PURCHASE CONTRACT

This purchase contract („**Contract**") was concluded pursuant to section 2079 *et seq*. of the act no. 89/2012 Coll., Civil Code, as amended („**Civil Code**"), on the day, month and year stated below by and between:

(1) Institute of Physics of the Academy of Sciences of the Czech Republic, a public research institution,

with its registered office at: Na Slovance 2, Praha 8, 182 21, Czech Republic

registration no.: 68378271

represented by: RNDr. Michael Prouza, Ph.D. – director

(„**Buyer**"); and

(2) SPECION, s.r.o.

with its registered office at: Praha 4, Budějovická 1998/55, PSČ 140 00

registration no.:48112836

represented by: Ing. Alexandr Gába – Managing director

enrolled in the commercial registered kept by MS Praha, C 16413

(„**Seller**").

(The Buyer and the Seller are hereinafter jointly referred to as „**Parties**" and individually as "**Party**".)

WHEREAS

(A) The Buyer is a public contracting authority and the beneficiary of a grant of the Ministry of Education, Youth and Sports of the Czech Republic within the Operational Programme Research, Development and Education. The Buyer carries out a project financed by the grant specified herein in this provision („**Project**").

(B) For the successful realization of the Project it is necessary to purchase the Object of Purchase (as defined below) in accordance with the Rules for the Applicants and Recipients within the Operational Programme Research, Development and Education.

(C) The Seller wishes to provide the Object of Purchase to the Buyer for consideration.

(D) The Seller's bid for the public procurement entitled „**AFM Raman spectrometer**", whose purpose was to procure the Object of Purchase („**Public Procurement**"), was selected by the Buyer as the most suitable.

(E) The Seller acknowledges that the Buyer is not, in connection to the subject matter of this Contract, an entrepreneur, and also that the subject matter of this Contract is not related to any business activities of the Buyer.

(F) The documentation necessary for the execution of the Contract is

- Technical Specification, which forms an integral part hereof as its Annex No. 1 (hereinafter the "TS"); this TS also formed a part of the procurement documentation for the Public Procurement in the form of Annex No. 1 of the procurement documentation;
- The Seller´s bid submitted fot the Public Procurement (hereinafter the "Seller´s bid"); the Seller´s bid forms Annex No. 2 of this Contract

IT WAS AGREED AS FOLLOWS:

1. BASIC PROVISIONS

1.1 Under this Contract the Seller shall deliver and install to the Buyer a device as described and defined in Annex 1 (Technical Specification) and Annex 2 (Seller´s bid) to this Contract in the required quality, and with the properties and related performance described therein („**Object of Purchase**") and shall transfer to the Buyer ownership right to the Object of Purchase, and the Buyer shall take over the Object of Purchase and shall pay the Seller the Purchase Price (as defined below), all under the terms and conditions stipulated in this Contract.

1.2 Under this Contract the Seller shall also carry out the following activities („**Related Activities**"):

a) Transport and delivery the Object of Purchase to the place of delivery (Art. 2.2 of the Contract);

b) Setup and installation of the Object of Purchase;

c) Provide training related to the Object of Purchase. A timetable regarding delivery and training, approved by the Contracting Authority must be provided before the Object of Purchase delivery; and

d) Cooperate with the Buyer during the performance of this Contract.

2. THE TIME AND PLACE OF DELIVERY

2.1 The Seller shall deliver the Object of Purchase and shall carry out Related Activities within **seven (7) months** from the effectiveness of this Contract, unless stipulated otherwise in this Cotnract. The time of delivery is stipulated herein in favour of the Buyer. The Buyer is entitled to prolong the time for delivery Object of Purchase and for carrying out Related Activities for two (2) more months, should there be important reasons for that on the side of the Buyer, such as, but not only, impossibility to take over the Object of Purchase at the Buyer´s premises due to reconstruction works taking place there.

2.2 The place of delivery shall be Fyzikální ústav AV ČR, v.v.i - HiLASE Centrum, Za Radnicí 828, 252 41 Dolní Břežany, Czech Republic or any other address in Dolní Břežany, Czech Republic, which the Buyer communicated to the Seller prior to the delivery of the Object of Purchase.

2.3 The Object of Purchase setup and installation under Art. 1.2.b.) of this Contract shall take place on the last day of delivery, unless Buyer and Seller agree otherwise. The training under Art. 1.2.c.) of this Contract shall be carried out for approximately five people/Buyer´s employees, shall start on the last day of the Object of Purchase installation and shall take at least two working days in lengt, unless Buyer and Seller agree otherwise.

2.4 The Seller acknowledges that the deadlines stated in this Article are of essential importance to the Buyer with respect to the timeline of the Project with respect to the deadline by which the Project are to be implemented, and that the Buyer could incur damage as a result of failure to meet the above stipulated deadlines.

3. THE OWNERSHIP RIGHT

The ownership right to the Object of Purchase shall be transferred to the Buyer upon the signature of the Hand – over protocol (delivery note).

4. PRICE AND PAYMENT TERMS

4.1 The purchase price for the Object of Purchase is **8 191 500 CZK** („**Purchase Price**") **excluding VAT.**

4.2 The Purchase Price cannot be exceeded and includes all costs and expenses of the Seller related to the performance of this Contract. The Purchase Price

includes, among others, all expenses related to the handover of the Object of Purchase and execution of Related Activities, costs of copyright, insurance, customs, warranty service and any other costs and expenses connected with the performance of this Contract.

4.3 The Purchase Price for the Object of Purchase shall be paid on the basis of a tax document – invoice, to the account of the Seller designated in the invoice. The Purchase Price shall be paid only after the Hand – over protocol is signed.

4.4 The Buyer shall realize payments on the basis of duly issued invoice within thirty (30) calendar days from their receipt. If the Seller stipulates any shorter due period of the invoiced amount in the invoice, such different due period shall not be deemed relevant and the due period stipulated herein prevails. The invoice shall be issued only after the Hand – over protocol signature.

4.5 The invoice issued by the Seller as a tax document must contain all information required by the applicable laws of the Czech Republic. Invoices issued by the Seller in accordance with this Contract shall contain in particular following information:

a) Name and registered office of the Buyer,

b) Tax identification number of the Buyer,

c) Name and registered office of the Seller,

d) Tax identification number of the Seller,

e) Registration number of the tax document,

f) Scope of the performance under this Contract (including the reference to this Contract),

g) Date of the issue of the tax document,

h) Date of the fulfilment of the Contract,

i) Purchase Price,

j) Registration number of this Contract, which the Buyer shall communicate to the Seller based on Seller's request before the issuance of the invoice,

k) Declaration that the performance of the Contract is for the purposes of the Project; the exact details of the Project including name and reg. number will be communicated to the Seller based on Seller´s request which shall be sent to the Buyer to following e-mails: and
before an invoice is issued. Seller shall issue an electronic invoice and send it

to following e-mails and for preliminary check. After the preliminary check the Seller shall send the final electronic invoice to

and must also comply with any double taxation treaties applicable to the given case.

4.6 The last invoice in each calendar year must be delivered by the Seller to the Buyer's no later than by December 15 of the given calendar year. In case that the invoice shall not contain the above mentioned information or the invoice does not comply with the requirements stipulated by law or the invoice is delivered to the Buyer later than by December 15 of the given calendar year, the Buyer is entitled to return it to the Seller during its maturity period and this shall not be considered as a default. The new maturity period shall begin from the receipt of the supplemented or corrected invoice to the Buyer.

4.7 The Buyer's invoicing details are set out in provision (1) hereof.

5. SELLER'S RIGHTS AND DUTIES

5.1 The Seller shall ensure that the Object of Purchase and Related Activities are in compliance with this Contract including all its annexes and applicable legal (e.g. safety), technical and quality norms.

5.2 During the performance of this Contract, the Seller proceeds independently. If the Seller receives instructions from the Buyer, the Seller shall follow such instructions unless these are against the law or in contradiction to this Contract. If the Seller, while exercising due professional care, finds out or should have found out that the instructions are for any reason inappropriate or illegal or in contradiction to this Contract, then the Seller must notify the Buyer.

5.3 All things necessary for the performance of this Contract shall be procured by the Seller, unless this Contract stipulates otherwise.

6. HANDOVER OF THE OBJECT OF PURCHASE

6.1 Handover and takeover of the Object of Purchase shall be realized on the basis of hand-over protocol ("**Hand – over protocol**") which shall be signed during Object of Purchase setup and installation and which shall contain following information:

- identification of the Seller, the Buyer and all subcontractors, if there are any,

- description of the Object of Purchase,
- the list of defects and deficiencies of the Object of Purchase, if there are any, and the deadlines for their removal,
- the signature and the date of the hand-over.

6.2 Instructions and manuals related to all items of the Object of Purchase shall be attached to the Hand-over protocol at the latest.

6.3 If the Seller fails to duly carry out all Related Activities or if the Object of Purchase does not fully meet requirements of this Contract, the Buyer is entitled to refuse the takeover of the Object of Purchase. In such a case, the Seller shall remedy the deficiencies within thirty (30) calendar days, unless Parties agree otherwise. The Buyer is entitled (but not obliged) take over the Object of Purchase despite the above mentioned deficiencies, in particular if such deficiencies do not prevent the Buyer in the proper operation of the Object of Purchase. In such a case, the Seller and the Buyer shall list the deficiencies in the Hand-over protocol, including the manner and the date of their removal (remedy). If the Parties do not reach agreement in the Hand-over protocol regarding the date of the removal, the Seller shall remove the deficiencies within fourteen (14) calendar days.

6.4 Parties hereby exclude application of section 2126 of the Civil Code.

7. WARRANTY

7.1 The Seller hereby provides a warranty of quality of the Object of Purchase for the period of **24** months.

7.2 The warranty period shall commence on the day of the signature of the Hand-over protocol by both Parties. However, if the Object of Purchase is taken over with defects or deficiencies, the warranty period shall commence on the date of the removal of the last defect or deficiency by the Seller.

7.3 The Seller shall remove defects that occur during the warranty period free of charge.

7.4 If the Buyer ascertains a defect of the Object of Purchase during the warranty period, the Buyer shall notify such defect without undue delay to the Seller ("**Warranty Claim**"). Defects may be notified on the last day of warranty period, at the latest; an e-mail is considered an adequate way to initiate a

Warranty Claim. Warranty Claim sent by the Buyer on the last day of the warranty period shall be deemed to be made in time.

7.5 The Buyer notifies defects in writing via e-mail. The Seller shall accept notifications of defects on the following e-mail address:

7.6 In the Warranty Claim the Buyer shall describe the defect and the manner of removal of the defect. The Parties shall agree on the manner of defect´s/defects´ removal. If the Parties do not reach the agreement, the Buyer has the right to:

a) request removal of the defect/defects by the delivery of Object of Purchase or its individual parts, or

b) request removal of the defect/defects by repair, or

c) request adequate discount from the Purchase Price.

The choice among the above mentioned rights shall be made by the Buyer. However, in case of a removable defect/defects that occur/occurs for the first time the Buyer shall not request removal of the defect by delivery of new Object of Purchase or its individual parts.

7.7 The Seller shall remove the defect within thirty (30) calendar days from the date on which the Warranty Claim was notified to the Seller, at the latest, unless the Buyer and the Seller agree otherwise.

7.8 The Seller shall remove defect/defects of the Object of Purchase within periods stated in the Contract also in the instances when the Seller is of the opinion that he is not liable for such defects. In cases when the Seller will not recognize the defect and the Buyer will not agree with such conclusion, the validity of the Warranty Claim shall be ascertained by an expert, which is to be commissioned by the Buyer but with whom the Supplier also must agree. In the event the expert declares the Warranty Claim as justified, the Seller shall bear the costs of the expert's assessment. If the Warranty Claim is raised unjustly according to expert's assessment, the Buyer shall reimburse the Seller all reasonably incurred costs associated with removing the defect/defetcs.

7.9 Parties shall execute a protocol on the removal of the defect, which shall contain the description of the defect/defects and the confirmation that the defect/defects was/were removed. The warranty period shall be extended by the time that expires from the date of exercising the Warranty Claim until the defect/defects is/are removed in cases where the Buyer was prevented from using the Object of Purchase for its intended purpose.

7.10 In case that the Seller fails to remove the defect/defects within time stipulated in this Contract or if the Seller refuses to remove the defect/defects, then the Buyer is entitled to remove the defect/defects at his own costs and the Seller shall reimburse these costs within thirty (30) calendar days after the Buyer's request to do so.

7.11 The warranty does not cover defects caused by unprofessional handling or by the failure to follow Seller's instructions for the operation and maintanence of the Object of Purchase.

7.12 Parties exclude application of the section 1925 (the sentence behind semi-colon) of the Civil Code.

7.13 The Seller shall provide to the Buyer technical support (consultation of operational, maintenance and other issues regarding the Object of Purchase) free of charge on the phone no.:

8. TERMINATION, RIGHT OF WITHDRAWAL, CONTRACTUAL PENALTIES

8.1 This Contract may be terminated by completing the performance required hereunder, by agreement of the Parties or by withdrawal from the Contract on the grounds stipulated by law or in the Contract.

8.2 The Buyer is entitled to withdraw from this Contract, if any of the following circumstances occur:

(a) the Seller has materially breached obligations imposed by the Contract, specifically by being in delay with the fulfilment of this Contract and such delay lasts more than 4 weeks; or

(b) the Seller has materially breached obligations imposed by the Contract, specifically Object of Purchase fails to meet technical parameters and qualities or other requirements defined in the Annex 1 (Technical Specification);

(c) the insolvency proceeding is initiated against the Seller´s assets;

(d) the fuding body providing finances for the Project ("Financial subsidy") or any other control body determines that the expenditures or part of the expenditures incurred on the basis of this Contract are ineligible;

(e) the Financial subsidy for implementation of the Project is withdrawn from the Buyer; or

(f) should it become apparent that the Seller provided information or documents in the Seller's bid, which were not true and which could, therefore, influence the outcome of the Procurement Procedure leading to the conclusion of this Contract (Section 223(2)(b) of the Act No. 134/2016 Coll., on public procurement).

8.3 The Seller is entitled to withdraw from the Contract in the event of material breach of the Contract by the Buyer and in case of events outside the control of the Seller (e.g. natural disasters, etc.).

8.4 In the event the Seller is in delay with term of delivery as stipulated in Art. 2 herein, the Seller shall pay to the Buyer the contractual penalty in the amount of 0.1% of the Purchase Price for each, even commenced calendar day of delay.

8.5 In the case where the Seller fails to remove defects within the periods stipulated in the Contract, the Seller shall pay to the Buyer a contractual penalty in the amount of 2.500 CZK for each defect and for each calendar day of delay.

8.6 If the Buyer fails to pay the Purchase Price vices within the deadlines set out in this Contract, the Buyer shall pay the Seller interest on delay in the amount set forth by the law for each day of delay unless the Buyer proves that the delay with the payment of the Purchase Price was caused by late release of the Financial subsidy for the Project by the funding body.

8.7 The obliged Party must pay any contractual penalty/penalties to the entitled Party not later than within fifteen (15) calendar days of the date of receipt of the relevant claim from the other party.

8.8 Payment of the contractual penalties pursuant to this Article shall in no way prejudice the Buyer's right to claim compensation for damage incurred by the Buyer as a result of the Seller's breach of obligations to which the penalty applies.

8.9 The Parties have agreed that the maximal amount of contractual penalties shall be limited to 10% of the Purchase Price.

8.10 The Buyer is entitled to set off by unilateral declaration any of its recievable or part of its recievable resulting from contractual penalty/contractual penalties against Seller´s claim to pay Purchase Price.

9. SPECIAL PROVISIONS

By signing this Contract, the Seller becomes a person that must cooperate during the

finance control within the Act no. 320/2001 Coll., on finance control in the public administration, as amended, and shall provide to the Directing Body of the Operational Programme Research, Development and Education or other control bodies (such as, but not only, European Commission, European Court of Auditors) acces to all parts of the bid, Contract or other documents that are related to the legal relationship formed by this Contract. This duty also covers documents that are subject to the protection in accordance with other acts (business secrets, secret information, etc.) provided that control bodies fulfil requirements stipulated by these acts. The Seller shall secure that all its subcontractors are also obliged to cooperate with control bodies in the above stipulated extent. The Seller shall secure that all its subcontractors are also obliged to cooperate with control bodies in the above stipulated extent. The Seller is obliged to duly archive all written material prepared in connection with the execution of this Contract and to provide access to the Buyer to these archived documents until 2027; any finance control may also be carried out until year 2027.

10. FINAL PROVISIONS

10.1 This Contract is governed by the laws of the Czech Republic, especially by the Civil Code.

10.2 All disputes arising out of this Contract or out of legal relations connected with this Contract shall be preferable settled by a mutual negotiation. In case that the dispute is not settled within sixty (60) calendar days, such dispute shall be decided by courts of the Czech Republic in the procedure initiated by one of the Parties.

10.3 All modifications and supplements of this Contract must be carried out in writing as numbered amendment/amendments.

10.4 In the event that any of the provisions of this contract shall later be shown or determined to be invalid, putative, ineffective or unenforceable, then such invalidity, putativeness, ineffectiveness or unenforceability shall not cause invalidity, putativeness, ineffectiveness or unenforceability of the Contract as a whole. In such event the Parties undertake without undue delay to subsequently clarify any such provision using Sec 553(2) of the Civil Code, or to replace after mutual agreement such invalid, putative, ineffective or unenforceable provision of the Contract by a new provision, that in the extent permitted by the laws and regulations of the Czech Republic, relates as closely as possible to the intentions of the Parties to the Contract at the time of creation hereof.

10.5 The Parties agree that the Seller shall not be entitled to set off any part of its receivable, or receivable of its sub-debtor against the Buyer or any of his receivables, unless this Contract stipulates otherwise. The Seller shall not be

entitled to assign any receivable arising in connection herewith to a third party. The Seller shall not be entitled to assign any rights or obligations arising to him hereunder or any of its parts to third parties.

10.6 The Parties declare that they accept the "risk of changed circumstances" within the meaning of Sec 1765(2) of the Civil Code.

10.7 The Parties declare that they shall maintain confidentiality with respect to all facts and information they learned in connection with the Contract or during the performance of the Contract, and the disclosure of such facts or information could cause damage to the other Party. This confidentiality provision does not affect duties of Parties with respect to applicable legislation.

10.8 This Contract shall constitute complete agreement of the Parties on the Contract subject matter including the Object of Purchase and shall substitute any and all possible previous discussons, negotiations and agreements of the Parties related to the Contract subject matter including the Object of Purchase.

10.9 This Contract is executed in four (4) counterparts and every Party shall receive two (2) counterparts.

10.10 The following Annexes form an integral part of the Contract:

- **Annex No. 1:** Technical Specification Document (if Annex 1 uses the term "Contracting Authority" or "contracting authority" it means Buyer. If Annex 1 uses the term "Supplier" or "supplier", it means Seller);
- **Annex No.** 2: The Seller´s bid submitted fot the Public Procurement; the Seller´s bid forms Annex 2 of this Contract.

In case of any discrepancies between this Contract and any of its annexes, the provisions of this Contract shall prevail. In case of any discrepancies between Annex No. 1 and Annex No. 2, the Annex No. 1 shall prevail except for those provisions of Annex No. 2, which were evaluated within Public Procurement under Suitability and Quality Performance evaluation sub-criterion and are also listed in Annex No 3 of the Seller´s bid

10.11 The Parties agree to publish the full text of this Contract, including its annexes, in the Register of Contracts pursuant to Act No. 340/2015 Coll., on Special Conditions for the Effectiveness of Certain Contracts, the Disclosure of These Contracts and the Register of Contracts, as amended (Act on the Register of Contracts).

10.12 This Contract shall become valid on the date of the signature of both Parties. The Contract shall become effective on the date of its publication at Register of Contracts.

11. Representatives of the Parties

11.1 The Seller has appointed the following authorised representatives for communication with the Buyer in relation to the subject of performance hereunder:

In technical matters:

11.2 The Buyer has appointed the following authorised representatives for communication with the Seller in relation to the subject of performance hereunder:

In technical matters:

IN WITNESS WHEREOF attach Parties their handwritten signatures:

Buyer	**Seller**
Signature: _____	Signature: _____
Name: RNDr. Michael Prouza, Ph.D.	Name: Ing. Alexandr Gába
Position: director	Position: Managing director
Date:	Date:

ANNEX 1

TECHNICAL SPECIFICATION

(NOTE: Annex No. 5 to the Procurement documetnation shall be attached hereto by the Contracting Authority before signature hereof by the Contracting Authority after the Public Procurement procedure is finished)

TECHNICAL SPECIFICATION

Combined Atomic Force Microscope and Raman Spectrometer

This Technical Specification Document applies to the purchase of a Raman spectrometer combined with an Atomic Force Microscope (AFM) consisting of:

- An AFM attached to a Raman spectrometer allowing combined analysis of the same sample via both instruments;
- In conjunction with this configuration they must also be capable of Tip Enhanced Raman Spectroscopy (TERS) which is a technique specific to this combination;
- Dedicated software for analysis, 2 licenses not limited in time, One PC, monitor, mouse, and keyboard, capable of operating the device, must also be provided;
- The Raman spectrometer must have analysis lasers with at least 3 different wavelengths from visible to infrared;
- Training for operation must be provided upon installation, available to >5 persons.

The required specifications of the AFM Raman and software are provided in tables below.
The system must be capable of use within a clean room operating at room temperature with acoustic noise average 45 dB and vibration velocity less than 2 μm/s at high frequencies.
The system must be capable of operating in non-contact and tapping modes, with varied probes for AFM, conductive AFM, magnetic, TERS, Co-localised measurements and must be expandable to allow STM, EFM, and SKM/KPFM. The Raman spectrometer must be capable of automated switching between excitation lasers and gratings. The software controlled stages must allow surface mapping and the ability to revisit already scanned locations after changing optics, tips, lasers or other characterization equipment.

The AFM laser must avoid inference with the spectroscopy CCD by using a feedback diode in the infrared region with 1100 nm wavelength or above. Changing the AFM tip must not interfere with the sample. Realignment of the AFM must return the tip to the same position relative to the aligned spectroscopic laser.

AFM movement: the system must allow at least 5x5 mm of motorized movement for the sample positioning. It must allow visualization from both top and side profiles utilizing a 100x 0.7 NA objective; NA below 0.5 are not acceptable for spectroscopic measurements.

The price, without VAT, must include the delivery, installation, software, training and warranty of at least 24 months. We also require a minimum response time for service issues of 72 hours (excluding non-working days). Details of required parameters are given in the tables.

Raman Spectrometer

Parameter name	Required specifications
Spectral range	At least from 70 cm^{-1} to 3500 cm^{-1}
Spectral resolution for 500-600 nm excitation wavelength	≤ 1.4 cm^{-1}
Spectral resolution for 600-700 nm excitation wavelength	≤ 1.4 cm^{-1}
Spectral resolution for 700-800 nm excitation wavelength	≤ 1.4 cm^{-1}
Excitation wavelengths	At least 3 individual lasers with respective wavelength: 500-600 nm, 600-700nm and 700-800 nm
Confocal resolution	≤ 500 nm XY lateral resolution
Positioning	Automated positioning with ≤ 1 µm repeatability. 50 nm resolution z resolution 10 nm
Fast Mapping	Yes, high performance CCD enabling mapping of ≥ 400 spectra/second
AFM combination	Port for combination with AFM
Optical microscope objectives	At least 10x, 20x, 50x and 100x
Lighting	White light source for Optical analysis
Gratings	At least 4 gratings; 550-650 l/mm, 1000-1500 l/mm, 1500-2000 l/mm and 2300-2500 l/mm
Laser attenuation	Motorised Filters for laser attenuation, controlled by software
Warranty	≥ 24 months
Auto laser change and alignment	Changing laser wavelengths as an automatic procedure.

AFM

Parameter name	Required specifications
Measuring modes	• Contact AFM, • Semi-contact AFM, • Non-contact AFM, • Phase imaging, • Lateral force microscopy, • Force modulation, • Conductive AFM, • Magnetic Force Microscopy, • Kelvin Probe, • Capacitance and electric force microscopy, • Force curve measurements, • Optional STM, • Optional Photocurrent mapping
	TERS, Conductivity, tapping and contact topography
AFM feedback laser	Alignment motorized and automated
Lateral positioning resolution of the motorized stage	< 1.5 µm
Sample scanner resonance	3 kHz or above
Sample scanning range	≥ 90 x 90 x 7 µm
Topographical vertical resolution	≤ 0.5 nm
XY closed loop noise	≤ 0.5nm
Conductive AFM	≤ 10 µA
TERS resolution	≤ 20 nm
Warranty	≥ 24 months
Sample alignment	Tip replacement and sample replacement must not result in a manual re-alignment of Raman laser to tip-apex
Spectroscopic alignment	Device to perform spectroscopic laser alignment to the SPM probe must be performed as close as possible to the sample, <10 cm
Sample size	Device must be able to accept samples of at least 20x20x15 mm.

Software

Parameter name	Required specifications
Software	For acquisition of Raman and AFM separately and combined. In English
Software abilities	Data acquisition and processing. Calibration, background subtraction, Auto-alignment, surface mapping, stage control, position control for automatic reposition after tip change
	Must allow control and processing of AFM and Raman simultaneously
	Must allow acquisition of spectral data and SPM signals and visualised spectral intensity images and SPM signal images within the same interface.

ANNEX 2

SELLER´S BID

Offered configuration:

Horiba Xplora Nano

Item part number	Description
	XploRA Spectrometer
XPLORA+/ML	NEW XploRA Plus V1.2 Å MULTILINE Confocal Raman microscope (#Class 3B laser product if CDRH option is not selected) Includes as follows: (1) Research grade optical microscope - Olympus BX, complete microscope with 2 position motorised white light illuminator including 5 MPix CMOS video camera- PC controlled Koehler Illumination by reflection (LED eqv 100W) /transmission (Halogen 30W) with lamp housings, Abbe condenser, and 3 objectives 10x (NA=0.25, WD 10.6mm), 20x and 100x(NA=0.9 WD= 0.21mm) (2) XploRA Plus, Raman Base including : Integrated Imaging spectrometer with 4 gratings mounted on motorised turret for full resolution, range and coverage (gratings: 600gr, 1200gr, 1800, 2400gr) HORIBA Scientific CCD detector, TE air cooled, 1024x256 pixel, low noise full range CCD chip format for sensitivity and range Motorised PC controlled 6 position ND filterwheel for laser power adjustment (0.1%, 1%,10%,25%, 50%, 100%) (software extendable to 10 positions) Motorised PC controlled confocal pinhole (for confocal and macro sampling) Motorised PC controlled entrance slit for resolution selection Confocal coupling optics and motorised filter selection (PC controlled) (3) computer and Spectroscopic software suite LabSPEC6 spectral software suite for the easy acquisition and analysis of Raman data. Includes control of the hardware and acquisition parameters, AUTOcalibration, customisable methods, FLAT fluorescence subtraction, Peak label and fit, Image capture, smoothing, spectral subtraction etc. 1+6 extended licenses package (1 license for system control ; 6 licenses for processing including one license on system computer). computer (see latest spec), with Win 10 64bit, flat screen 23" TFT screen, mouse and keyboard, I7 processor, 16 GB RAM, 256 GB SSD + 2 TB SATA HD. QC certification and electronic manuals, HORIBA certified referance sample and sample test kit. confocal resolution : ≤ 500nm lateral XY (with 532nm) and test sample Warranty on base unit 2 years as standard (including CCD, ex lasers) NOTE:Requires (1) at least one laser and (2) either manual or motorised XY stage (in remarks column)
UP-SWIFT XS-EmFI	Upgrade of base detector/system to new SWIFT XS. Includes deep cooled EMCCD, Front illuminated CCD, software and triggering options (suited to broad spectral range applications 400nm-1100nm), 1600x200 pix sensor
KIT-532-100	532 nm laser kit including air cooled solid state laser (532 nm/100 mW)., Edge and Bandpass filters set at 532 nm for measurements from 60 cm-1
KIT-638-30	638 nm laser kit including air cooled laser diode (638 nm/30 mW), Edge and Bandpass filters set at 638 nm for measurements from 50 cm^{-1}

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KIT-785-100	785 nm laser kit including air cooled laser diode (785 nm/100 mW), Edge and Bandpass filters set at 785 nm for measurements from 50 cm-1 Note: NIR optimized objectives can be selected to ensure better signal collection efficiency.
Kit-XYZ-PLUS	Full kit for sample positioning. Includes XY motorised stage (X = 75mm, Y = 50mm) and motorised Z device for BX and BXFM microscopes controlled by LabSpec software. XY specifications : repeatability $\leq 1\mu m$; accuracy $\pm 1\mu m$; resolution encoder 50nm (minimum step : 10nm, encoder disabled). Maximum sample weight: 500 g. Z specifications : resolution (minimum step size) = 0.01µm. Includes positioning joystick, external controller, software package and Raman AutoFocus capability. Includes the Standard SWIFT fast confocal imaging - SWIFT FAST Confocal Raman Image generation module. Innovative high speed Raman acquisition mode suited for fast mapping applications
50XVIS	50X visible objective, NA = 0.75, WD = 0.37 mm
KIA	KnowItAll HORIBA Edition: spectral searching and analysis software package.x1 (one) license includes : - HORIBA Raman libraries (>1750 spectra for polymers, inorganics, inks/pigments, semiconductors, and biomaterials) - KnowItAll spectral searching module - KnowItAll database building module to create customized databases - AnalyzeIt functional group module to view candidate functional groups causing a specific Raman peak - One click direct data link between LabSpec and KnowItAllIncludes 1 year maintenance program by Bio-Rad allowing upgrades and support for 1 year from purchase. After 1 year the software remains fully functional and if continuing technical support and upgrades are required further maintenance packages can be purchased directly from Bio-Rad.Includes 60 day free trial to HaveItAll® Raman with >10000 additional spectra. Availability of HaveItAll® databases will stop after 60 days; HORIBA Raman libraries will remain for continued use.
SIDE-OI-PORT-X	Horizontal side exit port for AFM coupling on XploRA Including motorized switching mirror and covered beam path. This port allows access to various AFM coupling options that sit on the left side of the Raman microscope.
	Omegascope Platform
AIST-AFM-RCtrl	**SPM Control for Raman-AFM operation including:**
	SPM Controller: AIST-AI110/300 AIST modular fully digital expandable controller, high speed DSP 300 MHz, USB 2.0 interface, high speed 500 kHz 18-bit ADC, 20 channels, 5 MHz frequency range registration system, 2 lock-in amplifiers with 5 MHz frequency range, 8 digital 32–bit generators 5 MHz frequency range, 0.01 Hz resolution, HV amplifiers -5 ÷ 120v, 2 ppm HV noise. AC, DC Bias Voltage -10 ÷ 10v, 0÷2 MHz frequency range, 7 step motors control, digital outputs for integration with external equipment, analog input/outputs for integration with external equipment, PLL and DFM mode are supported as a standard.

	Software: AIST-SW002 AIST user friendly windows software for SPM, Raman and TERS measurements. Powerful data processing, macro language for user programmable front end interface dialog boxes, scripting language for real time DSP programming, availability to develop custom operation modes in addition to known range of AFM standard modes, including true non-contact mode.
	Additional High Voltage board for AIST scanner: AIST-AI112 3 channel for capacitive sensors and 3 High Voltage amplifiers -5 to 120v, 2 ppm HV noise. D-sub connector This scanner is required for proper TERS operation. Only one objective scanner can be operated at a time.
AIST-SmartSPM	**SmartSPM body and scanner** **AIST motorized approach system: AIST-AP001** Fast and safe approach algorithm. XY sample positioning 5x5mm, positioning resolution 1 um. **AIST-S001 SmartSPM scanner:** AIST-S001 AIST XYZ piezo closed loop scanner with capacitive sensors and flexible guides, scanning range 100x100x15 µm, nonlinearity < 0.05%.
AIST-HE002	**AIST SPM head** (AFM Modes)Top/side optical access for external laser illumination: - Simultaneous top/side optical access for 0.7/0.28 NA Mitutoyo objectives (100x/10x); -Max. top objective 100x, 0.7 NA; -Max. side objective 100x, 0.7 NA;Fully automated laser and photodiode alignment.Infrared laser 1300nm.Registration system noise less than 0.1 nm.AIST Standard Cantilever Holder included
AIST-IO007	**SPM input/output coupling module** AIST Excitation light input-output unit for reflection configuration, including: - videomicroscope for top channel with 6x zoom, LED illuminator and USB CMOS camera, - coarse/fine focusing unit with XY positioner of top objective, - selector for on-axis/side excitation laser path, - turret with 100% mirror, 30/70% beamsplitter and through hole for video channel for conjunction of videomicroscope and on-axis laser, - videomicroscope for side channel with LED illuminator and USB CMOS camera. Microscope is installed on switchable adapter to remove microscope from side laser path when not in use - two USB control units for illuminators of top and side microscopes.
	Microscope Objectives
M10-028	Objective M PLAN APO 10X NA 0.28, working distance 33.5mm, wavelength correction 436-656nm
M100-07-06	Objective M PLAN APO 100X NA 0.7, working distance 6mm, wavelength correction 436-656nm
AIST-OS001-R	**Objective scanner for reflection**: AIST XYZ objective closed loop piezo scanner with capacitive sensors and flexible guides, XYZ scanning range 30x30x15 µm (exact XY range depends on an Objective scanner for reflection: AIST XYZ objective closed loop piezo scanner with capacitive sensors and flexible guides, XYZ scanning range 30x30x15 µm (exact XY range depends on an objective). Requires extra HV board AI112. This scanner is required for proper TERS operation. Only one objective scanner can be operated at a time.
	Probes

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AFM-TIP-NC	15 AFM Tips for non-contact and tapping mode, backside coating
AFM-TIP-COLOC	10 AFM tips for co-localized measurements, non-contact (ACCESS tip), backside coating
	TERS Probes
TERS-AG	5x Set of 6 probes for AFM TERS, silver
AIST-STS001	Set of test samples (AFM molecular resolution and electrical modes; TERS nanoresolution)
	Accessories
AIST-SMB001	AIST SmartSPM mounting base to attach STM or Shear-force probe holders.
	STM operation (requires the Conductive unit)
AIST-STMPH002	AIST STM probe holder compatible with SmartSPM and Combiscope mounting bases SMB001 and CMB001.
STM-TERS-GOLD	5 Gold TERS probes for 633nm excitation for STM and Normal Force operation
	Conductive Unit
AIST-CU001	Conductive unit for low current C-AFM, Low current Kelvin Probe and STM modes. Current range 100fA ÷ 10uA, 3 current ranges (1nA, 100na and 10uA) switchable from program, voltage range -10 ÷ +7V. RMS current noise 60fA for 1nA range. Conductive to Kelvin probe mode switchable from program.
AIST-SCU001	AIST Stand for Conductive AFM unit for use with HE002.
AFM-TIP-C-AFM	15 AFM tips for SKM/KPFM, Conductive AFM, EFM, Spreading resistance, with backside coating
	Others
	Additional computer for control of AFM and Raman on two seperate samples simultaneously
LS6-TR-1	LabSpec 6 package for data processing analysis and display.x1 (one) license for standard LabSpec 6 data processing version:- data processing functions including baseline correction, math, and smoothing/filtering- data analysis functions including peak fitting, map characterization and CLS multivariate fitting- display functions for spectra, images and 3D volumes- compatibility with optional LabSpec 6 plug-in modules (available for purchase) including "LS6-PF ParticleFinder", " LS6-MVA Multivariate Analysis" and "LS6-MW MultiWell".

Fulfilment of minimum technical requirements:

Raman Spectrometer

Parameter name	Required specifications	SPECION, s.r.o. offer
Spectral range	At least from 70 cm^{-1} to 3500 cm^{-1}	Yes, spectral range from 50 cm^{-1} to 4000 cm^{-1}
Spectral resolution for 500-600 nm excitation wavelength	≤ 1.4 cm^{-1}	Yes, spectral resolution for 532 nm = 0,703 cm^{-1}
Spectral resolution for 600-700 nm excitation wavelength	≤ 1.4 cm^{-1}	Yes, spectral resolution for 638 nm = 0,357 cm^{-1}

Spectral resolution for 700-800 nm excitation wavelength	≤ 1.4 cm^{-1}	Yes, spectral resolution for 785 nm = 0,206 cm^{-1}
Excitation wavelengths	At least 3 individual lasers with respective wavelength: 500-600 nm, 600-700nm and 700-800 nm	Yes, three lasers included: 532nm/100mW 638nm/30mW 785nm/100mW
Confocal resolution	≤ 500 nm XY lateral resolution	Yes, confocal resolution ≤ 500 nm XY
Positioning	Automated positioning with ≤ 1 µm repeatability. 50 nm resolution z resolution 10 nm	Yes, motorized stage with: ≤ 1 µm repeatability 50 nm resolution z resolution 10 nm
Fast Mapping	Yes, high performance CCD enabling mapping of ≥ 400 spectra/second	Yes, EMCCD camera with SWIFT XS technology for fast mapping of ≥ 1400 spectra/second
AFM combination	Port for combination with AFM	Yes, included
Optical microscope objectives	At least 10x, 20x, 50x and 100x	Yes, all these objectives are included
Lighting	White light source for Optical analysis	Yes, included
Gratings	At least 4 gratings; 550-650 l/mm, 1000-1500 l/mm, 1500-2000 l/mm and 2300-2500 l/mm	Yes, 4 gratings: 600 l/mm 1200 l/mm 1800 l/mm 2400 l/mm
Laser attenuation	Motorised Filters for laser attenuation, controlled by software	Yes, included
Warranty	≥ 24 months	Yes, 24 months
Auto laser change and alignment	Changing laser wavelengths as an automatic procedure.	Yes, fully automatic

AFM

Parameter name	Required specifications	
Measuring modes	• Contact AFM, • Semi-contact AFM, • Non-contact AFM, • Phase imaging, • Lateral force microscopy, • Force modulation, • Conductive AFM, • Magnetic Force Microscopy, • Kelvin Probe, • Capacitance and electric force microscopy, • Force curve measurements, • Optional STM, • Optional Photocurrent mapping	Yes, all these modes are included with our AFM.
	TERS, Conductivity, tapping and contact topography	Yes, all these modes are included with our AFM.
AFM feedback laser	Alignment motorized and automated	Yes, automated system adjustment (laser to the probe adjustment and signal optimization, scanning mode adjustment, tip engagement with the sample surface, feedback loop adjustment) Full automation will help to get rid of almost any routine operations, save a lot of time and reach the high level of measurement repeatability.
Lateral positioning resolution of the motorized stage	< 1.5 μm	Yes, motorized sample positioning, the positioning resolution is 1μm
Sample scanner resonance	3 kHz or above	Yes, scanner resonance: Resonant frequencies are 7kHz in XY & 15kHz in Z.
Sample scanning range	≥ 90 x 90 x 7 μm	Yes, scanning Range: 100 x 100 x 15 μm
Topographical vertical resolution	≤ 0.5 nm	Yes, Z noise with Z-sensor = <0.1 nm RMS Z noise without Z-sensor = 0.05 nm RMS with HE002 head
XY closed loop noise	≤ 0.5nm	Yes, XY Closed Loop noise: 0.1 nm RMS, 100 Hz bandwidth
Conductive AFM	≤ 10 μA	Yes, conductive AFM unit with Current range 100fA ÷ 10uA; 3 current ranges (1nA, 100na and 10uA) switchable from program.

TERS resolution	≤ 20 nm	Yes, side access is optimized for TERS (routine resolution is 20 nm; <10 nm resolution can be achieved).
Warranty	≥ 24 months	Yes, 24 months
Sample alignment	Tip replacement and sample replacement must not result in a manual re-alignment of Raman laser to tip-apex	Yes, Free access to the tip and to the sample. Optical alignment of the Raman laser to tip apex is maintained during tip or sample replacement.
Spectroscopic alignment	Device to perform spectroscopic laser alignment to the SPM probe must be performed as close as possible to the sample, <10 cm	Yes, XYZ Cloosed loop piezo Objective Scanner for stable long term spectroscopic laser alignment to the SPM probe. This Objective Scanner supports the objective (distance <10cm from the sample). Optimization is done in all directions. Range 30 µm x 30 µm x 15 µm; Resolution: 1 nm.
Sample size	Device must be able to accept samples of at least 20x20x15 mm.	Yes, Sample size: Maximum 50 x 40 mm,15 mm thickness.

Software

Parameter name	**Required specifications**	
Software	For acquisition of Raman and AFM separately and combined. In English	Yes, softwares are provided for using the AFM and Raman simultaneously or independently.
Software abilities	Data acquisition and processing. Calibration, background subtraction, Auto-alignment, surface mapping, stage control, position control for automatic reposition after tip change	Yes, all those functions are supported by the provided software: Data acquisition and processing. Calibration, background subtraction, Auto-alignment, surface mapping, stage control, position control for automatic reposition after tip change
	Must allow control and processing of AFM and Raman simultaneously	Yes, the control of the AFM and the Raman and processing of images can be done simultaneously
	Must allow acquisition of spectral data and SPM signals and visualised spectral intensity images and SPM signal images within the same interface.	Yes, the software allows the acquisition and visualisation of both Raman or Photoluminescence spectral images and SPM images.

Affirmation on Suitability and Quality Performance

„AFM Raman spectrometer"

Economic operator Business Name incl. Legal Form: SPECION, s.r.o.

Registered Office: Praha 4, Budějovická 1998/55, PSČ 140 00

Company Identification No.: 48112836

Authorized Representative: Ing. Alexandr Gába, Managing director

Requirement	Points	Values offered by the bidder
Confocal resolution of Raman	Requested resolution 0.5 μm: 0 Points 0.49-0.45 μm: 1 Point 0.44-0.40 μm: 2 points ≤ 0.39 μm: 3 points	0,500 μm 0 points
Spectral resolution for excitation wavelength 500-600 nm	1.4 cm^{-1} : 0 points 1.39- 1.2 cm^{-1}: 1 point <1.2 cm^{-1}: 2 points	0,703 cm-1 2 points
Spectral resolution for excitation wavelength 600-700 nm	1.4- 1.21 cm^{-1}: 0 points 1.2-1.0 cm^{-1}: 1 point <1.0 cm^{-1}: 2 points	0,357 cm-1 2 points
Spectral resolution for excitation wavelength 700-800 nm	1.4- 1.21 cm^{-1}: 0 points 1.2-1.0 cm^{-1}: 1 point <1.0 cm^{-1}: 2 points	0,026 cm-1 2 points
Spectral range low end	51-70 cm^{-1} : 0 points ≤ 50 cm^{-1} : 1 point	50 cm-1 1 point
Scanning rate (in spectra per second)	400-599 : 0 points 600-799: 1 point 800-999: 2 points ≥1000: 3 points	1400 spectra/second 3 points
Vertical resolution of AFM	0.5 nm: 0 points 0.49-0.4 nm: 1 points 0.39-0.3 nm: 2 points 0.29-0.2 nm: 3 points <0.2 nm: 4 points	<0,1 nm 4 points
Scanning range, AFM	90x90x7 μm: 0 points Between 90x90x7.1 and 90x90x9 μm: 1 points ≥ 90x90x9.1 μm: 2 points	100x100x15 μm 2 points
Response time for service repairs, (excluding non-working days)	72-48.1 hours: 0 points 48-36.1 hours: 1 point 36-24.1 hours: 2 points	24 hours 3 points

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	≤24 hours: 3 points	
Feedback laser diode wavelength	1100 nm : 0 point 1101-1199 nm: 1 point 1200-1299 nm: 2 points ≥1300 nm: 3 points	1 310 nm 3 points
Scanner resonance (Z)	3 kHz: 0 point 3.1-6 kHz: 1 points 6.1-10 kHz: 2 points >10 kHz: 3 points	15 kHz 3 points
XY closed loop noise	0.31-0.5 nm : 0 point 0.11-0.3 nm : 1 point ≤0.1 nm : 2 points	0,1 nm 2 points

In Prague On 01 -11- 2018

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Ing. Alexandr Gába – Managing director SPECION, s.r.o .

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