

## ► What is radiation?

When quantum, neutron and electron which compose an atom are not balanced, it has capability to generate radiation (radioactivity), and these materials are called radioactive substances and a kind of energy coming from radioactive substance is called radiation.

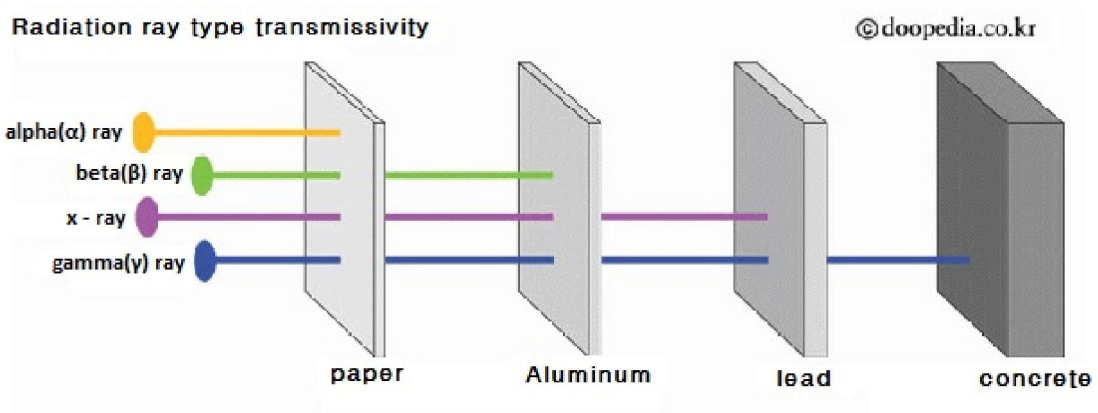
There are several kinds of radiation, that is, there are Alpha ray, Beta ray, X ray and Gamma ray, etc. Exposure to Alpha ray may not be serious because Alpha ray can be sufficiently blocked even by a thin paper or skin texture of human body. However, if radiation source is breathed in, taken in or absorbed into body through skin, human body can be damaged. Radon gas, existing in living environment (home, office, etc.) which has become a big issue recently, being the representative radium series element of radionuclide which emits Alpha ray, may cause biological damage that can arouse a lung cancer potentially, if it is taken into body by breathing.

Beta ray's penetrating power is not so strong even though its speed is high because it is the particle containing electricity and it gets electrostatic force in a substance. Strontium 90, being the representative radionuclide which emits Beta ray, exists in ashes which falls after atomic bomb or hydrogen bomb test, and if it goes into body through food or air, it will be accumulated in the skeleton and discharged from the body quite slowly. Therefore it is quite dangerous radioactive substance.

X( $\chi$ ) ray is widely used in medical field and non-destructive inspection because it has strong penetrating force, which enables you to see inside of a substance. It is widely known that volume of radiation exposure in the general medical test is very small, therefore the degree of danger is low.

Gamma ray is used to search weapons or smuggled goods, rummaging through bags or containers in an airport or a port by using penetrating power because it has the stronger penetrating force than any other radiation rays. Cesium, which is a representative nuclide, is a fission product generated during fission of uranium. In order to block Gamma rays, heavy metal like lead or special concrete of 60cm width is needed. Therefore you have to be especially careful not to be exposed to Gamma ray.

Sievert (=Sv), used in radiation protection field, is the unit that the degree of effect caused by radiation that human body absorbed is shown in numerical value, and indicated as Sv. Radiation dose that human body absorbed (Gy) is calculated using the predetermined coefficient by each radiation ray.



Quoted from Naver encyclopedia



## ► Smart Geiger, FSG-001

Even though the accident of Fukushima, Japan calmed down, the risk of radioactivity exists in many places. How about in my surroundings? How about the area where I am going to travel? Is it safe indeed? Are disclosed figures reliable? To satisfy curiosity, you'd better measure it personally!

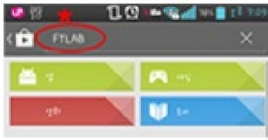
However, an ordinary consumer needs first to have a high-priced radiation detector of hundred thousands~millions Won at least in order to measure the radioactivity. It would be a big burden. "Isn't there any convenient way to measure? It would be good if we can just check whether there is radioactivity or not." It is Smart Geiger that is developed from this point.

The expensive smart-phones that most of you carry, of which price reaches up to six ~nine hundred thousand Won, is already a computer which has tremendous capabilities. 4 CPUs, several GBs of memory and top quality display! If it is utilized effectively, environmental data measurements can be done very easily and cheaply in many cases.

Smart Geiger(FSG-001) is a subminiature sensor of cheap price (29,800Won) which can detect radioactivity easily and conveniently by connecting to the earphone jack of a smart phone. It indicates radiation coming out from a radioactive substance in dose-rate figure(uSv/h) and informs even by sound, - using semiconductor sensor. The measurement error is approx. within 30% because there are many different kinds of smart-phones in the market. Therefore, you may leave the exact measurement of radiation dose to experts, and you can carry out preliminary simple measurement by inserting Smart Geiger into the smart-phone.

Smart Geiger is manufactured by R&D specialized company, FT Lab with a sense of mission, which has obtained 3 New Technology Certifications during the last 14 years of its R&D career.

## ▶ How to use Smart Geiger, FSG-001



① Search 'FTLAB' in Google play store(Android)/ App store(IOS), and download the App for Smart Geiger, and run the App. (Scanning QR code on the back side of packaging box by smart phone will lead you to the App download page.)



② Connect the sensor of Smart Geiger to the earphone jack of a smart device.  
-As for the compatibility of the product, refer to App or [Notice] page.  
-At the initial running of the App, the setting will take one minute at most. Wait until it is over without disconnecting the sensor. (From the next running, this job will not be repeated.)



③ When the initial setting is over, click [ON] button and start measurement of radiation.

-**Measure at least for 3 minutes at the closest point to the suspected object.**

④ You can adjust configuration, such as data saving, timer setting, change of reference value by clicking MENU button on the smart device.

# If there is phone call to the smart device during measurement, it may affect the measurement value.

# When product is connected to smart device, you cannot hear the receiver voice because the earphone jack is used for the product. When you talk over the phone, separate the sensor from the device.

# You may get an abnormal measurement result because measurement sensitivity differs depending on the smart device. In this case, refer to 'How to initialize App' or 'How to change reference value' on [Notice] page.

# Measurement error is approx. within 30% because there are so many different kinds of smart-phone in the market. Therefore, you may leave the exact measurement of radiation dose to an expert, and you can carry out preliminary simple measurement by inserting Smart Geiger into a smart-phone.

## ▶ Cautions for Smart Geiger, FSG-001

- ① **WARNING!** There is a risk of children putting it in their mouth or swallowing it because the size of the sensor is small. Keep it out of reach of children.
- ② Do not dismantle it arbitrarily since the sensor is a precision product. It will not be replaced if it is dismantled by user.
- ③ Be careful when keeping it since a measurement error or loose contact may occur due to scratch or damage to the sensor unit or quadrupole terminal unit.
- ④ Do not touch the sensor unit by hand during measurement because noise may be measured due to the static electricity when touched by hand.
- ⑤ Be careful that it is not to be touched by strong heat or chemicals, and not to be exposed to an environment of high temperature and humidity.