EXTRAORDINARY POSSIBILITIES
FOR YOUR EVERYDAY ANALYSIS

G2-XS QTof

Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

Xevo G2-XS QTof

EXTREME SENSITIVITY, EXTRAORDINARY SELECTIVITY,

Whether you're a scientist who wants to truly understand your samples, or a lab manager with urgent deadlines to meet, the Xevo™ G2-XS QTof is the ultimate solution.

This high-performance benchtop QTof gives you the confidence to make the right decisions quickly and easily using the highest quality, most comprehensive information. Powerful underlying technologies seamlessly integrate with industry-leading separations and informatics solutions.

Your lab will gain efficiency and productivity from proven robustness, reliability, and speed of analysis, with the flexibility to adapt to your changing needs.
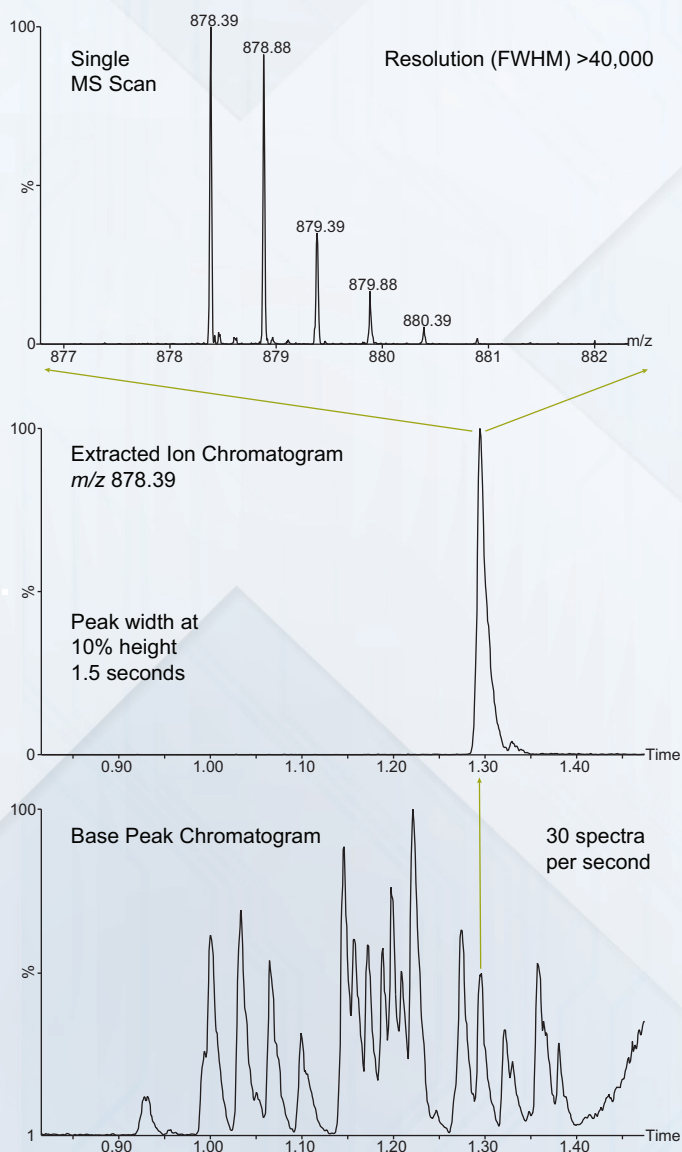
The Xevo G2-XS QTof is fully accessible to expert and non-expert alike, with its intuitive user interface and automated setup features, giving you the peace of mind that the system is always performing at its best.

ACQUITY UPLC H-Class System with Xevo G2-XS QTof

EXCEPTIONAL SOLUTIONS

High Resolution Data Independent of Scan Speed

Top: Single MS scan from peak apex, showing mass resolution >40,000
Middle: Extracted ion chromatogram showing peak width of 1.5 seconds at 10% height
Bottom: UPLC/MS Base Peak chromatogram acquired at 30 spectra per second

ENGINEERED SIMPLICITY

A design philosophy that delivers a combination of the highest performance with system versatility and simplicity of operation.

HIGH PERFORMANCE

StepWave™
Unique, off-axis ion source technology that delivers robust, reproducible, class-leading sensitivity.

XS Collision Cell
Collision cell technology with enhanced ion transmission, resulting in increased sensitivity and resolution.

QuanTof™ Technology
For dynamic range, speed and quantitative capability designed to integrate seamlessly with Waters' industry-leading separations solutions.

UPLC/TofMRM
High transmission mode giving improved limits of detection in targeted quantitative experiments, delivering the most sensitive and specific high resolution data on the market.

UPLC/MS^E
A simple method of data acquisition that comprehensively catalogs complex samples in a single analysis.

UPLC/FastDDA
For automated, intelligent, fast data directed analysis giving up to 30 high quality accurate mass MS/MS spectra per second for confirmation of known compounds and characterization of unknowns.

VERSATILITY

Universal Ion Source Architecture
The most extensive range of interface capabilities to service the broadest range of applications.

SIMPLICITY OF OPERATION

System Solutions
The most complete system solutions backed by superior support to ensure your success.

IntelliStart™ Technology
Guarantees maximum system performance and usability for reproducible results.
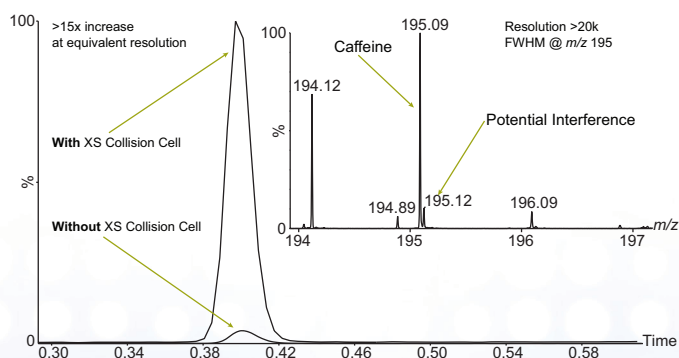
XS COLLISION CELL

For complex samples it is often challenging to obtain meaningful quantitative and qualitative MS data for every component of interest. Success is typically governed either by the ability to detect the ions, or the ability to resolve them from others with similar *m/z*.

With the Xevo G2-XS QTof, class-leading sensitivity enables you to detect more low-level components than ever before, while significantly increased mass resolution at full transmission enhances your ability to distinguish them from one another, enabling meaningful data to be collected for each one.

Segmented Quadrupole
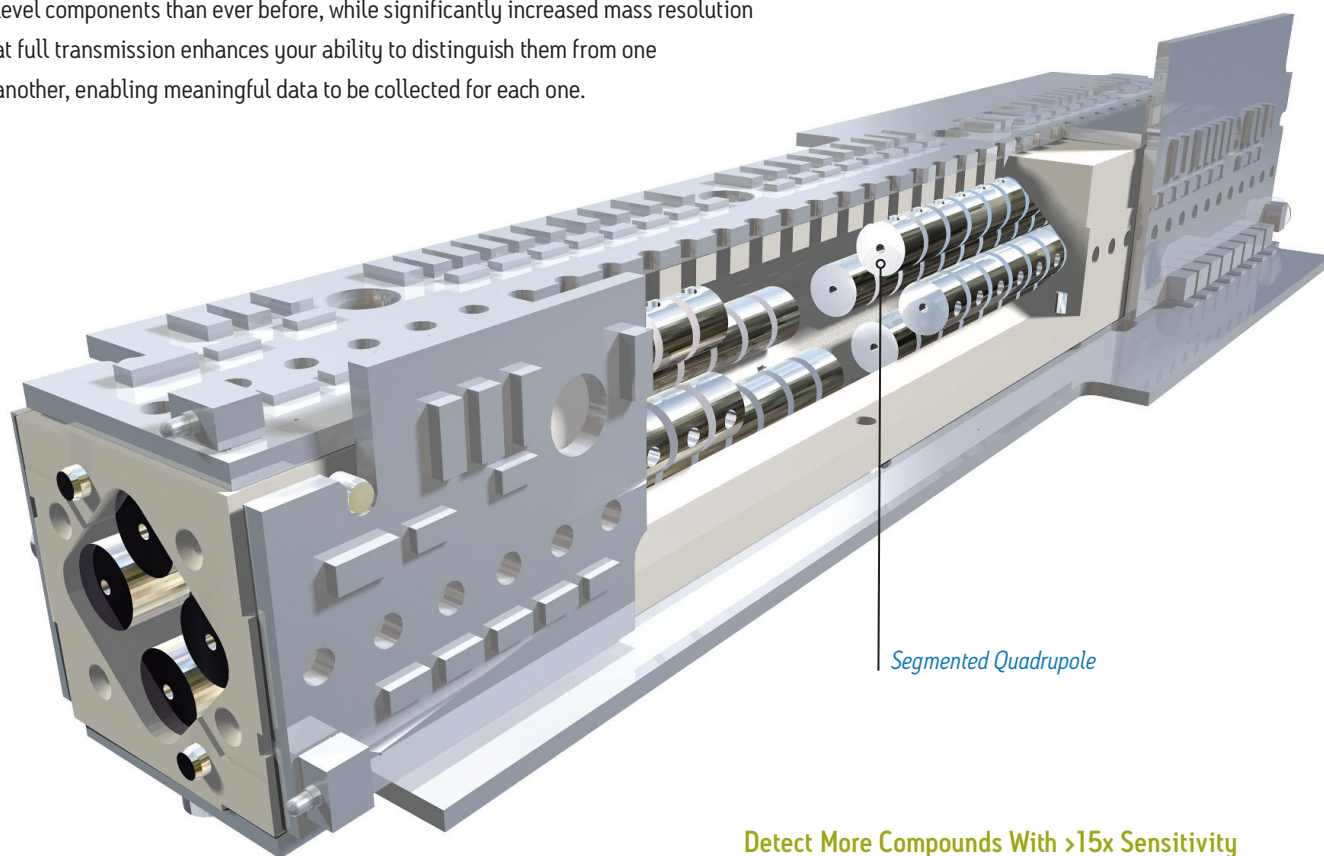
The XS Collision Cell focuses the ions such that they enter the Tof in a narrow, precisely controlled ion beam, resulting in improved transmission with a simultaneous increase in both sensitivity and resolution. This is described in more detail in the White Paper: The XS Collision Cell from Waters, Increased sensitivity and resolution for Time-of-Flight mass spectrometry (720005071en).

Detect More Compounds With >15x Sensitivity

>15x increase at equivalent resolution

With XS Collision Cell

Without XS Collision Cell

Caffeine

195.09

194.12

Resolution >20k FWHM @ *m/z* 195

Potential Interference

194.89   195.12   196.09

UPLC/MS chromatograms acquired at 10 spectra per second. The XS Collision Cell delivers a significant increase in signal, while maintaining the fast data acquisition rate necessary for narrow UPLC peaks, and the mass resolution required to separate potential interferences.

# MAXIMUM ROBUSTNESS WITH NO COMPROMISE IN PERFORMANCE

STEP WAVE™

For sample limited and demanding analytical experiments, you rely on achieving and maintaining the highest possible sensitivity from your system. This in itself is a challenge, which becomes even more difficult when, after running many complex samples, sensitivity is compromised due to contamination.

With the Xevo G2-XS QTof, MS signals are dramatically increased compared to previous source designs. At the same time, critical hardware components stay clean for longer, so your results are more reproducible and your laboratory stays productive.

Second Stage

Focused ion beam

First Stage

Eliminated neutrals

Conjoined T-Wave devices
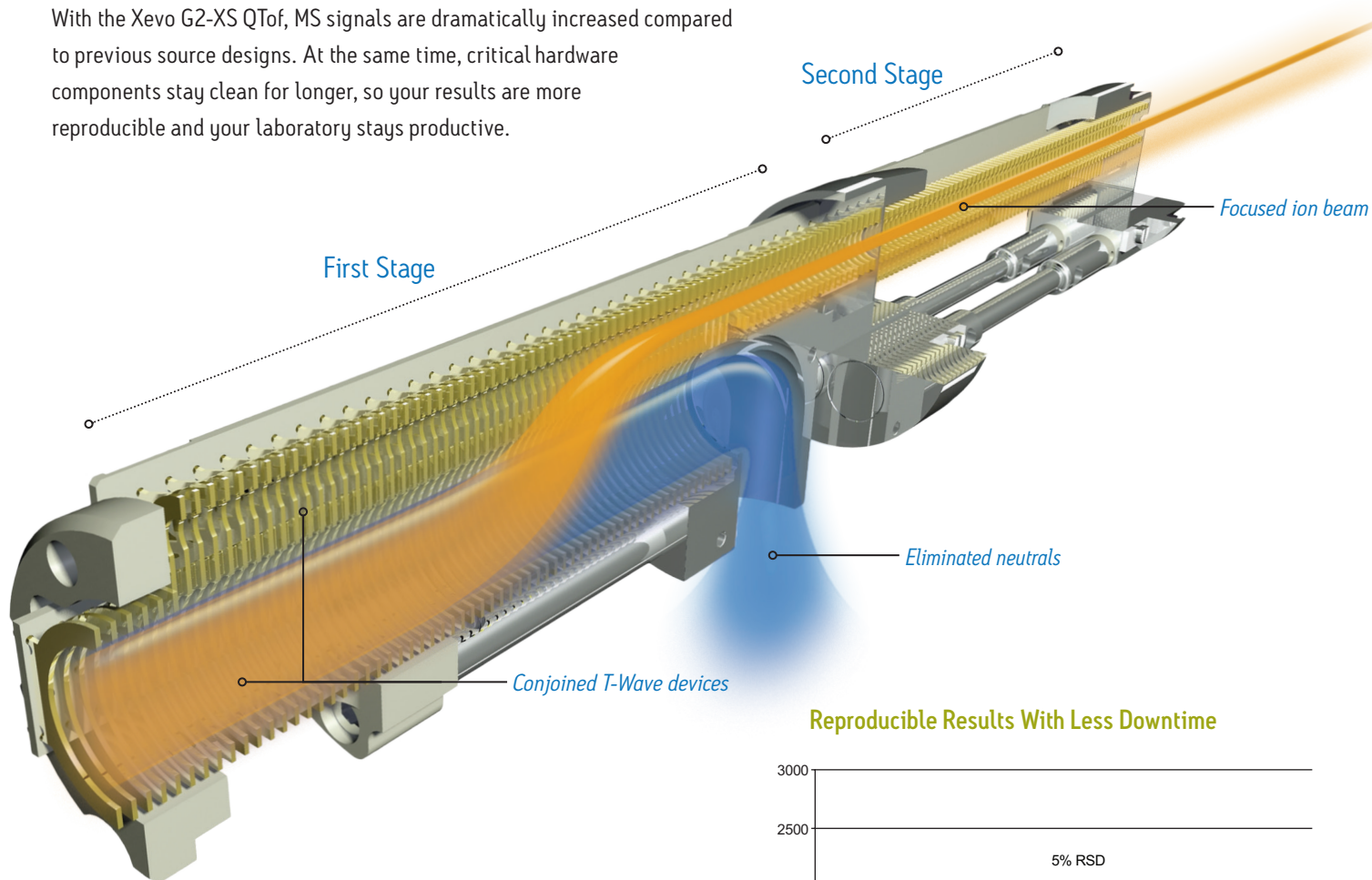
StepWave ion optics maximize instrument sensitivity while minimizing routine maintenance. Ions transfer from the source with the highest possible efficiency, while potential contaminants are actively filtered out. This is described in more detail in the White Paper: StepWave - Enhancing MS Sensitivity and Robustness (720004175en).

Reproducible Results With Less Downtime

5% RSD

Peak Area
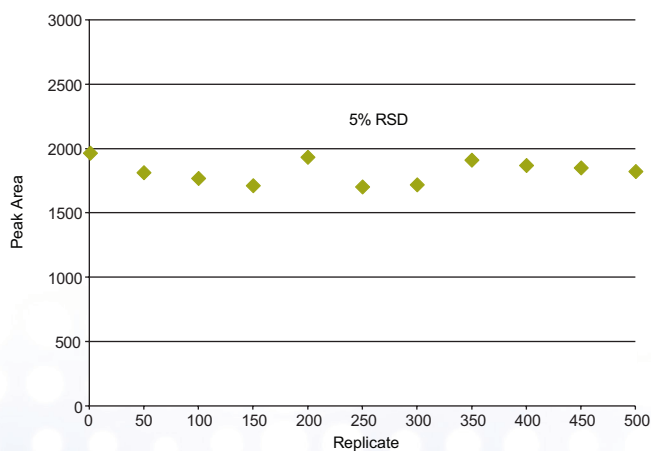
Replicate

The drug Verapamil was spiked into protein-precipitated plasma and UPLC/MS data acquired at 10 spectra per second. The relative standard deviation in peak area across 11 replicate samples run in a series of 500 injections is 5%.

QuanTof™

When the concentrations of different components in your sample show large variations, each still needs to be measured accurately, both in terms of peak area and accurate mass. For maximum efficiency and productivity, this should be achieved in a single analysis and as quickly as possible.

With the Xevo G2-XS QTof, because mass resolution is completely independent of scan speed, the narrowest chromatographic peaks from the most complex sample matrices can be identified and quantified with no compromise in MS performance. The MS integrates seamlessly with Waters' industry-leading separations solutions to create powerful analytical systems for your most challenging scientific problems.

Improved Confidence From <1ppm Mass Errors

Replicate	Observed *m/z*	Error (ppm)
1	235.1811	0.4
50	235.1812	0.9
100	235.1812	0.9
150	235.1812	0.9
200	235.1810	0.0
250	235.1811	0.4
300	235.1811	0.4
350	235.1812	0.9
400	235.1810	0.0
450	235.1810	0.0
500	235.1811	0.4

The drug Lidocaine was spiked into protein-precipitated plasma and UPLC/MS data acquired at 10 spectra per second. The theoretical m/z for the protonated molecule with elemental composition $C_{14}H_{23}N_2O$ is 235.1810. RMS mass error for 11 replicate samples run in a series of 500 injections is 0.6ppm.

QuanTof's innovative geometry and ion detection system combine to enhance sensitivity and provide outstanding mass resolution and dynamic range, giving you quantitative performance, mass accuracy and speed of analysis, simultaneously. This is described in more detail in the White Paper: QuanTof, High-Resolution, Accurate-Mass, Quantitative oaTof MS Technology (720004545en).

Dual-stage reflection

High field pusher

Detector

HIGH QUALITY, COMPREHENSIVE QUALITATIVE AND QUANTITATIVE INFORMATION
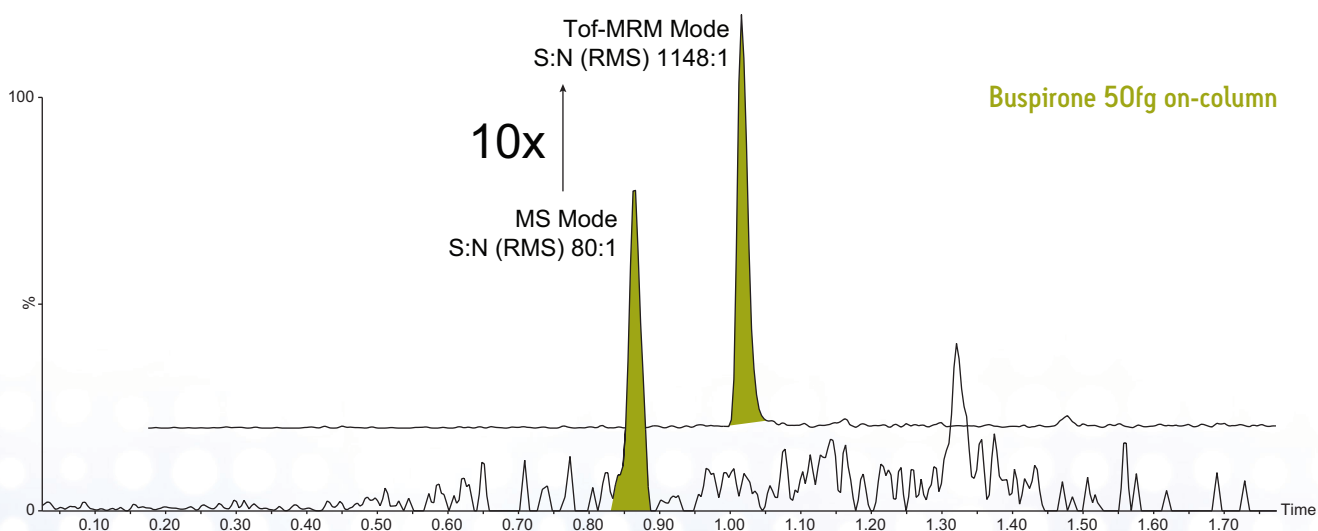
UPLC/Tof-MRM

For targeted quantitative analysis, one of the biggest challenges is to accurately and precisely quantify the components of interest down to the lowest possible levels, often in the presence of complex matrices.

The Xevo G2-XS QTof gives you class-leading quantitative performance in real terms, demonstrated by limits of detection and quantification that are superior to anything seen before on a high resolution instrument.

Tof-MRM takes full advantage of the efficient front-end transmission from the StepWave, enhanced sensitivity and selectivity from the XS Collision Cell, and high dynamic range from the QuanTof. When used in conjunction with Target Enhancement* capabilities this provides a powerful tool for targeted quantitative analysis.

Linear Response Down to Sub-fg Loadings

1/X weighting
$R^2 = 0.995$
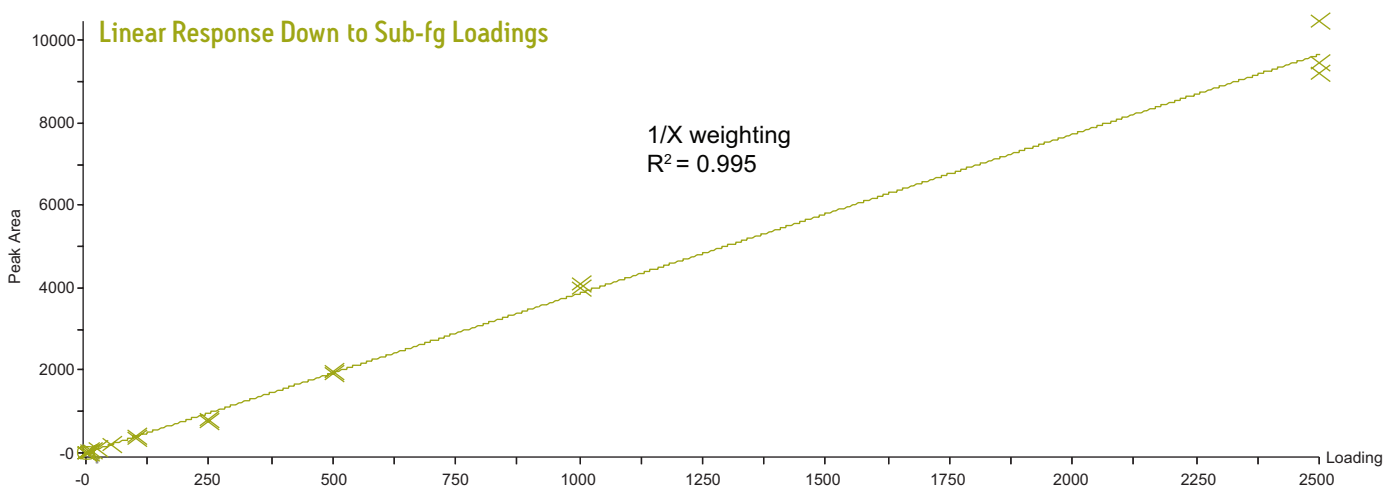
Graph showing the peak areas from UPLC/Tof-MRM analyses of the drug Buspirone , showing linear response over a range of loadings from 0.5fg to 2.5pg on-column.

Tof-MRM Mode
S:N (RMS) 1148:1

10x

MS Mode
S:N (RMS) 80:1

Buspirone 50fg on-column

UPLC/MS chromatograms showing 50fg injected on-column of the drug Buspirone, analyzed using Tof-MRM mode (top trace) and MS mode (bottom trace). Tof-MRM mode gives greater than 10-fold improvement in signal to noise.

Target Enhancement synchronizes the Tof with the arrival of ions in the specific m/z range of interest. Transmission of those ions is selectively improved and the signal increases by up to 15 times.
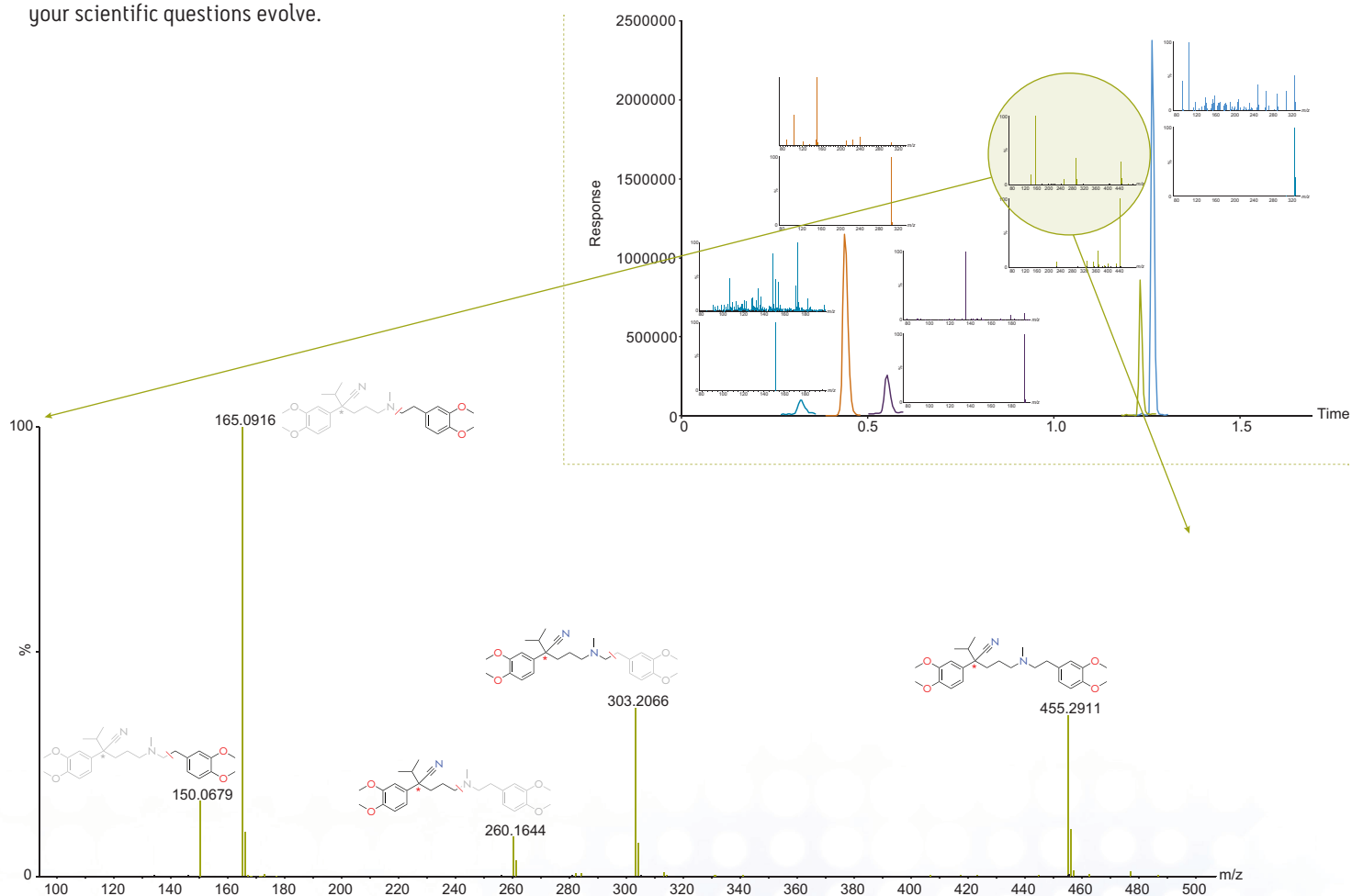
UPLC/MS^E

A detailed understanding of your samples requires a complete set of qualitative and quantitative data for the maximum number of components, collected on a fast timescale in order to access the full benefits of modern separation techniques.

With the Xevo G2-XS QTof you can quickly and easily set up a single experiment to collect accurate mass precursor and fragment ion data for every detectable component, whether chromatographically resolved or not. This represents the ultimate in qualitative information, with the same data also providing accurate quantitative profiles. And because the approach is un-targeted, you can go back to interrogate the data again at a later date as your scientific questions evolve.

MS^E is a simple but powerful data acquisition method that provides high quality, comprehensive accurate mass precursor and fragment ion information from a single analysis. This is described in more detail in the White Paper: An Overview of the Principles of MS^E The Engine that Drives MS Performance (720004036en).


A UPLC/MS^E spectrum of Verapamil obtained at 10 spectra per second. The excellent mass accuracy and MassFragment software allow structures to be assigned to the fragment ions automatically, and compounds to be characterized with high confidence.

UPLC/FastDDA

Obtaining targeted MS/MS spectra for all components of interest in your sample would require detailed prior knowledge of the sample composition, and lengthy method development. Even once fully optimized, this would not provide fragmentation data for any unexpected or unknown components.

The Xevo G2-XS QTof provides rapid, automated, intelligent accurate mass MS/MS capability for confirmation of known compounds or characterization of unknowns. Ions are intelligently selected for MS/MS acquisition in real time, as components elute from the chromatographic system.

UPLC/FastDDA uses embedded algorithms to rapidly interrogate MS survey spectra, selecting co-eluting precursor ions for MS/MS analysis based on user-defined criteria. The collision energy for each spectrum is optimized according to precursor charge state and *m/z*. For maximum efficiency, once a high quality MS/MS spectrum has been acquired, the system intelligently switches back to survey the MS spectrum for the next set of eligible precursor ions.
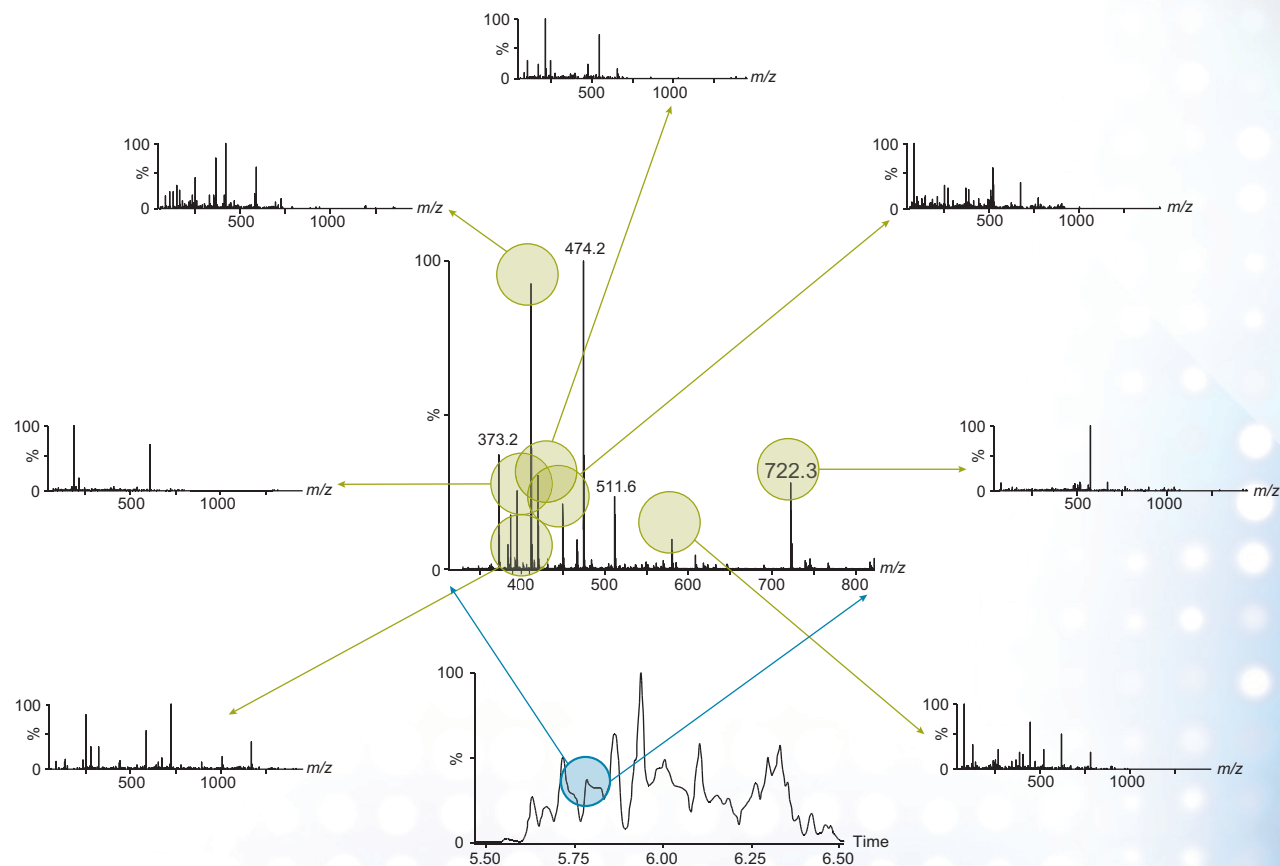
The instrument rapidly selects up to 30 precursor ions that correspond to the required charge states, isotope distribution, accurate mass include/exclude lists, and intensity thresholds set by the user. It then generates up to 30 high quality accurate mass MS/MS spectra per second.

FLEXIBILITY TO ADAPT
TO CHANGING NEEDS

The growing emphasis on efficiency and productivity in the laboratory demands analytical systems that are not only robust and reliable, but that also have the flexibility to accomplish a wide variety of tasks today, with future-proofing for the innovations of tomorrow.

Waters' Universal Ion Source Architecture enables the use of a single analytical platform for many different applications and molecule types, as well as providing the option to add new functionality as requirements and priorities change. All source options are designed to be quickly interchangeable and ready to use within minutes, maximizing versatility and minimizing downtime.

ACQUITY UPC²

ACQUITY UPLC M-Class System with HDX Technology

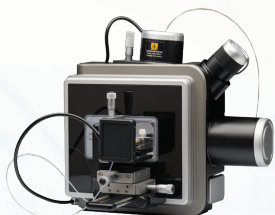*ACQUITY UPLC H-Class*

ACQUITY UPLC I-Class

ACQUITY UPLC M-Class

ESI – Electrospray Ionization
APCI – Atmospheric Pressure Chemical Ionization
ESCi™ – Dual ESI and APCi

nanoFlow™ ESI

APPI – Atmospheric Pressure
Photo Ionization
APCI – Atmospheric Pressure
Chemical Ionization

ionKey/MS™

UNIVERSAL ION SOURCE ARCHITECTURE

Change your ion source not your instrument.

The Xevo range of mass spectrometers all have multiple ion source options, which are interchangeable in minutes and provide optimal ionization for each function required in the laboratory.

The Xevo G2-XS QTof is compatible with ESI, ESCi,™ APCI, APPI, APGC, ASAP, DESI, REIMS,™ and ionKey/MS™ and is also simply changed to DART (IonSense), LDTD (Phytronix), and LAESI (Protea) ion sources.

APGC – Atmospheric Pressure Gas Chromatography

ASAP – Atmospheric Solids Analysis Probe

CONFIDENT WORKFLOWS, **MEANINGFUL INFORMATION,** BETTER RESULTS

PREPARE

IntelliStart ensures your system is ready to run for experts and beginners alike, giving you the peace of mind that the system is always performing at its best.

ANALYZE

Enjoy an entirely new level of quantitative and qualitative capability thanks to powerful underlying technologies, seamlessly integrated with industry-leading separations solutions.

INTERPRET

Process, visualize, compare and interpret the most complex data, automatically. Then turn it into meaningful information quickly and easily with informatics solutions that support MS and MS/MS workflows across many diverse applications.

DECIDE

Generate reports, share results and archive information easily with Waters laboratory informatics. Have the confidence to make decisions faster and better than ever before.
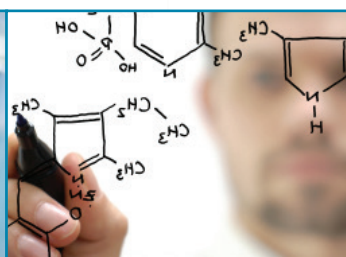
SIMPLICITY STARTS WITH **INTELLISTART**

Xevo G2-XS QTof features IntelliStart technology, an intuitive interface that automates routine tasks and ensures reproducible data of the highest quality.

INTELLISTART

Automated MS resolution and calibration checks

Simple setup of diverse experiments

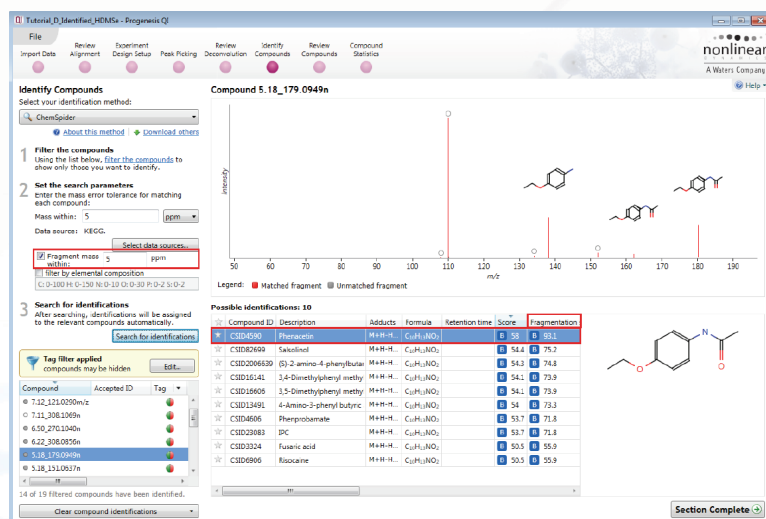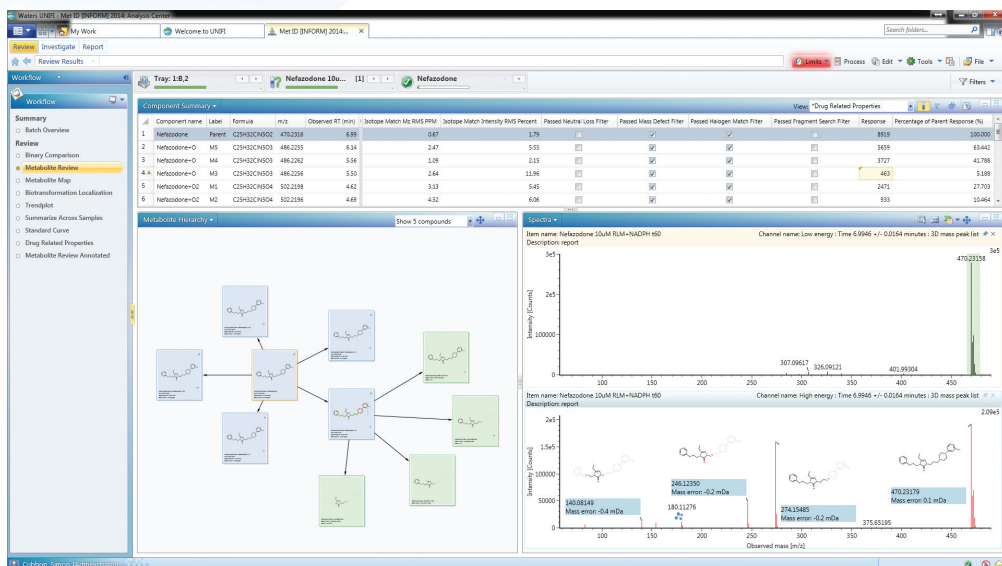**Automated LC/MS system check**

Automated system monitoring

Non-Experts Alike

INFORMATICS THAT **DELIVERS ANSWERS**

The Xevo G2-XS QTof is designed for use with either MassLynx™ or UNIFI,™ reinforced by a comprehensive suite of informatics tools and platform solutions to suit your needs, whatever your application.

UNIFI
SCIENTIFIC INFORMATION SYSTEM

Progenesis™ QI
nonlinear
A Waters Company

Xevo™

SALES OFFICES:

Australia 61 2 9933 1777

Austria 43 1 877 18 07

Belgium and Luxembourg 32 2 726 1000

Brazil 55 11 4134 3788

Canada 1 800 252 4752

China 86 21 6156 2666

Czech Republic 420 2 617 11384

Denmark 45 46 59 8000

Finland 358 9 5659 6288

France 33 1 30 48 72 00

Germany 49 6196 400 600

Hong Kong 852 2964 1800

Hungary 36 1 350 5086

India 91 080 49292200 03

Ireland 353 1 448 1500

Israel 9723 3731391

Italy 39 02 265 0983

Japan 81 3 3471 7191

Korea 82 2 6300 9200

Malaysia 603 7841 1688

Mexico 52 55 52 00 1860

The Netherlands 31 76 508 7200

Norway 47 6 384 6050

Poland 48 22 101 5900

Portugal 351 21 893 61 77

Puerto Rico 1 787 747 8445

Singapore 65 6593 7100

Spain 34 93 600 9300

Sweden 46 8 555 115 00

Switzerland 41 56 676 7000

Taiwan 886 2 2508 5500

UAE 971 4 214 62 38

UK 44 208 238 6100

US 1 800 252 4752

Waters Corporation
34 Maple Street
Milford, MA 01757 U.S.A.
T: 508 478 2000
F: 508 872 1990
www.waters.com

www.waters.com/QTof

Waters
THE SCIENCE OF WHAT'S POSSIBLE.™