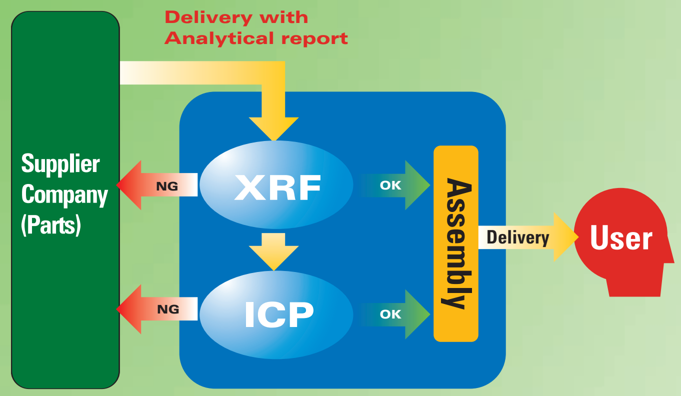
What is WEEE/RoHS/ELV?

Complementary directives from the European Union that require manufacturers, retailers, importers, exporters and consumers of electrical and electronic equipment to participate in stringent requirements for the disposal of resulting waste.



Under the directives, samples can first be screened with XRF. If the samples pass the limits, they are okay to continue into production and assembly. If they are above the limits, they must be returned to the supplier. If the results are borderline or below the detection capability of XRF, then ICP must be used for the analysis.

Are you ready for WEEE/RoHS/ELV?

WEEE: Waste Electrical and Electronic Equipment

Covers the waste management of electrical and electronic products and requires that new equipment placed on the market within Europe must comply with the directive so that products can easily be broken down, reused or recycled at the end of the life cycle. Effective August 13, 2005.

RoHS: Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

Bans the use of certain restricted substances in end products to prevent them from entering waste streams. The directive sets maximum allowable limits of the hazardous substances Pb, Cd, Hg, Cr (VI) and Br (from brominated flame retardants: PBB & PBDE). Effective July 1, 2006

ELV: End of Life Vehicle

Prohibits the use of these hazardous substances in vehicles sold after July 2003.

Maximum allowable limits for WEEE/RoHS/ELV

The regulation of PBB & PBDE is only for RoHS. For ELV, the Pb in steel and aluminum is less than 4000 ppm

Element	Expected max limits
Pb	1000 ppm
Hg	1000 ppm
Cd	100 ppm
Cr	1000 ppm
PBB (Br)	1000 ppm
PBDE (Br)	1000 ppm

CE

ISO 9001:2000
Certificate No A 25

Specifications subject to change without notice.

HORIBA JOBIN YVON

(All HORIBA Jobin Yvon companies were formerly known as Jobin Yvon)

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Explore the future

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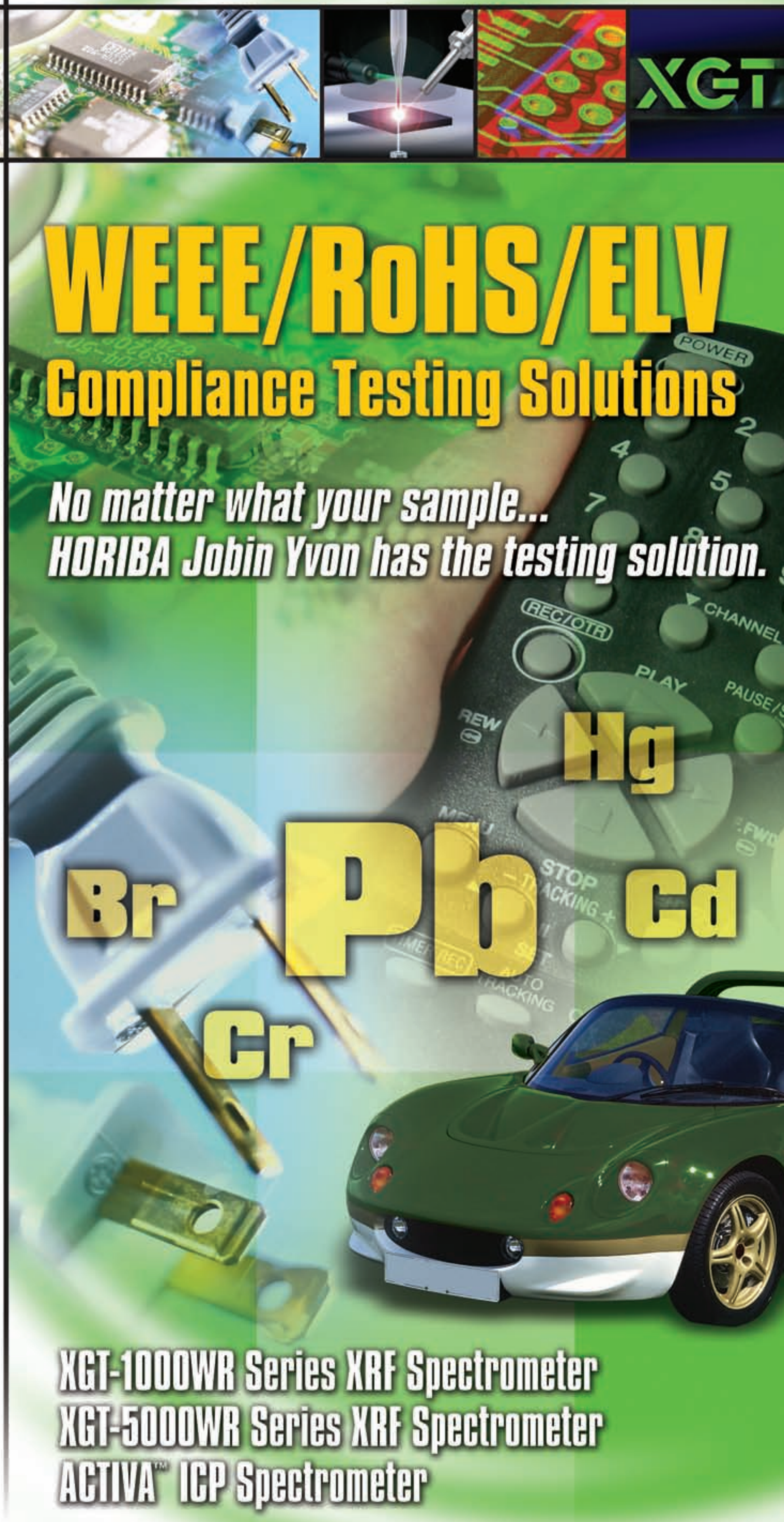


WEEE/RoHS/ELV

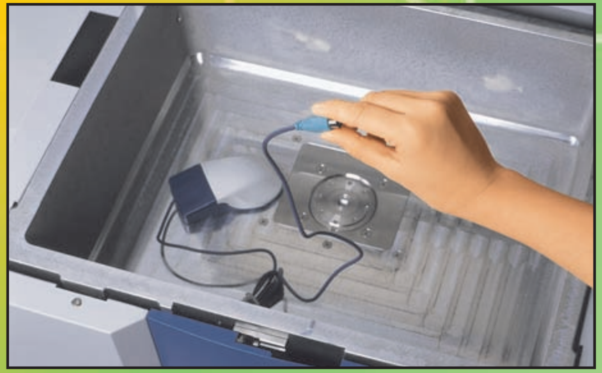
Compliance Testing Solutions

No matter what your sample...
HORIBA Jobin Yvon has the testing solution.

XGT-1000WR Series XRF Spectrometer
XGT-5000WR Series XRF Spectrometer
ACTIVA™ ICP Spectrometer

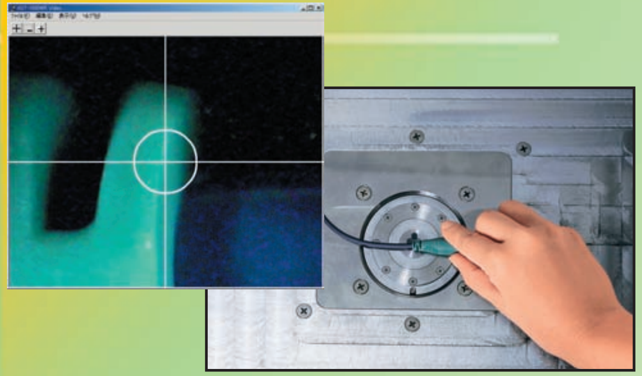
Simultaneous analysis of Cd, Pb, Cr, Hg and Br in less than 30 seconds!
XGT-1000WR Series : EDXRF Multi-elemental analyzer

1



▶ **Simply place the sample directly into the sample chamber. The X-ray beam is 1.2 mm to allow even small parts to be measured easily and precisely.**

2

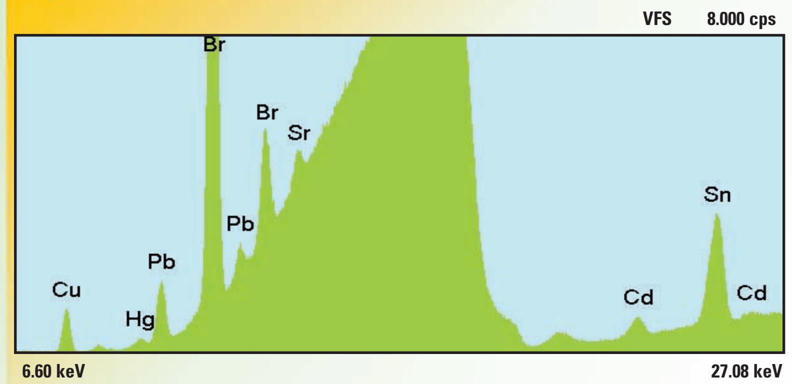


▶ **Selecting the measurement area using a 50X CCD camera and real-time image on the monitor of the PC.**

3

▶ **Just press the button to perform the analysis automatically.**

4

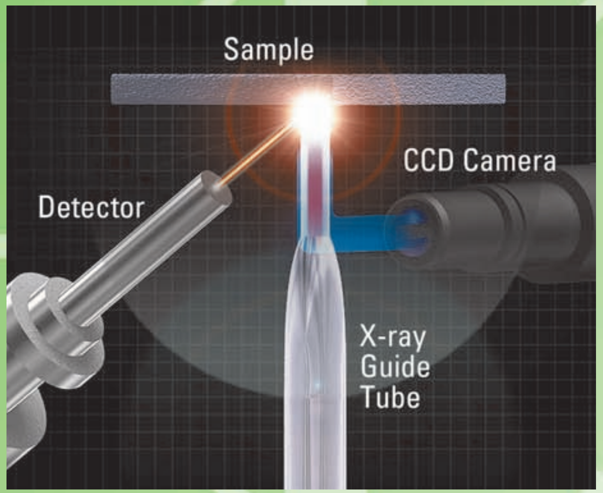


▶ **The analysis results are displayed quickly and accurately.**

Large sample size

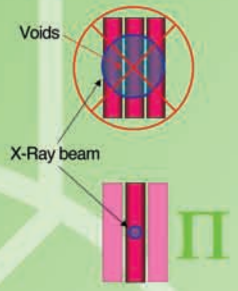
Large samples can be simply placed and measured in the large sample chamber with no disassembling or cutting. Chamber size is 46 cm x 36 cm x 15 cm.

Patented XGT provides small analysis spot and greater X-ray intensity.



The XGT-1000WR makes use of HORIBA original Xray beam focusing technology and uses a narrow, high intensity x-ray beam method. This provides shorter measurement time and higher precision compared to systems using an x-ray collimator. The XGT-1000WR can be equipped with 2 selectable X-ray Guide Tubes (XGT): 0.1 mm and 1.2 mm.

Small analysis spot

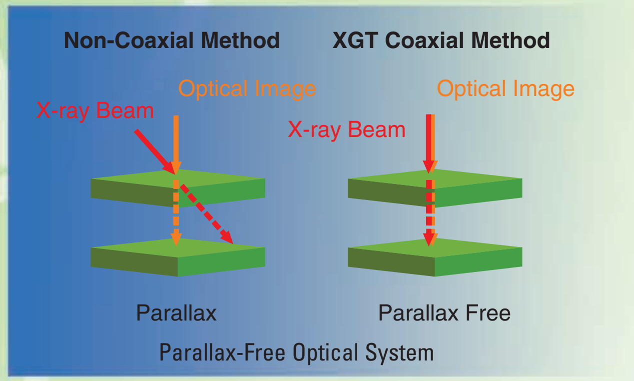


Large X-Ray beam: Not good
Need sample preparation or tedious positioning of multiple pieces. Furthermore, results can be affected by voids between each pieces of sample

Small X-Ray beam: good
No need for sample preparation, the beam fit on the pieces and do not overflow. The results are optimum

Coaxial design provides simple, accurate positioning

The XGT Series uses a structure that placed the CCD sample observation image along the same axis as the X-ray beam. This coaxial construction of the X-ray tube and the CCD camera allows the beams to remain focused at any position. This design greatly improves accuracy, especially on non-flat samples.



Parallax-Free Optical System

Easy operation with real time excel transfer and data judgment

Complete quantitative analysis with spectra and data export with automatic data judgment is performed at the touch of a button.

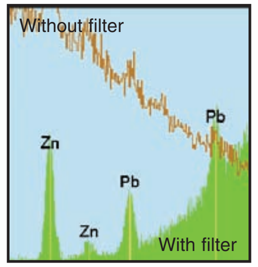
1	CA-1	Cable	S.Ohzawa	2004/2/16 21:18	White	110.7	29.9	Failed	109.4	32.1
2	CA-2	Plug	S.Ohzawa	2004/2/16 21:25	White	18.5	3.7	OK	15.8	4.2
3	CA-3	Plug	S.Ohzawa	2004/2/16 21:30	Red	18.4	3.7	OK	17.5	4.5
4	CA-4	Cable	S.Ohzawa	2004/2/16 21:35	White	110.5	25.6	Failed	145.5	40.5
5	CA-5	Plug	S.Ohzawa	2004/2/16 21:42	White	10.2	4.1	OK	10.9	4.6
6	CA-6	Plug	S.Ohzawa	2004/2/16 21:48	Red	11.4	4.1	OK	13.4	4.9

WEEE/RoHS Corrections

XRF when used to analyze plastic samples is at risk to influences of sample thickness, density, irregularity and material. The XGT series offers different corrections for sample thickness, chlorine and other to improve accuracy in any type of sample.

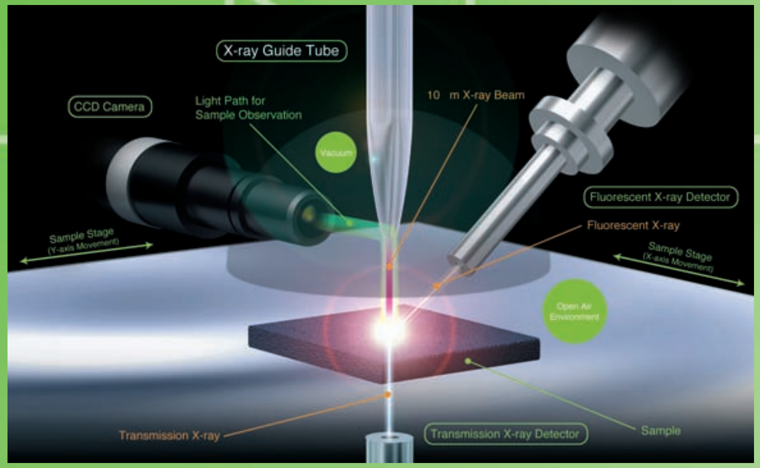
High sensitivity

The primary filter is used to reduce the background level to raise the S/N ratios of the hazardous substances. The typical EDXRF limit of detection of 100 ppm is reduced to 2 ppm for Cd, Pb, Hg and Br while Cr is 5 ppm.



Pb Spectrum

Mapping and microanalysis of components and structures
XGT-5000WR Series : EDXRF Analytical Imaging Microscope

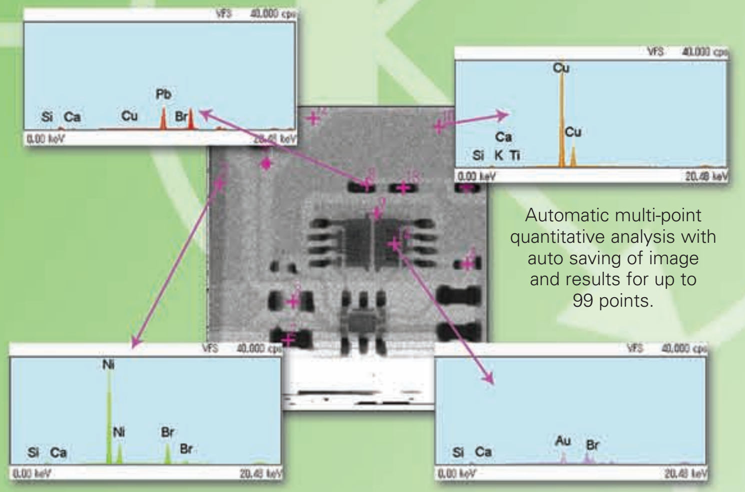


The 10 µm innovation

The ultra narrow 10 micron X-Ray beam is a result of the patented HORIBA X-Ray Guide Tube (XGT) Technology. While the sample is being scanned, the X-ray guide tube irradiates the sample with an x-ray beam, with the CCD camera and x-ray detector working together. The result is a completely seamless merger of optical microscope observation and the elemental analysis of the X-ray analyzer. With the small x-ray beam of 10 microns, a very high spatial resolution is achieved, as well as a large scanning area. High speed measurements are possible up to 50 times faster than conventional equipment. The unique coaxial design of the XGT Series provides parallax-free measurements with outstanding accuracy.

Multi-point quantitative analysis

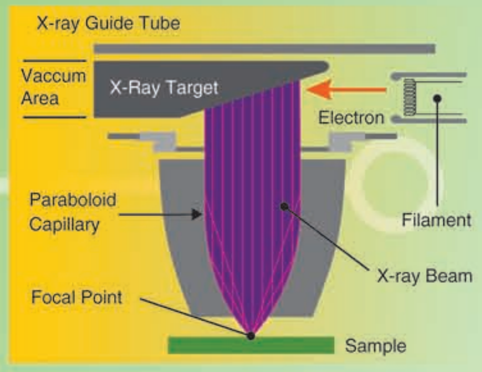
Automatic multi-point quantitative analysis can be perfomed for up to 99 points. Each image and spectrum is stored individually and automatically. The calculations of the concentration are carried out like the XGT-1000WR with data export to Excel and automatic data judgement.



Automatic multi-point quantitative analysis with auto saving of image and results for up to 99 points.

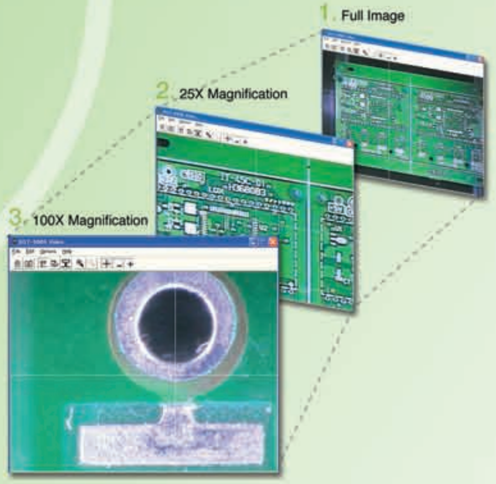
Patented X-ray Guide Tube (XGT)

The X-ray guide tube (XGT) irradiates the sample with a 10 micron or 100 mm high intensity x-ray beam. The analysis probe is set in vacuum, making it possible to analyze the same at normal atmospheric pressure.



Quickly proceed from a view of the entire sample to the selection of the target point.

Just three clicks from a view of the entire sample to the selection of the point to be measured. After the image of the entire sample is displayed on the monitor, you can select the exact point for high-precision elemental analysis in just 3 mouse button clicks.

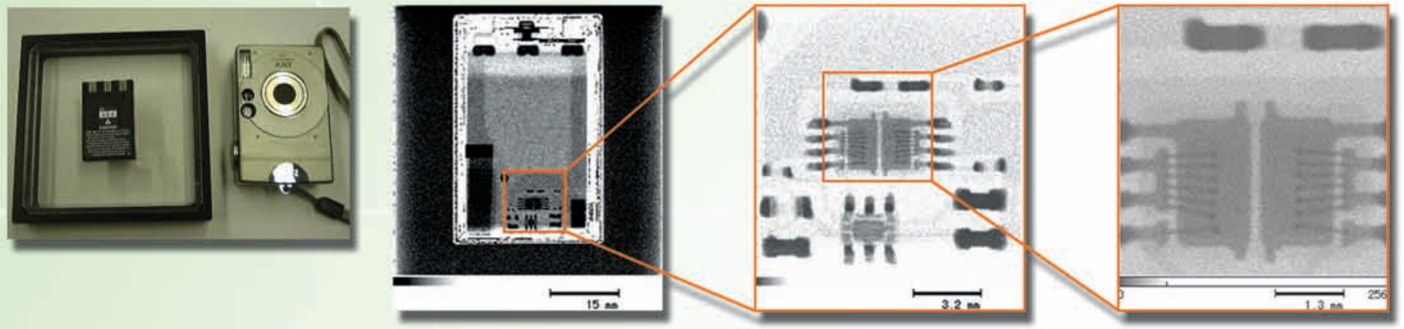


WEEE/RoHS/ELV control from the inside out

When you need to locate hazardous substances on a complete unit or finished product there is no need to disassemble or damage the unit. Using the example of a circuit board, there is no need to damage the protective resin on the circuit board, so the defective area in the circuit board can be accurately identified. Furthermore, because both transmission x-ray images and x-ray mapping images can be viewed simultaneously, information about internal elements can also be checked, providing useful information for deducing and identifying the cause of the problem.

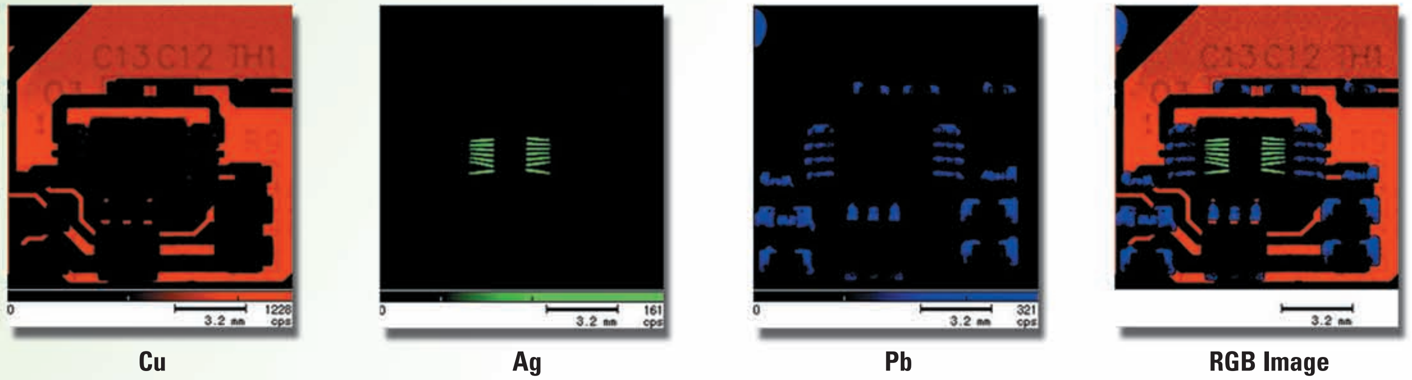
Internal observation using penetrating transmission images

With electronic parts encased in molded plastic, the external appearance of the parts provides no information about the internal circuit structure. With the XGT, however, transmission x-ray images can be used to check the internal structure.



Mapping Results

After the location of the defect has been identified, x-ray mapping images can be used to analyze the parts interior and deduce the cause of the defect. Elemental distribution by color can easily be seen using the RGB composite image.



Cu **Ag** **Pb** **RGB Image**

- **Up to 31 elements can be mapped and displayed simultaneously using the XGT-5000WR**

Low Level Analysis of Hazardous Substances
ACTIVA™ Simultaneous CCD ICP Spectrometer

ICP Spectroscopy is used in WEEE/RoHS/ELV compliance testing when XRF screening indicates that the hazardous substance is present at or above the limit or the detection capability of the unit is not sufficient to detect the substances present. While ICP analysis does require that the sample be in a liquid form and must therefore be dissolved, it does provide excellent limits of detection for the hazardous substances Pb, Cd, Hg, and Cr. The ACTIVA ICP Spectrometer also offers the capability to perform the analysis of Br.

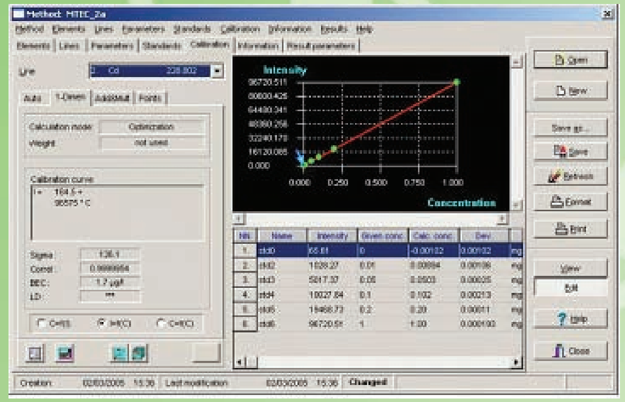
ACTIVA provides excellent limits of detection as shown in including those below 190 nm. Total Plasma View extends the analysis of trace elements to a variety of difficult environmental matrices, including organics and high dissolved solids.

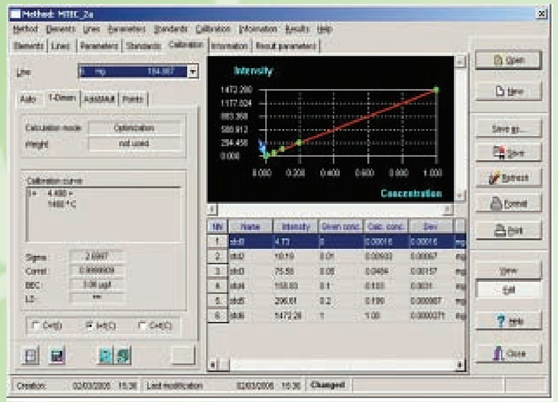
- High productivity with flexibility
- Advanced megapixel CCD technology for high analytical throughput with increased dynamic range
- SimShot simultaneous measurements within a Wavelength Analytical View (WAV)
- Optics tailored to the CCD provide constant, high resolution
- WAV-Builder provides assistance in WAV selection for multi-element and multi-line analysis

Typical Detection limits of WEEE RoHS ELV Hazardous Substances in µg/L

Element	LOD (mg/L)
Br 153.114	**1.10**
Cd 228.802	**0.00029**
Cl 134.724	**2.00**
Cr 205.552	**0.0005**
Cr 206.149	**0.0007**
Hg 184.887	**0.005**
Pb 168.155	**0.055**
Pb 220.353	**0.003**

ACTIVA offers a large dynamic range: Using the Pb 220 nm line, a calibration was perfomed between 0 and 100 mg/L with a good accuracy for both standards.



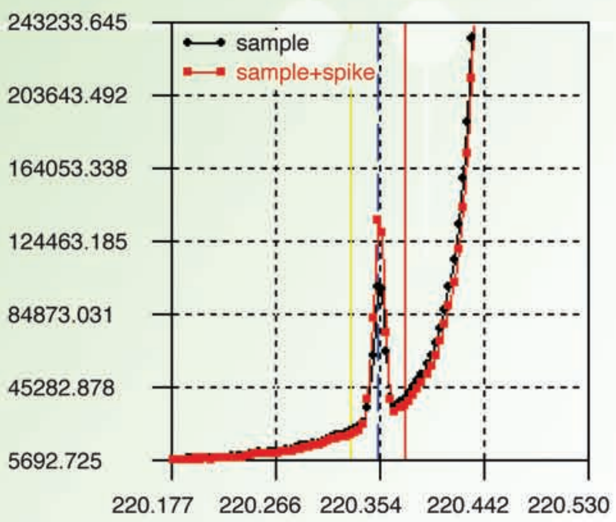


	A	B	RoHS expected norm as solid
Element	**Conc (mg/L)**	**Conc**	
Br 153.114	< 1.1	< 1.1	1000ppm (PBB.PBDE)
Cd 228.802	< 0.00029	< 0.00029	100ppm
Cr 206.149	< 0.0007	< 0.0007	100ppm (Cr6+)
Hg 184.887	< 0.005	< 0.005	100ppm
Pb 220.353	1.05	10.7	100ppm

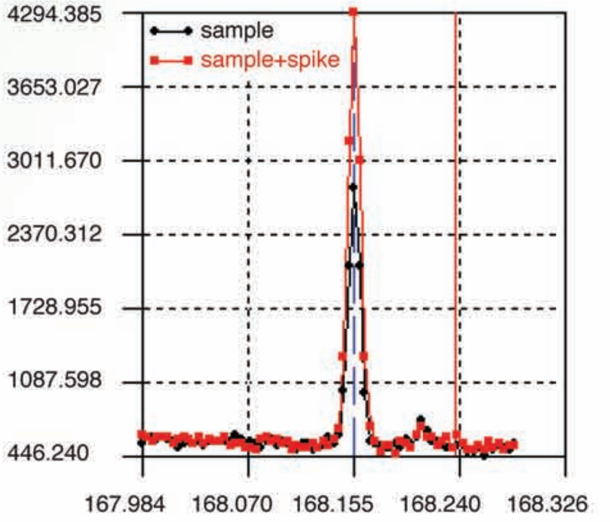
Analysis of the electronic sample shows concentrations within the range of acceptable RoHS limits.

	Sample 10 fold diluted + spike				
Element	**Conc (mg/L)**	**SD (mg/L)**	**RSD (%)**	**Conc expected (mg/L)**	**Recovery (%)**
Br 153.114	9.318	0.83	8.87	10.00	93.2
Cd 228.802	0.104	0.00	0.27	0.1007	103.1
Cr 205.552	0.110	0.00	0.47	0.11	100.8
Cr 206.149	0.110	0.00	0.82	0.11	101.3
Hg 184.887	0.105	0.01	6.33	0.10	105.0
Pb 168.155	11.803	0.39	3.29	11.64	101.4
Pb 220.353	11.405	0.04	0.39	11.53	99.0

Pb 220nm (without dilution)



Pb 168nm (without dilution)



Analysis of the electronic sample and the blank from the calibration curves show a high level of Al. In this case, the flexibility of ACTIVA allows to use the 168 nm for Pb which is not interfered by Al as shown above. The resolution or capability of the instrument to separate 2 close lines, is very important in the case of a complex matrix. ACTIVA offers optical resolution of less than 10 pm up to 420 nm and allows the selection of the primary lines, which is of a great interest when traces are being analyzed.