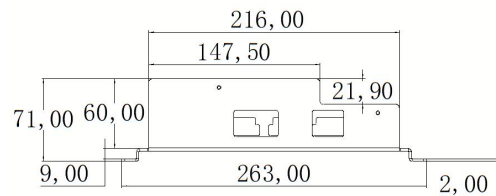
### Back View



### Side View



### Top View



## ● FCC STATEMENT:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body