



**The IAEA-TEL-2011-03 world wide open proficiency test on the determination of natural and artificial radionuclides in water and soil**

**Measured Gamma Spectra and Calibration Plots**

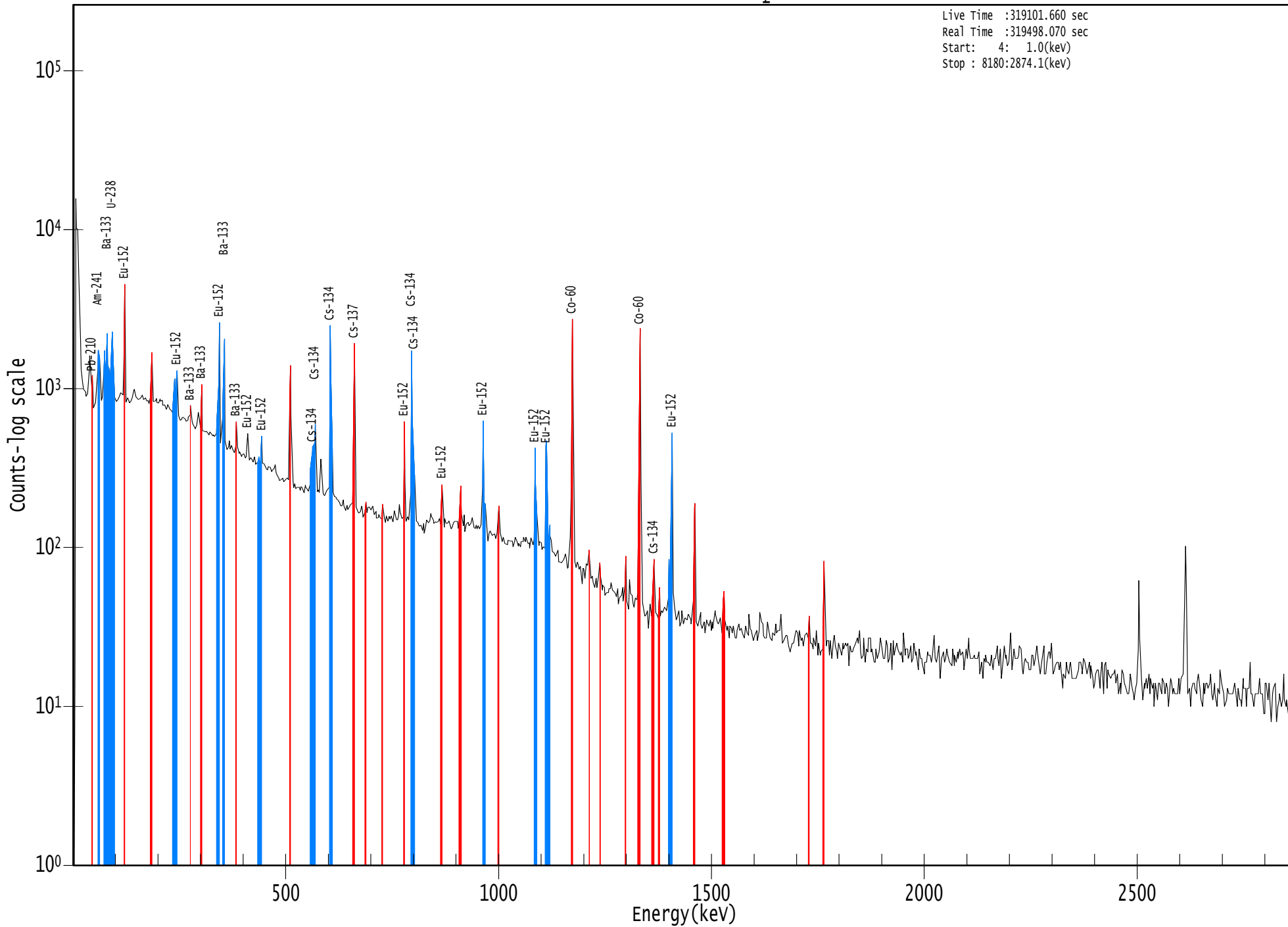
**Laboratory Code: 22 (CuNo: 13949)**

**Total Pages (with cover): 15**



# IAEA-TEL-2011-03-Sample1 - Water (GC Det)

Live Time : 319101.660 sec  
Real Time : 319498.070 sec  
Start: 4: 1.0(keV)  
Stop : 8180:2874.1(keV)

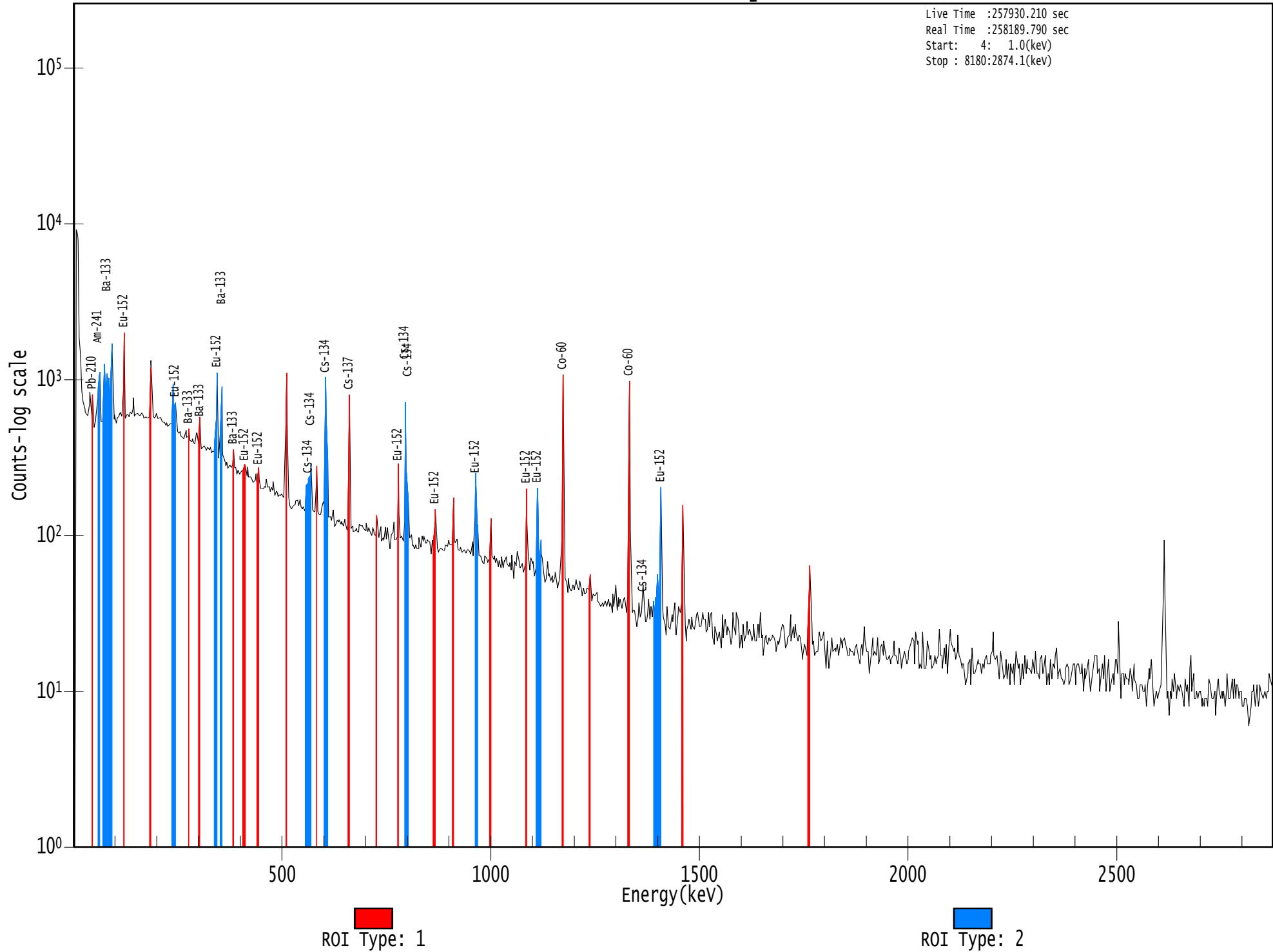


ROI Type: 1

ROI Type: 2

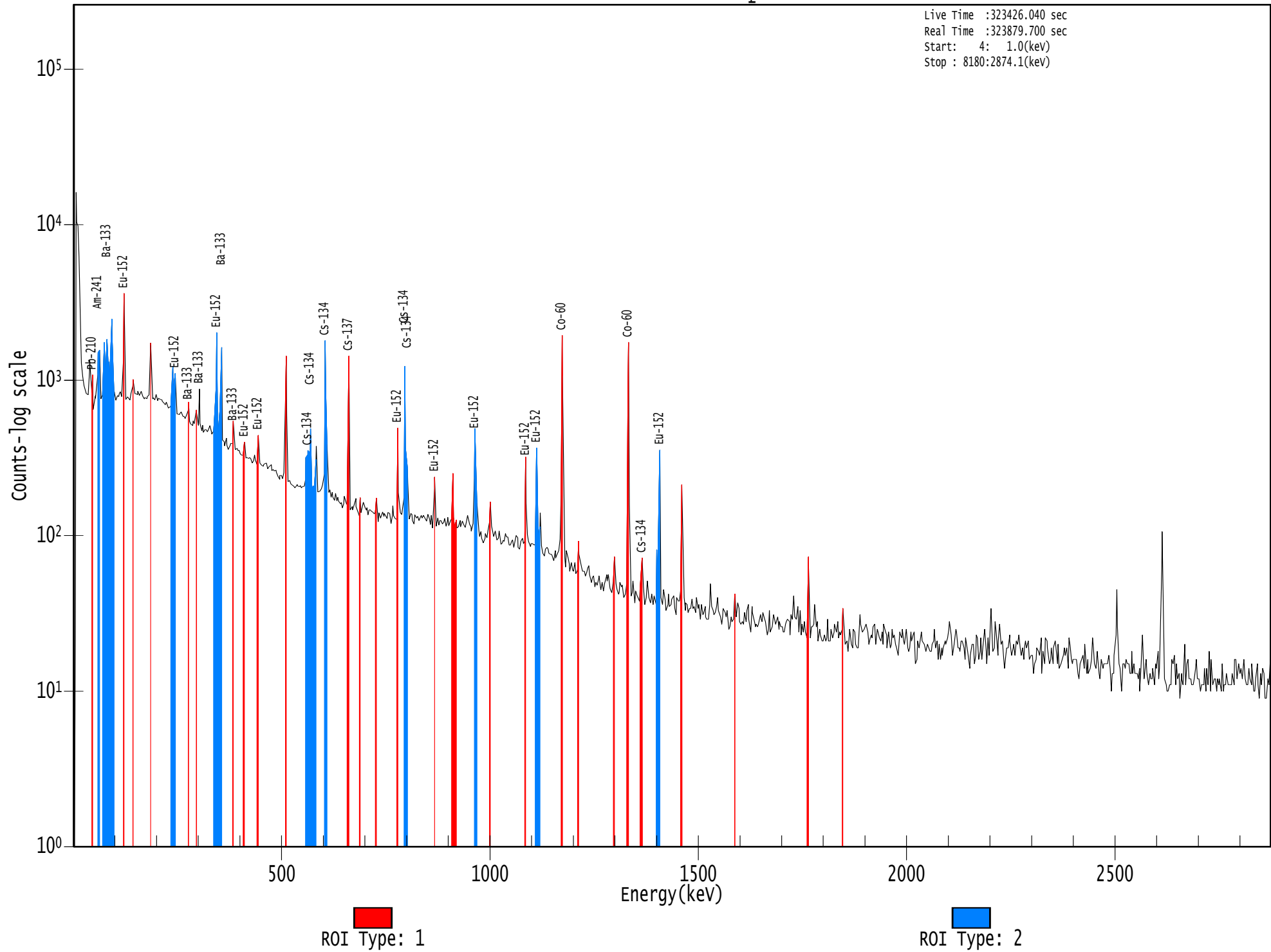
# IAEA-TEL-2011-03-Sample2 - Water (GC Det)

Live Time : 257930.210 sec  
Real Time : 258189.790 sec  
Start: 4: 1.0(keV)  
Stop : 8180:2874.1(keV)



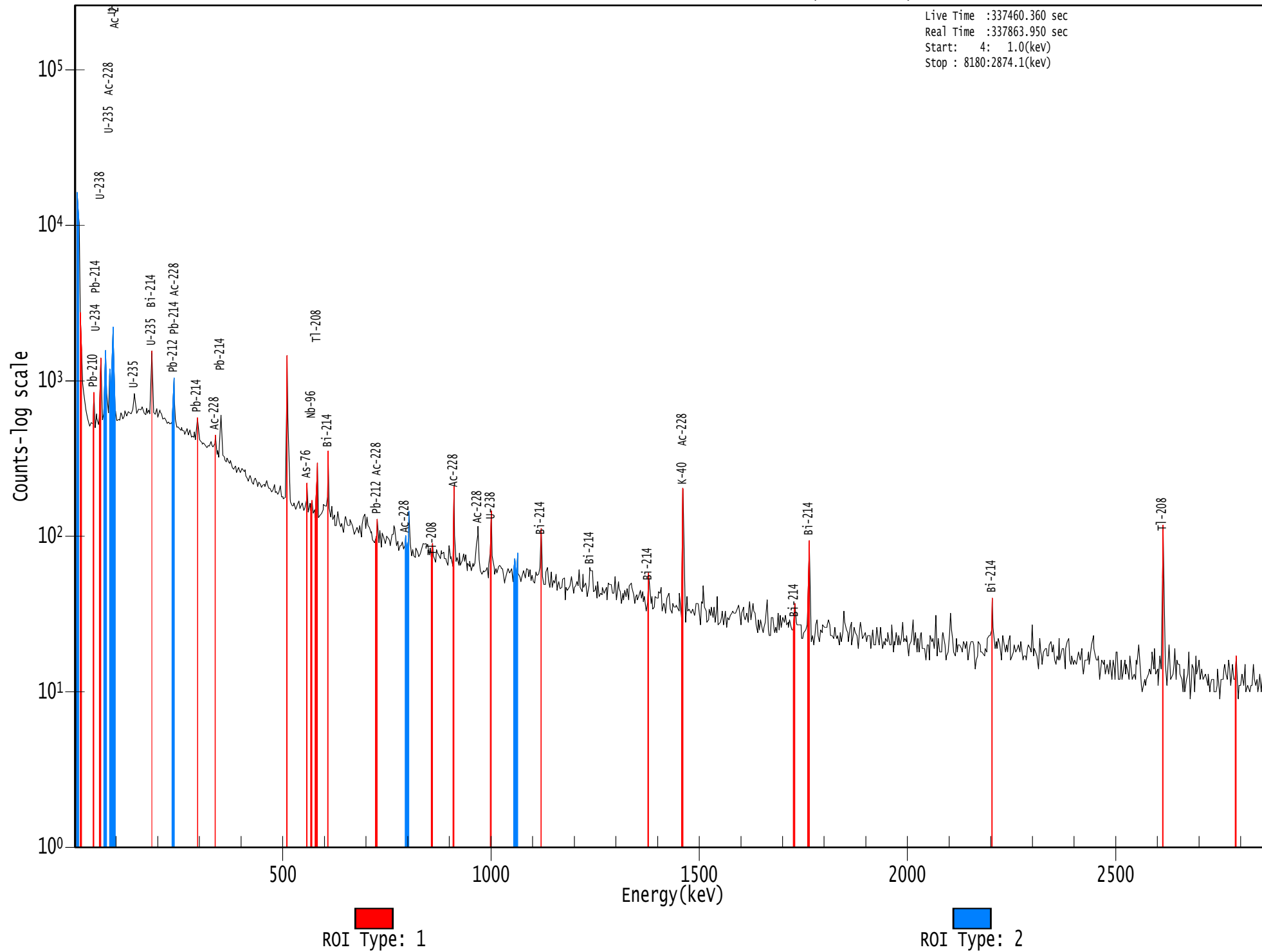
# IAEA-TEL-2011-03-Sample3 - Water (GC Det)

Live Time : 323426.040 sec  
Real Time : 323879.700 sec  
Start: 4: 1.0(keV)  
Stop : 8180:2874.1(keV)



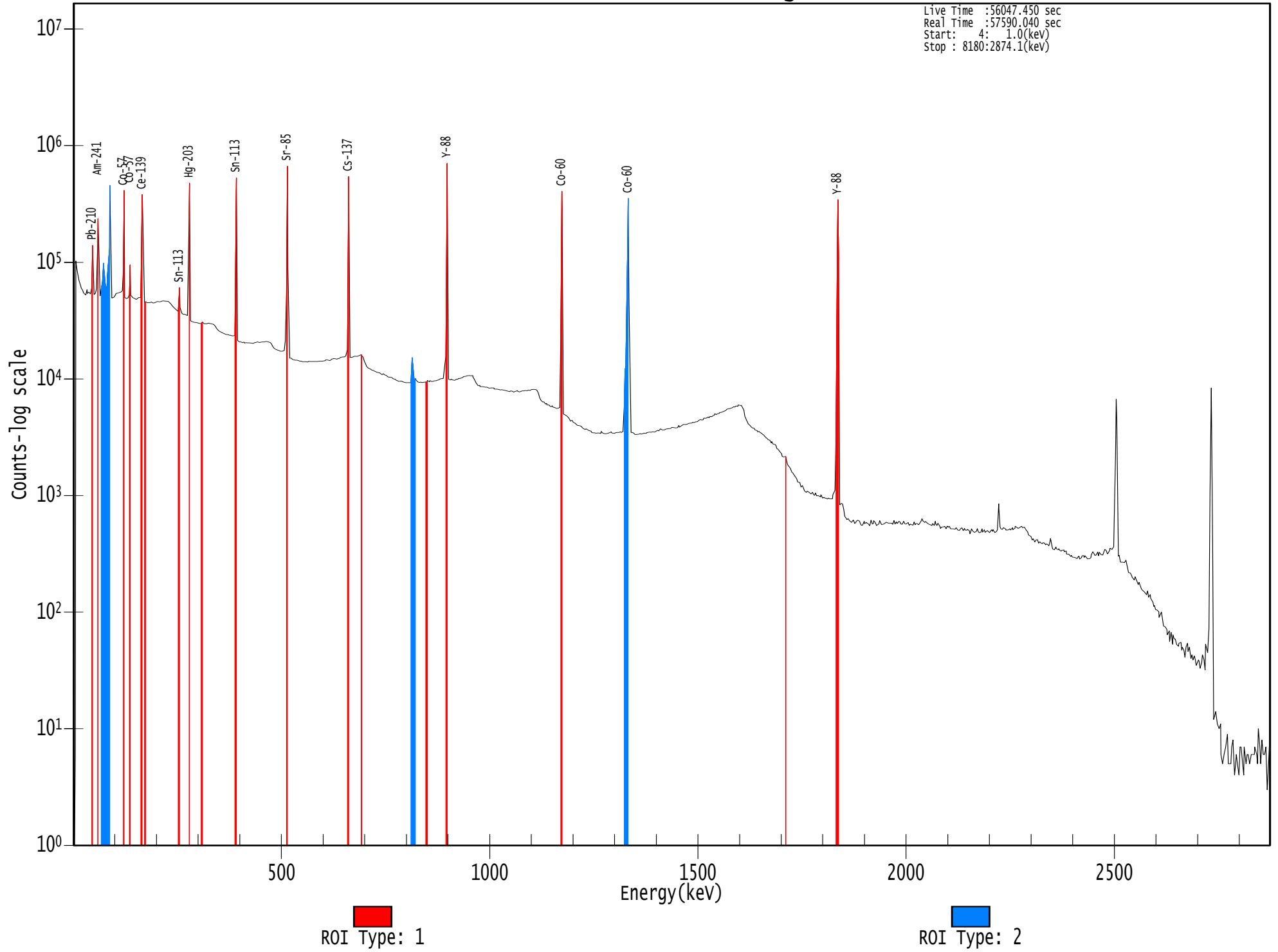
# BACKGROUND 2012 (GC Det)

Live Time : 337460.360 sec  
 Real Time : 337863.950 sec  
 Start : 4: 1.0(keV)  
 Stop : 8180:2874.1(keV)

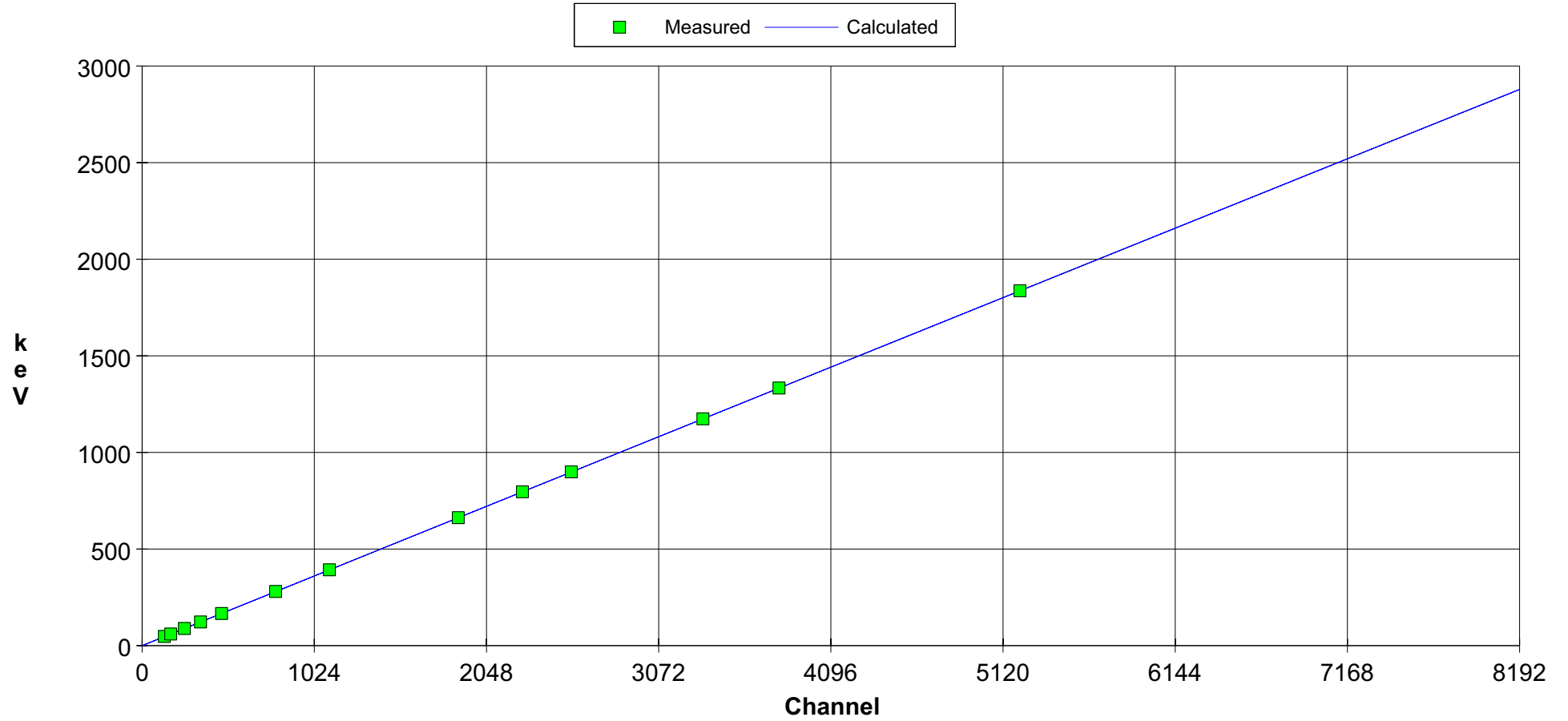


# Standard for 1.0gr/ml V=260ml (GC Det)

Live Time : 56047.450 sec  
Real Time : 57590.040 sec  
Start: 4: 1.0(keV)  
Stop : 8180:2874.1(keV)

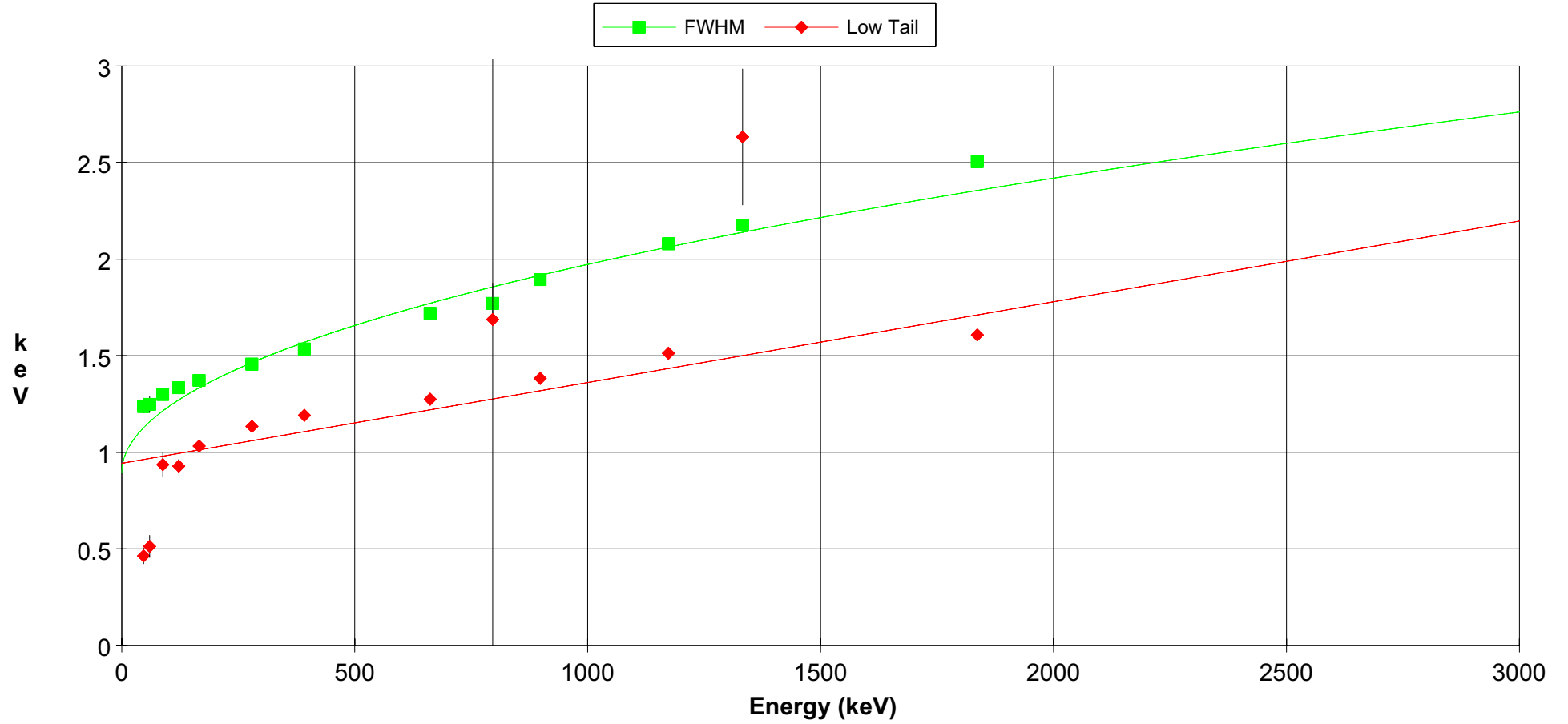


### Energy Calibration Curve



GC Detector  
Energy =  $-3.976e-001 \text{ keV} + 3.522e-001 * \text{Ch} - 3.438e-008 * \text{Ch}^2 - 6.925e-012 * \text{Ch}^3$   
FWHM =  $8.936e-001 \text{ keV} + 3.411e-002 * E^{1/2}$   
Lo Tail =  $9.426e-001 \text{ keV} + 4.183e-004 * E$

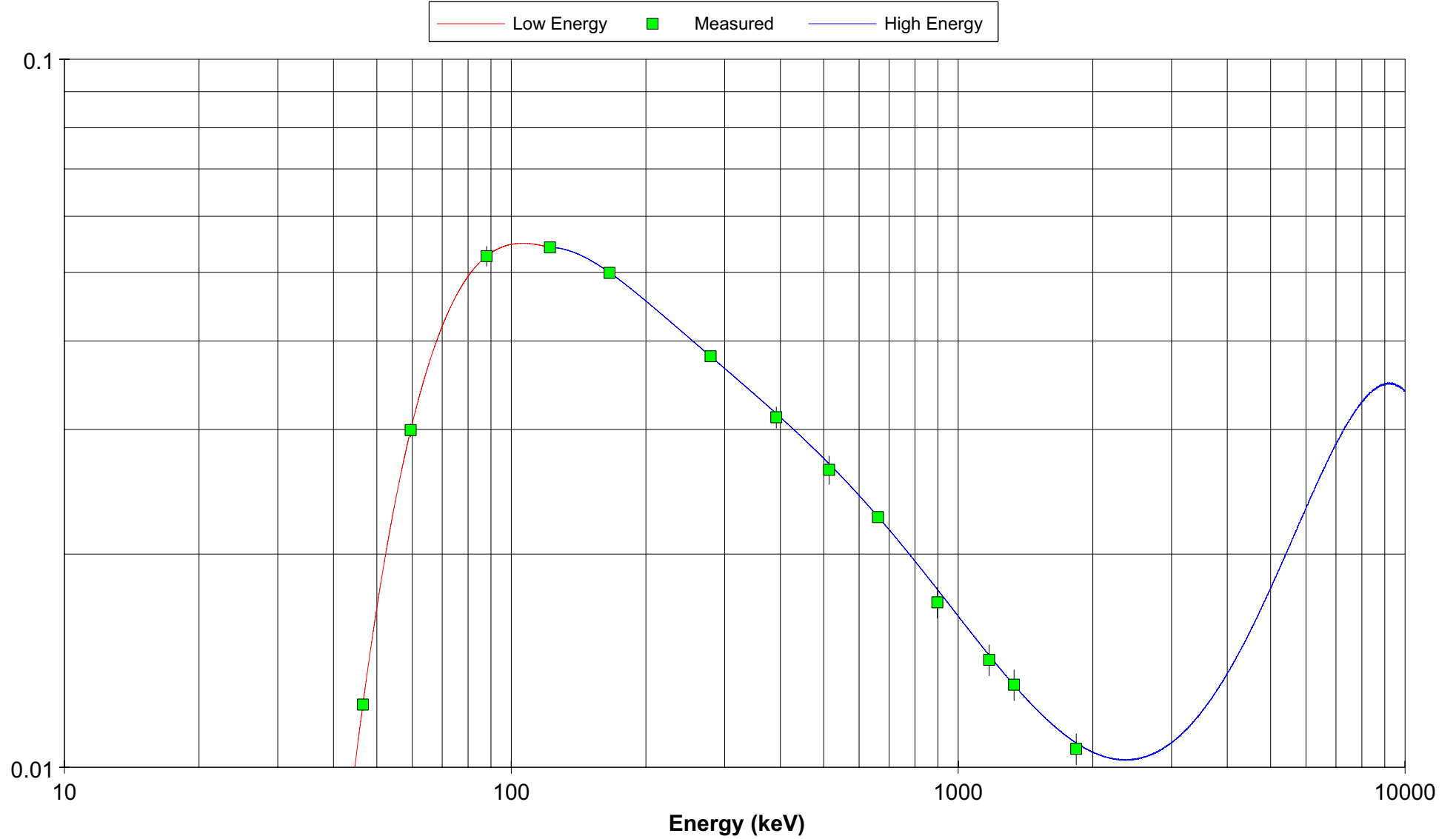
### Shape Calibration Curves



GC Detector  
Energy =  $-3.976e-001 \text{ keV} + 3.522e-001 * \text{Ch} - 3.438e-008 * \text{Ch}^2 - 6.925e-012 * \text{Ch}^3$   
FWHM =  $8.936e-001 \text{ keV} + 3.411e-002 * \text{E}^{1/2}$   
Lo Tail =  $9.426e-001 \text{ keV} + 4.183e-004 * \text{E}$



### Dual Efficiency Calibration Curve

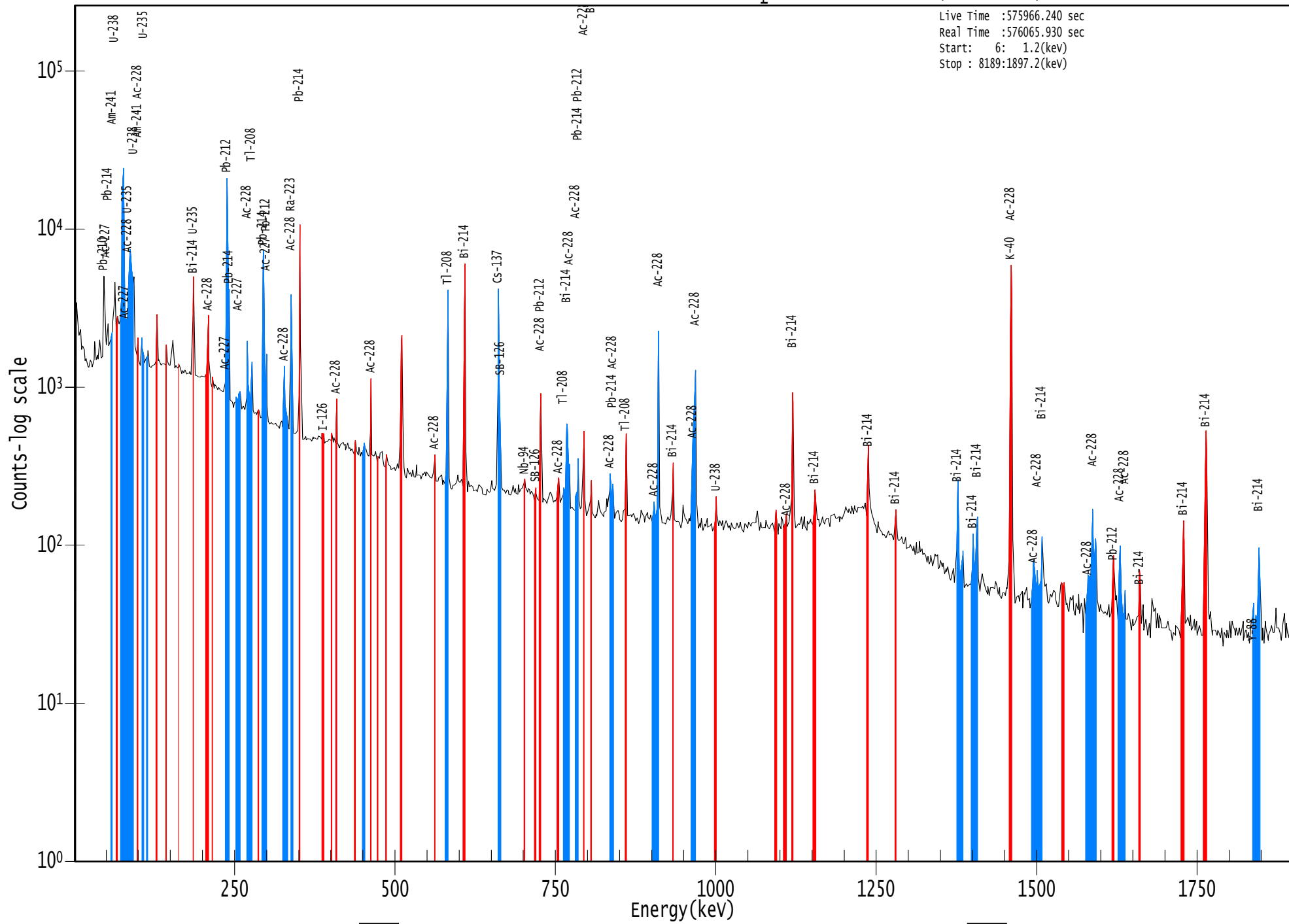


Geometry: CylVol=260ml d=1.0gr/ml (GC Detector)

$$\begin{aligned} \ln(\text{Eff}) &= -1.828e+002 + 1.115e+002 \cdot \ln(E) - 2.298e+001 \cdot \ln(E)^2 + 1.577e+000 \cdot \ln(E)^3 \\ \ln(\text{Eff}) &= -1.277e+003 + 1.205e+003 \cdot \ln(E) - 4.706e+002 \cdot \ln(E)^2 + 9.712e+001 \cdot \ln(E)^3 \\ &\quad - 1.116e+001 \cdot \ln(E)^4 + 6.771e-001 \cdot \ln(E)^5 - 1.691e-002 \cdot \ln(E)^6 \end{aligned}$$

# IAEA-TEL-2011-03-Sample4 - Soil (BE Det)

Live Time : 575966.240 sec  
 Real Time : 576065.930 sec  
 Start : 6: 1.2(keV)  
 Stop : 8189:1897.2(keV)

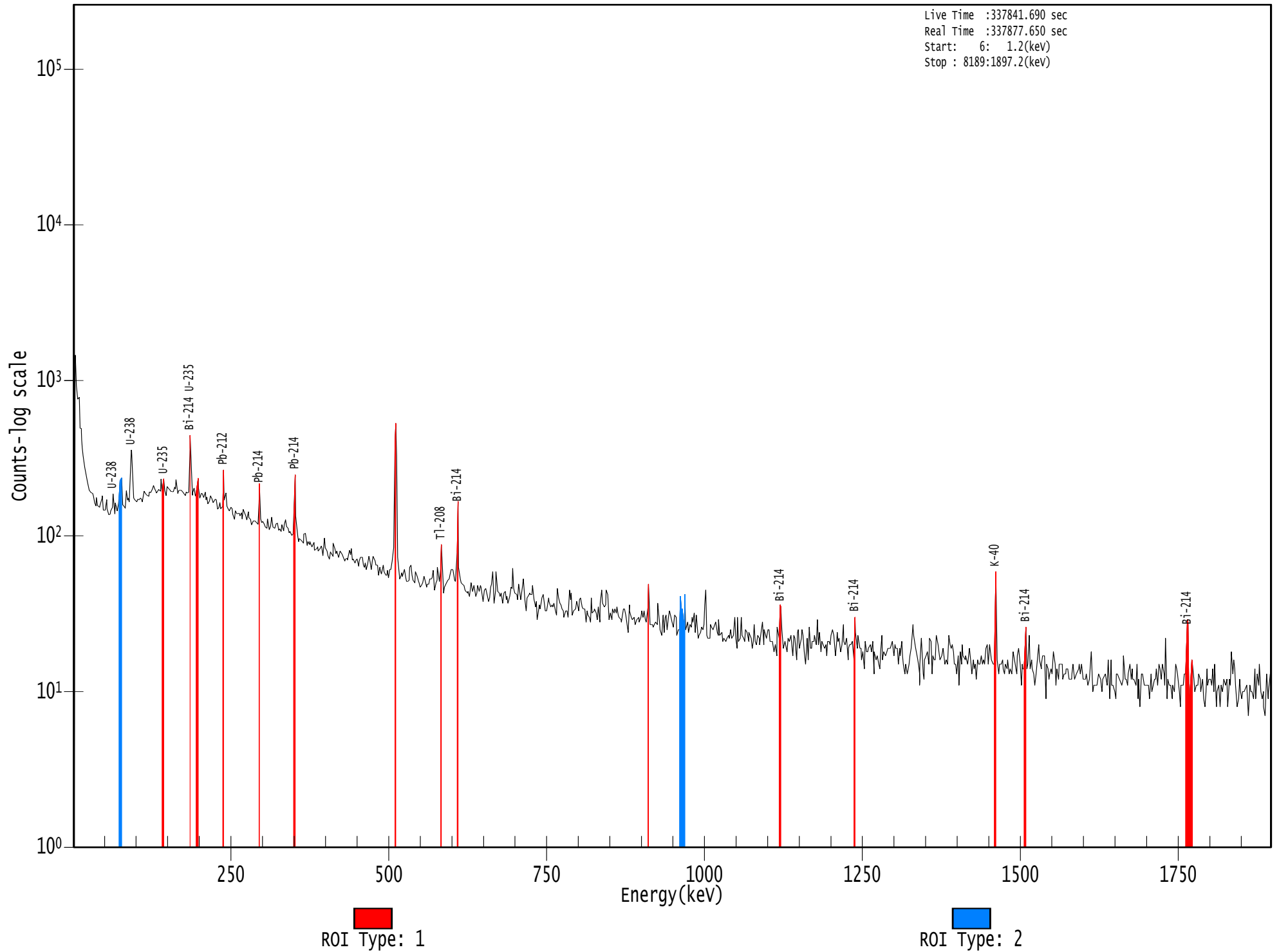


█ ROI Type: 1

█ ROI Type: 2

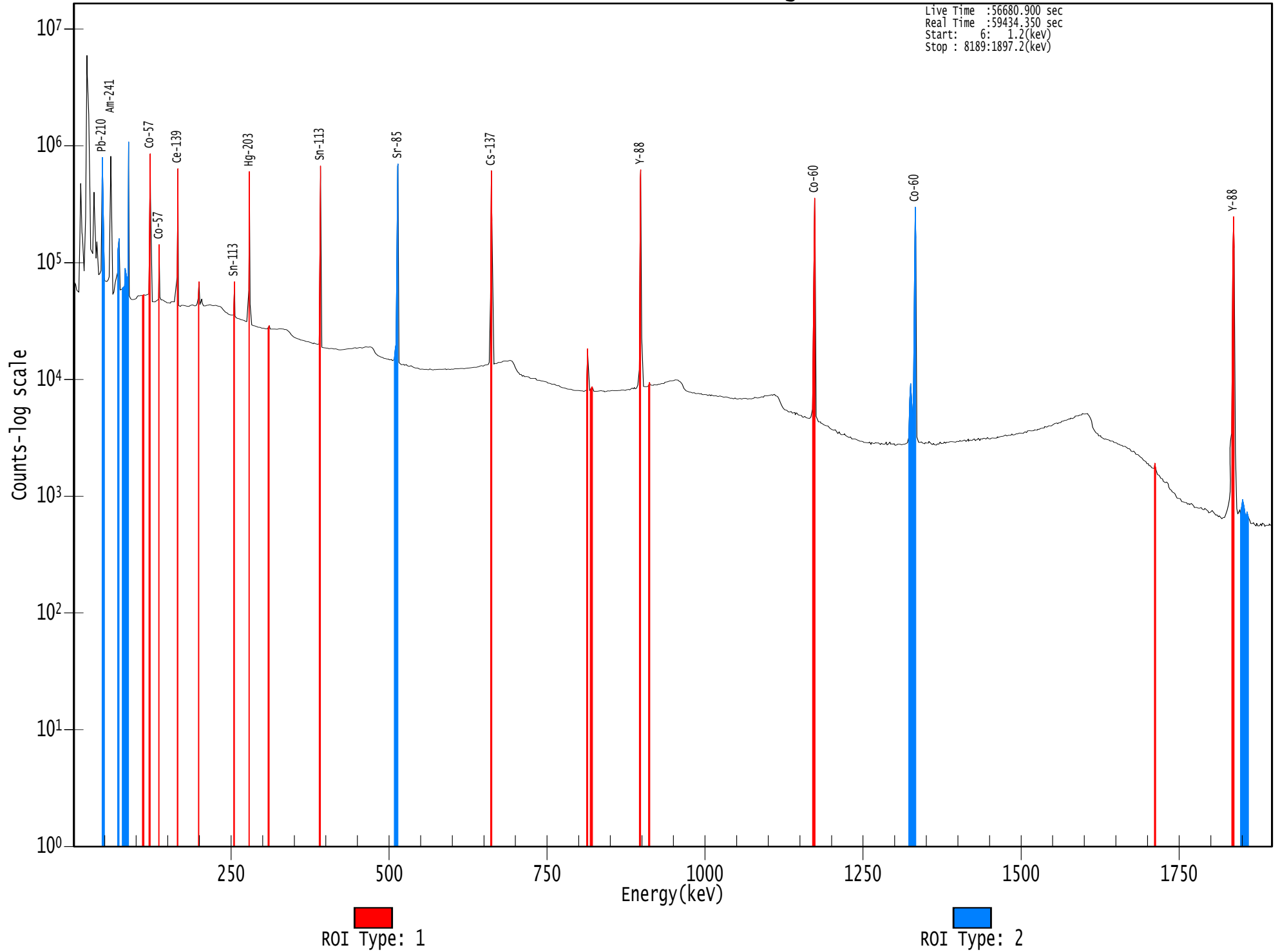
# BACKGROUND 2012 (BE Det)

Live Time : 337841.690 sec  
Real Time : 337877.650 sec  
Start: 6: 1.2(keV)  
Stop : 8189:1897.2(keV)

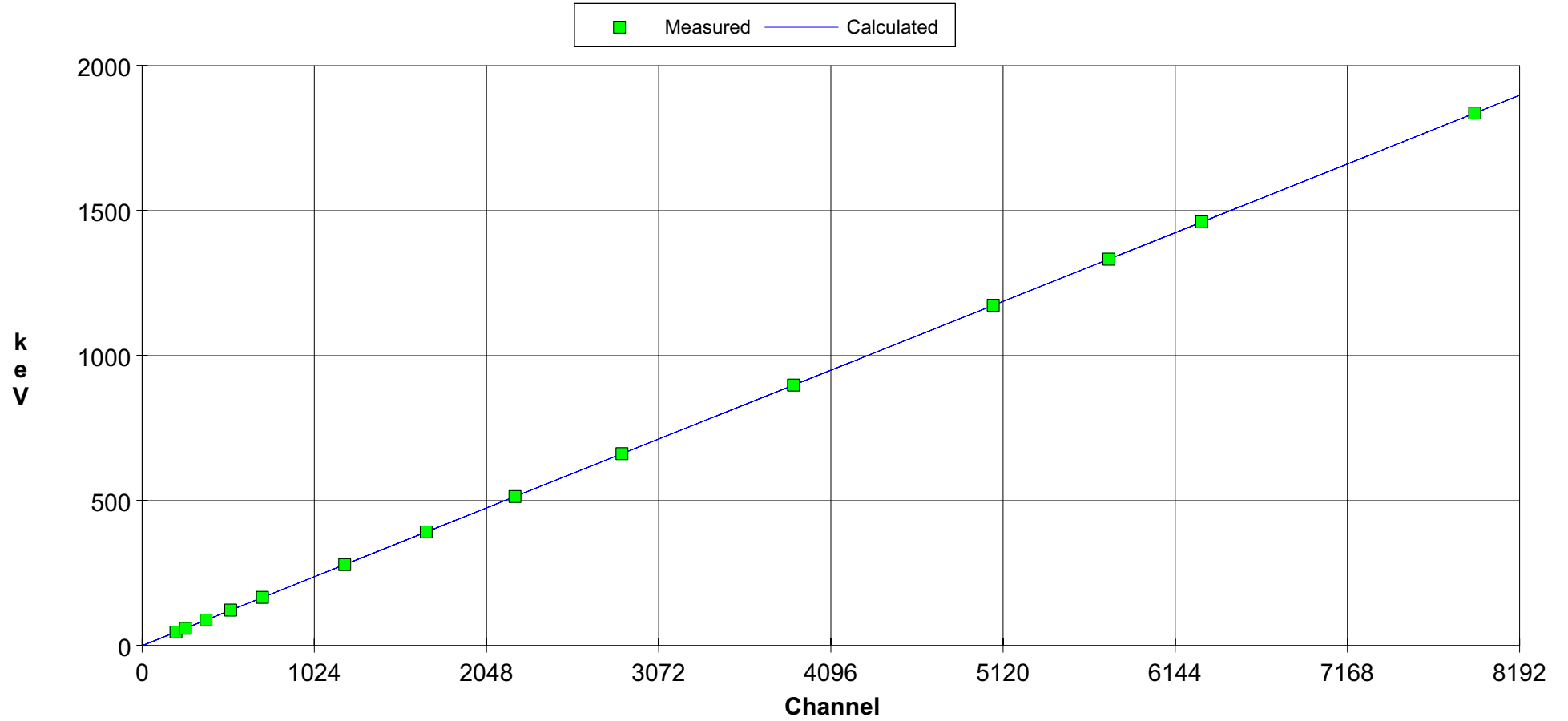


# Standard for 1.3gr/ml V=100ml (BE Det)

Live Time : 56680.900 sec  
Real Time : 59434.350 sec  
Start: 6: 1.2(keV)  
Stop : 8189:1897.2(keV)

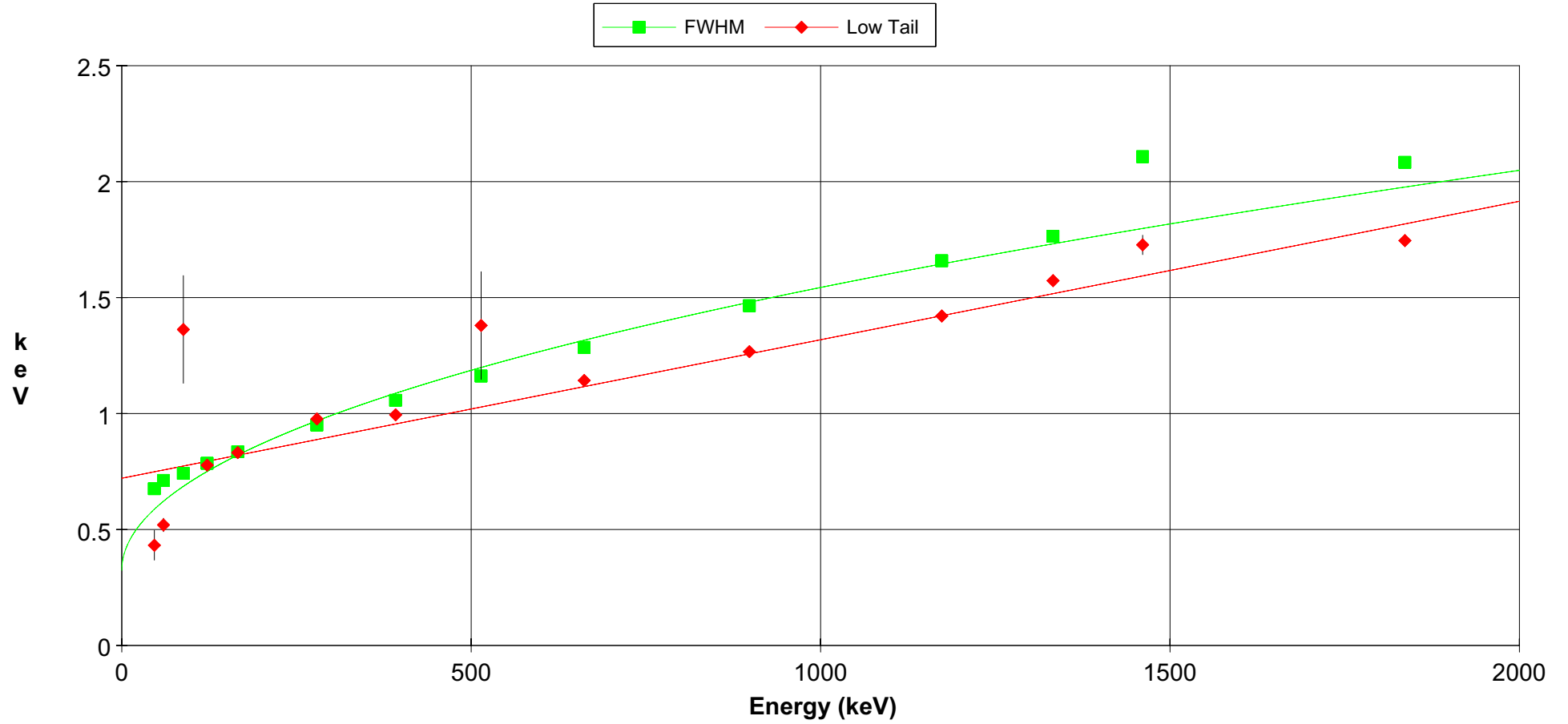


### Energy Calibration Curve



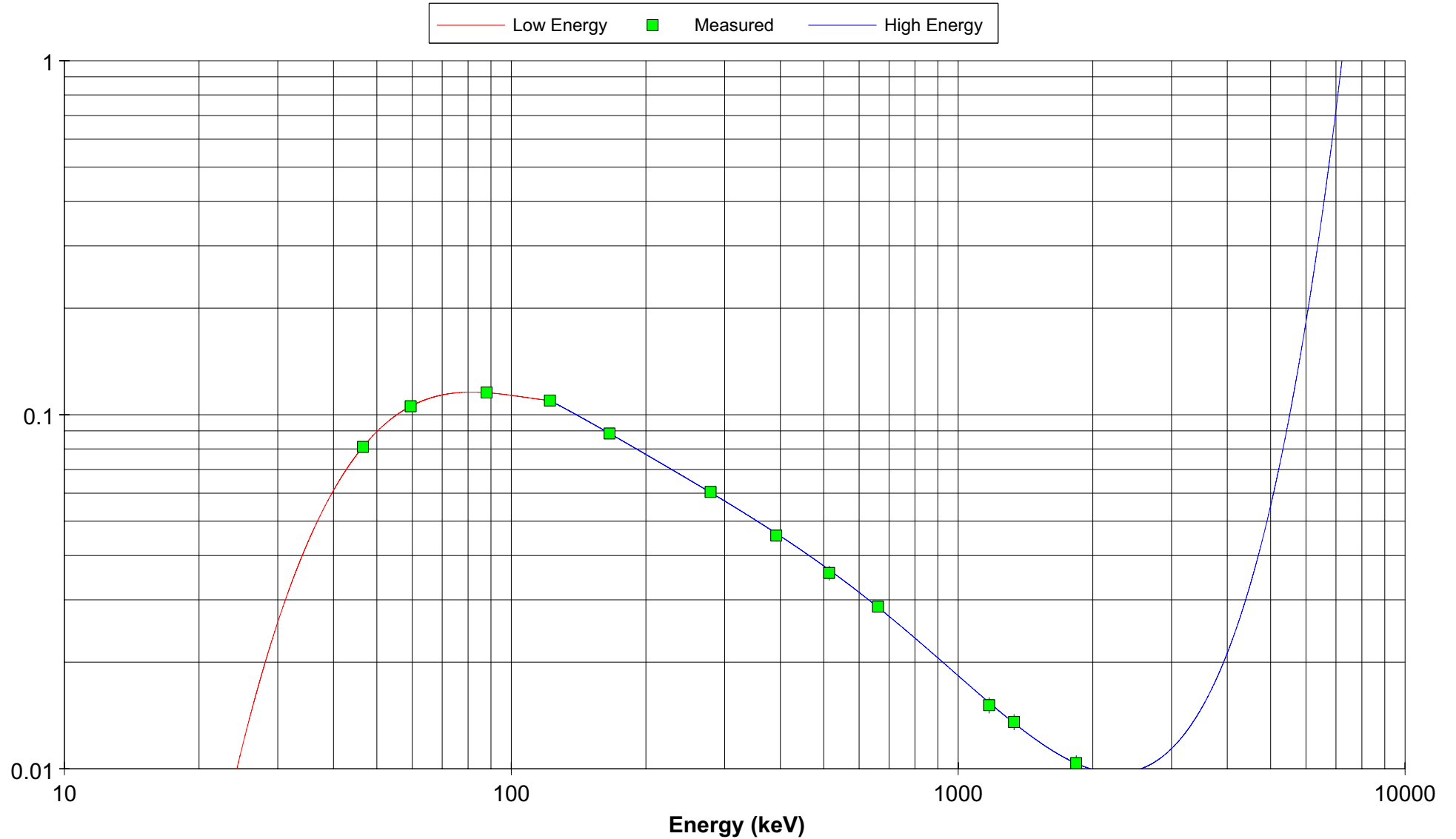
BE Detector  
Energy =  $-2.396e-001 \text{ keV} + 2.321e-001 \cdot \text{Ch} - 5.339e-008 \cdot \text{Ch}^2 + 7.272e-013 \cdot \text{Ch}^3$   
FWHM =  $3.237e-001 \text{ keV} + 3.857e-002 \cdot E^{1/2}$   
Lo Tail =  $7.207e-001 \text{ keV} + 5.972e-004 \cdot E$

### Shape Calibration Curves



BE Detector  
Energy =  $-2.396e-001 \text{ keV} + 2.321e-001 * Ch - 5.339e-008 * Ch^2 + 7.272e-013 * Ch^3$   
FWHM =  $3.237e-001 \text{ keV} + 3.857e-002 * E^{1/2}$   
Lo Tail =  $7.207e-001 \text{ keV} + 5.972e-004 * E$

### Dual Efficiency Calibration Curve



Geometry: CylVol=100ml d=1.3gr/ml (BE Detector)

$$\ln(\text{Eff}) = -8.579e+001 + 5.406e+001 \cdot \ln(E) - 1.161e+001 \cdot \ln(E)^2 + 8.287e-001 \cdot \ln(E)^3$$

$$\ln(\text{Eff}) = -2.138e+002 + 1.878e+002 \cdot \ln(E) - 6.584e+001 \cdot \ln(E)^2 + 1.143e+001 \cdot \ln(E)^3$$

$$- 9.870e-001 \cdot \ln(E)^4 + 3.381e-002 \cdot \ln(E)^5$$