lamaPLC: RadiationD Geiger counter module

The **RadiationD-v1.1** is a popular DIY Geiger counter module for measuring ionising radiation, often paired with microcontrollers like the ESP32 or Arduino. It typically utilizes a **Miller tube** *(Geiger-Müller tube)* to detect gamma rays and some beta particles.

The RadiationD-v1.1 module's measuring limits are primarily determined by the specific Geiger-Müller (GM) tube installed on the board. Most kits use either the J305 or M4011 glass tubes.

☢ Radiation Type Limits

- **Gamma (Γ):** Excellent detection. It is most accurate for Gamma rays (like those from Cesium-137).
- **Beta (β):** Detects high-energy (*"hard"*) Beta particles. Low-energy Beta may not penetrate the glass tube wall.
- **Alpha (α):** Not detectable. The glass wall of the J305/M4011 tubes is too thick for Alpha particles to enter; they are blocked by the glass or even a few centimeters of air

RadiationD Recommended and Compatible Tubes

The RadiationD-v1.1 (also known as the CAJOE module) is highly versatile and supports most Geiger-Müller (GM) tubes that operate with an anode voltage between 350V and 500V.

Parameter	J305	J321	M4011	SBM-20	STS-5	LND-712
Material	Glass	Glass	Glass	Metal (Stainless)	Metal (Stainless)	Metal / Mica Window
Sensitivity	Moderate	Low-Moderate	Moderate	High	High	Very High
Alpha	No	No	No	No	No	Yes (via window)
Beta	Yes (High energy)	Yes (High energy)	Yes (High energy)	Yes (Excellent)	Yes (Excellent)	Yes (Excellent)
Gamma	Yes	Yes	Yes	Yes	Yes	Yes
Dose Limit	~1.2 mSv/h	~1.0 mSv/h	~1.2 mSv/h	~1.44 mSv/h	~1.44 mSv/h	~2.0 mSv/h
Op. Voltage	350V - 450V	350V - 450V	350V - 450V	350V - 475V	350V - 475V	450V - 500V
Light Sens.	High (Needs tape)	High (Needs tape)	High (Needs tape)	None	None	None
Notes	Standard DIY tube; very fragile.	Similar to J305; often shorter.	Very common in Chinese kits.	Industry standard; very durable.	Soviet version of SBM-20; longer.	Professional; detects all types.

Detailed Comparison Notes

The Glass Tubes (J305, J321, M4011)

- **Light Sensitivity:** These act like solar cells. If you don't wrap them in black tape or put them in a dark box, the sun will cause thousands of “fake” counts.
- **Beta Detection:** They can only detect “hard” Beta. The glass walls are too thick for Beta particles to penetrate.

The Soviet Workhorses (SBM-20, STS-5)

- **Durability:** These are metal tubes. They won't break if you drop them, and they are completely immune to light interference.
- **Size:** The STS-5 is longer than the SBM-20. Neither usually fits the standard “clips” on the RadiationD board without modification or the use of wires.

The Professional Choice (LND-712)

- **Alpha Detection:** This is the only tube on your list with a Mica end-window. This window is thin enough to let Alpha particles through.
- **Voltage:** It requires the higher end of the RadiationD's power range (near 500V). You must adjust the blue potentiometer (P1) while measuring the voltage with a high-impedance multimeter.