

HAND-HELD SPECTROMETER FOR GAMMA RADIATION

B-RAD

MAIN FEATURES

- **Portable high-resolution spectrometer**
- **Specifically designed for use in extremely intense magnetic fields, up to 3 T**
- **Technology originally developed at CERN, licensed to ELSE NUCLEAR**
- Radio-isotope identification
- Double display
- Light and compact, ideal for radiation surveys
- Built-in signal processing electronics
- Equipped with a Hall probe
- Carrying cross-body pouch



DESCRIPTION

B-RAD is a portable, hand-held gamma detector, capable of providing the photon spectra in presence of strong electromagnetic fields. It has been tested to work properly in magnetic fields up to 3 T. For comparison, conventional devices fail to operate at intensities as low as 0.1 T.

Light and compact, **B-RAD** is ideal for radiation surveys and for local measurements of contamination or residual radioactivity in hot spots. It also includes a Hall probe connected to an indicator for a rough measurement of the magnetic field in which it is operating

B-RAD employs a high sensitivity $\text{LaBr}_3(\text{Ce}^{3+})$ crystal directly coupled to a Silicon photomultiplier (SiPM) matrix. The excellent scintillation properties and the high photon resolution of the scintillator (3.3% FWHM at 662 keV) make the device capable of operating over a wide energy range with a very fast response, i.e. reducing at minimum dead time-related issues.

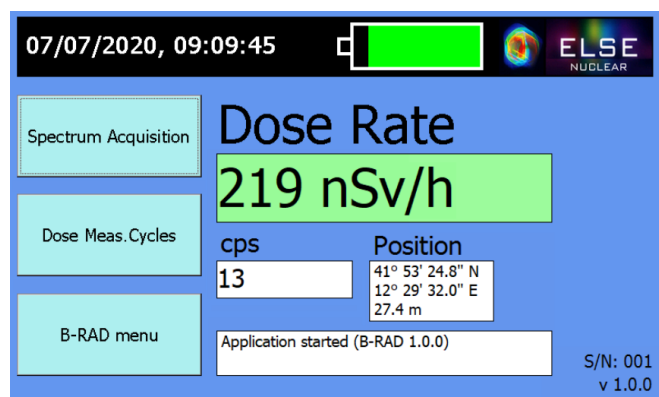
This technology has been originally developed at CERN (*) and has become the standard for radiation surveys in the Large Hadron Collider (LHC) experiments. It is commercialized under an official license granted by CERN, with the "CERN Technology" label.



technology

TECHNICAL SPECIFICATIONS

- Crystal: 0.6" x 0.6" $\text{LaBr}_3\text{Ce}^{3+}$ (8%)
- Housing material: aluminum
- Dose rate range: 100 nSv/h ÷ 10 mSv/h
- Sensitivity: 90 cps/ $\mu\text{Sv/h}$
- Energy range: 30 keV ÷ 2 MeV
- Temperature range: 0 ÷ 40 °C
- Battery life: up to 12 hours (in "power save mode")
- Dimensions:
 - Main unit: 156 x 191 x 92 mm
 - Probe: 180 x 50 mm (diameter)
- Weight: 2.3 kg

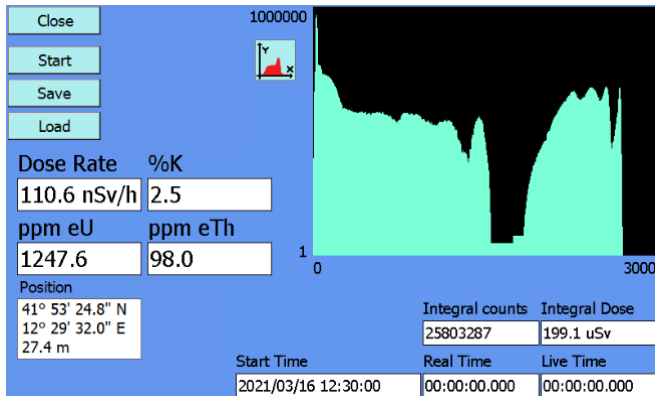


B-RAD software main panel

(*) Patent grant number: 9977134 (13 July 2017)
"Portable Radiation Detection Device for Operation in Intense Magnetic Fields".

Tests in magnetic fields

Tests were performed with the B-RAD by measuring the radioactivity emitted by a Cs-137 source in magnetic fields. The intensity of the magnetic field was steadily increased from 0 up to 3 T by first introducing in the magnetic field only the probe, and then introducing both probe and main unit. No detectable changes in the mean value or spread of the cps distributions have been noted for different values of the magnetic field, thus confirming the complete insensitivity of the device to magnetic field effects.



Natural nuclides assaying (B-RAD NAT version)



B-RAD main unit

Main applications

- Radiation surveys at particle accelerators
- Medical accelerators (electron linacs including Image Guided Radiation Therapy (IGRT) with MRI imaging, cyclotrons for radionuclide production and radiotherapy)
- Radiation measurements at medical PET/MRI scanners
- Radiation measurements in industrial applications, metal recycling and for fire brigade services
- Current and future technologies involving the need of measuring radioactivity in the potential presence of perturbing magnetic fields
- Geophysical applications (B-RAD NAT version)

OPTIONS

- Version for natural nuclides concentration measurement (B-RAD NAT)

ACCESSORIES AVAILABLE UPON REQUEST

1. GPS module
2. Warranty extension from 12 months to 24 months



B-RAD secondary LED display