http://www.envirokorea.co.kr

Enviro
ENVIRO KOREA Co.,Ltd.

smartRad

User Manual

Electronic Personal Dosimeter
Smart Radiation Monitor

smartRad Electronic Personal Dosimeter
Smart Radiation Monitor

Thank you for buying the SmartRad of Enviro Korea Co., Ltd.
Product operation guide and cautions in use are included in this manual.
If you are well informed of this manual, you can use the product more conveniently.

SmartRad : Personal Portable Dosimeter self-developed by ENVIRO KOREA for the purpose of Radiation Protection.
Product just fitted to IT Environment that anyone of radiation workers including general families comes in handy use.

In present-day's cultural society,
We are living with the invisible radiation as if it is a part of our everyday life.
Each one of us must have positive interest and preparedness to change
it from fearful object to manageable one NOW!

Let's defend Our Family as well as the Children against the radiation hazards with this Radiation Monitor, SmartRad!!

Introduction of Homepage
Homepage address with regard to products is http://www.envirokorea.co.kr

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1. Purpose of Use

This product is manufactured to protect against the radiation, and inform the users of the radiation dose rate and accumulated amount of radiation exposure by detecting the X-rays, Gamma-rays, and Beta-rays.

Notice) This product is manufactured by being calibrated with the standard source (Cs-137) for adjustment. But professional level of performance is not guaranteed as it shows the performance level suitable for the general equipment due to the nature of the sensor.

2. Before Use

Please be sure to be well informed as they are cautions for the right use of the product.
Our company is not liable for any accidents occurring by not complying with the cautions.

2-1. Cautions at time of Product Use

(1) Do not use this product for other purposes except for those written in the operating manual.
(2) If possible, please avoid the places which are too hot or too cold at time of product storage. Recommended temperature for the safe use of the product is 0℃ ~ 40℃.
(3) Please be careful for the outside impact, as LCD and GM-Tube can be damaged if this product is dropped. If damaged, replacement for A/S is charged.
(4) Do not arbitrarily disassemble the product as high voltage flows inside the product. There can be a safety problem. In case disassembled or remodelled arbitrarily, free of charge A/S is not provided.
(5) Do not apply heat at the outside or place it near firearms as this product uses lithium ion battery as its power source.

2-2. Package Components

This product consists of the following components.

Some of the manufacturers components can be changed without prior notice.

① Packing Box

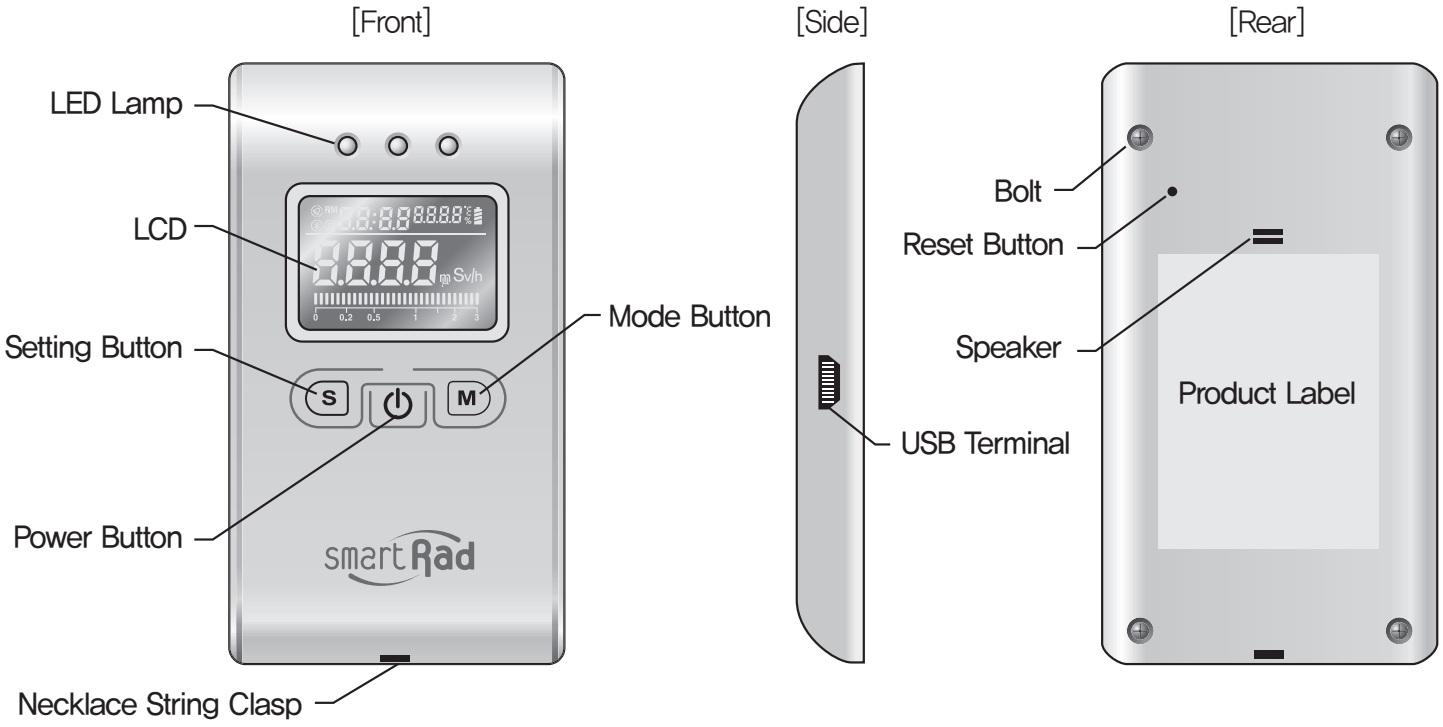
② Body

③ Necklace String

④ Charging Adapter

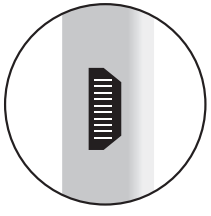
⑤ User Manual

2-3. Name of each Part



2-4. Charging of Product

(1) Connect the charging adapter to the USB terminal of the body.
(2) Red LED is lighted on during the charging.
(3) If charging is finished, the red LED is automatically lighted off.



3. Method of Use

3-1. Power ON/OFF

1) Power ON : If the Power button is pressed for 5 seconds, Power is switched ON with starting sound, and the LCD Back Light is switched on for 10 seconds.
2) Power OFF : If the Power button is pressed for 3 seconds, Power is switched OFF with stopping sound.

3-2. Buttons Explanation

1) S Button : Used for changing Setting place when changing Setting mode and setting.
2) ⏻ Button : Used when Power is switched ON/OFF.
3) M Button : Used when Mode is changed.
Setting Mode is used for changing Setting value and Changing unit.

notice) S and M buttons of SmartRad can be operated in the state that the LCD Back light is switched on.

3-3. LED Explanation

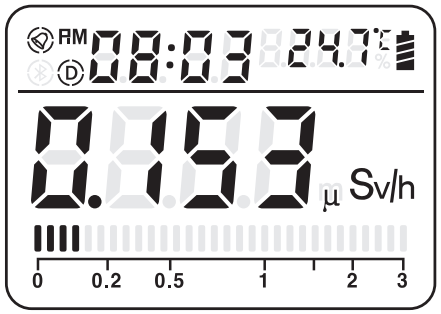
1) Red LED : Charging status is displayed. (Switched at time of buffer)
2) Blue LED : Wireless local area communication status is displayed. (Only applied for the SmartRad EV-iB Model)
3) Green LED : Sleep Mode is displayed.
(Use Mode is changed into Sleep Mode if the button is not operated for more than 10 minutes in Use Mode)

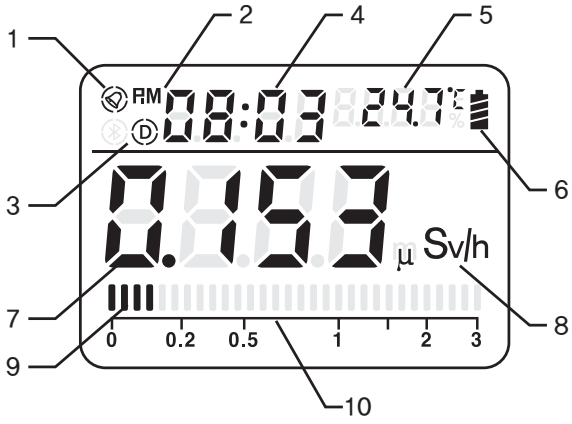
3-4. Order of Equipment Modes Change

If (M) button is pressed, Mode is repeatedly changed into the desired Mode in following order.

1) Dose Rate Mode : Radiation dose rate is measured.
2) Dose Mode : Accumulated amount of radiation exposure is measured.
3) Calendar Mode : Date and current times are informed, and additional features can be set.

3-5. Display Explanation - Dose Rate Mode

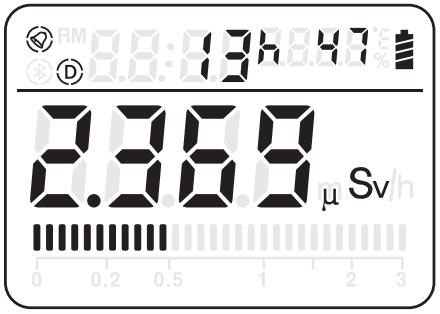


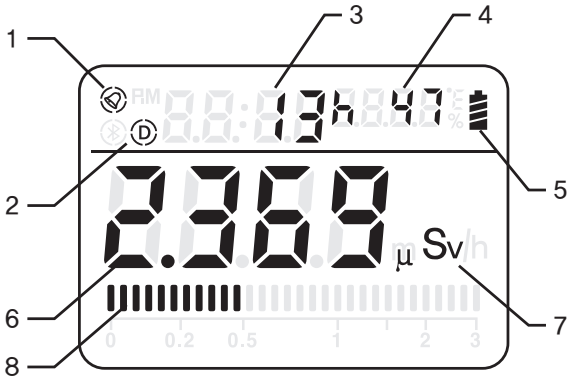


1) If the Power of the equipment is switched on, it is automatically operated in Dose Rate Mode, and the current radiation dose rate number is displayed on the LCD after about 10 seconds of equipment stabilization time. (Natural radiation dose rate is 0.1 μ Sv/h ~ 0.2 μ Sv/h)
2) At this Mode, 3 stage alarm setting of the radiation dose rate is available. (Refer to 3.5)
3) If the button is not operated for more than 10 seconds at this Mode, it is automatically changed into the Sleep Mode, and LCD is switched off and the green LED is blinked. (Ⓓ state is real time constant display Mode. This state dose not go into sleep Mode.)
4) Sleep Mode is automatically cancelled and returned to the normal state if any button is pressed by the user, or the set alarm is reached.
5) Following information is shown on the LCD in Dose Rate Mode.

No.	Description	Remarks
1	Alarm State	:Radiation Detecting Sound audible and Alarm mode at the setting value :Alarm mode only above the setting value Note) On disappearing bellshape, Alarm OFF
2	AM	AM/PM
3	Display State	Ⓓ : Real time Constant Display Mode D : If you don't use without Operating button on this state, go into sleep Mode after 10 minutes.
4	Current Time (Hour, Minute)	–
5	Current Temperature (℃)	Can be changed as Display of Residual Battery Amount (%)
6	Remaining Battery Amount Display Bar	–
7	Measured Value(Dose Rate)	–
8	Dose Rate Unit	Automatic Change according to the Measured Amount(μSv/h, mSv/h)
9	Measured Value Interlock State Bar Graph	–
10	Dose Rate Marking(0 μ Sv/h ~ 3 μ Sv/h)	Bar Graph is only displayed from above 3 μSv/h

3-6. Display Explanation - Dose Mode

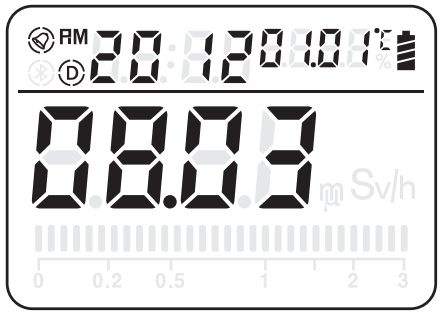


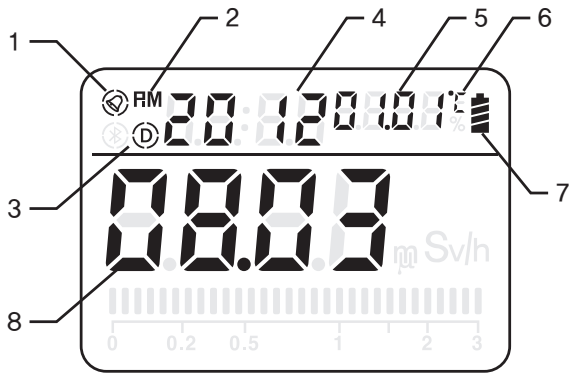


1) If M button is pressed one time in a state that the Back Light is switched On by pressing any button at Dose Rate Mode, it is changed into Dose Mode, and the accumulated amount of Radiation Exposure number is displayed on the LCD.
2) At this Mode, 3 stage of alarm setting of the accumulated amount of Radiation Exposure is available. (Refer to 3.5)
3) If the button is not operated for more than 10 seconds at this Mode, it is automatically changed into the Sleep Mode, and LCD is switched off and the green LED is blinked.
4) Sleep Mode is automatically cancelled and returned to the normal state if any button is pressed by the user, or the set alarm is reached.
5) The accumulated amount of Radiation Exposure is automatically accumulated and measured from the instant that the power is switched regardless of Mode.
6) Following information is shown on the LCD in Dose Mode.

No.	Description	Remarks
1	Alarm State	: Radiation Detecting Sound audible and Alarm mode at the setting value : Alarm mode only above the setting value Note) On disappearing bellshape, Alarm OFF
2	Display State	Ⓓ : Real time Constant Display Mode D : If you don't use without Operating button on this state, go into sleep Mode after 10 minutes.
3	Accumulated time (Hour)	0 ~ 99 Hours
4	Accumulated time (Minute)	0 ~ 60 Minutes
5	Remaining Battery Amount Display Bar	–
6	Measured Value(Accumulated Dose)	–
7	Accumulated Dose Unit	Automatic Change according to the Accumulated Amount (μSv, mSv)
8	Measured Value Interlock State Bar Graph	–

3-7. Display Explanation - Calendar Mode





1) If M button is pressed one time in a state that the Back Light is switched On by pressing any button at Dose Mode, it is changed into Calendar Mode, and the date and current times are displayed on the LCD.
2) At this Mode, setting of additional features of the product is available. (Refer to 3.5)
3) If the button is not operated for more than 10 seconds at this Mode, it is automatically changed into the Dose Rate Mode.
4) Following information is displayed on the LCD at Calendar Mode.

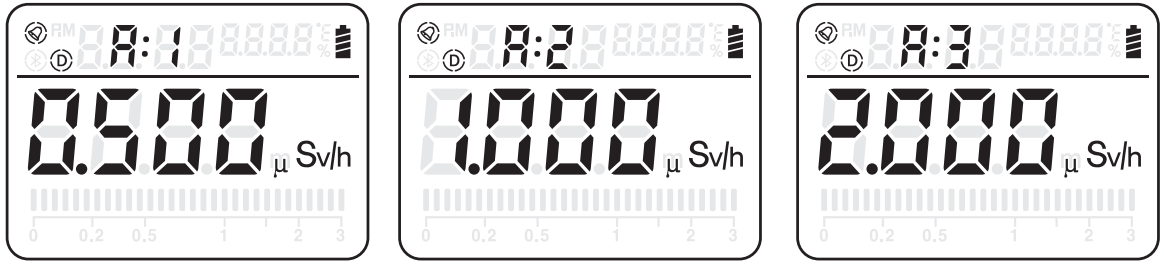
No.	Description	Remarks
1	Alarm State	:Radiation Detecting Sound audible and Alarm mode at the setting value :Alarm mode only above the setting value Note) On disappearing bellshape, Alarm OFF
2	AM	AM/PM
3	Display State	(D) : Real time Constant Display Mode D : If you don't use without Operating button on this state, go into sleep Mode after 10 minutes.
4	Year	–
5	Month Date	–
6	Temperature Sign	(℃ : Temperature) → (% :Remaining Battery)
7	Remaining Battery Amount Display Bar	–
8	Current Time	–

3-8. Setting of Equipment

1) Alarm Setting of Dose Rate Mode

(1) Alarm Basic Value

The Setting value of the Alarm of Dose Rate Mode can be set as 3 stages (A:1→A:2→A:3).
Alarm basic values for the Radiation Dose are as follows;



(2) The state of each Stage of the Alarm

Alarm Stage	Basic Setting Radiation Dose	State
A:1(Notice)	Below 0.5 ~ 0.9 μSv/h	Every 3 seconds, one beep, LCD Back light on and off
A:2(Warning)	Below 1.0 ~ 1.9 μSv/h	Every 3 seconds, two beeps, LCD Back light on and off
A:3(Danger)	Above 2 μSv/h	Continued beep, LCD Back light on and off

(3) Method of Alarm Setting by Users

① If S button is pressed for 3 seconds at Dose Rate Mode, it is changed into the Setting screen of Alarm Basic Value (A:1 Value).
② After moving the setting place to S button, Alarm number and unit can be set with M button. (the order of changing the Setting Place: a) Alarm Stage→b) Changing Decimal Point Place→c) Inputting Numbers→d) Changing Unit)
③ If S button is pressed after the Setting of A:1 Value is finished, the whole screen is blinked one time, and it is changed into the Setting of A:2 Value. (A:2, A:3 Values can be set in a same manner.)
④ If S button is pressed after the Alarm Setting is finished up to A:3, the whole screen is blinked one time, and it is changed into the Dose Rate Mode. Provided, it is automatically changed into the Dose Rate Mode if the button is not pressed for more than 10 seconds during the Alarm Setting. (In this case, the setting value will not be saved)

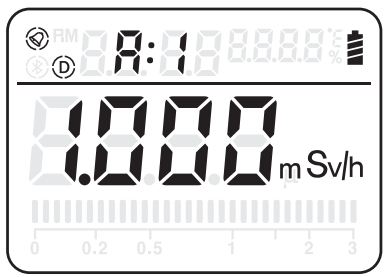
3-8. Setting of Equipment

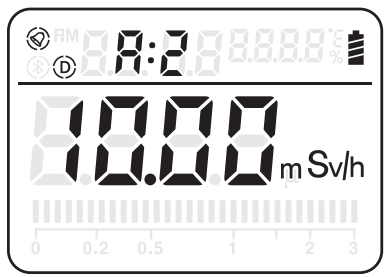
2) Alarm Setting of Dose Mode

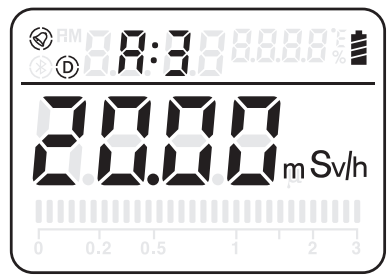
(1) Alarm Basic Value

The Setting Value of the Alarm of Dose Rate Mode can be set as 3 stages (A:1→A:2→A:3).

The Alarm Basic Values for the Accumulated Amount of Dose of Radiation Exposure are as follows;







(2) The state of each Stage of the Alarm

Alarm Stage	Basic Setting Radiation Dose	State
A:1(Notice)	1 mSv	Every 3 seconds, one beep, LCD Back light on and off
A:2(Warning)	10 mSv	Every 3 seconds, two beeps, LCD Back light on and off
A:3(Danger)	20 mSv	Continued beep, LCD Back light on and off

(3) Method of Alarm Setting by Users

① If S button is pressed for 3 seconds at Dose Mode, it is changed into the Setting screen of Alarm Basic Value (A:1 Value).

② After moving the setting place to S button, Alarm number and unit can be set with M button.
(the order of changing the Setting Place: a) Alarm Stage→b) Changing Decimal Point Place→c) Inputting Numbers→d) Changing Unit)

③ If S button is pressed after the Setting of A:1 Value is finished, the whole screen is blinked one time, and it is changed into the Setting of A:2 Value.
(A:2, A:3 Values can be set in a same manner.)

④ If S button is pressed after the Alarm Setting is finished up to A:3, the whole screen is blinked one time, and it is changed into the Dose Mode.
Provided, it is automatically changed into the Dose Mode if the button is not pressed for more than 10 seconds during the Alarm Setting.
(In this case, the setting value will not be saved)

3-8. Setting of Equipment

3) Additional Features Setting of Calendar Mode

(1) Additional Features Setting Method by Users

The Calendar Mode is changed into the Setting Mode if the S button is pressed for 5 seconds, and the Setting of additional features is available according to below order. If changed into Setting Mode, the S button is used as Cursor Move function, and the M button as Value Input Function.

① Alarm State Setting

: Radiation Detecting Sound audible and Alarm mode at the setting value.

: Alarm mode only above the setting value.

Note) On disappearing bellshape, Alarm OFF

② Display State Setting

: Real time Constant Display Mode.

D : If you don't use without Operating button on this state, go into sleep Mode after 10 minutes.

③ Time Setting

Date and Current Time can be set.

The Year is blinked if the S button is pressed one time after D Setting is finished, and the figures can be changed with M button.

④ Temperature Display, CPS Measurement or Remaining Battery Amount Display

Desired information can be selected at Dose Rate Mode by a User out of the Current Temperature or Remaining Battery Amount. If the S button is pressed one time after Time Setting is finished, Current Temperature(℃) or Remaining Battery Amount can be selected with button to be shown in figure(%).

3-9. Additional Features Explanation

1) Zero Setting of Measured Value

The measured value blinks if (M) button is pressed for 5 seconds at Dose Rate Mode, and Dose Mode. At the same state, it becomes zero if M button is pressed for 3 seconds.

2) Local Area Wireless Communication Function

(1) Zero Setting of Measured Value

The measured value blinks if M button is pressed for 5 seconds at Dose Rate Mode, and Dose Mode. At the same state, it becomes zero if M button is pressed for 3 seconds.

(2) Local Area Wireless Communication Function

Local Area Wireless Communication Function by Smart Phone can be used by the model of SmartRad EV-IB model only.

1) If S button and M button are pressed simultaneously, Local Area Wireless Communication function (Blue Tooth) is switched ON, and at the same time Blue Led is switched on and off for every one second.
2) At the above state, if S button and M button is simultaneously pressed again, Blue Led is switched on and off for every 0.2 second. This represents the Blue Tooth is operating and it does for 20 seconds. Blue Led is switched on and off after pairing is finished.
3) Local Wireless communication function can be used by the above state 1) in the following connection with the equipment which is once finished with paring.
4) If disconnected with Smart Phone, Local Area Wireless Communication function(Blue Tooth) is automatically switched OFF.

Notice) *For Local Area Wireless function, Smart Phone App provided by Enviro Korea Co., Ltd. is strongly recommended to get downloaded.
*If Local Area Wireless Communication function(Blue Tooth) is used, Use time is reduced as the consumption amount of Battery is increased

4. Product Specification

Model		SmartRad (EV–I, EV–IB)
Use		Electronic Personal Dosimeter (Measurement of Doses of Gamma–rays, X–rays)
Type		GM–Tube Built–in Type
Measurement Range	Dose Rate	0.1 μ Sv/h ~ 10 mSv/h
	Accumulated Amount of Dose	1 μ Sv ~ 10 Sv
Energy Range		60 KeV ~ 1.5 MeV
Reaction Time		2 sec
Accuracy		± 15 %
Display		Mono LCD (Automatic Unit Change)
Power		Charging Type battery 700 mAh (Continuous Waiting : 200 h, Continuous Use : 150 h) Provided, the Use Time can be reduced if Blue Tooth is used (SmartRad EV–IB Model).
Size		100 × 55 × 13.4 mm (H×W×D)
Weight		55 g

5. Customer Support and A/S Guide

Fault Diagnosis before A/S

(1) In case Power is not switched ON.
If the Battery is fully discharged, please switch ON the Power after charging it by use of the Authentic Adapter only.

(2) In case not operated despite Button is pressed
Press the Reset button at the back of the Equipment for Initialization, and inform to the manufacturer in case not operated yet.

A/S Center Location

Head Office : 528 Yongsan-dong, Yousung-gu, Daejeon Metropolitan City

Adjustment Center of Radiation Measuring Equipment : Room No. 301, Venture Town Dasan Building, 1687-2, Shinil-dong, Daedeok-gu, Daejeon Metropolitan City

Working Time

Mon ~ Fri : 09:00 ~ 18:00

Telephone Inquiry

+82-42-864-2341~2

6. Quality Assurance

This product passed the strict Quality Control and Test of the Enviro Korea Co., Ltd.
If failed due to the manufacturing defect or natural failure within the Warranty Period,
all services are provided in accordance with the mentioned items of below Warranty.

Warranty

Model Name	SmartRad (EV-I, EV-IB)	
Product Serial No.		
Warranty Period	Body	1 Year(Battery-6Months)
	Consumables	3Months / Adapter-6Months
Purchase Date		Year / Month / Date
Purchase Place		

Enviro ENVIRO KOREA Co.,Ltd. smartRad

1) Warranty Period : 1 Year after Purchase
2) Warranty Details

(1) If a failure occurs in a state normally used according to the manual within the Warranty Period, lawful tangible/intangible services are provided.
(2) All the components of the body are consumables. (based on the Box State of Regular Product)
(3) In following case, despite that it is within the Warranty Period, a fixed cost may be charged or even charged A/S may not be available.
① In case failed by the User's Mistake, Poor Use, Carelessness, Impact, Flooding etc.
② In case product is disassembled or part is exchanged arbitrarily by the User.
③ In case failed due to the Flood, Fire, Earthquake etc,

FCC Information to User

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 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 con-nected.

• Consult the dealer or an experienced radio/TV technician for help.

Caution

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Compliance Information : 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

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