

The Thermo Scientific TSQ Quantum Access MAX offers unsurpassed price-to-performance capability. It sets the benchmark for versatility and sensitivity in its class, incorporating the innovative QED-MS/MS structural quantitation technique.

## Thermo Scientific TSQ Quantum Access MAX

Unsurpassed Price-to-Performance



- Mass range  $m/z$  10-3000
- 3000 Timed SRMs
- QED-MS/MS
- Compatible with Thermo Scientific FAIMS technology
- Fast positive/negative mode switching,  $\leq 25$  ms
- Enhanced resolution
- Comprehensive application-specific software

The Thermo Scientific TSQ Quantum Access MAX triple stage quadrupole mass spectrometer is designed to meet the quantitative and qualitative challenges of a broad range of applications, including: pharmaceutical, environmental, food safety, clinical research, and forensics. Based on the widely used TSQ Quantum system, it sets the benchmark for sensitivity in its class, and provides unmatched analytical specificity.

Capabilities such as Highly Selective Reaction Monitoring (H-SRM) and high-Field Asymmetric waveform Ion Mobility Spectrometry (FAIMS) are available on the TSQ Quantum Access MAX™. Innovative technology such as Quantitation-Enhanced Data-Dependent MS/MS (QED-MS/MS) makes structural confirmation and quantitation easy, facilitating metabolite ID or multi-residue screens. Also standard is the new Reversed Energy Ramp (RER) scan, which ensures library-searchable, fragment-rich MS/MS spectra are produced routinely.



## Standard Features

### Thermo Scientific Ion Max API Source

- Enhanced sensitivity and ruggedness
- Sweep gas reduces chemical noise
- Optimal 60-degree spray angle for best sensitivity and ruggedness
- Interchangeable HESI-II and APCI ionization probes
- APPI/APCI combination probe
- Removable ion transfer tube provides vent-free maintenance
- High temperature, self-cleaning APCI heater employing state-of-the-art ceramic heater technology
- Automatic source recognition for ease of use and simplified data logging

### Transfer Ion Optics

- Patented tube lens and noise reduction geometry
- Dual square quadrupole high efficiency transfer optics

## Triple Quadrupole Mass Analyzer

- Mass range of 10–3000 daltons (Da)
- Patented Thermo Scientific HyperQuad mass analyzers provide superior and unique combination of resolution and sensitivity
- 90° high-efficiency square quadrupole collision cell for super fast SRMs
- CID gas pressure programmable through the software
- Variable peak width selection in all scan modes
- Scan rate of 5,000  $\mu$ s
- Minimum SRM scan time of 1 ms

## Scan Functions

- Full-scan MS in Q1 or Q3
- Selected Ion Monitoring (SIM) in Q1 or Q3
- Selected Reaction Monitoring (SRM)
- Product Ion Scanning
- Precursor Ion Scanning
- Neutral Loss Scanning

## Advanced Scan Functions

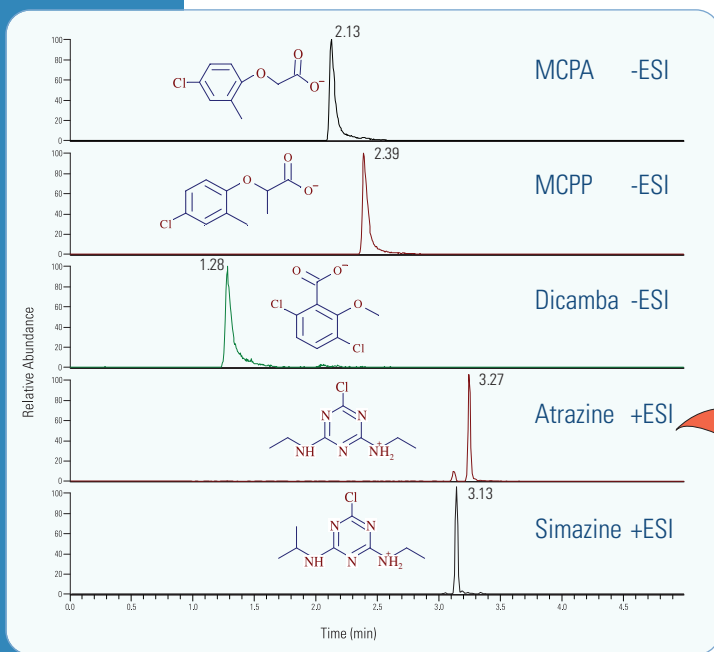
- QED-MS/MS scanning
- Reversed Energy Ramp (RER) scanning
- Highly Selective Reaction Monitoring (H-SRM)

## Acquisition

- Real-time high-speed digital signal processing eliminates high frequency noise
- Digital sampling rate up to 195,000 samples per second
- High-resolution centroiding

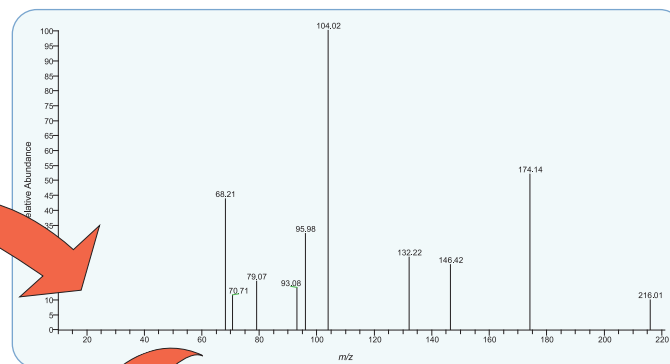
## Detection System

- Patented detection system uses a fast switching ( $\leq 25$  ms) post-acceleration conversion dynode with  $\pm 10$  kV applied voltage
- Off-axis continuous dynode electron multiplier with increased dynamic range
- System integrated electron multiplier eliminates field emission and microphonic noise



## QED-MS/MS of an Herbicide Mix

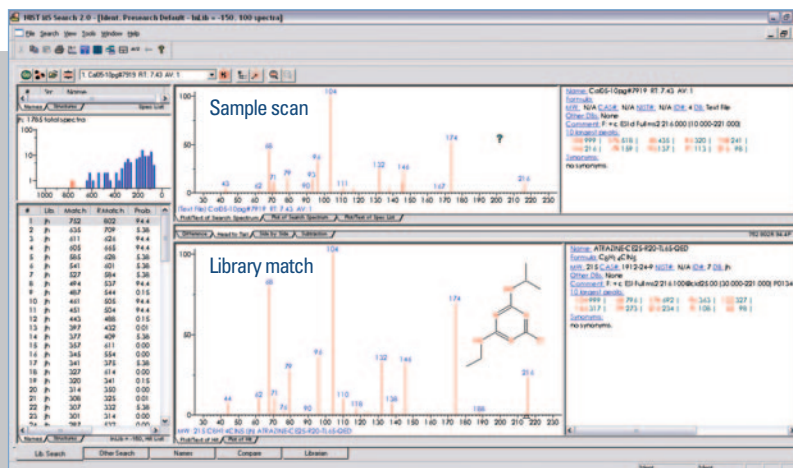
QED-MS/MS provides simultaneous "Quan/Qual" for structural confirmation and quantitation in metabolite identification or multi-residue screens.



MS/MS Confirmation (Scan Event 2)

## SRM Quantitation (Scan Event 1)

Sample scan (top) and library match (bottom) showing confirmation of atrazine



## Vacuum System

- Unique close-coupled triple inlet turbo molecular pumping
- Four stages of pumping provides optimal vacuum throughout LC/MS/MS analyzer
- Single mechanical pump

## Other Integrated Standard Features

- Automated valve for making manual loop injections or diverting LC flow stream to waste
- Automated infusion with syringe pump
- Automated loop injection from syringe pump for analyte optimization

## Data System

### Instrument Control—Thermo Scientific Xcalibur

- Xcalibur™ software controls all aspects of the integrated Thermo Scientific Accela LC and TSQ Quantum Access MAX MS system
- Simple user interfaces for high-throughput instrument tuning and optimization
- Automated optimization of all instrument parameters including collision gas pressure and collision energy within an experiment
- Uses optimized parameters to automatically build the analytical method
- Import and export sequence lists from LIMS or external packages

### Instrument Diagnostics

- Graphical diagnostics for all power supplies, electronic circuits and pumping system
- Remote access allows our engineers to troubleshoot via modem
- Electronic logbook of diagnostic results

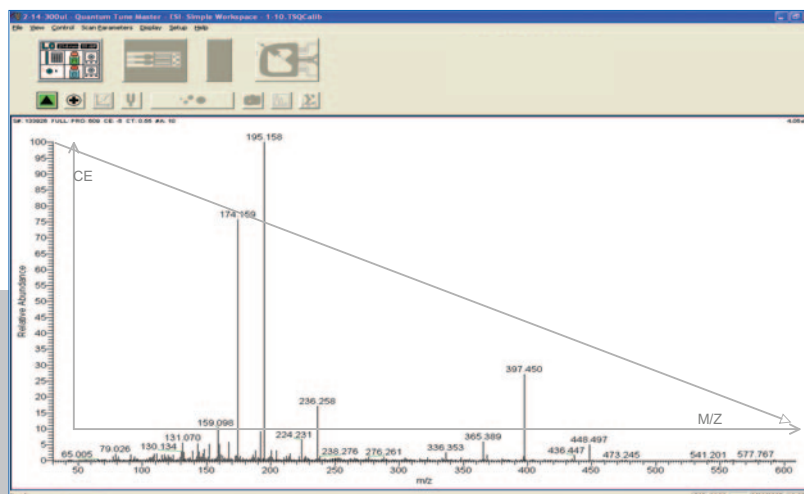
**Reversed Energy Ramping (RER) provides library-searchable MS/MS spectra used in the QED-MS/MS scan for routine structure confirmation and quantitation.**

## Optional Thermo Scientific Application-Specific Software

- LCQUAN™ quantitation software supports 21 CFR Part 11 compliance
- Watson LIMS™ – highly specialized protocol-driven Laboratory Information Management System designed to support DMPK/Bioanalytical studies in drug development
- Galileo LIMS™ – fully integrated system for *in vitro* ADME experiments in a single client-server application
- QuickQuan™ – high-throughput, automated quantitation software for early drug discovery
- QuickCalc™ software powered by Gubbs Inc. GMSU – quantitation and reporting solution for high-throughput ADME laboratories
- MetWorks™ – automated metabolite identification, component detection and predicted fragmentation in one intuitive workplace
- Mass Frontier™ – spectral interpretation and classification software for the identification of unknowns
- TraceFinder™ – simplifies method development and routine analysis in food safety and environmental laboratories

## LC Connectivity

- Direct control of multiple vendor LC and autosampler configurations through Xcalibur
- Universal connectivity to LC systems or other devices by contact closure



## System Specifications

### MS/MS Acceptance Test

(Specifications to be run at time of installation)

#### Heated Electrospray (HESI) at Unit Resolution and H-SRM (0.4 Da FWHM)

A 10 µL injection of a 100 fg/µL (0.3250 fmol/µL) reserpine solution on a Thermo Scientific Hypersil GOLD aQ 20 X 2.1 mm 1.9µm particle packed column at a flow rate of 500 µL/min 30:70:0.1 water/Acetonitrile/Formic acid will produce a minimum signal-to-noise ratio of 200:1 for the transition of the protonated molecule at  $m/z$  609.3 to the fragment ion at  $m/z$  195.1 when operated in selected reaction monitoring mode (SRM) with Q1 and Q3 resolution set to 0.7 Da FWHM. If required this specification can also be performed with Q1 resolution set to 0.4 Da FWHM.

#### Atmospheric Pressure Chemical Ionization (APCI) and Atmospheric Pressure Photoionization (APPI) at Unit Resolution and H-SRM (0.4 Da FWHM)

A 10 µL injection of a 100 fg/µL (0.3250 fmol/µL) reserpine solution on a Hypersil GOLD aQ™ 20 X 2.1 mm 1.9µm particle packed column at a flow rate of 500 µL/min 30:70:0.1 water/Acetonitrile/Formic acid will produce a minimum signal-to-noise ratio of 200:1 for the transition of the protonated molecule at  $m/z$  609.3 to the fragment ion at  $m/z$  195.1 when operated in selected reaction monitoring mode (SRM) with Q1 and Q3 resolution set to 0.7 Da FWHM. If required this specification can also be performed with Q1 resolution set to 0.4 Da FWHM.

**Typical TSQ Quantum Access MAX sensitivity for 1 pg chloramphenicol injected on a Hypersil GOLD aQ 20 X 2.1 mm 1.9 µm particle packed column at a flow rate of 500 µL/min 30:70 water/methanol. Operating in negative ion mode monitoring the transition 321.0→152.1. Three consecutive injections on the column are visible and showing excellent s/n ratios of 490 and better.**

## Installation Requirements

### Power

#### TSQ Quantum Access MAX

- One 230 Vac ±10% at 15 amps, 50/60 Hz, single phase, with earth ground, dedicated to the instrument

### Data System

- 120 Vac at 10 amps or 230 Vac at 5 amps, single phase, with earth ground

### Liquid Chromatograph

- 120 Vac at 10 amps or 230 Vac at 5 amps, single phase, with earth ground

### Gas

- One high-purity (99% pure) nitrogen gas supply for the API source. Required pressure is 690±140 kPa (100±20 psi). Maximum consumption of nitrogen gas is 20 L/min (56 SCFH).
- One ultra high-purity argon gas supply (99.995% pure). Required pressure is 135±70 kPa (20±10 psi).

## Environment

- System averages 8000 Btu/h (2300 W) output when considering air conditioning needs. Operating environment must be 59–81°F (15–27°C) and relative humidity must be 40–80% with no condensation.
- Optimum operating temperature is 65–70°F (18–21°C)

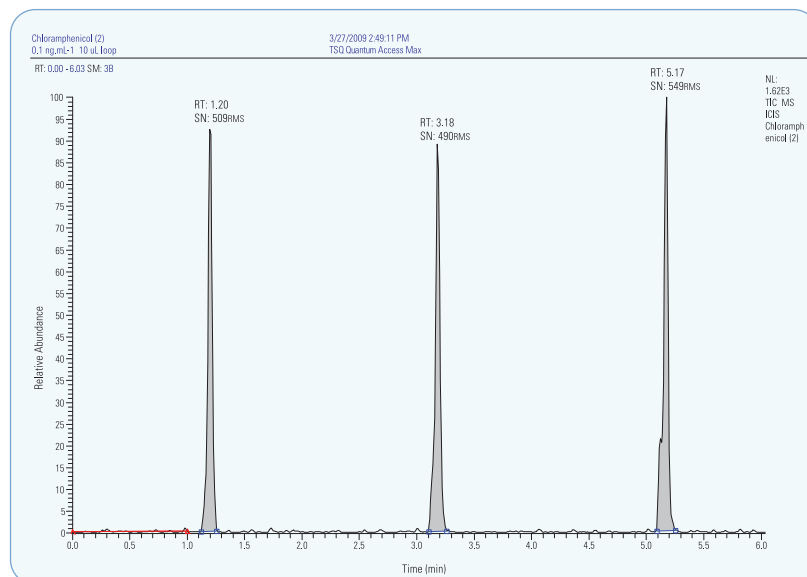
## Dimensions

- TSQ Quantum Access MAX: 61 × 56 × 79 cm (h × w × d)
- Liquid chromatograph\*: 73 × 36 × 50 cm (h × w × d)
- Minitower computer: 48 × 18 × 43 cm (h × w × d)
- Monitor: 41 × 41 × 43 cm (h × w × d)
- Forepump: 30 × 20 × 64 cm (h × w × d)
- Laser printer: 20 × 41 × 46 cm (h × w × d)

## Weight

- TSQ Quantum Access MAX: 118 kg
- Liquid chromatograph\*: 62 kg
- Minitower computer: 14 kg
- Monitor: 5 kg
- Forepump: 34 kg
- Laser printer: 7 kg

\*Values are for the Accela system. Other LC systems will vary.



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