

EQUIPMENT 1: GAS CHROMATOGRAPHY – HEADSPACE – MASS SPECTROMETRY (Ei/Ci) – FLAME IONISATION DETECTOR (FID) SYSTEM

Description & Specifications		Compliance Checklist (Please tick Yes/No for compliance to specifications)		
Equipment 1: Gas Chromatography - Headspace – Mass Spectrometry (Ei/ Ci) – Flame Ionisation Detector (FID) System Quantity: 1 unit Location: Cosmetics Laboratory		Yes	No	If No, please specify.
Scope of Tender Supply, delivery, installation and commissioning of one unit of Gas Chromatography – Headspace - Mass Spectrometry (EI/ CI) – Flame Ionisation Detector (FID) system. Published brochures and/or certified documents must substantiate claims to compliance with tender specifications. If relevant data are not available, please state non-compliance.				
TECHNICAL SPECIFICATIONS				
	The GCMS/ FID - Headspace should include the following modules. a. Column Oven b. Split/Splitless Inlet c. Auto-Liquid Sampler d. Headspace Sampler e. Mass-Spectrometer (EI/CI) f. Flame Ionisation Detector (FID) g. Data Management System h. Miscellaneous- Accessories i. Others			
a.	Column Oven 1. Operating temperature range should be 35°C to 350°C. 2. Must allow at least 20 oven ramps and 20 plateaus. 3. Oven temperature set point resolution should be at least 0.1°C. 4. Ramping rate of oven must be able to go up to at least 120°C per minute. 5. The oven must be able to cool down from 450°C to 50°C in less than 250s. 6. Accessories to enable column change without venting the system			
b.	Split/Splitless Inlet (2 units) 1. Must equip with dual injector ports for independent dual column operation. 2. Must be suitable for all capillary columns from 50µm to 530 µm id 3. Must be able to support 4 operating modes: Split, Splitless, Pulsed Split or Pulsed Splitless. 4. Maximum operating temperature up to 400°C. 5. Should have gas saver mode to reduce gas consumption during standby. 6. There should be electronic pressure/flow control. 7. Accommodate at least split ratio of up to 7500:1			

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c.	Auto-Liquid Sampler (2 units) - Sample tray must be able to handle at least 150 pcs of sample vials. - Standard turret must have a sample capacity of at least 16 samples. - Shall have the capability to rinse the syringe both pre- and post-injection with 2 separate solvents of at least 15 times for each solvent. - Shall allow at least 15 sample pre-washes. - Shall allow at least 15 sample pumps. - Vial size should be 2 ml for samples and 4 ml for wash or waste bottles. - Shall have a programmable viscosity delay of at least 5 seconds. - Shall allow at least 20 injections per vial with specified syringe volumes. - Must be able to accommodate 1, 5, 10, 50 and 100µL syringe sizes with syringe carriage. - Shall allow injection volume settings of 1% to 50% of syringe volume in increments of 1%. - Shall have available injection delay times at least 60 seconds. - Shall be capable of injecting at a speed of 100 milliseconds or faster. - The GC shall have the capacity to have two autoinjectors mounted simultaneously on the GC so that injections can be made simultaneously by BOTH autoinjectors. - Maximum carryover should not exceed 1 part in 100,000. - Capability to change the headspace sampler to auto injector (liquid) with minimal work or use of external tools.			
d.	Headspace sampler (1 unit) - Sample tray capacity shall be able to accommodate at least 105 vials in removable trays; the trays shall be exchangeable during sequence for continuous operation. - Can support 10mL, 20 mL and 22mL; screw or crimp top; flat or rounded bottom style vials without adapter. - Headspace sampler and autoliquid sampler must be integrated on 1 inlet such that no tools/ movements are required when interchanging sampler. - Shall have at least three vials in priority sample positions for urgent samples. - Racks are exchangeable. - Shall be able to store at least 30 user-defined headspace methods. - All temperature zones (oven, sample line and transfer line) shall allow setpoint with minimum range of +5°C to 300°C or more, with setpoint increments in 1°C with 0.1°C resolution. - Shall allow independent vial pressurization and GC column headpressures, with overlapped thermostating of at least 12 vials for maximized sample throughput. - Flow setpoints may be adjusted by increments of 0.01 mL/min or lower, with flow rate of at least 100 mL/min.			

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	10. Pressure sensors: - Accuracy: not more than $\pm 2\%$ full scale - Repeatability: not more than ± 0.05 psi - Drift: not more than ± 0.1 psi/6 months 11. Flow sensors: - Repeatability: not more than $\pm 0.35\%$ of setpoint 12. Software must be able to integrate between the Headspace and GCMS such as creating methods, creating sequence for run, initialling the runs, all can be done on the same software for the ease of operation. 13. Headspace sampler shall be able to operate primarily in standalone mode, using the keypad, without software (if needed). 14. Automatic vial leak check ensures vials have been sealed correctly before sampling and requires no calibration or setup. 15. Shall have electronic control to allow the headspace to control the final vial pressure seen in the sample loop during the sample loop filling process. Minimizing effects from ambient atmospheric pressure fluctuations in environment. 16. Headspace must have robust valve and loop headspace sampling system with standard full electronic control. This is to provide complete control of the sampling process a) flows independent vial pressurization and b) GC column head pressures. 17. Logging of movements, events, and errors for each vial. 18. Sequence Actions (continue, skip, pause, abort) when any of the following occur: missing vials, wrong vial size, vial leak detected, and system not ready.			
e.	Mass Spectrometer 1. The system shall offer interchangeable source with electron ionization (EI) and chemical ionization (CI) that includes both positive CI and negative CI. 2. Must have a minimum mass range of m/z 10 – 1050 3. CI source. Please specify the material: _____ 4. There should be a dual gas inlet for CI gases. 5. Non-coated inert EI source, no stainless steel. 6. The system must have an electronic scan rate of at least 20,000 u/sec. 7. Ion source temperature at least from 150-350°C. 8. The mass filter should be a monolithic hyperbolic quadrupole. 9. Quadrupole is independently heated. Temperature is user-selectable from 100-200°C enabling bakeout.			

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	10. Mass resolution: Unit mass adjustable by tune. 11. Mass axis stability should be at least 0.10 amu/48 h. 12. The system must have the capability to create 100 selective ion monitoring (SIM) ion groups with at least 60 ions per group. 13. SIM speed must be down to no longer than 0.1 msec. 14. Dynamic range must be 10 ⁶ or higher. 15. There should be maintenance access: Source, filaments, lenses, mass filter, and detector on removable plate. 16. 2 filaments must be available in ion source to allow automatic switching when one fails to minimize downtime. 17. Electron ionization scan sensitivity: 1pg octafluoronaphthalene (OFN) gives > 1500:1 signal-to-noise ratio scanning from 50- 300 amu at nominal m/z 272 ion. 18. Electron ionization SIM sensitivity: 8 sequential 1 µL injections of 100 fg/µL OFN standard solution at nominal 272 ion gives instrument detection limit of at not more than 10 fg (at 99% confidence level based from area). 19. PCI scan S/N (methane) should be 125:1 or higher (1 µL injection of 100 fg/µL benzophenone standard scanning from 80 to 230 u at nominal 183 u ion) and NCI scan S/N (methane) should be 600:1 or higher (2 µL injection of 100 fg/µL OFN standard scanning from 50 to 300 u at nominal 272 u ion).			
f.	Flame Ionization Detector 1. Minimum detectable level for tridecane is 1.4 pg C/s or less. 2. Linear Dynamic Range shall be at least 10 ⁷ range. 3. Maximum operating temperature of at least 450 °C. 4. Maximum data acquisition speed shall be at least 500 Hz. 5. Automatic flame ignition from the keypad or operating software. 6. Fast flameout detection and efficient automatic re-ignition with shutdown capability (hydrogen gas off). 7. Electronic control for three gases: air – 0 to 800 mL/min; hydrogen – 0 to 100 mL/min; makeup gas (nitrogen or helium) – 0 to 100 mL/min;			
g.	Data Management System System control, data acquisition and operating software 1. Software shall be able to control the Gas Chromatograph through local area network (LAN) technology. 2. Shall be built-in or integrated to ECM control. 3. Full software control on the operation of the FID, MS, auto liquid sampler and headspace sampler and others (if applicable), for method and run control, online signal display, data handling, evaluation, reporting and system diagnostics. 4. The latest editions of the following spectral libraries should be installed: NIST and Wiley, with capability to install other libraries if necessary.			

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	5. Provides maintenance and troubleshooting support and graphic-aided, step-by-step instruction checklist which simplifies maintenance and helps the user to diagnose the instruments if required. 6. Integrated report generator with full spreadsheet functionality. 7. Upgradable to user management system with unlimited user levels. 8. Supports single analysis and batch analysis, batch table wizard, add or insert analyses. 9. Able to acquire data, integrate, review and report on an actively running sample with snapshot or real-time monitoring function. 10. At least 3 LAN cards; to support all the network connections. Computer and printer: The computer controlling and operating the system shall minimally consist of the following configuration or its equivalent or better, with standard warranty. 1. CPU with 3.2 GHz speed Intel Xeon processor, 4GB RAM and 500GB HDD. 2. Graphics: Intel HD Graphics P4600 3. Lan I/O: Integrated Intel 82579LM Gigabit Network Connection 4. Energy Star 5.0 enabled and qualified. 5. Licensed windows operating system – Windows 7 professional or latest version pre-installed with installation CD/ recovery disk included. 6. Microsoft Office – latest version pre-installed with installation CD included. 7. Anti-virus software pre-installed. 8. All necessary computer interfaces, cables, connectors and software drivers to be provided. 9. At least 20-inch flat screen wide monitor. 10. USB optical scroll mouse and mouse pad 11. USB keyboard 12. Able to integrate (seamlessly) with software system and to provide necessary accessories required for this integration (e.g. network card and etc.). 13. Network Colour Laser Jet printer with automatic duplex printing, at least 30ppm print speeds (letter/ A4), resolution of 1200 x 1200 dpi, 1.2GHz processor, 1G memory), allow network printing, , hi-speed USB 2.0 , or better.			
	h. MISCELLANEOUS – ACCESSORIES The offer shall include the following accessories: 1. GC startup kit 2. Leak test kit 3. One unit of moisture trap, oxygen trap and hydrocarbon trap 4. GC Headspace vials (≥ 22 mL) and caps with septa x 100 pieces.			

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i.	Others 1. The offer shall include delivery, installation, commissioning and training. 2. Within two (2) months from the date of commissioning, on-site basic training for at least 4 users should be given by trained personnel, and topics should include equipment overview, method optimization, data acquisition, data processing, report formatting and general maintenance. In addition, a proposed training program/ outline shall be appended with the tender submission. 3. Within one (1) year from the completion of on-site basic training, advanced training for approximately 4 staffs shall be provided, covering maintenance and optimization of method. Details on the advanced training shall be appended with the tender submission 4. The Contractor's application specialist(s) shall assist HSA Cosmetics Laboratory to complete the following required method/workflow development on-site after the instrument is successfully commissioned. (a) Benzene and 1,4 Dioxane (GC-Headspace-Mass Spectrometry) (b) Steroids Screening (GC-MS) (c) Diethylene Glycol (GC-MS with CI mode) (d) Nicotine (GC-FID) 5. The Tenderer must perform the risk assessment for the equipment to be located in the laboratory. A Risk Assessment Report in 5x5 matrix must be provided prior to the delivery. 6. The equipment must be fully commissioned before 31 st March 2018. 7. The warranty period should be minimum two (2) year and covers all hardware (e.g. electronic boards, pumps, UPS, etc) and software of the entire system. One preventive maintenance (PM) shall be performed annually within the warranty period.			

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COMPLIANCE OF REQUIREMENT SPECIFICATIONS

I hereby confirm that I can meet all the specifications and requirements as stated in Section 3: Requirement Specifications.

Tenderer's (as *Principal/Agent)
Company or Business Registration No:

Tenderer's official
Stamp:

Authorized Signature

Name:

Designation:

Please indicate any non-compliance to requirement specifications here should there be any.

Reference To	Remarks

EQUIPMENT 2: LIQUID CHROMATOGRAPH TANDEM TRIPLE-QUADRUPOLE MASS SPECTROMETER (LC-MS/MS) SYSTEM

Description & Specifications		Compliance Checklist (Please tick Yes/No for compliance to specifications)		
Equipment 2: Liquid Chromatograph Tandem Triple-Quadrupole Mass Spectrometer (LC-MS/MS) System Quantity: 1 unit Location: Food Safety Laboratory		Yes	No	If No, please specify.
Scope of Tender This tender includes the specifications for the procurement of one (1) unit of liquid chromatograph tandem triple-quadrupole mass spectrometer system and 3-years post-warranty comprehensive maintenance contract. The Authority shall reserve all rights to award as a whole or partially for this tender.				
	TECHNICAL SPECIFICATIONS			
	General A robust and sensitive liquid chromatograph tandem triple-quadrupole mass spectrometer (LC-MS/MS) shall offer configurations as follows: • Liquid chromatograph (LC) mainframe • Auto Sampler • Column Oven • Built-in or external infusion system/syringe pump • Tandem triple-quadrupole mass spectrometer (MS/MS) • Computer hardware and software • Data management software system • Roughing pump sound proof enclosure • Installation, commissioning and warranty • Application and hardware maintenance training • Technical support	✓		
	Requirement Specification The LC-MS/MS unit shall minimally offer the requirements set out in this tender or superior functions as follow:			
1	Liquid Chromatograph Mainframe 1.1 A high pressure binary pump system to enable at least 2 individual solvent lines to be utilised concurrently; 1.2 Integrated diagnostic functions that pre-empts instrument malfunction; 1.3 An integrated degassing unit; 1.4 Enable settable flow range set points from 0.001- 10 5 mL/min, in 0.001 mL/min increments; 1.5 Flow precision of ≤ 0.07 % Relative Standard Deviation (RSD) or ≤ 0.02 minute Standard Deviation (SD), whichever is greater; based on retention time at constant room temperature; 1.6 Flow accuracy of not more than $\pm 1\%$ RSD or 10 μL/min, whichever is greater; 1.7 Operating pressure (with LC column) with at least 120 MPa (1200 Bar); 1.8 User selectable compressibility compensation, based on mobile phase compressibility; 1.9 Minimum pH range of 1.0 to 12.5;	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		Better. 0.010 to 2.000 mL/min, Waters focused on achieving the lowest system dispersion volume for best resolution. However, other vendor focused on pressure and flow rate, but system dispersion is still bigger than UPLC I- Class. Furthermore, many journal article recommend flow rate of <500uL/min for optimal ESI. Better. Automatic and continous, no user intervention.

PART 3: REQUIREMENT SPECIFICATIONS
HSA000ETT17000059
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	1.10 Permit gradient formation such as low pressure binary mixing/gradient capability using high-speed proportioning valve; 1.11 User-selectable flow composition ranges from 0 – 100 % in 0.1% increment; 1.12 Composition accuracy of $\pm 0.5\%$ RSD or better; 1.13 Composition precision of $\leq 0.2\%$ RSD or ≤ 0.04 minute SD, whichever is greater; 1.14 Software and local control functions; 1.15 Enable communications via controller-area network. Remote: ready, start, stop and shut-down signals with optional LAN; 1.16 Safety and maintenance features to support extensive diagnostics, error detection and display, leak detection, safe leak handling, leak output signal for shutdown of the pumping system. Low voltage in major maintenance areas; 1.17 Early maintenance feedback (EMF) for continuous tracking of instrument usage in terms of seal wear and volume of pumped mobile phase with pre-defined and user settable limits and feedback messages. Electronic records of maintenance and errors required.	✓ ✓ ✓ ✓ ✓ ✓ ✓		Better. High pressure mixing which and equipped with Waters Intelligent Intake Valve (i2Valve) achieves faster system priming and startup times. More robust operation and highly repeatable system performance are achieved with difficult-to-pump solvents because disturbances to solvent flow in inlet lines are minimized.
2	Auto Sampler 2.1 Handles a minimum of 100 (1.5 mL) HPLC vials with thermostat cooling function; 2.2 Programmable injection volume range from 1 - 40 μ L preferably with the ability to extend to a maximum of 100 μ L with optional extension loops; 2.3 Injection volume accuracy of $\pm 1\%$; 2.4 Injection precision of $\leq 0.2\%$ RSD; 2.5 Sample washed out from needle on-line; 2.6 Temperature should be settable from 4 °C to 40 °C in 1 °C increments; 2.7 Injection cycle of < 25 s without needle wash and < 40 s with needle wash; 2.8 Random, programmable access to vials and adjustment of needle depth up to at least 0.1 mm increments; 2.9 Operating pressure (with LC column) with at least 120 MPa (1200 Bar).	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		Better. Offer 10ul as standard. I-Class focuses on low dispersion. Larger sample loop and injection range will create higher dispersion, affecting separation power. Nonetheless, 1-40ul is possible with sample 50ul sample loop. Better. 0.1% RSD Better. <15s Better. 124 MPa
3	Column Oven 3.1 Minimum temperature range of 10 °C below ambient to 80 °C; 3.2 Temperature stability: not more than ± 0.1 °C; 3.3 Temperature set point accuracy: not more than ± 0.5 °C; 3.4 Heat up rate of maximum 5 minutes from ambient to 40 °C and cool down rate of maximum 10 minutes from 40 – 20 °C; 3.5 Column capacity of up to a minimum of 3 columns of 100 mm with optional low dispersion heat exchange; 3.6 Able to handle column length from 10 – 300 mm.	✓ ✓ ✓ ✓ ✓ ✓		

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		Yes	No	If No, please specify.
Equipment 2: Liquid Chromatograph Tandem Triple-Quadrupole Mass Spectrometer (LC-MS/MS) System Quantity: 1 unit Location: Food Safety Laboratory				
4	Built-in or external infusion system/syringe pump 4.1 Built-in or external mechanical infusion system/syringe pump to support real-time data acquisition for MS method optimisation. A minimum infusion flow rate of 5 µL/min must be achieved.	✓		
5	Tandem Triple-quadrupole Mass Spectrometer 5.1 Minimum scanning speed of 10,000 Da/sec; 5.2 Linear dynamic range of greater than 5 orders of magnitude inter-scan linear dynamic range without signal reduction; 5.3 Positive/Negative polarity switching must be less than 30 msec, in continuous mode during LC/MS and LC/MS/MS runs; 5.4 Must offer a minimum mass range of 5 – 2000 m/z; 5.5 Must have a mass stability of at least ± 0.1 amu over 24 hrs with normal operating temperature and after the mass spectrometer has reached vacuum and electronics equilibrium 5.6 Must be equipped with a source housing hosting interchangeable APCI and ESI probes. 5.7 ESI source must be provided as standard with the instrument. The ESI must be able to allow effective optimisation of ionisation with minimal adduct formation. 5.8 ESI source must be compatible with flow rates of 5 to 2000 µL/min without splitting. 5.9 Must allow both qualitative and quantitative analyses to be carried out in a single experiment. 5.10 Must be able to provide at least full scan MS, product ion scan, precursor ion scan, neutral loss/gain scan, single/selected ion monitoring (SIM) at both mass filters (Q1 and Q3) of the MS, multiple/selected reaction monitoring (MRM/SRM).	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		Better. 20,000 Da/s Better. <15 ms
6	Data Acquisition / Processing Computer Hardware & Software 6.1 3.0 GHz dual core processor enabled; 6.2 8 GB DDR3 SDRAM; 6.3 Resolution display 1280 x 1024 (XGA); 6.4 2x2 TB hard disk storage space; 6.5 21' flat screen wide monitor; 6.6 Keyboard; 6.7 Mouse and mouse-pad; 6.8 Pre-installed with Windows 7, Microsoft Office 2013 and antivirus software which is compatible with the data management software system of the instrument; 6.9 One laserjet printer capable of double-sided printing; 6.10 All computer interfaces, cables and software drivers; 6.11 Must offer additional Ethernet and USB slots to support inter-computer and network data transfer function.	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		

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7	Data Management Software System 7.1 A flexible Windows-based data system that provides instrument control and data analysis; 7.2 Seamlessly with application-specific software modules; 7.3 Generate results that can be quickly reviewed with the qualitative, quantitative and library browsers; 7.4 A workflow-oriented approach to high-throughput quantitation, integrating the processes of acquisition, processing and data review with a set of predefined and customisable data-oriented reports; 7.5 The ability to run in a fully automated manner, while also providing for sophisticated manual data evaluation; 7.6 Include the following features: • Preconfigured processing methods • User-defined flags for different parameters • Automated retention time and ion ratio adjustment • The ability to associate a processing method with any previously saved calibration • Automatically generate reports 7.7 The feature to protect testing methods from being tampered.	✓ ✓ ✓ ✓ ✓ ✓		
8	Roughing Pump Sound Proof Enclosure 8.1 Enclosure box equipped with sound proof walls for minimisation of pump noise required.	✓		
9	Installation and Commissioning 9.1 The contractor must be able to perform risk assessment for the LC-MS/MS instrument that is to be located in the designated air-conditioned laboratory. A risk assessment report must be provided prior to the delivery, installation and commissioning of the equipment. 9.2 The quotation must also include Installation Qualification and Operation Qualification (IQ/OQ) that shall be performed during the commissioning of the LC-MS/MS system. 9.3 The power supply must be ~230 V 50/60 Hz for single phase power or 400 V 50/60 Hz for three phase power; 9.4 Prices quoted are to include delivery, installation, commission, calibration and training of operators. All proper documentation is to be supplied along with the delivery of the instrument. These shall include the operator's manuals/software manual, instrument manuals; 9.5 During the installation of the instrument, the contractor must make sure the instrument is properly connected to the gas pipeline in the laboratory using necessary tubings, connectors and other necessary parts without leakage; 9.6 During instrument commissioning, the technical specialist/engineer must validate the LC-MS/MS instrument based on the contractor's installation specifications on-site. A copy of the validation report must be submitted to HSA – Food Safety Laboratory after validation has been carried out on the LC-MS/MS instrument;	✓ ✓ ✓ ✓ ✓ ✓		

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	9.7 The Contractor must supply the calibration standards with their certificate of analysis attached, and all other accessories necessary to carry out validation checks and maintenance of the instrument. These accessories shall include syringes of appropriate sizes, as well as cleaning tissue and cleaning buds at no additional cost;	✓		
	9.8 The LC-MS/MS instrument power supply rating must be compatible with Singapore power supply to enable successful on-site installation and full commissioning. Power supply requirements can be obtained post tender award via on-site inspection;	✓		
	9.9 Lead time for instrument delivery post tender award must not exceed 16 weeks; under the scenario where delivery within the 16 weeks post tender award due to unforeseen circumstances, written agreement by end-user (HSA – Food Safety Laboratory) has to be obtained;	✓		
	9.10 The LC-MS/MS instrument must be fully commissioned within 4 weeks upon delivery; under the scenario where full commissioning cannot be fulfilled within the 4 weeks, written agreement by end-user (HSA – Food Safety Laboratory) has to be obtained;	✓		
10	Training			
	10.1 On-site training for 40 end-users in the Food Safety Division shall minimally covers instrument overview, MS method development and optimisation, data acquisition, and maintenance. Please provide a copy of the proposed training programme together with the tender submission;	✓		
	10.2 Advanced training for 12 to 20 end-users must be provided including theory for adducts-formation mechanisms under ESI and APCI ionisation modes, information dependent analysis for triggered MS/MS functions, compound library building using MS/MS scan function and trouble-shooting.	✓		
	10.3 The trainings shall be conducted by manufacturer trained personnel. A copy of the training certificate shall be provided upon request.	✓		
11	Technical Support			
	11.1 The Tenderer must be able to provide application and maintenance support through the provision of local technical specialists to assist in method developments, on-site training (hands-and theory), troubleshooting, instrument maintenance as well as readily available parts and consumables on demand. The applications portfolio and service track record of service engineers and application specialists must be submitted for evaluation upon request;	✓		
	11.2 The Tenderer is required to assist the laboratory to set up the running conditions for existing and new test methods as requested by HSA Food Safety Laboratory.	✓		
	11.3 The Tenderer is required to assist laboratory to migrate existing methods to the new system and ensure that the methods are running properly.	✓		

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12	Accreditation / Certification/ Track Records 12.1 The manufacturer of the product and the company shall preferably ISO 9001 certified or equivalent. Please provide the details in <u>Annex E to Part 3 - Performance Summary, point 6 - Accreditation to Relevant Standards in the Business</u> set out in this tender. A copy of the valid accreditation certificates must be submitted upon request. 12.2 At least one unit of the LC-MS/MS model proposed in this tender (or its older equivalent version) must be sold (and commissioned) in Singapore. Please provide the details of the LC-MS/MS system(s) commissioned in Singapore (between 2013 and 2017 (latest)) under <u>Annex E to Part 3 - Performance Summary, point 5 - Reference List of Installations</u> set out in this tender.	✓		
13	Evaluation Test 13.1 The Tenderer must complete the evaluation test as part of the requirement for the tender. 13.2 The samples used for the evaluation test are to be supplied by HSA and are prepared from spiked food samples. Due to the sensitivity of the analytes, the samples must be evaluated locally and not to be sent overseas. All samples should be tested within a week from collection; the samples should be analysed by the instrument in 10 replicates on the same day and another 10 replicates on a separate day. The instructions for sample testing will provided together upon collection of samples. 13.3 The result of the sample analysis must include the following: i. Method parameters for the chromatographic system including eluent, column, injection volume, column temperature, MS parameters (source and all analyte standards), operator's name, date of analysis etc.; ii. Chromatograms with integration indicators, proper peak labelling, S/N calculation along with a complete results table; iii. Ion ratios of the MRM transitions and to indicate whether the result is within acceptance range. 13.4 All Tenderers must submit both summary report and detailed report that covers the test methods, the extracted ion chromatograms, calibration curves, peaks area and resolution, derivation of S/N, RSD for replicates, and application libraries used (if any) within two (2) weeks after tender closing date in softcopy (email) or hardcopy. 13.5 Tenderers who do not participate in the sample evaluation test or fail to follow the stipulated instructions for conducting the test or fail to submit the test reports by the stipulated deadline shall be disqualified from the evaluation. 13.6 All participating Tenderers shall collect the analyte standards cocktails, spiked food samples and the instructions for sample testing from HSA on 04 August 2017 from 8 am to 4 pm . Tenderers shall pre-inform HSA for alternative collection dates (within 2 days after 04 August 2017) should they be unable to collect on the stipulated date. Please contact Ms Elin Tan Siew Hoon @ 6213 0434 for arrangement.	✓	✓	✓

[illegible]

EQUIPMENT 2: LIQUID CHROMATOGRAPH TANDEM TRIPLE-QUADRUPOLE MASS SPECTROMETER (LC-MS/MS) SYSTEM

Description & Specifications		Compliance Checklist (Please tick Yes/No for compliance to specifications)		
Equipment 2: Liquid Chromatograph Tandem Triple-Quadrupole Mass Spectrometer (LC-MS/MS) System Quantity: 1 unit Location: Food Safety Laboratory		Yes	No	If No, please specify.
<u>Preventive Maintenance</u> 14.6 The Preventive Maintenance shall consist of: i. Routine maintenance of the Instrument, including but not limited to the testing of functions and inspecting of the condition of the Instrument to keep the Instrument safe for use and in Good Working Order; and ii. Adjustment and/or repair of any defect in or malfunction of the Instrument discovered by the Contractor's representatives during the course of routine maintenance checks. 14.7 The Preventive Maintenance shall be carried out in compliance with the maintenance procedures and safety tests specified by the manufacturer; and during Office Hours i.e. Monday to Friday 8:30am to 6pm (excluding Saturday, Sunday & Public Holiday) unless extended coverage is provided under the Requirement Specifications. 14.8 The Contractor shall give the Authority a minimum of three (3) days' notice before carrying out the Preventive Maintenance at the Authority's premises. The Contractor's employees or subcontractors shall be given reasonable access onto the Authority's premises and to the instrument to perform the Preventive Maintenance and Corrective Maintenance.		✓		
<u>Corrective Maintenance</u> 14.9 Upon receipt of oral or written notice from the Authority, the Contractor shall use its best endeavours to ensure that the Contractor's suitably qualified and duly authorised representatives attends to the Authority, within the response time of not more than twenty-four (24) hours upon receipt of oral/written notification if the request is made on a Working Day. If the request is made on a non-Working Day, the Contractor shall respond within the first twenty-four (24) hours of the beginning of the next Working Day. 14.10 The Contractor shall attend to unlimited breakdown calls. For this purpose, the Contractor shall provide the Company with a telephone number through which requests for Corrective Maintenance can be made by the Authority. 14.11 The Contractor shall complete any repair, or replacement or adjustment of components within one (1) week from and including the date on which the Contractor was given notice pursuant to Clause 14.9 unless the Authority had agreed in writing to have the time period extended.		✓		
		✓		
		✓		

PART 3: REQUIREMENT SPECIFICATIONS

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EQUIPMENT 2: LIQUID CHROMATOGRAPH TANDEM TRIPLE-QUADRUPOLE MASS SPECTROMETER (LC-MS/MS) SYSTEM

Description & Specifications		Compliance Checklist (Please tick Yes/No for compliance to specifications)		
Equipment 2: Liquid Chromatograph Tandem Triple-Quadrupole Mass Spectrometer (LC-MS/MS) System Quantity: 1 unit Location: Food Safety Laboratory		Yes	No	If No, please specify.
15	Replacement and Purchase of Components 15.1 The Contractor shall inform the Authority of any part or component of the Equipment that needs to be replaced. Prior written approval must be issued by the Authority before the replacement may be effected unless the replacement required is deemed urgent by the Authority in which case a verbal approval (which shall subsequently be confirmed in writing) obtained from an authorised officer of the Authority shall suffice. 15.2 The Contractor shall use all reasonable endeavours to supply only original or genuine replacement components, which are required to maintain the Equipment in Good Working Order. 15.3 The Contractor shall bill the Authority after the maintenance has been completed, together with detailed and signed service reports for HSA designated staff.	✓		
		✓		
		✓		

COMPLIANCE OF REQUIREMENT SPECIFICATIONS

I hereby confirm that I can meet all the specifications and requirements as stated in Section 3: Requirement Specifications.

Tenderer's (as *Principal/Agent)
Company or Business Registration No: Waters Pacific Pte Ltd
200512450H

Tenderer's official
Stamp:



Authorized Signature

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Name: Joanna Ang

Designation: Account Manager

Please indicate any non-compliance to requirement specifications here should there be any.

Reference To	Remarks
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EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS)	Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
Location: Chemical Metrology Laboratory Quantity: 1	
Technical Specifications	
- The system must be a high performance liquid chromatography (HPLC) coupled to a tandem mass spectrometer (MS/MS). The modules must be capable of standalone operation and have internal diagnostics to monitor the instrument's performance. The system must have one single software to control all individual modules. - The LC-MS/MS must be a highly sensitive, bench-top triple quadrupole mass spectrometer. This instrument must allow both qualitative and quantitative analyses to be carried out in a single experiment and essentially come with a built-in integrated switching valve.	Yes/ No
- The entire system including HPLC, LC-MS/MS and controlling computer must be within the dimensions of 280 cm (L) x 80 cm (D) x 70 cm (H)	Yes/ No
- A bench must be provided free-of-charge to hold the system setup.	Yes/ No
(A1) High Performance Liquid Chromatograph	
- Must offer a high pressure binary pump system to enable at least 4 individual solvent lines to be utilised concurrently.	Yes/ No
- Must be able to switch among four different mobile phases (at least two of the four) by programmable software, allowing the switch between two different installed columns using at least two of the four mobile phases.	Yes/ No
- Must offer integrated diagnostic functions that pre-empts instrument malfunction.	Yes/ No
- Must offer an integrated internal degassing unit.	Yes/ No
- Must enable settable flow range set points from 0.001- 5 mL/min, in 0.001mL/min increments.	Yes/ No
- Must offer flow precision of ≤ 0.07 % Relative Standard Deviation (RSD) or ≤ 0.02 minute Standard Deviation (SD), whichever is greater; based on retention time at constant room temperature.	Yes/ No
- Flow accuracy of $\pm 1\%$ or better.	Yes/ No
- Operating pressure (with LC column) with at least 100 MPa (1000 Bar).	Yes/ No
- Selectable compressibility compensation, based on mobile phase compressibility.	Yes/ No
- Support and function in the pH range of 1.0 – 12.5.	Yes/ No
- Permit gradient formation such as low pressure binary mixing/gradient capability using high-speed proportioning valve.	Yes/ No
- User-selectable flow composition ranges from 0 – 100 % in 0.1% increment.	Yes/ No
- Composition precision of ≤ 0.2 % RSD or ≤ 0.04 min SD, whichever is greater.	Yes/ No
- Software and local control functions.	Yes/ No
- Safety and maintenance features to support extensive diagnostics, error detection and display, leak detection, safe leak handling, leak output signal for shutdown of the pumping system. Low voltage in major maintenance areas.	Yes/ No
- Must be able to notify the lab when the maintenance is due, early maintenance feedback to be provided for continuous tracking of instrument usage in terms of seal wear and volume of pumped mobile phase with predefined and user settable limits and feedback messages. Electronic records of maintenance and errors shall be provided.	Yes/ No

EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS) Location: Chemical Metrology Laboratory Quantity: 1	Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
(A2) Auto-Sample Injector - Sample injection volume must be variable between 0.1 µL to 40 µL inclusive with zero sample loss during injection.	☒ Yes/ ☐ No
- Must be able to process automatically the number of samples and random access for a minimum of 100 positions for 2 ml vial volume.	☒ Yes/ ☐ No
- To perform customised continuous analyses according to the conditions specified for each sample, including pre-treatment, injection and analysis conditions. Priority samples must be allowed to be inserted in the queue during automated run.	☒ Yes/ ☐ No
- Flow line rinse capability both before and after sampling must be possible.	☒ Yes/ ☐ No
- Carry over must be ≤ 0.1%.	☒ Yes/ ☐ No
- Injection precision must be ≤ 0.25% of RSD value.	☒ Yes/ ☐ No
- Must have a leak sensor, automatic rack and vial recognition as safety feature.	☒ Yes/ ☐ No
- Sample holder must have capability to control temperature, range covering minimally from 4 °C to 40 °C	☒ Yes/ ☐ No
(A3) Column Compartment - Must have uniform temperature distribution that can maintain constant temperature level even when power source voltage fluctuates.	☒ Yes/ ☐ No
- Allow a temperature range of 15 °C to 80 °C	☒ Yes/ ☐ No
- Temperature control precision should be ±0.1 °C or better.	☒ Yes/ ☐ No
- Must have temperature limit device and temperature fuse.	☒ Yes/ ☐ No
- Capable of temperature programming in linear and step programmes.	☒ Yes/ ☐ No
- Able to accommodate at least three columns with a minimum length of 30 cm.	☒ Yes/ ☐ No
- Must have a user programmable rotatory selector valve head for switching between columns.	☒ Yes/ ☐ No
(B) Tandem Mass Spectrometer - The instrument must be a high sensitivity, bench top triple quadrupole mass spectrometer designed for LC-MS/MS analyses. The instrument must have unique features which allow both qualitative and quantitative analyses to be carried out in a single experiment. It must also support fast chromatography applications with a large number of analytes.	☒ Yes/ ☐ No
- The instrument must have a minimum mass range (m/z) of 5-2000 Da.	☒ Yes/ ☐ No
- The instrument must have a minimum scan speed of 10,000 Da/sec.	☒ Yes/ ☐ No
- The mass spectrometer must offer computer controlled concurrent polarity switching functions, with not more than or equal to 25 milliseconds of polarity switching time.	☒ Yes/ ☐ No
- The mass spectrometer must have sensitivity (signal-to-noise ratio in MS/MS mode) must be equal to or higher than 500,000:1 using 1 pg of reserpine on column. This is for running very low concentration samples at parts per trillion/billion level analytes in complex matrices.	☒ Yes/ ☐ No
- The mass spectrometer must offer linear dynamic range of at least equal or greater than 5.5 orders of magnitude inter-scan linear dynamic range without signal reduction.	☒ Yes/ ☐ No

PART 3: REQUIREMENT SPECIFICATIONS

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EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS) Location: Chemical Metrology Laboratory Quantity: 1	Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
- The mass spectrometer should have a mass stability of at least 0.1 Da over 24 hours with normal operating temperature and after the mass spectrometer has reached vacuum and electronics equilibrium.	☒ Yes/ ☐ No
- The instrument must have no significant crosstalk detectable for reserpine (0.17 picomol/uL infused) while monitoring the MRM transitions of 609/195 and 100/195 with a 1 millisecond dwell time and 3 millisecond inter-MRM pause time.	☒ Yes/ ☐ No
- The minimum MRM dwell time must be at least 1 millisecond.	☒ Yes/ ☐ No
- The instrument must be equipped with a source housing hosting interchangeable APCI probe and ESI probe.	☒ Yes/ ☐ No
- The ESI source probe must be provided as standard with the instrument. The ESI probe must be able to allow effective optimization of ionization with minimal adduct formation.	☒ Yes/ ☐ No
- The ESI source probe must be able to operate at flow rate from 5 to 2000 ul/min without splitting. - The ionisation probes switching must be simple and tool free. - The ion source must have a flow rate compatibility in ESI mode which cover the range of 5µL/min to 1000 µL/min. - The solvent compatibility for the ion source must be from 100% aqueous to 100% organic, with full gradient capability. - The ESI nebulizer gas must be user selectable covering the range of 0 to 90 psi (0 to 0.62 MPa). - The desolvation temperature must be user selectable covering the range from ambient temperature to at least 700°C. - All ion source parameters except sprayer positioning must be computer-controllable. - The cleaning and maintenance of desolvation line must be simple and must be able to carry out without breaking the vacuum. - The source must be able to be removed from the host system without tools and without breaking the vacuum.	☒ Yes/ ☐ No
- The mass spectrometer should allow both qualitative and quantitative analyses to be carried out in a single experiment.	☒ Yes/ ☐ No
- The mass spectrometer should be able to provide at least full scan MS, selected ion for both Q1 and Q3, product ion scan, multiple reaction monitoring, and MS3 scan.	☒ Yes/ ☐ No
- Programmable software-controllable flow switching valve for diverting the flow to waste must be available.	☒ Yes/ ☐ No
- Auto-tuning must be standard with a syringe pump that delivers accurate calibrant injection under full workstation control in both positive and negative modes. Manual tuning must also be allowed.	☒ Yes/ ☐ No
- Provide a built-in or external mechanical infusion system/syringe pump to support real-time data acquisition for MS method optimisation. A minimum infusion flow rate at 5 µL/min must be achieved.	☒ Yes/ ☐ No
- A LC-MS start-up kit must be supplied as standard.	☒ Yes/ ☐ No
- A cover must be provided to reduce the noise of rough pump.	☒ Yes/ ☐ No
- The mass spectrometer must have an ion mobility spectrometry feature to enable	☒ Yes/ ☐ No

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EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS) Location: Chemical Metrology Laboratory Quantity: 1	Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
separation of isobaric analytes, which should at least meet the following requirements. (a) The device must have an integrated liquid pump for the purpose of introducing chemical modifiers into the mobility cell. (b) The device must be able to acquire data for a single multiple reaction monitoring transition in not more than 25 msec including inter-scan pause time of not more than 20 msec. (c) The device must be useable with software that provides automatic, dynamic adjustment of the acquiring multiple reaction monitoring transitions such that only compounds that elute within a specified time window are monitored.	☒ Yes/ ☐ No ☒ Yes/ ☐ No ☒ Yes/ ☐ No
(C) Sample Testing - The LC-MS/MS must be able to analyse peptide in low abundance level. Tenderers will be provided with two samples and the samples must be tested without further manipulation and using the conditions provided in the <i>Instruction on Sample Analysis (Please refer to Appendix 1)</i> . The details of the samples will be provided upon sample collection. Sample Collection Details: Tenderers are required to collect the <i>Instruction on Sample Analysis</i> and samples between 0830 to 1200 within the first week from the tender opening date at: Health Sciences Authority, 1 Science Park Road, #01-05/06, The Capricorn, Singapore Science Park II, Singapore 117528. Contact number: 6775 1605 ext 121 - The sample must be analysed on the system proposed in this tender. The sample result (raw data and processed) shall be submitted via email (in an EXCEL file) not later than 2 weeks from the tender closing date. The sample testing results must meet the following requirements: - The Relative Standard Deviation of the isotope peak area ratio from four injections for each Calibration Blend and Sample Blend must be below 5% (see Instruction for Sample Analysis for details). - The Calibration Curve must have a goodness-of-fit for linear regression (R²) better than 0.995. - The absolute value of relative deviations (%D) between the sample results and the certified value of the samples provided shall not exceed 10%. - The difference of %D between 2 samples shall not exceed 5%.	☒ Yes/ ☐ No
(D) Software and computer - Minimum configuration: 3.2 GHz dual core processor or equivalent, 32GB RAM, 4 x 2 TB hard drives, wireless modem 802.11a/b/g/n/ac , USB 3.0, DVD RW (CD RW capable), mouse and keyboard, high resolution 21 inch flat screen color monitor.	☒ Yes/ ☐ No
- Must provide Window 7 Professional Operating System and Microsoft Office and any other computer interfaces, cables and software drivers for the system to be usable at optimum conditions.	☒ Yes/ ☐ No

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EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS)		Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
Location: Chemical Metrology Laboratory	Quantity: 1	
- Single software platform must be provided for a seamless control of all the modules of LC and MS/MS.		☒ Yes/ ☐ No
- The software must allow the generation of sample run sequence table through the use of cut/paste function from MS Excel.		☒ Yes/ ☐ No
- The software must be able to generate both standard and customisable reports to suit different needs.		☒ Yes/ ☐ No
- The software must be able to generate the result reports of chromatograms during and after the sample sequence run.		☒ Yes/ ☐ No
- The software must be able to perform manual integration of single and group peaks capability for better peak identification.		☒ Yes/ ☐ No
- The software must be able to perform automatic integration of single and group peaks with both standard perimeters and user settable perimeters.		☒ Yes/ ☐ No
- The software must be able to generate numeric data compatible with Microsoft Excel for plotting chromatogram.		☒ Yes/ ☐ No
- Free software upgrade must be provided throughout the warranty period. If the upgraded software is not compatible with the existing computer and/or existing operation system, new/upgraded computer and/or operation system must be provided free-of-charge.		☒ Yes/ ☐ No
- The PC(s) must be under 3-year full warranty and accompanied with their system recovery CDs or DVDs.		☒ Yes/ ☐ No
- Laser jet printer must be provided.		
Miscellaneous		
- The system shall consist, but not be limited to, the above listed major components, complete with all the accessories and interfacing necessary to make a fully functional and operable system.		☒ Yes/ ☐ No
- The power supply must be 230 ± 6%, 50/60 Hz, suitable for use in Singapore.		☒ Yes/ ☐ No
- The Tenderer must provide for any tables/trolleys (suitable for clean room) to facilitate the placement of the entire instrument system (computer, LC system, MS system and any other necessary equipment necessary for the complete operation of the system) free-of-charge.		☒ Yes/ ☐ No
- The Tenderer must provide for any potential necessary modifications to the system (e.g extra/ longer vacuum lines) for the system to be operational free-of-charge.		☒ Yes/ ☐ No
(1) Prices quoted must include installation, commissioning, initial calibration and operator training (a maximum of up to ten (10) personnel can be trained after the commissioning of system) at Chemical Metrology Laboratory. The system with PC must come with a minimum 1 year warranty.		☒ Yes/ ☐ No
(2) The warranty must include: - unlimited breakdown calls and on-site support services by engineers within 24 hours, direct engagement with engineer for maintenance and breakdown through phone call and on-site. - unlimited consumables and free labour cost during non-scheduled maintenances, replacement of hardware parts and at least 1 comprehensive preventive maintenance with PM kit (inclusive of any tuning solution, if applicable) at no extra cost (includes both labour, all required consumables		

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EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS) Location: Chemical Metrology Laboratory Quantity: 1	Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
and replacement parts) per year, and cover the overall system (both hardware and software). - All replacement parts (both electronic and mechanical in nature), required consumables and labour during preventative maintenance and all non-scheduled maintenances and breakdown. - Any software revisions should also be provided free-of-charge. The Contractor is required to oversee overall systems integration, site preparation, installation and necessary configuration of the system.	
Tenderer is required to quote for the option to exercise 3-year post warranty comprehensive maintenance contract in <u>Annex C Price Summary</u>. The post warranty comprehensive maintenance contract shall minimally include the following: a) Unlimited breakdown calls and on-site support services by engineers within 24 hours. b) Direct engagement with engineer for maintenance and breakdown through phone call and on-site. c) All replacement parts (both electronic and mechanical in nature), required consumables and labour during preventative maintenance and all non-scheduled maintenances and breakdown. d) 1 PM ((includes both labour, all required consumables and replacement parts, both electronic and mechanical in nature) per year, and cover the overall system (both hardware and software) per year with PM kit (inclusive of any tuning solution, if applicable) provided free-of-charge. e) Update of software revision whenever available	Yes/ No
Standard consumables that are required for the set up and commissioning of the system must be provided. In addition to the standard consumables, the Tenderer <u>must provide</u> the list of consumables parts required for preventative maintenance or non-scheduled maintenance and the frequency of change of such part, for the respective modules as follow in the format set out in the Annex D to Part 3 - Schedule of Rates (SOR).	Yes/ No
- A declaration of Conformity certificate must be provided upon commissioning of equipment.	Yes/ No
- The delivery of the equipment must be coordinated with the Laboratory.	Yes/ No
- The Tenderer must be able to provide after-sales support from engineers and application chemists based in Singapore. The Tenderer must have a strong track record in providing personalized and responsive after-sales support in Singapore, that is, the company must provide: (a) Contacts (non-call centre number/ handphone number and email) of at least two engineers experienced with the system; (b) immediate instruction for trouble shooting by telephone when requested; (c) on-site service within 1 working days when requested; and (d) replacement of parts (within 1 working days when parts are available in Singapore, within 5 working days when parts are not available in Singapore and are needed to be ordered from overseas) when necessary.	Yes/ No
- Contractor shall guarantee that the spare parts, consumables and services for the system will be available for a period of at least eight (8) years from the date of discontinuation of the system and shall further undertake to locally supply or make available these parts/consumables for the said period.	Yes/ No

EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS) Location: Chemical Metrology Laboratory Quantity: 1	Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
- Tenderer must be able to provide on-site instrument operation and user maintenance training by certified engineer(s). The certificate(s) shall be provided upon request.	☒ Yes/ No
PERFORMANCE OF SERVICES a) The Contractor shall perform the Services in the manner as specified in the Contract in order to maintain the Equipment in Good Working Order. b) The Services to be performed by the Contractor shall consist of Preventive Maintenance and Corrective Maintenance as described below. Preventive Maintenance a) The Preventive Maintenance shall consist of: Routine maintenance of the Equipment, including but not limited to the testing of functions and inspecting of the condition of the Equipment in order to keep the Equipment safe for use and in Good Working Order; and Adjustment and/or repair of any defect in or malfunction of the Equipment discovered by the Contractor's representatives during the course of routine maintenance checks. b) The Preventive Maintenance performed shall be in compliance with the maintenance procedures and safety tests specified in the Requirement Specifications. c) The Preventive Maintenance shall be carried out and completed during Office Hours from 8:00 am to 5:30 pm Corrective Maintenance a) Upon receipt of oral or written notice from the Authority, the Contractor shall use its best endeavours to ensure that the Contractor's suitably qualified and duly authorised representatives attends to the Authority, within the response time of not more than twenty-four (24) hours upon receipt of oral/written notification if the request is made on a Working Day. If the request is made on a non-Working Day, the Contractor shall respond within the first twenty-four (24) hours of the beginning of the next Working Day. b) The Contractor shall attend to unlimited breakdown calls. For this purpose, the Contractor shall provide the Company with a telephone number through which requests for Corrective Maintenance can be made by the Authority. c) The Contractor shall complete any repair, or replacement or adjustment of components within 2 working days if there is no need to order parts from overseas from and including the date on which the Contractor was given notice pursuant to Clause II (a) unless the Authority had agrees in writing to have the time period extended.	☒ Yes/ No
<u>REPLACEMENT AND PURCHASE OF COMPONENTS</u> - The Contractor shall inform the Authority of any part or component of the Equipment that needs to be replaced. Prior written approval must be issued by the Authority before the replacement may be effected unless the replacement required is deemed urgent by the Authority in which case a verbal approval (which shall subsequently be confirmed in writing) obtained from an authorised officer of the Authority shall suffice. - The Contractor shall use all reasonable endeavours to supply only original or genuine replacement components, which are required to maintain the Equipment	☒ Yes/ No

PART 3: REQUIREMENT SPECIFICATIONS

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EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)

Equipment 3: High Performance Liquid Chromatography Tandem Mass Spectrometer (HPLC-MS/MS) Location: Chemical Metrology Laboratory Quantity: 1	Compliances (Yes/ No) <i>**If No, please indicate reason of non-compliances.</i>
in Good Working Order. All replacement components shall be provided free-of-charge during the period of warranty period and post warranty comprehensive maintenance contract.	

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EQUIPMENT 3: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETER (HPLC-MS/MS)**COMPLIANCE OF REQUIREMENT SPECIFICATIONS**

I hereby confirm that I can meet all the specifications and requirements as stated in Section 3: Requirement Specifications.

Tenderer's (as *Principal/Agent)
Company or Business Registration No: Waters Pacific Pte Ltd
200512450H

Tenderer's official
Stamp:



Authorized Signature

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Name: Joanna Ang

Designation: Account Manager

Please indicate any non-compliance to requirement specifications here should there be any.

Reference To	Remarks