No. DFSS/12(22)/2023/ 2177
Directorate of Forensic Science Services
Ministry of Home Affairs
Government of India
Block No 9, 8th Floor, CGO Complex
Lodhi Road, New Delhi-110003
Dated: 07/08/2023

Expression of Interest

The Directorate of Forensic Science Services invites Expression Of Interest(EOI) from manufacturer/principal firm or their authorized Indian agent with valid agency certificate for procurement of following items:-

(1) Energy Dispersive X-Ray Fluorescence Spectrometer (ED-XRF)
(Specification as per Annexure-I)

The EOI should contain detailed technical specification along with Brochure of the equipment and its utility for Forensic sample analysis and users list in India. The details of accessories spare part, consumables. Estimated budgetary quotation against each quoted model and last supplied price to Lab/Institution in India if any may be supplied with EOI. Last date for submission of EOI is 23.08.2023 at 3 PM.

The EOI may be addressed to **Director, Central Forensic Science Laboratory, DFSS, DJ-10/1, Action Area-1D, Street No 326, New Town, Kolkata-700160, West Bengal or emailed to dircfslkol@gmail.com.**

No communication in this regard will be entertained after the last date for submission of EOI.

(Yoginder Kumar)
Administrative Officer

Encl: Annexure-I

ANNEXURE-1

Generalised Technical Specification for ED-XRF

Sl.No.	Parameter	Description
1.	Instrument Name	Energy Dispersive – X-Ray Fluorescence (EDXRF) System
2.	Element Detection range	Sodium(11Na) to Uranium (92U) Below Na(11) and above U(92) are also acceptable.
3.	Applications	Non-Destructive analysis of elements in the range Sodium(11Na) to Uranium (92U) of different sample types including Solids, Liquids, pressed and loose powders. The system should hold irregular shaped samples and should be capable for large samples without placing in a sample holder. Capable of spot analysis of sample area of 1mm or more. It should be suitable to analyze various forensic samples like soil, glass, paint, electrical wires, ink, FICN, questioned documents, metals & stones (including precious), GSR element analysis, bullet composition, NDPS substances, post blast/explosive residues, biological materials & fluids, toxic materials /metals etc.
4.	Sample types to be Analysed	Solids, bulk materials, pressed & loose powders, Liquids and Thin films.
5.	X-RAY Tube	a) Air cooled, continuous power 12W to 50W, with Rh/Pd/Ag Target b) X-Ray generator of suitable capacity to excite all elements of range. c) The X-ray tube should preferably be of metal/ceramic insulation.
6.	X-ray Power unit:	a) Voltage: 5 to 50 kV or more, 1 kV step or better b) Current: 1 to 1500 µA or more, 1µA step or better c) Power: 12 to 50 Watts or better
7.	Detector & Resolution	a) Peltier Cooled High Performance FSDD/SDD with resolution less than or equal to 150 eV (preferably @ Mn K–α). b) The detector should be linear to at least 0.2Mcps @5.9Kev without loss of resolution.
8.	Lower Detection Limit	1ppm and up to 100%
9.	Sample Chamber	a) Chamber size: (300(W) × 250(D) × 100(H)mm or more b) The sample chamber should be able to hold irregular shaped samples and should be capable for holding large samples of minimum 25(W) X 20(D) X10(H) cm height without placing

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		in sample holder.
10.	Primary Filters	System with at least 5 or more types of Primary filters to be included as standard for high sensitivity analysis. The filters should be selected automatically through software.
11.	Sample Holders	a) Suitable sample holders for all types of solid, liquid & powder samples for analysis. b) Suitable protection/ design of EDXRF should be provided so as to avoid spillage of any samples (e.g., Loose powder) on detector/ X-Ray tube.
12.	Operating Environment	15 to 35 deg C & 25% to 75% humidity.
13.	Software Requirements	a) Qualitative Analysis: Measurement / analysis software
		b) Quantitative Analysis: Calibration-curve method, Matrix correction, Fundamental Parameter (FP) method, Thin-Film FP method, Background FP method.
		c) BG-FP (Background Fundamental Parameter) Method for calculating the background intensity as theoretical intensity.
		d) Composition Analysis for Small Amount of Sample
		e) Collimator Selection through Software between 1 to 8 mm, selectable. OR e) Spatial resolution from 10 micron to 1 mm or better.
		f) Sample observation through camera CCD/CMOS
		g) Navigation software
		h) Automatic Time Reduction Function (Preferable)
		i) Automatic correction of intensity during analysis of samples with different shape, size, and form
		j) Instrument status monitoring function, analysis results tabulate on function
14.	Device instrument / software & Application software for composition analysis	a) Software with perpetual license for the EDXRF spectrometer should be provided and the validity of the software should be at least 20 years from the date of installation. b) All sample spectra should also be output in XY format and be exportable to .xls or similar. Calibration curves should all be output in XY format with calibration uncertainties. c) The software should also have the following functions like

		Matrix Correction, Drift Correction, Spectrum Display during measurements, Display/Print/Export analysis results, Measurement Parameters setting and Zoom functions. d) Suitable standard less software with monitor sample for screening of unknown materials with fundamental parameter control algorithm, FVG algorithm, elemental overlap correction, intensity-based calculations etc. e) Set of standard samples required for calibration of equipment for standard less feature at site to be arranged by supplier. f) System should be equipped with application software or package for database development through raw spectra to identify origin of various kinds of samples simply by comparing with the stored data.
15.	Sample Turret / Mapping stage	a) Sample Turret -10 or more. OR b) Mapping Stage: 100 mm x 100 mm or better. c) A and B both also acceptable.
16.	Measurement medium	Air and Vacuum/Helium
17.	Automatic X-ray tube ageing function	Should have facility of Automatic X-ray tube ageing function.
18.	Safety provisions for the instrument and operation	The EDXRF should have provisions for switching off X-rays in case of an incorrect command or if the door/lid of EDXRF is opened during operation. The EDXRF should be safe from X-ray radiations emitting out of it and should have NOC/Type Approval from AERB, India.
19.	Display & Data storage and transfer system	a) Suitable configuration computer system, TYPE approved/ ISO or certified by CERTIN/CDAC alongwith auto-duplex Colour Laser printer (glossy A4). b) i7 processor, SSD of 1TB or above, optical drive-super multi drive, 32GB RAM, OS- Windows 10(pro), 64 Bit, full HD 22-inches or higher display monitor, keyboard& optical mouse, MS office with perpetual product key/ licence for all softwares. The processor/OS should be compatible with the system software.
.	Power supply	The EDXRF should work at standard 220-230V, 50Hz input supply.
.	UPS & batteries	Should be provided by the vendor of suitable capacity with the load capacity (10KVA UPS, 150Ah batteries 16 numbers along

		with all accessories) suited for quoted EDXRF and computer system.
22.	Vacuum/Helium Purge System	System should have provision to measure samples in an inert atmosphere. For this Vacuum/ helium purge system should be provided. Also, for Helium purging vendor should provide minimum 2 Helium cylinders with regulator and gas station arrangement.
23.	Accessories to be supplied	a) Hydraulic Press Pellet of capacity from 5 ton to 40 ton to be supplied for making pressed pellet to be analysed with EDXRF system. b) The EDXRF system should be supplied with at least 100 each of sample cups (Type 3517 with & without covers) for analysis of Oil and Powder samples & suitable sample holders for solids/powders with minimum 100 numbers of each type. c) At least 100 pre-cut Mylar film to be supplied with the system for preparation of sample cup for liquid and powder analysis.
23.	Warranty	Minimum 03 years warranty on EDXRF system and all accessories from the data of successful installation and commissioning of the entire system. During warranty periodic at least 02 nos. preventive maintenance and 02 no. break down visits in every year to be made or as and when required. No costs will be borne by purchaser towards these warranty services. All parts to be replaced during warranty or repairs should be done free of cost on DDP basis.
24.	Supply and Installation	To supply EDXRF system & accessories as per scope and installation thereafter will be at the site of respective seven (07) CFSLs locations. The installation & commissioning should be within the stipulated time preferably within 15 days from supply and the charges of installation will be included in the BID.
25.	Training	Extensive and adequate training of not less than five(5) days are to be conducted by the suppliers at the customer site through qualified technical engineers of OEM by OFFLINE mode and as per the customer's satisfaction within fifteen (15) days from the date of installation & commissioning of instrument & accessories. Training certificate should be given. Cost of training will be inclusive in BID.

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26. Additional Terms & Conditions

a) Operational Manual: The firm must supply all standard operating procedures (Soft copy in suitable storage media& hard copies) of the ED-XRF, Windows OS, MS-Office etc., for smooth functioning & usage.

b) Calibration: ED-XRF must have the facility of calibration for its various measurements. The firm must supply all essential manuals, tools &accessories for calibrating the instrument, such as set of calibration standards of requisite levels for accurate measurement of samples traceable to International and National standards with valid calibration certificates from accredited bodies.

c) Annual Maintenance Contract (AMC): The firm must quote yearly rates in INR for AMC (comprehensive & non-comprehensive) of ED-XRF for five(5) years after expiry of warranty period. During AMC period, at least twopreventive and two emergency on-site visits must be included every year and to be quoted accordingly.

d) Consumables: The firm must supply and install requisite consumables/consumable spare parts every year for uninterrupted normal functioning of equipment during the three years warranty period without any extra cost. A list of consumables/ consumable spare parts, schedule of requirement & tentative supply date must be attached along with the details at the time of bidding/participation during the procurement process.

e) Availability of consumables & spare parts: The firm must submit an undertaking or certificate to the effect that all consumables, spare parts, critical components of the offered equipment shall be made available and supplied for a period of at least **ten years** from the date of successful installation &commissioning. A list of those items shall also be attached at the time of bidding/procurement.

f) Prerequisites for installation & commissioning: The firm should inspect the user's site and submit a list of all pre-requisites (if any)along with the details to keep the site ready for installation & commissioning of offered equipment before supply.

g) Demonstration of IQ, OQ & PQ: The firm must demonstrate the Installation Qualifications (IQ), Operational Qualifications (OQ) and Performance Qualifications (PQ) of the offered make & model of the equipment to the fullest specifications. The firm must attach relevant documents to prove that the offered make & model of the equipment satisfy the requisite specifications. Deviations if any shall be brought to the notice of buyer immediately.

h) Response time to attend complaint: The firm must ensure that all complaints to be attended within 72 hours and shall not exceed 07 days in any instance to restore normal working condition of the equipment. Email IDs, name & contact numbers of concerned technical/service engineers shall be provided to the user.

i) Critical Components: The life of ED-XRF equipment shall be at least 10 years for its regular use. Any critical component/spare part which may be required during the period of 10 years must be available & specified with time schedule of replacement. A list of such critical components with full specifications, part no, model no, quantity, price etc must be attached & submitted.

j) Quoted model should be launched in nearest time to get latest technology. Any model older than 5 years will not be acceptable due to continuously change in technology in market. A latest model and latest features must be quoted.

k) The Bidders or any of its Director/Board members should not have been debarred/ blacklisted by any Govt/ semi Govt organization/ statutory body during last three years.

l) The manufacturer should have their direct office in India for after sales support and proper setup to support customer for their applications, whenever required.

m) The company should have customer support centre lab in India to support customer for demonstration, application, sample testing etc whenever required.

n) Comparison Chart: The firm shall submit detailed comparison chart of buyer's specifications and suppliers offered make/model with specifications in a separate column mentioning '**complied**' or '**not complied**'. If '**not complied**', then proof in the form of real sample analysis report with measured values or any authentic document/evidence should be supplied by the bidder to consider their claim for qualifying the specification. However, the decision of competent authority shall be deemed to be final.

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Dr.P.Paul Ramesh
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