ANNEXURE – I

Technical Specifications of Acoustic Emission Sensors and set up

1.0 Bidder Eligibility Criteria:

I	**Bidder Eligibility Criteria-I (Public Procurement – Preference to Make in India)**	**Class I / Class II**	**Local Content value**	**Reference, Page No.**
I	Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16th September 2020 and other subsequent orders issued therein.			
2.0	**Bidder Eligibility Criteria-II**	**Complied/Not Complied**	**Reference Page No.**	**Remarks, If any**
1	The supplier/vendor must be an original equipment manufacturer or an authorized agent/dealer/seller of the item. The vendor should have supplied at least 5 similar units at other IITs or NITs, or national laboratories and research centres (DRDO/CSIR/BARC/IGCAR), or R&D centres of reputed multinational companies, or globally recognized universities, in the last 5 years. PO copy, or performance certificate, along with contact details (for these organizations) needs to be submitted.			

3.0 Technical Compliance:

Equipment feature:

AE set-up comprising of AE data acquisition system and AE sensors must be able to capture and store the real-time AE signal time and frequency data of the specimen/structure under loading.

Sl.No.	**Specifications**	**Feature**	**Complied/Not Complied**	**Reference Page No.**
Technical Specifications:				
1.	**AE acquisition channel requirements**	Minimum 8 AE acquisition channels with the provision for expansion in the future.		
2.		Minimum 8 waveforms acquisition/transient recorder channels with the provision for expansion in the future.		
3.		Minimum 8 number of parametric acquisition channels		
4.	**AE board specifications & analog signal processing**	Bus architecture: signal processing board must have been built over PCI express bus architecture for maximum acquisition speed.		
5.		Board integration: 8-channels for AE time parameters, 8-channels for waveform acquisition and minimum 4 channels for other output parameter [e.g. temperature, pressure]		

		acquisition should be built in on single PCI express board to make system extremely portable.		
6.		Analog bandwidth (frequency response): 1kHz-1mHz		
7.		Analog filters options in software: Analog high pass computer selectable 2nd order active butterworth filters: 1 kHz, 5 MHz, 20 kHz, 100 kHz; Analog low pass computer selectable 2nd order active butterworth filters:100 kHz, 400 kHz, 1MHZ		
8.		Bus architecture: signal processing board must have been built over PCI express bus architecture for maximum acquisition speed.		
9.	**Digital Signal Processing**	Analog to Digital Converter (ADC) type: Minimum 16-bit with a sample rate of minimum 10 msps (mega samples per second)		
10.		Digital data processing: minimum 18 bit with a sample rate of 10 msps		
11.		AE time parameters: Time of first threshold crossing, Time of the test, Pac-energy, Signal strength, True energy, Peak amplitude, Rise time, Duration, Counts, Counts to peak, Root Mean Square (RMS), Average signal level (ASL), Threshold, Parametric, Average frequency		
12.		Extracted AE frequency-based features: frequency centroid, peak frequency		
13.	**Desirable parameterics inputs**	Analog inputs:Minimum 04 per board		
14.		Input range:+/- 10 volts on all channels		
15.		Resolution: 16-bit		
16.		Provide quotation for additional software licenses (in case of lost dongle, credentials etc.)		
17.	**Monitoring system**	Minimum channel capacity of 32 PC BUS: PCI Express, Passive backplane computer PROCESSOR: Intel Core i7 processor RAM: 16 GB MINIMUM HD: 1TB SSD OS: WIN-10, Keyboard, Mouse, and 24” LED Monitor		
18.		Software must perform simultaneous AE hits/events & waveform capture.		
19.		Software should include linear & zonal location capabilities, Wavelet analysis, Dispersion curves, Spectrogram & short time fft		

20.	**Real-time data acquisition & analysis software**	Software should contain both 2-D planar and 3-D location modules		
21.	**AE sensors and accessories**	Minimum 9 AE sensors with integral preamplifier is required. Sensors should have the following features: Resonant frequency: 50 to 60 khz; Operational frequency: 30khz – 100 khz; Peak sensitivity ref v/ (m/s): 105 db minimum; Temp range: -35 to 80 deg. C; Dimensions: diameter less than 30 mm; Connector: SMA or BNC		
22.		Power/signal cables: Minimum 9 cables of 10 m in length with BNC/SMA connectors		
23.		Magnetic hold downs for AE sensors for the number of sensors specified.		
24.		Printed manual for AE system and software.		

25.	**Warranty:**	Minimum 2 years.		
26.		Optional Quote-1: Additional 2 years warranty may be quoted separately		
27.		Optional Quote-2: AMC beyond 2 Years Warranty period		
28.		(Optional quotes will not be taken up for price bid comparison)		
Other Terms and Conditions				
1.	The system should be delivered within 14-16 weeks from the opening of the letter of credit or issue of the purchase order, whichever is later.			
2.	Costs and related information should be given only in the financial bid.			
3.	The cost should include all delivery costs up to IIT Madras.			
4.	The warranty shall commence only from the date of equipment installation at IITM.			
5.	Prices quoted should be valid for at least 120 days.			
6.	Item-wise break up of cost should be provided in the commercial bid for optional items and accessories.			
7.	IIT Madras reserves the right to exclude some items from the purchase. As part of tender technical evaluation, IIT Madras will approach the past end users for feedback and in case of any adverse feedback the bidder will be technically disqualified.			
8.	The system should be installed and commissioned with no additional cost.			
9.	Training at IIT Madras should be provided with no additional cost.			
10.	System manual should be provided in CD or pen drive form.			
11.	Services and spares should be necessarily available within India.			

Technical Bid should comprise of the following		Complied/Not Complied	Reference Page No.
1.	Detailed Technical brochure		
2.	Detailed technical write up explaining how each of the Technical Specifications are complied with, indicating the location in the brochure		
3.	The vendor should guarantee round the clock technical support not only during the warranty period but even beyond through an annual maintenance contract. Demonstration of having provided such satisfactory technical support to customers shall be enclosed with the technical bid.		
4.	The manufacturer must have a well-qualified technical support team		

(Note: It is mandatory for the bidders to provide the compliance statement in tabular column format along with catalogue page number (comply/not comply) for the Above points with document proof as required. Failing which bidders will be technically disqualified)