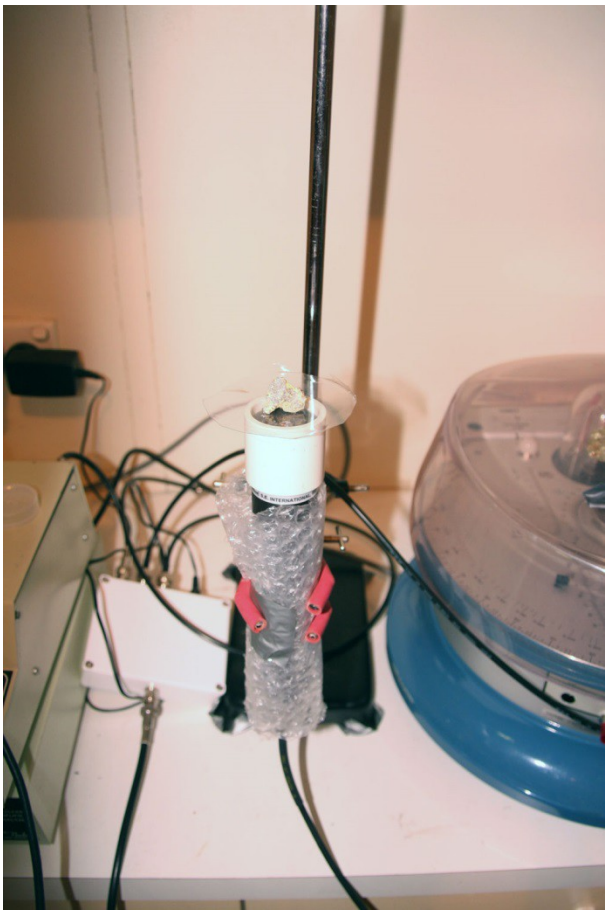
Test Results of APXS XRF with RAP47 and Modified RAPCAP

By Robert Kanen

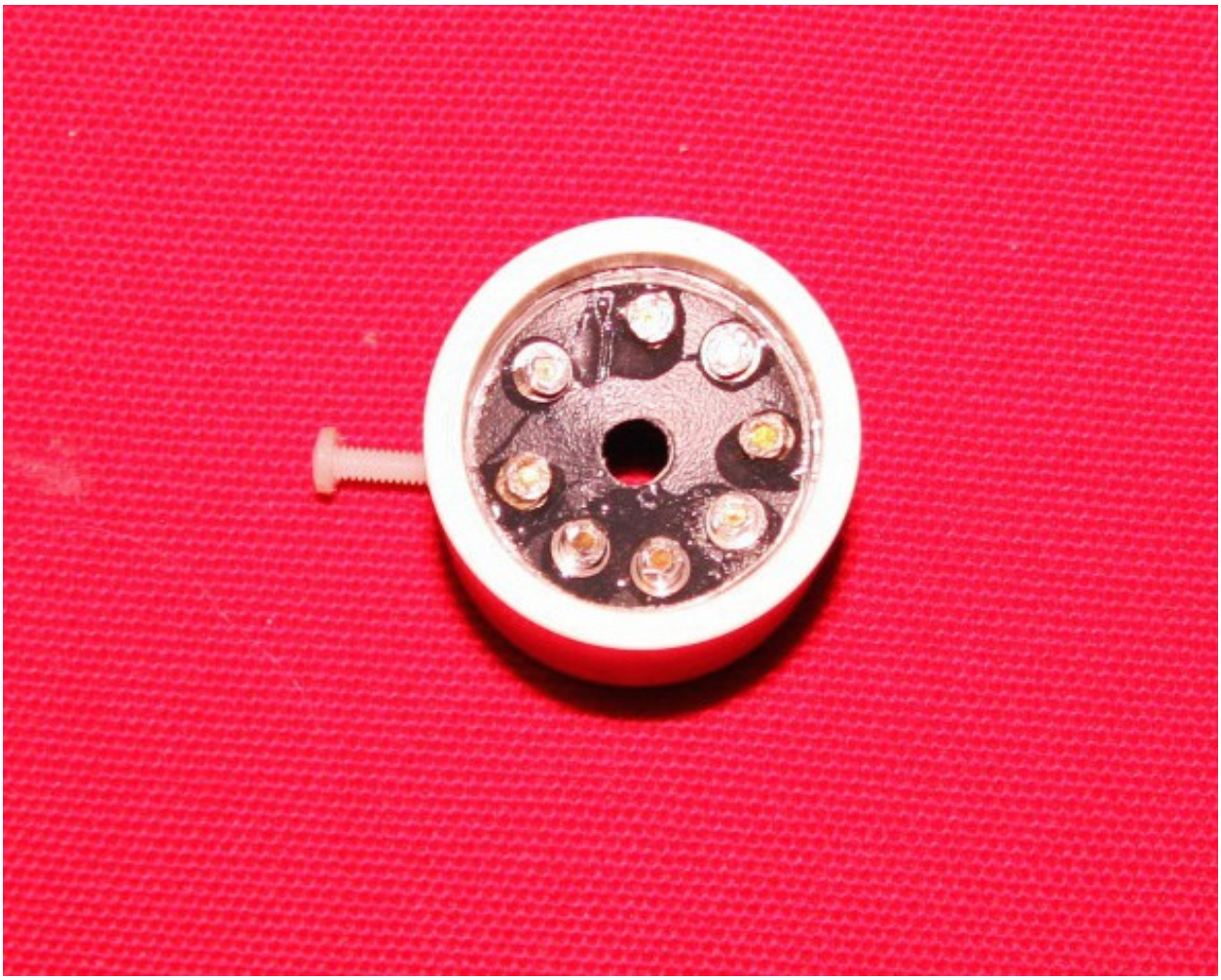
The tests were made with a RAP47 Cs(Tl) LEG Scintillation Probe, Gamma Spectacular and Theramino MCA software. This is a typical amateur setup. The radiation source is 8 smoke detector pellets mounted on a RAPCAP. The RAPCAP was modified by placing a sheet of lead across the top surface and making an 8mm hole in the middle for x-rays from the sample to reach the detector. Pellets were mounted on top of the lead sheet. The probe is held flush with the sample; gamma rays from the source hit the sample, causing fluorescence of secondary x-rays. The secondary x-rays enter the detector and are processed by a mca to determine the elements present. Several mineral and metal samples were tested. Some of the tests with this particular setup were unsuccessful. These include pyrite (Fe), chalcopyrite (Cu), pentlandite (Ni), chrysocolla (Cu). Mineral samples have a much weaker response than pure metals. The successful tests were brass (Cu and Zn), lead sheet (Pb), native antimony (Sb), sphalerite (Zn) and Molybdenite (Mo). Further modification of the RAPCAP/Setup will optimize results.

Thanks to George Dowell (GEOelectronics) for the design and initial idea.

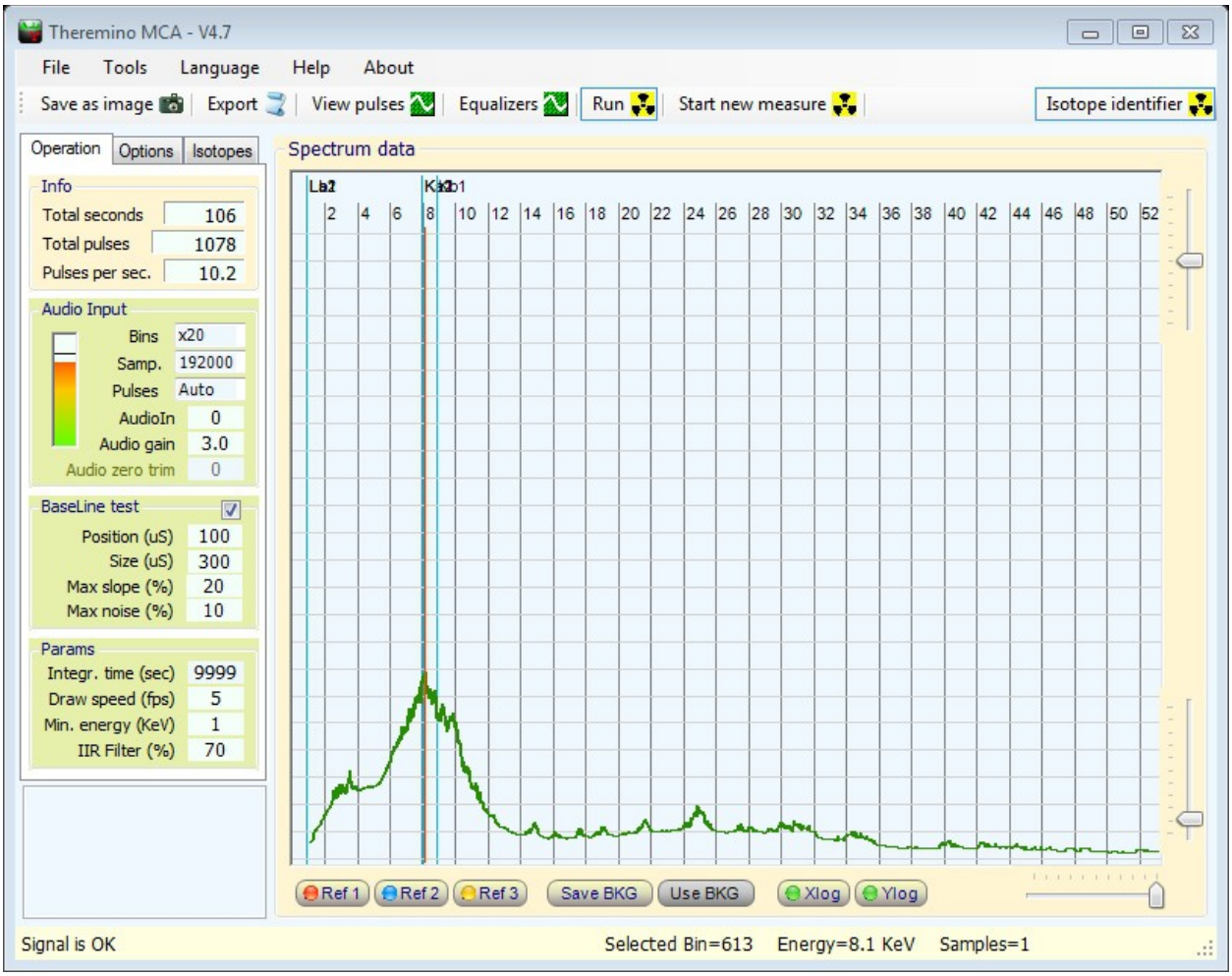
APXS XRF Setup



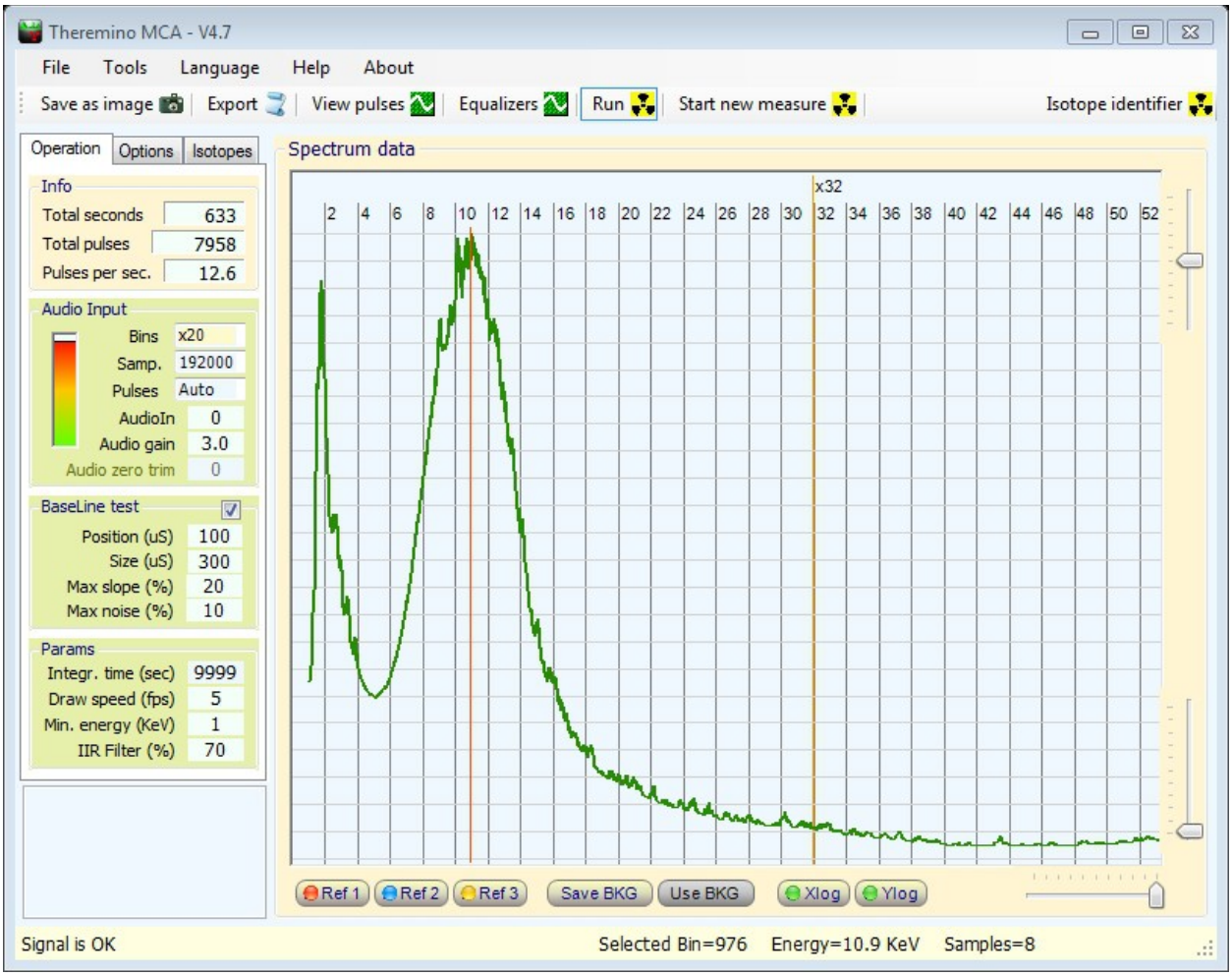
Modified RAPCAP



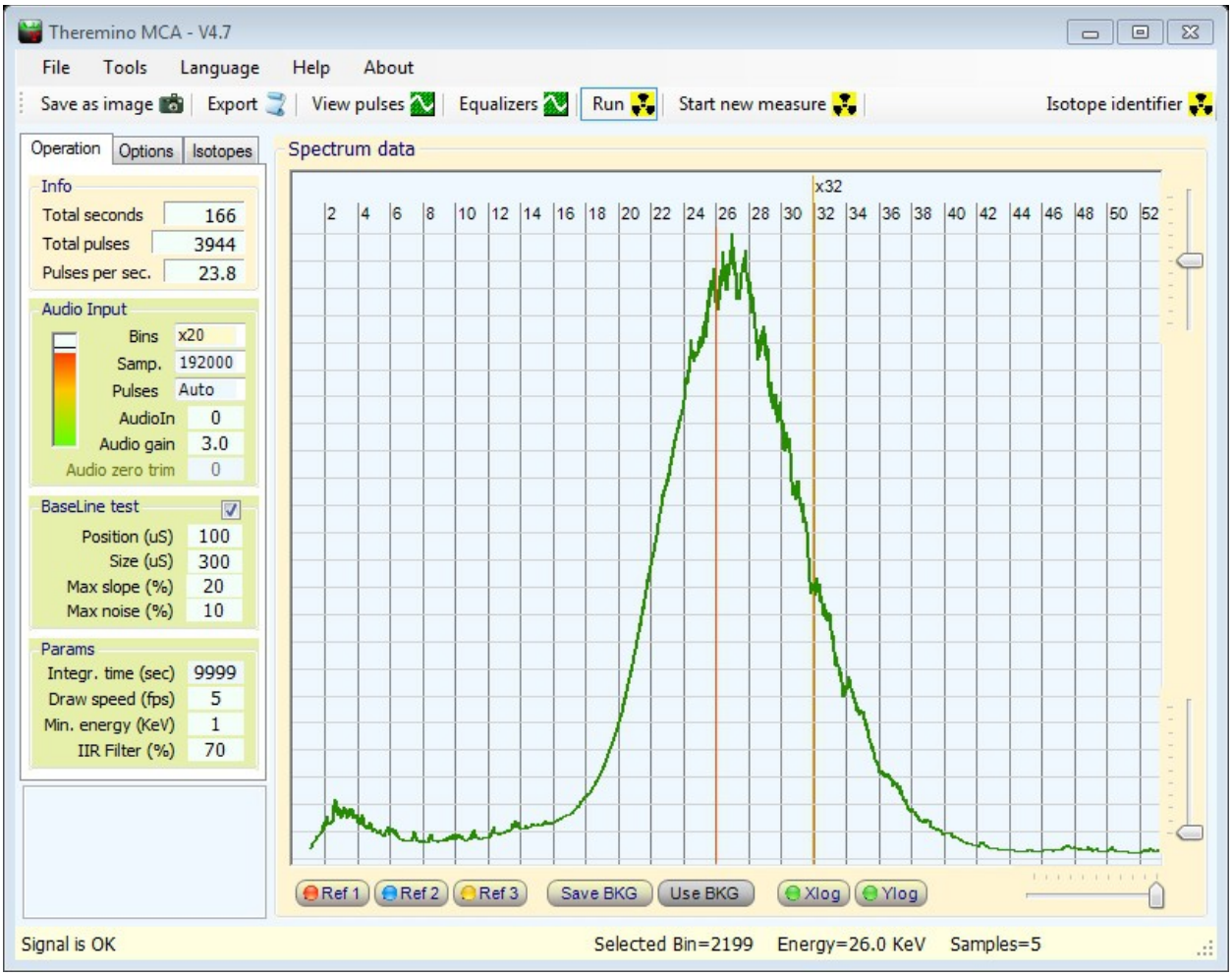
Brass containing Cu and Zn



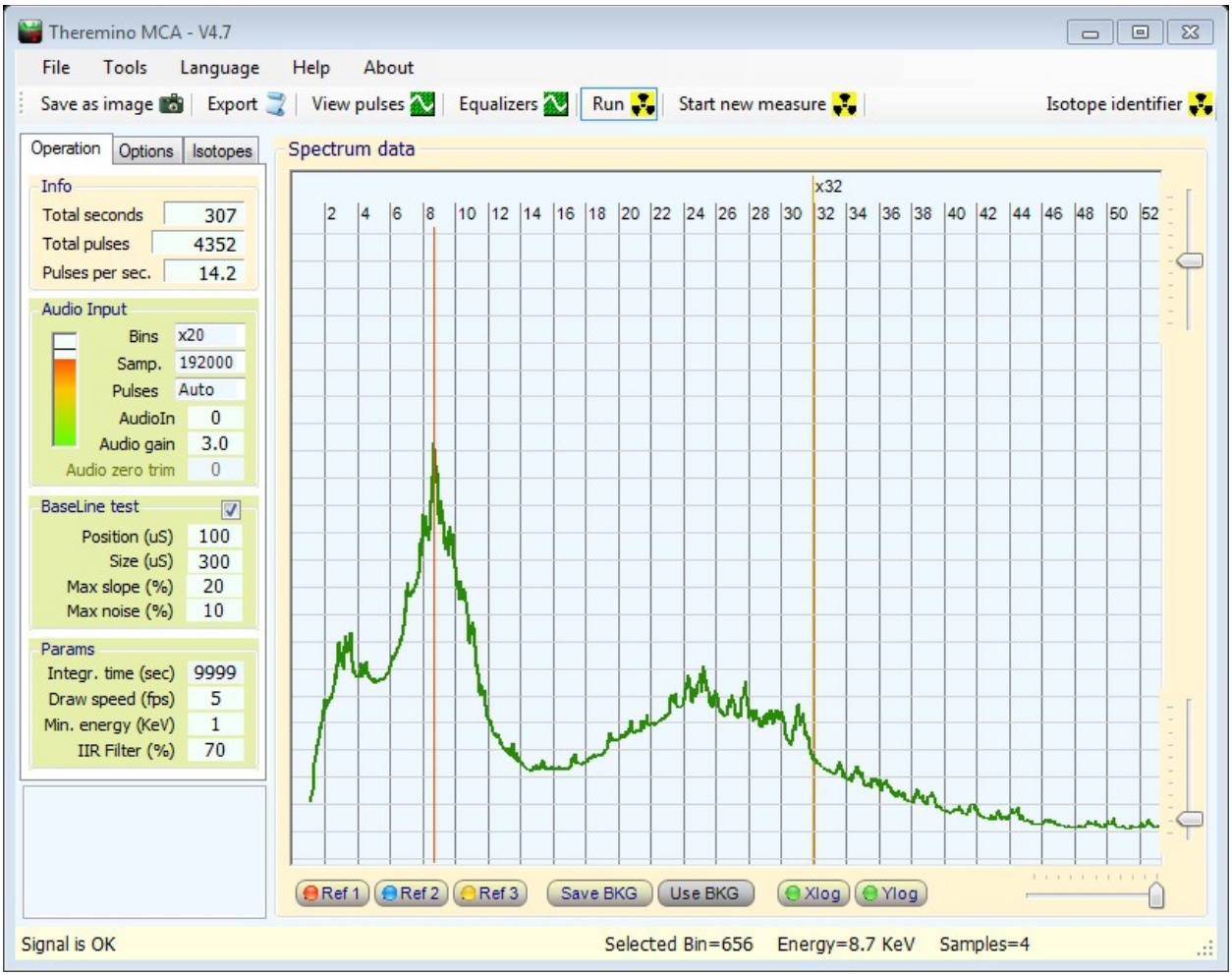
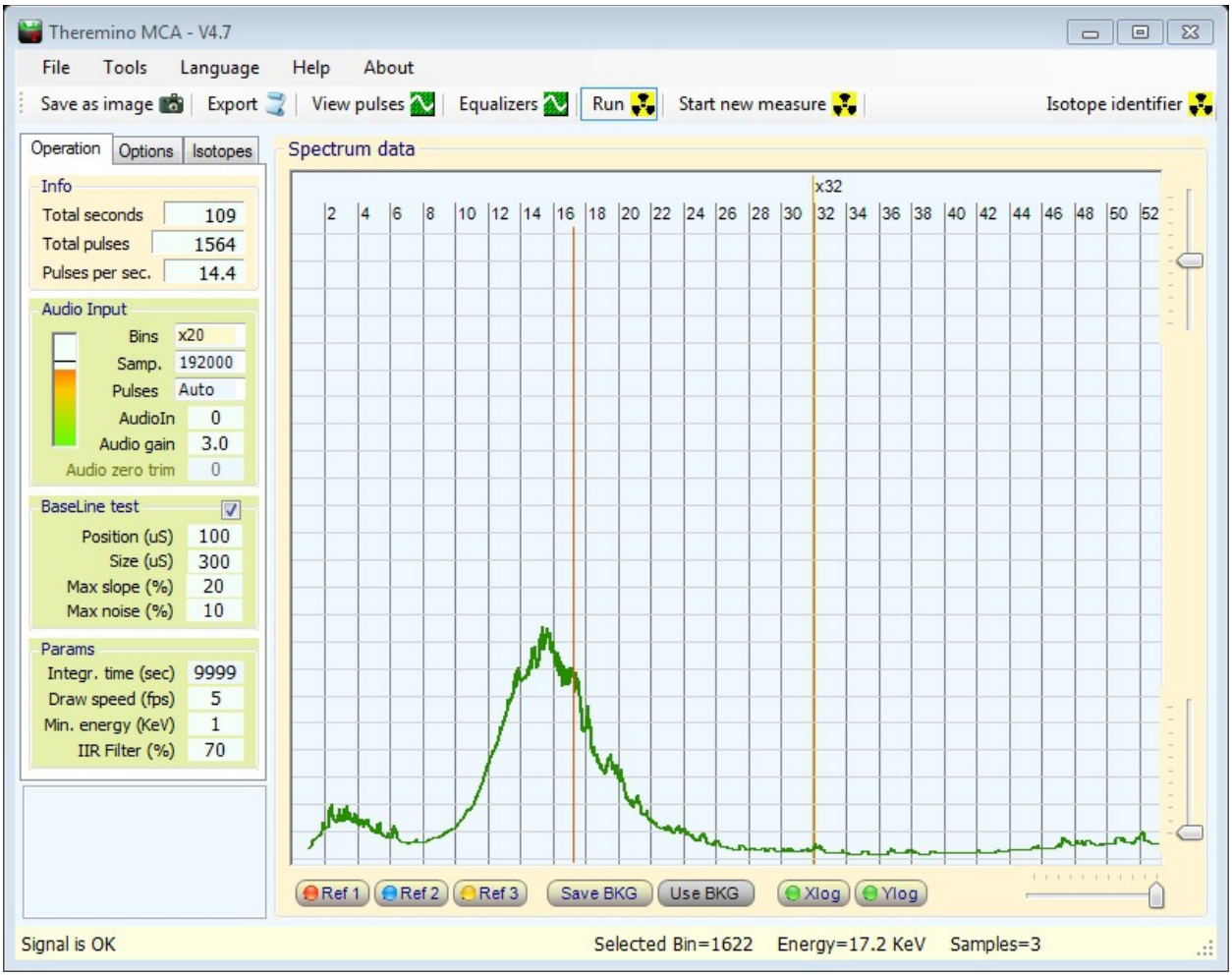
Lead sheet containing Pb



Native antimony (Sb)



Sphalerite containing zinc (Zn)



Molybdenite containing molybdenum (Mo)